VUPS

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ULTRA HIGH PURITY GAS SYSTEM

# Gas Control Solutions

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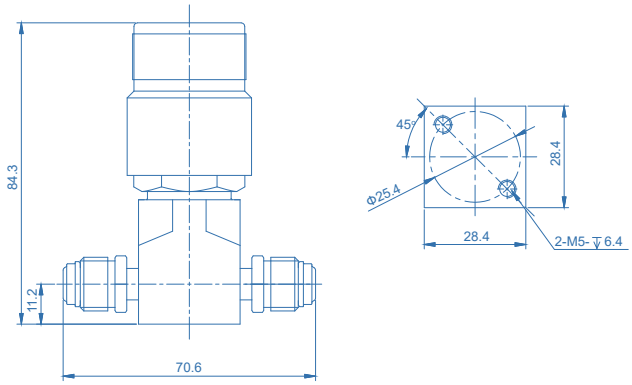
# Single Stage Pressure Regulators
# VSR-50UB Series

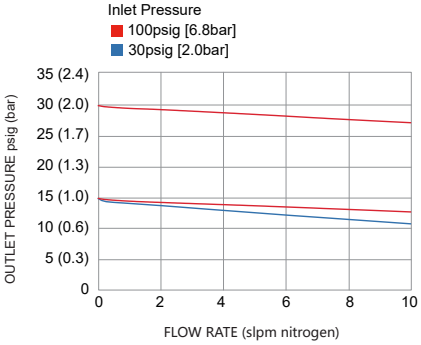
## Product Feature

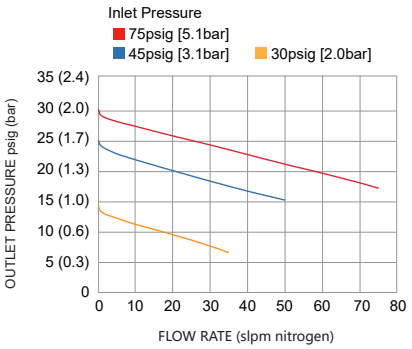
- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 15 slpm (standard), to 30 slpm (optional)
- 100% helium-leak-tested

## Dimensions (mm)




## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure P1: | 150 psig (10bar) |
| Outlet pressure P2: | Vac to 10/30/60/100 psig (0.7/2/4/7bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" VFS fitting and tube weld |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.06 (Cv=0.1 optional) |
| Supply pressure effect: | 0.2 psig rise in delivery pressure per 20 psig source pressure drop @Cv=0.06<br>0.4 psig rise in delivery pressure per 20 psig source pressure drop @Cv=0.1 |
| Weight: | approx. 0.5kg (depending on connections or options) |



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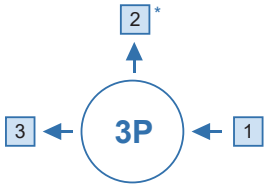
## Ordering Information






* port for gauge

**Inlet/outlet Connection**

FV4: 1/4" VFS female
MV4: 1/4" VFS male
TW4: 1/4" tube weld
P: gauge (1/4" VFS fitting)

* Other connection standard,consult factory

**Port Selection**

**VSR - 50UBPS - 10 - 7 - 3P - 1 - 2 - 3 -R25-HF-VS**

**Installation**

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

**Materials**

S: 316L
SHP: 316L body and nozzle
Hastelloy® C22 poppet

*All options diaphragm material is Hastelloy® C276

**Inlet Pressure**

10: 150 psig

**Outlet Pressure**

V0.7: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
0.7: to 10 psig *
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

**Valve seat Option**

None: PCTFE
VS: Vespel®

**Cv Option**

None: Cv=0.06
HF: Cv=0.1

**Surface Finish**

None: 10 μin. Ra
R25: 25 μin. Ra

**Port Config**

2P: 2 ports
3P: 3 ports

## Ordering Example

**VSR - 50UBS - 10 - 7- FV4 - P - FV4**

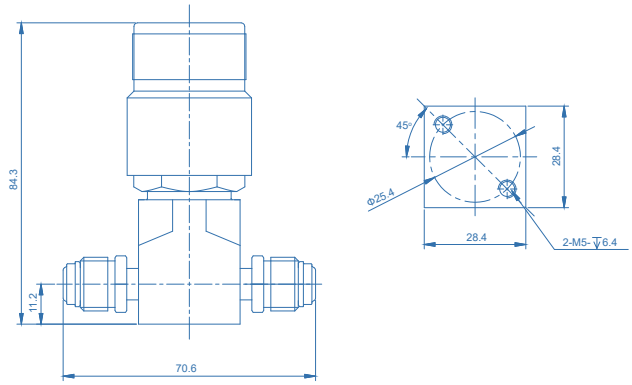
**1 - 2 - 3**

# Single Stage Pressure Regulators
# VSR-50UC Series

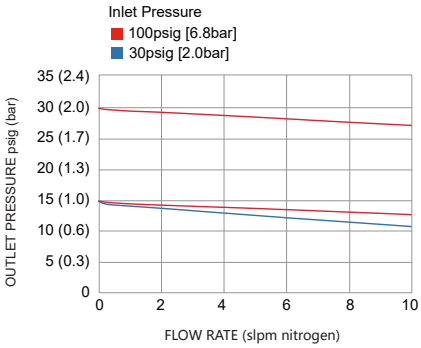
## Product Feature

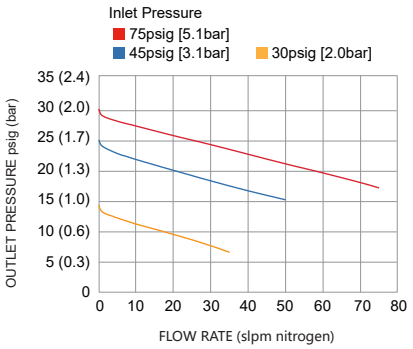
- Single-stage pressure regulator
- 15μin. Ra max, 10μin Ra average surface finish
  (10μin. Ra max, 7μin. Ra max. 5μin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Flow capacity: to 15 slpm (standard), to 30 slpm (optional)
- 100% helium-leak-tested

## Dimensions (mm)




## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | 150 psig (10bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100 psig (0.7/2/4/7bar) |
| Surface finish: | 15μin. Ra max, 10μin Ra average surface finish<br>(10μin. Ra max, 7μin. Ra max. 5μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" VFS fitting and tube weld |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.06 (Cv=0.1 optional) |
| Supply pressure effect: | 0.2 psig rise in delivery pressure per<br>20 psig source pressure drop @Cv=0.06<br>0.4 psig rise in delivery pressure per<br>20 psig source pressure drop @Cv=0.1 |
| Weight: | approx. 0.5kg (depending on connections or options) |



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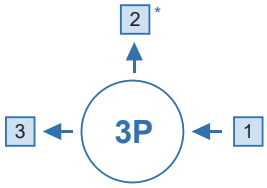
## Ordering Information






* port for gauge

**Inlet/outlet Connection**

FV4: 1/4" VFS female
MV4: 1/4" VFS male
TW4: 1/4" tube weld
P: gauge (1/4" VFS fitting)

* Other connection standard,consult factory

**Port Selection**

**VSR - 50UCPS - 10 - 7 - 3P - 1 - 2 - 3 -R5-HF-VS**

**Installation**

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

**Materials**

S: 316L secondary remelt
SHP: 316L body and nozzle
Hastelloy® C22 poppet

*All options diaphragm material is Hastelloy® C276

**Inlet Pressure**

10: 150 psig

**Outlet Pressure**

V0.7: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
0.7: to 10 psig *
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

**Valve seat Option**

None: PCTFE
VS: Vespel®

**Cv Option**

None: Cv=0.06
HF: Cv=0.1

**Surface Finish**

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max

**Port Config**

2P: 2 ports
3P: 3 ports

## Ordering Example

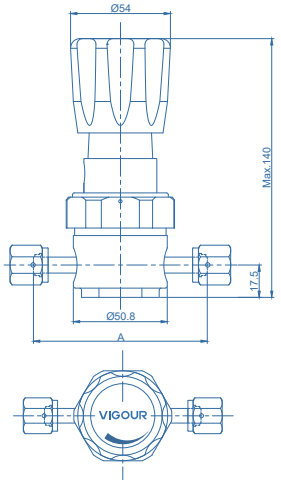
**VSR - 50UCS - 10 - 7- FV4 - P - FV4**
**1 - 2 - 3**

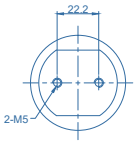
# Single Stage Pressure Regulators
# VSR-100UB Series

## Product Feature

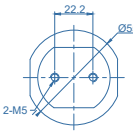
- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested

## Dimensions (mm)




body of 2 ports



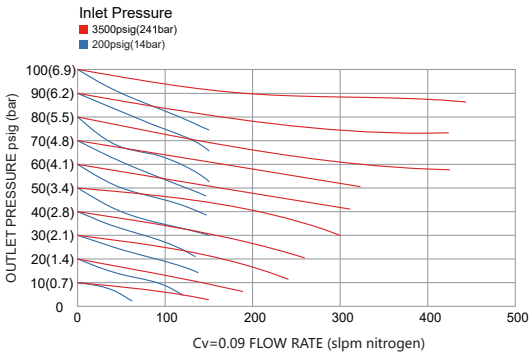

body of 3&4 ports

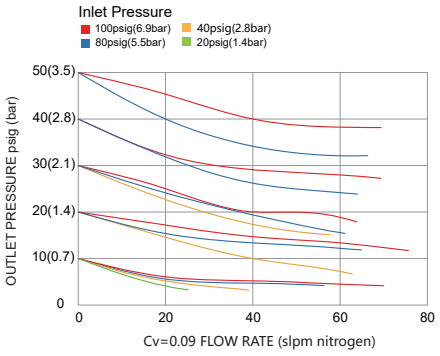
| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4 | 3.70 | (94.0) |
| MV4 | | |
| TW4 | 2.96 | (75.2) |
| FV6 | 4.70 | (119.4) |
| MV6 | | |
| TW6 | 2.96 | (75.2) |

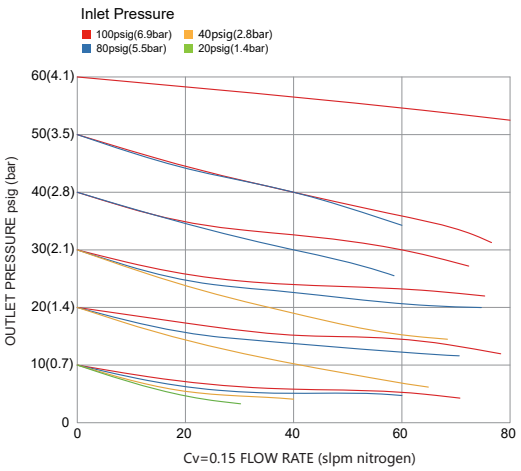
## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100/150 psig (0.7/2/4/7/10bar) |
| Prosf pressure: | 5000 psig (340bar) |
| Burst pressure: | 10000 psig (690bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.09 (Cv=0.15 optional) |
| Supply pressure effect: | 0.35 psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.09 |
| | 0.5psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.15 |
| Weight: | approx. 1.35kg (depending on connections or options) |

## Flowchart



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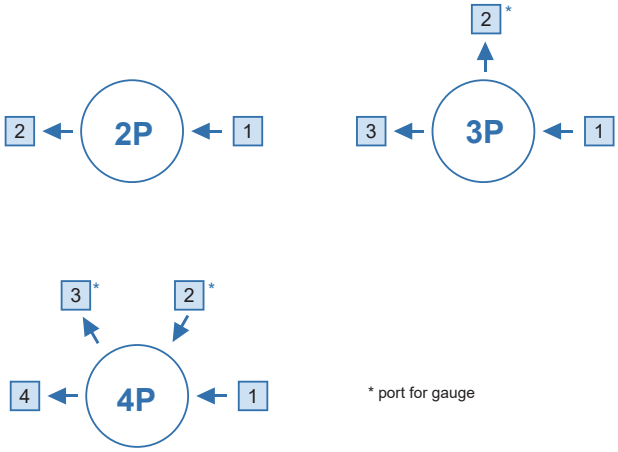
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

### Port Selection

**VSR - 100UBPS - 250 - 10 - 4P - 1 - 2 - 3 - 4 -R25-HF-VS**

### Installation

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

### Materials

S: 316L
SHP: 316L body and nozzle
Hastelloy® C22 poppet

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
250: 3500 psig

### Outlet Pressure

V0.7: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
0.7: to 10 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* When the outlet pressure is "V0.7" and "0.7", the inlet pressure can only be "20".

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Cv Option

None: Cv=0.09
HF: Cv=0.15

### Surface Finish

None: 10 μin. Ra
R25: 25 μin. Ra

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

## Ordering Example

**VSR - 100UBS - 250 - 10 - FV4 - P - P - FV4**

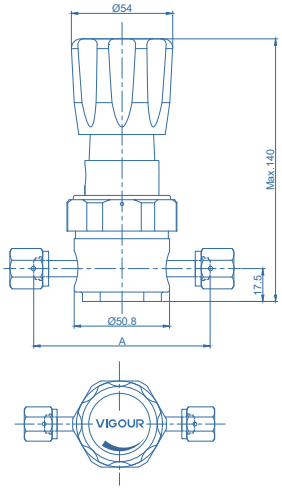
**1 - 2 - 3 - 4**

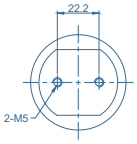
# Single Stage Pressure Regulators
# VSR-100UC Series

## Product Feature

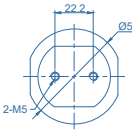
- Single-stage pressure regulator
- 15μin. Ra max, 10μin Ra average surface finish
  (10μin. Ra max, 7μin. Ra max. 5μin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested

## Dimensions (mm)




body of 2 ports



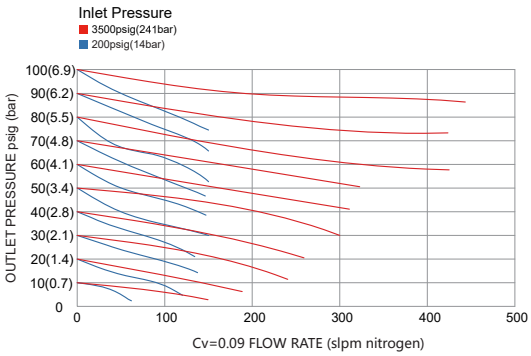

body of 3&4 ports

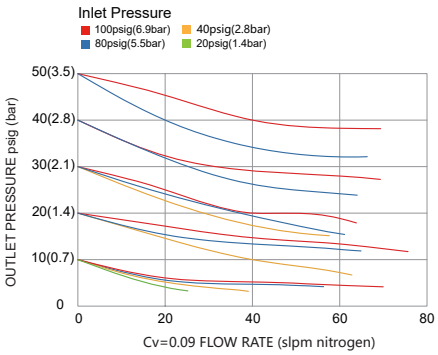
| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4 | 3.70 | (94.0) |
| MV4 | | |
| TW4 | 2.96 | (75.2) |
| FV6 | 4.70 | (119.4) |
| MV6 | | |
| TW6 | 2.96 | (75.2) |

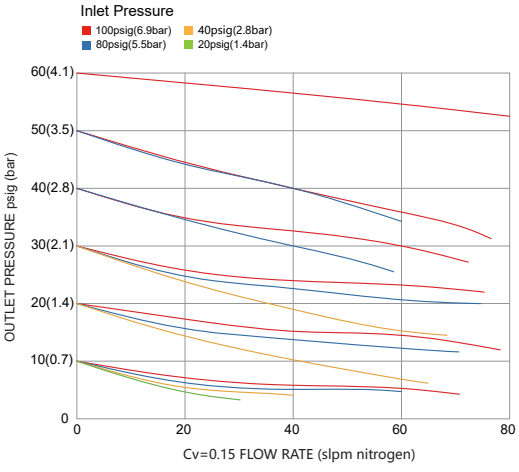
## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100/150 psig (0.7/2/4/7/10bar) |
| Surface finish: | 15μin. Ra max/10μin. Ra avg (10μin. Ra max, 7μin. Ra max, 5μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.09 (Cv=0.15 optional) |
| Supply pressure effect: | 0.35 psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.09 |
| | 0.5psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.15 |
| Weight: | approx. 1.35kg (depending on connections or options) |

## Flowchart



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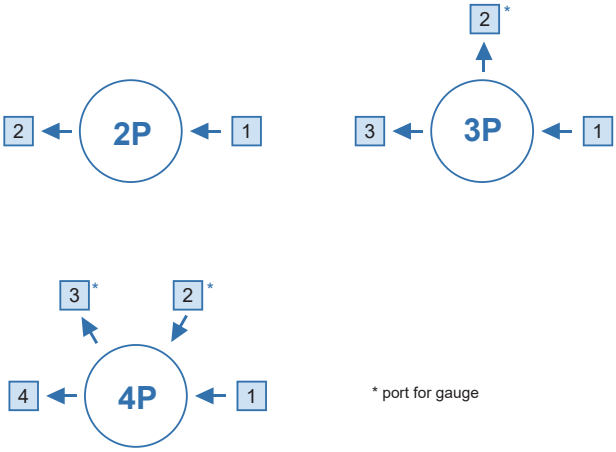
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

### Port Selection

**VSR - 100UC PS - 250 - 10 - 4P - 1 - 2 - 3 - 4 -R5-HF-VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ36mm

### Materials

S: 316L secondary remelt body 316L poppet and nozzle
SH: 316L secondary remelt body Hastelloy® C22 internals
SHP: 316L secondary remelt body Hastelloy® C22 poppet 316L nozzle
H: Hastelloy® C22 body and internals

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
250: 3500 psig

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

V0.7: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
0.7: to 10 psig *
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* When the outlet pressure is "V0.7" and "0.7", the inlet pressure can only be "20".

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Cv Option

None: Cv=0.09
HF: Cv=0.15

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max


## Ordering Example

**VSR - 100UCS - 250 - 10 - 4P - FV4 - P - P - FV4**

**1 - 2 - 3 - 4**

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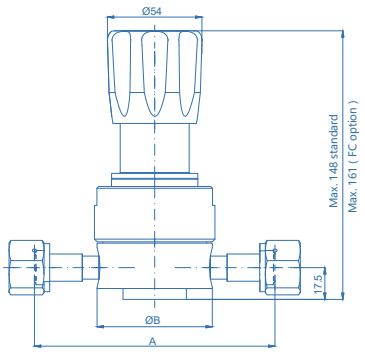
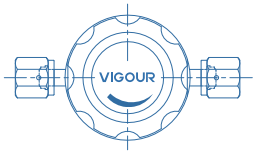
# Single Stage Pressure Regulators
# VSR-210UB Series

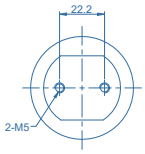
## Product Feature

- Single-stage pressure regulator
- 10µin. Ra surface finish (25µin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Force compensation has wider flow capacity
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

## Dimensions (mm)



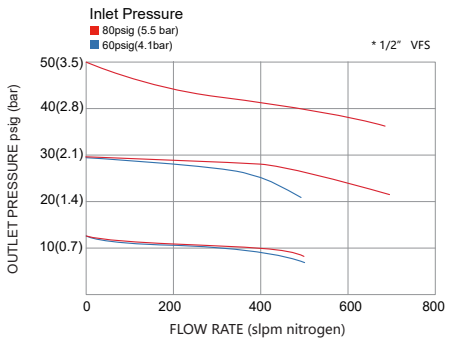



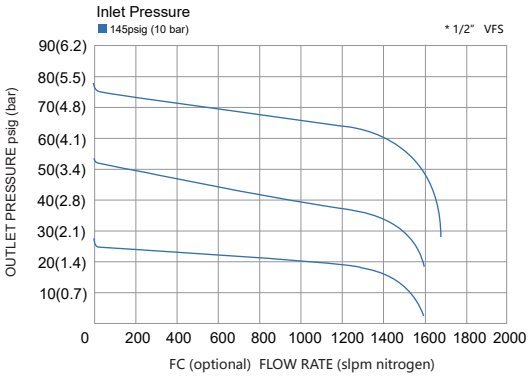

| Connections | B | A | |
|---|---|---|---|
| | | inch | (mm) |
| FV4 | 50.8 | 3.70 | (94.0) |
| MV4 | | 4.00 | (101.6) |
| TW4 | | 3.46 | (87.9) |
| FV6 | 63.5 | 5.22 | (132.6) |
| MV6 | | | |
| TW6 | | 4.00 | (101.6) |
| FV8 | | 5.22 | (132.6) |
| MV8 | | | |
| TW8 | | 4.34 | (110.2) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150/250 psig (2/4/7/10/17bar) |
| Prosf pressure: | 2550 psig (175bar) |
| Burst pressure: | 8000 psig (550bar) |
| Surface finish: | 10µin. Ra (25µin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" or 1/2" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT(F) (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.65, Cv=1.1 (HF option) |
| Supply pressure effect: | 3.5 psig rise in delivery pressure per 100 psig source pressure drop |
| | 4.2 psig rise in delivery pressure per 100 psig source pressure drop (FC option) |
| Weight: | approx. 2.0kg (depending on connections or options) |

## Flowchart



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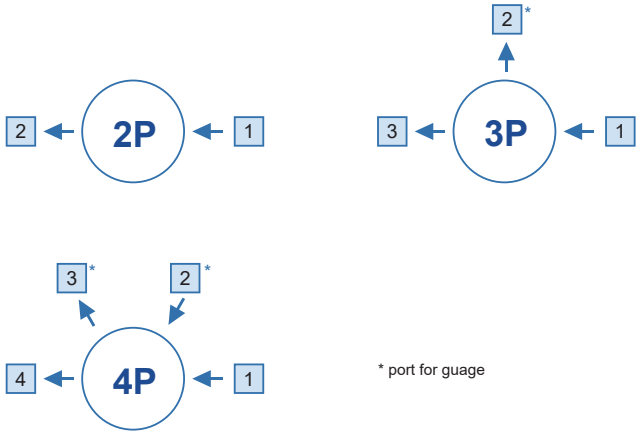
## Ordering Information


* port for guage

### Inlet/Outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | FV8: 1/2" VFS female | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | MV8: 1/2" VFS male | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | IFV4: 1/4" (gauge female threaded connection | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

### Port Selection

**VSR - 210UBPS - 117 - V4 - 4P- 1 - 2 - 3 - 4 - R25-HF-FC-VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ37mm

### Materials

S: 316L
SHP: 316L body
Hastelloy® C22 poppet

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
117: 1700 psig (standard)
200: 3000 psig*

* Not available with outlet pressure: V2 / V4 / 2 / 4

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig
P17: Preset to 250 psig*

* 250 psig outlet pressure preset at 800 psig (55 bar) inlet pressure.

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Option

FC: Force compensation

* Force conpensation feature inlet pressure Max. 300 psig

* FC option is available with connection size 1/2 inch

* Not available with outlet pressure: V2 / V4 / 2 / 4

### Cv Option

None: Cv=0.65
HF: Cv=1.1

### Surface Finish

None: 10 μin. Ra
R25: 25 μin. Ra

## Ordering Example

**VSR - 210UBS - 117 - V4 - 2P - MV4 - MV4**

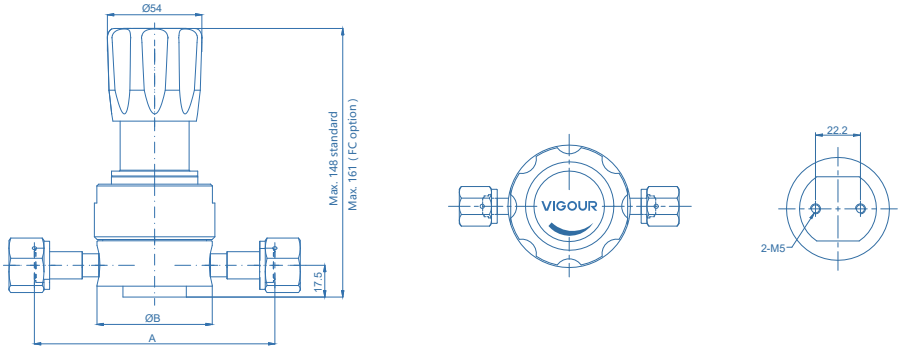
**1 - 2**

# Single Stage Pressure Regulators
# VSR-210UC Series

## Product Feature

- Single-stage pressure regulator
- 15µin. Ra max, 10µin. Ra average surface finish (10µin. Ra max, 7µin. Ra max, 5µin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Force compensation has wider flow capacity
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

## Dimensions (mm)

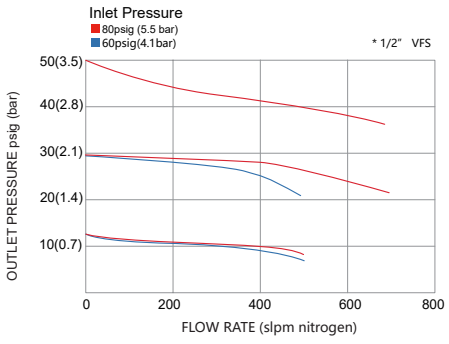


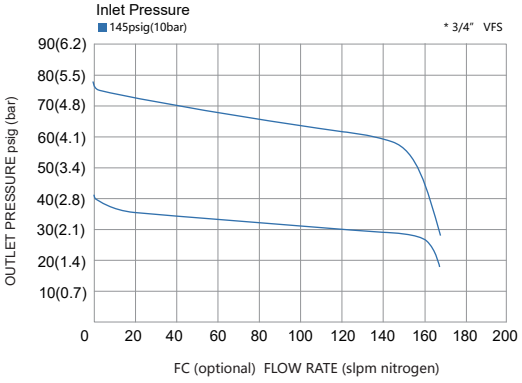

| Connections | B | A | |
|---|---|---|---|
| | | inch | (mm) |
| FV4 | 50.8 | 3.70 | (94.0) |
| MV4 | | 4.00 | (101.6) |
| TW4 | | 3.46 | (87.9) |
| FV6 | 63.5 | 5.22 | (132.6) |
| MV6 | | | |
| TW6 | | 4.00 | (101.6) |
| FV8 | | 5.22 | (132.6) |
| MV8 | | | |
| TW8 | | 4.34 | (110.2) |
| FV12 | | 6.26 | (159.0) |
| MV12 | | | |
| TW12 | | 5.00 | (127.0) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150/250 psig (2/4/7/10/17bar) |
| Surface finish: | 15µin. Ra max / 10µin. Ra avg (10µin. Ra max., 7µin. Ra max., 5µin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" / 1/2" or 3/4" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT(F) (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.65, Cv=1.1 (HF option) |
| Supply pressure effect: | 3.5 psig rise in delivery pressure per 100 psig source pressure drop<br>4.2 psig rise in delivery pressure per 100 psig source pressure drop (FC option) |
| Weight: | approx. 2.0kg (depending on connections or options) |

## Flowchart



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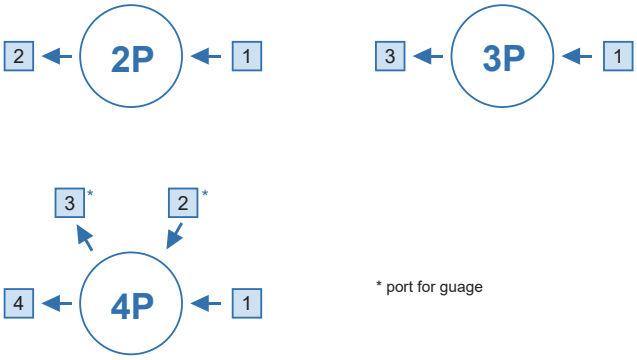
## Ordering Information


* port for guage

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | MV8: 1/2" VFS male | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | FV12: 3/4" VFS female | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | MV12: 3/4" VFS male | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | IFV4: 1/4" (gauge female threaded connection machined on the body) | TW12: 3/4" tube weld |
| FV8: 1/2" VFS female | | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

### Port Selection

**VSR - 210UCPS-117-V4-4P- 1 - 2 - 3 - 4 - R5-HF-FC-VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ37mm

### Materials

S: 316L secondary remelt body
316L poppet and nozzle
SH: 316L secondary remelt body
Hastelloy® C22 internals
SHP: 316L secondary remelt body
Hastelloy® C22 poppet
316L nozzle

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
117: 1700 psig (standard)
200: 3000 psig*

* Not available with outlet pressure: V2 / V4 / 2 / 4

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig
P17: Preset to 250 psig*

* 250 psig outlet pressure preset at 800 psig (55 bar) inlet pressure.

