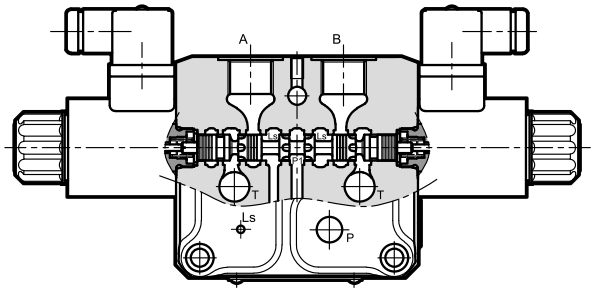
BLS6

PROPORTIONAL STACKABLE VALVE ASSEMBLY WITH LOAD SENSING

SERIES 20

p max **315** bar
Q max **120** l/min

OPERATING PRINCIPLE



— The BLS6 is a stackable valve assembly. It can be assembled with up to 8 working sections (proportional and solenoid directional valves together).

— Each working section is equipped with a meter-in compensator that keeps the flow costant, independently from load changes.

— Sections with pressure compensator are not influenced in any way by other operated functions, provided that sufficient pump capacity is available. In order to work correctly, the sum of the flows contemporarily used must not overcome the 90% of the inlet flow.

— Working ports A and B are threaded 1/2" BSPP. Ports P1, P2 and T1 of the inlet plate are threaded 3/4" BSPP.

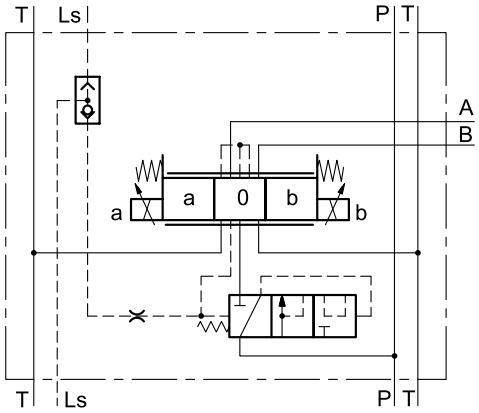
— The lever override is available as option.

PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50°C)

Maximum operating pressure: - A, B, P1 and P2 ports - T1 port	bar	 315 20
Maximum flowrate: - A and B ports - P1 and P2 ports - T1 port	l/min	 45 100 120
Electrical characteristics	see point 4	
Ambient temperature range	°C	-20 / +60
Fluid temperature range	°C	-20 / +80
Fluid viscosity range	cSt	10 ÷ 400
Fluid contamination degree	According to ISO 4406:1999 class 18/16/13	
Recommended viscosity	cSt	25
Single body mass	kg	4,5
Surface treatment of body and plates	galvanic, zinc-nickel	

HYDRAULIC SYMBOL



1 - IDENTIFICATION CODES FOR SPARE MODULES

Here below are shown the identification codes of all the loose components of the valve assembly. To order the assembled valve, please refer to the codes at points 9 and 10.

Different versions of inlet section are available, for fixed pumps and for systems with Load Sensing pump.

1.1 - Proportional working sections

BLS	6	-				/	20	V	-			/	

Compensated proportional directional valve, direct operated

Size

Spool type:
PC = proportional valve, closed center
PA = proportional valve, open center

Solenoid position:
(omit for configuration with two solenoids)
A = 1 solenoid on side A
B = 1 solenoid on side B

Spool nominal flow (see below)

Series no. (the overall and mounting dimensions remain unchanged from 20 to 29)

Seals: FPM seals

Coil type:
D12 = Nominal solenoid voltage 12V DC
D24 = Nominal solenoid voltage 24V DC

Coil electrical connection:
(see point 6)
K1 = plug for connector type EN 175301-803 (ex DIN 43650) (**standard**)
K7 = plug DEUTSCH DT04-2P for male connector type DEUTSCH DT06-2S

Manual override
(see point 11)

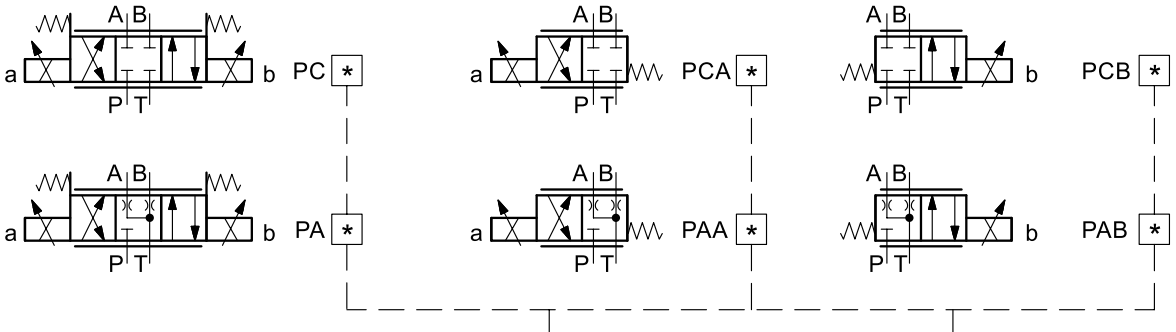
SPOOLS

Valve configuration depends on the combination of the following elements: solenoid quantity, spool type, nominal flow rate.

2 solenoids:
3 positions with spring centering

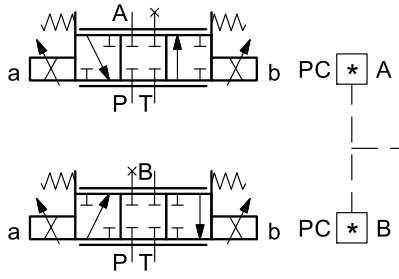
1 solenoid on side A:
2 positions (central + external)
with spring return

