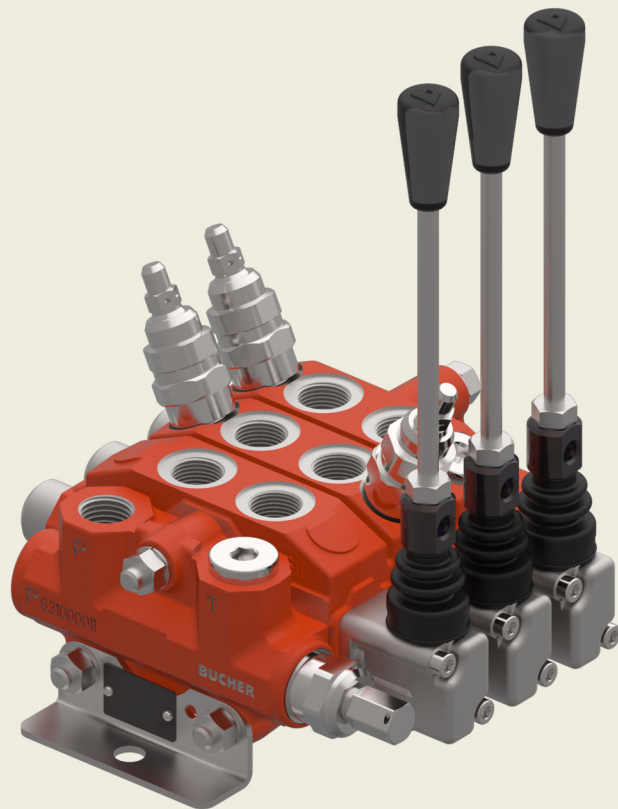


Directional Control Valve HDS11



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1 General information

1.1 Directional valve installation

For the installation of the directional control valve on the equipment frame it is important to consider the following recommendations:

- the valve can be assembled in any position but, in order to avoid deformations and spool sticking, the surface on which the product is mounted has to be flat;
- before connecting pipelines, make sure that the pipeline hollows as well as fittings and seals are thoroughly clean; check also that the work ports are protected until the connection of the pipelines
- during assembly and servicing operations, it is

necessary to adopt clean procedures and work in an environment free of chips, swarf, dust and other possible source of pollution;

- if the spools are connected to the equipment controls through linkages, make sure that they do not affect their operations;
- before painting the valve, check that the work port plastic plugs are tightly in place;
- do not use high pressure jet washer directly on the valve to prevent water infiltration inside lever and spool caps.

1.2 Fittings

In the interest of safety, only fittings with STRAIGHT THREAD ENDS should be used.

Fittings with TAPERED THREAD ENDS should never be used, as they can cause deformation and cracks in the valve body.

Warranty conditions will not be valid in case tapered fittings are used.

The work port adaptors have to be fastened respecting the tightening torque values indicated in the following table (for different port types contact our Sales Dept.):

Cavity	Recommended tightening torque for work port fittings - Nm / lbf		
Metric - ISO 261	M10X1	M14X1.5	M18X1.5
With O-Ring seal (ISO 6149-1)	15 / 11.1	30 / 22.1	40 / 29.5
With copper washer (ISO 9974-1)	15 / 11.1	30 / 22.1	40 / 29.5
With rubber washer or steel (ISO 9974-1)	15 / 11.1	30 / 22.1	35 / 25.8
BSP - ISO 228-1	1/8" BSP	1/4" BSP	3/8" BSP
With copper washer (ISO 1179-1)	15 / 11.1	30 / 22.1	40 / 29.5
With rubber washer or steel (ISO 1179-1)	15 / 11.1	30 / 22.1	35 / 25.8
UN-UNF - ISO 263	SAE4 7/16-20 UNF	SAE6 9/16-18 UNF	SAE8 3/4-16 UNF
With O-Ring seal (ISO 11926-1)	15 / 11.1	30 / 22.1	35 / 25.8



IMPORTANT!: Tightening torques depends on several different factors including lubrication, coating and surfaces finish. The fitting manufacturer shall be consulted.

1.3 Hydraulic fluid

The main function of the fluid used in hydraulic systems is to transfer energy but it performs also other important functions: protect the components from corrosion, lubricate the directional valve moving parts, remove particles and heat from the system.

In order to ensure proper operation and long life of the system it is important to choose the correct hydraulic fluid with proper additives.

Bucher Hydraulics recommends to use a mineral based oil according to type HL or type HLP (DIN 51524) only.

1.4 Filtration

In order to ensure proper operation and long life of the directional valve components it is extremely important to provide a proper and effective filtration of the hydraulic fluid. It is advisable to follow filter manufacturers instructions and recommendations.

The fineness of the filter should be selected in order to maintain the fluid contamination level according to the values listed at section 1.6.1 (Technical specification)

Particular attention has to be paid to the cleaning of the machine hydraulic circuit and its components before the first run-in, since the presence of foreign materials could cause damages to the directional valve components even if a proper filtration is provided.

1.5 Directives and standards

- PED (97/23/EC)

The pressure relief valves assembled into the directional control valve cannot be considered and/or confused with the safety valve when the PED Directive is applied to the hydraulic system.

- Atex



Attention: The equipment and protective systems of this catalogue ARE NOT intended for use in potentially explosive atmospheres. Ref: Directive 99/92/EC and Directive 2014/34/UE

- ISO 9001:2015 / ISO 14001:2015 / ISO 50001:2018

Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear pumps and motors, electro pumps, cartridge valves and integrated manifolds for hydraulic applications.

1.6 Hydraulic system

1.6.1 Technical specification



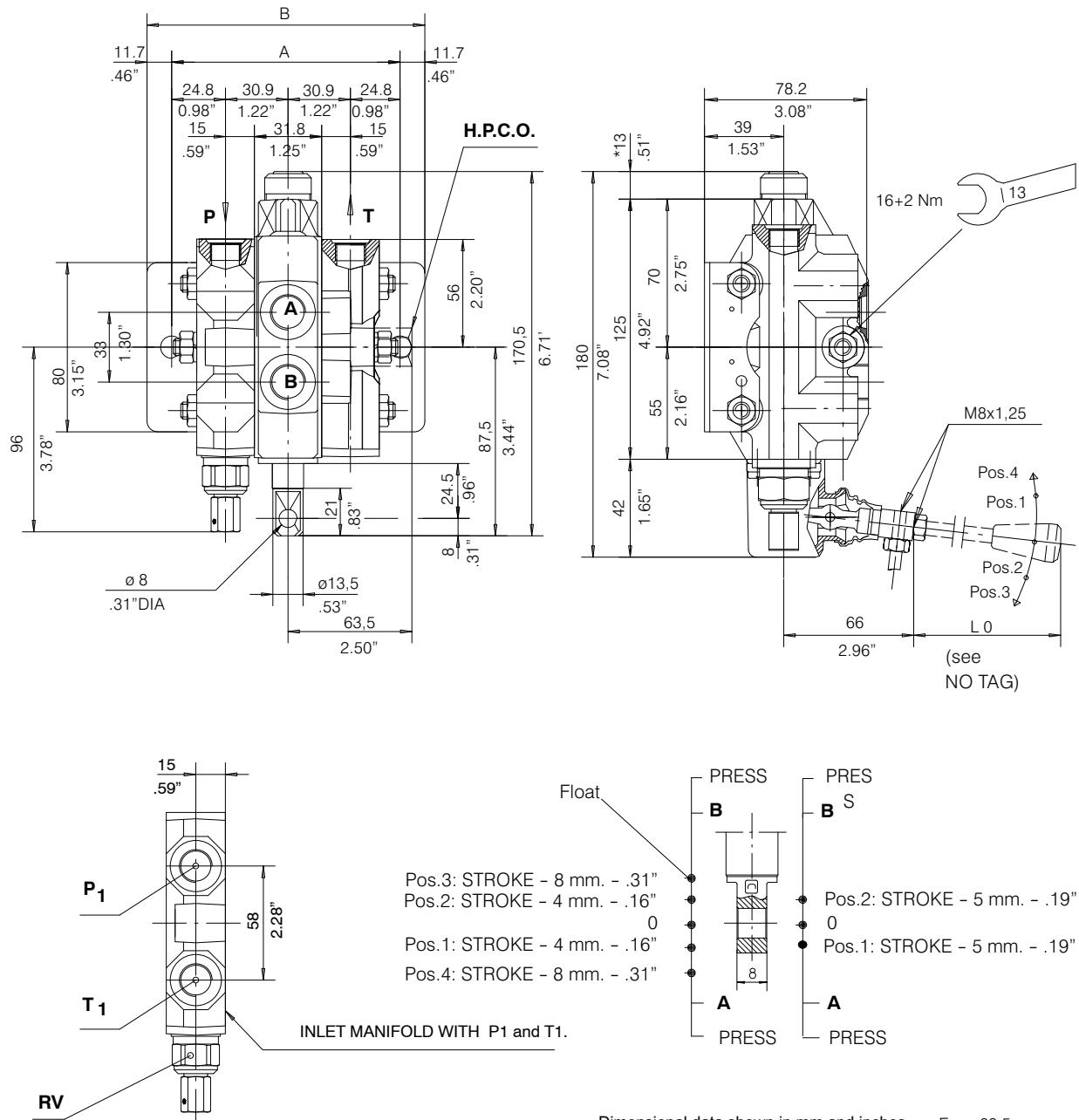
IMPORTANT!: Parameter values and diagrams shown in this catalogue have been measured with mineral oil having a viscosity of 23 mm²/s at 50° C

