

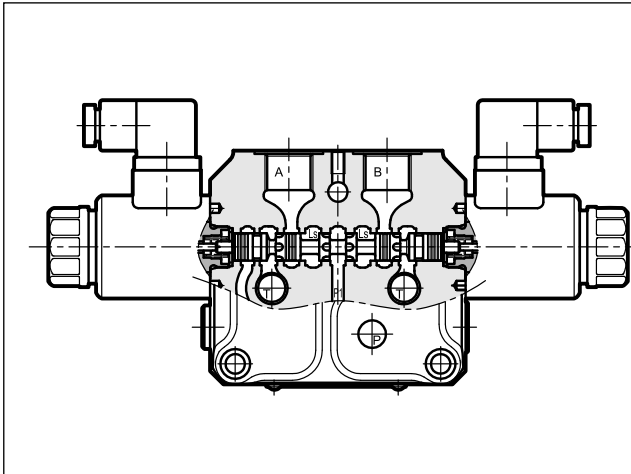
BLS6

PROPORTIONAL STACKABLE VALVE ASSEMBLY WITH LOAD SENSING

SERIES 12

p max 315 bar
Q max 120 l/min

OPERATING PRINCIPLE



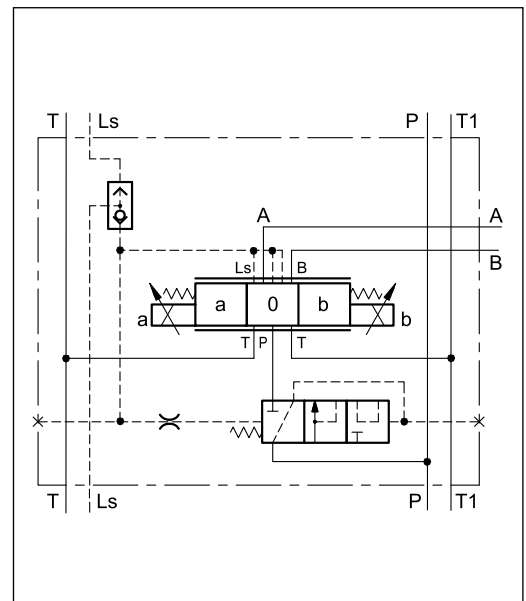
- The BLS6 is a stackable valve assembly. It can be assembled with up to 8 working sections (proportional and solenoid directional valves together)
- Each module is equipped with a meter-in compensator that keep constant the flow, independently from load changes.
- Sections with pressure compensator 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" BSP. Ports P1, P2 and T1 of the inlet plate are threaded 3/4" BSP.
- 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.

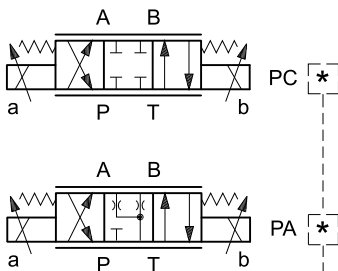
1.1 - Proportional working sections

BLS 6 - / 12 V - /	
<p>Compensated proportional directional valve, direct operated</p> <p>Size _____</p> <p>Spool type: _____ PC = proportional valve, closed center PA = proportional valve, open center</p> <p>Solenoid position: _____ (omit for configuration with two solenoids) A = 1 solenoid on side A B = 1 solenoid on side B</p> <p>Spool nominal flow (see below) _____</p>	<p>Manual override (see point 11)</p> <p>Coil electrical connection: (see point) K1 = plug for connector type EN 175301-803 (ex DIN 43650) (standard) K7 = plug for connector type DEUTSCH DT04-2P male</p> <p>Coil type: D12 = Nominal solenoid voltage 12V DC D24 = Nominal solenoid voltage 24V DC</p> <p>Seals: V = FPM seals (standard)</p> <p>Series no. (the overall and mounting dimensions remain unchanged from 10 to 19)</p>

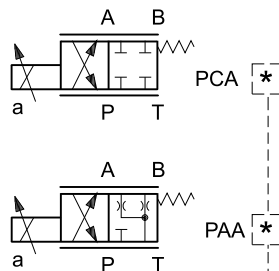
SPOOLS

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

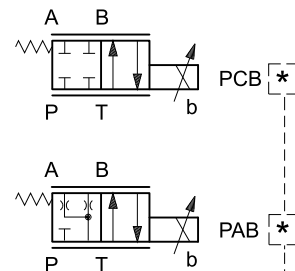
2 solenoids:
3 positions with spring centering



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

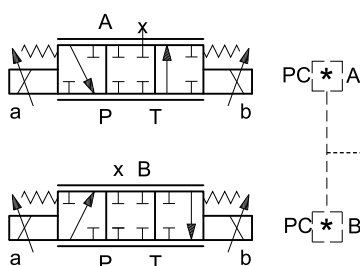


1 solenoid on side B:
2 positions (central + external) with spring return



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

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



SINGLE FLOW	
max flow	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:

