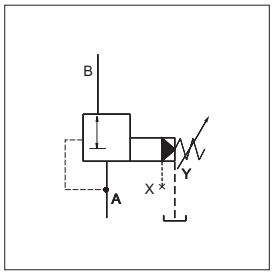
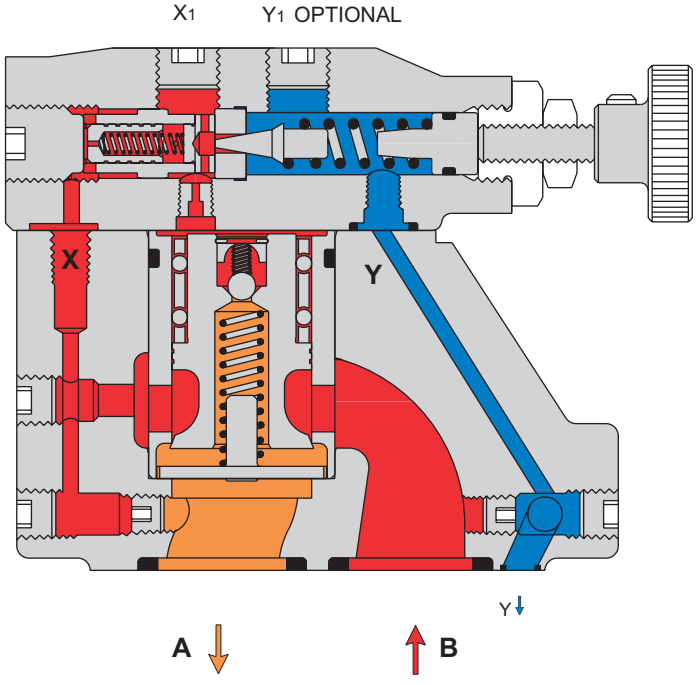
Veljan Pressure Reducer Valve Series VR4R are pilot operated controls used to control pressure in a secondary part of a hydraulic circuit. Pressure is maintained as set by control knob on the pilot or by an external pilot source. In some application,VR4R is used to maintain a lower pressure in the secondary circuit to limit the force available from certain actuators.



VR4R consists of a high flow poppet type seat valve section controlled by the low flow, adjustable pilot section mounted on top. Pressure setting is achieved by means of a knurled knob. For tamper proof setting, acorn nut with lead seal is available as an option. Optional vent valve VWO1 sandwiched between pilot section and main body can be used for venting the VR4R valves.

Extremely accurate settings can be obtained due to the precise construction of control components. The design of poppet allows for the minimum of friction and hysteresis giving a sensitive response to conditional changes.



Normally, port A is connected to the secondary part of the hydraulic circuit and port B to the primary part. When the secondary port A is unpressurised, the main poppet opens downwards against a spring by the pressure at primary Port B. Flow passes from primary port B to secondary port A. Pressure at port B passes to the pilot section and to the top of main poppet through an orifice. No flow takes place in this section until the pressure demand exceeds the setting of the pilot head ,as determined/set by the control knob. The pilot cone lifts from its seat against the setting spring and allows a maintained pilot flow to pass to external drain. The effect of this is to limit the pressure available on top of the main poppet. In this condition the main poppet moves up and floats allowing enough flow to the secondary circuit (port A) to maintain the set pressure. If the secondary circuit exceeds the pilot head setting, the main poppet moves up further and closes preventing flow to a secondary circuit.

Possibilities of any pressure intensification in the secondary part is eliminated by the small check valve when it opens and allows flow to pilot drain.

