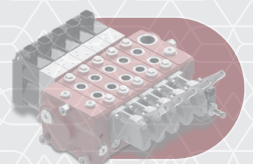
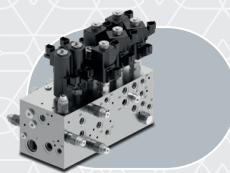
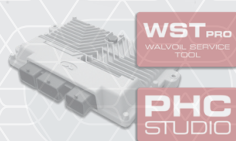


## SAE Cavity cartridges



COMPACT HYDRAULICS

**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.

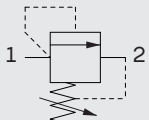
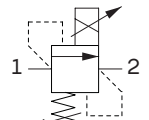
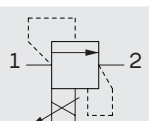
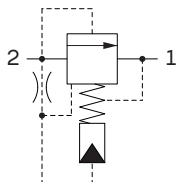
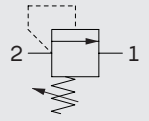
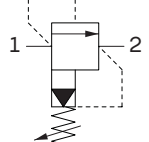
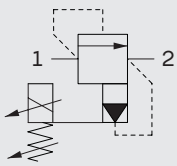
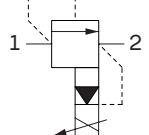
WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN  
INCORRECT USE OF THE PRODUCT.

1<sup>st</sup> edition January 2025

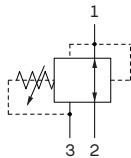
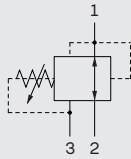
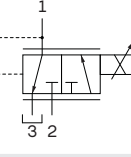
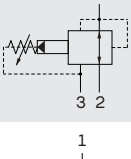
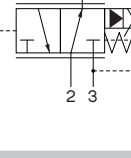
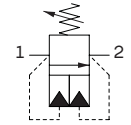
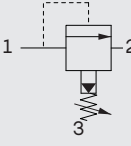
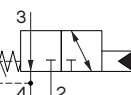


## Pressure control valves

## Pressure relief valves

| Hydraulic diagram                                                                   | Valve         | Execution | Operation    | Control type          | Max. flow up to |        | Max. press. up to |      | Page |
|-------------------------------------------------------------------------------------|---------------|-----------|--------------|-----------------------|-----------------|--------|-------------------|------|------|
|                                                                                     |               |           |              |                       | l/min           | US gpm | bar               | psi  |      |
| 2 way                                                                               |               |           |              |                       |                 |        |                   |      |      |
|    | MC10MV        | poppet    | direct       | mechanic              | 70              | 18.5   | 260               | 3770 | 11   |
|                                                                                     | MC..R         | poppet    | direct       | mechanic              | 60              | 15.8   | 350               | 5100 | 15   |
|    | MC10T         | poppet    | direct       | proportional solenoid | 10              | 2.6    | 350               | 5100 | 17   |
|                                                                                     | MC10T HF type |           |              |                       |                 |        |                   |      |      |
|    | MC10X         | poppet    | direct       | proportional solenoid | 10              | 2.6    | 350               | 5100 | 21   |
|                                                                                     | MC10X HF type |           |              |                       |                 |        |                   |      |      |
|   | MD..M         | poppet    | direct       | mechanic              | 120             | 31.7   | 350               | 5100 | 25   |
|  | MG..A         | poppet    | differential | mechanic              | 100             | 26.4   | 350               | 5100 | 31   |
|  | MP..M         | spool     | pilot        | mechanic              | 400             | 105,7  | 350               | 5100 | 33   |
|  | MP..T         | spool     | pilot        | proportional solenoid | 200             | 52.8   | 350               | 5100 | 37   |
|  | MP..X         | spool     | pilot        | proportional solenoid | 200             | 52.8   | 350               | 5100 | 41   |

## Pressure control valves

| Pressure reducing valves                                                            |                      |           |                       |                       |                 |        |                         |                           |      |
|-------------------------------------------------------------------------------------|----------------------|-----------|-----------------------|-----------------------|-----------------|--------|-------------------------|---------------------------|------|
| Hydraulic diagram                                                                   | Valve                | Execution | Operation             | Control type          | Max. flow up to |        | Max. press. up to       |                           | Page |
|                                                                                     |                      |           |                       |                       | l/min           | US gpm | bar                     | psi                       |      |
| 3 way                                                                               |                      |           |                       |                       |                 |        |                         |                           |      |
|    | RD08L                | spool     | direct with relieving | mechanic              | 15              | 3.96   | Port 2=350<br>Port 3=30 | Port 2=5100<br>Port 3=435 | 45   |
|    | RD08LH               | spool     | direct with relieving | mechanic              | 30              | 7.9    | Port 2=350<br>Port 3=30 | Port 2=5100<br>Port 3=435 | 49   |
|    | RD08TX               | spool     | direct with relieving | proportional solenoid | 12              | 3.17   | Port 2=210<br>Port 3=30 | Port 2=3045<br>Port 3=435 | 53   |
|  | RP..M                | spool     | pilot with relieving  | mechanic              | 70              | 18.5   | Port 2=350<br>Port 3=30 | Port 2=5100<br>Port 3=435 | 57   |
|  | RP..X                | spool     | pilot with relieving  | proportional solenoid | 70              | 18.5   | Port 2=350<br>Port 3=50 | Port 2=5100<br>Port 3=725 | 61   |
| Sequence valves                                                                     |                      |           |                       |                       |                 |        |                         |                           |      |
| Hydraulic diagram                                                                   | Valve                | Execution | Operation             | Control type          | Max. flow up to |        | Max. press. up to       |                           | Page |
|                                                                                     |                      |           |                       |                       | l/min           | US gpm | bar                     | psi                       |      |
| 2 way                                                                               |                      |           |                       |                       |                 |        |                         |                           |      |
|  | SW..A                | spool     | pilot                 | mechanic              | 180             | 48     | 350                     | 5100                      | 67   |
| 3 way                                                                               |                      |           |                       |                       |                 |        |                         |                           |      |
|  | SP10A                | spool     | pilot                 | mechanic              | 50              | 13     | 350                     | 5100                      | 69   |
| 4 way                                                                               |                      |           |                       |                       |                 |        |                         |                           |      |
|  | SN..L <sup>(1)</sup> | spool     | direct                | mechanic              | 50              | 13     | 350                     | 5100                      | 71   |

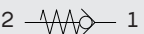
NOTE (1) the circuit shown are in normally open configuration; normally closed configuration is also available, see valves pages.

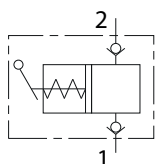
## Motion control valves

## Check valves

| Hydraulic diagram | Valve | Execution | Operation | Control type | Max. flow up to |        | Max. press. up to |     | Page |
|-------------------|-------|-----------|-----------|--------------|-----------------|--------|-------------------|-----|------|
|                   |       |           |           |              | l/min           | US gpm | bar               | psi |      |

## 2 way

|                                                                                   |              |        |        |          |     |    |     |      |    |
|-----------------------------------------------------------------------------------|--------------|--------|--------|----------|-----|----|-----|------|----|
|  | <b>UC..A</b> | poppet | direct | mechanic | 100 | 26 | 350 | 5100 | 75 |
|-----------------------------------------------------------------------------------|--------------|--------|--------|----------|-----|----|-----|------|----|

**UM08M**

-

direct

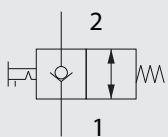
manual

1 in<sup>3</sup>/  
stroke

-

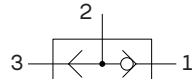
Port 1=50  
Port 2=210Port 1=725  
Port 2=3045

77

|                                                                                   |              |        |        |        |    |      |     |      |    |
|-----------------------------------------------------------------------------------|--------------|--------|--------|--------|----|------|-----|------|----|
|  | <b>UV10M</b> | poppet | direct | manual | 60 | 15.8 | 320 | 4650 | 79 |
|-----------------------------------------------------------------------------------|--------------|--------|--------|--------|----|------|-----|------|----|

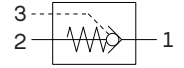
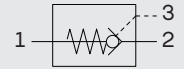
## Shuttle valves

## 3 way

|                                                                                    |              |      |        |          |    |     |     |      |    |
|------------------------------------------------------------------------------------|--------------|------|--------|----------|----|-----|-----|------|----|
|  | <b>UT..A</b> | ball | direct | mechanic | 20 | 5.3 | 350 | 5100 | 81 |
|------------------------------------------------------------------------------------|--------------|------|--------|----------|----|-----|-----|------|----|

## Pilot operated check valves

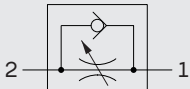
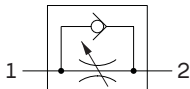
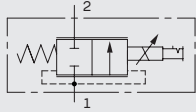
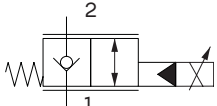
## 3 way

|                                                                                     |              |        |        |          |     |    |     |      |    |
|-------------------------------------------------------------------------------------|--------------|--------|--------|----------|-----|----|-----|------|----|
|  | <b>BC..A</b> | poppet | direct | mechanic | 100 | 26 | 350 | 5100 | 83 |
|  | <b>BC..B</b> | poppet | direct | mechanic | 100 | 26 | 350 | 5100 | 83 |
|  | <b>BC..C</b> | poppet | direct | mechanic | 60  | 16 | 350 | 5100 | 83 |

## Pressure control valves

| Counterbalance valves |       |           |           |              |                 |        |                   |      |      |
|-----------------------|-------|-----------|-----------|--------------|-----------------|--------|-------------------|------|------|
| Hydraulic diagram     | Valve | Execution | Operation | Control type | Max. flow up to |        | Max. press. up to |      | Page |
|                       |       |           |           |              | l/min           | US gpm | bar               | psi  |      |
| 3 way                 |       |           |           |              |                 |        |                   |      |      |
|                       | CC..A | poppet    | /         | mechanic     | 150             | 40     | 350               | 5100 | 87   |

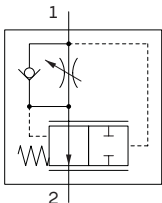
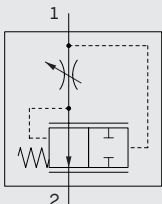
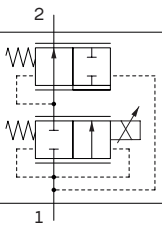
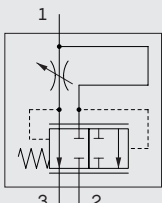
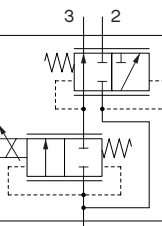
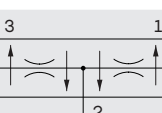
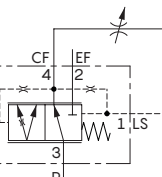
## Flow control valves

| Needle valves                                                                       |       |           |           |                       |                 |        |                   |      |      |
|-------------------------------------------------------------------------------------|-------|-----------|-----------|-----------------------|-----------------|--------|-------------------|------|------|
| Hydraulic diagram                                                                   | Valve | Execution | Operation | Control type          | Max. flow up to |        | Max. press. up to |      | Page |
|                                                                                     |       |           |           |                       | l/min           | US gpm | bar               | psi  |      |
| 2 way                                                                               |       |           |           |                       |                 |        |                   |      |      |
|  | NB..A | poppet    | /         | mechanic              | 100             | 26     | 350               | 5100 | 91   |
|   | NU..A | poppet    | /         | mechanic              | 100             | 26     | 350               | 5100 | 93   |
|   | NT..A | poppet    | /         | mechanic              | 100             | 26     | 350               | 5100 | 95   |
|   | EE..X | spool     | direct    | proportional solenoid | 60              | 16     | 315               | 4600 | 97   |
|   | EC..T | poppet    | pilot     | proportional solenoid | 97              | 25.6   | 350               | 5100 | 101  |

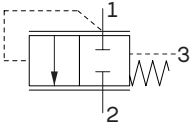
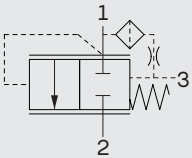
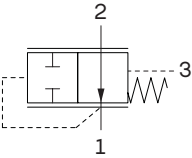
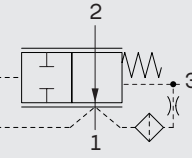


## Flow control valves

## Flow control pressure compensated valves

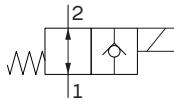
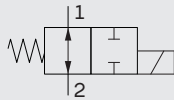
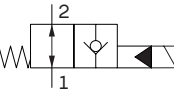
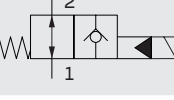
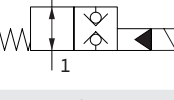
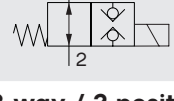
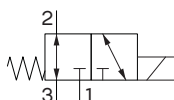
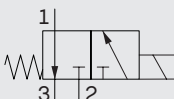
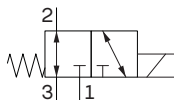
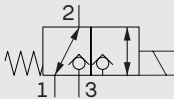
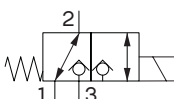
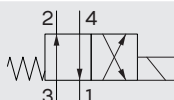
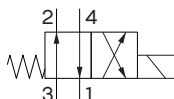
| Hydraulic diagram                                                                   | Valve | Execution | Operation | Control type          | Max. flow up to          |                            | Max. press. up to |      | Page |
|-------------------------------------------------------------------------------------|-------|-----------|-----------|-----------------------|--------------------------|----------------------------|-------------------|------|------|
|                                                                                     |       |           |           |                       | l/min                    | US gpm                     | bar               | psi  |      |
| 2 way                                                                               |       |           |           |                       |                          |                            |                   |      |      |
|    | PW..A | spool     | direct    | mechanic              | 90                       | 24                         | 315               | 4600 | 105  |
|    | PU..A | spool     | direct    | mechanic              | 90                       | 24                         | 315               | 4600 | 109  |
|   | PU..X | spool     | direct    | proportional solenoid | 90                       | 24                         | 315               | 4600 | 113  |
| 3 way                                                                               |       |           |           |                       |                          |                            |                   |      |      |
|  | PP..A | spool     | direct    | mechanic              | Port 1=150<br>Port 3=90  | Port 1=39.6<br>Port 3=24   | 350               | 5100 | 117  |
|  | PP..X | spool     | direct    | proportional solenoid | Port 1=150<br>Port 3=90  | Port 1=39.6<br>Port 3=24   | 315               | 4600 | 121  |
|  | PD    | spool     | direct    | mechanic              | 150                      | 40                         | 210               | 3045 | 125  |
| 4 way                                                                               |       |           |           |                       |                          |                            |                   |      |      |
|  | PL..M | spool     | pilot     | mechanic              | Port 3=160<br>port 4=140 | Port 3=42.2<br>Port 4=36.9 | 350               | 5100 | 127  |

## Logic valves

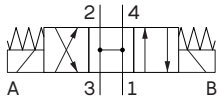
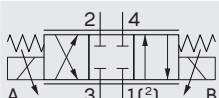
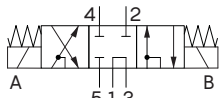
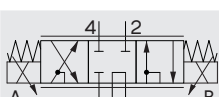
| Logic element                                                                     |               |           |                  |              |                 |        |                   |      |      |
|-----------------------------------------------------------------------------------|---------------|-----------|------------------|--------------|-----------------|--------|-------------------|------|------|
| Hydraulic diagram                                                                 | Valve         | Execution | Operation        | Control type | Max. flow up to |        | Max. press. up to |      | Page |
|                                                                                   |               |           |                  |              | l/min           | US gpm | bar               | psi  |      |
|   | <b>LA..QA</b> | spool     | pilot to close   | /            | 190             | 50.2   | 350               | 5100 | 131  |
|   | <b>LB..QA</b> | spool     | venting to open  | /            | 190             | 50.2   | 350               | 5100 | 133  |
|   | <b>LC..QA</b> | spool     | venting to close | /            | 190             | 50.2   | 350               | 5100 | 135  |
|  | <b>LD..QA</b> | spool     | pilot to open    | /            | 190             | 50.2   | 350               | 5100 | 137  |

## Directional control valves

## Solenoid directional control valves

| Hydraulic diagram                                                                   | Valve                 | Execution | Operation | Control type    | Max. flow up to |        | Max. press. up to                |                                    | Page |
|-------------------------------------------------------------------------------------|-----------------------|-----------|-----------|-----------------|-----------------|--------|----------------------------------|------------------------------------|------|
|                                                                                     |                       |           |           |                 | l/min           | US gpm | bar                              | psi                                |      |
| 2 way / 2 positions                                                                 |                       |           |           |                 |                 |        |                                  |                                    |      |
|    | EB08M                 | poppet    | direct    | on-off solenoid | 2               | 0.53   | 350                              | 5100                               | 139  |
|    | EE..M <sup>(1)</sup>  | spool     | direct    | on-off solenoid | 40              | 10.5   | 250                              | 3600                               | 141  |
|    | EC..M <sup>(1)</sup>  | poppet    | pilot     | on-off solenoid | 150             | 40     | 380                              | 5500                               | 145  |
|    | EF..M <sup>(1)</sup>  | poppet    | pilot     | on-off solenoid | 150             | 40     | 380                              | 5500                               | 149  |
|   | EH..M <sup>(1)</sup>  | poppet    | pilot     | on-off solenoid | 150             | 40     | 380                              | 5500                               | 153  |
|  | EW..M <sup>(1)</sup>  | poppet    | direct    | on-off solenoid | 40              | 10.5   | 350                              | 5100                               | 157  |
| 3 way / 2 positions                                                                 |                       |           |           |                 |                 |        |                                  |                                    |      |
|  | EJ08MF <sup>(2)</sup> | spool     | direct    | on-off solenoid | 10              | 2.6    | 70                               | 1050                               | 161  |
|  | EJ08G                 | spool     | direct    | on-off solenoid | 3               | 0.8    | 350                              | 5100                               | 165  |
|  | EJ..M <sup>(2)</sup>  | spool     | direct    | on-off solenoid | 60              | 15.8   | 250                              | 3600                               | 167  |
|  | EL08B                 | poppet    | direct    | on-off solenoid | 10              | 2.6    | 250                              | 3600                               | 173  |
|  | EL10C                 | poppet    | direct    | on-off solenoid | 20              | 5.3    | 210                              | 3050                               | 175  |
| 4 way / 2 positions                                                                 |                       |           |           |                 |                 |        |                                  |                                    |      |
|  | ER..L <sup>(2)</sup>  | spool     | direct    | on-off solenoid | 40              | 10.5   | 250                              | 3600                               | 177  |
|  | ER12M <sup>(2)</sup>  | spool     | direct    | on-off solenoid | 60              | 15.8   | Port 1=250<br>Port 2-3-4<br>=320 | Port 1=3600<br>Port 2-3-4<br>=4600 | 181  |

## Directional control valves

| Solenoid directional control valves                                              |                      |           |           |                       |                 |        |                   |      |      |
|----------------------------------------------------------------------------------|----------------------|-----------|-----------|-----------------------|-----------------|--------|-------------------|------|------|
| Hydraulic diagram                                                                | Valve                | Execution | Operation | Control type          | Max. flow up to |        | Max. press. up to |      | Page |
|                                                                                  |                      |           |           |                       | l/min           | US gpm | bar               | psi  |      |
| 4 way / 3 positions                                                              |                      |           |           |                       |                 |        |                   |      |      |
|  | ET..L <sup>(2)</sup> | spool     | direct    | on-off solenoid       | 40              | 10.5   | 250               | 3600 | 185  |
|  | ET..X <sup>(2)</sup> | spool     | direct    | proportional solenoid | 25              | 6.6    | 250               | 3600 | 189  |
| 5 way / 3 positions                                                              |                      |           |           |                       |                 |        |                   |      |      |
|  | EK10L <sup>(2)</sup> | spool     | direct    | on-off solenoid       | 20              | 5.3    | 250               | 3600 | 193  |
|  | EK10X <sup>(2)</sup> | spool     | direct    | proportional solenoid | 23              | 6.1    | 250               | 3600 | 197  |

NOTE (1) the circuit shown are in normally open configuration; normally closed configuration is also available, see valves pages.

NOTE (2) the circuit shown are one type of available spools; for several types of spools see valves pages.

## Accessories

### Coils and connectors

Types and ordering codes .....page 201

Dimensional data and features ..... page 203

### Adjustments

Types and dimensions ..... page 207

### Valve bodies

2 way bodies ..... page 208

3 way bodies .....page 210

4 way bodies .....page 212

5 way bodies .....page 214

How to order valves with body .....page 215

### Cavity tools and taps

2 way SAE cavity .....page 216

3 way SAE cavity .....page 217

4 way SAE cavity .....page 218

5 way SAE cavity .....page 219



## MC10MV type pressure relief valves – 2 way

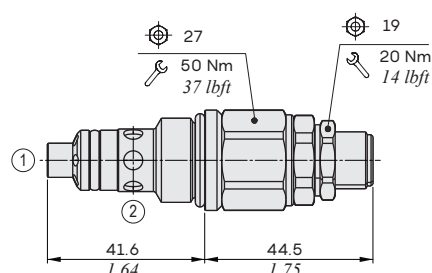
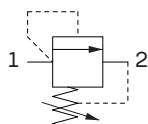
- Direct acting
- Poppet type
- Mechanical control with screw adjustment
- Prepared for antitampering cap
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

### MC10MV

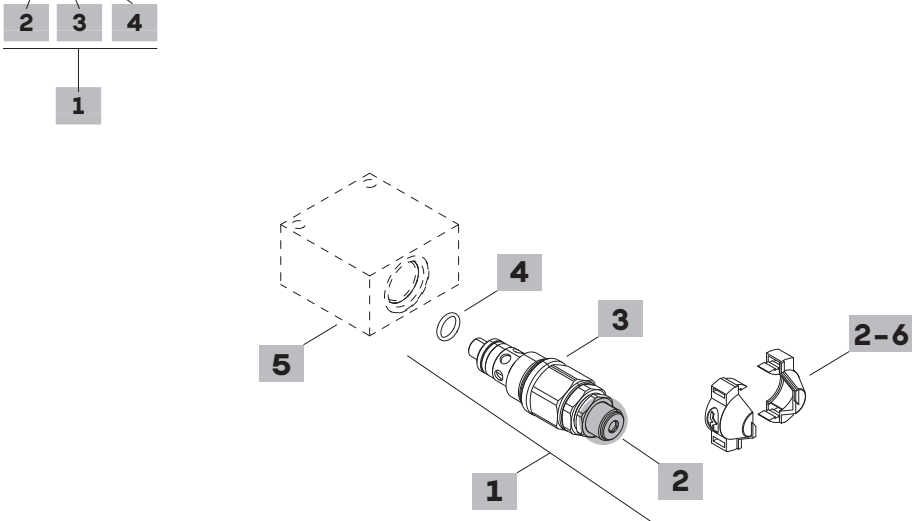
|                                            |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 70 l/min (18.5 US gpm)                                                   |
| Max. pressure                              |                                               | 260 bar (3770 psi)                                                       |
| Oil leakage                                | at 80% of max. pressure setting               | 0.25 cm <sup>3</sup> /min (0.015 in <sup>3</sup> /min)                   |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 10/2 A                                                               |
| Weight                                     |                                               | 0.18 kg (0.396 lb)                                                       |

NOTE – For different conditions, please contact Walvoil Sales Dpt.



Ordering codes and description composition

MC10MV/0Y2B



1 Cartridges

| TYPE        | CODE         | DESCRIPTION      |
|-------------|--------------|------------------|
| MC10MV/0Y2B | OMC100020A04 | Pressure range 2 |
| MC10MV/0Y3B | OMC100020A05 | Pressure range 3 |
| MC10MV/0Y4B | OMC100020A06 | Pressure range 4 |
| MC10MV/0Y5B | OMC100020A02 | Pressure range 5 |

2 Adjustments

| TYPE | DESCRIPTION                                               |
|------|-----------------------------------------------------------|
| Y    | With screw                                                |
| X    | Valve set with antitampering cap (part code: see point 6) |

3 Pressure range

| Standard setting is referred to 5 l/min (1.32 Us gpm) flow |                                                                                |
|------------------------------------------------------------|--------------------------------------------------------------------------------|
| TYPE                                                       | DESCRIPTION                                                                    |
| 2                                                          | Pressure range 5÷75 bar (72.5÷1100 psi);<br>Std. setting 50 bar (725 psi)      |
| 3                                                          | Pressure range 76÷125 bar (1100÷1800 psi);<br>Std. setting 80 bar (1160 psi)   |
| 4                                                          | Pressure range 126÷220 bar (1800÷3190 psi);<br>Std. setting 175 bar (2540 psi) |
| 5                                                          | Pressure range 221÷260 bar (3190÷3770 psi);<br>Std. setting 220 bar (3190 psi) |

4 Seals

| TYPE | DESCRIPTION                                  |
|------|----------------------------------------------|
| B    | NBR (Buna) o-ring seals, std configuration   |
| V    | FPM (Viton) o-ring seals, contact Sales Dept |

5 Valve body

| TYPE          | CODE       | DESCRIPTION                                             |
|---------------|------------|---------------------------------------------------------|
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve,<br>G 3/8 std thread |

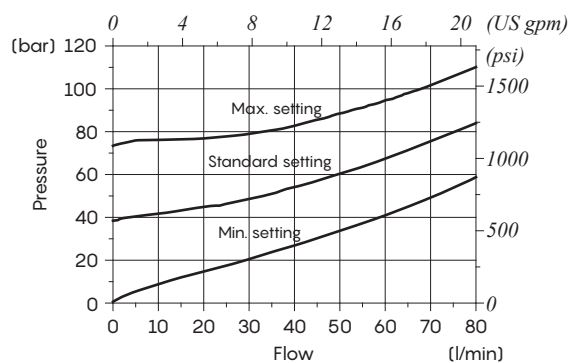
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

6 Accessories

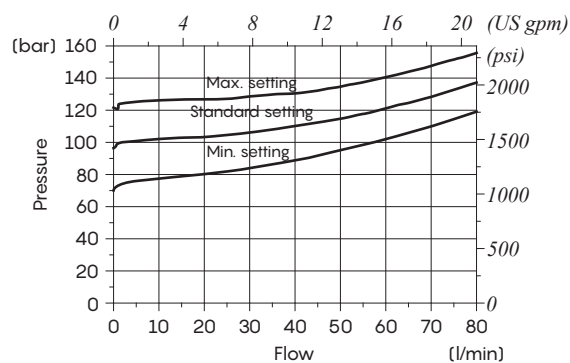
| TYPE | CODE       | DESCRIPTION            |
|------|------------|------------------------|
| -    | 4COP126301 | Antitampering cap (x2) |

**Rating diagrams**

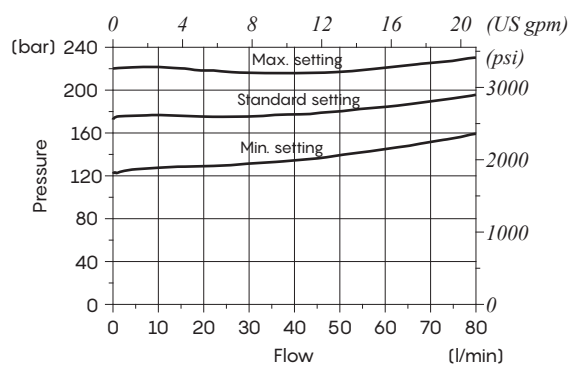
**MC10MV pressure vs. flow**  
Pressure range 2



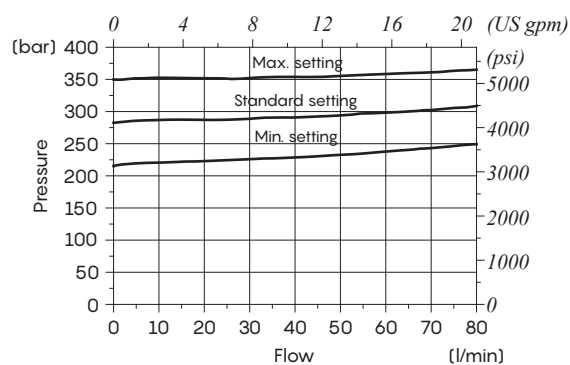
**MC10MV pressure vs. flow**  
Pressure range 3



**MC10MV pressure vs. flow**  
Pressure range 4



**MC10MV pressure vs. flow**  
Pressure range 5









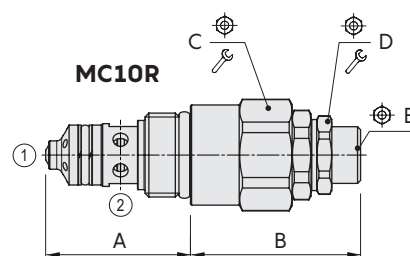
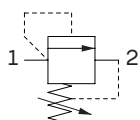
## MC..R type pressure relief valves - 2 way

- Direct acting
- Poppet type
- Mechanical control with screw adjustment
- Prepared for antitampering cap
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | MC08R                                                                    | MC09R                 | MC10R                  |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|-----------------------|------------------------|
| Nominal flow                               |                                               | 25 l/min (6.6 US gpm)                                                    | 35 l/min (9.2 US gpm) | 60 l/min (15.8 US gpm) |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |                       |                        |
| Oil leakage                                | at 80% of max. pressure setting               | 2 cm³/min (0.122 in³/min)                                                |                       |                        |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                       |                        |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                       |                        |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                         |                       |                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                       |                        |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                       |                        |
| Cavity                                     |                                               | SAE 08/2 A                                                               | SAE 09/2 A            | SAE 10/2 A             |
| Weight                                     |                                               | 0.170 kg (0.37 lb)                                                       | 0.230 kg (0.51 lb)    | 0.315 kg (0.69 lb)     |

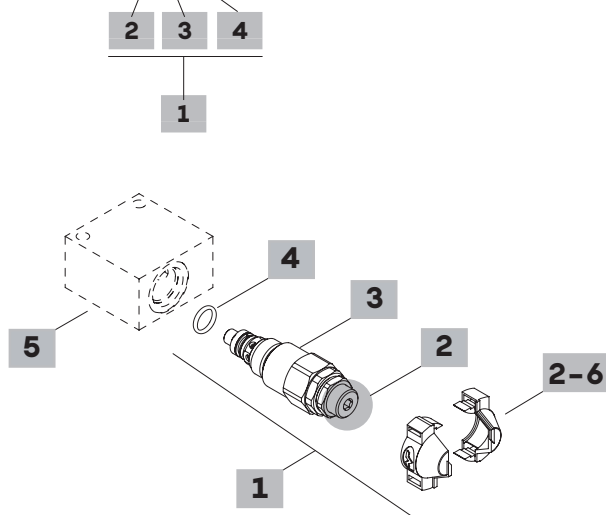
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C  |      | D  |      | E  |      |
|------------|------|------|------|------|----|------|----|------|----|------|
|            | mm   | in   | mm   | in   | Nm | lbft | Nm | lbft | Nm | lbft |
| MC08R      | 34   | 1.34 | 46.6 | 1.83 | 24 | 30   | 22 | 19   | 20 | 15   |
| MC09R      | 33.8 | 1.33 | 46.6 | 1.83 | 24 | 42   | 31 | 19   | 20 | 15   |
| MC10R      | 38.3 | 1.50 | 44.4 | 1.75 | 27 | 50   | 37 | 19   | 20 | 15   |

### Ordering codes and description composition

#### MC08R/OY1B



#### 1 Cartridges

| TYPE                     | CODE        | DESCRIPTION      |
|--------------------------|-------------|------------------|
| <b>SAE cavity 08/2 A</b> |             |                  |
| MC08R/OY1B               | OMC08002050 | Pressure range 1 |
| MC08R/OY2B               | OMC08002051 | Pressure range 2 |
| MC08R/OY3B               | OMC08002052 | Pressure range 3 |
| <b>SAE cavity 09/2 A</b> |             |                  |
| MC09R/OY1B               | OMC09002000 | Pressure range 1 |
| MC09R/OY2B               | OMC09002001 | Pressure range 2 |
| MC09R/OY3B               | OMC09002002 | Pressure range 3 |
| <b>SAE cavity 10/2 A</b> |             |                  |
| MC10R/OY1B               | OMC10002023 | Pressure range 1 |
| MC10R/OY2B               | OMC10002024 | Pressure range 2 |
| MC10R/OY3B               | OMC10002025 | Pressure range 3 |

#### 2 Adjustments

| TYPE | DESCRIPTION                                               |
|------|-----------------------------------------------------------|
| Y    | With screw                                                |
| X    | Valve set with antitampering cap (part code: see point 6) |

#### 3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

| TYPE | DESCRIPTION                                                                    |
|------|--------------------------------------------------------------------------------|
| 1    | Pressure range 10÷120 bar (145÷1740 psi);<br>Std. setting 80 bar (1160 psi)    |
| 2    | Pressure range 40÷200 bar (580÷2900 psi);<br>Std. setting 175 bar (2540 psi)   |
| 3    | Pressure range 200÷350 bar (2900÷5100 psi);<br>Std. setting 250 bar (3600 psi) |

#### 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

#### 5 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE09/2-G 3/8 | 3CC0920C11 | Aluminium body for cavity 09 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

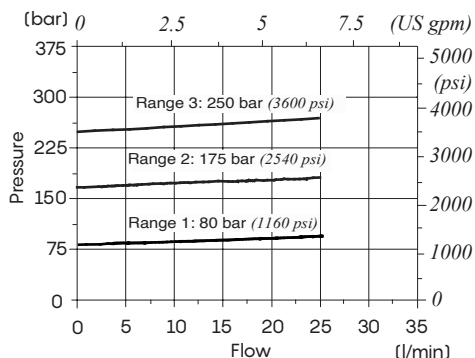
#### 6 Accessories

| TYPE | CODE       | DESCRIPTION            |
|------|------------|------------------------|
| -    | 4COP126301 | Antitampering cap (x2) |

### Rating diagrams

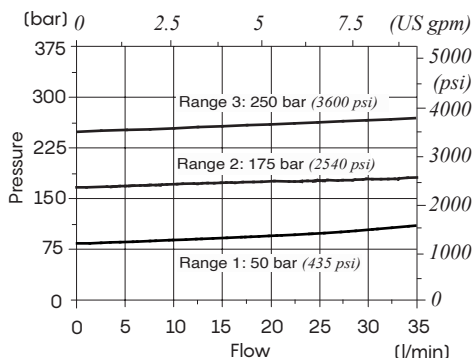
#### MC08R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



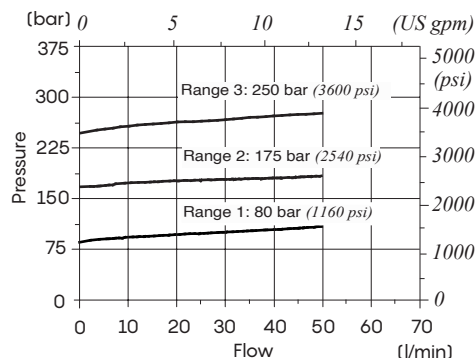
#### MC09R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



#### MC10R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)





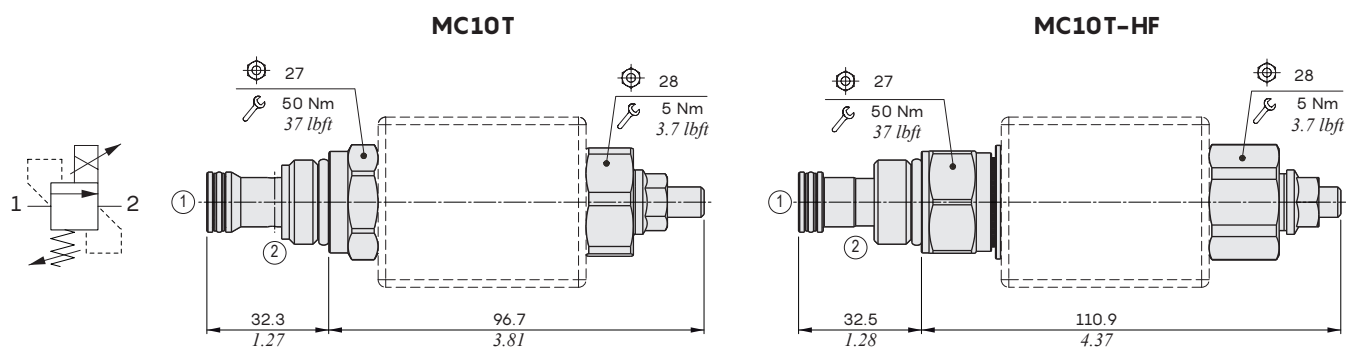
## MC10T - MC10T-HF type pressure relief valves - 2 way

- Solenoid proportional type, direct acting
- Poppet type
- Decreasing pressure with increasing current (N.C)
- System of purging of air
- Applications for low flow rates (max. 10 l/min - 2.64 US gpm)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

| MC10T                                      |                                                                        | MC10T-HF                                                                 |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Max. flow                                  | 3 l/min (0.79 US gpm)                                                  | 10 l/min (2.64 US gpm)                                                   |
| Max. pressure                              | 350 bar (5100 psi)                                                     | 250 bar (3600 psi)                                                       |
| Oil leakage                                | at 80% of max. pressure setting                                        |                                                                          |
|                                            | 0.25 cm <sup>3</sup> /min (0.015 in <sup>3</sup> /min)                 | 0.50 cm <sup>3</sup> /min (0.030 in <sup>3</sup> /min)                   |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane with FPM seals                             | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 10/2                                                               |                                                                          |
| Coil type*                                 | BH or BQP19                                                            | BQP19                                                                    |
| Nominal voltages                           | 12VDC - 24VDC                                                          |                                                                          |
| Power rating                               | 33 W (BH) - 15 W (BQP19)                                               | 15 W                                                                     |
| Max. control current                       | 12V->1.70 A - 24V->0.85 (BH)<br>12V->1.25 A - 24V->0.63 A (BQP19)      | 12V->1.25 A - 24V->0.63 A                                                |
| Dither frequency                           | 150 Hz                                                                 |                                                                          |
| Hysteresis                                 | <5%                                                                    |                                                                          |
| Weight                                     | 0.54 kg (1.19 lb)                                                      | 0.87 kg (1.91 lb)                                                        |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

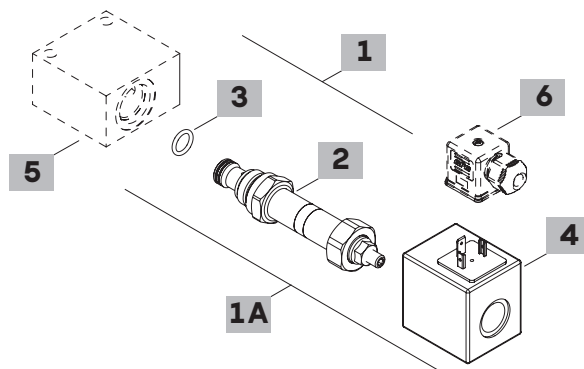


### Ordering codes and description composition

#### MC10T/001B



#### MC10T/031B



#### 1 Cartridges

| TYPE              | CODE        | DESCRIPTION             |
|-------------------|-------------|-------------------------|
| <b>MC10T/001B</b> | OMC10002047 | Pressure range <b>1</b> |
| <b>MC10T/002B</b> | OMC10002048 | Pressure range <b>2</b> |
| <b>MC10T/003B</b> | OMC10002049 | Pressure range <b>3</b> |

#### 1A Complete cartridges with coil

| TYPE                 | CODE        | DESCRIPTION                     |
|----------------------|-------------|---------------------------------|
| <b>MC10T/031B</b>    | OMC10002019 | Pressure range <b>1</b> , 12VDC |
| <b>MC10T/032B</b>    | OMC10002020 | Pressure range <b>2</b> , 12VDC |
| <b>MC10T/033B</b>    | OMC10002021 | Pressure range <b>3</b> , 12VDC |
| <b>MC10T-HF/033B</b> | OMC10002070 | Pressure range <b>3</b> , 12VDC |

#### 2 Pressure range

| TYPE            | DESCRIPTION                               |
|-----------------|-------------------------------------------|
| <b>MC10T</b>    |                                           |
| <b>1</b>        | Pressure range 15÷130 bar (217÷1885 psi); |
| <b>2</b>        | Pressure range 15÷170 bar (217÷2465 psi); |
| <b>3</b>        | Pressure range 15÷210 bar (217÷3045 psi); |
| <b>MC10T-HF</b> |                                           |
| <b>3</b>        | Pressure range 20÷225 bar (290÷3260 psi); |

Note: for further pressure range contact Sales Dept

#### 3 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 4 Coils

| TYPE                  | CODE        | DESCRIPTION        |
|-----------------------|-------------|--------------------|
| <b>2) BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>3) BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |
| <b>4) BH 24VDC</b>    | 4SLD002400A | 24VDC-ISO4400 coil |
| <b>5) BQP19 24VDC</b> | 4SL5000245A | 24VDC-ISO4400 coil |

Note: for HF version use only BQP19 coil  
For complete coils list see from page 201

#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

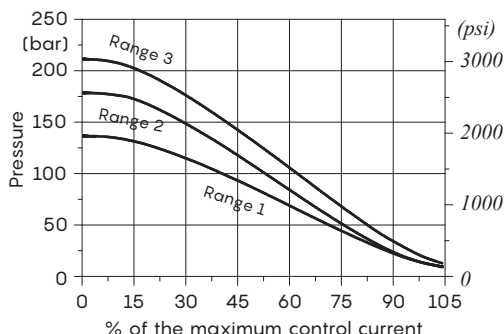
#### 6 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

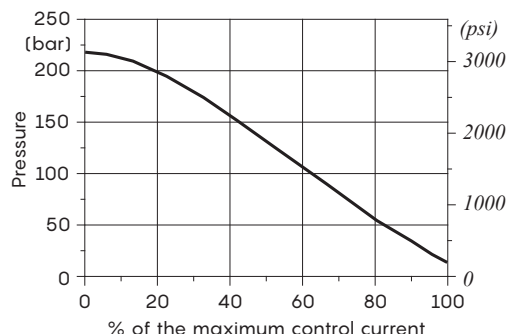
For complete connectors list see from page 201

**Rating diagrams**

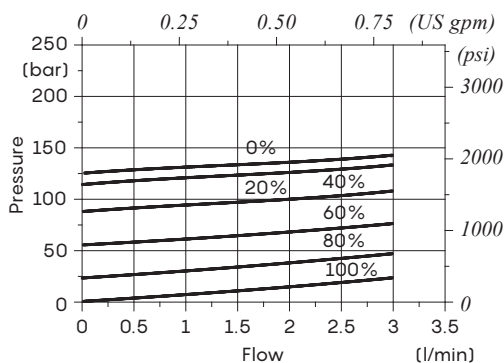
**MC10T pressure setting vs. % max. control current**  
at 1 l/min (0.26 US gpm)



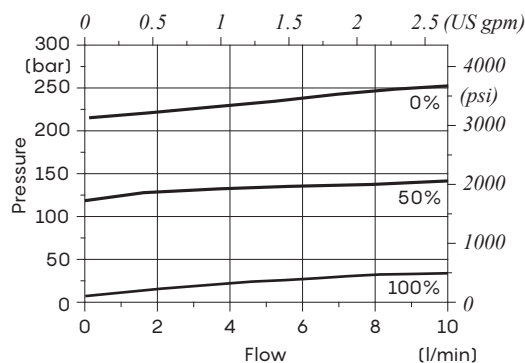
**MC10T-HF pressure setting vs. % max. control current**  
at 2 l/min (0.53 US gpm)



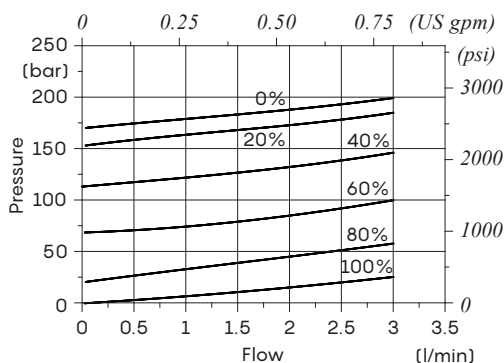
**MC10T pressure vs. flow 1->2**  
for % of control current - Pressure range 1



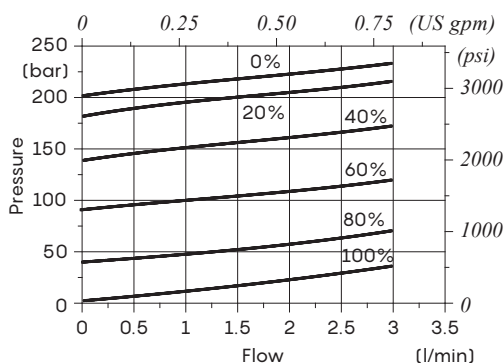
**MC10T-HF pressure vs. flow 1->2**  
for % of control current



**MC10T pressure vs. flow 1->2**  
for % of control current - Pressure range 2



**MC10T pressure vs. flow 1->2**  
for % of control current - Pressure range 3







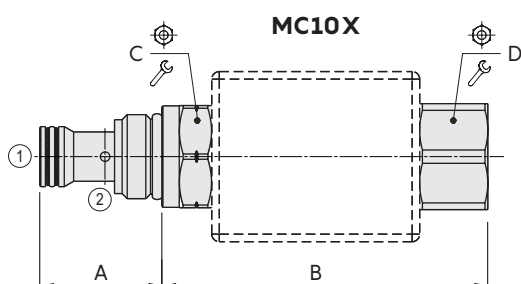
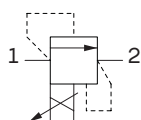
## MC10X - MC10X-HF type pressure relief valves - 2 way

- Solenoid proportional type, direct acting
- Poppet type
- Decreasing pressure with increasing current (N.C)
- System of purging of air
- Applications for low flow rates (max. 10 l/min - 2.64 US gpm)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | MC10X                                                                    | MC10X-HF                                               |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------|
| Max. flow                                  |                                               | 3 l/min (0.79 US gpm)                                                    | 10 l/min (2.64 US gpm)                                 |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       | 250 bar (3600 psi)                                     |
| Oil leakage                                | at 80% of max. pressure setting               | 0.25 cm <sup>3</sup> /min (0.015 in <sup>3</sup> /min)                   | 0.50 cm <sup>3</sup> /min (0.030 in <sup>3</sup> /min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                        |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                                                        |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                                                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                        |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                                                        |
| Cavity                                     |                                               | SAE 10/2                                                                 |                                                        |
| Coil type*                                 |                                               | BH or BQP19                                                              | BQP19                                                  |
| Nominal voltages                           |                                               | 12VDC - 24VDC                                                            |                                                        |
| Power rating                               |                                               | 33 W (BH) - 15 W (BQP19)                                                 | 15 W                                                   |
| Max. control current                       |                                               | 12V->1.70 A - 24V->0.85 (BH)<br>12V->1.25 A - 24V->0.63 A (BQP19)        | 12V->1.25 A - 24V->0.63 A                              |
| Dither frequency                           |                                               | 150 Hz                                                                   |                                                        |
| Hysteresis                                 |                                               | <5%                                                                      |                                                        |
| Weight                                     |                                               | 0.760 kg (1.67 lb)                                                       | 0.863 kg (1.90 lb)                                     |

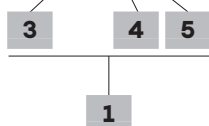
NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.



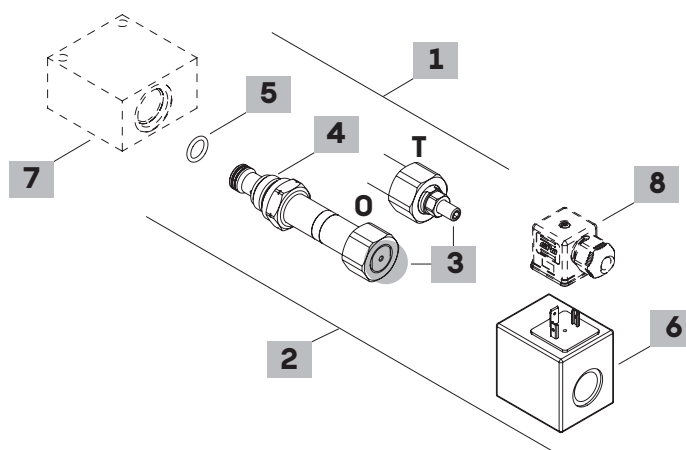
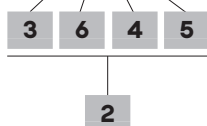
| Valve type | A    |      | B                             |      |            |      | C  |    | D  |    |
|------------|------|------|-------------------------------|------|------------|------|----|----|----|----|
|            | mm   | in   | N / O<br>without<br>emergency |      | T<br>screw |      | Nm |    | Nm |    |
| MC10X      | 32.3 | 1.27 | 86.2                          | 3.39 | -          | -    | 27 | 50 | 37 | 28 |
| MC10X-HF   | 32.5 | 1.28 | 94.5                          | 3.72 | 116.5      | 4.59 | 27 | 50 | 37 | 28 |

### Ordering codes and description composition

#### MC10X/001B



#### MC10X/031B



#### 1 Cartridges

| TYPE              | CODE        | DESCRIPTION             |
|-------------------|-------------|-------------------------|
| <b>MC10X/001B</b> | OMC10002050 | Pressure range <b>1</b> |
| <b>MC10X/002B</b> | OMC10002051 | Pressure range <b>2</b> |
| <b>MC10X/003B</b> | OMC10002052 | Pressure range <b>3</b> |

#### 2 Complete cartridges with coil

| TYPE                 | CODE        | DESCRIPTION                     |
|----------------------|-------------|---------------------------------|
| <b>MC10X/031B</b>    | OMC10002039 | Pressure range <b>1</b> , 12VDC |
| <b>MC10X/032B</b>    | OMC10002040 | Pressure range <b>2</b> , 12VDC |
| <b>MC10X/033B</b>    | OMC10002041 | Pressure range <b>3</b> , 12VDC |
| <b>MC10X-HF/033B</b> | OMC10002064 | Pressure range <b>3</b> , 12VDC |
| <b>MC10X-HF/T33B</b> | OMC10002089 | Pressure range <b>3</b> , 12VDC |

#### 3 Emergency

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>0</b> | Without override |
| <b>T</b> | With screw       |

#### 4 Pressure range

| TYPE            | DESCRIPTION                              |
|-----------------|------------------------------------------|
| <b>MC10X</b>    |                                          |
| <b>1</b>        | Pressure range 7÷120 bar (102÷1740 psi); |
| <b>2</b>        | Pressure range 7÷170 bar (102÷2450 psi); |
| <b>3</b>        | Pressure range 7÷210 bar (102÷3050 psi); |
| <b>MC10X-HF</b> |                                          |
| <b>3</b>        | Pressure range 3÷230 bar (43÷3330 psi);  |

Note: for further pressure range contact Sales Dept

#### 5 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 6 Coils

| TYPE                  | CODE        | DESCRIPTION        |
|-----------------------|-------------|--------------------|
| <b>2) BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>3) BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |
| <b>4) BH 24VDC</b>    | 4SLD002400A | 24VDC-ISO4400 coil |
| <b>5) BQP19 24VDC</b> | 4SL5000245A | 24VDC-ISO4400 coil |

Note: for HF version use only BQP19 coil  
For complete coils list see from page 201

#### 7 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

#### 8 Connector

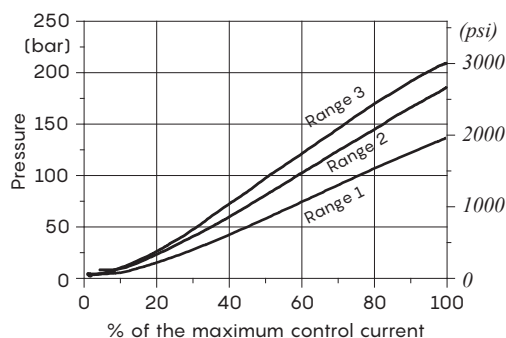
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

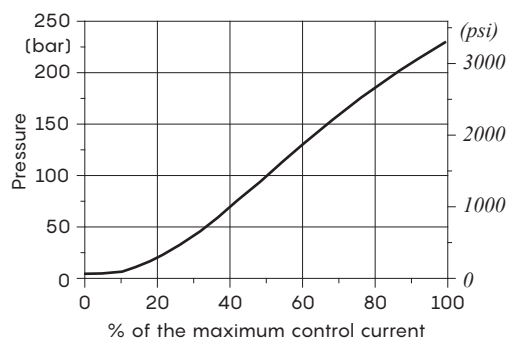


**Rating diagrams**

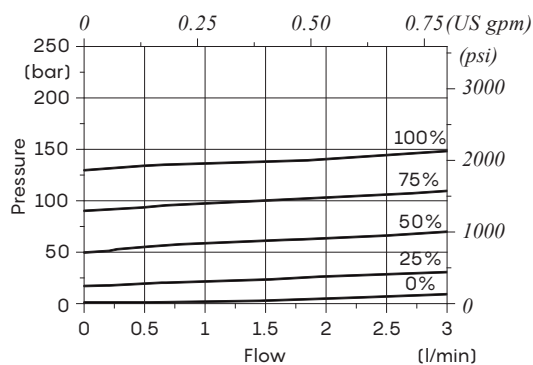
**MC10X pressure setting vs. % max. control current**  
at 1 l/min (0.26 US gpm)



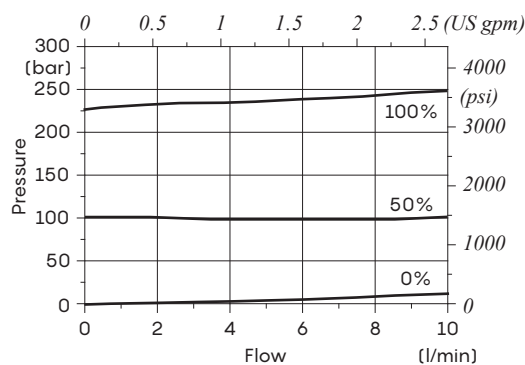
**MC10X-HF pressure setting vs. % max. control current**  
at 2 l/min (0.53 US gpm)



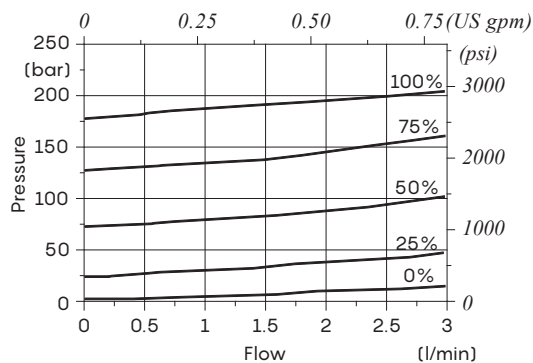
**MC10X pressure vs. flow 1->2**  
for % of control current - Pressure range 1



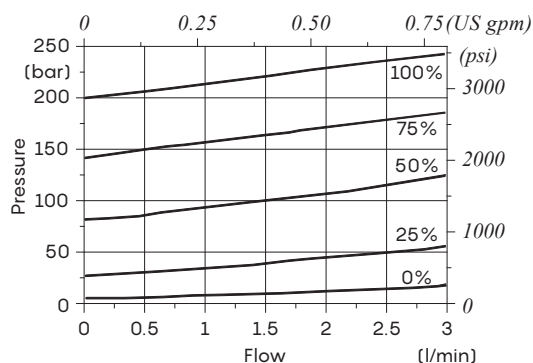
**MC10X-HF pressure vs. flow 1->2**  
for % of control current



**MC10X pressure vs. flow 1->2**  
for % of control current - Pressure range 2



**MC10X pressure vs. flow 1->2**  
for % of control current - Pressure range 3







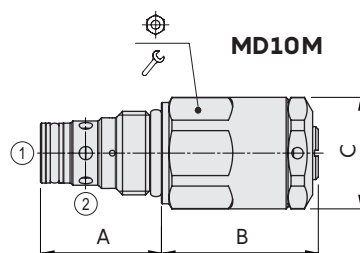
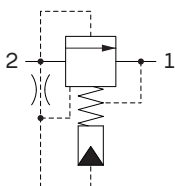
## MD..M type shockless pressure relief valves – 2 way

- Direct acting
- Poppet type
- Damp valve
- Different reaction time available
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                    | MD10M                                                                    | MD12M                                              |
|--------------------------------------------|------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------|
| Nominal flow                               |                                    | 60 l/min (15.8 US gpm)                                                   | 120 l/min (31.7 US gpm)                            |
| Max. pressure                              |                                    | 350 bar (5100 psi)                                                       |                                                    |
| Oil leakage                                | at 80% of max. pressure setting    | 5 cm <sup>3</sup> /min (0.30 in <sup>3</sup> /min)                       | 5 cm <sup>3</sup> /min (0.30 in <sup>3</sup> /min) |
| Fluid                                      |                                    | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                    |
| Viscosity                                  |                                    | 10–200 cSt                                                               |                                                    |
| Max level of contamination                 |                                    | 20/18/14 ISO4406                                                         |                                                    |
| Fluid temperature                          | with NBR seals+PTFE with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                    |
| Environmental temp. for working conditions |                                    | from -20°C (-4°F) to 60°C (140°F)                                        |                                                    |
| Cavity                                     |                                    | SAE 10/2                                                                 | SAE 12/2                                           |
| Weight                                     |                                    | 0.200 kg (0.44 lb)                                                       | 0.355 kg (0.78 lb)                                 |

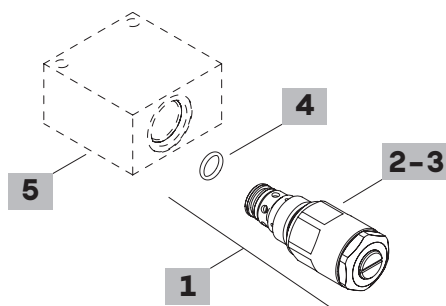
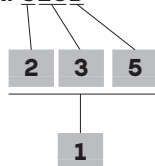
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A  |      | B    |      | C     |       |    |    |      |
|------------|----|------|------|------|-------|-------|----|----|------|
|            | mm | in   | mm   | in   | mm    | in    |    | Nm | lbft |
| MD10M      | 32 | 1.25 | 41.5 | 1.63 | Ø29.5 | Ø1.16 | 27 | 50 | 37   |
| MD12M      | 46 | 1.81 | 46.5 | 1.83 | Ø35   | Ø1.38 | 32 | 85 | 62.7 |

### Ordering codes and description composition

#### MD10M/313B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION              |
|------------------------|-------------|--------------------------|
| <b>SAE cavity 10/2</b> |             |                          |
| <b>MD10M/313B</b>      | OMD10002027 | Pressure range <b>13</b> |
| <b>SAE cavity 12/2</b> |             |                          |
| <b>MD12M/513B</b>      | OMD12002004 | Pressure range <b>13</b> |

#### 2 Reaction time

| TYPE     | DESCRIPTION                         |
|----------|-------------------------------------|
| <b>2</b> | Reaction time 0.2 sec. (± 0.1 sec.) |
| <b>3</b> | Reaction time 0.3 sec. (± 0.1 sec.) |
| <b>4</b> | Reaction time 0.4 sec. (± 0.1 sec.) |
| <b>5</b> | Reaction time 0.5 sec. (± 0.1 sec.) |
| <b>6</b> | Reaction time 0.6 sec. (± 0.1 sec.) |
| <b>7</b> | Reaction time 0.7 sec. (± 0.1 sec.) |

#### 3 Pressure range

| TYPE                   | DESCRIPTION                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>SAE cavity 10/2</b> |                                                                                                                     |
| <b>11</b>              | Pressure range 130÷200 bar (1900÷2900 psi); Pressure ratio 1.9                                                      |
| <b>12</b>              | Pressure range 180÷240 bar (2610÷3480 psi); Pressure ratio 2.2                                                      |
| <b>13</b>              | Pressure range 220÷290 bar (3190÷4200 psi); Setting 250 bar (3625 psi) at 25 l/min (6.6 US gpm); Pressure ratio 2.4 |
| <b>21</b>              | Pressure range 170÷270 bar (2465÷3915 psi); Pressure ratio 2.5                                                      |
| <b>22</b>              | Pressure range 220÷290 bar (3190÷4200 psi); Pressure ratio 2.8                                                      |
| <b>SAE cavity 12/2</b> |                                                                                                                     |
| <b>11</b>              | Pressure range 125÷155 bar (1810÷2250 psi); Pressure ratio 1.7                                                      |
| <b>12</b>              | Pressure range 160÷190 bar (2320÷2760 psi); Pressure ratio 1.9                                                      |
| <b>13</b>              | Pressure range 180÷240 bar (2610÷3480 psi); Setting 220 bar (3190 psi) at 60 l/min (16 US gpm); Pressure ratio 2.2  |
| <b>21</b>              | Pressure range 150÷185 bar (1900÷2685 psi); Pressure ratio 2                                                        |
| <b>22</b>              | Pressure range 190÷235 bar (2760÷3400 psi); Pressure ratio 2.35                                                     |
| <b>23</b>              | Pressure range 230÷275 bar (3335÷3990 psi); Pressure ratio 2.55                                                     |

#### 4 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |

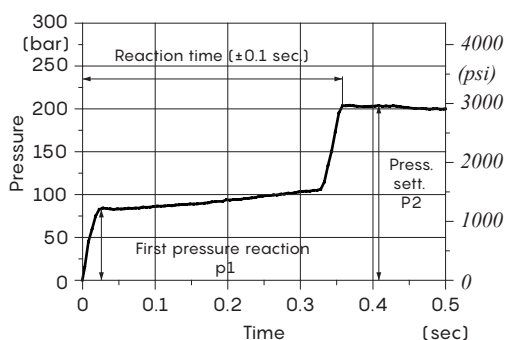
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

**Rating diagrams**

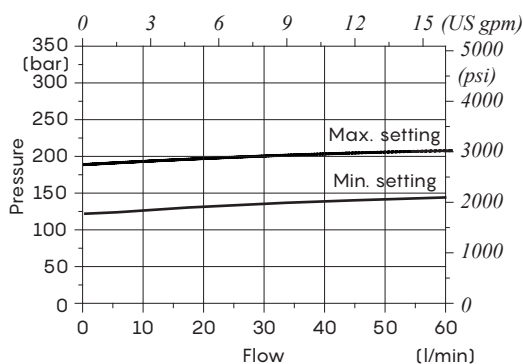
**MD10M performance curve example  
with typical dimensions**



Pressure ratio:  $R_p = \frac{p_2}{p_1}$

First pressure reaction:  $p_1 = \frac{p_2}{R_p}$

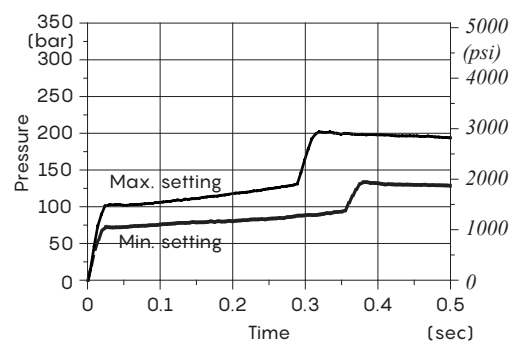
**MD10M pressure vs. flow  
at max. and min. setting**



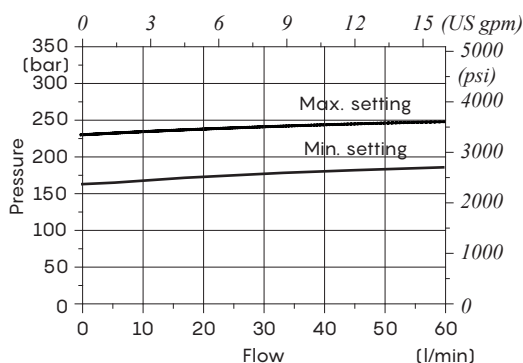
**Pressure range  
11**

130÷200 bar  
(1900÷2900 psi)  
Pressure ratio 1.9  
Q=60 l/min  
(15.8 US gpm)

**MD10M performance curve  
at max. and min. setting**



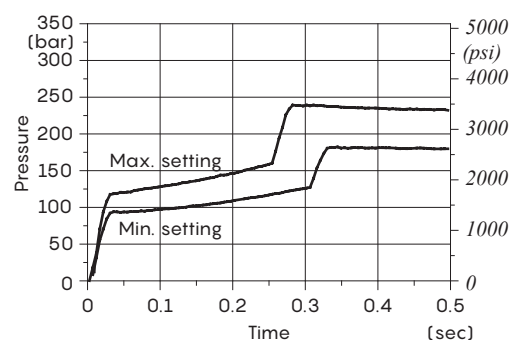
**MD10M pressure vs. flow  
at max. and min. setting**



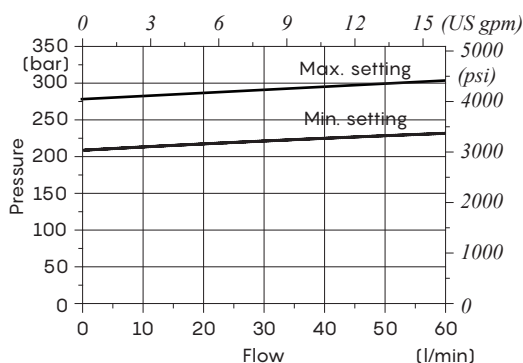
**Pressure range  
12**

180÷240 bar  
(2610÷3480 psi)  
Pressure ratio 2.2  
Q=60 l/min  
(15.8 US gpm)

**MD10M performance curve  
at max. and min. setting**



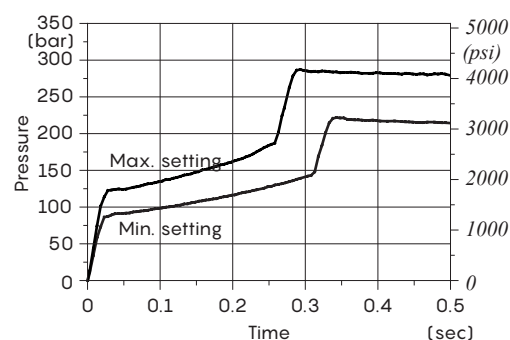
**MD10M pressure vs. flow  
at max. and min. setting**



**Pressure range  
13**

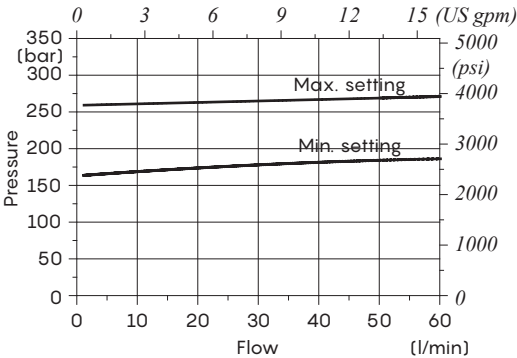
220÷290 bar  
(3190÷4200 psi)  
Setting 250 bar (3625 psi) at 25 l/min  
(6.6 US gpm)  
Pressure ratio 2.4  
Q=60 l/min  
(15.8 US gpm)

**MD10M performance curve  
at max. and min. setting**



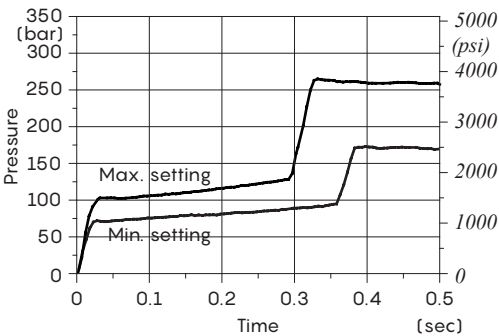
Rating diagrams

MD10M pressure vs. flow  
at max. and min. setting

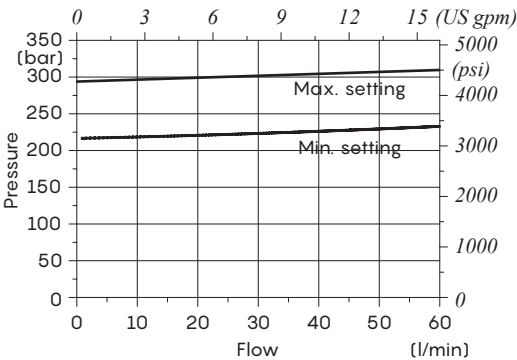


**Pressure range**  
**21**  
170÷270 bar  
(2465÷3915 psi)  
Pressure ratio 2.5  
Q=60 l/min  
(15.8 US gpm)

MD10M performance curve  
at max. and min. setting

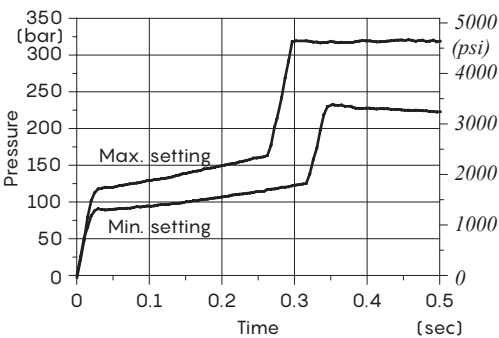


MD10M pressure vs. flow  
at max. and min. setting



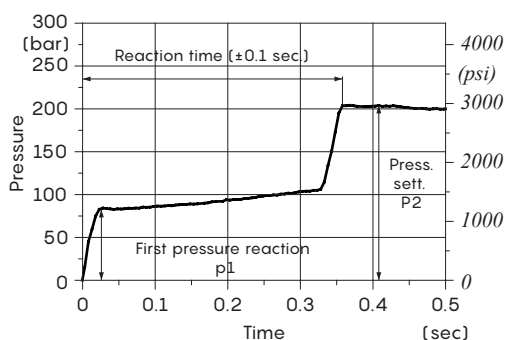
**Pressure range**  
**22**  
220÷290 bar  
(3190÷4200 psi)  
Pressure ratio 2.8  
Q=60 l/min  
(15.8 US gpm)

MD10M performance curve  
at max. and min. setting



**Rating diagrams**

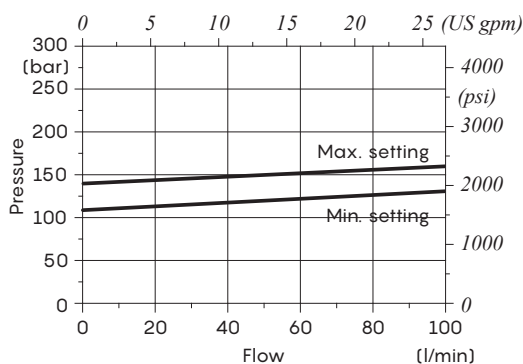
**MD12M performance curve example  
with typical dimensions**



Pressure ratio:  $R_p = \frac{p_2}{p_1}$

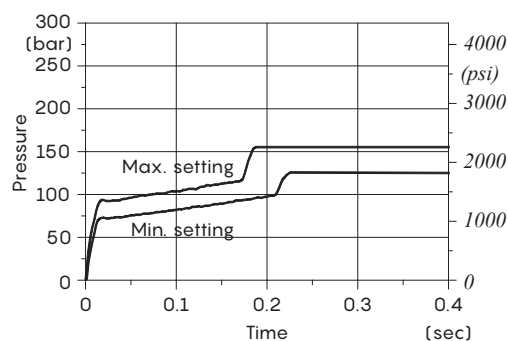
First pressure reaction:  $p_1 = \frac{p_2}{R_p}$

**MD12M pressure vs. flow  
at max. and min. setting**

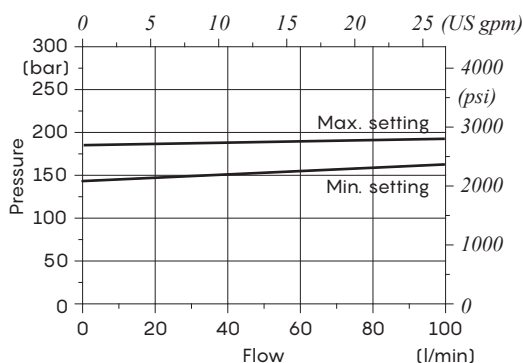


**Pressure range 11**  
125-155 bar  
(1810-2250 psi)  
Pressure ratio 1.7  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve  
at max. and min. setting**

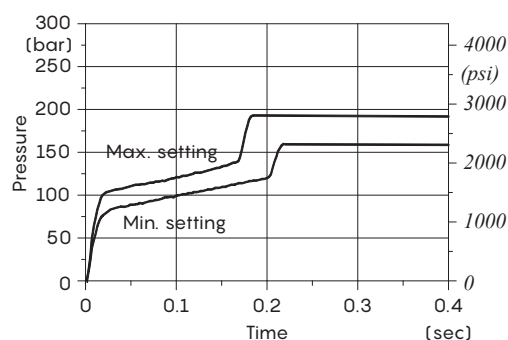


**MD12M pressure vs. flow  
at max. and min. setting**

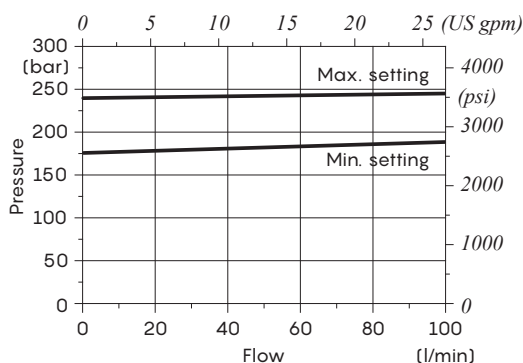


**Pressure range 12**  
160-190 bar  
(2320-2760 psi)  
Pressure ratio 1.9  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve  
at max. and min. setting**

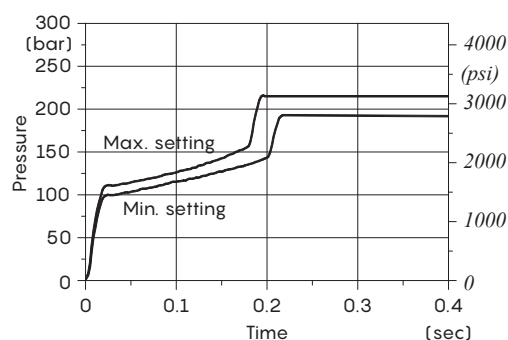


**MD12M pressure vs. flow  
at max. and min. setting**



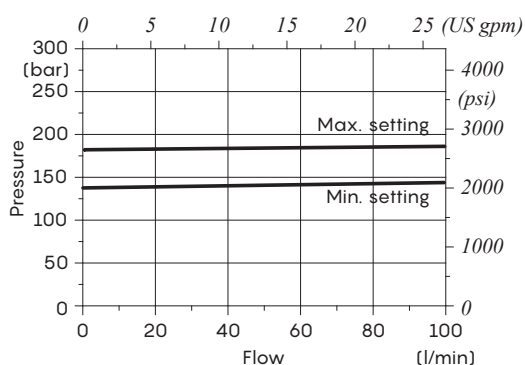
**Pressure range 13**  
180-220 bar  
(2610-3190 psi)  
Setting 220 bar (3190 psi) at 60 l/min  
(16 US gpm)  
Pressure ratio 2.2  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve  
at max. and min. setting**



### Rating diagrams

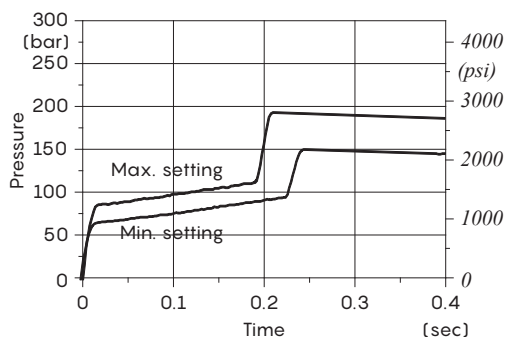
**MD12M pressure vs. flow**  
at max. and min. setting



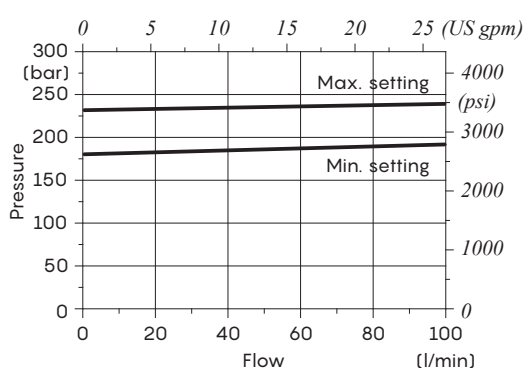
**Pressure range 21**

150÷185 bar  
(1900÷2685 psi)  
Pressure ratio 2  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve**  
at max. and min. setting



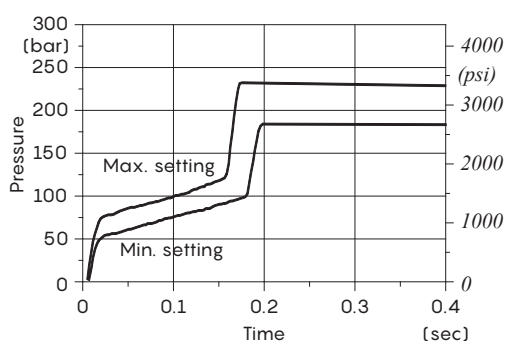
**MD12M pressure vs. flow**  
at max. and min. setting



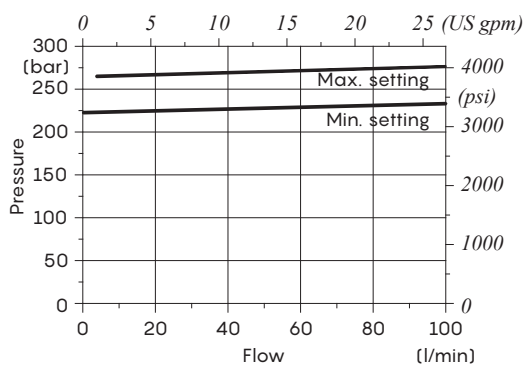
**Pressure range 22**

190÷235 bar  
(2760÷3400 psi)  
Pressure ratio 2.35  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve**  
at max. and min. setting



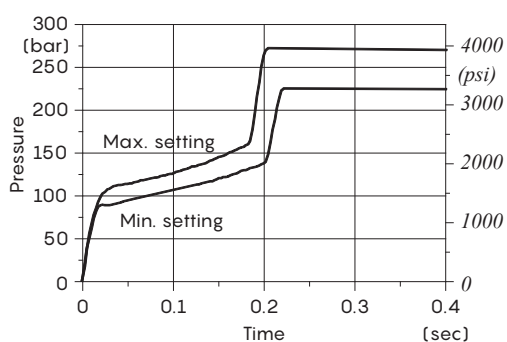
**MD12M pressure vs. flow**  
at max. and min. setting



**Pressure range 23**

230÷275 bar  
(3335÷3990 psi)  
Pressure ratio 2.55  
Q=100 l/min  
(26.4 US gpm)

**MD12M performance curve**  
at max. and min. setting







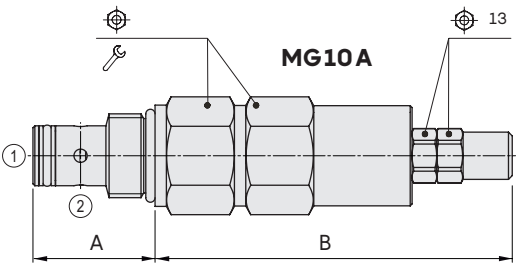
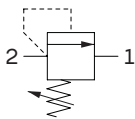
**MG..A type  
pressure relief valves – 2 way**

- Differential operated
- Poppet type
- Available with different types of adjustments
- The backpressure values on line 1 must be added to valve nominal setting
- Prepared for antitampering cap
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

| MG10A                                      |                                                                        | MG12A                                                                    |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 60 l/min (15.8 US gpm)                                                 | 100 l/min (26.4 US gpm)                                                  |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |
| Oil leakage                                | at 80% of max. pressure setting                                        | 2 cm <sup>3</sup> /min (0.122 in <sup>3</sup> /min)                      |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 10/2                                                               | SAE 12/2                                                                 |
| Weight                                     | 0.34 kg (0.75 lb)                                                      | 0.87 kg (1.92 lb)                                                        |

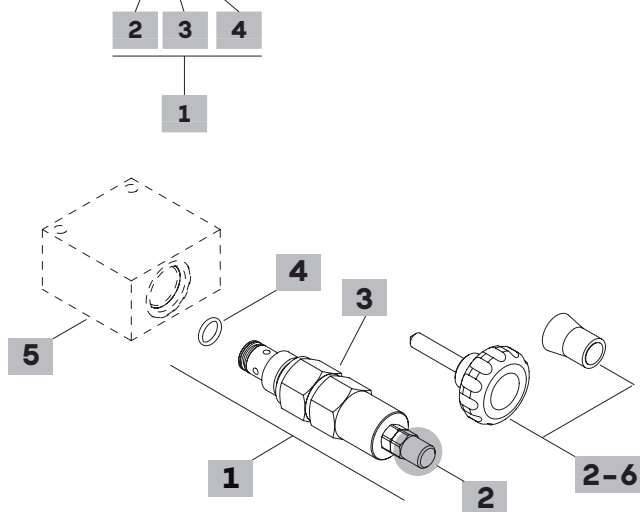
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B     |      |    |    |        |
|------------|------|------|-------|------|----|----|--------|
|            | mm   | in   | mm    | in   |    | Nm | lbf·ft |
| MG10A/OS   | 32.3 | 1.27 | 94.5  | 3.72 | 27 | 50 | 37     |
| MG12A/OS   | 46   | 1.81 | 126.5 | 4.98 | 36 | 80 | 59     |

### Ordering codes and description composition

#### MG10A/0S1B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION      |
|------------------------|-------------|------------------|
| <b>SAE cavity 10/2</b> |             |                  |
| MG10A/0S1B             | OMG10002009 | Pressure range 1 |
| MG10A/0S2B             | OMG10002002 | Pressure range 2 |
| MG10A/0S3B             | OMG10002003 | Pressure range 3 |
| MG10A/0S4B             | OMG10002001 | Pressure range 4 |
| <b>SAE cavity 12/2</b> |             |                  |
| MG12A/0S1B             | OMG12002000 | Pressure range 1 |
| MG12A/0S2B             | OMG12002001 | Pressure range 2 |
| MG12A/0S3B             | OMG12002002 | Pressure range 3 |

#### 2 Adjustments

| TYPE | DESCRIPTION                                               |
|------|-----------------------------------------------------------|
| S    | Screw with cap                                            |
| V    | With handwheel (part code: see point 6)                   |
| X    | Valve set with antitampering cap (part code: see point 6) |

#### 3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

| TYPE | DESCRIPTION                                                                                                                                                                                         |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | For SAE cavity 10/2: pressure range 30÷100 bar (435÷1450 psi);<br>Std. setting 80 bar (1160 psi)<br>For SAE cavity 12/2: pressure range 20÷100 bar (290÷1450 psi);<br>Std. setting 50 bar (725 psi) |
| 2    | Pressure range 50÷200 bar (725÷2900 psi);<br>Std. setting 150 bar (2175 psi)                                                                                                                        |
| 3    | Pressure range 150÷350 bar (2175÷5100 psi);<br>Std. setting 250 bar (3625 psi)                                                                                                                      |
| 4    | Pressure range 5÷60 bar (72.5÷870 psi);<br>Std. setting 30 bar (435 psi); only for SAE cavity 10/2                                                                                                  |

#### 4 Seals

| TYPE | DESCRIPTION                                     |
|------|-------------------------------------------------|
| B    | NBR (Buna)+PTFE o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept    |

#### 5 Valve body

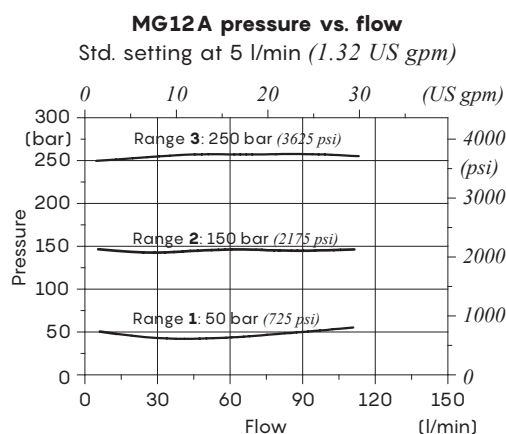
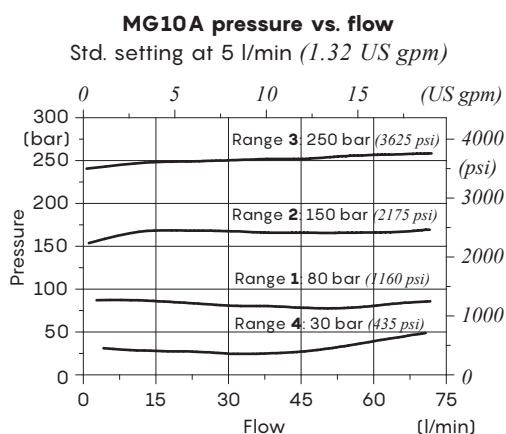
| TYPE          | CODE       | DESCRIPTION                                             |
|---------------|------------|---------------------------------------------------------|
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve,<br>G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve,<br>G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

#### 6 Accessories

| TYPE | CODE       | DESCRIPTION       |
|------|------------|-------------------|
| -    | 4VL2407100 | Handwheel         |
| -    | 4COP120420 | Antitampering cap |

### Rating diagrams





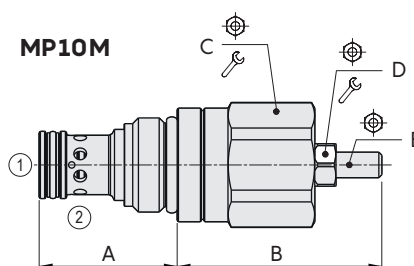
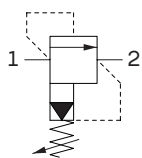
## MP..M type pressure relief valves – 2 way

- Pilot operated
- Spool type
- Mechanical control with screw adjustments
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                               |                                               | MP10M                                                                    | MP12M                   | MP16M                       |
|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|-------------------------|-----------------------------|
| Nominal flow                                  |                                               | 120 l/min (31.7 US gpm)                                                  | 200 l/min (52.8 US gpm) | 400 l/min (105.67 US gpm)   |
| Max. pressure                                 |                                               | Port 1= 350 bar (5100 psi)<br>Port 2= 30 bar (435 psi)                   |                         | 350 bar (5100 psi)          |
| Oil leakage                                   | at 80% of max.<br>pressure setting            | 25 cm³/min (1.525 in³/min)                                               |                         | 100 cm³/min (6.102 in³/min) |
| Fluid                                         |                                               | mineral based or sinthetic hydraulic fluid with lubricating properties   |                         |                             |
| Viscosity                                     |                                               | 10-200 cSt                                                               |                         | 12-400 cSt                  |
| Max level of contamination                    |                                               | 18/16/13 ISO4406                                                         |                         | 20/18/14 ISO4406            |
| Fluid temperature                             | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                             |
| Environmental temp. for<br>working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                         |                             |
| Cavity                                        |                                               | SAE 10/2                                                                 | SAE 12/2                | SAE 16/2                    |
| Weight                                        |                                               | 0.190 kg (0.42 lb)                                                       | 0.300 kg (0.66 lb)      | 0.490 kg (1.080 lb)         |

