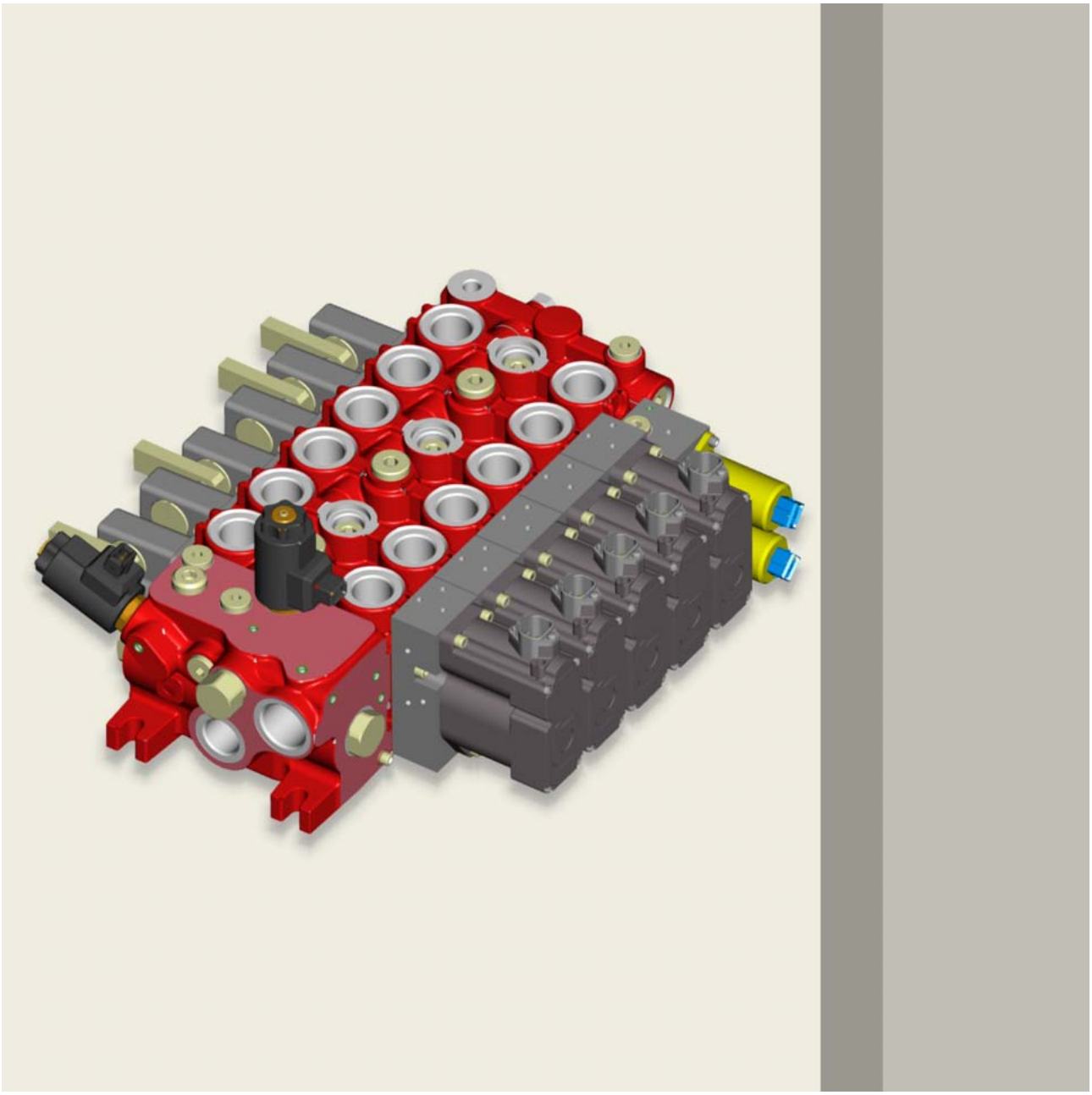
BUCHER HYDRAULICS

Directional Control Valve HDS34

Load Sensing



motion and progress

Reference: 200-P-991227-E-00

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BUCHER HYDRAULICS

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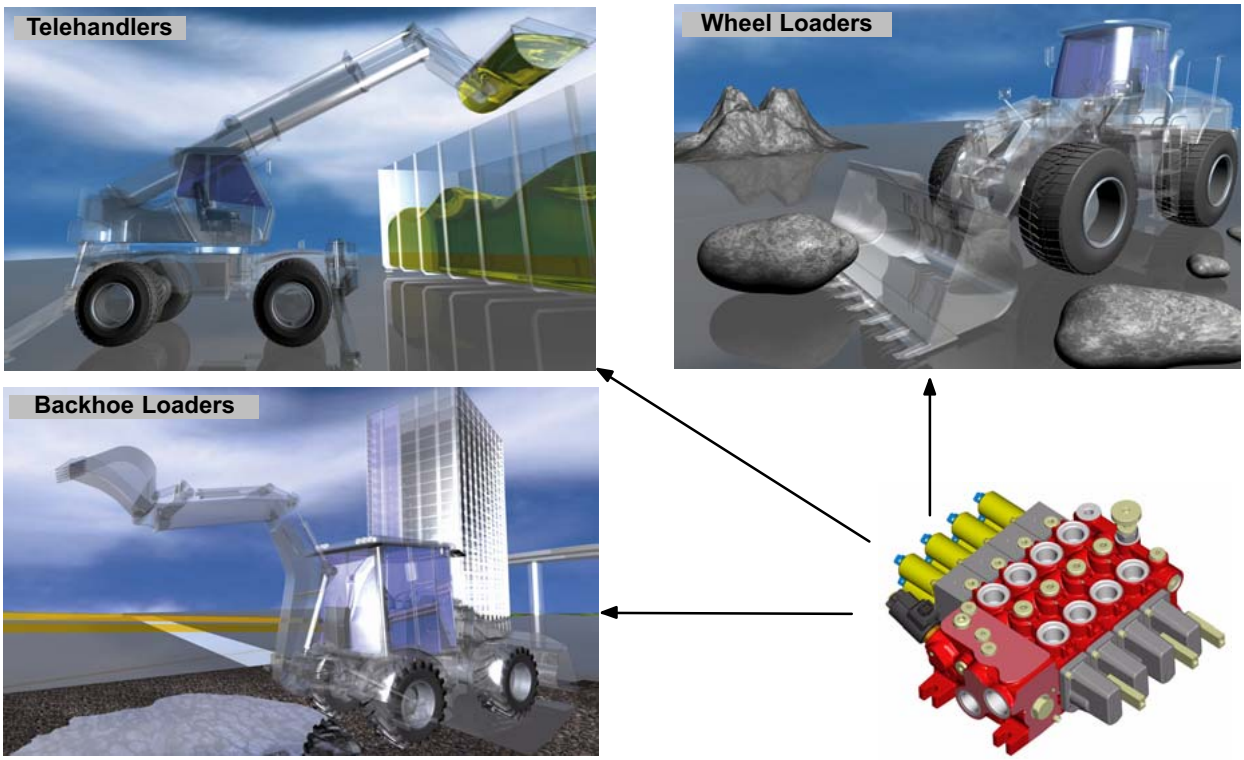
1 General information

1.1 Introductions

More than 20 years of leading presence and successful supplies in the telescopic loaders sector, the deep know-how gained in the earthmoving machines field and the strong commitment to anticipate the upcoming technical and application needs of our customers, have guided Bucher Hydraulics Reggio Emilia in the development of the flow sharing directional valve HDS34.

The stakable construction with a wide range of inlet and outlet covers as well as of controls, gives the designer a high degree of freedom in the choice of the assembling position of the valve and of the hydraulic circuit which fits in the best way the machine requirements . Each valve section can be equipped with a load holding valve as well as a pressure compensator, in order to satisfy the requirements of both basic and premium machines, where a function control independent from the load and the inlet flow is requested.

HDS34 can be equipped with single levers or dual axis joystick, hydraulic proportional, open and closed loop electro-hydraulic proportional controls, in combination also with dual axis joystick. The wide range of controls combined with the compact dimensions, especially in height which is a big issue in the development of machine cabins, makes the HDS34 a very flexible valve able to fulfil all the requirements of modern machines



1.2 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.

1.3 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 / *lbft*					
Metric - ISO 261	**M14X1.5**	**M18X1.5**	**M22X1.5**	**M27X2**	**M33x2**
With O-Ring seal (ISO 6149-1)	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*	100 / *73.8*
With copper washer (ISO 9974-1)	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*	100 / *73.8*
With rubber washer or steel (ISO 9974-1)	25 / *18.4*	35 / *25.8*	60 / *44.3*	70 / *51.7*	90 / *66.4*
BSP - ISO 228-1	**1/4" BSP**	**3/8" BSP**	**1/2" BSP**	**3/4" BSP**	**1" BSP**
With copper washer (ISO 1179-1)	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*	100 / *73.8*
With rubber washer or steel (ISO 1179-1)	25 / *18.4*	35 / *25.8*	60 / *44.3*	70 / *51.7*	90 / *66.4*
UN-UNF - ISO 263	**SAE6 - 9/16-18 UNF**	**SAE8 - 3/4-16 UNF**	**SAE10 - 7/8-14UNF**	**SAE12 - 1-1/16-12UNF**	**SAE16**
With O-Ring seal (ISO 11926-1)	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*	130 / *95.9*

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

1.4 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.

1.5 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 20/18/15 ISO 4406:1999 (NAS 1638 class 9) 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. The filters integrated in the HDS34 are provided to protect the valve components against big particles and not to filter the system.

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.

1.6 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 98/37/EC

- ISO 9001: 2000

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.

1.7 Technical specification:

IMPORTANT!: Specification and diagrams shown in this catalogue are measured with mineral oil having a viscosity of 23 mm^2/s at 50° C

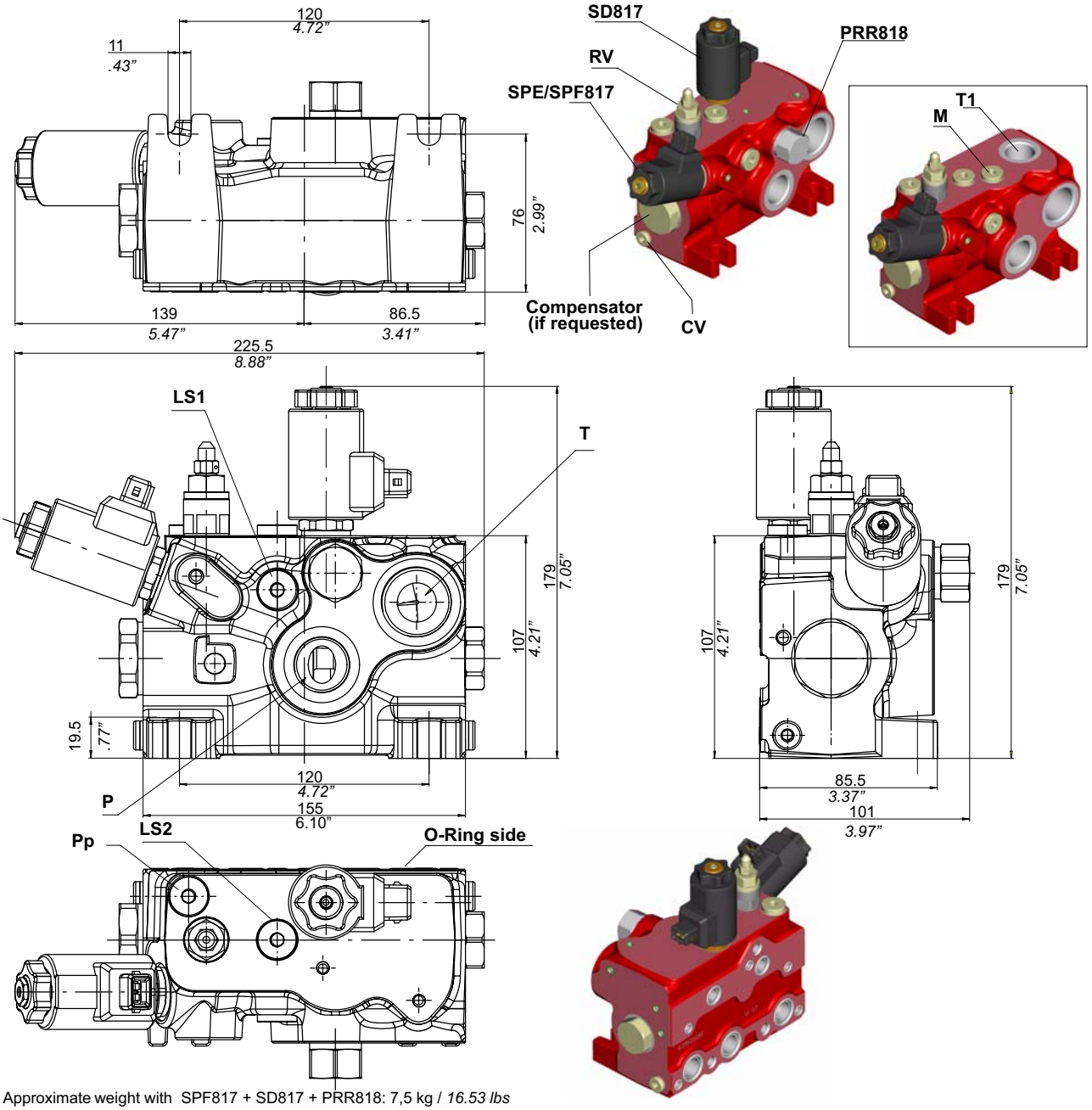
Features	
Max inlet flow	**180 l/min** *(48 US gpm)*
Max work port A/B flow (13 bar *190 PSI* margin)	**150 l/min** *(40 US gpm)*
Max return flow admitted	**250 l/min** *(67 US gpm)*
Supply port P max continuous operating pressure	**300 bar** *(4300 PSI)*
Work port A/B max peak pressure	**350 bar** *(5000 PSI)*
Max back pressure (*)	**30 bar** *(430 PSI)*
Port threads size	**1/2" BSP - 3/4" BSP - SAE10 - SAE12 - (CEJN quick coupling- please contact our Sales Dept)**
Max spool leakage	**20 cc/min (100 bar / *1430 PSI*, 50° C, 23 mm^2/s) Lower values on demand**
Service port relief and anti-cavitation fixed setting valves	see chapter 5.3
Max contamination level	**20 / 18 / 15 - ISO 4406:1999** *(NAS 1638 class 9)*
Fluid temperature	**-20°C / +80°C (NBR seals)**
Viscosity operating range	**from 15 to 75 mm^2/s**
Max number of elements	**10**
Painting (on request)	**PRIMER**

For different operating conditions, please contact our Sales Dept.

(*) With electro-hydraulic pilot heads the back pressure must not exceed 5 bar. For higher back pressure values the pilot flow must be unloaded to tank through a separate line (Tp)

2 Inlet cover

2.1 Standard inlet cover



Approximate weight with SPF817 + SD817 + PRR818: 7,5 kg / *16.53 lbs*

RV = LS signal adjustable relief valve

CV = pilot tank line check valve (optional)

SD817 = pilot oil supply cut-off valve (optional)

SPE/SPF817 = LS signal unloading solenoid valve (optional)

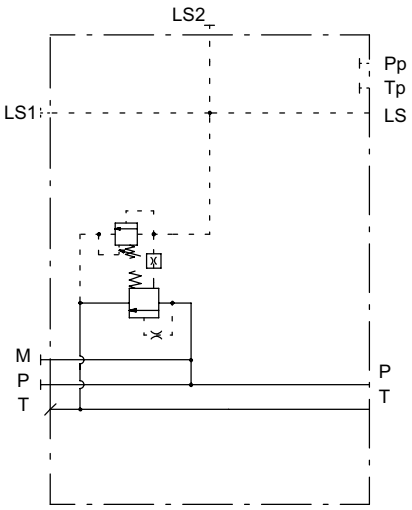
PRR818 = pilot oil supply pressure reducing valve (optional)

2.1.1 Ports Size

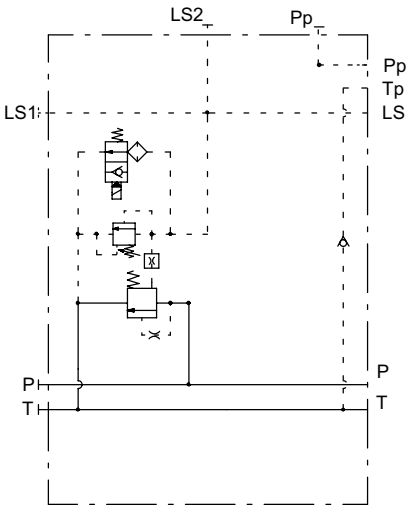
Threads	P	T	T1 (Optional)	LS1	LS2	Pp	M
BSP	3/4”	1”	3/4”	1/4”	1/4”	1/4”	1/4”
Metric	M27x2	M33x2	M27x2	M14x1.5	M14x1.5	M14x1.5	M14x1.5
UNF	SAE12	SAE16	SAE12	SAE6	SAE6	SAE6	SAE6

2.1.2 Systems with fixed displacement pump - Examples

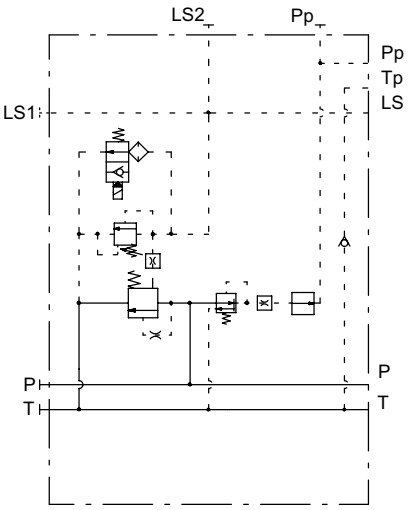
With LS relief valve



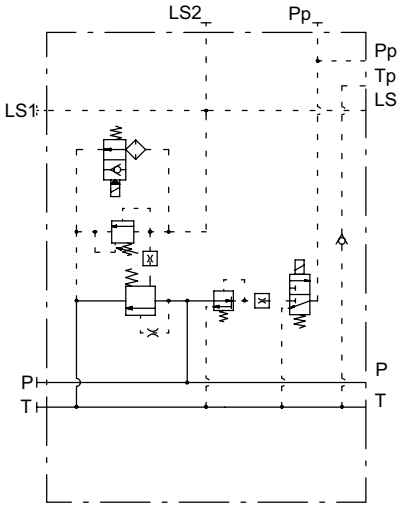
With LS relief valve + LS signal unloading valve + pilot tank line check valve



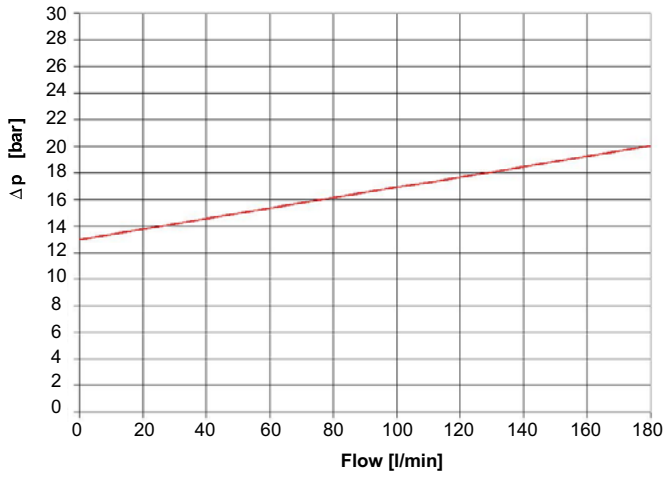
With LS relief valve + LS signal unloading valve + pilot oil supply pressure reducing valve + pilot tank line check valve



With LS relief valve + LS signal unloading valve + pilot oil supply pressure reducing and cut-off valve + pilot tank line check valve

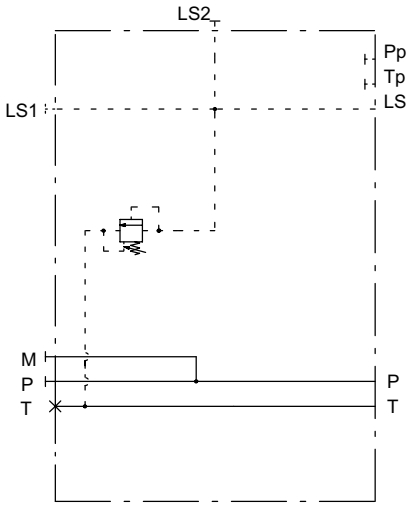


Standard inlet cover - Gear Pump version
Three way inlet compensator - STD spring

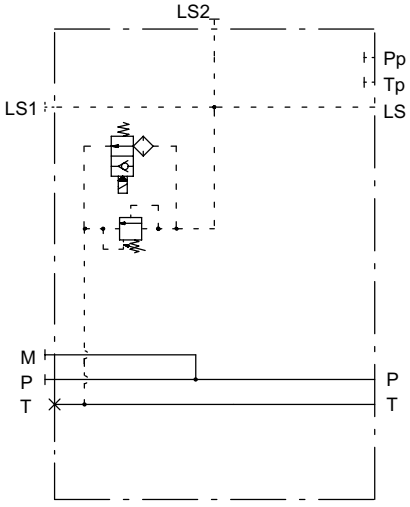


2.1.3 Systems with LS pump - Examples

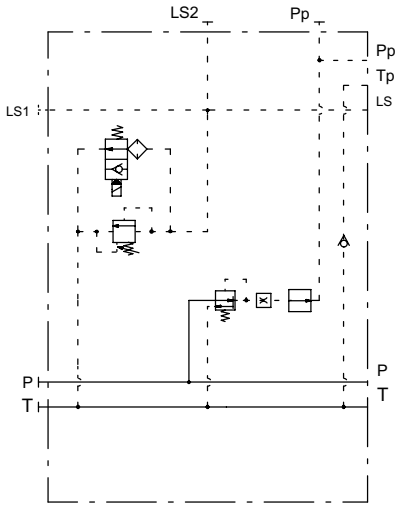
With LS relief valve



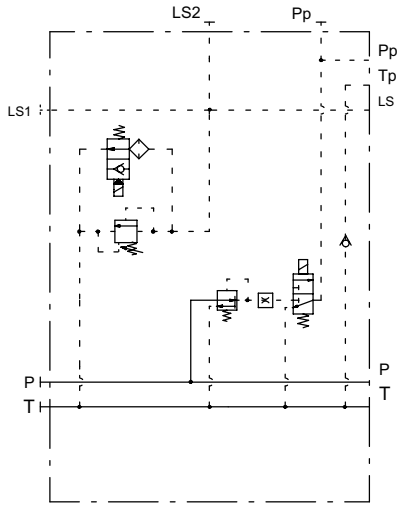
With LS relief valve + LS signal unloading valve



