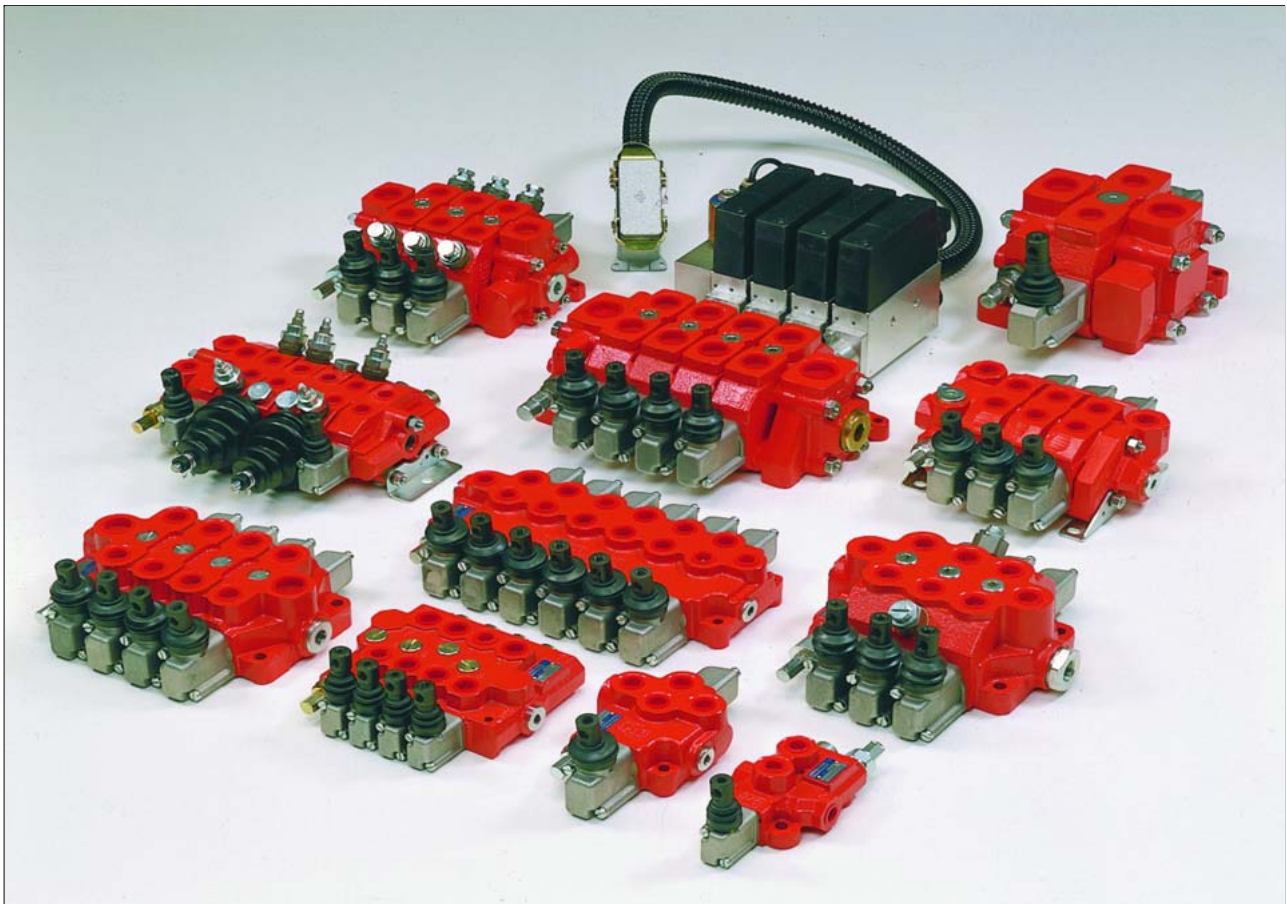
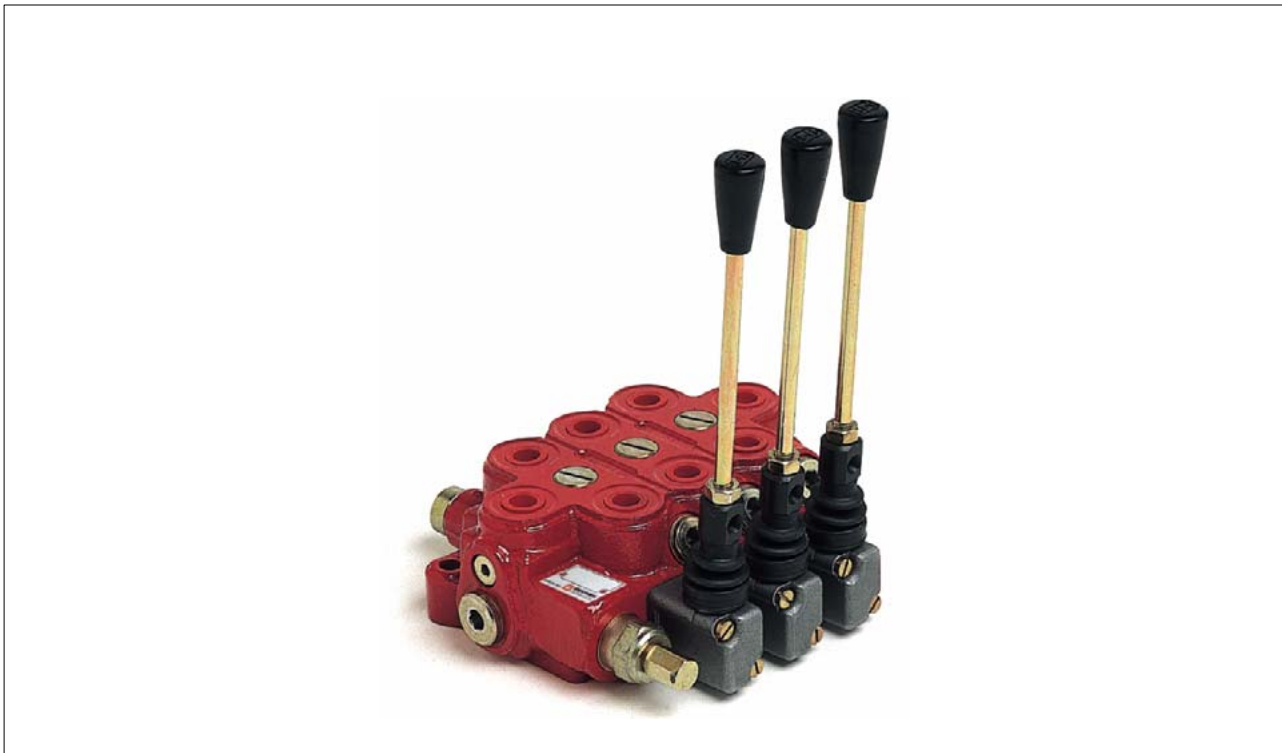


Monobloc and Sectional Directional Control Valves



HDM11S

4 Monobloc directional control valves HDM11S**Contents**

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HDM11S

4.1 General specifications

Technical specification		
Max flow rate	l/min U.S.G.P.M.	45 12
Max continuous operating pressure supply port P Parallel circuit	bar PSI	250* 3600*
Max intermittent peak pressure work port A/B Parallel circuit	bar PSI	320* 4600*
Max back pressure tank port T	bar PSI	30 430
Oil temperature	° C ° F	-10 to 80 14 to 180
Oil viscosity	mm ² /s	16 to 75
Oil filtration	μ	≤ 30

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 mm ² /s:		
Maximum	cm ³ /min Cu. In./min	12 0.732
Average	cm ³ /min Cu. In./min	6 0.366
Lower values on demand (to be agreed with our Sales Dept..)		

Number of spools	1 to 6
Adjustable direct operated relief valve (tamper-proof seal available on request)	RV
Load hold check valve in each section	LC
Cartridge Anti-Shock Anti-cavitation and service relief valve	OA-UC-C
Mechanical release check valve	RSM3

4.1.1 Weight (standard version; without options)

Version	kg	lb
HDM11S/1	3.5	7.7
HDM11S/2	5.2	11.45
HDM11S/3	6.9	15.20
HDM11S/4	8.6	18.94

* Higher pressure are admitted depending on the versions and operating conditions, please consult Bucher Reggio Emilia Sales Organisation.

HDM11S/5	10.3	22.69
HDM11S/6	12	26.43

4.1.2 Material specification:

Body: High strength cast-iron.
Spool: Hardened steel and chrome plated
Seals: Buna "N".

4.1.3 Standard features:

- 1) Parallel circuit
- 2) Balanced interchangeable spools (provides minimum leakage, smooth operation)
- 3) Wide selection inlets, work ports, and outlets threaded ports.
- 4) Negative overlapping of the spool.