Features		
Nominal flow range		45 l/min (12 US gpm)
Max inlet pressure (P)		250 bar (3600 PSI)
Max work port pressure (A/B)		320 bar (4640 PSI)
Max back pressure (T)		30 bar (430 PSI)
Max internal leakage A/B→T (at 100 bar/1450 PSI, 23 mm ² /s) ¹⁾		12 cc/min (0.854 Cu In/min)
Fluid		mineral based oil (see 1.3)
Fluid temperature (with NBR seals)		-20°C / +80°C (-4° to 176° F)
Contamination class		21/19/16 ISO4406:1999 (NAS 1638 class10)
Viscosity operating range	recommended	from 15 to 75 mm ² /s
	admissible	from 12 to 400 mm ² /s
Number of spools		1 to 10
Ambient temperature in operating conditions:	with mechanical/hydraulic/ pneumatic controls	from -30 to +60 °C
Tie-rods tightening torque		18 ⁺² Nm

For different operating conditions, please contact our Sales Dept.

1) Spool leakage values are strongly influenced by fluid viscosity with a linear inversed relationship: 10 cc/min at 100 bar and 23 cSt become roughly 5 cc/min at 100 bar and 46 cSt.

1.7 Dimensional data



Dimensional data shown in mm and inches Ex.: 63.5 = mm 2.50" = inches

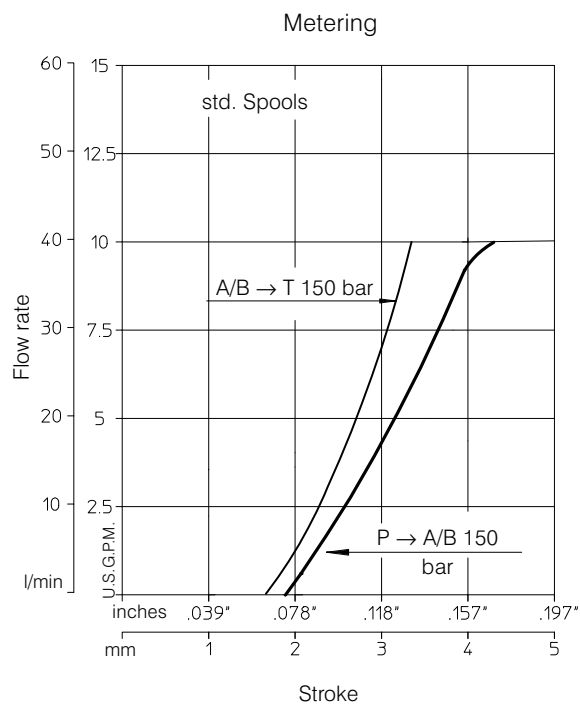
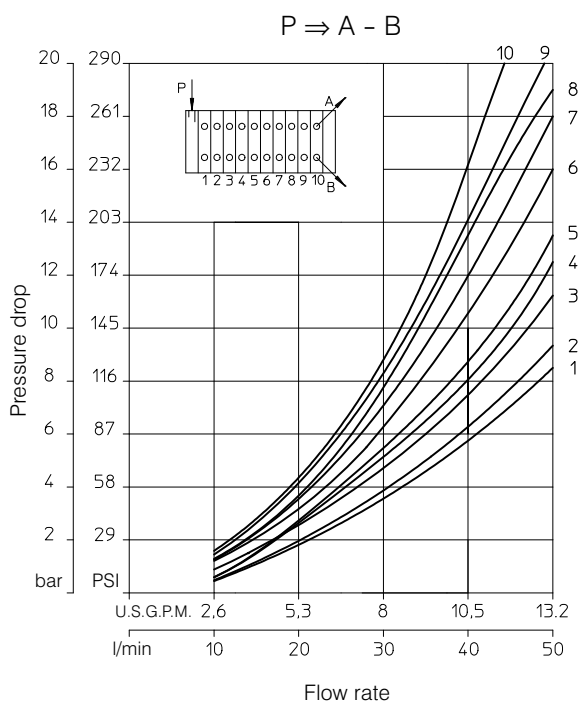
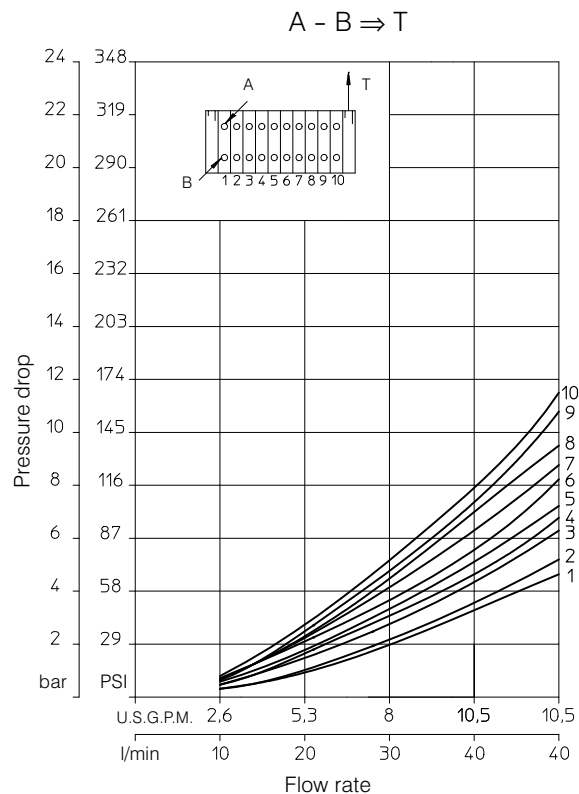
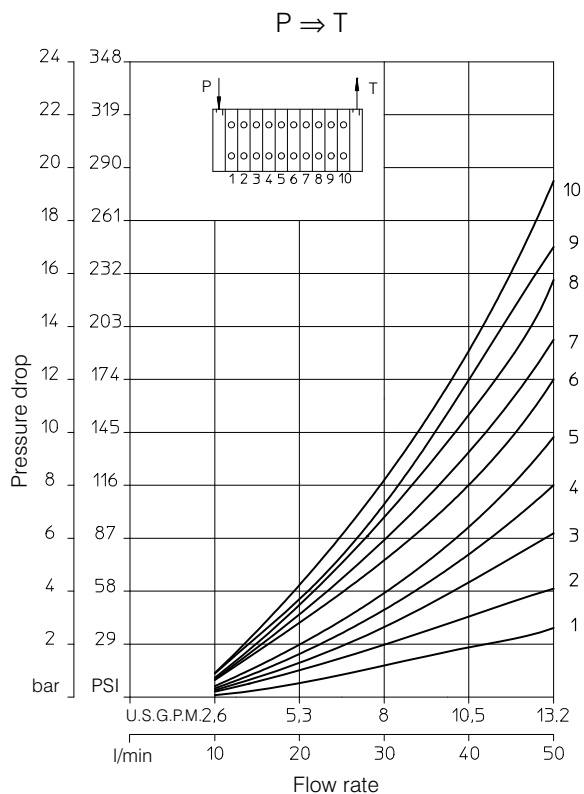
N. of sections	1	2	3	4	5	6	7	8	9	10
A	111.4	143.2	175	206.8	238.6	270.4	302.2	334	365.8	397.6
	4.38"	5.64"	6.89"	8.14"	9.39"	10.64"	11.90"	13.15"	14.40"	15.65"
B	134.8	166.6	198.4	230.2	262	293.8	325.6	357.4	389.2	421
	5.31"	6.56"	7.81"	9.06"	10.31"	11.57"	12.82"	14.07"	15.32"	16.57"

