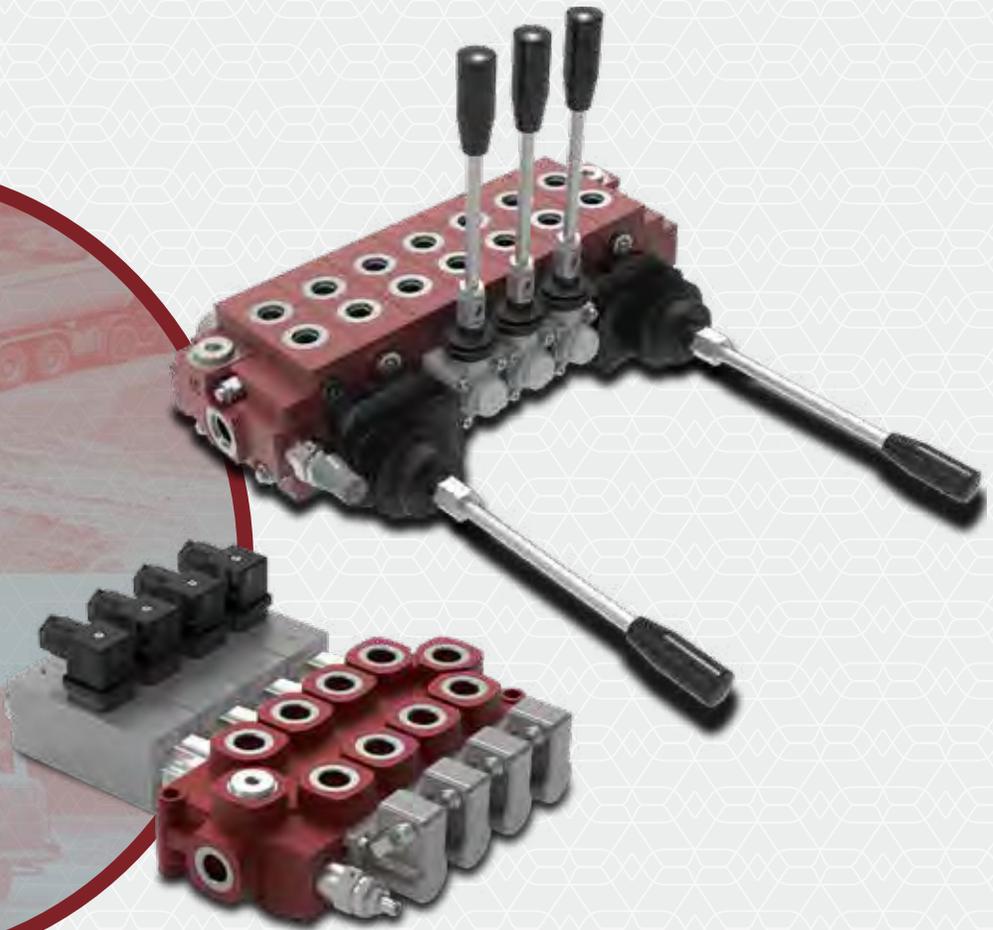
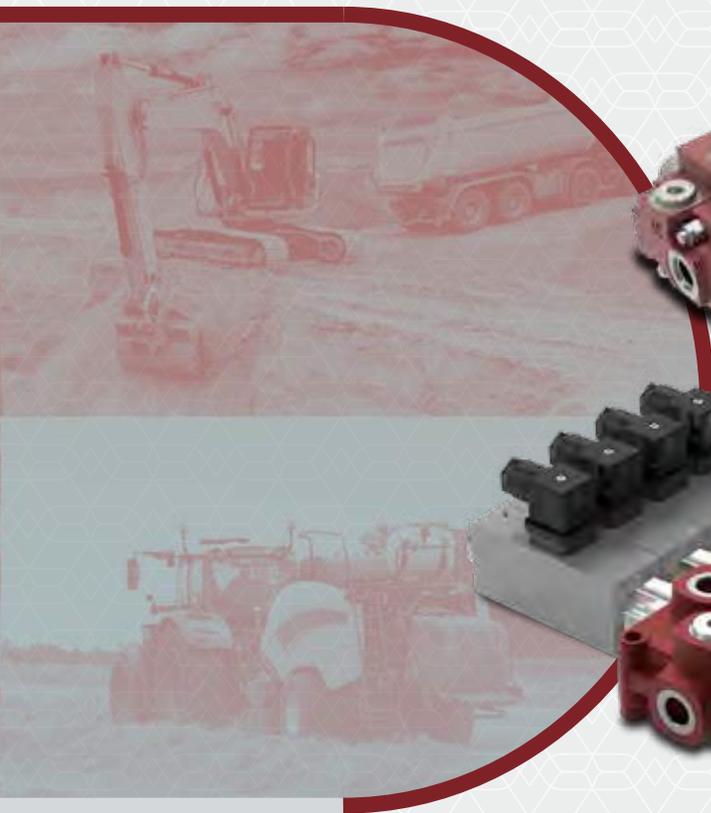


Monoblock and Sectional control valves range
Q series and GSV50



Features

Simple, compact and heavy duty designed monoblock/sectional valves from 1 to 10 sections

- Available with parallel, tandem or series circuit.
- For open and closed center hydraulic systems, optional carry-over port.
- Working sections with and without port valves arrangement.
- Available with manual, pneumatic, electropneumatic, hydraulic, direct solenoid and electrohydraulic on-off controls.

Additional information

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

WARNING!

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

WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN
INCORRECT USE OF THE PRODUCT.

5th edition April 2025

Content**Monoblock directional control valves**

- **Q35** page 5
- **Q25 - Q45** page 19
- **Q75 - Q95** page 51

Sectional directional control valves

- **Q30** page 77
- **GSV50** page 125
- **Q80** page 169
- **Q130** page 207

- **Accessories**

- Coils and connectors page 243

- **Installation and Maintenance**

- Main rules page 246





Q35

Monoblock directional valve

- Simple, compact and heavy duty designed monoblock valve
- Only one section for open center hydraulic systems
- Only mechanical controls available

Working conditions

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

Nominal flow rating	40 l/min - (10.6 Us gpm)	
Max. pressure	300 bar (4300 psi)	
Max. back pressure on outlet T port (*)	25 bar (360 psi)	
Number sections	1	
Internal leakage A(B)⇒T	$\Delta p = 100 \text{ bar (1450 psi)}$	5 cm ³ /min (0.30 in ³ /min)
Fluid	Mineral oil	
Fluid temperature	with NBR (BUNA-N) seals	from -30 °C to 80 °C - from -22 °F to 176 °F
Viscosity	operating range	from 10 to 400 mm ² /s - from 10 to 400 cSt
Max. contamination level	16/14/12 - ISO 4406 - NAS1638 class 6	
Ambient temperature	from -20 °C to 50 °C - from -4 °F to 122 °F	

NOTE - For different conditions please contact our Sales Department.

(*): On request max back pressure allowable is 180 bar (2610 psi)

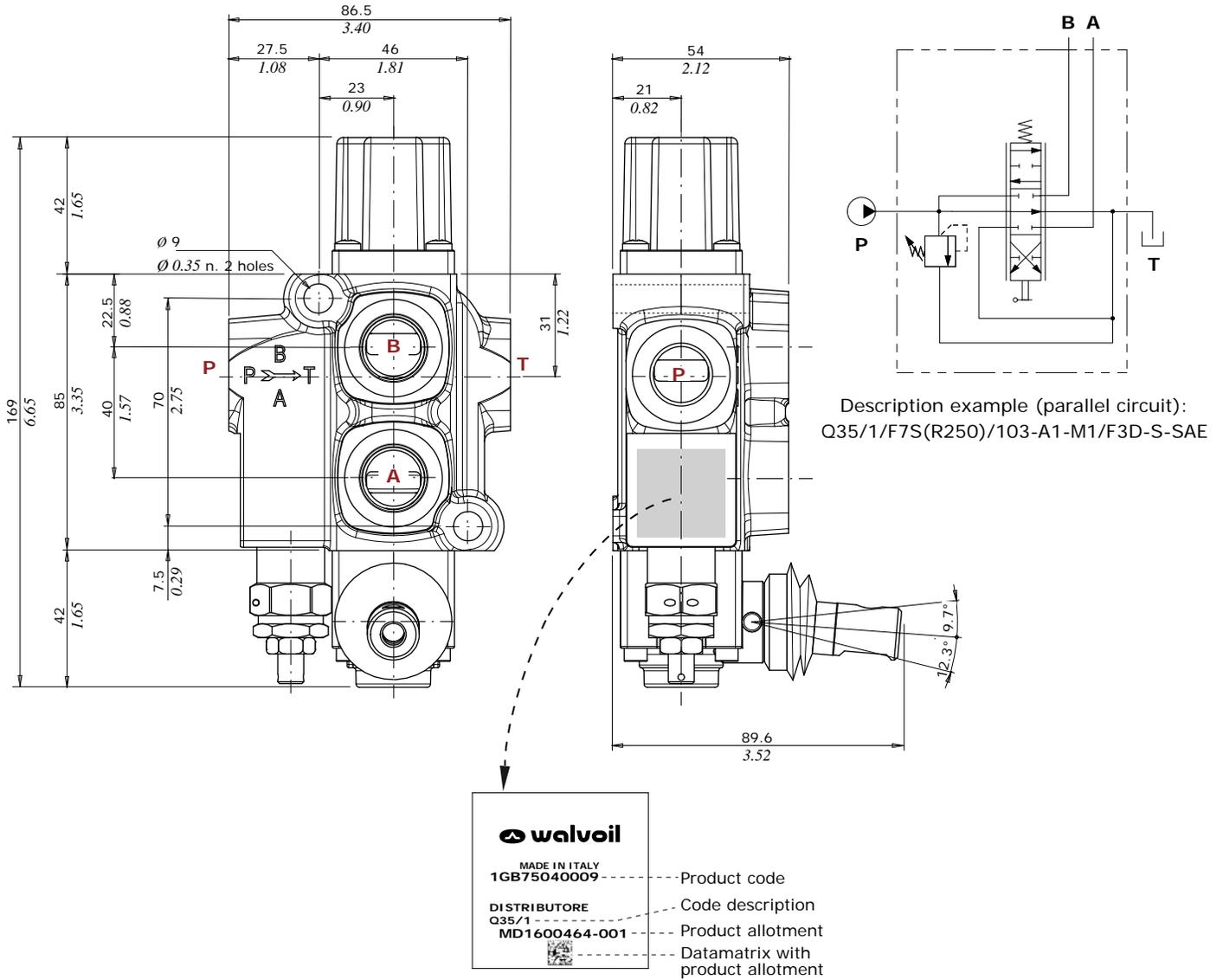
REFERENCE STANDARD

		BSP	UN-UNF
THREAD ACCORDING TO		ISO 228/1	ISO 263
		BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO	1179	11926
	SAE		J11926
	DIN	3852-2 shape X or Y	

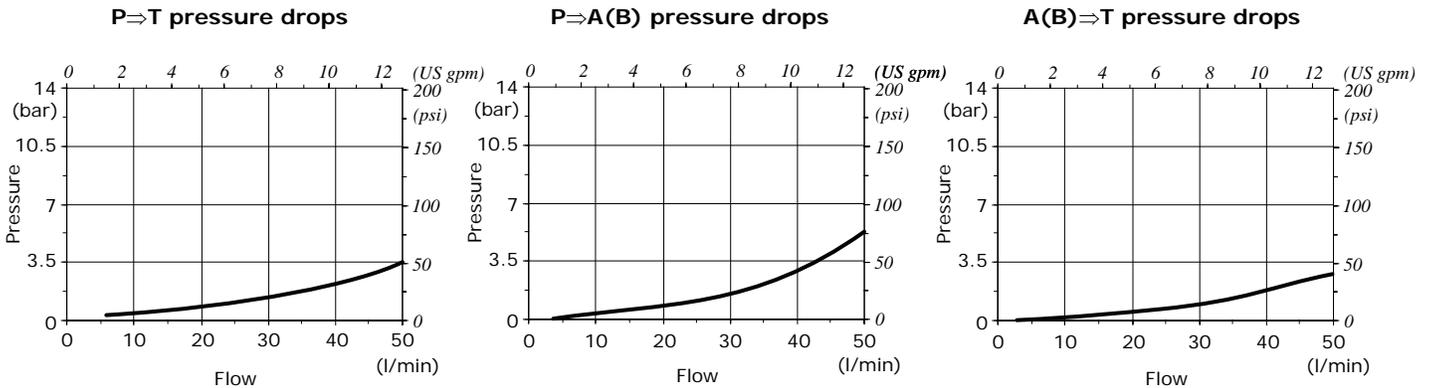
PORT THREADING

PORTS	BSP	UN-UNF
P Inlet	G 3/8	3/4-16 (SAE 8)
A and B ports	G 3/8	3/4-16 (SAE 8)
T Outlet	G 3/8	3/4-16 (SAE 8)

Dimensional data and hydraulic circuit



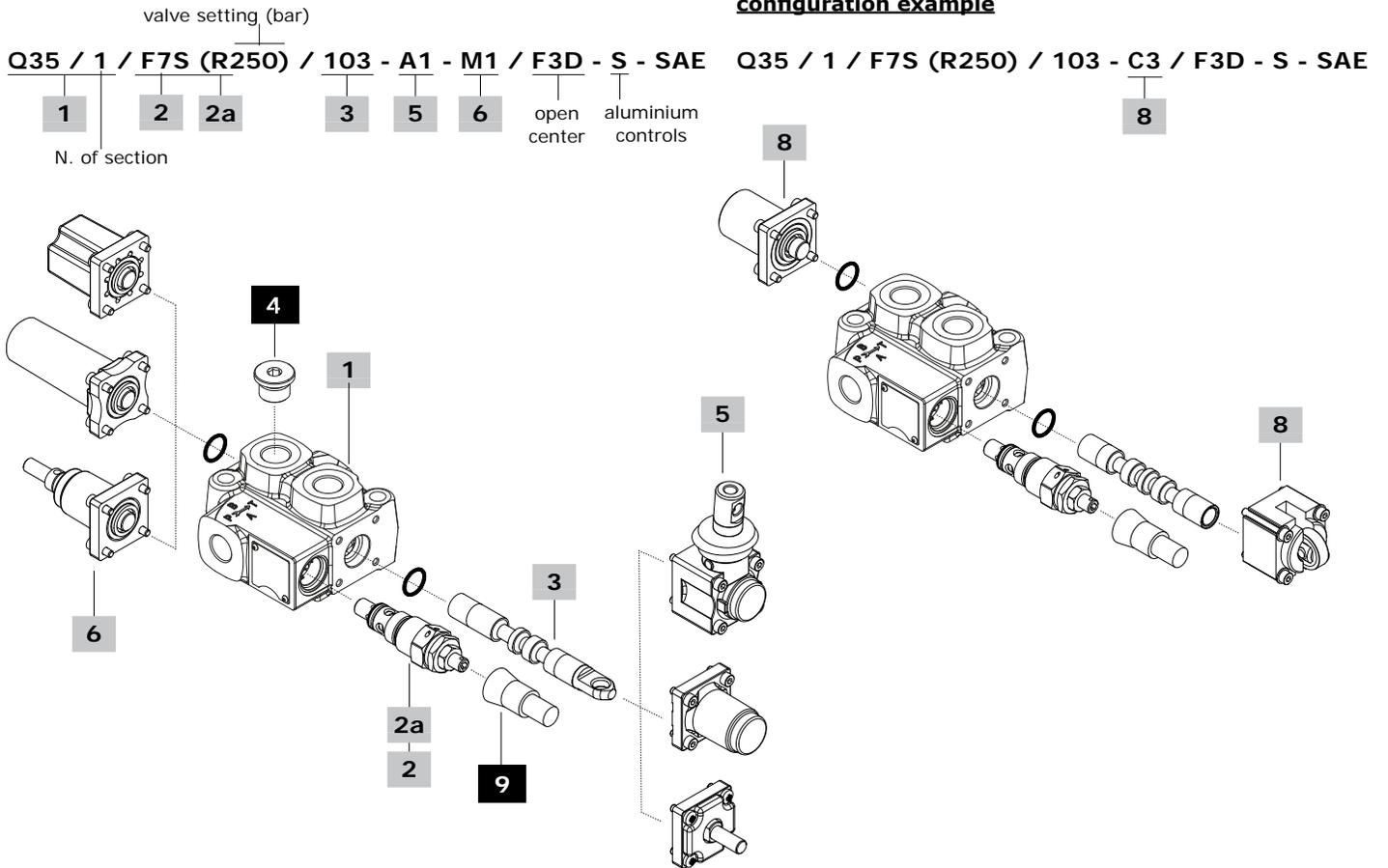
Performance data



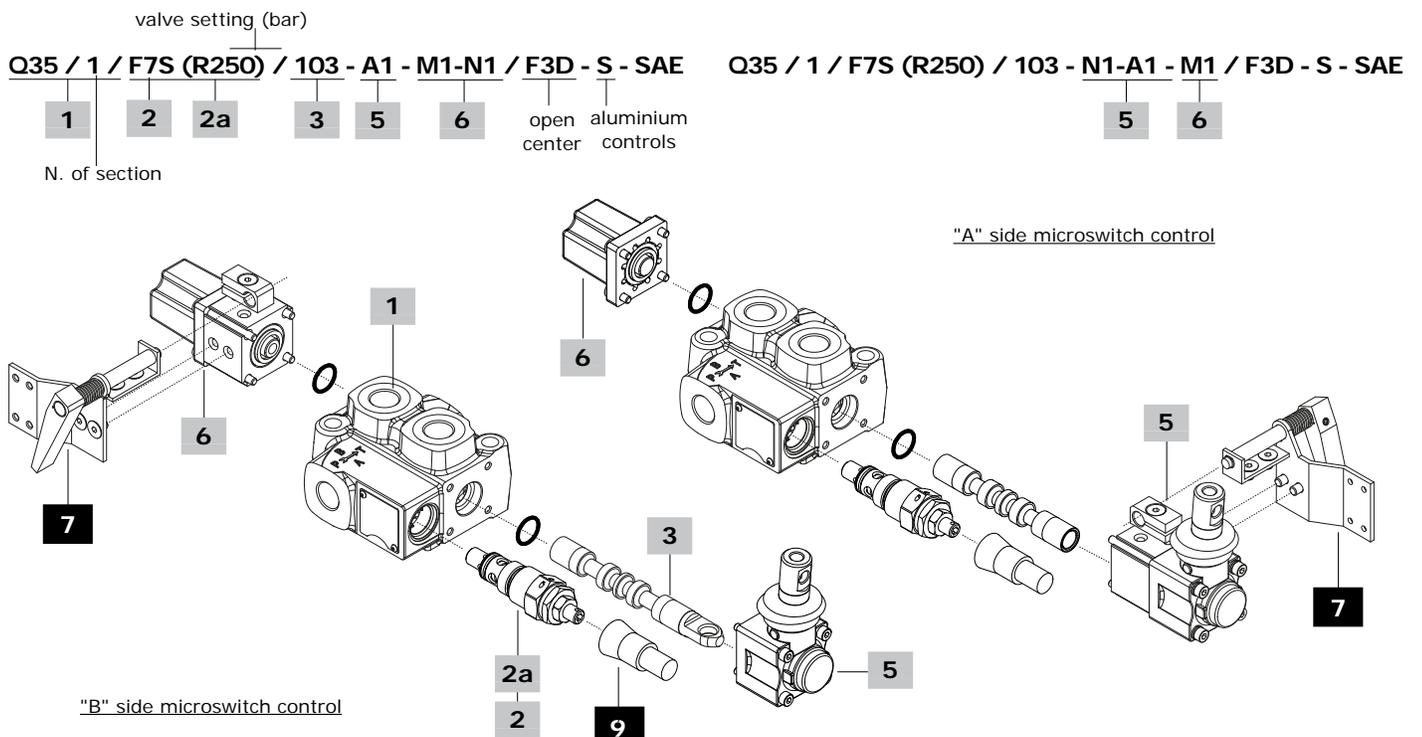
NOTE: Drawings and dimensions are referred to a UN-UNF threading configuration.

Mechanical control valve configuration example

C2/C3 complete mechanical controls valve configuration example



Microswitch control valve configuration example



Parts ordering codes

1 Body kit*

TYPE	CODE	DESCRIPTION
Q35/1-SAE	5KC0600129518	1 section

2 Inlet configuration* page 9

TYPE	DESCRIPTION
F7S-SAE	With pressure relief valve
F8S-SAE	Without valves (pressure relief valve plugged port)

2a Main pressure relief valve page 9

TYPE: B	CODE: 700035205000000
DESCRIPTION:	VLP35S valve, setting range 10-100 bar (145-1450 psi)
TYPE: N	CODE: 700035105000000
DESCRIPTION:	VLP35S valve, setting range 101-200 bar (1460-2900 psi)
TYPE: R	CODE: 700035305000000
DESCRIPTION:	VLP35S valve, setting range 201-380 bar (2910-5500 psi)
TYPE: -	CODE: 060002788899
DESCRIPTION:	Without valves (pressure relief valve plugged port)

3 Spool page 10

TYPE	CODE	DESCRIPTION
Standard spools		
103	KR35103	Double acting, A and B closed in neutral pos.
	KR35103N	As previous one, negative overlap
111	KR35111	Double acting, A and B to tank in neutral pos.
101	KR35101-102	Single acting on port A. SAE8 plug is required, see #4
102	KR35101-102	Single acting on port B. SAE8 plug is required, see #4

Special spools for cam, microswitch controls and other leverless controls

103	3CUG2800600	Double acting, A and B closed in neutral pos.
111	3CUG2807300	Double acting, A and B to tank in neutral pos.

4 Plug for single acting spool*

TYPE	CODE	DESCRIPTION
-	255008	SAE8 plug

5 A side control page 11

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	03600A1-A2	M8 thread plastic lever box
A2	03600A1-A2	As A1 type, with lever box rotated 180°
A1/10	03610A1-A2/10	M8 thread aluminium lever box
A2/10	03610A1-A2/10	As A1/10 type, with lever box rotated 180°
A1/PM	03610A1-A2/PM	M10 thread aluminium lever box
A2/PM	03610A1-A2/PM	As A1/PM type, with lever box rotated 180°
A1/PMP	03610A1-A2/PMP	M10 thread plastic lever box
A2/PMP	03610A1-A2/PMP	As A1/PMP type, with lever box rotated 180°

With safety lever control:

A1/S⁽¹⁾	03624A1-A2/S	M8 thread aluminium lever box
A2/S⁽¹⁾	03624A1-A2/S	As A1/S type, with lever box rotated 180°

Without lever control:

A8	03622A8/03	Flexible cable control arrangement
-----------	------------	------------------------------------

For types 103 and 111 special spoolsWith spool position microswitch:

Note: To complete the control you must use the assembly kit at #7

N1-A1	03641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
N1A-A1	03642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	03643N1BA1/A2L	Micro operation in pos. 2, with lever box
N1-A3	03648N1-A3L	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	03648N1A-A3L	Micro operation in pos. 1, without lever with cap
N1B-A3	03648N1B-A3L	Micro operation in pos. 2, without lever with cap

5 A side control (cont.) page 11

TYPE	CODE	DESCRIPTION
For types 103 and 111 special spools		
<u>Without lever control:</u>		
A3	03614A3	Without lever, with cap
	03614A3/03	As previous one, with aluminium cap
A4	03617A4	M8 male thread external pin with flange
	03617A4/03	As previous one, with aluminium flange
A5⁽²⁾	03619A5	Flange with spherical spool end

6 B side control page 15

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	03730M1	3 pos., spring return in neutral position
	03730M1/03	As previous one, with aluminium cap
M1-U1	03701M1-U1	As M1 type, with M8 male thread external pin
M2	03732M2	2 pos. (0-1), spring return in neutral position
	03732M2/03	As previous one, with aluminium cap
M2-U1	03702M2-U1	As M2 type, with M8 male thread external pin
M3	03733M3	2 pos. (0-2), spring return in neutral position
	03733M3/03	As previous one, with aluminium cap
M3-U1	03703M3-U1	As M3 type, with M8 male thread external pin
M4-U1	03704M4-U11-2	2 pos. (1-2), spring return in pos. 1, with M8 male thread external pin

With flexible cable control arrangement:

M1-U2	03715M1-U2	3 pos., spring return in neutral position
M2-U2	03716M2-U2	2 pos. (0-1), spring return in neutral position

With detent:

R1	03741R1	3 pos., detent in position 1
	03741R1/03	As previous one, with aluminium cap
R2	03742R2	3 pos., detent in position 2
	03742R2/03	As previous one, with aluminium cap
R3	03743R3	3 pos., detent in all position
	03743R3/03	As previous one, with aluminium cap

With spool position microswitch:

Note: To complete the control is necessary to combine at #7 the assembly kit

M1-N1	03766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
M1-N1A	03767M1-N1AL	As M1-N1 type, micro operation in pos. 1
M1-N1B	03768M1-N1BL	As M1-N1 type, micro operation in pos. 2
M2-N1	03769M2-N1L	2 pos. (0-1), spring return in neutral position
M3-N1	03772M3-N1L	2 pos. (0-2), spring return in neutral position

7 Microswitch assembling kit

CODE	DESCRIPTION
03650N1-01	Kit for 1 section

8 Complete controls A+B sides page 18

TYPE	CODE	DESCRIPTION
For types 103 and 111 special spools		
C2	03792C2-C3	Cam control from position 1 to 2
C3	03792C2-C3	Cam control from position 2 to 1

9 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

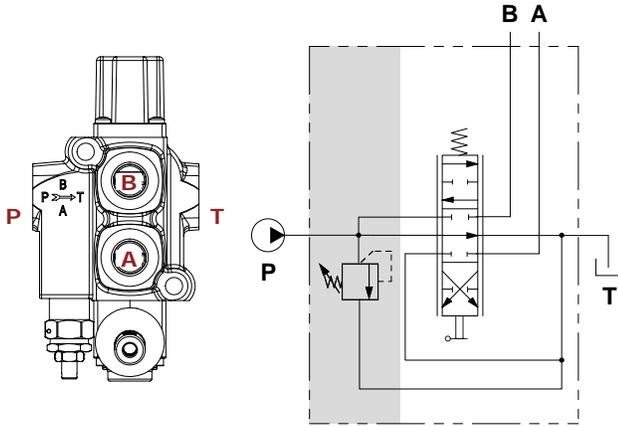
(*): Codes are referred to **UN-UNF** thread

(!): Always complete with lever knob

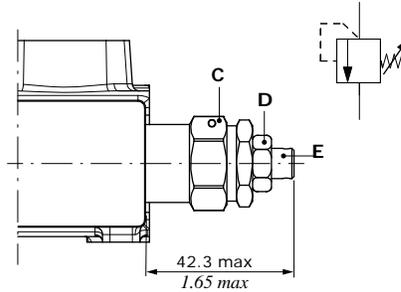
(?): To be assembled only with M4 control

Main pressure relief valve

F7S-SAE configuration
With pressure relief valve



Main pressure relief valve

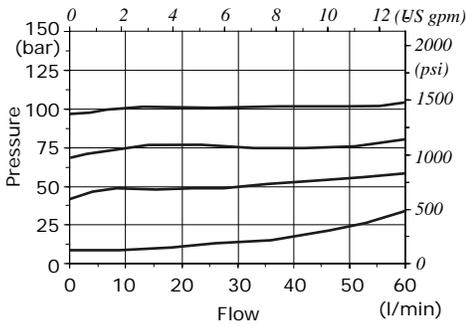


Wrenches and tightening torques

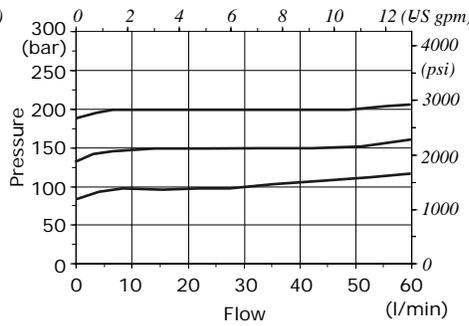
- C = wrench 22 - 42 Nm (30.9 lbft)
- D = wrench 13 - 24 Nm (17.7 lbft)
- E = allen wrench 4

Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

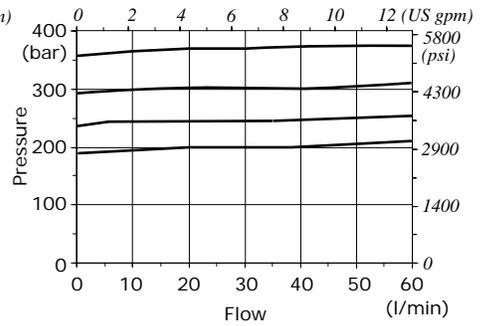
Setting example (B type spring)



Setting example (N type spring)

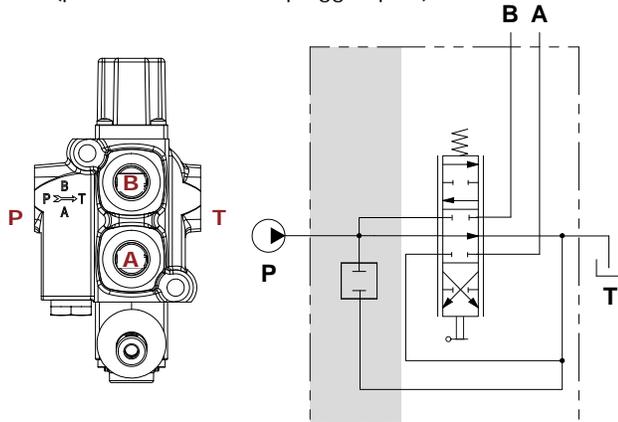


Setting example (R type spring)

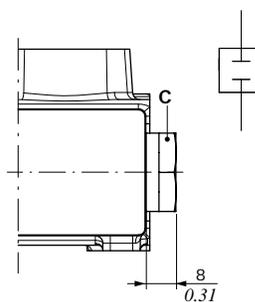


F8S-SAE configuration

Without valves
(pressure relief valve plugged port)



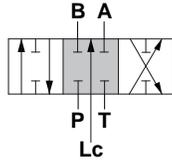
Relief valve blanking plug



Spool

103 type
A and B closed
in neutral position

2 0 1

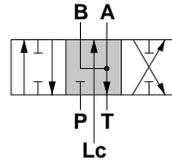


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

111 type
A and B to tank
in neutral position

2 0 1

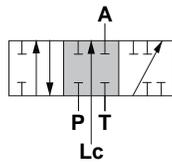


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

101 type
Single acting on A,
B plugged

2 0 1

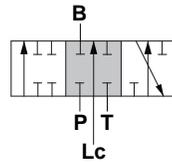


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

102 type
Single acting on B,
A plugged

2 0 1



Stroke

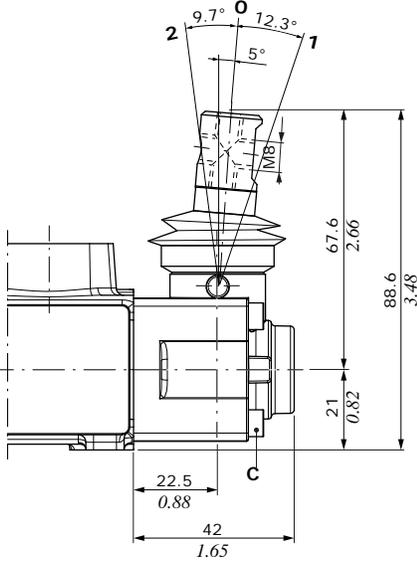
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

A side controls

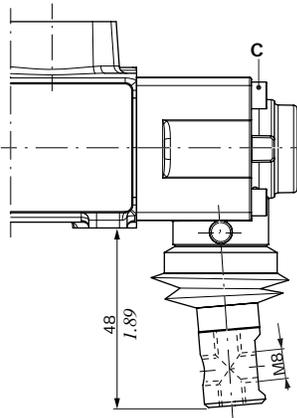
Mechanical controls

With lever control

A1 type
M8 thread plastic lever box

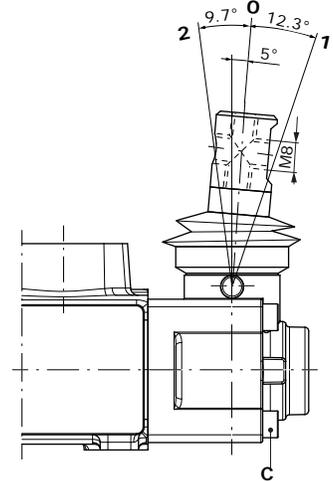


A2 type
As A1 type, rotated 180°



A1/10 type
M8 thread aluminium lever box.
Dimensions are the same of A1 type

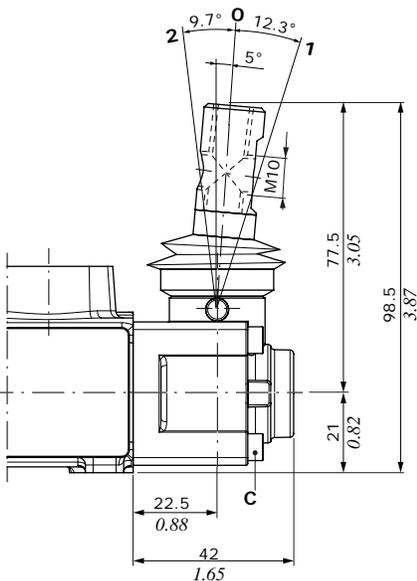
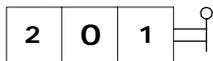
A2/10 type
As A1/10 type, rotated 180°



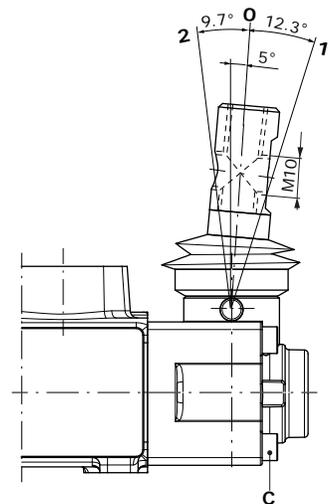
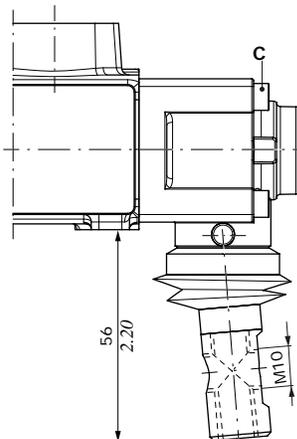
A1/PM type
M10 thread plastic lever box.
Dimensions are the same of A1/PM type

A2/PM type
As A1/PM type, rotated 180°

A1/PM type
M10 thread aluminium lever box



A2/PM type
As A1/PM type, rotated 180°



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf)

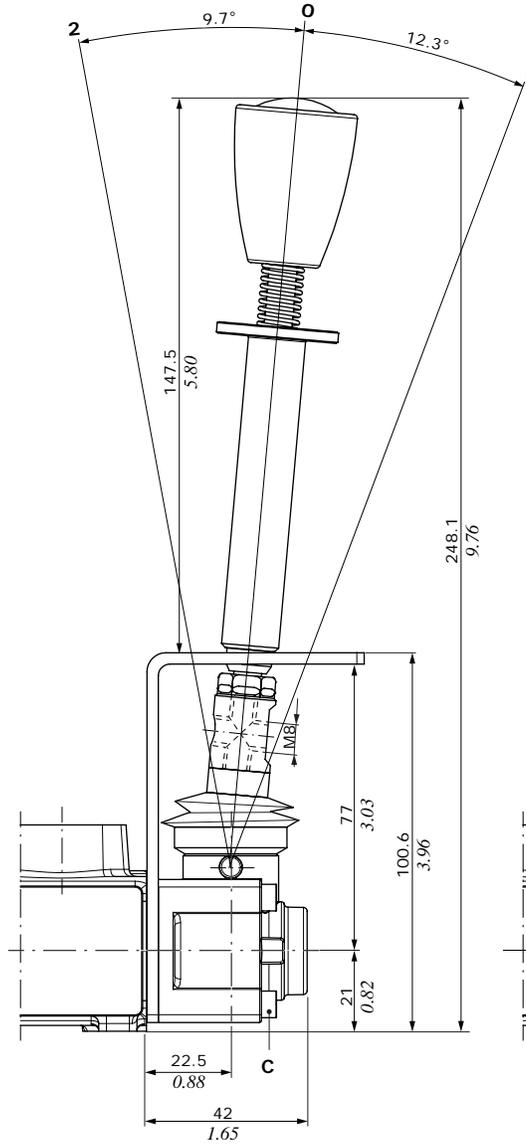
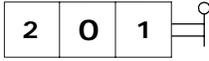
A side controls

Mechanical controls

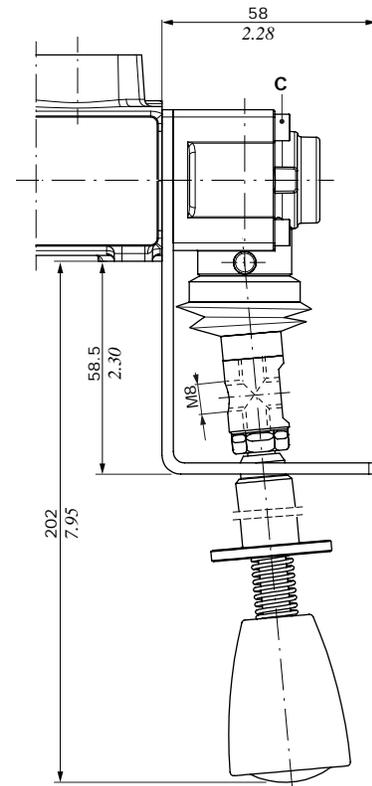
With safety lever control

A1/S type

M8 thread, aluminium lever box



A2/S type
As A1/S type, rotated 180°



Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbf)

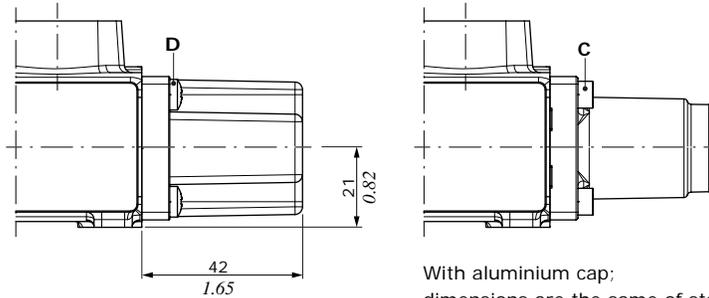
Mechanical controls

Without lever control

A3 type

With cap.

Available with aluminium cap

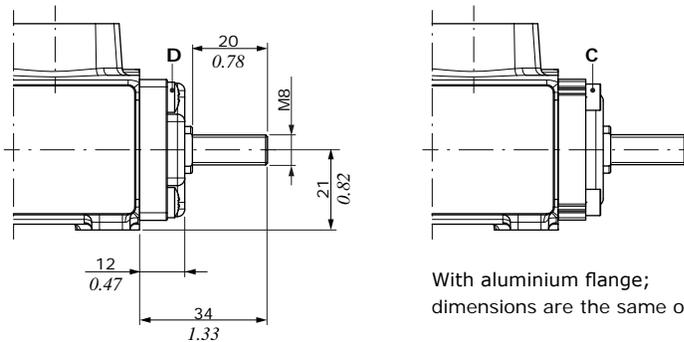


With aluminium cap;
dimensions are the same of standard type

A4 type

M8 male thread external pin with flange.

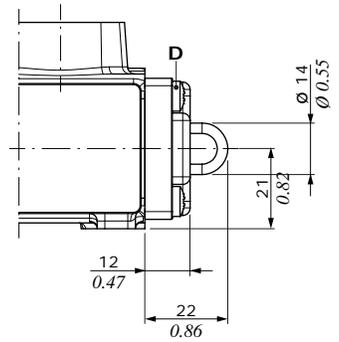
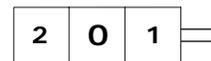
Available with aluminium flange



With aluminium flange;
dimensions are the same of standard type

A5 type

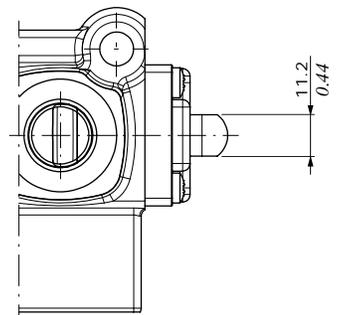
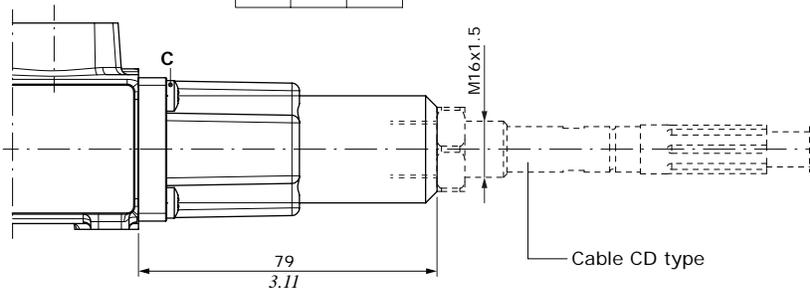
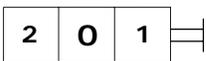
Flange with spherical pool end



With flexible cable control arrangement

A8 type

With flexible cable control arrangement



Wrenches and tightening torques

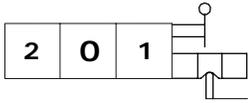
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)

A side controls

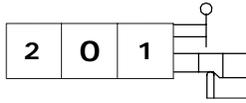
Spool position microswitch

With lever control

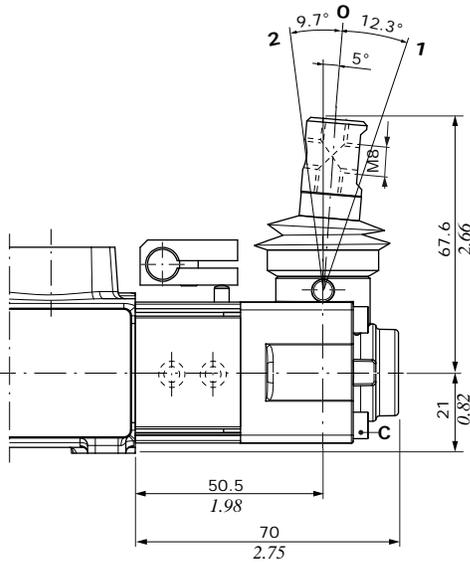
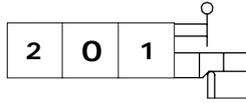
N1-A1 type
Micro operation
in position 1 and 2



N1A-A1 type
Micro operation in
position 1



N1B-A1 type
Micro operation in
position 2

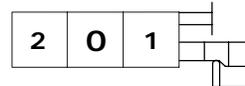


Without lever control, with cap

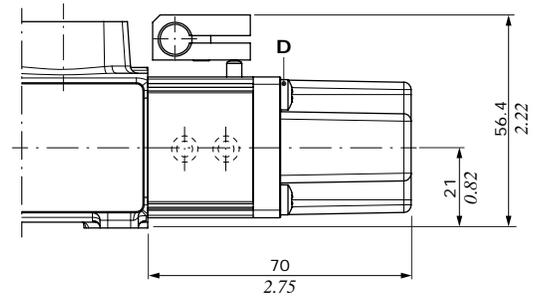
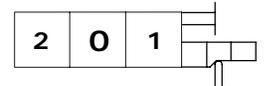
N1-A3 type
Micro operation
in position 1 and 2



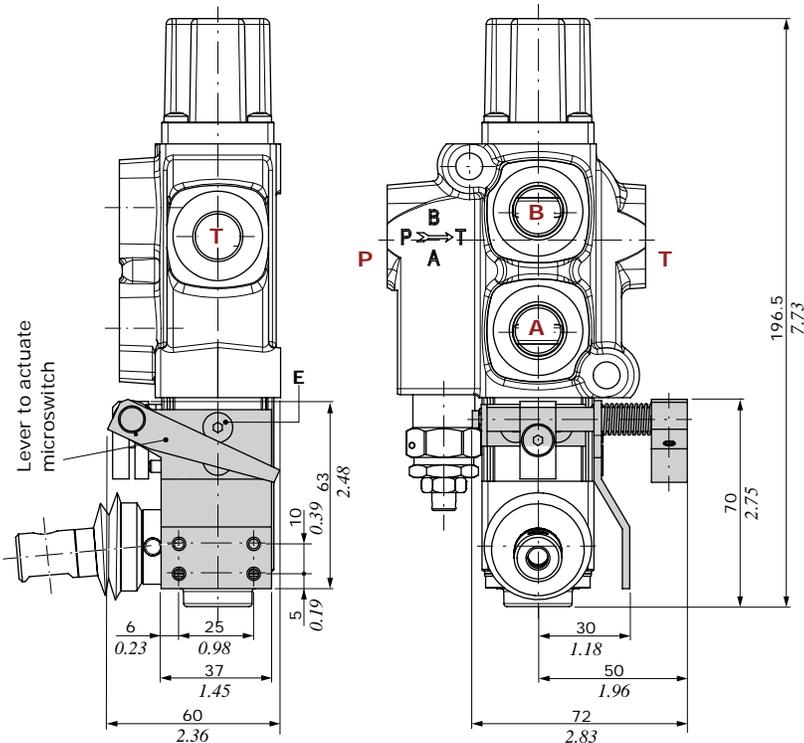
N1A-A3 type
Micro operation in
position 1



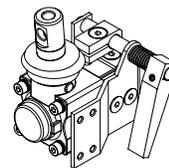
N1B-A3 type
Micro operation in
position 2



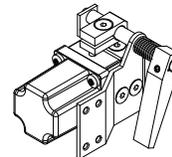
Microswitch assembly kit for 1 working section (N1-A1 type)



with lever box



with cap



Wrenches and tightening torques

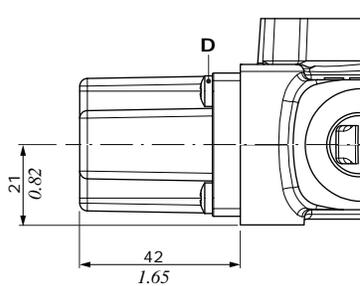
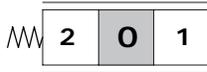
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Mechanical controls

With spring return control

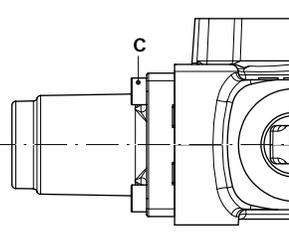
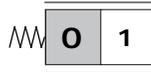
M1 type

3 position, spring return in neutral position.
Available with aluminium cap



M2 type

2 position (0-1), spring return in neutral position.
Available with aluminium cap



With aluminium cap; dimensions are the same of standard type

M3 type

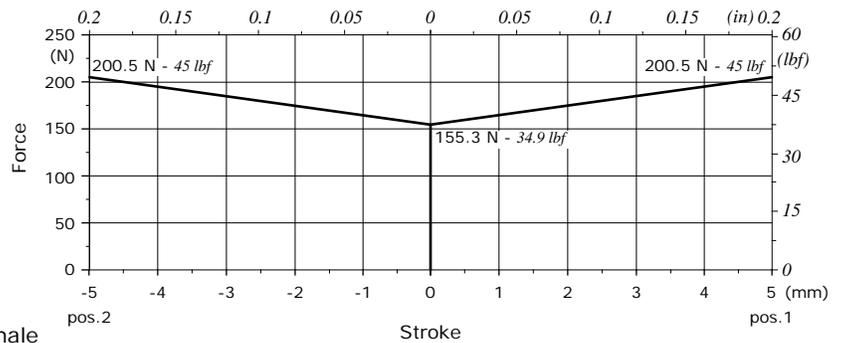
2 position (0-2), spring return in neutral position.
Available with aluminium cap



Wrenches and tightening torques

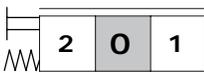
C = allen wrench 3 - 3 Nm (2.2 lbf)
D = cross-head - 3 Nm (2.2 lbf)

M1 control type - Force vs. Stroke diagram



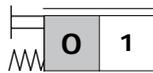
M1/U1 type

As M1 type, with M8 male thread external pin



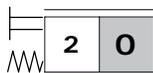
M2/U1 type

As M2 type, with M8 male thread external pin



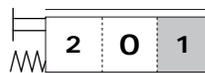
M3/U1 type

As M3 type, with M8 male thread external pin



M4/U1 type

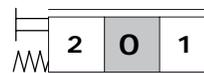
2 position (1-2), spring return in pos. 1, with M8 male thread external pin



With flexible cable control arrangement

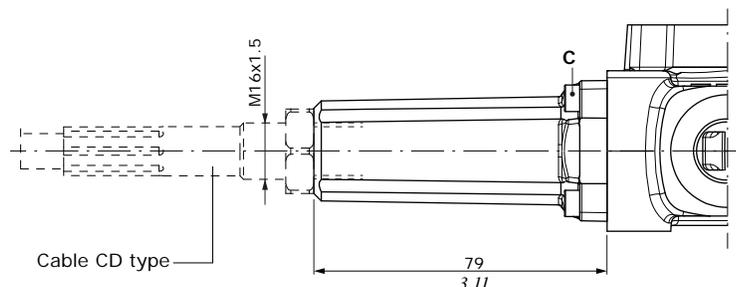
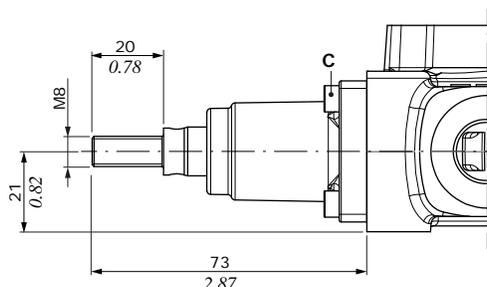
M1/U2 type

3 position, spring return in neutral position



M2/U2 type

2 position (0-1), spring return in neutral position



B side controls

Mechanical controls

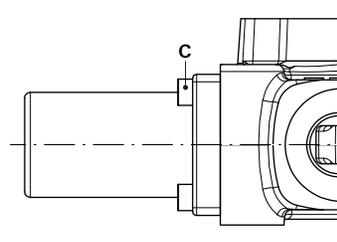
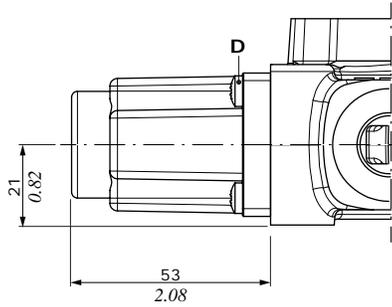
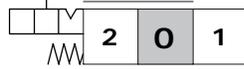
With detent control

R1 type

3 position, detent in position 1.
Available with aluminium cap

Wrenches and tightening torques

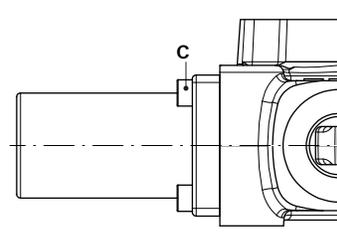
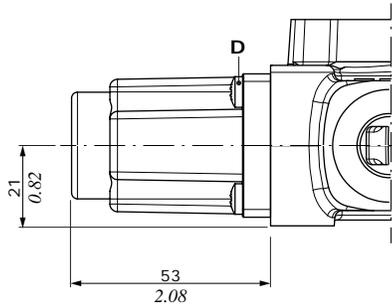
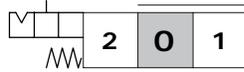
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)



With aluminium cap;
dimensions are the same of standard type

R2 type

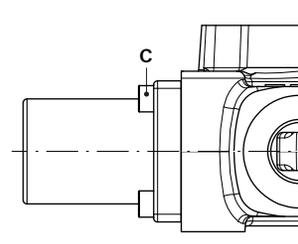
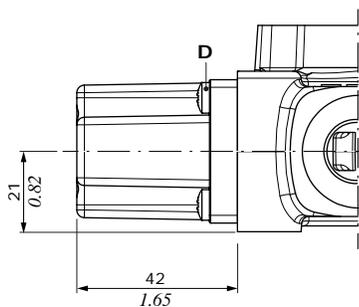
3 position, detent in position 2.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

R3 type

3 position, detent in all position.
Available with aluminium cap

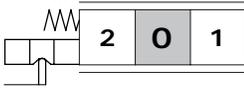


With aluminium cap;
dimensions are the same of standard type

Spool position microswitch

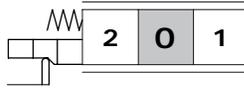
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position



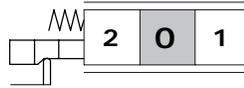
M1-N1A type

3 position, micro operation in position 1



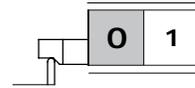
M1-N1B type

3 position, micro operation in position 2



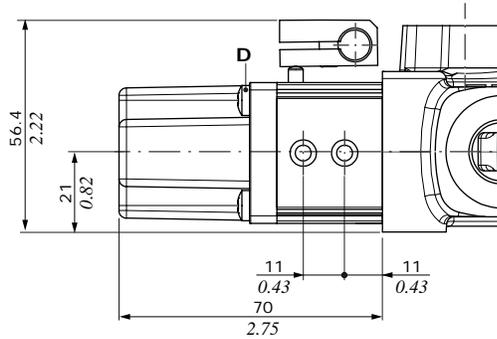
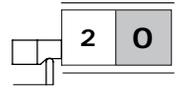
M2-N1 type

2 position (0-1), spring return in neutral position



M3-N1 type

2 position (0-2), spring return in neutral position

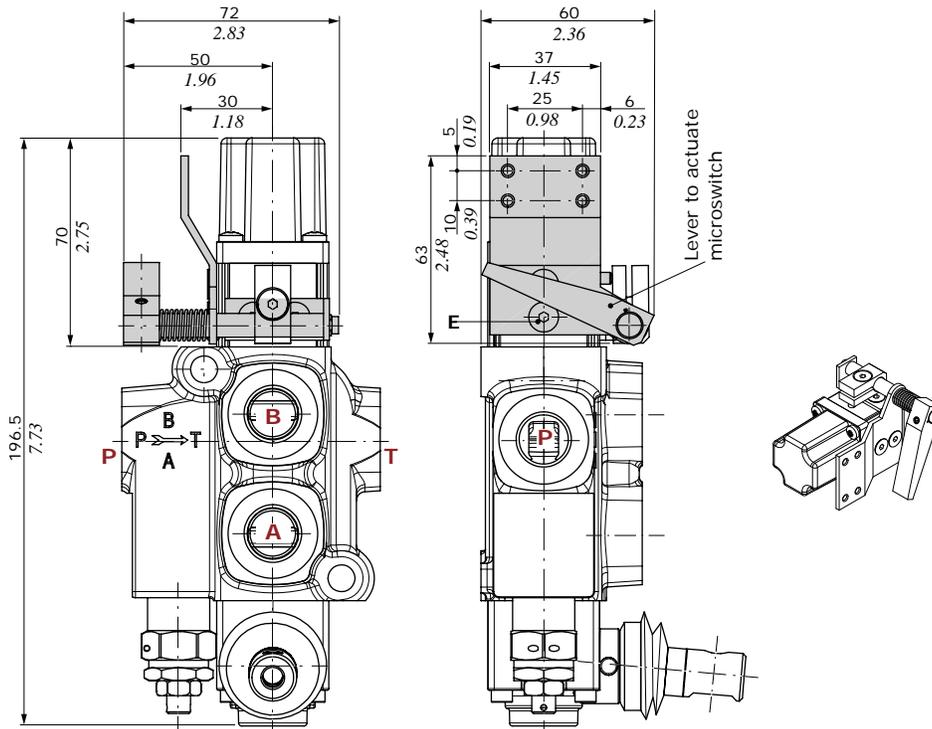


Wrenches and tightening torques

D = cross-head - 3 Nm (2.2 lbft)

E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Microswitch assembly kit for 1 working section (M1-N1 type)



A+B side controls

With cam control

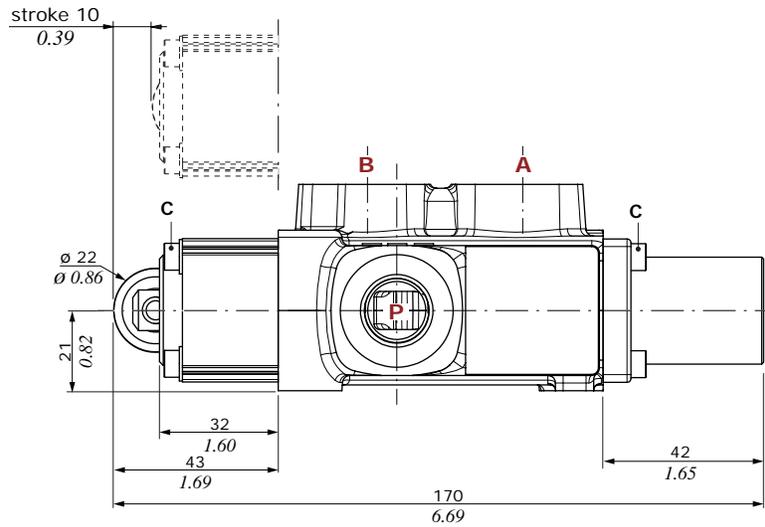
C2 type

From position 1 to position 2,
spring return in position 1



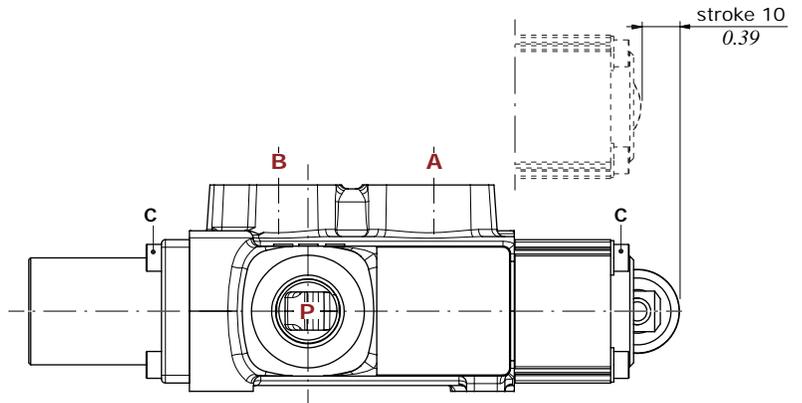
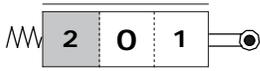
Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbf^t)



C3 type

From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type





Q25 - Q45

Monoblock directional valves

- Simple, compact and heavy duty designed monoblock valve
- From 1 to 8 sections
- For open and closed center hydraulic systems, optional carry over port
- Mechanical, pneumatic, electropneumatic, hydraulic and direct solenoid controls

Working conditions

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

		Q25	Q45
Nominal flow rating		30 l/min - (8 Us gpm)	50 l/min - (13.2 Us gpm)
Max. pressure	from 1 up to 2 sections		
	3 sections		max. 300 bar (4350 psi)
	from 4 up to 8 sections		
Max. back pressure on outlet T port (*)			25 bar (360 psi)
Number sections			from 1 to 8
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)		4 cm ³ /min (0.24 in ³ /min)
Fluid			Mineral oil
Fluid temperature	with NBR (BUNA-N) seals		from -30 °C to 80 °C - from -22 °F to 176 °F
Viscosity	operating range		from 10 to 400 mm ² /s - from 10 to 400 cSt
Max. contamination level			16/14/12 - ISO 4406 - NAS1638 class 6
Ambient temperature	without electric devices		from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices		from -20 °C to 50 °C - from -4 °F to 122 °F

NOTE - For different conditions please contact our Sales Department.

(*): On request for 1 or 2 section monoblock valve only, max back pressure allowable is 180 bar (2610 psi)

REFERENCE STANDARD

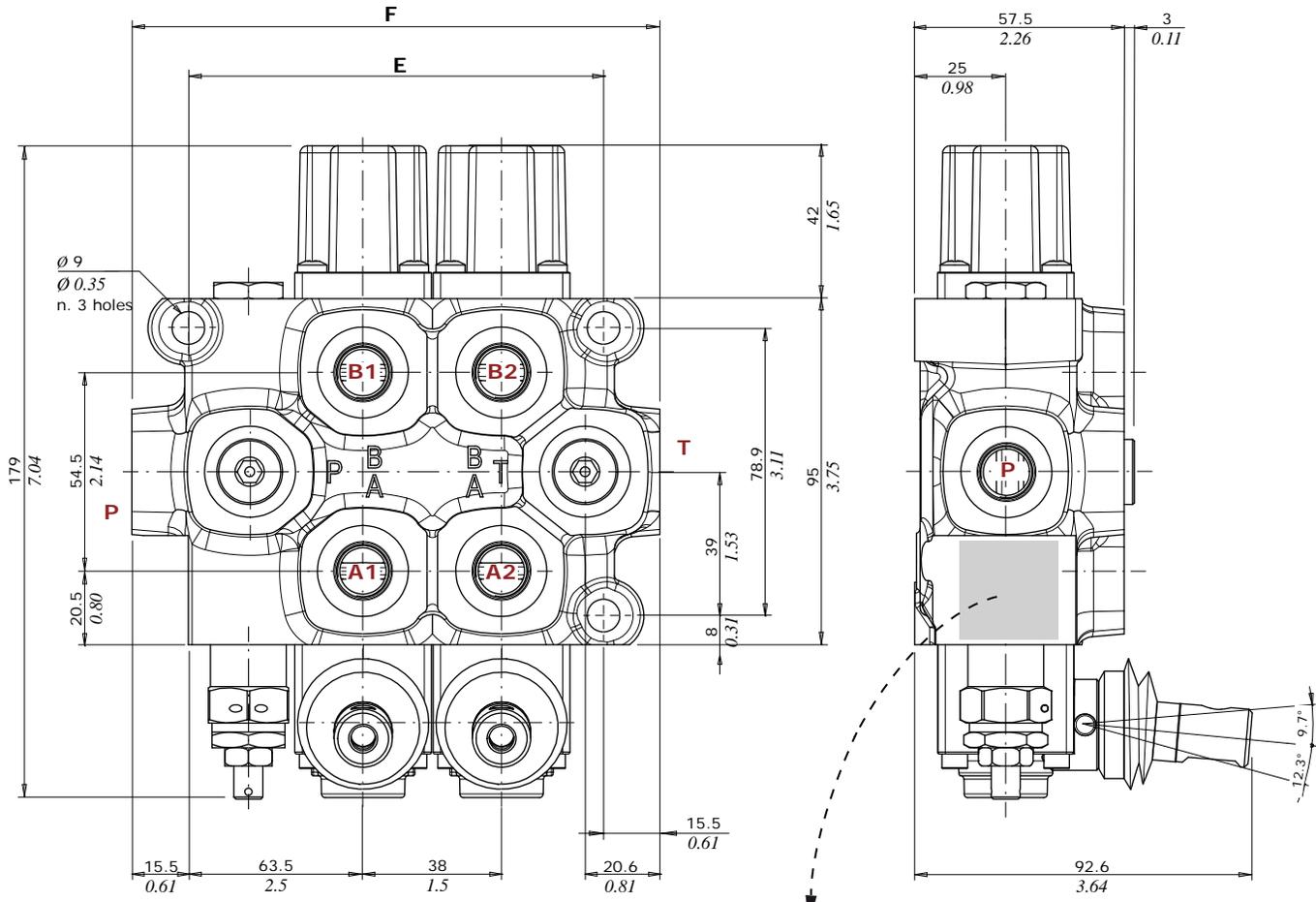
		BSP	UN-UNF
THREAD ACCORDING TO		ISO 228/1	ISO 263
		BS 2779	ANSI B1.1 unified
	ISO	1179	11926
CAVITY DIMENSION ACCORDING TO	SAE		J11926
	DIN	3852-2 shape X or Y	

PORT THREADING

PORTS	Q25		Q45	
	BSP	UN-UNF	BSP	UN-UNF
P Inlet	G 3/8	9/16-18 (SAE 6)	G 1/2	3/4-16 (SAE 8)
P1 Inlet	G 3/8	9/16-18 (SAE 6)	G 1/2	3/4-16 (SAE 8)
A and B ports	G 3/8	9/16-18 (SAE 6)	G 1/2	3/4-16 (SAE 8)
T Outlet	G 1/2	7/8-14 (SAE 10)	G 1/2	7/8-14 (SAE 10)
T1 Outlet	G 3/8	9/16-18 (SAE 6)	G 1/2	3/4-16 (SAE 8)
Lc port (Carry-over plug - T port)	G 3/8	3/4-16 (SAE 8)	G 1/2	3/4-16 (SAE 8)
Hydraulic controls	G 1/4	9/16-18 (SAE 6)	G 1/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

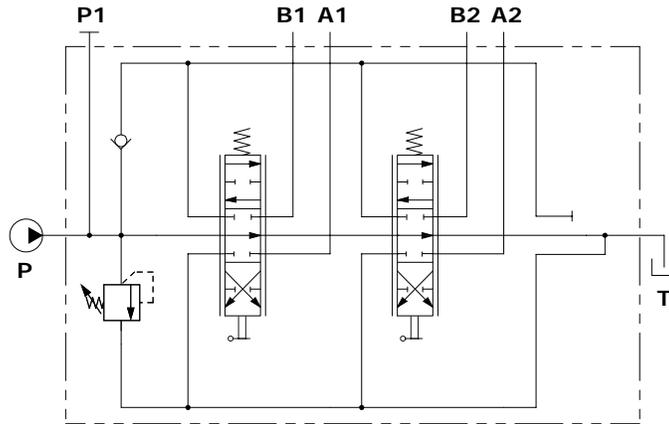
The Q25 and Q45 monoblock valves, have same dimensions but different threads. See port threading on page 19. Drawing are referred to a Q25 monoblock valve.



walvoil
 MADE IN ITALY
1GB75040009 ----- Product code
 DISTRIBUTORE ----- Code description
Q25/2
MD1600464-001 ----- Product allotment
 ----- Datamatrix with product allotment

Type	E		F	
	mm	in	mm	in
Q25/1 - Q45/1	76	2.99	107	4.21
Q25/2 - Q45/2	114	4.48	145	5.70
Q25/3 - Q45/3	152	5.98	183	7.2
Q25/4 - Q45/4	190	7.48	221	8.7
Q25/5 - Q45/5	228	8.97	259	10.19
Q25/6 - Q45/6	266	10.47	297	11.69
Q25/7 - Q45/7	304	11.96	335	13.18
Q25/8 - Q45/8	342	13.46	373	14.68

NOTE: Drawings and dimensions are referred to a UN-UNF threading configuration.

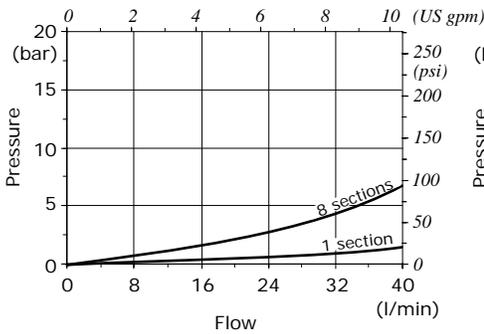


Description example (parallel circuit):
 Q25/2/F1S(N250)/103-A1-M1/103-A1-M1/F3D-S-SAE
 Q45/2/F1S(N250)/103-A1-M1/103-A1-M1/F3D-S-SAE

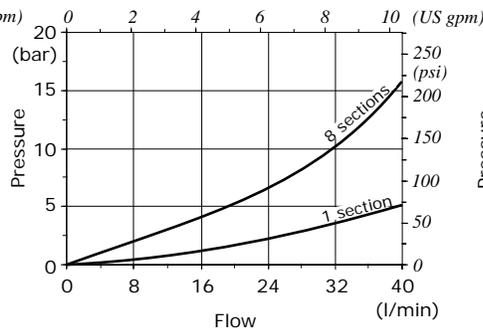
Performance data

Q25

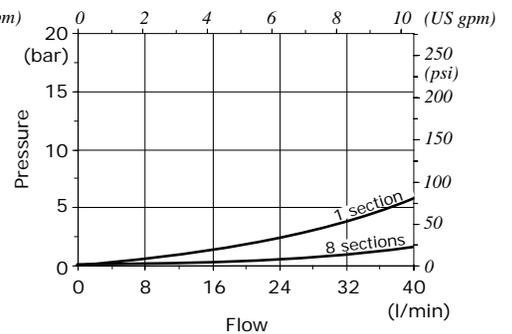
P⇒T pressure drops



P⇒A(B) pressure drops

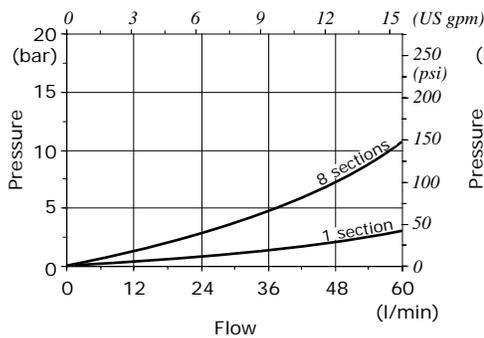


A(B)⇒T pressure drops

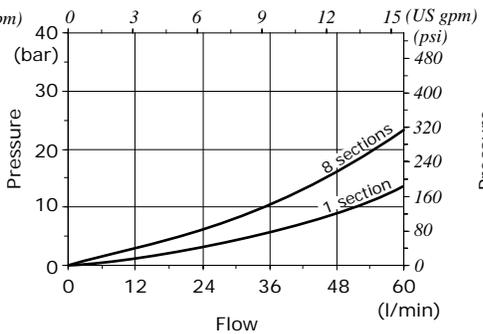


Q45

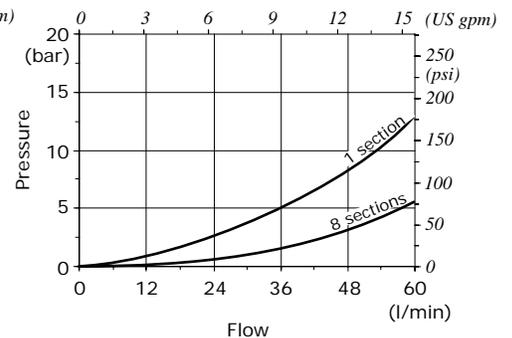
P⇒T pressure drops



P⇒A(B) pressure drops

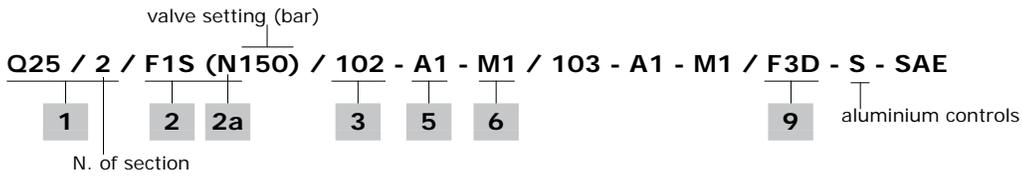


A(B)⇒T pressure drops

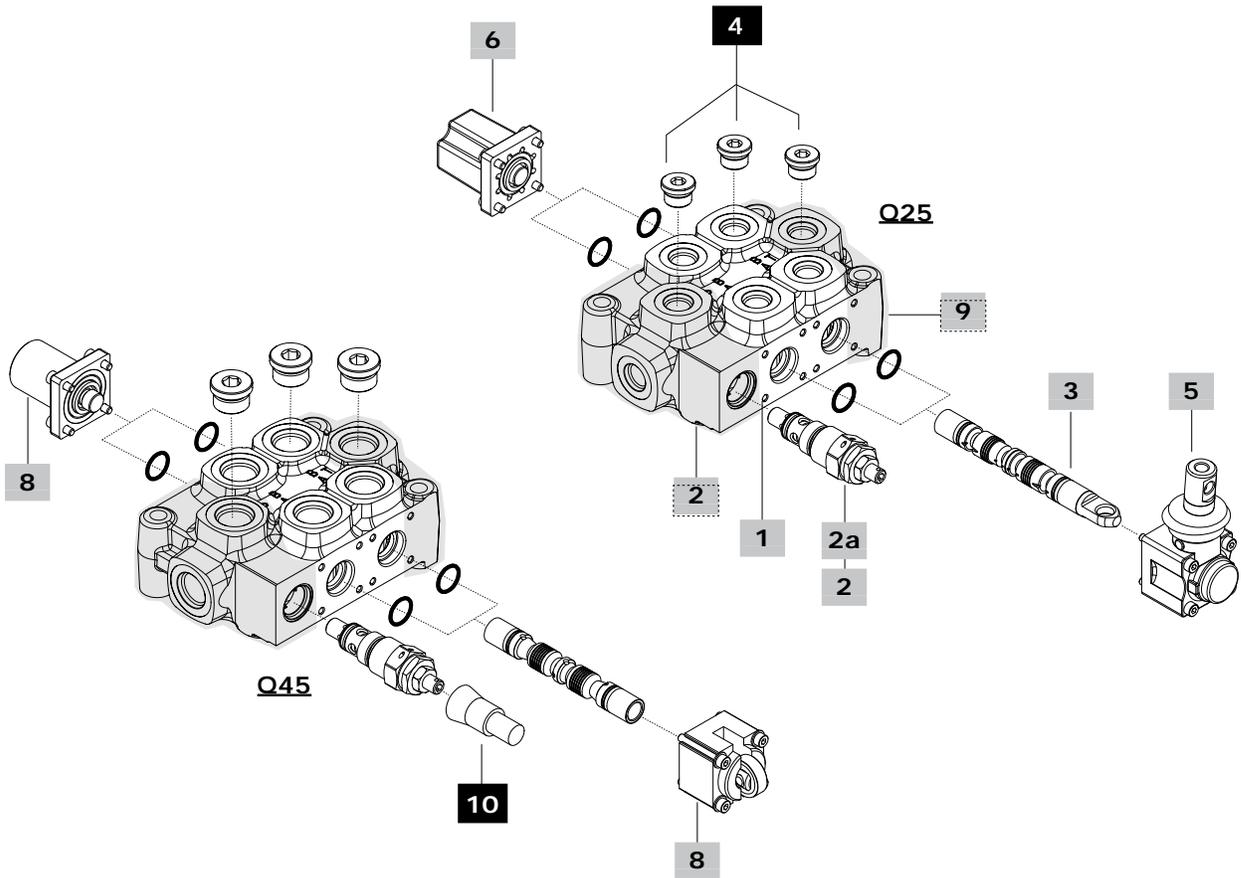


Parts ordering codes

Mechanical control valve configuration example



C2/C3 complete mechanical control valve configuration example



1 Body kit* page 28

The codes are referred to sections with O-ring seals

TYPE	CODE	DESCRIPTION
Q25/1-SAE	5KC0600132085	1 section
Q25/2-SAE	5KC0600131800	2 sections
Q25/3-SAE	5KC0600131842	3 sections
Q25/4-SAE	5KC0600131966	4 sections
Q25/5-SAE	5KC0600132436	5 sections
Q25/6-SAE	5KC0600131965	6 sections
Q25/8-SAE	5KC0600132438	8 sections

Q45/1-SAE	5KC0600128100	1 section
Q45/2-SAE	5KC0600128099	2 sections
Q45/3-SAE	5KC0600128103	3 sections
Q45/4-SAE	5KC0600128201	4 sections
Q45/5-SAE	5KC0600127785	5 sections
Q45/6-SAE	5KC0600129943	6 sections
Q45/7-SAE	5KC0600131149	7 sections
Q45/8-SAE	5KC0600131651	8 sections

2 Inlet configuration* page 28

TYPE	DESCRIPTION
F1S-SAE	With load check and pressure relief valves
F2S-SAE	With load check valve
F7S-SAE	With pressure relief valve
F8S-SAE	Without valves (pressure relief valve plugged port)

Note: Inlet configurations require upper P port plugged: see #4

2a Main pressure relief valve page 29

TYPE: B	CODE: 700035205000000
DESCRIPTION:	VLP35S valve, setting range 10-100 bar (145-1450 psi)
TYPE: N	CODE: 700035105000000
DESCRIPTION:	VLP35S valve, setting range 101-200 bar (1460-2900 psi)
TYPE: R	CODE: 700035305000000
DESCRIPTION:	VLP35S valve, setting range 201-380 bar (2910-5500 psi)
TYPE: -	CODE: 060002788899
DESCRIPTION:	Relief valve blanking plug

3 Spool page 30

TYPE	CODE	DESCRIPTION
Standard spools		
103	060103179499	Double acting, A and B closed in neutral position
	3CUG3197800	As previous one, for kick-out control
106	KR30106	Double acting, for closed circuit
107	KR30107-108	Double acting, A to tank and B closed in neutral position
108	KR30107-108	Double acting, B to tank and A closed in neutral position
111	060103179599	Double acting, A and B to tank in neutral position
	KR30111K	As previous one, for kick-out control
114	KR30114	Double acting, A and B to tank in neutral position, for closed circuit
101	3CUG3218000	Single acting on port A (3)
102	3CUG3218001	Single acting on port B (3)
116	3CUG3179200	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
126	3CUG3179201	Double acting, with floating in the 4 th position (spool out): requires dedicated spool control

Note (3): Q25 valve required SAE6 plug, see #4
Q45 valve required SAE6 plug, see #4

(*): Codes are referred to **UN-UNF** thread

(!): Always complete with lever knob

(?): To be assembled only with M4 control

3 Spool (cont.) page 30

TYPE	CODE	DESCRIPTION
Special spools for cam, microswitch controls and other leverless controls		
103	060103179099	Double acting, A and B closed in neutral position
111	060103179199	Double acting, A and B to tank in neutral position

4 Plug for single acting spool or P-T ports*

TYPE	CODE	DESCRIPTION
-	255006	SAE6 plug for Q25 valve
-	255008	SAE8 plug for Q45 valve

5 A side control page 31

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	03600A1-A2	M8 thread plastic lever box
A2	03600A1-A2	As A1 type, with lever box rotated 180°
A1/10	03610A1-A2/10	M8 thread aluminium lever box
A2/10	03610A1-A2/10	As A1/10 type, with lever box rotated 180°
A1/06	03606A1-A2/06	Aluminium lever box with stroke limiter
A2/06	03606A1-A2/06	As A1/06 type, with lever box rotated 180°
A1/PM	03610A1-A2/PM	M10 thread aluminium lever box
A2/PM	03610A1-A2/PM	As A1/PM type, with lever box rotated 180°
A1/PMP	03610A1-A2/PMP	M10 thread plastic lever box
A2/PMP	03610A1-A2/PMP	As A1/PMP type, with lever box rotated 180°
A1/Z1	03610A1-A2/Z1	Plastic lever box for 116 spool type
A2/Z1	03610A1-A2/Z1	As A1/Z1 type, with lever box rotated 180°
<u>With safety lever control:</u>		
A1/S ⁽¹⁾	03624A1-A2/S	M8 thread aluminium lever box
A2/S ⁽¹⁾	03624A1-A2/S	As A1/S type, with lever box rotated 180°
<u>Without lever control:</u>		
A4/Z1	03617A4/Z1	M8 male thread external pin with flange, for 116 spool type
A6	03620A6	With flange
A6-H/Z1	03620A6-H/Z1SI	As A6 type, for 116 spool type
A8	03622A8	Flexible cable control arrangement
	03622A8/03	As previous one, with aluminium cap
A8/Z1	03622A8/Z1	As A8 type, for 116 spool type
<u>With joystick controls for 2 section operation:</u>		
A35/1	03640A35-12	Joystick 1 type
A35/2	03640A35-12	Joystick 2 type
A35/3	03640A35-34	Joystick 3 type
A35/4	03640A35-34	Joystick 4 type
For types 103 and 111 special spools		
<u>With spool position microswitch:</u>		
Note: to complete the control you must use the assembly kit at #7		
N1-A1	03641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
	03641N1-A1/10	As previous one, with aluminium lever box
N1A-A1	03642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	03643N1BA1/A2L	Micro operation in pos. 2, with lever box
N1-A3	03648N1-A3L	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	03648N1A-A3L	Micro operation in pos. 1, without lever with cap
N1B-A3	03648N1B-A3L	Micro operation in pos. 2, without lever with cap
<u>Without lever control:</u>		
A3	03614A3	Without lever, with cap
	03614A3/03	As previous one, with aluminium cap
A4	03617A4	M8 male thread external pin with flange
	03617A4/03	As previous one, with aluminium flange
A4/01	03617A4/01	M10 male thread external pin with flange
A5 ⁽²⁾	03619A5	Flange with spherical spool end
	03619A5/10	As previous one, with aluminium flange

Parts ordering codes

6 B side control page 39

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	03730M1	3 pos., spring return in neutral position
	03730M1/03	As previous one, with aluminium cap
M1-B1	03753M1-B1	As M1 type, with microswitch arrangement
	03753M1-B1/03	As previous one, with aluminium cap
M1/O1	03730M1/O1	As M1 type, for mechanical joystick
	03730M1/O1/03	As previous one, with aluminium cap
M1/O2	03730M1/O2	As M1 type, with stroke limiter
M1-U1	03701M1-U1	As M1 type, with M8 male thread external pin
M2	03732M2	2 pos. (0-1), spring return in neutral position
	03732M2/03	As previous one, with aluminium cap
M2-U1	03702M2-U1	As M2 type, with M8 male thread external pin
M3	03733M3	2 pos. (0-2), spring return in neutral position
	03733M3/03	As previous one, with aluminium cap
M3-U1	03703M3-U1	As M3 type, with M8 male thread external pin
M4	03734M41-2/03	2 pos. (1-2), spring return in position 1
	03735M42-1/03	2 pos. (2-1), spring return in position 2
M4-U1	03704M4-U11-2	As M4 type (1-2), with M8 male thread external pin
<u>With flexible cable control arrangement:</u>		
M1-U2	03715M1-U2	3 pos., spring return in neutral position
M2-U2	03716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	03717M3-U2	2 pos. (0-2), spring return in neutral position
<u>With detent:</u>		
R1	03741R1	3 pos., detent in position 1
	03741R1/03	As previous one, with aluminium cap
R2	03742R2	3 pos., detent in position 2
	03742R2/03	As previous one, with aluminium cap
R3	03743R3	3 pos., detent in all position
	03743R3/03	As previous one, with aluminium cap
R4	03744R4	2 pos., detent in position 0-1
	03744R4/03	As previous one, with aluminium cap
R5	03745R5	2 pos., detent in position 0-2
	03745R5/03	As previous one, with aluminium cap
R6	03746R6	2 pos., detent in position 1-2
	03746R6/03	As previous one, with aluminium cap
R8	03748R8	4 pos., detent in 4 th pos., for 116 type spool
	03748R8/03	As previous one, with aluminium cap
R10/Z1	03750R10/Z1	4 pos., detent in 4 th pos., for 126 type spool
	03750R10/Z1/03	As previous one, with aluminium cap
<u>With detent and kick out function:</u>		
R1K	03741R1K	3 pos., detent in position 1
	03741R1K/03	As previous one, with aluminium cap
R2K	03742R2K	3 pos., detent in position 2
	03742R2K/03	As previous one, with aluminium cap
R3K	08743R3K	3 pos., detent in all position
	03743R3K/03	As previous one, with aluminium cap
<u>With spool position microswitch:</u>		
Note: To complete the control you must use the assembly kit at #7		
M1-N1	03766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
	03766M1-N1/03	As previous one, with aluminium lever box
M1-N1A	03767M1-N1AL	As M1-N1 type, micro operation in pos. 1
	03767M1-N1AL/3	As previous one, with aluminium cap
M1-N1B	03768M1-N1BL	As M1-N1 type, micro operation in pos. 2
	03768M1-N1BL/3	As previous one, with aluminium cap
M2-N1	03769M2-N1L	2 pos. (0-1), spring return in neutral pos.
M3-N1	03772M3-N1L	2 pos. (0-2), spring return in neutral pos.
<u>With pneumatic and electropneumatic controls:</u>		
P1NW	03661P1-NW	ON/OFF pneumatic control
P1NPW	03661P1-NPW	Proportional pneumatic control
D3W	03691D3-F-12DC	12 VDC, ON/OFF electropneumatic control
	03692D3-F-24DC	24 VDC, ON/OFF electropneumatic control

7 Microswitch assembling kit

CODE	DESCRIPTION
03650N1-01	Kit for 1 section
03650N1-02	Kit for 2 sections
03650N1-03	Kit for 3 sections
03650N1-04	Kit for 4 sections
03650N1-05	Kit for 5 sections
03650N1-06	Kit for 6 sections
03650N1-07	Kit for 7 sections
03650N1-08	Kit for 8 sections

8 Complete controls A+B sides page 45

TYPE	CODE	DESCRIPTION
<u>For types 103 and 111 special spools</u>		
C2	03792C2-C3	Cam control from position 1 to 2
C3	03792C2-C3	Cam control from position 2 to 1

9 Outlet configuration* page 49

TYPE	DESCRIPTION
F3D-SAE	Open center configuration: for Q25 valve, n. 1 SAE6 plug code 255006, on T1 port; for Q45 valve, n. 1 SAE10 plug code 255010, on T1 port
F6D-SAE	Carry-over configuration: for Q25 valve, n. 1 SAE8 joint code 060002780899, on T port; for Q45 valve, n. 1 SAE8 joint code 060002780899, on T port
F16D-SAE	Closed center configuration: for Q25 valve, n. 1 SAE6 plug code 255006 on T1 port and n. 1 SAE8 joint code 060002807999, on T port; for Q45 valve, n. 1 SAE10 plug code 255010 on T1 port and n. 1 SAE8 joint code 060002807999, on T port

10 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

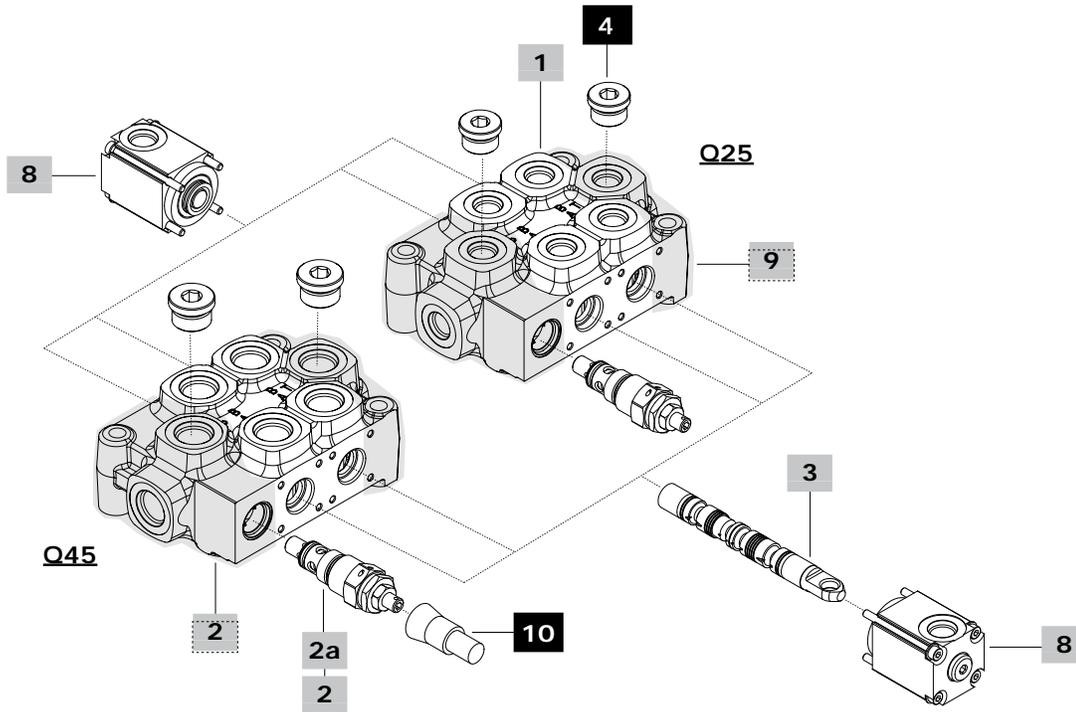
(*) Codes are referred to **UN-UNF** thread

Proportional hydraulic controls valve configuration example

valve setting (bar)
Q25 / 2 / F1S (N150) / 103 - H5 / 103 - H5 / F3D - S - SAE

1 2 2a 3 8 9 aluminium controls

N. of section



1 Body kit*

TYPE	CODE	DESCRIPTION
Q25/1-SAE	5KC0600132085A	1 section
Q25/2-SAE	5KC0600131800A	2 sections
Q25/3-SAE	5KC0600131842A	3 sections
Q25/4-SAE	5KC0600131966A	4 sections
Q25/5-SAE	5KC0600132436A	5 sections
Q25/6-SAE	5KC0600131965A	6 sections
Q25/8-SAE	5KC0600132438A	8 sections
<hr/>		
Q45/1-SAE	5KC0600128100A	1 section
Q45/2-SAE	5KC0600128099A	2 sections
Q45/3-SAE	5KC0600128103C	3 sections
Q45/4-SAE	5KC0600128201A	4 sections
Q45/5-SAE	5KC0600127785A	5 sections
Q45/6-SAE	5KC0600129943A	6 sections
Q45/7-SAE	5KC0600131149A	7 sections
Q45/8-SAE	5KC0600131651A	8 sections

2 Inlet configuration* page 28

See #2, page 23

2a Main pressure relief valve page 29

See #2a, page 23

3 Spool page 30

TYPE	CODE	DESCRIPTION
103	060103179499	Double acting, A and B closed in neutral position

4 Plug for P-T ports*

See #4, page 23

8 Hydraulic controls A+B sides* page 46

TYPE	CODE	DESCRIPTION
H5	03785H5/SAE	Low pressure proportional type, upper ports

9 Outlet configuration* page 49

See #9, page 24

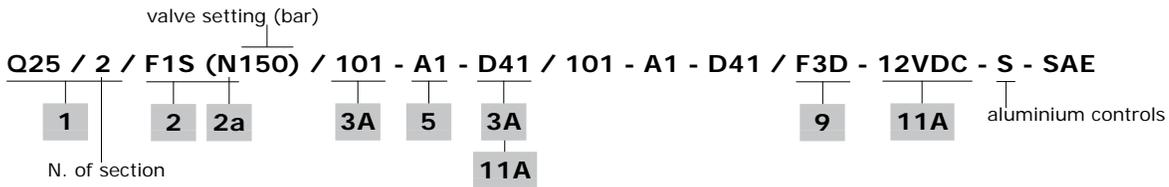
10 Accessory

See #10, page 24

(*): Codes are referred to UN-UNF thread

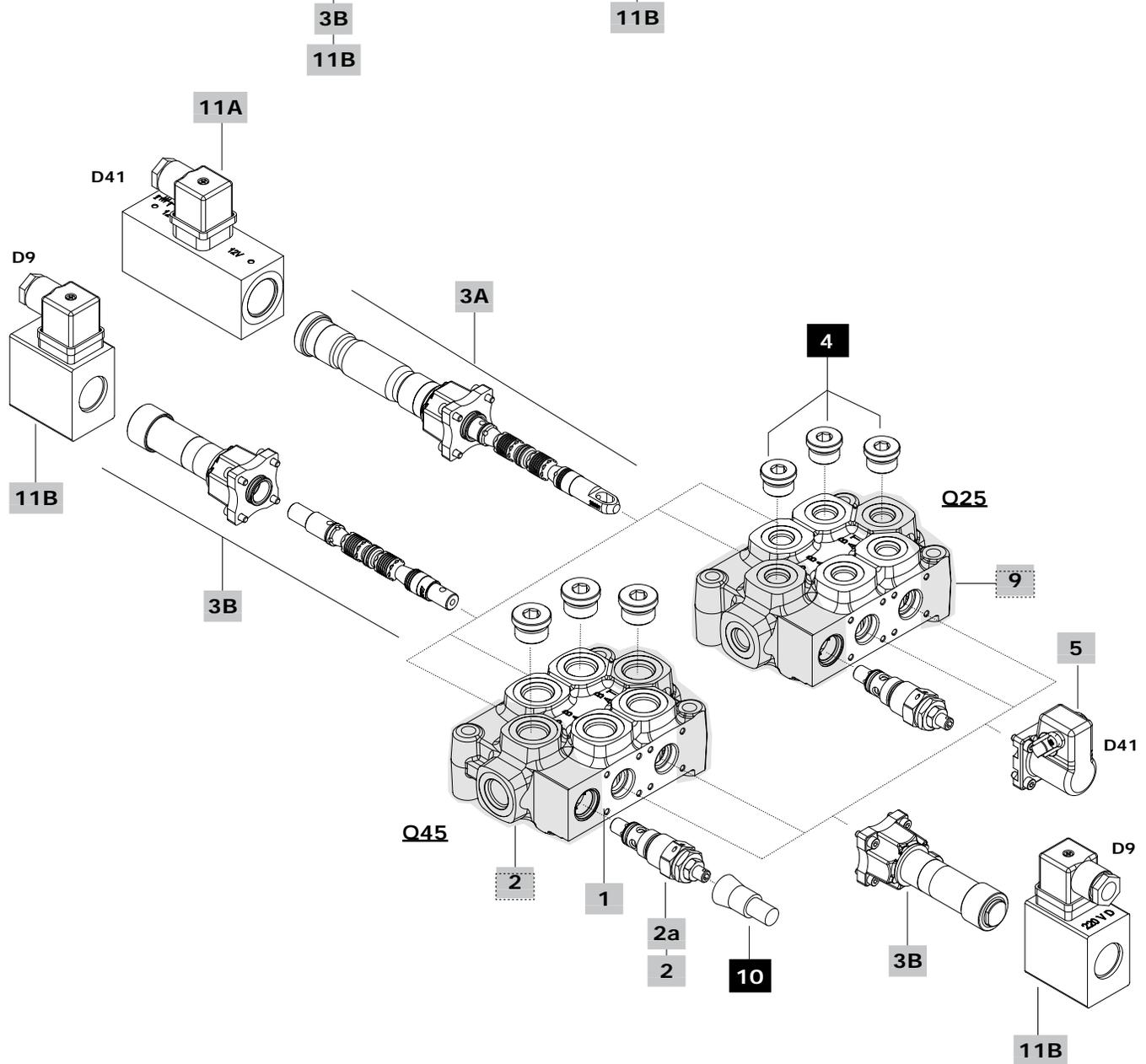
Parts ordering codes

One side - ON/OFF direct solenoid control valve configuration example



Two side - ON/OFF direct solenoid control valve configuration example

Q45 / 2 / F1S (N150) / 101 - D9 / 101 - D9 / F3D - 12VDC - S - SAE



1 Body kit* **page 28**

TYPE	CODE	DESCRIPTION
Q25/1-SAE	5KC0600132085A	1 section
Q25/2-SAE	5KC0600131800A	2 sections
Q25/3-SAE	5KC0600131842A	3 sections
Q25/4-SAE	5KC0600131966A	4 sections
Q25/5-SAE	5KC0600132436A	5 sections
Q25/6-SAE	5KC0600131965A	6 sections
Q25/8-SAE	5KC0600132438A	8 sections
Q45/1-SAE	5KC0600128100A	1 section
Q45/2-SAE	5KC0600128099A	2 sections
Q45/3-SAE	5KC0600128103C	3 sections
Q45/4-SAE	5KC0600128201A	4 sections
Q45/5-SAE	5KC0600127785A	5 sections
Q45/6-SAE	5KC0600129943A	6 sections
Q45/7-SAE	5KC0600131149A	7 sections
Q45/8-SAE	5KC0600131651A	8 sections

2 Inlet configuration* **page 28**

See #2, page 23

2a Main pressure relief valve **page 29**

See #2a, page 23

3A D41 solenoid control **page 47**

One side solenoid control

For Q25 valve:

TYPE	CODE	DESCRIPTION
103	X060102889799	Tube assembly with double acting spool, A and B closed in neutral position
107	X060102938199	Tube assembly with double acting spool, A to tank and B closed in neutral position
108	X060102937199	Tube assembly with double acting spool, B to tank and A closed in neutral position
109	X060102952699	Tube assembly with single acting spool on port A, A to tank in neutral position. SAE6 plug is required, see #4
111	X060102894299	Tube assembly with double acting spool, A and B to tank in neutral position
101	X060102905099	Tube assembly with single acting spool on port A. SAE6 plug is required, see #4
102	X060102894199	Tube assembly with single acting spool on port B. SAE6 plug is required, see #4

For Q45 valve:

103	X060102889700	Tube assembly with double acting spool, A and B closed in neutral position
107	X060102938100	Tube assembly with double acting spool, A to tank and B closed in neutral position
108	X060102937100	Tube assembly with double acting spool, B to tank and A closed in neutral position
109	X060102952600	Tube assembly with single acting spool on port A, A to tank in neutral position. SAE8 plug is required, see #4
111	X060102894200	Tube assembly with double acting spool, A and B to tank in neutral position
101	X060102905000	Tube assembly with single acting spool on port A. SAE8 plug is required, see #4
102	X060102894100	Tube assembly with single acting spool on port B. SAE8 plug is required, see #4

3B D9 solenoid control **page 48**

Two side solenoid control

For Q25/Q45 valves:

TYPE	CODE	DESCRIPTION
101	X060103012699	Tube assembly with single acting spool on port A (1)
102	X060103012699	Tube assembly with single acting spool on port B (1)
103	X060102998299	Tube assembly with double acting spool, A and B closed in neutral position
108	X060103070799	Tube assembly with double acting spool, B to tank and A closed in neutral position
110	X060103037699	Tube assembly with single acting spool on port B, B to tank in neutral position (1)
111	X060103000499	Tube assembly with double acting spool, A and B to tank in neutral position

Note (1): Q25 valve required SAE6 plug, see #4
Q45 valve required SAE8 plug, see #4

4 Plug for single acting spool or P-T ports*

See #4, page 23

5 A side control for D41 **page 47**

TYPE	CODE	DESCRIPTION
A1	060003236899	M8 thread cast iron lever box
A2	060003236899	As A1 type, with lever box rotated 180°

9 Outlet configuration* **page 49**

See #9, page 24

10 Accessory

See #10, page 24

11A/B Coil **page 47**

D41 coil

For Q25 valve:

TYPE	CODE	DESCRIPTION
-	ZEB012	12 VDC ISO4400 coil
-	ZEB024	24 VDC ISO4400 coil

For Q45 valve:

-	4SLG111200	12 VDC ISO4400 coil
-	4SLG111400	24 VDC ISO4400 coil

D9 coil

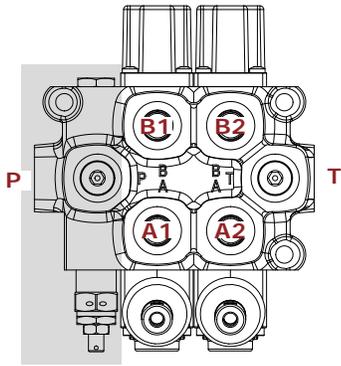
For Q25/Q45 valves:

-	ZDB212	12 VDC ISO4400 coil
-	ZDB224	24 VDC ISO4400 coil

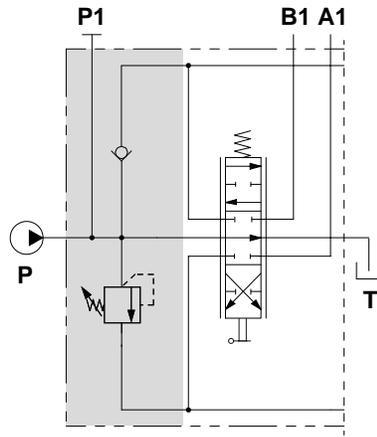
Note: The connector is included

(*): Codes are referred to **UN-UNF** thread

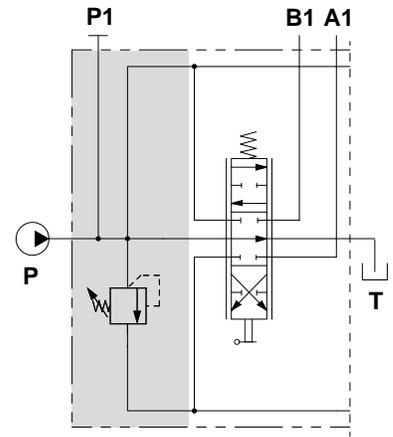
Inlet configuration



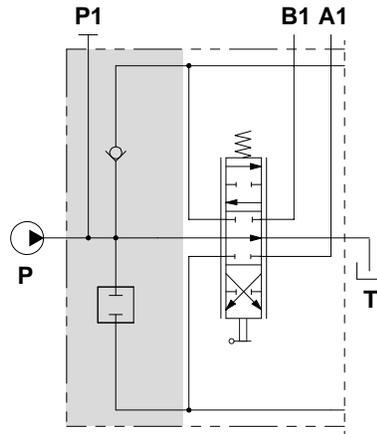
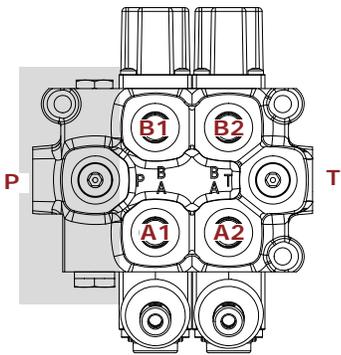
F1S-SAE configuration
With load check and pressure relief valve



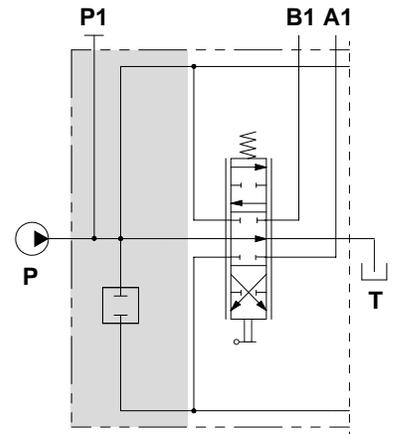
F7S-SAE configuration
With pressure relief valve



F2S-SAE configuration
With load check valve

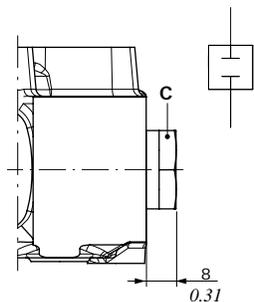


F8S-SAE configuration
Without valves
(pressure relief valve plugged port)

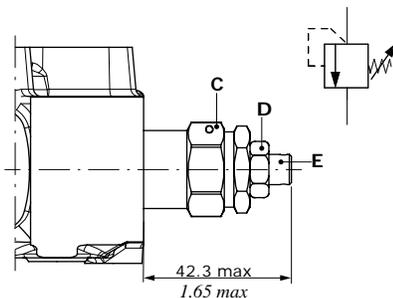


Main pressure relief valve

Relief valve blanking plug

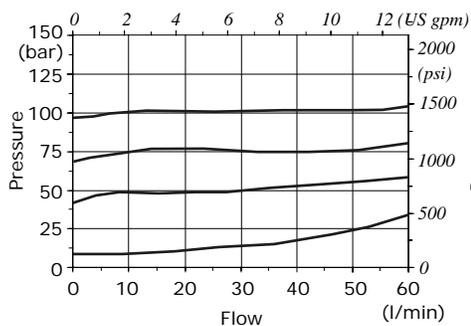


Main pressure relief valve

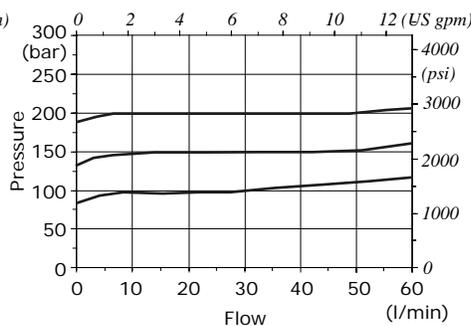


Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

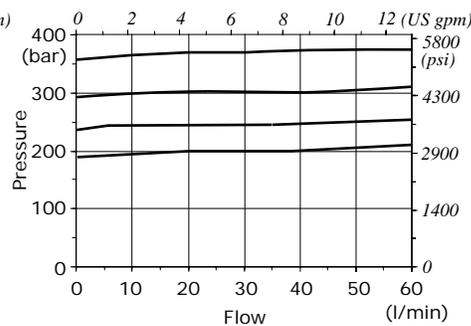
Setting example (B type spring)



Setting example (N type spring)



Setting example (R type spring)

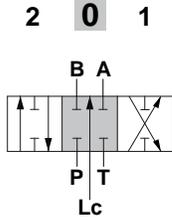


Wrenches and tightening torques

- C = wrench 22 - 42 Nm (30.9 lbft)
- D = wrench 13 - 24 Nm (17.7 lbft)
- E = allen wrench 4

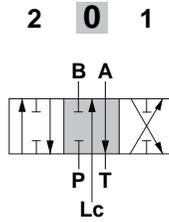
Spool

103 type
A and B closed
in neutral position



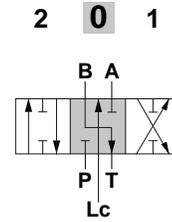
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

107 type
A to tank, B closed
in neutral position



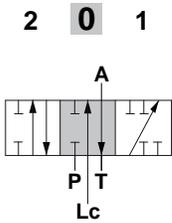
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

108 type
B to tank, A closed
in neutral position



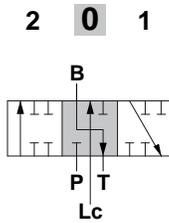
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

109 type
A to tank in neutral position,
B plugged



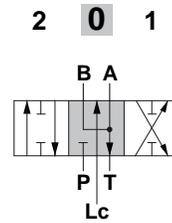
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

110 type
B to tank in neutral position,
A plugged



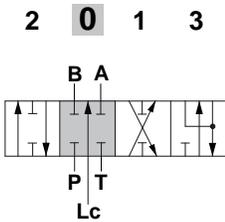
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

111 type
A and B to tank
in neutral position



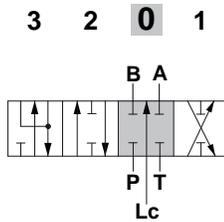
Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

116 type
With floating in the 4th position
(spool in)



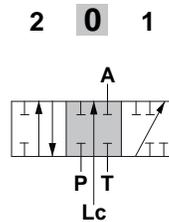
Stroke
Position 1: - 4 mm (- 0.15 in)
Position 2: + 5 mm (+ 0.19 in)
Position 3: - 8.6 mm (- 0.33 in)

126 type
With floating in the 4th position
(spool out)



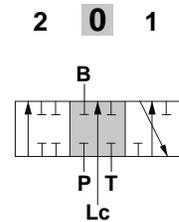
Stroke
Position 1: + 4 mm (+ 0.15 in)
Position 2: - 5 mm (- 0.19 in)
Position 3: + 8.6 mm (+ 0.33 in)

101 type
Single acting on A,
B plugged



Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

102 type
Single acting on B,
A plugged

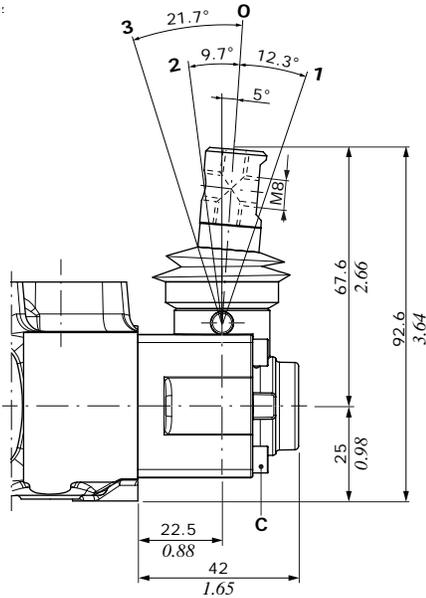


Stroke
Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

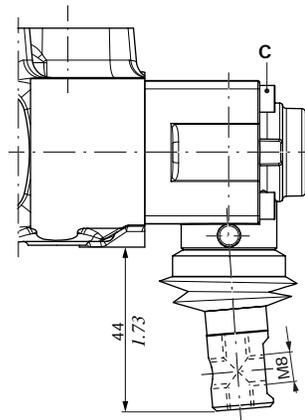
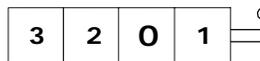
Mechanical controls

With lever control

A1 type
M8 thread plastic lever box

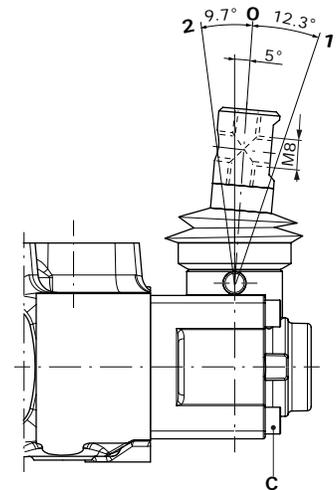


A2 type
As A1 type, rotated 180°

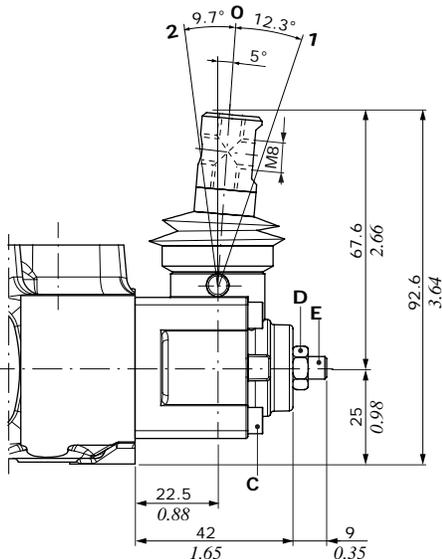
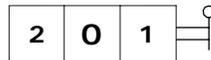


A1/10 type
M8 thread aluminium lever box.
Dimensions are the same of A1 type

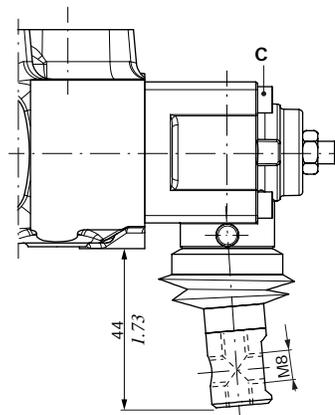
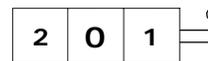
A2/10 type
As A1/10 type, rotated 180°



A1/06 type
M8 thread,
with stroke limiter



A2/06 type
As A1/06 type, rotated 180°



Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = wrench 10 - 9.8 Nm (7.2 lbft)
- E = allen wrench 4 - 9.8 Nm (7.2 lbft)

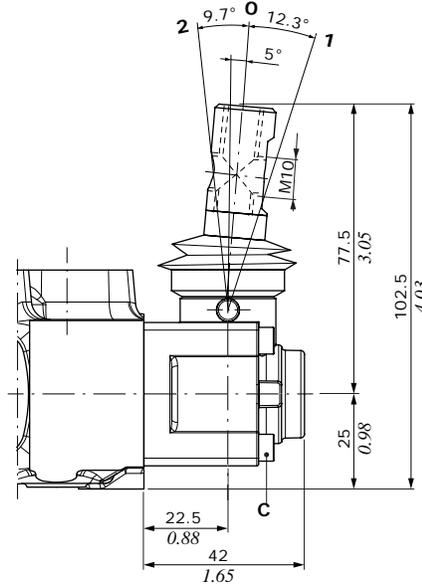
A side controls

Mechanical controls

With lever control

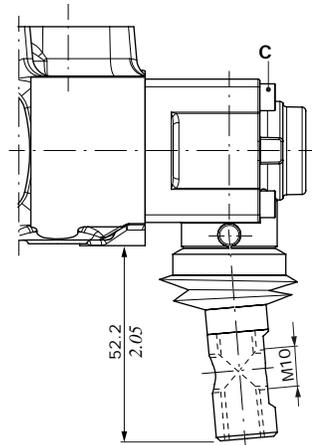
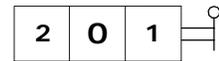
A1/PM type

M10 thread aluminium lever box



A2/PM type

As A1/PM type, rotated 180°



Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbf^t)

A1/PMP type

M10 thread

plastic lever box.