1 solenoid on side B:
2 positions (central + external)
with spring return



SYMMETRICAL	
Q max	Δp
05/05	4
09/09	8
15/15	4
25/25	8
30/30	4
45/45	8

ASYMMETRICAL	
Q max	Δp
15/10	4
25/15	8
30/20	4
45/30	8



SINGLE FLOW	
Q max	Δp
30	4
45	8

1.2 - Solenoid working sections

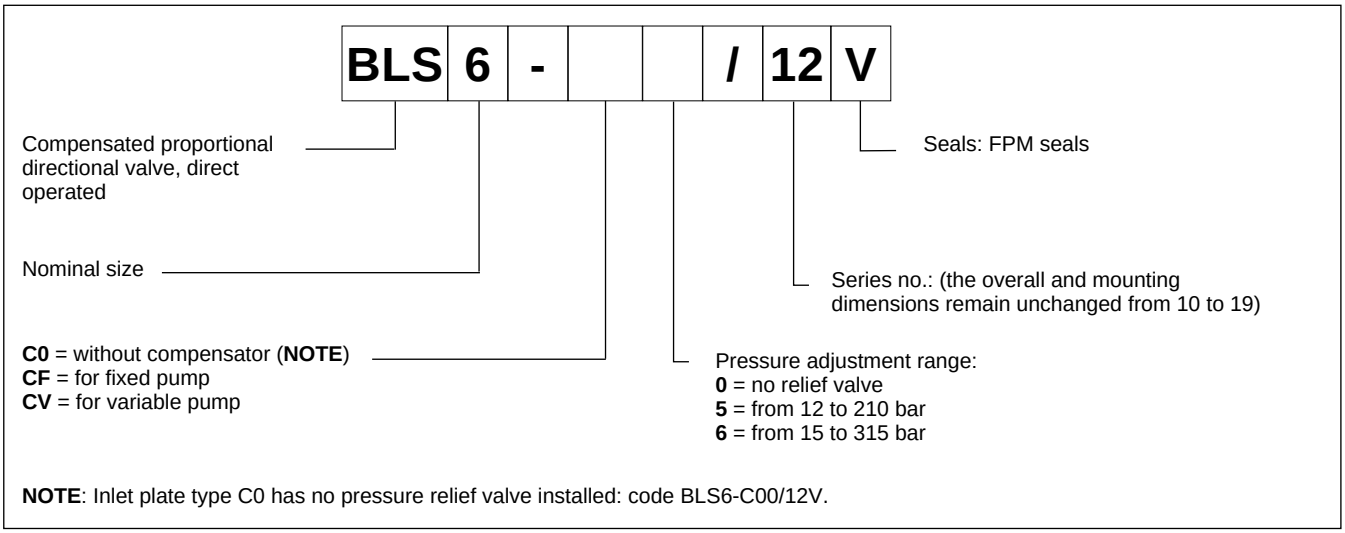
Proportional directional valves and solenoid valves can be used together in the assembly. In this case, the description to be included in the identification code under the 'spool type' item is as follow:

SC = solenoid valve, closed center
SA = solenoid valve, open center

Two spools for high flow rates are also available: SC60/60 and SA60/60.

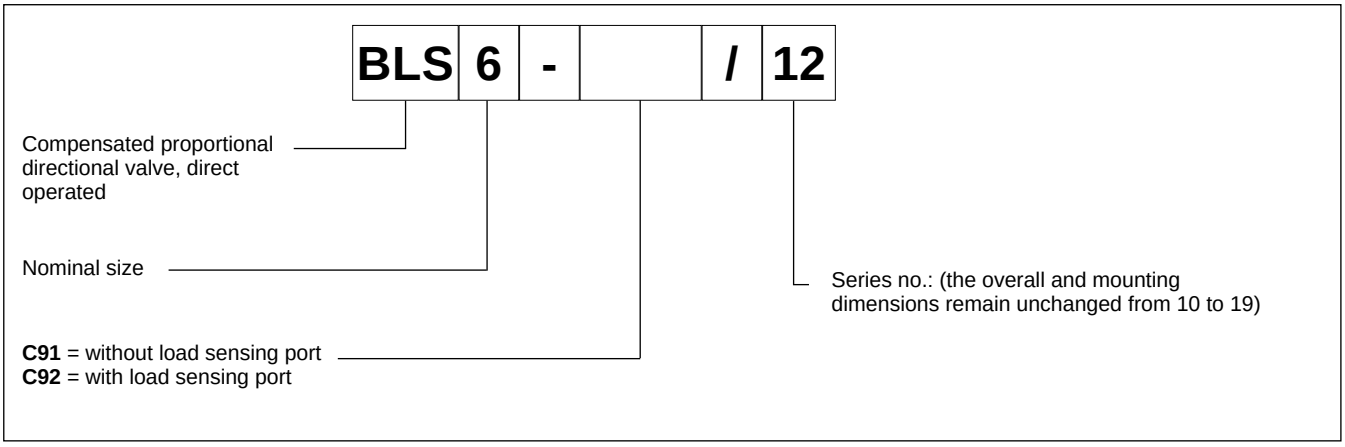
1.3 - Inlet plates

Inlet plates for fixed and for variable pumps with load sensing are available. The version for fixed pump can be easily converted to work with variable pumps and vice versa.



NOTE: Inlet plate type C0 has no pressure relief valve installed: code BLS6-C00/12V.

1.4 - End plates



2 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4 or fluids HFDR type. For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

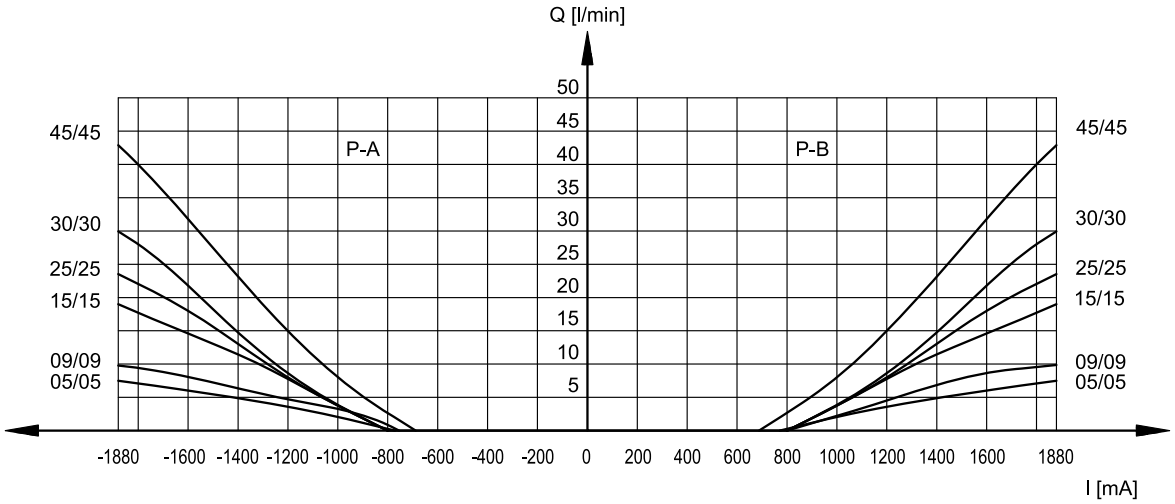
The fluid must be preserved in its physical and chemical characteristics.

3 - CHARACTERISTIC CURVES

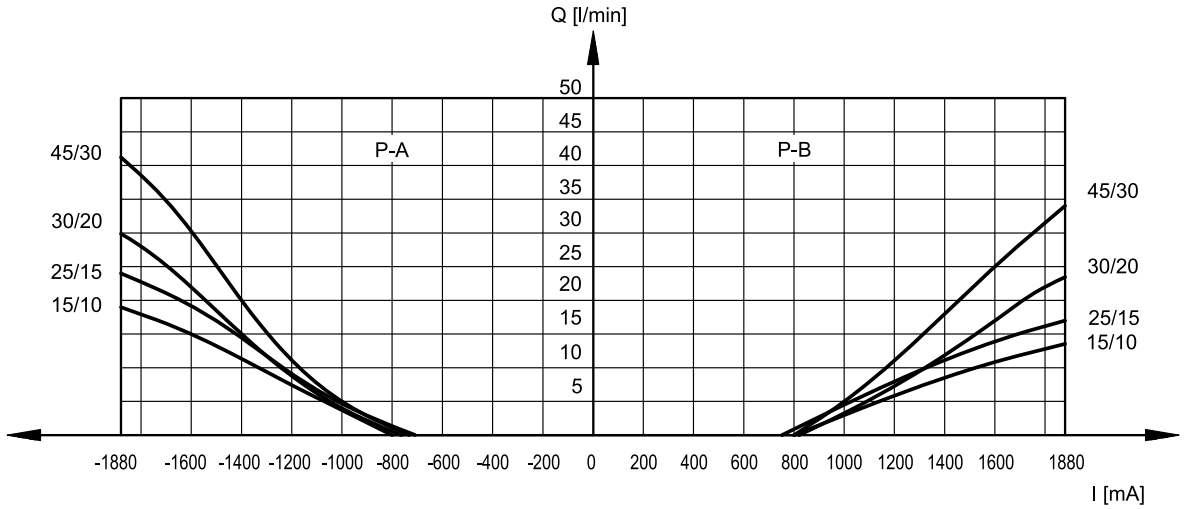
(values obtained with viscosity 36 cSt at 50 °C)

Typical constant flow rate obtained through the embedded compensator, with 12 V supply voltage (for D24 version the maximum current is 860 mA), measured for the various spool types available.