1.8 Performance curves

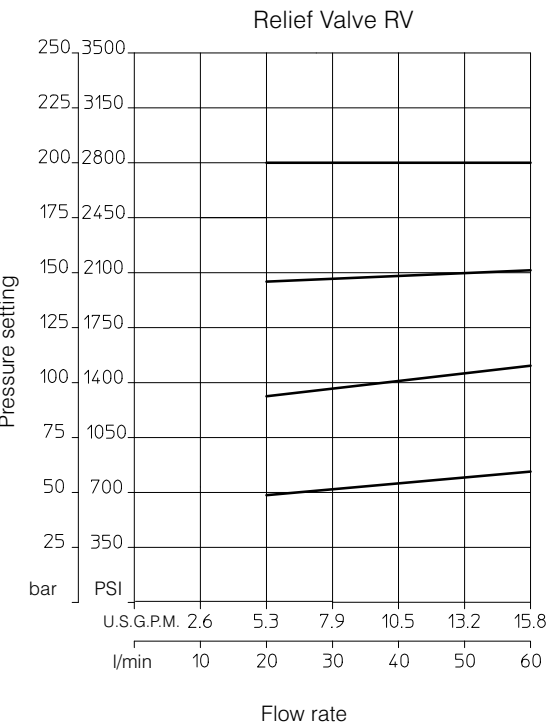
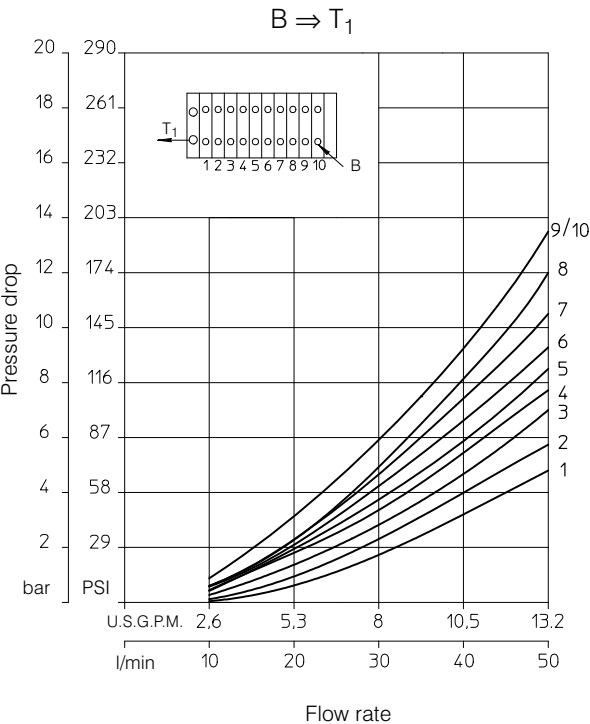
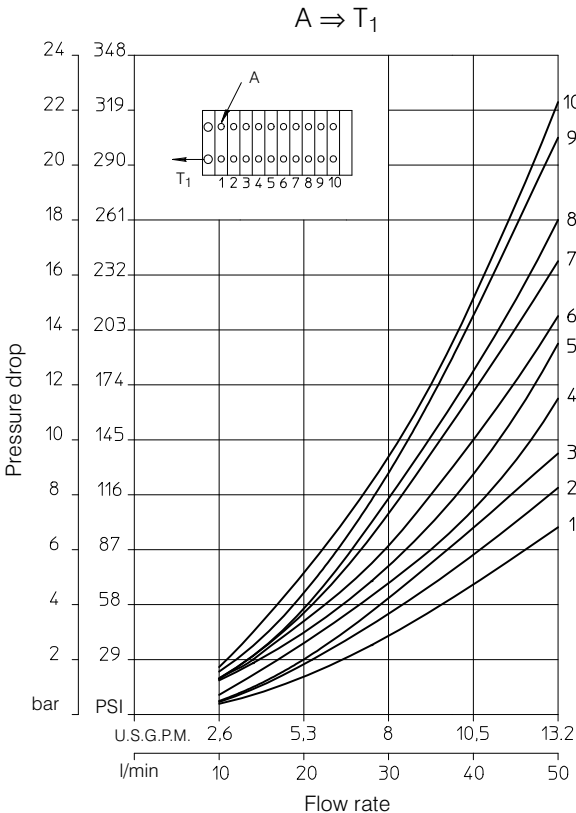
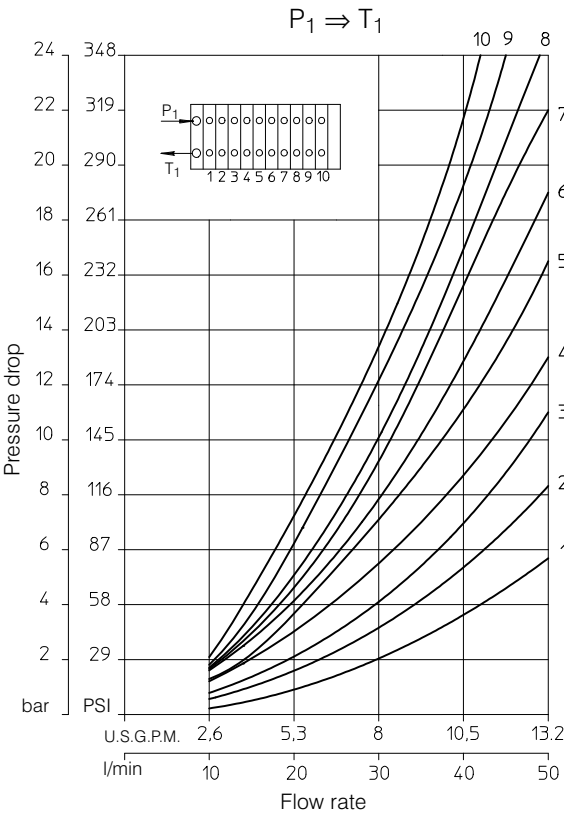
Oil: Shell Tellus T37

Temperature: 50° C (120° F)

Viscosity: 27 mm²/s

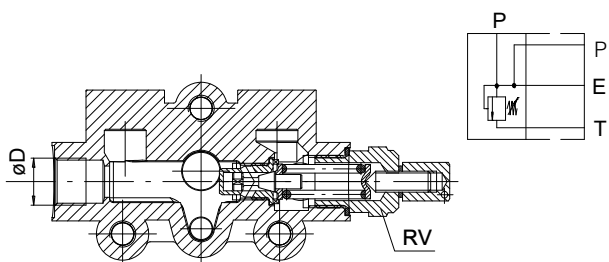


Oil: Shell Tellus T37
Temperature: 50° C (120° F)
Viscosity: 27 mm²/s



2 Inlet covers

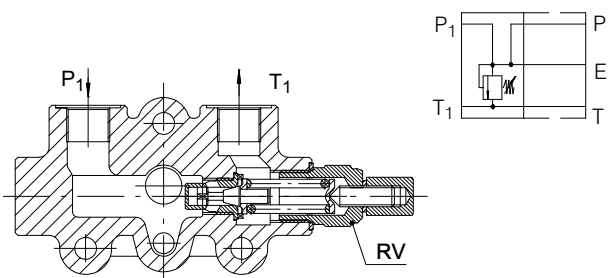
2.1 Inlet manifold (standard) with P and RV



* Inlet section code with RV set at standard pressure: 150 bar (2100 PSI)

Type	Ø D	Code
T06	SAE6	200931060020*
T07	SAE8	200931070030*
T09	3/8" BSP	200931020020*
T10	M18x1.5	200931010030*

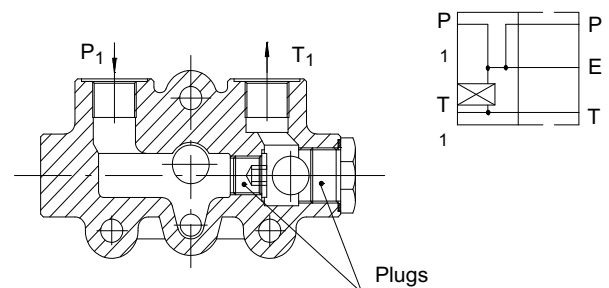
2.2 Inlet manifold with P1 - T1 - RV



* Inlet section code with RV set at standard pressure: 150 bar (2100 PSI)

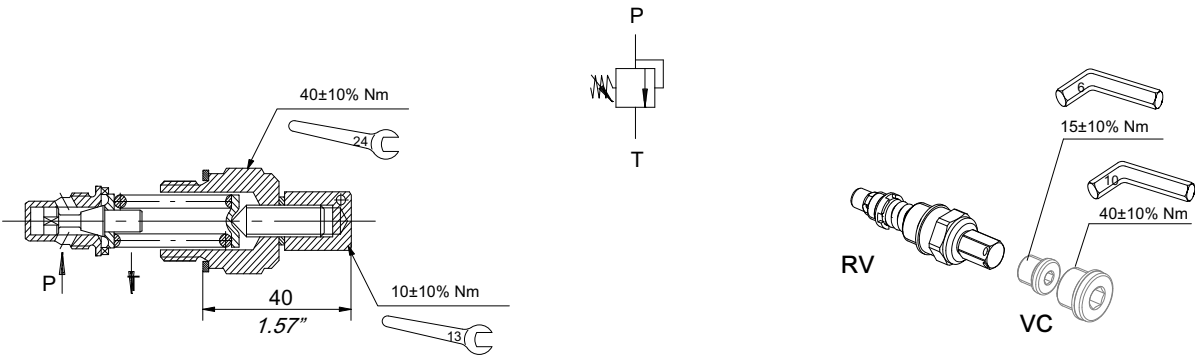
Type	Ø D	Code
T11	SAE6	200931060030*
T12	SAE8	200931070020*
T14	3/8" BSP	200931020030*
T15	M18x1.5	200931010020*

