



# SDM122 DLM122

**Monoblock valves for  
Front Loaders Applications**



## Features

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- Configuration open center SDM122 and Load Sensing DLM122
- Fitted with a main pressure relief valve (on SDM122) and load check valve on every working section
- Optional power beyond port (on SDM122)
- Anticavitation and antishock valves (with fixed setting) available on every section
- Dedicated range of controls: manual, mechatronic and remote with flexible cable

### Additional information

This catalogue shows the product in the most standard configurations.  
Please contact our Sales Dpt. for more detailed information or special requests.

### WARNING!

All specifications of this catalogue refer to the standard product at this date.  
Walvoil, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

**WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN  
INCORRECT USE OF THE PRODUCT.**

3<sup>rd</sup> edition October 2014

Working conditions . . . . . page 4

### **SDM122**

Dimensional data . . . . . page 5  
Hydraulic circuit . . . . . page 7  
Ordering codes . . . . . page 8  
Main relief valves . . . . . page 10  
Port valves . . . . . page 10  
Spools . . . . . page 11  
"A" side spool control kit for mechanical control . . page 12  
"B" side spool control kit for mechanical control . . page 12  
"A" side spool control kit for mechatronic control . . page 13  
"B" side spool control kit for mechatronic control . . page 13  
Return circuit . . . . . page 14

### **DLM122**

Dimensional data . . . . . page 15  
Hydraulic circuit . . . . . page 17  
Ordering codes . . . . . page 18  
Spools. . . . . page 20  
"A" side spool control kit for mechanical control . . page 12  
"B" side spool control kit for mechanical control . . page 12  
"A" side spool control kit for mechatronic control . . page 13  
"B" side spool control kit for mechatronic control . . page 13  
Return circuit . . . . . page 21

### **Systems for mechatronics modules control**

Ordering codes . . . . . page 22  
  
Installation and maintenance . . . . . page 23

# SDM122-DLM122

## Working conditions

This catalogue shows technical specifications and diagrams measured with mineral oil of 46mm<sup>2</sup>/s - 46 cSt viscosity at 40°C - 104°F temperature.

Max. flow rating		80 l/min	21 US gpm
Operating pressure (max.)		250 bar	3600 psi
Back pressure (max.)	on outlet port T	10 bar	1450 psi
Medium internal leakage	A(B)⇒T with $\Delta p = 100 \text{ bar} - 1450 \text{ psi}$	3 cm <sup>3</sup> /min	0.18 in <sup>3</sup> /min
Fluid		Mineral based oil	
Fluid temperature	with NBR (BUNA-N) seals	from -20°C to 80°C	from -4°F to 176°F
	with FPM (VITON) seals	from -20°C to 100°C	from -4°F to 212°F
Viscosity	operating range	from 15 to 75 mm <sup>2</sup> /s	from 15 to 75 cSt
	min.	12 mm <sup>2</sup> /s	12 cSt
	max.	400 mm <sup>2</sup> /s	400 cSt
Max. contamination level		-/19/16 - ISO 4406	NAS 1638 - class 10
Ambient temperature for working conditions	with mechanical devices	from -40°C to 60°C	from -40°F to 140°F
	with mechatronic devices	from -25°C to 60°C	from -13°F to 122°F

NOTE - For different conditions please contact our Sales Dpt.

## Standard threads

REFERENCE STANDARD					
		BSP	UN-UNF	METRIC	METRIC ISO
THREAD ACCORDING TO		ISO 228/1	ISO 263		
		BS 2779	ANSI B1.1 unified	ISO 261	ISO 261
CAVITY DIMENSION ACCORDING TO	ISO	1179	11926	9974/1	6149
	SAE		J11926		J2244
	DIN	3852-2 shape X or Y			

PORTS THREADING			
MAIN	BSP	UN-UNF	METRIC
Inlet <b>P</b> and power beyond <b>C</b>	G 3/4	11/16-12 (SAE 12)	M27x2
Ports <b>A</b> and <b>B</b>	G 1/2	7/8-14 (SAE 10)	M22x1.5
Outlet <b>T</b>	G 3/4	11/16-12 (SAE 12)	M27x2
Load Sensing <b>LS</b>	G 1/4	9/16-18 (SAE 6)	M14x1.5

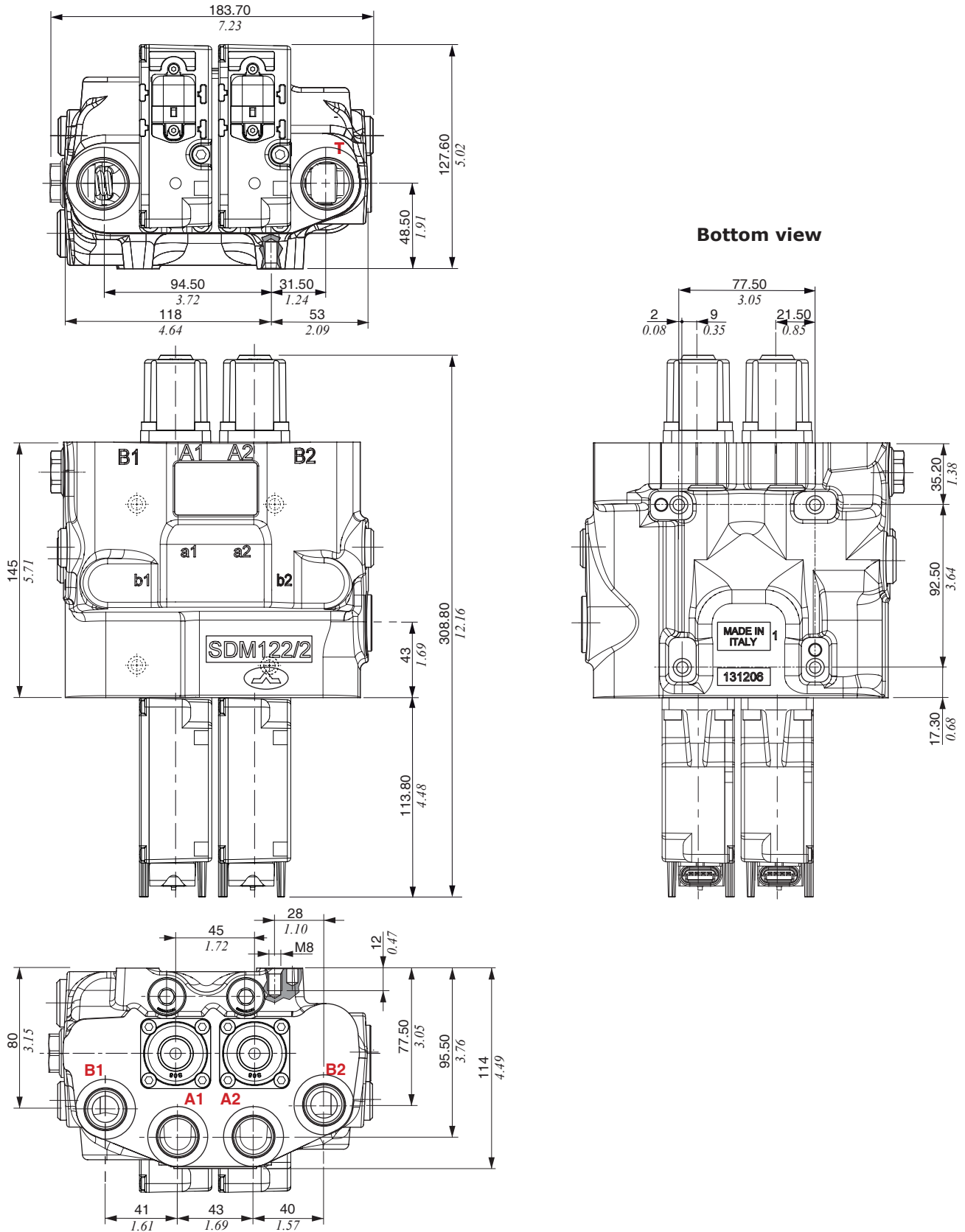
Note: for different port size contact our Sales Dpt.



