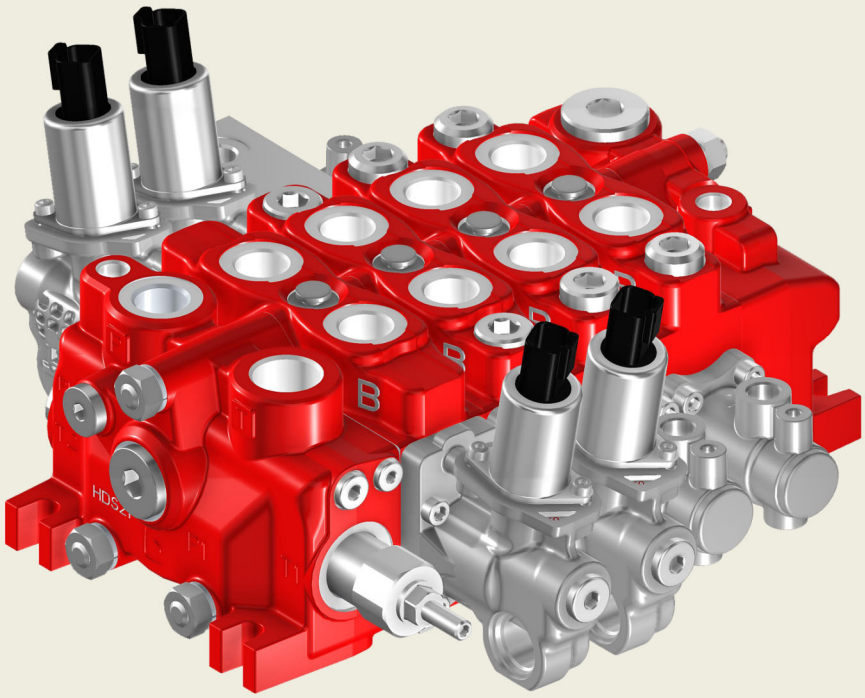
BUCHER hydraulics

Directional Control Valve HDS21



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1 General information

1.1 Introduction

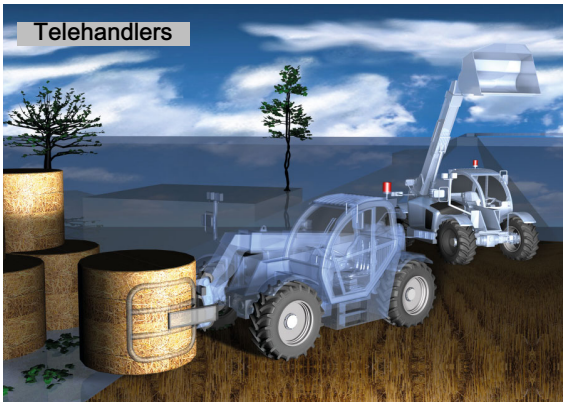
Several decades of leading presence and successful supplies in the earthmoving applications, the deep know-how gained in the material handling sector and the strong commitment to anticipate the upcoming technical and application needs of our customers, have guided Bucher Hydraulics in the development of HDS21.

The stackable construction with a wide range of inlet and outlet cover configurations, up to 10 parallel and series elements, possibility to utilize several different controls, gives the machine 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 various type of spools, in order to satisfy the application specific requirements in terms of hydraulic circuit and precise control of the machine functions.

HDS21 can be equipped with single levers or dual axis joystick, as well as hydraulic proportional and open loop electro-hydraulic proportional controls.

The wide range of controls combined with the compact dimensions makes the HDS21 a very flexible valve able to fulfill 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;
- do not use high pressure jet washer directly on the valve to prevent water infiltration inside lever and spool caps.

1.3 Fittings

In the interest of safety, only fittings with STRAIGHT THREAD ENDS have to be used.
Fittings with TAPERED THREAD ENDS shall never be used, as they can cause deformation and cracks in the valve body.
Warranty conditions will not be valid in case tapered fittings are used.
The work port adaptors have to be fastened respecting the tightening torque values indicated in the following table (for different port types contact our Sales Dept.):

Cavity	Recommended tightening torque for work port fittings - Nm / *lbft*				
Metric - ISO 261	M10X1	M14X1.5	M18X1.5	M22X1.5	M27x2
With O-Ring seal (ISO 6149-1)	15 / *11.1*	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*
With copper washer (ISO 9974-1)	15 / *11.1*	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*
With rubber washer or steel (ISO 9974-1)	15 / *11.1*	25 / *18.4*	35 / *25.8*	60 / *44.3*	70 / *51.7*
BSP - ISO 228-1	1/8" BSP	1/4" BSP	3/8" BSP	1/2" BSP	3/4" BSP
With copper washer (ISO 1179-1)	15 / *11.1*	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*
With rubber washer or steel (ISO 1179-1)	15 / *11.1*	25 / *18.4*	35 / *25.8*	60 / *44.3*	70 / *51.7*
UN-UNF - ISO 263	SAE4 7/16-20 UNF	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)	20 / *14.7*	30 / *22.1*	40 / *29.5*	60 / *44.3*	90 / *66.4*

IMPORTANT!: Tightening torques depend 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 according to type HM (ISO 6743/4) or type HLP (DIN 51524) 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 instructions and recommendations.

The fineness of the filter should be selected in order to maintain the fluid contamination level according to the values listed at section 1.7.1 (Technical specification)
Particular attention has to be paid to the cleanliness of the machine hydraulic circuit and its components before the first run-in, since the presence of foreign materials could cause damages to the directional valve components even if a proper filtration is provided.

1.6 Directives and standards

- PED (97/23/EC)

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

- Atex

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

- ISO 9001:2015 / ISO 14001:2015

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 Hydraulic system

1.7.1 Technical specification

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

Features		
Nominal flow range		80 l/min *(21 US gpm)*
Max inlet pressure (P) 1)		290 bar *(4200 psi)*
Max work port pressure (A/B) 1)		320 bar *(4640 psi)*
Max back pressure (T)	standard	30 bar *(430 PSI)*
	with electro-hydraulic positioner (EHO)	10 bar *(145 PSI)*
	with ON/OFF control	20 bar *(290 PSI)*
Max internal leakage A/B→T (at 100 bar/1450 PSI, 23 mm^2/s)2)	standard section without port valves	16 cc/min (*) *(0.976 Cu In/min)*
	standard section with port valves	21 cc/min (*) *(1.281 Cu In/min)*
	ON-OFF section without port valves	45 cc/min (*) *(2.746 Cu In/min)*
	ON-OFF section with port valves	50 cc/min (*) *(3.051 Cu In/min)*
Fluid		mineral based oil (see 1.4)
Fluid temperature (with NBR seals)		-20°C / +80°C *(-4° to 176° F)*
Contamination class		21/19/16 ISO4406:1999 *(NAS 1638 class10)*
Contamination class with electro-hydraulic controls		20/18/15 ISO 4406:1999 *(NAS 1638 class 9)*
Viscosity operating range	recommended	from 15 to 75 mm^2/s
	admissible	from 12 to 400 mm^2/s
Max number of elements		10
Ambient temperature in operating conditions:	with mechanical/hydraulic/ pneumatic controls	from -30 to +60 °C
	with electric/ electro-hydraulic devices	from -30 to +50 °C
Tie-rods tightening torque	standard	22.5±2.5 Nm

For different operating conditions, please contact our Sales Dept.

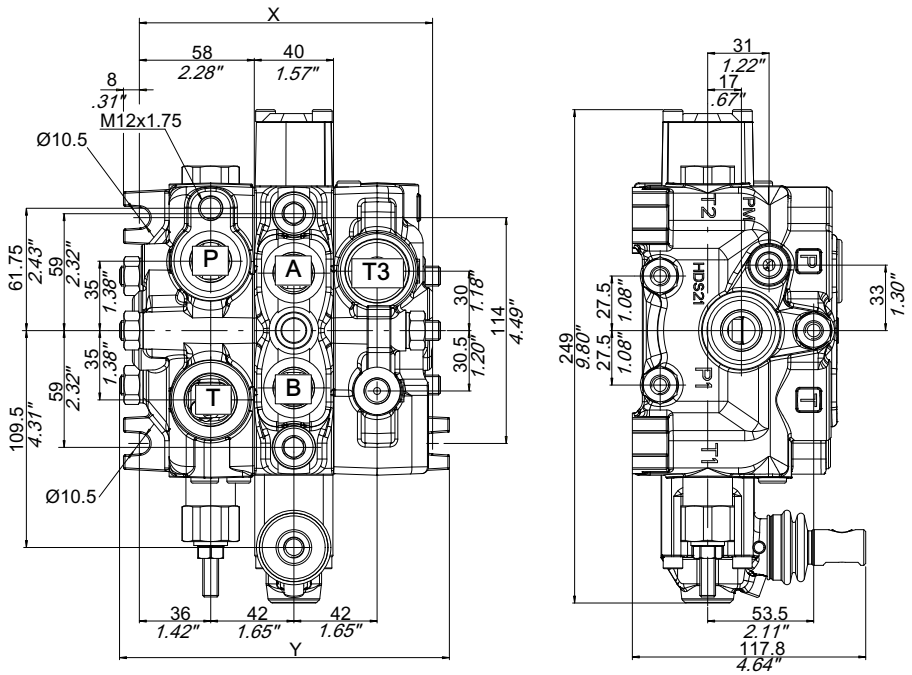
1) Fatigue tested according to internal procedure at 1.16x rated pressure on 5 samples for 1˙000˙000 cycles.
For work port sizes bigger than ½" BSP and for specific modules the rated pressure could be limited to a lower value (see correspondent paragraph)

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

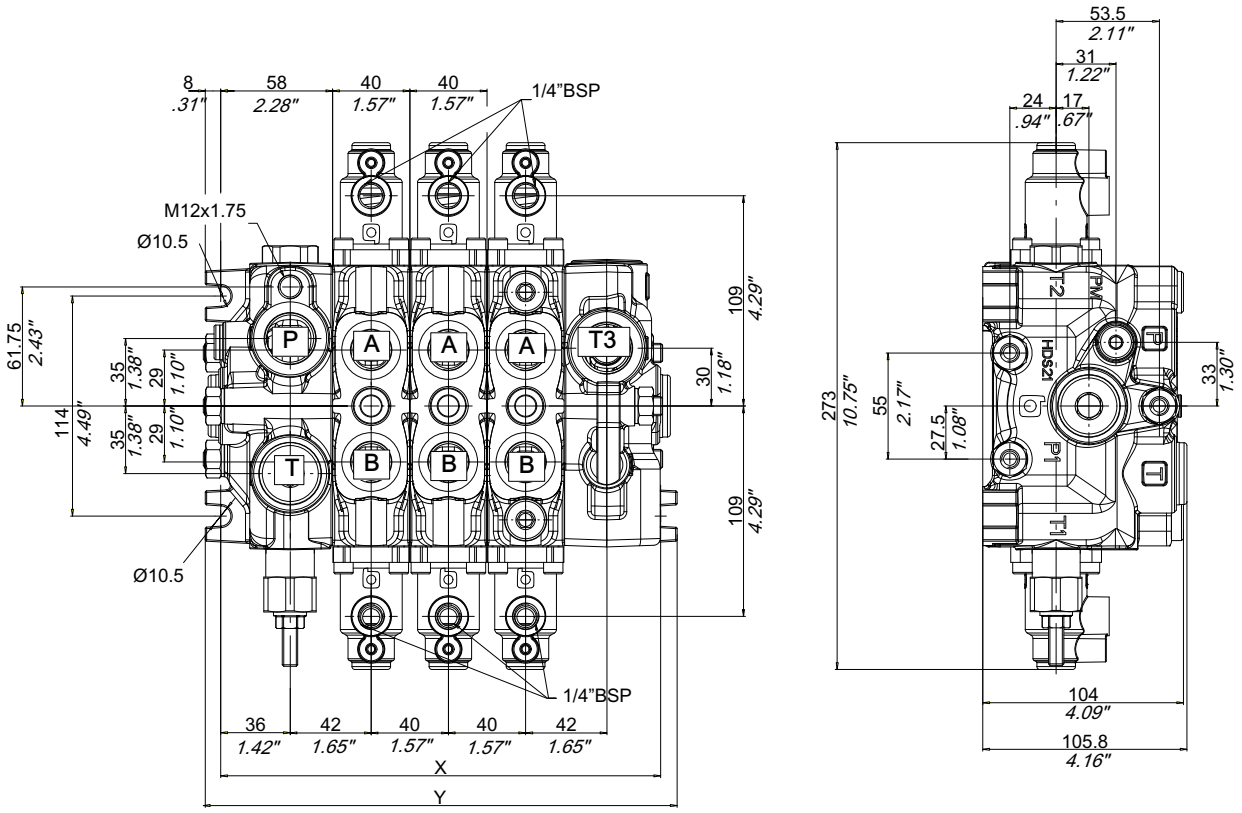
(*) Lower values can be provided on demand

1.8 Dimensional data

1.8.1 Manual operated



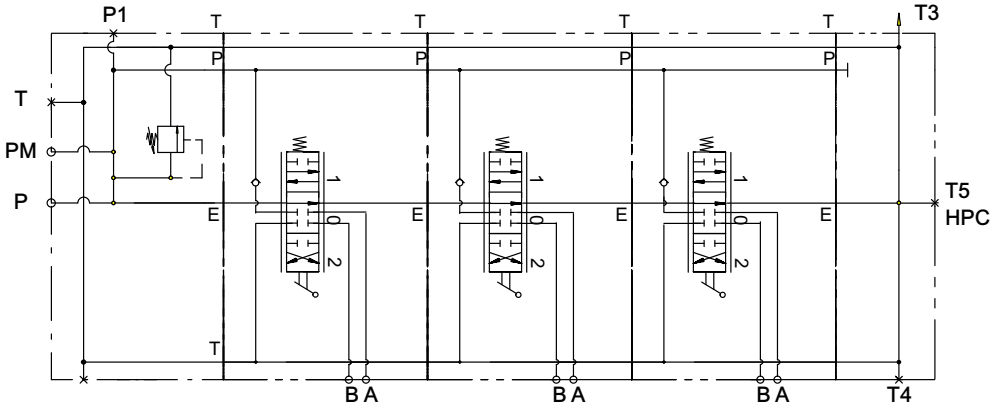
1.8.2 Hydraulic operated



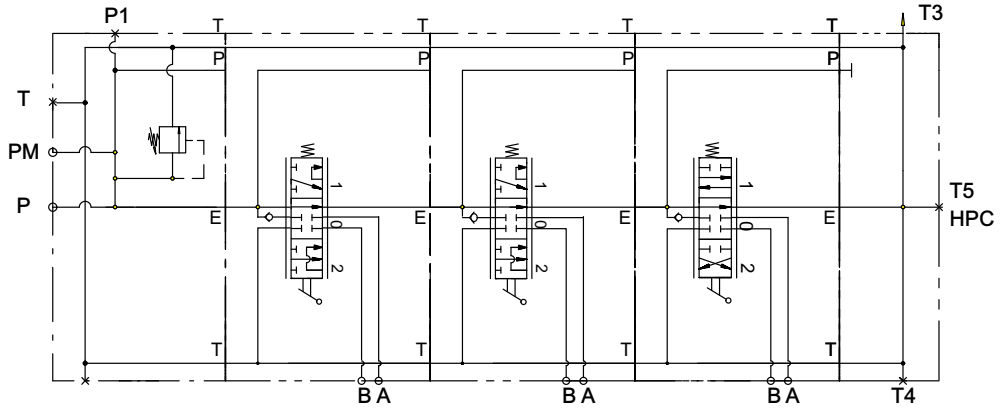
N° of section		/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X	mm	148	188	228	268	308	348	388	428	468	508
	inches	*5.83*	*7.40*	*8.98*	*10.55*	*12.13*	*13.7*	*15.28*	*16.85*	*18.43*	*20*
Y	mm	165	205	245	285	325	365	405	445	485	525
	inches	*6.50*	*8.07*	*9.65*	*11.22*	*12.8*	*14.37*	*15.94*	*17.52*	*19.09*	*20.67*

1.8.3 Hydraulic circuits combination examples

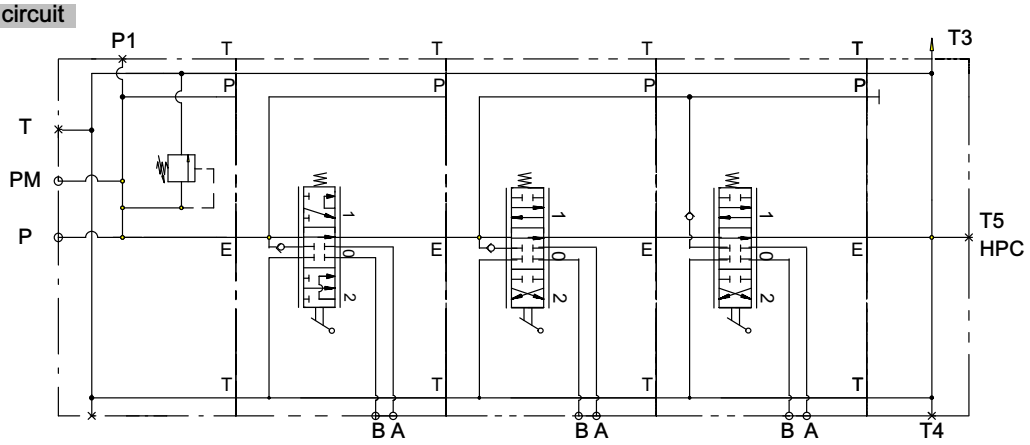
Parallel circuit



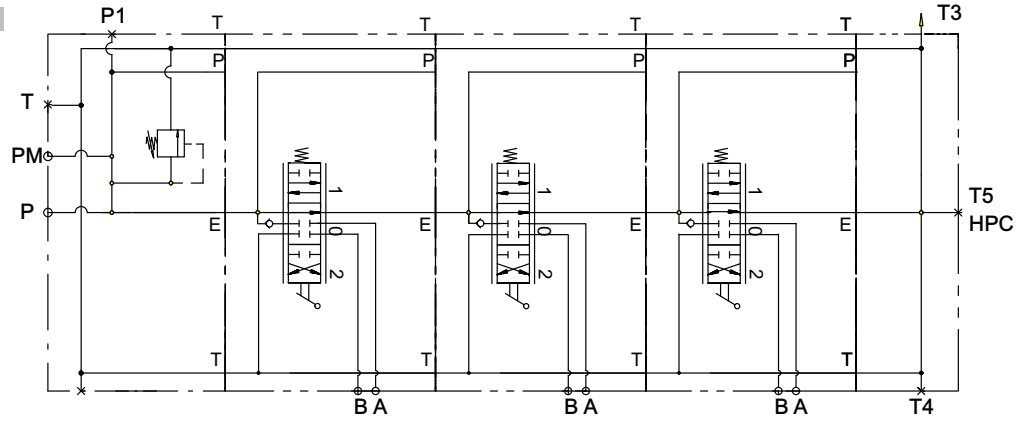
Series circuit



Series/parallel circuit



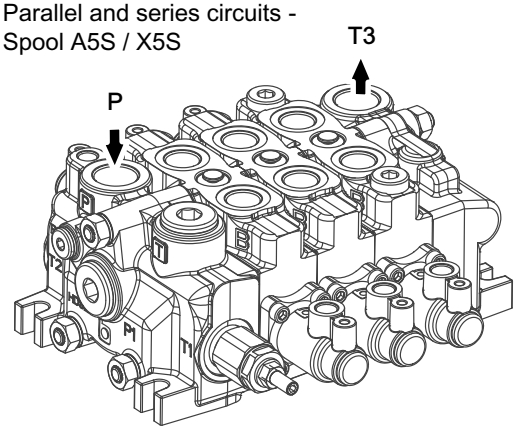
Tandem circuit

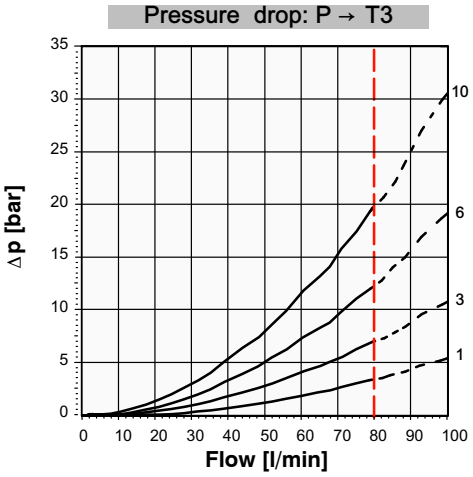


1.9 Performance data

1.9.1 Open centre P → T3

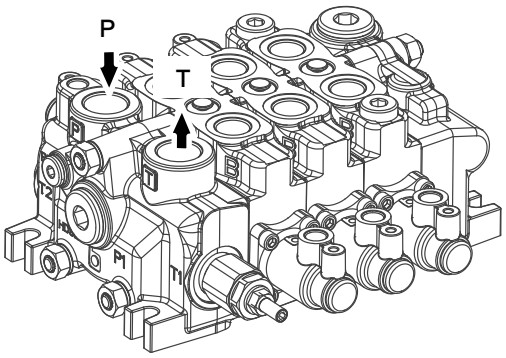
Parallel and series circuits -
Spool A5S / X5S

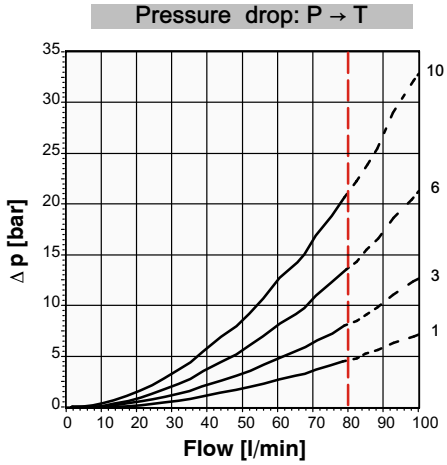




1.9.2 Open centre P → T

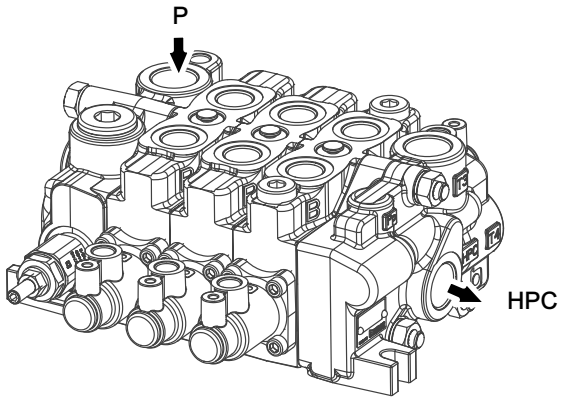
Parallel and series circuits -
Spool A5S / X5S

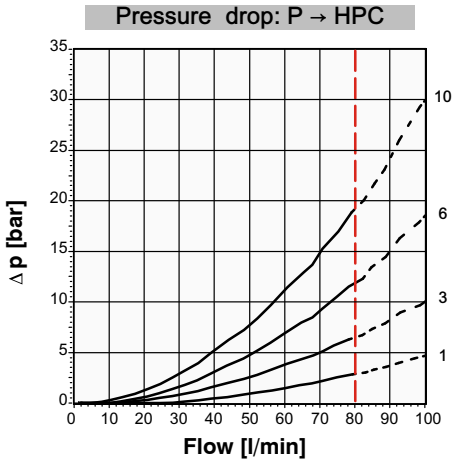




1.9.3 Carry over (HPC)

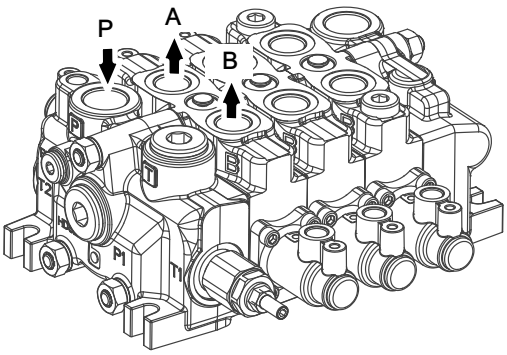
Parallel and series circuits -
Spool A5S / X5S