4.1.4 Optional features available:

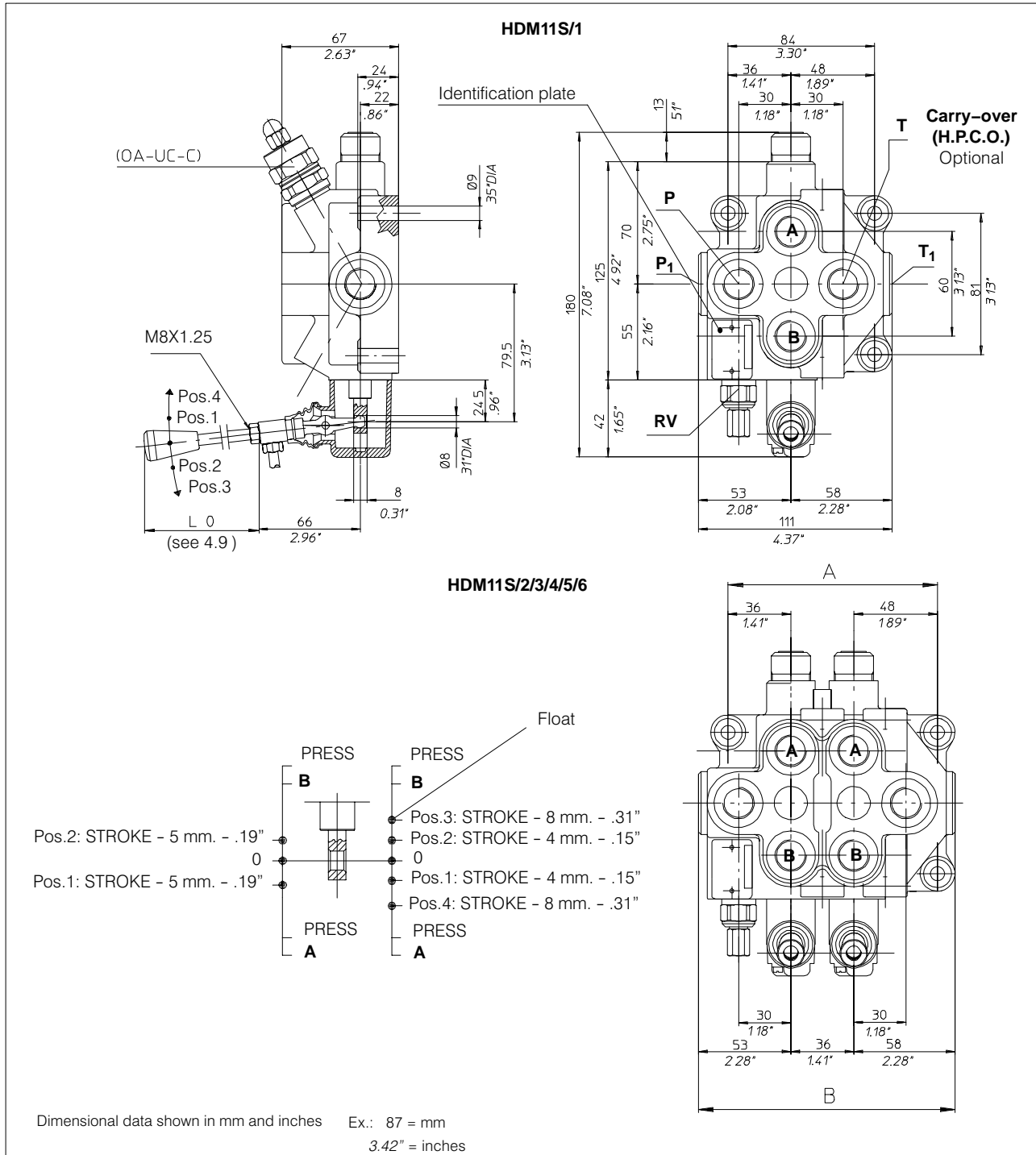
- 1) Open or closed centre positions, 3 or 4 way operations, 3 or 4 position (float position), full open centre (motor spool) and other spool options.
- 2) Carry over.
- 3) Series circuit
- 4) Load Sensing circuit closed centre for variable displacement pump
- 5) Complete lever assembly
- 6) Wide range of positioners

4.1.5 Symbols:

P: inlet port
T: outlet port
A/B: work ports
H.P.C.O.: carry-over
RV: relief valve
P₁T₁: side inlet and outlet ports
 3.1.0.2: spool position
P: pressure line
T: exhaust line
E: centre line (by pass).

HDM11S

4.2 Dimensional data

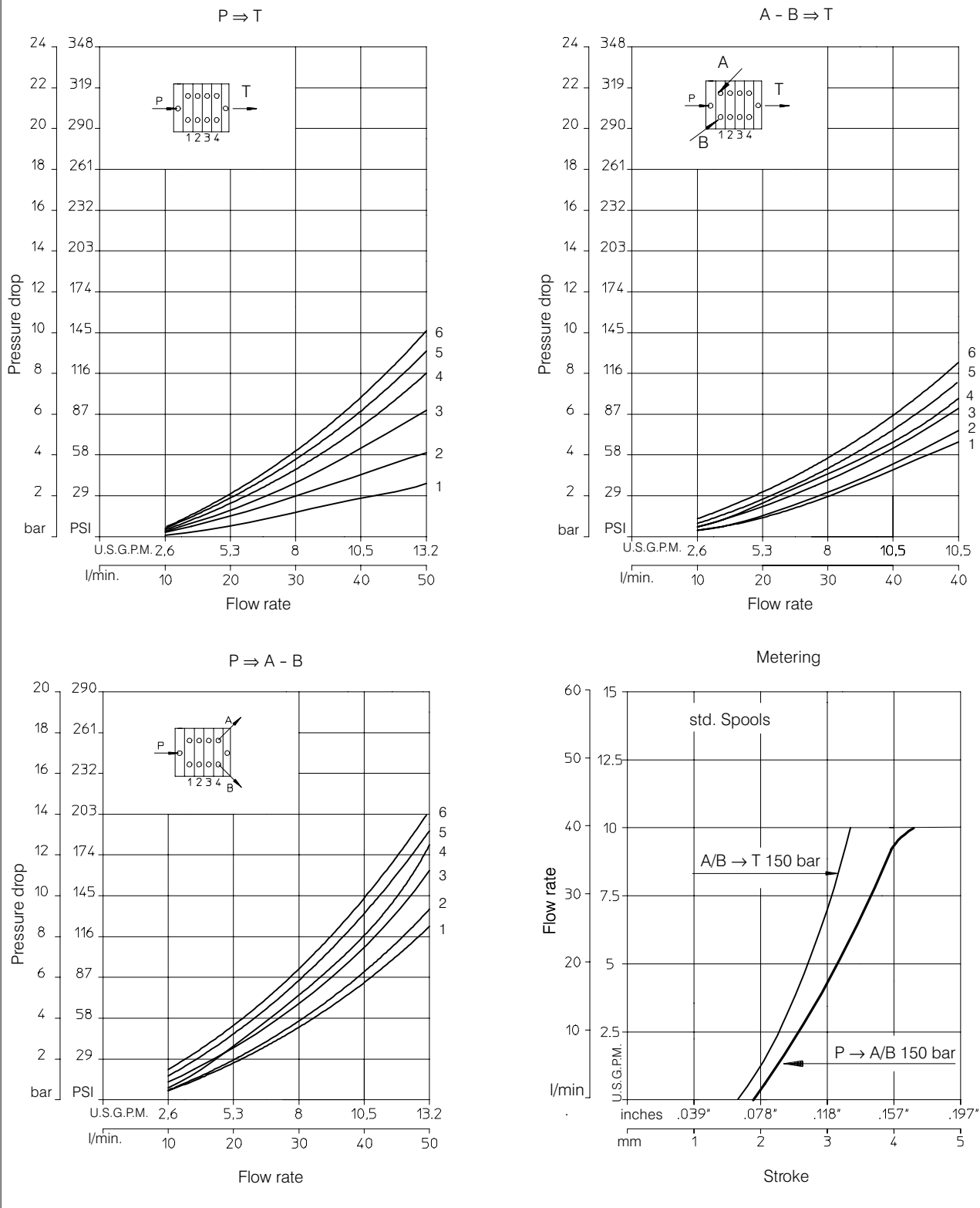


N. of sections		HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
Dimension	A	120	156	192	228	264
		4.72"	6.14"	7.56"	9.98"	10.40"
	B	147	183	219	255	291
		5.78"	7.20"	8.62"	10.04	11.45"

HDM11S

4.3 Performance curves

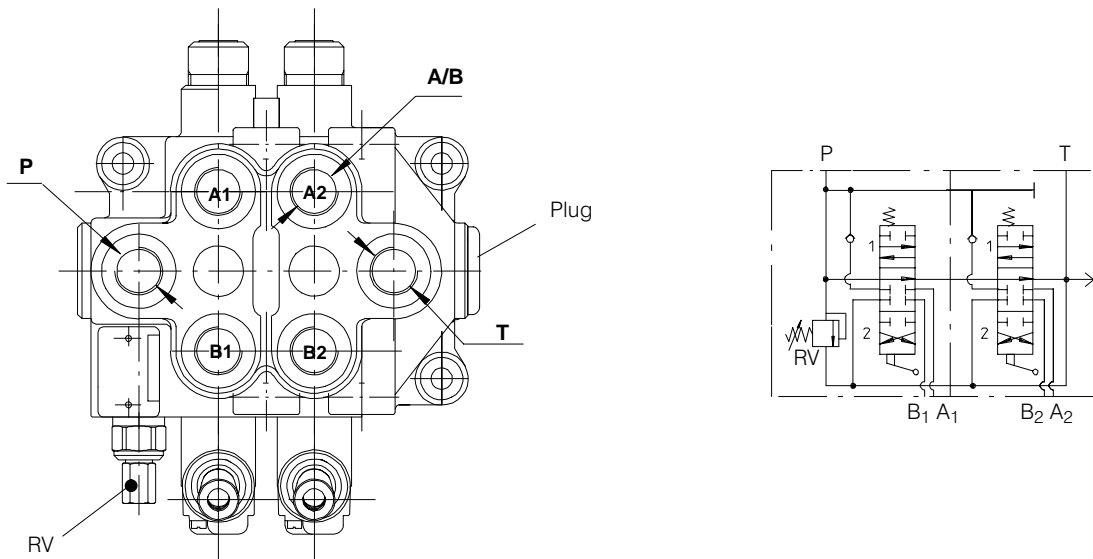
Oil: Shell Tellus T37
 Temperature: 50° C (120° F)
 Viscosity: 27 mm²/s