2.3 Inlet manifold with P1 - T1



Type	Ø D	Code
T16	SAE6	200931060040
T17	SAE8	200931070050
T19	3/8" BSP	200931020040
T20	M18x1.5	200931010040

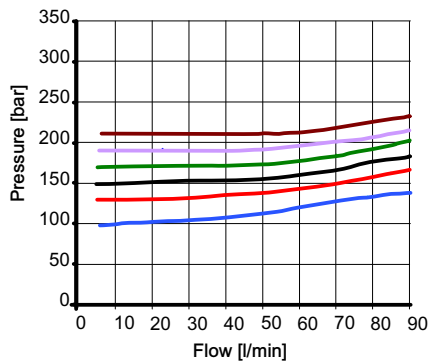
3 Adjustable direct acting pressure Relief Valve RV



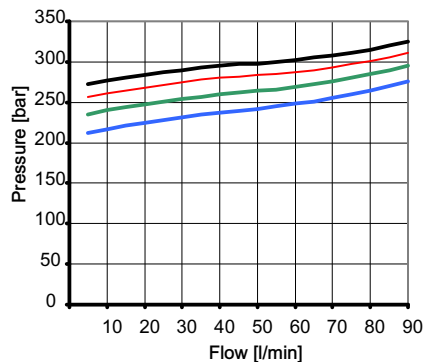
Pressure set range bar (PSI)	Type	Code	Standard setting bar (PSI)	Setting Code	Spring colour
30 - 95 (400 - 1400)	RV01-06	200787400720	60 (860)	05	Yellow (YE)
96 - 210 (1370 - 3040)	RV01-15	200787400740	150 (2100)	15	Green (GR)
211 - 300 (3040 - 4350)	RV01-26**	200787400710	260 (3700)	26	Blue (BL)
VC (plugged valve)		200778400140	-	-	-

 **IMPORTANT!** Example: RV01-15* = 150 bar standard setting value. Different setting values have to be specified at the order.
Please pay attention that the minimum setting step has to be fixed in 10 bar.

RV01 (96-210 bar)

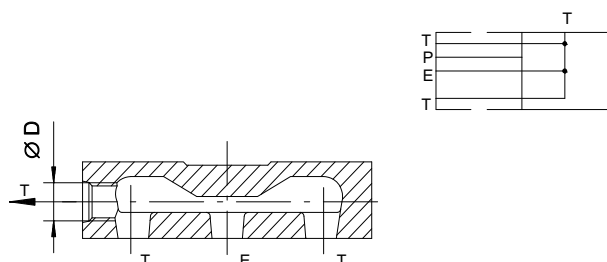


RV01 (211-300 bar)



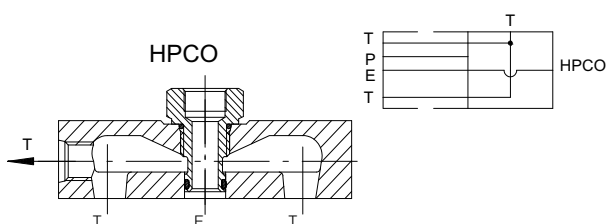
4 Outlet covers

4.1 Outlet covers (std) with T and open center



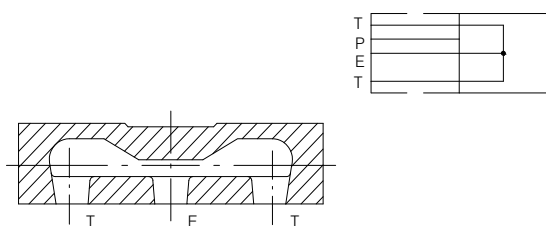
Type	Ø D	Code
P01	SAE6	200630060011
P02	SAE8	200630070010
P04	3/8" BSP	200630020011
P05	M18x1.5	200630010010

4.2 Outlet covers with T and H.P.C.O. (power beyond)



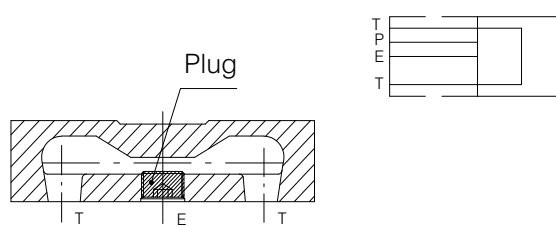
Type	Ø D	Code
P06	SAE6	200930060020
P07	SAE8	200930070020
P09	3/8" BSP	200930020020
P10	M18x1.5	200930010020

4.3 Outlet cover with open center



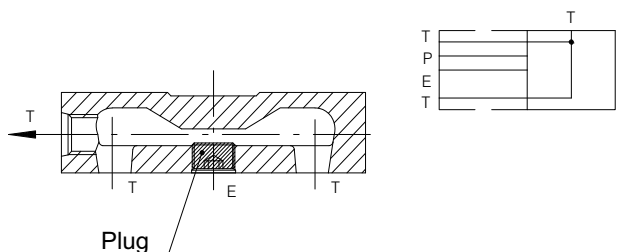
Type	Code
P11	200630090010

4.4 Outlet cover with closed center



Type	Code
P12	200930090020

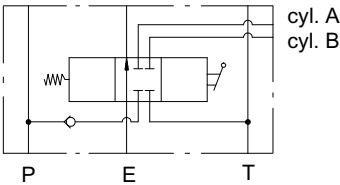
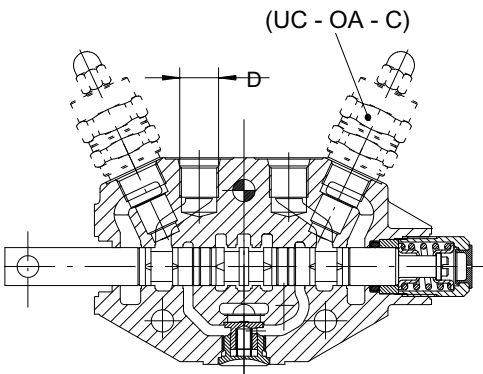
4.5 Outlet covers with T and closed center



Type	Ø D	Code
P13	SAE6	200930060030
P14	SAE8	200930070030
P16	3/8" BSP	200930020030
P17	M18x1.5	200930010030

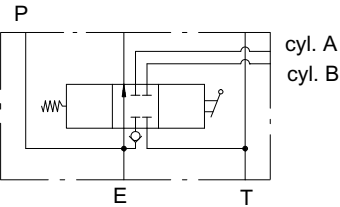
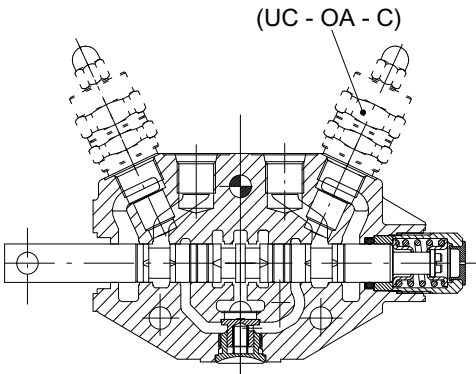
5 Sections

5.1 Standard circuit: parallel



Type/Code		Ø D
Standard	With UC-OA-C valve	
K01 200941360510	K06 200941360530	SAE6
K02 200941370270	K07 200941370280	SAE8
K04 200941326240	K09 200941326250	3/8" BSP
K05 200941312720	K10 200941312730	M18x1.5

5.2 Optional circuit: series and tandem



Type/Code		Ø D
Standard	With UC-OA-C valve	
K47 200941360520	K52 200941360540	SAE6
K47 200941370290	K53 200941370300	SAE8
K50 200941326260	K55 200941326270	3/8" BSP
K51 200941312740	K56 200941312750	M18x1.5

Note: Body code consist of machined casting, seals and hold check valve only. Not to be used for complete valve order.

