

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.

6th edition November 2000:

This edition supercedes all prior documents.

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SDM080

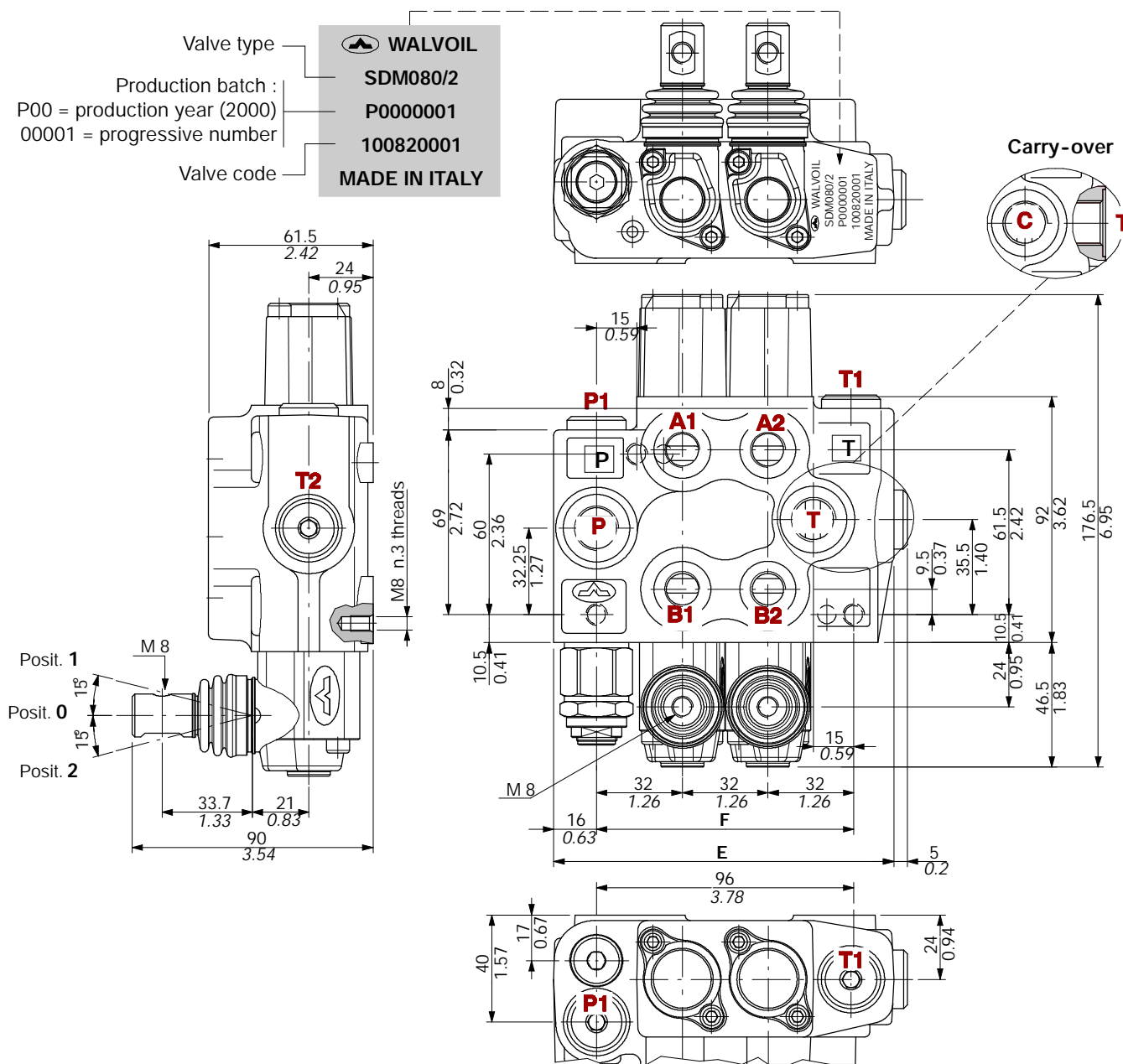
Working conditions

This catalogue shows technical specifications and diagrams measured with mineral oil of 46 mm²/s - 46 cSt viscosity at 40°C temperature.

| | | | |
|------------------------------|--|----------------------------------|---------------------------|
| Nominal flow rating | | 25 l/min | |
| Operating pressure (maximum) | | 315 bar | 4600 psi |
| Max. back pressure | <i>on outlet port T</i> | 25 bar | 360 psi |
| Internal leakage A(B)→T | <i>Δp=100 bar - 1450 psi fluid and valve at 40°C</i> | 3 cm ³ /min | 0.18 in ³ /min |
| Fluid | | Mineral oil | |
| Fluid temperature | <i>with NBR (BUNA-N) seals</i> | from -20° to 80°C | |
| | <i>with FPM (VITON) seals</i> | from -20° to 100°C | |
| Viscosity | <i>operating range</i> | from 15 to 75 mm ² /s | <i>from 15 to 75 cSt</i> |
| | <i>min.</i> | 12 mm ² /s | 12 cSt |
| | <i>max.</i> | 400 mm ² /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 |

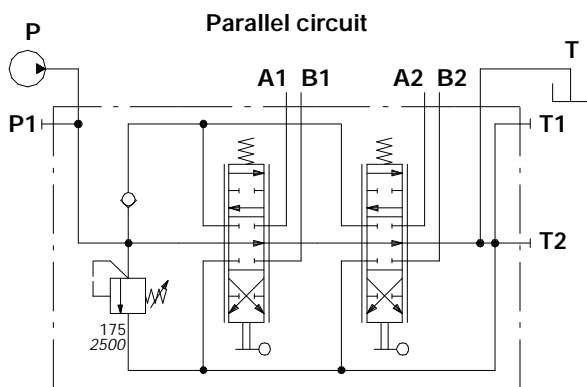
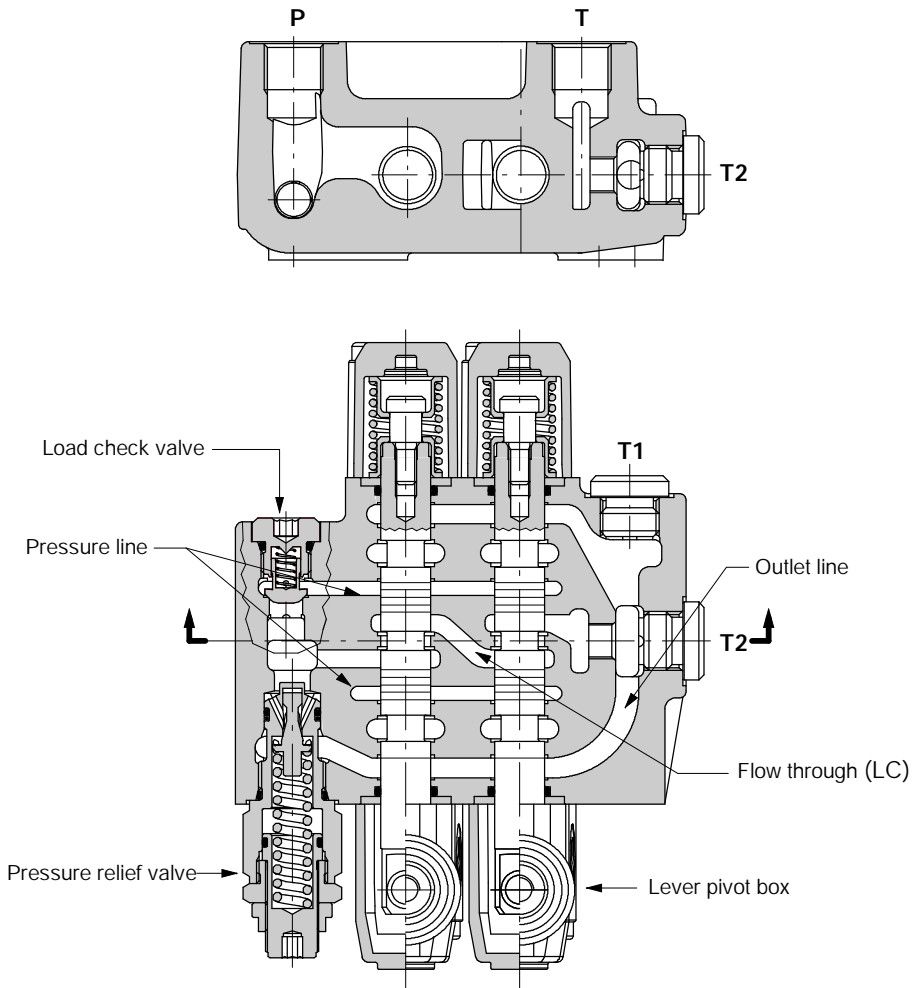
| TYPE | E | | F | | Weight | |
|------------|-----|-------|-----|------|--------|------|
| | mm | in | mm | in | kg | lb |
| SDM080/4-P | 191 | 7.52 | 160 | 6.30 | 5.5 | 12.2 |
| SDM080/5-P | 223 | 8.78 | 192 | 7.56 | 6.5 | 14.3 |
| SDM080/6-P | 255 | 10.04 | 224 | 8.82 | 7.5 | 16.5 |

