

Directional Control Valve HDM19WL



Contents

Page

1	Installation and maintenance - General information	4
1.1	Directional valve installation	4
1.2	Fittings	4
1.3	Hydraulic fluid	4
1.4	Filtration	5
1.5	Directives and standards	5
2	Hydraulic system	5
2.1	Typical applications	5
2.2	Advantages	6
2.3	Technical specification:	7
2.4	Examples	8
3	Ports	9
3.1	Port threads	9
4	Performance data	10
4.1	Open centre	10
4.2	Inlet to work port	10
4.3	Work port to outlet	10
5	Spools	11
6	Valves	12
6.1	Main pressure relief valve RV	13
6.2	Anti-cavitation valves C	14
6.3	Anti-shock and anti-cavitation valves UC	14
6.4	Piloted differential relief valve VMDP/F - HDM19WL only	15
6.5	VS check valve/flow restrictor	15
6.6	RMF check valve/flow restrictor	15
7	Levers	16
7.1	Standard lever group	16
7.2	Free end spool with dust proof plate	16
7.3	Joystick control L133-134	17
7.4	Joystick control L260 - L460 with integrated locking system	18
7.5	Joystick control for three spools - HDM19WL only	19
8	Positioners	20
8.1	Spring return to neutral position	20
8.2	Detent in floating position and spring return to neutral from position 1 and 2	20
8.3	Detent in position 1 or 2 and spring return to neutral in both directions	21

8.4	Detent in position 2 and 3 and spring return to neutral in both directions	21
8.5	With microswitch in floating position	21
8.6	Microswitch positioners	22
8.7	Electro-magnetic detent positioners (EMD)	23
8.8	Electro-mechanic locking system	24
8.9	Hydraulic controls (HP)	25
8.10	Electro-hydraulic open loop proportional / ON-OFF control (EHO) - HDM19WL only	27
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9	Stackable elements - HDM19WL only	30
9.1	HDS15 ON-OFF	30
9.2	HDS15 proportional controls	31
9.3	Back covers	33
9.4	Ports A1 / B1 unloading valve - (A1-B1-T internal connections)	33
<hr/>		
10	Hydraulic schematics examples	34
<hr/>		
11	Composition of HDM19WL ordering code	36
11.1	Examples of HDM19WL ordering code	37
11.2	Product identification plate	38

1 Installation and maintenance - 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.

1.2 Fittings

In the interest of safety, only fittings with STRAIGHT THREAD ENDS should be used (e.g. DIN3852).

Fittings with TAPERED THREAD ENDS (e.g. DIN 3852 form C) should never be used, as they can cause deformation and cracks in the valve body.

Our 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.):

Recommended tightening torque for work port fittings - Nm / lbf				
Metric - ISO 261	M14X1.5	M18X1.5	M22X1.5	
With O-Ring seal (ISO 6149-1)	30 / 22.1	40 / 29.5	60 / 44.3	
With copper washer (ISO 9974-1)	30 / 22.1	40 / 29.5	60 / 44.3	
With rubber washer or steel (ISO 9974-1)	25 / 18.4	35 / 25.8	60 / 44.3	
BSP - ISO 228-1	1/4" BSP	3/8" BSP	1/2" BSP	3/4" BSP
With copper washer (ISO 1179-1)	30 / 22.1	40 / 29.5	60 / 44.3	90 / 66.4
With rubber washer or steel (ISO 1179-1)	25 / 18.4	35 / 25.8	60 / 44.3	70 / 51.7
UN-UNF - ISO 263	SAE6 - 9/16-18 UNF	SAE8 - 3/4-16 UNF	SAE10 - 7/8-14UNF	SAE12 - 1-1/16-12UNF
With O-Ring seal (ISO 11926-1)	30 / 22.1	40 / 29.5	60 / 44.3	90 / 66.4



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 responding to ISO 6743/4 requirements, only.

The system should be operated only with hydraulic oil containing anti-foaming and antioxidant additives. Before using other types of fluid, please contact our Sales Dept, since they can cause serious damage to the directional valve components and jeopardize the correct function of the system.

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 instruction and recommendations.

The fineness of the filter should be selected in order to guarantee that a contamination level of 21/19/16 ISO 4406:1999 (NAS 1638 class 10) is not exceeded.

When the high reliability of the system is an important requirement a 10 µm nominal pressure filter must be used. In these cases it is also advisable to use a pressure filter with by-pass and indicator.

For mechanical operated directional valves a <30 µm nominal return filter is adequate.

The size of the return filters must suit the maximum return flow whereas the size of the pressure filters must suit the maximum pump flow.

It is advisable to fit filters with pressure gauge or dirt indicator in order to make it possible to verify the filter condition.

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.

In order to obtain the best performance of the system we recommend to strictly follow the conditions advised here above, failing which warranty shall be void.

1.5 Directives and standards

- Atex:



Attention: The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC

- Machinery safety

Hydraulic directional control valves are excluded by Directive 2006/42/CE

- ISO 9001:2008 / ISO 14001:2004

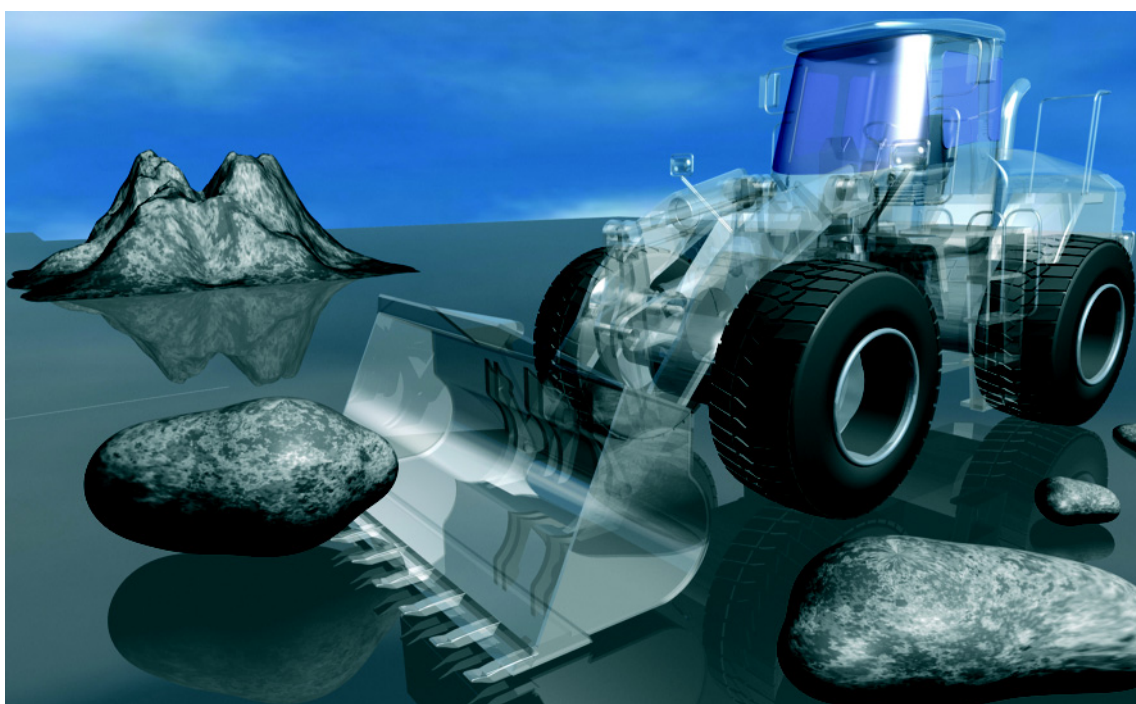
Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear pumps and motors, electro pumps, cartridge valves and integrated manifolds for hydraulic applications.

2 Hydraulic system

2.1 Typical applications

The monobloc directional control valve HDM19WL has been specifically designed to fulfil the typical requirements of compact wheeled and telescopic loaders.

The modular construction and wide range of controls as well as integrated valves satisfy to any application-adapted solutions.



2.2 Advantages



High metering spools combined with extremely low operating forces for a fine control of the load.



Very fine control during boom lowering to avoid vibrations and machine instability with full load



Manual or hydraulic operated joysticks which allow a simultaneous control of two functions:

- boom/bucket (main handle)
- aux/bucket (auxiliary handle).

The manual version can be equipped with handles locking

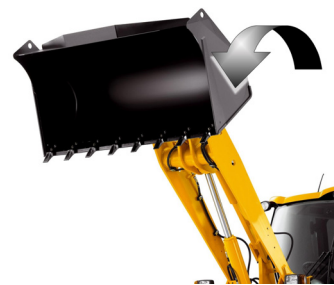
system, to avoid unwanted movement of boom/bucket, for safe travelling on roads



The monoblock construction guarantees very low spool leakage.



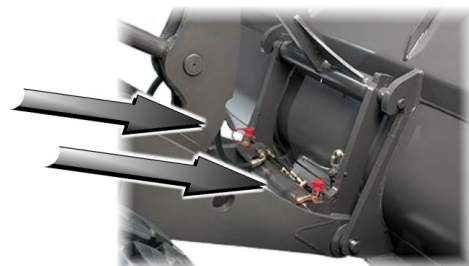
Optional circuit to eliminate “no reaction time” after fast boom lowering, to increase productivity.



- Wide availability of integrated flow restrictors for maximum dumping speed setting
- Regenerative circuit for fast dumping speed as alternative



Up to seven stackable on-off, manual, hydraulic or electro-hydraulic proportional elements to control telescopic and auxiliary functions



Optional integrated manifold to unload auxiliary function work ports for an easy connection/disconnection of quick couplings.

2.3 Technical specification:



IMPORTANT! Specification and diagrams shown in this catalogue are measured with mineral oil having a viscosity of 23 mm²/s at 50° C

Features - Parallel circuit		
Nominal flow range	80 l/min (21 US gpm)	
Max inlet pressure (P)(*)	280 bar (4060 PSI) (*)	
Max work port pressure (A/B)(*)	300 bar (4200 PSI) (**)	
Max back pressure (T)	30 bar (430 PSI)	
Max back pressure (T) with electro-hydraulic positioner (EHO)	10 bar (145 PSI)	
Max internal leakage A/B → T (100 bar, 23 mm ² /s) without service port valves	15 cc/min (0.730 in ³ /min) (***)	
Max internal leakage A/B → T (100 bar, 23 mm ² /s) with service port valves	20 cc/min (0.973 in ³ /min) (***)	
Fluid	mineral based oil (see 1.4)	
Fluid temperature (with NBR seals)	from -20° to 80 °C (from -4° to 176° F)	
Viscosity operating range	recommended	from 15 to 75 mm ² /s
	admissible	from 12 to 400 mm ² /s
Max contamination level	21/19/16 - ISO 4406:1999 (NAS 1638 class 10)	
Max contamination level with electric/electro-hydraulics devices	20/18/15 - ISO 4406:1999 (NAS 1638 class 9)	
Ambient temperature in operating conditions:	With mechanical/hydraulic/ pneumatic controls	from -30 to +60 °C
	With electric/ electrohydraulic devices	from -30 to +50 °C

(*) Fatigue tested according to internal procedure at 1,1x rated pressure on 6 sample for 1.000.000 cycles

(**) Fatigue tested according to internal procedure at 1,1x rated pressure on 6 sample for 500.000 cycles

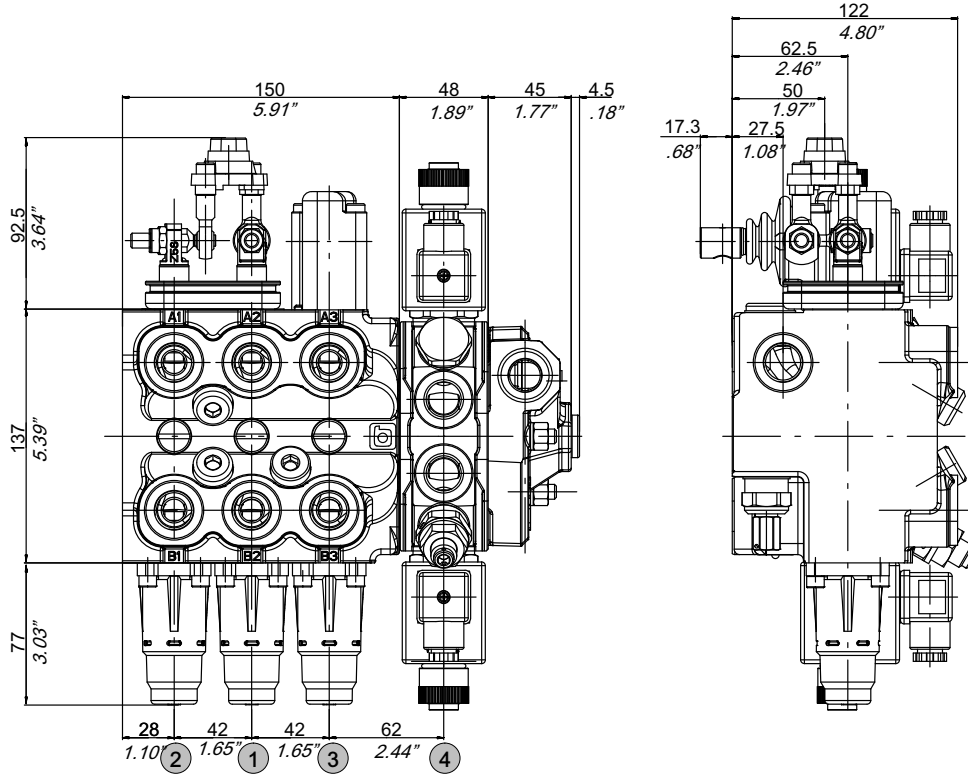
(***) Lower values for specific functions (BOOM/BUCKET) can be provided on demand

For different operating conditions, please contact our Sales Dept.

2.4 Examples

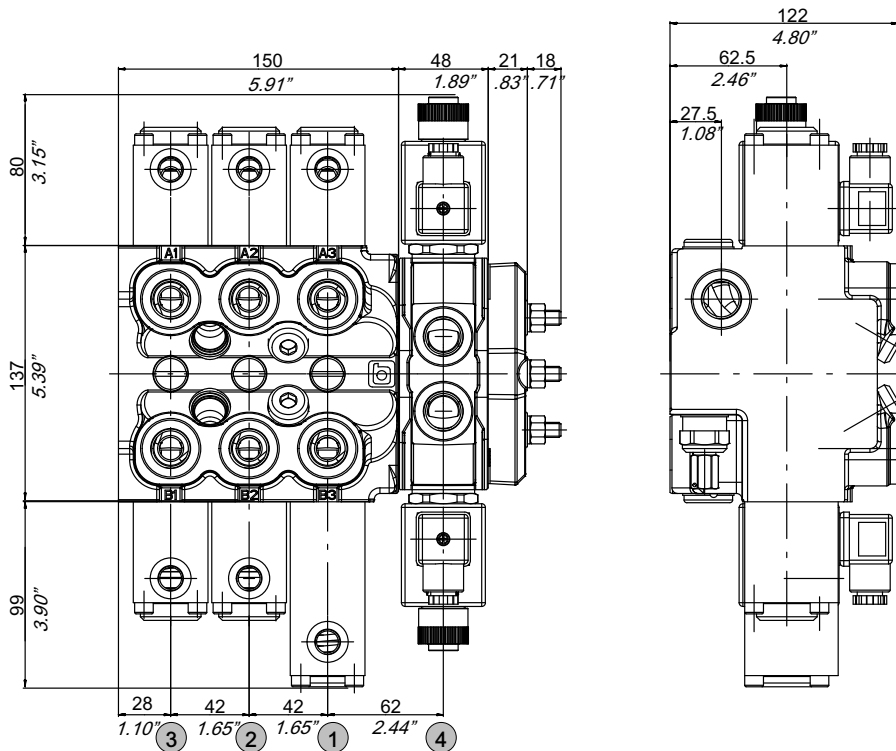
2.4.1 Manual operated

Manual operated with ON-OFF stackable additional section to control telescopic or auxiliary function.
Optional tank port in the back cover