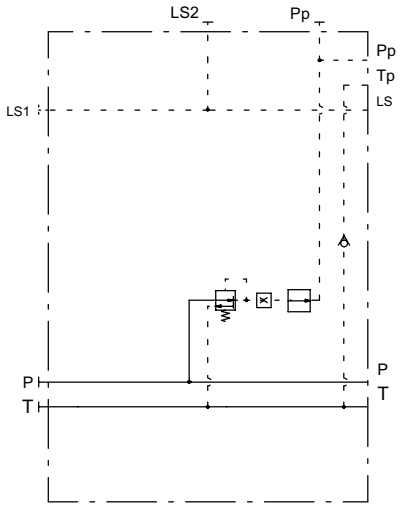
With LS relief valve + LS signal unloading valve + pilot oil supply pressure reducing valve + pilot tank line check valve



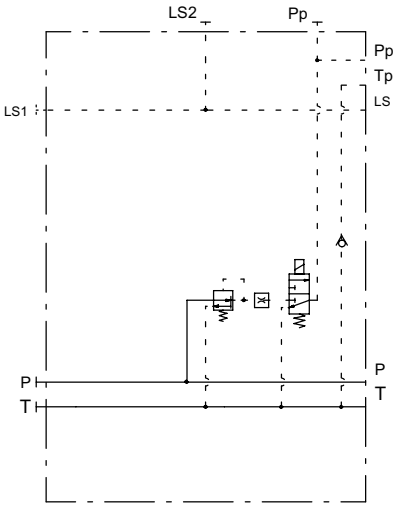
With LS relief valve + LS signal unloading valve + pilot oil supply pressure reducing valve + pilot tank line check valve and cut-off valve



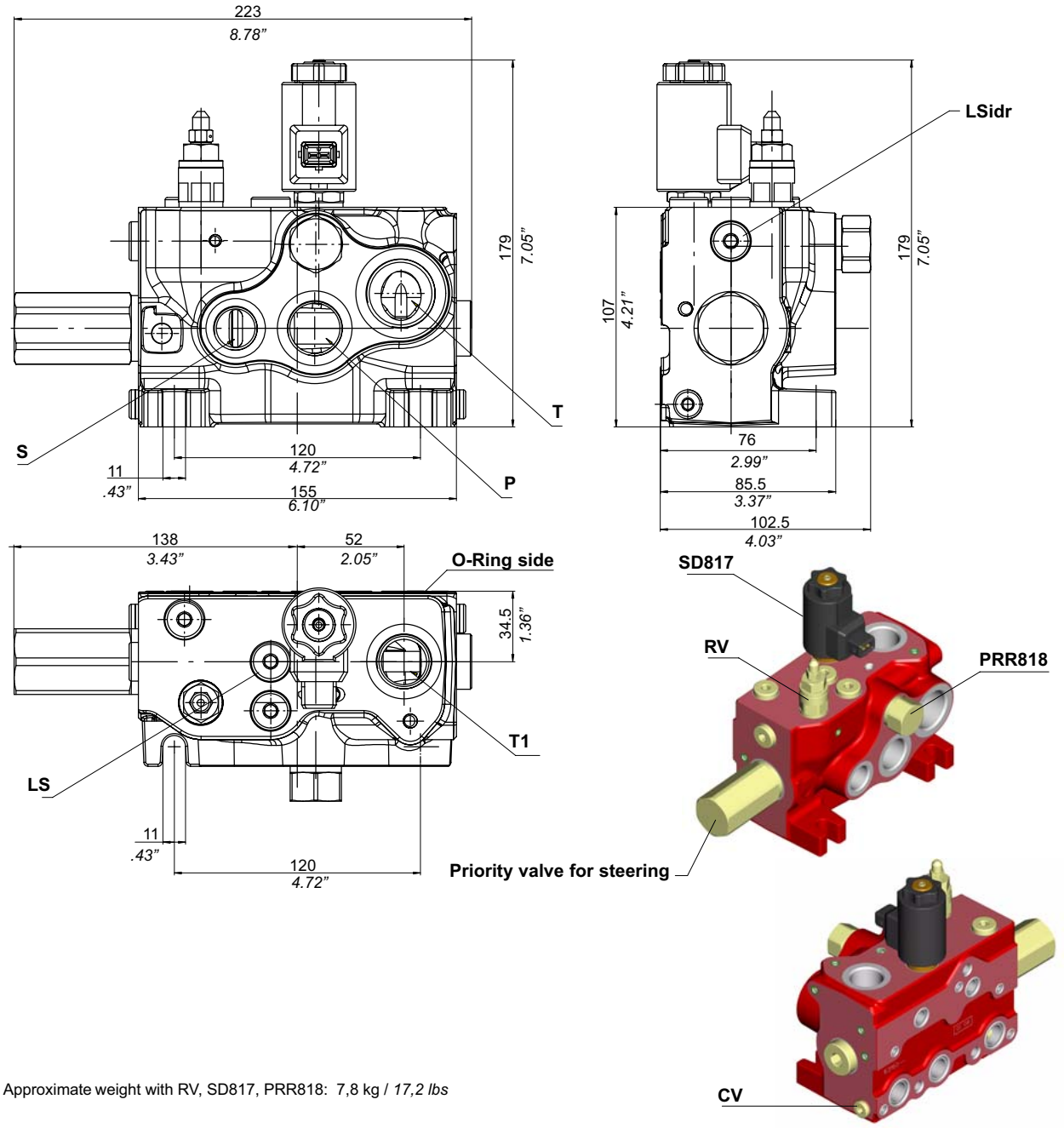
With pilot oil supply pressure reducing valve + pilot tank line check valve



With pilot oil supply pressure reducing valve + cut-off valve + pilot tank line check valve



2.2 Inlet cover with priority for steering



Approximate weight with RV, SD817, PRR818: 7,8 kg / *17,2 lbs*

RV = LS signal adjustable relief valve

CV = pilot tank line check valve

SD817 = pilot oil supply cut-off valve (optional)

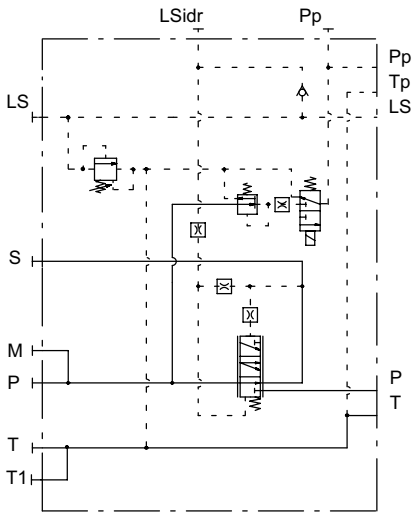
PRR818 = pilot oil supply pressure reducing valve (optional)

2.2.1 Ports size

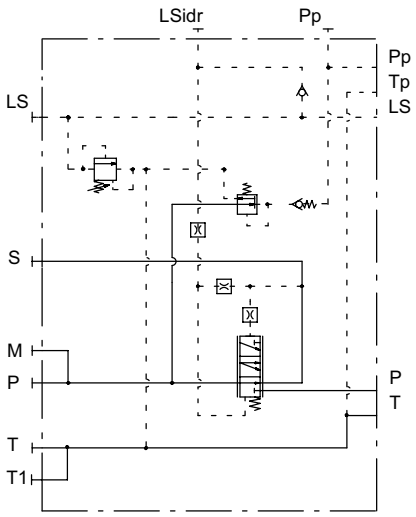
Threads	P	S	T	T1 (optional)	LSidr	LS
BSP	3/4”	1/2”	1”	3/4”	1/4”	1/4”
Metric	M27x2	M22x1,5	M33x2	M27x2	M14x1.5	M14x1.5
UNF	SAE12	SAE10	SAE16	SAE12	SAE6	SAE6

2.2.2 Systems with priority function for steering - Examples

With pilot oil supply pressure reducing and cut-off valves



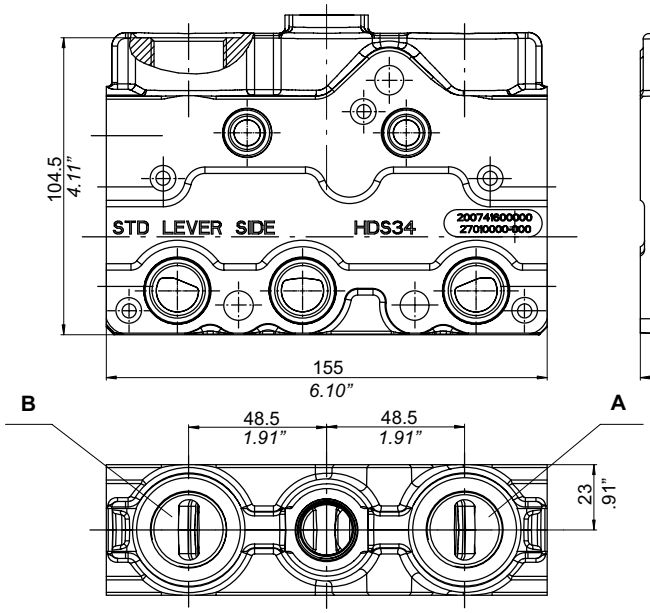
With pilot oil supply pressure reducing valve and check valve (Pp accumulator port)



3 Elements

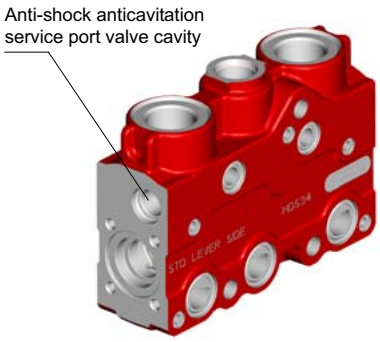
3.1 Local compensator element

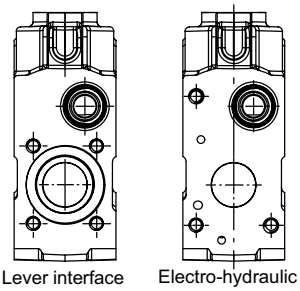
"**KC**": with local compensator (for functions with load holding valves on the cylinder)



Approximate weight with spoil, positioner 349, lever L100, element service port valves and compensator : 4,260 kg / *9,39 lbs*

"**KL**": with local compensator and check function (for functions without load holding valves on the cylinder)



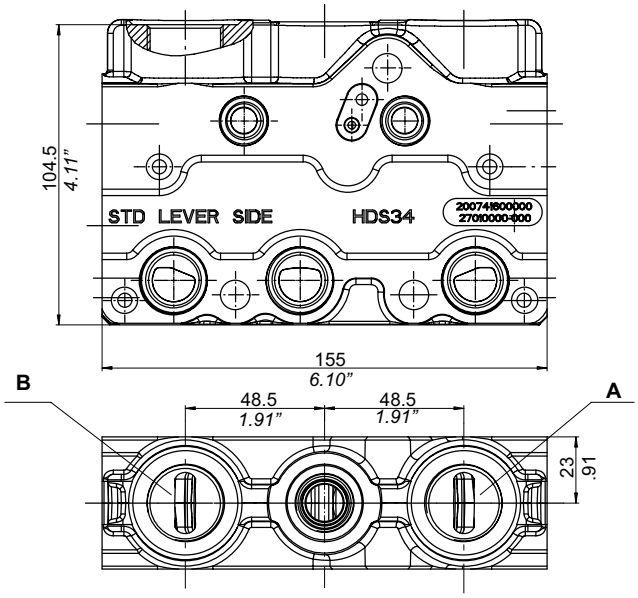


Lever interface "MAN"

Electro-hydraulic interface "EH"

3.2 Local check element:

"**KU**": for functions with load holding valves on the cylinder



Approximate weight with spool, positioner 349, lever L100, service port valves and check valve: 4,260 kg / *9,39 lbs*

"**KD**": for function without load holding valves on the cylinder

Lever interface "MAN"

Electro-hydraulic interface "EH"

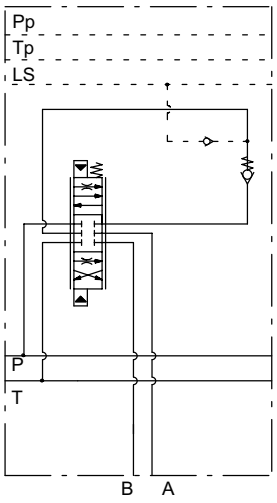
3.3 Ports size

Threads	Standard A/B	On demand
BSP	3/4"	1/2"
Metric	M27x2	M22x1,5
UNF	SAE12	SAE10

3.4 Element hydraulic schemes

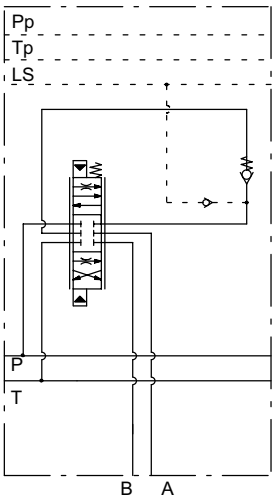
KU

Local check



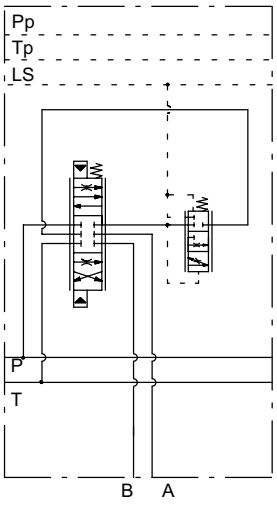
KD

Local check



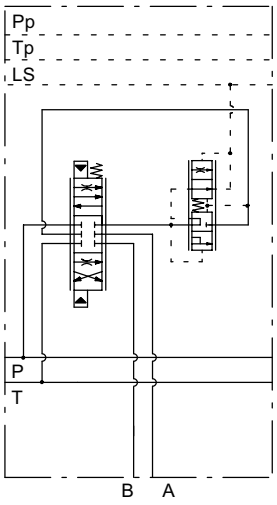
KC

Local compensator

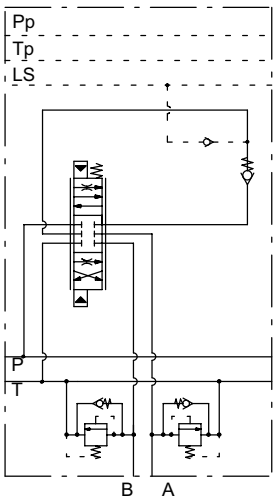


KL

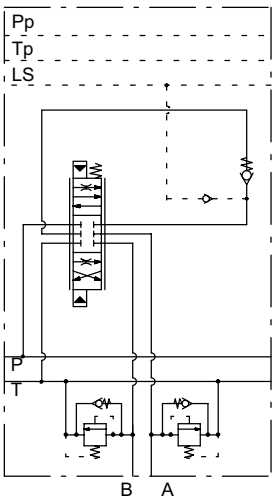
Local compensator + check function



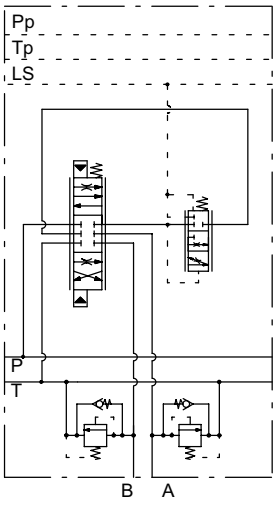
Local check + service port valves



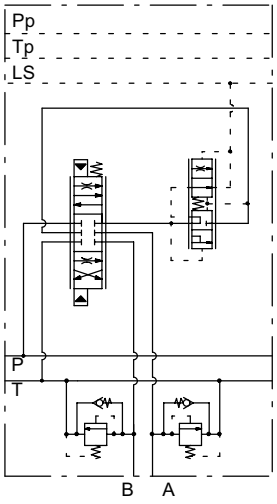
Local check + service port valves



Local compensator + service port valves



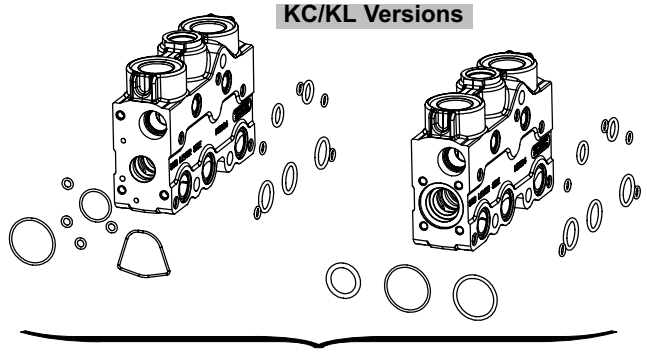
Local compensator + check function + service port valve



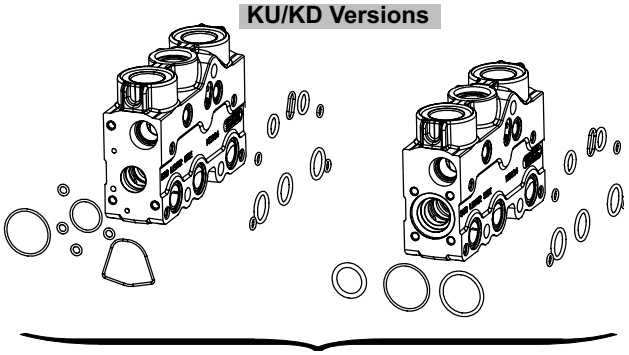
3.5 Seal kit

Seal kit code: 200973801840

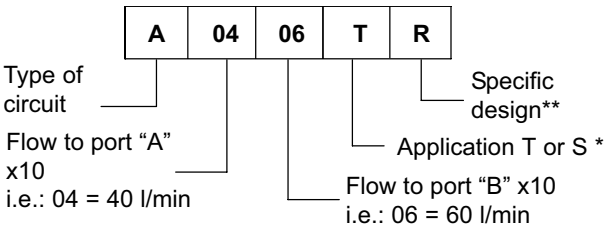
KC/KL Versions



KU/KD Versions



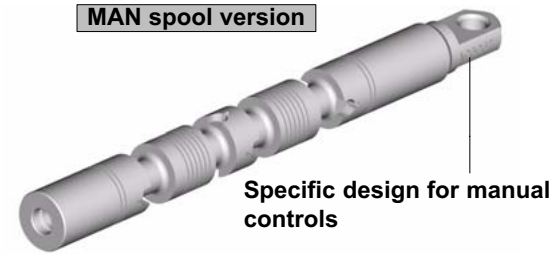
4 Spools



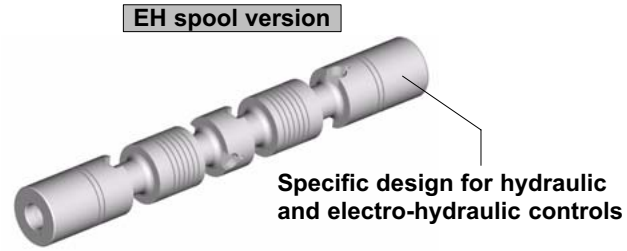
Example of symmetric spool : A1010T
Example of not symmetric spool: A1008T
* **T** = reduced overlap/high metering spools
S = standard overlap - Low leakage spool to be used in applicationswithout load holding valves
** **R** = linear metering with soft start for rotation
M = high metering at the beginning of the stroke
Note: contact our Sales Dept. for any combination in asymmetrical spools

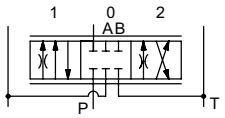
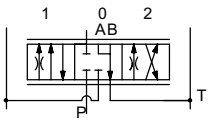
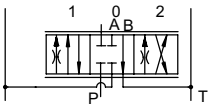
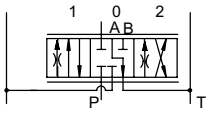
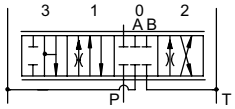
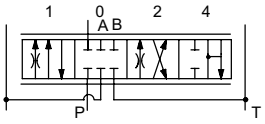
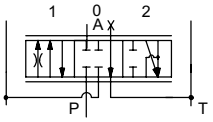
Ref	Nominal Flow (13 bar margin)
02	15 l/min
03	25 l/min
04	40 l/min
06	60 l/min
08	80 l/min
10	100 l/min
12	120 l/min
15	150 l/min

MAN spool version



EH spool version

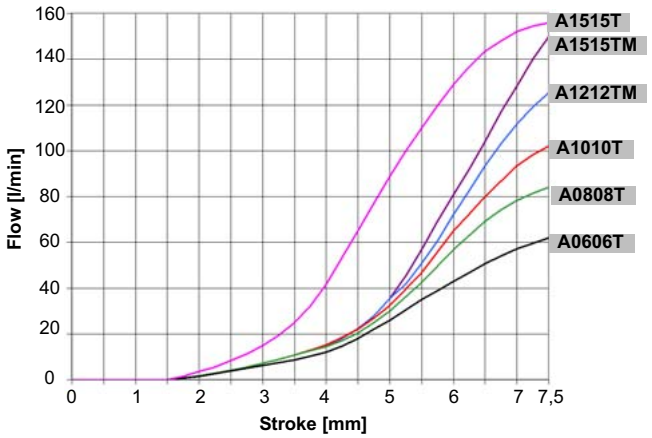


Spool Type	Hydraulic schematic	Features
A		A/B ports closed to tank
C		A/B ports connected to tank - Motor spool
D		B port connected to tank A port closed
L		A port connected to tank B port closed
Z		Floating positions pulling the spool
W		Floating positions pushing the spool
S		Single effect

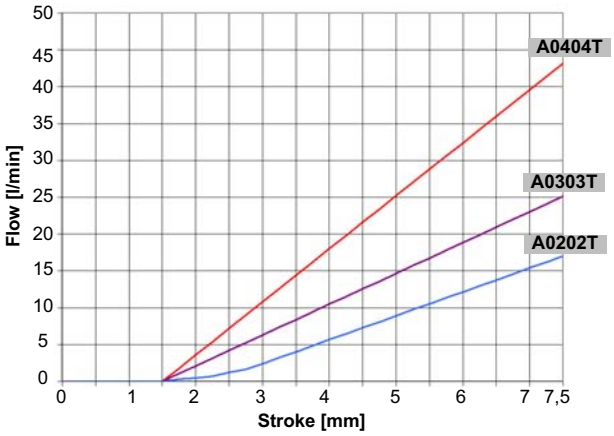
4.1 Spools metering

The metering curves have been recorded with the standard pressure margin of 13 bar