Standard threads

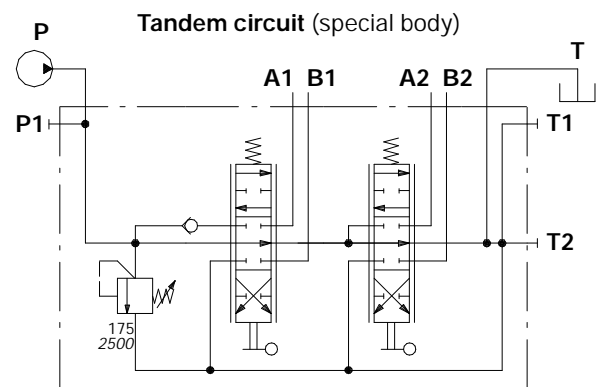
| PORT | BSP (ISO 228/1) | UN-UNF (ISO 11926-1) | METRIC (ISO 6149-1) |
|--|--------------------|-------------------------|------------------------|
| Inlet P and carry-over C | G 3/8 | | M18x1.5 |
| A and B ports | G 1/4 | 9/16-18 UNF-2B (SAE 6) | M14x1.5 |
| Outlet T | G 3/8 | | M18x1.5 |

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



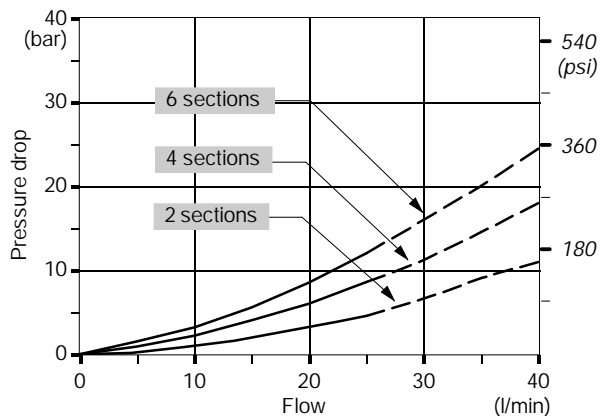
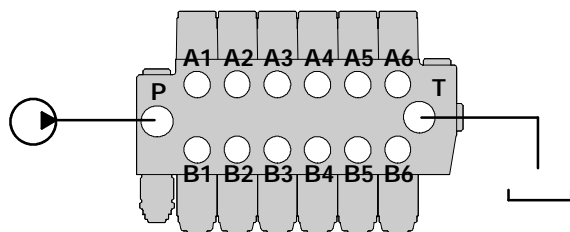
Ex.: SDM080/2-SP1(TG3-175)/18L/18L/PSA

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

Performance data (pressure drop vs. flow)

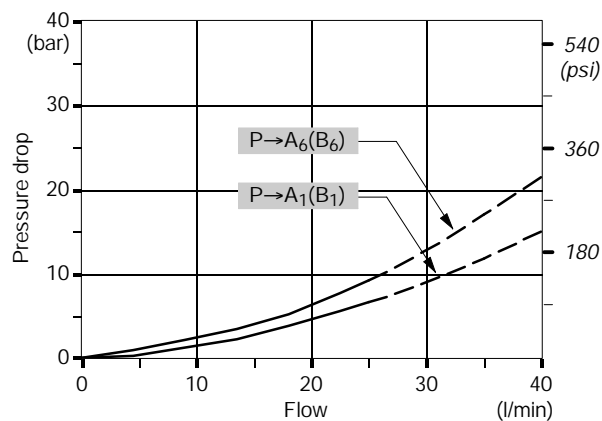
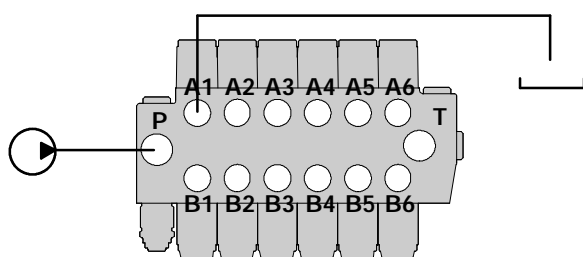
Open centre

From upper inlet to upper outlet (PSA configuration).



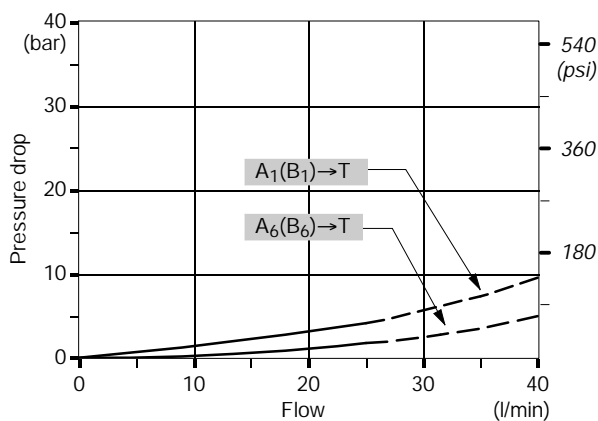
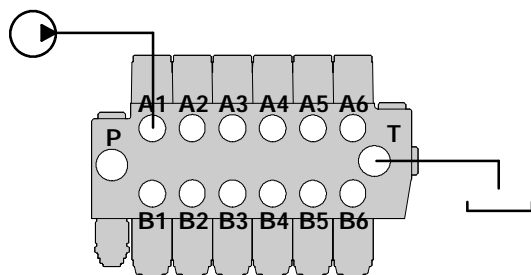
Inlet to work port

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



Work port to outlet

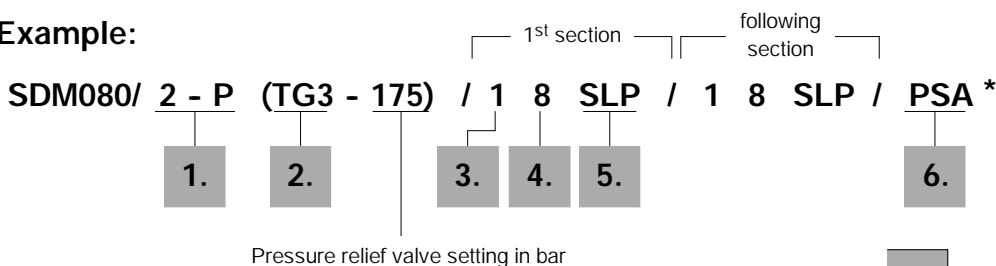
From A port (spool in position 2) or B port (spool in position 1) to upper outlet



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 standard setting 80 bar / 1150 psi |
| (TG3-175) | X162121175 | Range 100 to 200 bar / 1450 to 2900 psi standard setting 175 bar / 2500 psi |
| (TG4-250) | X162121250 | Range 160 to 250 bar / 2300 to 3600 psi standard setting 250 bar / 3600 psi |

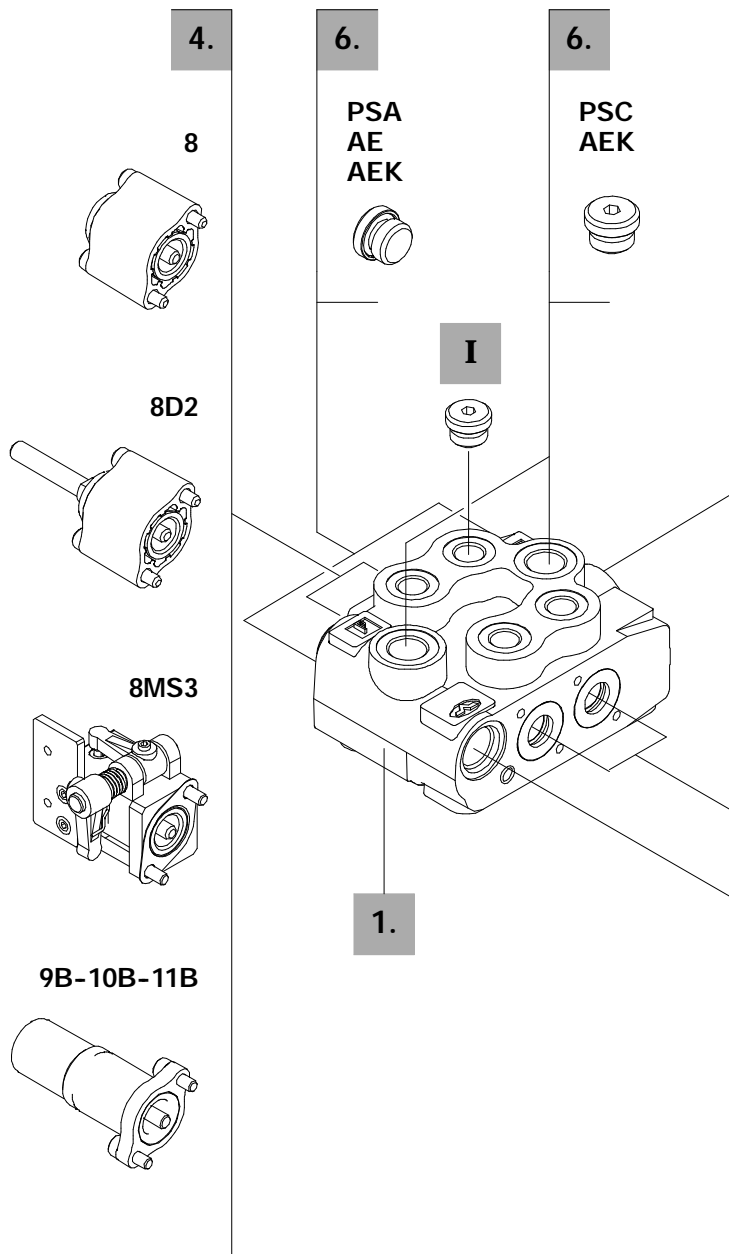
Standard setting is referred to 10 l/min flow.

| | | |
|----|------------|----------------------------|
| 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 (set to 55 bar / 800 psi) |
| 1PB(190) | 3CU1011200 | Double acting, 3 positions, with anti-shock valve on port B (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*

