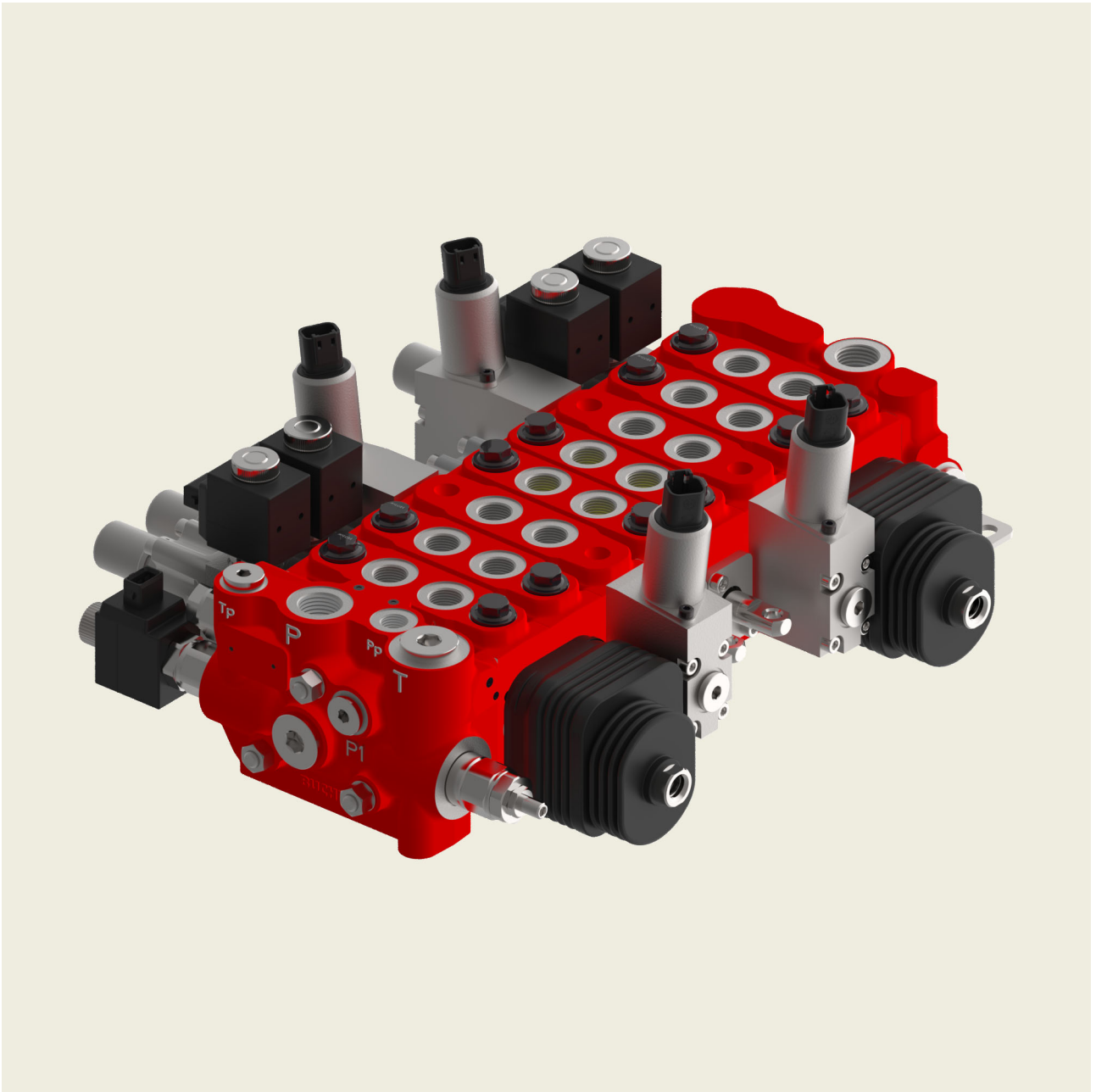
BUCHER hydraulics

Directional Control Valve HDS12



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Contents

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1 General information

1.1 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		45 l/min *(12 US gpm)*	
Max inlet pressure (P) 1)		270 bar *(3900PSI)***	
Max work port pressure (A/B) 1)		300 bar *(4300 PSI)*	
Max back pressure (T)	standard	30 bar *(430 PSI)*	
	with ON-OFF control	20 bar *(290 PSI)*	
	with electro-hydraulic positioner (EHO)	10 bar *(145PSI)*	
Max internal leakage A/B→T (at 100 bar/1450 PSI, 23 mm^2/s)2)		Parallel section	Series section
	standard section	12 cc/min (*) *(0.732 Cu In/min)*	15 cc/min (*) *(0.915 Cu In/min)*
	standard section with port valves	20 cc/min (*) *(1.220 Cu In/min)*	23 cc/min (*) *(1.404 Cu In/min)*
	ON-OFF section	35 cc/min *(2.135 Cu In/min)*	38 cc/min *(2.319 Cu In/min)*
	ON-OFF section with port valves	40 cc/min *(2.440 Cu In/min)*	43 cc/min *(2.624 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 and direct ON-OFF 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/ electrohydraulic devices	from -30 to +50 °C	
Tie-rods tightening torque		18^{+2} Nm	

For different operating conditions, please contact our Sales Center.

1) Fatigue tested according to internal procedure at 1.14x rated pressure on 6 samples for 1˙000˙000 cycles.
For work port sizes bigger than M18 and for specific modules the rated pressure is limited to a lower value (see specific pharagraphs).

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

(**) For direct on-off version see operating limit diagrams at section 3.5

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

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*	30 / *22.1*	35 / *25.8*	60 / *44.3*	90 / *66.4*
BSP - ISO 228-1	G 1/8	G 1/4	G 3/8	G 1/2	G 3/4
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*	30 / *22.1*	35 / *25.8*	60 / *44.3*	90 / *66.4*
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)	12 / *8.9*	30 / *22.1*	35 / *25.8*	60 / *44.3*	90 / *66.4*

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

1.4 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 Center, 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 1.1 (Technical specifications)

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

1.6 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

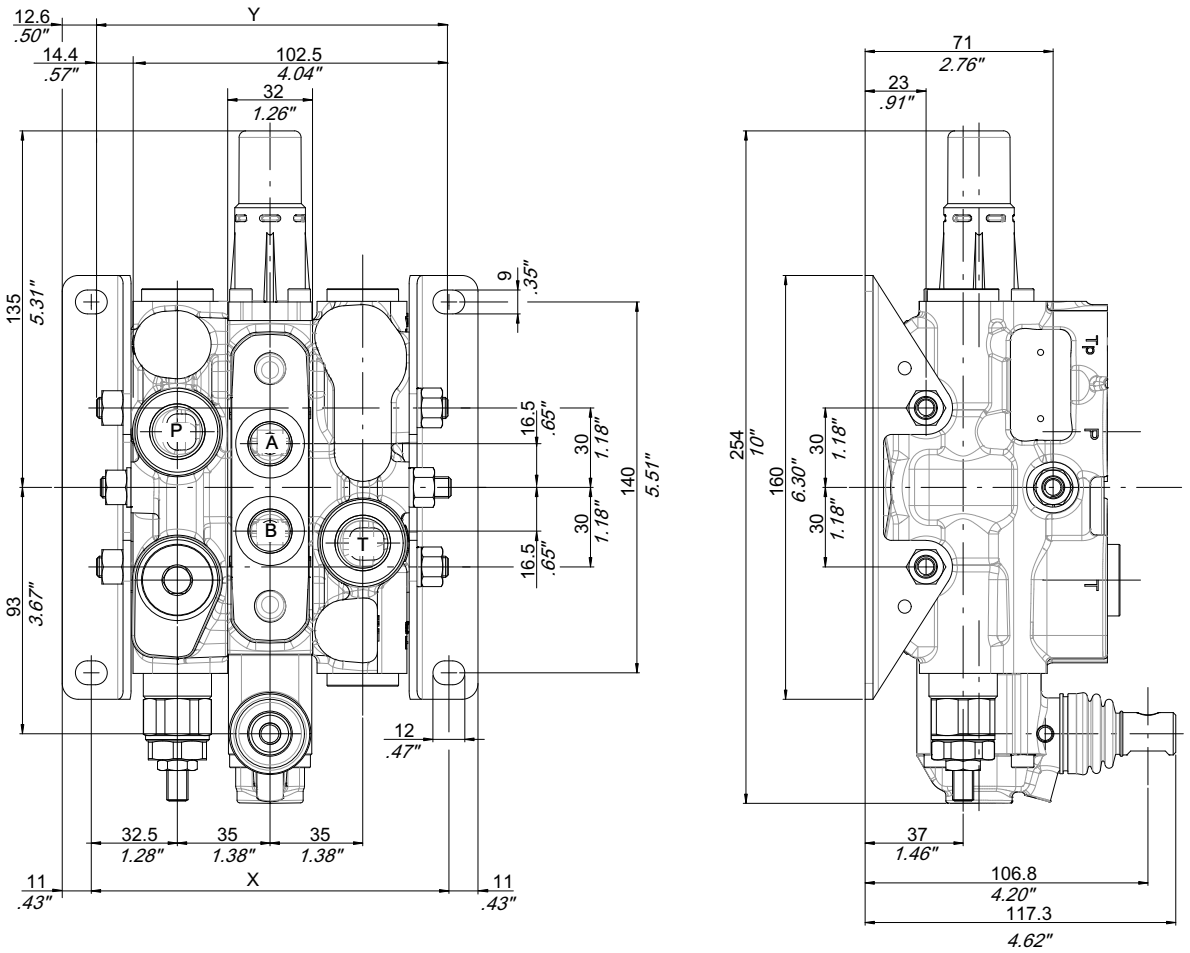
Attention: The equipment and protective systems of this catalogue ARE NOT intended for use in potentially explosive atmospheres. Ref: Directive 99/92/EC and Directive 2014/34/UE

- 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.

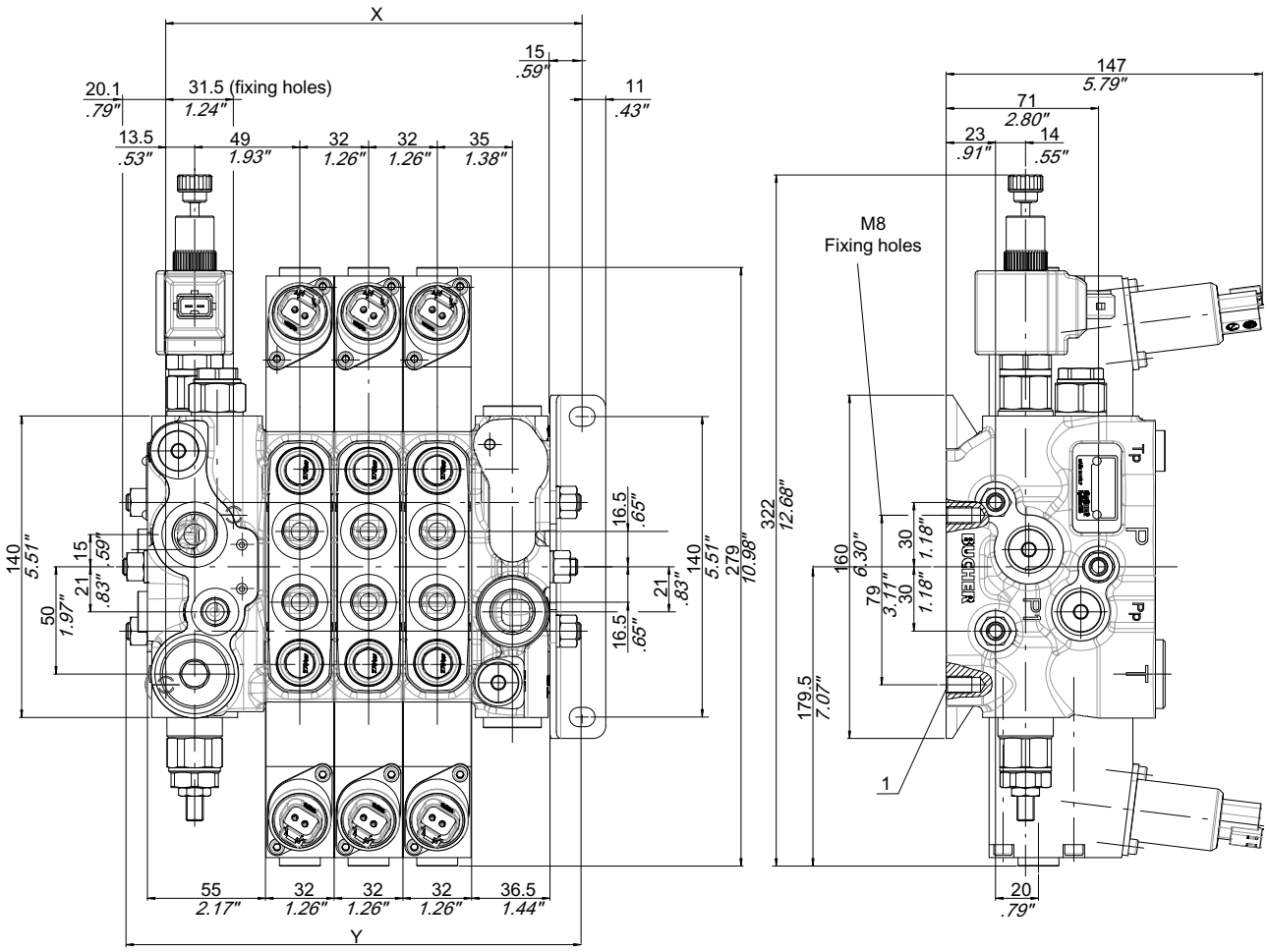
1.7 Dimensional data

1.7.1 Manual operated sections KS with standard inlet



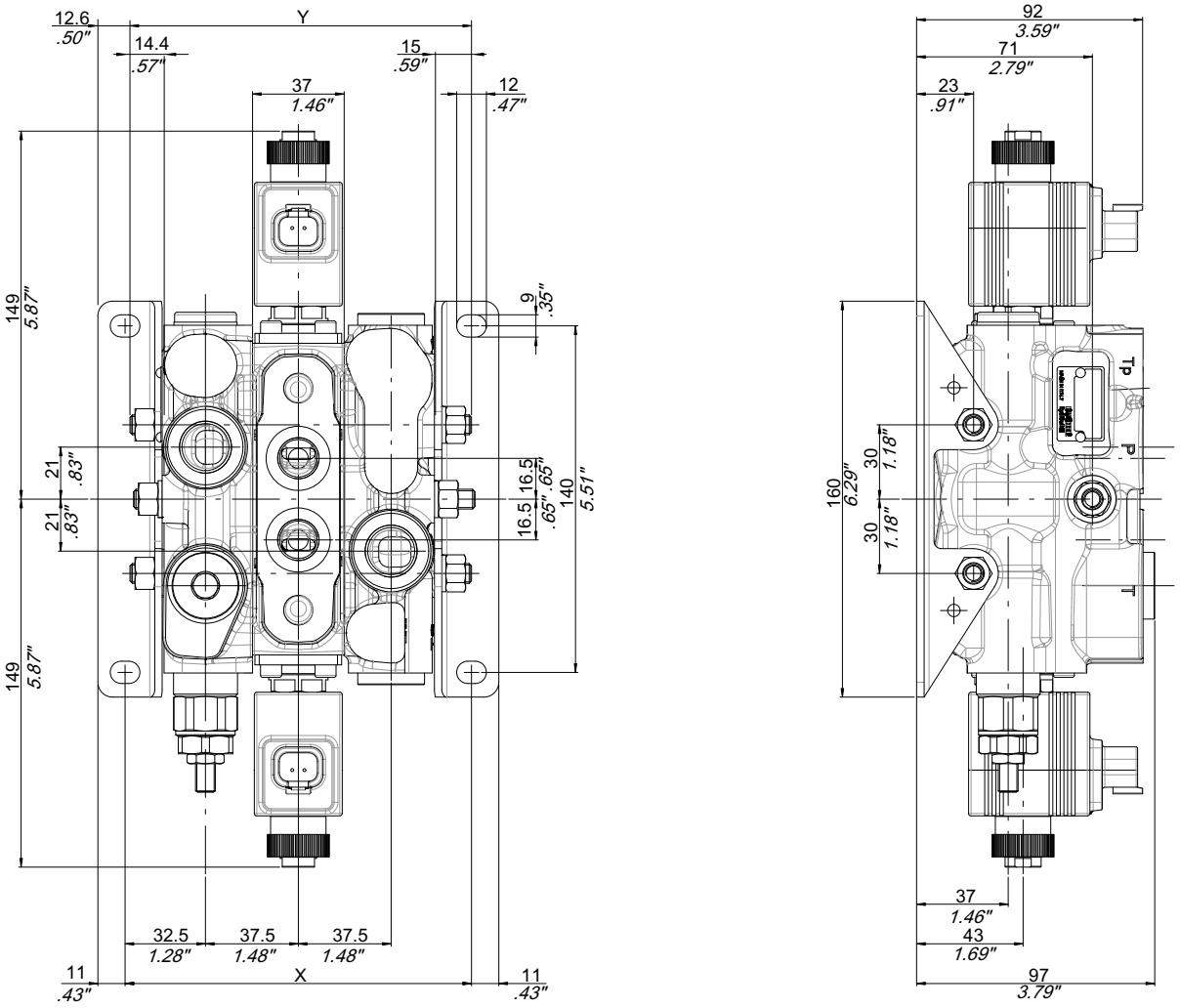
N° of section		/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X	mm	135	167	199	231	263	295	327	359	391	423
	inches	*5.31*	*6.57*	*7.83*	*9.09*	*10.35*	*11.61*	*12.87*	*10.20*	*15.39*	*16.65*
Y	mm	133	166	196	229	264	293	325	357	389	424
	inches	*5.23*	*6.54*	*7.72*	*9.02*	*10.40*	*11.54*	*12.80*	*14.06*	*15.31*	*16.69*

1.7.2 Electro-hydraulic operated sections KS with T2P inlet



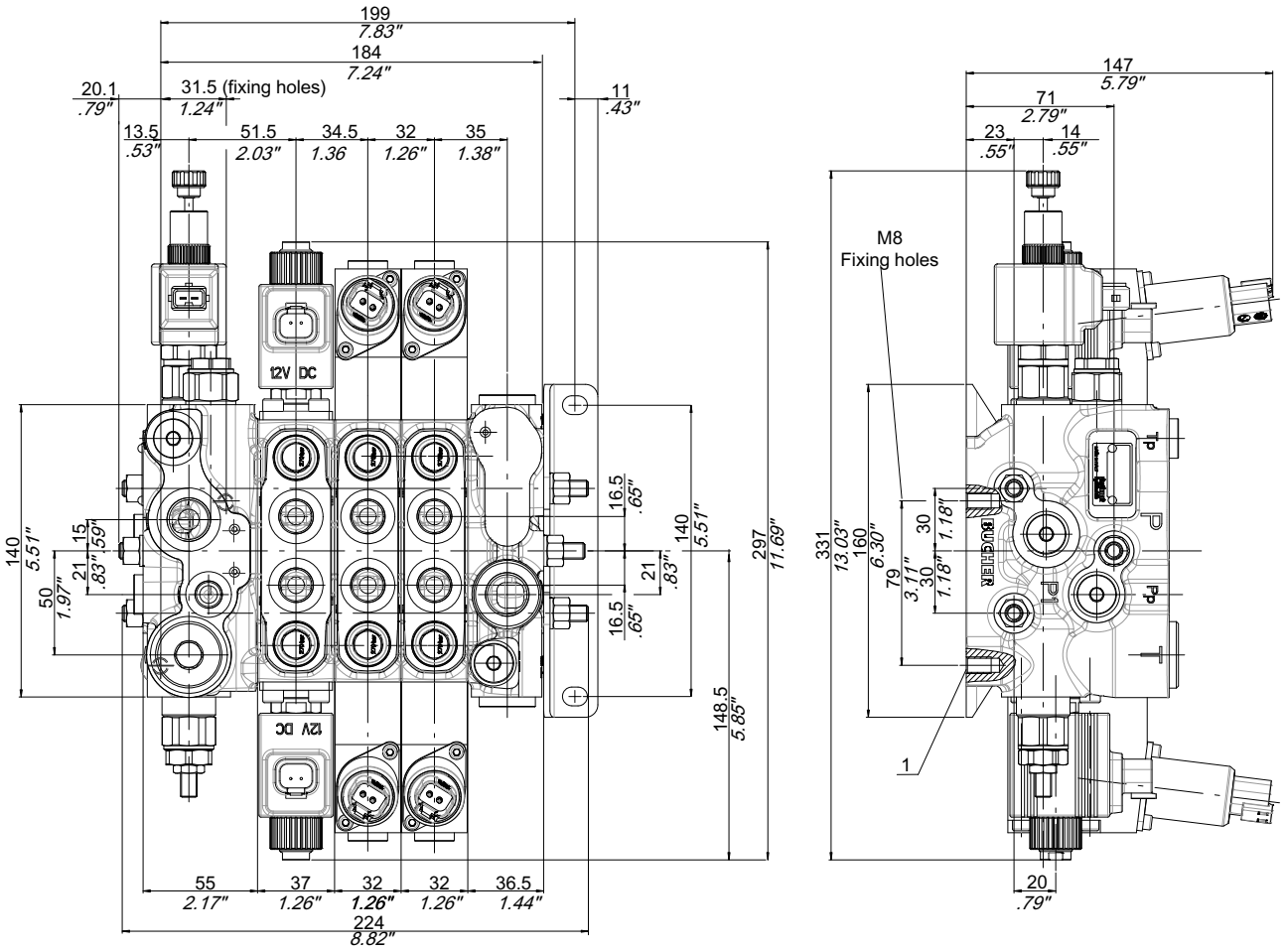
N° of section		/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X	mm	149	181	213	245	277	309	341	373	405	437
	inches	*5.87*	*7.13*	*8.39*	*9.65*	*10.91*	*12.17*	*13.43*	*14.69*	*15.94*	*17.20*
Y	mm	161	193	225	257	289	321	353	385	417	449
	inches	*6.34*	*7.60*	*8.86*	*10.12*	*11.38*	*12.64*	*13.90*	*15.16*	*16.42*	*17.68*

1.7.3 Direct electric ON-OFF operated sections KH with standard inlet



N° of section		/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X	mm	140	177	212	249	286	323	360	397	435	472
	inches	*5.51*	*6.97*	*8.35*	*9.80*	*11.26*	*12.72*	*14.17*	*15.63*	*17.13*	*18.58*
Y	mm	138	175	206	239	271	304	335	366	399	431
	inches	*5.43*	*6.89*	*8.11*	*9.41*	*10.67*	*11.97*	*13.19*	*14.41*	*15.71*	*16.97*

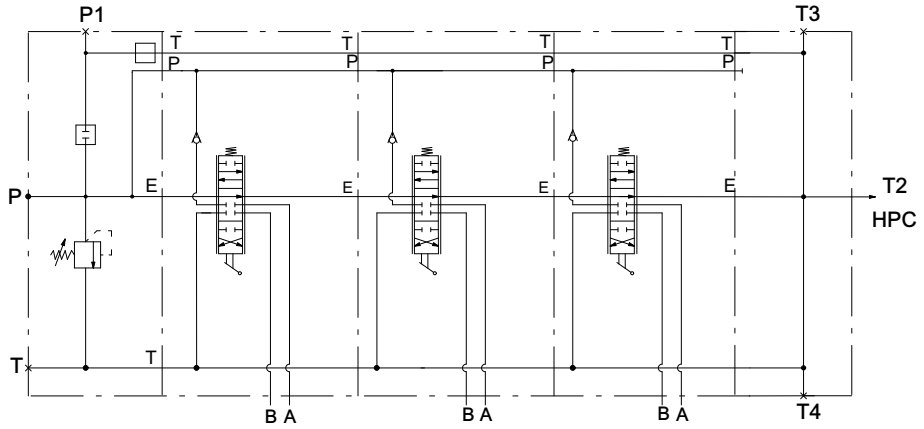
1.7.4 Hybrid configuration with KS and KH sections and T2P inlet



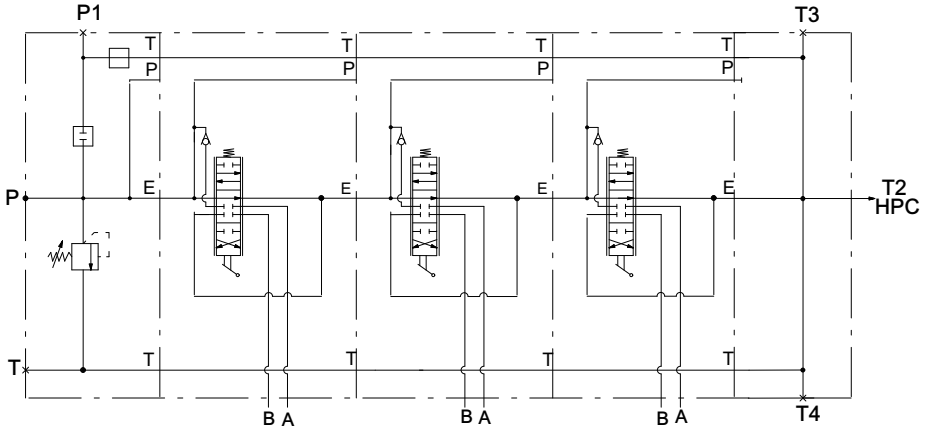
For valve in mixed configuration please contact our Sales Center.