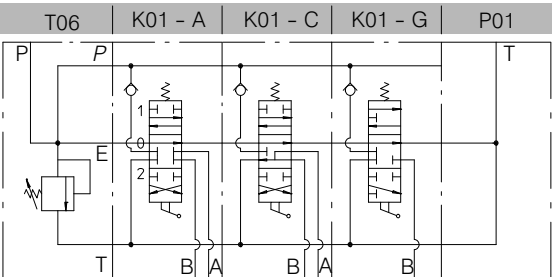
6 Standard spools

Spool Type	Hydraulic schematic	Circuit	Features	Application examples
A		4 way - 3 position A/B closed E open by pass Double acting A/B closed	Symmetric	
AS		High metering spool (max flow suggested 15 l/min.)	Symmetric	
B		4 way - 3 position A/B-E closed Double acting A/B-E closed	Motor Spool	
C		4 way - 3 position A/B to tank in neutral E open by pass Double acting A/B to tank	Motor Spool	
G		3 way - 3 position B closed E open by pass Single acting B closed		FORK LIFT LIFTING FUNCTION
S		3 way - 3 position A closed E open by pass Single acting A closed		FORK LIFT LIFTING FUNCTION
X		4 way - 3 position series connection Double acting A/B closed	Series spool	
Z		4 way - 4 position 4 th floating position Double acting A/B closed	Pull to float (Manual controls only)	LOADERS BOOM FUNCTION
WW*		4 way - 4 position 4 th floating position Double acting A/B closed	Push to float	LOADERS BOOM FUNCTION

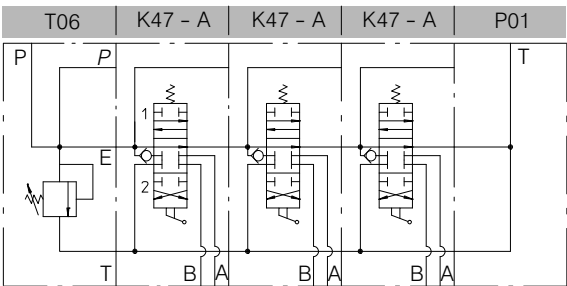
* : "WW" spool require special body (K...), positioner (240) and lever (L192)

7 Hydraulic circuits

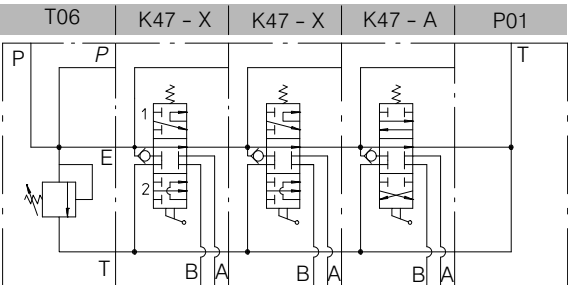
7.1 Standard circuits: parallel



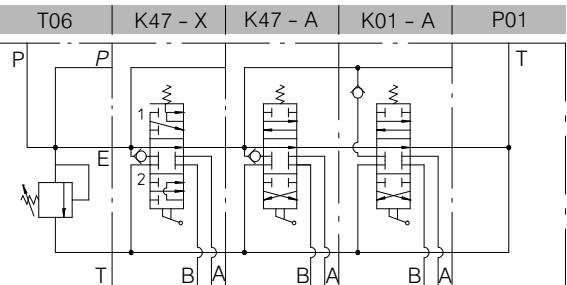
7.2 Optional circuit: tandem



7.3 Optional circuit: series

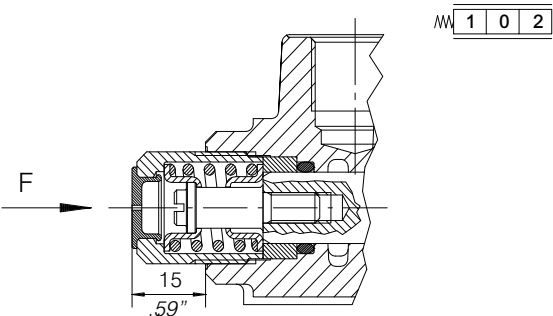


7.4 Combined circuit: parallel/series



8 Manual positioners

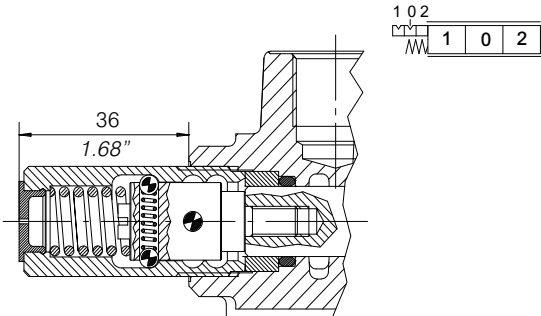
8.1 Three position spring return to neutral



Type	Code*	F (N)
01	200768510010	200
79	200768510920	140

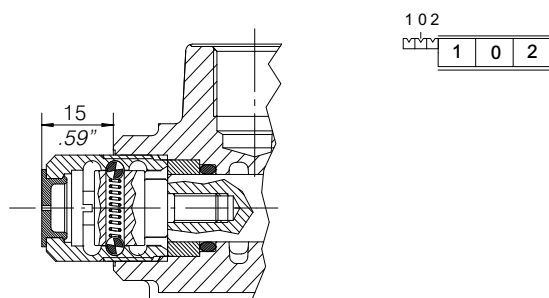
* : code without plastic plug; plastic plug code: 2006780.0008.0
Code F (N)**: force in Newton (N) needed to operate the spool