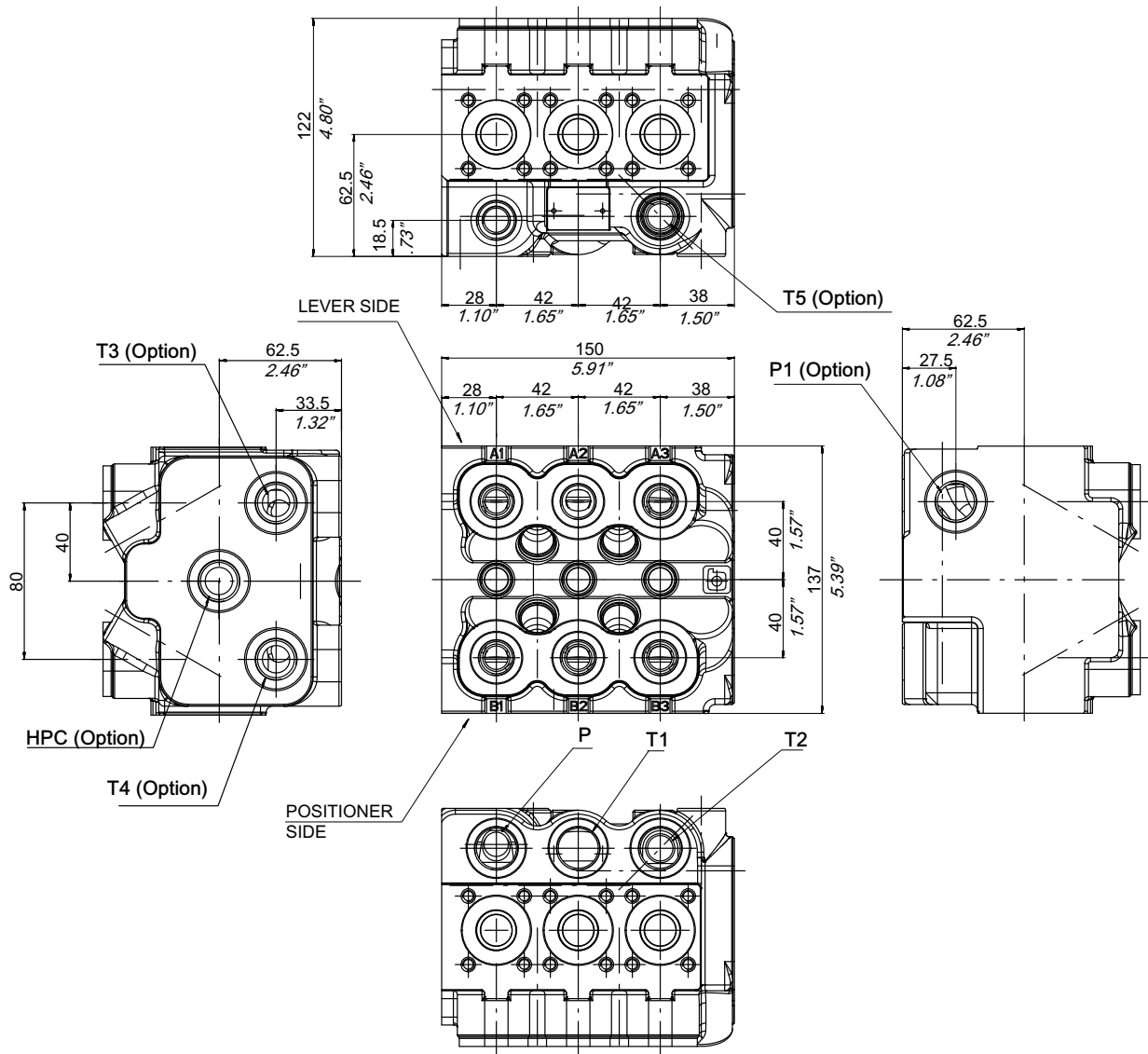
2.4.2 Hydraulic operated

Hydraulic proportional operated with stackable additional section to control telescopic or auxiliary function.



- ① BOOM
- ② BUCKET
- ③ AUXILIARY
- ④ TELESCOPIC/AUXILIARY

3 Ports



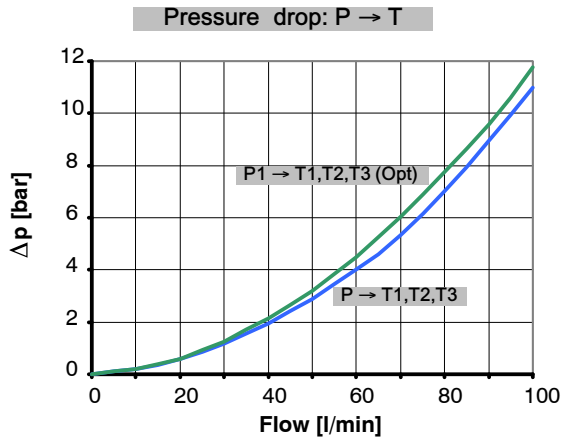
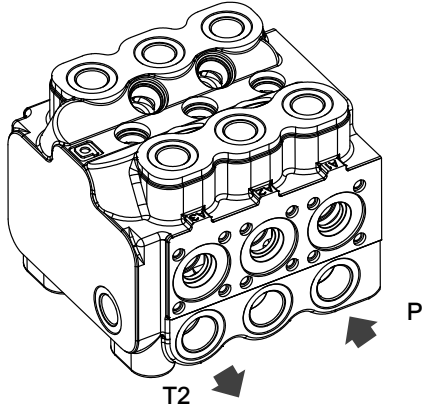
3.1 Port threads

PORT CAVITIES - STANDARDS			
	BSP parallel thread	Metric straight thread	UN-UNF straight thread
Thread	ISO228-1	ISO 261	ISO 263
			SAE J475
Cavity	ISO 1179-1	ISO 9974-1	ISO 11926-1
	DIN 3852-2	DIN 3852-1	SAE J1926-1
PORT SIZE			
Main ports	BSP	Metric	UNF
Inlet P, P1	1/2"	M22X1.5	7/8"-14 (SAE10)
Ports A/B	1/2"	M18X1.5	3/4"-16 (SAE8)
Outlet T1, T2, T3, T4, T5, HPC	1/2"	M22X1.5	7/8"-14 (SAE10)
Controls	BSP	Metric	UNF
Hydraulic	1/4"		
Open loop proportional	1/4"		

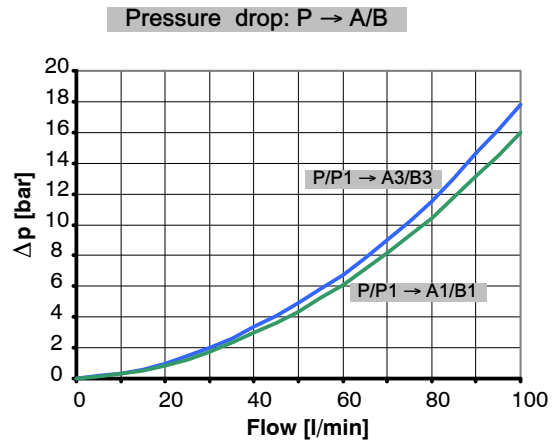
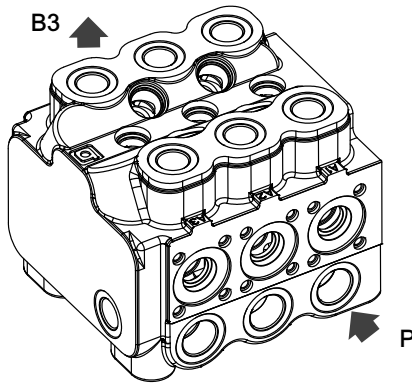
For different ports size please contact our Sales Department

4 Performance data

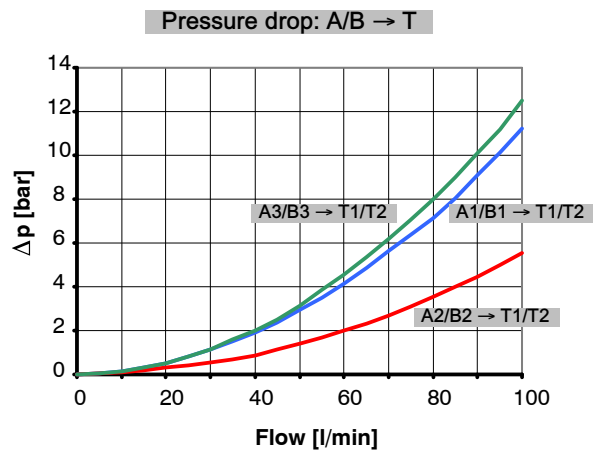
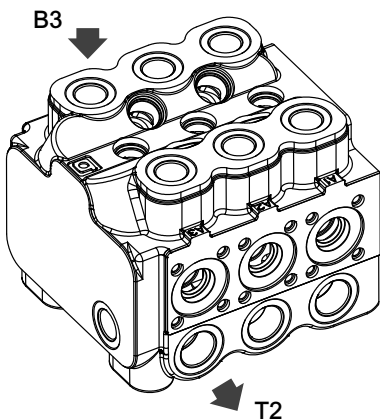
4.1 Open centre



4.2 Inlet to work port



4.3 Work port to outlet

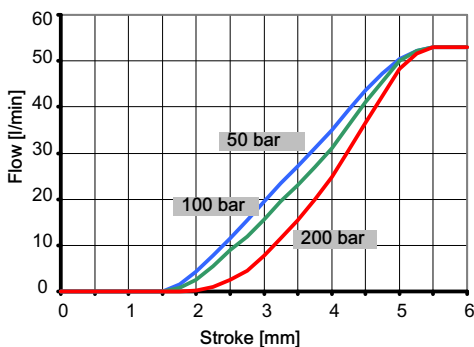


Note: the curves have been recorded with A5S spool

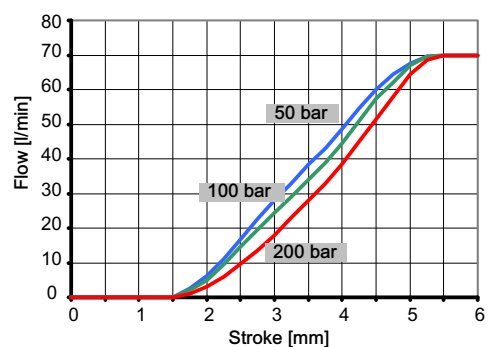
5 Spools

Spool Type	Hydraulic schematic	Features
A5S		Symmetric metering on port A/B (AUXILIARY FUNCTION)
A5A		High metering to tank on lever side (BUCKET FUNCTION)
A5B		High metering to tank on positioner side (BUCKET FUNCTION)
Z5S		Floating position pulling the spool (BOOM FUNCTION)
W5S		Floating position pushing the spool (BOOM FUNCTION)
Z5A		Symmetric floating spool to unload to tank the work ports for quick couplings easy engagement (AUXILIARY FUNCTION)
R5RB		Regenerative circuit at full stroke pushing the spool for high dumping speed (BUCKET FUNCTION)

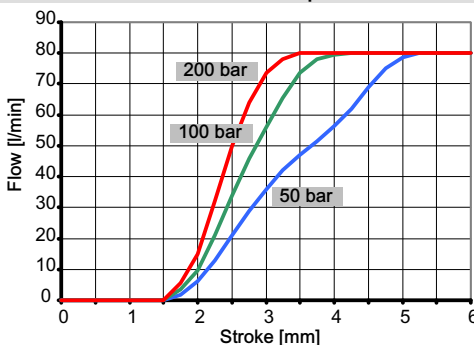
Spool metering: P → A/B (inlet flow 53 l/min)



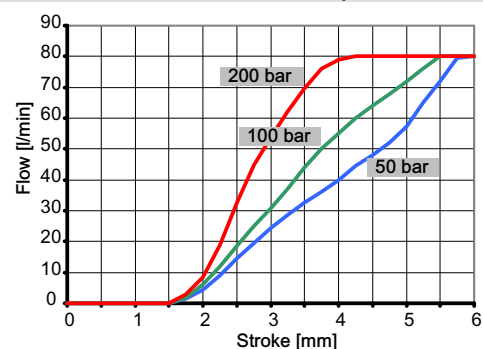
Spool metering: P → A/B (inlet flow 70 l/min)



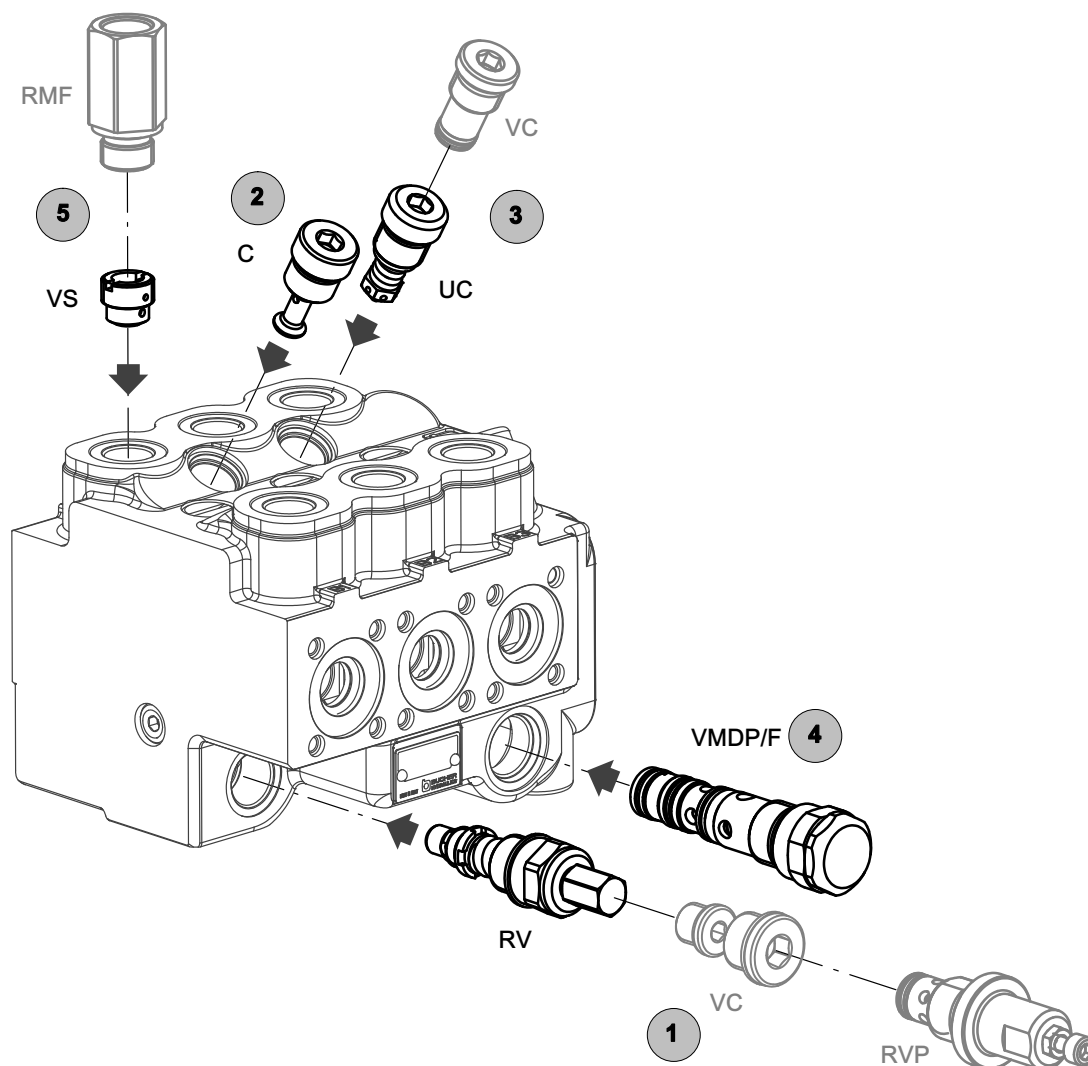
Spool metering: A/B → T (port flow 80 l/min)
STANDARD spool



Spool metering: A/B → T (port flow 80 l/min)
BOOM and BUCKET spools



6 Valves

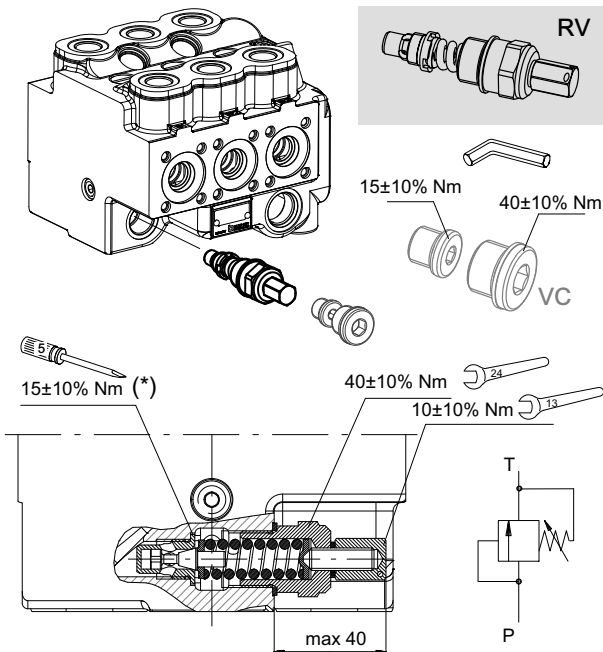


- | | |
|---|--|
| <ul style="list-style-type: none"> ① Main pressure relief valve : direct acting
RV / piloted RVP ② Anti-cavitation valve: C | <ul style="list-style-type: none"> ③ Anti-shock and anti-cavitation valves: UC ④ Piloted pressure differential relief valve: VMDP/F ⑤ Check valve / flow restrictor: VS/RMF |
|---|--|