1.8 Hydraulic circuits combination examples

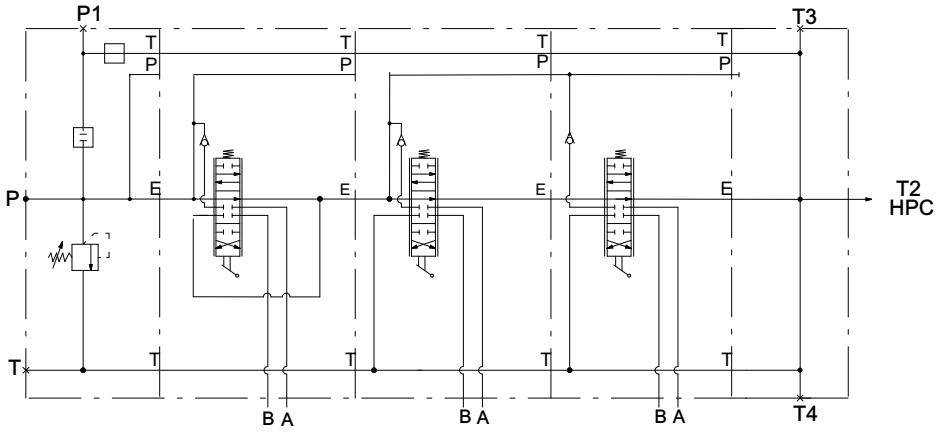
Parallel circuit



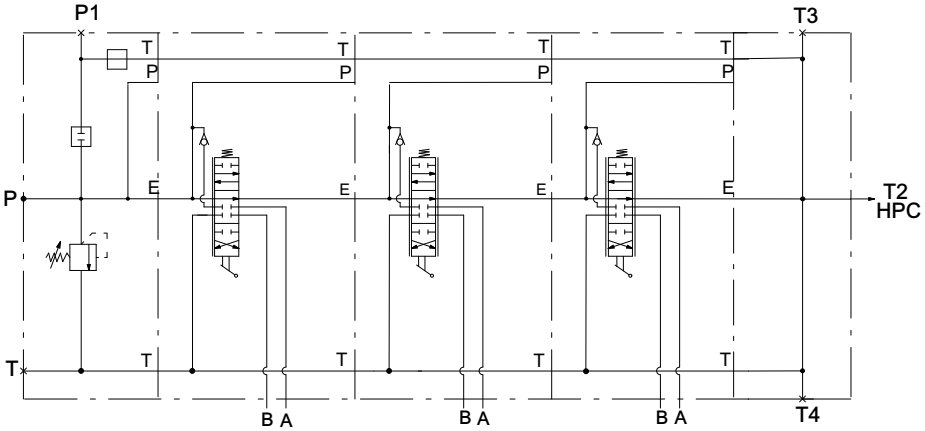
Series circuit



Series/parallel circuit



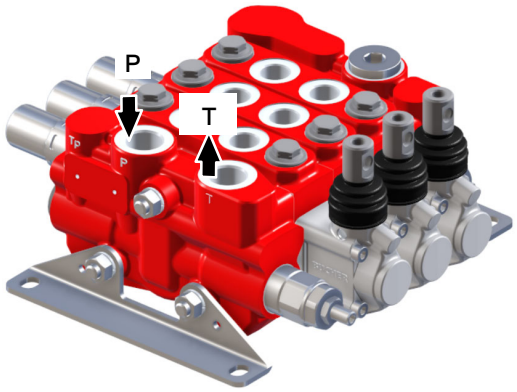
Tandem circuit

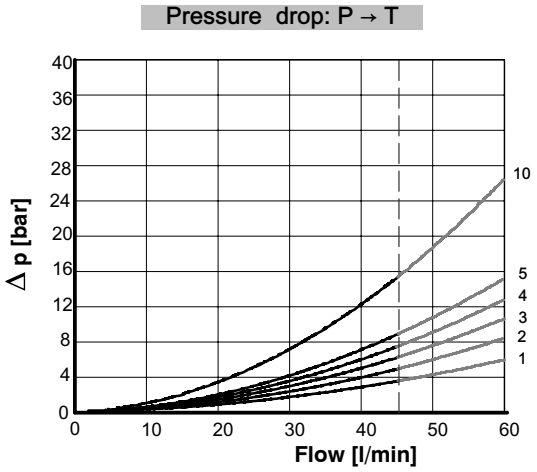


1.9 Pressure drop curves - KS

1.9.1 Through neutral P → T

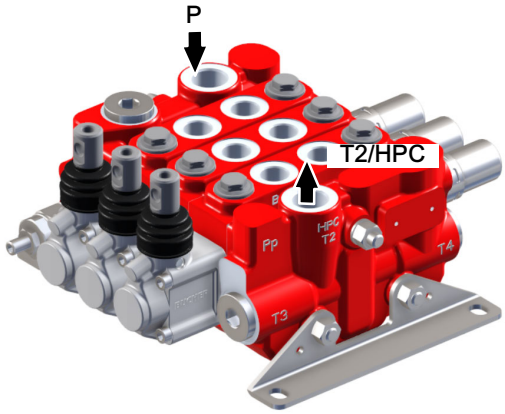
Parallel circuit
Spool A3S

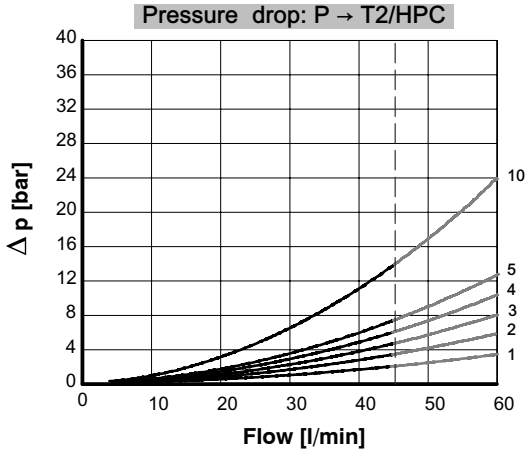




1.9.2 Through neutral P → T2/HPC

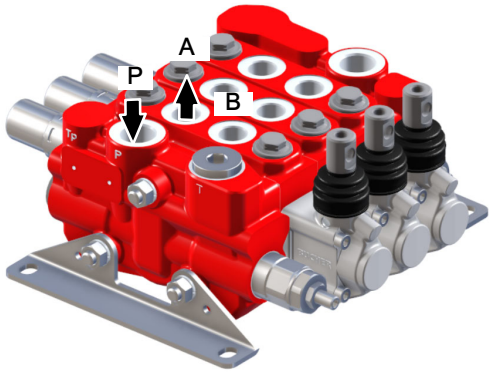
Parallel circuit
Spool A3S
Outlet ports T3-T4 and T2/HPC have the same pressure drops

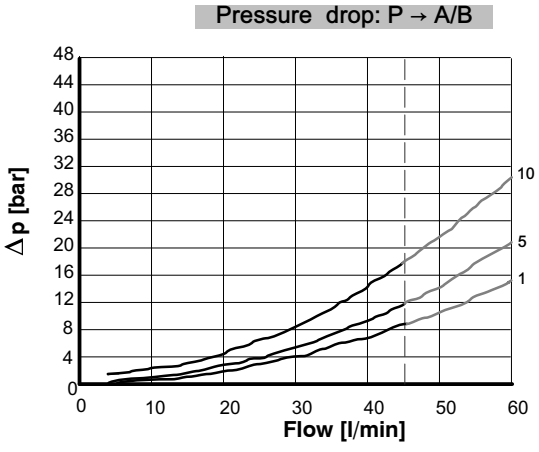




1.9.3 P → A/B

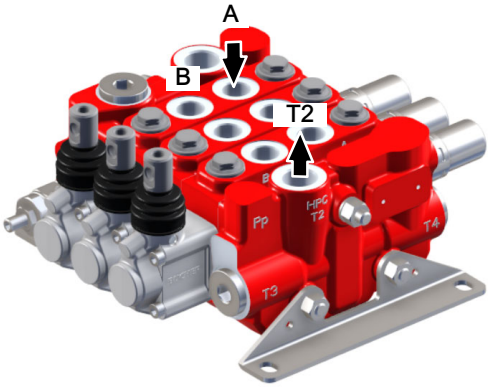
Parallel circuit
Spool A3S

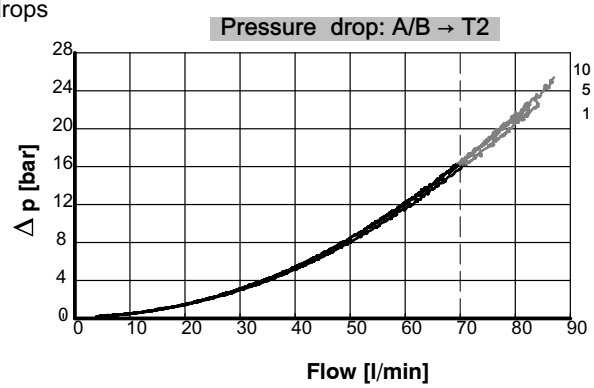




1.9.4 A/B → T2

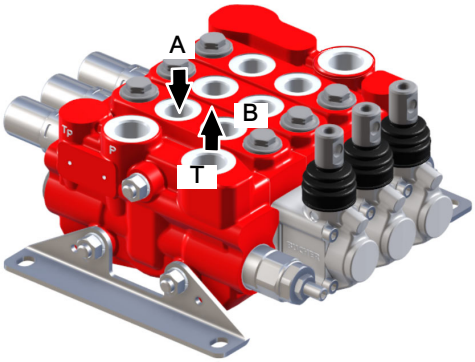
Parallel circuit
Spool A3S
Outlet ports T3-T4 and T2/HPC have the same pressure drops

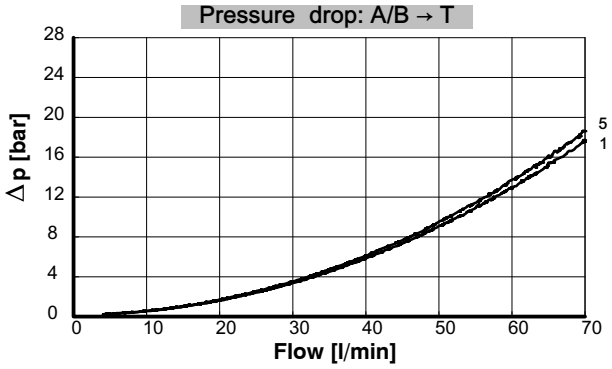




1.9.5 A/B → T

Parallel circuit
Spool A3S





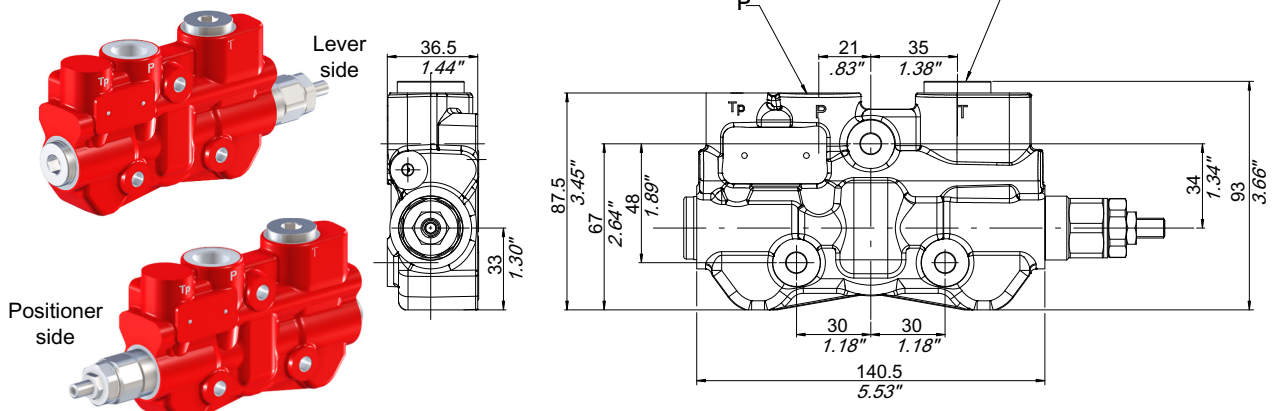
2 Inlet covers

2.1 TM type for manual and ON-OFF configuration

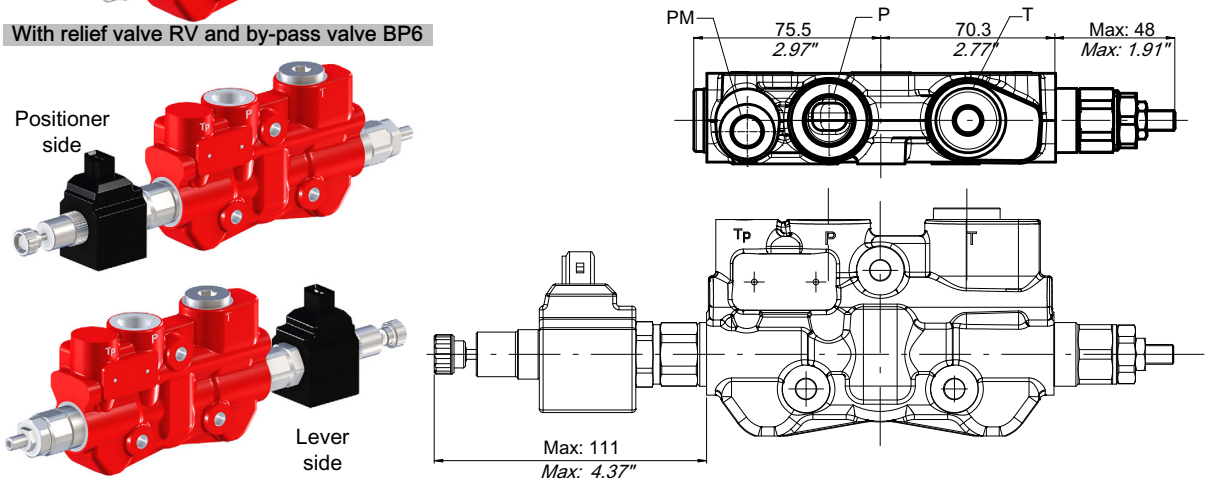
It cannot be used in combination with electro-hydraulic controls

2.1.1 TM inlet with relief valve and unloading valve

With relief valve RV

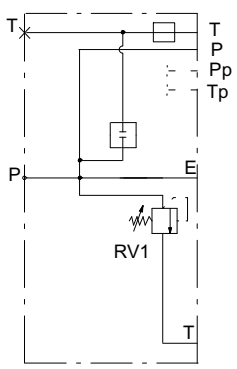


With relief valve RV and by-pass valve BP6

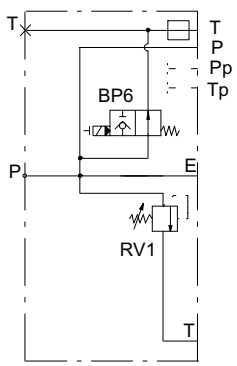


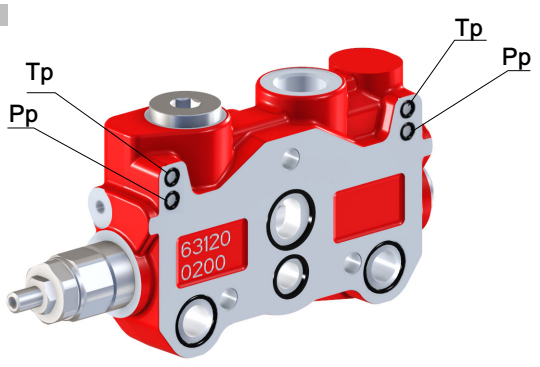
Type	P	T	PM
TM 101	G 1/2	G 1/2	-
TM 103	G 1/2	G 1/2	G 1/4
TM 801	M18x1.5	M18x1.5	-
TM 803	M18x1.5	M18x1.5	M14x1.5
TM 401	SAE8	SAE8	-
TM 403	SAE8	SAE8	SAE6

TEST 12 TM_01 20GRVCPOXX



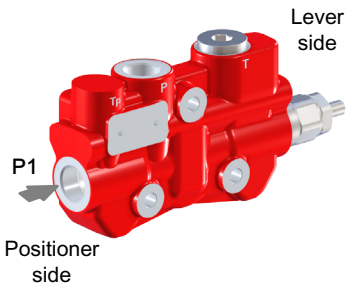
TEST 12 TM_01 20GRAE12H-POXX

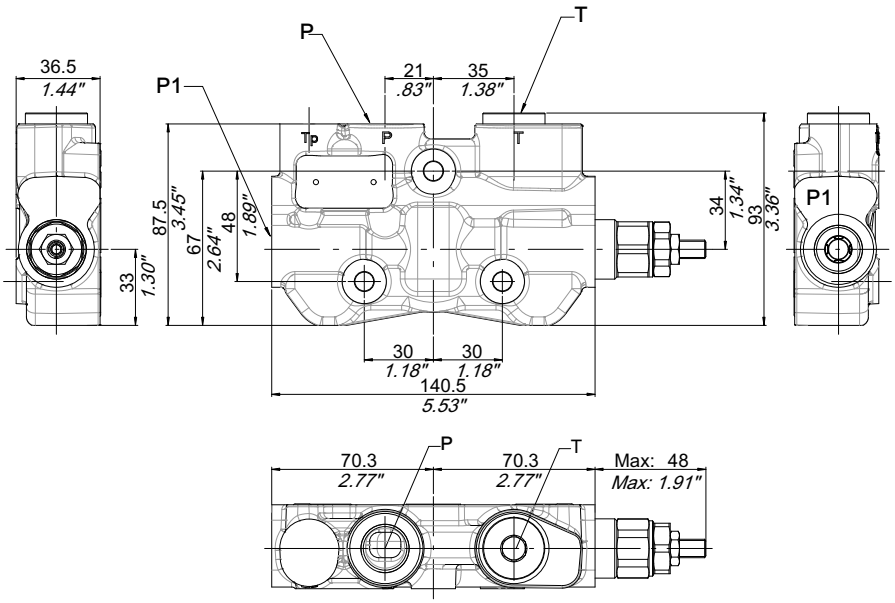




2.1.2 TM inlet with P1 port on positioner side

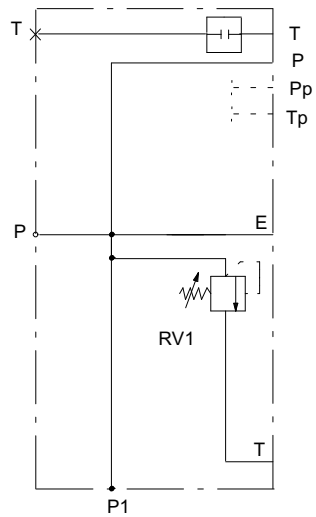
With relief valve RV





Type	P	T	P1
TM 102 P1	G 1/2	G 1/2	G 1/2
TM 802 P1	M18x1.5	M18x1.5	M18x1.5
TM 402 P1	SAE8	SAE8	SAE8

TEST 12 TM_02 20GRP1POXX

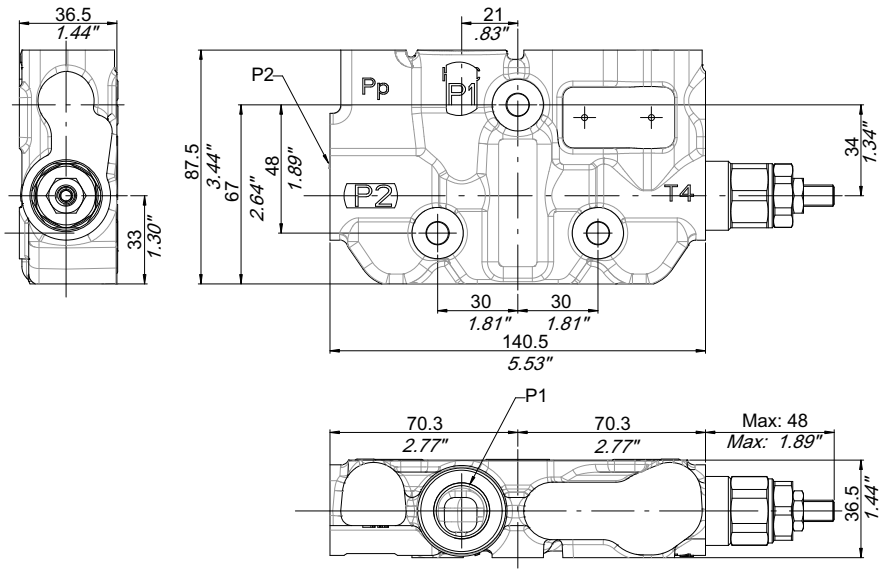


2.2 PTM

2.2.1 PTM parallel connection inlet for manual and ON-OFF configuration

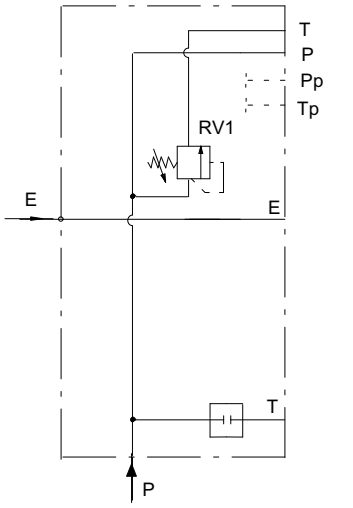
Suitable for connection of two independent valve blocks in parallel (for example in a forestry crane).
It cannot be used in combination with electro-hydraulic controls

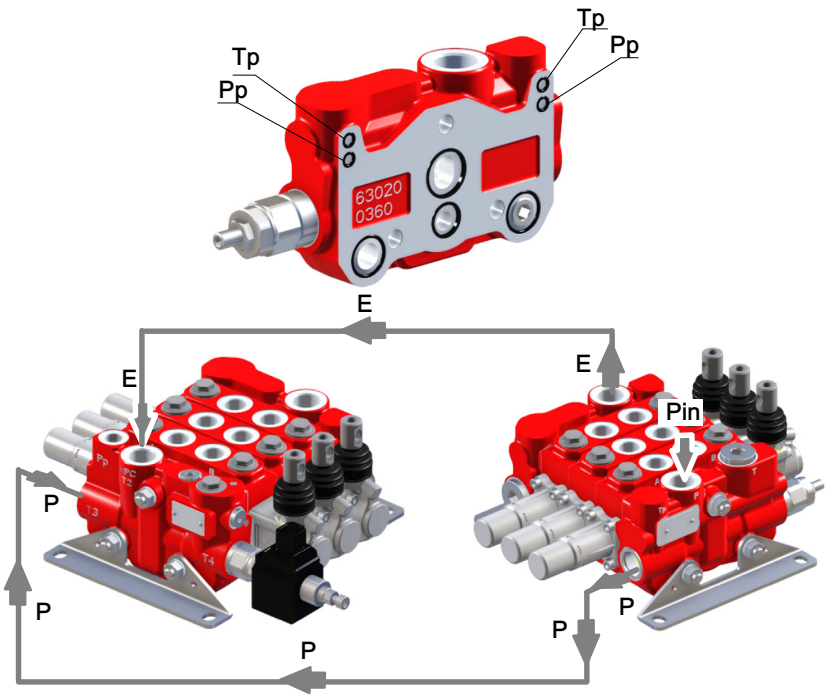
With adjustable relief valve RV



Type	P1	P2
PTM 101	G 1/2	G 1/2
PTM 401	SAE8	SAE8
PTM 501	M22x1.5	M22x1.5

TEST 12 PTM_01 P1P220GR0000



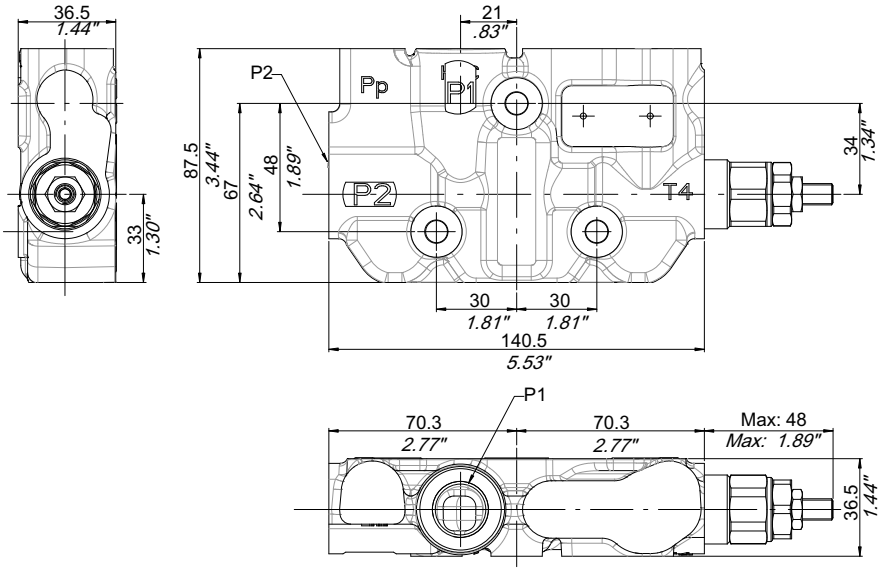


2.2.2 PTM double pump inlet

Suitable in multiple pump systems (for example: High Flow).

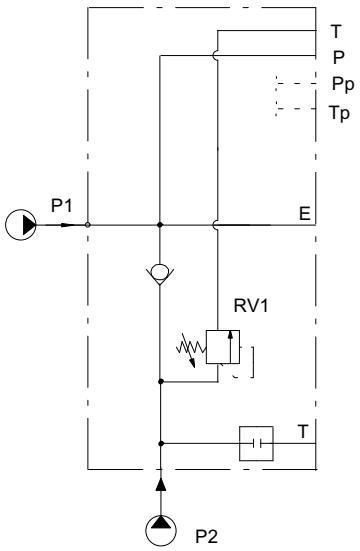
With lower pressure circuit relief valve

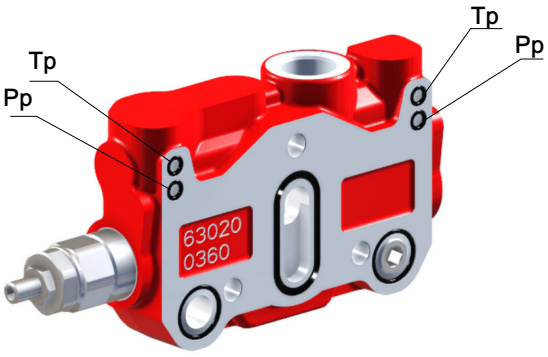
Lever side



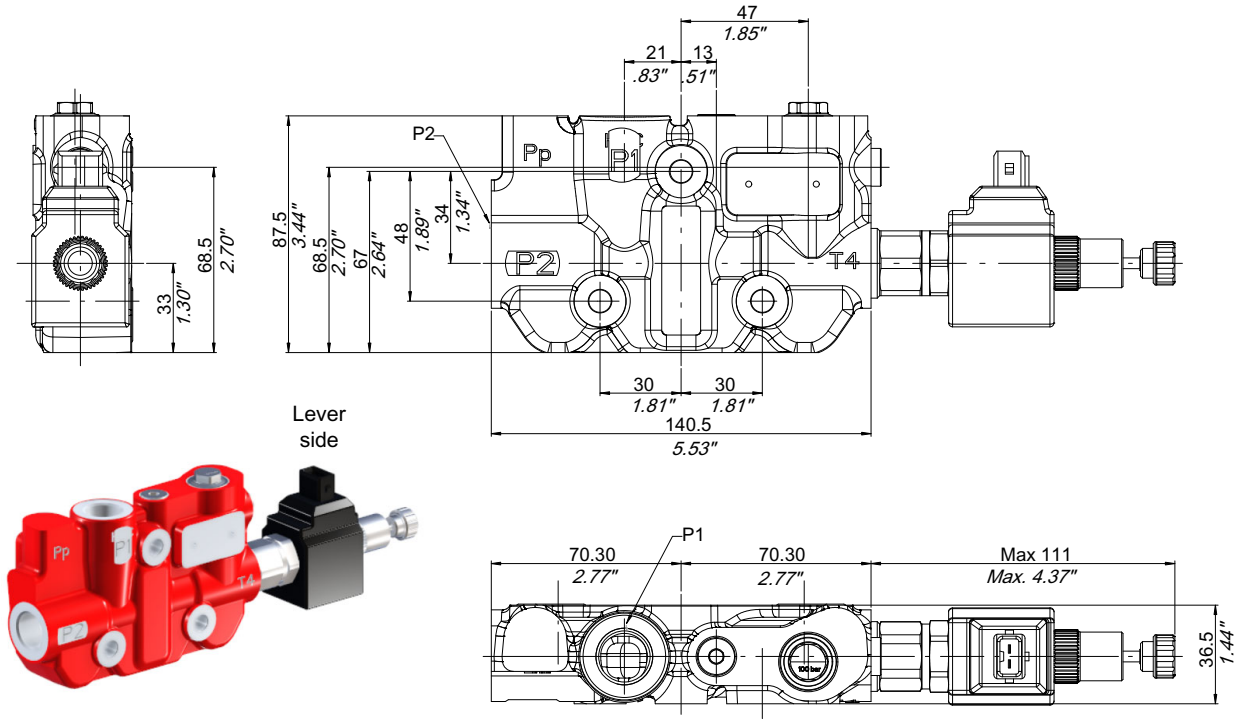
Type	P1	P2
PTM 102	G 1/2	G 1/2
PTM 402	SAE8	SAE8
PTM 502	M22x1.5	M22x1.5

TEST 12 PTM_02 P1P220GR0000



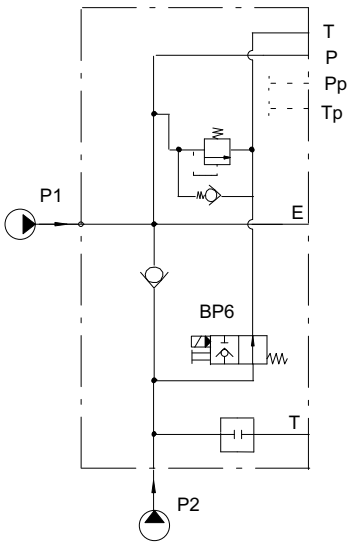


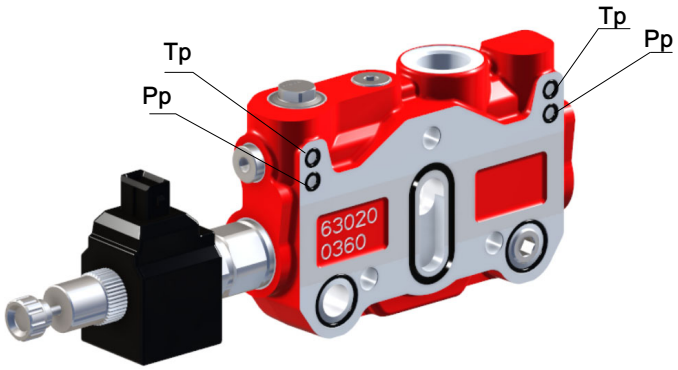
2.2.3 PTM double pump inlet with by-pass valve for second pump