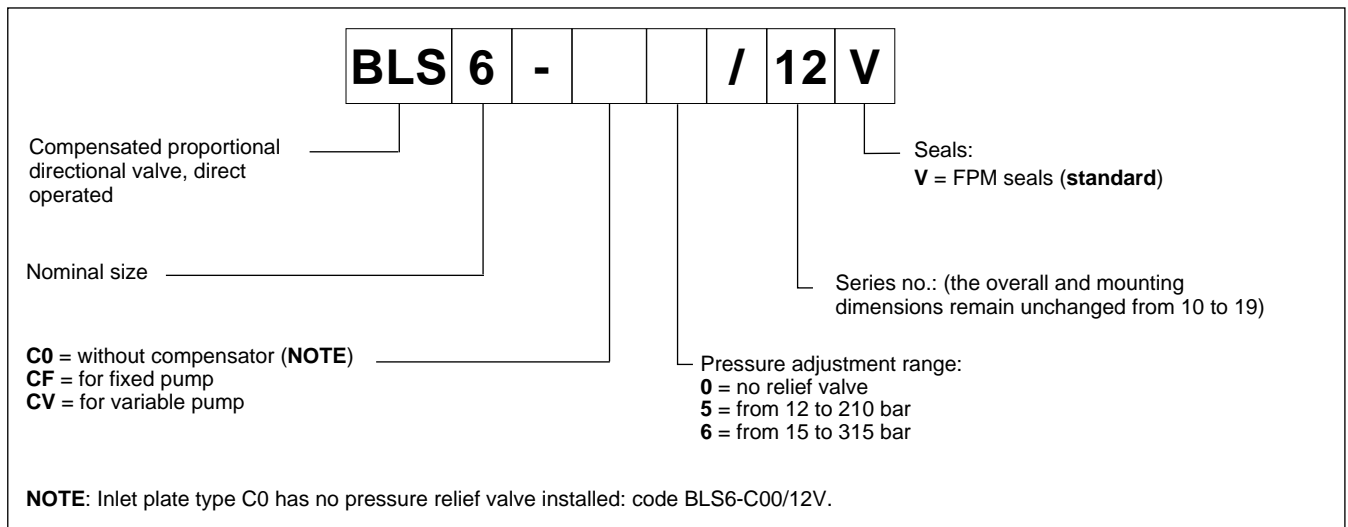
SC = solenoid valve, closed center

SA = solenoid valve, open center

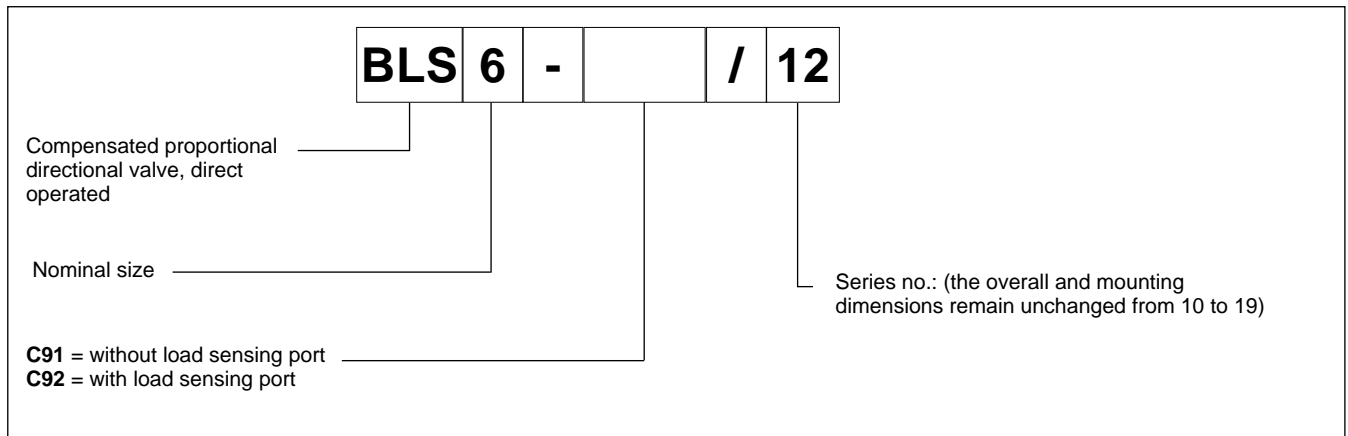
Two spools for high flow rates are also available: SC60/60 and SA60/60.

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.



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.

