Hy-Lok DV Series

Diaphragm Valves

Catalog No. H-DV100
Aug, 2006

Design & Engineering

- 316L VIM / VAR
- Low and High Pressure Model
- ZCR, Tube Butt Weld, and Hy-Lok Tube End Connections
- Manual Handle or Pneumatic Actuator
- 100% Helium Leak Tested

Application

- Ultrahigh Purity Process
- Semiconductor
- Biotech
- Pharmaceutical

HY-LOK CORPORATION

ISO 14001 OHSAS 18001

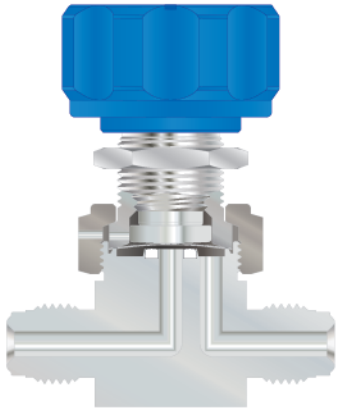
Features

Body

- 316L VIM / VAR Stainless Steel
- Minimum dead space
- Maximum flow capacity
- Electro polishing processing

Diaphragm

- Elgiloy® material
- Excellent corrosion resistance
- Electro polishing processing
- Long cycle life



Seat

- Excellent chemical resistance
- Low coefficient for thermal expansion
- Minimum particle of contamination
- Long cycle life

Manual Handle and Pneumatic Actuators

Manual Handle

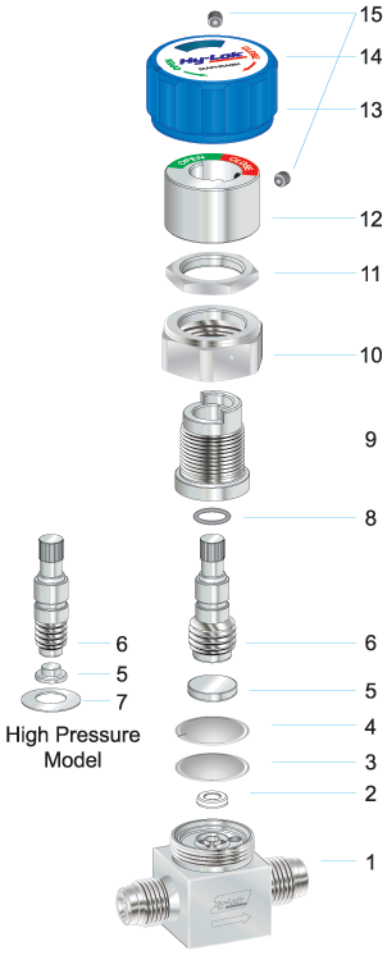
- 1/4" size is quick, quarter-turn actuation and 1/2" and 3/4" size is half-turn actuation
- Low pressure model are applicable blue color handle
- High pressure model are applicable white color handle
- Visually OPEN and CLOSE positions confirm by handle window
- This handle are available on low and high pressure model

Pneumatic Actuator

- Low pressure model
- Max. working pressure: 250 psig (17.2 barg)
- Flow coefficient : 0.27
- Actuation pressure : 60~100psig(4.2~8.2barg)

- High pressure model
- Max. working pressure: 3,000 psig (207 barg)
- Flow coefficient : 0.2
- Actuation pressure : 70~100psig(4.9~8.2barg)

Materials of Construction



No.	Parts	Material / ASTM Specification			
		Manual Handle		Pneumatic Actuator	
		Low Pressure	High Pressure	Low Pressure	High Pressure
* 1	Body	316L VIM / A479 Stainless Steel			
* 2	Seat	PCTFE / D1430			
* 3	Diaphragm	Elgiloy® / AMS5876			
4	Support Diaphragm	Elgiloy® / AMS5876			
5	Stem Button	Silver Plated Stainless Steel 316 / A479			
6	Stem	Silver Plated Stainless Steel 316 / A479			
7	Disc Washer	-	S17700	-	S17700
8	O-Ring	VITON®		-	
9	Bonnet	Stainless Steel 316 / A479			
10	Bonnet Nut	Stainless Steel 316 / A479			
11	Pannel Nut	Stainless Steel 316 / A479		-	
12	Indicator	Stainless Steel 316 / A479		-	
13	Handle	Aluminum		-	
14	Handle Cap	NYLON		-	
15	Set Screw (2)	Stainless Steel 304		-	
	Housing, Cap, Pistons	-		Aluminum	
	Piston O-Ring	-		NBR	
	Piston Spring	-		S17700	