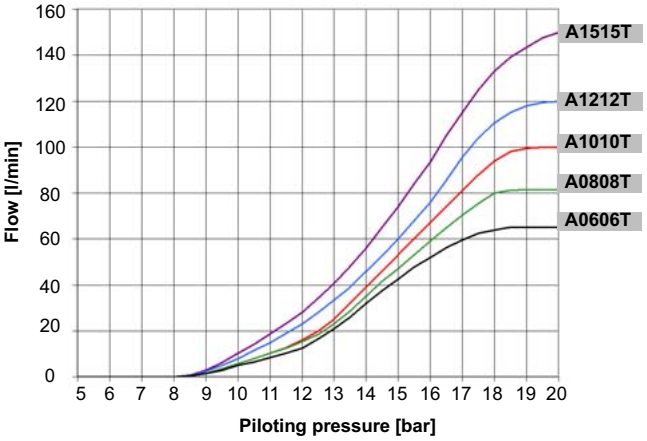
Manual spools: T/M



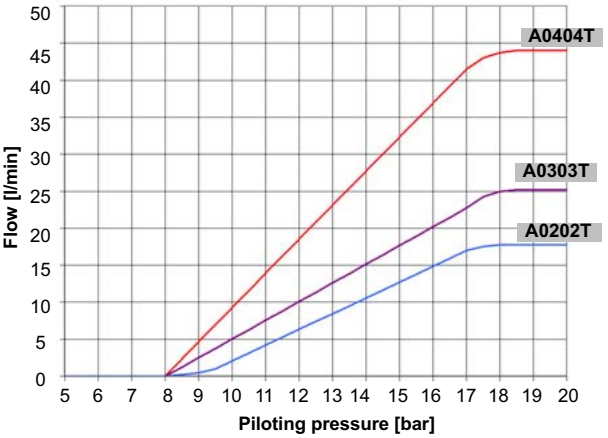
Manual spools: T/TR



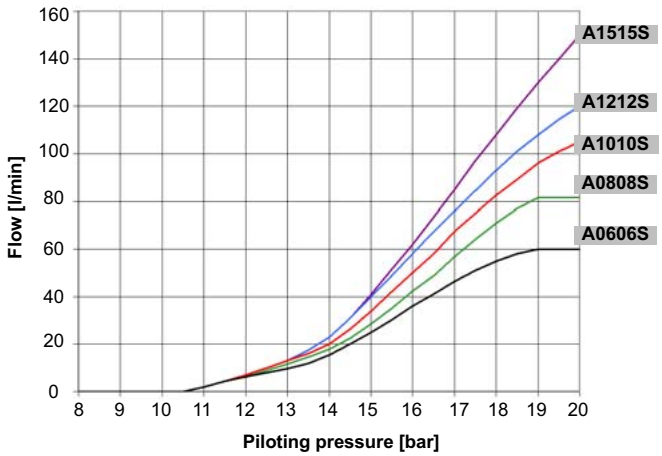
Hydraulic proportional spools: T - EH POS 50-51-52



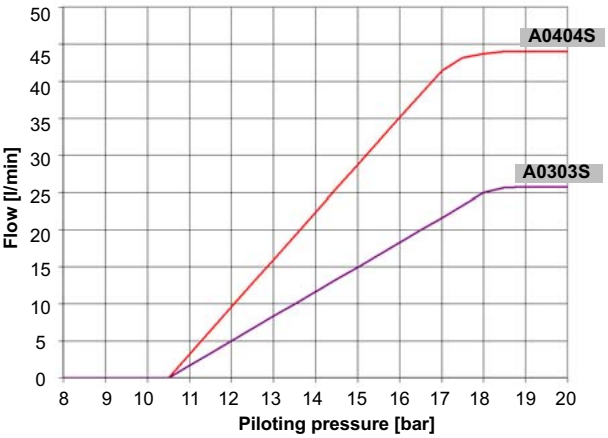
Hydraulic proportional: T/TR - EH POS 50-51-52



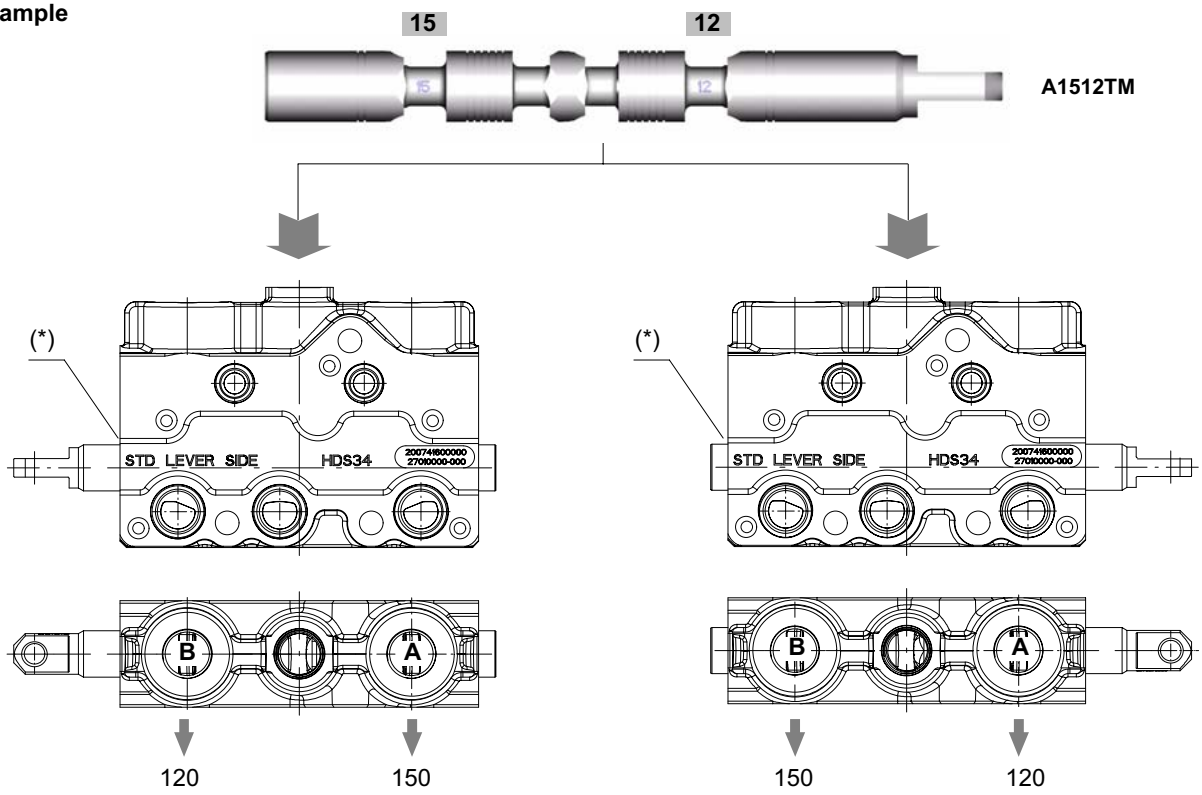
Hydraulic proportional spools: S - EH POS 50-51-52



Hydraulic proportional: S - EH POS 50-51-52



Not symmetric spool assembling
Example



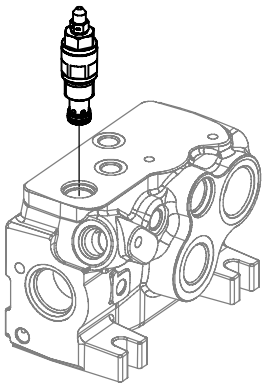
EL.34KC203A1512T.... **EL.34KC203A1215T....**

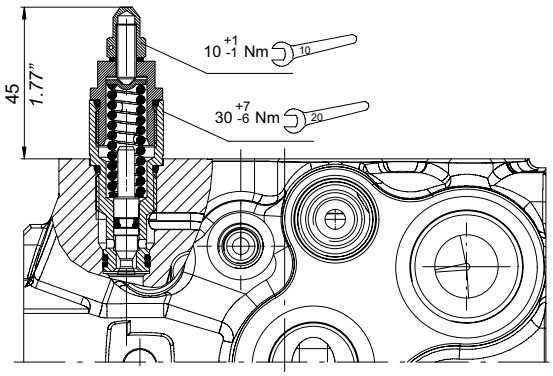
B port is always on the standard lever side printed on the body (*)

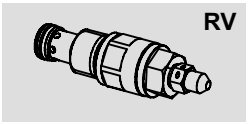
Note: Contact Sales Dept. for any desired combination

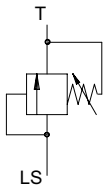
5 Valves

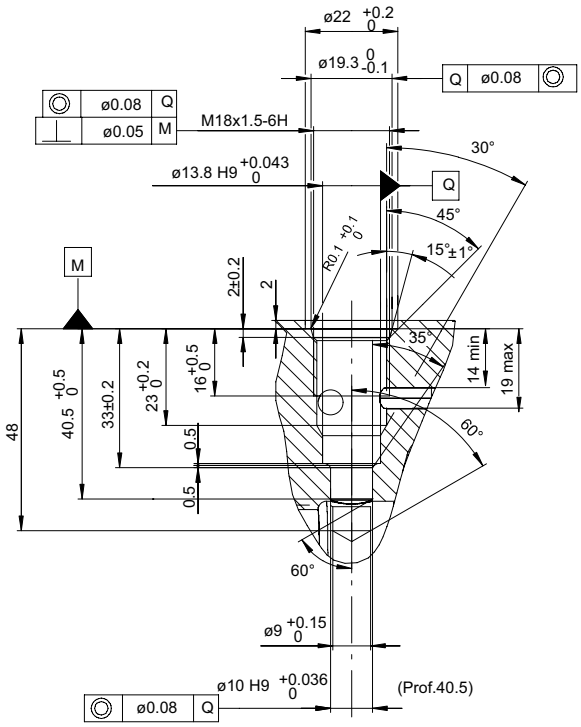
5.1 LS signal adjustable relief valve



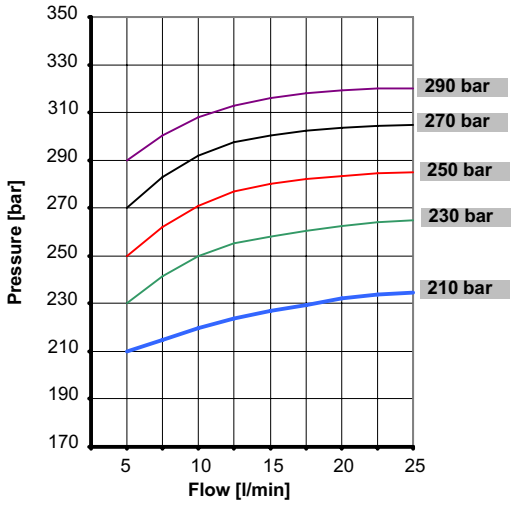




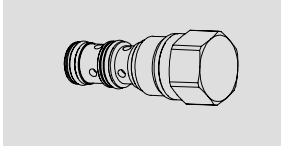


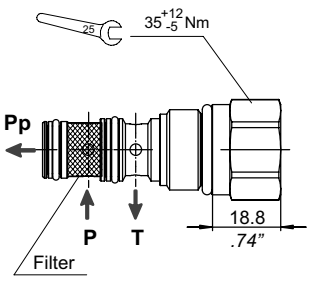


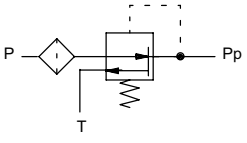
Pressure setting range bar (PSI)	Type	Code
150 - 300 (2170 - 4300)	**RV****	200787403281



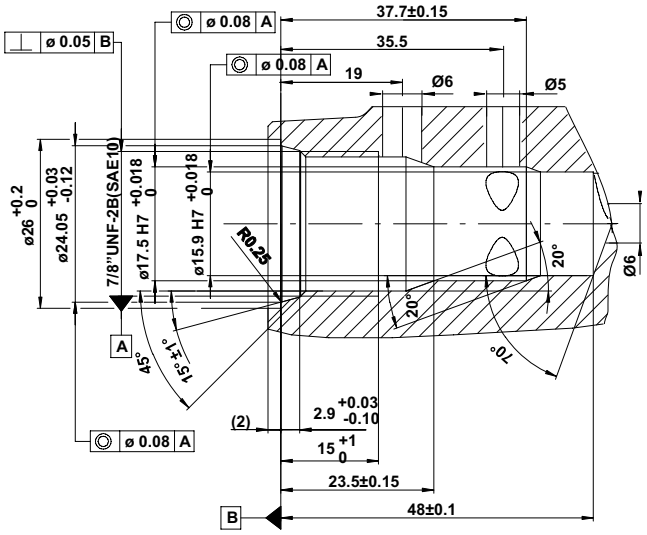
5.2 Pressure reducing valve PRR818



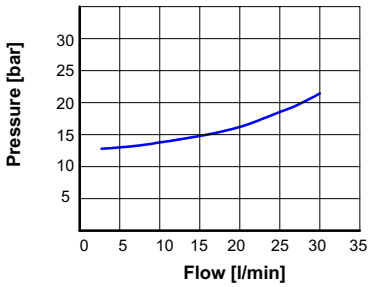




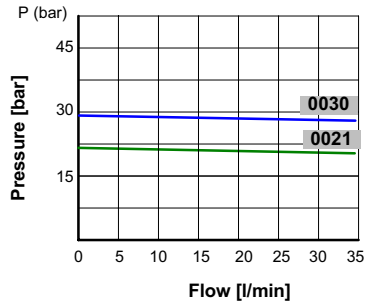
Type	Code	Works in combination with
VALV PRR818/21-F	200533930076	EHC positioner
VALV PRR818/30-F	200533930075	EHO positioner



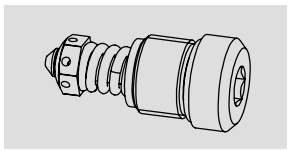
A → T

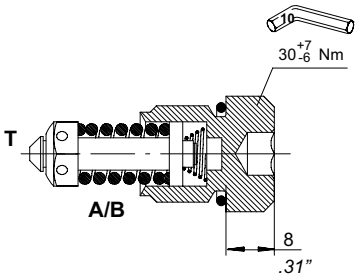


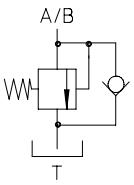
P → A

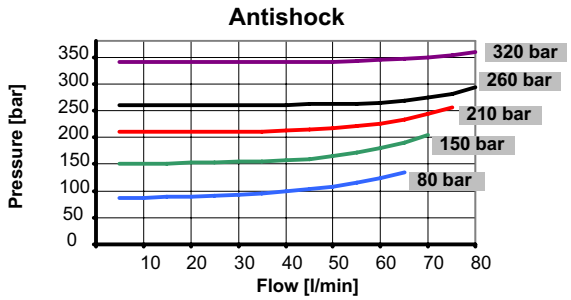


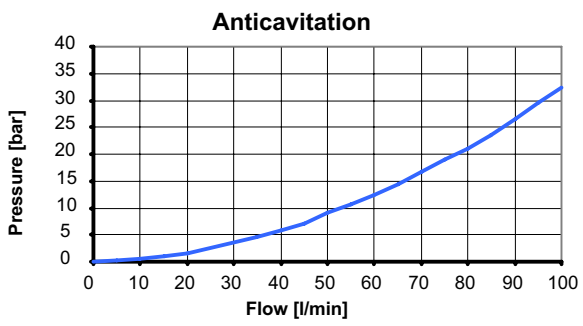
5.3 Anti-shock and anti-cavitation valves UC











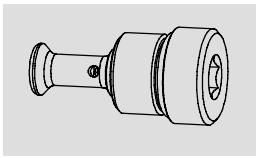
Pressure setting bar *(PSI)*	Code
40 *(580)*	200533930068
60 *(870)*	200533930077
80 *(1160)*	200533930050
130 *(1880)*	200533930057
140 *(2030)*	200533930059
150 *(2170)*	200533930051
160 *(2320)*	200533930067
170 *(2460)*	200533930071
180 *(2610)*	200533930056
200 *(2900)*	200533930060
210 *(3000)*	200533930080
220 *(3190)*	200533930064
230 *(3330)*	200533930058
250 *(3620)*	200533930052
260 *(3750)*	200533930065
270 *(3900)*	200533930066
280 *(4050)*	200533930053
290 *(4200)*	200533930069
320 *(4600)*	200533930054
340 *(4900)*	200533930055
VC (plug)	200778400310

IMPORTANT!: The UC anti-shock valve is designed to absorb shock effects. Therefore, it should not be used as pressure relief valve

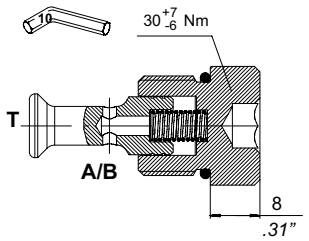
The dedicated cavity is machined on request only

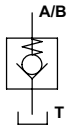
For the cavity see chapter 5.1

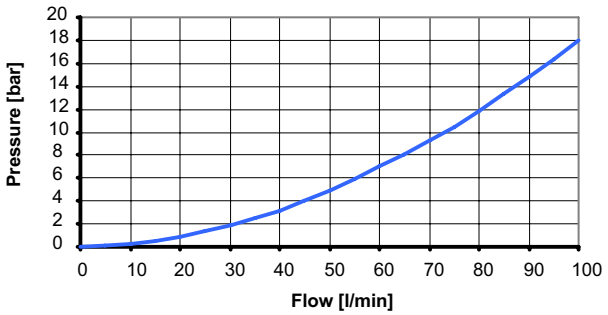
5.4 Anti-cavitation valves C



Type	Code
C	200787602560
VC (plug)	200778400310

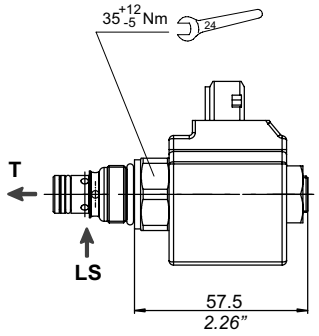


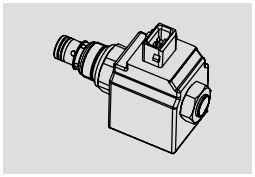


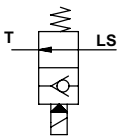


The dedicated cavity is machined on request only
For the cavity see chapter 5.1

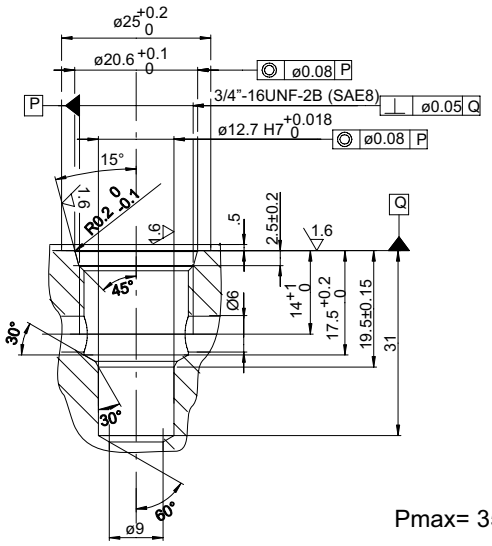
5.5 LS signal normally open unloading valve (SPF)





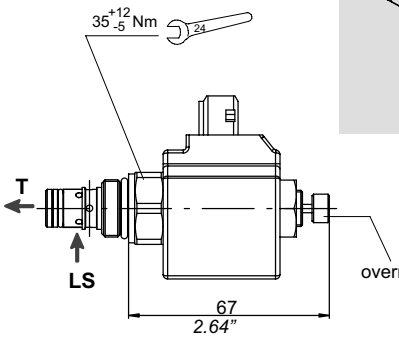


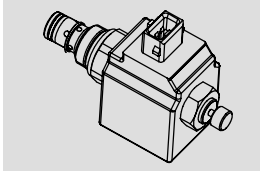
Voltage	Mechanical part only	Solenoid
12 VDC	200542300012	200541210032
24 VDC		200541220033

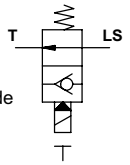


Pmax= 350 bar

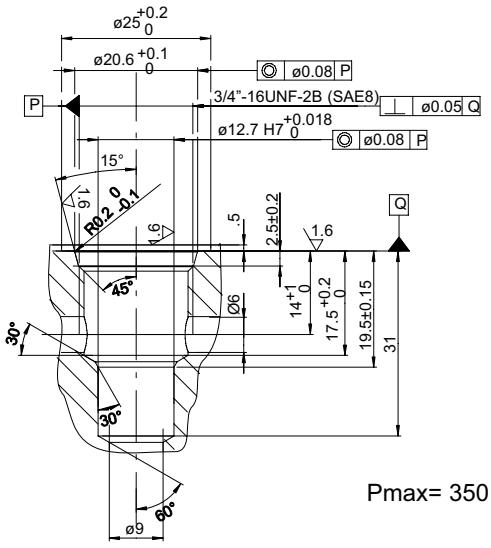
5.6 LS signal normally open unloading valve with manual override (SPE)





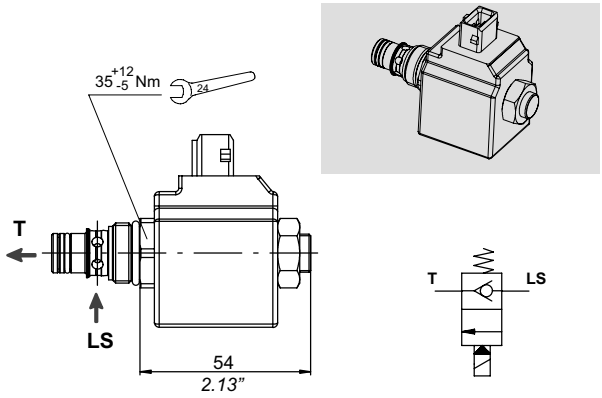


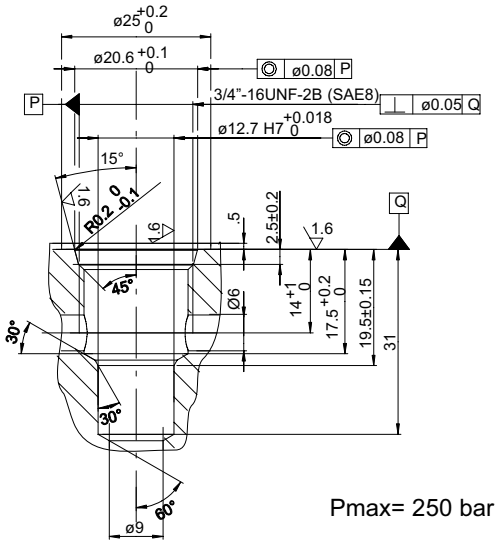
Voltage	Mechanical part only	Solenoid
12 VDC	200542300013	200541210032
24 VDC		200541220033