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure

### Valve seat Option

None: PCTFE
VS: Vespel®

### Option

FC: Force compensation

* Force conpensation feature inlet pressure Max. 300 psig
* FC option is available with connection size 1/2 or 3/4 inch
* Not available with outlet pressure: V2 / V4 / 2 / 4
* connection size 3/4 inch Max. 2400 psig

### Cv Option

None: Cv=0.65
HF: Cv=1.1

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max

## Ordering Example

**VSR - 210UCS - 117 - V4 - 2P - MV4 - FV4**

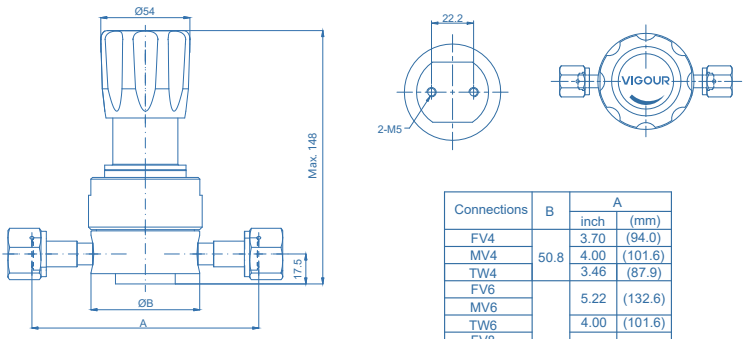
**1 - 2**

# Single Stage Pressure Regulators
# VSR-410UB Series

## Product Feature

- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design
- Sub-atmospheric pressure delivery optional

## Dimensions (mm)

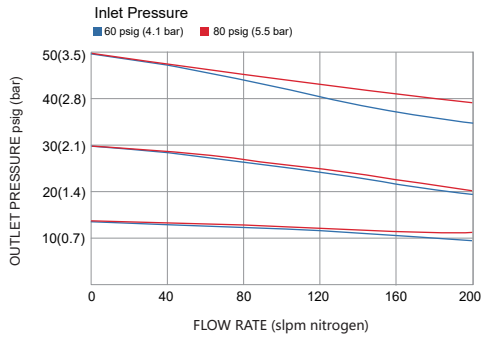


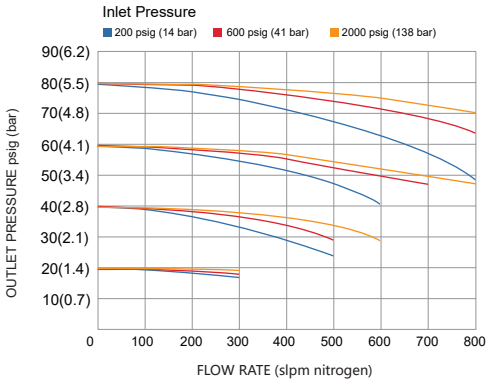

| Connections | B | A | |
|---|---|---|---|
| | | inch | (mm) |
| FV4 | 50.8 | 3.70 | (94.0) |
| MV4 | | 4.00 | (101.6) |
| TW4 | | 3.46 | (87.9) |
| FV6 | 63.5 | 5.22 | (132.6) |
| MV6 | | | |
| TW6 | | 4.00 | (101.6) |
| FV8 | | 5.22 | (132.6) |
| MV8 | | | |
| TW8 | | 4.34 | (110.2) |

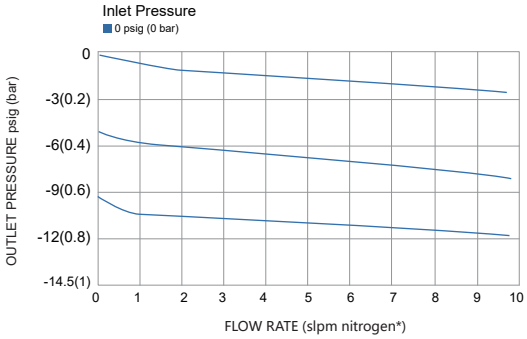
## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Prosf pressure: | 4000 psig (275bar) |
| Burst pressure: | 8000 psig (550bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" or 1/2" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT(F) (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.45 |
| Supply pressure effect: | 1.6 psig rise in delivery pressure per 100 psig source pressure drop |
| Weight: | approx. 2.1kg (depending on connections or options) |

## Flowchart




* The volumetric flow rate under normal conditions (0℃, 1 atm) when $N_2$ gas is flowing.



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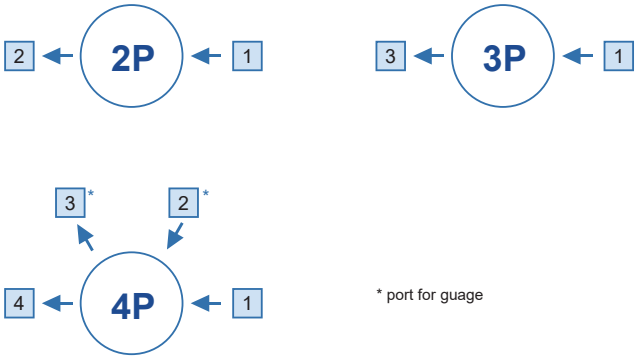
## Ordering Information


* port for guage

### Inlet/Outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | FV8: 1/2" VFS female | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | MV8: 1/2" VFS male | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | IFV4: 1/4" (gauge female threaded connection | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

Port Selection

**VSR - 410UBPS - 160 - V4 - 4P- 1 - 2 - 3 - 4 - R25 -VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ40mm

### Materials

S: 316L body
Hasterlloy® C22 poppet

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
160: 2300 psig (standard)
200: 3000 psig*

* Not available with outlet pressure: VC2 / V2 / V4 / 2 / 4

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

VC2: -12.5~30 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* VC2 optional feature inlet pessure Max. 300 psig.

* With the exception of the VC2 option, the V option cannot adjust the negative pressure and can only be presented by the pressure gauge

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 10 μin. Ra
R25: 25 μin. Ra

## Ordering Example

**VSR - 410UBS - 160 - V4 - 2P - MV4 - MV4**

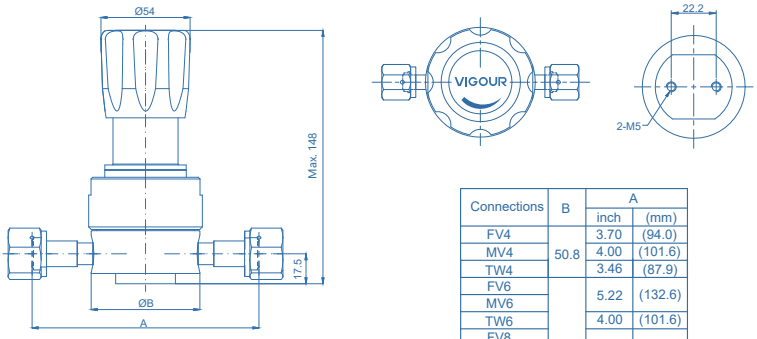
**1 - 2**

# Single Stage Pressure Regulators
# VSR-410UC Series

## Product Feature

- Single-stage pressure regulator
- 15μin. Ra max, 10μin. Ra average surface finish (10μin. Ra max, 7μin. Ra max, 5μin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design
- Sub-atmospheric pressure delivery option

## Dimensions (mm)

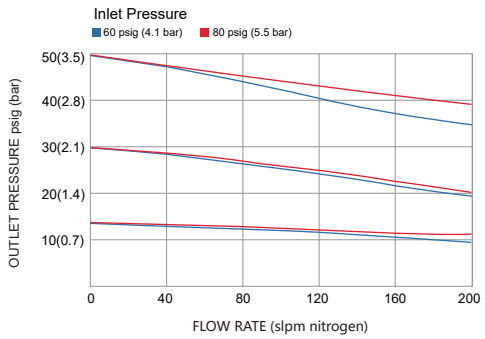


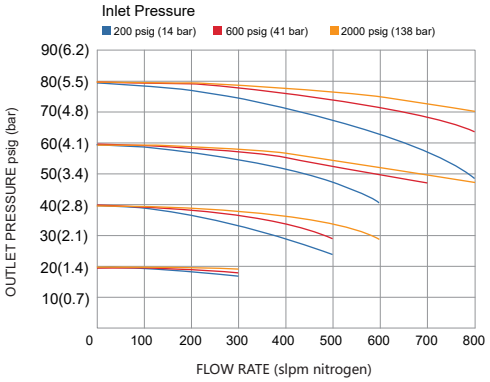

| Connections | B | A | |
|---|---|---|---|
| | | inch | (mm) |
| FV4 | 50.8 | 3.70 | (94.0) |
| MV4 | | 4.00 | (101.6) |
| TW4 | | 3.46 | (87.9) |
| FV6 | 63.5 | 5.22 | (132.6) |
| MV6 | | | |
| TW6 | | 4.00 | (101.6) |
| FV8 | | 5.22 | (132.6) |
| MV8 | | | |
| TW8 | | 4.34 | (110.2) |

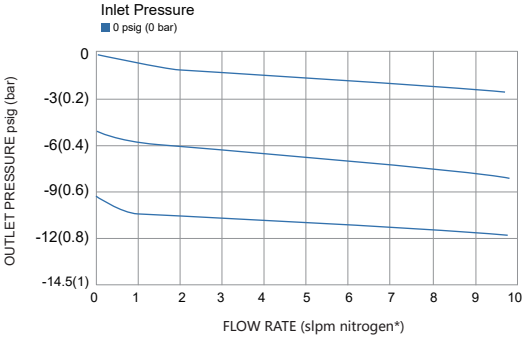
## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | Vac to 30/30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 15μin. Ra max / 10μin. Ra avg (10μin. Ra max., 7μin. Ra max., 5μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" / 1/2" or 3/4" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT(F) (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.45 |
| Supply pressure effect: | 1.6 psig rise in delivery pressure per 100 psig source pressure drop |
| Weight: | approx. 2.1kg (depending on connections or options) |

## Flowchart




* The volumetric flow rate under normal conditions (0°C, 1 atm) when $N_2$ gas is flowing.



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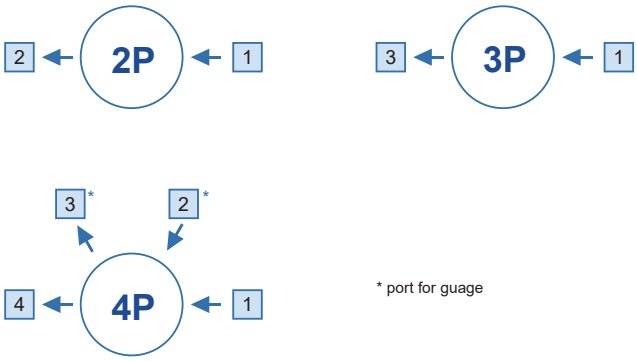
## Ordering Information


* port for guage

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | FV8: 1/2" VFS female | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | MV8: 1/2" VFS male | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | IFV4: 1/4" (gauge female threaded connection | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

### Port Selection

**VSR - 410UC PS - 117 - V4 - 4P - 1 - 2 - 3 - 4 - R5 - VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ40mm

### Materials

S: 316L secondary remelt body
Hastelloy® C22 poppet
316L nozzle
SH: 316L secondary remelt body
Hastelloy® C22 internals

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
160: 2300 psig (standard)
200: 3000 psig*

* Not available with outlet pressure: VC2 / V2 / V4 / 2 / 4

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

VC2: -12.5~30 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* VC2 optional feature inlet pessure Max. 300 psig.

* With the exception of the VC2 option, the V option cannot adjust the negative pressure and can only be presented by the pressure gauge

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max


## Ordering Example

**VSR - 410UCS - 160 - V4 - 2P - MV4 - FV4**

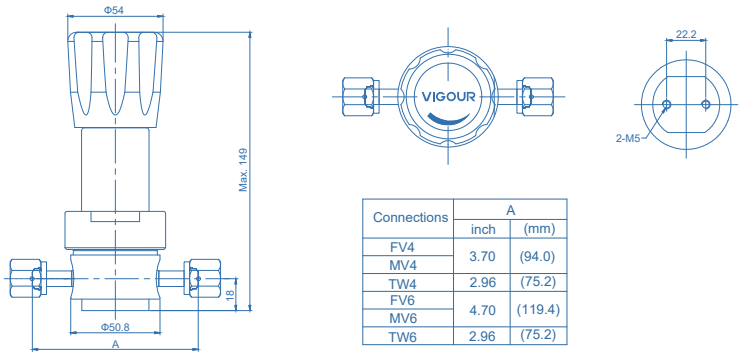
**1 - 2**

# Single Stage Pressure Regulators
# VSR-510UB Series

## Product Feature

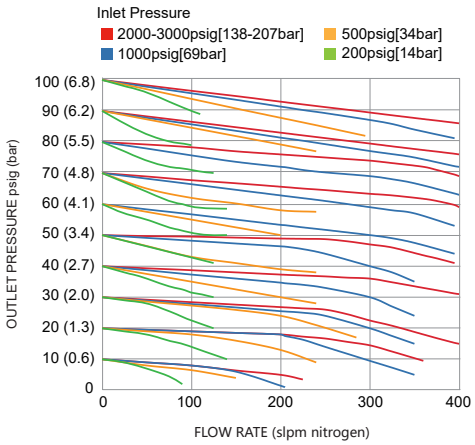
- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

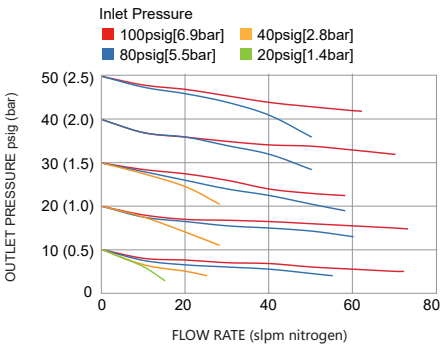
## Dimensions (mm)




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4 | 3.70 | (94.0) |
| MV4 | | |
| TW4 | 2.96 | (75.2) |
| FV6 | 4.70 | (119.4) |
| MV6 | | |
| TW6 | 2.96 | (75.2) |

## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.09 (Cv=0.15 optional) |
| Supply pressure effect: | 0.35 psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.09 |
| | 0.5psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.15 |
| Weight: | approx. 1.35kg (depending on connections or options) |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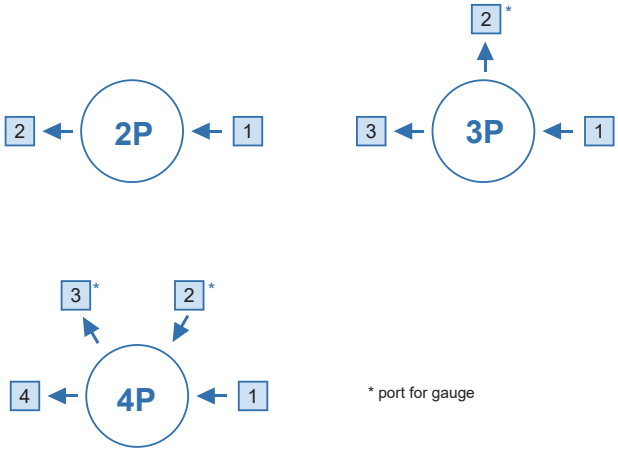
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

Port Selection

**VSR - 510UBPS - 250 - 10 - 4P - 1 - 2 - 3 - 4 -R25-HF-VS**

### Installation

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

### Materials

S: 316L
SHP: 316L body and nozzle
Hastelloy® C22 poppet
H: Hastlloy body

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
250: 3500 psig

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Cv Option

None: Cv=0.09
HF: Cv=0.15

### Surface Finish

None: 10 μin. Ra
R25: 25 μin. Ra

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

## Ordering Example

**VSR - 510UBS - 250 - 10 - FV4 - P - P - FV4**

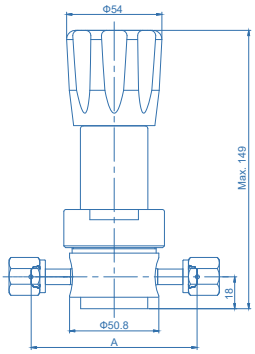
**1 - 2 - 3 - 4**

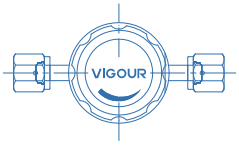
# Single Stage Pressure Regulators
# VSR-510UC Series

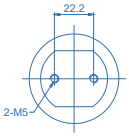
## Product Feature

- Single-stage pressure regulator
- 15μin. Ra max, 10μin Ra average surface finish
  (10μin. Ra max, 7μin. Ra max. 5μin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

## Dimensions (mm)

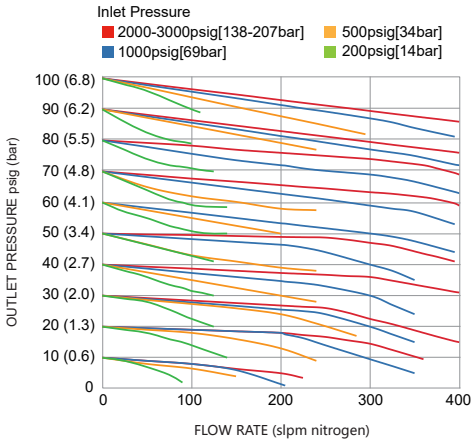


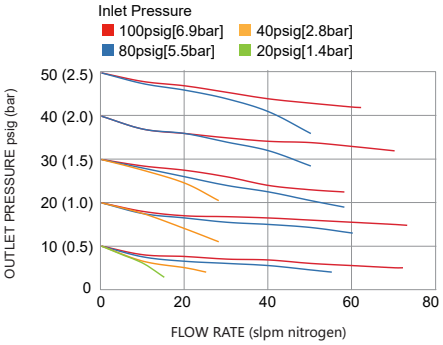




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4 | 3.70 | (94.0) |
| MV4 | | |
| TW4 | 2.96 | (75.2) |
| FV6 | 4.70 | (119.4) |
| MV6 | | |
| TW6 | 2.96 | (75.2) |

## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 15μin. Ra max, 10μin Ra average surface finish<br>(10μin. Ra max, 7μin. Ra max. 5μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.09 (Cv=0.15 optional) |
| Supply pressure effect: | 0.35 psig rise in delivery pressure per<br>100 psig source pressure drop @Cv=0.09<br>0.5psig rise in delivery pressure per<br>100 psig source pressure drop @Cv=0.15 |
| Weight: | approx. 1.35kg (depending on connections or options) |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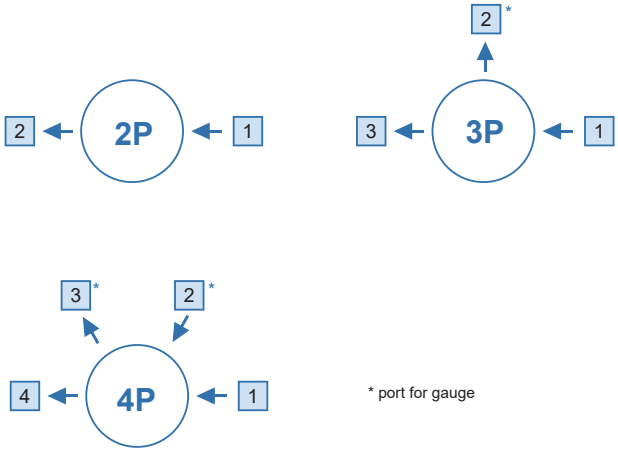
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

### Port Selection

**VSR - 510UC PS - 250 - 10 - 4P - 1 - 2 - 3 - 4 - R25 - HF - VS**

### Installation

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

### Materials

S: 316L secondary remelt
SHP: 316L body and nozzle Hastelloy® C22 poppet
H: Hastlloy body

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
250: 3500 psig

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Cv Option

None: Cv=0.09
HF: Cv=0.15

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max

## Ordering Example

**VSR - 510UCS - 250 - 10 - FV4 - P - P - FV4**

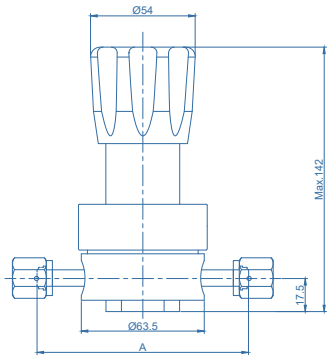
**1 - 2 - 3 - 4**

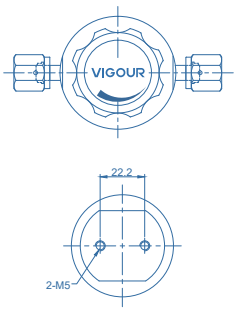
# Single Stage Pressure Regulators
# VSR-610UB Series

## Product Feature

- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested

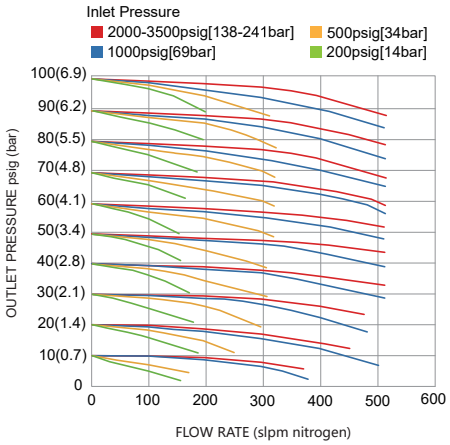
## Dimensions (mm)

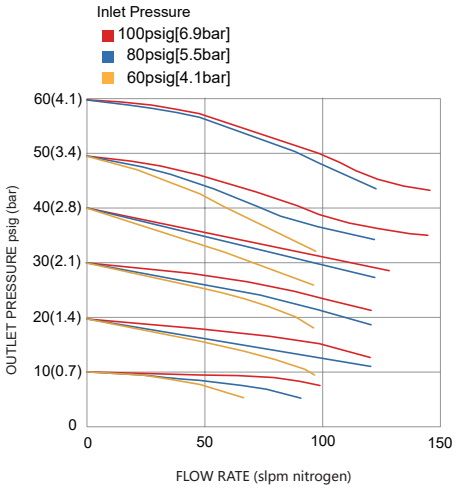



| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4<br>MV4 | 4.30 | (109.2) |
| TW4 | 3.46 | (87.9) |
| FV6<br>MV6 | 5.22 | (132.6) |
| TW6 | 4.00 | (101.6) |
| FV8<br>MV8 | 5.22 | (132.6) |
| TW8 | 4.00 | (101.6) |

## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100 psig (1/2/4/7bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" or 1/2" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.13 |
| Supply pressure effect: | 0.25 psig rise in delivery pressure per 100 psig source pressure drop |
| Weight: | approx. 1.54kg (depending on connections or options) |



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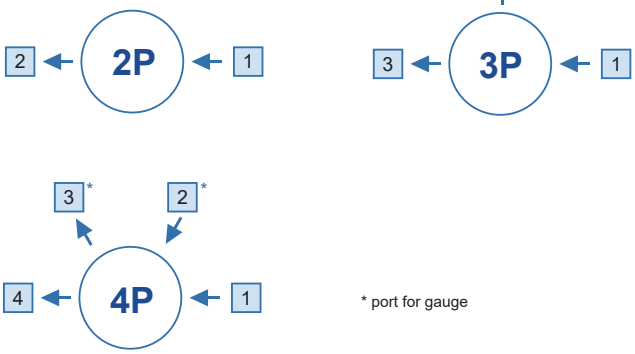
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | FV8: 1/2" VFS female | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | MV8: 1/2" VFS male | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | IFV4: 1/4" (gauge female threaded connection | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

