



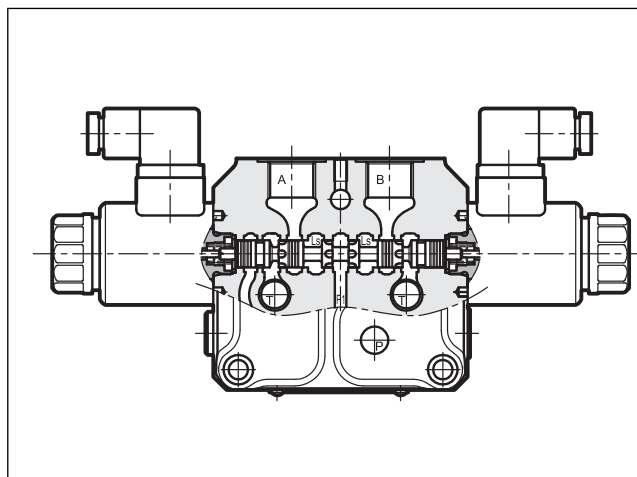
# BLS6

## BANKABLE LOAD SENSING PROPORTIONAL CONTROL VALVE

### SERIES 11

**p** max 300 bar  
**Q** max 120 l/min

#### OPERATING PRINCIPLE

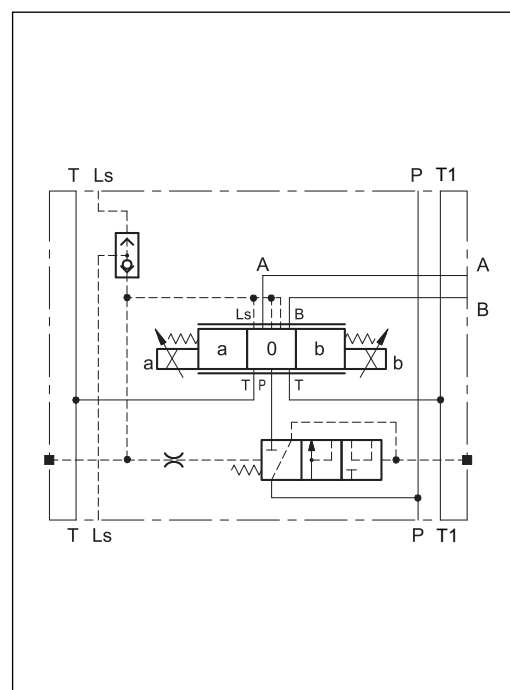


- The BLS6 directional control valve is stackable and can be assembled up to 8 different proportional and on/off modules .
- Each module is equipped with a meter-in compensator that keep constant the flow, independently from load changes.
- Sections with pressure compensators are not influenced in any way by other operated functions, provided that sufficient pump capacity is available. To correctly work, the sum of the flows contemporarily used must not overcome the 90% of the inlet flow.
- The user ports A and B are threaded 1/2" BSP. On the inlet module the ports P1, P2 and T1 are threaded 3/4" BSP.
- The manual lever override is available as option.

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

Maximum operating pressure: - A and B ports - P1 and P2 ports - T1 port	bar	300 250 20
Maximum flowrate: - A and B ports - P1 and P2 ports - T1 port	l/min	45 100 120
Electrical characteristics	see paragraph 5	
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	thermochemical antioxidant	

#### HYDRAULIC SYMBOL

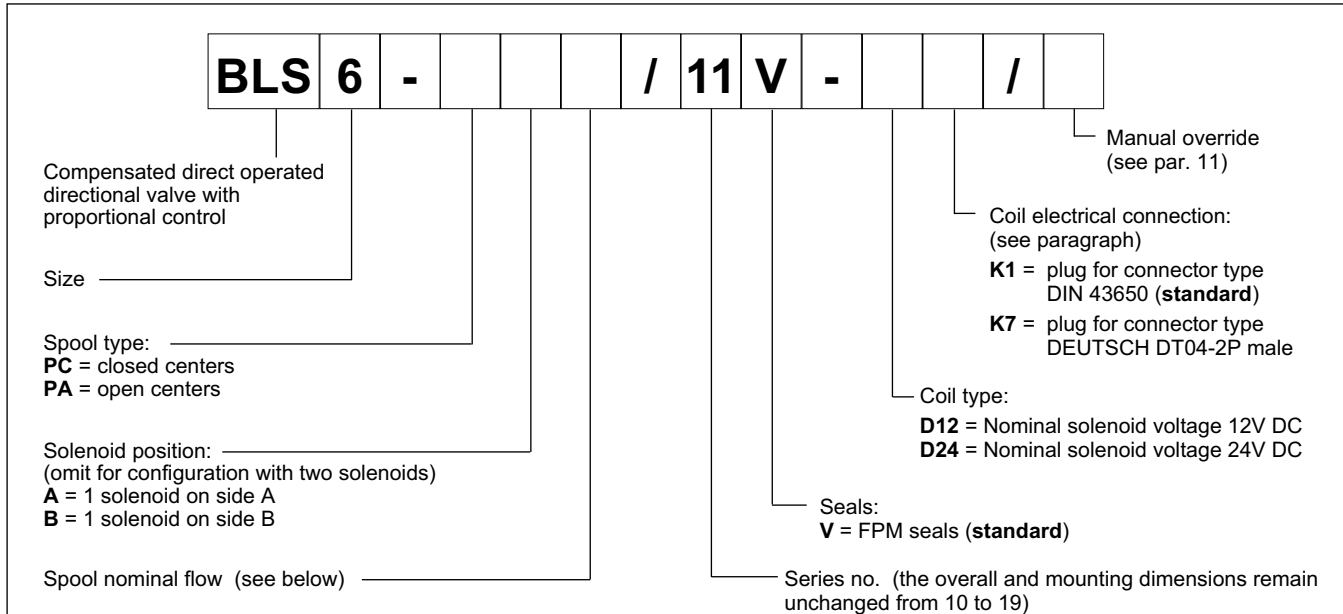


### 1 - IDENTIFICATION CODES FOR LOOSE MODULES

Here below all the loose components identification codes of the bankable valve are shown. To order a whole assembled valve, please use the codes at paragraphs 9 and 10.