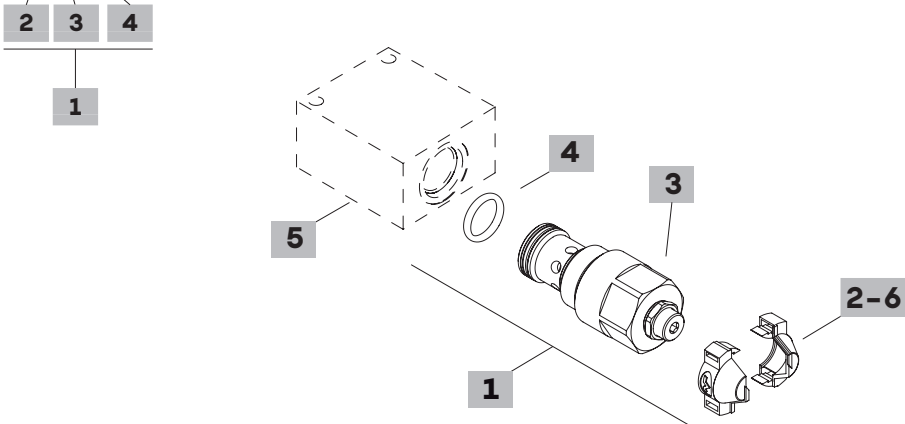
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C                                                                                     |     |        | D                                                                                     |     |        | E                                                                                     |  |
|------------|------|------|------|------|---------------------------------------------------------------------------------------|-----|--------|---------------------------------------------------------------------------------------|-----|--------|---------------------------------------------------------------------------------------|--|
|            |      |      |      |      |  |     |        |  |     |        |  |  |
|            | mm   | in   | mm   | in   |                                                                                       | Nm  | lbf·ft |                                                                                       | Nm  | lbf·ft |                                                                                       |  |
| MP10M      | 32.6 | 1.28 | 48.3 | 1.90 | 27                                                                                    | 50  | 37     | 10                                                                                    | 6.6 | 4.9    | 3                                                                                     |  |
| MP12M      | 45   | 1.77 | 46.9 | 1.85 | 32                                                                                    | 80  | 59     | 10                                                                                    | 6.6 | 4.9    | 3                                                                                     |  |
| MP16M      | 45.2 | 1.78 | 49.8 | 1.96 | 36                                                                                    | 100 | 74     | 19                                                                                    | 20  | 15     | 5                                                                                     |  |

Ordering codes and description composition

MP16M/OY2B



1 Cartridges

| TYPE                   | CODE         | DESCRIPTION      |
|------------------------|--------------|------------------|
| <b>SAE cavity 10/2</b> |              |                  |
| MP10M/OG1B             | OMP10002091  | Pressure range 1 |
| MP10M/OG2B             | OMP100020A00 | Pressure range 2 |
| MP10M/OG3B             | OMP10002093  | Pressure range 3 |
| <b>SAE cavity 12/2</b> |              |                  |
| MP12M/OG1B             | OMP12002046  | Pressure range 1 |
| MP12M/OG2B             | OMP12002047  | Pressure range 2 |
| MP12M/OG3B             | OMP12002048  | Pressure range 3 |
| <b>SAE cavity 16/2</b> |              |                  |
| MP16M/OY1B             | OMP16002017  | Pressure range 1 |
| MP16M/OY2B             | OMP16002013  | Pressure range 2 |
| MP16M/OY3B             | OMP16002014  | Pressure range 3 |

2 Adjustments

| TYPE | DESCRIPTION                                               |
|------|-----------------------------------------------------------|
| G/Y  | With screw                                                |
| X    | Valve set with antitampering cap (part code: see point 6) |

3 Pressure range

| TYPE | DESCRIPTION                                 |
|------|---------------------------------------------|
| 1    | Pressure range 5÷50 bar (72.5÷725 psi);     |
| 2    | Pressure range 50÷220 bar (725÷3190 psi);   |
| 3    | Pressure range 150÷350 bar (2175÷5100 psi); |

4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

5 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

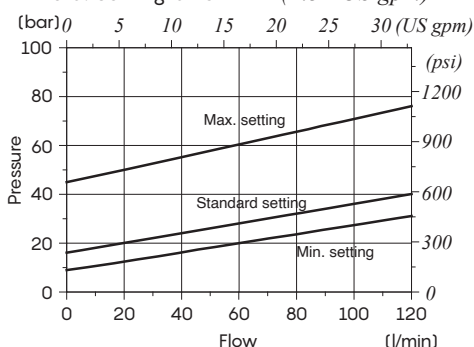
6 Accessories

| TYPE | CODE       | DESCRIPTION                        |
|------|------------|------------------------------------|
| -    | 4COP116420 | Cap (for MP10M / MP12M)            |
| -    | 4COP126300 | Antitampering cap (x2) (for MP16M) |

**Rating diagrams**

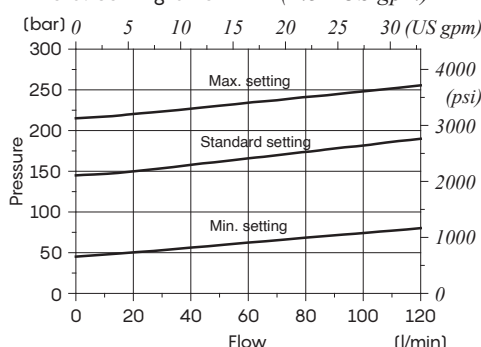
**MP10M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



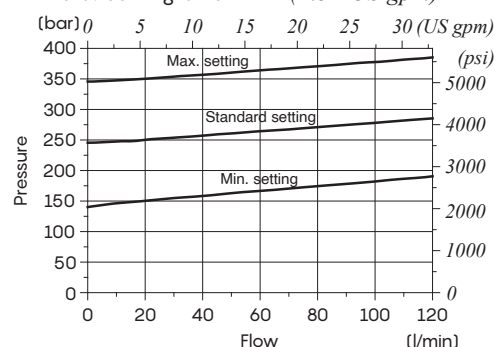
**MP10M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



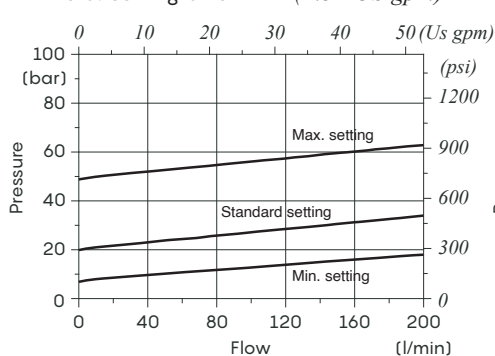
**MP10M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



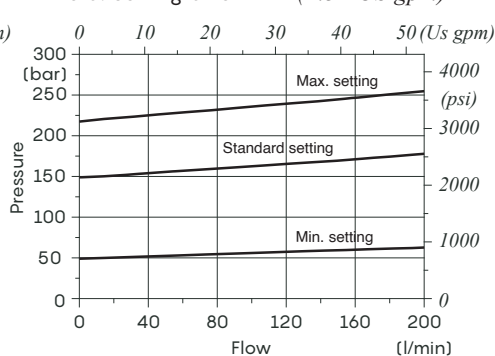
**MP12M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



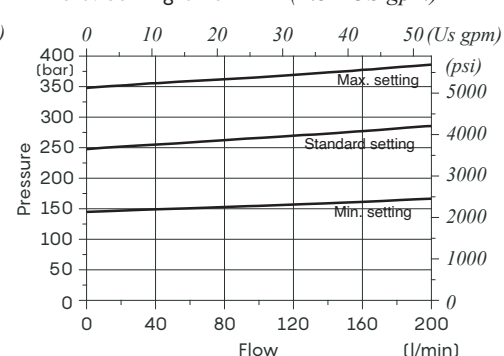
**MP12M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



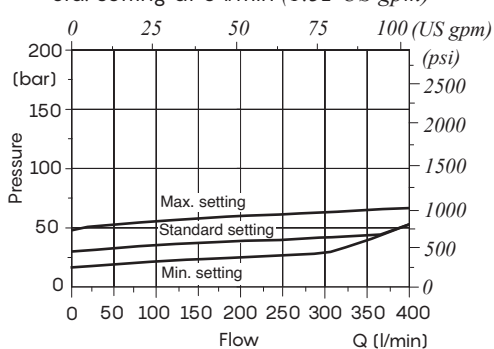
**MP12M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



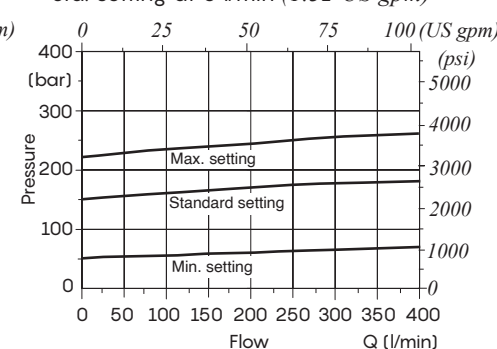
**MP16M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



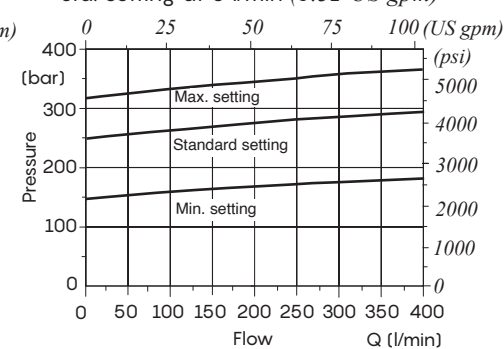
**MP16M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)



**MP16M pressure vs. flow**

Std. setting at 5 l/min (1.32 US gpm)







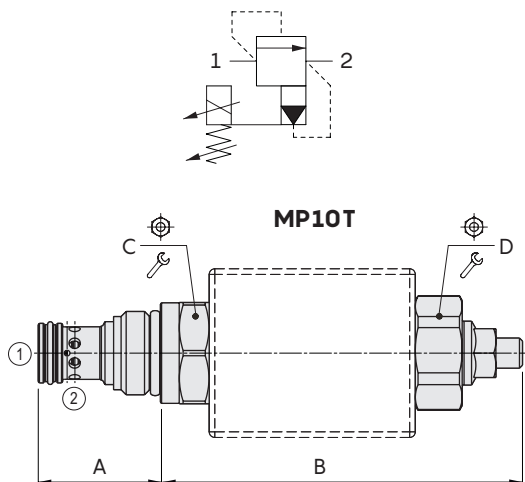
## MP..T type pressure relief valves – 2 way

- Solenoid proportional type, direct acting
- Spool type
- Decreasing pressure with increasing current (N.C)
- Applications for high flow rates (max. 200 l/min – 52.8 US gpm)
- System of purging of air
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | MP10T                                                                    | MP12T                                                  |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------|
| Nominal flow                               |                                               | 120 l/min (31.7 US gpm)                                                  | 200 l/min (52.8 US gpm)                                |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |                                                        |
| Oil leakage                                | at 80% of max. pressure setting               | <150 cm <sup>3</sup> /min (9.15 in <sup>3</sup> /min)                    | <200 cm <sup>3</sup> /min (<12.2 in <sup>3</sup> /min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                        |
| Viscosity                                  |                                               | 10–200 cSt                                                               |                                                        |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                                                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                        |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                                                        |
| Cavity                                     |                                               | SAE 10/2                                                                 | SAE 12/2                                               |
| Coil type*                                 |                                               | BH or BQP19                                                              |                                                        |
| Nominal voltages                           |                                               | 12VDC – 24VDC                                                            |                                                        |
| Power rating                               |                                               | 33 W (BH) – 15 W (BQP19)                                                 |                                                        |
| Max. control current                       |                                               | 12V->1.70 A – 24V->0.85 (BH)<br>12V->1.25 A – 24V->0.63 A (BQP19)        |                                                        |
| Dither frequency                           |                                               | 200 Hz                                                                   |                                                        |
| Hysteresis                                 |                                               | <5%                                                                      |                                                        |
| Weight                                     |                                               | 0.77 kg (1.70 lb)                                                        | 0.92 kg (2.03 lb)                                      |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



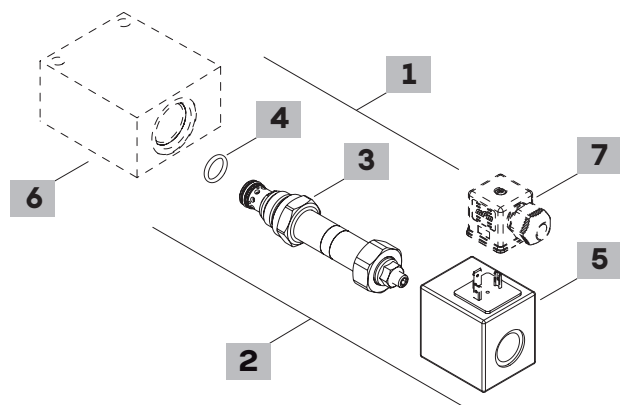
| Valve type | A    |      | B   |      | C                                                                                     |    |      | D                                                                                     |    |      |
|------------|------|------|-----|------|---------------------------------------------------------------------------------------|----|------|---------------------------------------------------------------------------------------|----|------|
|            |      |      |     |      |  |    |      |  |    |      |
|            | mm   | in   | mm  | in   |                                                                                       | Nm | lbft |                                                                                       | Nm | lbft |
| MP10T      | 32.6 | 1.28 | 100 | 3.94 | 27                                                                                    | 50 | 37   | 28                                                                                    | 5  | 3.7  |
| MP12T      | 45   | 1.81 | 115 | 4.53 | 32                                                                                    | 85 | 62.7 | 28                                                                                    | 5  | 3.7  |

### Ordering codes and description composition

#### MP10T/001B



#### MP10T/031B



#### 1 Cartridges

| TYPE                   | CODE         | DESCRIPTION             |
|------------------------|--------------|-------------------------|
| <b>SAE cavity 10/2</b> |              |                         |
| <b>MP10T/001B</b>      | OMP10002051  | Pressure range <b>1</b> |
| <b>MP10T/002B</b>      | OMP10002052  | Pressure range <b>2</b> |
| <b>MP10T/003B</b>      | OMP10002053  | Pressure range <b>3</b> |
| <b>MP10T/004B</b>      | OMP100020A02 | Pressure range <b>4</b> |
| <b>SAE cavity 12/2</b> |              |                         |
| <b>MP12T/001B</b>      | OMP12002028  | Pressure range <b>1</b> |
| <b>MP12T/002B</b>      | OMP12002029  | Pressure range <b>2</b> |
| <b>MP12T/003B</b>      | OMP12002030  | Pressure range <b>3</b> |
| <b>MP12T/004B</b>      | OMP12002035  | Pressure range <b>4</b> |

#### 2 Complete cartridges

| TYPE                   | CODE        | DESCRIPTION                     |
|------------------------|-------------|---------------------------------|
| <b>SAE cavity 10/2</b> |             |                                 |
| <b>MP10T/031B</b>      | OMP10002035 | Pressure range <b>1</b> , 12VDC |
| <b>MP10T/032B</b>      | OMP10002036 | Pressure range <b>2</b> , 12VDC |
| <b>MP10T/033B</b>      | OMP10002037 | Pressure range <b>3</b> , 12VDC |
| <b>SAE cavity 12/2</b> |             |                                 |
| <b>MP12T/031B</b>      | OMP12002020 | Pressure range <b>1</b> , 12VDC |
| <b>MP12T/032B</b>      | OMP12002021 | Pressure range <b>2</b> , 12VDC |
| <b>MP12T/033B</b>      | OMP12002022 | Pressure range <b>3</b> , 12VDC |
| <b>MP12T/034B</b>      | OMP12002027 | Pressure range <b>4</b> , 12VDC |

#### 3 Pressure range

| TYPE     | DESCRIPTION                              |
|----------|------------------------------------------|
| <b>1</b> | Pressure range 8+130 bar (116÷1900 psi)  |
| <b>2</b> | Pressure range 8+180 bar (116÷2600 psi)  |
| <b>3</b> | Pressure range 8+240 bar (116÷3500 psi)  |
| <b>4</b> | Pressure range 8+300 bar (116÷4350 psi); |

Note: for further pressure range contact Sales Dept

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE                  | CODE        | DESCRIPTION        |
|-----------------------|-------------|--------------------|
| <b>2) BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>3) BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |
| <b>4) BH 24VDC</b>    | 4SLD002400A | 24VDC-ISO4400 coil |
| <b>5) BQP19 24VDC</b> | 4SL5000245A | 24VDC-ISO4400 coil |

For complete coils list see from page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)

For steel bodies or different threading see from page 208

#### 7 Connector

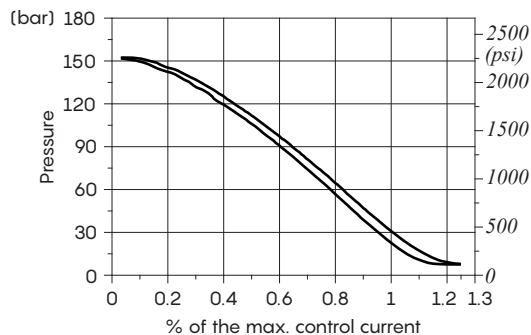
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

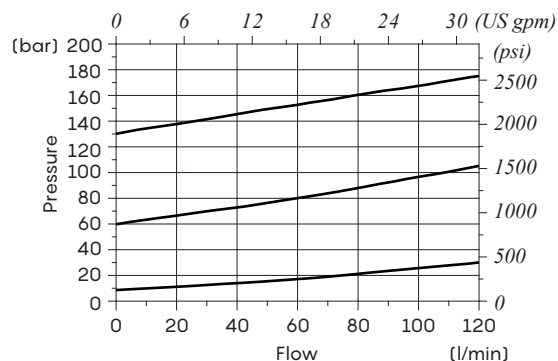


**Rating diagrams**

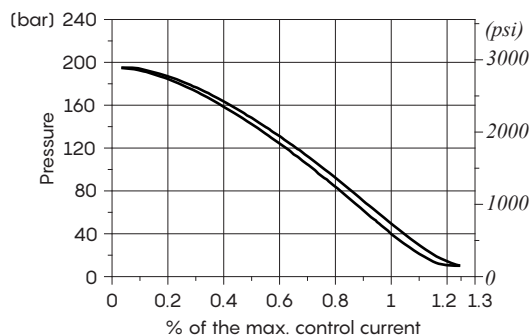
**MP10T pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



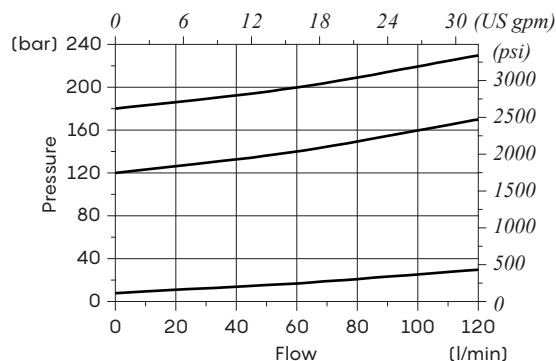
**MP10T pressure vs. flow 1->2**  
for % of control current - Pressure range 1



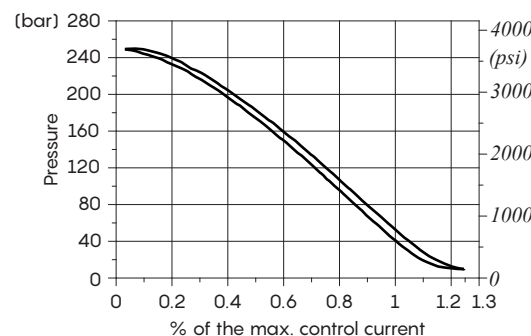
**MP10T pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



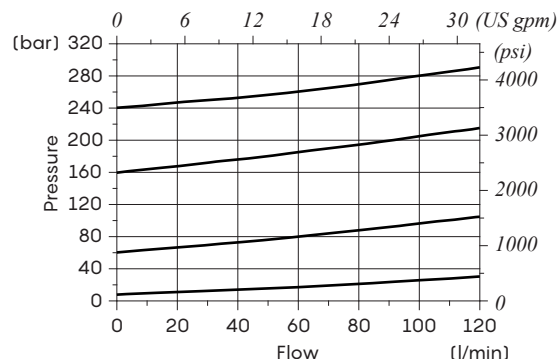
**MP10T pressure vs. flow 1->2**  
for % of control current - Pressure range 2



**MP10T pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)

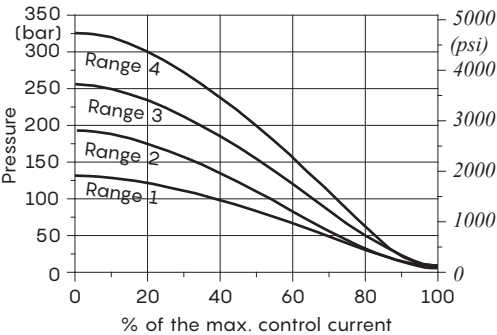


**MP10T pressure vs. flow 1->2**  
for % of control current - Pressure range 3

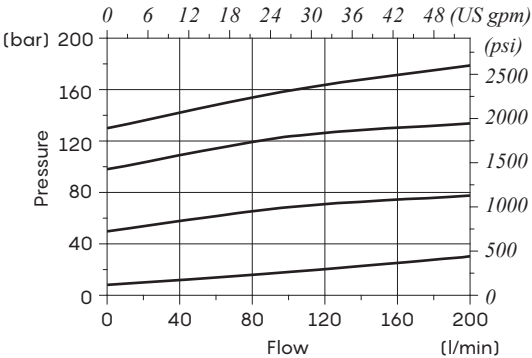


Rating diagrams

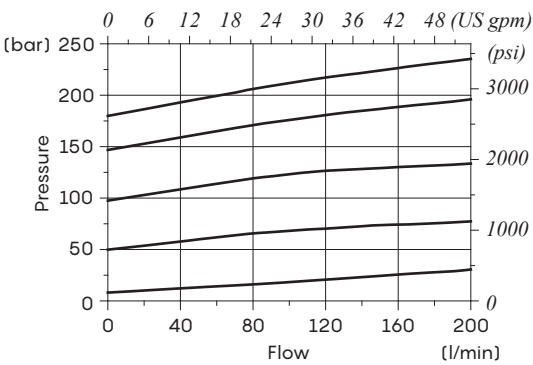
MP12T pressure setting vs. % max. control current  
at 10 l/min (2.6 US gpm)



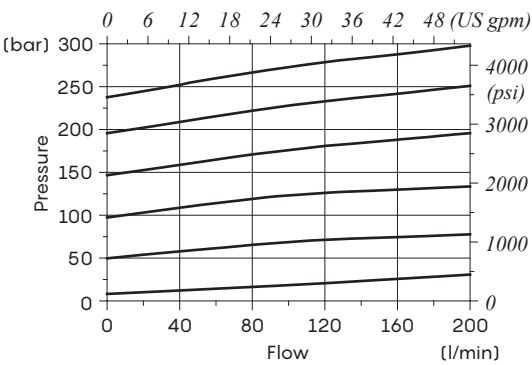
MP12T pressure vs. flow 1->2  
for % of control current - Pressure range 1



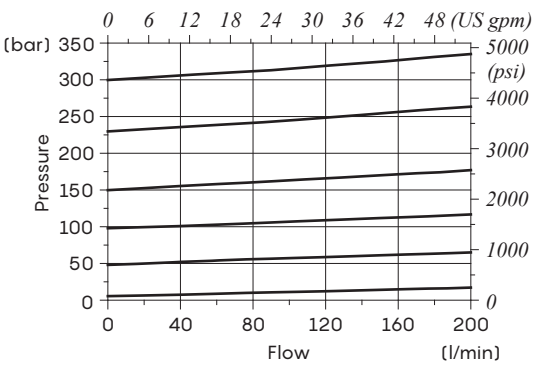
MP12T pressure vs. flow 1->2  
for % of control current - Pressure range 2



MP12T pressure vs. flow 1->2  
for % of control current - Pressure range 3



MP12T pressure vs. flow 1->2  
for % of control current - Pressure range 4





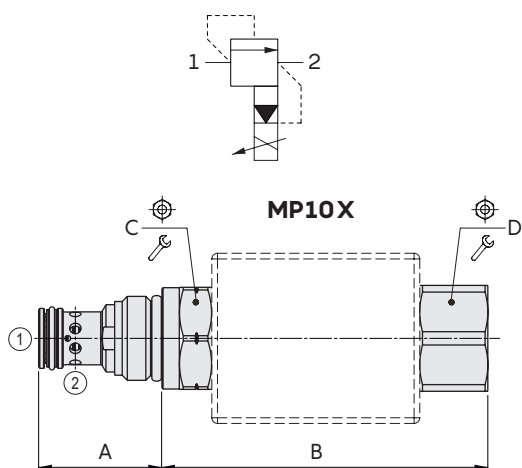
## MP..X type pressure relief valves – 2 way

- Solenoid proportional type, pilot operated
- Spool type
- Increasing pressure with increasing current (N.O)
- Applications for high flow rates (max. 200 l/min – 52.8 US gpm)
- System of purging of air
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | MP10X                                                                    | MP12X                                                 |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------|
| Max. flow                                  |                                               | 120 l/min (31.7 US gpm)                                                  | 200 l/min (52.8 US gpm)                               |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |                                                       |
| Oil leakage                                | at 80% of max. pressure setting               | <150 cm <sup>3</sup> /min (9.15 in <sup>3</sup> /min)                    | <200 cm <sup>3</sup> /min (12.2 in <sup>3</sup> /min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                       |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                                                       |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                                                       |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                       |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                                                       |
| Cavity                                     |                                               | SAE 10/2                                                                 | SAE 12/2                                              |
| Coil type*                                 |                                               | BH or BQP19                                                              |                                                       |
| Nominal voltages                           |                                               | 12VDC – 24VDC                                                            |                                                       |
| Power rating                               |                                               | 33 W (BH) – 15 W (BQP19)                                                 |                                                       |
| Max. control current                       |                                               | 12V->1.70 A – 24V->0.85 (BH)<br>12V->1.25 A – 24V->0.63 A (BQP19)        |                                                       |
| Dither frequency                           |                                               | 150-200 Hz                                                               |                                                       |
| Hysteresis                                 |                                               | <5%                                                                      |                                                       |
| Weight                                     |                                               | 0.76 kg (1.67 lb)                                                        | 0.88 kg (1.94 lb)                                     |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



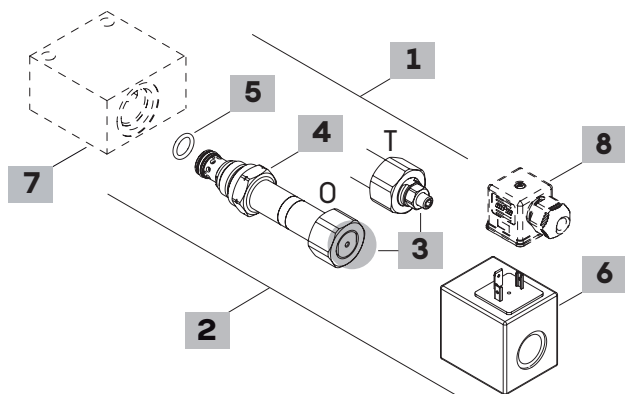
| Valve type | A    |      | B                       |      |         |      | C  |    | D    |    |      |     |
|------------|------|------|-------------------------|------|---------|------|----|----|------|----|------|-----|
|            | mm   | in   | N / O without emergency |      | T screw |      | Nm |    | Nm   |    | lbft |     |
| MP10X      | 32.6 | 1.28 | 86                      | 3.38 | 104.2   | 4.10 | 27 | 50 | 37   | 28 | 5    | 3.7 |
| MP12X      | 45   | 1.77 | 103                     | 4.05 | 118.3   | 4.66 | 32 | 85 | 62.7 | 28 | 5    | 3.7 |

### Ordering codes and description composition

#### MP10X/001B



#### MP10X/031B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION             |
|------------------------|-------------|-------------------------|
| <b>SAE cavity 10/2</b> |             |                         |
| MP10X/001B             | OMP10002054 | Pressure range <b>1</b> |
| MP10X/002B             | OMP10002055 | Pressure range <b>2</b> |
| MP10X/003B             | OMP10002056 | Pressure range <b>3</b> |
| MP10X/004B             | OMP10002057 | Pressure range <b>4</b> |
| <b>SAE cavity 12/2</b> |             |                         |
| MP12X/001B             | OMP12002031 | Pressure range <b>1</b> |
| MP12X/002B             | OMP12002032 | Pressure range <b>2</b> |
| MP12X/003B             | OMP12002033 | Pressure range <b>3</b> |
| MP12X/004B             | OMP12002034 | Pressure range <b>4</b> |

#### 2 Complete cartridges

| TYPE                   | CODE        | DESCRIPTION                     |
|------------------------|-------------|---------------------------------|
| <b>SAE cavity 10/2</b> |             |                                 |
| MP10X/031B             | OMP10002044 | Pressure range <b>1</b> , 12VDC |
| MP10X/032B             | OMP10002045 | Pressure range <b>2</b> , 12VDC |
| MP10X/033B             | OMP10002046 | Pressure range <b>3</b> , 12VDC |
| MP10X/034B             | OMP10002047 | Pressure range <b>4</b> , 12VDC |
| <b>SAE cavity 12/2</b> |             |                                 |
| MP12X/031B             | OMP12002023 | Pressure range <b>1</b> , 12VDC |
| MP12X/032B             | OMP12002024 | Pressure range <b>2</b> , 12VDC |
| MP12X/033B             | OMP12002025 | Pressure range <b>3</b> , 12VDC |
| MP12X/034B             | OMP12002026 | Pressure range <b>4</b> , 12VDC |

#### 3 Emergency

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>0</b> | Without override |
| <b>T</b> | With screw       |

#### 4 Pressure range

| TYPE     | DESCRIPTION                               |
|----------|-------------------------------------------|
| <b>1</b> | Pressure range 10÷120 bar (145÷1740 psi)  |
| <b>2</b> | Pressure range 10÷160 bar (145÷2320 psi)  |
| <b>3</b> | Pressure range 10÷230 bar (145÷3335 psi)  |
| <b>4</b> | Pressure range 10÷350 bar (145÷5100 psi); |

Note: for further pressure range contact Sales Dept

#### 5 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 6 Coils

| TYPE                  | CODE        | DESCRIPTION        |
|-----------------------|-------------|--------------------|
| <b>2) BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>3) BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |
| <b>4) BH 24VDC</b>    | 4SLD002400A | 24VDC-ISO4400 coil |
| <b>5) BQP19 24VDC</b> | 4SL5000245A | 24VDC-ISO4400 coil |

For complete coils list see from page 201

#### 7 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

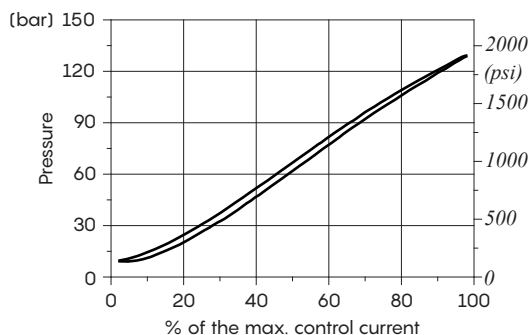
#### 8 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

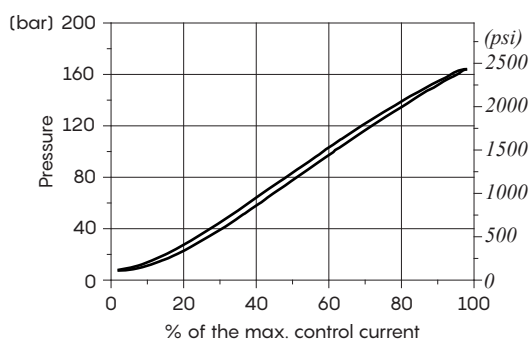
For complete connectors list see from page 201

**Rating diagrams**

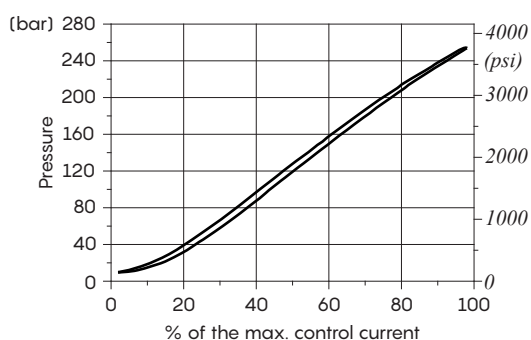
**MP10X pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



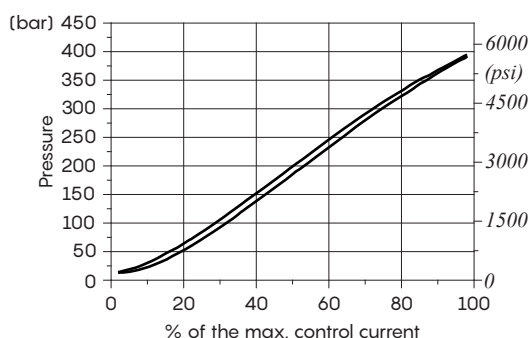
**MP10X pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



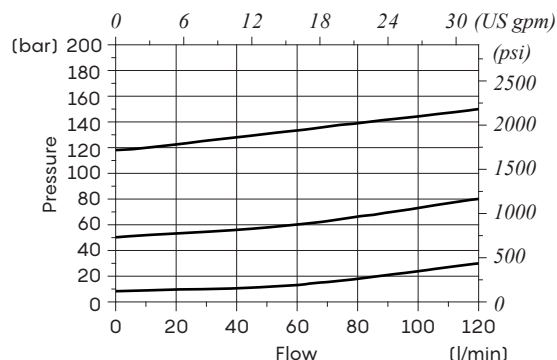
**MP10X pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



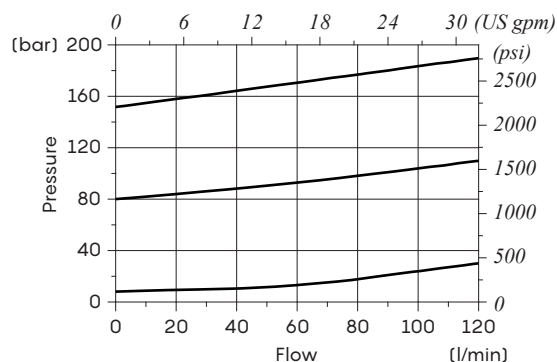
**MP10X pressure setting vs. % max. control current**  
at 5 l/min (1.32 US gpm)



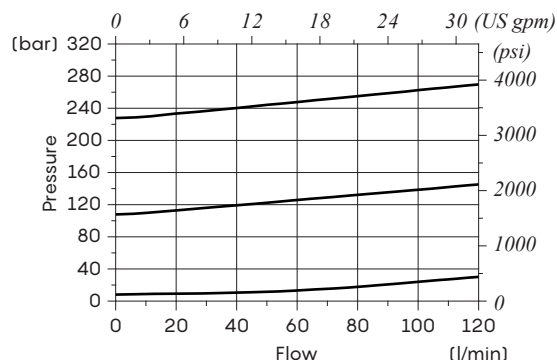
**MP10X pressure vs. flow 1->2**  
for % of control current - Pressure range 1



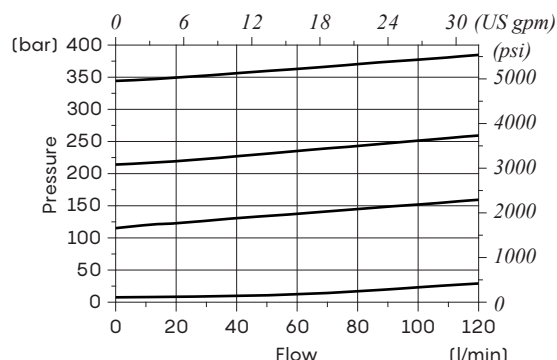
**MP10X pressure vs. flow 1->2**  
for % of control current - Pressure range 2



**MP10X pressure vs. flow 1->2**  
for % of control current - Pressure range 3

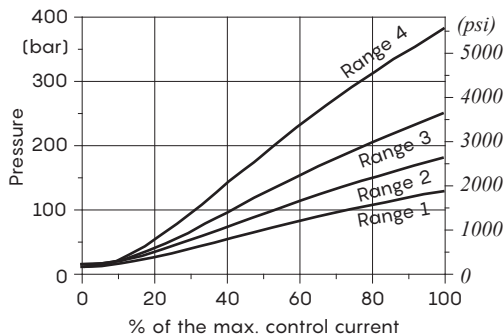


**MP10X pressure vs. flow 1->2**  
for % of control current - Pressure range 4

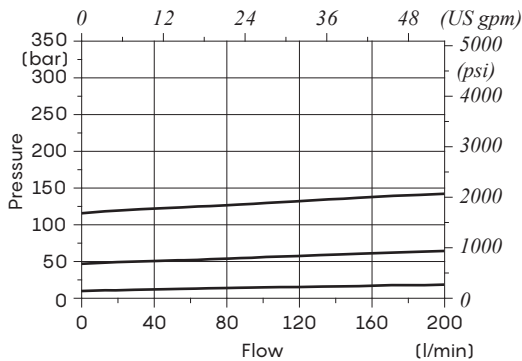


Rating diagrams

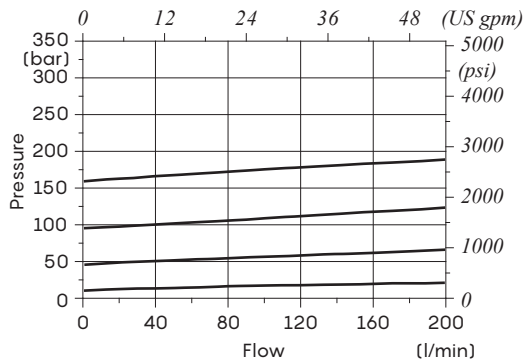
MP12X pressure setting vs. % max. control current  
at 10 l/min (2.64 US gpm)



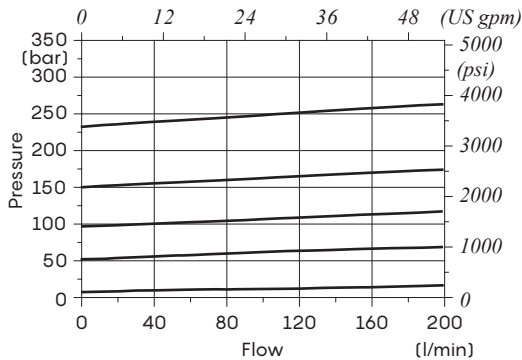
MP12X pressure vs. flow 1->2  
for % of control current - Pressure range 1



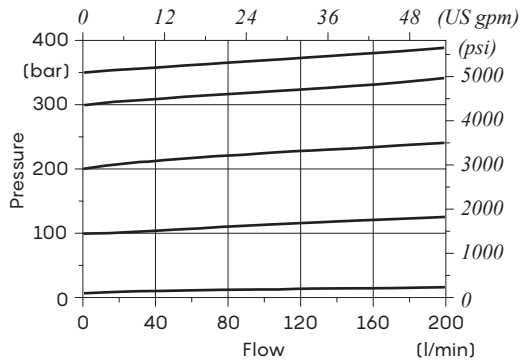
MP12X pressure setting vs. flow 1->2  
for % of control current - Pressure range 2



MP12X pressure vs. flow 1->2  
for % of control current - Pressure range 3



MP12X pressure vs. flow 1->2  
for % of control current - Pressure range 4





**RD08L type  
pressure reducing valves – 3 way**

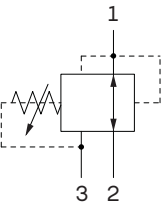
- Direct acting damped with relieving
- Spool type
- Mechanical control with screw adjustment
- Different springs available to vary pressure range (from 10 to 150 bar - 145 to 2175 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi) and low flow rates (15 l/min - 4 US gpm)
- Available with or without filter (mesh-type 90 microns)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

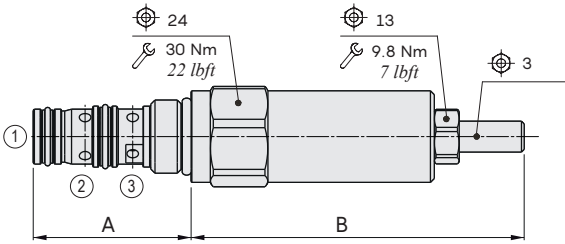
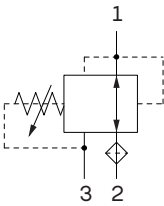
|                                            |                                                                        |                                                                          |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 15 l/min (4 US gpm)                                                    |                                                                          |
| Max. pressure                              | Port 2 = 350 bar (5100 psi)<br>Port 3 = 30 bar (435 psi)               |                                                                          |
| Oil leakage                                | -                                                                      |                                                                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 08/3                                                               |                                                                          |
| Weight                                     | 0.250 kg (0.55 lb)                                                     |                                                                          |

NOTE - For different conditions, please contact Walvoil Sales Dpt.

**Configuration  
without filter**



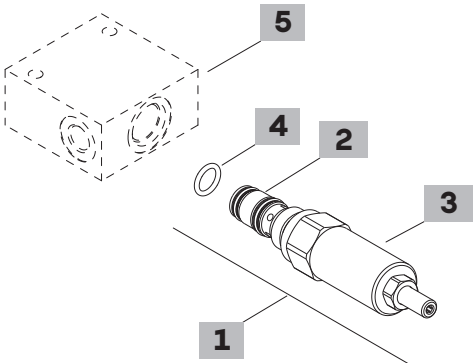
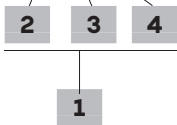
**Configuration  
with filter**



| Valve type | A    |      | B    |      |
|------------|------|------|------|------|
|            | mm   | in   | mm   | in   |
| G1B        | 41.1 | 1.62 | 86.7 | 3.41 |
| RD08L/ G2B | 41.1 | 1.62 | 86.7 | 3.41 |
| G3B        | 41.1 | 1.62 | 81.6 | 3.21 |

Ordering codes and description composition

RD08L/1G1B



1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                               |
|------------------------|-------------|-------------------------------------------|
| <b>SAE cavity 08/3</b> |             |                                           |
| <b>RD08L/0G1B</b>      | ORD08002038 | Pressure range <b>G1</b> , without filter |
| <b>RD08L/1G1B</b>      | ORD08002037 | Pressure range <b>G1</b> , with filter    |
| <b>RD08L/0G2B</b>      | ORD08002033 | Pressure range <b>G2</b> , without filter |
| <b>RD08L/1G2B</b>      | ORD08002039 | Pressure range <b>G2</b> , with filter    |
| <b>RD08L/0G3B</b>      | ORD08002034 | Pressure range <b>G3</b> , without filter |
| <b>RD08L/1G3B</b>      | ORD08002040 | Pressure range <b>G3</b> , with filter    |

2 Filter

| TYPE     | DESCRIPTION            |
|----------|------------------------|
| <b>0</b> | Without filter         |
| <b>1</b> | Mesh filter: 90 micron |

3 Pressure range

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

| TYPE      | DESCRIPTION                                                                   |
|-----------|-------------------------------------------------------------------------------|
| <b>G1</b> | Pressure range 10÷50 bar (145÷725 psi);<br>Std. setting 30 bar (435 psi)      |
| <b>G2</b> | Pressure range 40÷100 bar (580÷1450 psi);<br>Std. setting 50 bar (725 psi)    |
| <b>G3</b> | Pressure range 70÷150 bar (1015÷2175 psi);<br>Std. setting 100 bar (1450 psi) |

4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

5 Valve body

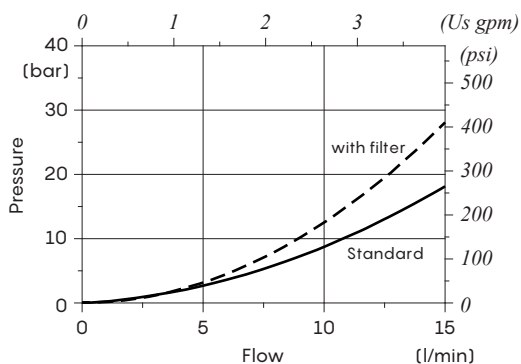
| TYPE                 | CODE       | DESCRIPTION                                             |
|----------------------|------------|---------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve,<br>G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

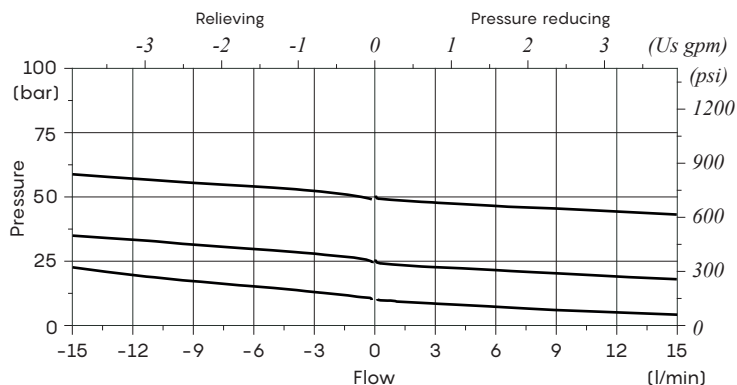


**Rating diagrams**

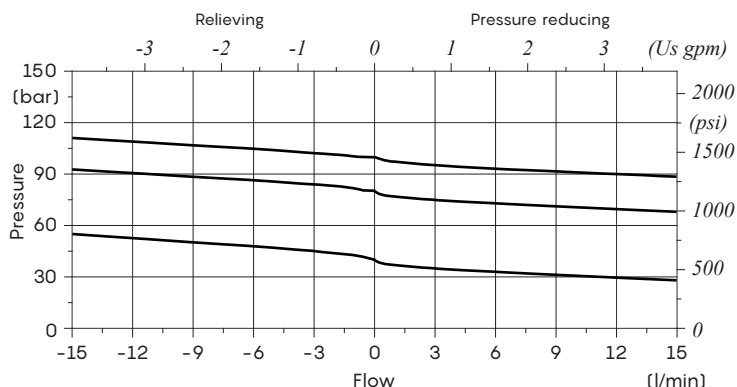
**Pressure vs. flow 2->1**



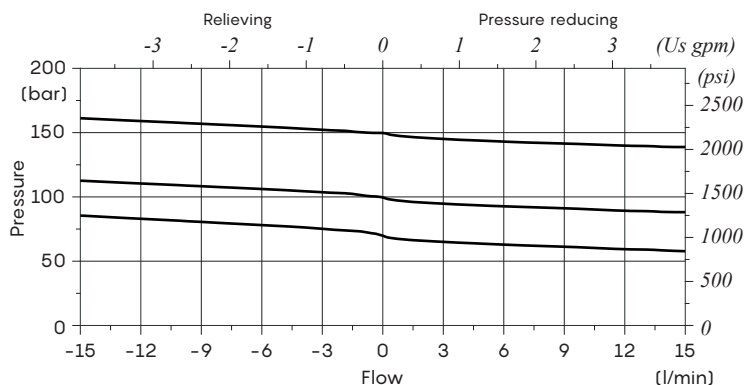
**G1 pressure range  
reducing/relieving pressure vs. flow**



**G2 pressure range  
reducing/relieving pressure vs. flow**



**G3 pressure range  
reducing/relieving pressure vs. flow**







**RD08LH type  
pressure reducing valves – 3 way**

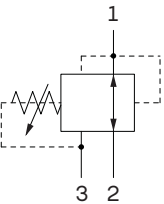
- Direct acting damped with relieving
- Spool type
- Mechanical control with screw adjustment
- Different springs available to vary pressure range (from 10 to 150 bar - 145 to 2175 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi) and high flow rates (30 l/min - 7.9 US gpm)
- Available with or without filter (mesh-type 90 microns)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

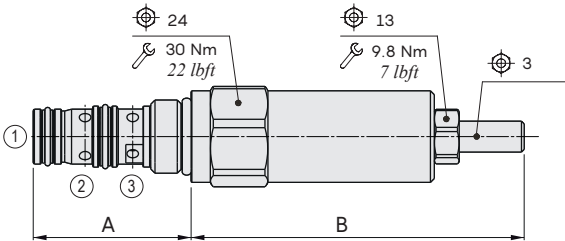
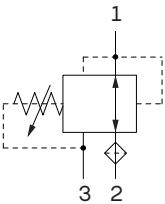
|                                            |                                                                        |                                                                          |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 30 l/min (7.9 US gpm)                                                  |                                                                          |
| Max. pressure                              | Port 2 = 350 bar (5100 psi)<br>Port 3 = 30 bar (435 psi)               |                                                                          |
| Oil leakage                                | -                                                                      |                                                                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 08/3                                                               |                                                                          |
| Weight                                     | 0.250 kg (0.55 lb)                                                     |                                                                          |

NOTE - For different conditions, please contact Walvoil Sales Dpt.

**Configuration  
without filter**



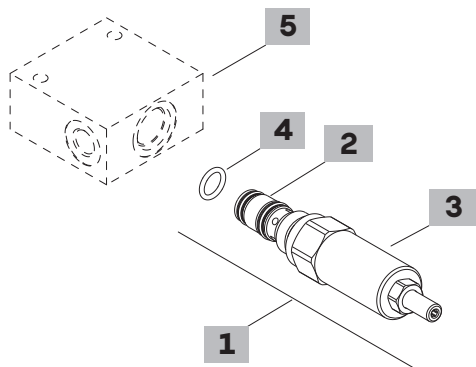
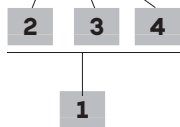
**Configuration  
with filter**



| Valve type  | A    |      | B    |      |
|-------------|------|------|------|------|
|             | mm   | in   | mm   | in   |
| G1B         | 41.1 | 1.62 | 86.7 | 3.41 |
| RD08LH/ G2B | 41.1 | 1.62 | 86.7 | 3.41 |
| G3B         | 41.1 | 1.62 | 81.6 | 3.21 |

Ordering codes and description composition

RD08LH/1G1B



1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                               |
|------------------------|-------------|-------------------------------------------|
| <b>SAE cavity 08/3</b> |             |                                           |
| <b>RD08LH/0G1B</b>     | ORD08002053 | Pressure range <b>G1</b> , without filter |
| <b>RD08LH/1G1B</b>     | ORD08002054 | Pressure range <b>G1</b> , with filter    |
| <b>RD08LH/0G2B</b>     | ORD08002055 | Pressure range <b>G2</b> , without filter |
| <b>RD08LH/1G2B</b>     | ORD08002056 | Pressure range <b>G2</b> , with filter    |
| <b>RD08LH/0G3B</b>     | ORD08002057 | Pressure range <b>G3</b> , without filter |
| <b>RD08LH/1G3B</b>     | ORD08002058 | Pressure range <b>G3</b> , with filter    |

2 Filter

| TYPE     | DESCRIPTION            |
|----------|------------------------|
| <b>0</b> | Without filter         |
| <b>1</b> | Mesh filter: 90 micron |

3 Pressure range

| Standard setting is referred to 5 l/min (1.32 Us gpm) flow |                                                                               |
|------------------------------------------------------------|-------------------------------------------------------------------------------|
| TYPE                                                       | DESCRIPTION                                                                   |
| <b>G1</b>                                                  | Pressure range 10÷50 bar (145÷725 psi);<br>Std. setting 30 bar (435 psi)      |
| <b>G2</b>                                                  | Pressure range 40÷100 bar (580÷1450 psi);<br>Std. setting 50 bar (725 psi)    |
| <b>G3</b>                                                  | Pressure range 70÷150 bar (1015÷2175 psi);<br>Std. setting 100 bar (1450 psi) |

4 Seals

| TYPE     | DESCRIPTION                                                      |
|----------|------------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna) + Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept              |

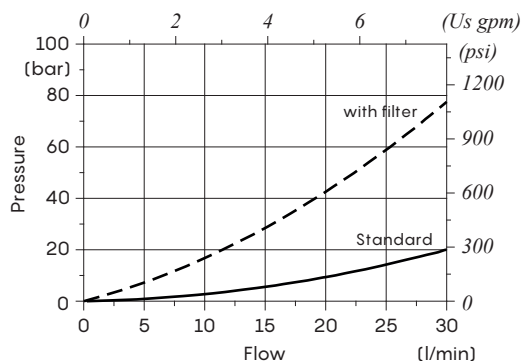
5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                             |
|----------------------|------------|---------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve,<br>G 3/8 std thread |

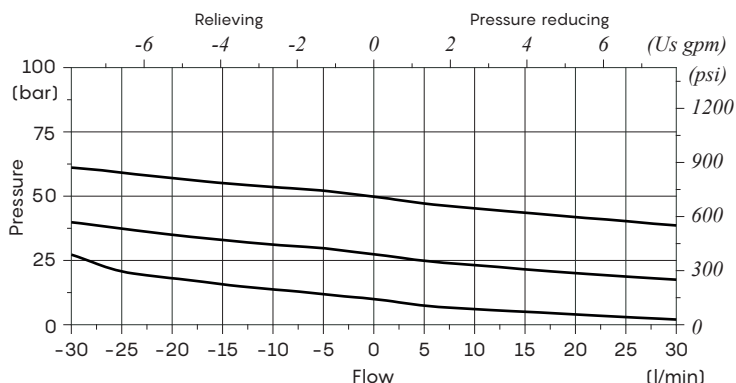
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

**Rating diagrams**

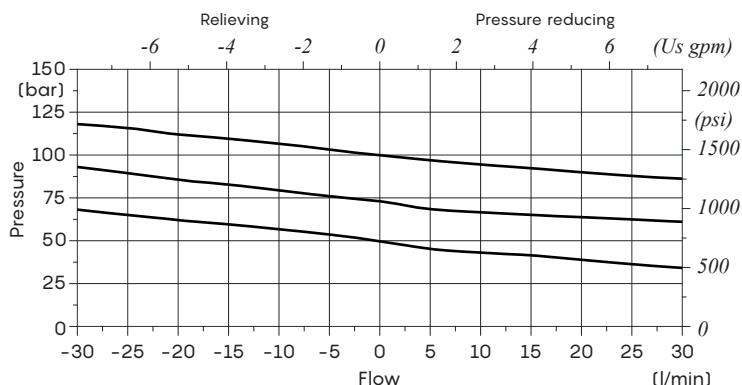
**Pressure vs. flow 2->1**



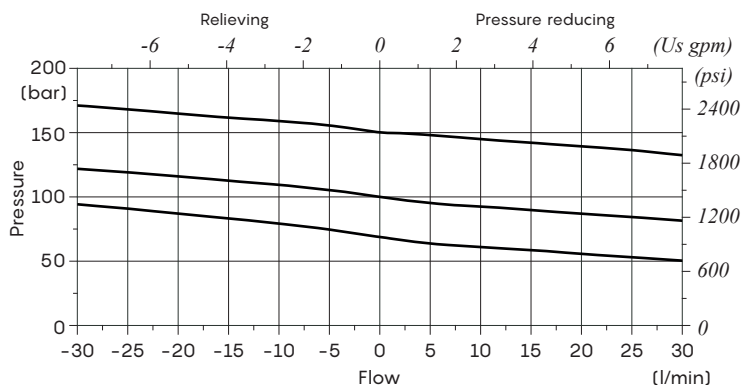
**G1 pressure range  
reducing/relieving pressure vs. flow**



**G2 pressure range  
reducing/relieving pressure vs. flow**



**G3 pressure range  
reducing/relieving pressure vs. flow**







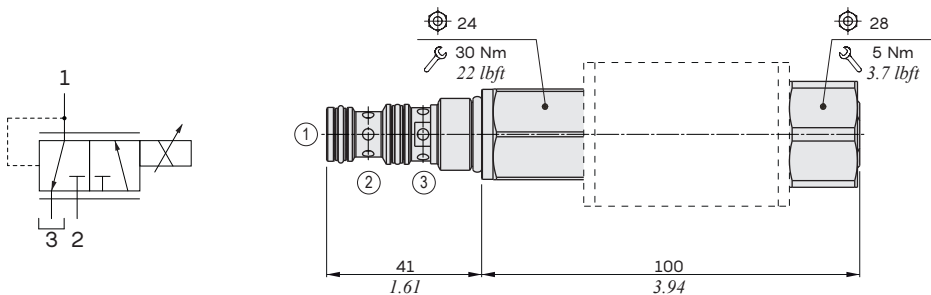
## RD08TX type pressure reducing valves - 3 way

- Direct acting with relieving
- Spool type
- Control with proportional solenoid
- System of purging of air
- Applications for high flow rates (max. 210 bar - 3050 psi)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

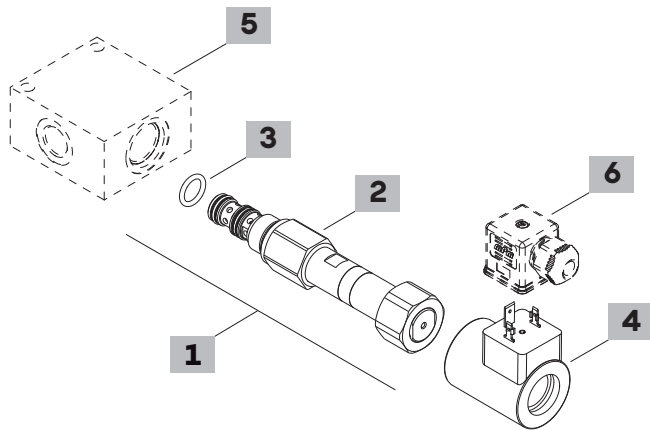
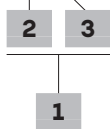
|                                            |                                                                        |                                                                          |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 12 l/min (3.17 US gpm)                                                 |                                                                          |
| Max. pressure                              | Port 2 = 210 bar (3050 psi)<br>Port 3 = 30 bar (435 psi)               |                                                                          |
| Oil leakage                                | -                                                                      |                                                                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 12-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 08/3                                                               |                                                                          |
| Coil type*                                 | BH                                                                     |                                                                          |
| Nominal voltages                           | 12 VDC - 24 VDC                                                        |                                                                          |
| Max. control current                       | 12 V -> 1.7 A - 24 V -> 0.85 A                                         |                                                                          |
| Dither frequency                           | 150-200 Hz                                                             |                                                                          |
| Weight                                     | 0.350 kg (0.77 lb)                                                     |                                                                          |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.



Ordering codes and description composition

RD08TX/002B



| 1 Cartridges |             |                  |
|--------------|-------------|------------------|
| TYPE         | CODE        | DESCRIPTION      |
| RD08TX/001B  | ORD08002041 | Pressure range 1 |
| RD08TX/002B  | ORD08002042 | Pressure range 2 |

| 2 Pressure range |                                        |
|------------------|----------------------------------------|
| TYPE             | DESCRIPTION                            |
| 1                | Pressure range 0÷45 bar (0÷652.5 psi); |
| 2                | Pressure range 0÷35 bar (0÷507.5 psi); |

| 3 Seals |                                                         |
|---------|---------------------------------------------------------|
| TYPE    | DESCRIPTION                                             |
| B       | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V       | FPM (Viton) o-ring seals, contact Sales Dept            |

| 4 Coils                                   |             |                     |
|-------------------------------------------|-------------|---------------------|
| TYPE                                      | CODE        | DESCRIPTION         |
| BH 24VDC                                  | 4SLD002400A | 24VDC-ISO 4400 coil |
| For complete coils list see from page 201 |             |                     |

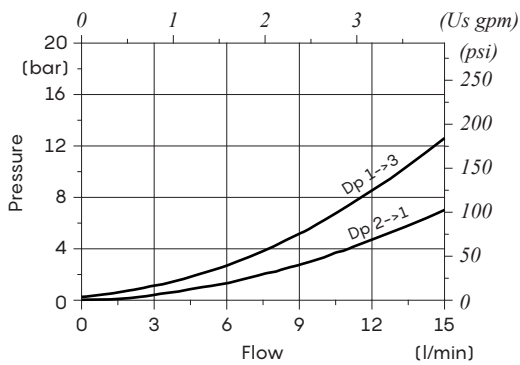
| 5 Valve body                                              |            |                                                      |
|-----------------------------------------------------------|------------|------------------------------------------------------|
| TYPE                                                      | CODE       | DESCRIPTION                                          |
| SAE08/3-G 3/8                                             | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| Note: aluminium body can stand up to 210 bar (3050 psi)   |            |                                                      |
| For steel bodies or different threading see from page 210 |            |                                                      |

| 6 Connector                                    |             |             |
|------------------------------------------------|-------------|-------------|
| TYPE                                           | CODE        | DESCRIPTION |
| ISO4400                                        | 4CN1009995B | Connector   |
| For complete connectors list see from page 201 |             |             |

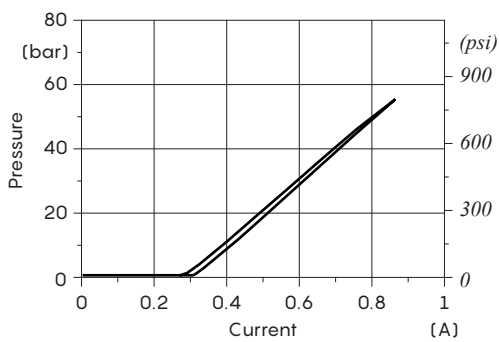


**Rating diagrams**

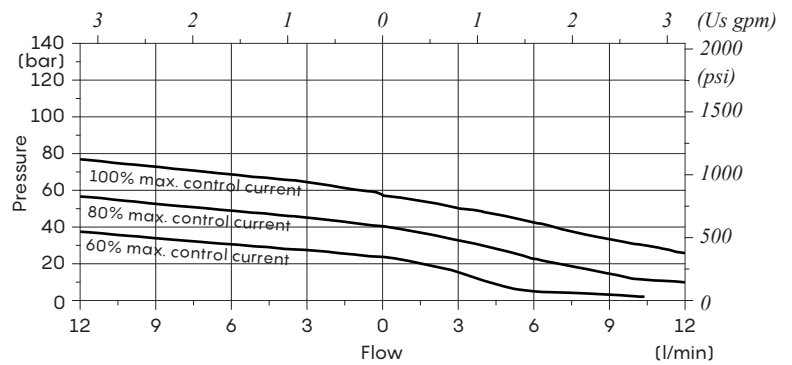
**Pressure drop**



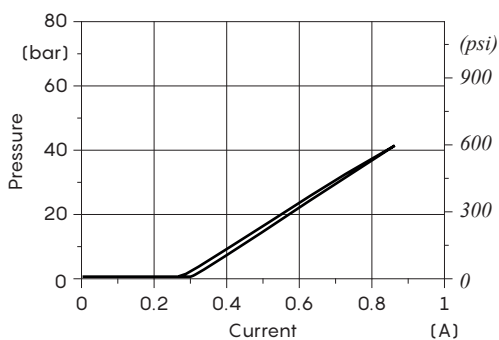
**Pressure range 1**  
**Reduced Pressure vs Control Current**



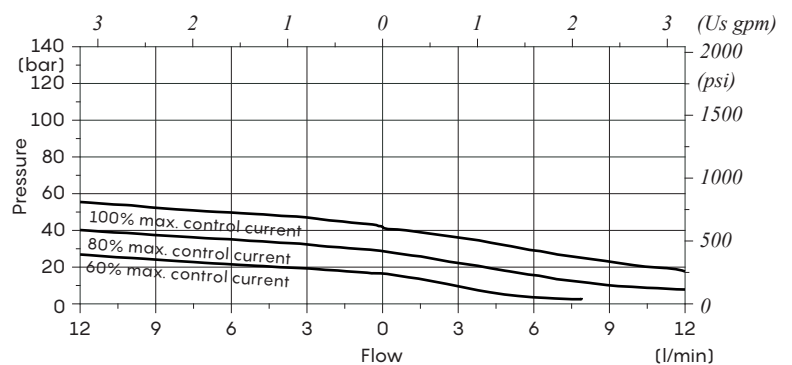
**Pressure range 1**  
**reducing/relieving pressure vs Flow rate**



**Pressure range 2**  
**Reduced Pressure vs Control Current**



**Pressure range 2**  
**reducing/relieving pressure vs Flow rate**







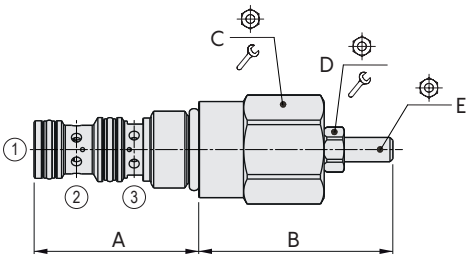
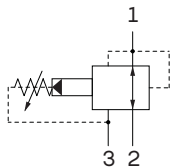
**RP..M type  
pressure reducing valves – 3 way**

- Piloted acting with relieving
- Spool type
- Mechanical control with screw adjustments
- Available in fixed or adjustable version (range from 5 to 350 bar - 72.5 to 5100 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi)
- The backpressure values on line 3 must be added to valve nominal setting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | RP08M                                                                    | RP10M                  |
|--------------------------------------------|--------------------------------------------------------------------------|------------------------|
| Nominal flow                               | 50 l/min (13 US gpm)                                                     | 70 l/min (18.5 US gpm) |
| Max. pressure                              | Port 2= 350 bar (5100 psi)<br>Port 3= 30 bar (435 psi)                   |                        |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties   |                        |
| Viscosity                                  | 12–200 cSt                                                               |                        |
| Max level of contamination                 | 18/16/13 ISO4406                                                         |                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                            |                        |
| Environmental temp. for working conditions | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                        |
| Cavity                                     | SAE 08/3                                                                 | SAE 10/3               |
| Weight                                     | 0.160 kg (0.35 lb)                                                       | 0.200 kg (0.44 lb)     |

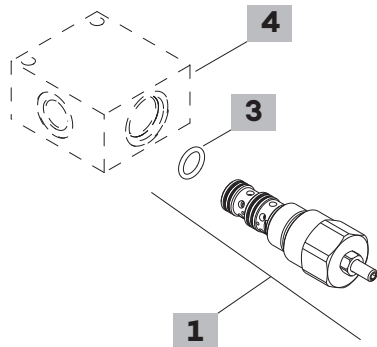
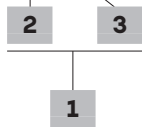
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C                                                                                     |     |    | D                                                                                     |     |     | E                                                                                     |  |
|------------|------|------|------|------|---------------------------------------------------------------------------------------|-----|----|---------------------------------------------------------------------------------------|-----|-----|---------------------------------------------------------------------------------------|--|
|            |      |      |      |      |  |     |    |  |     |     |  |  |
|            | mm   | in   | mm   | in   | Nm                                                                                    | lbf |    | Nm                                                                                    | lbf |     |                                                                                       |  |
| RP08M      | 40.8 | 1.61 | 48.1 | 1.89 | 24                                                                                    | 30  | 22 | 10                                                                                    | 6.6 | 4.9 | 3                                                                                     |  |
| RP10M      | 47.2 | 1.86 | 46.3 | 1.82 | 27                                                                                    | 50  | 37 | 10                                                                                    | 6.6 | 4.9 | 3                                                                                     |  |

Ordering codes and description composition

RP10M/1G1B



1 Cartridges

| TYPE                   | CODE        | DESCRIPTION      |
|------------------------|-------------|------------------|
| <b>SAE cavity 08/3</b> |             |                  |
| RP08M/1G1B             | ORP08002019 | Pressure range 1 |
| RP08M/1G2B             | ORP08002020 | Pressure range 2 |
| RP08M/1G3B             | ORP08002021 | Pressure range 3 |
| <b>SAE cavity 10/3</b> |             |                  |
| RP10M/1G1B             | ORP10002038 | Pressure range 1 |
| RP10M/1G2B             | ORP10002039 | Pressure range 2 |
| RP10M/1G3B             | ORP10002034 | Pressure range 3 |

2 Pressure range

| Standard setting is referred to 5 l/min (1.32 US gpm) |                                                                               |
|-------------------------------------------------------|-------------------------------------------------------------------------------|
| TYPE                                                  | DESCRIPTION                                                                   |
| G1                                                    | Pressure range 5÷80 bar (72.5÷1160 psi);<br>Std. setting 50 bar (725 psi)     |
| G2                                                    | Pressure range 20÷200 bar (290÷2900 psi);<br>Std. setting 150 bar (2175 psi)  |
| G3                                                    | Pressure range 90÷350 bar (1305÷5075 psi);<br>Std. setting 250 bar (3625 psi) |

3 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

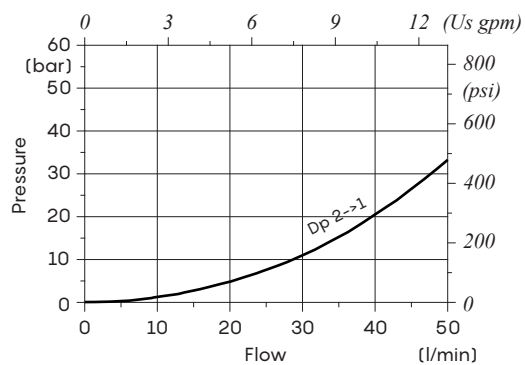
4 Valve body

| TYPE          | CODE       | DESCRIPTION                                             |
|---------------|------------|---------------------------------------------------------|
| SAE08/3-G 3/8 | 3CC0830C11 | Aluminium body for cavity 08 valve,<br>G 3/8 std thread |
| SAE10/3-G 3/8 | 3CC1030C11 | Aluminium body for cavity 10 valve,<br>G 3/8 std thread |

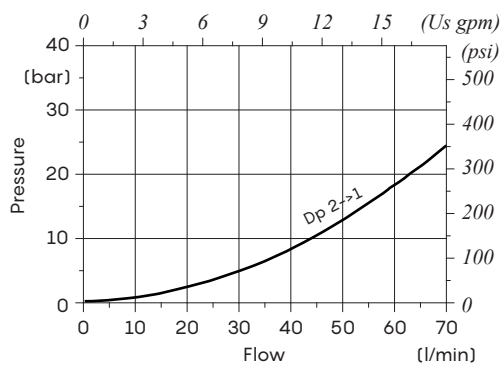
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

**Rating diagrams**

**RP08M pressure drop**



**RP10M pressure drop**







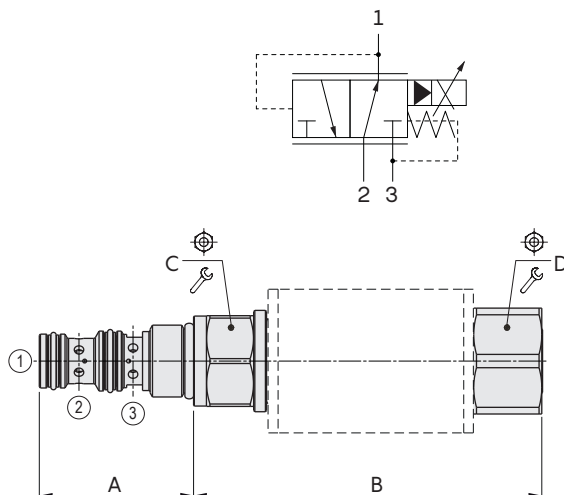
## RP..X type pressure reducing valves – 3 way

- Piloted acting with relieving
- Spool type
- Control with proportional solenoid
- External zinc-plated and corrosion-proof components
- Excellent stability throughout the range
- Suitable for applications where high flow rates and low pressure drop are required
- From SAE08 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | RP08X                                                                    | RP10X                  | RP12X                                                  |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|------------------------|--------------------------------------------------------|
| Nominal flow                               |                                               | 50 l/min (13 US gpm)                                                     | 70 l/min (18.5 US gpm) | 70 l/min (18.5 US gpm)                                 |
| Max. pressure                              |                                               | Port 2= 350 bar (5100 psi)<br>Port 3= 30 bar (435 psi)                   |                        | Port 2= 350 bar (5100 psi)<br>Port 3= 50 bar (725 psi) |
| Oil leakage                                |                                               | -                                                                        |                        |                                                        |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                        |                                                        |
| Viscosity                                  |                                               | 12-200 cSt                                                               |                        |                                                        |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                        |                                                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                        |                                                        |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                        |                                                        |
| Cavity                                     |                                               | SAE 08/3                                                                 | SAE 10/3               | SAE 12/2                                               |
| Coil type*                                 |                                               | BQP19/BH                                                                 |                        |                                                        |
| Nominal voltages                           |                                               | 12 VDC - 24 VDC                                                          |                        |                                                        |
| Power rating                               |                                               | 15 W (BQP19) - 33 W (BH)                                                 |                        |                                                        |
| Max. control current                       |                                               | 12V->1.25 A - 24V->0.63 A (BQP19)<br>12V->1.7 A- 24V->0.85 A (BH)        |                        |                                                        |
| Dither frequency                           |                                               | 150-200 Hz                                                               |                        |                                                        |
| Hysteresis                                 |                                               | -                                                                        |                        |                                                        |
| Weight                                     |                                               | 0.44 kg (0.97 lb)                                                        | 0.49 kg (1.08 lb)      | 0.61 kg (1.34 lb)                                      |

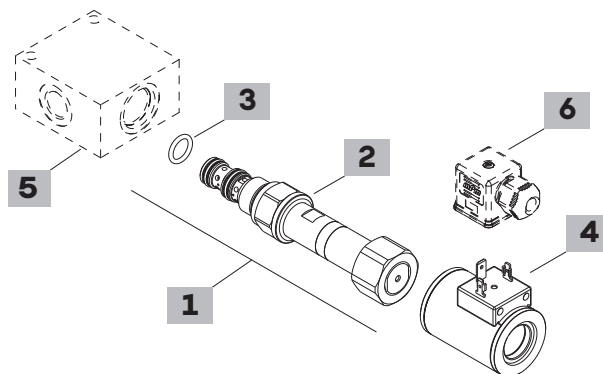
NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.



| Valve<br>type | A    |      | B    |      | C                                                                                     |    |      | D                                                                                     |    |      |
|---------------|------|------|------|------|---------------------------------------------------------------------------------------|----|------|---------------------------------------------------------------------------------------|----|------|
|               |      |      |      |      |  |    |      |  |    |      |
|               | mm   | in   | mm   | in   |                                                                                       | Nm | lbft |                                                                                       | Nm | lbft |
| RP08X         | 40.8 | 1.61 | 92.3 | 3.63 | 24                                                                                    | 30 | 22   | 28                                                                                    | 5  | 3.7  |
| RP10X         | 47.2 | 1.86 | 90.5 | 3.56 | 27                                                                                    | 50 | 37   | 28                                                                                    | 5  | 3.7  |
| RP12X         | 73.5 | 2.89 | 93   | 3.66 | 32                                                                                    | 80 | 59   | 28                                                                                    | 5  | 3.7  |

### Ordering codes and description composition

#### RP08X/001B



#### 1 Cartridges

| TYPE                   | CODE         | DESCRIPTION             |
|------------------------|--------------|-------------------------|
| <b>SAE cavity 08/3</b> |              |                         |
| RP08X/001B             | ORP080002016 | Pressure range <b>1</b> |
| RP08X/002B             | ORP080002015 | Pressure range <b>2</b> |
| RP08X/003B             | ORP080002017 | Pressure range <b>3</b> |
| RP08X/004B             | ORP080002018 | Pressure range <b>4</b> |
| <b>SAE cavity 10/3</b> |              |                         |
| RP10X/001B             | ORP10002035  | Pressure range <b>1</b> |
| RP10X/002B             | ORP10002033  | Pressure range <b>2</b> |
| RP10X/003B             | ORP10002036  | Pressure range <b>3</b> |
| RP10X/004B             | ORP10002037  | Pressure range <b>4</b> |
| <b>SAE cavity 12/3</b> |              |                         |
| RP12X/001B             | ORP12002019  | Pressure range <b>1</b> |
| RP12X/002B             | ORP12002020  | Pressure range <b>2</b> |
| RP12X/003B             | ORP12002021  | Pressure range <b>3</b> |
| RP12X/004B             | ORP12002022  | Pressure range <b>4</b> |

#### 2 Pressure range

| TYPE     | DESCRIPTION                                |
|----------|--------------------------------------------|
| <b>1</b> | Pressure range 10÷50 bar (145÷725 psi);    |
| <b>2</b> | Pressure range 10÷170 bar (145÷2465 psi);  |
| <b>3</b> | Pressure range 90÷350 bar (1300÷5075 psi); |
| <b>4</b> | Pressure range 10÷90 bar (145÷1300 psi);   |

#### 3 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 4 Coils

| TYPE               | CODE        | DESCRIPTION        |
|--------------------|-------------|--------------------|
| <b>BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |

For complete coils list see from page 201

#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/3-G 1/2</b> | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

#### 6 Connector

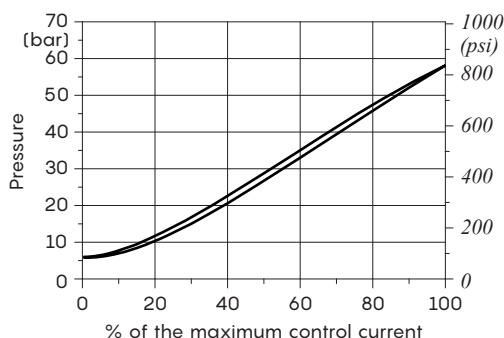
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

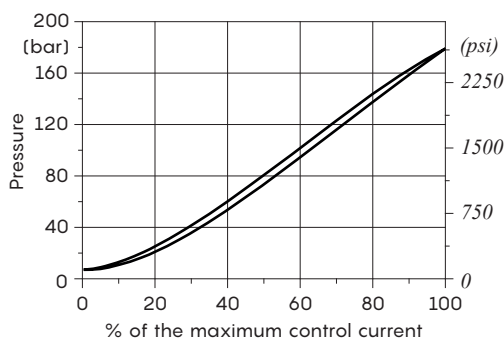


**Rating diagrams**

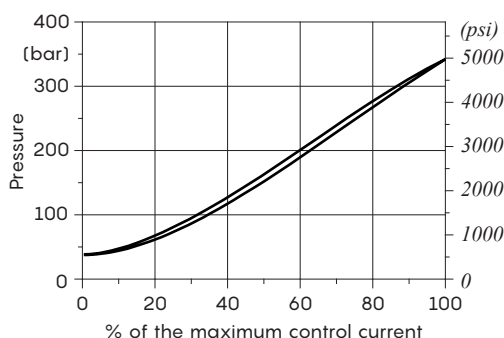
**Pressure reducing vs. control current**  
**RP08X/001B**



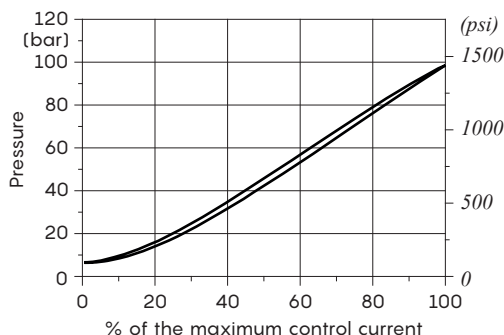
**Pressure reducing vs. control current**  
**RP08X/002B**



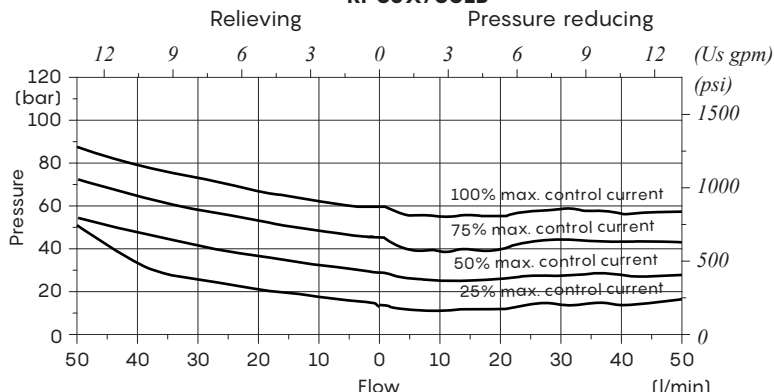
**Pressure reducing vs. control current**  
**RP08X/003B**



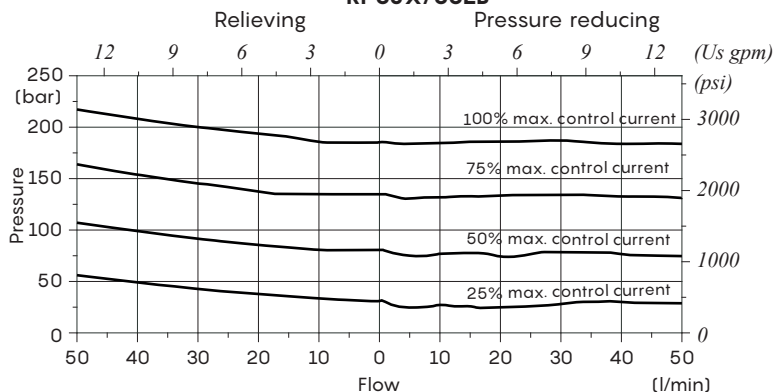
**Pressure reducing vs. control current**  
**RP08X/004B**



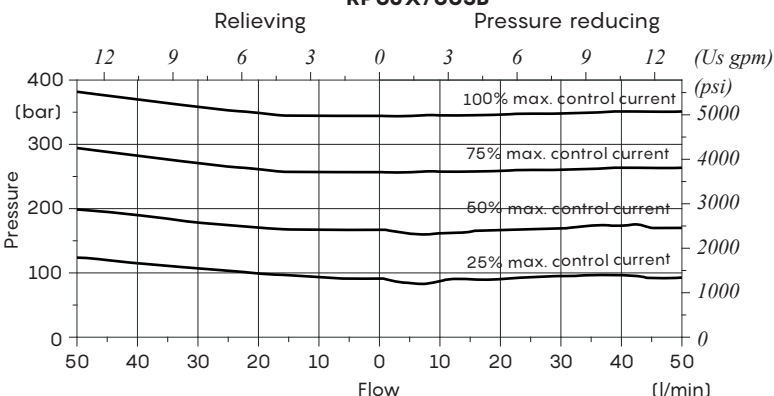
**Reducing/relieving pressure vs. flow**  
**RP08X/001B**



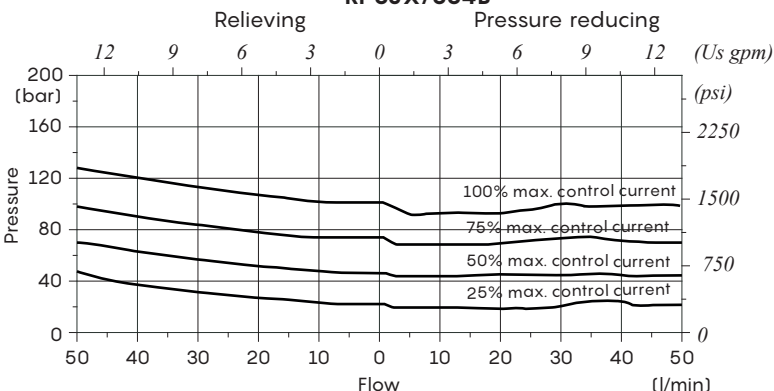
**Reducing/relieving pressure vs. flow**  
**RP08X/002B**



**Reducing/relieving pressure vs. flow**  
**RP08X/003B**

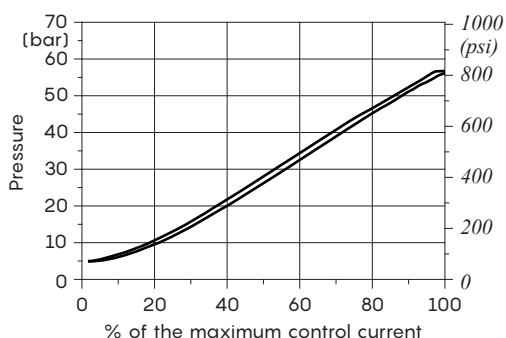


**Reducing/relieving pressure vs. flow**  
**RP08X/004B**

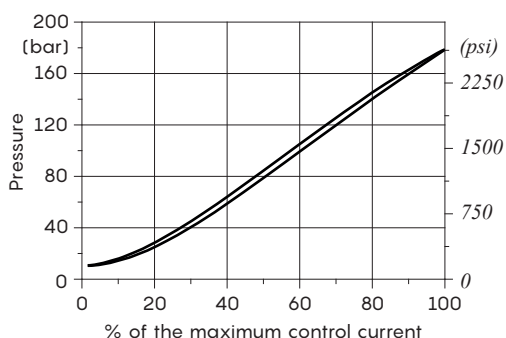


### Rating diagrams

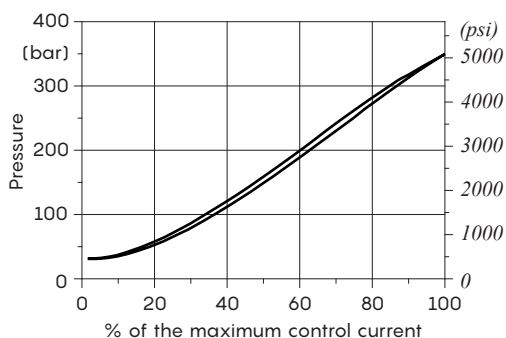
Pressure reducing vs. control current  
RP10X/001B



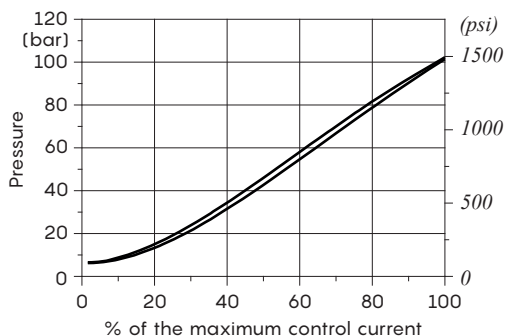
Pressure reducing vs. control current  
RP10X/002B



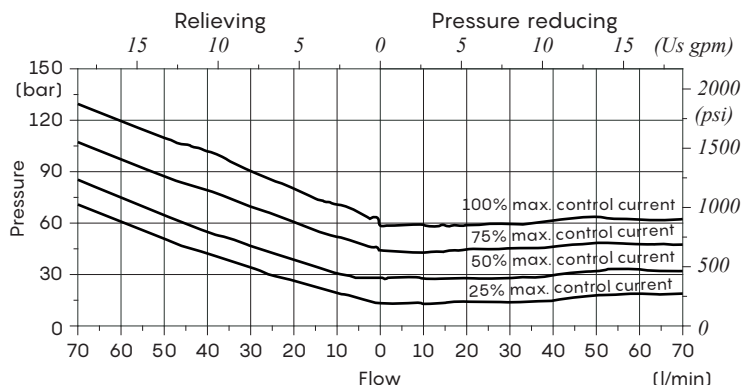
Pressure reducing vs. control current  
RP10X/003B