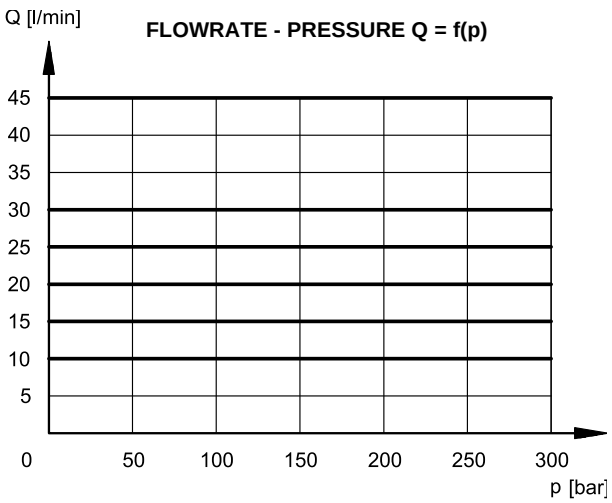
PRESSURE DROPS Δp-Q OF PROPORTIONAL WORKING SECTIONS
SYMMETRICAL FLOWS - PC AND PA SPOOLS



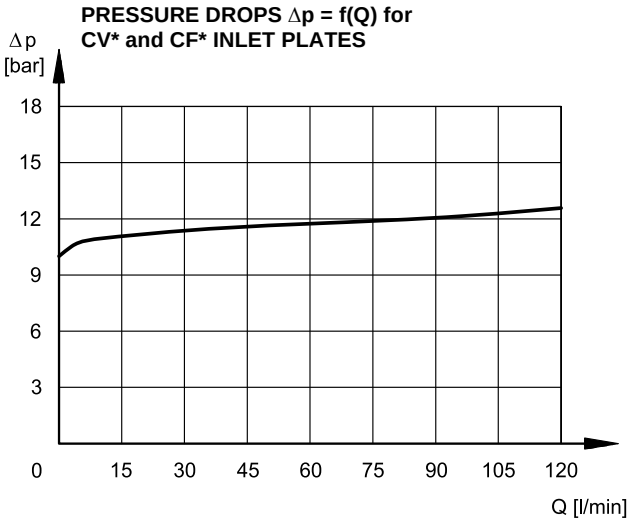
ASYMMETRICAL FLOWS - PC and PA SPOOLS



FLOWRATE - PRESSURE Q = f(p)



PRESSURE DROPS Δp = f(Q) for CV* and CF* INLET PLATES



4 - ELECTRICAL CHARACTERISTICS

Proportional solenoid

The proportional solenoid is made of two parts: tube and coil.

The tube, screwed to the valve body, contains the armature which is designed to maintain friction to a minimum thereby reducing hysteresis.

The coil is mounted on the tube secured by means of a lock nut.

It can be rotated through 360° depending on installation clearances.

NOMINAL VOLTAGE	V DC	**12**	**24**
RESISTANCE (at 20°C)	Ω	4.4	18.6
NOMINAL CURRENT	A	1.88	0.86
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC)	According to 2014/30/EU		
CLASS OF PROTECTION Coil insulation (VDE 0580) Impregnation:	class H class F		

Protection from atmospheric agents IEC 60529

The IP protection degree is guaranteed only with both valve and connectors of an equivalent IP degree correctly connected and installed.

electric connection	electric connection protection	whole valve protection
K1 EN 175301-803 (ex DIN 43650)	IP65	IP65
K7 DEUTSCH DT04 male	IP65/67	

5 - STEP RESPONSE

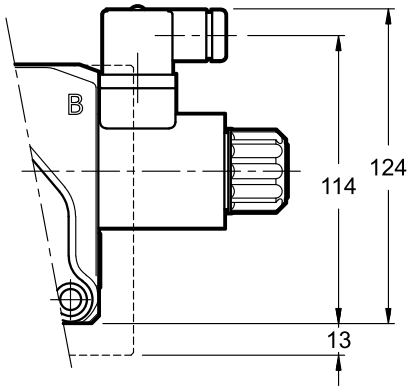
(measured with mineral oil with viscosity of 36 cSt at 50°C with electronic control card)

Step response is the time (delay) taken for the valve to reach 90% of the set position value following a step change of the reference signal.

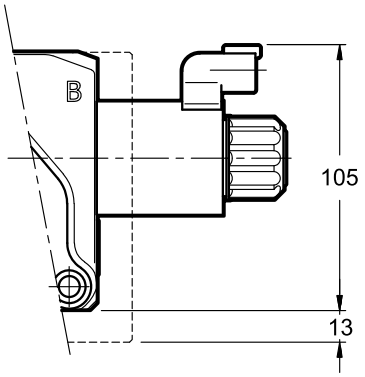
Reference signal step	0 →100%	100 →0%
STEP RESPONSE [ms]		
BLS6	50	40

6 - ELECTRICAL CONNECTIONS

connection for EN 175301-803 (ex DIN 43650) connector code **K1** (**standard**)



connection for DEUTSCH DT04-2P connector type code **K7**



7 - ELECTRICAL CONNECTORS

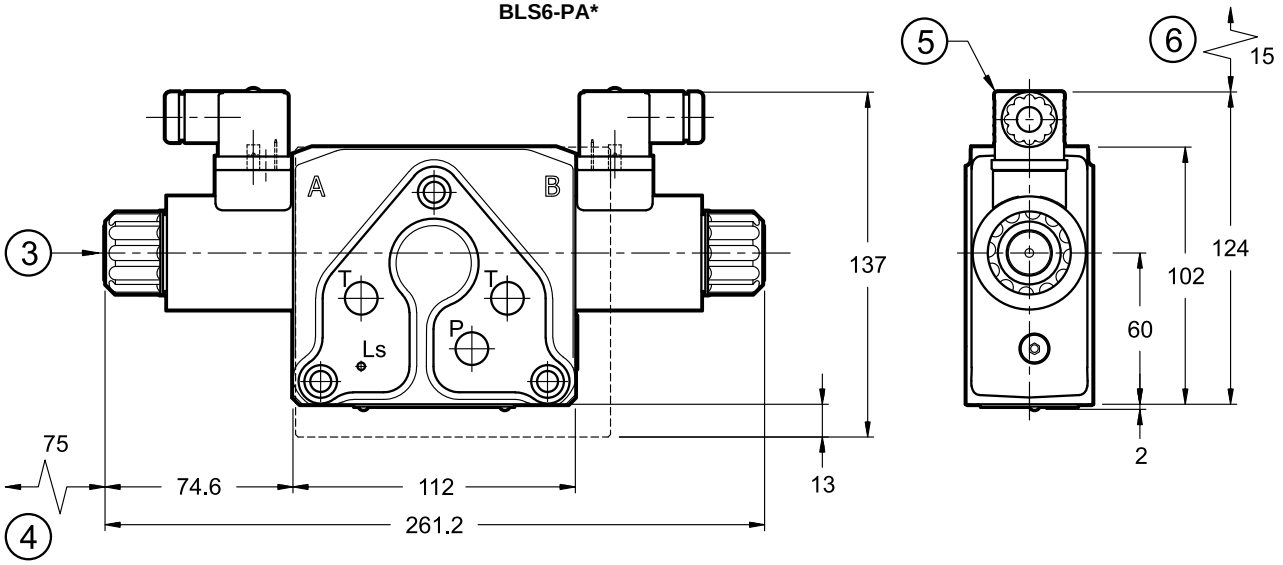
Solenoid working sections are supplied without connectors. Connectors for solenoid valves with K1 electrical connection EN 175301-803 (ex DIN 43650) can be ordered separately: see catalogue 49 000.