The inlet section is available in different version for fixed pump and for system with Load Sensing pump.

#### 1.1 - Proportional module



## 1.2 - On-off modules

If necessary the proportional spool can be used together with on-off solenoids. In this case the description for the spool type as to be as follow:

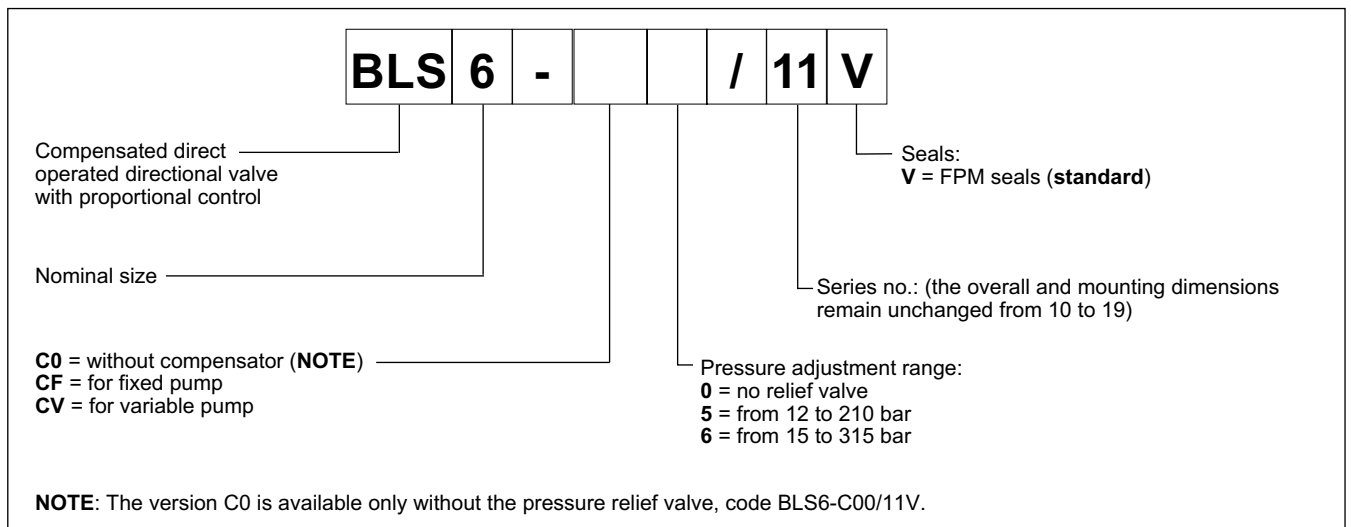
**SC** = closed center with on-off solenoid

**SA** = open center with on-off solenoid

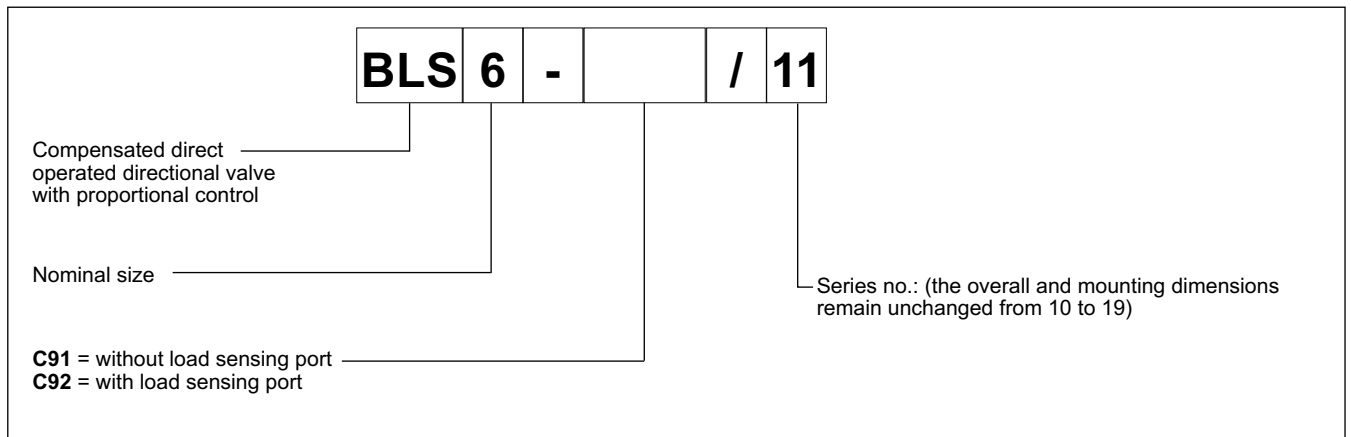
In this version is also available a spool for high flow named SC60/60 and SA60/60.

## 1.3 - Inlet modules

The inlet section is available in different version, for fixed and for variable pumps with load sensing. The version for fixed pump can be easily converted to work with variable pumps and vice versa.