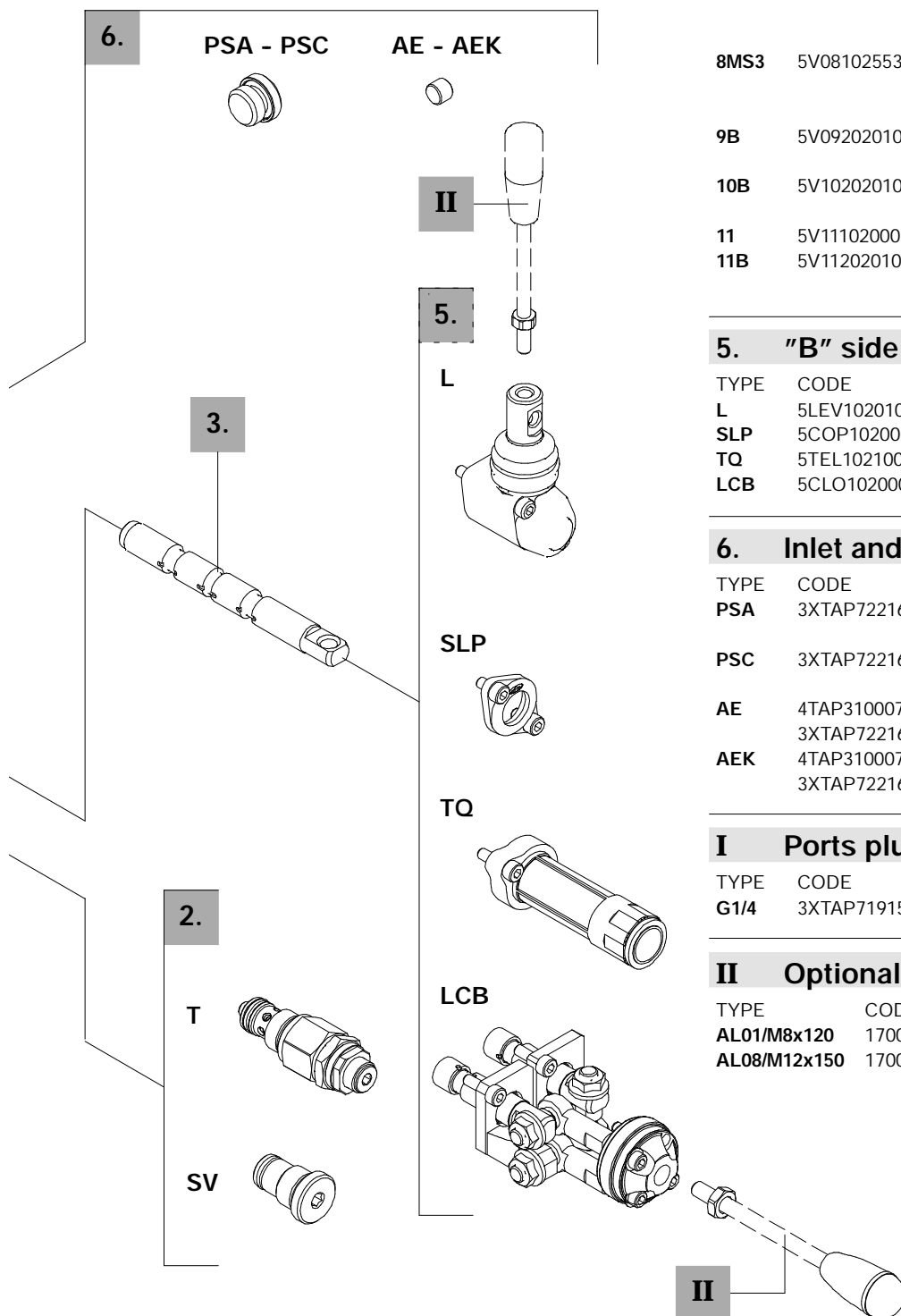
| TYPE | CODE | DESCRIPTION |
|------|---------------------------|---|
| PSA | 3XTAP722160 | Upper inlet and outlet (n.3 G 3/8 plugs required) |
| PSC | 3XTAP722160 | Cap side inlet and outlet (n.3 G 3/8 plugs required) |
| AE | 4TAP310007 3XTAP722160 | M10x1 plug for carry-over (n.2 G 3/8 plugs required)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

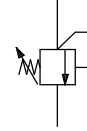
SDM080

Inlet relief options

Pressure relief valve

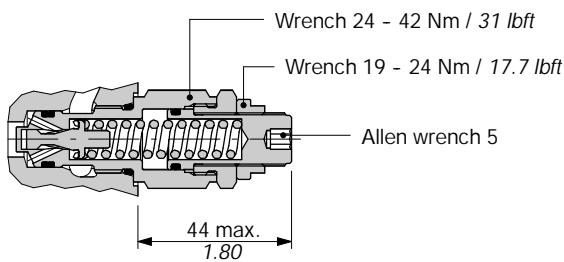
VMD080 (T G 3 - 175)

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

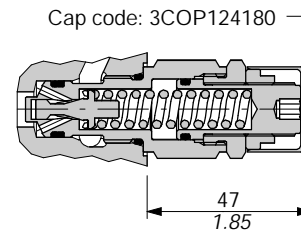


Adjustment type

G: with screw

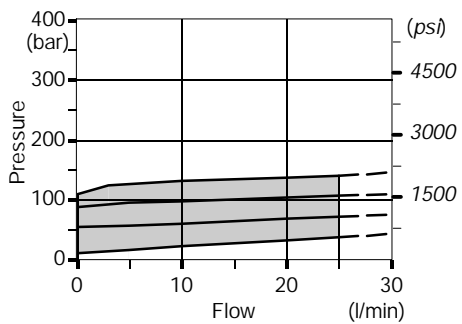


Z: with iron tamper proof cap

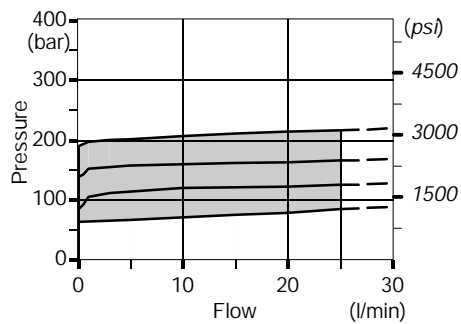


Performance data

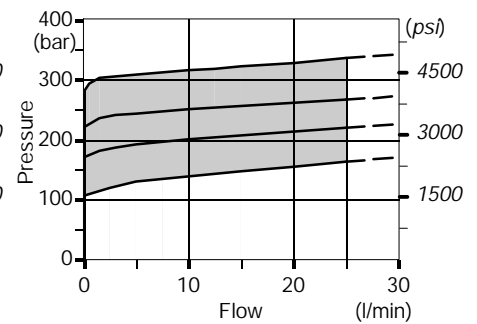
Spring nr. 2



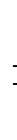
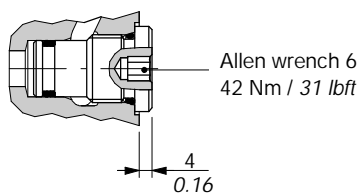
Spring nr. 3



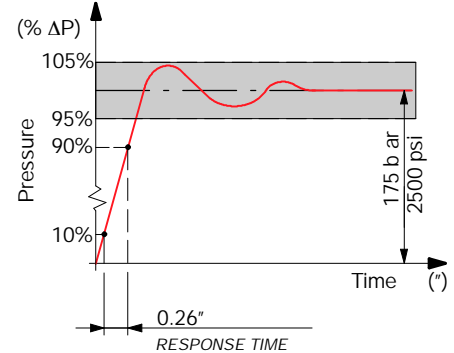
Spring nr. 4



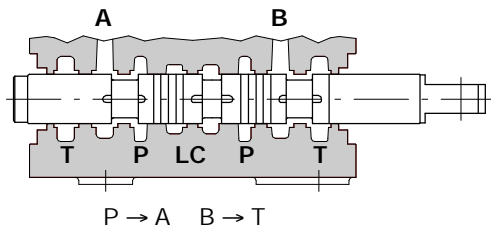
SV: relief valve blanking plug



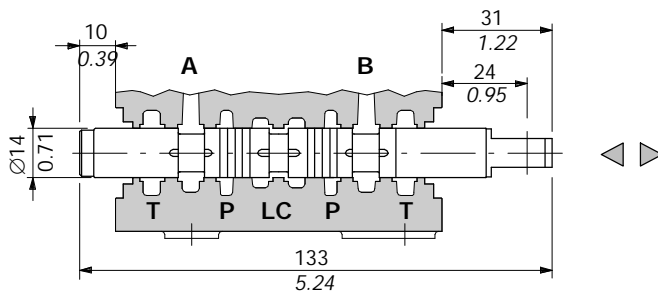
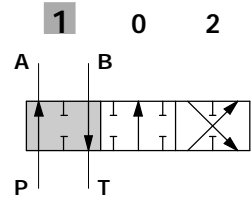
Response time



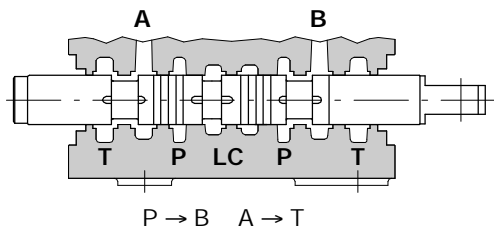
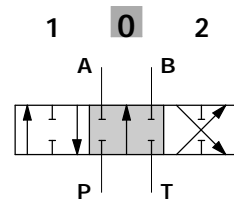
Type 1