Type	P1	P2
PTM 103	G 1/2	G 1/2
PTM 403	SAE8	SAE8
PTM 503	M22x1.5	M22x1.5

TEST 12 PTM_03 P1P2AE12D-1400

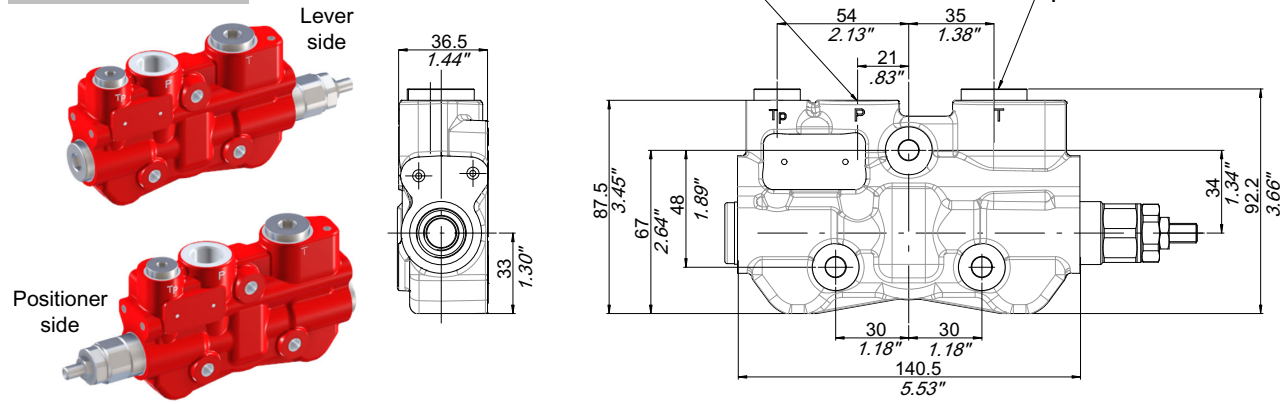




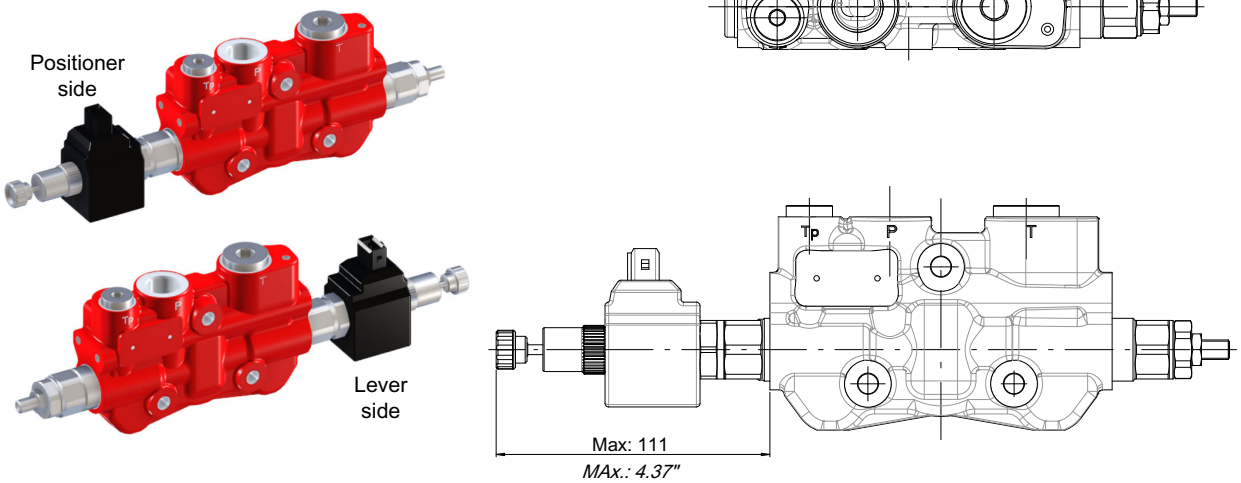
2.3 TH

2.3.1 TH inlet with relief valve, unloading valve and pilot drain line options

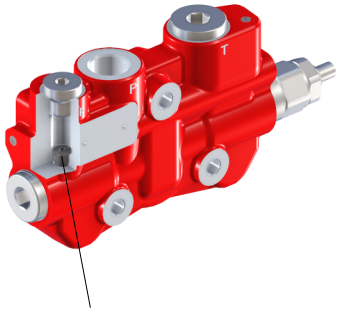
With relief valve RV



With by-pass valve BP6

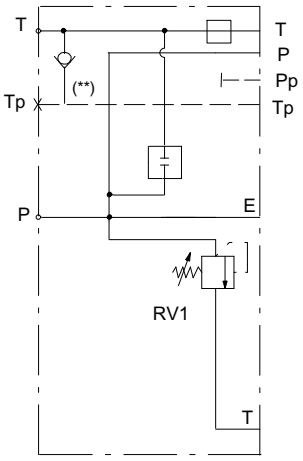


Type	P	T	Tp
TH 101	G 1/2	G 1/2	G 1/4
TH 801	M18x1.5	M18x1.5	M14x1.5
TH 401	SAE8	SAE8	SAE6

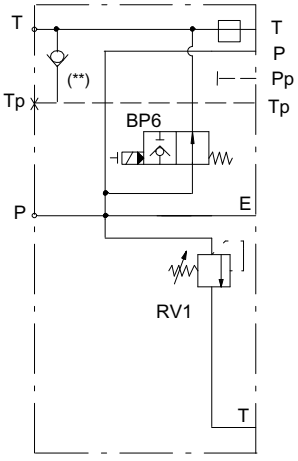


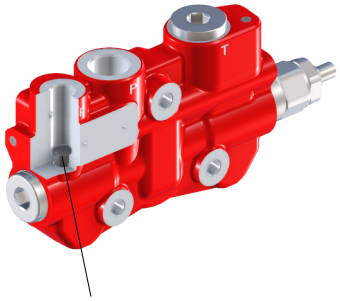
Internal drain option “C” with check valve M10x1 (**), Tp port plugged

TEST 12 TH_01
20GRVCCPOXX



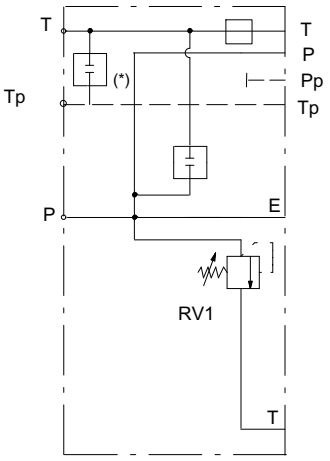
TEST 12 TH_01
20GRAE12D-CPOXX



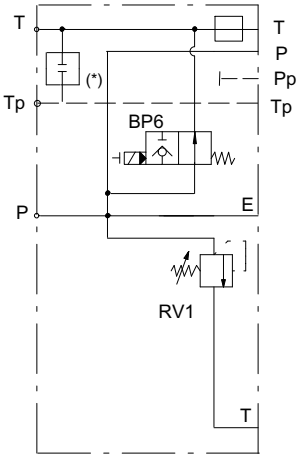


External drain option “T” with internal plug M10x1 (*), Tp port open

TEST 12 TH_01
20GRVCTPOXX

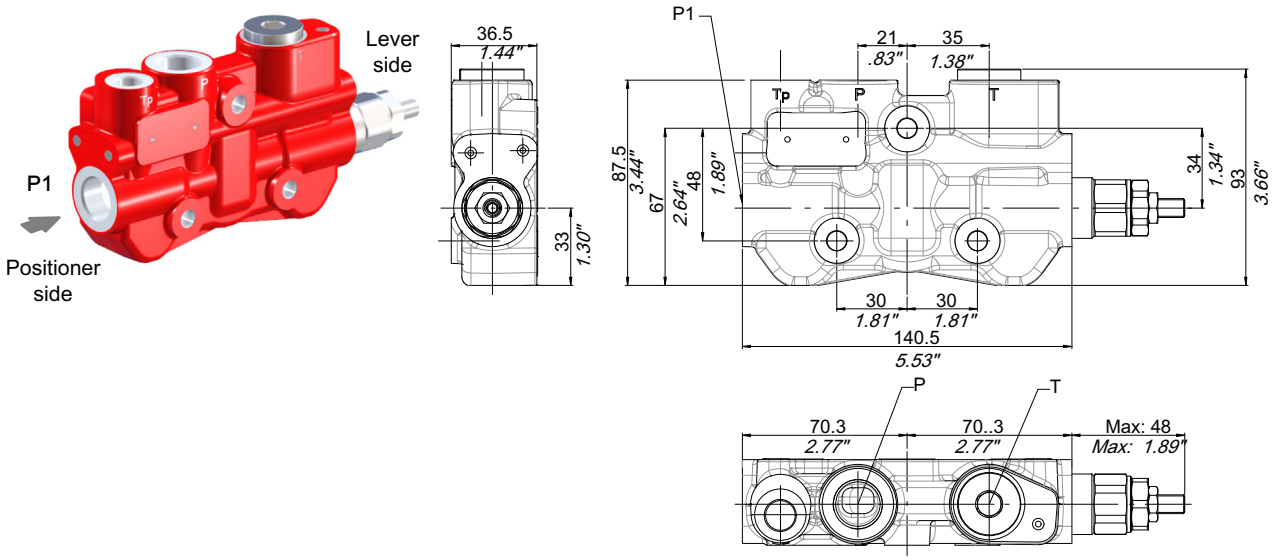


TEST 12 TH_01
20GRAE12D-TPOXX



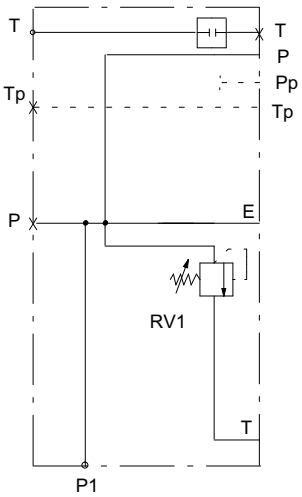
2.3.2 TH inlet with additional P1 port on positioner side

With relief valve RV



Type	P	T	Tp
TH 102 P1	G 1/2	G 1/2	G 1/4
TH 802 P1	M18x1.5	M18x1.5	M14x1.5
TH 402 P1	SAE8	SAE8	SAE6

TEST 12 TH_01 20GRP1CPOXX

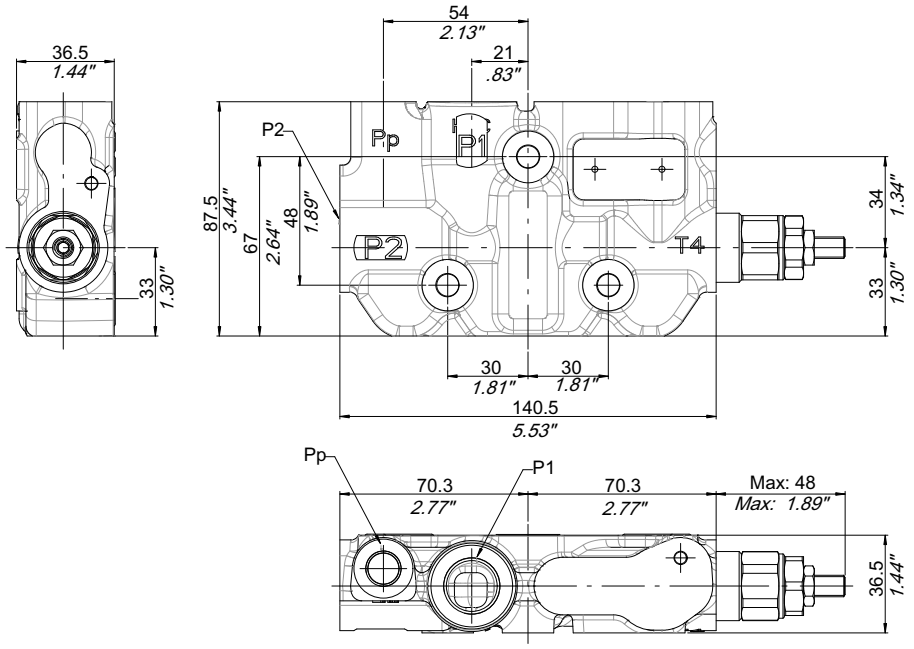


2.4 PTH

2.4.1 PTH parallel inlet connection for configurations with EH controls

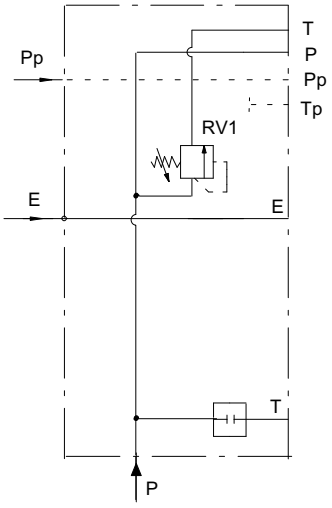
Suitable for connection of two independent valve blocks in parallel (for example in a forestry crane).

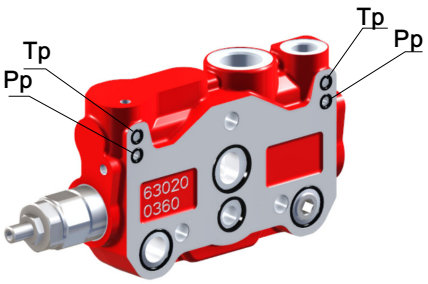
With relief valve RV

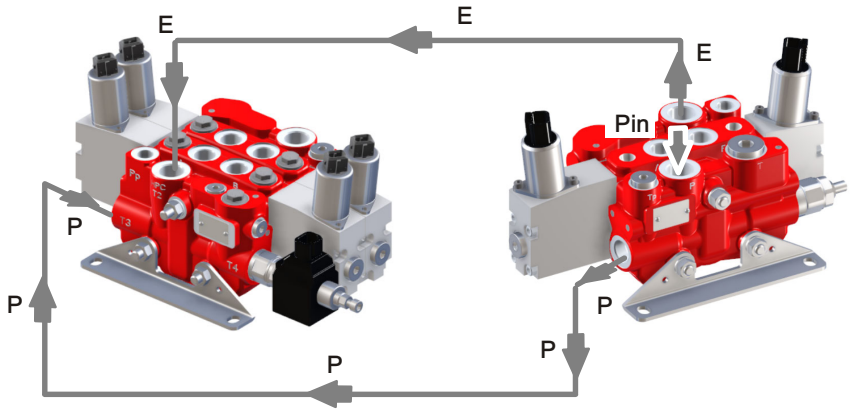


Type	P1	P2
PTH 101	G 1/2	G 1/4
PTH 401	SAE8	SAE6
PTH 501	M22x1.5	M14x1.5

TEST 12 PTH_01 P1P220GR00PP



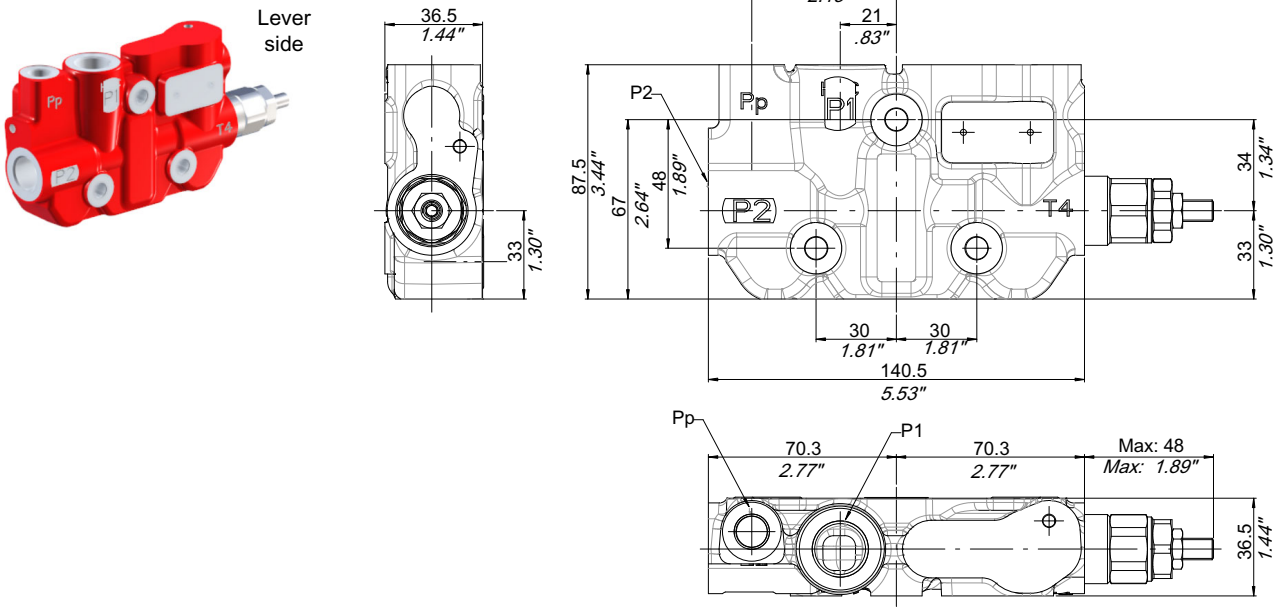




2.4.2 PTH double pump inlet

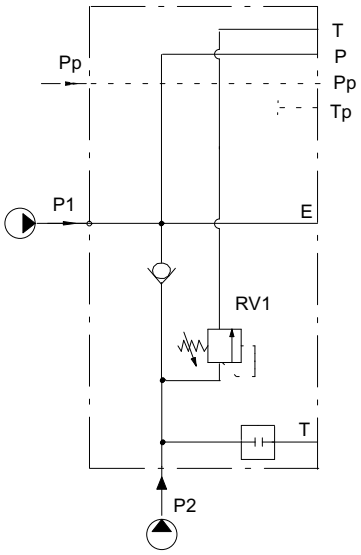
Suitable in multiple pump system (for example in High Flow)

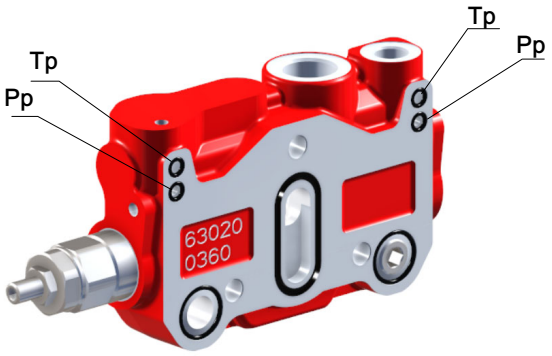
With lower pressure circuit relief valve



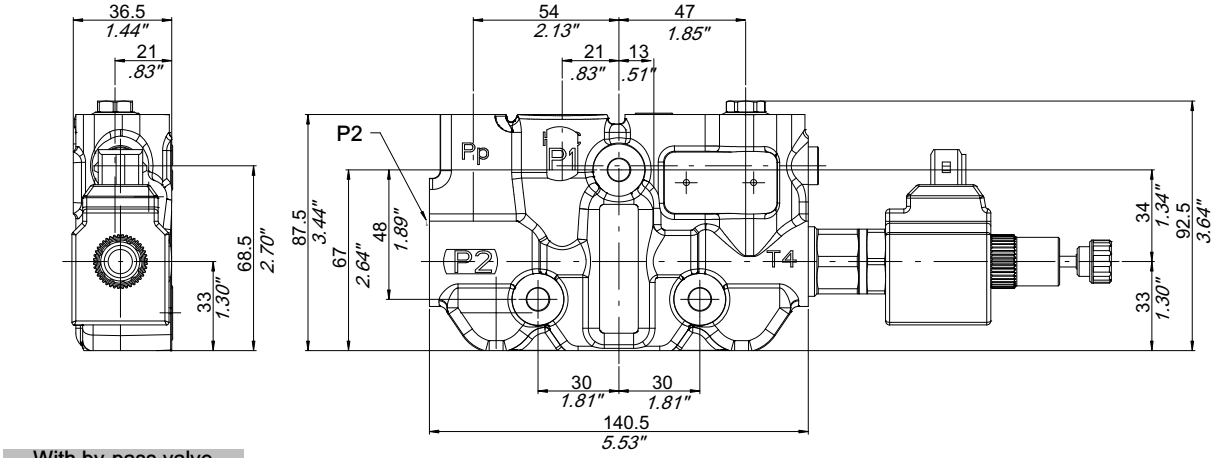
Type	P1	P2	PP
PTH 102	G 1/2	G 1/2	G 1/4
PTH 402	SAE8	SAE8	SAE6
PTH 502	M22x1.5	M22x1.5	M14x1.5

TEST 12 PTH_02 P1P220GR00PP

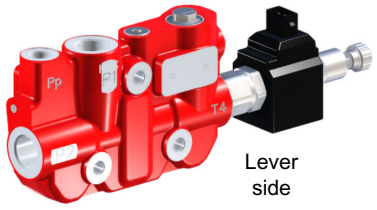


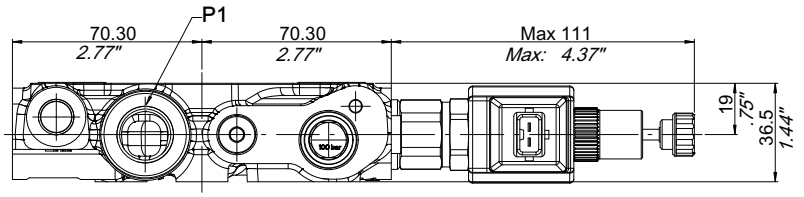


2.4.3 PTH double pump inlet with by-pass valve for solenoid exclusion



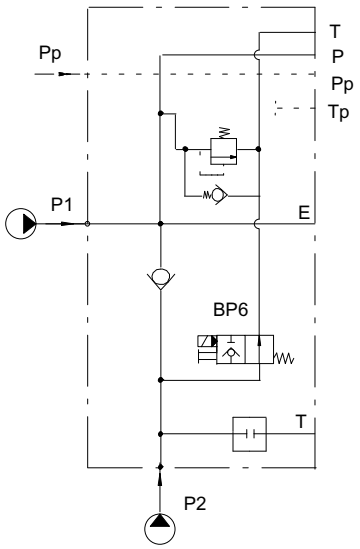
With by-pass valve BP6

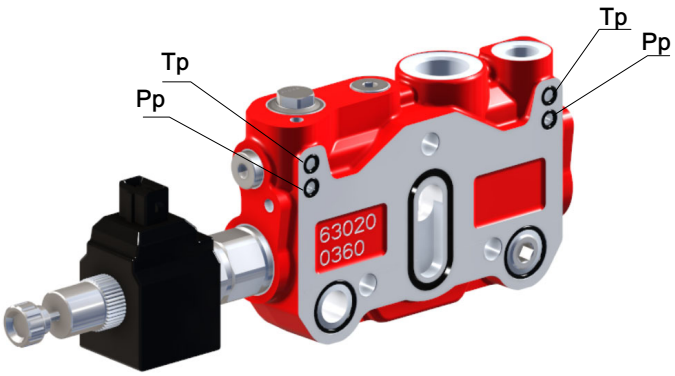




Type	P1	P2	PP
PTH 103	G 1/2	G 1/2	G 1/4
PTH 403	SAE8	SAE8	SAE6
PTH 503	M22x1.5	M22x1.5	M14x1.5

TEST 12 PTH_03 P1P2AE12D-14PP

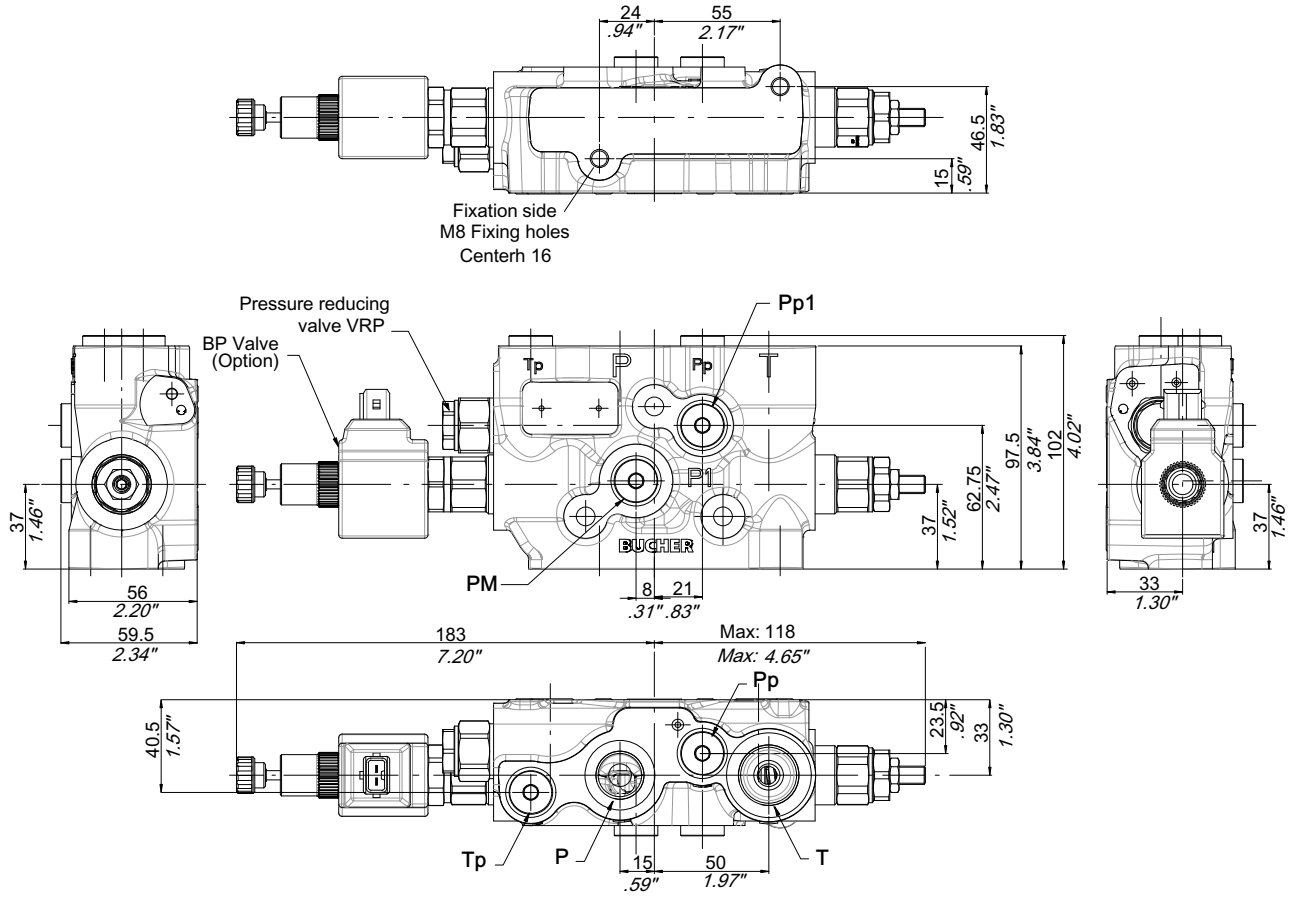




2.5 T2P type with pilot pressure reducing valve and pilot drain line option

Suitable for EH configurations when external Pp feeding is not available.