Dimensions are the same of A1/PM type

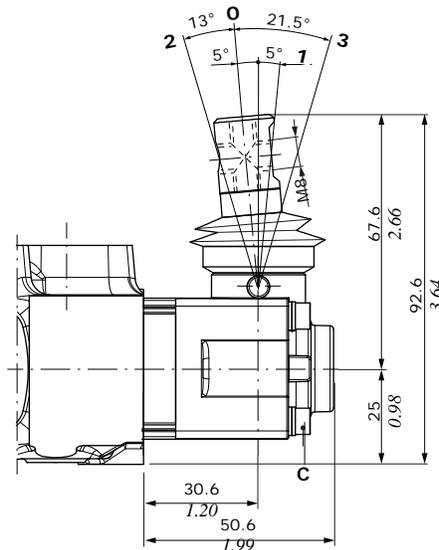
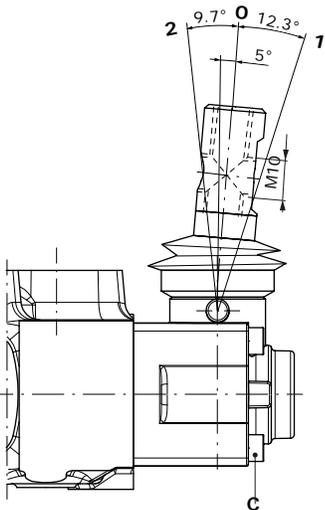
A2/PMP type

As A1/PMP type, rotated 180°

A1/Z1 type

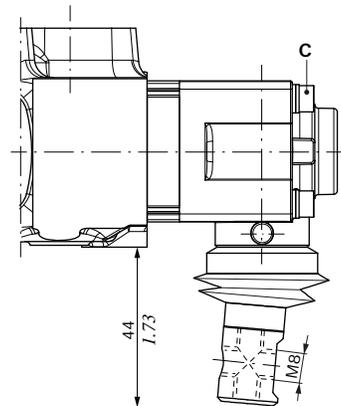
M8 thread,

for 116 floating spool type



A2/Z1 type

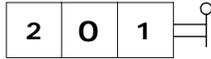
As A1/Z1 type, rotated 180°



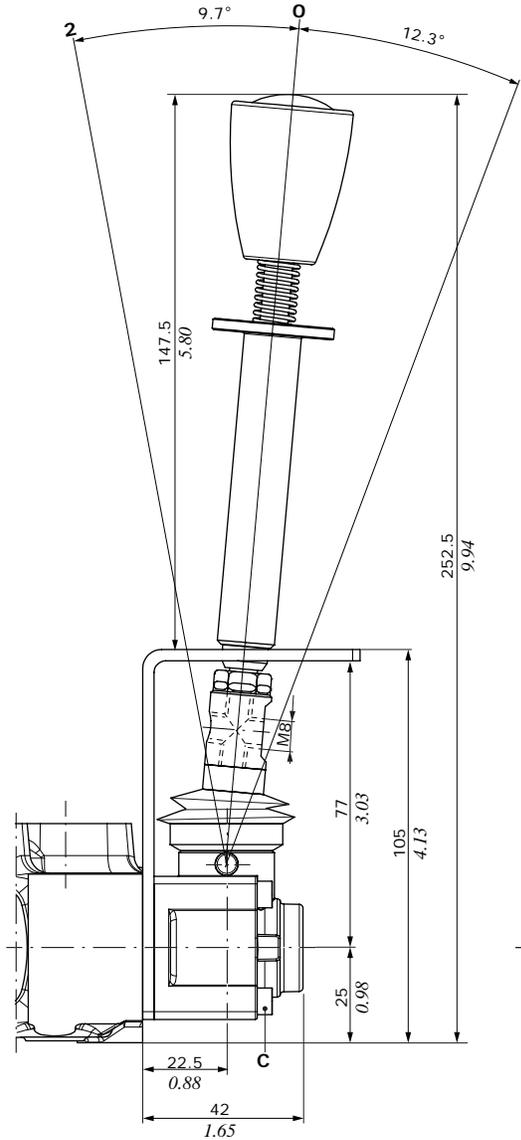
Mechanical controls

With safety lever control

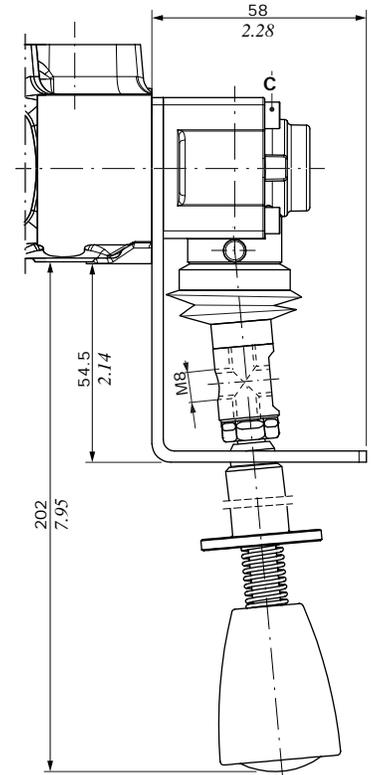
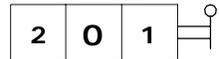
A1/S type
M8 thread, aluminium lever box



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf)
D = cross-head - 3 Nm (2.2 lbf)

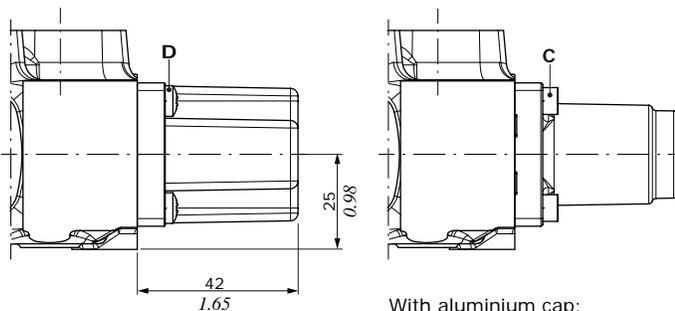


A2/S type
As A1/S type, rotated 180°



Without lever control

A3 type
With cap.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

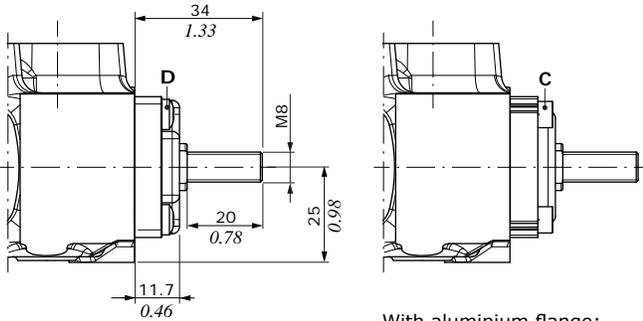
A side controls

Mechanical controls

Without lever control

A4 type

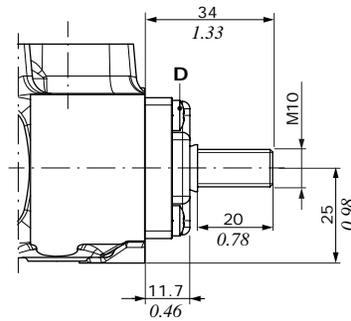
M8 male thread external pin with flange.
Available with aluminium flange



With aluminium flange;
dimensions are the same of standard type

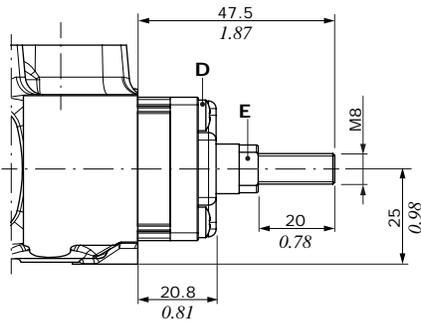
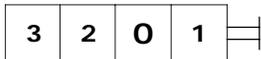
A4/O1 type

M10 male thread external pin with flange



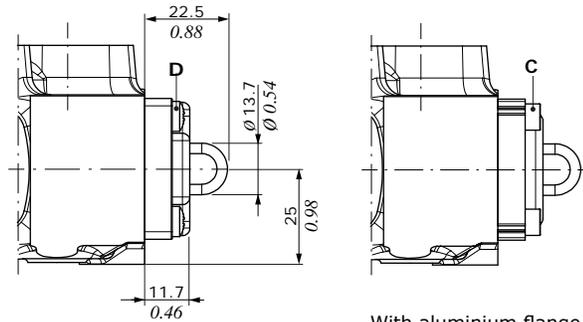
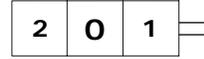
A4/Z1 type

As A4 type,
for 116 floating spool type

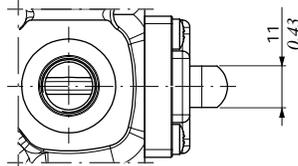


A5 type

Flange with spherical spool end.
Available with aluminium flange



With aluminium flange;
dimensions are the same of standard type



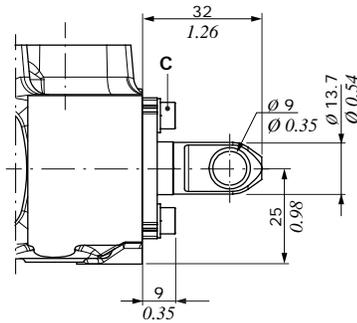
Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = wrench 9 - 9.8 Nm (7.2 lbft)

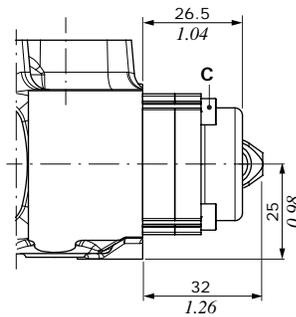
Mechanical controls

Without lever control

A6 type
With flange



A6-H/Z1 type
As A6 type,
for 116 floating spool type

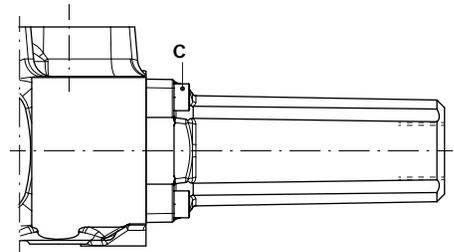
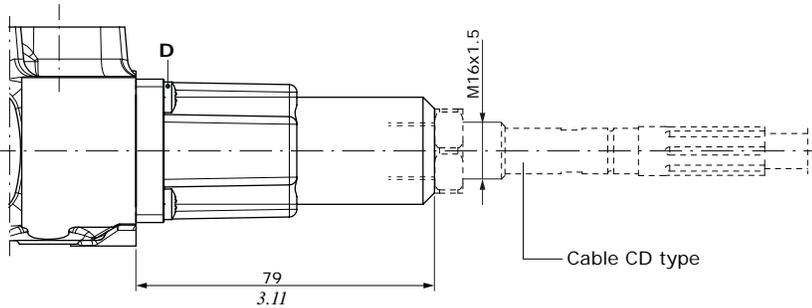


Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

A8 type

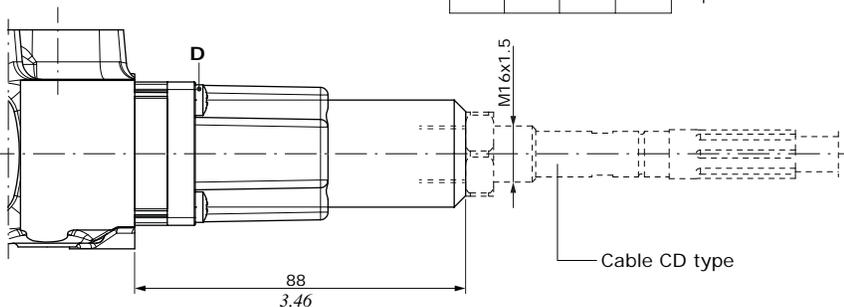
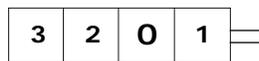
Flexible cable control arrangement.
Available with aluminium cap

With flexible cable control arrangement



With aluminium cap;
dimensions are the same of standard type

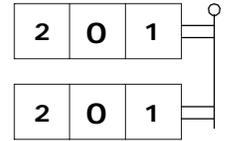
A8/Z1 type
As A8 type,
for 116 floating spool type



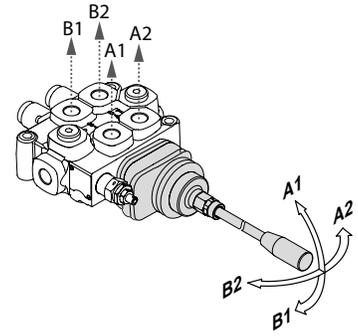
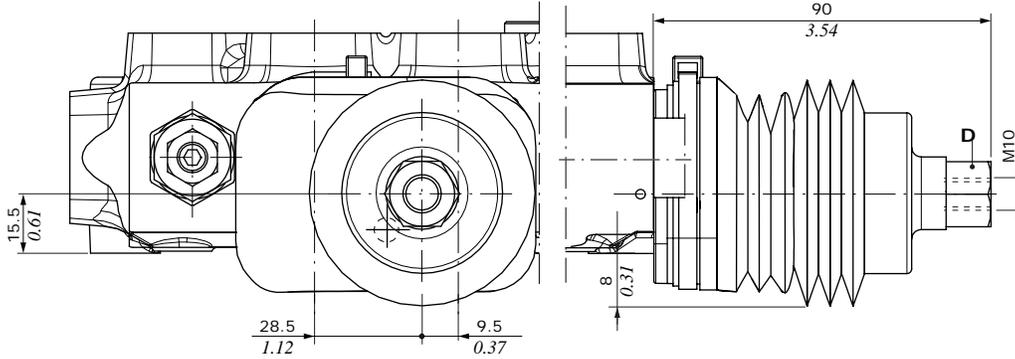
A side controls

Joystick controls

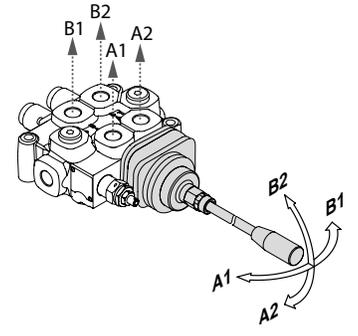
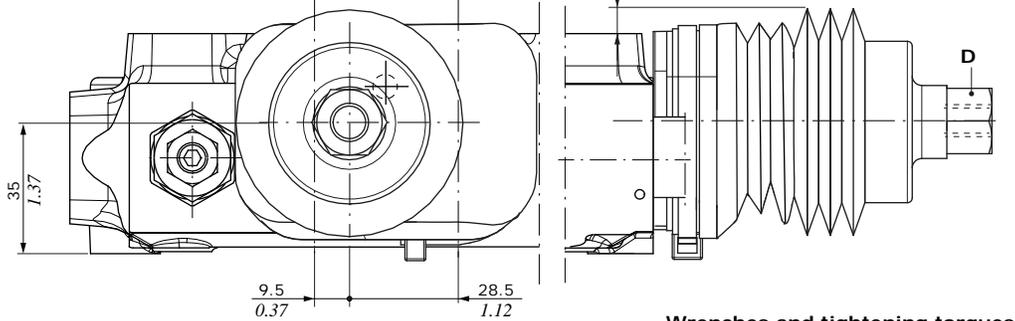
For operating the joystick control in the floating position, contact Sales Department.



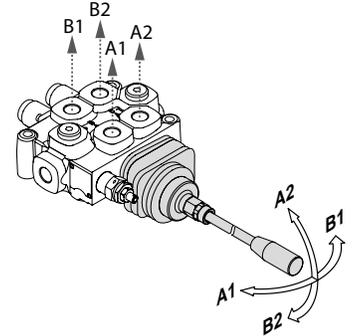
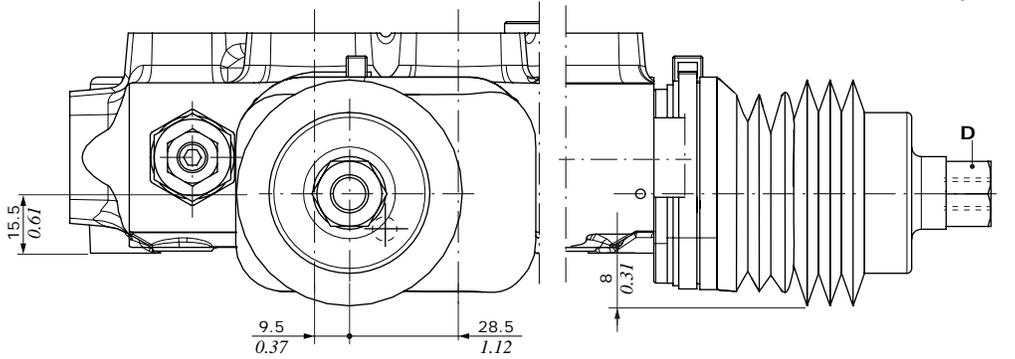
A35-1 type



A35-2 type

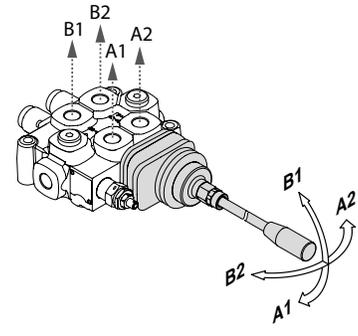
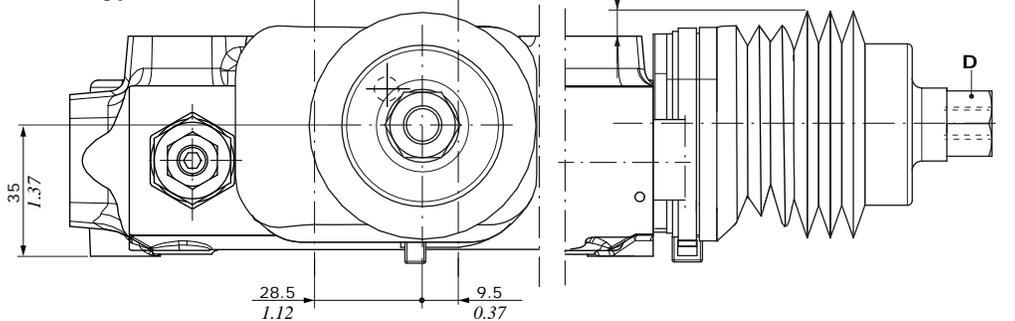


A35-3 type



Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbft)

A35-4 type

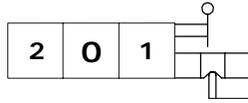


Spool position microswitch

With lever control

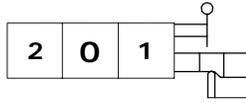
N1-A1 type

Micro operation in position 1 and 2.
Available with aluminium lever box



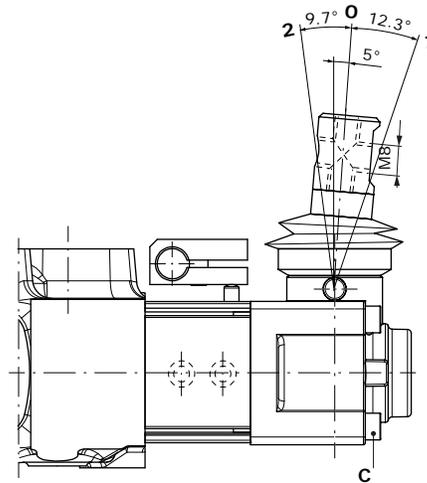
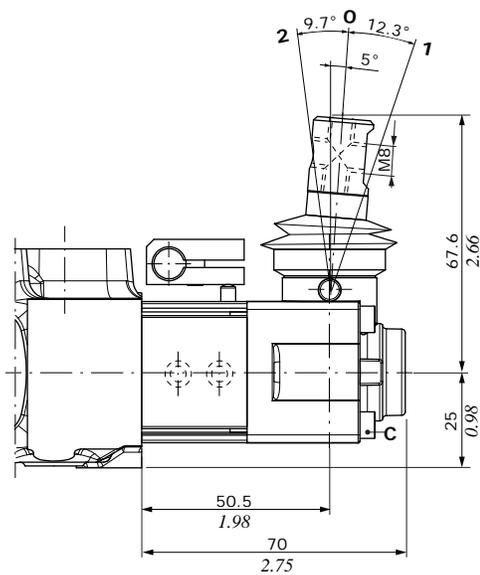
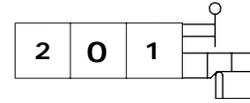
N1A-A1 type

Micro operation in position 1



N1B-A1 type

Micro operation in position 2

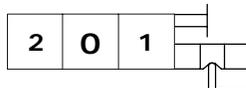


With aluminium lever box;
dimensions are the same of standard type

Without lever control, with cap

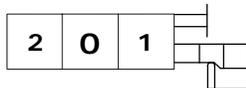
N1-A3 type

Micro operation in position 1 and 2



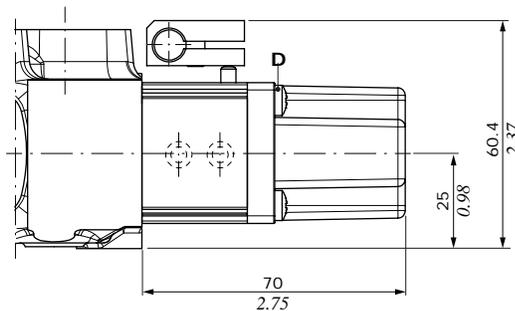
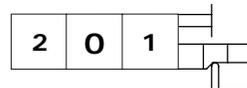
N1A-A3 type

Micro operation in position 1



N1B-A3 type

Micro operation in position 2



Wrenches and tightening torques

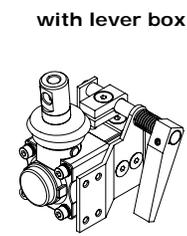
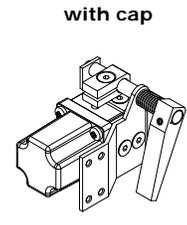
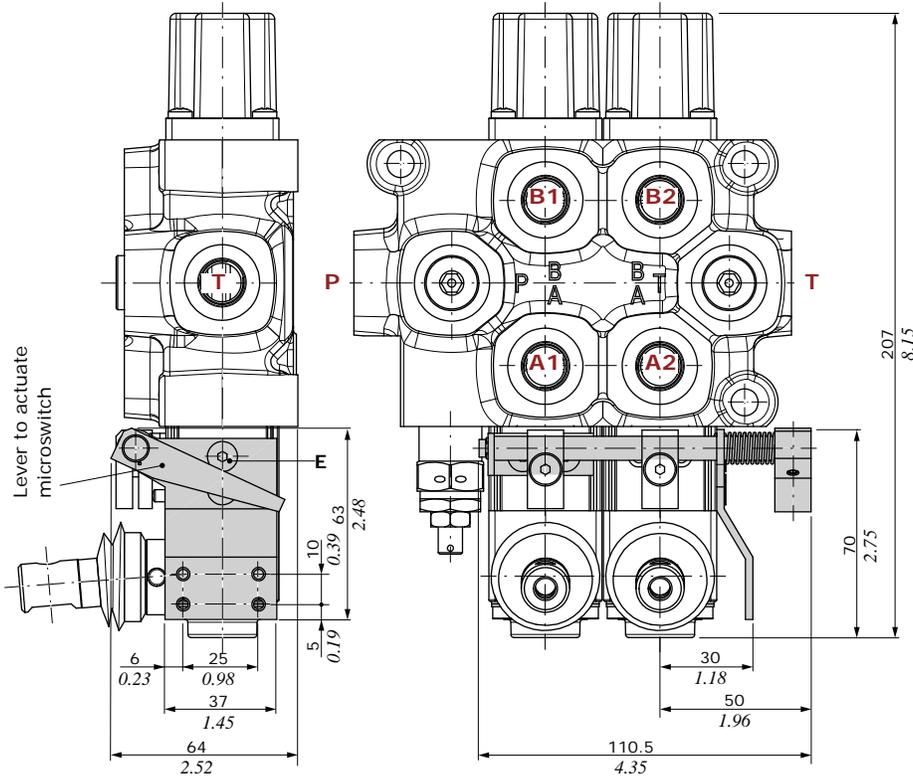
C = allen wrench 3 - 3 Nm (2.2 lbf)

D = cross-head - 3 Nm (2.2 lbf)

A side controls

Spool position microswitch

Microswitch assembly kit for 2 working section (N1-A1 type)



Wrenches and tightening torques
 E = allen wrench 3 - 6.6 Nm (4.8 lbft)

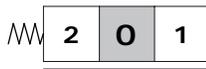
Drawing is referred to a Q25 monoblock valve.

Mechanical controls

With spring return control

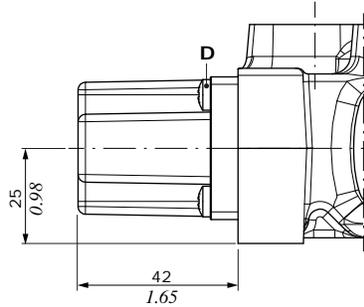
M1 type

3 position, spring return in neutral position.
Available with aluminium cap



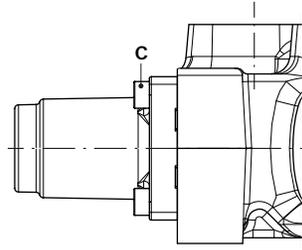
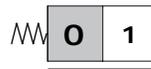
M1/01 type

3 position, for joystick control.
Available with aluminium cap



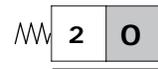
M2 type

2 position (0-1), spring return in neutral position.
Available with aluminium cap



M3 type

2 position (0-2), spring return in neutral position.
Available with aluminium cap

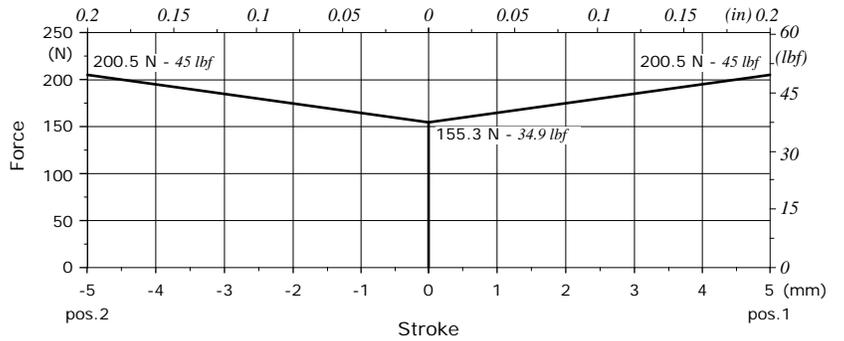


With aluminium cap:
dimensions are the same of standard type

Wrenches and tightening torques

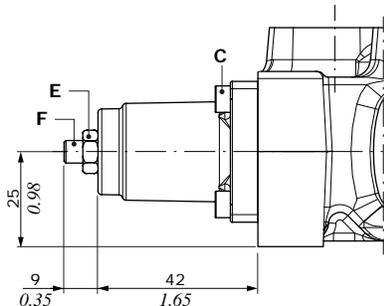
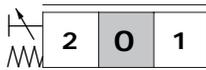
- C = allen wrench 3 - 3 Nm (2.2 lbf_t)
- D = cross-head - 3 Nm (2.2 lbf_t)
- E = wrench 10 - 9.8 Nm (7.2 lbf_t)
- F = allen wrench 4 - 9.8 Nm (7.2 lbf_t)

M1 control type - Force vs. Stroke diagram



M1/02 type

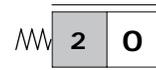
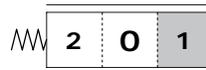
As M1 type, with stroke limiter



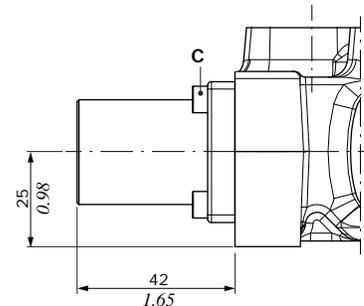
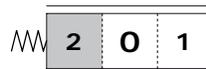
M4 types

2 position (1-2), spring return in position 1

2 position (2-0), spring return in position 2



2 position (2-1), spring return in position 2



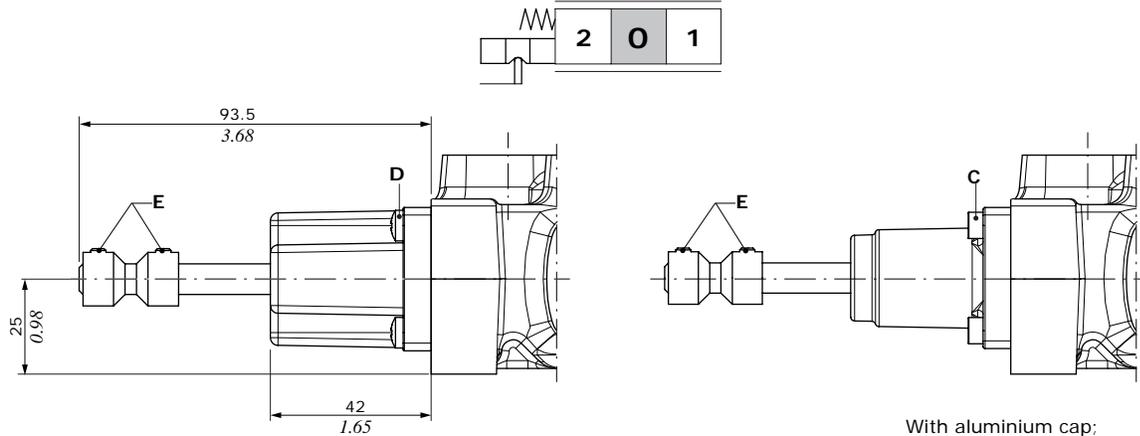
B side controls

Mechanical controls

With spring return control

M1-B1 type

3 position, microswitch arrangement.
Available with aluminium cap

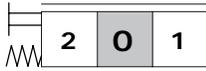


With aluminium cap;
dimensions are the same of standard type

With flexible cable control arrangement

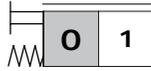
M1-U1 type

3 position, with M8 male thread external pin



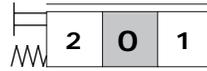
M2-U1 type

2 position (0-1), with M8 male thread external pin



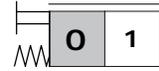
M1-U2 type

3 position, spring return in neutral position



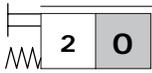
M2-U2 type

2 position (0-1), spring return in neutral position



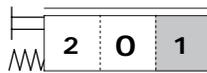
M3-U1 type

2 position (0-2), with M8 male thread external pin



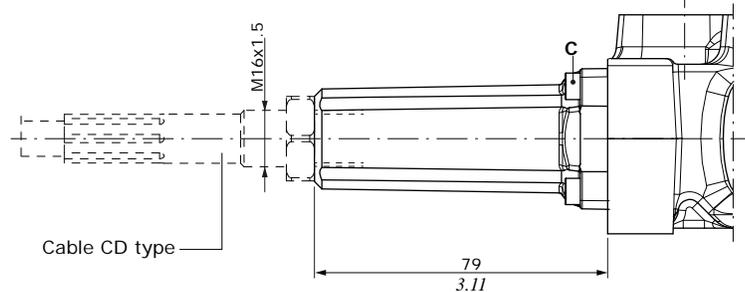
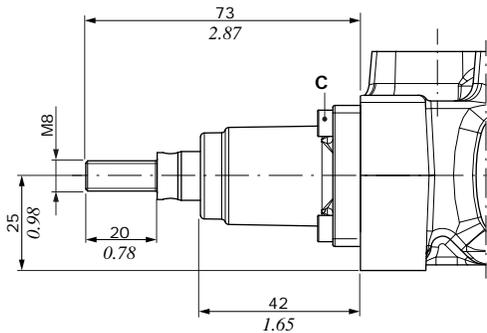
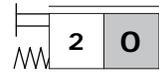
M4-U1 type

2 position (1-2), with M8 male thread external pin



M3-U2 type

2 position (0-2), spring return in neutral position



Wrenches and tightening torques

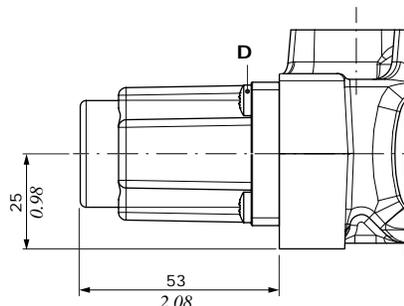
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = allen wrench 3 - 5 Nm (3.68 lbft)

Mechanical controls

With detent control

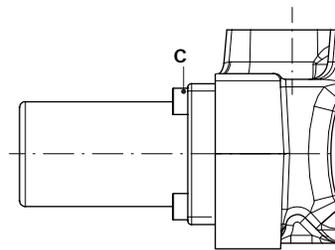
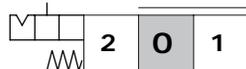
R1 type

3 position, detent in position 1.
Available with aluminium cap



R2 type

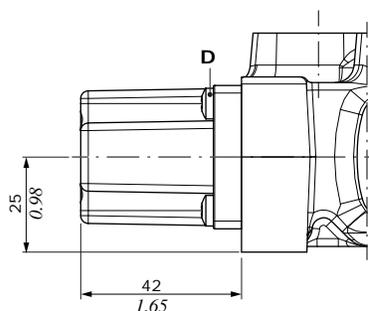
3 position, detent in position 2.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

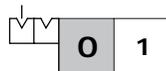
R3 type

3 position,
detent in all position.
Available with aluminium cap



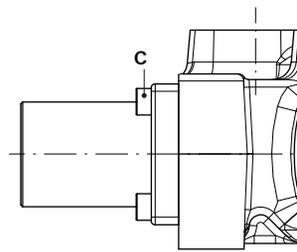
R4 type

2 position,
detent in position 0-1.
Available with aluminium cap



R5 type

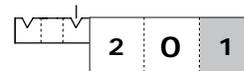
2 position,
detent in position 0-2.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

R6 type

2 position,
detent in position 1-2.
Available with aluminium cap



Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

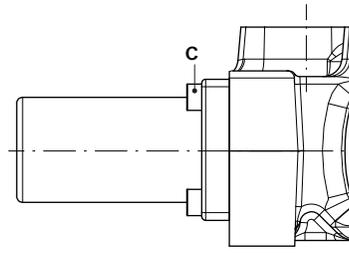
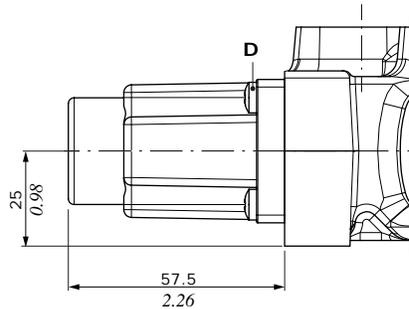
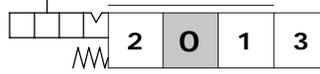
B side controls

Mechanical controls

With detent control

R8 type

4 position, detent in 4th position, for 116 floating spool type.
Available with aluminium cap



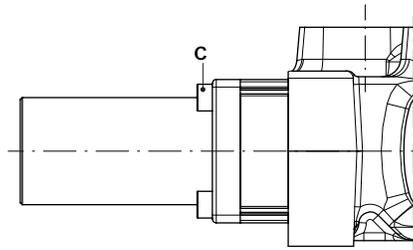
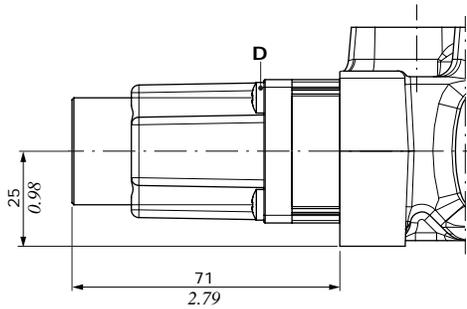
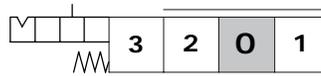
With aluminium cap;
dimensions are the same of standard type

Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = wrench 22 - 32 Nm (23.6 lbft)
- F = wrench 16
- G = allen wrench 10 - 32 Nm (23.6 lbft)

R10/Z1 type

4 position, detent in 4th position, for 126 floating spool type.
Available with aluminium cap

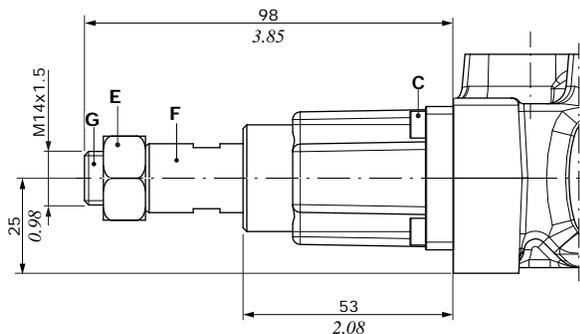
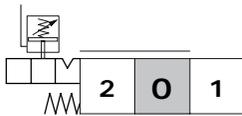


With aluminium cap;
dimensions are the same of standard type

With detent control and kick out function

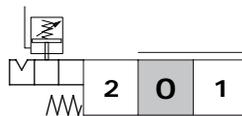
R1K type

3 position, detent in position 1.
Available with aluminium cap



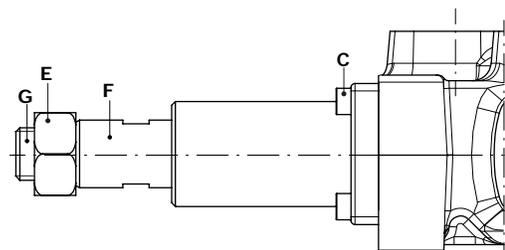
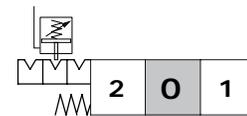
R2K type

3 position, detent in position 2.
Available with aluminium cap



R3K type

3 position, detent in all position.
Available with aluminium cap

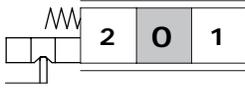


With aluminium cap;
dimensions are the same of standard type

Spool position microswitch

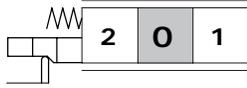
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position.
Available with aluminium cap



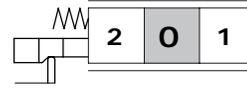
M1-N1A type

3 position, micro operation in position 1.
Available with aluminium cap



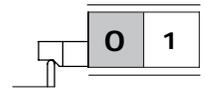
M1-N1B type

3 position, micro operation in position 2.
Available with aluminium cap



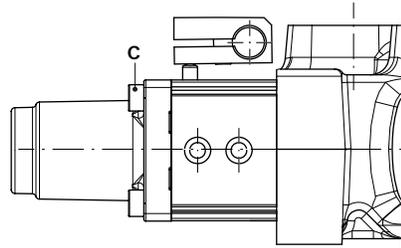
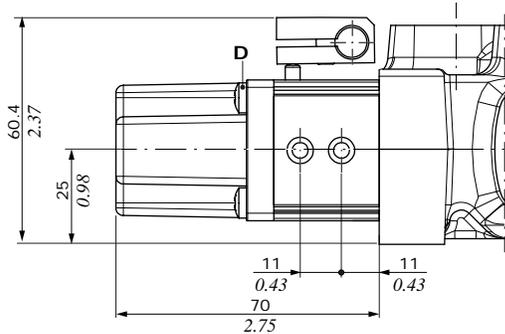
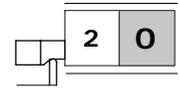
M2-N1 type

2 position (0-1) spring return in neutral position



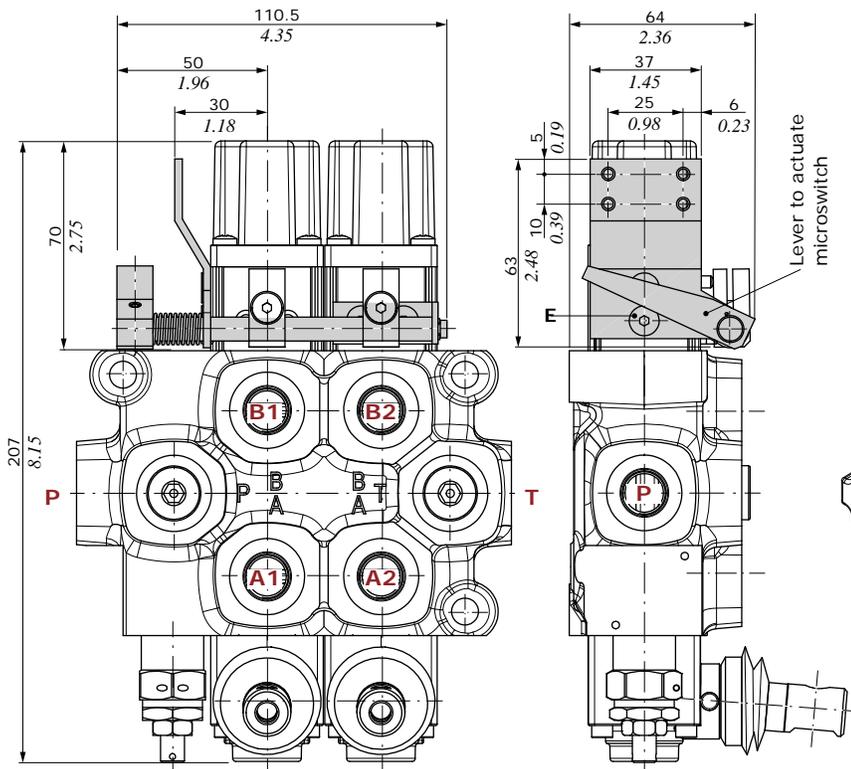
M3-N1 type

2 position (0-2) spring return in neutral position



With aluminium cap; dimensions are the same of standard type

Microswitch assembly kit for 2 working section (M1-N1 type)



Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = allen wrench 3 - 6.6 Nm (4.8 lbft)

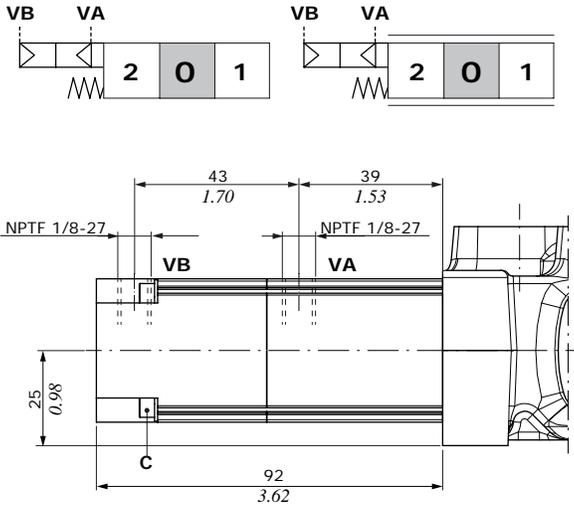
Drawing is referred to a Q25 monoblock valve.

B side controls

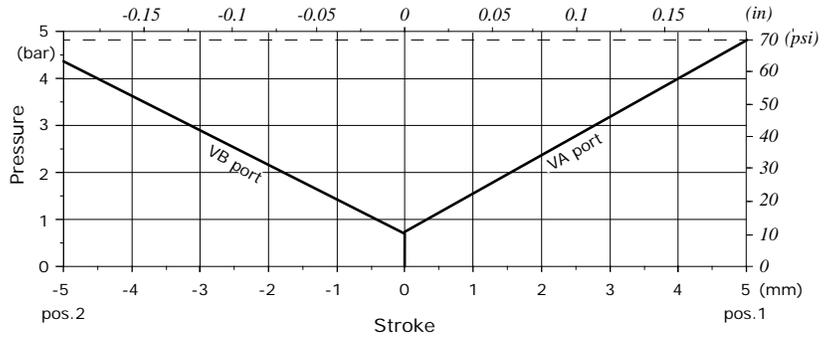
Pneumatic control

P1NW type
ON/OFF control

P1NPW type
Proportional control



Proportional pilot pressure curves



Operating features

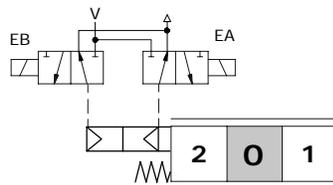
Pilot pressure.....: min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
 Pilot volume.....: 4 cm³/min (0.24 in³/min)

Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

ON/OFF electropneumatic control

D3 type
ON/OFF control



Operating features

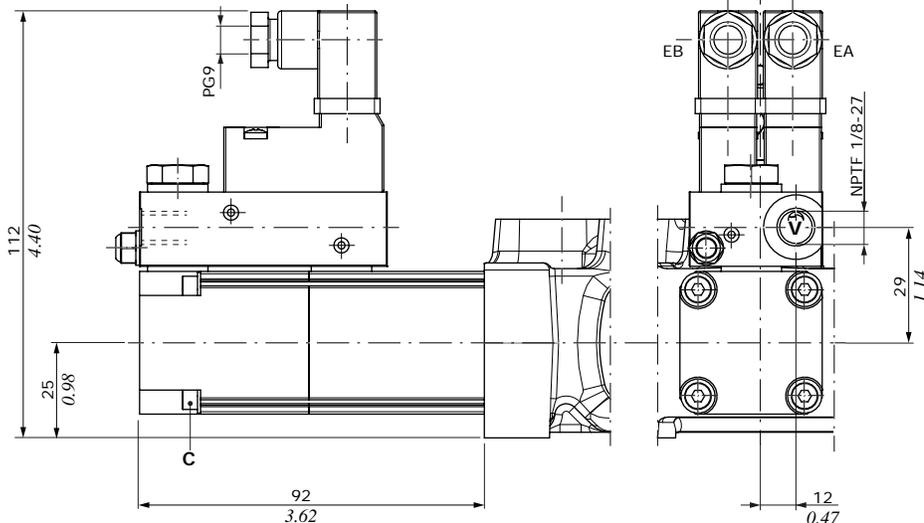
Pilot pressure.....: min. 1 bar (14.5 psi)
 max. 10 bar (145 psi)

COILS

Nominal voltage tolerance.....: -5% +10%
 Power rating.....: 2.3 W
 Nominal current.....: 12 VDC – 24VDC
 Coil insulation.....: Class F
 Weather protection.....: IP65
 Duty cycle.....: 100%

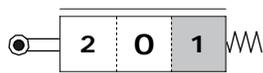
Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

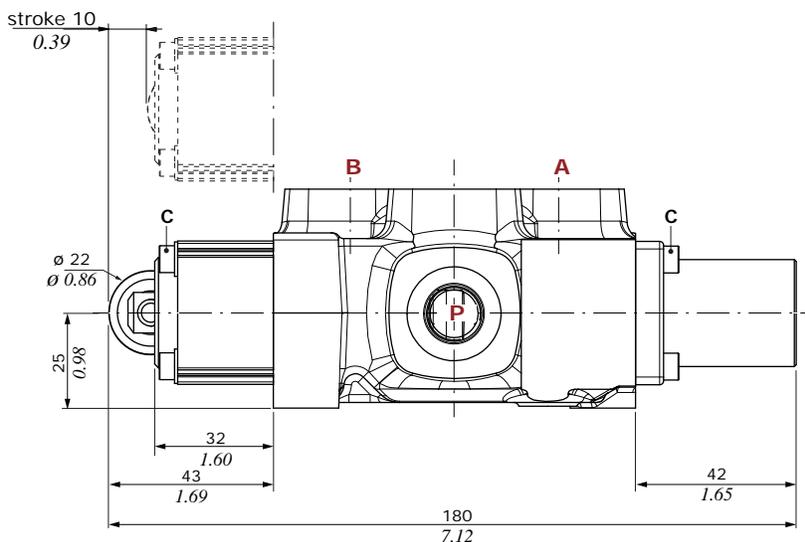


Cam control

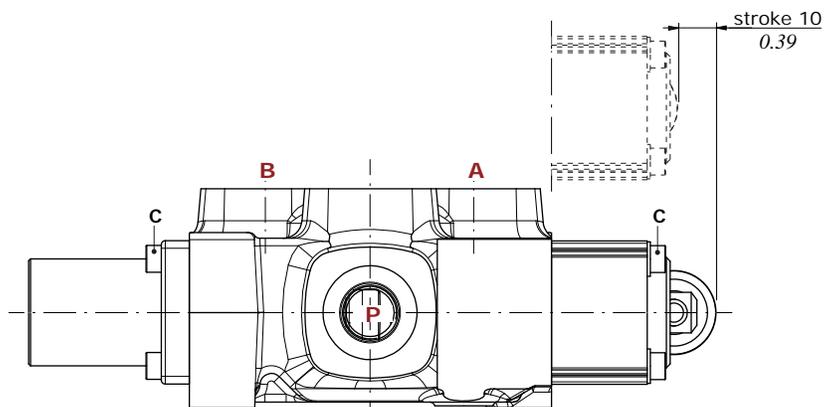
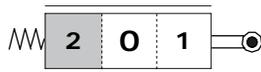
C2 type
From position 1 to position 2,
spring return in position 1



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf^t)

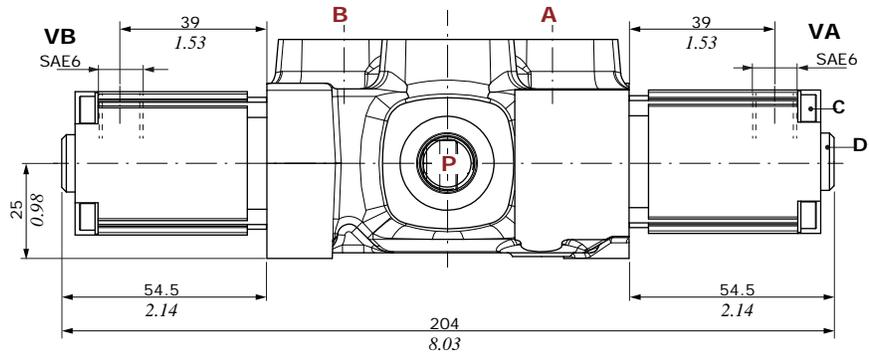
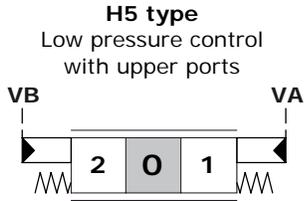


C3 type
From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



A+B side controls

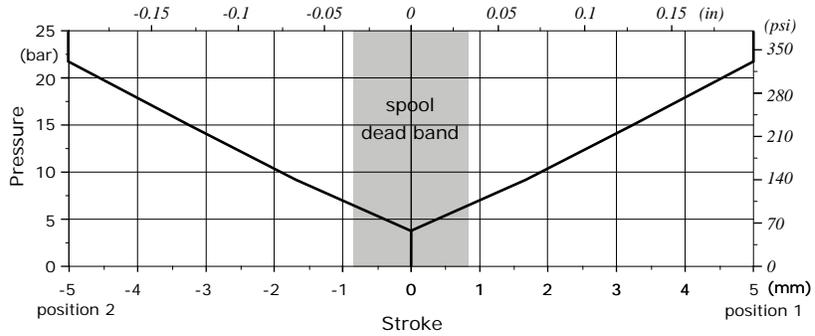
Proportional hydraulic controls



Operating features

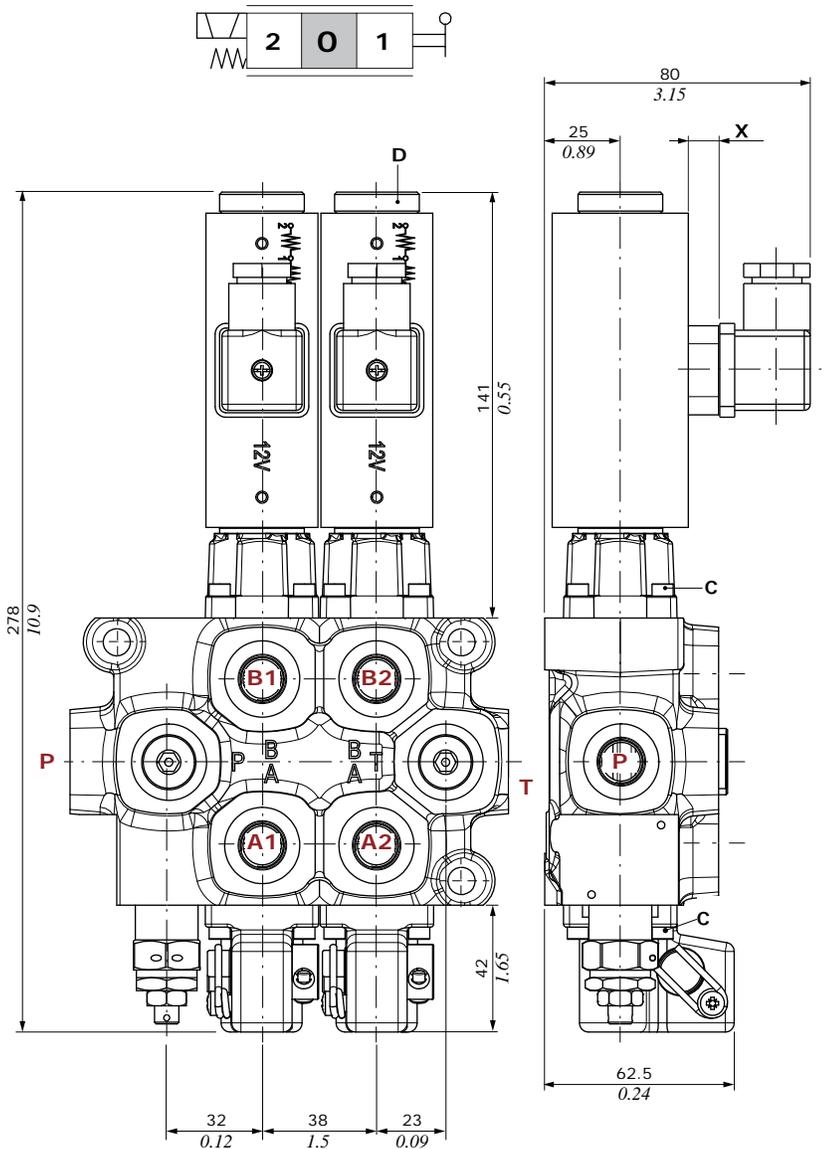
Pilot pressure..... : max. 100 bar (1450 psi)

Stroke vs. Pressure diagram for H5 type control



D41 type: ON/OFF one side

Drawing is referred to a Q25 monoblock valve.



D41 coil	
	Q25 Q45
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	58 W 52 W
Insulance	Class H
Weather protection	IP65

Connector type: ISO4400 3P+T-PG11

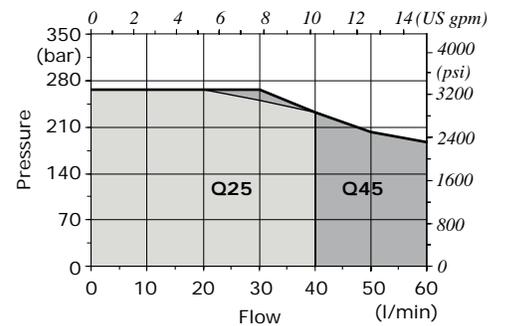
X	
Coil type	mm - in
Q25 ZEB012 coil	10 - 0.39
ZEB024 coil	
Q45 4SLG111200 coil	8 - 0.31
4SLG111200 coil	

Wrenches and tightening torques

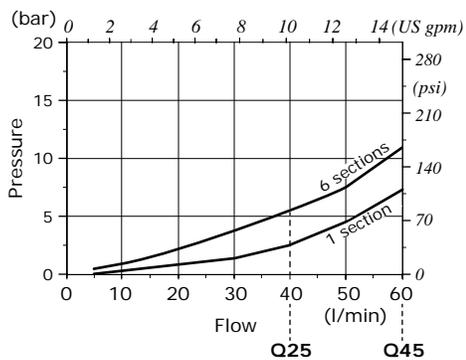
C = allen wrench 3 - 3 Nm (2.2 lbft)

D = manual tightening - 6.6 Nm (7.2 lbft)

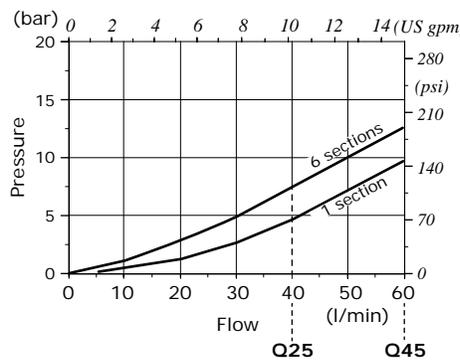
Dynamic conditions



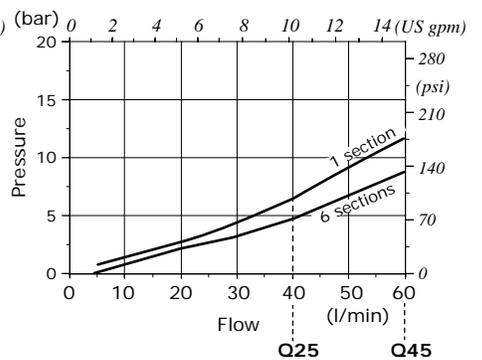
P⇒T pressure drops



P⇒A(B) pressure drops



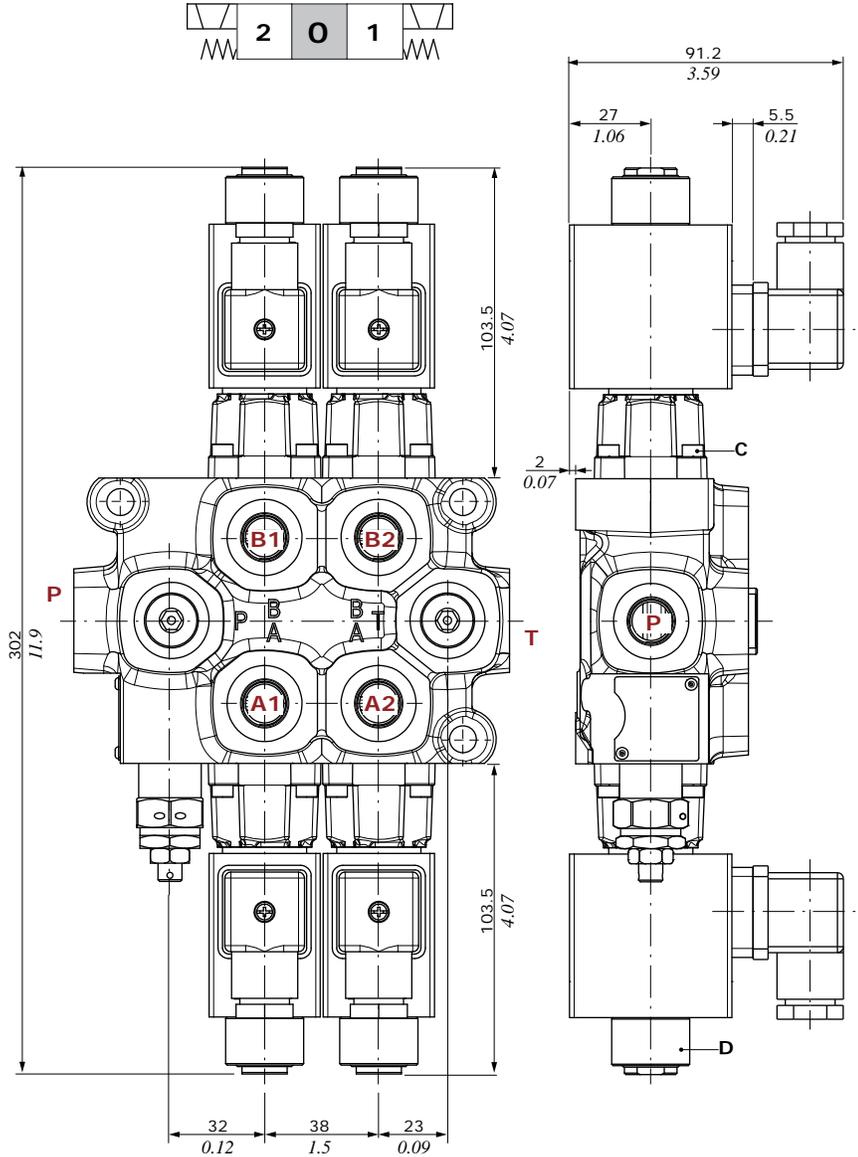
A(B)⇒T pressure drops



Direct solenoid control

D9 type: ON/OFF two side

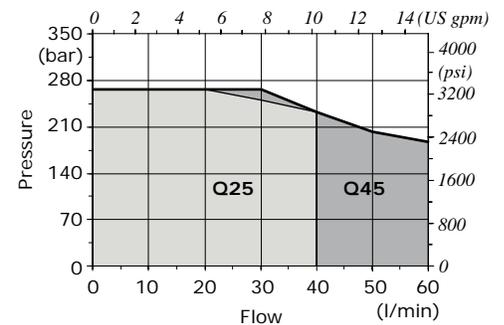
Drawing is referred to a Q25 monoblock valve.



D9 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	58 W
Insulance	Class H
Weather protection	IP65

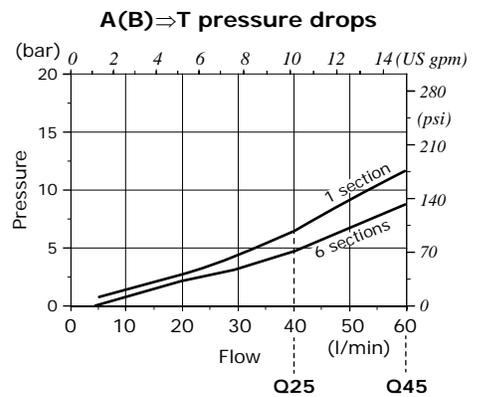
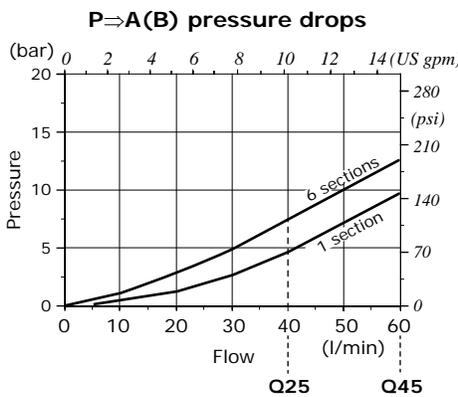
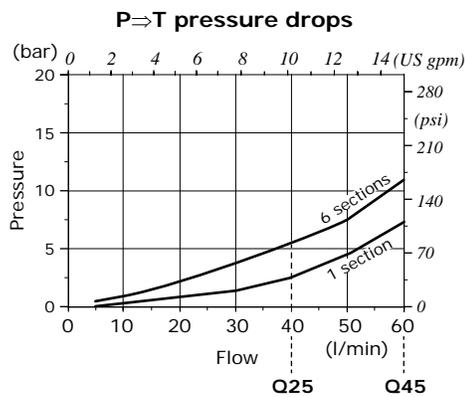
Connector type: ISO4400 3P+T-PG11

Dynamic conditions



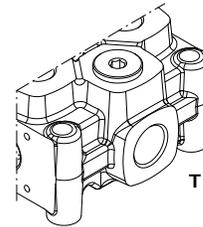
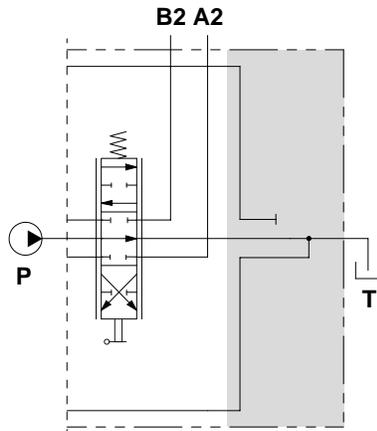
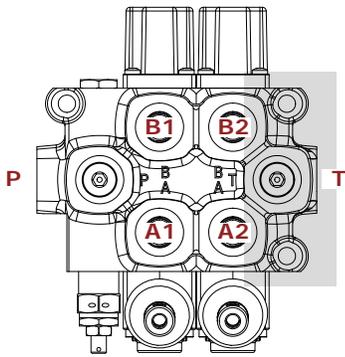
Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)

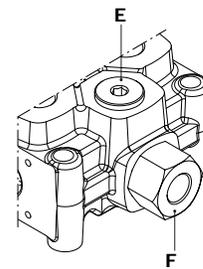
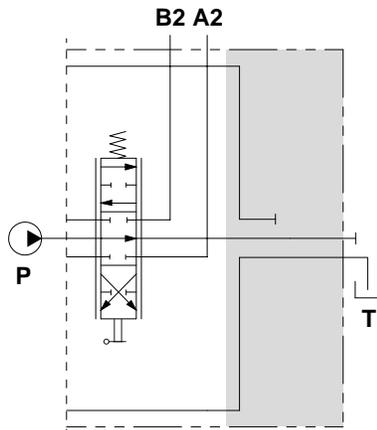
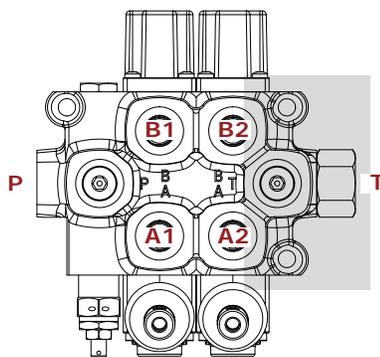


Outlet configuration

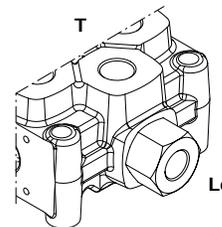
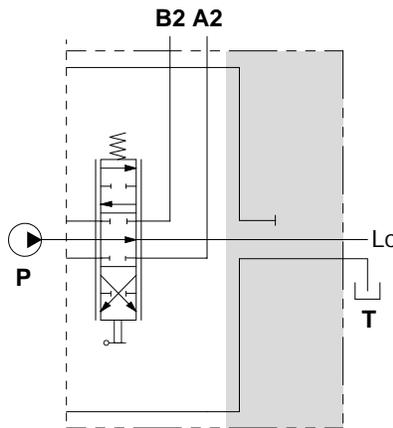
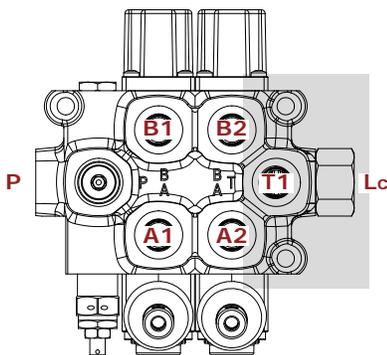
F3D-SAE configuration
Open center configuration



F16D-SAE configuration
Closed center configuration



F6D-SAE configuration
Carry-over configuration



Wrenches and tightening torques

E (Q25) = allen wrench 6 - 24 Nm (17.7 lbft)

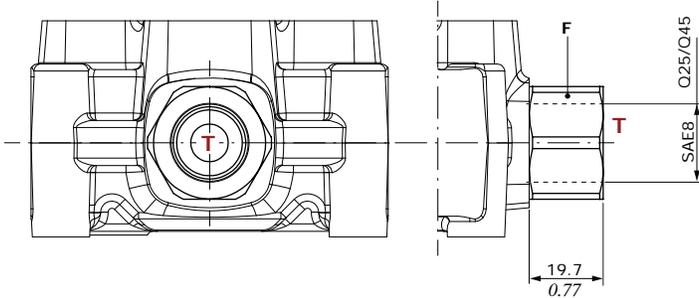
(Q45) = allen wrench 8 - 42 Nm (22 lbft)

F = wrench 30 - 42 Nm (30.9 lbft)

Outlet configuration

F6D - F16D joint dimension

Drawing is referred to a Q25 monoblock valve.



Wrenches and tightening torques
F = wrench 30 - 42 Nm (30.9 lbft)



Q75 - Q95

Monoblock directional valves

- Simple, compact and heavy duty designed monoblock valve
- From 1 to 6 sections
- For open and closed center hydraulic systems, optional carry over port
- Mechanical, pneumatic, electropneumatic, hydraulic and direct solenoid controls

Working conditions

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

	Q75	Q95
Nominal flow rating	80 l/min - (22 Us gpm)	100 l/min - (27 Us gpm)
Max. pressure	270 bar (3900 psi)	
Max. back pressure on outlet T port	25 bar (360 psi)	
Number sections	from 1 to 6	
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	6 cm ³ /min (0.36 in ³ /min)
Fluid	Mineral oil	
Fluid temperature	with NBR (BUNA-N) seals	from -30 °C to 80 °C - from -22 °F to 176 °F
Viscosity	operating range	from 10 to 400 mm ² /s - from 10 to 400 cSt
Max. contamination level	16/14/12 - ISO 4406 - NAS1638 class 6	
Ambient temperature	without electric devices	from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices	from -20 °C to 50 °C - from -4 °F to 122 °F

NOTES - For different conditions please contact our Sales Department.

REFERENCE STANDARD

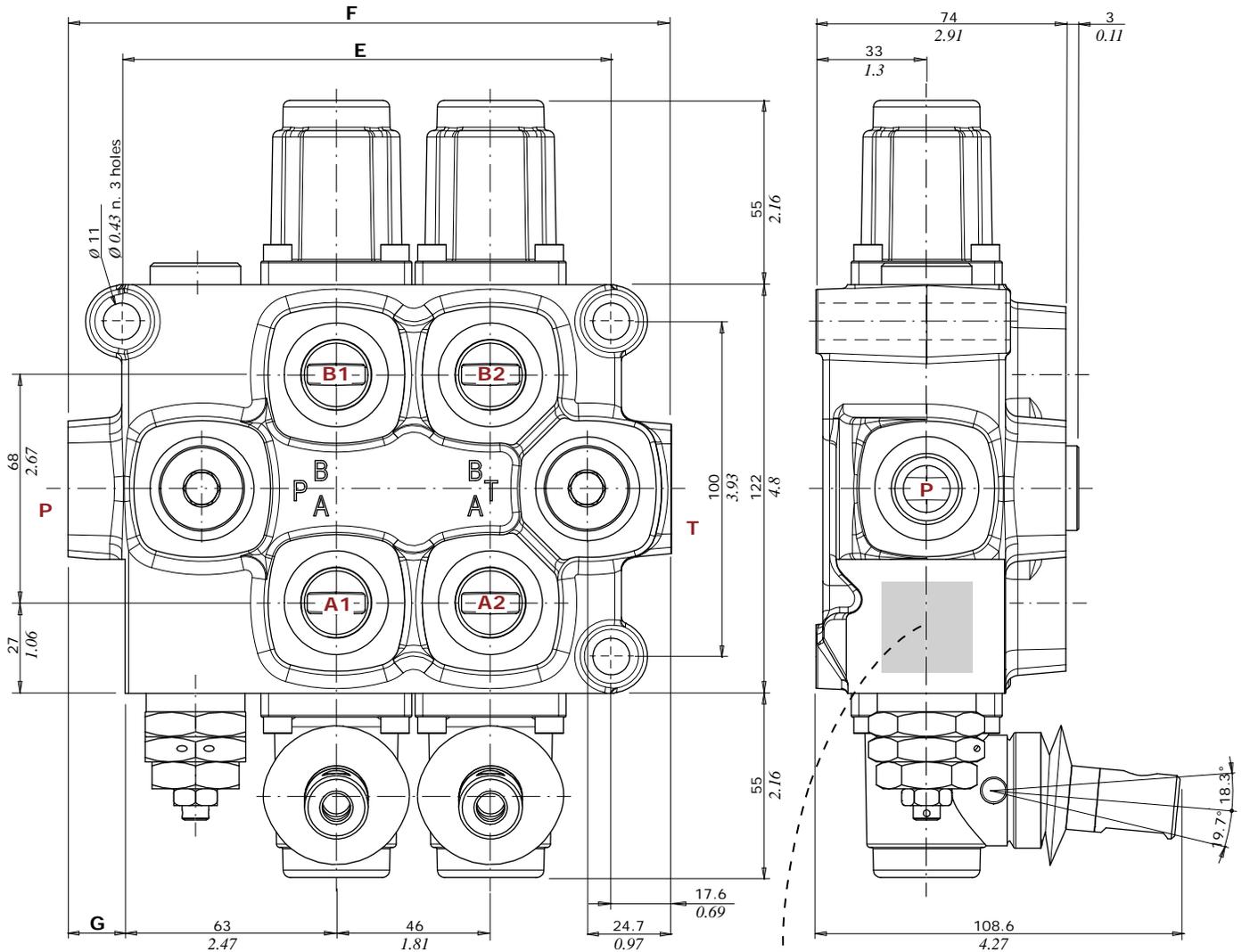
	BSP	UN-UNF
THREAD ACCORDING TO	ISO 228/1	ISO 263
	BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO	11926
	SAE	J11926
	DIN	3852-2 shape X or Y

PORT THREADING

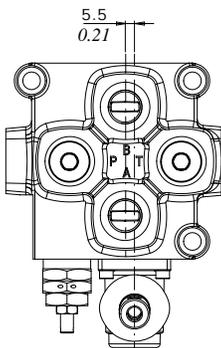
PORTS	Q75		Q95	
	BSP	UN-UNF	BSP	UN-UNF
P Inlet	G 1/2	7/8-14 (SAE 10)	G 3/4	1" 1/16-12 (SAE 12)
P1 Inlet	G 1/2	7/8-14 (SAE 10)	G 3/4	1" 1/16-12 (SAE 12)
A and B ports	G 1/2	7/8-14 (SAE 10)	G 3/4	1" 1/16-12 (SAE 12)
T Outlet	G 3/4	1" 1/16-12 (SAE 12)	G 3/4	1" 1/16-12 (SAE 12)
T1 Outlet	G 1/2	7/8-14 (SAE 10)	G 3/4	1" 1/16-12 (SAE 12)
Lc port (Carry-over plug - T port)	G 1/2	7/8-14 (SAE 10)	G 3/4	7/8-14 (SAE 10)
Hydraulic controls	G 1/4	9/16-18 (SAE 6)	G 1/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

The Q75 and Q95 monoblock valves, have same dimensions but different threads. See port threading on page 51. Drawing are referred to a Q75 monoblock valve.



Directional valve with 1 section



walvoil

MADE IN ITALY
1GB75040009 ----- Product code

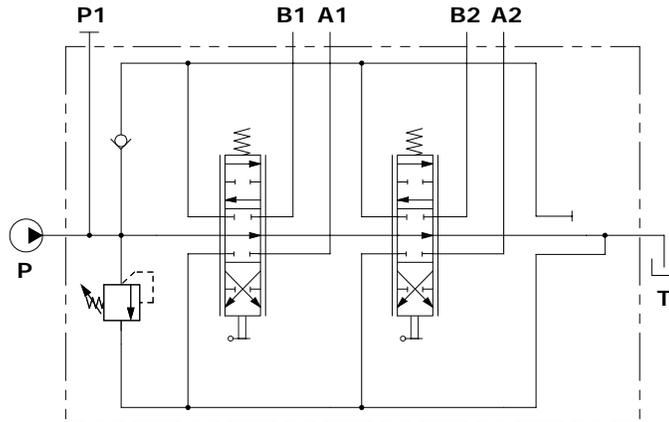
DISTRIBUTORE
Q75/2 ----- Code description

MD1600464-001 ----- Product allotment

----- Datamatrix with product allotment

Type	E		F		G	
	mm	in	mm	in	mm	in
Q75/1 - Q95/1	100	3.93	134	5.27	16.5	0.65
Q75/2 - Q95/2	146	5.75	180	7.08	16.5	0.65
Q75/3 - Q95/3	192	7.56	226	8.89	16.5	0.65
Q75/4 - Q95/4	238	9.37	269	10.59	13.5	0.53
Q75/5 - Q95/5	2.84	11.18	315	12.4	13.5	0.53
Q75/6 - Q95/6	330	13	365	14.67	16.5	0.65

NOTE: Drawings and dimensions are referred to a **BSP** threading configuration.

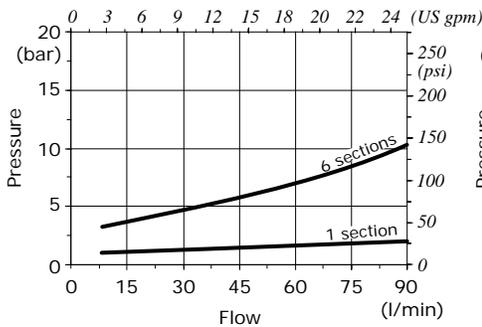


Description example (parallel circuit):
 Q75/2/F1S(R250)/103-A1-M1/103-A1-M1/F3D-SAE
 Q95/2/F1S(R250)/103-A1-M1/103-A1-M1/F3D-SAE

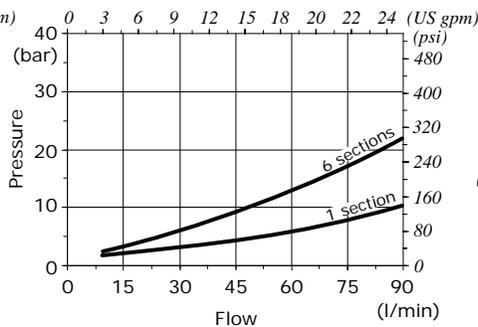
Performance data

Q75

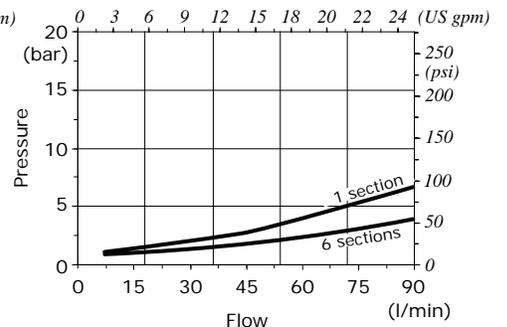
P⇒T pressure drops



P⇒A(B) pressure drops

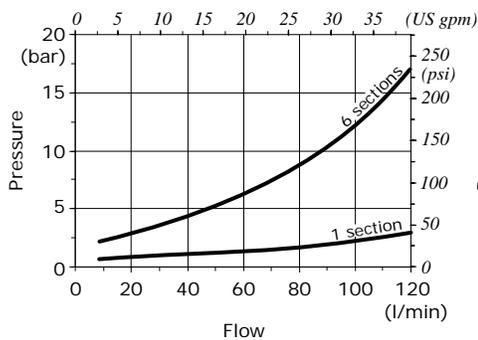


A(B)⇒T pressure drops

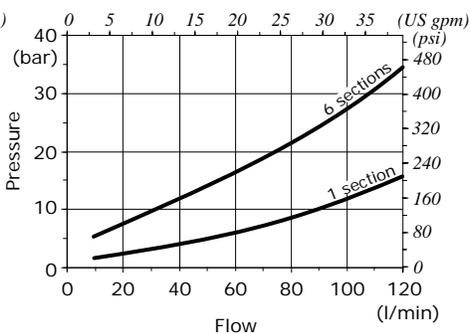


Q95

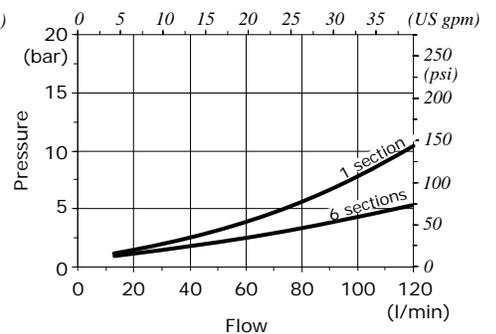
P⇒T pressure drops



P⇒A(B) pressure drops

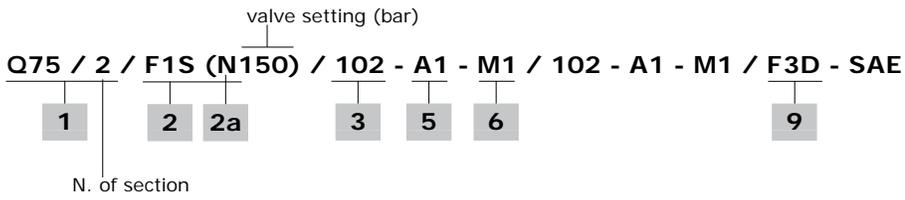


A(B)⇒T pressure drops

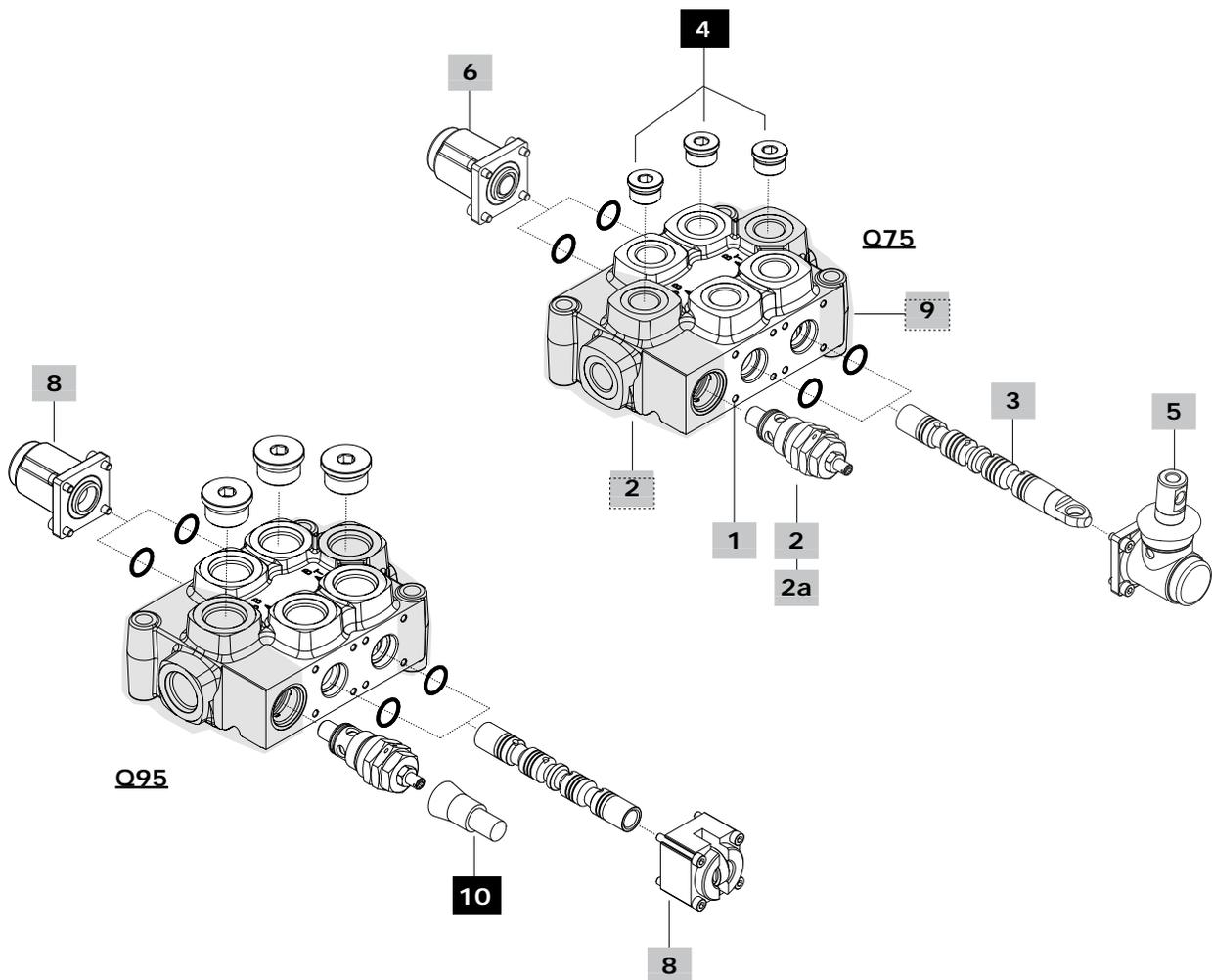
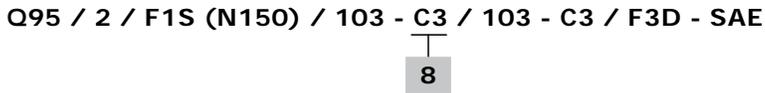


Parts ordering codes

Mechanical control valve configuration example



C2/C3 complete mechanical control valve configuration example



1 Body kit*

The codes are referred to sections with O-ring seals

TYPE	CODE	DESCRIPTION
Q75/1-SAE	5KC0600128155	1 section
Q75/2-SAE	5KC0600128156	2 sections
Q75/3-SAE	5KC0600128157	3 sections
Q75/4-SAE	5KC0600128158	4 sections
Q75/5-SAE	5KC0600127783	5 sections
Q75/6-SAE	5KC0600131404	6 sections

Q95/1-SAE	5KC0600130013	1 section
Q95/2-SAE	5KC0600130685	2 sections
Q95/3-SAE	5KC0600130764	3 sections
Q95/4-SAE	5KC0600132068	4 sections
Q95/5-SAE	5KC0600131719	5 sections
Q95/6-SAE	5KC0600131785	6 sections

2 Inlet configuration* page 59

TYPE	DESCRIPTION
F1S-SAE	With load check and pressure relief valves
F2S-SAE	With load check valve
F7S-SAE	With pressure relief valve
F8S-SAE	Without valves (pressure relief valve plugged port)

Note: Inlet configurations require upper P port plugged: see #4

2a Main pressure relief valve page 60

TYPE: B	CODE: 700065205000000
DESCRIPTION: VLP65S valve, setting range 10-100 bar (145-1450 psi)	
TYPE: N	CODE: 700065105000000
DESCRIPTION: VLP65S valve, setting range 101-200 bar (1460-2900 psi)	
TYPE: R	CODE: 700065305000000
DESCRIPTION: VLP65S valve, setting range 201-380 bar (2910-5500 psi)	
TYPE: -	CODE: 060002788999
DESCRIPTION: Relief valve blanking plug	

3 Spool page 61

TYPE	CODE	DESCRIPTION
Standard spools		
103	060102894999	Double acting, A and B closed in neutral position
	3CUG3051600	As previous one, for kick-out control
106	KR80106	Double acting, for closed circuit
107	KR80107-108	Double acting, A to tank and B closed in neutral position
108	KR80107-108	Double acting, B to tank and A closed in neutral position
111	060102996799	Double acting, A and B to tank in neutral position
114	KR80114	Double acting, A and B to tank in neutral position, for closed circuit
101	3CUG2891900	Single acting on port A (3)
102	3CUG2891901	Single acting on port B (3)
116	3CUG2897800	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
126	3CUG2897801	Double acting, with floating in the 4 th position (spool out): requires dedicated spool control

Note (3): Q75 valve required SAE10 plug, see #4
Q95 valve required SAE12 plug, see #4

Special spools for cam, microswitch controls and other leverless controls

103	060102879199	Double acting, A and B closed in neutral position
111	060102864199	Double acting, A and B to tank in neutral position

4 Plug for single acting spool or P-T ports*

TYPE	CODE	DESCRIPTION
-	255010	SAE10 plug for Q75 body kit
-	255012	SAE12 plug for Q95 body kit

5 A side control page 62

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	08600A1-A2	M10 thread aluminium lever box
A2	08600A1-A2	As A1 type, with lever box rotated 180°
A1/06	08606A1-A2/06	Aluminium lever box with stroke limiter
A2/06	08606A1-A2/06	As A1/06 type, with lever box rotated 180°
A1/Z1	08610A1-2/Z1	Aluminium lever box for 116 spool type
A2/Z1	08610A1-2/Z1	As A1/Z1 type, with lever box rotated 180°

<u>With safety lever control:</u>		
A1/S⁽¹⁾	08624A1-A2/S	M10 thread aluminium lever box
A2/S⁽¹⁾	08624A1-A2/S	As A1/S type, with lever box rotated 180°

<u>Without lever control:</u>		
A6	08620A6	With flange
A8	08622A8	Flexible cable control arrangement
A8/Z1	08622A8/Z1	As A8 type, for 116 spool type

With joystick controls for 2 section operation:

A35/1	08637A35-12	Joystick 1 type
A35/2	08637A35-12	Joystick 2 type
A35/3	08637A35-34	Joystick 3 type
A35/4	08637A35-34	Joystick 4 type

For types 103 and 111 special spools

With spool position microswitch:

Note: To complete the control you must use the assembly kit at #7

N1-A1	08641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
N1A-A1	08642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	08643N1B-A1/A2	Micro operation in pos. 2, with lever box
N1-A3	08648N1-A3L	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	08648N1A-A3	Micro operation in pos. 1, without lever with cap
N1B-A3	08648N1B-A3	Micro operation in pos. 2, without lever with cap

Without lever control:

A3	08614A3	Without lever, with cap
A4	08617A4	M10 male thread external pin with flange
A5⁽²⁾	08619A5	Flange with spherical spool end

(*): Codes are referred to **UN-UNF** thread

(¹): Always complete with lever knob

(²): To be assembled only with M4 control

Parts ordering codes

6 B side control page 67

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	08730M1	3 pos., spring return in neutral position
M1-B1	08753M1-B1	As M1 type, with microswitch arrangement
M1/O1	08730M1/O1	As M1 type, for mechanical joystick
M1/O2	08730M1/O2	As M1 type, with stroke limiter
M1-U1	08701M1-U1	As M1 type, with M10 male thread external pin
M2	08732M2	2 pos. (0-1), spring return in neutral position
M2-U1	08702M2-U1	As M2 type, with M10 male thread external pin
M3	08733M3	2 pos. (0-2), spring return in neutral position
M3-U1	08703M3-U1	As M3 type, with M10 male thread external pin
M4	08734M41-2	2 pos. (1-2), spring return in position 1
	08735M42-1	2 pos. (2-1), spring return in position 2
M4-U1	08704M4-U11-2	As M4 type (1-2), with M10 male thread external pin
<u>With flexible cable control arrangement:</u>		
M1-U2	08715M1-U2	3 pos., spring return in neutral position
M2-U2	08716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	08717M3-U2	2 pos. (0-2), spring return in neutral position
<u>With detent:</u>		
R1	08741R1	3 pos., detent in position 1
R2	08742R2	3 pos., detent in position 2
R3	08743R3	3 pos., detent in all position
R4	08744R4	2 pos., detent in position 0-1
R5	08745R5	2 pos., detent in position 0-2
R6	08746R6	2 pos., detent in position 1-2
R8	08748R8	4 pos., detent in 4 th pos., for 116 type spool
R10/Z1	08750R10/Z1	4 pos., detent in 4 th pos., for 126 type spool
<u>With detent and kick out function:</u>		
R1K	08741R1K	3 pos., detent in position 1
	08741R1K-TS	As previous one, water-proof configuration
R2K	08742R2K	3 pos., detent in position 2
	08742R2K-TS	As previous one, water-proof configuration
R3K	08743R3K	3 pos., detent in all position
	08743R3K-TS	As previous one, water-proof configuration
<u>With spool position microswitch:</u>		
Note: to complete the control you must use the assembly kit at #7		
M1-N1	08766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
M1-N1A	08767M1-N1A	As M1-N1 type, micro operation in pos. 1
M1-N1B	08768M1-N1B	As M1-N1 type, micro operation in pos. 2
M2-N1	08769M2-N1	2 pos. (0-1), spring return in neutral pos.
M3-N1	08772M3-N1	2 pos. (0-2), spring return in neutral pos.
<u>With pneumatic and electropneumatic controls:</u>		
P1N	08561P1-N	ON/OFF pneumatic control
P1NP	08561P1-NP	Proportional pneumatic control
D3	08591D3-V-12DC	12 VDC, ON/OFF electropneumatic control
	08592D3-V-24DC	24 VDC, ON/OFF electropneumatic control

7 Microswitch assembling kit

CODE	DESCRIPTION
08650N1-01	Kit for 1 section
08650N1-02	Kit for 2 sections
08650N1-03	Kit for 3 sections
08650N1-04	Kit for 4 sections
08650N1-05	Kit for 5 sections
08650N1-06	Kit for 6 sections

8 Complete controls A+B sides page 72

TYPE	CODE	DESCRIPTION
<u>For types 103 and 111 special spools</u>		
C2	08792C2-C3	Cam control from pos. 1 to 2
C3	08792C2-C3	Cam control from pos. 2 to 1

9 Outlet configuration* page 75

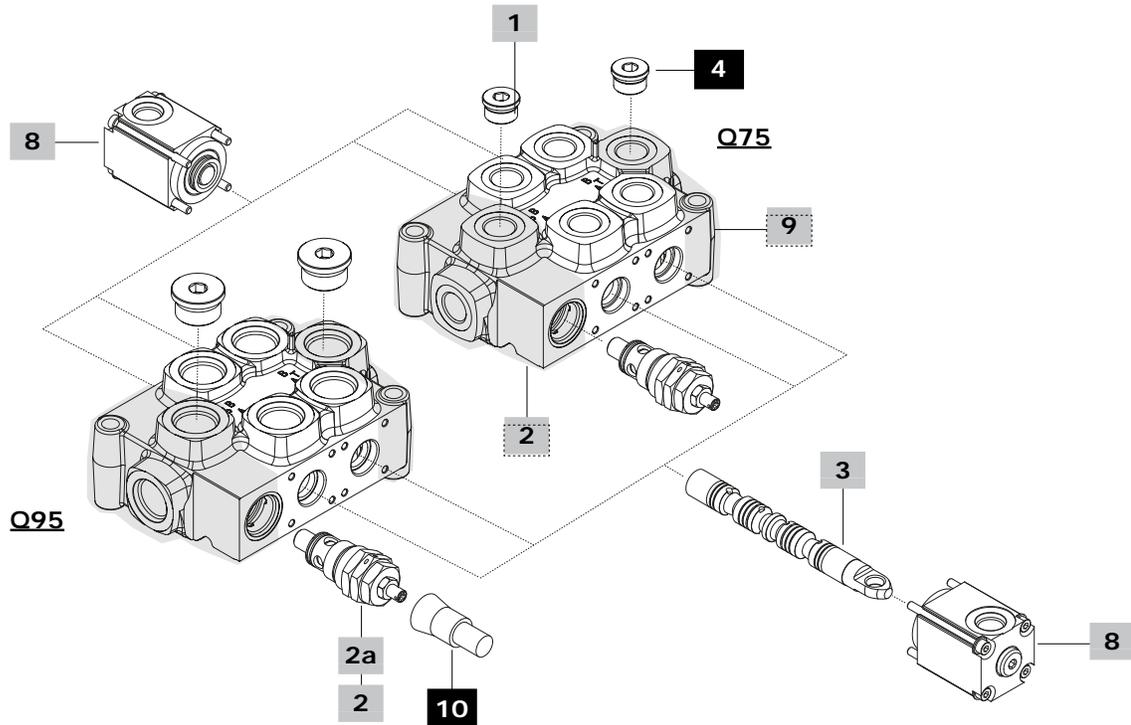
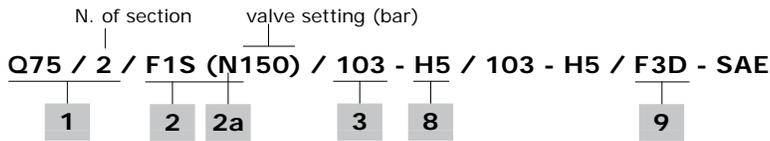
TYPE	DESCRIPTION
F3D-SAE	Open center configuration: for Q75 n. 1 SAE10 plug code 255010, on T1 port; for Q95 n. 1 SAE12 plug code 255012, on T1 port
F6D-SAE	Carry-over configuration: for Q75 n. 1 SAE10 joint code 060002780999, on T port; for Q95 n. 1 SAE10 joint code 060002780999, on T port
F16D-SAE	Closed center configuration: for Q75 n. 1 SAE10 plug code 255010, on T1 port; for Q75 n. 1 SAE10 joint code 060002808099, on T port; for Q95 n. 1 SAE12 plug code 255012, on T1 port; for Q95 n. 1 SAE10 joint code 060002808099, on T port

10 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

(*): Codes are referred to **UN-UNF** thread

Proportional hydraulic controls valve configuration example



1 Body kit* page 59

TYPE	CODE	DESCRIPTION
Q75/1-SAE	5KC0600128155B	1 section
Q75/2-SAE	5KC0600128156B	2 sections
Q75/3-SAE	5KC0600128157B	3 sections
Q75/4-SAE	5KC0600128158B	4 sections
Q75/5-SAE	5KC0600127783B	5 sections
Q75/6-SAE	5KC0600131404B	6 sections

Q95/1-SAE	5KC0600130013B	1 section
Q95/2-SAE	5KC0600130685B	2 sections
Q95/3-SAE	5KC0600130764B	3 sections
Q95/4-SAE	5KC0600132068B	4 sections
Q95/5-SAE	5KC0600131719B	5 sections
Q95/6-SAE	5KC0600131785B	6 sections

2 Inlet configuration* page 59

See #2, page 55

2a Main pressure relief valve page 60

See #2a, page 55

3 Spool page 61

TYPE	CODE	DESCRIPTION
103	060102894999	Double acting, A and B closed in neutral position

4 Plug for P-T ports*

See #4, page 55

8 Hydraulic controls A+B sides* page 73

TYPE	CODE	DESCRIPTION
H5	08785H5/SAE	Low pressure proportional type, upper ports

9 Outlet configuration* page 75

See #9, page 56

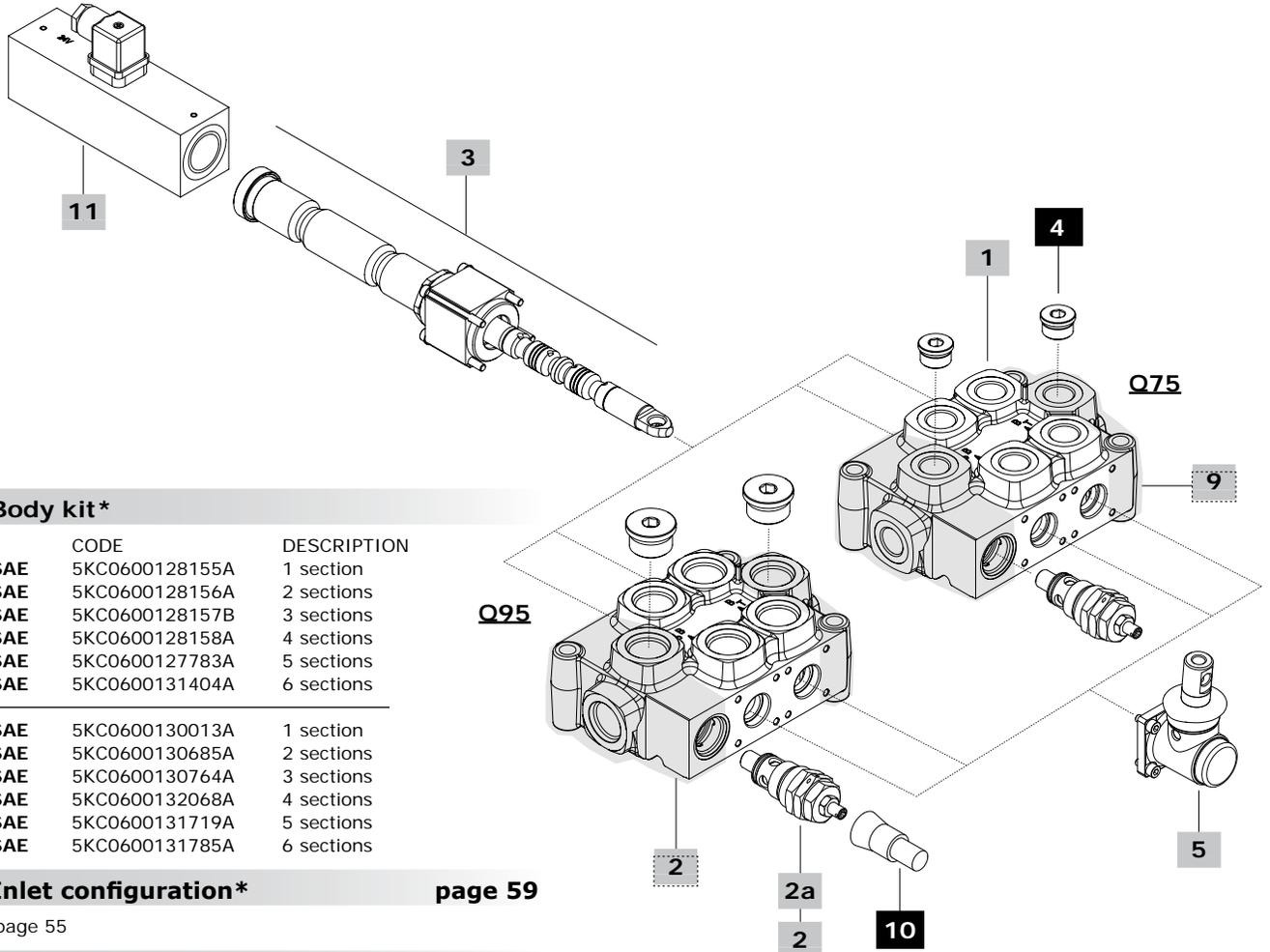
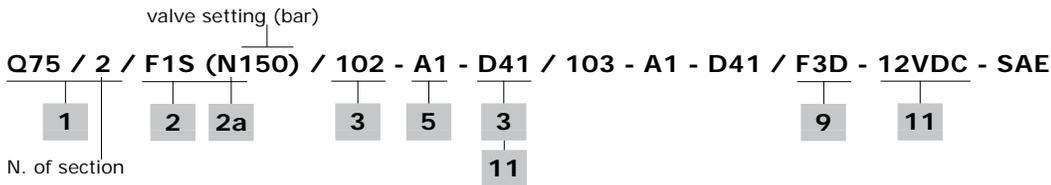
10 Accessory

See #10, page 56

(*): Codes are referred to UN-UNF thread

Parts ordering codes

One side - ON/OFF direct solenoid control valve configuration example



1 Body kit*

TYPE	CODE	DESCRIPTION
Q75/1-SAE	5KC0600128155A	1 section
Q75/2-SAE	5KC0600128156A	2 sections
Q75/3-SAE	5KC0600128157B	3 sections
Q75/4-SAE	5KC0600128158A	4 sections
Q75/5-SAE	5KC0600127783A	5 sections
Q75/6-SAE	5KC0600131404A	6 sections

Q95/1-SAE	5KC0600130013A	1 section
Q95/2-SAE	5KC0600130685A	2 sections
Q95/3-SAE	5KC0600130764A	3 sections
Q95/4-SAE	5KC0600132068A	4 sections
Q95/5-SAE	5KC0600131719A	5 sections
Q95/6-SAE	5KC0600131785A	6 sections

2 Inlet configuration* page 59

See #2, page 55

2a Main pressure relief valve page 60

See #2a, page 55

3 Solenoid control page 74

TYPE	CODE	DESCRIPTION
103	X0601030059	Tube assembly with double acting spool, A and B closed in neutral position
111	X0601030043	Tube assembly with double acting spool, A and B to tank in neutral position
101	X0601030060A	Tube assembly with single acting spool on port A (1)
102	X0601030060B	Tube assembly with single acting spool on port B (1)

Note (1): Q75 valve required SAE10 plug, see #4
Q95 valve required SAE12 plug, see #4

4 Plug for single acting spool or P-T ports*

See #4, page 55

5 A side control page 74

TYPE	CODE	DESCRIPTION
A1	08600A1-A2	M10 thread cast iron lever box
A2	08600A1-A2	As A1 type, with lever box rotated 180°

9 Outlet configuration* page 75

See #9, page 56

10 Accessory

See #10, page 56

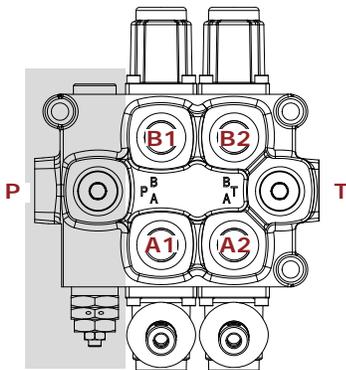
11 Coil page 74

TYPE	CODE	DESCRIPTION
-	ZEB112	12 VDC ISO4400 coil
-	ZEB124	24 VDC ISO4400 coil

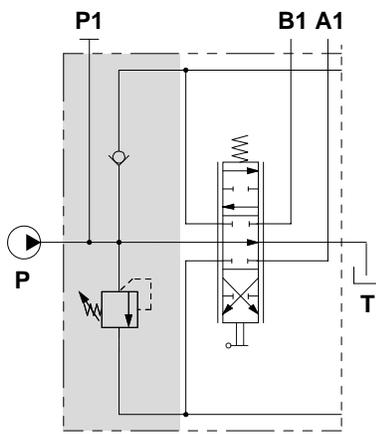
Note: The connector is included

(*): Codes are referred to UN-UNF thread

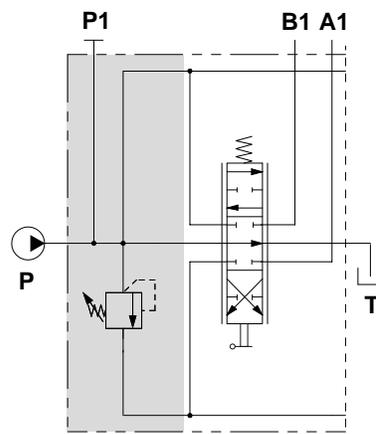
Inlet configuration



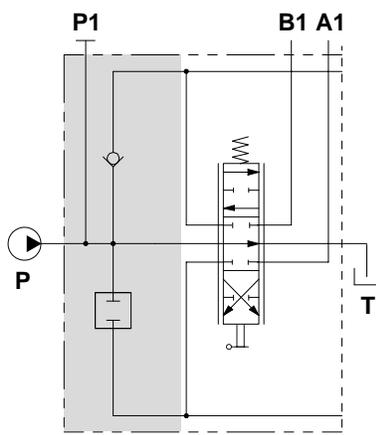
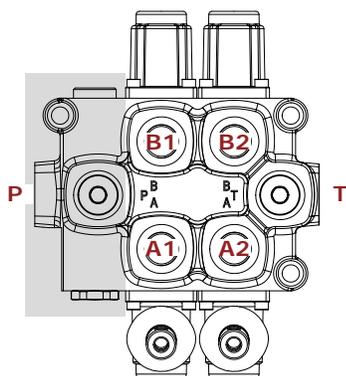
F1S-SAE configuration
With load check and pressure relief valve



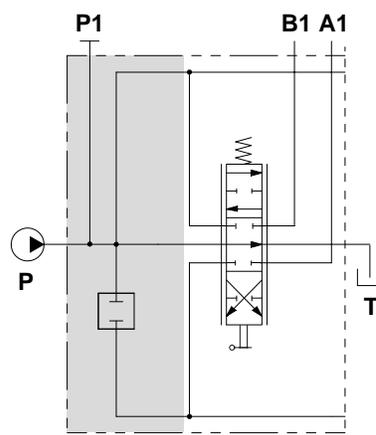
F7S-SAE configuration
With pressure relief valve



F2S-SAE configuration
With load check valve

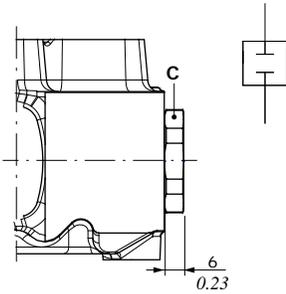


F8S-SAE configuration
Without valves
(pressure relief valve plugged port)

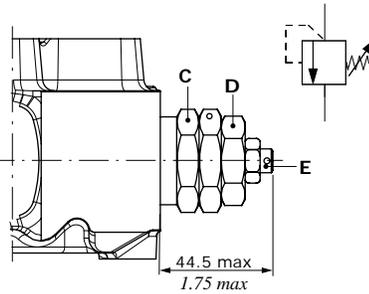


Main pressure relief valve

Relief valve blanking plug

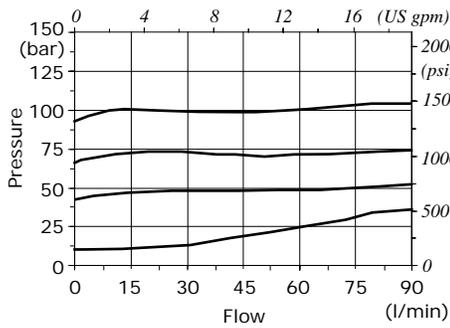


Main pressure relief valve

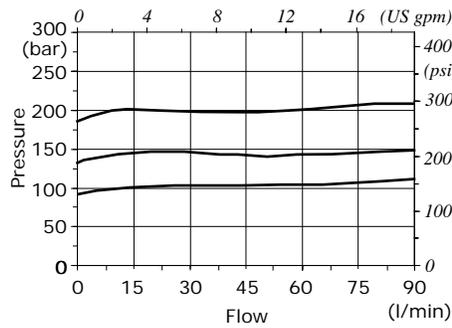


Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

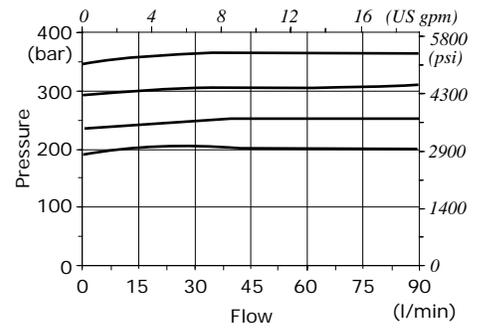
Setting example (B type spring)



Setting example (N type spring)



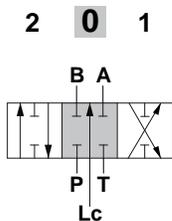
Setting example (R type spring)



Wrenches and tightening torques

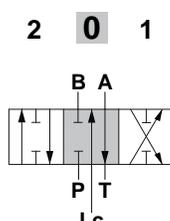
- C = wrench 30 - 80 Nm (59 lbft)
- D = wrench 26 - 42 Nm (35.2 lbft)
- E = allen wrench 4

103 type
A and B closed
in neutral position



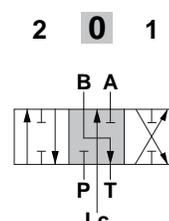
Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

107 type
A to tank, B closed
in neutral position



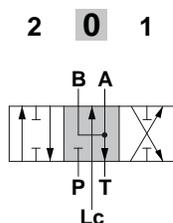
Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

108 type
B to tank, A closed
in neutral position



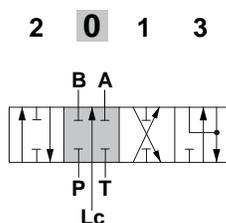
Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

111 type
A and B to tank
in neutral position



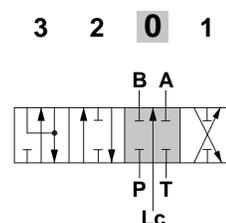
Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

116 type
With floating in the 4th position
(spool in)



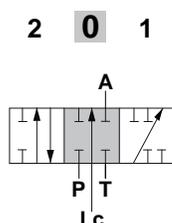
Stroke
Position 1: - 7 mm (+ 0.27 in)
Position 2: + 7 mm (+ 0.27 in)
Position 3: - 10.25 mm (- 0.40 in)

126 type
With floating in the 4th position
(spool out)



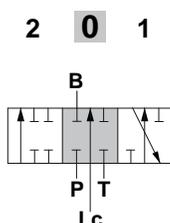
Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (+ 0.27 in)
Position 3: + 10.25 mm (- 0.40 in)

101 type
Single acting on A,
B plugged



Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

102 type
Single acting on B,
A plugged



Stroke
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

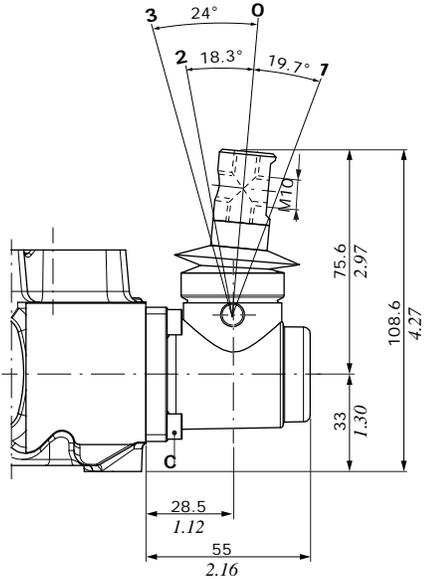
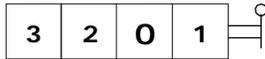
A side controls

Mechanical controls

With lever control

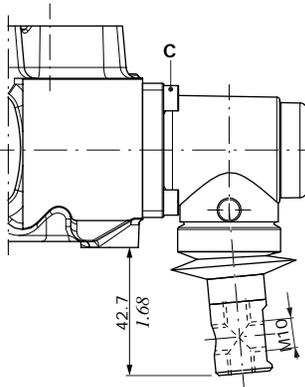
A1 type

M10 thread aluminium lever box



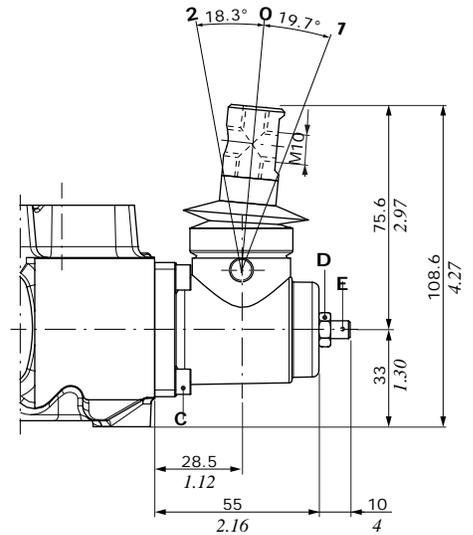
A2 type

As A1 type, rotated 180°



A1/06 type

M10 thread, with stroke limiter



A1/Z1 type

M10 thread, for 116 floating spool type



Wrenches and tightening torques

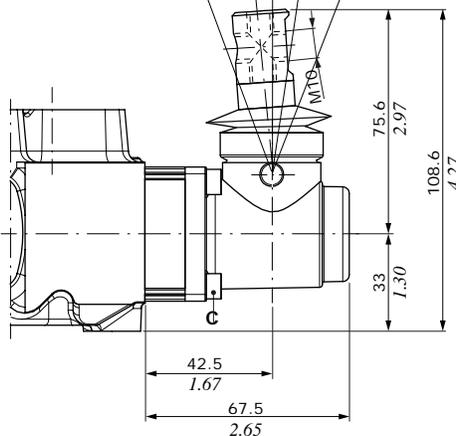
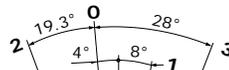
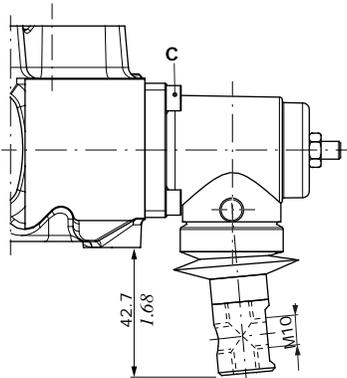
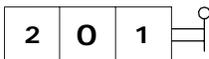
C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)

D = wrench 10 - 9.8 Nm (7.2 lbf^t)

E = allen wrench 4 - 9.8 Nm (7.2 lbf^t)

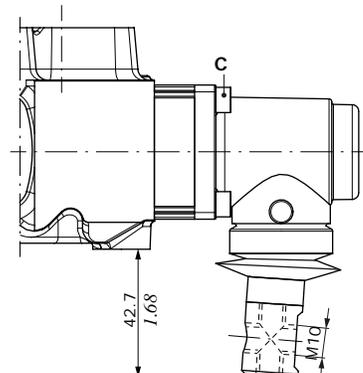
A2/06 type

As A1/06 type, rotated 180°



A2/Z1 type

As A1/Z1 type, rotated 180°



Mechanical controls

With safety lever control

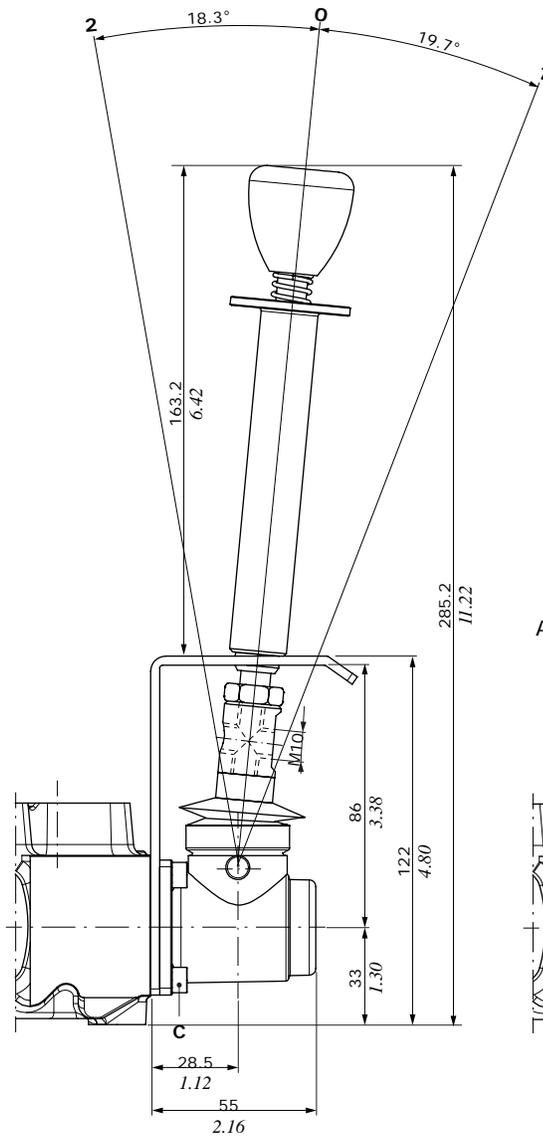
A1/S type

M10 thread, aluminium lever box



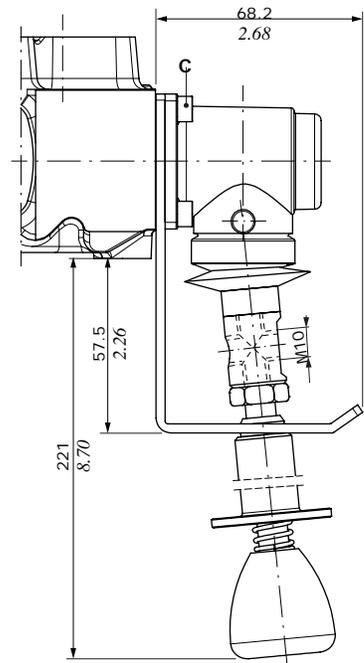
Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)



A2/S type

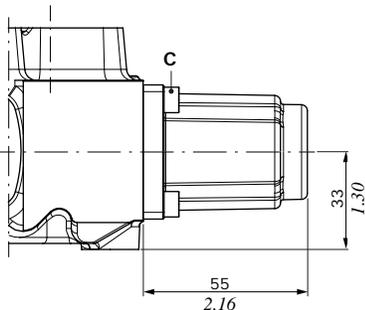
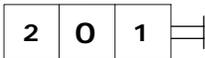
As A1/S type, rotated 180°



Without lever control

A3 type

With cap



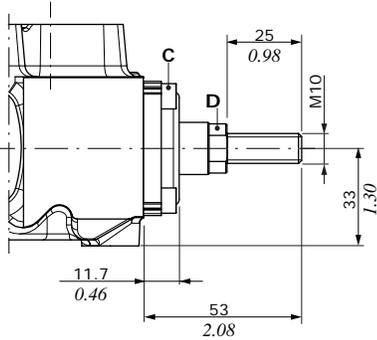
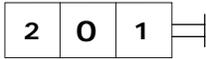
A side controls

Mechanical controls

Without lever control

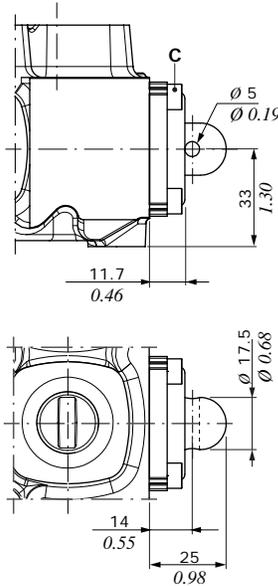
A4 type

M10 male thread
external pin with flange



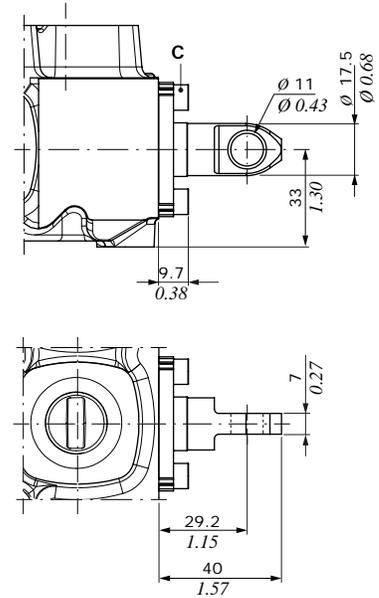
A5 type

Flange with spherical spool end



A6 type

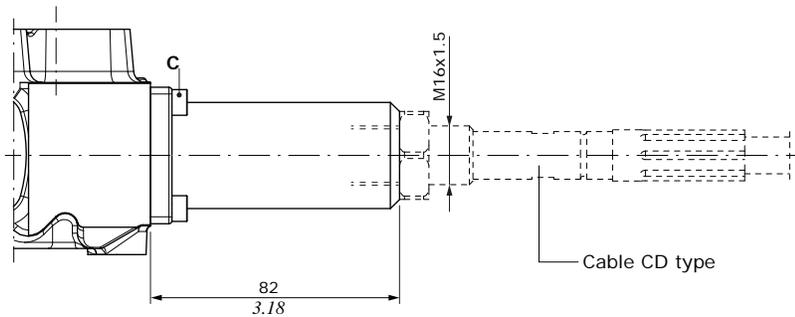
With flange



With flexible cable control arrangement

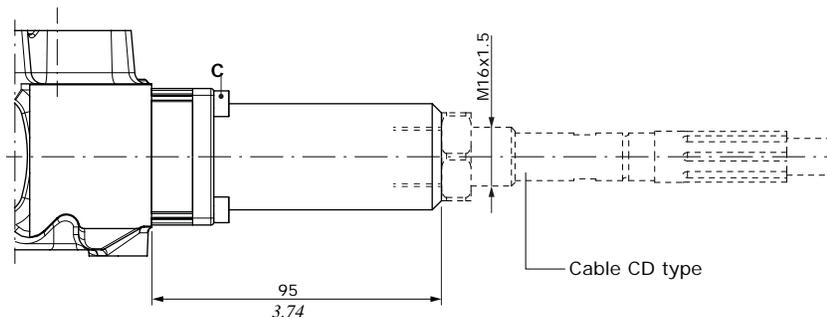
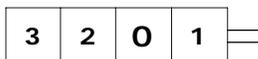
A8 type

Flexible cable control arrangement



A8/Z1 type

As A8 type,
for 116 floating spool type



Wrenches and tightening torques

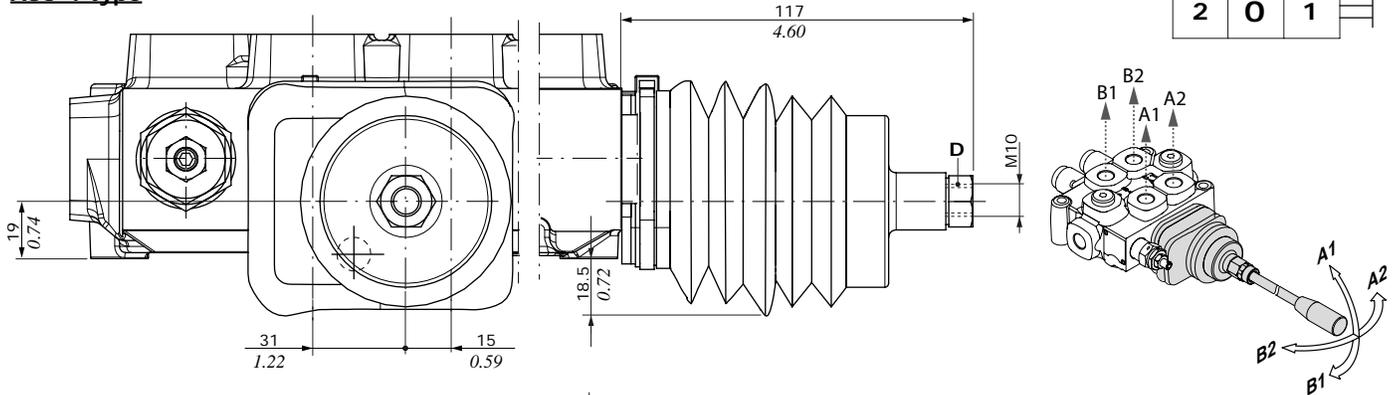
C = allen wrench 4 - 6.6 Nm (4.8 lbft)

D = wrench 13 - 9.8 Nm (7.2 lbft)

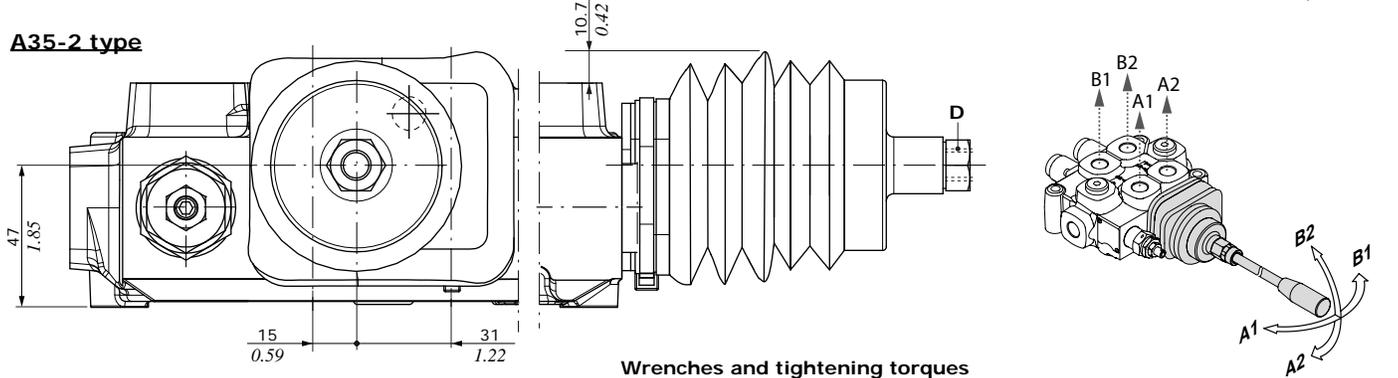
Joystick controls

For operating the joystick control in the floating position, contact Sales Department.