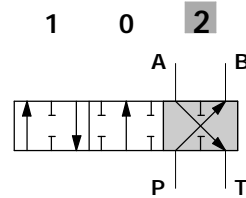
" stroke = + 5,5mm
+ 0.22 in



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

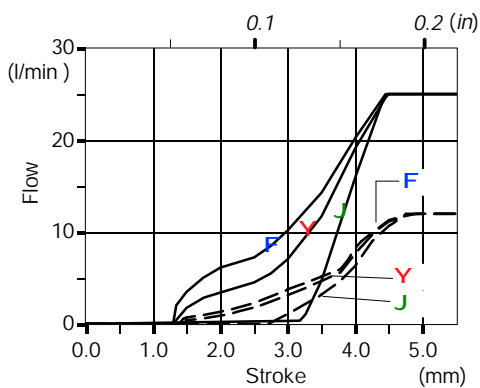


A stroke = - 5,5mm
- 0.22 in



Performance data

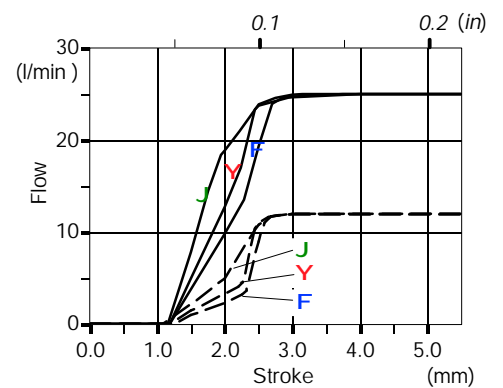
Spool metering P→A(B)



— = Type 1
Q_{in} = 25 l/min
- - - = Type 1CS
Q_{in} = 12 l/min

F P_(on ports) = 63bar/900psi
Y P_(on ports) = 100bar/1450psi
J P_(on ports) = 250bar/3600psi

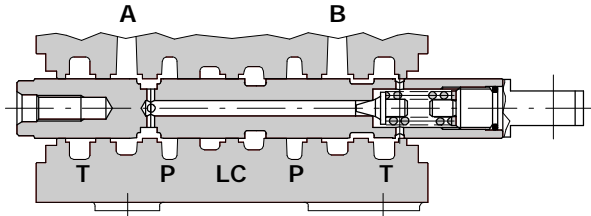
Spool metering A(B)→T



SDM080

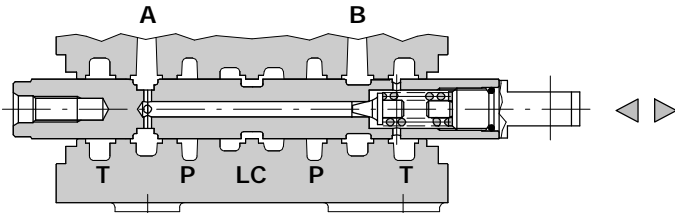
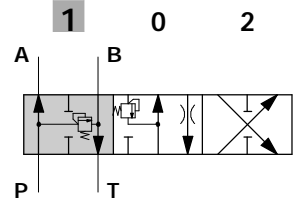
Spool options

Type 1PA(55)BH

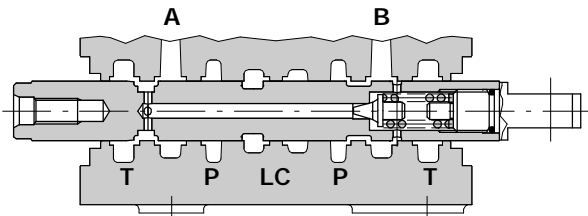
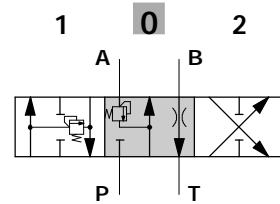


P → A B → T

stroke = + 5.5mm
+ 0.22 in

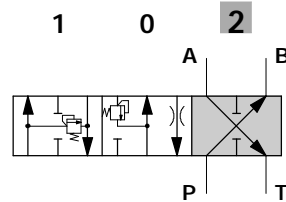


P-A closed, B partially open to T



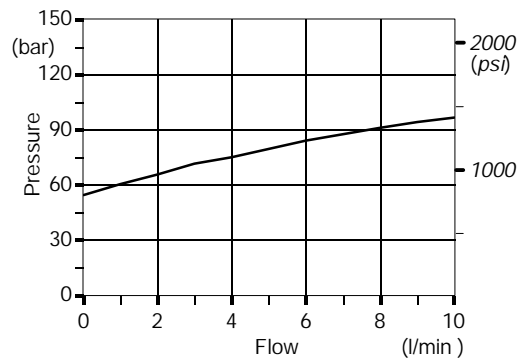
P → B A → T

stroke = - 5.5mm
- 0.22 in

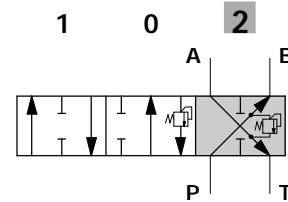
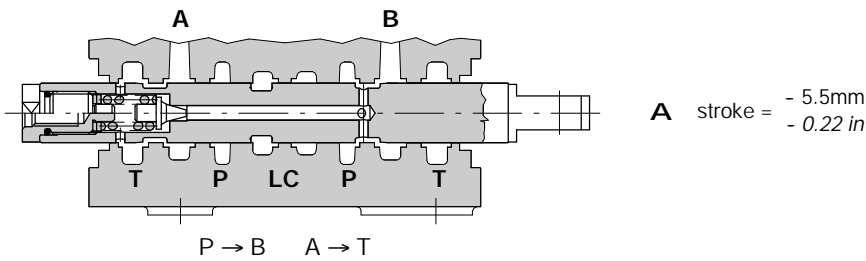
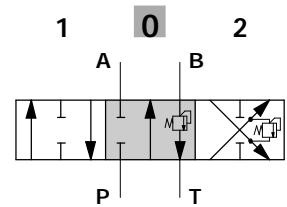
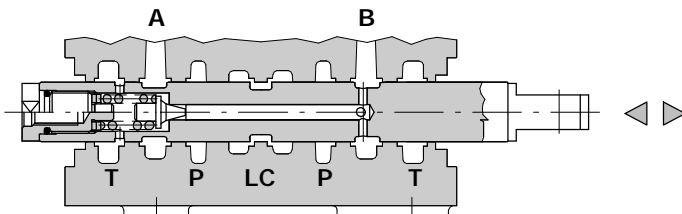
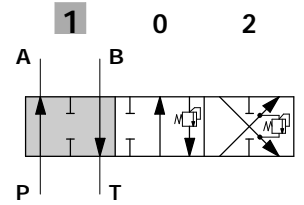
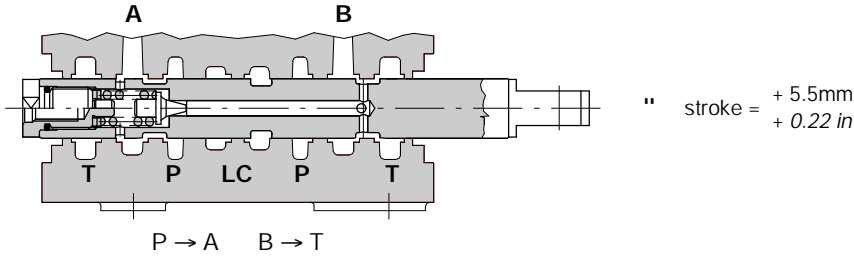


Performance data

Pressure-flow diagram

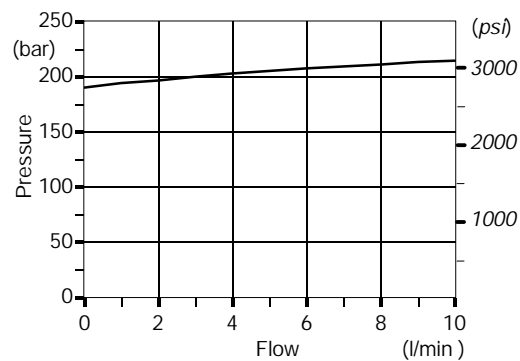


Type 1PB(190)



Performance data

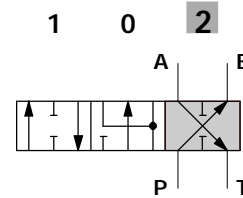
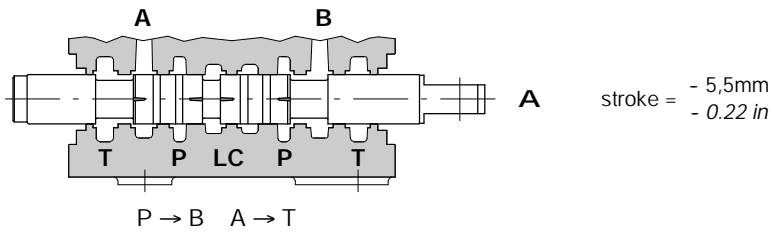
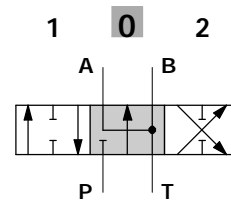
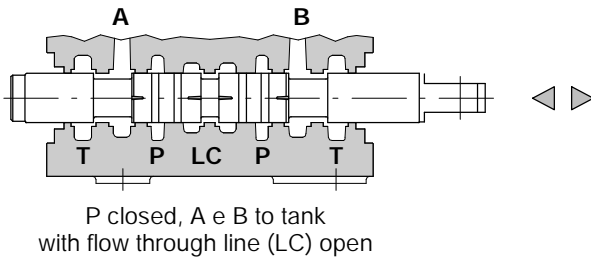
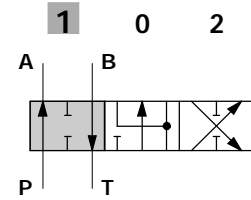
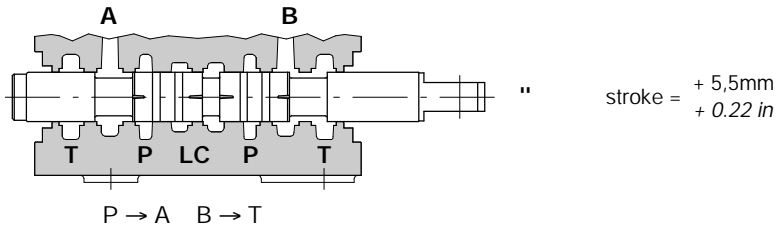
Pressure-flow diagram