# SDM122

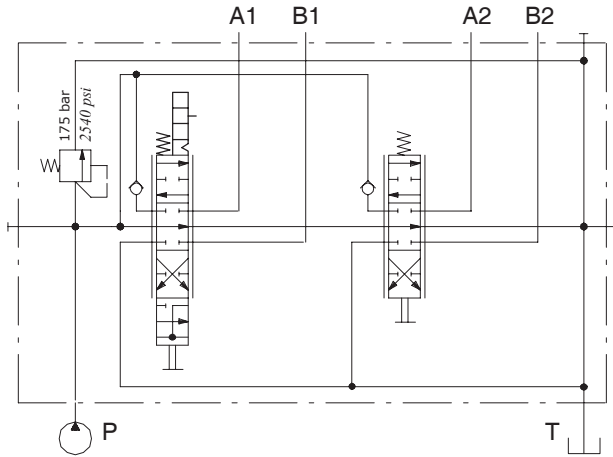
## Dimensional data

### Mechatronic control

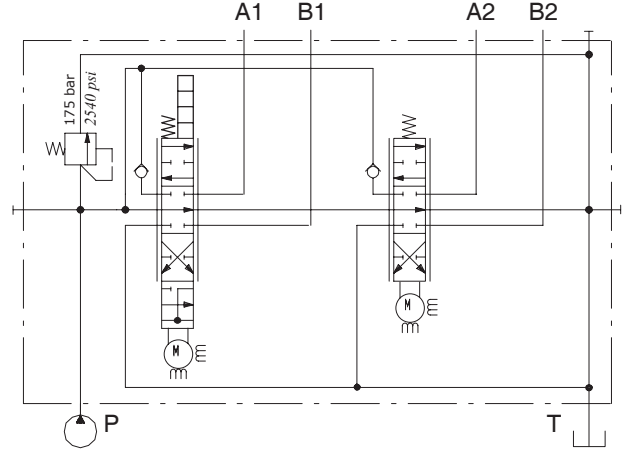


Configuration without port valves

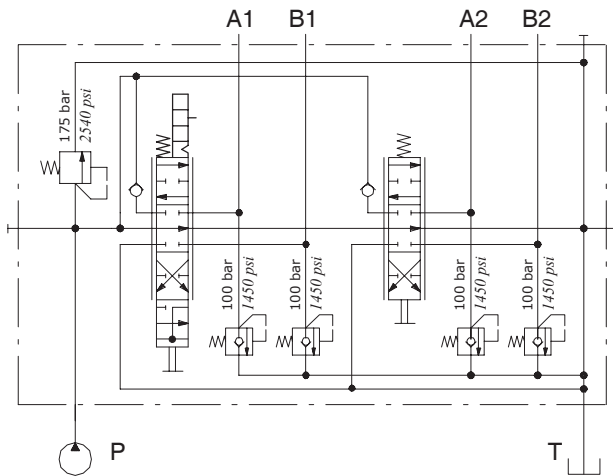
Mechanical control



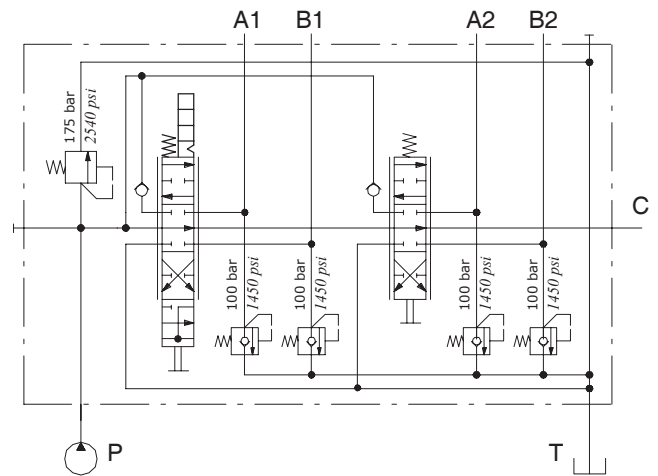
Mechatronic control



Configuration with port valves



Configuration with port valves and power-beyond



# SDM122

## Ordering codes

### Mechanical control

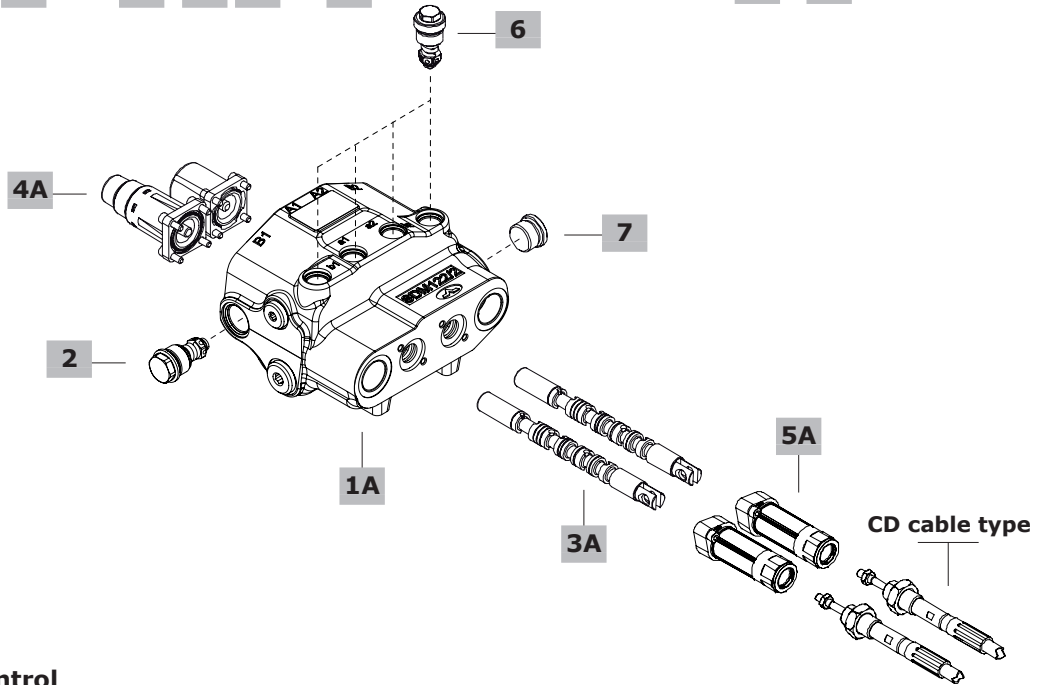
1 Mounted on port A  
 2 Mounted on port B  
 3 Mounted A and B

Man relief valve setting (bar)      Port valves setting (bar)

Valve is painted as standard, with one coat of Primer black antitrust paint

SDM122/ 2-P (UD - 180) / 1[S] 13 TQ . U3(100) / 1[S] 8MA TQ . U3(100) / AET - ... - <CVN>

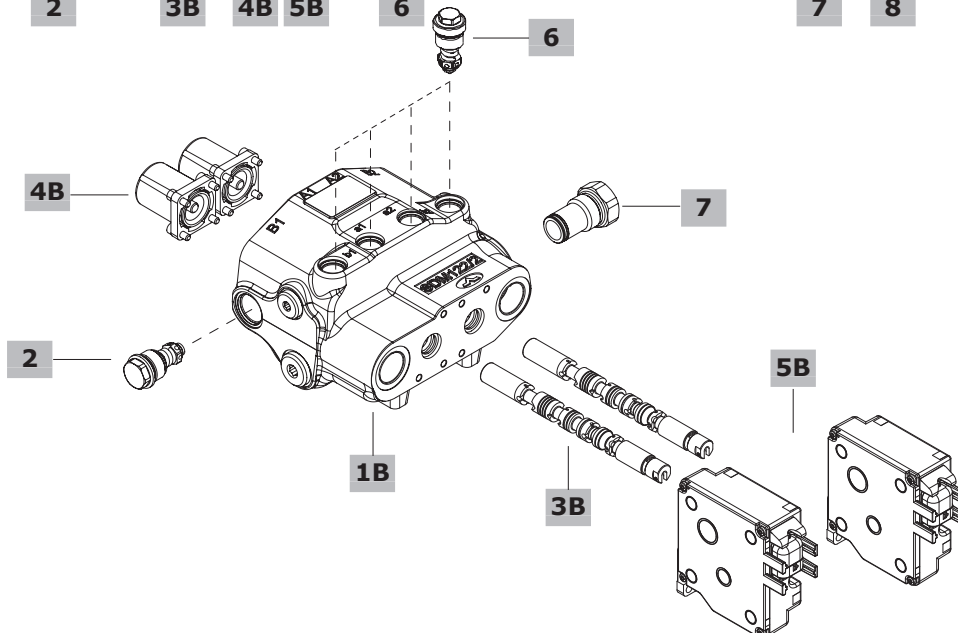
1A    2    3A 4A 5A    6    7    8



### Mechatronic control

SDM122/ 2-P (UD - 180) / 1SO[S] 13 EME . U3(100) / 1SO[S] 8 EME . U3(100) / AE - ... - <CVNE>

1B    2    3B 4B 5B    6    7    8





## Ordering codes

**With mechanical control****1A Body kit\***

TYPE: **SDM122/2-P/SAE** CODE: 5KC1847002  
 DESCRIPTION: Without port valves arrangement

Note: For port valves arrangement please contact Sales Dpt.

**3A Spool page 11**

TYPE	CODE	DESCRIPTION
<b>1[S]</b>	3CU5110100	With positioner kit <b>8MA</b> : double acting, 3 positions, A and B closed in neutral position With positioner kit <b>13</b> : 4 positions, A and B to tank in 4 <sup>th</sup> positions (float)

**4A "A" side spool positioners page 12**

TYPE	CODE	DESCRIPTION
<b>8MA</b>	5V08108240	3 positions with spring return in neutral position
<b>13</b>	5V13108040	4 positions, detent in 4 <sup>th</sup> position with detent spring return in neutral position

**5A "B" side spool control kit page 12**

TYPE	CODE	DESCRIPTION
<b>TQ81</b>	5TEL108220	Cable control arrangement

**With mechatronic control****1B Body kit\***

TYPE: **SDM122/2-P/SAE/EME** CODE: 5KC1847007  
 DESCRIPTION: Without port valves arrangement

Note: For port valves arrangement please contact our Sales Dpt.

