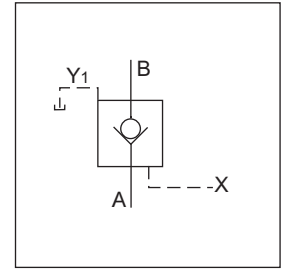


Veljan Pilot Operated Check Valves VC4V are with pilot control for hydraulic unlocking. These are spring-loaded poppet type valves. Mounting configuration of VC4V are according to International Standards such as CETOP, DIN, ISO or NFPA. Standard versions available are subplate mounting L - body and T - body. VC4V valves can be used as body type units or cartridges for manifold application.

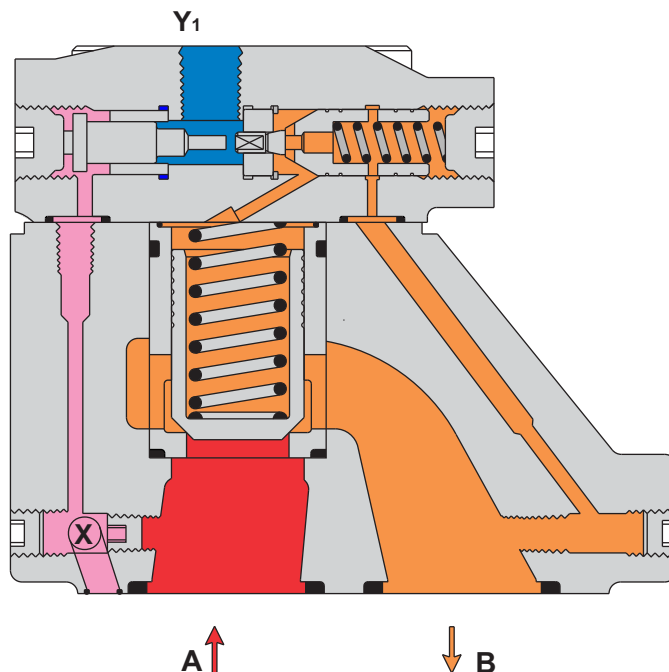
VC4V valves have zero-leak condition for flow from port B to port A and free flow in opposite direction. The blocked flow (zero-leak) direction can be unblocked hydraulically via a control piston. A small control piston and stroke is enough to unblock the flow. Thus the low pilot oil volume of 0.64 ml results in a fast response time.



CV

VC4V Pilot operated check valves works as a normal check valve for flow from port A to port B. Flow from port B to port A is blocked.

To achieve flow from port B to port A, a pilot pressure is necessary at pilot port X which allows the control piston to push the control cone from its seat. The control cone pushes the control spool to block flow from port B to spring chamber connected behind the control cone and spring side of main spool. Simultaneously, the spring chamber gets connected to Y1 port through unseated control cone and, on availability of pressure at port B, the main poppet opens to allow flow from port B to port A. On unloading the pilot line (X), the valve works as a normal check valve.



## SPECIFICATIONS

### General

|                            |  |
|----------------------------|--|
| Type                       | : Pilot Operated Check Valve   |
| Design                     | : Poppet Type  |
| Mounting                   | : VC4V03 : Threaded body/Subplate mounting/Cartridge<br>VC4V06 : Threaded body/Subplate mounting/Cartridge/Flange body<br>VC4V10 : Threaded body/Subplate mounting |
| Mounting Position          | : Optional   |
| Port sizes                 | : 3/8", 3/4", 1 1/2"   |
| Direction of flow          | : Optional, free flow from A → B<br>Pilot operated flow from B → A   |
| Ambient temperature range  | : -20° C...+60° C (-4° F...140° F)   |
| Special working conditions | : Consult VELJAN   |

### Hydraulics

|                          |   |
|--------------------------|---|
| Operating pressure range | : Minimum - 50 psi (3.5 bar)<br>Maximum - 5000 psi (350 bar)            |
| Cracking pressure        | : See model code  |
|                          | : VC4V 03 (3/8")      VC4V 06 (3/4")      VC4V10 (1 1/2")               |
| Maximum flow gpm (lpm)   | : 48 (180)                      95 (360)                      159 (600) |
| Nominal flow gpm (lpm)   | : 40 (150)                      72 (270)                      120 (450) |
| Fluid                    | : Mineral oil as per DIN 51524/25 or other fluids on request            |
| Fluid temperature range  | : -18° C...+80° C (0° F... 176° F)                                      |
| Viscosity recommended    | : 30 cSt (180 SSU)  |

