

MONOBLOCK  
DIRECTIONAL CONTROL VALVE

**S**  
**DM080**



 **walvoil**  
HYDRAULIC CONTROL SYSTEMS

## Features

Simple, compact and heavy duty designed monoblock valves from 1 to 6 sections for open and closed centre hydraulic systems.

H Fitted with a main pressure relief valve and a load check valve.

H Available with parallel or tandem circuit.

H Optional carry-over port.

H Diameter 14 mm - 0.55 in interchangeable spools.

H Available manual, with microswitches and remote with flexible cables spool control kits.

### Additional information

This catalogue shows the product in the most standard configurations.

Please contact Customer Service Dpt. for more detailed information or special request.

### 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.

6<sup>th</sup> edition November 2000:

**This edition supercedes all prior documents.**

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# SDM080

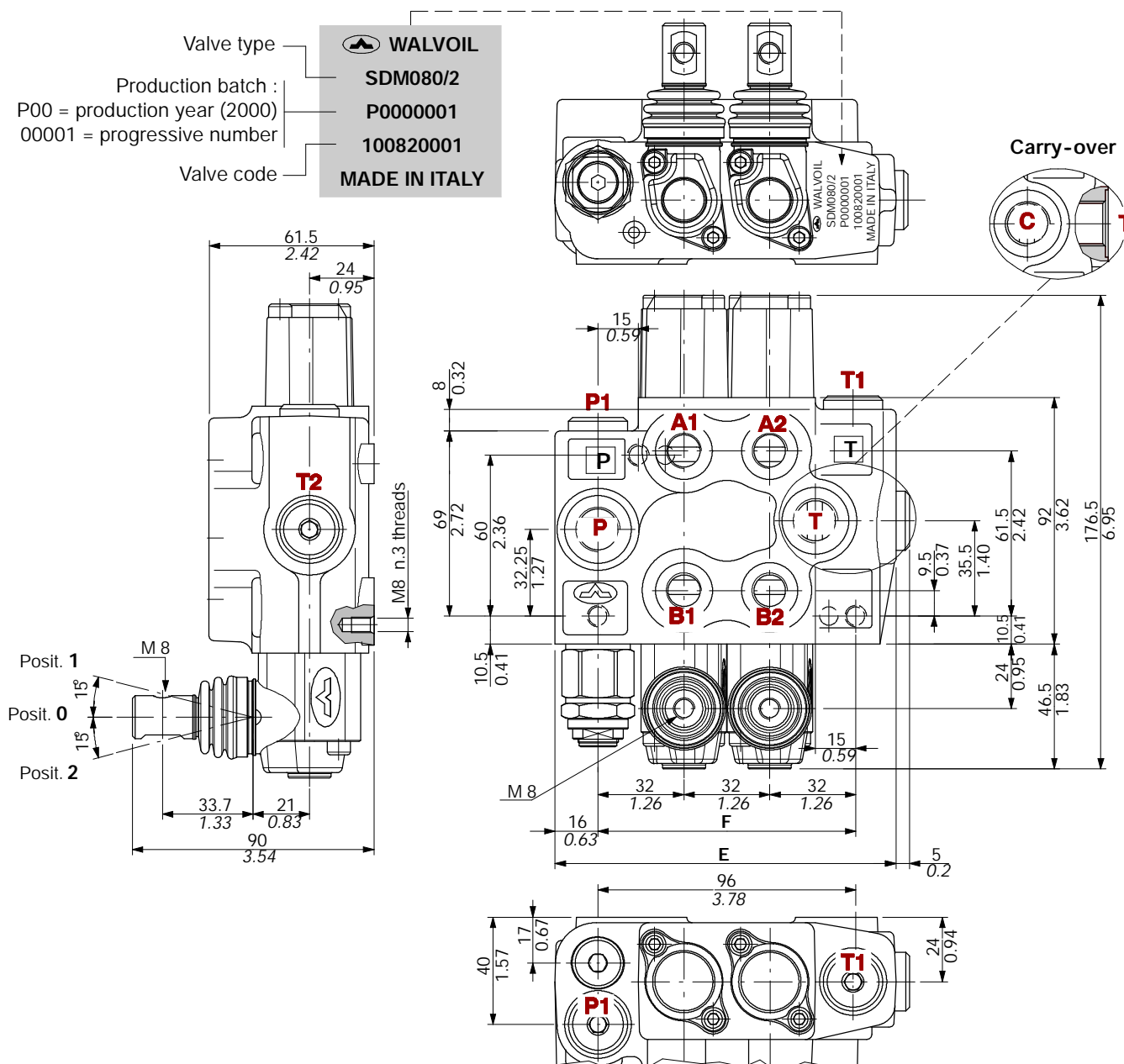
## Working conditions

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

|                              |  |                                  |                           |
|------------------------------|--|----------------------------------|---------------------------|
| Nominal flow rating          |  | 25 l/min                         |                           |
| Operating pressure (maximum) |  | 315 bar                          | 4600 psi                  |
| Max. back pressure           | on outlet port <b>T</b>  | 25 bar                           | 360 psi                   |
| Internal leakage A(B)→T      | $\Delta p=100 \text{ bar} - 1450 \text{ psi}$<br>fluid and valve at 40°C | 3 cm <sup>3</sup> /min           | 0.18 in <sup>3</sup> /min |
| Fluid                        |  | Mineral oil                      |                           |
| Fluid temperature            | with NBR (BUNA-N) seals  | from -20° to 80°C                |                           |
|                              | with FPM (VITON) seals   | from -20° to 100°C               |                           |
| 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 level of contamination   |  | 19/16 - ISO 4406                 |                           |
| Ambient temperature          |  | from -40° to 60°C                |                           |

NOTE - For different conditions please contact Customer Service.

Valve type **WALVOIL**  
**SDM080/2**  
 Production batch : **P0000001**  
 P00 = production year (2000)  
 00001 = progressive number  
**100820001**  
 Valve code **MADE IN ITALY**



| TYPE       | E   |      | F   |      | Weight |     |
|------------|-----|------|-----|------|--------|-----|
|            | mm  | in   | mm  | in   | kg     | lb  |
| SDM080/1-P | 95  | 3.74 | 64  | 2.52 | 2.5    | 5.5 |
| SDM080/2-P | 127 | 5.00 | 96  | 3.78 | 3.5    | 7.7 |
| SDM080/3-P | 159 | 6.26 | 128 | 5.04 | 4.5    | 9.9 |

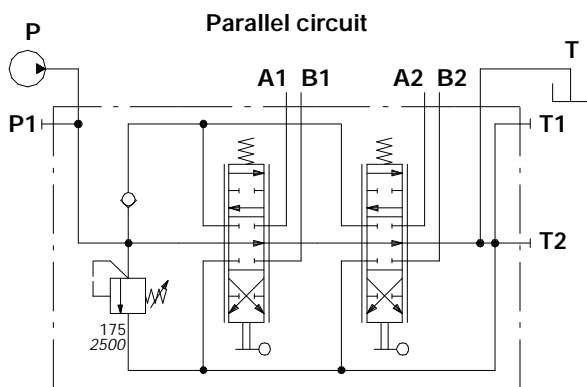
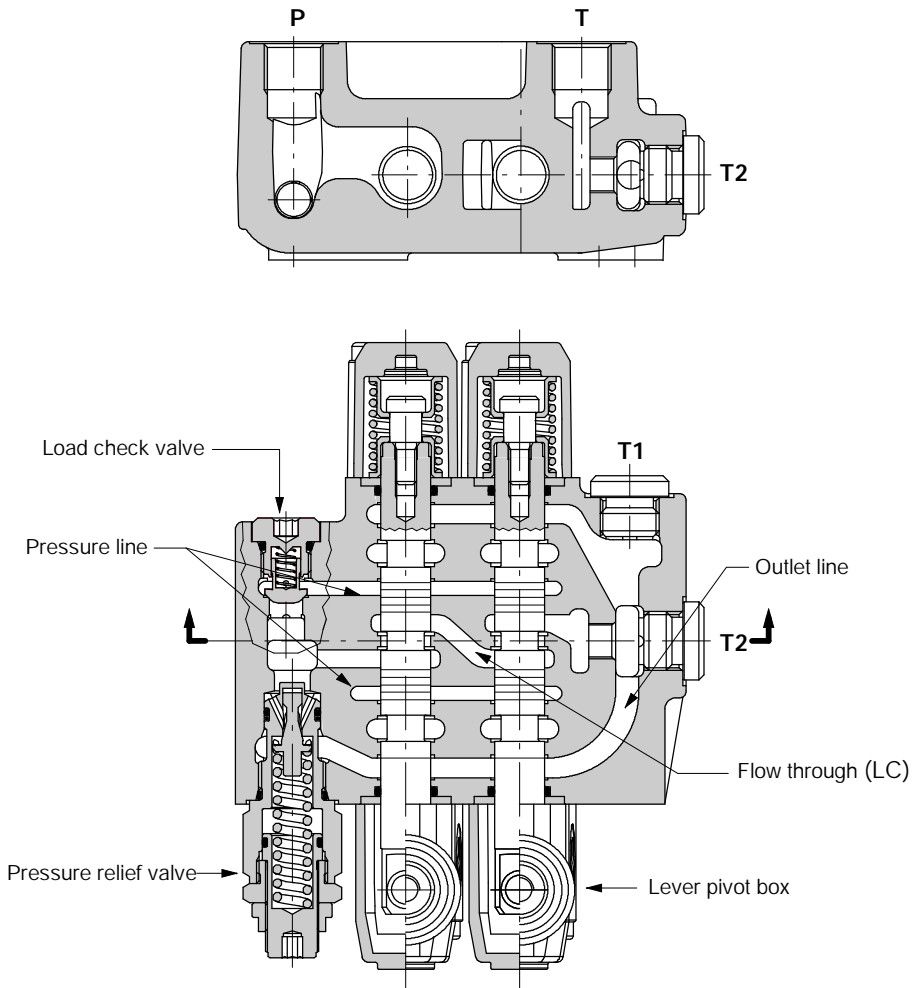
| TYPE       | E   |       | F   |      | Weight |      |
|------------|-----|-------|-----|------|--------|------|
|            | mm  | in    | mm  | in   | kg     | lb   |
| SDM080/4-P | 191 | 7.52  | 160 | 6.30 | 5.5    | 12.2 |
| SDM080/5-P | 223 | 8.78  | 192 | 7.56 | 6.5    | 14.3 |
| SDM080/6-P | 255 | 10.04 | 224 | 8.82 | 7.5    | 16.5 |

## Standard threads

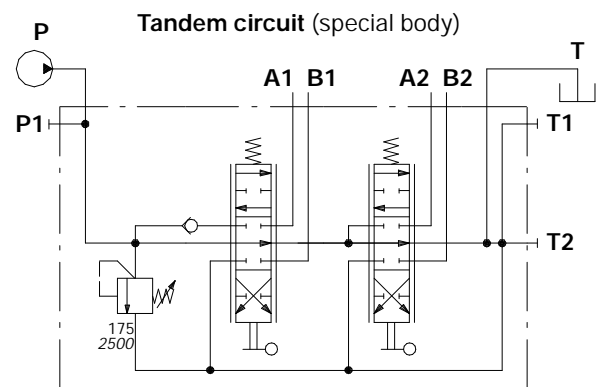
| PORT                                   | BSP<br>(ISO 228/1) | UN-UNF<br>(ISO 11926-1) | METRIC<br>(ISO 6149-1) |
|--|--------------------|-------------------------|------------------------|
| Inlet <b>P</b> and carry-over <b>C</b> | G 3/8              |                         | M18x1.5                |
| <b>A</b> and <b>B</b> ports            | G 1/4              | 9/16-18 UNF-2B (SAE 6)  | M14x1.5                |
| Outlet <b>T</b>                        | G 3/8              |                         | M18x1.5                |

## Hydraulic circuit

Standard execution with left inlet in relation to the lever pivot box and top inlet and outlet ports (**PSA** configuration).