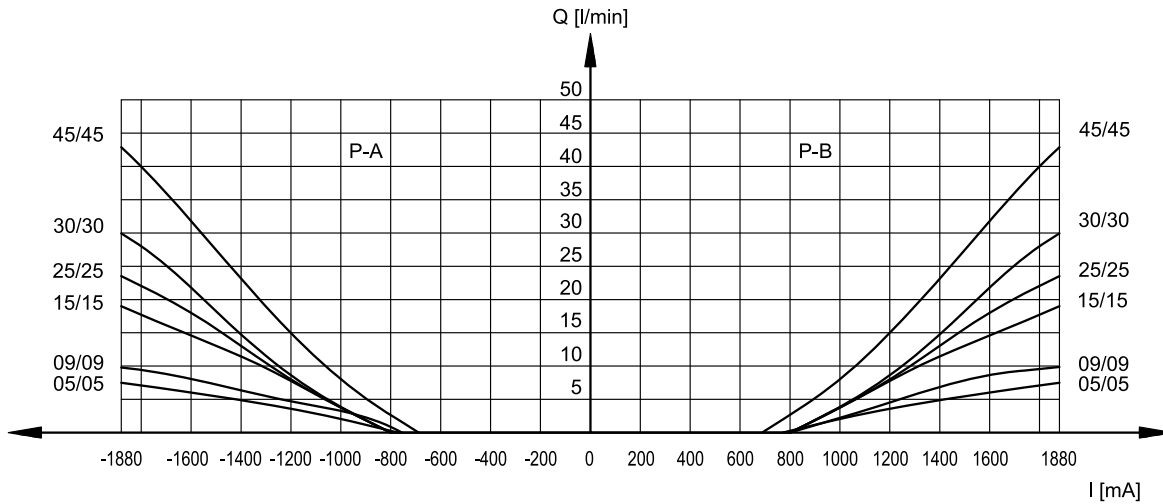


3 - CHARACTERISTIC CURVES

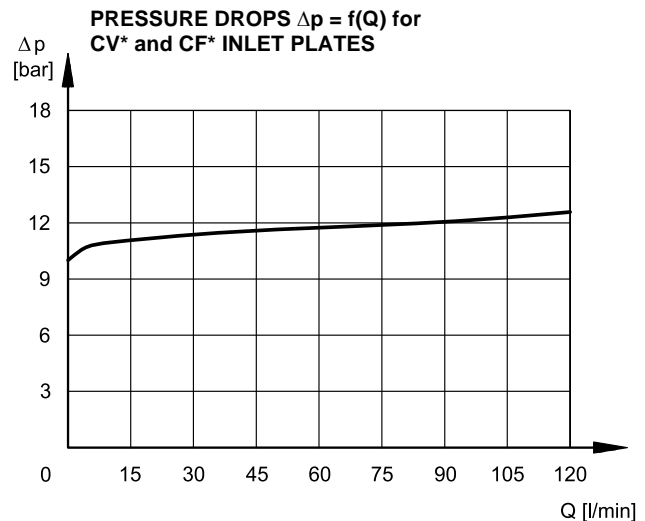
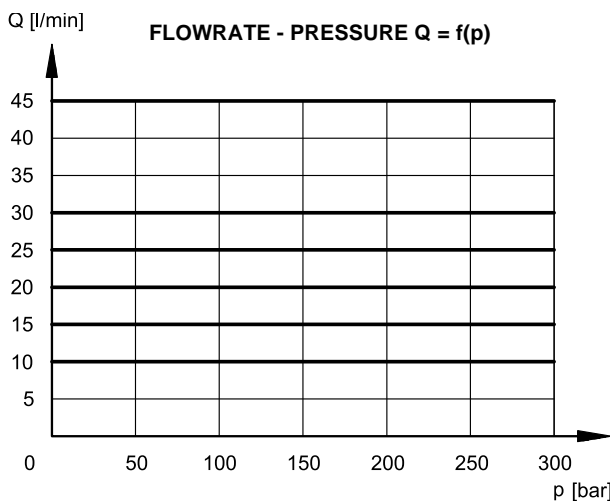
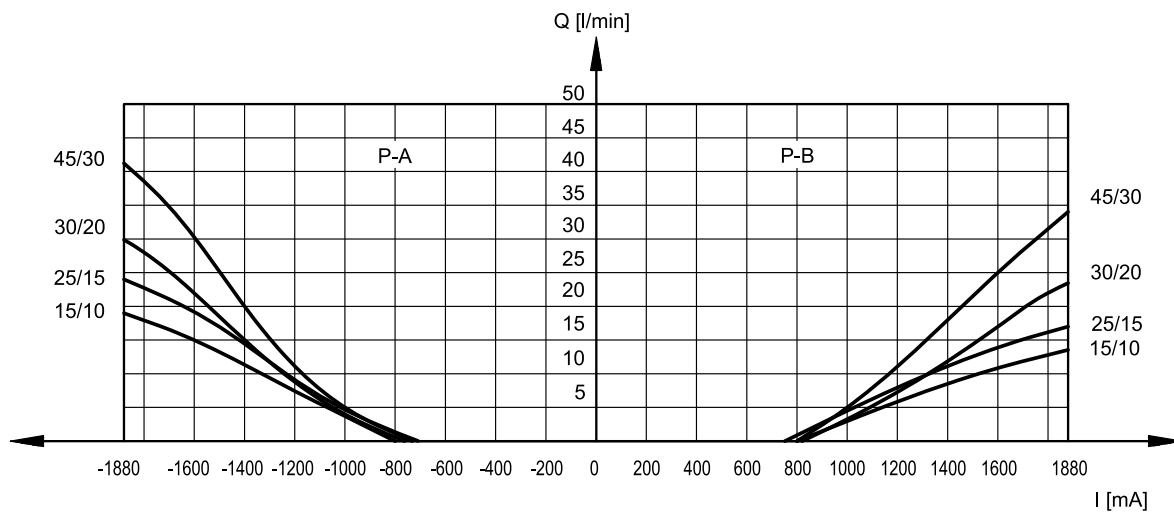
(values obtained with viscosity 36 cSt at 50 °C)

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



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)	K1 coil K7 coil	Ohm	3.66 4 17.6 19
NOMINAL CURRENT	A	1.88	0.86
DUTY CYCLE		100%	
PWM FREQUENCY	Hz	200	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 EN 60529

Plug-in type	IP 65	IP 69 K
K1 EN 175301-803 (ex DIN 43650)	x (*)	
K7 DEUTSCH DT04 male	x	x (*)

(*) The protection degree is guaranteed only with the connector connected and installed correctly.

5 - STEP RESPONSE

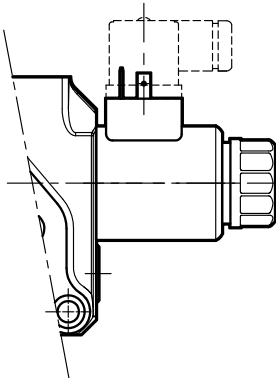
(measured with mineral oil with viscosity of 36 cSt at 50°C with electronic control card)

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.