**3B Spool page 11**

TYPE	CODE	DESCRIPTION
<b>1SO[S]-EME</b>	3CU5110111	With positioner kit <b>8</b> : double acting, 3 positions, A and B closed in neutral position With positioner kit <b>13</b> : 4 positions, A and B to tank in 4 <sup>th</sup> positions (float)

**4B "A" side spool positioners page 13**

TYPE	CODE	DESCRIPTION
<b>8</b>	5V08112001	3 positions with spring return in neutral position
<b>13</b>	5V13112001	4 positions, detent in 4 <sup>th</sup> position with detent spring return in neutral position

**5B "B" side spool control kit page 13**

TYPE	CODE	DESCRIPTION
<b>EME(8)</b>	5MEC080803	Mechatronic control kit for positioner type 8
<b>EME(13)</b>	5MEC130803	Mechatronic control kit for positioner type 13

**For all configurations****2 Main relief valves page 10**

TYPE	CODE	DESCRIPTION
<b>SV</b>	XTAP528480	Valve blanking plug

**Fixed setting valves**

Setting is referred to 10 l/min - 2.6 US gpm flow

<b>UD-170</b>	5KIT324170	170 bar - 2450 psi
<b>UD-180</b>	5KIT324180	180 bar - 2600 psi
<b>UD-190</b>	5KIT324190	190 bar - 2750 psi
<b>UD-210</b>	5KIT324210	210 bar - 3050 psi
<b>UD-230</b>	5KIT324230	230 bar - 3350 psi

**6 Port valves page 10**

TYPE	CODE	DESCRIPTION
<b>UT</b>	XTAP522441	Valve blanking plug
<b>SE/DE</b>	XKIT408200	Single/double effect selector

**Fixed setting antishock valves**

Setting is referred to 10 l/min - 2.6 US gpm flow

<b>U025</b>	5KIT330025	Valve setting 25 bar - 360 psi
<b>U030</b>	5KIT330030	Valve setting 30 bar - 430 psi
<b>U040</b>	5KIT330040	Valve setting 40 bar - 580 psi
<b>U050</b>	5KIT330050	Valve setting 50 bar - 720 psi
<b>U063</b>	5KIT330063	Valve setting 63 bar - 900 psi
<b>U080</b>	5KIT330080	Valve setting 80 bar - 1150 psi
<b>U100</b>	5KIT330100	Valve setting 100 bar - 1450 psi
<b>U110</b>	5KIT330110	Valve setting 110 bar - 1600 psi
<b>U125</b>	5KIT330125	Valve setting 125 bar - 1800 psi
<b>U140</b>	5KIT330140	Valve setting 140 bar - 2050 psi
<b>U150</b>	5KIT330150	Valve setting 150 bar - 2150 psi

**6 Port valves (continue) page 10**

TYPE	CODE	DESCRIPTION
<b>U160</b>	5KIT330160	Valve setting 160 bar - 2300 psi
<b>U175</b>	5KIT330175	Valve setting 175 bar - 2550 psi
<b>U190</b>	5KIT330190	Valve setting 190 bar - 2750 psi
<b>U200</b>	5KIT330200	Valve setting 200 bar - 2900 psi
<b>U210</b>	5KIT330210	Valve setting 210 bar - 3050 psi
<b>U220</b>	5KIT330220	Valve setting 220 bar - 3200 psi
<b>U230</b>	5KIT330230	Valve setting 230 bar - 3350 psi
<b>U240</b>	5KIT330240	Valve setting 240 bar - 3500 psi
<b>U250</b>	5KIT330250	Valve setting 250 bar - 3600 psi

**7 Return circuit\* page 14**

TYPE	CODE	DESCRIPTION
<b>AET</b>	3XTAP732201	Open center plug
<b>AEK</b>	3XTAP532450	Closed center plug
<b>AE-SAE10</b>	3XGIU532660	SAE10 female power-beyond sleeve
<b>AE</b>	XGIU536710	SAE12 female power-beyond sleeve

**8 Threading specification**

Specify thread type only if it's different from BSP standard:  
see page 4

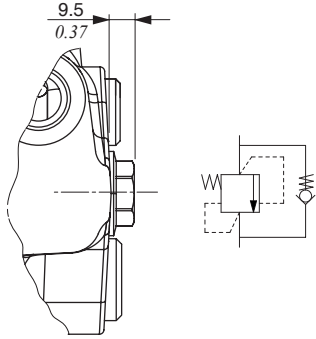
Note (\*): Codes are referred to UN-UNF standard thread

## Main relief valves

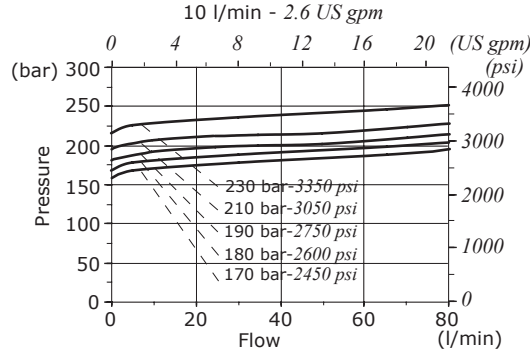
Description example: **(UD-180)**

▬ Valve setting (bar)

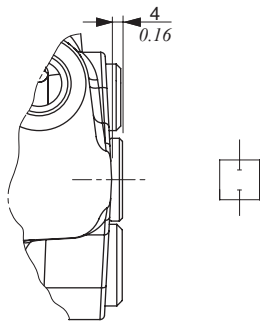
### UD fixed setting valve



### Setting examples



### Valve seat plug



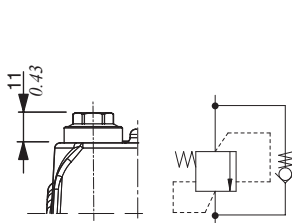
## Port valves

Description example: **U3(100)**

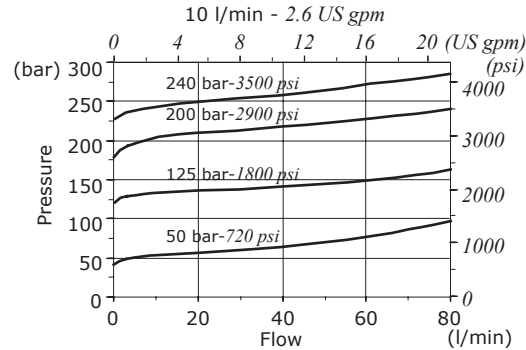
▬ Valve setting (bar)

- 1 Mounted on port A
- 2 Mounted on port B
- 3 Mounted on ports A and B

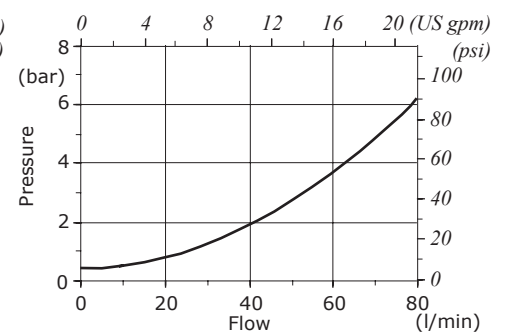
### U type fixed setting valve



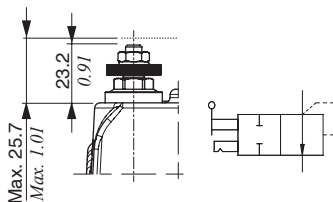
### Setting examples



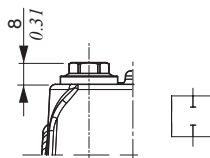
### Pressure drop



### SE/DE Single/double effect selector



### Valve seat plug

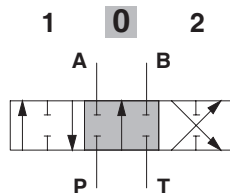


### 3 positions configuration

Configuration with double acting, 3 positions, A and B closed in neutral position.

**1[S]** type for mechanical control.

**1SO[S]** type for mechatronic control.



**Spool stroke: type 1[S]**

position 1: + 7 mm / + 0.28 in

position 2: - 7 mm / - 0.28 in

**Spool stroke: type 1SO[S]-EME**

position 1: + 6.6 mm / + 0.26 in

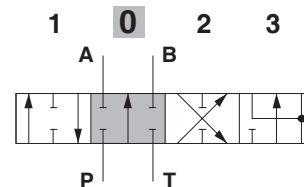
position 2: - 6.6 mm / - 0.26 in

### 4 positions configuration

Configuration with 4 positions, A and B to tank in 4<sup>th</sup> position (float).