Ex.: SDM080/2-P(TG3-175)/18L/18L/PSA



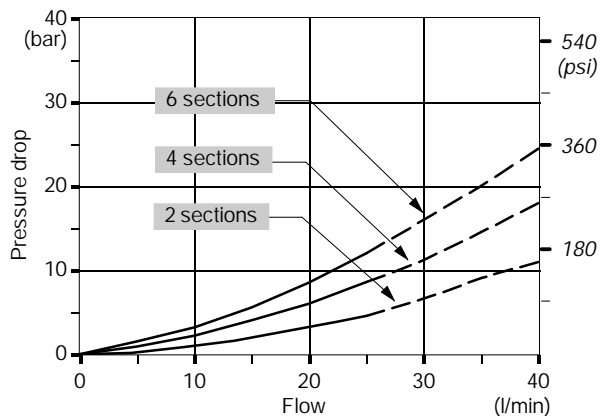
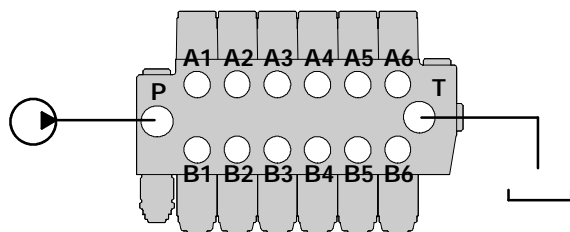
Ex.: SDM080/2-SP1(TG3-175)/18L/18L/PSA

NOTE - A simmetrical body allows the reverse assembly of spools and relative control kits (right inlet ED).

## Performance data (pressure drop vs. flow)

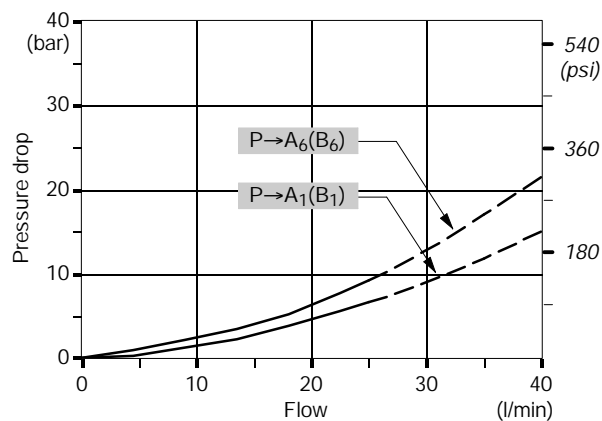
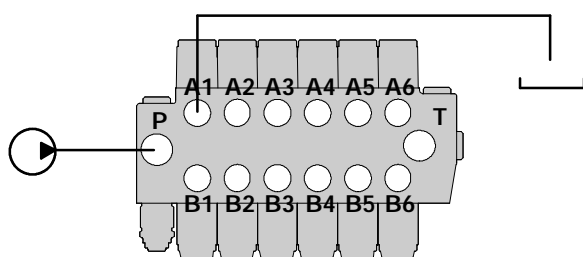
## Open centre

From upper inlet to upper outlet (PSA configuration).



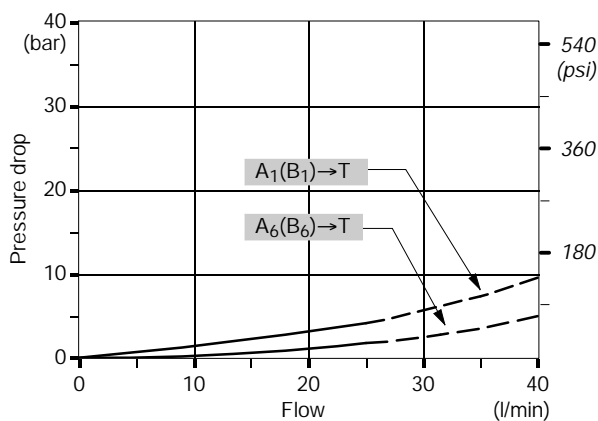
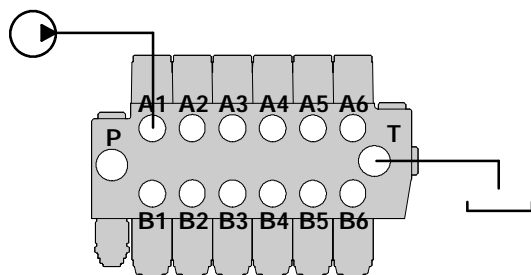
## Inlet to work port

From upper inlet to A port (spool in position 1) or B port (spool in position 2).



## Work port to outlet

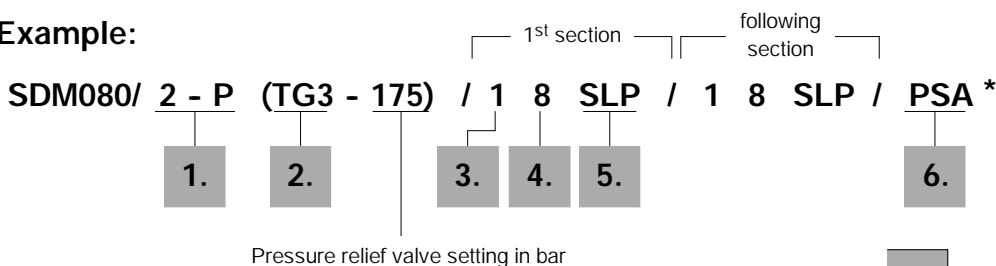
From A port (spool in position 2) or B port (spool in position 1) to upper outlet



NOTE - Measured with spool type 1.

## Ordering codes

Example:



### 1. Body kit \*

| TYPE | CODE       | DESCRIPTION         |
|------|------------|---------------------|
| 1-P  | 5KC5113000 | Parallel 1 section  |
| 2-P  | 5KC5123000 | Parallel 2 sections |
| 3-P  | 5KC5133000 | Parallel 3 sections |
| 4-P  | 5KC5143000 | Parallel 4 sections |
| 5-P  | 5KC5153000 | Parallel 5 sections |
| 6-P  | 5KC5163000 | Parallel 6 sections |

Include body, seals and load check valve.

### 2. Inlet relief options

page 10

| TYPE  | CODE       | DESCRIPTION  |
|---|------------|--|
| <u>VMD080 direct pressure relief valve type T</u> |            |  |
| (TG2-80)  | X162121080 | Range 63 to 125 bar / 900 to 1800 psi<br>standard setting 80 bar / 1150 psi    |
| (TG3-175)   | X162121175 | Range 100 to 200 bar / 1450 to 2900 psi<br>standard setting 175 bar / 2500 psi |
| (TG4-250)   | X162121250 | Range 160 to 250 bar / 2300 to 3600 psi<br>standard setting 250 bar / 3600 psi |

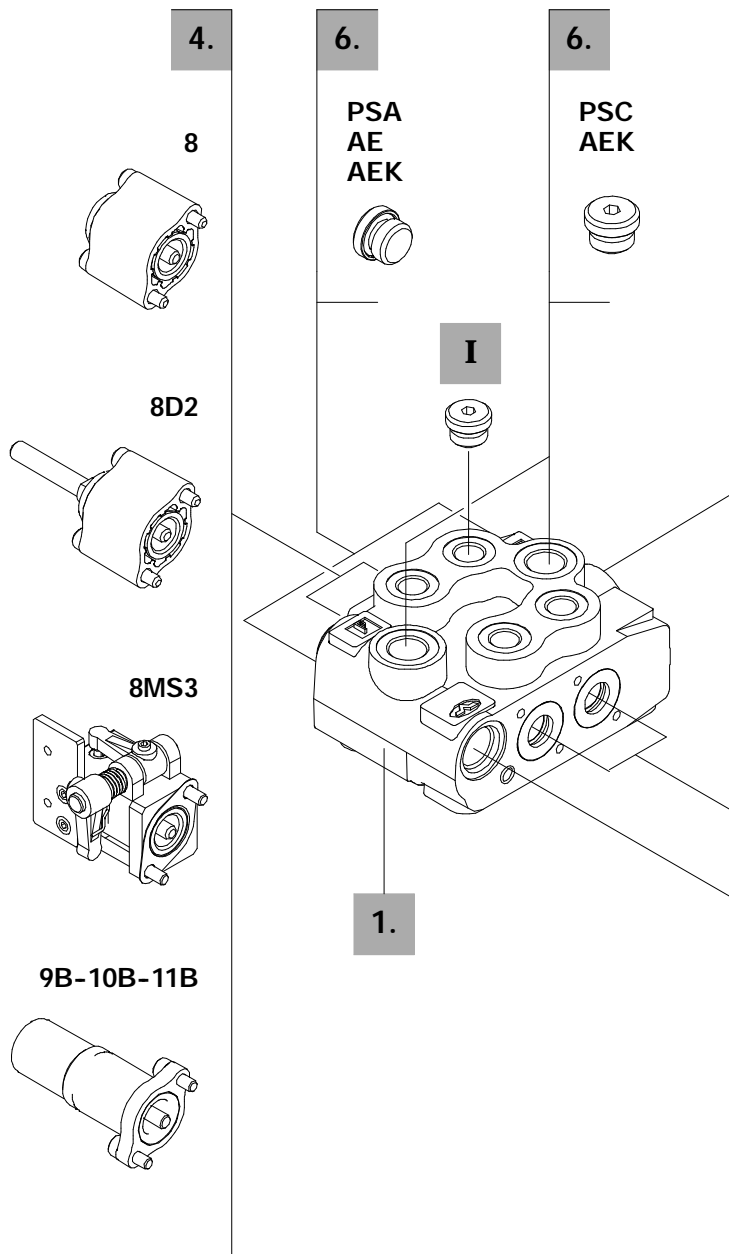
Standard setting is referred to 10 l/min flow.