HDM11S

4.4 Monobloc bodies

4.4.1 Standard circuit: parallel
Open center with P – T – RV (Standard)



P-T A/B	Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K01	K01	K01	K01 200.9434.6005.0	K01	K01
SAE 8	K02 200.9431.7004.0	K02 200.9432.7006.0	K02 200.9433.7006.0	K02 200.9434.7006.0	K02 200.9435.7006.0	K02
3/8" BSP	K04 200.9431.2018.0	K04 200.9432.2048.0	K04 200.9433.2056.0	K04 200.9434.2036.0	K04 200.9435.2027.0	K04 200.9436.2014.0
M18X1.5	K05 200.9431.1024.0	K05 200.9432.1045.0	K05 200.9433.1045.0	K05 200.9434.1027.0	K05 200.9435.1020.0	K05 200.9436.1012.0

P-T A/B	Section with valve UC-OA-C -Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K06	K06	K06	K06	K06	K06
SAE 8	K07 200.9431.7005.0	K07 200.9432.7007.0	K07 200.9433.7007.0	K07 200.9434.7007.0	K07 200.9435.7007.0	K07 200.9436.7006.0
3/8" BSP	K09 200.9431.2020.0	K09 200.9432.2050.0	K09 200.9433.2057.0	K09 200.9434.2037.0	K09	K09
M18X1.5	K10 200.9431.1023.0	K10 200.9432.1046.0	K10 200.9433.1046.0	K10 200.9434.1028.0	K10 200.9435.1021.0	K10 200.9436.1013.0

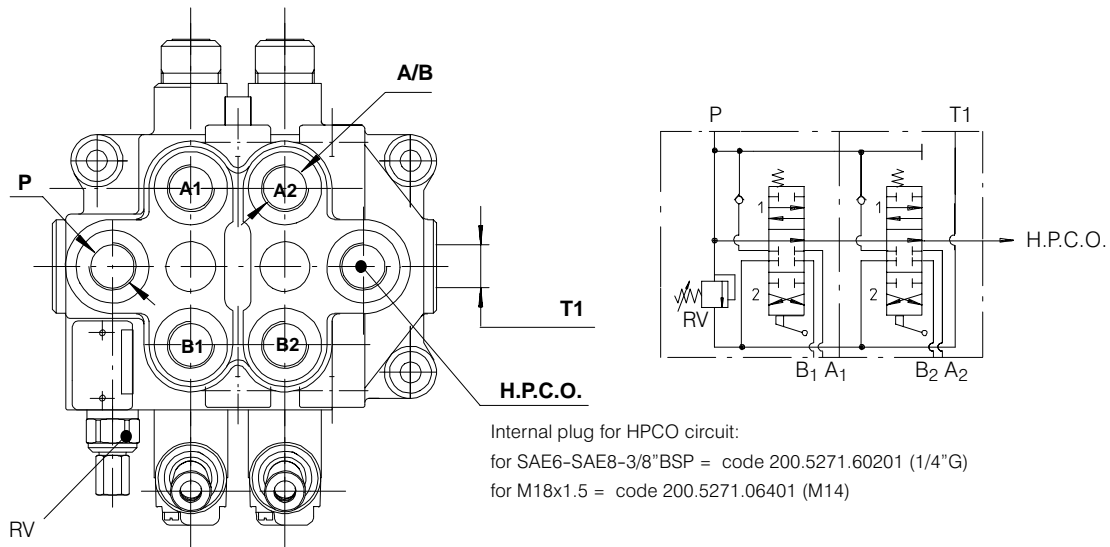
Note 1: Body codes consist of: machined casting, seals, plugs and check valve only. Not to be used for complete valve order.

Note 2: For availability of -K- bodies without ordering code please contact our Sales Department.

Note 3: 1/2" BSP size ports are available only under demand. Please take care that max continuous operating pressure must not exceed 180 bar.

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4.4.2 Standard circuit: parallel
Open centre and carry-over with P – T1 – R
H.P.C.O.



P-T1 A/B	Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K11	K11	K11	K11	K11	K11
SAE 8	K12 200.9431.7006.0	K12 200.9432.7008.0	K12 200.9433.7008.0	K12 200.9434.7004.0	K12	K12
3/8" BSP	K14 200.9431.2019.0	K14 200.9432.2049.0	K14 200.9433.2054.0	K14 200.9434.2038.0	K14	K14
M18X1.5	K15 200.9431.1025.0	K15 200.9432.1043.0	K15 200.9433.1051.0	K15 200.9434.1029.0	K15	K15

P-T1 A/B	Section with valve UC-OA-C - Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K21	K21	K21	K21	K21	K21
SAE 8	K22 200.9431.7007.0	K22 200.9432.7009.0	K22 200.9433.7009.0	K22 200.9434.7009.0	K22	K22
3/8" BSP	K24 200.9431.2021.0	K24 200.9432.2051.0	K24 200.9433.2055.0	K24 200.9434.2039.0	K24	K24
M18X1.5	K25 200.9431.1026.0	K25 200.9432.1044.0	K25 200.9433.1052.0	K25 200.9434.1030.0	K25	K25

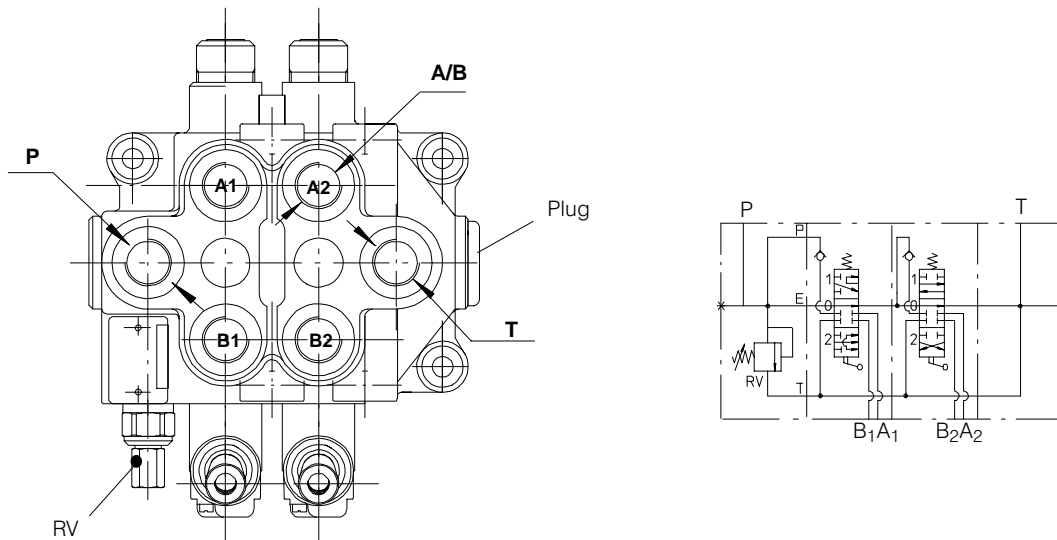
Note 1: Body codes consist of machined foundry, seals, plugs and check valve only. Not to be used ordering a complete valve

Note 2: For availability of -K- bodies without ordering code please contact our Sales Department.

Note 3: 1/2" BSP size ports are available only under demand. Please take care that max continuous operating pressure must not exceed 180 bar.

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4.4.3 Optional circuits: series and tandem
Open centre with P – T – RV



P-T A/B	Type/Code				
	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K31	K31	K31	K31	K31
SAE 8	K32	K32	K32	K32	K32
3/8" BSP	K34	K34 200.9433.2058.0	K34 200.9434.2040.0	K34	K34
M18X1.5	K35 200.9432.1047.0	K35 200.9433.1054.0	K35 200.9434.1031.0	K35	K35

P-T A/B	Section with valve UC-OA-C - Type/Code				
	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K36	K36	K36	K36	K36
SAE 8	K37	K37	K37	K37	K37
3/8" BSP	K39	K39 200.9433.2059.0	K39 200.9434.2041.0	K39	K39
M18X1.5	K40 200.9432.1048.0	K40 200.9433.1055.0	K40 200.9434.1032.0	K40	K40

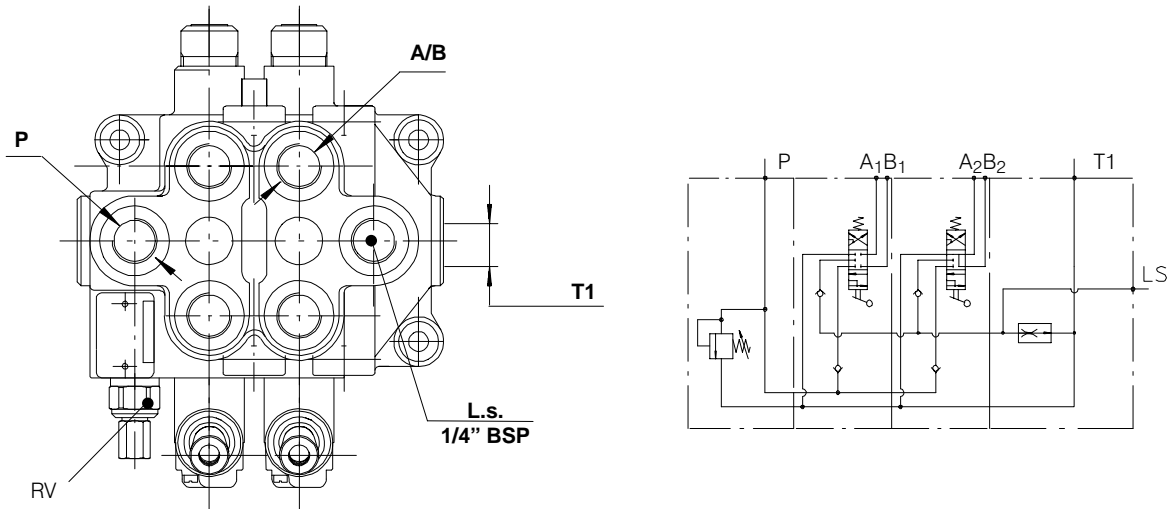
Note 1: Body codes consist of machined foundry, seals, plugs and check valve only. Not to be used ordering a complete valve

Note 2: For availability of -K- bodies without ordering code please contact our Sales Department.