Pmax= 350 bar

5.7 LS signal normally closed unloading valve (SPF normally closed)

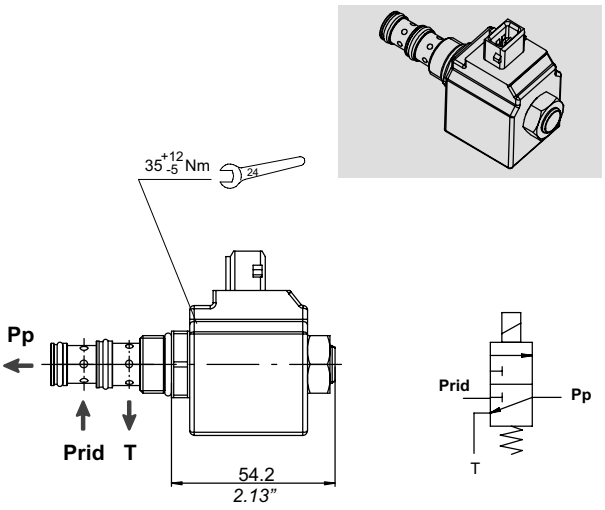


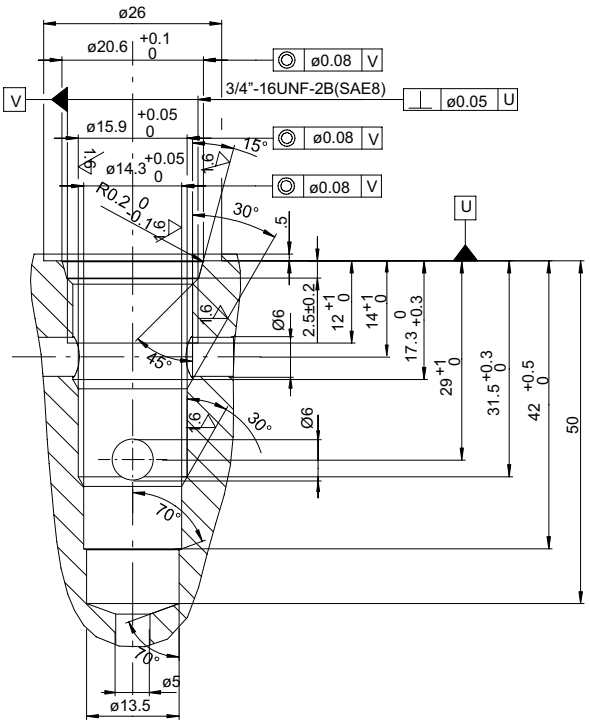


Pmax= 250 bar

Voltage	Mechanical part only	Solenoid
12 VDC	**200542300014**	200541210032
24 VDC		200541220033

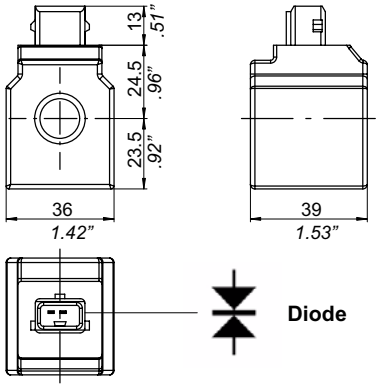
5.8 Pilot oil supply cut-off valve





Voltage	Type	Mechanical part only	Solenoid Code
12 VDC	**SD817/3CN**	200542310010	200541210032
24 VDC			200541220033

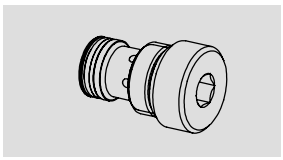
5.9 Coils for solenoid valves

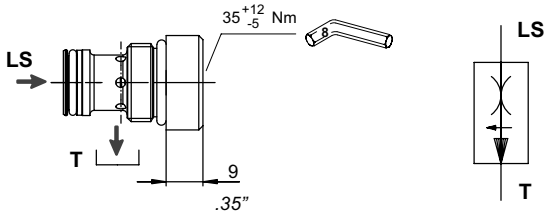


Wire class	H (VDE0580)
Coil insulation	F- IP65 (DIN40050)
Duty rating	ED 100%
Connector style	AMP 84-9419
Bi-directional diode	P6 K E33 CA
Voltage tolerance	± 10%
Weight	0,19 Kg

Supply voltage	Nominal coil voltage	Power (Watt)	Resistance (Ohm) Ambient Temperature	Current (Ampere) Ambient Temperature	Coil Code
12 V DC	12	21	6.85	1.75	200541210032
24 V DC	24	21	27	0.78	200541220033

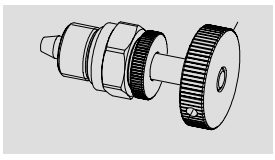
5.10 LS signal flow compensated drain valve (VRC)

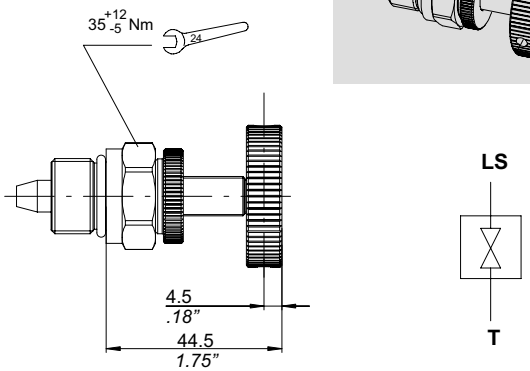




Type	Code
VALV VRC D. 0,7	200787202100

5.11 LS line manual shut-off valve (NV1)

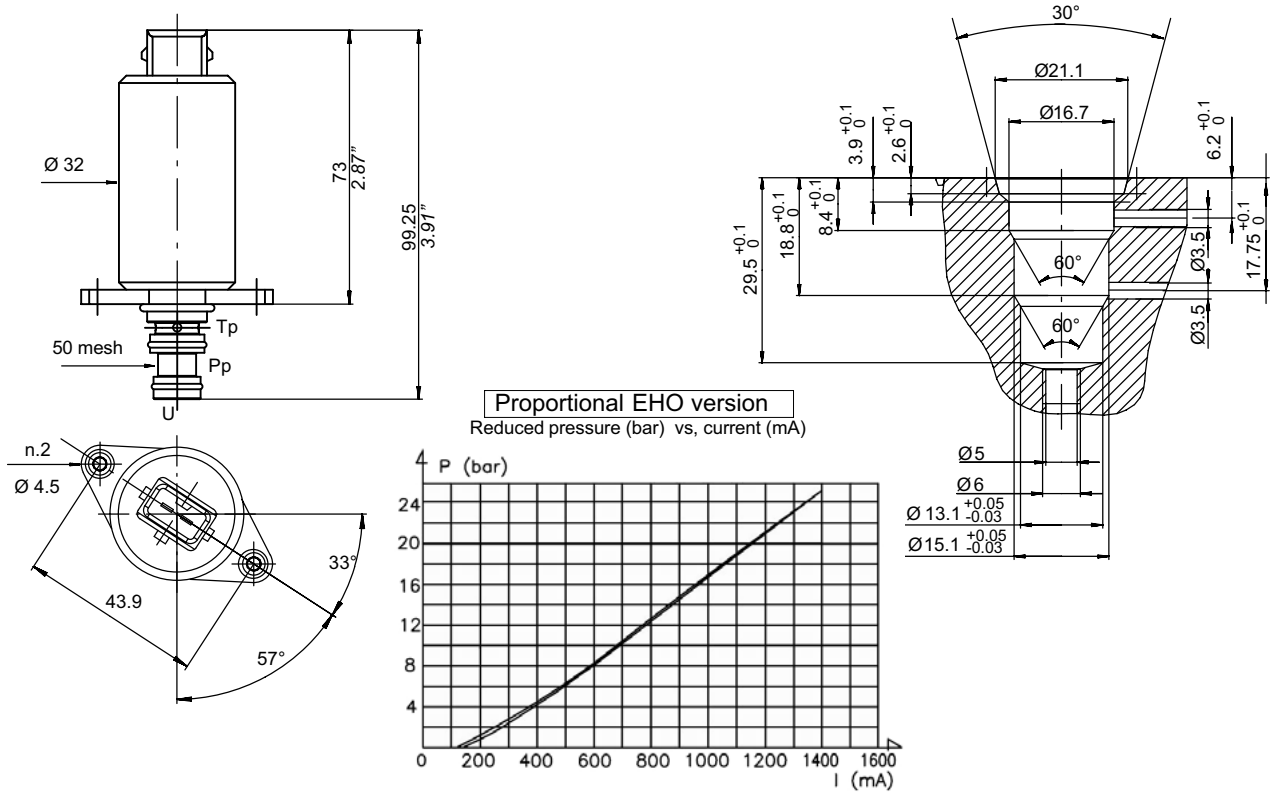


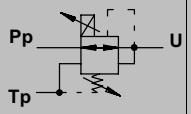
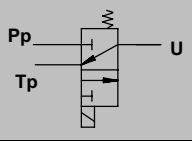


Type	Code
VALV NV1	200787602970

To close the LS signal drain line only when the valve is fed through a hand pump (emergency function) . Supplied normally open. Approximately 4 turns to close.

5.12 Proportional pressure reducing valve / ON-OFF directional valve



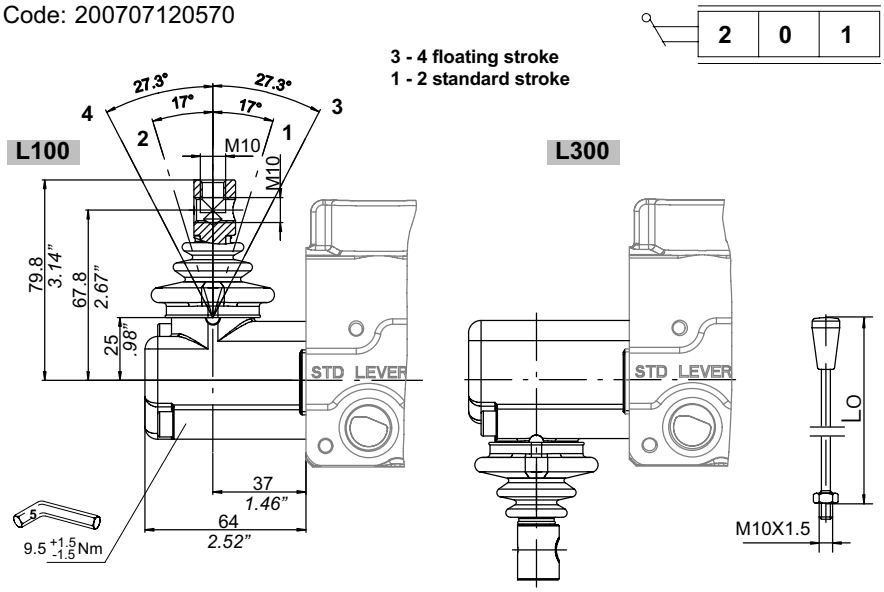
Electro-hydraulic specifications		
	Proportional 	**ON-OFF** 
Nominal flow rate	4 l/min *(1 GPM)*	6 l/min *(1.5 GPM)*
Max inlet pressure	35 bar *(500 PSI)*	
Rated supply voltage	12 VDC ±10%	
Current supply characteristic	PWM (Pulse width modul.)	-
Superimposed dither frequency	100 to 150 Hz	-
Degree of protection	IP67	
Max power consumption	11 W	20 W
Coil resistance	5.4 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	BLACK
Code (*)	200533960004	200533940075

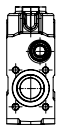
(*) nr. 2 screws M4x12 are not included

6 Levers

6.1 Standard lever group

Code: 200707120570

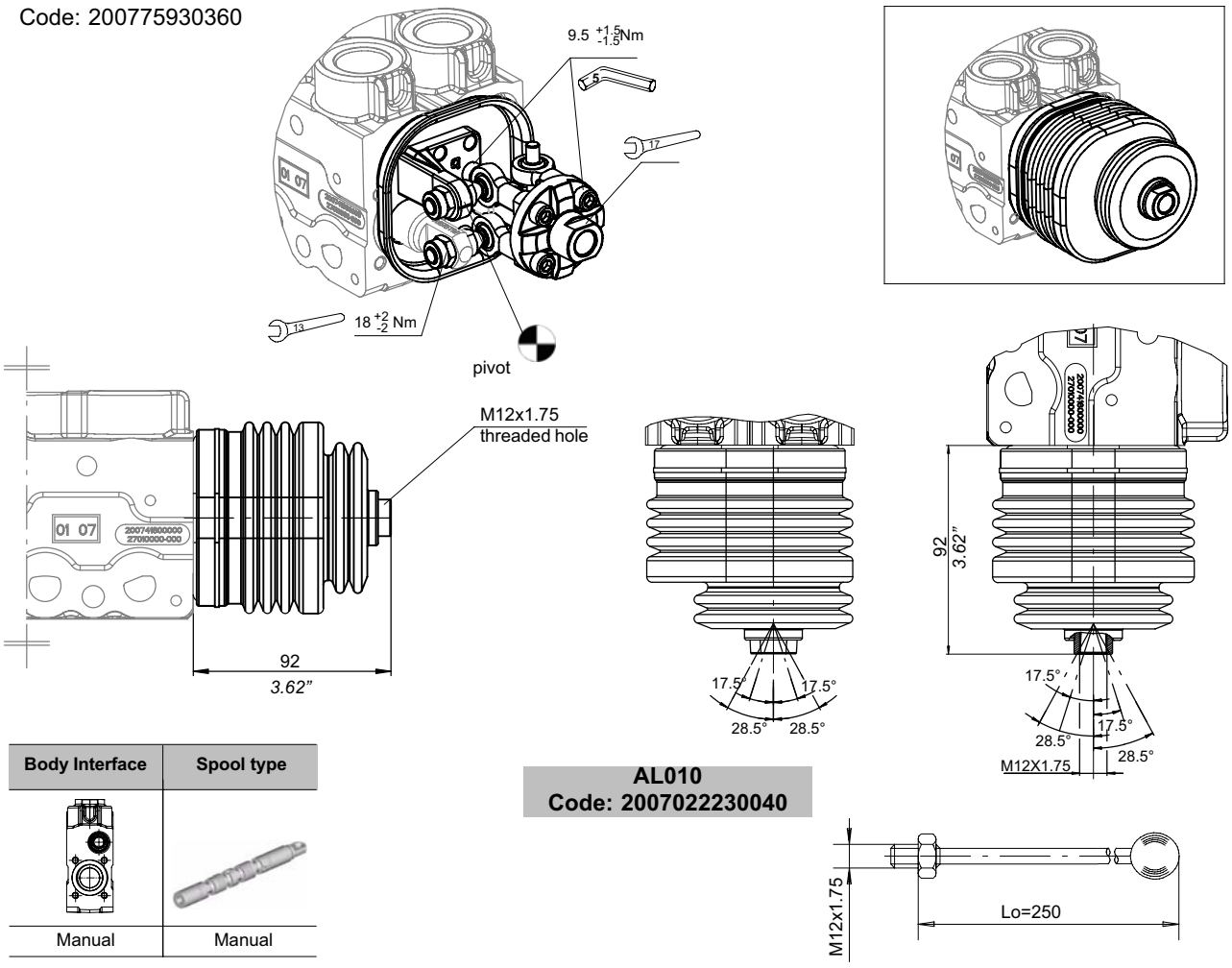


Body Interface	Spool type
	
Manual	Manual

Lo		Type	Code
mm	inches		
185	7.28	**AL001**	200702220010
250	9.84	**AL002**	200702220030
300	11.81	**AL003**	200702220040
350	13.78	**AL004**	200702220050

6.2 Manual joystick control

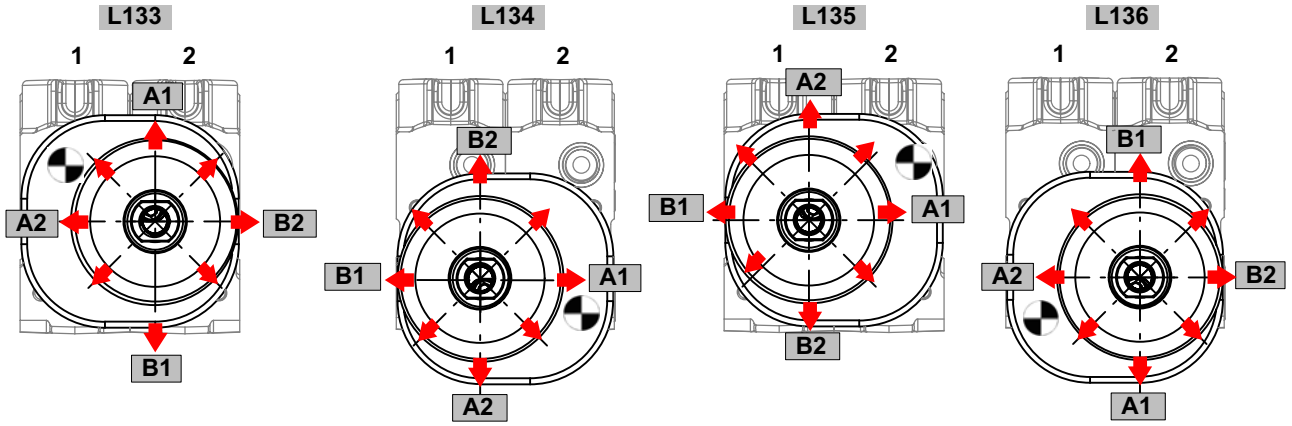
Code: 200775930360

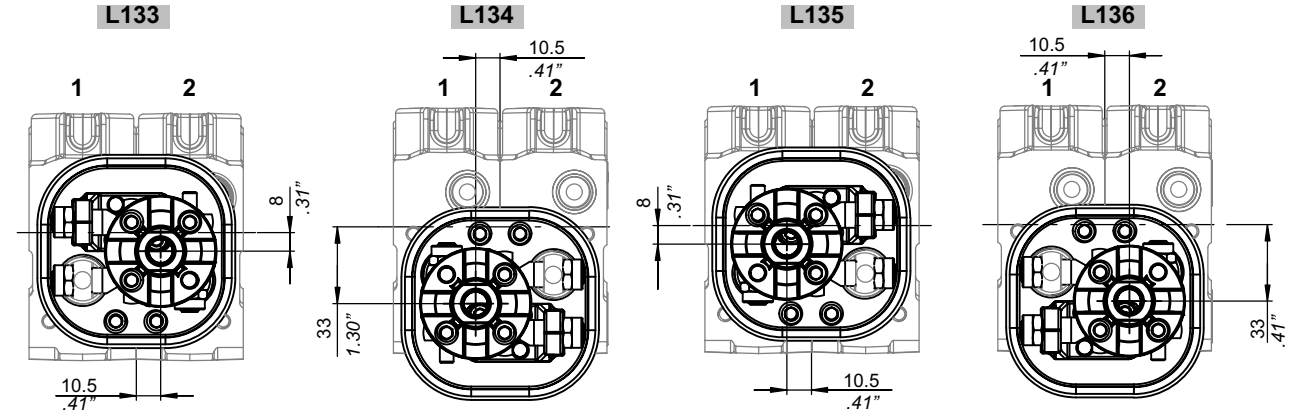


Body Interface	Spool type
Manual	Manual

AL010
Code: 2007022230040

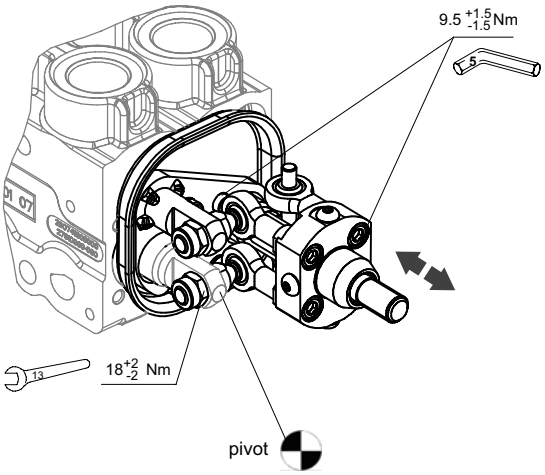
Pivot

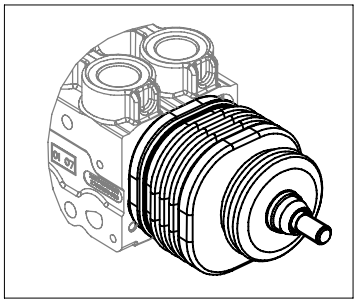

L133
1
2
A1
A2
B2
B1
L134
1
2
B2
B1
A1
A2
L135
1
2
A2
B1
A1
B2
L136
1
2
B1
A2
B2
A1

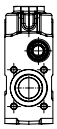

L133
1
2
8
.31"
10.5
.41"
L134
10.5
.41"
1
2
33
1.30"
L135
1
2
8
.31"
10.5
.41"
L136
10.5
.41"
1
2
33
1.30"