|    |            |                            |
|----|------------|----------------------------|
| SV | XTAP524340 | Relief valve blanking plug |
|----|------------|----------------------------|

### 3. Spool options

page 11

| TYPE      | CODE       | CIRCUIT DESCRIPTION  |
|-----------|------------|--|
| 1         | 3CU1010130 | Double acting, 3 positions, with A and B closed in neutral position  |
| 1CS       | 3CU1010200 | Double acting, 3 positions, with A and B closed in neutral position, for flow up to 12 l/min - 3.17 US gpm |
| 1PA(55)BH | 3CU1011100 | Double acting, 3 positions, with anti-shock valve on port A<br>(set to 55 bar / 800 psi)                   |
| 1PB(190)  | 3CU1011200 | Double acting, 3 positions, with anti-shock valve on port B<br>(set to 190 bar / 2760 psi)                 |
| 2CS       | 3CU1025130 | Double acting, 3 positions, with A and B open to tank in neutral position                                  |
| 3CS       | 3CU1031130 | Single acting on A, 3 positions, B plugged; needs G1/4 plug (see part I)                                   |





4. "A" side spool positioners *page 16*

| TYPE | CODE       | DESCRIPTION  |
|------|------------|--|
| 8    | 5V08102000 | With spring return in neutral position   |
| 8D   | 5V08102200 | With spring return in neutral position and extension pin with M6 female thread for dual control                        |
| 8D2  | 5V08102220 | With spring return in neutral position and extension pin with M8 thread for dual control                               |
| 8MS3 | 5V08102553 | With spring return in neutral position, operation in position 1 and 2, prearranged for centralized microswitch control |
| 9B   | 5V09202010 | With detent in position 1 and spring return in neutral position  |
| 10B  | 5V10202010 | With detent in position 2 and spring return in neutral position  |
| 11   | 5V11102000 | With detent in positions neutral, 1 and 2  |
| 11B  | 5V11202010 | With detent in positions 1 and 2, spring return in neutral position  |

5. "B" side options *page 20*

| TYPE | CODE       | DESCRIPTION                          |
|------|------------|--------------------------------------|
| L    | 5LEV102010 | Standard lever box                   |
| SLP  | 5COP102000 | Without lever, with dust-proof plate |
| TQ   | 5TEL102100 | Cable connection                     |
| LCB  | 5CLO102000 | Mechanical joystick                  |

6. Inlet and outlet port options \* *page 23*

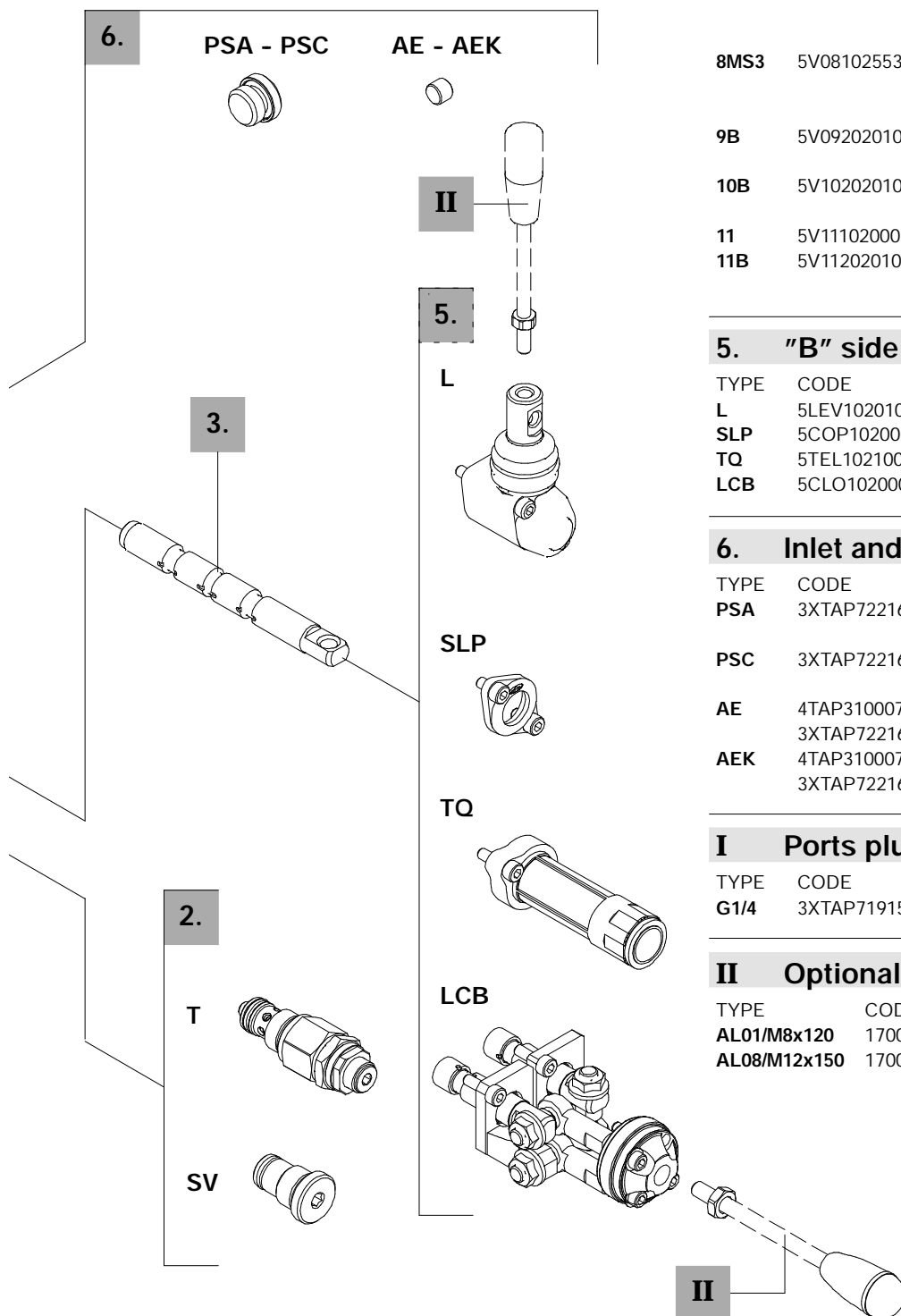
| TYPE | CODE                      | DESCRIPTION   |
|------|---------------------------|---|
| PSA  | 3XTAP722160               | Upper inlet and outlet<br>(n.3 G 3/8 plugs required)          |
| PSC  | 3XTAP722160               | Cap side inlet and outlet<br>(n.3 G 3/8 plugs required)       |
| AE   | 4TAP310007<br>3XTAP722160 | M10x1 plug for carry-over<br>(n.2 G 3/8 plugs required)       |
| AEK  | 4TAP310007<br>3XTAP722160 | M10x1 for closed center circuit<br>(n.3 G 3/8 plugs required) |

## I Ports plug \*

| TYPE | CODE        | DESCRIPTION                    |
|------|-------------|--------------------------------|
| G1/4 | 3XTAP719150 | For single acting spool type 3 |

## II Optional hand levers

| TYPE         | CODE      | DESCRIPTION                           |
|--------------|-----------|---------------------------------------|
| AL01/M8x120  | 170011012 | For L lever box L = 120 mm / 4.72 in  |
| AL08/M12x150 | 170013115 | For LCB joystick L = 150 mm / 5.91 in |

NOTE (\*) - Items are referred to **BSP** thread.

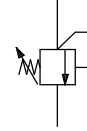
# SDM080

## Inlet relief options

### Pressure relief valve

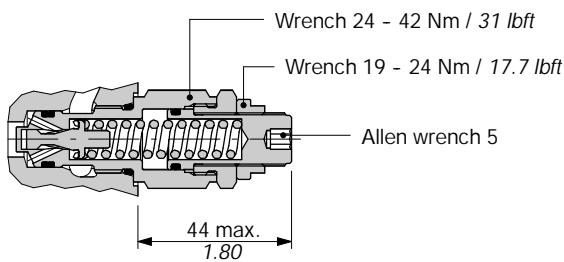
VMD080 ( T G 3 - 175 )

- Pressure setting in bar (standard 175 bar - 2500 psi).
- Adjustable spring type (2, 3, 4).
- Adjustment type (G, Z).

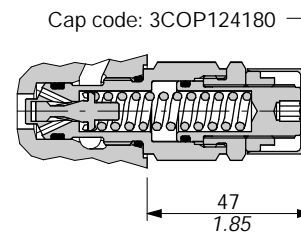


### Adjustment type

**G:** with screw

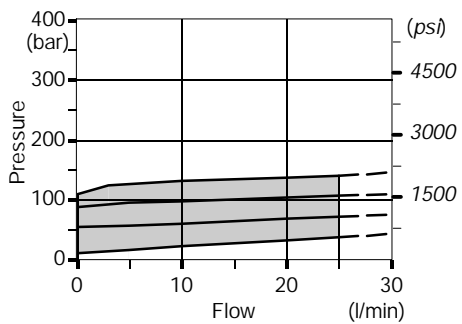


**Z:** with iron tamper proof cap

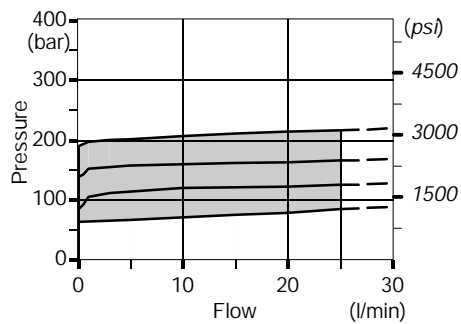


### Performance data

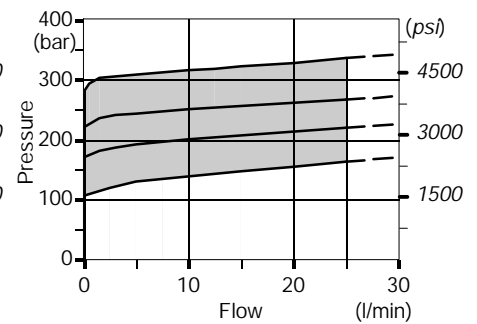
Spring nr. 2



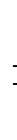
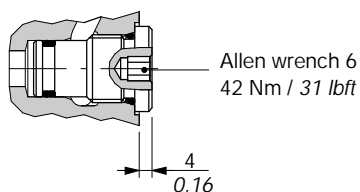
Spring nr. 3