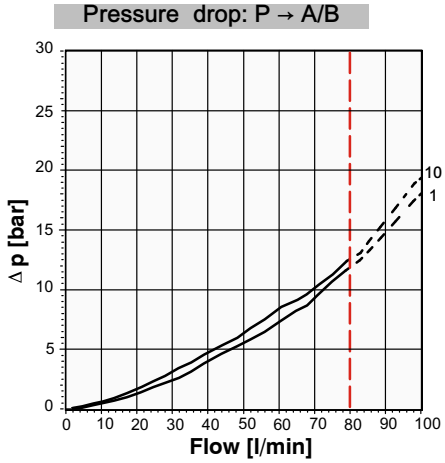




1.9.4 Inlet to work port A/B

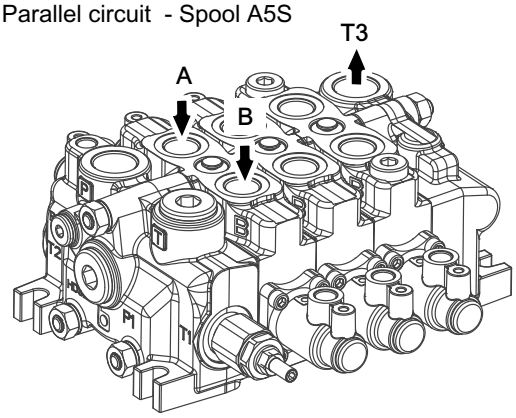
Parallel circuit - Spool A5S

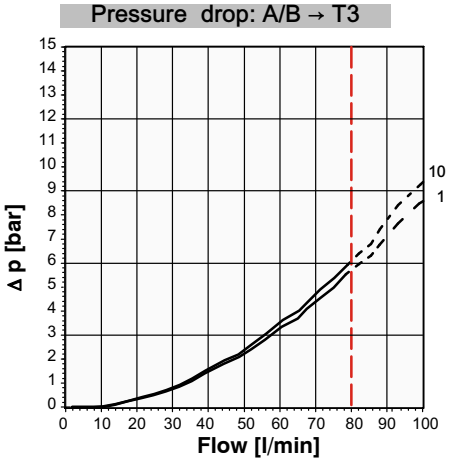




1.9.5 A/B work port to outlet “T3”

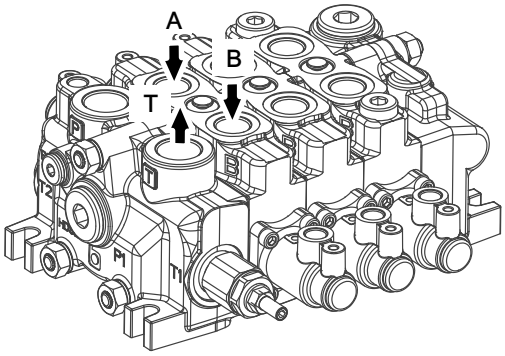
Parallel circuit - Spool A5S

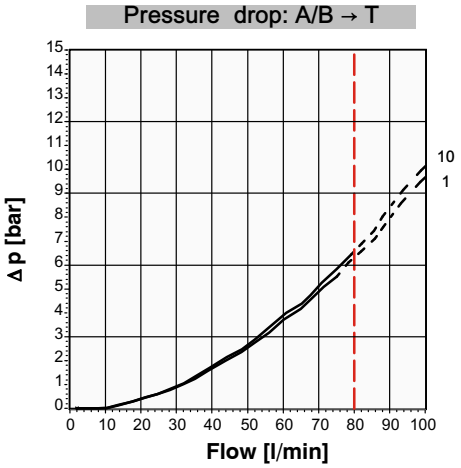




1.9.6 A/B work port to outlet “T”

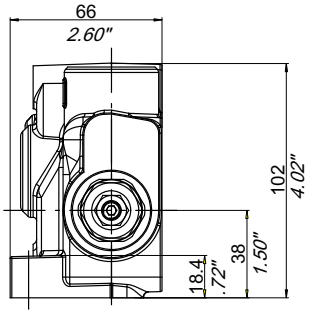
Parallel circuit - Spool A5S

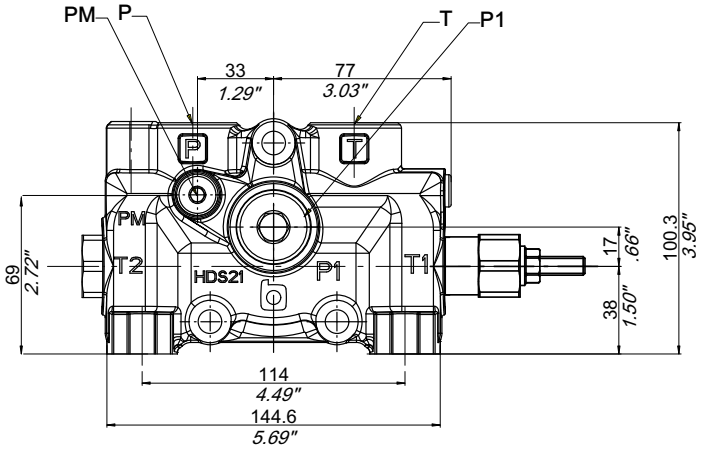




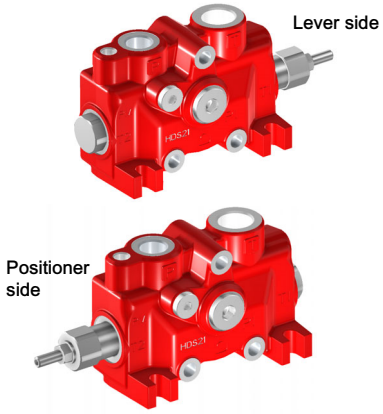
2 Inlet covers

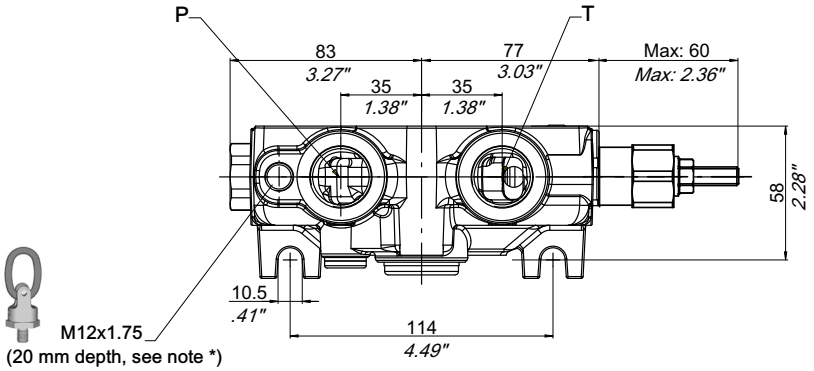
2.1 Dimensions and configurations



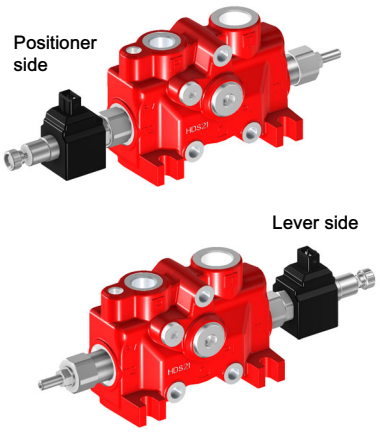


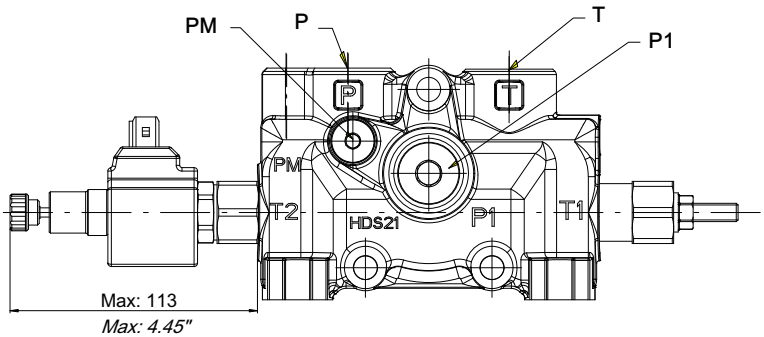
With relief valve RV





With BP valve





RV = adjustable relief valve
BP = by-pass 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 avoiding sudden accelerations.

2.1.1 Ports size without pilot lines - TM

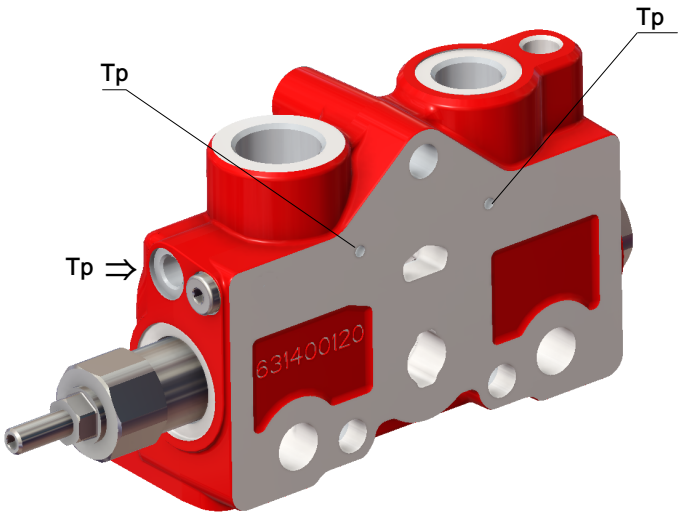
For fully manual controlled valve blocks.

Type	P	P1 (optional)	T	PM (optional)
TM 101	1/2” BSP	-	3/4” BSP	-
TM 102	1/2” BSP	1/2” BSP	3/4” BSP	1/4” BSP
TM 301	SAE10	-	SAE10	-
TM 302	SAE10	SAE10	SAE10	SAE6
TM 501	M22x1.5	-	M22x1.5	-
TM 502	M22x1.5	M22x1.5	M22x1.5	M14x1.5

2.1.2 Ports size with pilot lines - TH

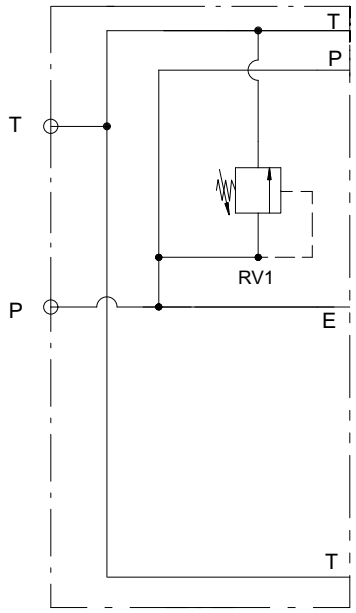
For valve blocks with electro-hydraulic controlled sections.

Type	P	P1 (optional)	T	PM (optional)	Tp
TH 101	1/2” BSP	-	3/4” BSP	-	M10x1
TH 102	1/2” BSP	1/2” BSP	3/4” BSP	1/4” BSP	M10x1
TH 301	SAE10	-	SAE10	-	M10x1
TH 302	SAE10	SAE10	SAE10	SAE6	M10x1
TH 501	M22x1.5	-	M22x1.5	-	M10x1
TH 502	M22x1.5	M22x1.5	M22x1.5	M14x1.5	M10x1



2.2 Inlet cover hydraulic schemes

TEST 21 TM _01 BL VC 00 00 0 PO TO



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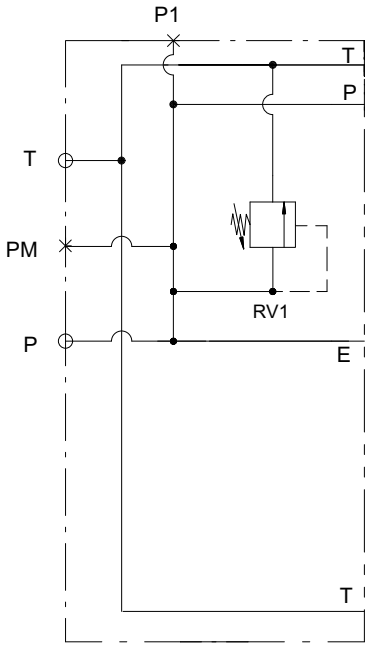
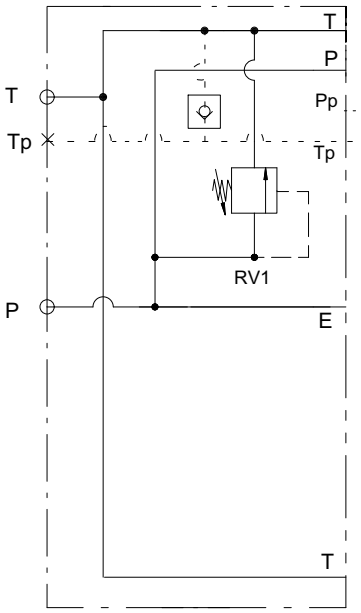


TEST 21 TH_01 GR VC 00 00 C PO TO



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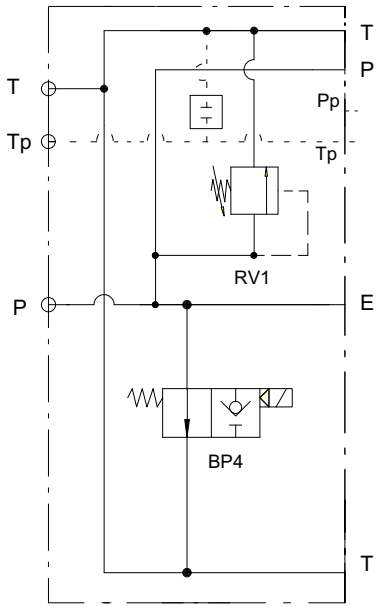
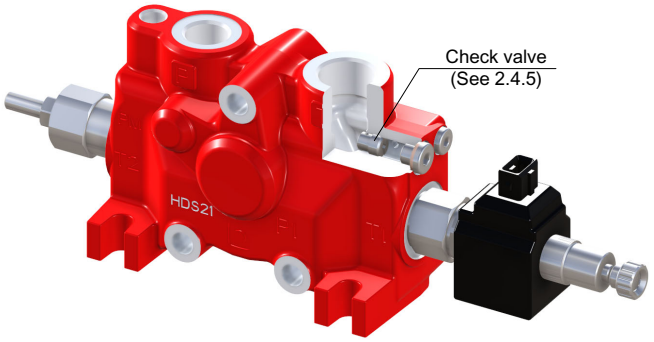
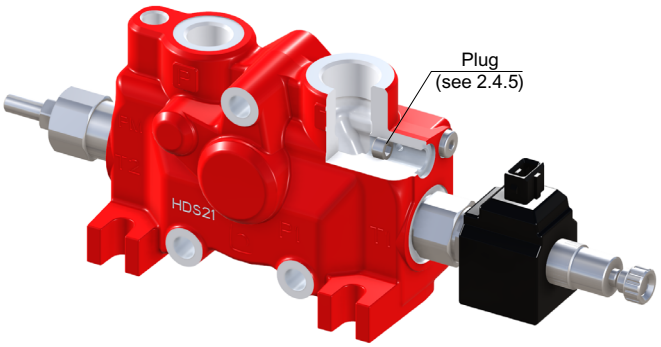
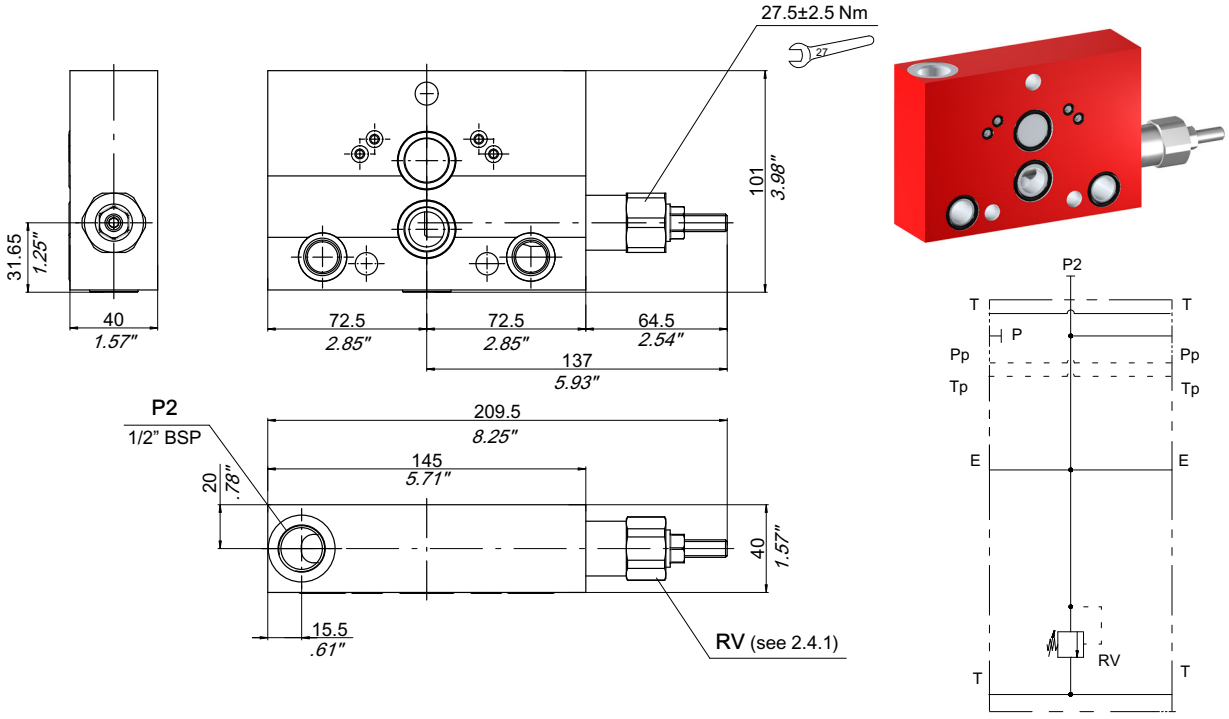






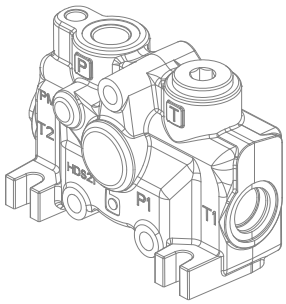
2.3 Intermediate sections

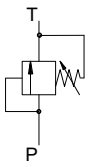
2.3.1 Intermediate inlet with relief valve - K84

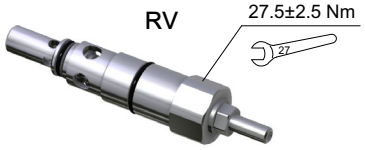


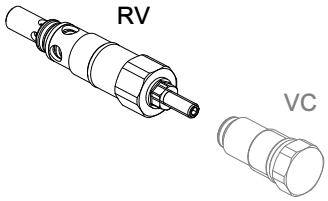
2.4 Inlet cover valves

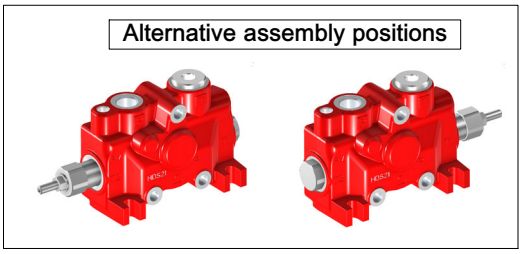
2.4.1 Standard relief valve - RV

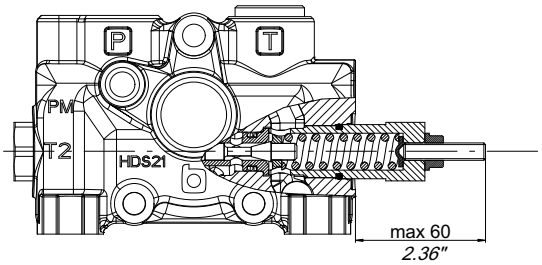


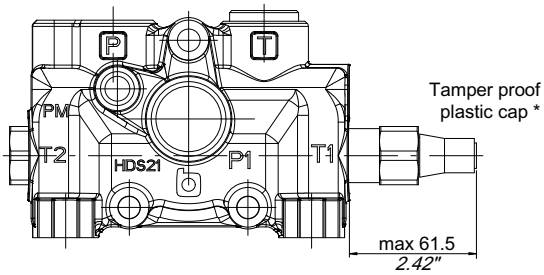






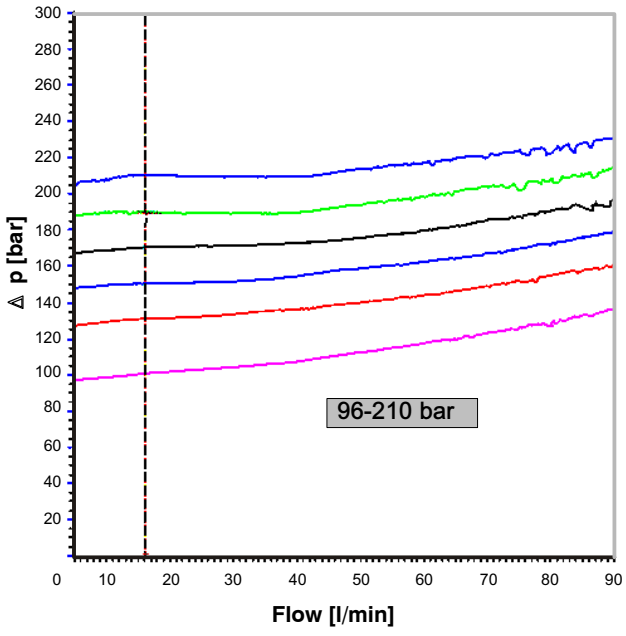


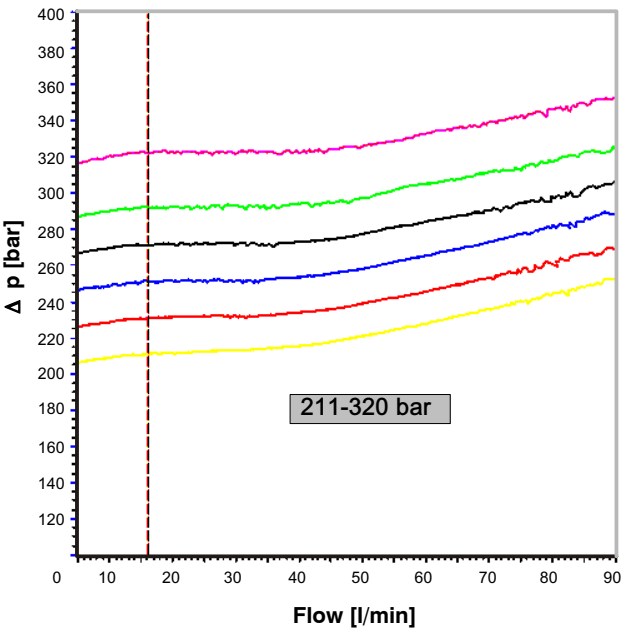




Pressure setting range bar (psi)	Type	Code
30 - 95 (435 - 1370)	YE	200787400782
96 - 210 (1390 - 3045)	GR	200787400802
211 - 320 (3060 - 4640)	BL	200787400762
Plug	VC	200778400160

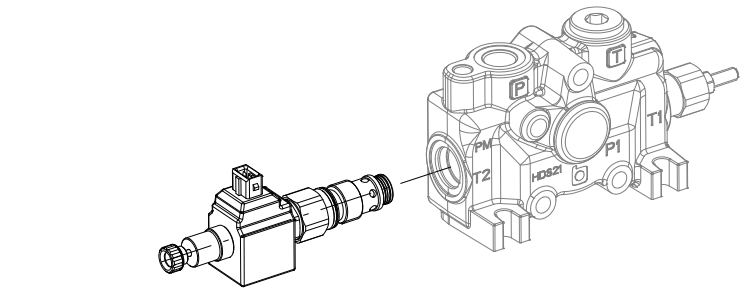
* Supplied on demand. Code: 200527900006.

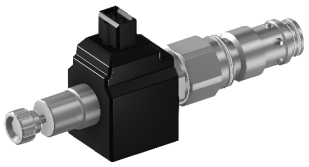


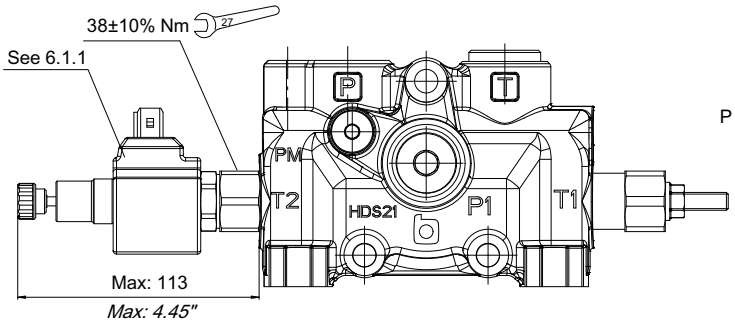


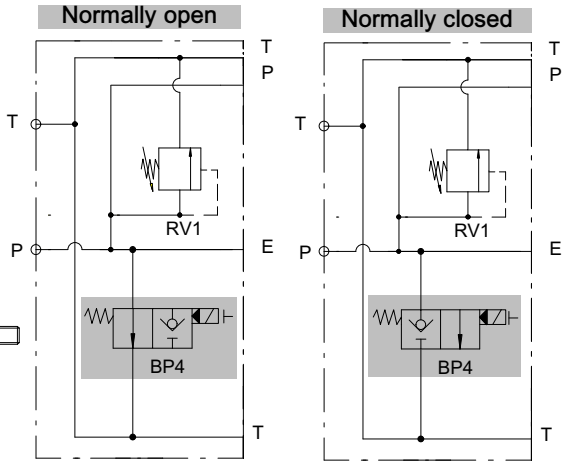
2.4.2 Unloading solenoid valve - BP4

Max operating pressure 240 bar



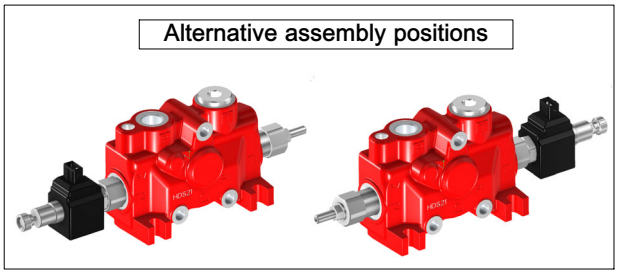






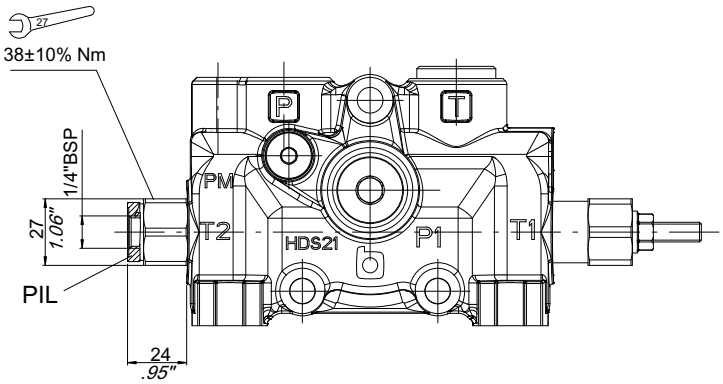
Circuit	Manual override	Type	Code without coil
Normally open	With (*)	AE	200757200530
	Without	A	200757200790
Normally closed	With (*)	CE	200757200520
	Without	C	200757200500

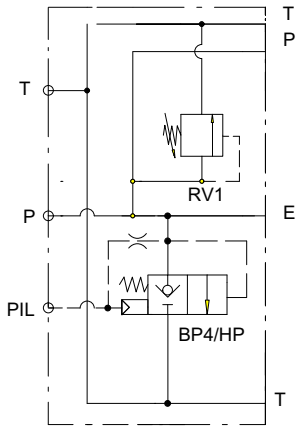
(*) Screw type override must not be used for continuous operation but for emergency only.