- " * " marked are wetted parts
- O-Rings are lubricated, wetted parts are not lubricated

Specification

Model	Size	Pressure Rating psig (barg)	Temp. Rating °F (°C)	Flow Coefficient Cv	Orifice in. (mm)
Low Pressure	1/4"	250 (17)	-10 ~ 150 (-23 ~ 65)	0.27	0.16 (4.1)
	1/2"			0.7	0.27 (7.0)
	3/4"				
High Pressure	1/4"	3,000 (207)		0.2	0.16 (4.1)

Internal Surface Grade

Grade	Designator	Roughness Average Ra. (E.P)	Packing Standard Class 10
High	H	0.13 μm (5 μin)	Double
Super	S	0.1 μm (4 μin)	Triple

- Grade "High" is standard.

Cleaning

Passivation is done at Nitrogen environment.
Fine cleaning is done by Ultra-sonic cleansing with resistivity over 18MΩ D.I water after finishing the passivation.

Assembly, Testing & Packaging

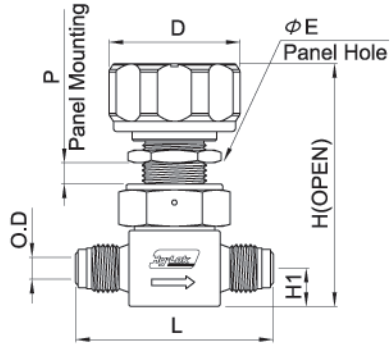
Assembly, Testing and Packaging is performed in the clean room of Class 10.
Inboard helium leak tested to a rate of 1 x 10^{-9} cm^3/s.
Valves are packed with anti-static polyethylene bag that is pressured into the high purity nitrogen gas.

Dimensions

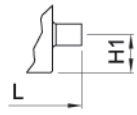
All dimensions are in inches(millimeters) and for reference only. In case of the end connection for Hy-Lok tube fitting, dimensions shown with Hy-Lok nuts in finger-tight position, where applicable.

Low Pressure Models

Manual Handle



Male ZCR

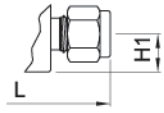


Tube Butt Weld

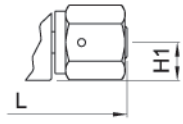
Upper (Handle Operating)

Open Position

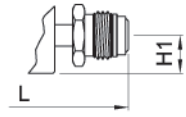
Close Position



Hy-Lok Tube



Female ZCR

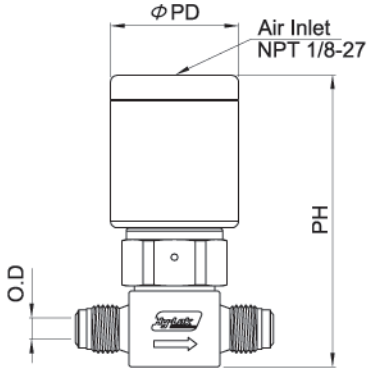


Rotatable Male ZCR

End Connection	Ordering No.	O.D	L	H1	H	D	P	E
Male ZCR Fitting	DVVM-4	1/4"	2.30 (58.4)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
	DVVM-8	1/2"	2.99 (76.0)	0.63 (16.0)	3.16 (80.2)	2.17 (55.0)	0.27 (7.0)	0.91 (23.1)
	DVVM-12	3/4"	3.47 (88.1)	0.87 (22.0)	3.67 (93.1)	2.56 (65.0)	0.27 (7.0)	0.91 (23.1)
Tube Butt Weld (Tube wall, 0.035 in.)	DVBW-4	1/4"	1.74 (44.2)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
	DVBW-8	1/2"	2.68 (68.0)	0.63 (16.0)	3.16 (80.2)	2.17 (55.0)	0.27 (7.0)	0.91 (23.1)
	DVBW-12	3/4"	2.90 (73.6)	0.87 (22.0)	3.67 (93.1)	2.56 (65.0)	0.27 (7.0)	0.91 (23.1)
Hy-Lok Tube Fitting	DVH-4	1/4"	2.45 (62.2)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
	DVH-8	1/2"	3.14 (79.8)	0.63 (16.0)	3.16 (80.2)	2.17 (55.0)	0.27 (7.0)	0.91 (23.1)
	DVH-12	3/4"	3.18 (80.8)	0.87 (22.0)	3.67 (93.1)	2.56 (65.0)	0.27 (7.0)	0.91 (23.1)
Female ZCR Fitting	DVVF-4	1/4"	2.78 (70.6)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
	DVVF-8	1/2"	3.27 (83.0)	0.63 (16.0)	3.16 (80.2)	2.17 (55.0)	0.27 (7.0)	0.91 (23.1)
	DVVF-12	3/4"	4.17 (106.0)	0.87 (22.0)	3.67 (93.1)	2.56 (65.0)	0.27 (7.0)	0.91 (23.1)
Rotatable Male ZCR Fitting	DVRM-4	1/4"	2.78 (70.6)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
	DVRM-8	1/2"	3.27 (83.0)	0.63 (16.0)	3.16 (80.2)	2.17 (55.0)	0.27 (7.0)	0.91 (23.1)
	DVRM-12	3/4"	4.17 (106.0)	0.87 (22.0)	3.67 (93.1)	2.56 (65.0)	0.27 (7.0)	0.91 (23.1)