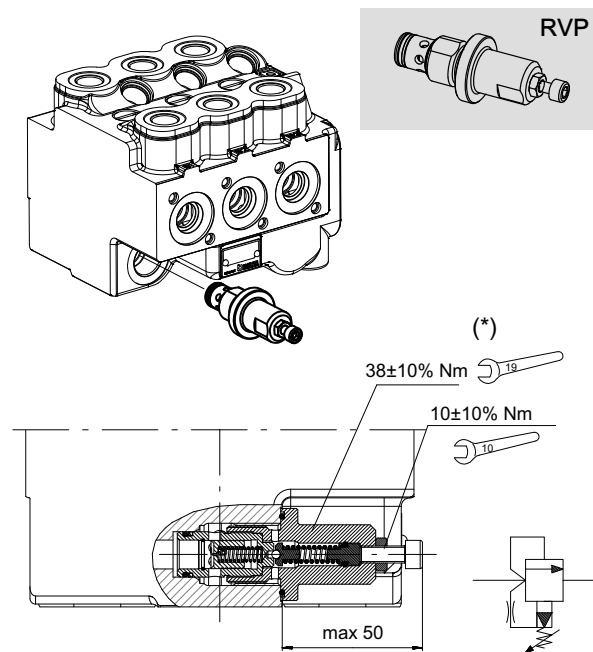
Note: VC is a functionless plug

6.1 Main pressure relief valve RV

6.1.1 Direct Acting



6.1.2 Piloted



A tamper proof shrinkable-sheath can be supplied if requested

Pressure setting range bar (PSI)	Type	Code
150 - 250 (2170-3620)	RV14	200787402970
211 - 320 (3050-4600)	RV01	200787400710
VC (plug)		200778400140

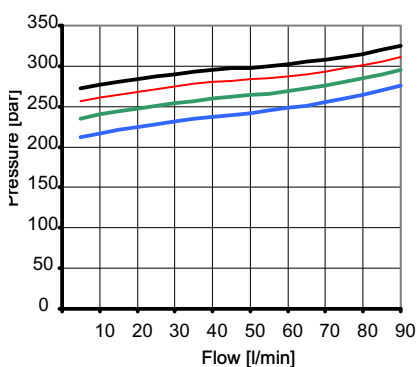
Pressure setting range bar (PSI)	Type	Code
100 - 270 (1450-3910)	RVP02 - 15	200787402871

NB: The body cavity is different compared to the direct acting version

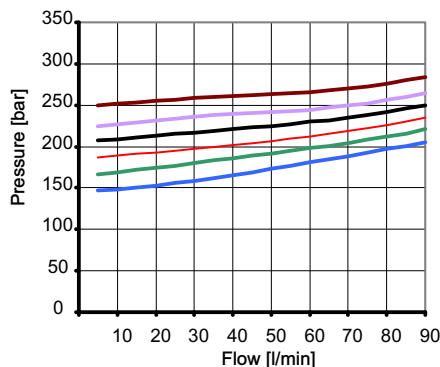


IMPORTANT!: (*) A wrench with a proper shape is required to assemble the valve seat in its cavity

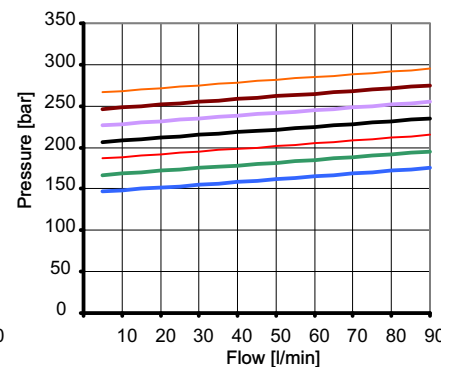
RV01



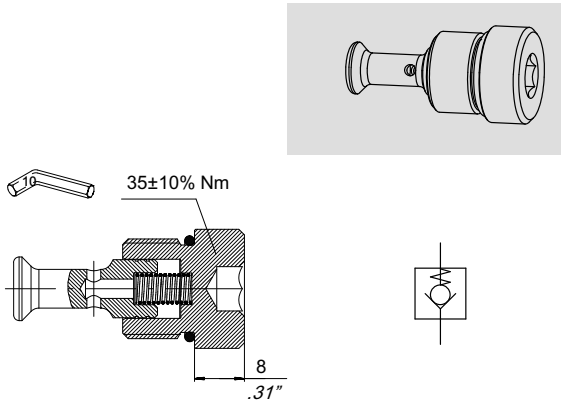
RV14



RVP02

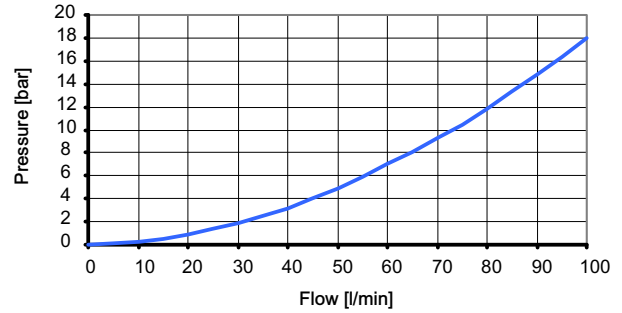


6.2 Anti-cavitation valves C

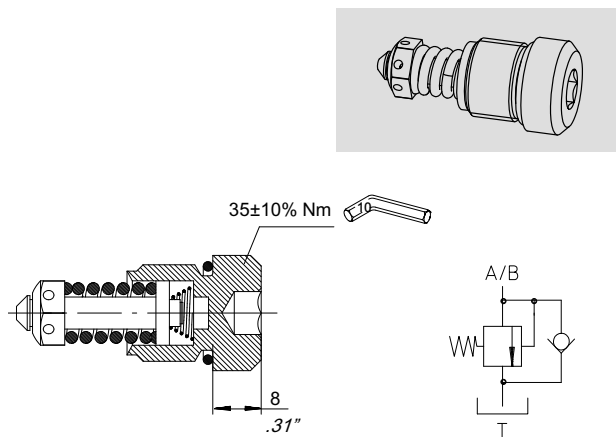


Note: the dedicated cavity is machined on request only

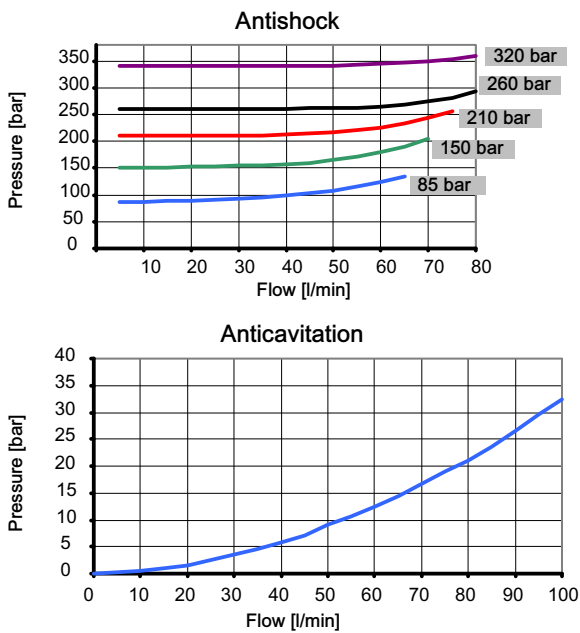
Type	Code
C	200787602560
VC (plug)	200778400310



6.3 Anti-shock and anti-cavitation valves UC

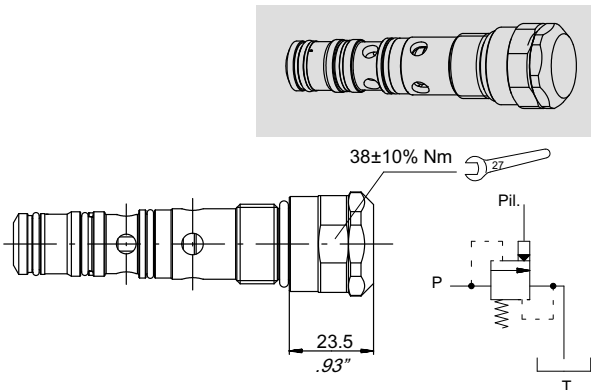


Pressure setting at 10 l/min (*) bar (PSI)	Code
40 (580)	200533930068
60 (870)	200533930077
70 (1010)	200533930050
80 (1160)	200533930050
90 (1300)	200533930084
100 (1450)	200533930100
110 (1590)	200533930110
120 (1740)	200533930085
130 (1880)	200533930057
140 (2030)	200533930059
150 (2170)	200533930051
160 (2320)	200533930067
170 (2460)	200533930071
180 (2610)	200533930056
190 (2750)	200533930113
200 (2900)	200533930060
210 (3040)	200533930080
220 (3190)	200533930064
230 (3330)	200533930058
240 (3480)	200533930081
250 (3620)	200533930052
260 (3770)	200533930065
270 (3910)	200533930066
280 (4060)	200533930053
290 (4200)	200533930069
300 (4350)	200533930079
320 (4640)	200533930054
VC (plug)	200778400310



(*) For different pressure settings please contact our Sales Department

6.4 Piloted differential relief valve VMDP/F HDM19WL only



Type	Code	Settings
VMDP/F-30	200789000170	18 + 4 bar (260 + 60 PSI)

This valve is used to increase productivity avoiding cavitation during boom lowering and bucket dumping operations

IMPORTANT! This function is not provided for the additional HDS15 elements

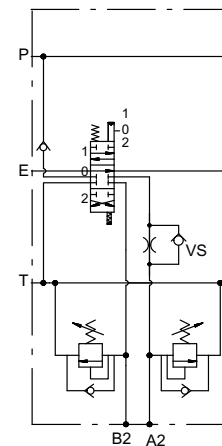
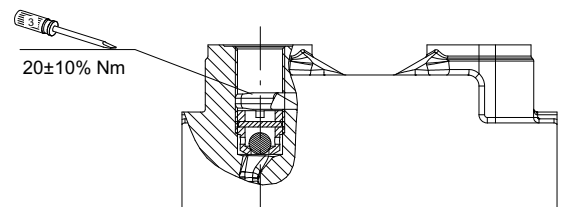
Note: the dedicated cavity is machined on request only

6.5 VS check valve/flow restrictor

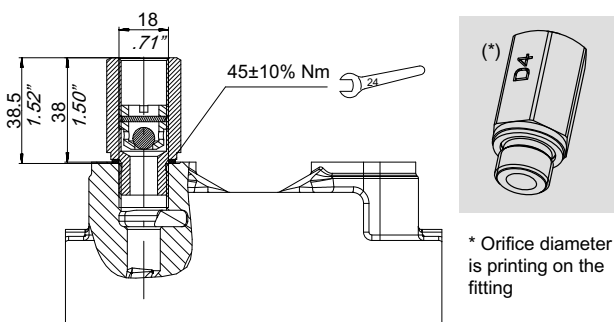


Type	Thread	Ø mm (inch)	Code
VS32	M18x1.5	3.5 (.138)	200787201580
VS40	1/2" BSP	3.5 (.138)	200787201680
VS42	M18x1.5	4.0 (.157)	200787201810
VS45	M18x1.5	4.2 (.165)	200787200610
VS46	M18x1.5	6.0 (.236)	200787201900

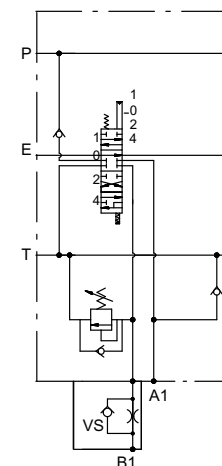
Note: the dedicated cavity is machined on request only



6.6 RMF check valve/flow restrictor



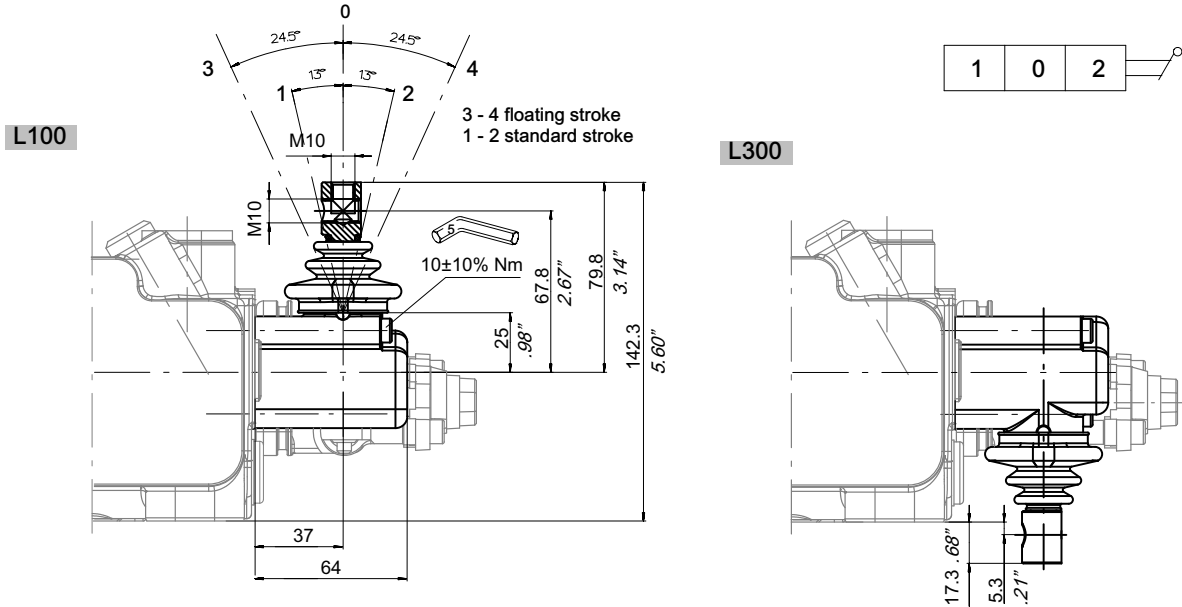
Type	Thread	Ø mm (inch)	Code
VS42	M18x1.5	4.0 (.157)	200787201800
VS46	M18x1.5	6.0 (.236)	200787201910



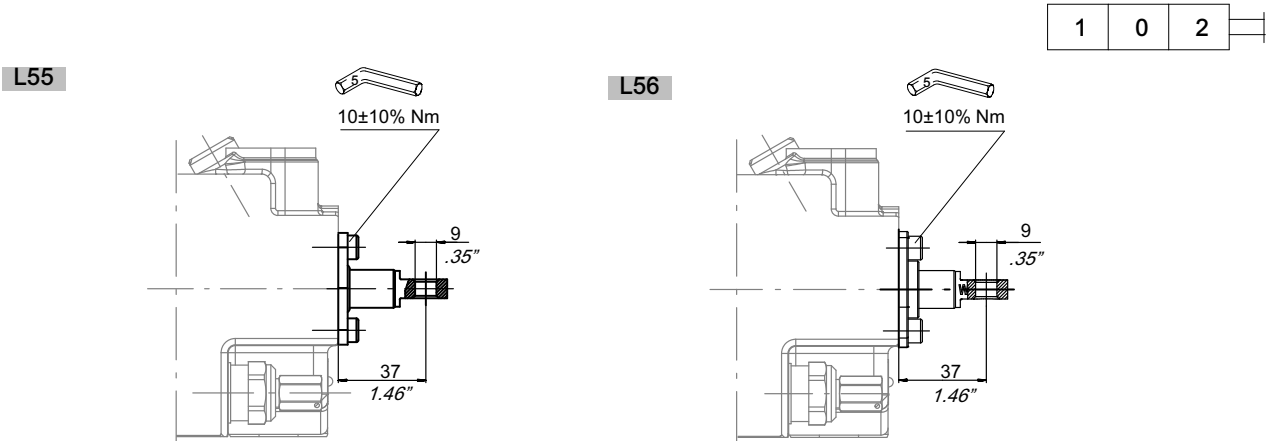
7 Levers

7.1 Standard lever group

Code: 200707120460



7.2 Free end spool with dust proof plate



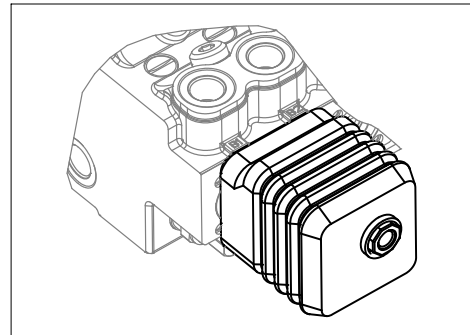
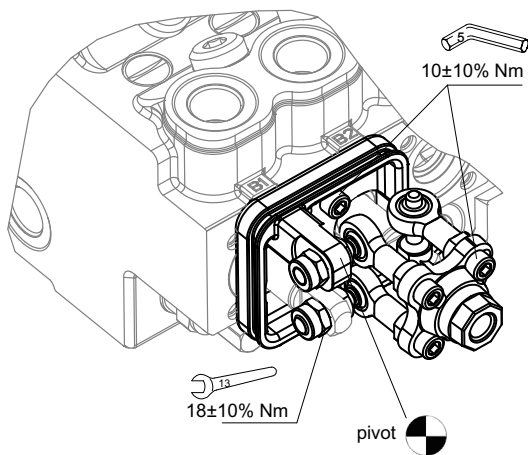
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Code: 200707190250