Note 3: 1/2" BSP size ports are available only under demand. Please take care that max continuous operating pressure must not exceed 180 bar.

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4.4.4 Optional circuit: load sensing
 Closed centre for variable-displacement pump
 with P – T1– RV and L.s.



P-T1 A/B	Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K51	K51	K51	K51	K51	K51
SAE 8	K52	K52	K52 200.9433.7014.0	K52	K52	K52
3/8" BSP	K54	K54	K54	K54	K54	K54
M18X1.5	K55	K55	K55	K55	K55	K55

P-T1 A/B	Section with valve UC-OA-C - Type/Code					
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6
SAE 6	K56	K56	K56	K56	K56	K56
SAE 8	K57	K57	K57	K57	K57	K57
3/8" BSP	K59	K59	K59	K59	K59	K59
M18X1.5	K60	K60	K60	K60	K60	K60

Note 1: Body codes consist of machined foundry, seals, plugs and check valve only. Not to be used ordering a complete valve

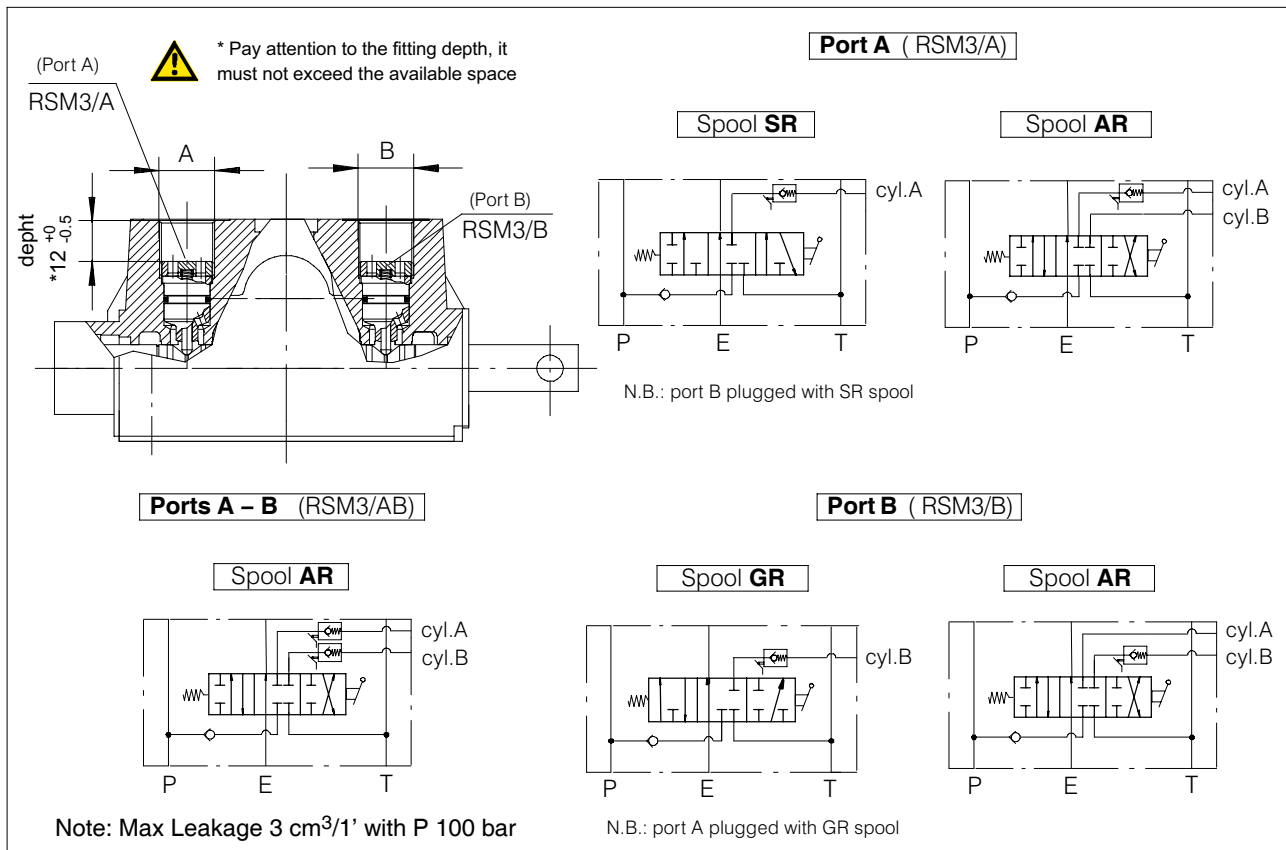
Note 2: For availability of -K- bodies without ordering code please contact our Sales Department.

Note 3: 1/2" BSP size ports are available only under demand. Please take care that max continuous operating pressure must not exceed 180 bar

HDM11S

4.4.5 Check valves with mechanical release RSM3

The check valve taper seal is released by means of a taper on the spool and by a push rod.



4.4.6 Directional control valve bodies for RSM3 valve

A/B	Type/Code						RSM3 Code
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6	
SAE 8	K82	K82	K82	K82	K82	K82	
3/8" BSP	K84 200.9431.2022.0	K84	K84	K84	K84	K84	200.7876.0234.1
M18X1.5	K85 200.9431.1027.0	K85	K85	K85	K85	K85	200.7876.0229.1

A/B	Section with valve UC-OA-C - Type/Code						RSM3 Code
	HDM11S/1	HDM11S/2	HDM11S/3	HDM11S/4	HDM11S/5	HDM11S/6	
SAE 8	K92	K92	K92	K92	K92	K92	
3/8" BSP	K94	K94	K94	K94	K94	K94	200.7876.0234.1
M18X1.5	K95	K95	K95	K95	K95	K95	200.7876.0229.1

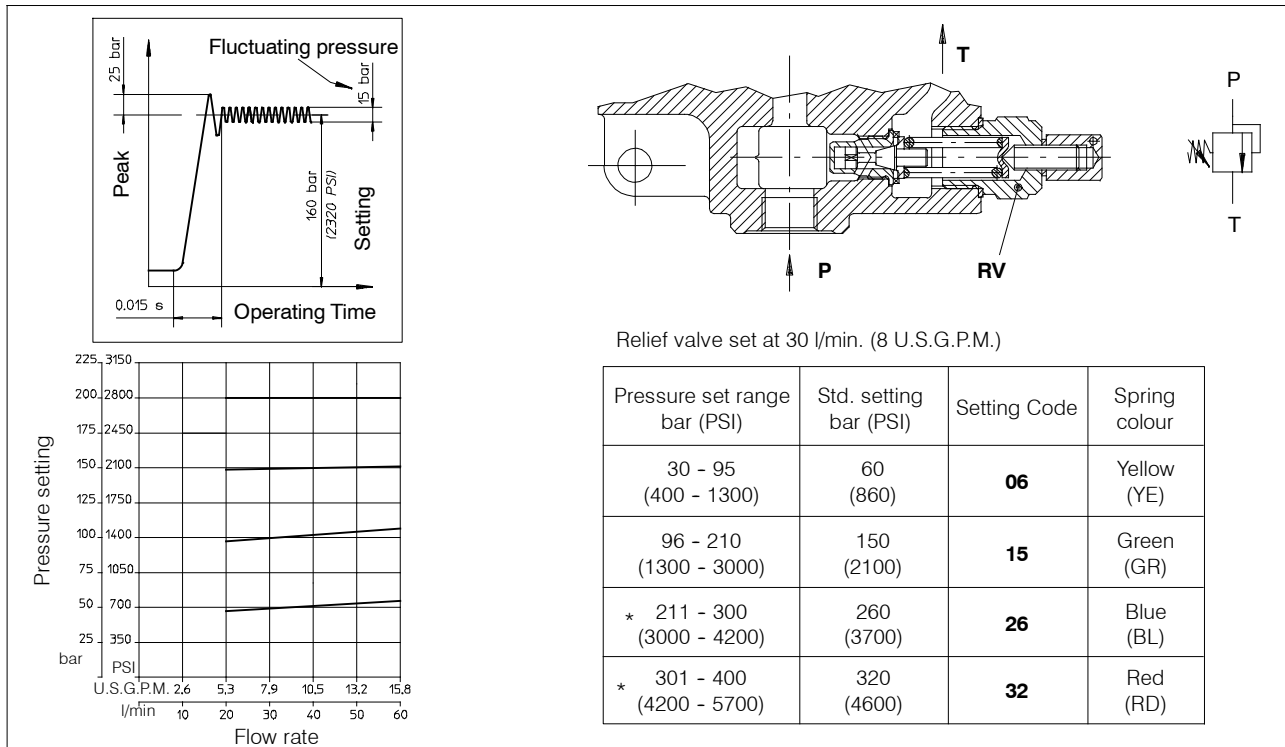
Note 1: Body codes consist of machined foundry, seals, plugs and check valve only. Not to be used ordering a complete valve

Note 2: For availability of -K- bodies without ordering code please contact our Sales Department.

Note 3: RSM3 check valve for SAE6 bodies is not available.

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4.5 Adjustable direct acting Relief Valve RV



* The maximum operating pressure for each valve series is indicated in the "Technical specification" at the first page of each valve section.

4.6 Spool charts

Spool scheme	Spool features	Type			
	4 way - 3 position A/B closed E open by pass	A AR**		4 way - 3 position series connection	X
	4 way - 3 position A/B-E closed	B		4 way - 3 position A/B to tank in neutral series connection	XC
	4 way - 3 position A/B to tank in neutral E open by pass	C		4 way - 4 position 4 th floating position	Z
	4 way - 3 position A closed B to tank in neutral	D		4 way - 4 positions 4 th floating position	* WW
	3 way - 3 position B closed E open by pass	G GR**		4 way - 3 position A/B closed Load Sensing	** LSA
	4 way - 3 position B closed A to tank in neutral	L		4 way - 3 position A/B to tank in neutral Load Sensing	** LSC
	4 way - 3 position with differential spool in 2 nd position	R**		3way - 3 position B closed Load Sensing	** LSG
	3 way - 3 position A closed E open by pass	S SR**		3 way - 3 position A closed Load Sensing	** LSS

Note: For availability of L/S versions please contact our Sales Department
 * "WW": special body required (K...), positioner (240) and lever (L192)
 **: special body required (please contact our Sales Dept..)