Port Selection

**VSR - 610UBPS - 250 - V2 - 4P - 1 - 2 - 3 - 4 - R7 -VS**

### Installation
None: bottom mount
P: panel mount
* Panel hole Φ37mm

### Materials
S: 316L

### Inlet Pressure
20: 300 psig
250: 3500 psig

### Port Config
2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure
V1: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
1: to 10 psig
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option
None: PCTFE
VS: Vespel®

### Surface Finish
None: 10 μin. Ra
R25: 25 μin. Ra

## Ordering Example

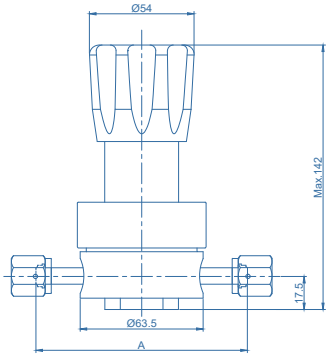
**VSR - 610UBS - 250 - V4 - 2P - MV4 - FV4**
**1 - 2**

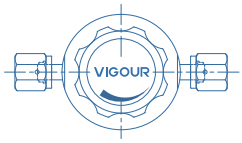
# Single Stage Pressure Regulators
# VSR-610UC Series

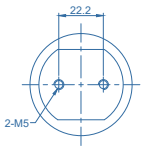
## Product Feature

- Single-stage pressure regulator
- 15μin. Ra max, 10μin. Ra average surface finish (10μin. Ra max, 7μin. Ra max, 5μin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested

## Dimensions (mm)

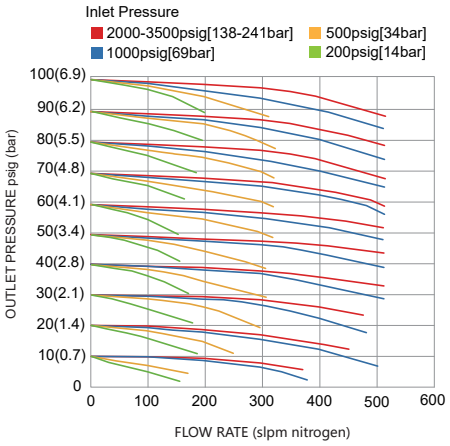


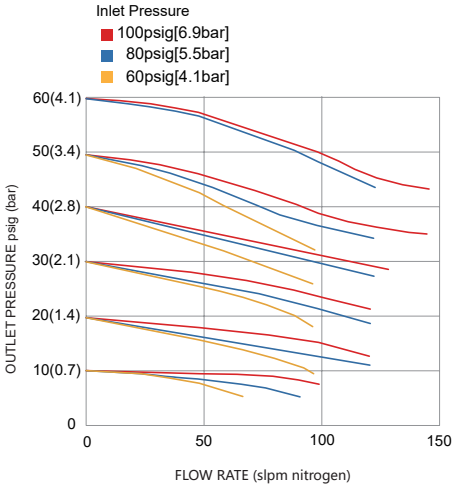




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4<br>MV4 | 4.30 | (109.2) |
| TW4 | 3.46 | (87.9) |
| FV6<br>MV6 | 5.22 | (132.6) |
| TW6 | 4.00 | (101.6) |
| FV8<br>MV8 | 5.22 | (132.6) |
| TW8 | 4.00 | (101.6) |

## Flowchart




## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max.. 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100 psig (1/2/4/7bar) |
| Surface finish: | 15μin. Ra max / 10μin. Ra avg (10μin. Ra max., 7μin. Ra max., 5μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" or 1/2" VFS fitting or tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.13 |
| Supply pressure effect: | 0.25 psig rise in delivery pressure per 100 psig source pressure drop |
| Weight: | approx. 1.54kg (depending on connections or options) |



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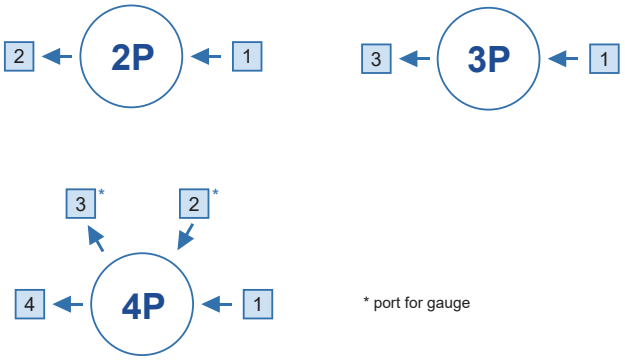
## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | FV8: 1/2" VFS female | TW4: 1/4" tube weld |
| MV4: 1/4" VFS male | MV8: 1/2" VFS male | TW6: 3/8" tube weld |
| FV6: 3/8" VFS female | IFV4: 1/4" (gauge female threaded connection | TW8: 1/2" tube weld |
| MV6: 3/8" VFS male | machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

### Port Selection

**VSR - 610UCPS - 250 - V2 - 4P - 1 - 2 - 3 - 4 - R5 - VS**

### Installation

None: bottom mount
P: panel mount

* Panel hole Φ37mm

### Materials

S: 316L secondary remelt body 316L poppet and nozzle
SH: 316L secondary remelt body Hastelloy® C22 internals

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

20: 300 psig
250: 3500 psig

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

### Outlet Pressure

V1: Vac to 10 psig*
V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
1: to 10 psig
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max
R7: 7 μin. Ra max
R5: 5 μin. Ra max

## Ordering Example

**VSR - 610UCS - 250 - V4 - 2P - MV4 - FV4**

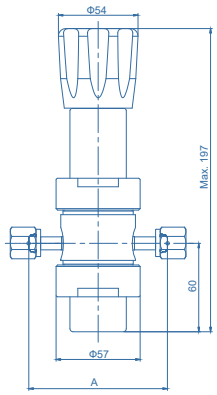
**1 - 2**

# Dual Stage Pressure Regulators
# VSR-710UB Series

## Product Feature

- Dual-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

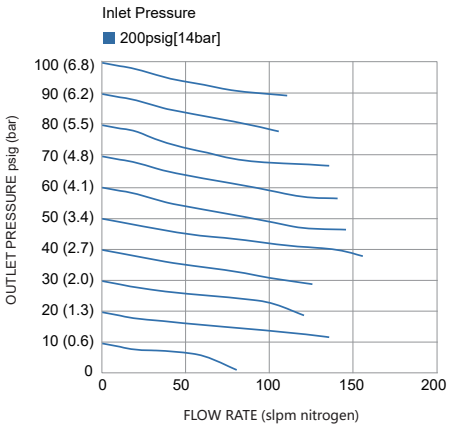
## Dimensions (mm)





| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4<br>MV4 | 3.70 | (94.0) |
| FV6<br>MV6 | 4.70 | (119.4) |

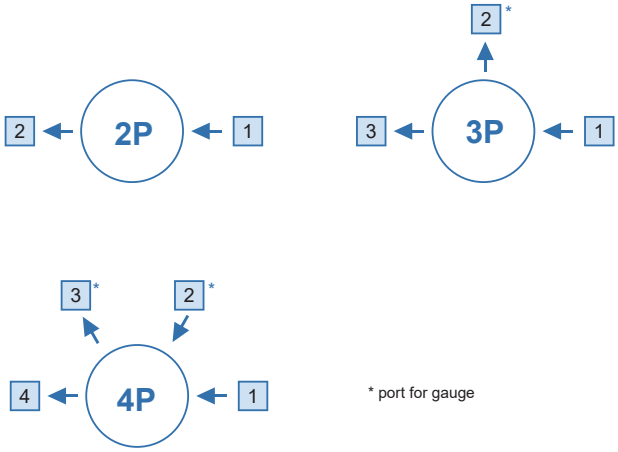
## Flowchart




## Technical Data

| | |
|---|---|
| Type: | Dual-stage |
| Inlet pressure $P_1$: | 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100 psig (2/4/7bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.05 |
| Supply pressure effect: | 0.05 psig rise in delivery pressure per 100 psig source pressure drop |
| Weight: | approx. 2.5kg (depending on connections or options) |

## Ordering Information


* port for gauge

### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

### Port Selection

**VSR - 710UB PS - 250 - 10 - 4P - 1 - 2 - 3 - 4 -R25-VS**

### Installation

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

### Materials

S: 316L
SHP: 316L body
Hastelloy® C22 poppet and nozzle

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

250: 3500 psig

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 10 μin. Ra
R25: 25 μin. Ra

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

## Ordering Example

**VSR - 710UBS - 250 - 10 - FV4 - P - P - FV4**

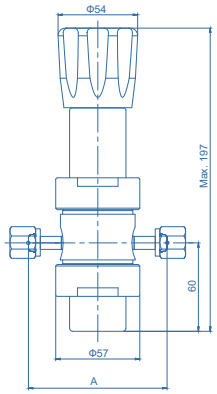
**1 - 2 - 3 - 4**

# Dual Stage Pressure Regulators
# VSR-710UC Series

## Product Feature

- Dual-stage pressure regulator
- 15µin. Ra max, 10µin Ra average surface finish
  (10µin. Ra max, 7µin. Ra max. 5µin. Ra max optional)
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

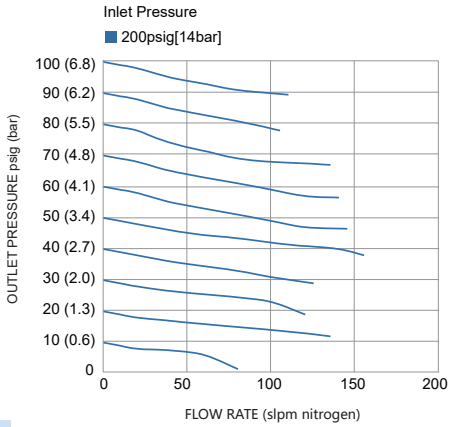
## Dimensions (mm)





| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV4<br>MV4 | 3.70 | (94.0) |
| FV6<br>MV6 | 4.70 | (119.4) |

## Flowchart




## Technical Data

| | |
|---|---|
| Type: | Dual-stage |
| Inlet pressure $P_1$: | 3500 psig (250bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100 psig (2/4/7bar) |
| Surface finish: | 15µin. Ra max, 10µin Ra average surface finish<br>(10µin. Ra max, 7µin. Ra max. 5µin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" / 3/8" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=0.05 |
| Supply pressure effect: | 0.05 psig rise in delivery pressure per<br>100 psig source pressure drop |
| Weight: | approx. 2.5kg (depending on connections or options) |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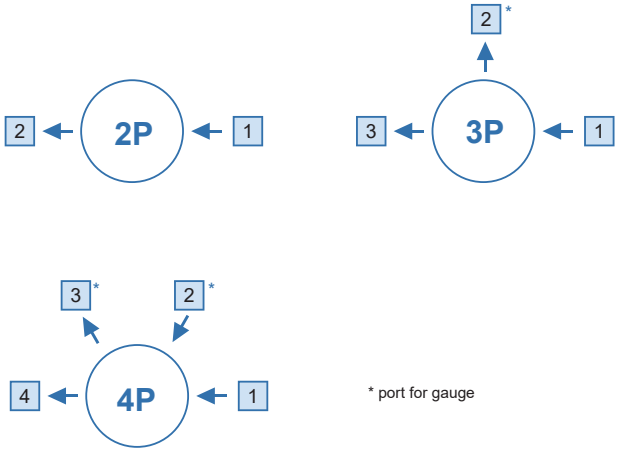
## Ordering Information


### Inlet/outlet Connection

| | | |
|---|---|---|
| FV4: 1/4" VFS female | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| MV4: 1/4" VFS male | TW4: 1/4" tube weld | IP: gauge (IFV4 fitting) |
| FV6: 3/8" VFS female | TW6: 3/8" tube weld | |
| MV6: 3/8" VFS male | | |

* Other connection standard,consult factory

### Port Selection

**VSR - 710UC PS - 250 - 10 - 4P - 1 - 2 - 3 - 4 - R25 - VS**

### Installation

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

### Materials

S: 316L
SHP: 316L body
Hastelloy® C22 poppet and nozzle

*All options diaphragm material is Hastelloy® C276

### Inlet Pressure

250: 3500 psig

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 15 µin. Ra max
R10: 10 µin. Ra max
R7: 7 µin. Ra max
R5: 5 µin. Ra max

### Port Config

2P: 2 ports
3P: 3 ports
4P: 4 ports

## Ordering Example

**VSR - 710UCS - 250 - 10 - FV4 - P - P - FV4**

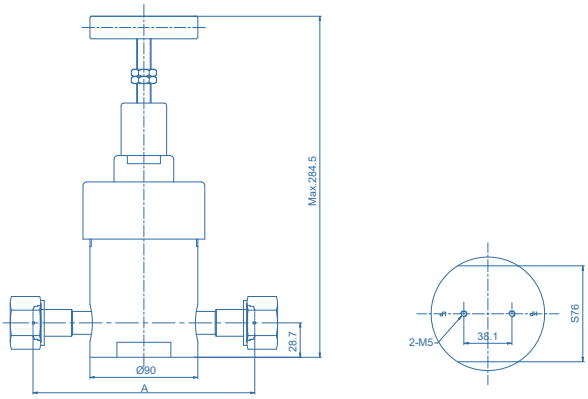
**1 - 2 - 3 - 4**

# Single Stage Pressure Regulators
# VSR-910UB Series

## Product Feature

- Single-stage pressure regulator
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- 15μin. Ra max. 10μin Ra max optional
- design for bulk special gas supply system
- Tied-diaphragm design with bellows sensing element
- Metal-to-metal seal to atmosphere
- 100% helium-leak-tested

## Dimensions (mm)

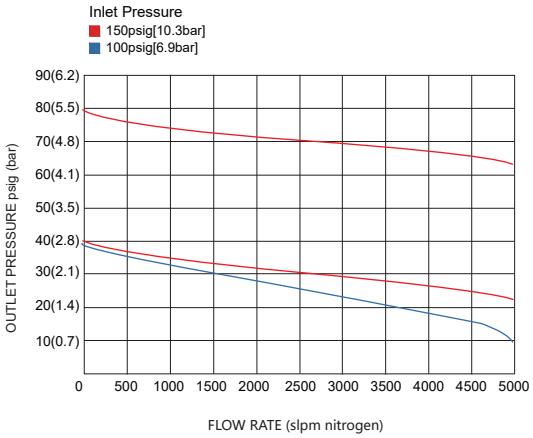



| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV8 | 6.22 | (158.0) |
| MV8 | | |
| TW8 | 9.50 | (241.4) |
| FV12 | 7.28 | (185.0) |
| MV12 | | |
| TW12 | 9.50 | (241.4) |
| FV16 | 7.84 | (199.2) |
| MV16 | | |
| TW16 | 9.50 | (241.4) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 15μin. Ra max |
| | 10μin. Ra max (optional) |
| Materials | |
| Body: | SS 316L |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C22 |
| Inlets and Outlets: | 1/2" / 3/4" or 1" VFS fitting or tube weld |
| Bonnet port: | 1/8" FNPT(optional) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=3.0 / Cv=4.0 |
| Weight: | approx. 6.7kg (depending on connections or options) |

## Flowchart





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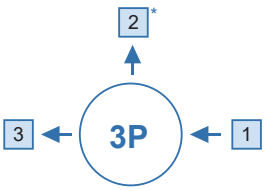
## Ordering Information






* port for gauge

### Inlet/Outlet Connection

| | | |
|---|---|---|
| FV8: 1/2" VFS female | FV16: 1" VFS female | TW8: 1/2" tube weld |
| MV8: 1/2" VFS male | MV16: 1" VFS male | TW12: 3/4" tube weld |
| FV12: 3/4" VFS female | MV4: 1/4" VFS male | TW16: 1" tube weld |
| MV12: 3/4" VFS male | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4" VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

Port Selection

**VSR - 910UBS - 55 - 4 - 3P - 1 - 2 - 3 - R10 - VS**

### Materials

S: 316L

### Inlet Pressure

55: 800 psig (Cv=4.0)
117: 1700 psig (Cv=3.0)
200: 3000 psig* (Cv=3.0)

* 3000 psig: The VS option must be selected.

### Port Config

2P: 2 port
3P: 3 port

### Outlet Pressure

V2: Vac to 30 psig*
V4: Vac to 60 psig*
V7: Vac to 100 psig*
V10: Vac to 150 psig*
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve seat Option

None: PCTFE
VS: Vespel®

### Surface Finish

None: 15 μin. Ra max
R10: 10 μin. Ra max

## Ordering Example

**VSR - 910UBS - 55 - 10 - 2P - MV12 - FV12**

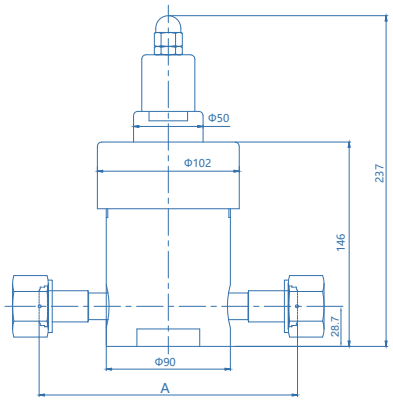
**1 - 2**

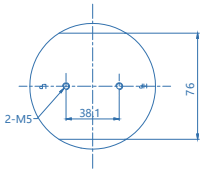
# Single Stage Pressure Regulators
# VSR-911UB Series

## Product Feature

- Single-stage pressure regulator
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- 15μin. Ra max. 10μin Ra max optional
- design for bulk special gas supply system
- Tied-diaphragm design with bellows sensing element
- Metal-to-metal seal to atmosphere
- 100% helium-leak-tested

## Dimensions (mm)



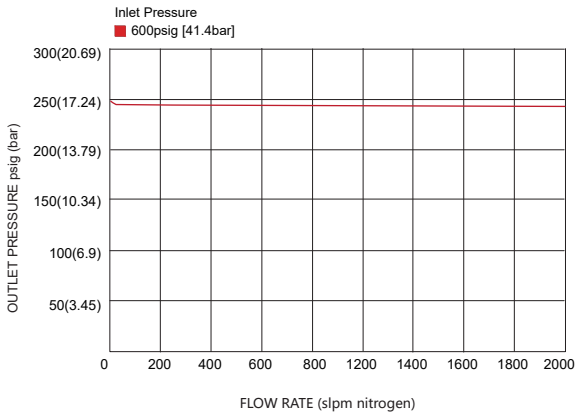




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV8<br>MV8 | 6.22 | (158.0) |
| TW8 | 9.50 | (241.4) |
| FV12<br>MV12 | 7.28 | (185.0) |
| TW12 | 9.50 | (241.4) |
| FV16<br>MV16 | 7.84 | (199.2) |
| TW16 | 9.50 | (241.4) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | Max. 3000 psig (200bar) |
| Outlet pressure $P_2$: | 300 psig (21bar) |
| Surface finish: | 15μin. Ra max |
| | 10μin. Ra max (optional) |
| Materials | |
| Body: | SS 316L |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C22 |
| Inlets and Outlets: | 1/2" / 3/4" or 1" face seal or tube weld |
| Bonnet port: | 1/8" FNPT(option) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=3.0 / Cv=4.0 |
| Weight: | approx. 6.0kg (depending on connections or options) |

## Flowchart



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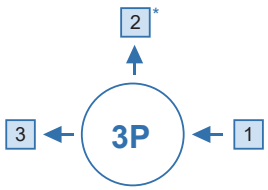
## Ordering Information






* port for gauge

**Inlet/Outlet Connection**

| | | |
|---|---|---|
| FV8: 1/2” VFS female | FV16: 1” VFS female | TW8: 1/2" tube weld |
| MV8: 1/2” VFS male | MV16: 1” VFS male | TW12: 3/4" tube weld |
| FV12: 3/4” VFS female | MV4: 1/4” VFS male | TW16: 1" tube weld |
| MV12: 3/4” VFS male | IFV4: 1/4" (gauge female threaded connection machined on the body) | P: gauge (1/4” VFS fitting) |
| | | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

**Port Selection**

**VSR - 911UBS - 55 - P21 - 3P - 1 - 2 - 3 - R10 - VS**

**Materials**

S: 316L

**Inlet Pressure**

55: 800 psig (Cv=4.0)
117: 1700 psig (Cv=3.0)
200: 3000 psig* (Cv=3.0)

* 3000 psig: The VS option must be selected.

**Port Config**

2P: 2 port
3P: 3 port

**Outlet Pressure**

P21: Preset to 300 psig*

* 300 psig outlet pressure preset at 800 psig inlet pressure.

**Valve seat Option**

None: PCTFE
VS: Vespel®

**Surface Finish**

None: 15 µin. Ra max
R10: 10 µin. Ra max

## Ordering Example

**VSR - 911UBS - 55 - P21 - 2P - MV12 - FV12**

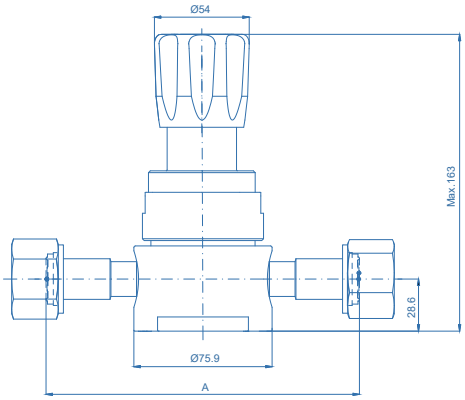
**1 - 2**

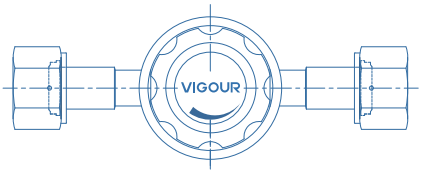
# Single Stage Pressure Regulators
# VSR-920UB Series

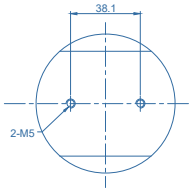
## Product Feature

- Single-stage pressure regulator
- 10µin. Ra surface finish
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 2000 slpm
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

## Dimensions (mm)



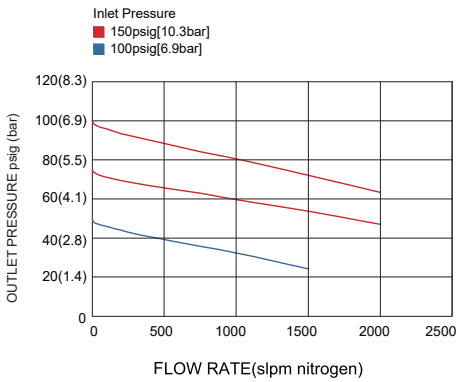




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV12 | 6.78 | (172.2) |
| MV12 | | |
| TW12 | 6.00 | (152.4) |
| FV16 | 7.34 | (186.4) |
| MV16 | | |
| TW16 | 6.00 | (152.4) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | 300 psig (20bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 10µin. Ra |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PFA (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 3/4" / 1" VFS fitting or tube weld |
| Bonnet port: | 1/8" FNPT(option) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=1.6 |
| Weight: | approx. 2.7kg (depending on connections or options) |
| Supply pressure effect: | 7 psig rise in delivery pressure per 100 psig source pressure drop |

## Flowchart



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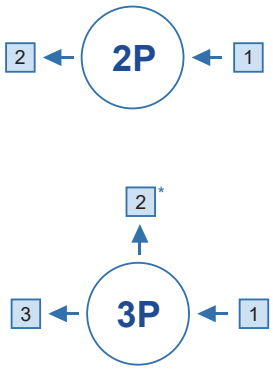
## Ordering Information


* port for gauge

**Inlet/Outlet Connection**

| | | |
|---|---|---|
| FV12: 3/4" VFS female | FV4: 1/4" VFS female | TW12: 3/4" tube weld |
| MV12: 3/4" VFS male | MV4: 1/4" VFS male | TW16: 1" tube weld |
| FV16: 1" VFS female | IFV4: 1/4" (gauge female threaded connection | P: gauge (1/4" VFS fitting) |
| MV16: 1" VFS male | machined on the body) | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

**Port Selection**

**VSR - 920UBPS - 20 - V4 - 3P - 1 - 2 - 3 - VS**

**Installation**

None: bottom mount
P: panel mount*
BP: bonnet port (1/8" FNPT)

* Panel hole Φ39.6mm

**Materials**

S: 316L

**Inlet Pressure**

20: 300 psig

**Outlet Pressure**

V2: Vac to 30 psig
V4: Vac to 60 psig
V7: Vac to 100 psig
V10: Vac to 150 psig
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

**Valve Seat Option**

None: PFA (standard)
VS: Vespel®

**Port Config**

2P: 2 ports
3P: 3 ports

## Ordering Example

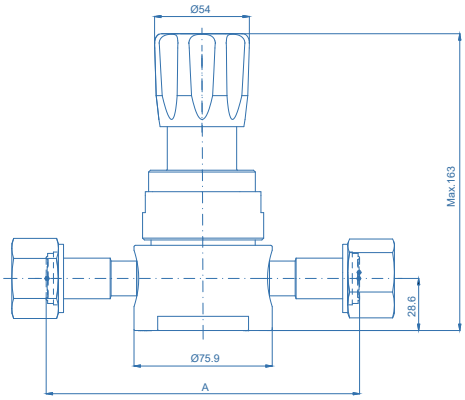
**VSR - 920UBS - 20 - 10 - 2P - MV12 - FV12**
**1 - 2**

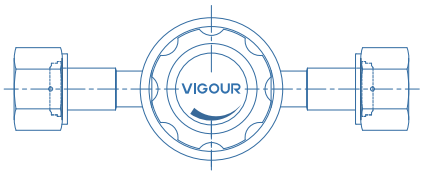
# Single Stage Pressure Regulators
# VSR-920UC Series

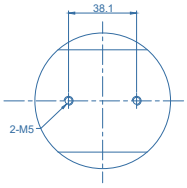
## Product Feature

- Single-stage pressure regulator
- 15μin. Ra max. 10μin Ra max optional
- Minimized internal volume for short purge times
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001A process specification
- Internal connectors for pressure gauges
- Flow capacity: to 2000 slpm
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- 100% helium-leak-tested
- Tied-diaphragm design

## Dimensions (mm)



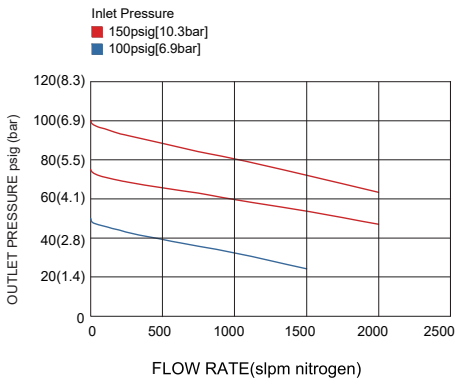




| Connections | A | |
|---|---|---|
| | inch | (mm) |
| FV12 | 6.78 | (172.2) |
| MV12 | | |
| TW12 | 6.00 | (152.4) |
| FV16 | 7.34 | (186.4) |
| MV16 | | |
| TW16 | 6.00 | (152.4) |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | 300 psig (20bar) |
| Outlet pressure $P_2$: | Vac to 30/60/100/150 psig (2/4/7/10bar) |
| Surface finish: | 15μin. Ra max / 10μin. Ra avg (10μin. Ra max optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PFA (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 3/4" / 1" VFS fitting or tube weld |
| Bonnet port: | 1/8" FNPT(option) |
| Temperature range: | -40°F to +160°F (-40°C to +71°C) |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |
| Flow capacity: | Cv=1.6 |
| Weight: | approx. 2.7kg (depending on connections or options) |
| Supply pressure effect: | 7 psig rise in delivery pressure per 100 psig source pressure drop |

## Flowchart



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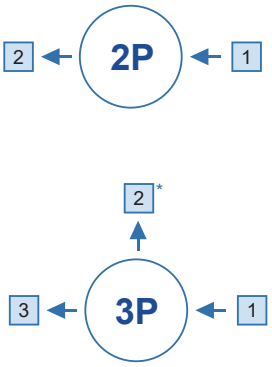
## Ordering Information


* port for gauge

### Inlet/Outlet Connection

| | | |
|---|---|---|
| FV12: 3/4" VFS female | FV4: 1/4" VFS female | TW12: 3/4" tube weld |
| MV12: 3/4" VFS male | MV4: 1/4" VFS male | TW16: 1" tube weld |
| FV16: 1" VFS female | IFV4: 1/4" (gauge female threaded connection | P: gauge (1/4" VFS fitting) |
| MV16: 1" VFS male | machined on the body) | IP: gauge (IFV4 fitting) |

* Other connection standard,consult factory

Port Selection

**VSR - 920UC PS - 20 - V4 - 3P - 1 - 2 - 3 - VS**

### Installation

None: bottom mount
P: panel mount*
BP: bonnet port (1/8" FNPT)

* Panel hole Φ39.6mm

### Materials

S: 316L

### Inlet Pressure

20: 300 psig

### Outlet Pressure

V2: Vac to 30 psig
V4: Vac to 60 psig
V7: Vac to 100 psig
V10: Vac to 150 psig
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

* With the V option, the negative pressure can not be adjusted, only the pressure gauge shows the negative pressure.