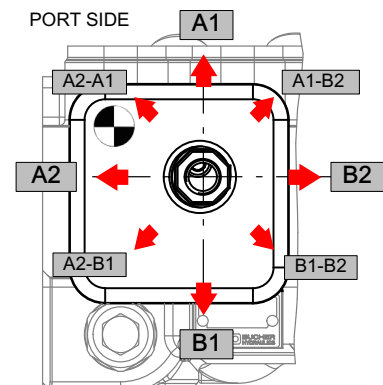
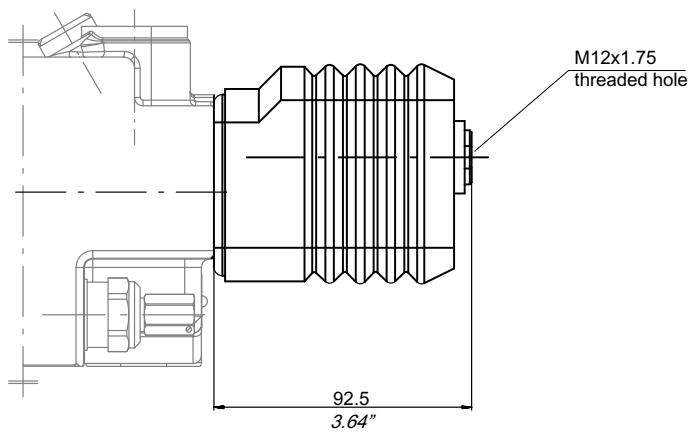
For W** spools only

7.3 Joystick control L133-134

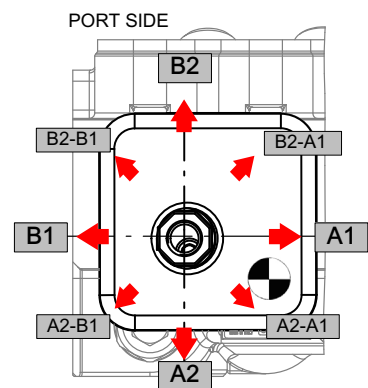
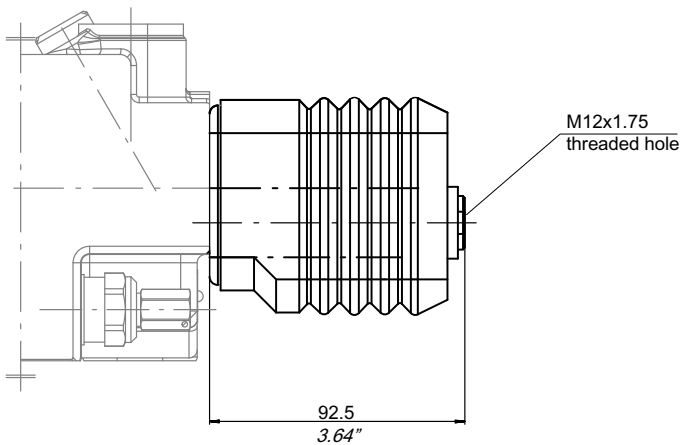
Code: 200775930320



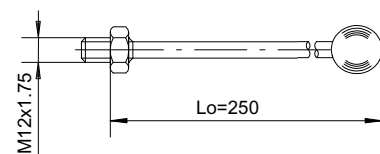
L133



L134

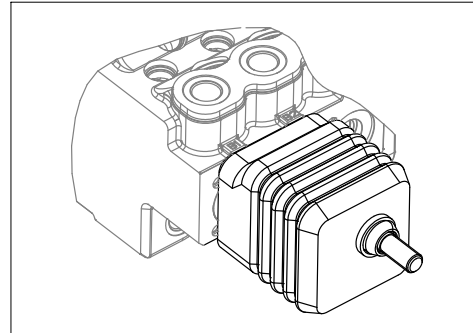
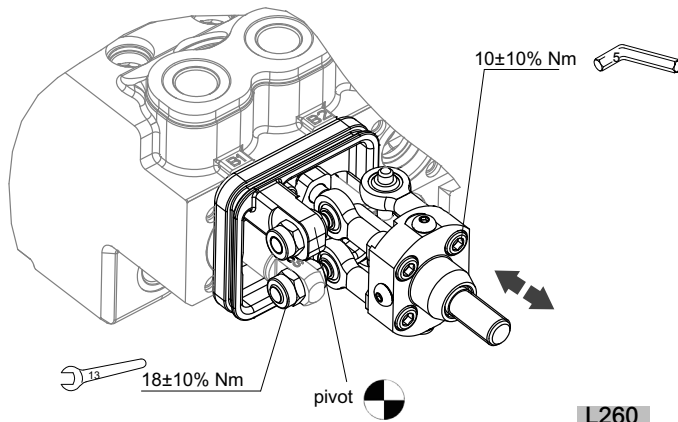


AL010
Code: 200702230040

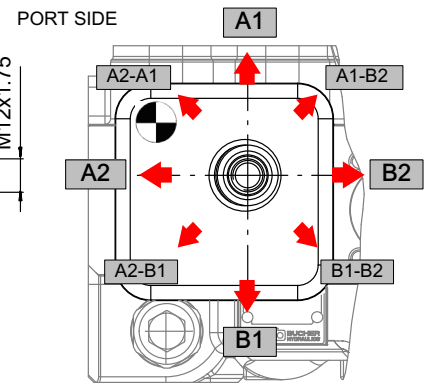
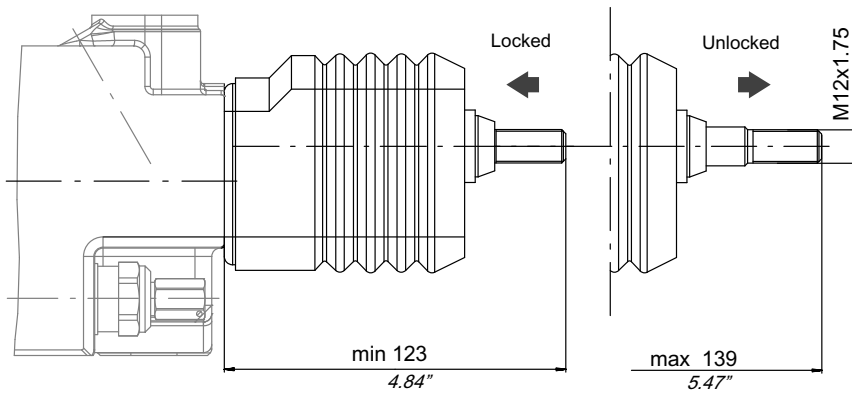


7.4 Joystick control L260 - L460 with integrated locking system

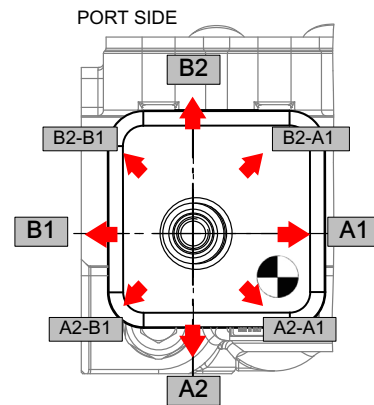
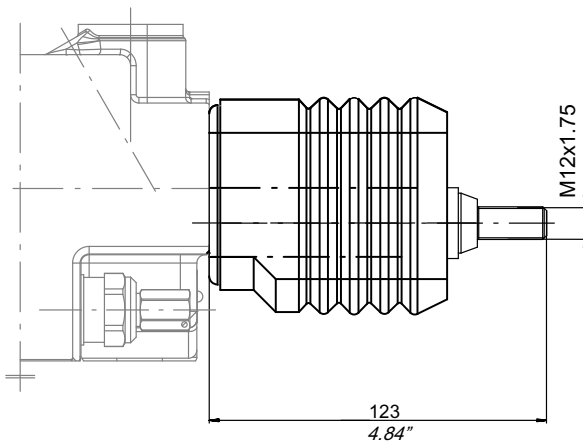
Code: 200775930410



L260



L460

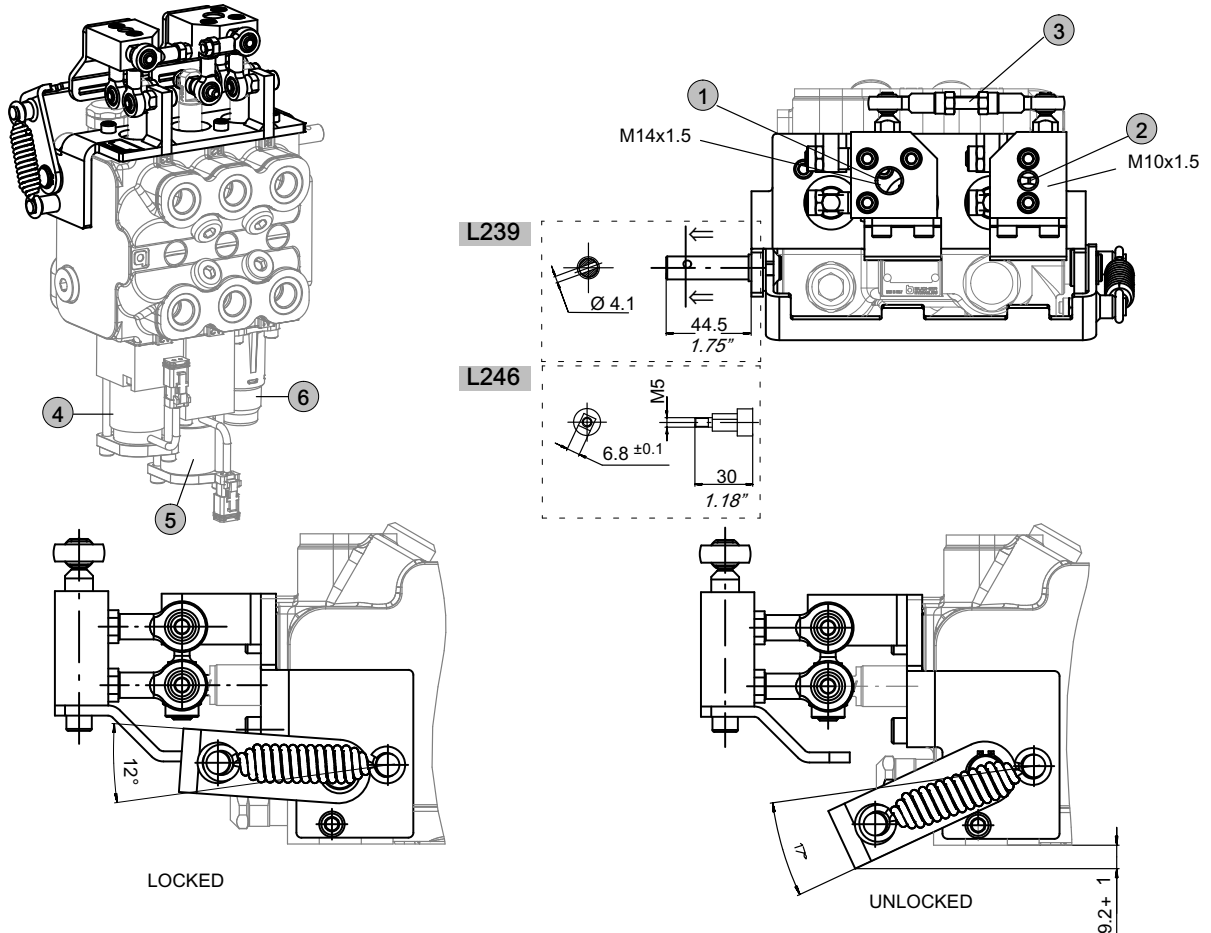


7.5 Joystick control for three spools HDM19WL only

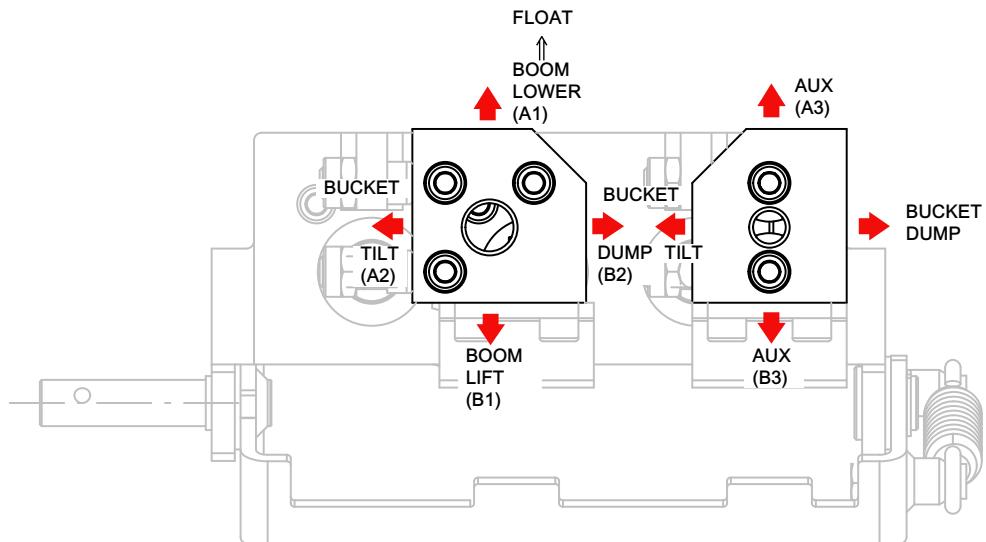
Manual joystick with integrated locking system to control simultaneously two functions with each handle.

Boom and bucket are operated by the main joystick (1).

The linkage (3) make it possible to control both bucket and auxiliary functions using the auxiliary handle (2).

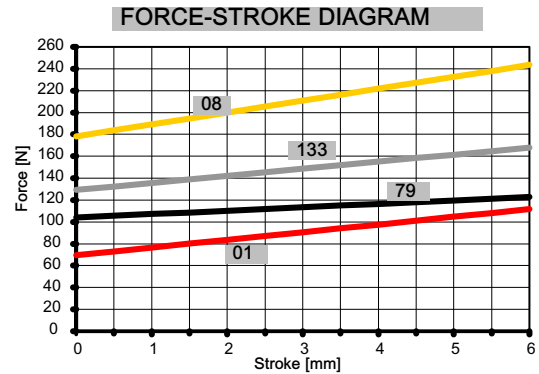
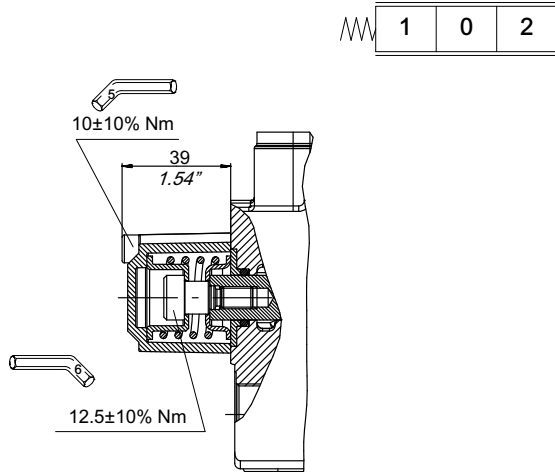


- | | |
|--------------------|----------|
| ① Main joystick | ④ AUX |
| ② Auxiliary handle | ⑤ BUCKET |
| ③ Linkage | ⑥ BOOM |



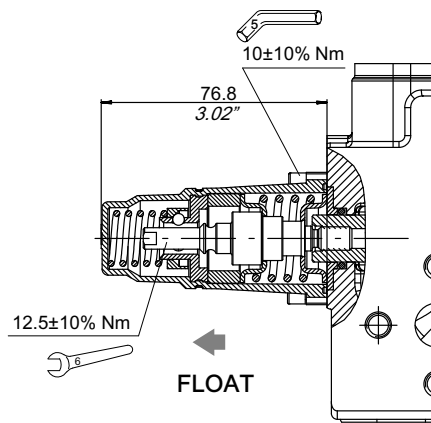
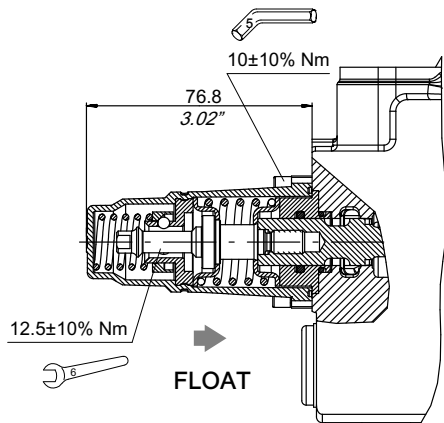
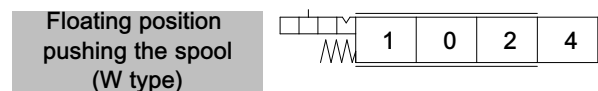
8 Positioners

8.1 Spring return to neutral position



Type	Code	Colour
01	200768611722	RED
79	200768612070	BLACK
133	200768612050	WHITE
08	200768612060	YELLOW

8.2 Detent in floating position and spring return to neutral from position 1 and 2

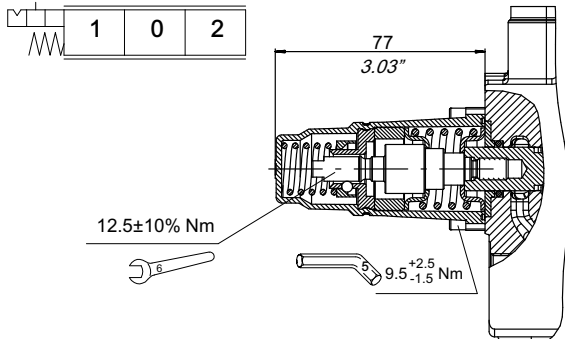


Type	Code	Main spring	Detent spring
04	200768640590	RED	BLACK
333	200768640640	BLACK	BLACK