PC

SPECIFICATIONS

General

Type	:	Pilot operated Pressure reducer Valve
Design	:	Poppet type
Mounting	:	Threaded/Subplate/Cartridge
Mounting position	:	Optional
Port sizes (nominal)	:	3/8", 3/4", 1 1/4"
Direction of flow	:	B→A
Ambient temperature	:	-20°C...+60°C (-4°F...+140°F)
Special working conditions	:	Consult **VELJAN**

Hydraulics

Pressure control range	:	Minimum - depends on flow Maximum - 5000 psi (350 bar)
Maximum operating pressure	:	
Port B (primary)		5000 psi (350 bar)
Port A (secondary)		5000 psi (350 bar)
Port X (pilot)		5000 psi (350 bar)
Port Y, Y_1 (Pilot drain)		Without pressure to tank

		VR4R 03 ($\frac{3}{8}$")	VR4R 06 ($\frac{3}{4}$")	VR4R 10 ($1\frac{1}{4}$")
Nominal flow gpm (lpm)	:	15.8 (60)	52.9 (200)	119.0 (450)
Maximum flow gpm (lpm)	:	23.8 (90)	79.4 (300)	158.7 (600)

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 Range	:	10 to 650 cSt (60 to 3900 SSU)
Optimum operating viscosity	:	30 cSt (180 SSU)
Seal compatibility	:	Code 1 (Buna N) or Code 5 (Viton) (contact Veljan with specific oil details)
Cleanliness recommended	:	Better than NAS 1638 Class 8 or ISO 17/14

Adjustment

Manual	:	Handwheel
Rotation	:	3.75 rev.
Operating torque	:	0.72 Nm
Electricals (Vent Valve VVV01)	:	Solenoid
Nominal voltage	:	Refer to Ordering Code
Permissible voltage fluctuation	:	+5%...-10%
Max. coil temperature	:	+155° C (311°F)
Type of current	:	Alternating Current (AC)/Direct Current (DC)
Input power	:	31 W
Holding	:	78 VA
Inrush	:	264 VA
Relative operating period	:	100%
Type of protection	:	I P 65

ORDERING CODE

VR4R 06 - 5 6 5 - 1 0 - 09 - W07 - B 1 *

Series

Size

03 - 3/8"
06 - 3/4"
10 - 1 1/4"

Max. Pressure of Valve Body

0 - for cartridges only
5 - 5000psi (350 bar)

Body Mounting

Cartridge

0 - Cartridge X_1 + Y_1 port = 1/4" NPTF
E - Cartridge X_1 + Y_1 port = SAE - 4 (7/16" - 20 UNF)
G - Cartridge X_1 + Y_1 port = G 1/4"

Threaded body

1 - Threaded body - VR4R03 = 1/2" NPTF ; (2 A - Ports, 1B - Port)
A - Threaded body VR4R06 = 3/4" NPTF (1 A - Port, 1B - Port)
} X1,Y1 ports = 1/4" NPTF

6 - Threaded body VR4R03 = 1/2" B.S.P.P ; (2 A - Ports, 1B - Port)
D - Threaded body VR4R06 = 3/4" B.S.P.P ; (1 A - Port, 1B - Port)
} X1,Y1 ports = G 1/4"

4 - Threaded body VR4R03 - SAE - 8 (2 A - Ports, 1B - Port)
B - Threaded body VR4R06 - SAE - 12, (1 A - Port, 1B - Port)
} X1,Y1 ports = SAE - 4 (7/16" - 20 UNF)

Subplate mounting

3 - Subplate mounting X_1+ Y_1 port = 1/4" NPTF
7 - Subplate mounting X_1+ Y_1 ports = SAE - 4 (7/16" - 20 UNF)
9 - Subplate mounting X_1+ Y_1 Ports = G 1/4"

Pressure setting range

1 - 100 - 1500 psi (7 - 105 bar)
3 - 100 - 3000 psi (7 - 210 bar)
5 - 100 - 5000 psi (7 - 350 bar)

Modification

Seal Class

1 - Buna N (Standard)
5 - Viton

Design letter

Solenoid Voltage

(Omit for non vent version)