■ Handle color for Low pressure model is blue.

Pneumatic Actuator



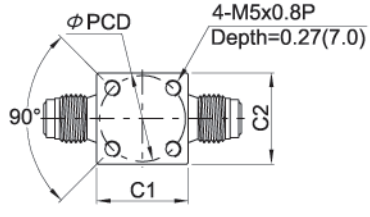
Ordering No.	O.D	Description	PH	PD
DVVM - 4 - PC	1/4"	Normally Close	3.38 (85.9)	1.50 (38.0)
DVVM - 8 - PC	1/2"		3.69 (93.7)	1.77 (45.0)
DVVM - 12 - PC	3/4"		4.08 (103.8)	1.77 (45.0)
DVVM - 4 - PO	1/4"	Normally Open	3.38 (85.9)	1.50 (38.0)
DVVM - 8 - PO	1/2"		3.69 (93.7)	1.77 (45.0)
DVVM - 12 - PO	3/4"		4.08 (103.8)	1.77 (45.0)

■ For end connection types and dimensions are same as Manual Handle.

Bottom (Mounting)

O.D	C1	C2	PCD
1/4"	1.06 (26.9)	1.06 (26.9)	1.00 (25.4)
1/2"	1.42 (36.0)	1.32 (33.5)	1.10 (28.0)
3/4"	1.46 (37.0)	1.46 (37.0)	1.10 (28.0)

■ All end connections for each O.D size is same bottom mounting.

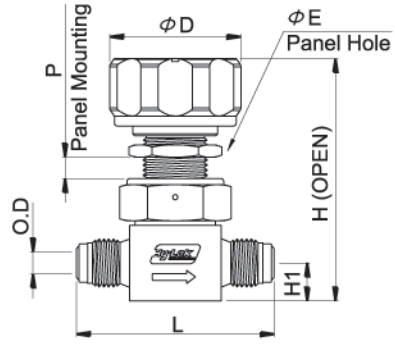


Dimensions

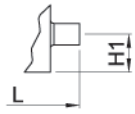
All dimensions are in inches(millimeters) and for reference only. In case of the end connection for Hy-Lok tube fitting, dimensions shown with Hy-Lok nuts in finger-tight position, where applicable.

High Pressure Models

Manual Handle



Male ZCR

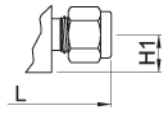


Tube Butt Weld

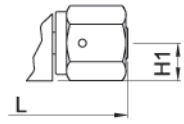
Upper (Handle Operating)