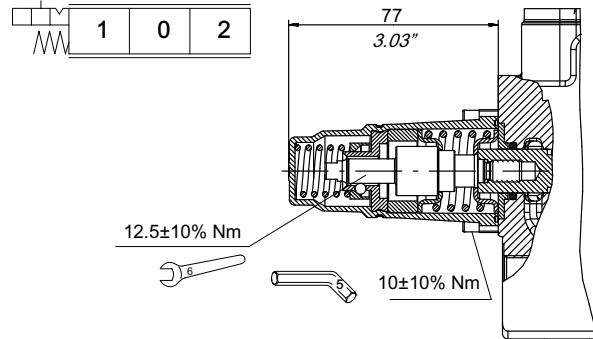
Type	Code	Main spring	Detent spring
06	200768640610	RED	BLACK

8.3 Detent in position 1 or 2 and spring return to neutral in both directions

A pre-feeling (force increase) signals the operator that the detent position is going to be engaged

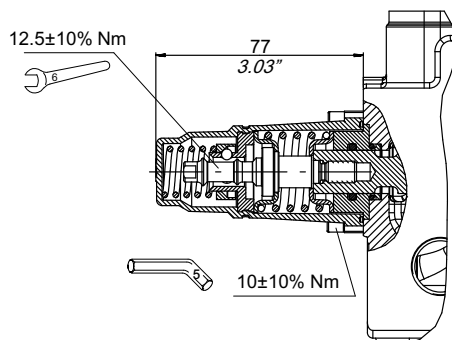
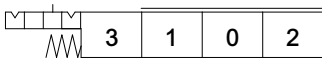


Type	Code	Main spring	Detent spring
359	200768630480	RED	BLACK



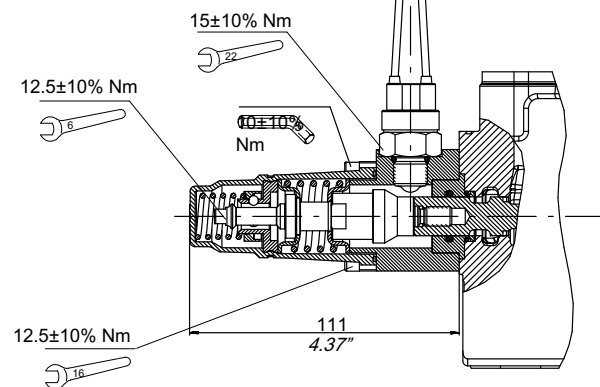
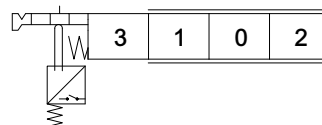
Type	Code	Main spring	Detent spring
340	200768640471	RED	BLACK

8.4 Detent in position 2 and 3 and spring return to neutral in both directions



Type	Code	Main spring	Detent spring
353	200768640700	RED	BLACK

8.5 With microswitch in floating position



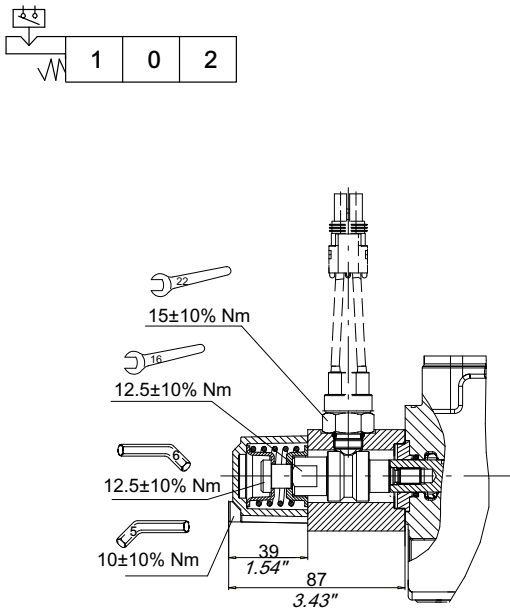
Type	Code	Main spring	Detent spring	Contact type
342	200768640670	RED	BLACK	NO

Microswitch specification

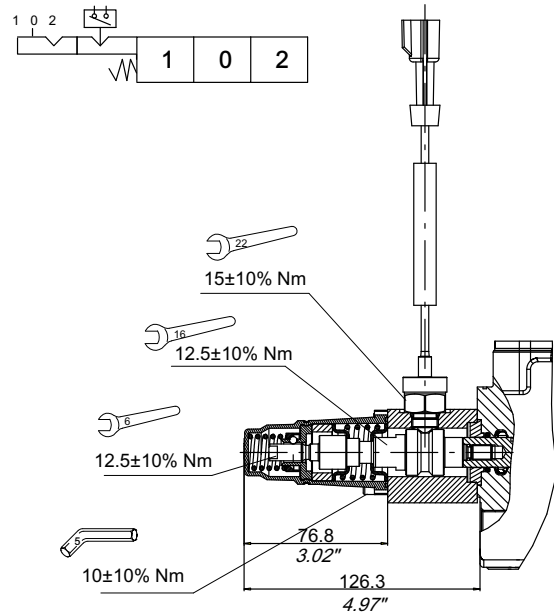
Current rating	.01 - 5.0 DC Amp
Voltage rating	5.0 - 24.0 VDC
Connector	Packard Metri-pack Female
Electrical life max.	500.000 Cycles
Mechanical life max.	1.000.000 Cycles
Type	Normally Open, Encapsulated with Wire Leads

8.6 Microswitch positioners

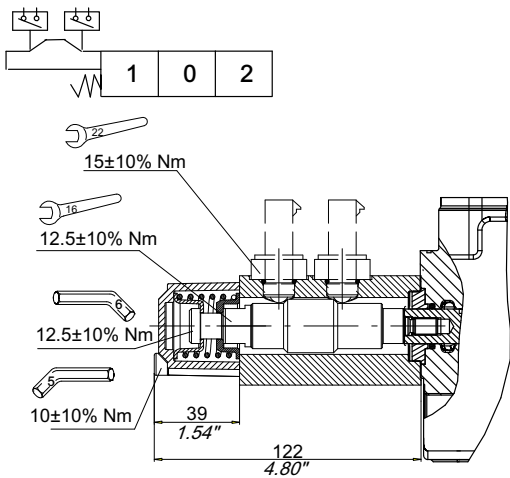
8.6.1 Spool movement detection






8.6.2 Spool movement detection with detent posit.











8.6.3 Spool direction detection



-  DE: microswitch operated in both directions
-  SE1: microswitch operated in POS.1
-  SE2: microswitch operated in POS.2

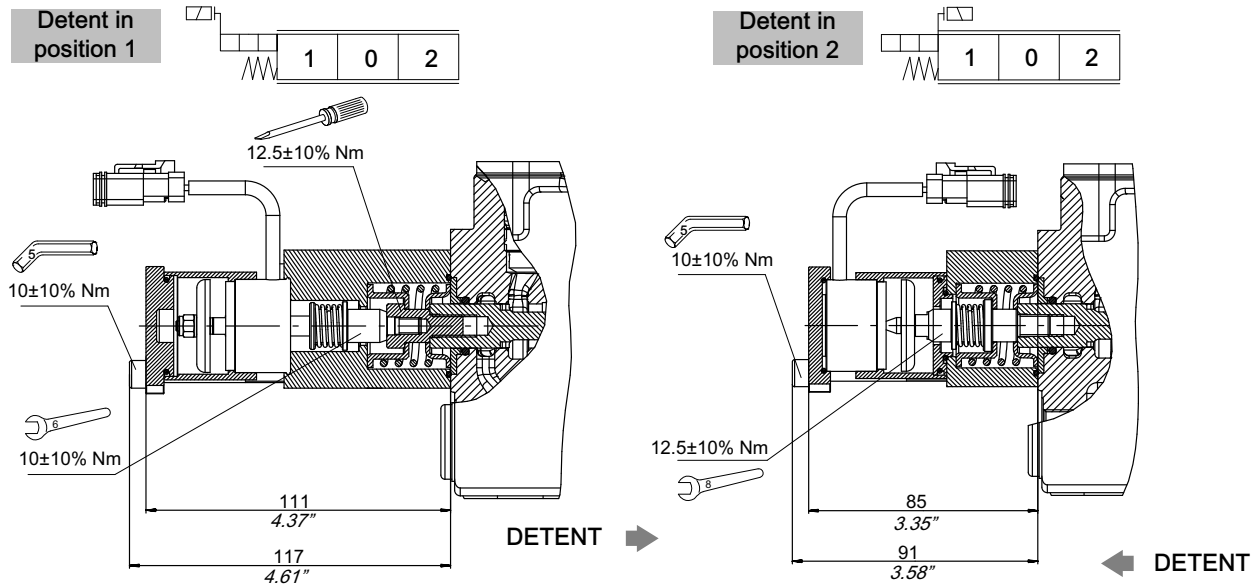
Microswitch control	
Current rating	.01 - 5.0 DC Amp
Voltage rating	5.0 - 24.0 VD C
Mechanical life	500.000 cycles
Temperature range	-30 to 120° C

The normally closed version is available too.

Type	Code	Hydraulic scheme	Description	Connector type	
SAE6 C21-478	200544124021		Normally Closed, Encapsulated with Wire Leads	Packard Weather Pack	
SAE6 O21-477	200544124022		Normally Open, Encapsulated with Wire Leads	Packard Weather Pack	
SAE6 O21-467	200544124023		Normally Open, Encapsulated with Wire Leads, Convoluted nylon wire shield	Packard Metri-pack	
SAE6 C21-462	200544124027		Normally Closed, Sealed Terminals	Packard Weather Pack	

8.7 Electro-magnetic detent positioners (EMD)

A pre-feeling (force increase) signals the operator that the detent position is going to be engaged



8.7.1 Operating features

COIL

Nominal voltage: 12 VDC ± 10%

Power rating: 7 W

Electrical resistance when holding (20°C): 21 ± 1.5 Ohm:

Min. solenoid axial hold force: 260 N

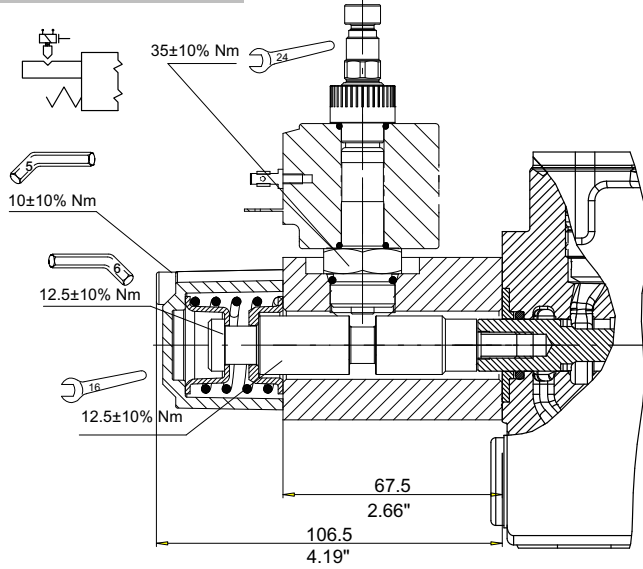
Duty cycle: 100%

Standard cable length: 500 mm

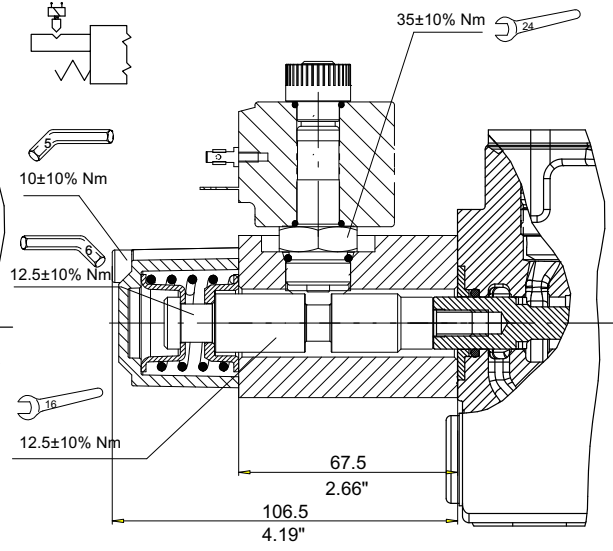
Type	Code	Spring	Voltage	Min. holding force	Connector	Detent position
336	200768670100	RED	12 VDC	137 N	DEUTSCH DT06-2S	2
363	200768670110	RED	12 VDC	137 N	DEUTSCH DT06-2S	1

8.8 Electro-mechanic locking system

With manual override



Without manual override



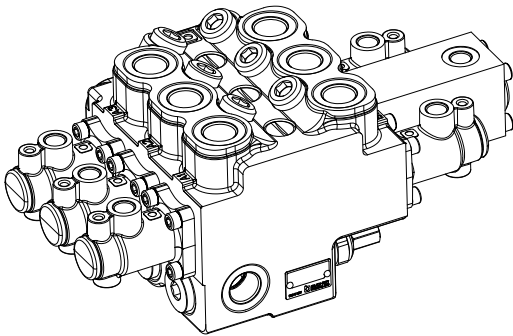
Type	Code	Colour	Manual override
178	200768690260	YELLOW	Y
179	200768690270	YELLOW	N

For types of coils see 6.7 and contact our Sales Department

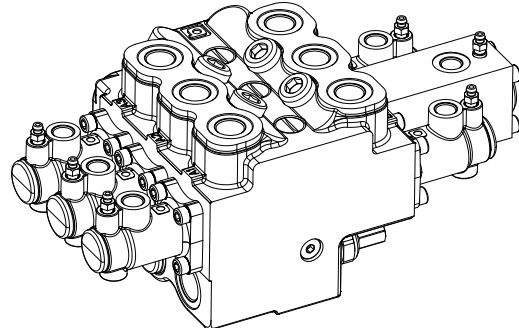
For other types of springs see section 8.1

8.9 Hydraulic controls (HP)

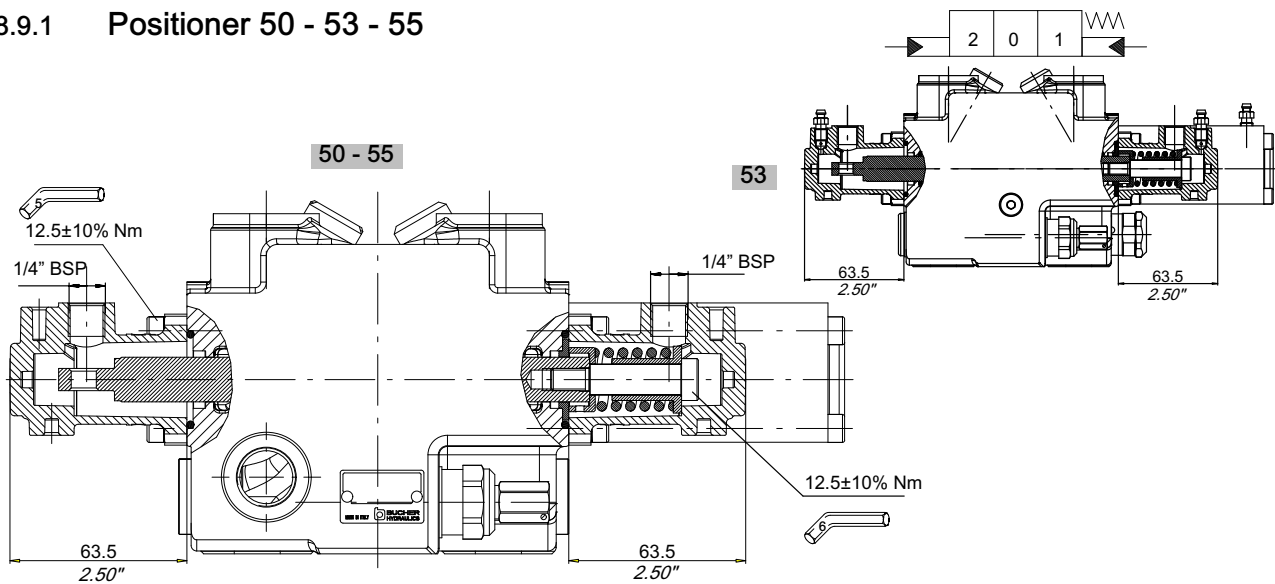
Standard



With de-aeration fittings to eliminate air from the piloting circuit



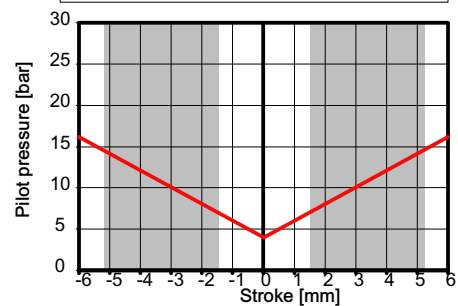
8.9.1 Positioner 50 - 53 - 55



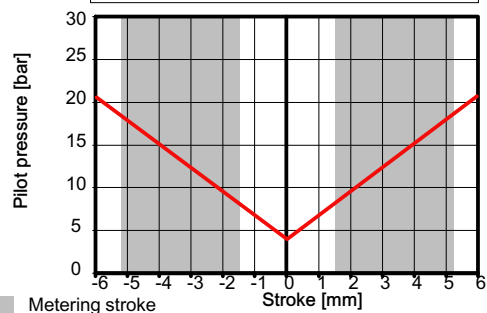
Type	Code
50	200768650512
53	200768650552
55	200768650671