**1[S]** type for mechanical control.

**1SO[S]** type for mechatronic control.



**Spool stroke: type 1[S]**

position 1: + 7 mm / + 0.28 in

position 2: - 7 mm / - 0.28 in

position 3 (floating): -12 mm / - 0.47 in

**Spool stroke: type 1SO[S]-EME**

position 1: + 6.6 mm / + 0.26 in

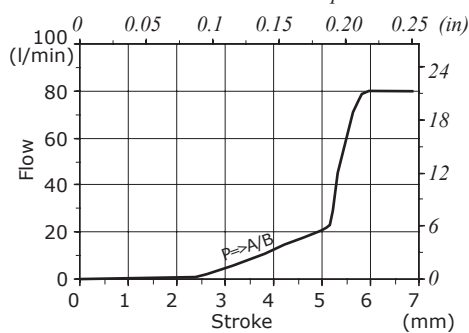
position 2: - 6.6 mm / - 0.26 in

position 3 (floating): -11,6 mm / - 0.46 in

#### Type 1[S] spool metering curve

$Q_{in} = 80 \text{ l/min} - 21 \text{ US gpm}$

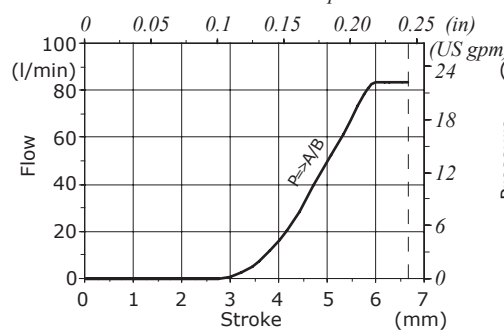
$P = 150 \text{ bar} - 2200 \text{ psi}$



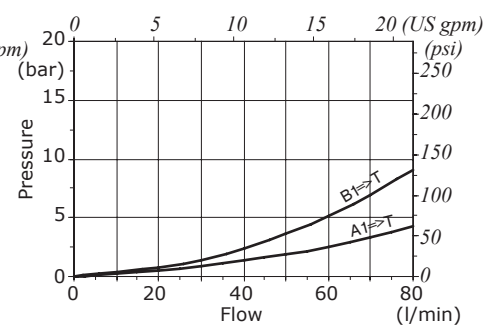
#### Type 1SO[S]-EME spool metering curve

$Q_{in} = 80 \text{ l/min} - 21 \text{ US gpm} (*)$

$P = 150 \text{ bar} - 2200 \text{ psi}$



#### Pressure drop in float position

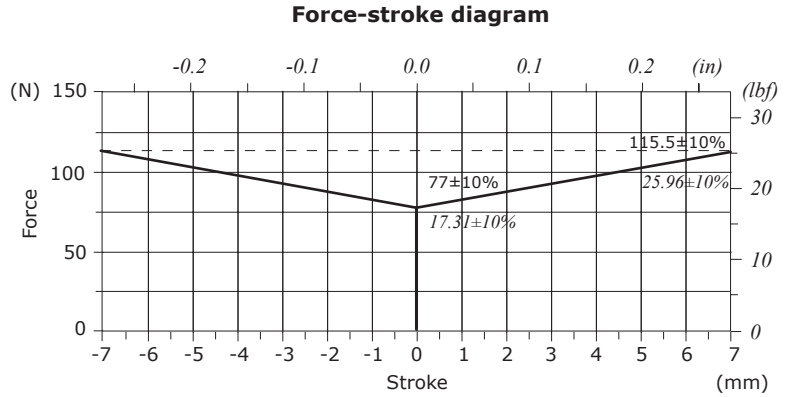
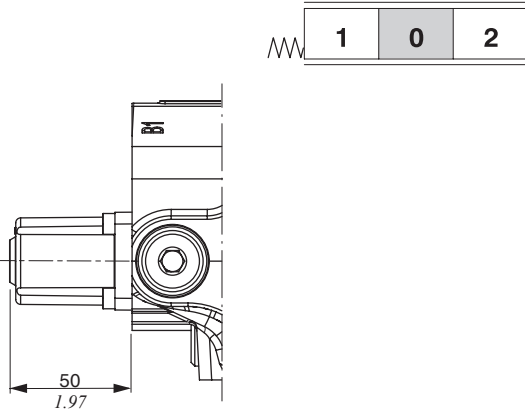


NOTE (\*) - For mechatronic control: spools with flow rates up to 100 l/min (26.4 US gpm) are recommended for flow rates higher than 80 l/min (21 US gpm). For availability, please contact our Sales Dpt.

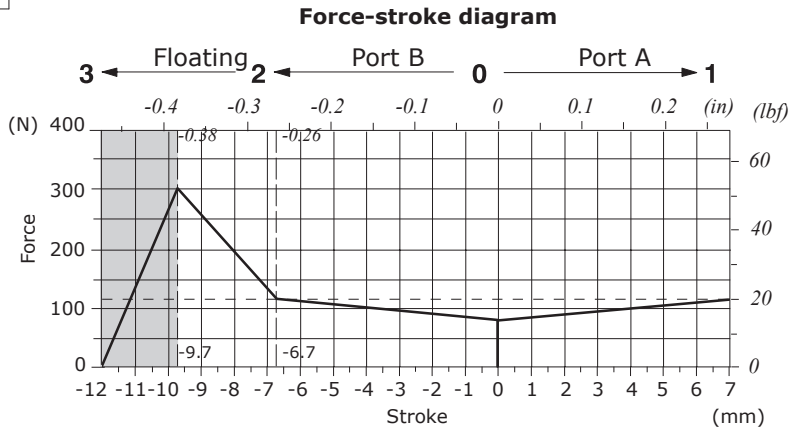
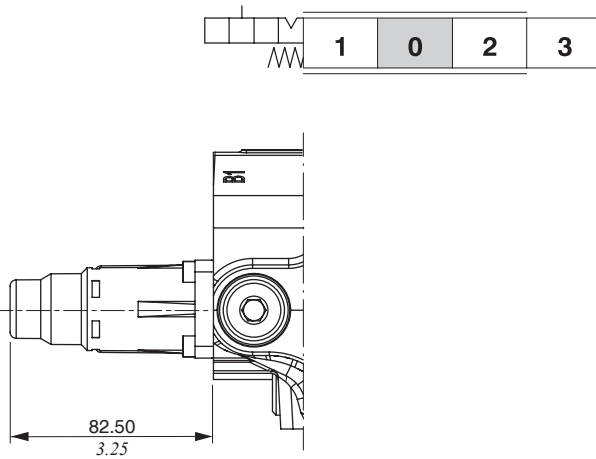
# SDM122

## "A" side spool positioners for mechanical control

### Type 8MA



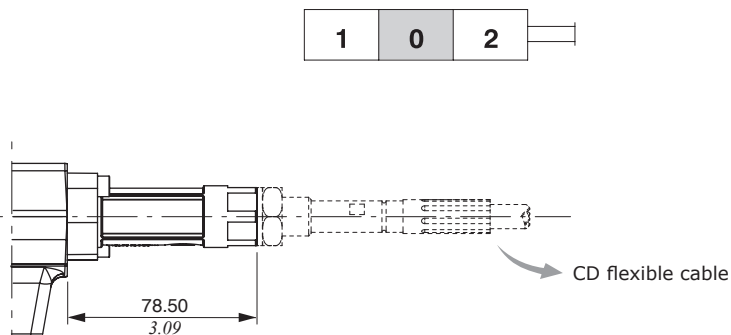
### Type 13



**Detent area**  
 Locking force: 300 N/67.4 lbf±10%  
 Release force: 270 N/60.7 lbf±10%

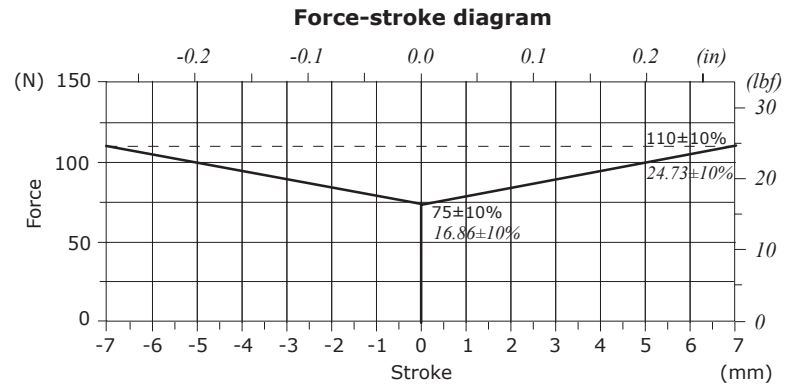
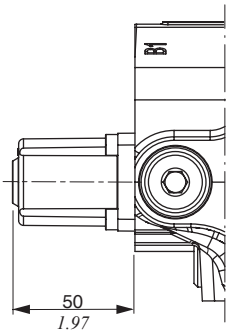
## "B" side spool control kit for mechanical control