### Type of actuator

|  |   |
|--|---|
| Hydraulically  | : Pilot operated  |
| Pilot pressure range   | : Minimum - 72 psi (5 bar)<br>Maximum - 5000 psi (350 bar)  |
| Pilot oil volume   | : At opening ratio      1 : 8 = 0.64 ml<br>1 : 10 = 0.64 ml<br>1 : 3 = 0.26 ml<br>1 : 1 = 0.08 ml               |
| Minimum holding pressure for pilot piston (independent of pressure at ports A & B) | : At opening ratio      1 : 8 / 1 : 10 = 72 psi (5 bar)<br>1 : 3 = 160 psi (11 bar)<br>1 : 1 = 305 psi (21 bar) |

Note : Where ports "A" & "Y" are applied with pressure, this pressure has to be considered as follows.

With pressure at port "A", the necessary pressure at port "B" will be 1.46 times lower than at "A".

With pressure at port "Y", the necessary pressure at port "B" will be 2.46 times higher than at "Y" as a minimum.

$$p_B \text{ nec.} = p_B + 2.46 p_Y - 1.46 p_A = \dots \text{bar}$$

CV

## ORDERING CODE

**VC4V 10 - 5 3 3 - 4 B 1 - \*\*\***

**Series** \_\_\_\_\_  
VC4V - Check valve (pilot operated)

**Size** \_\_\_\_\_  
03 - 3/8"  
06 - 3/4"  
10 - 1 1/2"

**Max Pressure** \_\_\_\_\_  
0 - for cartridges only } 5000 psi  
5 - for body valve valves only } (350 bar)

**Body Mounting** \_\_\_\_\_

Cartridge  
0 - Cartridge (VC4V03/VC4V06) ; Y<sub>1</sub> port = 1/4" NPTF  
G - Cartridge (VC4V03/VC4V06) ; Y<sub>1</sub> port = G 1/4"

Threaded body  
1 - Threaded body - VC4V03 = 1/2" NPTF ;  
VC4V06 = 1" NPTF  
(2 A - Ports, 1 B - Port )  
A - Threaded body - VC4V06 = 3/4" NPTF ;  
VC4V10 = 1 1/4" NPTF  
(1 A - Port, 1 B - Port )  
6 - Threaded body - VC4V03 = 1/2" B.S.P.P. ;  
VC4V06 = 1" B.S.P.P.  
(2 A - Ports, 1 B - Port )  
D - Threaded body - VC4V06 = 3/4" B.S.P.P. ;  
VC4V10 = 1 1/4" B.S.P.P.  
(1 A - Port, 1 B - Port )

X,Y<sub>1</sub> ports  
= 1/4"  
NPTF

X,Y<sub>1</sub> ports  
= G 1/4"

Subplate mounting  
3 - Subplate mounting VC4V03/06/10  
( Y<sub>1</sub> port - 1/4" NPTF )  
9 - Subplate mounting VC4V03/06/10  
( Y<sub>1</sub> Port = 1/4" B.S.P.P )

Flange body  
2 - Flange body ( X,Y<sub>1</sub> port - 1/4" NPTF )  
( 2 A - Ports, 1 B - Port )

**Modification**  
Seal Class  
1 - Buna N (Standard)  
5 - Viton

**Design letter**

**Cracking Pressure (approx.)**

|     | Flow A → B    |                  | Flow B → A    |                  |
|-----|---------------|------------------|---------------|------------------|
|     | VC4V03<br>bar | VC4V06/10<br>bar | VC4V03<br>bar | VC4V06/10<br>bar |
| 2 = | 1.0           | 1.0              | 1.5           | 1.7              |
| 4 = | 4.0           | 3.5              | 5.5           | 6.0              |
| 6 = | 2.0           | 2.2              | 3.0           | 3.8              |

**Body Head**  
1 - Pilot Control Head - Opening ratio 1:1  
3 - Pilot Control Head - Opening ratio 3:1  
8 - Pilot Control Head - Opening ratio 8:1  
9 - Pilot Control Head - Opening ratio 10:1