### Valve Seat Option

None: PFA (standard)
VS: Vespel®

### Port Config

2P: 2 ports
3P: 3 ports

## Ordering Example

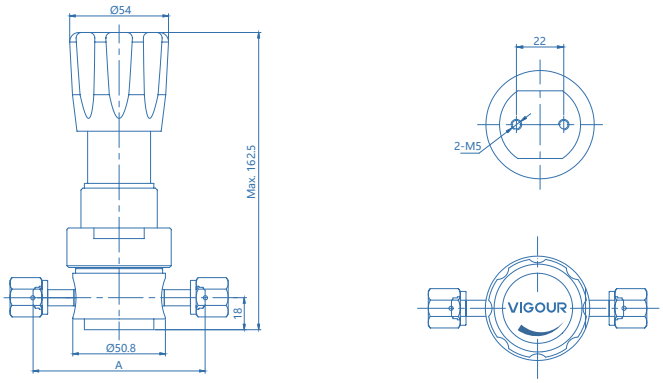
**VSR - 920UCS - 20 - 10 - 2P - MV12 - FV12**
**1 - 2**

# High Pressure Regulators
# VSR-930UB Series

## Product Feature

- Single-stage pressure regulator
- 10μin. Ra surface finish (25μin. Ra optional)
- Minimized internal volume for short purge times
- Piston sensing element
- All materials used meet ASTM A479 / A484 / A276 standards
- The product is fabricated in compliance with the VS001B process specification
- Internal connectors for pressure gauges
- Flow capacity: to 30 slpm (standard), to 120 slpm (optional)
- High control accuracy
- Metal-to-metal seal to atmosphere
- Simple outlet pressure limitation by hand-wheel
- Applies only to inert gases

## Dimensions (mm)

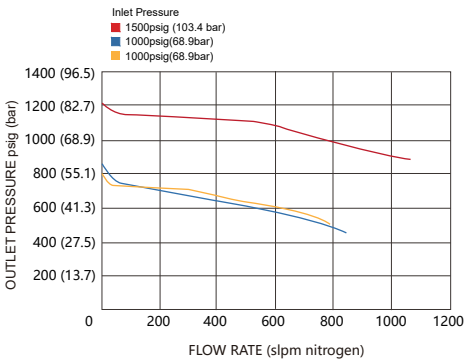



| Connections | A | |
|---|---|---|
| | inch | mm |
| FV4 | 3.70 | 94 |
| MV4 | | |

## Technical Data

| | |
|---|---|
| Type: | single-stage |
| Inlet pressure $P_1$: | 5800 psig (400bar) |
| Outlet pressure $P_2$: | 500/2500 psig (35/170bar) |
| Surface finish: | 10μin. Ra (25μin. Ra optional) |
| Materials | |
| Body: | see ordering info |
| Valve seat: | PCTFE (Vespel® optional) |
| Diaphragm: | Hastelloy® C276 |
| Inlets and Outlets: | 1/4" VFS fitting and tube weld |
| Bonnet port: | 1/8" NPT (on panel mount option, bonnet port is not threaded) |
| Temperature range: | 0°F to +140°F (-18°C to +60°C) |
| Leak rate: | Bubble tight |
| Flow capacity: | Cv=0.09 (Cv=0.15 optional) |
| Supply pressure effect: | 0.35 psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.09<br>0.5psig rise in delivery pressure per 100 psig source pressure drop @Cv=0.15 |
| Weight: | approx. 2.0kg (depending on connections or options) |

## Flowchart





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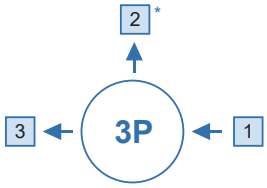
## Ordering Information






* port for gauge

**Inlet/outlet Connection**

FV4: 1/4" VFS female
MV4: 1/4" VFS male
IFV4: 1/4" (gauge female threaded connection machined on the body)
TW4: 1/4" tube weld
P: gauge (1/4" VFS fitting)
IP: gauge (IFV4 fitting)

* Other connection standard,consult factory

**Port Selection**

**VSR - 930UBPS - 400 - 170 - 4P - 1 - 2 - 3 - 4 - HF - VS - X**

**Installation**

None: bottom mount
P: panel mount *

* Panel hole Φ36mm

**Materials**

S: 316L

**Inlet Pressure**

400: 5800 psig

**Port Config**

2P: 2 ports
3P: 3 ports

**Outlet Pressure**

35: 25~500 psig
170: 100 ~ 2500 psig

**Option**

None: Self relieving (Venting)
X: Non-relieving (non-venting)

**Valve seat Option**

None: PCTFE
VS: Vespel®

**Cv Option**

None: Cv=0.09
HF: Cv=0.15*

*The HF option uses only Vespel® valve seats.

## Ordering Example

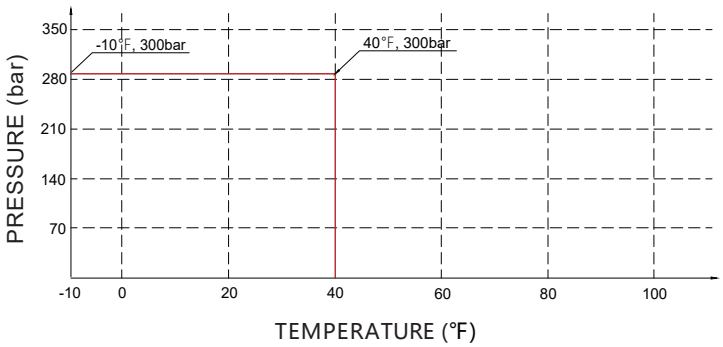
**VSR - 930UBS - 400 - 170 - FV4 - P - FV4**
**1 - 2 - 3**

# Diaphragm Valves
# VDV31UA Series

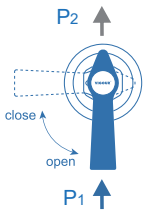
## Product Feature

- Diaphragm valve
- Stainless steel 316L body for corrosive gases
- Inlet pressure max 4500 psig (300 bar)
- The product is fabricated in compliance with the VS001B process specification
- Left or Right lever direction for Shutoff
- Wide range of inlets and outlets
- Metal-to-metal seal to atmosphere

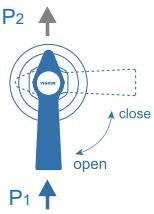

## Temperature / Pressure Rating




## Schematic Drawing




right lever for shutoff

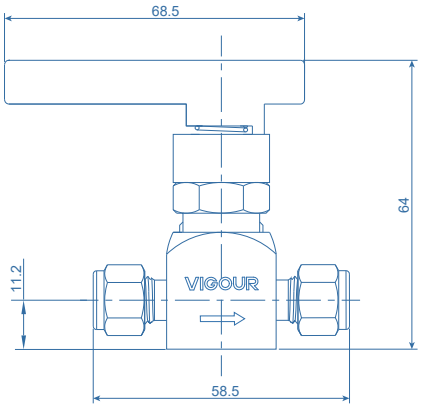


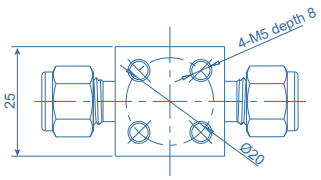

left lever for shutoff

## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 4500 psig (300bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Materials | |
| Body: | 316L |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=0.1 |
| Orifice: | Φ2.7mm |
| Weight: | approx. 0.25kg |

## Dimensions (mm)




## Ordering Information

**VDV31UAS - 04 - 04 - L**

**Materials**
S: 316L

**Inlets / Outlets**
02: 1/8” tube fitting
04: 1/4” tube fitting
6M: 6mm tube fitting
8M: 8mm tube fitting

**Lever**
None: right lever for shutoff
L: left lever for shutoff

# Diaphragm Valves
# VDV32UA Series

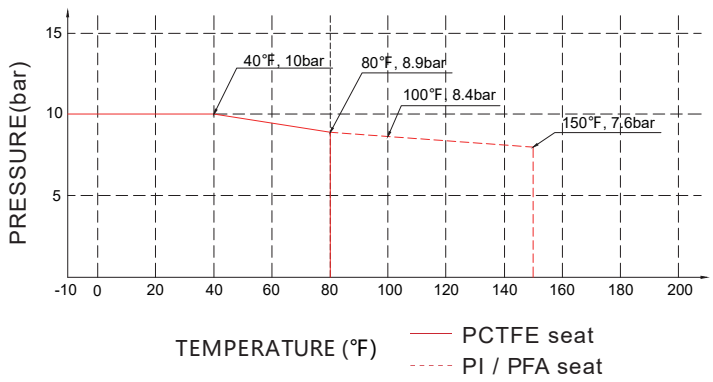
## Product Feature

- Suitable for high purity, flammable or toxic fluid gases
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001B process specification
- Valve open and closed opsition is easily visible at a glance
- Excellent gas displacement characteristics
- Standard seat material is PCTFE, Polyimide/PFA is option

1/4 Type

1/4 Type

## Temperature / Pressure Rating



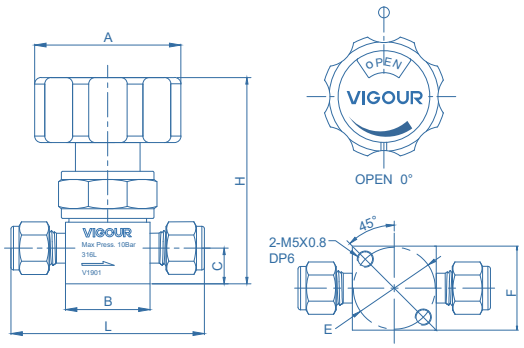

1/2 Type

1/2 Type

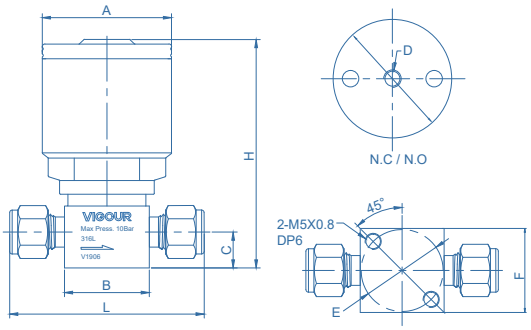
## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 150 psig (10bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 176°F (-10°C ~ 80°C) |
| Materials | |
| Body: | 316L |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4”Cv=0.3 3/8”1/2”Cv=0.65 |
| Weight: | approx. 0.27kg (depending on connections or options) |

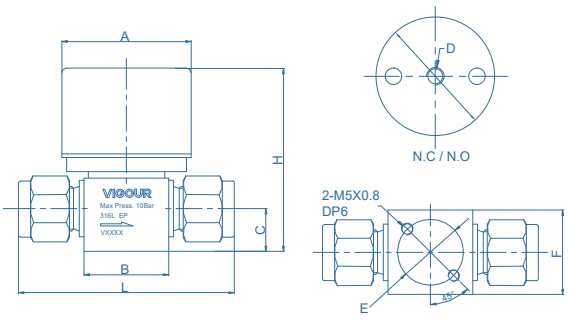
## Dimensions (mm)




1/4, 3/8, 1/2 manual actuator




1/4 pneumatic actuator




3/8, 1/2 pneumatic actuator

### manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" Tube Fitting | 4.4 | Φ45 | 26 | 11 | Φ25.4 | 26 | 60 | 64 |
| 3/8" Tube Fitting | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 78.8 | 78 |
| 1/2" Tube Fitting | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 83.6 | 78 |

### pneumatic actuator, normally opened / normally closed

| End Comections | Actuator | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | L | H |
| 1/4" Tube Fitting | N.C / N.O | 4.4 | Φ39.6 | 26 | 11 | M5x0.8 | Φ25.4 | 26 | 60 | 70 |
| 3/8" Tube Fitting | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 78.8 | 78 |
| 1/2" Tube Fitting | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 83.6 | 78 |

1/4", 3/8", 1/2" tube fitting dimensions for reference, other connections please contact factory.

## Ordering information

**VDV32UAS - M - 04 - 04 - PA**

**Materials**
S: 316L

**Actuator**
M: manual actuator
PO: pneumatic actuator, normally opened
PC: pneumatic actuator, normally closed

**Valve Seat Option**
None: PCTFE (standard)
VS: Vespel®
PA: PFA

**End Connection**
04: 1/4" tube fitting
06: 3/8" tube fitting
08: 1/2" tube fitting

* Other connection standard,consult factory

# Diaphragm Valves
# VDV33UA Series

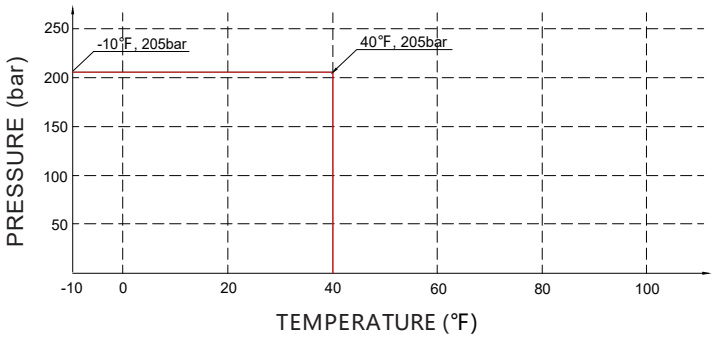
## Product Feature

- Suitable for high purity, flammable or toxic gases
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001B process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- Standard seat material is PCTFE, Polyimide/PFA is option

1/4 Type

1/4 Type

## Temperature / Pressure Rating



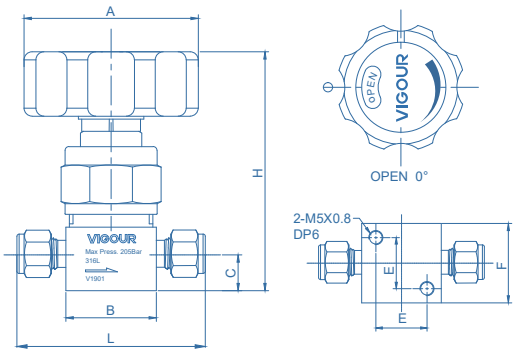

1/2 Type

1/2 Type

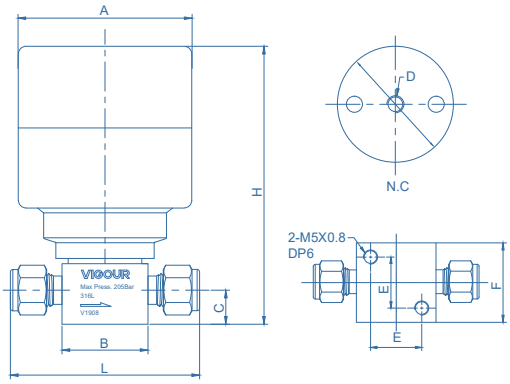
## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 3000 psig (200bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Materials | |
| Body: | 316L |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4”Cv=0.1 3/8”1/2”Cv=0.5 |
| Weight: | approx. 0.27kg (depending on connections or options) |

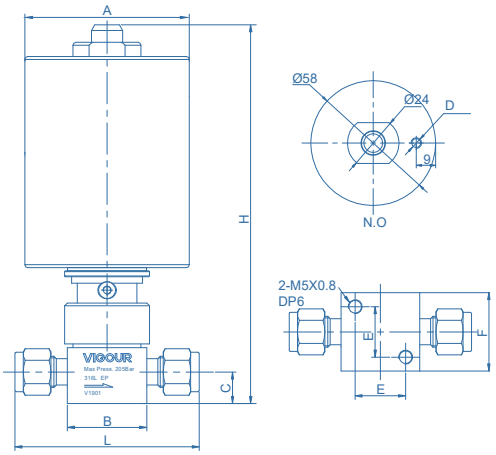
## Dimensions (mm)




1/4, 3/8, 1/2 manual actuator




1/4, 3/8, 1/2 pneumatic actuator (N.C)




1/4 pneumatic actuator (N.O)

### manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" Tube Fitting | 4.4 | Φ54 | 28 | 11.1 | 18 | 28 | 65 | 74 |
| 3/8" Tube Fitting | 7 | Φ54 | 42 | 18.2 | 27 | 38 | 84.8 | 86 |
| 1/2" Tube Fitting | 7 | Φ54 | 42 | 18.2 | 27 | 38 | 89.6 | 86 |

### pneumatic actuator, normally opened / normally closed

| End Comections | Actuator | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | L | H |
| 1/4" Tube Fitting | N.C | 4.4 | Φ56.5 | 28 | 11.1 | M5x0.8 | 18 | 28 | 65 | 90.5 |
| 1/4" Tube Fitting | N.O | 4.4 | Φ58 | 28 | 11.1 | M5x0.8 | 18 | 28 | 65 | 134 |
| 3/8" Tube Fitting | N.C | 7 | Φ56.5 | 42 | 18.2 | RC 1/8 | 27 | 38 | 84.8 | 105 |
| 1/2" Tube Fitting | N.C | 7 | Φ56.5 | 42 | 18.2 | M5x0.8 | 27 | 38 | 89.6 | 105 |

1/4", 3/8", 1/2" tube fitting dimensions for reference, other connections please contact factory.

## Ordering Information

**VDV33UAS - M - 04 - 04 - PA**

### Materials
S: 316L

### Actuator
M: manual actuator
PO: pneumatic actuator,normally opened *
PC: pneumatic actuator,normally closed

*Normally opened available with connetion size 1/4 thch.

### Valve Seat Option
None: PCTFE (standard)
PA: PFA
VS: Vespel®

### End Connection
F4: 1/4" NPT(F)
04: 1/4" tube fitting
06: 3/8" tube fitting
08: 1/2" tube fitting

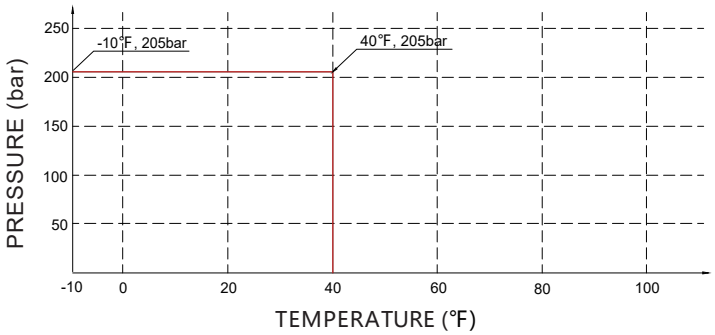
* Other connection standard,consult factory

# Diaphragm Valves
# VDV31UB Series

## Product Feature

- Quarter-turn ON/OFF, providing easy operation
- Handle shape provides visual indication of OPEN and CLOSE position
- The product is fabricated in compliance with the VS001B process specification
- Available on high and low-pressure models

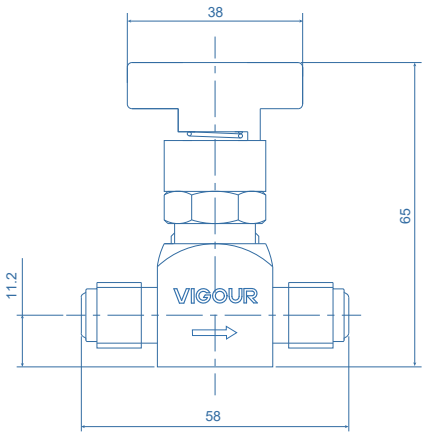

## Temperature / Pressure Rating

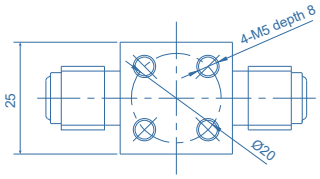



## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 3000 psig (200bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Materials | |
| Body: | 316L secondary remelt |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=0.1 |
| Orifice: | Φ4.0mm |
| Weight: | approx. 0.25kg |

## Dimensions (mm)




## Ordering Information

**VDV31UBS - MV4 - MV4**

**Materials**

S: 316L
SLV: 316L secondary remelt

**End Connection**

MV4: 1/4" VFS male

* Other connection standard,consult factory

# Diaphragm Valves
# VDV32UB Series

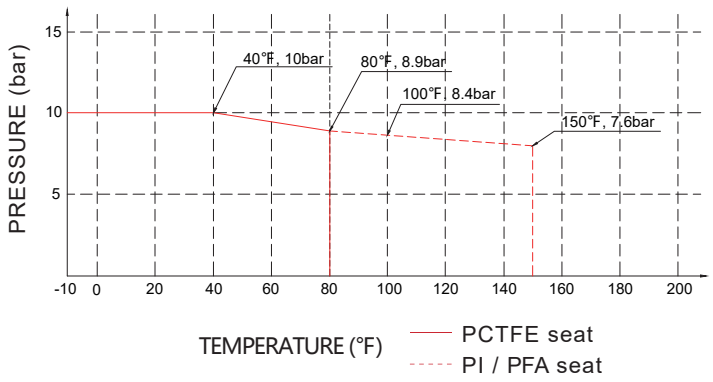
## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide/PFA is option

1/4 Type

1/4 Type

## Temperature / Pressure Rating



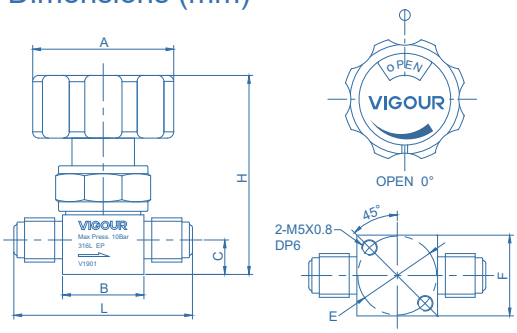

1/2 Type

1/2 Type

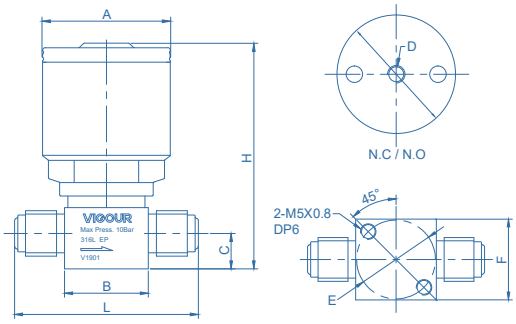
## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 150 psig (10bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 176°F (-10°C ~ 80°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4" Cv=0.3  3/8" 1/2" Cv=0.65 |
| Weight: | approx. 0.27kg (depending on connections or options) |