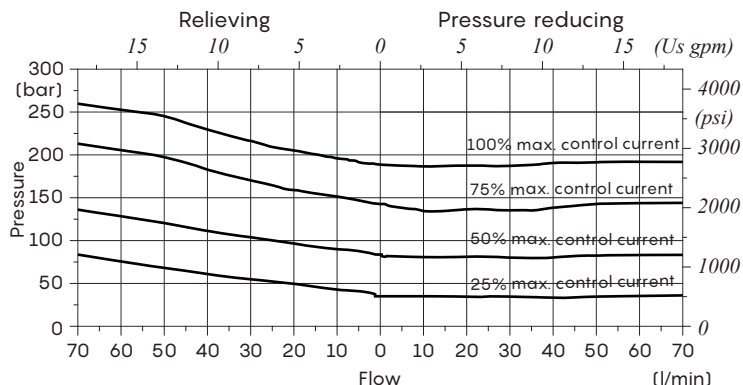
Pressure reducing vs. control current  
RP10X/004B



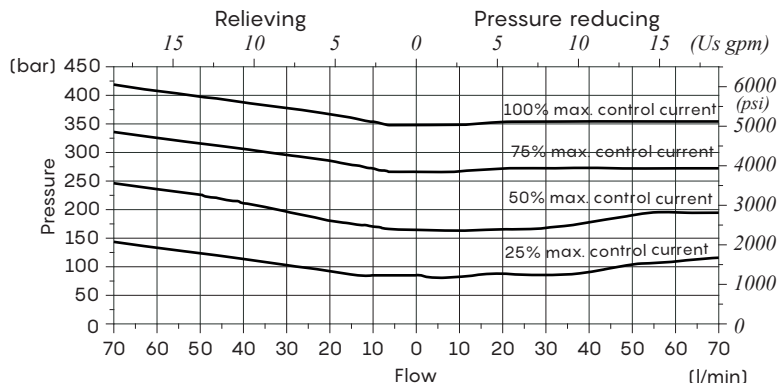
Reducing/relieving pressure vs. flow  
RP10X/001B



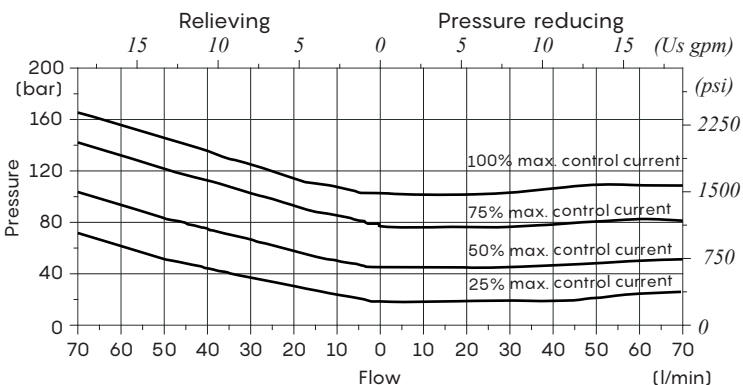
Reducing/relieving pressure vs. flow  
RP10X/002B



Reducing/relieving pressure vs. flow  
RP10X/003B

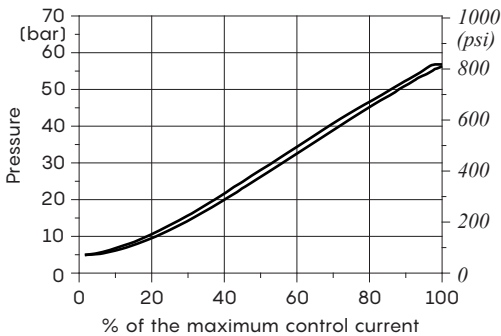


Reducing/relieving pressure vs. flow  
RP10X/004B

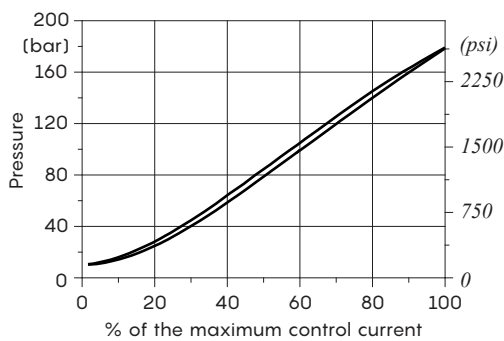


**Rating diagrams**

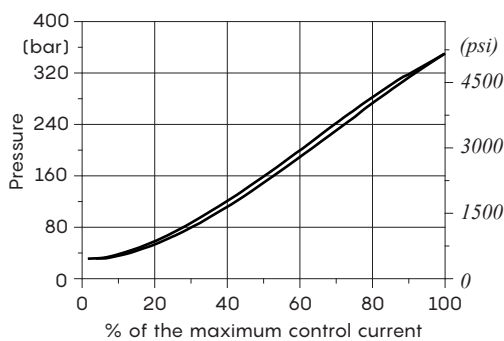
**Pressure reducing vs. control current  
RP12X/001B**



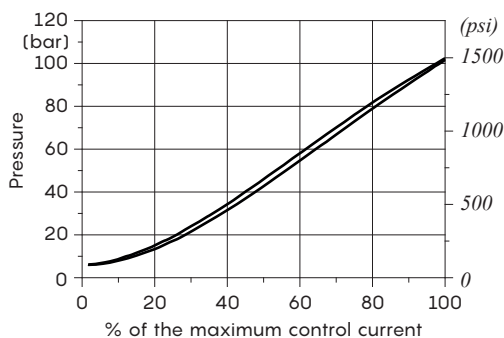
**Pressure reducing vs. control current  
RP12X/002B**



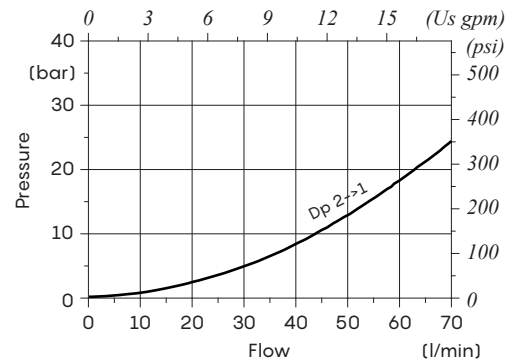
**Pressure reducing vs. control current  
RP12X/003B**



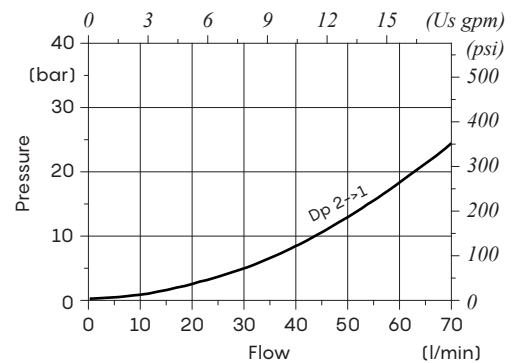
**Pressure reducing vs. control current  
RP12X/004B**



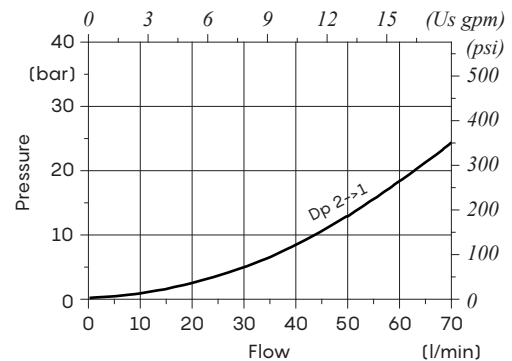
**Reducing/relieving pressure vs. flow  
RP12X/001B**



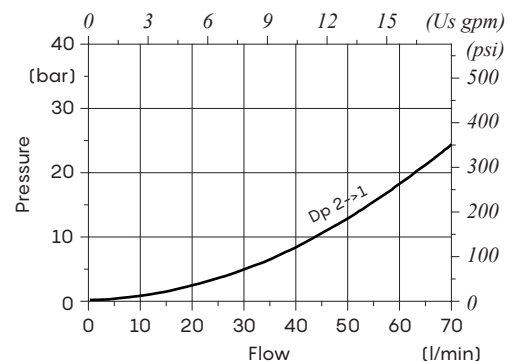
**Reducing/relieving pressure vs. flow  
RP12X/002B**



**Reducing/relieving pressure vs. flow  
RP12X/003B**



**Reducing/relieving pressure vs. flow  
RP12X/004B**







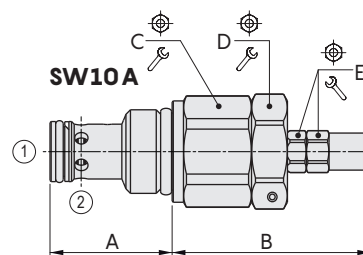
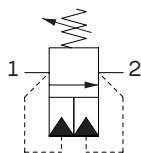
## SW..A type sequence valves – 2 way

- Piloted acting
- Spool type
- Valves with kickdown operation
- Mechanical control with screw adjustment
- Different springs available to vary pressure range
- From SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | SW10A                                                                    | SW12D                     | SW16A                     |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|---------------------------|---------------------------|
| Nominal flow                               |                                               | 60 l/min (16 US gpm)                                                     | 100 l/min (26 US gpm)     | 180 l/min (48 US gpm)     |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |                           |                           |
| Oil leakage                                | at 80% of max. pressure setting               | 22 cm³/min (1.34 in³/min)                                                | 50 cm³/min (3.05 in³/min) | 100 cm³/min (6.1 in³/min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                           |                           |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                           |                           |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                         |                           |                           |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                           |                           |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                           |                           |
| Cavity                                     |                                               | SAE 10/2                                                                 | SAE 12/2                  | SAE 16/2                  |
| Weight                                     |                                               | 0.20 kg (0.44 lb)                                                        | 0.30 kg (0.66 lb)         | 0.44 kg (0.97 lb)         |

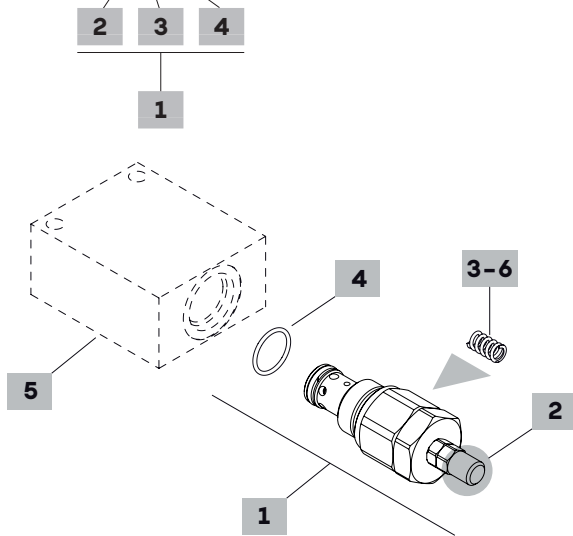
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C  |      | D  |      | E  |      |
|------------|------|------|------|------|----|------|----|------|----|------|
|            | mm   | in   | mm   | in   | Nm | lbft | Nm | lbft | Nm | lbft |
| SW10A      | 32.3 | 1.27 | 52.5 | 2.07 | 27 | 50   | 37 | 27   | 50 | 37   |
| SW12D      | 46   | 1.81 | 54.5 | 2.15 | 32 | 80   | 59 | 27   | 50 | 37   |
| SW16A      | 45.2 | 1.78 | 58   | 2.28 | 41 | 100  | 74 | 27   | 50 | 37   |

### Ordering codes and description composition

#### SW10A/OS2B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION             |
|------------------------|-------------|-------------------------|
| <b>SAE cavity 10/2</b> |             |                         |
| <b>SW10A/OS2B</b>      | OSW10002000 | Pressure range <b>2</b> |
| <b>SAE cavity 12/2</b> |             |                         |
| <b>SW12D/OS2B</b>      | OSW12002005 | Pressure range <b>2</b> |
| <b>SAE cavity 16/2</b> |             |                         |
| <b>SW16A/OS2B</b>      | OSW16002000 | Pressure range <b>2</b> |

#### 2 Adjustments

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>S</b> | Screw       |

#### 3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

| TYPE     | DESCRIPTION                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | Pressure range 10÷80 bar (145÷1160 psi); Std. setting 30 bar (435 psi), pressure increase by steps of 10 bar (145 psi) for screw turn       |
| <b>2</b> | Pressure range 50÷220 bar (725÷3200 psi); Std. setting 150 bar (2200 psi), pressure increase by steps of 36 bar (520 psi) for screw turn    |
| <b>3</b> | Pressure range 150÷350 bar (2200÷5100 psi); Std. setting 250 bar (3600 psi), pressure increase by steps of 90 bar (1300 psi) for screw turn |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

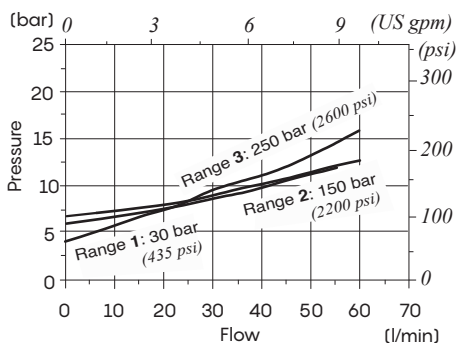
#### 6 Springs

| TYPE     | CODE       | DESCRIPTION                          |
|----------|------------|--------------------------------------|
| <b>1</b> | 3ML1081400 | Pressure range <b>1</b> - white band |
| <b>2</b> | 3ML1081401 | Pressure range <b>2</b> - no band    |
| <b>3</b> | 3ML1081402 | Pressure range <b>3</b> - red band   |

### Rating diagrams

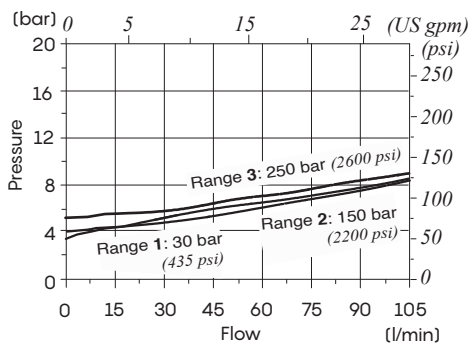
#### SW10A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)



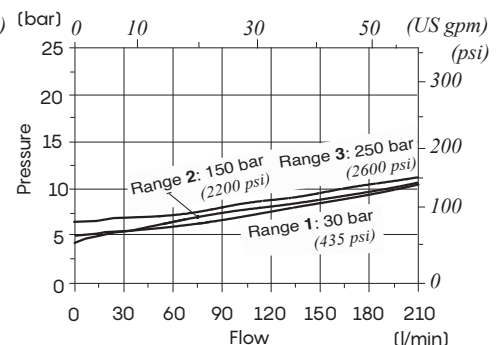
#### SW12A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)



#### SW16A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)





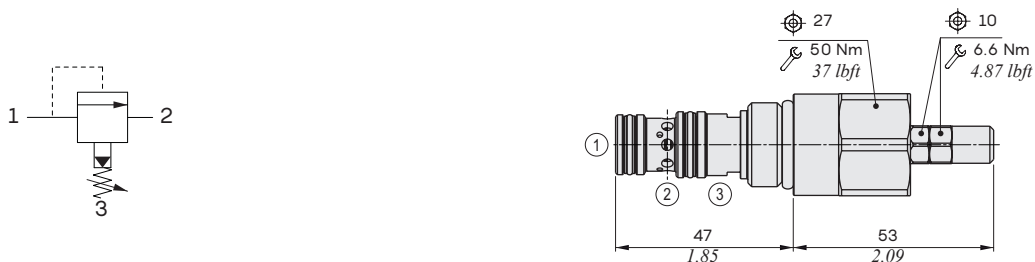
### SP10A type sequence valves – 3 way

- Piloted acting
- Spool type
- Not affected by back pressure on port 2
- Mechanical control with screw adjustment
- Different springs available to vary pressure range

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

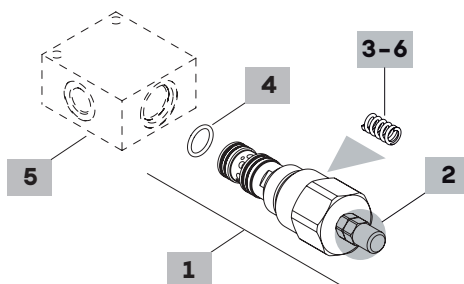
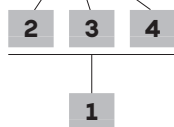
| SP10A                                      |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 50 l/min (13 US gpm)                                                     |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi)                         | 25 cm³/min (1.52 in³/min)                                                |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 10/3                                                                 |
| Weight                                     |                                               | 0.21 kg (0.46 lb)                                                        |

NOTE – For different conditions, please contact Walvoil Sales Dpt.



### Ordering codes and description composition

#### SP10A/1S3B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION             |
|------------------------|-------------|-------------------------|
| <b>SAE cavity 10/3</b> |             |                         |
| <b>SP10A/1S1B</b>      | OSP10002002 | Pressure range <b>1</b> |
| <b>SP10A/1S2B</b>      | OSP10002004 | Pressure range <b>2</b> |
| <b>SP10A/1S3B</b>      | OSP10002003 | Pressure range <b>3</b> |

#### 2 Adjustments

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>S</b> | Screw       |

#### 3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

| TYPE     | DESCRIPTION                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | Pressure range 10÷80 bar (145÷1160 psi); Std. setting 20 bar (290 psi), pressure increase by steps of 10 bar (145 psi) for screw turn        |
| <b>2</b> | Pressure range 50÷220 bar (725÷3200 psi); Std. setting 150 bar (2200 psi), pressure increase by steps of 46 bar (660 psi) for screw turn     |
| <b>3</b> | Pressure range 150÷350 bar (2200÷5100 psi); Std. setting 250 bar (3600 psi), pressure increase by steps of 110 bar (1600 psi) for screw turn |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Valve body

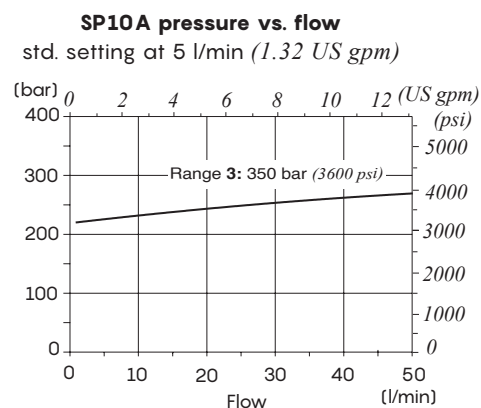
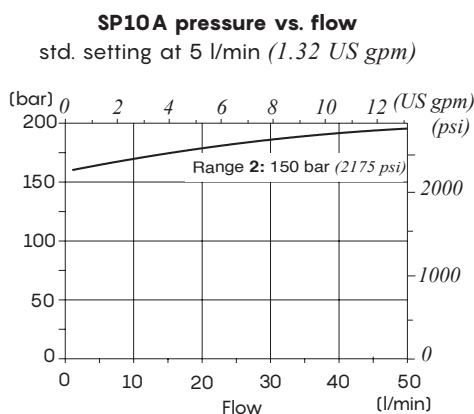
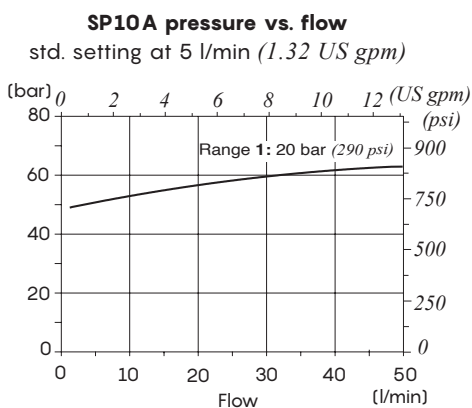
| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

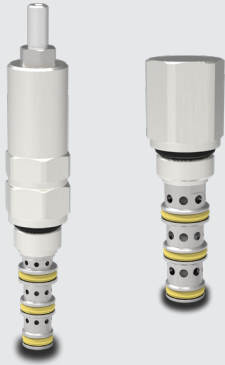
#### 6 Springs

| TYPE     | CODE       | DESCRIPTION                          |
|----------|------------|--------------------------------------|
| <b>1</b> | 3ML1081400 | Pressure range <b>1</b> - white band |
| <b>2</b> | 3ML1081401 | Pressure range <b>1</b> - no band    |
| <b>3</b> | 3ML1081402 | Pressure range <b>1</b> - red band   |

### Rating diagrams







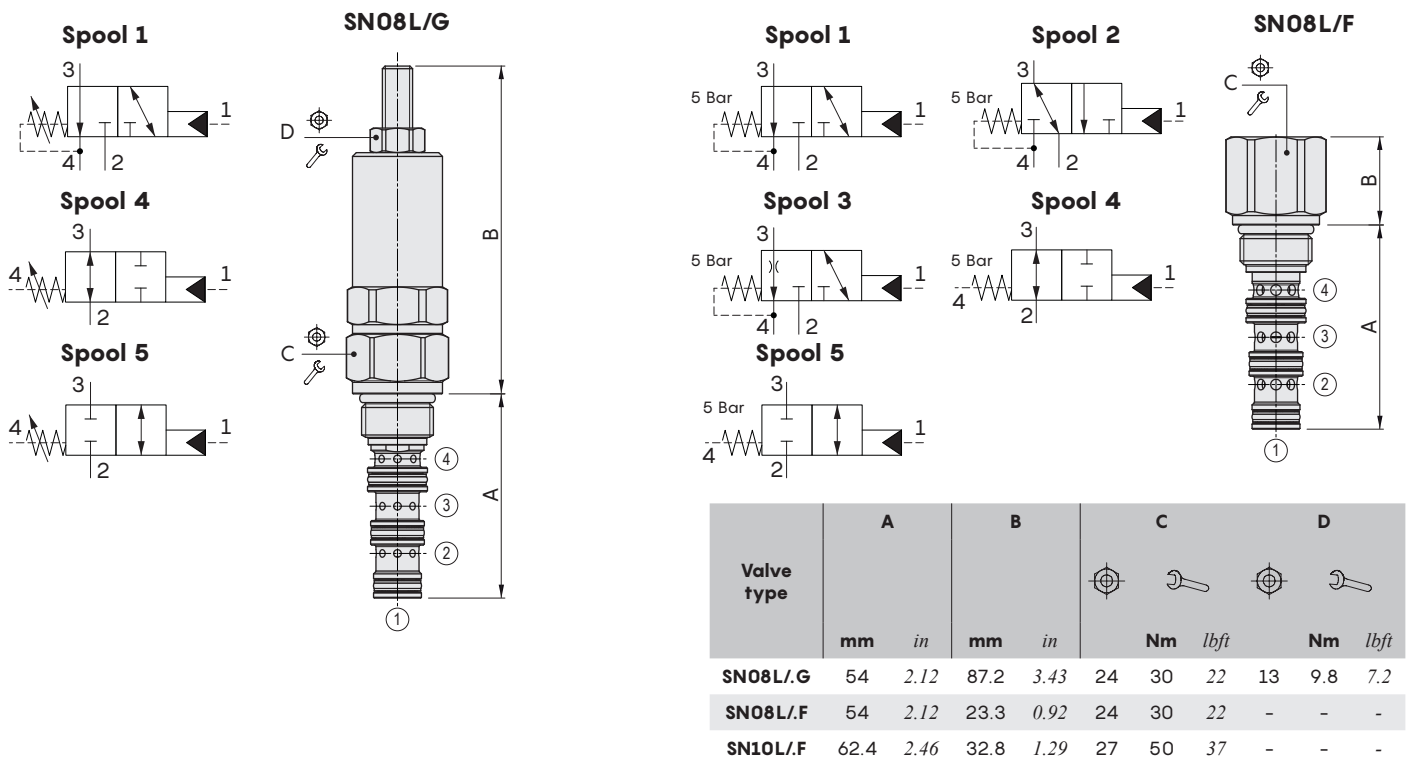
## SN..L type sequence valves – 4 way

- Direct acting
- Spool type
- External pilot and drain
- Variable (G) and fixed (F) setting configurations
- The spring chamber is drained to the tank line (port 4)
- The backpressure values on line 4 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

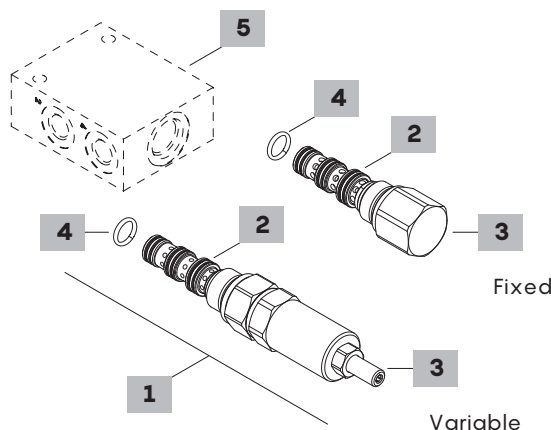
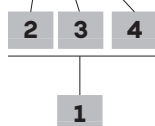
|                                            |                                               | SN08L/G                                                                | SN08L/F                                                                  | SN10L/F                |
|--------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------|
| Nominal flow                               |                                               | 20 l/min (5.3 US gpm)                                                  | 20 l/min (5.3 US gpm)                                                    | 50 l/min (13.2 US gpm) |
| Max. pressure                              |                                               | Port 4= 30 bar (435 psi)<br>350 bar (5100 psi)                         | 350 bar (5100 psi)                                                       | 350 bar (5100 psi)     |
| Oil leakage                                | at 210 bar (3050 psi)                         |                                                                        | 40 cm³/min (2.44 in³/min)                                                |                        |
| Fluid                                      |                                               | mineral based or sinthetic hydraulic fluid with lubricating properties |                                                                          |                        |
| Viscosity                                  |                                               | 10-200 cSt                                                             |                                                                          |                        |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                       |                                                                          |                        |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals |                                                                        | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                        |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                        |
| Cavity                                     |                                               | SAE 08/4                                                               | SAE 08/4                                                                 | SAE 10/4               |
| Weight                                     |                                               | 0.264 kg (0.582 lb)                                                    | 0.131 kg (0.289 lb)                                                      | 0.213 kg (0.470 lb)    |

NOTE - For different conditions, please contact Walvoil Sales Dpt.



### Ordering codes and description composition

#### SN08L/4G1B



#### 1 Cartridges

| TYPE                                  | CODE        | DESCRIPTION                                  |
|---------------------------------------|-------------|----------------------------------------------|
| <b>SAE cavity 08/4</b>                |             |                                              |
| <u>Variable pressure setting type</u> |             |                                              |
| <b>SN08L/1G1B</b>                     | OSN08002015 | From 30 to 90 bar (435 to 1300 psi), spool 1 |
| <b>SN08L/4G1B</b>                     | OSN08002012 | From 30 to 90 bar (435 to 1300 psi), spool 4 |
| <b>SN08L/5G1B</b>                     | OSN08002013 | From 30 to 90 bar (435 to 1300 psi), spool 5 |
| <u>Fixed pressure setting type</u>    |             |                                              |
| <b>SN08L/1F1B</b>                     | OSN08002007 | Setting 5 bar (72.5 psi), spool 1            |
| <b>SN08L/2F1B</b>                     | OSN08002008 | Setting 5 bar (72.5 psi), spool 2            |
| <b>SN08L/3F1B</b>                     | OSN08002009 | Setting 5 bar (72.5 psi), spool 3            |
| <b>SN08L/4F1B</b>                     | OSN08002010 | Setting 5 bar (72.5 psi), spool 4            |
| <b>SN08L/5F1B</b>                     | OSN08002016 | Setting 5 bar (72.5 psi), spool 5            |
| <b>SAE cavity 10/4</b>                |             |                                              |
| <u>Fixed pressure setting type</u>    |             |                                              |
| <b>SN10L/1F1B</b>                     | OSN10002002 | Setting 5 bar (72.5 psi), spool 1            |
| <b>SN10L/4F1B</b>                     | OSN10002004 | Setting 5 bar (72.5 psi), spool 4            |
| <b>SN10L/5F1B</b>                     | OSN10002003 | Setting 5 bar (72.5 psi), spool 5            |

#### 2 Spools

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | Spool 1     |
| <b>2</b> | Spool 2     |
| <b>3</b> | Spool 3     |
| <b>4</b> | Spool 4     |
| <b>5</b> | Spool 5     |

#### 3 Pressure setting

| Setting is referred to 1 l/min (0.26 US gpm) flow |                                                      |
|---------------------------------------------------|------------------------------------------------------|
| TYPE                                              | DESCRIPTION                                          |
| <b>G1</b>                                         | Variable setting from 30 to 90 bar (435 to 1300 psi) |
| <b>F1</b>                                         | Fixed setting 5 bar (72.5 psi)                       |
| <b>F2</b>                                         | Fixed setting 10 bar (145 psi)                       |
| <b>F3</b>                                         | Fixed setting 20 bar (290 psi)                       |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

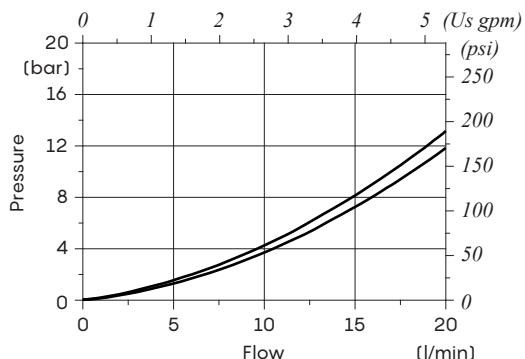
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/4-G 3/8</b> | 3CC0840C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/4-G 3/8</b> | 3CC1040C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

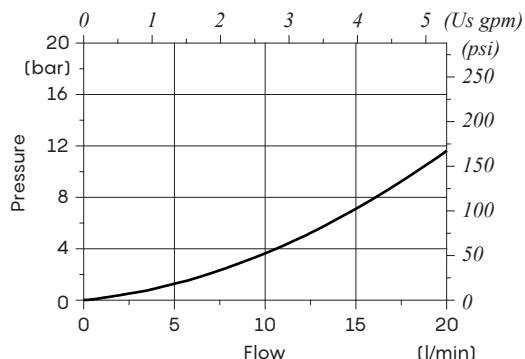
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

**Rating diagrams**

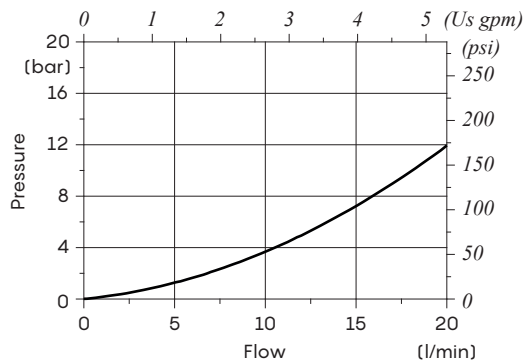
**SN08L pressure drop vs. flow**  
- Spool 1 - Variable pressure -



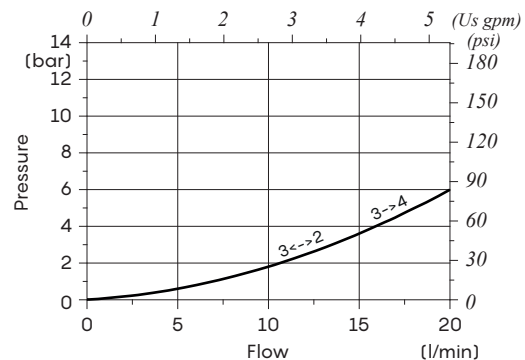
**SN08L pressure drop vs. flow**  
- Spool 4 - Variable pressure -



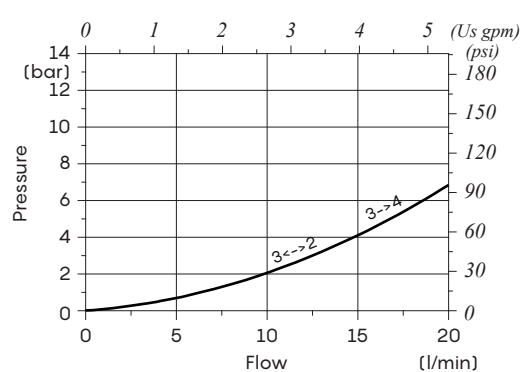
**SN08L pressure drop vs. flow**  
- Spool 5 - Variable pressure -



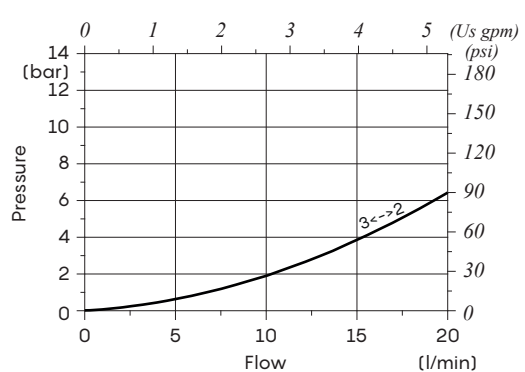
**SN08L pressure drop vs. flow**  
- Spool 1 - Fixed pressure -



**SN08L pressure drop vs. flow**  
- Spool 2 - Fixed pressure -

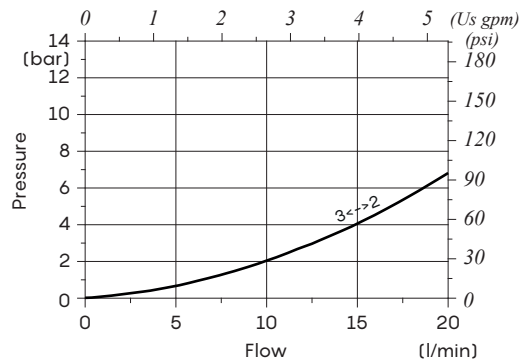


**SN08L pressure drop vs. flow**  
- Spool 3 - Fixed pressure -

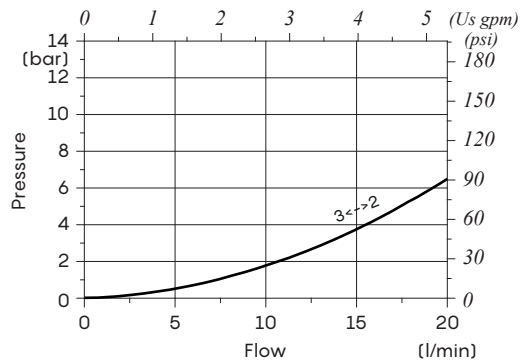


Rating diagrams

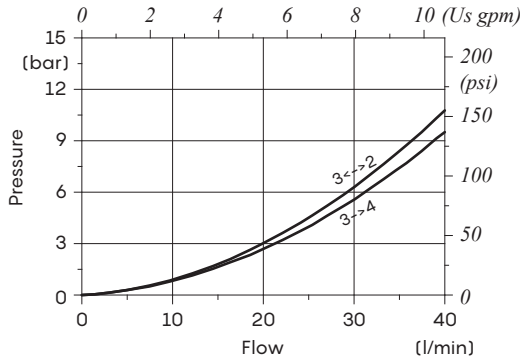
SN08L pressure drop vs. flow  
- Spool 4 - Fixed pressure -



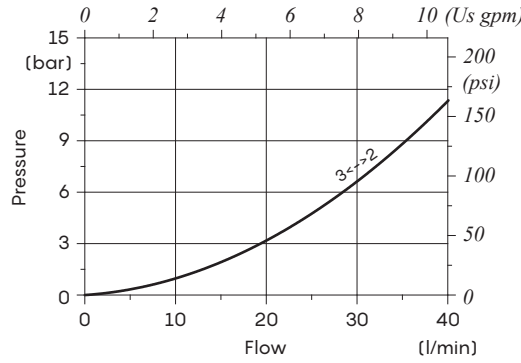
SN08L pressure drop vs. flow  
- Spool 5 - Fixed pressure -



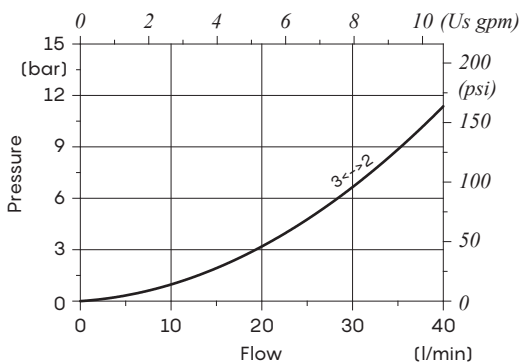
SN10L pressure drop vs. flow  
- Spool 1 -



SN10L pressure drop vs. flow  
- Spool 4 -



SN10L pressure drop vs. flow  
- Spool 5 -





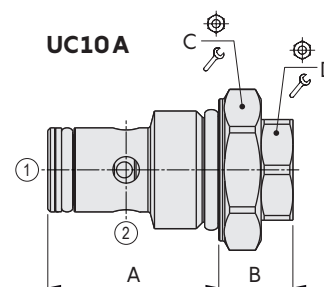
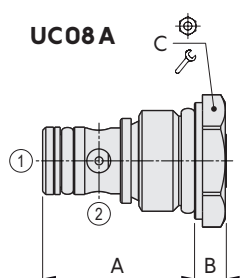
## UC..A type check valves – 2 way

- Poppet type
- Direct acting
- Different opening pressures available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                       | UC08A                                                                    | UC10A                            | UC12A                            | UC16A                            |
|--------------------------------------------|---------------------------------------|--------------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Nominal flow                               |                                       | up to 20 l/min<br>(5.3 US gpm)                                           | up to 35 l/min<br>(9.2 US gpm)   | up to 50 l/min<br>(13 US gpm)    | up to 100 l/min<br>(26 US gpm)   |
| Max. pressure                              |                                       | 350 bar (5100 psi)                                                       |                                  |                                  |                                  |
| Oil leakage                                | at 100 bar<br>(1450 psi)              | 0.25 cm³//min<br>(0.015 in³/min)                                         | 0.25 cm³//min<br>(0.015 in³/min) | 0.25 cm³//min<br>(0.015 in³/min) | 0.25 cm³//min<br>(0.015 in³/min) |
| Fluid                                      |                                       | mineral based or synthetic hydraulic fluid with lubricating properties   |                                  |                                  |                                  |
| Viscosity                                  |                                       | 10-200 cSt                                                               |                                  |                                  |                                  |
| Max level of contamination                 |                                       | 20/18/14 ISO4406                                                         |                                  |                                  |                                  |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                  |                                  |                                  |
| Environmental temp. for working conditions |                                       | from -20°C (-4°F) to 60°C (140°F)                                        |                                  |                                  |                                  |
| Cavity                                     |                                       | SAE 08/2                                                                 | SAE 10/2                         | SAE 12/2                         | SAE 16/2                         |
| Weight                                     |                                       | 0.080 kg (0.18 lb)                                                       | 0.090 kg (0.20 lb)               | 0.180 kg (0.40 lb)               | 0.370 kg (0.81 lb)               |

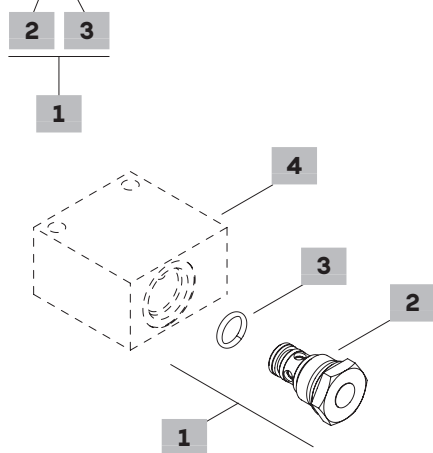
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B  |      | C  |     | D  |     |    |     |
|------------|------|------|----|------|----|-----|----|-----|----|-----|
|            | mm   | in   | mm | in   | Nm | lbf | Nm | lbf | Nm | lbf |
| UC08A      | 28.7 | 1.13 | 6  | 0.24 | 22 | 30  | 22 | -   | -  | -   |
| UC10A      | 32.3 | 1.27 | 14 | 0.55 | 27 | 50  | 37 | 19  | 30 | 22  |
| UC12A      | 46   | 1.81 | 14 | 0.55 | 32 | 80  | 59 | 22  | 42 | 31  |
| UC16A      | 45.2 | 1.78 | 25 | 0.98 | 41 | 100 | 73 | 30  | 65 | 48  |

### Ordering codes and description composition

UC08A/001B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                        |
|------------------------|-------------|------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                    |
| <b>UC08A/001B</b>      | 0UC08002001 | Opening pressure 0.5 bar (7.3 psi) |
| <b>SAE cavity 10/2</b> |             |                                    |
| <b>UC10A/001B</b>      | 0UC10002000 | Opening pressure 0.5 bar (7.3 psi) |
| <b>SAE cavity 12/2</b> |             |                                    |
| <b>UC12A/001B</b>      | 0UC12002000 | Opening pressure 0.5 bar (7.3 psi) |
| <b>SAE cavity 16/2</b> |             |                                    |
| <b>UC16A/001B</b>      | 0UC16002001 | Opening pressure 0.5 bar (7.3 psi) |

#### 2 Opening pressure from 1 to 2

| TYPE     | DESCRIPTION        |
|----------|--------------------|
| <b>1</b> | 0.5 bar (7.3 psi)  |
| <b>2</b> | 2.5 bar (36.2 psi) |
| <b>3</b> | 5 bar (72.5 psi)   |

#### 3 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

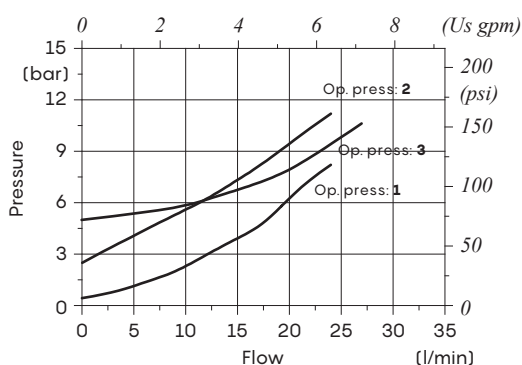
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

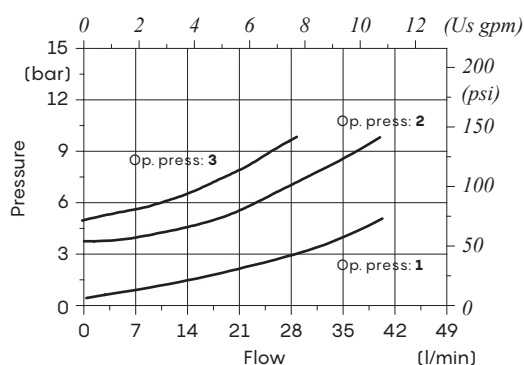
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

### Rating diagrams

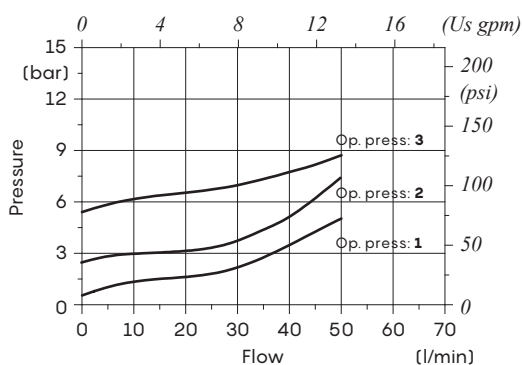
UC08A pressure drop vs. flow



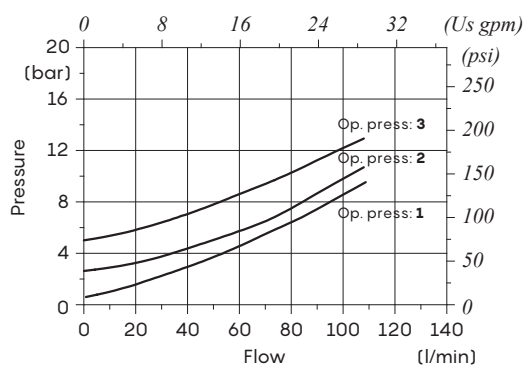
UC10A pressure drop vs. flow



UC12A pressure drop vs. flow



UC16A pressure drop vs. flow





## UM08M type check valves - 2 way

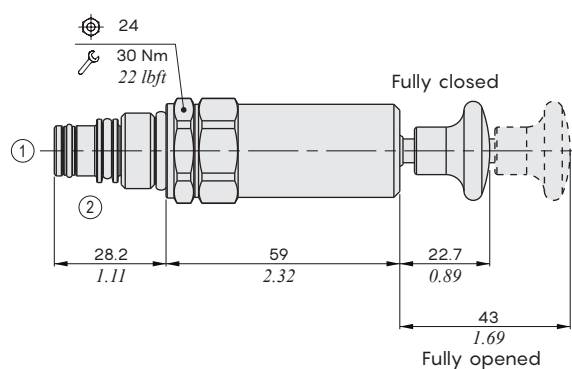
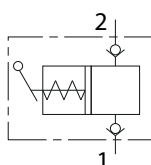
- Direct operation by knob
- Configuration with valve return in delivery position is available
- External zinc-plated and corrosion-proof components

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

### UM08M

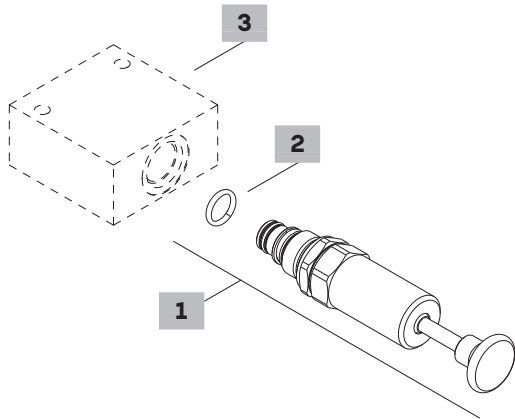
|                                            |                                                                        |                                                                          |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Displacement                               | 1 in <sup>3</sup> /stroke                                              |                                                                          |
| Max. pressure                              | Port 1 = 50 bar (750 psi)<br>Port 2 = 210 bar (3050 psi)               |                                                                          |
| Oil leakage                                | at 200 bar (2900 psi)                                                  | 0.25 cm <sup>3</sup> /min (0.015 in <sup>3</sup> /min)                   |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 12-200 cSt                                                             |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 08/2                                                               |                                                                          |
| Weight                                     | 0.212 kg (0.47 lb)                                                     |                                                                          |

NOTE - For different conditions, please contact Walvoil Sales Dpt.



Ordering codes and description composition

UM08M/1A1B



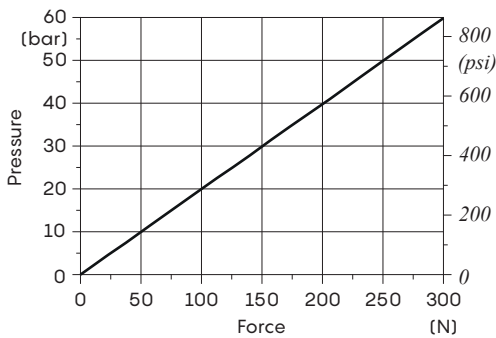
| 1 Cartridges           |             |                |
|------------------------|-------------|----------------|
| TYPE                   | CODE        | DESCRIPTION    |
| <b>SAE cavity 08/2</b> |             |                |
| <b>UM08M/1A1B</b>      | 0UM08002002 | Valve assembly |

| 2 Seals  |                                                                |
|----------|----------------------------------------------------------------|
| TYPE     | DESCRIPTION                                                    |
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

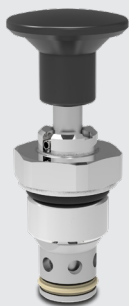
| 3 Valve body                                                                                                         |            |                                                      |
|----------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------|
| TYPE                                                                                                                 | CODE       | DESCRIPTION                                          |
| <b>SAE08/2-G 1/4</b>                                                                                                 | 3CC0820B11 | Aluminium body for cavity 08 valve, G 1/4 std thread |
| Note: aluminium body can stand up to 210 bar (3050 psi)<br>For steel bodies or different threading see from page 208 |            |                                                      |

Rating diagrams

Output Pressure vs. Input force







## UV10M type check valves - 2 way

- Poppet type
- Direct operation by knob
- Available mechanical detent
- External zinc-plated and corrosion-proof components

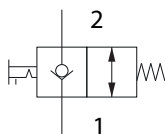
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

### UV10M

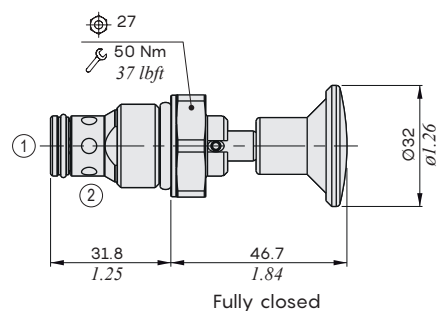
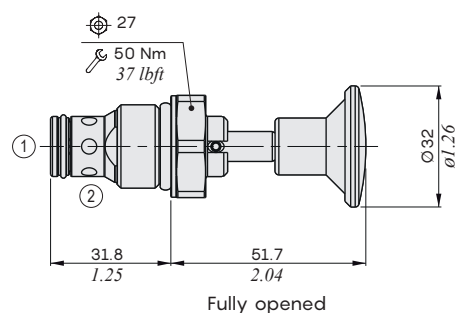
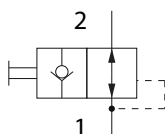
|                                            |                                                                          |
|--------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 60 l/min (16 US gpm)                                                     |
| Max. pressure                              | 320 bar (4650 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi) 0.25 cm³/min (0.015 in³/min)                       |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  | 20-200 cSt                                                               |
| Max level of contamination                 | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                            |
| Environmental temp. for working conditions | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Cavity                                     | SAE 10/2                                                                 |
| Weight                                     | 0.164 kg (0.36 lb)                                                       |

NOTE - For different conditions, please contact Walvoil Sales Dpt.

#### Normally closed configuration

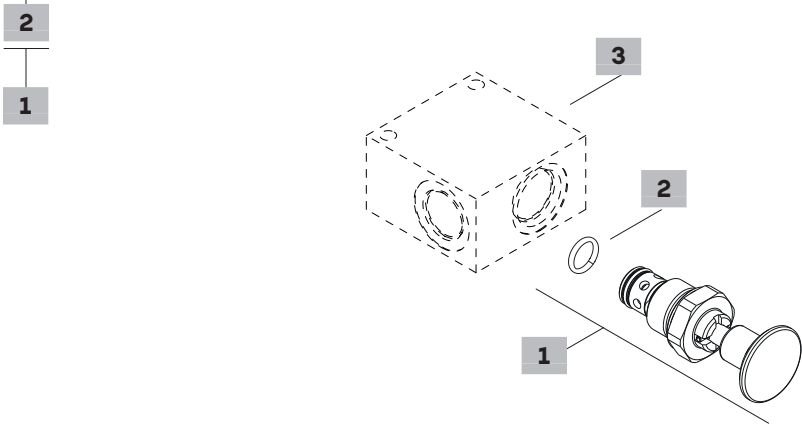


#### Normally open configuration



Ordering codes and description composition

UV10M/2A0B



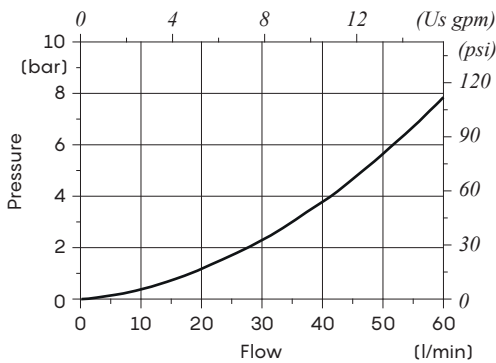
| 1 Cartridges           |             |                                                                    |
|------------------------|-------------|--------------------------------------------------------------------|
| TYPE                   | CODE        | DESCRIPTION                                                        |
| <b>SAE cavity 10/2</b> |             |                                                                    |
| <b>UV10M/2A0B</b>      | 0UV10002000 | Normally closed (N.C.) with detent, pull to operate; spring return |
| <b>UV10M/2E0B</b>      | 0UV10002002 | Normally closed (N.C.) without detent                              |

| 3 Valve body                                                                                                         |            |                                                      |
|----------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------|
| TYPE                                                                                                                 | CODE       | DESCRIPTION                                          |
| <b>SAE10/2-G 1/2</b>                                                                                                 | 3CC1020D11 | Aluminium body for cavity 10 valve, G 1/2 std thread |
| Note: aluminium body can stand up to 210 bar (3050 psi)<br>For steel bodies or different threading see from page 208 |            |                                                      |

| 2 Seals  |                                                                |
|----------|----------------------------------------------------------------|
| TYPE     | DESCRIPTION                                                    |
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

Rating diagrams

Pressure drop vs. flow





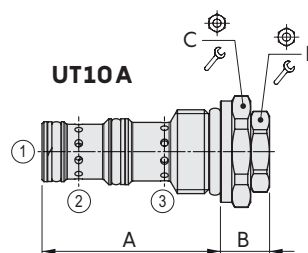
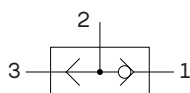
## UT..A type shuttle valves – 3 way

- Shuttle valve
- Direct acting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | UT08A                                                                  | UT10A                                                                    |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 15 l/min (4 US gpm)                                                    | up to 20 l/min (5.3 US gpm)                                              |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |
| Oil leakage                                | at 210 bar (3050 psi)                                                  | 0.50 cm <sup>3</sup> /min (0.030 in <sup>3</sup> /min)                   |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10–200 cSt                                                             |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 08/3                                                               | SAE 10/3                                                                 |
| Weight                                     | 0.80 kg (0.18 lb)                                                      | 0.100 kg (0.22 lb)                                                       |

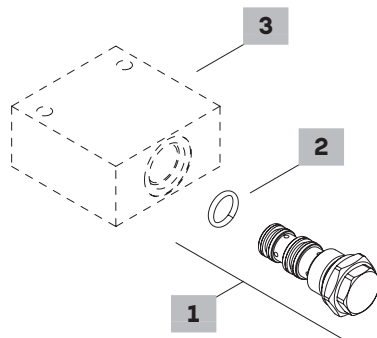
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C  |      | D  |      |
|------------|------|------|------|------|----|------|----|------|
|            | mm   | in   | mm   | in   | Nm | lbft | Nm | lbft |
| UT08A      | 40.8 | 1.60 | 12.5 | 0.49 | 24 | 30   | 22 | 19   |
| UT10A      | 47.2 | 1.86 | 13   | 0.51 | 27 | 50   | 37 | 19   |

### Ordering codes and description composition

UT08A/000B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION    |
|------------------------|-------------|----------------|
| <b>SAE cavity 08/3</b> |             |                |
| <b>UT08A/000B</b>      | OUT08002000 | Valve assembly |
| <b>SAE cavity 10/3</b> |             |                |
| <b>UT10A/000B</b>      | OUT10002000 | Valve assembly |

#### 2 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

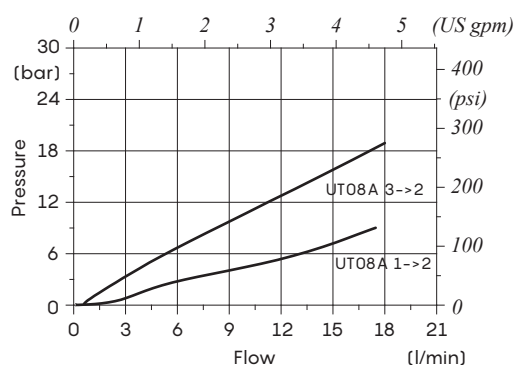
#### 3 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 1/4</b> | 3CC0830B11 | Aluminium body for cavity 08 valve, G 1/4 std thread |
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

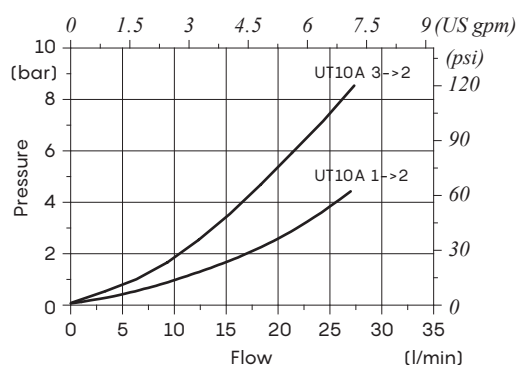
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

### Rating diagrams

UT08A pressure drop vs flow



UT10A pressure drop vs flow





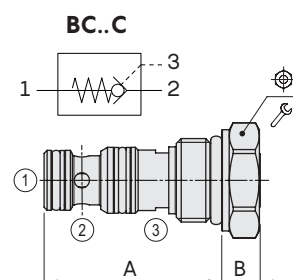
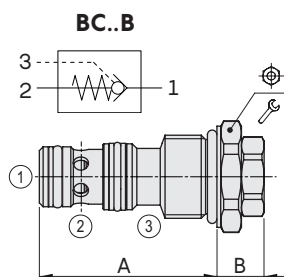
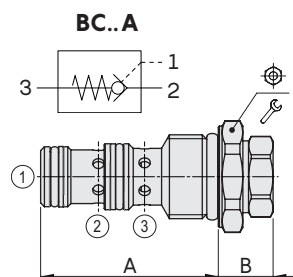
## BC...type pilot operated check valves – 3 way

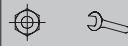
- Poppet type
- Direct acting
- From SAE08 to SAE16 cavities
- Different pilot ratio available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                                   | BC08A                                                                    | BC10A-B                         | BC10C                           | BC12A-B                         | BC16A-B                         |
|--------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Nominal flow                               |                                                   | 15 l/min<br>(4 US gpm)                                                   | 30 l/min<br>(8 US gpm)          | 60 l/min<br>(16 US gpm)         | 50 l/min<br>(13 US gpm)         | 100 l/min<br>(26 US gpm)        |
| Max. pressure                              |                                                   | 350 bar (5100 psi)                                                       |                                 |                                 |                                 |                                 |
| Oil leakage                                | at 100 bar<br>(1450 psi)                          | 0.25 cm³/min<br>(0.015 in³/min)                                          | 0.25 cm³/min<br>(0.015 in³/min) | 0.25 cm³/min<br>(0.015 in³/min) | 0.25 cm³/min<br>(0.015 in³/min) | 0.25 cm³/min<br>(0.015 in³/min) |
| Fluid                                      |                                                   | mineral based or sinthetic hydraulic fluid with lubricating properties   |                                 |                                 |                                 |                                 |
| Viscosity                                  |                                                   | 10-200 cSt                                                               |                                 |                                 |                                 |                                 |
| Max level of contamination                 |                                                   | 20/18/14 ISO4406                                                         |                                 |                                 |                                 |                                 |
| Fluid temperature                          | with NBR seals<br>+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                 |                                 |                                 |                                 |
| Environmental temp. for working conditions |                                                   | from -20°C (-4°F) to 60°C (140°F)                                        |                                 |                                 |                                 |                                 |
| Cavity                                     |                                                   | SAE 08/3                                                                 | SAE 10/3                        | SAE 10/3                        | SAE 12/3                        | SAE 16/3                        |
| Weight                                     |                                                   | 0.080 kg (0.18 lb)                                                       | 0.100 kg (0.22 lb)              | 0.111 kg (0.24 lb)              | 0.230 kg (0.51 lb)              | 0.440 kg (0.97 lb)              |

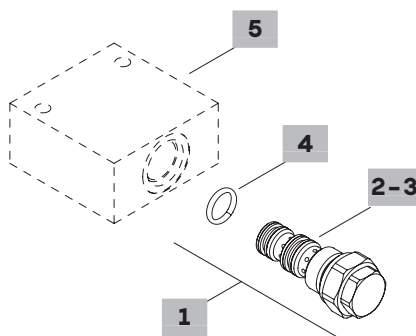
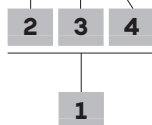
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A        |      | B    |      |                                                                                       |    |        |
|------------|----------|------|------|------|---------------------------------------------------------------------------------------|----|--------|
|            | mm       | in   | mm   | in   |  |    |        |
| BC..A      | SAE 08/3 | 40.8 | 1.61 | 17   | 0.67                                                                                  | 24 | 30 22  |
|            | SAE 10/3 | 47   | 1.85 | 12.5 | 0.49                                                                                  | 27 | 50 36  |
|            | SAE 12/3 | 73.5 | 2.89 | 14   | 0.55                                                                                  | 32 | 80 59  |
|            | SAE 16/3 | 75   | 2.97 | 24   | 0.94                                                                                  | 41 | 100 73 |
| BC..B      | SAE 10/3 | 47   | 1.85 | 12.5 | 0.49                                                                                  | 27 | 50 36  |
|            | SAE 12/3 | 73.5 | 2.89 | 14   | 0.55                                                                                  | 32 | 80 59  |
| BC..C      | SAE 16/3 | 75   | 2.95 | 24   | 0.94                                                                                  | 41 | 100 73 |
|            | SAE 10/3 | 47   | 1.85 | 10.2 | 0.40                                                                                  | 27 | 50 36  |

### Ordering codes and description composition

BC08A/3 0 1 B



#### 1 Cartridges

| TYPE                                        | CODE        | DESCRIPTION                                                 |
|---------------------------------------------|-------------|-------------------------------------------------------------|
| <b>SAE cavity 08/3</b><br><b>BC08A/301B</b> | OBC08002000 | Pilot ratio 1:2.5<br>Opening press. 2 to 3=5 bar (72.5 psi) |
| <b>SAE cavity 10/3</b><br><b>BC10A/301B</b> | OBC10002001 | Pilot ratio 1:3<br>Opening press. 2 to 3=5 bar (72.5 psi)   |
| <b>BC10B/301B</b>                           | OBC10002008 | Pilot ratio 1:2<br>Opening press. 1 to 2=5 bar (72.5 psi)   |
| <b>BC10C/401B</b>                           | OBC10002011 | Pilot ratio 1:4<br>Opening press. 2 to 1=5 bar (72.5 psi)   |
| <b>SAE cavity 12/3</b><br><b>BC12A/301B</b> | OBC12002000 | Pilot ratio 1:3<br>Opening press. 2 to 3=5 bar (72.5 psi)   |
| <b>BC12B/301B</b>                           | OBC12002005 | Pilot ratio 1:3<br>Opening press. 1 to 2=5 bar (72.5 psi)   |
| <b>SAE cavity 16/3</b><br><b>BC16A/301B</b> | OBC16002000 | Pilot ratio 1:2.5<br>Opening press. 2 to 3=5 bar (72.5 psi) |
| <b>BC16B/301B</b>                           | OBC16002004 | Pilot ratio 1:2.5<br>Opening press. 1 to 2=5 bar (72.5 psi) |

#### 2 Pilot ratio

| TYPE             | DESCRIPTION |
|------------------|-------------|
| <b>For BC..A</b> |             |
| BC08A/3          | 1:2.5       |
| BC10A/3          | 1:3         |
| BC12A/3          | 1:3         |
| BC16A/3          | 1:2.5       |
| <b>For BC..B</b> |             |
| BC10B/3          | 1:2         |
| BC12B/3          | 1:3         |
| BC16B/3          | 1:2.5       |
| <b>For BC..C</b> |             |
| BC10B/3          | 1:4         |

#### 3 Opening pressure from 2 to 3

| TYPE                         | DESCRIPTION                              |
|------------------------------|------------------------------------------|
| <b>For BC..A from 2 to 3</b> |                                          |
| 1                            | 5 bar (72.5 psi) with sealed piston      |
| 2                            | 2.5 bar (36.2 psi) without sealed piston |
| <b>For BC..B from 1 to 2</b> |                                          |
| 1                            | 5 bar (72.5 psi) with sealed piston      |
| <b>For BC..C from 2 to 1</b> |                                          |
| 1                            | 5 bar (72.5 psi) with seal               |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

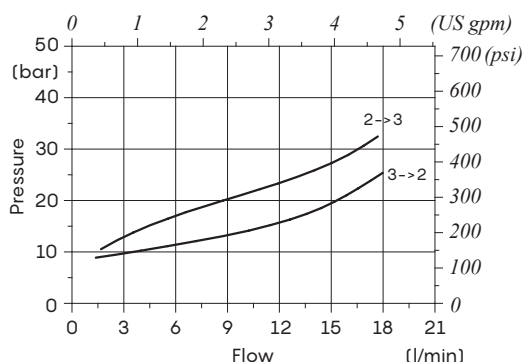
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/3-G 1/2</b> | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/3-G 3/4</b> | 3CC1630E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

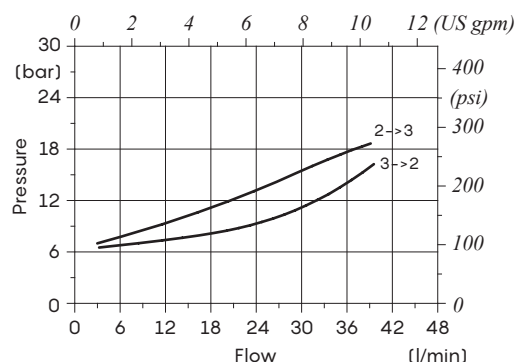
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

**Rating diagrams**

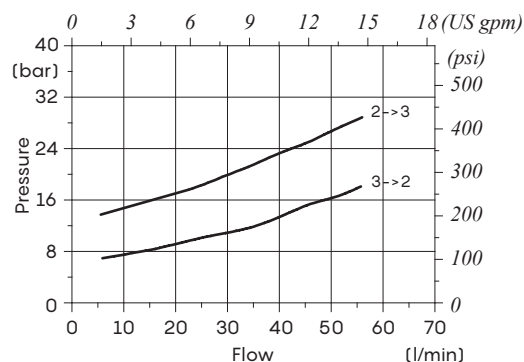
**BC08A pressure drop vs flow**



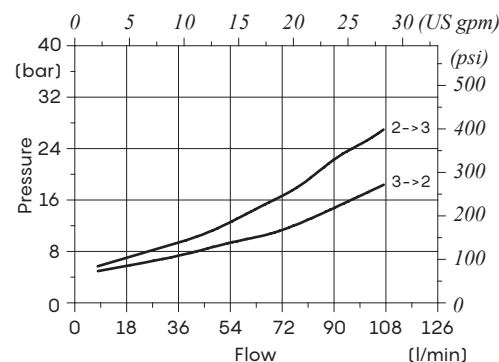
**BC10A pressure drop vs flow**



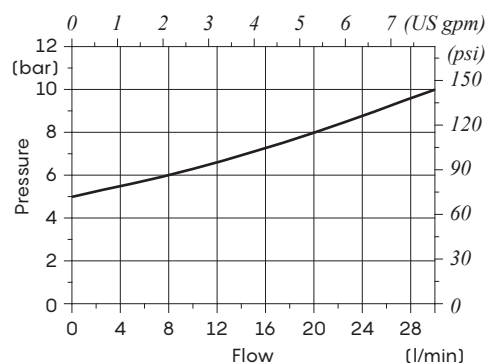
**BC12A pressure drop vs flow**



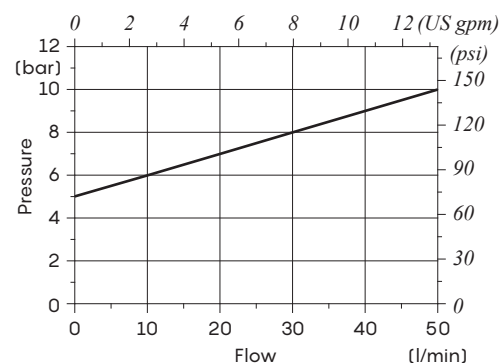
**BC16A pressure drop vs flow**



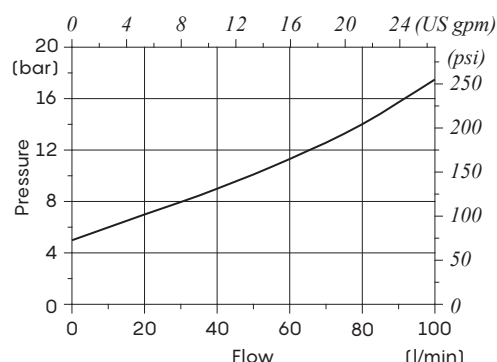
**BC10B pressure drop vs flow**



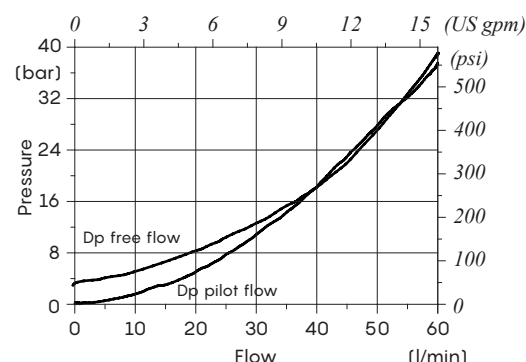
**BC12B pressure drop vs flow**



**BC16B pressure drop vs flow**



**BC10C pressure drop vs flow**









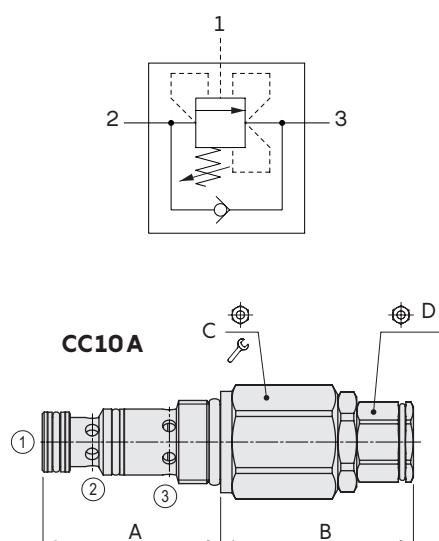
## CC..A type counterbalance valves – 3 way

- For closed center
- Line mounting
- Not affected by back pressure
- From SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                               |                                       | CC10A                                                                    | CC12A                                                     | CC16A                                                     |
|-----------------------------------------------|---------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|
| Nominal flow                                  |                                       | 30 l/min<br>(7.9 US gpm)                                                 | 60 l/min<br>(16 US gpm)                                   | 90 l/min<br>(24 US gpm)                                   |
| Max. pressure                                 |                                       | 350 bar (5100 psi)                                                       |                                                           |                                                           |
| Oil leakage                                   | at 80% of max.<br>pressure setting    | 0.25 cm <sup>3</sup> /min<br>(0.015 in <sup>3</sup> /min)                | 0.25 cm <sup>3</sup> /min<br>(0.015 in <sup>3</sup> /min) | 0.25 cm <sup>3</sup> /min<br>(0.015 in <sup>3</sup> /min) |
| Fluid                                         |                                       | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                           |                                                           |
| Viscosity                                     |                                       | 10–200 cSt                                                               |                                                           |                                                           |
| Max level of contamination                    |                                       | 20/18/14 ISO4406                                                         |                                                           |                                                           |
| Fluid temperature                             | with NBR seals+PTFE<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                           |                                                           |
| Environmental temp. for<br>working conditions |                                       | from -20°C (-4°F) to 60°C (140°F)                                        |                                                           |                                                           |
| Cavity                                        |                                       | SAE 10/3                                                                 | SAE 12/3                                                  | SAE 16/3                                                  |
| Weight                                        |                                       | 0.280 kg (0.62 lb)                                                       | 0.380 kg (0.84 lb)                                        | 0.720 kg (1.59 lb)                                        |

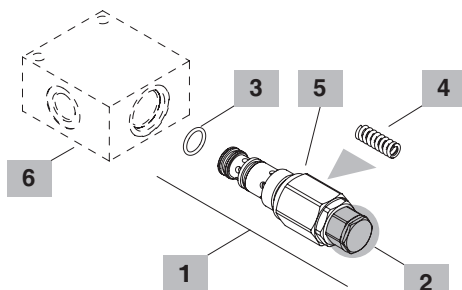
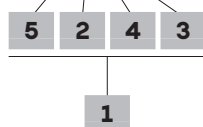
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type |    | A    |      | B    |      | C  |        | D  |        |
|------------|----|------|------|------|------|----|--------|----|--------|
|            |    | mm   | in   | mm   | in   | Nm | lbf·ft | Nm | lbf·ft |
| CC10A/     | 4S | 47.2 | 1.86 | 51   | 2.01 | 27 | 50     | 37 | 19     |
|            | W  | 47.2 | 1.86 | 51   | 2.01 | 27 | 50     | 37 | 19     |
| CC12A/     | 4S | 73.5 | 2.89 | 58.5 | 2.30 | 32 | 80     | 59 | 24     |
|            | 4W | 73.5 | 2.89 | 58.5 | 2.30 | 32 | 80     | 59 | 24     |
| CC16A/     | 4S | 75   | 2.95 | 69   | 2.72 | 41 | 100    | 74 | 27     |
|            | 4W | 75   | 2.95 | 69   | 2.72 | 41 | 100    | 74 | 27     |

### Ordering codes and description composition

#### CC10A/4S2B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                                                    |
|------------------------|-------------|----------------------------------------------------------------|
| <b>SAE cavity 10/3</b> |             |                                                                |
| <b>CC10A/4S2B</b>      | 0CC10002001 | Screw type adjustment, pilot ratio 1:4 pressure range <b>2</b> |
| <b>SAE cavity 12/3</b> |             |                                                                |
| <b>CC12A/4S2B</b>      | 0CC12002000 | Screw type adjustment, pilot ratio 1:4 pressure range <b>2</b> |
| <b>SAE cavity 16/3</b> |             |                                                                |
| <b>CC16A/4S2B</b>      | 0CC16002001 | Screw type adjustment, pilot ratio 1:4 pressure range <b>2</b> |

#### 2 Adjustments

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>S</b> | Screw             |
| <b>W</b> | Copped adjustment |

#### 3 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 4 Pressure setting springs

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

| TYPE                   | CODE       | DESCRIPTION                                         |
|------------------------|------------|-----------------------------------------------------|
| <b>For CC10A valve</b> |            |                                                     |
| <b>1</b>               | 3ML1092502 | Setting range 50-220 bar (725-3200 psi) red band    |
| <b>2</b>               | 3ML1092300 | Setting range 180-350 bar (2600-5100 psi) red band  |
| <b>3</b>               | 3ML1102800 | Setting range 300-700 bar (4350-10150 psi) red band |

#### For CC12A valve

|          |            |                                                        |
|----------|------------|--------------------------------------------------------|
| <b>1</b> | 3ML1133201 | Setting range 50-220 bar (725-3200 psi) blue band      |
| <b>2</b> | 3ML1133200 | Setting range 180-350 bar (2600-5100 psi) red band     |
| <b>3</b> | 3ML1133500 | Setting range 300-700 bar (4350-10150 psi) yellow band |

#### For CC16A valve

|          |            |                                                        |
|----------|------------|--------------------------------------------------------|
| <b>1</b> | 3ML1164000 | Setting range 50-220 bar (725-3200 psi) blue band      |
| <b>2</b> | 3ML1164001 | Setting range 180-350 bar (2600-5100 psi) red band     |
| <b>3</b> | 3ML1164002 | Setting range 300-700 bar (4350-10150 psi) yellow band |

#### 5 Pilot ratio

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>4</b> | 1:4         |

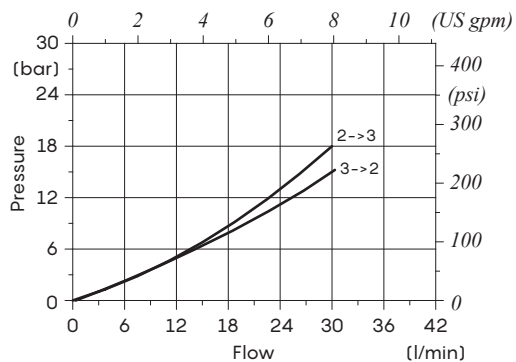
#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/3-G 1/2</b> | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/3-G 3/4</b> | 3CC1630E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

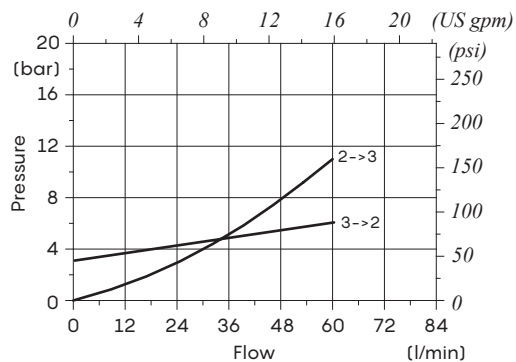
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

**Rating diagrams**

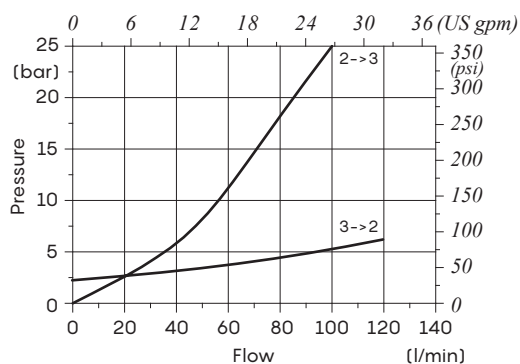
**CC10A pressure drop vs. flow**



**CC12A pressure drop vs. flow**



**CC16A pressure drop vs. flow**







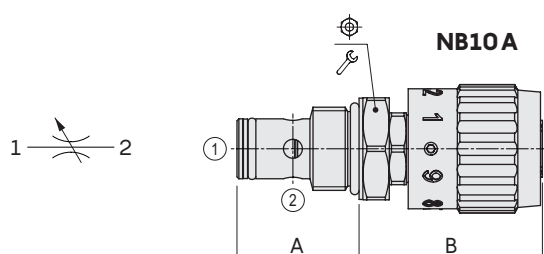
## NB..A type needle valves - 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Ideal use in the circuit as bleed off
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | NB08 A                                                                 | NB10 A                                                                   | NB12 A                  | NB16 A                   |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|--------------------------|
| Nominal flow                               | 15 l/min<br>(3.9 US gpm)                                               | 30 l/min<br>(7.9 US gpm)                                                 | 60 l/min<br>(16 US gpm) | 100 l/min<br>(26 US gpm) |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |                         |                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                         |                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |                         |                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |                         |                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                          |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                         |                          |
| Cavity                                     | SAE 08/2                                                               | SAE 10/2                                                                 | SAE 12/2                | SAE 16/2                 |
| Weight                                     | 0.180 kg (0.40 lb)                                                     | 0.200 kg (0.44 lb)                                                       | 0.280 kg (0.62 lb)      | 0.500 kg (1.10 lb)       |

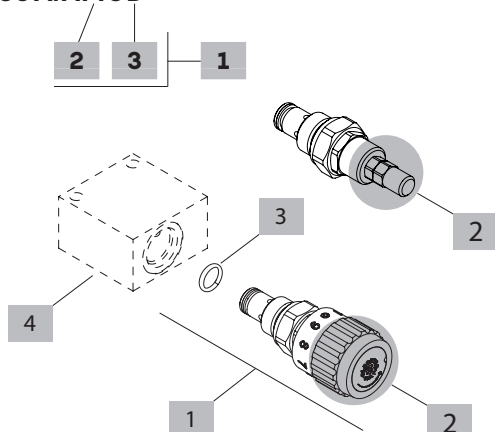
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      |  |     |      |
|------------|---|------|------|------|------|---------------------------------------------------------------------------------------|-----|------|
|            |   | mm   | in   | mm   | in   |                                                                                       | Nm  | lbft |
| NB08 A/A   | M | 27.6 | 1.09 | 55.5 | 2.19 | 24                                                                                    | 30  | 22   |
|            | S | 27.6 | 1.09 | 49.5 | 1.95 | 24                                                                                    | 30  | 22   |
| NB10 A/A   | M | 32.5 | 1.28 | 47.5 | 1.87 | 27                                                                                    | 50  | 37   |
|            | S | 32.5 | 1.28 | 46.5 | 1.83 | 27                                                                                    | 50  | 37   |
| NB12 A/A   | M | 46   | 1.81 | 53.4 | 2.10 | 32                                                                                    | 80  | 59   |
|            | S | 46   | 1.81 | 46.3 | 1.82 | 32                                                                                    | 80  | 59   |
| NB16 A/A   | M | 45.2 | 1.78 | 71.6 | 2.82 | 41                                                                                    | 100 | 74   |
|            | S | 45.2 | 1.78 | 60.9 | 2.40 | 41                                                                                    | 100 | 74   |

## Ordering codes and description composition

### NB08A/AMOB



### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION           |
|------------------------|-------------|-----------------------|
| <b>SAE cavity 08/2</b> |             |                       |
| NB08A/AMOB             | ONB08002000 | Handknob adjustment   |
| NB08A/ASOB             | ONB08002001 | Screw type adjustment |
| <b>SAE cavity 10/2</b> |             |                       |
| NB10A/AMOB             | ONB10002003 | Handknob adjustment   |
| NB10A/ASOB             | ONB10002001 | Screw type adjustment |
| <b>SAE cavity 12/2</b> |             |                       |
| NB12A/AMOB             | ONB12002002 | Handknob adjustment   |
| NB12A/ASOB             | ONB12002001 | Screw type adjustment |
| <b>SAE cavity 16/2</b> |             |                       |
| NB16A/AMOB             | ONB16002000 | Handknob adjustment   |
| NB16A/ASOB             | ONB16002002 | Screw type adjustment |

### 2 Adjustments

| TYPE     | DESCRIPTION         |
|----------|---------------------|
| <b>S</b> | Screw               |
| <b>M</b> | Handknob calibrated |
| <b>W</b> | Copped adjustment   |

### 3 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

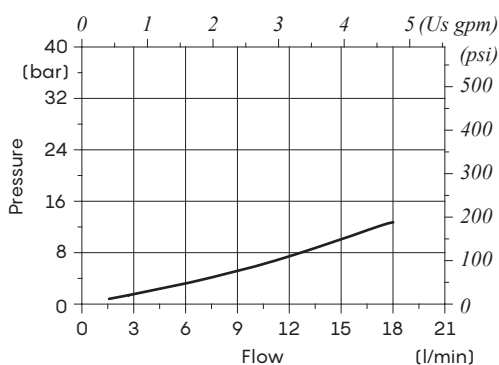
### 4 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

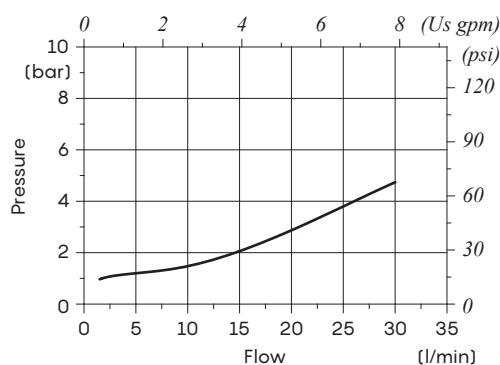
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

## Rating diagrams

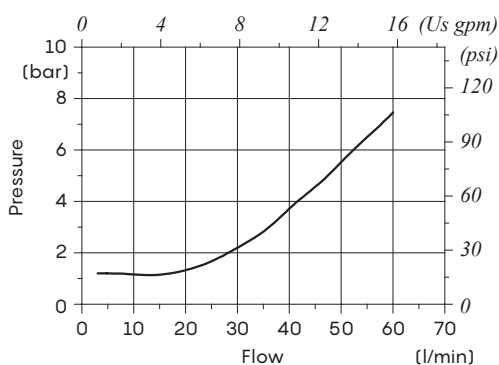
NB08A: pressure drop vs. flow 1->2 - 2->1, fully open



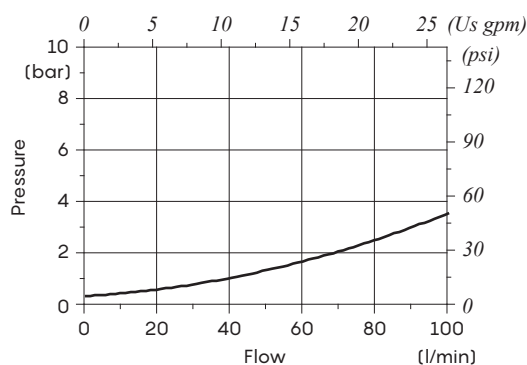
NB10A: pressure drop vs. flow 1->2 - 2->1, fully open



NB12A: pressure drop vs. flow 1->2 - 2->1, fully open



NB16A: pressure drop vs. flow 1->2 - 2->1, fully open





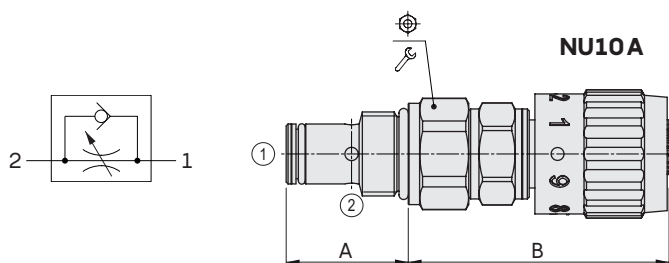
## NU..A type needle valves - 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Free return line
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | NU08A                                                                  | NU10A                                                                    | NU12A                   | NU16A                    |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|--------------------------|
| Nominal flow                               | 15 l/min<br>(3.9 US gpm)                                               | 30 l/min<br>(7.9 US gpm)                                                 | 60 l/min<br>(16 US gpm) | 100 l/min<br>(26 US gpm) |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |                         |                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                         |                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |                         |                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |                         |                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                          |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                         |                          |
| Cavity                                     | SAE 08/2                                                               | SAE 10/2                                                                 | SAE 12/2                | SAE 16/2                 |
| Weight                                     | 0.240 kg (0.53 lb)                                                     | 0.290 kg (0.64 lb)                                                       | 0.400 kg (0.88 lb)      | 0.550 kg (1.21 lb)       |

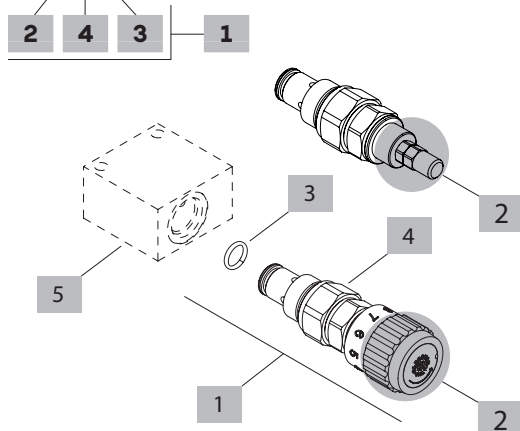
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      | <br>Nm    lbft |     |
|------------|---|------|------|------|------|-----------------------------------------------------------------------------------------------------|-----|
|            |   | mm   | in   | mm   | in   |                                                                                                     |     |
| NU08A/A    | M | 27.6 | 1.09 | 70.7 | 2.78 | 24                                                                                                  | 30  |
|            | S | 27.6 | 1.09 | 64.5 | 2.54 | 24                                                                                                  | 30  |
| NU10A/A    | M | 32.3 | 1.27 | 70   | 2.76 | 27                                                                                                  | 50  |
|            | S | 32.3 | 1.27 | 65   | 2.56 | 27                                                                                                  | 50  |
| NU12A/A    | M | 46   | 1.81 | 71.2 | 2.80 | 32                                                                                                  | 80  |
|            | S | 46   | 1.81 | 66   | 2.60 | 32                                                                                                  | 80  |
| NU16A/A    | M | 45.2 | 1.78 | 72.9 | 2.87 | 41                                                                                                  | 100 |
|            | S | 45.2 | 1.78 | 66   | 2.60 | 41                                                                                                  | 100 |