## 1.4 - End plate modules



## 2 - HYDRAULIC FLUIDS

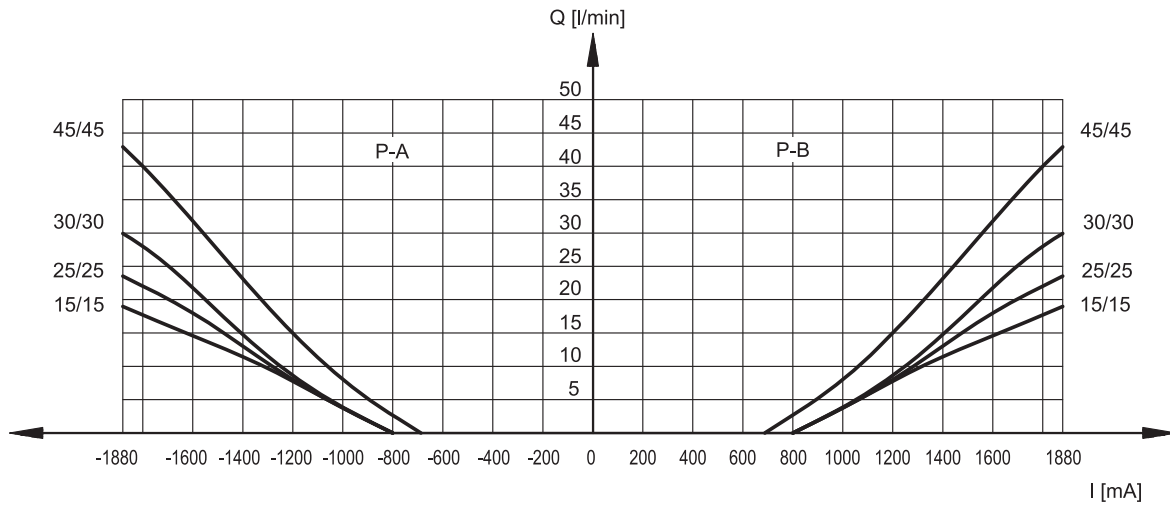
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4 or fluids HFDR type. For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals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

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

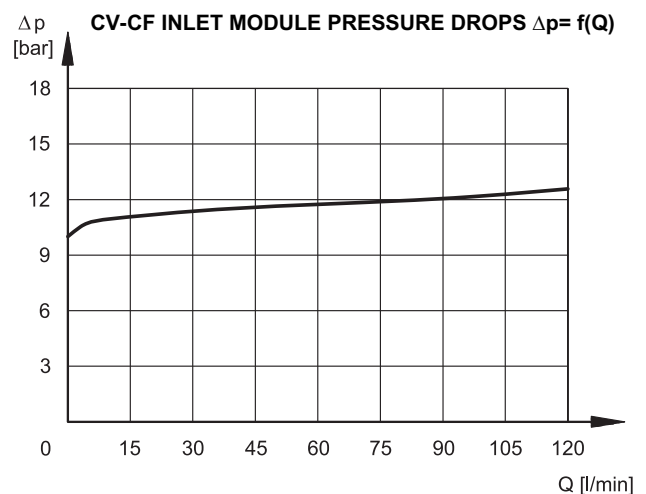
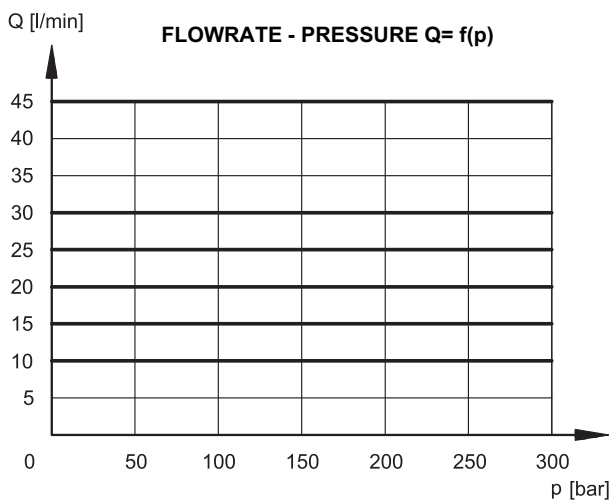
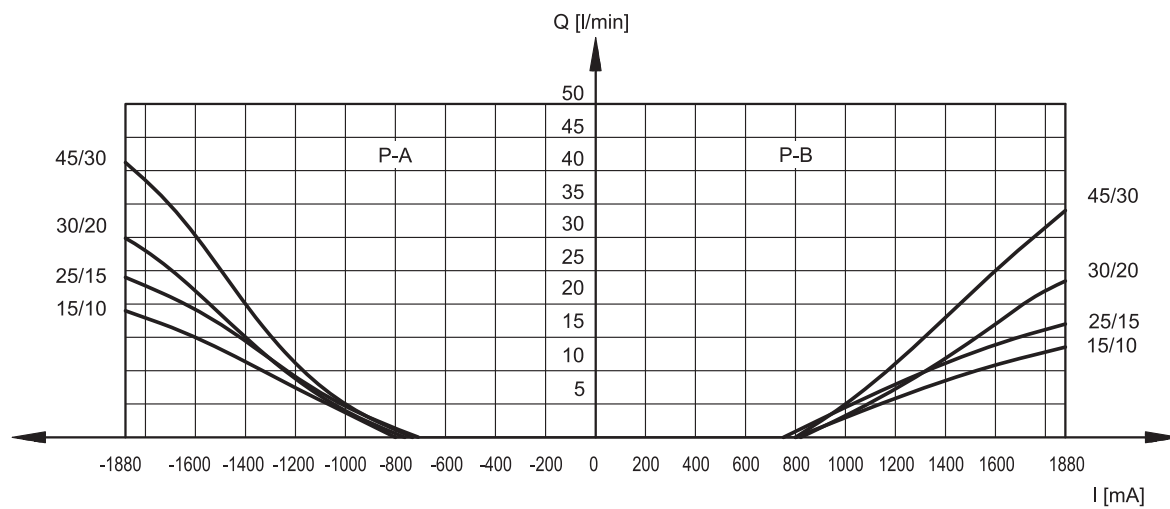
### 3 - CHARACTERISTIC CURVES (values obtained with viscosity 36 cSt at 50 °C)

Typical constant flow rate obtained with internal 2-way compensator, and current with 12V solenoid type (for D24 version the maximum current is 860 mA), measured for the various spool types available.

#### PROPORTIONAL MODULES PRESSURE DROPS $\Delta p$ -Q SYMMETRICAL FLOWS - PC AND PA SPOOLS



#### ASYMMETRICAL FLOWS - PC AND PA SPOOLS



### 4 - ELECTRICAL CHARACTERISTICS

#### Proportional solenoid

The proportional solenoid comprises 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.