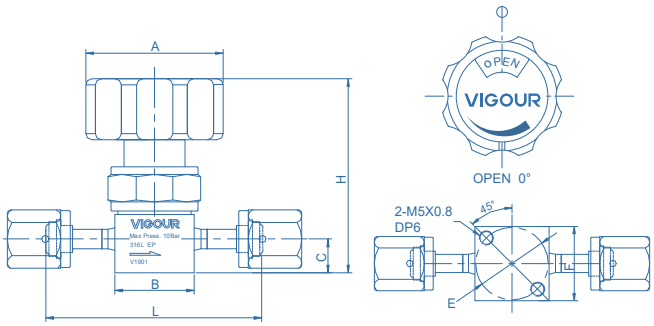
## Dimensions (mm)



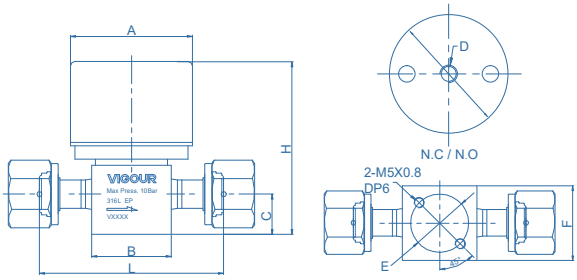

1/4, 3/8, 1/2 manual actuator (VFS male)



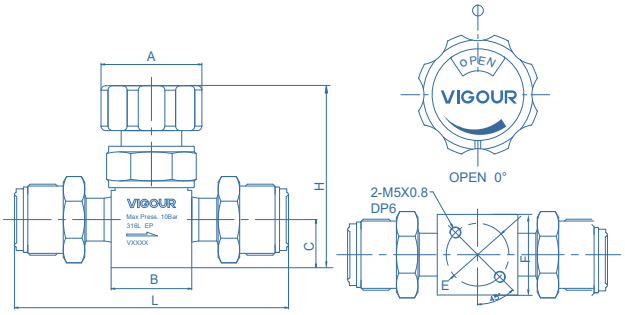

1/4 pneumatic actuator (VFS male)




1/4, 1/2, 3/4 manual actuator (VFS female)




1/2 pneumatic actuator (VFS female)




3/4 manual actuator (VFS male)

### manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ45 | 26 | 11 | Φ25.4 | 26 | 57 | 64 |
| 1/4" VFS female | 4.4 | Φ45 | 26 | 11 | Φ25.4 | 26 | 71 | 64 |
| 3/8" VFS male | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS male | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS female | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 83 | 78 |
| 3/4" VFS male | 7 | Φ45 | 36 | 21.5 | Φ28 | 36 | 122.3 | 82 |
| 3/4" VFS female | 7 | Φ45 | 36 | 21.5 | Φ28 | 36 | 106.3 | 82 |

### pneumatic actuator, normally opened / normally closed

| End Comections | Actuator | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | N.C / N.O | 4.4 | Φ39.6 | 26 | 11 | M5x0.8 | Φ25.4 | 26 | 57 | 70 |
| 1/4" VFS female | N.C / N.O | 4.4 | Φ39.6 | 26 | 11 | M5x0.8 | Φ25.4 | 26 | 71 | 70 |
| 3/8" VFS male | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS male | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS female | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 83 | 78 |

## Ordering information

**VDV32UBS - M - A - MV4 - MV4 - PA - IS**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

### Flow Circuit Diagram
For details, refer to the flow circuit diagram on page 54.

### Option
None: Standard
IS: Switch Position Indicator

### Valve Seat Option
None: PCTFE(standard)
VS: Vespel®
PA: PFA

### End Connection
MV4: 1/4" VFS male
FV4: 1/4" VFS female
TW4: 1/4" tube weld
MV6: 1/2" VFS male 3/8" O.D.
FV6: 1/2" VFS female 3/8" O.D.
TW6: 3/8" tube weld
MV8: 1/2" VFS male
FV8: 1/2" VFS female
TW8: 1/2" tube weld
MV12: 3/4" VFS male

* Other connection standard,consult factory

# Diaphragm Valves
# VDV33UB Series

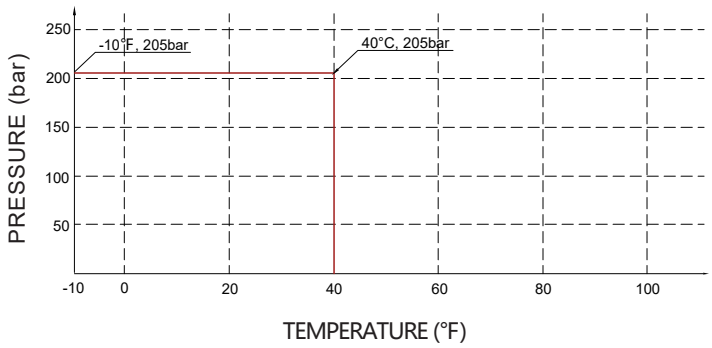
## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide/PFA is option


1/4 Type

1/4 Type

## Temperature / Pressure Rating





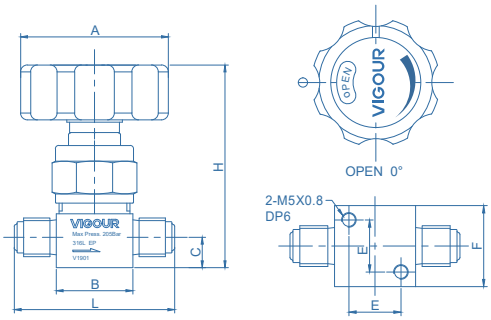
1/2 Type


1/2 Type

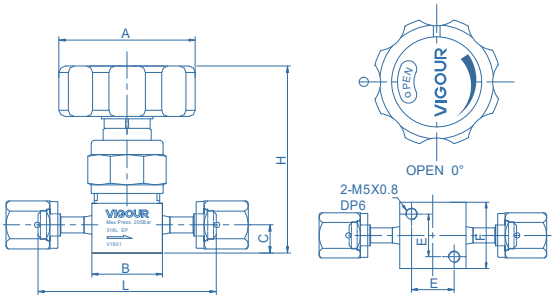
## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 3000 psig (200bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Surface finish: | 10µin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4" Cv=0.1  3/8" 1/2" Cv=0.5 |
| Weight: | approx. 0.27kg (depending on connections or options) |

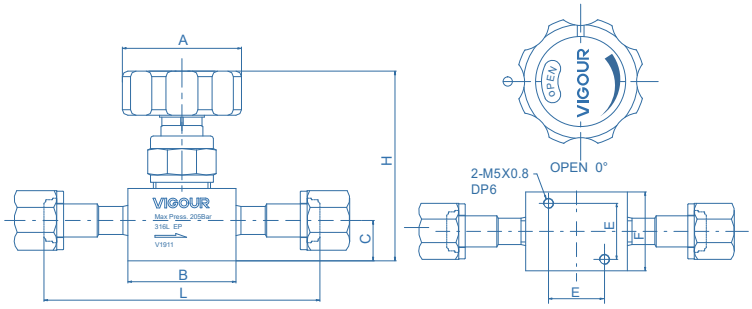
## Dimensions (mm)



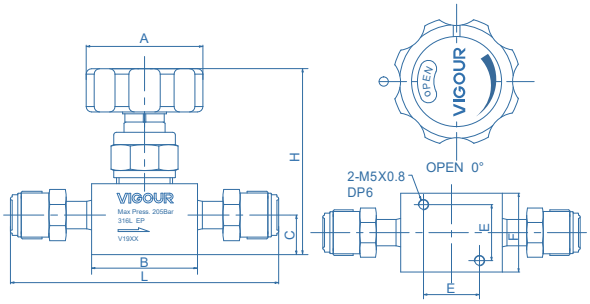

1/4 manual actuator (VFS male)



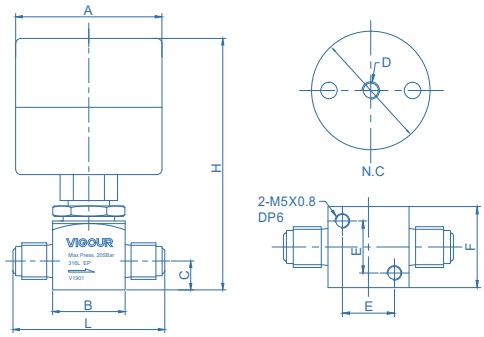

1/4 manual actuator (VFS female)



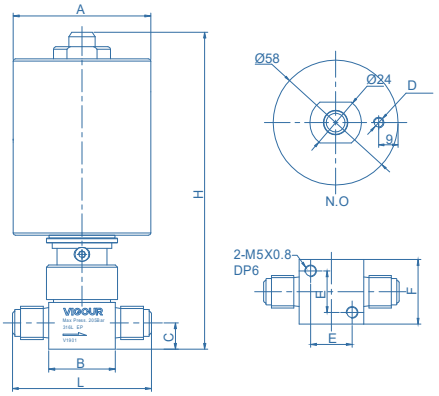

1/2 manual actuator (VFS female)



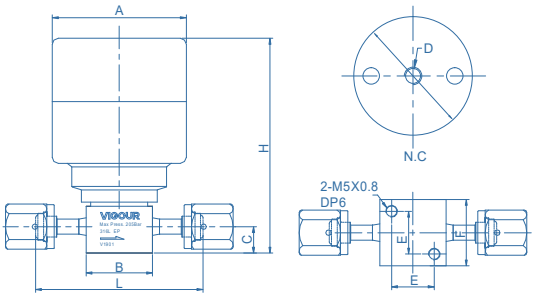

3/8, 1/2 manual actuator (VFS male)



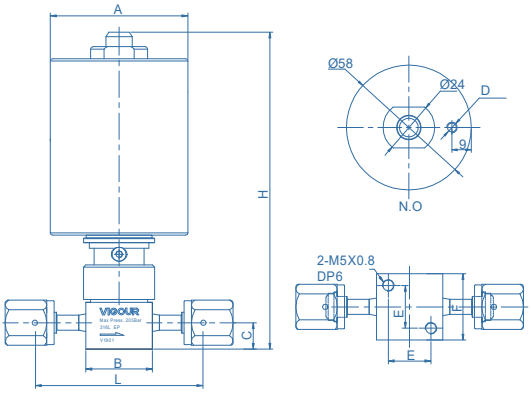

1/4 pneumatic actuator N.C (VFS male)




1/4 pneumatic actuator N.O (VFS male)

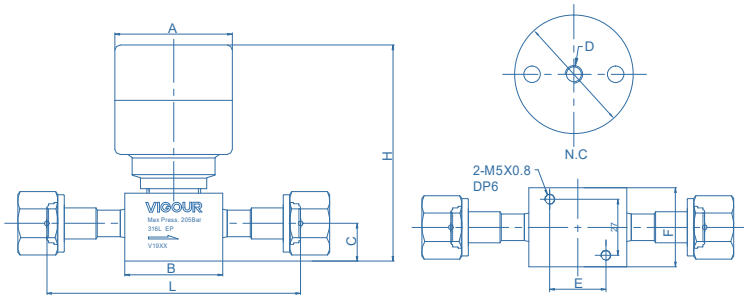



1/4 pneumatic actuator N.C (VFS female)

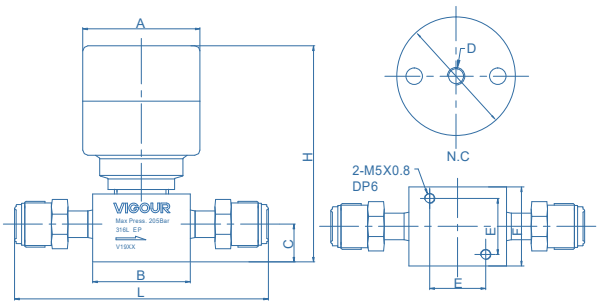



1/4 pneumatic actuator N.O (VFS female)

# Diaphragm Valves
# VDV33UB Series




1/2 pneumatic actuator N.C (VFS female)




3/8, 1/2 pneumatic actuator N.C (VFS male)

manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ54 | 28 | 11.1 | 18 | 28 | 58.7 | 74 |
| 1/4" VFS female | 4.4 | Φ54 | 28 | 11.1 | 18 | 28 | 71.6 | 74 |
| 3/8" VFS male | 7 | Φ54 | 47.1 | 18.2 | 27 | 38 | 123.2 | 86 |
| 1/2" VFS male | 7 | Φ54 | 47.1 | 18.2 | 27 | 38 | 123.2 | 86 |
| 1/2" VFS female | 7 | Φ54 | 47.1 | 18.2 | 27 | 38 | 123.2 | 86 |

pneumatic actuator, normally opened / normally closed

| End Comections | Actuator | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | N.C | 4.4 | Φ56.5 | 28 | 11.1 | M5x0.8 | 18 | 28 | 58.7 | 90.5 |
| 1/4" VFS male | N.O | 4.4 | Φ58 | 28 | 11.1 | M5x0.8 | 18 | 28 | 58.7 | 134 |
| 1/4" VFS female | N.C | 4.4 | Φ56.5 | 28 | 11.1 | M5x0.8 | 18 | 28 | 71.6 | 90.5 |
| 1/4" VFS female | N.O | 4.4 | Φ58 | 28 | 11.1 | M5x0.8 | 18 | 28 | 71.6 | 134 |
| 3/8" VFS male | N.C | 7 | Φ56.5 | 47.1 | 18.2 | M5x0.8 | 27 | 38 | 123.2 | 105 |
| 1/2" VFS male | N.C | 7 | Φ56.5 | 47.1 | 18.2 | M5x0.8 | 27 | 38 | 123.2 | 105 |
| 1/2" VFS female | N.C | 7 | Φ56.5 | 47.1 | 18.2 | M5x0.8 | 27 | 38 | 123.2 | 105 |

1/4", 3/8", 1/2" VFS fitting dimensions for reference, other connections please contact factory.

## Ordering Information

**VDV33UBS - M - A - MV4 - MV4 - PA**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PO: pneumatic actuator,normally opened *
PC: pneumatic actuator,normally closed

* Normally opened available with connetion size 1/4 thch.

### Flow Circuit Diagram
For details, refer to the flow circuit diagram on page 54.

### Valve Seat Option
None: PCTFE(standard)
VS: Vespel®
PA: PFA

### End Connection
MV4: 1/4" VFS male
FV4: 1/4" VFS female
TW4: 1/4" tube weld
MV6: 1/2" VFS male 3/8" O.D.
FV6: 1/2" VFS female 3/8" O.D.
TW6: 3/8" tube weld
MV8: 1/2" VFS male
FV8: 1/2" VFS female
TW8: 1/2" tube weld

* Other connection standard,consult factory

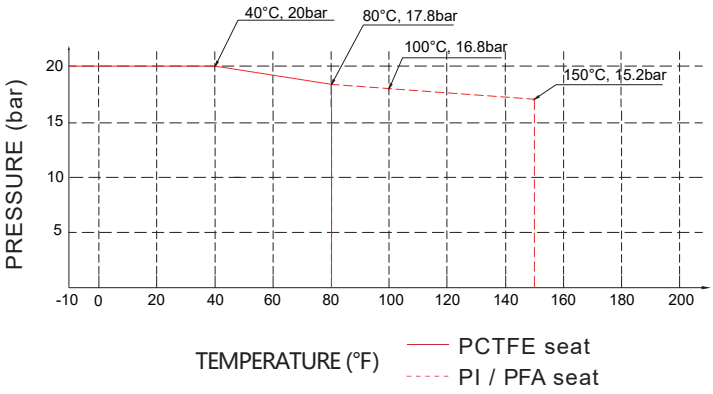
## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide/PFA is option


1/4 Type


1/4 Type

## Temperature / Pressure Rating





1/2 Type

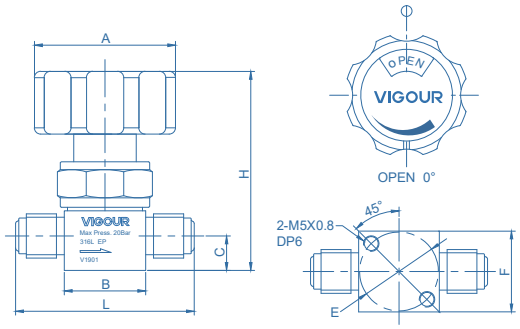

1/2 Type

## Technical Data

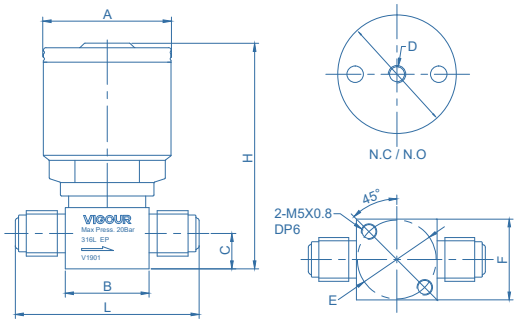
| | |
|---|---|
| Max. Working Pressure: | 300 psig (20bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 176°F (-10°C ~ 80°C) |
| Surface finish: | 10µin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4”Cv=0.3 3/8”1/2”Cv=0.65 |
| Weight: | approx. 0.27kg (depending on connections or options) |

# Diaphragm Valves
# VDV52UB Series

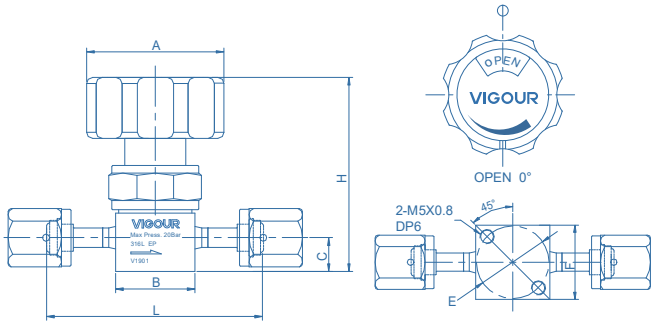
## Dimensions (mm)



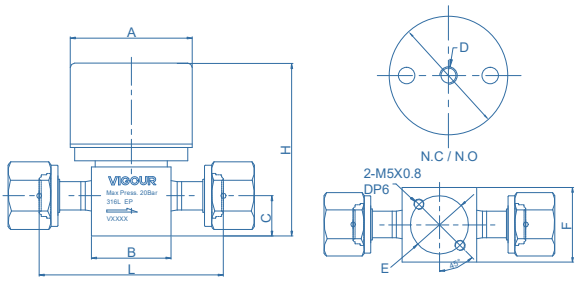

1/4, 3/8, 1/2 manual actuator (VFS male)




1/4 pneumatic actuator (VFS male)




1/4, 1/2 manual actuator (VFS female)




1/2 pneumatic actuator (VFS female)

### manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ45 | 26 | 11 | Φ25.4 | 26 | 57 | 64 |
| 1/4" VFS female | 4.4 | Φ45 | 26 | 11 | Φ25.4 | 26 | 71 | 64 |
| 3/8" VFS male | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS male | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS female | 7 | Φ45 | 36 | 18.2 | Φ28 | 36 | 83 | 78 |

### pneumatic actuator, normally opened / normally closed

| End Comections | Actuator | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | N.C / N.O | 4.4 | Φ39.6 | 26 | 11 | M5x0.8 | Φ25.4 | 26 | 57 | 70 |
| 1/4" VFS female | N.C / N.O | 4.4 | Φ39.6 | 26 | 11 | M5x0.8 | Φ25.4 | 26 | 71 | 70 |
| 3/8" VFS male | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS male | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 77 | 78 |
| 1/2" VFS female | N.C / N.O | 7 | Φ55 | 36 | 18.2 | RC 1/8 | Φ28 | 36 | 83 | 78 |

## Ordering information

**VDV52UB S - M - A - MV4 - MV4 - PA**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

### Flow Circuit Diagram
For details, refer to the flow circuit diagram on page 54.

### Valve Seat Option
None: PCTFE(standard)
VS: Vespel®
PA: PFA

### End Connection
MV4: 1/4" VFS male
FV4: 1/4" VFS female
TW4: 1/4" tube weld
MV6: 1/2" VFS male 3/8" O.D.
FV6: 1/2" VFS female 3/8" O.D.
TW6: 3/8" tube weld
MV8: 1/2" VFS male
FV8: 1/2" VFS female
TW8: 1/2" tube weld

* Other connection standard,consult factory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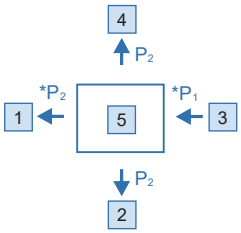
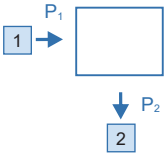
## Ports Diagrammatic Drawing:



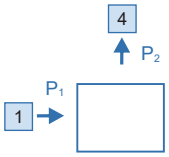

*P1: Inlet pressure
*P2: Outlet pressure

## Two ports flow circuit diagram:


Standard model



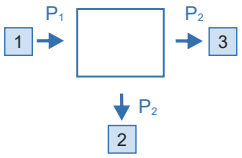

"A" Type



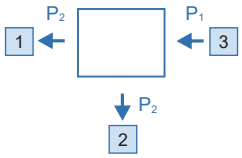

"B" Type


"K" Type
*Bottom interface

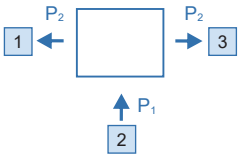
## Three ports flow circuit diagram:



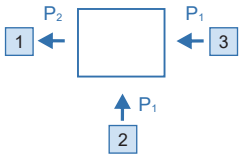

"C" Type



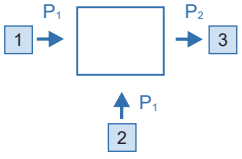

"D" Type



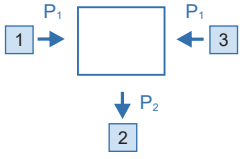

"E" Type




"F" Type

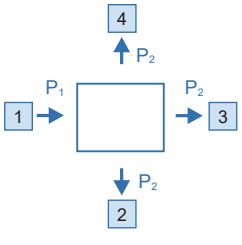



"G" Type

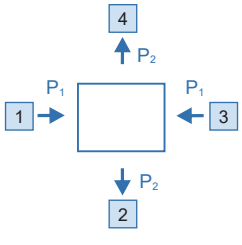



"H" Type

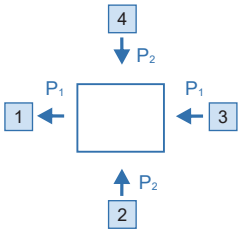
## Four ports flow circuit diagram:




"I" Type




"J" Type




"L" Type

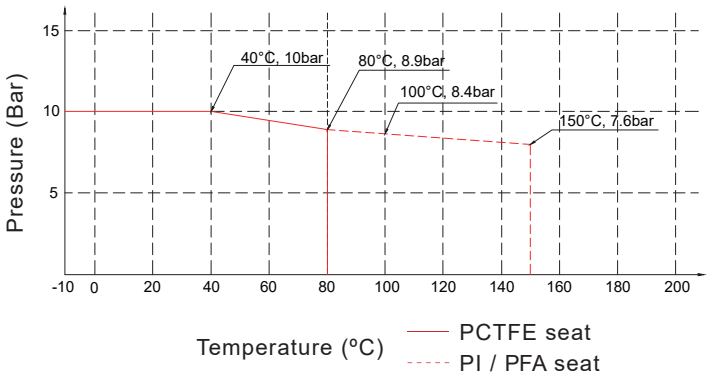
# Diaphragm Valves
# VDV22UB Series

## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide/PFA is option



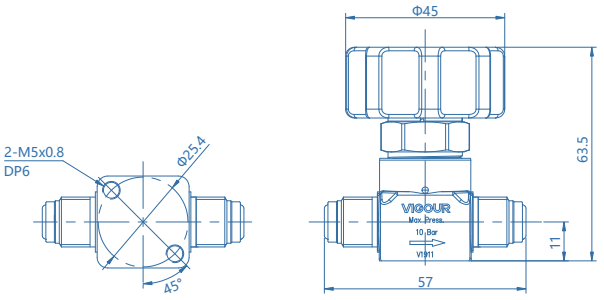
## Temperature / Pressure Rating



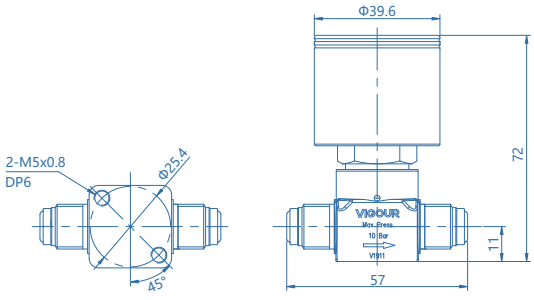

## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 150 psig (10bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 176°F (-10°C ~ 80°C) |
| Surface finish: | 10µin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | 1/4" Cv=0.3  1/2" Cv=0.65 |
| Weight: | approx. 0.36kg (depending on connections or options) |

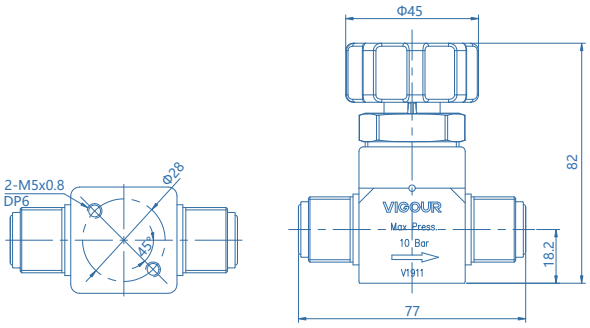
## Dimensions (mm)



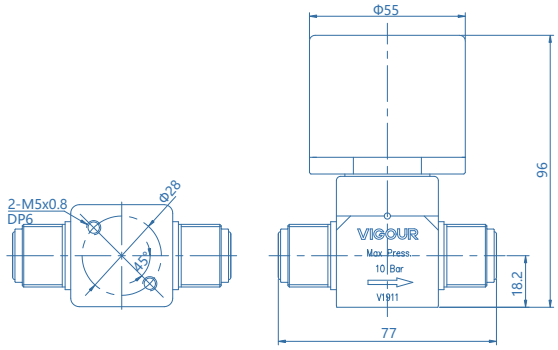

1/4 manual actuator (VFS fitting male)




1/4 pneumatic actuator (VFS fitting male)




1/2 manual actuator (VFS fitting male)




1/2 pneumatic actuator (VFS fitting male)

## Ordering information

**VDV22UBS - M - MV4 - MV4 - PA**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

### Valve Seat Option
None: PCTFE(standard)
VS: Vespel®
PA: PFA

### End Connection
MV4: 1/4" VFS fitting male
MV8: 1/2" VFS fitting male

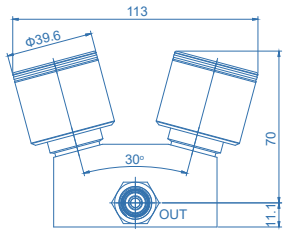
* Other connection standard,consult factory

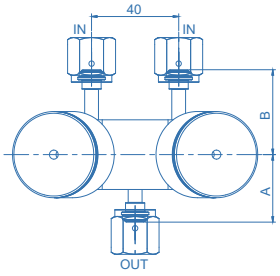
# Low-pressure Diaphragm Valve Manifold
# VDV36UB Series

## Product Feature

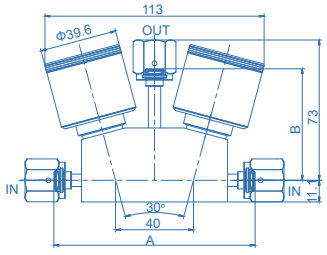
- Excellent degassing characteristics is achieved through minimized flow paths by combining 2 of VDV32、VDV33 diaphragm valves together in one valve body.
- Fewer welds over standard valve alignments
- Reduces space requirements
- Compact tubing arrangement
- The product is fabricated in compliance with the VS001A process specification
- Dead space free configuration

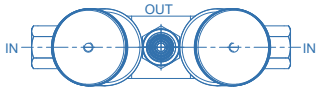

## Dimensions (mm)




| End Connections | Dimensions (mm) | |
|---|---|---|
| | A | B |
| VFS Female | 31 | 39 |
| VFS Male | 46.3 | 46.3 |



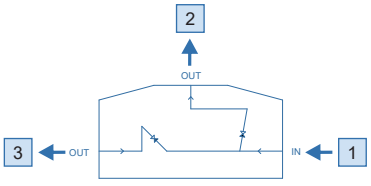




| End Connections | Dimensions (mm) | |
|---|---|---|
| | A | B |
| VFS Female | 103.4 | 57.3 |
| VFS Male | 139.6 | 70 |

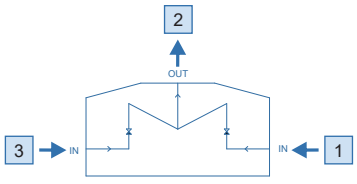
## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 150 psig (10bar) / 3000 psig (200bar) |
| Pneumatic Operating Pressure: | 58~87psig (4~6bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=0.3 (Low pressure)  Cv=0.1 (High pressure) |
| Weight: | approx. 1.36kg (depending on connections or options) |

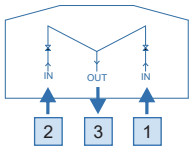
## Ordering information

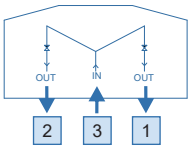
A Type



B Type



C Type



D Type

**Inlet/Outlet Connecion**

MV4: 1/4" VFS male
FV4: 1/4" VFS female
TW4: 1/4" tube weld

* Other connection standard, consult factory.