CV

## PERFORMANCE CURVES

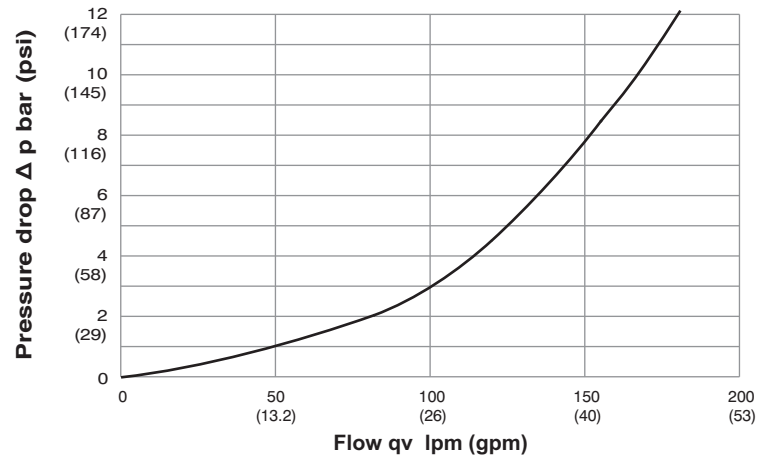
 $\Delta p$  -  $q_v$  - Characteristics

(Fluid 60 cSt at 40° C

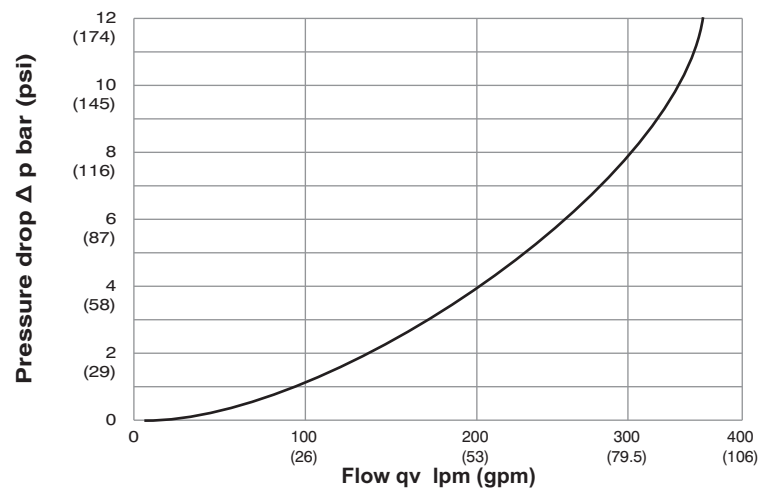
Test temp. 50° C  $\pm$  10%)