#### Protection from atmospheric agents CEI EN 60529

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

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

<b>NOMINAL VOLTAGE</b>	V DC	<b>12</b>	<b>24</b>
<b>RESISTANCE (at 20°C)</b>	<b>K1 COIL</b> <b>K7 COIL</b>	Ω	3.66 4 17.6 19
<b>NOMINAL CURRENT</b>	A	1.88	0.86
<b>DUTY CYCLE</b>		100%	
<b>PWM FREQUENCY</b>	Hz	200	100
<b>ELECTROMAGNETIC COMPATIBILITY (EMC)</b>		According to 2004/108/CE	
<b>CLASS OF PROTECTION :</b> Coil insulation (VDE 0580) Impregnation:		class H class F	

### 5 - STEP RESPONSE

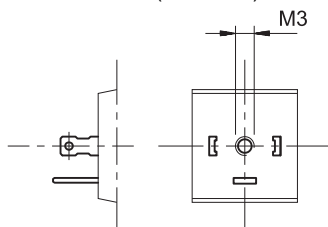
(measured with mineral oil with viscosity of 36 cSt at 50°C with the relative electronic control units)

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.

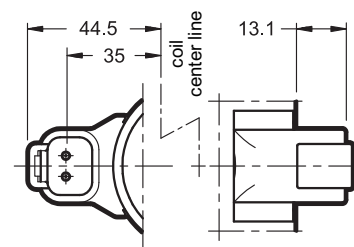
Reference signal step	0 → 100%	100 → 0%
Step response [ms]		
<b>BLS6</b>	50	40