W01 - 115V/60 Hz AC GOR - 12V DC
W02 - 230V/60 Hz AC GOQ - 24V DC
W06 - 115V/50 Hz AC GOH - 48V DC
W07 - 230V/50 Hz AC

Electrical Vent

(3way VENT VALVE VVV01)
Omit for non vent version

09 - With manual override (Solenoid de-energized : open to tank. Solenoid energized : vent line blocked)
10 - Without manual override (Solenoid de-energized : open to tank. Solenoid energized : vent line blocked)
11 - With manual override (Solenoid de-energized : vent line blocked Solenoid energized : open to tank)
12 - Without manual override (Solenoid de-energized : vent line blocked Solenoid energized : open to tank)

Drain line

0 - drain to manifold (only for cartridge)
1 - External from subplate or manifold (Y) } At subplate mounting only with body code 3,7,9
2 - External from pilot head (Y_1)

Type of Control

1 - Hand knob (32mm dia)
2 - Hand knob (50mm dia) (not for version with vent valve VVV01)
3 - Acorn nut with lead seal

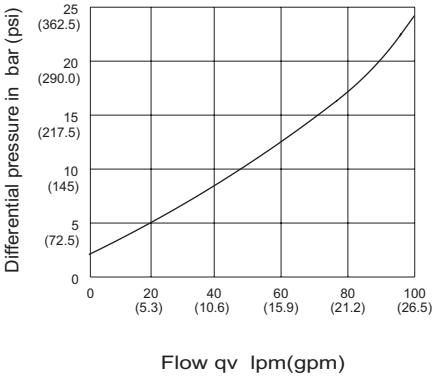
PERFORMANCE CURVES

ps min - qv characteristics

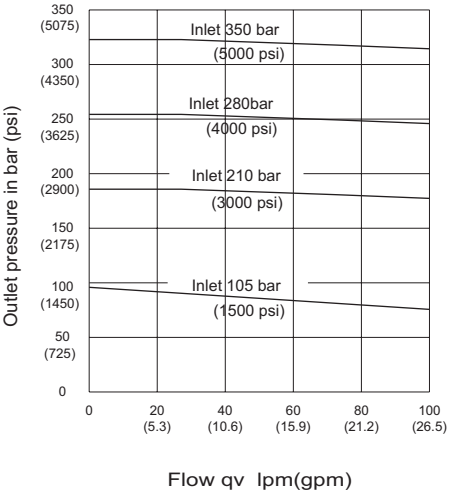
PC

VR4R03

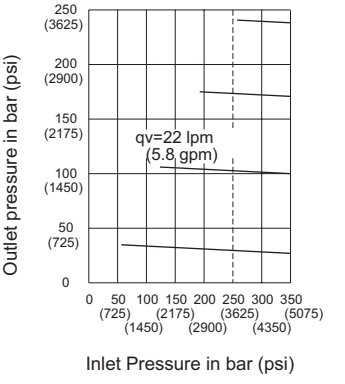
Minimum Differential Pressure between Inlet & Outlet Pressure at Various Flow Rates