A35-1 type

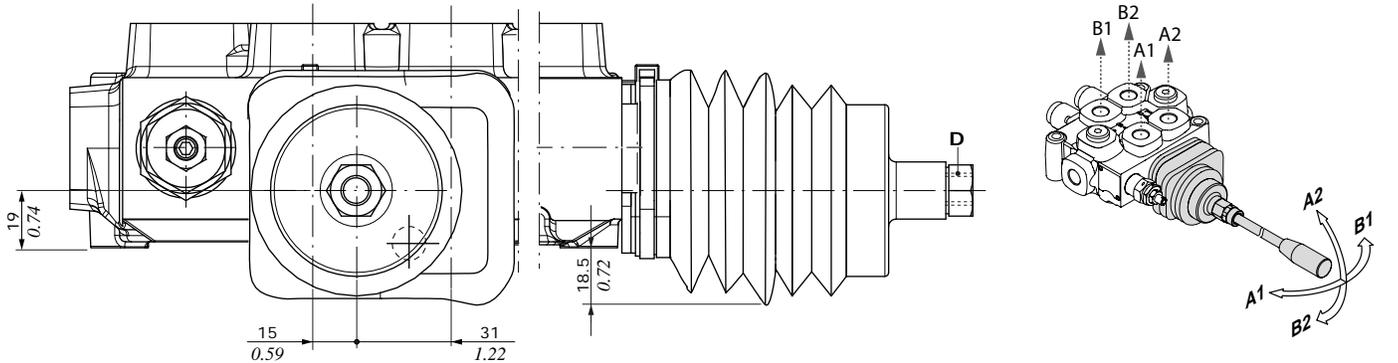


A35-2 type

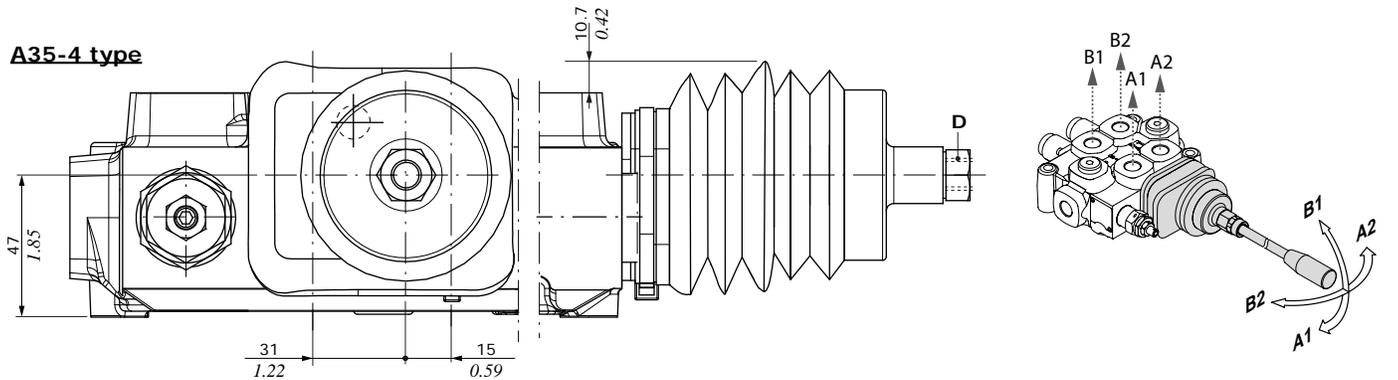


Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbf)

A35-3 type



A35-4 type

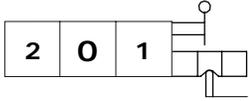


A side controls

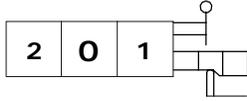
Spool position microswitch

With lever control

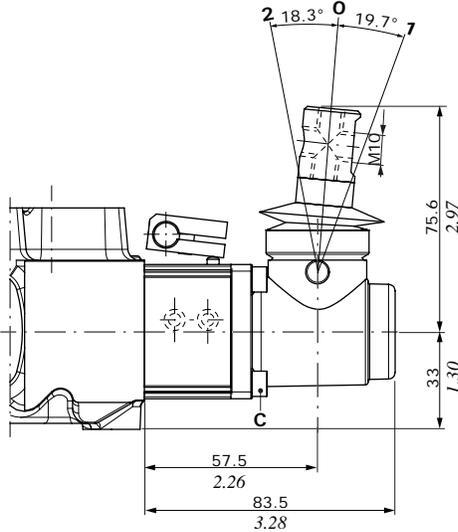
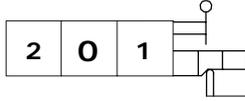
N1-A1 type
Micro operation
in position 1 and 2



N1A-A1 type
Micro operation in
position 1

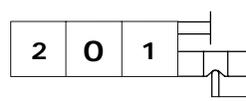


N1B-A1 type
Micro operation in
position 2

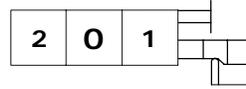


Without lever control, with cap

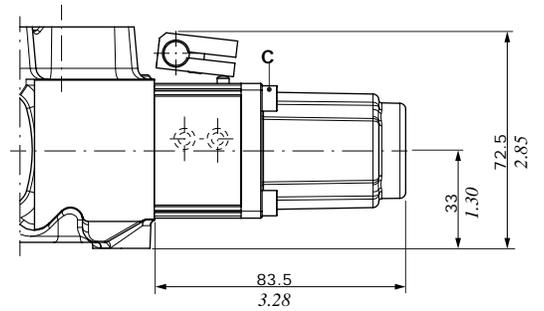
N1-A3 type
Micro operation
in position 1 and 2



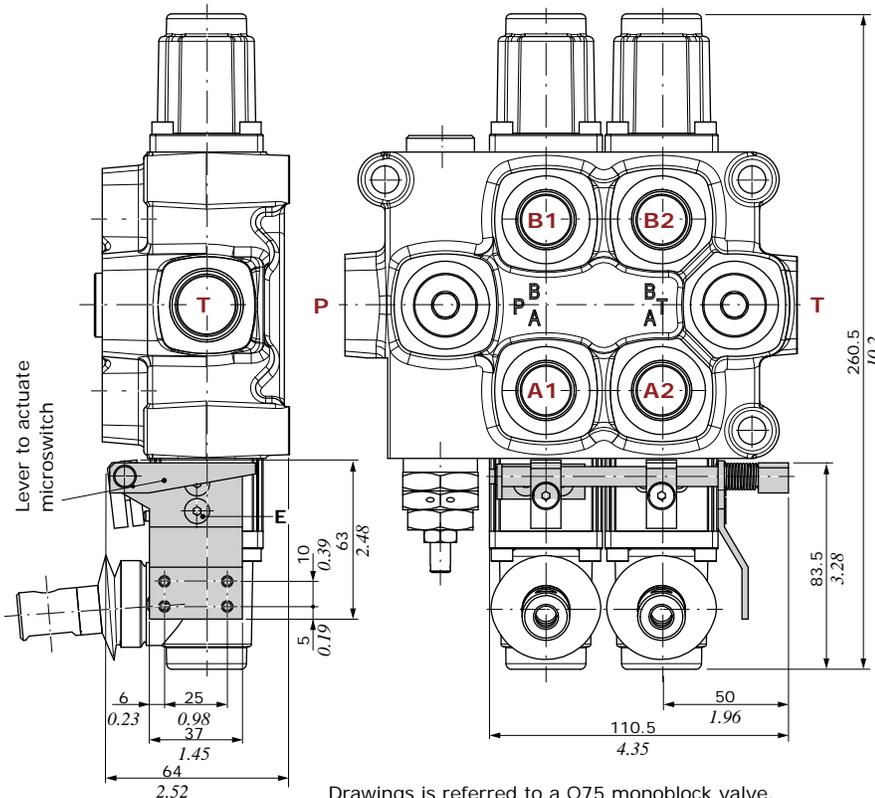
N1A-A3 type
Micro operation in
position 1



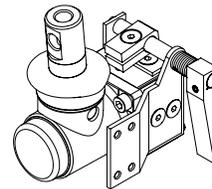
N1B-A3 type
Micro operation in
position 2



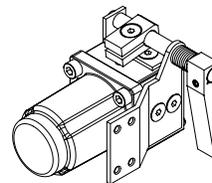
Microswitch assembly kit for 2 working section (N1-A1 type)



with lever box



with cap



Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)

E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Drawings is referred to a Q75 monoblock valve.

Mechanical controls

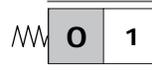
With spring return control

M1 type
3 position, spring return
in neutral position



M1/O1 type
3 position,
for joystick control

M2 type
2 position (0-1), spring return
in neutral position

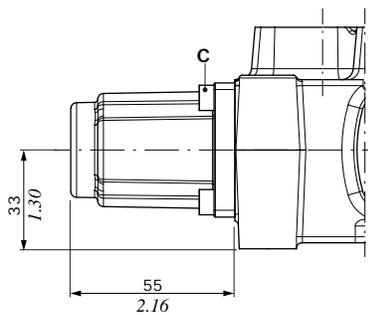
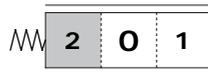


M3 type
2 position (0-2), spring return
in neutral position

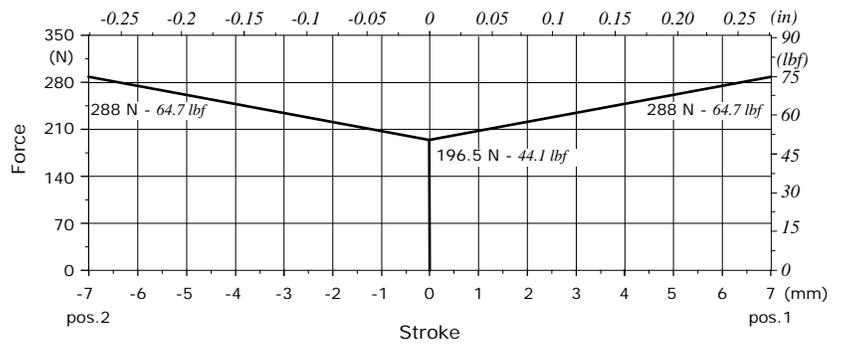


M4 types

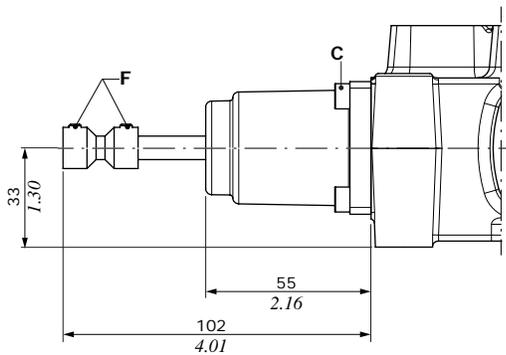
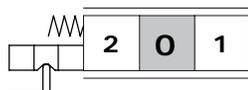
2 position (1-2),
spring return in position 1 2 position (2-1),
spring return in position 2



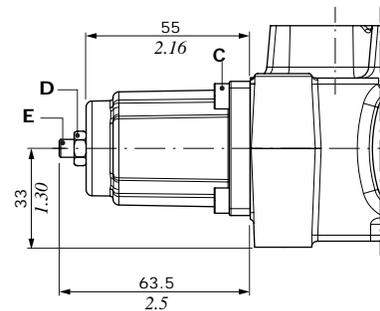
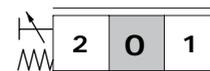
M1 control type - Force vs Stroke diagram



M1-B1 type
3 position,
microswitch arrangement



M1/O2 type
As M1 type, with stroke limiter



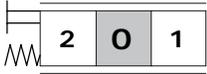
Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
D = wrench 10 - 9.8 Nm (7.2 lbft)
E = allen wrench 4 - 9.8 Nm (7.2 lbft)
F = allen wrench 3 - 5 Nm (3.68 lbft)

B side controls

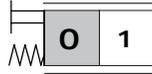
Mechanical controls

With spring return control

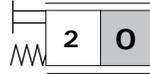
M1-U1 type
3 position, with M10 male thread external pin



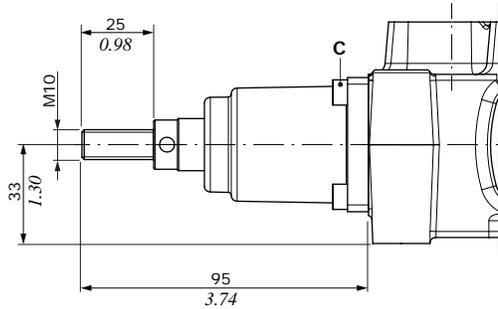
M2-U1 type
2 position (0-1), with M10 male thread male external pin



M3-U1 type
2 position (0-2), with M10 male thread male external pin



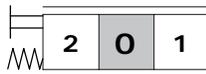
M4-U1 type
2 position (1-2), with M10 male thread external pin



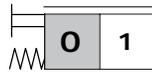
Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)

With flexible cable control arrangement

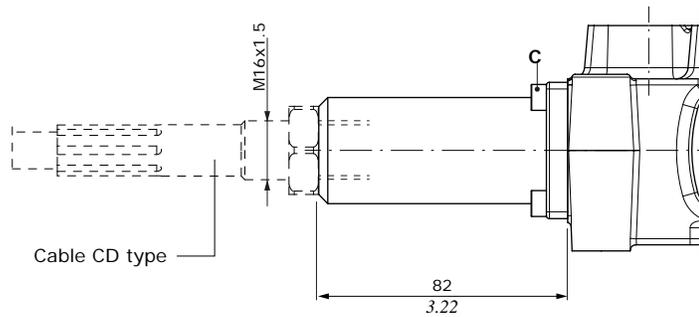
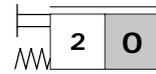
M1-U2 type
3 position, spring return in neutral position



M2-U2 type
2 position (0-1), spring return in neutral position

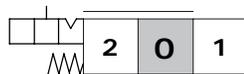


M3-U2 type
2 position (0-2), spring return in neutral position

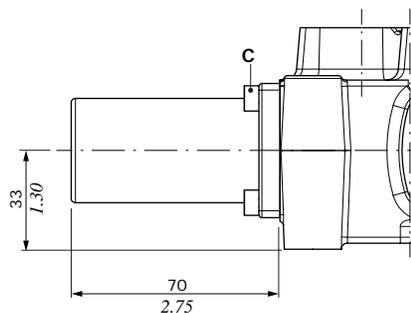
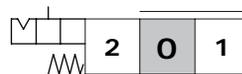


With detent control

R1 type
3 position, detent in position 1

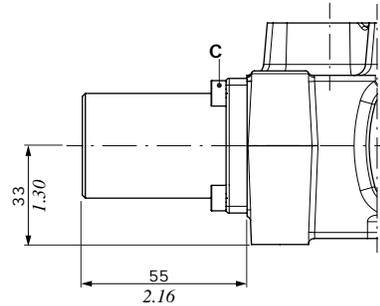
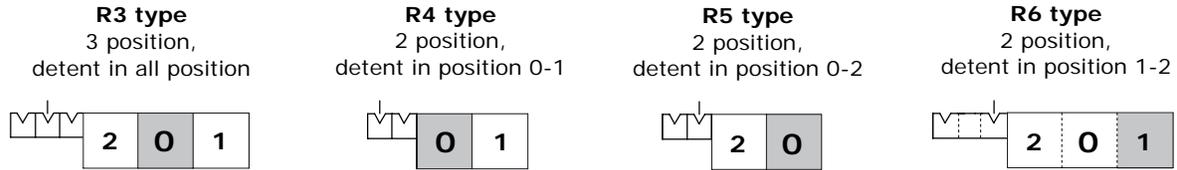


R2 type
3 position, detent in position 2



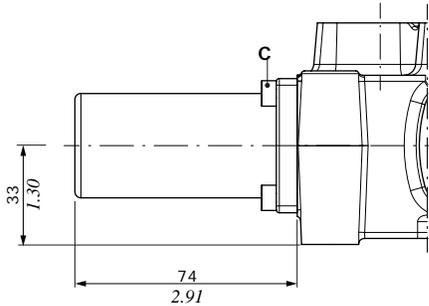
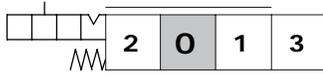
Mechanical controls

With detent control

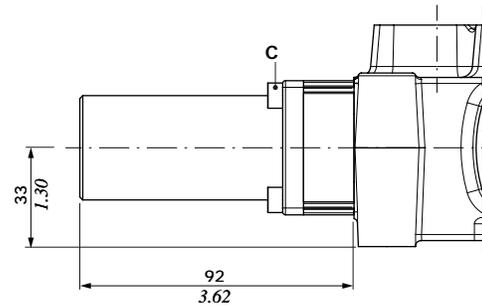
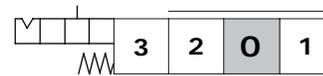


Wrenches and tightening torques
 C = allen wrench 4 - 6.6 Nm (4.8 lbft)
 D = wrench 30 - 42 Nm (30.9 lbft)
 E = wrench 22
 F = allen wrench 10 - 42 Nm (30.9 lbft)

R8 type
4 position, detent in 4th position,
for 116 floating spool type

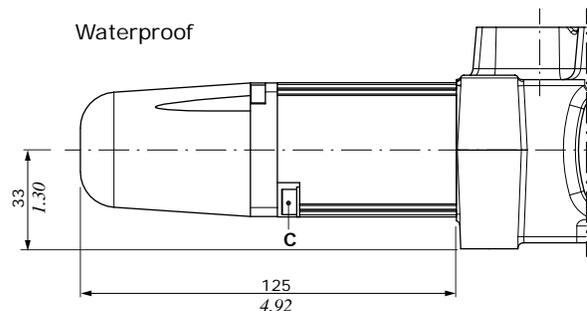
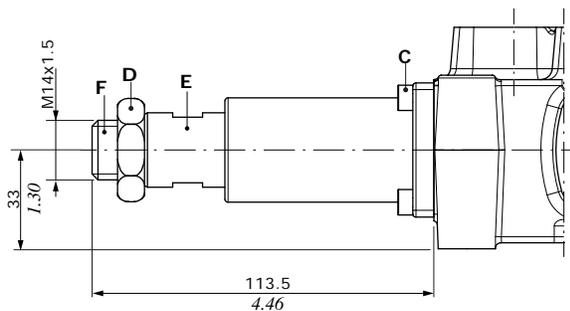
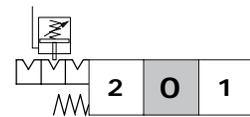
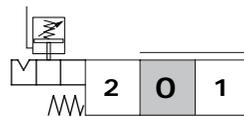
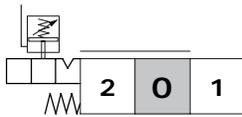


R10/Z1 type
4 position, detent in 4th position,
for 126 floating spool type



With detent control and kick out function

<p>R1K type 3 position, detent in position 1. Available with waterproof configuration</p>	<p>R2K type 3 position, detent in position 2. Available with waterproof configuration</p>	<p>R3K type 3 position, detent in all position. Available with waterproof configuration</p>
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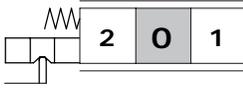


B side controls

Spool position microswitch

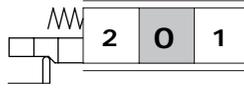
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position



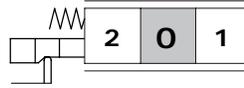
M1-N1A type

3 position, micro operation in position 1



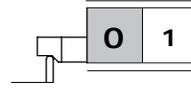
M1-N1B type

3 position, micro operation in pos. 2



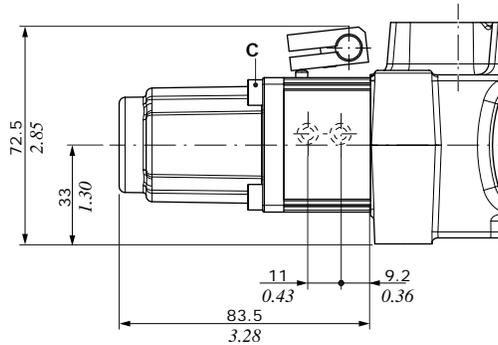
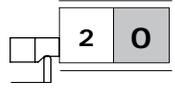
M2-N1 type

2 position (0-1) spring return in neutral position

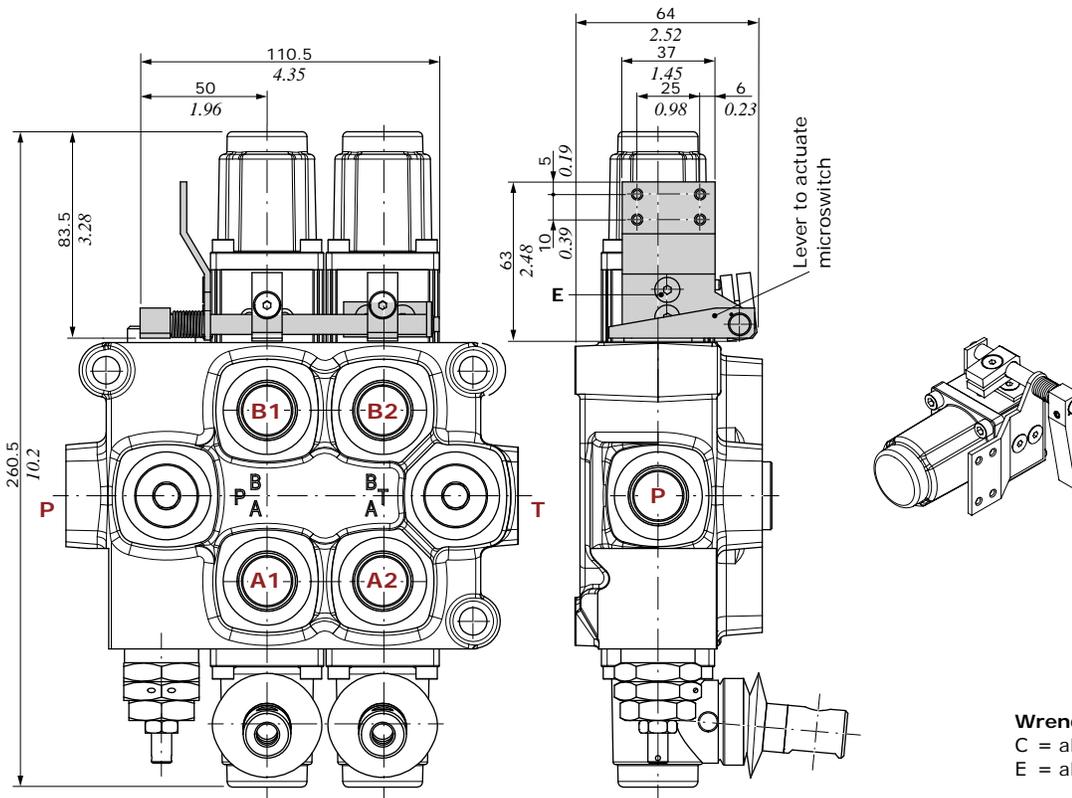


M3-N1 type

2 position (0-2) spring return in neutral position



Microswitch assembly kit for 2 working section (M1-N1 type)



Wrenches and tightening torques

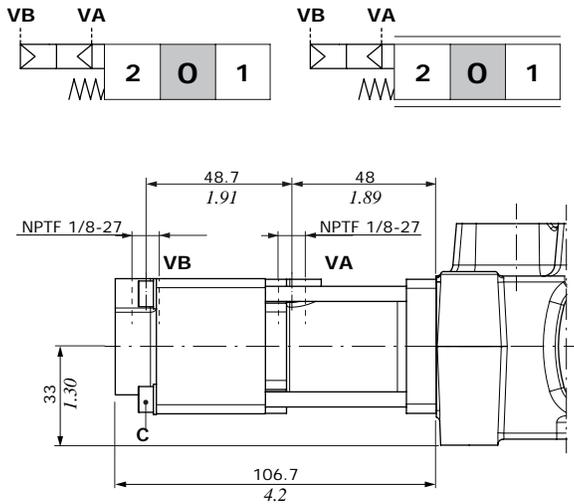
- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Drawing is referred to a Q75 monoblock valve.

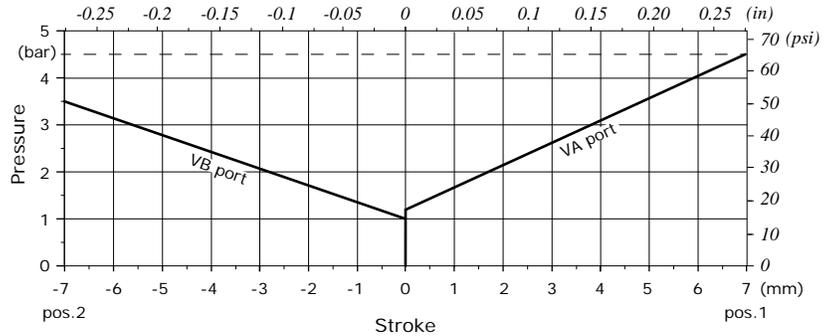
Pneumatic control

P1N type
ON/OFF control

P1NP type
Proportional control



Proportional pilot pressure curves



Operating features

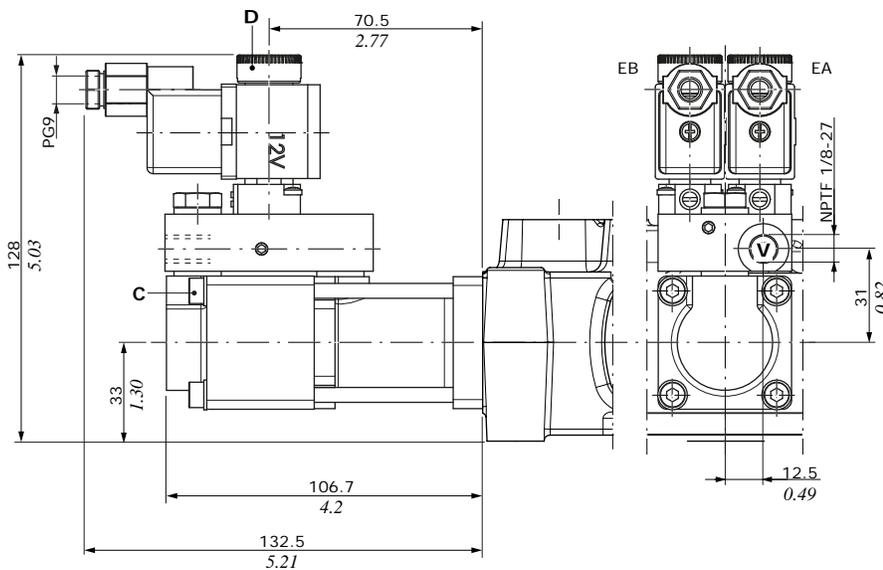
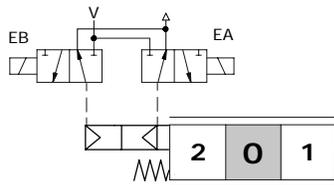
Pilot pressure.....: min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
Pilot volume.....: 9 cm³/min (0.54 in³/min)

Wrenches and tightening torques

C = wrench 4 - 6.6 Nm (4.8 lbft)

ON/OFF electropneumatic control

D3 type
ON/OFF control



Operating features

Pilot pressure.....: min. 1 bar (14.5 psi)
max. 10 bar (145 psi)

COILS

Nominal voltage tolerance.....: -5% +10%
Power rating.....: 2.3 W
Nominal current.....: 12 VDC – 24VDC
Coil insulation.....: Class F
Weather protection.....: IP65
Duty cycle.....: 100%

Wrenches and tightening torques

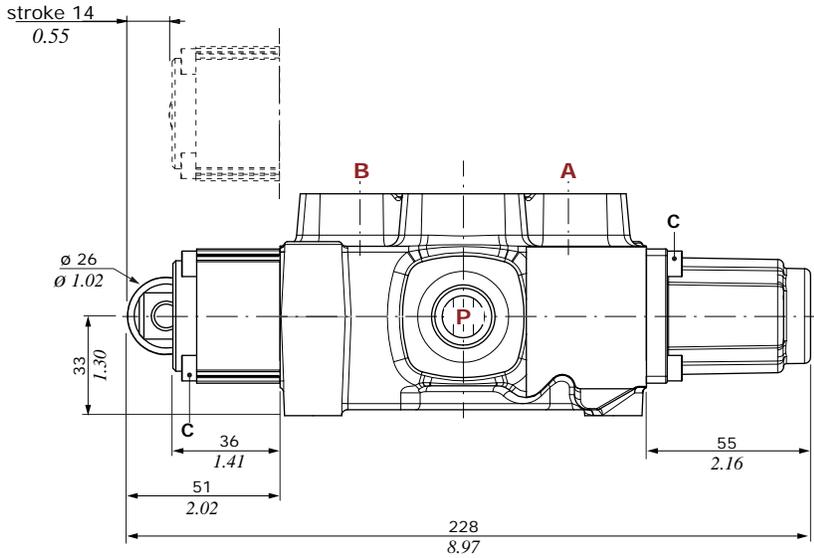
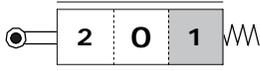
C = wrench 4 - 6.6 Nm (4.8 lbft)
D = manual tightening - 6.6 Nm (4.8 lbft)

A+B side controls

Cam control

C2 type

From position 1 to position 2,
spring return in position 1

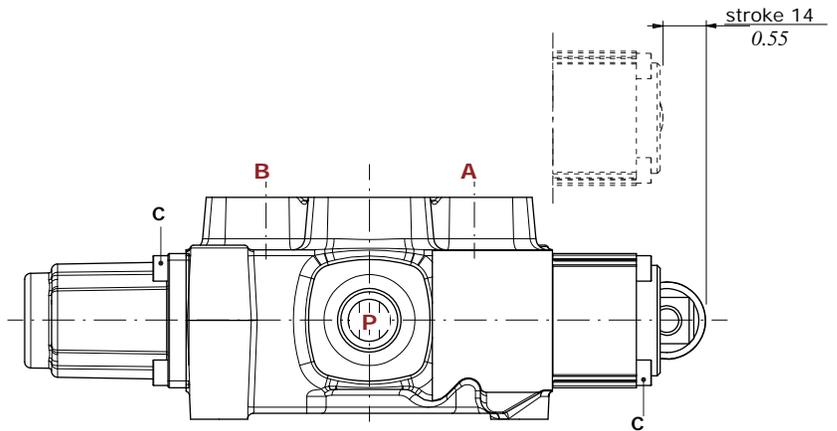
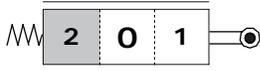


Wrenches and tightening torques

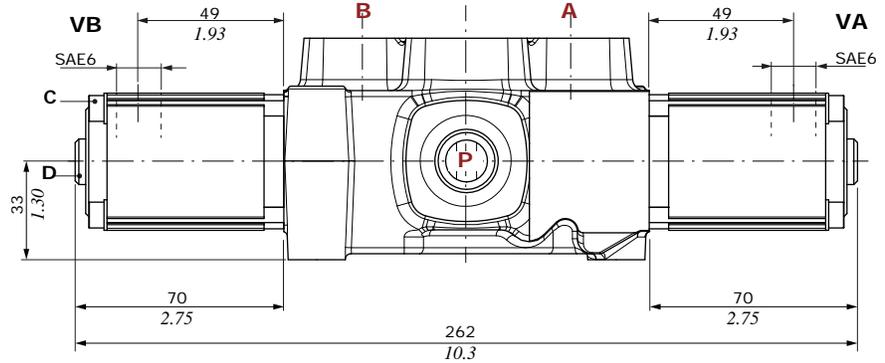
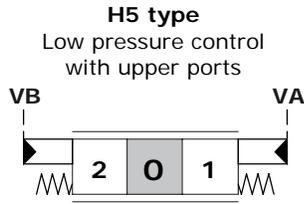
C = allen wrench 4 - 6.6 Nm (4.8 lbf)

C3 type

From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



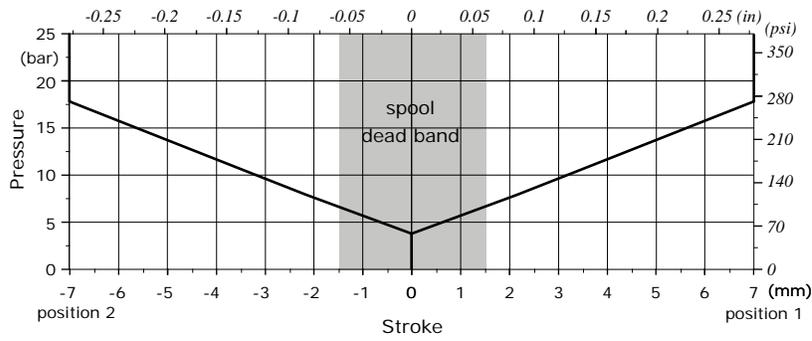
Proportional hydraulic control



Operating features

Pilot pressure..... : max. 100 bar (1450 psi)

Stroke vs. Pressure diagram for H5 type control



Wrenches and tightening torques

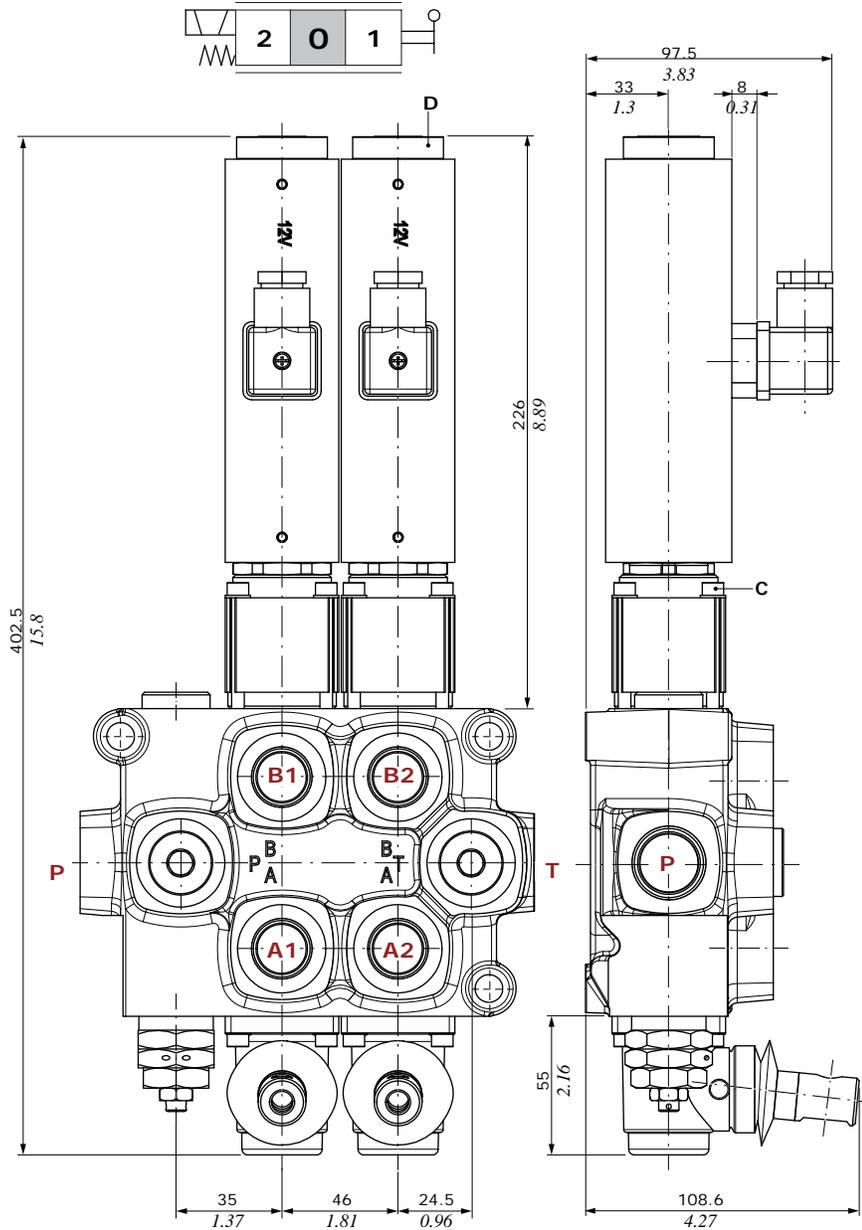
C = allen wrench 4 - 6.6 Nm (4.8 lbft)

D = allen wrench 4 - 9.8 Nm (7.2 lbft)

Direct solenoid control

D41 type: ON/OFF one side

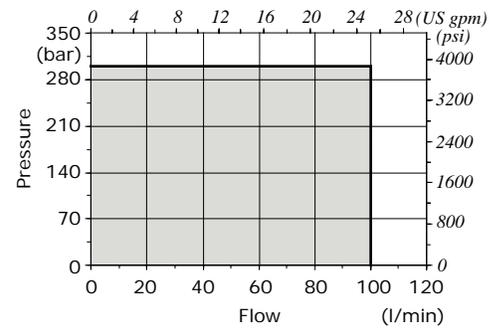
Drawing is referred to a Q75 monoblock valve.



D41 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	80 W
Insulance	Class H
Weather protection	IP65

Connector type: ISO4400 3P+T-PG11

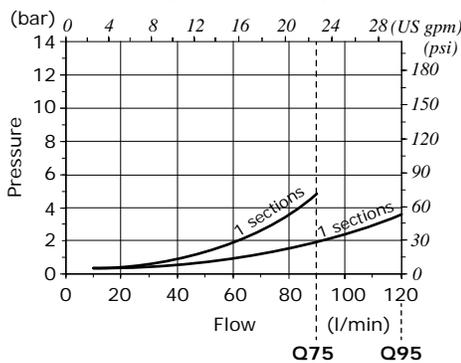
Dynamic conditions



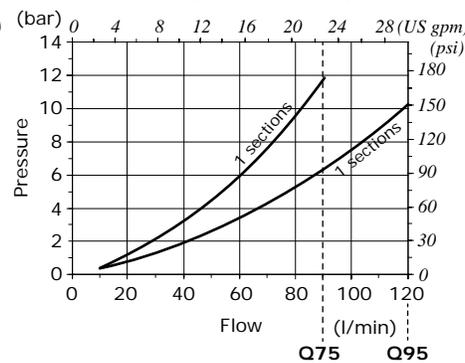
Wrenches and tightening torques

- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)

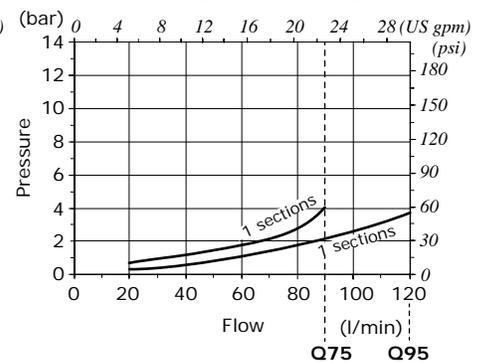
P→T pressure drops



P→A(B) pressure drops

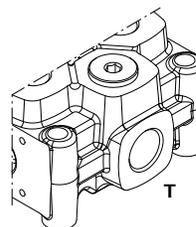
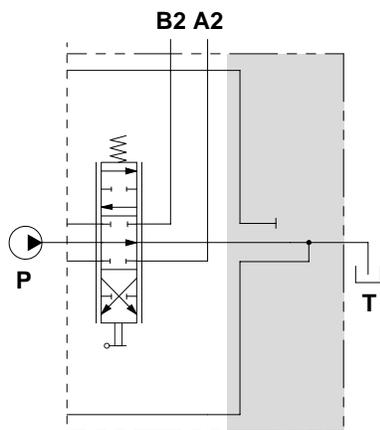
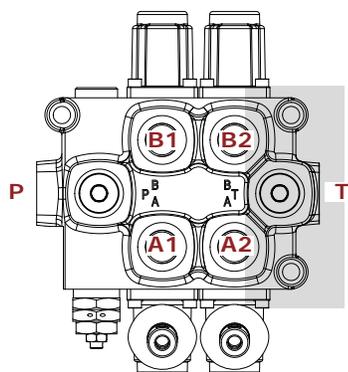


A(B)→T pressure drops

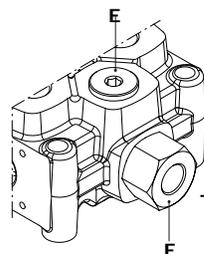
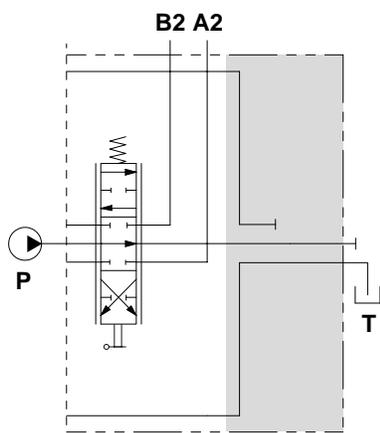
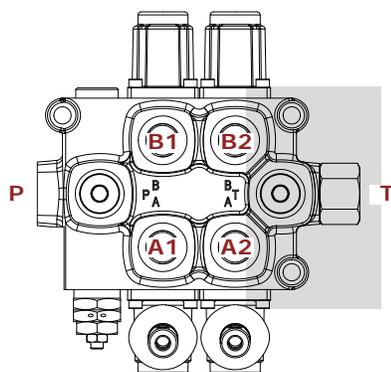


Outlet configuration

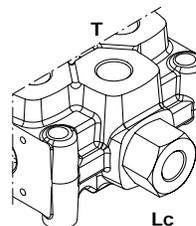
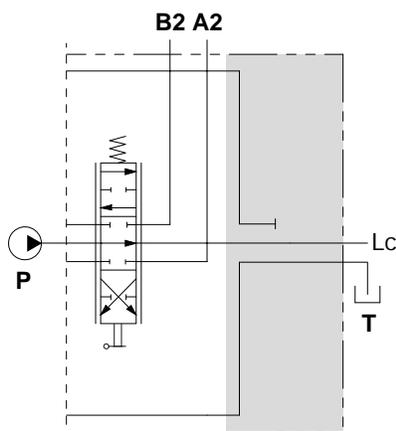
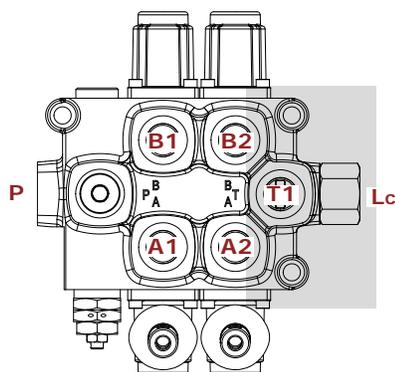
F3D-SAE configuration
Open center configuration



F16D-SAE configuration
Closed center configuration



F6D-SAE configuration
Carry-over configuration

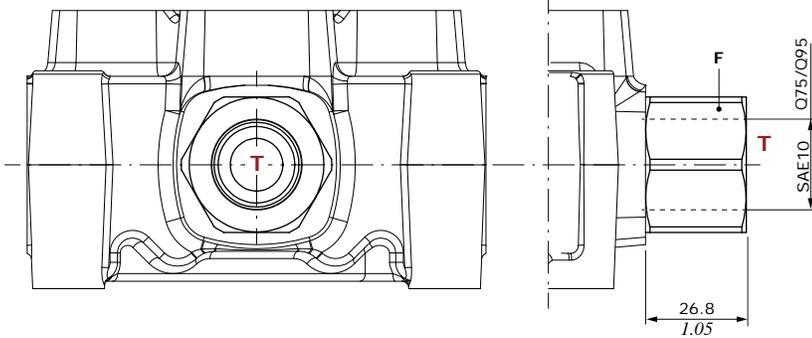


Wrenches and tightening torques
E (Q75) = allen wrench 6 - 24 Nm (17.7 lbft)
(Q95) = allen wrench 8 - 42 Nm (22 lbft)
F = wrench 36 - 80 Nm (59 lbft)

Outlet configuration

F6D - F16D joint dimension

Drawing is referred to a Q75 monoblock valve.



Wrenches and tightening torques
F = wrench 36 - 80 Nm (59 lbft)



Q30

Sectional directional control valve

- Available with parallel, tandem or series circuit
- Optional carry over port
- A wide range of antishock + anticavitation port valves
- Intermediate sections for several types of circuit
- Mechanical, pneumatic, electropneumatic, hydraulic and direct solenoid controls

Working conditions

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

Nominal flow rating		30 l/min - (8 Us gpm)
Max. pressure	parallel circuit	315 bar (4600 psi)
	series circuit	210 bar (3050 psi)
Max. back pressure on outlet T port		25 bar (360 psi)
Number sections		from 1 to 10
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm ³ /min (0.30 in ³ /min)
Fluid		Mineral oil
Fluid temperature	with NBR (BUNA-N) seals	from -20 °C to 80 °C - from -4 °F to 176 °F
Viscosity	operating range	from 12 to 400 mm ² /s - from 12 to 400 cSt
Max. contamination level		-/19/16 - ISO 4406 - NAS1638 class 6
Ambient temperature	with pneumatic and hydraulic devices	from -30 °C to 60 °C - from -22 °F to 140 °F
	without electric devices	from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices	from -20 °C to 50 °C - from -4 °F to 122 °F

NOTE - For different conditions please contact our Sales Department.

REFERENCE STANDARD

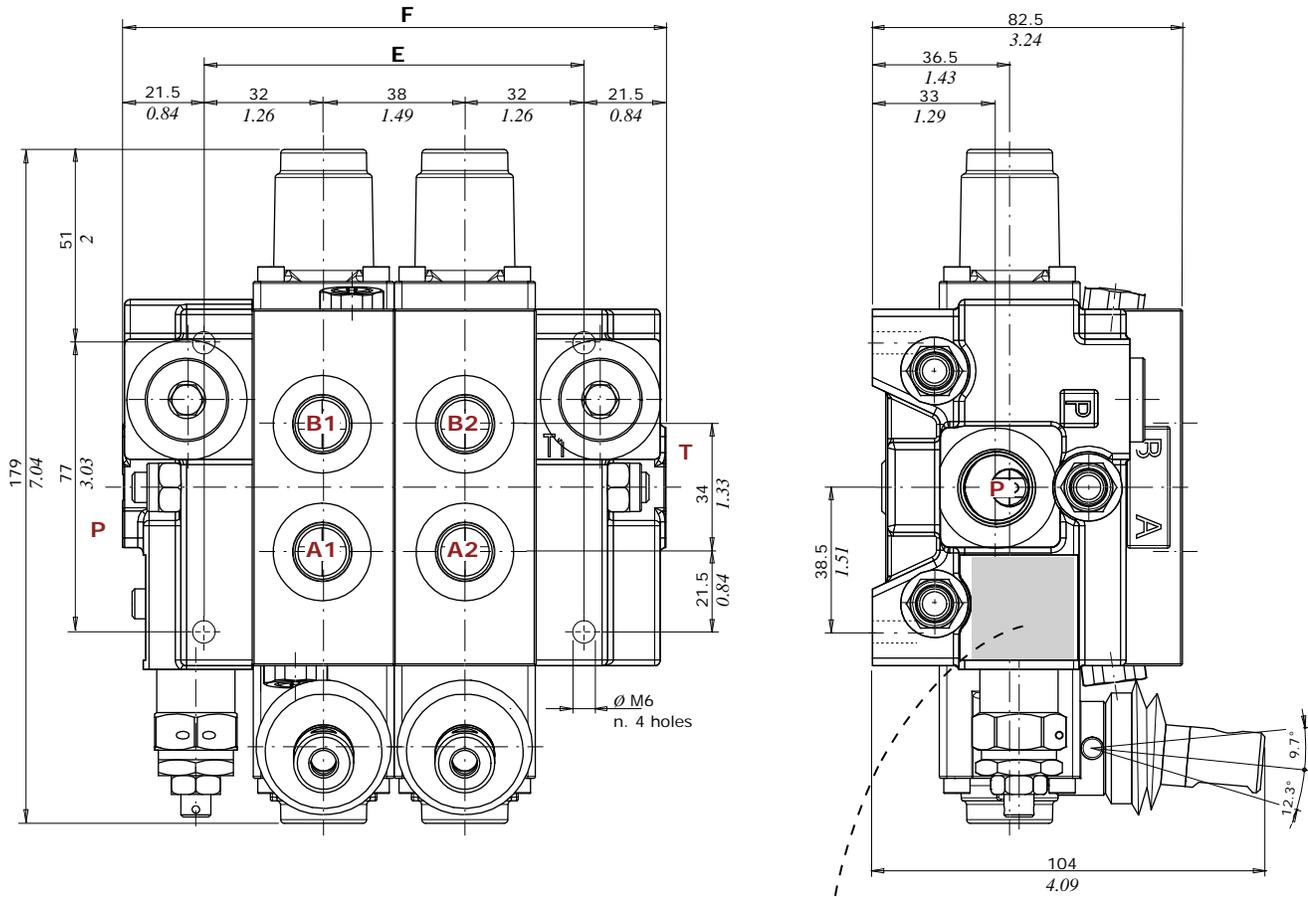
	BSP	UN-UNF
THREAD ACCORDING TO	ISO 228/1	ISO 263
	BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO	11926
	SAE	J11926
	DIN	3852-2 shape X or Y

PORT THREADING

	BSP	UN-UNF
P Inlet	G 3/8	3/4-16 (SAE 8)
P1 Inlet	G 3/8	3/4-16 (SAE 8)
A and B ports	G 3/8	9/16-18 (SAE 6)
T Outlet	G 1/2	7/8-14 (SAE 10)
T1 Outlet	G 1/2	3/4-16 (SAE 8)
Lc port (Carry-over plug - T port)	G 3/8-G 1/2	3/4-16 (SAE 8) - 7/8-14 (SAE 10)
Hydraulic controls	G 1/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

Standard configuration*



Type	E		F	
	mm	in	mm	in
Q30/1	64	2.52	107.5	4.23
Q30/2	102	4.01	145.5	5.72
Q30/3	140	5.51	183.5	7.22
Q30/4	178	7.00	221.5	8.72
Q30/5	216	8.50	259.5	10.21
Q30/6	254	10	297.5	11.71
Q30/7	292	11.50	335.5	13.20
Q30/8	330	13	373.5	14.70
Q30/9	368	14.48	411.5	16.20
Q30/10	406	15.98	449.5	17.69

walvoil

MADE IN ITALY

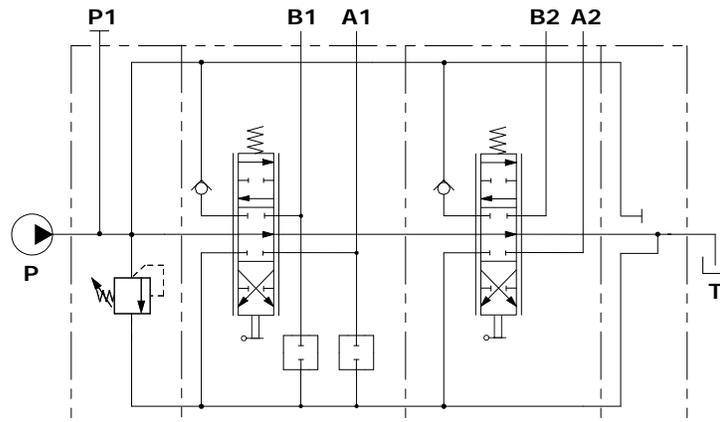
1GB75040009 ----- Product code

DISTRIBUTORE ----- Code description

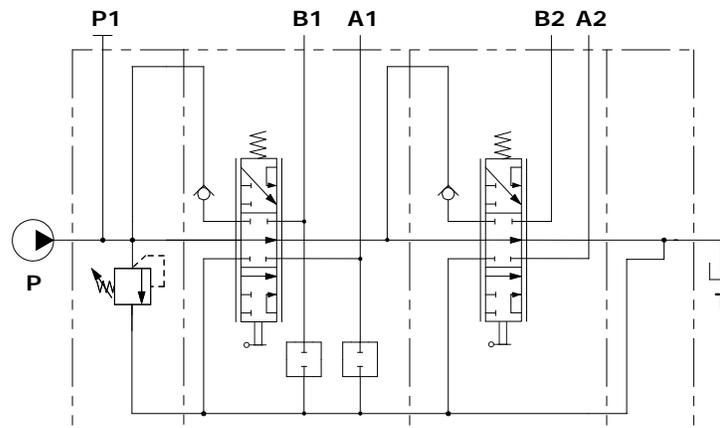
Q30/2 ----- Product allotment

MD1600464-001 ----- Datamatrix with product allotment

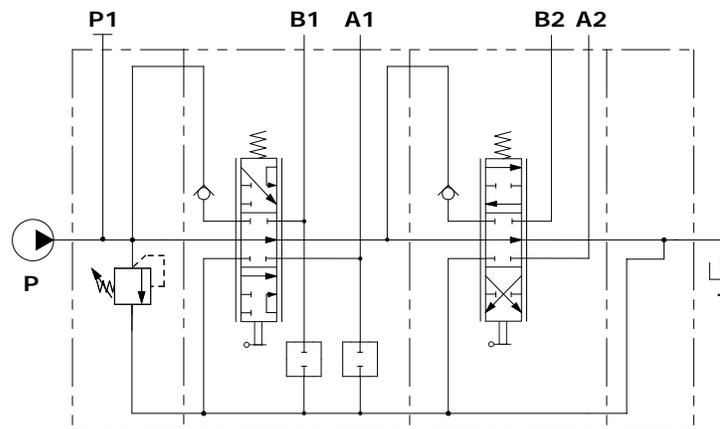
NOTE: Drawings and dimensions are referred to a UN-UNF threading configuration.
 (*): For other configurations, see page 122



Description example (parallel circuit):
 Q30/2/F7S(N150)/103-A1-M1.VC/103-A1-M1/F3D-S-SAE



Description example (series circuit):
 Q30/2/F7S(N150)/403-A1-M1.VC/403-A1-M1/F3D-S-SAE

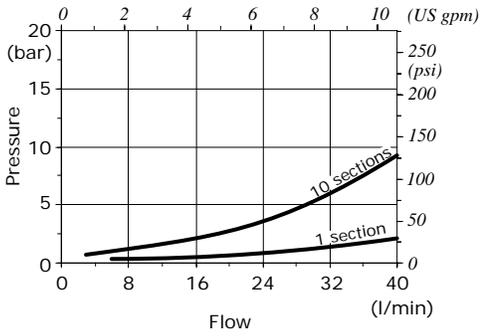


Description example (serie/parallel circuit):
 Q30/2/F7S(N150)/403-A1-M1.VC/103-A1-M1/F3D-S-SAE

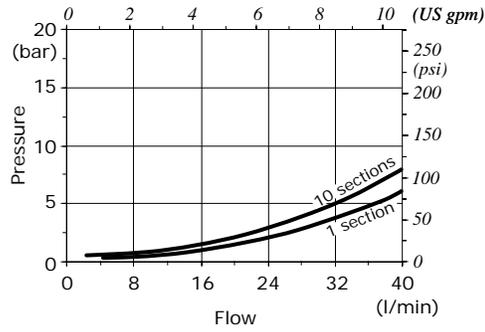
Performance data

Q30

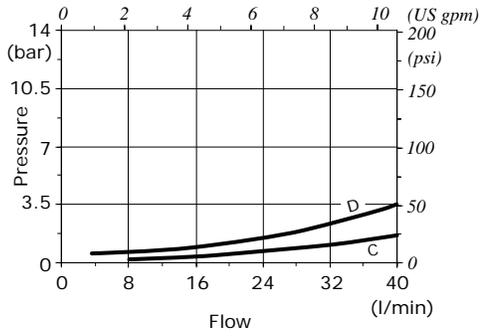
P⇒T pressure drops



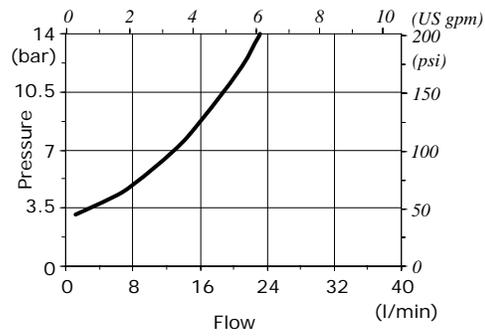
P⇒A(B) pressure drops



A(B)⇒T pressure drops



A1(B1)⇒A2(B2) pressure drops (with series circuit)



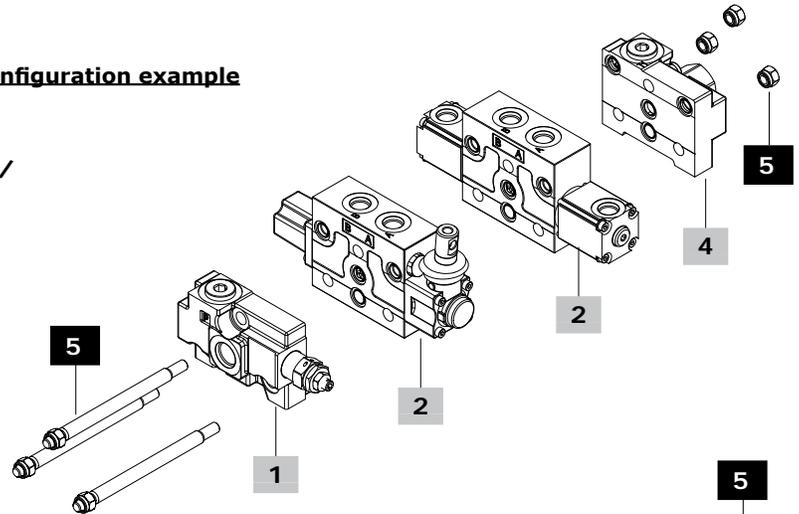
Legenda

- C= 10th section
- D= 1st section

Complete section ordering codes

Valve with mechanical and hydraulic controls configuration example

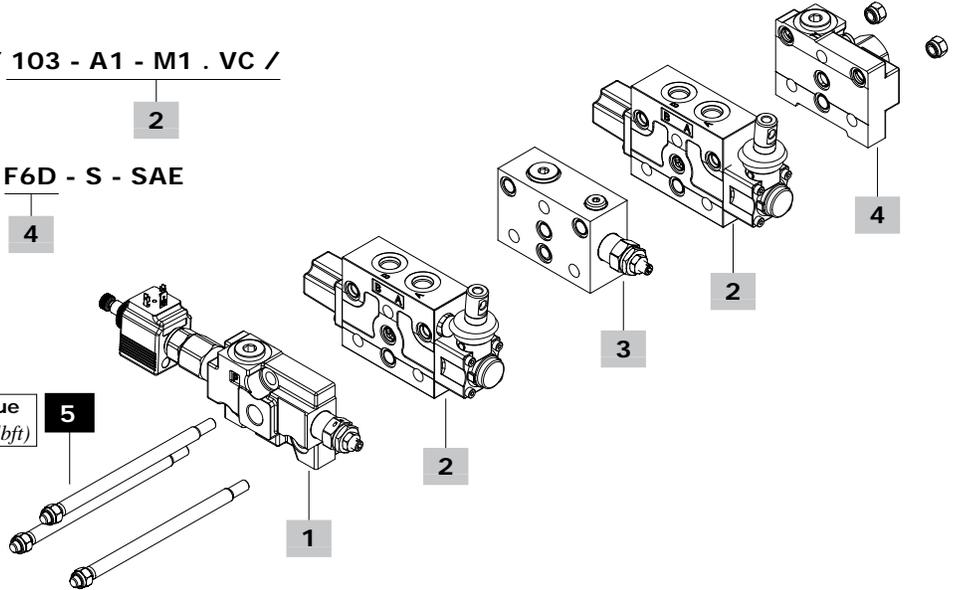
valve setting (bar)
Q30 / 2 / F7S(N150) / 103 - A1 - M1 . VC /
 N. of section 1 2
/ 103 - H1 / F6D - S - SAE
 2 4 aluminium controls



Valve with intermediate section and mechanical control configuration example

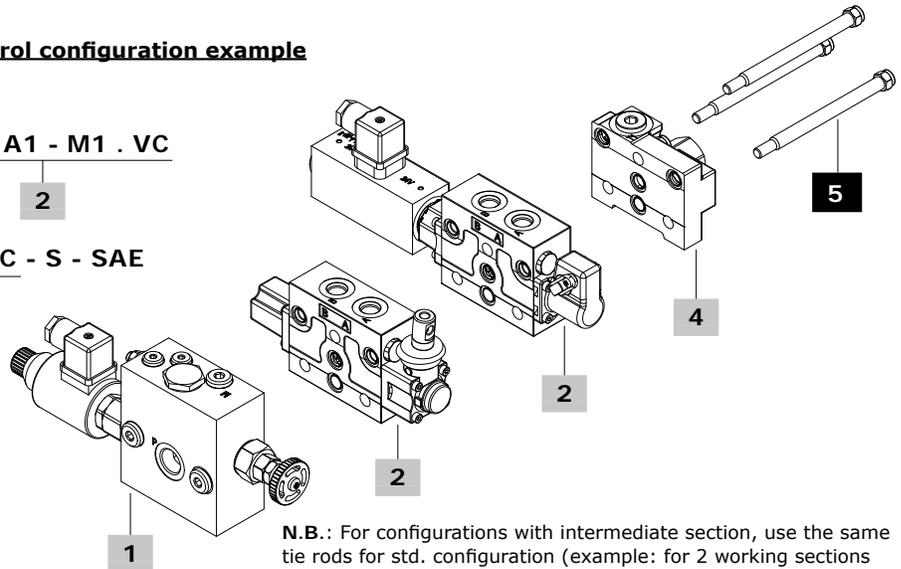
valve setting (bar) 1 2
Q30 / 2 / F7SMSE(NA)-N150 / 103 - A1 - M1 . VC /
 / E50(N150) / 103 - A1 - M1 / F6D - S - SAE
 3 2 4

Tie rod tightening torque
 wrench 13 - 24 Nm (17.7 lbf·ft)



Valve with mechanical and electric control configuration example (with inlet flow regulation)

Q30 / 2 / F7SPR3M(N150) / 103 - A1 - M1 . VC
 1 2
/ 103 - A1 - D41 . VC / F6D - 12VDC - S - SAE
 2 4 2



N.B.: For configurations with intermediate section, use the same tie rods for std. configuration (example: for 2 working sections + 1 intermediate section, use tie rods for 3 working sections)

Complete section ordering codes

1 Inlet section* page 84**Standard inlet section**

TYPE	CODE
FE-Q30/F7S(N150)-SAE	03000F7S/D/04N
DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve, setting range 101-200 bar (<i>1460-2900 psi</i>)	
TYPE	CODE
FE-Q30/F8S-SAE	03003F8S/D/04
DESCRIPTION: As previous one, without valves (pressure relief valve plugged port)	
TYPE	CODE
FE-Q30/F7SMSE(NA)	03000F7SDMS1-N
DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve setting range 101-200 bar (<i>1460-2900 psi</i>), 12VDC normally open unloader valve	
TYPE	CODE
FE-Q30/F7SMSE(NC)	03000F7SDMS7-N
DESCRIPTION: As previous one, with normally closed unloader valve	
TYPE	CODE
FE-Q30/F7SMSI	03000F7SDMSI-N
DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve setting range 101-200 bar (<i>1460-2900 psi</i>), and hydraulic unloader valve	
Inlet section with flow regulator	
TYPE	CODE
FE-Q30/F7SPR3M(N150)	03000F7SDPRN3M
DESCRIPTION: Side inlet open, 12 VDC proportional flow control valve, pressure relief valve setting range 101-200 bar (<i>1460-2900 psi</i>), manual unloader valve	
TYPE	CODE
FE-Q30/F7SPR3E(N150)-12VDC	03000F7SDPRN3E
DESCRIPTION: As previous one, with 12VDC unloader valve	

2 Working section* page 93**With mechanical controls**

TYPE	CODE
EL-Q30/103-A1-M1.VC-S-SAE	SGL300006
DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, lever control and spring return to neutral position	
TYPE	CODE
EL-Q30/103-A1-M1-S-SAE	SGL300005
DESCRIPTION: As previous one, without valve arrangement	
With proportional hydraulic controls	
TYPE	CODE
EL-Q30/103-H5.VC-S-SAE	SGL300014
DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, low pressure hydraulic controls, spring return to neutral position	
TYPE	CODE
EL-Q30/103-H5-S-SAE	SGL300015
DESCRIPTION: As previous one, without valve arrangement	
With electric solenoid controls - one side type	
TYPE	CODE
EL-Q30/103-A1-D41.VC-12VDC-S-SAE	SGL300020
DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC electric direct ON/OFF control with lever	
TYPE	CODE
EL-Q30/103-A1-D41-12VDC-S-SAE	030000103098200
DESCRIPTION: As previous one, without valve arrangement	
With electric solenoid controls - two side type	
TYPE	CODE
EL-Q30/103-D9.VC-12VDC-S-SAE	SGL300017
DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC electric direct ON/OFF control	
TYPE	CODE
EL-Q30/103-D9-12VDC-S-SAE	SGL300018
DESCRIPTION: As previous one, without valve arrangement	

(*) Codes are referred to **UN-UNF** thread

3 Intermediate section page 122

TYPE	CODE	DESCRIPTION
E50	03850E50-B	With pressure relief valve, setting range 10-100 bar (145-1450 psi)
	03850E50-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	03850E50-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E53	03854E53-B	With pressure relief valve, setting range 10-100 bar (145-1450 psi) and P2 port open for 2 nd pump
	03854E53-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	03854E53-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E51	03853E51SAE	Intermediate outlet section, T2 port open
E61	03885E61	Intermediate spacer section

4 Outlet section* page 124

TYPE	CODE
FS-Q30-SAE	03012F3D/04
DESCRIPTION: T port open, T1 port plugged. For open center circuit	
TYPE	CODE
FS-Q30-SAE	03016F16D/04
DESCRIPTION: T port open, T1 port plugged. For closed center circuit	
TYPE	CODE
FS-Q30-SAE	03014F6D/03
DESCRIPTION: Lc port and T1 port open. With joint for carry-over (HPCO) circuit	

5 Tie rod kit

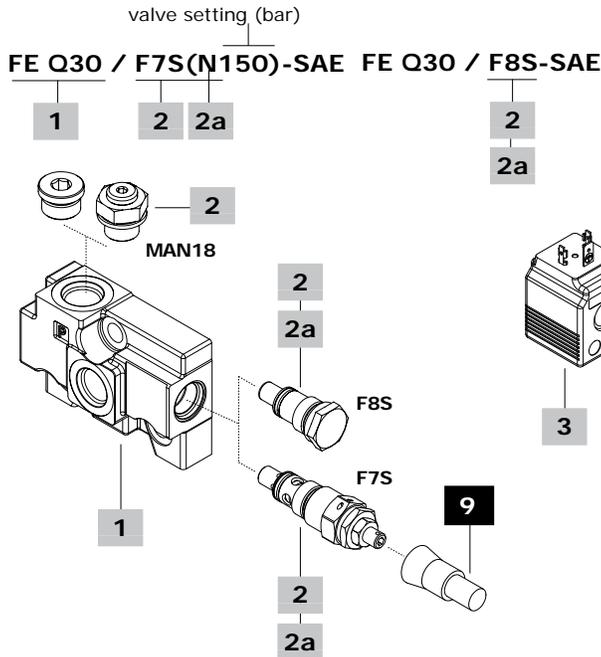
CODE	DESCRIPTION
For standard configuration	
03901TX1	For 1 section valve
03902TX2	For 2 sections valve
03903TX3	For 3 sections valve
03904TX4	For 4 sections valve
03905TX5	For 5 sections valve
03906TX6	For 6 sections valve
03907TX7	For 7 sections valve
03908TX8	For 8 sections valve
03909TX9	For 9 sections valve
03910TX10	For 10 sections valve
For flow regulator configuration	
03901TX1	For 1 section valve
03902TX2	For 2 sections valve
03903TX3	For 3 sections valve
03904TX4	For 4 sections valve
03905TX5	For 5 sections valve
03906TX6	For 6 sections valve
03907TX7	For 7 sections valve
03908TX8	For 8 sections valve
03909TX9	For 9 sections valve
03910TX10	For 10 sections valve

(*) : Codes are referred to **UN-UNF** thread

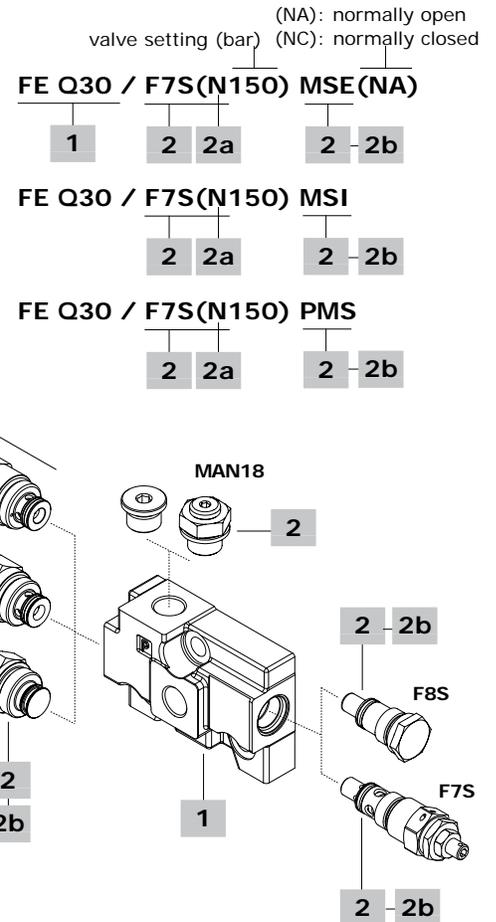
Inlet section - parts ordering codes

Standard section

With relief valve:



With relief and unloader valves:



1 Inlet body section page 85

TYPE	CODE
FE-Q30-SAE*	060013083499
DESCRIPTION:	Side inlet port, upper inlet plugged, pressure relief valve arrangement
TYPE	CODE
FE-Q30	060012979299
DESCRIPTION:	As previous one, with unloader valve arrangement

2 Configuration coding page 86

TYPE	DESCRIPTION
F7S-SAE*	With pressure relief valve
F8S-SAE*	Without valves (pressure relief valve plugged port)
F7S-MSE	With pressure relief valve and electric unloader valve
F7S-MSI	With pressure relief valve and hydraulic unloader valve
F7S-PMS	With pressure relief valve and PMS valve blanking plug
F8S-MSE	With electric unloader valve and pressure relief valve blanking plug
F8S-MSI	With hydraulic unloader valve and pressure relief valve blanking plug
F8S-PMS	Without valves (plugged ports)

Note: Inlet configuration with relief valve, require upper P port: for Q30 n. 1 SAE8 plug code 255008, or n. 1 pressure gauge arrangement code 5MAN624202;
Inlet configurations with relief and unloader valves, require upper P port: for Q30 n. 1 G3/8 plug code 060002792199, or n. 1 pressure gauge arrangement code 5MAN621200;

2a Main pressure relief valve page 87

TYPE: B	CODE: 700035205000000
DESCRIPTION:	VLP35S valve, setting range 10-100 bar (145-1450 psi)
TYPE: N	CODE: 700035105000000
DESCRIPTION:	VLP35S valve, setting range 101-200 bar (1460-2900 psi)
TYPE: R	CODE: 700035305000000
DESCRIPTION:	VLP35S valve, setting range 201-380 bar (2910-5500 psi)
TYPE: -	CODE: 060002788899
DESCRIPTION:	Relief valve blanking plug

2b Unloader inlet valve page 88

TYPE	CODE	DESCRIPTION
MSE(NA)	0EF08002003	Electric unloader valve, normally open, screw type emergency. It requires MSE assembly joint
MSE(NC)	0EF08002006	Electric unloader valve, normally closed, screw type emergency. It requires MSE assembly joint
-	060002997299	Assembling joint for MSE valves
MSI	03839MSI	Hydraulic unloader valve
PMS	060002978899	Valve blanking plug

3 Coil

TYPE	CODE	DESCRIPTION
For MSE valves		
BER	4SLE001200A	12 VDC ISO4400 coil
	4SLE002400A	24 VDC ISO4400 coil

Note: For BER type coils, see page 243

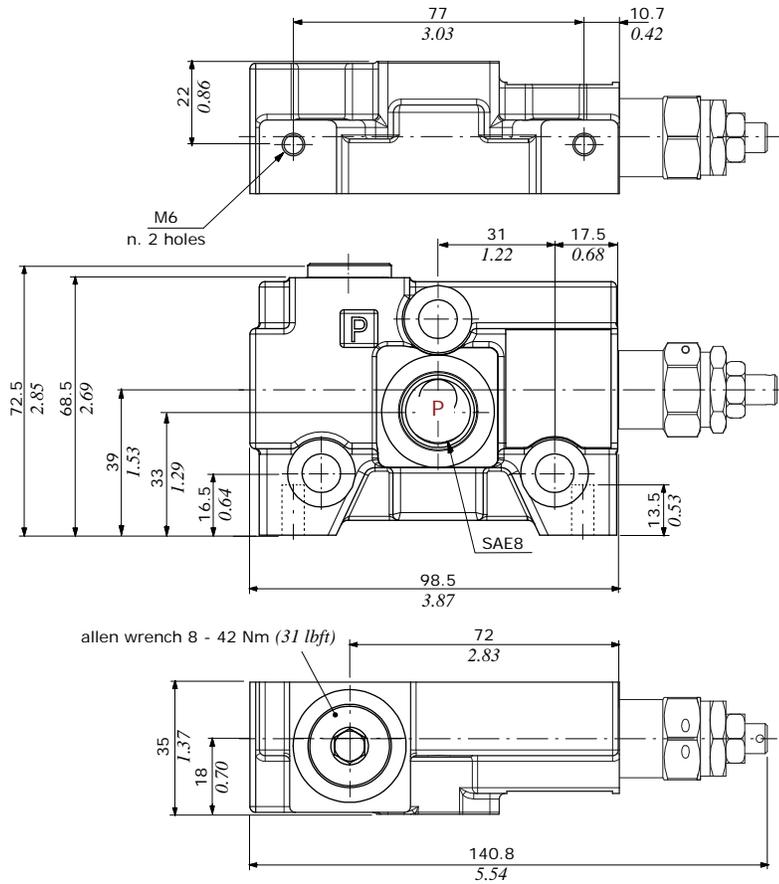
9 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

(*): Codes are referred to UN-UNF thread

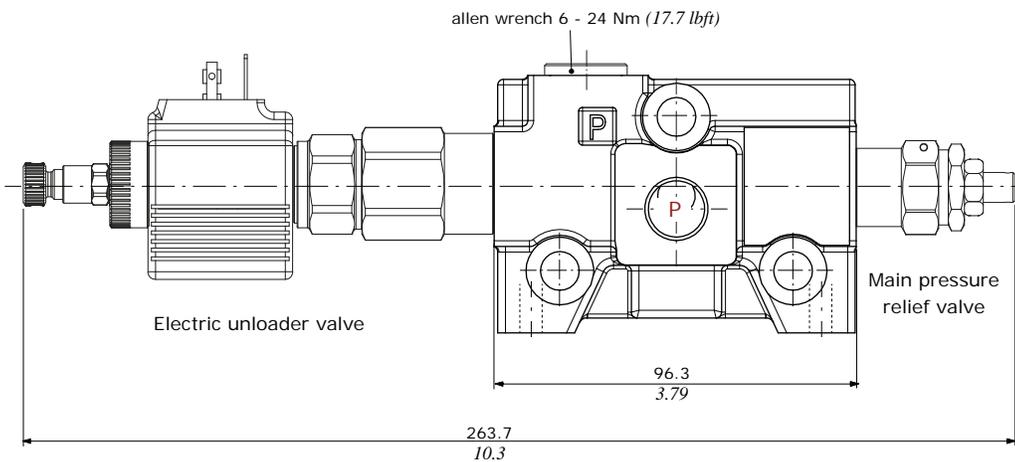
Dimensional data

With pressure relief valve



Note: For valves wrench and torque, see related pages

With relief and unloader valves



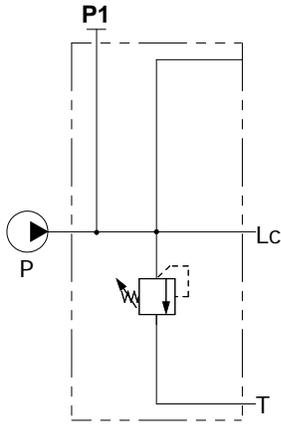
Note: For valves wrench and torque, see related pages

For other configurations, see page 88
 For other dimensions, see previous configuration

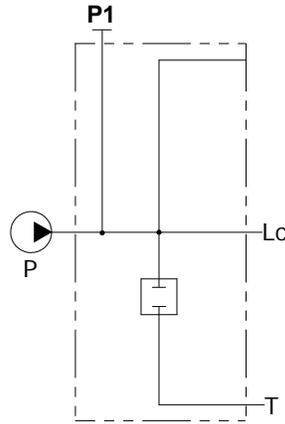
Standard inlet section

Hydraulic circuits

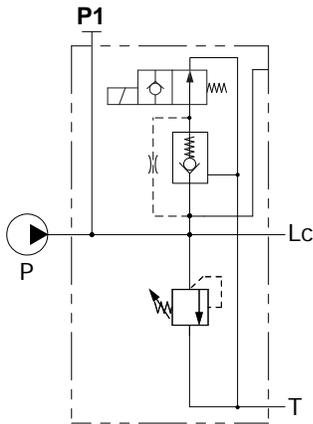
F7S-SAE configuration
With pressure relief valve



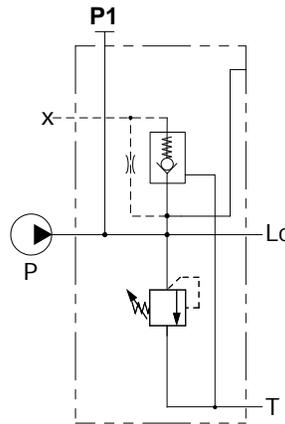
F8S-SAE configuration
Without valves
(pressure relief valve plugged port)



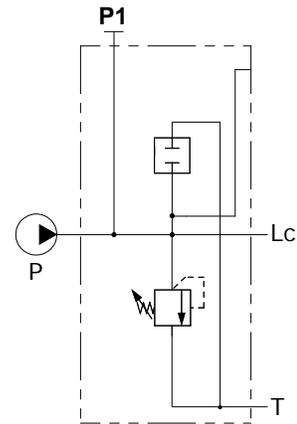
F7S-MSE(NA/NC) configuration
With pressure relief valve
and electric unloader valve



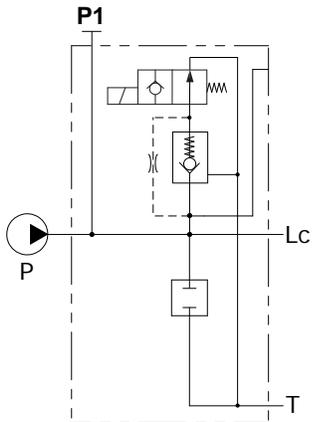
F7S-MSI configuration
With pressure relief valve
and hydraulic unloader valve



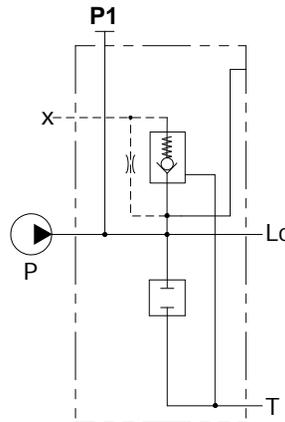
F7S-PMS configuration
With pressure relief valve
and unloader valve blanking plug



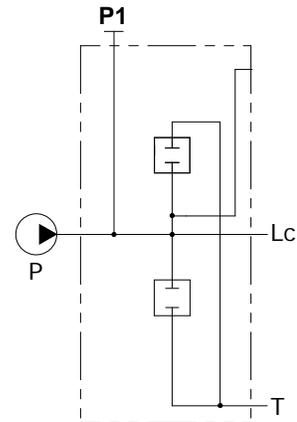
F8S-MSE(NA/NC) configuration
Without pressure relief valve
and electric unloader valve



F8S-MSI configuration
Without pressure relief valve
and hydraulic unloader valve

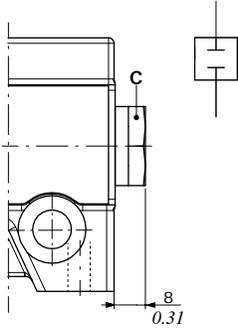


F8S-PMS configuration
Without valves (plugged ports)

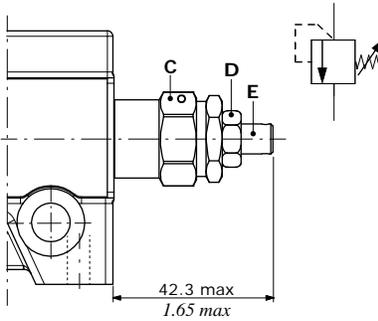


Main pressure relief valve

Relief valve blanking plug



Main pressure relief valve

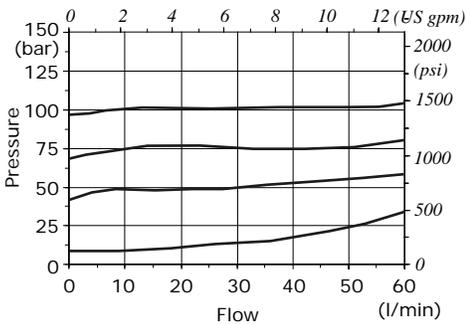


Wrenches and tightening torques

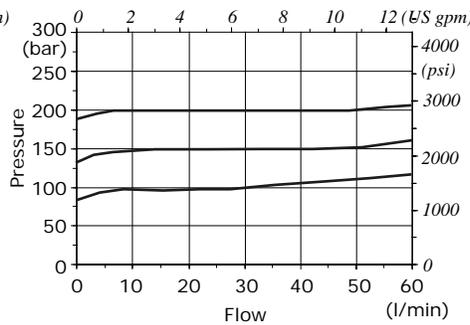
- C = wrench 22 - 42 Nm (31 lbft)
- D = wrench 13 - 24 Nm (17.7 lbft)
- E = allen wrench 4

Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

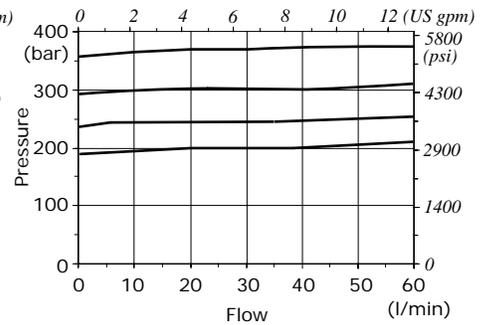
Setting example (B type spring)



Setting example (N type spring)



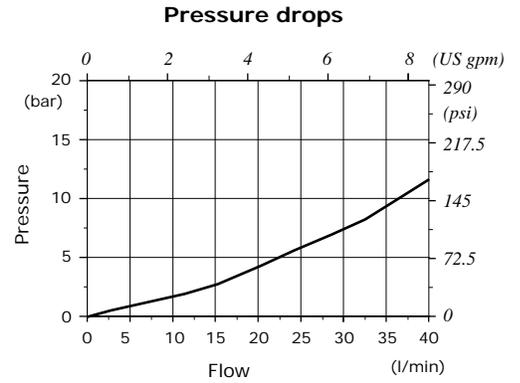
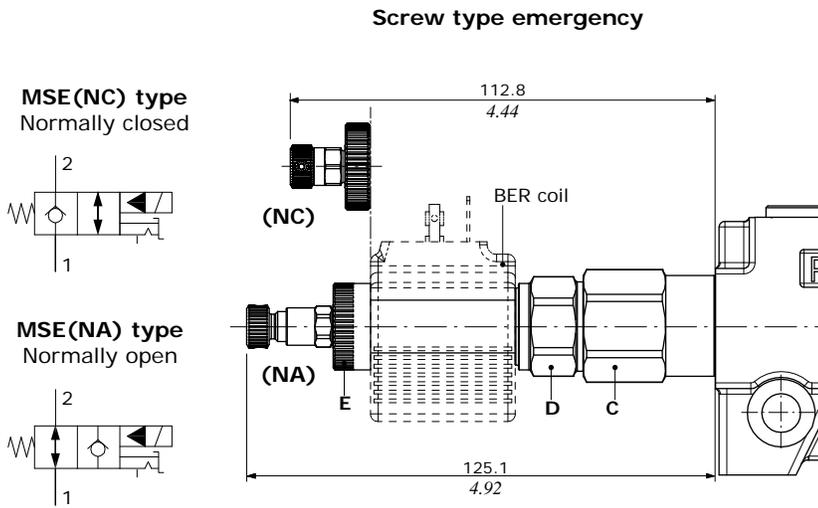
Setting example (R type spring)



Standard inlet section

Unloader valve

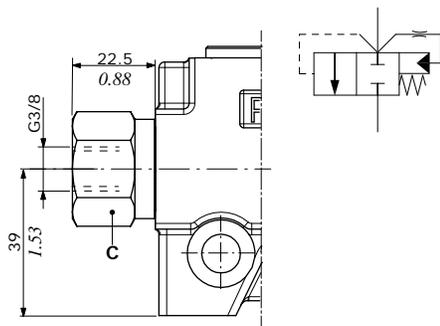
MSE type: electric control



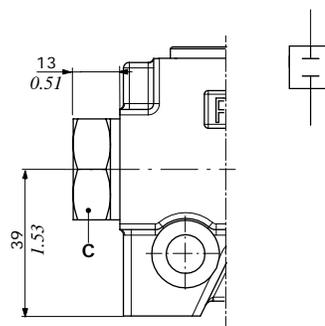
Valve features
 Nominal flow.....: 40 l/min (10.5 US gpm)
 Max. pressure: 380 bar (5500 psi)
 Max. internal leakage...: 0,50 cm³/min @ 210 bar
 (0.030 in³/min @ 3050 psi)

For **BER** type coils see page 243

MSI type: hydraulic control



PMS type: valve blanking plug

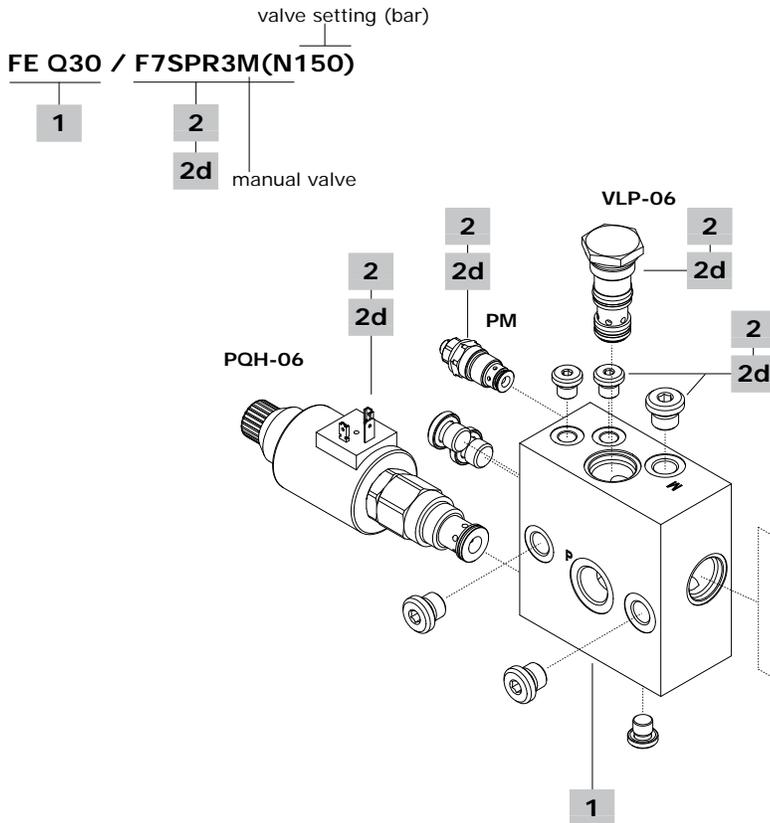


Wrenches and tightening torques
 C = wrench 27 - 42 Nm (30.9 lbft)
 D = wrench 24 - 30 Nm (22.1 lbft)
 E = manual tightening

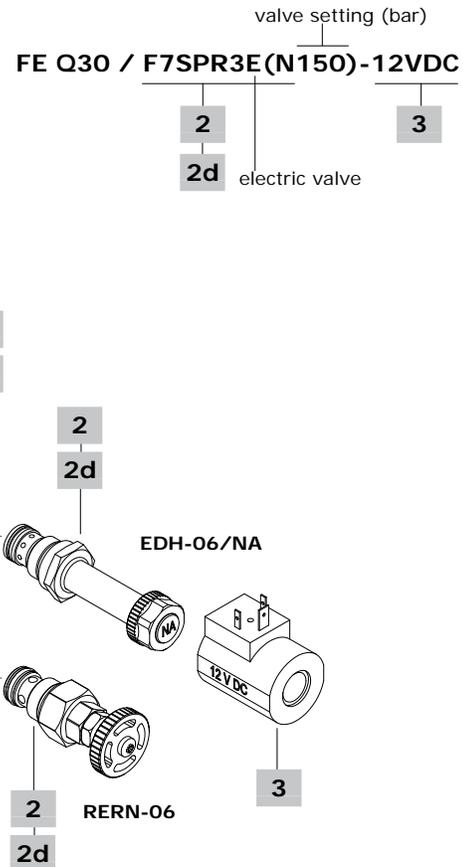
Inlet section - parts ordering codes

Section with flow regulator

With manual unloader valve:



With electric unloader valve:



1 Inlet body section* page 90

TYPE: **FE-Q30** CODE: 060013195499
 DESCRIPTION: Side inlet port, arrangement for flow control, unloader and pressure relief valve

2 Configuration coding* page 90

TYPE	DESCRIPTION
F7S-PR3M	With pressure relief valve, proportional flow control valve and manual unloader valve
F7S-PR3E	With pressure relief valve, proportional flow control valve and electric unloader valve, normally open

Note: Inlet configurations require:
 n. 5 G1/4 plugs code 3XTAP719150
 n. 3 G1/8 plugs code 3TP5110900

2d Inlet valves page 91

TYPE	CODE	DESCRIPTION
PQH-06	950208506010000	Flow control pressure compensated proportional valve, 12 VDC, coil included
	950208506010001	Flow control pressure compensated proportional valve, 24 VDC, coil included
PM	03800V30PM-N	Antishock valve
VLP-06	950209906010000	Pressure relief valve
RERN-06	955845060010000	Manual unloader valve
EDH-06/NA	950210600000000	Electric unloader valve, normally open

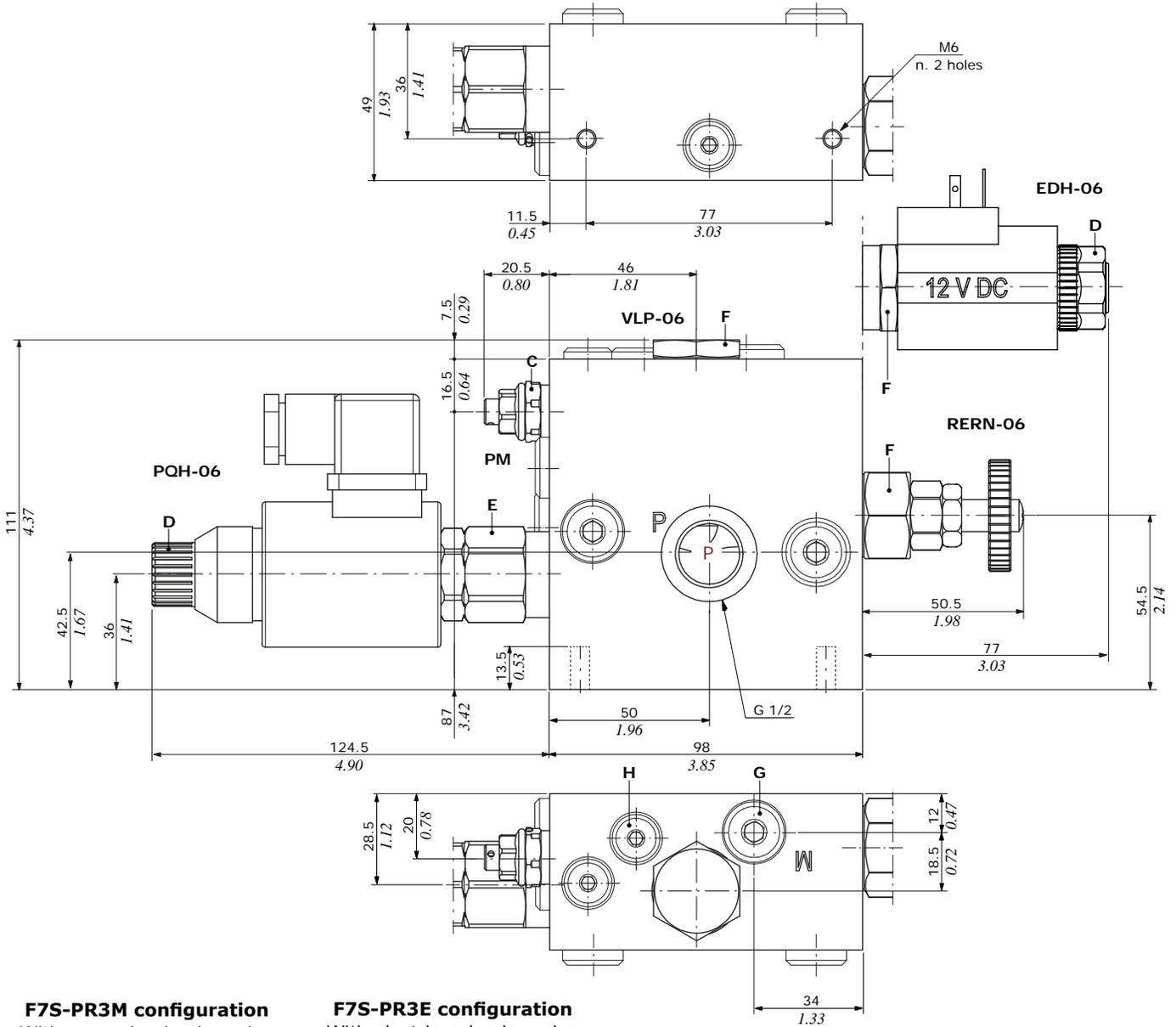
3 Coil

TYPE	CODE	DESCRIPTION
For EDH-06 valve		
A	954250000601200	12 VDC ISO4400 coil
	954250000602400	24 VDC ISO4400 coil

(*): Codes are referred to **BSP** thread

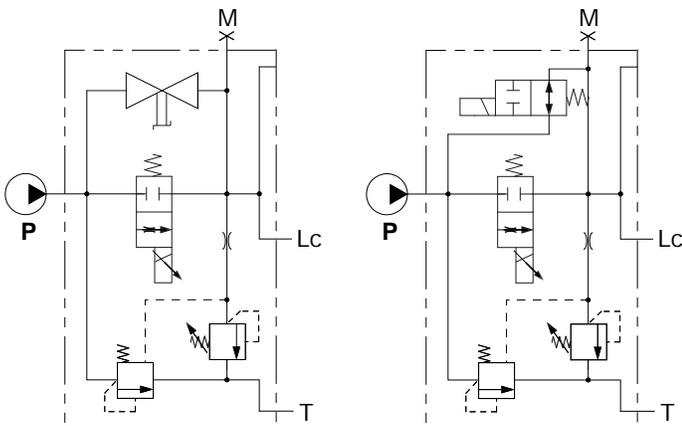
Inlet section with flow regulator

Dimensional data and hydraulic circuits



F7S-PR3M configuration
With manual unloader valve

F7S-PR3E configuration
With electric unloader valve



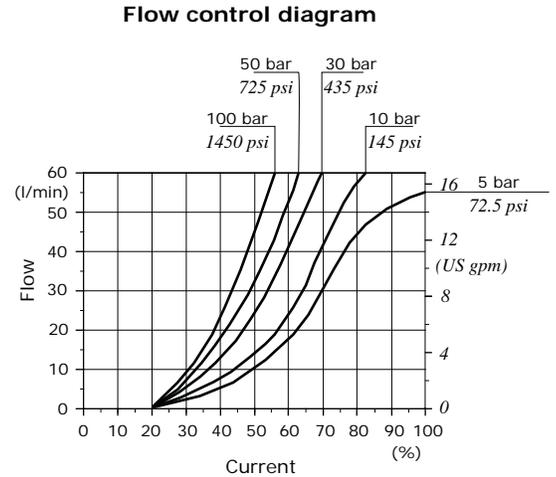
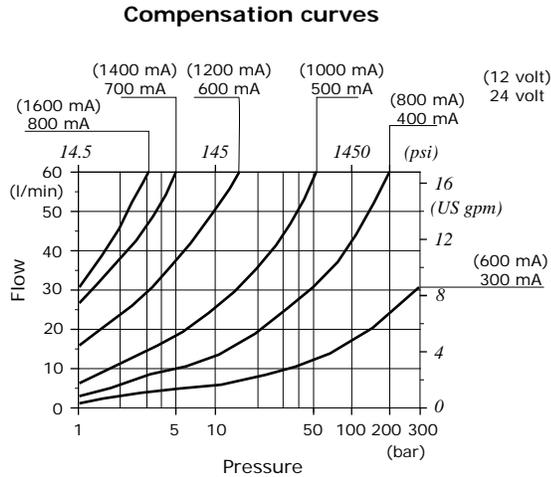
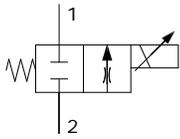
- Wrenches and tightening torques**
- C = wrench 17 - 30 Nm (22 lbft)
 - D = manual tightening
 - E = wrench 27 - 30 Nm (22 lbft)
 - F = wrench 27 - 60 Nm (44.2 lbft)
 - G = allen wrench 27 - 60 Nm (44.2 lbft)
 - H = allen wrench 6 - 24 Nm (17.7 lbft)

Inlet section with flow regulator

Inlet valves

PQH-06 type

Flow control proportional pressure compensated valve, 12/24 VDC



Valve features

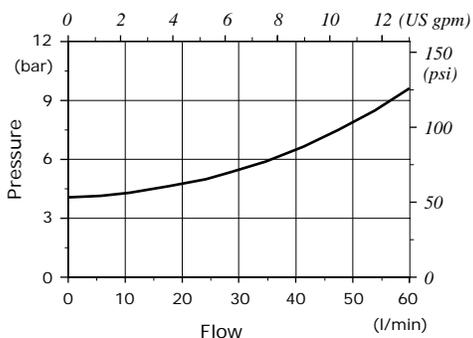
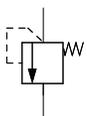
- Nominal flow.....: 60 l/min (15.8 US gpm)
- Max. pressure: 310 bar (4500 psi)
- Power rating.....: 22 W
- Max. internal leakage...: 100 cm³/min @ 210 bar (6.10 in³/min @ 3050 psi)
- Coil insulation.....: Class F
- Voltage.....: 12/24 VDC

Note: The coil and connector is included

VLP-06 type

Pressure relief valve

Pressure drops

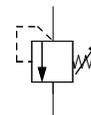


Valve features

- Nominal flow.....: 60 l/min (15.8 US gpm)
- Max. pressure: 350 bar (5070 psi)
- Opening start pressure.....: 4 bar (58 psi)

PM type

Antishock valve

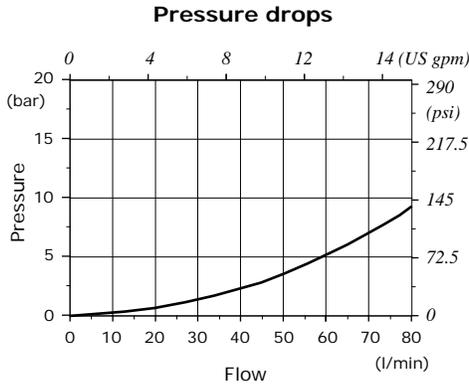
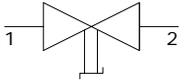


Inlet section with flow regulator

Inlet valves

RERN-06 type

Manual unloader valve

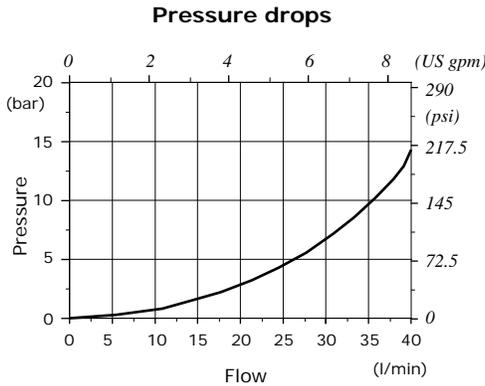
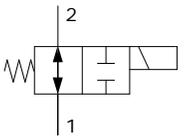


Valve features

Nominal flow.....: 70 l/min (18.5 US gpm)
 Max. pressure: 315 bar (4600 psi)
 Closed valve leakage....: 0

EDH-06 type

Electric unloader valve, normally open



Valve features

Nominal flow.....: 35 l/min (9.24 US gpm)
 Max. pressure: 310 bar (4500 psi)
 Max. internal leakage....: 50 cm³/min @ 210 bar
 (3.05 in³/min @ 3050 psi)

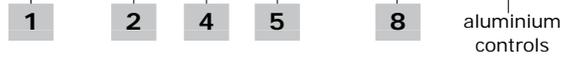
Coil **A** type: To be order separately, see #3 page 89

Working section - parts ordering codes

Mechanical control valve configuration example

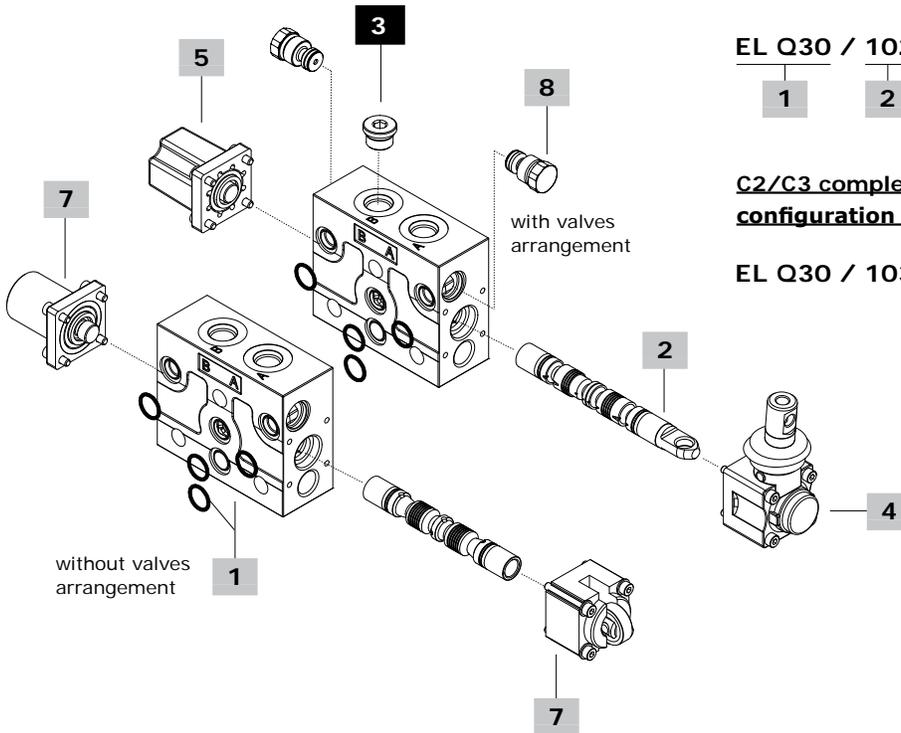
spring type and valve setting (bar)

EL Q30 / 102 - A1 - M1 . V40(N)120 - S - SAE



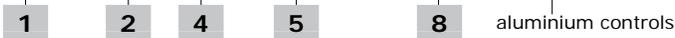
C2/C3 complete mechanical control configuration example

EL Q30 / 103 - C3 . V40(N)120 - S - SAE

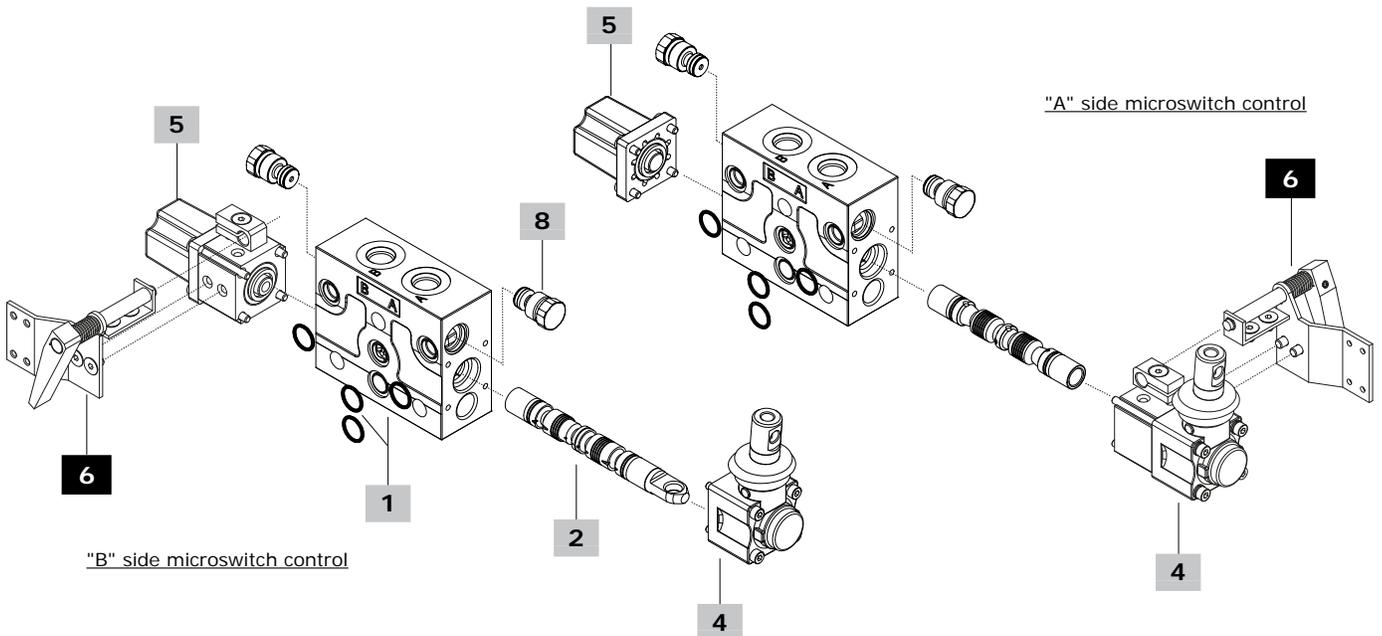


Microswitch control valve configurations example

EL Q30 / 103 - A1 - M1-N1 . V40(N)120 - S - SAE



EL Q30 / 103 - N1-A1 - M1 . V40(N)120 - S - SAE



Working section - parts ordering codes

1 Working section body kit * page 98

TYPE	CODE	DESCRIPTION
EL-Q30.VC-SAE	5EL0600128433	DESCRIPTION: Parallel circuit, with port valves arrangement
EL-Q30-SAE	5EL0600128107	DESCRIPTION: Parallel circuit, without port valves arrangement
EL-Q30.VC-SAE	5EL0600128435	DESCRIPTION: Series circuit, with port valves arrangement

2 Spool page 99

TYPE	CODE	DESCRIPTION
Standard spools		
103	060103179499	Double acting, A and B closed in neutral position
	3CUG3197800	As previous one, for kick-out control
106	KR30106	Double acting for closed circuit
107	KR80107-108	Double acting, A to tank and B closed in neutral position
108	KR80107-108	Double acting, B to tank and A closed in neutral position
111	060103179599	Double acting, A and B to tank in neutral position
	KR30111K	As previous one, for kick-out control
114	KR30114	Double acting, A and B to tank in neutral position, for closed circuit
101	3CUG32188000	Single acting on port A (3)
102	3CUG3218002	Single acting on port B (3)
116	3CUG3179200	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
126	3CUG3179201	Double acting, with floating in the 4 th position (spool out): requires dedicated spool control
403	5CUG2895202	Double acting, A and B closed in neutral position, for series circuit
411	5CUG2895402	Double acting, A and B to tank in neutral position, for series circuit
Note (3): Q30 valve required SAE6 plug, see #3		
Special spools for cam, microswitch controls and other leverless controls		
103	060103179099	Double acting, A and B closed in neutral position
111	060103179199	Double acting, A and B to tank in neutral position
403	5CUG2895203	Double acting, A and B closed in neutral position, for series circuit
411	5CUG2895403	Double acting, A and B to tank in neutral position, for series circuit

3 Plug for single acting spool *

TYPE	CODE	DESCRIPTION
-	255006	SAE6 plug

4 A side control page 100

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	03600A1-A2	M8 thread plastic lever box
A2	03600A1-A2	As A1 type, with lever box rotated 180°
A1/10	03610A1-A2/10	M8 thread aluminium lever box
A2/10	03610A1-A2/10	As A1/10 type, with lever box rotated 180°
A1/06	03606A1-A2/06	Aluminium lever box, with stroke limiter
A2/06	03606A1-A2/06	As A1/06 type, with lever box rotated 180°
A1/PM	03610A1-A2/PM	M10 thread aluminium lever box
A2/PM	03610A1-A2/PM	As A1/PM type, with lever box rotated 180°
A1/PMP	03610A1-A2/PMP	M10 thread plastic lever box
A2/PMP	03610A1-A2/PMP	As A1/PMP type, with lever box rotated 180°
A1/Z1	03610A1-A2/Z1	Plastic lever box, for 116 spool type
A2/Z1	03610A1-A2/Z1	As A1/Z1 type, with lever box rotated 180°
A1/Z1/10	03610A1-2/10Z1	As A1/Z1 type, with aluminium lever box
<u>With safety lever control:</u>		
A1/S⁽¹⁾	03624A1-A2/S	M8 thread aluminium lever box
A2/S⁽¹⁾	03624A1-A2/S	As A1/S type, with lever box rotated 180°
<u>Without lever control:</u>		
A4/Z1	03617A4/Z1	As A4 type, for 116 spool type
A6	03620A6	With flange
A6-H/Z1	03620A6-H/Z1S1	As A6 type, for 116 spool type
A8	03622A8	Arrangement for flexible cable control
	03622A8/03	As previous one, with aluminium cap
A8/Z1	03622A8/Z1	As A8 type, for 116 spool type
	03622A8/Z1/10	As previous one, with aluminium cap
<u>With joystick controls for 2 section operation:</u>		
A35/1	03640A35-12	Joystick 1 type
A35/2	03640A35-12	Joystick 2 type
A35/3	03640A35-34	Joystick 3 type
A35/4	03640A35-34	Joystick 4 type
For types 103, 111, 403 e 411 special spools		
<u>With spool position microswitch:</u>		
Note: To complete the control you must use the assembly kit at #6		
N1-A1	03641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
	03641N1-A1/10	As previous one, with aluminium lever box
N1A-A1	03642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	03643N1BA1/A2L	Micro operation in pos. 2, with lever box
N1-A3	03648N1-A3L	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	03648N1A-A3L	Micro operation in pos. 1, without lever with cap
N1B-A3	03648N1B-A3L	Micro operation in pos. 2, without lever with cap
<u>Without lever control:</u>		
A3	03614A3	Without lever, with cap
	03614A3/03	As previous one, with aluminium cap
A4	03617A4	M8 thread male external pin with flange
	03617A4/03	As previous one, with aluminium flange
A5⁽²⁾	03619A5	Flange with spherical spool end
	03619A5/10	As previous one, with aluminium flange

(*) : Codes are referred to **UN-UNF** thread

(1) : Always complete with lever knob

(2) : To be assembled only with M4 control

Working section - parts ordering codes

5 B side control page 109

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	03730M1	3 pos., spring return in neutral position
	03730M1/03	As previous one, with aluminium cap
M1/O1	03730M1/O1	As M1 type, for joystick control
	03730M1/O1/03	As previous one, with aluminium cap
M1/O2	03730M1/O2	As M1 type, with stroke limiter
M1/O5	03730M1/O5	As M1 type, for series spool
M1/O6	03730M1/O6	As M1/O5 type, with aluminium cap
M1/O7	03730M1/O7	As M1 type, for joystick control with series spool
	03730M1/O7/03	As previous one, with aluminium cap
M1-B1	03753M1-B1	As M1 type, with microswitch arrangement
	03753M1-B1/03	As previous one, with aluminium cap
M1-U1	03701M1-U1	As M1 type, with M8 thread male external pin
M2	03732M2	2 pos. (0-1), spring return in neutral position
	03732M2/03	As previous one, with aluminium cap
M2-U1	03702M2-U1	As M2 type, with M8 thread male external pin
M3	03733M3	2 pos. (0-2), spring return in neutral position
	03733M3/03	As previous one, with aluminium cap
M3-U1	03703M3-U1	As M3 type, with M8 thread male external pin
M4	03734M41-2	2 pos. (1-2), spring return in position 1
	03735M42-1	2 pos. (2-1), spring return in position 2
M4-U1	03704M4-U11-2	As M4 type (1-2), with M8 thread male external pin
<u>With flexible cable control arrangement:</u>		
M1-U2	03715M1-U2	3 pos., spring return in neutral position
M2-U2	03716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	03717M3-U2	2 pos. (0-2), spring return in neutral position
<u>With detent:</u>		
R1	03741R1	3 pos., detent in position 1
	03741R1/03	As previous one, with aluminium cap
R2	03742R2	3 pos., detent in position 2
	03742R2/03	As previous one, with aluminium cap
R3	03743R3	3 pos., detent in all position
	03743R3/03	As previous one, with aluminium cap
R4	03744R4	2 pos., detent in position 0-1
	03744R4/03	As previous one, with aluminium cap
R5	03745R5	2 pos., detent in position 0-2
	03745R5/03	As previous one, with aluminium cap
R6	03746R6	2 pos., detent in position 1-2
	03746R6/03	As previous one, with aluminium cap
R8	03748R8	4 pos., detent in 4 th pos., for 116 spool type
	03748R8/03	As previous one, with aluminium cap
R10/Z1	03750R10/Z1	4 pos., detent in 4 th pos., for 126 spool type
	03750R10/Z1/03	As previous one, with aluminium cap
<u>With detent and kick out function:</u>		
R1K	03741R1K	3 pos., detent in position 1
	03741R1K/03	As previous one, with aluminium cap
R2K	03742R2K	3 pos., detent in position 2
	03742R2K/03	As previous one, with aluminium cap
R3K	03743R3K	3 pos., detent in all position
	03743R3K/03	As previous one, with aluminium cap

5 B side control (cont.) page 109

TYPE	CODE	DESCRIPTION
<u>With spool position microswitch:</u>		
Note:	To complete the control you must use the assembly kit at #6	
M1-N1	03766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
	03766M1-N1/03	As previous one, with aluminium lever box
M1-N1A	03767M1-N1AL	As M1-N1 type, micro operation in pos. 1
	03767M1-N1AL/3	As previous one, with aluminium cap
M1-N1B	03768M1-N1BL	As M1-N1 type, micro operation in pos. 2
	03768M1-N1BL/3	As previous one, with aluminium cap
M2-N1	03769M2-N1L	2 pos. (0-1), spring return in neutral pos.
M3-N1	03772M3-N1L	2 pos. (0-2), spring return in neutral pos.
<u>With pneumatic and electropneumatic controls:</u>		
P1NW	03661P1-NW	ON/OFF pneumatic control
P1NPW	03661P1-NPW	Proportional pneumatic control
D3W	03691D3-F-12DC	12 VDC, ON/OFF electropneumatic control
	03692D3-F-24DC	24 VDC, ON/OFF electropneumatic control

6 Microswitch assembly kit

CODE	DESCRIPTION
03650N1-01	Kit for 1 section
03650N1-02	Kit for 2 sections
03650N1-03	Kit for 3 sections
03650N1-04	Kit for 4 sections
03650N1-05	Kit for 5 sections
03650N1-06	Kit for 6 sections
03650N1-07	Kit for 7 sections
03650N1-08	Kit for 8 sections
03650N1-09	Kit for 9 sections
03650N1-10	Kit for 10 sections

7 Complete controls A+B sides page 116

TYPE	CODE	DESCRIPTION
<u>For types 103, 111, 403, 411 special spools</u>		
C2	03792C2-C3	Cam control from position 1 to 2
C3	03792C2-C3	Cam control from position 2 to 1

8 Auxiliary port valve page 120

TYPE	CODE	DESCRIPTION
<u>Antishock valve:</u>		
V30-B	0380FV30-B	Setting range: from 50 to 100 bar (from 725 to 1450 psi)
V30-N	0380FV30-N	Setting range: from 101 to 200 bar (from 1460 to 2900 psi)
V30-R	0380FV30-R	Setting range: from 201 to 350 bar (from 2910 to 5100 psi)
<u>Antishock/anticavitation valve:</u>		
V33-B	0380FV33-B	Setting range: from 50 to 100 bar (from 725 to 1450 psi)
V33-N	0380FV33-N	Setting range: from 101 to 200 bar (from 1460 to 2900 psi)
V33-R	0380FV33-R	Setting range: from 201 to 350 bar (from 2910 to 5100 psi)
<u>Anticavitation valve:</u>		
V04	03808V04	Anticavitation valve
<u>Plug:</u>		
VC	060002846099	Valve blanking plug