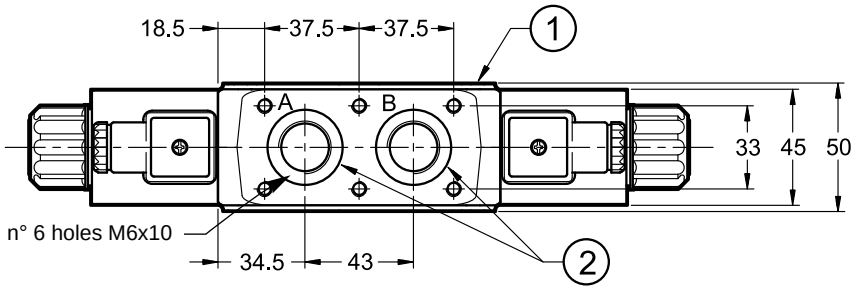
8 - OVERALL AND MOUNTING DIMENSIONS

8.1 - Proportional working sections

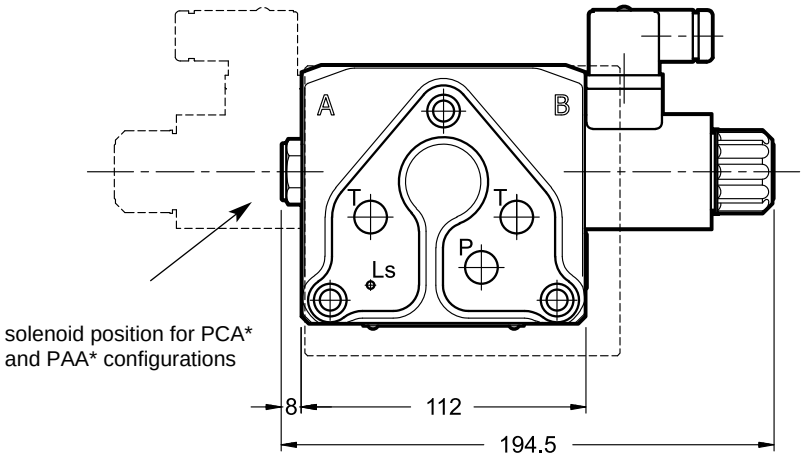
dimensions in mm

2 SOLENOIDS **BLS6-PC***
BLS6-PA*





1 SOLENOID **BLS6-PCB***
BLS6-PAB*

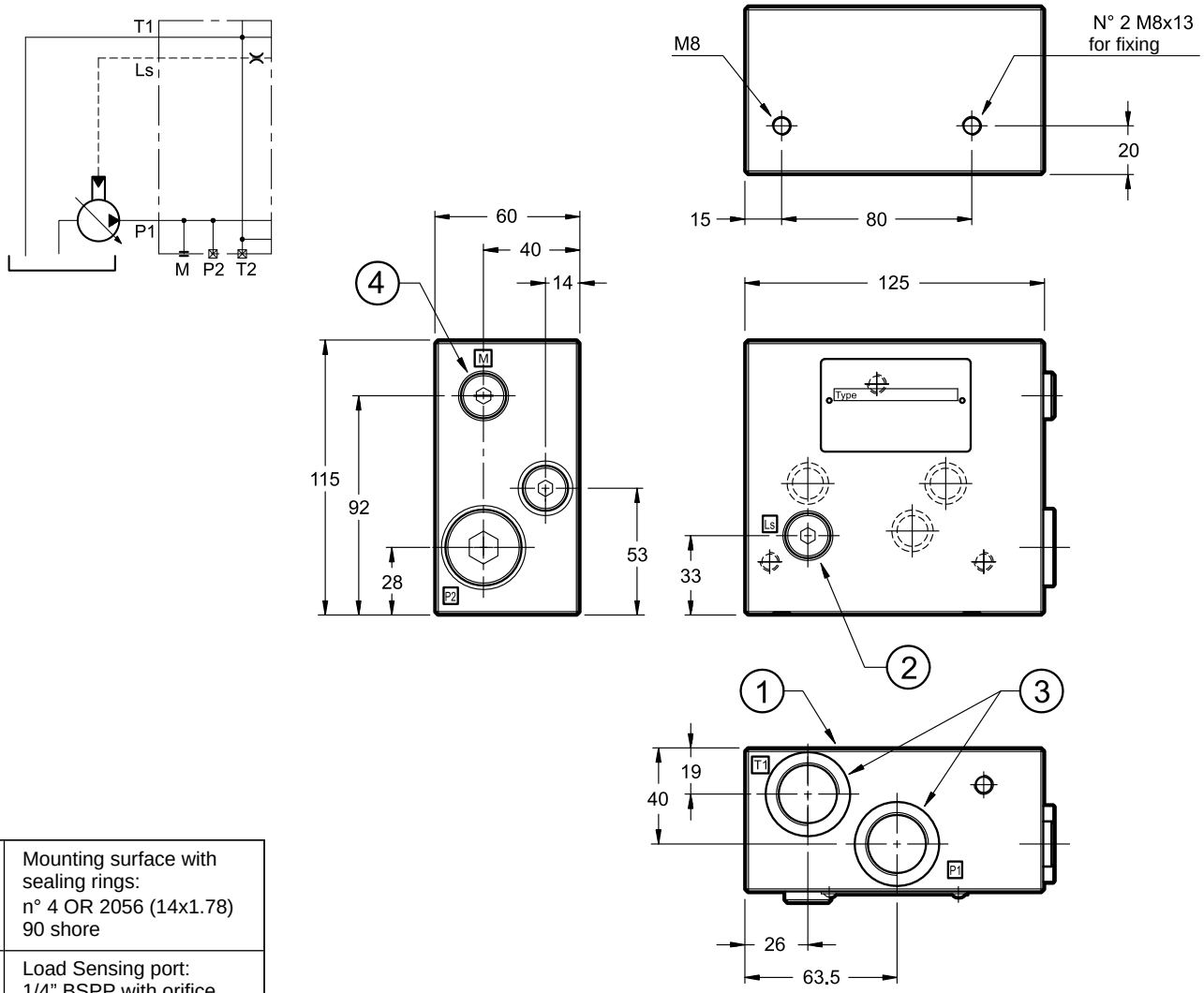


1	Mounting surface with sealing rings: n° 4 OR 2056 (14x1.78) 90 shore
2	A and B ports: 1/2” BSPP
3	Locking ring with standard manual override
4	Coil removal space
5	Electrical connector type EN 175301-803 (ex DIN 43650) (drawing with standard type K1 - for other connections see point 6)
6	Connector removal space