### Ordering codes and description composition

#### NU08 A/AM1B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION           |
|------------------------|-------------|-----------------------|
| <b>SAE cavity 08/2</b> |             |                       |
| NU08 A/AM1B            | ONU08002000 | Handknob adjustment   |
| NU08 A/AS1B            | ONU08002001 | Screw type adjustment |
| <b>SAE cavity 10/2</b> |             |                       |
| NU10 A/AM1B            | ONU10002000 | Handknob adjustment   |
| NU10 A/AS1B            | ONU10002001 | Screw type adjustment |
| <b>SAE cavity 12/2</b> |             |                       |
| NU12 A/AM1B            | ONU12002000 | Handknob adjustment   |
| NU12 A/AS1B            | ONU12002001 | Screw type adjustment |
| <b>SAE cavity 16/2</b> |             |                       |
| NU16 A/AM1B            | ONU16002000 | Handknob adjustment   |
| NU16 A/AS1B            | ONU16002001 | Screw type adjustment |

#### 2 Adjustments

| TYPE     | DESCRIPTION         |
|----------|---------------------|
| <b>S</b> | Screw               |
| <b>M</b> | Handknob calibrated |
| <b>W</b> | Copped adjustment   |

#### 3 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 4 Opening pressure check valve from 1 to 2

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>1</b> | 0.5 bar (7.3 psi) |

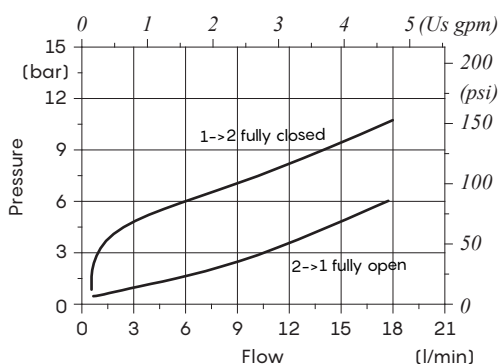
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

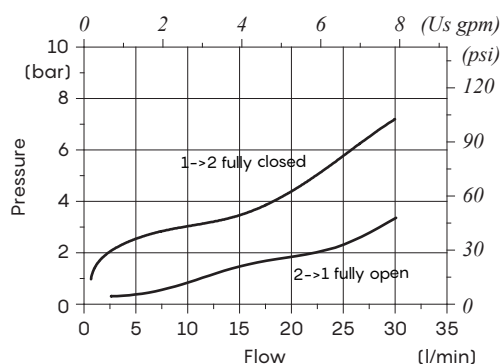
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

### Rating diagrams

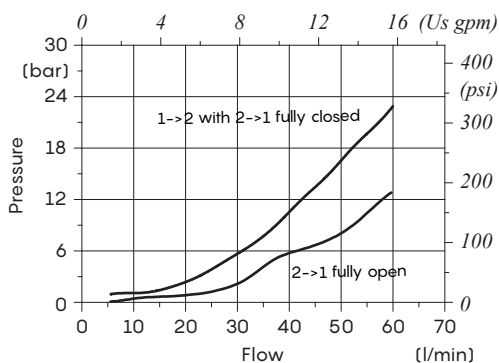
NU08 A pressure drop vs. flow



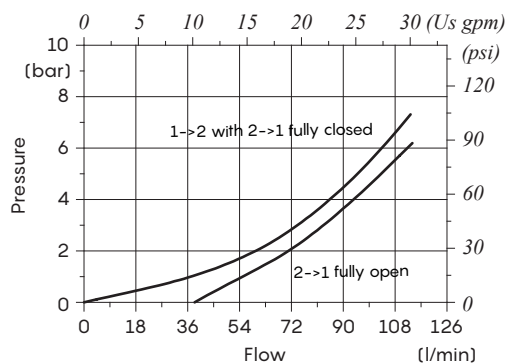
NU10 A pressure drop vs. flow



NU12 A pressure drop vs. flow



NU16 A pressure drop vs. flow







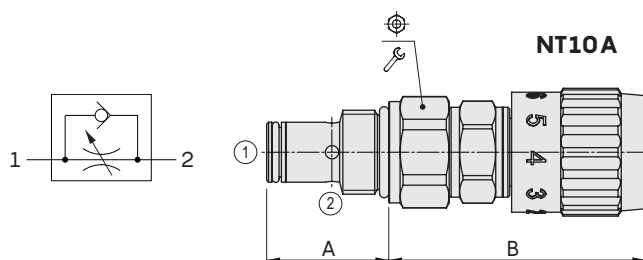
## NT..A type needle valves – 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Free return line
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | NT08 A                                                                 | NT10A                                                                    | NT12A                   | NT16 A                   |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|--------------------------|
| Nominal flow                               | 15 l/min<br>(3.9 US gpm)                                               | 30 l/min<br>(7.9 US gpm)                                                 | 60 l/min<br>(16 US gpm) | 100 l/min<br>(26 US gpm) |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |                         |                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                         |                          |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |                         |                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |                         |                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                          |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                         |                          |
| Cavity                                     | SAE 08/2                                                               | SAE 10/2                                                                 | SAE 12/2                | SAE 16/2                 |
| Weight                                     | 0.240 kg (0.53 lb)                                                     | 0.290 kg (0.64 lb)                                                       | 0.400 kg (0.88 lb)      | 0.550 kg (1.21 lb)       |

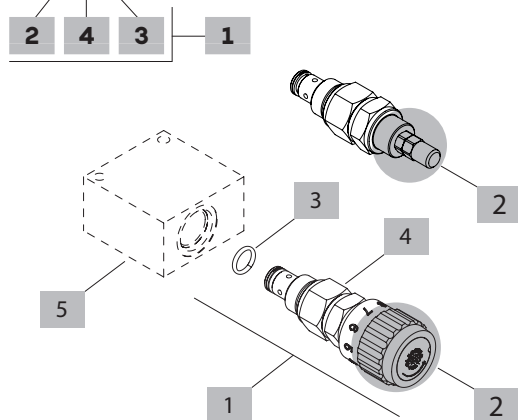
NOTE – For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      |  |     |      |
|------------|---|------|------|------|------|---------------------------------------------------------------------------------------|-----|------|
|            |   | mm   | in   | mm   | in   |                                                                                       | Nm  | lbft |
| NT08 A/A   | M | 27.6 | 1.09 | 70.7 | 2.78 | 24                                                                                    | 30  | 22   |
|            | S | 27.6 | 1.09 | 64.5 | 2.54 | 24                                                                                    | 30  | 22   |
| NT10 A/A   | M | 32.3 | 1.27 | 70   | 2.76 | 27                                                                                    | 50  | 37   |
|            | S | 32.3 | 1.27 | 65   | 2.56 | 27                                                                                    | 50  | 37   |
| NT12 A/A   | M | 46   | 1.81 | 71.2 | 2.80 | 32                                                                                    | 80  | 59   |
|            | S | 46   | 1.81 | 66   | 2.60 | 32                                                                                    | 80  | 59   |
| NT16 A/A   | M | 45.2 | 1.78 | 72.9 | 2.87 | 41                                                                                    | 100 | 74   |
|            | S | 45.2 | 1.78 | 66   | 2.60 | 41                                                                                    | 100 | 74   |

### Ordering codes and description composition

#### NT08A/AM1B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION           |
|------------------------|-------------|-----------------------|
| <b>SAE cavity 08/2</b> |             |                       |
| NT08A/AM1B             | ONT08002000 | Handknob adjustment   |
| NT08A/AS1B             | ONT08002001 | Screw type adjustment |
| <b>SAE cavity 10/2</b> |             |                       |
| NT10A/AM1B             | ONT10002000 | Handknob adjustment   |
| NT10A/AS1B             | ONT10002001 | Screw type adjustment |
| <b>SAE cavity 12/2</b> |             |                       |
| NT12A/AM1B             | ONT12002000 | Handknob adjustment   |
| NT12A/AS1B             | ONT12002001 | Screw type adjustment |
| <b>SAE cavity 16/2</b> |             |                       |
| NT16A/AM1B             | ONT16002000 | Handknob adjustment   |
| NT16A/AS1B             | ONT16002001 | Screw type adjustment |

#### 2 Adjustments

| TYPE     | DESCRIPTION         |
|----------|---------------------|
| <b>S</b> | Screw               |
| <b>M</b> | Handknob calibrated |
| <b>W</b> | Copped adjustment   |

#### 3 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 4 Opening pressure check valve from 1 to 2

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>1</b> | 0.5 bar (7.3 psi) |

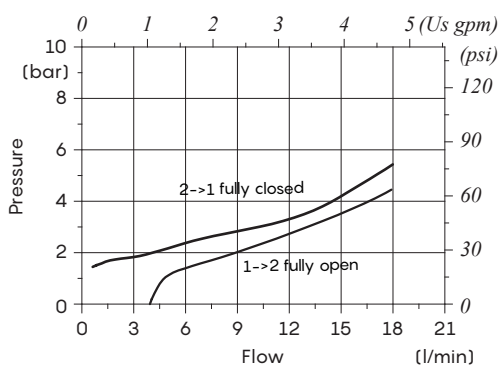
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

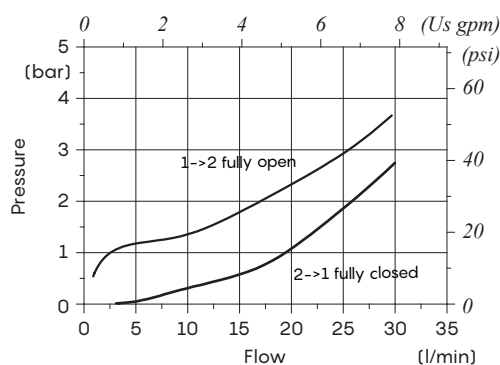
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

### Rating diagrams

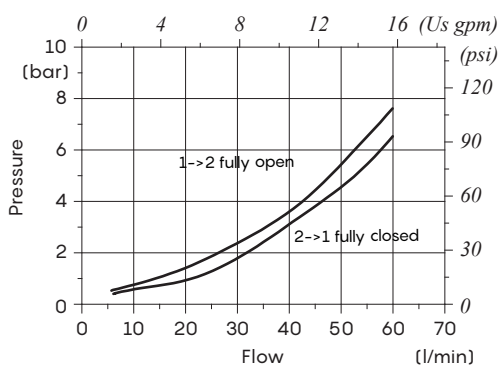
NT08A pressure drop vs. flow



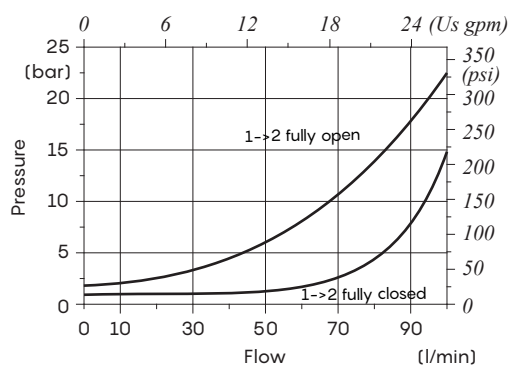
NT10A pressure drop vs. flow



NT12A pressure drop vs. flow



NT16A pressure drop vs. flow





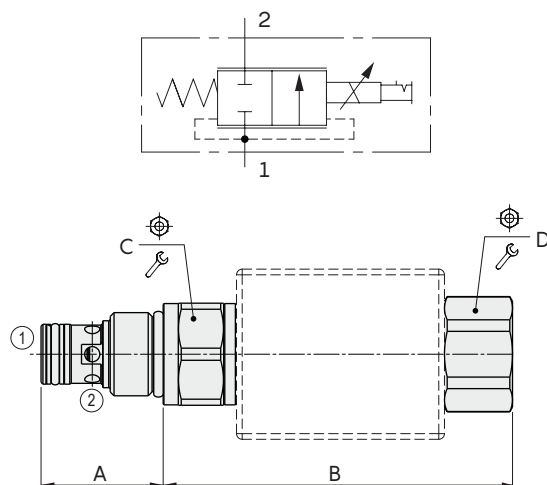
## EE..X type needle valves - 2 way

- Spool type
- Direct acting through proportional solenoid
- Excellent low flow metering capability
- System of purging of air
- To be combined with an external compensator
- SAE10 and SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

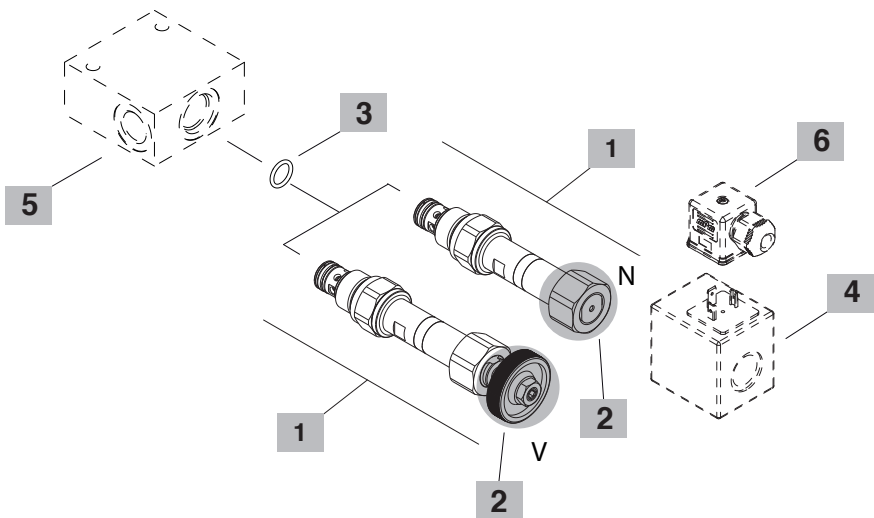
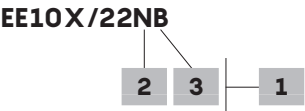
|                                            |                                               | EE10X                                                                    | EE12X                                                |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------|
| Nominal flow <sup>(1)</sup>                | with 10 bar (145 psi) stand-by                | 40 l/min (10.6 US gpm)                                                   | 60 l/min (15.8 US gpm)                               |
| Max. pressure                              |                                               | 300 bar (4350 psi)                                                       | 315 bar (4600 psi)                                   |
| Oil leakage                                | at 150 bar (2175 psi)                         | 150 cm <sup>3</sup> /min (9.1 in <sup>3</sup> /min)                      | 200 cm <sup>3</sup> /min (12.2 in <sup>3</sup> /min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                                                      |
| Viscosity                                  |                                               | 12-200 cSt                                                               |                                                      |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                                                      |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                      |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                                                      |
| Cavity                                     |                                               | SAE 10/2                                                                 | SAE 12/2                                             |
| Coil type <sup>(2)</sup>                   |                                               | BQP19 or BH                                                              |                                                      |
| Nominal voltages                           |                                               | 12VDC - 24VDC ± 10%                                                      |                                                      |
| Power rating                               |                                               | 15 W (BQP19) - 33 W (BH)                                                 |                                                      |
| Max. control current                       |                                               | 12V -> 1.25A - 24V -> 0.63A (BQP19)<br>12V -> 1.70A - 24V -> 0.85A (BH)  |                                                      |
| Dither frequency                           |                                               | 150 Hz                                                                   |                                                      |
| Weight                                     |                                               | 0.30 kg (0.66 lb)                                                        | 0.426 kg (0.94 lb)                                   |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - <sup>(1)</sup> Values are checked with cartridge in parallel with compensator  
- <sup>(2)</sup> For coils further features see from page 201.



| Valve<br>type | A    |      | B                             |      |               |      | C                                                                                     |    |        | D                                                                                     |    |        |
|---------------|------|------|-------------------------------|------|---------------|------|---------------------------------------------------------------------------------------|----|--------|---------------------------------------------------------------------------------------|----|--------|
|               |      |      | N / O<br>without<br>emergency |      | V<br>handknob |      |  |    |        |  |    |        |
|               | mm   | in   | mm                            | in   | mm            | in   |                                                                                       | Nm | lbf·ft |                                                                                       | Nm | lbf·ft |
| EE10X         | 32.3 | 1.27 | 92.4                          | 3.64 | 121.9         | 4.80 | 27                                                                                    | 50 | 37     | 28                                                                                    | 5  | 3.7    |
| EE12X         | 45   | 1.77 | 94.9                          | 3.74 | 124.3         | 4.89 | 32                                                                                    | 80 | 59     | 28                                                                                    | 5  | 3.7    |

Ordering codes and description composition



| 1 Cartridges           |             |                     |
|------------------------|-------------|---------------------|
| TYPE                   | CODE        | DESCRIPTION         |
| <b>SAE cavity 10/2</b> |             |                     |
| EE10X/22NB             | OEE10002009 | Without emergency   |
| EE10X/22VB             | OEE10002008 | Handwheel emergency |
| <b>SAE cavity 12/2</b> |             |                     |
| EE12X/20NB             | OEE12002007 | Without emergency   |
| EE12X/20VB             | OEE12002009 | Handwheel emergency |

| 2 Emergency |                    |
|-------------|--------------------|
| TYPE        | DESCRIPTION        |
| N           | Without emergency  |
| V           | Handknob emergency |

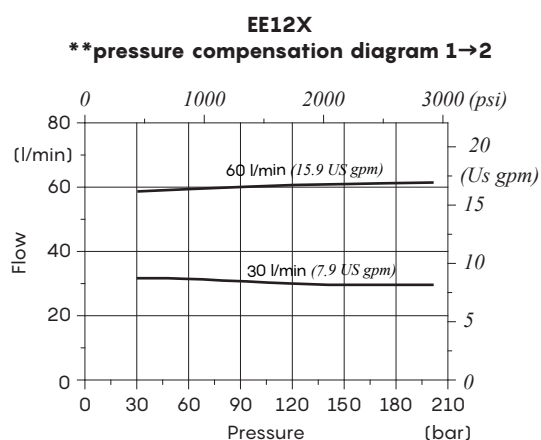
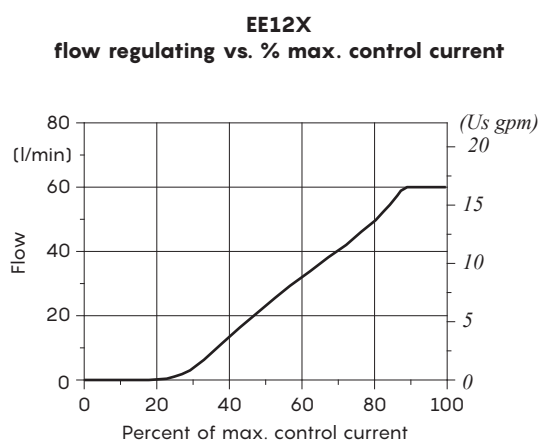
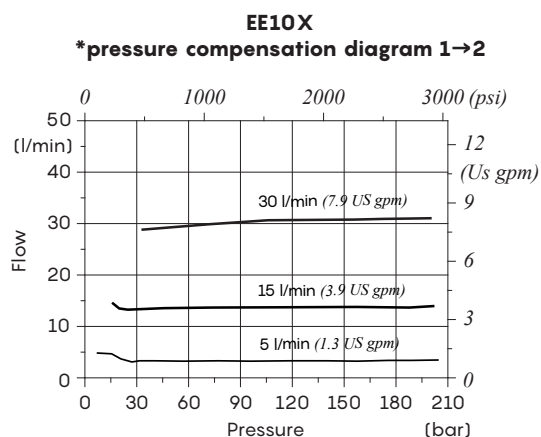
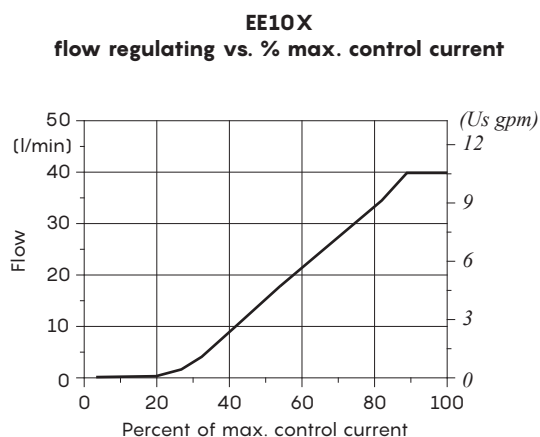
| 3 Seals |                                                         |
|---------|---------------------------------------------------------|
| TYPE    | DESCRIPTION                                             |
| B       | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V       | FPM (Viton) o-ring seals, contact Sales Dept            |

| 4 Coils                                   |             |                    |
|-------------------------------------------|-------------|--------------------|
| TYPE                                      | CODE        | DESCRIPTION        |
| BQP19 12VDC                               | 4SL5000126A | 12VDC-ISO4400 coil |
| For complete coils list see from page 201 |             |                    |
| It is possible also combine coils BH      |             |                    |

| 5 Valve body                                              |            |                                                      |
|-----------------------------------------------------------|------------|------------------------------------------------------|
| TYPE                                                      | CODE       | DESCRIPTION                                          |
| SAE10/2-G 3/8                                             | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2                                             | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| Note: aluminium body can stand up to 210 bar (3050 psi)   |            |                                                      |
| For steel bodies or different threading see from page 208 |            |                                                      |

| 6 Connector                                    |             |             |
|------------------------------------------------|-------------|-------------|
| TYPE                                           | CODE        | DESCRIPTION |
| ISO4400                                        | 4CN1009995B | Connector   |
| For complete connectors list see from page 201 |             |             |

**Rating diagrams**



\*Compensation diagram were detected with the cartridge combined with a VPR/3/ET 38-12 compensator with 10 bar (145 psi) stand by

\*\*Compensation diagram were detected with the cartridge combined with a VPR/3/ET 38-12 compensator with 7 bar (102 psi) stand by





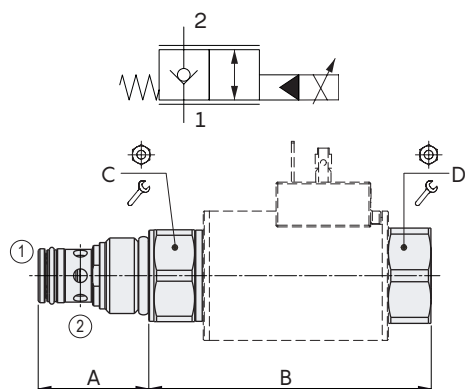
## EC..T type needle valves - 2 way

- Poppet type
- Driven by proportional solenoid
- Excellent low flow metering capability
- To be combined with an external compensator
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                               |                                               | EC08T                                                                    | EC10T                           | EC12T                           | EC16T                           |
|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Nominal flow <sup>(1)</sup>                   | with 5 bar (72.5 psi) stand-by                | 35 l/min<br>(9.2 US gpm)                                                 | 44 l/min<br>(11.6 US gpm)       | 55 l/min<br>(15.5 US gpm)       | 70 l/min<br>(18.5 US gpm)       |
|                                               | with 10 bar (145 psi) stand-by                | 44 l/min<br>(11.6 US gpm)                                                | 58 l/min<br>(15.3 US gpm)       | 70 l/min<br>(18.5 US gpm)       | 97 l/min<br>(25.6 US gpm)       |
| Max. pressure                                 |                                               | 350 bar (5100 psi)                                                       |                                 |                                 |                                 |
| Oil leakage                                   | at 350 bar (5100 psi)                         | 0.25 cm³/min<br>(0.015 in³/min)                                          | 0.25 cm³/min<br>(0.015 in³/min) | 0.25 cm³/min<br>(0.015 in³/min) | 0.35 cm³/min<br>(0.021 in³/min) |
| Fluid                                         |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                                 |                                 |                                 |
| Viscosity                                     |                                               | 12-200 cSt                                                               |                                 |                                 |                                 |
| Max level of contamination                    |                                               | 18/16/13 ISO4406                                                         |                                 |                                 |                                 |
| Fluid temperature                             | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                 |                                 |                                 |
| Environmental temp.<br>for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                                 |                                 |                                 |
| Cavity                                        |                                               | SAE 08/2                                                                 | SAE 10/2                        | SAE 12/2                        | SAE 16/2                        |
| Coil type <sup>(2)</sup>                      |                                               | BH                                                                       |                                 |                                 |                                 |
| Nominal voltages                              |                                               | 12VDC - 24VDC ± 10%                                                      |                                 |                                 |                                 |
| Power rating                                  |                                               | 33 W (BH)                                                                |                                 |                                 |                                 |
| Max. control current                          |                                               | 12V -> 1.70A - 24V -> 0.85A (BH)                                         |                                 |                                 |                                 |
| Dither frequency                              |                                               | from 100 Hz to 120 Hz                                                    |                                 |                                 |                                 |
| Weight                                        |                                               | 0.275 kg (0.61 lb)                                                       | 0.310 kg (0.68 lb)              | 0.390 kg (0.86 lb)              | 0.490 kg (1.08 lb)              |

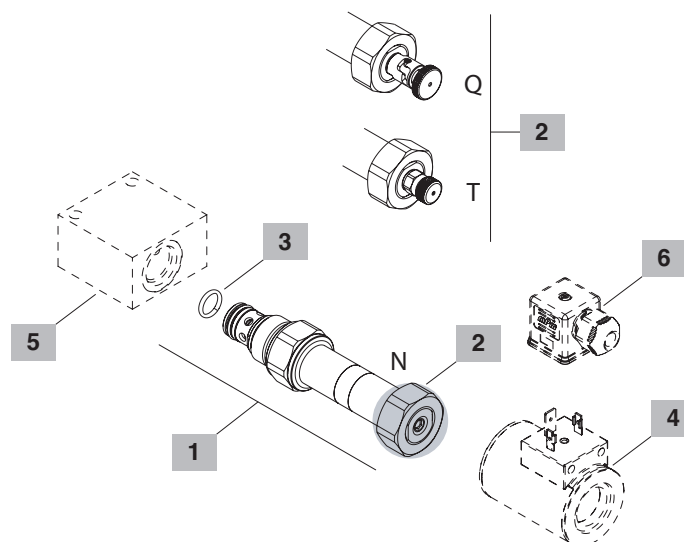
NOTE - For different conditions, please contact Walvoil Sales Dpt. - <sup>(1)</sup> Values are checked with cartridge in parallel with compensator - <sup>(2)</sup> For coils further features see from page 201.



| Valve type | A    |      | N / O without emergency |      | B<br>T screw |      | Q<br>pull type with detent |      | C  |     |    | D  |     |     |
|------------|------|------|-------------------------|------|--------------|------|----------------------------|------|----|-----|----|----|-----|-----|
|            | mm   | in   | mm                      | in   | mm           | in   | mm                         | in   | Nm | lbf |    | Nm | lbf |     |
| EC08T      | 28.1 | 1.11 | 83                      | 3.27 | 97.5         | 3.84 | 105.6                      | 4.16 | 27 | 50  | 37 | 28 | 5   | 3.7 |
| EC10T      | 32.5 | 1.28 | 83                      | 3.27 | 97.5         | 3.84 | 105.6                      | 4.16 | 27 | 50  | 37 | 28 | 5   | 3.7 |
| EC12T      | 45   | 1.77 | 82.5                    | 3.25 | 97           | 3.82 | 105.1                      | 4.14 | 32 | 85  | 63 | 28 | 5   | 3.7 |
| EC16T      | 45.6 | 1.80 | 81                      | 3.19 | 95.5         | 3.76 | 103.6                      | 4.08 | 32 | 85  | 63 | 28 | 5   | 3.7 |

### Ordering codes and description composition

#### EC10T/AONB



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION            |
|------------------------|-------------|------------------------|
| <b>SAE cavity 08/2</b> |             |                        |
| EC08T/AONB             | OEC08002056 | Without emergency      |
| EC08T/AOTB             | OEC08002058 | Screw type emergency   |
| EC08T/AOQB             | OEC08002073 | "Push&twist" emergency |
| <b>SAE cavity 10/2</b> |             |                        |
| EC10T/AONB             | OEC10002025 | Without emergency      |
| EC10T/AOTB             | OEC10002027 | Screw type emergency   |
| EC10T/AOQB             | OEC10002029 | "Push&twist" emergency |
| <b>SAE cavity 12/2</b> |             |                        |
| EC12T/AONB             | OEC12002018 | Without emergency      |
| EC12T/AOTB             | OEC12002019 | Screw type emergency   |
| EC12T/AOQB             | OEC12002020 | "Push&twist" emergency |
| <b>SAE cavity 16/2</b> |             |                        |
| EC16T/AONB             | OEC16002033 | Without emergency      |
| EC16T/AOTB             | OEC16002035 | Screw type emergency   |
| EC16T/AOQB             | OEC16002038 | "Push&twist" emergency |

#### 2 Emergency

| TYPE | DESCRIPTION            |
|------|------------------------|
| N    | Without emergency      |
| T    | Screw type emergency   |
| Q    | "Push&twist" emergency |

#### 3 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

#### 4 Coils

| TYPE    | CODE        | DESCRIPTION        |
|---------|-------------|--------------------|
| BH12VDC | 4SLD001200A | 12VDC-ISO4400 coil |

For complete coils list see from page 201

#### 5 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

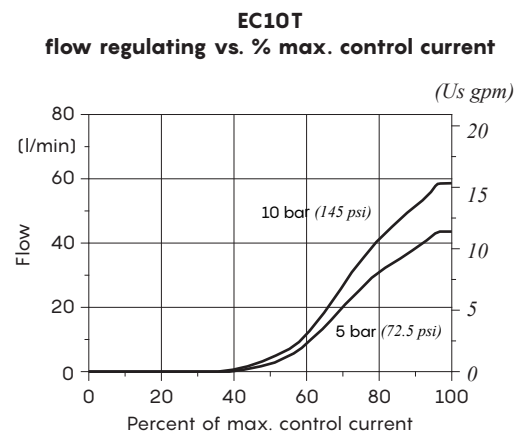
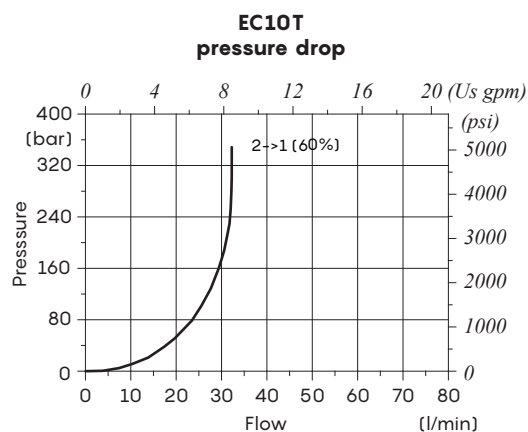
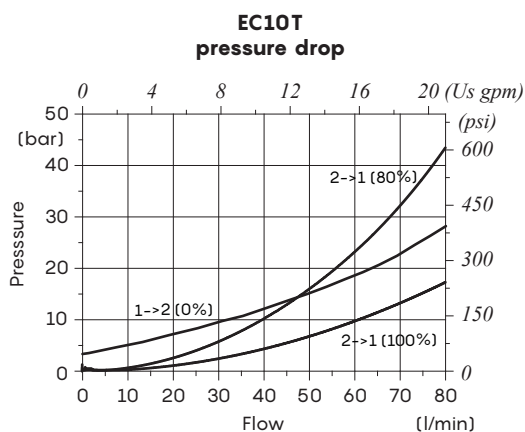
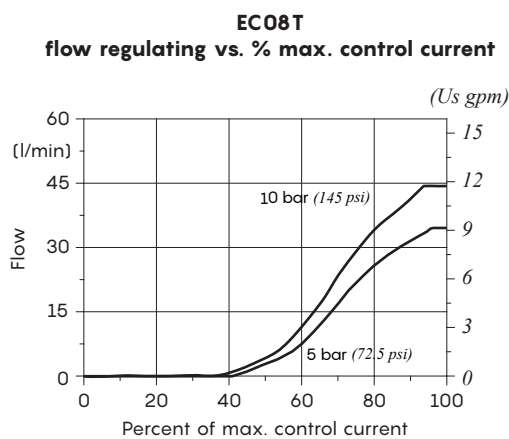
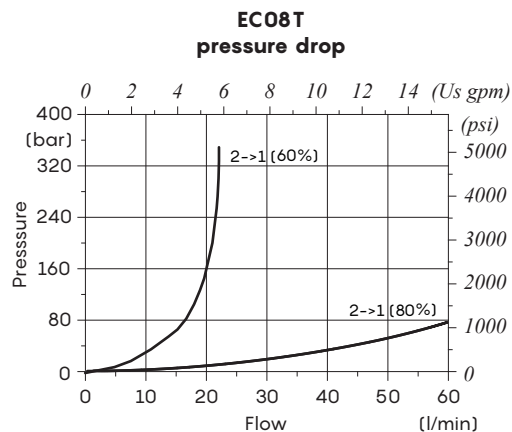
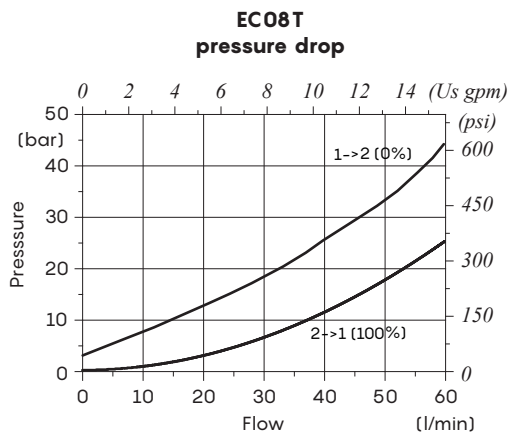
#### 6 Connector

| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

For complete connectors list see from page 201

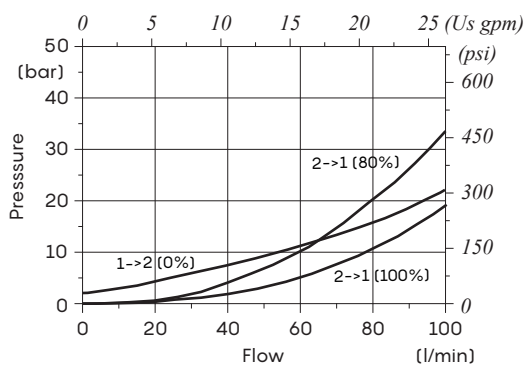


**Rating diagrams**

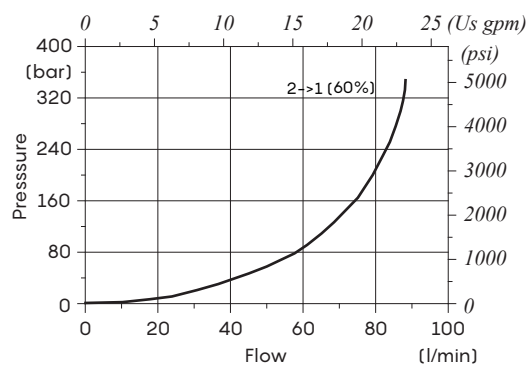


### Rating diagrams

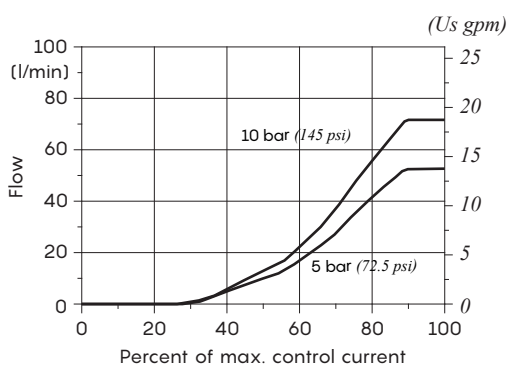
**EC12T  
pressure drop**



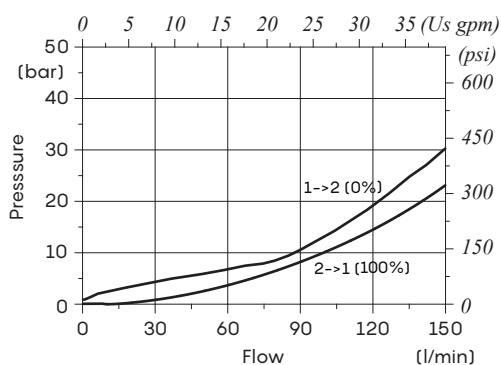
**EC12T  
pressure drop**



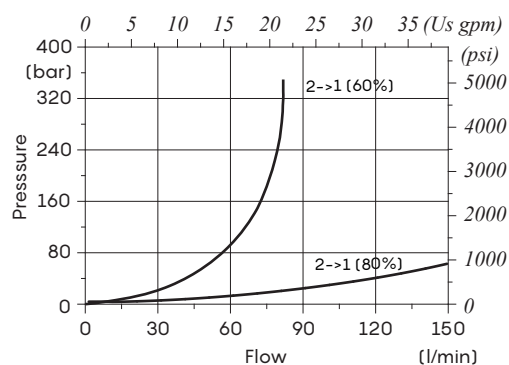
**EC12T  
flow regulating vs. % max. control current**



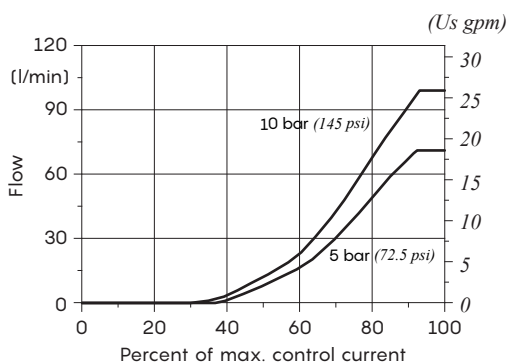
**EC16T  
pressure drop**



**EC16T  
pressure drop**



**EC16T  
flow regulating vs. % max. control current**





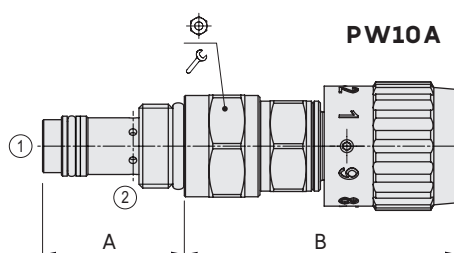
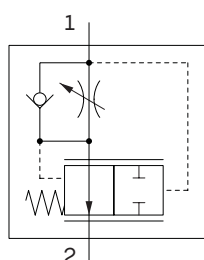
## PW..A type flow control pressure compensated valves - 2 way

- Spool type
- Different types of manual adjustment
- Adjustment from port 1 to port 2
- With reverse free flow check
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | PW08 A                                                                 | PW10A                                                                    | PW12A                   | PW16 A                  |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------|
| Nominal flow                               | 10 l/min<br>(2.6 US gpm)                                               | 30 l/min<br>(7.9 US gpm)                                                 | 50 l/min<br>(13 US gpm) | 90 l/min<br>(24 US gpm) |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |                         |                         |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                         |                         |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |                         |                         |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |                         |                         |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                         |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                         |                         |
| Cavity                                     | SAE 08/2 A                                                             | SAE 10/2 A                                                               | SAE 12/2 A              | SAE 16/2 A              |
| Weight                                     | 0.22 kg (0.48 lb)                                                      | 0.30 kg (2.20 lb)                                                        | 0.72 kg (1.58 lb)       | 0.98 kg (2.16 lb)       |

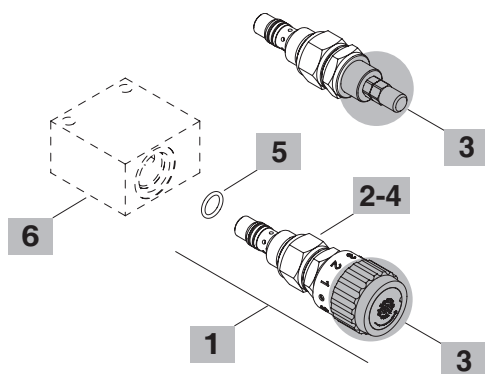
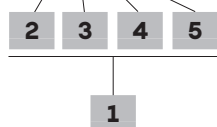
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      | <br>Nm    lbft |    |
|------------|---|------|------|------|------|-----------------------------------------------------------------------------------------------------|----|
|            |   | mm   | in   | mm   | in   |                                                                                                     |    |
| PW08 A/A   | M | 36.6 | 1.44 | 67.6 | 2.66 | 24                                                                                                  | 22 |
|            | S | 36.6 | 1.44 | 62   | 2.44 | 24                                                                                                  | 22 |
| PW10 A/A   | M | 37.5 | 1.48 | 72.5 | 2.85 | 27                                                                                                  | 37 |
|            | S | 37.5 | 1.48 | 69   | 2.72 | 27                                                                                                  | 37 |
| PW12 A/A   | M | 58.5 | 2.30 | 69.2 | 2.72 | 32                                                                                                  | 59 |
|            | S | 58.5 | 2.30 | 61.5 | 2.42 | 32                                                                                                  | 59 |
| PW16 A/A   | M | 68   | 2.68 | 102  | 4.02 | 41                                                                                                  | 74 |
|            | S | 68   | 2.68 | 96   | 3.78 | 41                                                                                                  | 74 |

### Ordering codes and description composition

#### PW08A/AM1B



#### 1 Cartridges

| TYPE                     | CODE        | DESCRIPTION           |
|--------------------------|-------------|-----------------------|
| <b>SAE cavity 08/2 A</b> |             |                       |
| PW08A/AM1B               | OPW08002000 | Handknob adjustment   |
| PW08A/AS1B               | OPW08002003 | Screw type adjustment |
| <b>SAE cavity 10/2 A</b> |             |                       |
| PW10A/AM1B               | OPW10002000 | Handknob adjustment   |
| PW10A/AS1B               | OPW10002001 | Screw type adjustment |
| <b>SAE cavity 12/2 A</b> |             |                       |
| PW12A/AM1B               | OPW12002000 | Handknob adjustment   |
| PW12A/AS1B               | OPW12002001 | Screw type adjustment |
| <b>SAE cavity 16/2 A</b> |             |                       |
| PW16A/AM1B               | OPW16002000 | Handknob adjustment   |
| PW16A/AS1B               | OPW16002001 | Screw type adjustment |

#### 2 Pressure drop from 1 to 2

| TYPE | DESCRIPTION      |
|------|------------------|
| A    | 12 bar (170 psi) |

#### 3 Adjustments

| TYPE | DESCRIPTION |
|------|-------------|
| S    | Screw       |
| M    | Handknob    |

#### 4 Pressure drop from 2 to 1

| TYPE | DESCRIPTION       |
|------|-------------------|
| 1    | 0.5 bar (7.3 psi) |

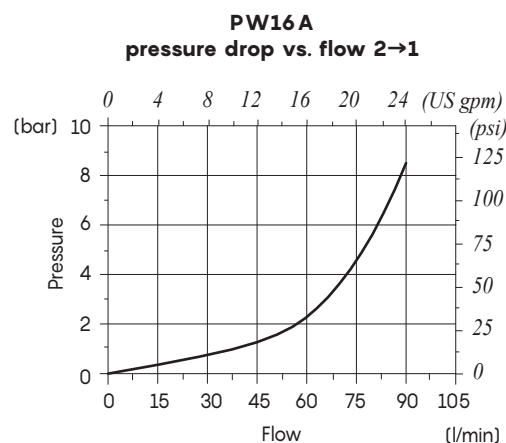
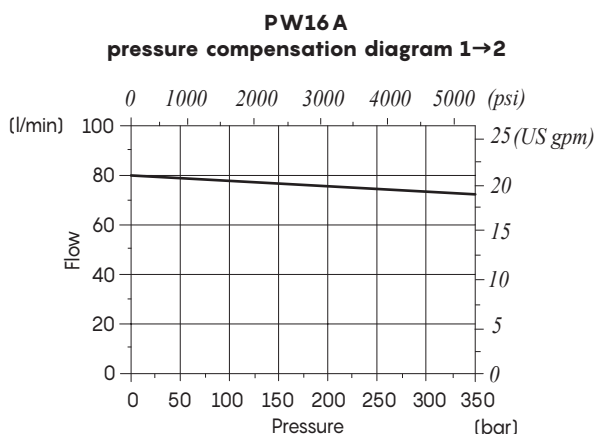
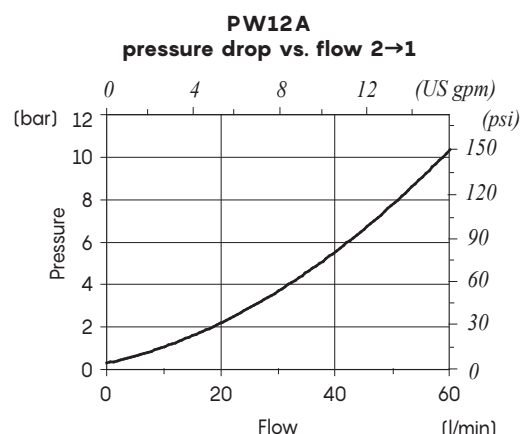
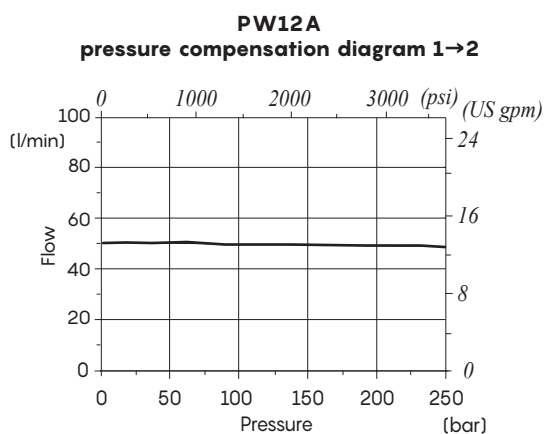
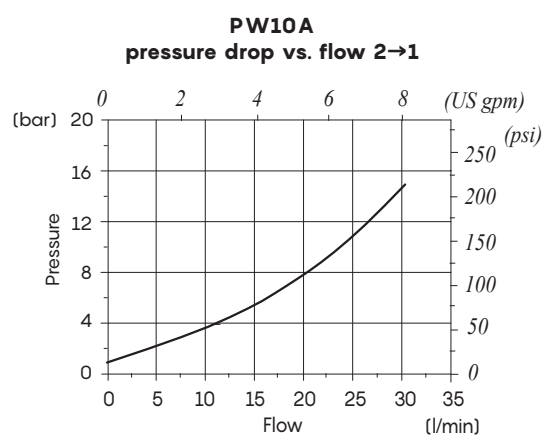
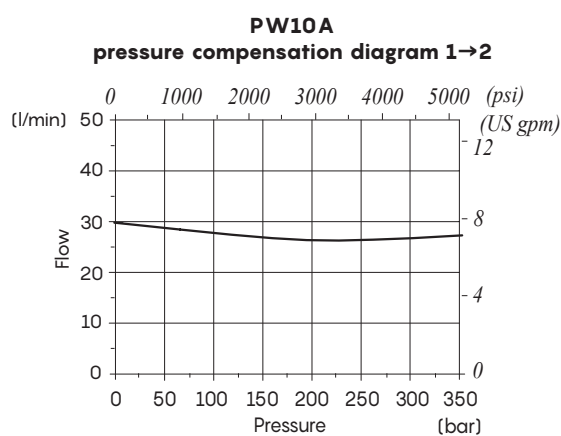
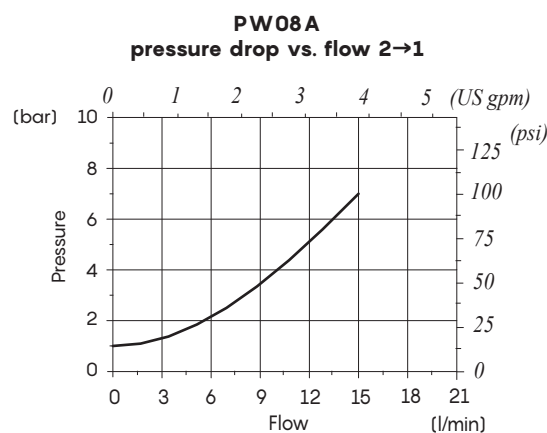
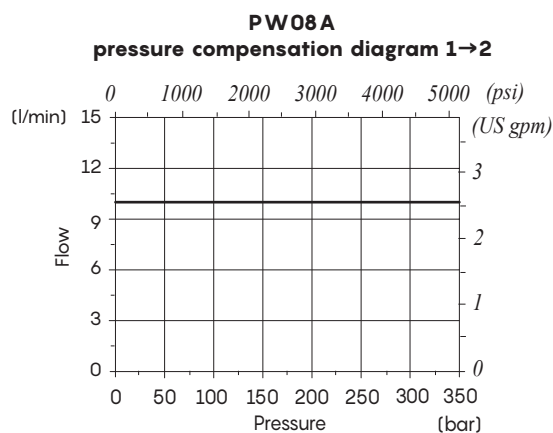
#### 5 Seals

| TYPE | DESCRIPTION                                     |
|------|-------------------------------------------------|
| B    | NBR (Buna)+PTFE o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept    |

#### 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208







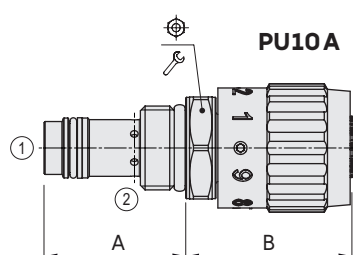
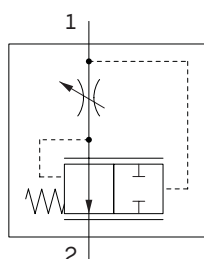
## PU..A type flow control pressure compensated valves - 2 way

- Spool type
- Different types of manual adjustment
- Adjustment from port 1 to port 2
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | PU08 A                                                                 | PU10 A                                                                   | PU12 A                  | PU16 A                  |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------|
| Nominal flow                               | 15 l/min<br>(3.9 US gpm)                                               | 30 l/min<br>(7.9 US gpm)                                                 | 50 l/min<br>(13 US gpm) | 90 l/min<br>(24 US gpm) |
| Max. pressure                              | 350 bar (5100 psi)                                                     |                                                                          |                         |                         |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                         |                         |
| Viscosity                                  | 10-200 cSt                                                             |                                                                          |                         |                         |
| Max level of contamination                 | 20/18/14 ISO4406                                                       |                                                                          |                         |                         |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                         |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                         |                         |
| Cavity                                     | SAE 08/2 A                                                             | SAE 10/2 A                                                               | SAE 12/2 A              | SAE 16/2 A              |
| Weight                                     | 0.18 kg (0.40 lb)                                                      | 0.20 kg (0.44 lb)                                                        | 0.30 kg (0.66 lb)       | 0.55 kg (1.21 lb)       |

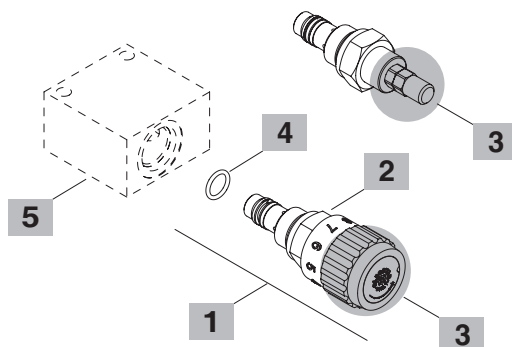
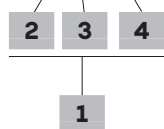
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      |  |      |    |
|------------|---|------|------|------|------|---------------------------------------------------------------------------------------|------|----|
|            |   | mm   | in   | mm   | in   | Nm                                                                                    | lbft |    |
| PU08 A/A   | M | 33.6 | 1.32 | 48   | 1.89 | 24                                                                                    | 30   | 22 |
|            | S | 33.6 | 1.32 | 46   | 1.81 | 24                                                                                    | 30   | 22 |
| PU10 A/A   | M | 37.5 | 1.48 | 44   | 1.73 | 27                                                                                    | 50   | 37 |
|            | S | 37.5 | 1.48 | 42   | 1.65 | 27                                                                                    | 50   | 37 |
| PU12 A/A   | M | 58.5 | 2.30 | 48   | 1.89 | 32                                                                                    | 80   | 59 |
|            | S | 58.5 | 2.30 | 42   | 1.65 | 32                                                                                    | 80   | 59 |
| PU16 A/A   | M | 68   | 2.68 | 53.5 | 2.11 | 41                                                                                    | 100  | 74 |
|            | S | 68   | 2.68 | 51   | 2.01 | 41                                                                                    | 100  | 74 |

### Ordering codes and description composition

#### PU08A/AM0B



#### 1 Cartridges

| TYPE                     | CODE        | DESCRIPTION           |
|--------------------------|-------------|-----------------------|
| <b>SAE cavity 08/2 A</b> |             |                       |
| <b>PU08A/AM0B</b>        | OPU08002000 | Handknob adjustment   |
| <b>PU08A/AS0B</b>        | OPU08002003 | Screw type adjustment |
| <b>SAE cavity 10/2 A</b> |             |                       |
| <b>PU10A/AM0B</b>        | OPU10002001 | Handknob adjustment   |
| <b>PU10A/AS0B</b>        | OPU10002000 | Screw type adjustment |
| <b>SAE cavity 12/2 A</b> |             |                       |
| <b>PU12A/AM0B</b>        | OPU12002000 | Handknob adjustment   |
| <b>PU12A/AS0B</b>        | OPU12002003 | Screw type adjustment |
| <b>SAE cavity 16/2 A</b> |             |                       |
| <b>PU16A/AM0B</b>        | OPU16002000 | Handknob adjustment   |
| <b>PU16A/AS0B</b>        | OPU16002007 | Screw type adjustment |

#### 2 Pressure drop from 1 to 2

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>A</b> | 12 bar (170 psi) |

#### 3 Adjustments

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>S</b> | Screw       |
| <b>M</b> | Handknob    |

#### 4 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

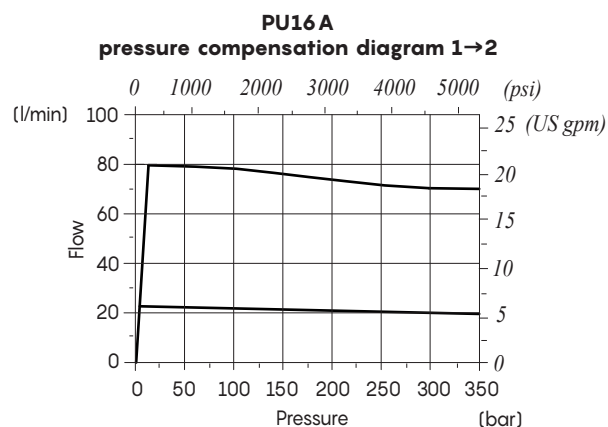
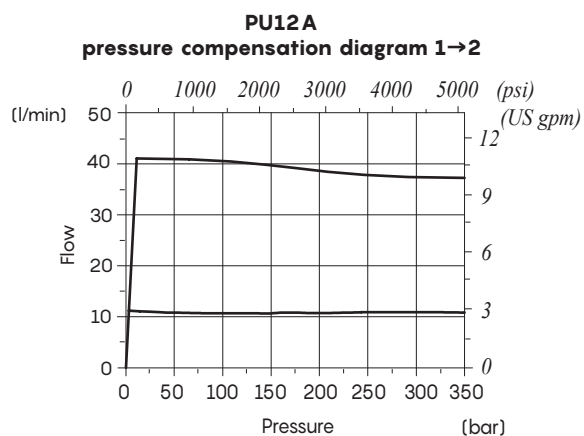
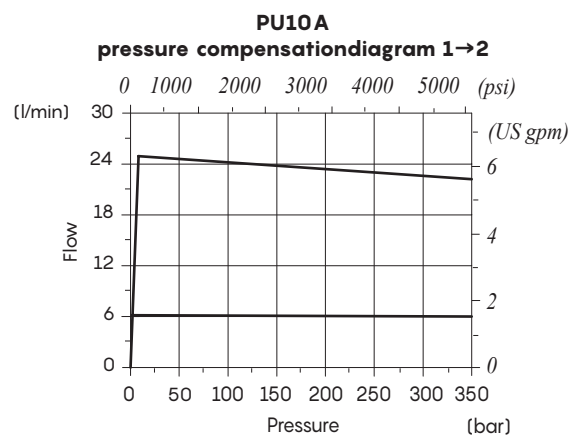
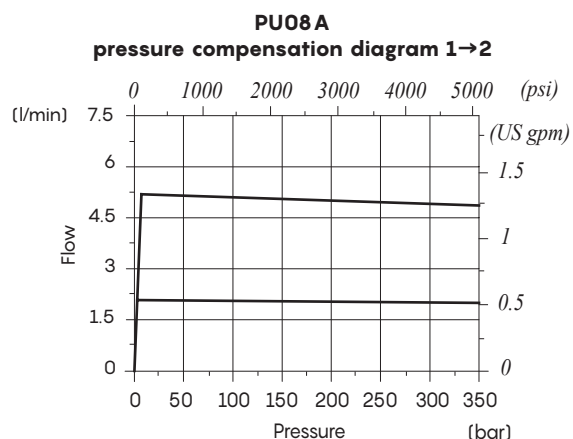
#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208



## Rating diagrams







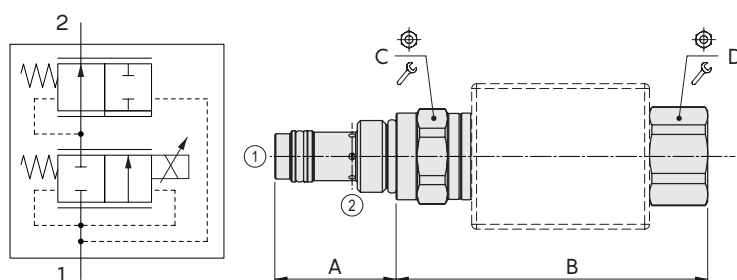
## PU..X type flow control pressure compensated valves - 2 way

- Spool type
- Direct acting through proportional solenoid
- Different types of emergencies available
- Adjustment from port 1 to port 2
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                                                         | PU08X                                                                    | PU10X                        | PU12X                         | PU16X                         |
|--------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------|-------------------------------|-------------------------------|
| Nominal flow                               |                                                                         | 10 l/min<br>(2.6 US gpm)                                                 | 30 l/min<br>(7.9 US gpm)     | 50 l/min<br>(13 US gpm)       | 90 l/min<br>(24 US gpm)       |
| Max. pressure                              |                                                                         | 315 bar (4600 psi)                                                       |                              |                               |                               |
| Oil leakage                                | at 210 bar (3050 psi)                                                   | 80 cm³/min<br>(4.9 in³/min)                                              | 150 cm³/min<br>(9.2 in³/min) | 250 cm³/min<br>(15.3 in³/min) | 400 cm³/min<br>(24.4 in³/min) |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties  |                                                                          |                              |                               |                               |
| Viscosity                                  | 10-200 cSt                                                              |                                                                          |                              |                               |                               |
| Max level of contamination                 | 18/16/13 ISO4406                                                        |                                                                          |                              |                               |                               |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                   | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                              |                               |                               |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                       |                                                                          |                              |                               |                               |
| Cavity                                     |                                                                         | SAE 08/2 A                                                               | SAE 10/2 A                   | SAE 12/2 A                    | SAE 16/2 A                    |
| Coil type*                                 | BH or BQP19                                                             |                                                                          |                              |                               |                               |
| Nominal voltages                           | 12VDC - 24VDC ± 10%                                                     |                                                                          |                              |                               |                               |
| Power rating                               | 33 W (BH) - 15 W (BQP19)                                                |                                                                          |                              |                               |                               |
| Max. control current                       | 12V -> 1.70A - 24V -> 0.85A (BH)<br>12V -> 1.25A - 24V -> 0.63A (BQP19) |                                                                          |                              |                               |                               |
| Dither frequency                           | 150Hz                                                                   |                                                                          |                              |                               |                               |
| Hysteresis                                 | 8%                                                                      |                                                                          |                              |                               |                               |
| Weight                                     |                                                                         | 0.34 kg (0.75 lb)                                                        | 0.39 kg (0.86 lb)            | 0.51 kg (1.12 lb)             | 0.90 kg (1.98 lb)             |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

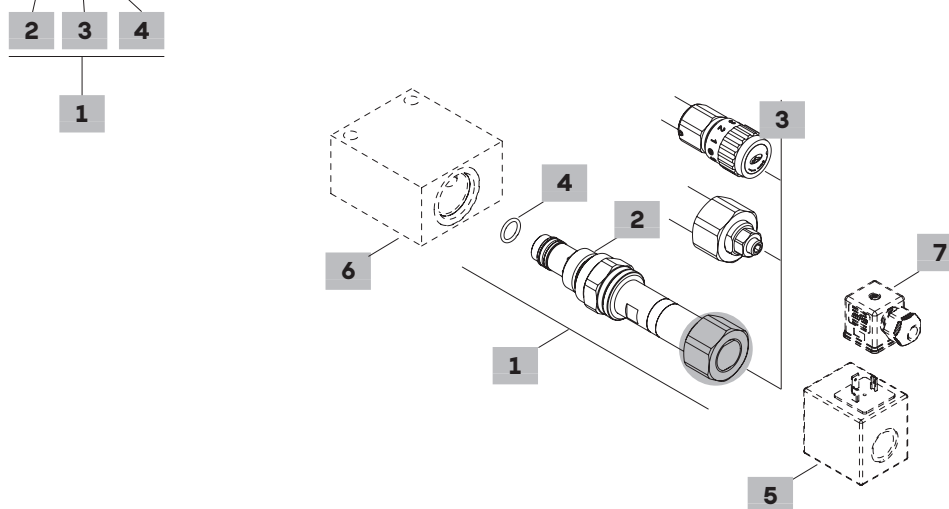


| Valve type | A    |      | B    |      | C  |      | D  |      |
|------------|------|------|------|------|----|------|----|------|
|            | mm   | in   | mm   | in   | Nm | lbft | Nm | lbft |
| PU10X      | 37.5 | 1.48 | 96.4 | 3.80 | 27 | 50   | 37 | 28   |
|            |      |      |      |      |    |      | 5  | 3.7  |

For dimensions with different type of emergency see list page 116

### Ordering codes and description composition

#### PU08X/A0NB



#### 1 Cartridges

| TYPE                     | CODE        | DESCRIPTION          |
|--------------------------|-------------|----------------------|
| <b>SAE cavity 08/2 A</b> |             |                      |
| <b>PU08X/A0NB</b>        | OPU08002012 | Without emergency    |
| <b>PU08X/A0TB</b>        | OPU08002013 | Screw type emergency |
| <b>PU08X/A0VB</b>        | OPU08002014 | Handknob emergency   |
| <b>SAE cavity 10/2 A</b> |             |                      |
| <b>PU10X/A0NB</b>        | OPU10002020 | Without emergency    |
| <b>PU10X/A0TB</b>        | OPU10002021 | Screw type emergency |
| <b>PU10X/A0VB</b>        | OPU10002022 | Handknob emergency   |
| <b>SAE cavity 12/2 A</b> |             |                      |
| <b>PU12X/A0NB</b>        | OPU12002007 | Without emergency    |
| <b>PU12X/A0TB</b>        | OPU12002008 | Screw type emergency |
| <b>PU12X/A0VB</b>        | OPU12002009 | Handknob emergency   |
| <b>SAE cavity 16/2 A</b> |             |                      |
| <b>PU16X/A0NB</b>        | OPU16002010 | Without emergency    |
| <b>PU16X/A0TB</b>        | OPU16002011 | Screw type emergency |
| <b>PU16X/A0VB</b>        | OPU16002012 | Handknob emergency   |

#### 2 Pressure drop from 1 to 2

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>A</b> | 12 bar (170 psi) |

#### 3 Emergency

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>N</b> | Without emergency |
| <b>T</b> | Screw type        |
| <b>V</b> | Handknob          |

#### 4 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 5 Coils

| TYPE               | CODE        | DESCRIPTION        |
|--------------------|-------------|--------------------|
| <b>BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |

For complete coils list see from page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/2-G 1/2</b> | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/2-G 3/4</b> | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

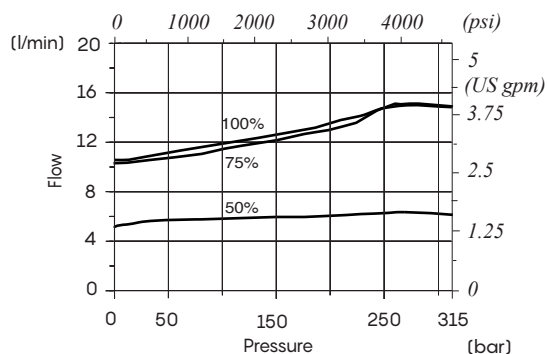
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

#### 7 Connector

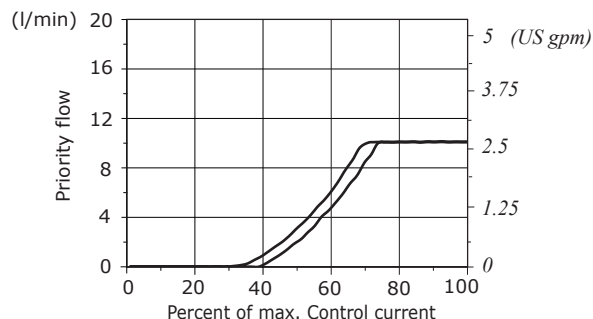
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

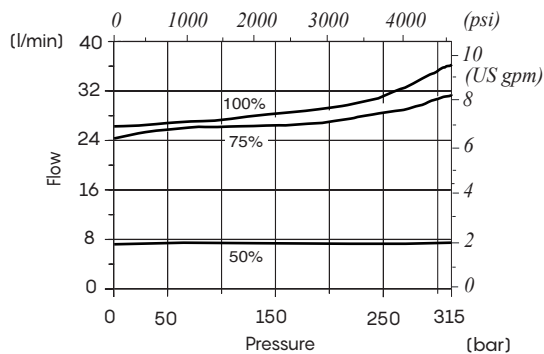
**PU08X: pressure compensation diagram 1→2**  
for % of control current



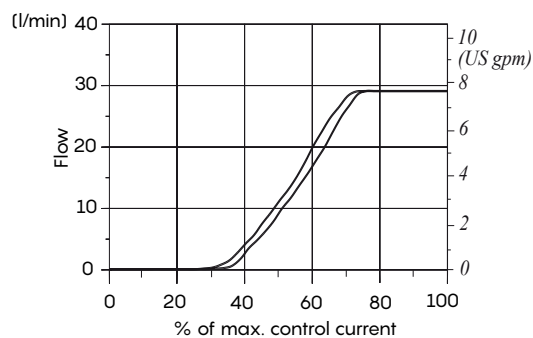
**PU08X**  
flow regulating vs. % max. control current



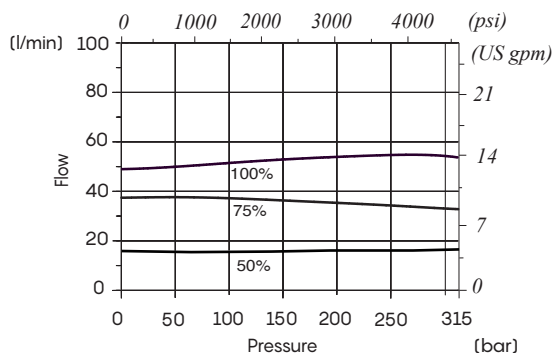
**PU10X: pressure compensation diagram 1→2**  
for % of control current



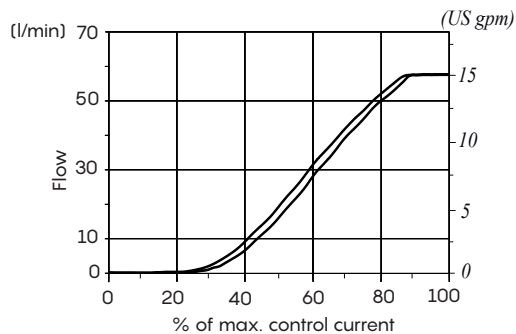
**PU10X**  
flow regulating vs. % max. control current



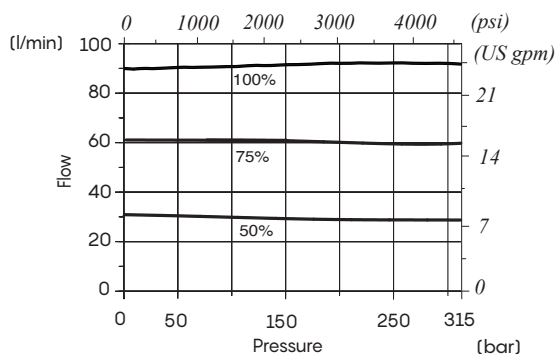
**PU12X: pressure compensation diagram 1→2**  
for % of control current



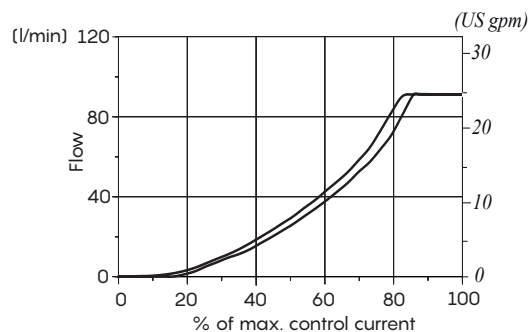
**PU12X**  
flow regulating vs. % max. control current



**PU16X: pressure compensation diagram 1→2**  
for % of control current



**PU16X**  
flow regulating vs. % max. control current



### Types and dimensions

| Valve type | A                         |      | B          |      |               |      |                                                                                    |                                                                                     | C                                                                                   |                                                                                     |    | D    |   |     |
|------------|---------------------------|------|------------|------|---------------|------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----|------|---|-----|
|            | N<br>without<br>emergency |      | T<br>screw |      | V<br>handknob |      |  |  |  |  |    |      |   |     |
|            | mm                        | in   | mm         | in   | mm            | in   | mm                                                                                 | in                                                                                  | Nm                                                                                  | lbft                                                                                | Nm | lbft |   |     |
| PU08X      | 36.6                      | 1.44 | 93.9       | 3.70 | 107.9         | 4.25 | 139.9                                                                              | 5.51                                                                                | 24                                                                                  | 30                                                                                  | 22 | 28   | 5 | 3.7 |
| PU10X      | 37.5                      | 1.48 | 96.4       | 3.80 | 110.4         | 4.35 | 142.4                                                                              | 5.61                                                                                | 27                                                                                  | 50                                                                                  | 37 | 28   | 5 | 3.7 |
| PU12X      | 58.5                      | 2.30 | 97.4       | 3.83 | 111.4         | 4.39 | 145.4                                                                              | 5.72                                                                                | 32                                                                                  | 75                                                                                  | 55 | 28   | 5 | 3.7 |
| PU16X      | 68                        | 2.68 | 121.4      | 4.78 | 135.4         | 5.33 | 169.4                                                                              | 6.67                                                                                | 41                                                                                  | 95                                                                                  | 70 | 28   | 5 | 3.7 |



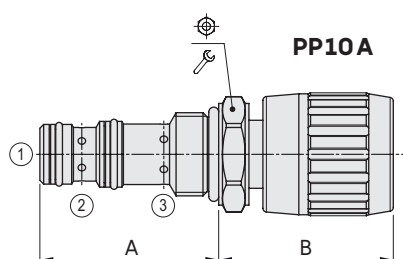
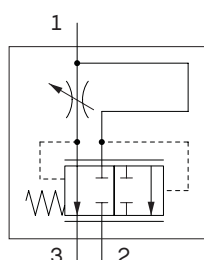
## PP..A type flow control pressure compensated valves – 3 way

- Spool type
- Different types of manual adjustment
- With exceeding flow to pressure
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                    | PP08A                                                                    | PP10A                  | PP12A                  | PP16A                   |
|--------------------------------------------|------------------------------------|--------------------------------------------------------------------------|------------------------|------------------------|-------------------------|
| Nominal flow                               | Q1max=                             | 20 l/min (5.2 US gpm)                                                    | 50 l/min (13.2 US gpm) | 90 l/min (23.8 US gpm) | 150 l/min (39.6 US gpm) |
|                                            | Q3max=                             | 15 l/min (4 US gpm)                                                      | 30 l/min (7.9 US gpm)  | 50 l/min (13 US gpm)   | 90 l/min (24 US gpm)    |
| Max. pressure                              |                                    | 350 bar (5100 psi)                                                       |                        |                        |                         |
| Fluid                                      |                                    | mineral based or synthetic hydraulic fluid with lubricating properties   |                        |                        |                         |
| Viscosity                                  |                                    | 10–200 cSt                                                               |                        |                        |                         |
| Max level of contamination                 |                                    | 20/18/14 ISO4406                                                         |                        |                        |                         |
| Fluid temperature                          | with NBR seals+PTFE with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                        |                        |                         |
| Environmental temp. for working conditions |                                    | from -20°C (-4°F) to 60°C (140°F)                                        |                        |                        |                         |
| Cavity                                     |                                    | SAE 08/3                                                                 | SAE 10/3               | SAE 12/3               | SAE 16/3                |
| Weight                                     |                                    | 0.15 kg (0.33 lb)                                                        | 0.20 kg (0.44 lb)      | 0.42 kg (0.92 lb)      | 0.57 kg (1.26 lb)       |

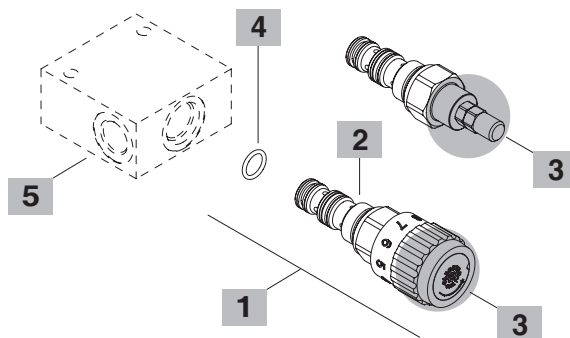
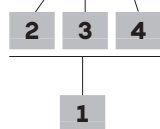
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type |   | A    |      | B    |      | <br>Nm    lbf·ft |     |
|------------|---|------|------|------|------|-------------------------------------------------------------------------------------------------------|-----|
|            |   | mm   | in   | mm   | in   |                                                                                                       |     |
| PP08A/A    | M | 41.1 | 1.62 | 54.1 | 2.13 | 24                                                                                                    | 30  |
|            | S | 41.1 | 1.62 | 48   | 1.89 | 24                                                                                                    | 30  |
| PP10A/A    | M | 47.2 | 1.86 | 47.2 | 1.86 | 27                                                                                                    | 50  |
|            | S | 47.2 | 1.86 | 42   | 1.65 | 27                                                                                                    | 50  |
| PP12A/A    | M | 73.5 | 2.89 | 47.5 | 1.87 | 32                                                                                                    | 80  |
|            | S | 73.5 | 2.89 | 43   | 1.69 | 32                                                                                                    | 80  |
| PP16A/A    | M | 75   | 2.95 | 51.5 | 2.03 | 41                                                                                                    | 100 |
|            | S | 75   | 2.95 | 51   | 2.01 | 41                                                                                                    | 100 |

### Ordering codes and description composition

#### PP08A/AMOB



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION           |
|------------------------|-------------|-----------------------|
| <b>SAE cavity 08/3</b> |             |                       |
| PP08A/AMOB             | OPP08002000 | Handknob adjustment   |
| PP08A/ASOB             | OPP08002004 | Screw type adjustment |
| <b>SAE cavity 10/3</b> |             |                       |
| PP10A/AMOB             | OPP10002000 | Handknob adjustment   |
| PP10A/ASOB             | OPP10002005 | Screw type adjustment |
| <b>SAE cavity 12/3</b> |             |                       |
| PP12A/AMOB             | OPP12002000 | Handknob adjustment   |
| PP12A/ASOB             | OPP12002004 | Screw type adjustment |
| <b>SAE cavity 16/3</b> |             |                       |
| PP16A/AMOB             | OPP16002001 | Handknob adjustment   |
| PP16A/ASOB             | OPP16002006 | Screw type adjustment |

#### 2 Pressure drop from 1 to 2

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>A</b> | 12 bar (170 psi) |

#### 3 Adjustments

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>S</b> | Screw       |
| <b>M</b> | Handknob    |

#### 4 Seals

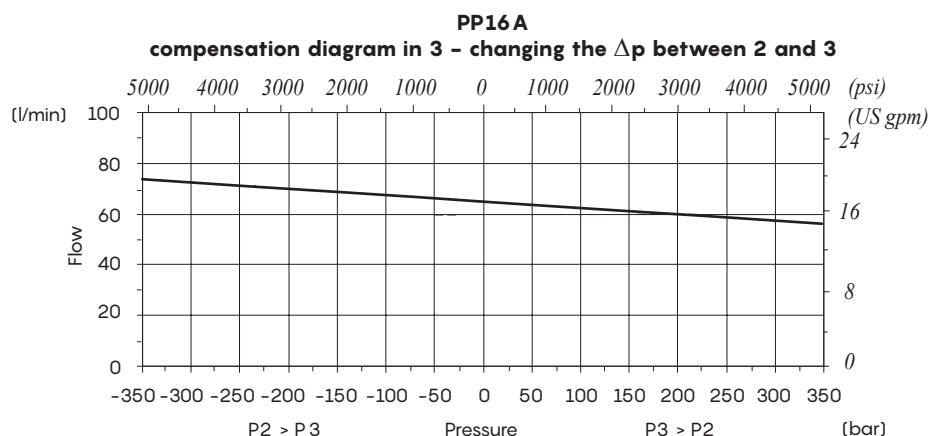
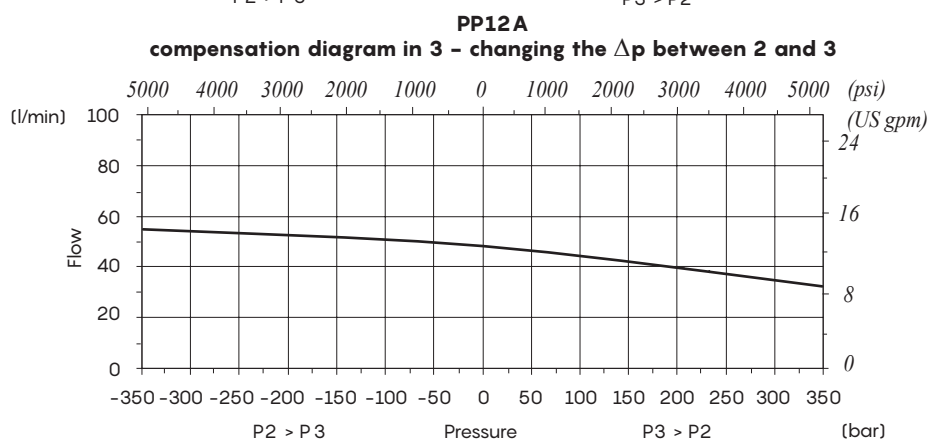
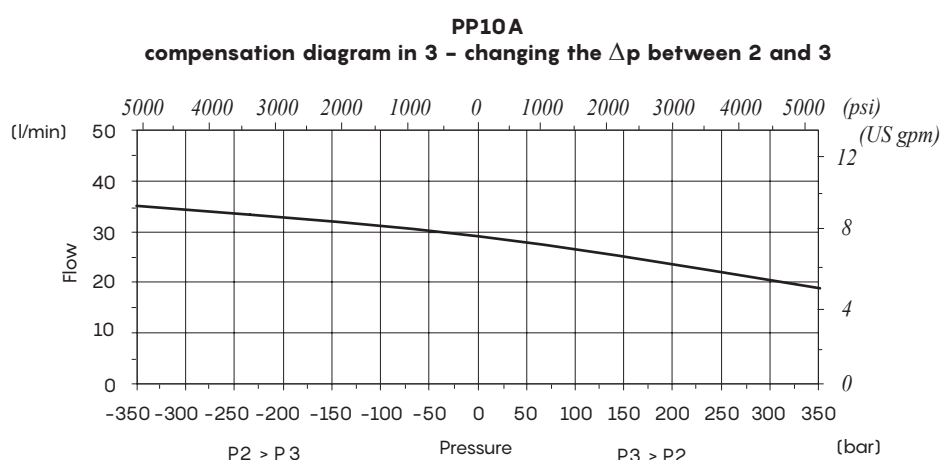
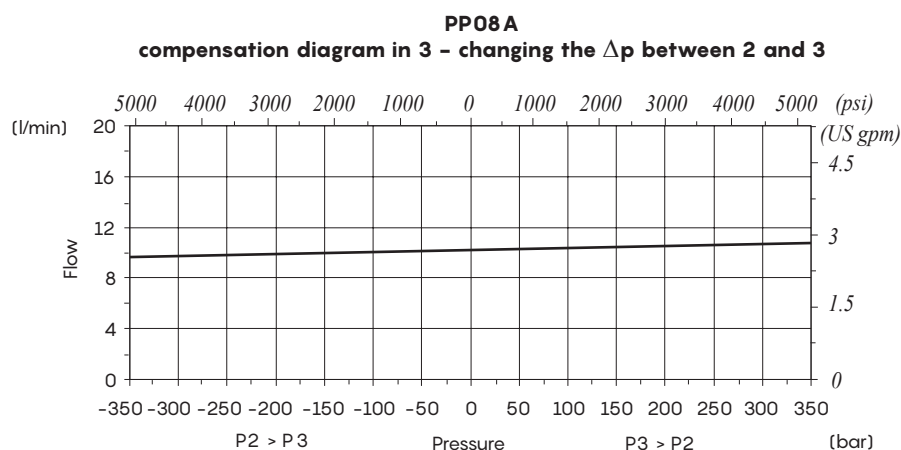
| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/3-G 1/2</b> | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/3-G 3/4</b> | 3CC1630E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210









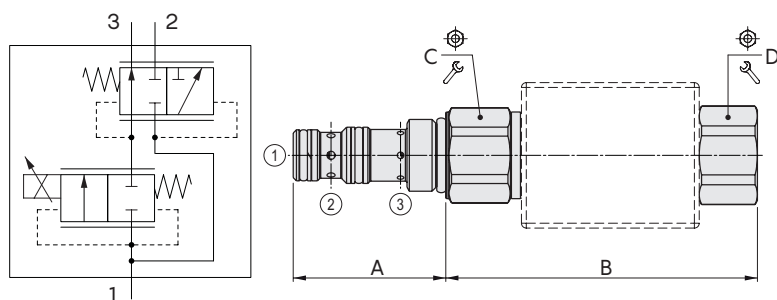
## PP..X type flow control pressure compensated valves – 3 way

- Spool type
- Direct acting through proportional solenoid
- Different types of emergencies available
- With exceeding flow to pressure
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                                                         | PP08X                                                                    | PP10X                                           | PP12X                                          | PP16X                                           |
|--------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------|-------------------------------------------------|
| Nominal flow                               | Q1max=<br>Q3max=                                                        | 20 l/min (5.2 US gpm)<br>15 l/min (4 US gpm)                             | 50 l/min (13.2 US gpm)<br>30 l/min (7.9 US gpm) | 90 l/min (23.8 US gpm)<br>60 l/min (16 US gpm) | 150 l/min (39.6 US gpm)<br>90 l/min (24 US gpm) |
| Max. pressure                              |                                                                         | 315 bar (4600 psi)                                                       |                                                 |                                                |                                                 |
| Oil leakage                                | at 210 bar<br>(3050 psi)                                                | 80 cm³/min<br>(4.9 in³/min)                                              | 150 cm³/min<br>(9.2 in³/min)                    | 250 cm³/min<br>(15.3 in³/min)                  | 400 cm³/min<br>(24.4 in³/min)                   |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties  |                                                                          |                                                 |                                                |                                                 |
| Viscosity                                  | 10–200 cSt                                                              |                                                                          |                                                 |                                                |                                                 |
| Max level of contamination                 | 18/16/13 ISO4406                                                        |                                                                          |                                                 |                                                |                                                 |
| Fluid temperature                          | with NBR seals+<br>Polyurethane<br>with FPM seals                       | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                                                 |                                                |                                                 |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                       |                                                                          |                                                 |                                                |                                                 |
| Cavity                                     |                                                                         | SAE 08/3                                                                 | SAE 10/3                                        | SAE 12/3                                       | SAE 16/3                                        |
| Coil type*                                 | BQP19 or BH                                                             |                                                                          |                                                 |                                                |                                                 |
| Nominal voltages                           | 12VDC - 24VDC ± 10%                                                     |                                                                          |                                                 |                                                |                                                 |
| Power rating                               | 33 W (BH) - 15 W (BQP19)                                                |                                                                          |                                                 |                                                |                                                 |
| Max. control current                       | 12V -> 1.70A - 24V -> 0.85A (BH)<br>12V -> 1.25A - 24V -> 0.63A (BQP19) |                                                                          |                                                 |                                                |                                                 |
| Dither frequency                           | 150Hz                                                                   |                                                                          |                                                 |                                                |                                                 |
| Hysteresis                                 | 8%                                                                      |                                                                          |                                                 |                                                |                                                 |
| Weight                                     |                                                                         | 0.44 kg (0.97 lb)                                                        | 0.49 kg (1.08 lb)                               | 0.61 kg (1.34 lb)                              | 1 kg (2.20 lb)                                  |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