Pmax= 40 bar (580 PSI)

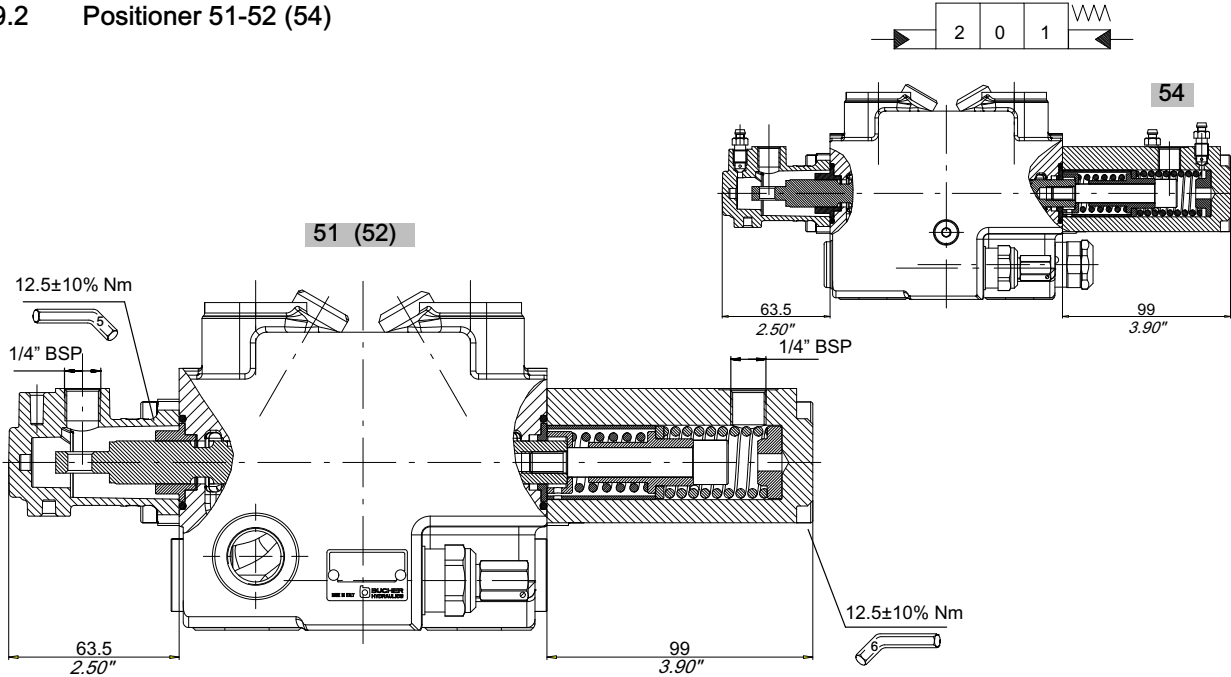
Spring characteristic curve 50-53



Spring characteristic curve 55



8.9.2 Positioner 51-52 (54)



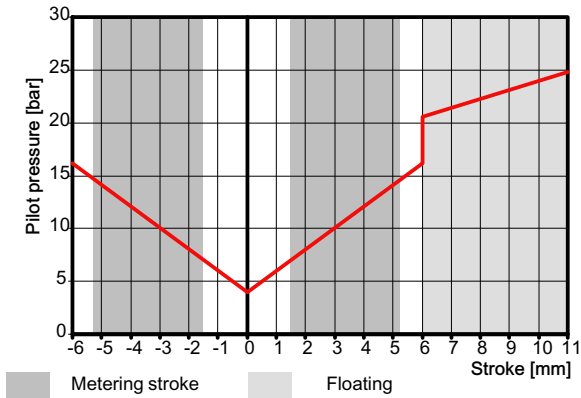
Type	Code
51	200768650522
54	200768650562

Type	Code
52	200768650532

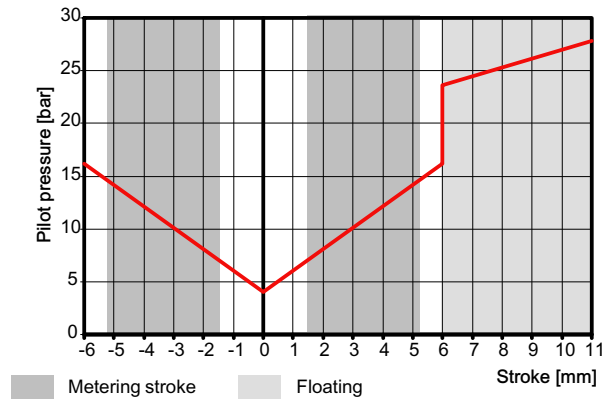
Pmax= 40 bar (580 PSI)

Pmax= 40 bar (580 PSI)

Spring characteristic curve

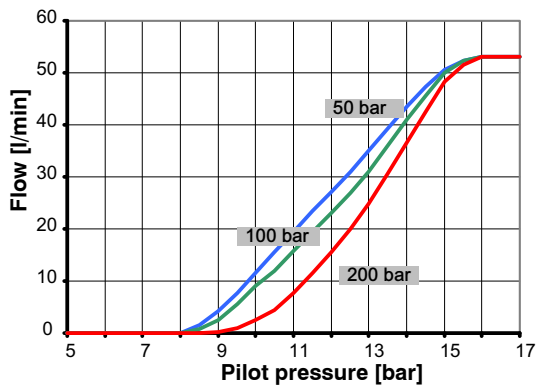


Spring characteristic curve

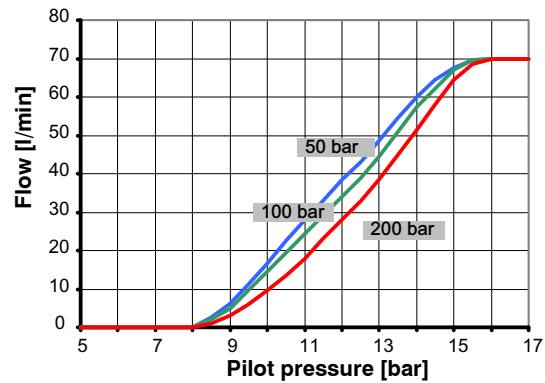


8.9.3 Spool metering curves

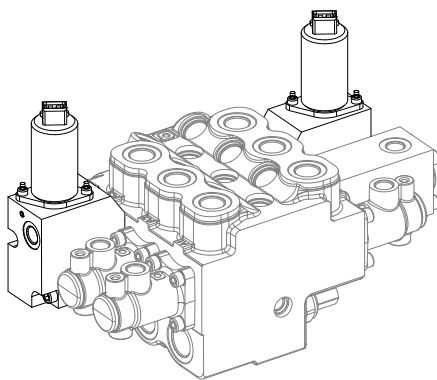
Spool metering: P → A/B (inlet flow 53 l/min)



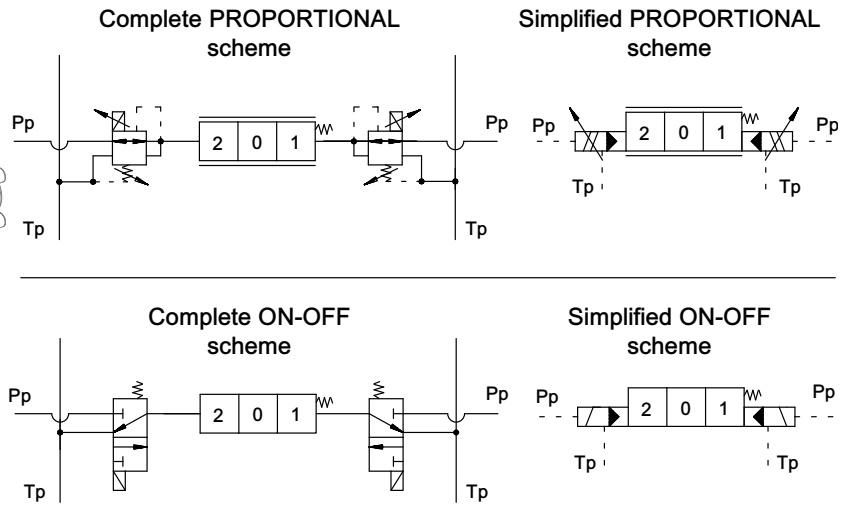
Spool metering: P → A/B (inlet flow 70 l/min)



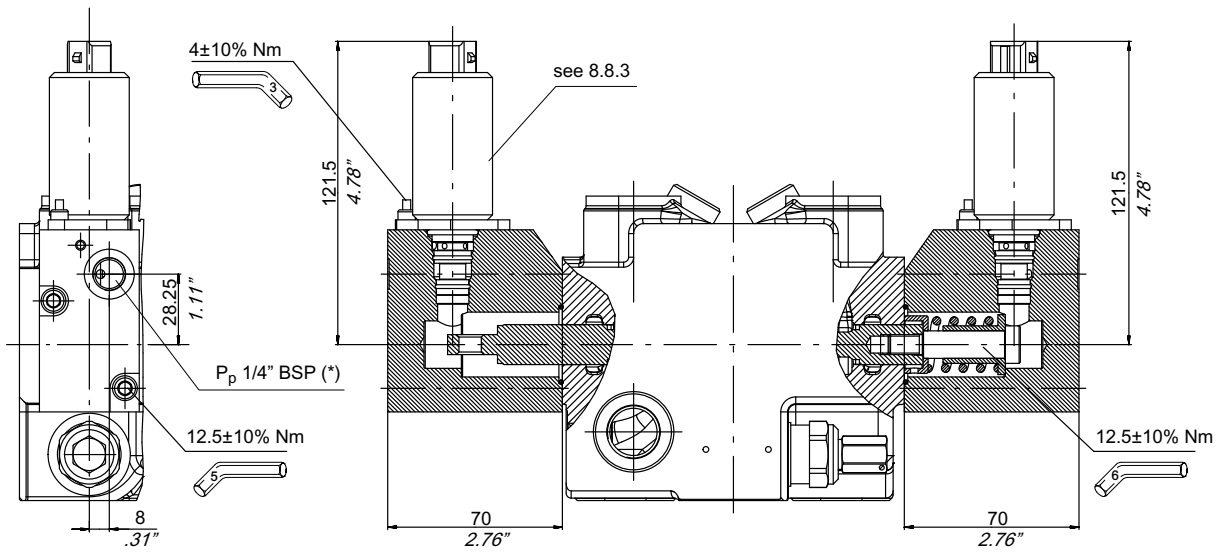
8.10 Electro-hydraulic open loop proportional / ON-OFF control (EHO) HDM19WL only



Pp= External connections
Tp= Internal connections



8.10.1 Single section version



Pmax= 30 bar (430 PSI)

Control	Type	Code	Voltage	Connector
Proportional	400	200768660660	12 VDC	AMP 84-9419
ON-OFF	405	200768660750	12 VDC	AMP 84-9419

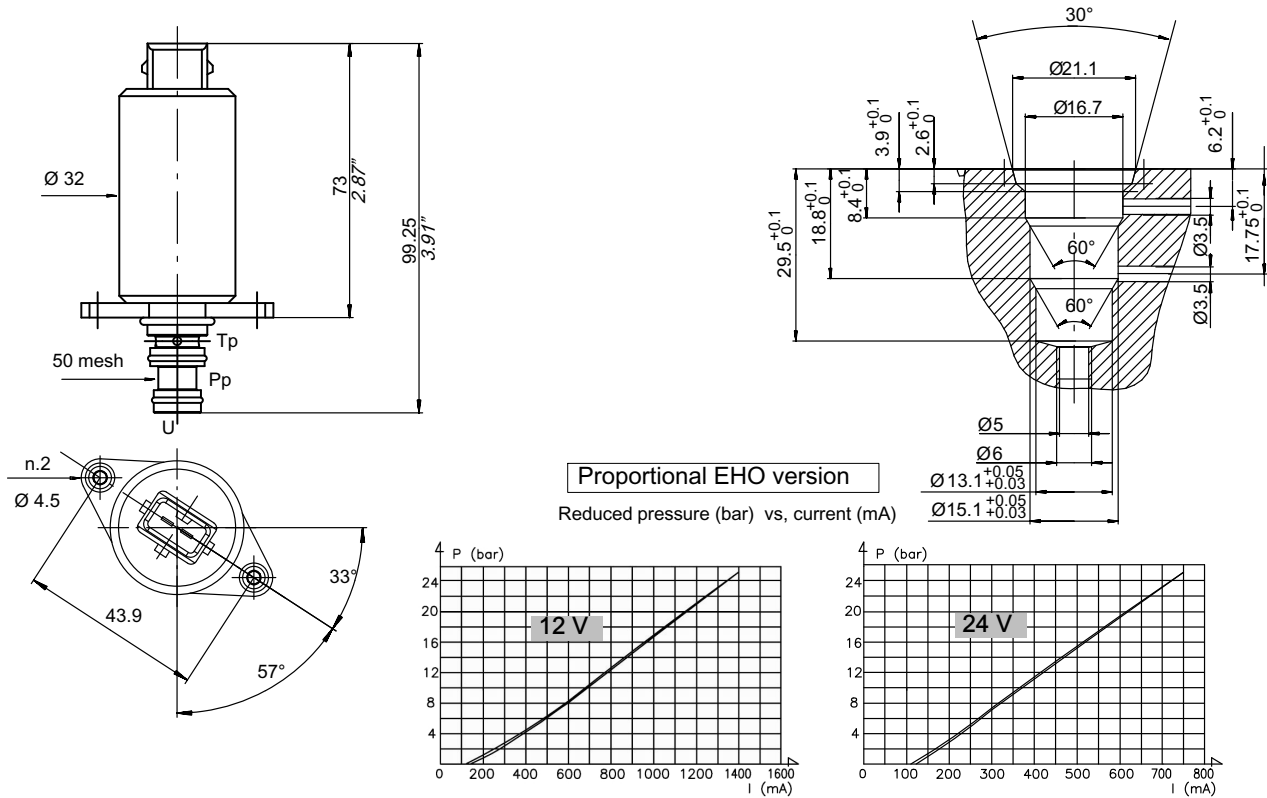


IMPORTANT! It is possible to assemble the "single" version in the 3rd section only.
A dedicated body is requested

(*) It is necessary to supply oil to both positioner caps (A port side and B port side). The return line is directly connected to the tank channel of the directional valve.

(**) Please, contact our Sales Department

8.10.2 Direct acting proportional pressure reducing valve / ON-OFF directional valve



	Electro-hydraulic specifications		
	Proportional		ON-OFF
Nominal flow rate	4 l/min (1 GPM)		6 l/min (1.5 GPM)
Max inlet pressure	35 bar (500 PSI)		50 bar (750 PSI)
Reduced pressure tolerance	±5%		-
Rated supply voltage	12 VDC	24 VDC	12 VDC ±10%
Current supply characteristic	PWM (Pulse width modul.)		ON-OFF
Superimposed dither frequency	100 to 150 Hz		-
Degree of protection	IP65		
Max power consumption	11 W	14 W	20 W
Coil resistance (at 20°C)	5.4 Ohm	22 Ohm	7.2 Ohm
Response time	< 80 ms		from 30 to 45 ms
Leakage	< 15 cc/min. at 35 bar and 80°C (< 0.9 cu.in./min. at 500 psi and 176 °F)		
Duty cycle	ED 100%		
Connector Type	AMP Junior timer (AMP84-9419)		
Connector colour	BLUE	RED	BLACK
Code (*)	200533960004	200533960007	200533940075

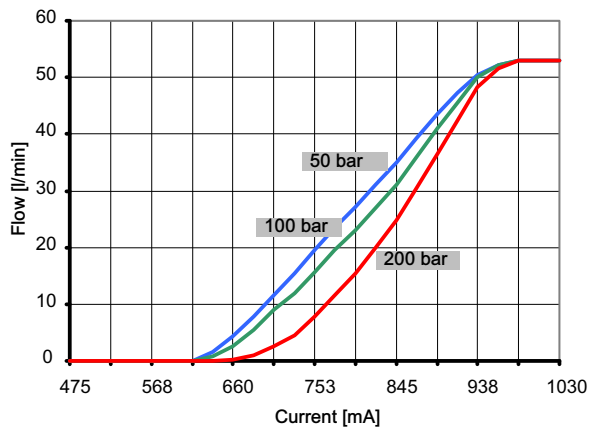
(*) nr. 2 screws M4x12 are not included

For proportional versions, ED100% not guaranteed for current values higher than the maximum shown in the correspondent diagram.