For other configurations and positions, see page 120

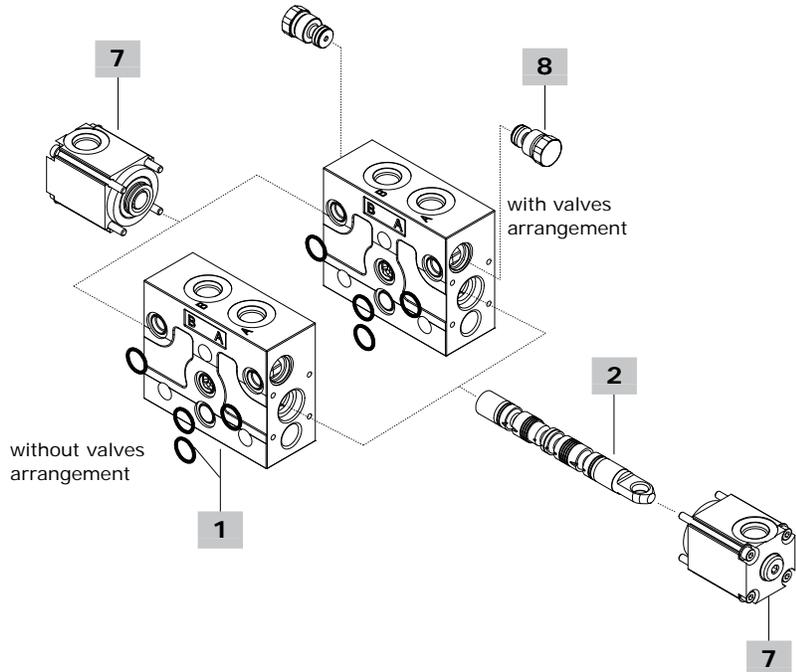
Working section - parts ordering codes

Proportional hydraulic control valve configuration example

spring type and valve setting (bar)

EL Q30 / 103 - H5 . V40(N)120 - S - SAE

aluminium controls



1 Working section body kit* page 98

TYPE	CODE	
EL-Q30-H5.VC-SAE	5EL0600128433H5	
DESCRIPTION: Parallel circuit, with port valves arrangement		
TYPE	CODE	
EL-Q30-H5-SAE	5EL0600128107H5	
DESCRIPTION: Parallel circuit, without port valves arrangement		

2 Spool page 99

TYPE	CODE	DESCRIPTION
103	060103179499	Double acting, A and B closed in neutral position

7 Hydraulic controls A+B sides* page 117

TYPE	CODE	DESCRIPTION
H5	03785H5/SAE	Low pressure proportional type, upper ports

8 Auxiliary port valve page 120

See #8, page 95

(*): Codes are referred to **UN-UNF** thread

Working section - parts ordering codes

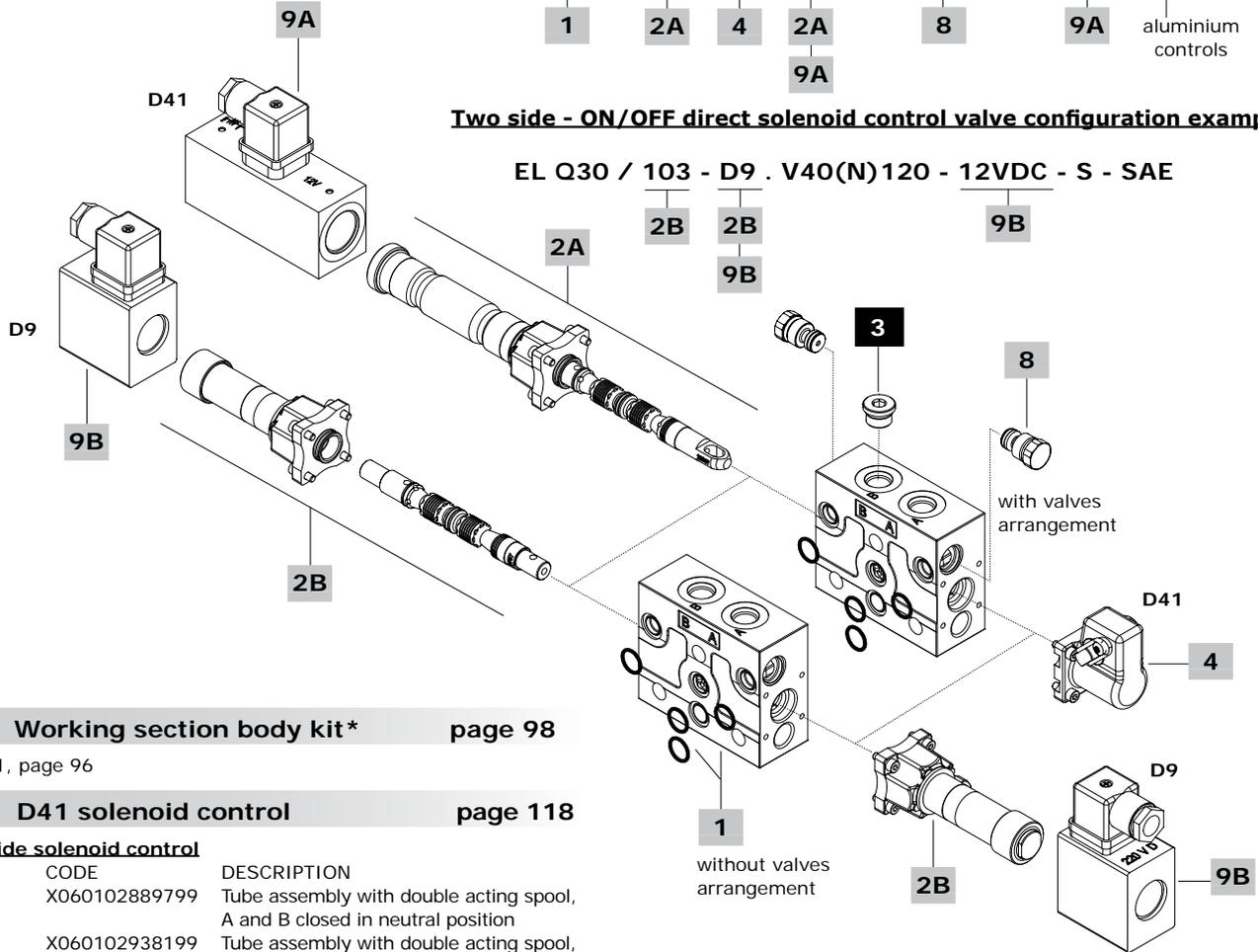
One side - ON/OFF direct solenoid control valve configuration example

spring type and valve setting (bar)

EL Q30 / 103 - A1 - D41 . V40(N)120 - 12VDC - S - SAE
 1 2A 4 2A 8 9A aluminium controls

Two side - ON/OFF direct solenoid control valve configuration example

EL Q30 / 103 - D9 . V40(N)120 - 12VDC - S - SAE



1 Working section body kit* page 98

See #1, page 96

2A D41 solenoid control page 118

One side solenoid control

TYPE	CODE	DESCRIPTION
103	X060102889799	Tube assembly with double acting spool, A and B closed in neutral position
107	X060102938199	Tube assembly with double acting spool, A to tank and B closed in neutral position
108	X060102937199	Tube assembly with double acting spool, B to tank and A closed in neutral position
109	X060102952699	Tube assembly with single acting spool on port A, A to tank in neutral position (1)
111	X060102894299	Tube assembly with double acting spool, A and B to tank in neutral position
101	X060102905099	Tube assembly with single acting spool on port A (1)
102	X060102894199	Tube assembly with single acting spool on port B (1)

2B D9 solenoid control page 119

Two side solenoid control

TYPE	CODE	DESCRIPTION
103	X060102998299	Tube assembly with double acting spool, A and B closed in neutral position
108	X060103070799	Tube assembly with double acting spool, B to tank and A closed in neutral position
111	X060103000499	Tube assembly with double acting spool, A and B to tank in neutral position
101	X060103012699	Tube assembly with single acting spool on port A (1)
102	X060103012699	Tube assembly with single acting spool on port B (1)

Note (1): Q30 valve required SAE6 plug, see #3

3 Plug for single acting spool*

See #3, page 94

4 A side control for D41 page 118

TYPE	CODE	DESCRIPTION
A1	060003236899	M8 thread cast iron lever box
A2	060003236899	As A1 type, with lever box rotated 180°

8 Auxiliary port valve page 120

See #8, page 95

9A/B Coil page 118

D41 coil

TYPE	CODE	DESCRIPTION
-	ZEB012	12 VDC ISO4400 coil
-	ZEB024	24 VDC ISO4400 coil

D9 coil

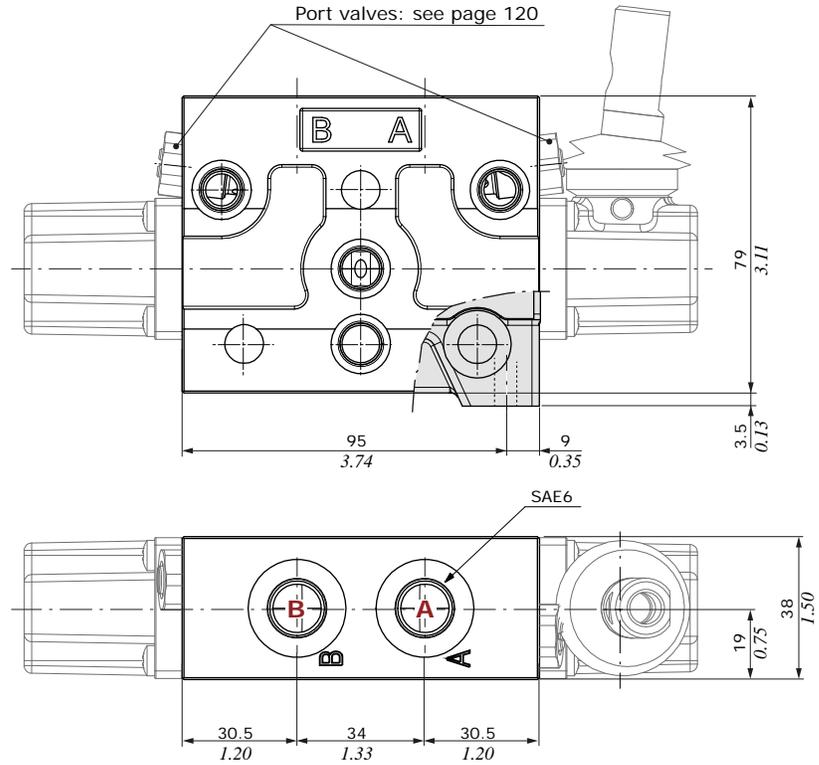
-	ZDB212	12 VDC ISO4400 coil
-	ZDB224	24 VDC ISO4400 coil

Note: The connector is included

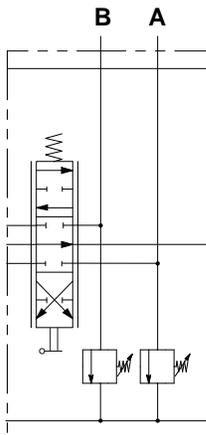
(*): Codes are referred to UN-UNF thread

Working section

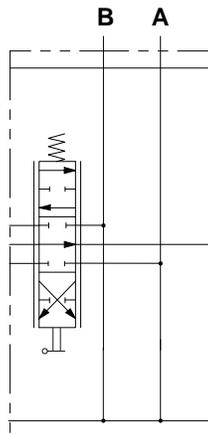
Dimensional data and hydraulic circuits



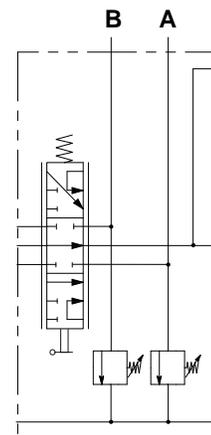
Q30.V40(N)120-SAE configuration
Parallel circuit,
mechanical control with aux valves



Q30-SAE configuration
Parallel circuit,
mechanical control without aux valves



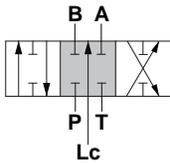
Q30.V40(N)120-SAE configuration
Series circuit,
mechanical control with aux valves



Spool

103 type
A and B closed
in neutral position

2 0 1

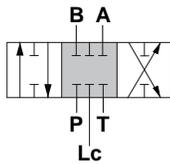


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

106 type
A, B and Lc closed in
neutral position. For closed center

2 0 1

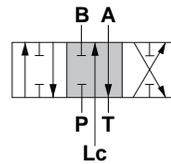


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

107 type
A to tank, B closed
in neutral position

2 0 1

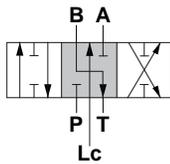


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

108 type
B to tank, A closed
in neutral position

2 0 1

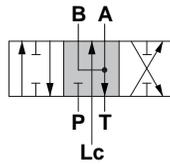


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

111 type
A and B to tank
in neutral position

2 0 1

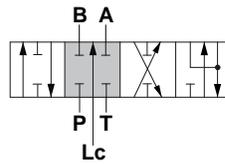


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

116 type
With floating in the 4th position
(spool in)

2 0 1 3

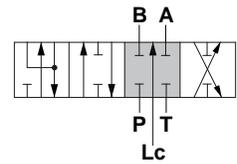


Stroke

Position 1: - 4 mm (- 0.15 in)
Position 2: + 5 mm (+ 0.19 in)
Position 3: - 8.6 mm (- 0.33 in)

126 type
With floating in the 4th position
(spool out)

3 2 0 1

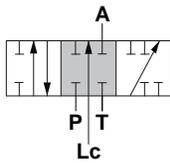


Stroke

Position 1: + 4 mm (+ 0.15 in)
Position 2: - 5 mm (- 0.19 in)
Position 3: + 8.6 mm (+ 0.33 in)

101 type
Single acting on A,
B plugged

2 0 1

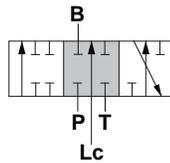


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

102 type
Single acting on B,
A plugged

2 0 1

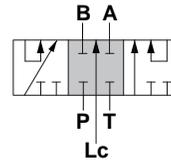


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

403 type
A and B closed in neutral
position for serie circuit

2 0 1

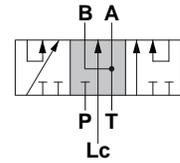


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

411 type
A and B to tank in neutral
position for serie circuit

2 0 1



Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

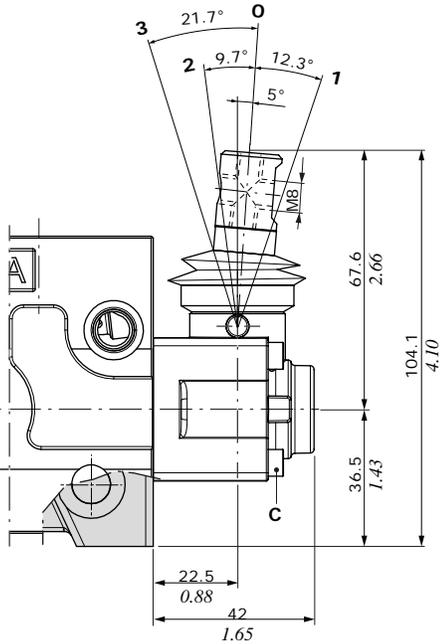
Working section

A side controls

With lever control

A1 type

M8 thread plastic lever box



A1/10 type

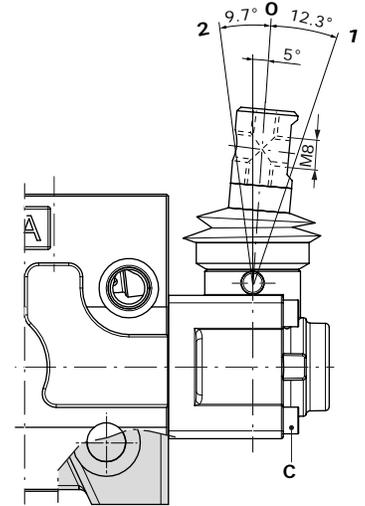
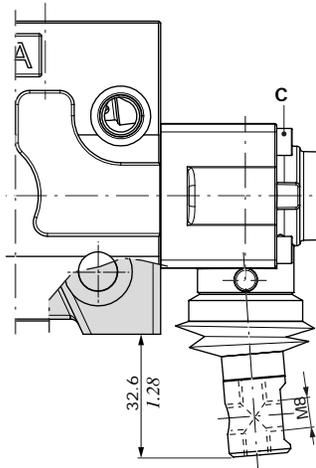
M8 thread aluminium lever box.
Dimensions are the same of A1 type

A2/10 type
As A1/10 type, rotated 180°



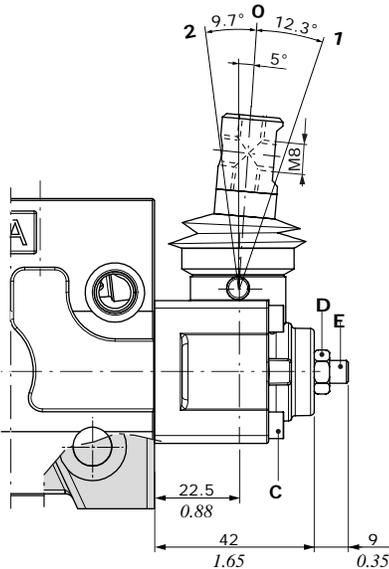
A2 type

As A1 type, rotated 180°



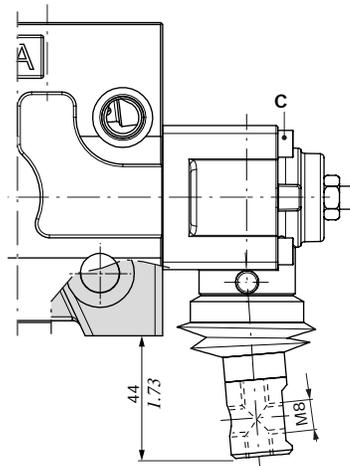
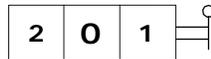
A1/06 type

M8 thread, with stroke limiter



A2/06 type

As A1/06 type, rotated 180°



Wrenches and tightening torques

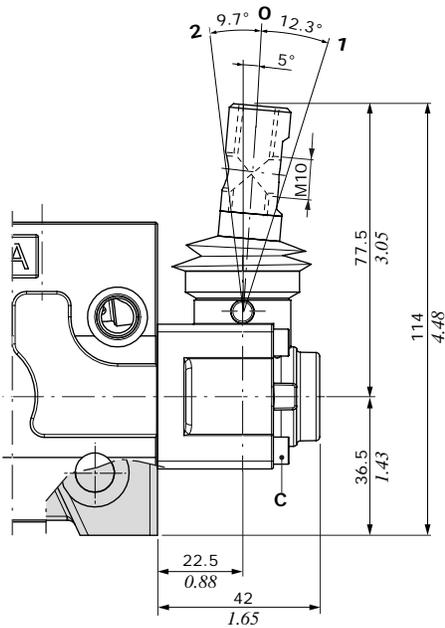
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = wrench 10 - 9.8 Nm (7.2 lbft)
- E = allen wrench 4 - 9.8 Nm (7.2 lbft)

A side controls

With lever control

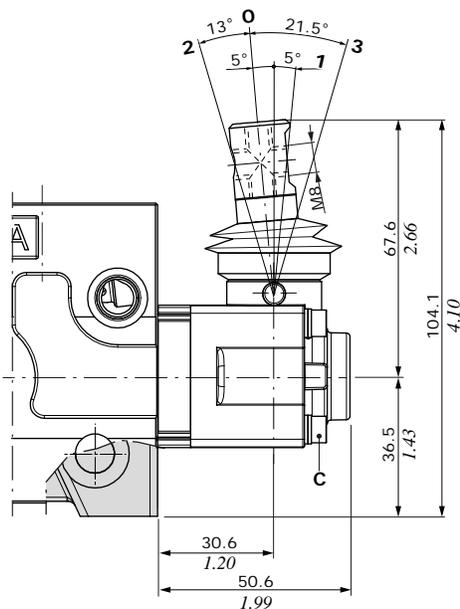
A1/PM type

M10 thread aluminium lever box



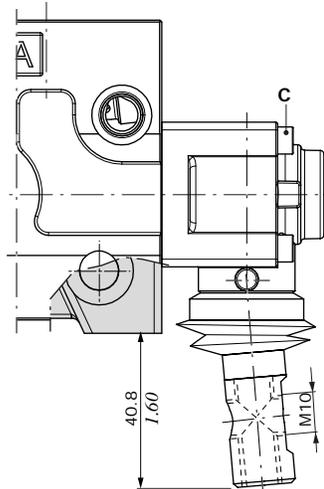
A1/Z1 type

M8 thread, for 116 floating spool type



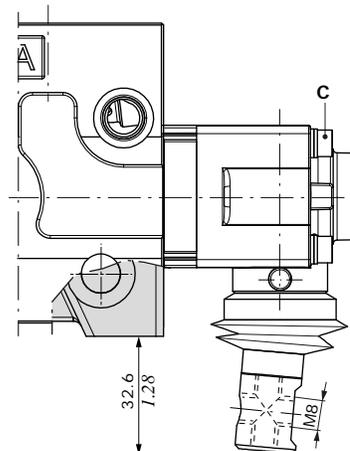
A2/PM type

As A1/PM type, rotated 180°



A2/Z1 type

As A1/Z1 type, rotated 180°



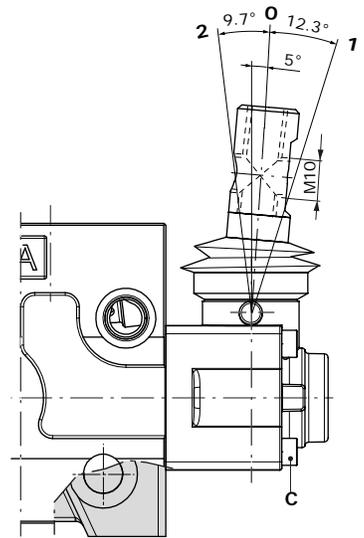
A1/PMP type

M10 thread plastic lever box.

A2/PMP type

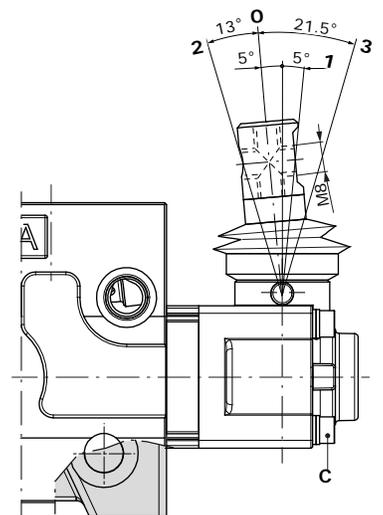
Dimensions are the same of A1/PM type

As A1/PMP type, rotated 180°



A1/Z1/10 type

As A1/Z1 type, with aluminium lever box



Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

Working section

A side controls

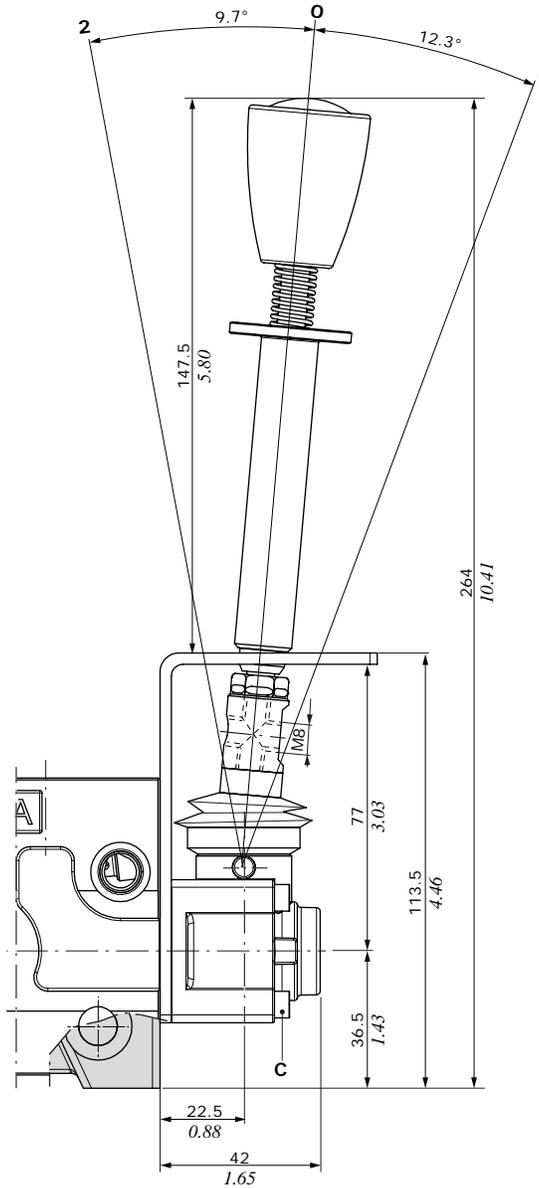
With safety lever control

A1/S type

M8 thread, aluminium lever box

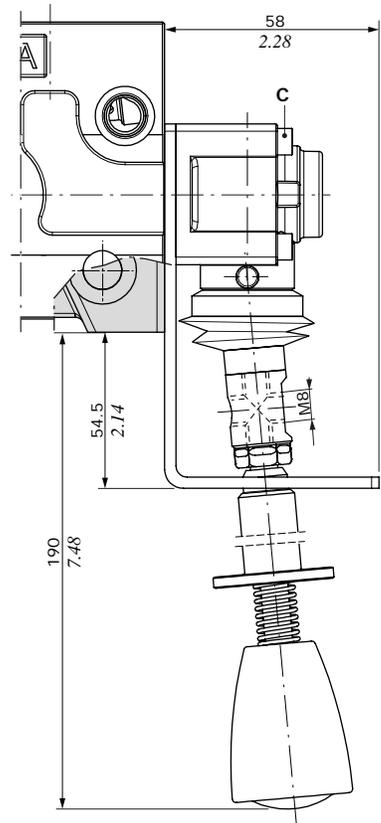


Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf)



A2/S type

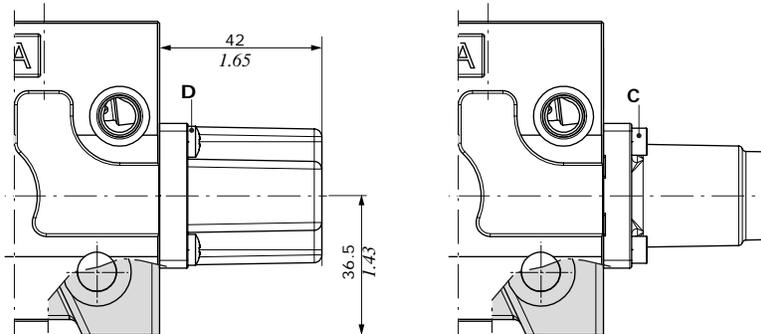
As A1/S type, rotated 180°



A side controls

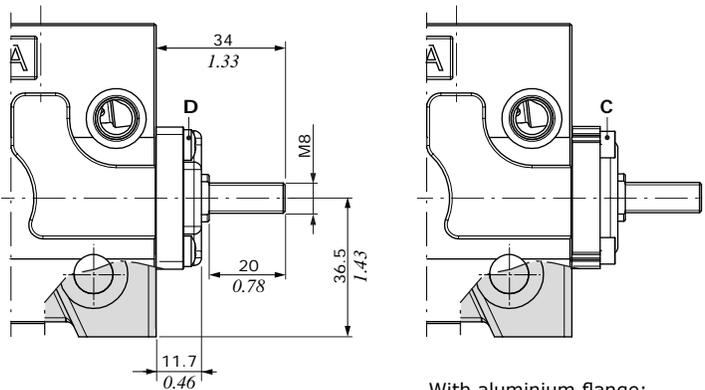
Without lever control

A3 type
With cap.
Available with aluminium cap



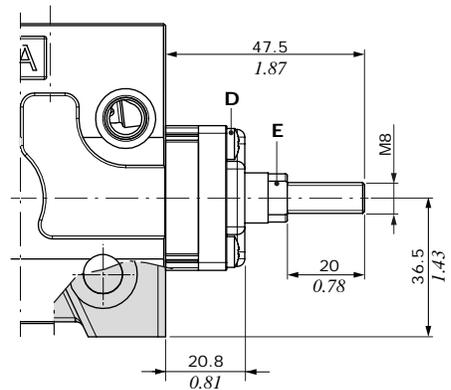
With aluminium cap;
dimensions are the same of standard type

A4 type
M8 male thread external pin with flange.
Available with aluminium flange



With aluminium flange;
dimensions are the same of
standard type

A4/Z1 type
As A4 type,
for 116 floating spool type



Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

D = cross-head - 3 Nm (2.2 lbft)

E = wrench 9 - 9.8 Nm (7.2 lbft)

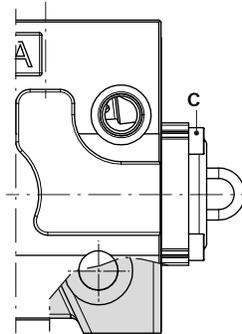
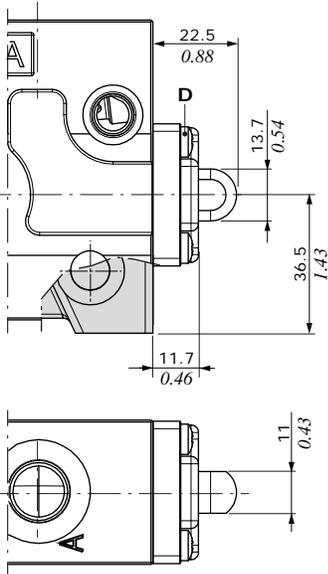
Working section

A side controls

Without lever control

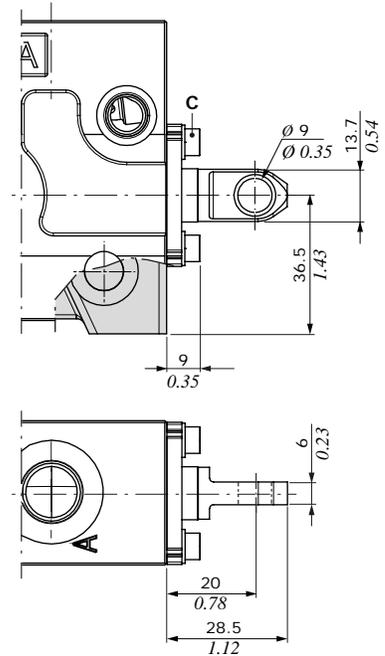
A5 type

Flange with spherical spool end.
Available with aluminium flange



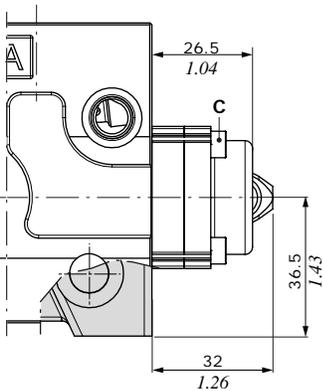
With aluminium flange;
dimensions are the same of
standard type

A6 type
With flange



A6-H/Z1 type

As A6 type,
for 116 floating spool type



Wrenches and tightening torques

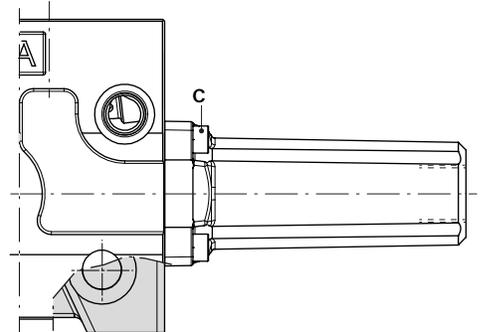
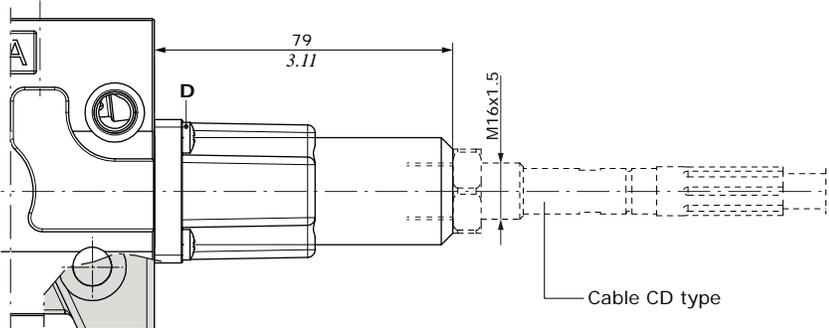
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

A side controls

With flexible cable control arrangement

A8 type

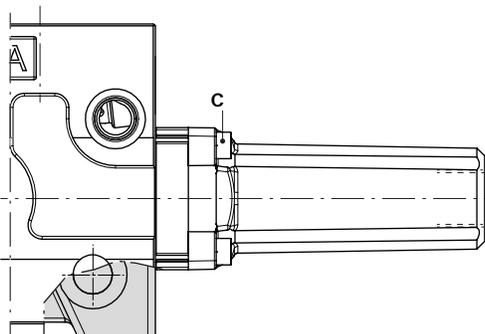
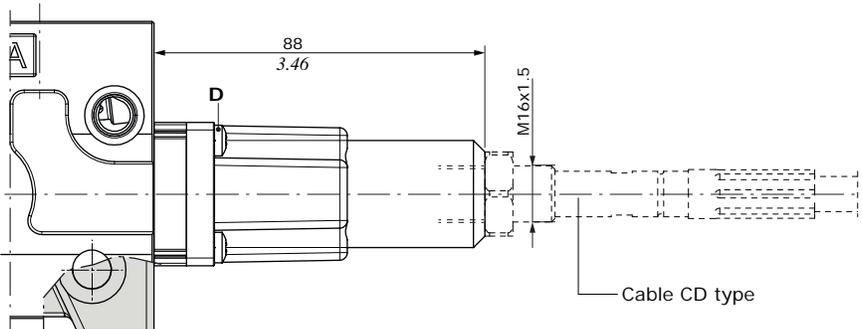
Flexible cable control arrangement.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

A8/Z1 type

As A8 type, for 116 floating spool type.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

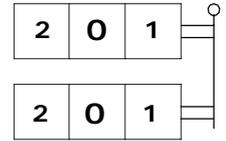
Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

Working section

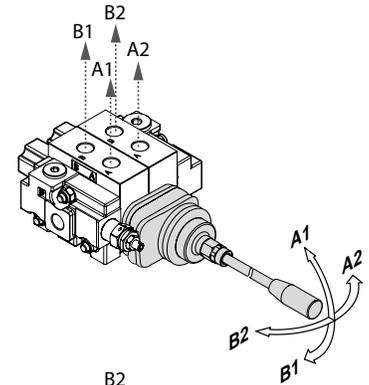
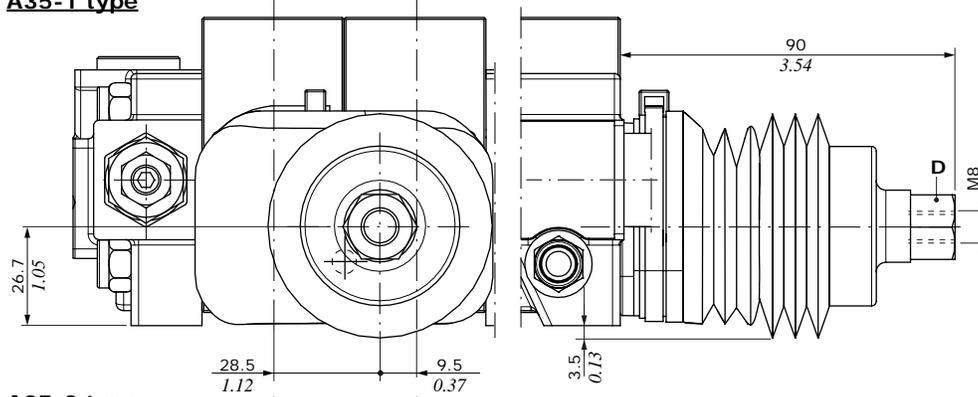
A side controls

Joystick control

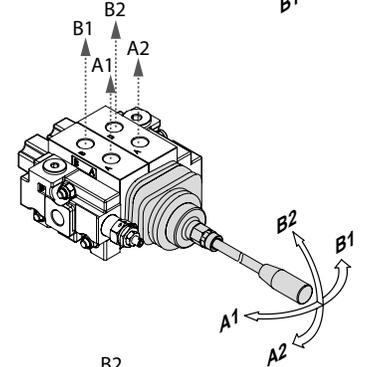
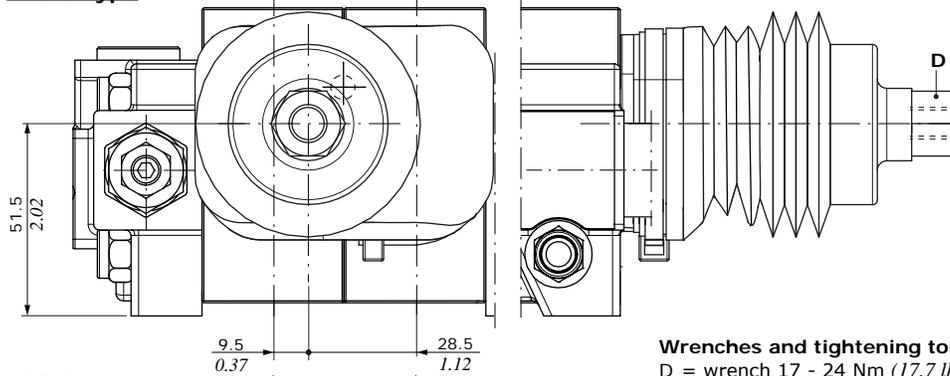
For operating the joystick control in the floating position, contact Sales Department.



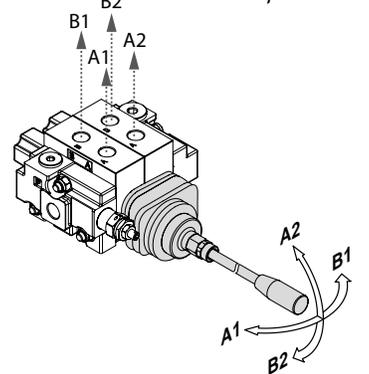
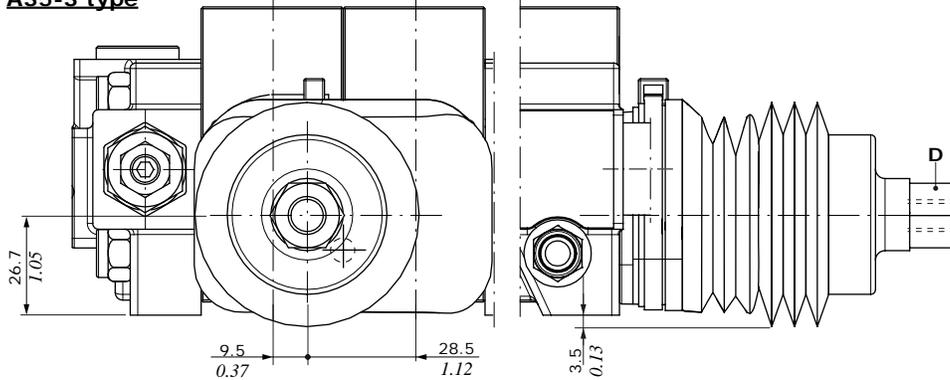
A35-1 type



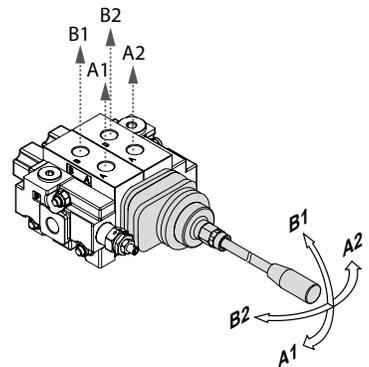
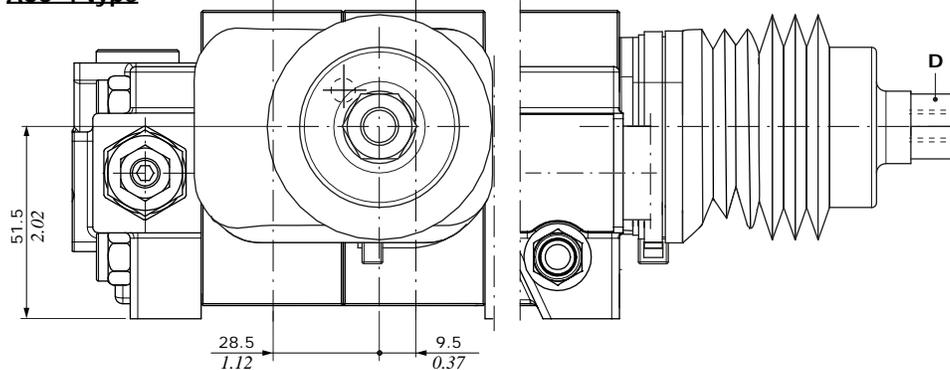
A35-2 type



A35-3 type



A35-4 type



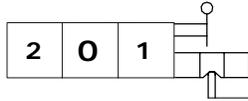
Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbft)

A side controls

With spool position microswitch, with lever

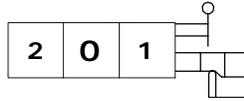
N1-A1 type

Micro operation in position 1 and 2.
Available with aluminium lever box



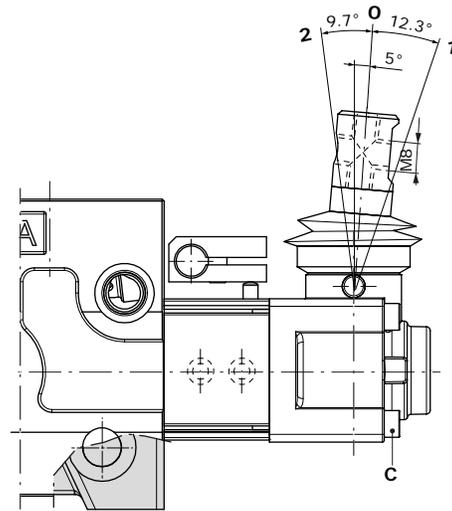
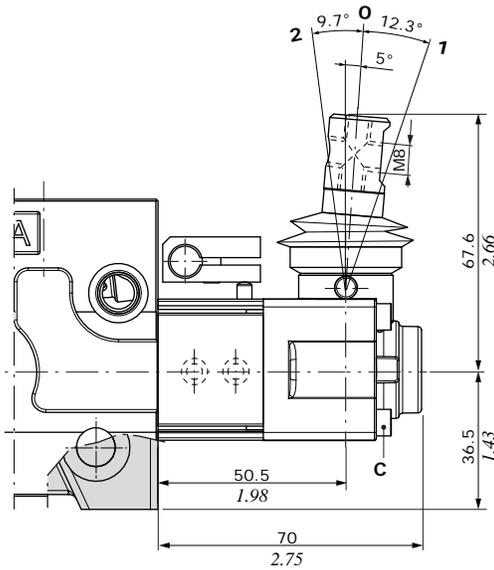
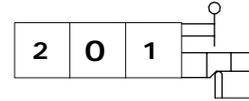
N1A-A1 type

Micro operation in position 1



N1B-A1 type

Micro operation in position 2

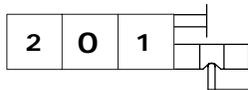


With aluminium lever box;
dimensions are the same of standard type

With spool position microswitch, with cap

N1-A3 type

Micro operation in position 1 and 2



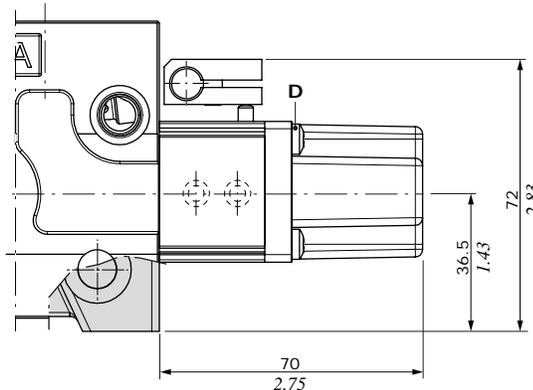
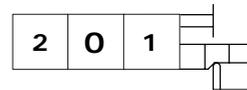
N1A-A3 type

Micro operation in position 1



N1B-A3 type

Micro operation in position 2



Wrenches and tightening torques

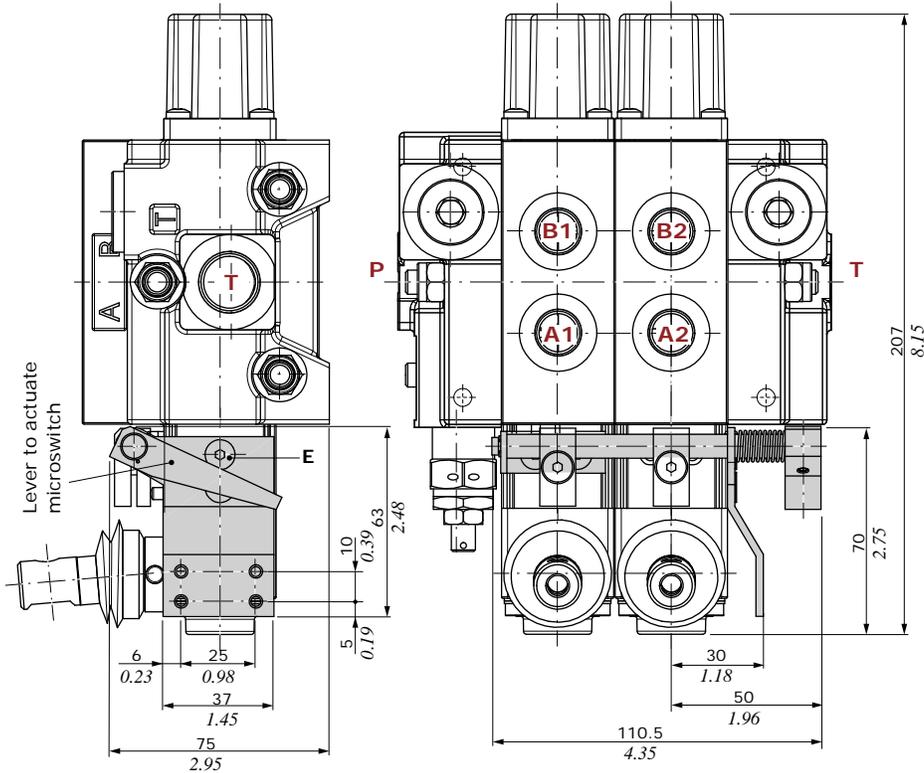
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

Working section

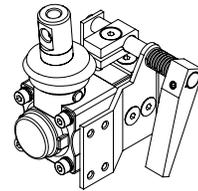
A side controls

With spool position microswitch

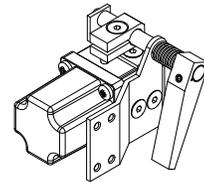
Microswitch assembly kit for 2 working section (N1-A1 type)



with cap



with lever box



Wrenches and tightening torques
 E = allen wrench 3 - 6.6 Nm (4.8 lbft)

B side controls

With spring return control

M1 type

3 position, spring return in neutral position.
Available with aluminium cap



M2 type

2 position (0-1), spring return in neutral position.
Available with aluminium cap



M3 type

2 position (0-2), spring return in neutral position.
Available with aluminium cap



M1/01 type

As M1 type, for joystick control.
Available with aluminium cap

M1/05 type

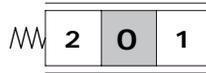
As M1 type, for series spool

M1/06 type

As M1/05 type, with aluminium cap

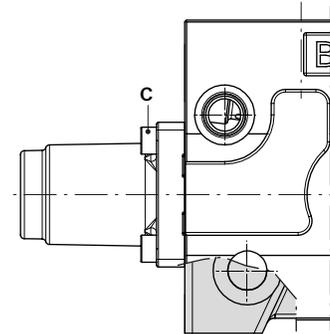
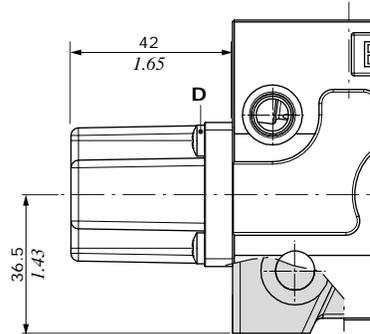
M1/07 type

As M1 type, for joystick series spool.
Available with aluminium cap



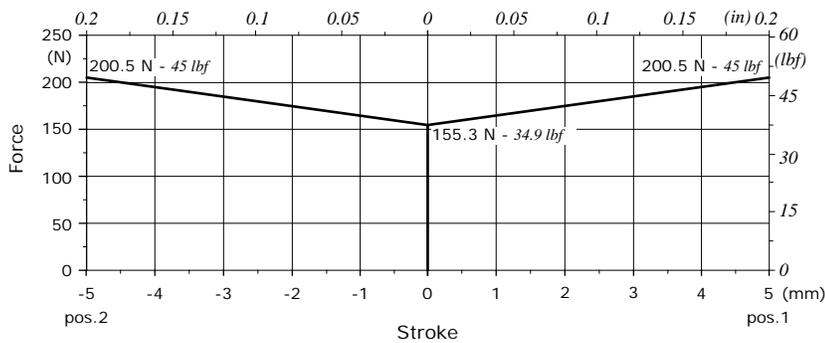
Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbf_t)
- D = cross-head - 3 Nm (2.2 lbf_t)
- E = wrench 10 - 9.8 Nm (7.2 lbf_t)
- F = allen wrench 4 - 9.8 Nm (7.2 lbf_t)



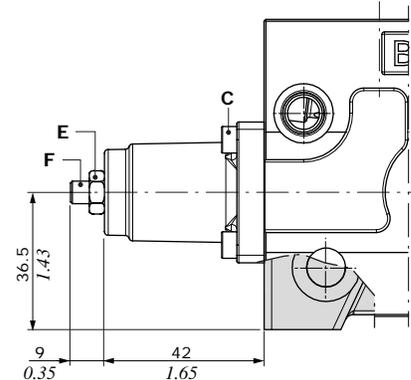
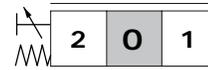
With aluminium cap; dimensions are the same of standard type

M1 control type - Force vs. Stroke diagram



M1/02 type

As M1 type, with stroke limiter



Working section

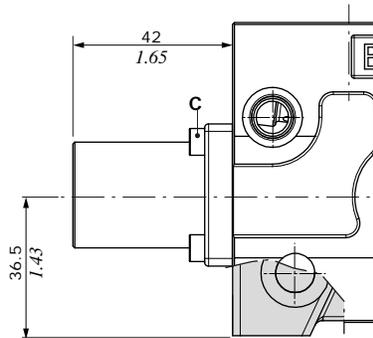
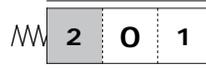
B side controls

With spring return control

M4 types

2 position (1-2),
spring return in position 1

2 position (2-1),
spring return in position 2



Wrenches and tightening torques

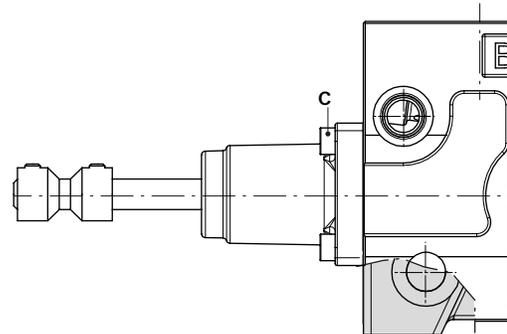
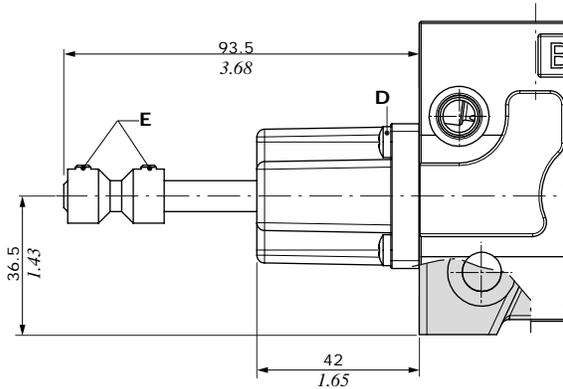
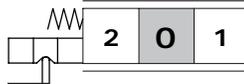
C = allen wrench 3 - 3 Nm (2.2 lbft)

D = cross-head - 3 Nm (2.2 lbft)

E = allen wrench 3 - 5 Nm (3.68 lbft)

M1-B1 type

3 position, microswitch arrangement.
Available with aluminium cap



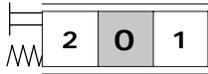
With aluminium cap;
dimensions are the same of standard type

B side controls

With spring return control

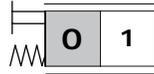
M1-U1 type

3 position, with M8 male thread external pin



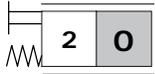
M2-U1 type

2 position (0-1), with M8 male thread external pin



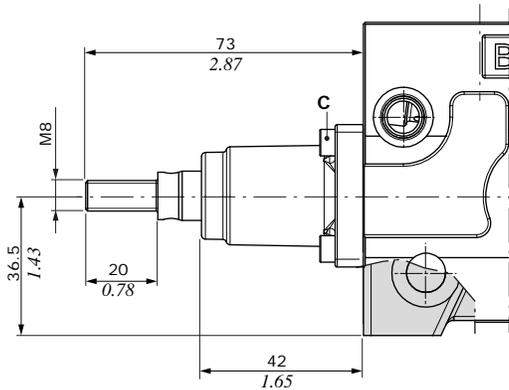
M3-U1 type

2 position (0-2), with M8 male thread external pin



M4-U1 type

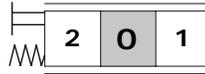
2 position (1-2), with M8 male thread external pin



With flexible cable control arrangement

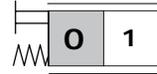
M1-U2 type

3 position, spring return in neutral position



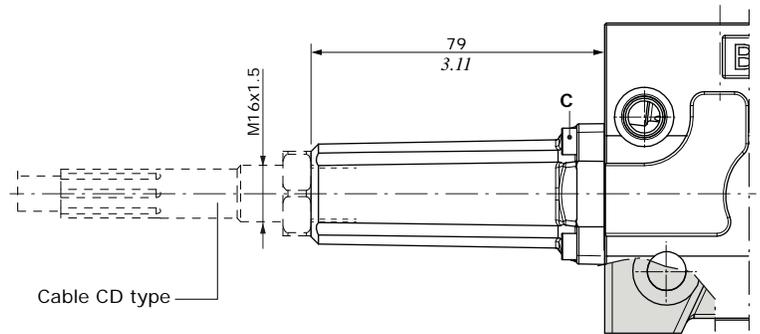
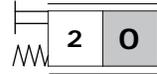
M2-U2 type

2 position (0-1), spring return in neutral position



M3-U2 type

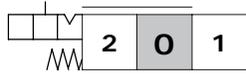
2 position (0-2), spring return in neutral position



With detent control

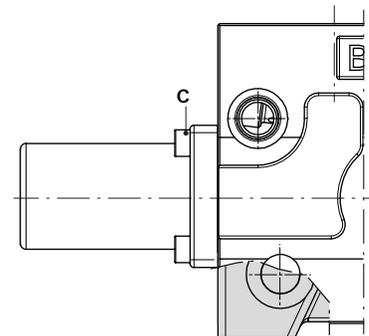
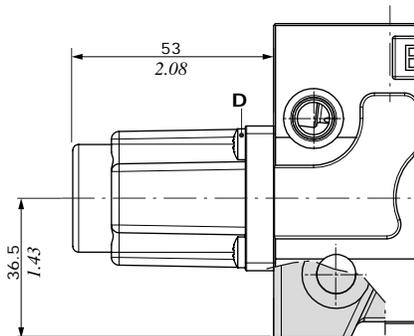
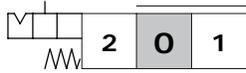
R1 type

3 position, detent in position 1. Available with aluminium cap



R2 type

3 position, detent in position 2. Available with aluminium cap



With aluminium cap; dimensions are the same of standard type

Wrenches and tightening torques

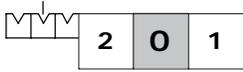
C = allen wrench 3 - 3 Nm (2.2 lbft)
D = cross-head - 3 Nm (2.2 lbft)

Working section

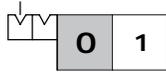
B side controls

With detent control

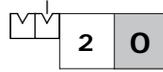
R3 type
3 position,
detent in all position.
Available with aluminium cap



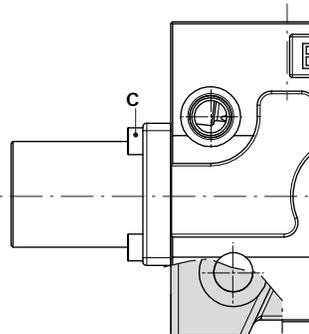
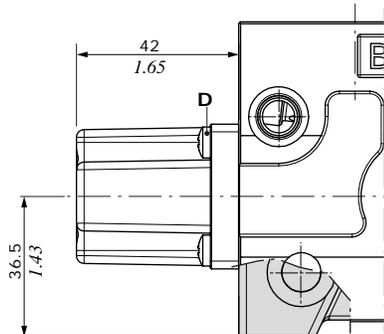
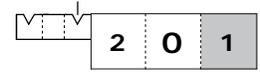
R4 type
2 position,
detent in position 0-1.
Available with aluminium cap



R5 type
2 position,
detent in position 0-2.
Available with aluminium cap



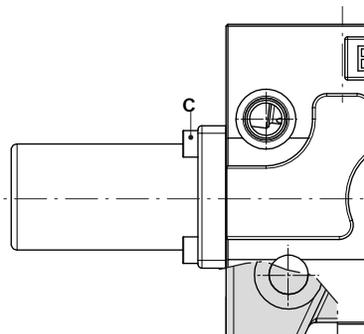
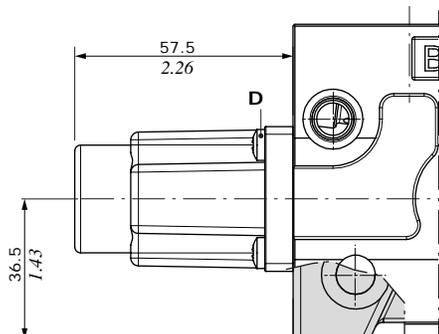
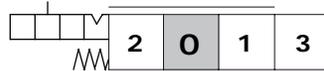
R6 type
2 position,
detent in position 1-2.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf^t)
D = cross-head - 3 Nm (2.2 lbf^t)

R8 type
4 position, detent in 4th position, for 116 floating spool type.
Available with aluminium cap



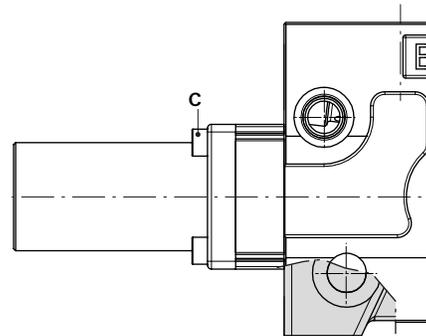
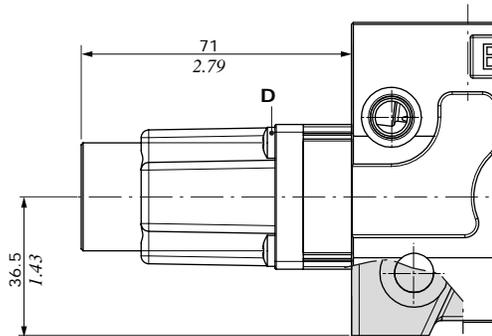
With aluminium cap;
dimensions are the same of standard type

B side controls

With detent control

R10/Z1 type

4 position, detent in 4th position, for 126 floating spool type.
Available with aluminium cap

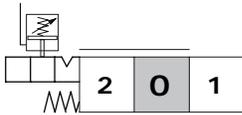


With aluminium cap;
dimensions are the same of standard type

With detent control and kick out function

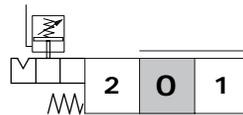
R1K type

3 position, detent in position 1.
Available with aluminium cap



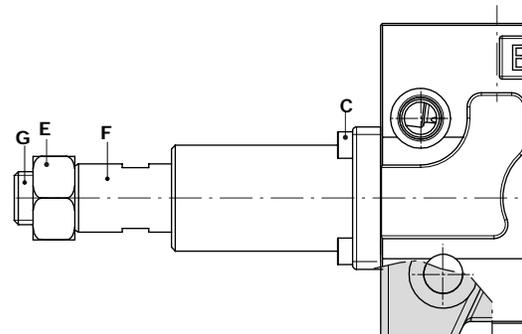
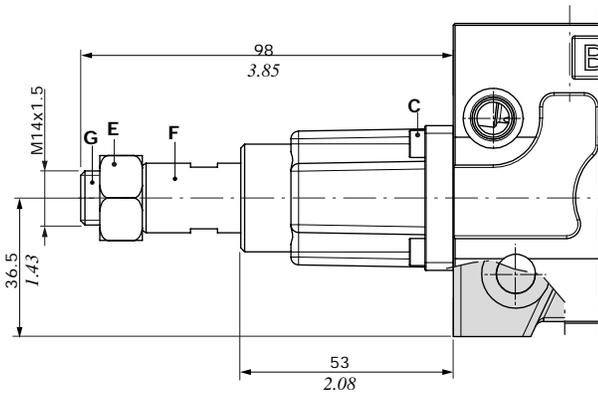
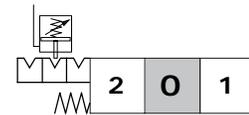
R2K type

3 position, detent in position 2.
Available with aluminium cap



R3K type

3 position, detent in all position.
Available with aluminium cap



With aluminium cap;
dimensions are the same of standard type

Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbf)
- D = cross-head - 3 Nm (2.2 lbf)
- E = wrench 22 - 32 Nm (23.6 lbf)
- F = wrench 16
- G = allen wrench 10 - 32 Nm (23.6 lbf)

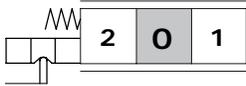
Working section

B side controls

With spool position microswitch

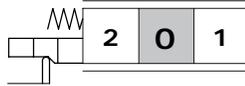
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position.
Available with aluminium cap



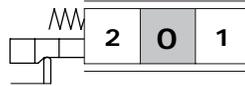
M1-N1A type

3 position, micro operation in position 1.
Available with aluminium cap



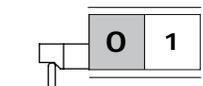
M1-N1B type

3 position, micro operation in position 2.
Available with aluminium cap



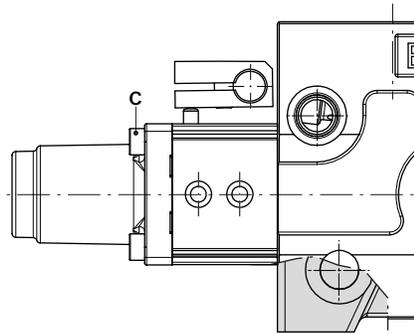
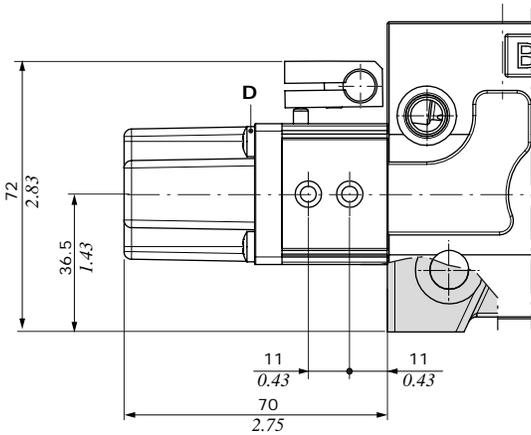
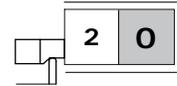
M2-N1 type

2 position (0-1) spring return in neutral position



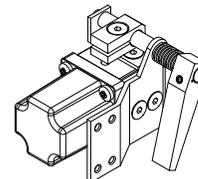
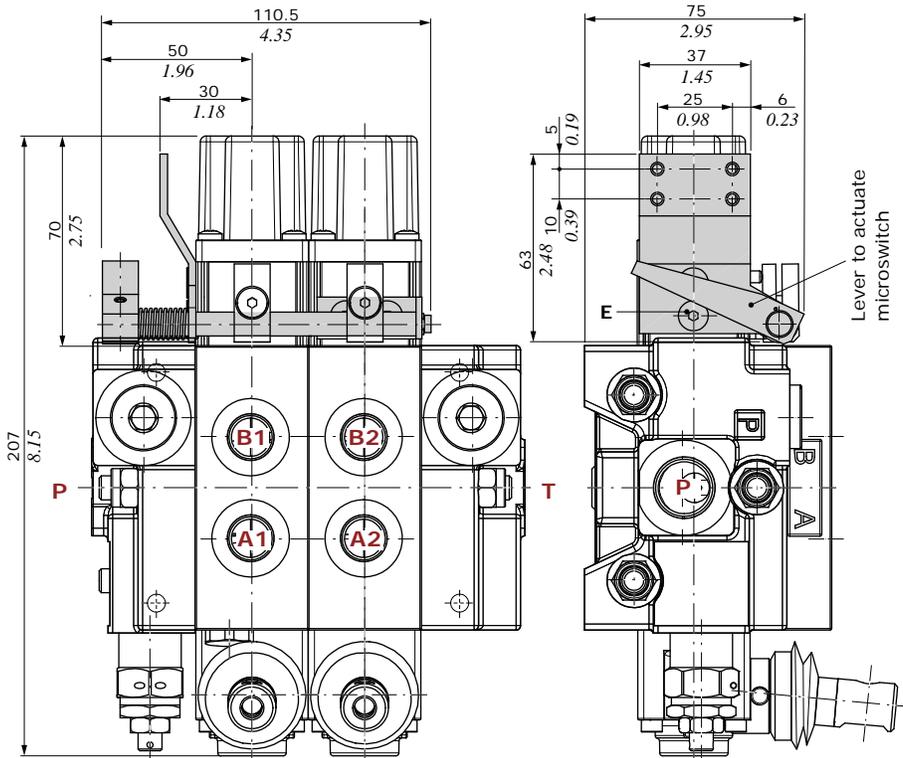
M3-N1 type

2 pos. (0-2) spring return in neutral position



With aluminium cap; dimensions are the same of standard type

Microswitch assembly kit for 2 working section (M1-N1 type)

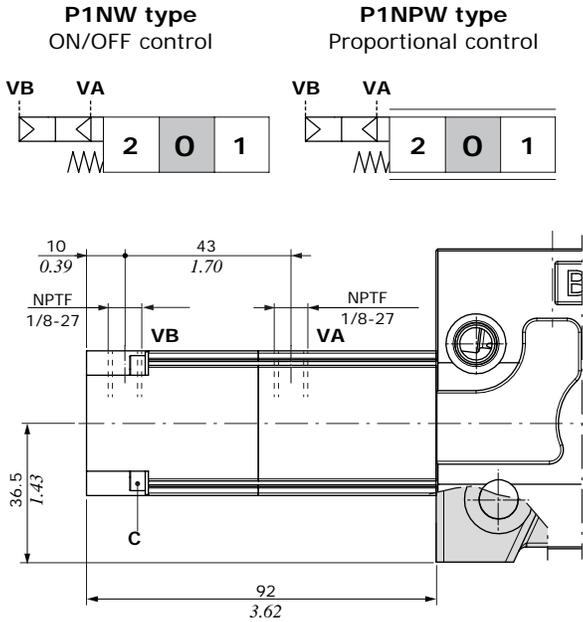


Wrenches and tightening torques

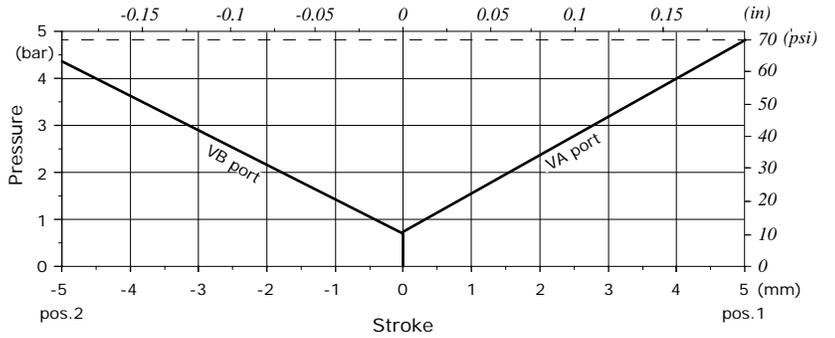
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = allen wrench 3 - 6.6 Nm (4.8 lbft)

B side controls

With pneumatic control



Proportional pilot pressure curves



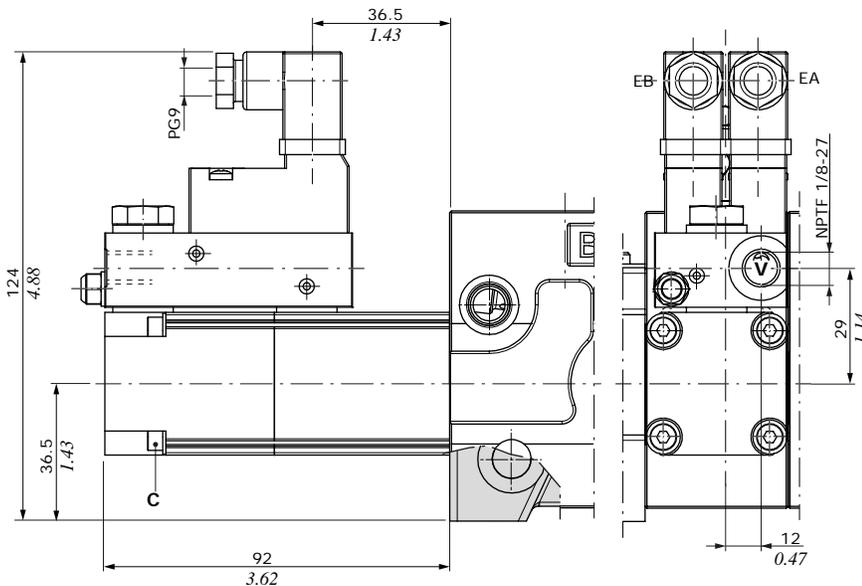
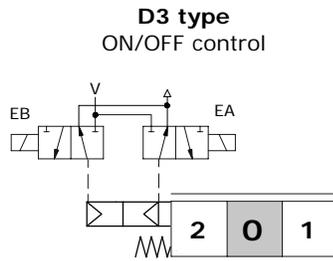
Operating features

Pilot pressure.....: min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
 Pilot volume.....: 4 cm³/min (0.24 in³/min)

Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

With ON/OFF electropneumatic control



Operating features

Pilot pressure.....: min. 1 bar (14.5 psi)
 max. 10 bar (145 psi)

COILS

Nominal voltage tolerance.....: -5% +10%
 Power rating.....: 2.3 W
 Nominal current.....: 12 VDC – 24VDC
 Coil insulation.....: Class F
 Weather protection.....: IP65
 Duty cycle.....: 100%

Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

Working section

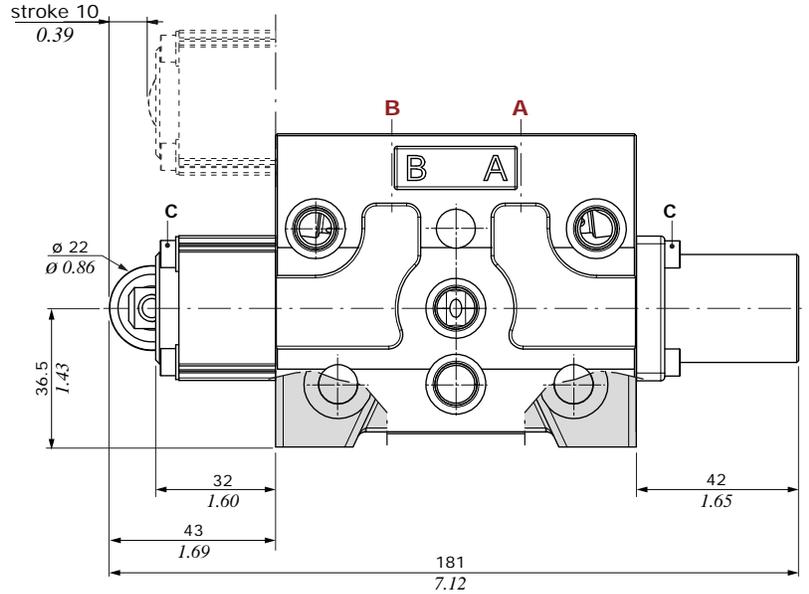
A+B side controls

With cam control

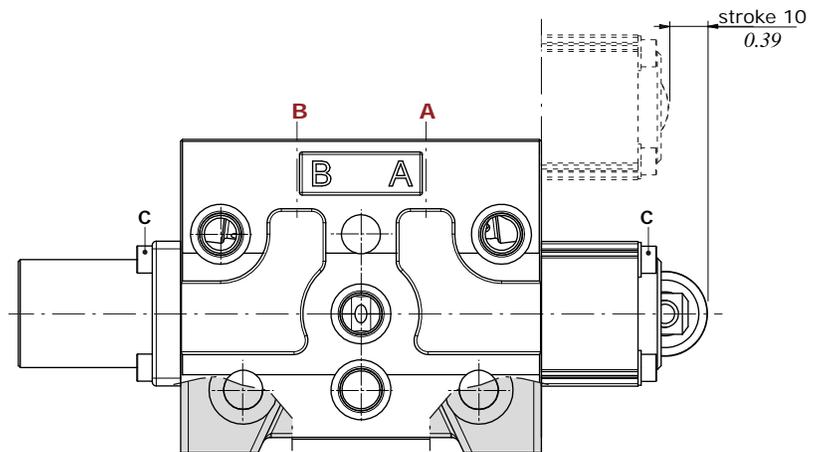
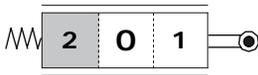
C2 type
From position 1 to position 2,
spring return in position 1



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf)

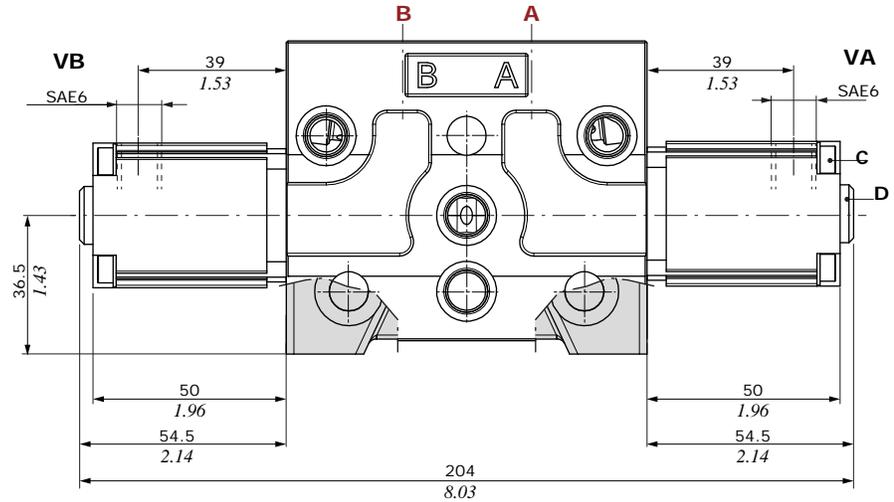
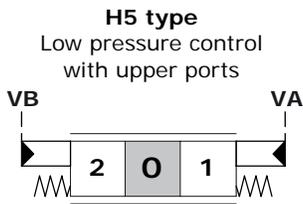


C3 type
From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



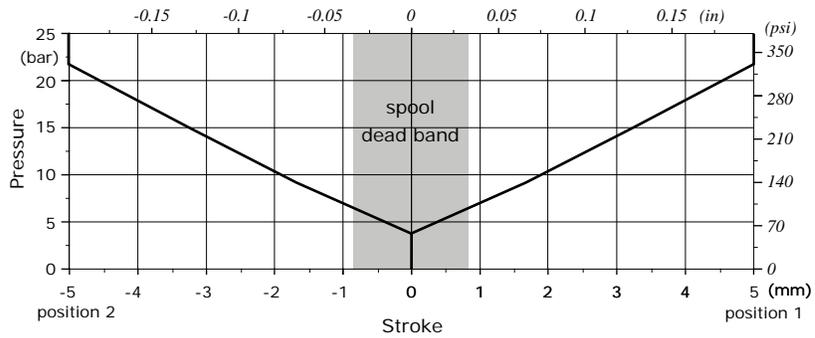
A+B side controls

Proportional hydraulic control



Operating features

Pilot pressure..... : max. 100 bar (1450 psi)



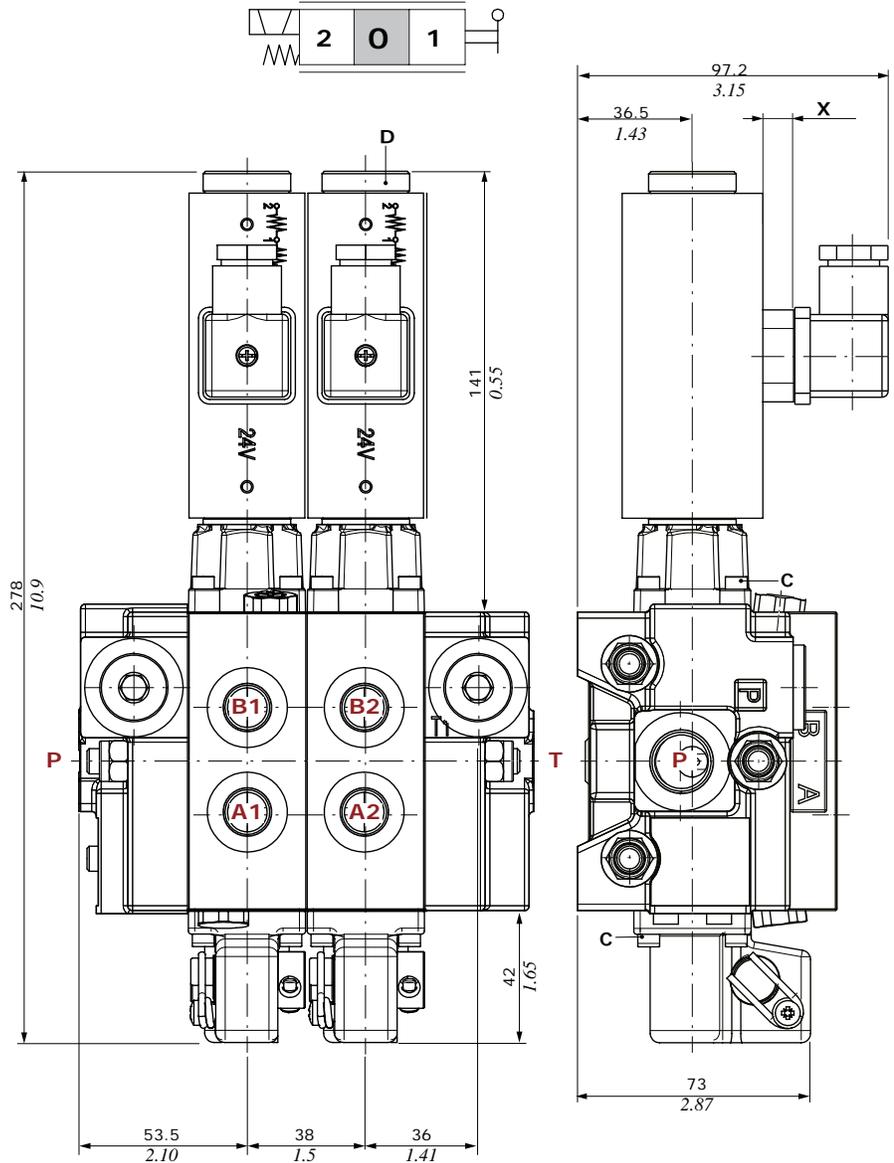
Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = allen wrench 4 - 9.8 Nm (7.2 lbft)

Working section

Direct solenoid control

D41 type: ON/OFF one side



D41 coil	
Nominal voltage	12 VDC 24 VDC

Nominal voltage tolerance	±10%
Power rating	58 W
Insulance	Class H
Weather protection	IP65

Connector type: ISO4400 3P+T-PG11

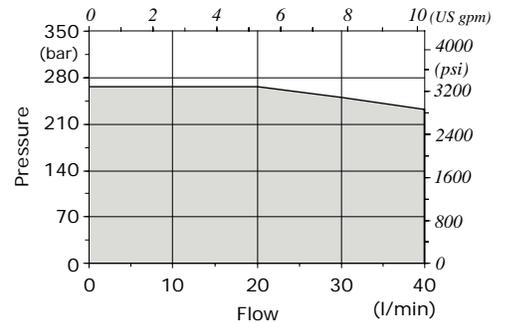
X	
coil type	mm - in
ZEB012 coil	10 - 0.39
ZEB024 coil	

Wrenches and tightening torques

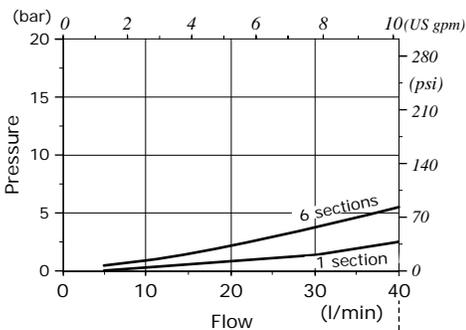
C = allen wrench 3 - 3 Nm (2.2 lbft)

D = manual tightening - 6.6 Nm (7.2 lbft)

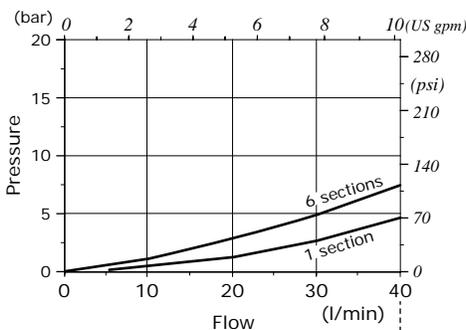
Dynamic conditions



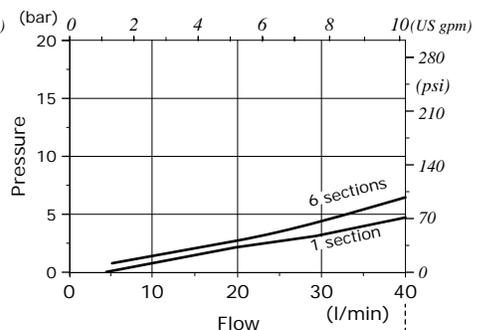
P⇒T pressure drops



P⇒A(B) pressure drops

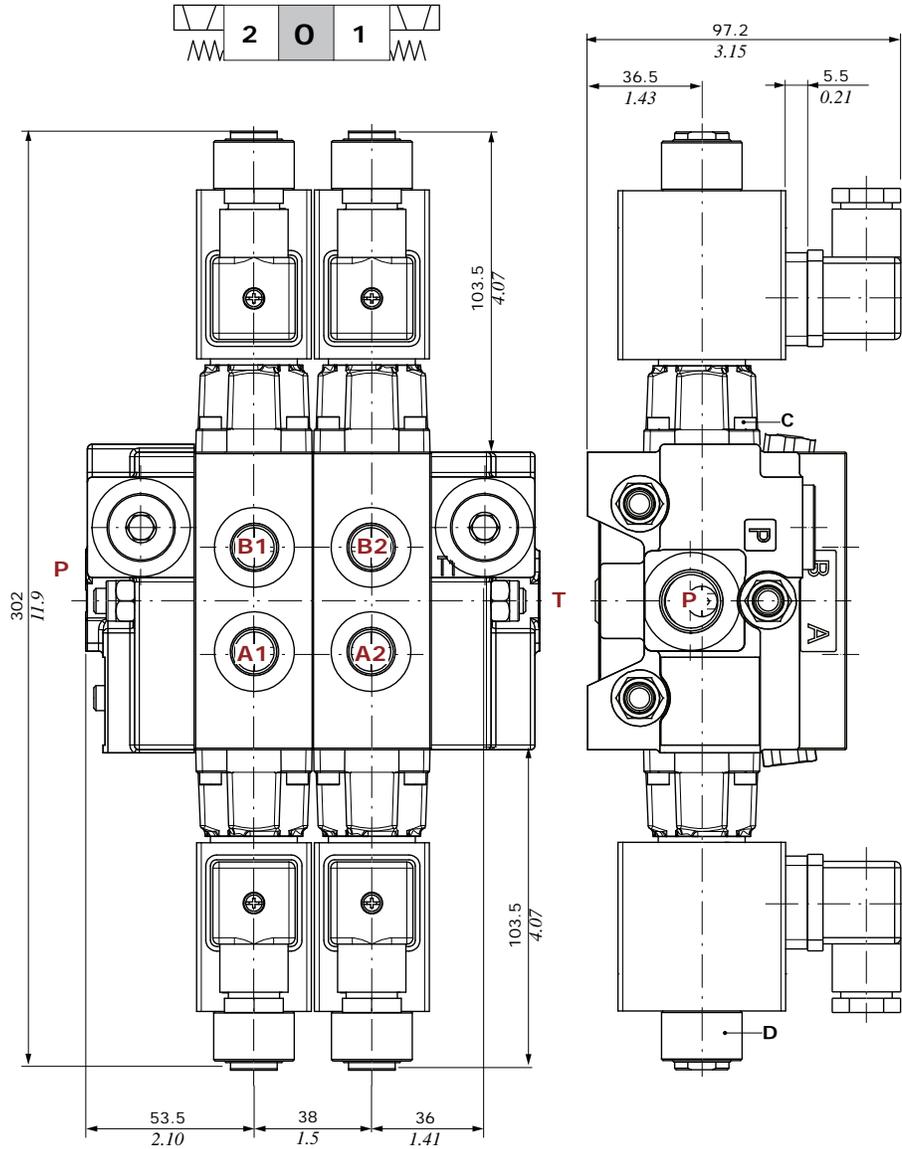


A(B)⇒T pressure drops



Direct solenoid control

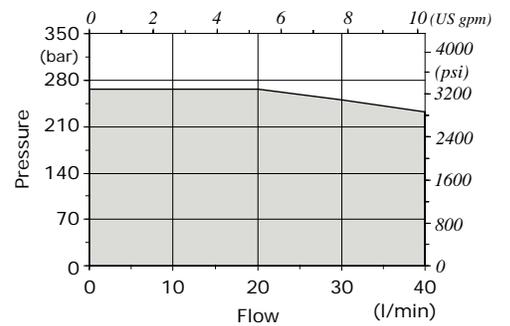
D9 type: ON/OFF two side



D9 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	58 W
Insulance	Class H
Weather protection	IP65

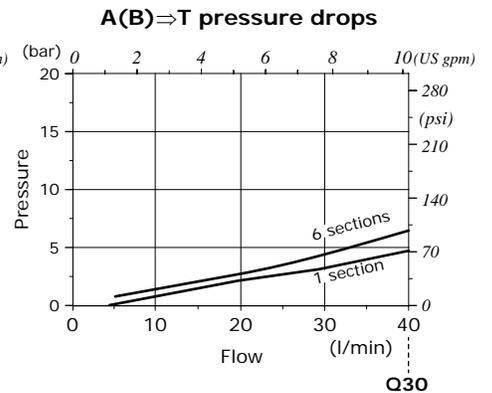
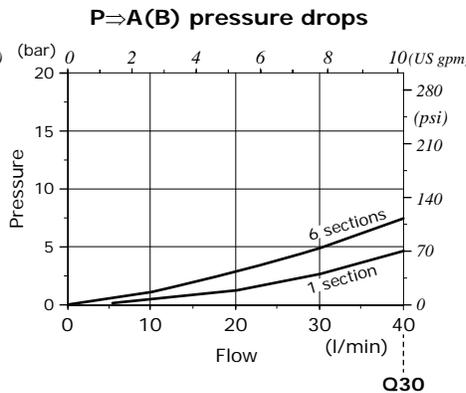
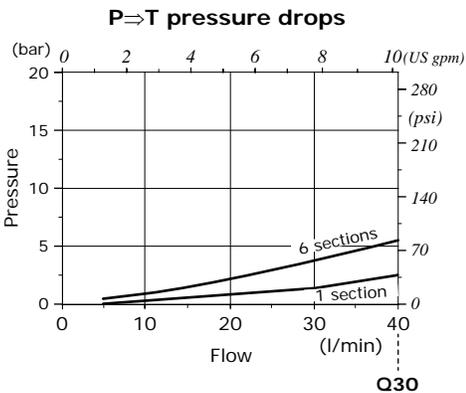
Connector type: ISO4400 3P+T-PG11

Dynamic conditions



Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)



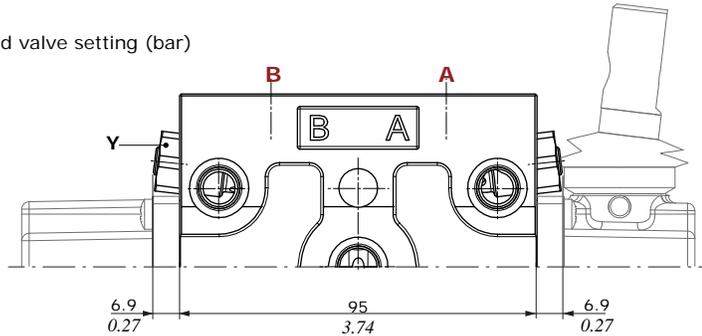
Auxiliary valve configuration

Dimensional data, hydraulic circuits and performance data

Description example

Q30 / 1 / ... / 103 - A1 - M1 - **V32(N)120** / ...
 aux valve spring type and valve setting (bar)

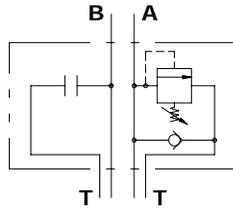
Wrenches and tightening torques
 Y = wrench 16 - 20 Nm (14.7 lbft)



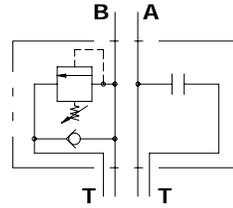
Antishock/anticavitation valve example

A side configuration: B side configuration: A+B side configuration:

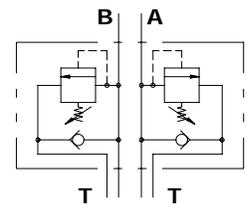
V33



V34



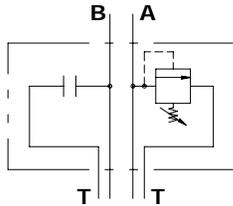
V35 (V34 + V33)



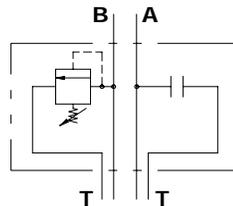
Antishock valve example

A side configuration: B side configuration: A+B side configuration:

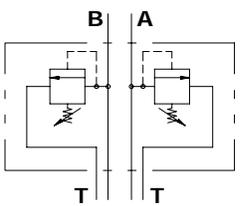
V30



V31

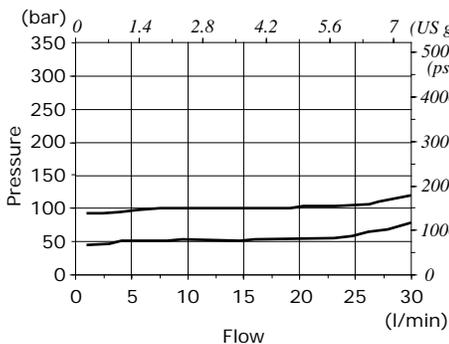


V32 (V30 + V31)

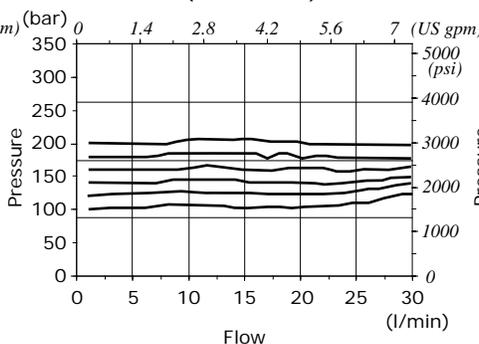


Spring type	Setting ranges (bar - psi)
B (white)	From 50 to 100 - from 725 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 350 - from 2910 to 5100

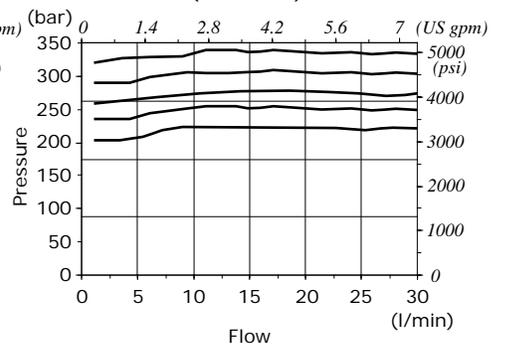
Setting range example (white band)



Setting range example (black band)



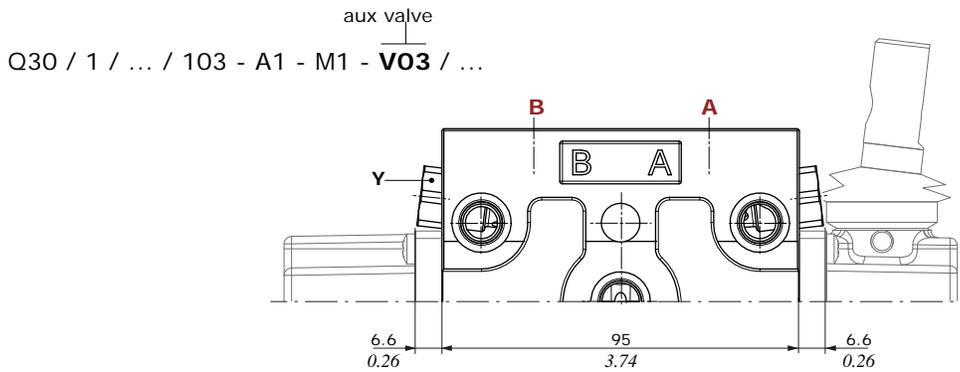
Setting range example (red band)



Auxiliary valve configuration

Dimensional data and hydraulic circuits

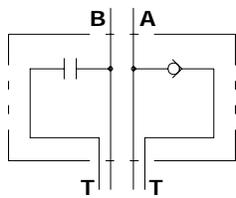
Anticavitation valve example



Wrenches and tightening torques
 Y = wrench 16 - 20 Nm (14.7 lbf)

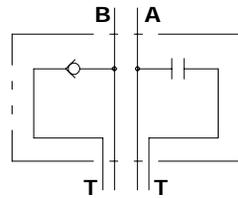
A side configuration:

V04



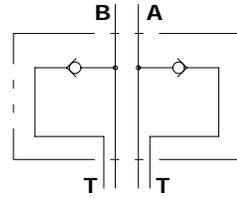
B side configuration:

V05



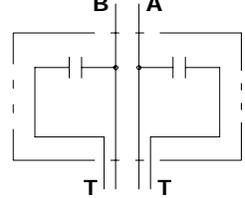
A+B side configuration:

V03 (V04 + V05)

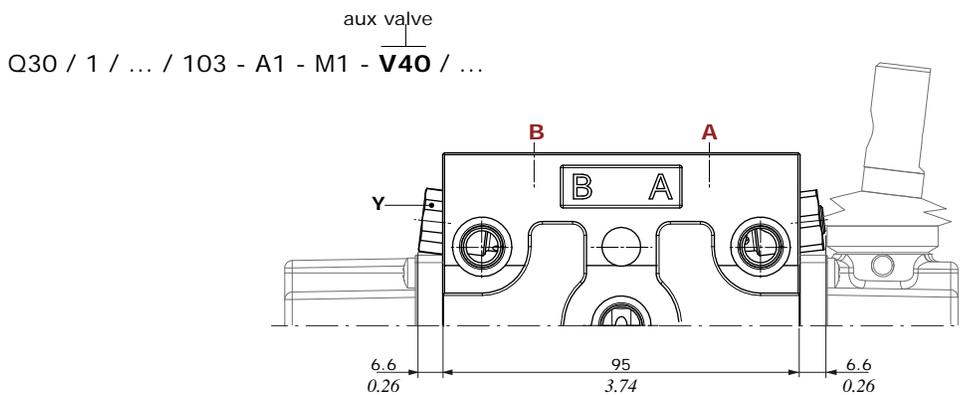


Plug valve:

VC

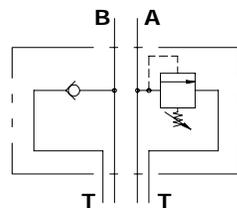


Antishock and anticavitation combining valves example



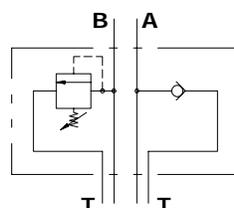
A side configuration:

V40 (V30 + V05)



B side configuration:

V41 (V31 + V04)

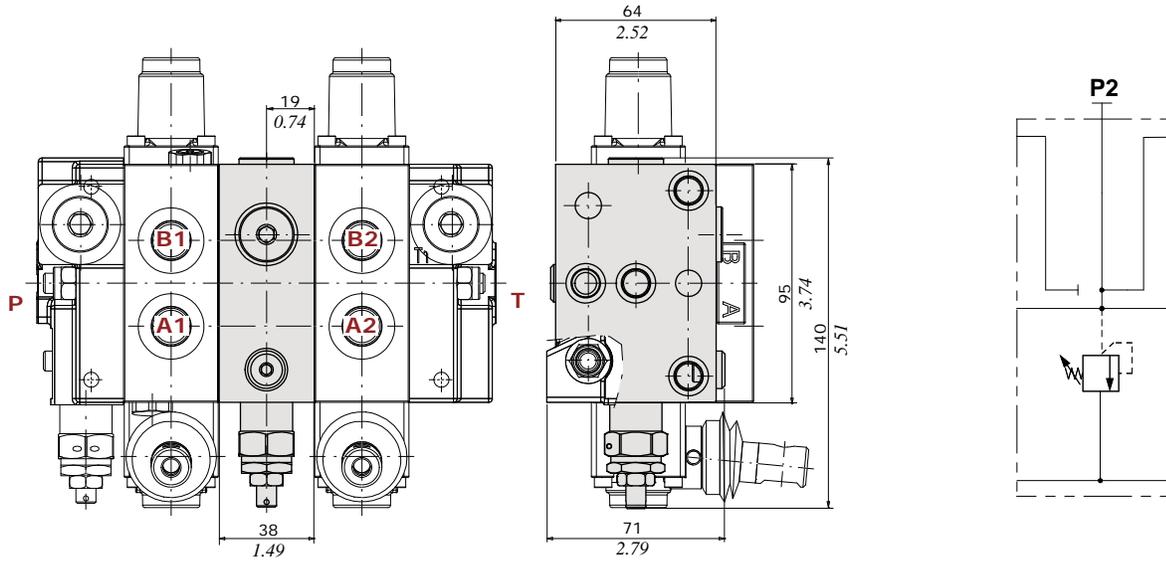


Intermediate section

Dimensional data and hydraulic circuit

E50 type

Intermediate inlet section with pressure relief valve

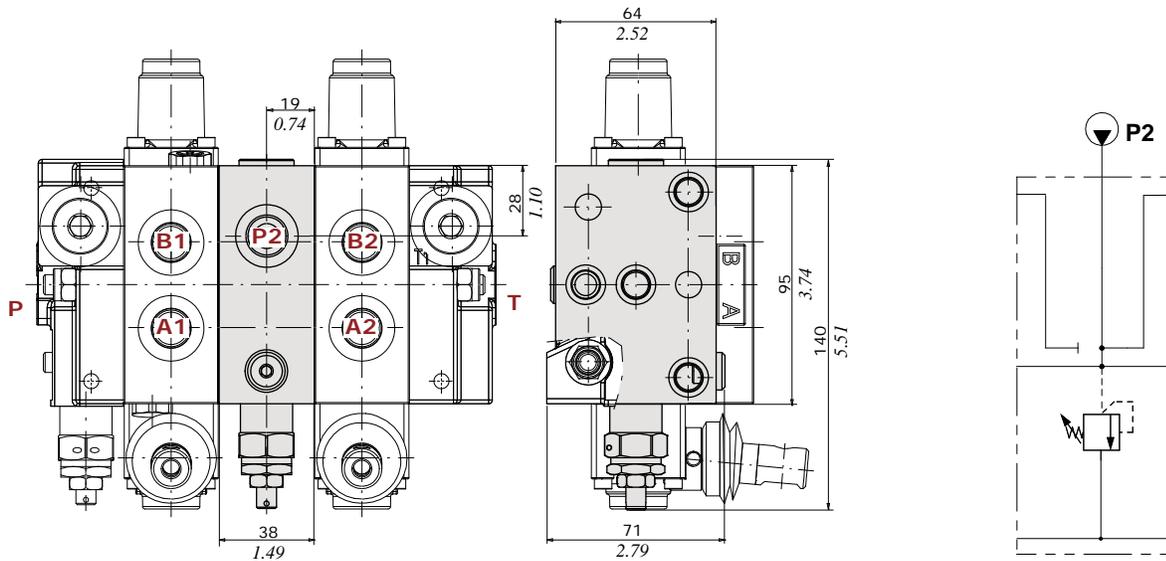


Description example: Q30/2/F7S(N150)/103-A1-M1.VC/**E50(N150)**/103-A1-M1/F3D-S-SAE

intermediate section spring type and valve setting (bar)

E53 type

Intermediate inlet section with pressure relief valve and P2 port open



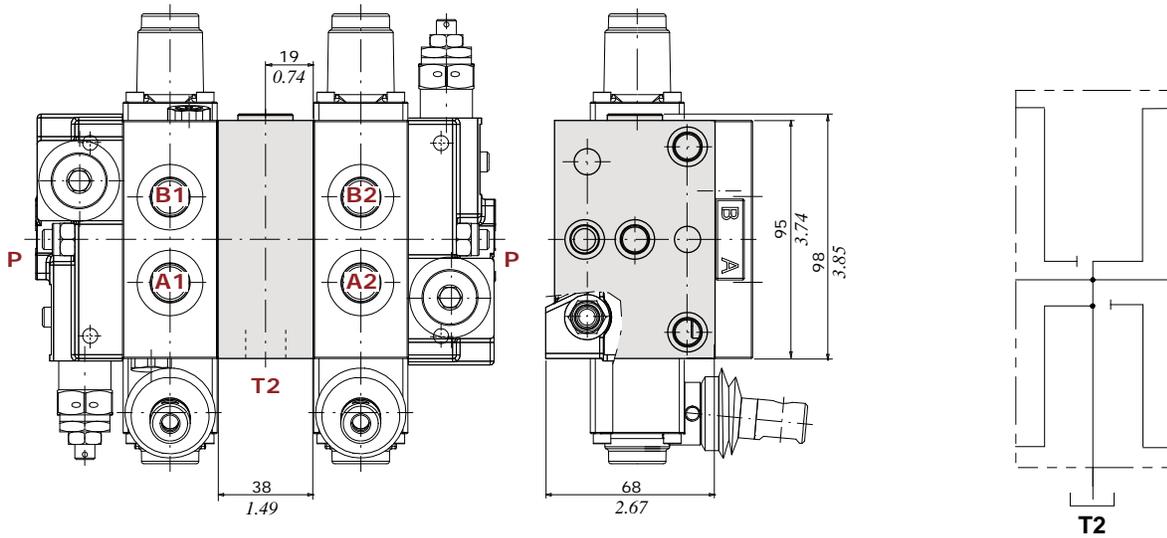
Description example: Q30/2/F7S(N150)/103-A1-M1.VC/**E53(N150)**/103-A1-M1/F3D-S-SAE

intermediate section spring type and valve setting (bar)

Dimensional data and hydraulic circuit

E51 type

Intermediate outlet section, T2 port open

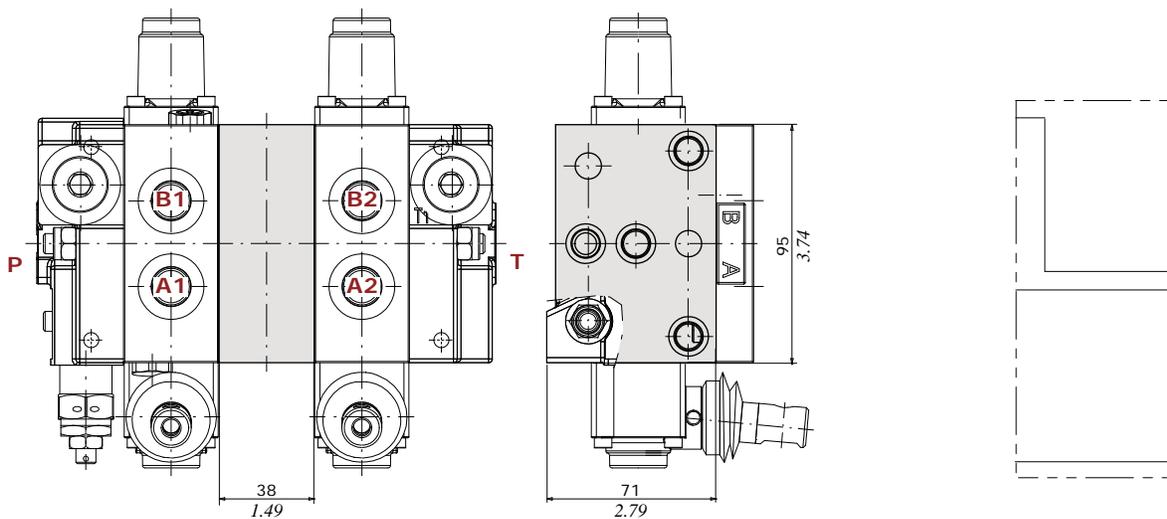


Description example: Q30/2/F7S(N150)/103-A1-M1.VC/**E51**/103-A1-M1/F3D-S-SAE

intermediate section

E61 type

Intermediate spacer section

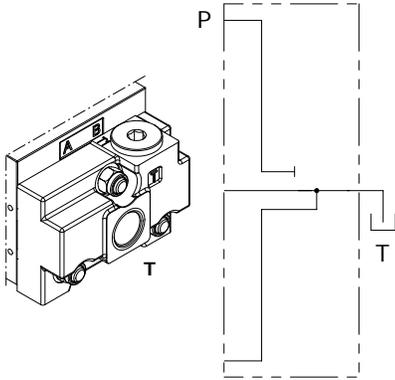


Description example: Q30/2/F7S(N150)/103-A1-M1.VC/**E61**/103-A1-M1/F3D-S-SAE

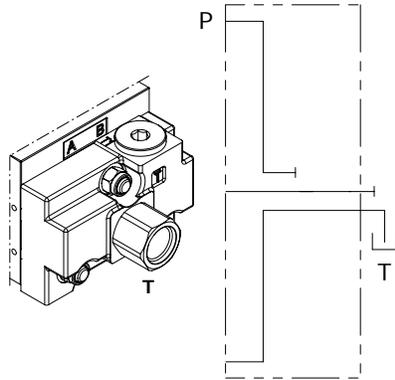
intermediate section

Outlet section

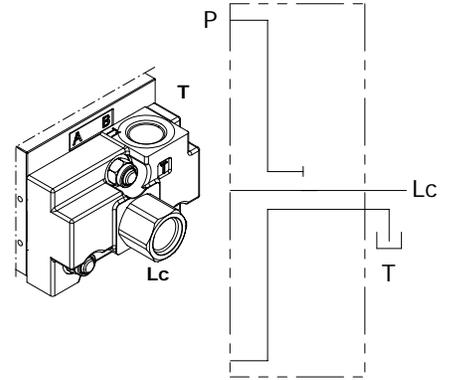
F3D-SAE configuration
Open center configuration



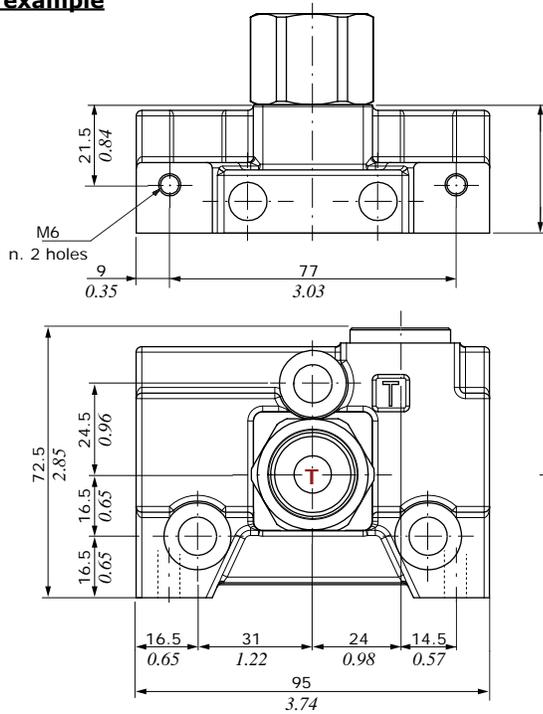
F16D-SAE configuration
Closed center configuration



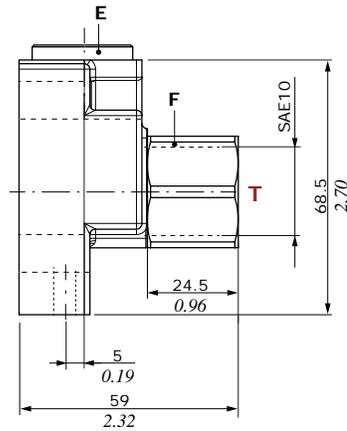
F6D-SAE configuration
Carry-over configuration



F16D configuration example



Wrenches and tightening torques
E = allen wrench 8 - 42 Nm (30.9 lbft)
F = wrench 30 - 42 Nm (30.9 lbft)





GSV50

Sectional directional control valve

- Available with parallel circuit
- Optional carry over port
- A wide range of antishock + anticavitation port valves
- Mechanical, pneumatic, electropneumatic, hydraulic and direct solenoid controls

Working conditions

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

Nominal flow rating		50 l/min - (13.2 Us gpm)
Max. pressure		315 bar (4550 psi)
Max. back pressure on outlet T port		25 bar (360 psi)
Number sections		from 1 to 10
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	5 cm ³ /min (0.30 in ³ /min)
Fluid		Mineral oil
Fluid temperature	with NBR (BUNA-N) seals	from -20 °C to 80 °C - from -4 °F to 176 °F
Viscosity	operating range	from 12 to 400 mm ² /s - from 12 to 400 cSt
Max. contamination level		-/19/16 - ISO 4406 - NAS1638 class 6
Ambient temperature	with pneumatic and hydraulic devices	from -30 °C to 60 °C - from -22 °F to 140 °F
	without electric devices	from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices	from -20 °C to 50 °C - from -4 °F to 122 °F

NOTE - For different conditions please contact our Sales Department.