**Port Selection**

**VDV36UB S - A - H - M - PC - 1 - 2 - 3**

**Materials**

S: 316L EP
SLV: 316L secondary remelt

**Flow Rate**

A: A Type
B: B Type
C: C Type
D: D Type

**Working Pressure**

None: 150 psig
H: 3000 psig

**Valve2 Actuator***

M: manual actuator
PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

* When the actuatos are the some there will be one symbol.

**Valve1 Actuator**

M: manual actuator
PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

## Ordering Example

**VDV36UBS - C - PC - PC - FV4 - FV4 - FV4**
**1 - 2 - 3**

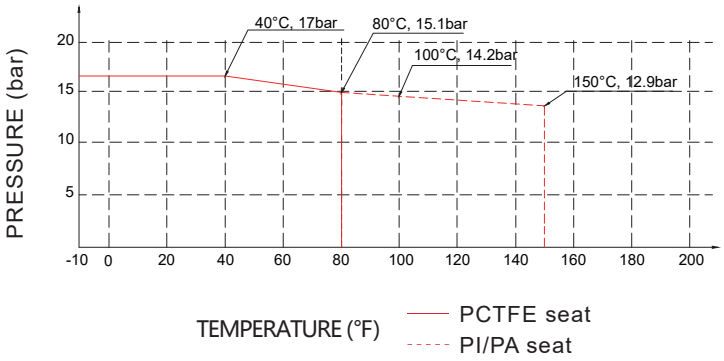
# Diaphragm Valves
# VDV37UB Series

## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide is option


1/2" pneumatic actuator

## Temperature / Pressure Rating



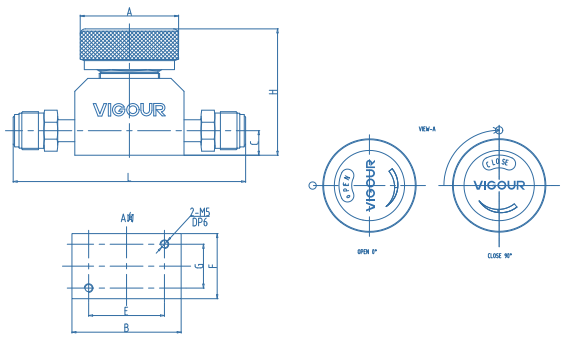


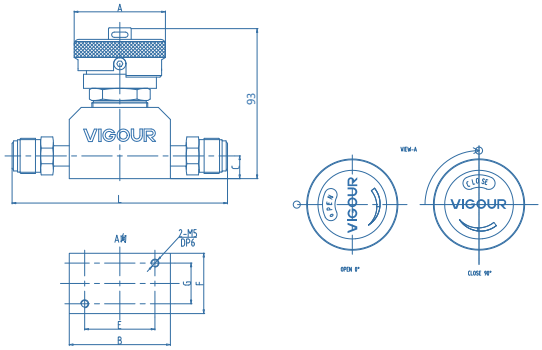
1/2" manual actuator

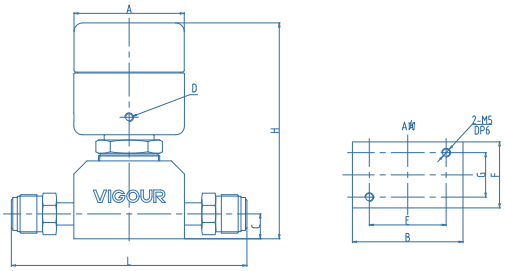
## Technical Data

| | |
|---|---|
| Operating Pressure: | 250 psig (17bar) |
| Actuation Pressure: | 80~100 psig (5.5~6.8bar) |
| Max. Working Temp.: | -40°F ~ 159°F (-40°C ~ 71°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=2.8 |
| Weight: | approx. 1.36kg (depending on connections or options) |

## Dimensions (mm)




manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | G | L | H |
| 1/2" VFS male | 10.2 | Φ57 | 63.2 | 14.2 | 43.9 | 37.7 | 25.4 | 134.6 | 80 |
| 1/2" VFS female | 10.2 | Φ57 | 63.2 | 14.2 | 43.9 | 37.7 | 25.4 | 134.6 | 80 |
| 3/4" VFS male | 12.8 | Φ57 | 63.2 | 14.2 | 43.9 | 37.7 | 25.4 | 162.6 | 80 |
| 3/4" VFS female | 12.8 | Φ57 | 63.2 | 14.2 | 43.9 | 37.7 | 25.4 | 162.6 | 80 |

pneumatic actuator (normally closed)

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | L | H |
| 1/2" VFS male | 10.2 | Φ63 | 63.2 | 14.2 | M5x0.8 | 43.9 | 37.7 | 25.4 | 134.6 | 125 |
| 1/2" VFS female | 10.2 | Φ63 | 63.2 | 14.2 | M5x0.8 | 43.9 | 37.7 | 25.4 | 134.6 | 125 |
| 3/4" VFS male | 12.8 | Φ63 | 63.2 | 14.2 | M5x0.8 | 43.9 | 37.7 | 25.4 | 162.6 | 125 |
| 3/4" VFS female | 12.8 | Φ63 | 63.2 | 14.2 | M5x0.8 | 43.9 | 37.7 | 25.4 | 162.6 | 125 |

## Ordering Information

**VDV37UBS - M - MV8 - MV8 - VS - LO**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PC: pneumatic actuator (normally closed)

### End Connection
FV8: 1/2" VFS Female
MV8: 1/2" VFS male
FV12: 3/4" VFS Female
MV12: 3/4" VFS male

* Other connection standard,consult factory

### Optional
None: Round Knob
LO: Round Knob
Pull, then turn to open
lock out / tag out

### Valve Seat Option
None: PCTFE (standard)
VS: Vespel®

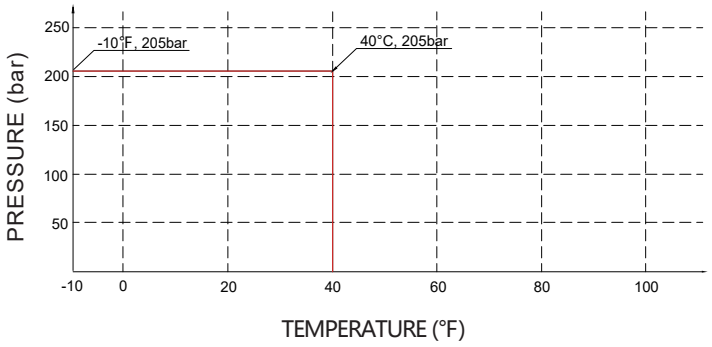
# Diaphragm Valves
# VDV38UB Series

## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide is option


1/2″ pneumatic actuator

## Temperature / Pressure Rating



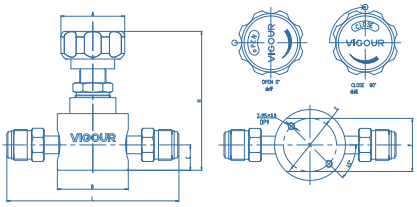


1/2″ manual actuator

## Technical Data

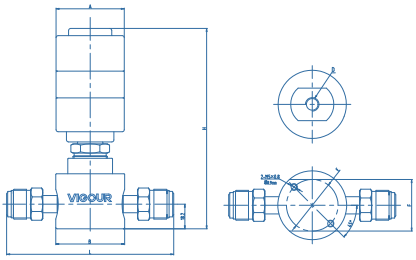
| | |
|---|---|
| Operating Pressure: | 3000 psig (200bar) / 1300 psig (90bar) |
| Actuation Pressure: | 70~110 psig (5~8bar) |
| Max. Working Temp.: | -40°F ~ 150°F (-40°C ~ 65°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | manual actuator Cv=1.0<br>pneumatic actuator Cv=1.0 (90bar) / Cv=0.7 (206 bar) |
| Weight: | approx. 1.36kg (depending on connections or options) |

## Dimensions (mm)



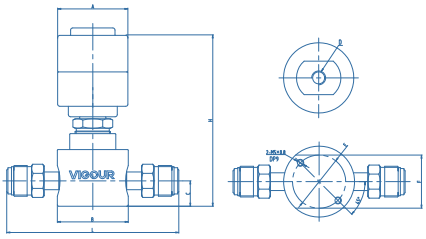
manual actuator (90 bar)

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 102 | 100 |
| 1/4" VFS female | 4.4 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 102 | 100 |
| 1/2" VFS male | 7 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 123 | 100 |
| 1/2" VFS female | 7 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 123 | 100 |
| 3/4" VFS male | 7 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 178 | 100 |
| 3/4" VFS female | 7 | Φ47.8 | 50.8 | 18.2 | Φ38.1 | 38 | 178 | 100 |



pneumatic actuator (normally closed 90 bar)

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 102 | 148 |
| 1/4" VFS female | 4.4 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 102 | 148 |
| 1/2" VFS male | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 123 | 148 |
| 1/2" VFS female | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 123 | 148 |
| 3/4" VFS male | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 178 | 148 |
| 3/4" VFS female | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 178 | 148 |



pneumatic actuator (normally closed 206 bar)

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 102 | 125 |
| 1/4" VFS female | 4.4 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 102 | 125 |
| 1/2" VFS male | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 123 | 125 |
| 1/2" VFS female | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 123 | 125 |
| 3/4" VFS male | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 178 | 125 |
| 3/4" VFS female | 7 | Φ50.3 | 50.8 | 18.2 | 1/8" NPT | Φ38.1 | 38 | 178 | 125 |

## Ordering Information

**VDV38UBS - M - MV8 - MV8 - VS - H**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PC: pneumatic actuator (normally closed)

### End Connection

| | |
|---|---|
| MV4: 1/4" VFS male | MV8: 1/2" VFS male |
| FV4: 1/4" VFS female | FV8: 1/2" VFS female |
| TW4: 1/4" tube weld | TW8: 1/2" tube weld |
| MV6: 1/2" VFS male 3/8" O.D. | MV12: 3/4" VFS male |
| FV6: 1/2" VFS female 3/8" O.D. | FV12: 3/4" VFS female |
| TW6: 3/8" tube weld | TW12: 3/4" tube weld |

* Other connection standard,consult factory

### Work Pressure
H: 3000 psig
M: 1300 psig

### Valve Seat Option
None: PCTFE (standard)
VS: Vespel®

# Diaphragm Valves
# VDV39UB Series

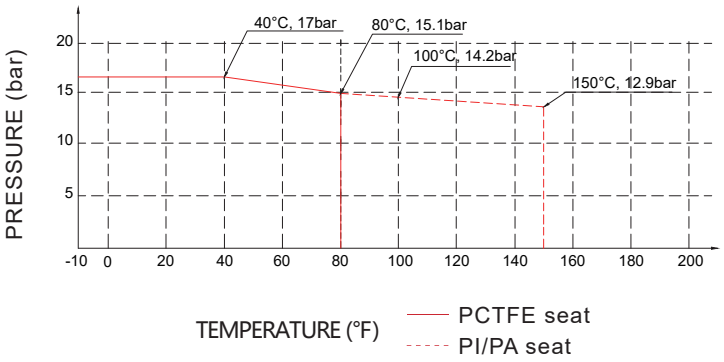
## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle and dead-space-free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide is option


3/4" manual actuator


1/2" manual actuator

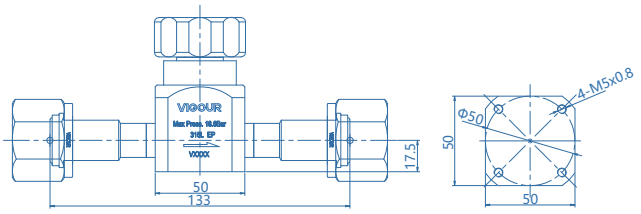
## Temperature / Pressure Rating



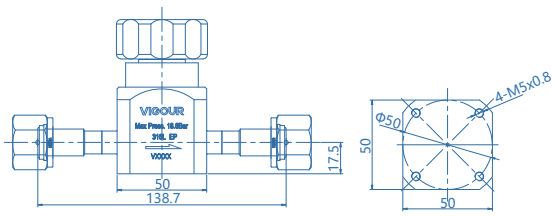

## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 270 psig (18.6bar) |
| Max. Working Temp.: | 14°F ~ 104°F (-10°C ~ 40°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® (316L optional) |
| Seat packing: | PCTFE (PFA / VESPEL optional) |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=2.8 |
| Weight: | approx. 1.45kg (depending on connections or options) |

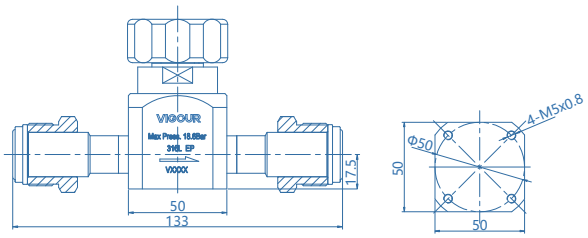
## Dimensions (mm)



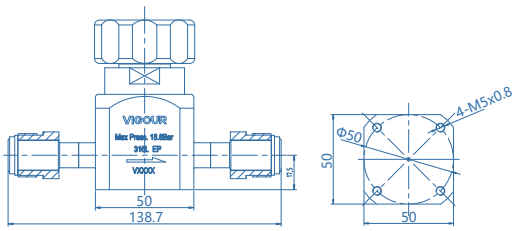

3/4 manual actuator (VFS female)




1/2 manual actuator (VFS female)




3/4 manual actuator (VFS male)




1/2 manual actuator (VFS male)

## Ordering Information

**VDV39UBS - M - MV8 - MV8 - PA**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator

### Valve Seat Option
None: PCTFE (standard)
VS: Vespel®
PA: PFA

### End Connection
FV12: 3/4" VFS (F)
MV12: 3/4" VFS (M)
TW12: 3/4" tube weld
FV8: 1/2" VFS (F)
MV8: 1/2" VFS (M)
TW8: 1/2" tube weld

* Other connection standard,consult factory

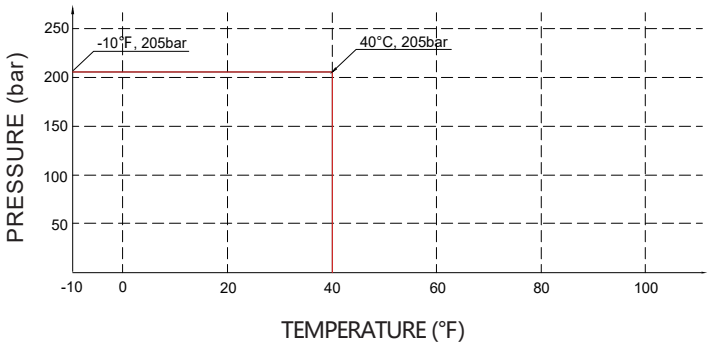
# Diaphragm Valves
# VDV40UB Series

## Product Feature

- Suitable for ultra-pure, flammable or toxic fluid lines in semiconductor manufacturing equipment and facilities
- Direct diaphragm construction with superior sealing performance, remarkable durability, compactness and particle free performance
- The product is fabricated in compliance with the VS001A process specification
- Valve open and closed position is easily visible at a glance
- Excellent gas displacement characteristics
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Polyimide is option


1/4" pneumatic actuator

## Temperature / Pressure Rating



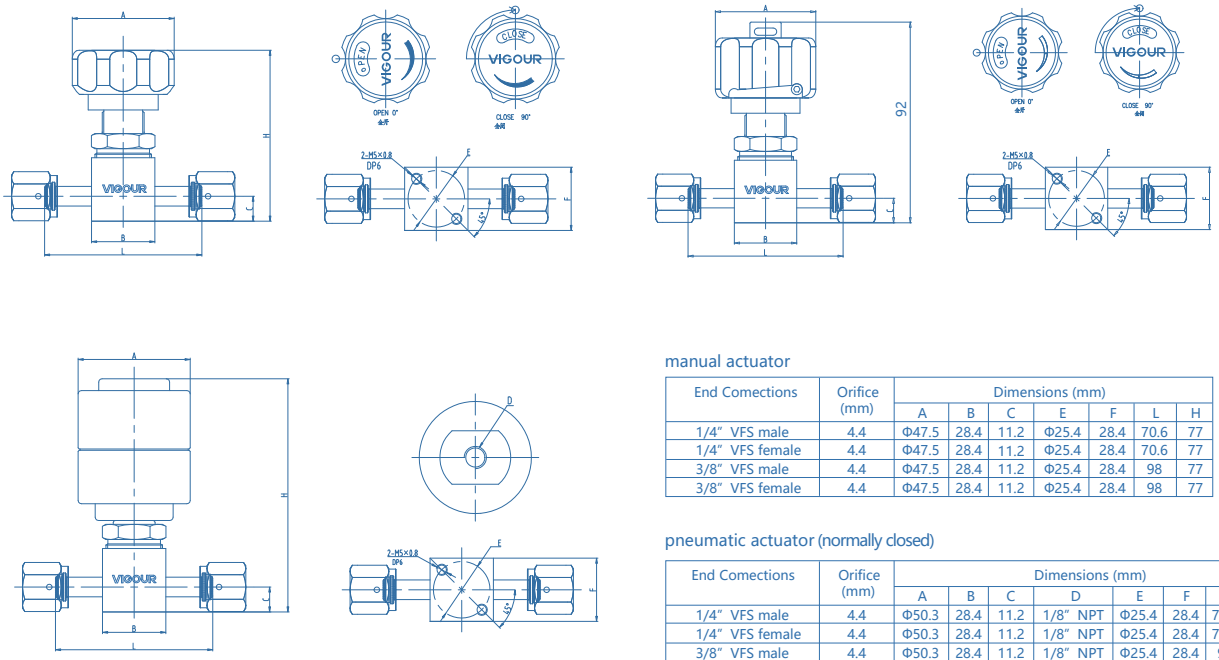


1/4" manual actuator

## Technical Data

| | |
|---|---|
| Operating Pressure: | 3000 psig (200bar) |
| Actuation Pressure: | 70~110 psig (5~8bar) |
| Max. Working Temp.: | -40°F ~ 160°F (-40°C ~ 71°C) |
| Surface finish: | 10μin. Ra |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $1x10^{-9}$ mbar l/s He |
| Flow capacity: | pneumatic actuator Cv=0.23 manual actuator Cv=0.29 |
| Weight: | approx 1.27kg (depending on connections or options) |

## Dimensions (mm)




manual actuator

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | A | B | C | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ47.5 | 28.4 | 11.2 | Φ25.4 | 28.4 | 70.6 | 77 |
| 1/4" VFS female | 4.4 | Φ47.5 | 28.4 | 11.2 | Φ25.4 | 28.4 | 70.6 | 77 |
| 3/8" VFS male | 4.4 | Φ47.5 | 28.4 | 11.2 | Φ25.4 | 28.4 | 98 | 77 |
| 3/8" VFS female | 4.4 | Φ47.5 | 28.4 | 11.2 | Φ25.4 | 28.4 | 98 | 77 |

pneumatic actuator (normally closed)

| End Comections | Orifice (mm) | Dimensions (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | L | H |
| 1/4" VFS male | 4.4 | Φ50.3 | 28.4 | 11.2 | 1/8" NPT | Φ25.4 | 28.4 | 70.6 | 105 |
| 1/4" VFS female | 4.4 | Φ50.3 | 28.4 | 11.2 | 1/8" NPT | Φ25.4 | 28.4 | 70.6 | 105 |
| 3/8" VFS male | 4.4 | Φ50.3 | 28.4 | 11.2 | 1/8" NPT | Φ25.4 | 28.4 | 98 | 105 |
| 3/8" VFS female | 4.4 | Φ50.3 | 28.4 | 11.2 | 1/8" NPT | Φ25.4 | 28.4 | 98 | 105 |

## Ordering Information

**VDV40UBS - M - MV4 - MV4 - VS - LO**

### Materials
S: 316L
SLV: 316L secondary remelt

### Actuator
M: manual actuator
PC: pneumatic actuator (normally closed)

### End Connection
MV4: 1/4" VFS male
FV4: 1/4" VFS female
TW4: 1/4" tube weld
MV6: 1/2" VFS male 3/8" O.D.
FV6: 1/2" VFS female 3/8" O.D.
TW6: 3/8" tube weld

* Other connection standard,consult factory

### Optional
None: Round Knob
LO: Round Knob
Pull, then turn to open
lock out / tag out

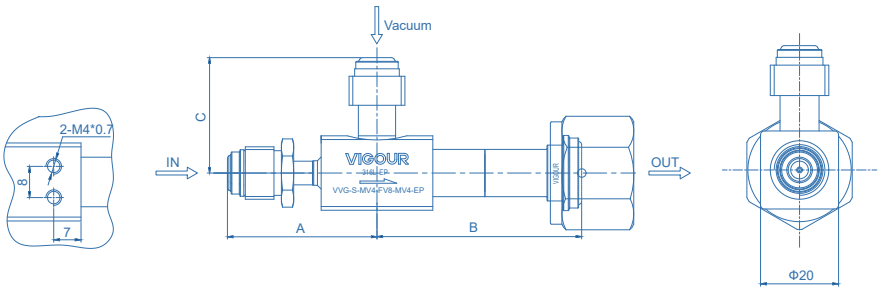
### Valve Seat Option
None: PCTFE (standard)
VS: Vespel®

# Vacuum Generators
# VVG Series

## Product Feature

- Max. vacuum pressure: -90kPa
- Stainless steel 316L construction
- MMHG (Torr) vacuum generators
- The product is fabricated in compliance with the VS001A process specification
- With a minimum source nitrogen pressure of 90 psig (6bar)
- 100% helium leak test


## Dimensions (mm)

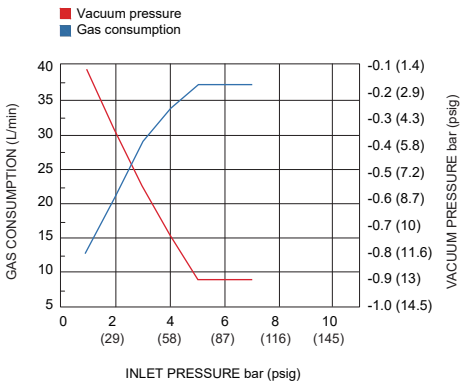



| Connections | | mm | inch |
|---|---|---|---|
| A | FV4 | 32.5 | 1.27 |
| | MV4 | 39.8 | 1.57 |
| B | FV8 | 55 | 2.16 |
| | MV8 | 64.8 | 2.55 |
| C | FV4 | 24 | 0.94 |
| | MV4 | 31 | 1.22 |

## Technical Data

| | |
|---|---|
| Type: | Vacuum Generators |
| Max. Vacuum pressure: | -90kPa |
| Inlet pressure at limiting vacuum pressure: | 70psig (5 bar) |
| Flow at limiting vacuum pressure: | 37L/min |
| Body Material: | SS 316L |
| Max. Working pressure: | 150psig (10 bar) |
| Temperature range: | 0~150℃ |
| Source Gas: | Nitrogen |

## Vacuum and Flow Specification





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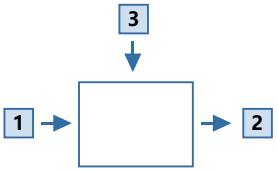
## Ordering Information


**Inlet/Outlet Connecion**

FV4: 1/4” VFS female
FV8: 1/2” VFS female
MV4: 1/4” VFS male
MV8: 1/2” VFS male

* Other connection standard, consult factory.