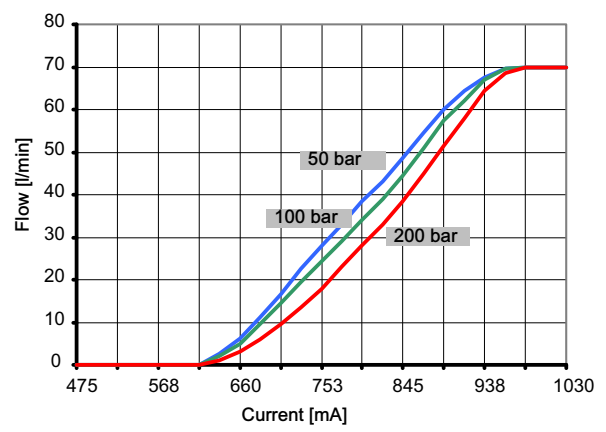
For ED100% without current limitation the ON-OFF version must be used

8.10.3 Spool metring curves

Spool metering: P → A/B (inlet flow 53 l/min)



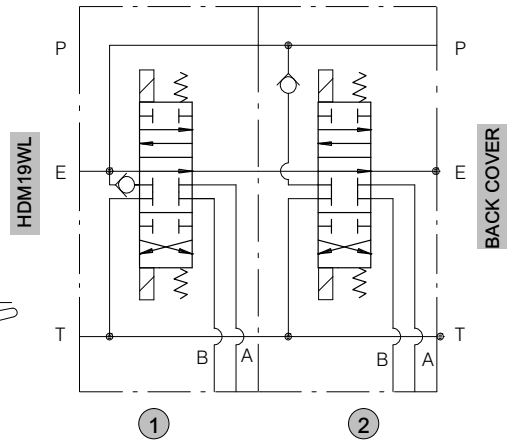
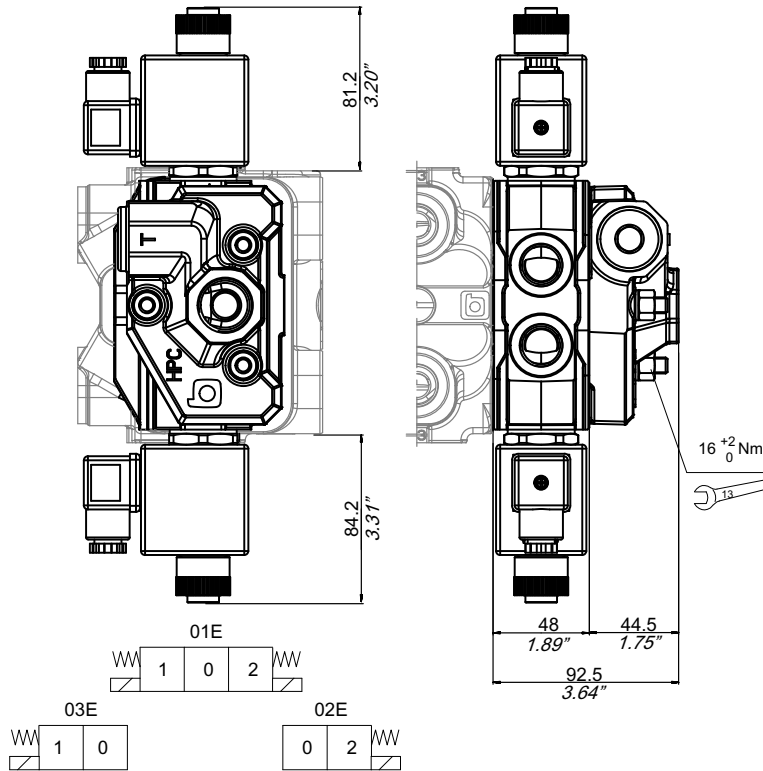
Spool metering: P → A/B (inlet flow 70 l/min)



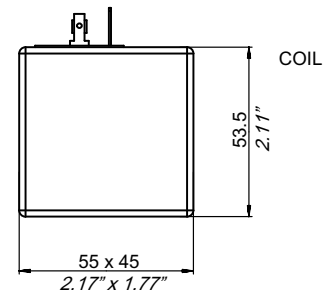
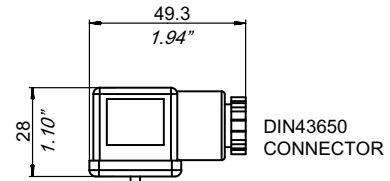
9 Stackable elements - HDM19WL only

It is possible to flange up to seven HDS15 elements on the tank port side or manifolds with specific functions on the inlet port side.

9.1 HDS15 ON-OFF



- ① Series body only
- ② ⑦ Parallel or series body



Operating hydraulic features

Max internal leakage A/B→T (at 100 bar/1450 PSI, 23 mm ² /s)	Without port valves	35 cc/min (2.492 Cu In/min)
	With port valves	40 cc/min (2.634 Cu In ³ /min)

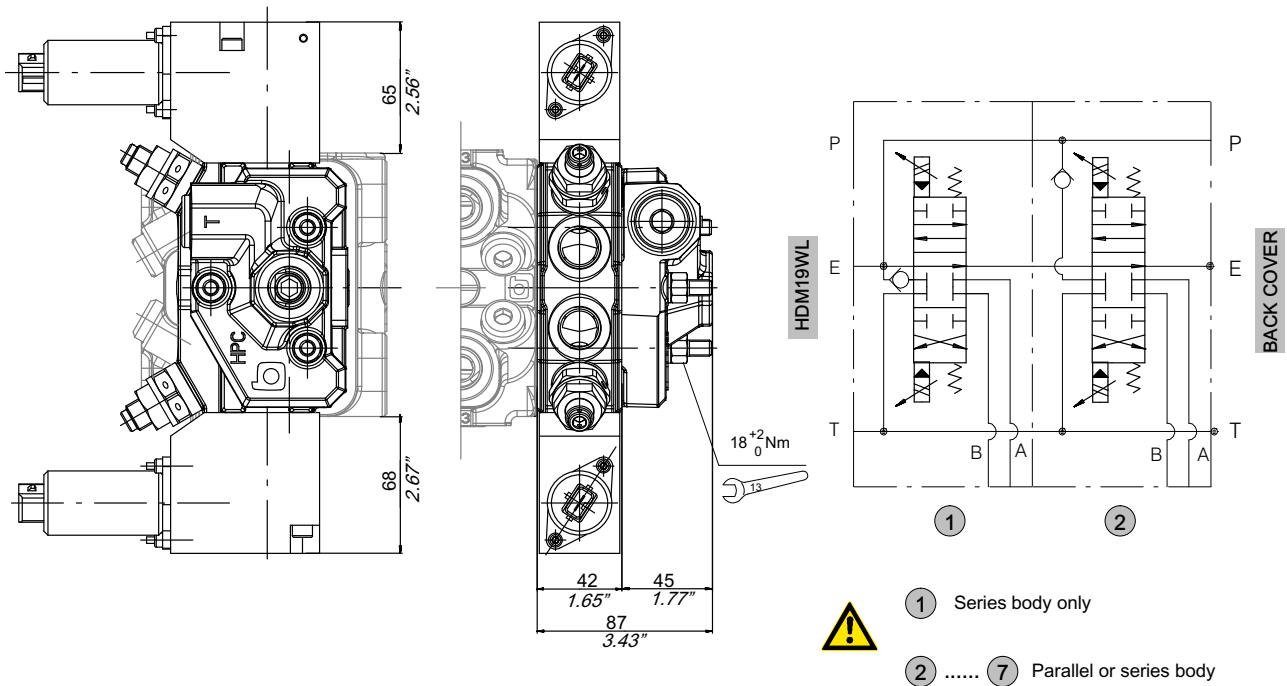
Operating electrical features

Nominal voltage	12 VDC ±10%
Power consumption	48 W
Coil insulation	class H (VDEO 0580)
Duty cycle	ED 100%
Protection class	IP65 (DIN 40050)

Voltage	Connector	Coil + Connector Code	Connector code	Coil code
12 VDC	DIN43650	200774910450	200544110009	200674910110

IMPORTANT!: For bodies, spools, service port valves and back-covers see the HDM/S15 catalogue.

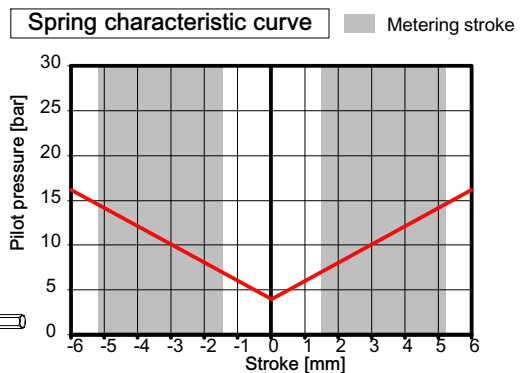
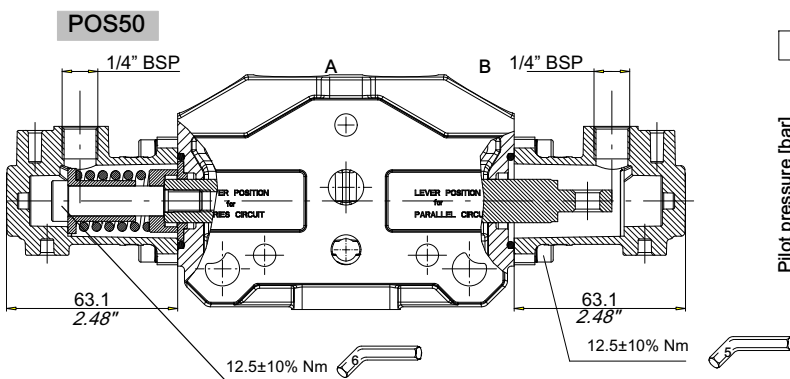
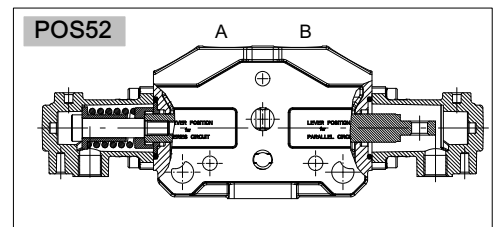
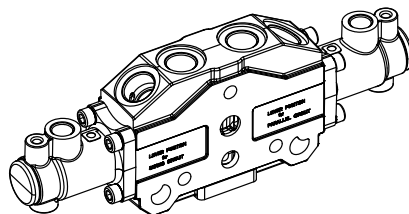
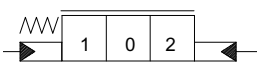
9.2 HDS15 proportional controls



IMPORTANT!: For bodies, spools and service port valves see the HDM/S15 catalogue

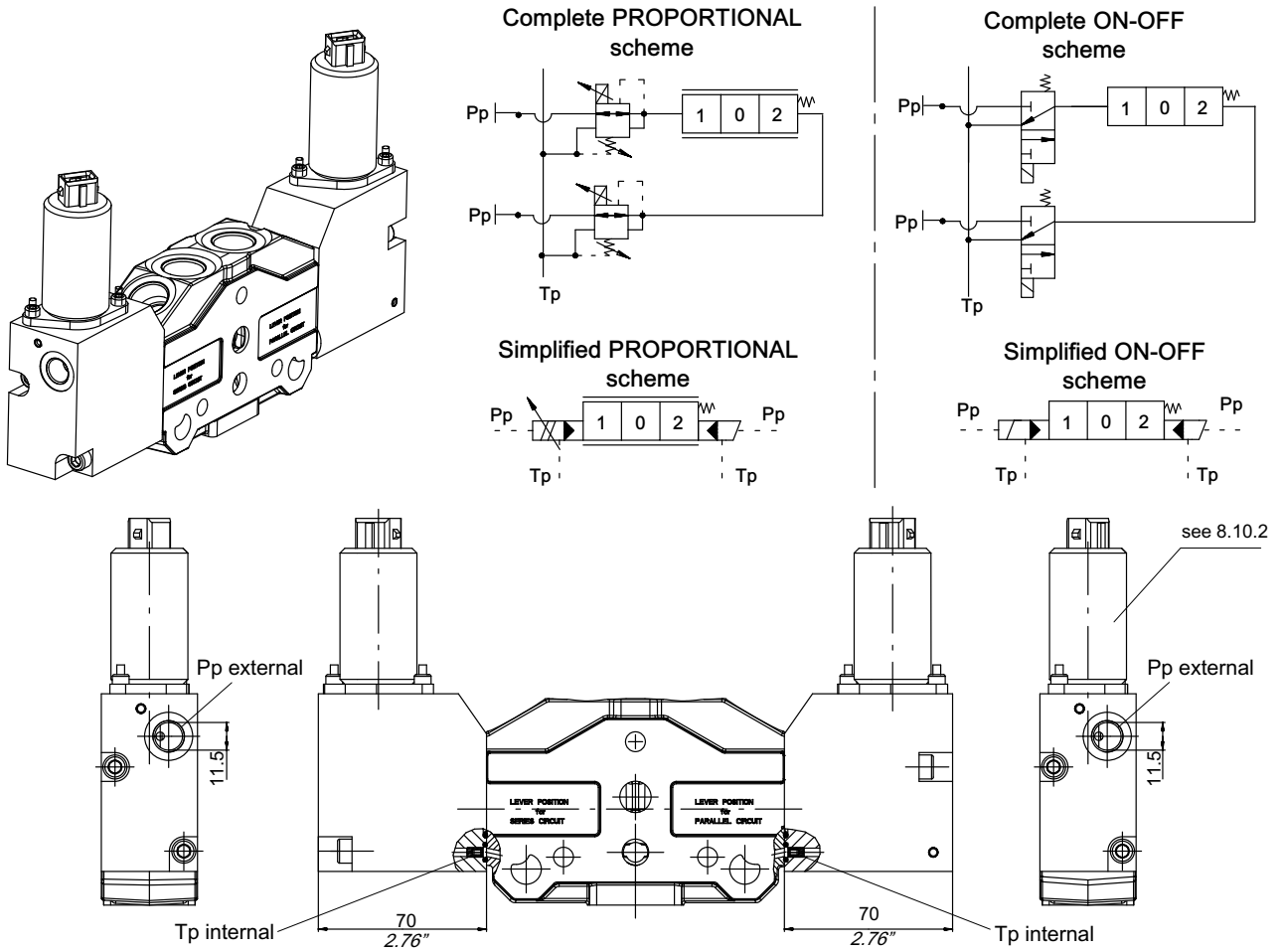
9.2.1 HDS15 Hydraulic control (HP)

Type	Code
50-52	200768650632



A special body with four lever/positioner fixing holes is requested.

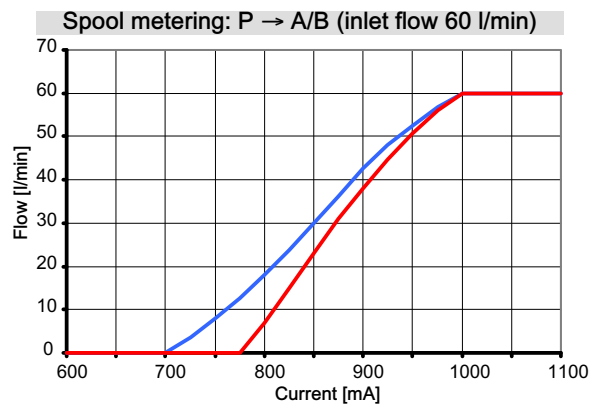
9.2.2 HDS15 Electro-hydraulic open loop proportional / ON-OFF control (EHO)



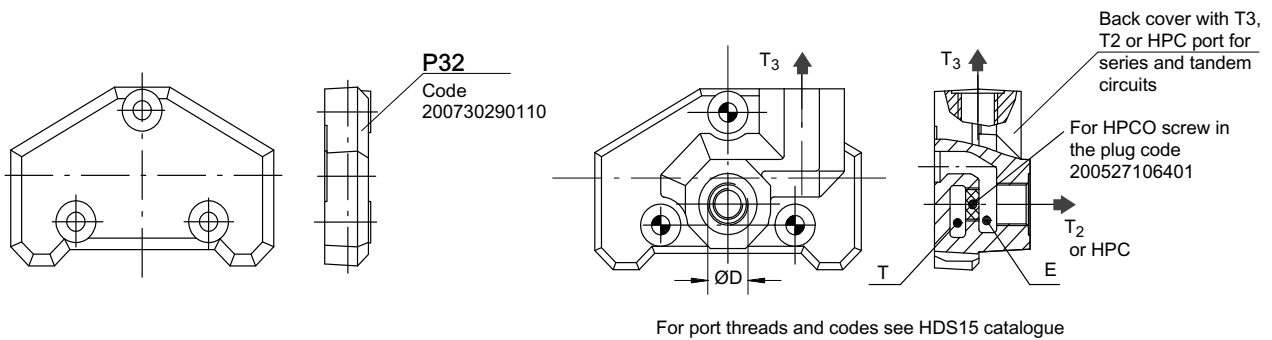
Control	Type	Code	Voltage	Connector
Proportional	420	200768660680	12 VDC	AMP 84-9419
ON-OFF	425	200768660740	12 VDC	AMP 84-9419

The pressure differential between pilot lines Pp and Tp should be > 25 bar in order to be sure to switch the spool to full stroke in all operating conditions