### 6 - ELECTRIC CONNECTIONS

connection for DIN 43650 connector  
code **K1 (standard)**



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

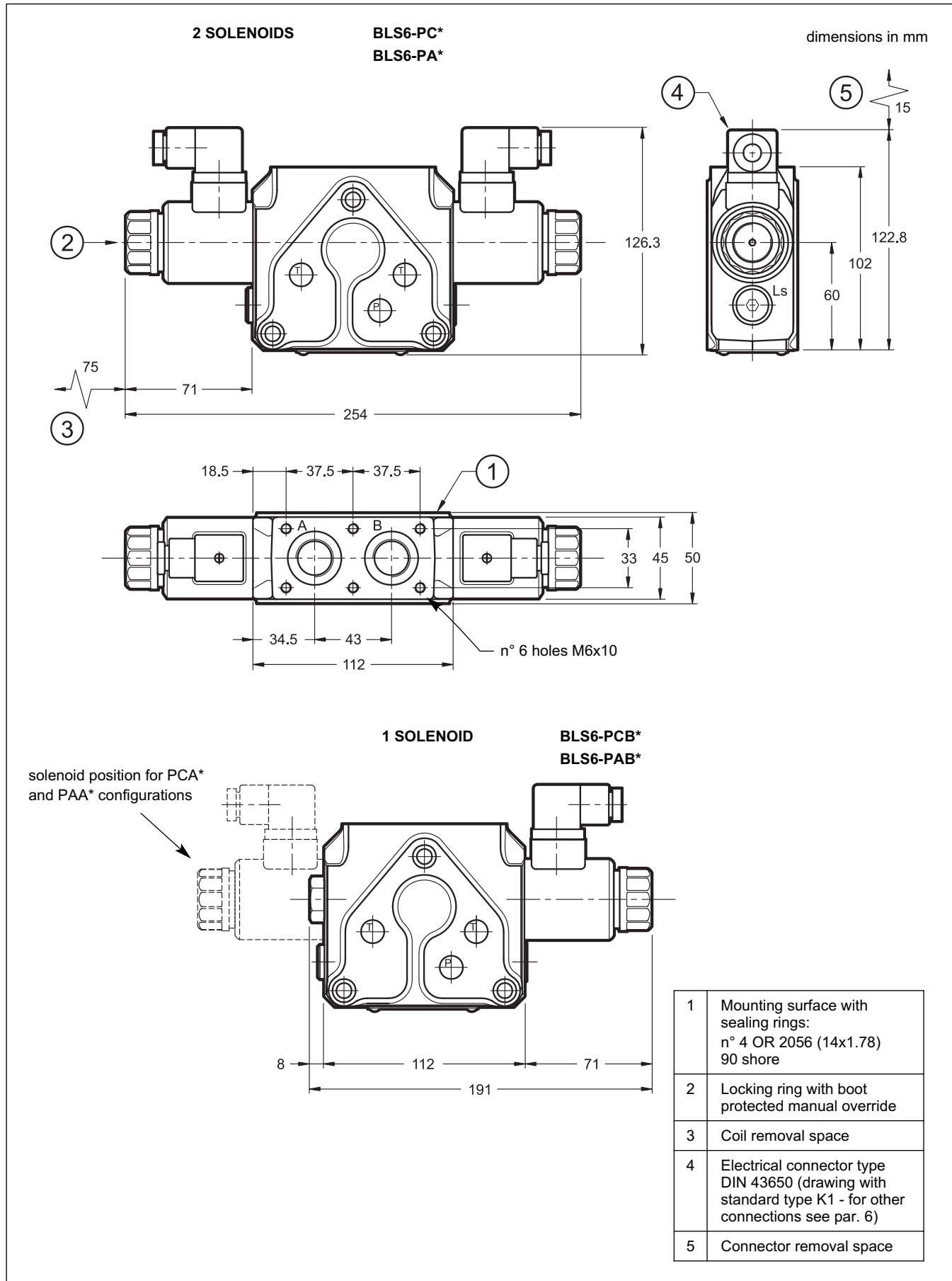


### 7 - ELECTRIC CONNECTORS

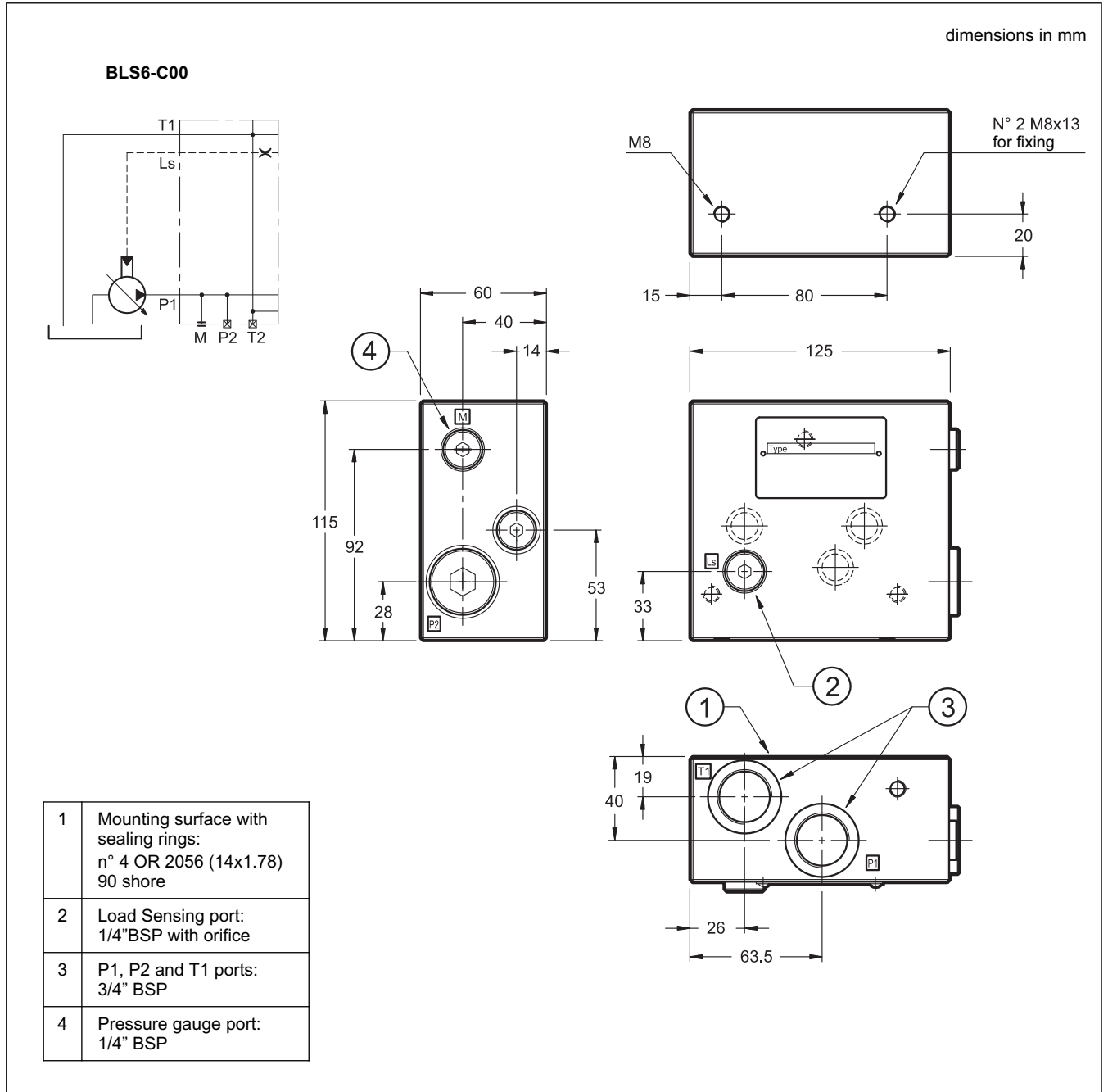
The on-off valves are supplied without connectors. For coils with standard electrical connections K1 type (DIN 43650) the connectors can be ordered separately. For the identification of the connector type to be ordered please see cat. 49 000. Connectors for K7 connections are not available.