Open Position

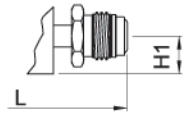
Close Position



Hy-Lok Tube



Female ZCR

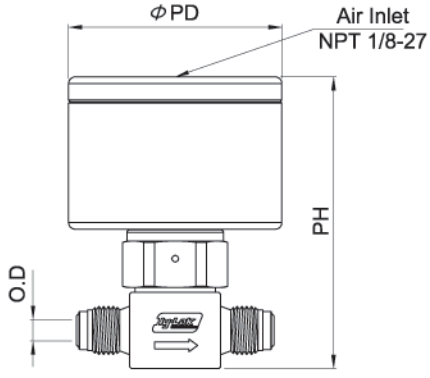


Rotatable Male ZCR

End Connection	Ordering No.	O.D	L	H1	H	D	P	E
Male ZCR Fitting	DVHPVM-4	1/4"	2.30 (58.4)	0.44 (11.2)	2.84 (72.1)	1.58 (40.0)	0.24 (6.0)	0.79 (20.0)
Tube Butt Weld (Tube wall, 0.035 in.)	DVHPBW-4		1.74 (44.2)					
Hy-Lok Tube Fitting	DVHPH-4		2.45 (62.2)					
Female ZCR Fitting	DVHPVF-4		2.78 (70.6)					
Rotable Male ZCR Fitting	DVHPRM-4							

■ Handle color for high pressure model is white.

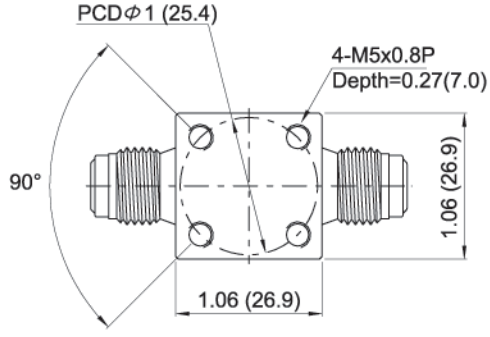
Pneumatic Actuator



Ordering No.	O.D	Description	PH	PD
DVHPVM - 4 - PC	1/4"	Normally Close	3.89 (98.8)	2.48 (63.0)
DVHPVM - 4 - PO	1/4"	Normally Open		

■ For end connection types and dimensions are same as Manual Handle.

Bottom (Mounting)



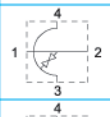
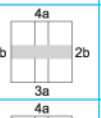
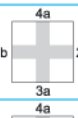
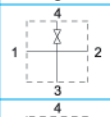
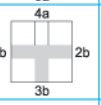
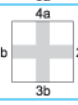
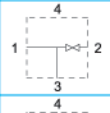
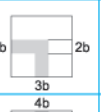
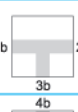
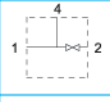
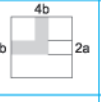
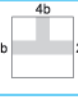
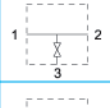
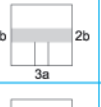
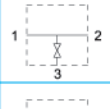
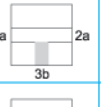
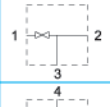
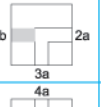
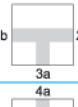
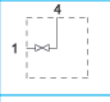
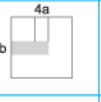
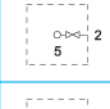
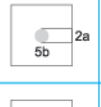
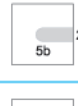
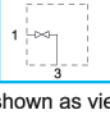
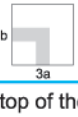
■ All end connections for each O.D size is same bottom mounting.

Multiport Diaphragm Valves

To customize this model to meet your system requirements, select designators for :

- multiport flow path
- end connector for each port
- internal surface grade
- manual handle or pneumatic actuator

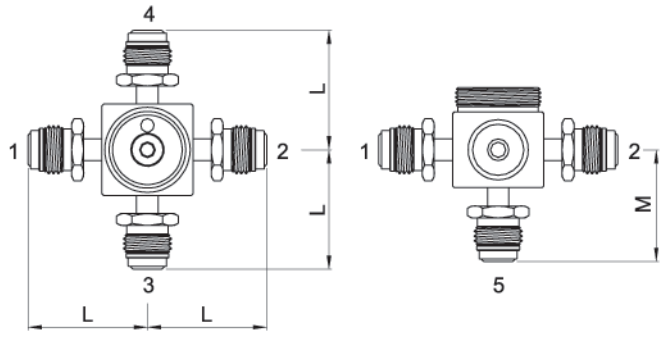
Multiport Flow Path

Ports No.	Designator	Schematic	Flow Path	
			Close	Open
4	L			
	N			
3	C			
	E			
	R			
	T			
	Y			
2	J			
	Q			
	U			

- The flow path is shown as viewed from the top of the valve body.
- The "a" next to the port number indicate that a port is above the valve seat.
- The "b" next to the port number indicate that a port is below the valve seat.

Dimension

All dimensions are in inches(millimeters) and for reference only.
In case of the end connection for Hy-Lok tube fitting, dimensions shown with Hy-Lok nuts in finger-tight position, where applicable.