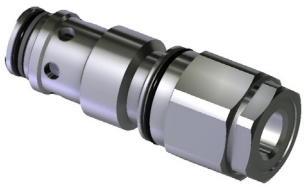


2.4.3 Hydraulic operated unloading valve - BP4/HP

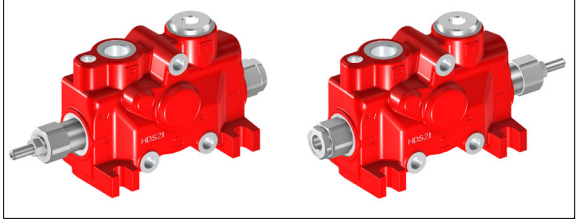
Type	Code
HP	200787202390





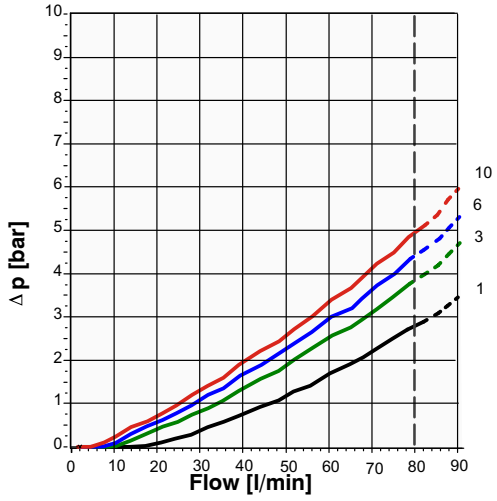


Alternative assembly positions

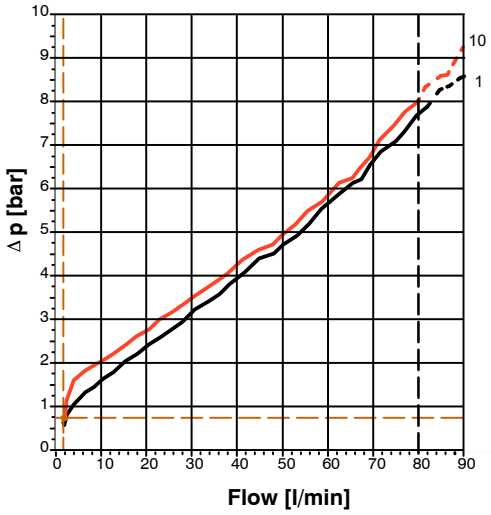


2.4.4 Pressure drop curves - BP4 (A/AE)

Pressure drop: P → T3
With by-pass valve open and spools in neutral position

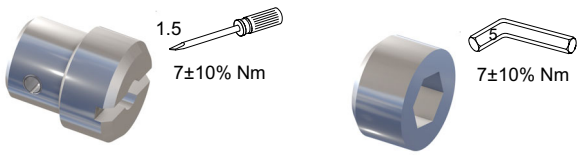


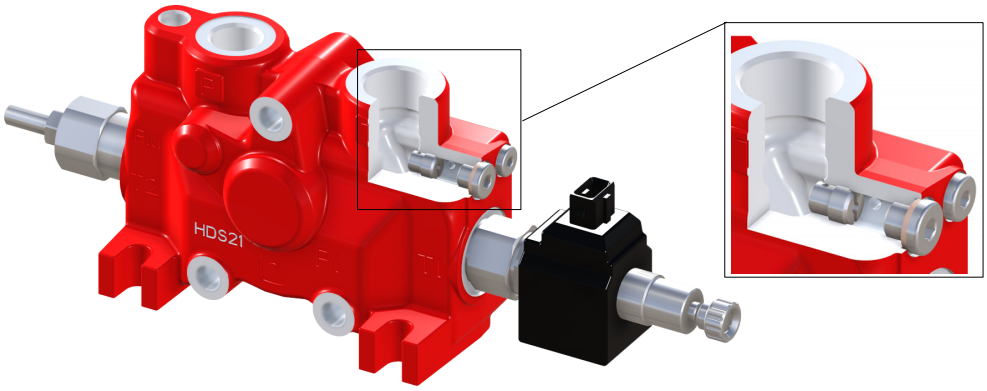
Pressure drop: P → T3
With by-pass valve open and neutral gallery close (one spool switched to full stroke) and A/B plugged



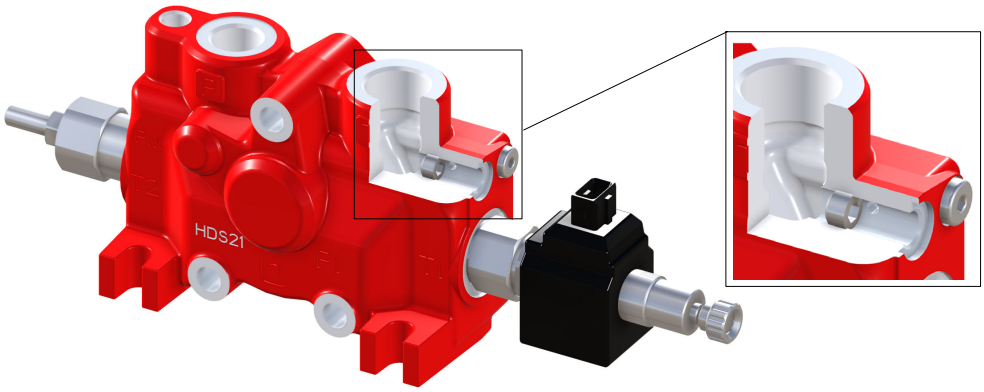
2.4.5 Tank pilot line options

Type	Code
C	200787603100
T	200678000110





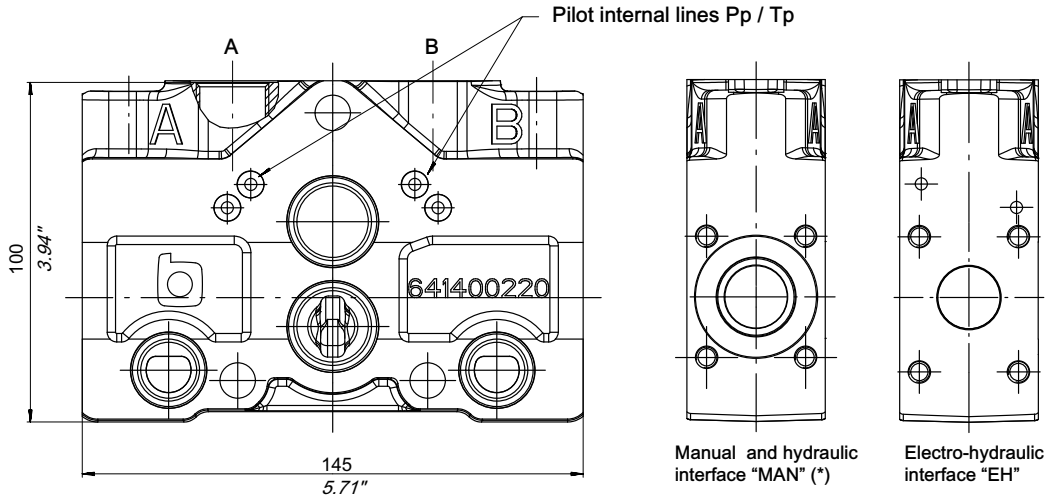
C= internal drain (with check valve), externally plugged

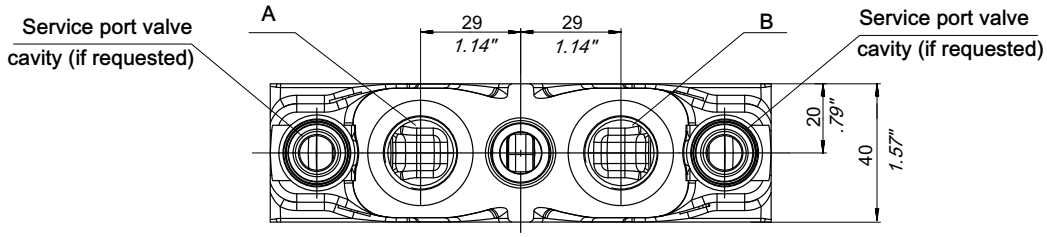


T= external drain, internally plugged

3 Sections

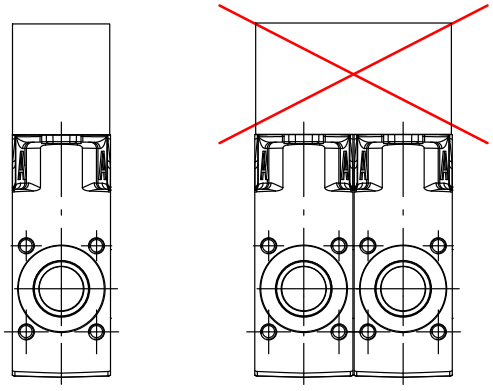
3.1 Characteristics and dimensions





(*) for Manual, HP and ON-OFF controls

Attention:
flanging manifolds on the top work port surface of a valve section is not allowed without previous approval by our Technical Department. Larger flanging manifolds that connect two or more valve sections together are forbidden.



3.1.1 Parallel valve bodies without pilot lines

To be used with TM and PM covers only.

Thread	Interface	Type	
		Without A/B service port valve cavities	With A/B service port valve cavities
1/2” BSP	MAN	K104	K103
SAE10	MAN	K304	K303
M22x1.5	MAN	K504	K503

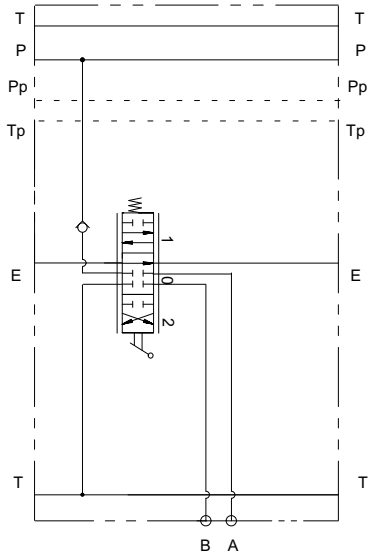
3.1.2 Parallel valve bodies with pilot lines (Pp/Tp)

To be used with TH and PH covers only.
For valve blocks with electro-hydraulic controlled sections.

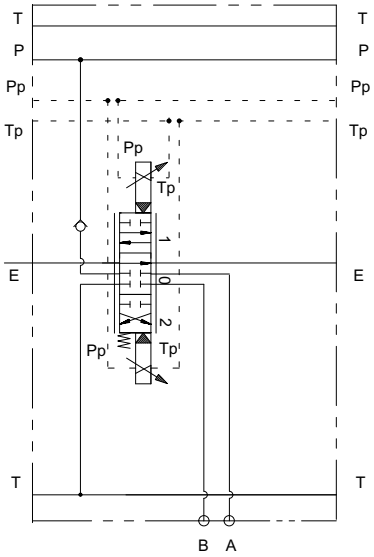
Thread	Interface	Type	
		Without A/B service port valve cavities	With A/B service port valve cavities
1/2” BSP	MAN	K102	K101
1/2” BSP	EH	K108	K107
SAE10	MAN	K302	K301
SAE10	EH	K308	K307
M22x1.5	MAN	K502	K501
M22x1.5	EH	K508	K507

3.1.3 Parallel circuits

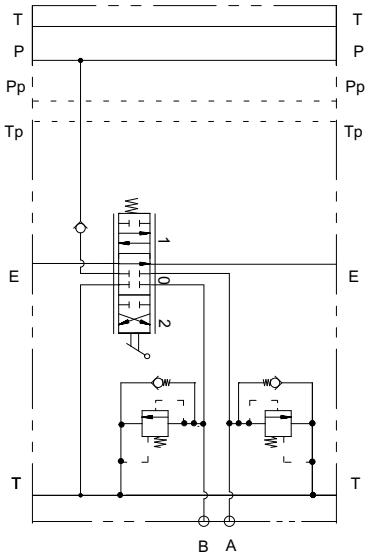
HDS21 K_02 A5S 133 L100



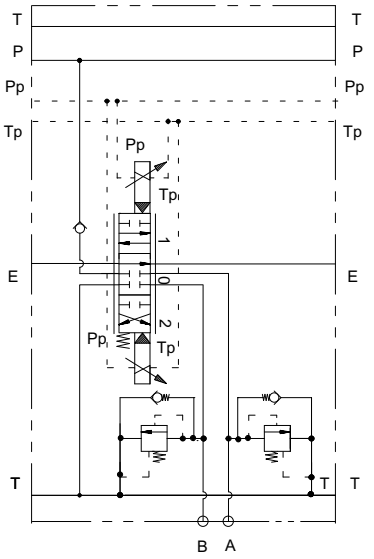
HDS21 K_08 A5S 322S6NN0

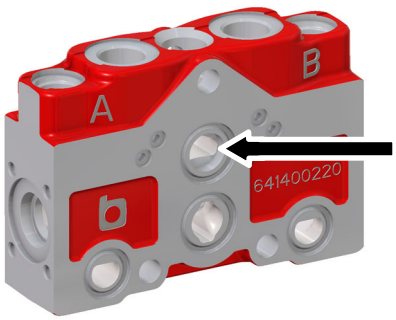


HDS21 K_01 A5S 133 L100 20 20



HDS21 K_07 A5S 322S6NN0 25 25





OPEN with parallel circuit

3.1.4 Series and tandem valve bodies without pilot lines

To be used with TM and PM covers only.

Thread	Interface	Type	
		Without A/B service port valve cavities	With A/B service port valve cavities
1/2” BSP	MAN	K154	K153
SAE10	MAN	K354	K353
M22x1.5	MAN	K554	K553

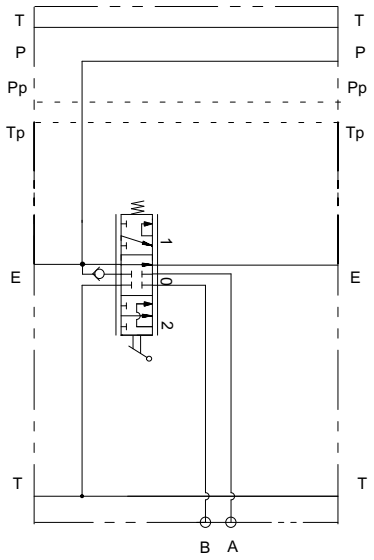
3.1.5 Series and tandem valve bodies with pilot lines (Pp/Tp)

To be used with TH and PH covers only.
For valve blocks with electro-hydraulic controlled sections.

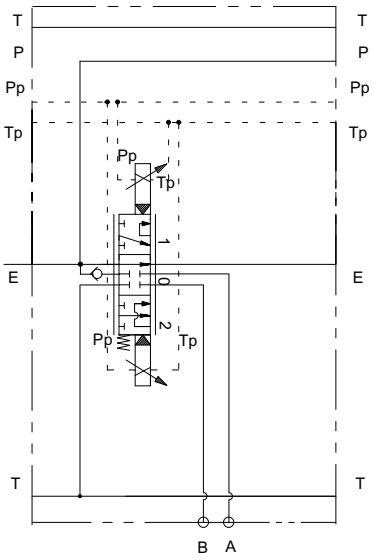
Thread	Interface	Type	
		Without A/B service port valve cavities	With A/B service port valve cavities
1/2” BSP	MAN	K152	K151
1/2” BSP	EH	K158	K157
SAE10	MAN	K352	K351
SAE10	EH	K358	K357
M22x1.5	MAN	K552	K551
M22x1.5	EH	K558	K557

3.1.6 Series circuits

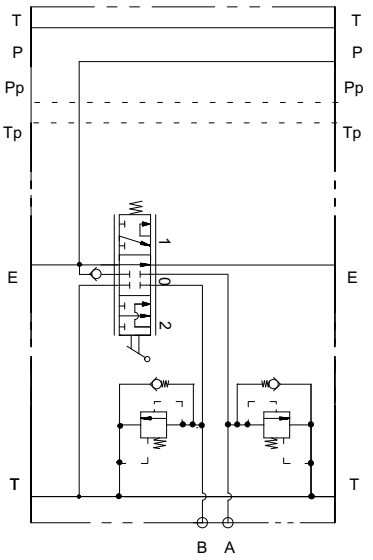
HDS21 K_52 X5S 79 L100



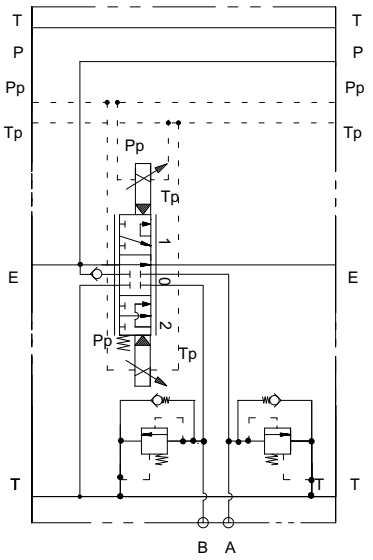
HDS21 K_58 X5S 322S6NN0

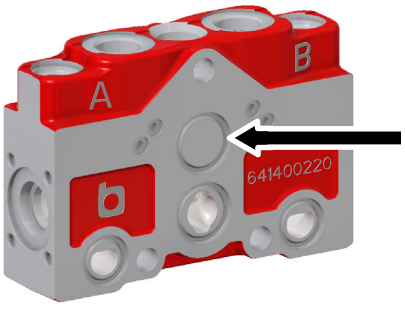


HDS21 K_51 X5S 79 L100 25 25



HDS21 K_57 X5S 322S6NN0 20 20

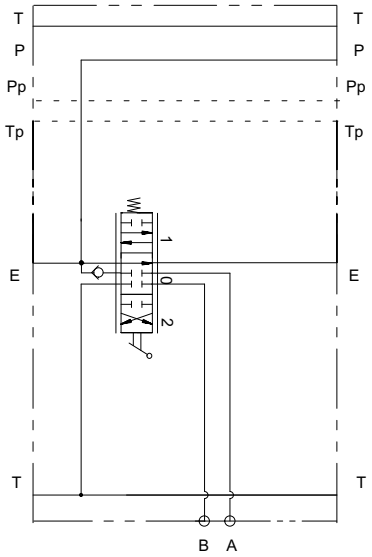




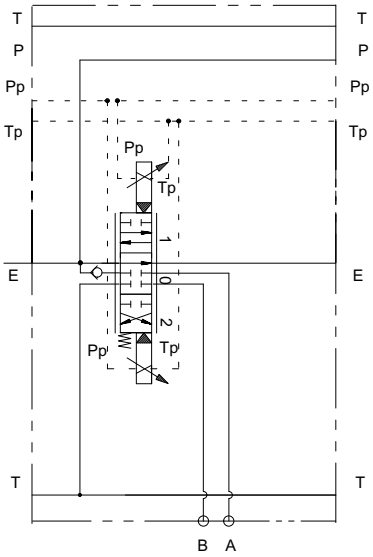
CLOSED with series circuit

3.1.7 Tandem circuits

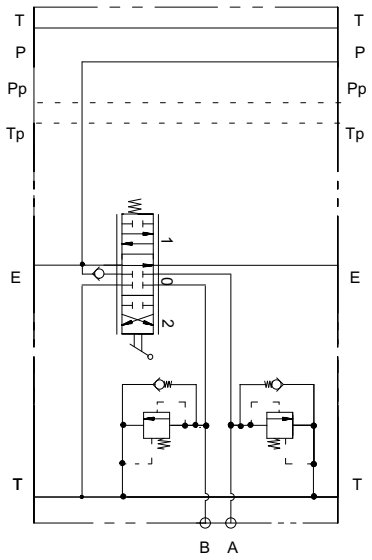
HDS21 K_52 A5S 79 L100



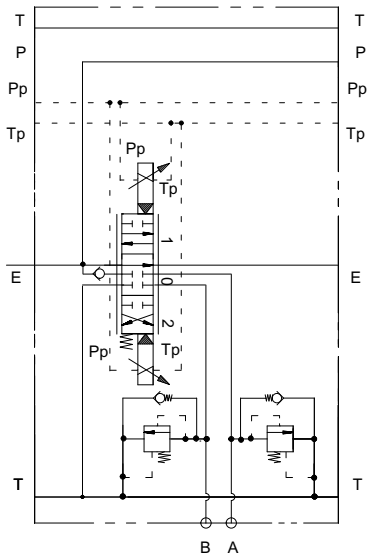
HDS21 K_58 A5S 322S6NN0

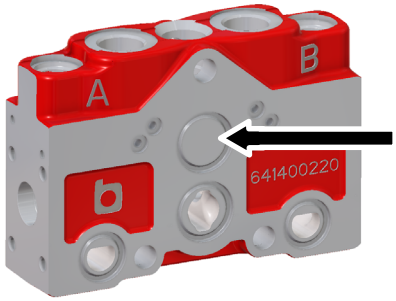


HDS21 K_51 A5S 79 L100 20 20



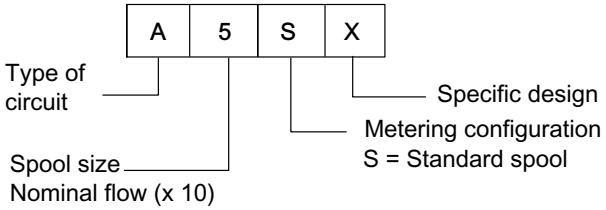
HDS21 K_57 A5S 322S6NN0 25 25

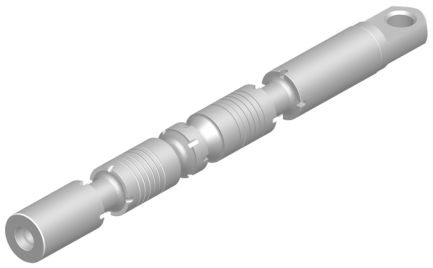




CLOSED with
tandem circuit

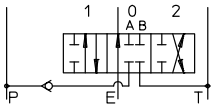
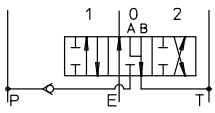
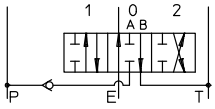
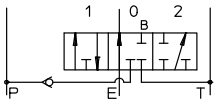
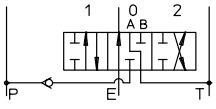
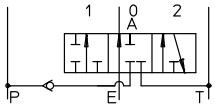
3.2 Spools

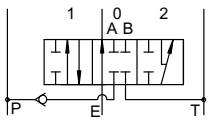
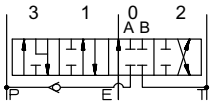
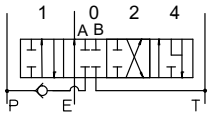
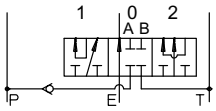




3.2.1 Standard spools

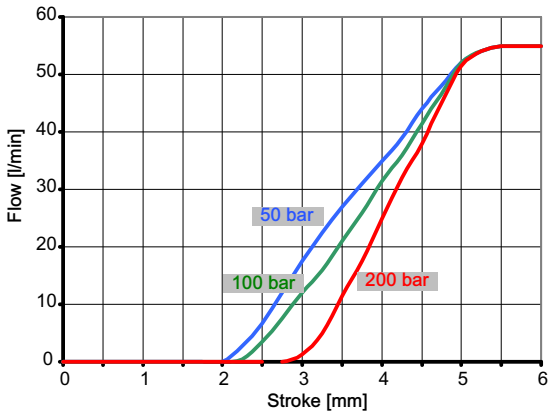
For manual, hydraulic and electro-hydraulic controls

Spool Type	Hydraulic schematic	Circuit	Features	Application examples
A5S		Double acting A/B closed	Symmetric	
A5B		Double acting A/B closed	High metering to tank on B side	LOADERS BOOM and BUCKET FUNCTION
A5A		Double acting A/B closed	High metering to tank on A side	LOADERS BOOM and BUCKET FUNCTION
A5BP		Double acting A/B closed	High metering to tank on B side (For HP controls only)	
A6R		Double acting A/B closed	Symmetric High metering to tank on A/B	SWING FUNCTION / ROTATION
A6A		Double acting A/B closed	High metering to tank on A side	LOADERS BOOM and BUCKET FUNCTION
A6B		Double acting A/B closed	High metering to tank on B side	LOADERS BOOM and BUCKET FUNCTION
A7S		Double acting A/B closed	Symmetric	
C5S		Double acting A/B to tank	Motor Spool	
D6S		Double acting A closed - B to tank		
(G5S)		Single acting B closed		FORK LIFT LIFTING FUNCTION
(L5S)		Double acting B closed A to tank in neutral		
S5S		Single acting A closed		FORK LIFT LIFTING FUNCTION

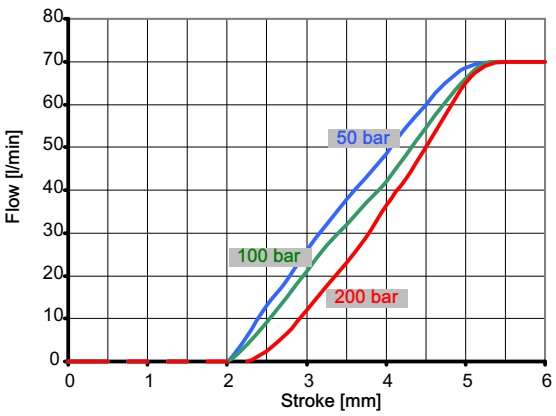
Spool Type	Hydraulic schematic	Circuit	Features	Application examples
R5B*		Double acting A/B closed	Regen pushing the spool	
Z5S		Double acting A/B closed	Pull to float (Manual controls only)	LOADERS BOOM FUNCTION
W5S		Double acting A/B closed	Push to float High metering to tank on A side	LOADERS BOOM FUNCTION
W5P		Double acting A/B closed	Push to float (HP/EHO controls only)	LOADERS BOOM FUNCTION
X5S		Double acting A/B closed	Series spool	

* A special body is required
( ): should this specific spool be needed, please contact our Sales Dept.

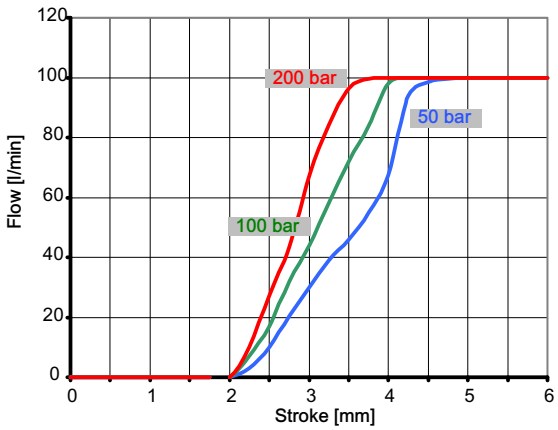
Spool size 5 metering: P → A/B (inlet flow 55 l/min)



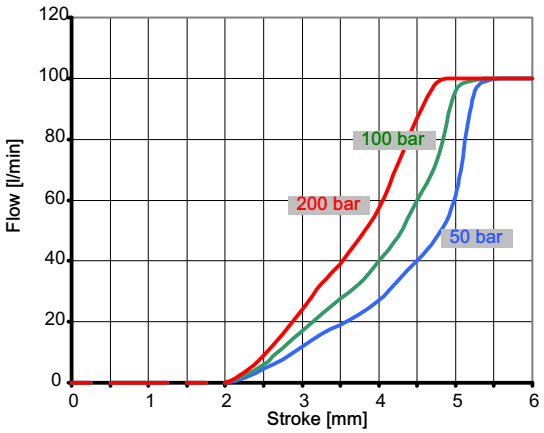
Spool size 5 metering: P → A/B (inlet flow 70 l/min)



Spool size 5 metering: A/B → T (port flow 100 l/min)
metering configuaration S

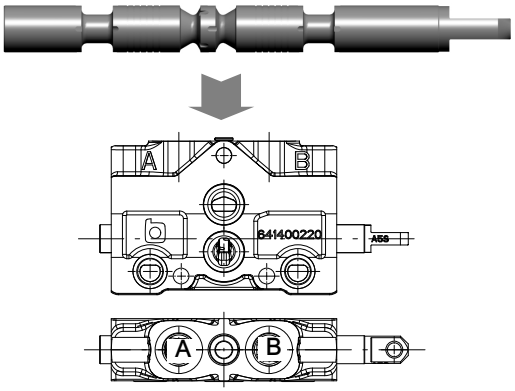


Spool size 5 metering: A/B → T (port flow 100 l/min)
High metering to tank spools
Metering configuration A and B and floating



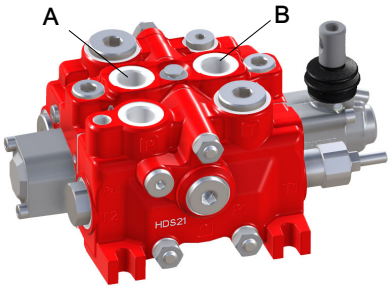
3.2.2 Spool assembly direction

Positioner kit on A port - standard position



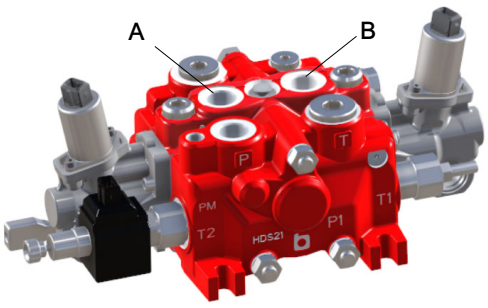
standard position

HDS21 K101 A5S 79 L100 0000

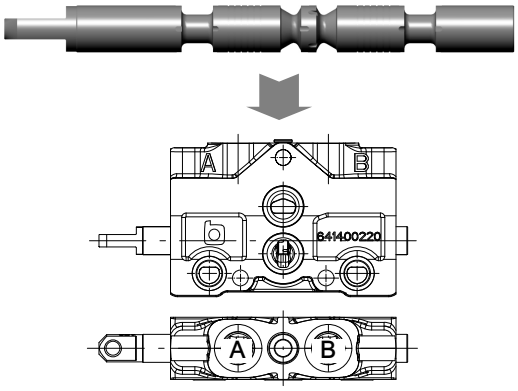


standard position

HDS21 K107 A5S 320S6NNKH 0505

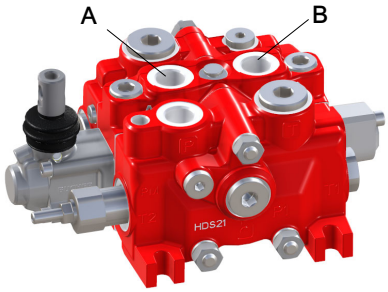


Positioner kit on B port - inverted spool



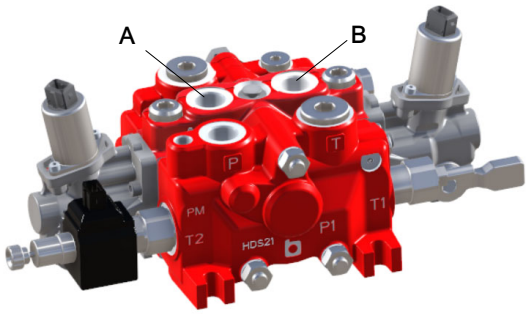
inverted spool

HDS21 K101 A5S 79 L100 0000 I



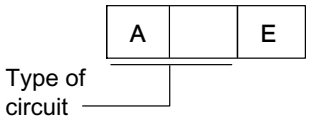
inverted spool

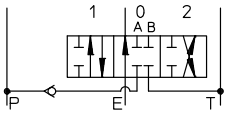
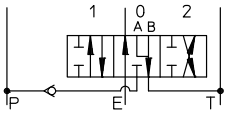
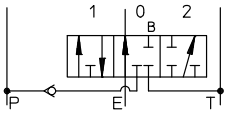
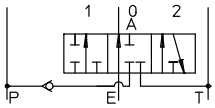
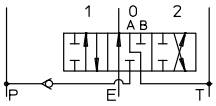
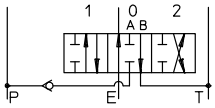
HDS21 K107 A5S 320S6NNKH 0505 I



A and B are marked on casting.