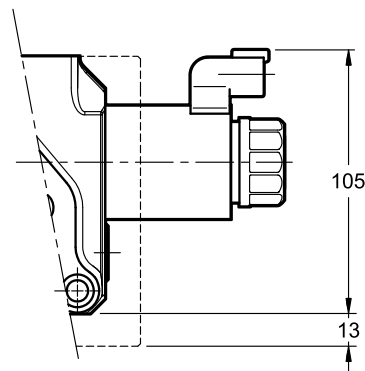
Reference signal step	0 →100%	100 →0%
STEP RESPONSE [ms]		
BLS6	50	40

6 - ELECTRICAL CONNECTIONS

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



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

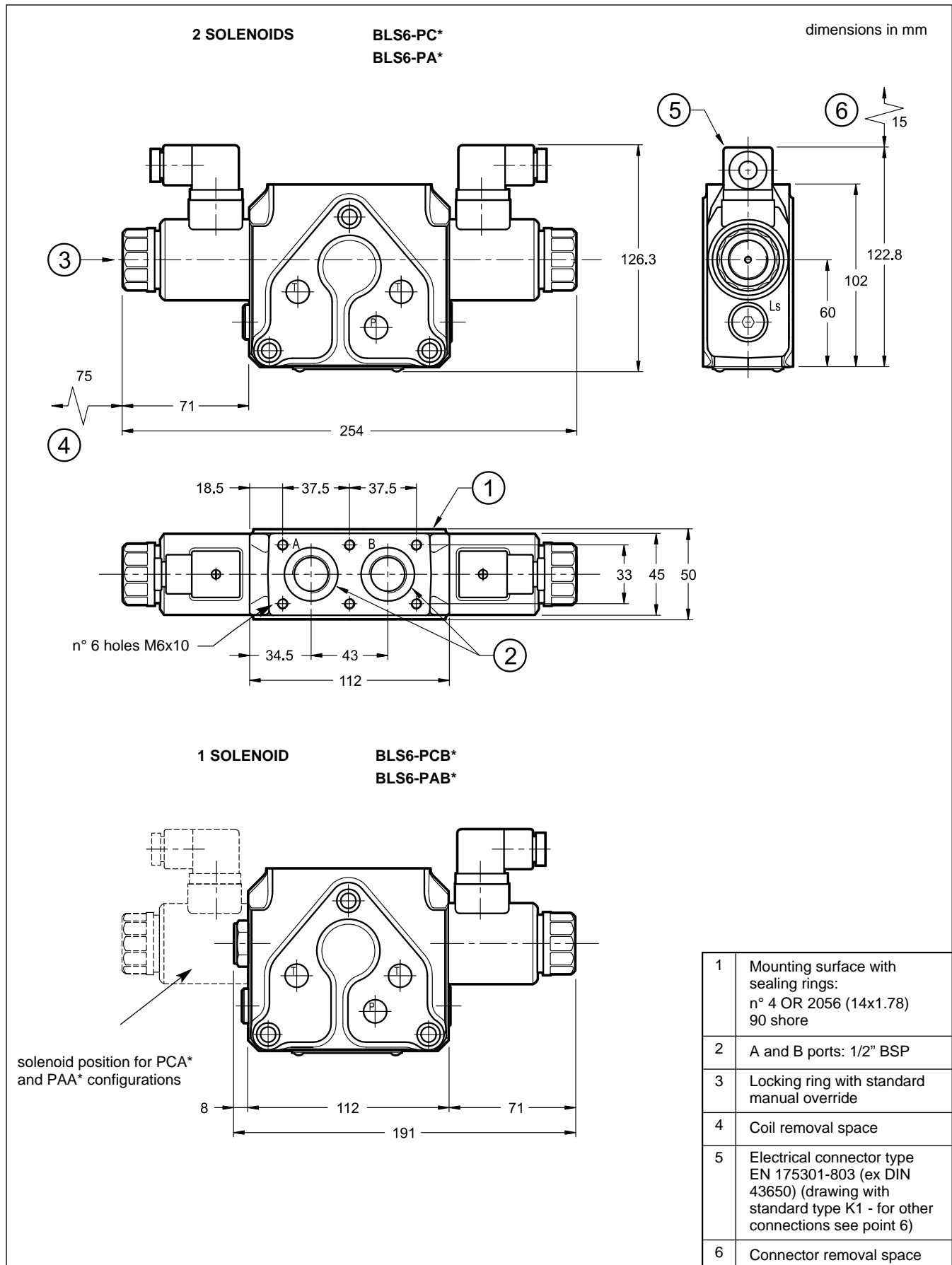


7 - ELECTRICAL CONNECTORS

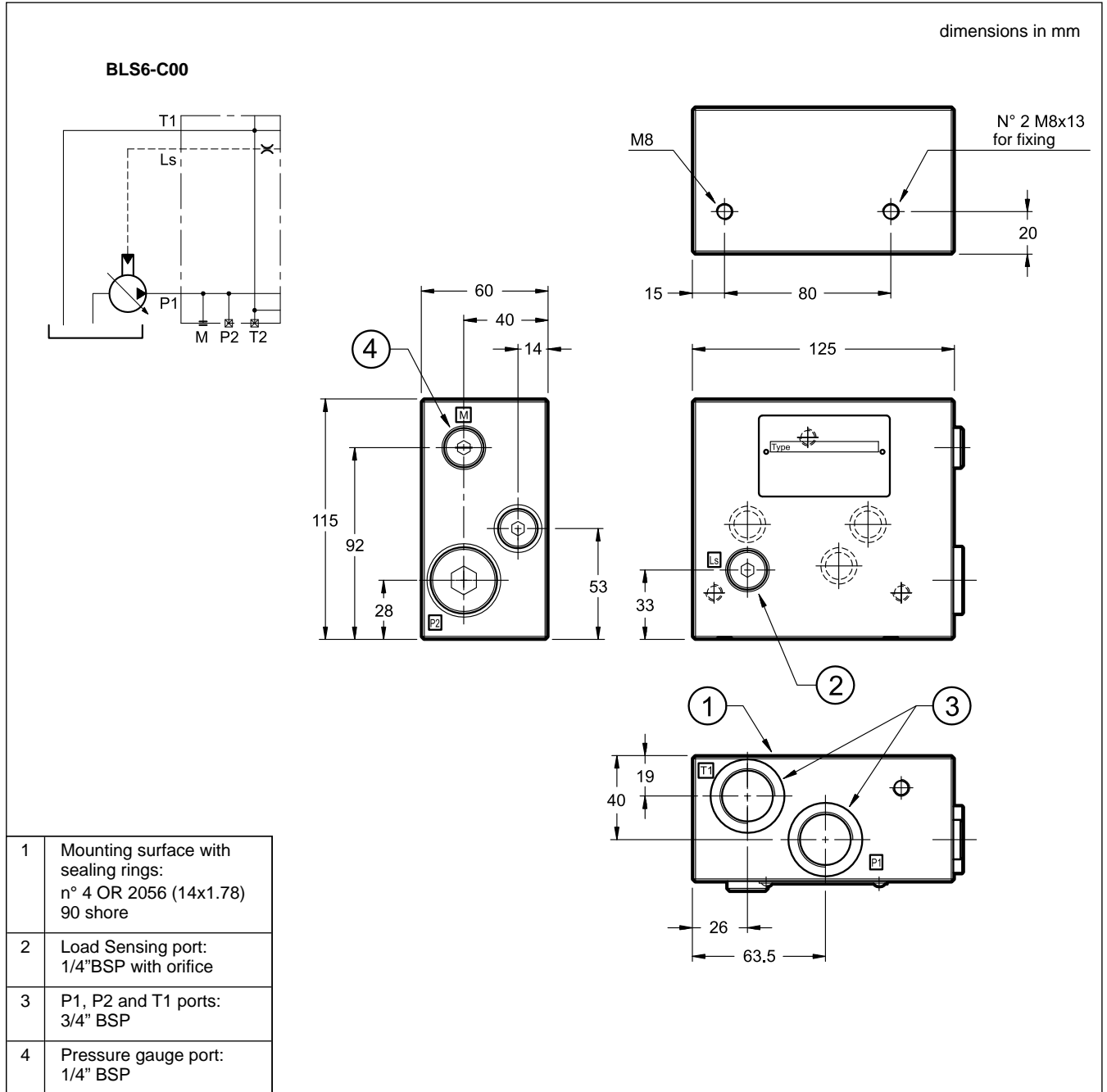
Solenoid working sections are supplied without connectors. Connectors for solenoid valves with K1 electrical connection EN 175301-803 (ex DIN 43650) can be ordered separately: see catalogue 49 000.