## 8 - OVERALL AND MOUNTING DIMENSIONS

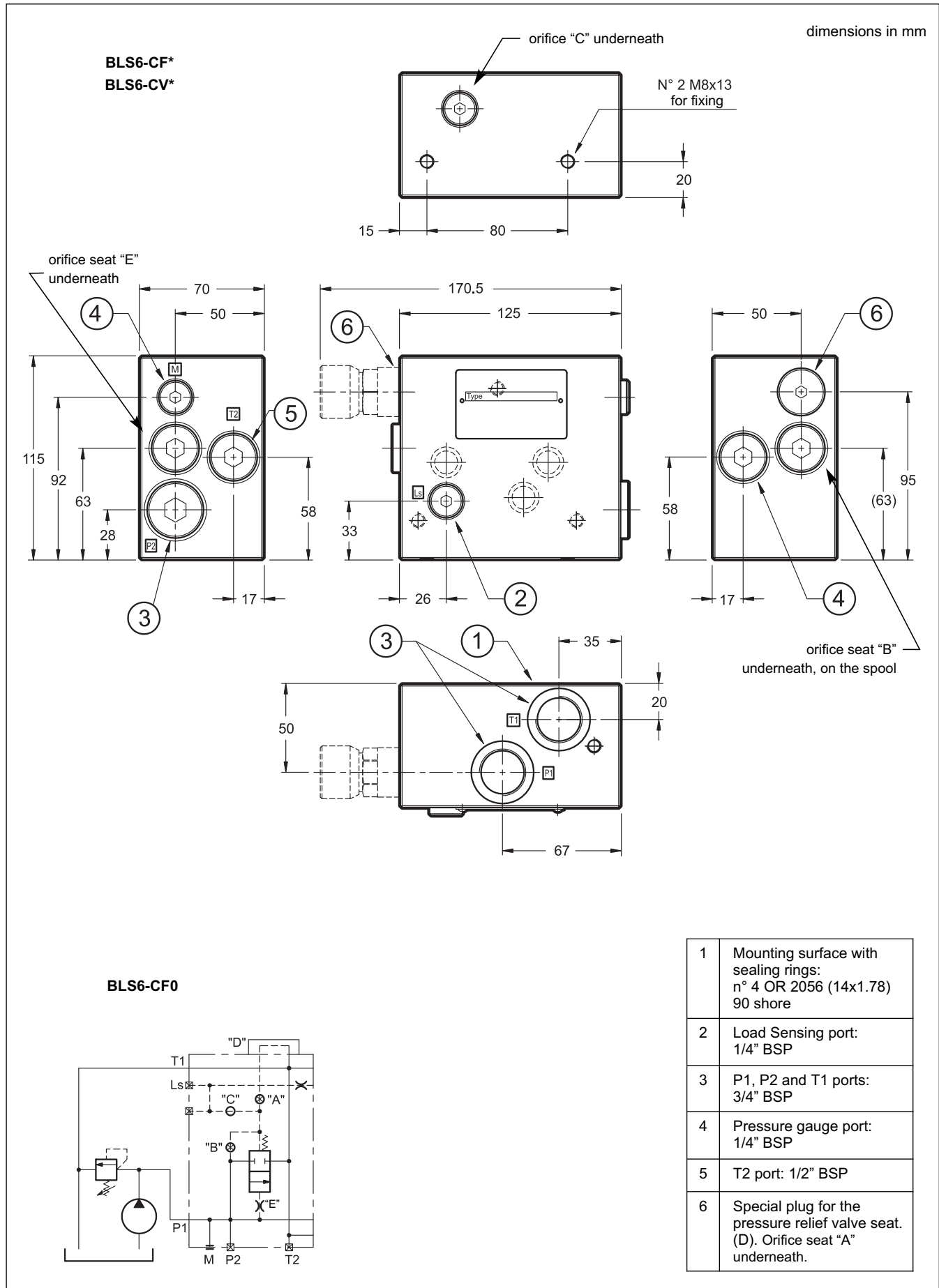
### 8.1 - Proportional module



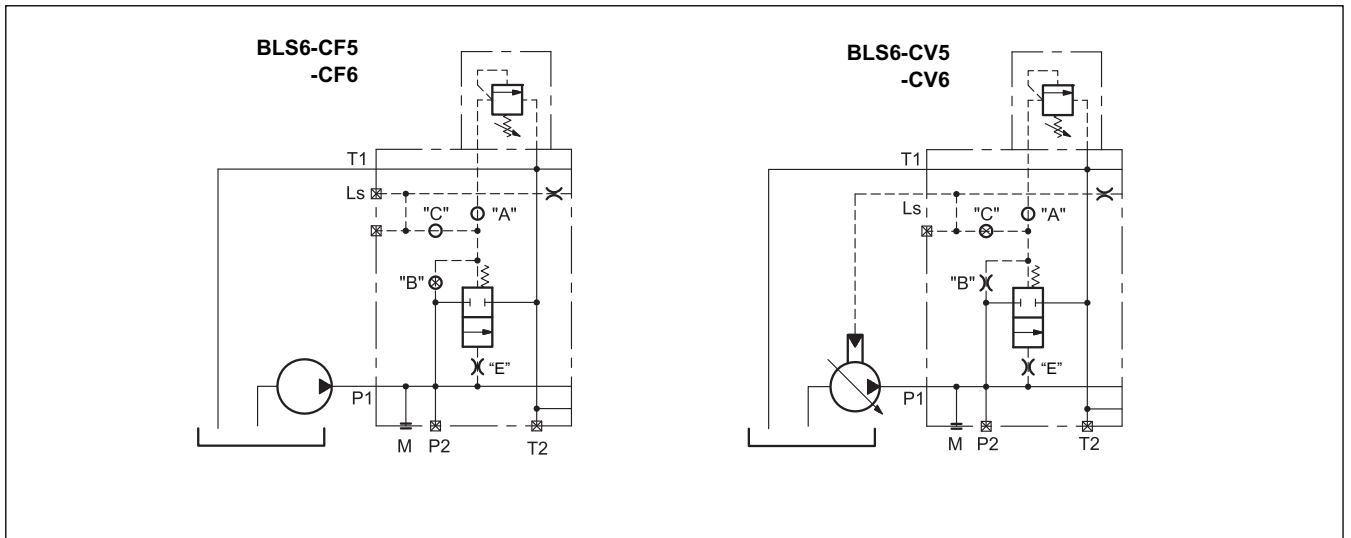
## 8.2 - Inlet modules



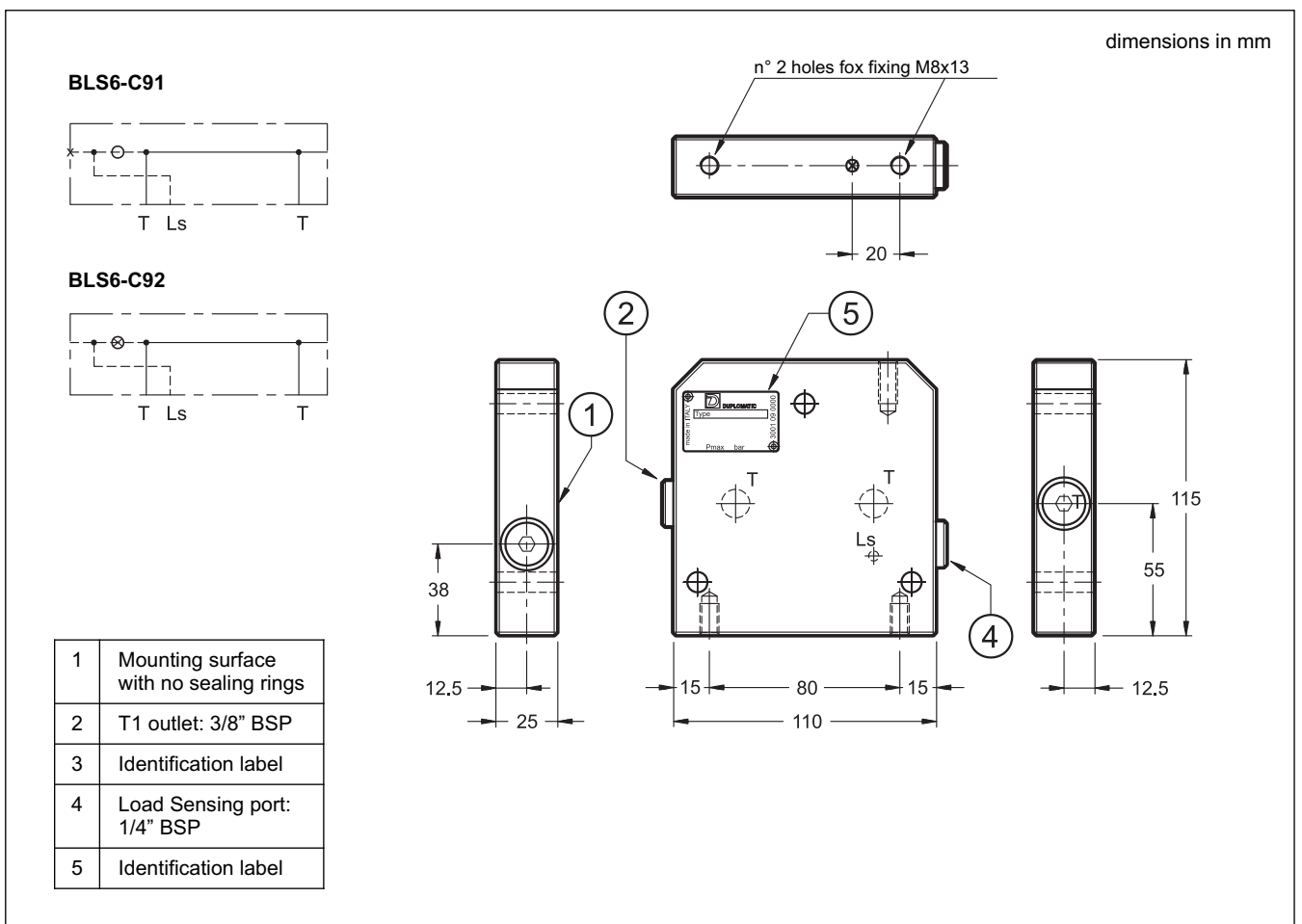
### 8.2 - Inlet modules







### 8.3 - End modules



## 9 - IDENTIFICATION CODE OF ASSEMBLED VALVE

<b>BLS6</b>	-		-		-		-		/	<b>11</b>	V	-		/	
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Compensated direct operated directional valve with proportional control

Inlet module: \_\_\_\_\_  
**C0** = without compensator (**NOTE**)  
**CF** = for fixed pump  
**CV** = for variable pump

Pressure adjustment range: \_\_\_\_\_  
**0** = no relief valve  
**5** = from 12 to 210 bar  
**6** = from 15 to 315 bar

Proportional module: \_\_\_\_\_  
 Choose open or closed center, and then the spool type, like code in par. 1.1  