3.2.3 Direct acting ON/OFF spools

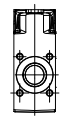


Spool Type	Hydraulic schematic	Circuit	Features
AE		Double acting A/B closed	
(CE)		Double acting A/B to tank in neutral	
(GE)		Single acting B closed	
(SE)		Single acting A closed	
(LE)		Double acting B closed A to tank	
(DE)		Double acting A closed B to tank	

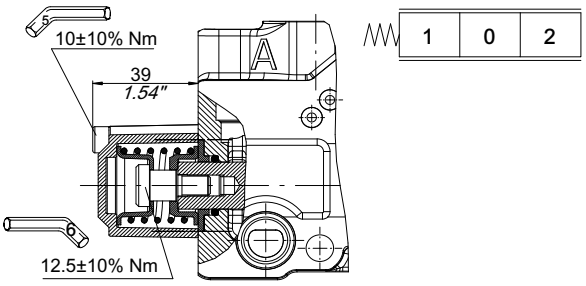
( ): should this specific spool be modified, please contact our Sales Dept.

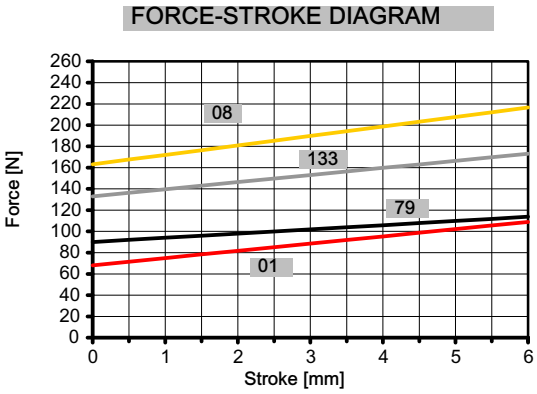
3.3 Manual positioners

The standard position of the spring kit is always located on A port side

Body interface

MAN

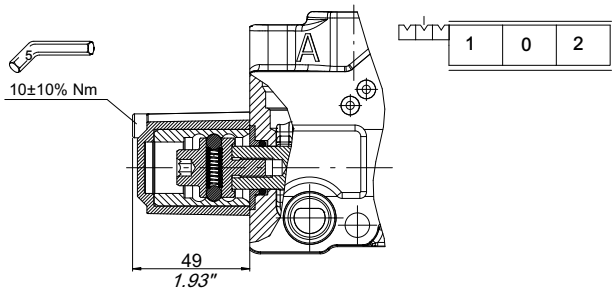
3.3.1 Spring return to neutral position





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

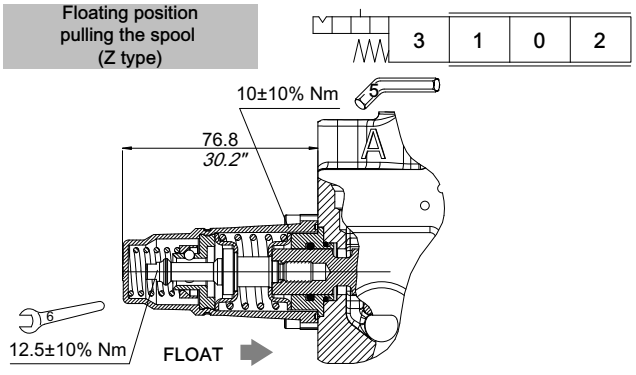
3.3.2 Detent in all positions



Type	Code
17	200768630600

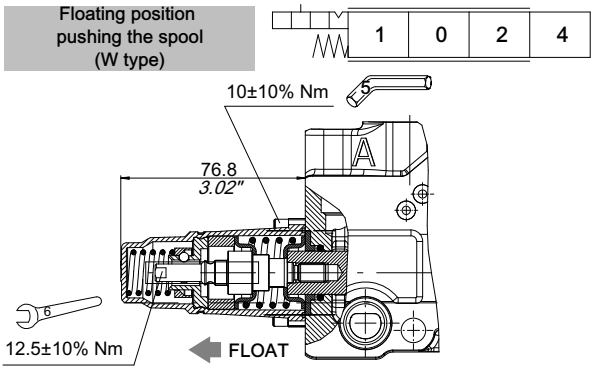
3.3.3 Detent in floating position and spring return to neutral from position 1 and 2

Floating position pulling the spool (Z type)



Type	Code	Main spring	Detent spring
04	200768640800	RED	BLACK
333	200768640830	BLACK	BLACK

Floating position pushing the spool (W type)

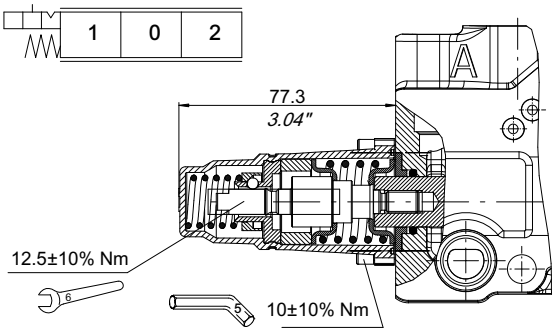


Type	Code	Main spring	Detent spring
06	-	RED	BLACK
32	-	BLACK	BLACK

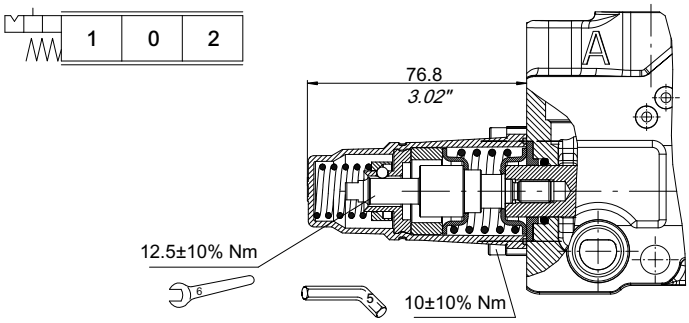
Should this positioner be needed, please contact our Sales Dept.

3.3.4 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
36	200768630720	RED	BLACK

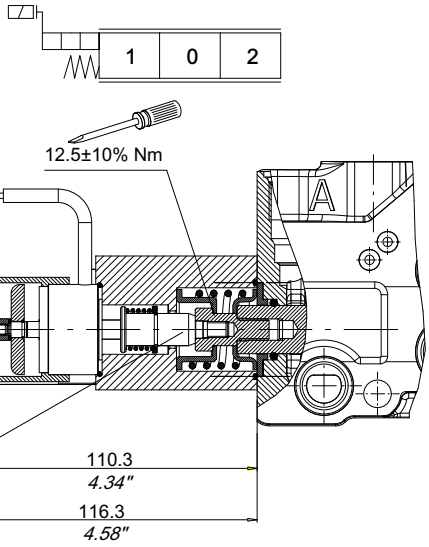


Type	Code	Main spring	Detent spring
34	200768630710	RED	BLACK

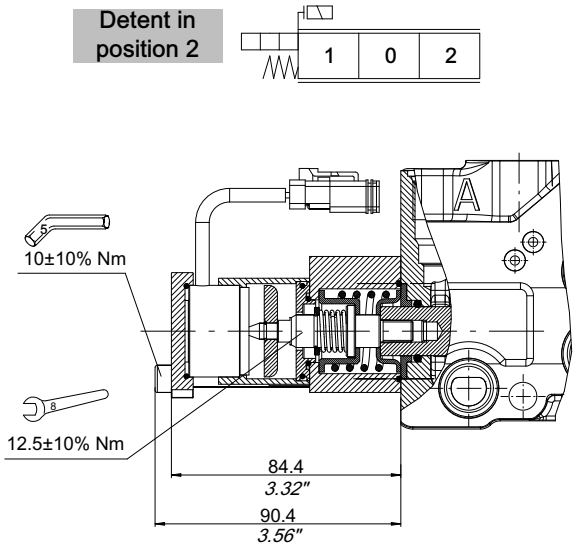
3.3.5 Electro-magnetic detent positioners (EMD)

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

Detent in position 1



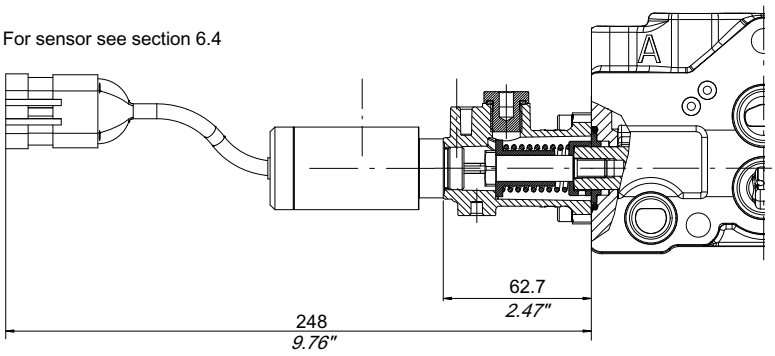
Detent in position 2

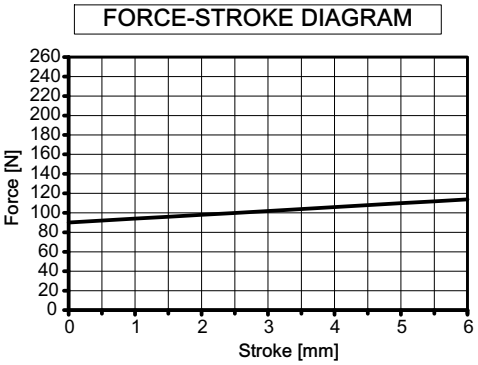


Coil operating features	
Nominal voltage	12 VDC ± 10%
Power rating	7 W
Electrical resistance when holding (20°C)	21 ± 1.5 Ohm
Min. solenoid axial hold force	260 N
Duty cycle	100%
Standard cable length	500 mm

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

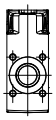
3.3.6 Manual positioner with spool sensor





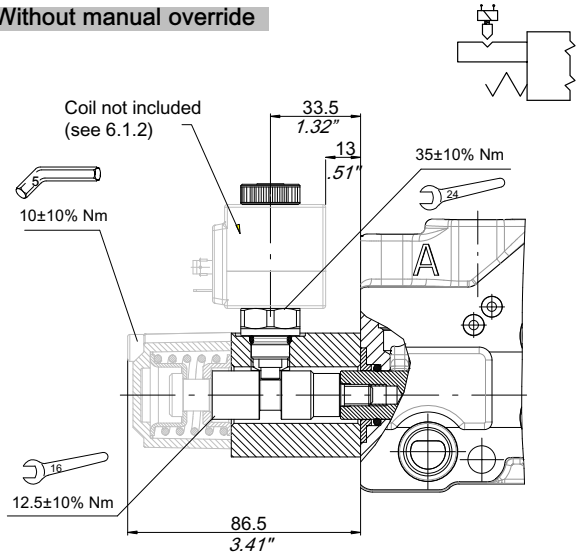
Type	Code
70	200768612230

3.4 Intermediate kits

Body interface

MAN

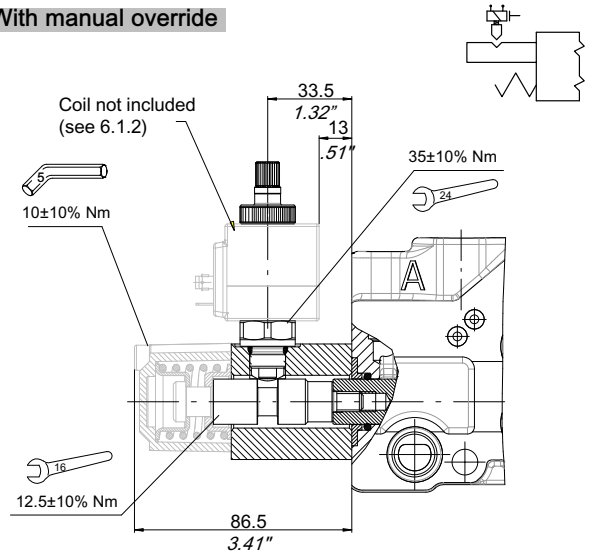
3.4.1 Electro-mechanical locking (normally locked)

Without manual override



Type	Code
EM	200768320030

With manual override

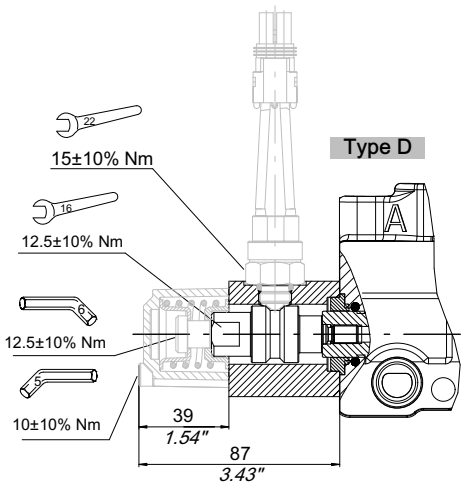


Type	Code
EME	-

Should a version without part number be needed, please contact our Sales Dept.

3.4.2 Microswitch kits

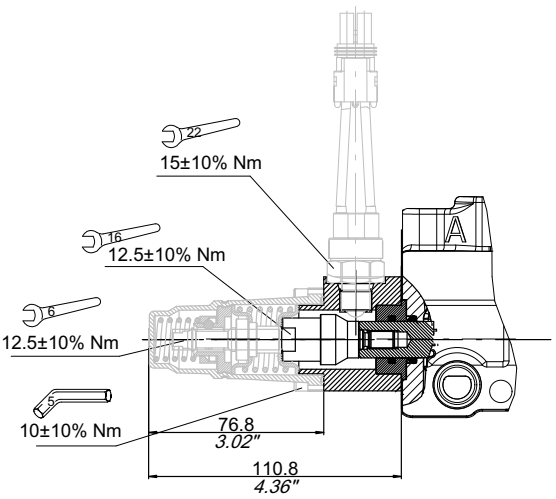
3.4.2.1 Spool movement detection



Type	Code	Scheme
D	-	1 0 2
S1	-	1 0 2
S2	-	1 0 2

Should this positioner be needed, please contact our Sales Dept.

3.4.2.2 Floating position detection

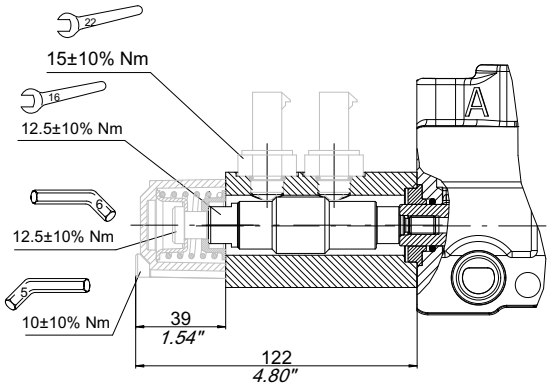


Only with Z spool

Type	Code	Scheme
S3	-	3 1 0 2

Should this positioner be needed, please contact our Sales Dept.

3.4.2.3 Spool direction detection



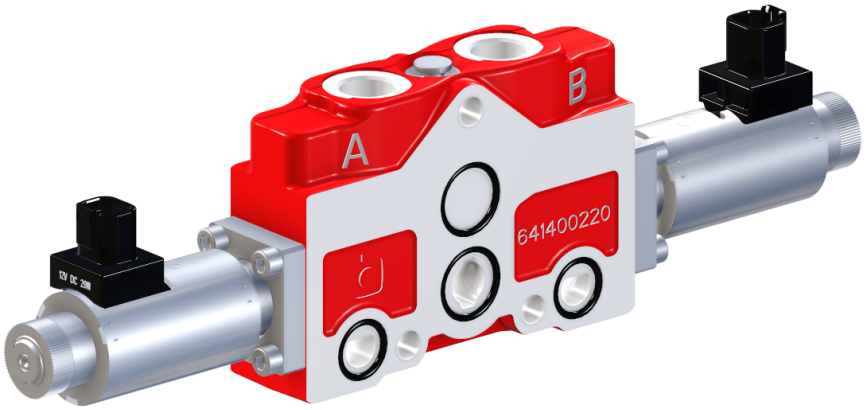
Type	Code	Scheme
D2	-	1 0 2

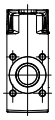
Should this positioner be needed, please contact our Sales Dept.

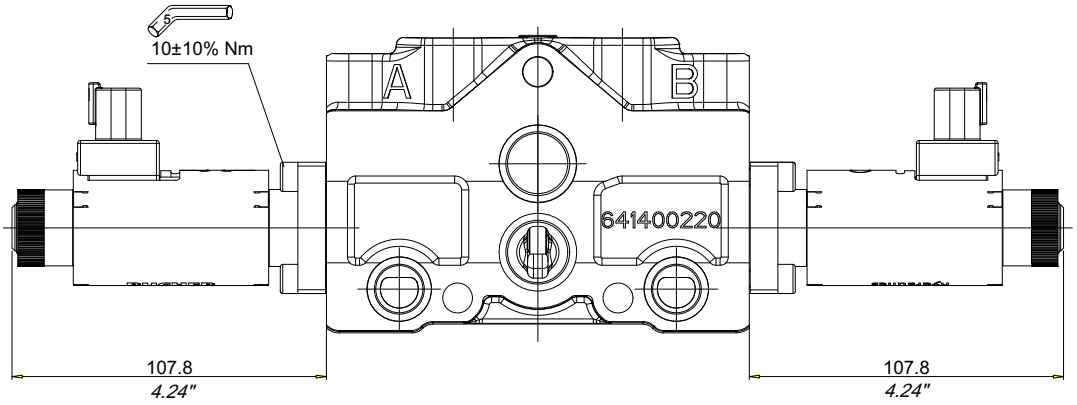
D: microswitch operated in both directions
S1: microswitch operated in POS.1
S2: microswitch operated in POS. 2
S3: microswitch operated in POS. 3 (only with Z spool)
D2: two microswitches, one for each direction.

For microswitches see 6.2

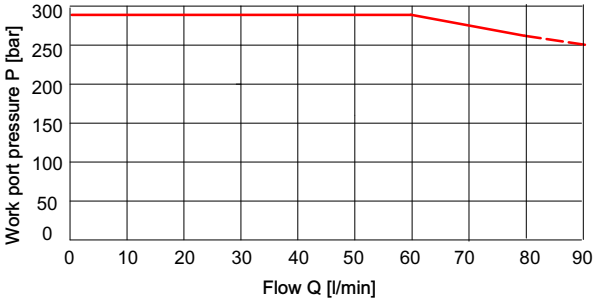
3.5 Direct acting ON-OFF control



Body interface

MAN



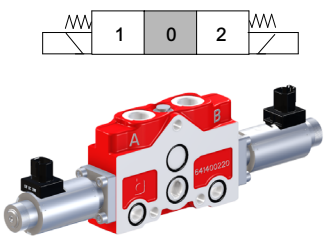
Solenoid tube mechanical characteristics	
Max peak pressure	100 bar *(1450 PSI)*
Max static pressure	250 bar *(3630 PSI)*

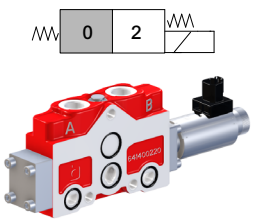


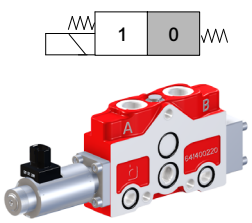
Operating performance with coil under stabilization temperature conditions at nominal voltage.

Valid for single actuation of parallel, series and indipendent sections with T or HPC back pressure < 20 bar.

For other operating conditions please contact our Sales Department.

Type	Double acting
01E	

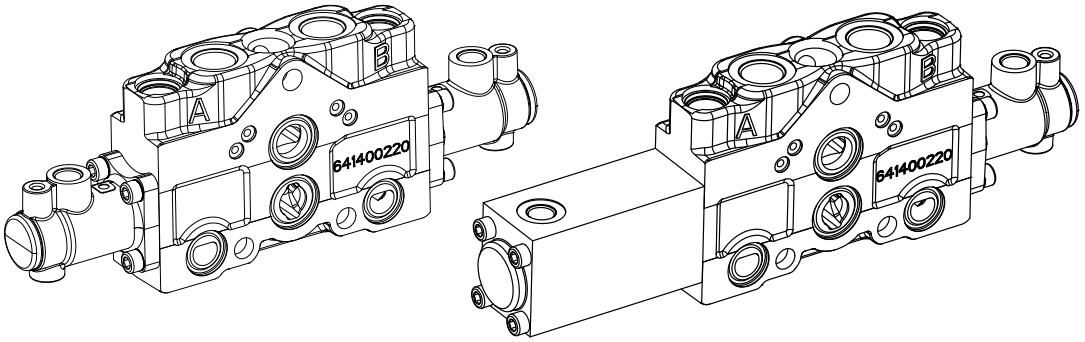
Type	Single acting port “B”
02E	

Type	Single acting port “A”
03E	

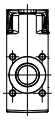
For coils see section 6.1.2.

3.6 Hydraulic controls - HP

The standard position of positioner kits is on A port side

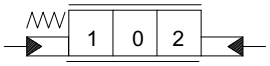


Body interface



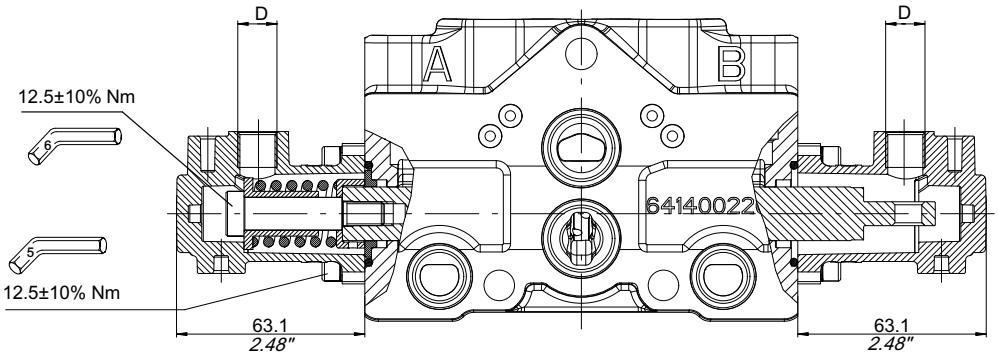
MAN

3.6.1 Standard positioners



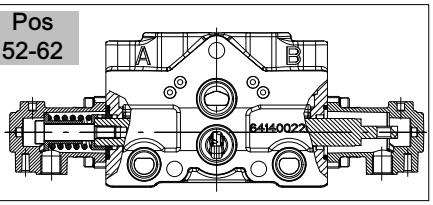
Pmax= 40 bar *(580 PSI)*

Pos
50-60

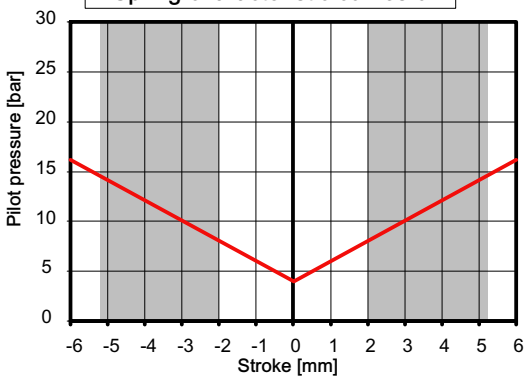


Type		D	Spring	Code
50	52	1/4" BSP	5	200768650691
-	-	SAE6	-	-
60	62	1/4" BSP	6	200768650701
-	-	SAE6	-	-

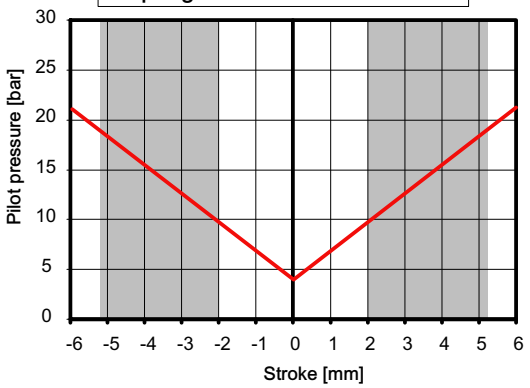
Pos
52-62



Spring characteristic curves 5



Spring characteristic curves 6

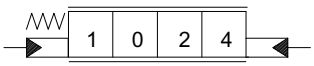


Standard metering stroke

Spools for specific applications/functions could have different metering strokes

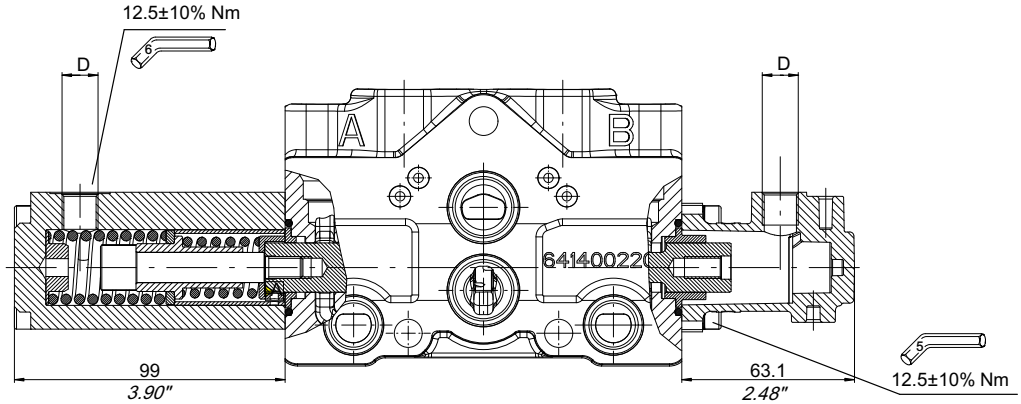
Should a version without part number be needed, please contact our Sales Dept.

3.6.2 Floating positioners



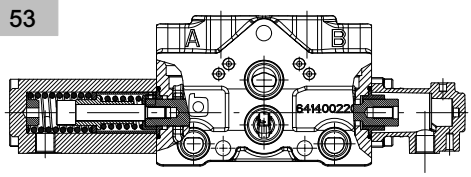
Pmax= 40 bar *(580 PSI)*

Pos 51

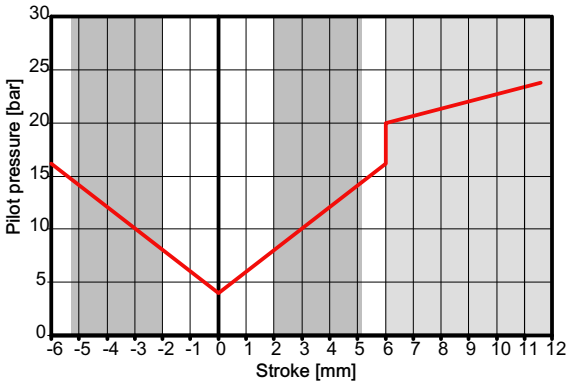


Type		D	Spring	Code
51	53	1/4" BSP	5	200768650681
-	-	SAE6	-	-

Pos 53



Spring characteristic curve 5



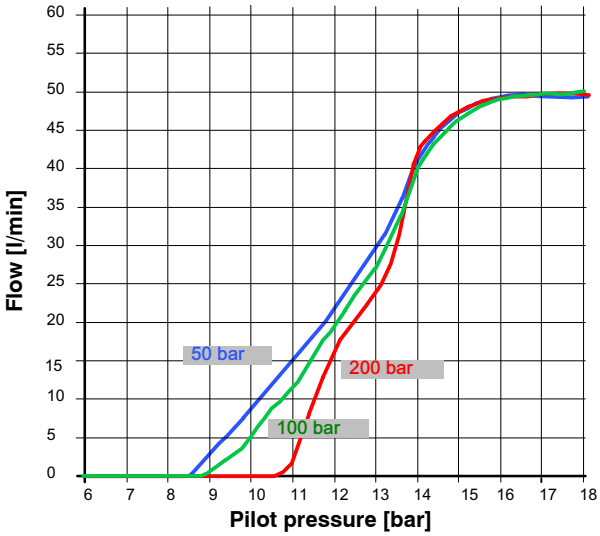
Standard metering stroke Floating

Spools for specific applications/functions could have different metering strokes
Only for W spool applications

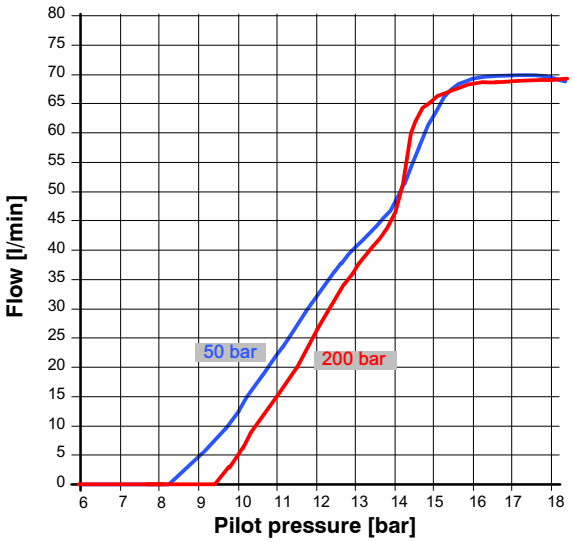
Should a version without part number be needed, please contact our Sales Dept.