Variation in Outlet Pressure for variation in Flow Rate

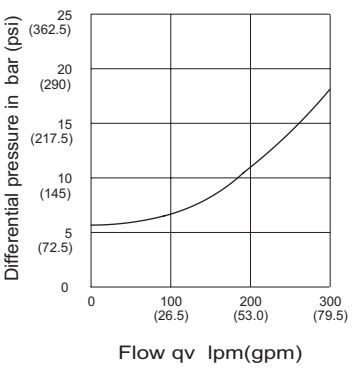


The effect of increase of Inlet Pressure on Outlet Pressure setting

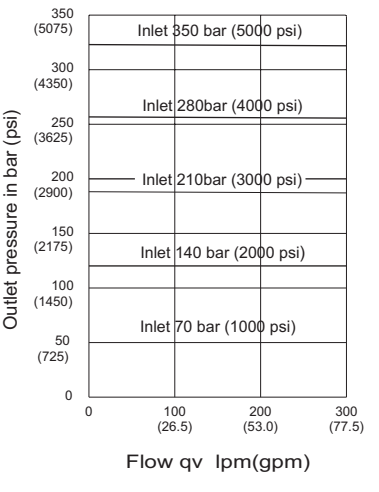


VR4R06 & VR4R10

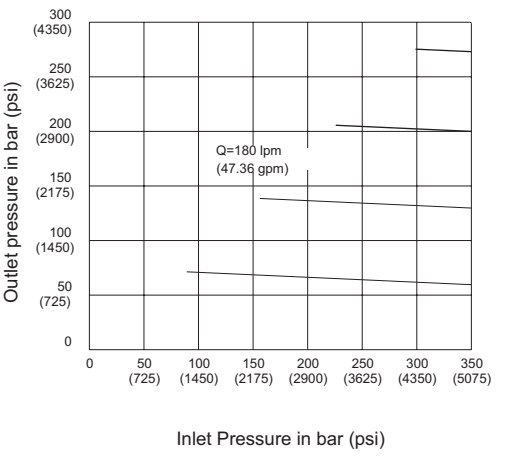
Minimum Differential Pressure between Inlet & Outlet Pressure at Various flow Rates



Variation in Outlet Pressure for variation in Flow Rate



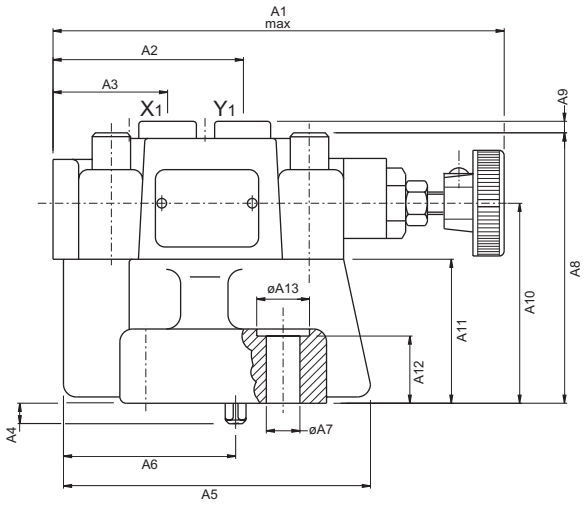
The effect of increase of Inlet Pressure on Outlet Pressure setting



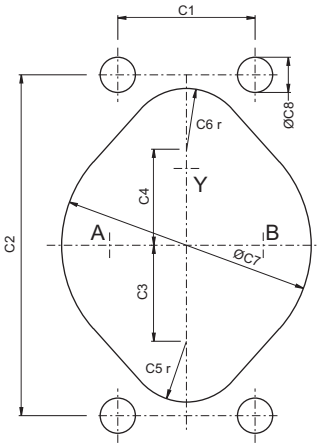
Note : All Performance Data given is typical and can be influenced by application.
Oil Temperature = 45°C (113°F) ; Oil Viscosity = 40cSt (240SSU).

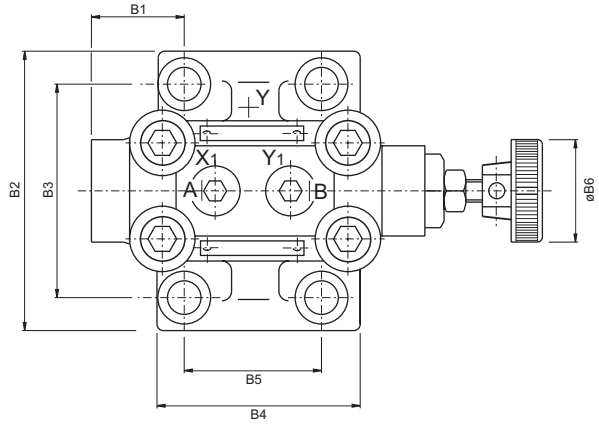
VR4R03 (3/8") SUBPLATE MOUNTING BODY (#3, #7 & #9)

Weight : 5.93 lbs (2.7 kg)