8.2 - Inlet plates

dimensions in mm

BLS6-C00

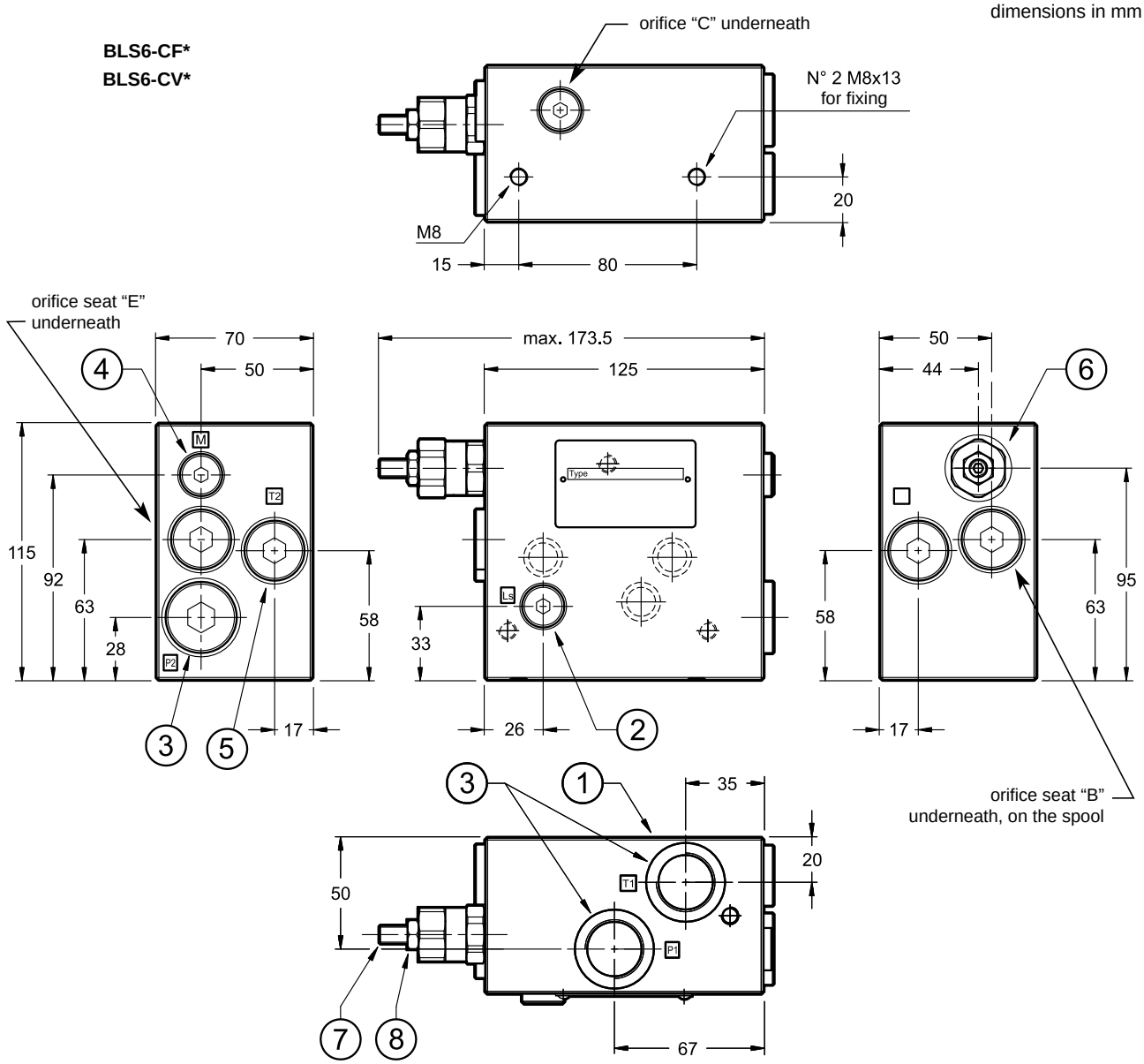


1	Mounting surface with sealing rings: n° 4 OR 2056 (14x1.78) 90 shore
2	Load Sensing port: 1/4” BSPP with orifice
3	P1, P2 and T1 ports: 3/4” BSPP
4	Pressure gauge port: 1/4” BSPP

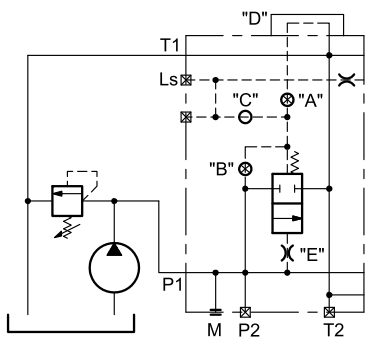
8.2 - Inlet plates

dimensions in mm

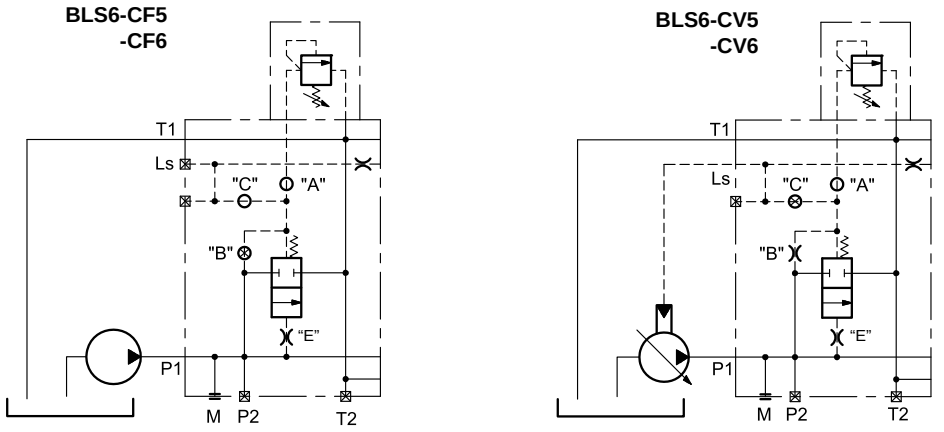
BLS6-CF*
BLS6-CV*



BLS6-CF0



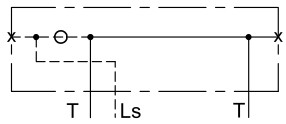
1	Mounting surface with sealing rings: n° 4 OR 2056 (14x1.78) 90 shore
2	Load Sensing port: 1/4" BSPP
3	P1, P2 and T1 ports: 3/4" BSPP
4	Pressure gauge port: 1/4" BSPP
5	T2 port: 1/2" BSPP
6	Pressure relief valve 'D'. **For BLS6-CF0 only:** plug 3/4"-16 UNF. Orifice seat "A" underneath.
7	Socket hex adjustment screw: Hex key 4.
8	Locking nut: spanner 13 Tightening torque: 12 ÷ 17 Nm