8 - OVERALL AND MOUNTING DIMENSIONS

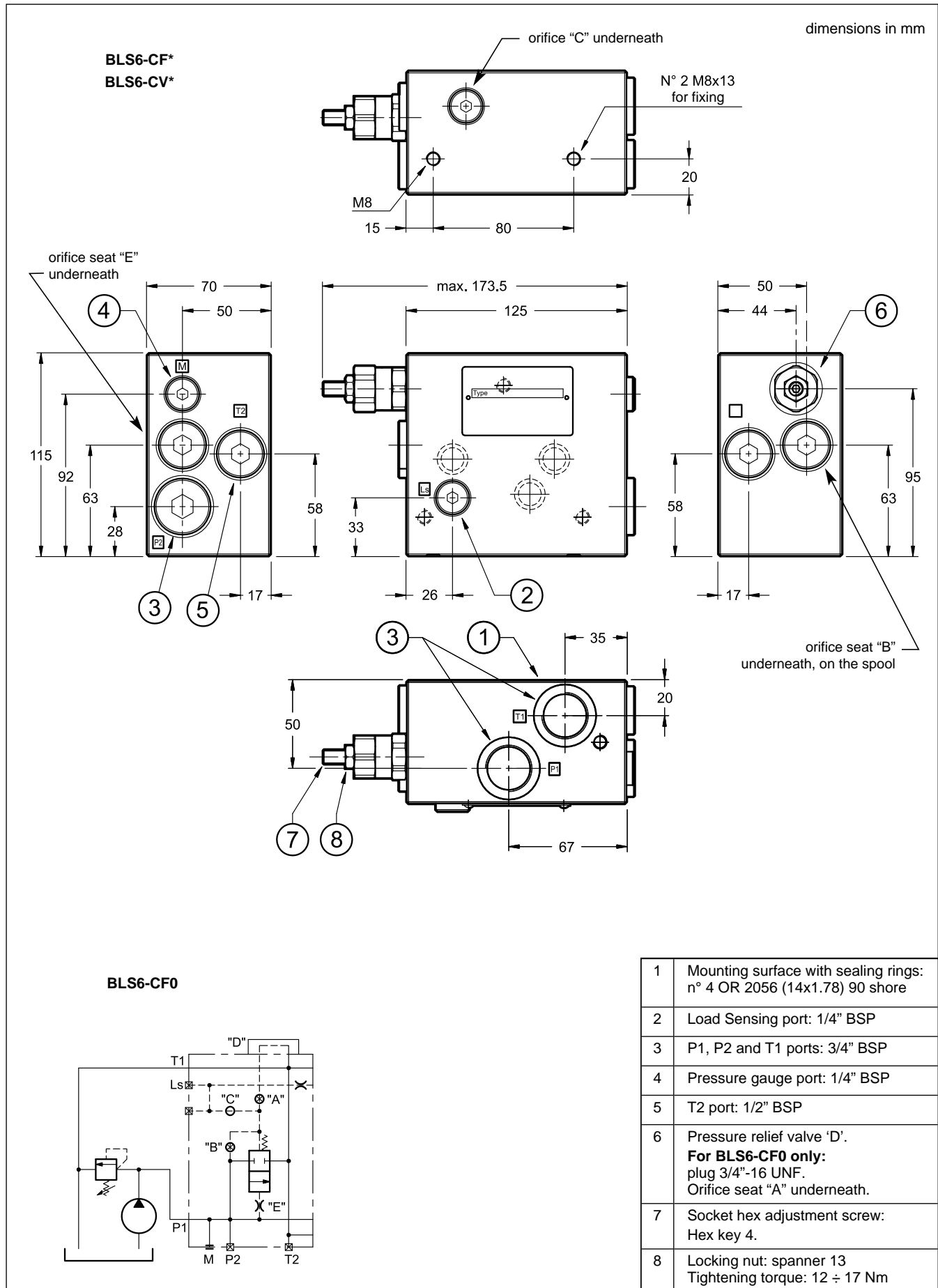
8.1 - Proportional working sections

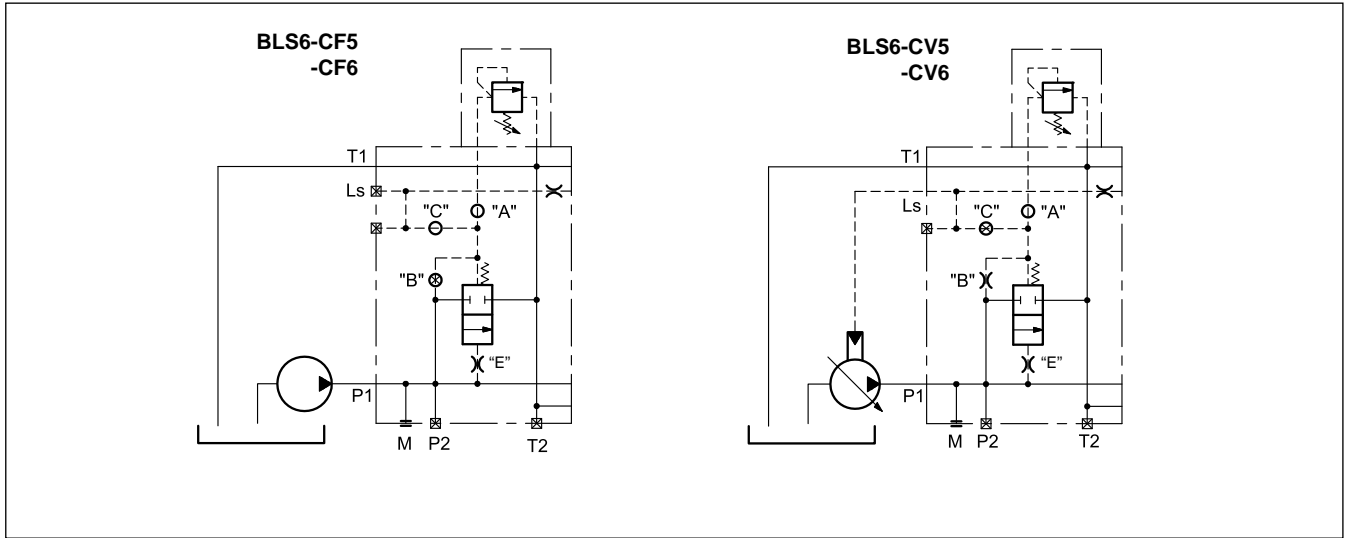


8.2 - Inlet plates

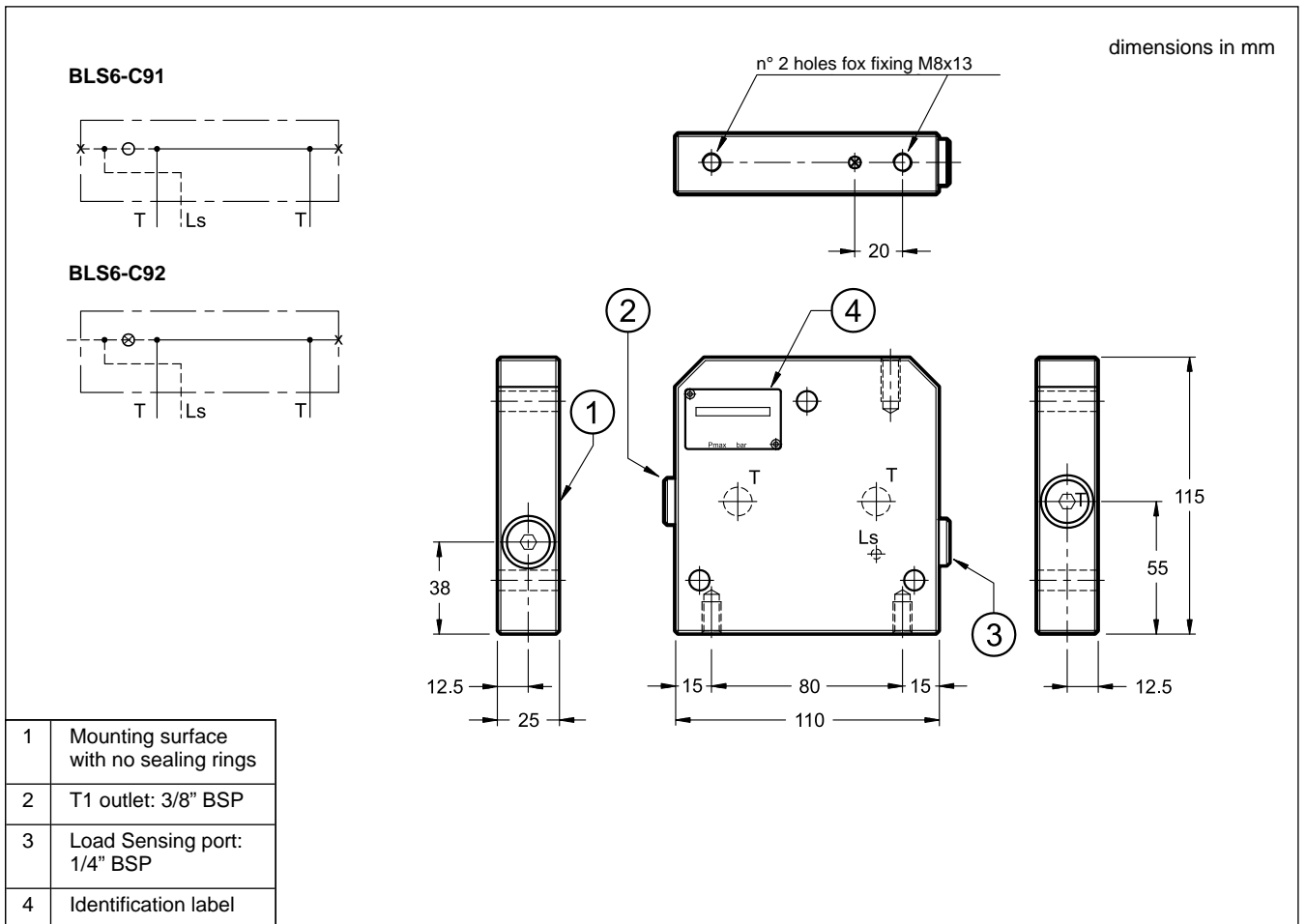


8.2 - Inlet plates





8.3 - End plates



9 - IDENTIFICATION CODE OF THE ASSEMBLED VALVE

BLS6	-		-		-		-		/	12	V	-		/	
-------------	---	--	---	--	---	--	---	--	---	----	---	---	--	---	--

Compensated proportional directional valve, direct operated

Inlet plate: _____
C0 = without compensator (**NOTE**)
CF = for fixed pump