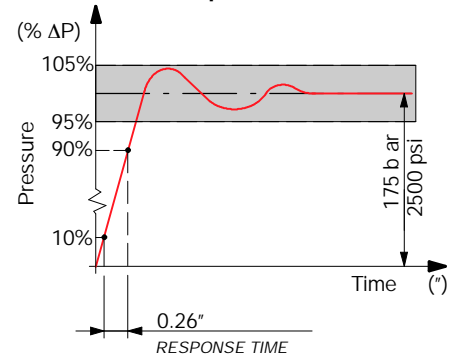
Spring nr. 4



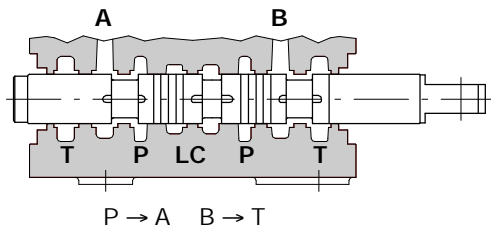
### SV: relief valve blanking plug



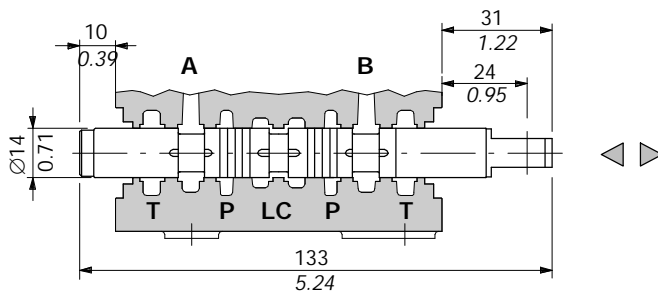
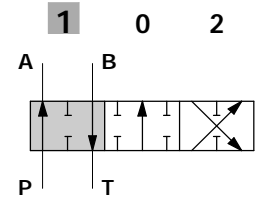
Response time



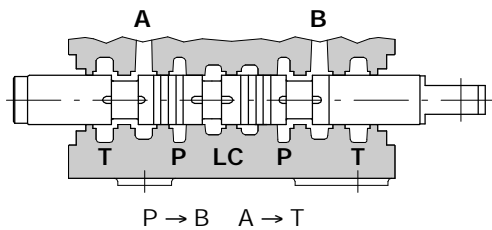
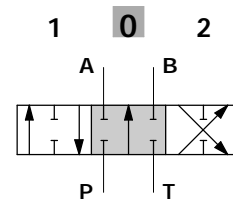
**Type 1**



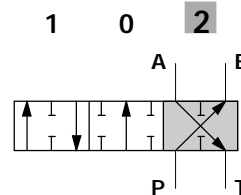
" stroke = + 5,5mm  
+ 0.22 in



P-A-B-T closed, with flow through line (LC) open

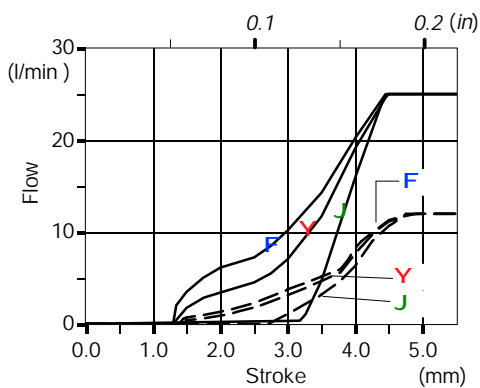


A stroke = - 5,5mm  
- 0.22 in



**Performance data**

**Spool metering P→A(B)**

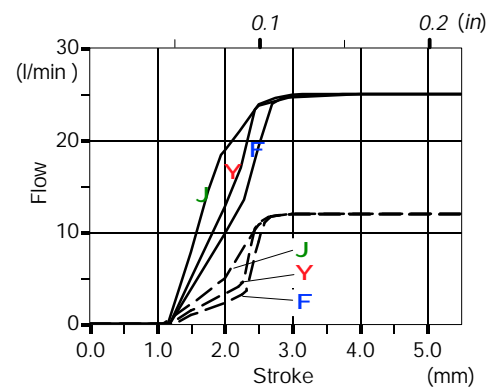


— = Type 1  
Q<sub>in</sub> = 25 l/min

- - - = Type 1CS  
Q<sub>in</sub> = 12 l/min

F P<sub>(on ports)</sub> = 63bar/900psi  
Y P<sub>(on ports)</sub> = 100bar/1450psi  
J P<sub>(on ports)</sub> = 250bar/3600psi

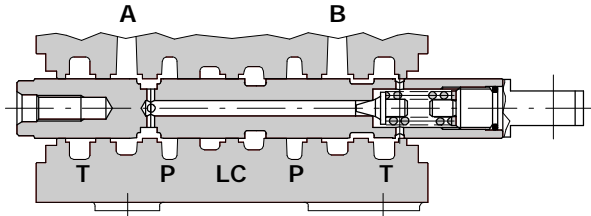
**Spool metering A(B)→T**



# SDM080

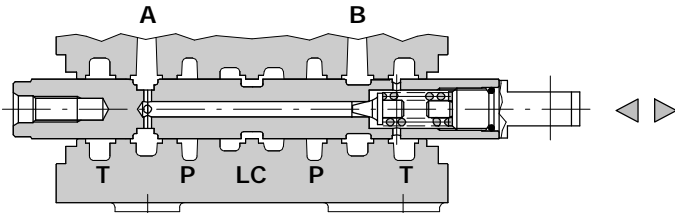
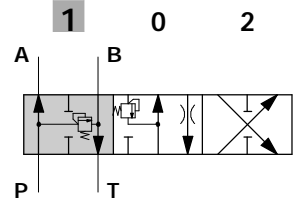
## Spool options

### Type 1PA(55)BH

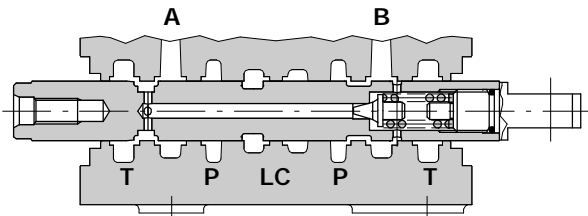
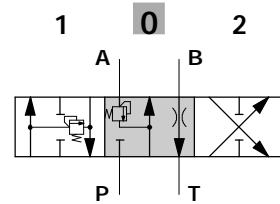


P → A B → T

stroke = + 5.5mm  
+ 0.22 in

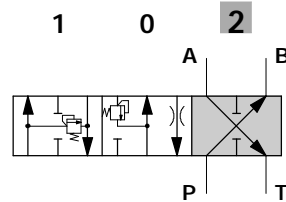


P-A closed, B partially open to T



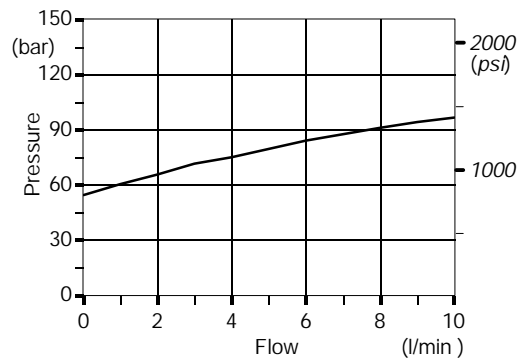
P → B A → T

A stroke = - 5.5mm  
- 0.22 in

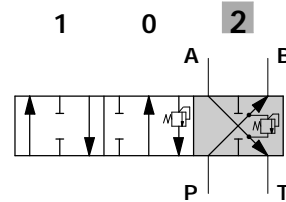
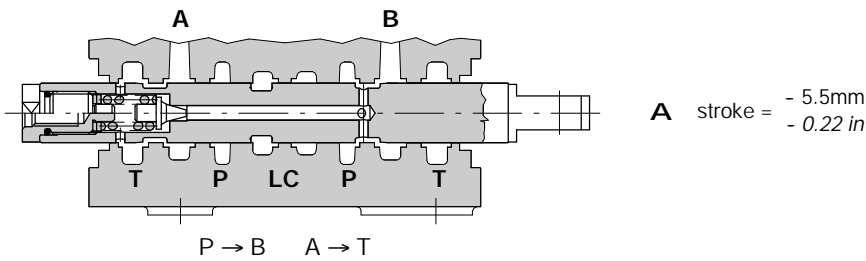
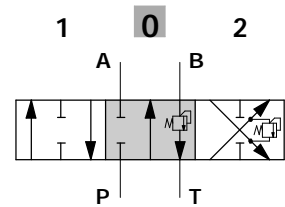
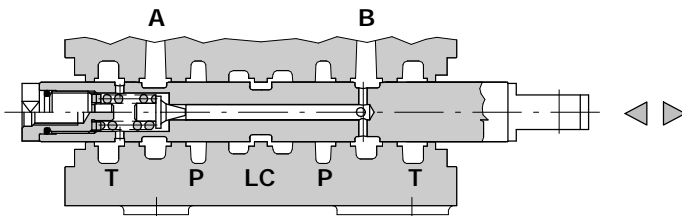
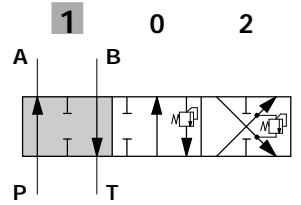
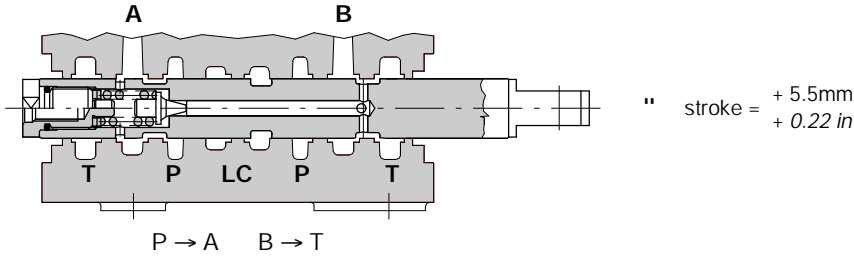


## Performance data

Pressure-flow diagram

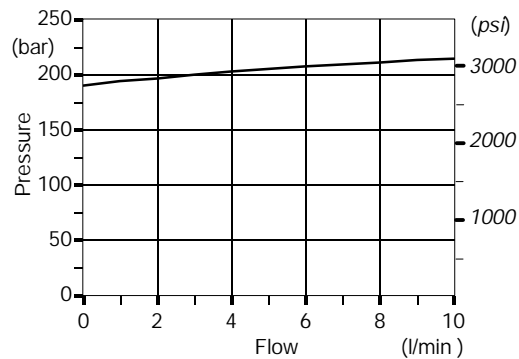


Type 1PB(190)