**Port Selection**

**VVG - S - 1 - 2 - 3 - EP**

**Materials**
S: 316L

**Inlet Connection**
MV4: 1/4” VFS male

**Outlet Connection**
FV8: 1/2” VFS female
MV8: 1/2” VFS male

**Surface Finish**
BA: 0.4 μin. Ra
EP: 0.25 μin. Ra

**Vacuum Connection**
FV4: 1/4” VFS female
MV4: 1/4” VFS male

## Ordering Example

**VVG - S - MV4 - FV8 - MV4**
**1 - 2 - 3**

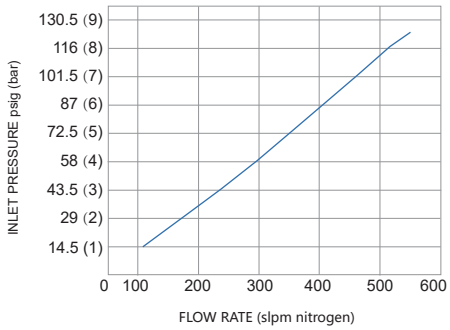
# Bellows Valves
# VUBV Series

## Product Feature

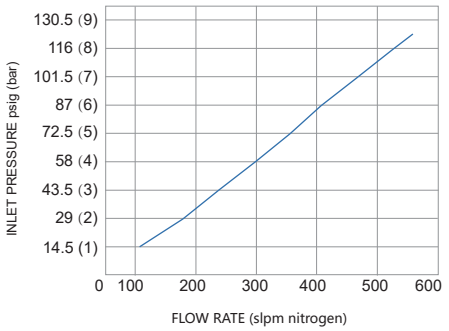
- 316L stainless steel construction
- Tube fitting, tube welding, and VFS fitting joints
- Easy to clean to keep operation clean
- Excellent gas displacement characteristics
- The product is fabricated in compliance with the VS001A process specification
- EP treatment is standard for all wetted surfaces
- Standard seat material is PCTFE, Vespel® is option
- All-metal seal to atmosphere


## Flowchart

Maunal Actuator



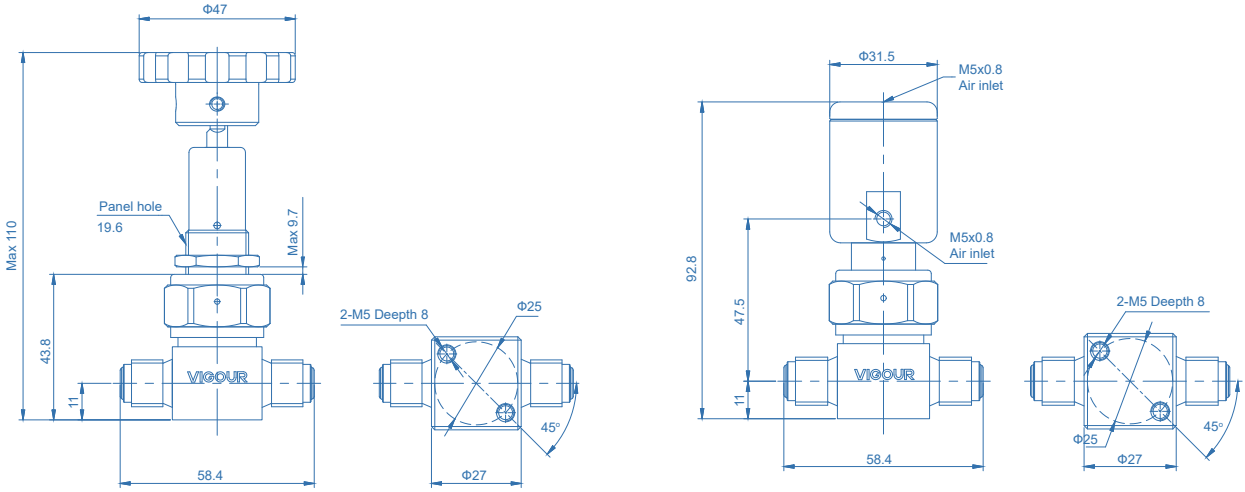

Pneumatic Actuator




## Technical Data

| | |
|---|---|
| Manual Pressure: | Vacuum 500 psig (35bar) |
| Pneumatic Pressure: | Vacuum 125 psig (8.6bar) |
| Operating Pressure: | 45~120 psig (3.2~8.2bar) |
| Surface finish: | 10μin. Ra Standard (7μin. Ra / 5μin. Ra optional) |
| Working Temp.: | -40°F ~ 200°F (-40°C ~ 93°C) |
| Materials | |
| Body: | 316L |
| Bellows: | A269 / A240 stainless steel |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $<1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $<1x10^{-9}$ mbar l/s He |
| Flow capacity: | Cv=0.3 |
| Weight: | approx. 1.54kg (depending on connections or options) |

## Dimensions (mm)




## Ordering Information

**VUBV S - M - MV4 - MV4 - VS**

**Materials**

S: 316L

**Actuator**

M: manual actuator
PC: pneumatic actuator,normally closed

**Valve Seat Option**

None: PCTFE (standard)
VS: Vespel®

**End Connection**

04: 1/4” tube fitting
TW4: 1/4” tube weld
FV4: 1/4” VFS female
MV4: 1/4” VFS male

* Other connection standard,consult factory

* Tube fitting wetted surface Ra. 20μm machine finished, TW4、 FV4、 MV4 wetted surface Ra. 8μm machine finished and electropolishad

# Bellows Valves
# VUBV2 Series

## Product Feature

- 316L stainless steel construction
- Tube welding and VFS fitting connection
- Easy to clean
- Excellent airtightness characteristics
- The product is fabricated in compliance with the VS001A process specification
- EP treatment is standard for all wetted surfaces
- The standard seat material is PCTFE, Vespel® (optional)
- All-metal seal to atmosphere


Manual Actuator 3/4~1"

## parameter specification

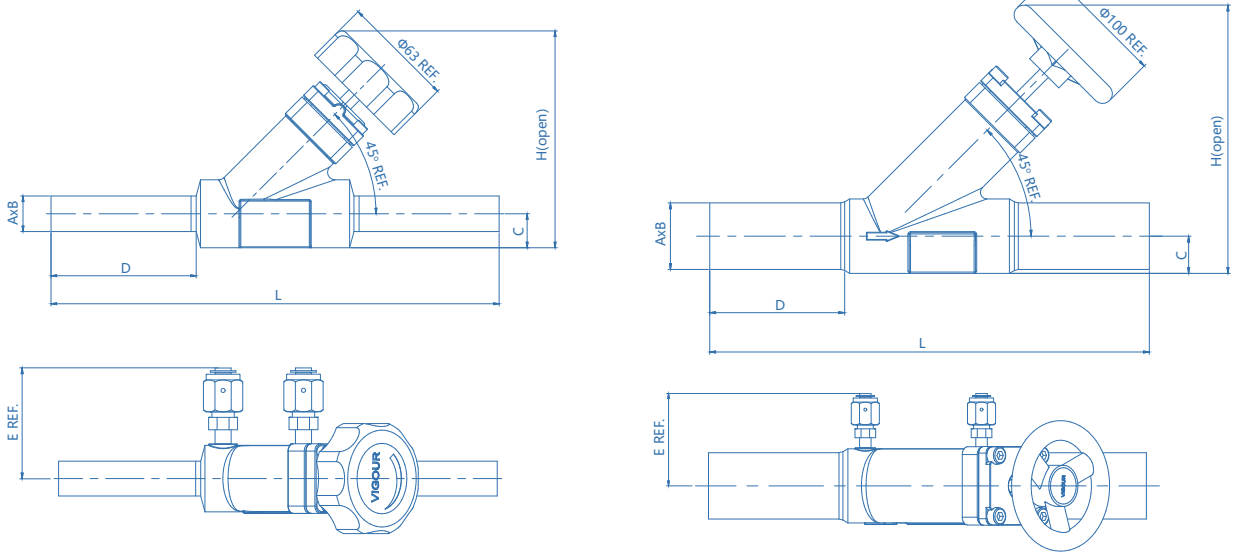
| Connections | Size | Cv | Max Pressure |
|---|---|---|---|
| MV12 | 3/4" | 14.5 | 375pisg (25.8bar) |
| FV12 | | | |
| TW12 | | | |
| MV16 | 1" | 21 | |
| FV16 | | | |
| TW16 | | | |
| TW24 | 1.5" | 46 | |
| TW32 | 2" | 52 | |

Manual Actuator 1.5~2"

## Technical Data

| | |
|---|---|
| Pneumatic Pressure: | Vacuum 375 psig (25.8bar) |
| Surface finish: | 10μin. Ra |
| Working Temp.: | -22°F ~ 180°F (-30°C ~ 82°C) |
| Materials | |
| Body: | 316L |
| Bellows: | SUS316L / Hastelloy® |
| Seat packing: | PCTFE |
| Handle: | AL |
| Internal Leakage Allowance: | $<1x10^{-9}$ mbar l/s He |
| External Leakage Allowance: | $<1x10^{-9}$ mbar l/s He |
| Flow capacity: | See parameter specification |

## Dimensions (mm)




| Size | Dimensions (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | L | H |
| 3/4" | Φ19.05 | 1.65 | 18.03 | 77.2 | 57 | 239 | 105.2 |
| 1" | Φ25.4 | 1.65 | 18.03 | 77.2 | 57 | 239 | 105.2 |
| 1.5" | Φ38.1 | 1.65 | 28.7 | 77.7 | 67 | 284.7 | 211.1 |
| 2" | Φ50.8 | 1.65 | 28.7 | 101.1 | 67 | 335.5 | 211.1 |

## Ordering Information

**VUBV2 S - M - MV12 - MV12 - P1 - P2 - VS**

### Materials
S: 316L

### Actuator
M: Manual Actuator

### End Connection
FV12: 3/4" VFS female
MV12: 3/4" VFS male
TW12: 3/4" tube weld
FV16: 1" VFS female
MV16: 1" VFS male
TW16: 1" tube weld
TW24: 1.5" tube weld
TW32: 2" tube weld

* Other connection standard,consult factory

### Valve Seat Option
None: PCTFE (standard)
VS: Vespel®

### Outlet Purge Connection
None: No outlet purge
P2: 1/4"outlet purge
P2V: 1/4"outlet purge valve

### Inlet Purge Connection
None: No inlet purge
P1: 1/4"inlet purge
P1V: 1/4"inlet purge valve

# Metering Valves
# VMV Series

## Product Features

- Low pressure metering valves
- Body materials: 316
- Panel installation is possible
- The product is fabricated in compliance with the VS001A process specification
- Vernier handles options
- Straight and Angle flow patterns
- Working pressure: Max. 2000psig (138bar)
- Straight-pattern flow coefficients (Cv) from 0.004 to 0.16


## Technical Data

| Series | Pressure-Temperature Ratings | | Orifice in. (mm) | Shutoff Service | Stem Taper (Included Angle) |
|---|---|---|---|---|---|
| | Temperature ℃ | Working Pressure bar | | | |
| A type | -23℃ to +204℃ (FKM O-rings) | 137 | 0.032 (0.81) | No | 1° |
| B type | -23℃ to +148℃ (Buna N, O-rings) | 68.9 ① | 0.056 (1.42) | No | 3° |
| C type | | | 0.128 (3.25) | Yes② | 6° |

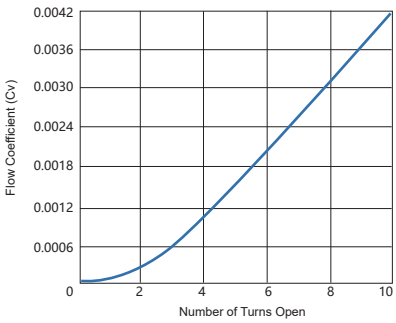
① Downstream pressure 500 psig (34.4 bar) max when valve requires adjustment at pressure due to strength limitations of the fine-pitch threads and high operating torque.

② Stainless steel L series valves are not recommended for shutoff in vacuum or gas service, or for repetitive shutoff in liquid service.

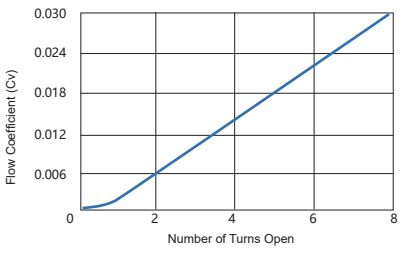
## Flow Coefficient at Turns Open

Flow Data at 70°F (20℃)

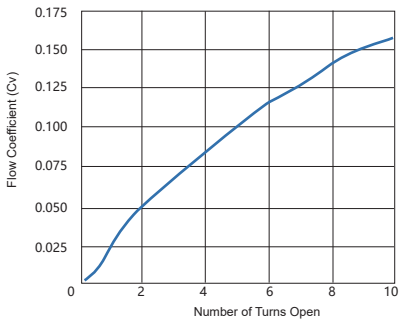
A type Metering Valves




B type Metering Valves




C type Metering Valves

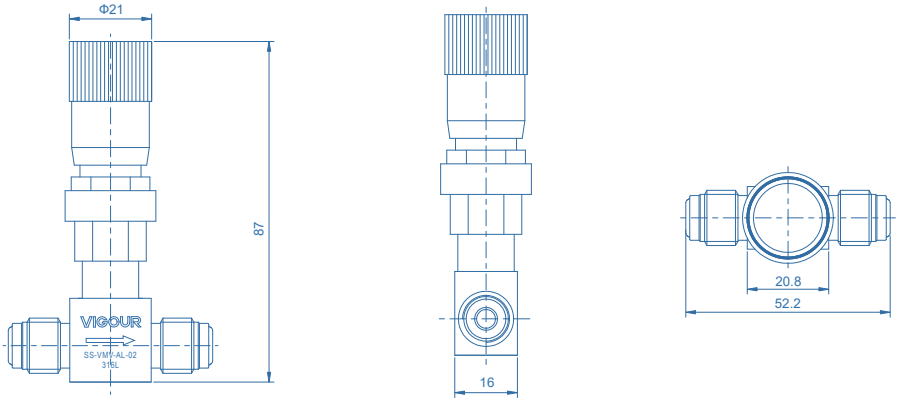



| Max. Flow Cv=0.004 | |
|---|---|
| Pressure Drop to Atmosphere bar | Air Flow std L/min |
| 0.68 | 1.1 |
| 3.4 | 2.8 |
| 6.8 | 5.6 |

| Max. Flow Cv=0.03 | |
|---|---|
| Pressure Drop to Atmosphere bar | Air Flow std L/min |
| 0.68 | 9.3 |
| 3.4 | 25.4 |
| 6.8 | 42.4 |

| Max. Flow Cv=0.16 | |
|---|---|
| Pressure Drop to Atmosphere bar | Air Flow std L/min |
| 0.68 | 56.6 |
| 3.4 | 181 |
| 6.8 | 323 |

## Dimensions




| End Connections | | Ordering Number | Dimensions, in. (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inlet/Outlet | Size | | L | H | H1 | H2 | E | G |
| A type (Straight Pattern) | | | | | | | | |
| Tube Fittings | 1/16 in. | SS-VMV-A-01 | 1.56 (39.6) | 2.34 (59.4) | 0.92 (23.4) | / | 0.38 (9.6) | 0.45 (11.4) |
| | 1/8 in. | SS-VMV-A-02 | 1.90 (48.3) | | | | | |
| | 1/4 in. | SS-VMV-A-04 | 2.04 (51.8) | | | | | |
| | 3mm | SS-VMV-A-3M | 1.90 (48.3) | | | | | |
| | 6mm | SS-VMV-A-6M | 2.04 (51.8) | | | | | |
| VFS Male | 1/4 in. | SS-VMV-A-MV4 | 2.06 (52.3) | | | | | |
| A type (Angle Pattern) | | | | | | | | |
| Tube Fittings | 1/16 in. | SS-VMV-AL-01 | 0.81 (20.6) | 3.22 (81.8) | 0.92 (23.4) | 0.88 (22.4) | 0.38 (9.6) | 0.45 (11.4) |
| | 1/8 in. | SS-VMV-AL-02 | 0.98 (24.9) | 3.22 (81.8) | | 0.98 (24.9) | | |
| | 1/4 in. | SS-VMV-AL-04 | 1.02 (25.9) | 3.36 (85.3) | | 1.02 (25.9) | | |
| | 3mm | SS-VMV-AL-3M | 0.98 (24.9) | 3.32 (84.3) | | 0.99 (25.1) | | |
| Male NPT / Tube Fittings | 1/8 in. | SS-VMV-AL-M2-02 | 0.98 (24.9) | 3.07 (78.0) | | 0.98 (24.9) | | |
| B type (Straight Pattern) | | | | | | | | |
| Tube Fittings | 1/8 in. | SS-VMV-B-02 | 2.02 (51.3) | 2.78 (70.6) | 1.56 (39.6) | / | 0.50 (12.7) | 0.58 (14.7) |
| | 1/4 in. | SS-VMV-B-04 | 2.20 (55.9) | | | | | |
| | 3mm | SS-VMV-B-3M | 2.02 (51.3) | | | | | |
| | 6mm | SS-VMV-B-6M | 2.20 (55.9) | | | | | |
| Male NPT | 1/8 in. | SS-VMV-B-M2 | 1.50 (38.1) | | | | | |
| | 1/4 in. | SS-VMV-B-M4 | 1.96 (49.8) | | | | | |
| Female NPT | 1/8 in. | SS-VMV-B-F2 | 1.94 (49.3) | | | | | |
| VFS Male | 1/4 in. | SS-VMV-B-MV4 | 2.06 (52.3) | | | | | |
| B type (Angle Pattern) | | | | | | | | |
| Tube Fittings | 1/8 in. | SS-VMV-BL-02 | 1.01 (25.7) | 3.30 (83.8) | 1.07 (27.2) | 1.01 (25.7) | 0.50 (12.7) | 0.58 (14.7) |
| | 1/4 in. | SS-VMV-BL-04 | 1.10 (27.9) | 3.39 (86.1) | | 1.10 (27.9) | | |
| | 3mm | SS-VMV-BL-3M | 1.01 (25.7) | 3.30 (83.8) | | 1.01 (25.7) | | |
| | 6mm | SS-VMV-BL-6M | 1.10 (27.9) | 3.39 (86.1) | | 1.10 (27.9) | | |
| Male NPT | 1/8 in. | SS-VMV-BL-M2 | 0.75 (19.1) | 3.04 (77.2) | | 0.75 (19.1) | | |
| | 1/4 in. | SS-VMV-BL-M4 | 0.98 (24.9) | 3.27 (83.1) | | 1.02 (25.9) | | |
| Male NPT / Tube Fittings | 1/8 in. | SS-VMV-BL-M2-02 | 1.01 (25.7) | 3.04 (77.2) | | 0.75 (19.1) | | |
| Female NPT | 1/8 in. | SS-VMV-BL-F2 | 0.97 (24.6) | 3.26 (82.8) | | 0.97 (24.6) | | |

# Metering Valves
# VMV Series

## Dimensions

| End Connections | | Ordering Number | Dimensions, in. (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inlet/Outlet | Size | | L | H | H1 | H2 | E | G |
| C type (Straight Pattern) | | | | | | | | |
| Tube Fittings | 1/4 in. | SS-VMV-C-04 | 2.34 (59.4) | 2.82 (71.6) | 1.26 (32.0) | / | 1.13 (28.7) | 0.58 (14.7) |
| | 3/8 in. | SS-VMV-C-06 | 2.46 (62.5) | | | | | |
| | 6mm | SS-VMV-C-6M | 2.34 (59.4) | | | | | |
| Male NPT | 1/4 in. | SS-VMV-C-M4 | 2.00 (50.8) | | | | | |
| C type (Angle Pattern) | | | | | | | | |
| Tube Fittings | 1/4 in. | SS-VMV-CL-04 | 1.17 (29.7) | 3.77 (95.8) | 1.04 (26.4) | 1.17 (29.7) | 1.13 (28.7) | 0.58 (14.7) |
| | 6mm | SS-VMV-CL-6M | | | | | | |

## Options and Accessories

### Vernier Handle

Product Features:

- Helps ensure repeatable flow adjustments.
- Provides readings accurate to 1/25 turn.
- Kits contain all parts necessary to add a Vernier handle to an existing valve.

Ordering Example:
SS-VMV-AL-02-Y

## Ordering Infomation

**SS - VMV - B - 02 - 02 - Y**

**Materials**

SS: 316

**Series**

A: A type (Straight Pattern)
AL: A type (Angle Pattern)
B: B type (Straight Pattern)
BL: B type (Angle Pattern)
C: C type (Straight Pattern)
CL: C type (Angle Pattern)

**Inlet / Outlet**

Tube fittings: See product size table for details
Male NPT: See product size table for details
Female NPT: See product size table for details
VFS Male: See product size table for details

**Handle**

None: standard
Y: Vernier Handle

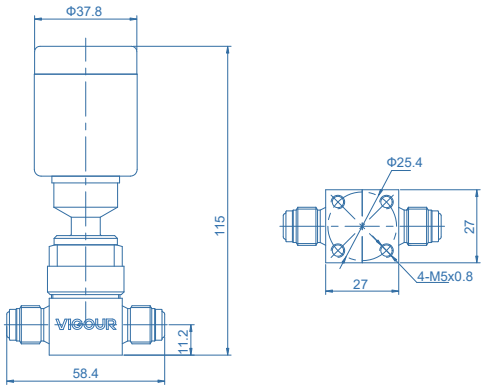
## Product Feature

- Ultrahigh cycle life with high-speed actuation
- Normally open and normally closed pneumatic actuation
- Electronic or optical actuator position-sensing option
- The product is fabricated in compliance with the VS001A process specification
- Suitable for ultrahigh-purity applications
- Modular surface-mount, tube butt weld, and VFS end connections
- Opening and closing time of less than 5ms
- Fully swept flow path facilities
- Thermal isolation coupling optional


## Technical Data

| | |
|---|---|
| Max. Working Pressure: | 150 psig (10bar) |
| Nominal Diameter: | Φ4.1 |
| Working Temp.: | -9°F ~ 399°F (-23°C ~ 200°C)<br>Body Max. Temp 200°C |
| Materials | |
| Body: | see ordering info |
| Diaphragm: | Elgiloy® |
| Seat: | High purity PFA |
| Flow capacity: | Cv=0.27 |
| Weight: | approx. 1.54kg |

## Dimensions (mm)




## Ordering Information

**VALD S - PO - MV4 - MV4**

**Materials**

S: 316L
SLV: 316L secondary remelt

**Actuator**

PO: pneumatic actuator,normally opened
PC: pneumatic actuator,normally closed

**End Connection**

TW4: 1/4" tube weld
FV4: 1/4" VFS (F)
MV4: 1/4" VFS (M)

* Other connection standard,consult factory

# All-Welded Check Valves
# VUCV Series

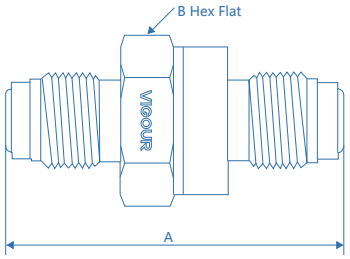
## Product Feature

- All-welded design body with minimal dead space
- Cracking pressure less than 2 psig (0.13bar)
- The product is fabricated in compliance with the VS001A process specification
- 316L SS Materials for ultra-high purity grackle
- Strong durability as well as corrosion resistance for long cycle life
- Elgiloy® spring material with free noise in the process of using


## Technical Data

| | |
|---|---|
| Working Pressure: | 3000 psig (200bar) |
| Cracking Pressure: | <2 psig (0.13bar) |
| Working Temperature: | -10~80℃ |
| Material | |
| Body: | SS 316L |
| Sprting: | Elgiloy® |
| O-ring: | FKM |
| Flow Capacity: | Cv=0.55 (1/4") |
| | Cv=0.70 (1/2") |

## Dimensions (mm)




| End Comections | Dimensions (mm) | |
|---|---|---|
| | A | B |
| 1/4" VFS male | 45.7 | 22 |
| 1/2" VFS male | 52.5 | 27 |

## Ordering Information

**VUCV - S - MV4 - MV4 - E**

**Material**

S: 316L
H: Hastelloy® C276

**Inlets / Outlets**

MV4: 1/4"VFS male
MV8: 1/2"VFS male

**Seal Materials**

E: EPDM
K: Kalrez® (FFKM)

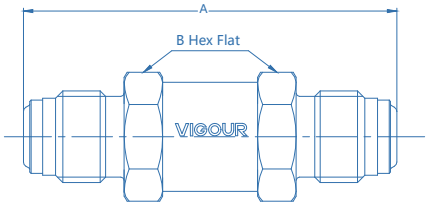
## Product Feature

- Compact check valve
- O-ring Materials: VITON® standard, EPDM or FFKM optional
- Working pressure: Max. 4500 psig (300bar)
- The product is fabricated in compliance with the VS001A process specification
- Opening pressure: 1/3psi / 1psi
- Inlet/outlet connection: VFS fitting