8.2 Two position detent - spring centre



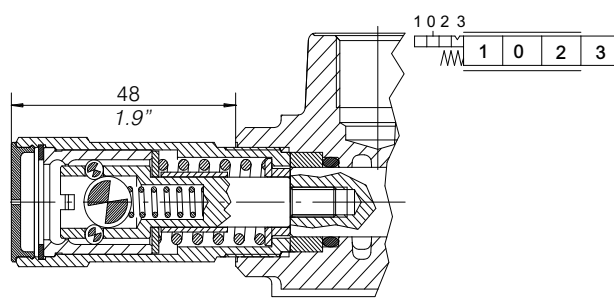
Type	Code*
02	200768530010

8.3 Three position detent



Type	Code*
03	200768520010

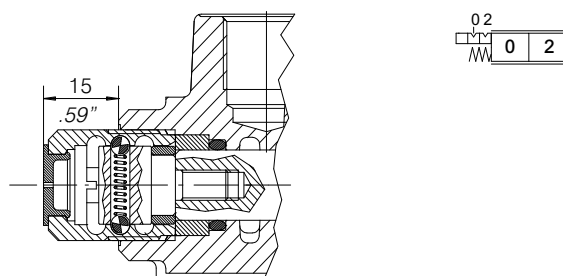
8.4 Four position float



Type	Code
04	200768540030

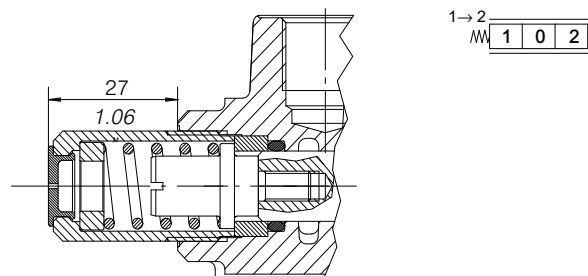
plastic plug code: 200678000090

8.5 Two position detent



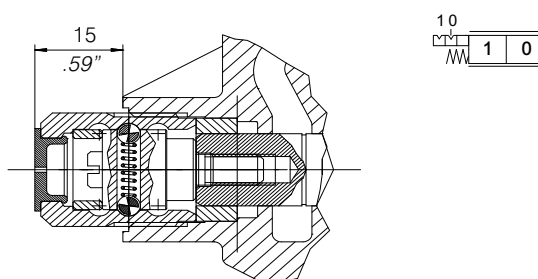
Type	Code*
05	200768520050

8.6 Two position spring return



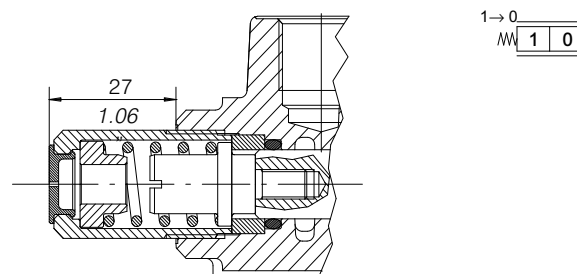
Type	Code*
06	200768510050

8.7 Two position detent



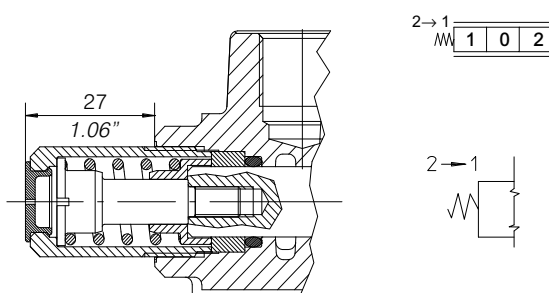
Type	Code*
07	200768520270

8.8 Two position spring return



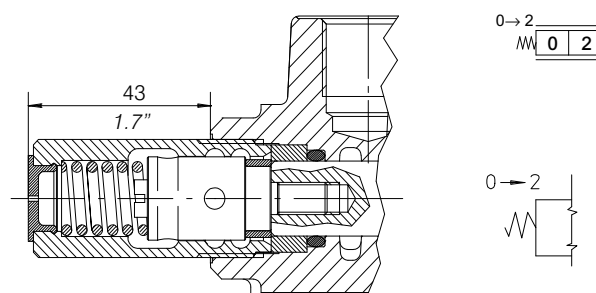
Type	Code*
12	200768510210

8.9 Two position spring return



Type	Code*
15	200768511090

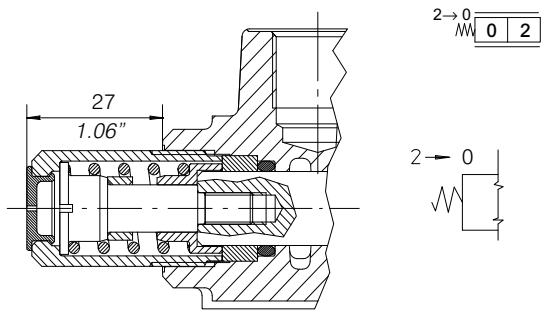
8.10 Two position spring return



Type	Code*
16	200768511100

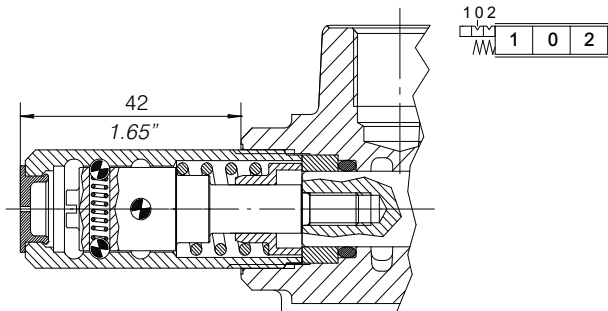
* : code without plastic plug; plastic plug code: 2006780.0008.0

8.11 Two position spring return



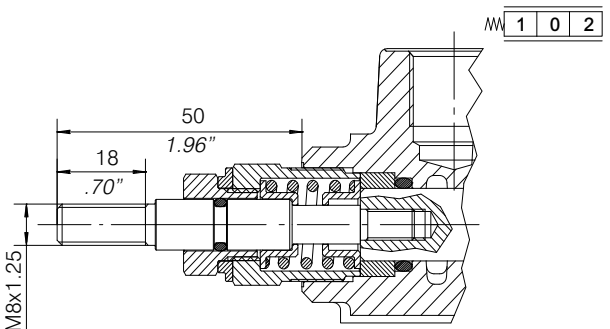
Type	Code*
17	200768510400

8.12 Two position detent + spring return



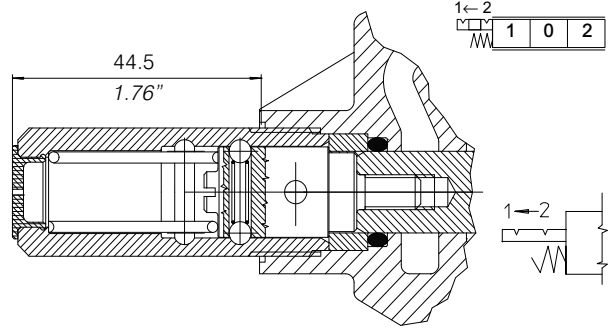
Type	Code*
20	200768530100

8.13 Three position spring return



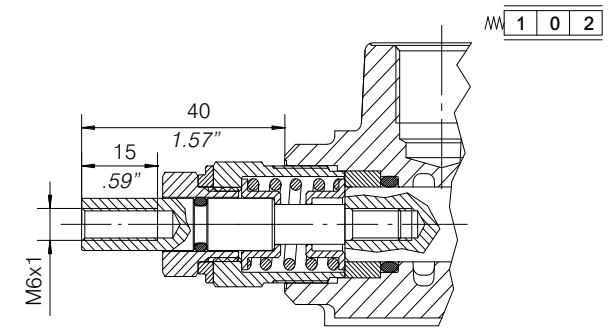
Type	Code
84	200968610970

8.14 Two position detent - spring return to pos. 1



Type	Code*
106	200768520280

8.15 Three position spring return to neutral



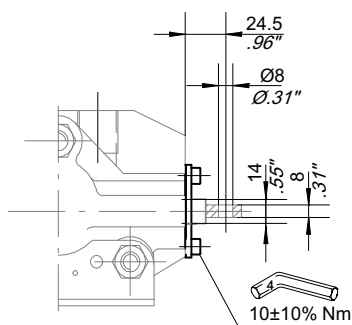
Type	Code
88	200968610100

* : code without plastic plug; plastic plug code: 2006780.0008.0

9 Levers

Type	Code
L55	200707190010

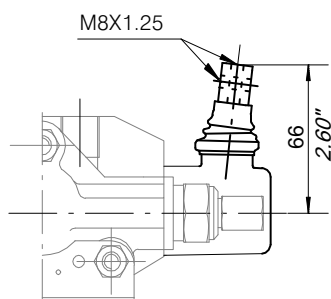
1	0	2
---	---	---



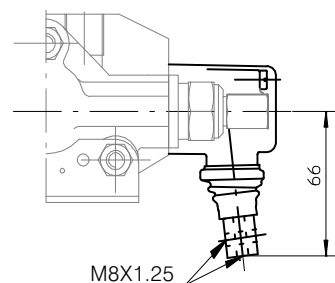
Type	Type	Code*
L100	L300	200707120330
L175*	L375*	200707110280
L192**	L392**	200707110301

1	0	2
---	---	---

L100
L175
L192

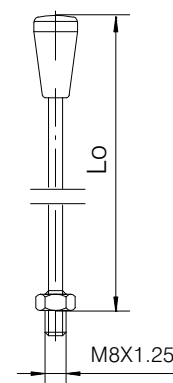


L300
L375
L392



*: L175 - L375 only for "Z" spool application **: L192 - L392 only for "WW" spool application

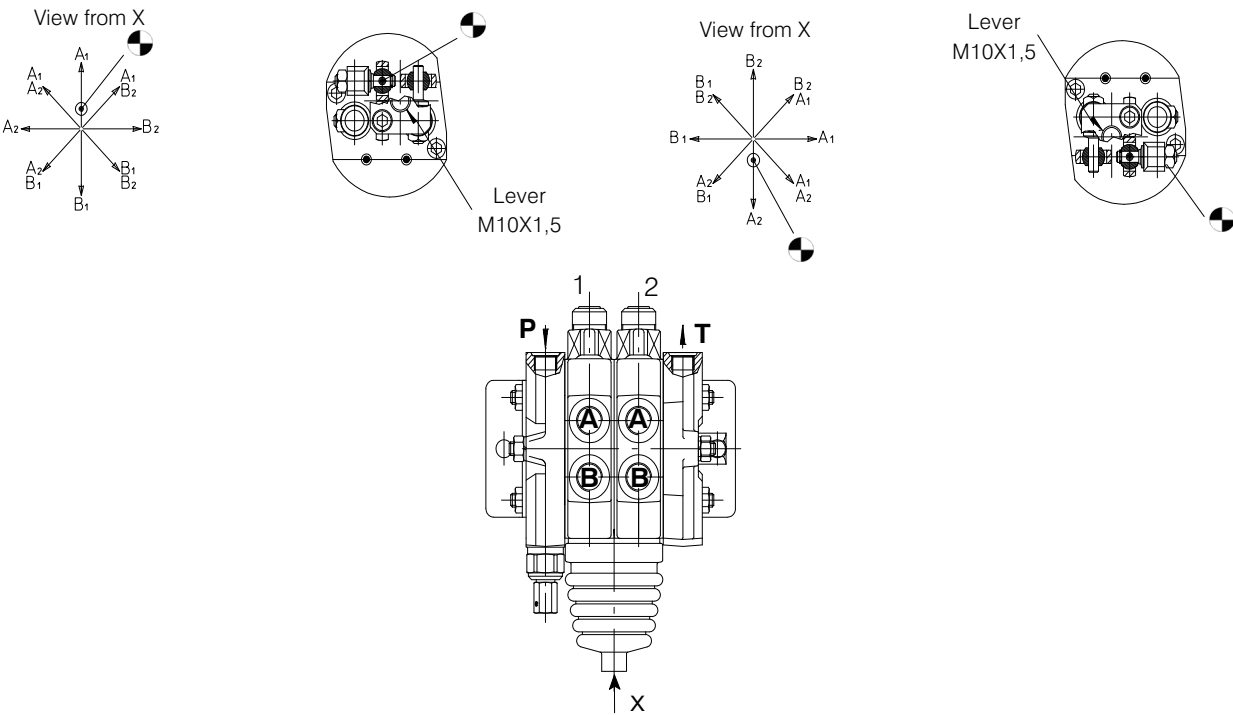
Lo mm (inches)	Type	Code
150 (5.90)	AL001	200702210190
200 (7.87)	AL002	200702210030
250 (9.84)	AL003	200702210050
300 (11.81)	AL004	200702210060