REFERENCE STANDARD

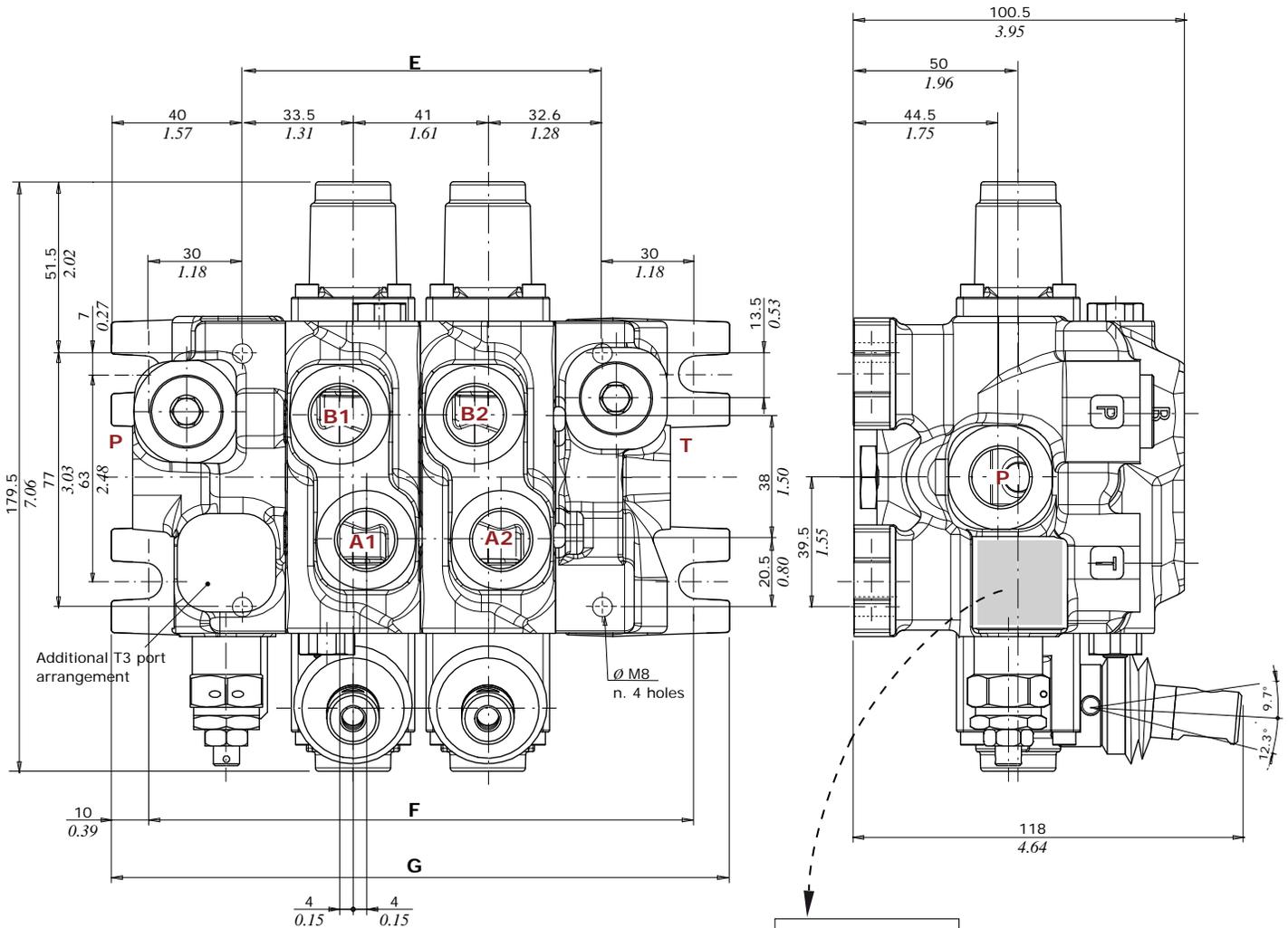
	BSP	UN-UNF
THREAD ACCORDING TO	ISO 228/1	ISO 263
	BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO	11926
	SAE	J11926
	DIN	3852-2 shape X or Y

PORT THREADING

PORTS	BSP	UN-UNF
P Inlet	G 1/2	3/4-16 (SAE 8)
P1 Inlet	G 1/2	3/4-16 (SAE 8)
A and B ports	G 1/2	3/4-16 (SAE 8)
T Outlet	G 1/2	7/8-14 (SAE 10)
T1 Outlet	G 1/2	3/4-16 (SAE 8)
Lc port (Carry-over plug - T port)	G 3/8-G 1/2	3/4-16 (SAE 8) - 7/8-14 (SAE 10)
Hydraulic controls	G 1/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

Standard configuration*



walvoil

MADE IN ITALY
1GB75040009 ----- Product code

DISTRIBUTORE
 GSV50/2 ----- Code description

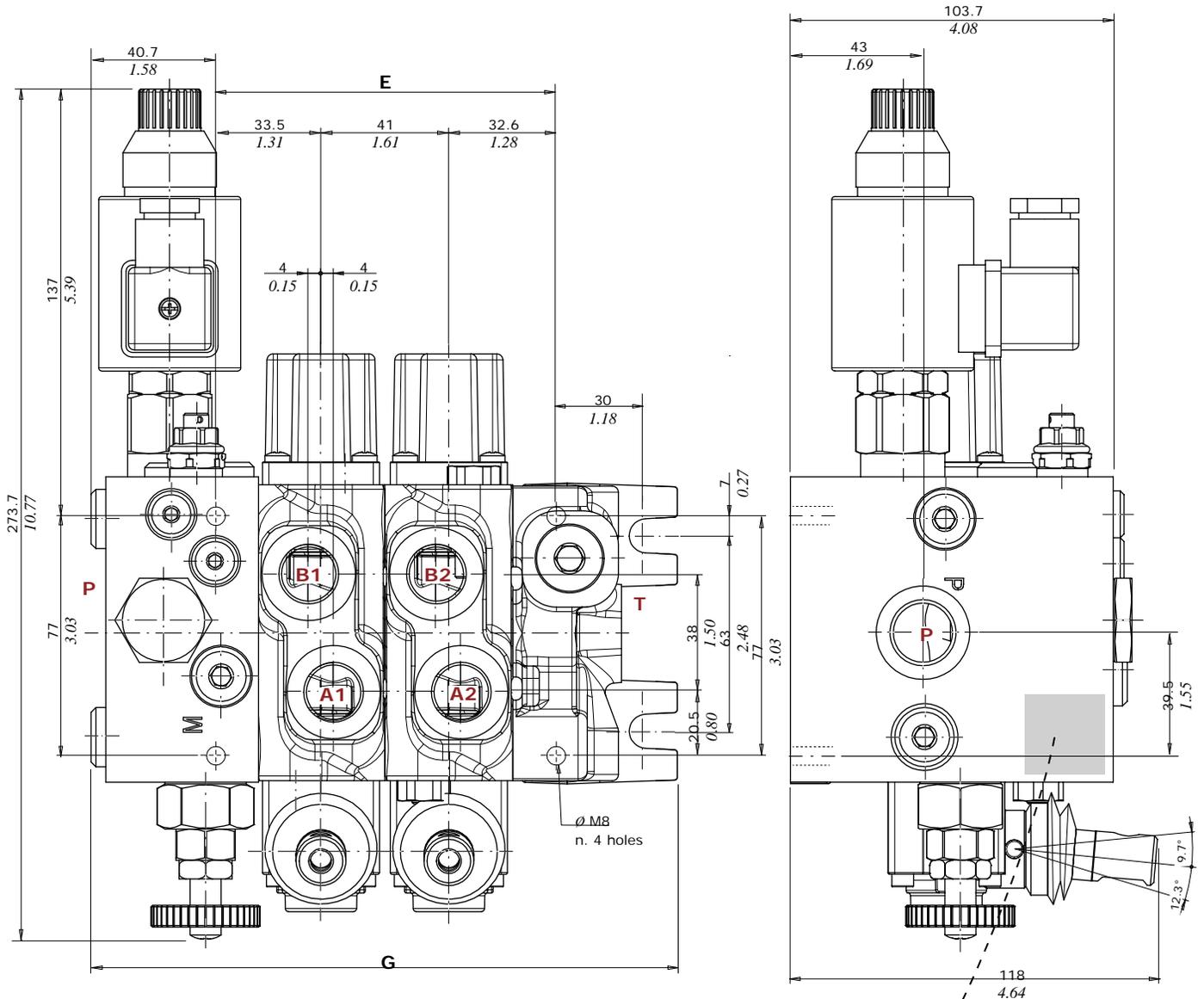
MD1600464-001 ----- Product allotment

----- Datamatrix with product allotment

Type	E		F		G	
	mm	in	mm	in	mm	in
GSV50/1	66.1	2.60	126	4.96	146	5.74
GSV50/2	107.1	4.21	167	6.57	187	7.36
GSV50/3	148.1	5.83	208	8.18	228	8.97
GSV50/4	189.1	7.44	249	9.80	269	10.60
GSV50/5	230.1	9.06	290	11.41	310	12.20
GSV50/6	271.1	10.67	331	13.03	351	13.81
GSV50/7	312.1	12.28	372	14.64	392	15.43
GSV50/8	353.1	13.90	413	16.25	433	17.04
GSV50/9	394.1	15.51	454	18.87	474	18.66
GSV50/10	435.1	17.12	495	19.48	515	20.27

NOTE: Drawings and dimensions are referred to a **UN-UNF** threading configuration.
 (*): For other configurations, see page 165

Proportional inlet section configuration*



Type	E		G	
	mm	in	mm	in
GSV50/1	66.1	2.60	146.7	5.77
GSV50/2	107.1	4.21	187.7	7.38
GSV50/3	148.1	5.83	228.7	9
GSV50/4	189.1	7.44	269.7	10.61
GSV50/5	230.1	9.06	310.7	12.21
GSV50/6	271.1	10.67	351.7	13.84
GSV50/7	312.1	12.28	392.7	15.46
GSV50/8	353.1	13.90	433.7	17.07
GSV50/9	394.1	15.51	474.7	18.68
GSV50/10	435.1	17.12	515.7	20.30

walvoil

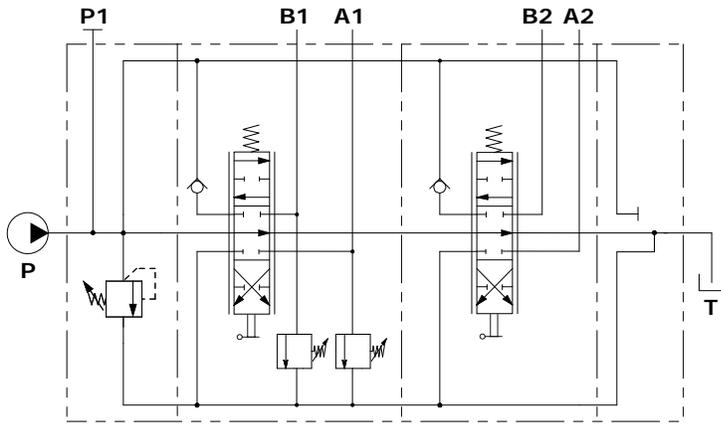
MADE IN ITALY
1GB75040009

DISTRIBUTORE
GSV50/2
MD1600464-001

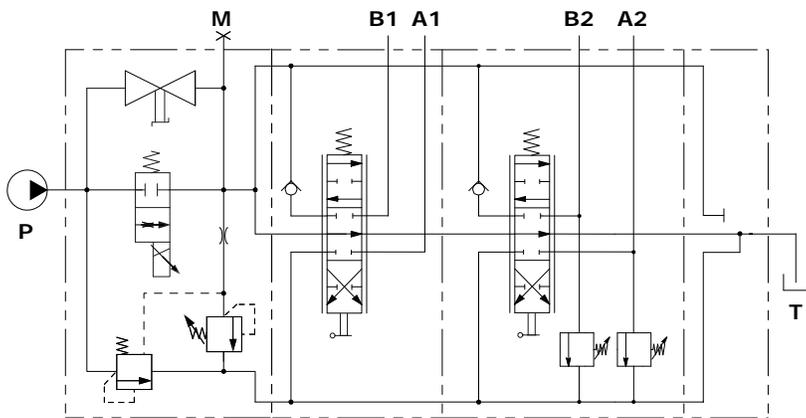
- Product code
- Code description
- Product allotment
- Datamatrix with product allotment

NOTE: Drawings and dimensions are referred to a UN-UNF threading configuration.
(*): For other configurations, see page 165

Hydraulic circuits



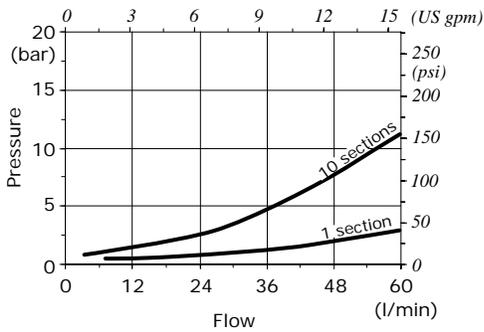
Description example (parallel circuit):
 GSV50/2/F7S(N150)/
 103-A1-M1.V32(N105\N105)/103-A1-M1/F3D-S-SAE



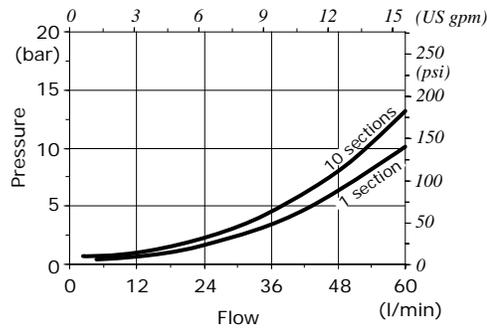
Description example (parallel circuit):
 GSV50/2/F7SPRN3M(N150)-12VDC/
 103-A1-M1/103-A1-M1.V32(N105\N105)/F3D-S-SAE

Performance data

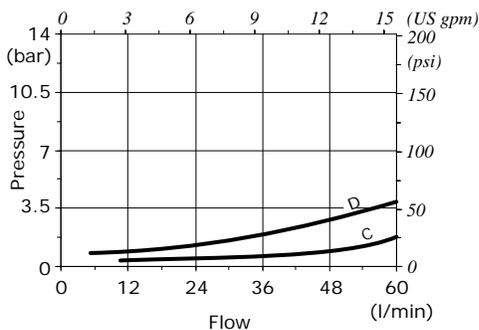
P⇒T pressure drops



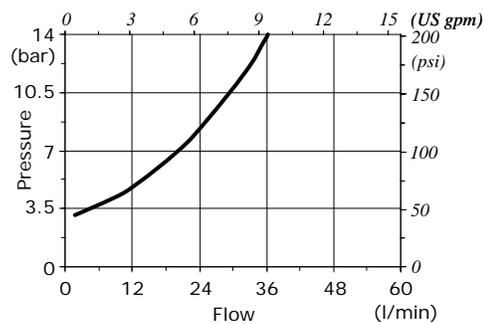
P⇒A(B) pressure drops



A(B)⇒T pressure drops



A1(B1)⇒A2(B2) pressure drops (with series circuit)



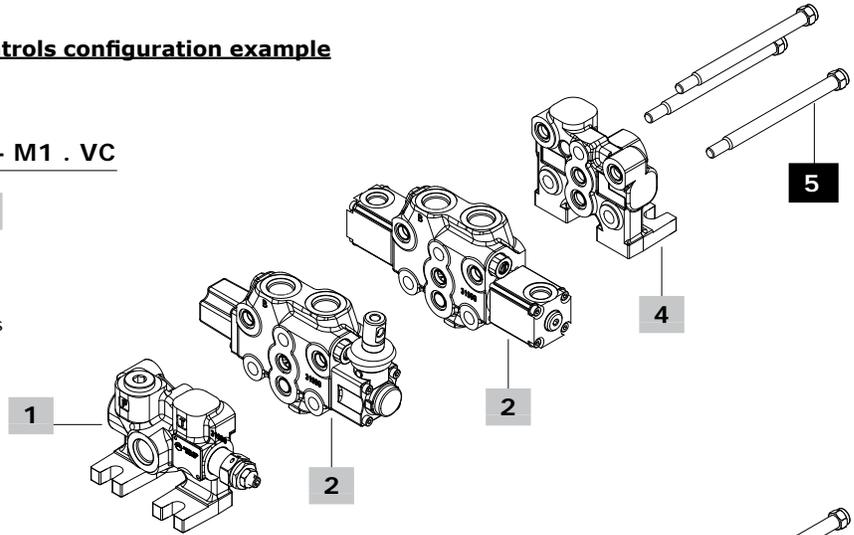
Legenda

- C= 10th section
- D= 1st section

Complete section ordering codes

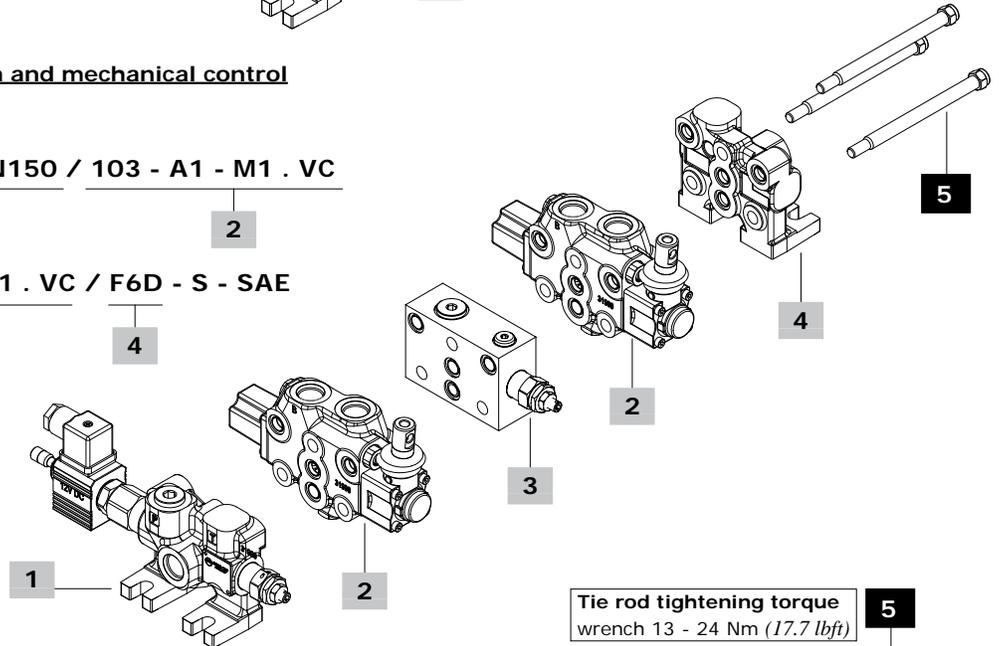
Valve with mechanical and hydraulic controls configuration example

valve setting (bar)
GSV50 / 2 / F7S(N150) / 103 - A1 - M1 . VC
 N. of section 1 2
 / 103 - H5 . VC / F6D - S - SAE
 2 4 aluminium controls



Valve with intermediate section and mechanical control configuration example

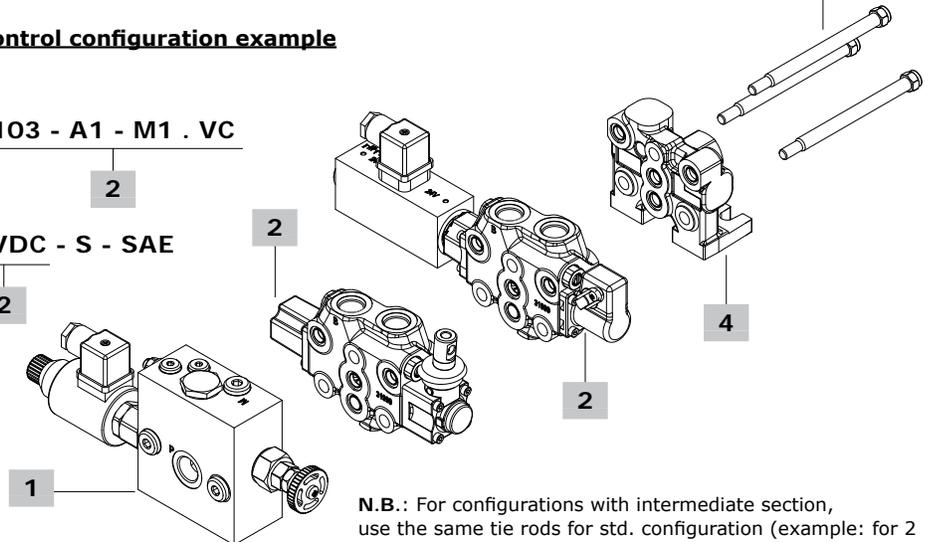
GSV50 / 2 / F7SMSE(NA)-N150 / 103 - A1 - M1 . VC
 valve setting (bar) 1 2
 / E50(N150) / 103 - A1 - M1 . VC / F6D - S - SAE
 3 2 4



Tie rod tightening torque
 wrench 13 - 24 Nm (17.7 lbft)

Valve with mechanical and electric control configuration example (with inlet flow regulation)

GSV50 / 2 / F7SPR3M(N150) / 103 - A1 - M1 . VC
 1 2
 / 103 - A1 - D41 . VC / F6D - 12VDC - S - SAE
 2 4 2



N.B.: For configurations with intermediate section, use the same tie rods for std. configuration (example: for 2 working sections + 1 intermediate section, use tie rods for 3 working sections)

Complete section ordering codes

1 Inlet section* page 131

Standard inlet sections

TYPE: **FE-QGSV50/F7S(N150)-SAE** CODE: 05100F7SD/04N
 DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve, setting range 101-200 bar (1460-2900 psi)
 TYPE: **FE-GSV50/F8S-SAE** CODE: 05100F8S/04
 DESCRIPTION: As previous one, without valves (pressure relief valve plugged port)
 TYPE: **FE-GSV50/F7SMSE(NA)** CODE: 05100F7SDMS1-N
 DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve setting range 101-200 bar (1460-2900 psi), 12VDC normally open unloader valve
 TYPE: **FE-GSV50/F7SMSE(NC)** CODE: 05100F7SDMS7-N
 DESCRIPTION: As previous one, with normally closed unloader valve
Inlet section with flow regulator
 TYPE: **FE-GSV50/F7SPR3M(N150)** CODE: 05100F7SDPRN3M
 DESCRIPTION: Side inlet open, 12 VDC proportional flow control valve, pressure relief valve setting range 101-200 bar (1460-2900 psi), manual unloader valve
 TYPE: **FE-GSV50/F7SPR3E(N150)-12VDC** CODE: 05100F7SDPRN3E
 DESCRIPTION: As previous one, with 12VDC unloader valve

2 Working section* page 140

With mechanical controls

TYPE: **EL-GSV50/103-A1-M1.VC-S-SAE** CODE: 051000103001500
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, lever control and spring return to neutral position
 TYPE: **EL-GSV50/103-A1-M1-S-SAE** CODE: 051000103001300
 DESCRIPTION: As previous one, without valve arrangement

With proportional hydraulic controls

TYPE: **EL-GSV50/103-H5.VC-S-SAE** CODE: SGLS50012
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, low pressure hydraulic controls, spring return to neutral position
 TYPE: **EL-GSV50/103-H5-S-SAE** CODE: SGLS50013
 DESCRIPTION: As previous one, without valve arrangement

With electric direct controls - one side type

TYPE: **EL-GSV50/103-A1-D41.VC-12VDC-S-SAE**
 CODE: 051000103012500
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC electric direct ON/OFF control with lever
 TYPE: **EL-GSV50/103-A1-D41-12VDC-S-SAE**
 CODE: SGLS50014
 DESCRIPTION: As previous one, without valve arrangement

With electric direct controls - two side type

TYPE: **EL-GSV50/103-D9.VC-12VDC-S-SAE**
 CODE: SGLS50015
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC electric direct ON/OFF control
 TYPE: **EL-Q30/103-D9-12VDC-S-SAE** CODE: SGLS50016
 DESCRIPTION: As previous one, without valve arrangement

3 Intermediate section page 165

TYPE	CODE	DESCRIPTION
E50	03850E50-B	With pressure relief valve, setting range 10-100 bar (145-1450 psi)
	03850E50-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	03850E50-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E53	03854E53-B	With pressure relief valve, setting range 10-100 bar (145-1450 psi) and P2 port open for 2 nd pump
	03854E53-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	03854E53-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E51	03853E51SAE	Intermediate outlet section, T2 port open
E61	03885E61	Intermediate spacer section

4 Outlet section* page 167

TYPE: **FS-GSV50-F3D-SAE** CODE: 05112F3D-SAE
 DESCRIPTION: T port open, T1 port plugged. For open center circuit
 TYPE: **FS-GSV50-F16D-SAE** CODE: 05116F16DSAE
 DESCRIPTION: T port open, T1 port plugged. For closed center circuit
 TYPE: **FS-GSV50-F6D-SAE** CODE: 05114F6D/SAE
 DESCRIPTION: Lc port and T1 port open. With joint for carry-over (HPCO) circuit

5 Tie rod kit

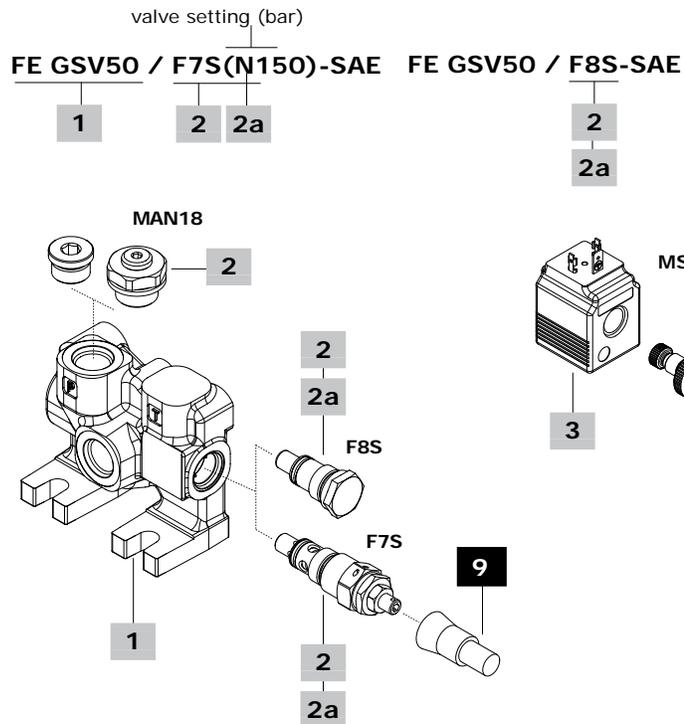
CODE	DESCRIPTION
05931TX1	For 1 section valve
05932TX2	For 2 sections valve
05933TX3	For 3 sections valve
05934TX4	For 4 sections valve
05935TX5	For 5 sections valve
05936TX6	For 6 sections valve
05937TX7	For 7 sections valve
05938TX8	For 8 sections valve
05939TX9	For 9 sections valve
05940TX10	For 10 sections valve

(*): Codes are referred to **UN-UNF** thread

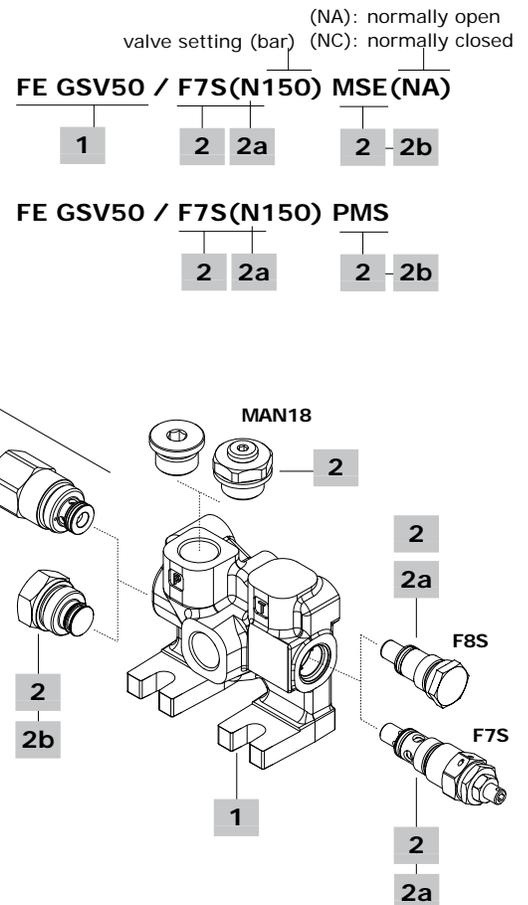
Inlet section - parts ordering codes

Standard section

With relief valve:



With relief and unloader valves:



1 Inlet body section page 132

TYPE: **FE-GSV50-SAE*** CODE: 060013190899
 DESCRIPTION: Side inlet port, upper inlet plugged, pressure relief valve arrangement
 TYPE: **FE-GSV50** CODE: 060013198199
 DESCRIPTION: As previous one, with unloader valve arrangement

2 Configuration coding page 133

TYPE	DESCRIPTION
F7S-SAE*	With pressure relief valve
F8S-SAE*	Without valves (pressure relief valve plugged port)
F7S-MSE	With pressure relief valve and electric unloader valve
F7S-PMS	With pressure relief valve and PMS valve blanking plug
F8S-MSE	With electric unloader valve and pressure relief valve blanking plug
F8S-PMS	Without valves (plugged ports)

Note: Inlet configuration with relief valve, require upper P port: n. 1 SAE8 plug code 255008, or n. 1 pressure gauge arrangement code 5MAN624202;
 Inlet configuration with relief and unloader valves, require upper P port: n. 1 G1/2 plug code 060002792099, or n. 1 pressure gauge arrangement code 5MAN625220

2a Main pressure relief valve page 134

TYPE: **B** CODE: 700035205000000
 DESCRIPTION: VLP35S valve, setting range 10-100 bar (145-1450 psi)
 TYPE: **N** CODE: 700035105000000
 DESCRIPTION: VLP35S valve, setting range 101-200 bar (1460-2900 psi)
 TYPE: **R** CODE: 700035305000000
 DESCRIPTION: VLP35S valve, setting range 201-380 bar (2910-5500 psi)
 TYPE: **-** CODE: 060002788899
 DESCRIPTION: Relief valve blanking plug

2b Unloader inlet valve page 135

TYPE	CODE	DESCRIPTION
MSE(NA)	0EF08002003	Electric unloader valve, normally open, screw type emergency. It requires MSE assembly joint
MSE(NC)	0EF08002006	Electric unloader valve, normally closed, screw type emergency. It requires MSE assembly joint
-	060002997299	Assembling joint for MSE valves
PMS	060002978899	Valve blanking plug

3 Coil

TYPE	CODE	DESCRIPTION
For MSE valves		
BER	4SLE001200A	12 VDC ISO4400 coil
	4SLE002400A	24 VDC ISO4400 coil

Note: For **BER** type coils see page 243

9 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

(*): Codes are referred to **UN-UNF** thread

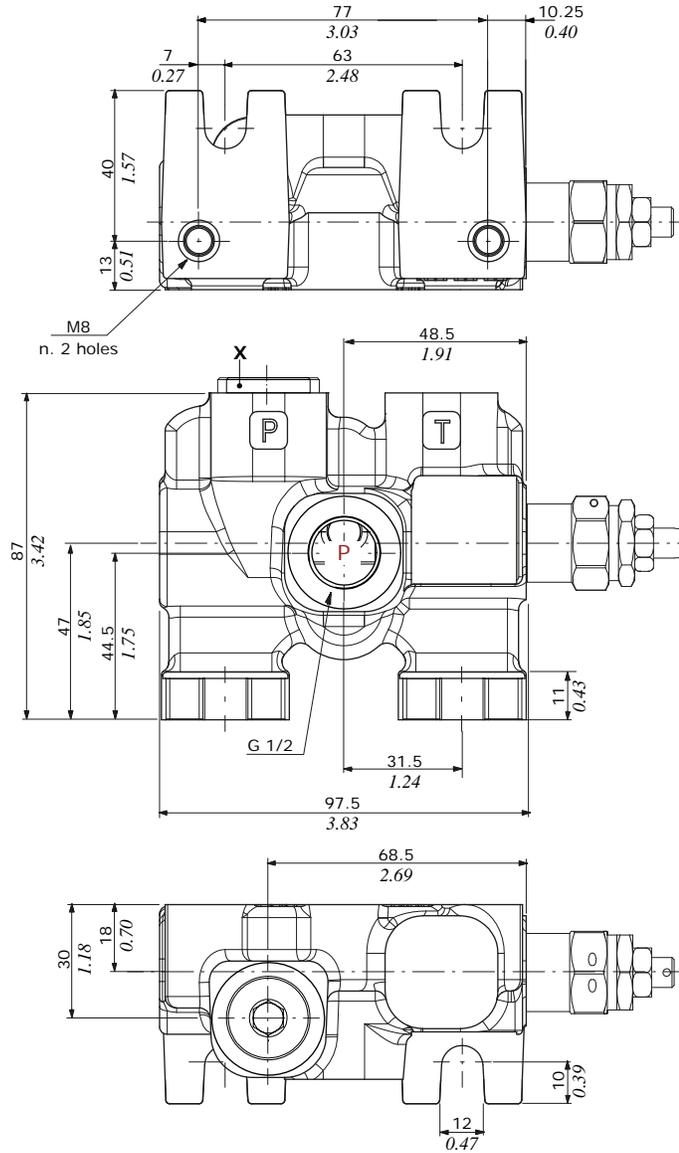
Standard inlet section

Dimensional data

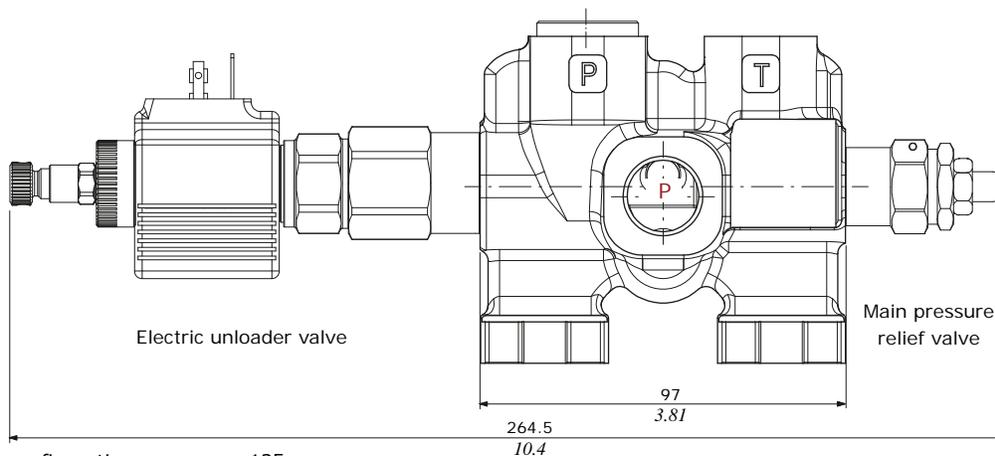
With pressure relief valve

Wrenches and tightening torques
 X = allen wrench 8 - 42 Nm (31 lbft)

Note: For valves wrench and torque, see related pages



With relief and unloader valves

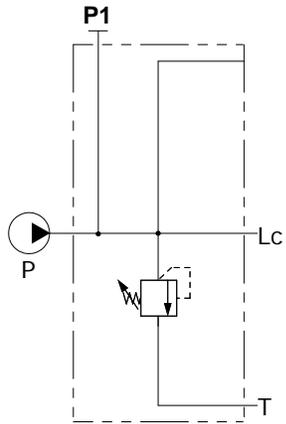


For other configurations, see page 135

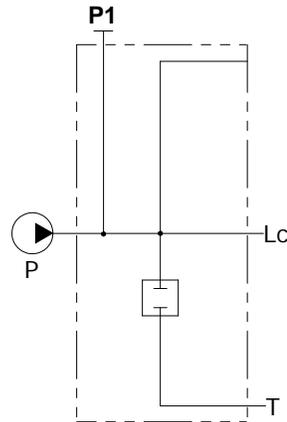
For other dimensions, see previous configuration

Hydraulic circuits

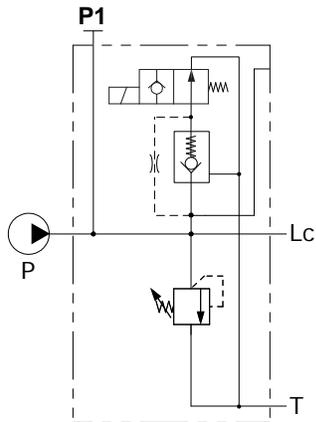
F7S-SAE configuration
With pressure relief valve



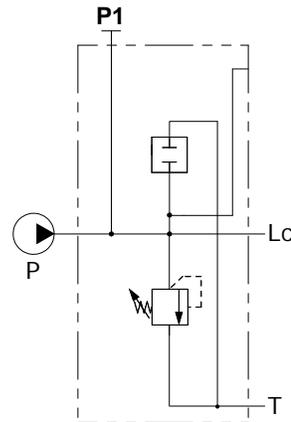
F8S-SAE configuration
Without valves
(pressure relief valve plugged port)



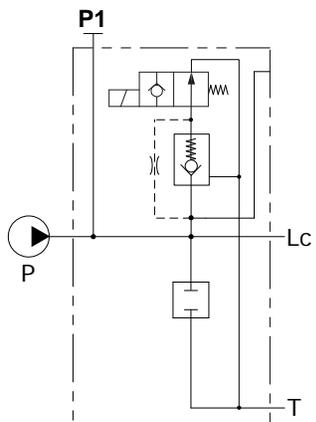
F7S-MSE(NA/NC) configuration
With pressure relief valve
and electric unloader valve



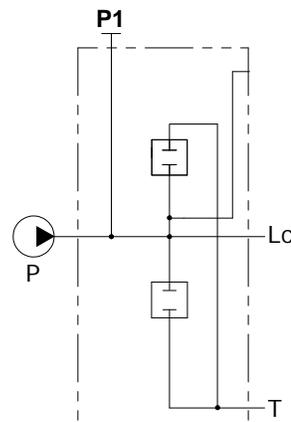
F7S-PMS configuration
With pressure relief valve
and unloader valve blanking plug



F8S-MSE(NA/NC) configuration
Without pressure relief valve
and electric unloader valve



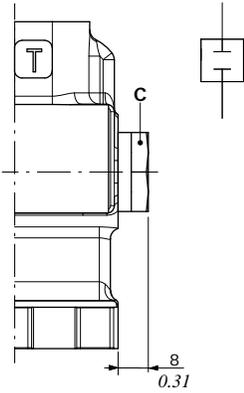
F8S-PMS configuration
Without valves (plugged ports)



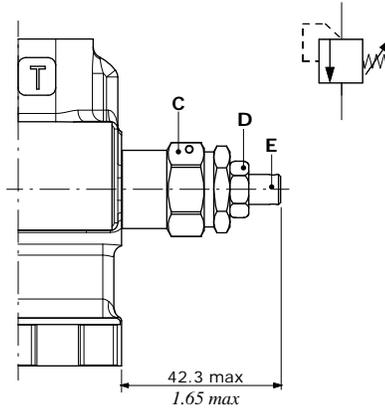
Standard inlet section

Main pressure relief valve

Relief valve blanking plug



Main pressure relief valve

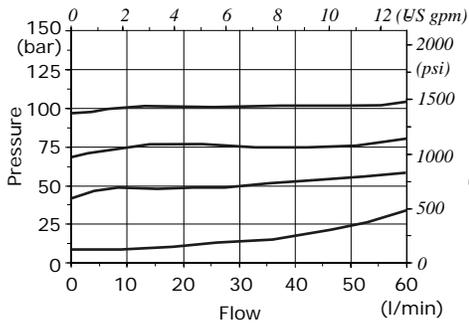


Wrenches and tightening torques

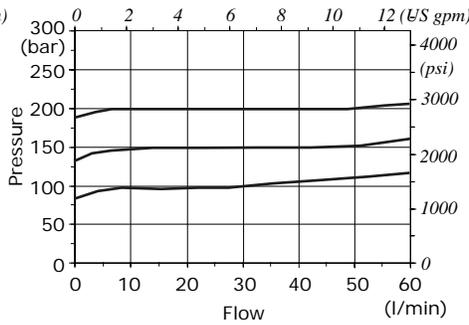
- C = wrench 22 - 42 Nm (31 lbft)
- D = wrench 13 - 24 Nm (17.7 lbft)
- E = allen wrench 4

Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

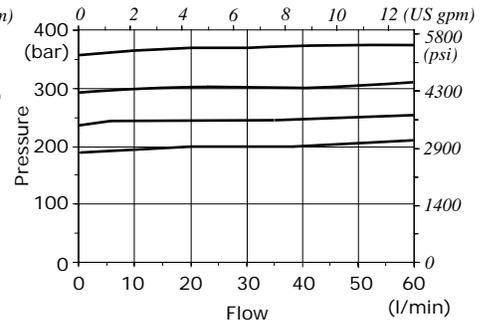
Setting example (B type spring)



Setting example (N type spring)

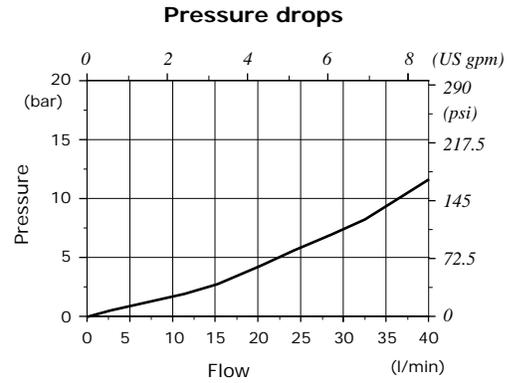
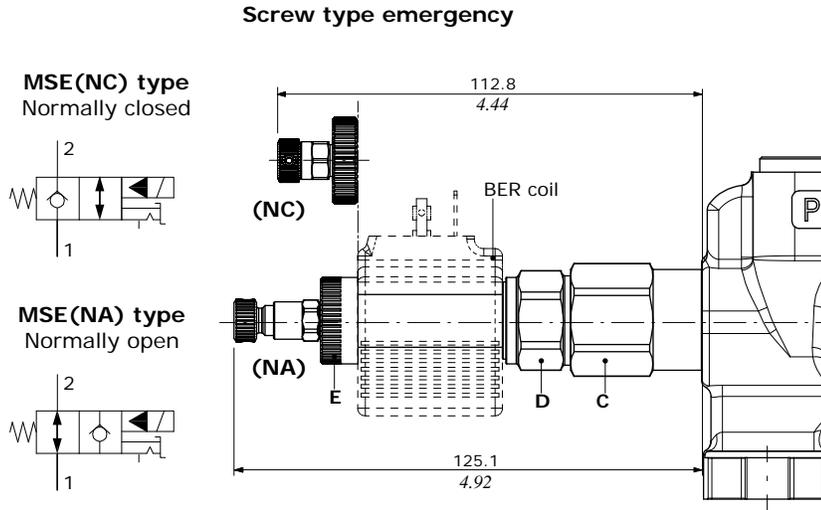


Setting example (R type spring)



Unloader valve

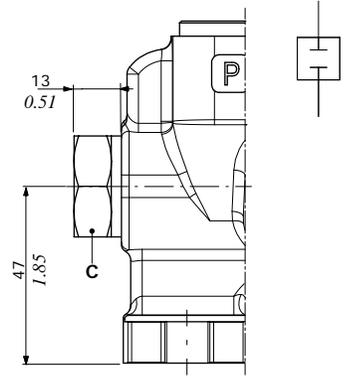
MSE type: electric control



Valve features
 Nominal flow.....: 40 l/min (10.5 US gpm)
 Max. pressure: 380 bar (5500 psi)
 Max. internal leakage...: 0,50 cm³/min @ 210 bar (0,030 in³/min @ 3050 psi)

For BER type coils see page 243

PMS type: valve blanking plug



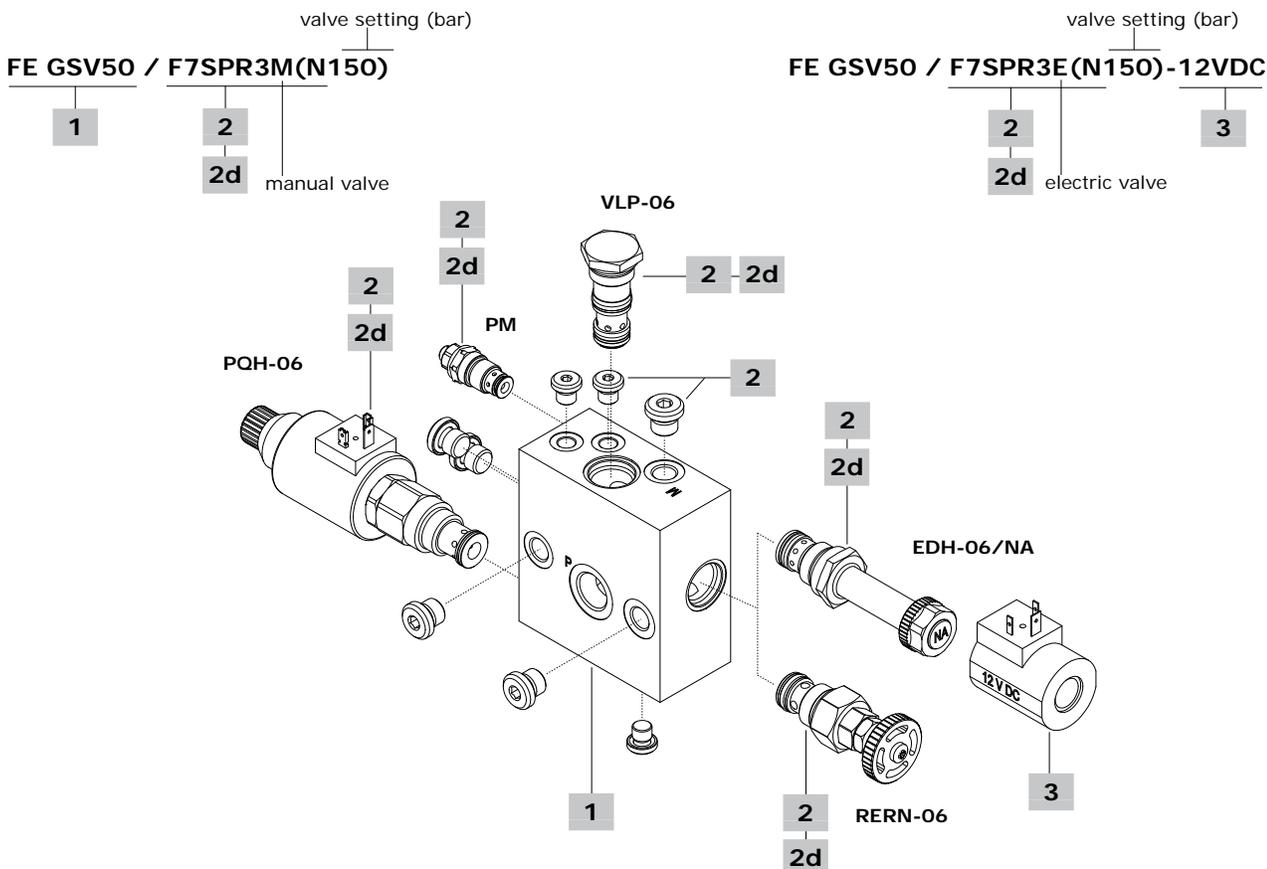
Wrenches and tightening torques
 C = wrench 27 - 42 Nm (30.9 lbft)
 D = wrench 24 - 30 Nm (22.1 lbft)
 E = manual tightening

Inlet section - parts ordering codes

Section with flow regulator

With manual unloader valve:

With electric unloader valve:



1 Inlet body section* page 137

TYPE: **FE-GSV50** CODE: 060013195499
 DESCRIPTION: Side inlet port, arrangement for flow control, unloader and pressure relief valve

2 Configuration coding* page 137

TYPE	DESCRIPTION
F7S-PR3M	With pressure relief valve, proportional flow control valve and manual unloader valve
F7S-PR3E	With pressure relief valve, proportional flow control valve and electric unloader valve, normally open

Note: Inlet configurations require:
 n. 5 G1/4 plugs code 3XTAP719150
 n. 3 G1/8 plugs code 3TP5110900

2d Inlet valves page 138

TYPE	CODE	DESCRIPTION
PQH-06	950208506010000	Flow control pressure compensated proportional valve, 12 VDC, coil included
	950208506010001	Flow control pressure compensated proportional valve, 24 VDC, coil included
PM	03800V30PM-N	Antishock valve
VLP-06	950209906010000	Pressure relief valve
RERN-06	955845060010000	Manual unloader valve
EDH-06/NA	950210600000000	Electric unloader valve, normally open

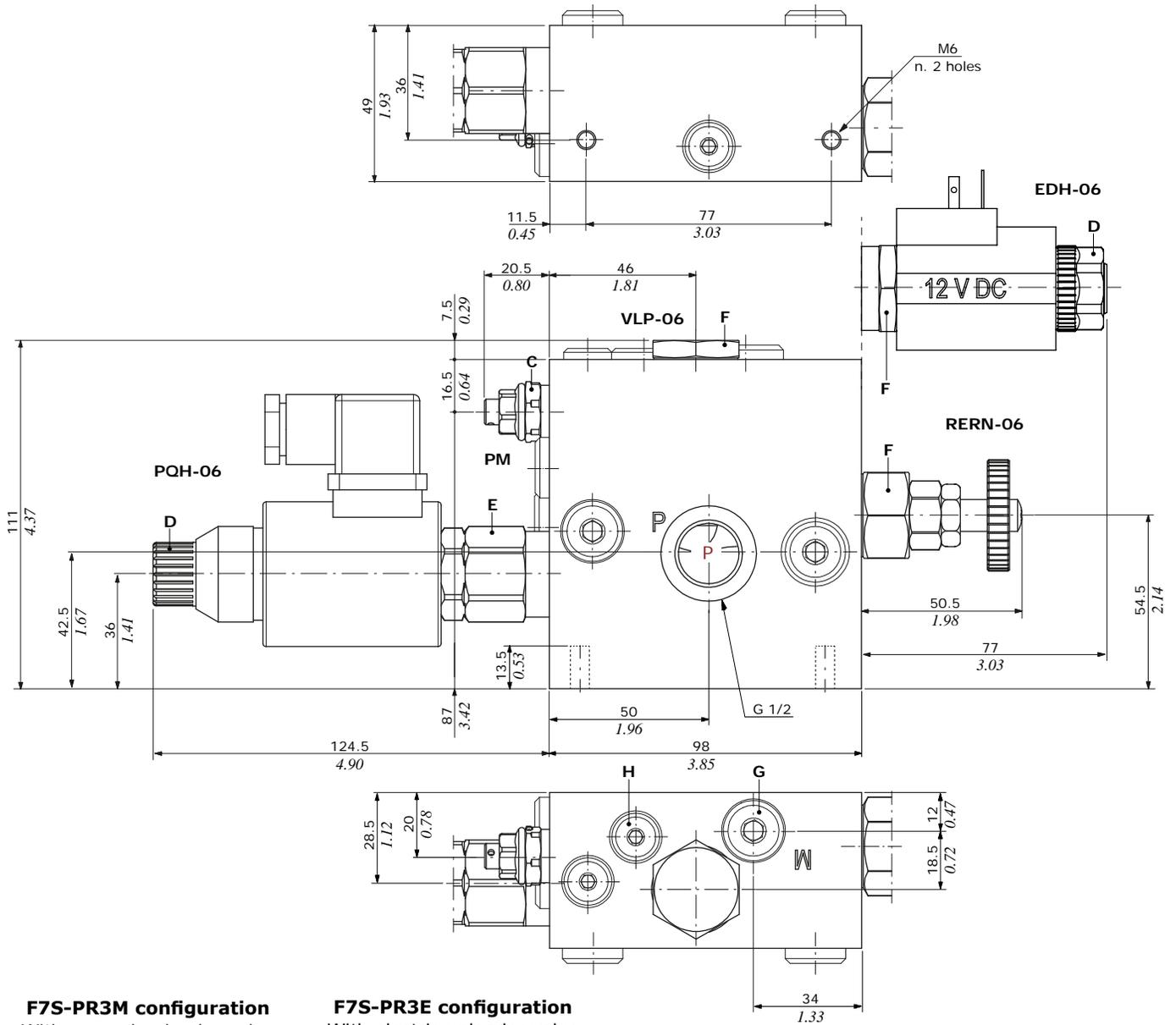
3 Coil

TYPE	CODE	DESCRIPTION
For EDH-06 valve		
A	954250000601200	12 VDC ISO4400 coil
	954250000602400	24 VDC ISO4400 coil

(*): Codes are referred to **BSP** thread

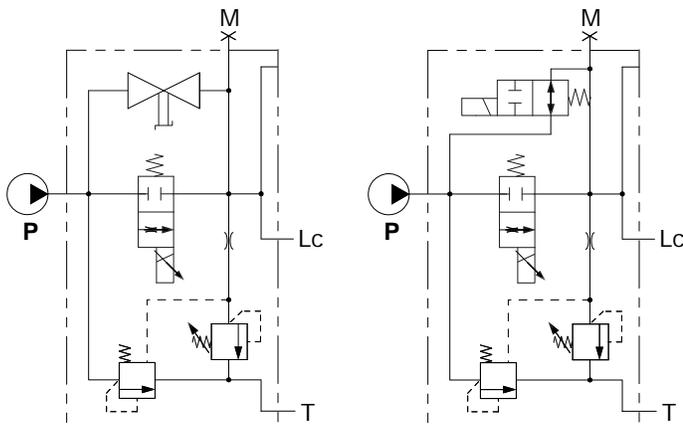
Inlet section with flow regulator

Dimensional data and hydraulic circuits



F7S-PR3M configuration
With manual unloader valve

F7S-PR3E configuration
With electric unloader valve



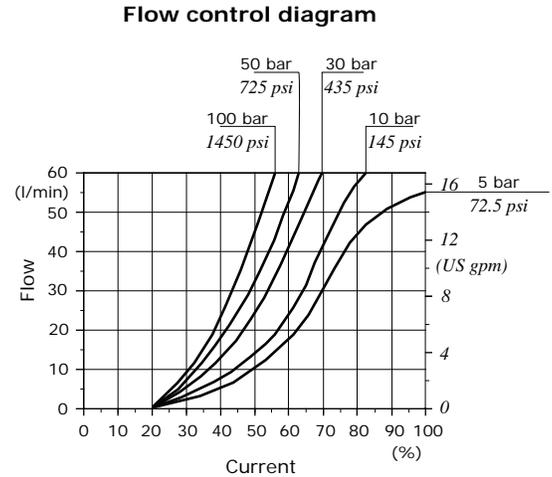
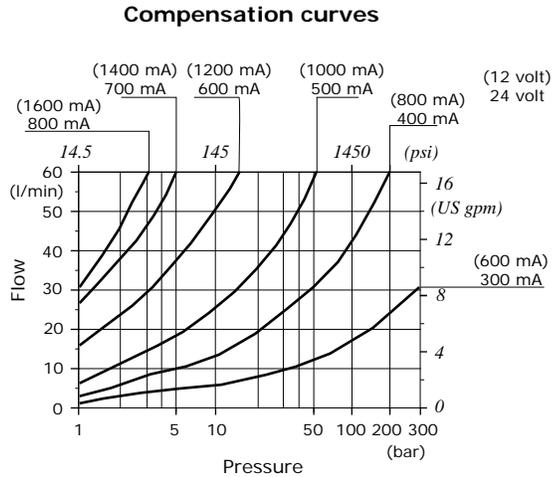
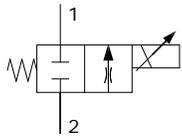
Wrenches and tightening torques
 C = wrench 17 - 30 Nm (22 lbft)
 D = manual tightening
 E = wrench 27 - 30 Nm (22 lbft)
 F = wrench 27 - 60 Nm (44.2 lbft)
 G = allen wrench 27 - 60 Nm (44.2 lbft)
 H = allen wrench 6 - 24 Nm (17.7 lbft)

Inlet section with flow regulator

Inlet valves

PQH-06 type

Flow control proportional pressure compensated valve, 12/24 VDC



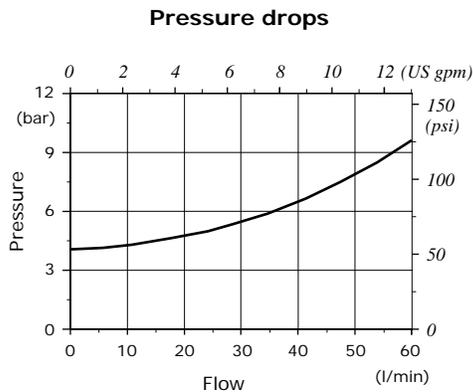
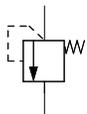
Valve features

- Nominal flow.....: 60 l/min (15.8 US gpm)
- Max. pressure: 310 bar (4500 psi)
- Power rating.....: 22 W
- Max. internal leakage...: 100 cm³/min @ 210 bar (6.10 in³/min @ 3050 psi)
- Coil insulation.....: Class F
- Voltage.....: 12/24 VDC

Note: The coil and connector is included

VLP-06 type

Pressure relief valve

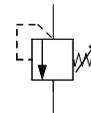


Valve features

- Nominal flow.....: 60 l/min (15.8 US gpm)
- Max. pressure: 350 bar (5070 psi)
- Opening start pressure.....: 4 bar (58 psi)

PM type

Antishock valve

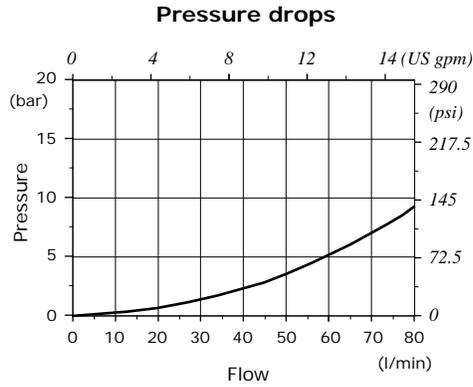
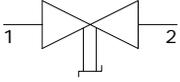


Inlet section with flow regulator

Inlet valves

RERN-06 type

Manual unloader valve

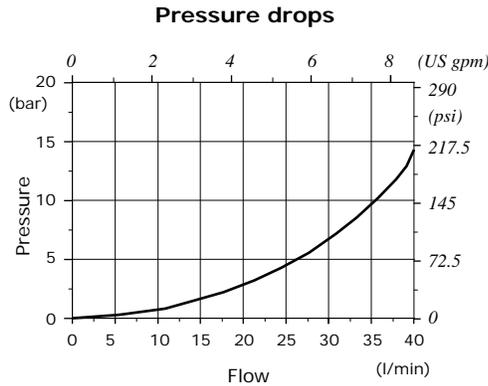
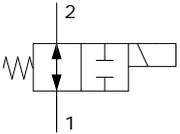


Valve features

Nominal flow.....: 70 l/min (18.5 US gpm)
 Max. pressure: 315 bar (4600 psi)
 Closed valve leakage....: 0

EDH-06 type

Electric unloader valve, normally open



Valve features

Nominal flow.....: 35 l/min (9.24 US gpm)
 Max. pressure: 310 bar (4500 psi)
 Max. internal leakage....: 50 cm³/min @ 210 bar
 (3.05 in³/min @ 3050 psi)

Coil **A** type: To be order separately, see #3 page 136

Working section - parts ordering codes

Mechanical control valve configuration example

spring type and setting valve (bar)

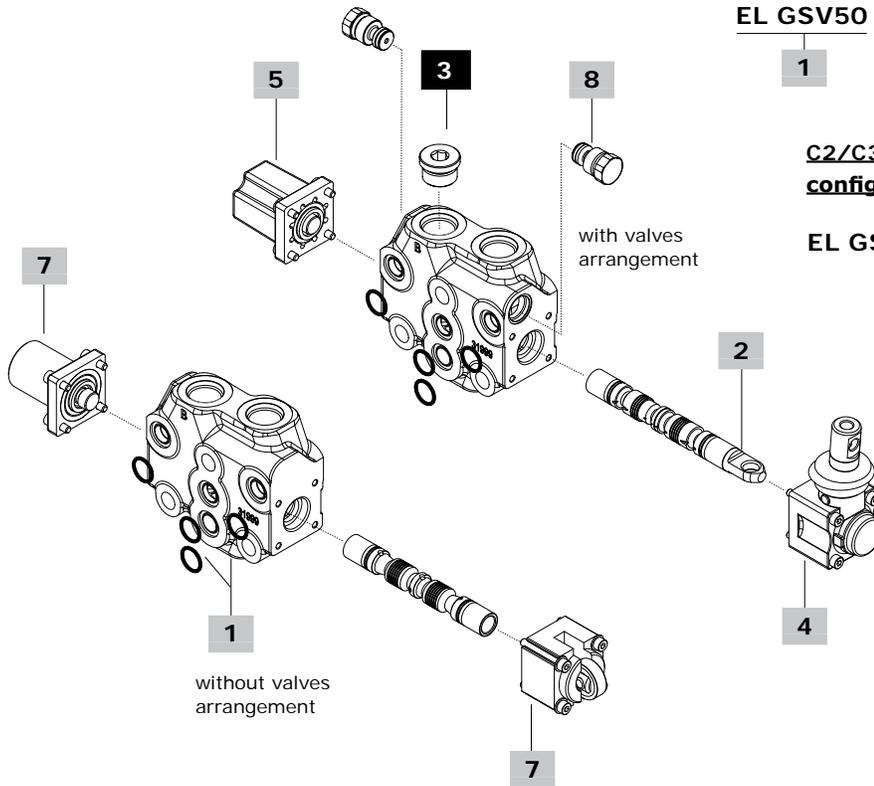
EL GSV50 / 102 - A1 - M1 . V40(N)120 - S - SAE

1 2 4 5 8 aluminium controls

C2/C3 complete mechanical control configuration example

EL GSV50 / 103 - C3 . V40(N)120 - S - SAE

7



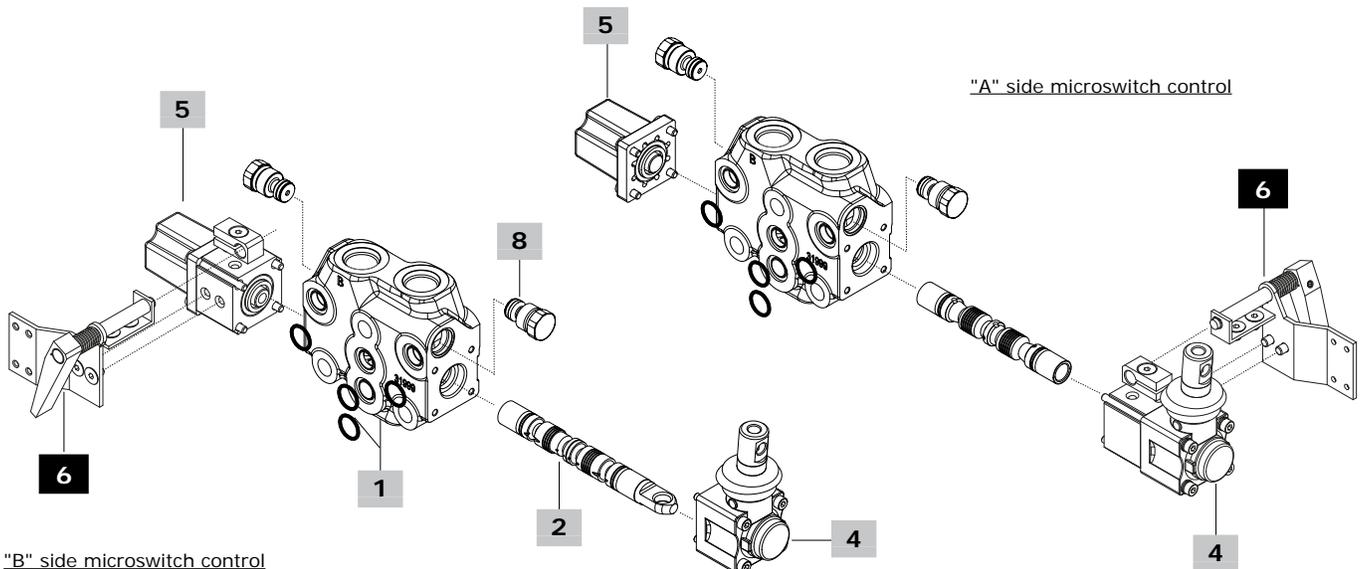
Microswitch control valve configurations example

EL GSV50 / 103 - A1 - M1-N1 . V40(N)120 - S - SAE

1 2 4 5 8 aluminium controls

EL GSV50 / 103 - N1-A1 - M1 . V40(N)120 - S - SAE

4 5



Working section - parts ordering codes

1 Working section body kit* page 145

TYPE: **EL-GSV50.VC-SAE** CODE: 5EL0600131747
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-GSV50-SAE** CODE: 5EL0600131746
 DESCRIPTION: Parallel circuit, without port valves arrangement

2 Spool page 146

TYPE	CODE	DESCRIPTION
Standard spools		
103	060103179499	Double acting, A and B closed in neutral position
	3CUG3197800	As previous one, for kick-out control
106	KR30106	Double acting for closed circuit
107	KR30107-108	Double acting, A to tank and B closed in neutral position
108	KR30107-108	Double acting, B to tank and A closed in neutral position
111	060103179599	Double acting, A and B to tank in neutral position
	KR30111K	As previous one, for kick-out control
101	3CUG3218000	Single acting on port A. SAE8 plug is required, see #3
102	3CUG3218002	Single acting on port B. SAE8 plug is required, see #3
116	3CUG3179200	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
126	3CUG3179201	Double acting, with floating in the 4 th position (spool out): requires dedicated spool control

Special spools for cam, microswitch controls and other leverless controls

103	060103179099	Double acting, A and B closed in neutral position
111	060103179199	Double acting, A and B to tank in neutral position

3 Plug for single acting spool*

TYPE	CODE	DESCRIPTION
-	255008	SAE8 plug

4 A side control page 147

Note: For other control type, see Q30 valves

TYPE	CODE	DESCRIPTION
------	------	-------------

For standard spoolsWith lever control:

A1	03600A1-A2	M8 thread plastic lever box
A2	03600A1-A2	As A1 type, with lever box rotated 180°
A1/10	03610A1-A2/10	M8 thread aluminium lever box
A2/10	03610A1-A2/10	As A1/10 type, with lever box rotated 180°
A1/PM	03610A1-A2/PM	M10 thread aluminium lever box
A2/PM	03610A1-A2/PM	As A1/PM type, with lever box rotated 180°
A1/PMP	03610A1-A2/PMP	M10 thread plastic lever box
A2/PMP	03610A1-A2/PMP	As A1/PMP type, with lever box rotated 180°
A1/Z1	03610A1-A2/Z1	Plastic lever box, for 116 spool type
A2/Z1	03610A1-A2/Z1	As A1/Z1 type, with lever box rotated 180°

With safety lever control:

A1/S⁽¹⁾	03624A1-A2/S	M8 thread aluminium lever box
A2/S⁽¹⁾	03624A1-A2/S	As A1/S type, with lever box rotated 180°

Without lever control:

A4/Z1	03617A4/Z1	As A4 type, for 116 spool type
A6	03620A6	With flange
A6-H/Z1	03620A6-H/Z1S1	As A6 type, for 116 spool type
A8	03622A8/03	Arrangement for flexible cable control
A8/Z1	03622A8/Z1	As A8 type, for 116 spool type

4 A side control (cont.) page 147

Note: For other control type, see Q30 valves

TYPE	CODE	DESCRIPTION
------	------	-------------

With joystick controls for 2 section operation:

A35/1	03640A35-12	Joystick 1 type
A35/2	03640A35-12	Joystick 2 type
A35/3	03640A35-34	Joystick 3 type
A35/4	03640A35-34	Joystick 4 type

For types 103 and 111 special spoolsWith spool position microswitch:

Note: To complete the control you must use the assembly kit at #6

N1-A1	03641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
N1A-A1	03642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	03643N1BA1/A2L	Micro operation in pos. 2, with lever box
N1-A3	03648N1-A3L	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	03648N1A-A3L	Micro operation in pos. 1, without lever with cap
N1B-A3	03648N1B-A3L	Micro operation in pos. 2, without lever with cap

Without lever control:

A3	03614A3	Without lever, with cap
A4	03617A4	M8 thread male external pin with flange
A5⁽²⁾	03619A5	Flange with spherical spool end

5 B side control page 154

Note: For other control type, see Q30 valves

TYPE	CODE	DESCRIPTION
------	------	-------------

With spring return:

M1	03730M1	3 pos., spring return in neutral position
M1/01	03730M1/01	As M1 type, for joystick control
M1-B1	03753M1-B1	As M1 type, with microswitch arrangement
M1-U1	03701M1-U1	As M1 type, with M8 male thread external pin
M2	03732M2	2 pos. (0-1), spring return in neutral position
M2-U1	03702M2-U1	As M2 type, with M8 male thread external pin
M3	03733M3	2 pos. (0-2), spring return in neutral position
M3-U1	03703M3-U1	As M3 type, with M8 male thread external pin
M4	03734M4-1-2	2 pos. (1-2), spring return in position 1
	03735M4-1-2	2 pos. (2-1), spring return in position 2
M4-U1	03704M4-U1-1-2	As M4 type (1-2), with M8 male thread external pin

With flexible cable control arrangement:

M1-U2	03715M1-U2	3 pos., spring return in neutral position
M2-U2	03716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	03717M3-U2	2 pos. (0-2), spring return in neutral position

With detent:

R1	03741R1	3 pos., detent in position 1
R2	03742R2	3 pos., detent in position 2
R3	03743R3	3 pos., detent in all position
R4	03744R4	2 pos., detent in position 0-1
R5	03745R5	2 pos., detent in position 0-2
R6	03746R6	2 pos., detent in position 1-2
R8	03748R8	4 pos., detent in 4 th pos., for 116 spool type

R10/Z1	03750R10/Z1	4 pos., detent in 4 th pos., for 126 spool type
---------------	-------------	---

With detent and kick out function:

R1K	03741R1K	3 pos., detent in position 1
R2K	03742R2K	3 pos., detent in position 2
R3K	03743R3K	3 pos., detent in all position

(*): Codes are referred to **UN-UNF** thread

(¹): Always complete with lever knob

(²): To be assembled only with M4 control

Working section - parts ordering codes

5 B side control (cont.) page 154

Note: For other control type, see Q30 valves

With spool position microswitch:

Note: To complete the control you must use the assembly kit at #6

M1-N1	03766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
M1-N1A	03767M1-N1AL	As M1-N1 type, micro operation in pos. 1
M1-N1B	03768M1-N1BL	As M1-N1 type, micro operation in pos. 2
M2-N1	03769M2-N1L	2 pos. (0-1), spring return in neutral position
M3-N1	03772M3-N1L	2 pos. (0-2), spring return in neutral position

With pneumatic and electropneumatic controls:

P1NW	03661P1-NW	ON/OFF pneumatic control
P1NPW	03661P1-NPW	Proportional pneumatic control
D3W	03691D3-F-12DC	12 VDC, ON/OFF electropneumatic control
	03692D3-F-24DC	24 VDC, ON/OFF electropneumatic control

6 Microswitch assembly kit

CODE	DESCRIPTION
03650N1-01	Kit for 1 section
03650N1-02	Kit for 2 sections
03650N1-03	Kit for 3 sections
03650N1-04	Kit for 4 sections
03650N1-05	Kit for 5 sections
03650N1-06	Kit for 6 sections
03650N1-07	Kit for 7 sections
03650N1-08	Kit for 8 sections
03650N1-09	Kit for 9 sections
03650N1-10	Kit for 10 sections

7 Complete controls A+B sides page 159

TYPE	CODE	DESCRIPTION
For types 103 and 111 special spools		
C2	03792C2-C3	Cam control from pos. 1 to 2
C3	03792C2-C3	Cam control from pos. 2 to 1

8 Auxiliary port valve page 163

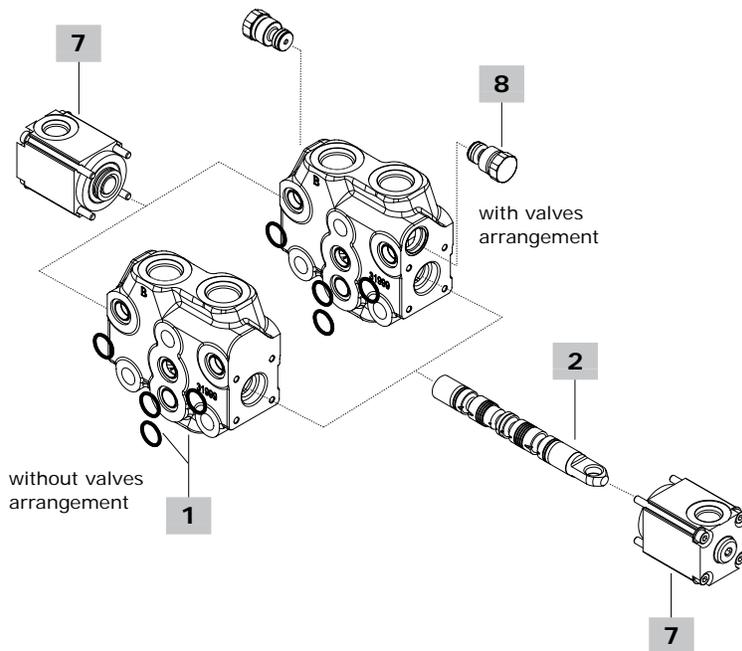
TYPE	CODE	DESCRIPTION
<u>Antishock valve:</u>		
V30-B	0380FV30-B	Setting range: from 50 to 100 bar <i>(from 725 to 1450 psi)</i>
V30-N	0380FV30-N	Setting range: from 101 to 200 bar <i>(from 1460 to 2900 psi)</i>
V30-R	0380FV30-R	Setting range: from 201 to 350 bar <i>(from 2910 to 5100 psi)</i>
<u>Antishock/anticavitation valve:</u>		
V33-B	0380FV33-B	Setting range: from 50 to 100 bar <i>(from 725 to 1450 psi)</i>
V33-N	0380FV33-N	Setting range: from 101 to 200 bar <i>(from 1460 to 2900 psi)</i>
V33-R	0380FV33-R	Setting range: from 201 to 350 bar <i>(from 2910 to 5100 psi)</i>
<u>Anticavitation valve:</u>		
V04	03808V04	Anticavitation valve
<u>Plug:</u>		
VC	060002846099	Valve blanking plug
For other configurations and positions, see page 163		

Proportional hydraulic controls valve configuration example

spring type and valve setting (bar)

EL GSV50 / 103 - H5 . V40(N)120 - S - SAE

aluminium controls



1 Working section body kit* page 145

TYPE: **EL-GSV50-H5.VC-SAE** CODE: 5EL0600131747H5
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-GSV50-H5-SAE** CODE: 5EL0600131746H5
 DESCRIPTION: Parallel circuit, without port valves arrangement

2 Spool page 146

TYPE	CODE	DESCRIPTION
103	060103179499	Double acting, A and B closed in neutral position

7 Hydraulic controls A+B sides* page 160

TYPE	CODE	DESCRIPTION
H5	03785H5/SAE	Low pressure proportional type, upper ports

8 Auxiliary port valve page 163

See #8, page 142

(*): Codes are referred to **UN-UNF** thread

Working section - parts ordering codes

One side - ON/OFF direct solenoid control valve configuration example

spring type and valve setting (bar)

EL GSV50 / 103 - A1 - D41 . V40(N)120 - 12VDC - S - SAE

1
 2A 4 2A
 8
 9A
 aluminium controls

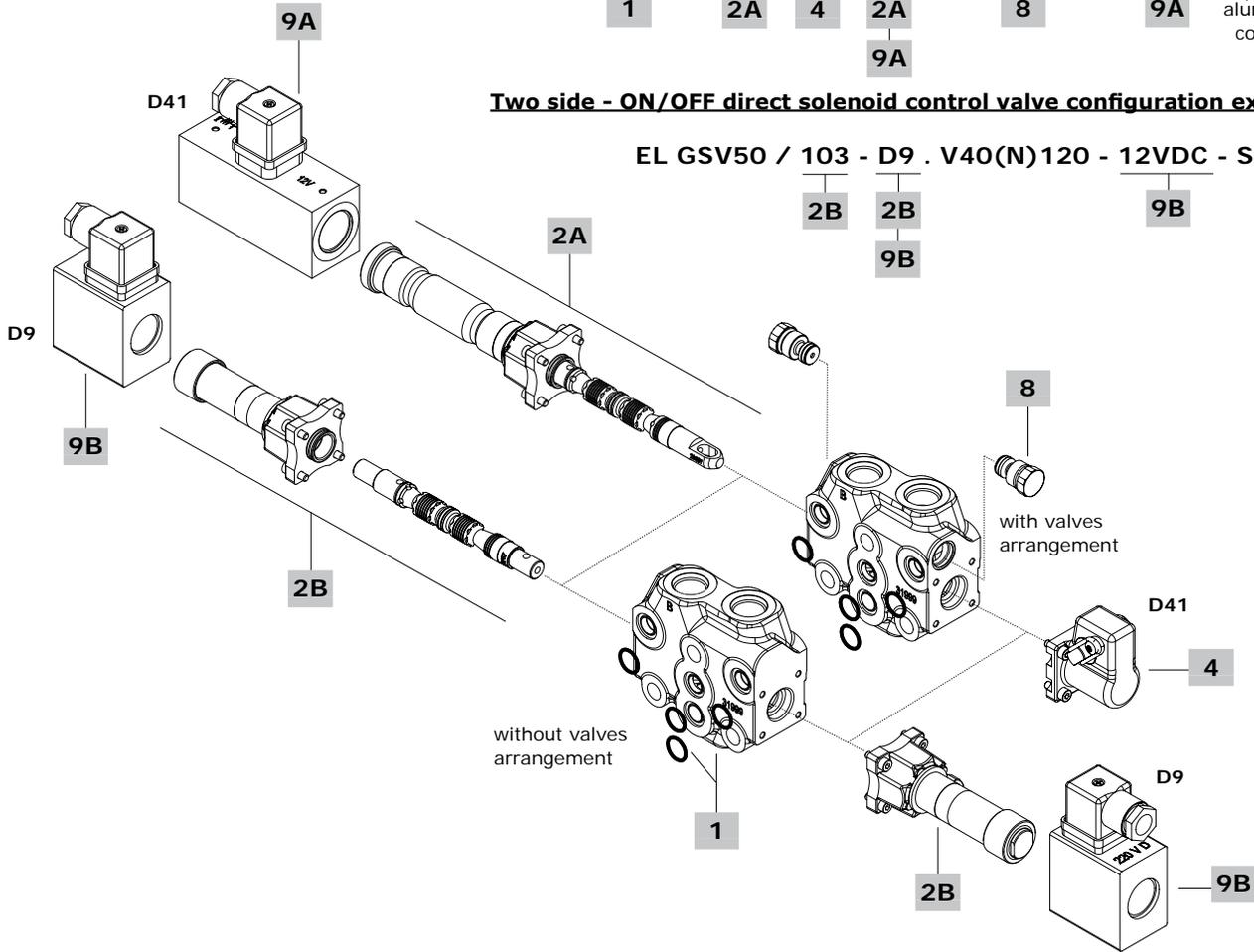
9A

Two side - ON/OFF direct solenoid control valve configuration example

EL GSV50 / 103 - D9 . V40(N)120 - 12VDC - S - SAE

2B 2B
 9B

9B



1 Working section body kit* page 145

See #1, page 143

2A D41 solenoid control page 161

One side solenoid control

TYPE	CODE	DESCRIPTION
103	X060102889799	Double acting, A and B closed in neutral position
107	X060102938199	Double acting, A to tank and B closed in neutral position
111	X060102894299	Double acting, A and B to tank in neutral position

2B D9 solenoid control page 162

Two side solenoid control

TYPE	CODE	DESCRIPTION
103	X060102998299	Double acting, A and B closed in neutral position
111	X060103000499	Double acting, A and B to tank in neutral position

4 A side control for D41 page 161

TYPE	CODE	DESCRIPTION
A1	060003236899	M8 thread cast iron lever box
A2	060003236899	As A1 type, with lever box rotated 180°

8 Auxiliary port valve page 163

See #8, page 142

9A/B Coil page 161

D41 coil

TYPE	CODE	DESCRIPTION
-	ZEB012	12 VDC ISO4400 coil
-	ZEB024	24 VDC ISO4400 coil

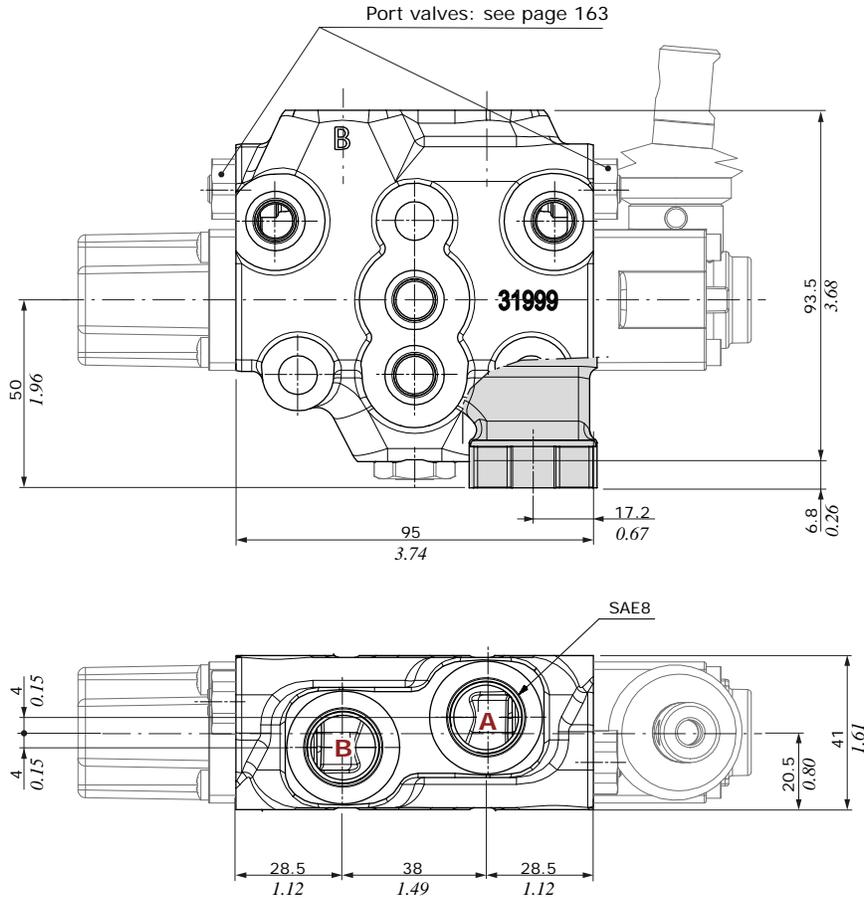
D9 coil

TYPE	CODE	DESCRIPTION
-	ZDB212	12 VDC ISO4400 coil
-	ZDB224	24 VDC ISO4400 coil

Note: The connector is included

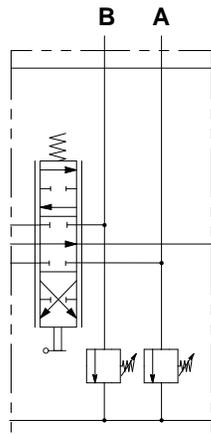
(*): Codes are referred to **UN-UNF** thread

Dimensional data and hydraulic circuits



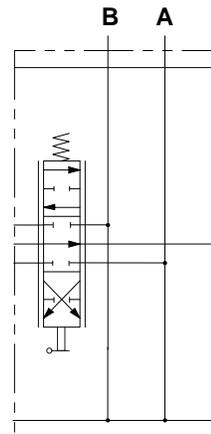
GSV50.V40(N)120-SAE configuration

Parallel circuit, mechanical control with aux valves



GSV50-SAE configuration

Parallel circuit, mechanical control without aux valves

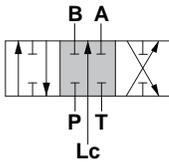


Working section

Spool

103 type
A and B closed
in neutral position

2 0 1

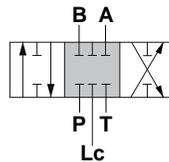


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

106 type
A, B and Lc closed in
neutral position. For closed center

2 0 1

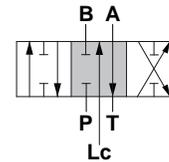


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

107 type
A to tank, B closed
in neutral position

2 0 1

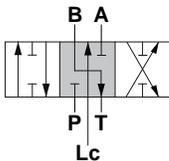


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

108 type
B to tank, A closed
in neutral position

2 0 1

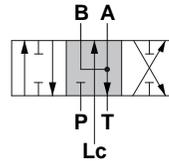


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

111 type
A and B to tank
in neutral position

2 0 1

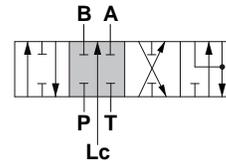


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

116 type
With floating in the 4th position
(spool in)

2 0 1 3

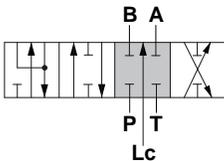


Stroke

Position 1: - 4 mm (- 0.15 in)
Position 2: + 5 mm (+ 0.19 in)
Position 3: - 8.6 mm (- 0.33 in)

126 type
With floating in the 4th position
(spool out)

3 2 0 1

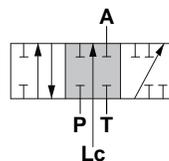


Stroke

Position 1: + 4 mm (+ 0.15 in)
Position 2: - 5 mm (- 0.19 in)
Position 3: + 8.6 mm (- 0.33 in)

101 type
Single acting on A,
B plugged

2 0 1

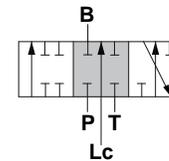


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

102 type
Single acting on B,
A plugged

2 0 1



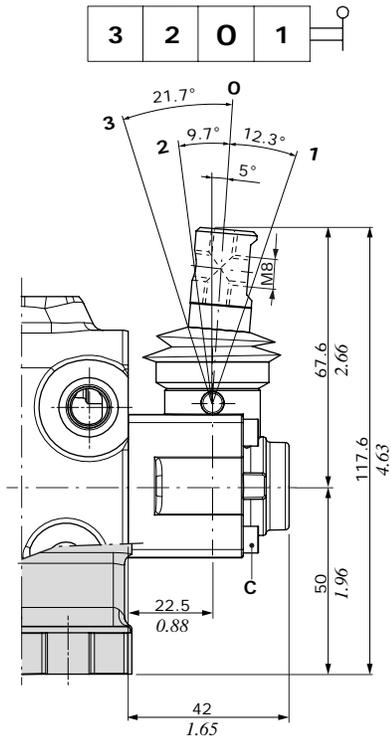
Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

A side controls

With lever control

A1 type
M8 thread plastic lever box

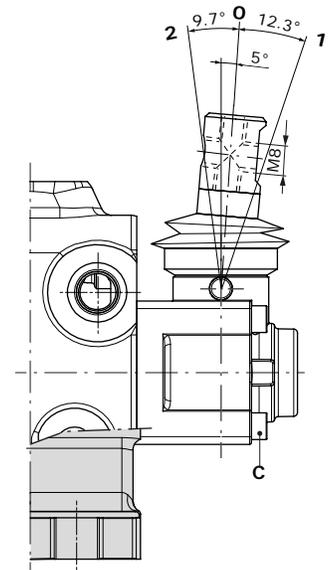
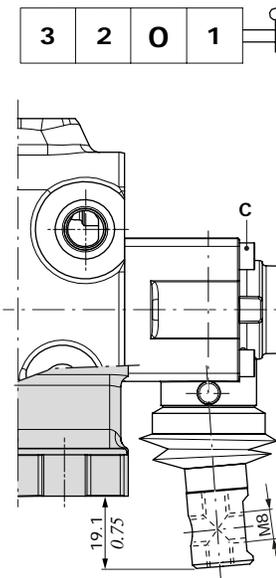


A1/10 type
M8 thread aluminium lever box.
Dimensions are the same
of A1 type

A2/10 type
As A1/10 type,
rotated 180°



A2 type
As A1 type, rotated 180°



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf_t)

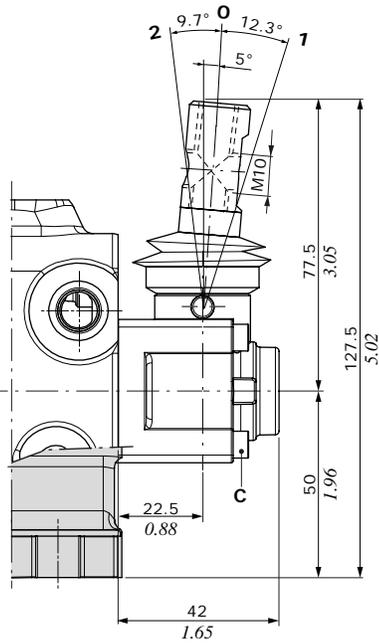
Working section

A side controls

With lever control

A1/PM type

M10 thread aluminium lever box



A1/PMP type

M10 thread plastic lever box.

A2/PMP type

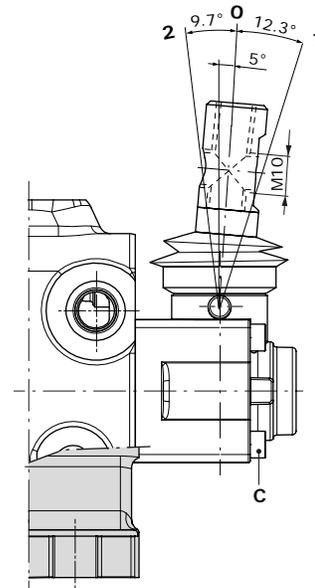
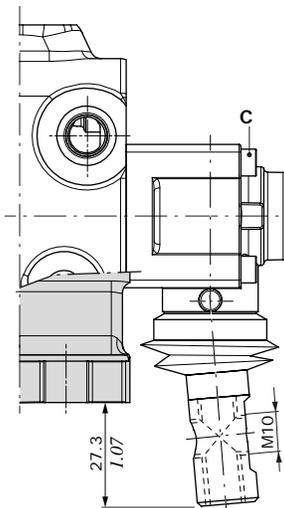
Dimensions are the same of A1/PM type

As A1/PMP type, rotated 180°



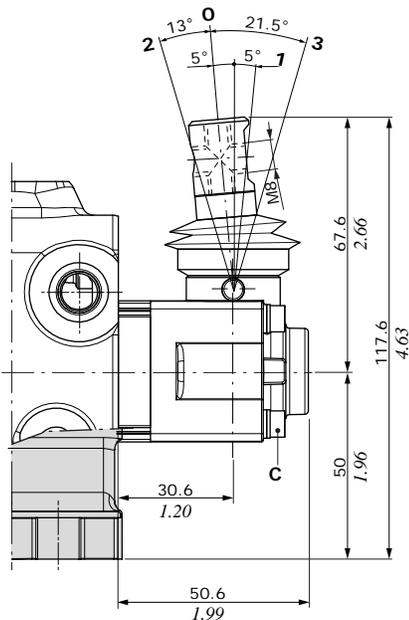
A2/PM type

As A1/PM type, rotated 180°



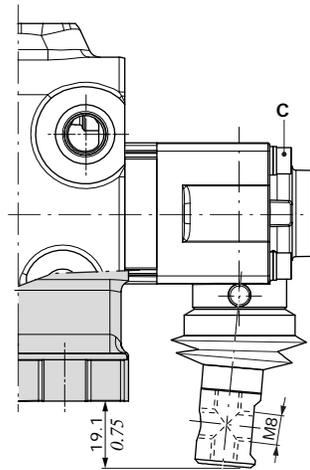
A1/Z1 type

M8 thread, for 116 floating spool type



A2/Z1 type

As A1/Z1 type, rotated 180°



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbft)

A side controls

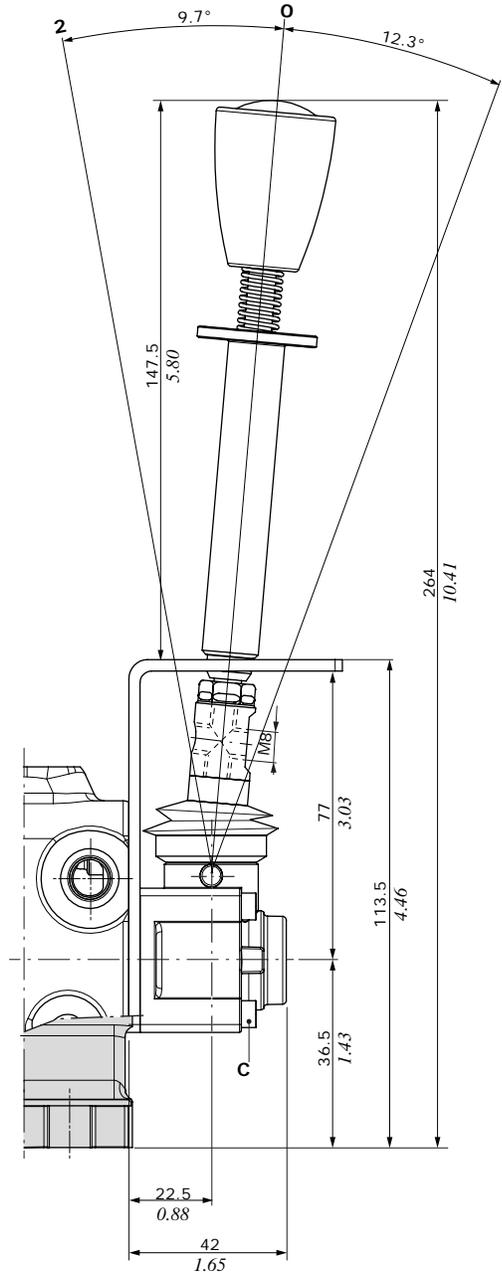
With safety lever control

A1/S type

M8 thread, aluminium lever box

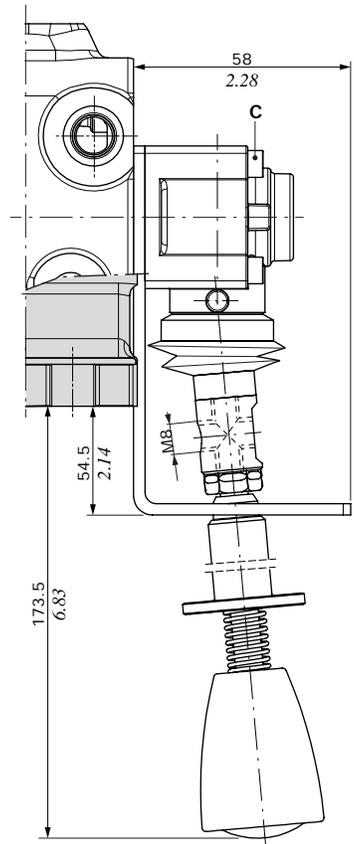


Wrenches and tightening torques
 C = allen wrench 3 - 3 Nm (2.2 lbf^t)



A2/S type

As A1/S type, rotated 180°

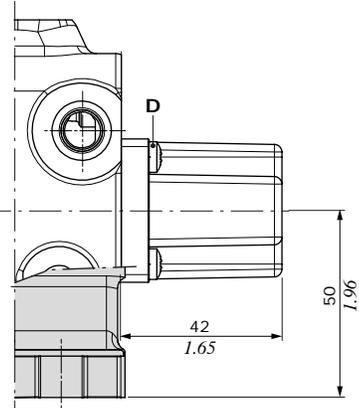


Working section

A side controls

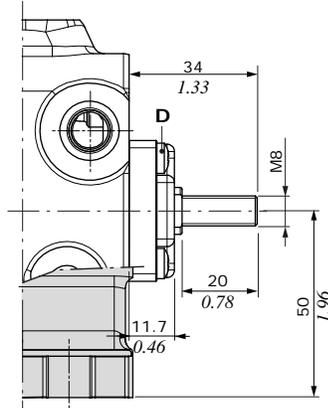
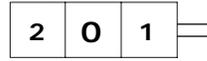
Without lever control

A3 type
With cap



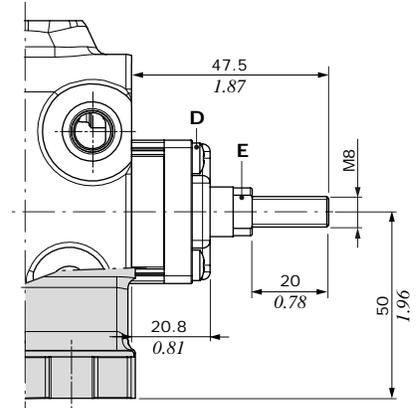
A4 type

M8 thread male external pin with flange



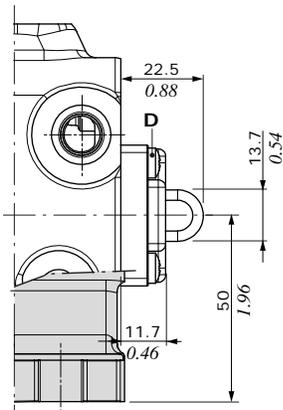
A4/Z1 type

As A4 type,
for 116 floating spool type



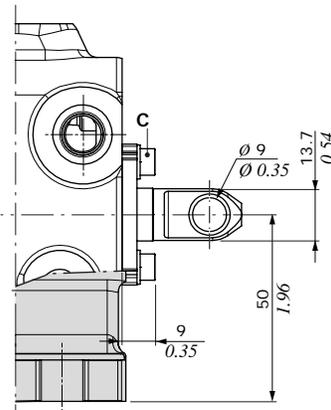
A5 type

Flange with spherical spool end



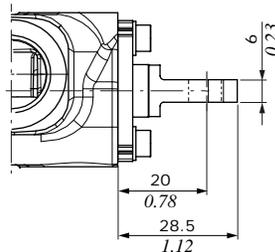
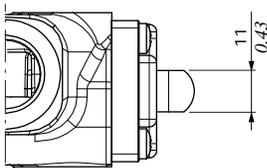
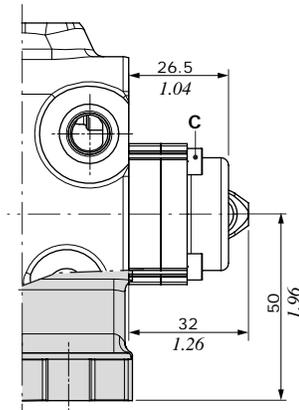
A6 type

Flange with spool eye end



A6-H/Z1 type

As A6 type, for 116 floating spool type



Wrenches and tightening torques

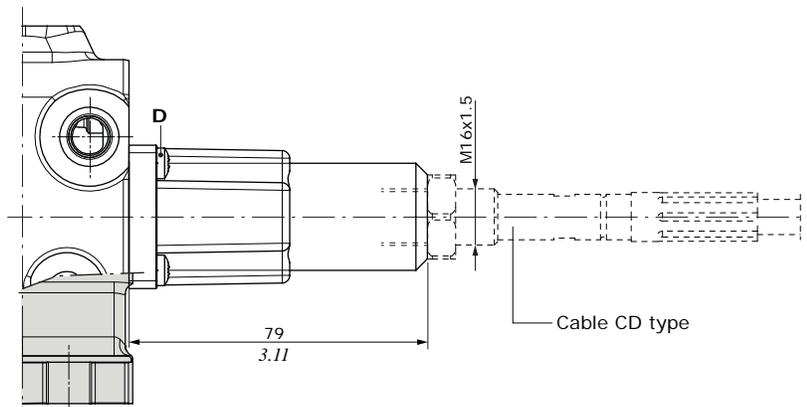
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = cross-head - 3 Nm (2.2 lbft)
- E = wrench 9 - 9.8 Nm (7.2 lbft)

A side controls

With flexible cable control arrangement

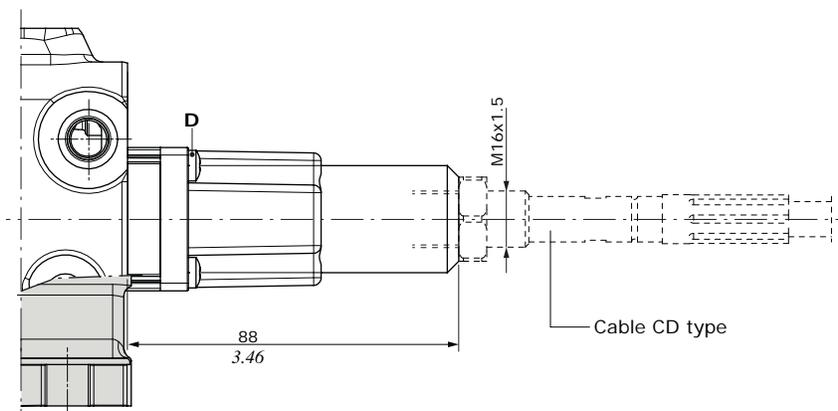
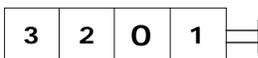
A8 type

Flexible cable control arrangement



A8/Z1 type

As A8 type, for 116 floating spool type



Wrenches and tightening torques

D = cross-head - 3 Nm (2.2 lbft)

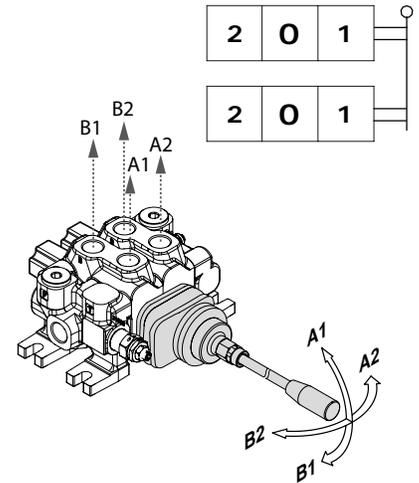
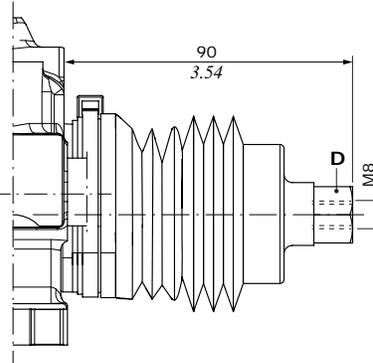
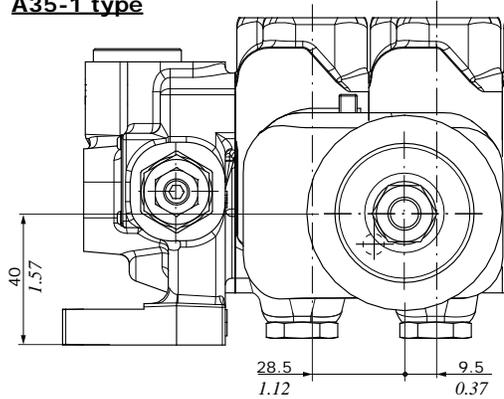
Working section

A side controls

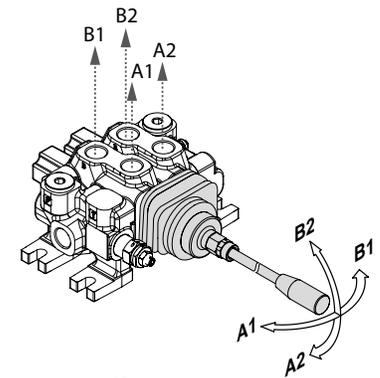
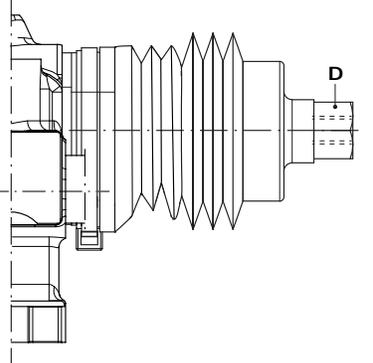
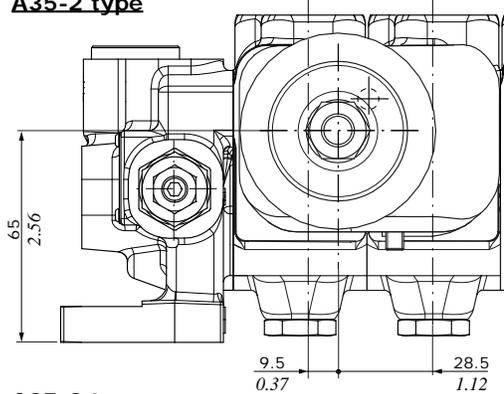
Joystick control

For operating the joystick control in the floating position, contact Sales Department.

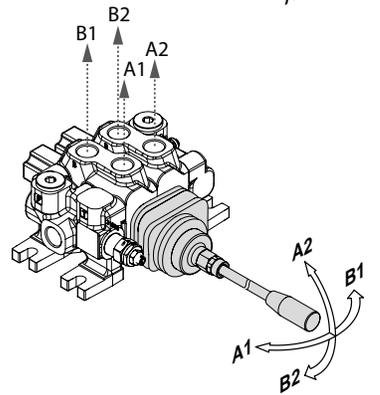
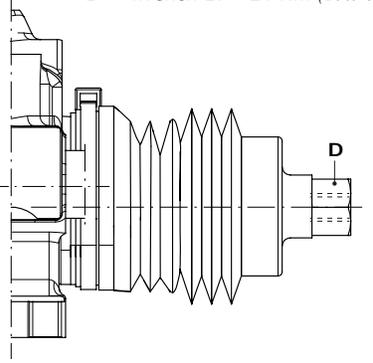
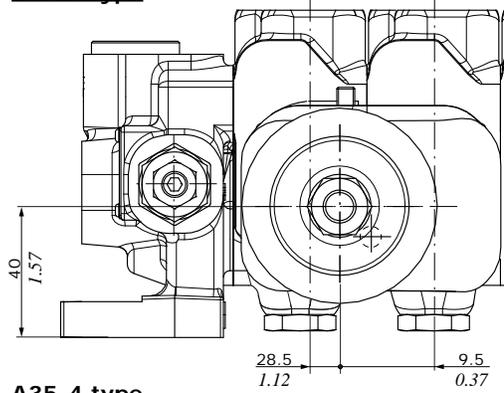
A35-1 type



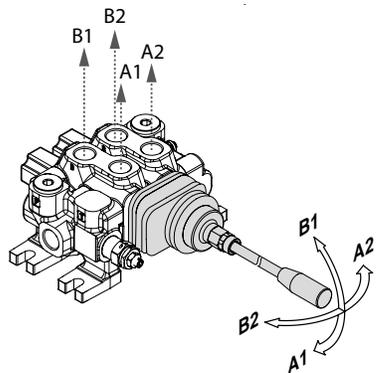
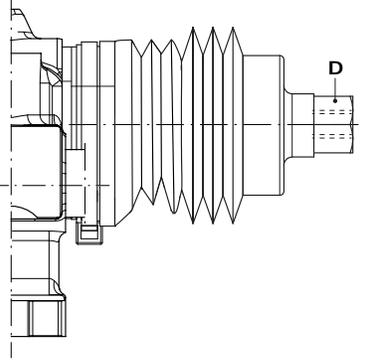
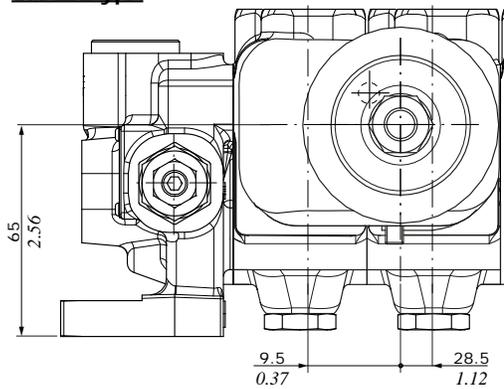
A35-2 type



A35-3 type



A35-4 type

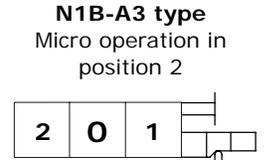
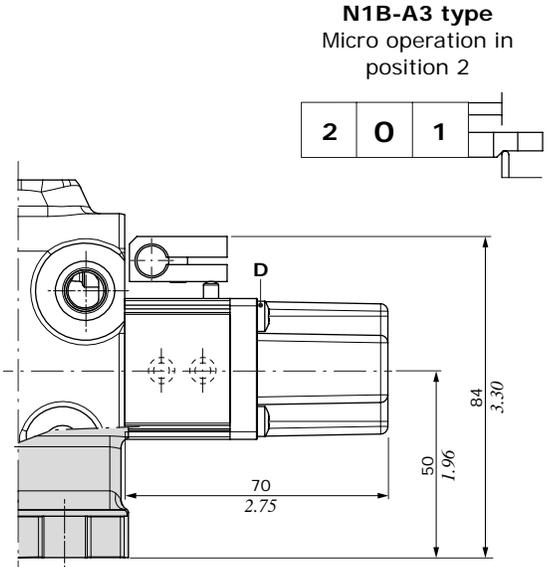
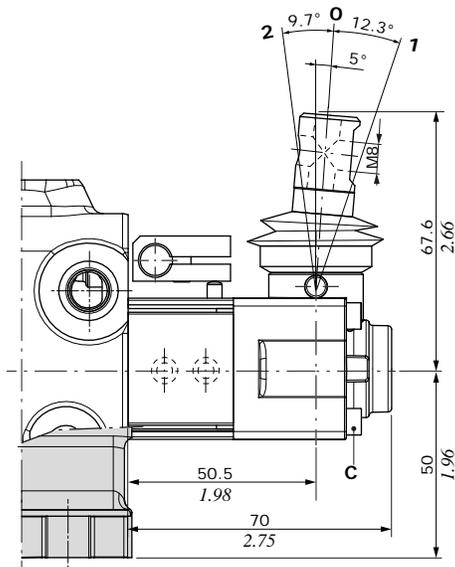
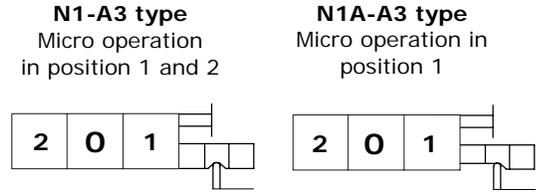
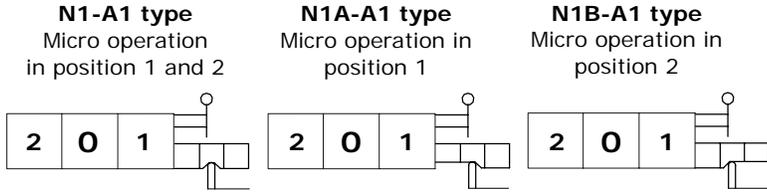


Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbf_t)

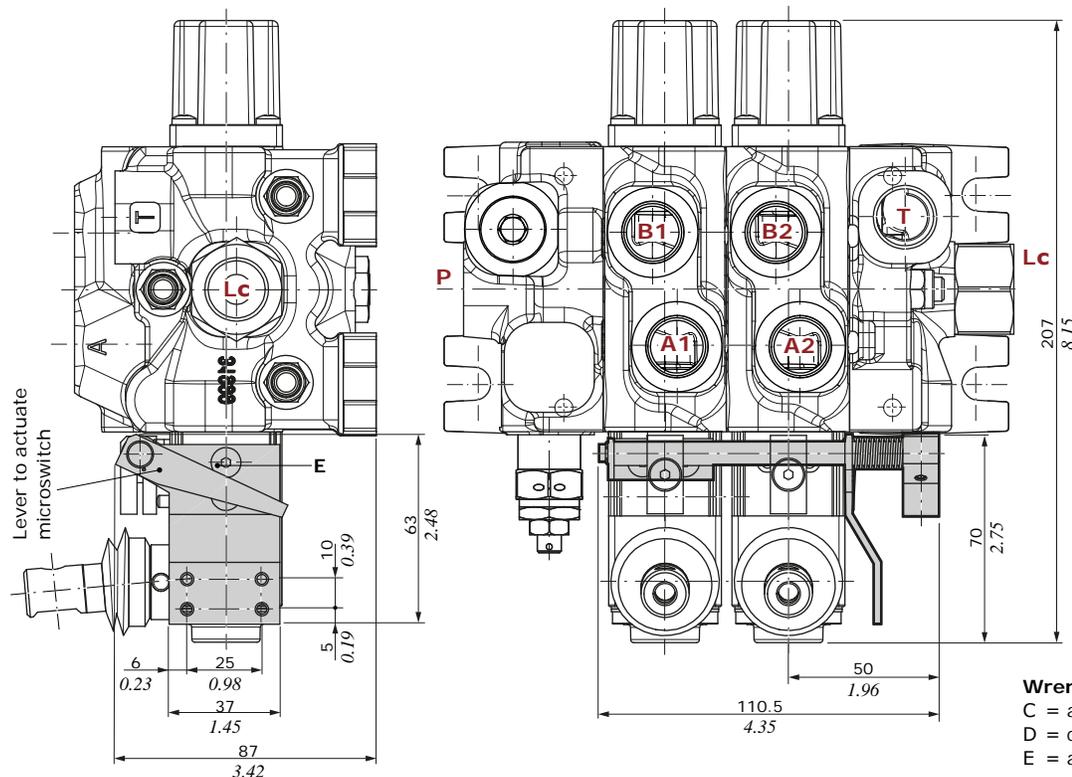
A side controls

With spool position microswitch, with lever

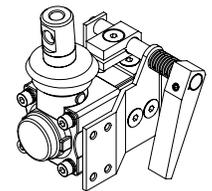
With spool position microswitch, with cap



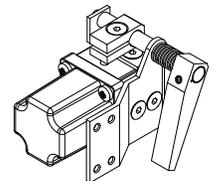
Microswitch assembly kit for 2 working section (N1-A1 type)



with lever box



with cap



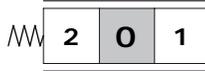
Wrenches and tightening torques
 C = allen wrench 3 - 3 Nm (2.2 lbft)
 D = cross-head - 3 Nm (2.2 lbft)
 E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Working section

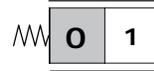
B side controls

With spring return control

M1 type
3 position, spring return
in neutral position

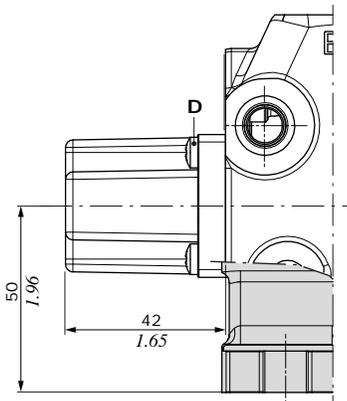


M1/O1 type
As M1 type,
for joystick control

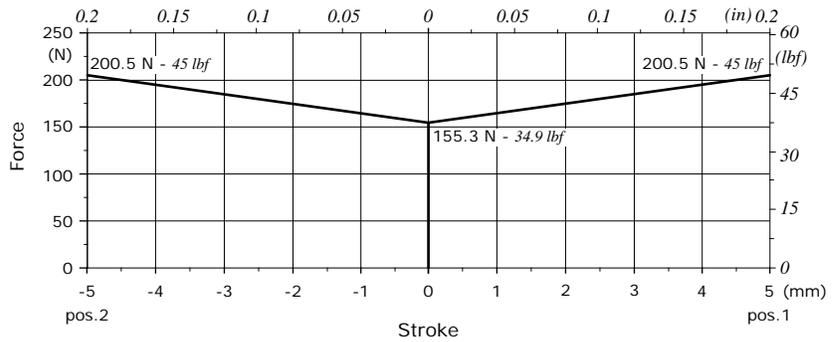


M2 type
2 position (0-1), spring return
in neutral position

M3 type
2 position (0-2), spring return
in neutral position

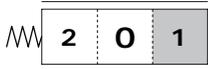


M1 control type - Force vs. Stroke diagram

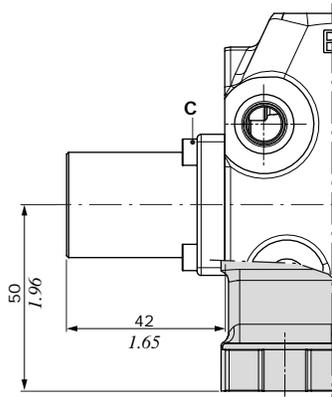
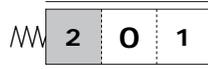


M4 types

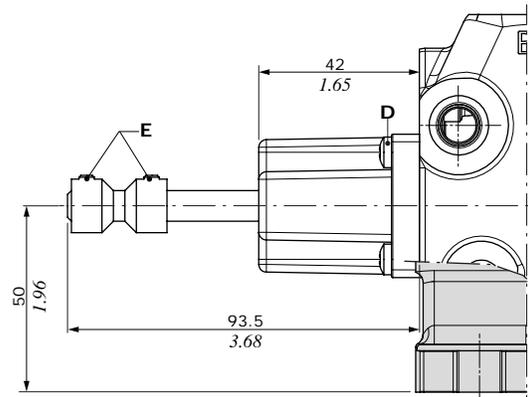
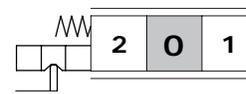
2 position (1-2),
spring return in position 1



2 position (2-1),
spring return in position 2



M1-B1 type
3 position, microswitch arrangement



Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbf_t)
- D = cross-head - 3 Nm (2.2 lbf_t)
- E = allen wrench 3 - 5 Nm (3.68 lbf_t)

B side controls

With spring return control

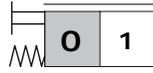
M1-U1 type

3 position, with M8 male thread external pin



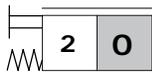
M2-U1 type

2 position (0-1), with M8 male thread external pin



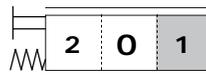
M3-U1 type

2 position (0-2), with M8 male thread external pin



M4-U1 type

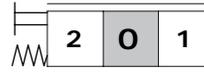
2 position (1-2), with M8 male thread external pin



With flexible cable control arrangement

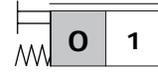
M1-U2 type

3 position, spring return in neutral position



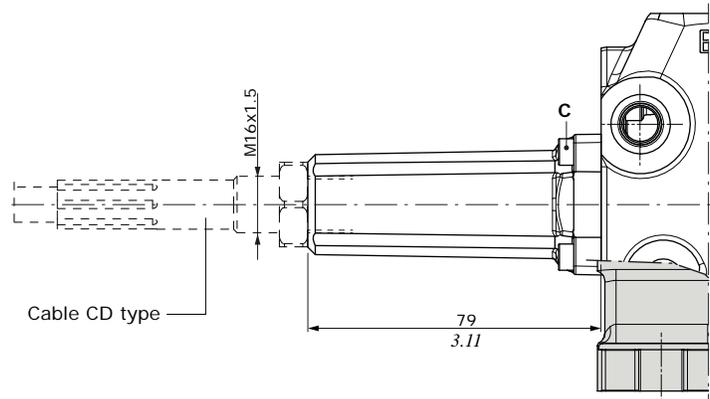
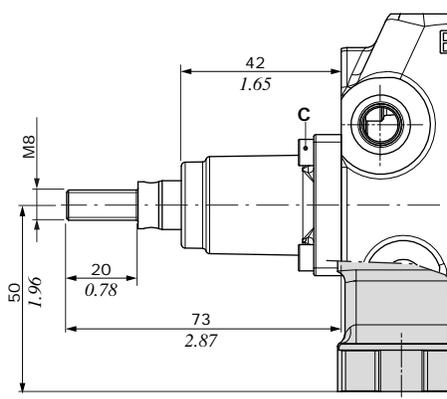
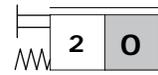
M2-U2 type

2 position (0-1), spring return in neutral position



M3-U2 type

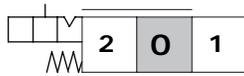
2 position (0-2), spring return in neutral position



With detent control

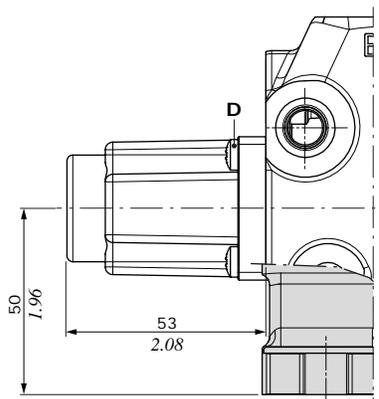
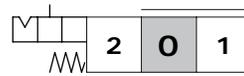
R1 type

3 position, detent in position 1



R2 type

3 position, detent in position 2

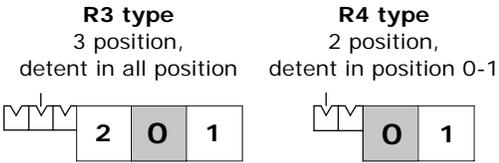


Wrenches and tightening torques
 C = allen wrench 3 - 3 Nm (2.2 lbft)
 D = cross-head - 3 Nm (2.2 lbft)

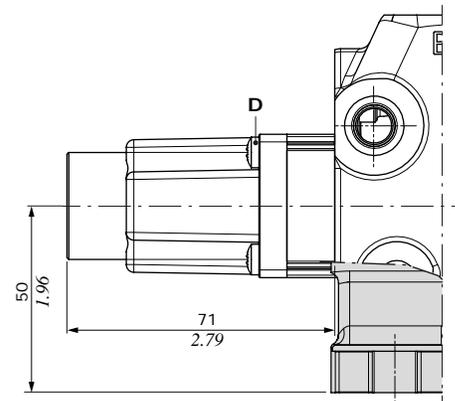
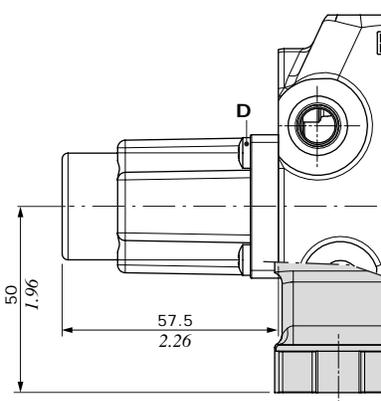
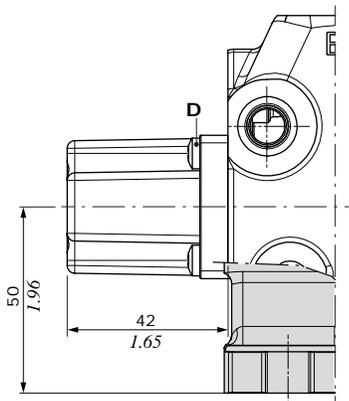
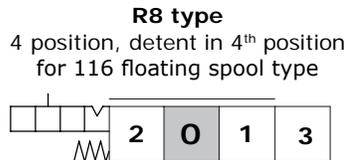
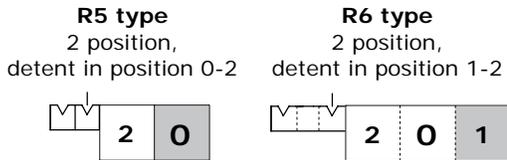
Working section

B side controls

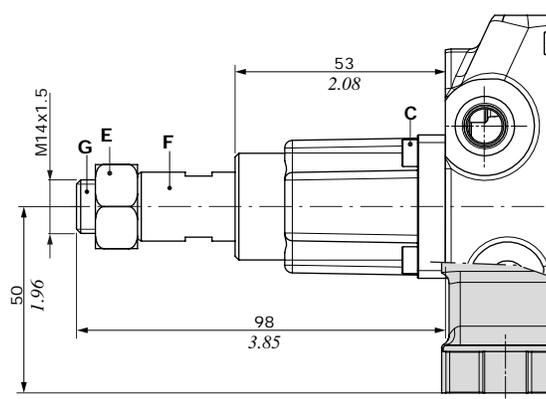
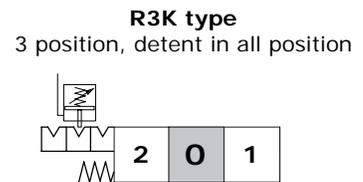
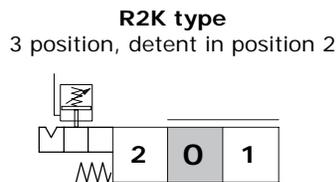
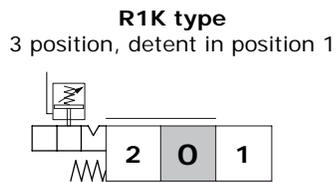
With detent control



Wrenches and tightening torques
 C = allen wrench 3 - 3 Nm (2.2 lbft)
 D = cross-head - 3 Nm (2.2 lbft)
 E = wrench 22 - 32 Nm (23.6 lbft)
 F = wrench 16
 G = allen wrench 10 - 32 Nm (23.6 lbft)



With detent control and kick out function

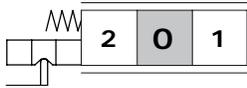


B side controls

With spool position microswitch

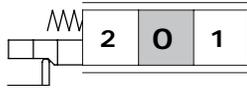
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position



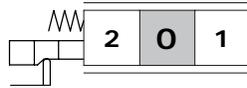
M1-N1A type

3 position, micro operation in position 1



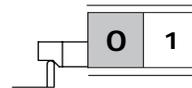
M1-N1B type

3 position, micro operation in position 2



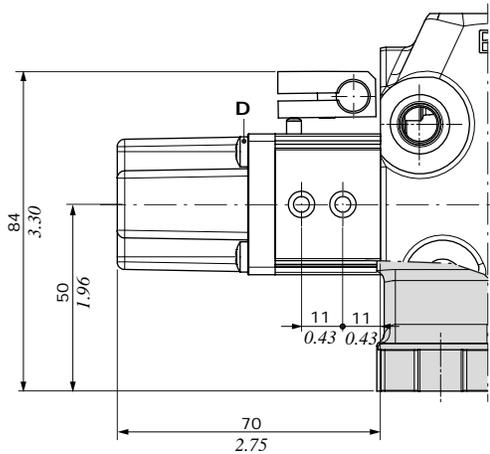
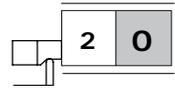
M2-N1 type