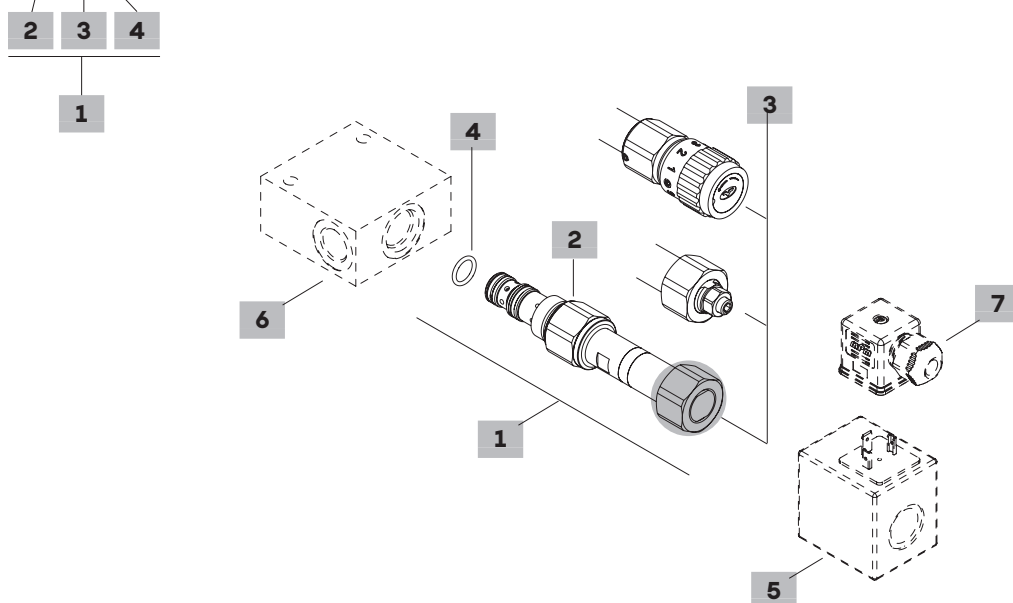


| Valve<br>type | A    |      | B                         |      | C                                                                                     |    |    | D                                                                                     |   |     |
|---------------|------|------|---------------------------|------|---------------------------------------------------------------------------------------|----|----|---------------------------------------------------------------------------------------|---|-----|
|               |      |      | N<br>without<br>emergency |      |  |    |    |  |   |     |
|               | mm   | in   | mm                        | in   | Nm <i>lbft</i>                                                                        |    |    | Nm <i>lbft</i>                                                                        |   |     |
| PP10X         | 47.2 | 1.86 | 96.4                      | 3.80 | 27                                                                                    | 50 | 37 | 28                                                                                    | 5 | 3.7 |

For dimensions with different type of emergency see list page 124

### Ordering codes and description composition

#### PP08X/A0NB



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION          |
|------------------------|-------------|----------------------|
| <b>SAE cavity 08/3</b> |             |                      |
| <b>PP08X/A0NB</b>      | OPP08002014 | Without emergency    |
| <b>PP08X/A0TB</b>      | OPP08002015 | Screw type emergency |
| <b>PP08X/A0VB</b>      | OPP08002016 | Handknob emergency   |
| <b>SAE cavity 10/3</b> |             |                      |
| <b>PP10X/A0NB</b>      | OPP10002031 | Without emergency    |
| <b>PP10X/A0TB</b>      | OPP10002033 | Screw type emergency |
| <b>PP10X/A0VB</b>      | OPP10002035 | Handknob emergency   |
| <b>SAE cavity 12/3</b> |             |                      |
| <b>PP12X/A0NB</b>      | OPP12002037 | Without emergency    |
| <b>PP12X/A0TB</b>      | OPP12002039 | Screw type emergency |
| <b>PP12X/A0VB</b>      | OPP12002041 | Handknob emergency   |
| <b>SAE cavity 16/3</b> |             |                      |
| <b>PP16X/A0NB</b>      | OPP16002013 | Without emergency    |
| <b>PP16X/A0TB</b>      | OPP16002015 | Screw type emergency |
| <b>PP16X/A0VB</b>      | OPP16002014 | Handknob emergency   |

#### 2 Pressure drop from 1 to 3

| TYPE     | DESCRIPTION      |
|----------|------------------|
| <b>A</b> | 12 bar (170 psi) |

#### 3 Emergency

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>N</b> | Without emergency |
| <b>T</b> | Screw type        |
| <b>V</b> | Handknob          |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE               | CODE        | DESCRIPTION        |
|--------------------|-------------|--------------------|
| <b>BH 12VDC</b>    | 4SLD001200A | 12VDC-ISO4400 coil |
| <b>BQP19 12VDC</b> | 4SL5000126A | 12VDC-ISO4400 coil |

For complete coils list see from page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/3-G 3/8</b> | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/3-G 1/2</b> | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/3-G 3/4</b> | 3CC1630E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

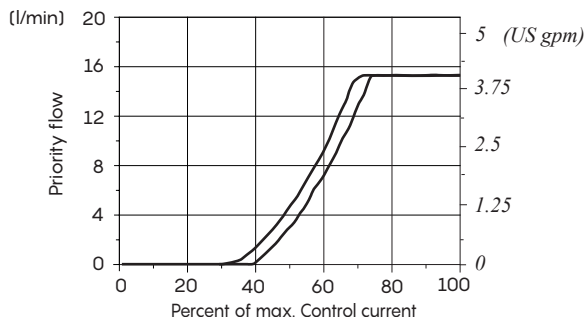
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

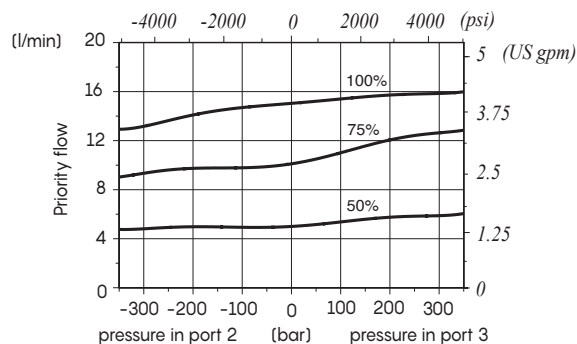
For complete connectors list see from page 201

## Rating diagrams

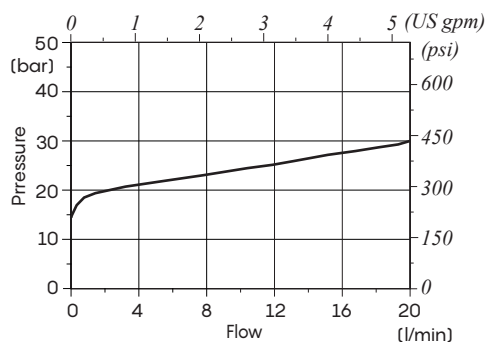
**PP08X**  
flow regulating vs. % max. control current  
 $Q_{in}$  = priority flow +30%



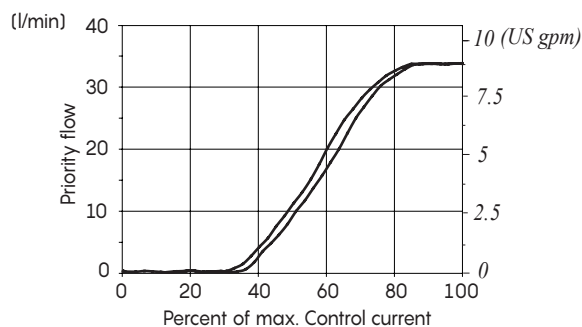
**PP08X**  
pressure compensation diagram 2→3  
for % of control current



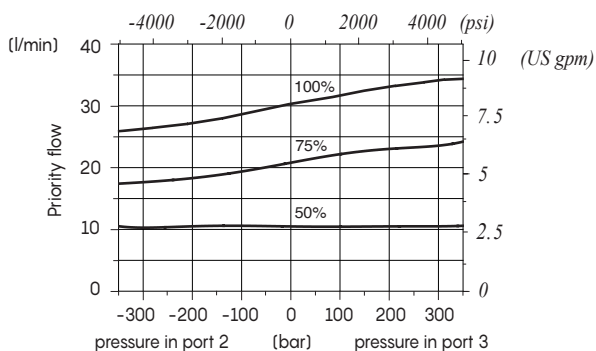
**PP08X**  
pressure drop with de-energized coil  
from 1→2



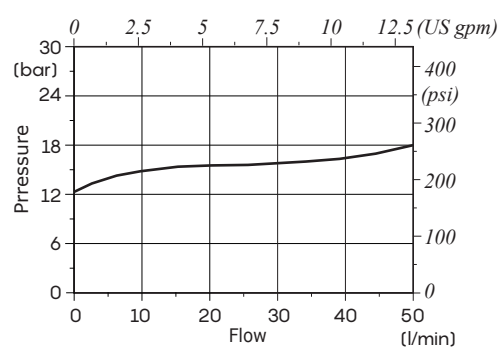
**PP10X**  
flow regulating vs. % max. control current  
 $Q_{in}$  = priority flow +5%



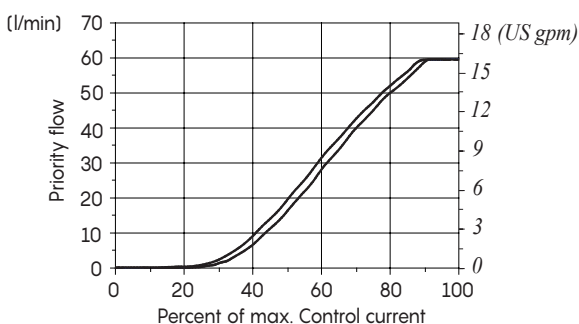
**PP10X**  
pressure compensation diagram 2→3  
for % of control current



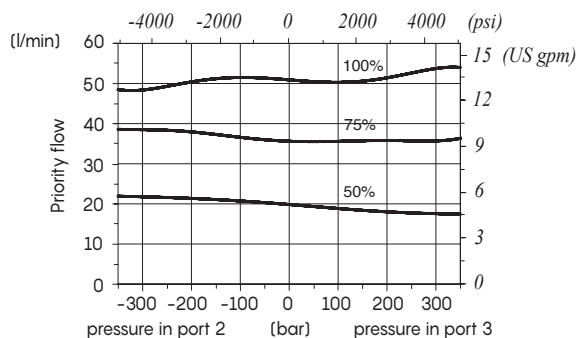
**PP10X**  
pressure drop with de-energized coil  
from 1→2



**PP12X**  
flow regulating vs. % max. control current  
 $Q_{in}$  = priority flow +15%

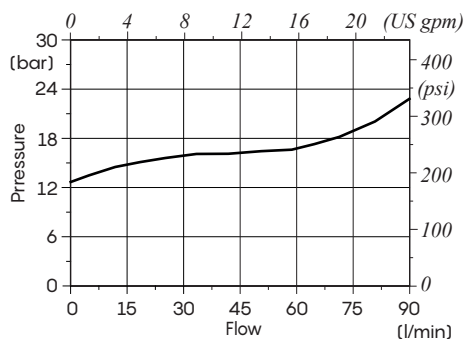


**PP12X**  
pressure compensation diagram 2→3  
for % of control current

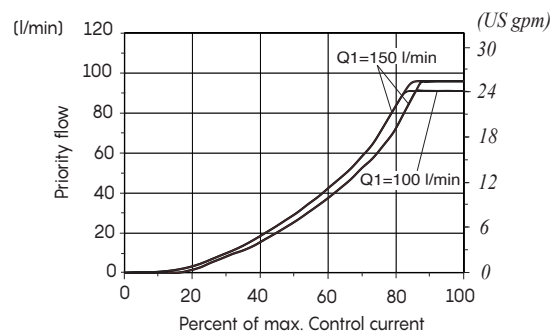


### Rating diagrams

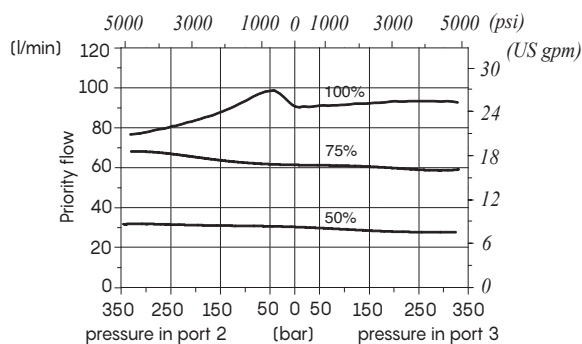
**PP12X**  
pressure drop with de-energized coil  
from 1→2



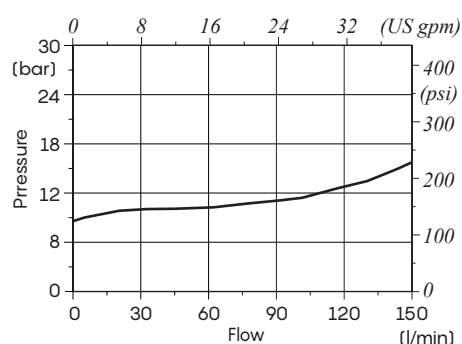
**PP16X**  
flow regulating vs. % max. control current  
 $Q_{in}$  = priority flow +10%



**PP16X**  
pressure compensation diagram 2→3  
for % of control current -  $Q_1=100$  l/min



**PP16X**  
pressure drop with de-energized coil  
from 1→2



### Types and dimensions

| Valve type | A    |      | N<br>without<br>emergency |      | B<br>T<br>screw |      | V<br>handknob |      | C  |      | D  |      |
|------------|------|------|---------------------------|------|-----------------|------|---------------|------|----|------|----|------|
|            | mm   | in   | mm                        | in   | mm              | in   | mm            | in   | Nm | lbft | Nm | lbft |
| PP08X      | 40.8 | 1.60 | 93.9                      | 3.70 | 107.9           | 4.25 | 141.9         | 5.59 | 24 | 30   | 22 | 5    |
| PP10X      | 47.2 | 1.86 | 96.4                      | 3.80 | 110.4           | 4.35 | 144.1         | 5.67 | 27 | 50   | 37 | 5    |
| PP12X      | 73.5 | 2.89 | 97.4                      | 3.83 | 111.4           | 4.39 | 145.4         | 5.72 | 32 | 80   | 59 | 5    |
| PP16X      | 75   | 2.95 | 121.4                     | 4.78 | 135.4           | 5.33 | 168.9         | 6.65 | 41 | 100  | 74 | 5    |



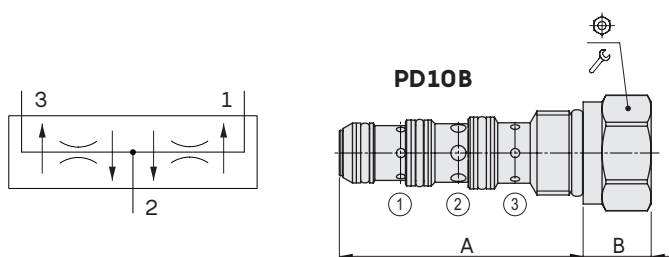
## PD... type flow control pressure compensated valves - 3 way

- Spool type
- Direct mechanical control
- Flow divider in one direction and flow combiner in the opposite direction
- From SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | PD10B/110B                                                                                                              | PD10B/120B                                                               | PD10B/130B                  | PD10B/140B                  | PD10B/150B                   | PD12B/100B                    | PD16C/110B                     |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------|-----------------------------|------------------------------|-------------------------------|--------------------------------|
| Flow range                                 | 4-12 l/min<br>(1-3 US gpm)                                                                                              | 12-20 l/min<br>(3-5 US gpm)                                              | 20-28 l/min<br>(5-7 US gpm) | 28-36 l/min<br>(7-9 US gpm) | 36-44 l/min<br>(9-12 US gpm) | 40-75 l/min<br>(10-20 US gpm) | 75-150 l/min<br>(20-40 US gpm) |
| Max. pressure                              | 210 bar (3045 psi)                                                                                                      |                                                                          |                             |                             |                              |                               |                                |
| Maximum division error                     | ± 5% of the oil flow in 1 or 3 and 120 bar - 1750 psi - pressure difference between 1 and 3.<br>(Division rate 50%+50%) |                                                                          |                             |                             |                              |                               |                                |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties                                                  |                                                                          |                             |                             |                              |                               |                                |
| Viscosity                                  | 10-200 cSt                                                                                                              |                                                                          |                             |                             |                              |                               |                                |
| Max level of contamination                 | 20/18/14 ISO4406                                                                                                        |                                                                          |                             |                             |                              |                               |                                |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                                                                   | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                             |                             |                              |                               |                                |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                                                                       |                                                                          |                             |                             |                              |                               |                                |
| Cavity                                     | SAE 10/4                                                                                                                | SAE 10/4                                                                 | SAE 10/4                    | SAE 10/4                    | SAE 10/4                     | SAE 12/4                      | SAE 16/4                       |
| Weight                                     | 0.20 kg<br>(0.44 lb)                                                                                                    | 0.20 kg<br>(0.44 lb)                                                     | 0.20 kg<br>(0.44 lb)        | 0.20 kg<br>(0.44 lb)        | 0.20 kg<br>(0.44 lb)         | 0.30 kg<br>(0.66 lb)          | 0.55 kg<br>(1.214 lb)          |

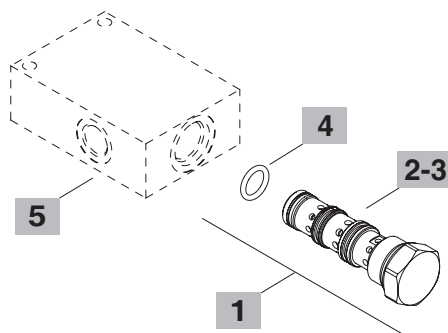
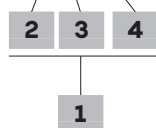
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B  |      | <br>Nm    lbft |           |
|------------|------|------|----|------|-----------------------------------------------------------------------------------------------------|-----------|
|            | mm   | in   | mm | in   |                                                                                                     |           |
| PD10B      | 64.5 | 2.54 | 18 | 0.71 | 27                                                                                                  | 50    37  |
| PD12B      | 83   | 3.27 | 12 | 0.47 | 32                                                                                                  | 80    59  |
| PD16C      | 104  | 4.09 | 17 | 0.69 | 41                                                                                                  | 100    74 |

## Ordering codes and description composition

### PD10B/110B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                       |
|------------------------|-------------|-----------------------------------|
| <b>SAE cavity 10/4</b> |             |                                   |
| PD10B/110B             | OPD10002004 | Flow range <b>1</b>               |
| PD10B/120B             | OPD10002005 | Flow range <b>2</b>               |
| PD10B/130B             | OPD10002006 | Flow range <b>3</b>               |
| PD10B/140B             | OPD10002007 | Flow range <b>4</b>               |
| PD10B/150B             | OPD10002008 | Flow range <b>5</b>               |
| <b>SAE cavity 12/4</b> |             |                                   |
| PD12B/100B             | OPD12002001 | Range 40÷75 l/min (10-20 US gpm)  |
| <b>SAE cavity 16/4</b> |             |                                   |
| PD16C/100B             | OPD16002003 | Range 75÷150 l/min (20-40 US gpm) |

#### 2 Dividing-Combining ratio

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | 50÷50       |

#### 3 Flow range

| TYPE     | DESCRIPTION               |
|----------|---------------------------|
| <b>1</b> | 4÷12 l/min (1-3 US gpm)   |
| <b>2</b> | 12÷20 l/min (3-5 US gpm)  |
| <b>3</b> | 20÷28 l/min (5-7 US gpm)  |
| <b>4</b> | 28÷36 l/min (7-9 US gpm)  |
| <b>5</b> | 36÷44 l/min (9-12 US gpm) |

#### 4 Seals

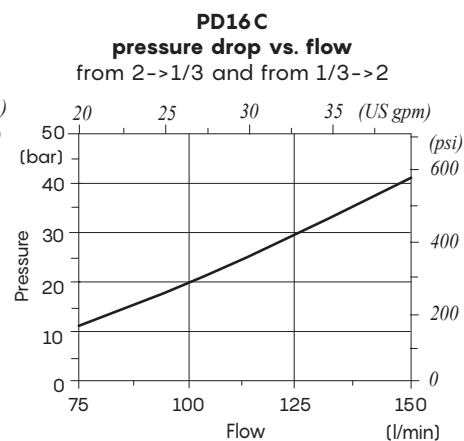
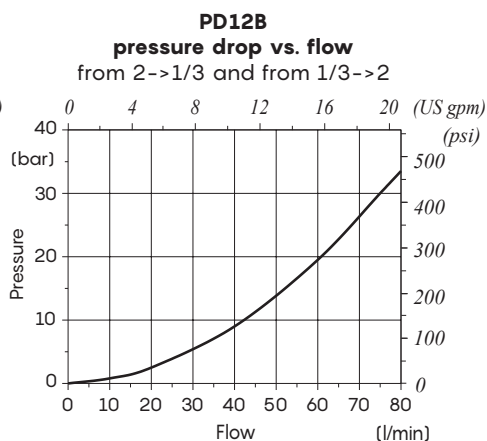
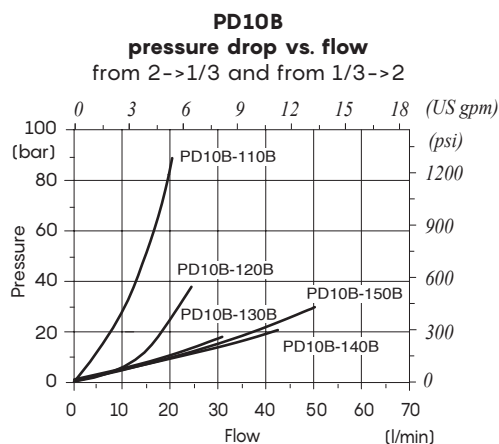
| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

#### 5 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/4-G 3/8</b> | 3CC1040C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| <b>SAE12/4-G 1/2</b> | 3CC1240D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/4-G 3/4</b> | 3CC1640E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

## Rating diagrams







## PL..M type flow control pressure compensated valves - 4 way

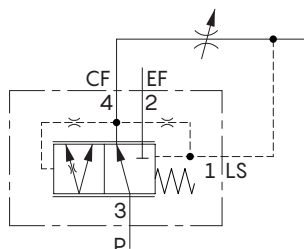
- Spool type
- Piloted acting by mechanical control
- Priority cartridges valves compensated with possibility of static and dynamic load sense
- External zinc-plated and corrosion-proof components
- Priority flow rate (port 4) not affected by changes in working conditions
- SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

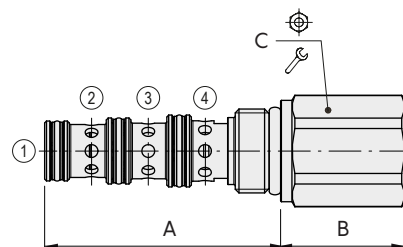
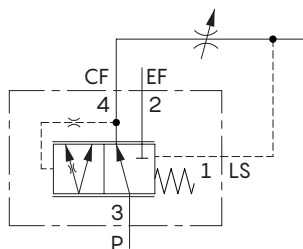
|                                            |                                               | PL10M                                                                    | PL12M                   | PL16M                   |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|-------------------------|-------------------------|
| Nominal flow                               | on port 3                                     | 50 l/min (13.2 US gpm)                                                   | 100 l/min (26.4 US gpm) | 160 l/min (42.2 US gpm) |
|                                            | max. on port 4                                | 40 l/min (10.5 US gpm)                                                   | 80 l/min (21.1 US gpm)  | 140 l/min (36.9 US gpm) |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |                         |                         |
| Stand-by                                   | PL..M/..AB                                    | 5 bar (72.5 psi)                                                         | 5 bar (72.5 psi)        | 5.5 bar (79.7 psi)      |
|                                            | PL..M/..BB                                    | -                                                                        | 7.5 bar (108 psi)       | -                       |
|                                            | PL..M/..CB                                    | 10 bar (145 psi)                                                         | 10.5 bar (152 psi)      | 11 bar (159 psi)        |
|                                            | PL..M/..DB                                    | -                                                                        | -                       | 22 bar (319 psi)        |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                         |                         |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                         |                         |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                         |                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                         |                         |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                         |                         |
| Cavity                                     |                                               | SAE 10/4                                                                 | SAE 12/4                | SAE 16/4                |
| Weight                                     |                                               | 0.224 kg (0.494 lb)                                                      | 0.378 kg (0.833 lb)     | 0.800 kg (1.76 lb)      |

NOTE - For different conditions, please contact Walvoil Sales Dpt.

**Dynamic circuit**



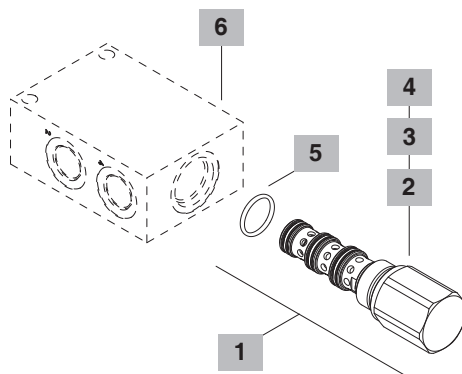
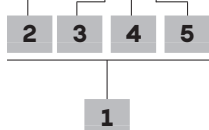
**Static circuit**



| Valve type | A     |      | B    |      | C       |     |    |
|------------|-------|------|------|------|---------|-----|----|
|            | mm    | in   | mm   | in   | Nm lbft |     |    |
| PL10M      | 62.4  | 2.46 | 32.8 | 1.29 | 27      | 50  | 37 |
| PL12M      | 81.9  | 3.22 | 35   | 1.38 | 32      | 80  | 59 |
| PL16M      | 102.5 | 4.04 | 37.6 | 1.48 | 36      | 100 | 74 |

### Ordering codes and description composition

#### PL10M/ D 1 C B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                                  |
|------------------------|-------------|----------------------------------------------|
| <b>SAE cavity 10/4</b> |             |                                              |
| <b>PL10M/S1AB</b>      | OPL10002000 | Static circuit, 5 bar (72.5 psi) stand by    |
| <b>PL10M/S1CB</b>      | OPL10002002 | Static circuit, 10 bar (145 psi) stand by    |
| <b>PL10M/D1AB</b>      | OPL10002003 | Dynamic circuit, 5 bar (72.5 psi) stand by   |
| <b>PL10M/D1CB</b>      | OPL10002001 | Dynamic circuit, 10 bar (145 psi) stand by   |
| <b>SAE cavity 12/4</b> |             |                                              |
| <b>PL12M/S1AB</b>      | OPL12002004 | Static circuit, 5 bar (72.5 psi) stand by    |
| <b>PL12M/S1BB</b>      | OPL12002005 | Static circuit, 7.5 bar (109 psi) stand by   |
| <b>PL12M/S1CB</b>      | OPL12002003 | Static circuit, 10.5 bar (152 psi) stand by  |
| <b>PL12M/D1AB</b>      | OPL12002000 | Dynamic circuit, 5 bar (72.5 psi) stand by   |
| <b>PL12M/D1BB</b>      | OPL12002002 | Dynamic circuit, 7.5 bar (109 psi) stand by  |
| <b>PL12M/D1CB</b>      | OPL12002001 | Dynamic circuit, 10.5 bar (152 psi) stand by |
| <b>SAE cavity 16/4</b> |             |                                              |
| <b>PL16M/S1AB</b>      | OPL16002003 | Static circuit, 5.5 bar (79.7 psi) stand by  |
| <b>PL16M/S1CB</b>      | OPL16002004 | Static circuit, 11 bar (159 psi) stand by    |
| <b>PL16M/S1DB</b>      | OPL16002005 | Static circuit, 22 bar (319 psi) stand by    |
| <b>PL16M/D1AB</b>      | OPL16002000 | Dynamic circuit, 5.5 bar (79.7 psi) stand by |
| <b>PL16M/D1CB</b>      | OPL16002001 | Dynamic circuit, 11 bar (159 psi) stand by   |
| <b>PL16M/D1DB</b>      | OPL16002002 | Dynamic circuit, 22 bar (319 psi) stand by   |

#### 2 Circuit type

| TYPE     | DESCRIPTION     |
|----------|-----------------|
| <b>S</b> | Static circuit  |
| <b>D</b> | Dynamic circuit |

#### 3 Metering hole

| TYPE     | DESCRIPTION                                                                   |
|----------|-------------------------------------------------------------------------------|
| <b>1</b> | Static circuit: Ø 0.5 mm (0.0197 in)<br>Dynamic circuit: Ø 0.5 mm (0.0197 in) |

#### 4 Stand-by setting

| TYPE     | DESCRIPTION      | PL10M            | PL12M             | PL16M              |
|----------|------------------|------------------|-------------------|--------------------|
| <b>A</b> | 5 bar (72.5 psi) | 5 bar (72.5 psi) | 5 bar (72.5 psi)  | 5.5 bar (79.7 psi) |
| <b>B</b> | -                | -                | 7.5 bar (109 psi) | -                  |
| <b>C</b> | 10 bar (145 psi) | 10 bar (145 psi) | 10 bar (145 psi)  | 11 bar (159 psi)   |
| <b>D</b> | -                | -                | -                 | 22 bar (319 psi)   |

#### 5 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/4-G 1/2</b> | 3CC1040D11 | Aluminium body for cavity 10 valve, G 1/2 std thread |
| <b>SAE12/4-G 1/2</b> | 3CC1240D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| <b>SAE16/4-G 3/4</b> | 3CC1640E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

## Flow control valves

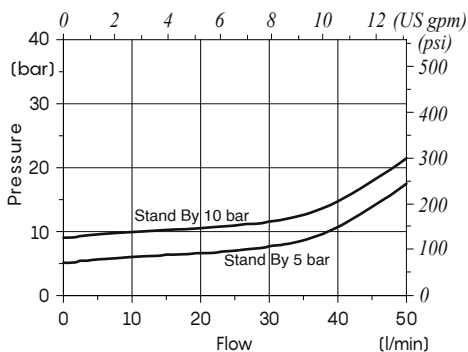
Flow control pressure compensated valves - 4 way

**PL..M type**

### Rating diagrams

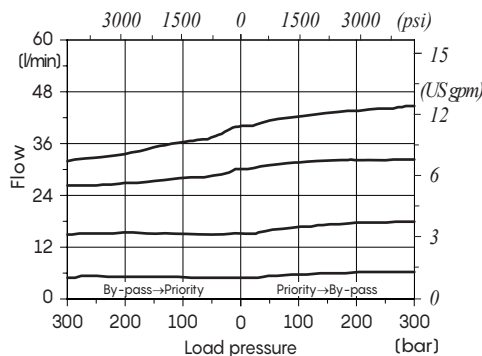
#### PL10M valve (valve body with G 1/2 ports)

**Pressure drop**  
from 3→2 (4 closed)



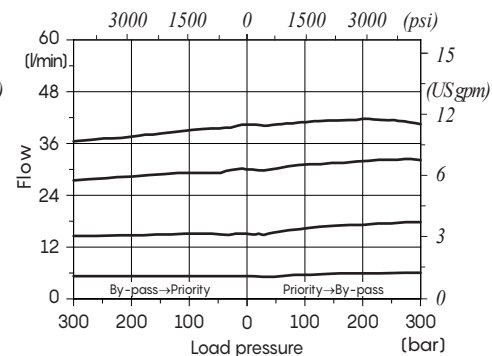
**Priority flow vs. Load pressure**

stand-by: 5 bar (72.5 psi)  
inlet flow: 50 l/min (13.2 US gpm)



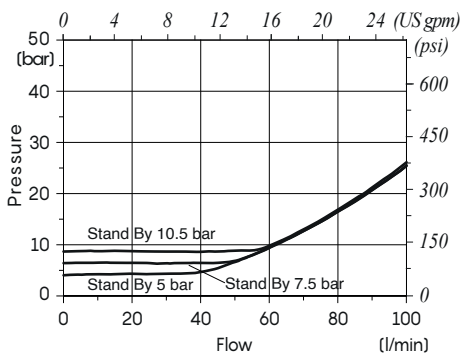
**Priority flow vs. Load pressure**

stand-by: 10 bar (145 psi)  
inlet flow: 50 l/min (13.2 US gpm)



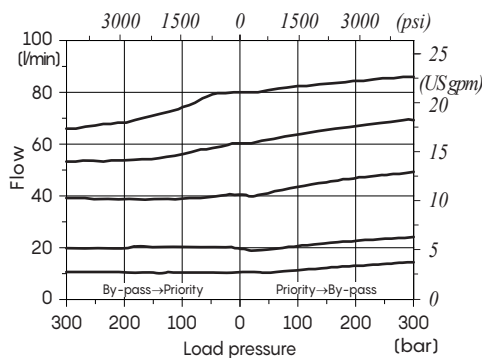
#### PL12M valve (valve body with G 1/2 ports)

**Pressure drop**  
from 3→2 (4 closed)



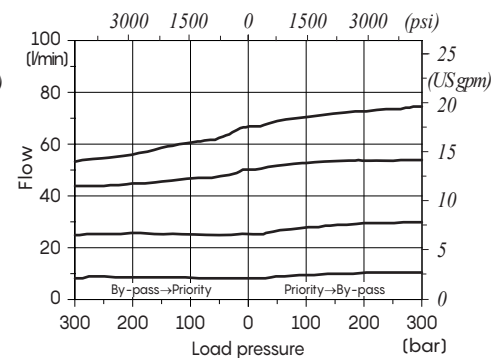
**Priority flow vs. Load pressure**

stand-by: 5 bar (72.5 psi)  
inlet flow: 100 l/min (26.4 US gpm)



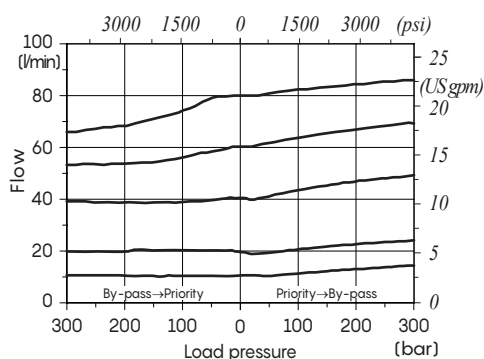
**Priority flow vs. Load pressure**

stand-by: 7.5 bar (108 psi)  
inlet flow: 100 l/min (26.4 US gpm)



**Priority flow vs. Load pressure**

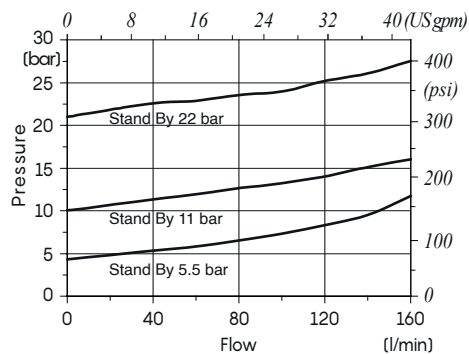
stand-by: 10.5 bar (152 psi)  
inlet flow: 100 l/min (26.4 US gpm)



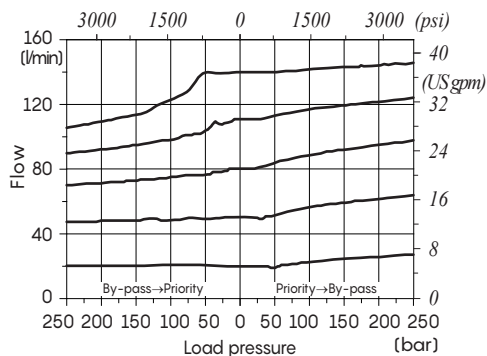
### Rating diagrams

**PL16M valve** (valve body with G 3/4 ports)

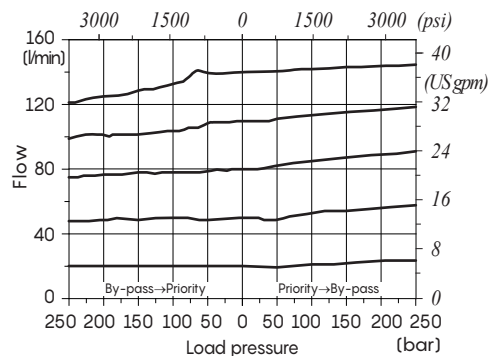
**Pressure drop**  
from 3->2 (4 closed)



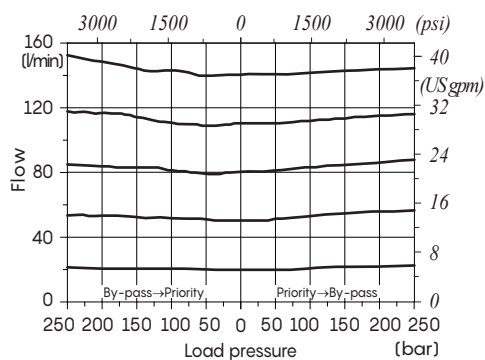
**Priority flow vs. Load pressure**  
stand-by: 5.5 bar (79.7 psi)  
inlet flow: 160 l/min (42.2 US gpm)



**Priority flow vs. Load pressure**  
stand-by: 11 bar (159 psi)  
inlet flow: 160 l/min (42.2 US gpm)



**Priority flow vs. Load pressure**  
stand-by: 22 bar (319 psi)  
inlet flow: 160 l/min (42.2 US gpm)





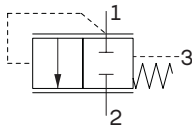
## LA..QA type logic element - 3 way

- Pilot to close configuration
- Fixed or adjustable configuration with lead sealing option
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | LA10QA                                                                                                     | LA16QA                                                                   |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 80 l/min (21 US gpm)                                                                                       | 190 l/min (50 US gpm)                                                    |
| Max. pressure                              | 350 bar (5100 psi)                                                                                         |                                                                          |
| Opening pressure                           | fixed setting: 1, 5, 10 bar (14.5, 72.5, 145 psi)<br>adjustable setting: from 8 to 15 bar (116 to 218 psi) |                                                                          |
| Oil leakage                                | at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)                                                            | 230 cm³/min (14.03 in³/min)                                              |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties                                     |                                                                          |
| Viscosity                                  | 10-200 cSt                                                                                                 |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                                                           |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                                                              | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                                                          |                                                                          |
| Cavity                                     | SAE 10/3Q                                                                                                  | SAE 16/3Q                                                                |
| Weight                                     | 0.15 kg (0.33 lb)                                                                                          | 0.45 kg (0.99 lb)                                                        |

NOTE - For different conditions, please contact Walvoil Sales Dpt.

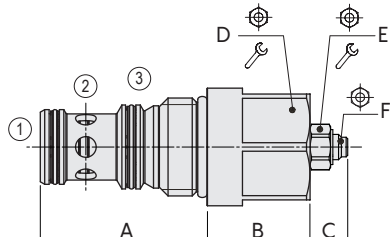
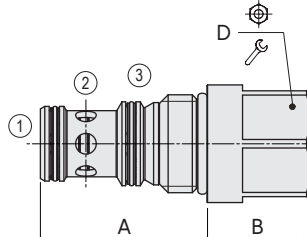
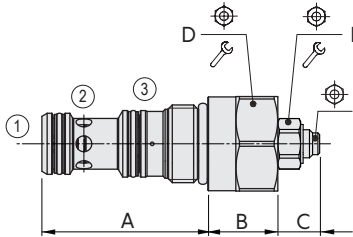
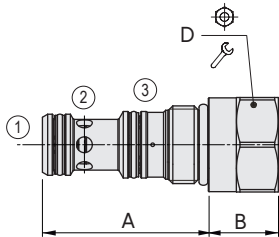


LA10QA/0...

LA10QA/OR..

LA16QA/0...

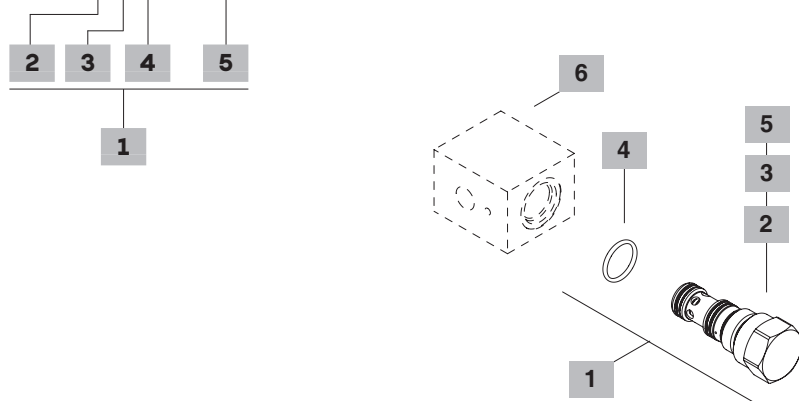
LA16QA/OR..



| Valve type | A    |      | B    |      | C (max) |      | D  |      | E  |      | F   |      |
|------------|------|------|------|------|---------|------|----|------|----|------|-----|------|
|            | mm   | in   | mm   | in   | mm      | in   | Nm | lbft | Nm | lbft | Nm  | lbft |
| LA10QA     | 47.4 | 1.87 | 42   | 1.65 | 11.9    | 0.47 | 27 | 70   | 52 | 13   | 9.8 | 7.2  |
| LA16QA     | 56.9 | 2.24 | 35.1 | 1.38 | 24      | 0.94 | 36 | 100  | 74 | 13   | 9.8 | 7.2  |

## Ordering codes and description composition

LA10QA/0 C 0 B SB=12bar

**1 Cartridges**

| TYPE                    | CODE         | DESCRIPTION                                      |
|-------------------------|--------------|--------------------------------------------------|
| <b>SAE cavity 10/3Q</b> |              |                                                  |
| LA10QA/0B0B             | OLA10Q002003 | Fixed setting, 5 bar (72.5 psi)                  |
| LA10QA/0C0B             | OLA10Q002001 | Fixed setting, 10 bar (145 psi)                  |
| LA10QA/0R0B SB=12bar    | OLA10Q002002 | Adjustable setting, std setting 12 bar (174 psi) |
| <b>SAE cavity 16/3Q</b> |              |                                                  |
| LA16QA/0C0B             | OLA16Q002000 | Fixed setting, 10 bar (145 psi)                  |
| LA16QA/0R0B SB=12bar    | OLA16Q002001 | Adjustable setting, std setting 12 bar (174 psi) |

**2 Stand by**

Setting is referred to 1 l/min (0.26 US gpm) flow

| TYPE | DESCRIPTION                                           |
|------|-------------------------------------------------------|
| A    | Fixed setting: 1 bar (14.5 psi)                       |
| B    | Fixed setting: 5 bar (72.5 psi)                       |
| C    | Fixed setting: 10 bar (145 psi)                       |
| R    | Adjustable setting: from 8 to 15 bar (116 to 218 psi) |

**3 Load sensing**

| TYPE | DESCRIPTION                                            |
|------|--------------------------------------------------------|
| O    | Without sealing                                        |
| X    | With sealing: for valves with adjustable stand-by only |

**4 Seals**

| TYPE | DESCRIPTION                                               |
|------|-----------------------------------------------------------|
| B    | NBR (Buna) + Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept              |

**5 Stand-by setting**

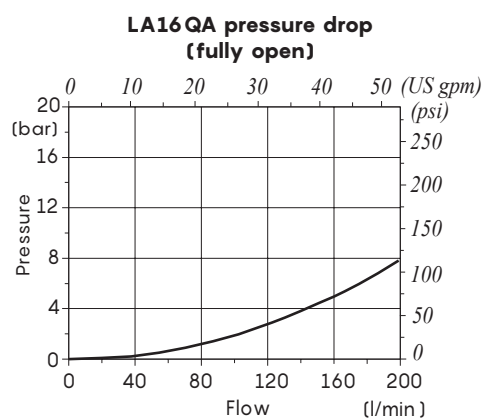
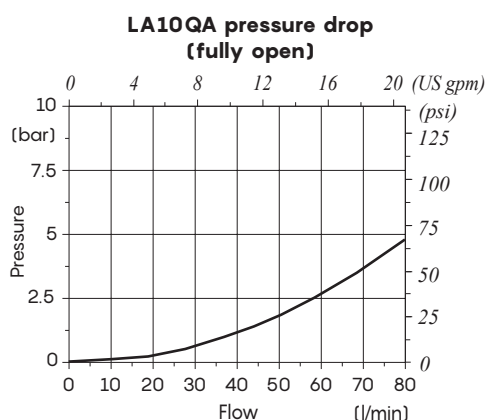
To be specified only with adjustable stand-by valve

**6 Valve body**

| TYPE           | CODE       | DESCRIPTION                                      |
|----------------|------------|--------------------------------------------------|
| SAE10/3Q-G 1/2 | 3CC1032D21 | Steel body for cavity 08 valve, G 1/2 std thread |
| SAE16/3Q-G 3/4 | 3CC1632E21 | Steel body for cavity 16 valve, G 3/4 std thread |

For aluminium bodies or different threading see from page 210

## Rating diagrams





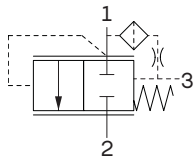
## LB..QA type logic element - 3 way

- Venting to open configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

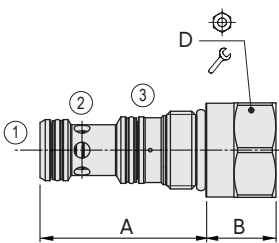
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            |                                               | LB10QA                                                                                            | LB16QA                      |
|--------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------|
| Nominal flow                               |                                               | 80 l/min (21 US gpm)                                                                              | 190 l/min (50 US gpm)       |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                                                |                             |
| Opening pressure                           |                                               | fixed setting: 5, 10 bar (72.5, 145 psi)<br>adjustable setting: from 8 to 15 bar (116 to 218 psi) |                             |
| Oil leakage                                | at 210 bar (3050 psi)                         | 80 cm³/min (4.88 in³/min)                                                                         | 230 cm³/min (14.03 in³/min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties                            |                             |
| Viscosity                                  |                                               | 10–200 cSt                                                                                        |                             |
| Max level of contamination                 |                                               | 20/18/14 ISO4406                                                                                  |                             |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F)                          |                             |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                                                 |                             |
| Cavity                                     |                                               | SAE 10/3Q                                                                                         | SAE 16/3Q                   |
| Weight                                     |                                               | 0.15 kg (0.33 lb)                                                                                 | 0.45 kg (0.99 lb)           |

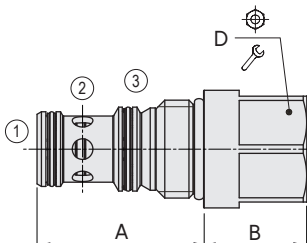
NOTE - For different conditions, please contact Walvoil Sales Dpt.



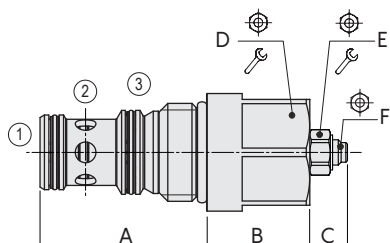
LB10QA/O...



LB16QA/O...



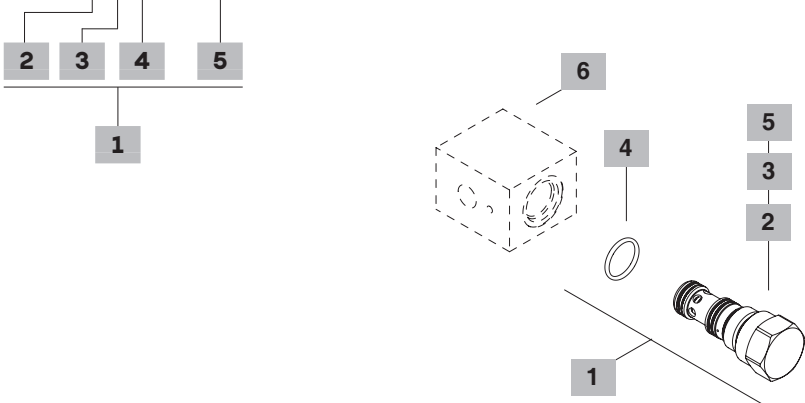
LB16QA/OR..



| Valve type | A    |      | B    |      | C (max) |      | D  |      | E  |      | F   |      |
|------------|------|------|------|------|---------|------|----|------|----|------|-----|------|
|            | mm   | in   | mm   | in   | mm      | in   | Nm | lbft | Nm | lbft | Nm  | lbft |
| LB10QA     | 47.4 | 1.87 | 20   | 0.79 | -       | -    | 27 | 70   | 52 | -    | -   | -    |
| LB16QA     | 56.9 | 2.24 | 35.1 | 1.38 | 24      | 0.94 | 36 | 100  | 74 | 13   | 9.8 | 7.2  |

Ordering codes and description composition

LB10QA/0 B 0 B SB=12bar



| 1 Cartridges            |              |                                               |
|-------------------------|--------------|-----------------------------------------------|
| TYPE                    | CODE         | DESCRIPTION                                   |
| <b>SAE cavity 10/3Q</b> |              |                                               |
| <b>LB10QA/0B0B</b>      | 0LB10Q002000 | Fixed setting, 5 bar (72.5 psi)               |
| <b>SAE cavity 16/3Q</b> |              |                                               |
| <b>LB16QA/0B0B</b>      | 0LB16Q002000 | Fixed setting, 5 bar (72.5 psi)               |
| <b>LB16QA/0R0B</b>      | 0LB16Q002001 | Adjustable setting, stand-by 12 bar (174 psi) |

| 2 Stand by                                        |                                                       |
|---------------------------------------------------|-------------------------------------------------------|
| Setting is referred to 1 l/min (0.26 Us gpm) flow |                                                       |
| TYPE                                              | DESCRIPTION                                           |
| <b>B</b>                                          | Fixed setting: 5 bar (72.5 psi)                       |
| <b>C</b>                                          | Fixed setting: 10 bar (145 psi)                       |
| <b>R</b>                                          | Adjustable setting: from 8 to 15 bar (116 to 218 psi) |

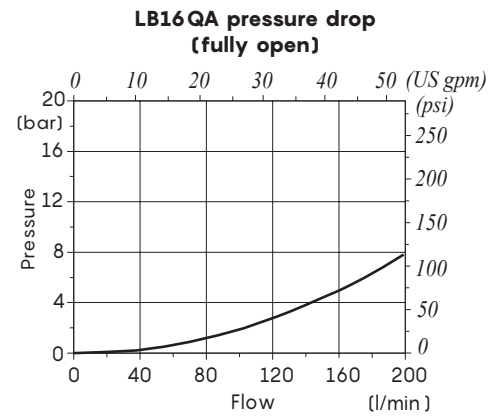
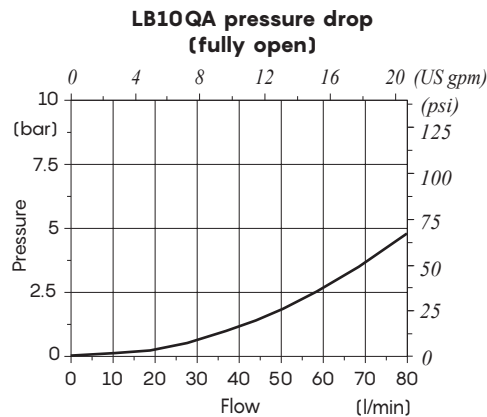
| 3 Load sensing |                                                        |
|----------------|--------------------------------------------------------|
| TYPE           | DESCRIPTION                                            |
| <b>0</b>       | Without sealing                                        |
| <b>X</b>       | With sealing: for valves with adjustable stand-by only |

| 4 Seals  |                                                                |
|----------|----------------------------------------------------------------|
| TYPE     | DESCRIPTION                                                    |
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

| 5 Stand-by setting                                  |  |
|-----------------------------------------------------|--|
| To be specified only with adjustable stand-by valve |  |

| 6 Valve body                                                  |            |                                                  |
|---------------------------------------------------------------|------------|--------------------------------------------------|
| TYPE                                                          | CODE       | DESCRIPTION                                      |
| <b>SAE10/3Q-G 1/2</b>                                         | 3CC1032D21 | Steel body for cavity 08 valve, G 1/2 std thread |
| <b>SAE16/3Q-G 3/4</b>                                         | 3CC1632E21 | Steel body for cavity 16 valve, G 3/4 std thread |
| For aluminium bodies or different threading see from page 210 |            |                                                  |

Rating diagrams







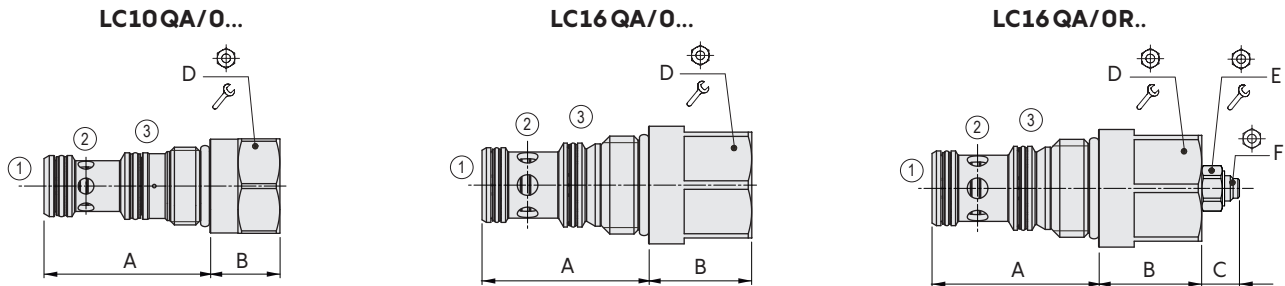
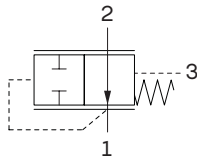
## LC..QA type logic element - 3 way

- Venting to close configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | LC10QA                                                                                            | LC16QA                                                                   |
|--------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 80 l/min (21 US gpm)                                                                              | 190 l/min (50 US gpm)                                                    |
| Max. pressure                              | 350 bar (5100 psi)                                                                                |                                                                          |
| Opening pressure                           | fixed setting: 5, 10 bar (72.5, 145 psi)<br>adjustable setting: from 8 to 15 bar (116 to 218 psi) |                                                                          |
| Oil leakage                                | at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)                                                   | 230 cm³/min (14.03 in³/min)                                              |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties                            |                                                                          |
| Viscosity                                  | 10-200 cSt                                                                                        |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                                                  |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                                                     | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                                                 |                                                                          |
| Cavity                                     | SAE 10/3Q                                                                                         | SAE 16/3Q                                                                |
| Weight                                     | 0.15 kg (0.33 lb)                                                                                 | 0.45 kg (0.99 lb)                                                        |

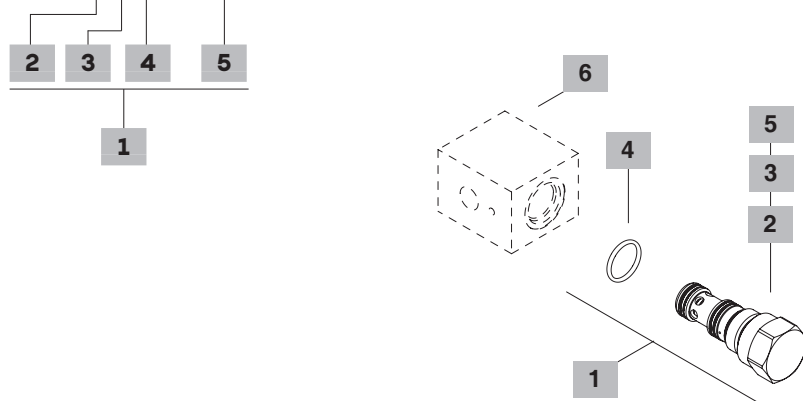
NOTE - For different conditions, please contact Walvoil Sales Dpt.



| Valve type | A    |      | B    |      | C (max) |      | D  |      | E  |      | F   |      |
|------------|------|------|------|------|---------|------|----|------|----|------|-----|------|
|            | mm   | in   | mm   | in   | mm      | in   | Nm | lbft | Nm | lbft | Nm  | lbft |
| LC10QA     | 47.4 | 1.87 | 20   | 0.79 | -       | -    | 27 | 70   | 52 | -    | -   | -    |
| LC16QA     | 56.9 | 2.24 | 35.1 | 1.38 | 24      | 0.94 | 36 | 100  | 74 | 13   | 9.8 | 7.2  |

## Ordering codes and description composition

LC10QA/0 B 0 B SB=12bar



### 1 Cartridges

| TYPE                    | CODE         | DESCRIPTION                          |
|-------------------------|--------------|--------------------------------------|
| <b>SAE cavity 10/3Q</b> |              |                                      |
| LC10QA/0B0B             | OLC10Q002001 | Fixed setting, 5 bar (72.5 psi)      |
| LC10QA/0C0B             | OLC10Q002002 | Fixed setting, 10 bar (145 psi)      |
| <b>SAE cavity 16/3Q</b> |              |                                      |
| LC16QA/0B0B             | OLC16Q002001 | Fixed setting, 5 bar (72.5 psi)      |
| LC16QA/0R0B             | OLC16Q002003 | Adjustable setting, 12 bar (174 psi) |

### 2 Stand by

Setting is referred to 1 l/min (0.26 US gpm) flow

| TYPE     | DESCRIPTION                                           |
|----------|-------------------------------------------------------|
| <b>B</b> | Fixed setting: 5 bar (72.5 psi)                       |
| <b>C</b> | Fixed setting: 10 bar (145 psi)                       |
| <b>R</b> | Adjustable setting: from 8 to 15 bar (116 to 218 psi) |

### 3 Load sensing

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>0</b> | Without sealing                                        |
| <b>X</b> | With sealing: for valves with adjustable stand-by only |

### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

### 5 Stand-by setting

To be specified only with adjustable stand-by valve

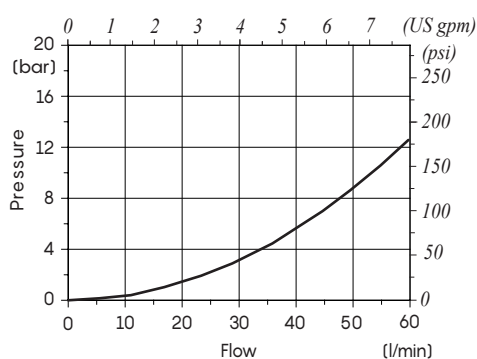
### 6 Valve body

| TYPE                  | CODE       | DESCRIPTION                                      |
|-----------------------|------------|--------------------------------------------------|
| <b>SAE10/3Q-G 1/2</b> | 3CC1032D21 | Steel body for cavity 08 valve, G 1/2 std thread |
| <b>SAE16/3Q-G 3/4</b> | 3CC1632E21 | Steel body for cavity 16 valve, G 3/4 std thread |

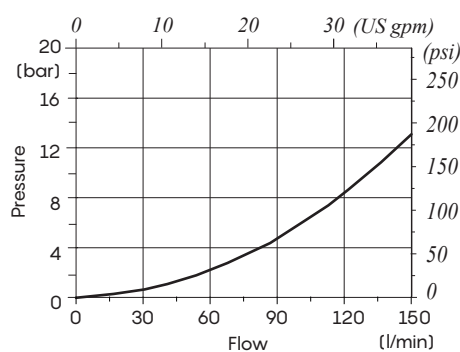
For aluminium bodies or different threading see from page 210

## Rating diagrams

LC10QA pressure drop  
(fully open)



LC16QA pressure drop  
(fully open)





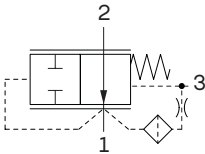
**LD..QA type  
logic element - 3 way**

- Pilot to open configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

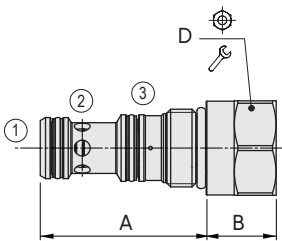
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | LD10QA                                                                                                     | LD16QA                                                                   |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 80 l/min (21 US gpm)                                                                                       | 190 l/min (50 US gpm)                                                    |
| Max. pressure                              | 350 bar (5100 psi)                                                                                         |                                                                          |
| Opening pressure                           | fixed setting: 1, 5, 10 bar (14.5, 72.5, 145 psi)<br>adjustable setting: from 8 to 15 bar (116 to 218 psi) |                                                                          |
| Oil leakage                                | at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)                                                            | 230 cm³/min (14.03 in³/min)                                              |
| Fluid                                      | mineral based or sinthetic hydraulic fluid with lubricating properties                                     |                                                                          |
| Viscosity                                  | 10-200 cSt                                                                                                 |                                                                          |
| Max level of contamination                 | 20/18/14 ISO4406                                                                                           |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                                                              | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                                                          |                                                                          |
| Cavity                                     | SAE 10/3Q                                                                                                  | SAE 16/3Q                                                                |
| Weight                                     | 0.15 kg (0.33 lb)                                                                                          | 0.45 kg (0.99 lb)                                                        |

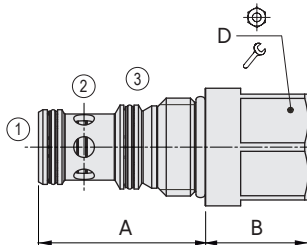
NOTE - For different conditions, please contact Walvoil Sales Dpt.



LD10QA/0...



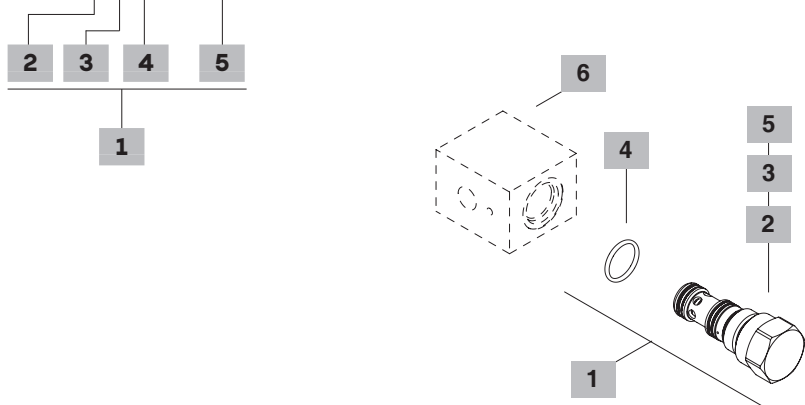
LD16QA/0...



| Valve type | A    |      | B    |      | D                                                                                                   |     |    |
|------------|------|------|------|------|-----------------------------------------------------------------------------------------------------|-----|----|
|            | mm   | in   | mm   | in   | <br>Nm    lbf·ft |     |    |
| LD10QA     | 47.4 | 1.87 | 20   | 0.79 | 27                                                                                                  | 70  | 52 |
| LD16QA     | 56.9 | 2.24 | 35.1 | 1.38 | 36                                                                                                  | 100 | 74 |

Ordering codes and description composition

LD10QA/0 B 0 B SB=12bar



| 1 Cartridges            |              |                                 |
|-------------------------|--------------|---------------------------------|
| TYPE                    | CODE         | DESCRIPTION                     |
| <b>SAE cavity 10/3Q</b> |              |                                 |
| LD10QA/0B0B             | OLD10Q002000 | Fixed setting, 5 bar (72.5 psi) |
| <b>SAE cavity 16/3Q</b> |              |                                 |
| LD16QA/0B0B             | OLD16Q002000 | Fixed setting, 5 bar (72.5 psi) |

| 2 Stand by                                        |                                                        |
|---------------------------------------------------|--------------------------------------------------------|
| Setting is referred to 1 l/min (0.26 Us gpm) flow |                                                        |
| TYPE                                              | DESCRIPTION                                            |
| A                                                 | Fixed setting: 1 bar (14.5 psi)                        |
| B                                                 | Fixed setting: 5 bar (72.5 psi)                        |
| C                                                 | Fixed setting: 10 bar (145 psi);                       |
| R                                                 | Adjustable setting: from 8 to 15 bar (116 to 218 psi); |

| 3 Load sensing |                                                        |
|----------------|--------------------------------------------------------|
| TYPE           | DESCRIPTION                                            |
| O              | Without sealing                                        |
| X              | With sealing: for valves with adjustable stand-by only |

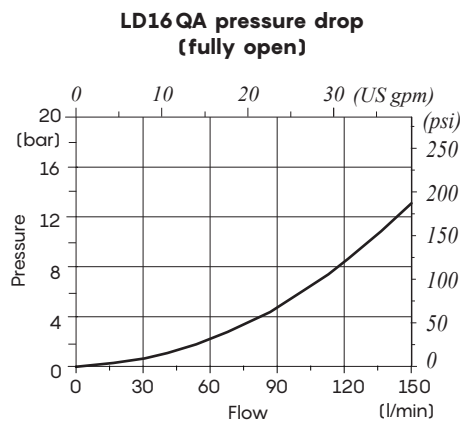
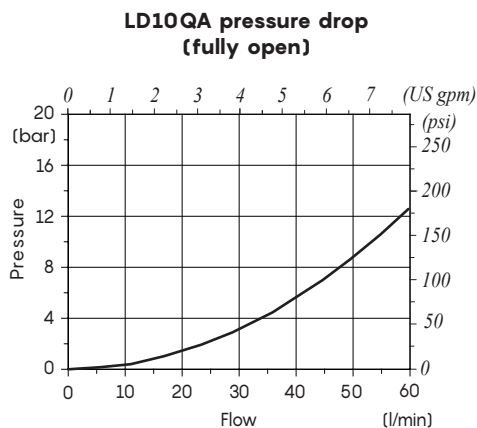
| 4 Seals |                                                         |
|---------|---------------------------------------------------------|
| TYPE    | DESCRIPTION                                             |
| B       | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V       | FPM (Viton) o-ring seals, contact Sales Dept            |

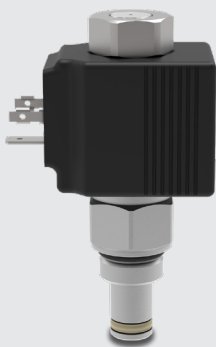
| 5 Stand-by setting                                  |  |
|-----------------------------------------------------|--|
| To be specified only with adjustable stand-by valve |  |

| 6 Valve body   |            |                                                  |
|----------------|------------|--------------------------------------------------|
| TYPE           | CODE       | DESCRIPTION                                      |
| SAE10/3Q-G 1/2 | 3CC1032D21 | Steel body for cavity 08 valve, G 1/2 std thread |
| SAE16/3Q-G 3/4 | 3CC1632E21 | Steel body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For aluminium bodies or different threading see from page 210

Rating diagrams





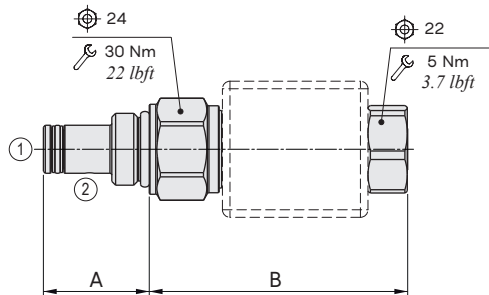
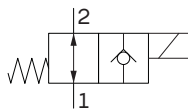
**EB08M type**  
**directional solenoid valves – 2 way/2 positions**

- Poppet type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Configuration normally open

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

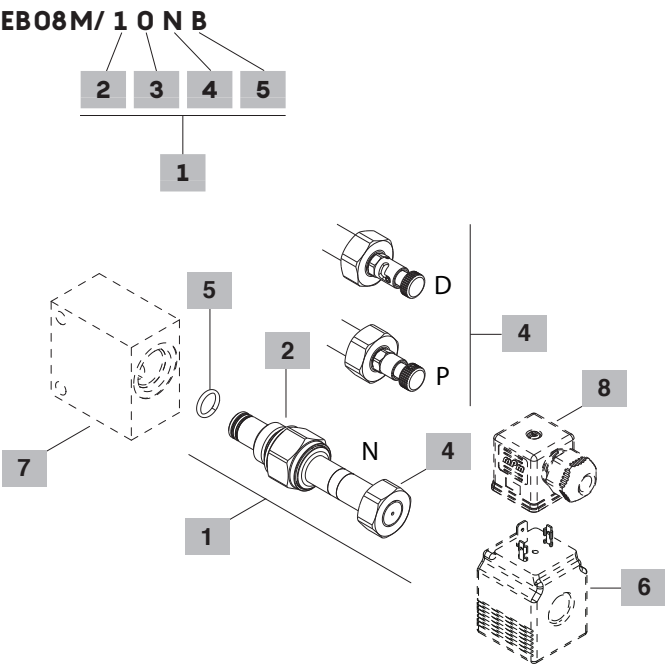
| EB08M                                      |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 2 l/min (0.53 US gpm)                                                    |
| Max. pressure                              |                                               | 350 bar (5100 psi)                                                       |
| Oil leakage                                | at 210 bar (5100 psi)                         | 0.25 cm³/min (0.015 in³/min)                                             |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 8/2                                                                  |
| Coil type*                                 |                                               | BER                                                                      |
| Nominal voltages                           |                                               | 12VDC - 24VDC ± 10%                                                      |
| Power rating                               |                                               | 19 W                                                                     |
| Weight                                     |                                               | 0.399 kg (0.88 lb)                                                       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



| Valve type | A  |      | B                         |      |                  |      |                               |     |
|------------|----|------|---------------------------|------|------------------|------|-------------------------------|-----|
|            |    |      | N<br>without<br>emergency |      | P<br>push button |      | D<br>push type<br>with detent |     |
|            | mm | in   | mm                        | in   | mm               | in   | mm                            | in  |
| EB08M      | 28 | 1.10 | 68.4                      | 2.69 | 91.3             | 3.59 | 94                            | 3.7 |

Ordering codes and description composition



| 1 Cartridges           |             |                                                  |
|------------------------|-------------|--------------------------------------------------|
| TYPE                   | CODE        | DESCRIPTION                                      |
| <b>SAE cavity 08/2</b> |             |                                                  |
| EB08M/10NB             | 0EB08002001 | (N.O.) without emergency                         |
| EB08M/1HDB             | 0EB08002000 | As previous one, push type with detent emergency |
| EB08M/10PB             | 0EB08002002 | As previous one, push button emergency           |

| 2 Spool |                             |
|---------|-----------------------------|
| TYPE    | DESCRIPTION                 |
| 1       | Normally open configuration |

| 3 Anti tampering arrangement |                                    |
|------------------------------|------------------------------------|
| TYPE                         | DESCRIPTION                        |
| 0                            | Without anti tampering arrangement |
| H                            | With anti tampering arrangement    |

| 4 Emergency                                                                 |                       |
|-----------------------------------------------------------------------------|-----------------------|
| TYPE                                                                        | DESCRIPTION           |
| N                                                                           | Without emergency     |
| P                                                                           | Push button emergency |
| D                                                                           | Push type with detent |
| Note: for configurations with different emergency types contact Sales Dept. |                       |

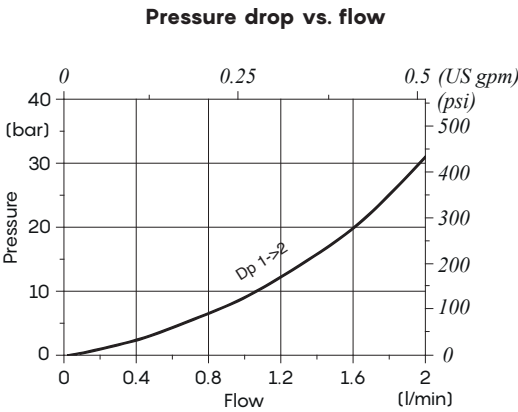
| 5 Seals |                                                                |
|---------|----------------------------------------------------------------|
| TYPE    | DESCRIPTION                                                    |
| B       | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| V       | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

| 6 Coils                              |             |                    |
|--------------------------------------|-------------|--------------------|
| TYPE                                 | CODE        | DESCRIPTION        |
| BER12VDC                             | 4SLE001200A | 12VDC-ISO4400 coil |
| For complete coils list see page 201 |             |                    |

| 7 Valve body                                              |            |                                                      |
|-----------------------------------------------------------|------------|------------------------------------------------------|
| TYPE                                                      | CODE       | DESCRIPTION                                          |
| SAE08/2-G 1/4                                             | 3CC0820B11 | Aluminium body for cavity 08 valve, G 1/4 std thread |
| Note: aluminium body can stand up to 210 bar (3050 psi)   |            |                                                      |
| For steel bodies or different threading see from page 208 |            |                                                      |

| 8 Connector                                    |             |             |
|------------------------------------------------|-------------|-------------|
| TYPE                                           | CODE        | DESCRIPTION |
| ISO4400                                        | 4CN1009995B | Connector   |
| For complete connectors list see from page 201 |             |             |

Rating diagrams





**EE..M type  
directional solenoid valves – 2 way/2 positions**

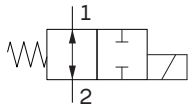
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Normally open and closed configurations
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

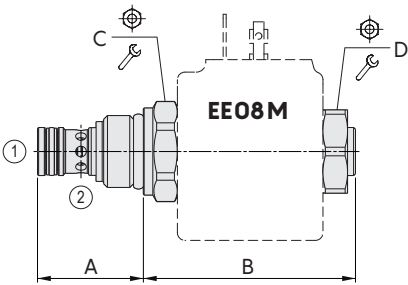
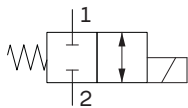
|                                            | EE08M                                                                  | EE10M                                                                    |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 15 l/min (3.96 US gpm)                                                 | 40 l/min (10.57 US gpm)                                                  |
| Max. pressure                              | 250 bar (3600 psi)                                                     |                                                                          |
| Oil leakage                                | at 210 bar (5100 psi) 20 cm³/min (1.22 in³/min)                        | 40 cm³/min (2.44 in³/min)                                                |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10–200 cSt                                                             |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals                                  | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 8/2                                                                | SAE 10/2                                                                 |
| Coil type*                                 | BER                                                                    | BC                                                                       |
| Nominal voltages                           | 12VDC - 24VDC ± 10%                                                    |                                                                          |
| Power rating                               | 19 W                                                                   | 26 W                                                                     |
| Weight                                     | 0.122 kg (0.27 lb)                                                     | 0.19 kg (0.42 lb)                                                        |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

**Normally open configuration**



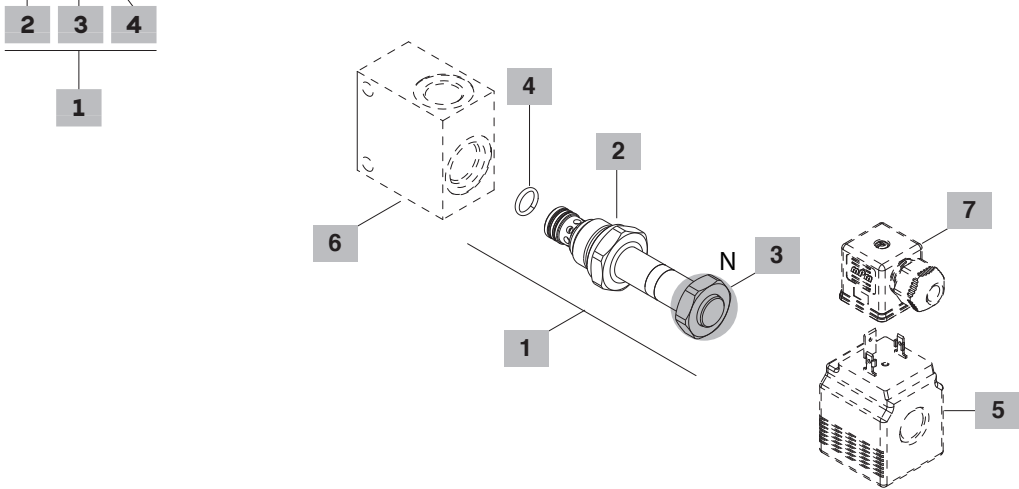
**Normally closed configuration**



| Valve type | A    |      | B<br>N<br>without emergency |      | C  |      | D  |            |
|------------|------|------|-----------------------------|------|----|------|----|------------|
|            | mm   | in   | mm                          | in   | Nm | lbft | Nm | lbft       |
| EE08M      | 28   | 1.10 | 56.1                        | 2.21 | 24 | 30   | 22 | 5±1 3.7    |
| EE10M      | 32.3 | 1.27 | 68                          | 2.68 | 27 | 50   | 37 | 23 5±1 3.7 |

Ordering codes and description composition

EE08M/ 1 0 N B



1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                                            |
|------------------------|-------------|--------------------------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                                        |
| <b>EE08M/10NB</b>      | OEE08002006 | Normally open configuration (N.O.) without emergency   |
| <b>EE08M/20NB</b>      | OEE08002007 | Normally closed configuration (N.C.) without emergency |
| <b>SAE cavity 10/2</b> |             |                                                        |
| <b>EE10M/10NB</b>      | OEE10002013 | Normally open configuration (N.O.) without emergency   |
| <b>EE10M/20NB</b>      | OEE10002014 | Normally closed configuration (N.C.) without emergency |

2 Spool

| TYPE     | DESCRIPTION                   |
|----------|-------------------------------|
| <b>1</b> | Normally open configuration   |
| <b>2</b> | Normally closed configuration |

3 Emergency

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>N</b> | Without emergency |

4 Seals

| TYPE     | DESCRIPTION                                            |
|----------|--------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

5 Coils

| TYPE            | CODE        | DESCRIPTION        |
|-----------------|-------------|--------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil |
| <b>BC12VDC</b>  | 4SL8000120  | 12VDC-ISO4400 coil |

For complete coils list see page 201

6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 1/2</b> | 3CC1020D11 | Aluminium body for cavity 10 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201



## Directional control valves

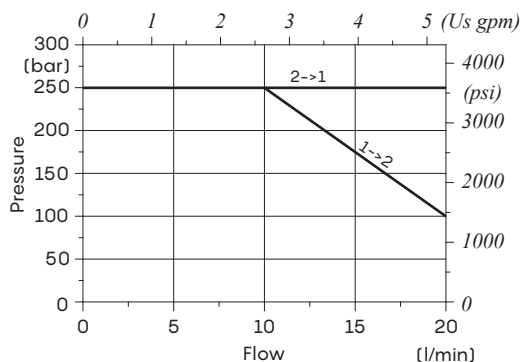
Directional solenoid valves - 2 way / 2 positions

**EE..M type**

### Rating diagrams

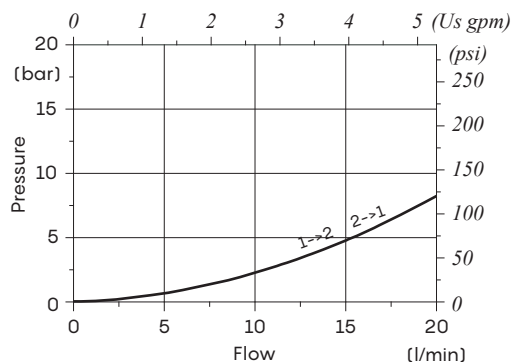
**EE08M performance range**

- Spool 1 / 2 -



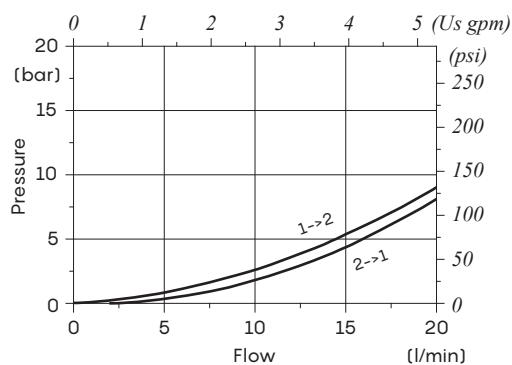
**EE08M pressure drop vs. flow**

- Spool 1 -



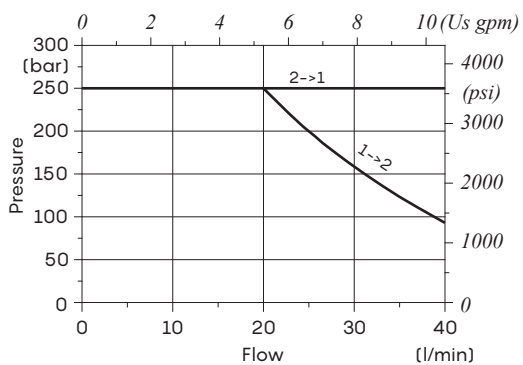
**EE08M pressure drop vs. flow**

- Spool 2 -



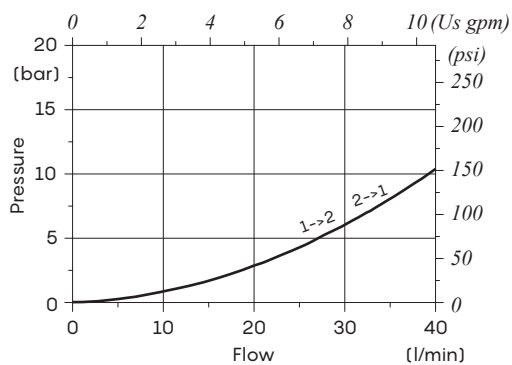
**EE10M performance range**

- Spool 1 / 2 -



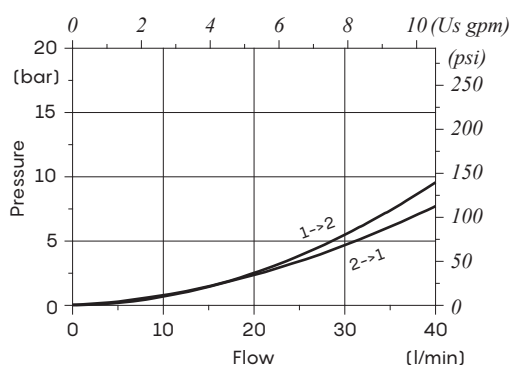
**EE10M pressure drop vs. flow**

- Spool 1 -



**EE10M pressure drop vs. flow**

- Spool 2 -







## EC..M type directional solenoid valves – 2 way / 2 positions

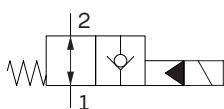
- Poppet type
- Piloted acting with on-off solenoid
- External zinc-plated and corrosion-proof components
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

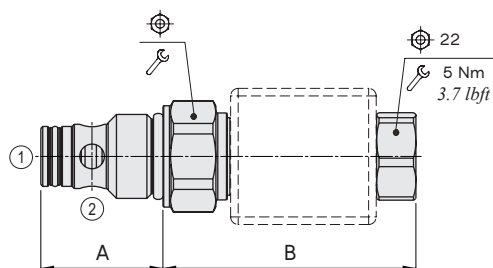
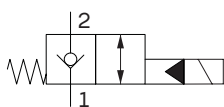
|                                            |                                               | EC08M                                                                    | EC10M                     | EC12M                    | EC16M                    |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|---------------------------|--------------------------|--------------------------|
| Max. flow                                  |                                               | 40 l/min<br>(10.5 US gpm)                                                | 70 l/min<br>(18.5 US gpm) | 150 l/min<br>(40 US gpm) | 150 l/min<br>(40 US gpm) |
| Max. pressure                              |                                               | 380 bar (5500 psi)                                                       |                           |                          |                          |
| Oil leakage                                | at 210 bar<br>(3050 psi)                      | 0.25 cm³/min (0.015 in³/min)                                             |                           |                          |                          |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                           |                          |                          |
| Viscosity                                  |                                               | 10–200 cSt                                                               |                           |                          |                          |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                           |                          |                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                           |                          |                          |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                           |                          |                          |
| Cavity                                     |                                               | SAE 08/2                                                                 | SAE 10/2                  | SAE 12/2                 | SAE 16/2                 |
| Coil type*                                 |                                               | BER                                                                      |                           |                          |                          |
| Nominal voltages                           |                                               | 12VDC - 24VDC ±10%                                                       |                           |                          |                          |
| Power rating                               |                                               | 19 W (12VDC - 24VDC)                                                     |                           |                          |                          |
| Weight                                     |                                               | 0.135 kg (0.30 lb)                                                       | 0.170 kg (0.37 lb)        | 0.230 kg (0.51 lb)       | 0.315 kg (0.69 lb)       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

**Normally open  
configuration**



**Normally closed  
configuration**

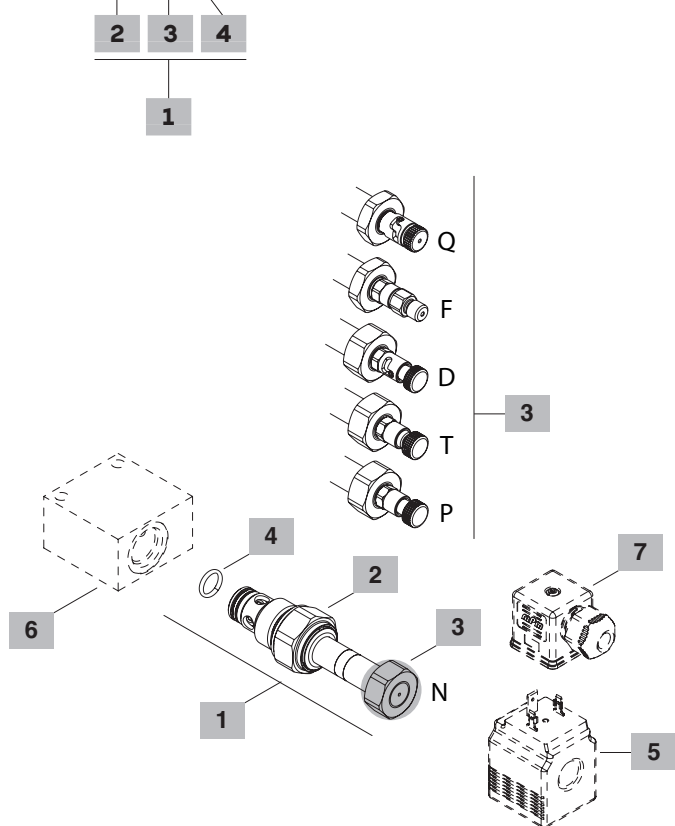


| Valve type | A    |      | B    |      | N<br>without<br>emergency | Nm | lbf |
|------------|------|------|------|------|---------------------------|----|-----|
|            | mm   | in   | mm   | in   |                           |    |     |
| EC10M/1    | 32.3 | 1.27 | 66.9 | 2.63 | 27                        | 50 | 37  |

For dimensions with different type of emergency see list page 147

## Ordering codes and description composition

EC08M/ 1 0 N B



### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                              |
|------------------------|-------------|------------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                          |
| EC08M/10NB             | OEC08002031 | Normally open (N.O.) without emergency   |
| EC08M/10PB             | OEC08002033 | (N.O.) push button emergency             |
| EC08M/10TB             | OEC08002034 | (N.O.) screw type emergency              |
| EC08M/10DB             | OEC08002035 | (N.O.) push type with detent emergency   |
| EC08M/20NB             | OEC08002032 | Normally closed (N.C.) without emergency |
| EC08M/20FB             | OEC08002036 | (N.C.) pull button emergency             |
| EC08M/20TB             | OEC08002037 | (N.C.) screw type emergency              |
| EC08M/20QB             | OEC08002038 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 10/2</b> |             |                                          |
| EC10M/10NB             | OEC10002012 | Normally open (N.O.) without emergency   |
| EC10M/10PB             | OEC10002014 | (N.O.) push button emergency             |
| EC10M/10TB             | OEC10002015 | (N.O.) screw type emergency              |
| EC10M/10DB             | OEC10002016 | (N.O.) push type with detent emergency   |
| EC10M/20NB             | OEC10002013 | Normally closed (N.C.) without emergency |
| EC10M/20FB             | OEC10002017 | (N.C.) pull button emergency             |
| EC10M/20TB             | OEC10002018 | (N.C.) screw type emergency              |
| EC10M/20QB             | OEC10002019 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 12/2</b> |             |                                          |
| EC12M/10NB             | OEC12002007 | Normally open (N.O.) without emergency   |
| EC12M/10PB             | OEC12002009 | (N.O.) push button emergency             |
| EC12M/10TB             | OEC12002010 | (N.O.) screw type emergency              |
| EC12M/10DB             | OEC12002011 | (N.O.) push type with detent emergency   |
| EC12M/20NB             | OEC12002008 | Normally closed (N.C.) without emergency |
| EC12M/20FB             | OEC12002012 | (N.C.) pull button emergency             |
| EC12M/20TB             | OEC12002013 | (N.C.) screw type emergency              |
| EC12M/20QB             | OEC12002014 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 16/2</b> |             |                                          |
| EC16M/10NB             | OEC16002020 | Normally open (N.O.) without emergency   |
| EC16M/10PB             | OEC16002022 | (N.O.) push button emergency             |
| EC16M/10TB             | OEC16002023 | (N.O.) screw type emergency              |
| EC16M/10DB             | OEC16002024 | (N.O.) push type with detent emergency   |
| EC16M/20NB             | OEC16002021 | Normally closed (N.C.) without emergency |
| EC16M/20FB             | OEC16002025 | (N.C.) pull button emergency             |
| EC16M/20TB             | OEC16002026 | (N.C.) screw type emergency              |
| EC16M/20QB             | OEC16002027 | (N.C.) pull type with detent emergency   |

### 2 Spool

| TYPE | DESCRIPTION                   |
|------|-------------------------------|
| 1    | Normally open configuration   |
| 2    | Normally closed configuration |

### 3 Emergency

| TYPE | DESCRIPTION                  |
|------|------------------------------|
| N    | Without emergency            |
| P    | Push button type (N.O.)      |
| T    | Screw type                   |
| D    | Push type with detent (N.O.) |
| F    | Pull button type (N.C.)      |
| Q    | Pull type with detent (N.C.) |

### 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

### 5 Coil

| TYPE     | CODE        | DESCRIPTION        |
|----------|-------------|--------------------|
| BER12VDC | 4SLE001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

### 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

### 7 Connector

| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

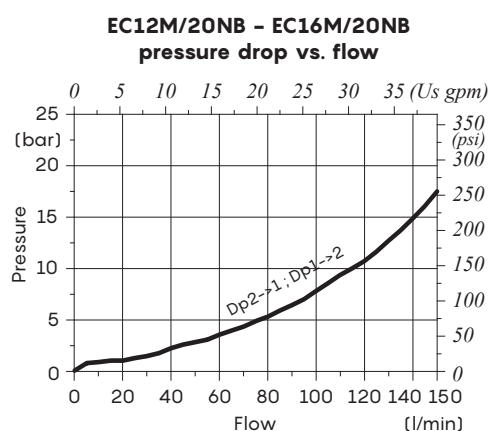
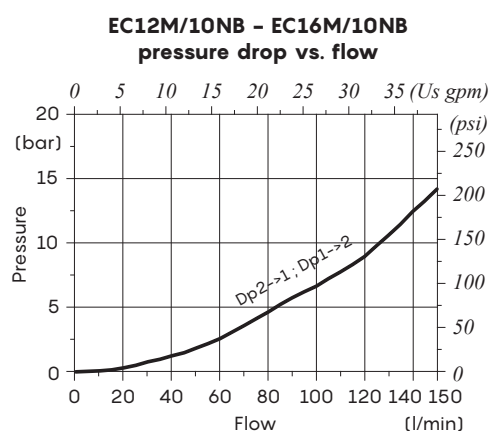
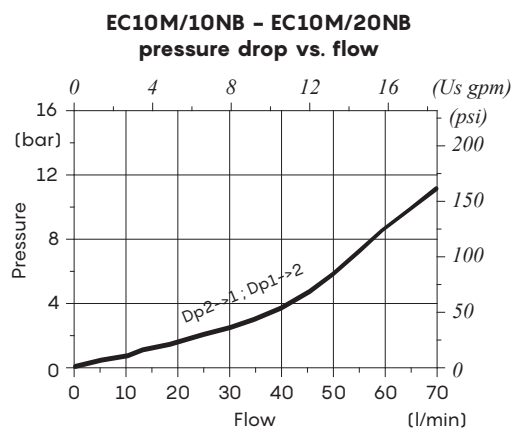
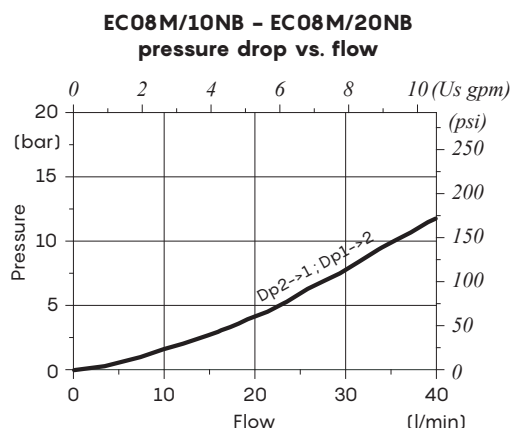
For complete connectors list see from page 201

## Directional control valves

Directional solenoid valves - 2 way / 2 positions

EC..M type

### Rating diagrams



### Types and dimensions

| Valve type | A    |      | B                         |      |            |      |                  |      |                               |      |                  |      |                               |      |    |    |      |
|------------|------|------|---------------------------|------|------------|------|------------------|------|-------------------------------|------|------------------|------|-------------------------------|------|----|----|------|
|            | mm   | in   | N<br>without<br>emergency |      | T<br>screw |      | P<br>push button |      | D<br>push type<br>with detent |      | F<br>pull button |      | Q<br>pull type<br>with detent |      |    |    |      |
|            |      |      | mm                        | in   | mm         | in   | mm               | in   | mm                            | in   | mm               | in   | mm                            | in   |    | Nm | lbft |
| EC08M/1    | 28   | 1.10 | 67.2                      | 2.64 | 90.1       | 3.55 | 90.1             | 3.55 | 92.8                          | 3.65 | -                | -    | -                             | -    | 24 | 30 | 22   |
| EC08M/2    | 28   | 1.10 | 63.3                      | 2.49 | 77.8       | 3.06 | -                | -    | -                             | -    | 91.3             | 3.59 | 84.4                          | 3.32 | 24 | 30 | 22   |
| EC10M/1    | 32.3 | 1.27 | 66.9                      | 2.63 | 89.8       | 3.54 | 89.8             | 3.54 | 92.5                          | 3.64 | -                | -    | -                             | -    | 27 | 50 | 37   |
| EC10M/2    | 32.3 | 1.27 | 63                        | 2.48 | 77.5       | 3.05 | -                | -    | -                             | -    | 91               | 3.58 | 84.1                          | 3.31 | 27 | 50 | 37   |
| EC12M/1    | 45   | 1.77 | 61.2                      | 2.40 | 84.2       | 3.31 | 84               | 3.31 | 86.8                          | 3.42 | -                | -    | -                             | -    | 32 | 80 | 59   |
| EC12M/2    | 45   | 1.77 | 57.1                      | 2.25 | 73.7       | 2.9  | -                | -    | -                             | -    | 85.1             | 3.35 | 78                            | 3.07 | 32 | 80 | 59   |
| EC16M/1    | 46   | 1.81 | 61.2                      | 2.40 | 84         | 3.31 | 84.1             | 3.31 | 86                            | 3.39 | -                | -    | -                             | -    | 38 | 80 | 59   |
| EC16M/2    | 46   | 1.81 | 57                        | 2.24 | 71.6       | 2.82 | -                | -    | -                             | -    | 85               | 3.35 | 78.3                          | 3.08 | 38 | 80 | 59   |





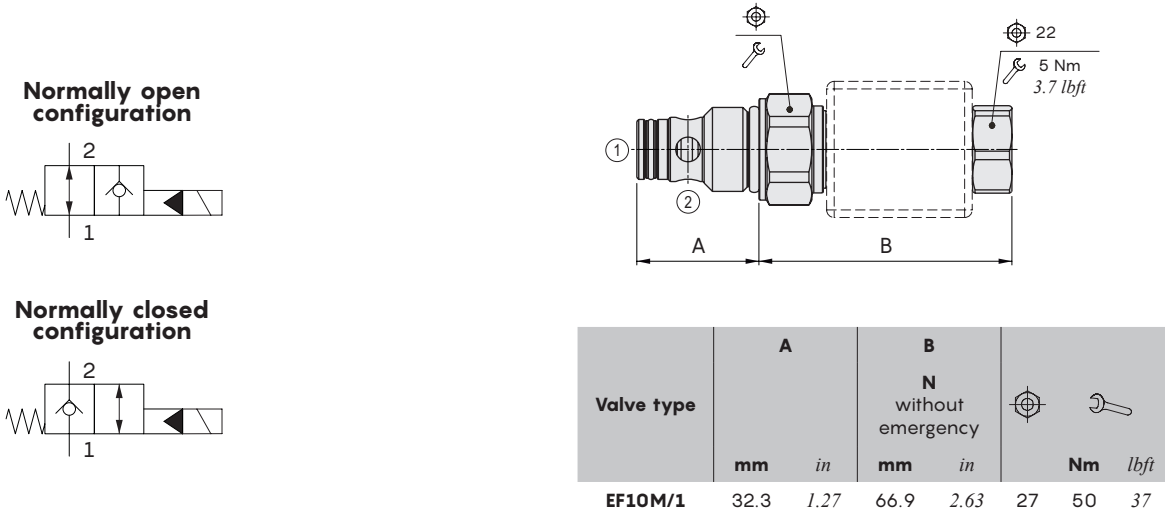
**EF..M type**  
**directional solenoid valves – 2 way / 2 positions**

- Poppet type
- Piloted acting with on-off solenoid
- External zinc-plated and corrosion-proof components
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                               | EF08M                                                                  | EF10M                                                                    | EF12M                    | EF16M                    |
|-----------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------|--------------------------|
| Max. flow                                     | 40 l/min<br>(10.5 US gpm)                                              | 70 l/min<br>(18.5 US gpm)                                                | 150 l/min<br>(40 US gpm) | 150 l/min<br>(40 US gpm) |
| Max. pressure                                 | 380 bar (5500 psi)                                                     |                                                                          |                          |                          |
| Oil leakage                                   | at 210 bar<br>(3050 psi)                                               | 0.50 cm³/min (0.030 in³/min)                                             |                          |                          |
| Fluid                                         | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |                          |                          |
| Viscosity                                     | 10-200 cSt                                                             |                                                                          |                          |                          |
| Max level of contamination                    | 18/16/13 ISO4406                                                       |                                                                          |                          |                          |
| Fluid temperature                             | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                          |                          |
| Environmental temp. for<br>working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |                          |                          |
| Cavity                                        | SAE 08/2                                                               | SAE 10/2                                                                 | SAE 12/2                 | SAE 16/2                 |
| Coil type*                                    | BER                                                                    |                                                                          |                          |                          |
| Nominal voltages                              | 12VDC - 24VDC ±10%                                                     |                                                                          |                          |                          |
| Power rating                                  | 19 W (12VDC - 24VDC)                                                   |                                                                          |                          |                          |
| Weight                                        | 0.135 kg (0.30 lb)                                                     | 0.170 kg (0.37 lb)                                                       | 0.230 kg (0.51 lb)       | 0.315 kg (0.69 lb)       |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.