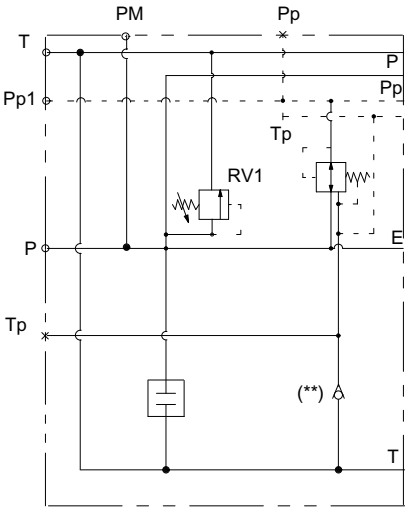
IMPORTANT!: the A and B tank galleries are connected together for further reduction of Δp



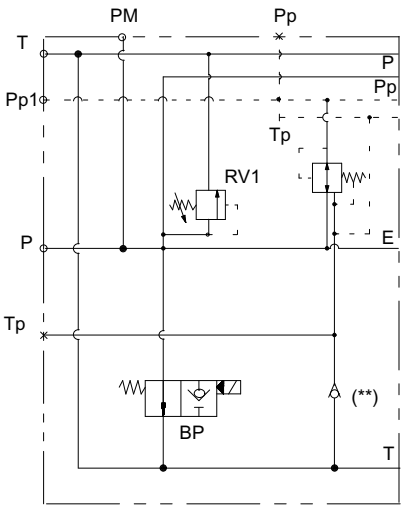
Type	P	T	Pp	Tp	P1	Pp1	PM
T2P101	G 1/2	G 1/2	G 1/4	G 1/4	G 1/4	G 1/4	G 1/4
T2P501	M22x1.5	M27x2	M14x1.5	M14x1.5	M14x1.5	M14x1.5	M14x1.5
T2P301	SAE10	SAE12	SAE4	SAE6	SAE6	SAE6	SAE6

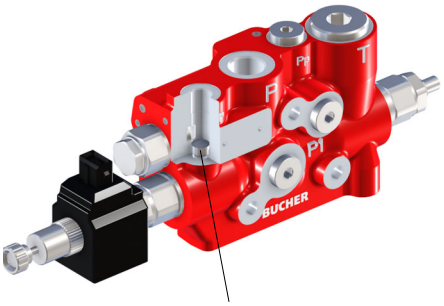
Internal drain option “C” with check valve M10x1 (**), Tp port pluggetd

TEST 12 T2P_01 15GR VC XX C PM PP1 32 PO TO



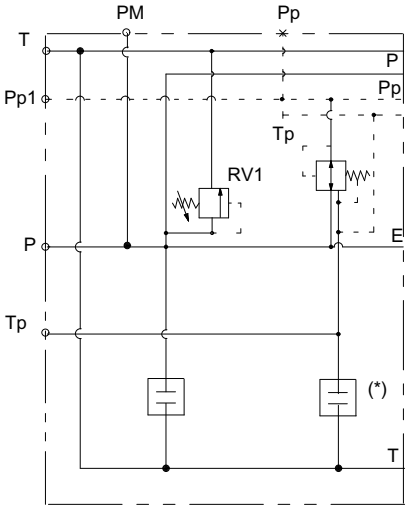
TEST 12 T2P_01 15GR AE 12A- XX C PM PP1 32 PO TO



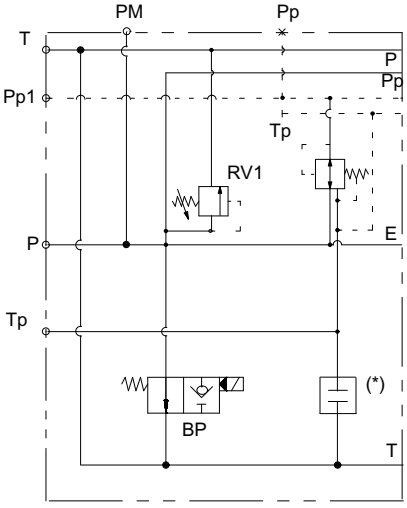


External drain option “T” with internal plug M10x1 (*), Tp port open

TEST 12 T2P_01 15GR VC XX T PM PP1 32 PO TO

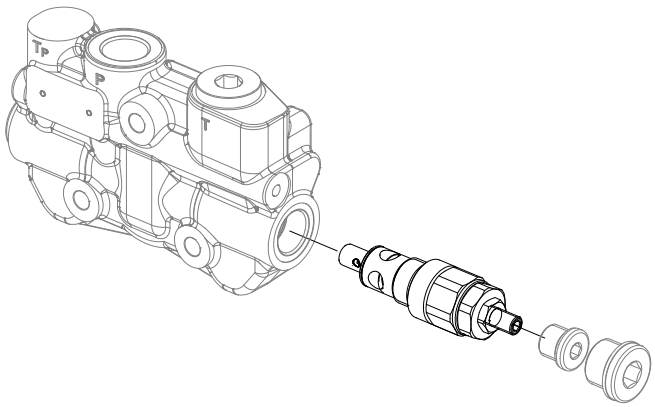


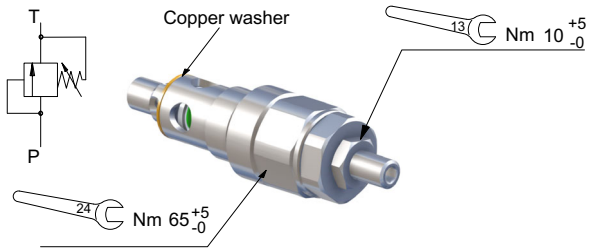
TEST 12 T2P_01 15GR AE 12A- XX T PM PP1 32 PO TO



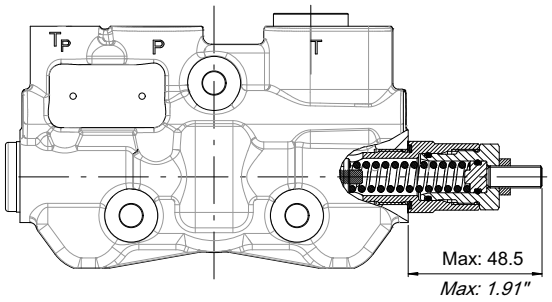
2.6 Inlet cover valves

2.6.1 Direct acting relief valve - VM01C





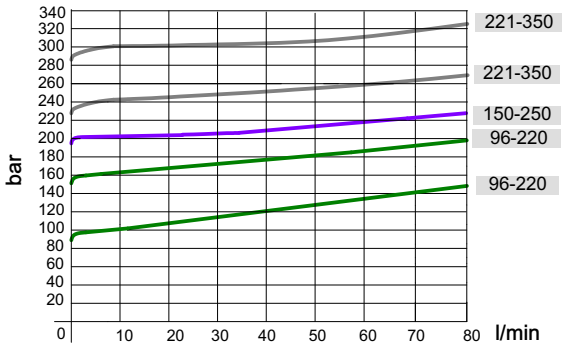
Check the correct position of the front copper washer and tighten with a torque wrench at the indicated value

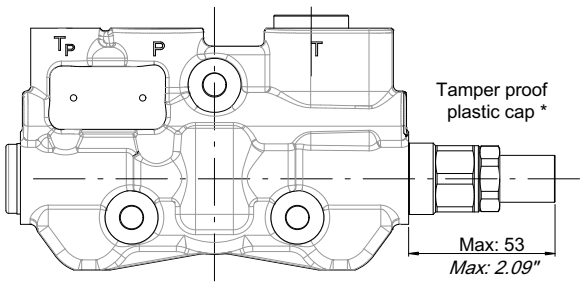


Pressure setting range bar (psi)	Type	Code
96 - 220 (1390 - 3190)	GR	200787403420
150 - 250 (2170 - 3620)	VI	200787403470
221 - 350 (3200 - 5070)	WH	200787403430

Pressure setting referred to 16 l/min

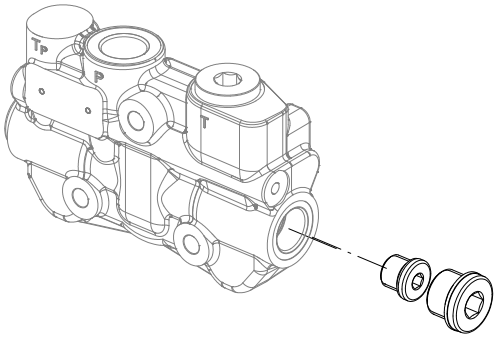
Pressure viscosity characteristic 46 cSt at 40°C



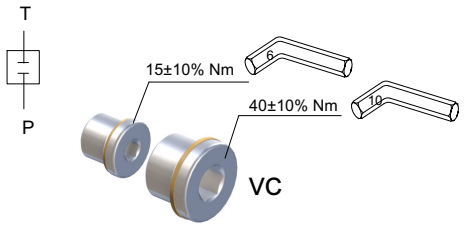


* Supplied on demand. Code: 200678400562.

2.6.2 Cavity plug - VC

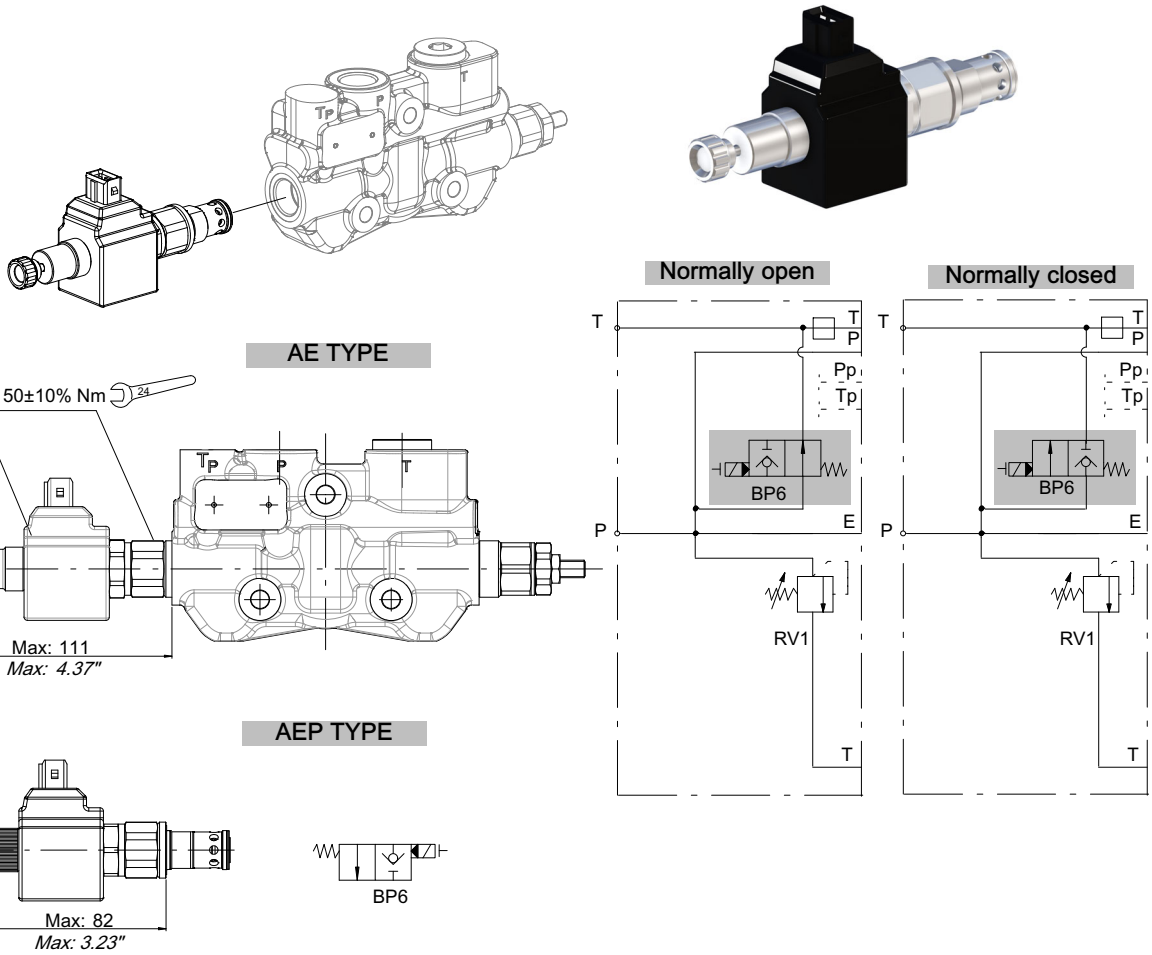


Check the correct position of the front copper washer and tighten with a torque wrench at the indicated value



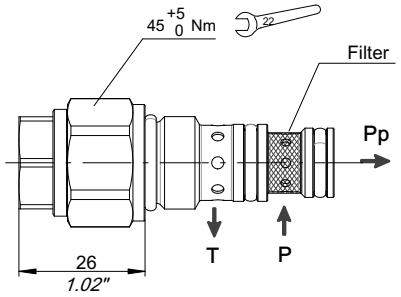
	Type	Code
Plug	VC	200978400140

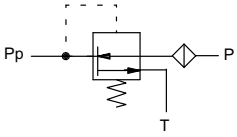
2.6.3 By-pass solenoid valve - BP6



(*) Screw type override must be used in case of emergency only.
Should a normally closed version be needed, please contact our Sales Center.

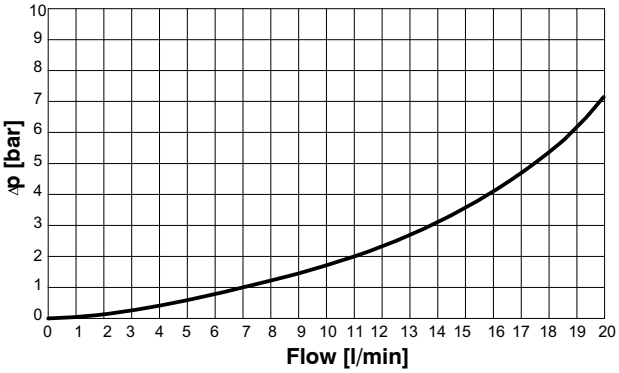
2.6.4 Pressure reducing valve - VRP (for TP inlets only)



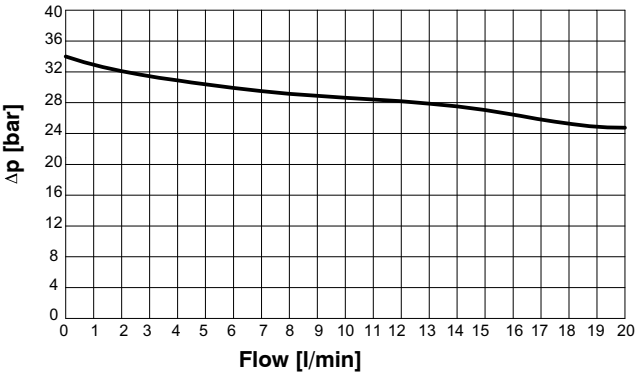


Type	Code	Nominal pressure (bar)
VRP32	200533930174	32

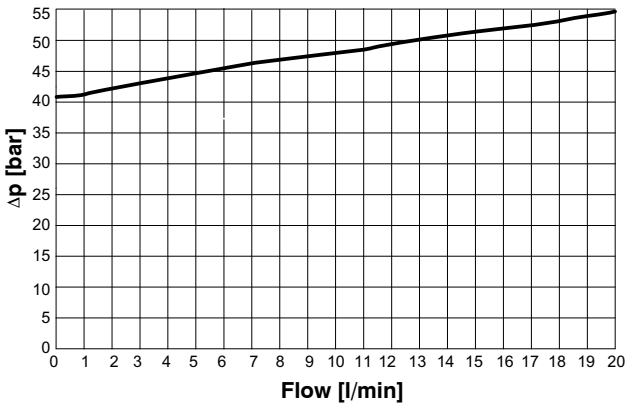
Pressure Vs. Flow Curve P → Pp (Fully open)



Pressure Vs. Flow Curve P → Pp (Reducing)

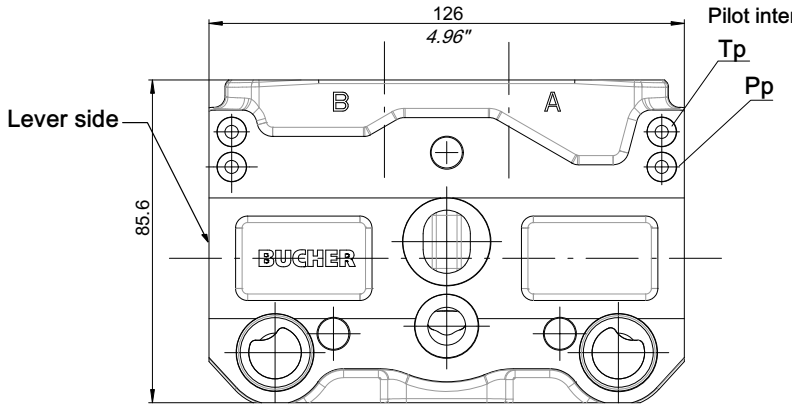


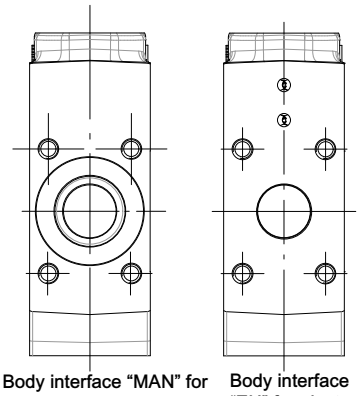
Pressure Vs. Flow Curve Pp → T (Relieving)



3 Sections

3.1 Characteristics and dimensions

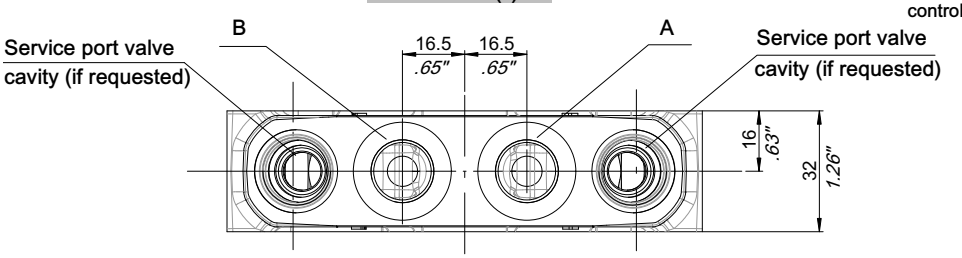




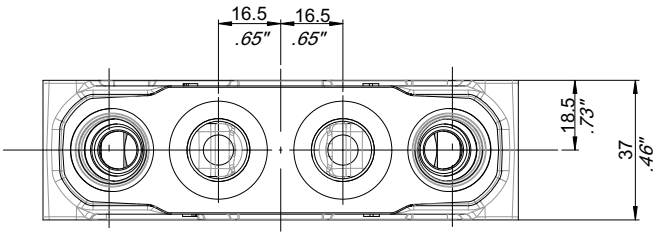
Body interface "MAN" for manual and hydraulic control

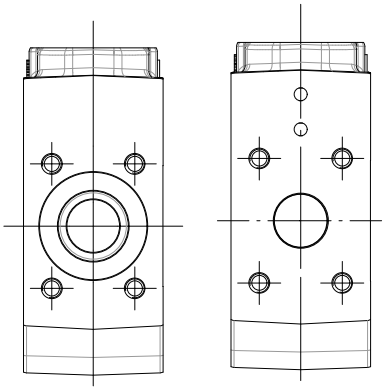
Body interface "EH" for electro-hydraulic control

Pitch 32 (*)



Pitch 37 (**)



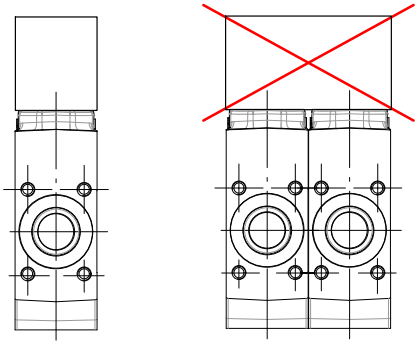


Body interface "MAN" for manual, hydraulic and ON-OFF control

Body interface "EH" for electro-hydraulic control

(*) for manual, HP and EHO controls
(**) for manual, HP, EHO 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 Center.. Larger flanging manifolds that connect together two or more valve sections are forbidden.



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

Thread	Interface	Type			
		Without A/B service port valve cavities		With A/B service port valve cavities	
		Pitch 32	Pitch 37	Pitch 32	Pitch 37
G 3/8	MAN	KS702	KH702	KS701	KH701
G 3/8	EH	KS706	KH706	KS705	KH705
M18x1.5	MAN	KS802	KH802	KS801	KH801
M18x1.5	EH	KS806	KH806	KS805	KH805
SAE8	MAN	KS402	KH402	KS401	KH401
SAE8	EH	KS406	KH406	KS405	KH405

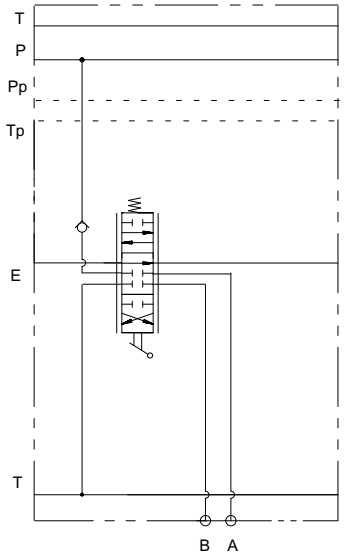
K	H		7	0	1

Specific circuit
S = valve pitch 32 mm
H = valve pitch 37 mm

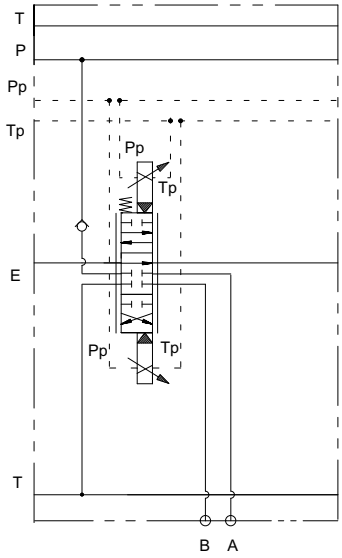
For internal use, only

3.1.2 Parallel circuit

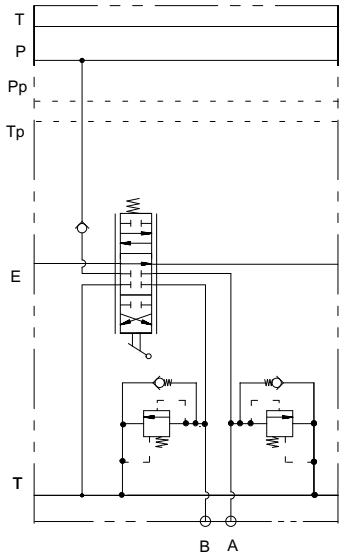
HDS12 K_ _02 A3S 79 L100 A



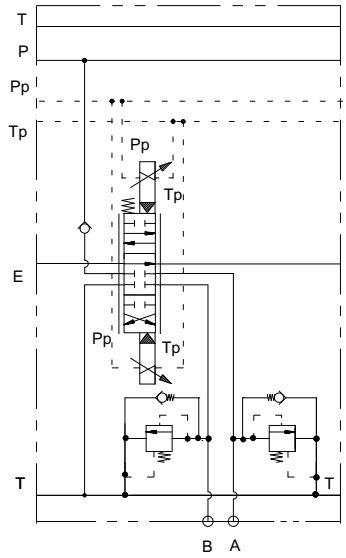
HDS12 K_ _06 A3S 322S6GG0 A



HDS12 K_ _01 A3S 79 L100 15 15 A



HDS12 K_ _05 A3S 322S6GG0 15 15 A



OPEN with parallel circuit

3.1.3 Tandem bodies with pilot lines (Pp / Tp)

Thread	Interface	Type			
		Without A/B service port valve cavities		With A/B service port valve cavities	
		Pitch 32	Pitch 37	Pitch 32	Pitch 37
G 3/8	MAN	KS782	KH782	KS781	KH781
G 3/8	EH	KS786	KH786	KS785	KH785
M18x1.5	MAN	KS882	KH882	KS881	KH881
M18x1.5	EH	KS886	KH886	KS885	KH885
SAE8	MAN	KS482	KH482	KS481	KH481
SAE8	EH	KS486	KH486	KS485	KH485

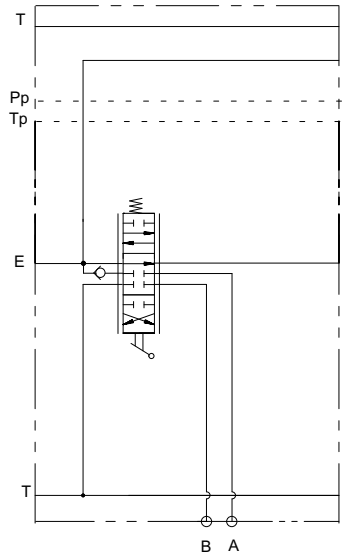
K	H		7	8	1

Specific circuit
S = valve pitch 32 mm
H = valve pitch 37 mm

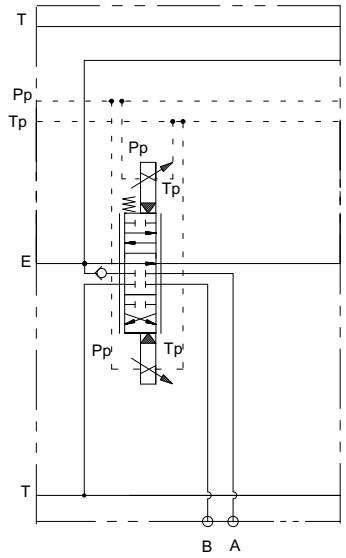
For internal use, only

3.1.4 Tandem circuit

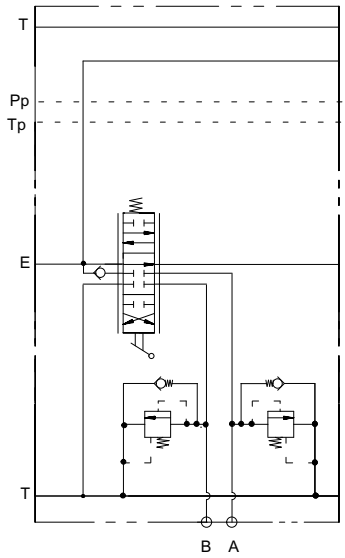
HDS12 K_ _82 A3S 79 L100 A



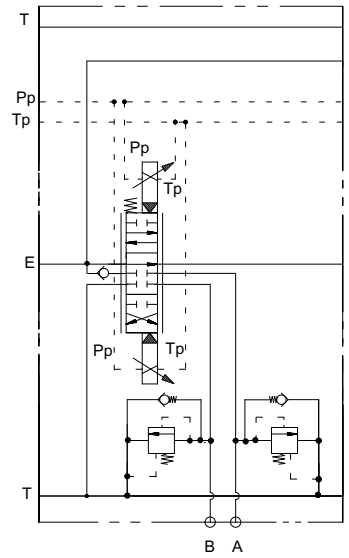
HDS12 K_ _86 A3S 322S6GG0 A



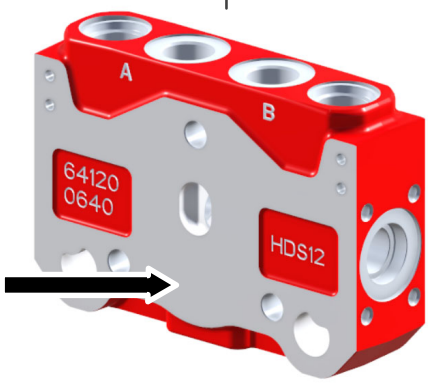
HDS12 K_ _81 A3S 79 L100 15 15 A



HDS12 K_ _85 A3S 322S6GG0 15 15 A



CLOSED with tandem circuit



3.1.5 Series bodies with pilot lines (Pp / Tp)

Thread	Interface	Type			
		Without A/B service port valve cavities		With A/B service port valve cavities	
		Pitch 32	Pitch 37	Pitch 32	Pitch 37
G 3/8	MAN	KS752	KH752	KS751	KH751
G 3/8	EH	KS756	KH756	KS755	KH755
M18x1.5	MAN	KS852	KH852	KS851	KH851
M18x1.5	EH	KS856	KH856	KS855	KH855
SAE8	MAN	KS452	KH452	KS451	KH451
SAE8	EH	KS456	KH456	KS455	KH455