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4.7 Load Sensing

Load-sensing control and working principle

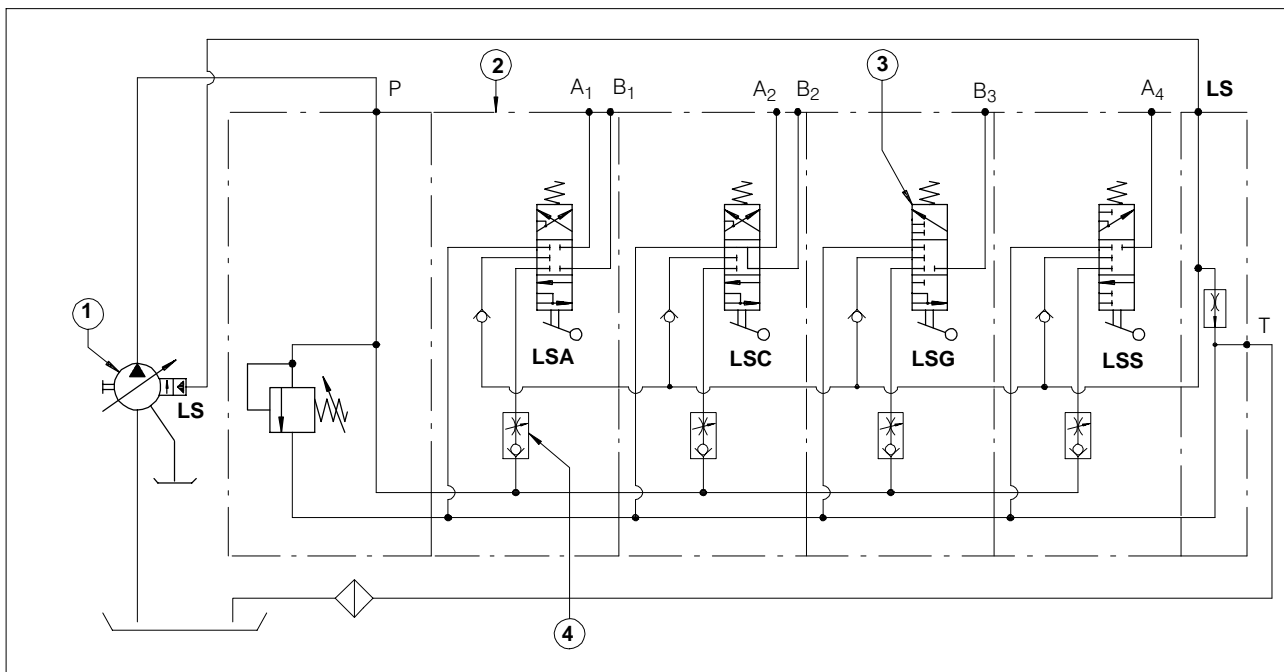
Through the use of variable flow pumps provided with a pressure and flow compensator the pressure and flow parameters can be adapted according to the different and real working conditions.

These pumps require the use of special valves provided with Load Sensing control which "feels" the hydraulic components (cylinder and motor) requirements and through a special pilot line (L.S.) controls the pump compensator conforming capacity and pressure to such requirements which can be variable in time within the limits of the pump performance.

The L.s. option requires specific bodies and spools. Please ask to Bucher Hydraulics S.p.A. for their availability

The Load Sensing brings following advantages:

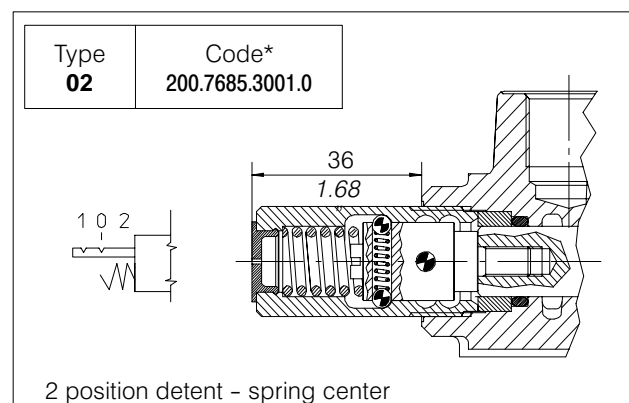
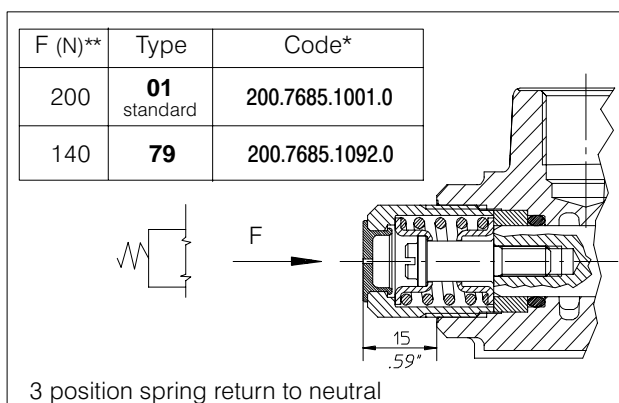
- Energy saving.
- Smaller heat exchangers can be used due to a smaller heat energy dissipation.
- Longer life of the pump and driving motor, due to reduced heavy working cycles.
- Excellent control of the load by using 100% of the spool metering.



- Variable flow pump provided with pressure and flow compensator.
- Load Sensing valve.

- Special spools: LSA – LSC – LSG – LSS
- Check valve provided with max flow control

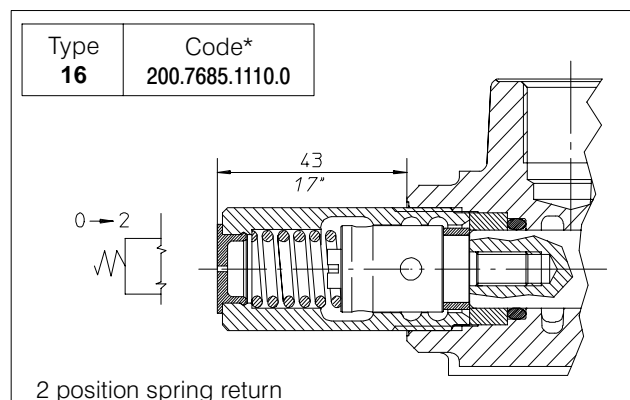
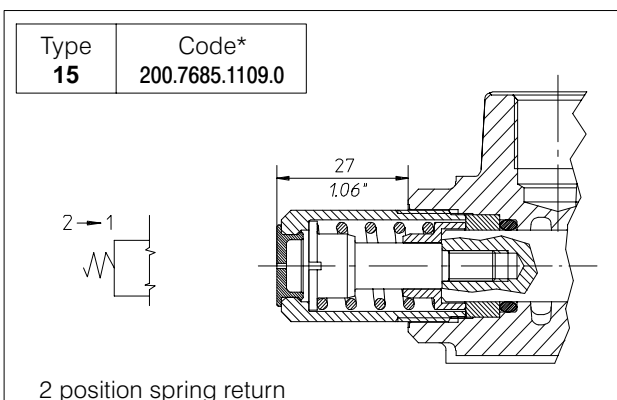
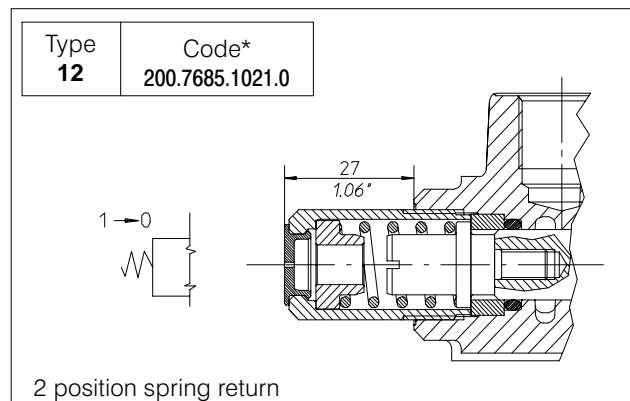
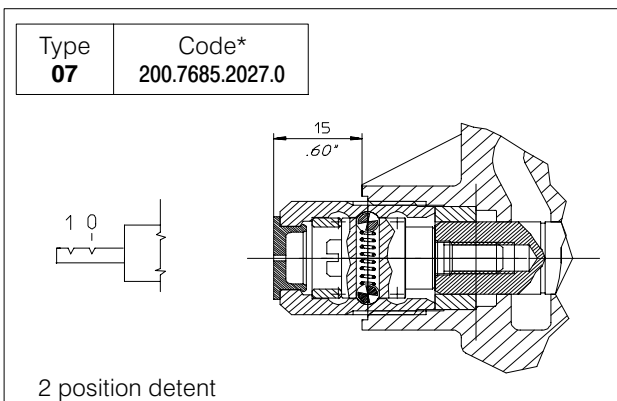
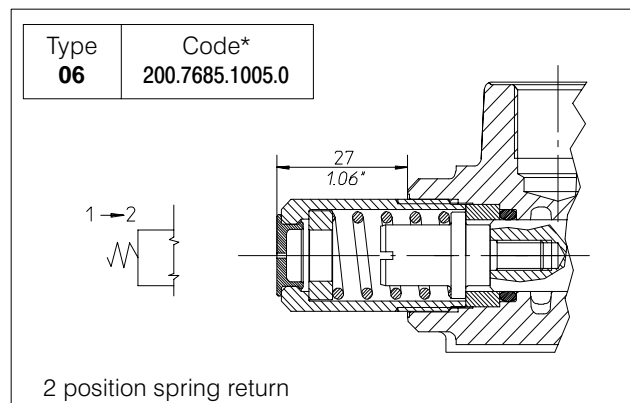
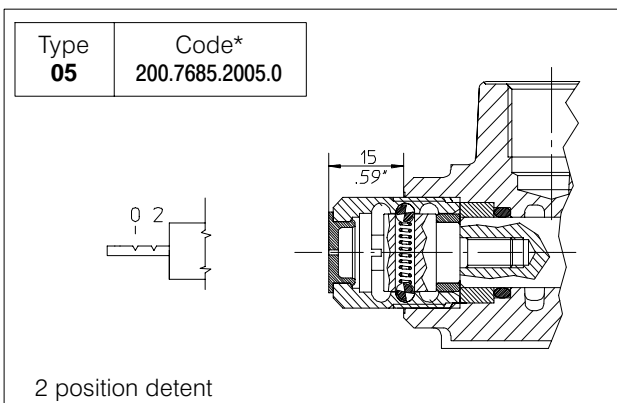
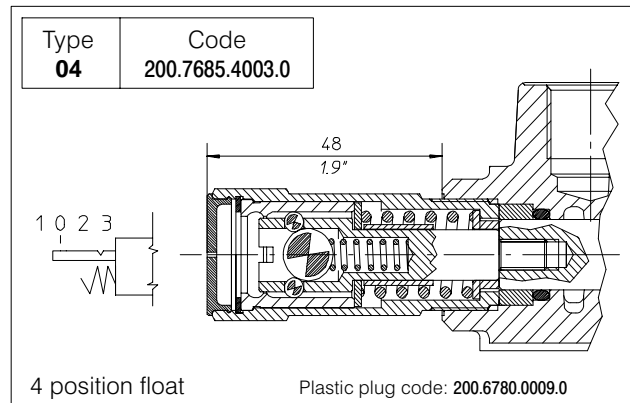
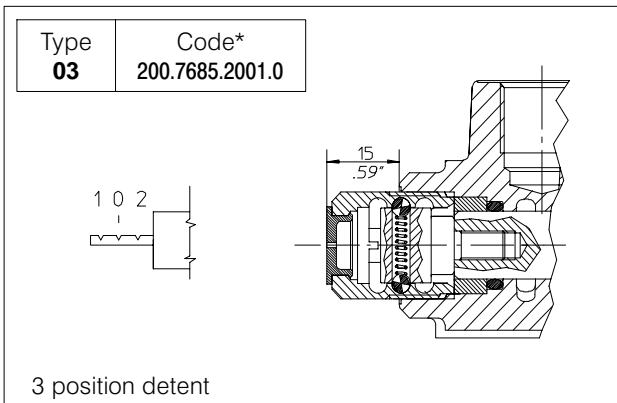
4.8 Spool positioners