CV

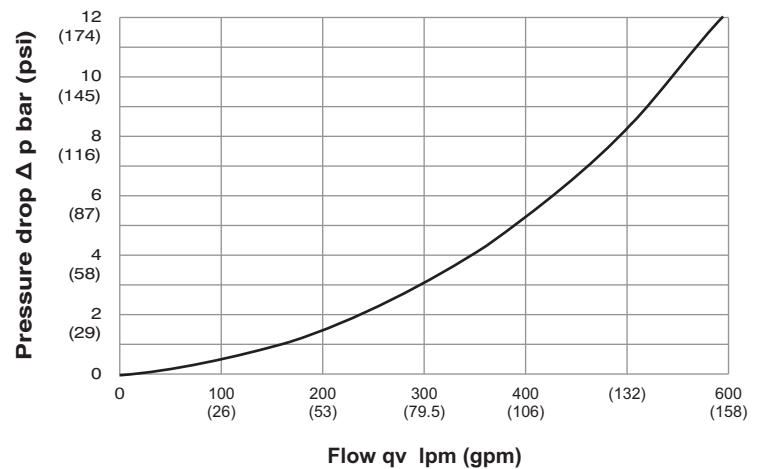
## VC4V03



## VC4V06

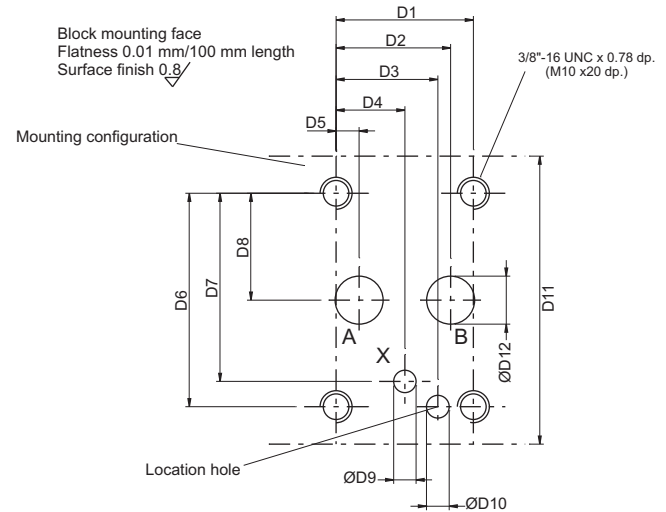
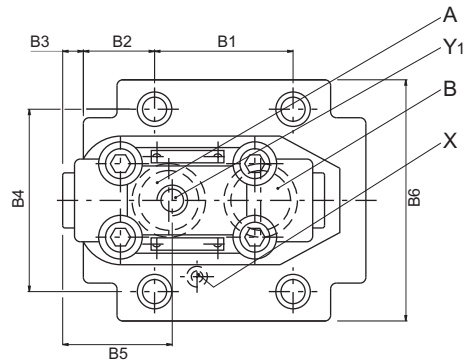
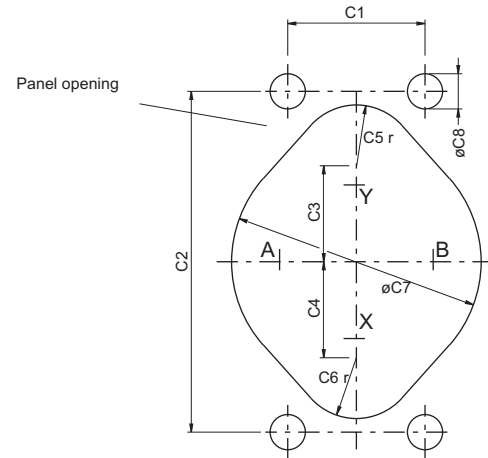
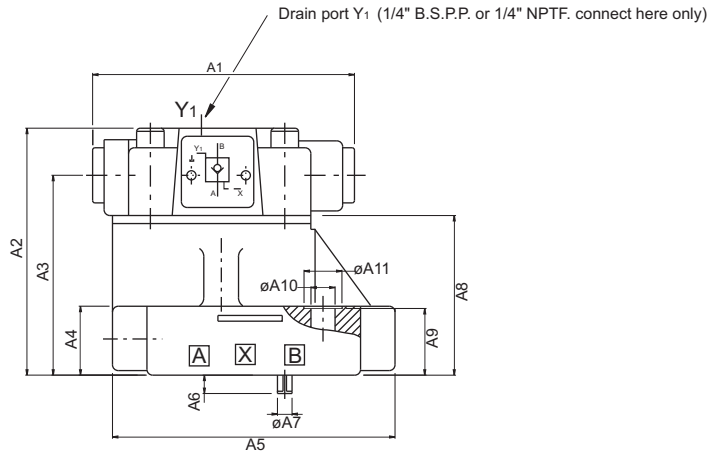


## VC4V10



# VC4V03 (3/8") SUBPLATE MOUNTING ( #3 )

Weight : 5.71 lbs (2.6 kg)



|     | Dimensions |        |
|-----|------------|--------|
|     | in         | mm     |
| A1  | 4.488      | 114.0  |
| A2  | 3.27       | 83.2   |
| A3  | 2.46       | 62.5   |
| A4  | 0.87       | 22.0   |
| A5  | 3.62       | 92.0   |
| A6  | 0.315      | 8.0    |
| A7  | ø 0.25     | ø 6.35 |
| A8  | 1.77       | 45.0   |
| A9  | 0.83       | 21.0   |
| A10 | ø 0.41     | ø 10.5 |
| A11 | ø 0.65     | ø 16.5 |

|    | Dimensions |      |
|----|------------|------|
|    | in         | mm   |
| B1 | 1.69       | 42.9 |
| B2 | 0.98       | 25.0 |
| B3 | 0.33       | 8.5  |
| B4 | 2.62       | 66.7 |
| B5 | 1.88       | 47.7 |
| B6 | 3.44       | 87.3 |

|    | Dimensions |        |
|----|------------|--------|
|    | in         | mm     |
| C1 | 1.69       | 42.9   |
| C2 | 4.19       | 106.5  |
| C3 | 1.18       | 30.0   |
| C4 | 1.18       | 30.0   |
| C5 | 0.75 r     | 19.0 r |
| C6 | 0.75 r     | 19.0 r |
| C7 | ø 3.07     | ø 78.0 |
| C8 | ø 0.43     | ø 11.0 |