Performance data

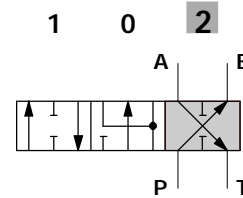
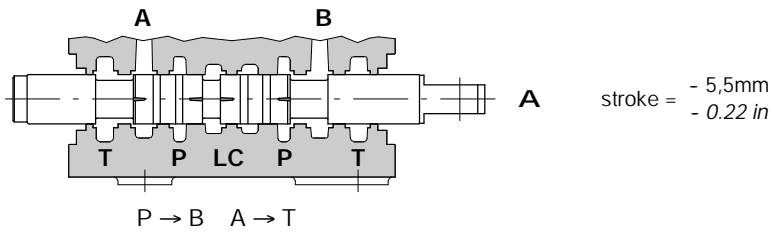
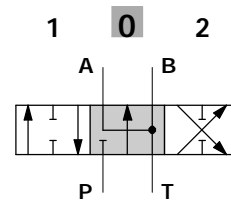
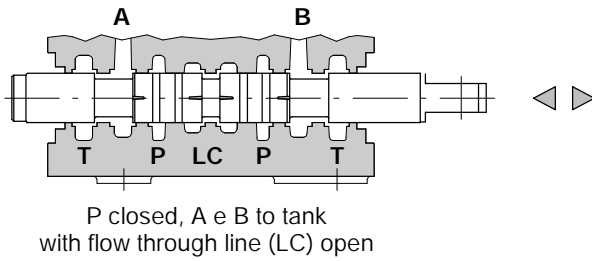
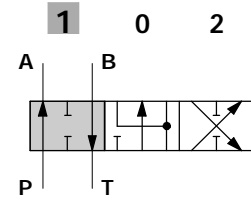
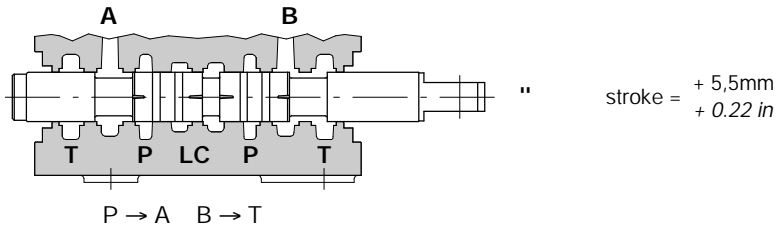
Pressure-flow diagram



# SDM080

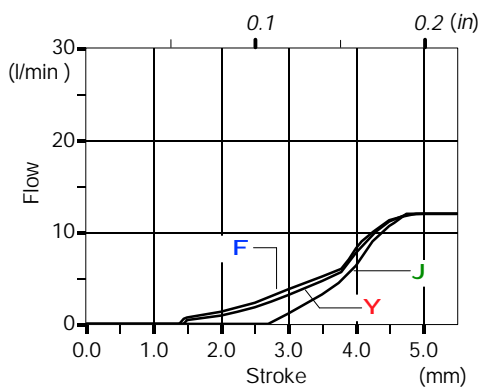
## Spool options

### Type 2CS



### Performance data

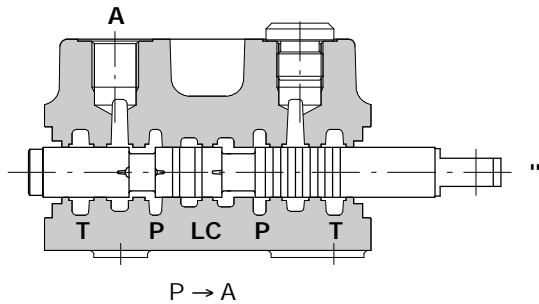
#### Spool metering P→A(B)



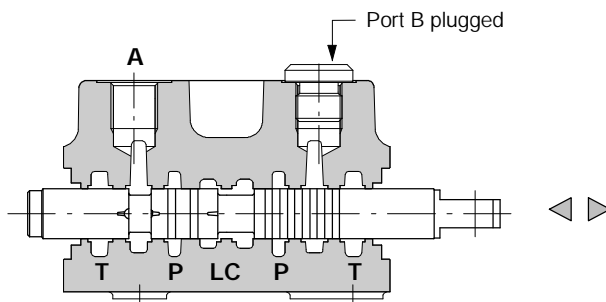
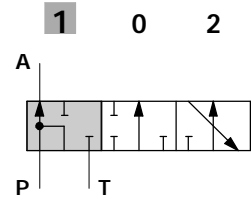
Q<sub>in</sub> = 12 l/min

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- Y P<sub>(on ports)</sub> = 100bar/1450psi
- J P<sub>(on ports)</sub> = 250bar/3600psi

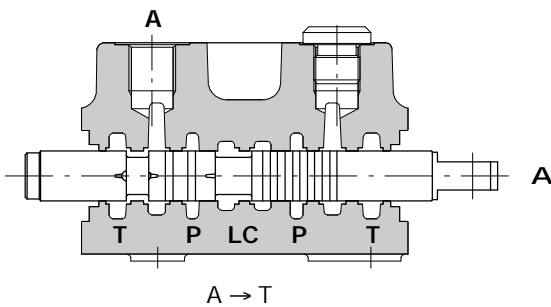
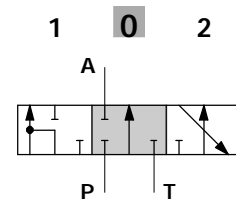
Type 3CS



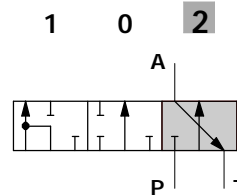
stroke = + 5,5mm  
+ 0.22 in



P-A-T closed, with flow through line (LC) open

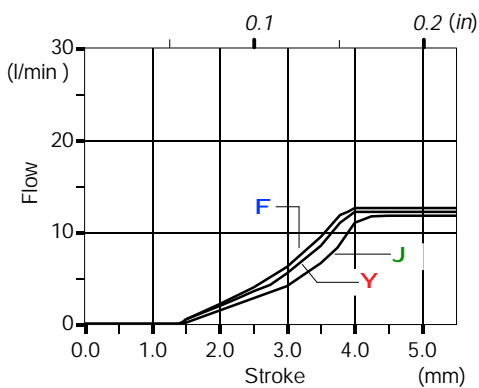


stroke = - 5,5mm  
- 0.22 in



Performance data

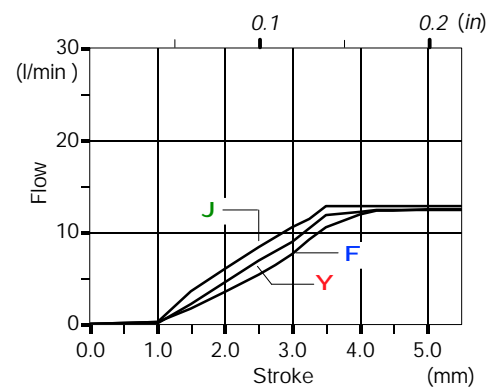
Spool metering P→A



Q<sub>in</sub> = 12 l/min

- F P<sub>(on ports)</sub> = 63bar/900psi
- Y P<sub>(on ports)</sub> = 100bar/1450psi
- J P<sub>(on ports)</sub> = 250bar/3600psi

Spool metering A→T



# SDM080

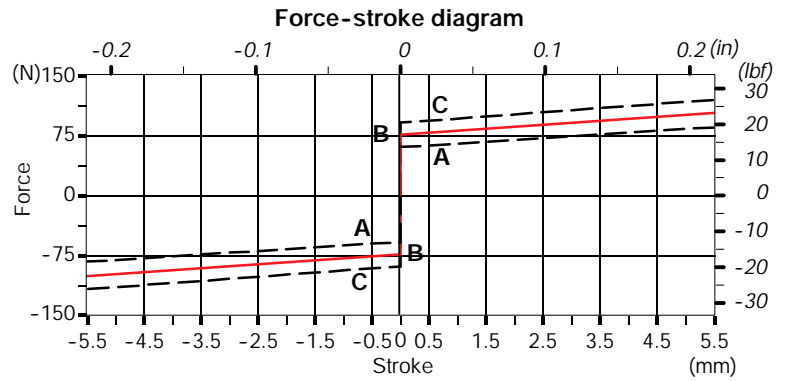
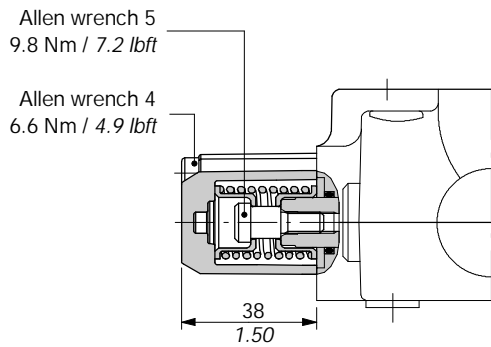
## "A" side spool positioners

### With spring return

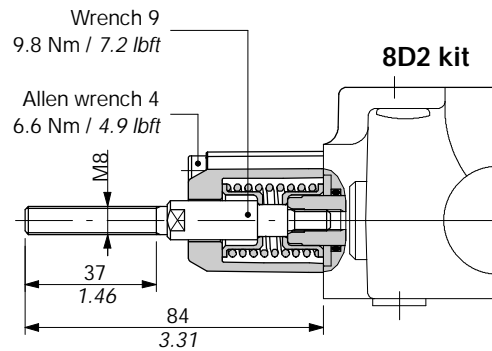
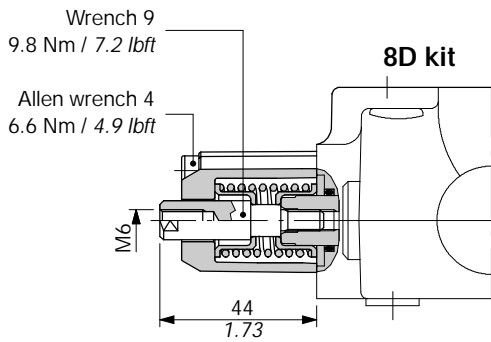
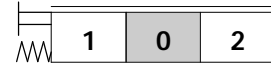
#### 8 kit

Supplied with standard spring type B (see force-stroke diagram).

Available with lighter spring type A (**8MA** code: 5V08302000) or heavier type C (**8MC** code: 5V08202000).