3.6.3 Spool size 5 metering curves - Spring type 5

Spool metering: P→A→B→T (inlet flow 50 l/min)

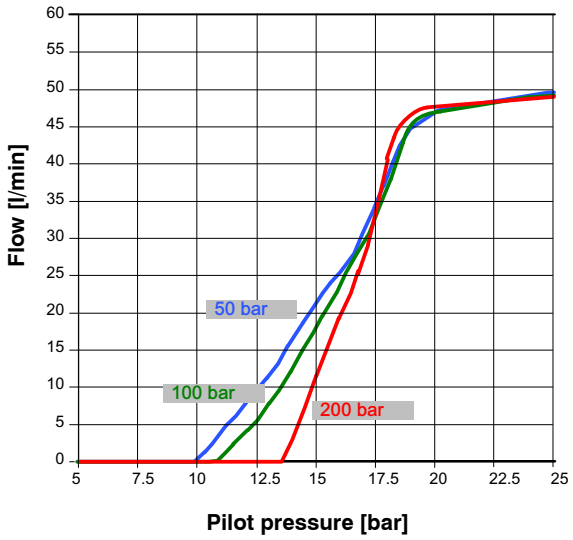


Spool metering: P→A→B→T (inlet flow 70 l/min)

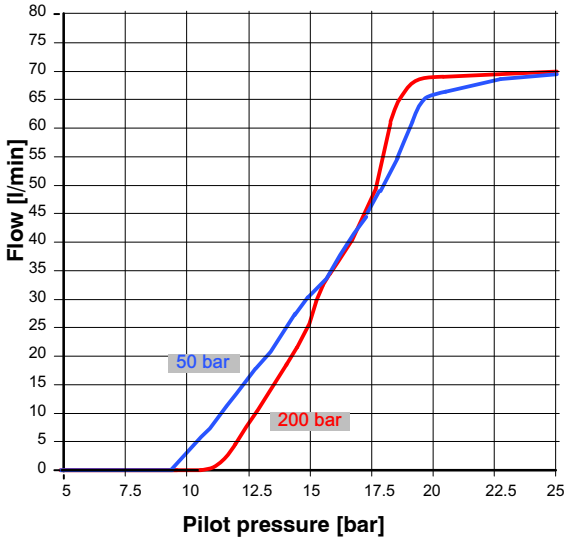


3.6.4 Spool size 5 metering curves - Spring type 6

Spool metering: P→A→B→T (inlet flow 50 l/min)



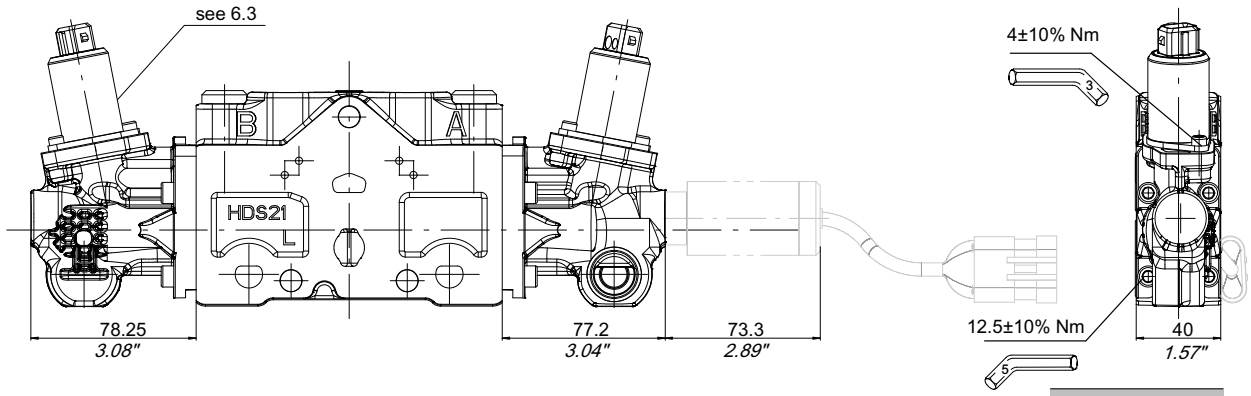
Spool metering: P→A→B→T (inlet flow 70 l/min)

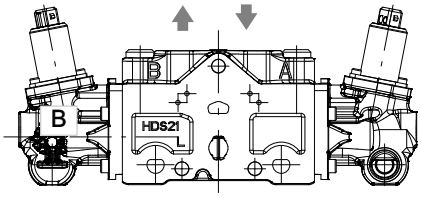


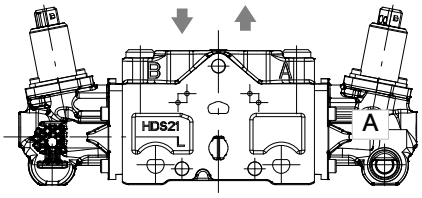
3.7 Electro-hydraulic open loop proportional / ON-OFF control - EHO

3.7.1 Standard version

The standard position of positioner kits/emergency lever is on A port side
Max piloted pressure= 35 bar

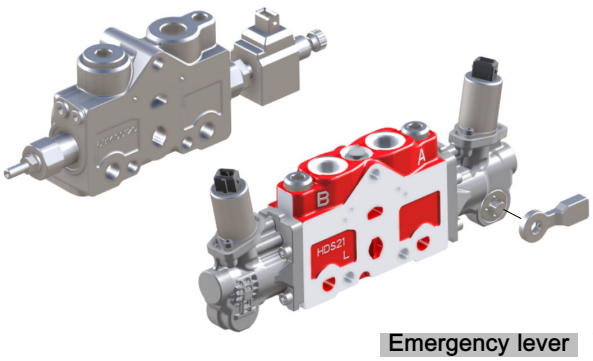




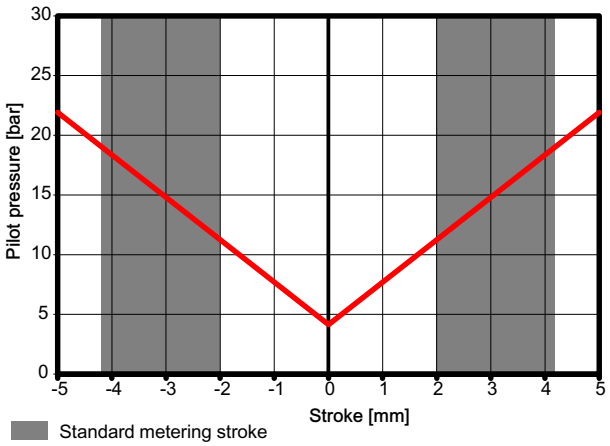


3	2	2	S	6	N	N	0	S	U

- Proportional pressure reducing valve type (see 6.3)
- Orifice type (fixed)
- Spring type (fixed)
- Combination type (see next page)
- Emergency lever type (fixed)
- Emergency lever position (see next page)

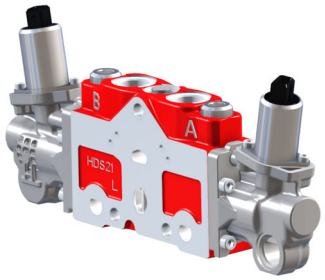
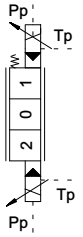


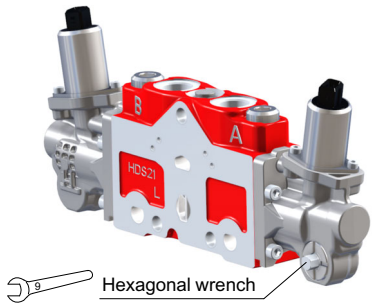
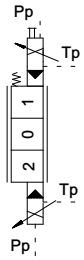
EHO positioner spring curve

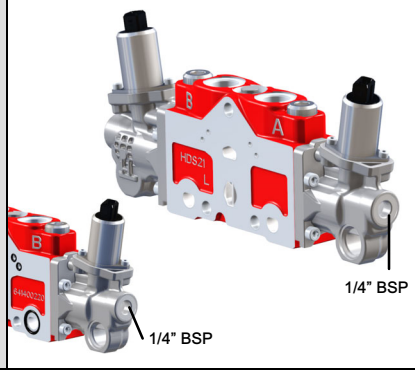
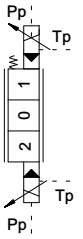


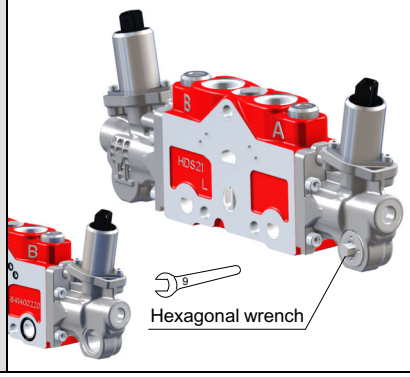
Spools for specific applications/functions could have different metering strokes
The pressure differential between pilot lines Pp and Tp should be > 25 bar in order to be sure to switch the spool to full stroke in all operating conditions

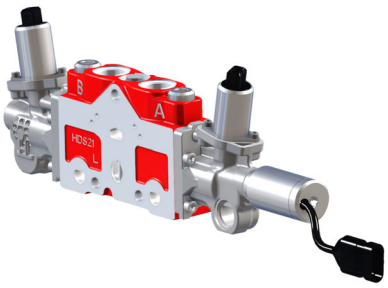
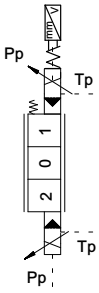
Combination types

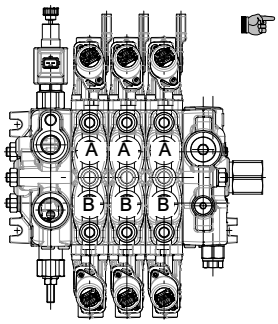
Type	Basic type	Scheme
NN0		

Type	With emergency hexagonal key	Scheme
NNK		

Type	With 1/4“ BSP drain port	Scheme
GG0		

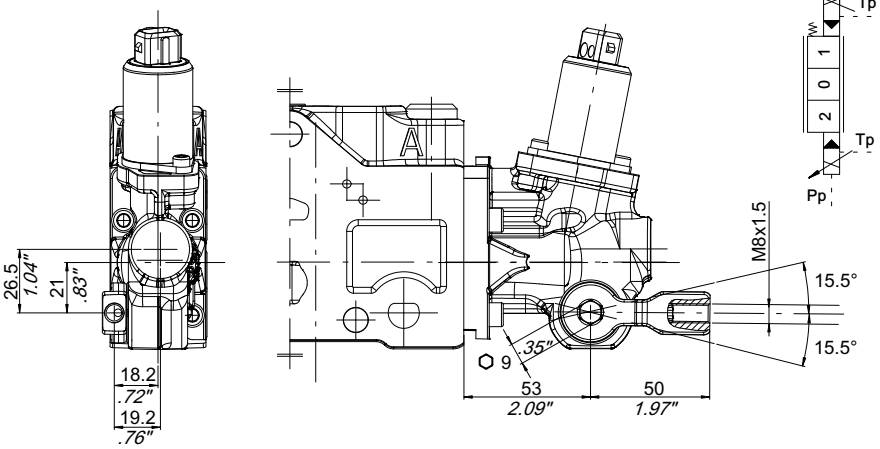
Type	With 1/4“ BSP drain port and emergency lever control	Scheme
GGK		

Type	With spool sensor	Scheme
NP0		

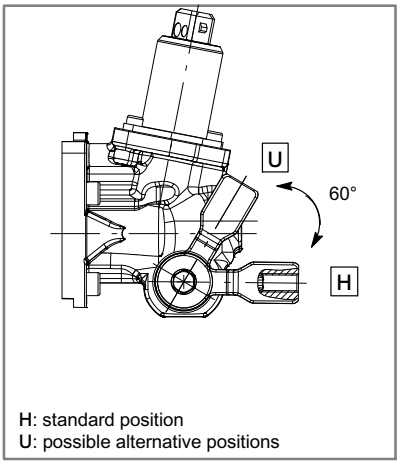


IMPORTANT:
The standard position of positioner kits/emergency lever is on A port side (see 3.2.2)

Emergency lever



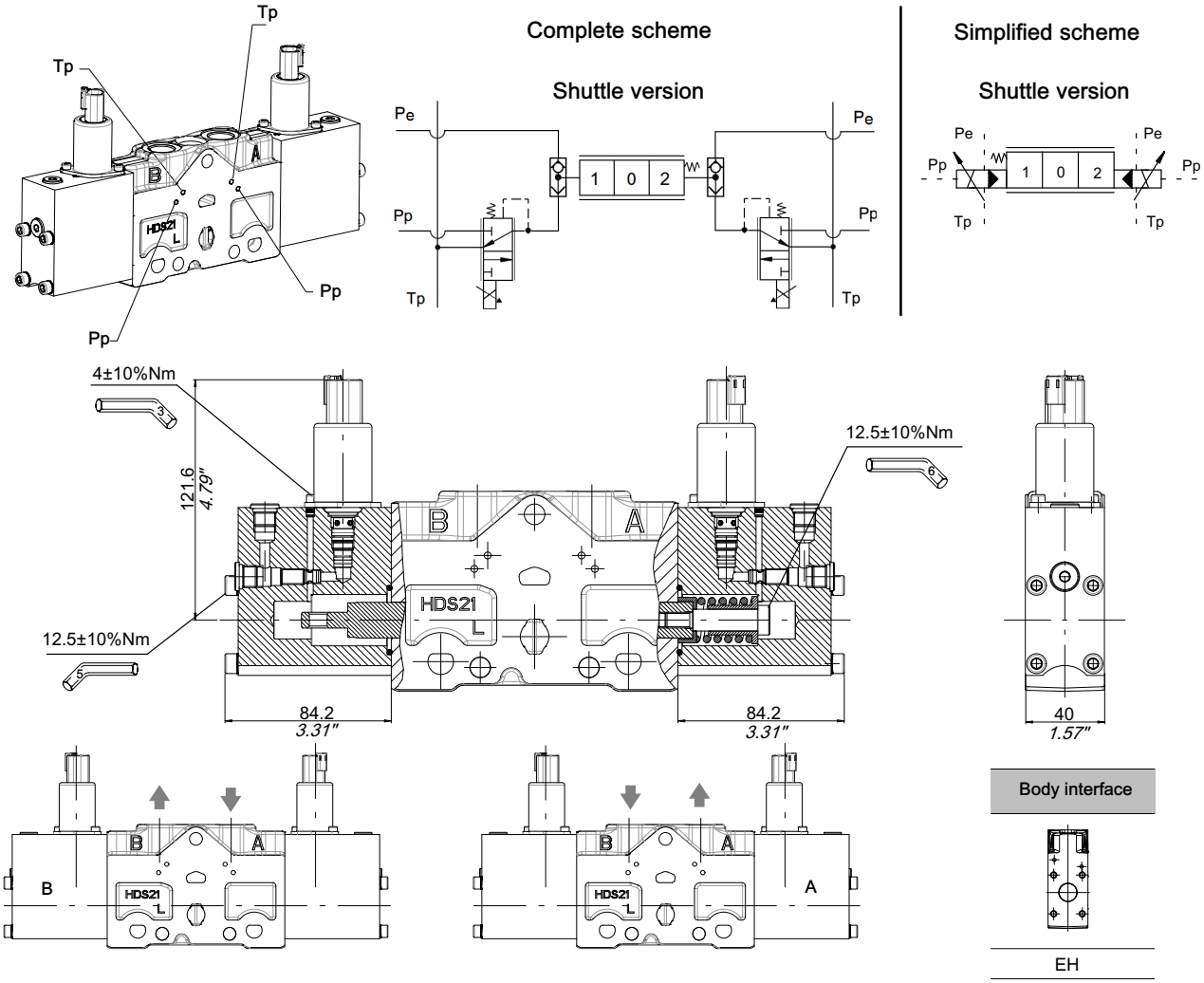
Emergency lever positions

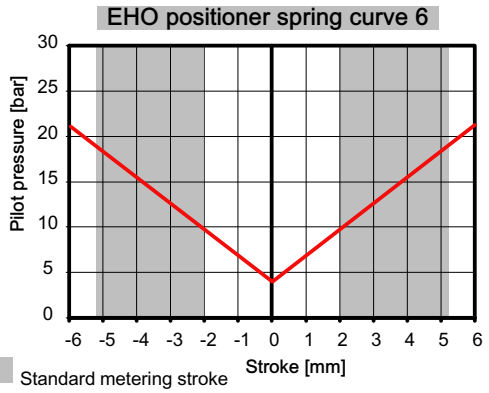


3.7.2 Shuttle version

The standard position of positioner kits is on A port side.
Max piloted pressure= 40 bar

Type	Code	Voltage (VDC)	Connector	Version
343B	200768661051	24	Deutsch	Shuttle





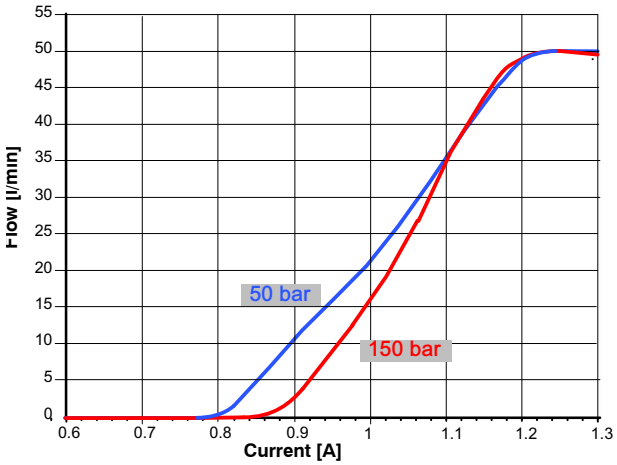
Spools for specific applications/functions could have different metering strokes

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

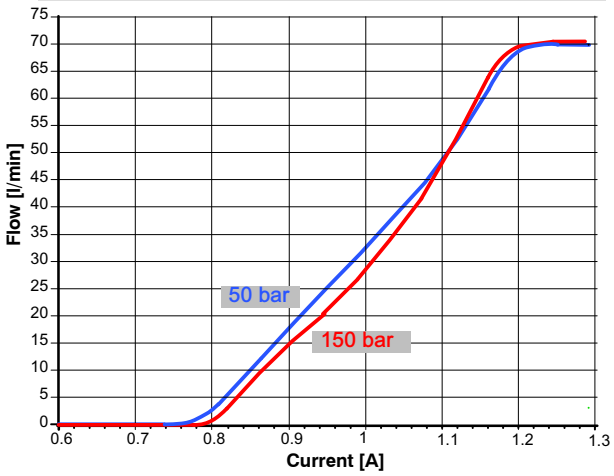
(*) nr. 2 screws M4x12 are not included

3.7.3 Spool metering curves 12 V

Spool metering : P→A→B→T (inlet flow 50 l/min)

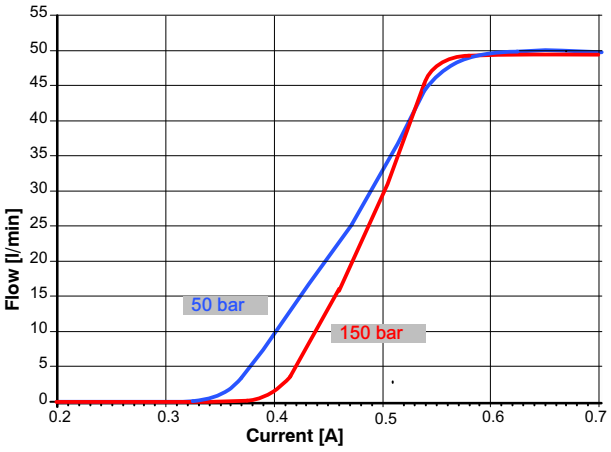


Spool metering: P→A→B→T (inlet flow 70 l/min)

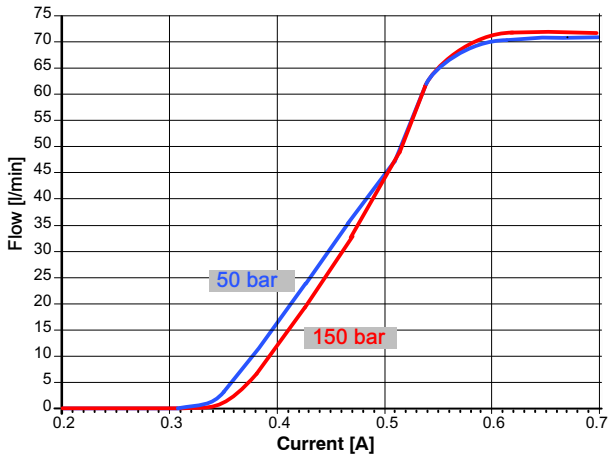


3.7.4 Spool metering curves 24 V

Spool metering: P→A→B→T (inlet flow 50 l/min)

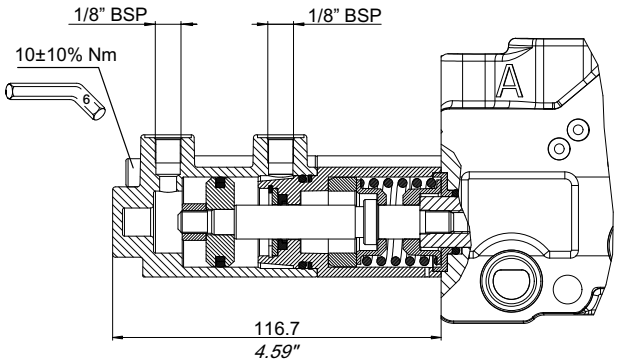


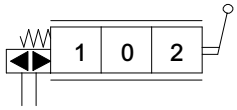
Spool metering: P→A→B→T (inlet flow 70 l/min)



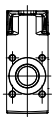
3.8 Pneumatic control

The standard position of positioner kits is on A port side





Body interface



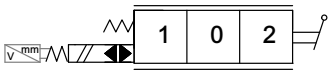
MAN

Type	Code
24	200768650760

Operating conditions
Hydraulic control:
Pressure range: min. 6 bar (87 psi) - max. 15 bar (217 psi)
Pneumatic control:
Pressure range: min. 6 bar (87 psi) - max. 10 bar (145 psi)

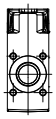
3.9 Electro-hydraulic ON-OFF control with lever option - EHI

Type	Code	Voltage
720	-	12/24 V DC



Lever side

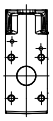
Body interface



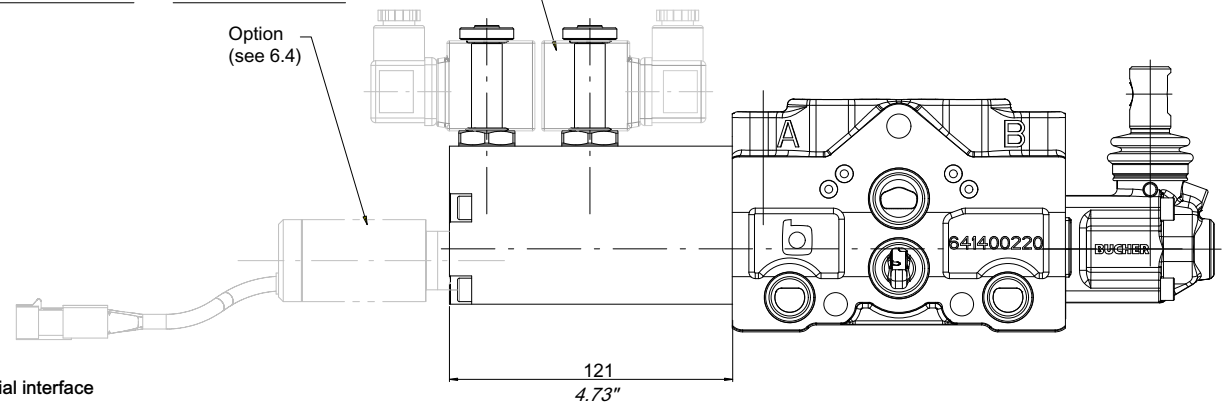
MAN

Positioner side

Body interface



EHM*

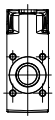


*Special interface

Should this positioner be needed, please contact our Sales Dept.

3.10 Levers

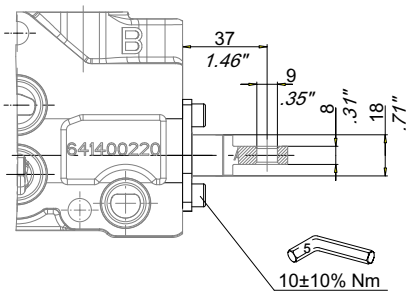
The standard position of lever kit is always on B port side.