9.1 Cross joystick for dual axis spool control L133-L134, L188-L189

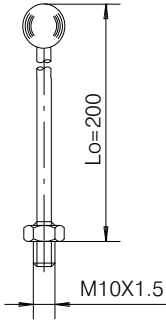
Type	Code
L133	200975920070
L188*	200975920240

Type	Code
L134	200975920070
L189*	200975920240



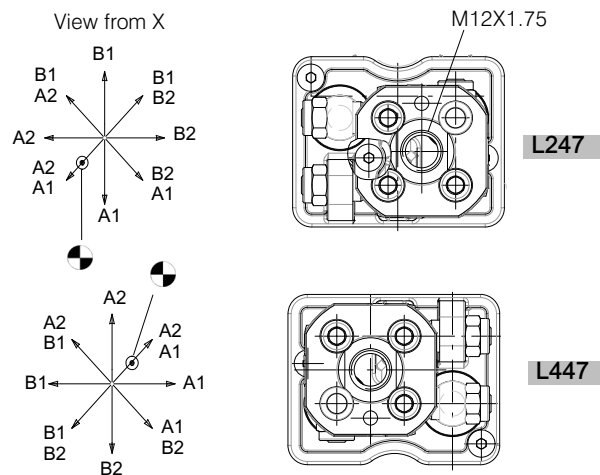
L133-L134-L188-L189 are supplied complete with rubber boot protection
L188* - L189*: only for "Z" spool application

Type	Code
AL038	200702220180

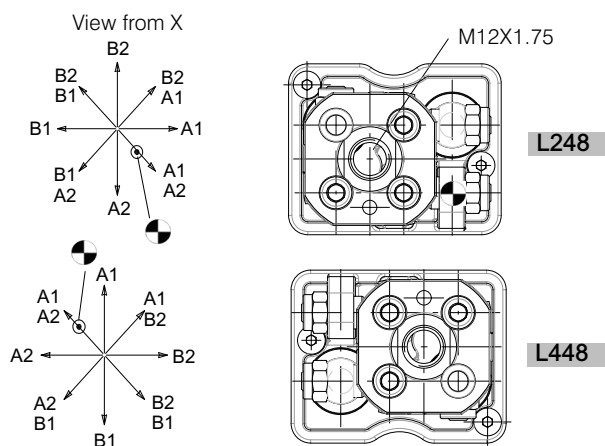


9.2 Cross joystick for dual axis spool control L247-L447, L248-L448, L260-460

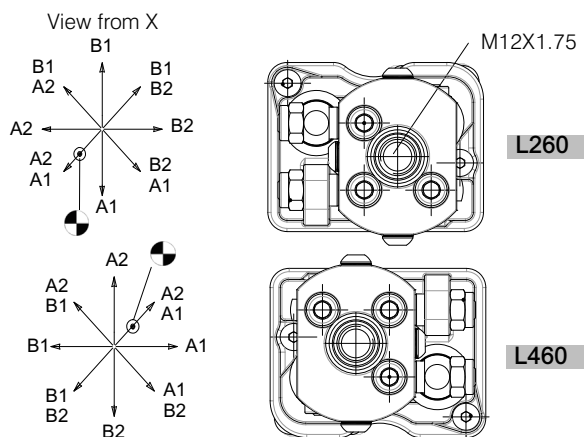
Type	Type	Code
L247	L447	200975920040



Type	Type	Code
L248	L448	200975920050

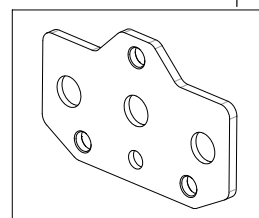
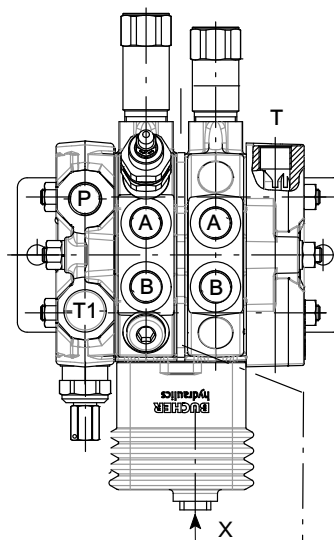


Type	Type	Code
L260	L460	200975920411



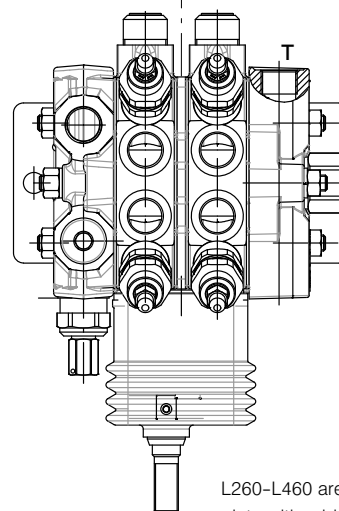
L247-L447-L248-L448 are supplied complete with rubber boot protection
Lever AL010 (M12x1.75) code 200702230040

Pivot



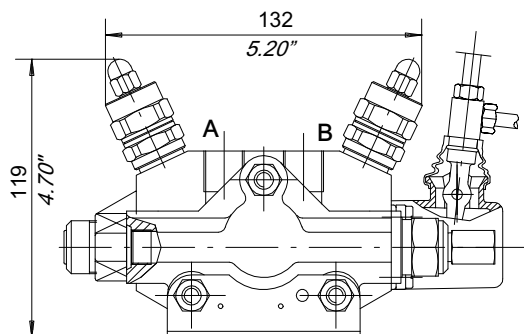
Spacer plate code 200964900470, necessary for :

L247 - L447
L248 - L448
L260 - L460



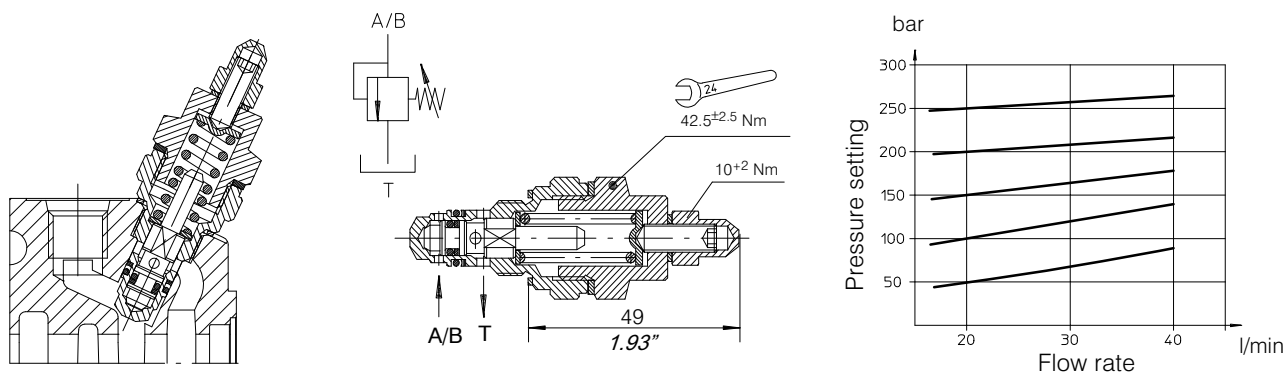
L260-L460 are supplied complete with rubber boot protection