 Repeat for each proportional module required, max 8 modules.

End plate: \_\_\_\_\_  
**C91** = without load sensing port  
**C92** = with load sensing port

Manual override on all proportional modules (see par. 13)

Coil electrical connection: (see paragraph 9)  
**K1** = plug for connector type 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 version C0 is available only without the pressure relief valve, with code BLS6-C00/11V.

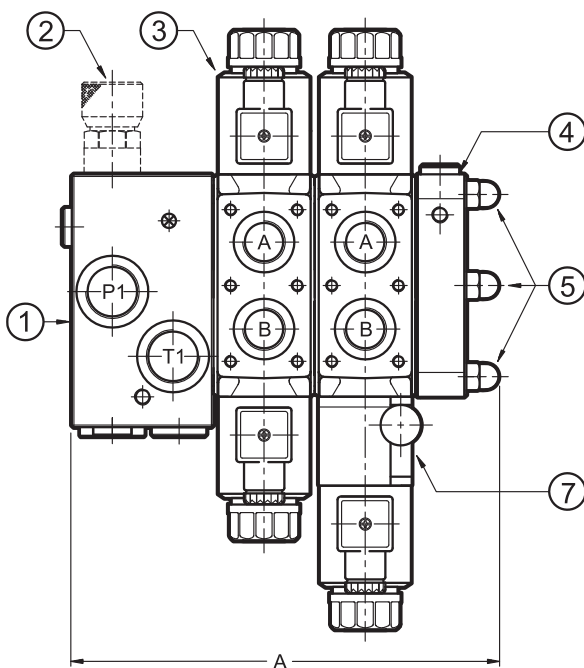
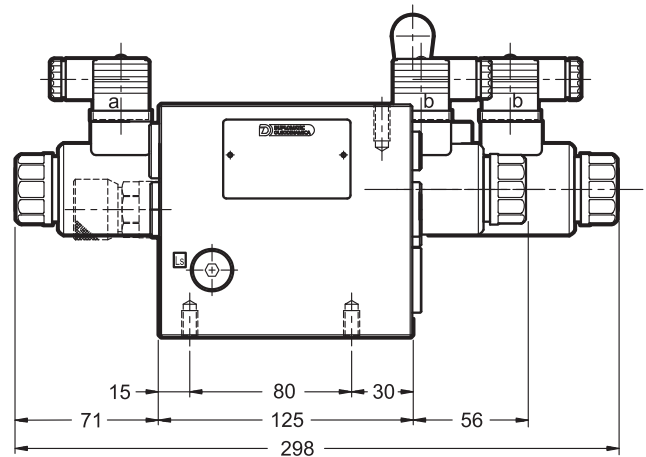
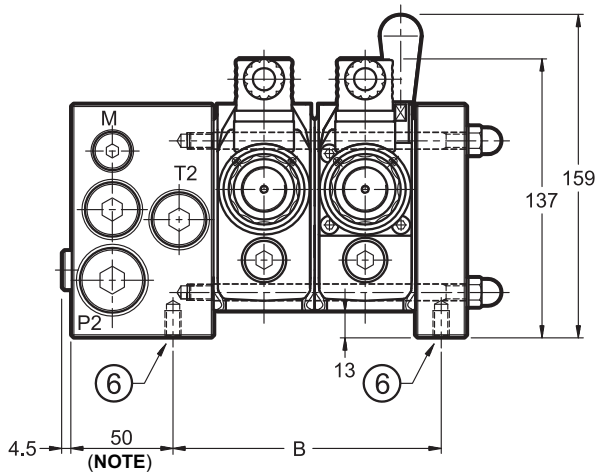
**Coding example:**  
**BLS6-C00-PC30/30-PC30/30-C92/11V-D24K1:** assembled valve includes: inlet module without 3 way compensator; 2 prop. modules with closed center flow 30/30; end plate without load sensing port; FPM seals, 24V DC coils and K1 connection.