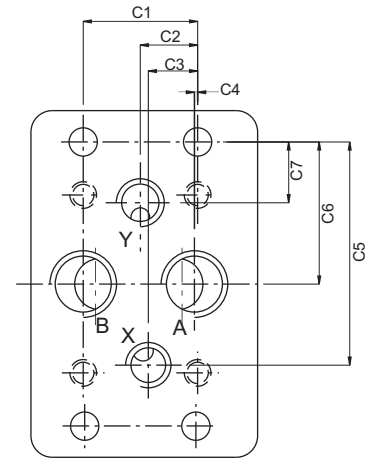
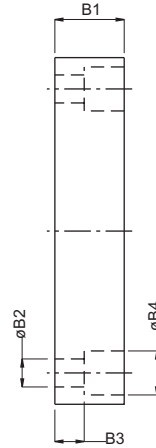
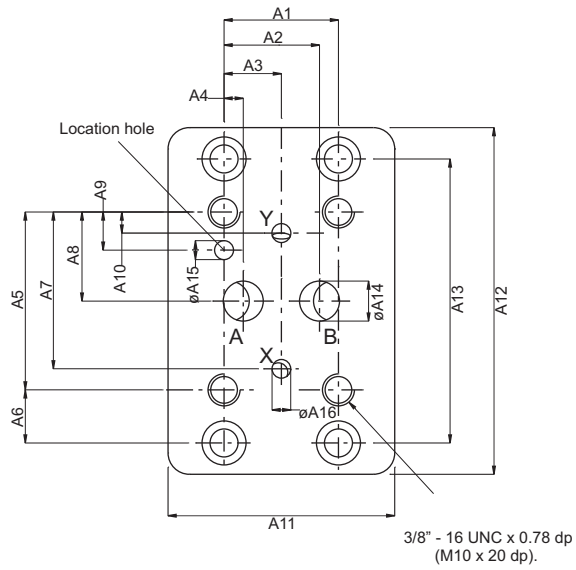
|     | Dimensions         |                  |
|-----|--------------------|------------------|
|     | in                 | mm               |
| D1  | 1.69               | 42.9             |
| D2  | 1.41               | 35.8             |
| D3  | 1.253              | 31.8             |
| D4  | 0.846              | 21.5             |
| D5  | 0.283              | 7.2              |
| D6  | 2.626              | 66.7             |
| D7  | 2.315              | 58.8             |
| D8  | 1.315              | 33.4             |
| D9  | ø 0.275            | ø 7.0            |
| D10 | ø 0.28 x 0.315 dp. | ø 7.1 x 11.0 dp. |
| D11 | 3.43               | 87.3             |
| D12 | ø 0.59             | ø 15.0           |

| Ports              | Function            |
|--------------------|---------------------|
| A                  | Inlet or outlet     |
| B                  | Outlet or inlet     |
| X                  | External pilot port |
| Y(Y <sub>1</sub> ) | External drain      |

Note : For details of Subplate & mtg. screws please refer page 27

## SUBPLATE FOR VC4V03 (3/8")

Weight : 4.4 lbs (2.0 kg)



|     | Dimensions            |                    |
|-----|-----------------------|--------------------|
|     | in                    | mm                 |
| A1  | 1.69                  | 42.9               |
| A2  | 1.41                  | 35.8               |
| A3  | 0.846                 | 21.5               |
| A4  | 0.283                 | 7.2                |
| A5  | 2.626                 | 66.7               |
| A6  | 0.783                 | 19.9               |
| A7  | 2.315                 | 58.8               |
| A8  | 1.315                 | 33.4               |
| A9  | 0.563                 | 14.3               |
| A10 | 0.311                 | 7.9                |
| A11 | 3.346                 | 85.0               |
| A12 | 5.12                  | 130.0              |
| A13 | 4.19                  | 106.5              |
| A14 | ø0.59                 | ø 15.0             |
| A15 | ø 0.28 x<br>0.315 dp. | ø 7.1 x<br>8.0 dp. |
| A16 | ø 0.275               | ø 7.0              |

|    | Dimensions |        |
|----|------------|--------|
|    | in         | mm     |
| B1 | 1.024      | 26.0   |
| B2 | ø 0.41     | ø 10.5 |
| B3 | 0.433      | 11.0   |
| B4 | ø 0.65     | ø 16.5 |

|    | Dimensions |      |
|----|------------|------|
|    | in         | mm   |
| C1 | 1.69       | 42.9 |
| C2 | 0.846      | 21.5 |
| C3 | 0.73       | 18.5 |
| C4 | 0.047      | 1.2  |
| C5 | 3.295      | 83.7 |
| C6 | 2.1        | 53.3 |
| C7 | 0.9        | 22.8 |