6.3 Joystick control L260-460 with integrated locking system

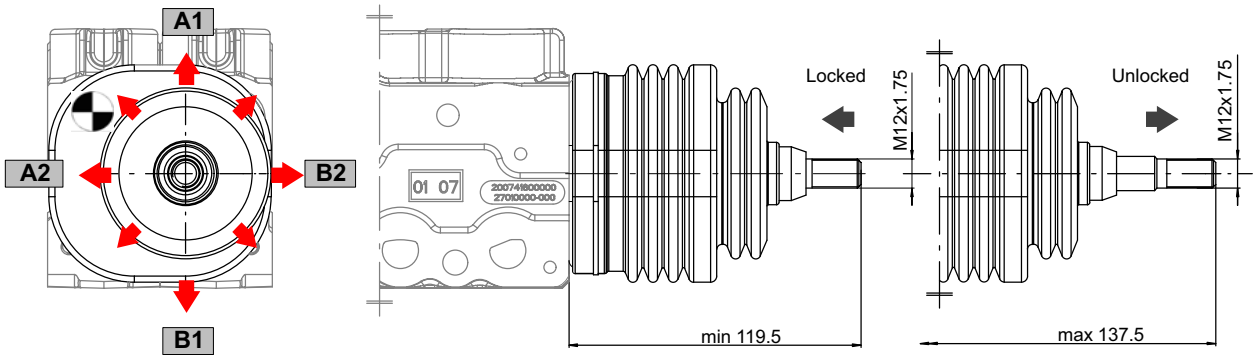
Code: 200775930400



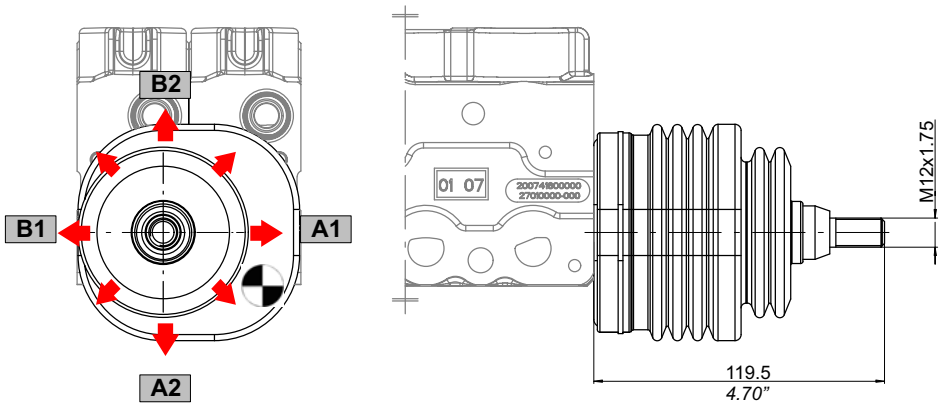


Body Interface	Spool type
	
Manual	Manual

L260



L460

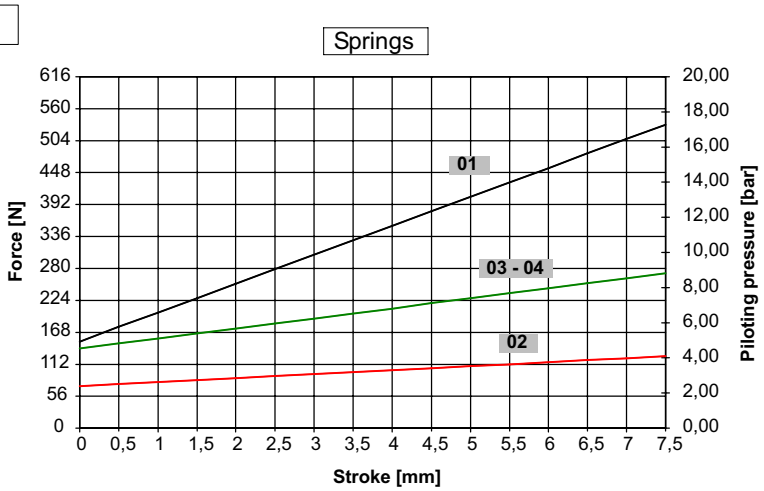


6.4 Pressurised positioner and lever (EHO - EHC functions)

L	P	0	3
L			

0 = without lever adaptor
P = with lever adaptor
A = with lever adaptor and adjustable stroke

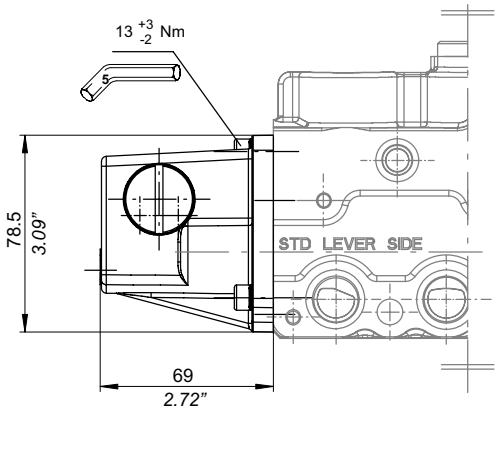
Type:
01 = in combination with EHO positioner
02 = in combination with EHC positioner
03 = in combination with EHC positioner
Suggested in combination with SD817
04 = in combination with EHC positioner
predisposed for lever adaptor (not included)

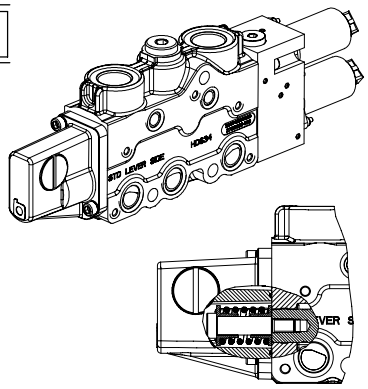


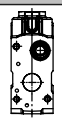
6.4.1 Pressurised cap type L0**

Code L001: 200707190300 (EHO)
Code L002: 200707190310 (EHC)
Code L003: 200707190320 (EHC)

2	0	1



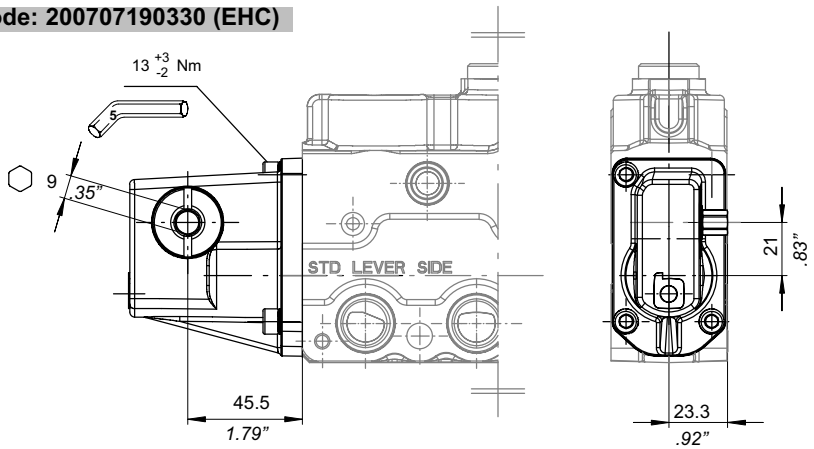


Body Interface	Spool type
	
Electro-hydraulic	EH

6.4.2 Pressurised cap LP04- Predispose for lever adaptor (not included)

Code: 200707190330 (EHC)

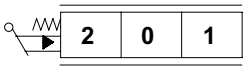
2	0	1



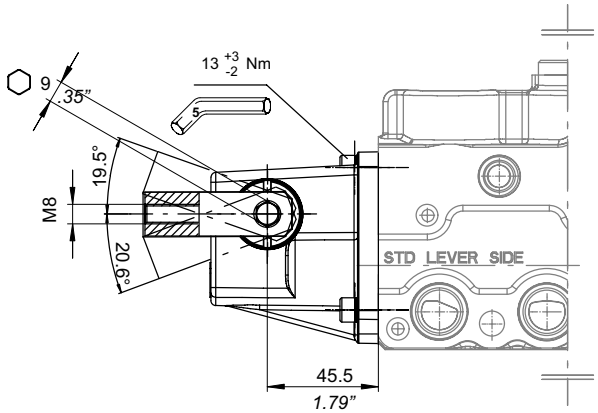
Body Interface	Spool type
	
Electro-hydraulic	EH

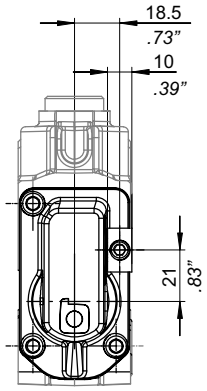
6.4.3 Pressurised cap LP** - With lever adaptor

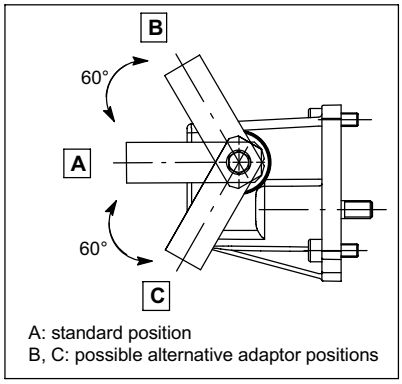
Code LP01: 200707110350 (EHO)
Code LP02: 200707110370 (EHC)
Code LP03: 200707110390 (EHC)



Body Interface	Spool type
	
Electro-hydraulic	EH

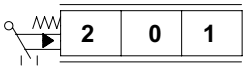


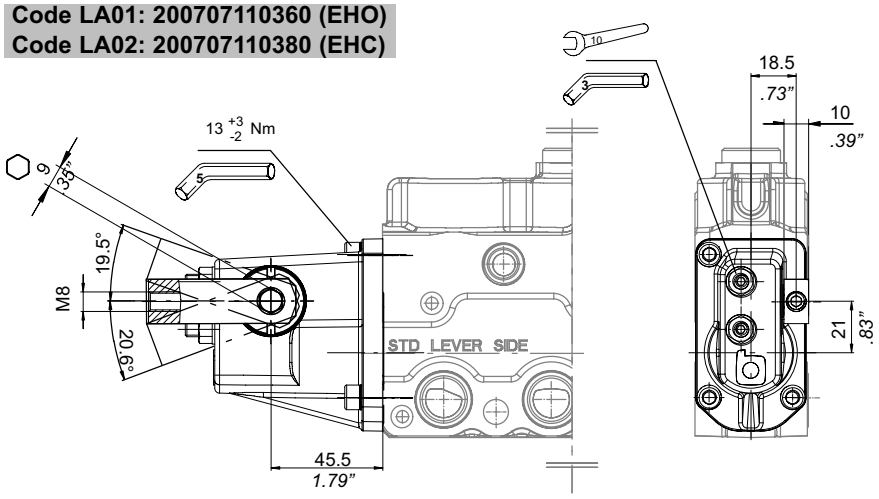


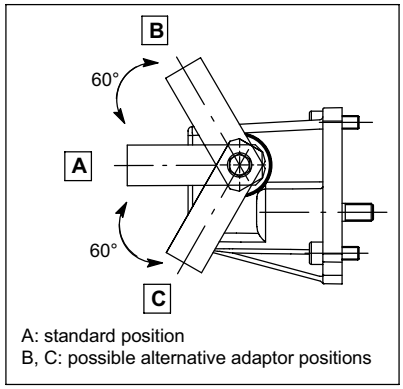


6.4.4 Pressurised cap LA** - With lever adaptor + adjustable spool stroke

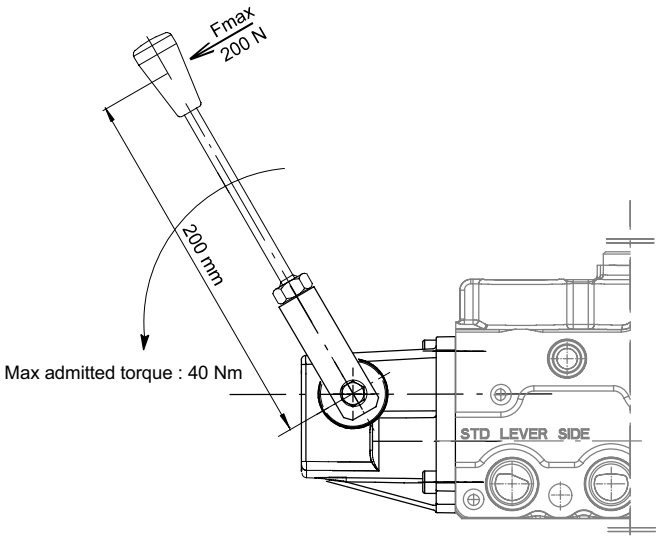
Code LA01: 200707110360 (EHO)
Code LA02: 200707110380 (EHC)

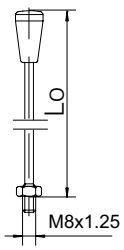






6.4.5 Max admitted lever force/torque for all the lever versions

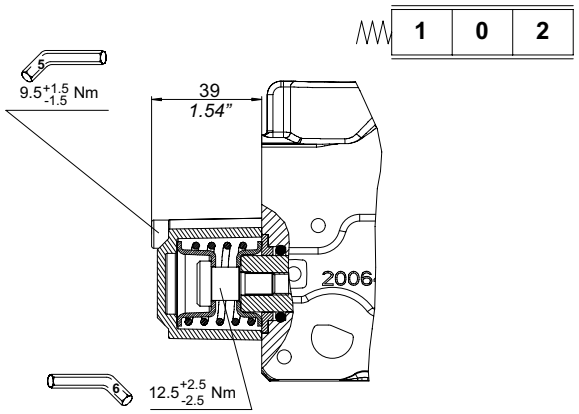


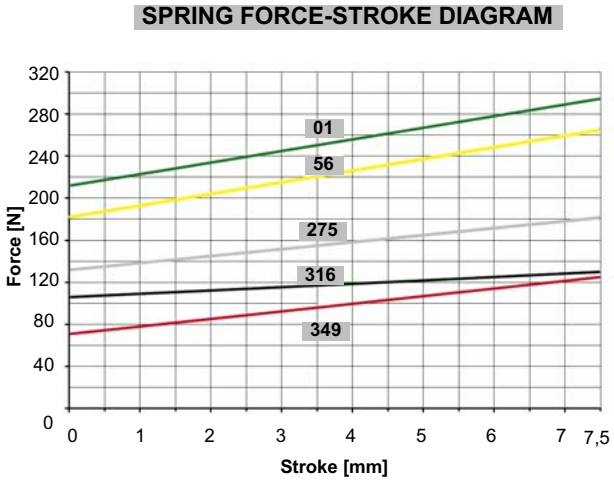


Lo		Type	Code
mm	inches		
150	5.90	**AL001**	200702210190
200	7.87	**AL002**	200702210030
250	9.84	**AL003**	200702210050
300	11.81	**AL004**	200702210060

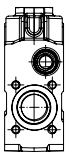
7 Positioners

7.1 Spring return to neutral position

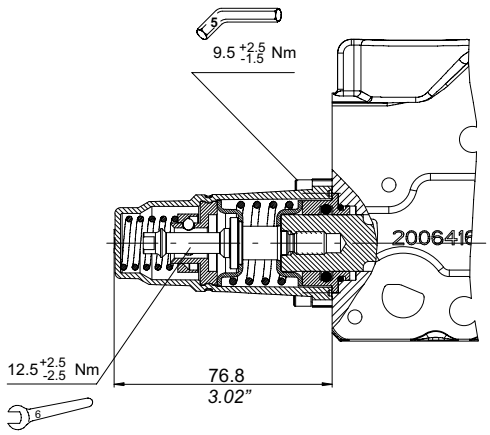


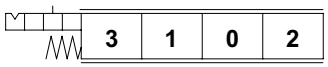


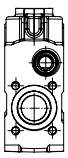
Type	Code	Spring	Colour
349	200768611811	200662402330	RED
316	200768611681	200662402430	BLACK
56	200768610861	200662402410	YELLOW
01	200768610021	200662402460	GREEN
275	200768611331	200662402450	WHITE

Body Interface	Spool type
	
Manual	Manual

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



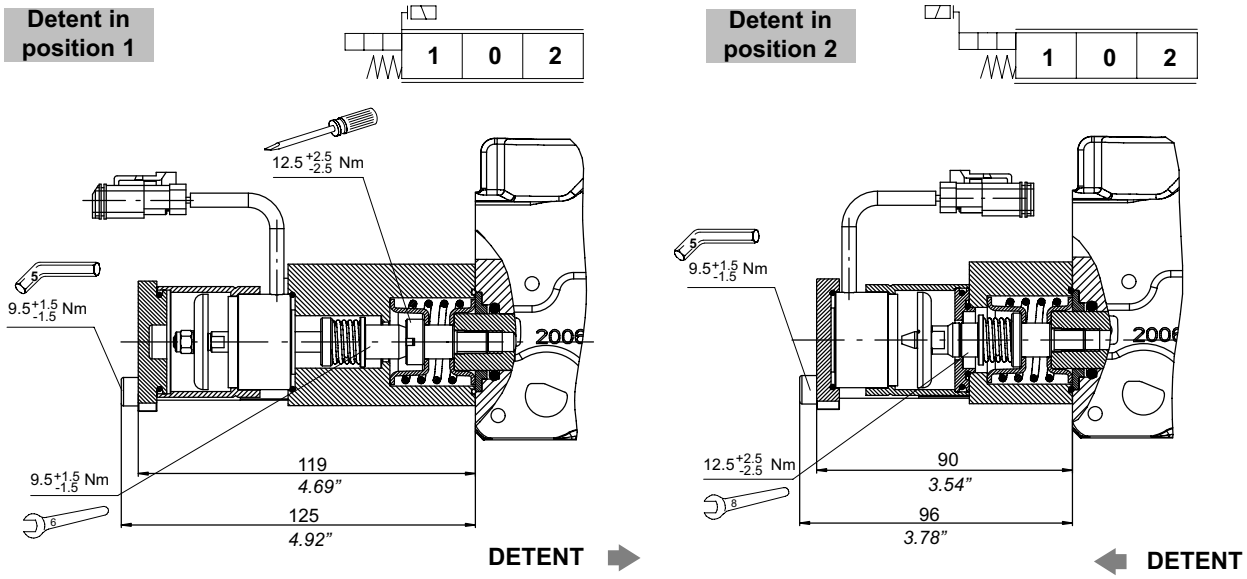


Body Interface	Spool type
	
Manual	Manual

Type	Code	Main spring	Detent spring
04	200768640780	RED	BLACK

7.3 Electro-magnetic detent (EMD)

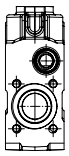
A pre-feeling (force increase) signals the operator that the detent position is going to be engaged



7.3.1 Operating features

COIL

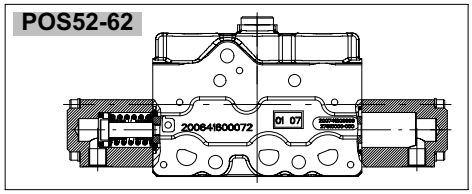
Nominal voltage: 12 VDC ± 10%
Power rating: 7 W
Electrical resistance when holding (20°C): 21 ± 1.5 Ohm:
Min. solenoid axial hold force: 260 N
Duty cycle: 100%
Standard cable length: 500 mm

Body Interface	Spool type
	
Manual	Manual

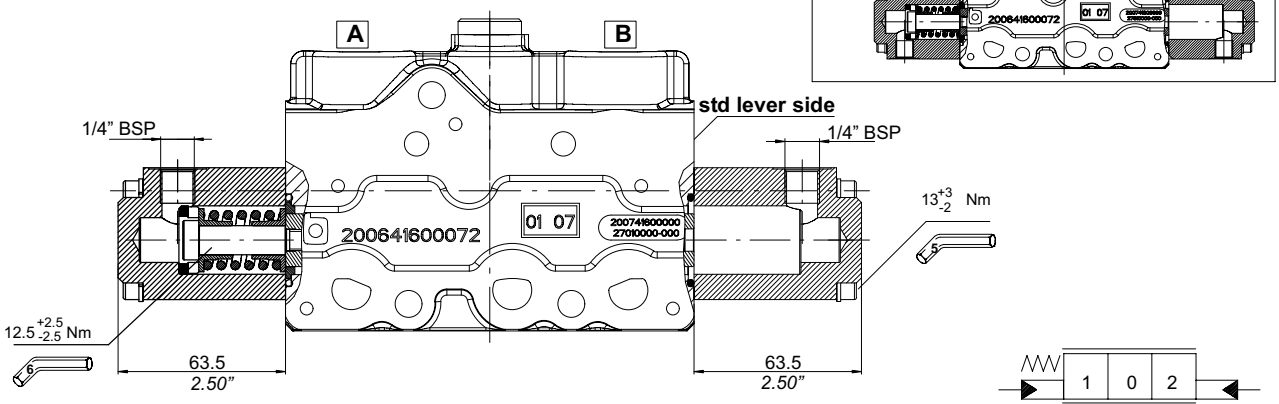
Type	Code	Spring	Voltage	Min. holding force	Connector	Detent position
336	200768670120	RED	12 VDC	137 N	DEUTSCH DT06-2S	2
363	200768670130	RED	12 VDC	137 N	DEUTSCH DT06-2S	1

7.4 Hydraulic controls

POS52-62



POS50-60



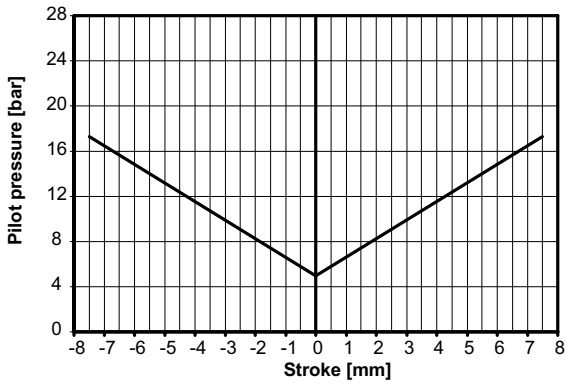
Type	Code
50-52	200768650590
60-62	200768650620

Pmax= 30 bar (*430 PSI*)

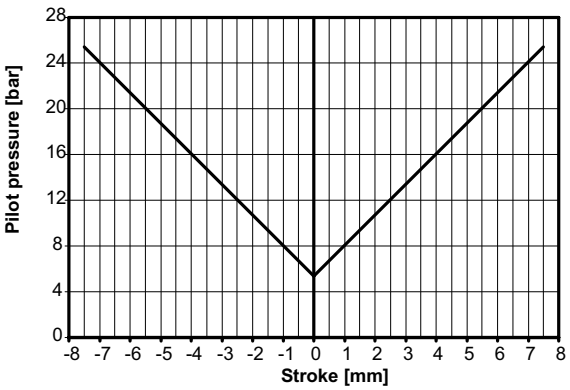
Body Interface	Spool type
	
Manual	EH

The metering area depends on the type of spool (see metering curves 4.1)

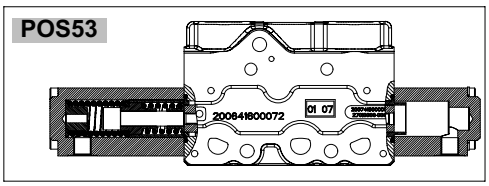
POS50-52

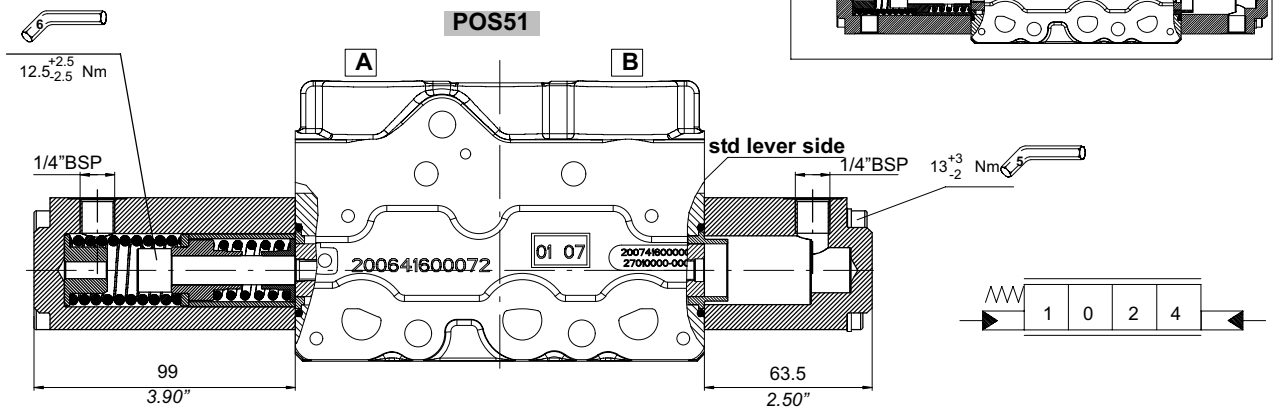


POS60-62



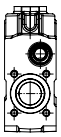
7.5 Hydraulic control + floating position