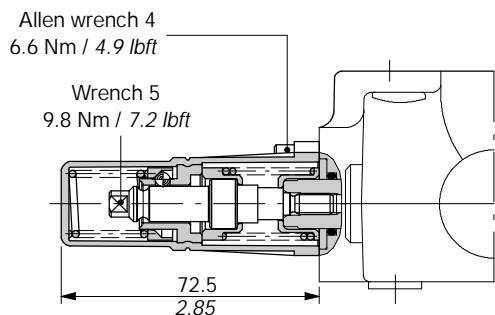
### 8D-8D2 kits for dual control





**With detent**

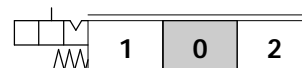
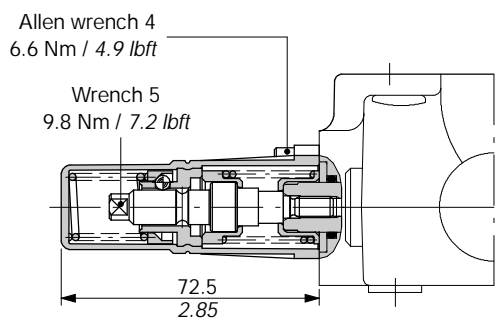
**9B kit**



**Operating features**

Unlocking force . . . . . : 200 N / 45 lbf ±10%

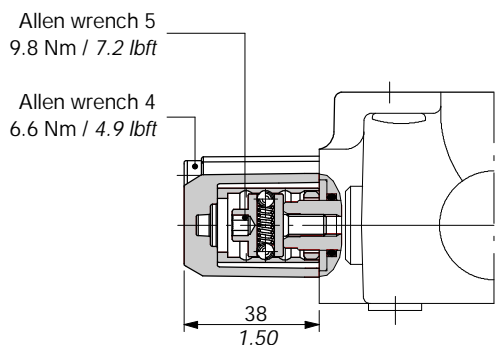
**10B kit**



**Operating features**

Unlocking force . . . . . : 200 N / 45 lbf ±10%

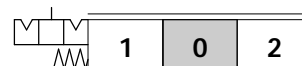
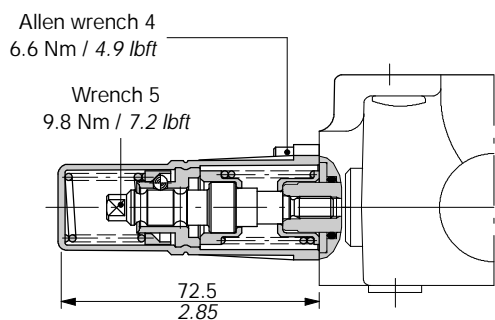
**11 kit**



**Operating features**

Locking force . . . . . : 100 N / 22.5 lbf ±10%  
 Unlocking force . . . . . : 100 N / 22.5 lbf ±10%

**11B kit**



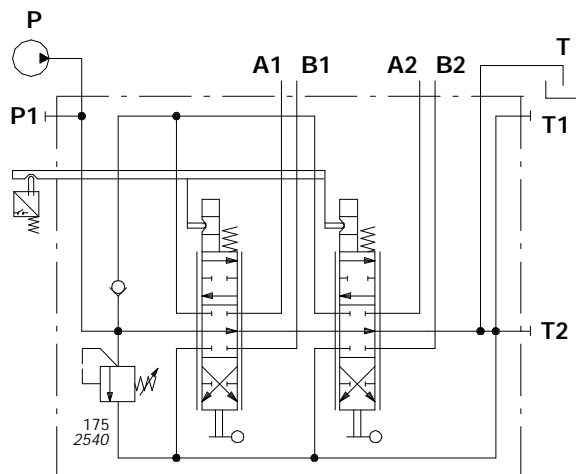
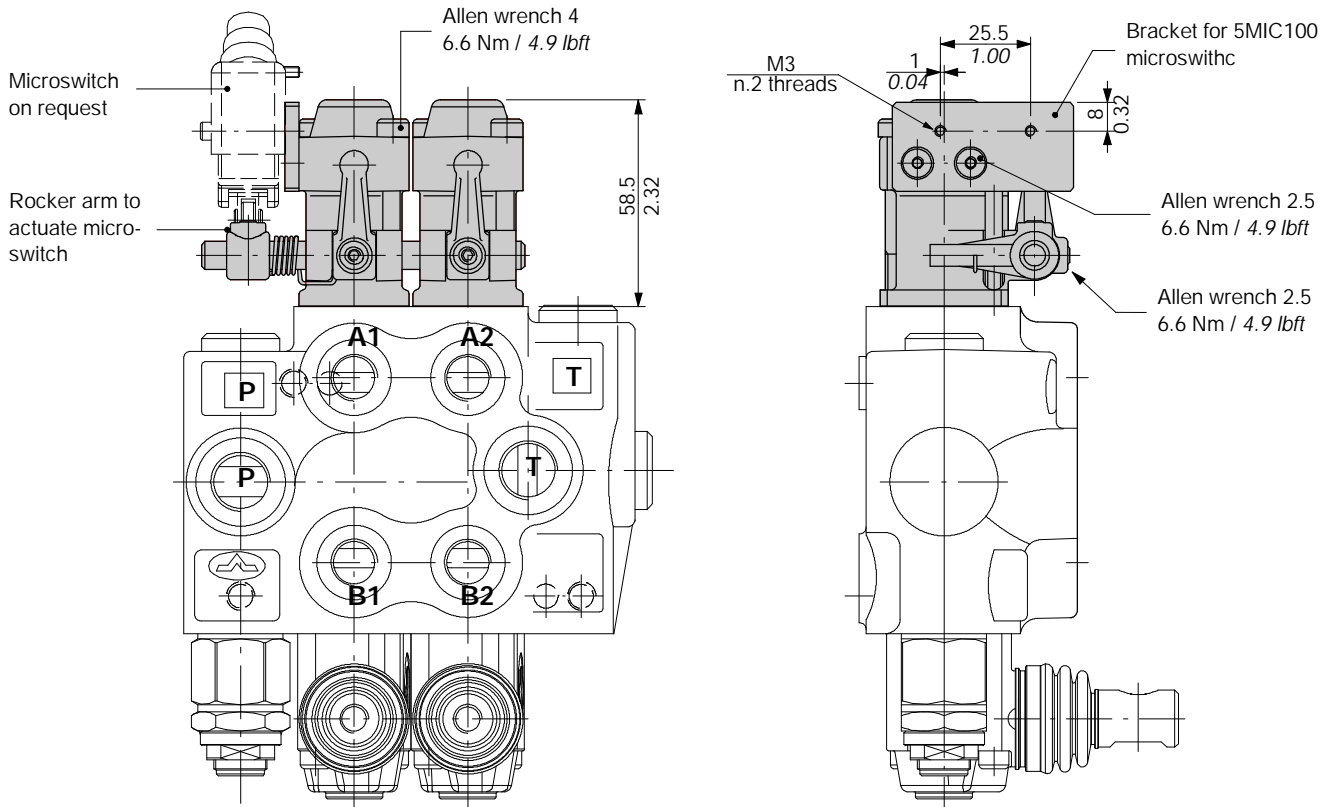
**Operating features**

Unlocking force . . . . . : 200 N / 45 lbf ±10%

## "A" side spool positioners

### 8MS3 kit: with centralized microswitch control

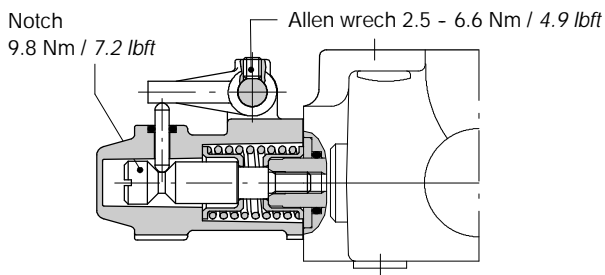
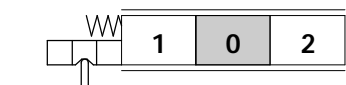
#### Example of a two section valve assembly



Ex.: SDM080/2-P(TG3-175)/18MS3L/18MS3L/PSA - **KM 2 S 51**

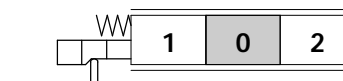
Assembling kit  
 Nr. of working sections  
 51 = with bracket for IP51 microswitch fixing  
 67 = with bracket for IP67 microswitch fixing  
 S = bracket placed on left  
 D = bracket placed on right

**8MS3 kit: with centralized microswitch control**

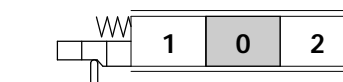


**Other configurations**

**8MS1 kit**  
microswitch operation in position 1



**8MS2 kit**  
microswitch operation in position 2

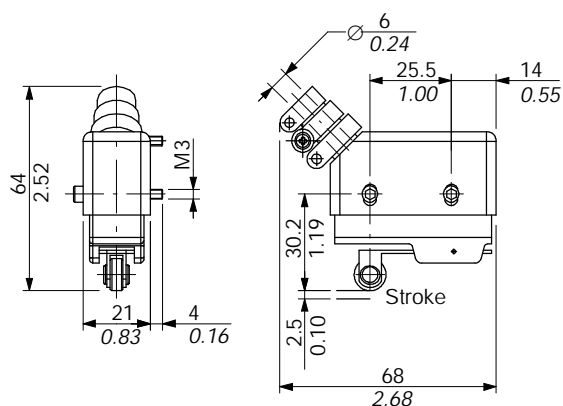


**Microswitches for 8MS kits**

Complete with rubber cover and mounting screws



**M51 code: 5MIC100**

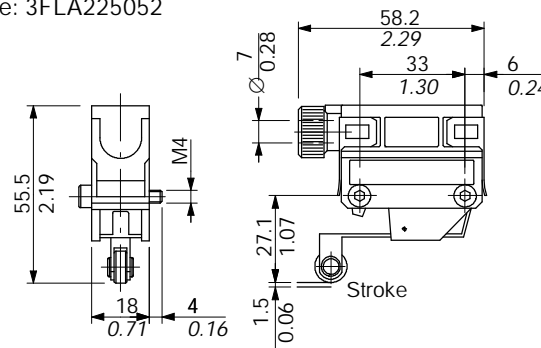


**Operating features**

Current / voltage max. .... : 15 A / 480 VAC  
 : 0,25 A / 250 VDC  
 Weather protection ..... : IP51

**M67 code: 5MIC200**

Dedicated bracket is needed for the assembly  
 code: 3FLA225052



**Operating features**

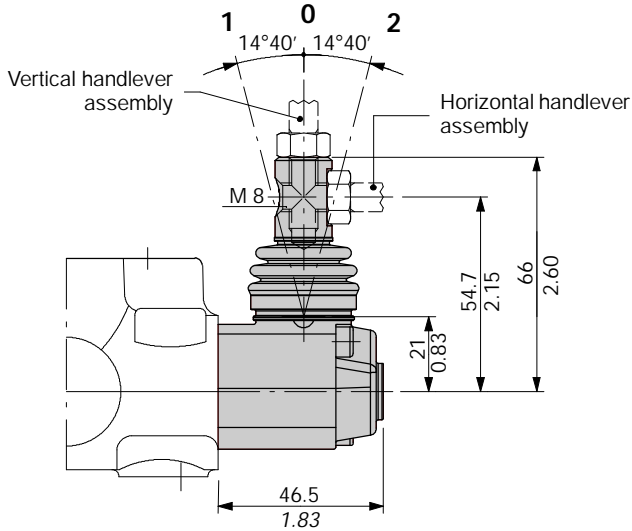
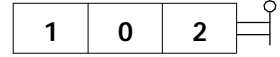
Current / voltage max. .... : 5 A / 250 VAC  
 : 0,25 A / 230VDC  
 Weather protection ..... : IP67

# SDM080

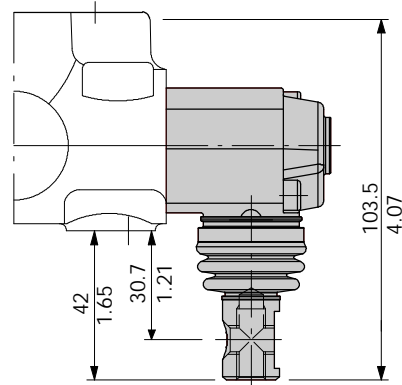
## "B" side options

### Lever box L

Reinforced nylon with protection boot lever pivot box; it can be rotated 180° (L180 configuration).