SDM080

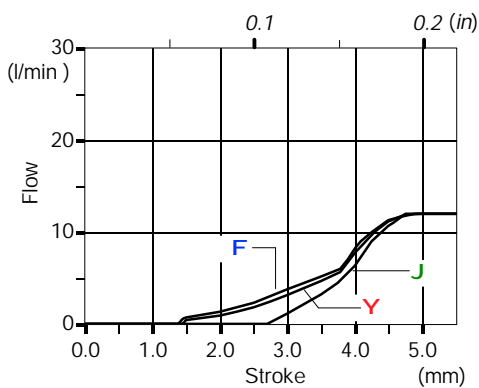
Spool options

Type 2CS



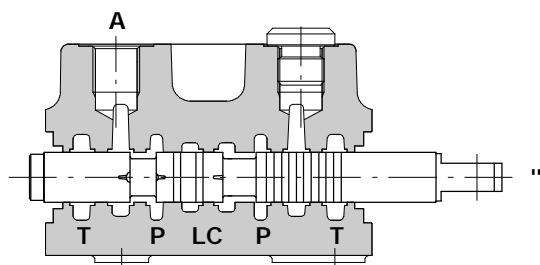
Performance data

Spool metering P → A(B)



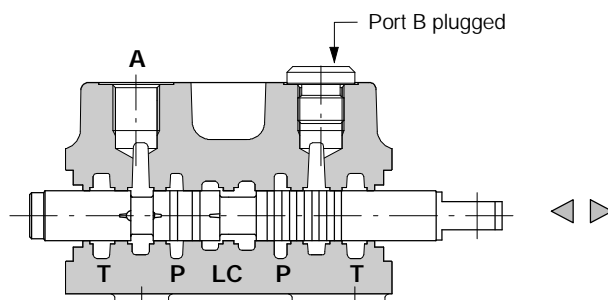
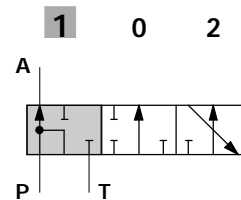
| | |
|---|--|
| F | P _(on ports) = 63bar/900psi |
| Y | P _(on ports) = 100bar/1450psi |
| J | P _(on ports) = 250bar/3600psi |

Type 3CS

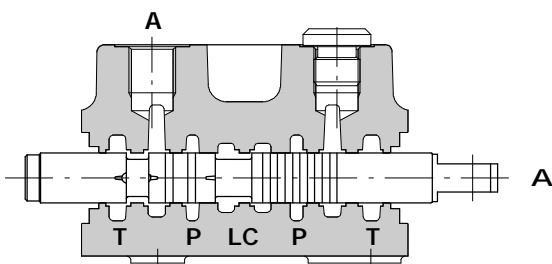
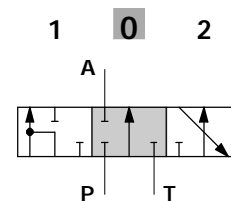


P → A

stroke = + 5,5mm
+ 0.22 in

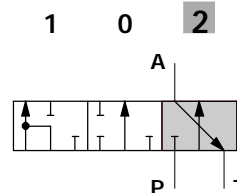


P-A-T closed, with flow through line (LC) open



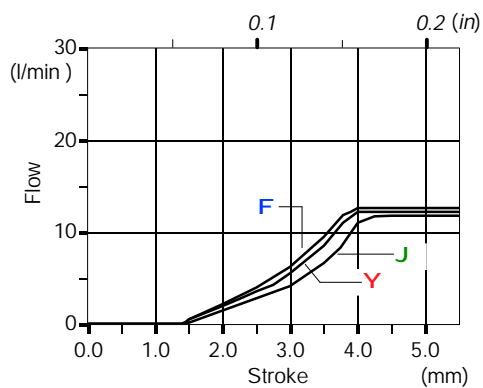
A → T

stroke = - 5,5mm
- 0.22 in



Performance data

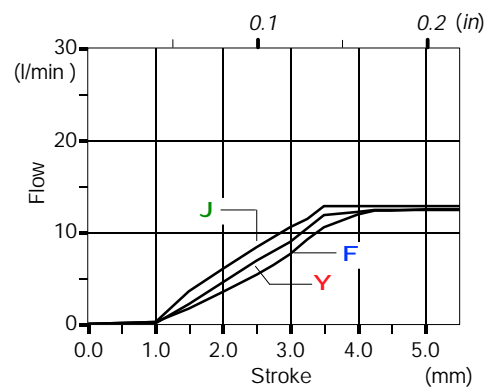
Spool metering P → A



Q_{in} = 12 l/min

- F P_(on ports) = 63bar/900psi
- Y P_(on ports) = 100bar/1450psi
- J P_(on ports) = 250bar/3600psi

Spool metering A → T



SDM080

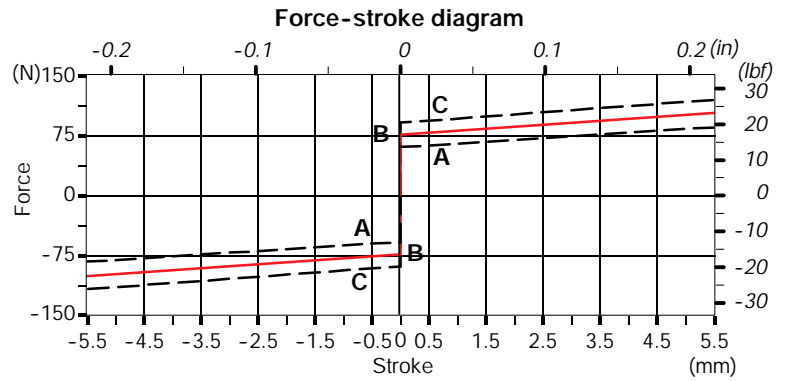
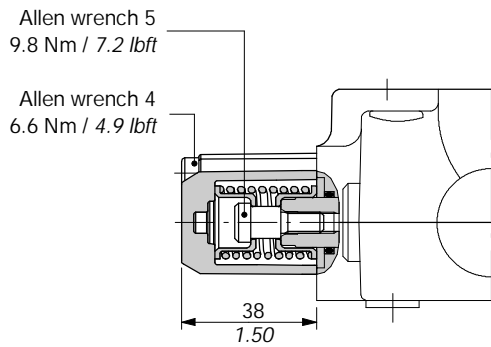
"A" side spool positioners

With spring return

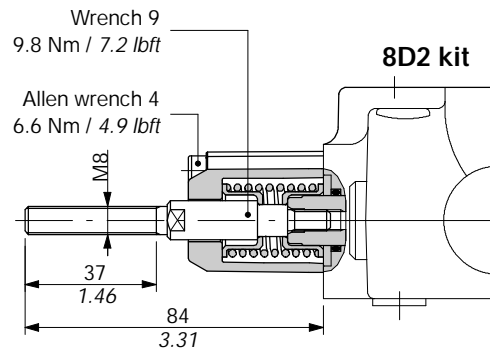
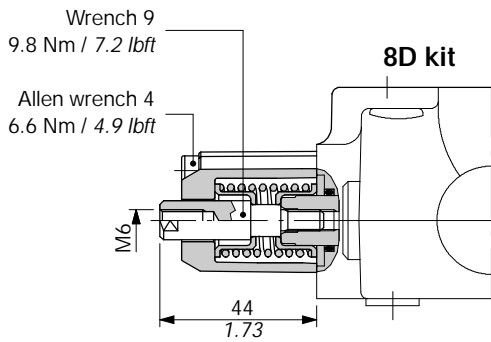
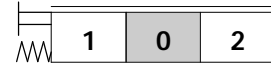
8 kit

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).

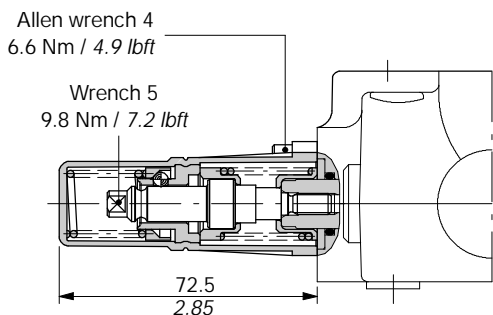


8D-8D2 kits for dual control



With detent

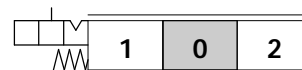
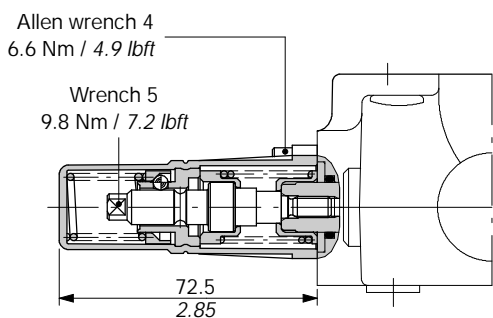
9B kit