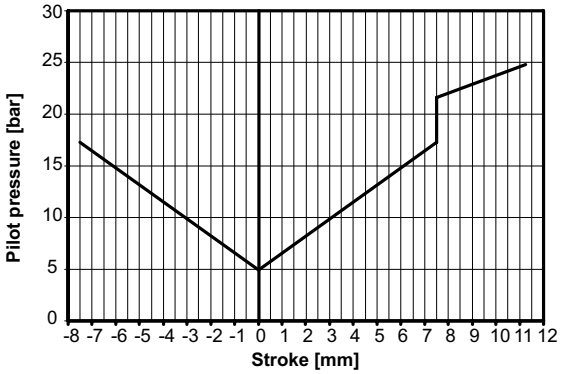




Type	Code
51-53	200768650600

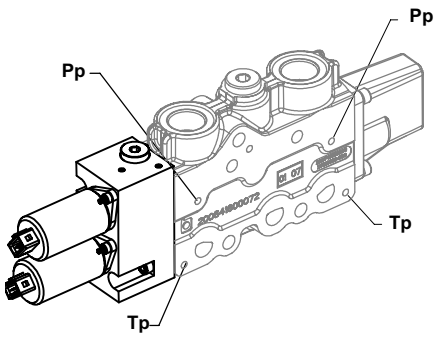
Pmax= 30 bar (*430 PSI*)

Body Interface	Spool type
	
Manual	EH

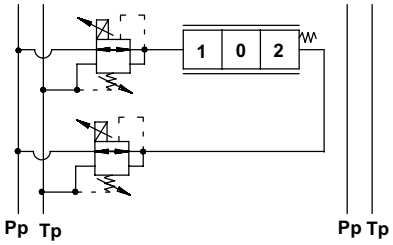


The metering area depends on the type of spool (see metering curves chapter 4.1)

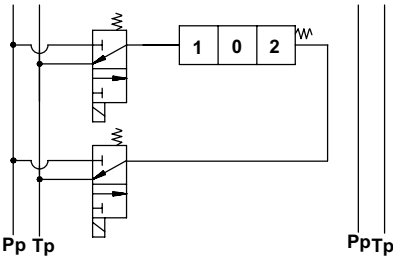
7.6 Electro-hydraulic open loop proportional / ON-OFF control (EHO)



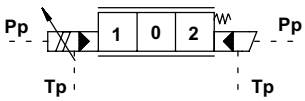
Complete PROPORTIONAL scheme



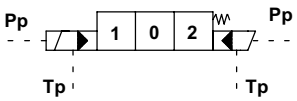
Complete ON-OFF scheme

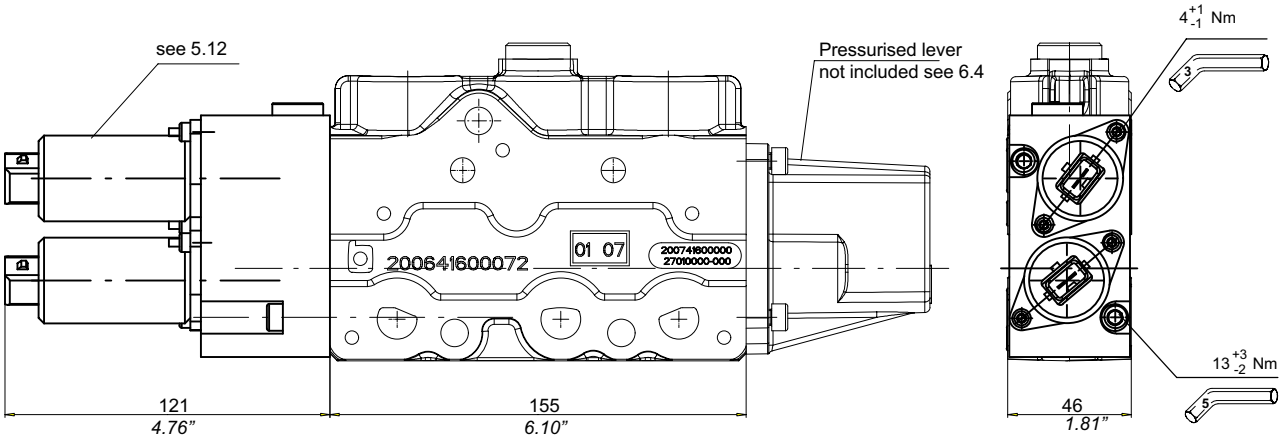


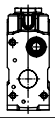
Simplified PROPORTIONAL scheme



Simplified ON-OFF scheme



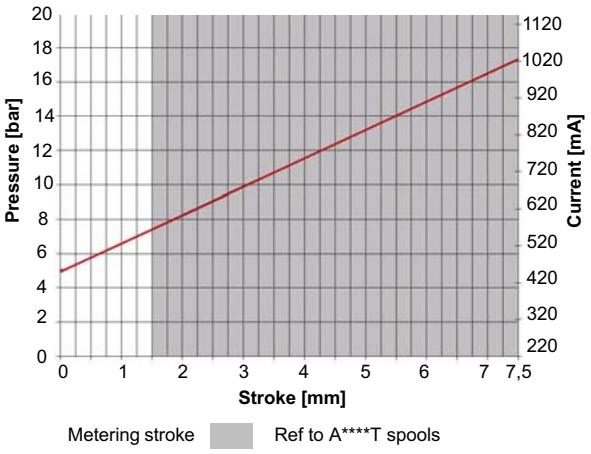


Body Interface	Spool type
	
Electro-hydraulic	EH

Control	Type	Code	Voltage	Connector
Proportional	300	200768660610	12 VDC	AMP 84-9419
ON-OFF	301	200768660730	12 VDC	AMP 84-9419

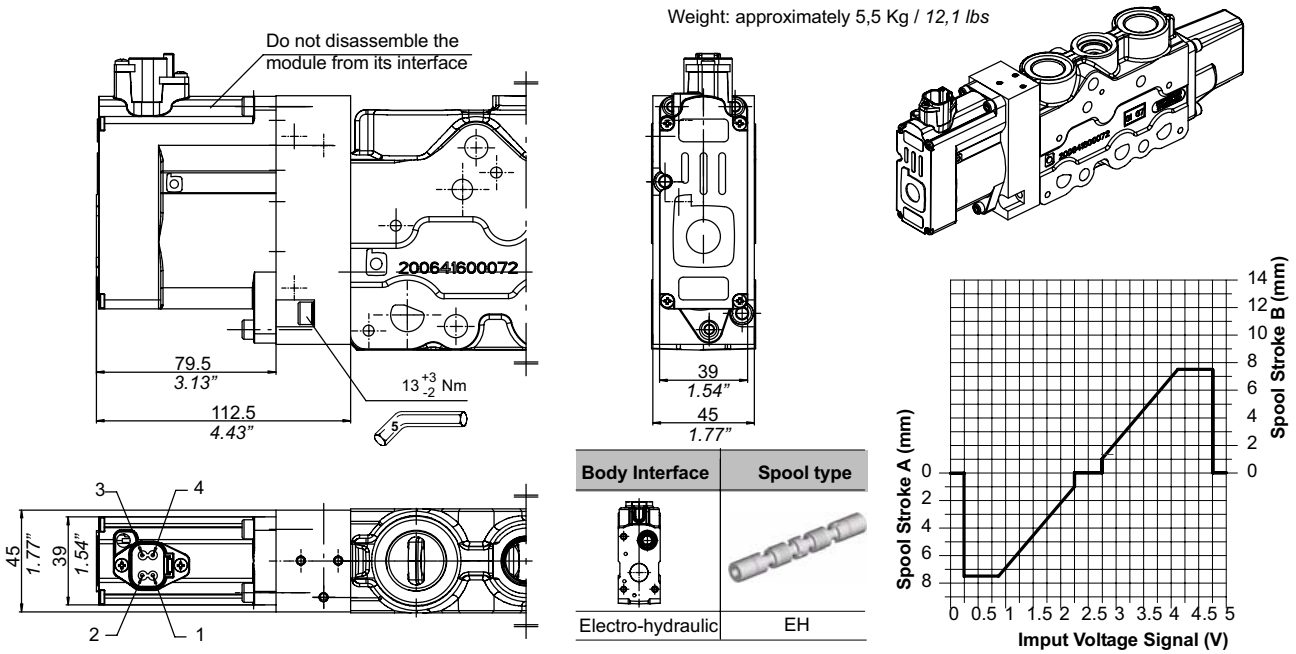
Spring characteristic curves obtained with L001, LP01, or LA01 spring lever / positioner see 6.4

EHO standard spring curve



Metering stroke Ref to A****T spools

7.7 Electro-hydraulic closed loop proportional control

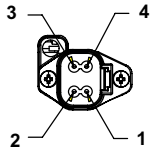


Code	Type	Description	Control type and output	Connector colour	Scheme
200768660720	400	FD6 D/A5-01S C1	Digital control with +5V output supply voltage	Blue	
200768660640	401	FD6 D/AF-01S C1	Digital control with spool position feed-back	Green	
On demand	-	FD6 D/CO-01S C1	Digital control with CAN bus interface	Black	

7.7.1 Module features

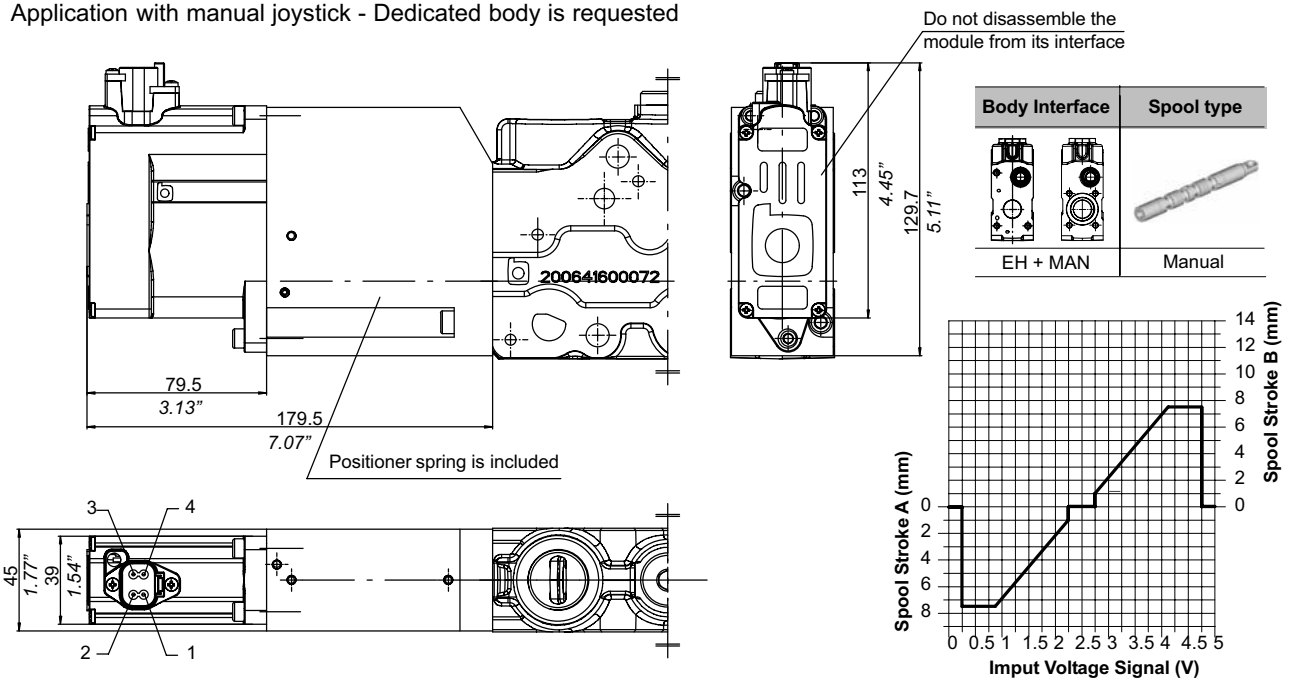
Hydraulic specifications	
Max supply pressure	**35 bar**
Min supply pressure	**12 bar**
Max back pressure	**1.5 bar**
Pilot flow requirement	**0.2 lt/section**
Oil temperature range	**-20 / +95 °C**
Oil viscosity range	**3 - 650 cSt**
Filtration	**18/15 (ISO 4406)**
Operating temperature	**-20 / +105 °C**

Electrical specifications	
Operating voltage	**8 - 30 VDC**
Max current consumption	**750 mA/section**
Analog input impedance	**>40 kOhm**
Typical ctrl pot resistance	**1-10 kOhm**
Analog input signal	**0 - 5 V**
Neutral position dead band	**from 2.25 to 2.75 VDC**
Signal cut-off is trigged at	**< 0.25 V and > 4.75 V**
Degree of protection	**IP68**

Deutsch Mod. DT04-4 compatible connector	Type	PIN			
		1	2	3	4
	...A5	+ Power source	+ 5V output supply voltage	Control signal	Power source (GND)
	...AF	+ Power source	Sensor feed-back output signal	Control signal	Power source (GND)
	...CO	+ Power source	CANL	CANH	Power source (GND)

7.8 Electro-hydraulic closed loop proportional control

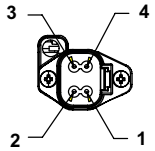
Application with manual joystick - Dedicated body is requested



Code	Type	Description	Control type and output	Connector colour	Scheme
200768660710	403	FD6 D/A5-01S M1	Digital control with +5V output supply voltage	Blue	
-	-	FD6 D/AF-01S M1	Digital control with spool position feed-back	Green	
On demand	-	FD6 D/CO-01S M1	Digital control with CAN bus interface	Black	

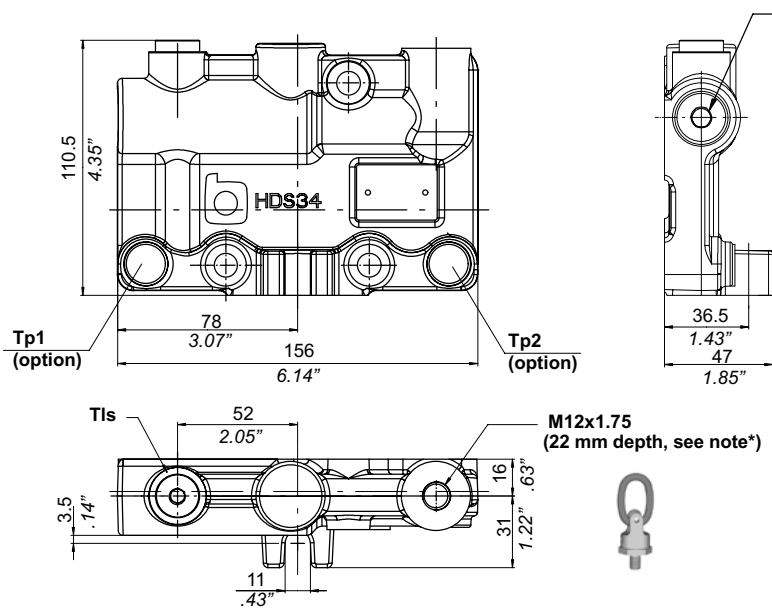
Hydraulic specifications	
Max supply pressure	**35 bar**
Min supply pressure	**12 bar**
Max back pressure	**1.5 bar**
Pilot flow requirement	**0.2 lt/section**
Oil temperature range	**-20 / +95 °C**
Oil viscosity range	**3 - 650 cSt**
Filtration	**18/15 (ISO 4406)**
Operating temperature	**-20 / +105 °C**

Electrical specifications	
Operating voltage	**8 - 30 VDC**
Max current consumption	**750 mA/section**
Analog input impedance	**>40 kOhm**
Typical ctrl pot resistance	**1-10 kOhm**
Analog input signal	**0 - 5 V**
Neutral position dead band	**from 2.25 to 2.75 VDC**
Signal cut-off is trigged at	**< 0.25 V and > 4.75 V**
Degree of protection	**IP68**

Deutsch Mod. DT04-4 compatible connector	Type	PIN			
		1	2	3	4
	..A5	+ Power source	+ 5V output supply voltage	Control signal	Power source (GND)
	...AF	+ Power source	Sensor feed-back output signal	Control signal	Power source (GND)
	...CO	+ Power source	CANL	CANH	Power source (GND)

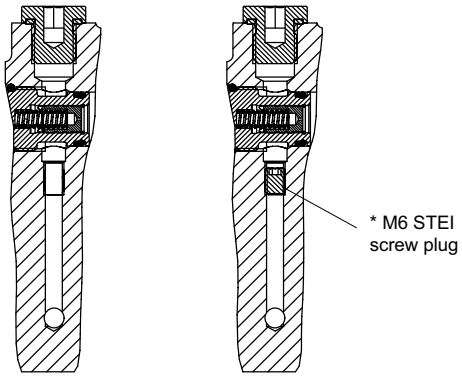
8 End covers

8.1 Blanking plate (P0... series)

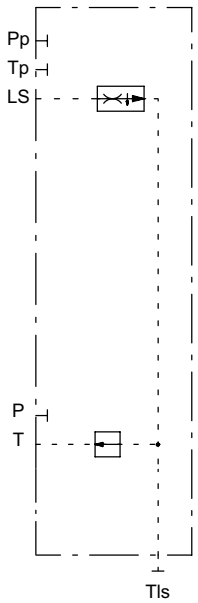


VRC= LS flow control drain valve

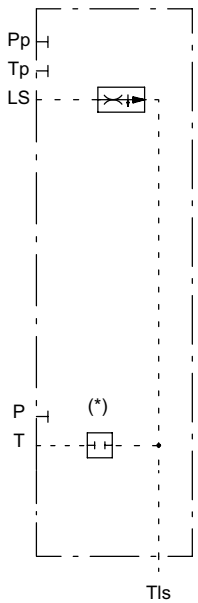
Threads	Tls	Tp (option)
BSP	1/4”	1/4”
Metric	M14x1,5	M14x1,5
UNF	SAE6	SAE6



With LS flow control valve - Internal drain

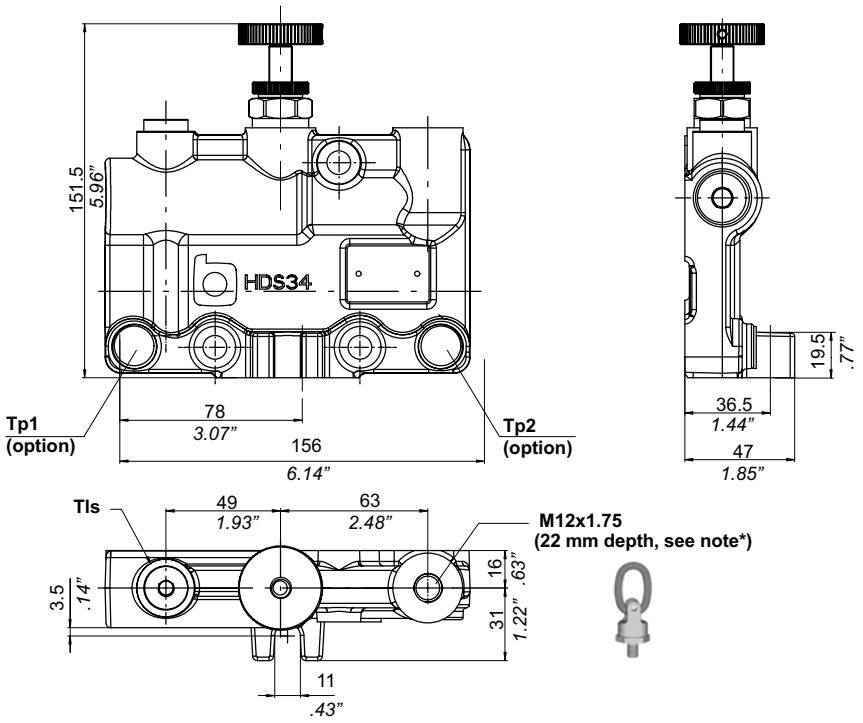


With LS flow control valve - External drain



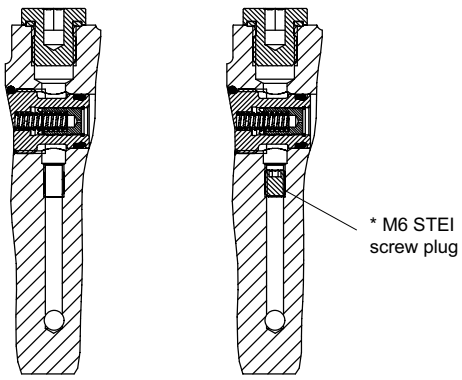
Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

8.2 Blanking plate with LS flow control drain valve + LS line manual shut-off valve (P0... series)

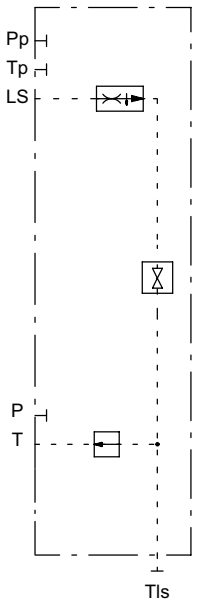


VRC= LS flow control drain valve
NV1= LS line manual shut-off valve

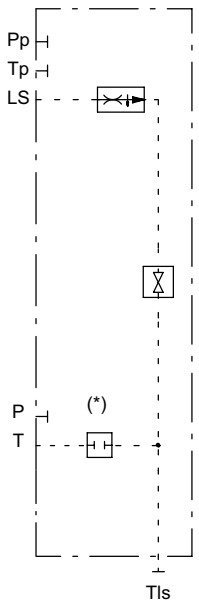
Threads	Tls	Tp (option)
BSP	1/4"	1/4"
Metric	M14x1,5	M14x1,5
UNF	SAE6	SAE6