\*\*Note : Port "Y" must not be connected to subplate

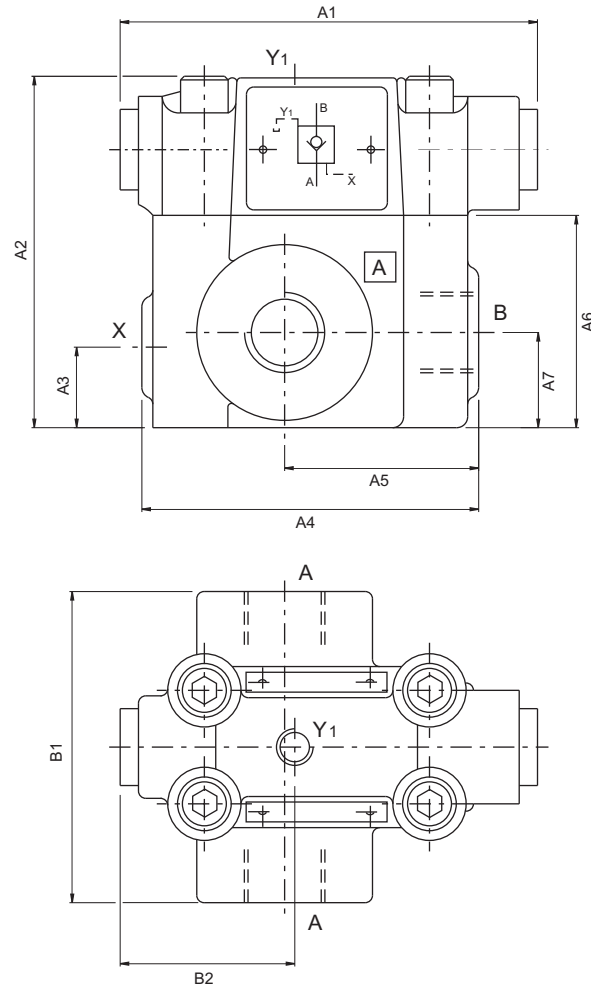
| Order No.            | Port sizes   |               | 4 Mounting screws*         |              |  |
|----------------------|--------------|---------------|----------------------------|--------------|--|
|                      | A+B          | X+Y**         | Dimensions                 | Order No.    | min.tensile strength   |
| VSS - P - 08 - G 112 | 1/2" NPTF    | 1/4" NPTF     | 3/8"- 16UNC<br>1 1/4" lg.  | V358 - 16180 | at p ≤ 210 bar = 100 daN/mm <sup>2</sup><br>(Torque 68 Nm)<br>at p > 210 bar = 120 daN/mm <sup>2</sup><br>(Torque 82 Nm) |
| VSS - B - 08 - G 113 | 1/2" B.S.P.P | 1/4" B.S.P.P. | M10 x 35<br>DIN 912 - 12.9 | V700 - 70039 |  |

\*Mounting screws are included in subplate order.

For valves ordered without subplate, mounting screws must be ordered separately.

**VC4V03 (3/8") - THREADED BODY ( #1& #6 )**

Weight : 6.81 lbs (3.1 kg)



| Dimensions |       |       |
|------------|-------|-------|
|            | in    | mm    |
| A1         | 4.488 | 114.0 |
| A2         | 3.78  | 96.0  |
| A3         | 0.867 | 22.0  |
| A4         | 3.623 | 92.0  |
| A5         | 2.087 | 53.0  |
| A6         | 2.284 | 58.0  |
| A7         | 1.024 | 26.0  |