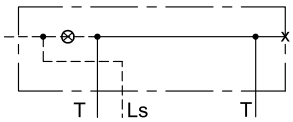
8.3 - End plates

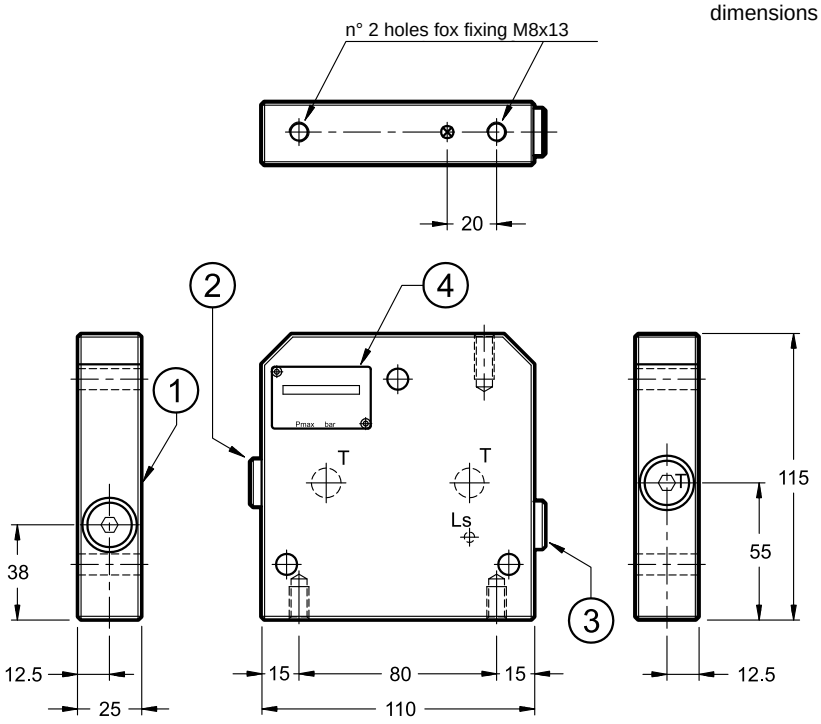
dimensions in mm

BLS6-C91



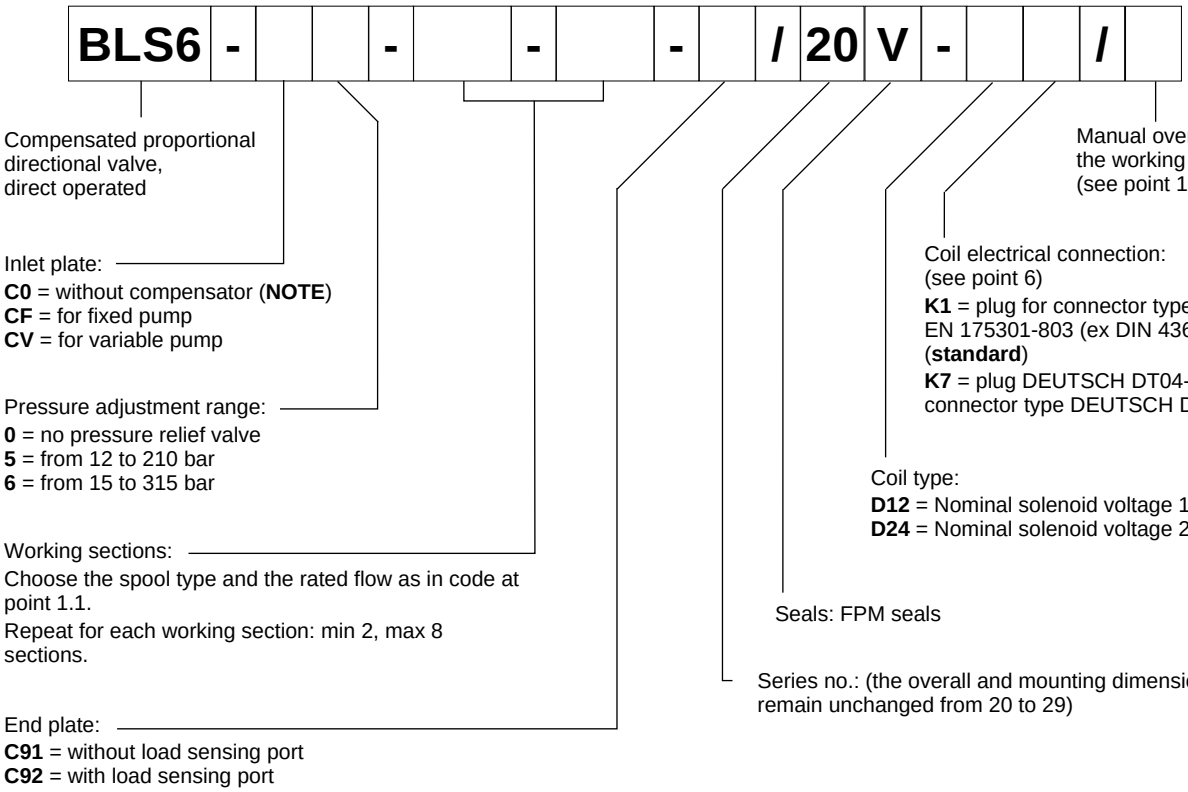
BLS6-C92





1	Mounting surface with no sealing rings
2	T1 outlet: 3/8” BSPP
3	Load Sensing port: 1/4” BSPP
4	Identification label

9 - IDENTIFICATION CODE OF THE ASSEMBLED VALVE



NOTE: The C0 version is available without the pressure relief valve only, with code BLS6-C00/12V.

Code example:

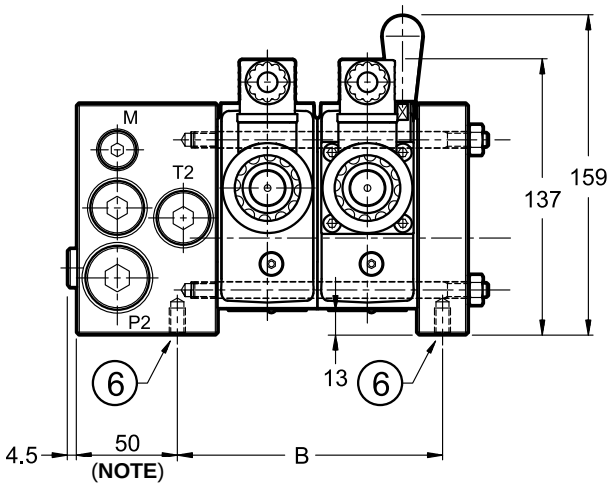
BLS6-C00-PC30/30-PC30/30-C92/20V-D24K1: assembled valve made of inlet plate without compensator; 2 proportional working sections, closed center spool, flow rate 30/30; end plate with load sensing port; FPM seals, 24V DC coils and K1 connection.

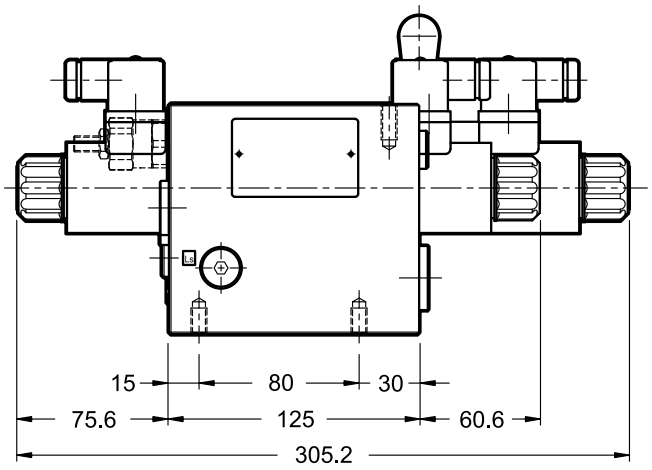
BLS6-CF5-PA45/30-PA45/30-PC30/30-PAB15/15-C91/20V-D12K1: assembled valve made of inlet plate for fixed pump, max pressure 210 bar; 2 proportional working sections, open center spool, flow rate 45/30; 1 proportional working section, closed center spool, flow rate 30/30 and 1 proportional working section with one solenoid only on side B, open center spool, flow rate 15/15; end plate without load sensing port; FPM seals; 12V DC coils with K1 connection.