* : code without plastic plug; plastic plug code: 200.6780.0008.0

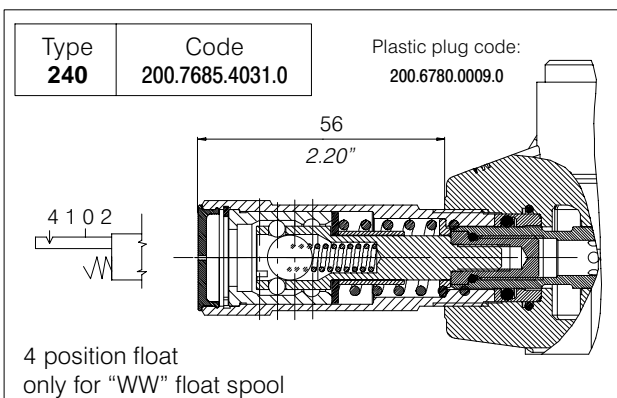
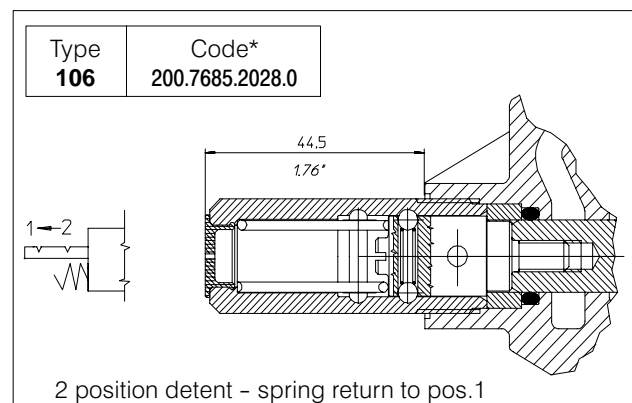
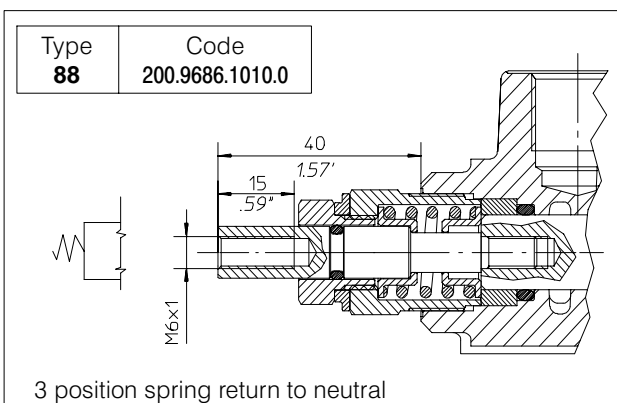
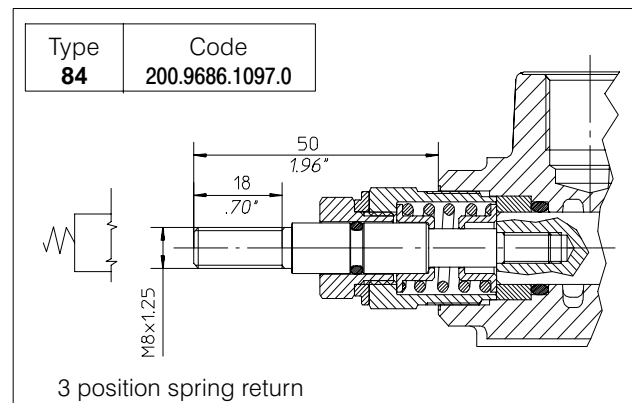
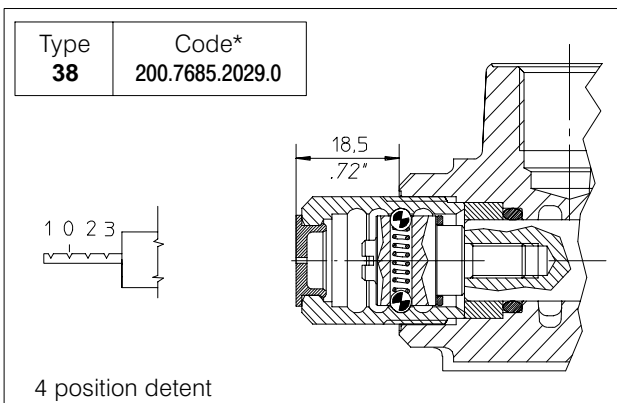
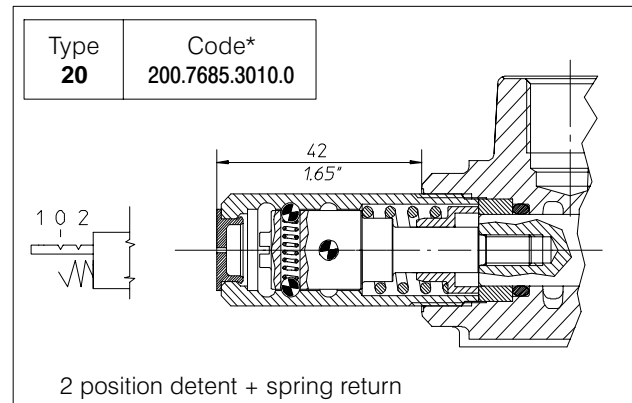
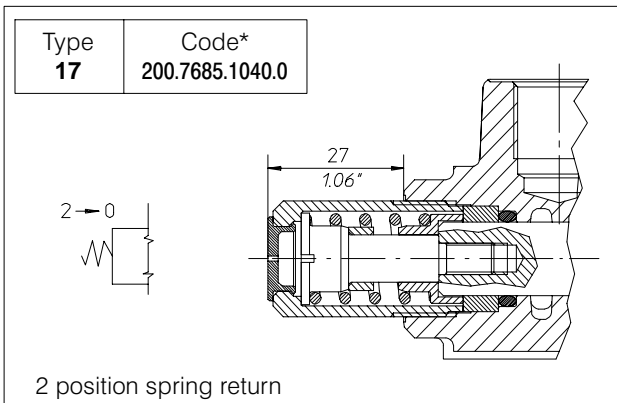
Code F (N)**: force in Newton (N) needed to operate the spool

HDM11S



* : code without plastic plug; plastic plug code: 200.6780.0008.0

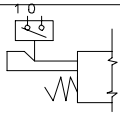
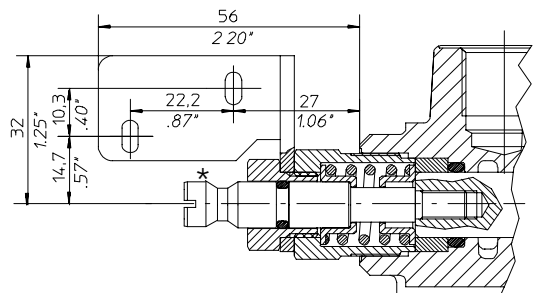
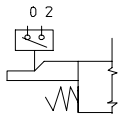
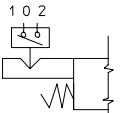
HDM11S