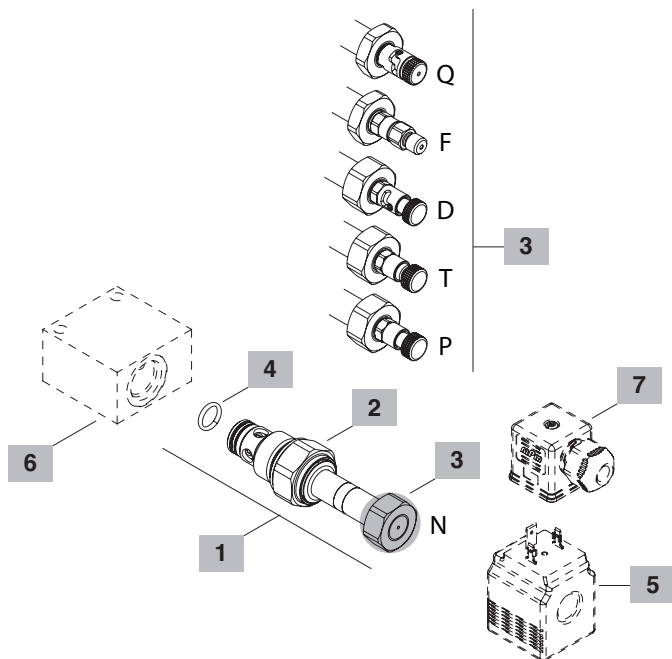
For dimensions with different type of emergency see list page 151

## Ordering codes and description composition

EF08M/ 1 0 N B

2 3 4

1



### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                              |
|------------------------|-------------|------------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                          |
| EF08M/10NB             | 0EF08002000 | Normally open (N.O.) without emergency   |
| EF08M/10PB             | 0EF08002002 | (N.O.) push button emergency             |
| EF08M/10TB             | 0EF08002003 | (N.O.) screw type emergency              |
| EF08M/10DB             | 0EF08002004 | (N.O.) push type with detent emergency   |
| EF08M/20NB             | 0EF08002001 | Normally closed (N.C.) without emergency |
| EF08M/20FB             | 0EF08002005 | (N.C.) pull button emergency             |
| EF08M/20TB             | 0EF08002006 | (N.C.) screw type emergency              |
| EF08M/20QB             | 0EF08002007 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 10/2</b> |             |                                          |
| EF10M/10NB             | 0EF10002000 | Normally open (N.O.) without emergency   |
| EF10M/10PB             | 0EF10002002 | (N.O.) push button emergency             |
| EF10M/10TB             | 0EF10002003 | (N.O.) screw type emergency              |
| EF10M/10DB             | 0EF10002004 | (N.O.) push type with detent emergency   |
| EF10M/20NB             | 0EF10002001 | Normally closed (N.C.) without emergency |
| EF10M/20FB             | 0EF10002005 | (N.C.) pull button emergency             |
| EF10M/20TB             | 0EF10002006 | (N.C.) screw type emergency              |
| EF10M/20QB             | 0EF10002007 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 12/2</b> |             |                                          |
| EF12M/10NB             | 0EF12002000 | Normally open (N.O.) without emergency   |
| EF12M/10PB             | 0EF12002002 | (N.O.) push button emergency             |
| EF12M/10TB             | 0EF12002003 | (N.O.) screw type emergency              |
| EF12M/10DB             | 0EF12002004 | (N.O.) push type with detent emergency   |
| EF12M/20NB             | 0EF12002001 | Normally closed (N.C.) without emergency |
| EF12M/20FB             | 0EF12002005 | (N.C.) pull button emergency             |
| EF12M/20TB             | 0EF12002006 | (N.C.) screw type emergency              |
| EF12M/20QB             | 0EF12002007 | (N.C.) pull type with detent emergency   |
| <b>SAE cavity 16/2</b> |             |                                          |
| EF16M/10NB             | 0EF16002000 | Normally open (N.O.) without emergency   |
| EF16M/10PB             | 0EF16002002 | (N.O.) push button emergency             |
| EF16M/10TB             | 0EF16002003 | (N.O.) screw type emergency              |
| EF16M/10DB             | 0EF16002004 | (N.O.) push type with detent emergency   |
| EF16M/20NB             | 0EF16002001 | Normally closed (N.C.) without emergency |
| EF16M/20FB             | 0EF16002005 | (N.C.) pull button emergency             |
| EF16M/20TB             | 0EF16002006 | (N.C.) screw type emergency              |
| EF16M/20QB             | 0EF16002007 | (N.C.) pull type with detent emergency   |

### 2 Spool

| TYPE | DESCRIPTION                   |
|------|-------------------------------|
| 1    | Normally open configuration   |
| 2    | Normally closed configuration |

### 3 Emergency

| TYPE | DESCRIPTION                  |
|------|------------------------------|
| N    | Without emergency            |
| P    | Push button type (N.O.)      |
| T    | Screw type                   |
| D    | Push type with detent (N.O.) |
| F    | Pull button type (N.C.)      |
| Q    | Pull type with detent (N.C.) |

### 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

### 5 Coil

| TYPE     | CODE        | DESCRIPTION        |
|----------|-------------|--------------------|
| BER12VDC | 4SLE001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

### 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

### 7 Connector

| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

For complete connectors list see from page 201

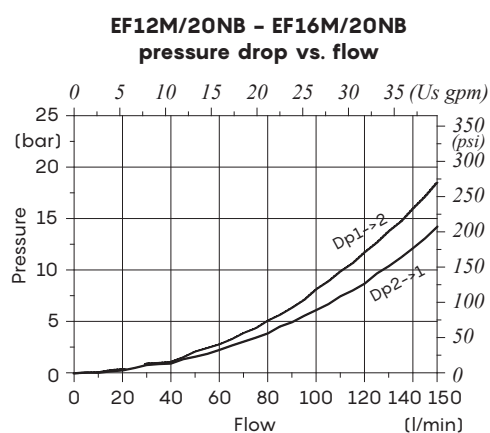
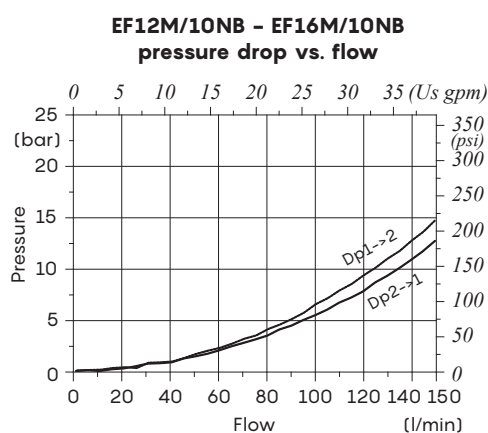
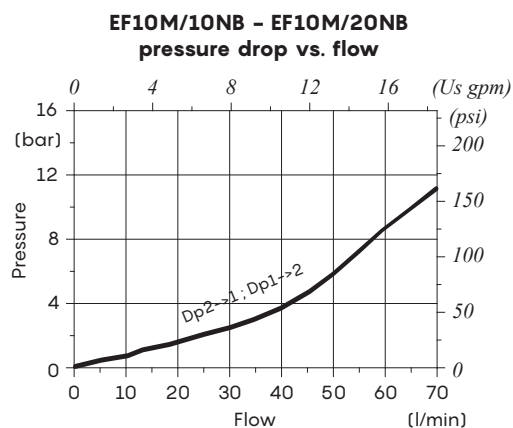
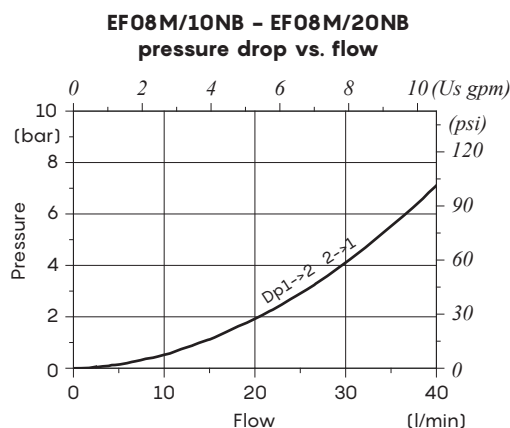


## Directional control valves

Directional solenoid valves - 2 way / 2 positions

**EF..M type**

### Rating diagrams



### Types and dimensions

| Valve type | A    |      | B                               |      |                  |      |                        |      |                                     |      |                        |      |                                     |      |   |    |    |
|------------|------|------|---------------------------------|------|------------------|------|------------------------|------|-------------------------------------|------|------------------------|------|-------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
|            | mm   | in   | N<br>without<br>emergency<br>mm | in   | T<br>screw<br>mm | in   | P<br>push button<br>mm | in   | D<br>push type<br>with detent<br>mm | in   | F<br>pull button<br>mm | in   | Q<br>pull type<br>with detent<br>mm | in   |                                                                                                                                                                             |    |    |
| EF08M/1    | 28   | 1.10 | 67.2                            | 2.64 | 90.1             | 3.55 | 90.1                   | 3.55 | 92.8                                | 3.65 | -                      | -    | -                                   | -    | 24                                                                                                                                                                          | 30 | 22 |
| EF08M/2    | 28   | 1.10 | 63.3                            | 2.49 | 77.8             | 3.06 | -                      | -    | -                                   | -    | 91.3                   | 3.59 | 84.4                                | 3.32 | 24                                                                                                                                                                          | 30 | 22 |
| EF10M/1    | 32.3 | 1.27 | 66.9                            | 2.63 | 89.8             | 3.54 | 89.8                   | 3.54 | 92.5                                | 3.64 | -                      | -    | -                                   | -    | 27                                                                                                                                                                          | 50 | 37 |
| EF10M/2    | 32.3 | 1.27 | 63                              | 2.48 | 77.5             | 3.05 | -                      | -    | -                                   | -    | 91                     | 3.58 | 84.1                                | 3.31 | 27                                                                                                                                                                          | 50 | 37 |
| EF12M/1    | 45   | 1.77 | 61.1                            | 2.40 | 84               | 3.31 | 84                     | 3.31 | 86.7                                | 3.41 | -                      | -    | -                                   | -    | 32                                                                                                                                                                          | 80 | 59 |
| EF12M/2    | 45   | 1.77 | 57.1                            | 2.25 | 71.6             | 2.82 | -                      | -    | -                                   | -    | 85.1                   | 3.35 | 78.2                                | 3.08 | 32                                                                                                                                                                          | 80 | 59 |
| EF16M/1    | 46   | 1.81 | 61.2                            | 2.40 | 84               | 3.31 | 84.1                   | 3.31 | 86                                  | 3.39 | -                      | -    | -                                   | -    | 38                                                                                                                                                                          | 80 | 59 |
| EF16M/2    | 46   | 1.81 | 57.2                            | 2.25 | 71.6             | 2.82 | -                      | -    | -                                   | -    | 85                     | 3.35 | 78.3                                | 3.08 | 38                                                                                                                                                                          | 80 | 59 |





## EH..M type directional solenoid valves – 2 way / 2 positions

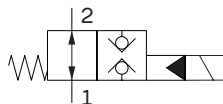
- Poppet type
- Piloted acting with on-off solenoid
- With check in both directions
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

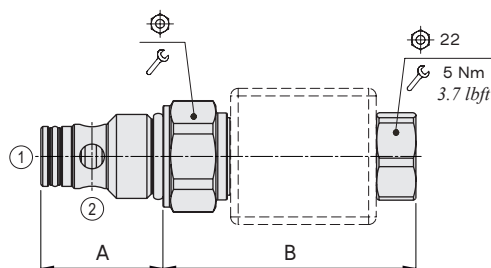
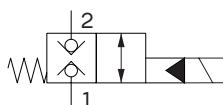
|                                            |                                               | EH08M                                                                    | EH10M                     | EH12M                     | EH16M                    |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|---------------------------|---------------------------|--------------------------|
| Max. flow                                  |                                               | 40 l/min<br>(10.5 US gpm)                                                | 70 l/min<br>(18.5 US gpm) | 150 l/min<br>(40 US gpm)  | 150 l/min<br>(40 US gpm) |
| Max. pressure                              |                                               | 380 bar (5500 psi)                                                       |                           |                           |                          |
| Oil leakage                                | at 210 bar<br>(3050 psi)                      | 0.50 cm³/min (0.030 in³/min)                                             |                           | 1 cm³/min (0.061 in³/min) |                          |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                           |                           |                          |
| Viscosity                                  |                                               | 10–200 cSt                                                               |                           |                           |                          |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                           |                           |                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                           |                           |                          |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                           |                           |                          |
| Cavity                                     |                                               | SAE 08/2                                                                 | SAE 10/2                  | SAE 12/2                  | SAE 16/2                 |
| Coil type*                                 |                                               | BER                                                                      |                           |                           |                          |
| Nominal voltages                           |                                               | 12VDC - 24VDC ±10%                                                       |                           |                           |                          |
| Power rating                               |                                               | 19 W (12VDC - 24VDC)                                                     |                           |                           |                          |
| Weight                                     |                                               | 0.135 kg (0.30 lb)                                                       | 0.170 kg (0.37 lb)        | 0.230 kg (0.51 lb)        | 0.315 kg (0.69 lb)       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

**Normally open configuration**



**Normally closed configuration**

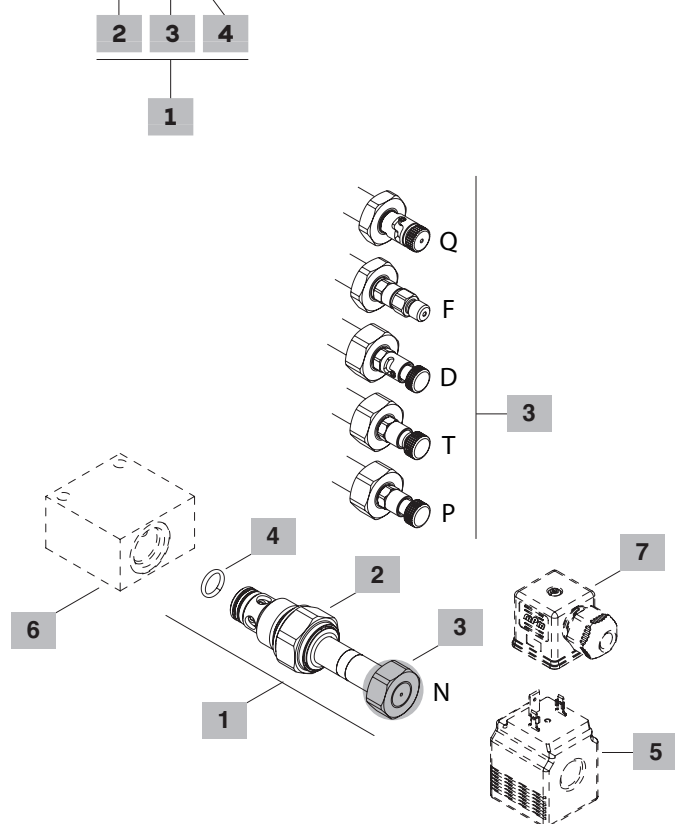


| Valve type | A    |      | B    |      | N<br>without emergency |    | Nm | lbf |
|------------|------|------|------|------|------------------------|----|----|-----|
|            | mm   | in   | mm   | in   | mm                     | in |    |     |
| EH10M/1    | 32.3 | 1.27 | 66.9 | 2.63 | 27                     | 50 | 37 |     |

For dimensions with different type of emergency see list page 155

## Ordering codes and description composition

EH08M/ 1 0 N B



## 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                              |
|------------------------|-------------|------------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                          |
| EH08M/10NB             | 0EH08002000 | Normally open (N.O.) without emergency   |
| EH08M/10PB             | 0EH08002002 | (N.O.) push button emergency             |
| EH08M/10TB             | 0EH08002003 | (N.O.) screw type emergency              |
| EH08M/10DB             | 0EH08002004 | (N.O.) push type with detent emergency   |
| EH08M/20NB             | 0EH08002001 | Normally closed (N.C.) without emergency |
| EH08M/20FB             | 0EH08002005 | (N.C.) pull button emergency             |
| EH08M/20TB             | 0EH08002006 | (N.C.) screw type emergency              |
| EH08M/20QB             | 0EH08002007 | (N.C.) pull type with detent emergency   |

**SAE cavity 10/2**

|            |             |                                          |
|------------|-------------|------------------------------------------|
| EH10M/10NB | 0EH10002000 | Normally open (N.O.) without emergency   |
| EH10M/10PB | 0EH10002002 | (N.O.) push button emergency             |
| EH10M/10TB | 0EH10002003 | (N.O.) screw type emergency              |
| EH10M/10DB | 0EH10002004 | (N.O.) push type with detent emergency   |
| EH10M/20NB | 0EH10002001 | Normally closed (N.C.) without emergency |
| EH10M/20FB | 0EH10002005 | (N.C.) pull button emergency             |
| EH10M/20TB | 0EH10002006 | (N.C.) screw type emergency              |
| EH10M/20QB | 0EH10002007 | (N.C.) pull type with detent emergency   |

**SAE cavity 12/2**

|            |             |                                          |
|------------|-------------|------------------------------------------|
| EH12M/10NB | 0EH12002000 | Normally open (N.O.) without emergency   |
| EH12M/10PB | 0EH12002002 | (N.O.) push button emergency             |
| EH12M/10TB | 0EH12002003 | (N.O.) screw type emergency              |
| EH12M/10DB | 0EH12002004 | (N.O.) push type with detent emergency   |
| EH12M/20NB | 0EH12002001 | Normally closed (N.C.) without emergency |
| EH12M/20FB | 0EH12002005 | (N.C.) pull button emergency             |
| EH12M/20TB | 0EH12002006 | (N.C.) screw type emergency              |
| EH12M/20QB | 0EH12002007 | (N.C.) pull type with detent emergency   |

**SAE cavity 16/2**

|            |             |                                          |
|------------|-------------|------------------------------------------|
| EH16M/10NB | 0EH16002000 | Normally open (N.O.) without emergency   |
| EH16M/10PB | 0EH16002002 | (N.O.) push button emergency             |
| EH16M/10TB | 0EH16002003 | (N.O.) screw type emergency              |
| EH16M/10DB | 0EH16002004 | (N.O.) push type with detent emergency   |
| EH16M/20NB | 0EH16002001 | Normally closed (N.C.) without emergency |
| EH16M/20FB | 0EH16002005 | (N.C.) pull button emergency             |
| EH16M/20TB | 0EH16002006 | (N.C.) screw type emergency              |
| EH16M/20QB | 0EH16002007 | (N.C.) pull type with detent emergency   |

## 2 Spool

| TYPE | DESCRIPTION                   |
|------|-------------------------------|
| 1    | Normally open configuration   |
| 2    | Normally closed configuration |

## 3 Emergency

| TYPE | DESCRIPTION                  |
|------|------------------------------|
| N    | Without emergency            |
| P    | Push button type (N.O.)      |
| T    | Screw type                   |
| D    | Push type with detent (N.O.) |
| F    | Pull button type (N.C.)      |
| Q    | Pull type with detent (N.C.) |

## 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

## 5 Coil

| TYPE     | CODE        | DESCRIPTION        |
|----------|-------------|--------------------|
| BER12VDC | 4SLE001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

## 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/2-G 3/8 | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/2-G 3/8 | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/2-G 1/2 | 3CC1220D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |
| SAE16/2-G 3/4 | 3CC1620E11 | Aluminium body for cavity 16 valve, G 3/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)

For steel bodies or different threading see from page 208

## 7 Connector

| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

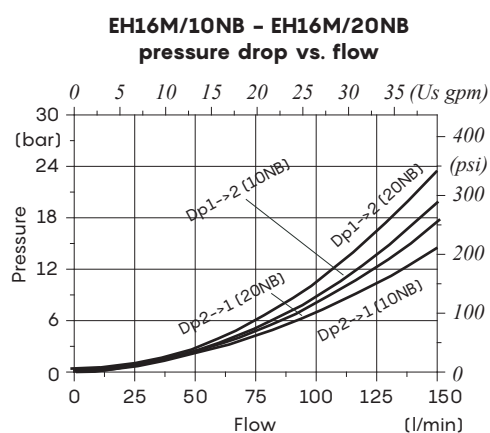
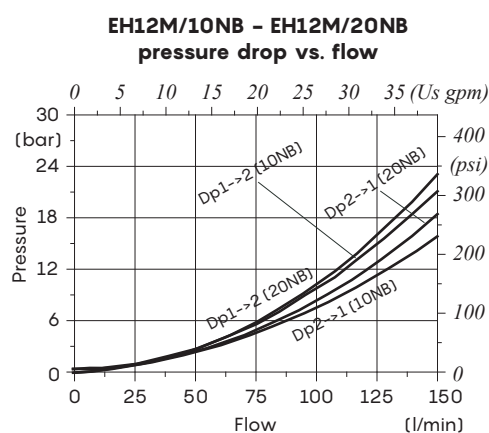
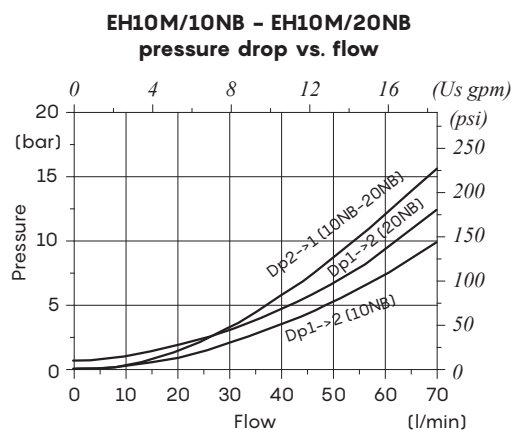
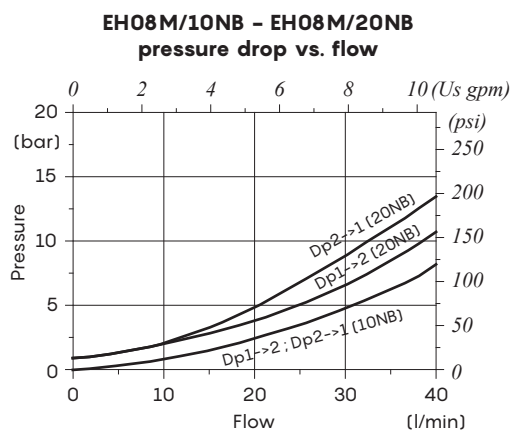
For complete connectors list see from page 201

## Directional control valves

Directional solenoid valves - 2 way / 2 positions

**EH..M type**

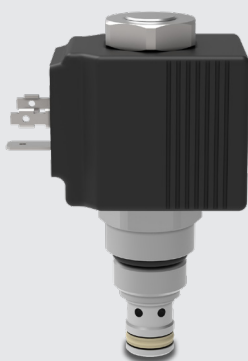
### Rating diagrams



### Types and dimensions

| Valve type | A    |      | B                         |            |                  |                               |                  |                               |      |      |      |      |      |      |    |    |    |
|------------|------|------|---------------------------|------------|------------------|-------------------------------|------------------|-------------------------------|------|------|------|------|------|------|----|----|----|
|            | mm   | in   | N<br>without<br>emergency | T<br>screw | P<br>push button | D<br>push type<br>with detent | F<br>pull button | Q<br>pull type<br>with detent |      |      |      |      |      |      |    |    |    |
| EH08M/1    | 28   | 1.10 | 67.2                      | 2.64       | 90.1             | 3.55                          | 90.1             | 3.55                          | 92.8 | 3.65 | -    | -    | -    | -    | 24 | 30 | 22 |
| EH08M/2    | 28   | 1.10 | 63.1                      | 2.48       | 77.8             | 3.06                          | -                | -                             | -    | -    | 91.3 | 3.59 | 84.4 | 3.32 | 24 | 30 | 22 |
| EH10M/1    | 32.3 | 1.27 | 66.9                      | 2.63       | 89.8             | 3.54                          | 89.8             | 3.54                          | 92.5 | 3.64 | -    | -    | -    | -    | 27 | 50 | 37 |
| EH10M/2    | 32.3 | 1.27 | 63                        | 2.48       | 77.5             | 3.05                          | -                | -                             | -    | -    | 90.8 | 3.57 | 84.1 | 3.31 | 27 | 50 | 37 |
| EH12M/1    | 45   | 1.77 | 61.3                      | 2.41       | 84.2             | 3.31                          | 83.9             | 3.30                          | 86.8 | 3.42 | -    | -    | -    | -    | 32 | 80 | 59 |
| EH12M/2    | 45   | 1.77 | 57.1                      | 2.25       | 73.7             | 2.9                           | -                | -                             | -    | -    | 85.1 | 3.35 | 78   | 3.07 | 32 | 80 | 59 |
| EH16M/1    | 46   | 1.81 | 61.3                      | 2.41       | 84               | 3.31                          | 84.2             | 3.31                          | 86   | 3.39 | -    | -    | -    | -    | 38 | 80 | 59 |
| EH16M/2    | 46   | 1.81 | 57.1                      | 2.25       | 71.6             | 2.82                          | -                | -                             | -    | -    | 85.3 | 3.36 | 78.3 | 3.08 | 38 | 80 | 59 |





## EW..M type directional solenoid valves – 2 way/2 positions

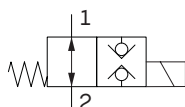
- Poppet type
- Direct acting with on-off solenoid
- With check in both directions
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

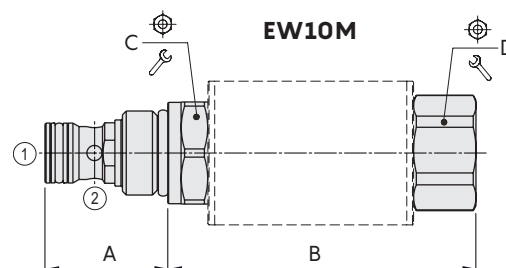
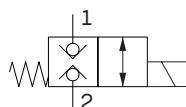
|                                            | EW08M                                                                  | EW10M                                                                    |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 20 l/min (5.28 US gpm)                                                 | 40 l/min (10.57 US gpm)                                                  |
| Max. pressure                              | 250 bar (3600 psi)                                                     | 350 bar (5100 psi)                                                       |
| Oil leakage                                | at 210 bar (5100 psi) 0.25 cm³/min (0.015 in³/min)                     |                                                                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  | 10–200 cSt                                                             |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                       |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                      |                                                                          |
| Cavity                                     | SAE 8/2                                                                | SAE 10/2                                                                 |
| Coil type*                                 | BER                                                                    | BH                                                                       |
| Nominal voltages                           | 12VDC – 24VDC ± 10%                                                    |                                                                          |
| Power rating                               | 19 W (12VDC – 24VDC)                                                   | 33 W                                                                     |
| Weight                                     | 0.15 kg (0.33 lb)                                                      | 0.30 kg (0.66 lb)                                                        |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

**Normally open configuration**

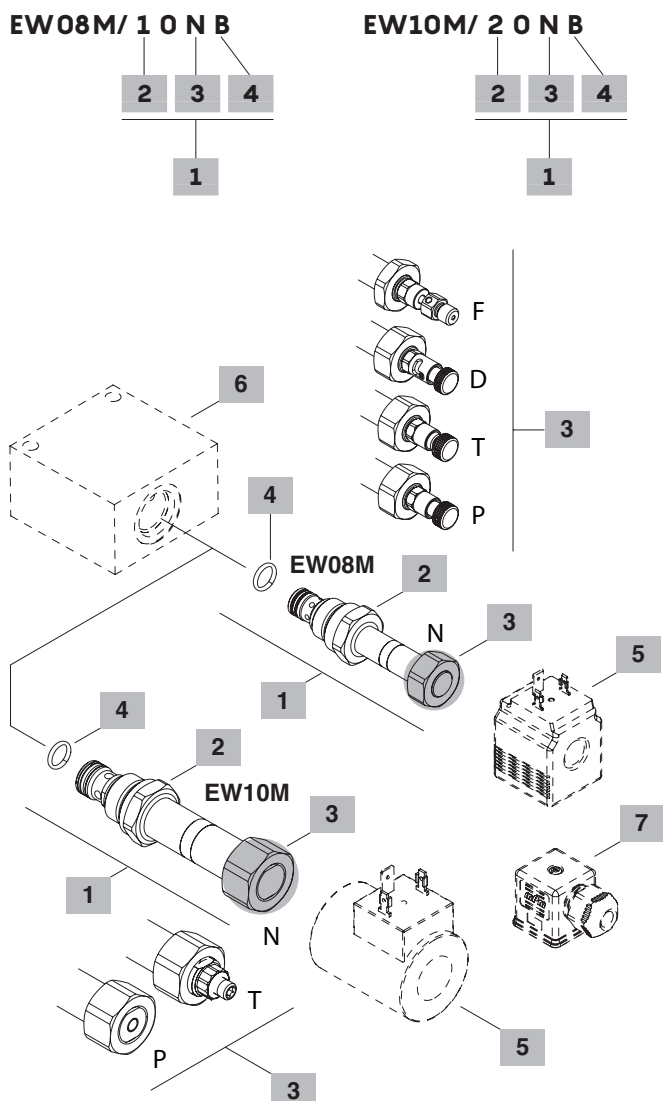


**Normally closed configuration**



| Valve type | A    |      | B                         |      |            |      |                  |      |                               |      |                  |      | C                                                                                     |                                                                                       | D                                                                                     |                                                                                       |   |     |
|------------|------|------|---------------------------|------|------------|------|------------------|------|-------------------------------|------|------------------|------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---|-----|
|            |      |      | N<br>without<br>emergency |      | T<br>screw |      | P<br>push button |      | D<br>push type<br>with detent |      | F<br>pull button |      |  |  |  |  |   |     |
|            | mm   | in   | mm                        | in   | mm         | in   | mm               | in   | mm                            | in   | mm               | in   | Nm                                                                                    | lbft                                                                                  | Nm                                                                                    | lbft                                                                                  |   |     |
| EW08M/1    | 28   | 1.10 | 60.2                      | 2.41 | 74.7       | 2.94 | -                | -    | -                             | -    | 88.2             | 3.47 | 24                                                                                    | 30                                                                                    | 22                                                                                    | 22                                                                                    | 5 | 3.7 |
| EW08M/2    | 28   | 1.10 | 62.5                      | 2.46 | 85.4       | 3.36 | 85.4             | 3.36 | 88.1                          | 3.47 | -                | -    | 24                                                                                    | 30                                                                                    | 22                                                                                    | 22                                                                                    | 5 | 3.7 |
| EW10M      | 32.5 | 1.28 | 81.5                      | 3.21 | 95.3       | 3.75 | 81.5             | 3.21 | -                             | -    | -                | -    | 27                                                                                    | 50                                                                                    | 37                                                                                    | 28                                                                                    | 5 | 3.7 |

### Ordering codes and description composition



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                              |
|------------------------|-------------|------------------------------------------|
| <b>SAE cavity 08/2</b> |             |                                          |
| <b>EW08M/10NB</b>      | 0EW08002014 | Normally open (N.O.) without emergency   |
| <b>EW08M/10FB</b>      | 0EW08002015 | (N.O.) pull button emergency             |
| <b>EW08M/10TB</b>      | 0EW08002016 | (N.O.) screw type emergency              |
| <b>EW08M/20NB</b>      | 0EW08002018 | Normally closed (N.C.) without emergency |
| <b>EW08M/20PB</b>      | 0EW08002019 | (N.C.) push button emergency             |
| <b>EW08M/20TB</b>      | 0EW08002020 | (N.C.) screw type emergency              |
| <b>EW08M/20DB</b>      | 0EW08002021 | (N.C.) push type with detent emergency   |
| <b>SAE cavity 10/2</b> |             |                                          |
| <b>EW10M/20NB</b>      | 0EW10002008 | Normally closed (N.C.) without emergency |
| <b>EW10M/20TB</b>      | 0EW10002009 | (N.C.) screw type emergency              |
| <b>EW10M/20PB</b>      | 0EW10002010 | (N.C.) push button emergency             |

#### 2 Spool

| TYPE     | DESCRIPTION                   |
|----------|-------------------------------|
| <b>1</b> | Normally open configuration   |
| <b>2</b> | Normally closed configuration |

#### 3 Emergency

| TYPE     | DESCRIPTION                                         |
|----------|-----------------------------------------------------|
| <b>N</b> | Without emergency                                   |
| <b>P</b> | Push button type (N.C.)                             |
| <b>T</b> | Screw type (N.C. - N.O. for EW08M / N.C. for EW10M) |
| <b>D</b> | Push type with detent (N.C.)                        |
| <b>F</b> | Pull button type (N.O.)                             |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE            | CODE        | DESCRIPTION                  |
|-----------------|-------------|------------------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil for EW08M |
| <b>BH12VDC</b>  | 4SLD001200A | 12VDC-ISO4400 coil for EW10M |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/2-G 3/8</b> | 3CC0820C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/2-G 3/8</b> | 3CC1020C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 208

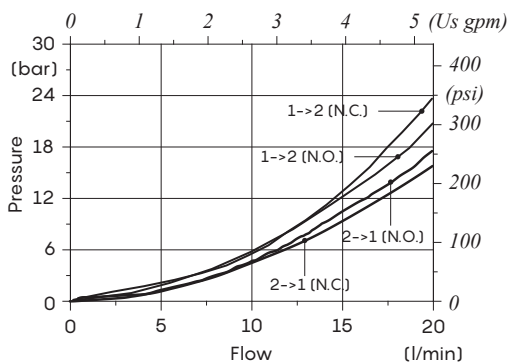
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

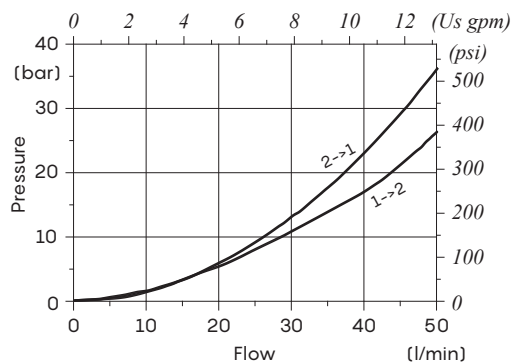
For complete connectors list see from page 201



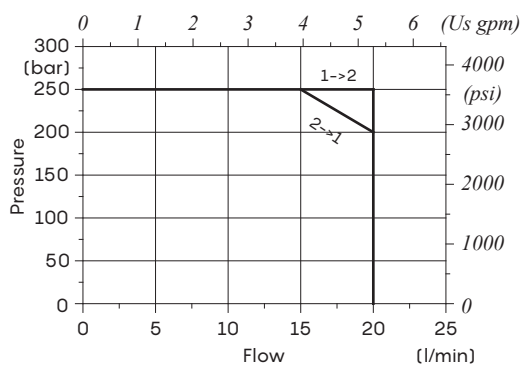
**EW08M pressure drop vs. flow**



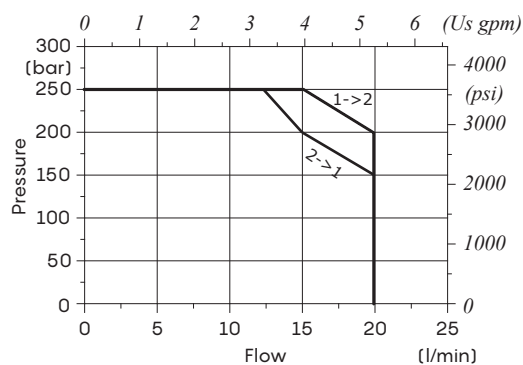
**EW10M pressure drop vs. flow (N.C.)**



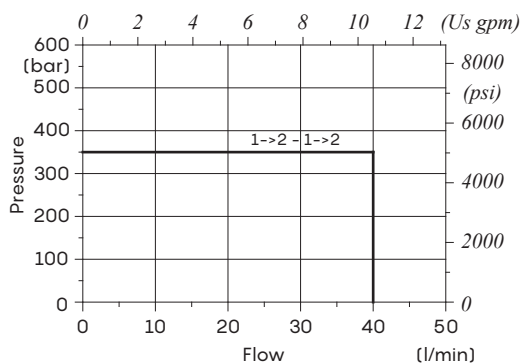
**EW08M performance limit (N.O.)**



**EW08M performance limit (N.C.)**



**EW10M performance limit (N.C.)**







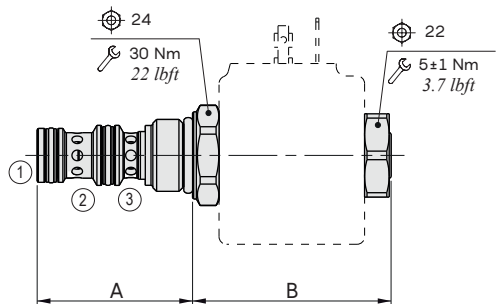
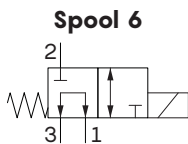
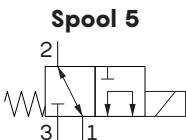
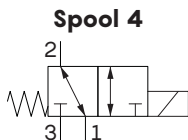
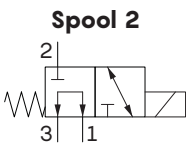
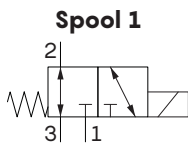
**EJ08MF type**  
**directional solenoid valves – 3 way / 2 positions**

- Spool type
- Direct acting with on-off solenoid
- Suitable for low pressure: 70 bar (1015 psi)
- Different types of emergencies available
- Different spool options and related schemes available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

| EJ08MF                                     |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 10 l/min (2.64 US gpm)                                                   |
| Max. pressure                              |                                               | 70 bar (1015 psi)                                                        |
| Oil leakage                                | at 70 bar (1015 psi)                          | 20 cm³/min (1.22 in³/min)                                                |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 8/3                                                                  |
| Coil type*                                 |                                               | BER                                                                      |
| Nominal voltages                           |                                               | 12VDC - 24VDC ± 10%                                                      |
| Power rating                               |                                               | 19 W                                                                     |
| Weight                                     |                                               | 0.358 kg (0.79 lb)                                                       |

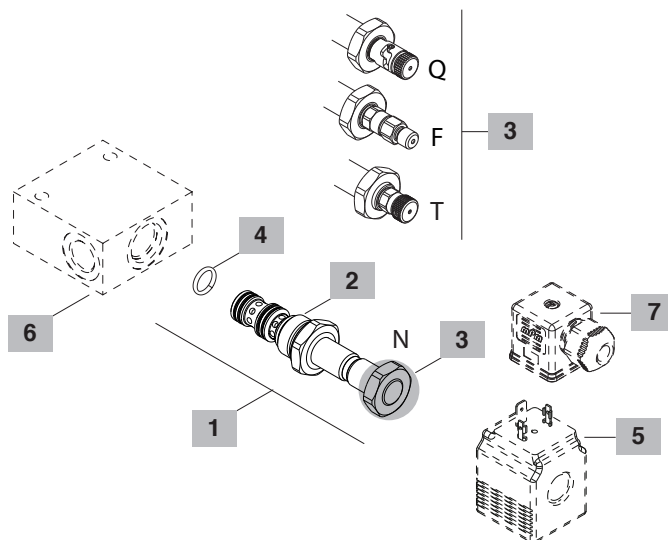
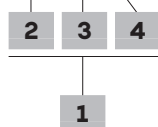
NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.



| Valve type | A    |      | B                         |      |                 |      |
|------------|------|------|---------------------------|------|-----------------|------|
|            |      |      | N<br>without<br>emergency |      | T<br>screw type |      |
|            | mm   | in   | mm                        | in   | mm              | in   |
| EJ08MF     | 41.1 | 1.62 | 52.5                      | 2.07 | 67.5            | 2.66 |

### Ordering codes and description composition

EJ08MF/ 1 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                   |
|------------------------|-------------|-------------------------------|
| <b>SAE cavity 08/3</b> |             |                               |
| <b>EJ08MF/10NB</b>     | 0EJ08002070 | Without emergency, spool 1    |
| <b>EJ08MF/20NB</b>     | 0EJ08002072 | Without emergency, spool 2    |
| <b>EJ08MF/40NB</b>     | 0EJ08002074 | Without emergency, spool 4    |
| <b>EJ08MF/50NB</b>     | 0EJ08002075 | Without emergency, spool 5    |
| <b>EJ08MF/60NB</b>     | 0EJ08002076 | Without emergency, spool 6    |
| <b>EJ08MF/20TB</b>     | 0EJ08002079 | Screw type emergency, spool 2 |

#### 2 Spool

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | Spool 1     |
| <b>2</b> | Spool 2     |
| <b>4</b> | Spool 4     |
| <b>5</b> | Spool 5     |
| <b>6</b> | Spool 6     |

#### 3 Emergency

| TYPE     | DESCRIPTION                  |
|----------|------------------------------|
| <b>N</b> | Without emergency            |
| <b>T</b> | Screw type                   |
| <b>F</b> | Pull button type (N.C.)      |
| <b>Q</b> | Pull type with detent (N.C.) |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE            | CODE        | DESCRIPTION        |
|-----------------|-------------|--------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 3/8</b> | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |

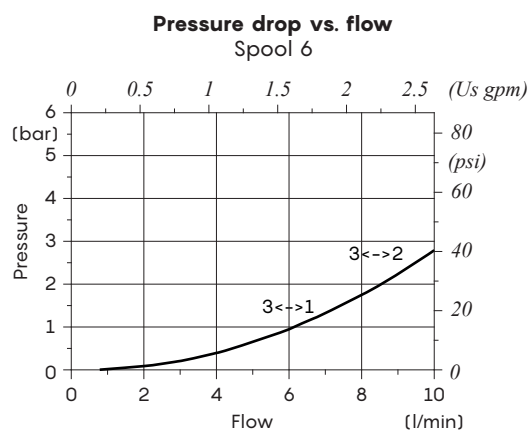
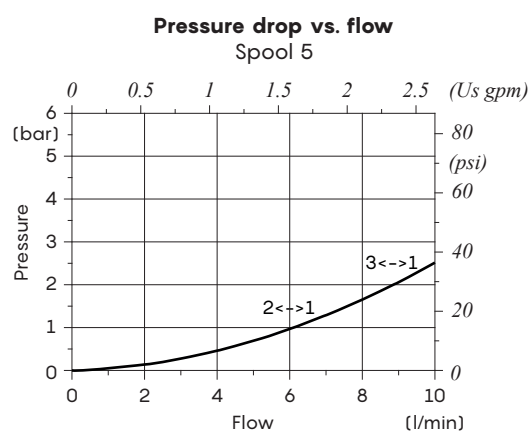
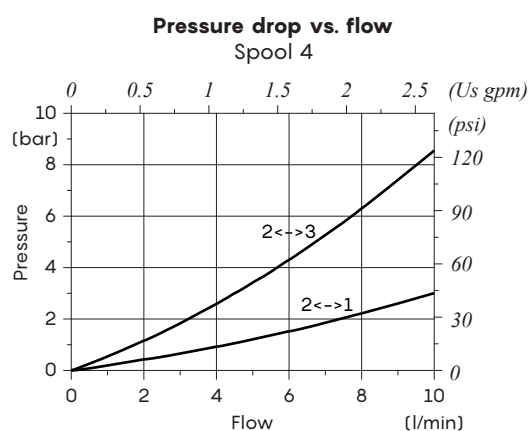
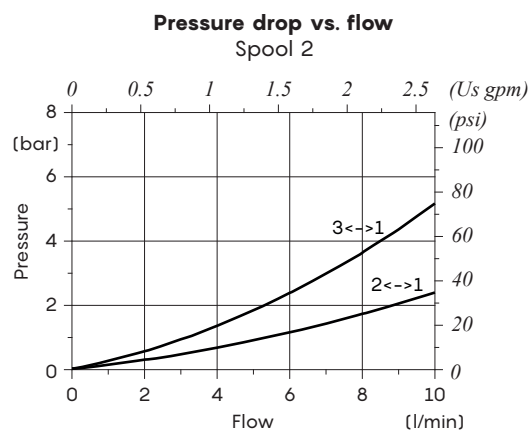
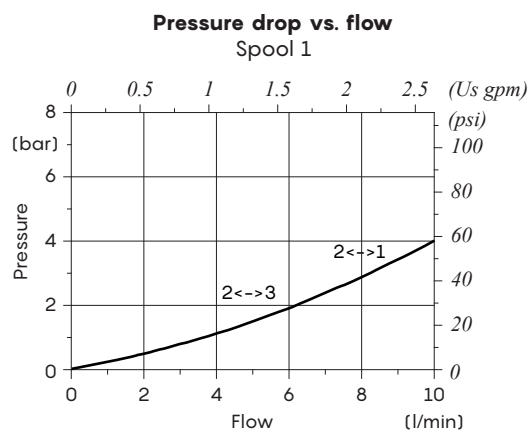
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

**Rating diagrams**







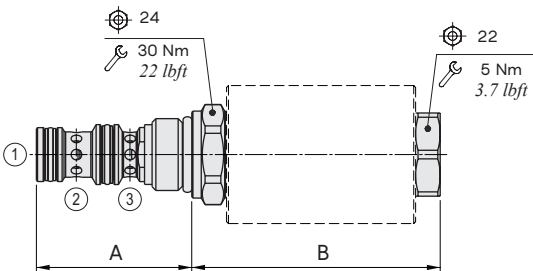
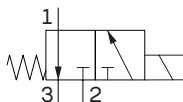
**EJ08G type**  
**directional solenoid valves – 3 way / 2 positions**

- Spool type
- Direct acting with on-off solenoid
- Suitable for high pressure: 350 bar (5100 psi)
- Different types of emergencies available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

| EJ08G                                      |                                                                        |                                                                          |
|--------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                                                        | 3 l/min (0.80 US gpm)                                                    |
| Max. pressure                              |                                                                        | 350 bar (5100 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi)                                                  | 10 cm³/min (0.61 in³/min)                                                |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties |                                                                          |
| Viscosity                                  |                                                                        | 10–200 cSt                                                               |
| Max level of contamination                 |                                                                        | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                          | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                                                        | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                                                        | SAE 8/3                                                                  |
| Coil type*                                 |                                                                        | BT                                                                       |
| Nominal voltages                           |                                                                        | 12VDC - 24VDC ± 10%                                                      |
| Power rating                               |                                                                        | 21 W                                                                     |
| Weight                                     |                                                                        | 0.134 kg (0.29 lb)                                                       |

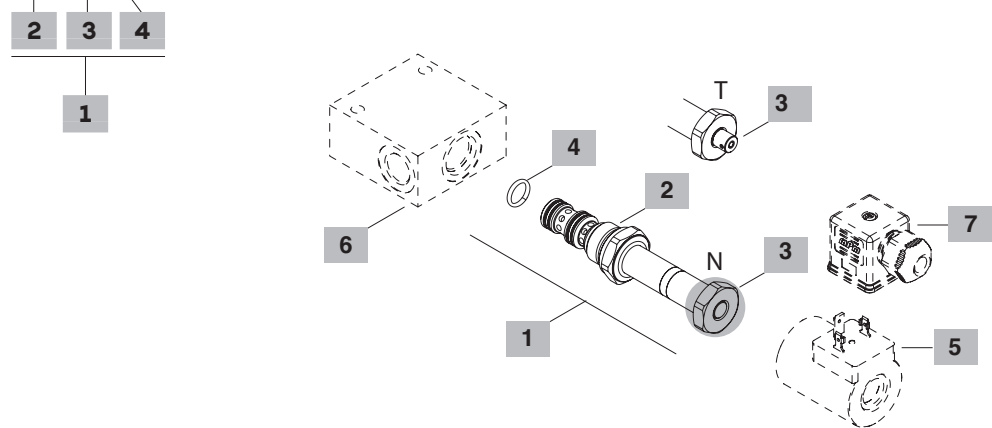
NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



| Valve type | A    |      | B                         |     |                 |      |
|------------|------|------|---------------------------|-----|-----------------|------|
|            |      |      | N<br>without<br>emergency |     | T<br>screw type |      |
|            | mm   | in   | mm                        | in  | mm              | in   |
| EJ08G      | 41.1 | 1.62 | 66                        | 2.6 | 73.5            | 2.89 |

Ordering codes and description composition

EJ08G/ 2 0 N B



1 Cartridges

| TYPE                   | CODE        | DESCRIPTION          |
|------------------------|-------------|----------------------|
| <b>SAE cavity 08/3</b> |             |                      |
| EJ08G/20NB             | 0EJ08002035 | Without emergency    |
| EJ08G/20TB             | 0EJ08002042 | Screw type emergency |

2 Spool

| TYPE | DESCRIPTION |
|------|-------------|
| 2    | Spool 2     |

3 Emergency

| TYPE | DESCRIPTION       |
|------|-------------------|
| N    | Without emergency |
| T    | Screw type        |

4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

5 Coils

| TYPE                                 | CODE       | DESCRIPTION        |
|--------------------------------------|------------|--------------------|
| BT12VDC                              | 4SL3000120 | 12VDC-ISO4400 coil |
| For complete coils list see page 201 |            |                    |

6 Valve body

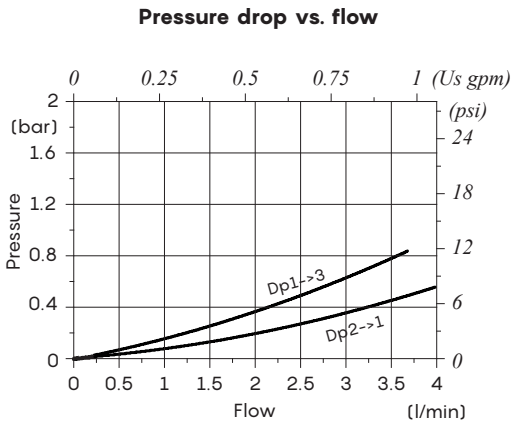
| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/3-G 1/4 | 3CC0830B11 | Aluminium body for cavity 08 valve, G 1/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

7 Connector

| TYPE                                           | CODE        | DESCRIPTION |
|------------------------------------------------|-------------|-------------|
| ISO4400                                        | 4CN1009995B | Connector   |
| For complete connectors list see from page 201 |             |             |

Rating diagrams







## EJ..M type directional solenoid valves – 3 way / 2 positions

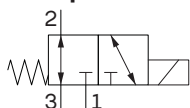
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- From SAE08 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

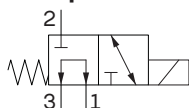
|                                            |                                               | EJ08M                                                                    | EJ10M                     | EJ12M                      |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|---------------------------|----------------------------|
| Max. flow                                  |                                               | 25 l/min (6.6 US gpm)                                                    | 40 l/min (10.5 US gpm)    | 60 l/min (15.8 US gpm)     |
| Max. pressure                              |                                               | 250 bar (3600 psi)                                                       |                           |                            |
| Oil leakage                                | at 210 bar (3050 psi)                         | 40 cm³/min (2.44 in³/min)                                                | 80 cm³/min (4.88 in³/min) | 400 cm³/min (24.4 in³/min) |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |                           |                            |
| Viscosity                                  |                                               | 10-200 cSt                                                               |                           |                            |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |                           |                            |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |                           |                            |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |                           |                            |
| Cavity                                     |                                               | SAE 08/3                                                                 | SAE 10/3                  | SAE 12/3                   |
| Coil type*                                 |                                               | BER                                                                      | BC                        | BH                         |
| Nominal voltages                           |                                               |                                                                          | 12VDC - 24VDC ±10%        |                            |
| Power rating                               |                                               | 19 W (12VDC - 24VDC)                                                     | 26 W (12VDC - 24VDC)      | 33 W                       |
| Weight                                     |                                               | 0.125 kg (0.27 lb)                                                       | 0.300 kg (0.661 lb)       | 0.434 kg (0.956 lb)        |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

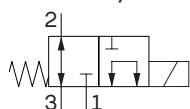
**Spool 1**



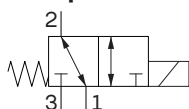
**Spool 2**



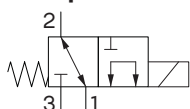
**Spool 3 (only EJ08M)**



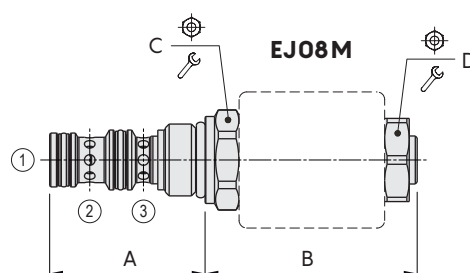
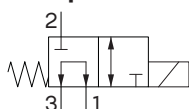
**Spool 4**



**Spool 5**



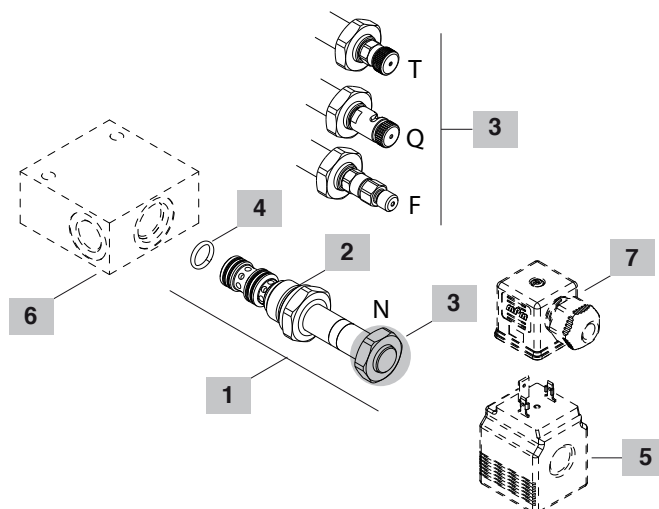
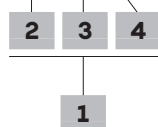
**Spool 6**



| Valve type | A    |      | B<br>N<br>without emergency |      | C  |      | D  |      |
|------------|------|------|-----------------------------|------|----|------|----|------|
|            | mm   | in   | mm                          | in   | Nm | lbft | Nm | lbft |
| EJ08M      | 41.1 | 1.62 | 56.1                        | 2.21 | 24 | 30   | 22 | 5    |
| EJ10M      | 47   | 1.85 | 68                          | 2.68 | 27 | 50   | 37 | 5    |
| EJ12M      | 73.5 | 2.89 | 85.5                        | 3.37 | 32 | 85   | 63 | 5    |

### Ordering codes and description composition

EJ08M/ 1 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                |
|------------------------|-------------|----------------------------|
| <b>SAE cavity 08/3</b> |             |                            |
| EJ08M/10NB             | 0EJ08002030 | Without emergency, spool 1 |
| EJ08M/20NB             | 0EJ08002031 | Without emergency, spool 2 |
| EJ08M/30NB             | 0EJ08002032 | Without emergency, spool 3 |
| EJ08M/40NB             | 0EJ08002033 | Without emergency, spool 4 |
| EJ08M/50NB             | 0EJ08002034 | Without emergency, spool 5 |
| <b>SAE cavity 10/3</b> |             |                            |
| EJ10M/10NB             | 0EJ10002018 | Without emergency, spool 1 |
| EJ10M/20NB             | 0EJ10002019 | Without emergency, spool 2 |
| EJ10M/40NB             | 0EJ10002021 | Without emergency, spool 4 |
| EJ10M/50NB             | 0EJ10002022 | Without emergency, spool 5 |
| EJ10M/60NB             | 0EJ10002023 | Without emergency, spool 6 |
| <b>SAE cavity 12/3</b> |             |                            |
| EJ12M/10NB             | 0EJ12002011 | Without emergency, spool 1 |
| EJ12M/20NB             | 0EJ12002012 | Without emergency, spool 2 |
| EJ12M/40NB             | 0EJ12002013 | Without emergency, spool 4 |
| EJ12M/50NB             | 0EJ12002014 | Without emergency, spool 5 |

#### 2 Spool

| TYPE | DESCRIPTION |
|------|-------------|
| 1    | Spool 1     |
| 2    | Spool 2     |
| 3    | Spool 3     |
| 4    | Spool 4     |
| 5    | Spool 5     |
| 6    | Spool 6     |

#### 3 Emergency

| TYPE | DESCRIPTION           |
|------|-----------------------|
| N    | Without emergency     |
| F    | Pull button type      |
| Q    | Pull type with detent |
| T    | Screw type            |

#### 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE     | CODE        | DESCRIPTION                  |
|----------|-------------|------------------------------|
| BER12VDC | 4SLE001200A | 12VDC-ISO4400 coil for EJ08M |
| BC12VDC  | 4SL8000120  | 12VDC-ISO4400 coil for EJ10M |
| BH12VDC  | 4SLD001200A | 12VDC-ISO4400 coil for EJ12M |

For complete coils list see page 201

#### 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/3-G 3/8 | 3CC0830C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/3-G 3/8 | 3CC1030C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |
| SAE12/3-G 1/2 | 3CC1230D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

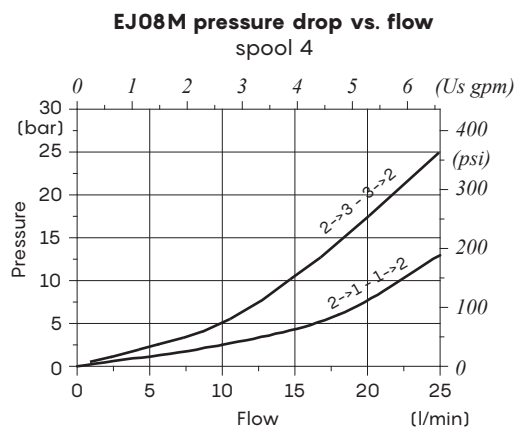
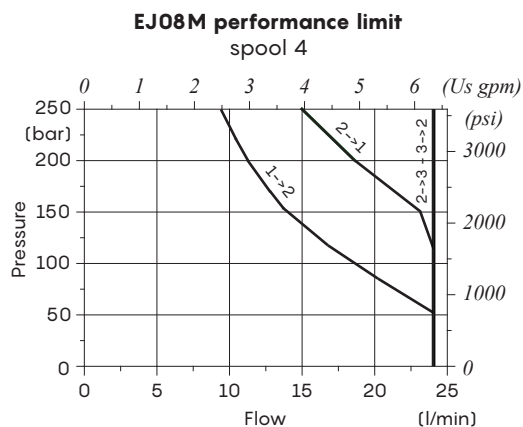
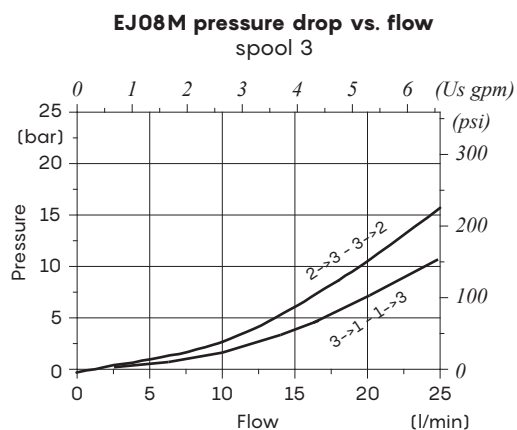
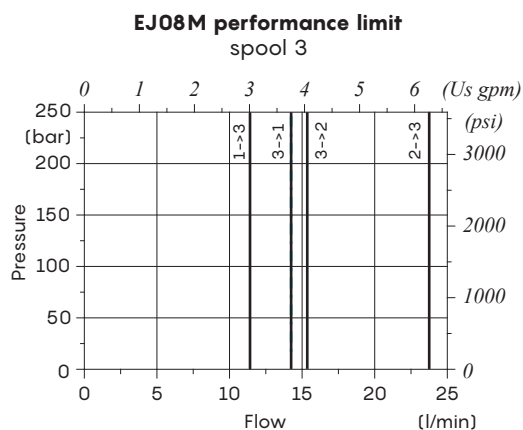
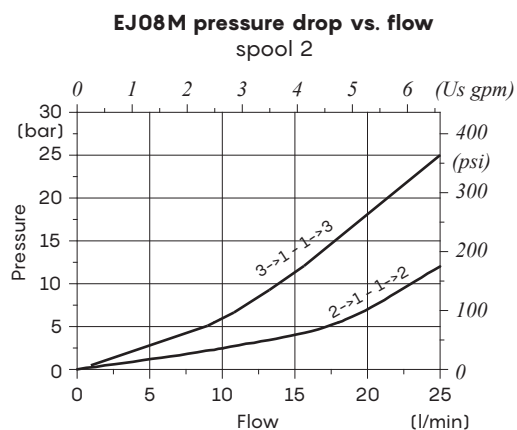
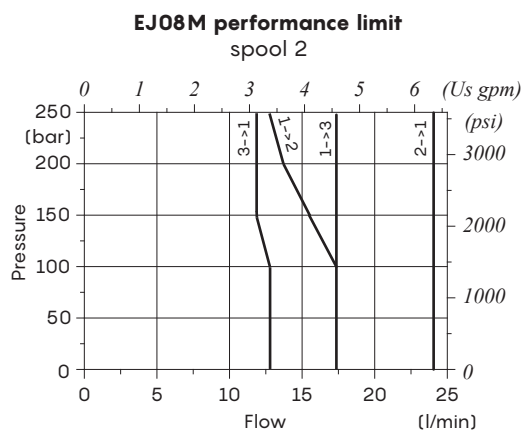
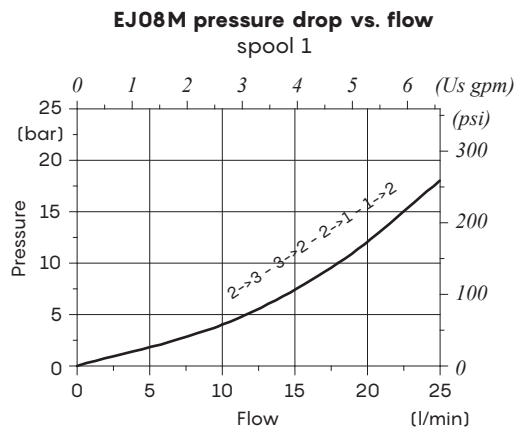
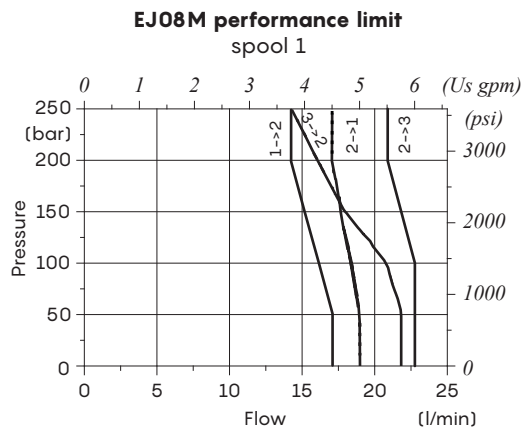
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

#### 7 Connector

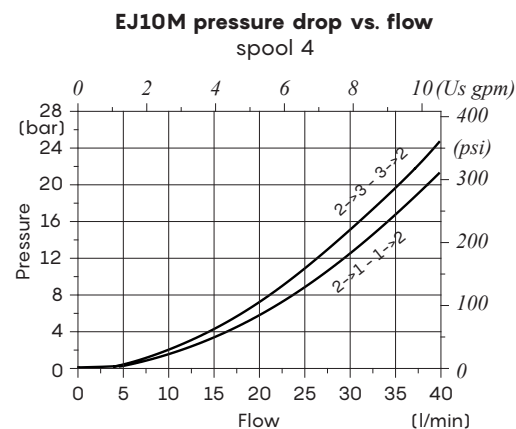
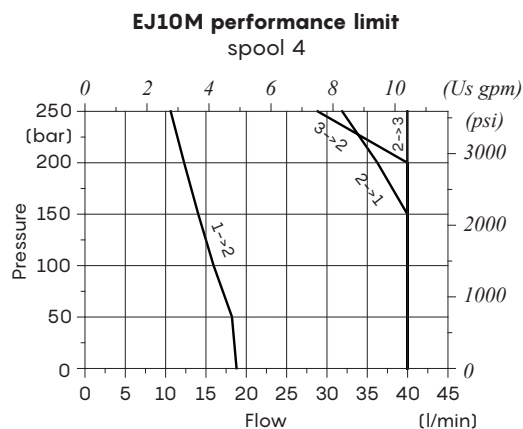
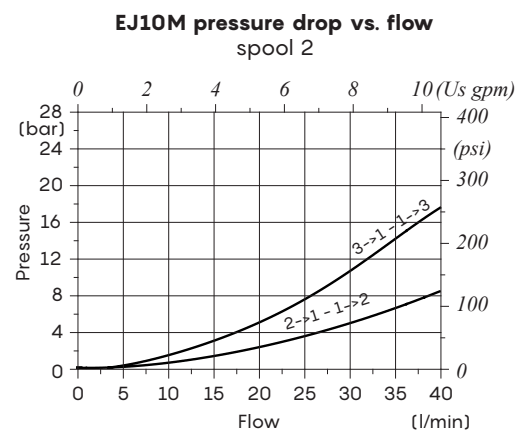
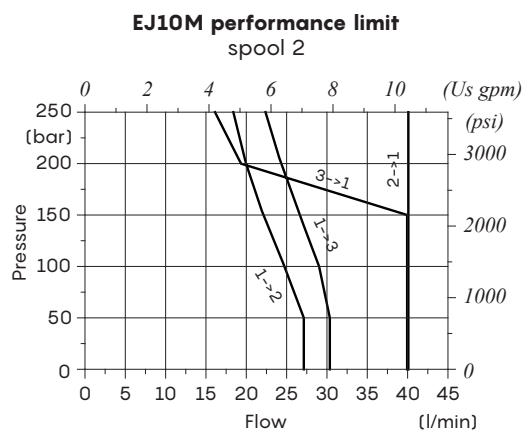
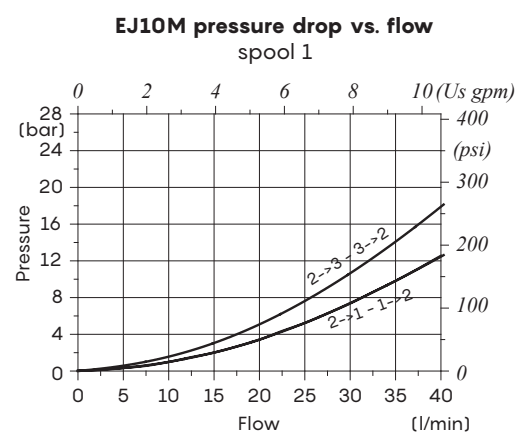
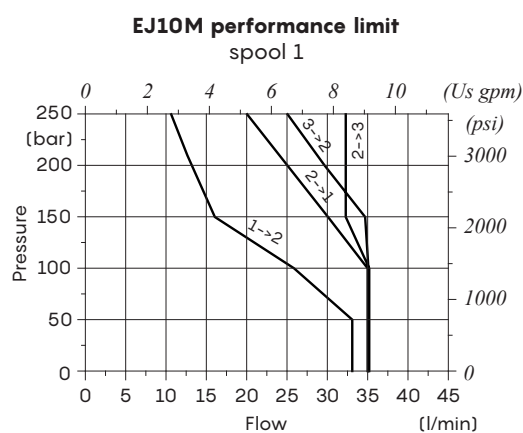
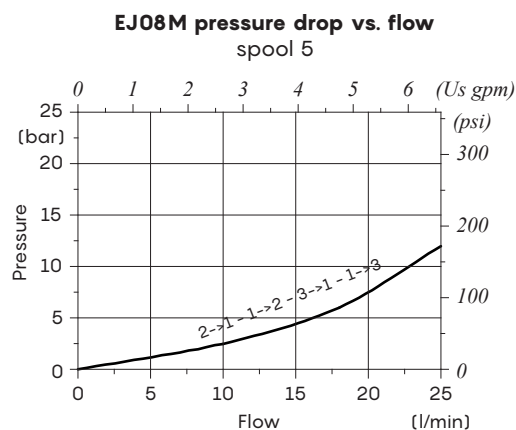
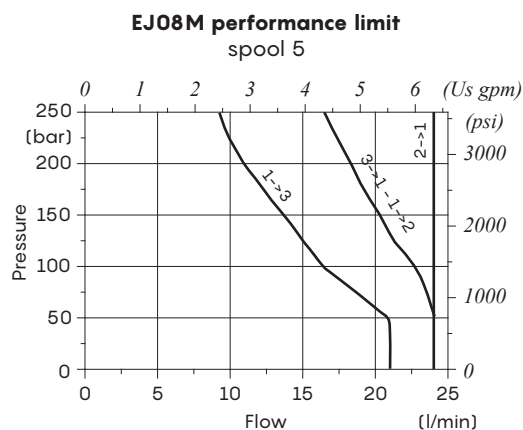
| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

For complete connectors list see from page 201

**Rating diagrams**

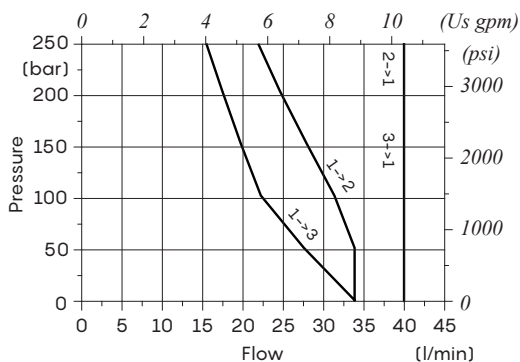


### Rating diagrams

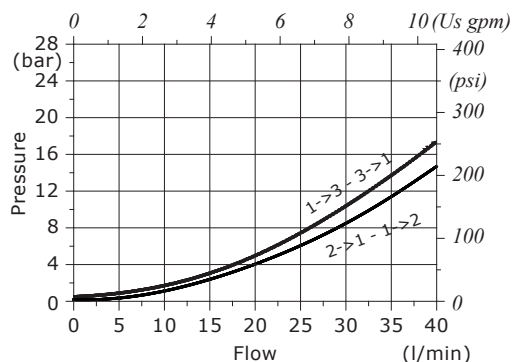


## Rating diagrams

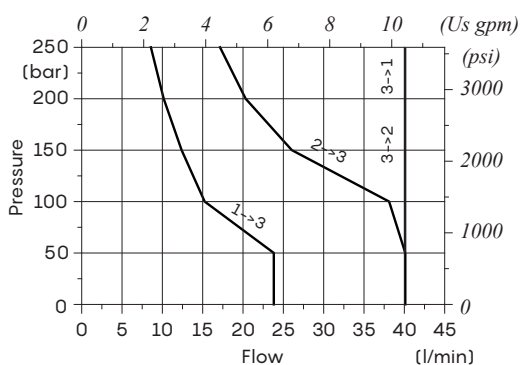
**EJ10M performance limit  
spool 5**



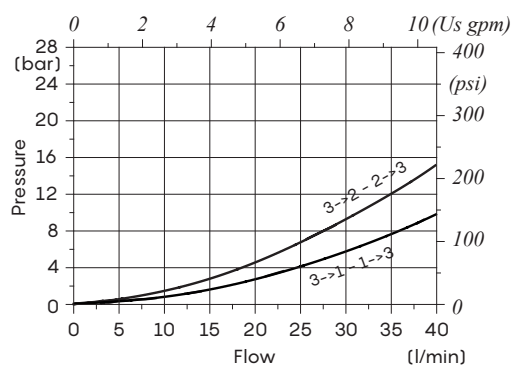
**EJ10M pressure drop vs. flow  
spool 5**



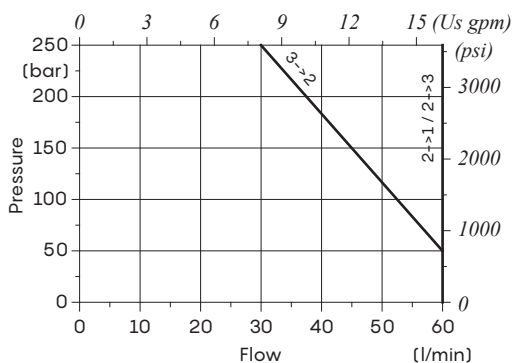
**EJ10M performance limit  
spool 6**



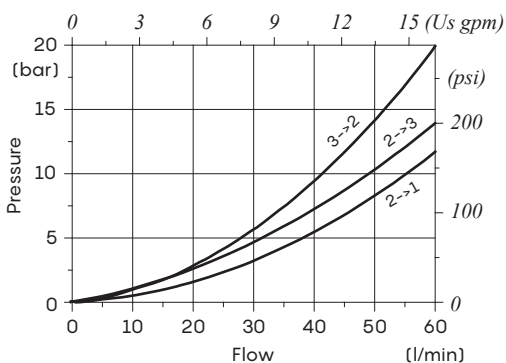
**EJ10M pressure drop vs. flow  
spool 6**



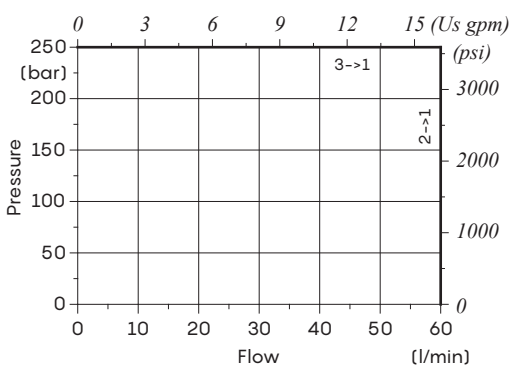
**EJ12M performance limit  
spool 1**



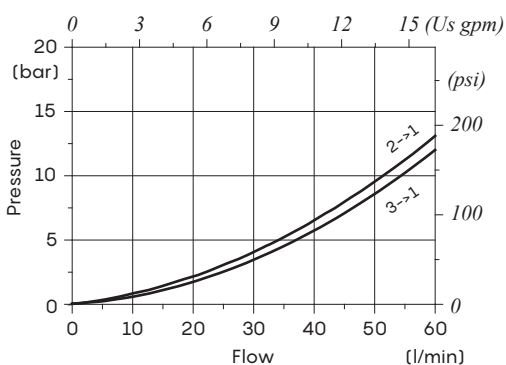
**EJ12M pressure drop vs. flow  
spool 1**



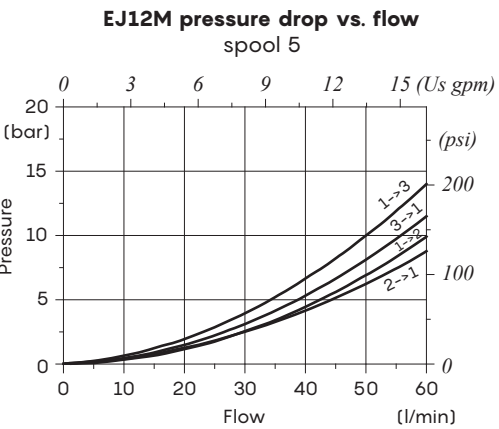
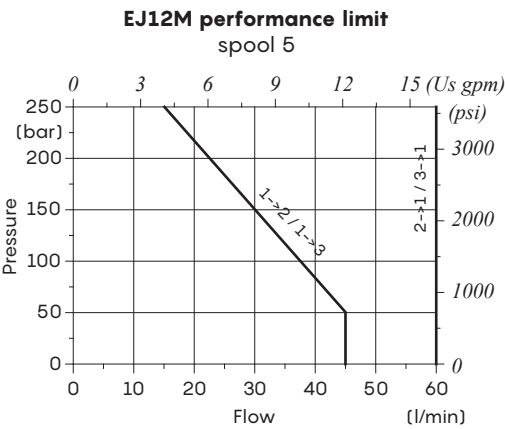
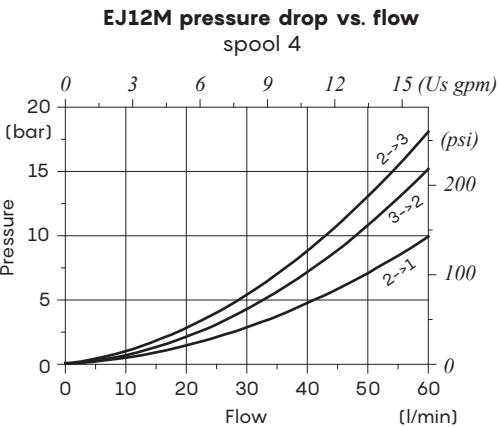
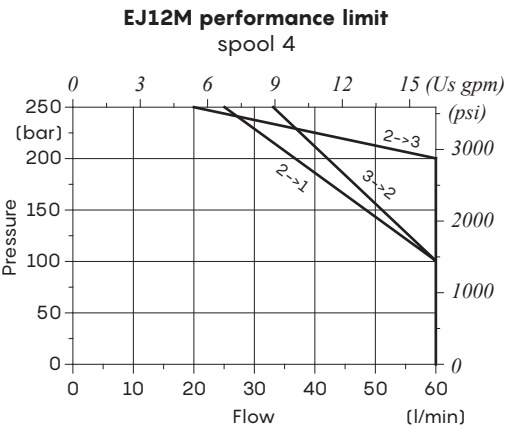
**EJ12M performance limit  
spool 2**