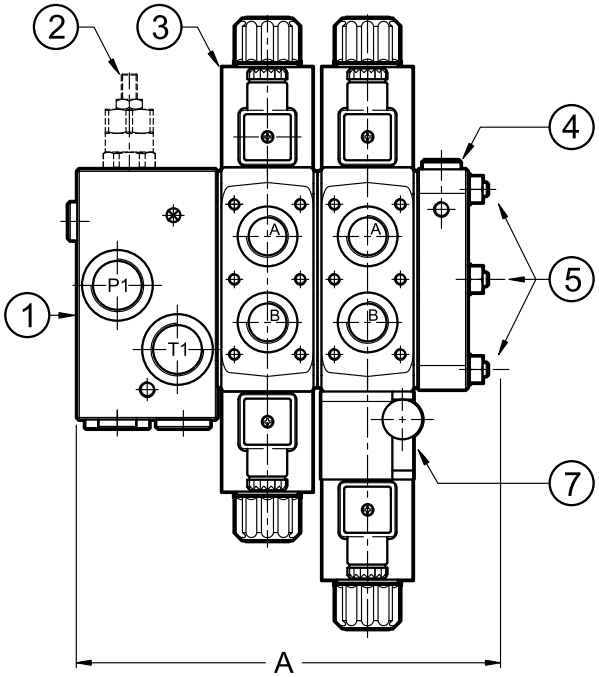
NOTE: To obtain the best performances, we recommend that the spool with the higher flowrate should be the first, and then the others in descending order.

10 - INSTALLATION AND OVERALL DIMENSIONS OF THE ASSEMBLED VALVE

dimensions in mm







Modules	A (**NOTE**)	B
2	212	132,5
3	262	182,5
4	312	232,5
5	362	282,5
6	412	332,5
7	462	382,5
8	512	432,5

NOTE: 10 mm shorter in BLS6-C00 inlet plate

1	Inlet plate
2	Pressure relief valve
3	Proportional working section
4	End plate
5	Fixing studs
6	Fixing holes
7	Working section with lever override

Fixing kit

The fixing kit includes, all zinc-coated

3 studs,
3 nuts
3 washers

Please use the following codes to order :

No. of working sections	**Code**
2	3404150010
3	3404150011
4	3404150012
5	3404150013
6	3404150014
7	3404150015
8	3404150016

Tightening torque: 25 Nm

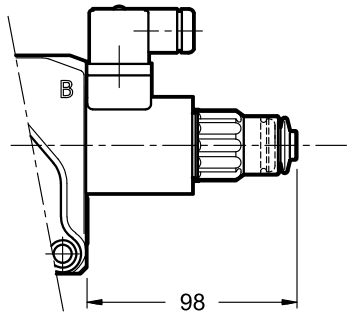
11 - MANUAL OVERRIDE

The standard working section has solenoids whose pin for the manual operation is integrated in the tube. The operation of this device must be done with a suitable tool, minding not to damage the sliding surface.

The following manual overrides are available:

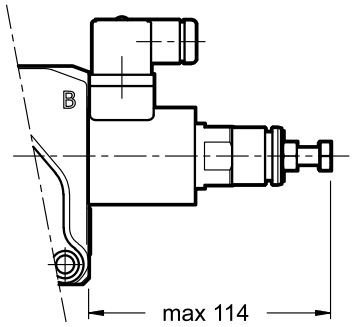
- **CM** version, boot protected.
- **CS** version, with metal ring nut provided with a M8 screw and a blocking locknut.
- **CK1** version, turning knob override.
- **CH** lever manual override.

CM Version



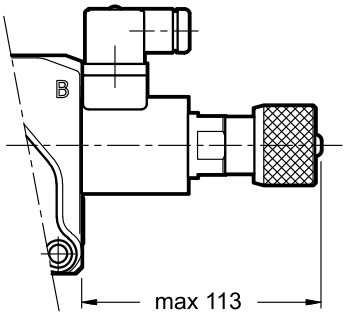
Code: 3401150006

CS Version



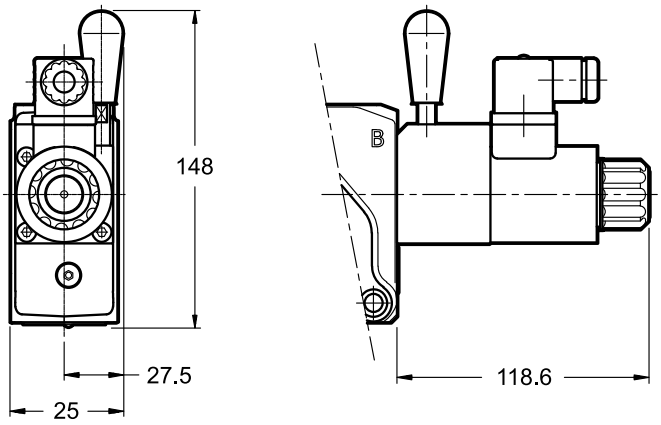
Code: 3803210006

CK1 Version



Code: 3401150031

CH Version



12 - ELECTRONIC CONTROL UNITS

One solenoid

EDC-111	for solenoid 24V DC	plug version	see cat. 89 120
EDC-141	for solenoid 12V DC		
EDM-M111	for solenoid 24V DC	DIN EN 50022 rail mounting	see cat. 89 252
EDM-M141	for solenoid 12V DC		

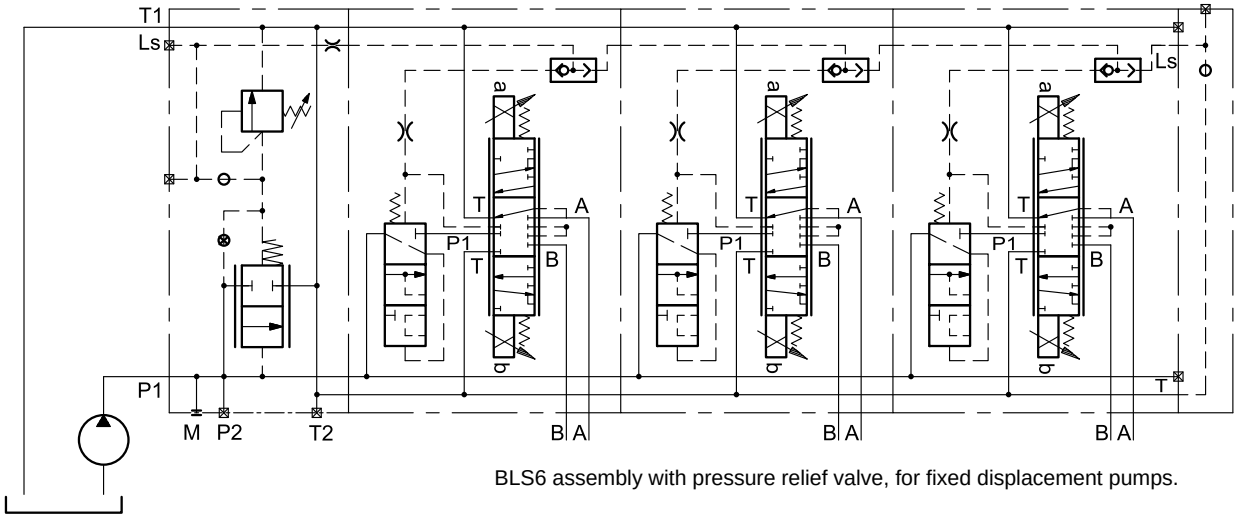
Two solenoids

EDM-M211	for solenoid 24V DC	rail mounting DIN EN 50022	see cat. 89 252
EDM-M241	for solenoid 12V DC		