Body interface

MAN

3.10.1 Free end spool with dust proof seal

Type	Code
L55	200707190050

1	0	2



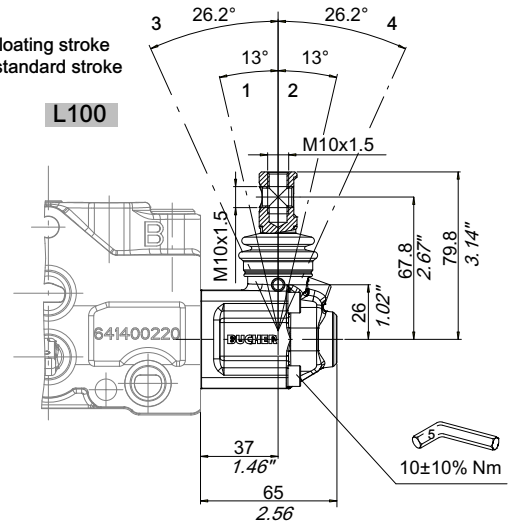
3.10.2 Standard lever group

Type		Code
L100	L300	200707120670

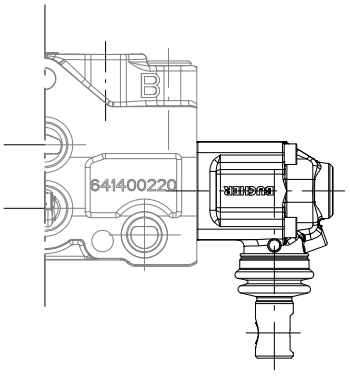
1	0	2

3 - 4 floating stroke
1 - 2 standard stroke

L100

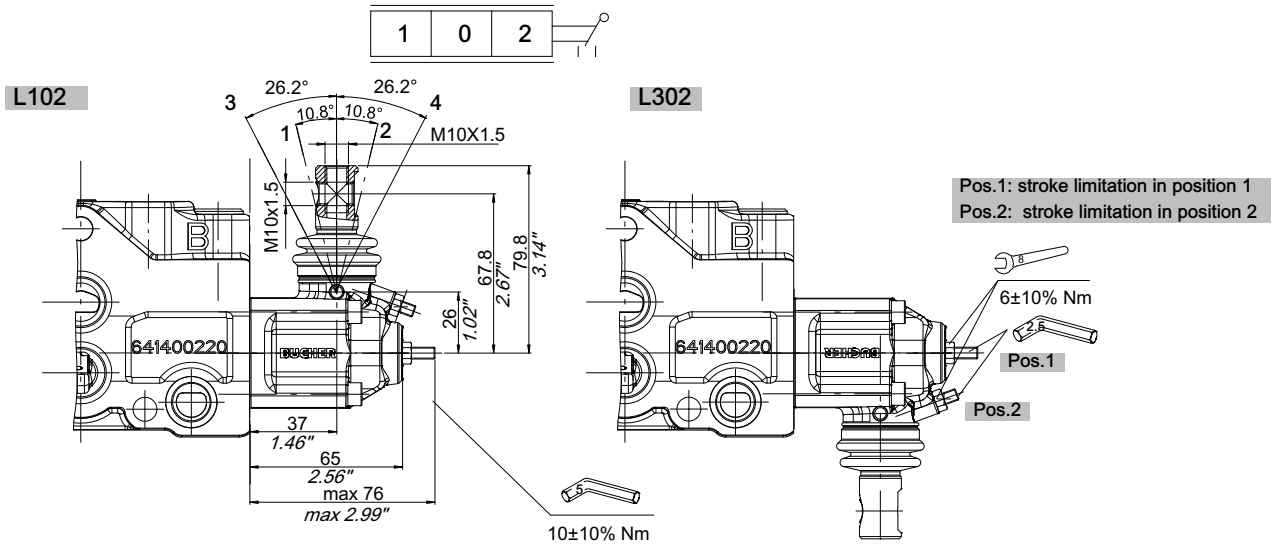


L300



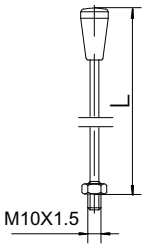
3.10.3 Lever group with stroke limitation

Type		Code
L102	L302	200707120690



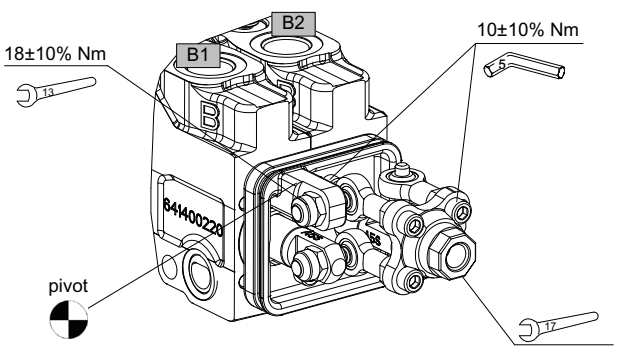
Lever stick

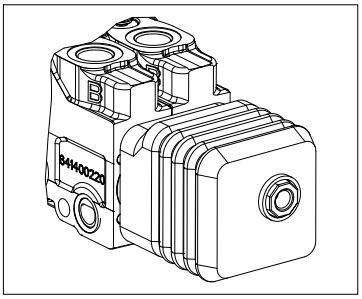
L		Type	Code
mm	inches		
190	7.48	AL001	200702220010
255	10.04	AL002	200702220030
300	11.81	AL003	200702220040
350	13.78	AL004	200702220050

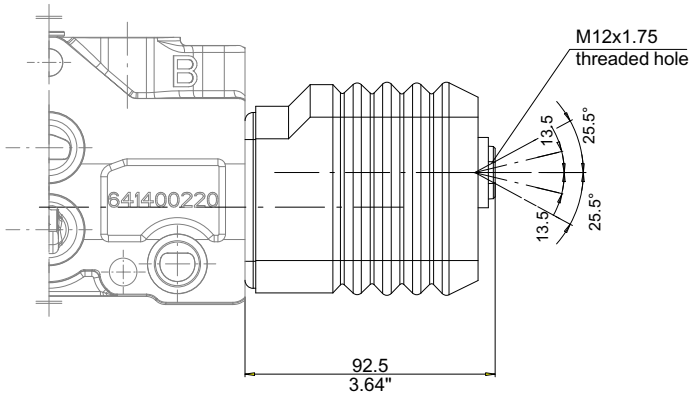


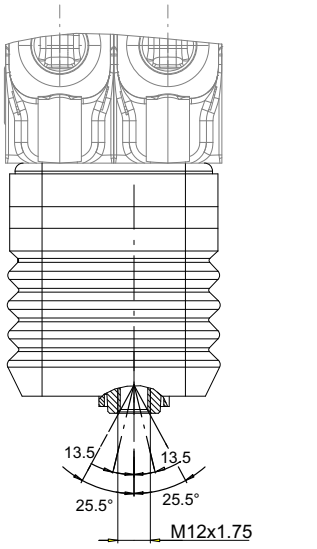
3.10.4 Standard joystick control - L133-134

Type		Code
L133	L134	200775930470

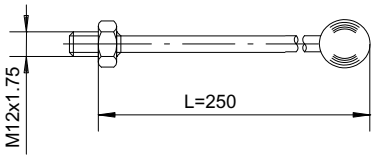


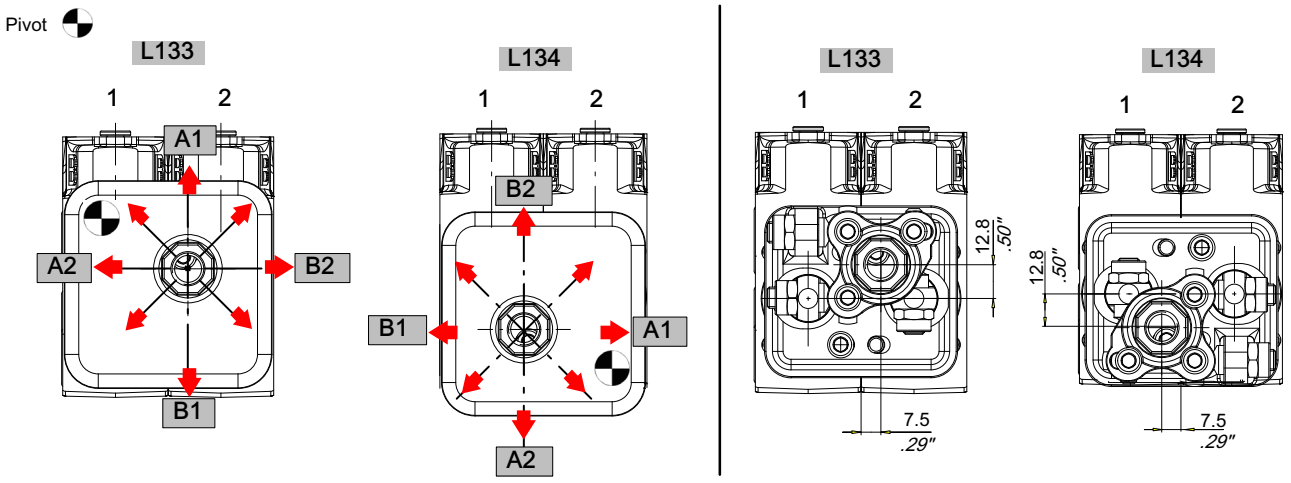






Type	Code
AL010	200702230040

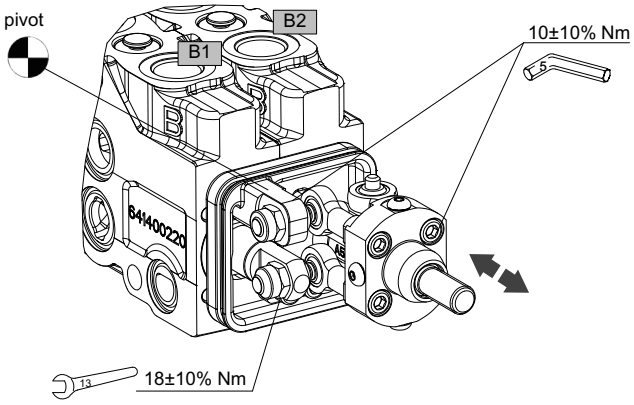


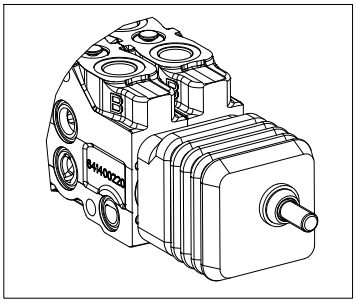


With two floating spools the combinations Z-Z and W-W are permitted, only.

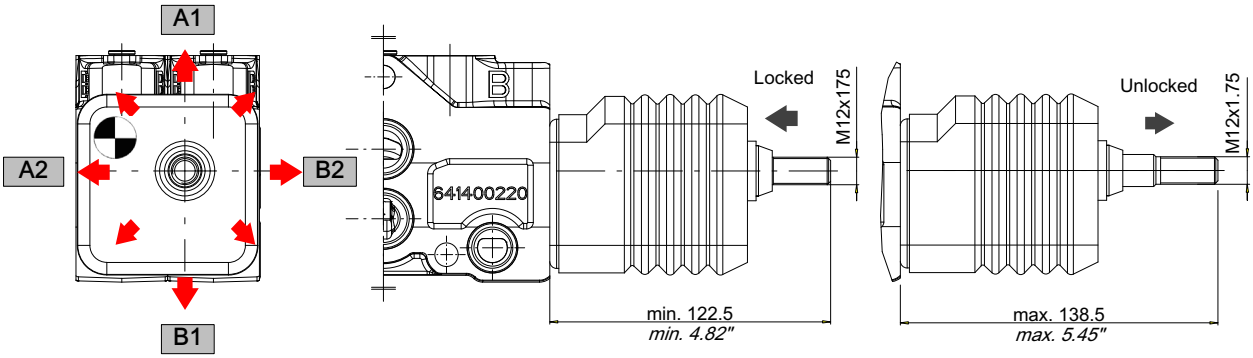
3.10.5 Joystick control with integrated locking system - L260-460

Type		Code
L260	L460	200775930480

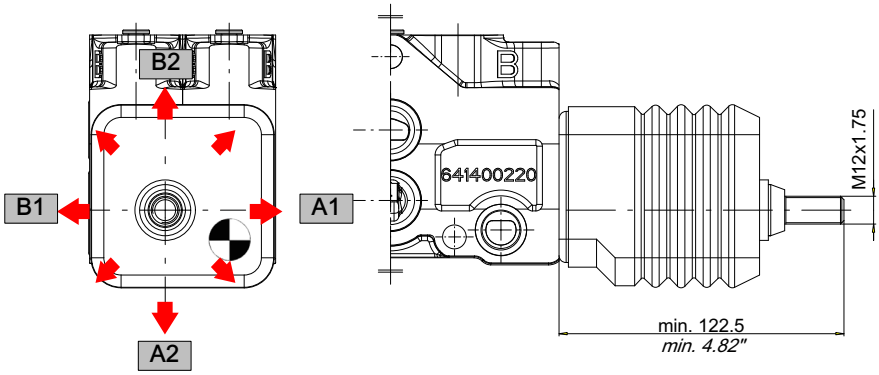




L260

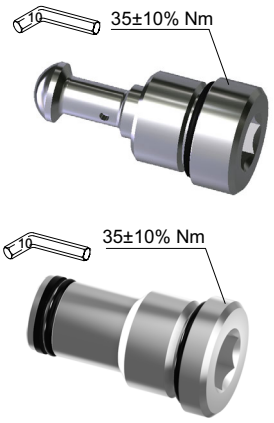


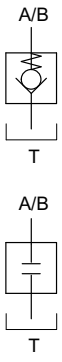
L460



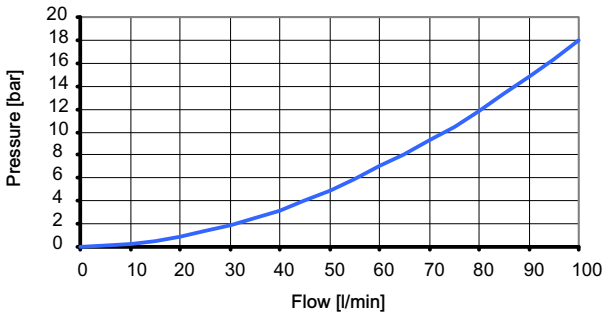
4 Section valves

4.1 Anti-cavitation valves - C

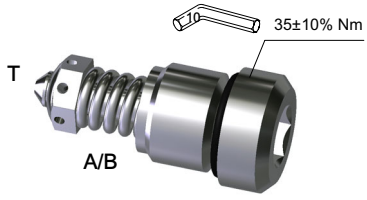


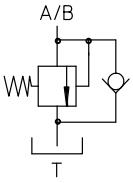


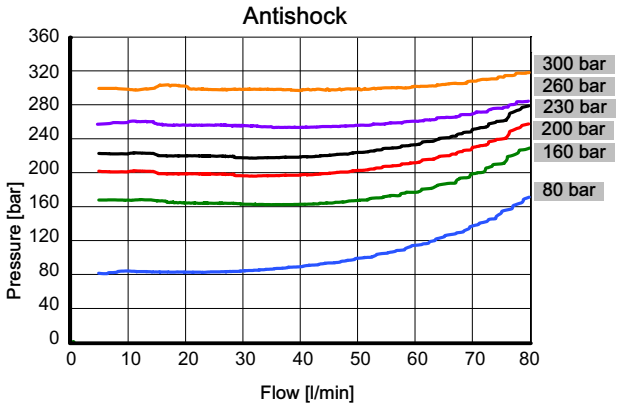
Type	Code
C	200787602560
00 (plug)	200778400310

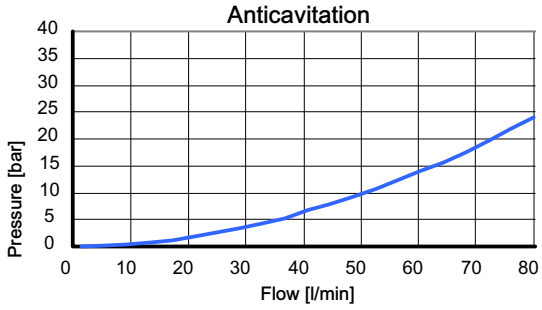


4.2 Anti-shock and anti-cavitation valves - UC









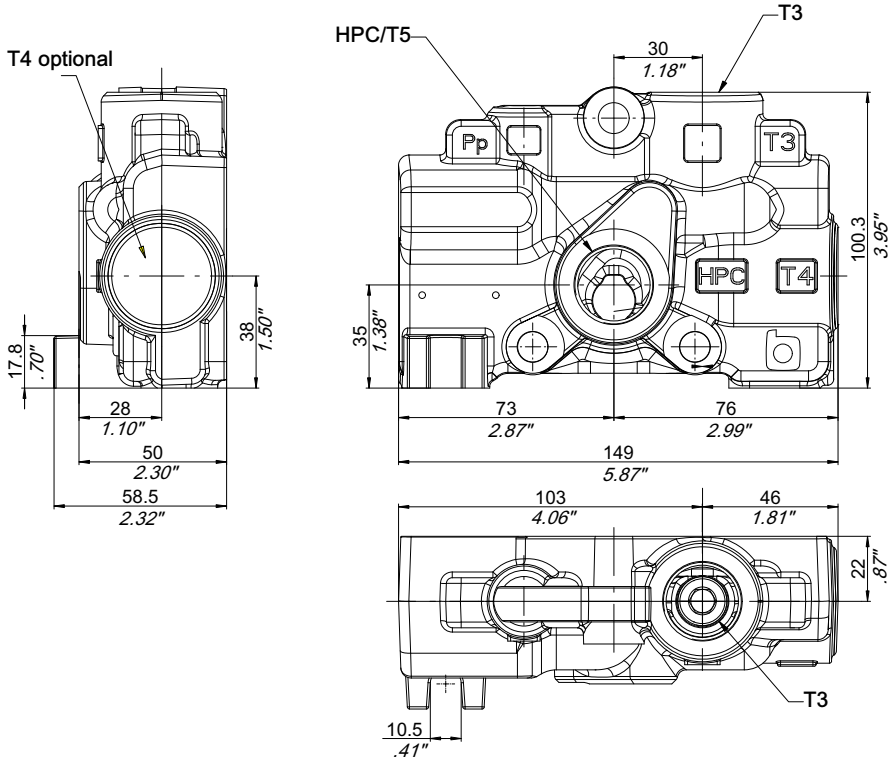
IMPORTANT!: The UC anti-shock valve is designed to absorb shock effects. Therefore, it should not be used as pressure relief valve

Setting/10	Pressure setting at 10 l/min (*) bar *(psi)*	Code
04	40 *(580)*	200533930068
06	60 *(870)*	200533930077
07	70 *(1010)*	200533930050
08	80 *(1160)*	200533930050
09	90 *(1300)*	200533930084
10	100 *(1450)*	200533930100
11	110 *(1590)*	200533930110
12	120 *(1740)*	200533930085
13	130 *(1880)*	200533930057
14	140 *(2030)*	200533930059
15	150 *(2170)*	200533930051
16	160 *(2320)*	200533930067
17	170 *(2460)*	200533930071
18	180 *(2610)*	200533930056
19	190 *(2750)*	200533930113
20	200 *(2900)*	200533930060
21	210 *(3040)*	200533930080
22	220 *(3190)*	200533930064
23	230 *(3330)*	200533930058
24	240 *(3480)*	200533930081
25	250 *(3620)*	200533930052
26	260 *(3770)*	200533930065
27	270 *(3910)*	200533930066
28	280 *(4060)*	200533930053
29	290 *(4200)*	200533930069
30	300 *(4350)*	200533930079
32	320 *(4640)*	200533930054
00	00 (plug)	200778400310

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

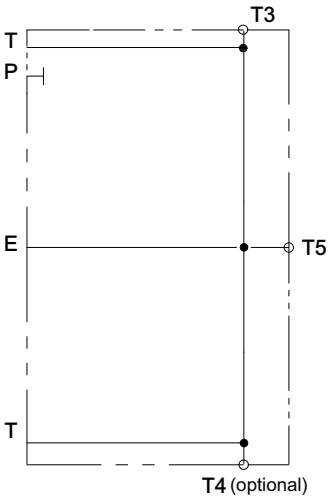
5 End covers

5.1 End cover without pilot lines - PM

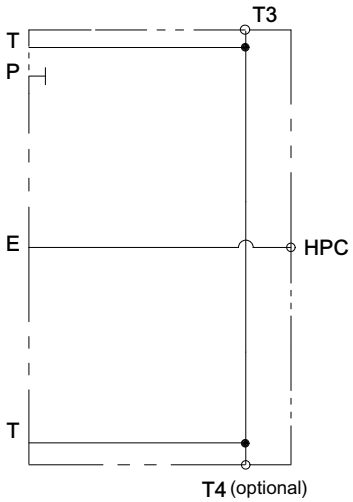


Type		HPC/T5	T3	T4 (optional)
Standard	HPC			
PM 201	PM 211	3/4” BSP	3/4” BSP	-
PM 202	PM 212	3/4” BSP	3/4” BSP	3/4” BSP
PM 301	PM 311	SAE10	SAE10	-
PM 302	PM 312	SAE10	SAE10	SAE10
PM 501	PM 511	M22x1.5	M22x1.5	-
PM 502	PM 512	M22x1.5	M22x1.5	M22x1.5

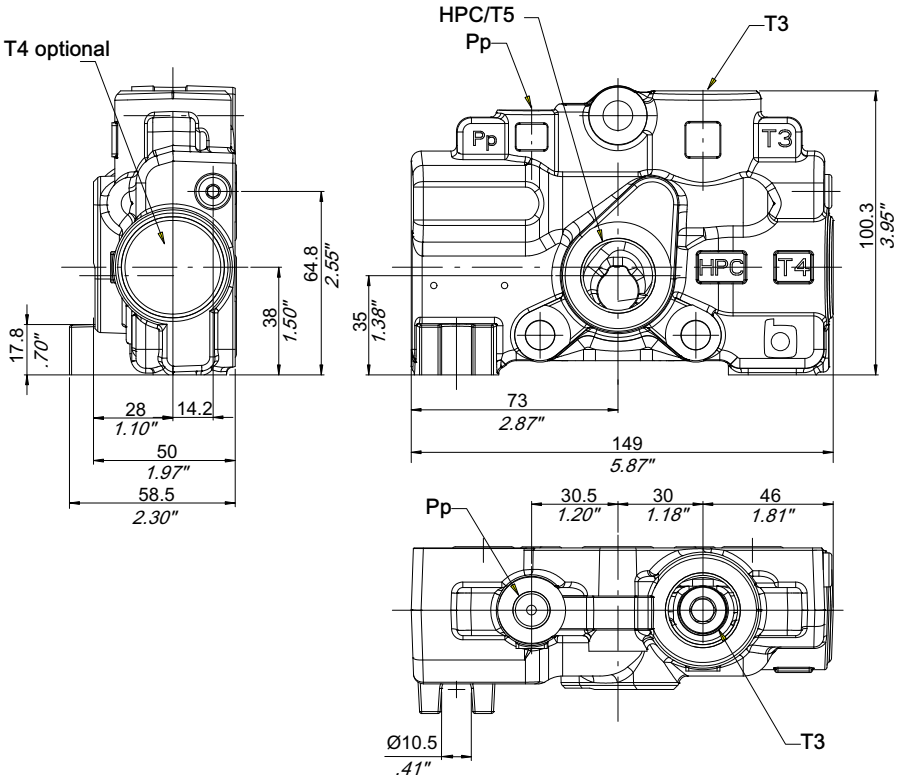
COP 21 PM_02 T5 T3 T4 00 00



COP 21 PM_12 HPC T3 T4 00 00

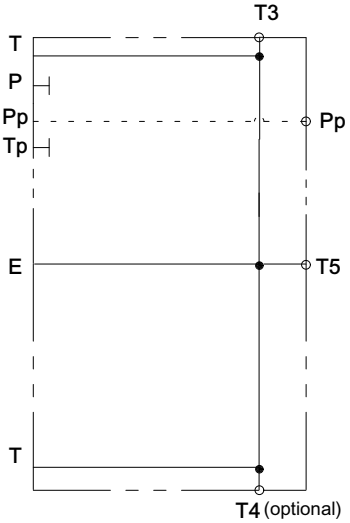


5.2 End cover with pilot lines - PH

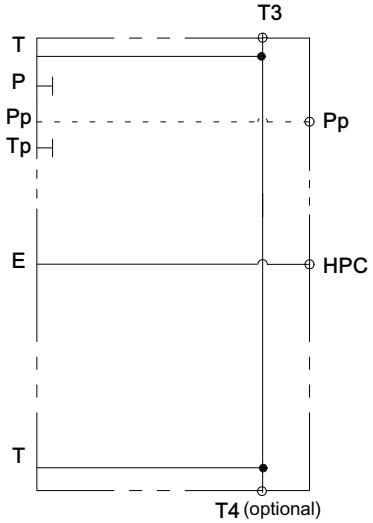


Type		HPC/T5	T3	T4 (optional)	Pp
Standard	HPC				
PH 201	PH 211	3/4" BSP	3/4" BSP	-	1/4" BSP
PH 202	PH 212	3/4" BSP	3/4" BSP	3/4" BSP	1/4" BSP
PH 301	PH 311	SAE10	SAE10	-	SAE6
PH 302	PH 312	SAE10	SAE10	SAE10	SAE6
PH 501	PH 511	M22x1.5	M22x1.5	-	M14x1.5
PH 502	PH 512	M22x1.5	M22x1.5	M22x1.5	M14x1.5

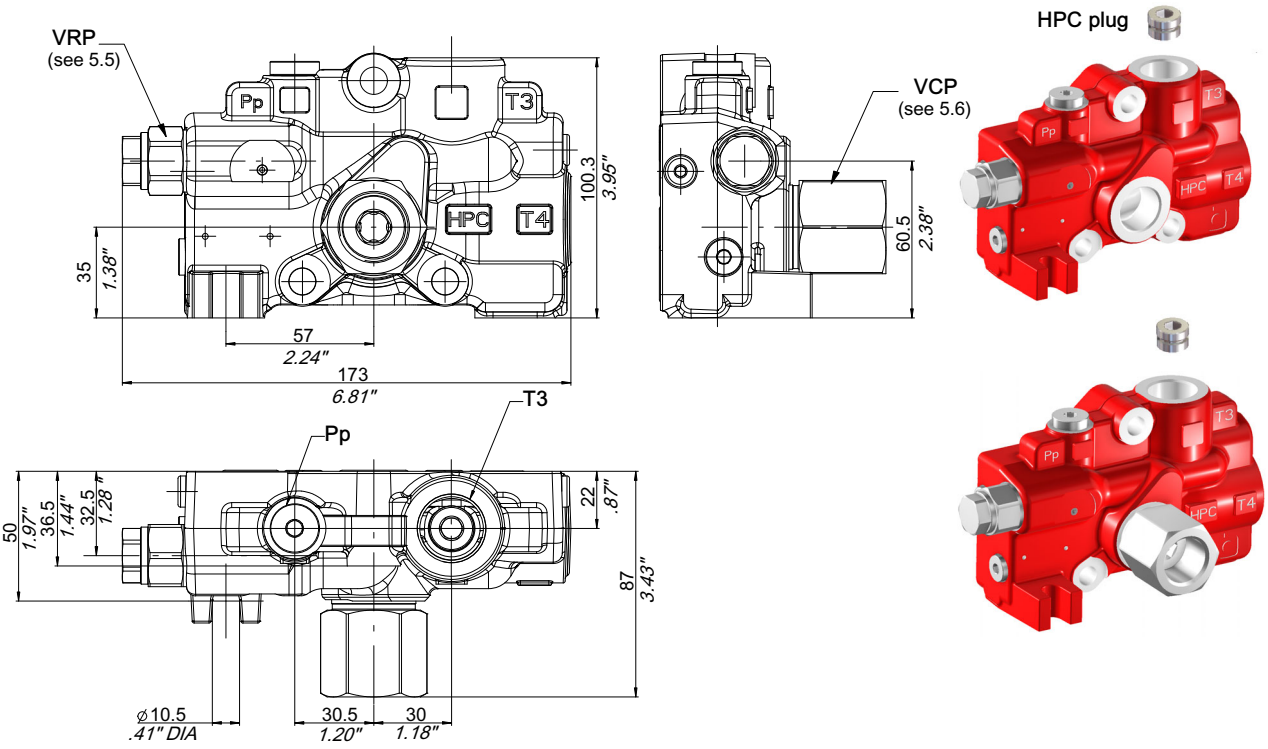
COP 21 PH_02 T5 T3 T4 PP 00



COP 21 PH_12 HPC T3 T4 PP 00

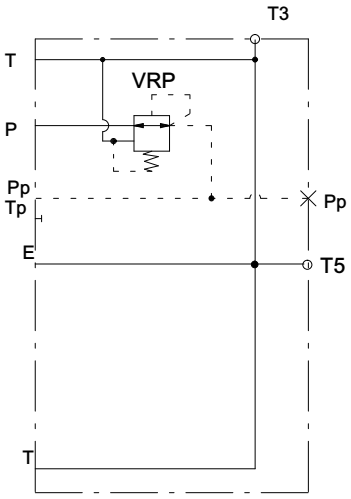


5.3 End cover with pilot lines and pilot oil supply pressure reducing valve - PH

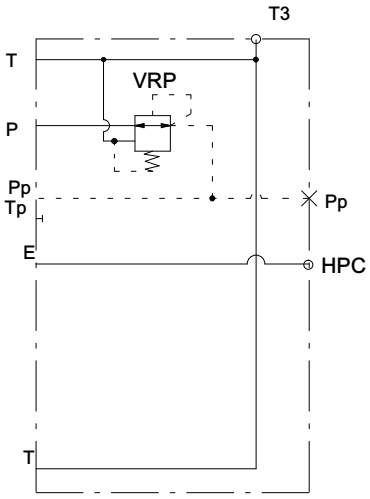


Type		HPC/T5	T3	T4 (optional)	Pp
Standard	HPC				
PH 203	PH 213	3/4" BSP	3/4" BSP	-	1/4" BSP