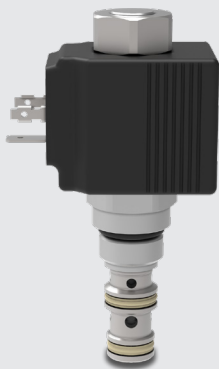


**EJ12M pressure drop vs. flow  
spool 2**



Rating diagrams





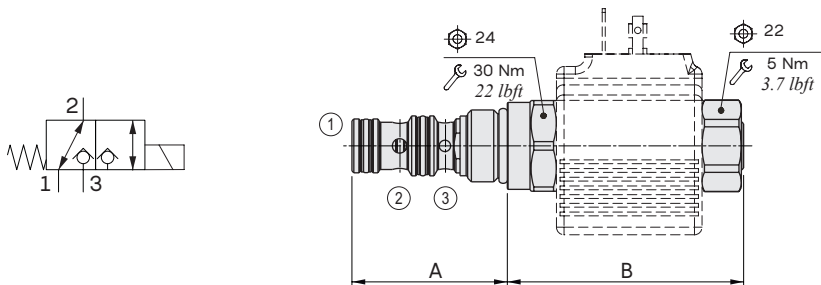
**EL08B type**  
**directional solenoid valves – 3 way / 2 positions**

- Poppet type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Suitable for low pressure: 100 bar (1450 psi)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

| EL08B                                      |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 10 l/min (2.64 US gpm)                                                   |
| Max. pressure                              |                                               | 250 bar (3600 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi)                         | 0.25 cm³/min (0.015 in³/min)                                             |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 08/3                                                                 |
| Coil type*                                 |                                               | BER                                                                      |
| Nominal voltages                           |                                               | 12VDC - 24VDC ± 10%                                                      |
| Power rating                               |                                               | 19 W                                                                     |
| Weight                                     |                                               | 0.16 kg (0.35 lb)                                                        |

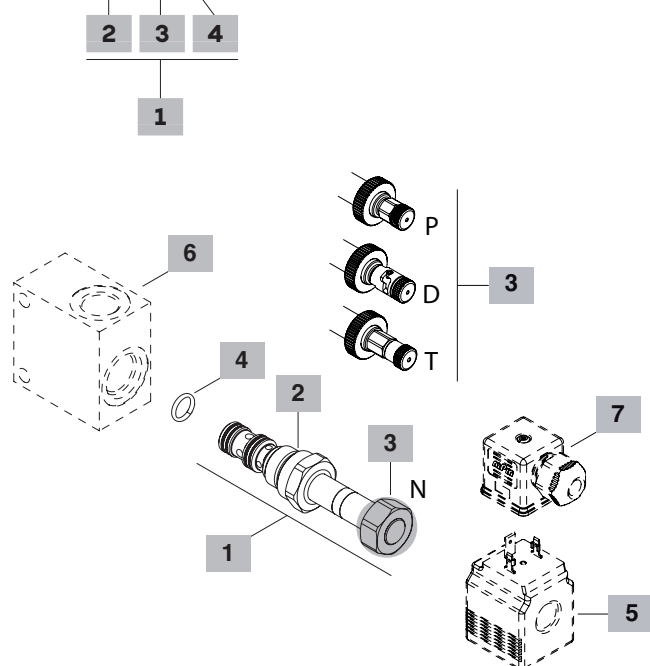
NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



| Valve type | A    |      | B                         |      |            |      |                  |      |                               |      |
|------------|------|------|---------------------------|------|------------|------|------------------|------|-------------------------------|------|
|            |      |      | N<br>without<br>emergency |      | T<br>screw |      | P<br>push button |      | D<br>push type<br>with detent |      |
|            | mm   | in   | mm                        | in   | mm         | in   | mm               | in   | mm                            | in   |
| EL08B      | 41.1 | 1.62 | 62.5                      | 2.46 | 85.4       | 3.36 | 85.4             | 3.36 | 88.1                          | 3.47 |

### Ordering codes and description composition

#### EL08B/ 1 0 N B



#### 1 Cartridges

| TYPE              | CODE        | DESCRIPTION                     |
|-------------------|-------------|---------------------------------|
| <b>EL08B/10NB</b> | OEL08002009 | Without emergency               |
| <b>EL08B/10PB</b> | OEL08002006 | With push-button emergency      |
| <b>EL08B/10TB</b> | OEL08002007 | Screw type emergency            |
| <b>EL08B/10DB</b> | OEL08002008 | Push type with detent emergency |

#### 2 Spool

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | Spool 1     |

#### 3 Emergency

| TYPE     | DESCRIPTION                     |
|----------|---------------------------------|
| <b>N</b> | Without emergency               |
| <b>P</b> | Push-button emergency           |
| <b>T</b> | Screw type emergency            |
| <b>D</b> | Push type with detent emergency |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coil

| TYPE            | CODE        | DESCRIPTION        |
|-----------------|-------------|--------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/3-G 1/4</b> | 3CC0830B11 | Aluminium body for cavity 08 valve, G 1/4 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 210

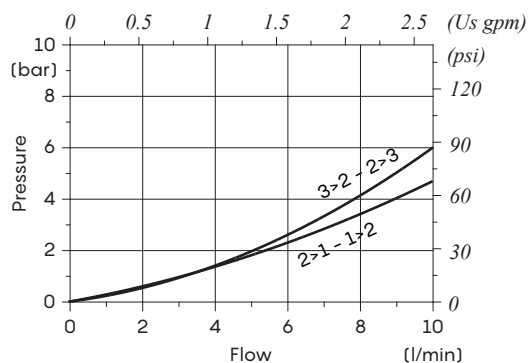
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CNI009995B | Connector   |

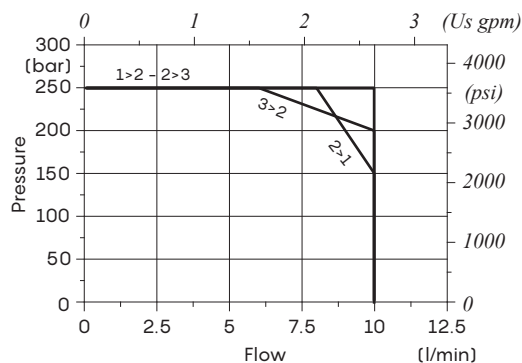
For complete connectors list see from page 201

### Rating diagrams

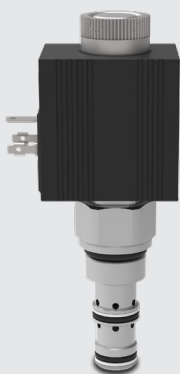
Pressure drop vs. flow



Performance limit







## EL10C type directional solenoid valves – 3 way / 2 positions

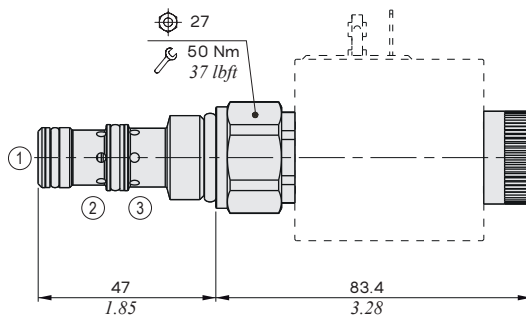
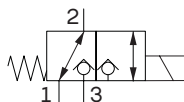
- Poppet type
- Direct acting with on-off solenoid

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

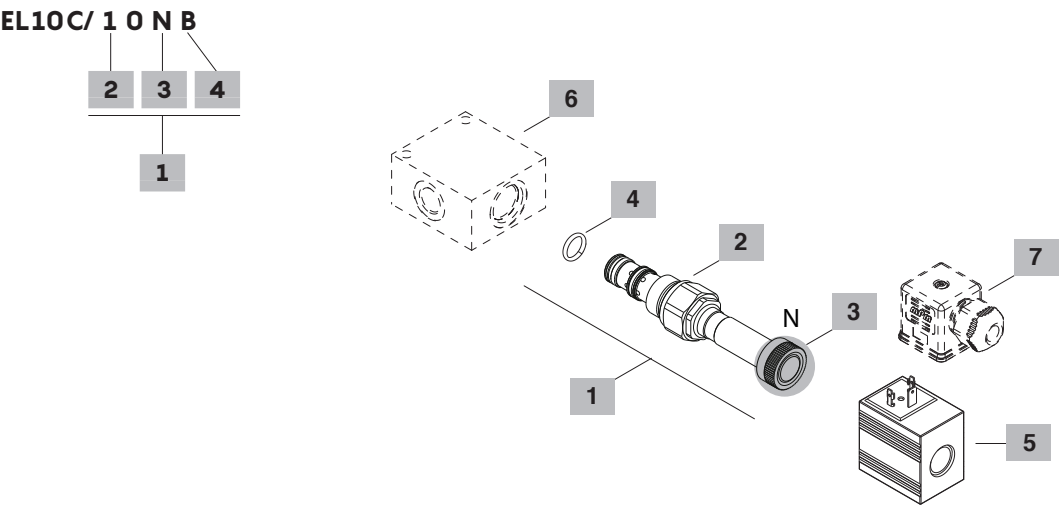
### EL10C

|                                            |                                       |                                                                          |
|--------------------------------------------|---------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                       | 20 l/min (5.28 US gpm)                                                   |
| Max. pressure                              |                                       | 210 bar (3050 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi)                 | 0.25 cm³/min (0.015 in³/min)                                             |
| Fluid                                      |                                       | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                       | 10–200 cSt                                                               |
| Max level of contamination                 |                                       | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+PTFE<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                       | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                       | SAE 10/3                                                                 |
| Coil type*                                 |                                       | BQ16                                                                     |
| Nominal voltages                           |                                       | 12VDC ± 10%                                                              |
| Power rating                               |                                       | 30 W                                                                     |
| Weight                                     |                                       | 0.27 kg (0.59 lb)                                                        |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



Ordering codes and description composition



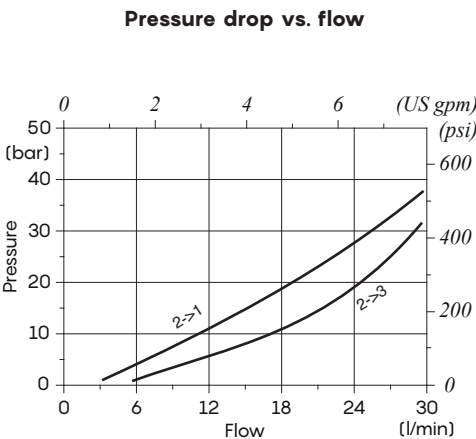
| 1 Cartridges           |             |                   | 5 Coils                              |      |             |
|------------------------|-------------|-------------------|--------------------------------------|------|-------------|
| TYPE                   | CODE        | DESCRIPTION       | TYPE                                 | CODE | DESCRIPTION |
| <b>SAE cavity 10/3</b> |             |                   | <b>BQ16 12VDC</b>                    |      |             |
| <b>EL10C/10NB</b>      | OEL10002008 | Without emergency | For complete coils list see page 201 |      |             |

| 2 Spool  |             | 6 Valve body                                                                                                         |      |             |
|----------|-------------|----------------------------------------------------------------------------------------------------------------------|------|-------------|
| TYPE     | DESCRIPTION | TYPE                                                                                                                 | CODE | DESCRIPTION |
| <b>1</b> | Spool 1     | <b>SAE10/3-G 3/8</b> 3CC1030C11 Aluminium body for cavity 10 valve, G 3/8 std thread                                 |      |             |
|          |             | Note: aluminium body can stand up to 210 bar (3050 psi)<br>For steel bodies or different threading see from page 210 |      |             |

| 3 Emergency |                   | 7 Connector                                    |      |             |
|-------------|-------------------|------------------------------------------------|------|-------------|
| TYPE        | DESCRIPTION       | TYPE                                           | CODE | DESCRIPTION |
| <b>N</b>    | Without emergency | <b>ISO4400</b> 4CN1009995B Connector           |      |             |
|             |                   | For complete connectors list see from page 201 |      |             |

| 4 Seals  |                                                        |
|----------|--------------------------------------------------------|
| TYPE     | DESCRIPTION                                            |
| <b>B</b> | <b>NBR (Buna)+PTFE</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept    |

Rating diagrams





## ER..L type directional solenoid valves – 4 way/2 positions

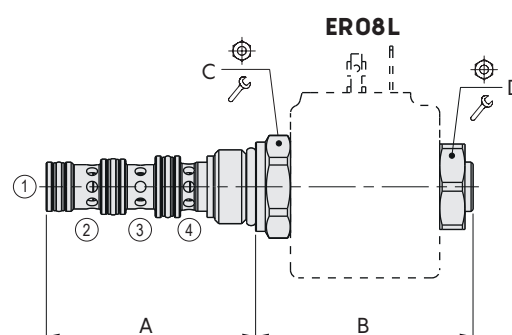
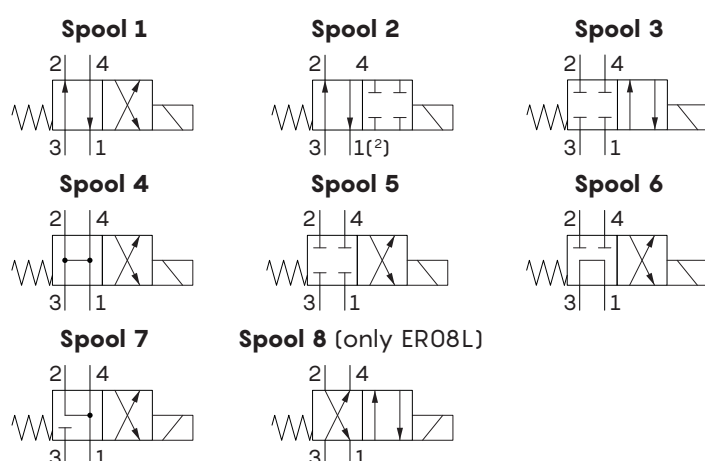
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components
- Low pressure drop
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | ER08L                                                                     | ER10L                                                                    |
|--------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 20 l/min (5.3 US gpm)                                                     | 40 l/min (10.6 US gpm)                                                   |
| Max. pressure                              | 250 bar (3600 psi)                                                        |                                                                          |
| Oil leakage                                | at 210 bar (5100 psi) 40 cm <sup>3</sup> /min (2.44 in <sup>3</sup> /min) | 80 cm <sup>3</sup> /min (4.88 in <sup>3</sup> /min)                      |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties    |                                                                          |
| Viscosity                                  | 10-200 cSt                                                                |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                          |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                             | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                         |                                                                          |
| Cavity                                     | SAE 08/4                                                                  | SAE 10/4                                                                 |
| Coil type*                                 | BER                                                                       | BC                                                                       |
| Nominal voltages                           | 12VDC - 24VDC ± 10%                                                       |                                                                          |
| Power rating                               | 19 W (12VDC - 24VDC)                                                      | 26 W (12VDC - 24VDC)                                                     |
| Weight                                     | 0.372 kg (0.82 lb)                                                        | 0.432 kg (0.95 lb)                                                       |

NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

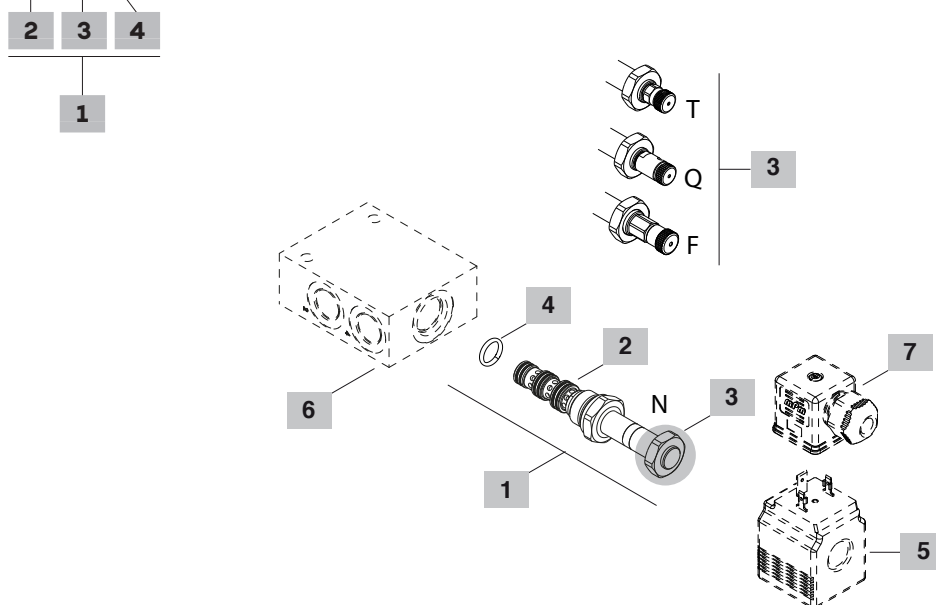
- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



| Valve type | A    |      | B                         |      |                 |      |                  |      |                               |      | C  |      | D  |            |
|------------|------|------|---------------------------|------|-----------------|------|------------------|------|-------------------------------|------|----|------|----|------------|
|            |      |      | N<br>without<br>emergency |      | T<br>screw type |      | F<br>pull button |      | Q<br>pull type<br>with detent |      |    |      |    |            |
|            | mm   | in   | mm                        | in   | mm              | in   | mm               | in   | mm                            | in   | Nm | lbft | Nm | lbft       |
| ER08L      | 54   | 2.13 | 56.1                      | 2.21 | 71.1            | 2.8  | 84               | 3.31 | 77.2                          | 3.04 | 24 | 30   | 22 | 5±1 3.7    |
| ER10L      | 62.4 | 2.46 | 68                        | 2.68 | 82.5            | 3.25 | 95.2             | 3.75 | 88.5                          | 3.48 | 27 | 50   | 37 | 23 5±1 3.7 |

## Ordering codes and description composition

ER08L/ 1 0 N B

**1 Cartridges**

| TYPE                   | CODE        | DESCRIPTION                    |
|------------------------|-------------|--------------------------------|
| <b>SAE cavity 08/4</b> |             |                                |
| <b>ER08L/10NB</b>      | OER08002036 | Without emergency, spool 1     |
| <b>ER08L/20NB</b>      | OER08002042 | Without emergency, spool 2     |
| <b>ER08L/30NB</b>      | OER08002043 | Without emergency, spool 3     |
| <b>ER08L/40NB</b>      | OER08002044 | Without emergency, spool 4     |
| <b>ER08L/50NB</b>      | OER08002039 | Without emergency, spool 5     |
| <b>ER08L/60NB</b>      | OER08002045 | Without emergency, spool 6     |
| <b>ER08L/70NB</b>      | OER08002046 | Without emergency, spool 7     |
| <b>ER08L/80NB</b>      | OER08002047 | Without emergency, spool 8     |
| <b>ER08L/70QB</b>      | OER08002041 | Pull type with detent, spool 7 |
| <b>SAE cavity 10/4</b> |             |                                |
| <b>ER10L/10NB</b>      | OER10002040 | Without emergency, spool 1     |
| <b>ER10L/20NB</b>      | OER10002047 | Without emergency, spool 2     |
| <b>ER10L/30NB</b>      | OER10002048 | Without emergency, spool 3     |
| <b>ER10L/40NB</b>      | OER10002044 | Without emergency, spool 4     |
| <b>ER10L/50NB</b>      | OER10002045 | Without emergency, spool 5     |
| <b>ER10L/60NB</b>      | OER10002042 | Without emergency, spool 6     |
| <b>ER10L/70NB</b>      | OER10002046 | Without emergency, spool 7     |

**2 Spool**

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | Spool 1     |
| <b>2</b> | Spool 2     |
| <b>3</b> | Spool 3     |
| <b>4</b> | Spool 4     |
| <b>5</b> | Spool 5     |
| <b>6</b> | Spool 6     |
| <b>7</b> | Spool 7     |
| <b>8</b> | Spool 8     |

**3 Emergency**

| TYPE     | DESCRIPTION           |
|----------|-----------------------|
| <b>N</b> | Without emergency     |
| <b>F</b> | Pull screw button     |
| <b>Q</b> | Pull type with detent |
| <b>T</b> | Screw type            |

**4 Seals**

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

**5 Coils**

| TYPE            | CODE        | DESCRIPTION                  |
|-----------------|-------------|------------------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil for ER08L |
| <b>BC12VDC</b>  | 4SL8000120  | 12VDC-ISO4400 coil for ER10L |

For complete coils list see page 201

**6 Valve body**

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/4-G 3/8</b> | 3CC0840C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/4-G 1/2</b> | 3CC1040D11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

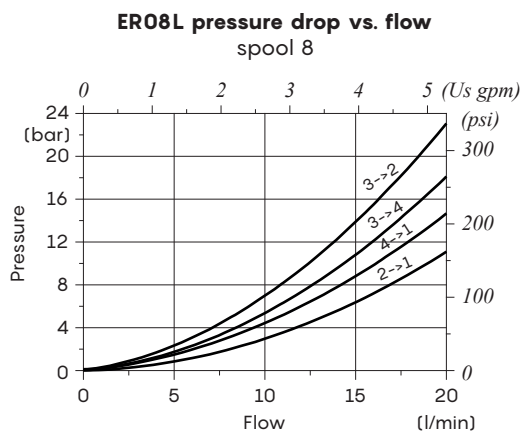
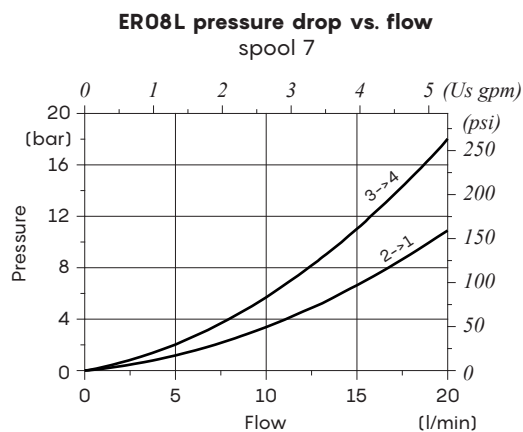
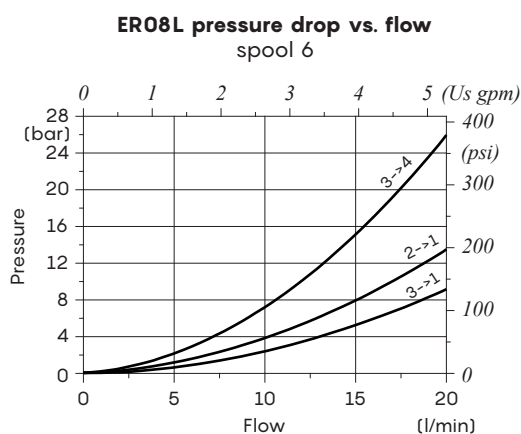
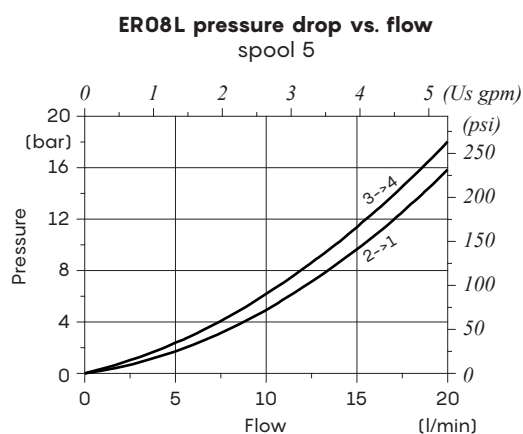
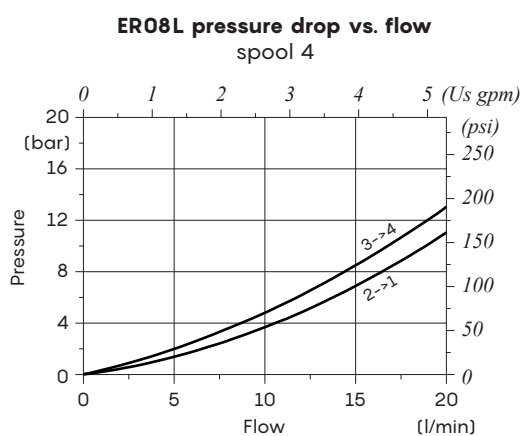
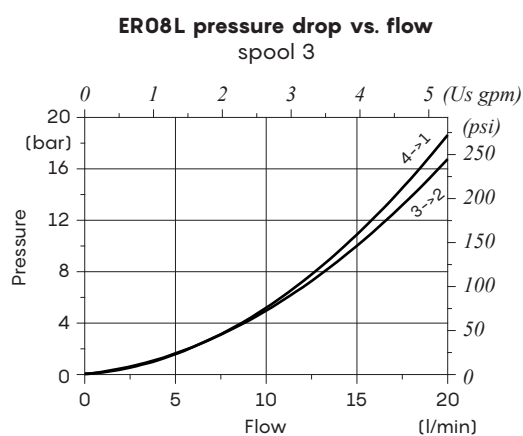
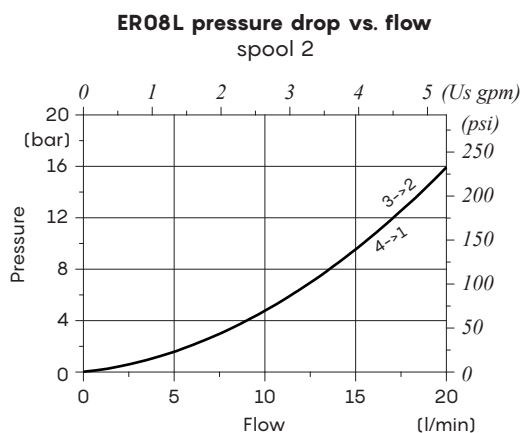
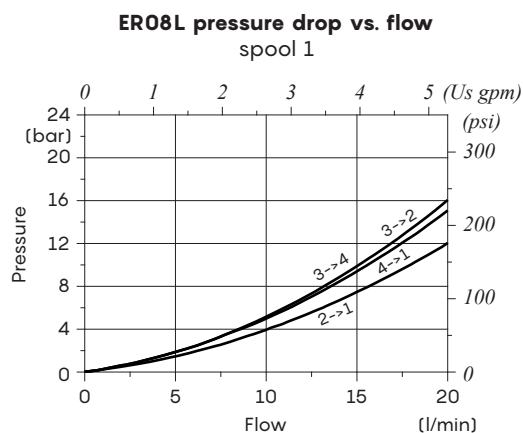
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

**7 Connector**

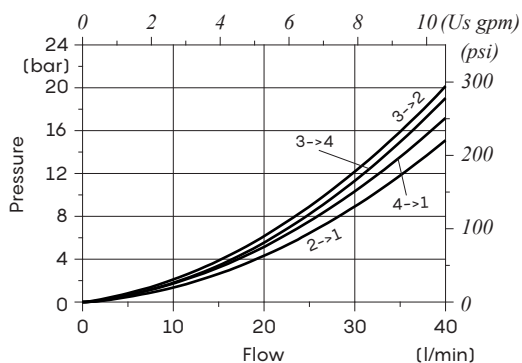
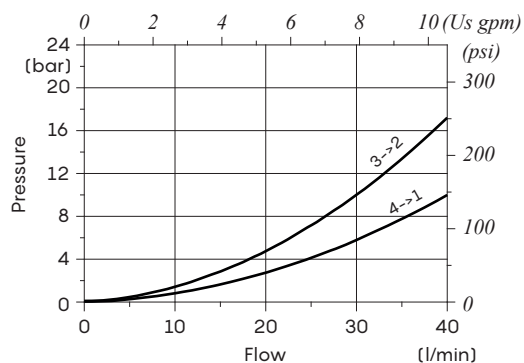
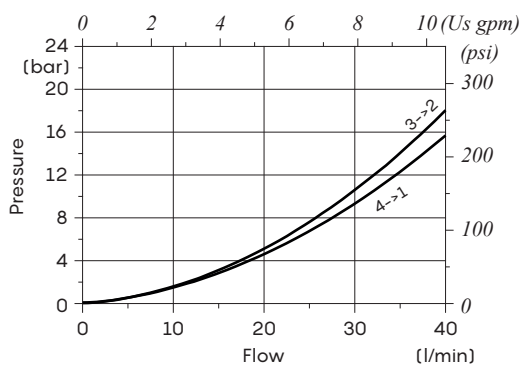
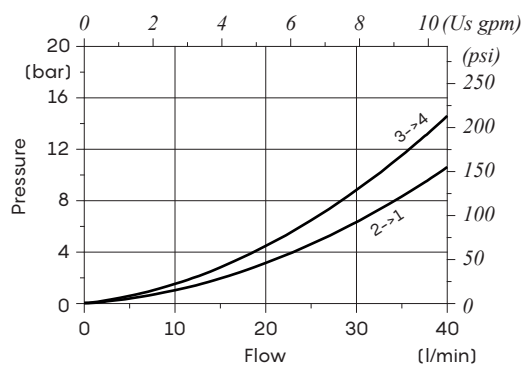
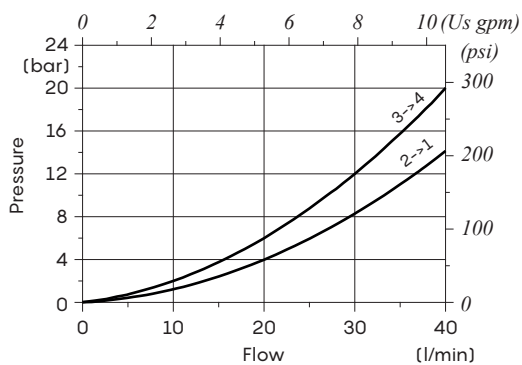
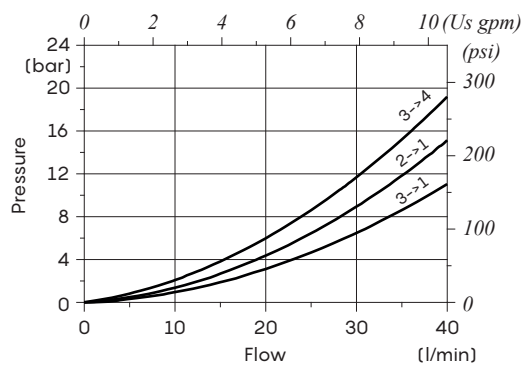
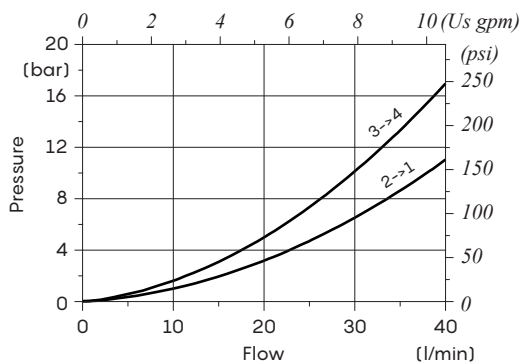
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

**Rating diagrams**



## Rating diagrams

ER10L pressure drop vs. flow  
spool 1ER10L pressure drop vs. flow  
spool 2ER10L pressure drop vs. flow  
spool 3ER10L pressure drop vs. flow  
spool 4ER10L pressure drop vs. flow  
spool 5ER10L pressure drop vs. flow  
spool 6ER10L pressure drop vs. flow  
spool 7



## ER12M type directional solenoid valves – 4 way / 2 positions

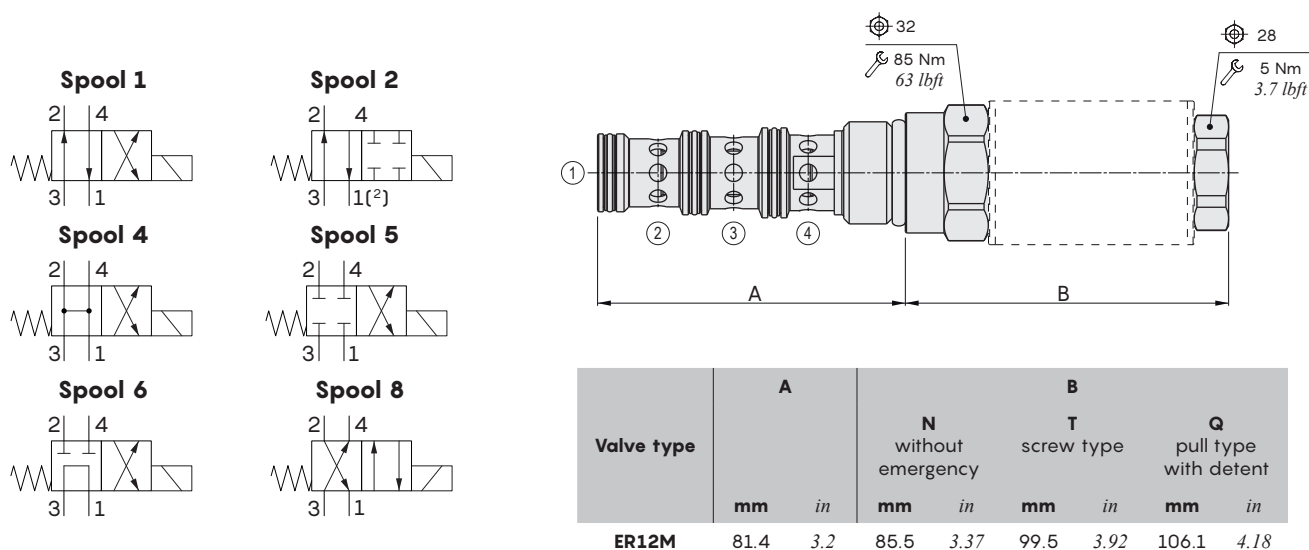
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

### ER12M

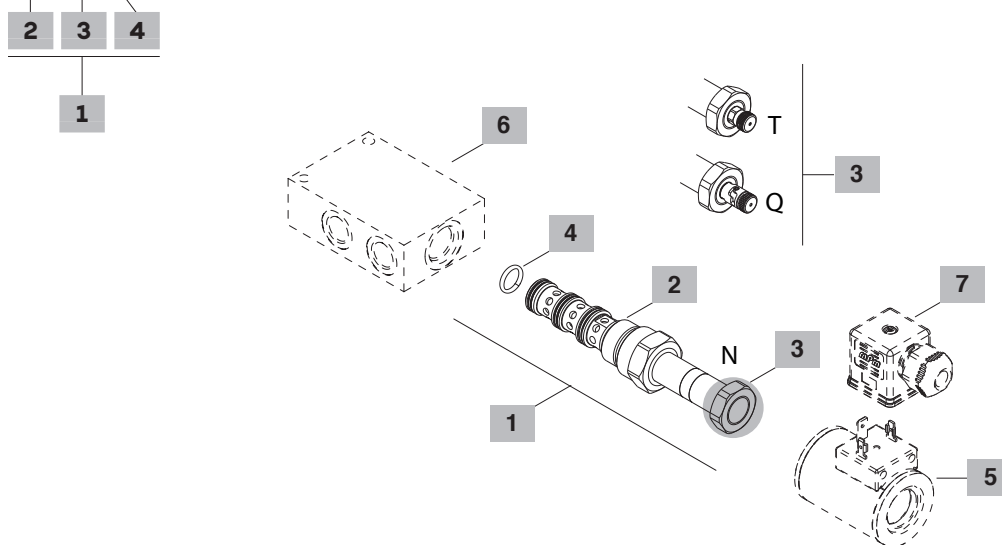
|                                            |                                               |                                                                          |
|--------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               |                                               | 60 l/min (15.8 US gpm)                                                   |
| Max. pressure                              | port 1<br>port 2, 3, 4                        | 250 bar (3600 psi)<br>320 bar (4600 psi)                                 |
| Oil leakage                                | at 210 bar (3050 psi)                         | 200 cm <sup>3</sup> /min (12.20 in <sup>3</sup> /min)                    |
| Fluid                                      |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  |                                               | 10–200 cSt                                                               |
| Max level of contamination                 |                                               | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                     |                                               | SAE 12/4                                                                 |
| Coil type*                                 |                                               | BH                                                                       |
| Nominal voltages                           |                                               | 12VDC – 24 VDC ± 10%                                                     |
| Power rating                               |                                               | 33 W (12/24 VDC)                                                         |
| Weight                                     |                                               | 0.73 kg (1.61 lb)                                                        |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.



## Ordering codes and description composition

ER12M/ 1 0 N B

**1 Cartridges**

| TYPE                   | CODE        | DESCRIPTION                              |
|------------------------|-------------|------------------------------------------|
| <b>SAE cavity 12/4</b> |             |                                          |
| <b>ER12M/10NB</b>      | OER12002021 | Without emergency, spool 1               |
| <b>ER12M/20NB</b>      | OER12002023 | Without emergency, spool 2               |
| <b>ER12M/40NB</b>      | OER12002031 | Without emergency, spool 4               |
| <b>ER12M/50NB</b>      | OER12002024 | Without emergency, spool 5               |
| <b>ER12M/60NB</b>      | OER12002028 | Without emergency, spool 6               |
| <b>ER12M/80NB</b>      | OER12002022 | Without emergency, spool 8               |
| <b>ER12M/10QB</b>      | OER12002033 | Pull type emergency with detent, spool 1 |
| <b>ER12M/60TB</b>      | OER12002030 | Screw type, spool 6                      |

**2 Spool**

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>1</b> | Spool 1     |
| <b>2</b> | Spool 2     |
| <b>4</b> | Spool 4     |
| <b>5</b> | Spool 5     |
| <b>6</b> | Spool 6     |
| <b>8</b> | Spool 8     |

**3 Emergency**

| TYPE     | DESCRIPTION           |
|----------|-----------------------|
| <b>N</b> | Without emergency     |
| <b>Q</b> | Pull type with detent |
| <b>T</b> | Screw type            |

**4 Seals**

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

**5 Coils**

| TYPE                   | CODE        | DESCRIPTION        |
|------------------------|-------------|--------------------|
| <b>BH12VDC-ISO4400</b> | 4SLD001200A | 12VDC-ISO4400 coil |

For complete coils list see page 201

**6 Valve body**

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE12/4-G 1/2</b> | 3CC1240D11 | Aluminium body for cavity 12 valve, G 1/2 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

**7 Connector**

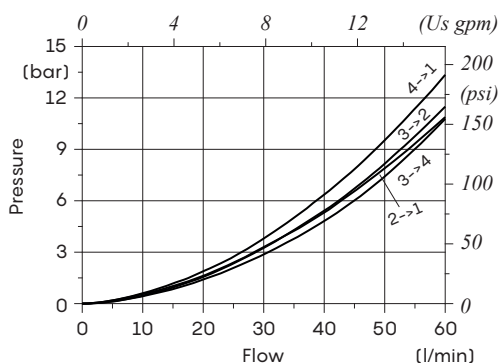
| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

For complete connectors list see from page 201

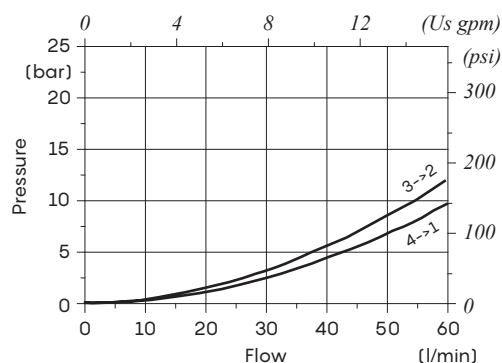


**Rating diagrams**

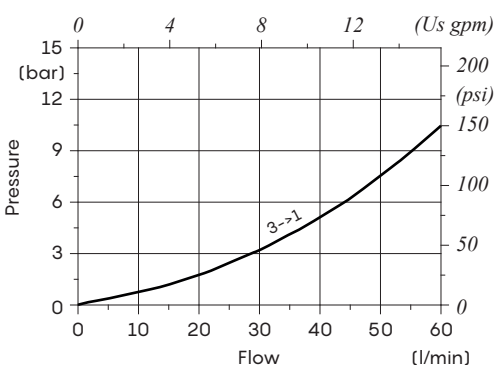
**ER12M pressure drop vs. flow**  
spool 1



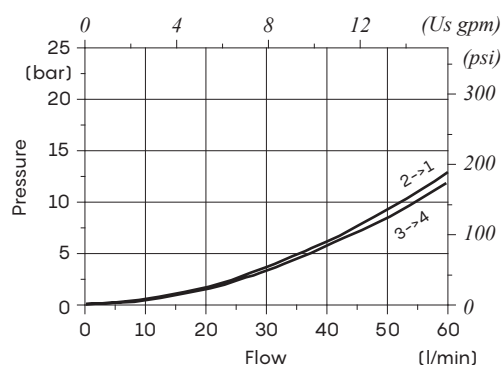
**ER12M pressure drop vs. flow**  
spool 2



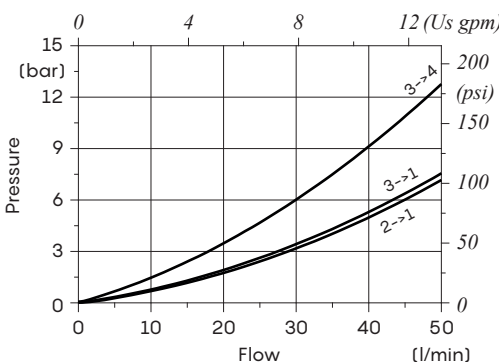
**ER12M pressure drop vs. flow**  
spool 4



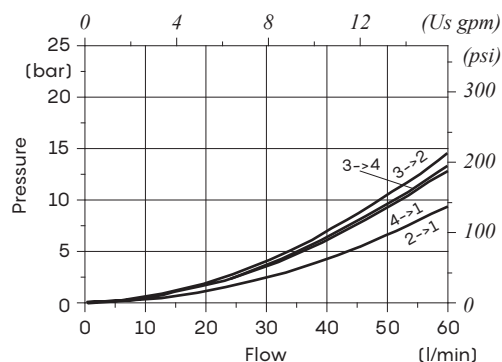
**ER12M pressure drop vs. flow**  
spool 5



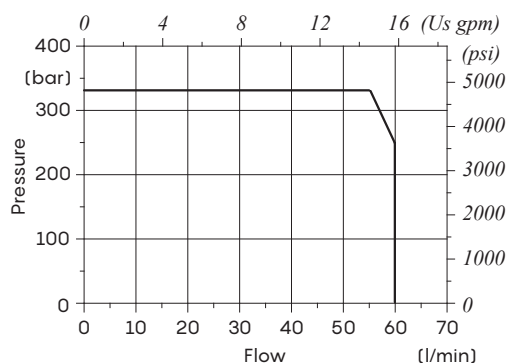
**ER12M pressure drop vs. flow**  
spool 6



**ER12M pressure drop vs. flow**  
spool 8



**ER12M performance limit**







## ET..L type directional solenoid valves – 4 way/3 positions

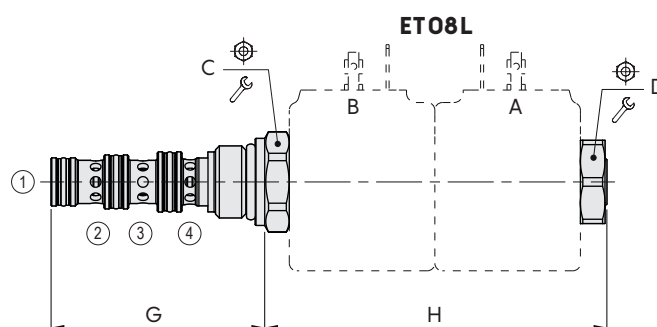
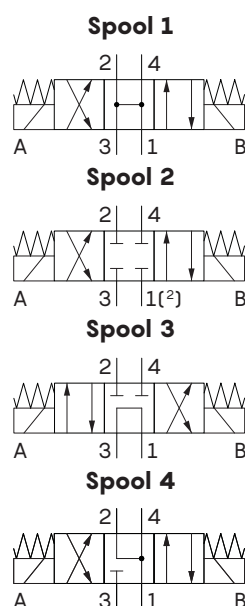
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | ET08L                                                                     | ET10L                                                                    |
|--------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 20 l/min (5.3 US gpm)                                                     | 40 l/min (10.6 US gpm)                                                   |
| Max. pressure                              | 250 bar (3600 psi)                                                        |                                                                          |
| Oil leakage                                | at 210 bar (5100 psi) 40 cm <sup>3</sup> /min (2.44 in <sup>3</sup> /min) | 80 cm <sup>3</sup> /min (4.88 in <sup>3</sup> /min)                      |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties    |                                                                          |
| Viscosity                                  | 10–200 cSt                                                                |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                          |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                             | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                         |                                                                          |
| Cavity                                     | SAE 08/4                                                                  | SAE 10/4                                                                 |
| Coil type*                                 | BER                                                                       | BC                                                                       |
| Nominal voltages                           | 12VDC – 24VDC ± 10%                                                       |                                                                          |
| Power rating                               | 19 W (12VDC – 24VDC)                                                      | 26 W (12VDC – 24VDC)                                                     |
| Weight                                     | 0.635 kg (1.4 lb)                                                         | 0.702 kg (1.55 lb)                                                       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

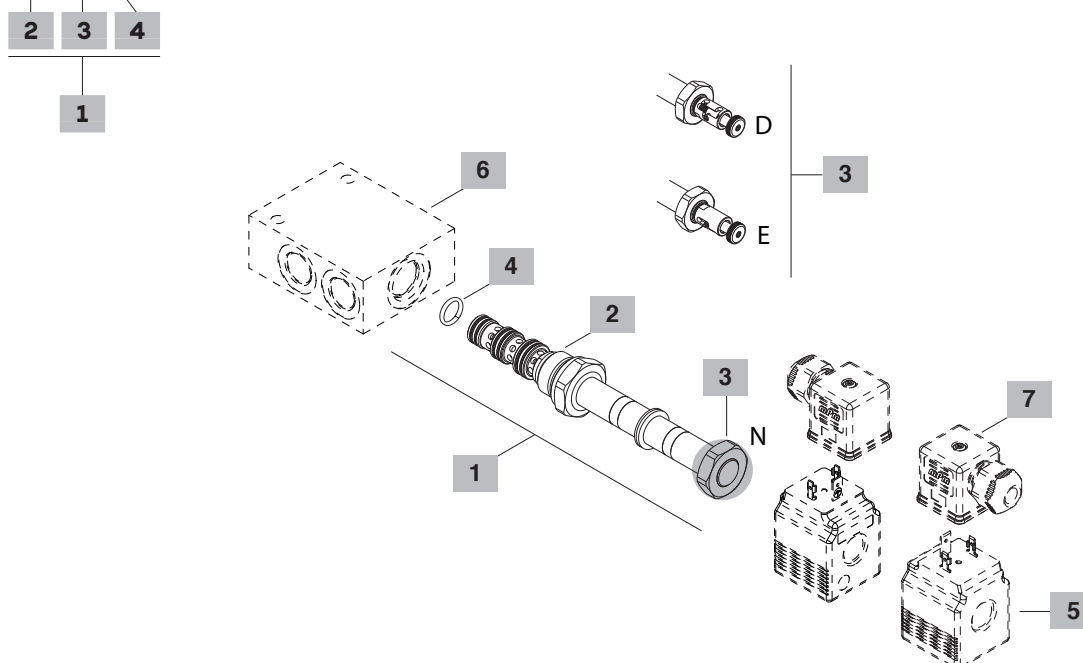
– (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



| Valve type | G    |      | N without emergency |      | H D push type with detent |      | E with pull/ push button |      | C  |      | D  |            |
|------------|------|------|---------------------|------|---------------------------|------|--------------------------|------|----|------|----|------------|
|            | mm   | in   | mm                  | in   | mm                        | in   | mm                       | in   | Nm | lbft | Nm | lbft       |
| ET08L      | 54   | 2.13 | 93                  | 3.66 | 122                       | 4.8  | 122                      | 4.8  | 24 | 30   | 22 | 5±1 3.7    |
| ET10L      | 62.4 | 2.46 | 114                 | 4.49 | 142.8                     | 5.62 | 142.8                    | 5.62 | 27 | 50   | 37 | 23 5±1 3.7 |

### Ordering codes and description composition

ET08L/ 1 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                |
|------------------------|-------------|----------------------------|
| <b>SAE cavity 08/4</b> |             |                            |
| ET08L/10NB             | OET08002026 | Without emergency, spool 1 |
| ET08L/20NB             | OET08002027 | Without emergency, spool 2 |
| ET08L/30NB             | OET08002025 | Without emergency, spool 3 |
| ET08L/40NB             | OET08002028 | Without emergency, spool 4 |
| <b>SAE cavity 10/4</b> |             |                            |
| ET10L/10NB             | OET10002041 | Without emergency, spool 1 |
| ET10L/20NB             | OET10002043 | Without emergency, spool 2 |
| ET10L/30NB             | OET10002040 | Without emergency, spool 3 |
| ET10L/40NB             | OET10002042 | Without emergency, spool 4 |

#### 2 Spool

| TYPE | DESCRIPTION |
|------|-------------|
| 1    | Spool 1     |
| 2    | Spool 2     |
| 3    | Spool 3     |
| 4    | Spool 4     |

#### 3 Emergency

| TYPE | DESCRIPTION                   |
|------|-------------------------------|
| N    | Without emergency             |
| D    | Push/pull type with detent    |
| E    | Push/pull type without detent |

#### 4 Seals

| TYPE | DESCRIPTION                                             |
|------|---------------------------------------------------------|
| B    | NBR (Buna)+Polyurethane o-ring seals, std configuration |
| V    | FPM (Viton) o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE     | CODE        | DESCRIPTION                  |
|----------|-------------|------------------------------|
| BER12VDC | 4SLE001200A | 12VDC-ISO4400 coil for ET08L |
| BC12VDC  | 4SL8000120  | 12VDC-ISO4400 coil for ET10L |

For complete coils list see page 201

#### 6 Valve body

| TYPE          | CODE       | DESCRIPTION                                          |
|---------------|------------|------------------------------------------------------|
| SAE08/4-G 3/8 | 3CC0840C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| SAE10/4-G 1/2 | 3CC1040D11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

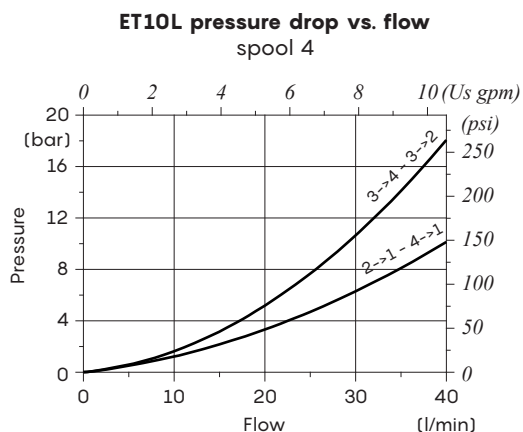
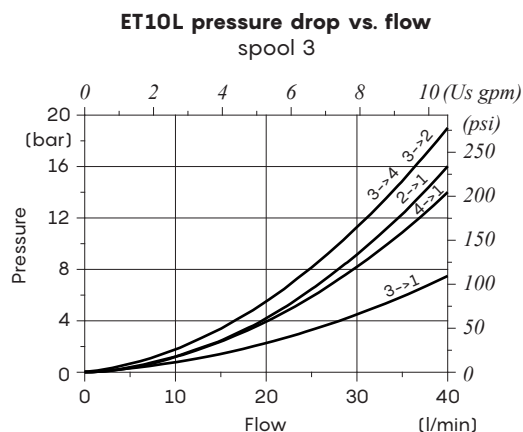
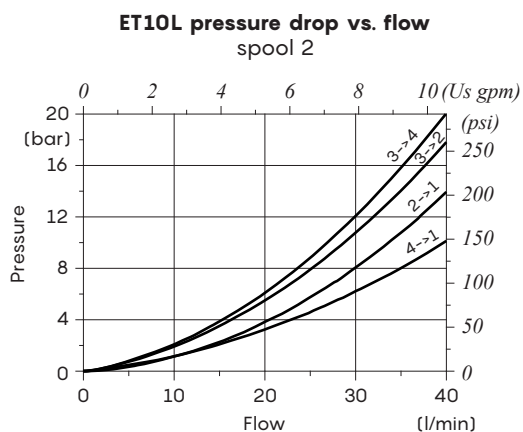
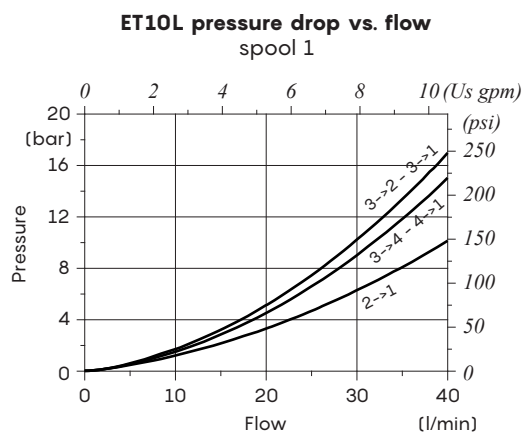
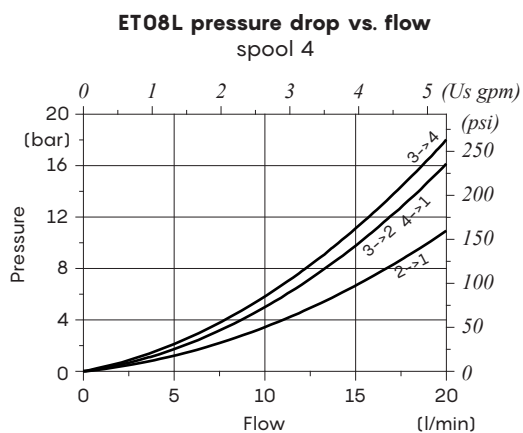
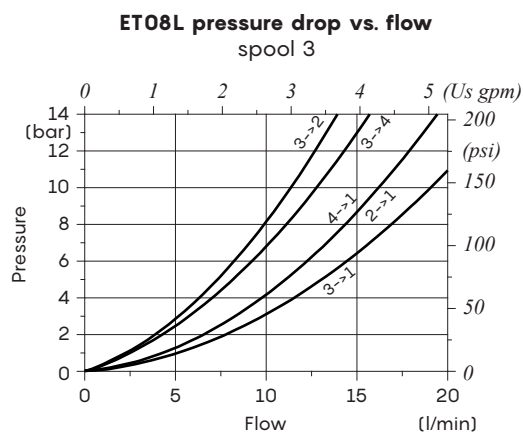
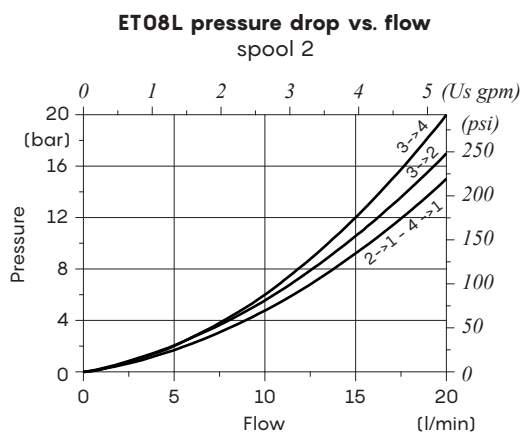
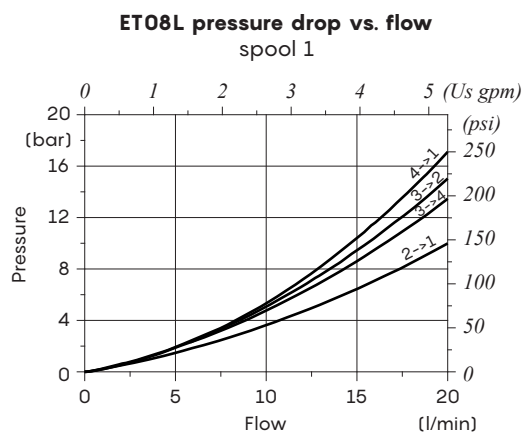
Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

#### 7 Connector

| TYPE    | CODE        | DESCRIPTION |
|---------|-------------|-------------|
| ISO4400 | 4CN1009995B | Connector   |

For complete connectors list see from page 201

**Rating diagrams**







## ET..X type directional solenoid valves – 4 way/3 positions

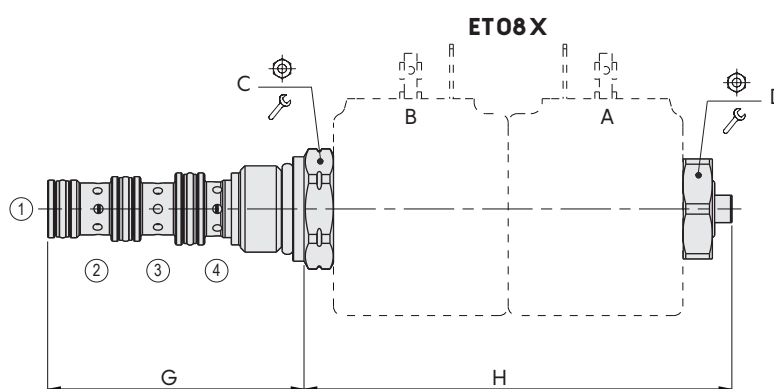
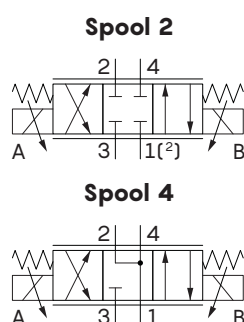
- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- Optimized linearity and hysteresis
- External zinc-plated and corrosion-proof components
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

|                                            | ET08X                                                                     | ET10X                                                                    |
|--------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 12 l/min (3.17 US gpm)                                                    | 25 l/min (6.6 US gpm)                                                    |
| Max. pressure                              | 250 bar (3600 psi)                                                        |                                                                          |
| Oil leakage                                | at 210 bar (5100 psi) 80 cm <sup>3</sup> /min (4.88 in <sup>3</sup> /min) | 200 cm <sup>3</sup> /min (12.20 in <sup>3</sup> /min)                    |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties    |                                                                          |
| Viscosity                                  | 10–200 cSt                                                                |                                                                          |
| Max level of contamination                 | 18/16/13 ISO4406                                                          |                                                                          |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                             | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for working conditions | from -20°C (-4°F) to 60°C (140°F)                                         |                                                                          |
| Cavity                                     | SAE 08/4                                                                  | SAE 10/4                                                                 |
| Coil type*                                 | BER                                                                       | BC                                                                       |
| Nominal voltages                           | 12VDC – 24VDC ± 10%                                                       |                                                                          |
| Power rating                               | 19 W (12VDC – 24VDC)                                                      | 26 W (12VDC – 24VDC)                                                     |
| Weight                                     | 0.638 kg (1.41 lb)                                                        | 0.720 kg (1.59 lb)                                                       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

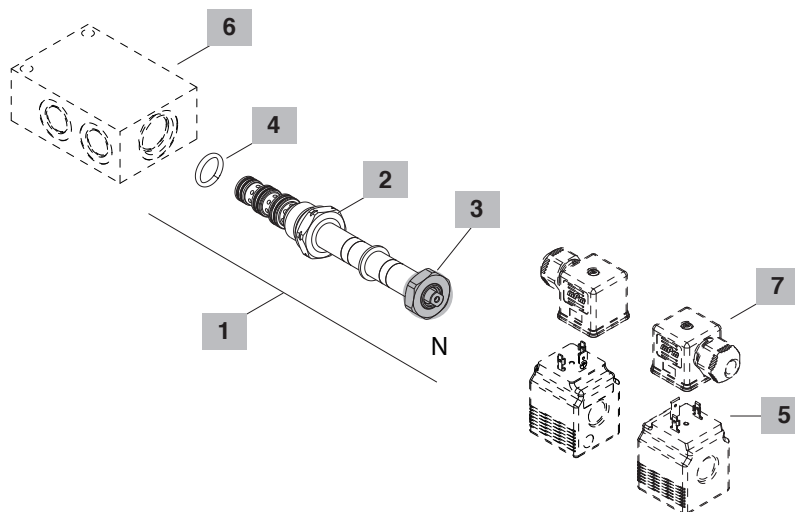
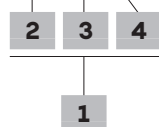
– (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



| Valve type | G    |      | H<br>N<br>without<br>emergency |      | C  |        | D  |            |
|------------|------|------|--------------------------------|------|----|--------|----|------------|
|            | mm   | in   | mm                             | in   | Nm | lbf·ft | Nm | lbf·ft     |
| ET08X      | 54   | 2.13 | 96.8                           | 3.81 | 24 | 30     | 22 | 5±1 3.7    |
| ET10X      | 62.4 | 2.46 | 117.8                          | 4.64 | 27 | 50     | 37 | 23 5±1 3.7 |

### Ordering codes and description composition

ET08X/ 2 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                |
|------------------------|-------------|----------------------------|
| <b>SAE cavity 08/4</b> |             |                            |
| <b>ET08X/20NB</b>      | OET08002035 | Without emergency, spool 2 |
| <b>ET08X/40NB</b>      | OET08002036 | Without emergency, spool 4 |
| <b>SAE cavity 10/4</b> |             |                            |
| <b>ET10X/20NB</b>      | OET10002058 | Without emergency, spool 2 |
| <b>ET10X/40NB</b>      | OET10002059 | Without emergency, spool 4 |

#### 2 Spool

| TYPE     | DESCRIPTION |
|----------|-------------|
| <b>2</b> | Spool 2     |
| <b>4</b> | Spool 4     |

#### 3 Emergency

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>N</b> | Without emergency |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)•Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE            | CODE        | DESCRIPTION                  |
|-----------------|-------------|------------------------------|
| <b>BER12VDC</b> | 4SLE001200A | 12VDC-ISO4400 coil for ET08X |
| <b>BC12VDC</b>  | 4SL8000120  | 12VDC-ISO4400 coil for ET10X |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE08/4-G 3/8</b> | 3CC0840C11 | Aluminium body for cavity 08 valve, G 3/8 std thread |
| <b>SAE10/4-G 3/8</b> | 3CC1040C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 212

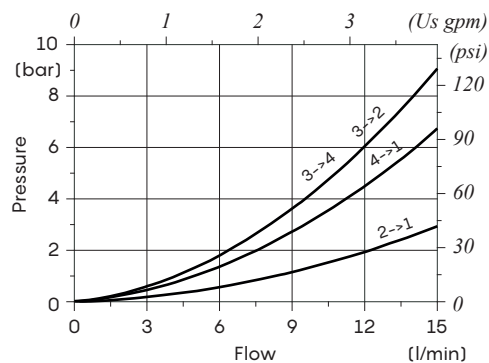
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

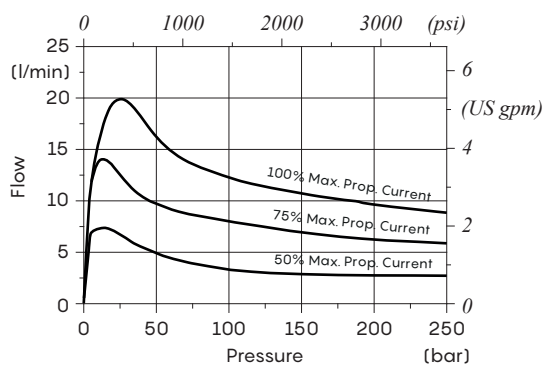
For complete connectors list see from page 201



**ET08X pressure drop vs. flow**  
spool 2

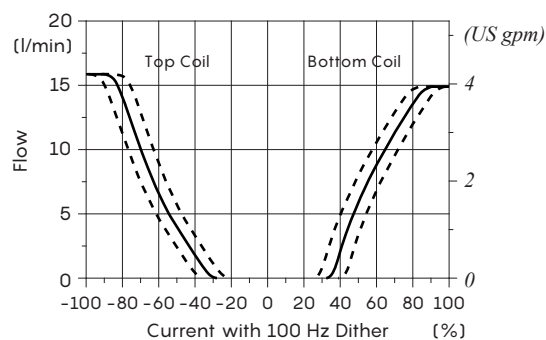


**Pressure compensation**  
(inlet to work port - spool 2)

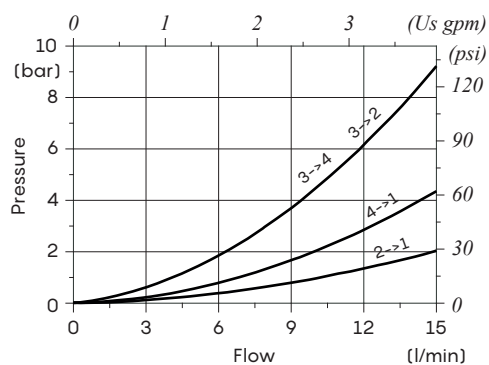


**Flow vs. current**

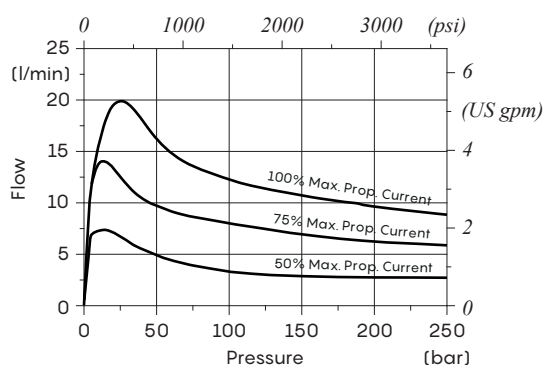
(with 10.5 bar/152 psi inline compensator- spool 2)



**ET08X pressure drop vs. flow**  
spool 4

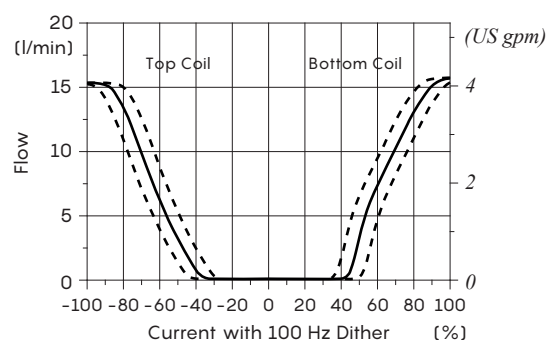


**Pressure compensation**  
(inlet to work port - spool 4)



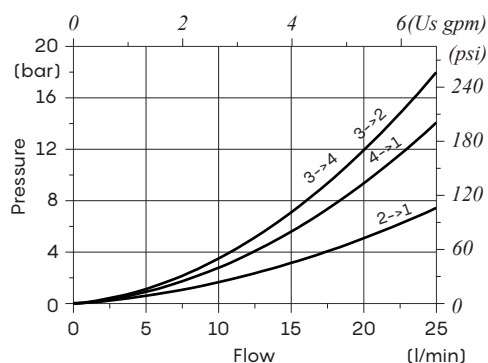
**Flow vs. current**

(with 10.5 bar/152 psi inline compensator- spool 4)

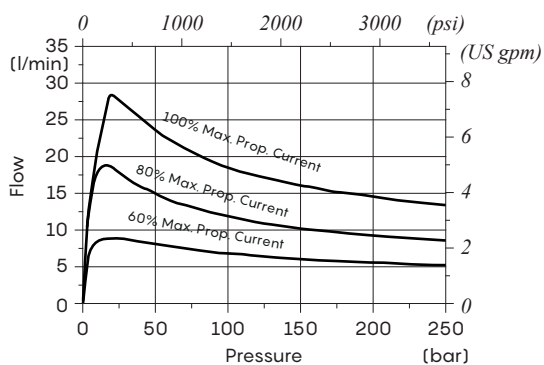


### Rating diagrams

**ET10X pressure drop vs. flow**  
spool 2/4 type

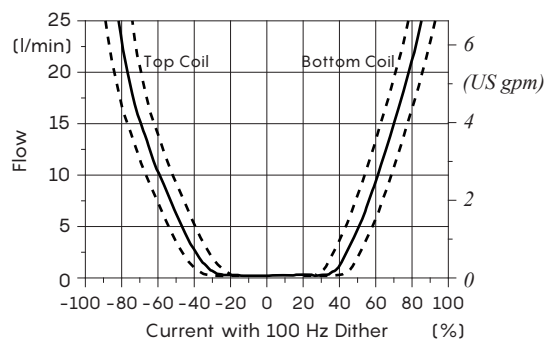


**Pressure compensation**  
(inlet to work port - spool 2/4 type)



**Flow vs. current**

(with 10.5 bar/152 psi inline compensator - spool 2/4 type)





## EK10L type directional solenoid valves – 5 way / 3 positions

- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

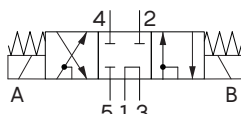
### EK10L

|                                            |                                                                          |
|--------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                               | 20 l/min (5.3 US gpm)                                                    |
| Max. pressure                              | 250 bar (3600 psi)                                                       |
| Oil leakage                                | at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)                          |
| Fluid                                      | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                  | 10–200 cSt                                                               |
| Max level of contamination                 | 18/16/13 ISO4406                                                         |
| Fluid temperature                          | with NBR seals+Polyurethane<br>with FPM seals                            |
| Environmental temp. for working conditions | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Cavity                                     | SAE 10/5                                                                 |
| Coil type*                                 | BC                                                                       |
| Nominal voltages                           | 12VDC - 24 VDC ± 10%                                                     |
| Power rating                               | 26 W (12VDC - 24VDC)                                                     |
| Weight                                     | 0.720 kg (1.59 lb)                                                       |

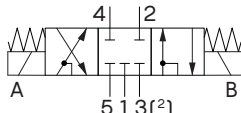
NOTE - For different conditions, please contact Walvoil Sales Dpt. - \*For coils further features see from page 201.

- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.

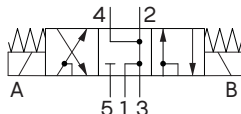
#### Spool 21



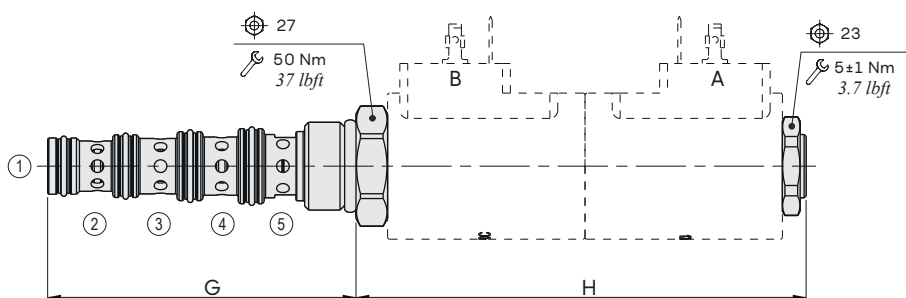
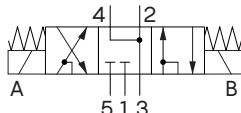
#### Spool 22



#### Spool 41



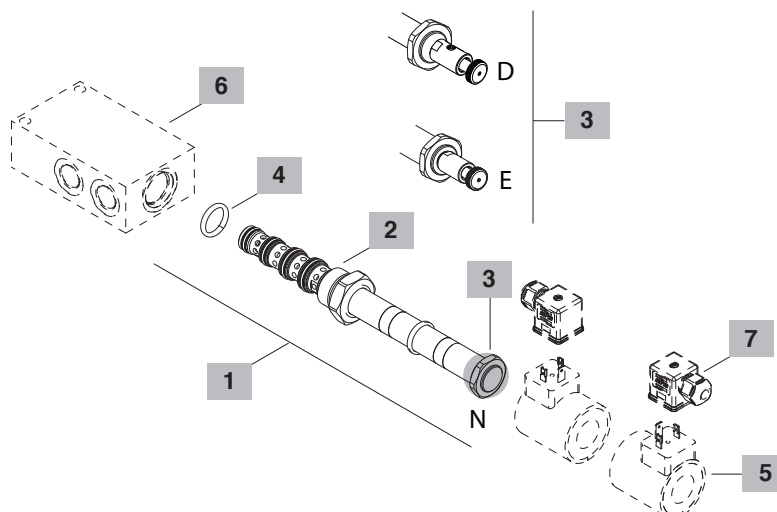
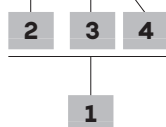
#### Spool 42



| Valve type | G    |      | N<br>without emergency |      | H<br>D push type with detent |      | E<br>with pull/push button |      |
|------------|------|------|------------------------|------|------------------------------|------|----------------------------|------|
|            | mm   | in   | mm                     | in   | mm                           | in   | mm                         | in   |
| EK10L      | 78.1 | 3.07 | 114                    | 4.49 | 142                          | 5.59 | 142                        | 5.59 |

### Ordering codes and description composition

EK10L/22 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                 |
|------------------------|-------------|-----------------------------|
| <b>SAE cavity 10/5</b> |             |                             |
| <b>EK10L/210NB</b>     | OEK10002003 | Without emergency, spool 21 |
| <b>EK10L/220NB</b>     | OEK10002000 | Without emergency, spool 22 |
| <b>EK10L/410NB</b>     | OEK10002001 | Without emergency, spool 41 |
| <b>EK10L/420NB</b>     | OEK10002004 | Without emergency, spool 42 |

#### 2 Spool

| TYPE      | DESCRIPTION |
|-----------|-------------|
| <b>21</b> | Spool 21    |
| <b>22</b> | Spool 22    |
| <b>41</b> | Spool 41    |
| <b>42</b> | Spool 42    |

#### 3 Emergency

| TYPE     | DESCRIPTION                   |
|----------|-------------------------------|
| <b>N</b> | Without emergency             |
| <b>D</b> | Push/pull type with detent    |
| <b>E</b> | Push/pull type without detent |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE           | CODE       | DESCRIPTION        |
|----------------|------------|--------------------|
| <b>BC12VDC</b> | 4SL8000120 | 12VDC-ISO4400 coil |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/5-G 3/8</b> | 3CC1050C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 214

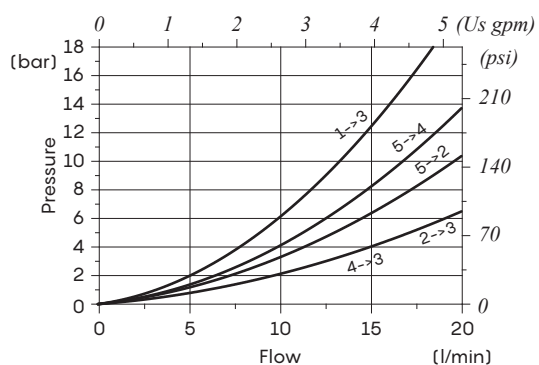
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

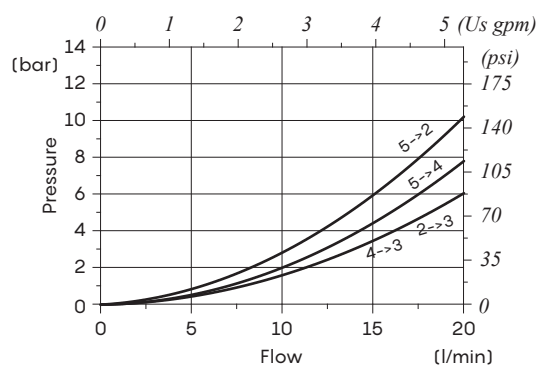
For complete connectors list see from page 201

**Rating diagrams**

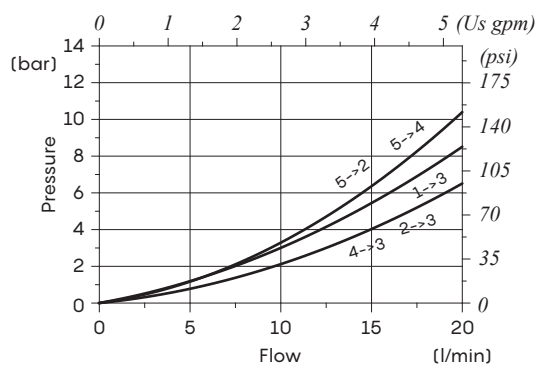
**EK10L pressure drop vs. flow**  
spool 21



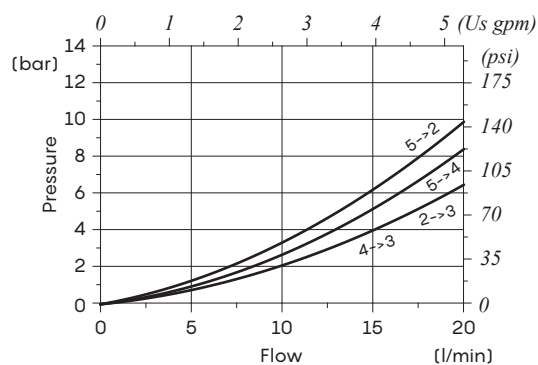
**EK10L pressure drop vs. flow**  
spool 22



**EK10L pressure drop vs. flow**  
spool 41



**EK10L pressure drop vs. flow**  
spool 42







## EK10X type directional solenoid valves – 5 way / 3 positions

- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- Optimized linearity and hysteresis
- External zinc-plated and corrosion-proof components

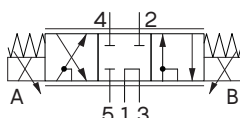
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

### EK10X

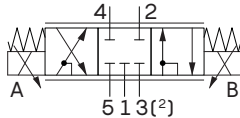
|                                               |                                               |                                                                          |
|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------|
| Nominal flow                                  |                                               | 23 l/min (6.1 US gpm)                                                    |
| Max. pressure                                 |                                               | 250 bar (3600 psi)                                                       |
| Oil leakage                                   | at 210 bar (3050 psi)                         | 200 cm <sup>3</sup> /min (12.2 in <sup>3</sup> /min)                     |
| Fluid                                         |                                               | mineral based or synthetic hydraulic fluid with lubricating properties   |
| Viscosity                                     |                                               | 10–200 cSt                                                               |
| Max level of contamination                    |                                               | 18/16/13 ISO4406                                                         |
| Fluid temperature                             | with NBR seals+Polyurethane<br>with FPM seals | from -25°C (-13°F) to 90°C (194°F)<br>from -20°C (-4°F) to 110°C (230°F) |
| Environmental temp. for<br>working conditions |                                               | from -20°C (-4°F) to 60°C (140°F)                                        |
| Cavity                                        |                                               | SAE 10/5                                                                 |
| Coil type*                                    |                                               | BC                                                                       |
| Nominal voltages                              |                                               | 12VDC – 24 VDC ± 10%                                                     |
| Power rating                                  |                                               | 26 W (12VDC – 24VDC)                                                     |
| Weight                                        |                                               | 0.736 kg (1.62 lb)                                                       |

NOTE – For different conditions, please contact Walvoil Sales Dpt. – \*For coils further features see from page 201.