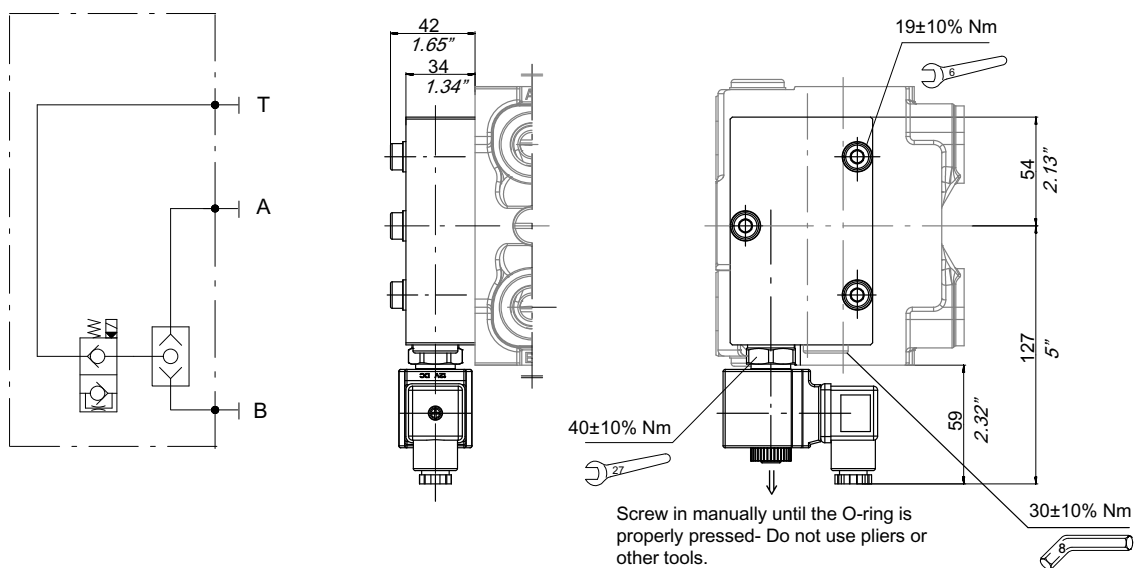
"AEH" spool metering curve



9.3 Back covers

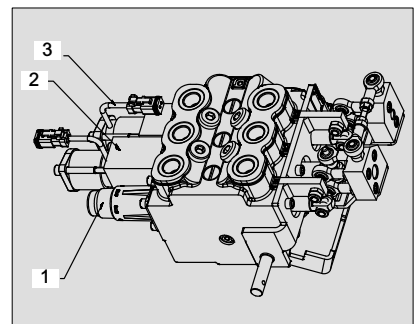
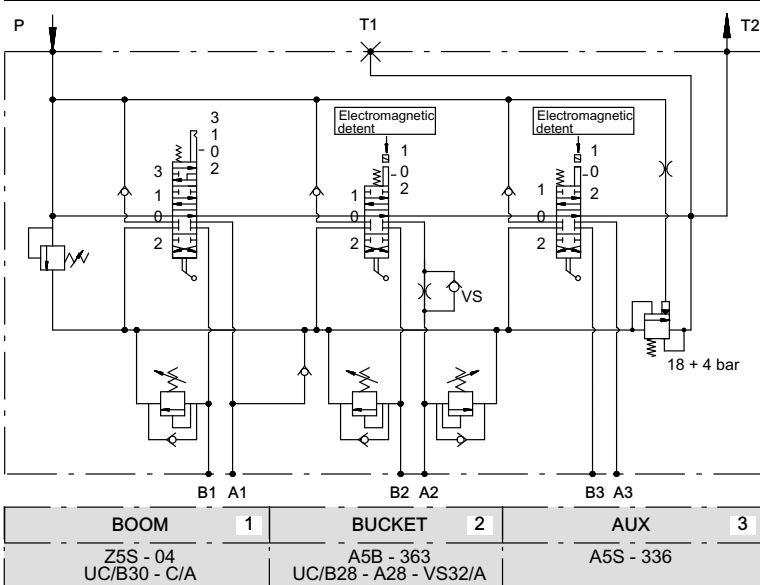
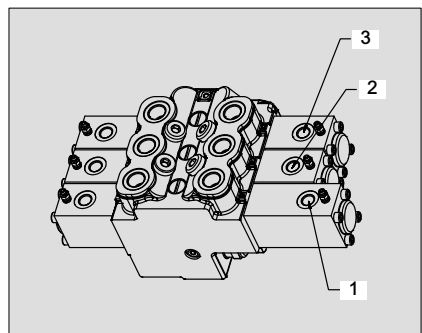
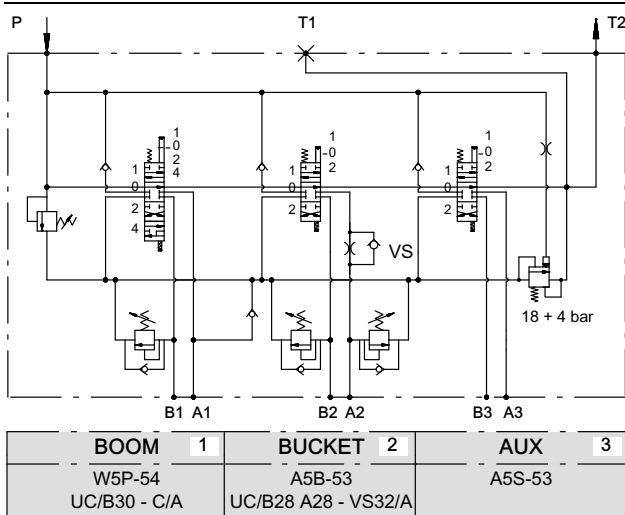
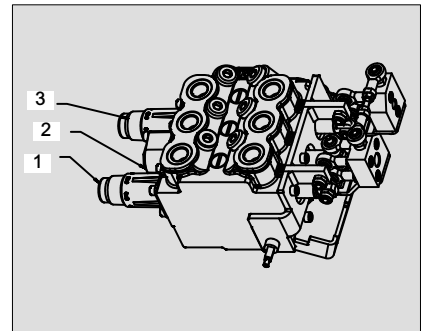
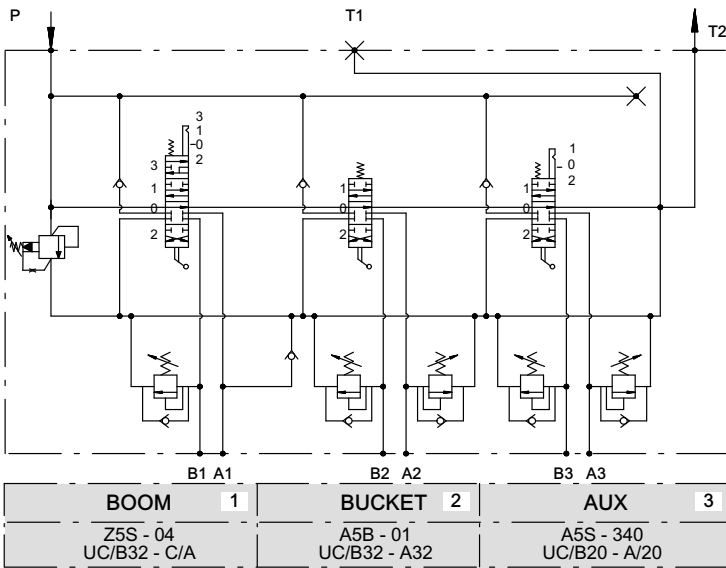


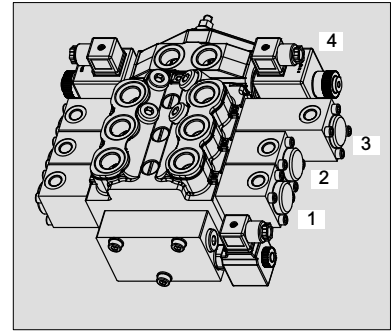
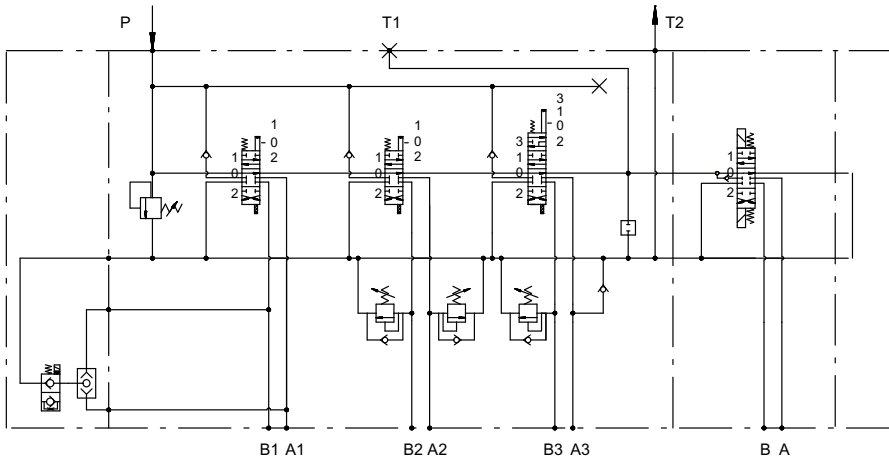
9.4 Ports A1 / B1 unloading valve - (A1-B1-T internal connections)



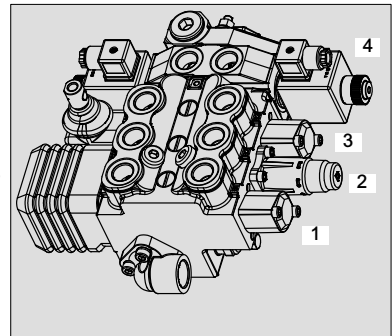
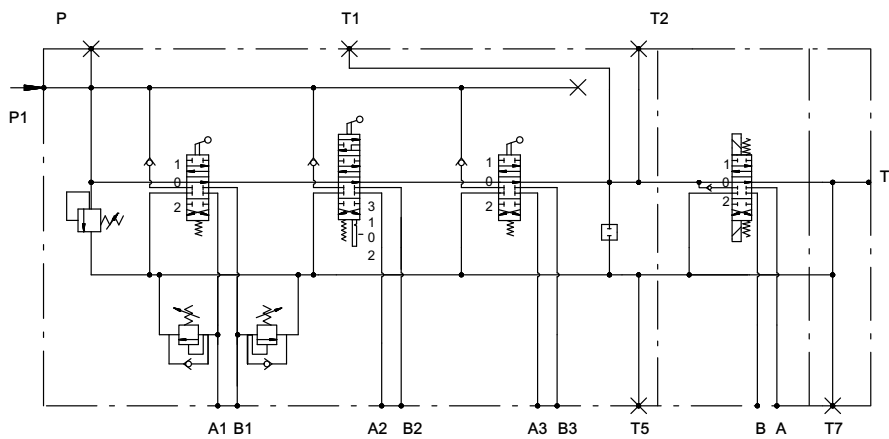
IMPORTANT!: Using the unloading valve, max A1/B1 working pressure = 250 bar - for higher values, please contact our Sales Department
Dedicated HDM19WL main body required

10 Hydraulic schematics examples



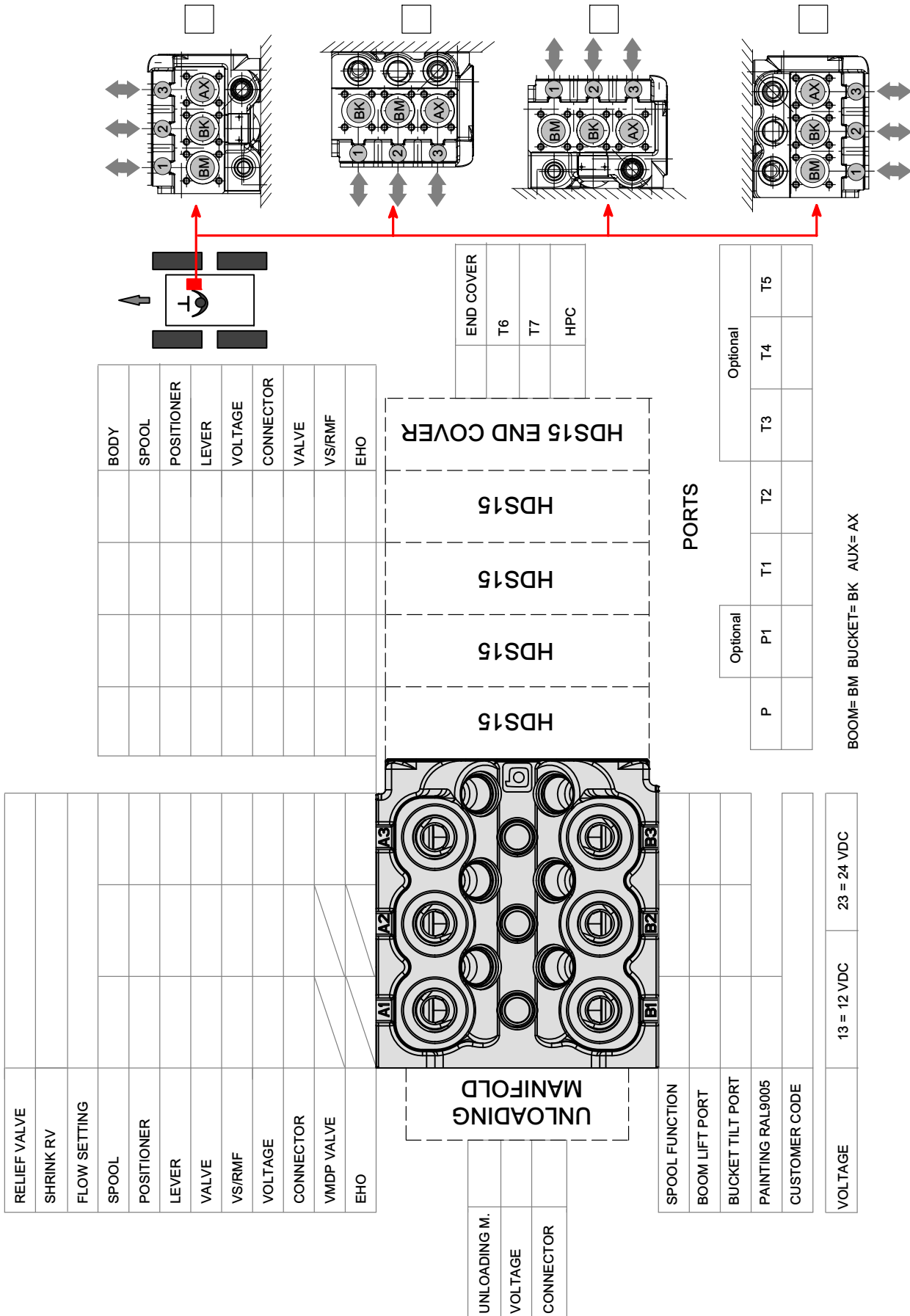


UNLOADING	AUX	1	BUCKET	2	BOOM	3	TELESCOPIC	4	BACK-COVER
MANIFOLD	A5S -50		A5B - 50 UC/A18B28		W5P - 51 C/A - UC/B28		AE - 01E 13		P32



BUCKET	1	BOOM	2	AUX	3	TELESCOPIC	4	BACK-COVER
A5A-01-L134 UC/A30B30		Z5S-04-L134		A5S-01-L100		AE-01E-13		P53

11 Composition of HDM19WL ordering code



11.1 Examples of HDM19WL ordering code

RELIEF VALVE	22VM14	
SHRINK RV		
FLOW SETTING	80 l/min	
SPOOL	A5S	W5P
POSITIONER	50	51
LEVER	UCA28B28	
VALVE		
VS/RMF		
VOLTAGE		
CONNECTOR		
VMDP VALVE	YES	
EHO		

UNLOADING M.	YES
VOLTAGE	13
CONNECTOR	DIN43650

UNLOADING MANIFOLD

SPOOL FUNCTION	BOOM	BUCKET	AUX
BOOM LIFT PORT	-	-	-
BUCKET TILT PORT	✓	-	-
PAINTING RAL9005			
CUSTOMER CODE			
VOLTAGE	13 = 12 VDC	23 = 24 VDC	

K243	BODY
AE	SPOOL
01E	POSITIONER
	LEVER
	VOLTAGE
13	CONNECTOR
	VALVE
	VS/RMF
	EHO

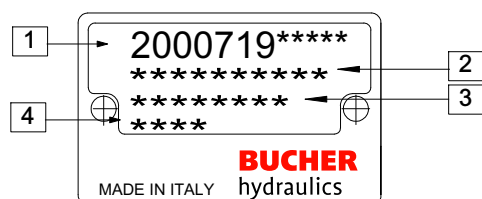
HDS15	
HDS15	
HDS15	
HDS15	
HDS15 END COVER	

P32	END COVER
T6	
T7	
HPC	

P	1/2"BSP	Optional
P1	-	Optional
T1	PLUG	Optional
T2	1/2"BSP	Optional
T3	-	Optional
T4	-	Optional
T5	PLUG	Optional

BOOM= BM BUCKET= BK AUX= AX

11.2 Product identification plate



- 1 : BHRE Product Order Code.
- 2 : Customer Code (on demand, only - if not requested manufacturing year and month are printed).
- 3 : WO : Production Work Order .
- 4 : WO progressive number.

Manufacturing month	Manufacturing year					
	2014	2015	2016	2017	2018	2019
January	4A	5A	6A	7A	8M	9M
February	4B	5B	6B	7B	8N	9N
March	4C	5C	6C	7C	8P	9P
April	4D	5D	6D	7D	8Q	9Q
May	4E	5E	6E	7E	8R	9R
June	4F	5F	6F	7F	8S	9S
July	4G	5G	6G	7G	8T	9T
August	4H	5H	6H	7H	8U	9U
September	4I	5I	6I	7I	8V	9V
October	4J	5J	6J	7J	8Z	9Z
November	4K	5K	6K	7K	8X	9X
December	4L	5L	6L	7L	8Y	9Y

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Classification: 430.300.000