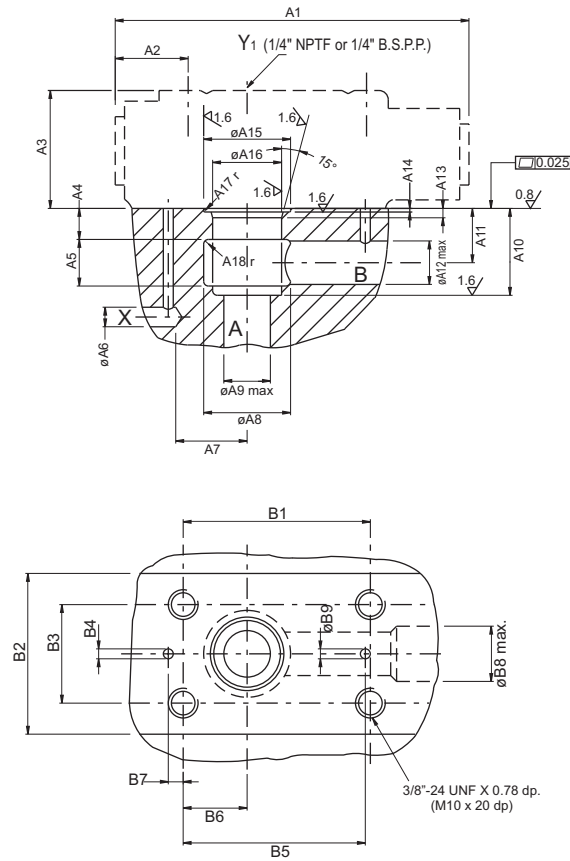
| Dimensions |       |      |
|------------|-------|------|
|            | in    | mm   |
| B1         | 3.347 | 85.0 |
| B2         | 1.878 | 47.7 |

| Ports          | Function                      | Port sizes                 |
|----------------|-------------------------------|----------------------------|
| A (2x)         | Free flow                     | 1/2" B.S.P.P or 1/2" NPTF  |
| B              | Normally closed pilot to open |                            |
| X              | External pilot port           | 1/4" B.S.P.P. or 1/4" NPTF |
| Y <sub>1</sub> | External drain                |                            |

CV

## CARTRIDGE WITH PILOT VALVE VC4V03 ( #0 )

Weight : 1.97 lbs (0.9 kg)



| Dimensions |                            |                           |
|------------|----------------------------|---------------------------|
|            | in                         | mm                        |
| A1         | 4.49                       | 114.0                     |
| A2         | 0.92                       | 23.5                      |
| A3         | 1.496                      | 38.0                      |
| A4         | 0.4                        | 10.0                      |
| A5         | 0.59                       | 15.0                      |
| A6         | ø 0.25                     | ø 6.3                     |
| A7         | 0.91                       | 23.0                      |
| A8         | ø 1.1                      | ø 28.0                    |
| A9         | ø 0.59                     | ø 15.0                    |
| A10        | 1.1 <sup>+0.02</sup>       | 28.0 <sup>+0.05</sup>     |
| A11        | 0.69                       | 17.5                      |
| A12        | ø 0.55                     | ø 14.0                    |
| A13        | 0.12                       | 3.0                       |
| A14        | 0.045 <sup>+0.008</sup>    | 1.15 <sup>+0.15</sup>     |
| A15        | ø 1.1 <sup>+0.004</sup>    | ø 28.0 <sup>+0.1</sup>    |
| A16        | ø 0.875 <sup>+0.0008</sup> | ø 22.225 <sup>+0.02</sup> |
| A17        | 0.016 r                    | 0.4 r                     |
| A18        | 0.06 r                     | 1.5 r                     |

| Dimensions |                         |                       |
|------------|-------------------------|-----------------------|
|            | in                      | mm                    |
| B1         | 2.374 <sup>+0.008</sup> | 60.32 <sup>+0.2</sup> |
| B2         | 2.03                    | 51.8                  |
| B3         | 1.25 <sup>+0.008</sup>  | 31.75 <sup>+0.2</sup> |
| B4         | ø 0.126                 | ø 3.2                 |
| B5         | 2.31                    | 58.7                  |
| B6         | 0.81                    | 20.6                  |
| B7         | 0.189                   | 4.8                   |
| B8         | ø 0.69                  | ø 17.8                |
| B9         | ø 0.126                 | ø 3.2                 |

| Ports          | Function                       |
|----------------|--------------------------------|
| A              | Free flow                      |
| B              | Normally closed, pilot to open |
| X              | External pilot port            |
| Y <sub>1</sub> | External drain                 |

| 4 Mounting screws          |              |
|----------------------------|--------------|
| Dimensions                 | Order No.    |
| M10 x 45mm, DIN 912 - 10.9 | V700 - 71602 |

(Mounting screws must be ordered separately)  
Torque 68 Nm