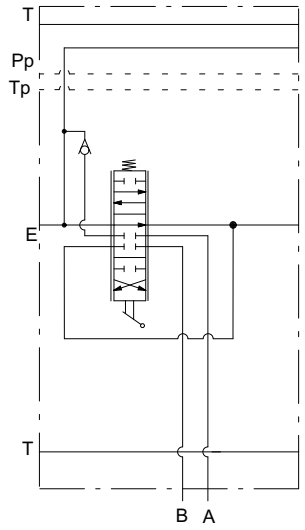
K	H		7	5	1

Specific circuit
S = valve pitch 32 mm
H = valve pitch 37 mm

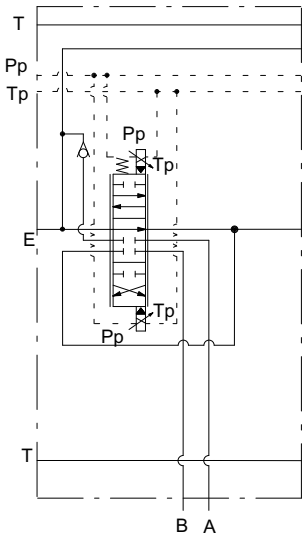
For internal use, only

3.1.6 Series circuit

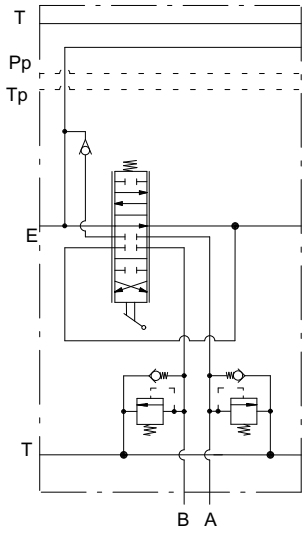
HDS12 K_ _52 A3S 79 L100 A



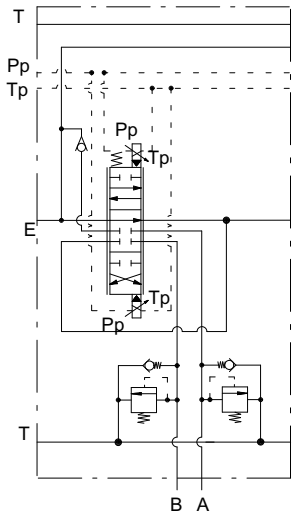
HDS12 K_ _56 A3S 322S6GG0 A



HDS12 K_ _51 A3S 79 L100 15 15 A

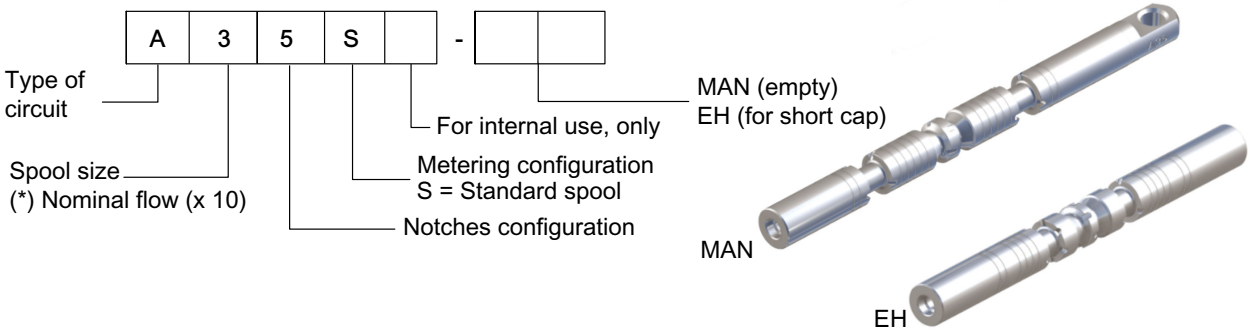


HDS12 K_ _55 A3S 322S6GG0 15 15 A



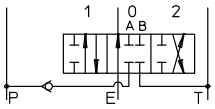
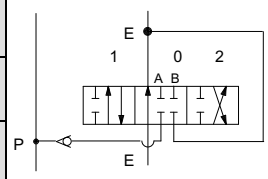
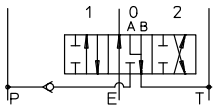
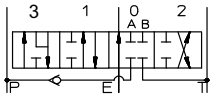
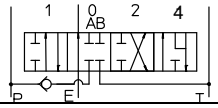
CLOSED with series circuit

3.2 Spools



3.2.1 Standard spools

For manual, hydraulic and electro-hydraulic controls

Spool Type	Hydraulic schematic	Circuit	Features	Application examples
A3S		Double acting A/B closed	Symmetric	
A3S-EH				
(A45A)			High metering to tank on A side	LOADERS BOOM and BUCKET FUNCTION
A45S			Symmetric	
A45S-EH				
Y45S		Double acting A/B closed	Symmetric for series body	
Y45S-EH				
Y3S-EH				
(C45S) (C3S)		Double acting A/B to tank	Motor Spool	
Z25S		Double acting A/B closed	Pull to float	LOADERS BOOM FUNCTION
Z35B			Pull to float High metering to tank on B side	
Z45B				
(W45A)		Double acting A/B closed	Push to float High metering to tank on A side	LOADERS BOOM FUNCTION

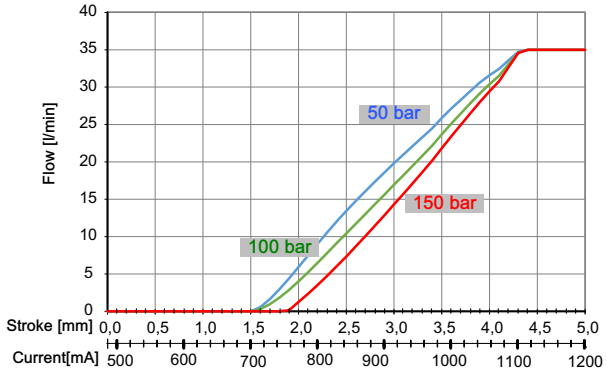
( ) : should this specific spool be needed, please contact our Sales Center.

(*) : the nominal flow showned in SPOOL SIZE is indicated as best inlet pump flow for that spool

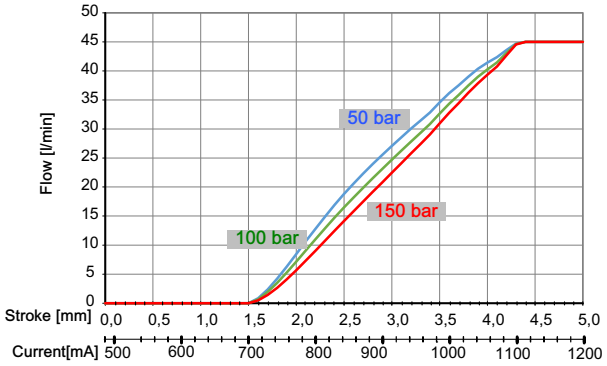
3.2.2 Parallel spools metering

Spool size 3

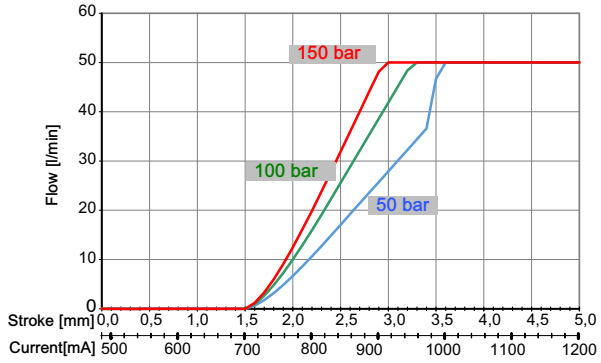
P → A/B (inlet flow 35 l/min)



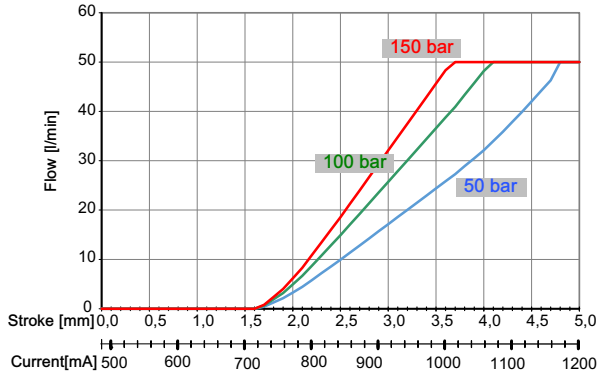
P → A/B (inlet flow 45 l/min)



A/B → T (inlet flow 50 l/min) - Notch type S

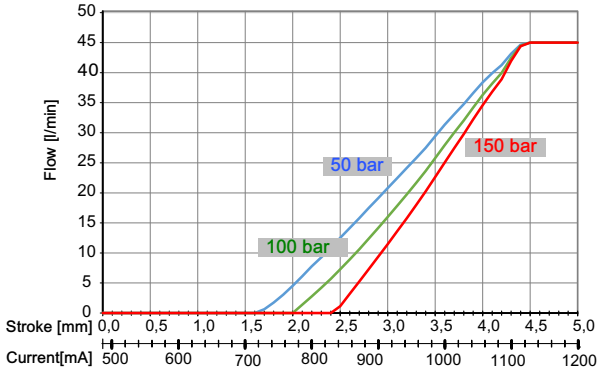


A/B → T (inlet flow 50 l/min) - Notch type B

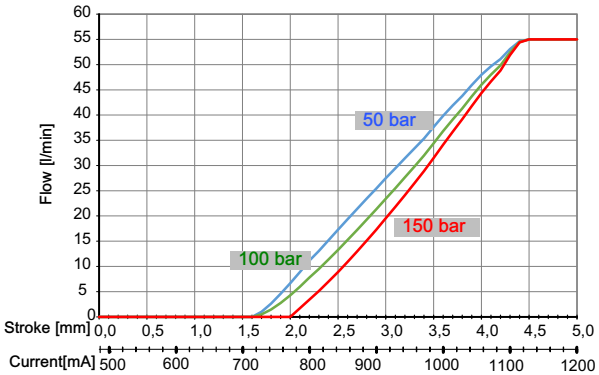


Spool size 45

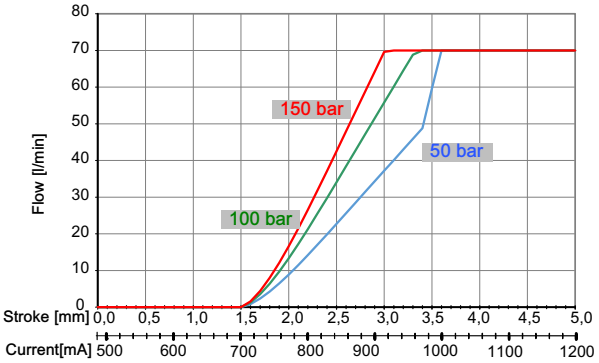
P → A/B (port flow 45 l/min)



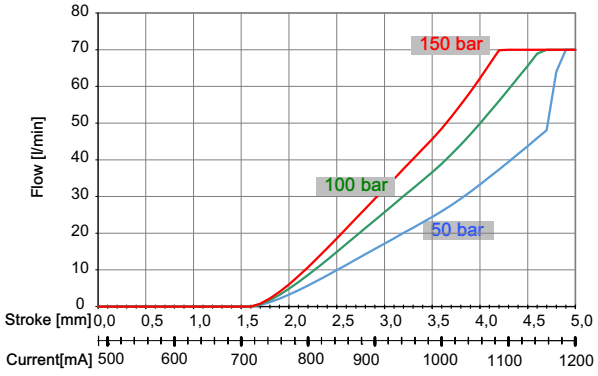
P → A/B (port flow 55 l/min)



A/B → T (inlet flow 70 l/min) - Notch type S



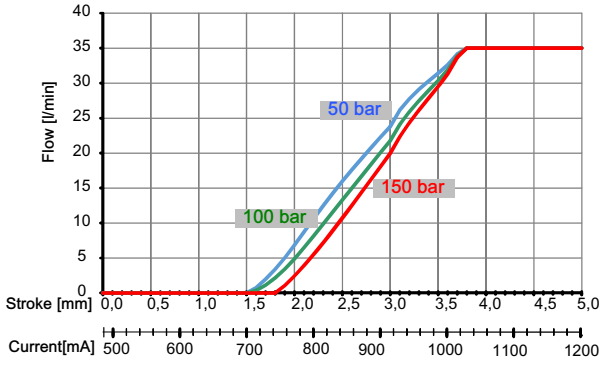
A/B → T (inlet flow 70 l/min) - Notch type B



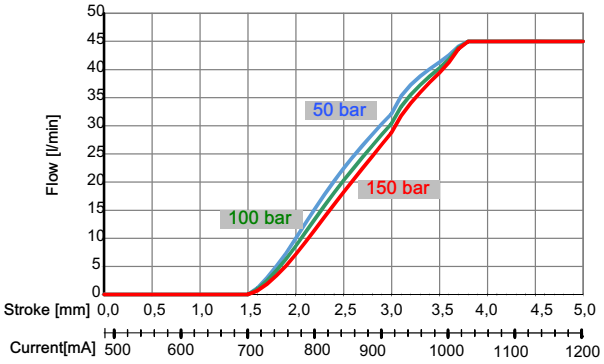
3.2.3 Series spools metering

Spool size 3

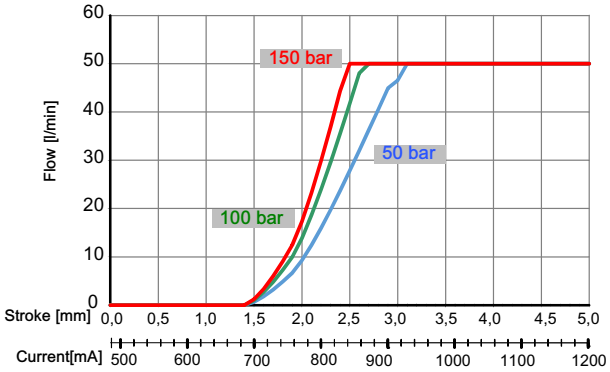
P → A/B (inlet flow 35 l/min)



P → A/B (inlet flow 45 l/min)

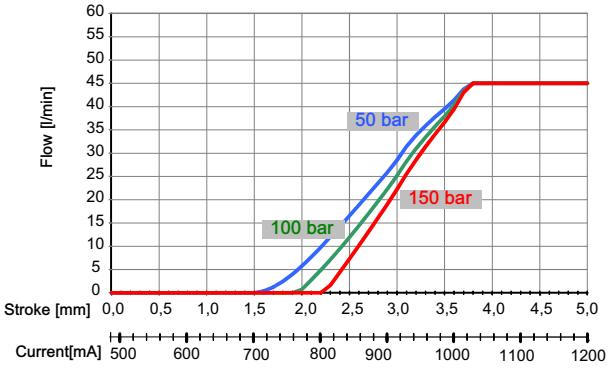


A/B → T (inlet flow 50 l/min) - Notch type S

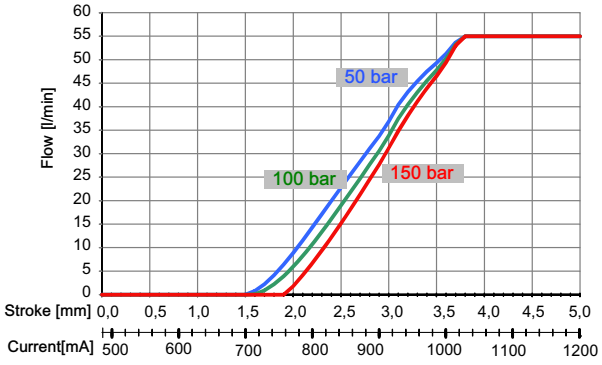


Spool size 45

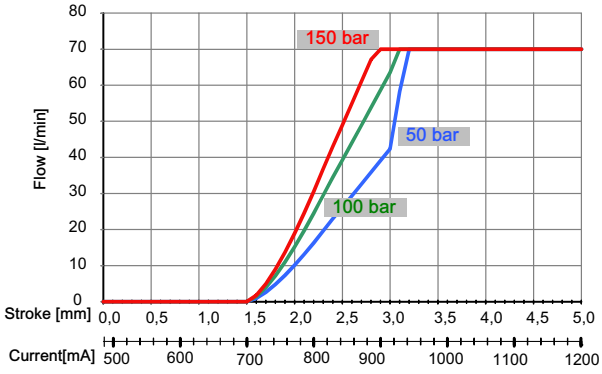
P → A/B (port flow 45 l/min)



P → A/B (port flow 55 l/min)

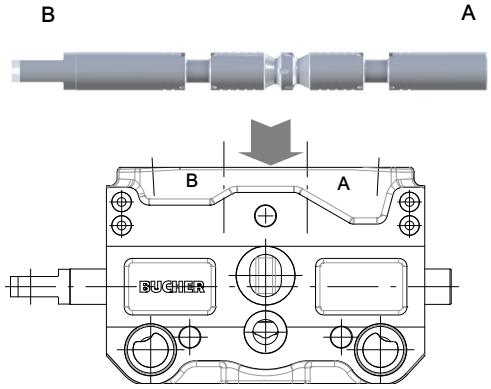


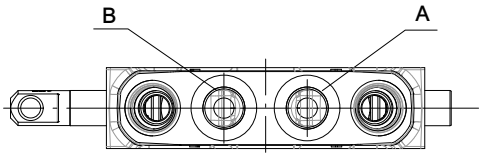
A/B → T (inlet flow 45 l/min) - Notch type S

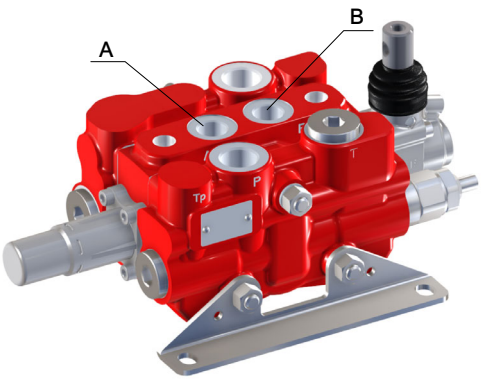


3.2.4 Spool assembly option

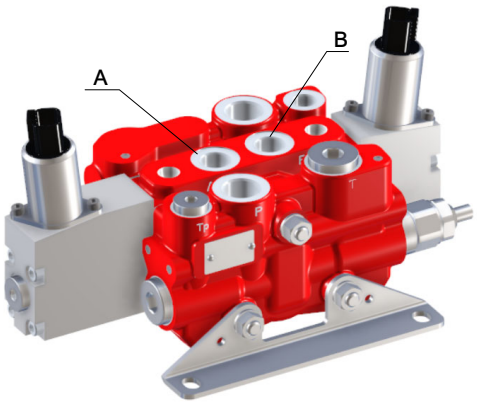
Positioner kit on A side - STANDARD





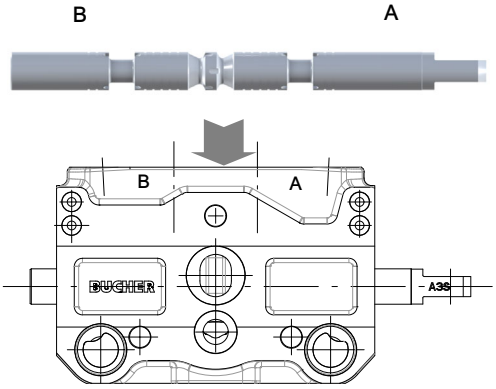


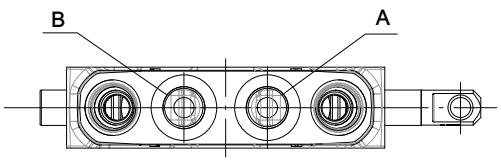
HDS12 KS702 A3S 33 L100 A

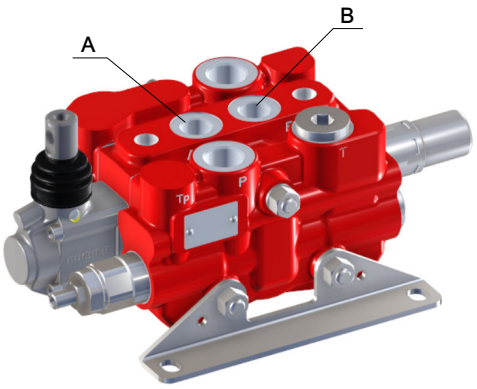


HDS12 KS706 A3S 322S6GGC A

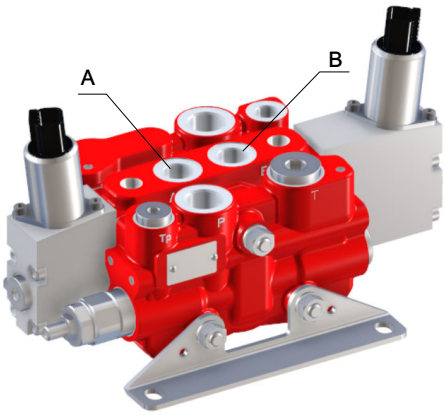
Positioner kit on B side - INVERTED







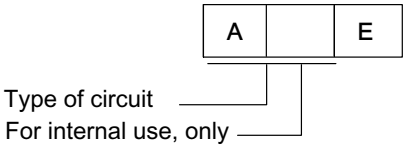
HDS12 KS701 A3S 33 L100 B

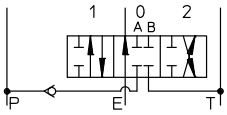
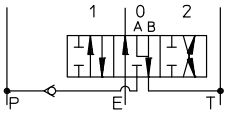
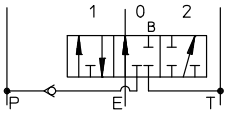
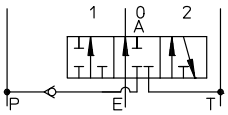
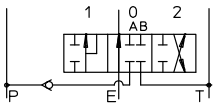
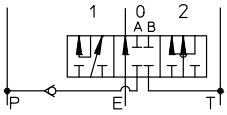
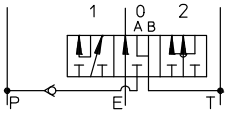


HDS12 KS706 A3S 322S6GGC B

A and B are marked on casting.

3.2.5 Direct acting ON/OFF spools (*)

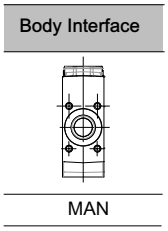


Spool Type	Hydraulic schematic	Circuit	Features
AE		Double acting A/B closed	
CE		Double acting A/B to tank in neutral	
(GE)		Single acting B closed	
(SE)		Single acting A closed	
(RE)		Double acting A/B closed	Regenerative in A or B port Special body required
YE		Double acting A/B closed	Series spool
(YCE)		Double acting A/B to tank in neutral	Series spool

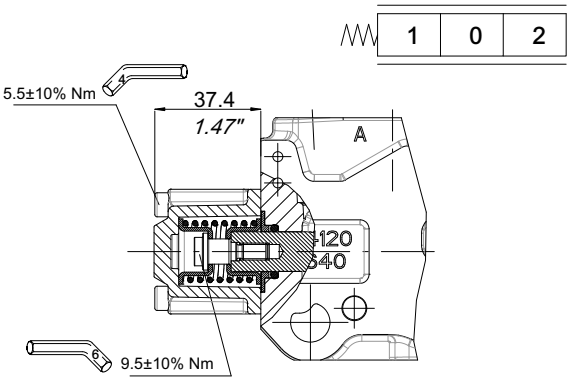
( ) : should this specific spool be needed, please contact our Sales Center.
(*) : body type “H” must be used

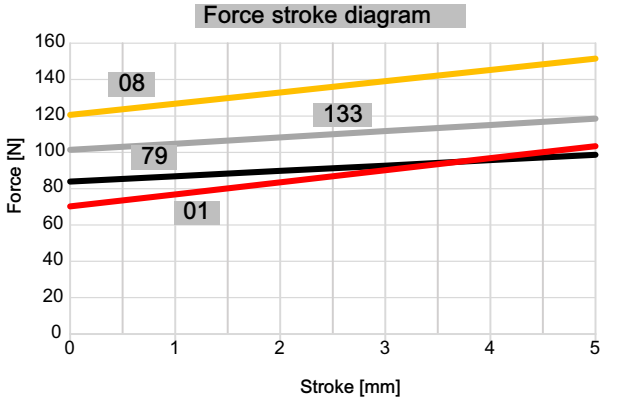
3.3 Manual positioners

The standard position of positioner kit is on A side.



3.3.1 Spring return to neutral position

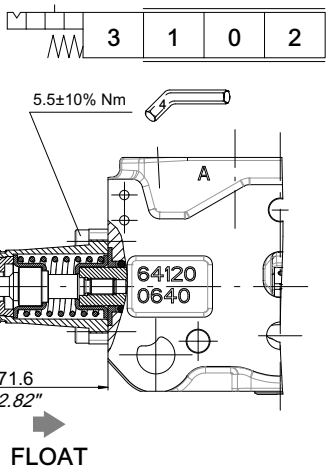




Type	Code	Spring colour
08	200768612570	YELLOW
79	200768612460	BLACK
133	200768612580	WHITE
01	200768612590	RED

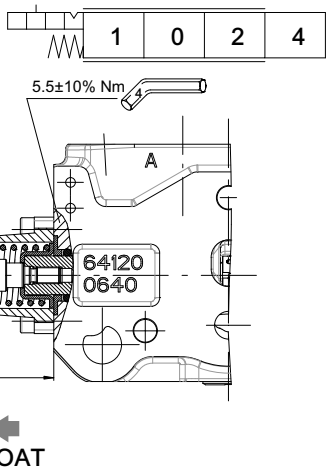
3.3.2 Detent in floating position and spring return to neutral from position 1 and 2

Floating position pulling the spool (Z type)



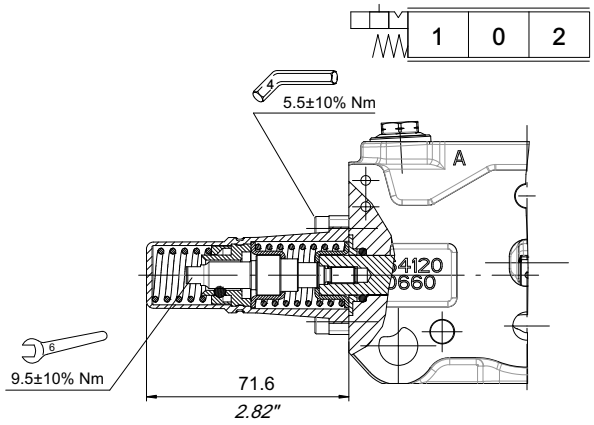
Type	Code	Main spring	Detent spring
33	200768641080	BLACK	BLACK
31	200768641090	BLACK	WHITE

Floating position pushing the spool (W type)



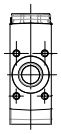
Type	Code	Main spring	Detent spring
32	200768641060	BLACK	BLACK
30	200768641070	BLACK	WHITE

3.3.3 Detent in position 1 and spring centred



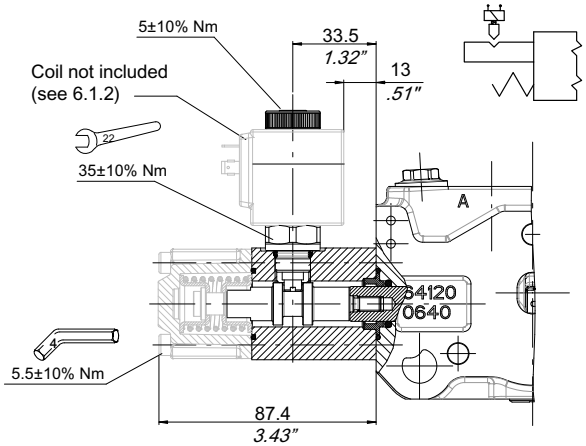
Type	Code	Main spring	Detent spring
34	200768630700	BLACK	BLACK

3.4 Intermediate kits

Body Interface

MAN

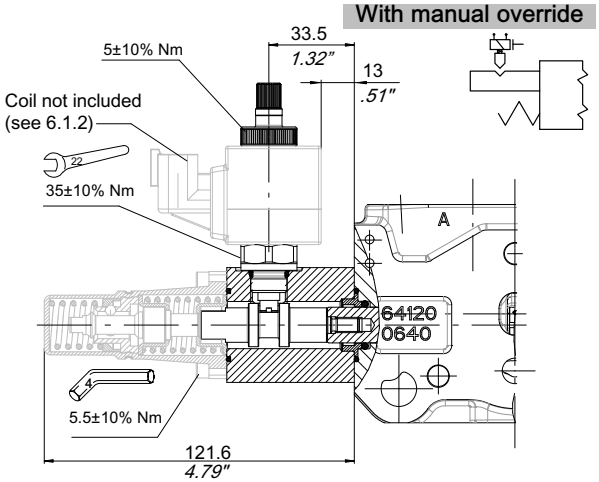
3.4.1 Electro-mechanical locking (normally locked)

Without manual override



Type	Code
EM	200768320010

With manual override



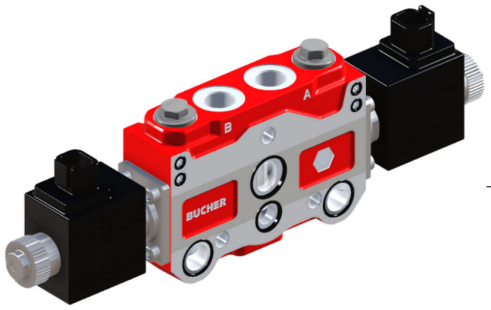
Type	Code
EME	

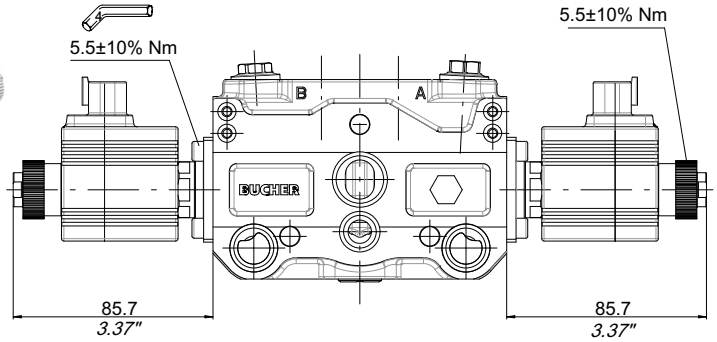
Should this positioner be needed, please contact our Sales Center.