10 Port relief and anti-cavitation valves



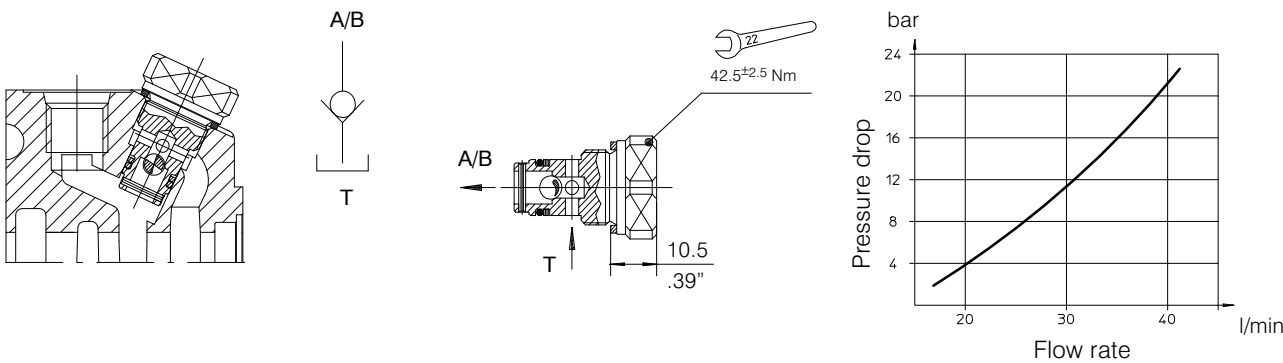
Pressure set range bar (PSI)	Standard setting bar (PSI)	Type	Spring colour
30 - 130 (435 - 1885)	60 (8600)	06	Yellow (YE)
130 - 300 (1885 - 4350)	150 (2100)	15	Green (GR)

10.1 Port relief valve OA



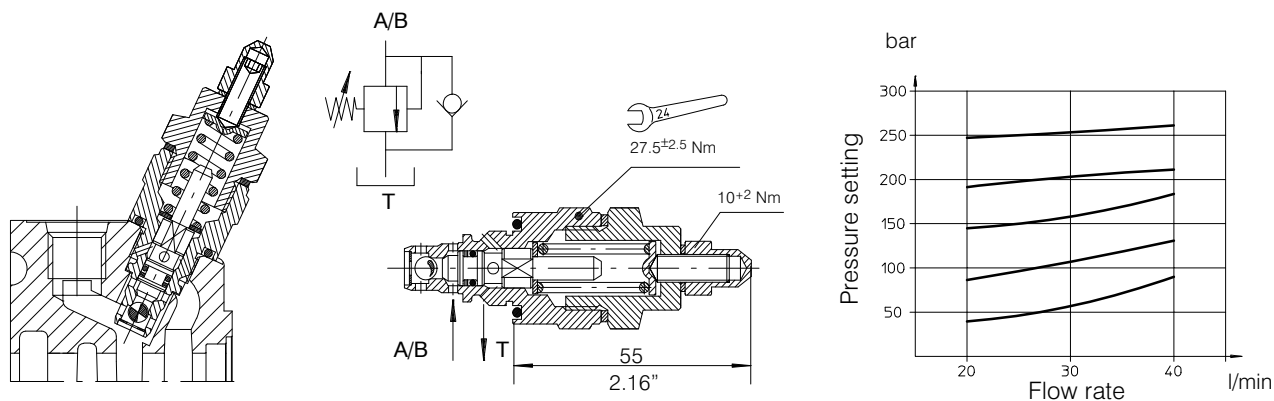
Pressure set range bar (PSI)	Type	Code	Spring code
0 - 30 (0-435)	OA/A02 OA/B02	200787400920	200662401130
31 - 130 (450-1885)	OA/A06 OA/B06	200787400940	200662400700
131 - 300 (1900-4350)	OA/A15 OA/B15	200787400930	200662400770
VC (plugged valve)		200778400040	-

10.2 Anti-cavitation valve C



Type	Code
C/A/ or C/B	200787600930
VC (plugged valve)	200778400040

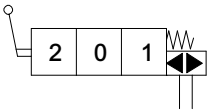
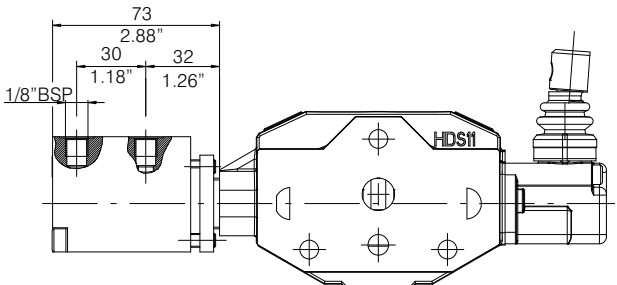
10.3 Combined port relief and anti-cavitation valve UC



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 30 (0-435)	UC/A02 UC/B02	200787401260	200662401130
31 - 130 (450-1885)	UC/A06 UC/B06	200787401290	200662400700
131 - 300 (1900-4350)	UC/A15 UC/B15	200787401270	200662400770
VC (plugged valve)		200778400040	-

11 Hydraulic-Pneumatic control ON-OFF

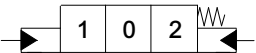
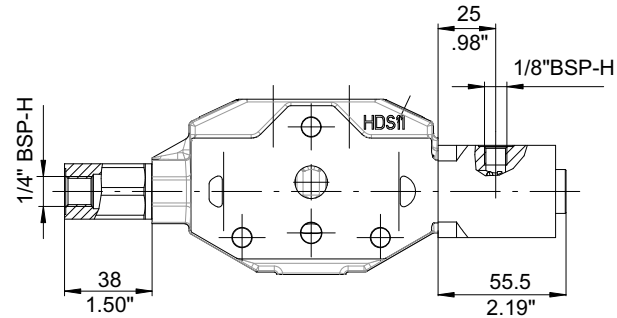
Type	Code
HP24	200968650490



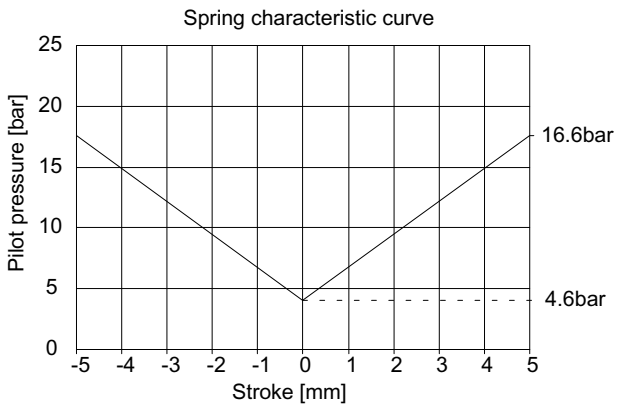
Operating conditions	Hydraulic control	Pneumatic control
Min. pressure	6 bar (85 PSI)	6 bar (85 PSI)
Max. pressure	15 bar (215 PSI)	10 bar (145 PSI)

12 Hydraulic control

Type	Code
HP50	200968650583

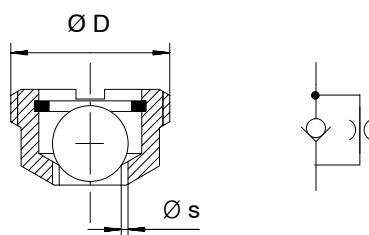


Operating conditions	Hydraulic control
Min Pressure	4.6 bar (67 PSI)
Max Pressure	16.6 bar (241 PSI)

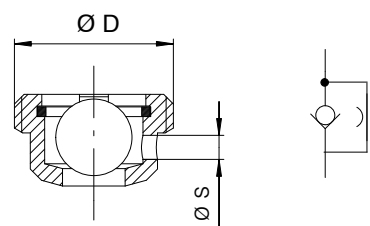


13 Cartridge valves

13.1 Flow control valve series VS



Ø D	Type	Code	Ø s
M18x1,5	VS4	200787200430	1.4
	VS6	200787200450	2
	VS11	200787200330	2.5
3/8" BSP	VS15	200787200370	1.4 (Ø 6.5)
	VS16	200787200380	1.4
	VS17	200787200390	1.4 (Ø 7.2)
	VS39	200787201660	2.5
SAE6	VS18	200787200400	1.5
	VS25	200787201040	2
	VS26	200787201050	2



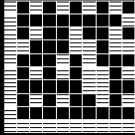
Ø D	Type	Code	Ø s
M18x1,5	VS105	200787201690	0.5
	VS108	200787201700	0.8
	VS112	200787201710	1.2
	VS116	200787201720	1.6
	VS125	200787201730	2.5
	VS225	200787201740	2.5
3/8" BSP	VS225	200787201740	2.5
SAE6	VS625	200787201750	2.5

14 Product identification plate

Article Code ↳
Description ↳
Order No. / Serial No. ↳
Article Customer Code ↳
(only if available)

DATA MATRIX ↳

200 0111*****
HDS11/***** *****
*****/*****



BUCHER
hydraulics

↳ Manufacturing Date (yyyymm)
↳ BUCHER Logo

DATA MATRIX:

Size: 8.5mm x 8.5mm

Internal data:

*	*	*	*	*	*	*	*	/	*	*	*	*	.	*	*	*	*	*	*	.	2	0	0	0	1	1	1	*	*	*	*	*	*	*	*	*	*	*
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Order No. / Serial No.

Semicolon

Date (yyyymm)

Semicolon

Article code

Semicolon

Article customer code (only if available)

info.it@bucherhydraulics.com

www.bucherhydraulics.com

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Classification: 430.300.000