CV = for variable pump

Pressure adjustment range: _____
0 = no pressure relief valve
5 = from 12 to 210 bar
6 = from 15 to 315 bar

Working sections: _____
Choose the spool type and the rated flow as in code at point 1.1.
Repeat for each working section.
Max 8 sections.

End plate: _____
C91 = without load sensing port
C92 = with load sensing port

Manual override on all the working sections (see point 11)

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

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

Seals:
V = FPM seals (**standard**)

Series no.: (the overall and mounting dimensions remain unchanged from 10 to 19)

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

Code example:

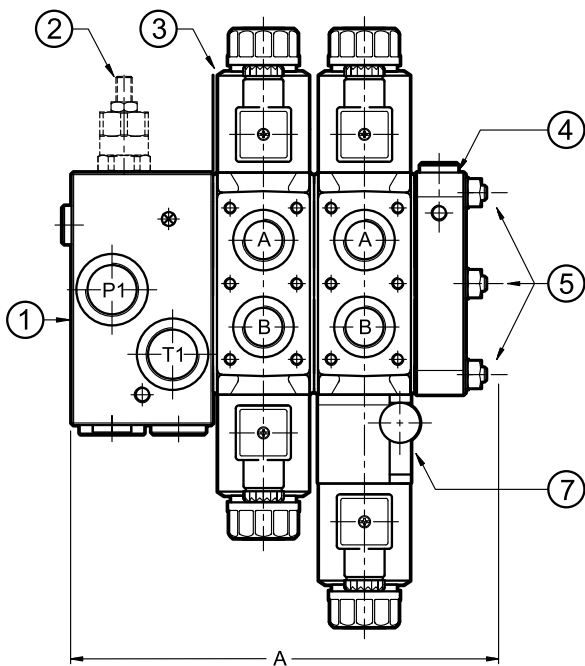
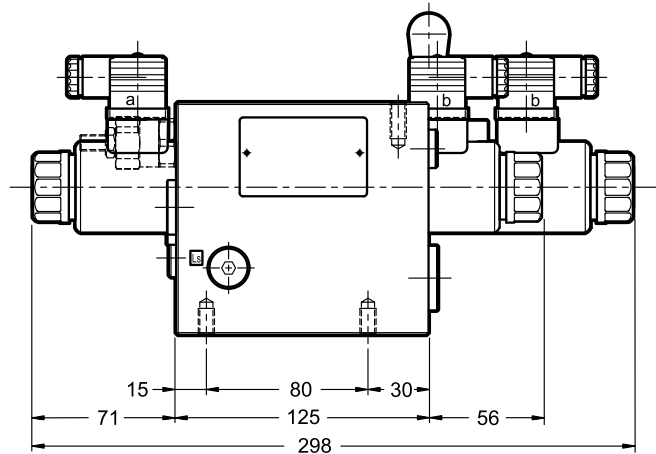
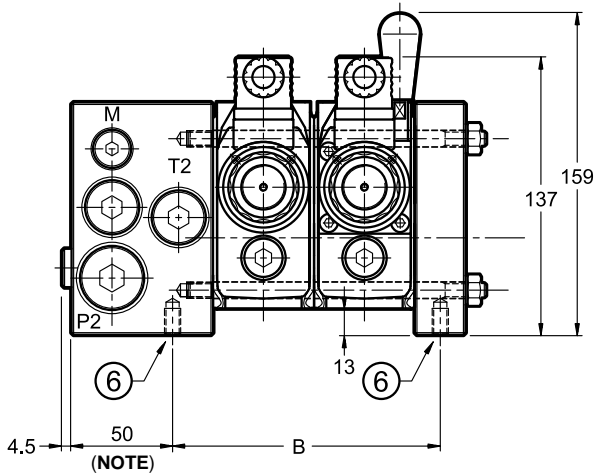
BLS6-C00-PC30/30-PC30/30-C92/12V-D24K1: assembled valve made of inlet plate without compensator; 2 proportional working sections, closed center spool, flow rate 30/30; end plate without load sensing port; FPM seals, 24V DC coils and K1 connection.