End Connection	O.D	L	M
Tube Butt Weld (Tube wall, 0.035 in.)	1/4"	0.87 (22.1)	0.76 (19.3)
Female ZCR Fitting		1.39 (35.3)	1.63 (41.4)
Rotatable Male ZCR Fitting			

- The end connection designators are reference on page 8.
- The dimension of four bottom mounting holes are same as standard 2 port valve body on page 4.
- The flow path designator "Q" is no mounting holes.

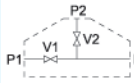
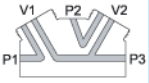
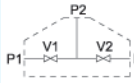
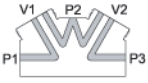
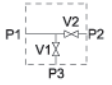
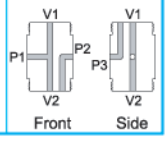
Example Ordering Information

Ordering No.	DVLMFMF-4-H	DVHPCFWF-4-H	DVJWW-4-PC-H
Material	316L VIM / VAR Stainless Steel		
Model Series	Low Pressure, 1/4"	High Pressure, 1/4"	Low Pressure, 1/4"
Flow Path	4 ports, L	3 ports, C	2 ports, J
Port No. 1 End Connection	Rotatable Male ZCR Fitting	Female ZCR Fitting	Tube Butt Weld
Port No. 2 End Connection	Female ZCR Fitting	Tube Butt Weld	-
Port No. 3 End Connection	Rotatable Male ZCR Fitting	Female ZCR Fitting	-
Port No. 4 End Connection	Female ZCR Fitting	-	Tube Butt Weld
Actuation Method	Manual Handle, Color Blue	Manual Handle, Color White	Normally Close

Manifolds Diaphragm Valves

To customize this model to meet your system requirements, select designators for :
manifold flow path
end connector for each port
internal surface grade
manual handle or pneumatic actuator

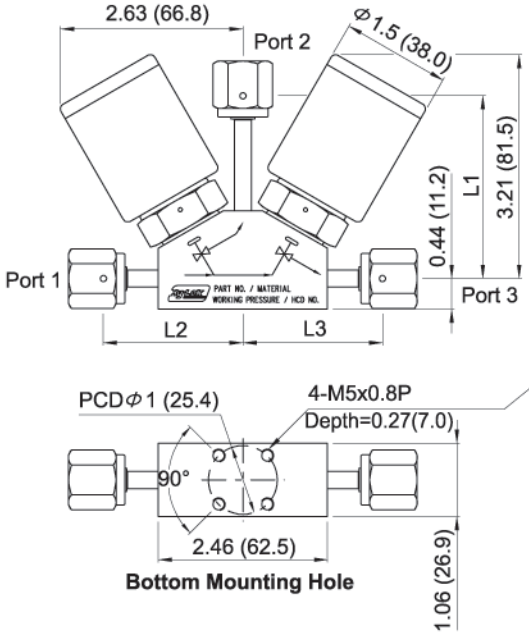
Manifold Flow Path

Manifold	Designator	Schematic	Flow Path
2 Valve & 3 Port Mono Block	M1		
	M2		
2 Valve & 3 Port Double Pattern	M3		 Front Side

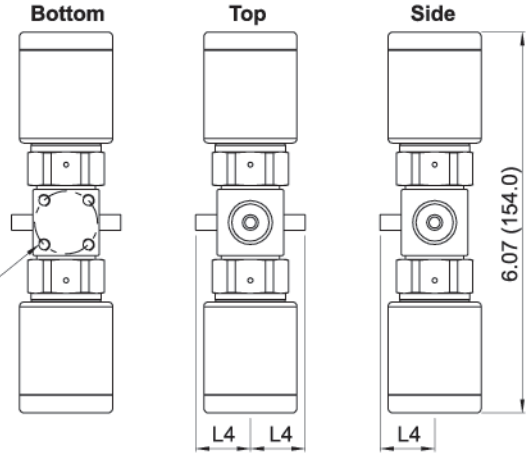
Dimension

All dimensions are in inches(millimeters) and for reference only. In case of the end connection for Hy-Lok tube fitting, dimensions shown with Hy-Lok nuts in finger-tight position, where applicable.