3.5 Direct acting electric ON-OFF control

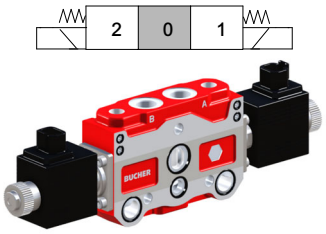
Body Interface

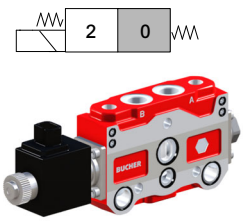
MAN (Pitch 37 mm)

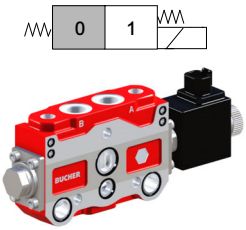




Solenoid tube mechanical characteristics	
Max peak pressure	100 bar *(1450 PSI)*
Max static pressure	270 bar *(3900 PSI)*

Type	Double acting
01E	

Type	Single acting port “B”
02E	

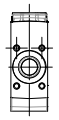
Type	Single acting port “A”
03E	

For coils see 6.1.3.

3.6 Hydraulic controls - HP

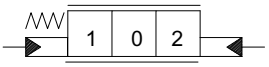
The standard position of the spring positioner kit is on A side

Body Interface



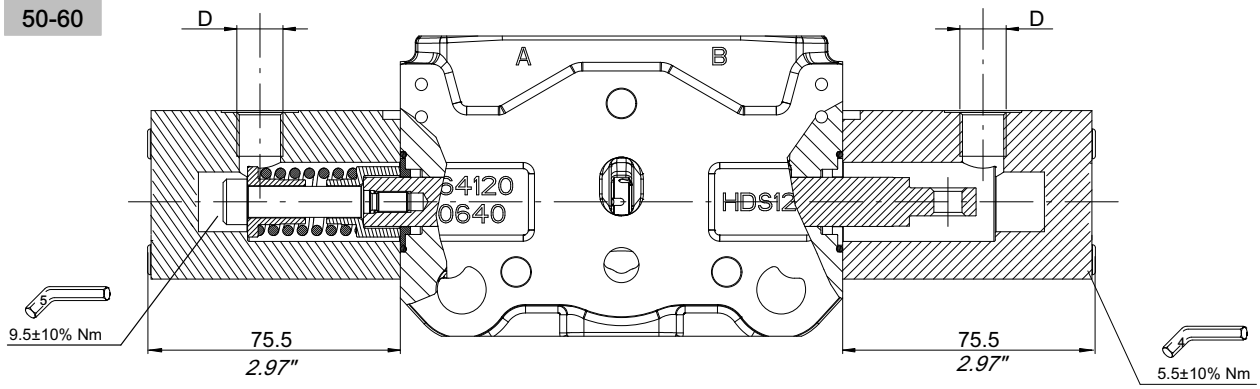
MAN

3.6.1 Standard HP positioners



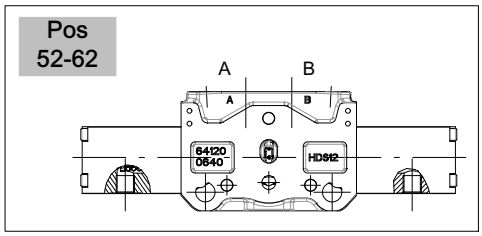
Pmax= 40 bar *(580 PSI)*

Pos 50-60



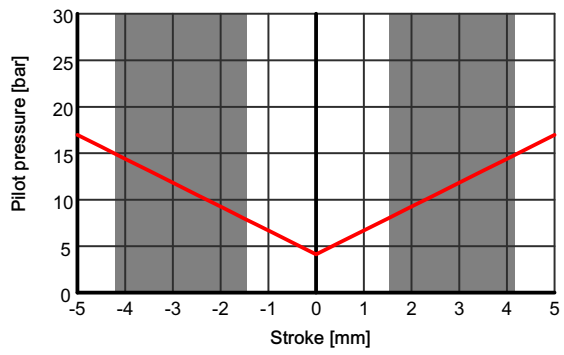
Type		D	Spring	Code
50	52	G 1/4	5	
-	-	SAE6	-	-
60	62	G 1/4	6	-
-	-	SAE6	-	-

Pos 52-62

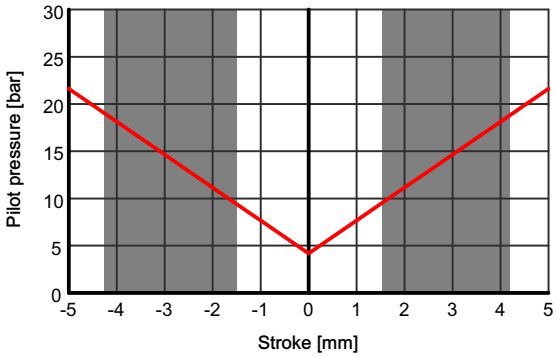


Spring types

Pos 50-52



Pos 60-62



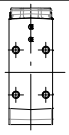
Standard metering stroke

Spools for specific applications/functions could have different metering strokes.
Should a version without part number be needed, please contact our Sales Center.

3.7 EHO Electro-hydraulic proportional controls

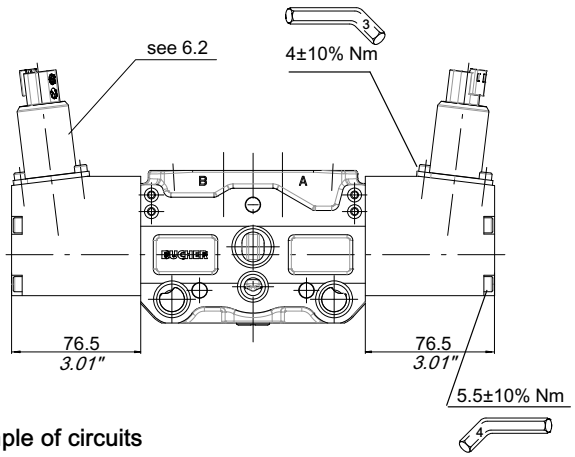
The standard position of spring kits is on A side
Max piloted pressure= 35 bar

Body interface

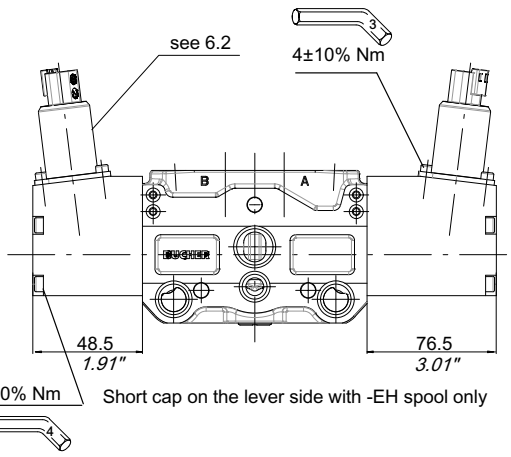


EH

Standard long version



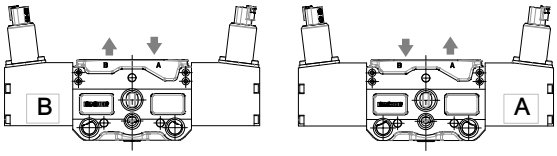
Standard short version



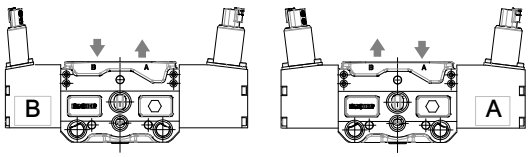
Short cap on the lever side with -EH spool only

Example of circuits

Parallel circuit



Series circuit



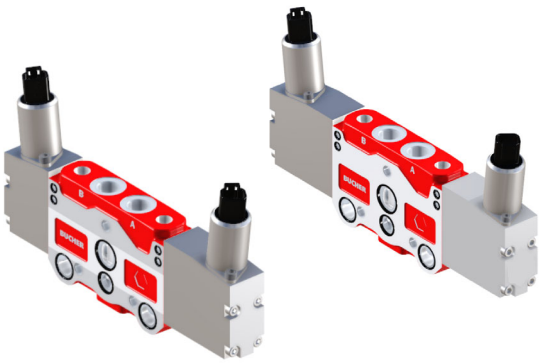
3	2	2	S	6	N	N	0

Proportional pressure reducing valve type (see 6.2)

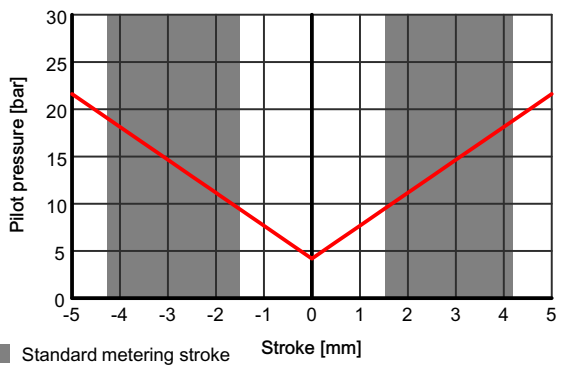
Orifice type (fixed)

Spring type (fixed)

Combination type (see next page)

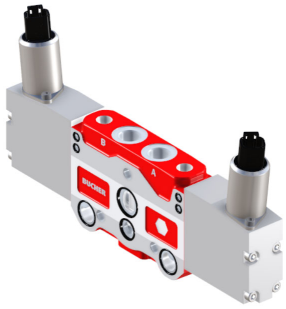
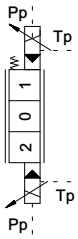


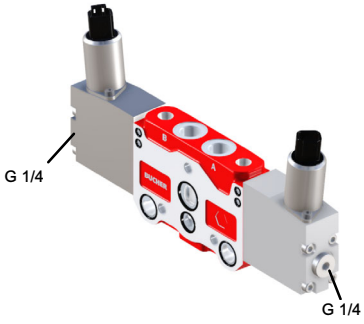
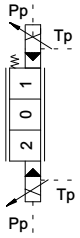
EHO positioner spring curve

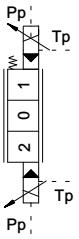


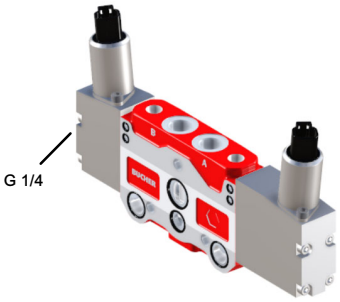
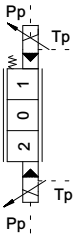
The pressure differential between pilot lines Pp and Tp should be ≥ 25 bar in order to reach the end stroke of the spool in all operating conditions.

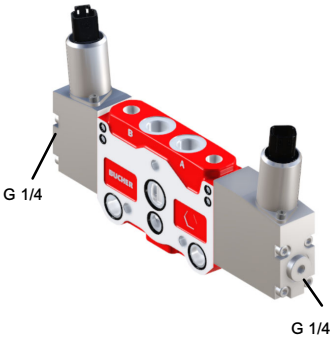
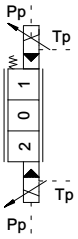
Combination types

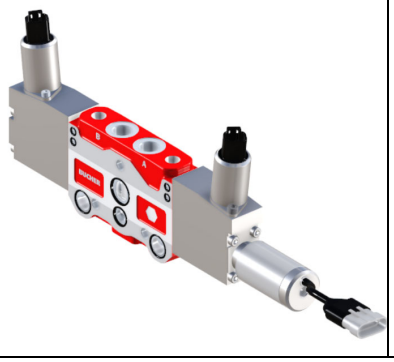
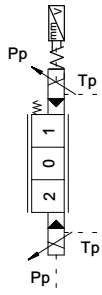
Type	Basic	Scheme
NN0		

Type	G 1/4 pilot ports	Scheme
GG0		

Type	Short cap on B side G 1/4 port on A side (positioner)	Scheme
GNC		

Type	Short cap with G 1/4 port on B side	Scheme
NGC		

Type	Short cap on B side G 1/4 ports	Scheme
GGC		

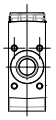
Type	Spool sensor	Scheme
(PN0)		

( ) : Should this version be needed, please contact our Sales Center.

3.8 Levers

IMPORTANT!: The standard position of the lever kit is on B side.

Body Interface

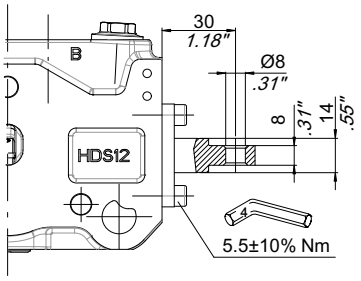


MAN

3.8.1 Free end spool with dust proof seal

Type	Code
L55	200707190510

1	0	2

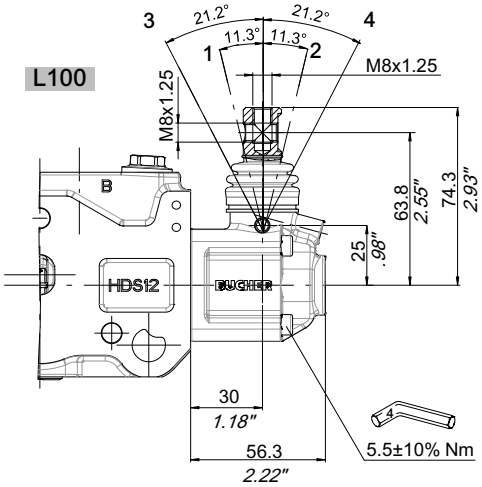


3.8.2 Standard lever

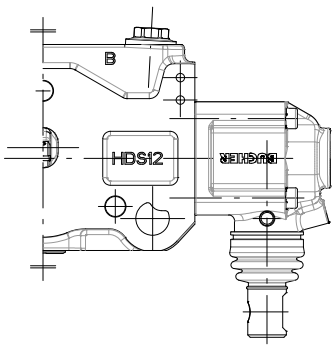
Type		Code
L100	L300	200707120730

1	0	2

L100



L300

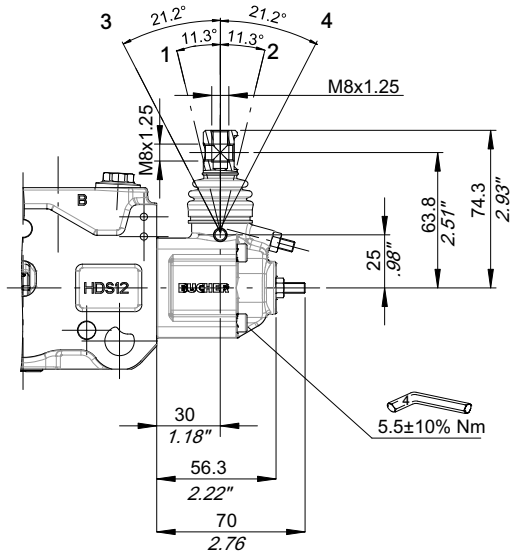


3.8.3 Lever with stroke limitation

Type		Code
L102	L302	200707120710

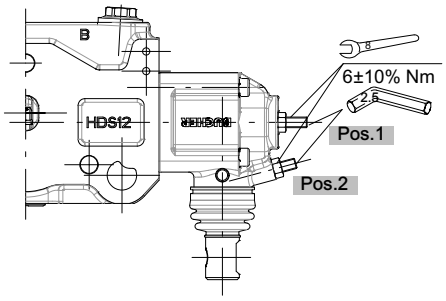
1	0	2

L102



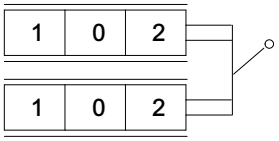
L302

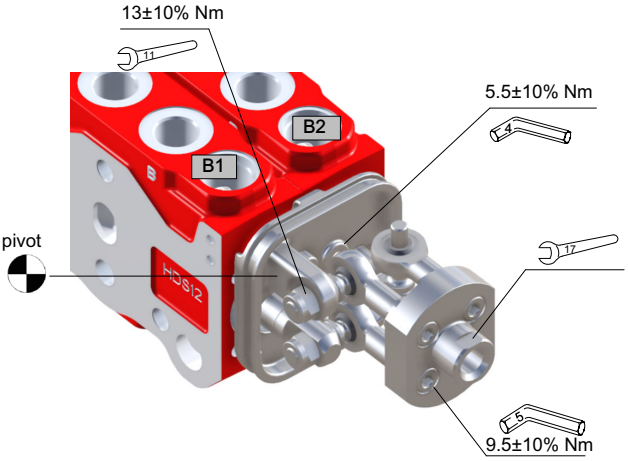
Pos.1: stroke limitation in position 1
Pos.2: stroke limitation in position 2

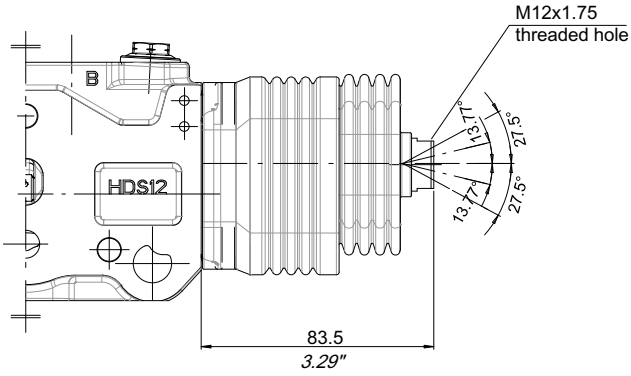


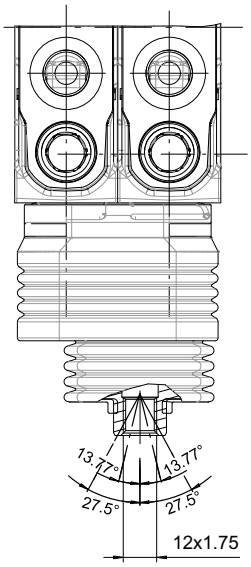
3.8.4 Manual joystick control L133 - 134

Type		Code
L133	L134	200775930520

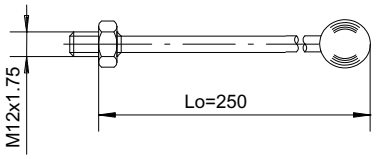


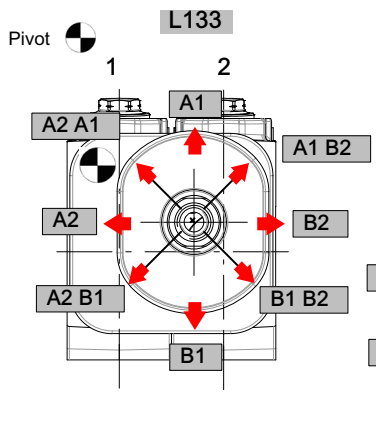


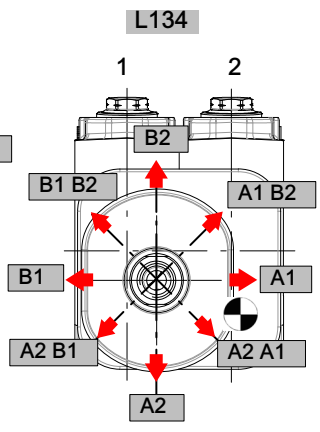


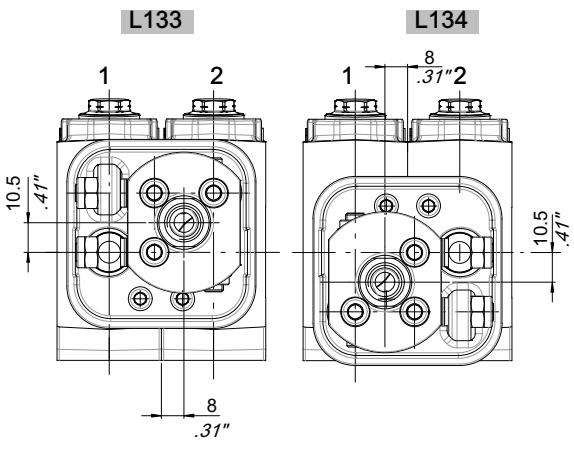


Type	Code
AL010	200702230040







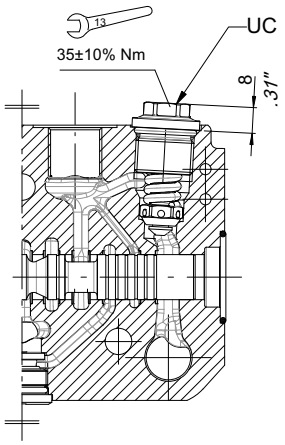


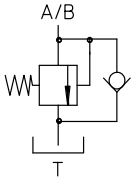
With two floating spools the combinations Z-Z and W-W are permitted, only.

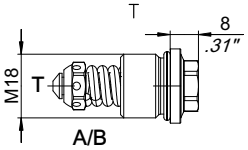
4 Auxiliary valves

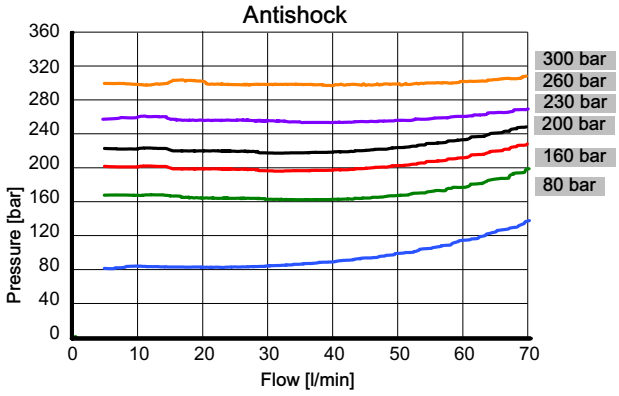
4.1 Anti-shock and anti-cavitation valves - UC

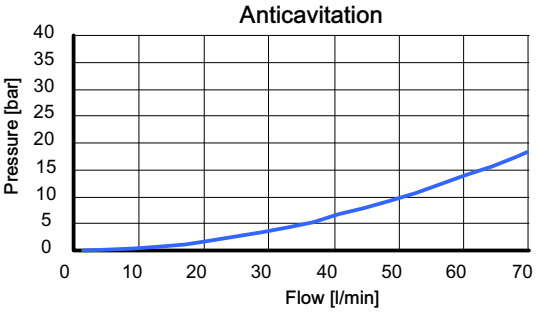
4.1.1 Fixed setting







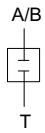




Setting/ 10	Pressure setting at 10 l/min (*) bar *(psi)*	Code
05	50 *(720)*	200533930240
08	80 *(1160)*	200533930370
10	100 *(1450)*	200533930250
12	120 *(1740)*	200533930260
14	140 *(2030)*	200533930175
15	150 *(2170)*	200533930270
16	160 *(2320)*	200533930380
17	170 *(2460)*	200533930280
18	180 *(2610)*	200533930460
19	190 *(2750)*	200533930290
20	200 *(2900)*	200533930300
21	210 *(3040)*	200533930310
23	230 *(3330)*	200533930320
24	240 *(3480)*	200533930390
25	250 *(3620)*	200533930330
26	260 *(3770)*	200533930400
27	270 *(3910)*	200533930410
28	280 *(4060)*	200533930340
30	300 *(4350)*	200533930173
32	320 *(4640)*	200533930350
35	350 *(5070)*	200533930360

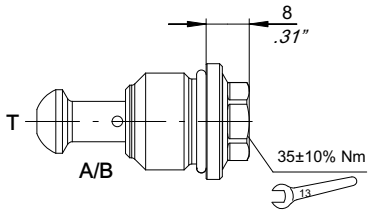
(*) For different pressure settings please contact our Sales Center.