* : code without plastic plug; plastic plug code: 200.6780.0008.0

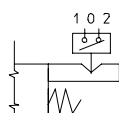
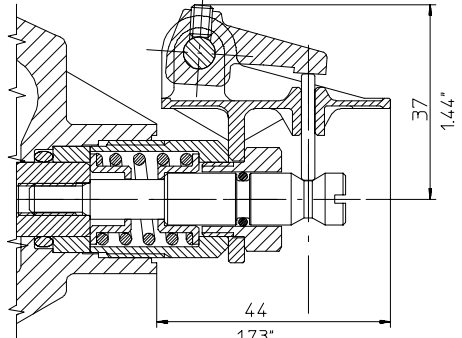
HDM11S

4.8.1 Microswitch control on each single element

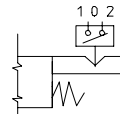
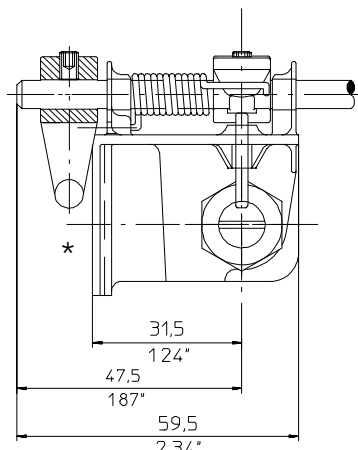
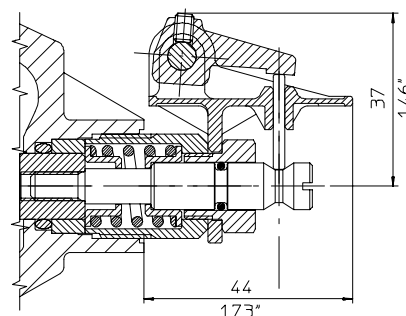
Type 30	Code 200.9686.1050.0	Microswitch is operated when the spool is in pos. 1		
Type 32	Code 200.9686.1060.0	Microswitch is operated when the spool is in pos. 2		
Type 34	Code 200.9686.1064.0	Microswitch is operated when the spool is in pos. 1 and 2		

* The microswitch is supplied only on customer's request.

4.8.2 Single microswitch control for multi-sectional valves (from 1st up to second-last element).

Type 39 (MSF)	Code 200.9686.1139.0	Microswitch is operated when the spool is in pos. 1 and 2		
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4.8.3 Single microswitch control for multi-sectional valves (last element, T side).

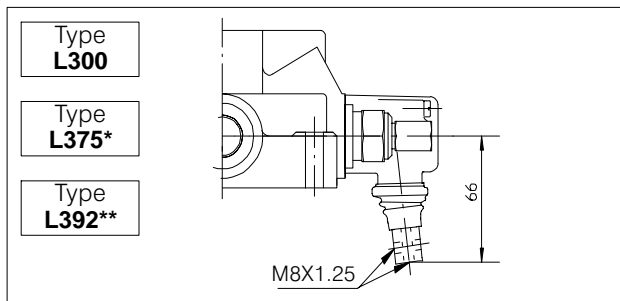
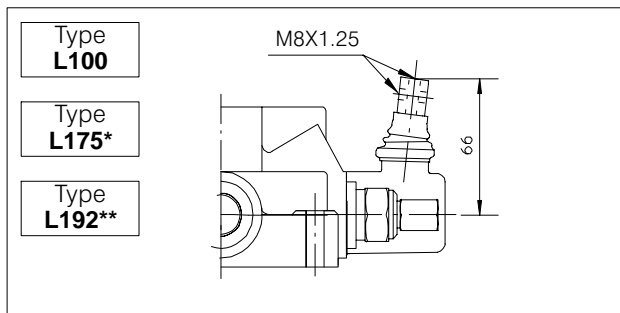
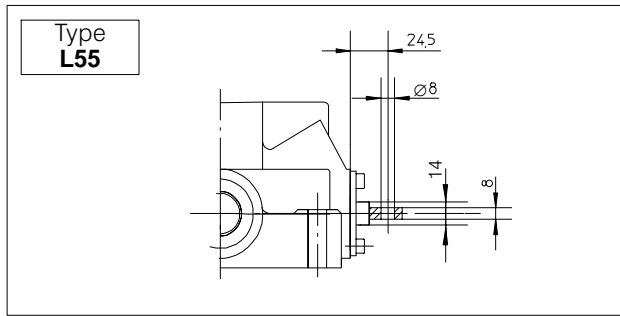
Type 40 (MFL)	Code 200.9686.1140.0	Microswitch is operated when the spool is in pos. 1 and 2			
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* The microswitch is supplied only on customer's request.

Positioner 40 must be assembled only on the last element.

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4.9 Lever styles

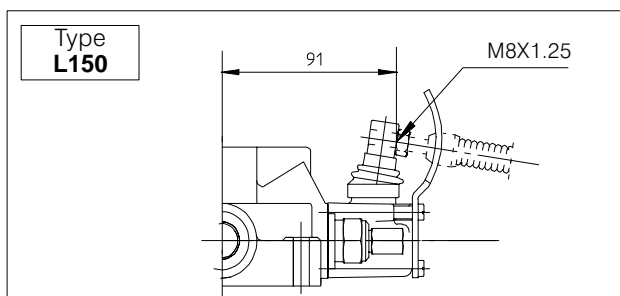
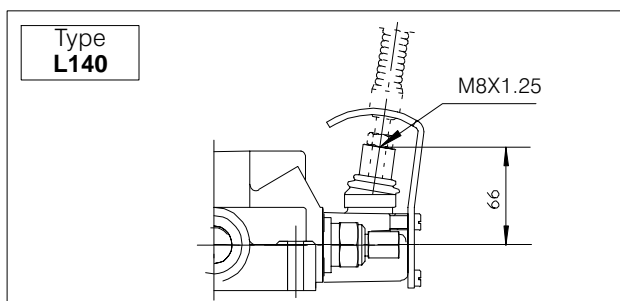


Lo		Type	Code
mm	inches		
150	5.90	AL001	200.7022.1019.0
200	7.87	AL002	200.7022.1003.0
250	9.84	AL003	200.7022.1005.0
300	11.81	AL004	200.7022.1006.0

* L175 - L375 only for "Z" spool application

** L192 - L392 only for "WW" spool application

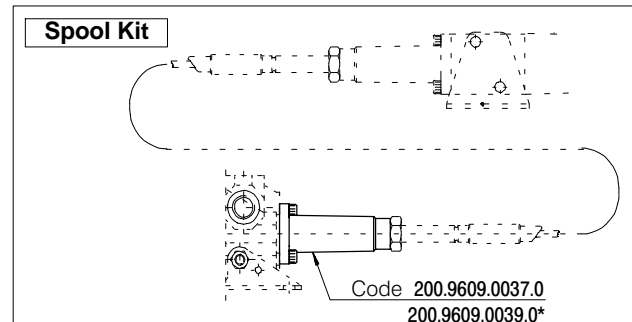
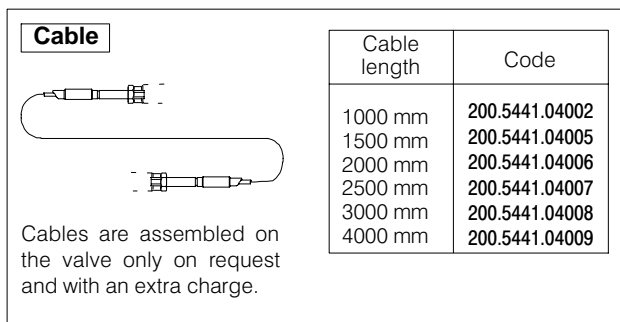
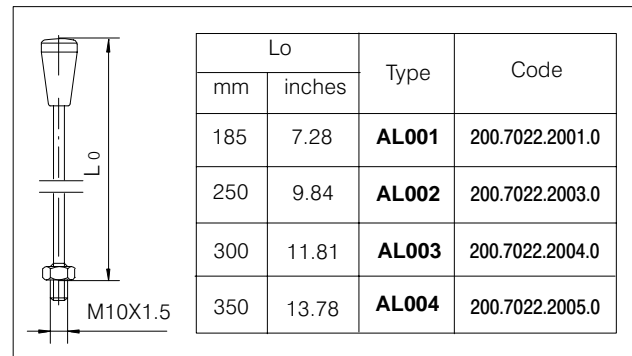
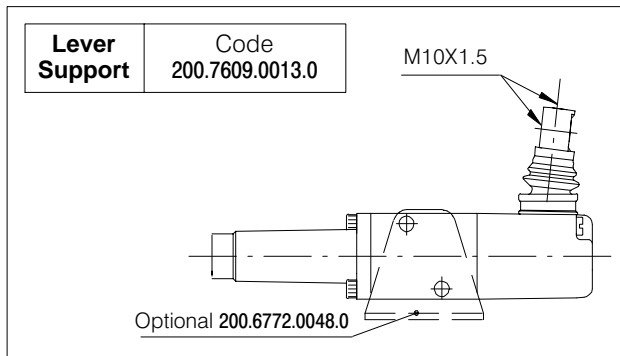
4.9.1 Safety levers