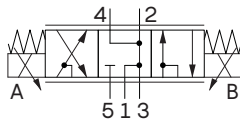
#### Spool 21



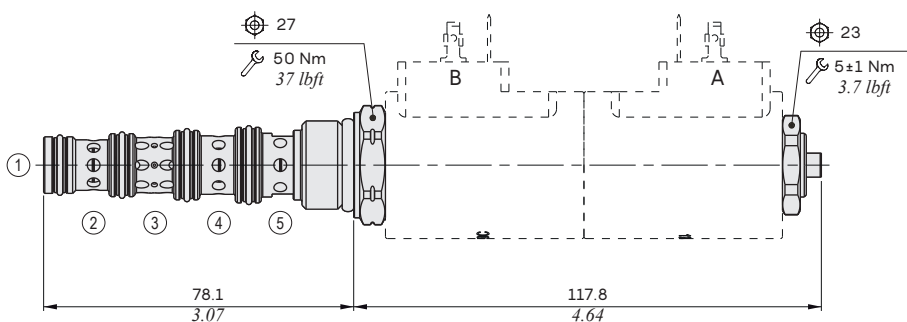
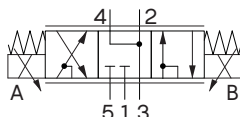
#### Spool 22



#### Spool 41

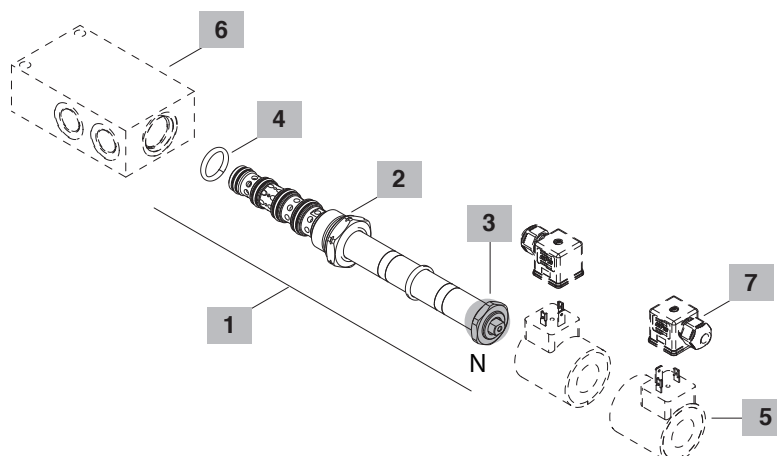
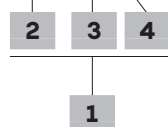


#### Spool 42



### Ordering codes and description composition

EK10X/21 0 N B



#### 1 Cartridges

| TYPE                   | CODE        | DESCRIPTION                 |
|------------------------|-------------|-----------------------------|
| <b>SAE cavity 10/5</b> |             |                             |
| <b>EK10X/210NB</b>     | OEK10002017 | Without emergency, spool 21 |
| <b>EK10X/220NB</b>     | OEK10002015 | Without emergency, spool 22 |
| <b>EK10X/410NB</b>     | OEK10002014 | Without emergency, spool 41 |
| <b>EK10X/420NB</b>     | OEK10002002 | Without emergency, spool 42 |

#### 2 Spool

| TYPE      | DESCRIPTION |
|-----------|-------------|
| <b>21</b> | Spool 21    |
| <b>22</b> | Spool 22    |
| <b>41</b> | Spool 41    |
| <b>42</b> | Spool 42    |

#### 3 Emergency

| TYPE     | DESCRIPTION       |
|----------|-------------------|
| <b>N</b> | Without emergency |

#### 4 Seals

| TYPE     | DESCRIPTION                                                    |
|----------|----------------------------------------------------------------|
| <b>B</b> | <b>NBR (Buna)+Polyurethane</b> o-ring seals, std configuration |
| <b>V</b> | <b>FPM (Viton)</b> o-ring seals, contact Sales Dept            |

#### 5 Coils

| TYPE           | CODE       | DESCRIPTION        |
|----------------|------------|--------------------|
| <b>BC12VDC</b> | 4SL8000120 | 12VDC-ISO4400 coil |

For complete coils list see page 201

#### 6 Valve body

| TYPE                 | CODE       | DESCRIPTION                                          |
|----------------------|------------|------------------------------------------------------|
| <b>SAE10/5-G 3/8</b> | 3CC1050C11 | Aluminium body for cavity 10 valve, G 3/8 std thread |

Note: aluminium body can stand up to 210 bar (3050 psi)  
For steel bodies or different threading see from page 214

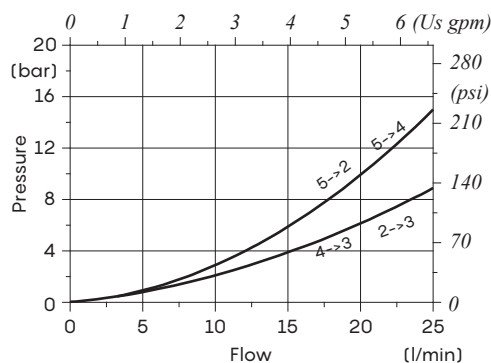
#### 7 Connector

| TYPE           | CODE        | DESCRIPTION |
|----------------|-------------|-------------|
| <b>ISO4400</b> | 4CN1009995B | Connector   |

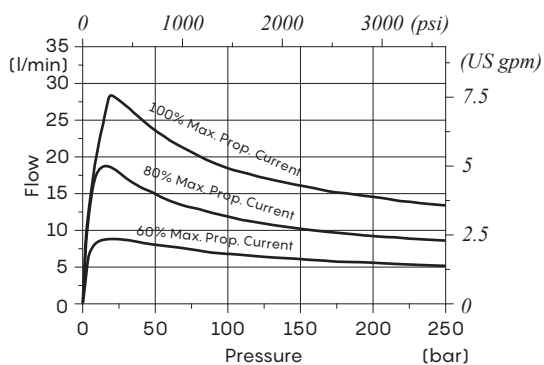
For complete connectors list see from page 201



**EK10X pressure drop vs. flow**  
spool 22

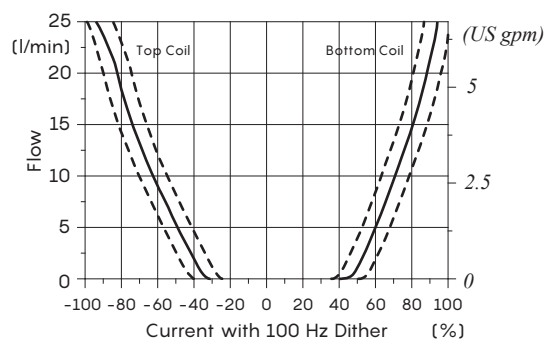


**Pressure compensation**  
(inlet to work port - spool 22)

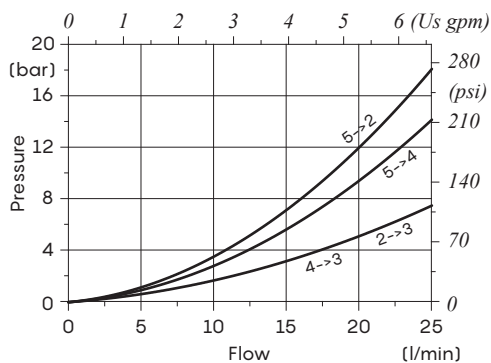


**Flow vs. current**

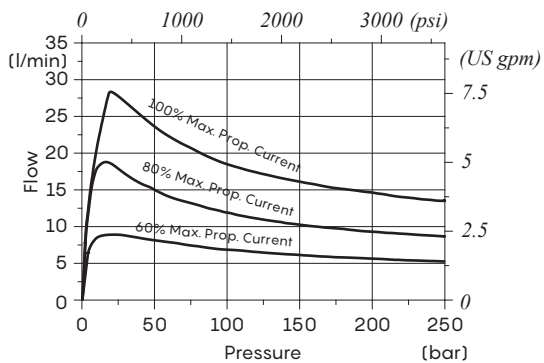
(with 10.5 bar/152 psi inline compensator- spool 22)



**EK10X pressure drop vs. flow**  
spool 21-41-42

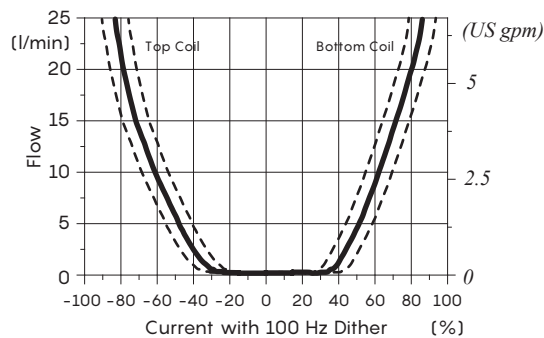


**Pressure compensation**  
(inlet to work port - spool 21-41-42)



**Flow vs. current**

(with 10.5 bar/152 psi inline compensator- spool 21-41-42)





## Types and ordering codes

| Valve type                                                                                                  | Coil  | Voltage     | Connector                                                               |                                                                                                                                                        |                                                            |                            |                           |              |
|-------------------------------------------------------------------------------------------------------------|-------|-------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------|---------------------------|--------------|
|                                                                                                             |       |             | ISO4400                                                                 | Deutsch DT                                                                                                                                             | AMP JPT                                                    | Packard Weather-pack       | Packard Metri-pack        | Flying leads |
| Directional solenoid valves                                                                                 |       |             |                                                                         |                                                                                                                                                        |                                                            |                            |                           |              |
| EJ08 G                                                                                                      | BT    | 10 VDC      | 4SL3000100                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 12 VDC      | 4SL3000120<br>4SL3000126 <sup>(4)</sup>                                 | 4SL3000130 <sup>(6)</sup><br>4SL3000134 <sup>(3-6)</sup><br>4SL3000128 <sup>(2)</sup>                                                                  | 4SL3000122 <sup>(5)</sup><br>4SL3001200 <sup>(3-6)</sup>   | 4SL3000124 <sup>(2)</sup>  | 4SL3000127 <sup>(2)</sup> | 4SL300012 C  |
|                                                                                                             |       | 24 VDC      | 4SL3000240<br>4SL3030240 <sup>(11)</sup>                                | 4SL3000249 <sup>(6)</sup><br>4SL300024 C <sup>(3-6)</sup>                                                                                              | 4SL3000248 <sup>(6)</sup>                                  | -                          | -                         | 4SL3000246   |
|                                                                                                             |       | 26 VDC      | 4SL3000260                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 48 VDC      | 4SL3000480<br>4SL3030480 <sup>(11)</sup>                                | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 110 VDC     | 4SL3001100<br>4SL3031100 <sup>(11)</sup>                                | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 220 VDC     | 4SL3002200<br>4SL3032200 <sup>(11)</sup>                                | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
| EC..T<br>EW10M<br>ER12M<br>RD08TX<br>EJ12M                                                                  | BH    | 12 VDC      | 4SLD001200A                                                             | 4SLD001201A <sup>(6)</sup>                                                                                                                             | 4SLD001207A <sup>(6)</sup>                                 | -                          | -                         | 4SLD001203A  |
| 24 VDC                                                                                                      |       | 4SLD002400A | 4SLD002401A <sup>(6)</sup>                                              | 4SLD002407A <sup>(6)</sup>                                                                                                                             | -                                                          | -                          | 4SLD002403A               |              |
| EE08 A<br>EB08M<br>EC..M<br>EF..M<br>EH..M<br>EW08M<br>EJ08MF<br>EJ08M<br>EL08B<br>ER08L<br>ET08L<br>ET08 X | BER   | 10 VDC      | 4SLE001000A                                                             | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 12 VDC      | 4SLE001200A<br>4SLE001217A <sup>(3)</sup>                               | 4SLE001201A <sup>(5)</sup><br>4SLE001209A <sup>(3-5)</sup><br>4SLE001202A <sup>(6)</sup><br>4SLE001216A <sup>(3-6)</sup><br>4SLE001206A <sup>(2)</sup> | 4SLE001203A <sup>(5)</sup><br>4SLE001211A <sup>(3-5)</sup> | 4SLE001210A <sup>(2)</sup> | 4SLE001214 <sup>(2)</sup> | 4SLE001207A  |
|                                                                                                             |       | 24 VDC      | 4SLE002400A<br>4SLE002408A <sup>(3)</sup><br>4SLE302400A <sup>(1)</sup> | 4SLE002401A <sup>(5)</sup><br>4SLE002407A <sup>(3-5)</sup><br>4SLE002402A <sup>(6)</sup>                                                               | 4SLE002403A <sup>(5)</sup>                                 | -                          | -                         | 4SLE002404A  |
|                                                                                                             |       | 48 VDC      | 4SLE004800A<br>4SLE304800A <sup>(11)</sup>                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 110 VDC     | 4SLE011000A<br>4SLE311000A <sup>(1)</sup>                               | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 220 VDC     | 4SLE022000A<br>4SLE322000A <sup>(1)</sup>                               | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 10.5 VDC    | 4SL6000100                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
| EE10A                                                                                                       | BIN19 | 12 VDC      | 4SL6000121                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 24 VDC      | 4SL6000240                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
| EE12 A                                                                                                      | BIN22 | 12 VDC      | 4SL6000128                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 24 VDC      | 4SL6000245                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
| EJ10M<br>ER10L<br>ET10L<br>ET10X<br>EK10L<br>EK10X                                                          | BC    | 10.5 VDC    | 4SL8000110                                                              |                                                                                                                                                        |                                                            |                            |                           |              |
|                                                                                                             |       | 12 VDC      | 4SL8000120                                                              | 4SL800012BA <sup>(6)</sup><br>4SL8001201A <sup>(6-3)</sup>                                                                                             | 4SL8000127 <sup>(5)</sup><br>4SL8000130 <sup>(5-3)</sup>   | -                          | -                         | 4SL800012A   |
|                                                                                                             |       | 24 VDC      | 4SL8000240<br>4SL8030240 <sup>(11)</sup>                                | 4SL8000243 <sup>(6)</sup>                                                                                                                              | 4SL8000241 <sup>(5)</sup>                                  | -                          | -                         | 4SL8000242   |
|                                                                                                             |       | 26 VDC      | 4SL8000260                                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 48 VDC      | 4SL8030480 <sup>(11)</sup>                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 110 VDC     | 4SL8031100 <sup>(11)</sup>                                              | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
|                                                                                                             |       | 220 VDC     | 4SL8032200A <sup>(11)</sup>                                             | -                                                                                                                                                      | -                                                          | -                          | -                         | -            |
| EL10C                                                                                                       | BQ16  | 12 VDC      | 4SL8000121                                                              | 4SL8000128 <sup>(5)</sup>                                                                                                                              | -                                                          | -                          | 4SL8000124 <sup>(2)</sup> | 4SL8000125   |
|                                                                                                             |       | 24 VDC      | 4SL8002400                                                              | 4SL8000245 <sup>(5)</sup>                                                                                                                              | -                                                          | -                          | -                         | -            |

## Types and ordering codes

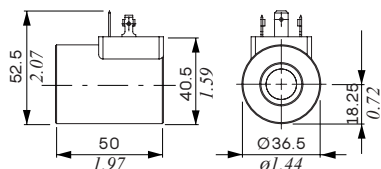
| Valve type                                                                                                                                                                                                                                                                                   | Coil  | Voltage | Connector   |                            |                            |                      |                    |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|-------------|----------------------------|----------------------------|----------------------|--------------------|--------------|
|                                                                                                                                                                                                                                                                                              |       |         | ISO4400     | Deutsch DT                 | AMP JPT                    | Packard Weather-pack | Packard Metri-pack | Flying leads |
| Pressure relief valves – Pressure reducing valves – Flow control pressure compensated valves                                                                                                                                                                                                 |       |         |             |                            |                            |                      |                    |              |
| MC10T<br>MC10X<br>MP..T<br>MP..X<br>PP..X<br>PU..X<br>RP..X<br>EE.X                                                                                                                                                                                                                          | BQP19 | 12 VDC  | 4SL5000126A | 4SL5000125A <sup>(6)</sup> | 4SL5000129A <sup>(5)</sup> | -                    | -                  | -            |
|                                                                                                                                                                                                                                                                                              |       | 24 VDC  | 4SL5000245A | 4SL5000244A <sup>(6)</sup> | 4SL5000248 <sup>(A5)</sup> | -                    | -                  | -            |
|                                                                                                                                                                                                                                                                                              | BH    | 12 VDC  | 4SLD001200A | 4SLD001201A <sup>(6)</sup> | 4SLD001207A <sup>(6)</sup> | -                    | -                  | 4SLD001203A  |
|                                                                                                                                                                                                                                                                                              |       | 24 VDC  | 4SLD002400A | 4SLD002401A <sup>(6)</sup> | 4SLD002407A <sup>(6)</sup> | -                    | -                  | 4SLD002403A  |
| Mating connectors<br>(For connector with rectifier see following table)                                                                                                                                                                                                                      |       |         | 4CN1009995B | 5CON140031                 | 5CON003                    | 5CON001              | 5CON017            | -            |
| Notes: <sup>(1)</sup> supply with AC and use only with rectifier connector – <sup>(2)</sup> with flying leads – <sup>(3)</sup> with bidirectional diode – <sup>(4)</sup> with unidirectional diode<br><sup>(5)</sup> integrated perpendicular type – <sup>(6)</sup> integrated parallel type |       |         |             |                            |                            |                      |                    |              |

| Voltage | ISO 4400 mating connector with rectifier |              |               |              |
|---------|------------------------------------------|--------------|---------------|--------------|
|         | BT type coil                             | BE type coil | BER type coil | BC type coil |
| 24 VDC  | 4CN3010240                               | 4CN1010240   | 4CN1010240    | 4CN3010240   |
| 48 VDC  | 4CN3010480                               | 4CN1010480   | 4CN1010480    | 4CN3010480   |
| 110 VDC | 4CN3011100                               | 4CN1011100   | 4CN1011100    | 4CN3011100   |
| 220 VDC | 4CN3012200                               | 4CN1012200   | 4CN1012200    | 4CN3012200   |

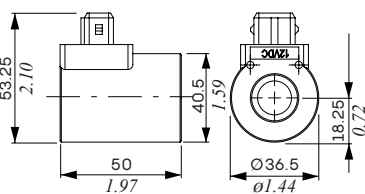
## Dimensional data and features

## BT type

## ISO4400 connector



## AMP JPT connector



## Features

Nominal voltage tolerance :  $\pm 10\%$ 

Power rating.....

|                        |
|------------------------|
| : 19 W - 10 VDC        |
| : 21 W - 12/24/26 VDC  |
| : 20.3 W - 48 VDC      |
| : 17.3 W - 110 VDC     |
| : 17.7 W - 220 VDC     |
| : 19.9 W - 24 RAC      |
| : 20.7 W - 48 RAC      |
| : 20 W - 110 / 220 RAC |

Max. operating current ...

|                    |
|--------------------|
| : 1.9 A - 10 VDC   |
| : 1.77 A - 12 VDC  |
| : 0.89 A - 24VDC   |
| : 0.84 A - 26 VDC  |
| : 0.43 A - 48 VDC  |
| : 0.16 A - 110 VDC |
| : 0.08 A - 220 VDC |
| : 0.93 A - 24 RAC  |
| : 0.47 A - 48 RAC  |
| : 0.18 A - 110 RAC |
| : 0.09 A - 220 RAC |

Coil insulation..... Class F (155°C - 311°F)

Weather protection..... IP65 - ISO4400

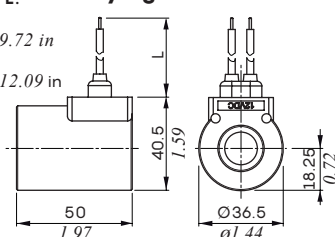
|                      |
|----------------------|
| : IP69K - Deutsch DT |
| : IP65 - AMP JPT     |
| : IP67 - Weatherpack |
| : IP67 - Metri-pack  |

Insertion..... 100%

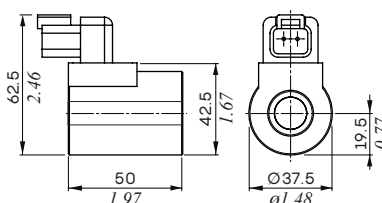
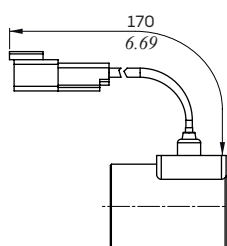
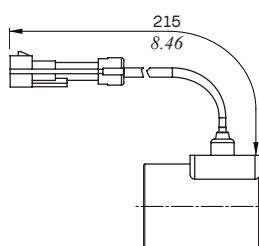
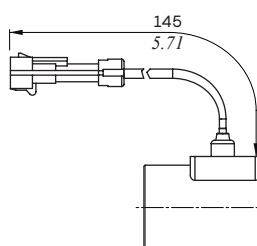
## Dimension L:

12 VDC =  
247 mm / 9.72 in  
24 VDC =  
307 mm / 12.09 in

## Flying leads

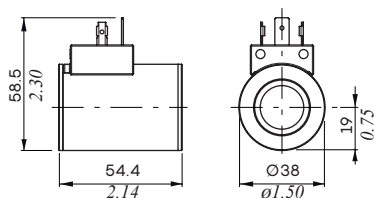


## DEUTSCH DT04 connector

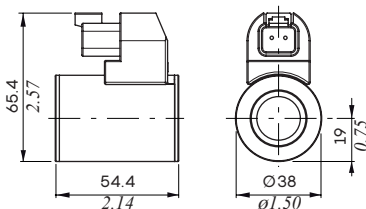
Flying leads with  
DEUTSCH DT04  
connectorFlying leads with  
PACKARD WEATHER-PACK  
connectorFlying leads with  
PACKARD METRI-PACK  
connector

## BH type

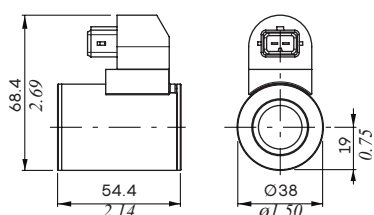
## ISO4400 connector



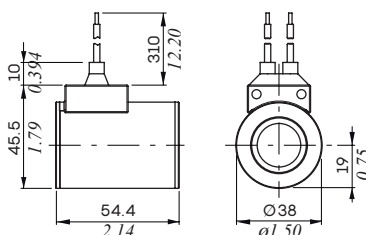
## DEUTSCH DT04 connector



## AMP JPT connector



## Flying leads



## Features

Nominal voltage tolerance...  $\pm 10\%$ 

Power rating..... 33 W - 12/24 VDC

Max. oper. current (on/off) ... 2.75 A - 12 VDC

: 1.38 A - 24 VDC

Max. prop. control current ... 1.7 A - 12 VDC

: 0.85 A - 24 VDC

Coil insulation..... Class H  
(180°C - 356°F)

Weather protection..... IP65 - ISO4400

: IP69K -Deutsch DT

: IP65 - AMP JPT

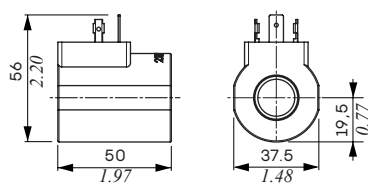
Insertion..... 100%



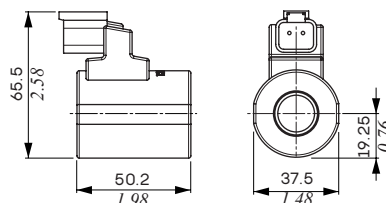
## Dimensional data and features

## BC type

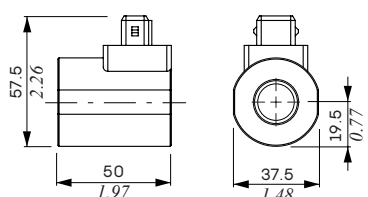
## ISO4400 connector



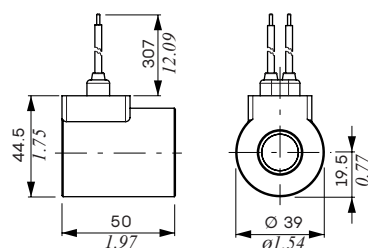
## DEUTSCH DT04 connector



## AMP JPT connector



## Flying leads

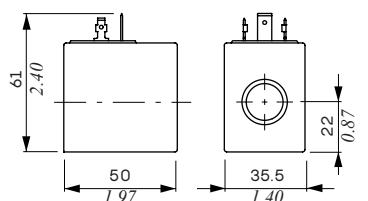


## Features

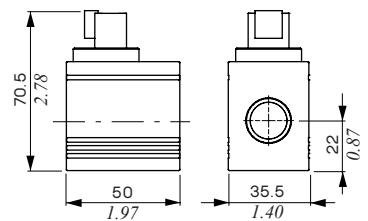
|                           |                            |
|---------------------------|----------------------------|
| Nominal voltage tolerance | : ±10%                     |
| Power rating              | : 26.9 W - 10.5 VDC        |
|                           | : 26 W - 12 VDC            |
|                           | : 26 W - 24 VDC            |
|                           | : 24 W - 26 VDC            |
|                           | : 26 W - 24/48/110/220 RAC |
| Max. operating current    | : 2.6 A - 10.5 VDC         |
|                           | : 2.19 A - 12 VDC          |
|                           | : 1.08 A - 24 VDC          |
|                           | : 0.92 A - 26 VDC          |
|                           | : 1.2 A - 24 RAC           |
|                           | : 0.6 A - 48 RAC           |
|                           | : 0.3 A - 110 RAC          |
|                           | : 0.15 A - 220 RAC         |
| Coil insulation           | : Class H (180°C - 356°F)  |
| Weather protection        | : IP65 - ISO4400           |
|                           | : IP65 - AMP JPT           |
|                           | : IP69K - Deutsch DT       |
| Insertion                 | : 100%                     |

## BQ16 type

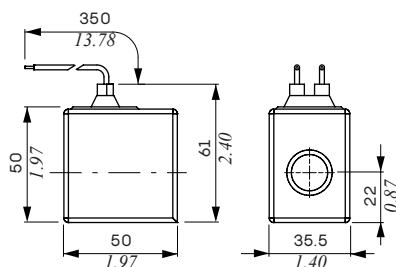
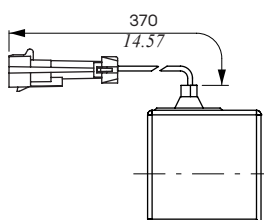
## ISO4400 connector



## DEUTSCH DT04 connector



## Flying leads

Flying leads with  
PACKARD METRI-PACK  
connector

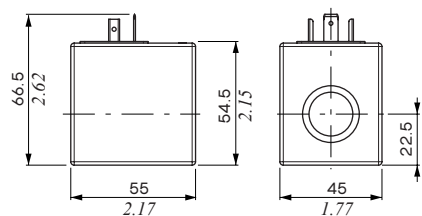
## Features

|                           |                           |
|---------------------------|---------------------------|
| Nominal voltage tolerance | : ±10%                    |
| Power rating              | : 30 W - 12/24 VDC        |
| Max. operating current    | : 2.5 A - 12 VDC          |
|                           | : 1.25 A - 24 VDC         |
| Coil insulation           | : Class H (180°C - 356°F) |
| Weather protection        | : IP65 - ISO4400          |
|                           | : IP69K - Deutsch DT      |
|                           | : IP67 - Metri-pack       |
| Insertion                 | : 100%                    |

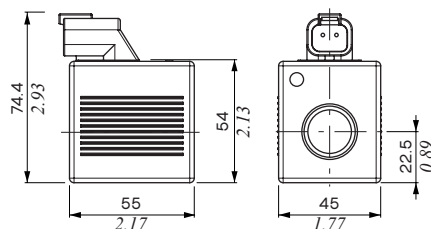
## Dimensional data and features

**BQP19 type**

**ISO 4400 connector**



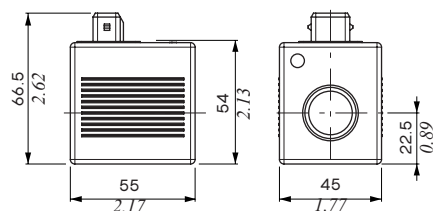
## DEUTSCH DT04 connector



## Features

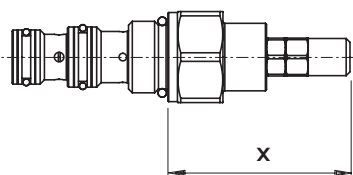
[illegible]

### AMP JPT connector



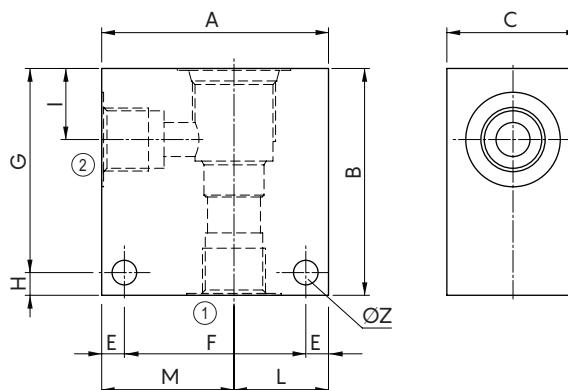
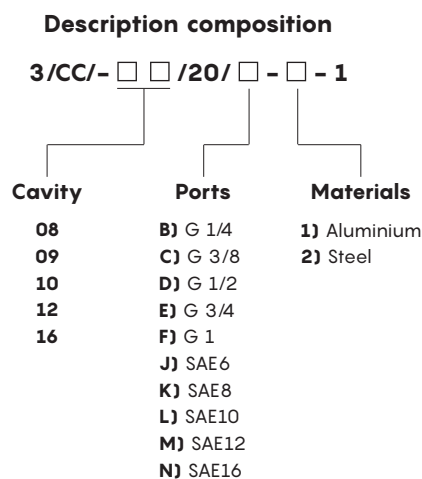


## Types and dimensions



| Valve type | Cavity | Dimension "X" |      |                |      |                                          |      |                           |      |
|------------|--------|---------------|------|----------------|------|------------------------------------------|------|---------------------------|------|
|            |        | M<br>handknob |      | S (Y)<br>screw |      | X<br>Valve set with<br>antitampering cap |      | W<br>Copped<br>adjustment |      |
|            |        | mm            | in   | mm             | in   | mm                                       | in   | mm                        | in   |
| MC..MV     | 10/2   | -             | -    | 44.5           | 1.75 | 49.8                                     | 1.96 | -                         | -    |
|            | 08/2   | -             | -    | 46.6           | 1.83 | 54.9                                     | 2.16 | -                         | -    |
| MC..R      | 09/2   | -             | -    | 46.6           | 1.83 | 54.9                                     | 2.16 | -                         | -    |
|            | 10/2   | -             | -    | 44.4           | 1.75 | 52.7                                     | 2.07 | -                         | -    |
| MG..A      | 10/2   | -             | -    | 94.5           | 3.72 | -                                        | -    | -                         | -    |
|            | 12/2   | -             | -    | 126.5          | 4.98 | -                                        | -    | -                         | -    |
| MP..M      | 10/2   | -             | -    | 48.3           | 1.9  | -                                        | -    | -                         | -    |
|            | 12/2   | -             | -    | 46.9           | 1.85 | -                                        | -    | -                         | -    |
| SW..A      | 10/2   | -             | -    | 49.8           | 1.96 | 58.25                                    | 2.29 | -                         | -    |
|            | 16/2   | -             | -    | 52.5           | 2.07 | -                                        | -    | -                         | -    |
| SW..A      | 12/2   | -             | -    | 54.5           | 2.15 | -                                        | -    | -                         | -    |
|            | 16/2   | -             | -    | 58             | 2.28 | -                                        | -    | -                         | -    |
| SP..A      | 10/3   | -             | -    | 53             | 2.09 | -                                        | -    | -                         | -    |
|            | 10/3   | -             | -    | 51             | 2.01 | -                                        | -    | 51                        | 2.01 |
| CC..A      | 12/3   | -             | -    | 58.5           | 2.3  | -                                        | -    | 58.5                      | 2.3  |
|            | 16/3   | -             | -    | 69             | 2.72 | -                                        | -    | 69                        | 2.72 |
| NB..A      | 08/2   | 55.5          | 2.18 | 49.5           | 1.95 | -                                        | -    | -                         | -    |
|            | 10/2   | 47.5          | 1.87 | 46.5           | 1.83 | -                                        | -    | -                         | -    |
|            | 12/2   | 53.4          | 2.10 | 46.3           | 1.82 | -                                        | -    | -                         | -    |
|            | 16/2   | 71.6          | 2.82 | 60.9           | 2.40 | -                                        | -    | -                         | -    |
| NU..A      | 08/2   | 70.7          | 2.78 | 64.5           | 2.54 | -                                        | -    | -                         | -    |
|            | 10/2   | 70            | 2.75 | 65             | 2.56 | -                                        | -    | -                         | -    |
|            | 12/2   | 71.2          | 2.80 | 66             | 2.60 | -                                        | -    | -                         | -    |
|            | 16/2   | 72.9          | 2.87 | 66             | 2.60 | -                                        | -    | -                         | -    |
| NT..A      | 08/2   | 70.7          | 2.78 | 64.5           | 2.54 | -                                        | -    | -                         | -    |
|            | 10/2   | 70            | 2.76 | 65             | 2.56 | -                                        | -    | -                         | -    |
|            | 12/2   | 71.2          | 2.80 | 66             | 2.60 | -                                        | -    | -                         | -    |
|            | 16/2   | 72.9          | 2.87 | 66             | 2.60 | -                                        | -    | -                         | -    |
| PW..A      | 08/2   | 67.6          | 2.66 | 62             | 2.44 | -                                        | -    | -                         | -    |
|            | 10/2   | 72.5          | 2.85 | 69             | 2.72 | -                                        | -    | -                         | -    |
|            | 12/2   | 69.2          | 2.72 | 61.5           | 2.42 | -                                        | -    | -                         | -    |
|            | 16/2   | 102           | 4.02 | 96             | 3.78 | -                                        | -    | -                         | -    |
| PU..A      | 08/2   | 48            | 1.89 | 46             | 1.81 | -                                        | -    | -                         | -    |
|            | 10/2   | 44            | 1.73 | 42             | 1.65 | -                                        | -    | -                         | -    |
|            | 12/2   | 48            | 1.89 | 42             | 1.65 | -                                        | -    | -                         | -    |
|            | 16/2   | 53.5          | 2.11 | 51             | 2.01 | -                                        | -    | -                         | -    |
| PP..A      | 08/2   | 54.1          | 2.13 | 48             | 1.89 | -                                        | -    | -                         | -    |
|            | 10/2   | 47.2          | 1.86 | 42             | 1.65 | -                                        | -    | -                         | -    |
|            | 12/2   | 47.5          | 1.87 | 43             | 1.69 | -                                        | -    | -                         | -    |
|            | 16/2   | 51.5          | 2.03 | 51             | 2.01 | -                                        | -    | -                         | -    |

### Dimensional and ordering codes



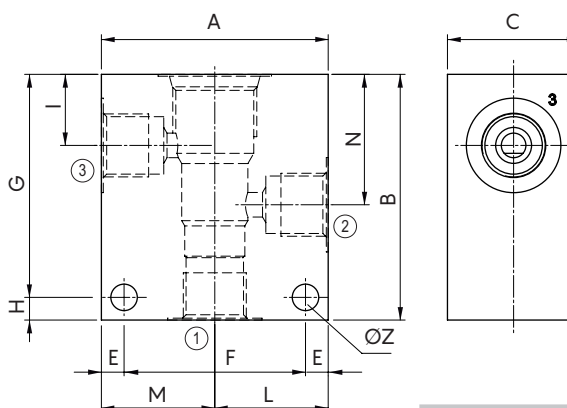
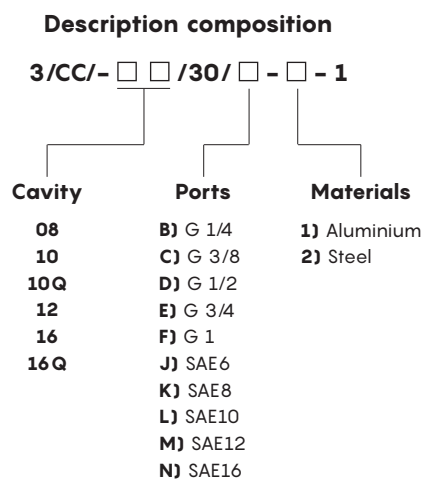
| Material  | Max. pressure |      |
|-----------|---------------|------|
|           | bar           | psi  |
| Aluminium | 210           | 3050 |
| Steel     | 350           | 5100 |

| Cavity   | Ports | Dimensions |      |      |      |      |      |      |      |      |      |      |            | Ordering code |            |
|----------|-------|------------|------|------|------|------|------|------|------|------|------|------|------------|---------------|------------|
|          |       | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | ØZ   | Aluminium  | Steel         |            |
| SAE 08/2 | G 1/4 | mm         | 50   | 50   | 30   | 6    | 38   | 44   | 6    | 14.8 | 20   | 30   | 6.5        | 3CC0820B11    | 3CC0820B21 |
|          |       | in         | 1.97 | 1.97 | 1.18 | 0.24 | 1.50 | 1.73 | 0.24 | 0.58 | 0.79 | 1.18 | 0.26       |               |            |
|          | G 3/8 | mm         | 50   | 50   | 30   | 6    | 38   | 44   | 6    | 14.8 | 20   | 30   | 6.5        | 3CC0820C11    | 3CC0820C21 |
|          |       | in         | 1.97 | 1.97 | 1.18 | 0.24 | 1.50 | 1.73 | 0.24 | 0.58 | 0.79 | 1.18 | 0.26       |               |            |
|          | G 1/2 | mm         | 60   | 60   | 35   | 6    | 48   | 54   | 6    | 18   | 25   | 35   | 6.5        | 3CC0820D11    | /          |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.16 | 0.24 | 0.71 | 0.98 | 1.38 | 0.26       |               |            |
|          | SAE6  | mm         | 50   | 50   | 30   | 6    | 38   | 44   | 6    | 14.8 | 20   | 30   | 6.5        | 3CC0820J11    | 3CC0820J21 |
|          |       | in         | 1.97 | 1.97 | 1.18 | 0.24 | 1.50 | 1.73 | 0.24 | 0.58 | 0.79 | 1.18 | 0.25       |               |            |
|          | SAE8  | mm         | 60   | 60   | 30   | 6    | 48   | 54   | 6    | 14   | 25   | 35   | 6.5        | 3CC0820K11    | 3CC0820K21 |
|          |       | in         | 2.36 | 2.36 | 1.18 | 0.24 | 1.89 | 2.12 | 0.24 | 0.55 | 0.98 | 1.38 | 0.26       |               |            |
| SAE 09/2 | G 3/8 | mm         | 60   | 60   | 35   | 6    | 48   | 54   | 6    | 14   | 25   | 35   | 6.5        | 3CC0920C11    | 3CC0920C21 |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.12 | 0.24 | 0.55 | 0.98 | 1.38 | 0.26       |               |            |
| SAE 10/2 | G 1/4 | mm         | 60   | 60   | 35   | 6    | 48   | 54   | 6    | 18.8 | 25   | 35   | 6.5        | 3CC1020B11    | 3CC1020B21 |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.12 | 0.24 | 0.74 | 0.98 | 1.38 | 0.26       |               |            |
|          | G 3/8 | mm         | 60   | 60   | 35   | 6    | 48   | 54   | 6    | 18.8 | 25   | 35   | 6.5        | 3CC1020C11    | 3CC1020C21 |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.12 | 0.24 | 0.74 | 0.98 | 1.38 | 0.26       |               |            |
|          | G 1/2 | mm         | 60   | 60   | 35   | 6    | 48   | 54   | 6    | 18.8 | 25   | 35   | 6.5        | 3CC1020D11    | 3CC1020D21 |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.12 | 0.24 | 0.74 | 0.98 | 1.38 | 0.26       |               |            |
|          | SAE6  | mm         | 60   | 60   | 35   | 6    | 48   | 64   | 6    | 18.8 | 25   | 35   | 6.5        | 3CC1020J11    | 3CC1020J21 |
|          |       | in         | 2.36 | 2.36 | 1.38 | 0.24 | 1.89 | 2.52 | 0.24 | 0.74 | 0.98 | 1.38 | 0.26       |               |            |
|          | SAE8  | mm         | 70   | 70   | 35   | 6    | 58   | 64   | 6    | 18.5 | 35   | 35   | 6.5        | 3CC1020K11    | 3CC1020K21 |
|          |       | in         | 2.75 | 2.75 | 1.38 | 0.24 | 2.28 | 2.52 | 0.24 | 0.73 | 1.38 | 1.38 | 0.26       |               |            |
| SAE10    | mm    | 70         | 70   | 40   | 8    | 54   | 62   | 8    | 22   | 30   | 40   | 8.5  | 3CC1020L11 | 3CC1020L21    |            |
|          | in    | 2.75       | 2.75 | 1.57 | 0.31 | 2.12 | 2.44 | 0.31 | 0.87 | 1.18 | 1.57 | 0.33 |            |               |            |

**Dimensional and ordering codes**

| Cavity   | Ports |    | Dimensions |      |      |      |      |      |      |      |      |      |      | Ordering code |             |
|----------|-------|----|------------|------|------|------|------|------|------|------|------|------|------|---------------|-------------|
|          |       |    | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | OZ   | Aluminium     | Steel       |
| SAE 12/2 | G 1/2 | mm | 70         | 80   | 40   | 8    | 54   | 72   | 8    | 25   | 30   | 40   | 8.5  | 3CC1220D11    | 3CC1220D21  |
|          |       | in | 2.75       | 3.15 | 1.57 | 0.31 | 2.12 | 2.83 | 0.31 | 0.98 | 1.18 | 1.57 | 0.33 |               |             |
|          | G 3/4 | mm | 70         | 90   | 40   | 8    | 54   | 82   | 8    | 25   | 30   | 40   | 8.5  | 3CC1220E11    | 3CC1220E21  |
|          |       | in | 2.75       | 3.54 | 1.57 | 0.31 | 2.12 | 3.23 | 0.31 | 0.98 | 1.18 | 1.57 | 0.33 |               |             |
|          | SAE10 | mm | 70         | 85   | 40   | 8    | 54   | 77   | 8    | 25   | 30   | 40   | 8.5  | 3CC1220L11    | 3CC1220L21  |
|          |       | in | 2.75       | 3.35 | 1.57 | 0.31 | 2.12 | 3.03 | 0.31 | 0.98 | 1.18 | 1.57 | 0.33 |               |             |
| SAE 16/2 | G 1/2 | mm | 80         | 90   | 50   | 10   | 60   | 80   | 10   | 25   | 35   | 45   | 10.5 | 3CC1620D11    | 3CC1620D21  |
|          |       | in | 3.15       | 3.54 | 1.97 | 0.39 | 2.36 | 3.15 | 0.39 | 0.98 | 1.38 | 1.77 | 0.41 |               |             |
|          | G 3/4 | mm | 80         | 90   | 50   | 10   | 60   | 80   | 10   | 25   | 35   | 45   | 10.5 | 3CC1620E11    | 3CC1620E21  |
|          |       | in | 3.15       | 3.54 | 1.97 | 0.39 | 2.36 | 3.15 | 0.39 | 0.98 | 1.38 | 1.77 | 0.41 |               |             |
|          | G 1   | mm | 85         | 100  | 60   | 10   | 65   | 90   | 10   | 23.5 | 40   | 45   | 10.5 | 3CC1620F11    | 3CC1620F210 |
|          |       | in | 3.35       | 3.94 | 2.36 | 0.39 | 2.56 | 3.54 | 0.39 | 0.92 | 1.57 | 1.77 | 0.41 |               |             |
|          | SAE12 | mm | 80         | 90   | 50   | 10   | 60   | 80   | 10   | 25   | 35   | 45   | 10.5 | 3CC1620M11    | 3CC1620M21  |
|          |       | in | 3.15       | 3.54 | 1.97 | 0.39 | 2.36 | 3.15 | 0.39 | 0.98 | 1.38 | 1.77 | 0.41 |               |             |
|          | SAE16 | mm | 80         | 100  | 50   | 10   | 60   | 90   | 10   | 25   | 35   | 45   | 10.5 | 3CC1620N11    | 3CC1620N21  |
|          |       | in | 3.15       | 3.94 | 1.97 | 0.39 | 2.36 | 3.54 | 0.39 | 0.98 | 1.38 | 1.77 | 0.41 |               |             |

## Dimensional and ordering codes



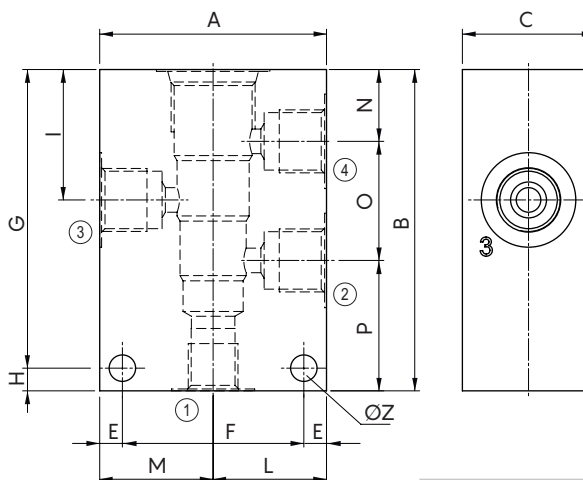
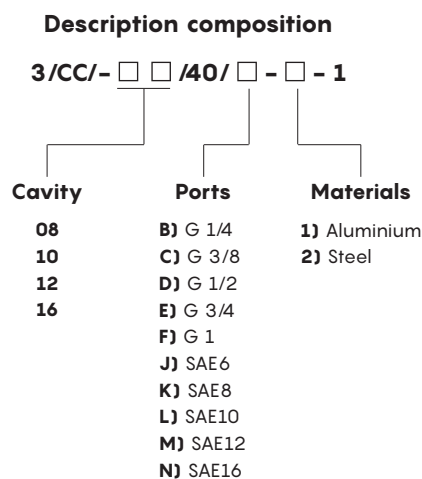
| Material  | Max. pressure |      |
|-----------|---------------|------|
|           | bar           | psi  |
| Aluminium | 210           | 3050 |
| Steel     | 350           | 5100 |

| Cavity    | Ports | Dimensions |      |      |      |      |      |      |      |      |      |      |      |           | Ordering code |            |
|-----------|-------|------------|------|------|------|------|------|------|------|------|------|------|------|-----------|---------------|------------|
|           |       | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | N    | ØZ   | Aluminium | Steel         |            |
| SAE 08/3  | G 1/4 | mm         | 60   | 60   | 30   | 7    | 46   | 48   | 12   | 14.8 | 30   | 30   | 29.1 | 6.5       | 3CC0830B11    | 3CC0830B21 |
|           |       | in         | 2.36 | 2.36 | 1.18 | 0.27 | 1.81 | 1.89 | 0.47 | 0.58 | 1.18 | 1.18 | 1.14 | 0.25      |               |            |
|           | G 3/8 | mm         | 60   | 60   | 30   | 7    | 46   | 48   | 12   | 14.5 | 30   | 30   | 29.1 | 6.5       | 3CC0830C11    | 3CC0830C21 |
|           |       | in         | 2.36 | 2.36 | 1.18 | 0.27 | 1.81 | 1.89 | 0.47 | 0.57 | 1.18 | 1.18 | 1.14 | 0.25      |               |            |
|           | G 1/2 | mm         | 70   | 65   | 35   | 7    | 56   | 53   | 12   | 14.5 | 35   | 35   | 29.1 | 6.5       | 3CC0830D11    | /          |
|           |       | in         | 2.75 | 2.56 | 1.38 | 0.27 | 2.20 | 2.09 | 0.47 | 0.57 | 1.38 | 1.38 | 1.14 | 0.25      |               |            |
|           | SAE6  | mm         | 60   | 60   | 30   | 7    | 46   | 48   | 12   | 14.5 | 30   | 30   | 29.1 | 6.5       | 3CC0830J11    | 3CC0830J21 |
|           |       | in         | 2.36 | 2.36 | 1.18 | 0.27 | 1.81 | 1.89 | 0.47 | 0.57 | 1.18 | 1.18 | 1.14 | 0.25      |               |            |
|           | SAE8  | mm         | 60   | 60   | 30   | 7    | 46   | 48   | 12   | 15   | 30   | 30   | 29   | 6.5       | 3CC0830K11    | 3CC0830K21 |
|           |       | in         | 2.36 | 2.36 | 1.18 | 0.27 | 1.81 | 1.89 | 0.47 | 0.59 | 1.18 | 1.18 | 1.14 | 0.25      |               |            |
| SAE 08/3C | G 3/8 | mm         | 60   | 50   | 30   | 7    | 46   | 40   | 10   | 14.5 | 30   | 30   | 22   | 6.5       | 3CC0833C11    | /          |
|           |       | in         | 2.36 | 1.97 | 1.18 | 0.27 | 1.81 | 1.57 | 0.39 | 0.57 | 1.18 | 1.18 | 0.87 | 0.25      |               |            |
| SAE 10/3  | G 1/4 | mm         | 60   | 65   | 35   | 6    | 48   | 59   | 6    | 18   | 30   | 30   | 34.5 | 7         | 3CC1030B11    | 3CC1030B21 |
|           |       | in         | 2.36 | 2.56 | 1.38 | 0.24 | 1.89 | 2.32 | 0.24 | 0.70 | 1.18 | 1.18 | 1.36 | 0.27      |               |            |
|           | G 3/8 | mm         | 60   | 65   | 35   | 6    | 48   | 59   | 6    | 18.8 | 30   | 30   | 34.5 | 7         | 3CC1030C11    | 3CC1030C21 |
|           |       | in         | 2.36 | 2.56 | 1.38 | 0.24 | 1.89 | 2.32 | 0.24 | 0.74 | 1.18 | 1.18 | 1.36 | 0.27      |               |            |
|           | G 1/2 | mm         | 65   | 70   | 35   | 6    | 53   | 64   | 6    | 18.8 | 32.5 | 32.5 | 34.5 | 7         | 3CC1030D11    | 3CC1030D21 |
|           |       | in         | 2.56 | 2.75 | 1.38 | 0.24 | 2.09 | 2.52 | 0.24 | 0.74 | 1.28 | 1.28 | 1.36 | 0.27      |               |            |
|           | SAE6  | mm         | 65   | 70   | 35   | 6    | 53   | 64   | 6    | 18.8 | 32.5 | 32.5 | 34.5 | 7         | 3CC1030J11    | 3CC1030J21 |
|           |       | in         | 2.56 | 2.75 | 1.38 | 0.24 | 2.09 | 2.52 | 0.24 | 0.74 | 1.28 | 1.28 | 1.36 | 0.27      |               |            |
|           | SAE8  | mm         | 65   | 70   | 35   | 6    | 53   | 64   | 6    | 18.8 | 32.5 | 32.5 | 34.5 | 7         | 3CC1030K11    | 3CC1030K21 |
|           |       | in         | 2.56 | 2.75 | 1.38 | 0.24 | 2.09 | 2.52 | 0.24 | 0.74 | 1.28 | 1.28 | 1.36 | 0.27      |               |            |
|           | SAE10 | mm         | 65   | 70   | 35   | 6    | 53   | 64   | 6    | 18   | 31.5 | 33.5 | 34.5 | 7         | 3CC1030L11    | 3CC1030L21 |
|           |       | in         | 2.56 | 2.75 | 1.38 | 0.24 | 2.09 | 2.52 | 0.24 | 0.70 | 1.24 | 1.32 | 1.36 | 0.27      |               |            |

**Dimensional and ordering codes**

| Cavity    | Ports                               |    | Dimensions |      |      |      |      |      |      |      |      |      |      |      | Ordering code |            |
|-----------|-------------------------------------|----|------------|------|------|------|------|------|------|------|------|------|------|------|---------------|------------|
|           |                                     |    | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | N    | ØZ   | Aluminium     | Steel      |
| SAE 10/3Q | ports 1-2 = G 1/2<br>port 3 = G 1/4 | mm | 60         | 70   | 35   | 6    | 48   | 64   | 6    | 14.8 | 30   | 30   | 31.7 | 7    | /             | 3CC1032D21 |
|           |                                     | in | 2.36       | 2.75 | 1.38 | 0.24 | 1.89 | 2.52 | 0.24 | 0.58 | 1.18 | 1.18 | 1.25 | 0.27 |               |            |
| SAE 12/3  | G 1/2                               | mm | 70         | 100  | 40   | 8    | 54   | 92   | 8    | 25   | 35   | 35   | 53.5 | 8.5  | 3CC1230D11    | 3CC1230D21 |
|           |                                     | in | 2.75       | 3.94 | 1.57 | 0.31 | 2.12 | 3.6  | 0.31 | 0.98 | 1.38 | 1.38 | 2.10 | 0.33 |               |            |
|           | G 3/4                               | mm | 90         | 100  | 50   | 10   | 70   | 90   | 10   | 25.1 | 45   | 45   | 53.5 | 10.5 | 3CC1230E11    | 3CC1230E21 |
|           |                                     | in | 3.54       | 3.94 | 1.97 | 0.39 | 2.75 | 3.54 | 0.39 | 0.99 | 1.77 | 1.77 | 2.11 | 0.41 |               |            |
|           | SAE10                               | mm | 80         | 100  | 40   | 8    | 64   | 92   | 8    | 25   | 40   | 40   | 53.5 | 8.5  | 3CC1230L11    | 3CC1230L21 |
|           |                                     | in | 3.15       | 3.94 | 1.57 | 0.31 | 2.52 | 3.6  | 0.31 | 0.98 | 1.57 | 1.57 | 2.11 | 0.33 |               |            |
|           | SAE12                               | mm | 80         | 100  | 45   | 8    | 64   | 92   | 8    | 25   | 40   | 40   | 53.5 | 8.5  | 3CC1230M11    | 3CC1230M21 |
|           |                                     | in | 3.15       | 3.94 | 1.77 | 0.31 | 2.52 | 3.6  | 0.31 | 0.98 | 1.57 | 1.57 | 2.11 | 0.33 |               |            |
| SAE16/3   | G 1/2                               | mm | 90         | 100  | 50   | 10   | 70   | 90   | 10   | 25   | 45   | 45   | 53.5 | 10.5 | 3CC1630D11    | 3CC1630D21 |
|           |                                     | in | 3.54       | 3.94 | 1.97 | 0.39 | 2.75 | 3.54 | 0.39 | 0.98 | 1.77 | 1.77 | 2.11 | 0.41 |               |            |
|           | G 3/4                               | mm | 90         | 100  | 50   | 10   | 70   | 90   | 10   | 25.1 | 45   | 45   | 53.5 | 10.5 | 3CC1630E11    | 3CC1630E21 |
|           |                                     | in | 3.54       | 3.94 | 1.97 | 0.39 | 2.75 | 3.54 | 0.39 | 0.99 | 1.77 | 1.77 | 2.11 | 0.41 |               |            |
|           | G 1                                 | mm | 90         | 105  | 50   | 10   | 70   | 95   | 10   | 25   | 46   | 44   | 53.5 | 10.5 | 3CC1630F11    | 3CC1630F21 |
|           |                                     | in | 3.54       | 4.13 | 1.97 | 0.39 | 2.75 | 3.74 | 0.39 | 0.98 | 1.81 | 1.73 | 2.11 | 0.41 |               |            |
|           | SAE12                               | mm | 90         | 105  | 50   | 10   | 70   | 95   | 10   | 25.1 | 45   | 45   | 53.5 | 10.5 | 3CC1630M11    | 3CC1630M21 |
|           |                                     | in | 3.54       | 4.13 | 1.97 | 0.39 | 2.75 | 3.74 | 0.39 | 0.99 | 1.77 | 1.77 | 2.11 | 0.41 |               |            |
|           | SAE16                               | mm | 90         | 105  | 50   | 10   | 70   | 95   | 10   | 25.1 | 45   | 45   | 53.5 | 10.5 | 3CC1630N11    | 3CC1630N21 |
|           |                                     | in | 3.54       | 4.13 | 1.97 | 0.39 | 2.75 | 3.74 | 0.39 | 0.99 | 1.77 | 1.77 | 2.11 | 0.41 |               |            |
| SAE 16/3Q | ports 1-2 = G 3/4<br>port 3 = G 1/4 | mm | 80         | 85   | 50   | 10   | 60   | 75   | 10   | 17.2 | 40   | 40   | 38.1 | 10.5 | /             | 3CC1632E21 |
|           |                                     | in | 3.15       | 3.35 | 1.97 | 0.39 | 2.36 | 2.95 | 0.39 | 0.68 | 1.57 | 1.57 | 1.50 | 0.41 |               |            |

## Dimensional and ordering codes



| Material  | Max. pressure |      |
|-----------|---------------|------|
|           | bar           | psi  |
| Aluminium | 210           | 3050 |
| Steel     | 350           | 5100 |

| Cavity   | Ports | Dimensions |      |      |      |      |      |      |      |      |      |      |      |      |      |            | Ordering code |            |
|----------|-------|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------|---------------|------------|
|          |       | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | N    | O    | P    | ØZ   | Aluminium  | Steel         |            |
| SAE 08/4 | G 1/4 | mm         | 60   | 75   | 30   | 7    | 46   | 63   | 12   | 29.1 | 30   | 30   | 14.8 | 29.1 | 31.1 | 6.5        | 3CC0840B11    | 3CC0840B21 |
|          |       | in         | 2.36 | 2.95 | 1.18 | 0.27 | 1.81 | 2.48 | 0.47 | 1.14 | 1.18 | 1.18 | 0.58 | 1.14 | 1.22 | 0.25       |               |            |
|          | G 3/8 | mm         | 60   | 75   | 30   | 7    | 46   | 63   | 12   | 29.1 | 30   | 30   | 14.8 | 28.6 | 31.6 | 6.5        | 3CC0840C11    | 3CC0840C21 |
|          |       | in         | 2.36 | 2.95 | 1.18 | 0.27 | 1.81 | 2.48 | 0.47 | 1.14 | 1.18 | 1.18 | 0.58 | 1.13 | 1.24 | 0.25       |               |            |
|          | SAE6  | mm         | 60   | 75   | 30   | 7    | 46   | 63   | 12   | 29.1 | 30   | 30   | 14.8 | 29.1 | 31.1 | 6.5        | 3CC0840J11    | 3CC0840J21 |
|          |       | in         | 2.36 | 2.95 | 1.18 | 0.27 | 1.81 | 2.48 | 0.47 | 1.14 | 1.18 | 1.18 | 0.58 | 1.14 | 1.22 | 0.25       |               |            |
| SAE8     | mm    | 60         | 75   | 30   | 7    | 46   | 63   | 12   | 29   | 30   | 30   | 15   | 28.5 | 31.5 | 6.5  | 3CC0840K11 | 3CC0840K21    |            |
|          | in    | 2.36       | 2.95 | 1.18 | 0.27 | 1.81 | 2.48 | 0.47 | 1.14 | 1.18 | 1.18 | 0.59 | 1.12 | 1.24 | 0.25 |            |               |            |
| SAE 10/4 | G 1/4 | mm         | 60   | 85   | 35   | 6    | 48   | 79   | 6    | 34.5 | 30   | 30   | 19   | 31.5 | 34.5 | 7          | 3CC1040B11    | 3CC1040B21 |
|          |       | in         | 2.36 | 3.35 | 1.38 | 0.24 | 1.89 | 3.11 | 0.24 | 1.36 | 1.18 | 1.18 | 0.75 | 1.24 | 1.36 | 0.27       |               |            |
|          | G 3/8 | mm         | 60   | 85   | 35   | 6    | 48   | 79   | 6    | 34.5 | 30   | 30   | 18.8 | 31.7 | 34.5 | 7          | 3CC1040C11    | 3CC1040C21 |
|          |       | in         | 2.36 | 3.35 | 1.38 | 0.24 | 1.89 | 3.11 | 0.24 | 1.36 | 1.18 | 1.18 | 0.74 | 1.25 | 1.36 | 0.27       |               |            |
|          | G 1/2 | mm         | 70   | 85   | 35   | 6    | 58   | 79   | 6    | 34.5 | 35   | 35   | 18.8 | 31.7 | 34.5 | 7          | 3CC1040D11    | 3CC1040D21 |
|          |       | in         | 2.75 | 3.35 | 1.38 | 0.24 | 2.28 | 3.11 | 0.24 | 1.36 | 1.38 | 1.38 | 0.74 | 1.25 | 1.36 | 0.27       |               |            |
|          | SAE6  | mm         | 60   | 85   | 35   | 6    | 48   | 79   | 6    | 34.5 | 30   | 30   | 18.8 | 31.7 | 34.5 | 7          | 3CC1040J11    | 3CC1040J21 |
|          |       | in         | 2.36 | 3.35 | 1.38 | 0.24 | 1.89 | 3.11 | 0.24 | 1.36 | 1.18 | 1.18 | 0.74 | 1.25 | 1.36 | 0.27       |               |            |
|          | SAE8  | mm         | 70   | 85   | 35   | 6    | 58   | 79   | 6    | 34.5 | 35   | 35   | 18.8 | 31.7 | 34.5 | 7          | 3CC1040K11    | 3CC1040K21 |
|          |       | in         | 2.75 | 3.35 | 1.38 | 0.24 | 2.28 | 3.11 | 0.24 | 1.36 | 1.38 | 1.38 | 0.74 | 1.25 | 1.36 | 0.27       |               |            |
| SAE10    | mm    | 70         | 85   | 35   | 6    | 58   | 79   | 6    | 34.5 | 35   | 35   | 19   | 31.5 | 34.5 | 7    | 3CC1040L11 | 3CC1040L11    |            |
|          | in    | 2.75       | 3.35 | 1.38 | 0.24 | 2.28 | 3.11 | 0.24 | 1.36 | 1.38 | 1.38 | 0.75 | 1.24 | 1.36 | 0.27 |            |               |            |

**Dimensional and ordering codes**

| Cavity   | Ports | Dimensions |      |      |      |      |      |      |      |      |      |      |      |      |      |           | Ordering code |            |
|----------|-------|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|---------------|------------|
|          |       | A          | B    | C    | E    | F    | G    | H    | I    | L    | M    | N    | O    | P    | ØZ   | Aluminium | Steel         |            |
| SAE 12/4 | G 3/8 | mm         | 80   | 115  | 40   | 8    | 64   | 107  | 8    | 44   | 40   | 40   | 22   | 44.5 | 48.5 | 8.5       | 3CC1240C11    | 3CC1240C21 |
|          |       | in         | 3.15 | 4.53 | 1.57 | 0.31 | 2.52 | 4.21 | 0.31 | 1.73 | 1.57 | 1.57 | 0.87 | 1.75 | 1.9  | 0.33      |               |            |
|          | G 1/2 | mm         | 80   | 115  | 40   | 8    | 64   | 107  | 8    | 44   | 40   | 40   | 22   | 44.5 | 48.5 | 8.5       | 3CC1240D11    | 3CC1240D21 |
|          |       | in         | 3.15 | 4.53 | 1.57 | 0.31 | 2.52 | 4.21 | 0.31 | 1.73 | 1.57 | 1.57 | 0.87 | 1.75 | 1.9  | 0.33      |               |            |
|          | SAE10 | mm         | 80   | 115  | 40   | 8    | 64   | 107  | 8    | 44   | 40   | 40   | 22   | 44.5 | 48.5 | 8.5       | 3CC1240L11    | 3CC1240L21 |
|          |       | in         | 3.15 | 4.53 | 1.57 | 0.31 | 2.52 | 4.21 | 0.31 | 1.73 | 1.57 | 1.57 | 0.87 | 1.75 | 1.9  | 0.33      |               |            |
| SAE 16/4 | G 3/4 | mm         | 100  | 130  | 50   | 10   | 80   | 120  | 10   | 53.5 | 50   | 50   | 25.1 | 56.9 | 48   | 10.5      | 3CC1640E11    | 3CC1640E21 |
|          |       | in         | 3.94 | 5.12 | 1.97 | 0.39 | 3.15 | 4.72 | 0.39 | 2.11 | 1.97 | 1.97 | 0.99 | 2.24 | 1.89 | 0.41      |               |            |
|          | SAE16 | mm         | 100  | 130  | 50   | 10   | 80   | 120  | 10   | 53.5 | 50   | 50   | 25.1 | 56.9 | 48   | 10.5      | 3CC1640N11    | 3CC1640N21 |
|          |       | in         | 3.94 | 5.12 | 1.97 | 0.39 | 3.15 | 4.72 | 0.39 | 2.11 | 1.97 | 1.97 | 0.99 | 2.24 | 1.89 | 0.41      |               |            |

Dimensional and ordering codes

Description composition

3/CC/-□□/50/□-□-1

Cavity

10

Ports

B) G 3/8

C) SAE6

Materials

1) Aluminium

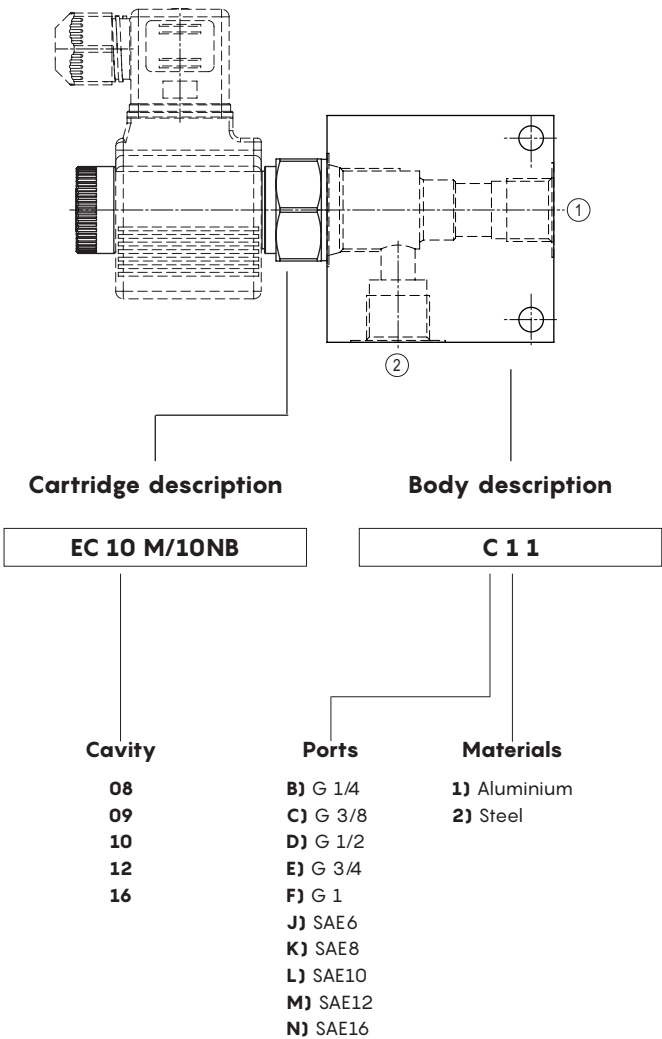
2) Steel

| Material  | Max. pressure |      |
|-----------|---------------|------|
|           | bar           | psi  |
| Aluminium | 210           | 3050 |
| Steel     | 350           | 5100 |

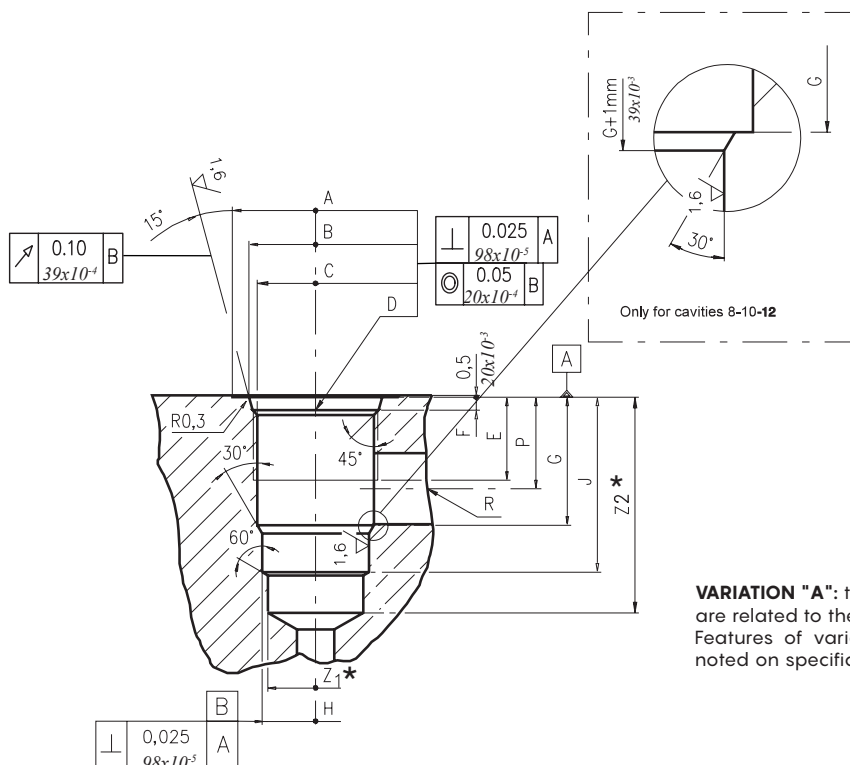
| Cavity   | Ports | Dimensions |      |      |      |      |      |     |      |      |      |      |      |      |      |      |           | Ordering code |            |
|----------|-------|------------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|-----------|---------------|------------|
|          |       | A          | B    | C    | E    | F    | G    | H   | I    | L    | M    | N    | O    | P    | Q    | ØZ   | Aluminium | Steel         |            |
| SAE 10/5 | G 3/8 | mm         | 60   | 100  | 35   | 6    | 48   | 94  | 6    | 31.7 | 30   | 30   | 34.3 | 31.4 | 34.3 | 18.2 | 7         | 3CC1050C11    | 3CC1050C21 |
|          |       | in         | 2.36 | 3.94 | 1.38 | 0.24 | 1.89 | 3.7 | 0.24 | 1.25 | 1.18 | 1.18 | 1.35 | 1.24 | 1.35 | 0.72 | 0.27      |               |            |
|          | SAE6  | mm         | 60   | 100  | 35   | 6    | 48   | 94  | 6    | 31.7 | 30   | 30   | 34.3 | 31.4 | 34.3 | 18.2 | 7         | 3CC1050J11    | 3CC1050J21 |
|          |       | in         | 2.36 | 3.94 | 1.38 | 0.24 | 1.89 | 3.7 | 0.24 | 1.25 | 1.18 | 1.18 | 1.35 | 1.24 | 1.35 | 0.72 | 0.27      |               |            |



How to order valves with body



## Dimensions



**VARIATION "A":** the dimension with "\*" are related to the variation "A" of 2 way cavity. Features of variation "A" are required only if noted on specific product catalogue page.

| Cavity | A  | B<br>±0.05 | C<br>±0.05 | D     | E             | F    | G    | H<br>±0.02 | J     | K<br>±0.02 | L | M<br>±0.02 | N | P    | R<br>OMAX | S | T<br>OMAX | U | V<br>OMAX | X<br>OMAX | Z1*<br>OMIN | Z2*<br>MIN |
|--------|----|------------|------------|-------|---------------|------|------|------------|-------|------------|---|------------|---|------|-----------|---|-----------|---|-----------|-----------|-------------|------------|
| 08/2   | mm | 27         | 20.66      | 17.42 | 3/4-16 UNF    | 12.5 | 2.5  | 18.2       | 12.72 | 29.5       | - | -          | - | 14   | 8         | - | -         | - | -         | -         | 12          | 39         |
| 08/2 A | in | 1.06       | 0.81       | 0.68  |               | 0.49 | 0.10 | 0.72       | 0.50  | 1.16       | - | -          | - | 0.55 | 0.31      | - | -         | - | -         | -         | 0.47        | 1.53       |
| 09/2A  | mm | 27         | 20.66      | 17.42 | 3/4-16 UNF    | 13.5 | 2.5  | 18         | 15.9  | 29.5       | - | -          | - | 14   | 8.5       | - | -         | - | -         | -         | 14          | 35         |
| 09/2A  | in | 1.06       | 0.81       | 0.68  |               | 0.53 | 0.10 | 0.71       | 0.62  | 1.16       | - | -          | - | 0.55 | 0.35      | - | -         | - | -         | -         | 0.57        | 1.43       |
| 10/2   | mm | 30         | 24         | 20.62 | 7/8-14 UNF    | 16   | 2.8  | 24         | 15.9  | 33.5       | - | -          | - | 18.3 | 11        | - | -         | - | -         | -         | 14.5        | 40         |
| 10/2 A | in | 1.18       | 0.94       | 0.81  |               | 0.63 | 0.11 | 0.94       | 0.62  | 1.32       | - | -          | - | 0.72 | 0.43      | - | -         | - | -         | -         | 0.57        | 1.57       |
| 12/2   | mm | 38         | 29.23      | 24.73 | 1 1/16-12 UNF | 19   | 3.5  | 34.15      | 22.25 | 46.8       | - | -          | - | 24.5 | 19        | - | -         | - | -         | -         | 21.5        | 60         |
| 12/2 A | in | 1.50       | 1.15       | 0.97  |               | 0.75 | 0.14 | 1.34       | 0.87  | 1.84       | - | -          | - | 0.96 | 0.75      | - | -         | - | -         | -         | 0.85        | 2.36       |
| 16/2   | mm | 45         | 35.6       | 31.34 | 1 5/16-12 UNF | 22   | 3.50 | 34         | 28.62 | 47         | - | -          | - | 24.5 | 19        | - | -         | - | -         | -         | 25.5        | 70         |
| 16/2 A | in | 1.77       | 1.40       | 1.23  |               | 0.87 | 0.14 | 1.34       | 1.13  | 1.85       | - | -          | - | 0.96 | 0.75      | - | -         | - | -         | -         | 1.00        | 2.75       |

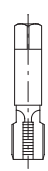
### Rougher tool



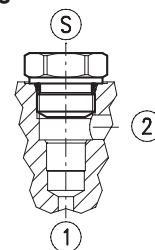
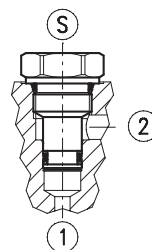
### Finisher tool



### Tap



### Cavity plugs



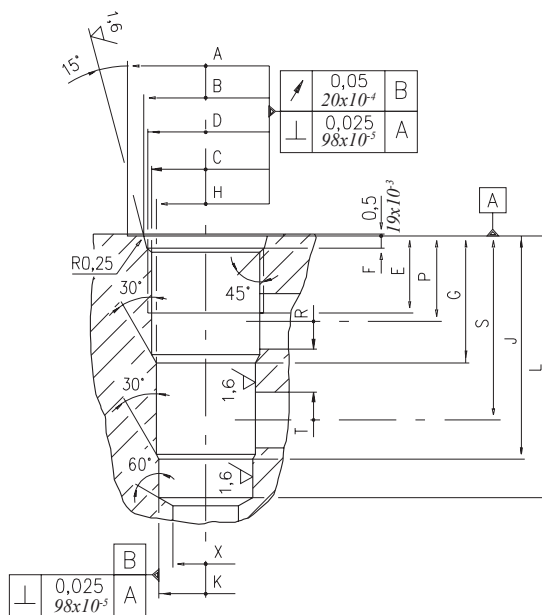
| Cavity | Ordering code |
|--------|---------------|
| 08/2   | UDPF175030    |
| 08/2A  | UDPF175030    |
| 09/2A  | UDPF174230    |
| 10/2   | UDPF20503F    |
| 10/2A  | UDAS24003C    |
| 12/2   | UDAS380031    |
| 12/2A  | UDAS380031    |
| 16/2   | UDPF313031    |
| 16/2A  | UDPF313031    |

| Cavity | Ordering code |
|--------|---------------|
| 08/2   | UCAC127066    |
| 08/2A  | UCAC127060    |
| 09/2A  | UCAT159260    |
| 10/2   | UCAC159080    |
| 10/2A  | UCAC159080    |
| 12/2   | UDAC222661    |
| 12/2A  | UDAC222661    |
| 16/2   | UDAC286261    |
| 16/2A  | UDAC286261    |

| Cavity | Ordering code |
|--------|---------------|
| 08/2   | UCMS3/4161    |
| 08/2A  | UCMS3/4161    |
| 09/2A  | UCPL140020    |
| 10/2   | UCMS7/8142    |
| 10/2A  | UCMS7/8142    |
| 12/2   | UCMS11/162    |
| 12/2A  | UCMS11/162    |
| 16/2   | UCMS15/160    |
| 16/2A  | UCMS15/160    |

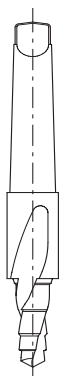
| Cavity | Ordering code | ① | ② | ③ |
|--------|---------------|---|---|---|
| 08/2   | 3XTP3533700   | X | X | X |
| 08/2A  | 4TP5531500    | 0 | 0 | X |
| 09/2A  | XTAP524340D   | X | X | X |
| 10/2   | 3XTP3544200   | X | X | X |
| 10/2A  | 3XTP1542300   | 0 | 0 | X |
| 12/2   | 3XTP3555400   | X | X | X |
| 12/2A  | 3XTP1552900   | 0 | 0 | X |
| 16/2   | 3XTP3575500   | X | X | X |
| 16/2A  | 3XTAP838200   | 0 | 0 | X |

X=Close 0=Open



| Cavity | A       | B<br>±0.05 | C<br>±0.05 | D              | E    | F    | G     | H<br>±0.02 | J    | K<br>±0.02 | L     | M<br>±0.02 | N | P    | R<br>oMAX | S    | T<br>oMAX | U | V<br>oMAX | X<br>oMAX |
|--------|---------|------------|------------|----------------|------|------|-------|------------|------|------------|-------|------------|---|------|-----------|------|-----------|---|-----------|-----------|
| 08/3   | mm 27   | 20.66      | 17.42      | 3/4 -16 UNF    | 12.5 | 2.5  | 19.1  | 15.90      | 33.3 | 14.3       | 43.3  | -          | - | 14.3 | 5.5       | 28.6 | 5.5       | - | -         | 12.5      |
|        | in 1.06 | 0.81       | 0.68       |                | 0.49 | 0.10 | 0.75  | 0.62       | 1.31 | 0.56       | 1.70  | -          | - | 0.56 | 0.22      | 1.12 | 0.22      | - | -         | 0.49      |
| 08/3C  | mm 27   | 20.66      | 17.42      | 3/4 -16 UNF    | 10   | 2.5  | 14.3  | 15.9       | 25.2 | 14.3       | 31.5  | -          | - | 10.5 | 5         | 21.5 | 5         | - | -         | 12.5      |
|        | in 1.06 | 0.81       | 0.68       |                | 0.39 | 0.10 | 0.56  | 0.62       | 1.31 | 0.56       | 1.70  | -          | - | 0.41 | 0.20      | 0.85 | 0.20      | - | -         | 0.49      |
| 10/3   | mm 30   | 24         | 20.62      | 7/8 -14 UNF    | 16   | 2.8  | 23.1  | 17.5       | 39.6 | 15.9       | 47.6  | -          | - | 18.3 | 6.5       | 34   | 6.5       | - | -         | 14        |
|        | in 1.18 | 0.94       | 0.81       |                | 0.63 | 0.11 | 0.94  | 0.69       | 1.56 | 0.62       | 1.87  | -          | - | 0.72 | 0.25      | 1.34 | 0.25      | - | -         | 0.55      |
| 10/3Q  | mm 30   | 24         | 20.62      | 7/8 -14 UNF    | 14.2 | 2.5  | 17.75 | 19.05      | 39.7 | 17.475     | 47.6  | -          | - | 14.2 | 4.4       | 31.2 | 14        | - | -         | 12.5      |
|        | in 1.18 | 0.94       | 0.81       |                | 0.56 | 0.10 | 0.7   | 0.75       | 1.56 | 0.69       | 1.87  | -          | - | 0.56 | 0.17      | 1.23 | 0.55      | - | -         | 0.49      |
| 12/3   | mm 38   | 29.23      | 24.73      | 1 1/16 -12 UNF | 19   | 3.56 | 36.6  | 23.82      | 63.5 | 22.25      | 76.4  | -          | - | 24.5 | 16        | 53   | 16        | - | -         | 19        |
|        | in 1.50 | 1.15       | 0.97       |                | 0.75 | 0.14 | 1.44  | 0.94       | 2.5  | 0.88       | 2.97  | -          | - | 0.96 | 0.63      | 2.09 | 0.63      | - | -         | 0.75      |
| 16/3   | mm 45   | 35.6       | 28.62      | 1 5/16 -12 UNF | 22   | 3.5  | 36.5  | 28.62      | 64.3 | 27.02      | 75.3  | -          | - | 24.5 | 16        | 53   | 16        | - | -         | 19        |
|        | in 1.77 | 1.40       | 1.13       |                | 0.87 | 0.14 | 1.44  | 1.13       | 2.53 | 1.06       | 2.96  | -          | - | 0.96 | 0.63      | 2.09 | 0.63      | - | -         | 0.75      |
| 16/3Q  | mm 45   | 35.55      | 31.34      | 1 5/16 -12 UNF | 17.5 | 3.5  | 22.1  | 28.6       | 47.6 | 25.425     | 56.85 | -          | - | 16.5 | 6         | 37   | 15.5      | - | -         | 19        |
|        | in 1.77 | 1.40       | 1.23       |                | 0.69 | 0.14 | 0.87  | 1.13       | 1.87 | 1          | 2.24  | -          | - | 0.65 | 0.24      | 1.46 | 0.61      | - | -         | 0.75      |
| 20/3   | mm 58   | 43.6       | 36.55      | 1 5/8 -12 UNF  | 21   | 3.5  | 46    | 36.55      | 87.6 | 33.37      | 100   | -          | - | 31   | 25.4      | 71.5 | 25.4      | - | -         | 30        |
|        | in 2.28 | 1.71       | 1.44       |                | 0.83 | 0.14 | 1.81  | 1.04       | 3.45 | 1.31       | 3.93  | -          | - | 1.22 | 1         | 2.81 | 1         | - | -         | 1.18      |

**Rougher tool**



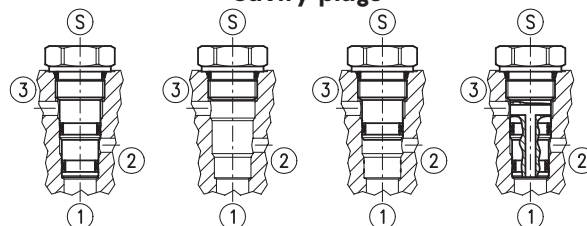
**Finisher tool**



**Tap**



**Cavity plugs**



| Cavity | Ordering code |
|--------|---------------|
| 08/3   | UDAS207021    |
| 08/3C  | UDPF174021    |
| 10/3   | UDPF20503B    |
| 10/3Q  | UDAS30003I    |
| 12/3   | UDAS380032    |
| 16/3   | UDAS450032    |
| 16/3Q  | UDAS450033    |
| 20/3   | UT05X55380    |

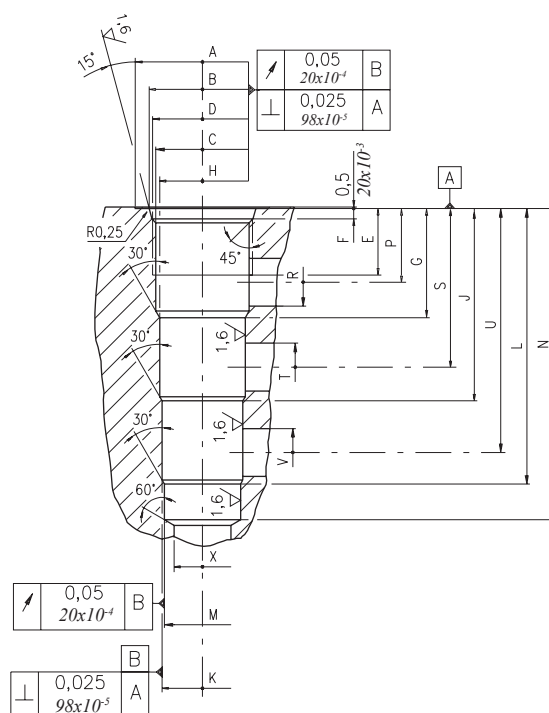
| Cavity | Ordering code |
|--------|---------------|
| 08/3   | UDAS159064    |
| 08/3C  | UDAS159063    |
| 10/3   | UDAC175080    |
| 10/3Q  | UDAS190560    |
| 12/3   | UDAS238060    |
| 16/3   | UDAS286261    |
| 16/3Q  | UDAS286060    |
| 20/3   | UT05X55390    |

| Cavity | Ordering code |
|--------|---------------|
| 08/3   | UCMS3/4161    |
| 08/3C  | UCMS3/4161    |
| 10/3   | UCMS7/8142    |
| 10/3Q  | UCMS7/8142    |
| 12/3   | UCMS11/162    |
| 16/3   | UCMS15/160    |
| 16/3Q  | UCMS15/160    |
| 20/3   | UCMS15/812    |

| Cavity | Ordering code | ① | ② | ③ | S |
|--------|---------------|---|---|---|---|
| 08/3   | XTAP324541    | X | X | X | X |
|        | 3XTAP822150   | 0 | 0 | 0 | X |
|        | XTAP324400    | 0 | 0 | X | X |
|        | XTAP324540    | 0 | X | 0 | X |
| 08/3C  | XTAP824370    | X | X | X | X |
|        | 3XTAP822150   | 0 | 0 | 0 | X |
| 10/3   | 3XTP3545700   | X | X | X | X |
|        | 3XTP1542300   | 0 | 0 | 0 | X |
|        | 3XTP3545701   | 0 | X | 0 | X |
| 10/3Q  | XTAP327350    | 0 | 0 | X | X |
|        | XTAP327573    | X | X | X | X |
| 12/3   | 3XTP3558200   | X | X | X | X |
|        | 3XTP1552900   | 0 | 0 | 0 | X |
|        | 3XTP3558201   | 0 | X | 0 | X |
| 16/3   | 3XTP3578400   | X | X | X | X |
|        | 3XTAP838200   | 0 | 0 | 0 | X |
| 16/3Q  | XTAP341570    | X | X | X | X |

X=Close 0=Open

## Dimensions



| Cavity |    | A     | B<br>±0.05 | C<br>±0.05 | D             | E    | F    | G    | H<br>±0.02 | J    | K<br>±0.02 | L     | M<br>±0.02 | N     | P    | R<br>oMAX | S    | T<br>oMAX | U    | V<br>oMAX | X<br>oMAX |
|--------|----|-------|------------|------------|---------------|------|------|------|------------|------|------------|-------|------------|-------|------|-----------|------|-----------|------|-----------|-----------|
| 08/4   | mm | 28.00 | 20.66      | 17.42      | 3/4-16 UNF    | 12.5 | 2.5  | 19.1 | 15.9       | 33.3 | 14.3       | 47.6  | 12.72      | 57.6  | 14.3 | 5.5       | 28.6 | 5.5       | 42.9 | 5.5       | 11        |
|        | in | 1.10  | 0.81       | 0.68       |               | 0.49 | 0.10 | 0.75 | 0.62       | 1.31 | 0.56       | 1.87  | 0.50       | 2.27  | 0.56 | 0.22      | 1.12 | 0.22      | 1.69 | 0.22      | 0.43      |
| 10/4   | mm | 30    | 24.00      | 20.62      | 7/8-14 UNF    | 16   | 2.8  | 23.6 | 19.08      | 39.6 | 17.5       | 55.4  | 15.9       | 63.5  | 18.3 | 6.5       | 34   | 6.5       | 50   | 6.5       | 14        |
|        | in | 1.18  | 0.94       | 0.81       |               | 0.63 | 0.11 | 0.93 | 0.75       | 1.56 | 0.69       | 2.18  | 0.62       | 2.50  | 0.72 | 0.26      | 1.34 | 0.25      | 1.97 | 0.25      | 0.55      |
| 12/4   | mm | 38    | 29.23      | 24.73      | 1 1/16-12 UNF | 19   | 3.56 | 29.5 | 23.82      | 51.5 | 22.25      | 73.6  | 20.65      | 83.33 | 21.5 | 11        | 43.5 | 11        | 66   | 11        | 19        |
|        | in | 1.50  | 1.15       | 0.97       |               | 0.75 | 0.14 | 1.16 | 0.94       | 2.03 | 0.87       | 2.90  | 0.81       | 3.28  | 0.85 | 0.43      | 1.71 | 0.43      | 2.60 | 0.43      | 0.75      |
| 16/4   | mm | 45    | 35.60      | 31.34      | 1 5/16-12 UNF | 22   | 3.5  | 36.5 | 28.62      | 64.3 | 27.02      | 92.07 | 25.45      | 104   | 24.6 | 16        | 53   | 16        | 81.5 | 16        | 19        |
|        | in | 1.77  | 1.40       | 1.23       |               | 0.87 | 0.14 | 1.44 | 1.13       | 2.53 | 1.06       | 3.62  | 1.00       | 4.09  | 0.97 | 0.63      | 2.09 | 0.63      | 3.21 | 0.63      | 0.75      |

## Cavity plugs

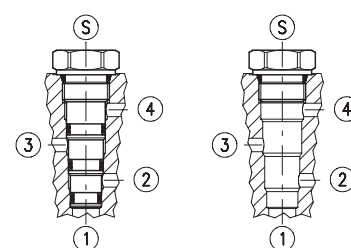
### Rougher tool



### Finisher tool



### Tap



| Cavity | Ordering code | ① | ② | ③ | ④ | ⑤ |
|--------|---------------|---|---|---|---|---|
| 08/4   | 3XTP3536500   | X | X | X | X | X |
|        | 3XTAP822150   | 0 | 0 | 0 | 0 | X |
| 10/4   | 3XTP3548301   | X | X | X | X | X |
|        | 3XTP1542300   | 0 | 0 | 0 | 0 | X |
| 12/4   | 3XTP3559300   | X | X | X | X | X |
|        | 3XTP1552900   | 0 | 0 | 0 | 0 | X |
| 16/4   | 3XTP357B300   | X | X | X | X | X |
|        | 3XTAP838200   | 0 | 0 | 0 | 0 | X |

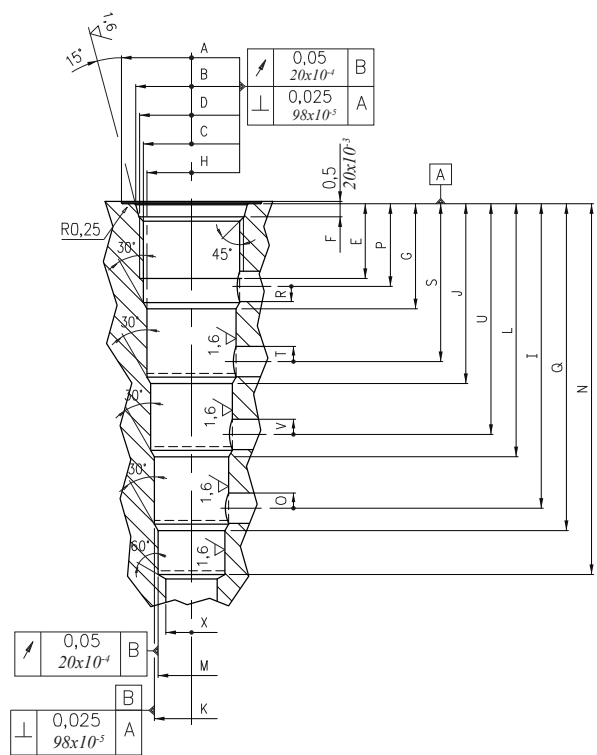
X=Close 0=Open

| Cavity | Ordering code |
|--------|---------------|
| 08/4   | UDAS207020    |
| 10/4   | UDAS30003H    |
| 12/4   | UDAS292020    |
| 16/4   | UDAS356030    |

| Cavity | Ordering code |
|--------|---------------|
| 08/4   | UDAS170080    |
| 10/4   | UDAS190861    |
| 12/4   | UDAS238260    |
| 16/4   | UDAS286262    |

| Cavity | Ordering code |
|--------|---------------|
| 08/4   | UCMS3/4161    |
| 10/4   | UCMS7/8142    |
| 12/4   | UCMS11/162    |
| 16/4   | UCMS15/160    |

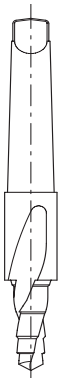
Dimensions



| Cavity |    | A    | B<br>±0.05 | C<br>±0.05 | D          | E    | F    | G    | H<br>±0.02 | I    | J    | K<br>±0.02 | L    | M<br>±0.02 | N    | O<br>oMAX | P    | Q    | R<br>oMAX | S    | T<br>oMAX | U    | V<br>oMAX | X<br>oMAX |
|--------|----|------|------------|------------|------------|------|------|------|------------|------|------|------------|------|------------|------|-----------|------|------|-----------|------|-----------|------|-----------|-----------|
| 10/5   | mm | 30   | 24.00      | 20.62      | 7/8-14 UNF | 16   | 2.8  | 22.5 | 19.08      | 65.2 | 38.5 | 15.9       | 54.2 | 14.3       | 79.4 | 3.25      | 17.7 | 70   | 3.25      | 33.8 | 3.25      | 49.4 | 3.25      | 11        |
|        | in | 1.18 | 0.94       | 0.81       |            | 0.63 | 0.11 | 0.89 | 0.75       | 2.57 | 1.51 | 0.63       | 2.13 | 0.56       | 3.13 | 0.13      | 0.70 | 2.75 | 0.13      | 1.33 | 0.13      | 1.94 | 0.13      | 0.43      |

Cavity plugs

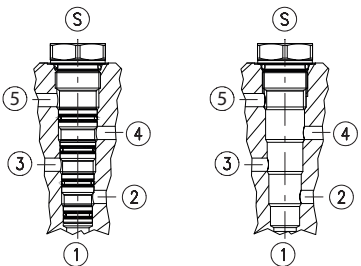
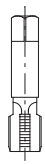
Rougher tool



Finisher tool



Tap



| Cavity | Ordering code | ① | ② | ③ | ④ | ⑤ | ⑥ |
|--------|---------------|---|---|---|---|---|---|
| 10/5   | XTAP327880    | X | X | X | X | X | X |
|        | 3XTP1542300   | 0 | 0 | 0 | 0 | 0 | 0 |

X=Close 0=Open

| Cavity | Ordering code |
|--------|---------------|
| 10/5   | UDPS188030    |

| Cavity | Ordering code |
|--------|---------------|
| 10/5   | UDPF204021    |

| Cavity | Ordering code |
|--------|---------------|
| 10/5   | UDAS190862    |

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