Operating features

Unlocking force : 200 N / 45 lbf ±10%

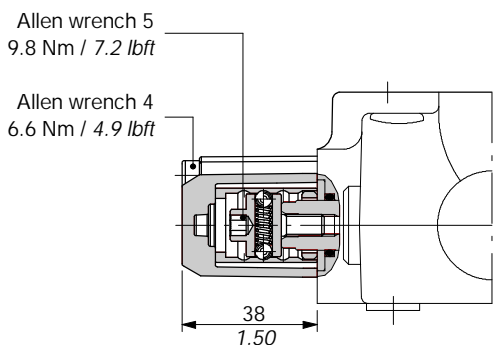
10B kit



Operating features

Unlocking force : 200 N / 45 lbf ±10%

11 kit

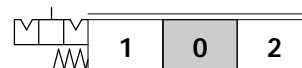
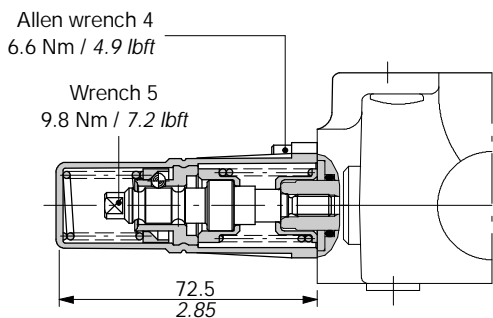


Operating features

Locking force : 100 N / 22.5 lbf ±10%

Unlocking force : 100 N / 22.5 lbf ±10%

11B kit



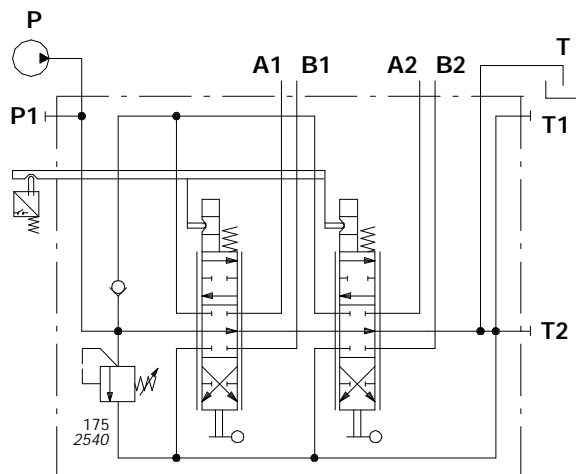
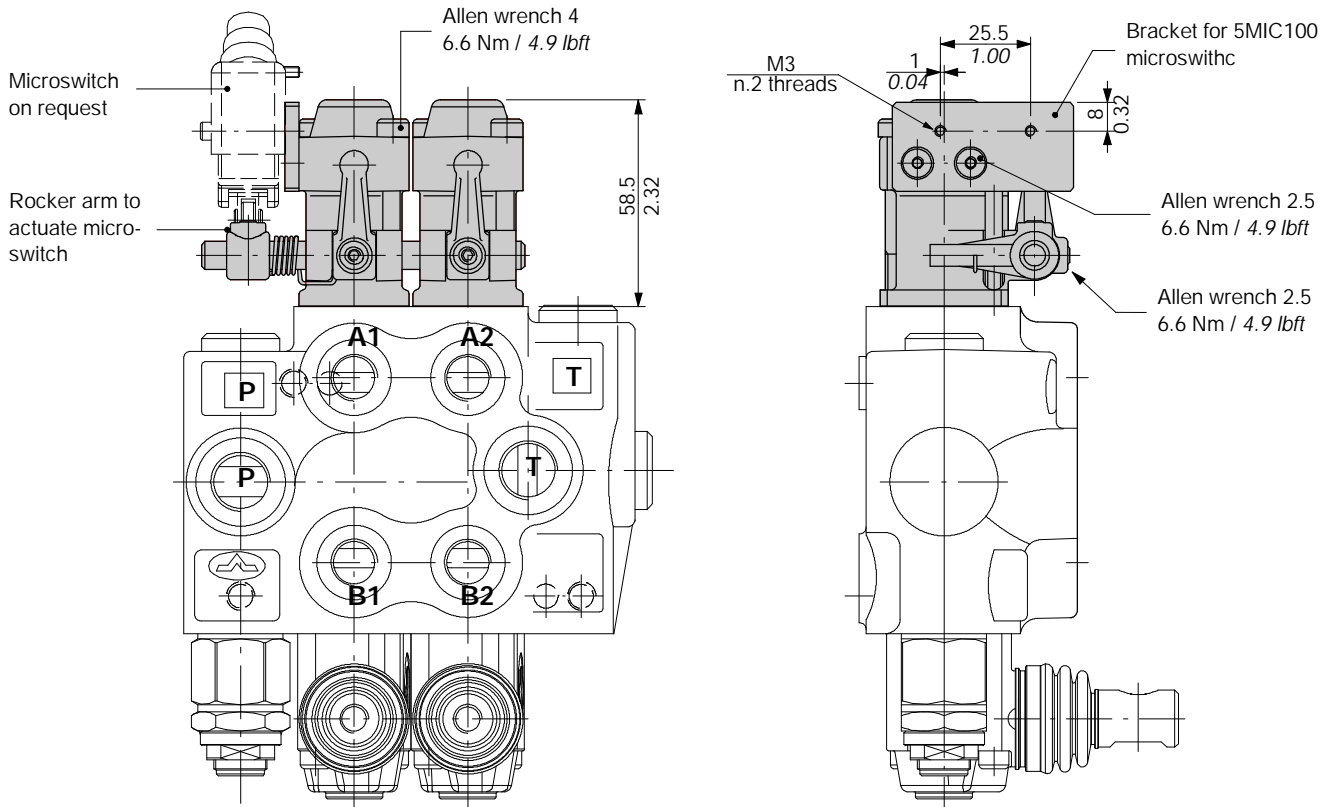
Operating features

Unlocking force : 200 N / 45 lbf ±10%

"A" side spool positioners

8MS3 kit: with centralized microswitch control

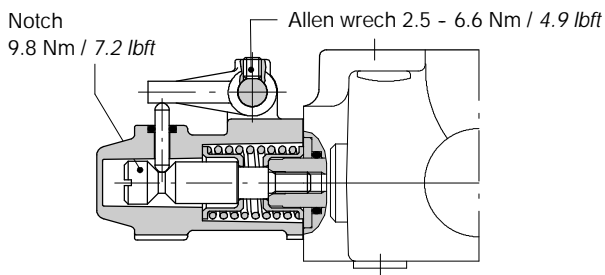
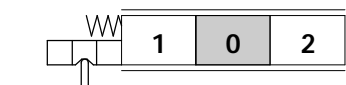
Example of a two section valve assembly



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

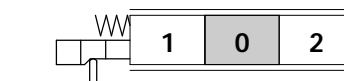
Assembling kit
 Nr. of working sections
 51 = with bracket for IP51 microswitch fixing
 67 = with bracket for IP67 microswitch fixing
 S = bracket placed on left
 D = bracket placed on right

8MS3 kit: with centralized microswitch control

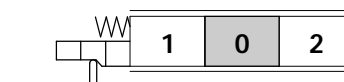


Other configurations

8MS1 kit
microswitch operation in position 1



8MS2 kit
microswitch operation in position 2

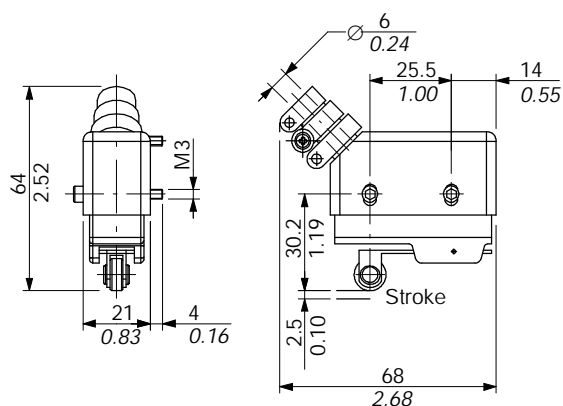


Microswitches for 8MS kits

Complete with rubber cover and mounting screws



M51 code: 5MIC100

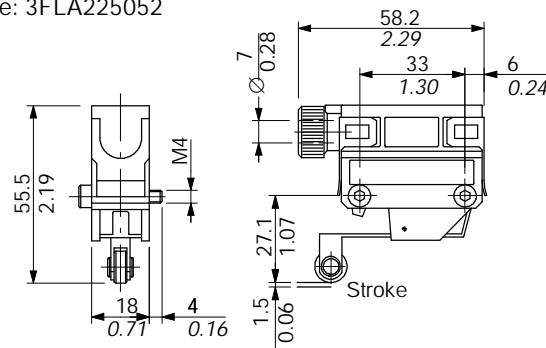


Operating features

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

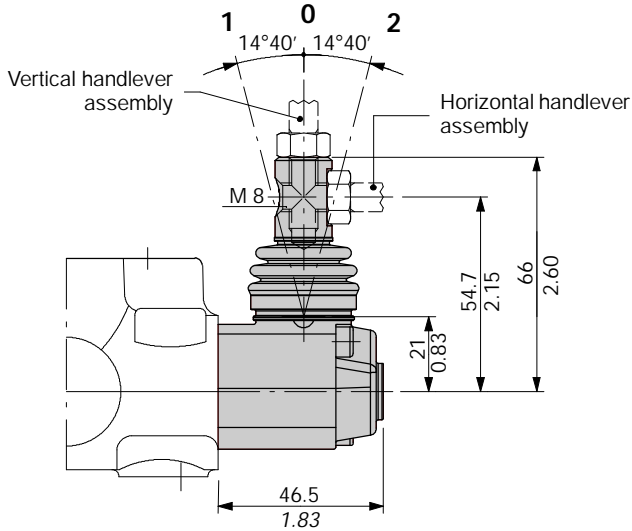
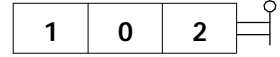
Current / voltage max. : 5 A / 250 VAC
 : 0,25 A / 230VDC
 Weather protection : IP67