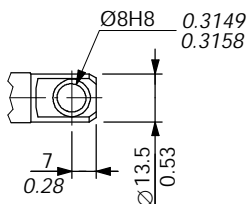
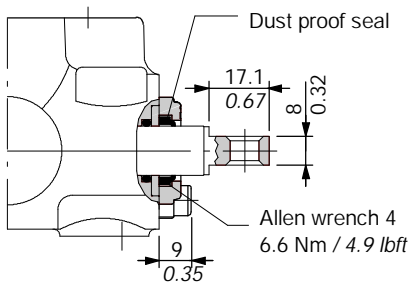
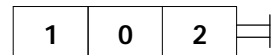
L180 configuration



NOTE - The handle lever must be ordered separately (see page 9).

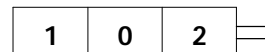
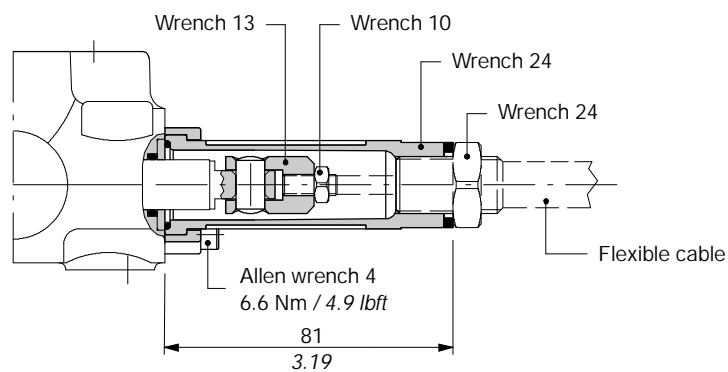
### Dust proof plate SLP

Mechanical control with dust proof plate

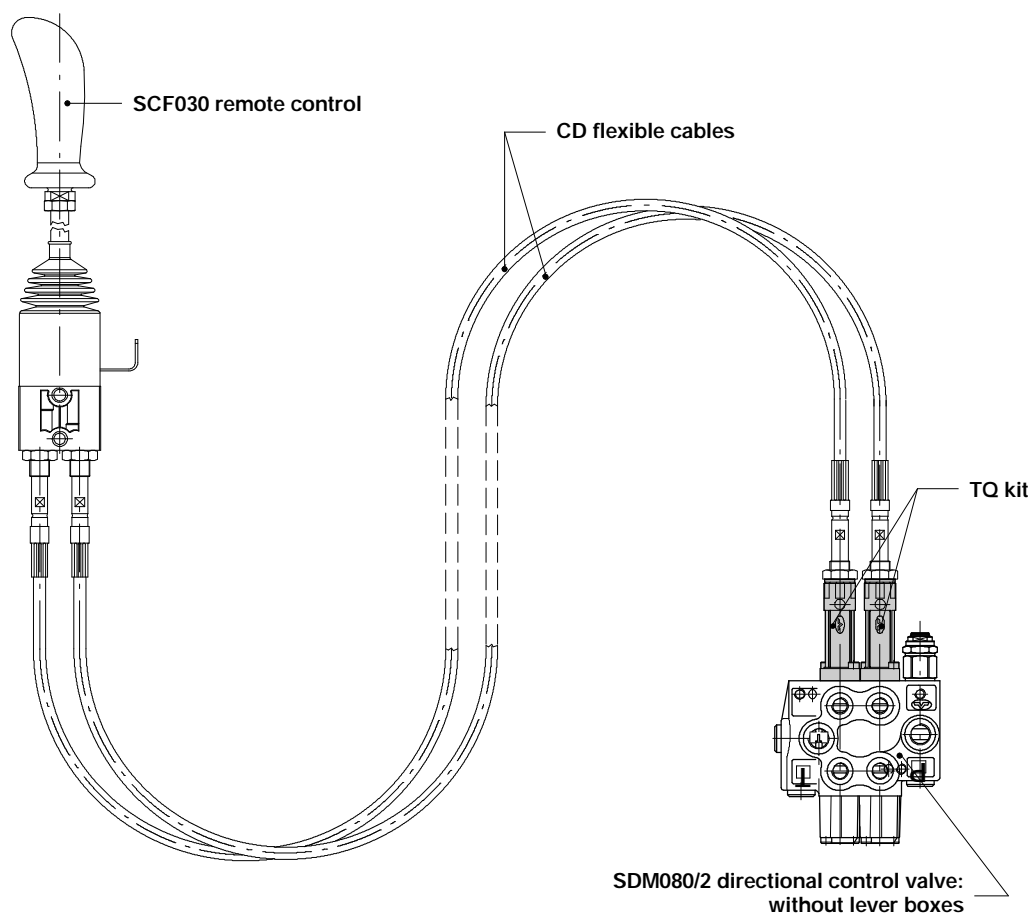


## TQ cable connection

Waterproof cap for remote control with flexible cable.



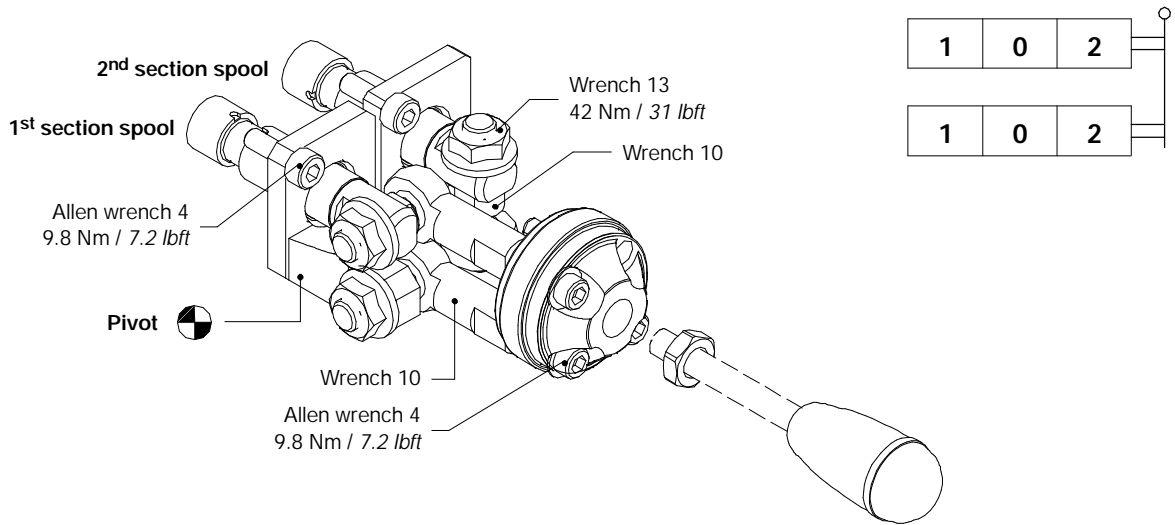
## Example of cable control



NOTE - For more information concerning remote cable control require appropriate documentation.

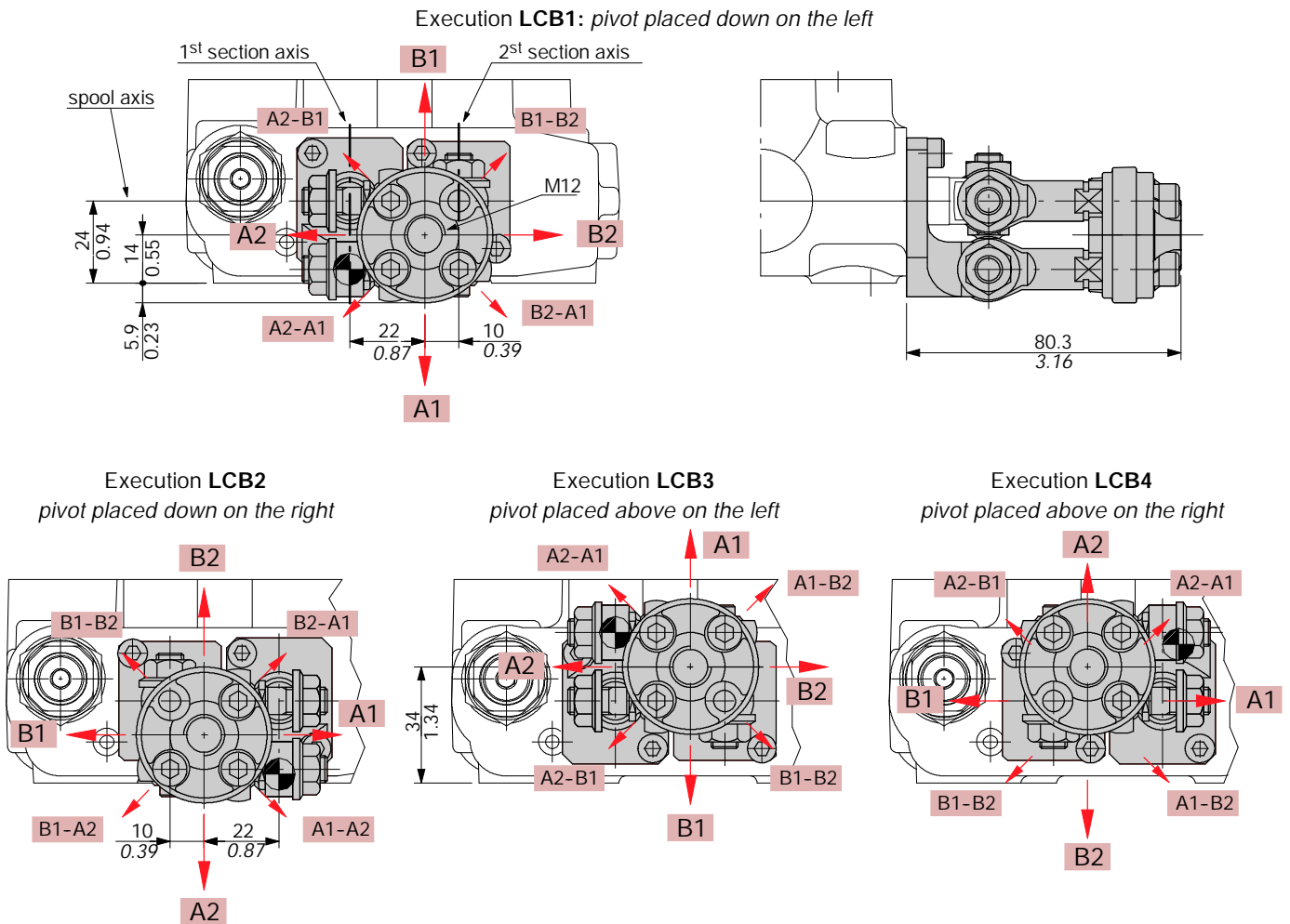
## "B" side options

### Mechanical joystick LCB



NOTE - The handlever must be ordered separately (see page 9).