2 Valve & 3 Port Monoblock



2 Valve & 3 Port Double Pattern



End Connection	O.D	2 Valve & 3 Port Mono Block			2 Valve & 3 Port Double Pattern
		L1	L2	L3	L4
Tube Butt Weld (Tube wall, 0.035 in.)	1/4"	1.81 (46.0)	2.79 (70.9)	1.81 (46.0)	0.87 (22.1)
Female ZCR Fitting		2.03 (51.6)	2.66 (67.6)	2.03 (51.6)	1.39 (35.3)
Rotatable Male ZCR Fitting		2.39 (60.7)	3.35 (85.1)	2.39 (60.7)	

■ The end connection designators are reference on page 8.

DV Series Diaphragm Valves

Example Ordering Information

Ordering No.	DVM1FMF-4-PCO-H	DVHPM2WWW-4-H	DVM3MFF-4-H
Material		316L VIM / VAR Stainless Steel	
Model Series	Low Pressure, 1/4"	High Pressure, 1/4"	Low Pressure, 1/4"
Flow Path	2 Valve & 3 port Monoblock, M1	2 Valve & 3 port Monoblock, M2	2 Valve & 3 port Double Pattern, M3
Port No. 1 End Connection	Female ZCR Fitting	Tube Butt Weld	Rotatable Male ZCR Fitting
Port No. 2 End Connection	Rotatable Male ZCR Fitting	Tube Butt Weld	Female ZCR Fitting
Port No. 3 End Connection	Female ZCR Fitting	Tube Butt Weld	Female ZCR Fitting
Valve 1 Actuation Method	Normally Close	Manual Handle, Color White	Manual Handle, Color Blue
Valve 2 Actuation Method	Normally Open	Manual Handle, Color White	Manual Handle, Color Blue

Maintenance Kits

To disassemble or assemble the maintenance kits, refer to the Hy-Lok Corporation document no. H-DV100-IM.

Diaphragm Kits

- Two diaphragms are maintenance kits.
- Ordering number is **DVDM-4-KITS**(1/4" size)
  DVDM-8-KITS(1/2" and 3/4" size)

Pneumatic Actuator Kits

- Ordering number is the following.

Model	Ordering No.	O.D Size	Description
Low Pressure	DV-4-PO	1/4"	Normally Open
	DV-4-PC		Normally Close
	DV-8-PO	1/2", 3/4"	Normally Open
	DV-8-PC		Normally Close
High Pressure	DVH-4-PO	1/4"	Normally Open
	DVH-4-PC		Normally Close

⚠ Do not interchange high pressure actuator and low pressure actuator.

Ordering Information

DV - **HP** - **M1** - **MFF** - **4** - **PCO** - **H** - **VV6L**

Valve Series Designator
- DV - Diaphragm Valve

Model
- Nil - Low Pressure
- HP - High Pressure

Flow Path
- Nil - Standard (page 4, 5)
- M1 - Multiport (page 6) Manifold (page 7)

End Connection	Standard	Multiport & Manifold
Male ZCR Fitting	VM	-
Tube Butt Weld	BW	W
Female ZCR Fitting	VF	F
Hy-Lok Tube Fitting	H	-
Rotatable Male ZCR	RM	M

Size
- 4 - 1/4"
- 8 - 1/2"
- 12 - 3/4"

Pneumatic Actuator
- Nil - Manual Handle
- PO - Pneumatic Actuator (Normally Open)
- PC - Pneumatic Actuator (Normally Close)
- PCO - Valve 1: Normally Close, Valve 2: Normally Open
- POC - Valve 1: Normally Open, Valve 2: Normally Close

Surface Grade
- H - Grade "High"
- S - Grade "Super"

Body Material Designator
- VV6L - 316L VIM / VAR Stainless Steel / ASTM A479

■ QUALITY SYSTEM CERTIFICATES

ISO 9001
CERTIFICATE NO.GQC 212

ASME SECT Ⅲ (MO)
CERTIFICATE NO. QSC 584

■ TYPE APPROVALS (for Hy-Lok Tube Fittings)

American Bureau Shipping
CERTIFICATE NO.00-BK50288-X

Lloyd's Register
CERTIFICATE NO.01/10075

GERMANISCHER LLOYD
CERTIFICATE NO.57798-91 HH

DET NORSKE VERITAS
CERTIFICATE NO.P-9100

SAFETY in VALVE SELECTION

Proper installation, material compatibility, operation and maintenance of these valves are the responsibility of the user. The total system design must be taken into consideration to ensure optimal performance and safety.