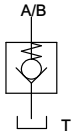
4.1.2 Plug for fixed and adjustable auxiliary valves



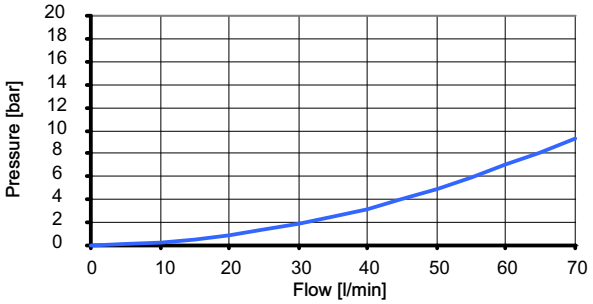
00	00 (plug)	200778400410

4.2 Anti-cavitation valves - C





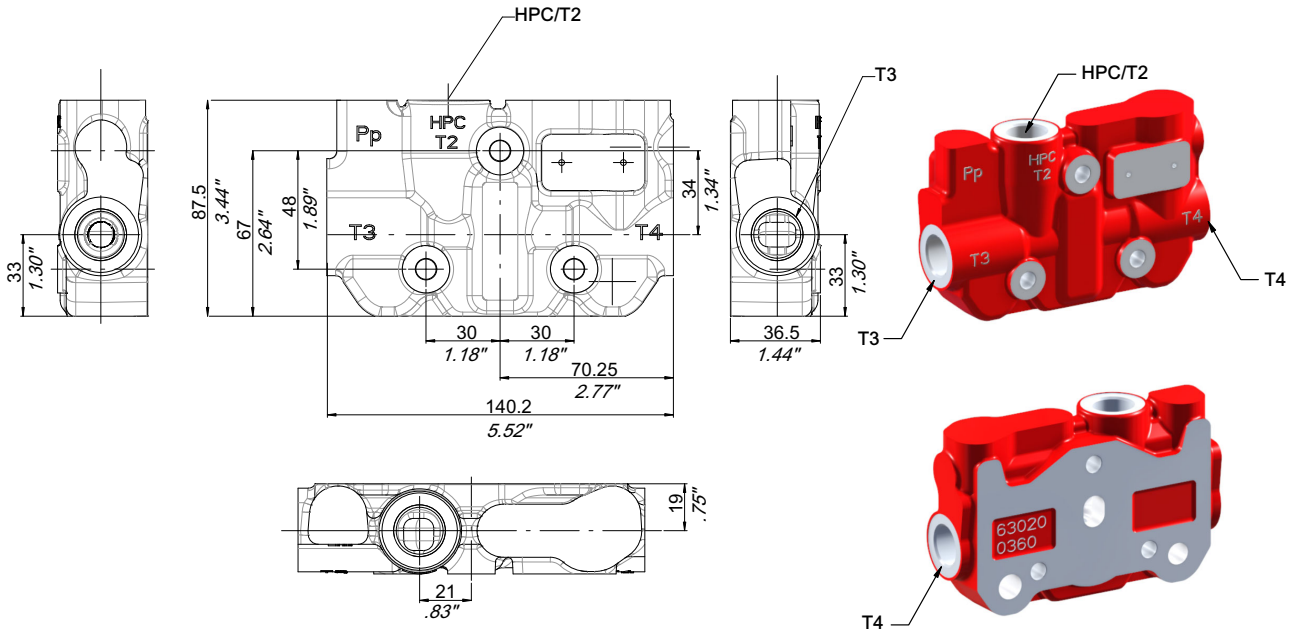
Type	Code
C	200533940088



5 End covers

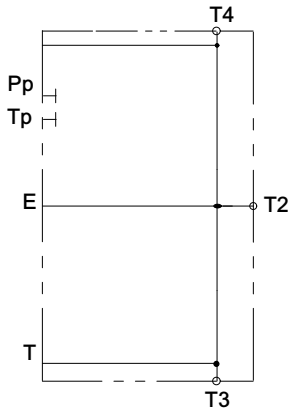
5.1 P

Configuration with three T ports

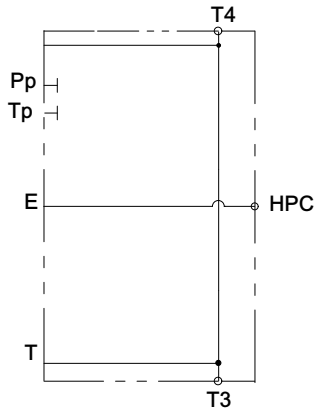


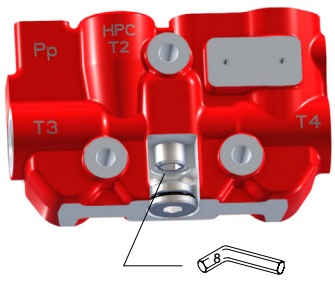
Type		T2/HPC	T3	T4
Standard	With HPC			
P 101	P 111	G 1/2	G 1/2	G 1/2
P 401	P 411	SAE8	SAE8	SAE8
P 501	P 511	M22X1.5	M22X1.5	M22X1.5

COP12 P_01 T2 T3 T4 00 00



COP12 P_11 HPC T3 T4 00 00

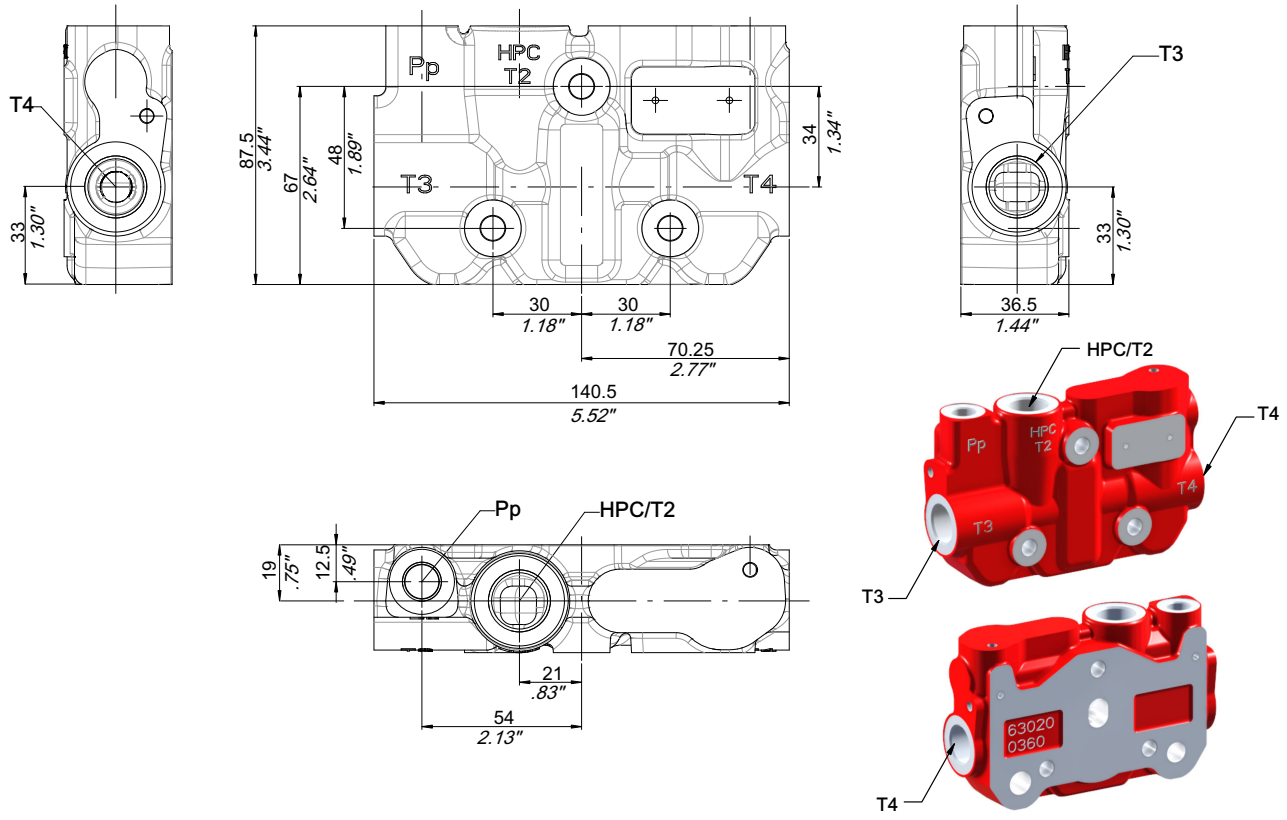




HPC Plug CEI
M14X1.5

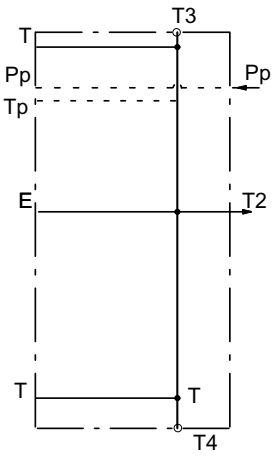
5.2 PH

5.2.1 PH end cover with three T ports and pilot pressure port Pp

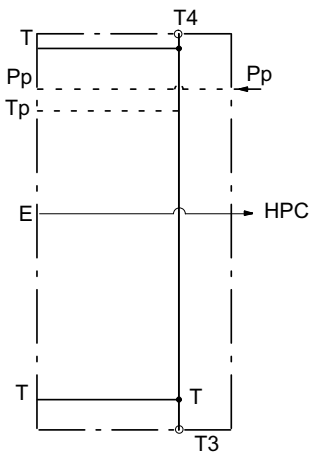


Type		T2/HPC	Pp	T3	T4
Standard	With HPC				
PH 101	PH 111	G 1/2	G 1/4	G 1/2	G 1/2
PH 102	PH 112	G 1/2	G 1/4	G 1/2	G 1/2
PH 103	PH 113	G 1/2	G 1/4	G 1/2	G 1/2
PH 401	PH 411	SAE8	SAE6	SAE8	SAE8
PH 402	PH 412	SAE8	SAE6	SAE8	SAE8
PH 501	PH 511	M22x1.5	M14x1.5	M22x1.5	M22x1.5
PH 502	PH 512	M22x1.5	M14x1.5	M22x1.5	M22x1.5

COP12 PH_01 T2 T3 T4 00 00

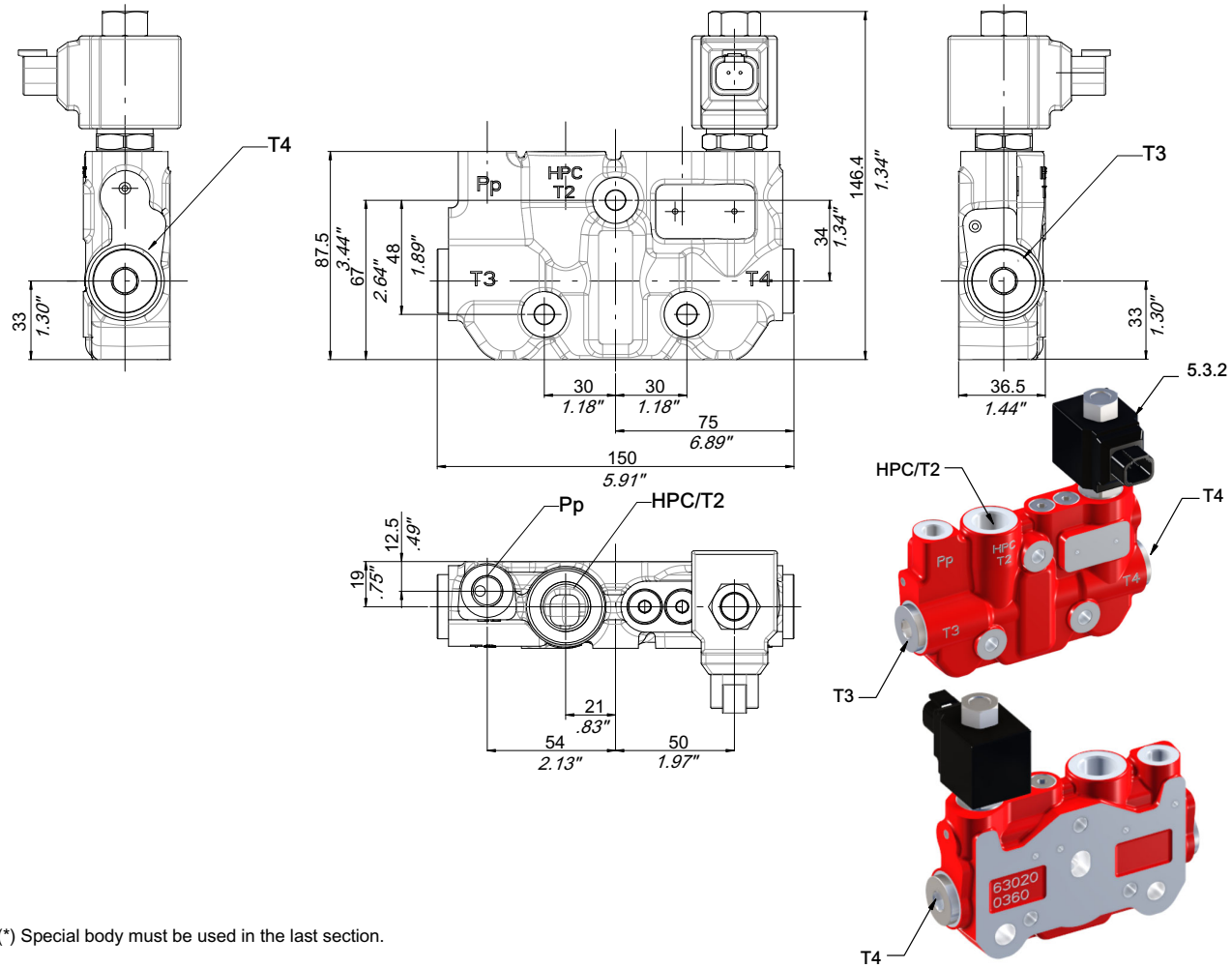


COP12 PH_11 HPC T3 T4 00 00



5.2.2 PH end cover with electric unloading valve easy connecting

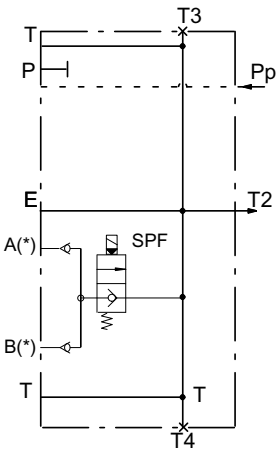
Allows to unload to tank both A and B ports of adjacent section for an easy connection of attachements (i.e.: quick couplings).



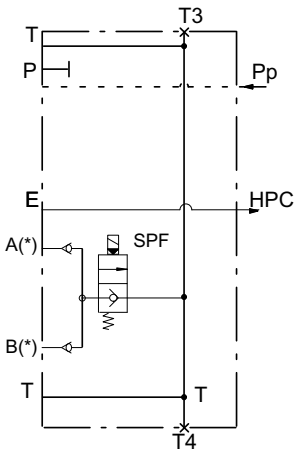
(*) Special body must be used in the last section.

Type		T2/HPC	T3	T4	Pp
Standard	With HPC				
PH 103	PH 113	G 1/2	G 1/2	G 1/2	G 1/4
PH 403	PH 413	SAE8	SAE8	SAE8	SAE6
PH 503	PH 513	M22x1.5	M22x1.5	M22x1.5	M14x1.5

COP 12 PH_03 T2 XX XX PP C 12A-

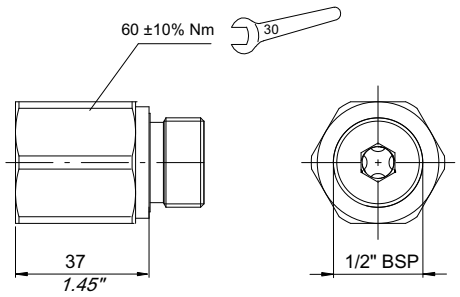


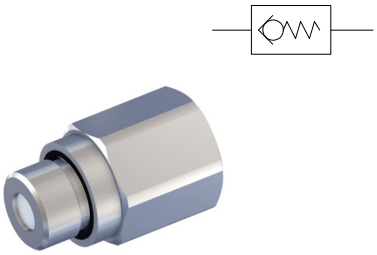
COP 12 PH_13 HPC T3 T4 PP C 24DD



5.3 End cover valves

5.3.1 Back pressure valve - VCP

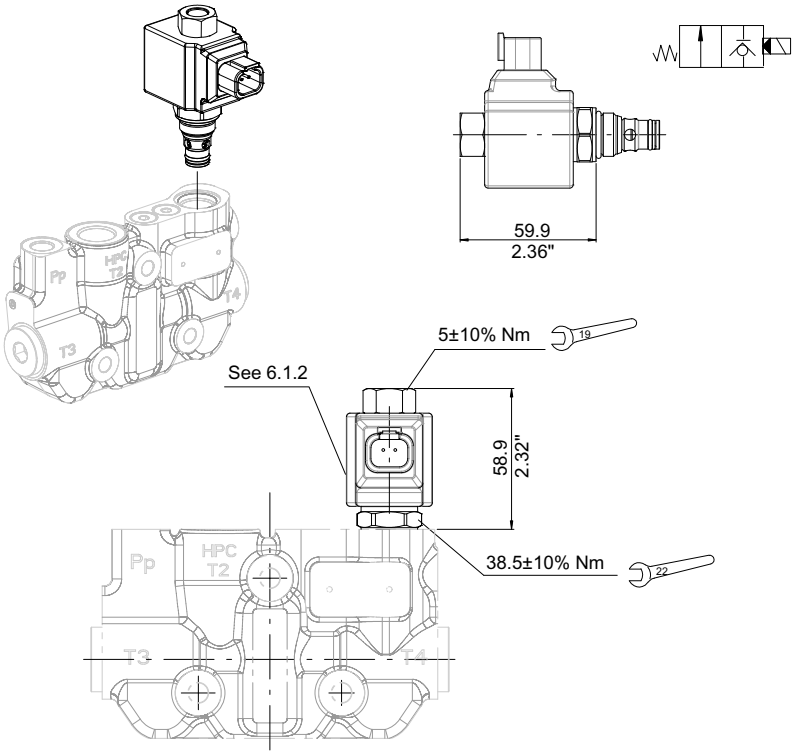


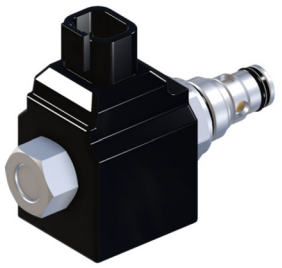


Type	Code	Nominal pressure (bar)
VCP08	200787406760	8
VCP12	200787406770	12

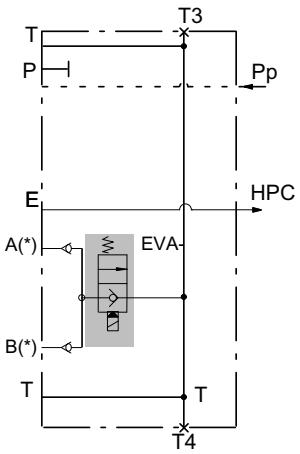
Should this positioner be needed, please contact our Sales Center.

5.3.2 Electric-unloading valve - EV





Normally open



Circuit	Manual override screw type	Type	Code without coil
Normally open	with	EVAE	-
	without	EVA-	200542300025
Normally closed	with	EVC-	-
	without	EVCE	-

(*) Screw type override must be used in case of emergency only.

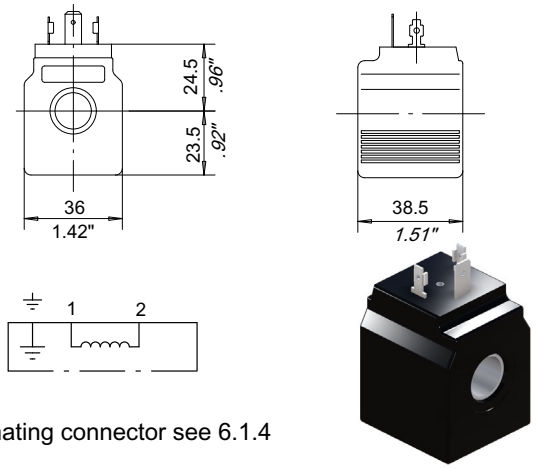
Should a version without part number be needed, please contact our Sales Center.

6 Electric and electronic devices

6.1 Coils and connectors

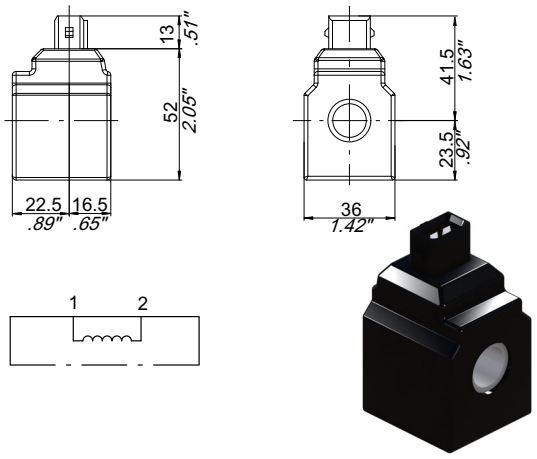
6.1.1 Solenoid valve coils (Ø13 L36)

DIN 43650-A/ISO4400 connector

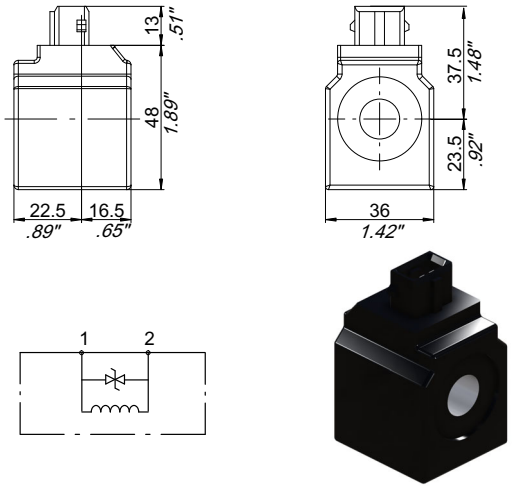


For mating connector see 6.1.4

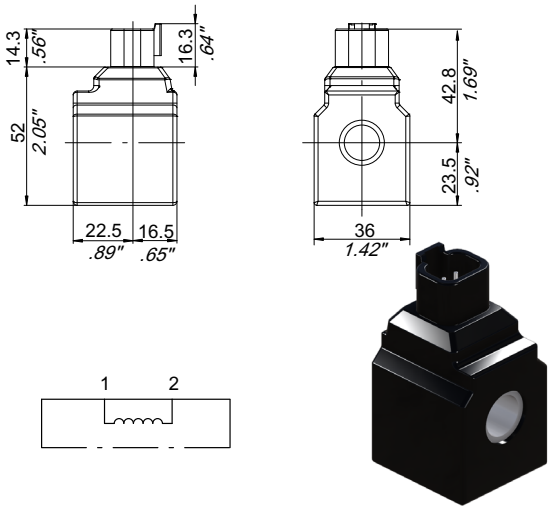
AMP JT 84-9414 connector



AMP JT 84-9419 connector



Deutsch DT04-2P connector



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

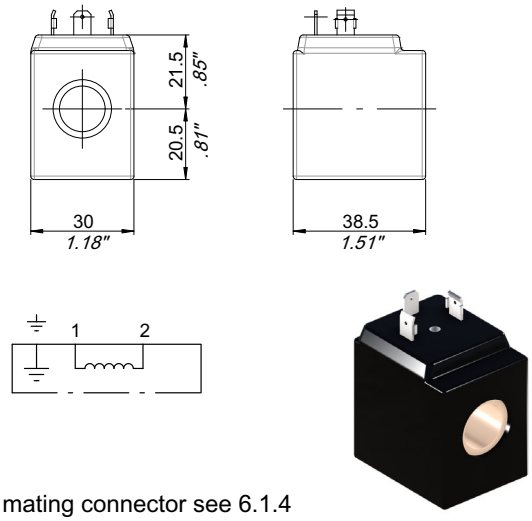
Connector style	Type	IP	Diode	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	12 H -	65	-	200674910100	12	27.2	2.2	5.3
	24 H -		-	200674920080	24	27	1.12	21.3
AMP	12 A -	65	-	200674910250	12	27.2	2.2	5.3
	24 A -		-	200674920200	24	27	1.12	21.3
AMP + 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 Center.

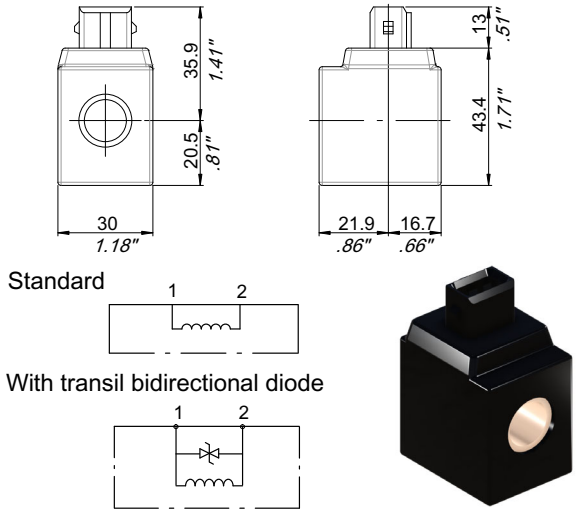
6.1.2 Solenoid valve coils (Ø13 L30 - 18 W)

DIN 43650-A/ISO4400 connector

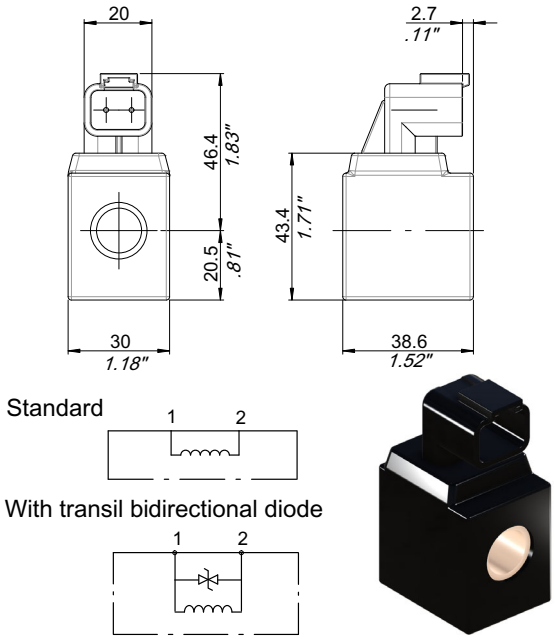


For mating connector see 6.1.4

AMP JT 84-9414 connector



Deutsch DT04-2P connector



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

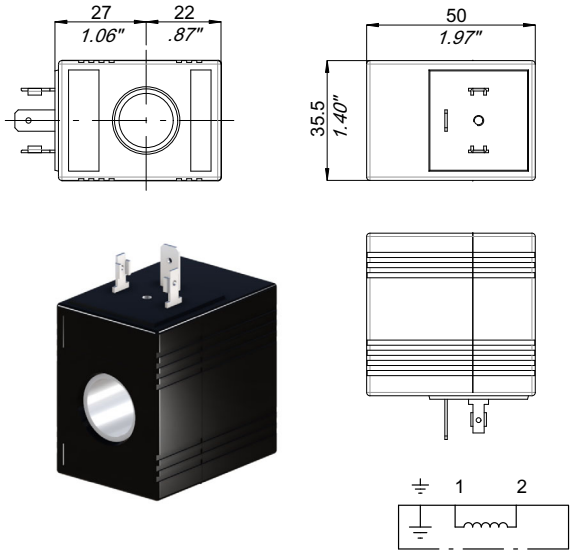
Connector style	Type	IP	Diode	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	(12 H -)	65	-	200674910490	12	18	1.5	8
	(24 H -)		-	200674920390	24	18	0.75	32
AMP	(12 A -)	65	-	200674910480	12	18	1.5	8
	(12 A D)		Transil	200674910540	12	18	1.5	8
	(24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

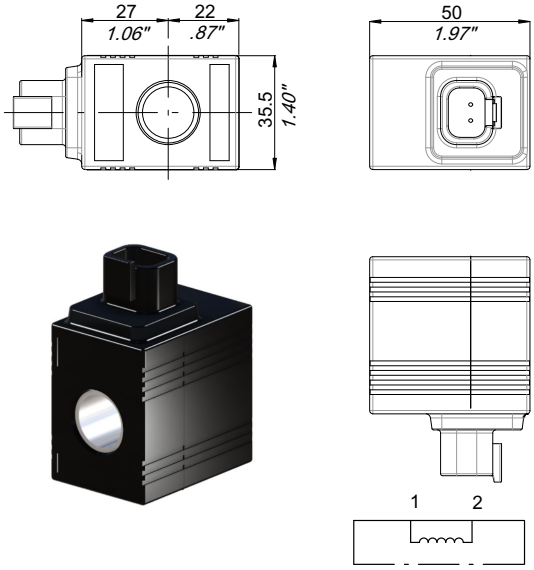
6.1.3 ON-OFF positioner coils (Ø16)

DIN 43650-A/ISO4400 connector

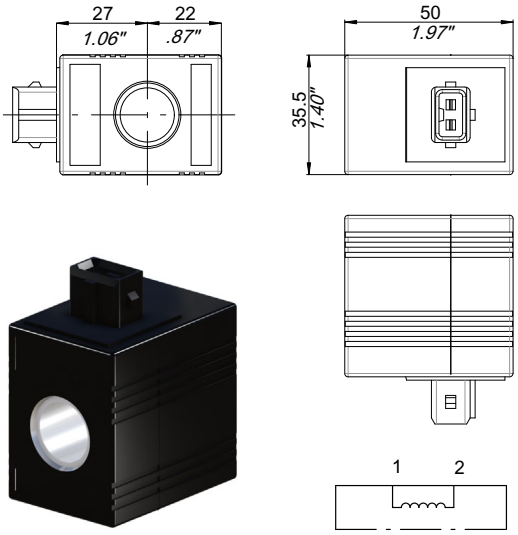


For mating connector see 6.1.4

Deutsch DT04-2P connector



AMP JT-84-9419 connector



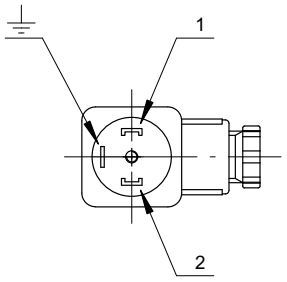
Coil features	
Wire class	H (VDE0580)
Duty cycle	ED 100%
Voltage tolerance	± 10%
Magnetic frame protection	Fe/ZnNi5/Cn/T0 (DIN 50979)

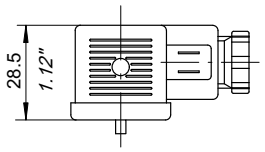
Connector style	Type	IP	Code	Nominal coil voltage (VDC)	Power (W)	Current consumption at 20°C (A)	Resistance at 20°C (Ω)
DIN	12 H -	65	200674910570	12	30	2.5	4.8 ± 7%
	24 H -		200674920420	24	30	1.25	19.2 ± 7%
AMP	12 A -	65	200674910580	12	30	2.5	4.8 ± 7%
	24 A -		200674920430	24	30	1.25	19.2 ± 7%
DT	12 D -	67	200674910560	12	30	2.5	4.8 ± 7%
	24 D -		200674920450	24	30	1.25	19.2 ± 7%

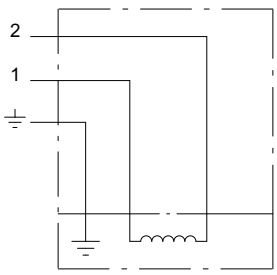
IP value is not referred to the coil itself and is reached using the proper mating connector and seals in the final assembly.