With LS line manual shut-off valve Internal drain

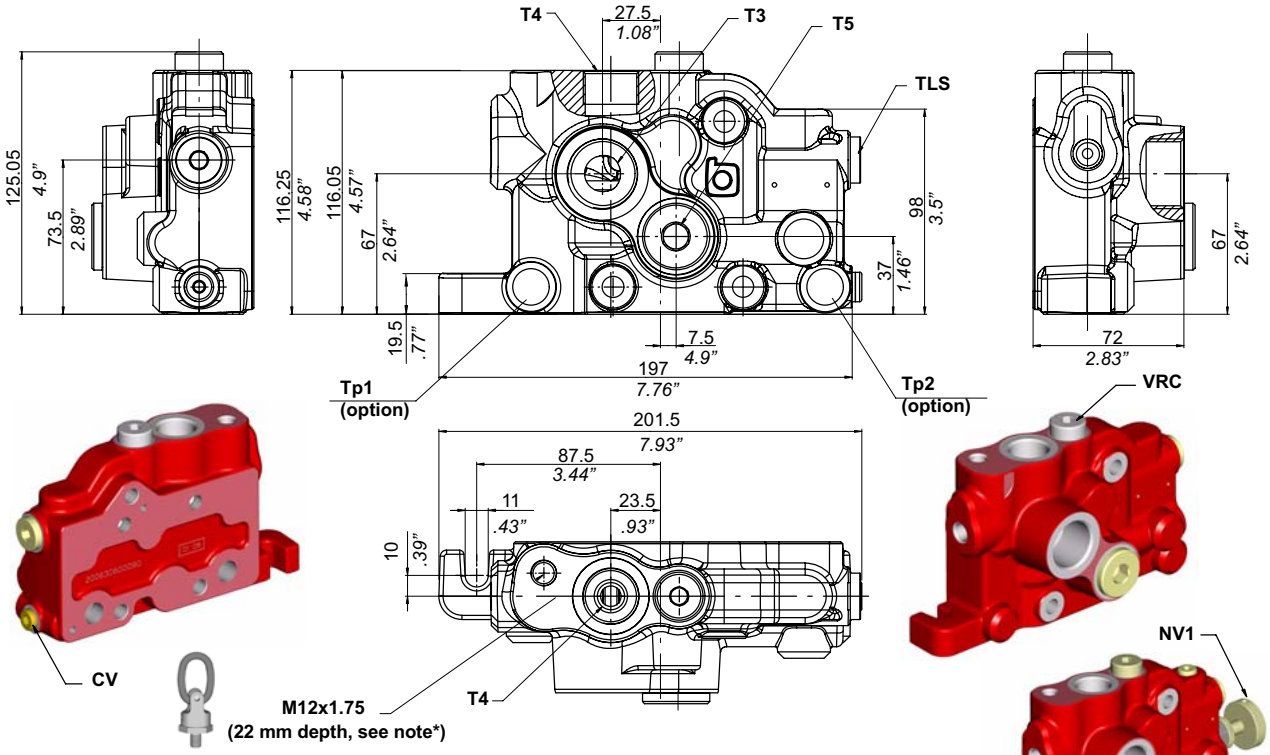


With LS line manual shut-off valve External drain



Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

8.3 End cover with tank line ports (PT... series)



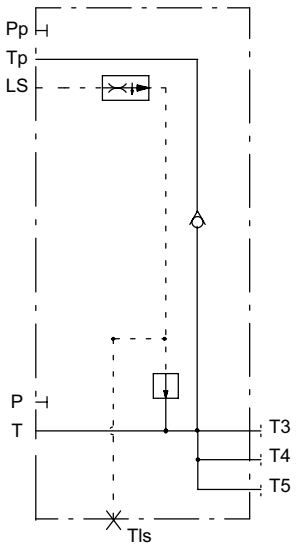
CV = pilot tank line check valve

VRC= LS flow control drain valve

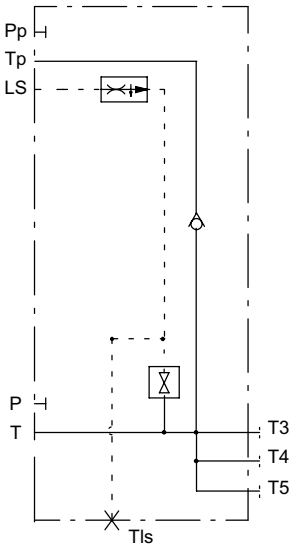
NV1= LS line manual shut-off valve (option)

Threads	T4	T3	T5	Tls	Tp (option)
BSP	3/4”	1“	3/4”	3/8”	1/4”
Metric	M27x2	M33x2	M27x2	M18x1.5	M14x1.5
UNF	SAE12	SAE16	SAE12	SAE8	SAE6

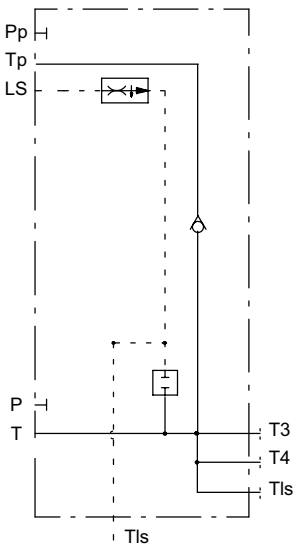
With internal drain + pilot tank line check valve



With Manual LS shut-off valve + pilot tank line check valve

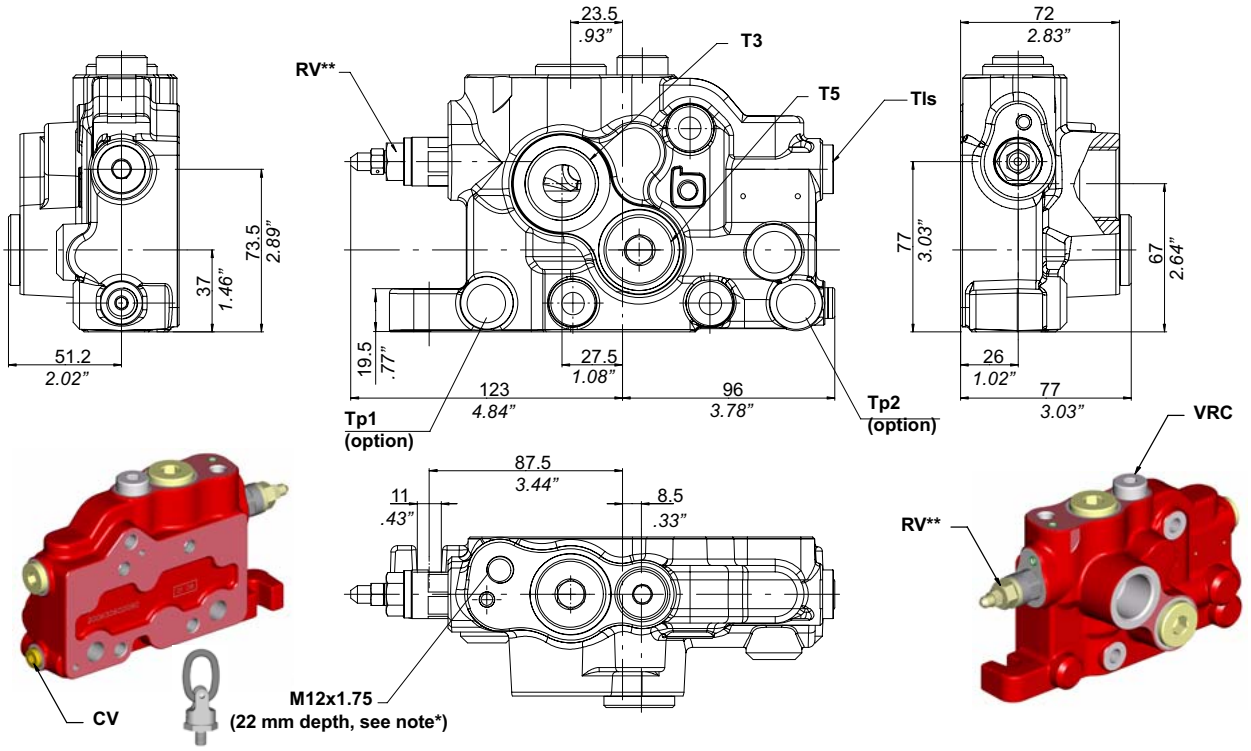


With LS external drain + pilot tank line check valve



Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

8.4 End cover with LS relief valve and tank line ports (PT... series)



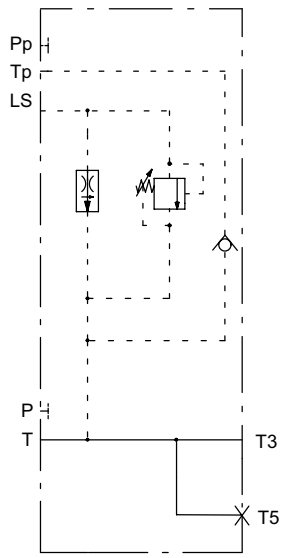
RV = LS signal adjustable relief valve

VRC = LS flow control drain valve

CV = pilot tank line check valve

Threads	T3	T5	Tls	Tp (option)
BSP	1”	3/4”	3/8”	1/4”
Metric	M33x2	M27x2	M18x1.5	M14x1.5
UNF	SAE16	SAE12	SAE8	SAE6

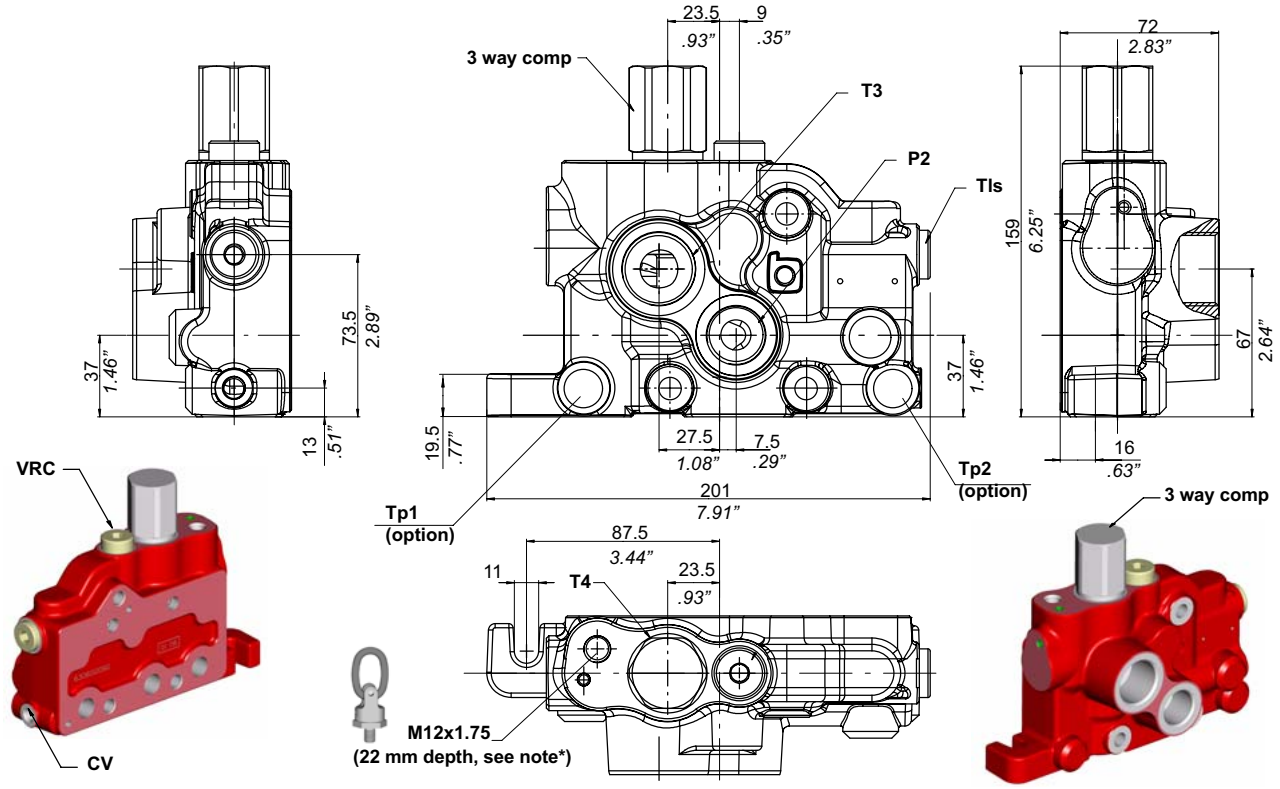
With LS relief valve + pilot tank line check valve



Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

8.5 End cover with 3-way compensator (PC... series)

Used in combination with priority for steering inlet cover allows to unload to tank the full flow of a fixed displacement pump or the stand-by flow of an LS pump. The compensator spring must be chosen depending on the type of pump.



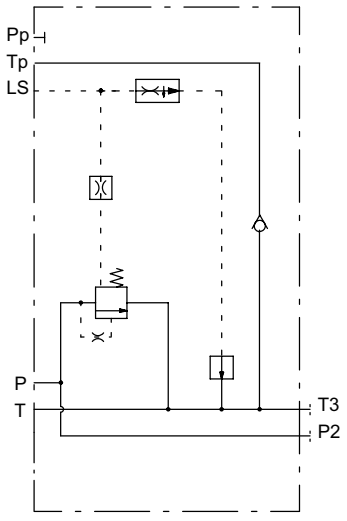
3 way comp = main compensator

CV = pilot tank line check valve

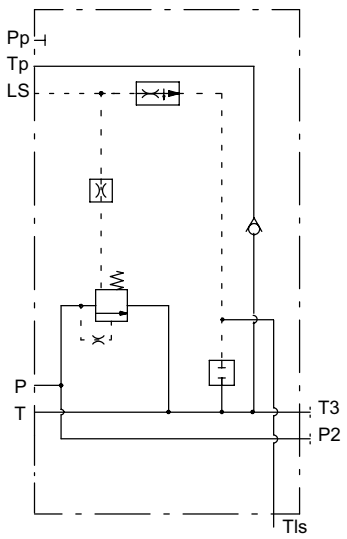
VRC = LS flow control drain valve

Threads	T3	P2	Tls	Tp
BSP	1”	3/4”	3/8”	1/4”
Metric	M33x2	M27x2	M18x1.5	M14x1.5
UNF	SAE16	SAE12	SAE8	SAE6

With LS flow control drain valve and internal drain + pilot tank line check valve

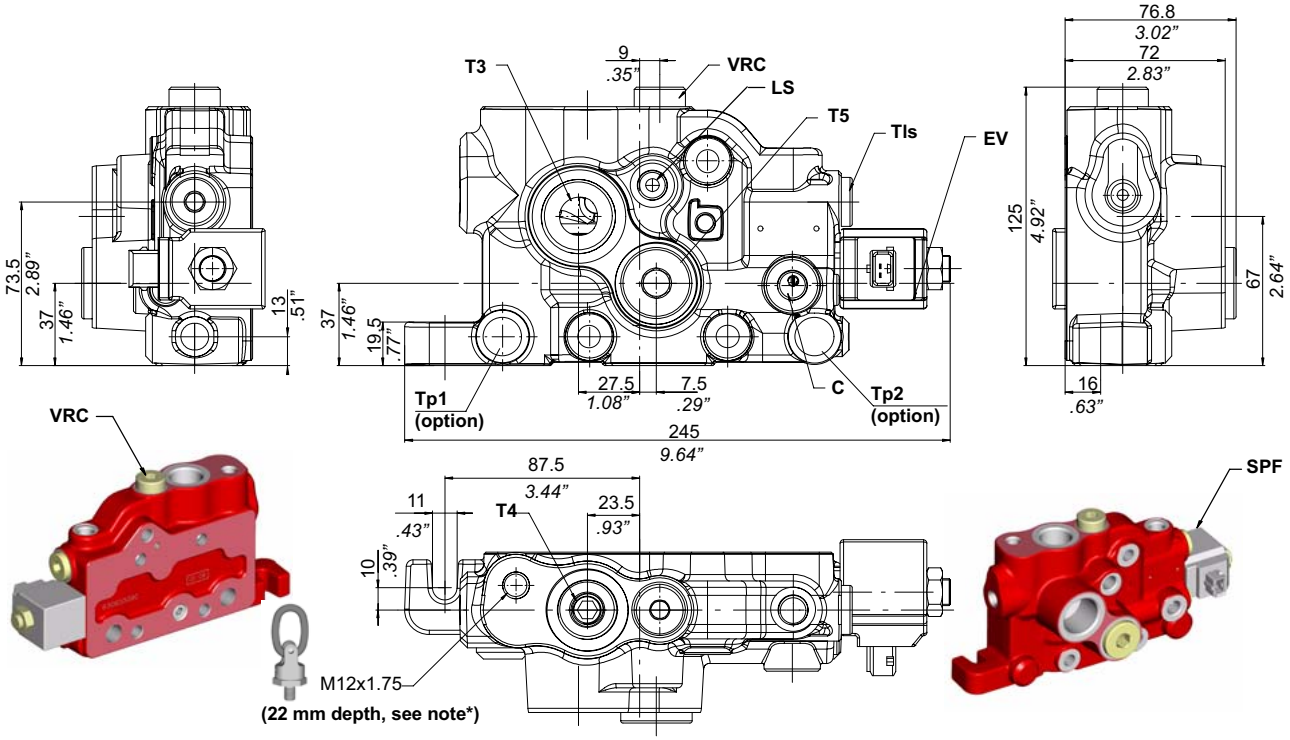


With LS flow control drain valve and external drain + pilot tank line check valve



Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

8.6 Sliding function end cover specific for backhoe application (PS... series)



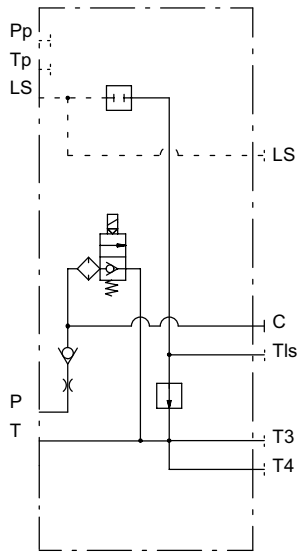
SPF = sliding frame release lock solenoid valve

CV = pilot tank line check valve (option)

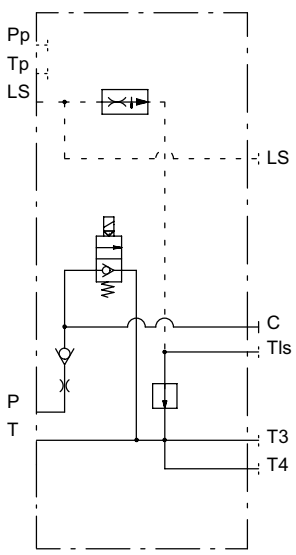
VRC = LS flow control drain valve

Threads	T4	T3	Tls	LS (option)	C	Tp (option)
BSP	3/4"	1"	3/8"	1/4"	1/4"	1/4"
Metric	M27x2	M33x2	M18x1.5	M14x1.5	M14x1.5	M14x1.5
UNF	SAE12	SAE16	SAE8	SAE6	SAE6	SAE8

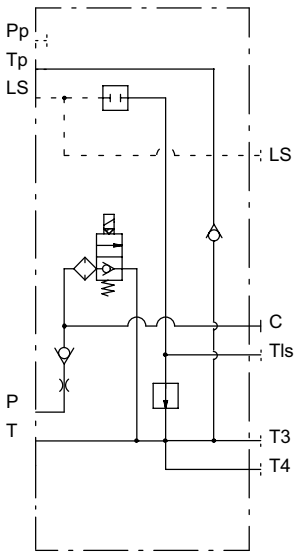
Without LS flow control drain valve



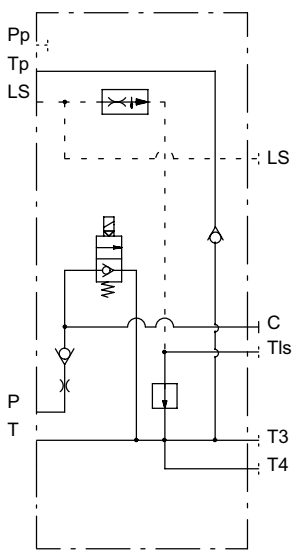
With LS flow control drain valve



Without LS flow control drain valve + pilot tank line check valve



With LS flow control drain valve + pilot tank line check valve

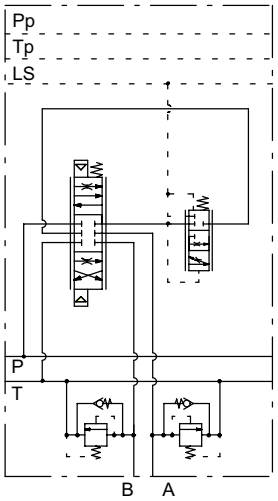


Attention: * To handle the complete valve block use the M12x1,75 threaded hole.
For the lifting operations use proper accessories like eye-bolts, cables, etc. certified and dimensioned for the weight to be lifted. Always handle with care and without giving sudden accelerations.

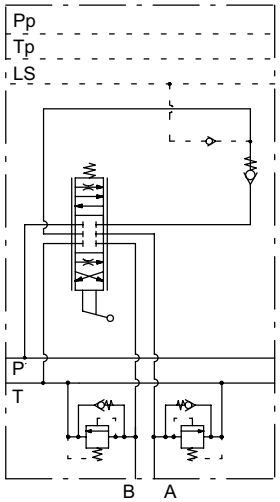
9 Suitable applications (Examples)

Telehandlers

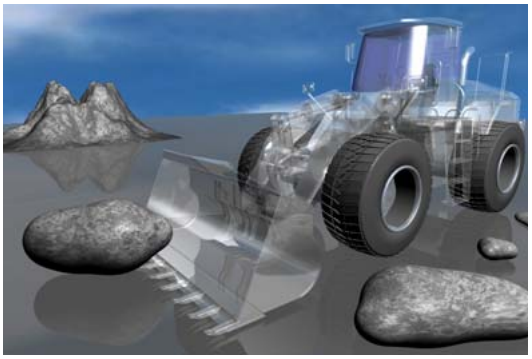
Local compensator (KC)



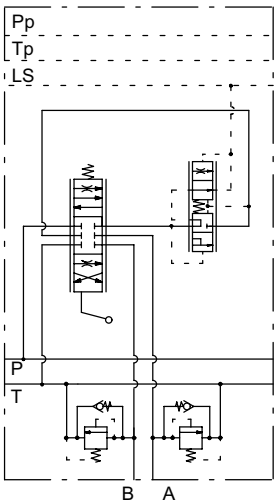
Local check (KU)



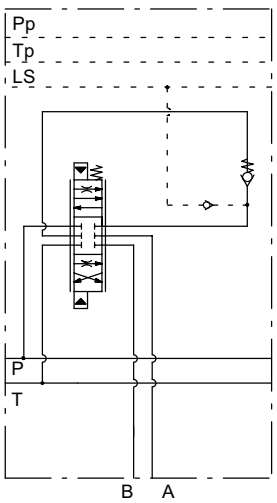
Wheel Loaders



Local compensator + check (KL)



Local check (KD)

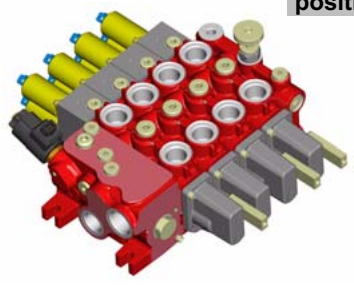


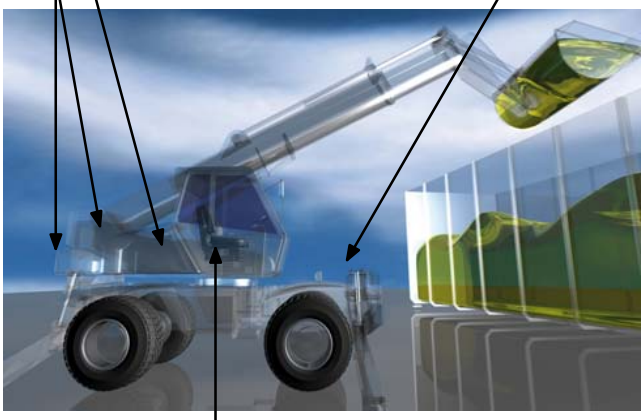
Backhoe Loaders

9.1 Telehandlers
Assembling positions / controls flexibility

Closed loop controls for more precise operations and electronic management of machine safety functions.