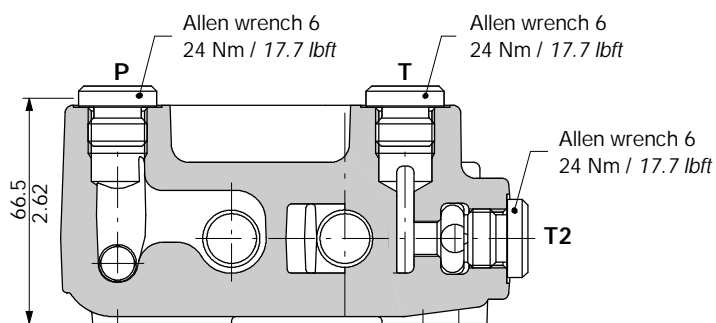
### Dimensions and movement scheme



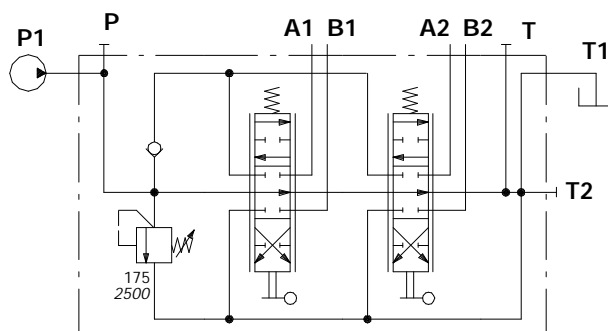
### PSA: upper (standard)

See page 6

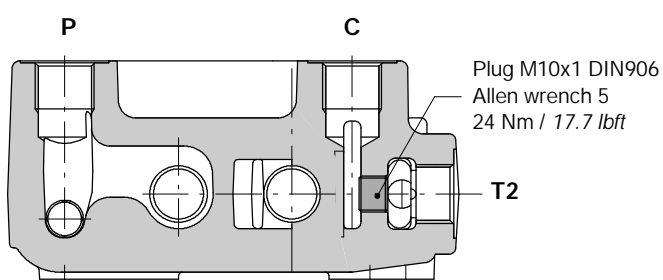
### PSC: "A" control side



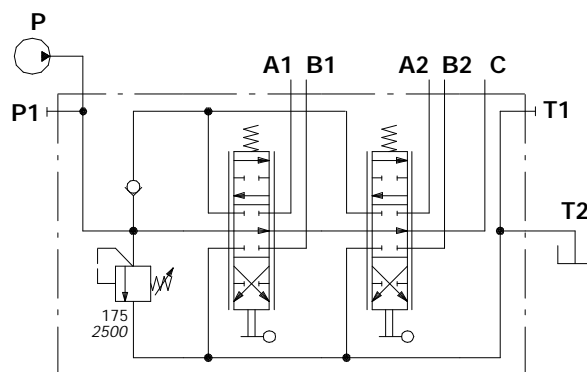
Ex.: SDM080/2-P(TG3-175)/18L/18L/PSC



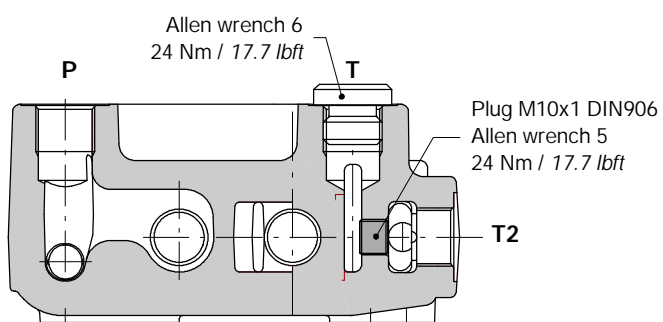
### AE: with carry-over



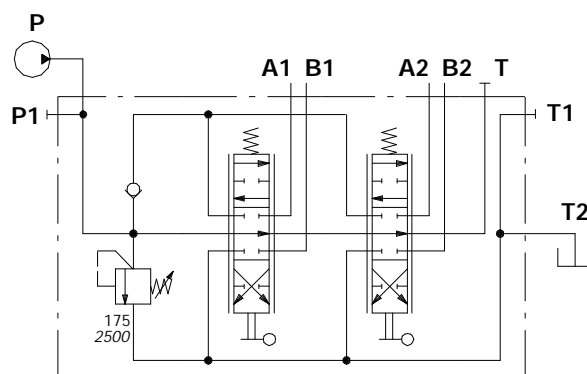
Ex.: SDM080/2-P(TG3-175)/18L/18L/AE



### AEK: closed centre



Ex.: SDM080/2-P(TG3-175)/18L/18L/AEK

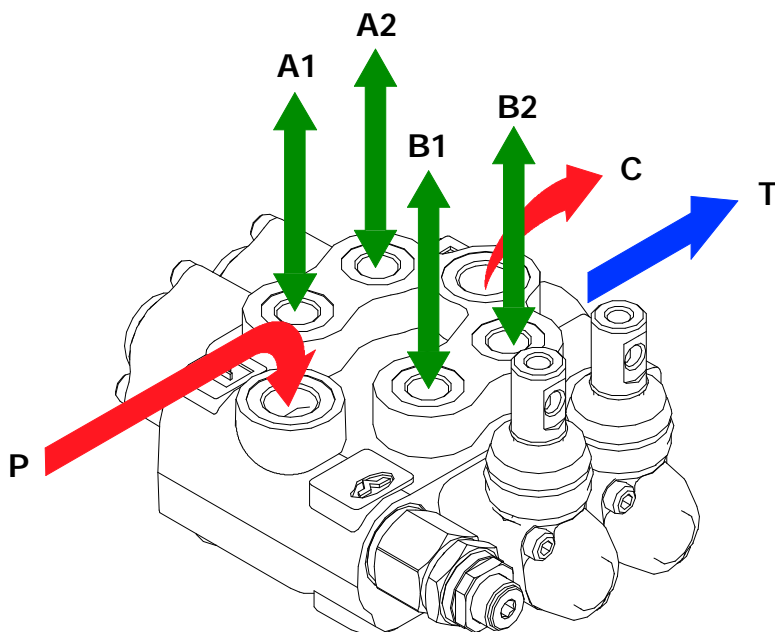


## Installation and maintenance

The SDM080 valve is assembled and tested as per the technical specification of this catalogue.

Before the final installation on your equipment, follow the below recommendations:

- 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 lever box and 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.



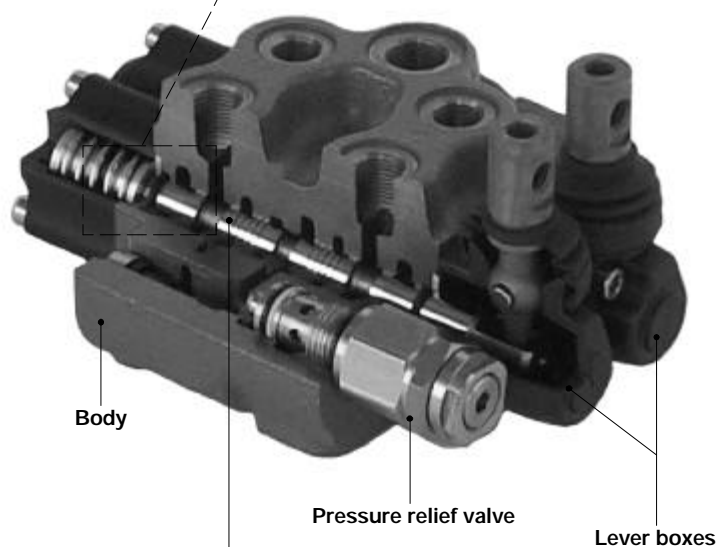
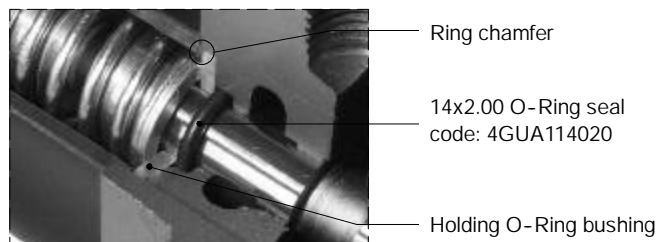
Carry-over configuration

### Fitting tightening torque - Nm / lbft

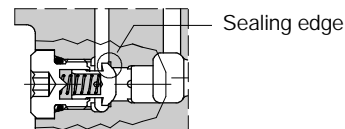
| THREADS TYPE                 | P and C ports          | A and B ports          | T port                 |
|------------------------------|------------------------|------------------------|------------------------|
| BSP (ISO 228/1)              | G 3/8                  | G 1/4                  | G 3/8                  |
| With O-Ring seal             | 35 / 25.8              | 25 / 18.4              | 35 / 25.8              |
| With copper washer           | 40 / 29.5              | 30 / 22.1              | 40 / 29.5              |
| With steel and rubber washer | 30 / 22.1              | 16 / 11.8              | 30 / 22.1              |
| UN-UNF (ISO 11926-1)         | 9/16-18 UNF-2B (SAE 6) | 9/16-18 UNF-2B (SAE 6) | 9/16-18 UNF-2B (SAE 6) |
| With O-Ring seal             | 30 / 22.1              | 30 / 22.1              | 30 / 22.1              |
| METRIC (ISO 6149-3)          | M18x1.5                | M14x1.5                | M18x1.5                |
| With O-Ring seal             | 45 / 33.2              | 35 / 25.8              | 45 / 33.2              |

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





**Spool**  
Normally spools are interchangeable. Verify the smoothness during the assembly



NOTE - All articulated parts inside cap, lever box and mechanical joystick are lubricated with synthetic base grease grade NLGI2

| Malfunction   | Cause  | Remedy   |
|---|--|--|
| External leakage pivot box lever or control kit 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 ports.         | Pressure relief valve blocked open.<br>Low pump pressure and flow. | Remove and clean or replace the valve.<br>Check the pump and circuit.        |

## Notes

The SDM080 valve can be supplied with one coat of opaque black paint (**CVN** configuration).

Example of specification: SDM080/2-P(TG3-175)/18L/18L/PSA-<**CVN**>

NOTE - *For different color consult Customer Service.*





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