SDM080

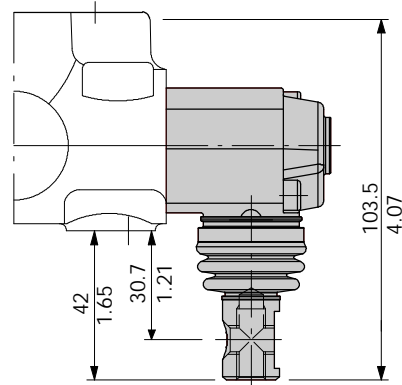
"B" side options

Lever box L

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



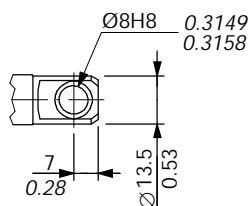
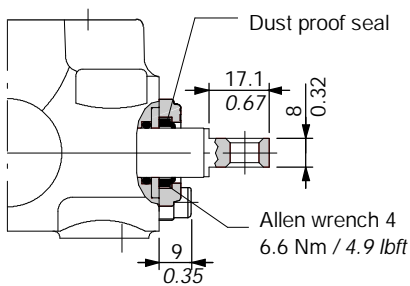
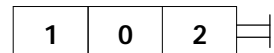
L180 configuration



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

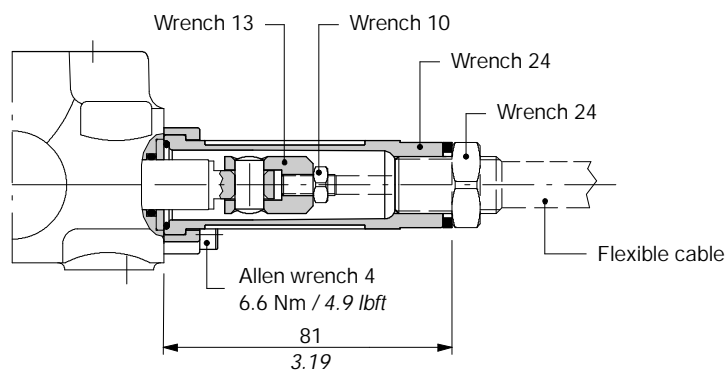
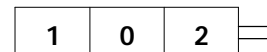
Dust proof plate SLP

Mechanical control with dust proof plate

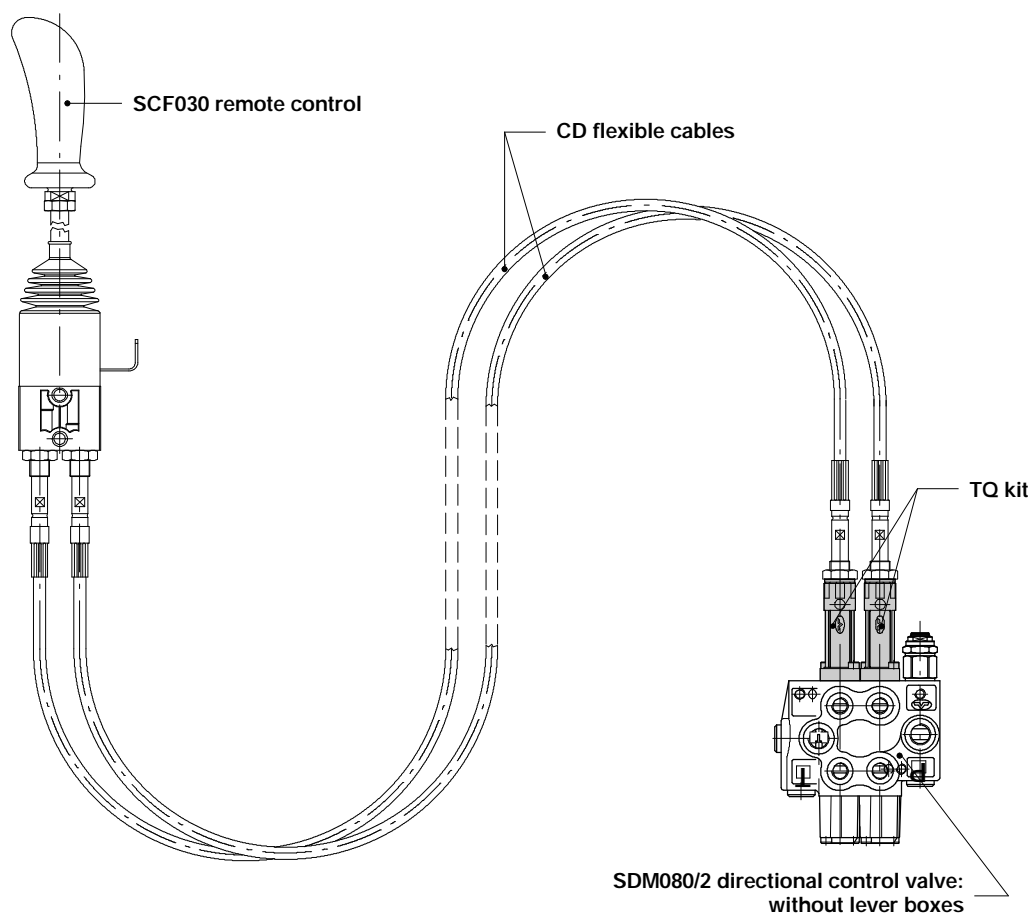


TQ cable connection

Waterproof cap for remote control with flexible cable.