### Type TQ81

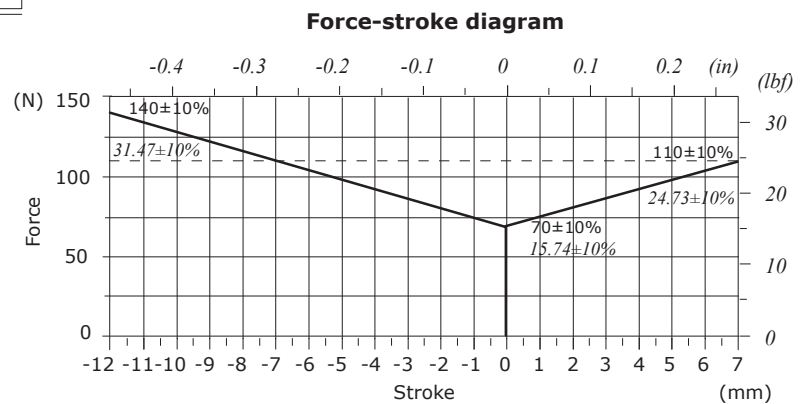
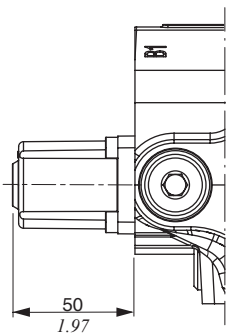
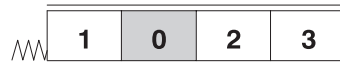


## "A" side spool positioners for mechatronic control

### Type 8EMC



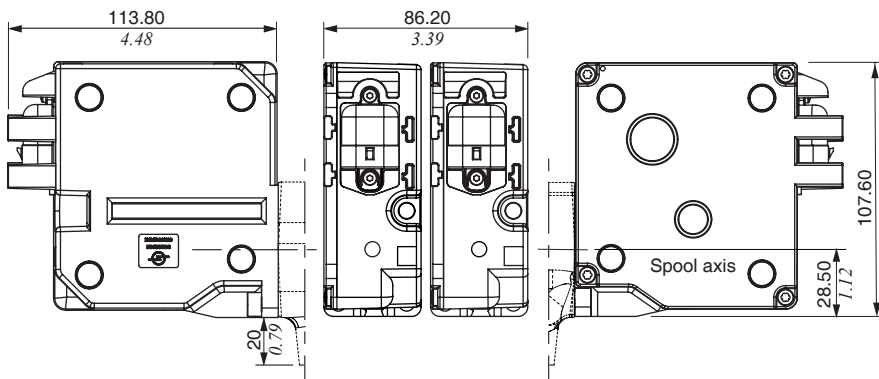
### Type 13EMC



## "B" side spool control kit for mechatronic control

### Type EME

The dimensions of the type (8) and the type (13) are the same.

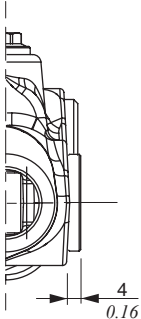


TECHNICAL DATA		
Force	up to 160 N	up to 35.97 lbf
Speed	up to 80 mm/s	up to 80 cSt
Residual force	<45 N	10.12 lbf
Travel	± 12 mm	±0.47 in
Resolution	0.01 mm/incr.	0.0004 in/incr
Protocol	SAE J1939	
Supply voltage	9-16 VDC	
Max. axial play	<0.25 mm	<0.01 in
EMC	ISO 14982	
Vibration	IEC 68-2	

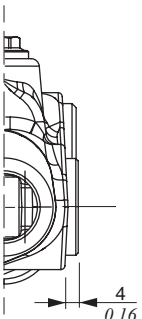
Notes: Parameter such as spool stroke may be limited by WST software according to the application.