2 position (0-1), spring return in neutral position



M3-N1 type

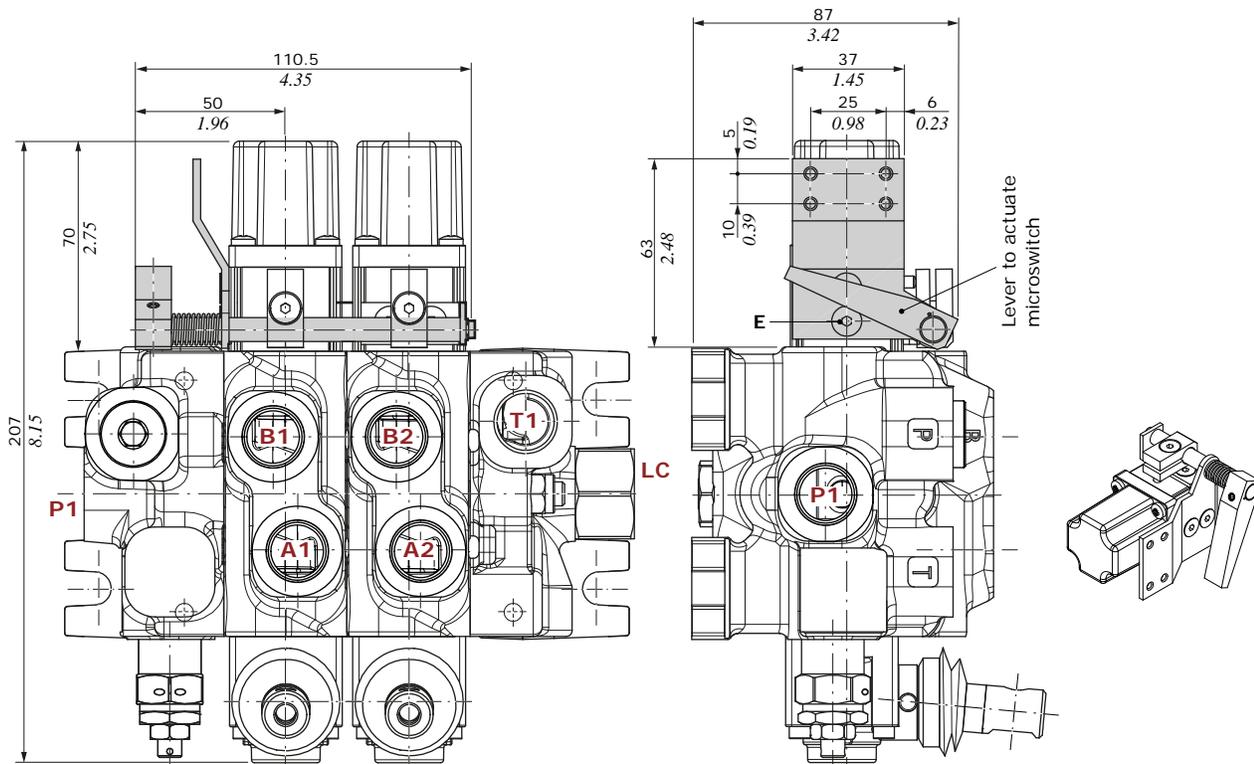
2 position (0-2), spring return in neutral position



Wrenches and tightening torques

D = cross-head - 3 Nm (2.2 lbft)
E = allen wrench 3 - 6.6 Nm (4.8 lbft)

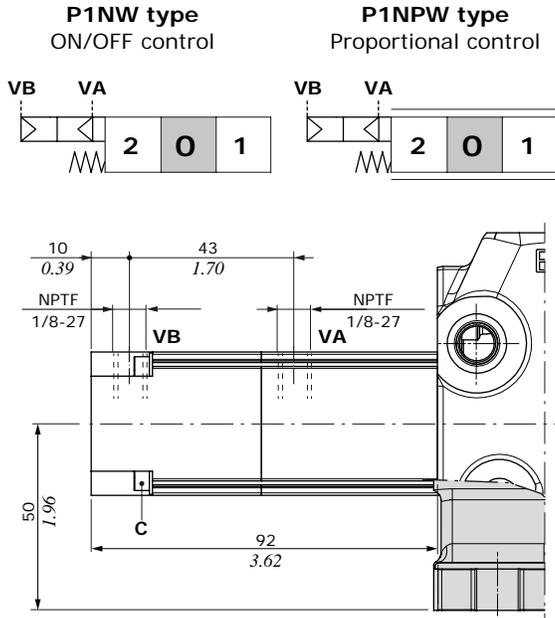
Microswitch assembly kit for 2 working section (M1-N1 type)



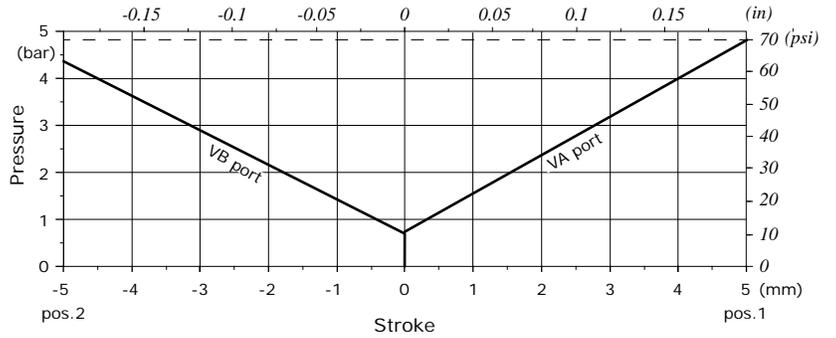
Working section

B side controls

With pneumatic control



Proportional pilot pressure curves



Operating features

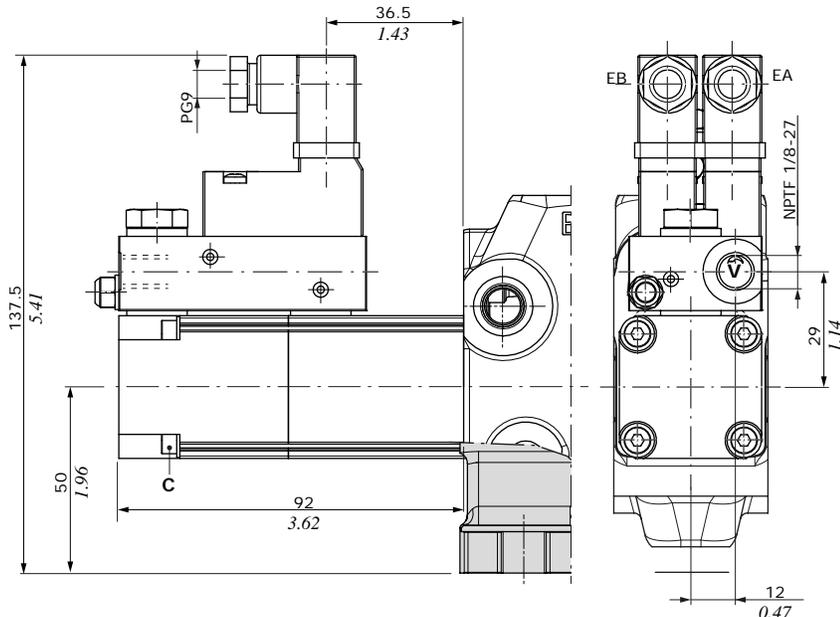
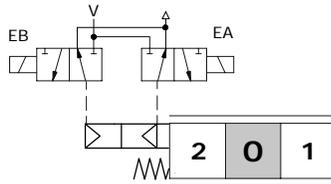
Pilot pressure.....: min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
 Pilot volume.....: 4 cm³/min (0.24 in³/min)

Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

With ON/OFF electropneumatic control

D3W type
ON/OFF control



Operating features

Pilot pressure.....: min. 1 bar (14.5 psi)
 max. 10 bar (145 psi)

COILS

Nominal voltage tolerance.....: -5% +10%
 Power rating.....: 2.3 W
 Nominal current.....: 12 VDC – 24VDC
 Coil insulation.....: Class F
 Weather protection.....: IP65
 Duty cycle.....: 100%

Wrenches and tightening torques

C = allen wrench 3 - 3 Nm (2.2 lbft)

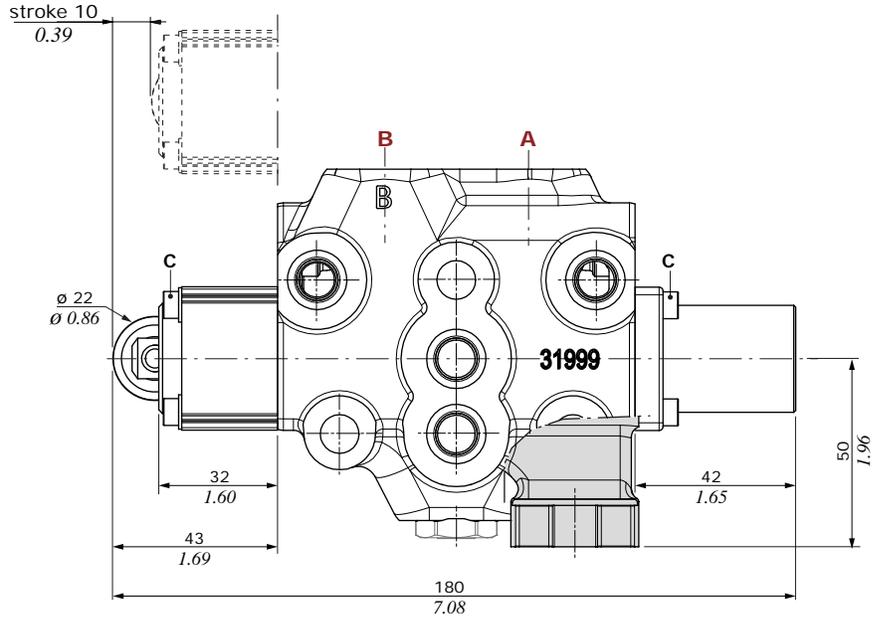
A+B side controls

With cam control

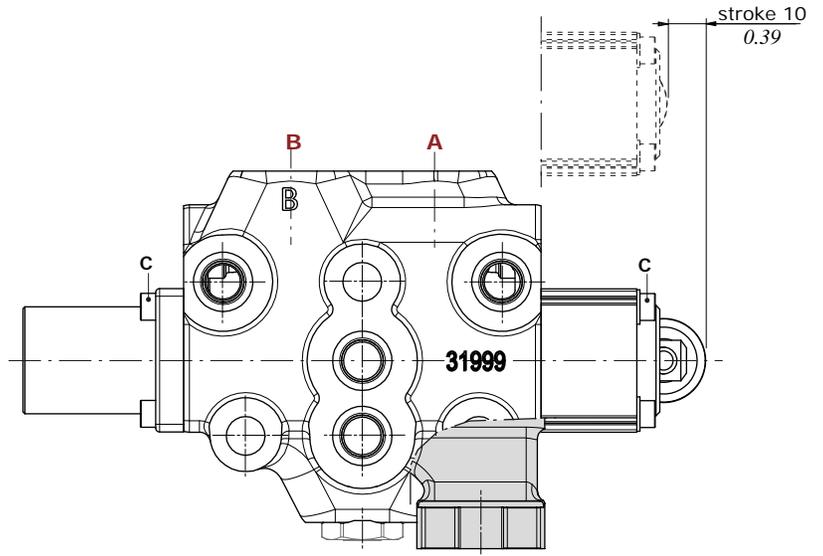
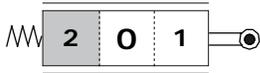
C2 type
From position 1 to position 2,
spring return in position 1



Wrenches and tightening torques
C = allen wrench 3 - 3 Nm (2.2 lbf^t)



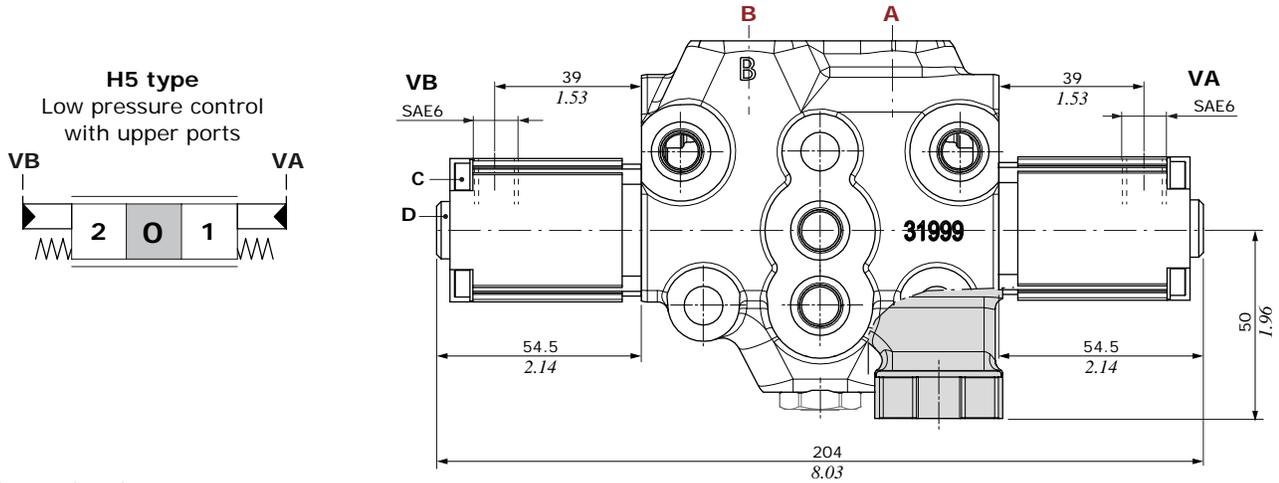
C3 type
From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



Working section

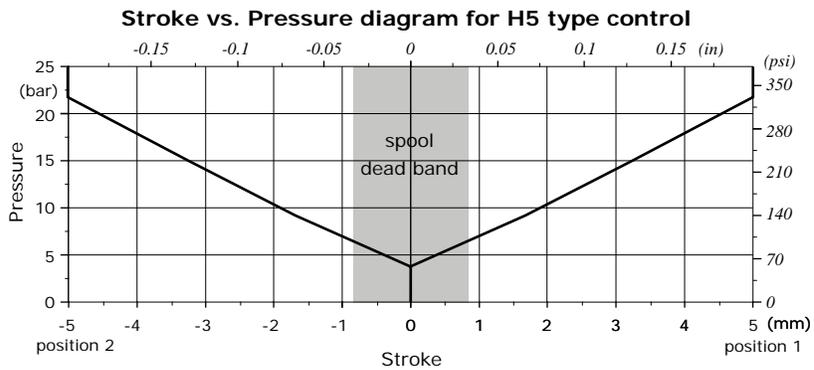
A+B side controls

With proportional hydraulic control



Operating features

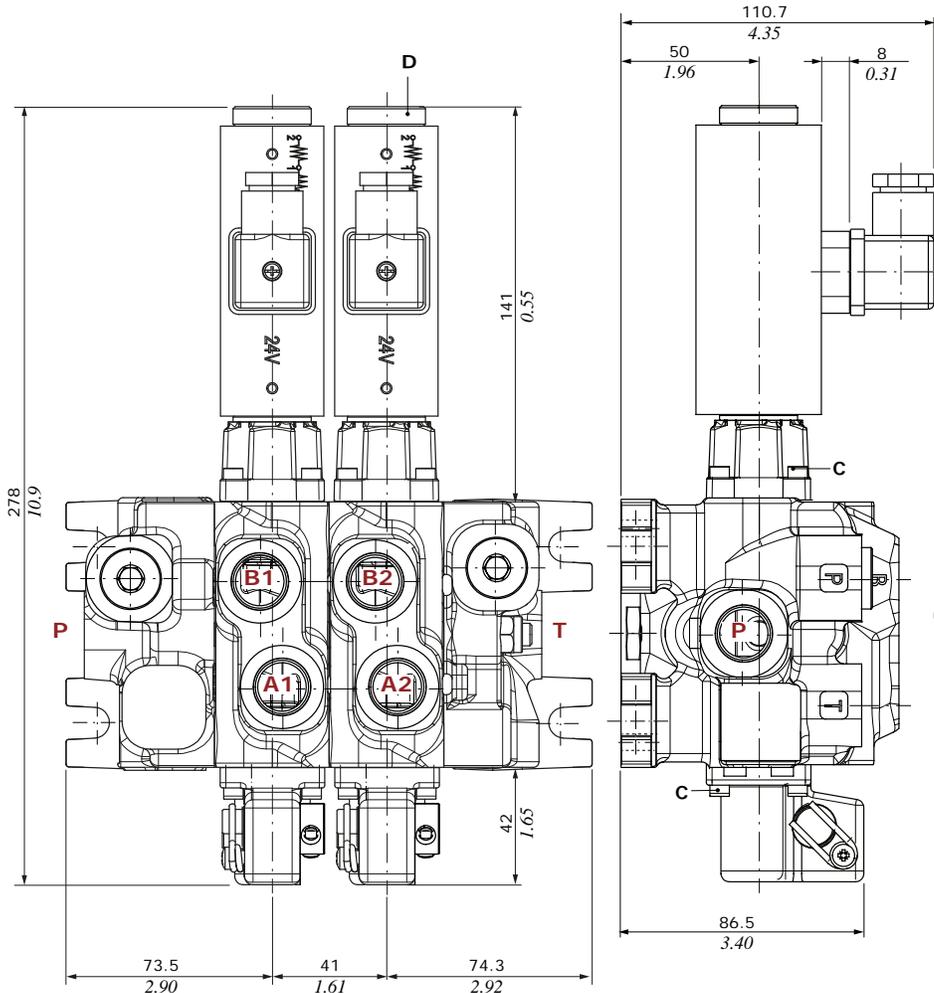
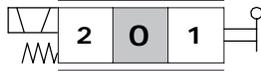
Pilot pressure..... : max. 100 bar (1450 psi)



Wrenches and tightening torques
 C = allen wrench 3 - 3 Nm (2.2 lbft)
 D = allen wrench 4 - 9.8 Nm (7.2 lbft)

Direct solenoid control

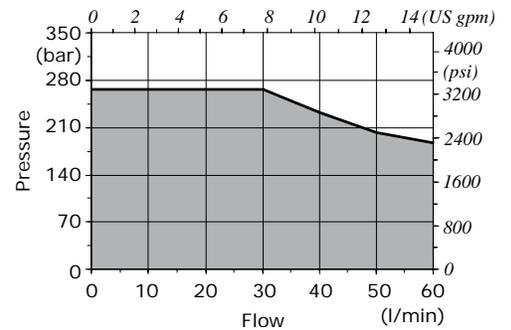
D41 type: ON/OFF one side



D41 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	52 W
Insulation	Class H
Weather protection	IP65

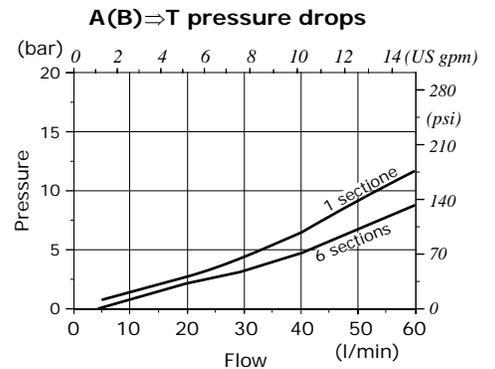
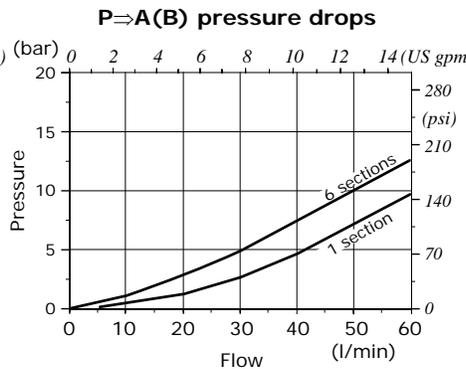
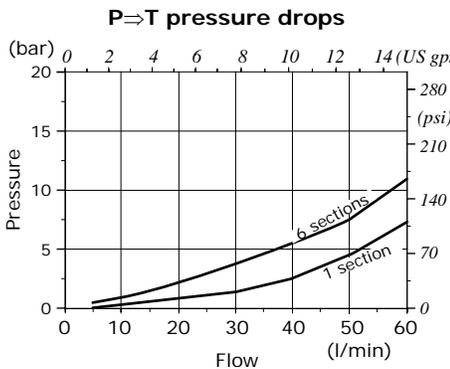
Connector type: ISO4400 3P+T-PG11

Dynamic conditions



Wrenches and tightening torques

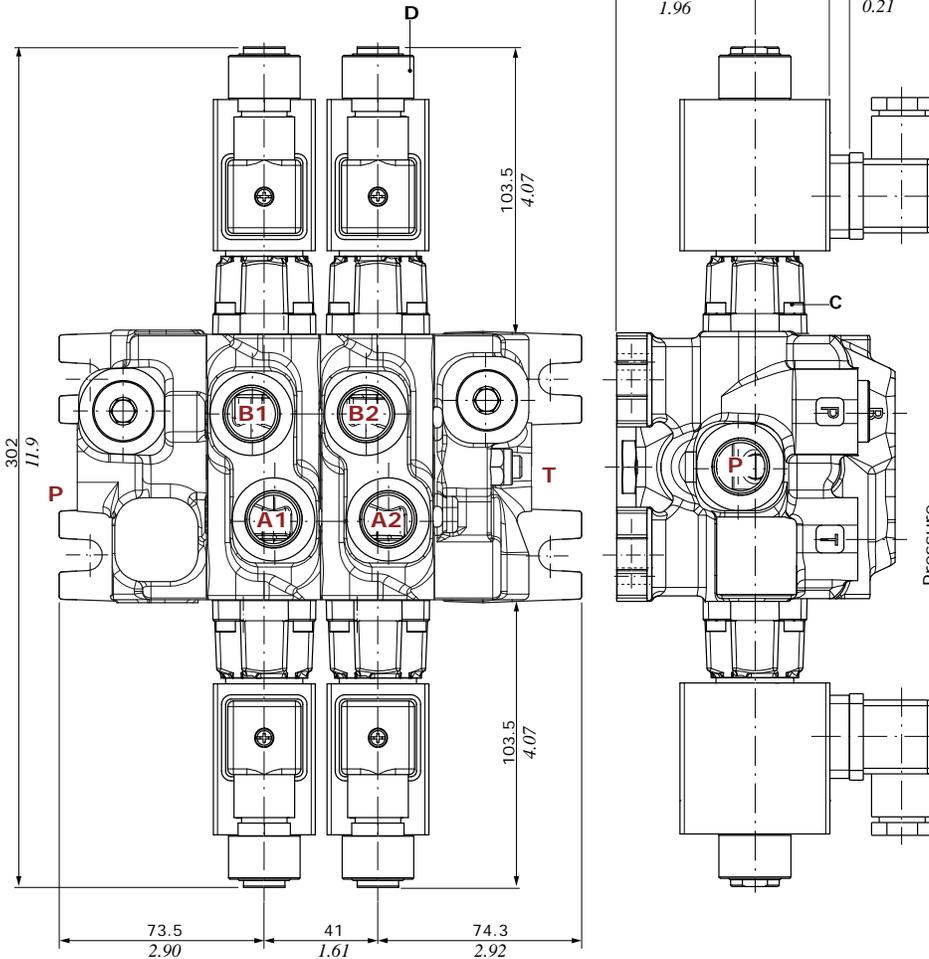
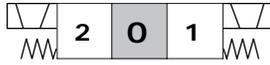
- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)



Working section

Direct solenoid control

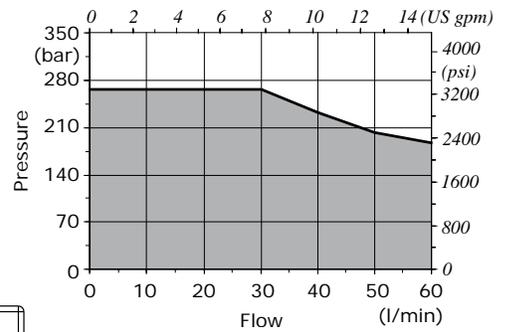
D9 type: ON/OFF two side



D9 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	58 W
Insulance	Class H
Weather protection	IP65

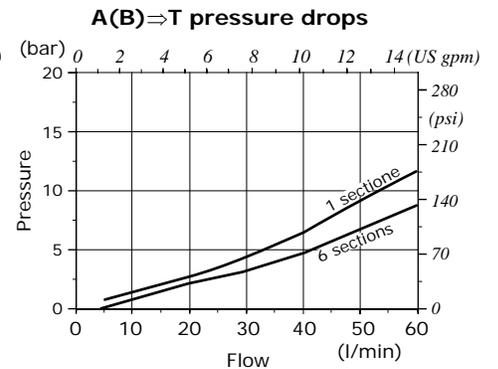
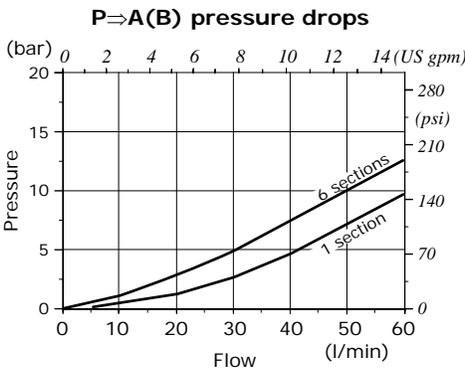
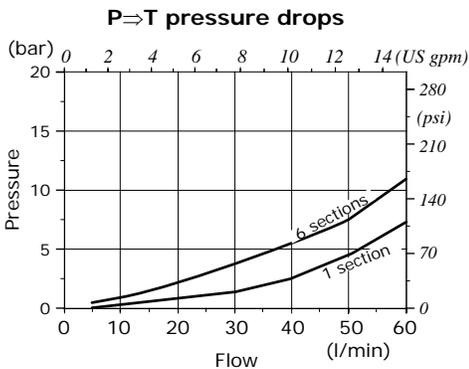
Connector type: ISO4400 3P+T-PG11

Dynamic conditions



Wrenches and tightening torques

- C = allen wrench 3 - 3 Nm (2.2 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)



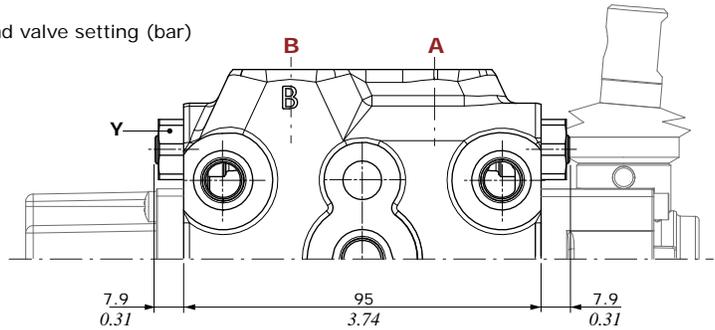
Auxiliary valve configuration

Dimensional data, hydraulic circuits and performance data

Description example

GSV50 / 1 / ... / 103 - A1 - M1 - ^{aux valve} **V32(N)** ^{spring type and valve setting (bar)} **120** / ...

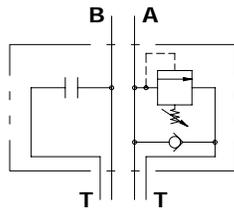
Wrenches and tightening torques
 Y = wrench 16 - 20 Nm (14.7 lbf ft)



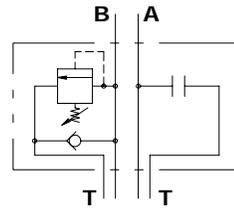
Antishock/anticavitation valve example

A side configuration: B side configuration: A+B side configuration:

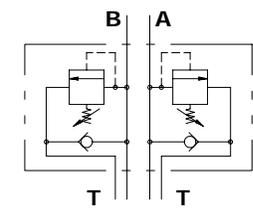
V33



V34



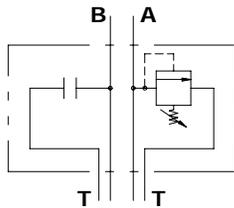
V35 (V34 + V33)



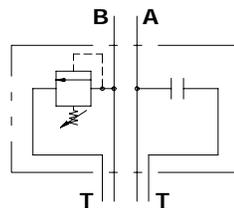
Antishock valve example

A side configuration: B side configuration: A+B side configuration:

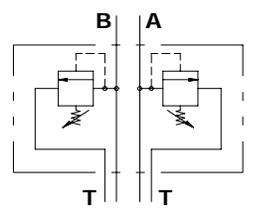
V30



V31

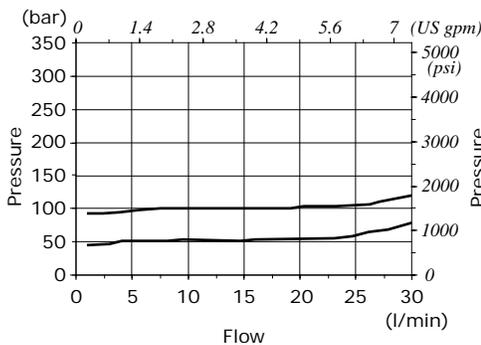


V32 (V30 + V31)

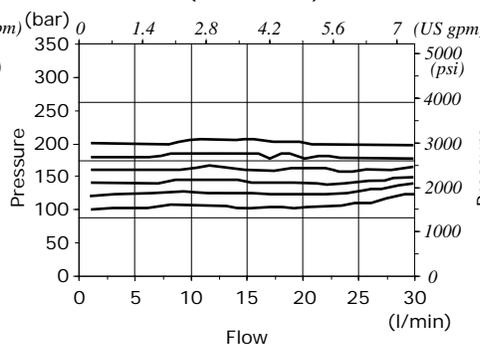


Spring type	Setting ranges (bar - psi)
B (white)	From 50 to 100 - from 725 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 350 - from 2910 to 5100

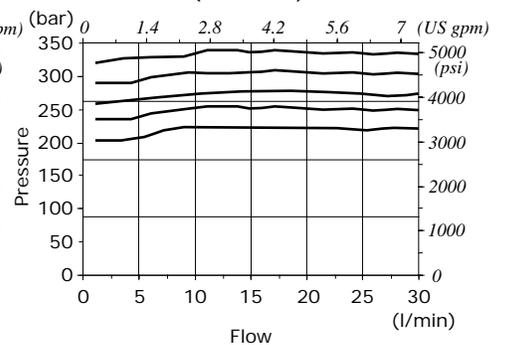
Setting range example (white band)



Setting range example (black band)



Setting range example (red band)

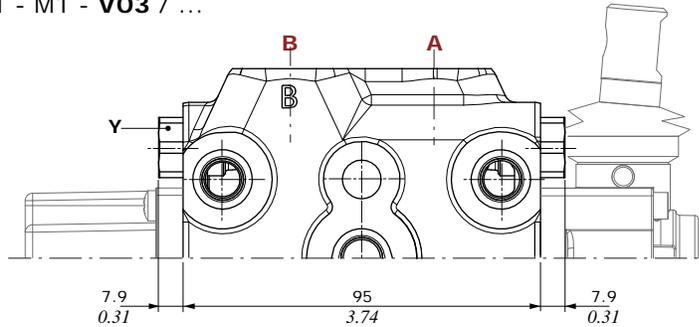


Auxiliary valve configuration

Dimensional data and hydraulic circuits

Anticavitation valve example

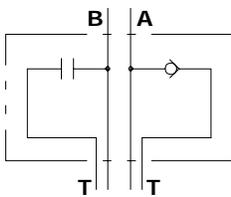
Q30 / 1 / ... / 103 - A1 - M1 - aux valve
 Q30 / 1 / ... / 103 - A1 - M1 - **V03** / ...



Wrenches and tightening torques
 Y = wrench 16 - 20 Nm (14.7 lbf)

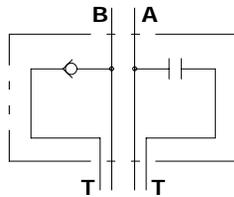
A side configuration:

V04



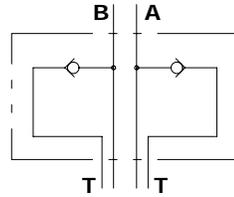
B side configuration:

V05



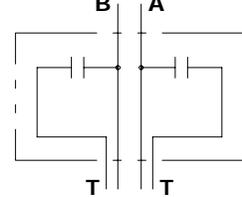
A+B side configuration:

V03 (V04 + V05)



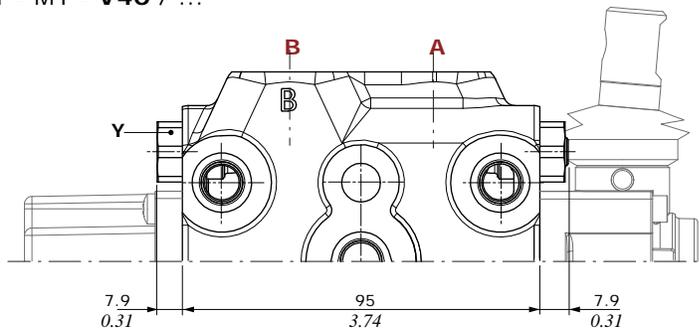
Plug valve:

VC



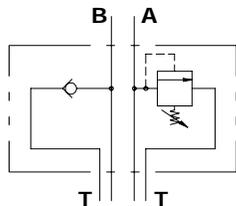
Antishock and anticavitation combining valves example

Q30 / 1 / ... / 103 - A1 - M1 - aux valve
 Q30 / 1 / ... / 103 - A1 - M1 - **V40** / ...



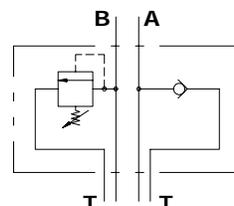
A side configuration:

V40 (V30 + V05)



B side configuration:

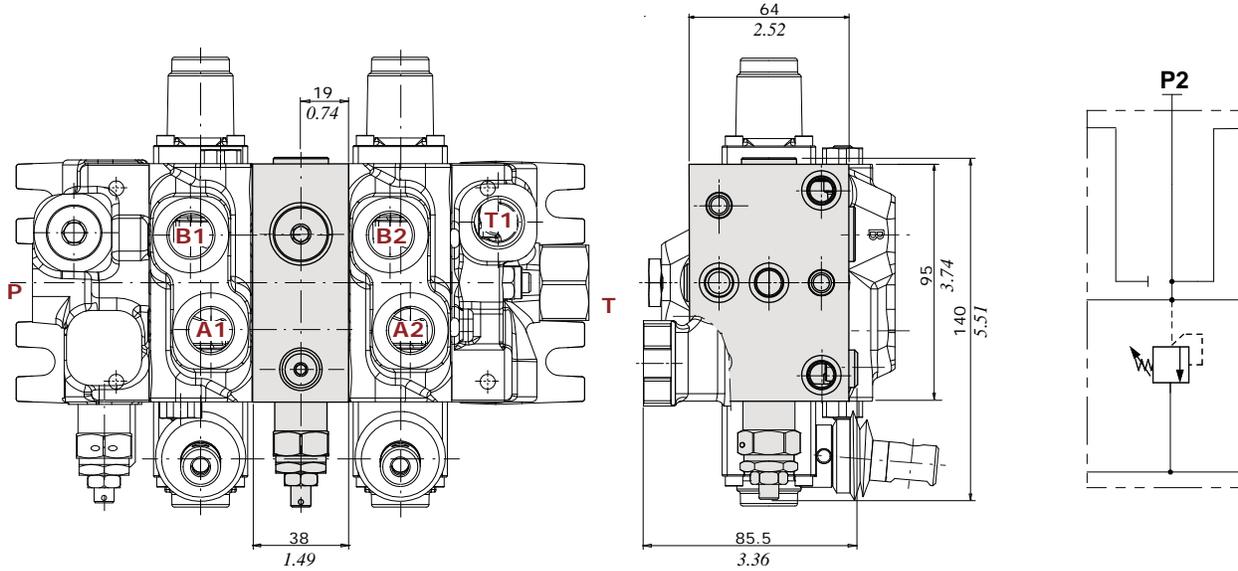
V41 (V31 + V04)



Dimensional data and hydraulic circuit

E50 type

Intermediate inlet section with pressure relief valve

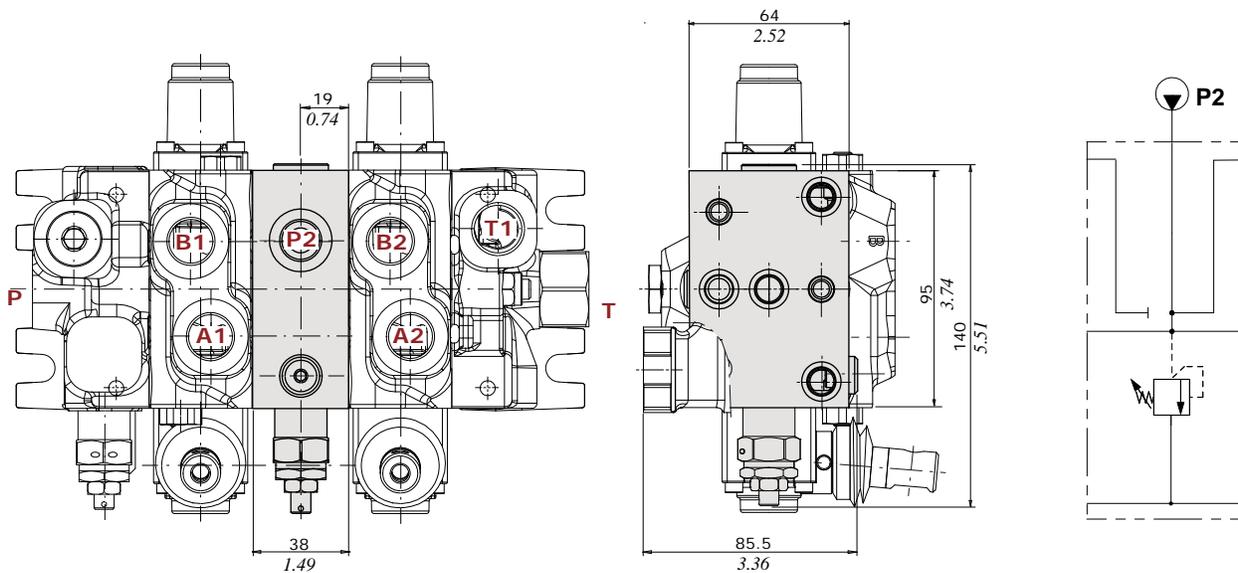


Description example: GSV50/2/F7S(N150)/103-A1-M1.VC/**E50(N150)**/103-A1-M1/F3D-S-SAE

intermediate section spring type and valve setting (bar)

E53 type

Intermediate inlet section with pressure relief valve and P2 port open



Description example: GSV50/2/F7S(N150)/103-A1-M1.VC/**E53(N150)**/103-A1-M1/F3D-S-SAE

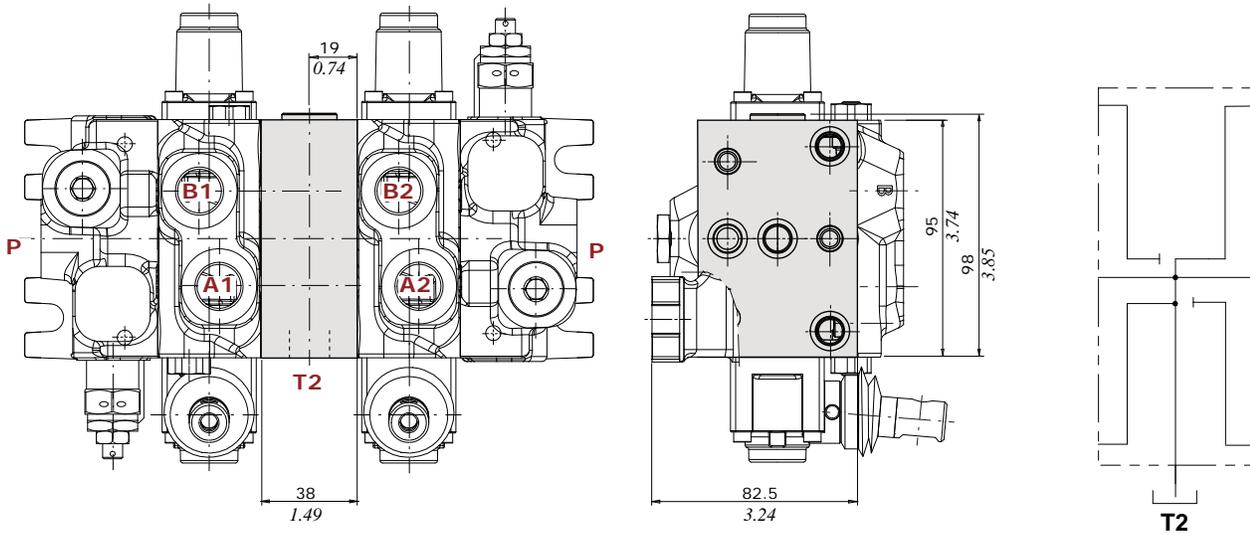
intermediate section spring type and valve setting (bar)

Intermediate section

Dimensional data and hydraulic circuit

E51 type

Intermediate outlet section, T2 port open

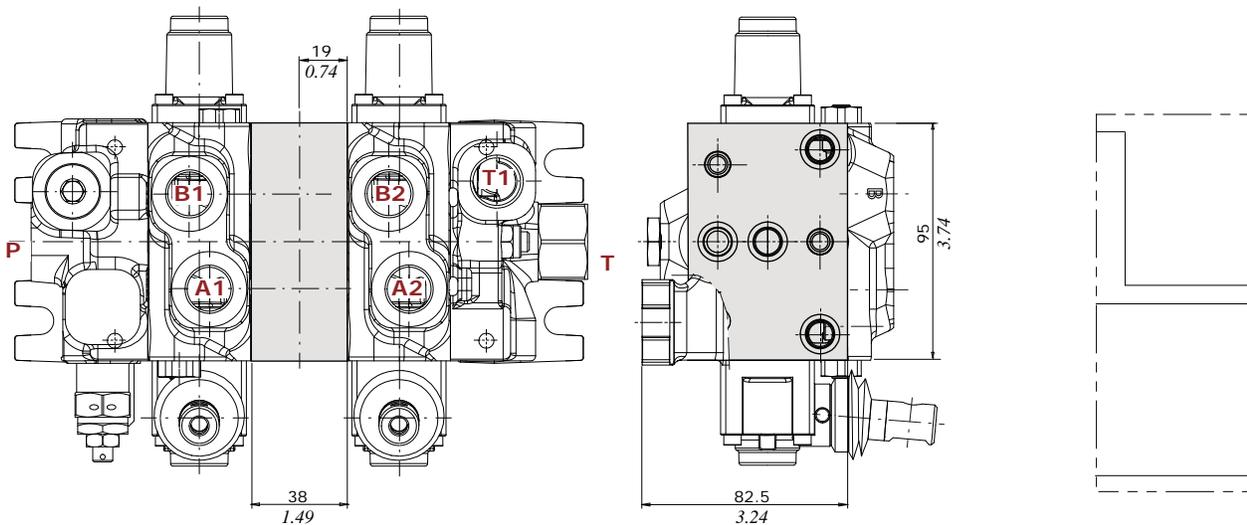


Description example: GSV50/2/F7S(N150)/103-A1-M1.VC/**E51**/103-A1-M1/F3D-S-SAE

intermediate section

E61 type

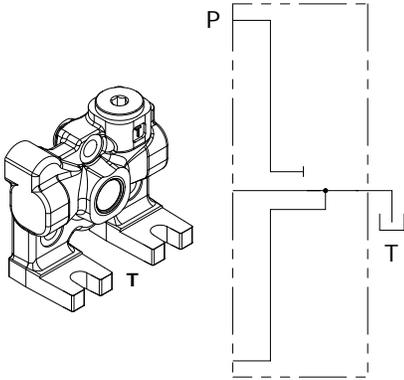
Intermediate spacer section



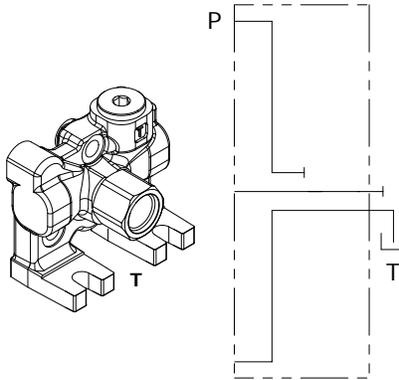
Description example: GSV50/2/F7S(N150)/103-A1-M1.VC/**E61**/103-A1-M1/F3D-S-SAE

intermediate section

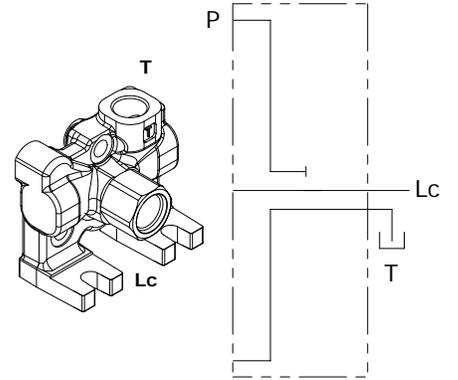
F3D-SAE configuration
Open center configuration



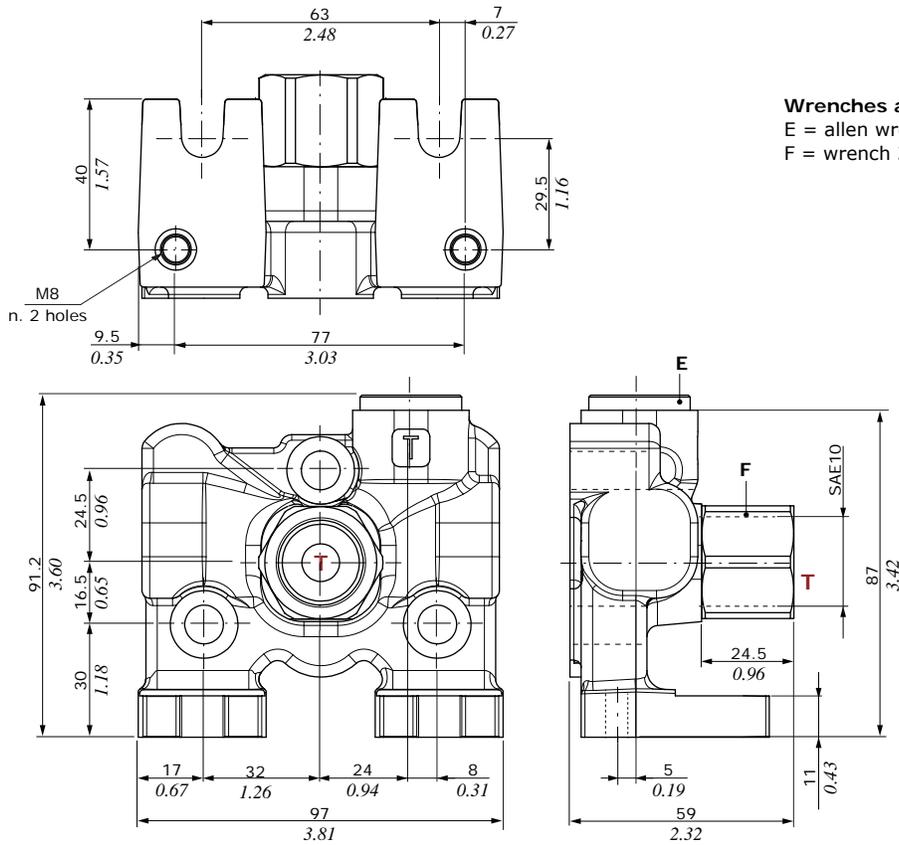
F16D-SAE configuration
Closed center configuration



F6D-SAE configuration
Carry-over configuration



F16D configuration example



Wrenches and tightening torques
E = allen wrench 8 - 42 Nm (30.9 lbf·ft)
F = wrench 30 - 42 Nm (30.9 lbf·ft)



Q80

Sectional directional control valve

- Available with parallel, tandem or series circuit
- Optional carry over port
- A wide range of antishock + anticavitation port valves
- Intermediate sections for several types of circuit
- Manual, pneumatic, electropneumatic, hydraulic, direct solenoid and electrohydraulic on-off controls

Working conditions

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

Nominal flow rating		80 l/min - (21.1 Us gpm)
Max. pressure		300 bar (4350 psi)
Max. back pressure on outlet T port		25 bar (360 psi)
Number sections		from 1 to 10
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	6 cm ³ /min (0.36 in ³ /min)
Fluid		Mineral oil
Fluid temperature	with NBR (BUNA-N) seals	from -30 °C to 80 °C - from -22 °F to 176 °F
Viscosity	operating range	from 10 to 400 mm ² /s - from 10 to 400 cSt
Max. contamination level		16/14/12 - ISO 4406 - NAS1638 class 6
Ambient temperature	without electric devices	from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices	from -20 °C to 50 °C - from -4 °F to 122 °F

NOTE - For different conditions please contact our Sales Department.

REFERENCE STANDARD

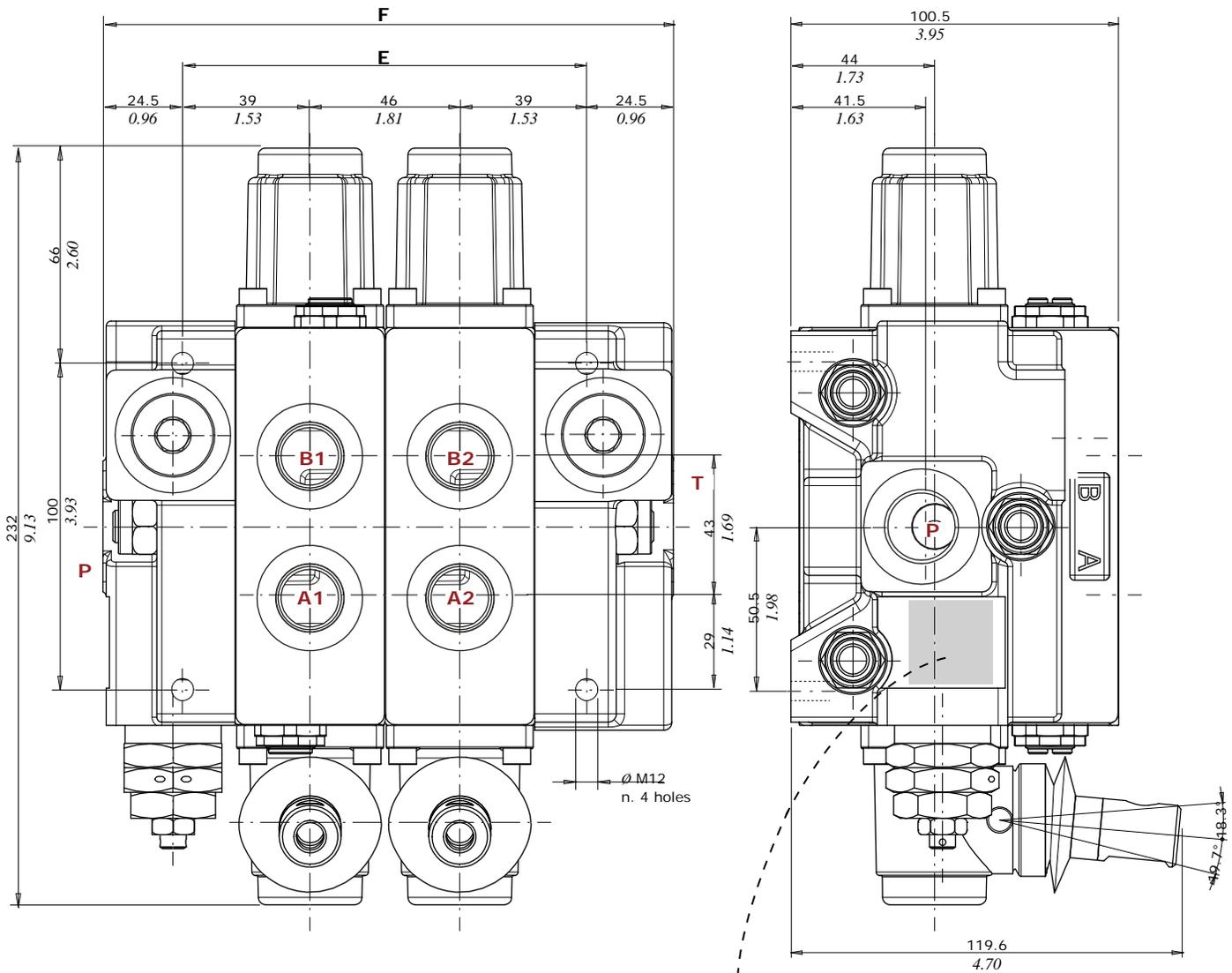
		BSP	UN-UNF
THREAD ACCORDING TO		ISO 228/1	ISO 263
		BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO	1179	11926
	SAE		J11926
	DIN	3852-2 shape X or Y	

PORT THREADING

PORTS	BSP (standard)	BSP (G 3/4)	UN-UNF
P Inlet	G 1/2	G 3/4	7/8-14 (SAE 10)
P1 Inlet	G 1/2	G 3/4	7/8-14 (SAE 10)
A and B ports	G 1/2	G 3/4	3/4-16 (SAE 8)
T Outlet	G 3/4	G 3/4	1" 1/16-12 (SAE12)
T1 Outlet	G 3/4	G 3/4	7/8-14 (SAE 10)
Lc port (Carry-over plug - T port)	G 1/2-G 3/4	G 3/4	7/8-14 (SAE 10)
Hydraulic controls	G 1/4	G 3/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

Standard configuration*

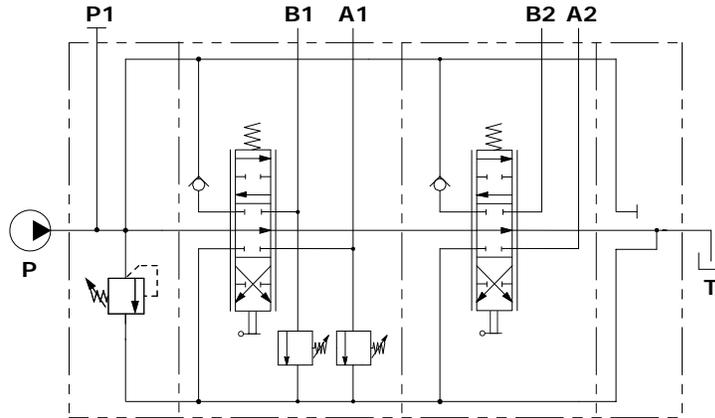


Type	E		F	
	mm	in	mm	in
Q80/1	78	3.07	127	5
Q80/2	124	4.88	173	6.81
Q80/3	170	6.69	219	8.62
Q80/4	216	8.50	265	10.43
Q80/5	262	10.31	311	12.24
Q80/6	308	12.12	357	14.05
Q80/7	354	13.93	403	15.86
Q80/8	400	15.74	449	17.67
Q80/9	446	17.56	495	19.48
Q80/10	492	19.37	541	21.3



- Product code
- Code description
- Product allotment
- Datamatrix with product allotment

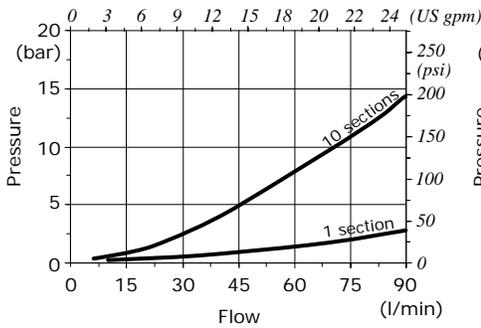
NOTE: Drawings and dimensions are referred to a **UN-UNF** threading configuration.
 (*): For other configurations, see page 203



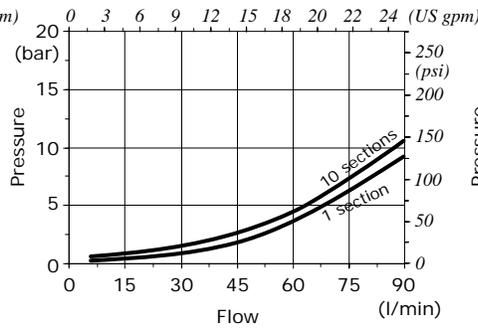
Description example (parallel circuit):
Q80/2/F7S(N150)/103-A1-M1.V32(N105\N105)/103-A1-M1/F3D-SAE

Performance data

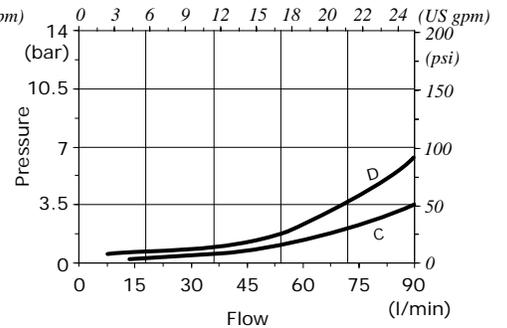
P⇒T pressure drops



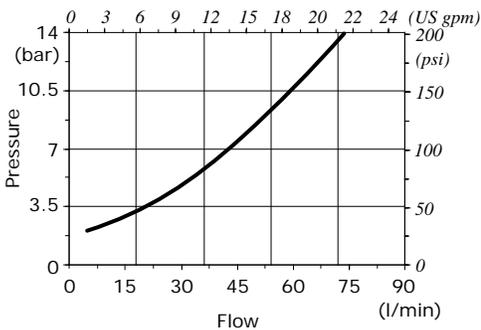
P⇒A(B) pressure drops



A(B)⇒T pressure drops



A1(B1)⇒A2(B2) pressure drops
(with series circuit)



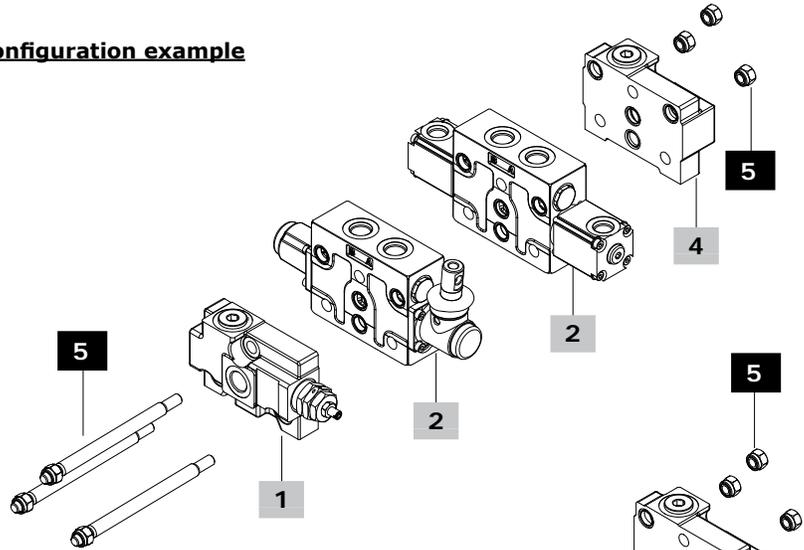
Legenda

- C= 10th section
- D= 1st section

Complete section ordering codes

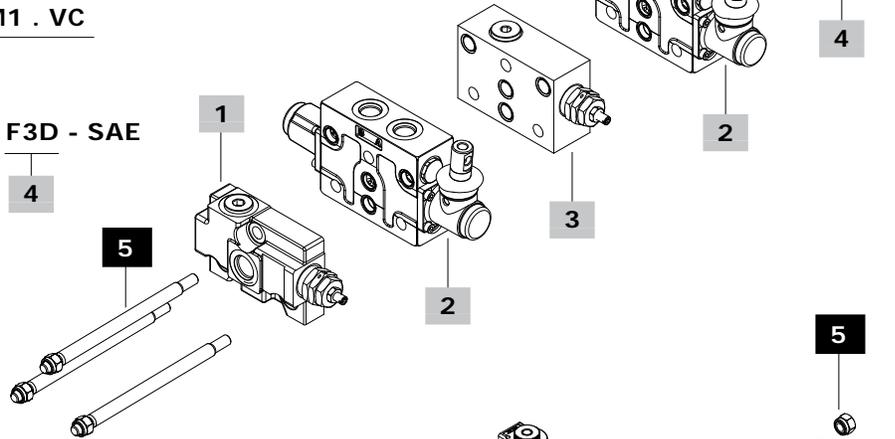
Valve with mechanical and hydraulic controls configuration example

valve setting (bar)
Q80 / 2 / F7S(N150) / 103 - A1 - M1 . VC
 N. of section **1** **2**
 / 103 - H5 . VC / F3D - SAE
 2 **4**



Valve with intermediate section and mechanical control configuration example

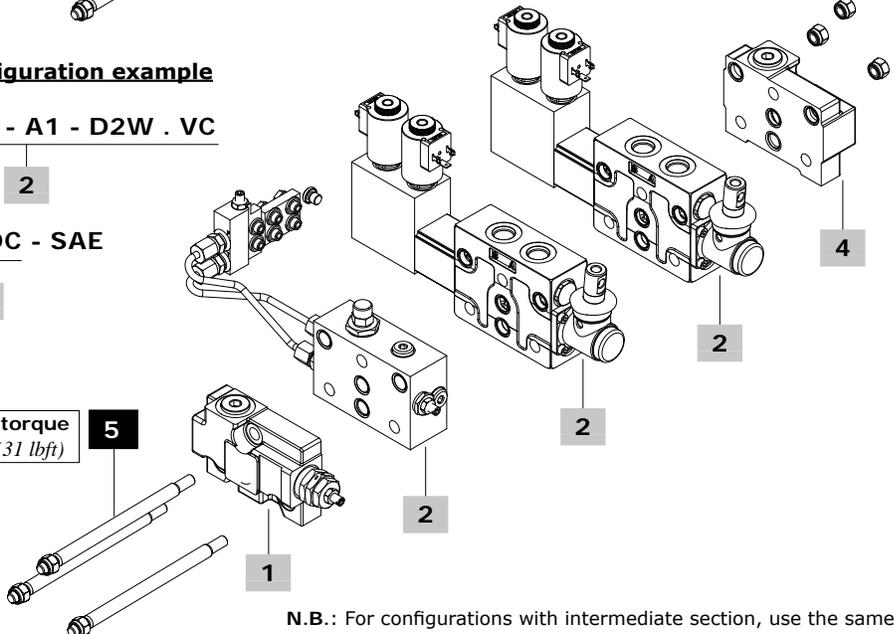
Q80 / 2 / F7S(N150) / 103 - A1 - M1 . VC
 valve setting (bar) **1** **2**
 / E50(N150) / 103 - A1 - M1 . VC / F3D - SAE
 3 **2** **4**



Valve with electrohydraulic control configuration example

Q80 / 2 / F7S(N150) / KE2R / 103 - A1 - D2W . VC
 1 **2**
 / 103 - A1 - D2W . VC / F3D - 12VDC - SAE
 2 **4** **2**

Tie rod tightening torque
 wrench 17 - 42 Nm (31 lbft)



N.B.: For configurations with intermediate section, use the same tie rods for std. configuration (example: for 2 working sections + 1 intermediate section, use tie rods for 3 working sections)

1 Inlet section* page 174

TYPE: **FE-Q80/F7S(N150)-SAE** CODE: 08000F7S/D/04N
 DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve, setting range 101-200 bar (1460-2900 psi)
 TYPE: **FE-Q80/F8S-SAE** CODE: 08003F8S/D/04
 DESCRIPTION: As previous one, without valves (pressure relief valve plugged port)

2 Working section* page 176**With mechanical controls**

TYPE: **EL-Q80/103-A1-M1.VC-SAE** CODE: SGL800020
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, lever control and spring return to neutral position

TYPE: **EL-Q80/103-A1-M1-SAE** CODE: 080000103001200
 DESCRIPTION: As previous one, without valve arrangement

With proportional hydraulic controls

TYPE: **EL-Q80/103-H5.VC-SAE** CODE: SGL800021
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, low pressure hydraulic controls, spring return to neutral position

TYPE: **EL-Q80/103-H5-SAE** CODE: SGL800022
 DESCRIPTION: As previous one, without valve arrangement

With electric solenoid controls - one side type

TYPE: **EL-Q80/103-A1-D41.VC-12VDC-SAE**
 CODE: SGL800023
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC electric direct ON/OFF control with lever

TYPE: **EL-Q80/103-A1-D41-12VDC-SAE**
 CODE: SGL800024
 DESCRIPTION: As previous one, without valve arrangement

With electrohydraulic ON/OFF controls - one side type

TYPE: **EL-Q80/KE1S/103-A1-D2W.VC-12VDC-SAE**
 CODE: SGL800025
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC one-side electrohydraulic ON/OFF control, internal pilot and drain, lever control and spring return to neutral position

TYPE: **EL-Q80/KE1S/103-A1-D2W-12VDC-SAE**
 CODE: SGL800026
 DESCRIPTION: As previous one, without valve arrangement

3 Intermediate section page 203

TYPE	CODE	DESCRIPTION
E50	08850E50-B	With pressure relief valve setting range 10-100 bar (145-1450 psi)
	08850E50-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	08850E50-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E53	08854E53-B	With pressure relief valve setting range 10-100 bar (145-1450 psi) and P2 port open for 2 nd pump
	08854E53-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	08854E53-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E51	08853E51	Intermediate outlet section, T2 port open
E61	08877E61	Intermediate spacer section

4 Outlet section* page 205

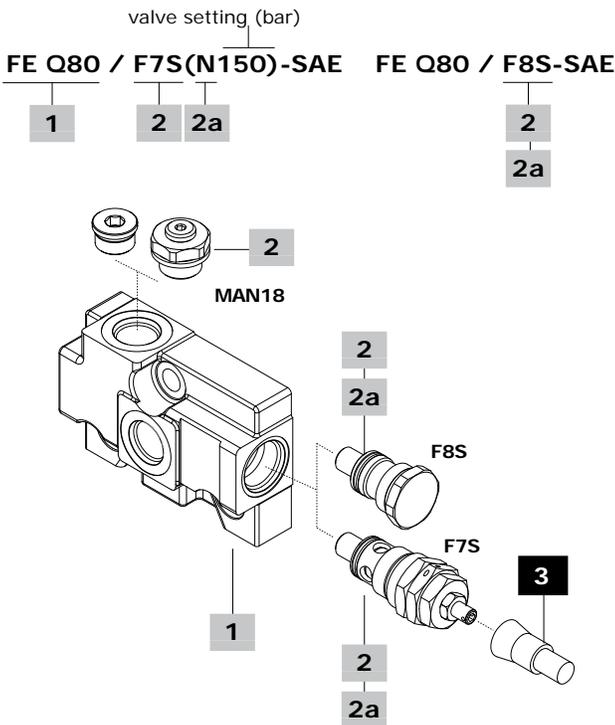
TYPE	CODE	DESCRIPTION
FS-Q80-F3D-SAE	08012F3D/04	T port open, T1 port plugged. For open center circuit
FS-Q80-F16D-SAE	08016F16D/04	T port open, T1 port plugged. For closed center circuit
FS-Q80-F6D-SAE	08014F6D/04	Lc port and T1 port open. With joint for carry-over (HPCO) circuit

5 Tie rod kit

CODE	DESCRIPTION
08901TX1	For 1 sections valve
08902TX2	For 2 sections valve
08903TX3	For 3 sections valve
08904TX4	For 4 sections valve
08905TX5	For 5 sections valve
08906TX6	For 6 sections valve
08907TX7	For 7 sections valve
08908TX8	For 8 sections valve
08909TX9	For 9 sections valve
08910TX10	For 10 sections valve

(*): Codes are referred to **UN-UNF** thread

Inlet section - parts ordering codes



1 Inlet body section* page 174

TYPE: **FE-Q80-SAE** CODE: 060013083699
 DESCRIPTION: Side inlet port, upper inlet plugged, pressure relief valve arrangement

2 Configuration coding* page 174

TYPE DESCRIPTION
F7S-SAE With pressure relief valve
F8S-SAE Without valves (pressure relief valve plugged port)
Note: Inlet configurations require upper P port:
 n. 1 SAE10 plug code 255010, or n. 1 pressure gauge arrangement code 5MAN627210

2a Main pressure relief valve page 175

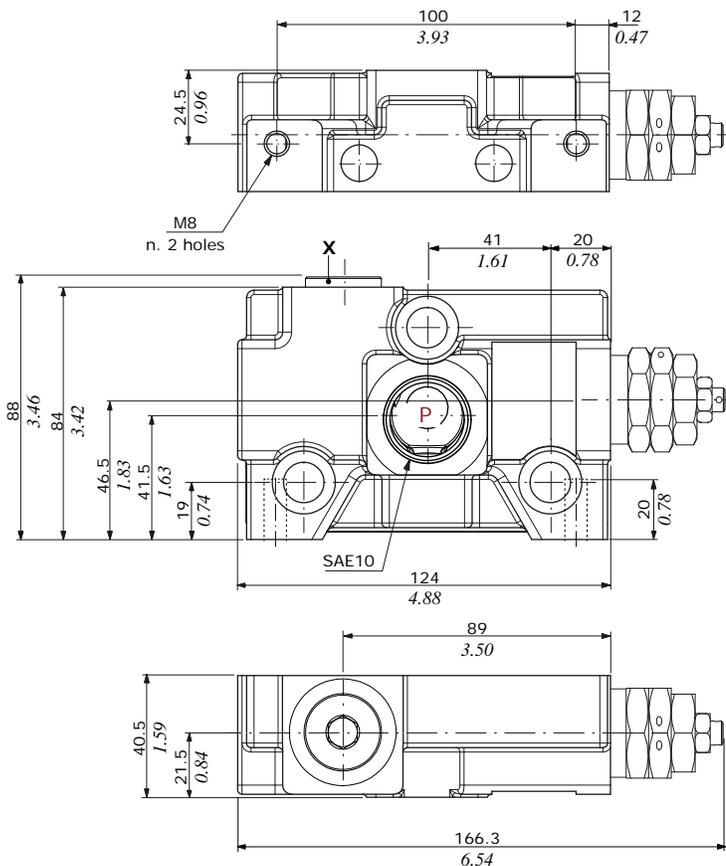
TYPE: **B** CODE: 700065205000000
 DESCRIPTION: VLP65S valve, setting range 10-100 bar (145-1450 psi)
 TYPE: **N** CODE: 700065105000000
 DESCRIPTION: VLP65S valve, setting range 101-200 bar (1460-2900 psi)
 TYPE: **R** CODE: 700065305000000
 DESCRIPTION: VLP65S valve, setting range 201-380 bar (2910-5500 psi)
 TYPE: **-** CODE: 060002788999
 DESCRIPTION: Relief valve blanking plug

3 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

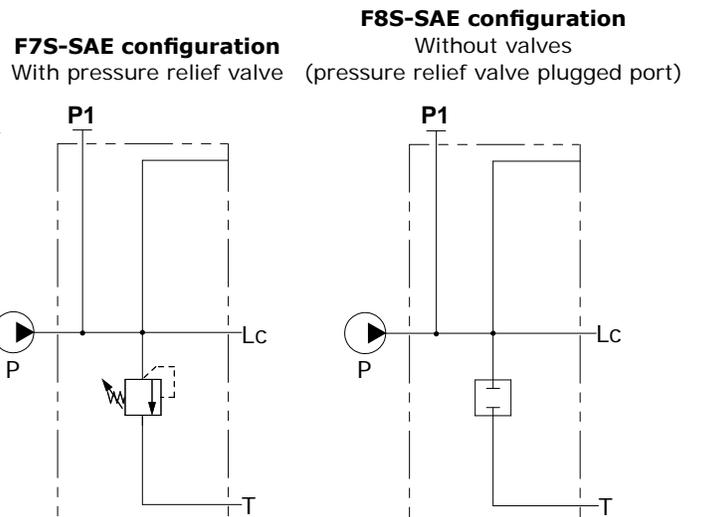
(*): Codes are referred to **UN-UNF** thread

Dimensional data and hydraulic circuits



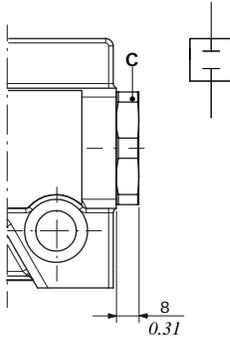
Wrenches and tightening torques
 X = allen wrench 10 - 42 Nm (31 lbft)

Note: For valves wrench and torque, see related pages

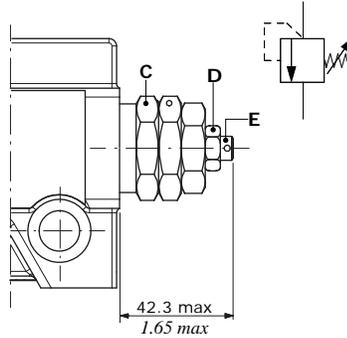


Main pressure relief valve

Relief valve blanking plug



Main pressure relief valve

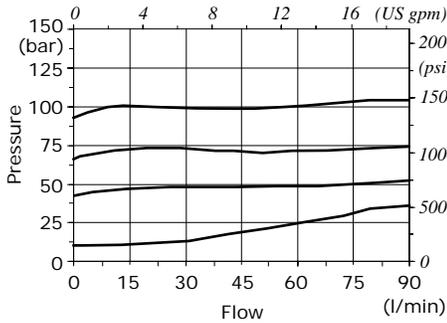


Wrenches and tightening torques

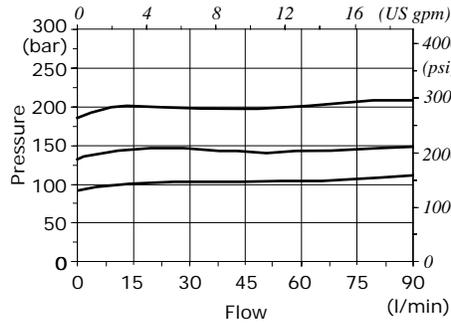
- C = wrench 30 - 80 Nm (59 lbf^t)
- D = wrench 13 - 24 Nm (17.7 lbf^t)
- E = allen wrench 4

Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

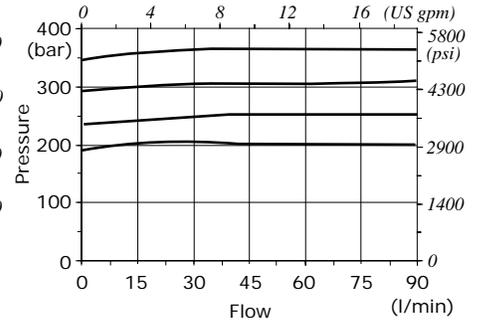
Setting example (B type spring)



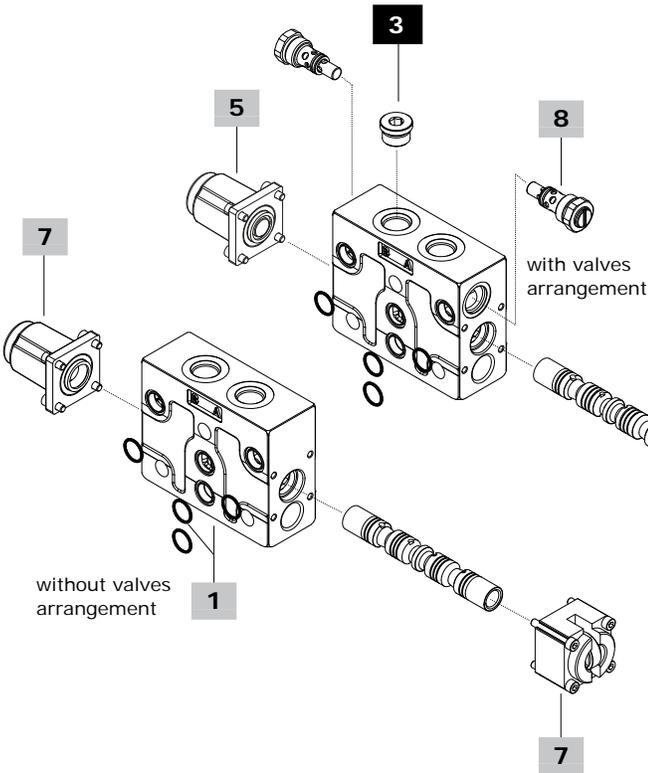
Setting example (N type spring)



Setting example (R type spring)



Working section - parts ordering codes



Mechanical control valve configuration example

spring type and valve setting (bar)

EL Q80 / 102 - A1 - M1 . V40(N)120 - SAE

1
2
4
5
8

C2/C3 complete mechanical control configuration example

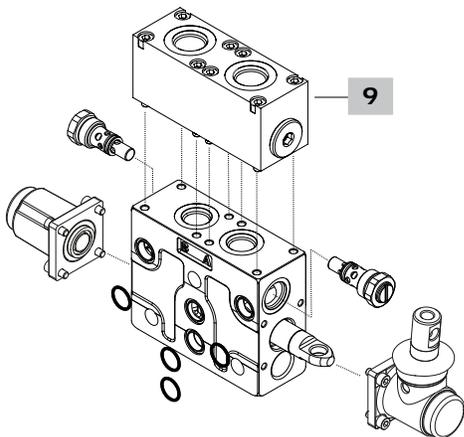
EL Q80 / 103 - C3 . V40(N)120 - SAE

7

Mechanical control valve with arrangement for secondary aux valves block: configuration example

EL Q80 / 103 - A1 - M1 . V40(N)120 / VC03 - SAE

9



Working section - parts ordering codes

1 Working section body kit* page 182

TYPE: EL-Q80.VC-SAE	CODE: 5EL0600127877
DESCRIPTION: Parallel circuit, with port valves arrangement	
TYPE: EL-Q80-SAE	CODE: 5EL0600127854
DESCRIPTION: Parallel circuit, without port valves arrangement	
TYPE: EL-Q80.VC.VPC-SAE	CODE: 5EL0600132355
DESCRIPTION: Parallel circuit with port valves arrangement, for secondary aux valves block	
TYPE: EL-Q80.VC-SAE	CODE: 5EL0600127884
DESCRIPTION: Series circuit, with port valves arrangement	

2 Spool page 183

TYPE	CODE	DESCRIPTION
Standard spools		
103	060102894999	Double acting, A and B closed in neutral position
	3CUG3051600	As previous one, for kick-out control
106	KR80106	Double acting for closed circuit
107	KR80107-108	Double acting, A to tank and B closed in neutral position
108	KR80107-108	Double acting, B to tank and A closed in neutral position
111	060102996799	Double acting, A and B to tank in neutral position
114	KR80114	Double acting, A and B to tank in neutral position, for closed circuit
101	3CUG2891900	Single acting on port A. SAE8 plug is required, see #3
102	3CUG2891901	Single acting on port B. SAE8 plug is required, see #3
116	3CUG2897800	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
126	3CUG2897801	Double acting, with floating in the 4 th position (spool out): requires dedicated spool control
403	KR80403	Double acting, A and B closed in neutral position, for series circuit
411	KR80411	Double acting, A and B to tank in neutral position, for series circuit
Special spools for cam, microswitch controls and other leverless controls		
103	060102879199	Double acting, A and B closed in neutral position
111	060102864199	Double acting, A and B to tank in neutral position

3 Plug for single acting spool*

TYPE	CODE	DESCRIPTION
-	255008	SAE8 plug

4 A side control page 184

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	08600A1-A2	M10 thread aluminium lever box
A2	08600A1-A2	As A1 type, with lever box rotated 180°
A1/O6	08606A1-A2/O6	Aluminium lever box with stroke limiter
A2/O6	08606A1-A2/O6	As A1/O6 type, with lever box rotated 180°
A1/Z1	08610A1-A2/Z1	Aluminium lever box for 116 spool type
A2/Z1	08610A1-A2/Z1	As A1/Z1 type, with lever box rotated 180°
<u>With safety lever control:</u>		
A1/S⁽¹⁾	08624A1-A2/S	M10 thread aluminium lever box
A2/S⁽¹⁾	08624A1-A2/S	As A1/S type, with lever box rotated 180°
<u>Without lever control:</u>		
A6	08620A6	With flange
A8	08622A8	Arrangement for flexible cable control
A8/Z1	08622A8/Z1	As A8 type, for 116 spool type

4 A side control (cont.) page 184

TYPE	CODE	DESCRIPTION
<u>With joystick controls for 2 section operation:</u>		
A35/1	08637A35-12	Joystick 1 type
A35/2	08637A35-12	Joystick 2 type
A35/3	08637A35-34	Joystick 3 type
A35/4	08637A35-34	Joystick 4 type
For types 103 and 111 special spools		
<u>With spool position microswitch:</u>		
Note: To complete the control you must use the assembly kit at #6		
N1-A1	08641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
N1A-A1	08642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	08643N1B-A1/A2	Micro operation in pos. 2, with lever box
N1-A3	08648N1-A3	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	08648N1A-A3	Micro operation in pos. 1, without lever with cap
N1B-A3	08648N1B-A3	Micro operation in pos. 2, without lever with cap
<u>Without lever control:</u>		
A3	08614A3	Without lever, with cap
A4	08617A4	M10 thread male external pin with flange
A5⁽²⁾	08619A5	Flange with spherical spool end

5 B side control page 189

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	08730M1	3 pos., spring return in neutral position
M1/O1	08730M1/O1	As M1 type, for joystick control
M1/O2	08730M1/O2	As M1 type, with stroke limiter
M1/O5	08730M1/O5	As M1 type, for series spool
M1/O7	08730M1/O7	As M1 type, for joystick control with series spool
M1-B1	08753M1-B1	As M1 type, with microswitch arrangement
M1-U1	08701M1-U1	As M1 type, with M10 male thread external pin
M2	08732M2	2 pos. (0-1), spring return in neutral position
M2-U1	08702M2-U1	As M2 type, with M10 male thread external pin
M3	08733M3	2 pos. (0-2), spring return in neutral position
M3-U1	08703M3-U1	As M3 type, with M10 male thread external pin
M4	08734M41-2	2 pos. (1-2), spring return in position 1
	08735M42-1	2 pos. (2-1), spring return in position 2
M4-U1	08734M4-U11-2	As M4 type (1-2), with M10 male thread external pin
<u>With flexible cable control arrangement:</u>		
M1-U2	08715M1-U2	3 pos., spring return in neutral position
M2-U2	08716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	08717M3-U2	2 pos. (0-2), spring return in neutral position
<u>With friction:</u>		
R0	08740R0	Adjustable friction control
<u>With detent:</u>		
R1	08741R1	3 pos., detent in position 1
R2	08742R2	3 pos., detent in position 2
R3	08743R3	3 pos., detent in all position
R4	08744R4	2 pos., detent in position 0-1
R5	08745R5	2 pos., detent in position 0-2
R6	08746R6	2 pos., detent in position 1-2
R8	08748R8	4 pos., detent in 4 th pos., for 116 spool type
R10/Z1	08750R10/Z1	4 pos., detent in 4 th pos., for 126 spool type

(*) Codes are referred to **UN-UNF** thread

(1): Always complete with lever knob

(2): To be assembled only with M4 control

Working section - parts ordering codes

5 B side control (cont.) page 189

TYPE	CODE	DESCRIPTION
<u>With detent and kick out function:</u>		
R1K	08741R1K	3 pos., detent in position 1
R2K	08742R2K	3 pos., detent in position 2
R3K	08743R3K	3 pos., detent in all position
<u>With spool position microswitch:</u>		
Note: To complete the control is necessary to combine at #6 the assembly kit		
M1-N1	08766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
M1-N1A	08767M1-N1A	As M1-N1 type, micro operation in pos. 1
M1-N1B	08768M1-N1B	As M1-N1 type, micro operation in pos. 2
M2-N1	08769M2-N1	2 pos. (0-1), spring return in neutral position
M3-N1	08772M3-N1	2 pos. (0-2), spring return in neutral position
<u>With pneumatic and electropneumatic controls:</u>		
P1N	08561P1-N	ON/OFF pneumatic control
P1NP	08561P1-NP	Proportional pneumatic control
D3	08591D3-V-12DC	12 VDC, ON/OFF electropneumatic control
	08592D3-V-24DC	24 VDC, ON/OFF electropneumatic control

6 Microswitch assembly kit

CODE	DESCRIPTION
08650N1-01	Kit for 1 section
08650N1-02	Kit for 2 sections
08650N1-03	Kit for 3 sections
08650N1-04	Kit for 4 sections
08650N1-05	Kit for 5 sections
08650N1-06	Kit for 6 sections
08650N1-07	Kit for 7 sections
08650N1-08	Kit for 8 sections
08650N1-09	Kit for 9 sections
08650N1-10	Kit for 10 sections

7 Complete controls A+B sides page 195

TYPE	CODE	DESCRIPTION
<u>For types 10 and 111 special spools</u>		
C2	08792C2-C3	Cam control from pos. 1 to 2
C3	08792C2-C3	Cam control from pos. 2 to 1

8 Auxiliary port valve page 200

TYPE	CODE	DESCRIPTION
<u>Antishock valve:</u>		
V30-B	08800V30-B	Setting range: from 30 to 80 bar (from 435 to 1150 psi)
V30-N	08800V30-N	Setting range: from 81 to 200 bar (from 1170 to 2900 psi)
V30-R	08800V30-R	Setting range: from 201 to 370 bar (from 2910 to 5400 psi)
<u>Antishock/anticavitation valve:</u>		
V33-B	08803V33-B	Setting range: from 30 to 80 bar (from 435 to 1150 psi)
V33-N	08803V33-N	Setting range: from 81 to 200 bar (from 1170 to 2900 psi)
V33-R	08803V33-R	Setting range: from 201 to 370 bar (from 2910 to 5400 psi)
<u>Anticavitation valve:</u>		
V04	08808V04	Anticavitation valve
<u>Plug:</u>		
VC	060002758699	Valve blanking plug

For other configurations and positions, see page 201

9 Secondary aux valves* page 202

TYPE	CODE	DESCRIPTION
VRP-VC01-SAE	08835V01CSAE12	DESCRIPTION: Single piloted check valve on A port, 250 bar (3600 psi)
TYPE	CODE	
VRP-VC03-SAE	08837V03CSAE12	DESCRIPTION: Double piloted check valve on A and B ports, 250 bar (3600 psi)

(*): Codes are referred to **UN-UNF** thread

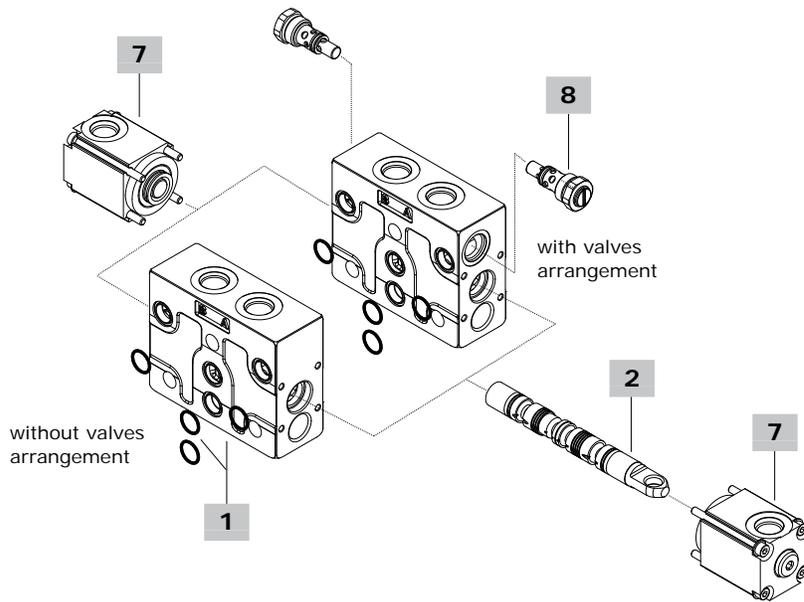
Working section - parts ordering codes

Proportional hydraulic controls valve configuration example

spring type and valve setting (bar)

EL Q80 / 103 - H5 . V40(N)120 - SAE

1
 2
 7
 8



1 Working section body kit* page 182

TYPE: **EL-Q80-H5.VC-SAE** CODE: 5EL0600127877H5
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-Q80-H5-SAE** CODE: 5EL0600127854H5
 DESCRIPTION: Parallel circuit, without port valves arrangement

2 Spool page 183

TYPE	CODE	DESCRIPTION
103	060102894999	Double acting, A and B closed in neutral position

7 Hydraulic controls A+B sides* page 196

TYPE	CODE	DESCRIPTION
H5	08785H5/SAE	Low pressure proportional type, upper ports

8 Auxiliary port valve page 200

See #8, page 178

(*): Codes are referred to **UN-UNF** thread

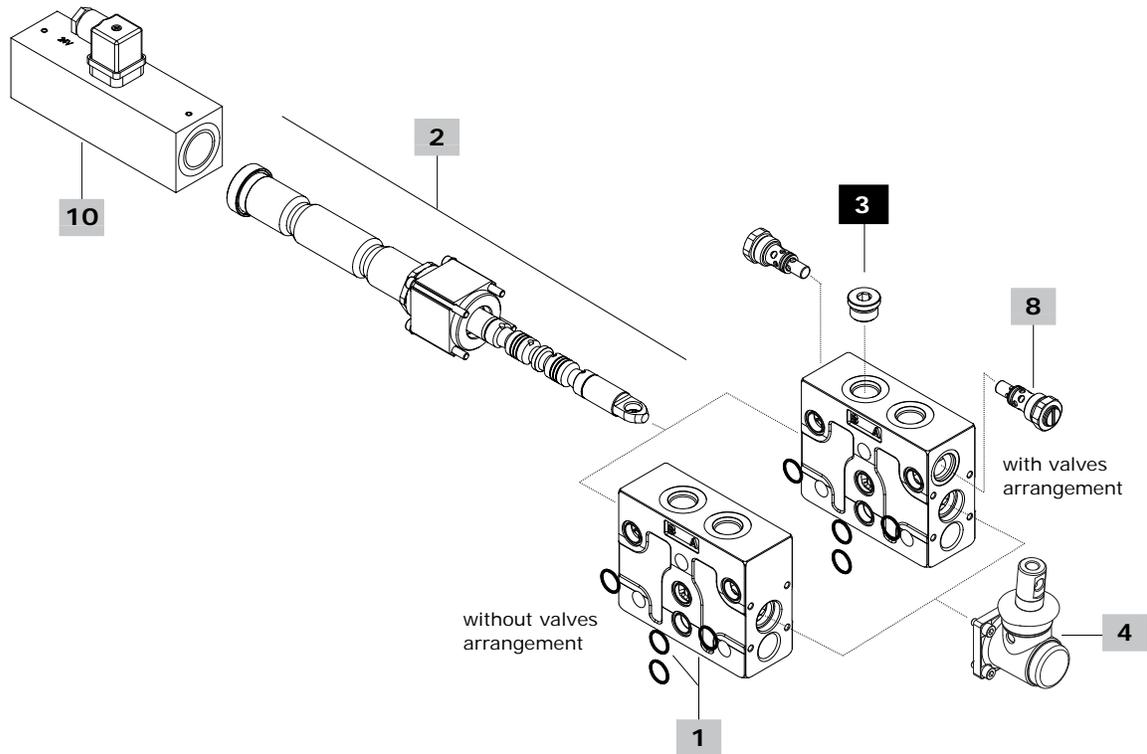
Working section - parts ordering codes

One side - ON/OFF direct solenoid control valve configuration example

spring type and valve setting (bar)

EL Q80 / 103 - A1 - D41 . V40(N)120 - 12VDC - SAE

1
 2
 4
 2
 8
 10



1 Working section body kit* page 182

TYPE: **EL-Q80.VC-SAE** CODE: 5EL0600127877D41
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-Q80-SAE** CODE: 5EL0600127854D41
 DESCRIPTION: Parallel circuit, without port valves arrangement

2 Solenoid control page 197

TYPE	CODE	DESCRIPTION
103	X0601030059	Double acting, A and B closed in neutral position
111	X0601030043	Double acting, A and B to tank in neutral position
101	X0601030060A	Single acting on port A. SAE8 plug is required, see #3.
102	X0601030060B	Single acting on port B. SAE8 plug is required, see #3.

3 Plug for single acting spool*

See #3, page 177

4 A side control page 197

TYPE	CODE	DESCRIPTION
A1	08600A1-A2	M10 thread aluminium lever box
A2	08600A1-A2	As A1 type, with lever box rotated 180°

8 Auxiliary port valve page 200

See #8, page 178

10 Coil

TYPE	CODE	DESCRIPTION
-	ZEB112	12 VDC ISO4400 coil
-	ZEB124	24 VDC ISO4400 coil

Note: The connector is included

(*): Codes are referred to **UN-UNF** thread

Working section - parts ordering codes

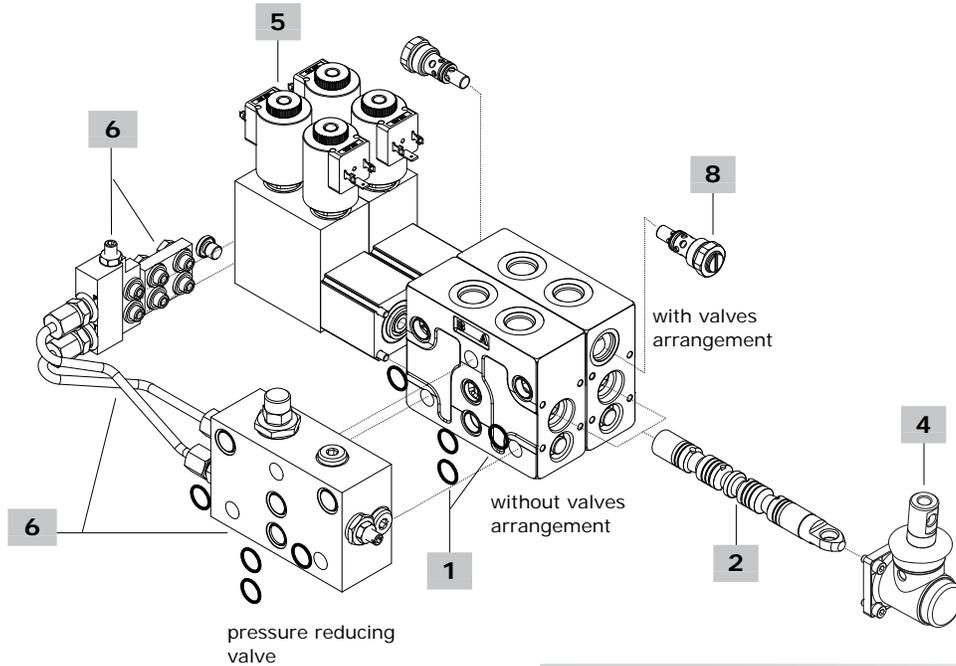
One side - ON/OFF electrohydraulic control valve configuration example

R = with pressure reducing valve
 S = without pressure reducing valve

spring type and valve setting (bar)

EL Q80 / KE2R / 103 - A1 - D2W . V40(N)120 - 12VDC - SAE

1 6 2 4 5 8 5



1 Working section body kit* page 182

See #1, page 177

2 Spool page 183

See #2, page 177

4 A side control page 184

See #4, page 177

5 B side electrohydraulic control page 198

TYPE	CODE	DESCRIPTION
D2W-12VDC	08681D2W1200	3 pos., 12VDC ON/OFF electrohydraulic control
D2W-24VDC	08681D2W2400	3 pos., 24VDC ON/OFF electrohydraulic control

Note: For BT type coils, see page 243

6 Connector kit page 199

TYPE	CODE	DESCRIPTION
Without pressure reducing valve		
KE1S	5GKE08S010	Kit for 1 section
KE2S	5GKE08S020	Kit for 2 sections
KE3S	5GKE08S030	Kit for 3 sections
KE4S	5GKE08S040	Kit for 4 sections
KE5S	5GKE08S050	Kit for 5 sections
KE6S	5GKE08S060	Kit for 6 sections
KE7S	5GKE08S070	Kit for 7 sections
KE8S	5GKE08S080	Kit for 8 sections
KE9S	5GKE08S090	Kit for 9 sections
KE10S	5GKE08S100	Kit for 10 sections

Note: Connector kit are included collector and feeding block

With pressure reducing valve

KE1R	5GKE08R010	Kit for 1 section
KE2R	5GKE08R020	Kit for 2 sections
KE3R	5GKE08R030	Kit for 3 sections
KE4R	5GKE08R040	Kit for 4 sections
KE5R	5GKE08R050	Kit for 5 sections
KE6R	5GKE08R060	Kit for 6 sections
KE7R	5GKE08R070	Kit for 7 sections
KE8R	5GKE08R080	Kit for 8 sections
KE9R	5GKE08R090	Kit for 9 sections
KE10R	5GKE08R100	Kit for 10 sections

Note: Connector kit are included collector and feeding block, drain lines and pressure reducing valve

8 Auxiliary port valve page 200

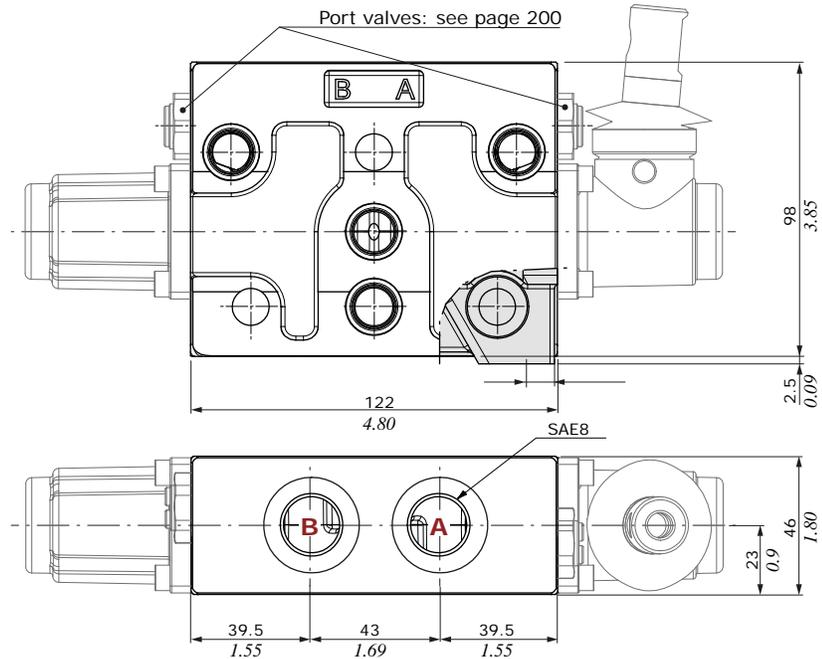
See #8, page 178

(*): Codes are referred to UN-UNF thread

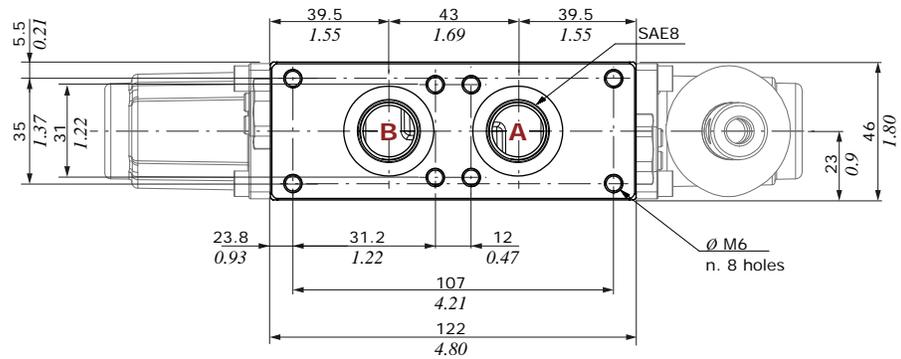
Working section

Dimensional data and hydraulic circuits

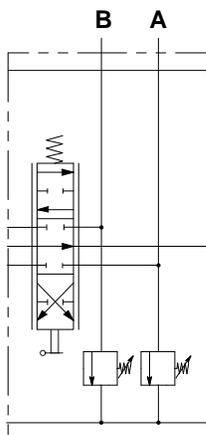
Standard working section



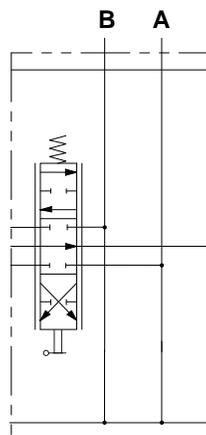
Working section for secondary aux valves block



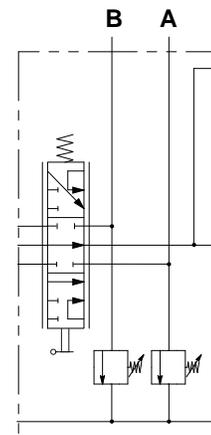
Q80.V40(N)120-SAE configuration
Parallel circuit,
mechanical control with aux valves



Q80-SAE configuration
Parallel circuit,
mechanical control without aux valves



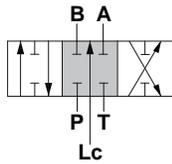
Q80.V40(N)120-SAE configuration
Series circuit,
mechanical control with aux valves



Spool

103 type
A and B closed
in neutral position

2 0 1

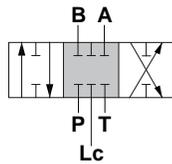


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

106 type
A, B and Lc closed in
neutral position. For closed center

2 0 1

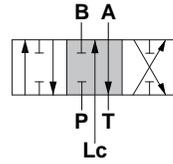


Stroke

Position 1: + 5 mm (+ 0.19 in)
Position 2: - 5 mm (- 0.19 in)

107 type
A to tank, B closed
in neutral position

2 0 1

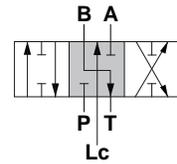


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

108 type
B to tank, A closed
in neutral position

2 0 1

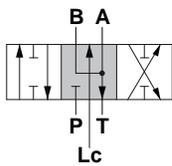


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

111 type
A and B to tank
in neutral position

2 0 1

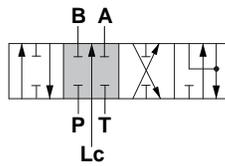


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

116 type
With floating in the 4th position
(spool in)

2 0 1 3

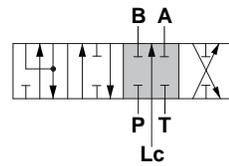


Stroke

Position 1: - 4.5 mm (- 0.17 in)
Position 2: + 7 mm (+ 0.27 in)
Position 3: - 10.25 mm (- 0.40 in)

126 type
With floating in the 4th position
(spool out)

3 2 0 1

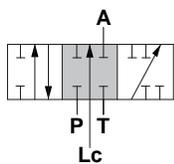


Stroke

Position 1: + 4.5 mm (+ 0.17 in)
Position 2: - 7 mm (- 0.27 in)
Position 3: + 10.25 mm (- 0.40 in)

101 type
Single acting on A,
B plugged

2 0 1

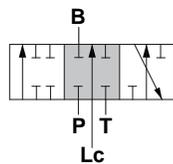


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

102 type
Single acting on B,
A plugged

2 0 1

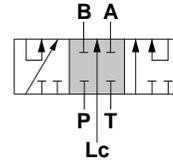


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

403 type
A and B closed in neutral
position. For series circuit

2 0 1

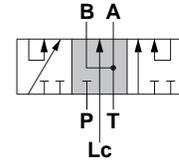


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

411 type
A and B to tank in neutral
position. For series circuit

2 0 1



Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

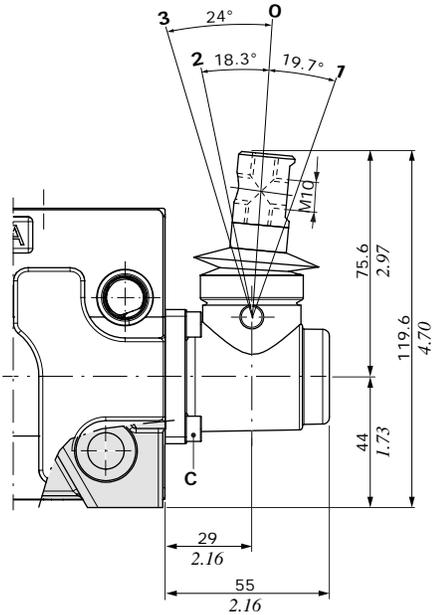
Working section

A side controls

With lever control

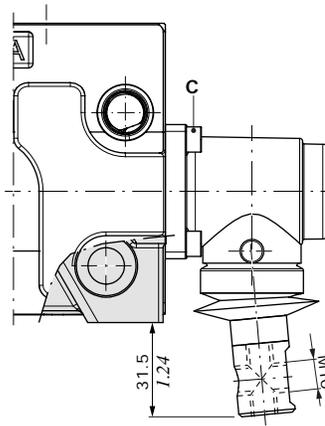
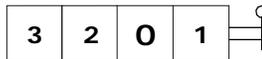
A1 type

M10 thread aluminium lever box



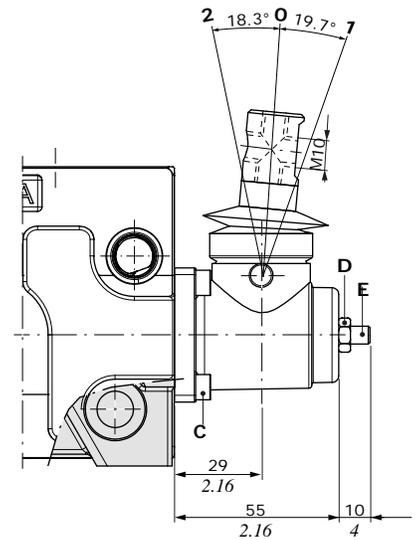
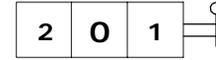
A2 type

As A1 type, rotated 180°



A1/06 type

M10 thread, with stroke limiter



A1/Z1 type

M10 thread, for 116 floating spool type

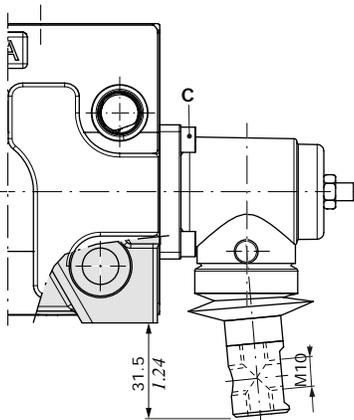
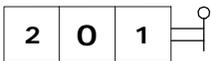


Wrenches and tightening torques

- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- D = wrench 10 - 9.8 Nm (7.2 lbft)
- E = allen wrench 4 - 9.8 Nm (7.2 lbft)

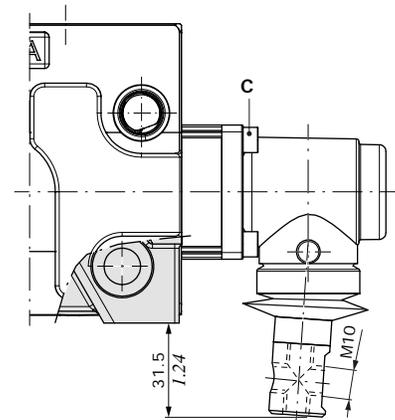
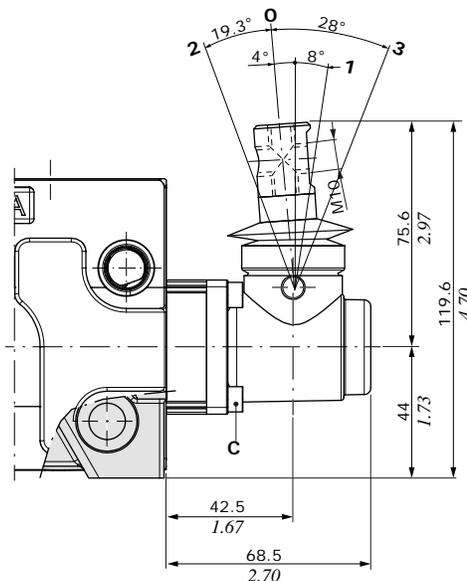
A2/06 type

As A1/06 type, rotated 180°



A2/Z1 type

As A1/Z1 type, rotated 180°

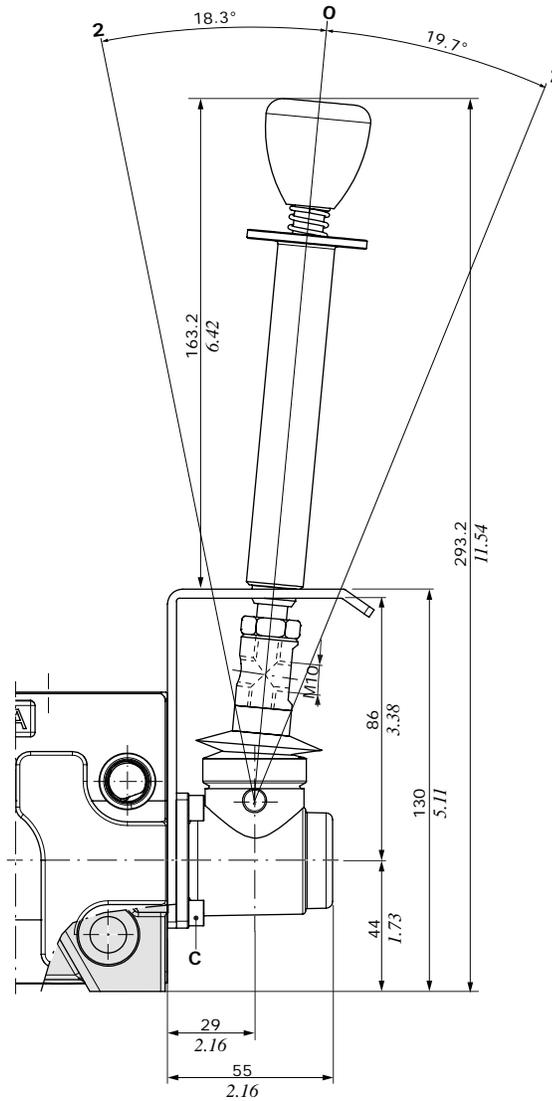


A side controls

With safety lever control

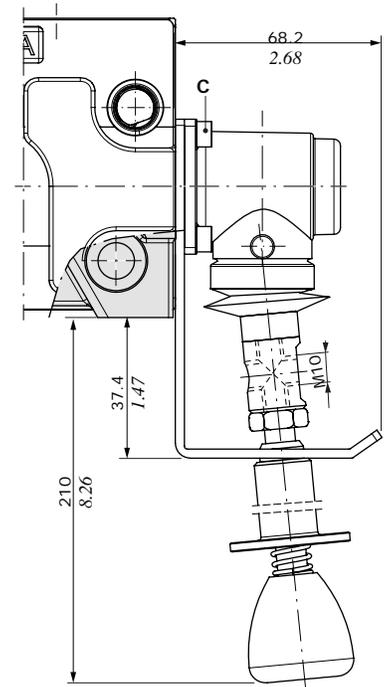
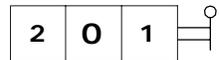
A1/S type

M10 thread, aluminium lever box



A2/S type

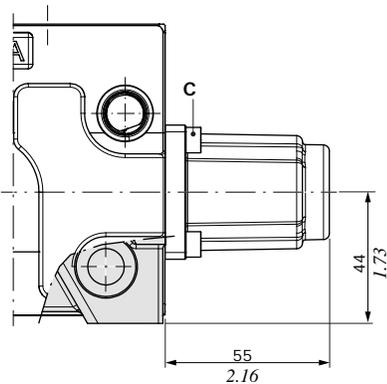
As A1/S type, rotated 180°



Without lever control

A3 type

With cap



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf_t)

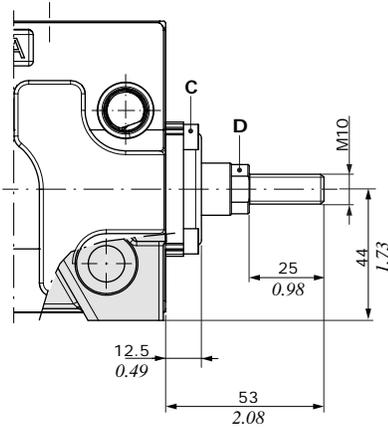
Working section

A side controls

Without lever control

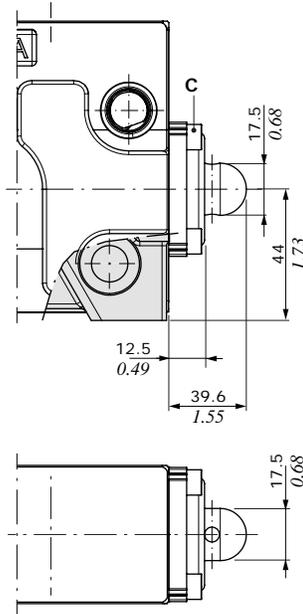
A4 type

M10 male thread external pin with flange



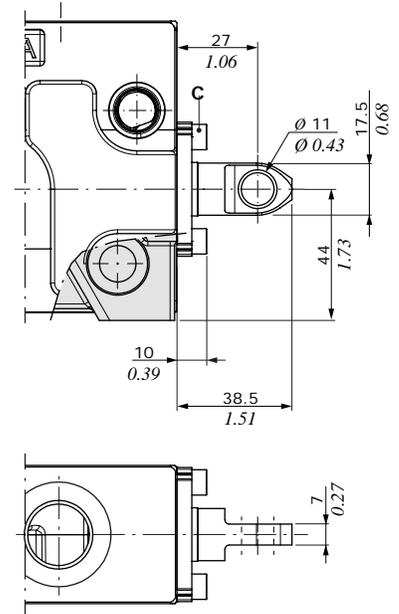
A5 type

Flange with spherical spool end



A6 type

With flange



Wrenches and tightening torques

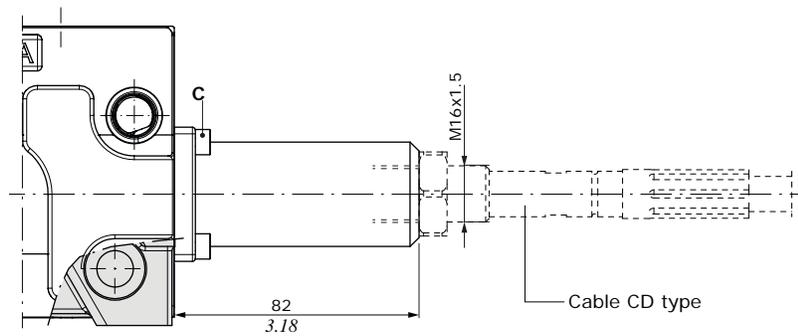
C = allen wrench 4 - 6.6 Nm (4.8 lbft)

D = wrench 13 - 9.8 Nm (7.2 lbft)

With flexible cable control arrangement

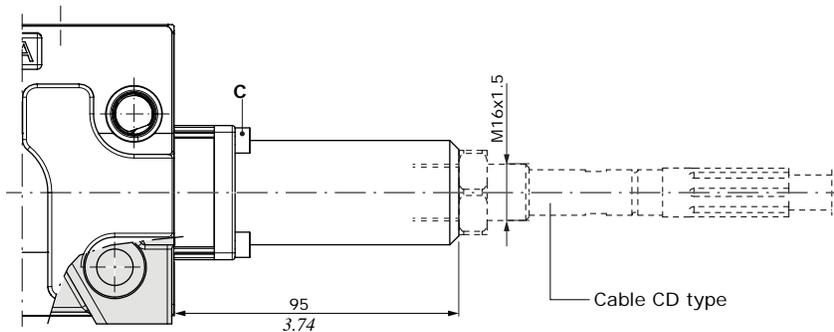
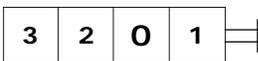
A8 type

Flexible cable control arrangement



A8/Z1 type

As A8 type, for 116 floating spool type

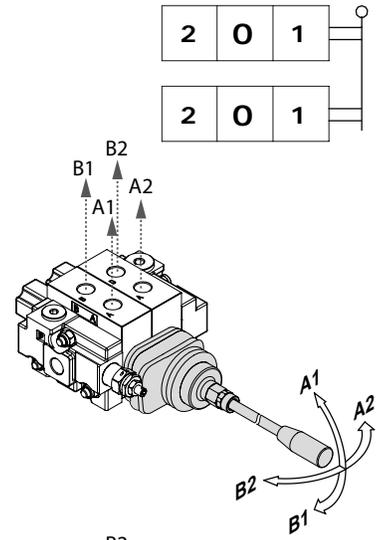
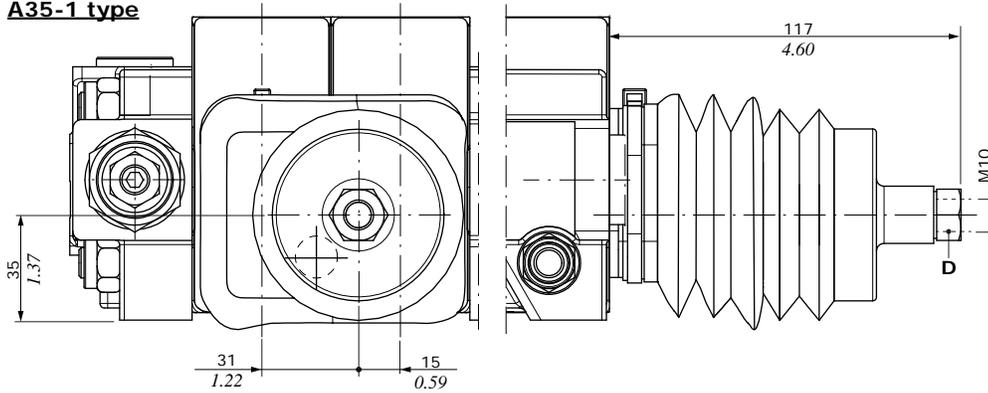


A side controls

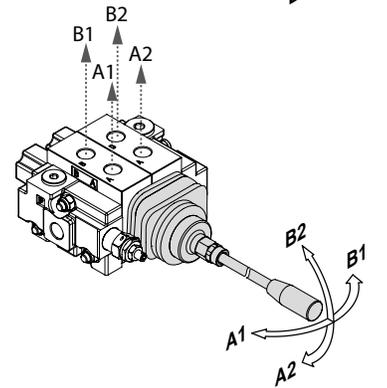
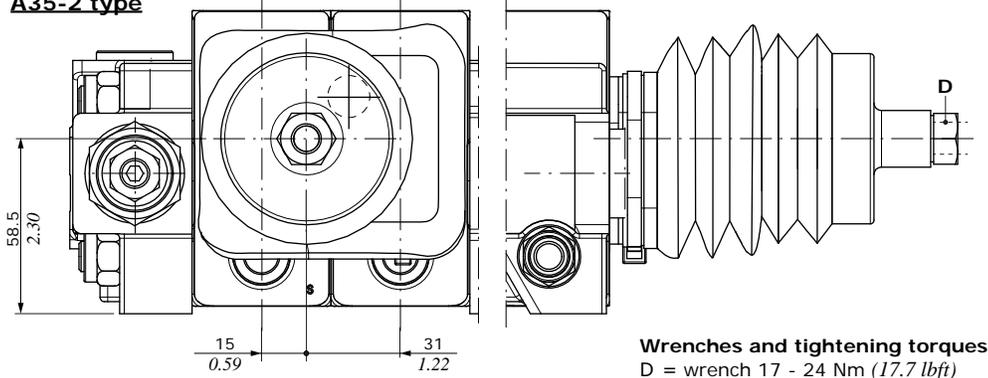
Joystick control

For operating the joystick control in the floating position, contact Sales Department.