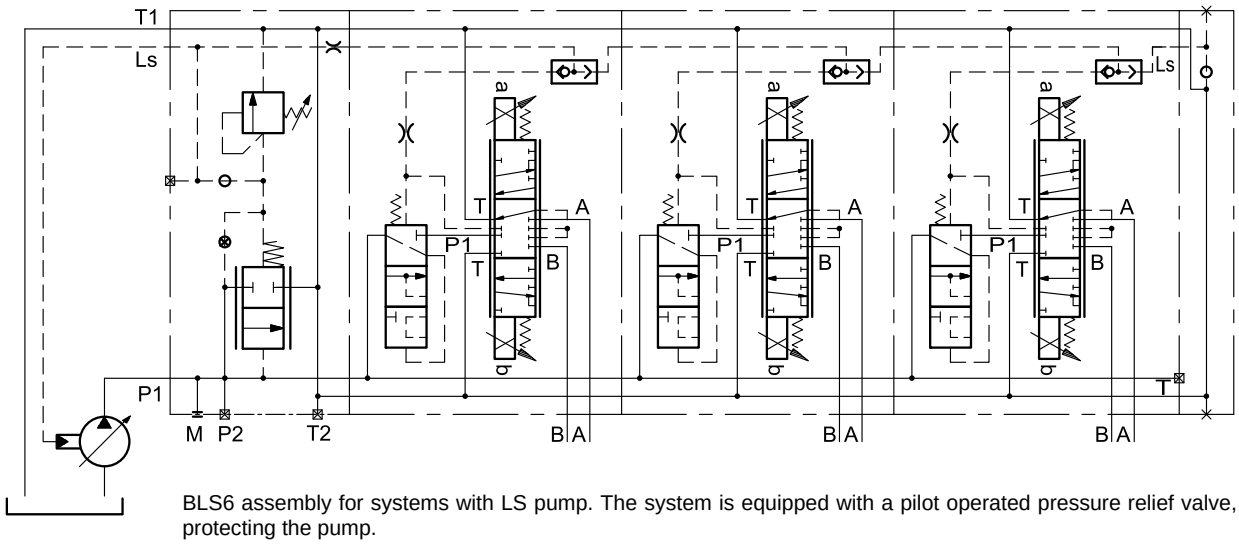
These cards can drive only a working section at once.

Every working section to be driven by electronic card must have its own.

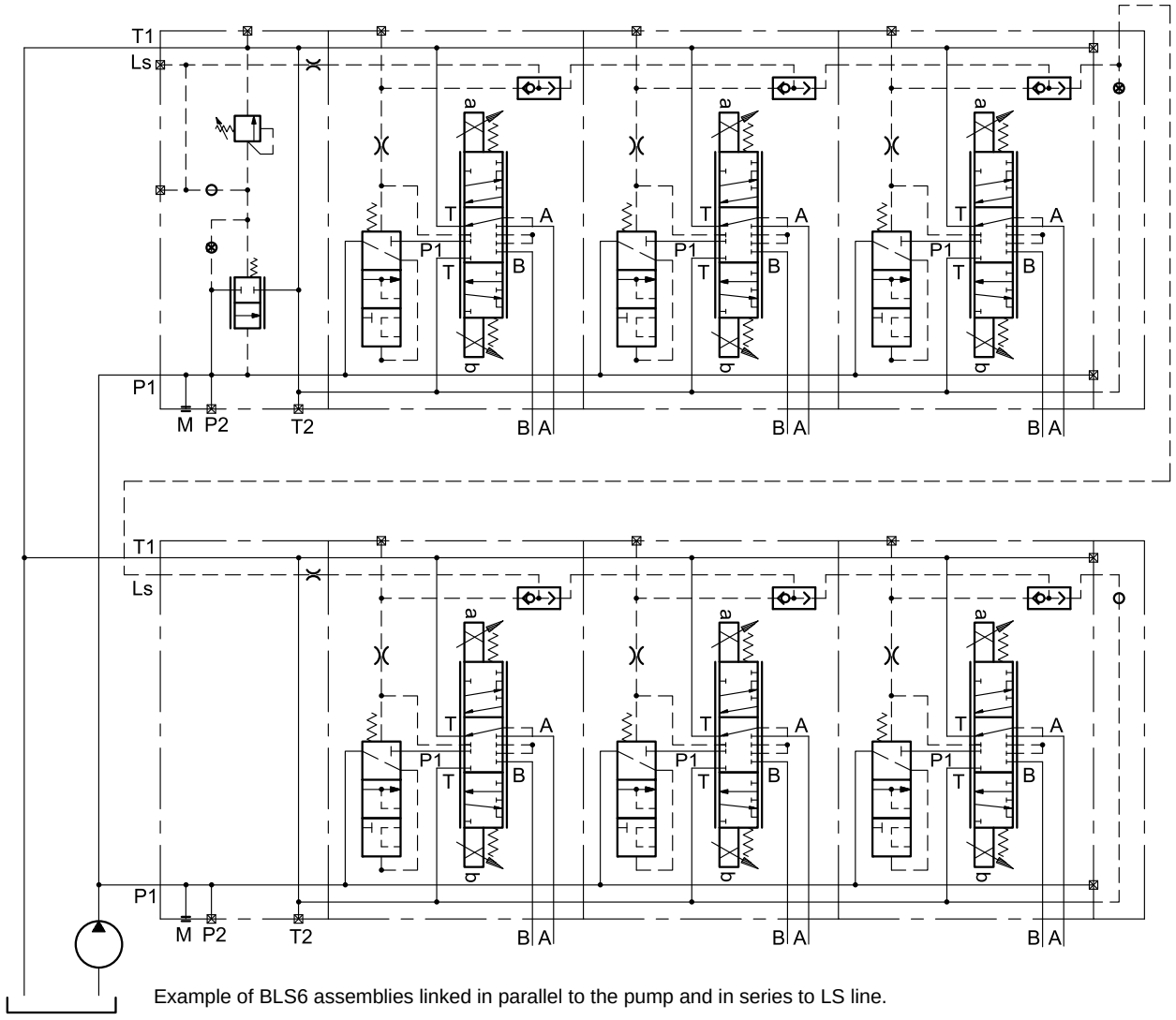
13 - APPLICATION EXAMPLES



BLS6 assembly with pressure relief valve, for fixed displacement pumps.



BLS6 assembly for systems with LS pump. The system is equipped with a pilot operated pressure relief valve, protecting the pump.



Example of BLS6 assemblies linked in parallel to the pump and in series to LS line.

DUPLOMATIC
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