## Return circuit

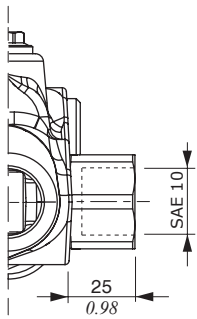
**AET**  
open center plug



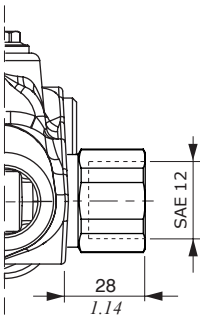
**AEK**  
closed center plug



**AE-SAE10**  
SAE10 female "power-beyond" sleeve



**AE**  
SAE12 female "power-beyond" sleeve

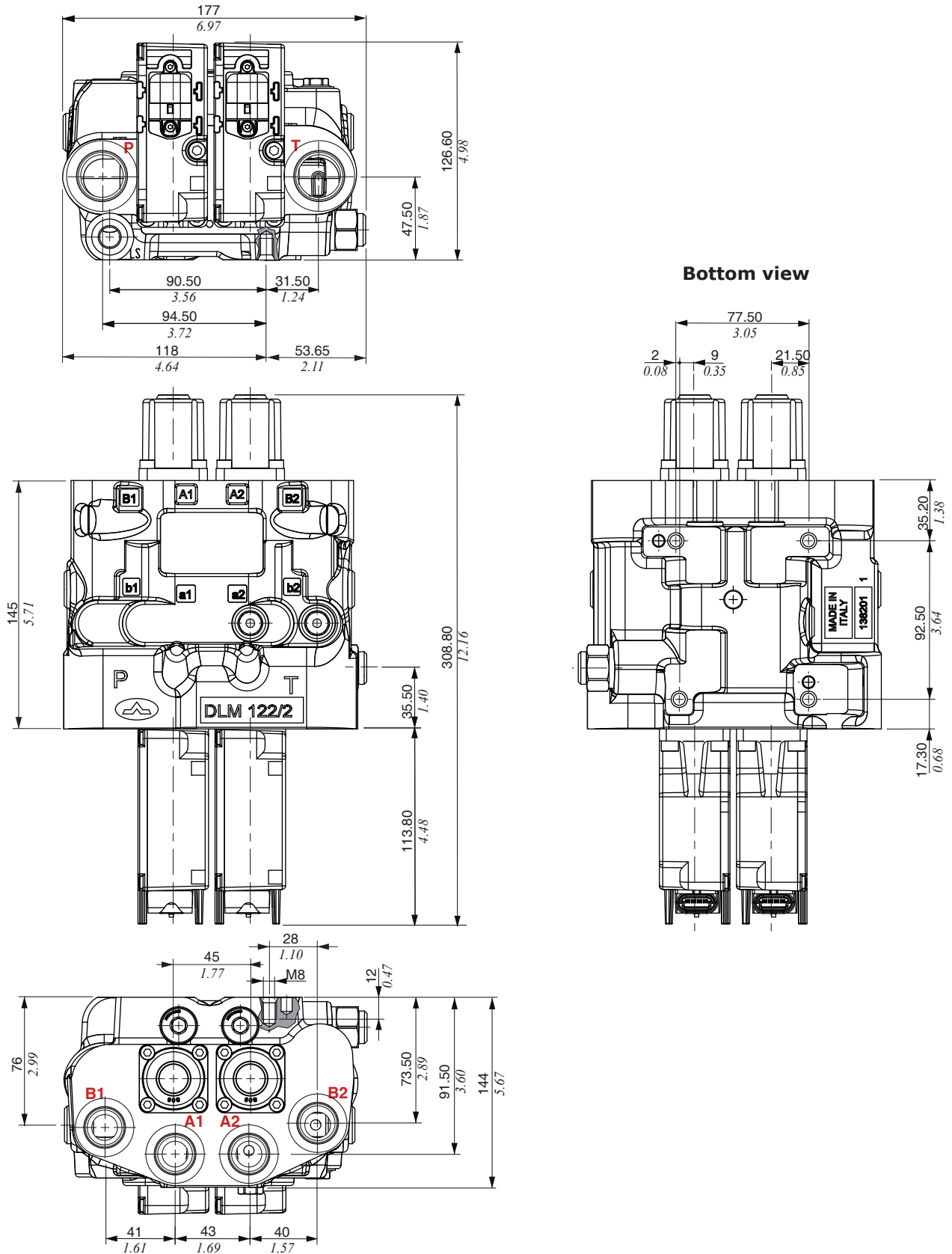




# DLM122

## Dimensional data

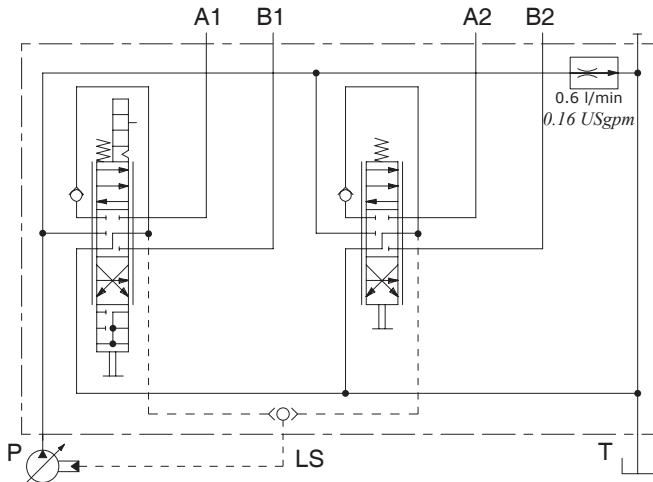
### Mechatronic control



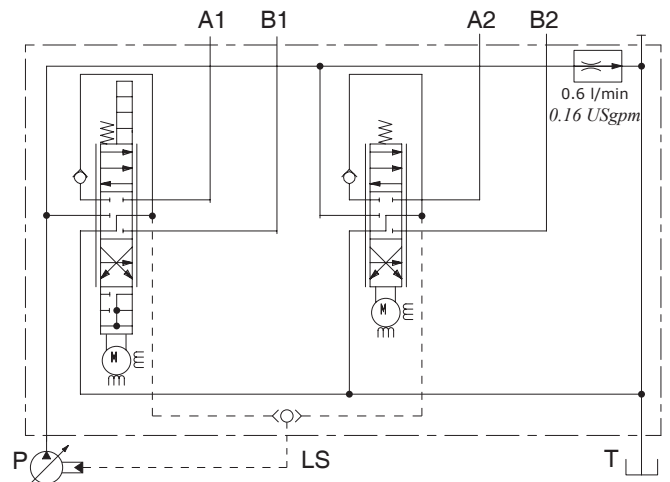


### Configuration without port valves, with Bleed valve

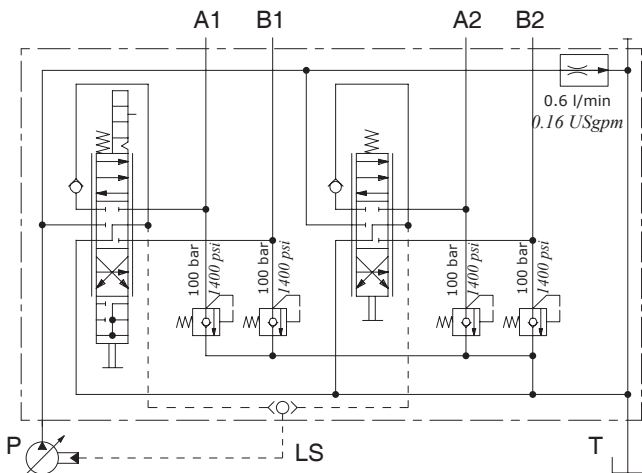
#### Mechanical control



#### Mechatronic control



### Configuration with port valves and Bleed valve



### Ordering codes

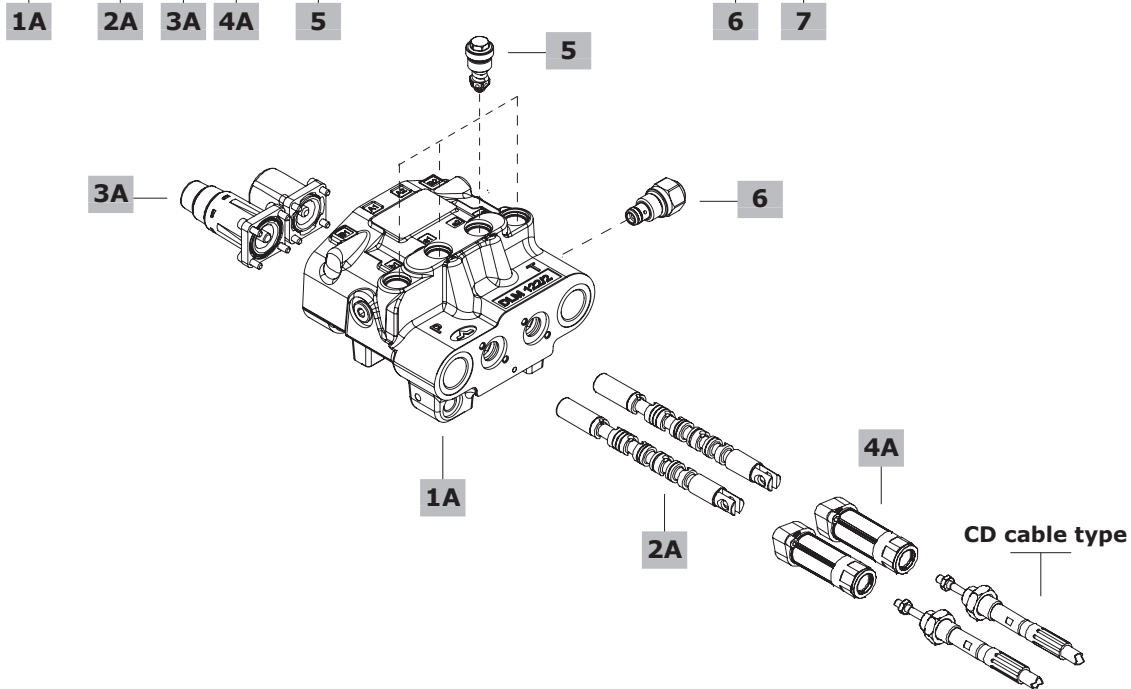
#### Mechanical control

- 1 Mounted on port A
- 2 Mounted on port B
- 3 Mounted A and B

Port valves setting (bar)

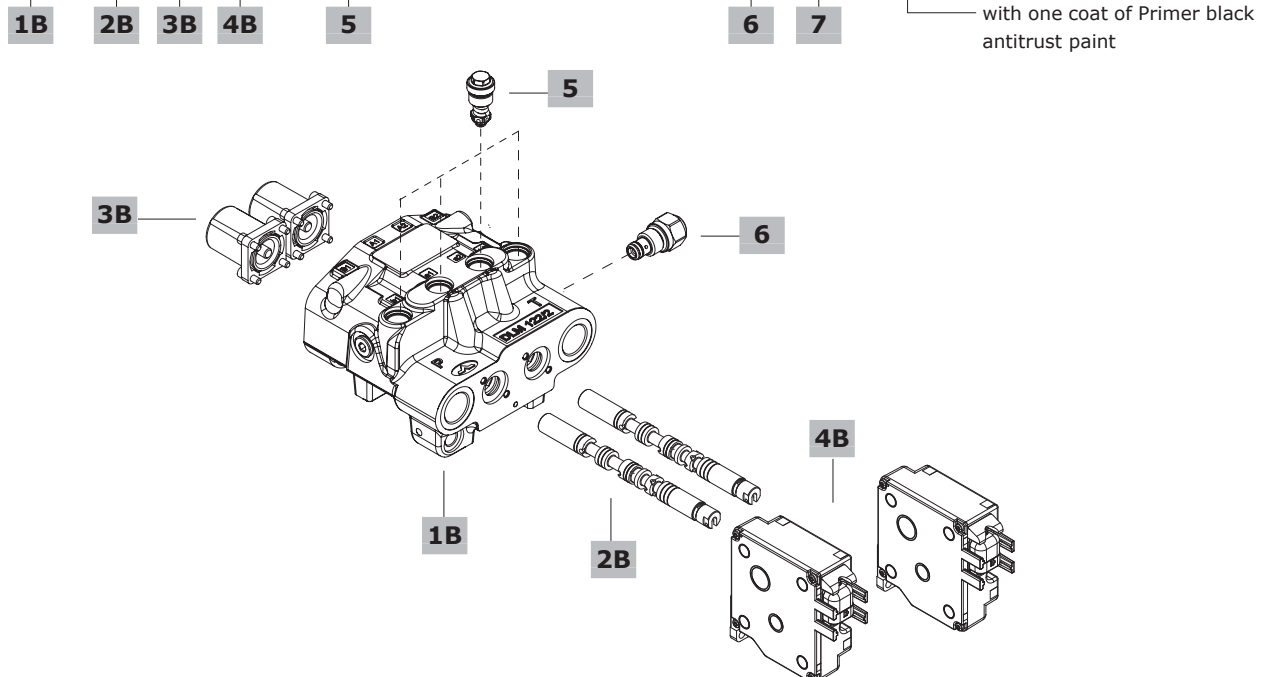
Valve is painted as standard, with one coat of Primer black antitrust paint

**DLM122/ 2-AP / 1[S] 13 TQ . U3(100) / 1[S] 8MA TQ . U3(100) / VB / ... - <CVN>**



#### Mechatronic control

**DLM122/ 2-AP / 1[S] 13 EME . U3(100) / 1[S] 8 EME . U3(100) / VB / ... - <CVN>**



**With mechanical control****1A Body kit\***

TYPE: <b>DLM122/2-P/SAE</b>	CODE: 5KC1847000
DESCRIPTION: Configuration without bleed valve arrangement	
TYPE: <b>DLM122/2-P/SAE-VBF</b>	CODE: 5KC1847003A
DESCRIPTION: Configuration with bleed valve arrangement	

Note: For port valves arrangement please contact Sales Dpt.

**2A Spool page 20**

TYPE	CODE	DESCRIPTION
<b>1[S]</b>	3CU5111100	<u>With positioner kit 8MA</u> : double acting, 3 positions, A and B closed in neutral position <u>With positioner kit 13</u> : 4 positions, A and B to tank in 4 <sup>th</sup> positions (float)

**3A "A" side spool positioners page 12**

TYPE	CODE	DESCRIPTION
<b>8MA</b>	5V08108240	3 positions with spring return in neutral position
<b>13</b>	5V13108040	4 positions, detent in 4 <sup>th</sup> position with detent spring return in neutral position

**4A "B" side spool control kit page 12**

TYPE	CODE	DESCRIPTION
<b>TQ81</b>	5TEL108220	Cable control arrangement

**With mechatronic control****1B Body kit\***

TYPE: <b>DLM122/2-P/SAE-EME</b>	CODE: 5KC1847008
DESCRIPTION: Configuration without bleed valve arrangement	
TYPE: <b>DLM122/2-A/SAE-VBF-EME</b>	CODE: 5KC1847009
DESCRIPTION: Configuration with bleed valve arrangement	

Note: For port valves arrangement please contact our Sales Dpt.