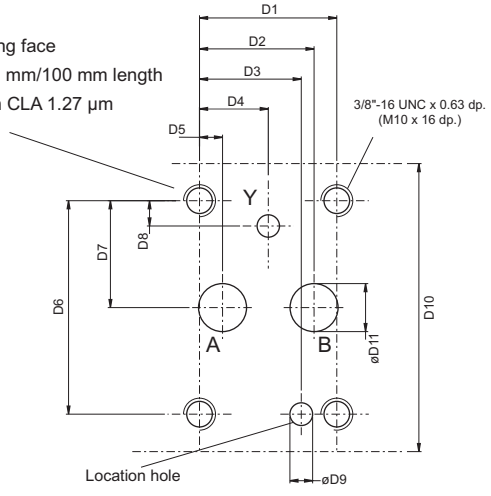


Panel opening





Block mounting face
Flatness 0.01 mm/100 mm length
Surface finish CLA 1.27 µm



	Dimensions	
	in	mm
A1	5.55	141.0
A2	2.34	59.5
A3	1.41	35.8
A4	0.25	6.4
A5	3.62	92.0
A6	2.12	53.8
A7	ø0.4	ø10.5
A8	3.33	84.5
A9	0.14	3.6
A10	2.46	62.5
A11	1.77	45.0
A12	0.826	21.0
A13	ø0.65	ø16.5

	Dimensions	
	in	mm
B1	1.14	29.0
B2	3.437	87.3
B3	2.626	66.7
B4	2.5	63.5
B5	1.69	42.9
B6	ø1.26	ø32.0

	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	ø3.07	ø78.0
C8	ø0.43	ø11.0

	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	1.315	33.4
D8	0.311	7.9
D9	ø0.28 x 0.315 dp.	ø7.1 x 8.0 dp.
D10	3.543	90.0
D11	ø0.59	ø15.0

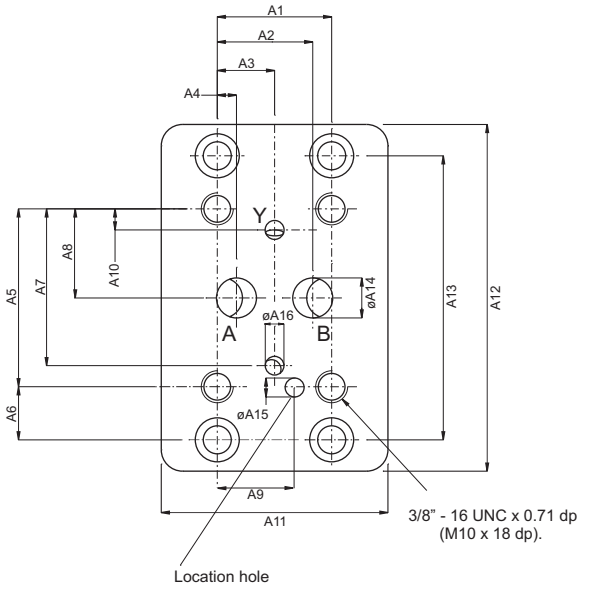
Ports	Function
B	Primary (inlet)
A	Secondary (outlet)
X_1	Remote control or vent connection
Y, Y_1	External drain

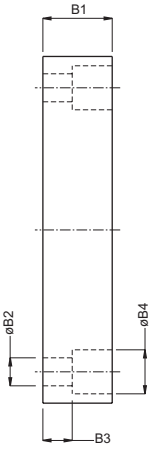
Note : For details of Subplate & mtg. screws please refer page 66

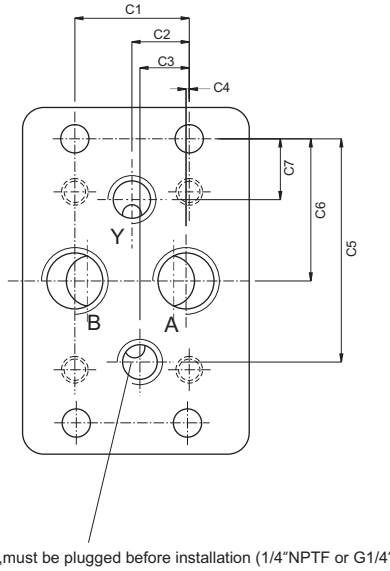
PC

VR4R03 (3/8″) SUBPLATE

Weight : 4.4 lbs (2.0 kg)