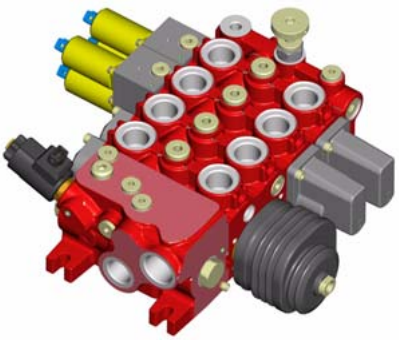
Open loop controls for a high degree of freedom in terms of assembling position.

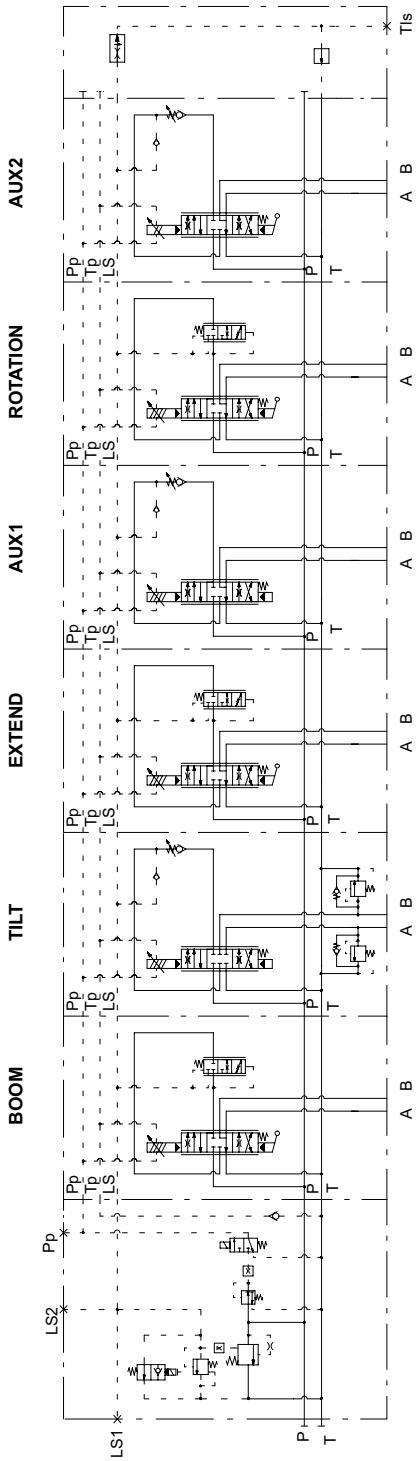




Customised inlet covers with additional functions

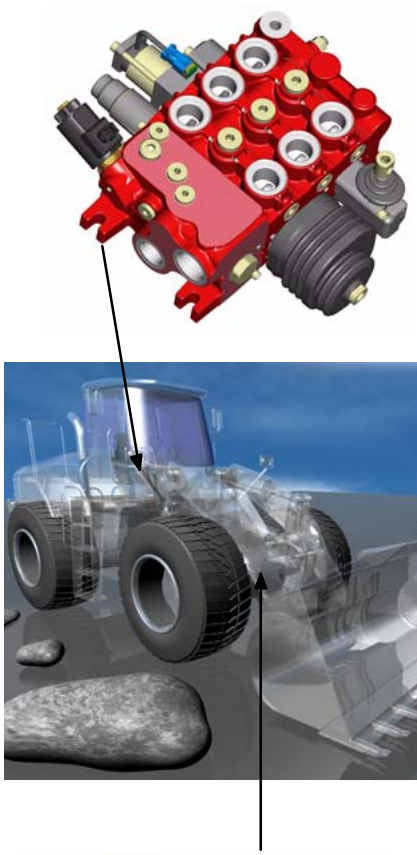
Direct manual joystick compact configuration suitable to be assembled on the cabin side



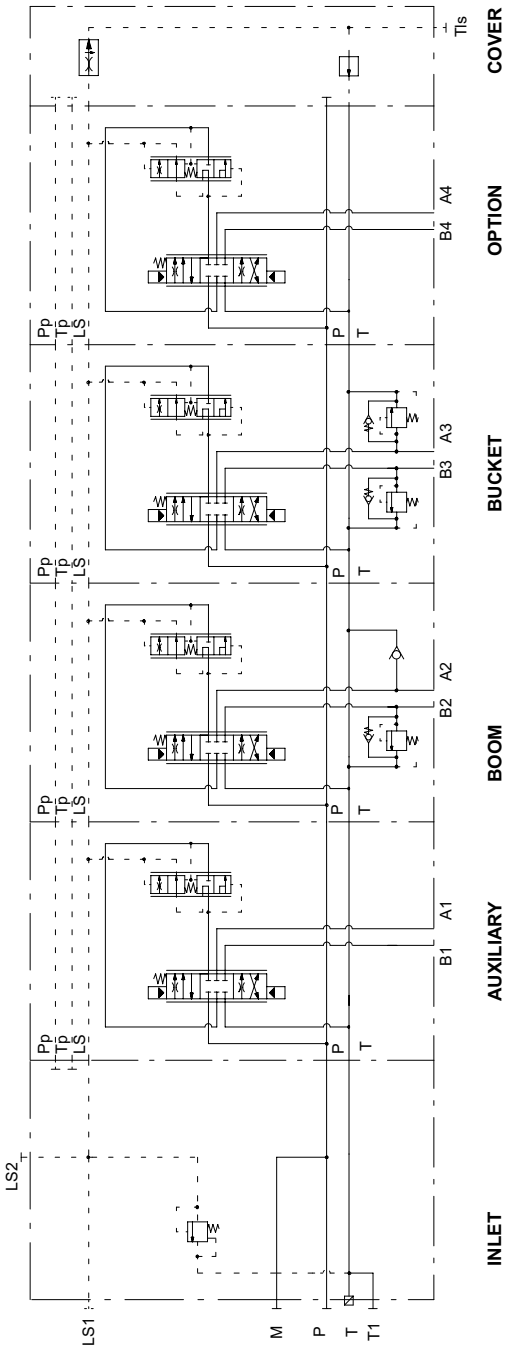


9.2 Wheel loader
Assembling positions / controls flexibility

Direct manual joystick
For a cost effective solution



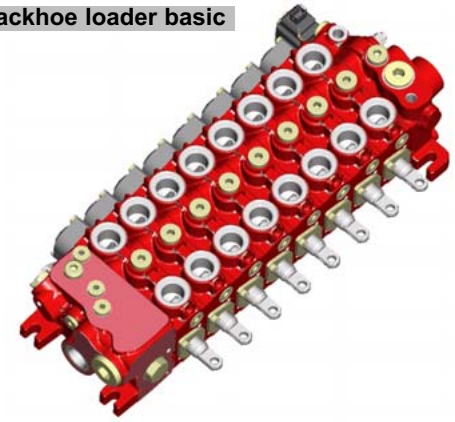
Proportional controls for a high degree of freedom in terms of assembling position



9.3 Backhoe loader
Assembling positions / controls flexibility

Front loader basic

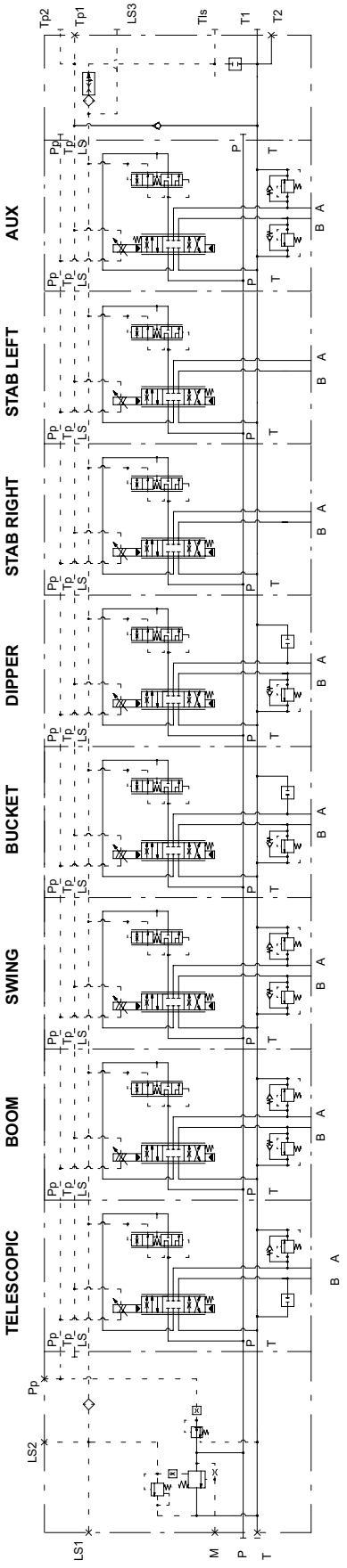
Backhoe loader basic



Front loader hydraulic / electro-hydraulic controlled

Backhoe loader hydraulic controlled

Backhoe loader electro-hydraulic controlled



10 Composition of ordering code

10.1 Std inlet cover

TEST34	TV	2	01	00	-	250	000	00	00000	00	000	00
TEST34	TF	2	01	13	-	270	SPE	21	SD817	12	AMP	CV
TEST34	TF	2	01	13	-	230	SPF	30	00000	00	AMP	CV

TF = inlet cover for systems with fixed displacement pump

TV = inlet cover for systems with LS pump

“P” PORT THREAD
3/4” BSP = 2
SAE12 = 4
M27x2 = 6
Different = 9

Inlet cover version (do not fill)

00 = NO compensator (LS pump)
13 = main compensator 13 bar spring

LS relief valve pressure setting (RV)
000 = not requested
i.e. 270 = 270 bar - see 5.1

LS signal, solenoid unloading valve (Normally open)
000 = not requested
SPE = with manual override
SPF = without manual override

Pilot supply pressure reducing valve PRR818
00 = not requested
21 = 21 bar (suitable for EHC positioner)
30 = 30 bar (suitable for EHO positioner)

Pilot oil supply cut-off valve
00 = not requested
SD817 = without manual override

Voltage:
00 = without coil (coils)
12 = 12 VDC
24 = 24 VDC

Connector style (the male connector is not included)
000 = coil not requested
AMP = AMP 84-9419
DIN = DIN 43650

00 = not requested
CV = pilot tank line check valve

10.2 Priority for steering inlet cover

T	E	S	T	3	4	T	S	2	0	1	1	1	-	2	7	0	2	1	S	D	8	1	7	1	2	A	M	P	C	V
T	E	S	T	3	4	T	S	2	0	1	1	1	-	2	5	0	3	0	S	D	8	1	7	1	2	A	M	P	C	V
T	E	S	T	3	4	T	S	2	0	1	1	1	-	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TS = inlet cover for systems with LS pump and priority function for steering

"P" PORT THREAD

3/4" BSP =	2
SAE12 =	4
M27x2 =	6
Different =	9

Inlet cover version (do not fill)

11 = steering compensator 11 bar spring

LS relief valve pressure setting (RV)
000 = not requested
i.e. 270 = 270 bar - see 5.1

Pilot oil supply pressure reducing valve
00 = not requested
21 = 21 bar (suitable for EHC positioner)
30 = 30 bar (suitable for EHO positioner)

Pilot oil supply cut-off valve
00 = not requested
SD817 = without manual override

Voltage:
00 = without coil
12 = 12 VDC
24 = 24 VDC

Connector style (the connector is not included)
000 = coil not requested
AMP = AMP 84 - 9419
DIN = DIN 43650

00 = not requested
CV = pilot tank line check valve

10.3 Elements

E L . 3 4	K C	2	0	1	C 1 5 1 5 T	3 4 9	L 1 0 0	0 0 0 0 0 0 0 0	I
E L . 3 4	K C	2	0	1	A 0 6 0 4 T R	3 0 0	L 0 0 1	V C A 2 0 B 0 0	
E L . 3 4	K C	2	0	1	A 1 0 1 0 T	4 0 0	L P 0 3	U C A 2 3 B 2 3	

Body version
KC = local compensator
KL = local compensator with check function
KU = local check (function with load holding valves)
KD = local check (function without load holding valves)

PORT THREADS

1/2" BSP =	1
3/4" BSP =	2
SAE10 =	3
SAE12 =	4
M22x1,5 =	5
M27x2 =	6
CEJN 600 =	7
CEJN 800 =	8
Different =	9

Element version (do not fill)

Spool type (see chapter 4)

Specific design

Positioner (see chapter 7)

Lever type (see chapter 6)

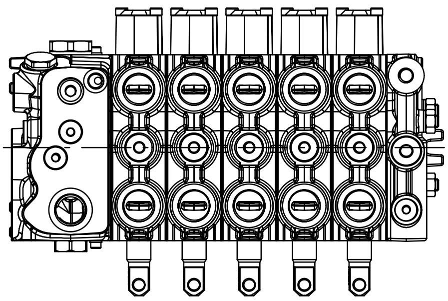
Service port valves:
UC = anti-shock and anti-cavitation valves
C = anti-cavitation valves

A service port setting:
00 (not requested)
i.e. 25 = 250 bar

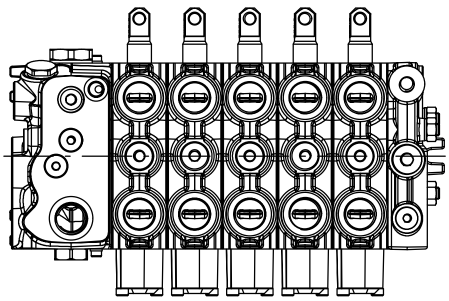
B service port setting:
00 (not requested)
i.e. 25 = 250 bar

I = spool inverted - Positioner assembled on the standard lever side (omitted if not necessary)

Std spool assembling position

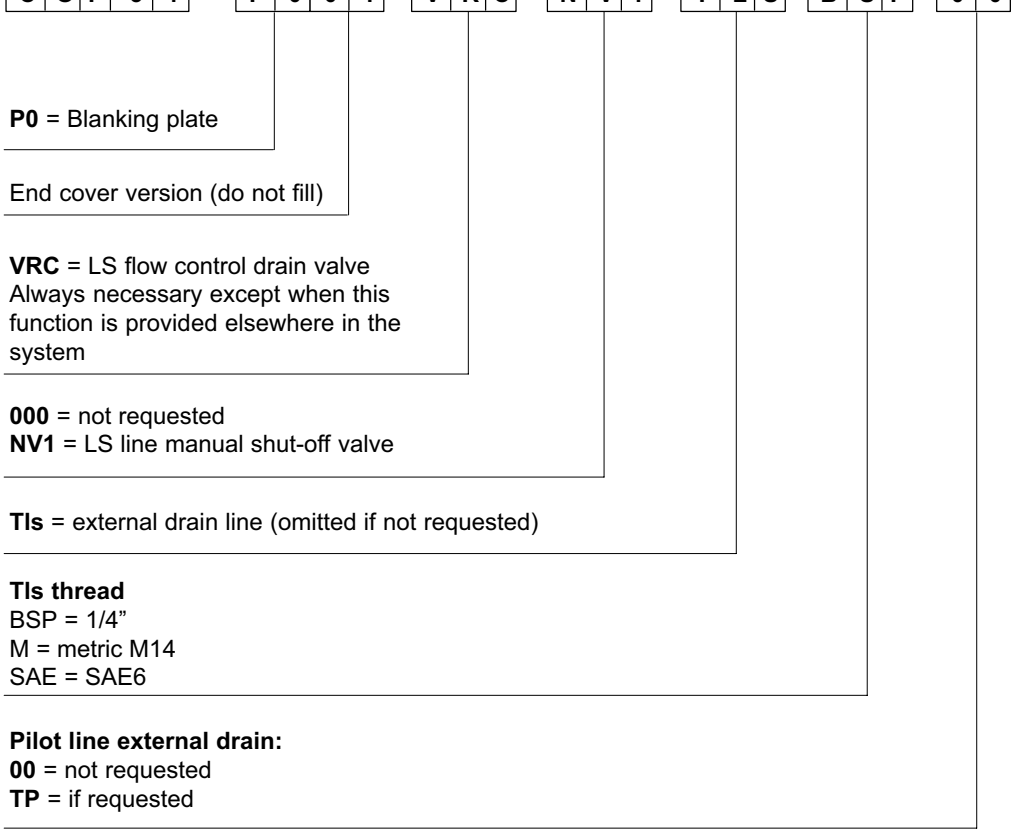


Inverted spools assembling position
(the positioners are assembled on the std lever side)



10.4 Blanking plate end cover

COP34	P001	VRC	NV1	000	000	00
COP34	P002	VRC	000	TLS	BSP	TP
COP34	P001	VRC	NV1	TLS	BSP	00



P0 = Blanking plate

End cover version (do not fill)

VRC = LS flow control drain valve
Always necessary except when this function is provided elsewhere in the system

000 = not requested
NV1 = LS line manual shut-off valve

Tls = external drain line (omitted if not requested)

Tls thread
BSP = 1/4”
M = metric M14
SAE = SAE6

Pilot line external drain:
00 = not requested
TP = if requested

10.5 End cover with tank line ports

COP34	PT901	VRC	NV1	TLS	BSP	TP	CV	270
COP34	PT901	VRC	000	000	000	00	CV	000
COP34	PT902	VRC	NV1	000	000	00	CV	000

PT = With tank line

T3 = tank line port
1/2" BSP = 1
3/4" BSP = 2
SAE10 = 3
SAE12 = 4
M22x1,5 = 5
M27x2 = 6
CEJN 600 = 7
CEJN 800 = 8
1" BSP = 9

End cover version (do not fill)

VRC = LS flow control drain valve.
Always necessary except when this function is provided elsewhere in the system

00 = not requested LS line
NV1 = LS line manual shut-off valve

Tls = external drain line (omitted if not requested)

Tls thread
BSP = 3/8"
M = metric M18x1.5
SAE = SAE8

Pilot line external drain:
00 = not requested
TP = if requested

00 = not requested
CV = pilot tank line check valve

LS relief valve pressure setting (RV)
000 = not requested
i.e. 270 = 270 bar - see 5.1

10.6 End cover with 3-way compensator

COP34	PC901	13	VRC	000	000	00	00
COP34	PC901	13	VRC	TLS	BSP	TP	CV

PC = With compensator

T3 = tank line port
1/2” BSP = 1
3/4” BSP = 2
SAE10 = 3
SAE12 = 4
M22x1,5 = 5
M27x2 = 6
CEJN 600 = 7
CEJN 800 = 8
Different = 9

End cover version (do not fill)

30 = main compensator 30 bar spring (suitable for LS pump)
13 = main compensator 13 bar spring (suitable for gear pumps)

VRC = LS flow control drain valve.
Always necessary except when this function is provided elsewhere in the system

Tls = external drain line (omitted if not requested)

Tls thread
BSP = 3/8”
M = metric M18x1.5
SAE = SAE8

Pilot line external drain:
00 = not requested
TP = if requested

00 = not requested
CV = pilot tank line check valve

10.7 Sliding function end cover

C	O	P	3	4	P	S	9	0	1	V	R	C	S	P	F	1	2	A	M	P	0	0	0	0	0	0	0	0
C	O	P	3	4	P	S	9	0	1	V	R	C	S	P	F	1	2	A	M	P	T	L	S	B	S	P	T	P	C	V

PS = for sliding function

T3 = tank line port
1/2" BSP = 1
3/4" BSP = 2
SAE10 = 3
SAE12 = 4
M22x1,5 = 5
M27x2 = 6
CEJN 600 = 7
CEJN 800 = 8
Different = 9

End cover version (do not fill)

VRC = LS flow control drain valve.
Always necessary except when this function is provided elsewhere in the system

LS signal, solenoid unloading valve (Normally closed)
000 = not requested
SPF = normally closed, without manual override

Voltage:
00 = without coil (coils)
12 = 12 VDC
24 = 24 VDC

Connector style (the male connector is not included)
000 = coil not requested
AMP = AMP 84-9419
DIN = DIN 43650

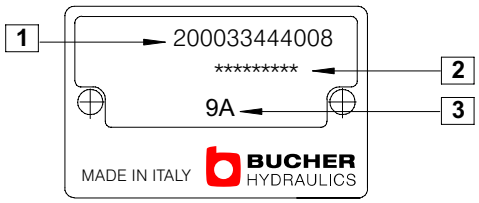
TIs = external drain line (omitted if not requested)

TIs thread
BSP = 3/8"
M = metric M18x1.5
SAE = SAE8

Pilot line external drain:
00 = not requested
TP = if requested

00 = not requested
CV = pilot tank line check valve

10.8 Product identification plate



1 : Product Order Code
2 : Customer Code (only on request)
3 : Manufacturing Year and Month

Manufacturing month	Manufacturing year						
	2008	2009	2010	2011	2012	2013	2014
January	8A	9A	0A	1A	2A	3A	4A
February	8B	9B	0B	1B	2B	3B	4B
March	8C	9C	0C	1C	2C	3C	4C
April	8D	9D	0D	1D	2D	3D	4D
May	8E	9E	0E	1E	2E	3E	4E
June	8F	9F	0F	1F	2F	3F	4F
July	8G	9G	0G	1G	2G	3G	4G
August	8H	9H	0H	1H	2H	3H	4H
September	8I	9I	0	1I	2I	3I	4I
October	8J	9J	0J	1J	2J	3J	4J
November	8K	9K	0K	1K	2K	3K	4K
December	8L	9L	0L	1L	2L	3L	4L

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Classification: 430.300.000