**2B Spool page 20**

TYPE	CODE	DESCRIPTION
<b>1[S]-EME</b>	3CU5111111	<u>With positioner kit 8</u> : double acting, 3 positions, A and B closed in neutral position <u>With positioner kit 13</u> : 4 positions, A and B to tank in 4 <sup>th</sup> positions (float)

**3B "A" side spool positioners page 13**

TYPE	CODE	DESCRIPTION
<b>8</b>	5V08112001	3 positions with spring return in neutral position
<b>13</b>	5V13112001	4 positions, detent in 4 <sup>th</sup> position with detent spring return in neutral position

**4B "B" side spool control kit page 13**

TYPE	CODE	DESCRIPTION
<b>EME(08)</b>	5MEC080804	Mechatronic control kit for positioner type 8
<b>EMC(13)</b>	5MEC130804	Mechatronic control kit for positioner type 13

**For all configurations****5 Port valves page 10**

TYPE	CODE	DESCRIPTION
<b>UT</b>	XTAP522441	Valve blanking plug
<b>SE/DE</b>	XKIT408200	Single/double effect selector
<b>Fixed setting antishock valves</b>		
Setting is referred to 10 l/min - 2.6 US gpm flow		
<b>U025</b>	5KIT330025	Valve setting 25 bar - 360 psi
<b>U030</b>	5KIT330030	Valve setting 30 bar - 430 psi
<b>U040</b>	5KIT330040	Valve setting 40 bar - 580 psi
<b>U050</b>	5KIT330050	Valve setting 50 bar - 720 psi
<b>U063</b>	5KIT330063	Valve setting 63 bar - 900 psi
<b>U080</b>	5KIT330080	Valve setting 80 bar - 1150 psi
<b>U100</b>	5KIT330100	Valve setting 100 bar - 1450 psi
<b>U110</b>	5KIT330110	Valve setting 110 bar - 1600 psi
<b>U125</b>	5KIT330125	Valve setting 125 bar - 1800 psi
<b>U140</b>	5KIT330140	Valve setting 140 bar - 2050 psi
<b>U150</b>	5KIT330150	Valve setting 150 bar - 2150 psi
<b>U160</b>	5KIT330160	Valve setting 160 bar - 2300 psi
<b>U175</b>	5KIT330175	Valve setting 175 bar - 2550 psi
<b>U190</b>	5KIT330190	Valve setting 190 bar - 2750 psi
<b>U200</b>	5KIT330200	Valve setting 200 bar - 2900 psi
<b>U210</b>	5KIT330210	Valve setting 210 bar - 3050 psi
<b>U220</b>	5KIT330220	Valve setting 220 bar - 3200 psi
<b>U230</b>	5KIT330230	Valve setting 230 bar - 3350 psi
<b>U240</b>	5KIT330240	Valve setting 240 bar - 3500 psi
<b>U250</b>	5KIT330250	Valve setting 250 bar - 3600 psi

**6 Bleed valves page 21**

TYPE	CODE	DESCRIPTION
<b>LC(FC0.8)</b>	XTAP722421	Screw with orifice Ø 0.8 mm - Ø 0.03 in
<b>LC(NFC)</b>	XTAP722420	Screw without orifice
<b>VB</b>	X138810000	Bleed valve with standard orifice Ø 0.7 mm - Ø 0.03 in
<b>VB(1.2)</b>	X138810010	Bleed valve with orifice Ø 1.2 mm - Ø 0.05 in

**7 Threading specification**

Specify thread type only if it's different from BSP standard:  
see page 4

Notes (\*): Codes are referred to UN-UNF standard thread

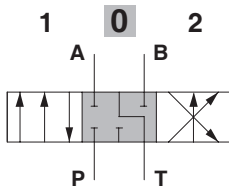
## Spools

### 3 positions configuration

Double acting spool, 3 positions, A and B closed in neutral position.

1[S] type for mechanical control.

1[S]-EME type for mechatronic control.



**Type 1[S] spool stroke**  
 position 1: + 7 mm / + 0.28 in  
 position 2: - 6.7 mm / - 0.26 in

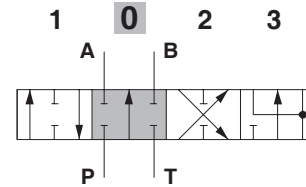
**Type 1[S]-EME spool stroke**  
 position 1: + 6.6 mm / + 0.25 in  
 position 2: - 6.6 mm / - 0.25 in

### 4 positions configuration

Double acting spool, 4 positions, A and B to tank in 4<sup>th</sup> position (float).

1[S] type for mechanical control.

1[S]-EME type for mechatronic control.

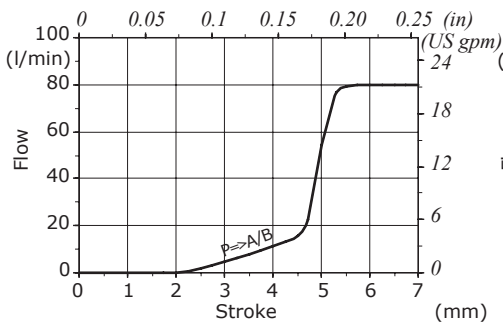


**Type 1[S] spool stroke**  
 position 1: + 7 mm / + 0.28 in  
 position 2: - 6.7 mm / - 0.26 in  
 position 3 (floating): -12 mm / - 0.47 in

**Type 1[S]-EME spool stroke**  
 position 1: + 6.6 mm / + 0.25 in  
 position 2: - 6.6 mm / - 0.25 in  
 position 3 (floating): -11.6 mm / - 0.45 in

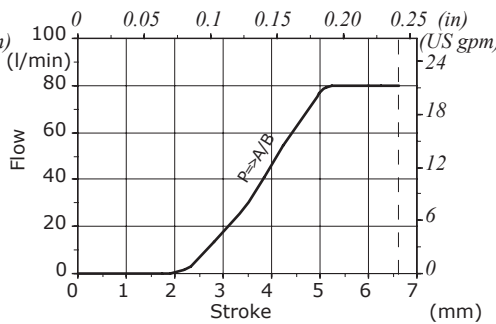
### 1[S] type Spool metering curve

$Q_{in} = 80 \text{ l/min} - 21 \text{ US gpm}$   
 $P = 150 \text{ bar} - 2200 \text{ psi}$

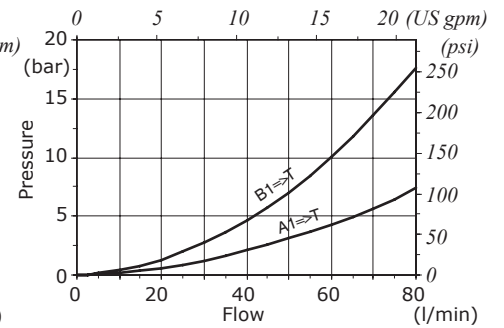


### 1[S]-EME type Spool metering curve

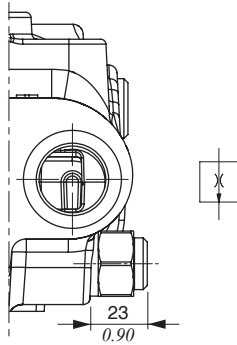
$Q_{in} = 80 \text{ l/min} - 21 \text{ US gpm}$   
 $P = 150 \text{ bar} - 2200 \text{ psi}$