**BLS6-CF5-PA45/30-PA45/30-PC30/30-PAB15/15-C91/11V-D12K1:** assembled valve includes: inlet module for fixed pump, with pressure max 210 bar; 2 prop. modules with open center flow 45/30, 1 prop. module with close center, flow 30/30 and 1 prop. module with open center and solenoid only on side B, flow 15/15; end plate with load sensing port; FPM seals, 12V DC coils and K1 connection.

**NOTE:** To obtain the best performances, we suggest to mount the spool with the max flow first, and then the others decreasing.

### 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:** with the inlet module BLS6-C00 the dimension results 10 mm shorter.

#### Fixing kit

The fixing kit includes n° 3 studs, 3 self locking nuts and 3 washers, all zinc-coated.

To order it please use the following codes:

1	Inlet module
2	Pressure relief valve
3	Proportional modules
4	End plate
5	Fixing studs
6	Fixing holes
7	Manual lever override module

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

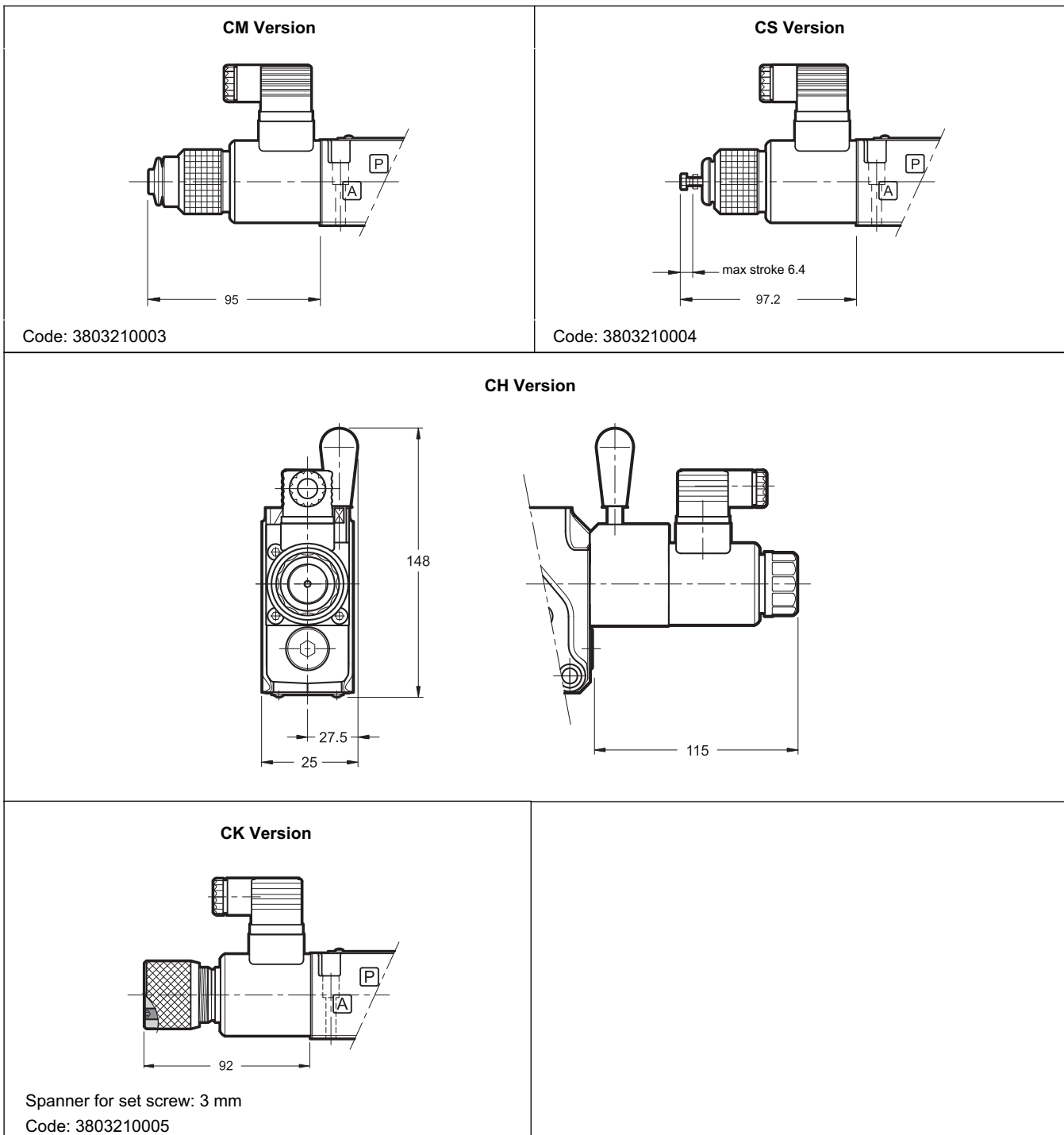
Tightening torque: 25 Nm

### 11 - MANUAL OVERRIDE

The standard valve 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.

Four different manual override version are available upon request:

- **CM** version, manual override belt protected.
- **CS** version, with metal ring nut provided with a M4 screw and a blocking locknut to allow the continuous mechanical operations.
- **CH** version, lever manual override.
- **CK** version, knob. 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.



## 12 - ELECTRONIC CONTROL UNITS

### One solenoid

<b>EDC-111</b>	for solenoid 24V DC	plug version	see cat. 89 120
<b>EDC-141</b>	for solenoid 12V DC		
<b>EDM-M111</b>	for solenoid 24V DC	DIN EN 50022 rail mounting	see cat. 89 250
<b>EDM-M141</b>	for solenoid 12V DC		

These cards drive only a module at once.  
Every module to be driven with electronic card must have its one.

### Two solenoids

<b>EDM-M211</b>	for solenoid 24V DC	rail mounting DIN EN 50022	see cat. 89 250
<b>EDM-M241</b>	for solenoid 12V DC		

## 13 - EXAMPLES OF APPLICATION