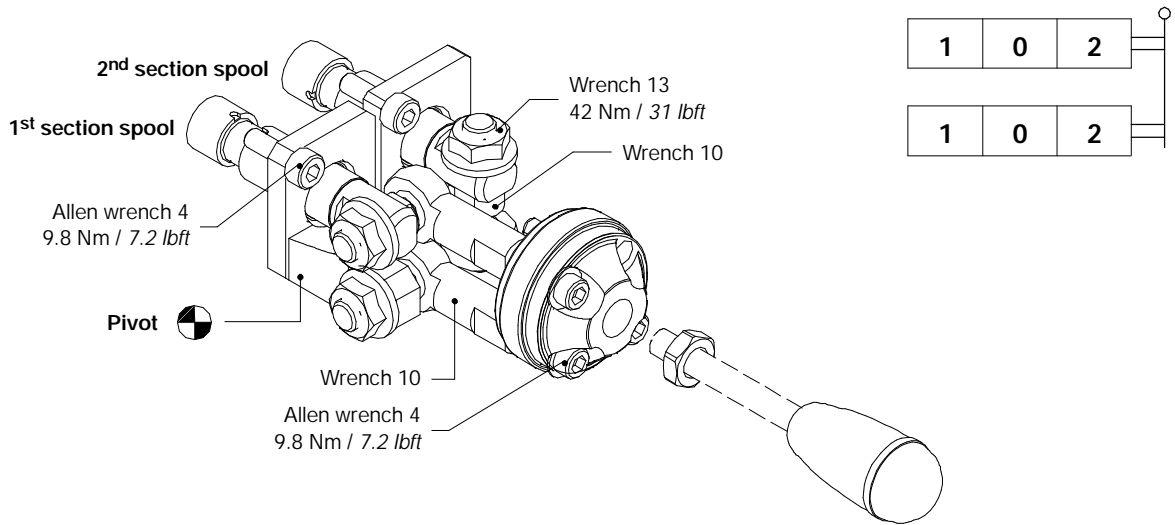
Example of cable control



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

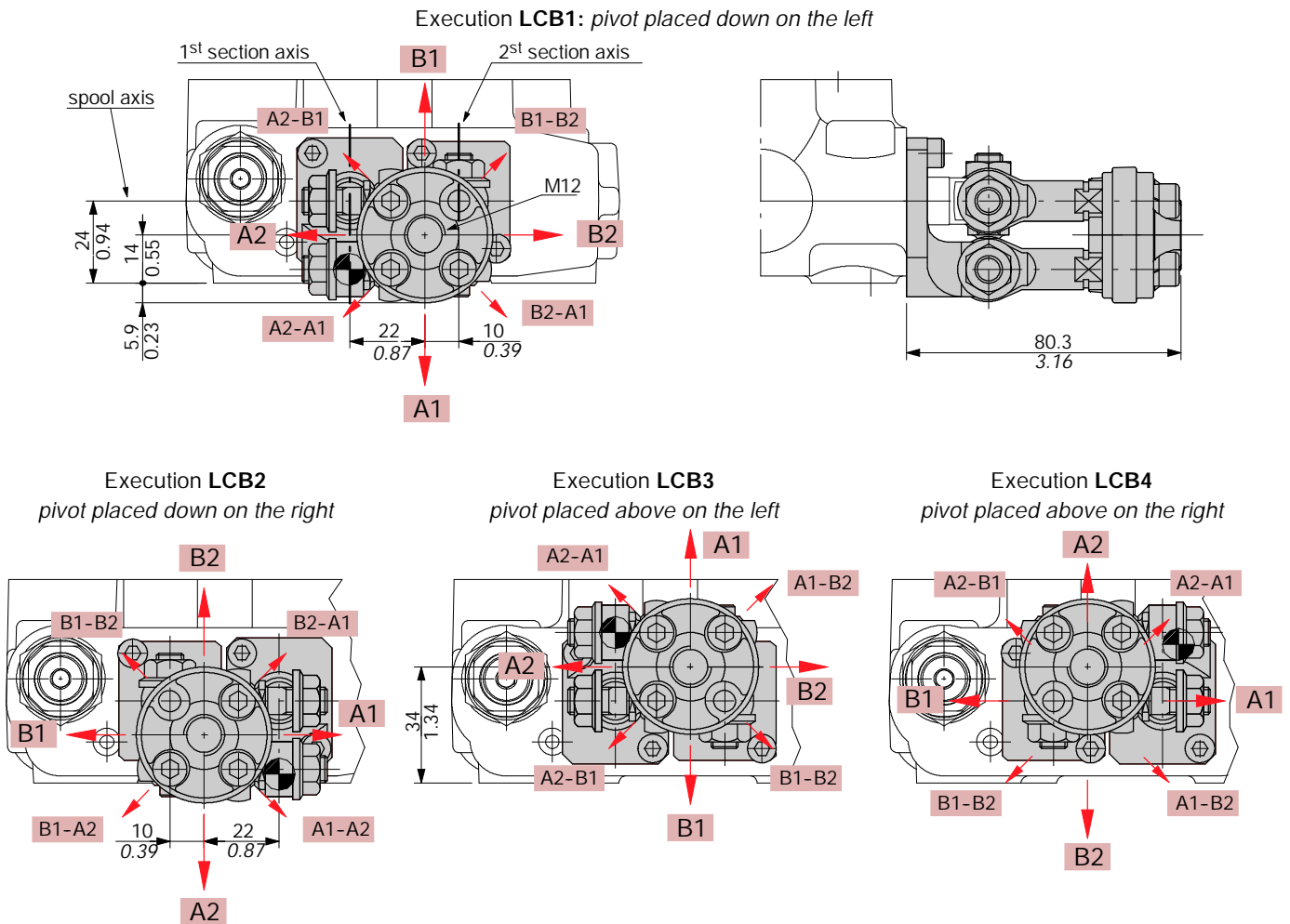
"B" side options

Mechanical joystick LCB



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

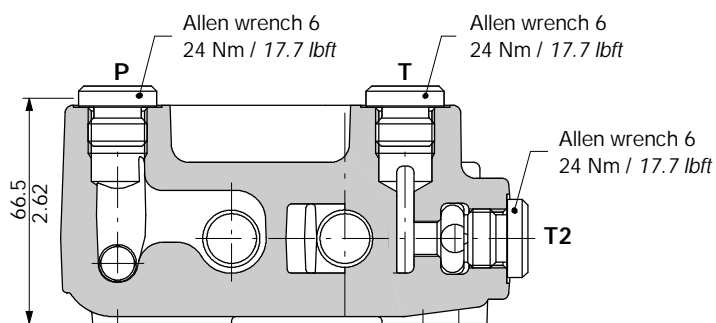
Dimensions and movement scheme



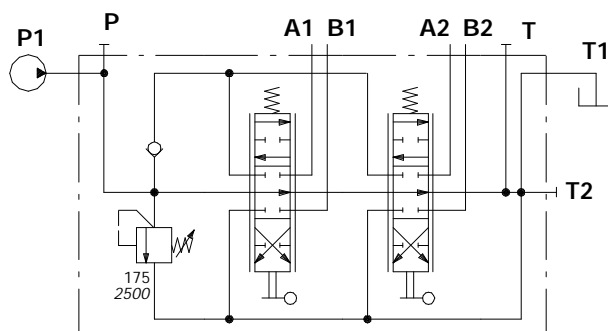
PSA: upper (standard)

See page 6

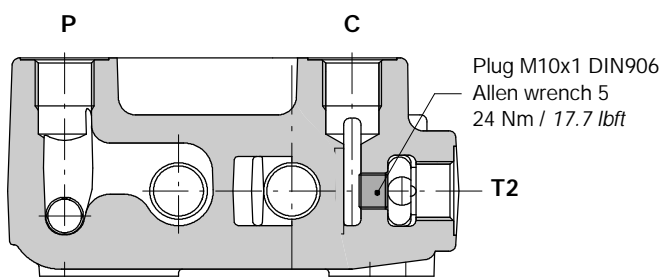
PSC: "A" control side



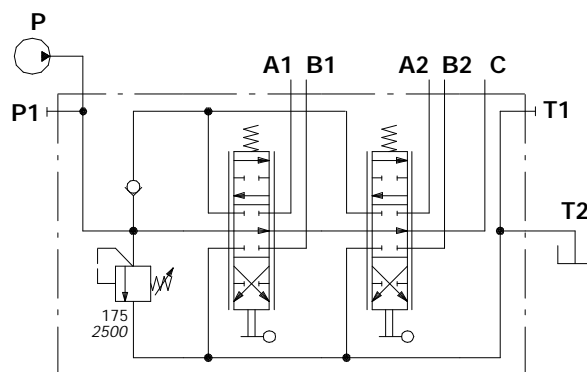
Ex.: SDM080/2-P(TG3-175)/18L/18L/PSC



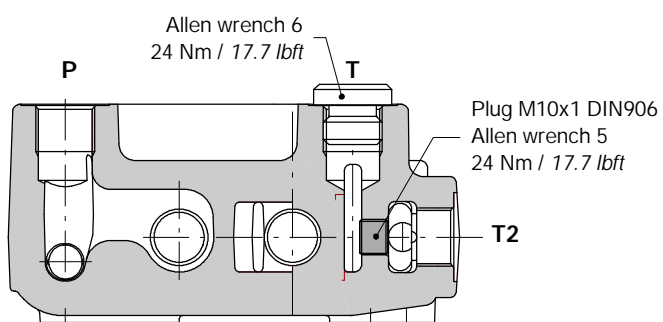
AE: with carry-over



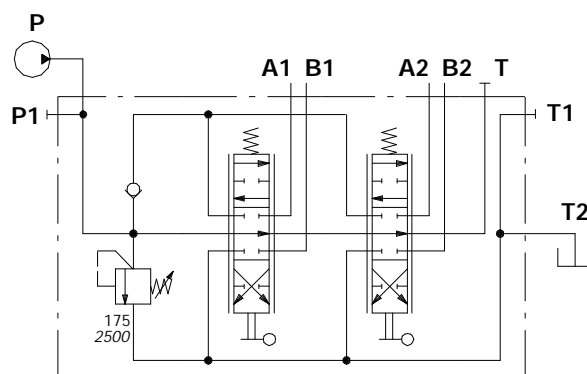
Ex.: SDM080/2-P(TG3-175)/18L/18L/AE



AEK: closed centre



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

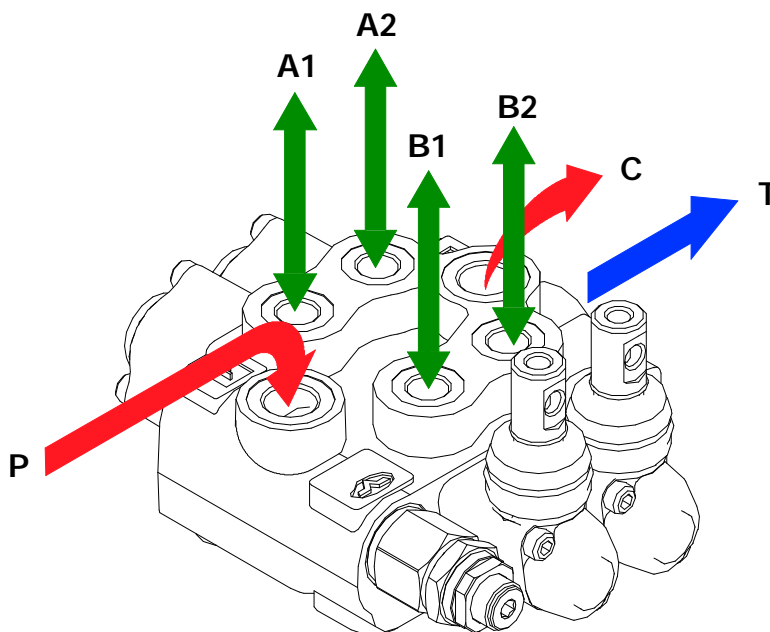


Installation and maintenance

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.

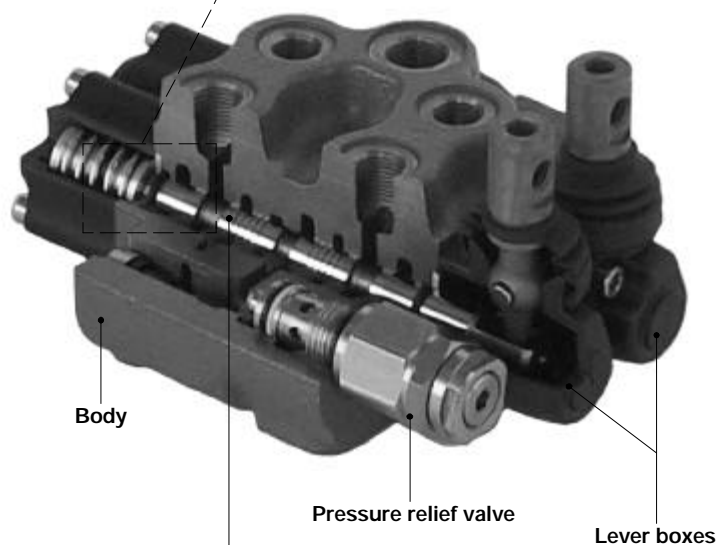
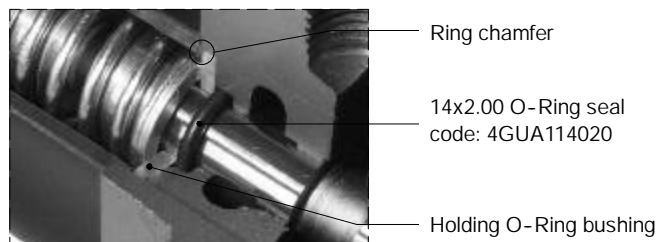


Carry-over configuration

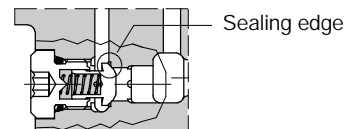
Fitting tightening torque - Nm / lbft

| 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. Low pump pressure and flow. | Remove and clean or replace the valve. 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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