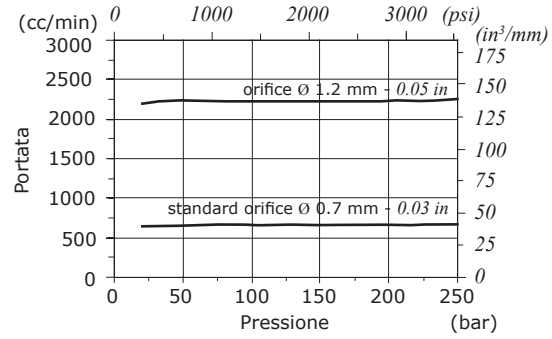
### Pressure drop in float position



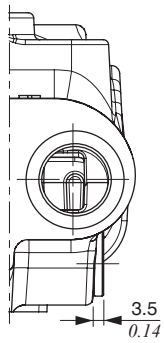
Bleed valves



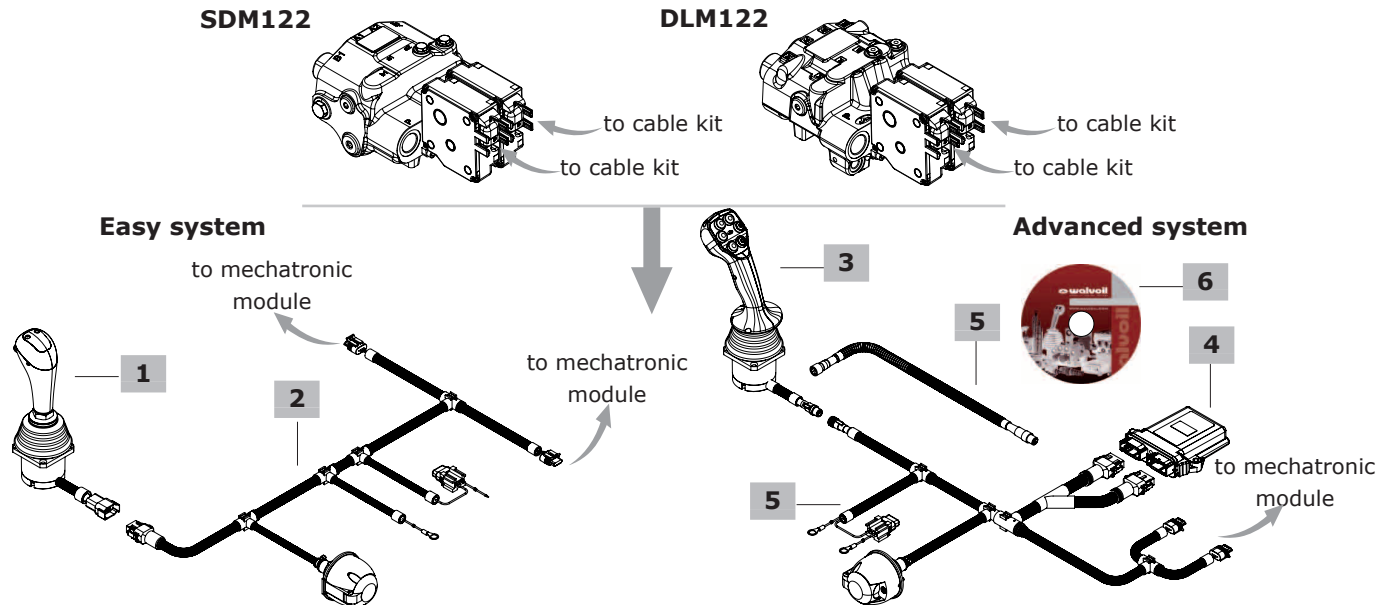
Pressure drop VB bleed valve



Screw with or without metering hole option



### Ordering codes



#### Easy system

##### 1 Joystick

TYPE: CJW2043B-FWV-B-1MV2-2KN5-3MR3-4RL-5VL/  
(D2F08035)-(TC)

CODE: 183530010

DESCRIPTION: Two proportional axis joystick with auxiliary and ON/OFF functions, CAN-Bus, and FWV-B type handle with 3 push-up buttons and symbols according to UNI-EN 12525

Supply voltage from 8 to 31 V

Output CAN protocols SAE J1939

Working temperature from -40° C to +85° C / from -40° F to 185°F

Weather protection IP65

#### Advanced system

##### 3 Joystick

TYPE: CJW2040A-PMB6000AQ-1N2-2N2-3R4-4N2-5Y8-6V9/  
(F1M05150)-(TC)

CODE: 183530017

DESCRIPTION: Two proportional axis joystick with auxiliary and ON/OFF functions, P type handle with 6 push-up buttons

Supply voltage from 8 to 31 V

Output CAN protocols SAE J1939

Working temperature from -40° C to +85° C / from -40° F to 185°F

Weather protection IP65

##### 4 Electronic control unit

TYPE: CED040/WALVOIL/PHC250C-12V/ v6.00

CODE: 183360010

DESCRIPTION: Electronic control unit

Supply voltage from 9 to 16 V

Working temperature from -40° C to +85° C / from -40° F to 185°F

Weather protection IP67 with mating connector attached

##### 2 Cable kit

TYPE: KCD05/D2M06-01CCF07600(TC)-02M2M04345(TC)-  
03M2M04345(TC)-AU2F15734(TC)-AU1730(TC)

CODE: 183480165

DESCRIPTION: Cable kit for directional valve connection to joystick and auxiliary functions

##### 5 Cable kit

TYPE: KCD05/(D2M12-D2M12)-01F1F05080(TC)02CCF07330(TC)-  
03M2M04180(TC)-04M2M04180(TC)-AU1F15350(TC)

CODE: 183480166

DESCRIPTION: Cable kit for directional valve connection to joystick and auxiliary functions

TYPE: F1M05-F1F05(TC)

CODE: 183490001

DESCRIPTION: Extension for cable kit

##### 6 Accessories

TYPE: PROGRAMMING CABLE FOR EME MODULES

CODE: VCAV600020

DESCRIPTION: Programming cable (L=1.5 m / 59 in)

TYPE: WST

CODE: DCDSW0210004

DESCRIPTION: System programming software "Walvoil service tool"

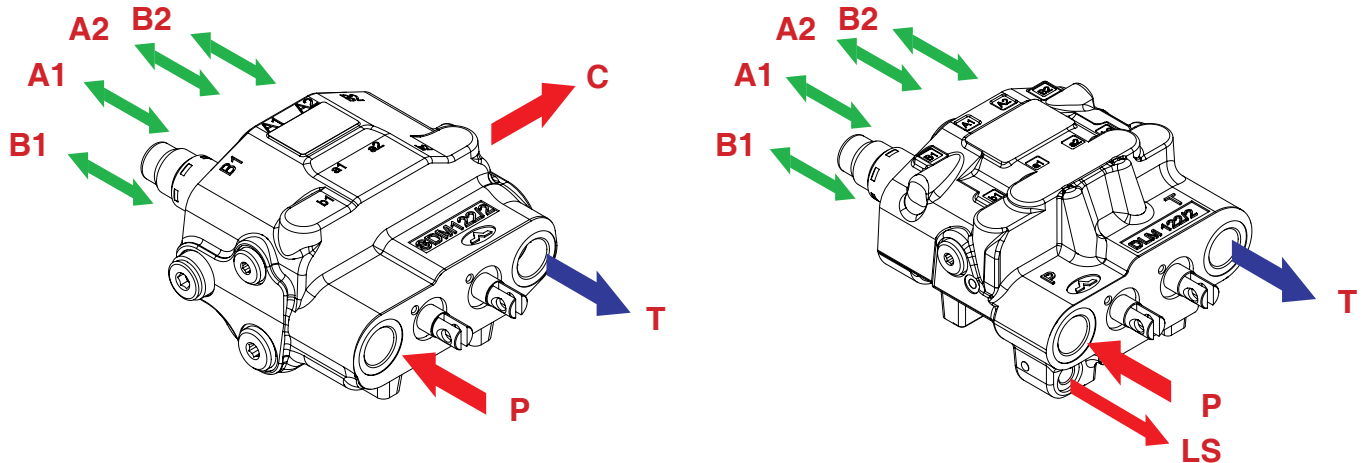
**Note: for technical specifications see the catalog of Electronic components and PHC systems code D1WWEE01E**

**Installation and maintenance**

The SDM122-DLM122 valves are assembled and tested as per the technical specification of this catalogue.

Before the final installation on your equipment, follow the below re commendations:

- the valve can be assembled in any position; in order to prevent body deformation and spool sticking mount the product on a flat surface;
- In order to prevent the possibility of water entering the spool control kit, do not use high pressure wash down directly on the valve;
- prior to painting, ensure plastic port plugs are tightly in place.



**Fitting tightening torque - Nm / lbft**

THREAD TYPE	P and C ports	A and B ports	T port	LS port
BSP	G 3/4	G 1/2	G 3/4	G 1/4
With O-Ring seal	70 / 51.6	50 / 36.9	70 / 51.6	25 / 18.4
With copper washer	70 / 51.6	60 / 44.3	70 / 51.6	30 / 22.1
With steel and rubber washer	70 / 51.6	60 / 44.3	70 / 51.6	16 / 11.8
UN-UNF	1 1/16-12 (SAE 12)	7/8-14 (SAE 10)	1 1/16-12 (SAE 12)	9/16-18 (SAE 6)
With O-Ring seal	95 / 70.1	60 / 44.3	95 / 70.1	30 / 22.1
METRIC	M27 x 2	M22 x 1.5	M27 x 2	M14 x 1.5
With O-Ring seal	90 / 66.4	50 / 36.9	90 / 66.4	25 / 18.4
With copper washer	60 / 44.3	40 / 29.5	60 / 44.3	30 / 22.1
With steel and rubber washer	70 / 51.6	60 / 44.3	70 / 51.6	20 / 14.7

NOTE – These torque are recommended. Assembly tightening torque depends on many factors, including lubrication, coating and surface finish. The manufacturer shall be consulted.

Malfunction	Cause	Remedy
External leakage control kit or opposite side.	Worn spool seal due to mechanical actuation or high back pressure.	Locate the leakage and replace the seal. Check back pressure level.
Excessive internal leakage on A and B ports.	Increase clearance between spools and body due to high wear.	Replace the directional control valve and check the oil contamination level.
Dropping load during transition while raising.	High leakage on the load check valve.	Remove the load check valve and clean the seat.
Inability to build pressure on A and B	Main pressure relief valve blocked open.	Remove and clean or replace the main relief valve.
	Port relief valve open.	Remove and clean or replace the port relief valve.
	Low pump pressure and flow.	Check the pump and the circuit.

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