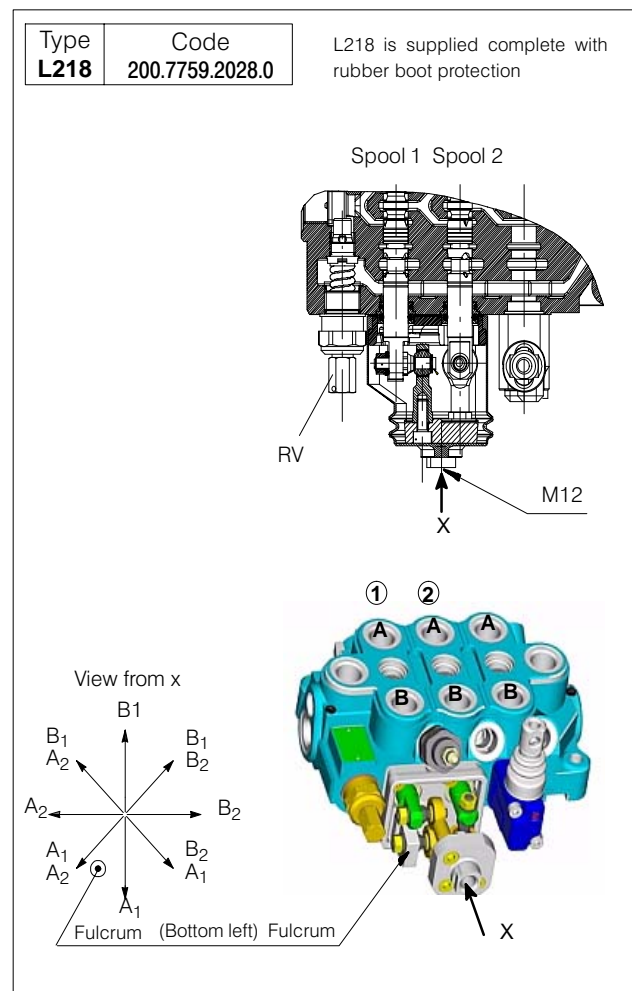
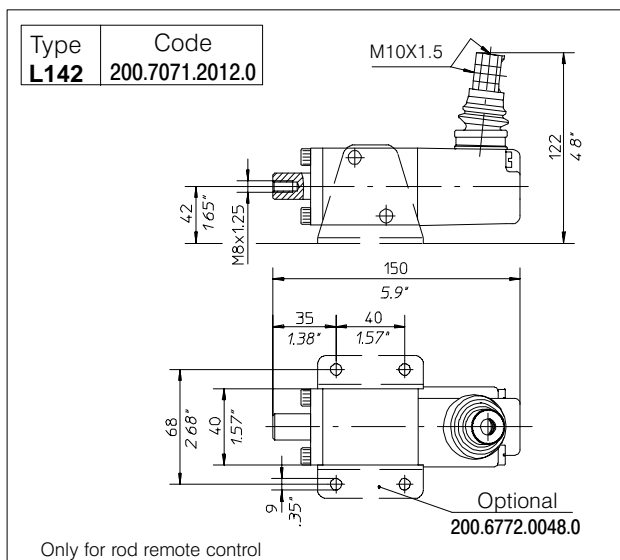
Lo		Type	Code
mm	inches		
160	6.30	AL014	200.7022.1009.0
180	7.08	AL018	200.7022.1011.0

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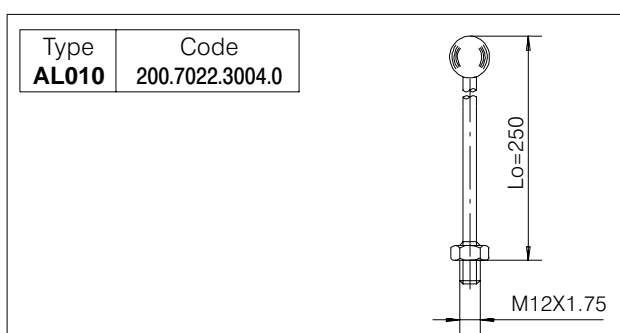
4.9.2 Remote cable control



* only for "Z" spool application



4.9.3 Cross joystick for dual axis spool control



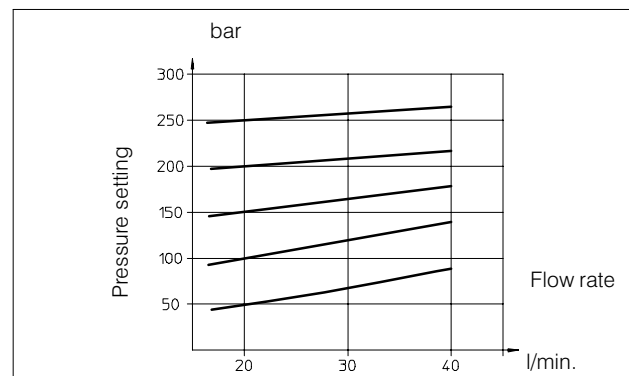
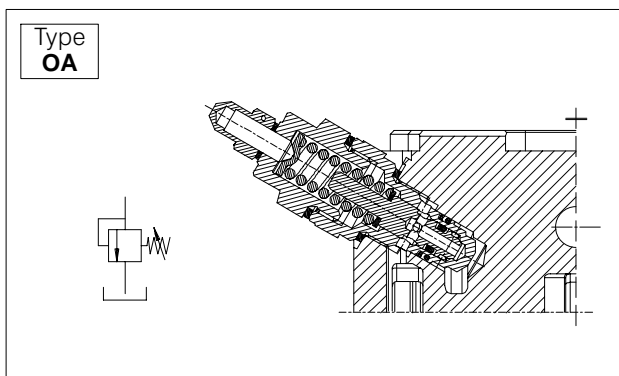
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4.10 Port relief and anti-cavitation valves

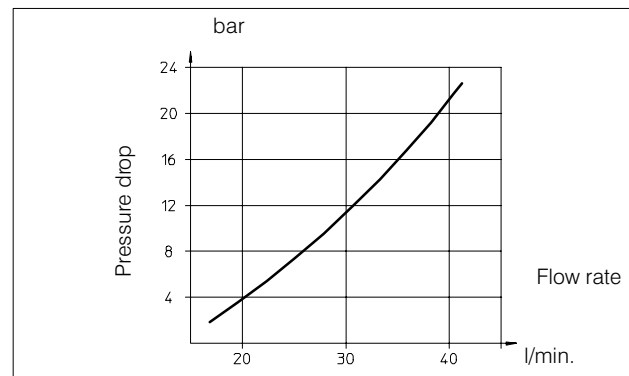
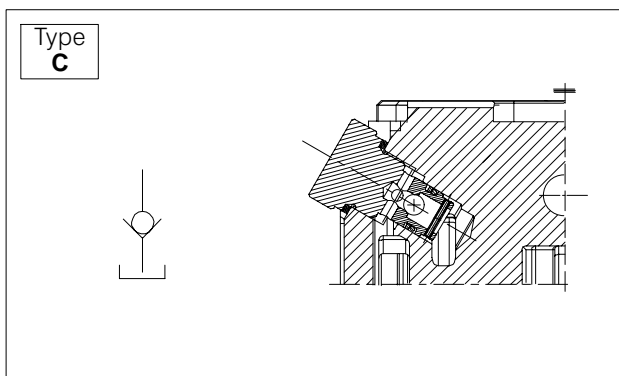
Port relief valve settings

Pressure set range bar (PSI)	Std. setting bar (PSI)	Type	Spring colour
31 - 130 (400 - 1850)	60 (860)	06	Yellow (YE)
131 - 320 (1850 - 4600)	150 (2100)	15	Green (GR)

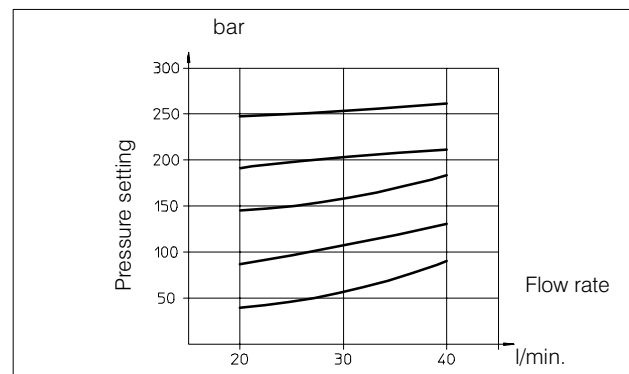
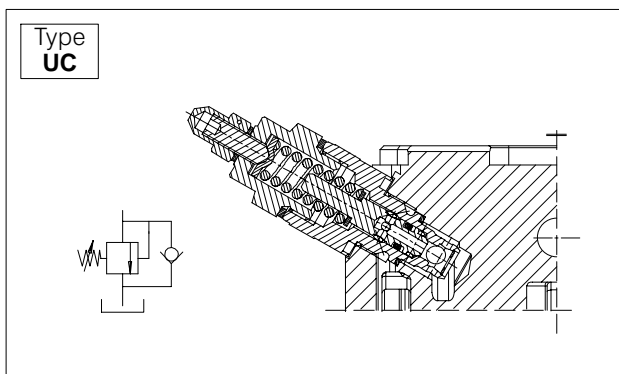
4.10.1 Port relief valve



4.10.2 Anti-cavitation valve



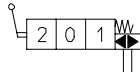
4.10.3 Combined port relief and anti-cavitation valve



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4.11 Hydraulic-Pneumatic control ON-OFF

Type	Code
HP 24	200.9686.5049.0



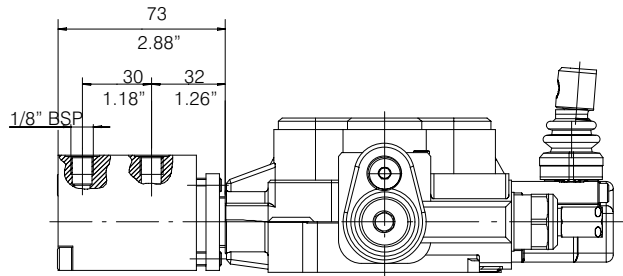
Operating conditions

Hydraulic control:

Pressure range: (bar) Min. 6 - Max. 15
(PSI) Min. 85 - Max. 215

Pneumatic control:

Pressure range: (bar) Min. 6 - Max. 10
(PSI) Min. 85 - Max. 145



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We reserve the right of modification without prior notice.