A35-1 type

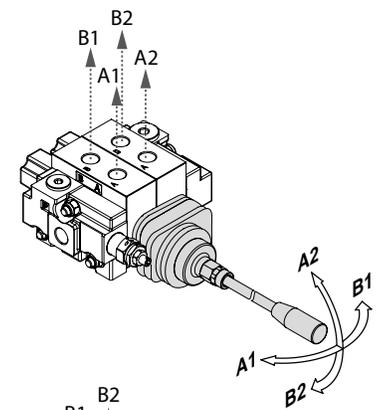
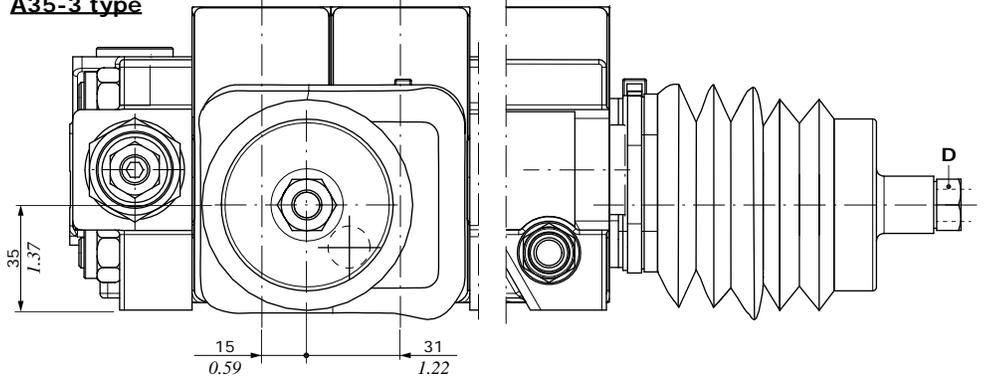


A35-2 type

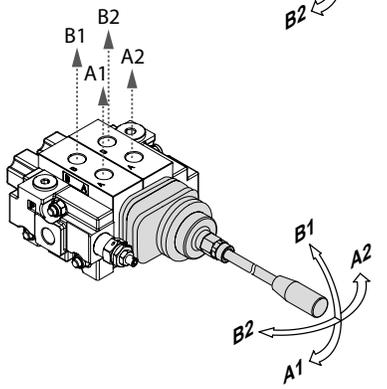
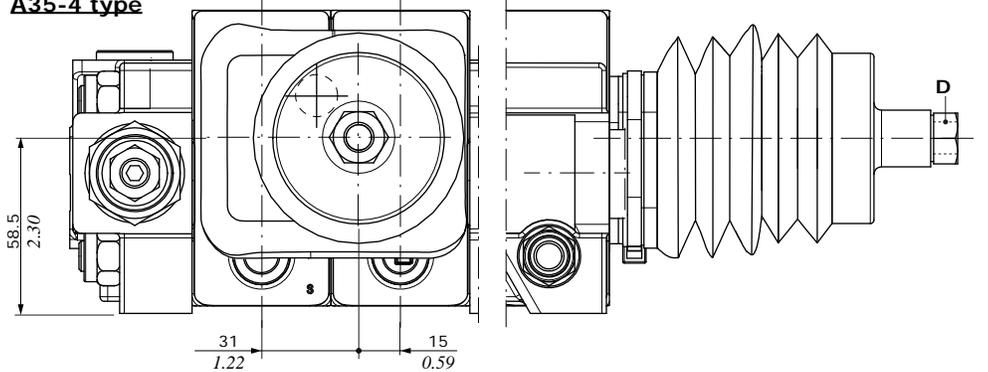


Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbf ft)

A35-3 type



A35-4 type



Working section

A side controls

With spool position microswitch, with lever

With spool position microswitch, with cap

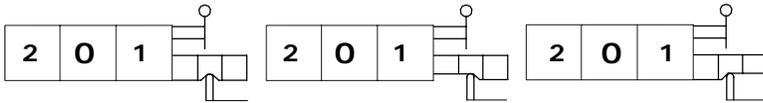
N1-A1 type
Micro operation
in position 1 and 2

N1A-A1 type
Micro operation in
position 1

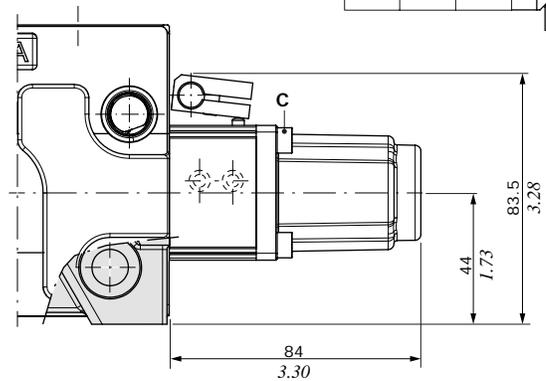
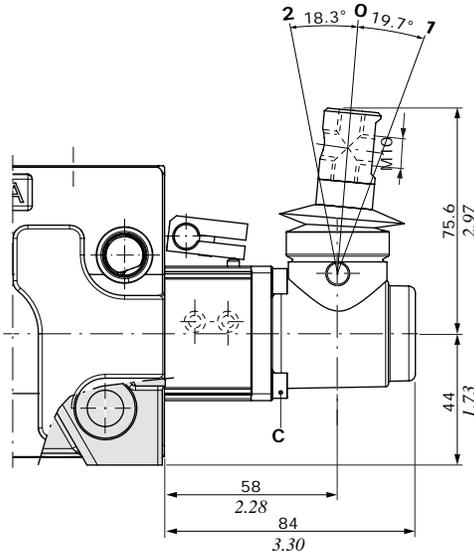
N1B-A1 type
Micro operation in
position 2

N1-A3 type
Micro operation
in position 1 and 2

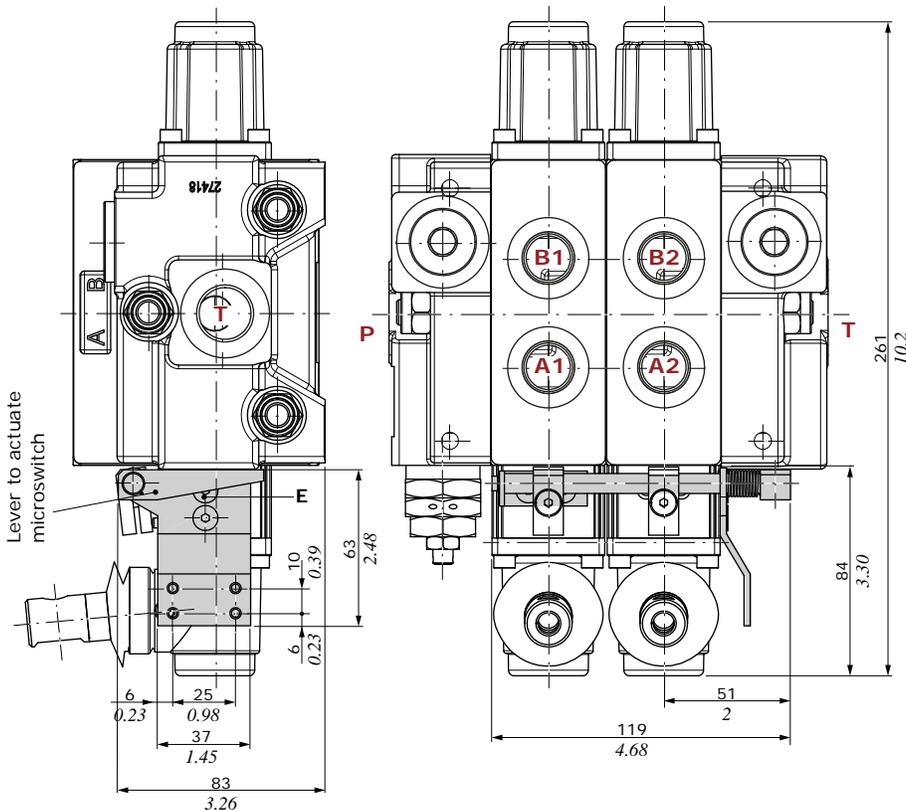
N1A-A3 type
Micro operation in
position 1



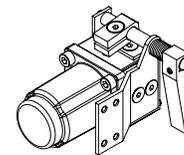
N1B-A3 type
Micro operation in
position 2



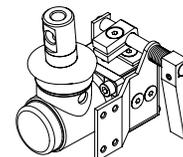
Microswitch assembly kit for 2 working section (N1-A1 type)



with cap



with lever box



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
E = allen wrench 3 - 6.6 Nm (4.8 lbft)

B side controls

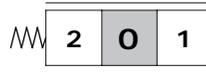
With spring return control

M1 type
3 position, spring return
in neutral position

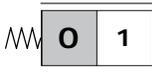
M1/01 type
As M1 type,
for joystick control

M1/05 type
As M1 type,
for series spool

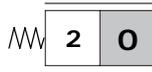
M1/07 type
As M1 type, for
joystick series spool



M2 type
2 position (0-1), spring return
in neutral position



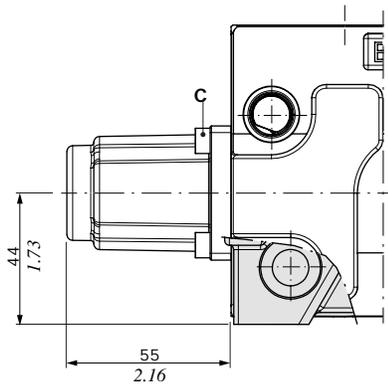
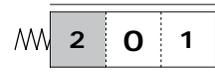
M3 type
2 position (0-2), spring return
in neutral position



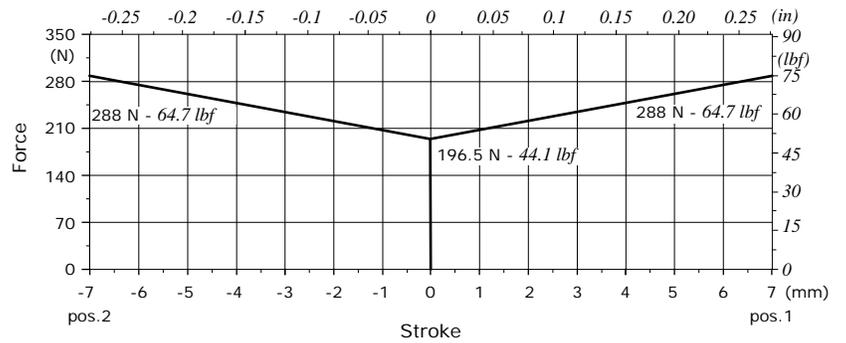
M4 types
2 position (1-2),
spring return in position 1



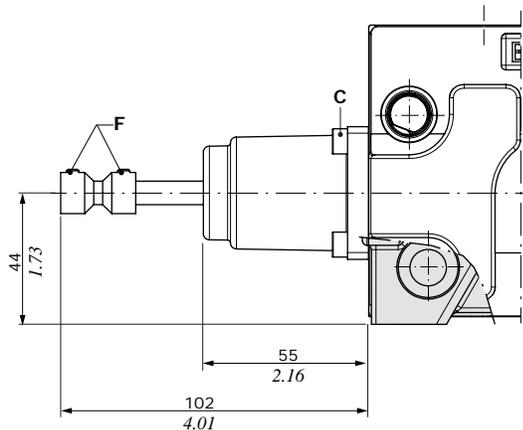
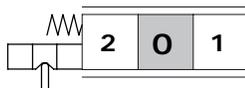
2 position (2-1),
spring return in position 2



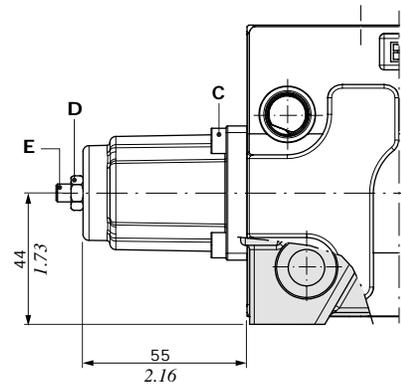
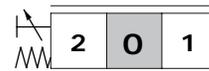
M1 control type - Force vs. Stroke diagram



M1-B1 type
3 position, microswitch arrangement



M1/02 type
As M1 type, with stroke limiter



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
D = wrench 10 - 9.8 Nm (7.2 lbft)
E = allen wrench 4 - 9.8 Nm (7.2 lbft)
F = allen wrench 3 - 5 Nm (3.68 lbft)

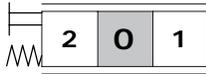
Working section

B side controls

With spring return control

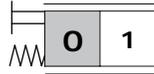
M1-U1 type

3 position, with M10 male thread external pin



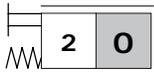
M2-U1 type

2 position (0-1), with M10 male thread external pin



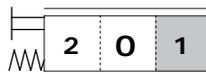
M3-U1 type

2 position (0-2), with M10 male thread external pin



M4-U1 type

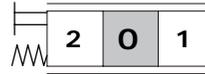
2 position (1-2), with M10 male thread external pin



With flexible cable control arrangement

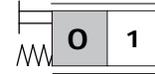
M1-U2 type

3 position, spring return in neutral position



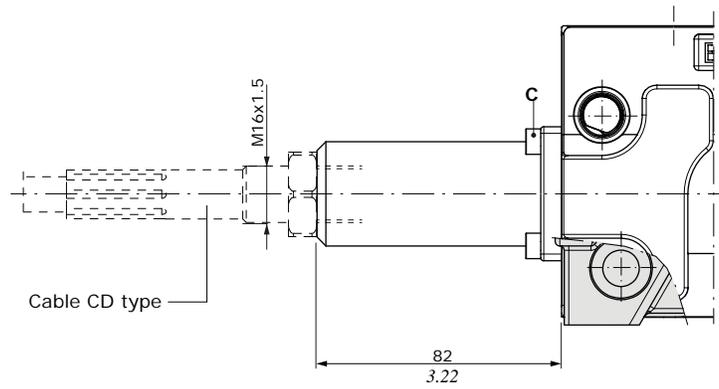
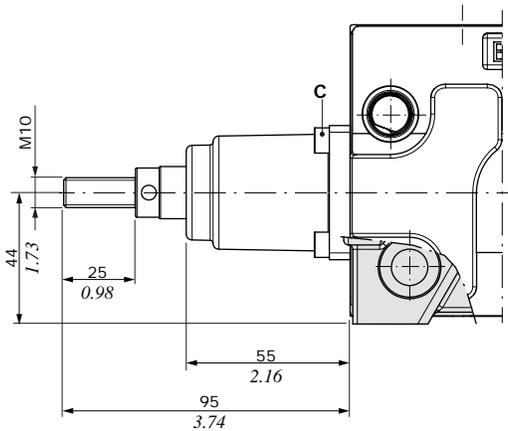
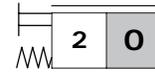
M2-U2 type

2 position (0-1), spring return in neutral position



M3-U2 type

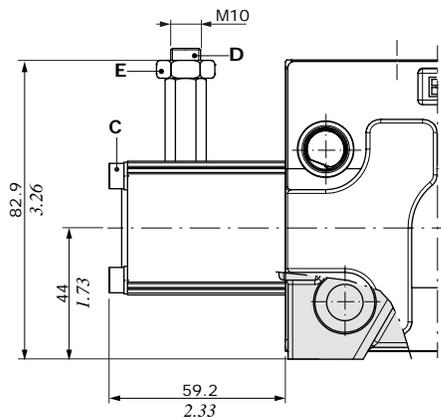
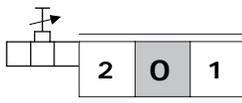
2 position (0-2), spring return in neutral position



With friction control

R0 type

Adjustable friction control

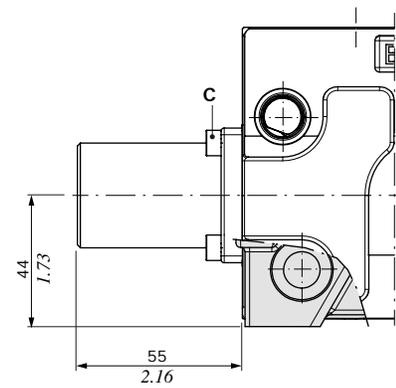
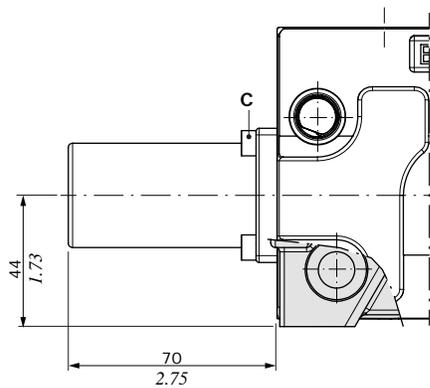
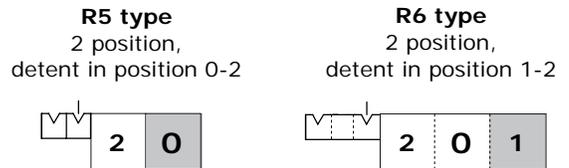
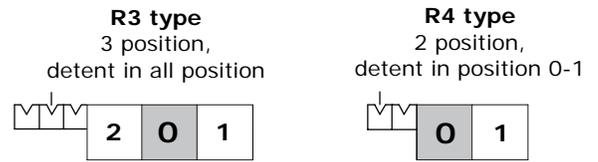
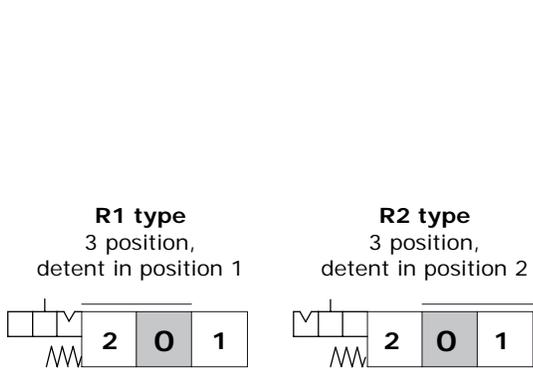


Wrenches and tightening torques

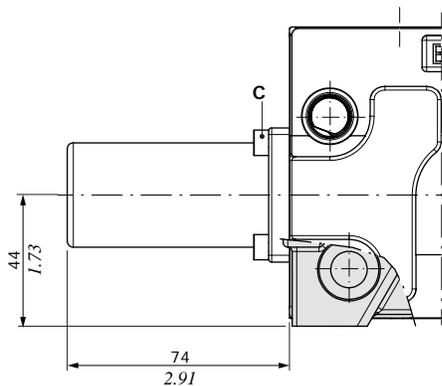
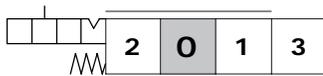
- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- D = allen wrench 5 - 15 Nm (11.1 lbft)
- E = wrench 17 - 9.8 Nm (7.2 lbft)

B side controls

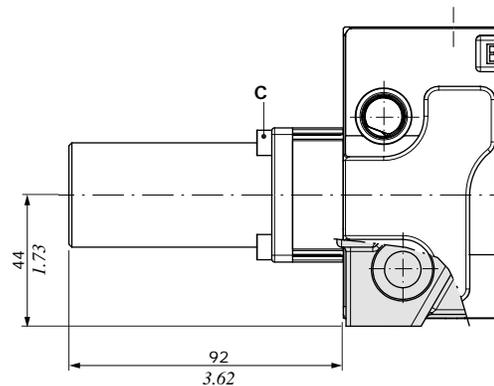
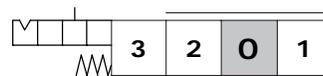
With detent control



R8 type
4 position, detent in 4th position,
for 116 floating spool type



R10/Z1 type
4 position, detent in 4th position,
for 126 floating spool type



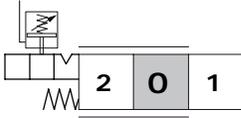
Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf)

Working section

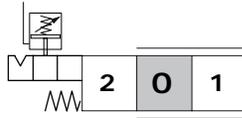
B side controls

With detent control and kick out function

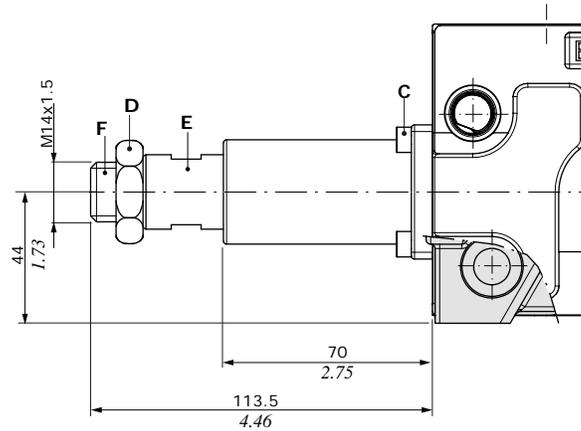
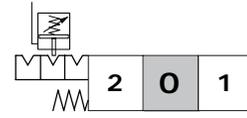
R1K type
3 position, detent in position 1



R2K type
3 position, detent in position 2



R3K type
3 position, detent in all position



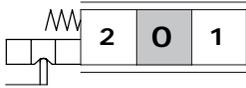
- Wrenches and tightening torques**
 C = allen wrench 4 - 6.6 Nm (4.8 lbft)
 D = wrench 30 - 42 Nm (30.9 lbft)
 E = wrench 22
 F = allen wrench 10 - 42 Nm (30.9 lbft)

B side controls

With spool position microswitch

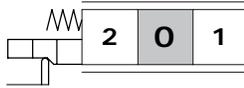
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position



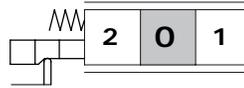
M1-N1A type

3 position, micro operation in position 1



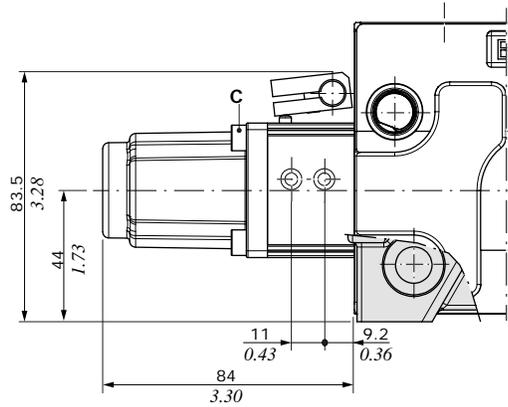
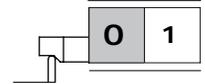
M1-N1B type

3 position, micro operation in position 2

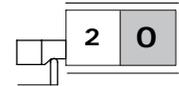


M2-N1 type

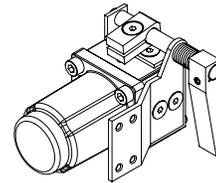
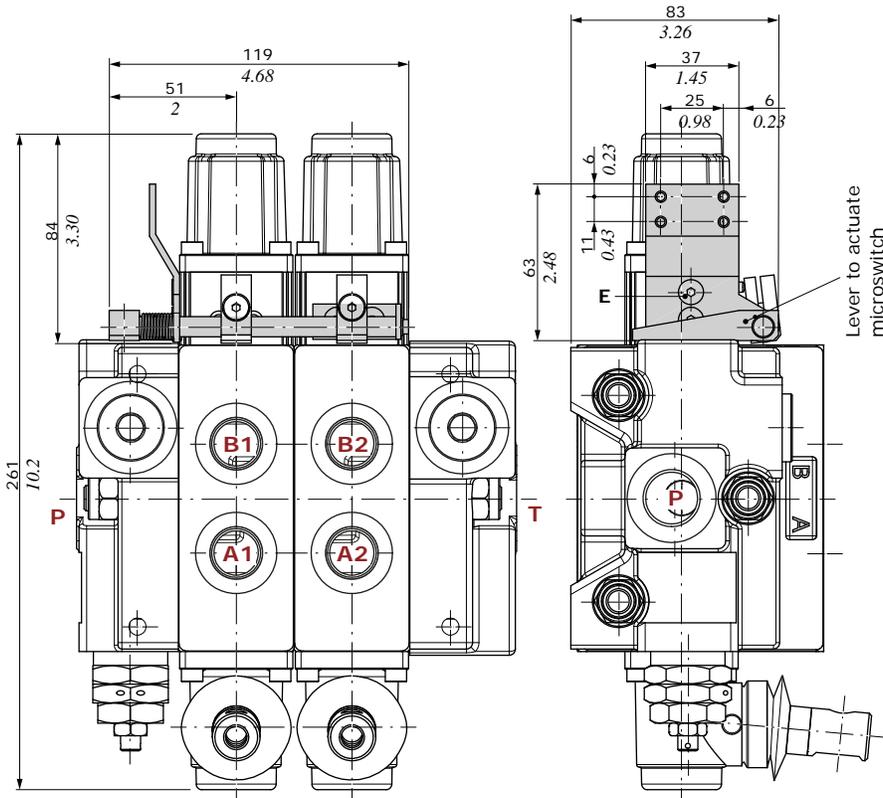
2 position (0-1), spring return in neutral position



M3-N1 type
2 position (0-2), spring return in neutral position



Microswitch assembly kit for 2 working section (M1-N1 type)

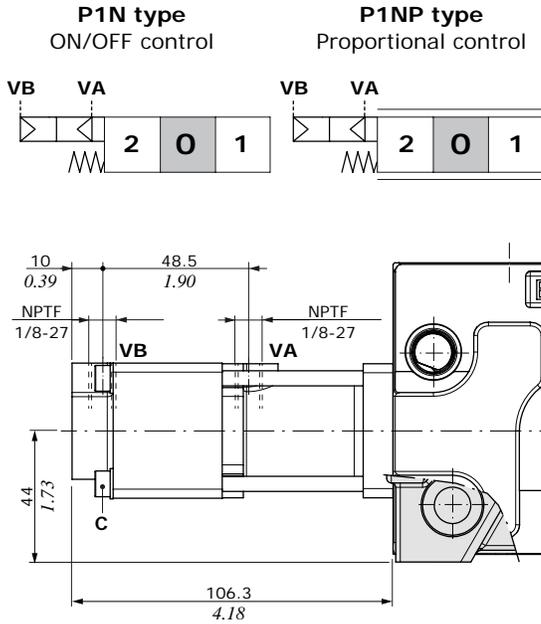


Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
E = allen wrench 3 - 6.6 Nm (4.8 lbft)

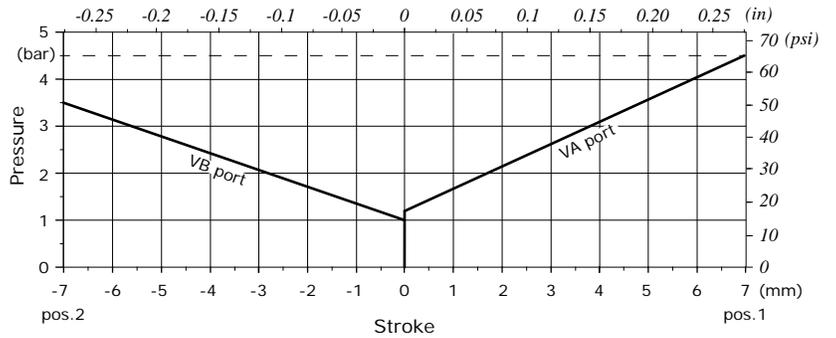
Working section

B side controls

With pneumatic control



Proportional pilot pressure curves



Operating features

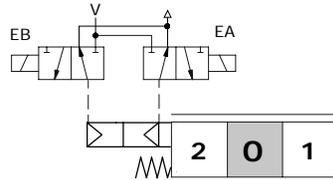
Pilot pressure.....: min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
 Pilot volume.....: 9 cm³/min (0.54 in³/min)

Wrenches and tightening torques

C = wrench 4 - 6.6 Nm (4.8 lbft)

With ON/OFF electropneumatic control

D3W type
ON/OFF control

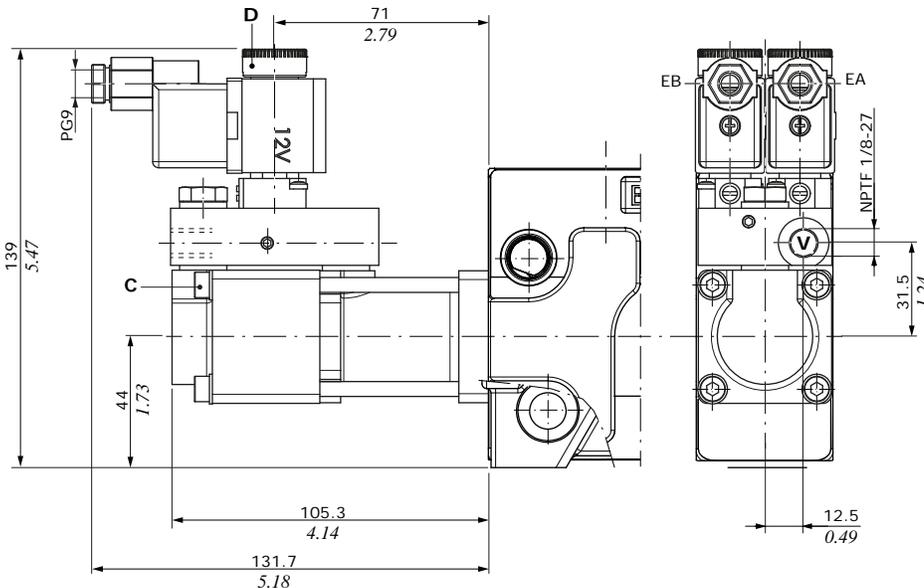


Operating features

Pilot pressure.....: min. 1 bar (14.5 psi)
 max. 10 bar (145 psi)

COILS

Nominal voltage tolerance.....: -5% +10%
 Power rating.....: 5 W
 Nominal current.....: 12 VDC – 24VDC
 Coil insulation.....: Class F
 Weather protection.....: IP65
 Duty cycle.....: 100%



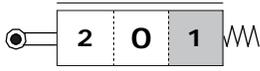
Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)
 D = manual tightening - 6.6 Nm (4.8 lbft)

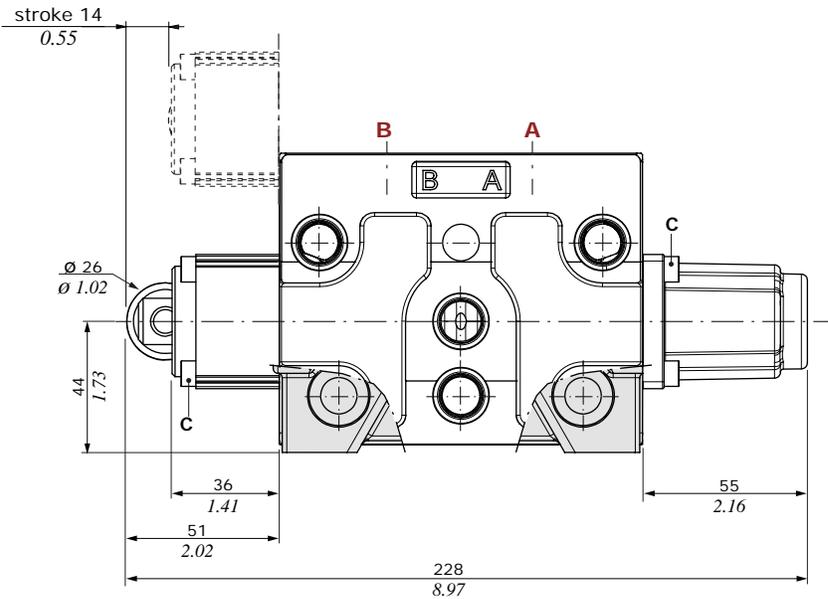
A+B side controls

With cam control

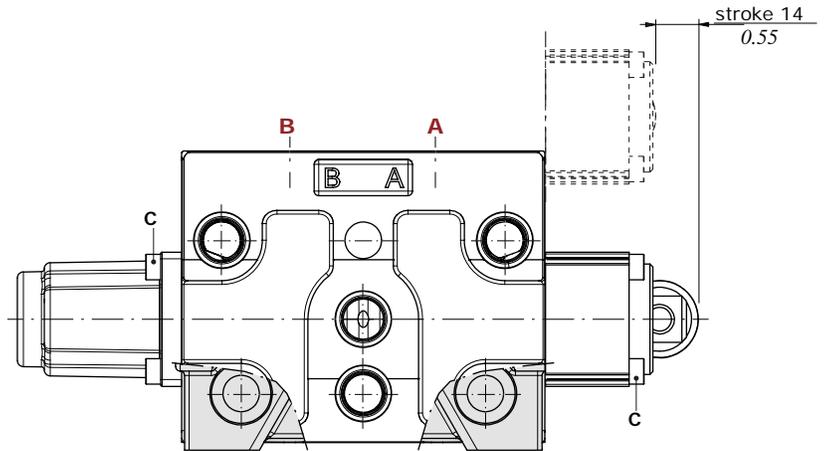
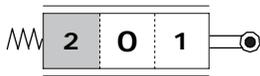
C2 type
From position 1 to position 2,
spring return in position 1



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf)



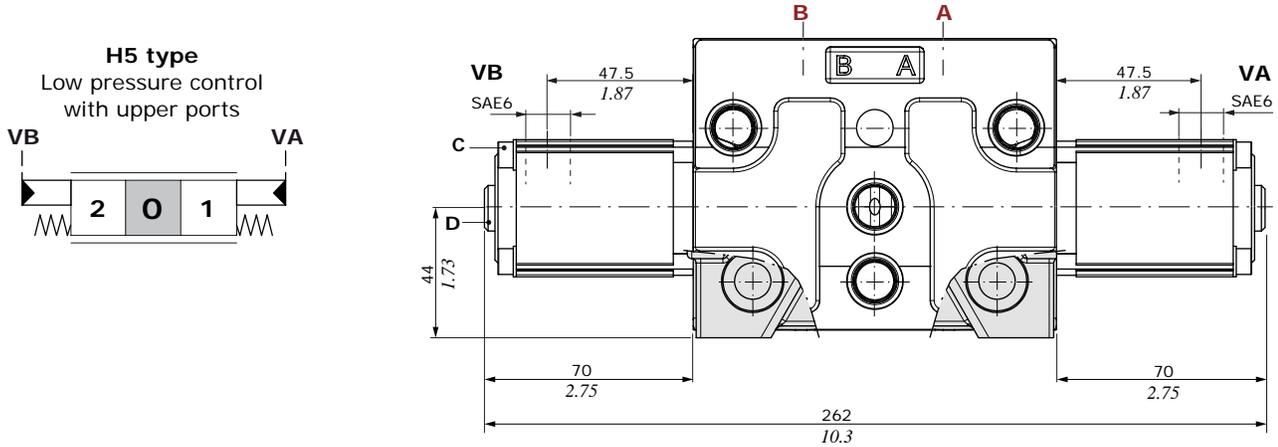
C3 type
From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



Working section

A+B side controls

With proportional hydraulic control



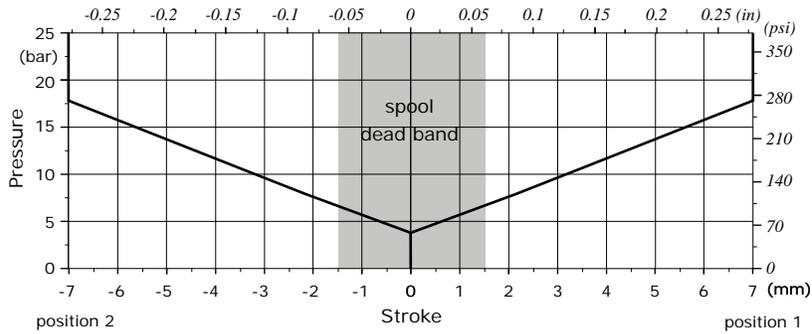
Operating features

Pilot pressure..... : max. 100 bar (1450 psi)

Wrenches and tightening torques

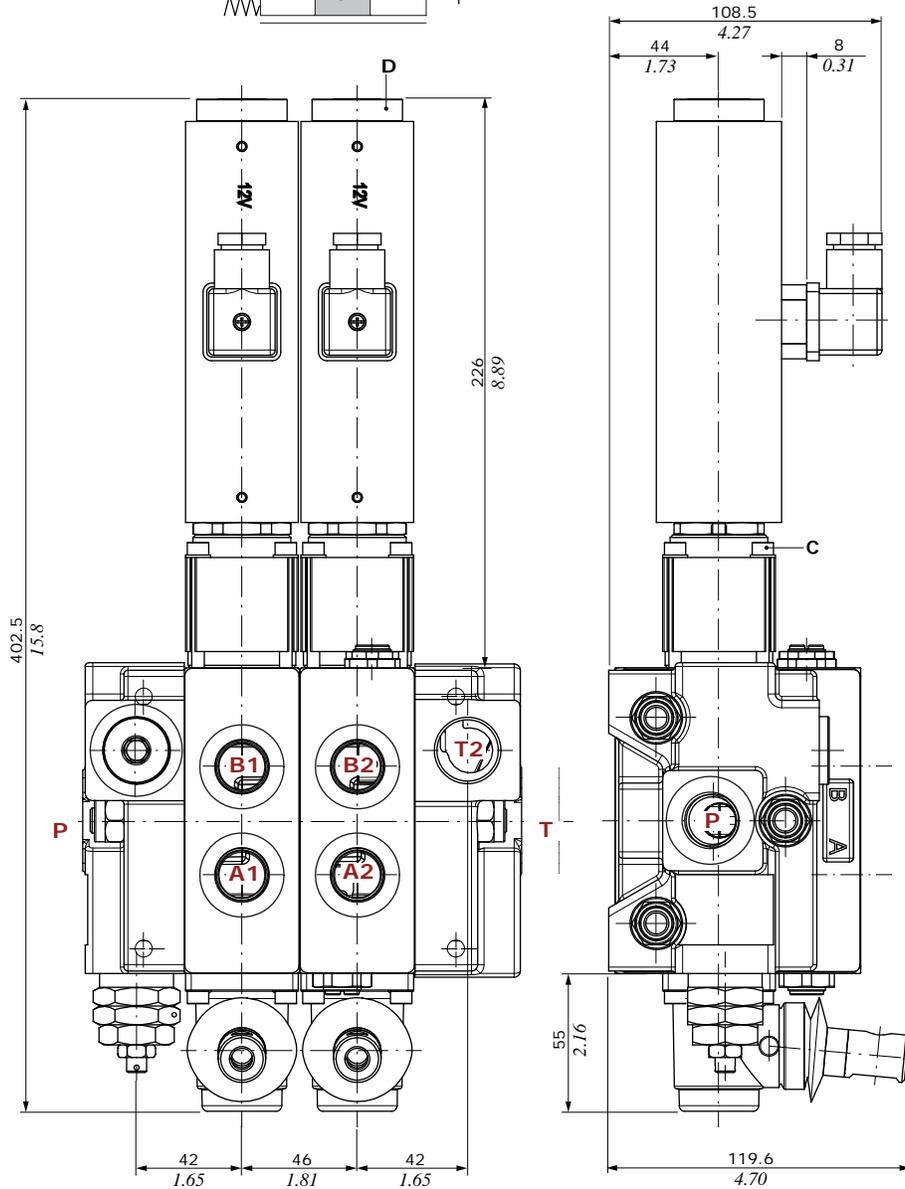
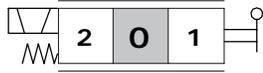
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
 D = allen wrench 4 - 9.8 Nm (7.2 lbft)

Stroke vs. Pressure diagram for H5 type control



Direct solenoid control

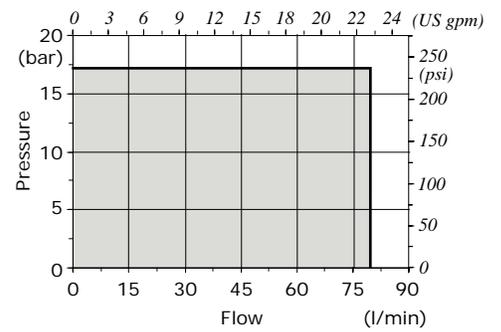
D41 type: ON/OFF one side



D41 coil	
Nominal voltage	12 VDC 24 VDC
Nominal voltage tolerance	±10%
Power rating	80 W
Insulation	Class H
Weather protection	IP65

Connector type: ISO4400 3P+T-PG11

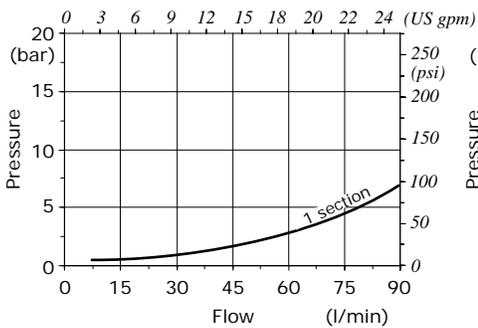
Dynamic conditions



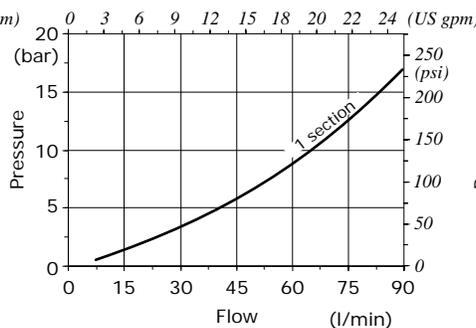
Wrenches and tightening torques

- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- D = manual tightening - 6.6 Nm (4.8 lbft)

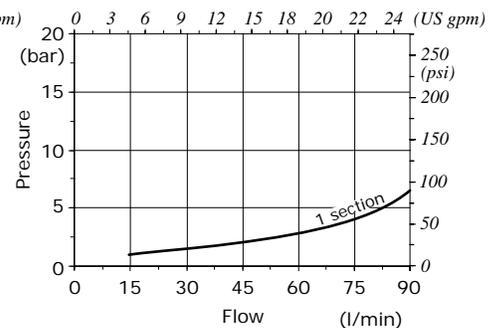
P⇒T pressure drops



P⇒A(B) pressure drops



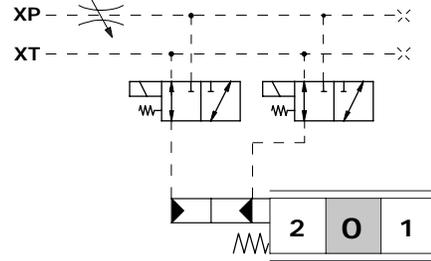
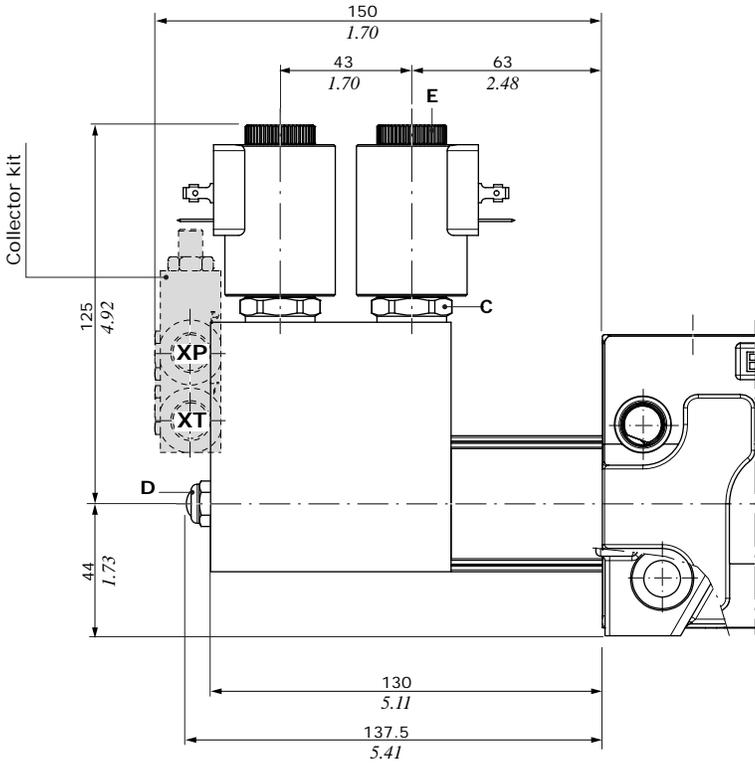
A(B)⇒T pressure drops



Working section

Electrohydraulic control

D2W type: ON/OFF one side

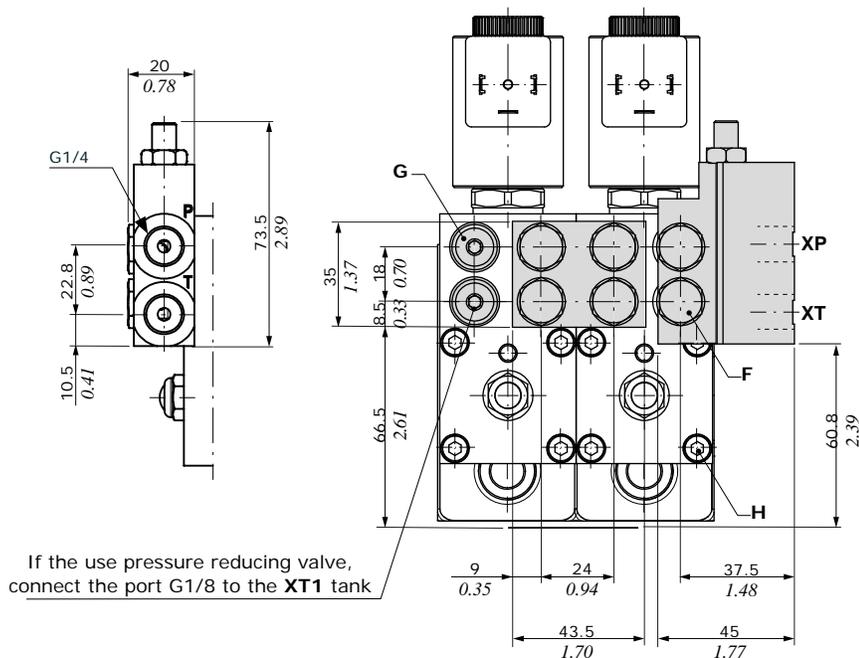


Features

- Pilot pressure on XP..... : min. 20 bar (290 psi)
: max. 35 bar (500 psi)
- Max backpressure on XT..... : 4 bar (58 psi)

For BT type coils and mating connectors, see page 243

KE2S connector kit



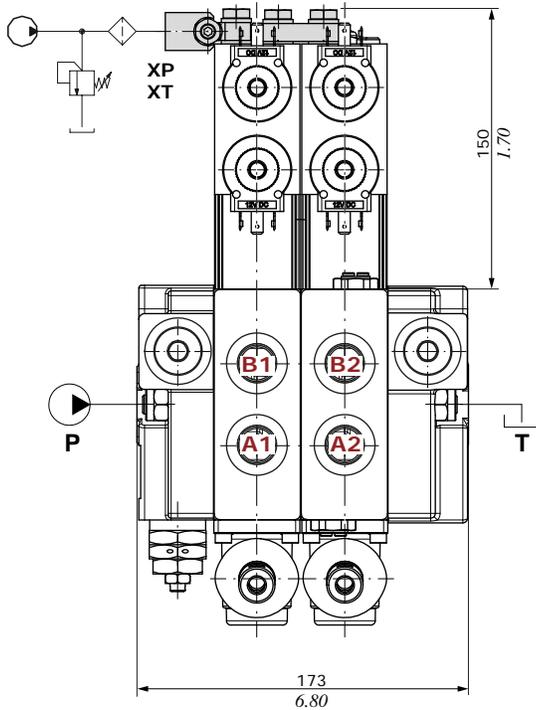
If the use pressure reducing valve, connect the port G1/8 to the XT1 tank

Wrenches and tightening torques

- C = wrench 24 - 30 Nm (22.1 lbft)
- D = wrench 13 - 9 Nm (6.6 lbft)
- E = wrench 6.6 - 9.8 Nm (7.2 lbft)
- F = wrench 14 - 24 Nm (17.7 lbft)
- G = allen wrench 4 - 9.8 Nm (6.6 lbft)
- H = allen wrench 4 - 3 Nm (2.2 lbft)

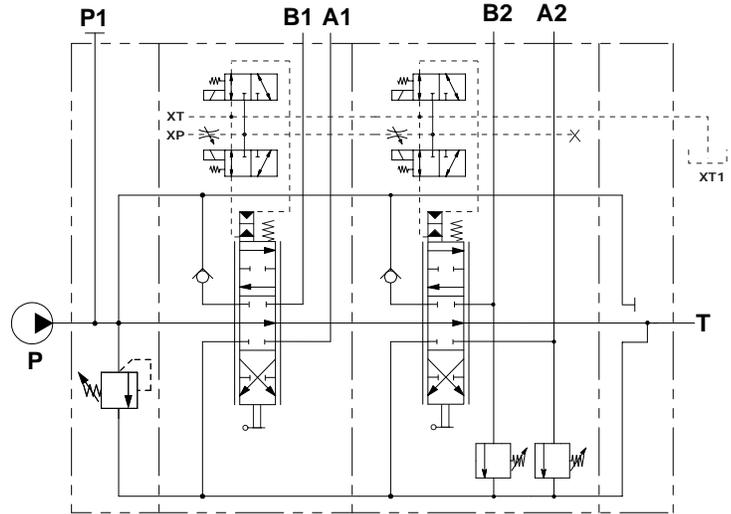
Electrohydraulic control

Connector kit for external pilot and drain



CONNECTOR KIT CODES		
Type	Code*	Description
KE2S	5GKE08S020	Kit for 2 section

For other connector kit codes, see page 181

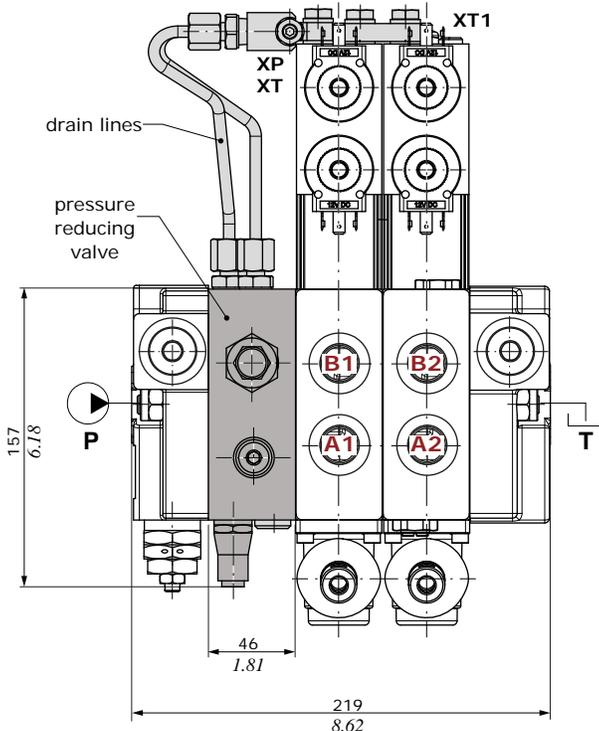


Description example:

Q80/2/F7S(N120)/KE2S/103-A1-D2W.V40(N)120/
103-A1-D2W.V40(N)120/F3D-12VDC-S-SAE

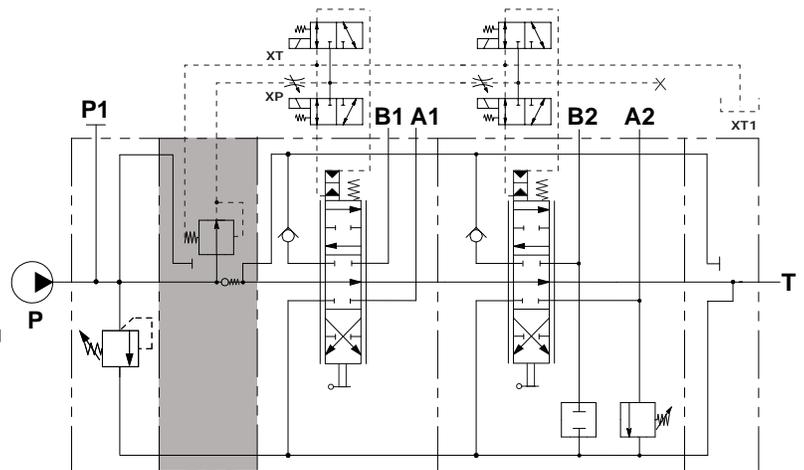
Connector kit for internal pilot and drain

The kit is made of collector, pressure reducing valve and drain lines.



CONNECTOR KIT CODES		
Type	Code*	Description
KE2R	5GKE08R020	Kit for 2 section

For other connector kit codes, see page 181



Description example:

Q80/2/F7S(N120)/KE2R/103-A1-D2W.V40(N)120/
103-A1-D2W.V40(N)120/F3D-12VDC-S-SAE

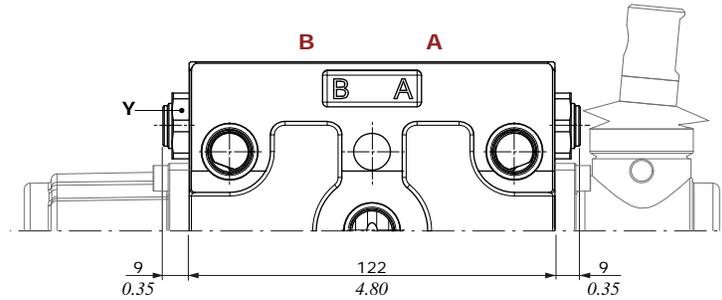
Pressure reducing valve

Auxiliary valve configuration

Dimensional data and hydraulic circuits

Description example

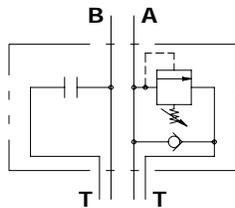
Q80 / 1 / ... / 103 - A1 - M1 - ^{aux valve} **V32(N)** ^{spring type and valve setting (bar)} **120** / ...



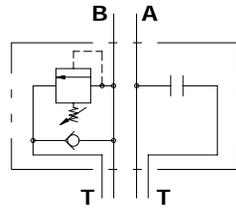
Antishock/anticavitation valve example

A side configuration: **B side configuration:** **A+B side configuration:**

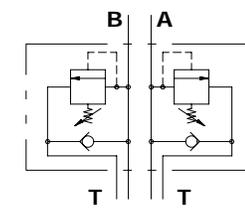
V33



V34



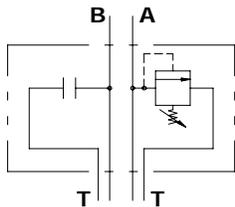
V35 (V34 + V33)



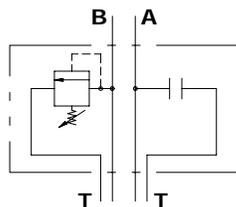
Antishock valve example

A side configuration: **B side configuration:** **A+B side configuration:**

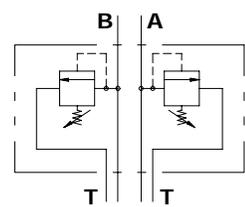
V30



V31



V32 (V30 + V31)



Spring type	Setting ranges (bar - psi)
B (white)	From 30 to 80 - from 435 to 1150
N (black)	From 81 to 200 - from 1170 to 2900
R (red)	From 201 to 370 - from 2910 to 5400

Wrenches and tightening torques

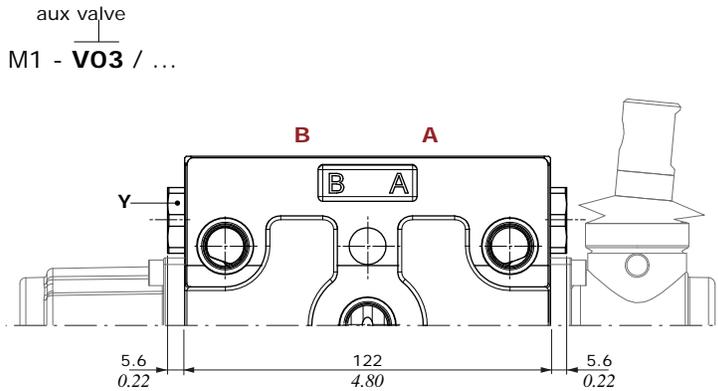
Y = wrench 22 - 42 Nm (30.9 lbf^t)

Auxiliary valve configuration

Dimensional data and hydraulic circuits

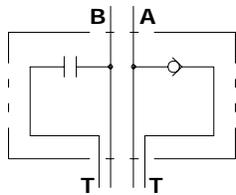
Anticavitation valve example

Q80 / 1 / ... / 103 - A1 - M1 - **V03** / ...



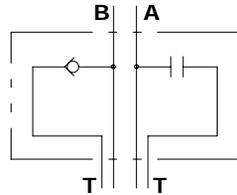
A side configuration:

V04



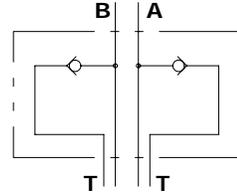
B side configuration:

V05



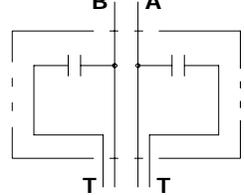
A+B side configuration:

V03 (V04 + V05)



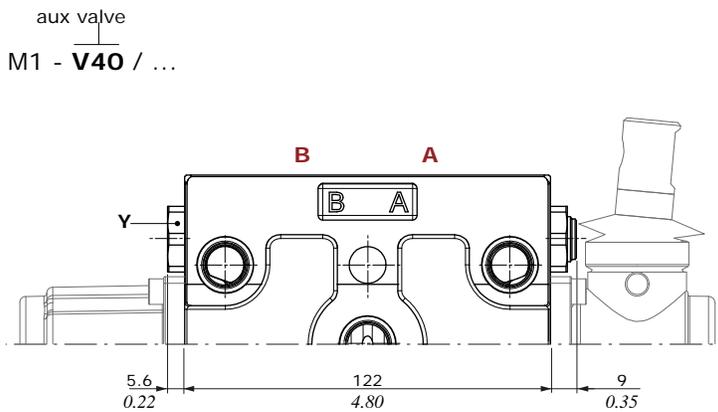
Plug valve:

VC



Antishock and anticavitation combining valves example

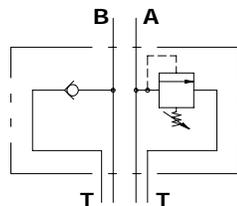
Q80 / 1 / ... / 103 - A1 - M1 - **V40** / ...



Wrenches and tightening torques
Y = wrench 22 - 42 Nm (30.9 lbf)

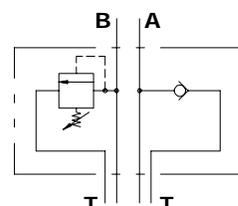
A side configuration:

V40 (V30 + V05)



B side configuration:

V41 (V31 + V04)

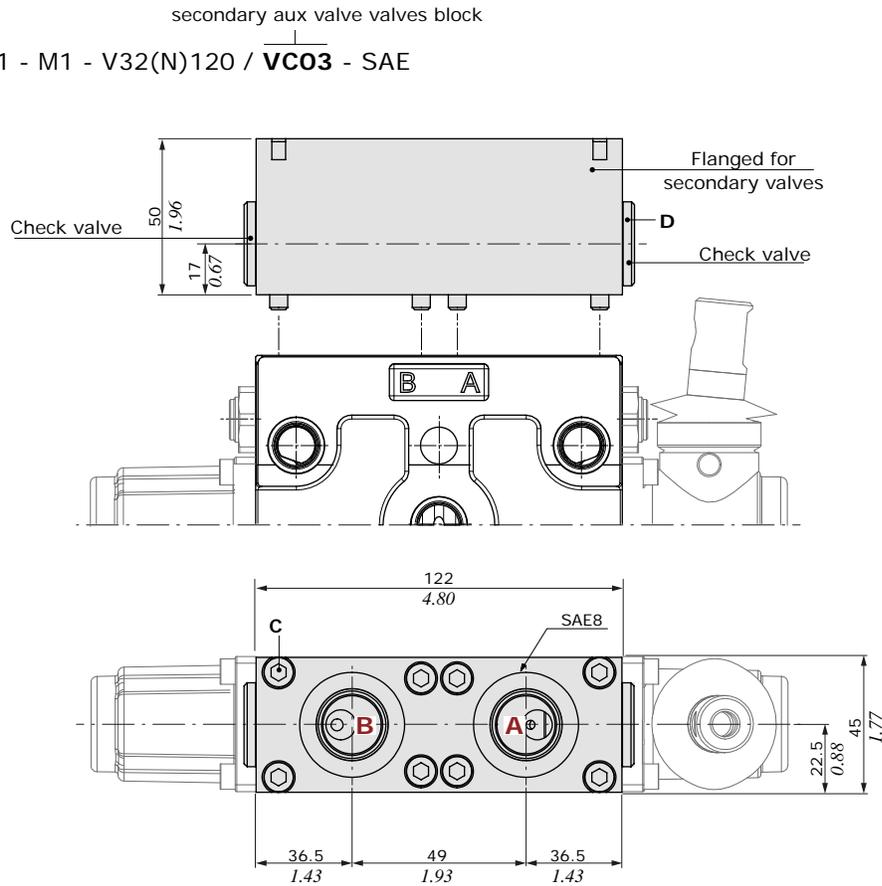


Secondary valve configuration

Dimensional data and hydraulic circuits

Description example

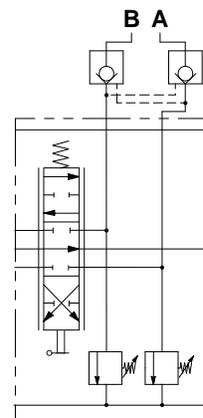
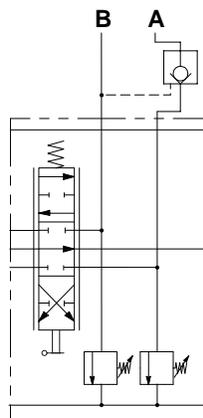
Q80 / 1 / ... / 103 - A1 - M1 - V32(N)120 / **VC03** - SAE



Wrenches and tightening torques
 C = allen wrench 5 - 9.8 Nm (7.2 lbf^t)
 D = allen wrench 8 - 60 Nm (44.2 lbf^t)

Q80.V40(N)120/VC01-SAE configuration
 Parallel circuit, mechanical control with aux valves and flanged for single piloted check valve on A port

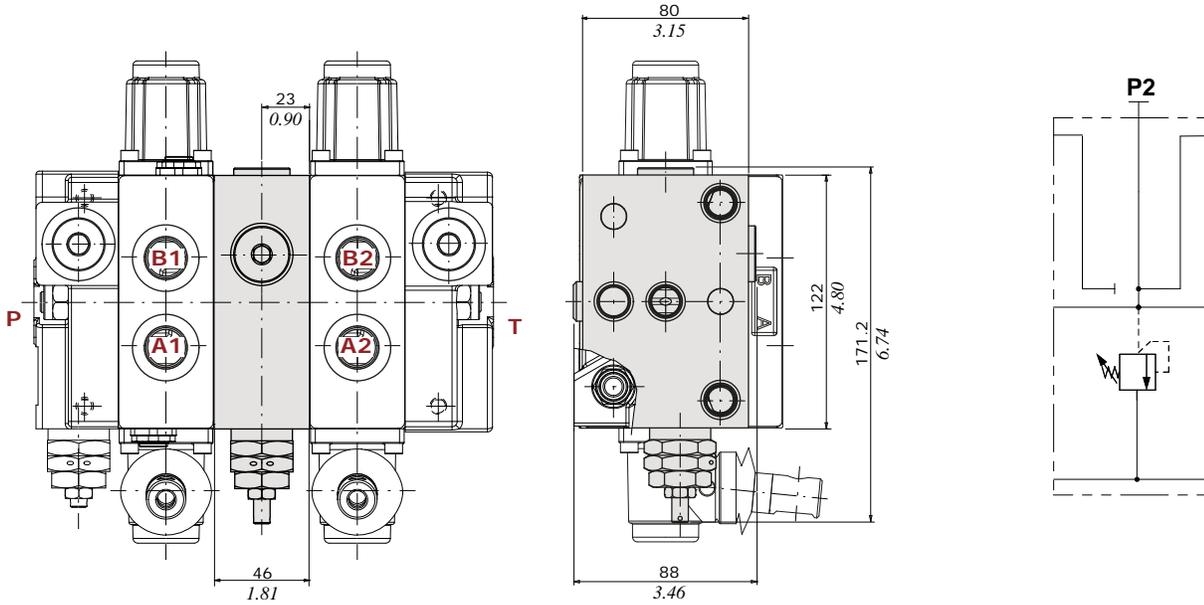
Q80.V40(N)120/VC03-SAE configuration
 Parallel circuit, mechanical control with aux valves and flanged for double piloted check valve on A and B ports



Dimensional data and hydraulic circuit

E50 type

Intermediate inlet section with pressure relief valve

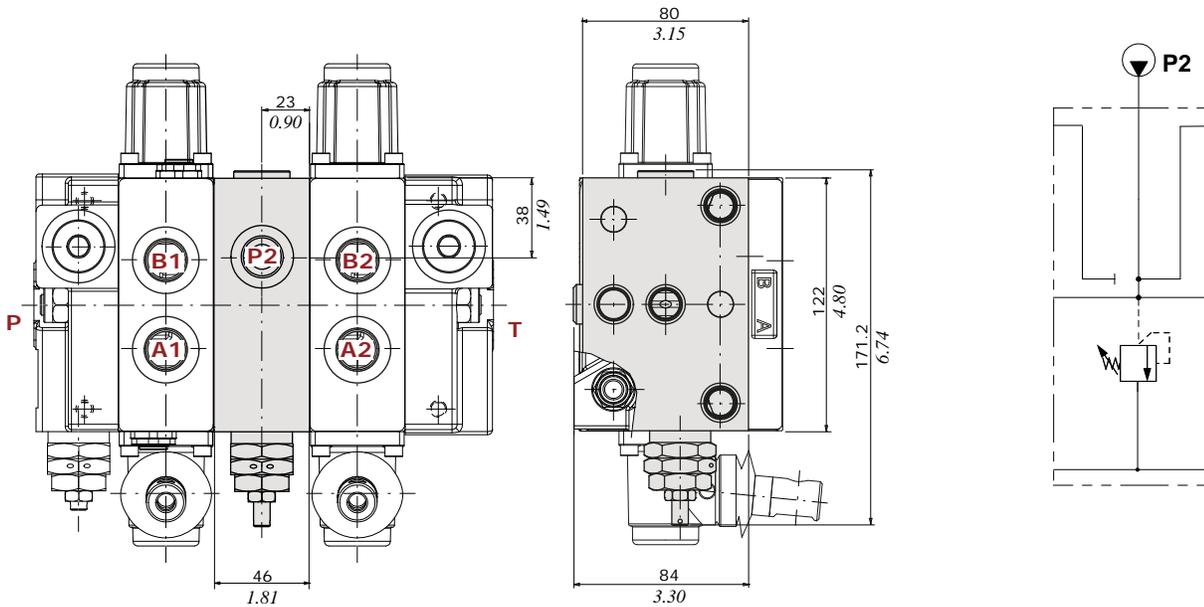


Description example: Q80/2/F7S(N150)/103-A1-M1.VC/**E50(N150)**/103-A1-M1/F3D-SAE

intermediate section spring type and valve setting (bar)

E53 type

Intermediate inlet section with pressure relief valve and P2 port open



Description example: Q80/2/F7S(N150)/103-A1-M1.VC/**E53(N150)**/103-A1-M1/F3D-SAE

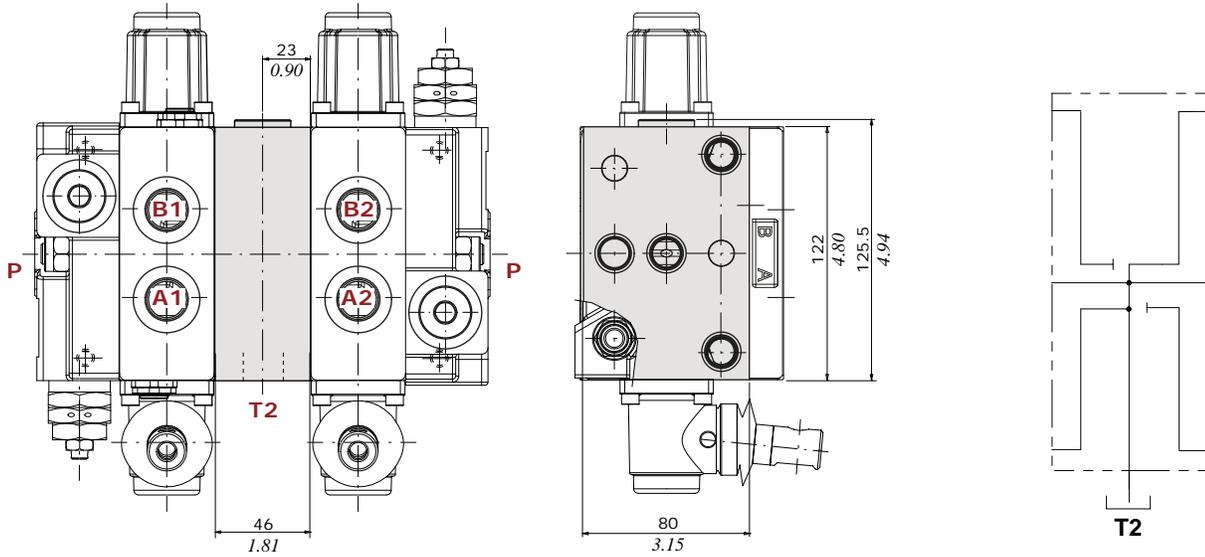
intermediate section spring type and valve setting (bar)

Intermediate section

Dimensional data and hydraulic circuit

E51 type

Intermediate outlet section, T2 port open

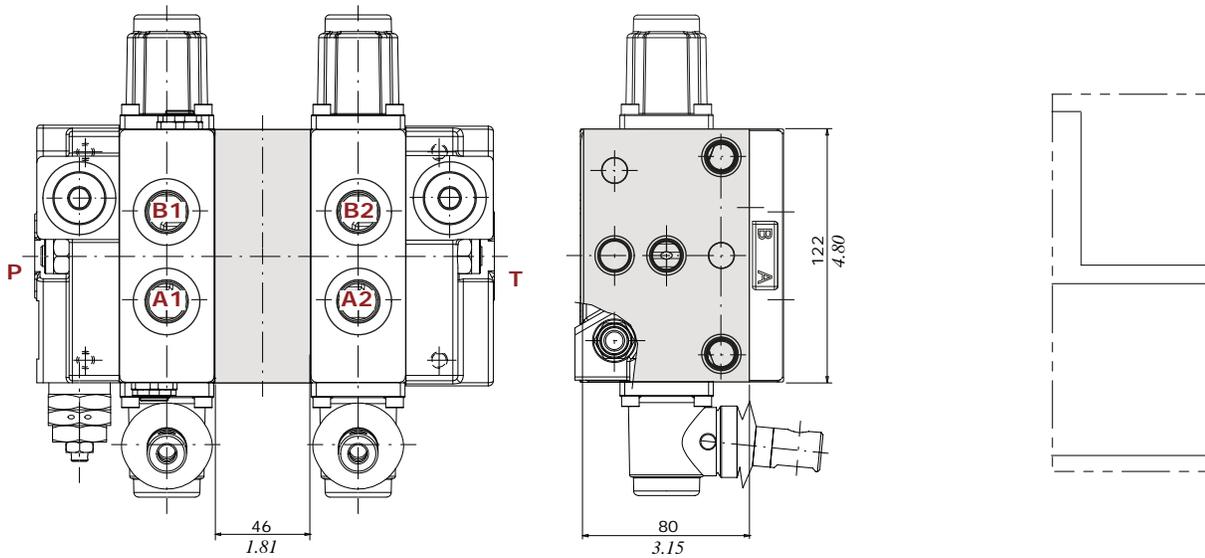


Description example: Q80/2/F7S(N150)/103-A1-M1.VC/**E51**/103-A1-M1/F3D-SAE

intermediate section

E61 type

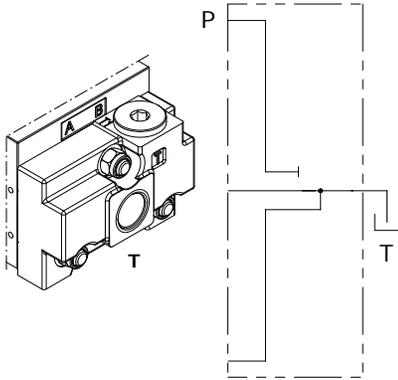
Intermediate spacer section



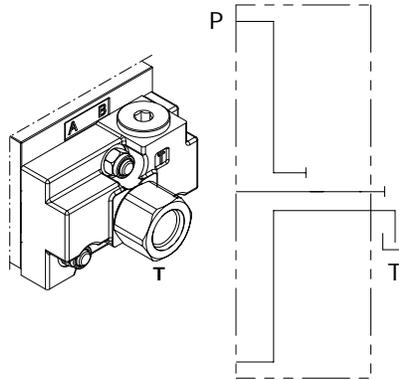
Description example: Q80/2/F7S(N150)/103-A1-M1.VC/**E61**/103-A1-M1/F3D-SAE

intermediate section

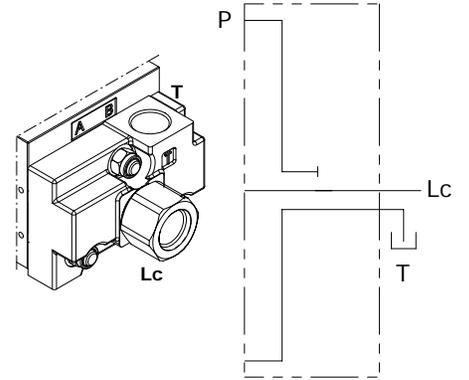
F3D-SAE configuration
Open center configuration



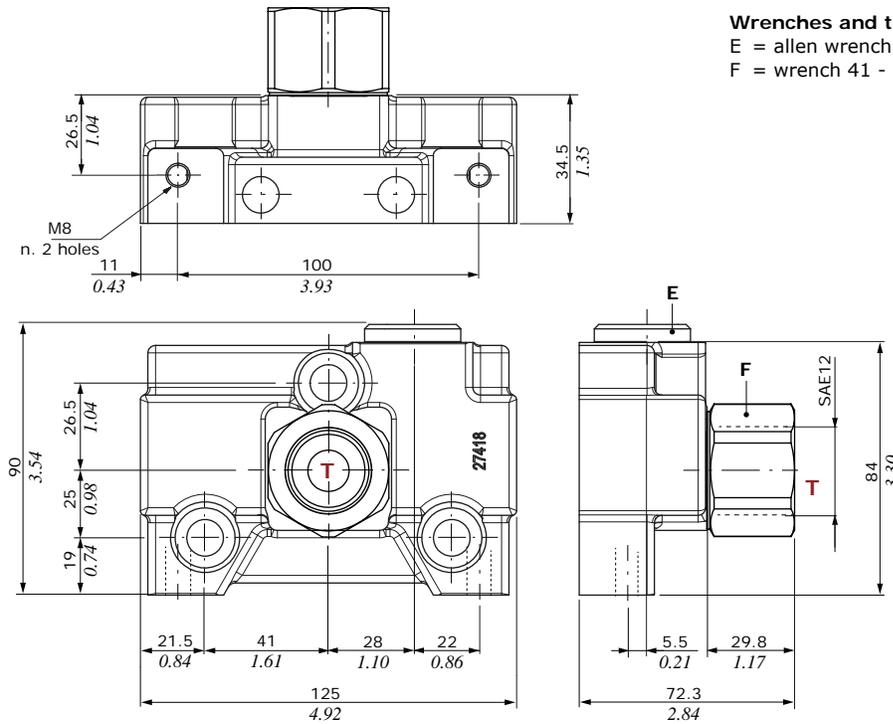
F16D-SAE configuration
Closed center configuration



F6D-SAE configuration
Carry-over configuration



F16D configuration example





Q130

Sectional directional control valve

- Available with parallel, tandem or series circuit
- Optional carry over port
- A wide range of antishock + anticavitation port valves
- Intermediate sections for several types of circuit
- Manual, pneumatic, electropneumatic, hydraulic, direct solenoid and electrohydraulic on-off controls

Working conditions

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

Nominal flow rating		130 l/min - (34.3 Us gpm)
Max. pressure		300 bar (4350 psi)
Max. back pressure on outlet T port		25 bar (360 psi)
Number sections		from 1 to 10
Internal leakage A(B)⇒T	Δp = 100 bar (1450 psi)	10 cm ³ /min (0.61 in ³ /min)
Fluid		Mineral oil
Fluid temperature	with NBR (BUNA-N) seals	from -30 °C to 80 °C - from -22 °F to 176 °F
Viscosity	operating range	from 10 to 400 mm ² /s - from 10 to 400 cSt
Max. contamination level		16/14/12 - ISO 4406 - NAS1638 class 6
Ambient temperature	without electric devices	from -40 °C to 60 °C - from 40 °F to 140 °F
	with electric devices	from -20 °C to 50 °C - from -4 °F to 122 °F

NOTE - For different conditions please contact our Sales Department.

REFERENCE STANDARD

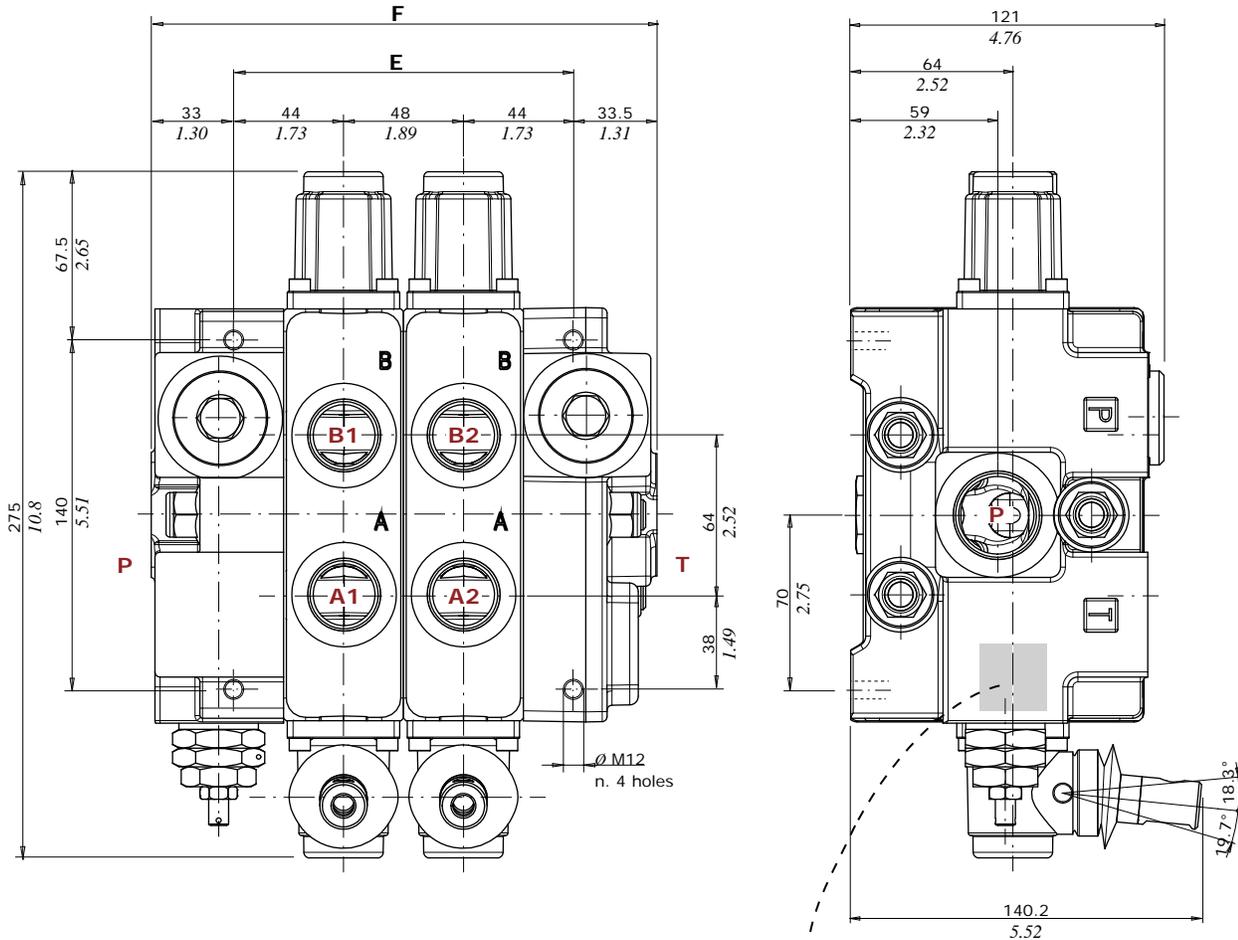
	BSP	UN-UNF
THREAD ACCORDING TO	ISO 228/1	ISO 263
	BS 2779	ANSI B1.1 unified
CAVITY DIMENSION ACCORDING TO	ISO 1179	11926
	SAE	J11926
	DIN 3852-2 shape X or Y	

PORT THREADING

PORTS	BSP (standard)	BSP (G 1")	UN-UNF
P Inlet	G 3/4	G 1"	1" 5/16-12 (SAE16)
P1 Inlet	G 3/4	G 1"	1" 5/16-12 (SAE16)
A and B ports	G 3/4	G 1"	1" 5/16-12 (SAE16)
T Outlet	G 1"	G 1"	1" 5/16-12 (SAE16)
T1 Outlet	G 1"	G 1"	1" 5/16-12 (SAE16)
Lc port (Carry-over plug - T port)	G 3/4-G 1"	G 1"	1" 1/16-12 (SAE12)
Hydraulic controls	G 1/4	G 3/4	9/16-18 (SAE 6)
Pneumatic controls	NPTF 1/8-27	NPTF 1/8-27	NPTF 1/8-27

Dimensional data

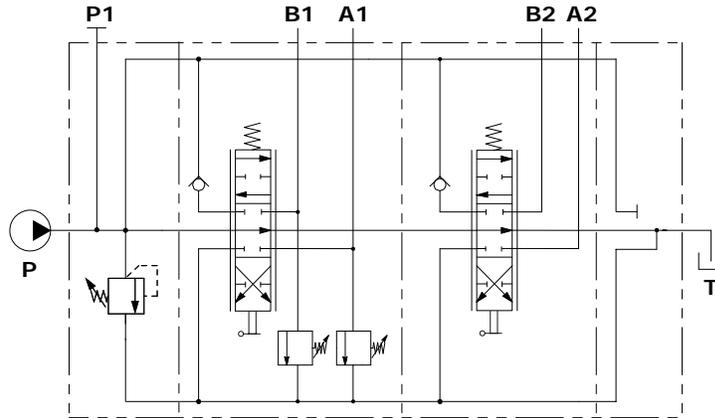
Standard configuration*



Type	E		F	
	mm	in	mm	in
Q130/1	88	3.46	154.5	6.08
Q130/2	136	5.35	202.5	7.97
Q130/3	184	7.24	250.5	9.86
Q130/4	232	9.13	298.5	11.75
Q130/5	280	11	346.5	13.64
Q130/6	328	12.91	394.5	15.53
Q130/7	376	14.80	442.5	17.42
Q130/8	424	16.70	490.5	19.31
Q130/9	472	18.58	538.5	21.20
Q130/10	520	20.47	586.5	23.09



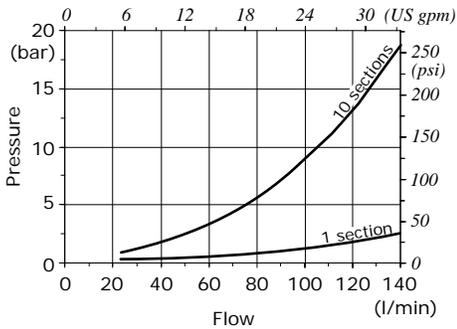
NOTE: Drawings and dimensions are referred to a **UN-UNF** threading configuration.
 (*): For other configurations, see page 240



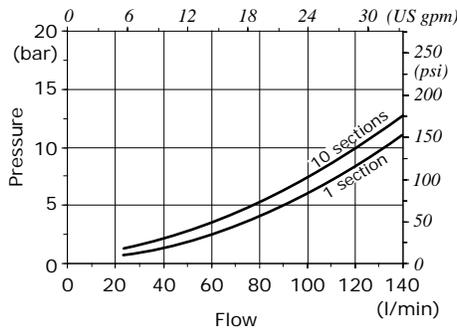
Description example (parallel circuit):
 Q130/2/F7S(N150)/103-A1-M1.V32(N105\N105)/103-A1-M1/F3D-SAE

Performance data

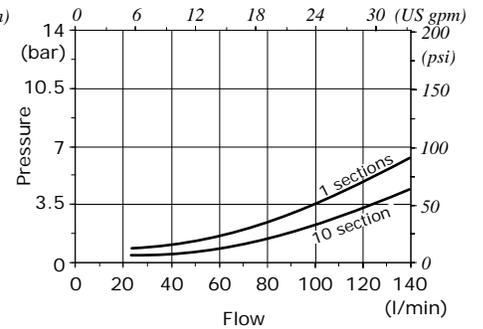
P→T pressure drops



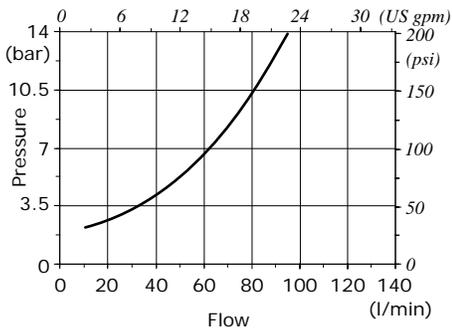
P→A(B) pressure drops



A(B)→T pressure drops



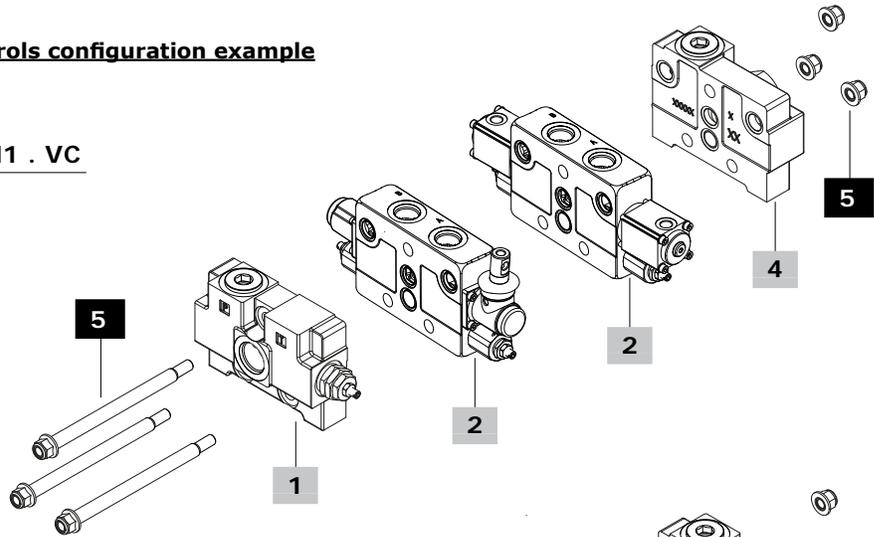
A1(B1)→A2(B2) pressure drops
 (with series circuit)



Complete section ordering codes

Valve with mechanical and hydraulic controls configuration example

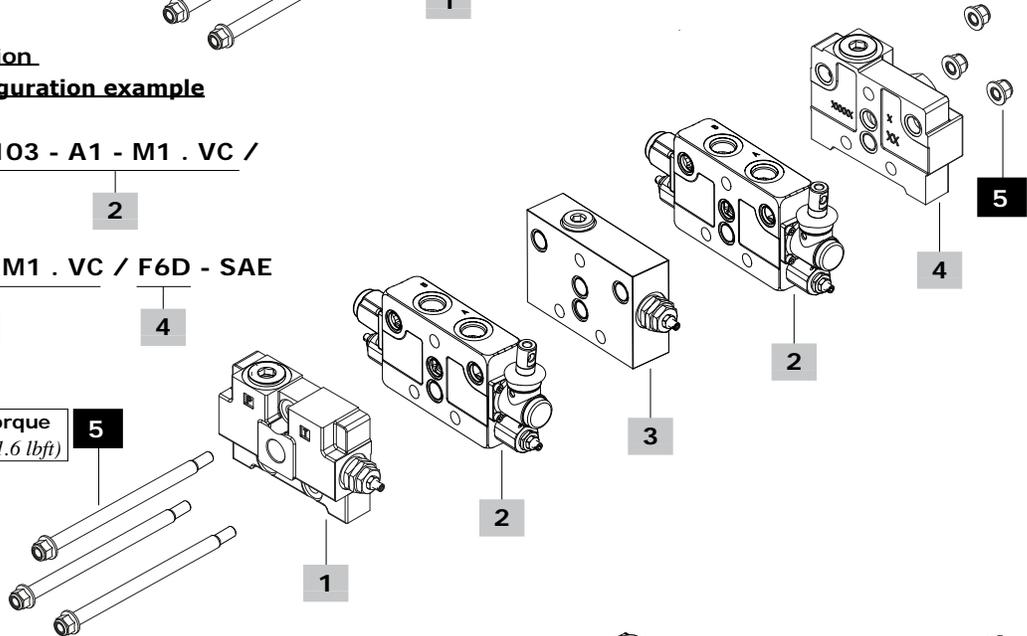
valve setting (bar)
Q130 / 2 / F7S(N150) / 103 - A1 - M1 . VC
 N. of section 1 2
 / 103 - H5 . VC / F6D - SAE
 2 4



Valve with intermediate section and mechanical control configuration example

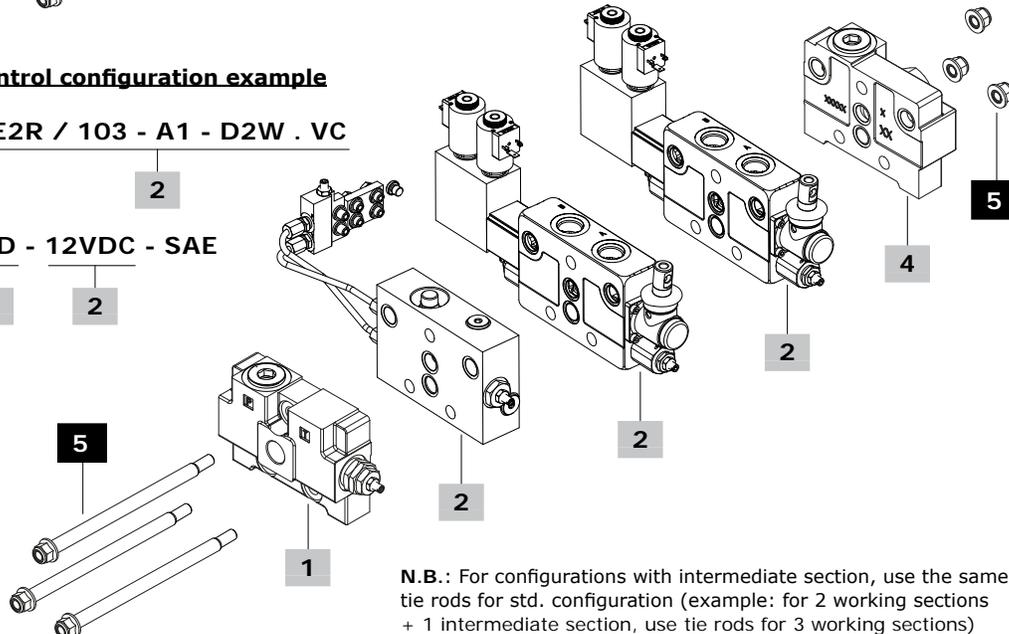
valve setting (bar)
Q130 / 2 / F7S(N150) / 103 - A1 - M1 . VC /
 1 2
/ E50(N150) / 103 - A1 - M1 . VC / F6D - SAE
 3 2 4

Tie rod tightening torque
 wrench 18 - 70 Nm (51.6 lbft)



Valve with electrohydraulic control configuration example

Q130 / 2 / F7S(N150) / KE2R / 103 - A1 - D2W . VC
 1 2
/ 103 - A1 - D2W . VC / F6D - 12VDC - SAE
 2 4 2



N.B.: For configurations with intermediate section, use the same tie rods for std. configuration (example: for 2 working sections + 1 intermediate section, use tie rods for 3 working sections)

1 Inlet section* page 212

TYPE: **FE-Q130/F7S(N150)-SAE** CODE: 10000F7S/D/03N
 DESCRIPTION: Side inlet open, upper inlet plugged, with pressure relief valve, setting range 101-200 bar (1460-2900 psi)
 TYPE: **FE-Q130/F8S-SAE** CODE: 10003F8S/D/03
 DESCRIPTION: As previous one, without valves (pressure relief valve plugged port)

2 Working section* page 215**With mechanical controls**

TYPE: **EL-Q130/103-A1-M1.VC-SAE** CODE: 100000103001500
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, lever control and spring return to neutral position

TYPE: **EL-Q130/103-A1-M1-SAE** CODE: 100000103001100
 DESCRIPTION: As previous one, without valve arrangement

With proportional hydraulic controls

TYPE: **EL-Q130/103-H5.VC-SAE** CODE: SGL130015
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, low pressure hydraulic controls, spring return to neutral position

TYPE: **EL-Q130/103-H5-SAE** CODE: SGL130016
 DESCRIPTION: As previous one, without valve arrangement

With electrohydraulic ON/OFF controls - one side type

TYPE: **EL-Q130/KE1S/103-A1-D2W.VC -12VDC-SAE**
 CODE: SGL130017
 DESCRIPTION: Parallel circuit with valve arrangement (seat plugged), 3 positions double acting spool, 12VDC one-side electrohydraulic ON/OFF control, internal pilot and drain, lever control and spring return to neutral position

TYPE: **EL-Q130/KE1S/103-A1-D2W-12VDC-SAE**
 CODE: SGL130018

DESCRIPTION: As previous one, without valve arrangement

3 Intermediate section page 240

TYPE	CODE	DESCRIPTION
E50	10850E50-B	With pressure relief valve setting range 10-100 bar (145-1450 psi)
	10850E50-N	As previous one, setting range 101-200 bar (1460-2900 psi)
	10850E50-R	As previous one, setting range 201-380 bar (2910-5500 psi)
E53	10854E53-BSAE	With pressure relief valve setting range 10-100 bar (145-1450 psi) and P2 port open for 2 nd pump
	10854E53-NSAE	As previous one, setting range 101-200 bar (1460-2900 psi)
	10854E53-RSAE	As previous one, setting range 201-380 bar (2910-5500 psi)
E51	10853E51SAE	Intermediate outlet section, T2 port open
E61	10877E61	Intermediate spacer section

4 Outlet section* page 242

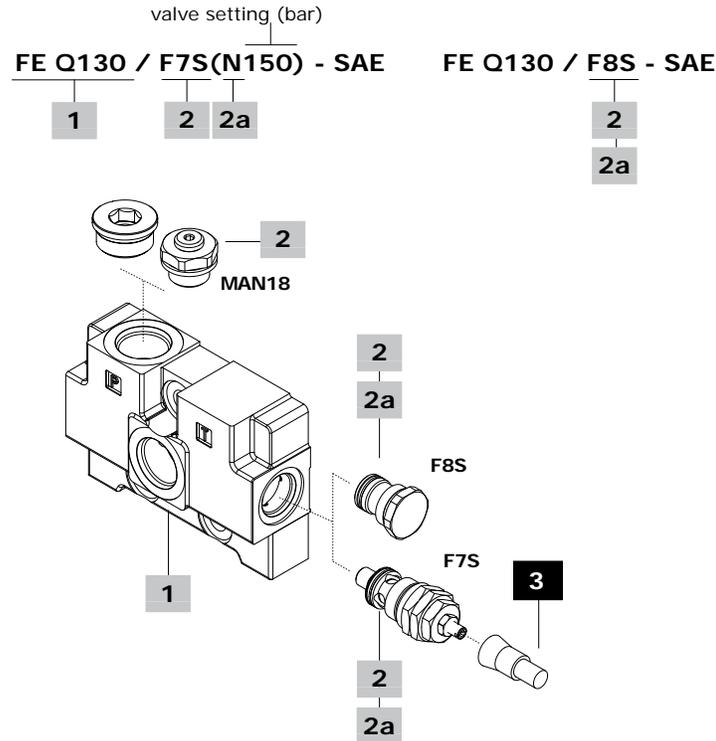
TYPE	CODE	DESCRIPTION
FS-Q130-F3D-SAE	10012F3D/02/04	T port open, T1 port plugged. For open center circuit
FS-Q130-F16D-SAE	10016F16D/02/04	T port open, T1 port plugged. For closed center circuit
FS-Q130-F6D-SAE	10014F6D/02/04	Lc port and T1 port open. With joint for carry-over (HPCO) circuit

5 Tie rods kit

CODE	DESCRIPTION
10901TX1	For 1 section valve
10902TX2	For 2 sections valve
10903TX3	For 3 sections valve
10904TX4	For 4 sections valve
10905TX5	For 5 sections valve
10906TX6	For 6 sections valve
10907TX7	For 7 sections valve
10908TX8	For 8 sections valve
10909TX9	For 9 sections valve
10910TX10	For 10 sections valve

(*): Codes are referred to **UN-UNF** thread

Inlet section - parts ordering codes



1 Inlet body section* page 213

TYPE: **FE-Q130-SAE** CODE: 060013083899
 DESCRIPTION: Side inlet port, upper inlet plugged, for pressure relief valve arrangement

2 Configuration coding* page 213

TYPE	DESCRIPTION
F7S-SAE	With pressure relief valve
F8S-SAE	Without valves (pressure relief valve plugged port)

Note: Inlet configurations require upper P port:
 n. 1 SAE16 plug code 255016, or n. 1 pressure gauge arrangement code 5MAN641250

2a Main pressure relief valve page 214

TYPE: B	CODE: 700105205000000	DESCRIPTION: VLP105S valve, setting range 10-100 bar (145-1450 psi)
TYPE: N	CODE: 700105105000000	DESCRIPTION: VLP105S valve, setting range 101-200 bar (1460-2900 psi)
TYPE: R	CODE: 700105305000000	DESCRIPTION: VLP105S valve, setting range 201-380 bar (2910-5500 psi)
TYPE: -	CODE: 06000468999	DESCRIPTION: Relief valve blanking plug

3 Accessory

TYPE	CODE	DESCRIPTION
-	4COP120420	Antitamper cap for pressure relief valve

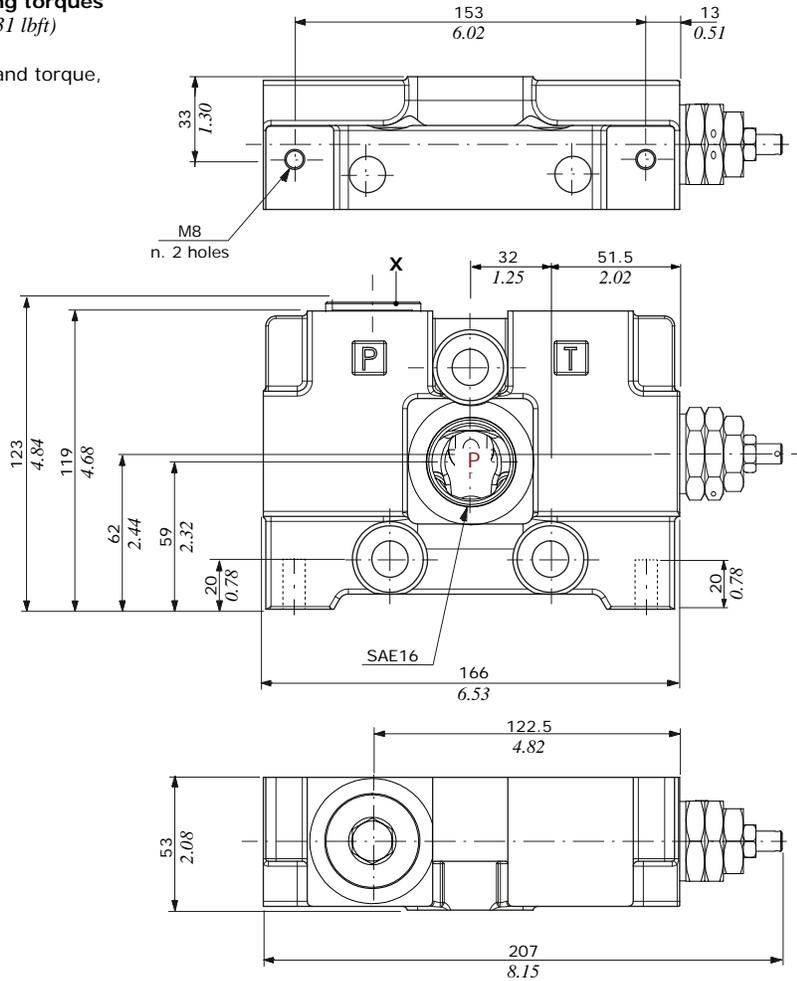
(*): Codes are referred to **UN-UNF** thread

Dimensional data and hydraulic circuits

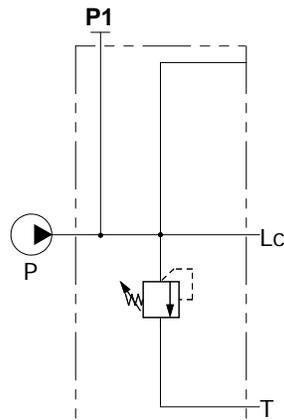
Wrenches and tightening torques

X = wrench 12 - 42 Nm (31 lbft)

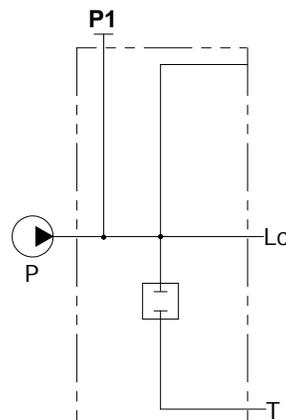
Note: For valves wrench and torque, see related pages



F7S-SAE configuration
With pressure relief valve



F8S-SAE configuration
Without valves
(pressure relief valve plugged port)



Inlet section

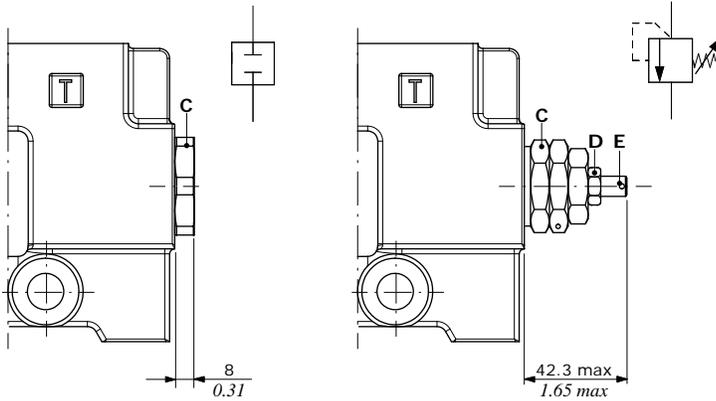
Main pressure relief valve

Relief valve blanking plug

Main pressure relief valve

Wrenches and tightening torques

- C = wrench 32 - 80 Nm (59 lbft)
- D = wrench 13 - 24 Nm (17.7 lbft)
- E = allen wrench 4

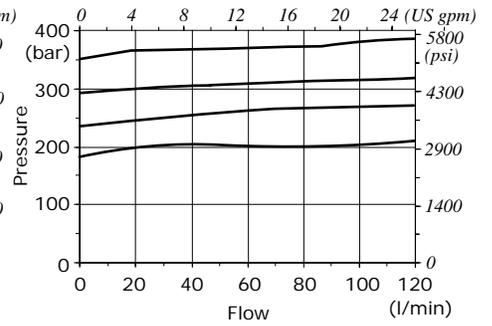
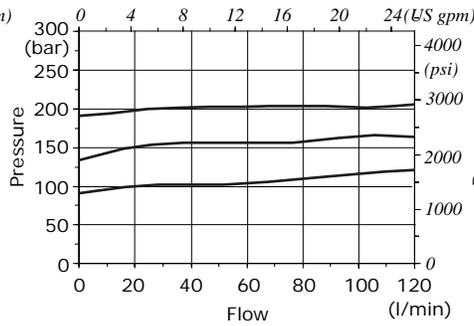
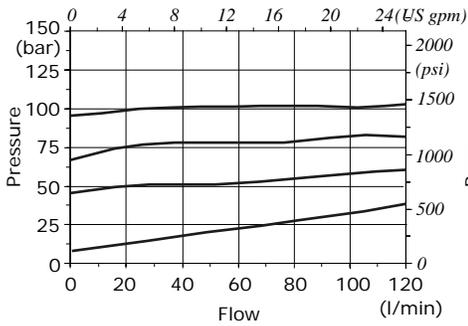


Spring type	Setting ranges (bar - psi)
B (white)	From 10 to 100 - from 145 to 1450
N (black)	From 101 to 200 - from 1460 to 2900
R (red)	From 201 to 380 - from 2910 to 5500

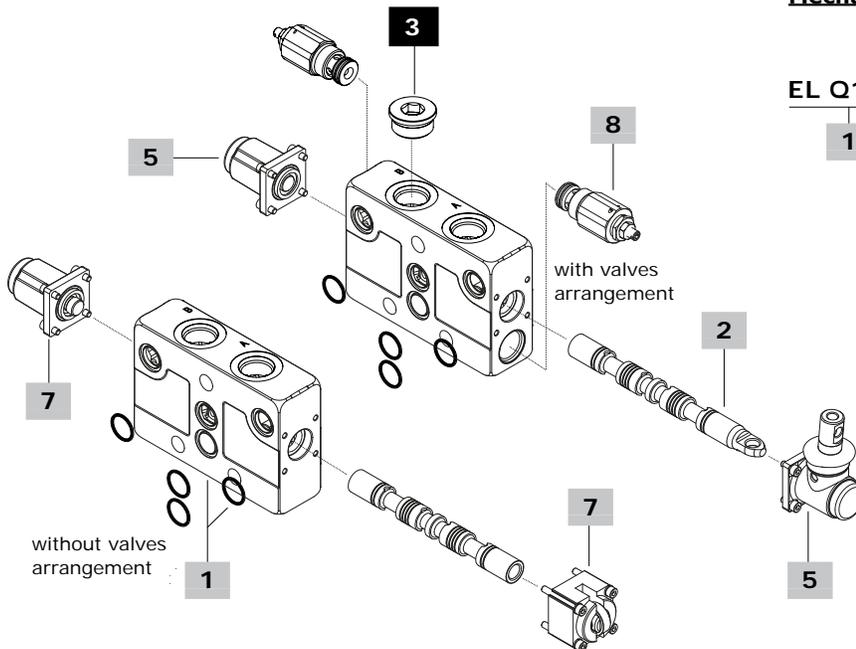
Setting example (B type spring)

Setting example (N type spring)

Setting example (R type spring)



Working section - parts ordering codes



Mechanical control valve configuration example

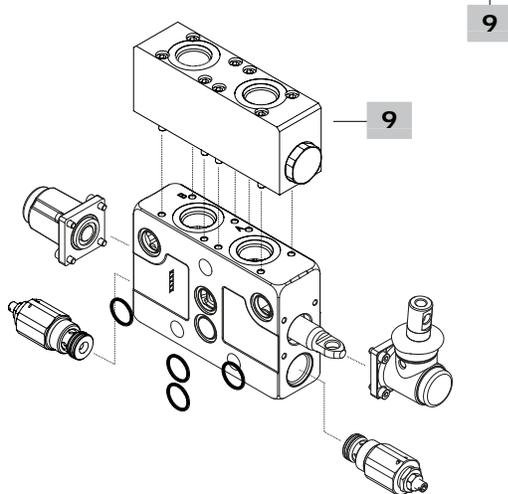
spring type and valve setting (bar)
EL Q130 / 102 - A1 - M1 . V40(N)120 - SAE
 1 2 4 5 8

C2/C3 complete mechanical control configuration example

EL Q130 / 103 - C3 . V40(N)120 - SAE
 7

Mechanical control valve with arrangement for secondary aux valves block: configuration example

EL Q130 / 103 - A1 - M1 . V40(N)120 / VC03 - SAE



2 Spool page 220

TYPE	CODE	DESCRIPTION
Standard spools		
103	060102983699	Double acting, A and B closed in neutral position
	KR130103K	As previous one, for kick-out control
106	KR130106	Double acting for closed circuit
107	KR130107-108	Double acting, A to tank and B closed in neutral position
108	KR130107-108	Double acting, B to tank and A closed in neutral position
111	060102996399	Double acting, A and B to tank in neutral position
	KR103111K	As previous one, for kick-out control
101	3CUG2996000	Single acting on port A. SAE12 plug is required, see #3
102	3CUG2996001	Single acting on port B. SAE12 plug is required, see #3
116	KR130116	Double acting, with floating in the 4 th position (spool in): requires dedicated spool control
603	060103218199	Double acting, A and B closed in neutral position, for series circuit
Special spools for cam, microswitch controls and other leverless controls		
103	060102996199	Double acting, A and B closed in neutral position
111	060102996299	Double acting, A and B to tank in neutral position
603	060103236499	Double acting, A and B to tank in neutral position, for series circuit

1 Working section body kit* page 219

TYPE: **EL-Q130.VC-SAE** CODE: 5EL0600127990
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-Q130.VC.VPC-SAE** CODE: 5EL0600132356
 DESCRIPTION: Parallel circuit with port valves arrangement, for secondary aux valves block
 TYPE: **EL-Q130-SAE** CODE: 5EL0600127985
 DESCRIPTION: Parallel circuit, without port valves arrangement
 TYPE: **EL-Q130.VC-SAE** CODE: 5EL0600127987
 DESCRIPTION: Series circuit, with port valves arrangement

3 Plug for single acting spool*

TYPE	CODE	DESCRIPTION
-	255012	SAE12 plug

(*): Codes are referred to **UN-UNF** thread

Working section - parts ordering codes

4 A side control page 221

TYPE	CODE	DESCRIPTION
For standard spools		
<u>With lever control:</u>		
A1	10600A1-A2	M10 thread aluminium lever box
A2	10600A1-A2	As A1 type, with lever box rotated 180°
A1/Z1	10610A1-A2/Z1	Aluminium lever box for 116 spool type
A2/Z1	10610A1-A2/Z1	As A1/Z1 type, with lever box rotated 180°
<u>With safety lever control:</u>		
A1/S⁽¹⁾	10624A1-A2/S	M10 thread aluminium lever box
A2/S⁽¹⁾	10624A1-A2/S	As A1/S type, with lever box rotated 180°
<u>Without lever control:</u>		
A6	10620A6	With flange
A6/Z1	10620A6/Z1	As A6 type, for 116 spool type
A6H	10620A6HH	As A6 type, with scraper
A8	10622A8	Arrangement for flexible cable control
A8/Z1	10622A8/Z1	As A8 type, for 116 spool type
<u>With joystick controls for 2 section operation:</u>		
A35/1	10637A35-12	Joystick 1 type
A35/2	10637A35-12	Joystick 2 type
A35/3	10637A35-34	Joystick 3 type
A35/4	10637A35-34	Joystick 4 type
For types 103, 111 and 603 special spools		
<u>With spool position microswitch:</u>		
Note: to complete the control you must use the assembly kit at #6		
N1-A1	10641N1-A1/A2	Micro operation in pos. 1 and 2, with lever box
N1A-A1	10642N1A-A1/A2	Micro operation in pos. 1, with lever box
N1B-A1	10643N1B-A1/A2	Micro operation in pos. 2, with lever box
N1-A3	10648N1-A3	Micro operation in pos. 1 and 2, without lever with cap
N1A-A3	10648N1A-A3	Micro operation in pos. 1, without lever with cap
N1B-A3	10648N1B-A3	Micro operation in pos. 2, without lever with cap
<u>Without lever control:</u>		
A3	10614A3	Without lever, with cap
A4	10617A4	M10 thread male external pin with flange
A5⁽²⁾	10619A5	Flange with spherical spool end

5 B side control page 228

TYPE	CODE	DESCRIPTION
<u>With spring return:</u>		
M1	10730M1	3 pos., spring return in neutral position
M1/O1	10730M1/O1	As M1 type, for joystick control
M1/B1	10753M1-B1	As M1 type, with microswitch arrangement
M1-U1	10701M1-U1	As M1 type, with M10 male thread external pin
M2	10732M2	2 pos. (0-1), spring return in neutral position
M2-U1	10702M2-U1	As M2 type, with M10 male thread external pin
M3	10733M3	2 pos. (0-2), spring return in neutral position
M3-U1	10702M3-U1	As M3 type, with M10 male thread external pin
M4	10735M42-1	2 pos. (2-1), spring return in position 2
<u>With flexible cable control arrangement:</u>		
M1-U2	10715M1-U2	3 pos., spring return in neutral position
M2-U2	10716M2-U2	2 pos. (0-1), spring return in neutral position
M3-U2	10717M3-U2	2 pos. (0-2), spring return in neutral position
<u>With friction:</u>		
RO	10740RO	Adjustable friction control
<u>With detent:</u>		
R1	10741R1	3 pos., detent in position 1
R2	10742R2	3 pos., detent in position 2
R3	10743R3	3 pos., detent in all position
R4	10744R4	2 pos., detent in position 0-1
R5	10745R5	2 pos., detent in position 0-2
R6	10746R6	2 pos., detent in position 1-2
R8	10748R8	4 pos., detent in 4 th pos., for 116 spool type

5 B side controls (cont.) page 228

TYPE	CODE	DESCRIPTION
<u>With detent and kick out function:</u>		
R1K	10741R1K	3 pos., detent in position 1
R2K	10742R2K	3 pos., detent in position 2
R3K	10743R3K	3 pos., detent in all position
<u>With spool position microswitch:</u>		
Note: To complete the control you must use the assembly kit at #6		
M1-N1	10766M1-N1	3 pos., micro operation in pos. 1 and 2, spring return in neutral position
M1-N1A	10767M1-N1A	As M1-N1 type, micro operation in pos. 1
M1-N1B	10768M1-N1B	As M1-N1 type, micro operation in pos. 2
M2-N1	10769M2-N1	2 pos. (0-1), spring return in neutral position
M3-N1	10772M3-N1	2 pos. (0-2), spring return in neutral position
<u>With pneumatic and electropneumatic controls:</u>		
P1N	10561P1-N	ON/OFF pneumatic control
P1NP	10561P1-NP	Proportional pneumatic control
D3	10591D3-O-12DC	12 VDC, ON/OFF electropneumatic control
	10592D3-O-24DC	24 VDC, ON/OFF electropneumatic control

6 Microswitch assembly kit

CODE	DESCRIPTION
10650N1-01	Kit for 1 section
10650N1-02	Kit for 2 sections
10650N1-03	Kit for 3 sections
10650N1-04	Kit for 4 sections
10650N1-05	Kit for 5 sections
10650N1-06	Kit for 6 sections
10650N1-07	Kit for 7 sections
10650N1-08	Kit for 8 sections
10650N1-09	Kit for 9 sections
10650N1-10	Kit for 10 sections

7 Complete controls A+B sides page 233

TYPE	CODE	DESCRIPTION
For types 103, 111 and 603 special spools		
C2	10792C2-C3	Cam control from pos. 1 to 2
C3	10792C2-C3	Cam control from pos. 2 to 1

8 Auxiliary port valve page 237

TYPE	CODE	DESCRIPTION
<u>Antishock valve:</u>		
V30-B	10800V30-B	Setting range: from 30 to 80 bar (from 435 to 1150 psi)
V30-N	10800V30-N	Setting range: from 81 to 200 bar (from 1170 to 2900 psi)
V30-R	10800V30-R	Setting range: from 201 to 350 bar (from 2910 to 5100 psi)
<u>Antishock/anticavitation valve:</u>		
V33-B	10803V33-B	Setting range: from 30 to 80 bar (from 435 to 1150 psi)
V33-N	10803V33-N	Setting range: from 81 to 200 bar (from 1170 to 2900 psi)
V33-R	10803V33-R	Setting range: from 201 to 350 bar (from 2910 to 5100 psi)
<u>Anticavitation valve:</u>		
V04	10808V04	Anticavitation valve
<u>Plug:</u>		
VC	060002798999	Valve blanking plug
For other configurations and positions, see page 237		

9 Secondary aux valves* page 239

TYPE	CODE	DESCRIPTION
VRP-VC01-SAE	10835V01/SAE	Single piloted check valve on A port, 250 bar (3600 psi)
VRP-VC03-SAE	10837V03/SAE	Double piloted check valve on A and B ports, 250 bar (3600 psi)

(*): Codes are referred to **UN-UNF** thread
 (1): Always complete with lever knob
 (2): To be assembled only with M4 control

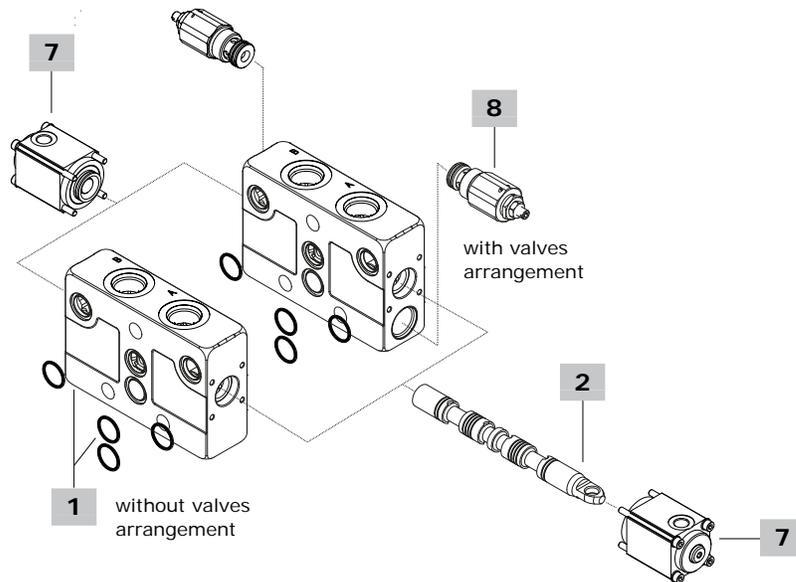
Working section - parts ordering codes

Proportional hydraulic controls valve configuration example

spring type and valve setting (bar)

EL Q130 / 103 - H5 . V40(N)120 - SAE

1
 2
 7
 8



1 Working section body kit* page 219

TYPE: **EL-Q130-H5.VC-SAE** CODE: 5EL0600127990H5
 DESCRIPTION: Parallel circuit, with port valves arrangement
 TYPE: **EL-Q130-H5-SAE** CODE: 5EL0600127985H5
 DESCRIPTION: Parallel circuit, without port valves arrangement

2 Spool page 220

TYPE	CODE	DESCRIPTION
103	060102983699	Double acting, A and B closed in neutral position