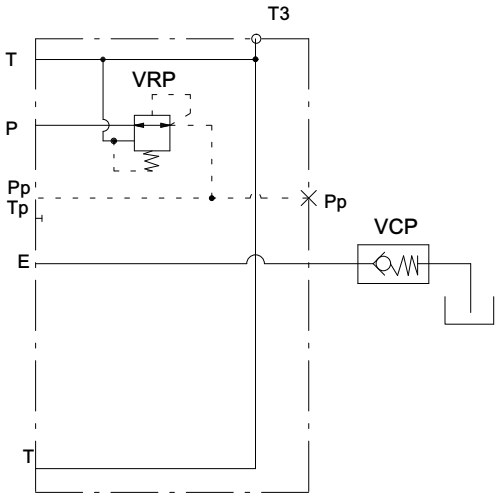
COP 21 PH_03 T5 T3 00 XX 32



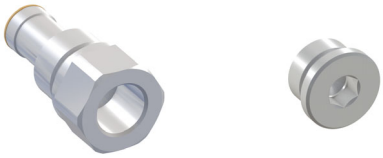
COP 21 PH_13 HPC T3 00 XX 32



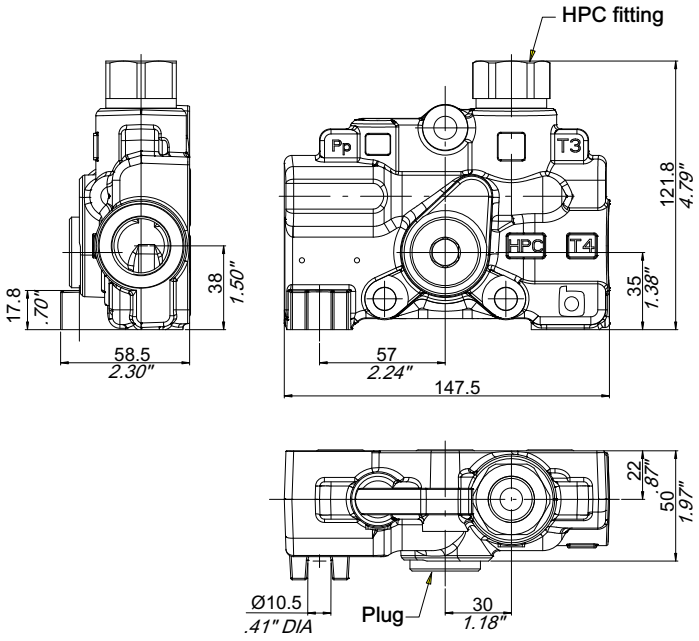
COP 21 PH_13 VCP12 T3 00 XX 32

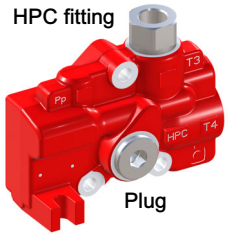


5.4 Upper HPC kit

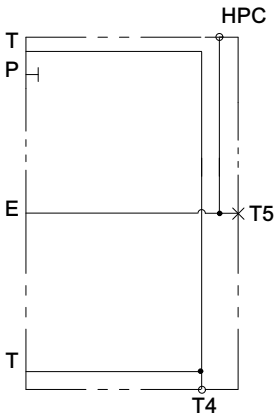


5.4.1 PM/PH standard type (with T4)

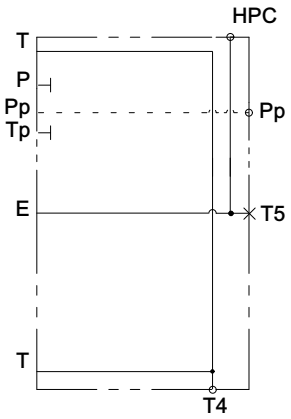




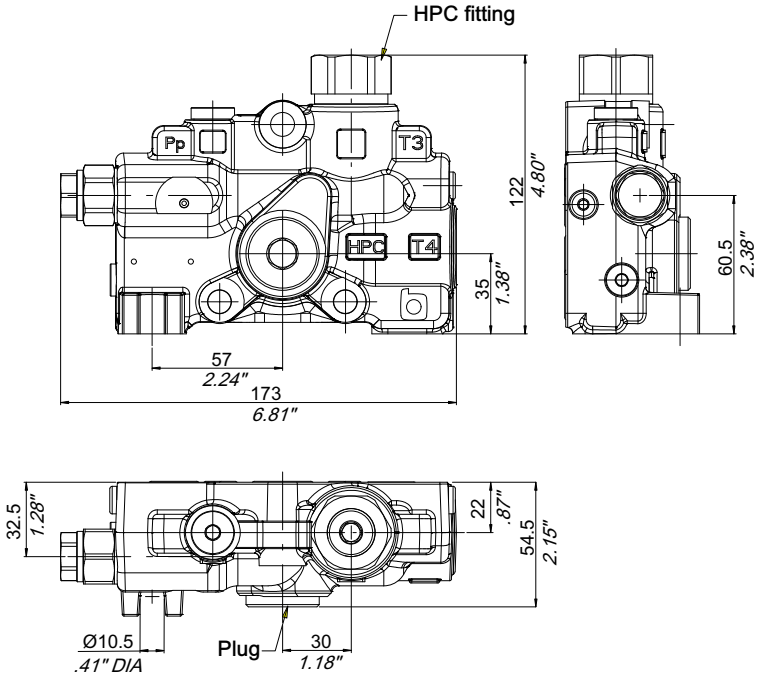
COP 21 PM_02
XX HPC T4 00 00

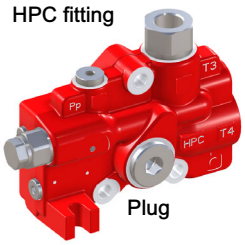


COP 21 PH_02
XX HPC T4 00 00

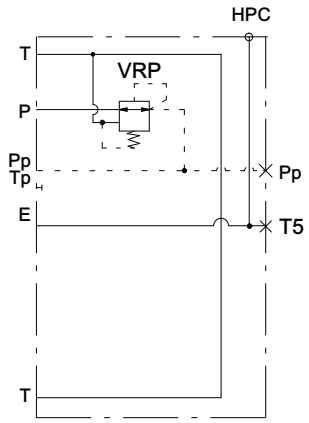


5.4.2 PH standard with VRP type



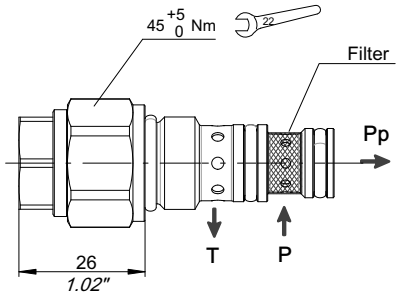


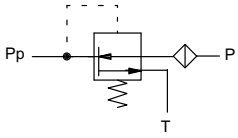
COP 21 PH_03 XX HPC 00 XX 32



(*) the tank port in the inlet cover must be used.

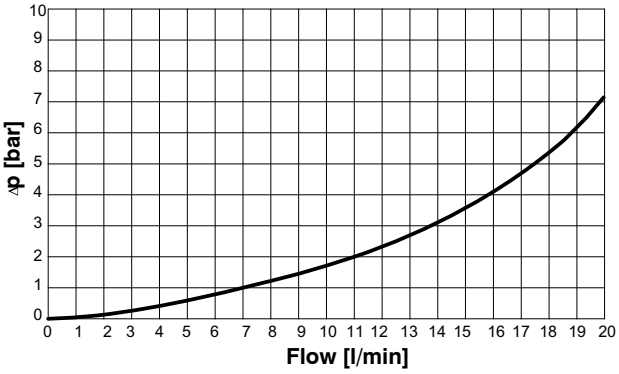
5.5 Pressure reducing valve (VRP)



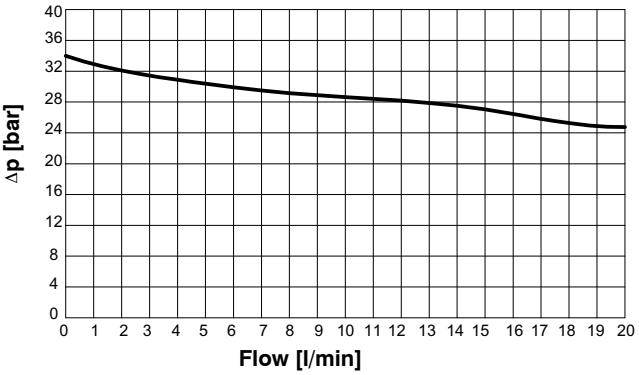


Type	Code	Nominal pressure (bar)
VRP32	200533930174	32

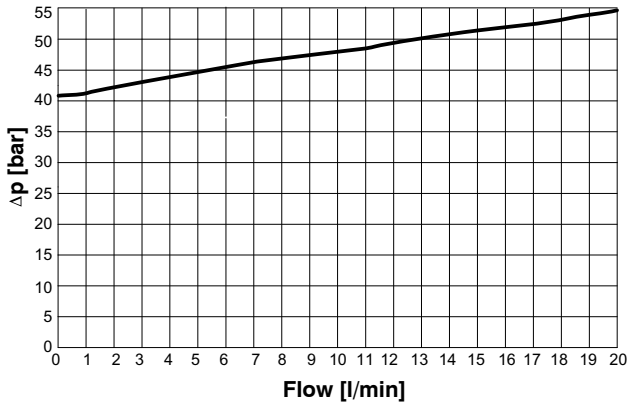
Pressure Vs. Flow Curve P → Pp (Fully open)



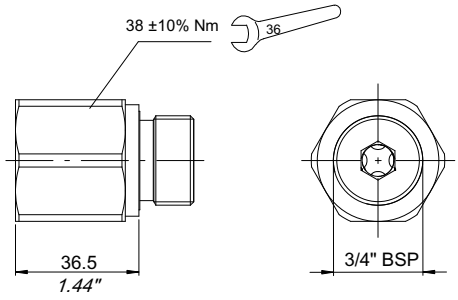
Pressure Vs. Flow Curve P → Pp (Reducing)

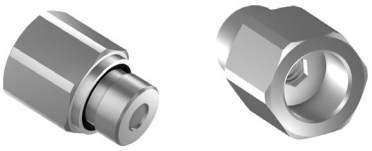


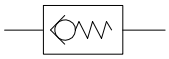
Pressure Vs. Flow Curve Pp → T (Relieving)



5.6 Back pressure valve (VCP)

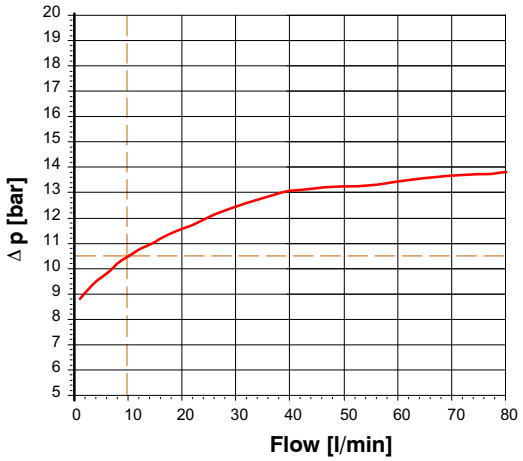






Type	Code	Nominal pressure (bar)
VCP12	200787404340	12

VCP characteristic curve (cartridge valve only)
Valve set with 10 l/min.

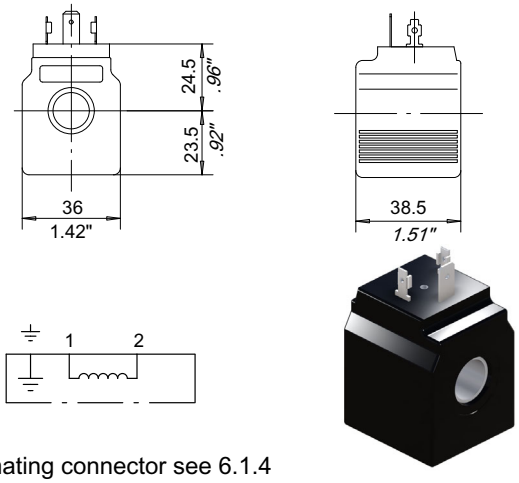


6 Additional electric and electronic devices

6.1 Coils and connectors

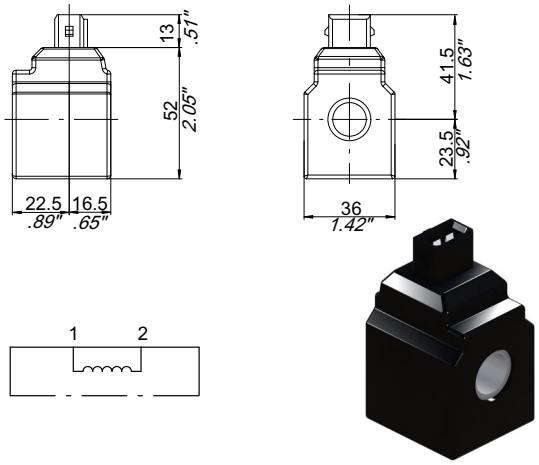
6.1.1 Solenoid valve coils (Ø13 L36)

DIN 43650-A/ISO4400 connector

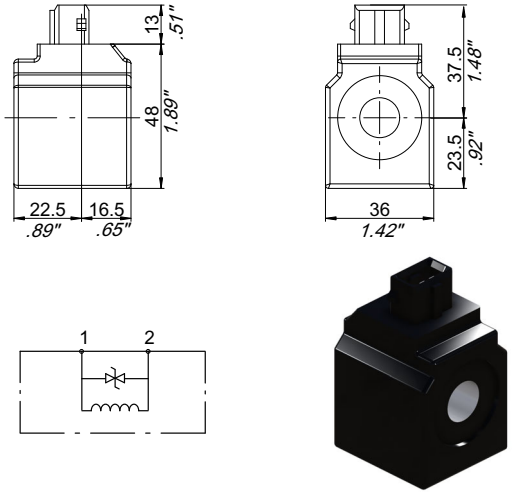


For mating connector see 6.1.4

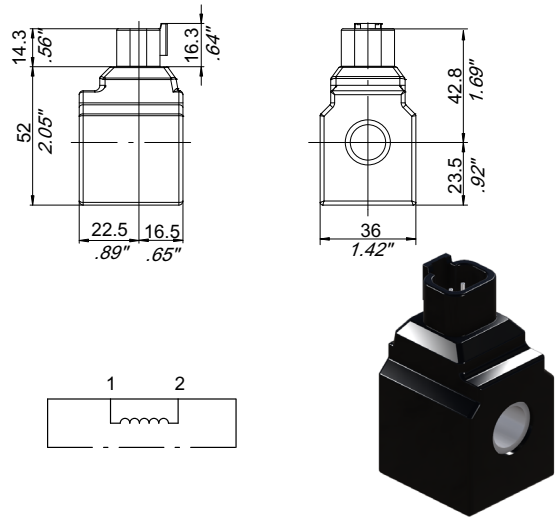
AMP JT 84-9414 connector



AMP JT 84-9419 connector



Deutsch DT04-2P connector



Coil features	
Wire class	H (VDE0580)
Duty cycle	ED 100%
Voltage tolerance	± 10%

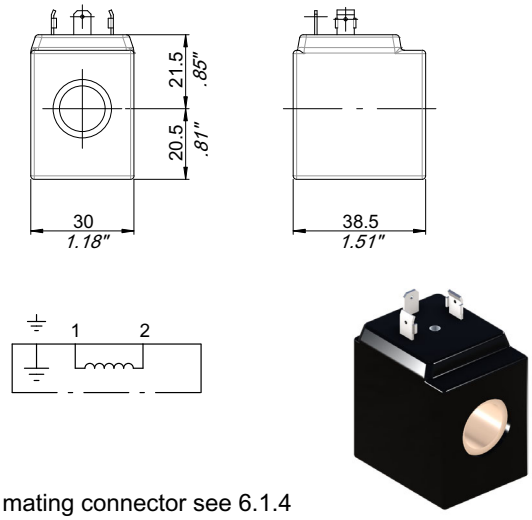
Connector style	Type	IP	Diode	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	12 H -	65	-	200674910100	12	27.2	2.2	5.3
	24 H -		-	200674920080	24	27	1.12	21.3
AMP	12 A -	65	-	200674910250	12	27.2	2.2	5.3
	24 A -		-	200674920200	24	27	1.12	21.3
AMP + DIODE	12 A D	65	Transil	200541210032	12	21	1.75	6.85
	(24 A D)		Transil	200541220033	24	21	0.78	27
DT	12 D -	67	-	200674910370	12	27	2.2	5.3
	(24 D -)		-	200674920290	24	27.2	1.12	21.3

IP value is not referred to the coil itself and is reached using the proper mating connector and seals in the final assembly.

( ) : should this specific coil be needed, please contact our Sales Dept.

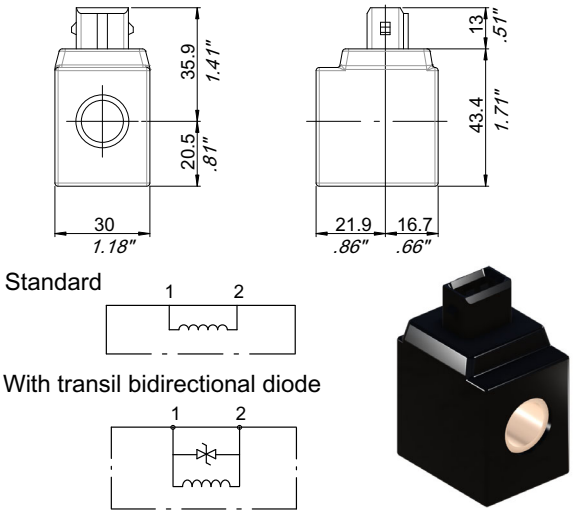
6.1.2 Solenoid valve coils (Ø13 L30 - 18 W)

DIN 43650-A/ISO4400 connector

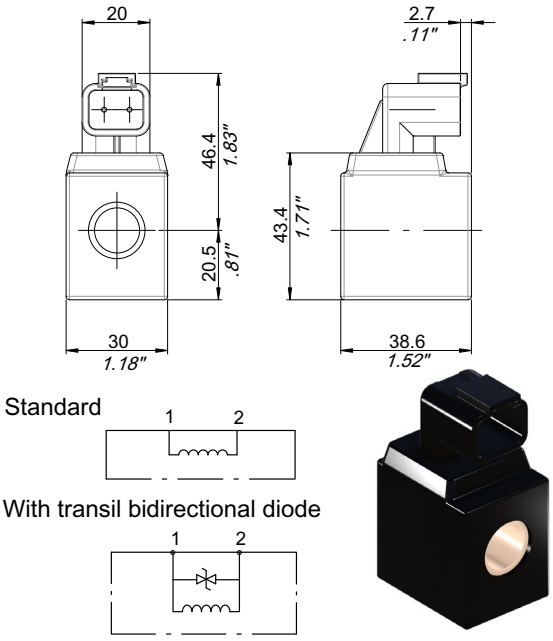


For mating connector see 6.1.4

AMP JT 84-9414 connector



Deutsch DT04-2P connector



Coil features	
Wire class	H (VDE0580)
Duty cycle	ED 100%
Voltage tolerance	± 10%

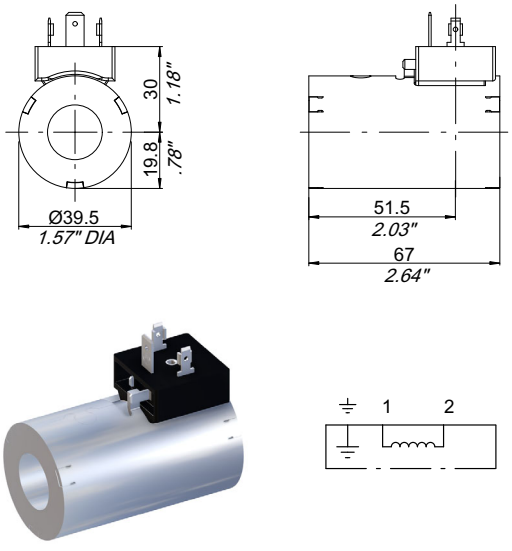
Connector style	Type	IP	Diode	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	(12 H -)	65	-	200674910490	12	18	1.5	8
	(24 H -)		-	200674920390	24	18	0.75	32
AMP	(12 A -)	65	-	200674910480	12	18	1.5	8
	(12 A D)		Transil	200674910540	12	18	1.5	8
	(24 A -)		-	200674920400	24	18	0.75	32
	(24 A D)		Transil	200674920370	24	18	0.75	32
DT	12 D -	67	-	200674910470	12	18	1.5	8
	(12 D D)		Transil	200674910530	12	18	1.5	8
	(24 D -)		-	200674920410	24	18	0.75	32
	(24 D D)		Transil	200674920380	24	18	0.75	32

IP value is not referred to the coil itself and is reached using the proper mating connector and seals in the final assembly.

( ) : should this specific coil be needed, please contact our Sales Dept.

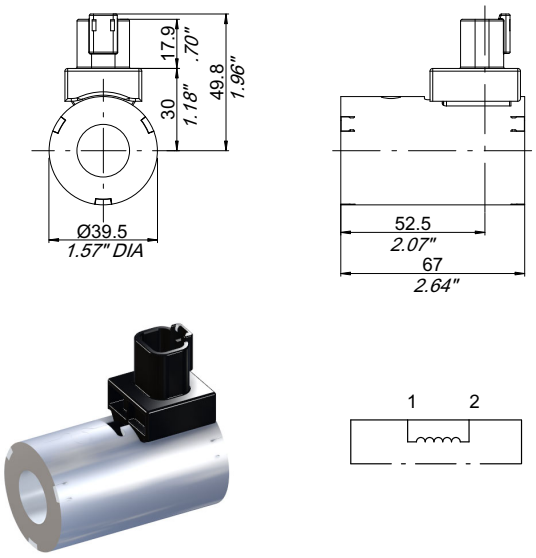
6.1.3 ON-OFF positioner coils (Ø19)

DIN 43650-A/ISO4400 connector

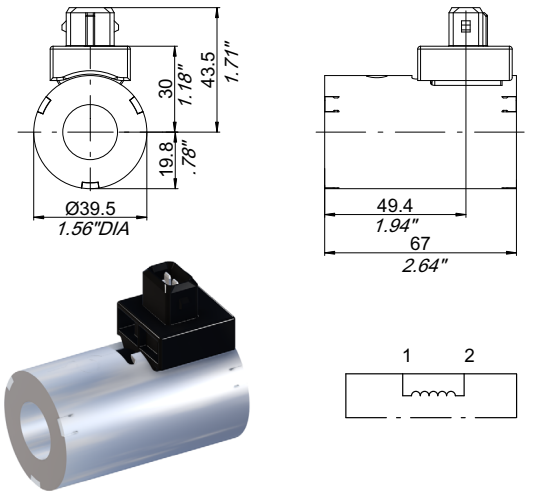


For mating connector see 6.1.4

Deutsch DT04-2P connector



AMP JT-84-9419 connector



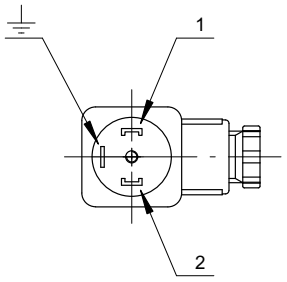
Coil features	
Wire class	H (VDE0580)
Duty cycle	ED 100%
Voltage tolerance	± 10%
Magnetic frame protection	Fe/ZnNi5/Cn/T0 (DIN 50979)

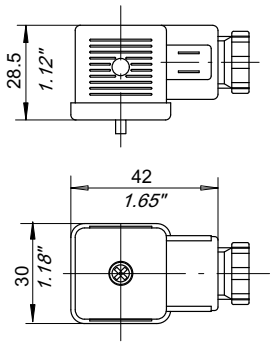
Connector style	Type	IP	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	12 H -	65	200674910430	12	29	2.35	5.1
	24 H -		200674920320	24	25	1.12	21.5
AMP	12 A -	65	200674910450	12	29	2.35	5.1
	24 A -		200674920340	24	25	1.12	21.5
DT	12 D -	67	200674910440	12	29	2.35	5.1
	24 D -		200674920330	24	25	1.12	21.5

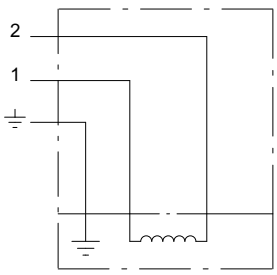
IP value is not referred to the coil itself and is reached using the proper mating connector and seals in the final assembly.

6.1.4 DIN43650-A/ISO4400 connector

Type	Code
DIN43650-A/ISO4400	200544110009







For power input	D.C.
Number of poles	2 + ⏚
Nom. capacity at contacts	10 A.
Max capacity at contacts	16 A.
Resistance at contacts	≥ 4 mOhm
Max section of cable	1.5 mm^2
Outer material	Glass fibre reinforced Nylon
Contact mount material	
Color	Black
Armour clamp	Pg 9
Ø cable	6-8 mm.
Protection factor	IP65 (DIN40050)
Insulation class	C (VDE0110)
Temperature range	-40 / +90 °C

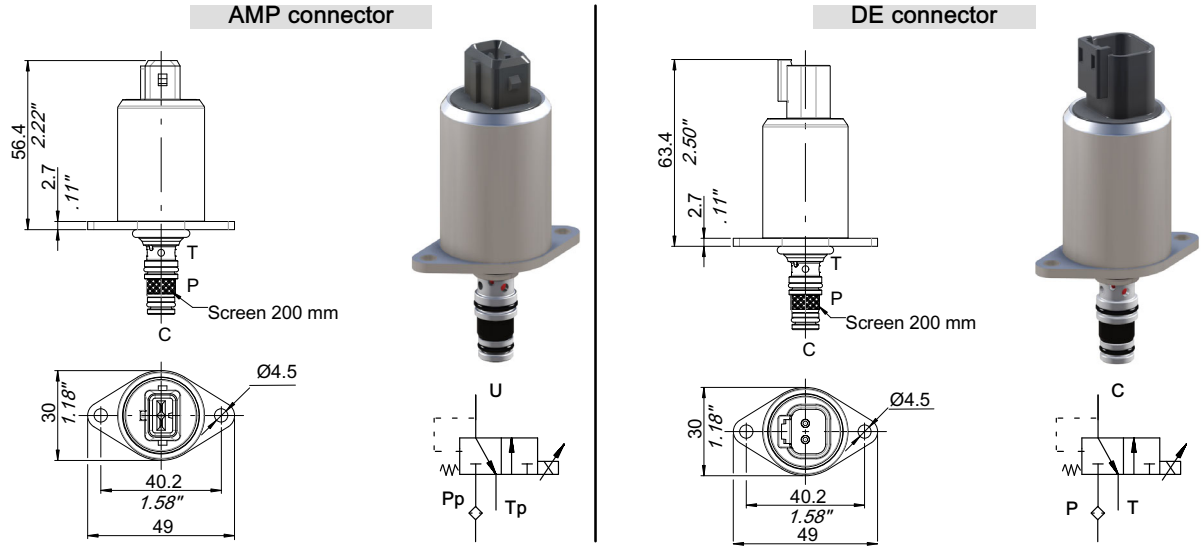
To be ordered separately, not included in the coil.