Note: Not used,must be plugged before installation (1/4"NPTF or G1/4")

	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	1.25	31.8
A10	0.311	7.9
A11	3.346	85.0
A12	5.12	130.0
A13	4.19	106.5
A14	ø0.59	ø15.0
A15	ø0.28 x 0.315 dp.	ø7.1 x 8.0 dp.
A16	ø0.275	ø7.0

	Dimensions	
	in	mm
B1	1.024	26.0
B2	ø0.41	ø10.5
B3	0.433	11.0
B4	ø0.65	ø16.5

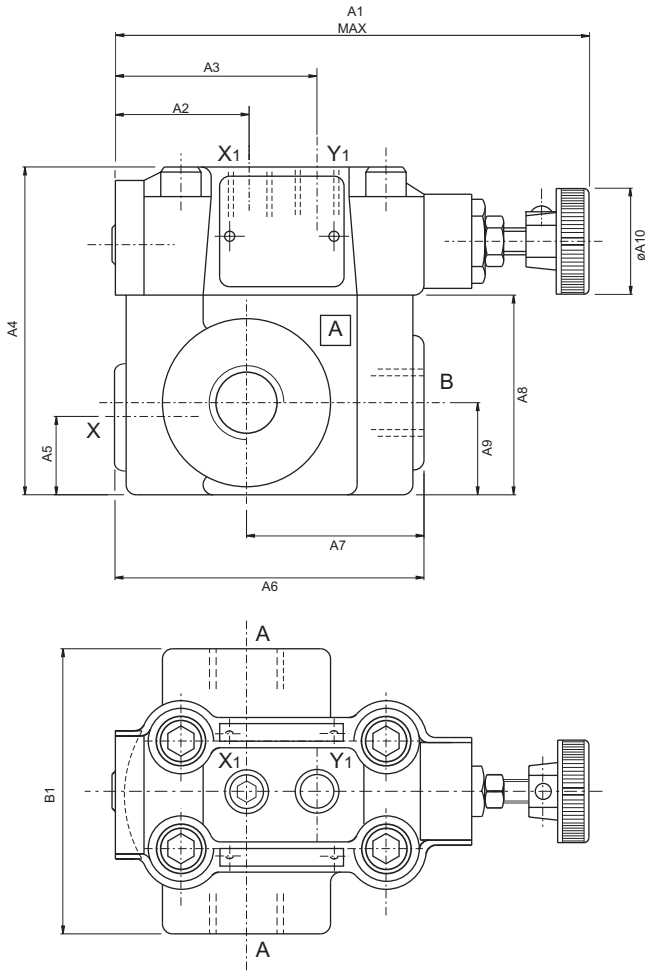
	Dimensions	
	in	mm
C1	1.69	42.9
C2	0.846	21.5
C3	0.73	18.5
C4	0.047	1.2
C5	3.295	83.7
C6	2.1	53.3
C7	0.9	22.8

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

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

VR4R03 (3/8") - THREADED BODY (#1, #4 & #6)

Weight : 7.03 lbs (3.2 kg)



	Dimensions	
	in	mm
A1	5.55	141.0
A2	2.34	59.5
A3	1.46	37.3
A4	3.84	97.5
A5	0.92	23.3
A6	3.62	92.0
A7	2.08	53.0
A8	2.34	59.4
A9	1.02	26.0
A10	ø1.26	ø32.0