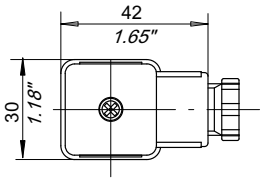
6.1.4 DIN43650-A/ISO4400 connector

Type	Code
DIN43650-A/ISO4400	200544110009





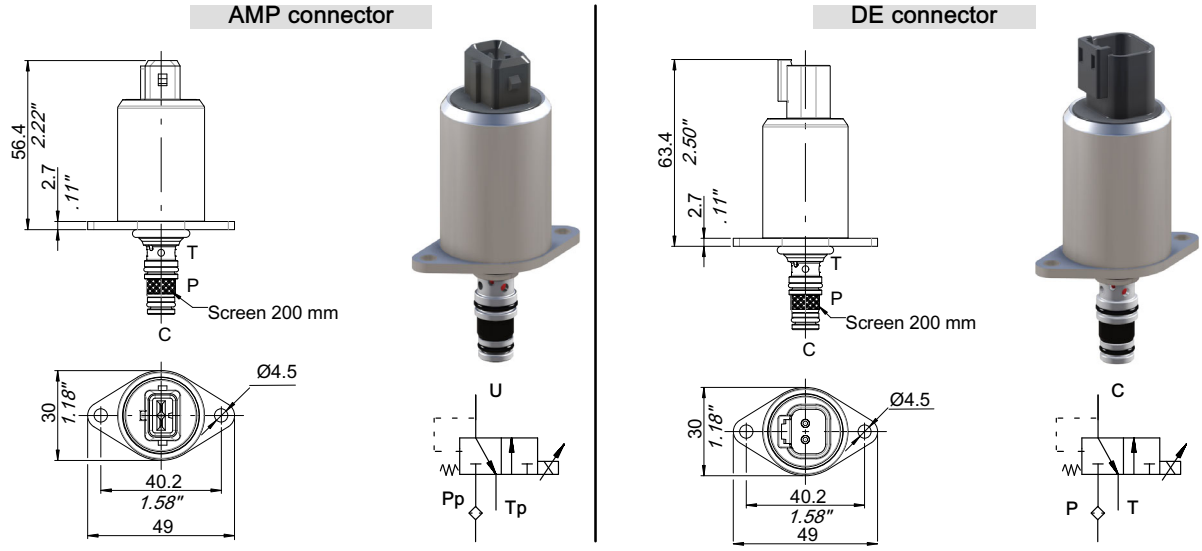




For power input	D.C.
Number of poles	2 + ⏚
Nom. capacity at contacts	10 A.
Max capacity at contacts	16 A.
Resistance at contacts	≥ 4 mOhm
Max section of cable	1.5 mm^2
Outer material	Glass fibre reinforced Nylon
Contact mount material	
Color	Black
Armour clamp	Pg 9
Ø cable	6-8 mm.
Protection factor	IP65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

To be ordered separately, not included in the coil.

6.2 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

(**) all versions can be used in ON-OFF mode

6.3 Spool position hall effect sensor

6.3.1 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

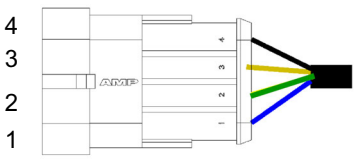
Electric specifications - Linear, Hall-effect sensor	
Power Supply Voltage	7 ÷ 32 Vdc
Current Consumption	< 20 mA
Output signal in Neutral	2.5 V
Output signal range	1 V ÷ 4 V
Tolerance on output signal	± 0.1 V
Maximum linearity error (-25 ÷ 105°C)	± 2%
Max. Electrical stroke linearity range	± 7.5 mm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

Statistical data (reliability)	
MTTFd	127 y
DC	low

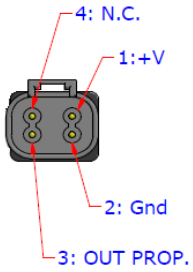
Electrical Connections

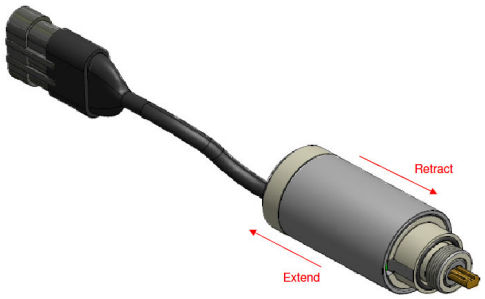
1. Vcc - Blue
2. Gnd - Green/Yellow
3. Proportional Output - Brown
4. n.u. - Black

Amp seal, 4 male pins

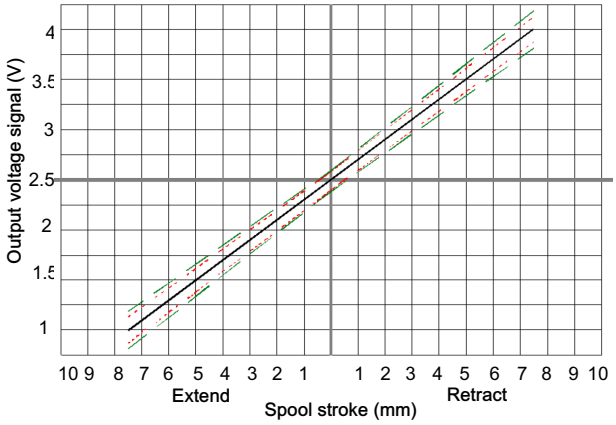


Deutsch DT04-4P

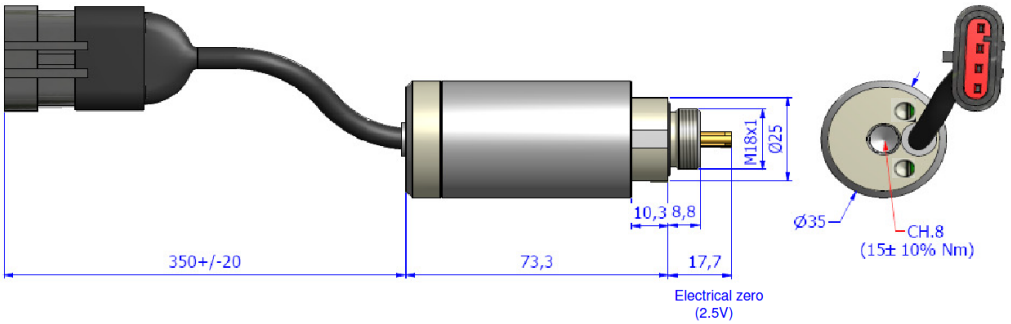




Output signal control characteristic (proportional version)



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



6.3.2 ON-OFF

Connector style	Type	Codes
AMP	OS A	200544124032

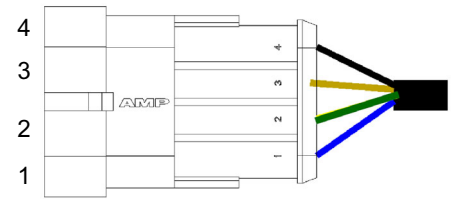
Mechanical specifications	
Maximum mechanical stroke	≥ ±8.5 mm
External diameter	35 mm
Body lenght	91 ± 8.5 mm
Cable lenght (including connector)	350 mm
Maximum operating pressure	5 MPa (50bar)
Operating temperature range	-25°C / +105°C
Protection class	IP 67
Connector	Amp seal, 4 male pins
Mechanical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

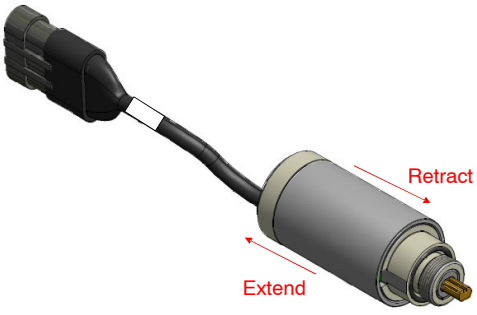
Electric specifications - Linear, Hall-effect sensor	
Power Supply Voltage	7 ÷ 32 Vdc
Current Consumption	< 20 mA
Output signal (inactive)	> VBATT-1 V
Output signal (active, external pull-down)	< 1 V
Switching threshold	1 mm
Hysteresis on switching threshold	0.3 mm
Insulation resistance	>500 MΩ @ 500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

Statistical data (reliability)	
MTTFd	127 y
DC	low

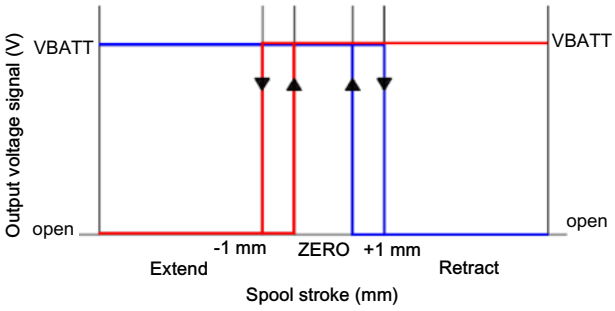
Electrical Connections (proportional version)

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

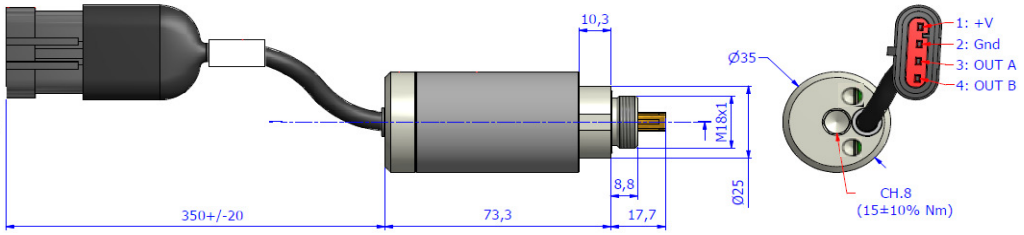




Output signal control characteristic (proportional version)

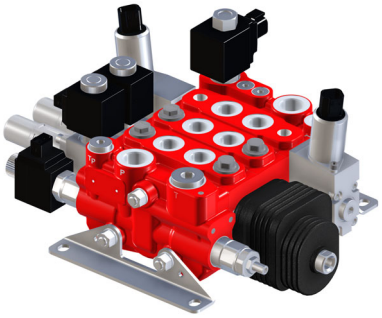


- NEUTRAL POSITION: **Out A**,, **Out B** to VBATT,
- EXTEND (stem entering in the sensor): **Out A** (blue) to VBATT, **Out B** (red) goes open.
- RETRACT (stem exiting from the sensor): **Out B** (red) to VBATT, **Out A** (blue) goes open.
- The hysteresis keeps the switching threshold more stable

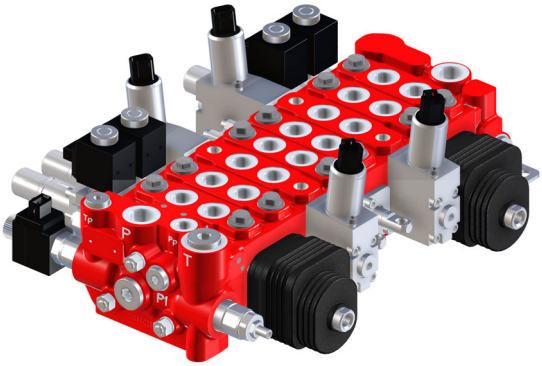


7 Application examples

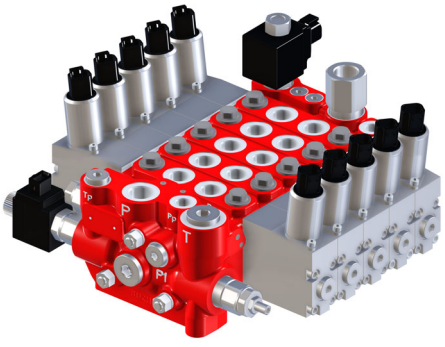
7.1 Wheel loaders



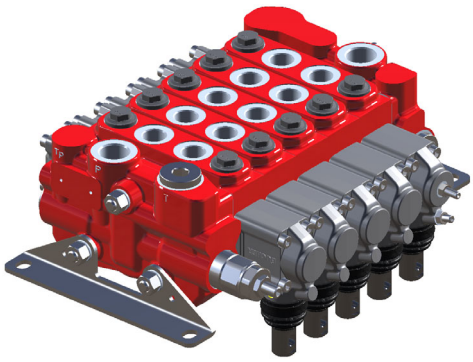
7.2 Forestry cranes



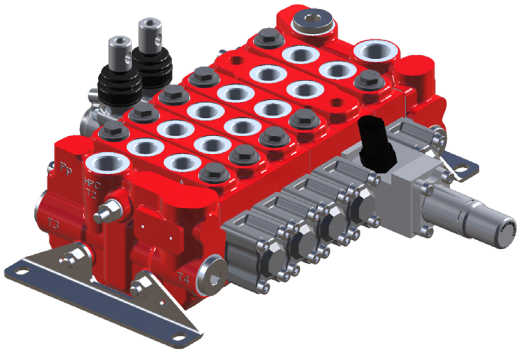
7.3 Telehandlers



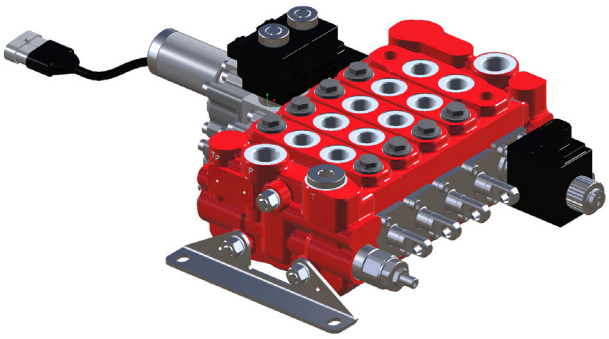
7.4 Boom lifters



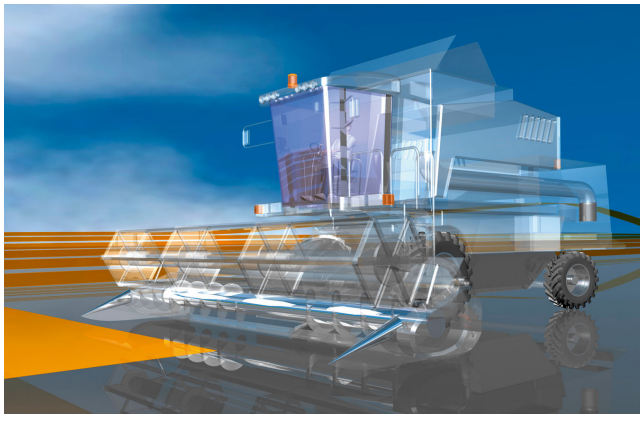
7.5 Back-hoes

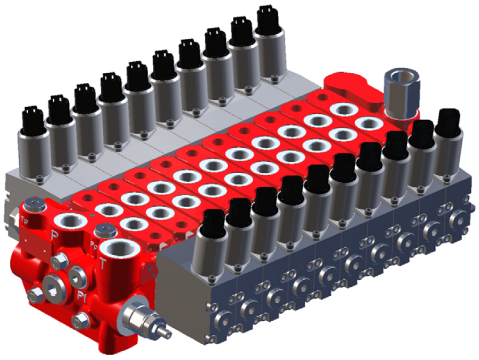


7.6 Fork lifts



7.7 Harversters machine

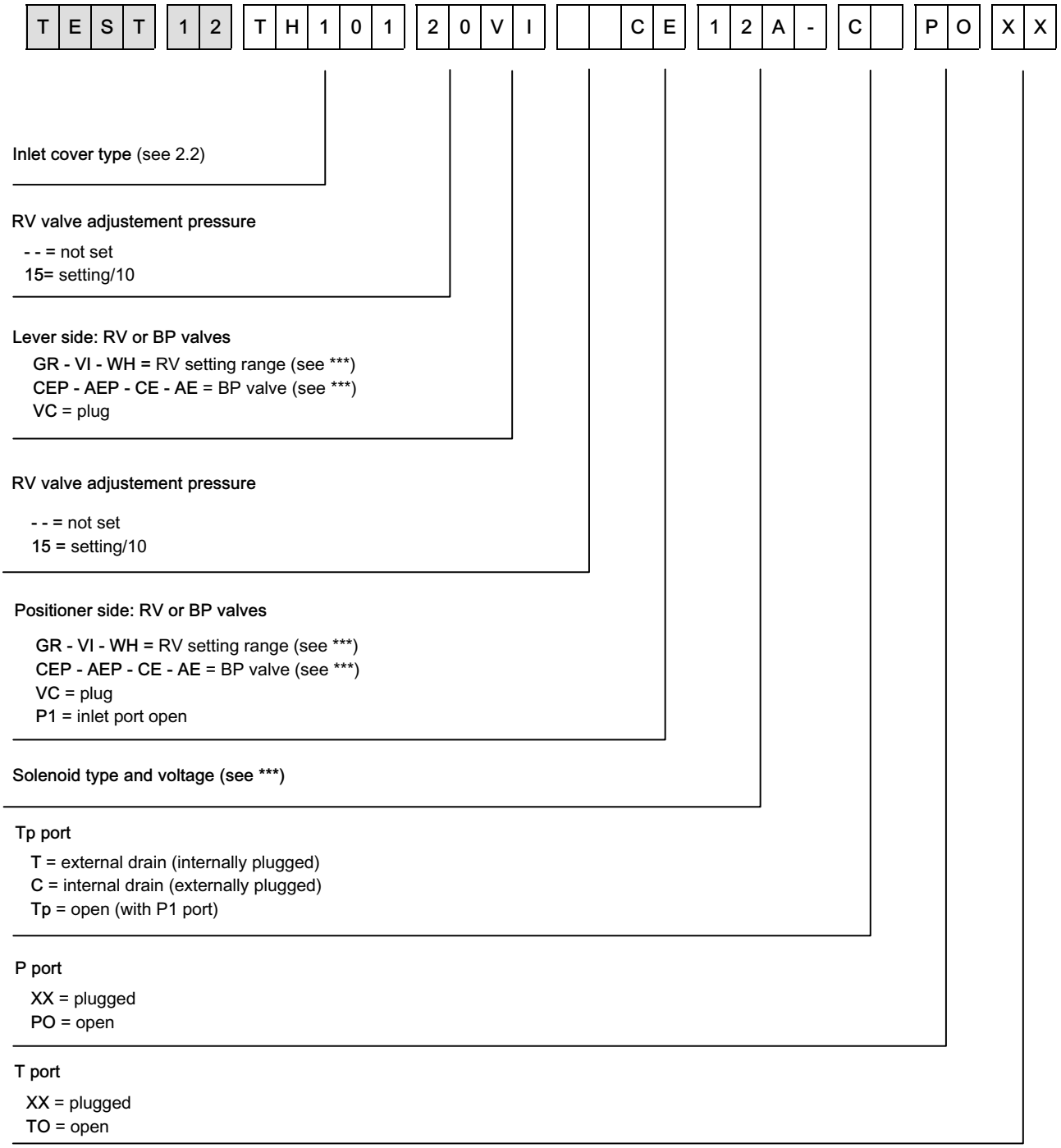




8 Ordering code composition

8.1 Inlet cover

8.1.1 Inlet cover - TH



Examples

TEST 12 TH101 15GR VC PO XX

TEST 12 TH102 15GR P1 TP XX TO

TEST 12 TH101 AE 18GR 12AD T PO XX

8.1.2 Inlet cover - TM

T	E	S	T	1	2	T	M	1	0	1	2	0	V	I			C	E	1	2	A	-	P	O	X	X

Inlet cover type (see 2.1)

RV valve adjustement pressure

- - = not set
15= setting/10

Lever side: RV or BP valves

GR - VI - WH = RV setting range (see ***)
CEP - AEP - CE - AE = BP valve (see ***)
VC = plug

RV valve adjustement pressure

- - = not set
15 = setting/10

Positioner side: RV or BP valves

GR - VI - WH = RV setting range (see ***)
CEP - AEP - CE - AE = BP valve (see ***)
VC = plug
P1 = inlet port open

Solenoid type and voltage (see *)**

P port

XX = plugged
PO = open

T port

XX = plugged
TO = open

Examples

TEST 12 TM101 20GR AE 12D- PO TO

TEST 12 TM102 20GR P1 PO XX

8.1.3 Inlet cover - PTH

T	E	S	T	1	2	P	T	H	1	0	3	P	2			C	E	1	2	A	-	P	1	1	4	P	P

Inlet cover type (see 2.1)

P port

XX = plugged
P2 = open

Lever side: RV or BP valves

GR - VI - WH = RV setting range (see 2.6.1)
CEP - AEP - CE - AE = BP valve (see 2.3.2)
VC = plug

Solenoid type and voltage (see 6.1.1)

P port

XX = plugged
P1 = open

UC

00 = not present
14 = setting/10

PP

00 = not present
PP = present, open
XX = plugged

Examples

TEST 12 PTH101 P1 P2 20GR 00 PP

TEST 12 PTH102 P1 P2 20GR 00 PP

TEST 12 PTH103 P1 P2 AE12- 14 PP

8.1.4 Inlet cover - PTM

T	E	S	T	1	2	P	T	M	1	0	3	P	2			C	E	1	2	A	-	P	1	1	4

Inlet cover type (see 2.1)

P port

XX = plugged
P2 = open

Lever side: RV or BP valves

GR - VI - WH = RV setting range (see 2.6.1)
CEP - AEP - CE - AE = BP valve (see 2.3.2)
VC = plug

Solenoid type and voltage (see 6.1.1)

P port

XX = plugged
P1 = open

UC

00 = not present
14 = setting/10

Examples

TEST 12 PTH101 P1 P2 20GR 00

TEST 12 PTH102 P1 P2 20GR 00

TEST 12 PTH103 P1 P2 AE12- 14

8.1.5 Inlet cover - T2P

T	E	S	T	1	2	T	2	P	1	0	1	1	5	G	R			A	E	1	2	A	-	P	P	C	P	M	P	P	1	3	2	P	O	X	X

Inlet cover type
(see 2.5)

RV valve adjustement pressure
- - = not set
15 = setting/10

Lever side: RV or BP valves
GR - VI - WH = RV setting range (see 2.6.1)
CEP - AEP - CE - AE = BP valve (see 2.3.2)
VC = plug

RV valve adjustement pressure
- - = not set
15 = setting/10

Positioner side: RV or BP valves
GR - VI - WH = RV setting range (see 2.6.1)
CEP - AEP - CE - AE = BP valve (see 2.3.2)
VC = plug

Solenoid type and voltage (see 6.1.1)

Pp port
PP = present, open
XX = plugged

Tp port
T = external drain (open, internal M10x1 plug)
C = internal drain (externally plugged + check valve)

PM port
00 = not present
PM = present, open
XX = plugged

Pp1 port
PP1 = present, open
XX = plugged

Pilot supply pressure reducing valve VRP
32 = pressure reducing valve adjustment in bar (see 2.6.4)
XX = plugged

P port
XX = plugged
PO = open

T port
XX = plugged
TO = open

Examples

TEST 12 T2P301 CE 20VI 24D- XX T PP1 32 PO TO

TEST 12 T2P101 30WH AE 12A- PP C XX XX 32 PO XX

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hydraulics

8.2 Sections

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

H	D	S	1	2	K	*	1	0	1	A	3	S		7	9			L	1	0	0	2	5	2	5	A				

Body type
* = specific pitch
S = 32 mm
H = 37 mm

Spool type (see 3.2)

Positioner type (see 3.3, 3.5, 4.7, 3.6, 4.10 and 4.11)

Lever type (see 3.8)

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 3.2.4)
A = with positioner kit on A port - standard position
B = positioner kit on B port - inverted spool

Additional information
ON-OFF controls solenoid (see 6.1.3)
Positioners with sensor (see 6.3)
EHI control solenoid (see 6.1.2)

Examples

HDS12 KH752 YE 01E 12D-

HDS12 KS801 Z45S 33 L133 14 00 B

8.2.1 Sections with EHO control

H	D	S	1	2	K	*	1	0	1	A	6	S	3	2	0	S	6	N	N	K	2	5	2	5	A

Body type
* = specific pitch
S = 32 mm
H = 37 mm

Spool type (see **)

EHO Configuration (see **)

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/emergency lever side indication (see ***)
A = with positioner kit/emergency lever on A port - standard position
B = positioner kit/emergency lever on B port - inverted spool

Examples

HDS12 KS701 A45S 322S6GGC 15 15 A

HDS12 KS801 A3S 322GG0 00 00 A

8.2.2 Sections with electro-mechanical locking system / microswitch

Body type
* = specific pitch
S = 32 mm
H = 37 mm

Spool type (see 3.2)

Positioner type (see 3.3)

Intermediate kit
EM - EME = electro-mechanical locking system (see 3.4.1)
D-S1-S2-S3-D2 = microswitch positioner type (see 4.5)

Lever type (see 3.8)

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 3.2.4)
A = with positioner kit on A port - standard position
B = positioner kit on B port - inverted spool

Additional information
Electro-mechanical locking solenoid (see 6.1.2)
Microswitch positioners (see 7.2)

Additional information (**)

Examples

HDS12 KS701 A45S 08 EME L100 25 25 A 12A-

HDS12 KH801 A3S 133 D L100 14 00 A OW-

(**) Positioners with electro-mechanical locking system and microswitch

8.3 End covers

8.3.1 Outlet cover - P

C	O	P	1	2	P	1	0	1	T	2		T	3	T	4

Outlet cover type (see **)

Standard
HPC

T2/HPC port

Standard type
T2 = open
XX = plugged
HPC type
HPC = purely HPC (open)
CC = closed centre

T3 port

T3 = open
XX = plugged

T4 port

T4 = open
XX = plugged

Examples

COP 12 P101 T2 XX XX

COP 12 P111 HPC XX XX

COP 12 P 101 XXT3 XX

8.3.2 Outlet cover - P and P6H

C	O	P	1	2	P	H	1	0	1	T	2		T	3	T	4	P	P

Outlet cover type (see 6.5)
- Standard
- HPC

T2/HPC port

Standard type
- T2 = open
- XX = plugged

HPC type
- HPC = purely HPC (open)
- CC = closed centre

T3 port
- T3 = open
- XX = plugged

T4 port
- T4 = open
- XX = plugged

Pp port
- 00 = not present
- PP = open
- XX = plugged

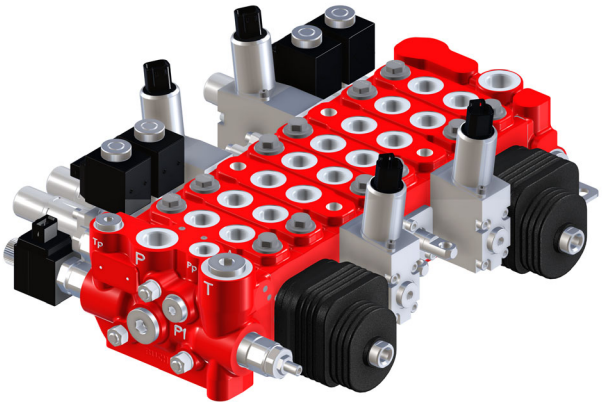
Examples

COP 12 P101 T2 T3 XX PP

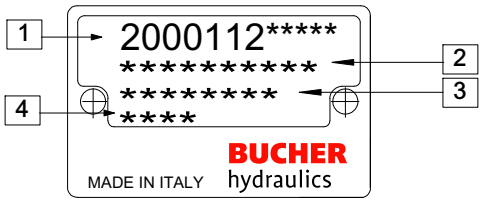
COP 12 PH111 HPC XX XX XX

8.4 Examples of ordering code

TEST12 TP_01 15GR AE 12A- XX T XX XX 32 PO XX
HDS12 KH_01 Z_ _ 33 L133 20 20 A
HDS12 KH_01 Z_ _ 33 L133 20 20 A
HDS12 KS_06 A_ _ 322S6GGK A
HDS12 KS_01 A_ _ 79 L55 00 00 A
HDS12 KS_01 A_ _ 79 L55 00 00 A
HDS12 KS_06 A_ _ 322S6GGK A
HDS12 KH_01 Z_ _ 33 L133 20 20 A
HDS12 KH_01 Z_ _ 33 L133 20 20 A
COP12 PH_01 XX T3 PP PP1 00



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									
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
January	9M	0M	1M	2M	3M	4M	5M	6M	7M	8A
February	9N	0N	1N	2N	3N	4N	5N	6N	7N	8B
March	9P	0P	1P	2P	3P	4P	5P	6P	7P	8C
April	9Q	0Q	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8D
May	9R	0R	1R	2R	3R	4R	5R	6R	7R	8E
June	9S	0S	1S	2S	3S	4S	5S	6S	7S	8F
July	9T	0T	1T	2T	3T	4T	5T	6T	7T	8G
August	9U	0U	1U	2U	3U	4U	5U	6U	7U	8H
September	9V	0V	1V	2V	3V	4V	5V	6V	7V	8I
October	9Z	0Z	1Z	2Z	3Z	4Z	5Z	6Z	7Z	8J
November	9X	0X	1X	2X	3X	4X	5X	6X	7X	8K
December	9Y	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8L

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hydraulics

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

Classification: 430.300.000