6.2 Microswitches

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

Microswitch features	
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

6.3 Proportional pressure reducing valves



Electro-hydraulic specifications	12 V	24 V
Nominal flow rate	3.5 l/min *(0.93 US gpm)*	
Max pressure (P, T)	P: 50 bar (725 PSI), T: 40 bar *(580 psi)*	
Rated supply voltage	12 VDC	24 VDC
Current supply characteristic	PWM (Pulse width modul.)	
Rated current range	100 - 1400 mA	50 - 720 mA
Superimposed dither frequency	100 ÷ 180 Hz	
Degree of protection	AMP IP65 / Deutsch IP67 and IP69K	
Pp filter screen	200 µm	
Coil resistance	4.7 Ohm ±5%	20.8 Ohm ±5%
Response time	< 40 ms	
Leakage from Pp to Tp	< 15 cc/min. at 35 bar *(< 0.9 cu:in./min. at 500 psi)*	
Duty cycle	ED100% @ 14,4 VDC and 80°C assembled on the valve housing	ED 100% @ 28.8 VDC and 80°C assembled on the valve housing
Connector Type	AMP Junior timer / DEUTSCH DT04-2P	

Type	Code	Voltage	Connector
320	200533960033	12 VDC	AMP
321	200533960034	24 VDC	AMP
322	200533960035	12 VDC	Deutsch
323	200533960036	24 VDC	Deutsch

(*) nr. 2 screws M4x12 are not included

6.4 Spool position hall effect sensor

6.4.1 Proportional

Connector style	Type	Codes
AMP	PS A	200544124029
Deutsch	PS D	200544124033

Mechanical specifications	
Maximum mechanical stroke	≥ ±8.5 mm
External diameter	35 mm
Body lenght	91 ± 8.5 mm
Cable lenght (including connector)	350 mm
Maximum operating pressure	5 MPa (50bar)
Operating temperature range	-25°C / +105°C
Protection class	IP 67

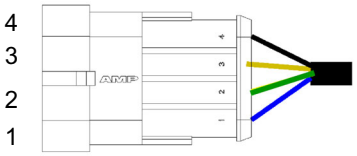
Electrical specifications - Linear, Hall-effect sensor	
Power Supply Voltage	7 ÷ 32 Vdc
Current Consumption	< 20 mA
Output signal in Neutral	2.5 V
Output signal range	1 V ÷ 4 V
Tolerance on output signal	± 0.1 V
Maximum linearity error (-25 ÷ 105°C)	± 2%
Max. Electrical stroke linearity range	± 7.5 mm (adjustable)
Insulation resistance	>500 MΩ @ 500 V

Statistical data (reliability)	
MTTFd	127 y
DC	low

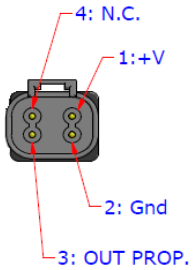
Electrical Connections

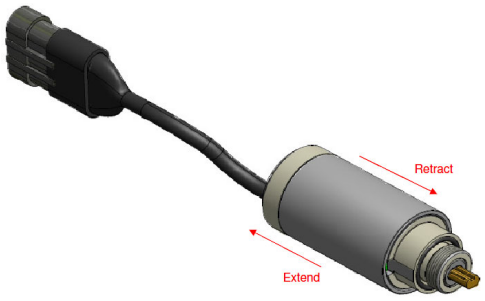
1. Vcc - Blue
2. Gnd - Green/Yellow
3. Proportional Output - Brown
4. n.u. - Black

Amp seal, 4 male pins

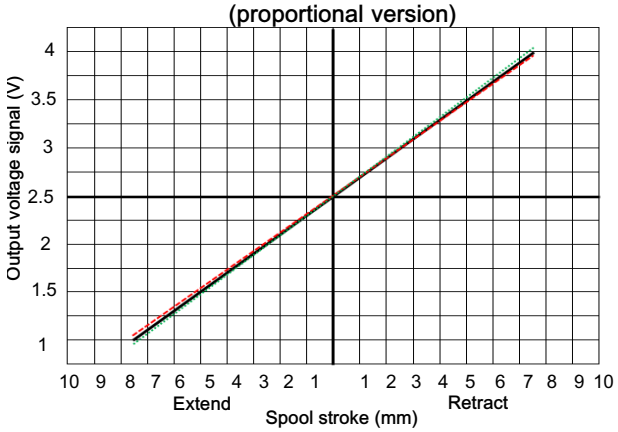


Deutsch DT04-4P

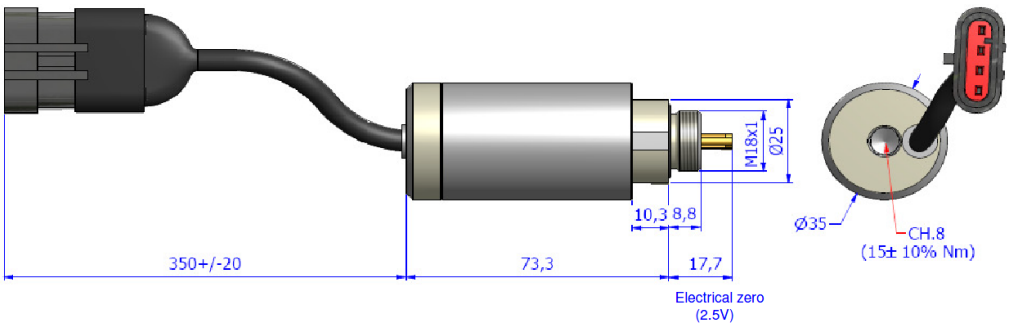




Output signal control characteristic (proportional version)



Red lines: -25 / +85 °C Green lines: 85 / 105 °C



6.4.2 ON-OFF

Connector style	Type	Codes
AMP	OS A	200544124032

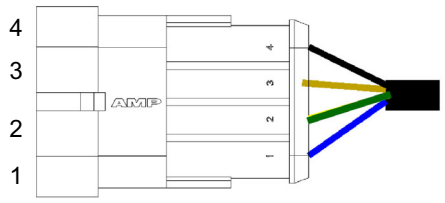
Mechanical specifications	
Maximum mechanical stroke	≥ ±8.5 mm
External diameter	35 mm
Body lenght	91 ± 8.5 mm
Cable lenght (including connector)	350 mm
Maximum operating pressure	5 MPa (50bar)
Operating temperature range	-25°C / +105°C
Protection class	IP 67
Connector	Amp seal, 4 male pins
Mechanical life	5 Million cycles

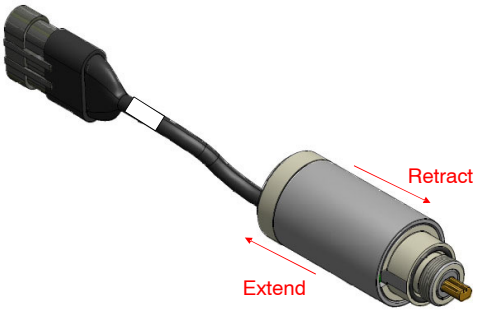
Electrical specifications - Linear, Hall-effect sensor	
Power Supply Voltage	7 ÷ 32 Vdc
Current Consumption	< 20 mA
Output signal (inactive)	> VBATT-1 V
Output signal (active, external pull-down)	< 1 V
Switching threshold	1 mm
Hysteresis on switching threshold	0.3 mm
Insulation resistance	>500 MΩ @ 500 V

Statistical data (reliability)	
MTTFd	127 y
DC	low

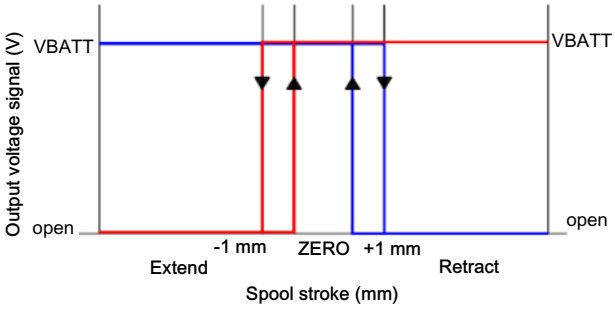
Electrical Connections (proportional version)

1. Vcc - Blue
2. Gnd - Green/Yellow
3. OUT A (Retract) - Brown
4. OUT B (Extend) - Black

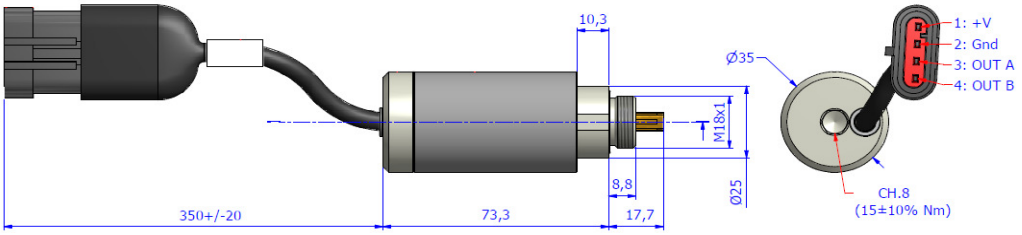




Output signal control characteristic (proportional version)

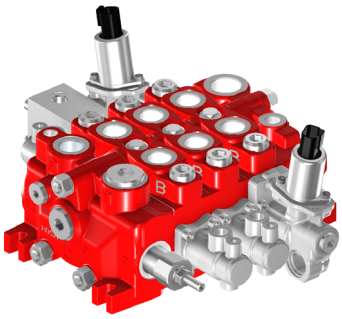


- NEUTRAL POSITION: Out A,, Out B to VBATT,
- EXTEND (stem entering in the sensor): Out A (blue) to VBATT, Out B (red) goes open.
- RETRACT (stem exiting from the sensor): Out B (red) to VBATT, Out A (blue) goes open.
- The hysteresis keeps the switching threshold more stable

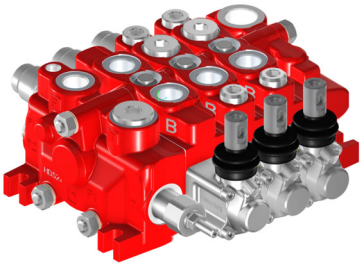


7 Suitable applications (Examples)

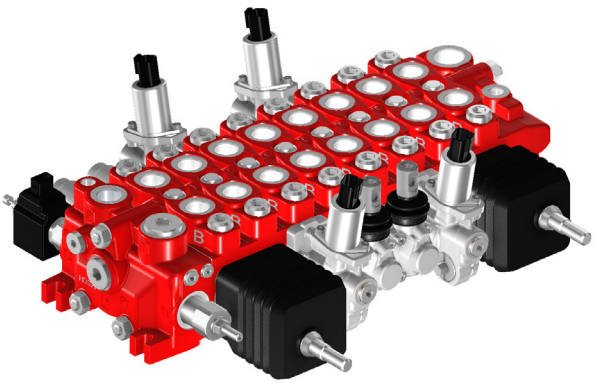
7.1 Wheel loaders



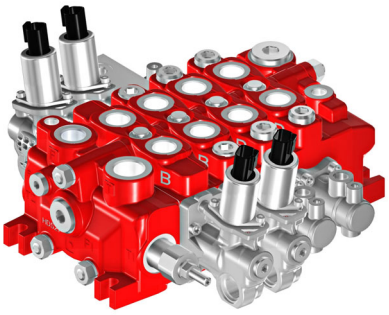
7.2 Tractors



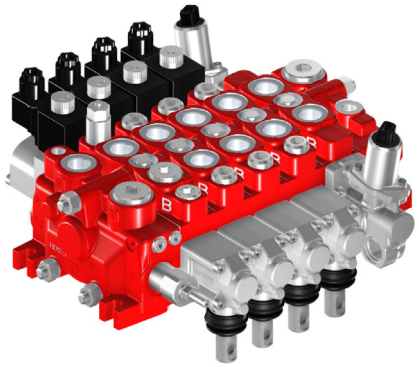
7.3 Forestry cranes



7.4 Telehandlers

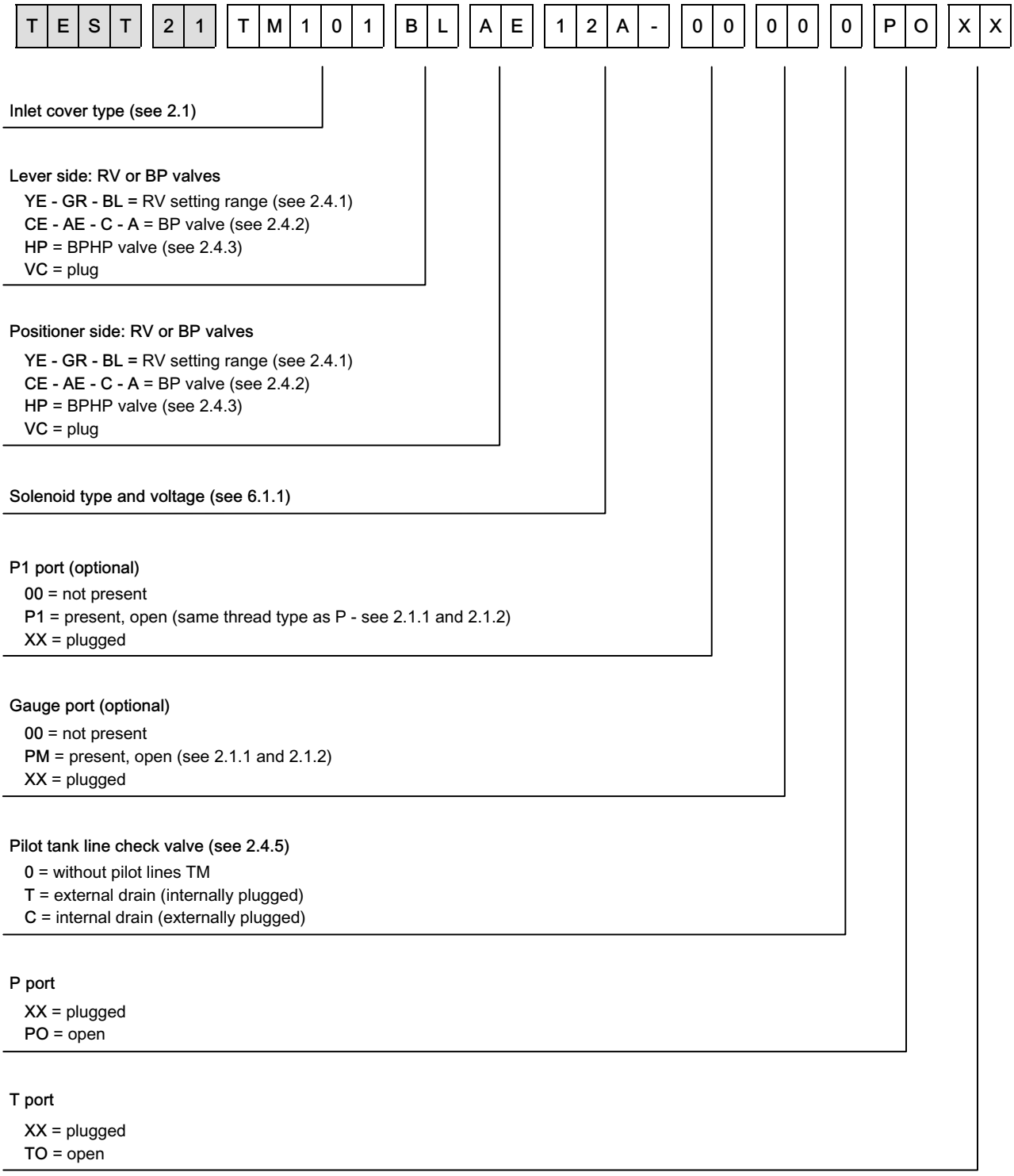


7.5 Fork lifts



8 Composition of ordering code

8.1 Inlet cover



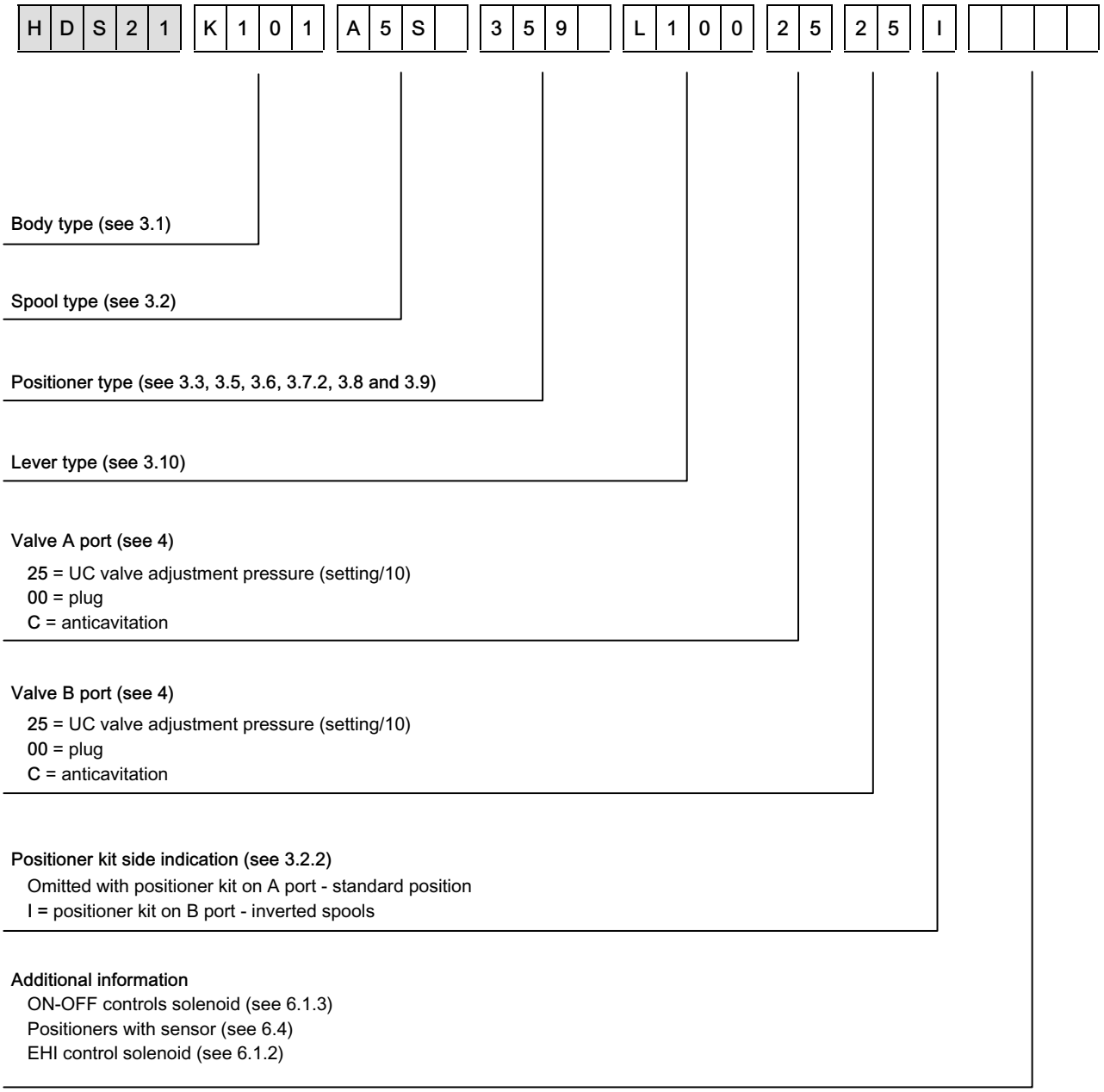
Examples

TEST 21 TM101 BL AE 12A- 00 00 0 PO XX

TEST 21 TH102 CE YE 24AD P1 XX C PO TO

8.2 Sections

For versions with Electro Mechanical Locking System/Microswitch see 8.2.1
For versions with standard EHO control see 8.2.2



Examples

HDS21 K101 W5P 51 25 C

HDS21 K107 A5S 133 L100 00 00

HDS21 K307 C5S 343B 25 20

HDS21 K101 AE 01E 12D-

8.2.1 Sections with electro-mechanical locking system / microswitch

H	D	S	2	1	K	1	0	1	A	5	S		1	3	3		E	M		L	1	0	0	2	5	2	5		1	2	D	-

Body type (see 3.1)

Spool type (see 3.2)

Positioner type (see 3.3)

Intermediate kit (see 3.4)
EM - EME = electro-mechanical locking system
D-S1-S2-S3-D2 = microswitch positioner type

Lever type (see 3.10)

Valve A port (see 4)
25 = UC valve adjustment pressure (setting/10)
00 = plug
C = anticavitation

Valve B port (see 4)
25 = UC valve adjustment pressure (setting/10)
00 = plug
C = anticavitation

Positioner kit side indication (see 3.2.2)
Omitted with positioner kit on A port - standard position
I = positioner kit on B port - inverted spools

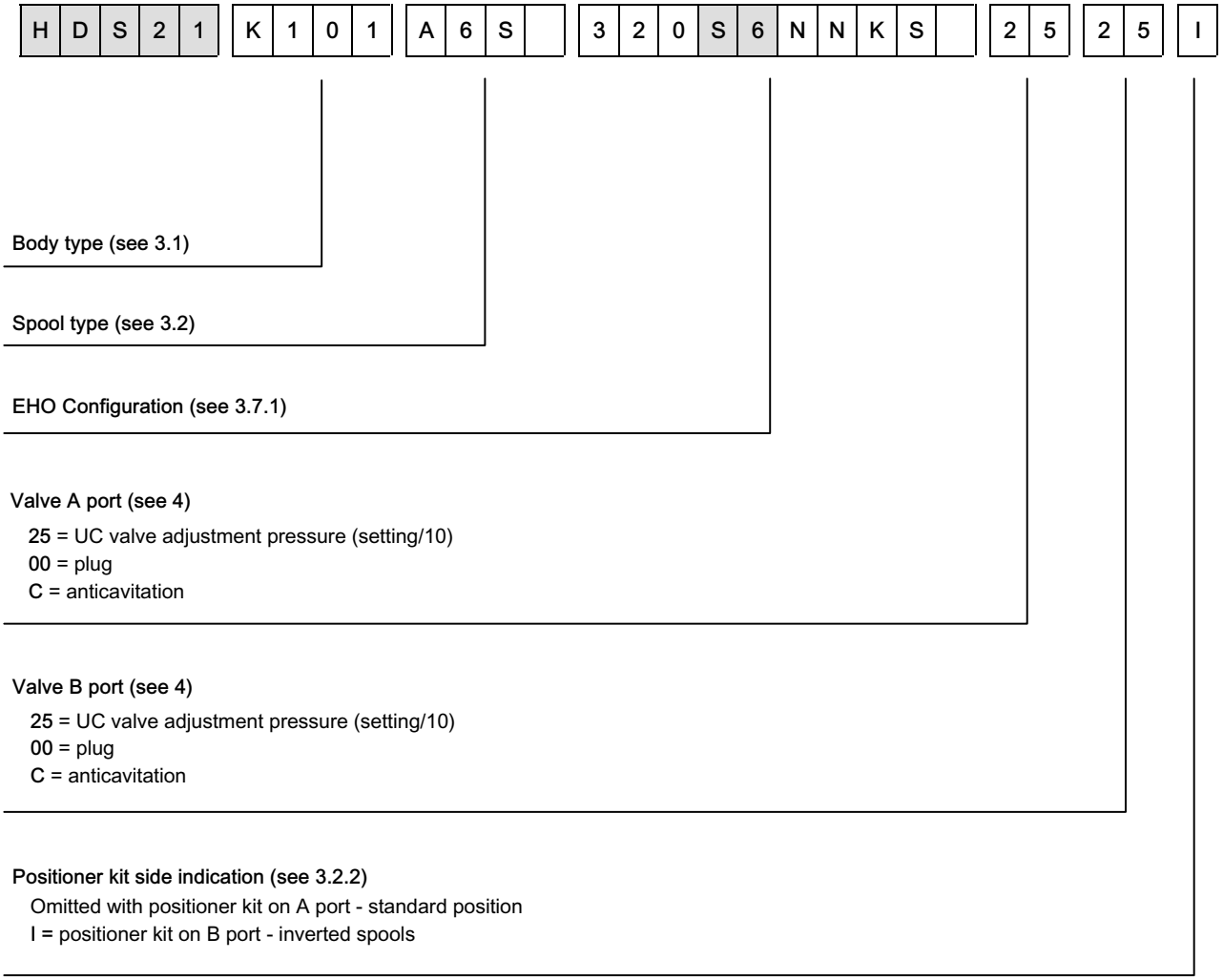
Additional information
Electro-mechanical locking solenoid (see 6.1.2)
Microswitch positioners (see 6.2)

Examples

HDS21 K101 A5A 01 EME L100 30 20 12A-

HDS21 K101 A5S 133 D L100 15 15 OW-

8.2.2 Sections with standard EHO control



Examples

HDS21 K107 A5S 322S6NNKSH 15 15

HDS21 K108 AXB 320S6GG0

8.3 End cover

C	O	P	2	1	P	M	2	0	1	T	5				T	3		0	0	0	0	0	0

End cover type (see 5)
- Standard
- HPC
- Standard with VRP
- HPC with VRP

T5/HPC port

Standard (with/without VRP) type
- **T5** = open
- **XX** = plugged

HPC type
- **HPC** = purely HPC (open)
- **CC** = closed centre
- **VCP12** = with VCP (12: spring setting in bar - see 5.6) needed with VRP valve only.

T3 port
- **T3** = open
- **XX** = plugged
- **HPC** = with upper HPC kit (optional)

T4 port (optional)
- **00** = not present
- **T4** = present, open (same thread type as T3 - see 5)
- **XX** = plugged

Pp port
- **00** = not present
- **PP** = present, open (see 5)
- **XX** = plugged

Pilot supply pressure reducing valve VRP
- **00** = not present
- **32** = pressure reducing valve adjustment in bar (see 5.5)
- **XX** = plugged

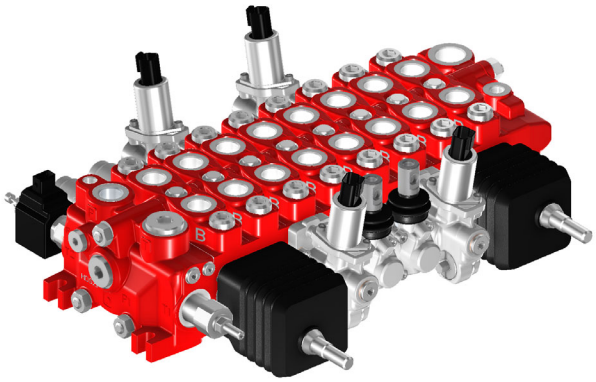
Examples

COP 21 PM212HPC XX T4 PP 00

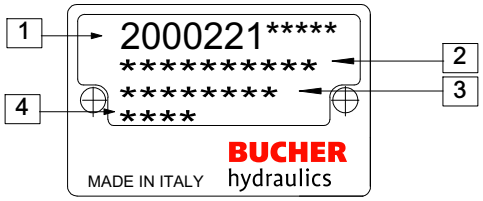
COP 21 PH213 VCP12 T3 00 PP 32

8.4 Examples of ordering code

TEST21 TH_02 GR AE 12A- XX XX C PO XX
HDS21 K_01 A_ _ 79 L460 20 20
HDS21 K_01 A_ _ 33 L460 22 10
HDS21 K_07 A_ _ 322S6GGK 12 25 I
HDS21 K_01 A_ _ 79 L100 00 00
HDS21 K_01 A_ _ 79 L100 00 00
HDS21 K 07 A_ _ 322S6GGK 20 20 I
HDS21 K_01 A_ _ 33 L460 22 10
HDS21 K_01 A_ _ 79 L460 20 20
COP21 PH_13 VCP12 T3 00 XX 32



9 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					
	2017	2018	2019	2020	2021	2022
January	7A	8M	9M	0M	1M	2M
February	7B	8N	9N	0N	1N	2N
March	7C	8P	9P	0P	1P	2P
April	7D	8Q	9Q	0Q	1Q	2Q
May	7E	8R	9R	0R	1R	2R
June	7F	8S	9S	0S	1S	2S
July	7G	8T	9T	0T	1T	2T
August	7H	8U	9U	0U	1U	2U
September	7I	8V	9V	0V	1V	2V
October	7J	8Z	9Z	0Z	1Z	2Z
November	7K	8X	9X	0X	1X	2X
December	7L	8Y	9Y	0Y	1Y	2Y

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info.it@bucherhydraulics.com www.bucherhydraulics.com

Classification: 430.300.000