BLS6-CF5-PA45/30-PA45/30-PC30/30-PAB15/15-C91/12V-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 with load sensing port; FPM seals; 12V DC coils with K1 connection.

NOTE: To obtain the best performances, we suggest 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

Fixing kit

The fixing kit includes, all zinc-coated

- 3 studs,
- 3 nuts
- 3 washers

Please use the following codes to order :

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

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

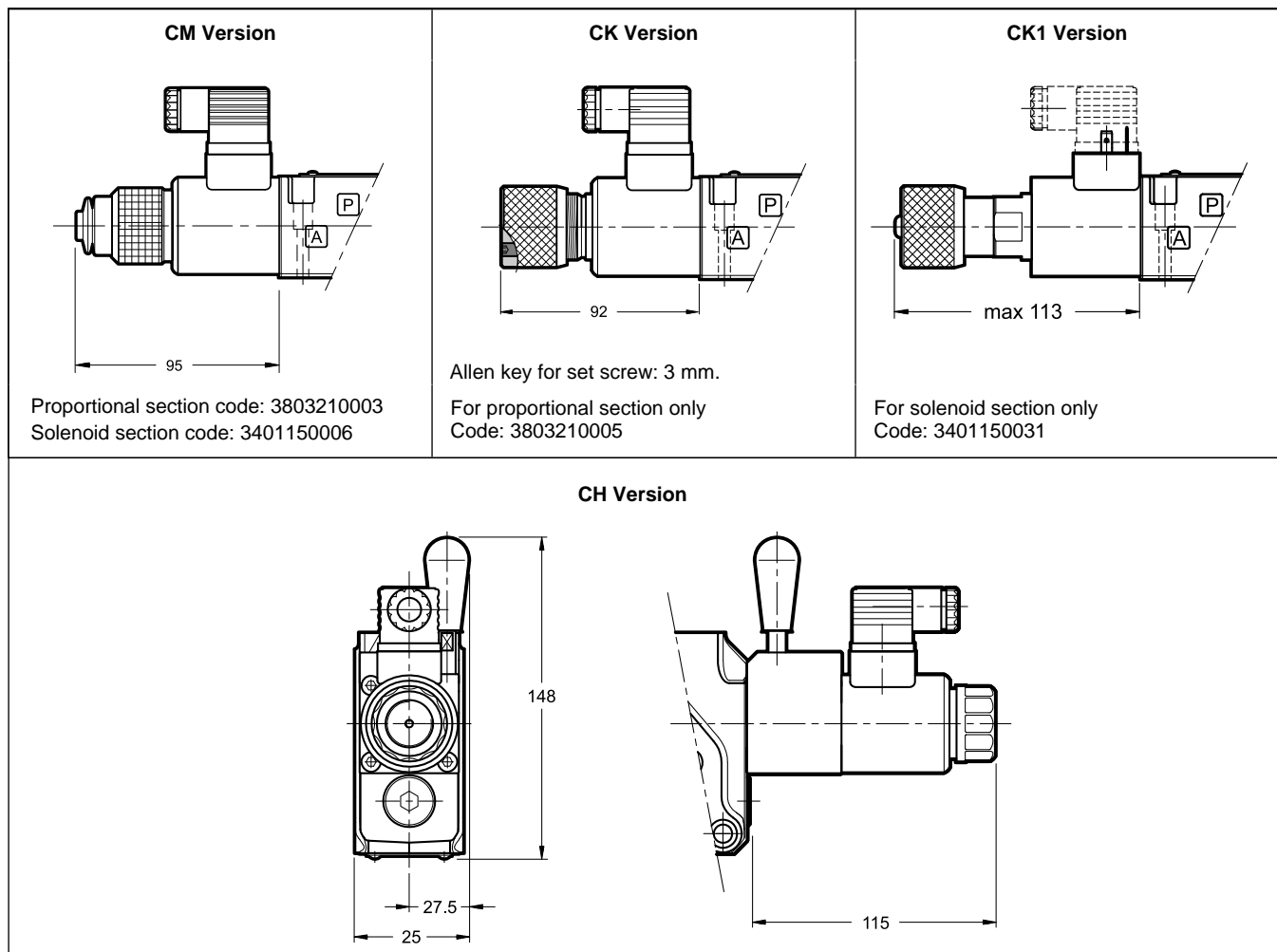
Tightening torque: 25 Nm

11 - MANUAL OVERRIDE

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

The following manual overrides are available:

- **CM** manual override, boot protected.
- **CK** knob for proportional valves: When the set screw is screwed and its point is aligned with the edge of the knob, tighten the knob till it touches the spool: in this position the override is not engaged and the valve is de-energized. After adjusting the override, tighten the set screw in order to avoid the knob loosening.
- **CK1** knob for solenoid valves: the device is actuated by screwing it.
- **CH** lever manual override.



NOTE: The overall dimension shown in the drawings is for the proportional section. Please consider an increase of 5 mm for solenoid working section.

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		

These cards can drive only a working section at once.
Every working section to be driven by electronic card must have its own.

Two solenoids

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

13 - APPLICATION EXAMPLES