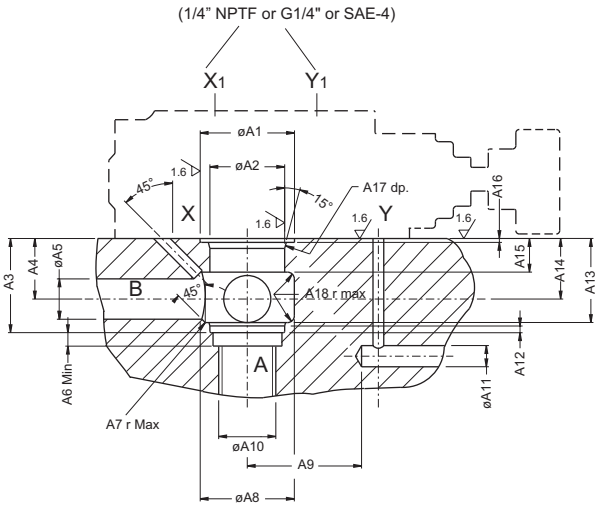
	Dimensions	
	in	mm
B1	3.34	84.8

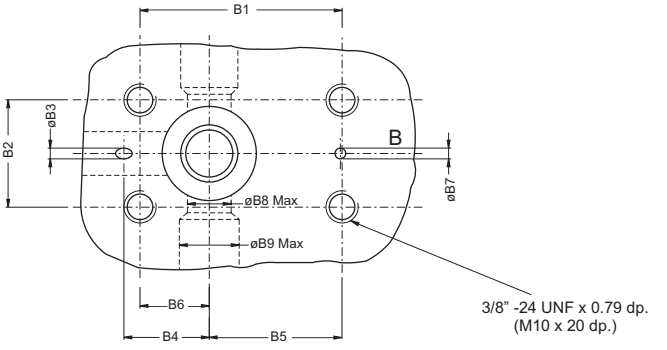
Ports	Function	Port Sizes
A(2)	Secondary port (outlet)	1/2" NPTF or G 1/2" or SAE - 8 (3/4" - 16 UNF)
B	Primary (inlet)	1/2" NPTF or G 1/2" or SAE - 8 (3/4" - 16 UNF)
X, X_1	Remote control or vent connection	1/4" NPTF or G 1/4" or SAE - 4 (7/16" - 20 UNF)
Y_1	External drain	1/4" NPTF or G 1/4" or SAE - 4 (7/16" - 20 UNF)

PC

CARTRIDGE WITH PILOT VALVE VR4R03 (3/8") (#0, #E & #G)

Weight : 1.31 lbs (0.6 kg)





	Dimensions	
	in	mm
A1	ø1.11/1.10	ø28.1/28.0
A2	ø0.876 ø0.875	ø22.245 ø22.225
A3	1.105/1.103	28.07/28.02
A4	0.71	18.0
A5	ø0.48	ø12.0
A6	0.16	4.0
A7	0.016 r	0.4 r
A8	ø1.1	ø28.0
A9	1.34	34.0
A10	ø0.60/0.61	ø15.2/15.4
A11	ø0.25	ø6.3
A12	0.08	2.0
A13	0.98	25.0
A14	0.70/0.68	17.8/17.3
A15	0.4	10.0
A16	0.045/0.050	1.14/1.27
A17	0.071 r	1.8 r
A18	0.08 r	2.0 r

	Dimensions	
	in	mm
B1	2.367/2.383	60.12/60.52
B2	1.24/1.26	31.55/31.95
B3	ø0.126	ø3.2
B4	1.0	25.4
B5	1.496	38.0
B6	0.81	20.6
B7	ø0.126 ø0.236	ø3.2 ø6.0
B8	ø0.51	ø13.0
B9	ø0.7	ø17.8

Ports	Function
B	Primary (Inlet)
A	Secondary (Outlet)
X	Internal pilot pressure
X_1	Remote control or vent connection
Y, Y_1	External drain

4 Mounting screws*	
Dimensions	Order No.
3/8" - 24 UNF x $1\frac{3}{4}$" lg. or M10 x 45mm, DIN 912 - 12.9	V359 - 15220 or V700 - 71602

* Mounting screws must be ordered separately