7 Hydraulic controls A+B sides* page 234

TYPE	CODE	DESCRIPTION
H5	10785H5/SAE	Low pressure proportional type, upper ports

8 Auxiliary port valve page 237

See #8, page 216

(*): Codes are referred to **UN-UNF** thread

Working section - parts ordering codes

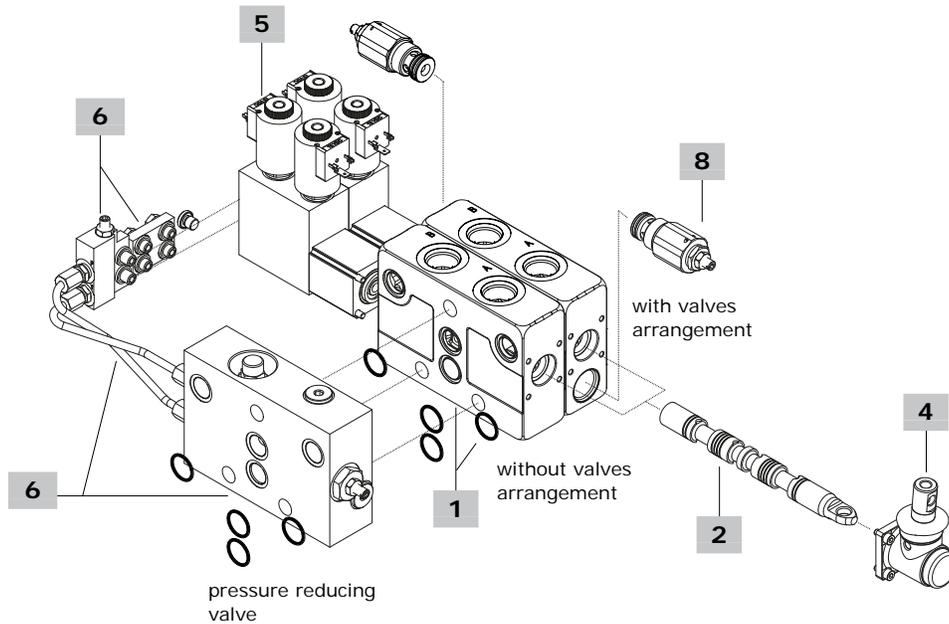
One side - ON/OFF electrohydraulic control valve configuration example

R = with pressure reducing valve
S = without pressure reducing valve

spring type and valve setting (bar)

EL Q130 / KE1R / 103 - A1 - D2W . V40(N)120 - 12VDC - SAE

1 6 2 4 5 8 5



1 Working section body kit* page 219

See #1, page 215

2 Spool page 220

See #2, page 215

4 A side control page 221

See #4, page 216

5 B side electrohydraulic control page 235

TYPE	CODE	DESCRIPTION
D2W-12VDC	10681D2W1200	3 pos., 12VDC ON/OFF electrohydraulic control
D2W-24VDC	10681D2W2400	3 pos., 24VDC ON/OFF electrohydraulic control

Note: For BT type coils, see page 243

6 Connector kit page 236

TYPE	CODE	DESCRIPTION
Without pressure reducing valve		
KE1S	5GKE13S010	Kit for 1 section
KE2S	5GKE13S020	Kit for 2 sections
KE3S	5GKE13S030	Kit for 3 sections
KE4S	5GKE13S040	Kit for 4 sections
KE5S	5GKE13S050	Kit for 5 sections
KE6S	5GKE13S060	Kit for 6 sections
KE7S	5GKE13S070	Kit for 7 sections
KE8S	5GKE13S080	Kit for 8 sections
KE9S	5GKE13S090	Kit for 9 sections
KE10S	5GKE13S100	Kit for 10 sections

Note: Connector kit are included collector and feeding block

With pressure reducing valve

KE1R	5GKE13R010	Kit for 1 section
KE2R	5GKE13R020	Kit for 2 sections
KE3R	5GKE13R030	Kit for 3 sections
KE4R	5GKE13R040	Kit for 4 sections
KE5R	5GKE13R050	Kit for 5 sections
KE6R	5GKE13R060	Kit for 6 sections
KE7R	5GKE13R070	Kit for 7 sections
KE8R	5GKE13R080	Kit for 8 sections
KE9R	5GKE13R090	Kit for 9 sections
KE10R	5GKE13R100	Kit for 10 sections

Note: Connector kit are included collector and feeding block, drain lines and pressure reducing valve

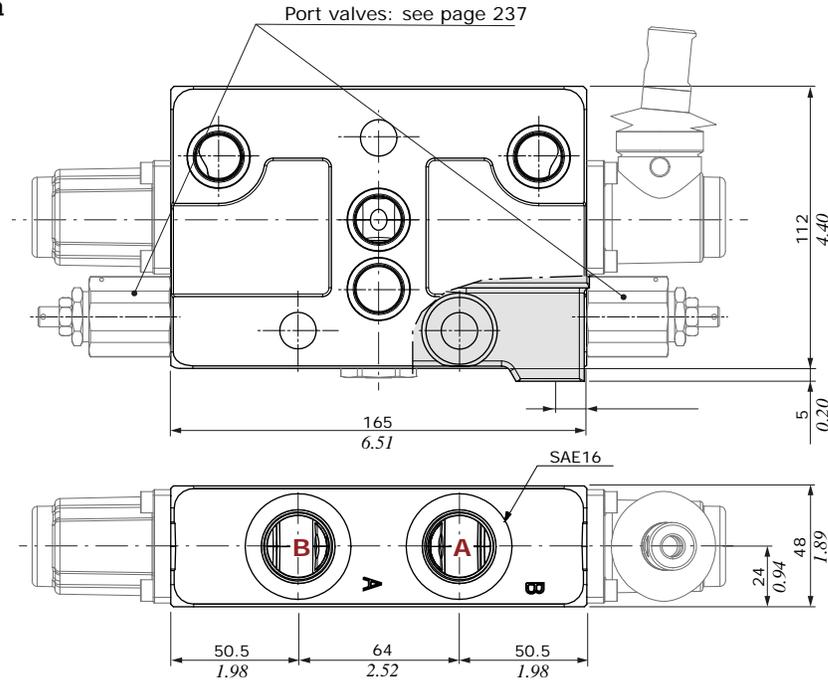
7 Auxiliary port valve page 237

See #8, page 216

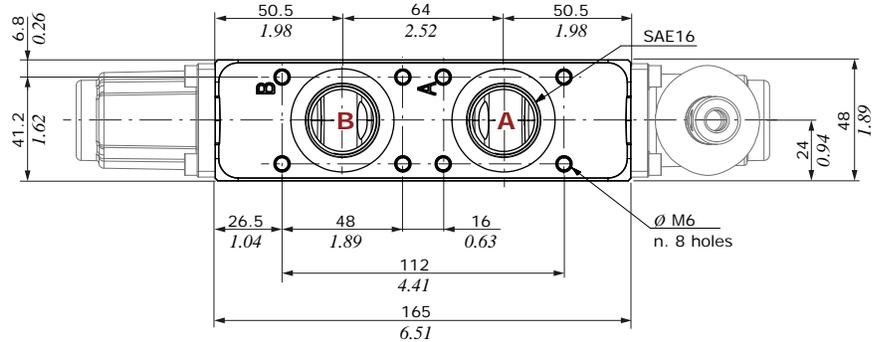
(*): Codes are referred to UN-UNF thread

Dimensional data and hydraulic circuits

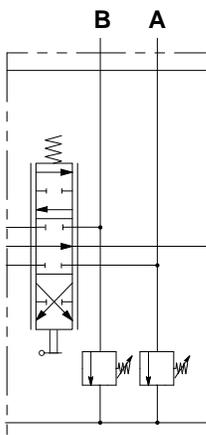
Standard working section



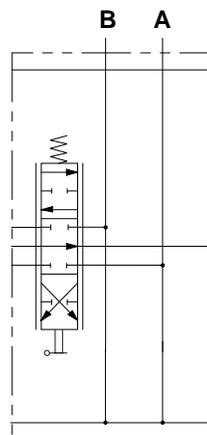
Working section for secondary aux valves block



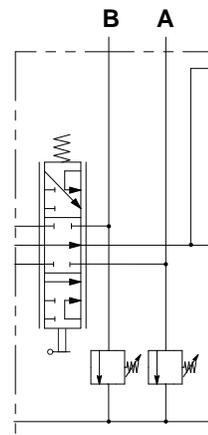
Q130.V40(N)120-SAE configuration
Parallel circuit,
mechanical control with aux valves



Q130-SAE configuration
Parallel circuit,
mechanical control without aux valves



Q130.V40(N)120-SAE configuration
Series circuit,
mechanical control with aux valves

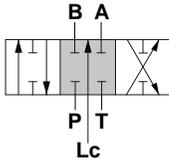


Working section

Spool

103 type
A and B closed
in neutral position

2 0 1

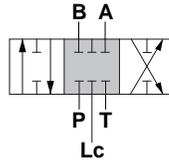


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

106 type
A, B and Lc closed in
neutral position. For closed center

2 0 1

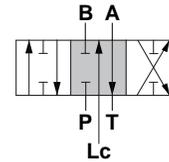


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

107 type
A to tank, B closed
in neutral position

2 0 1

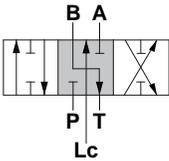


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

108 type
B to tank, A closed
in neutral position

2 0 1

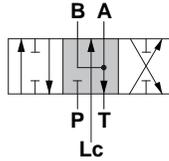


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

111 type
A and B to tank
in neutral position

2 0 1

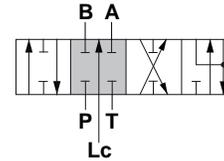


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

116 type
With floating in the 4th position
(spool in)

2 0 1 3

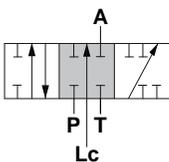


Stroke

Position 1: - 4.5 mm (- 0.17 in)
Position 2: + 7 mm (+ 0.27 in)
Position 3: - 10.25 mm (- 0.40 in)

101 type
Single acting on A,
B plugged

2 0 1

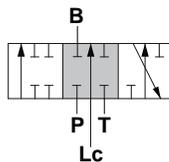


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

102 type
Single acting on B,
A plugged

2 0 1

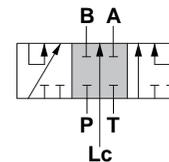


Stroke

Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

603 type
A and B closed in neutral
position. For series circuit

2 0 1



Stroke

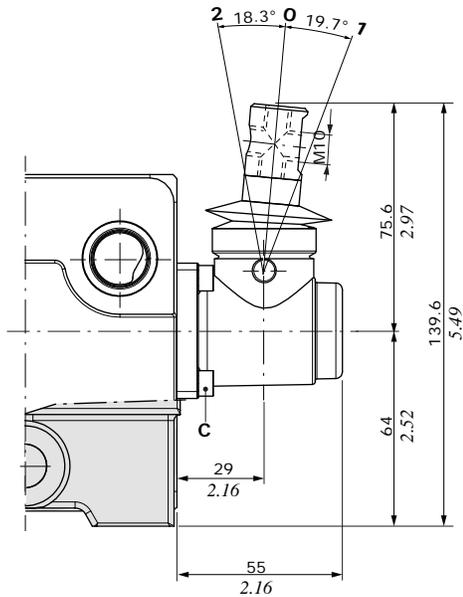
Position 1: + 7 mm (+ 0.27 in)
Position 2: - 7 mm (- 0.27 in)

A side controls

With lever control

A1 type

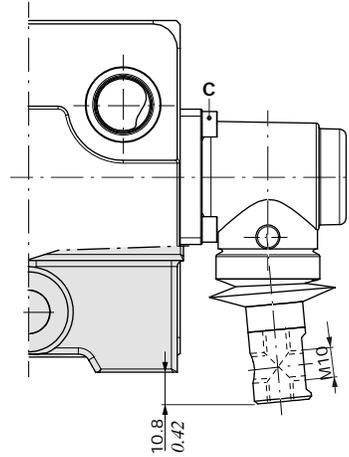
M10 thread aluminium lever box



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)

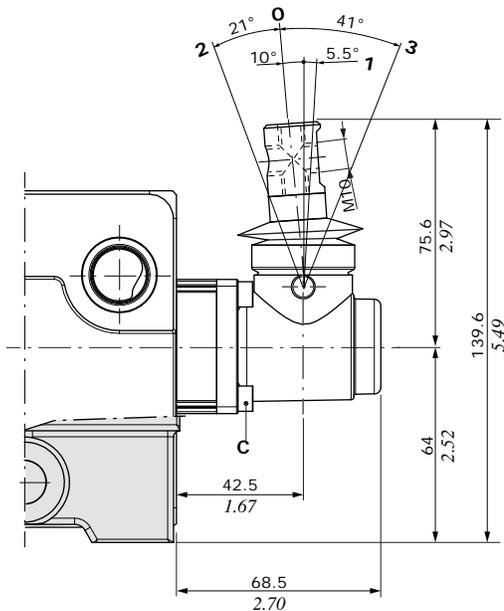
A2 type

As A1 type, rotated 180°



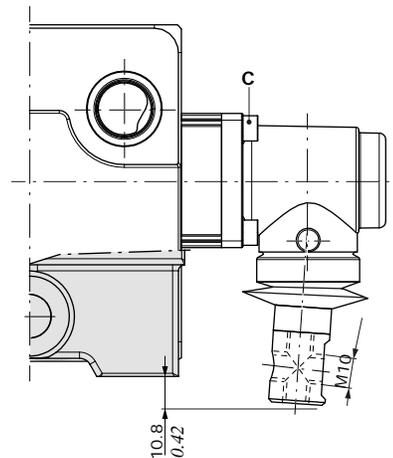
A1/Z1 type

M10 thread, for 116 floating spool type



A2/Z1 type

As A1/Z1 type, rotated 180°



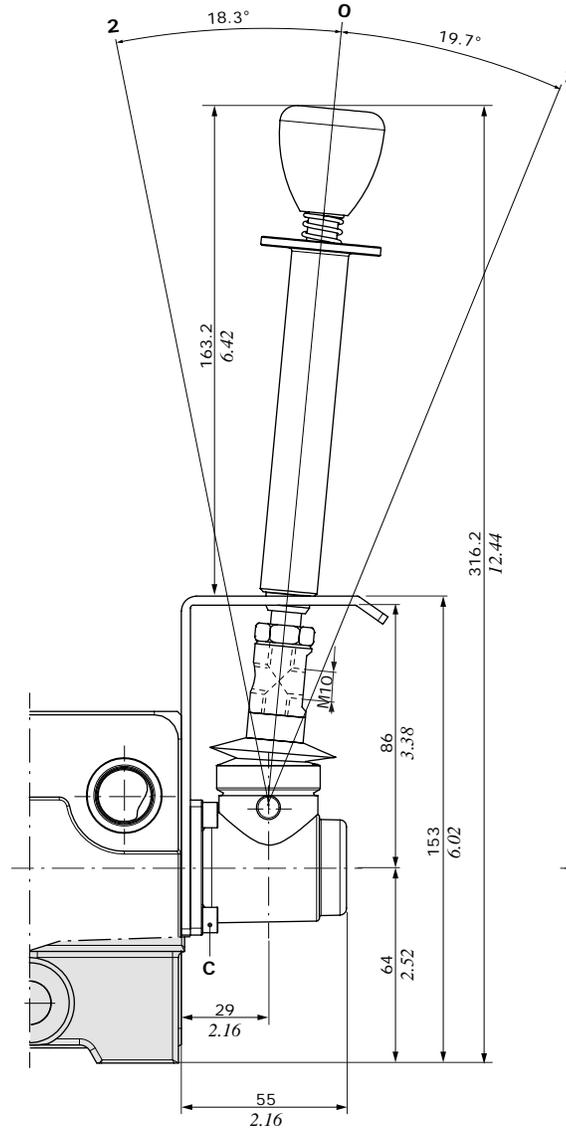
Working section

A side controls

With safety lever control

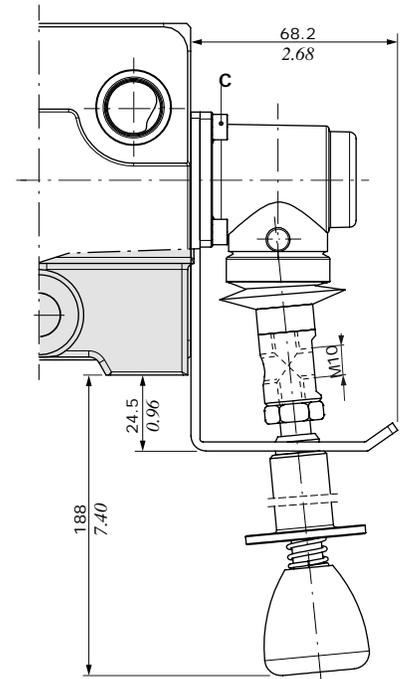
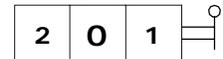
A1/S type

M10 thread, aluminium lever box



A2/S type

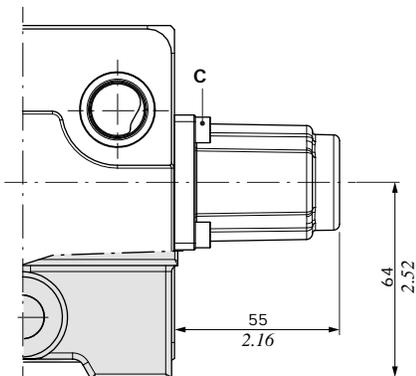
As A1/S type, rotated 180°



Without lever control

A3 type

With cap



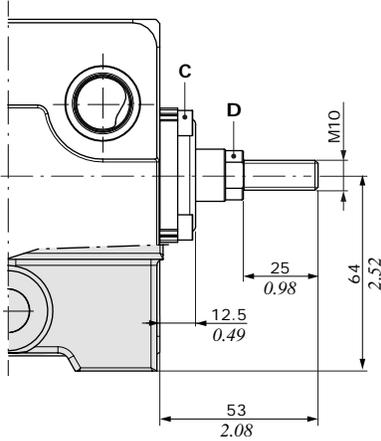
Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf)

A side controls

Without lever control

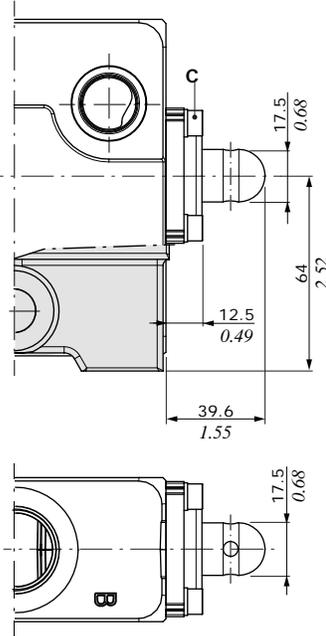
A4 type

M8 male thread external pin with flange



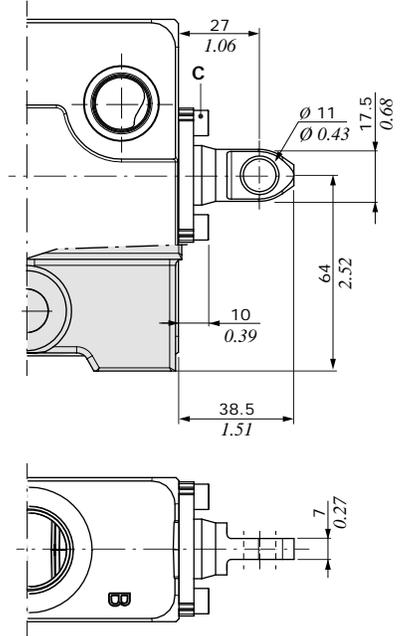
A5 type

Flange with spherical spool end



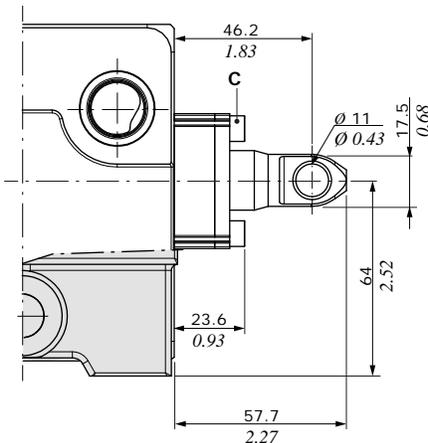
A6 type

With flange



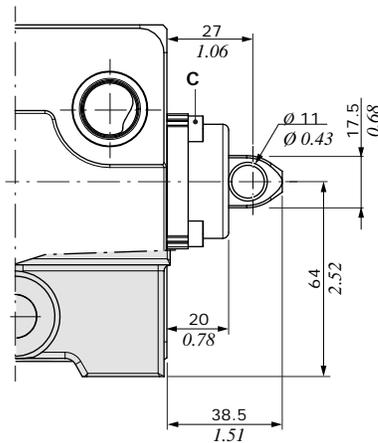
A6/Z1 type

As A6 type,
for 116 floating spool type



A6H type

As A6 type, with scraper



Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)
D = wrench 13 - 9.8 Nm (7.2 lbft)

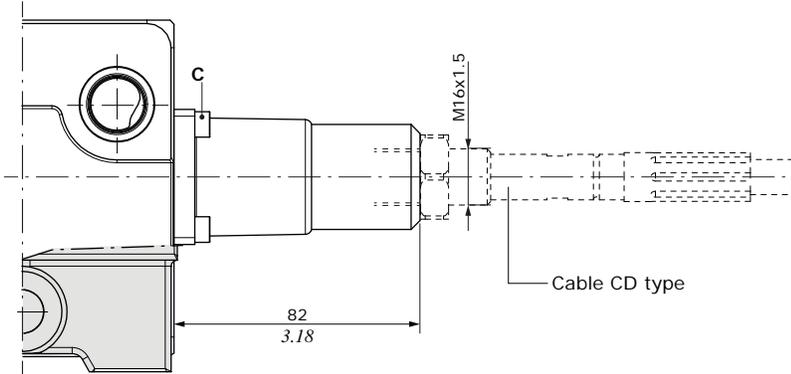
Working section

A side controls

With flexible cable control arrangement

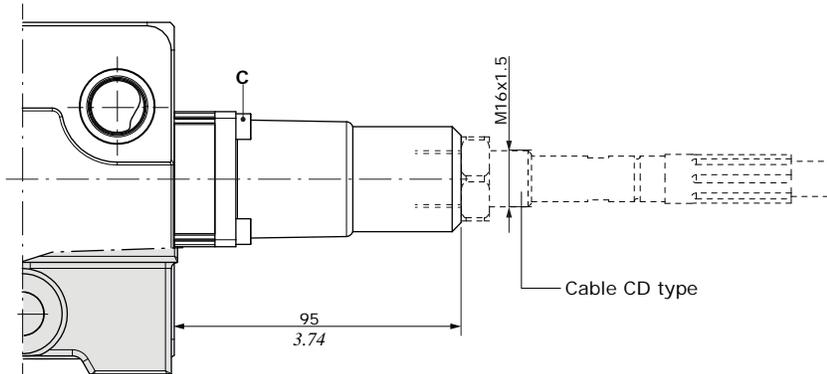
A8 type

Flexible cable control arrangement



A8/Z1 type

As A8 type,
for 116 floating spool type



Wrenches and tightening torques

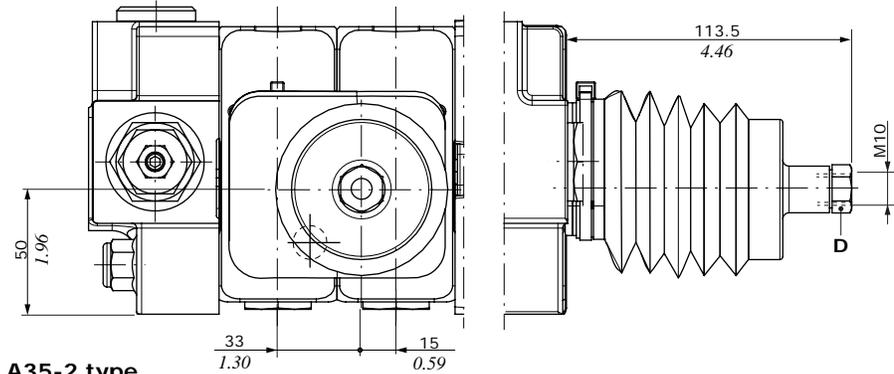
C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)

A side controls

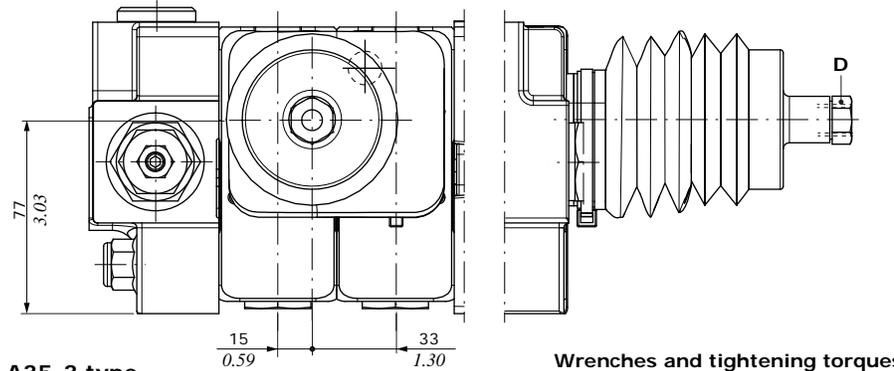
Joystick control

For operating the joystick control in the floating position, contact Sales Department.

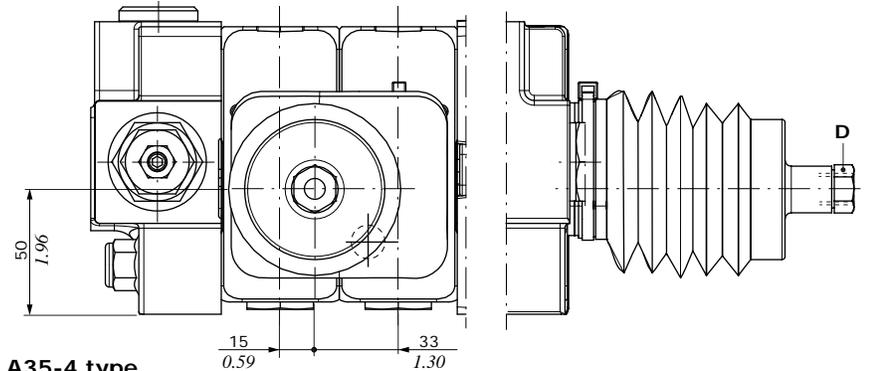
A35-1 type



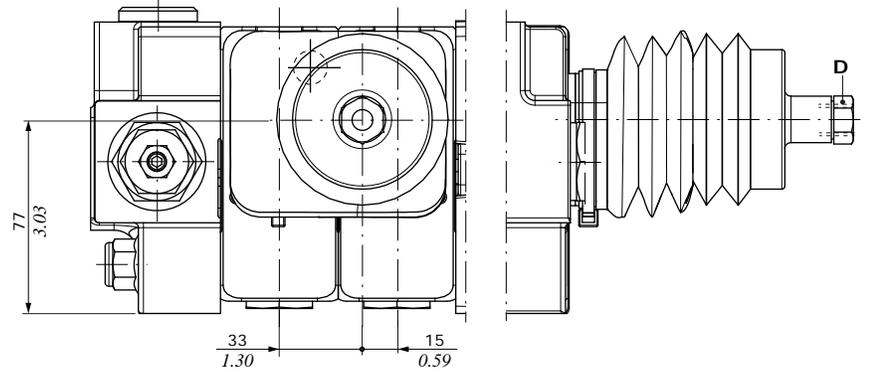
A35-2 type



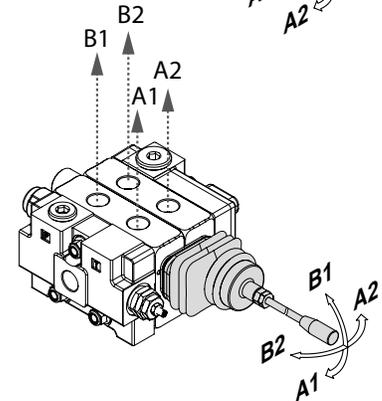
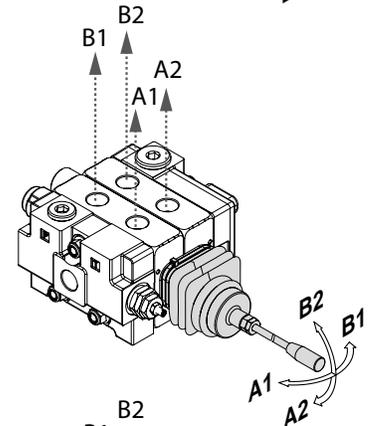
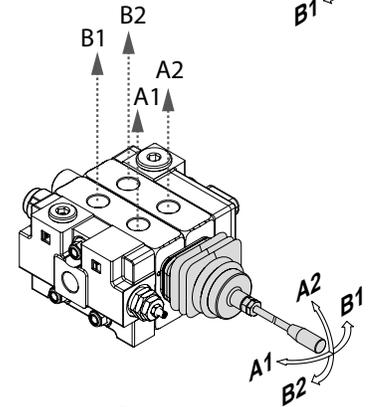
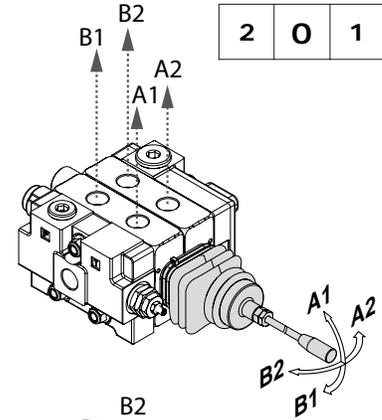
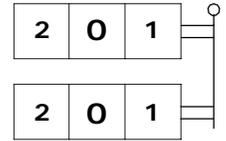
A35-3 type



A35-4 type



Wrenches and tightening torques
D = wrench 17 - 24 Nm (17.7 lbf_t)

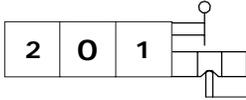


Working section

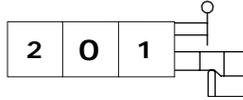
A side controls

With spool position microswitch, with lever

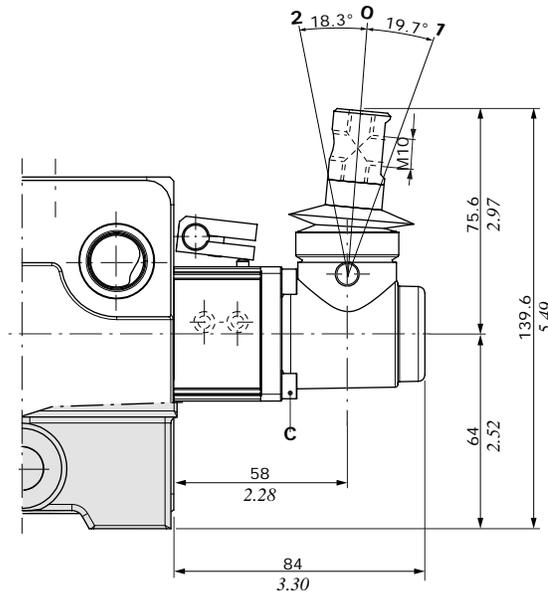
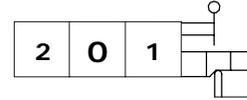
N1-A1 type
Micro operation
in position 1 and 2



N1A-A1 type
Micro operation in
position 1

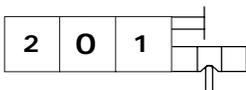


N1B-A1 type
Micro operation in
position 2

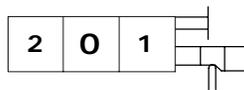


With spool position microswitch, with cap

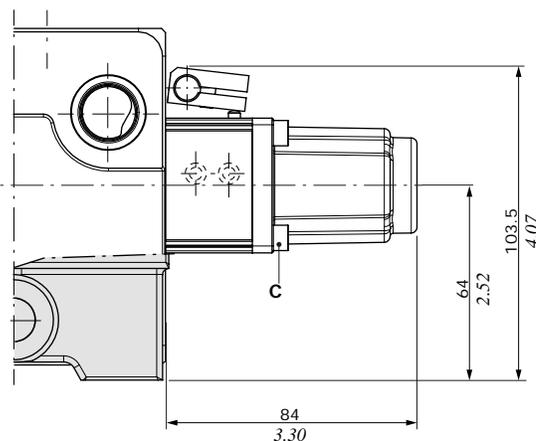
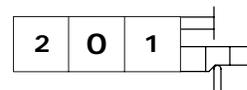
N1-A3 type
Micro operation
in position 1 and 2



N1A-A3 type
Micro operation in
position 1



N1B-A3 type
Micro operation in
position 2

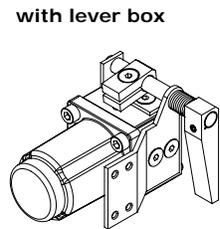
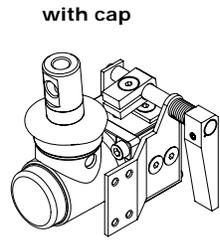
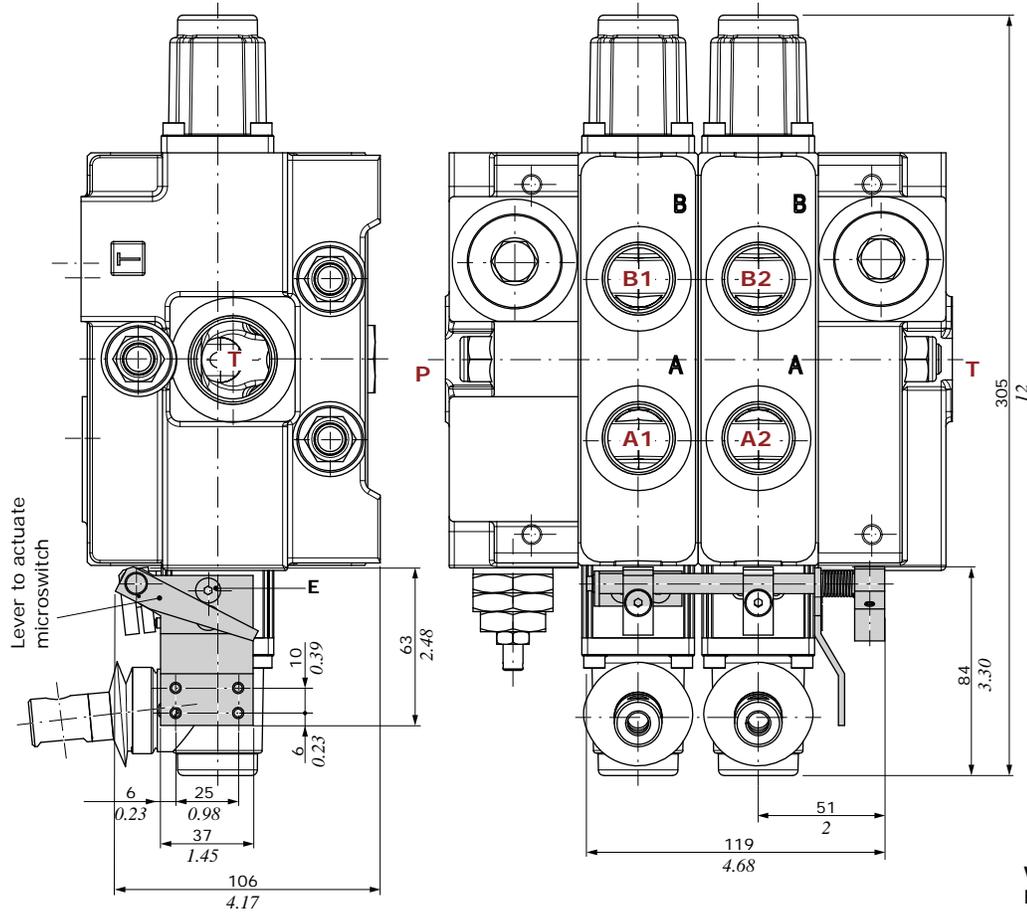


Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)

A side controls

With spool position microswitch

Microswitch assembly kit for 2 working section (N1-A1 type)



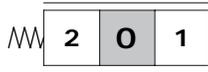
Wrenches and tightening torques
 E = allen wrench 3 - 6.6 Nm (4.8 lbft)

Working section

B side controls

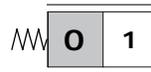
With spring return

M1 type
3 position, spring return
in neutral position

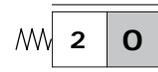


M1/O1 type
As M1 type,
for joystick control

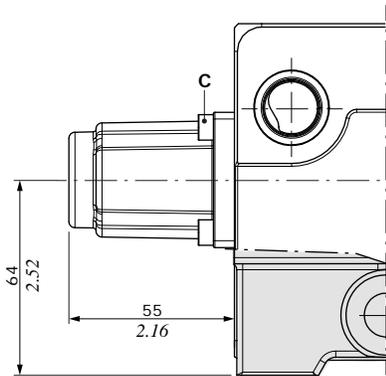
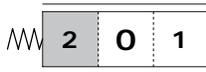
M2 type
2 position (0-1), spring return
in neutral position



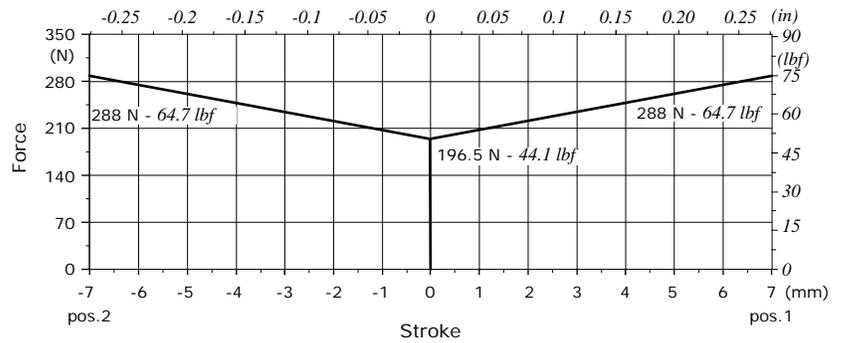
M3 type
2 position (0-2), spring return
in neutral position



M4 type
2 position (2-1), spring return
in position 2



M1 control type - Force vs. Stroke diagram

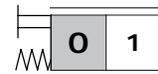


Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbft)
D = allen wrench 3 - 5 Nm (3.68 lbft)

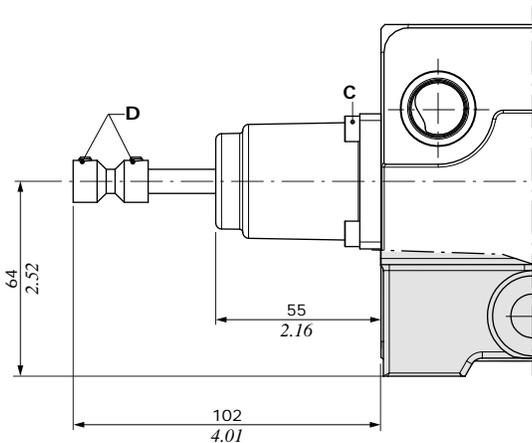
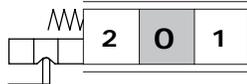
M1-U1 type
3 position, with M10 male
thread external pin



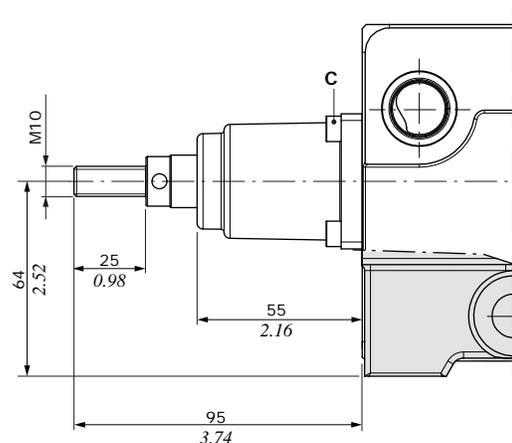
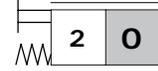
M2-U1 type
2 position (0-1), with M10 male
thread external pin



M1-B1 type
3 position, microswitch arrangement



M3-U1 type
2 position (0-2), with M10
male thread external pin

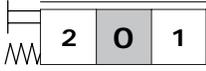


B side controls

With flexible cable control arrangement

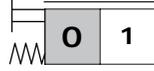
M1-U2 type

3 position, spring return in neutral position



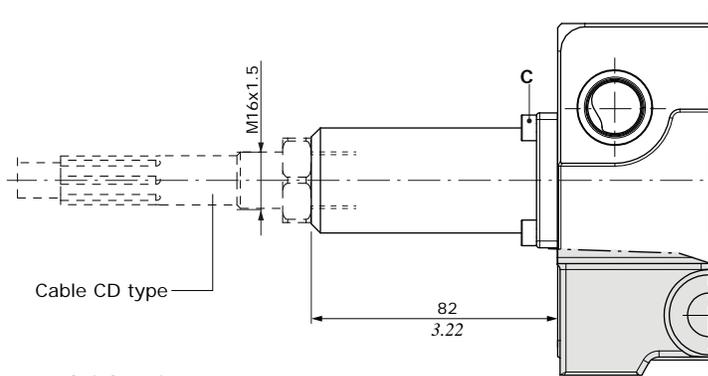
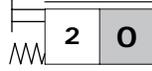
M2-U2 type

2 position (0-1), spring return in neutral position



M3-U2 type

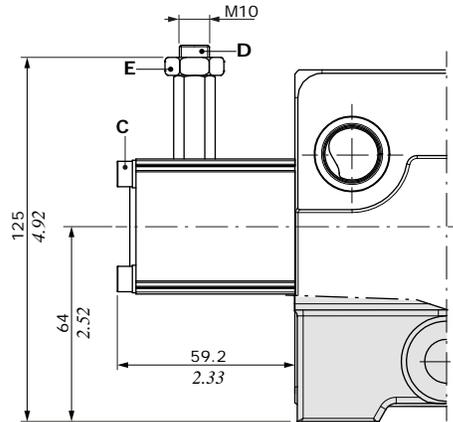
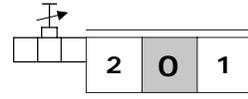
2 position (0-2), spring return in neutral position



With friction control

R0 type

Adjustable friction control



Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)

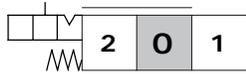
D = allen wrench 5 - 15 Nm (11.1 lbft)

E = wrench 17 - 9.8 Nm (7.2 lbft)

With detent control

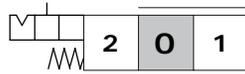
R1 type

3 position, detent in position 1



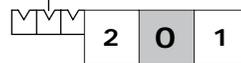
R2 type

3 position, detent in position 2



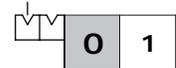
R3 type

3 position, detent in all position



R4 type

2 position, detent in position 0-1



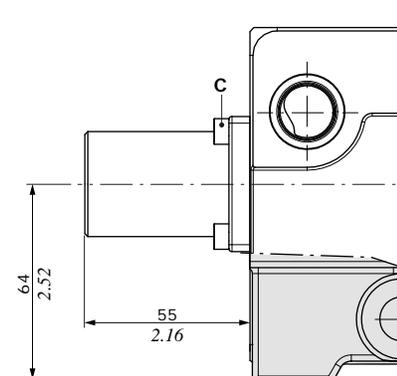
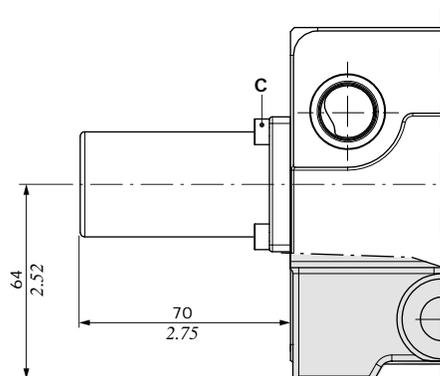
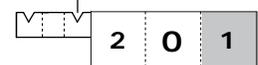
R5 type

2 position, detent in position 0-2



R6 type

2 position, detent in position 1-2



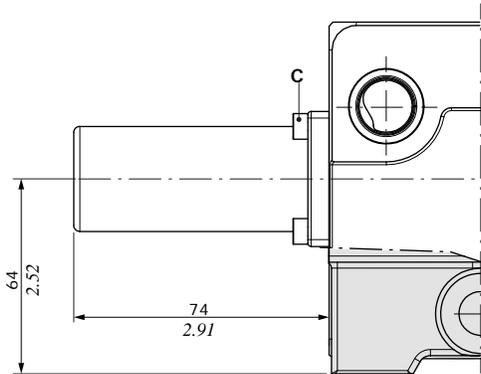
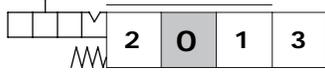
Working section

B side controls

With detent control

R8 type

4 position, detent in 4th position,
for 116 floating spool type



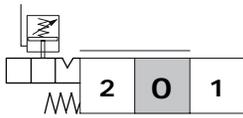
Wrenches and tightening torques

- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- D = wrench 30 - 42 Nm (30.9 lbft)
- E = wrench 22
- F = allen wrench 10 - 42 Nm (30.9 lbft)

With detent and kick out function

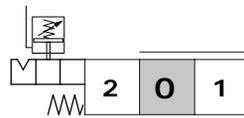
R1K type

3 position, detent in position 1



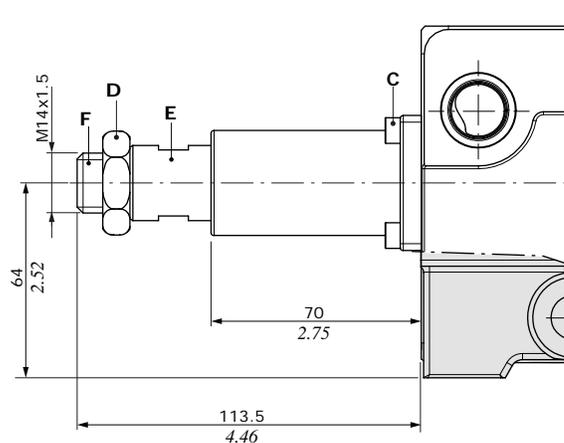
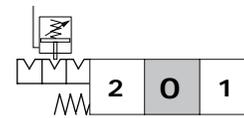
R2K type

3 position, detent in position 2



R3K type

3 position, detent in all position

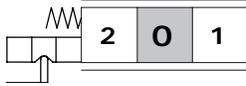


B side controls

With spool position microswitch

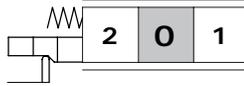
M1-N1 type

3 position, micro operation in position 1 and 2, spring return in neutral position



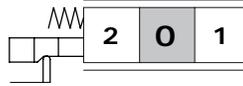
M1-N1A type

3 position, micro operation in position 1



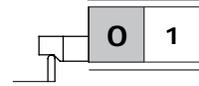
M1-N1B type

3 position, micro operation in position 2



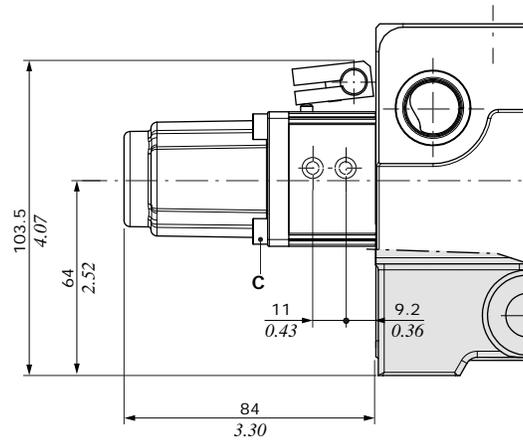
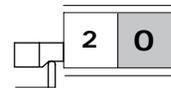
M2-N1 type

2 position (0-1), spring return in neutral position



M3-N1 type

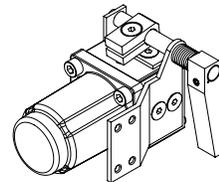
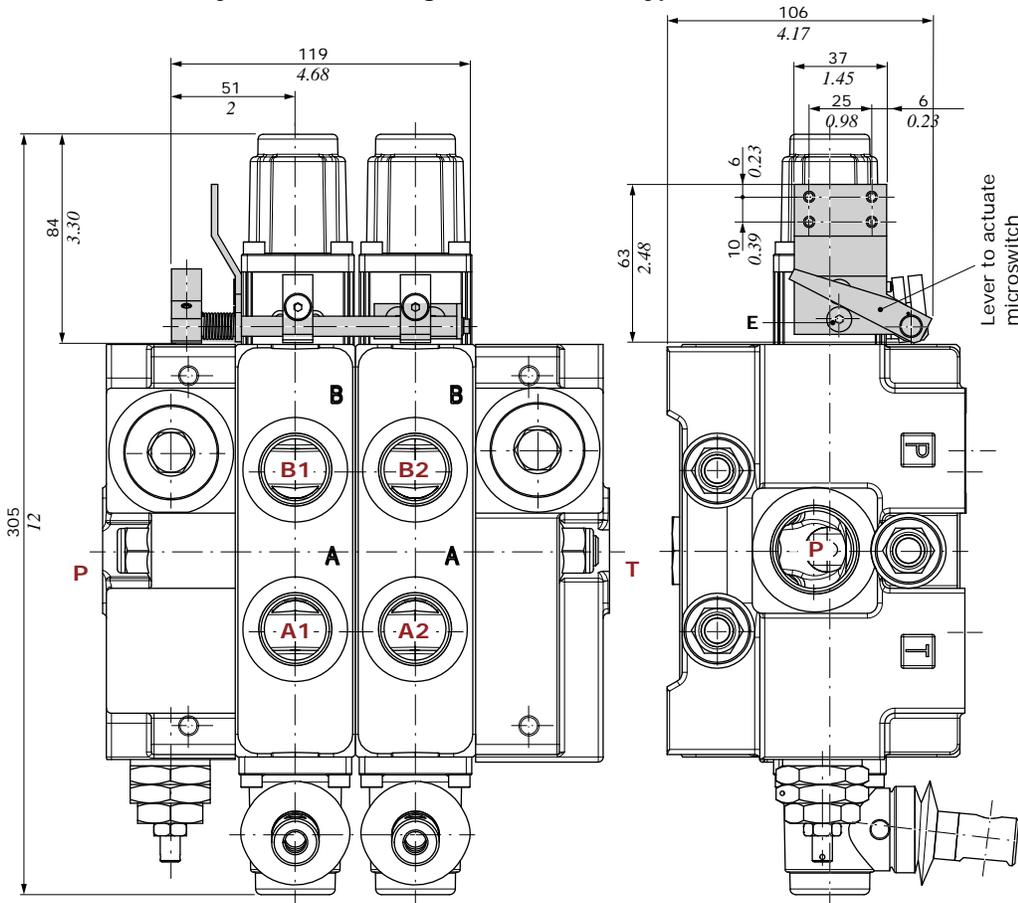
2 position (0-2), spring return in neutral position



Wrenches and tightening torques

- C = allen wrench 4 - 6.6 Nm (4.8 lbft)
- E = allen wrench 3 - 6.6 Nm (4.8 lbft)

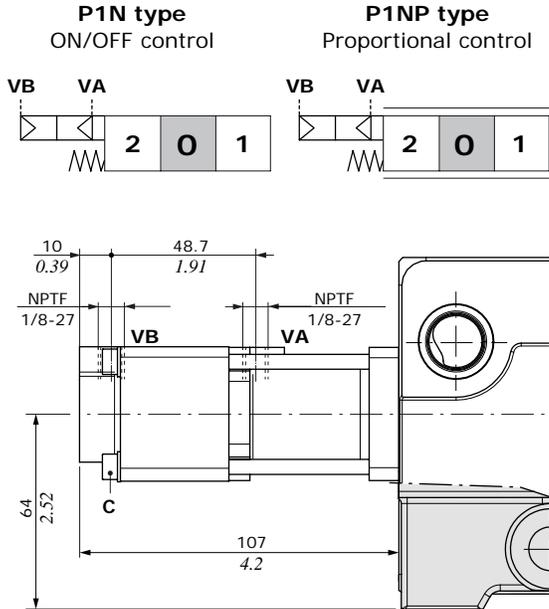
Microswitch assembly kit for 2 working section (M1-N1 type)



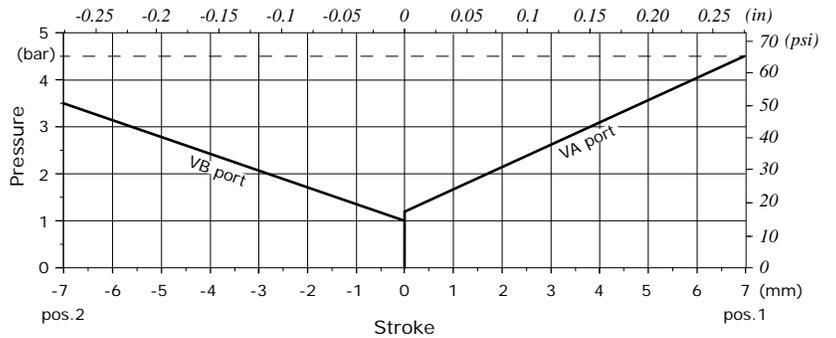
Working section

B side controls

With pneumatic control



Proportional pilot pressure curves



Operating features

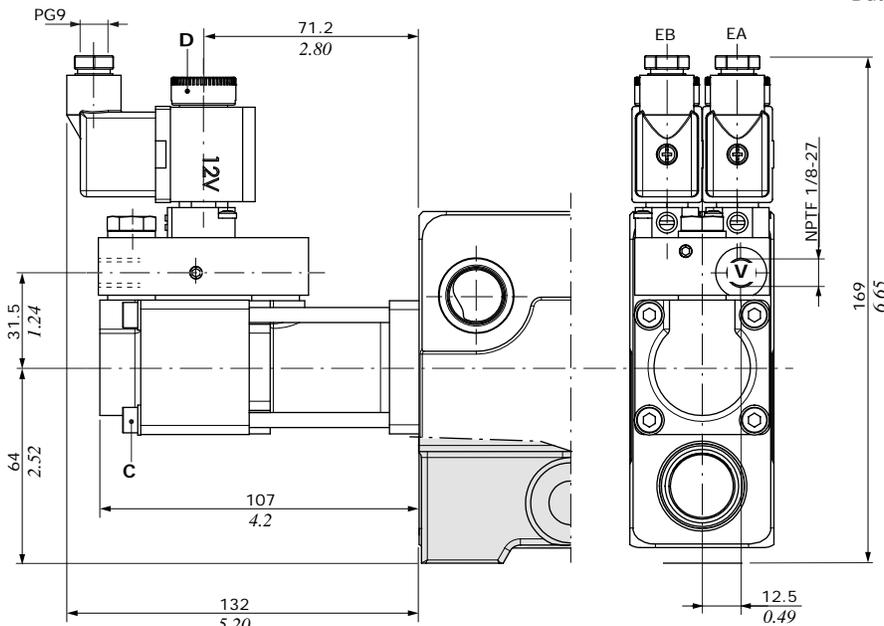
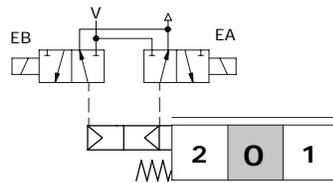
Pilot pressure..... min. 5 bar (72.5 psi) - max. 30 bar (435 psi)
 Pilot volume..... 9 cm³/min (0.54 in³/min)

Wrenches and tightening torques

C = wrench 4 - 6.6 Nm (4.8 lbft)

With ON/OFF electropneumatic control

D3 type
ON/OFF control



Operating features

Pilot pressure..... min. 1 bar (14.5 psi)
 max. 10 bar (145 psi)

COILS

Nominal voltage tolerance..... -5% +10%
 Power rating..... 5 W
 Nominal current..... 12 VDC - 24VDC
 Coil insulation..... Class F
 Weather protection..... IP65
 Duty cycle..... 100%

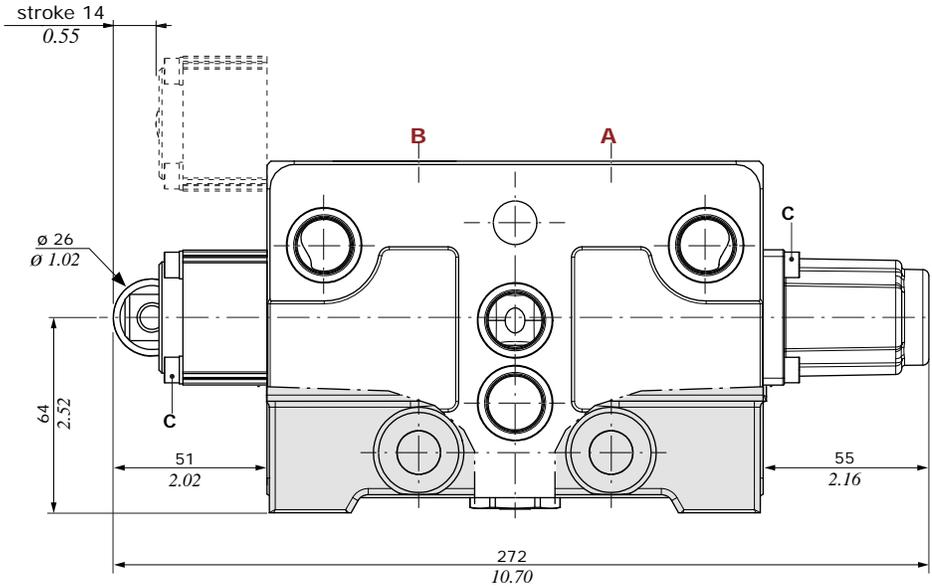
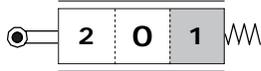
Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)
 D = manual tightening - 6.6 Nm (4.8 lbft)

A+B side controls

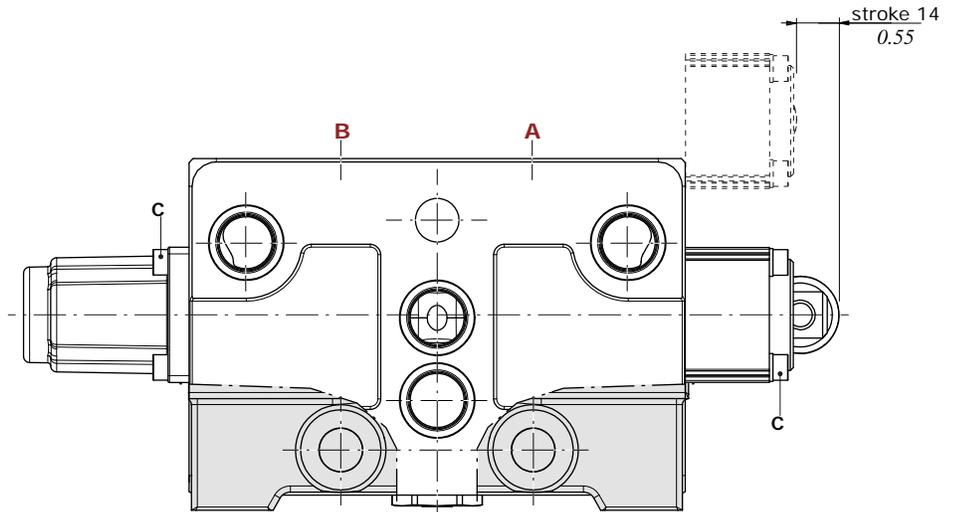
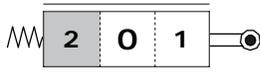
With cam control

C2 type
From position 1 to position 2,
spring return in position 1



Wrenches and tightening torques
C = allen wrench 4 - 6.6 Nm (4.8 lbf^t)

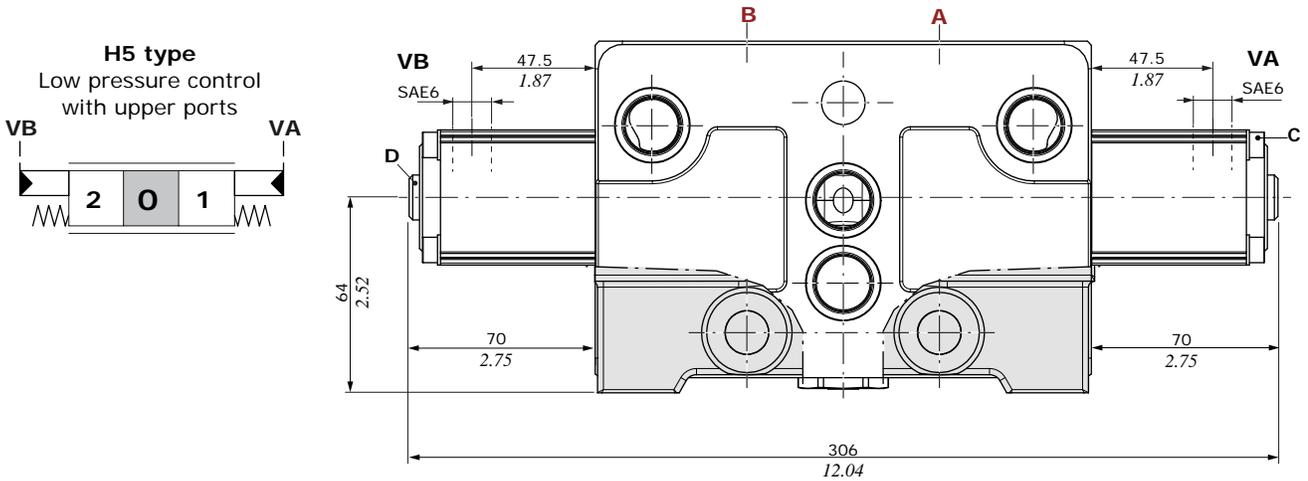
C3 type
From position 2 to position 1,
spring return in position 2.
Dimensions are the same of C2 type



Working section

A+B side controls

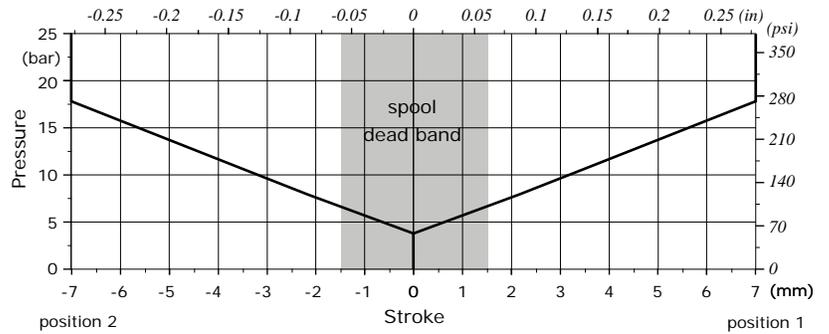
With proportional hydraulic control



Operating features

Pilot pressure..... : max. 100 bar (1450 psi)

Stroke vs. Pressure diagram for H5 type control



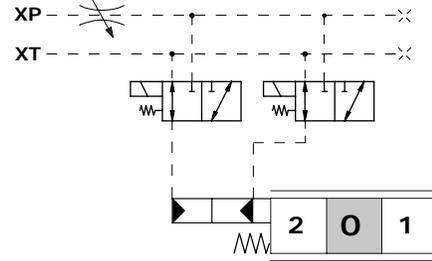
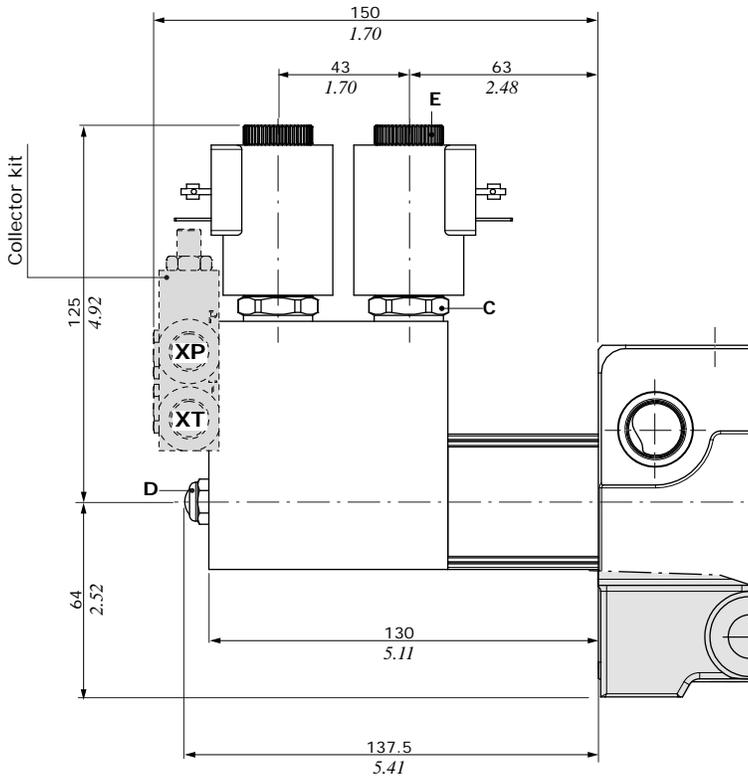
Wrenches and tightening torques

C = allen wrench 4 - 6.6 Nm (4.8 lbft)

D = allen wrench 4 - 9.8 Nm (7.2 lbft)

Electrohydraulic control

D2W type: ON/OFF one side

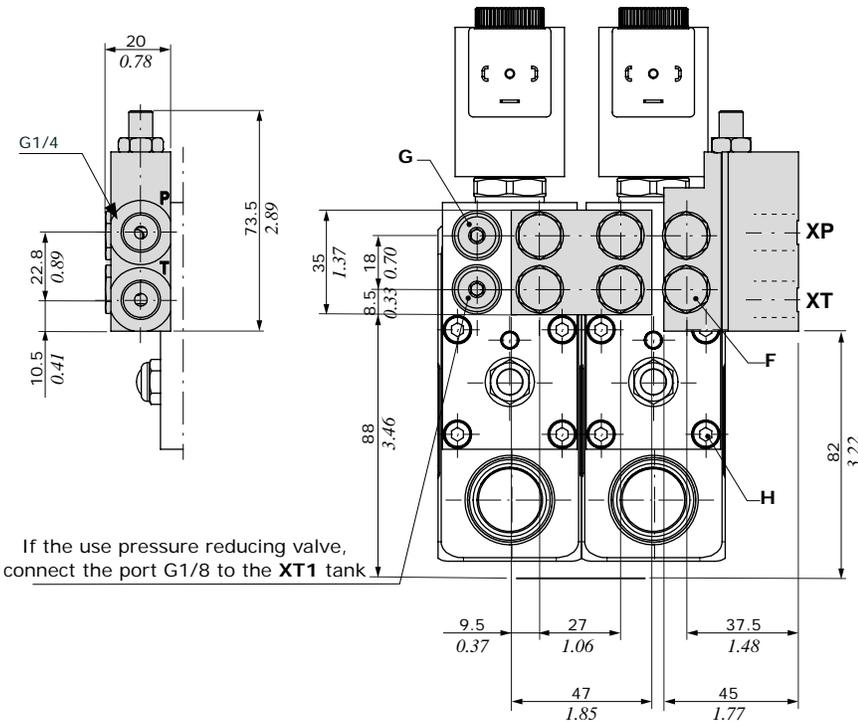


Features

- Pilot pressure on XP.....: min. 20 bar (290 psi)
: max. 35 bar (500 psi)
- Max backpressure on XT.....: 4 bar (58 psi)

For BT type coils and mating connectors see page 243

KE2S connector kit



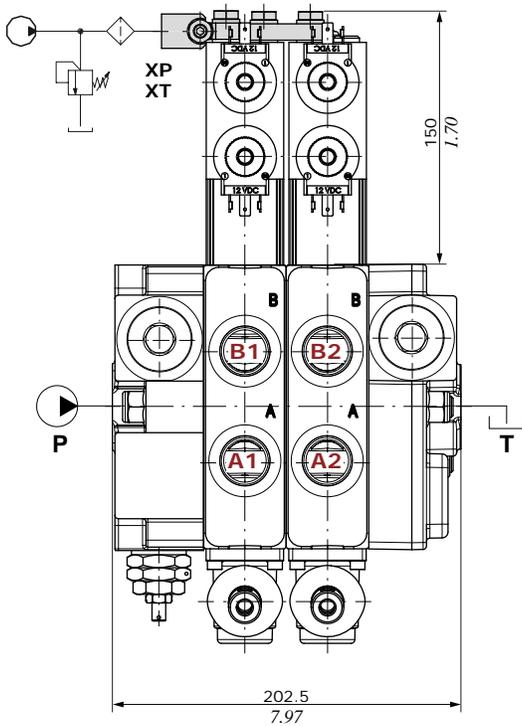
Wrenches and tightening torques

- C = wrench 24 - 30 Nm (22 lbft)
- D = wrench 13 - 9 Nm (6.6 lbft)
- E = wrench 6.6 - 9.8 Nm (7.2 lbft)
- F = wrench 14 - 24 Nm (17.7 lbft)
- G = allen wrench 4 - 9.8 Nm (6.6 lbft)
- H = allen wrench 4 - 3 Nm (2.2 lbft)

Working section

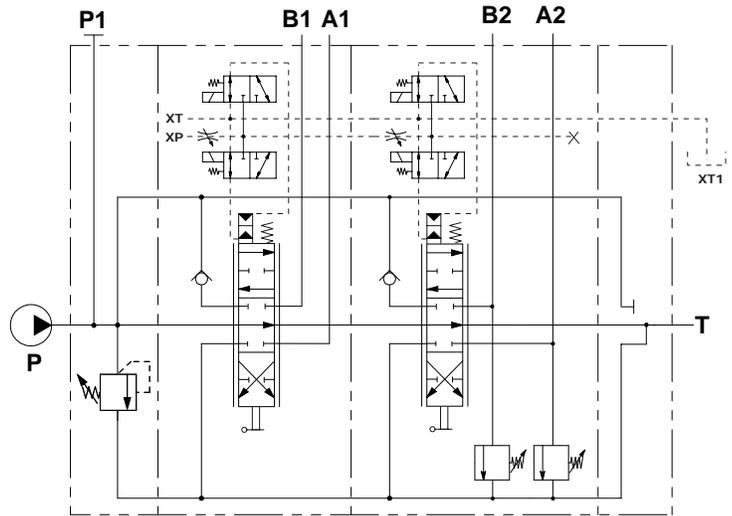
Electrohydraulic control

Connector kit for external pilot and drain



CONNECTOR KIT CODES		
Type	Code*	Description
KE2S	5GKE13S020	Kit for 2 section

For other connector kit codes, see page 218



Description example:

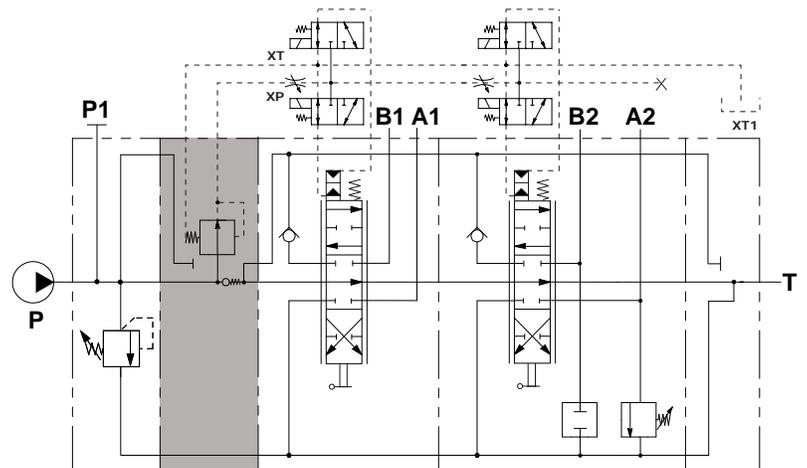
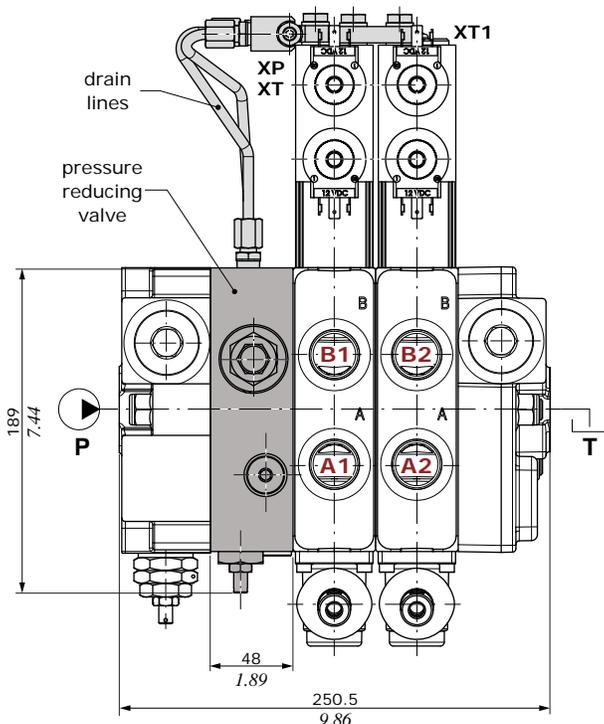
Q130/2/F7S(N120)/KE2S/103-A1-D2W.V40(N)120/
103-A1-D2W.V40(N)120/F3D-12VDC-S-SAE

Connector kit for internal pilot and drain

The kit is made of collector, pressure reducing valve and drain lines.

CONNECTOR KIT CODES		
Type	Code*	Description
KE2R	5GKE13R020	Kit for 2 section

For other connector kit codes, see page 218



Description example:

Q130/2/F7S(N120)/KE2R/103-A1-D2W.V40(N)120/
103-A1-D2W.V40(N)120/F3D-12VDC-S-SAE

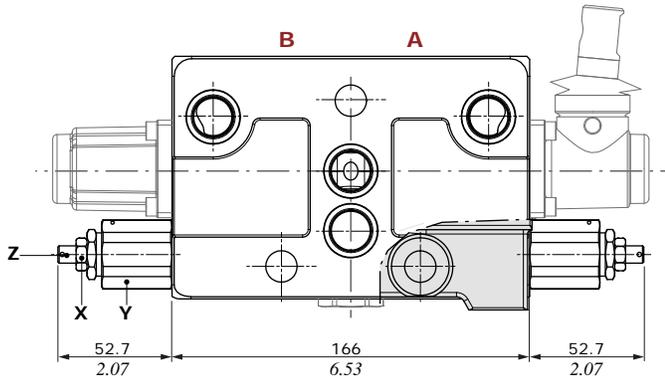
VRP pressure reducing valve

Auxiliary valve configuration

Dimensional data and hydraulic circuits

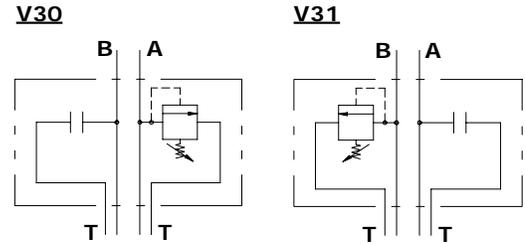
Antishock valve example

Q130 / 1 / ... / 103 - A1 - M1 - ^{aux valve}V32(N)^{spring type and valve setting (bar)}120 / ...



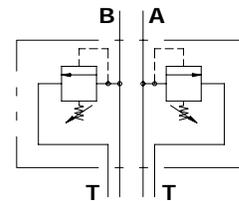
Spring type	Setting ranges (bar - psi)
B (white)	From 30 to 80 - from 435 to 1150
N (black)	From 81 to 200 - from 1170 to 2900
R (red)	From 201 to 350 - from 2910 to 5100

A side configuration: B side configuration:



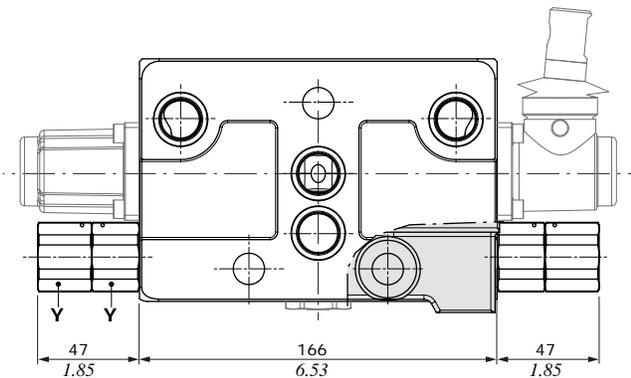
A+B side configuration:

V32 (V30 + V31)

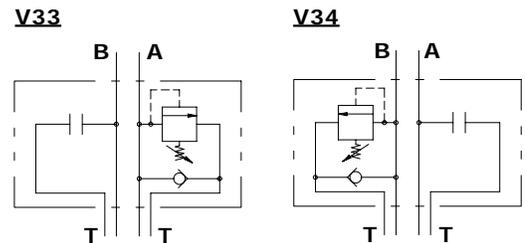


Antishock/anticavitation valve example

Q130 / 1 / ... / 103 - A1 - M1 - ^{aux valve}V33(N)^{spring type and valve setting (bar)}120 / ...

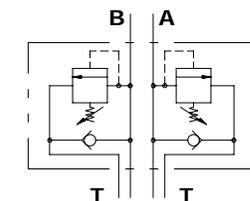


A side configuration: B side configuration:



A+B side configuration:

V35 (V34 + V33)



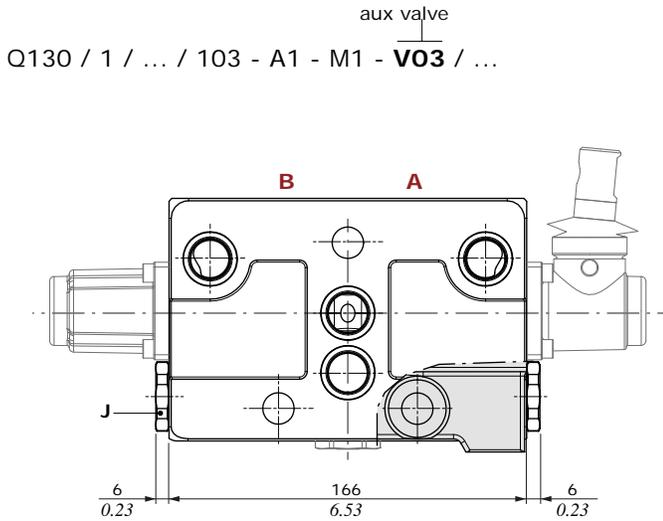
Wrenches and tightening torques

- Y = wrench 30 - 80 Nm (59 lbf)
- X = wrench 20 - 24 Nm (17.7 lbf)
- Z = allen wrench 4

Auxiliary valve configuration

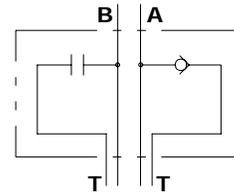
Dimensional data and hydraulic circuits

Anticavitation valve example



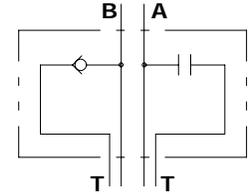
A side configuration:

V04



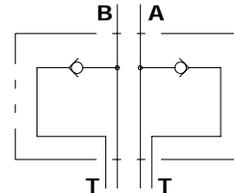
B side configuration:

V05



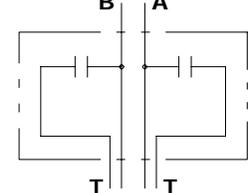
A+B side configuration:

V03 (V04 + V05)



Plug valve:

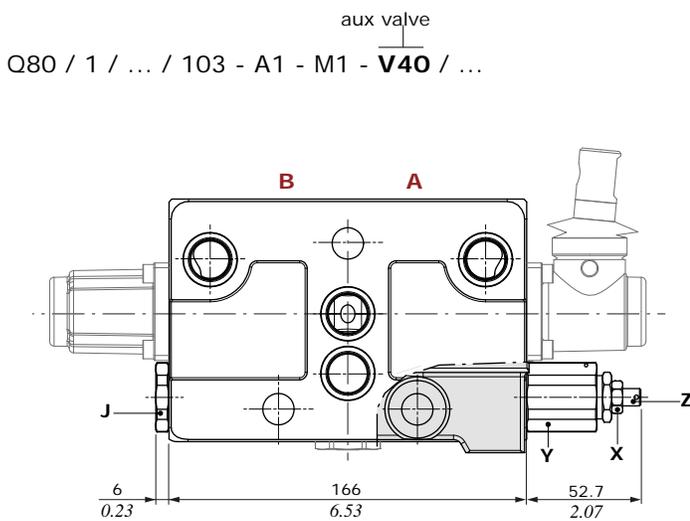
VC



Wrenches and tightening torques

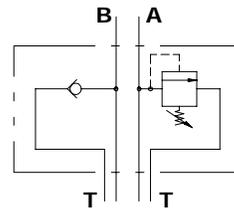
- J = wrench 30 - 42 Nm (30.9 lbf^t)
- Y = wrench 30 - 80 Nm (59 lbf^t)
- X = wrench 20 - 24 Nm (17.7 lbf^t)
- Z = allen wrench 4

Antishock and anticavitation combining valves example



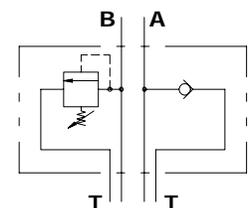
A side configuration:

V40 (V30 + V05)



B side configuration:

V41 (V31 + V04)



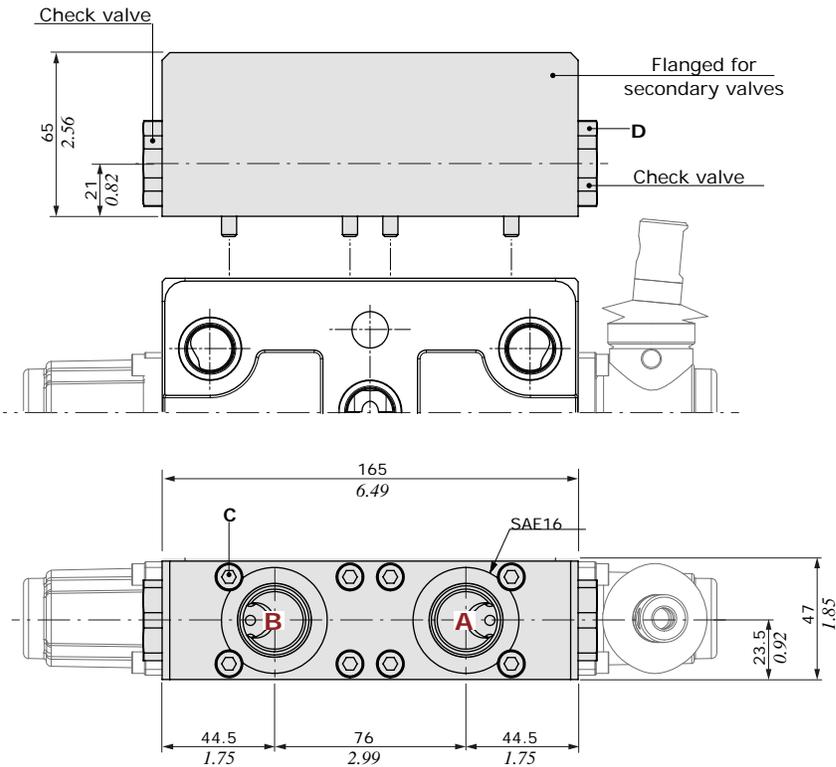
Secondary valve configuration

Dimensional data and hydraulic circuits

Description example

secondary aux valve valves block

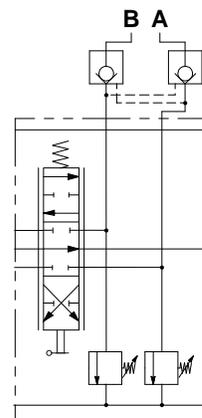
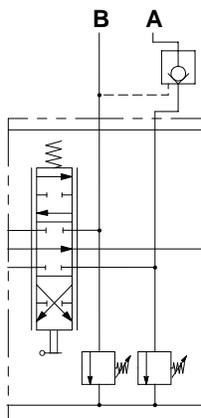
Q130 / 1 / ... / 103 - A1 - M1 - V32(N)120 / VC03 - SAE



Wrenches and tightening torques
 C = allen wrench 5 - 9.8 Nm (7.2 lbft)
 D = wrench 12 - 42 Nm (31 lbft)

Q130.V40(N)120/VC01-SAE configuration
 Parallel circuit, mechanical control with aux valves and flanged for single piloted check valve on A port

Q130.V40(N)120/VC03-SAE configuration
 Parallel circuit, mechanical control with aux valves and flanged for double piloted check valve on A and B ports

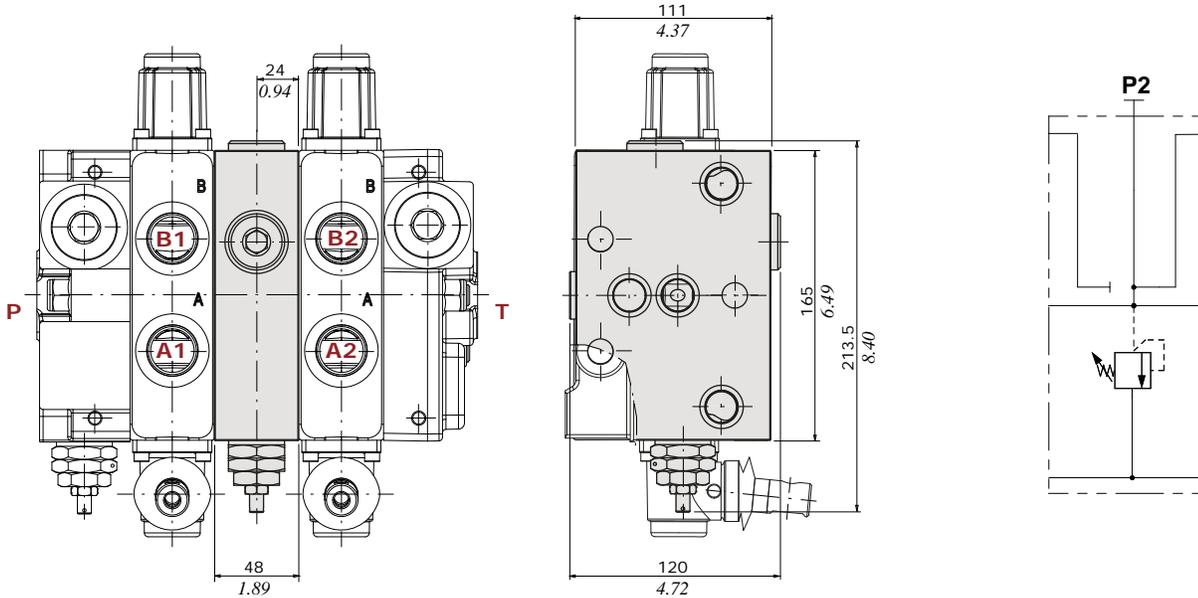


Intermediate section

Dimensional data and hydraulic circuit

E50 type

Intermediate inlet section with pressure relief valve

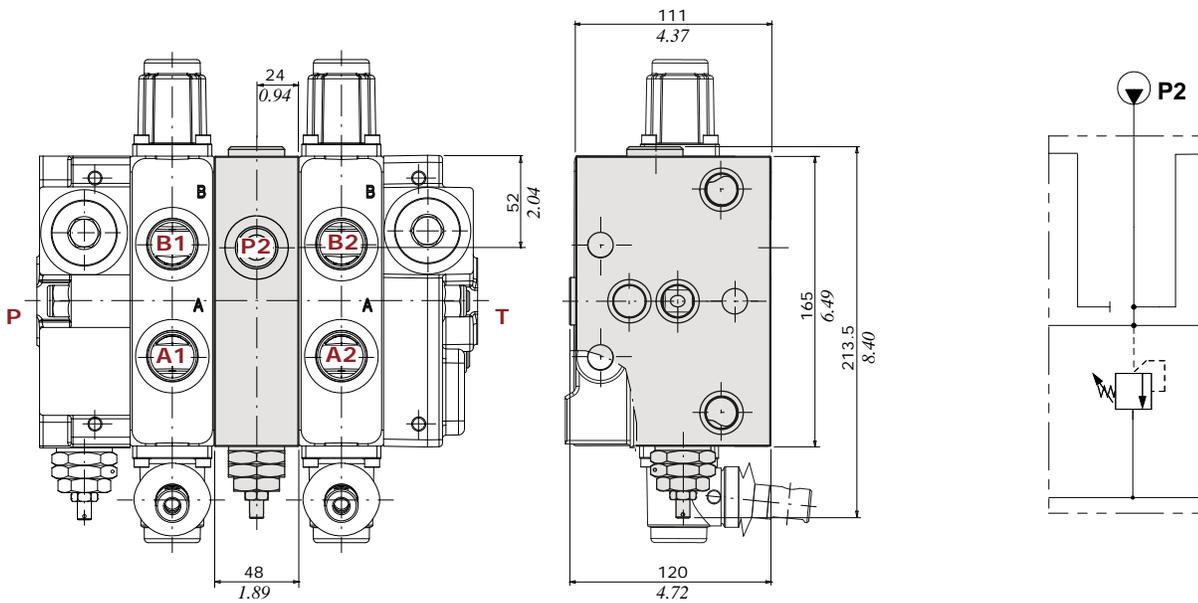


Description example: Q130/2/F7S(N150)/103-A1-M1/**E50(N150)**/103-A1-M1/F3D-SAE

intermediate section spring type and valve setting (bar)

E53 type

Intermediate inlet section with pressure relief valve and P2 port open



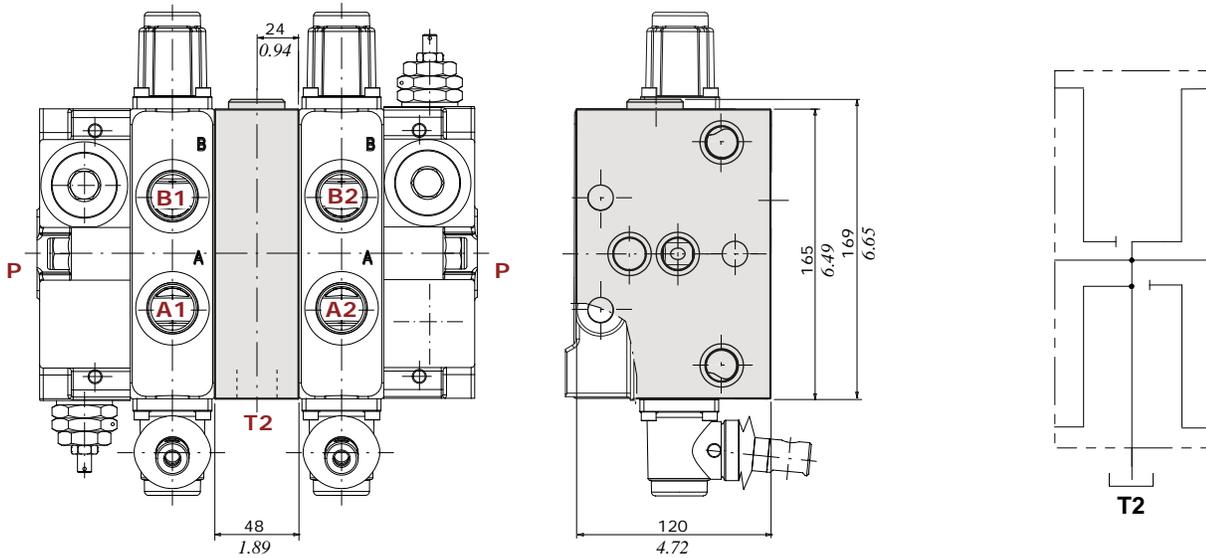
Description example: Q130/2/F7S(N150)/103-A1-M1/**E53(N150)**/103-A1-M1/F3D-SAE

intermediate section spring type and valve setting (bar)

Dimensional data and hydraulic circuit

E51 type

Intermediate outlet section, T2 port open

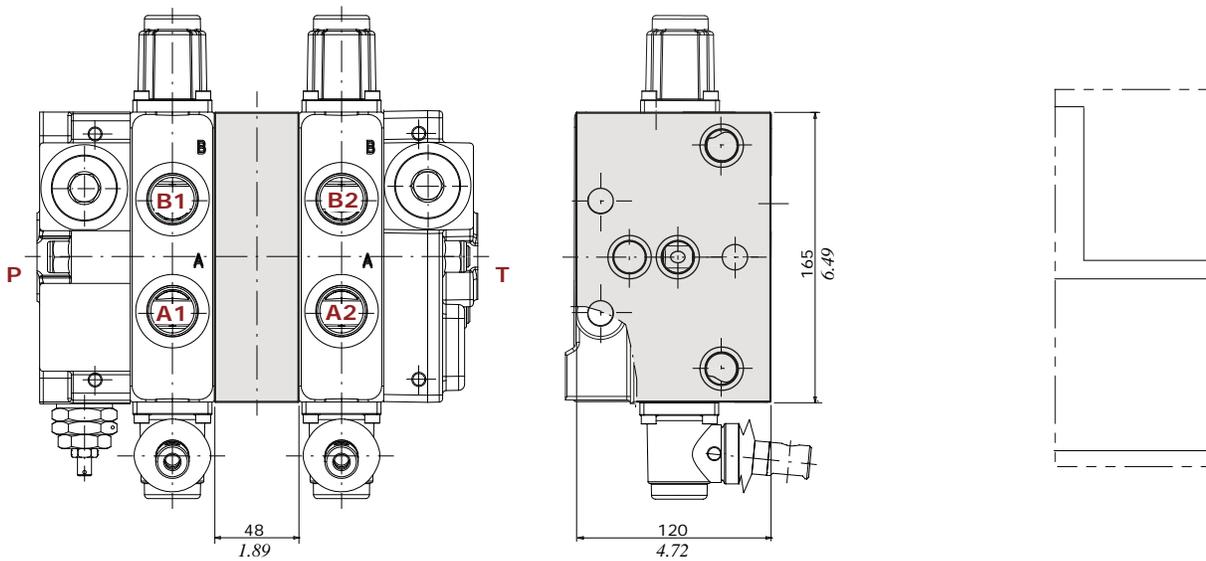


Description example: Q130/2/F7S(N150)/103-A1-M1/**E51**/103-A1-M1/F3D-SAE

intermediate section

E61 type

Intermediate spacer section

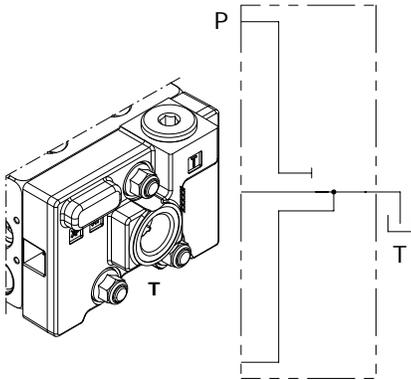


Description example: Q130/2/F7S(N150)/103-A1-M1/**E61**/103-A1-M1/F3D-SAE

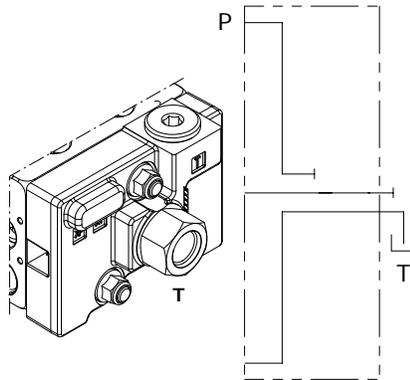
intermediate section

Outlet section

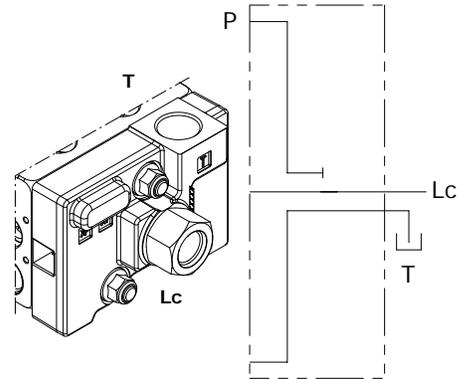
F3D-SAE configuration
Open center configuration



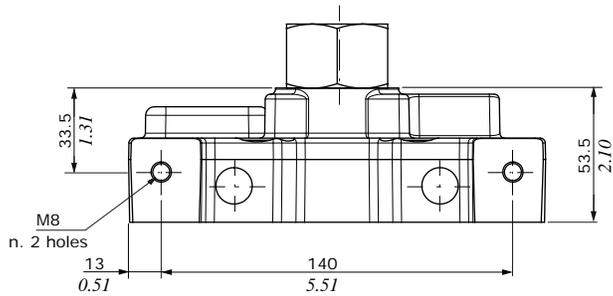
F16D-SAE configuration
Closed center configuration



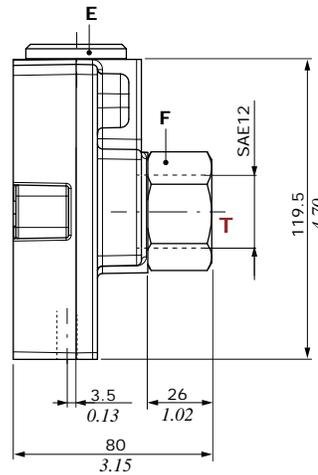
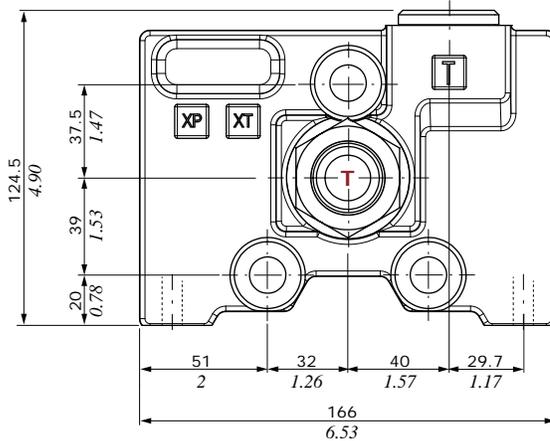
F6D-SAE configuration
Carry-over configuration



F16D configuration example



Wrenches and tightening torques
E = allen wrench 12 - 42 Nm (30.9 lbft)
F = wrench 41 - 80 Nm (59 lbft)



Dimensional data and features

Coil type	Voltage	Connectors						
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads (without conn.)	
BER	10 VDC	4SLE001000A	-	-	-	-	-	
	12 VDC	4SLE001200A 4SLE001217A ⁽³⁾	4SLE001201A ⁽⁵⁾	4SLE001209A ⁽³⁻⁵⁾	4SLE001203A ⁽⁵⁾	4SLE001210A ⁽²⁾	4SLE001214A ⁽²⁾	4SLE001207A
			4SLE001202A ⁽⁶⁾	4SLE001216A ⁽³⁻⁶⁾	4SLE001211A ⁽³⁻⁵⁾	-	-	-
			4SLE001206A ⁽²⁾	4SLE001400A ⁽⁶⁾	4SLE001403A ⁽³⁻⁵⁾	-	-	-
			4SLE001401A ⁽³⁻⁶⁾	4SLE001402A ⁽³⁻⁵⁾	-	-	-	
	14 VDC	-	4SLE001400A ⁽⁶⁾	4SLE001403A ⁽³⁻⁵⁾	-	-	-	
	24 VDC	4SLE002400A 4SLE002408A ⁽³⁾ 4SLE302400A ⁽¹⁾	4SLE002401A ⁽⁵⁾	4SLE002407A ⁽³⁻⁵⁾	4SLE002403A ⁽⁵⁾	-	-	4SLE002404A
			4SLE002402A ⁽⁶⁾	-	-	-	-	
	28 VDC	-	4SLE002802A ⁽⁶⁾	4SLE002800A ⁽⁵⁾	-	-	-	-
	48 VDC	4SLE004800A 4SLE304800A ⁽¹⁾	-	-	-	-	-	-
110VDC	4SLE011000A 4SLE311000A ⁽¹⁾	-	-	-	-	-	-	
220 VDC	4SLE022000A 4SLE322000A ⁽¹⁾	-	-	-	-	-	-	
		-	-	-	-	-	-	
Mating connectors (For connector with rectifier see last table)		4CN1009995	5CON140031	5CON003	5CON001	5CON017	-	

Coil type	Voltage	Connectors						
		ISO4400	Deutsch DT	AMP JPT	Packard Weatherpack	Packard Metri-pack	Flying leads (without conn.)	
BT	10 VDC	4SL3000100	-	-	-	-	-	
	12 VDC	4SL3000120 4SL3000126 ⁽⁴⁾	4SL3000130 ⁽⁶⁾	4SL3000134 ⁽³⁻⁶⁾	4SL3000122 ⁽⁵⁾	4SL3000124 ⁽²⁾	4SL3000127 ⁽²⁾	4SL300012C
			4SL3000128 ⁽²⁾	4SL3000129 ⁽⁶⁾	4SL30001200 ⁽³⁻⁵⁾	-	-	-
			4SL3000240 ⁽¹⁾	4SL300024C ⁽³⁻⁶⁾	4SL3000248 ⁽⁵⁾	-	-	4SL3000246
	24 VDC	4SL3000240 ⁽¹⁾	4SL300024C ⁽³⁻⁶⁾	4SL3000248 ⁽⁵⁾	-	-	-	
	26 VDC	4SL3000260	-	-	-	-	-	
	48 VDC	4SL3000480 4SL3030480 ⁽¹⁾	-	-	-	-	-	
	110VDC	4SL3001100 4SL3031100 ⁽¹⁾	-	-	-	-	-	
	220 VDC	4SLE022000A 4SLE322000A ⁽¹⁾	-	-	-	-	-	-
			-	-	-	-	-	-
Mating connectors (For connector with rectifier see last table)		4CN1009995	5CON140031	5CON003	5CON001	5CON017	-	

Notes: (1) supply with AC and use only with rectifier connector - (2) with flying leads - (3) with bidirectional diode (4) with unidirectional diode - (5) integrated perpendicular type - (6) integrated parallel type

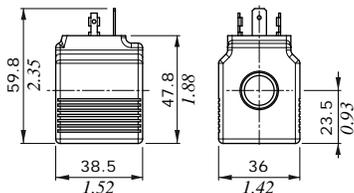
Voltage	ISO 4400 mating connector with rectifier
	BER type coil
24 VDC	4CN1010240
48 VDC	4CN1010480
110 VDC	4CN1011100
220 VDC	4CN1012200

Coils and connectors

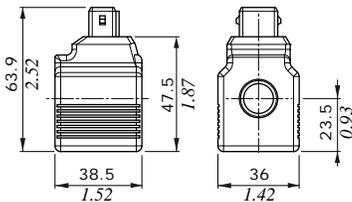
Dimensional data and features

BER type

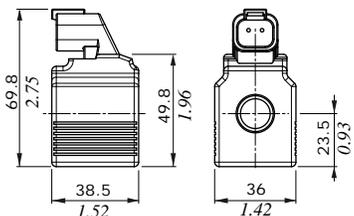
ISO4400 connector



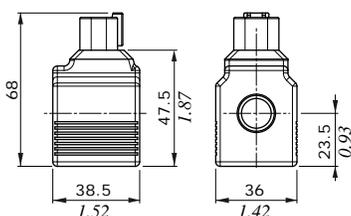
AMP JPT connector



DEUTSCH DT04 connector (parallel type)



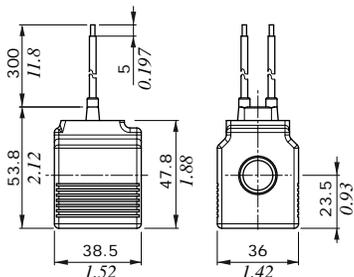
DEUTSCH DT04 connector (perpendicular type)



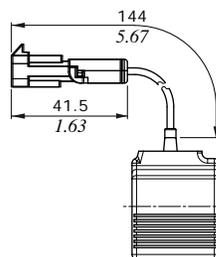
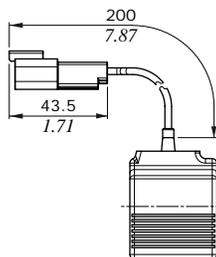
Features

- Nominal voltage tolerance : ±10%
- Power rating : 19.2 W - 12/24 VDC - 48 RAC
: 19.1 W - 28 VDC
: 19 W - 10/14/48/110/220 VDC
: 24/110/220 RAC
- Max. operating current . . . : 1.90 A - 10 VDC
: 1.60 A - 12 VDC
: 1.36 A - 14 VDC
: 0.80 A - 24 VDC
: 0.68 A - 28 VDC
: 0.40 A - 48 VDC
: 0.17 A - 110 VDC
: 0.09 A - 220 VDC
- Coil insulation : Class H (180°C - 356°F)
- Weather protection : IP65 - ISO4400
: IP69K - Deutch DT
: IP65 - AMP JPT
: IP67 - Weatherpack
: IP67 - Metri-pack
- Insertion : 100%

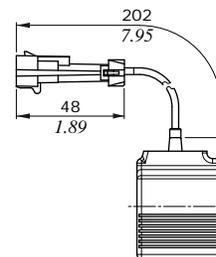
Flying leads with DEUTSCH DT04 connector



Flying leads with PACKARD WEATHER-PACK connector



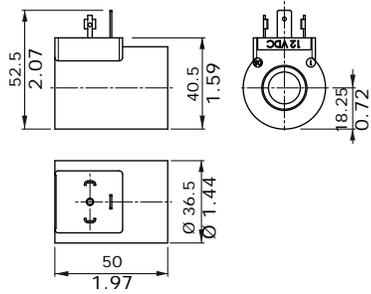
Flying leads with PACKARD METRI-PACK connector



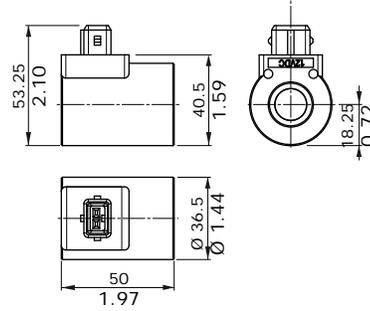
Dimensional data and features

BT type

ISO4400 connector



AMP JPT connector

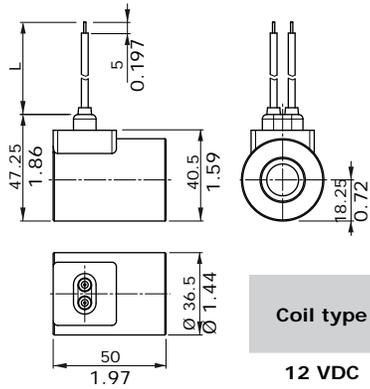
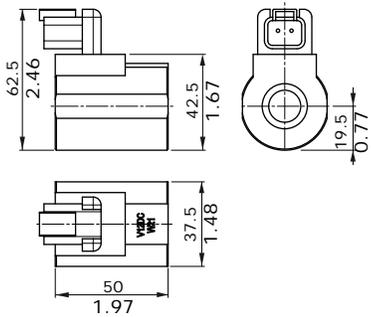


Features

- Nominal voltage tolerance: $\pm 10\%$
- Power rating:
 - 19 W - 10 VDC - 48 RAC
 - 21 W - 12/24/26 VDC
 - 20.3 W - 48 VDC
 - 17.3 W - 110 VDC
 - 17.7 W - 220 VDC
 - 19.9 W - 24 RAC
 - 20.7 W - 48 RAC
 - 20 W - 110/220 RAC
- Max. operating current:
 - 1.90 A - 10 VDC
 - 1.77 A - 12 VDC
 - 0.89 A - 24 VDC
 - 0.84 A - 26 VDC
 - 0.43 A - 48 VDC
 - 0.16 A - 110 VDC
 - 0.08 A - 220 VDC
 - 0.93 A - 24 RAC
 - 0.47 A - 48 RAC
 - 0.18 A - 110 RAC
 - 0.09 A - 220 RAC
- Coil insulation: Class F (155°C - 311°F)
- Weather protection:
 - IP65 - ISO4400
 - IP69K - Deutsch DT
 - IP65 - AMP JPT
 - IP67 - Weatherpack
 - IP67 - Metri-pack
- Insertion: 100%

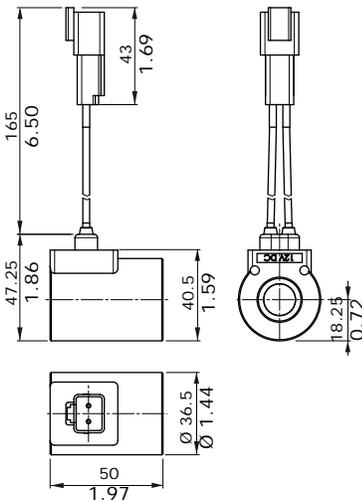
Flying leads

DEUTSCH DT04 connector (parallel type)

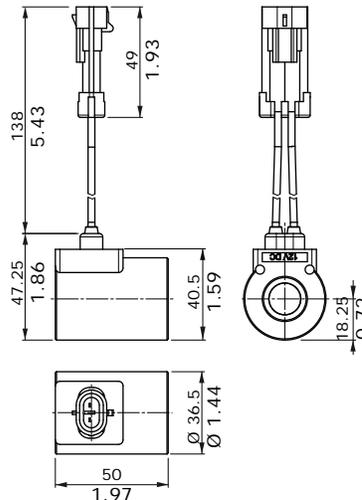


Coil type	L dimension	
	(mm)	(in)
12 VDC	240	9.45
24 VDC	600	23.62

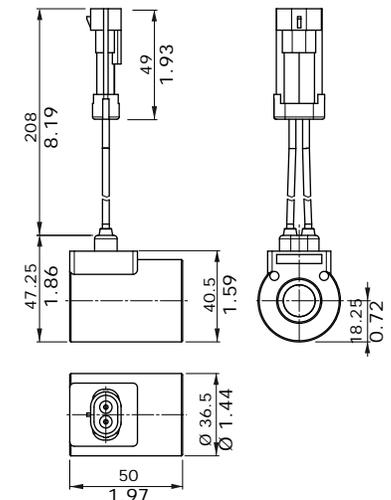
Flying leads with DEUTSCH DT04 connector



Flying leads with PACKARD METRI-PACK connector



Flying leads with PACKARD WEATHER-PACK connector



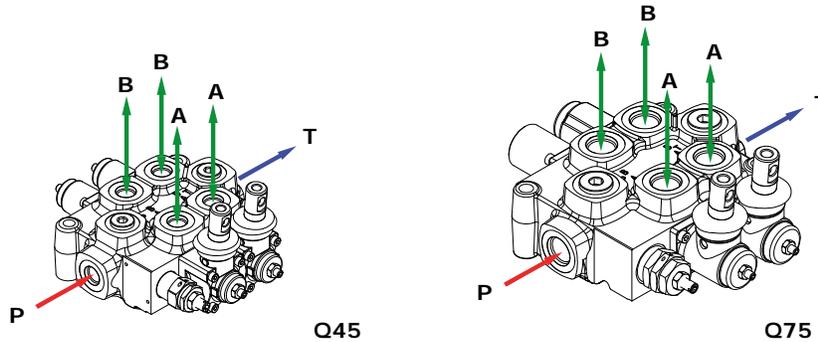
Main rules

The directional control valves range are assembled and tested as per the technical specifications of this catalogue.

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

- 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 spool control kit, do not use high pressure washdown directly on the valve;
- before painting, ensure plugs on normally open ports are tightly in place.

Monoblock valves



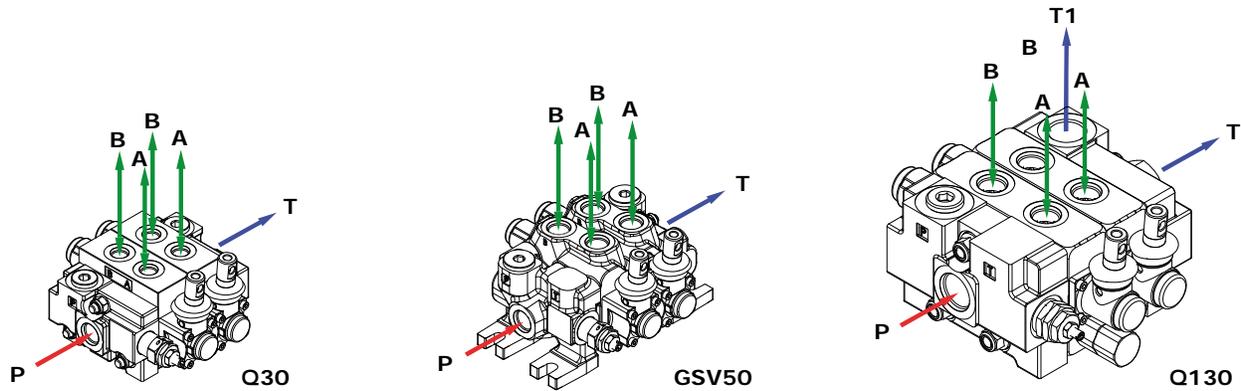
FITTING TIGHTENING TORQUE - Nm / lbft							
THREAD TYPE	P port		A and B ports		T port	Lc port	
Q35	BSP	G 3/8	G 3/8		G 3/8	-	
	With O-Ring seal	35 / 25.8	35 / 25.8		35 / 25.8	-	
	With copper washer	40 / 29.5	40 / 29.5		40 / 29.5	-	
	With steel and rubber washer	30 / 22.1	30 / 22.1		30 / 22.1	-	
	UN-UNF	3/4-16 (SAE 8)	3/4-16 (SAE 8)		3/4-16 (SAE 8)	-	
With O-Ring seal	50 / 36.9	50 / 36.9		50 / 36.9	-		

THREAD TYPE	P and P1 ports		A and B ports		T port	T1 and Lc ports	
	Q25	Q45	Q25	Q45	Q25/Q45	Q25	Q45
Q25 - Q45	BSP	G 3/8	G 1/2	G 3/8	G 1/2	G 3/8	G 1/2
	With O-Ring seal	35 / 25.8	50 / 36.9	35 / 25.8	50 / 36.9	50 / 36.9	35 / 25.8 50 / 36.9
	With copper washer	40 / 29.5	60 / 44.3	40 / 29.5	60 / 44.3	60 / 44.3	40 / 29.5 60 / 44.3
	With steel and rubber washer	30 / 22.1	60 / 44.3	30 / 22.1	60 / 44.3	60 / 44.3	30 / 22.1 60 / 44.3
	UN-UNF	9/16-18 (SAE 6)	3/4-16 (SAE 8)	9/16-18 (SAE 6)	3/4-16 (SAE 8)	7/8-14 (SAE 10)	3/4-16 (SAE 8) 3/4-16 (SAE 8)
With O-Ring seal	30 / 22.1	35 / 25.8	30 / 22.1	35 / 25.8	90 / 66.4	35 / 25.8 35 / 25.8	

THREAD TYPE	Q75	Q95	Q75	Q95	Q75/Q95	Q75	Q95
	P and P1 ports		A and B ports		T port	T1 and Lc ports	
Q75 - Q95	BSP	G 1/2	G 3/4	G 1/2	G 3/4	G 1/2	G 3/4
	With O-Ring seal	50 / 36.9	90 / 66.4	50 / 36.9	90 / 66.4	90 / 66.4	50 / 36.9 90 / 66.4
	With copper washer	60 / 44.3	90 / 66.4	60 / 44.3	90 / 66.4	90 / 66.4	60 / 44.3 90 / 66.4
	With steel and rubber washer	60 / 44.3	70 / 51.6	60 / 44.3	70 / 51.6	70 / 51.6	60 / 44.3 70 / 51.6
	UN-UNF	7/8-14 (SAE 10)	1" 1/16-12 (SAE 12)	7/8-14 (SAE 10)	1" 1/16-12 (SAE 12)	1" 1/16-12 (SAE 12)	7/8-14 (SAE 10) 1" 1/16-12 (SAE 12)
With O-Ring seal	90 / 66.4	95 / 70.1	90 / 66.4	95 / 70.1	95 / 70.1	90 / 66.4 95 / 70.1	

NOTE – These torques are recommended. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish.

Sectional valves



FITTING TIGHTENING TORQUE - Nm / lbft					
THREAD TYPE	P and P1 ports	A and B ports	T port	T1 and Lc ports	
Q30	BSP	G 3/8	G 3/8	G 1/2	G 1/2
	With O-Ring seal	35 / 25.8	35 / 25.8	50 / 36.9	50 / 36.9
	With copper washer	40 / 29.5	40 / 29.5	60 / 44.3	60 / 44.3
	With steel and rubber washer	30 / 22.1	30 / 22.1	60 / 44.3	60 / 44.3
	UN-UNF	3/4-16 (SAE 8)	9/16-18 (SAE 6)	7/8-14 (SAE 10)	3/4-16 (SAE 8)
	With O-Ring seal	35 / 25.8	30 / 22.1	90 / 66.4	35 / 25.8
GSV50	BSP	G 1/2	G 1/2	G 1/2	G 1/2
	With O-Ring seal	50 / 36.9	50 / 36.9	50 / 36.9	50 / 36.9
	With copper washer	60 / 44.3	60 / 44.3	60 / 44.3	60 / 44.3
	With steel and rubber washer	60 / 44.3	60 / 44.3	60 / 44.3	60 / 44.3
	UN-UNF	3/4-16 (SAE 8)	3/4-16 (SAE 8)	7/8-14 (SAE 10)	3/4-16 (SAE 8)
	With O-Ring seal	35 / 25.8	35 / 25.8	90 / 66.4	35 / 25.8
Q80	BSP	G 1/2 - G 3/4	G 1/2 - G 3/4	G 3/4	G 3/4
	With O-Ring seal	50 / 36.9 - 90 / 66.4	50 / 36.9 - 90 / 66.4	90 / 66.4	90 / 66.4
	With copper washer	60 / 44.3 - 90 / 66.4	60 / 44.3 - 90 / 66.4	90 / 66.4	90 / 66.4
	With steel and rubber washer	60 / 44.3 - 70 / 51.6	60 / 44.3 - 70 / 51.6	70 / 51.6	70 / 51.6
	UN-UNF	7/8-14 (SAE 10)	3/4-16 (SAE 8)	1" 1/16-12 (SAE 12)	7/8-14 (SAE 10)
	With O-Ring seal	90 / 66.4	35 / 25.8	95 / 70.1	90 / 66.4
Q130	BSP	G 3/4 - G 1"	G 3/4 - G 1"	G 1"	G 1"
	With O-Ring seal	90 / 66.4 - 100 / 73.8	90 / 66.4 - 100 / 73.8	100 / 73.8	100 / 73.8
	With copper washer	90 / 66.4 - 90 / 66.4	90 / 66.4 - 90 / 66.4	90 / 66.4	90 / 66.4
	With steel and rubber washer	70 / 51.6 - 100 / 73.8	70 / 51.6 - 100 / 73.8	100 / 73.8	100 / 73.8
	UN-UNF	1" 5/16-12 (SAE 16)	1" 5/16-12 (SAE 16)	1" 5/16-12 (SAE 16)	1" 5/16-12 (SAE 16)
	With O-Ring seal	150 / 100.6	150 / 100.6	150 / 100.6	150 / 100.6

NOTE - These torques are recommended. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish.

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