## Typical Applications

- Designed for instrument panels and systems
- Hydrogen energy
- High-flow applications

## Dimensions (mm)



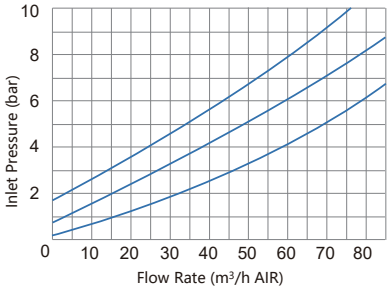

| Ordering Number | Dimensions (mm) | |
|---|---|---|
| | A | B |
| VCVH-S-MV4-MV4 | 58.2 | 17.4 |
| VCVH-S-MV8-MV8 | 68.3 | 25.4 |
| VCVH-S-MV12-MV12 | 96.0 | 41.2 |

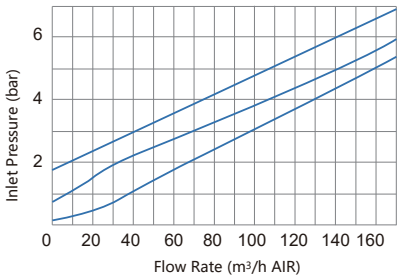
## Technical Data

| | |
|---|---|
| Working pressure: | Max. 4500 psig (300 bar) |
| Opening pressure: | 1/3psi / 1psi |
| Parent material: | see ordering info |
| Inlet/outlet connection: | see ordering info |
| O-ring: | VITON® (standard)<br>EPDM / FFKM (optional) |
| Leakage rate: | Bubble-tight |

## Flowchart

| Nominal opening pressure | Opening pressure range | Reset pressure |
|---|---|---|
| psi (bar) | | |
| 1/3 (0.03) | 3 (0.21) under | 6 (0.42) under |
| 1 (0.07) | 4 (0.28) under | 5 (0.35) |
| 5 (0.35) | 3~9 (0.21~0.63) | 2 (0.14) |
| 10 (0.69) | 7~15 (0.49~1.1) | 3 (0.21) |
| 25 (1.8) | 20~30 (1.4~2.1) | 17 (1.21) |




## Ordering Information

**VCVH - S - MV4 - MV4 - E - 1**

**Materials**
S: 316L
H: Hastelloy® C276

**Inlet / Outlet Connection**
MV4: 1/4" VFS male
MV8: 1/2" VFS male
MV12: 3/4" VFS male

**Opening pressure**
1: 1psi
1/3: 1/3 psi

**O-ring**
None: VITON®
E: EPDM
K: FFKM

# Adjustable Check Valve
# VCA Series

## Product Feature

- Check Valve with Adjustable Pressure
- Set the opening pressure via the adjusting screw
- The locking screw keeps the setting
- The product is fabricated in compliance with the VS001A process specification
- 316 stainless steel and brass materials

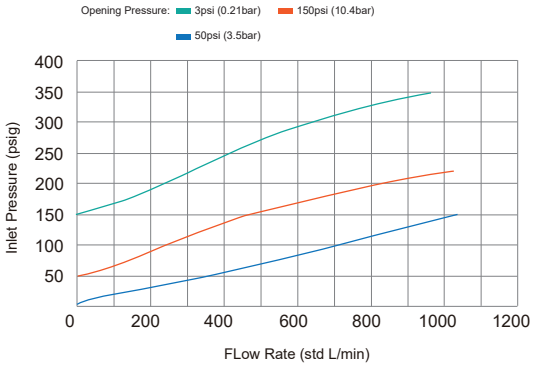

## Typical Applications

- Designed for instrument panels and systems
- Hydrogen energy
- High-flow applications

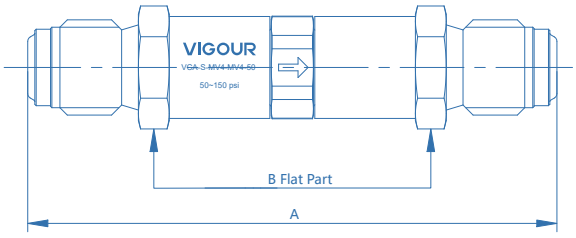
## Technical Data

| | |
|---|---|
| Working pressure: | Max. 3000 psig (206 bar) |
| Opening pressure: | 3~350psi |
| Parent material: | see ordering info |
| Inlet/outlet connection: | see ordering info |
| O-ring: | FKM (Standard) EPDM / FFKM (optional) |
| Leakage rate: | Bubble-tight |

## Flowchart




## Dimensions (mm)




| Connections | Dimensions (mm) | |
|---|---|---|
| | A | B |
| 04 | 82 | 15.8 |
| 6M | | |
| 8M | 84.3 | |
| M4 | 79.2 | |
| MV4 | 78.5 | |

## Ordering Information

**VCA - S - MV4 - MV4 - 50 - E**

**Materials**

S: 316L

**Inlet / Outlet**

04: 1/4" Tube fitting
6M: 6mm Tube fitting
8M: 8mm Tube fitting
M4: 1/4" NPT male
MV4: 1/4" VFS male

**O-ring**

None: FKM
E: EPDM
K: FFKM

**Opening pressure**

3: 3~50psi
50: 50~150 psi
150: 150~350psi

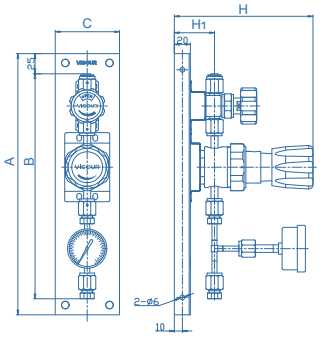
## Product Features

- Ultra high purity gas stick for all gas delilery systems
  100TG: ≤30 slpm delivery 1/4" VFS
  200TG: ≤300 slpm delivery 3/8" VFS
  300TG: ≤600 slpm delivery 1/2" VFS
- The product is fabricated in compliance with the VS001A process specification
- High control accuracy
- All connections welded or VFS
- Manual or pneumatic diaphragm valve option
- 100% Helium-leak-tested

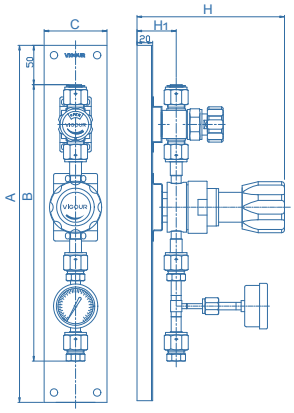

## Technical Data

| | |
|---|---|
| Inlet pressure $P_1$: | 300 psig (20bar) |
| Outlet pressure $P_2$: | Vac to 10/30/60/100/150 psig (1/2/4/7/10bar) |
| Diaphragm valve materials | |
| body: | 316L |
| Valve seat: | PCTFE |
| Diaphragm: | Elgiloy® |
| Regulator materials | |
| body: | 316L / 316L secondary remelt |
| Valve seat: | PCTFE |
| Diaphragm: | Hastelloy® C276 |
| Leak rate: (to atmosphere) | $1x10^{-9}$ mbar l/s He |
| (via seat) | $1x10^{-8}$ mbar l/s He |

## Dimensions (mm)



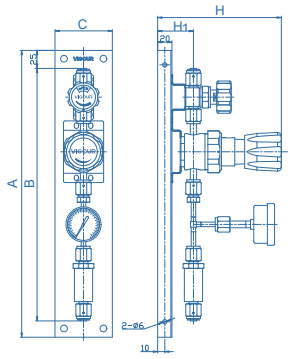

VUP-100TG (A Type)



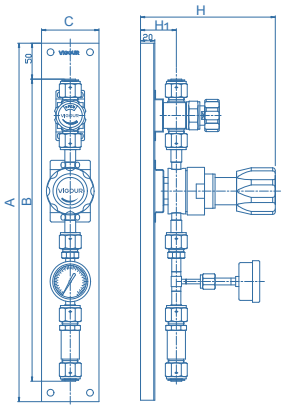

VUP-200TG / VUP-300TG (A Type)

| Type | Panel Thickness mm | Ordering Number | Dimensions, mm | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | H | H1 |
| 100TG | 20 | VUP-100TG-A | 325 | 280 | 80 | 172.5 | 50 |
| 200TG | 20 | VUP-200TG-A | 455 | 352.4 | 80 | 188 | 50 |
| 300TG | 20 | VUP-300TG-A | 455 | 349.2 | 80 | 188 | 50 |

# Gas Stick Assemblies
# VUP Series

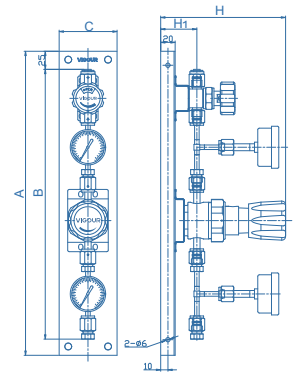



VUP-100TG (B Type)

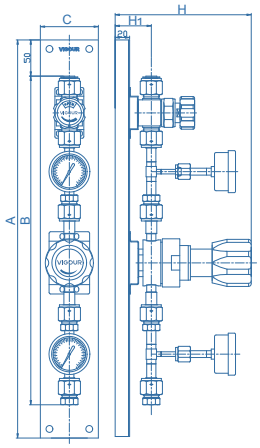



VUP-200TG / VUP-300TG (B Type)

| Type | Panel Thickness mm | Ordering Number | Dimensions, mm | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | H | H1 |
| 100TG | 20 | VUP-100TG-B | 400 | 352.3 | 80 | 172.5 | 50 |
| 200TG | 20 | VUP-200TG-B | 500 | 421.4 | 80 | 188 | 50 |
| 300TG | 20 | VUP-300TG-B | 500 | 418.2 | 80 | 188 | 50 |

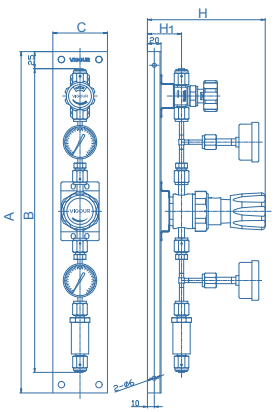



VUP-100TG (C Type)

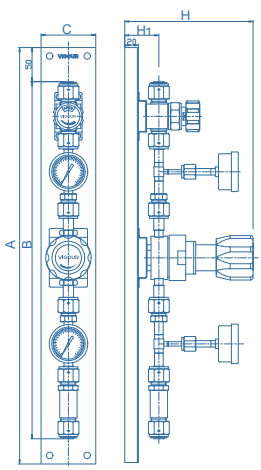



VUP-200TG / VUP-300TG (C Type)

| Type | Panel Thickness mm | Ordering Number | Dimensions, mm | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | H | H1 |
| 100TG | 20 | VUP-100TG-C | 420 | 372.6 | 80 | 172.5 | 50 |
| 200TG | 20 | VUP-200TG-C | 550 | 454.1 | 80 | 188 | 50 |
| 300TG | 20 | VUP-300TG-C | 550 | 447.7 | 80 | 188 | 50 |




VUP-100TG (D Type)




VUP-200TG / VUP-300TG (D Type)

| Type | Panel Thickness mm | Ordering Number | Dimensions, mm | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | H | H1 |
| 100TG | 20 | VUP-100TG-D | 500 | 444.9 | 80 | 172.5 | 50 |
| 200TG | 20 | VUP-200TG-D | 610 | 523.1 | 80 | 188 | 50 |
| 300TG | 20 | VUP-300TG-D | 610 | 516.7 | 80 | 188 | 50 |



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## Ordering Information

**VUP - 100TG - D - 20 - 10 - FV4 - P - P - FV4 - F - PC**

### Series
100TG: ≤30 slpm delivery 1/4”VFS
200TG: ≤300 slpm delivery 3/8”VFS
300TG: ≤600 slpm delivery 1/2”VFS

### Type
A: Single gauge, No filter included
B: Single gauge, included filter
C: Dual gauge, No filter included
D: Dual gauge, included filter
E: Inlet and Outlet diaphragm valves

### Inlet Pressure $P_1$
20: 300 psig

### Outlet Pressure $P_2$
V1: Vac to 10 psig
V2: Vac to 30 psig
V4: Vac to 60 psig
V7: Vac to 100 psig
V10: Vac to 150 psig
1: to 10 psig
2: to 30 psig
4: to 60 psig
7: to 100 psig
10: to 150 psig

### Inlet Valve
None: No inlet valve
MV4: 1/4”VFS male
FV4: 1/4”VFS female
MV8: 1/2”VFS male
FV8: 1/2”VFS female

### Diaphragm Valve Option
None: Manual valve
PC: Pneumatic valve (normally closed)

### Outlet Option
None: Without
F: Filter (0.003 μm)

### Outlet Valve
MV4: 1/4”VFS male
FV4: 1/4”VFS female
MV8: 1/2”VFS male
FV8: 1/2”VFS female

### Outlet Pressure Indication
None: No inlet gauge
P: Pressure gauge
K: Contact pressure gauge
PT: Pressure mitter transmitter

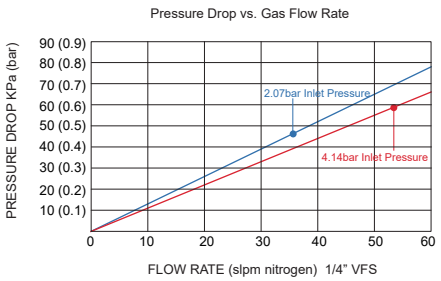
### Inlet Pressure Indication
None: No outlet gauge
P: Pressure gauge
K: Contact pressure gauge
PT: Pressure transducer

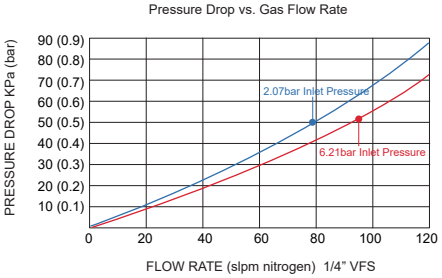
# Filters
# VUF Series

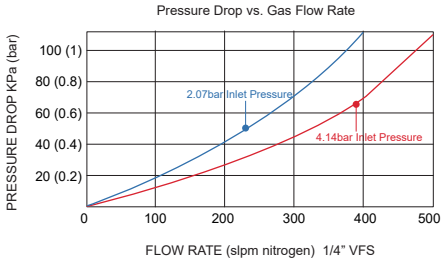
## Product Feature

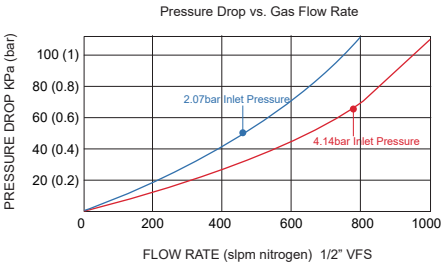
- The VUF series is an in-line gas filter designed for ultra-high purity gas filtration applications
- Filter material: PTFE, Shell material: 316L
- High particle removal efficiency
- Excellent chemical compatibility
- The product is fabricated in compliance with the VS001A process specification
- Filtration accuracy: 0.003μm
- High temperature and high pressure working environment
- Compact and easy to install
- 100% helium leak test


## Vacuum and Flow Specification

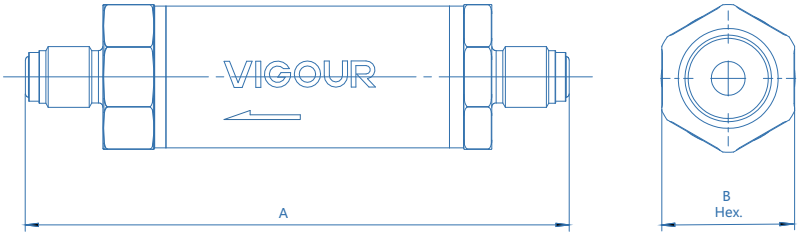


## Dimensions (mm)




| Ordering Number | Dimensions (mm) | |
|---|---|---|
| | A | B |
| VUF-P-MV4-MV4-60 | 84.1 | 18.9 |
| VUF-P-MV4-FV4-60 | 88.9 | 18.9 |
| VUF-P-MV4-MV4-120 | 127 | 25.8 |
| VUF-P-MV4-MV4-500 | 127 | 33.8 |
| VUF-P-MV4-FV4-500 | 141.2 | 33.8 |
| VUF-P-MV8-MV8-120 | 133.4 | 25.8 |
| VUF-P-MV8-MV8-1000 | 127 | 33.8 |

## Ordering Information

| Ordering Number | Shell Material | Filter Material | Inlet Connection | Outlet Connection | Max. Flow Rate |
|---|---|---|---|---|---|
| VUF-P-MV4-MV4-60 | 316L | PTFE | 1/4”VFS male | 1/4”VFS male | 0~60 slpm |
| VUF-P-MV4-FV4-60 | 316L | PTFE | 1/4”VFS male | 1/4”VFS female | 0~60 slpm |
| VUF-P-MV4-MV4-120 | 316L | PTFE | 1/4”VFS male | 1/4”VFS male | 0~120 slpm |
| VUF-P-MV4-MV4-500 | 316L | PTFE | 1/4”VFS male | 1/4”VFS male | 0~500 slpm |
| VUF-P-MV4-FV4-500 | 316L | PTFE | 1/4”VFS male | 1/4”VFS female | 0~500 slpm |
| VUF-P-MV8-MV8-120 | 316L | PTFE | 1/2”VFS male | 1/2”VFS male | 0~120 slpm |
| VUF-P-MV8-MV8-1000 | 316L | PTFE | 1/2”VFS male | 1/2”VFS female | 0~1000 slpm |

# Filters
# VFH Series

## Product Feature

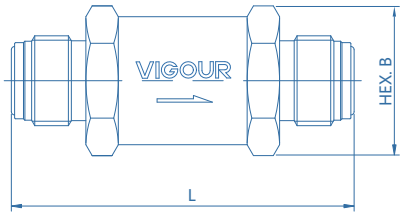
- The VFH Series is an In-Line filtration device
- Filter material: 316L
- The product is fabricated in compliance with the VS001A process specification
- Compact size and lightweight
- Outstanding chemical compatibility
- Tested for use with oxygen


In-line Type

## Technical Data

| | |
|---|---|
| Working Pressure: | 2350 psig (162bar) |
| Working Temperature: | -10~100℃ |
| Material | |
| Body: | SS 316L |
| Filter Element: | SS 316L |
| Gasket: | SS 316L / PTFE |
| End Connection: | VFS Threaded Fitting |

## Dimensions (mm)




| End Comections | Dimensions (mm) | |
|---|---|---|
| | L | B |
| 1/4" VFS male | 79.3 | 32 |
| 1/2" VFS male | 84.4 | 32 |

## Ordering Information

**VFH - S - MV4 - MV4 - 2**

**Material**

S: 316L

**Inlets / Outlets**

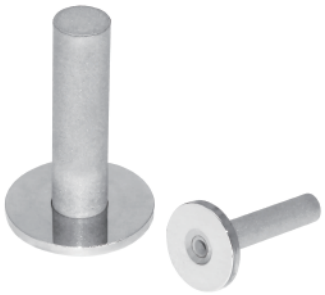
MV4: 1/4" VFS male
MV8: 1/2" VFS male

**Nominal Pore Size**

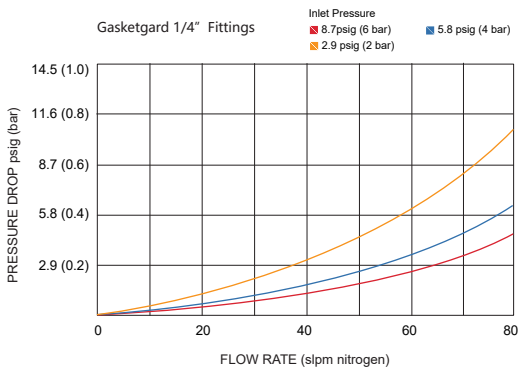
0.5: 0.5 μm
2: 2 μm
5: 5 μm
10: 10 μm
20: 20 μm
40: 40 μm
70: 70 μm

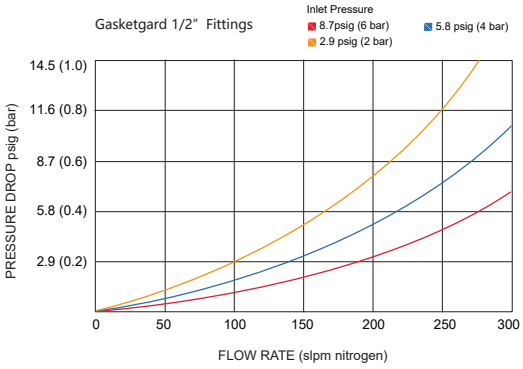
## Product Feature

- All-metal filter
- Comrpact design
- Protect sensitive gas componers from particle damage
- Zntegrate into the gas system with out adding length
- Retain particles down to 0.3μm
- The product is fabricated in compliance with the VS001A process specification
- Filtration accuracy: 0.003μm
- Dired with high purity nitragen
- Fits in place of standard 1/4", 1/2" VFS Gasket

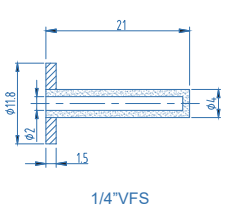


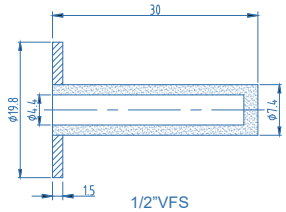
## Flow Rata

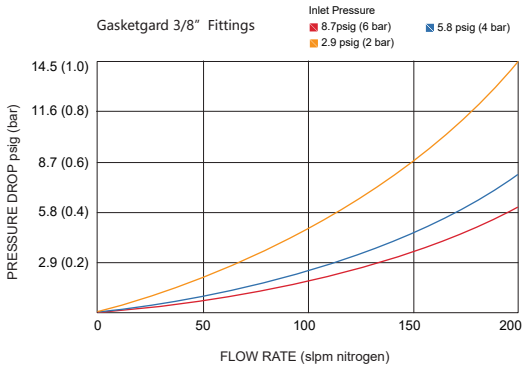



## Dimensions (mm)




## Ordering Information

**VUGF - GK - G4**

| Gasket Option | Option |
|---|---|
| GK: Gasket | G4: 1/4" VFS Gasket |
| GKR: Gasket Retainer Assembly | G6: 3/8" VFS Gasket |
| | G8: 1/2" VFS Gasket |

# Face Seal Fittings
# VVR Series

## General Information

### Materials

| Material | Ordering Number Designator | Specification |
|---|---|---|
| **Glands, Bodies, and Nuts** | | |
| 316L stainless steel | Standard | Bar stock: ASME SA479, ASTM A276<br>Forgings: ASME A182 |
| 316L secondary remelt stainless steel | -SLV | Bar stock: ASME SA479, ASTM A276<br>Forgings: ASME A182 |
| **Gaskets** | | |
| Nickel | -NI | ASTM B162 |
| 316L stainless steel | Standard | ASTM A240, ASTM A167 |

*** The product is fabricated in compliance with the VS001A process specification**

### Dimensions

- Dimensions are for reference only and may change without prior notice
- The D1 dimension refers to the smallest nominal inside diameter of the part

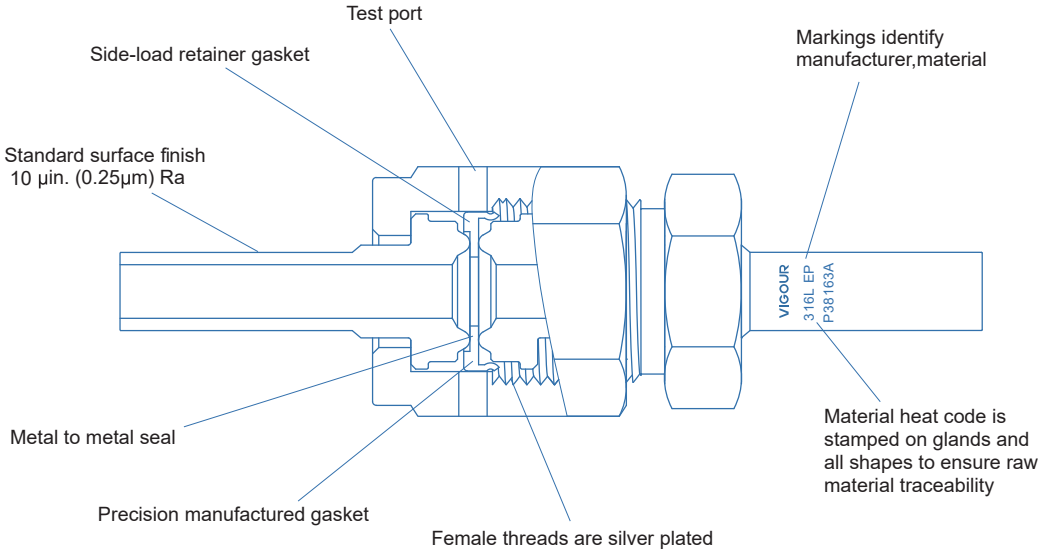
### Pressure Ratings

- Ratings are based upon tests conducted using VFS assemblies
- All ratings comply with calculations per ANSI Code for Pressure Piping B31.3
- To determine pressure ratings in accordance with ANSI B31.3, mutiply psig rating by 0.94
- Ratings determined at ambient temperature

| Components | Material | Temperature, °F (°C) |
|---|---|---|
| Fittings | 316L stainless steel | 1000 (537) |
| | 316L secondary remelt stainless steel | 1000 (537) |
| Gaskets | 316L stainless steel | 1000 (537) |
| | Nickel | 600 (315) |

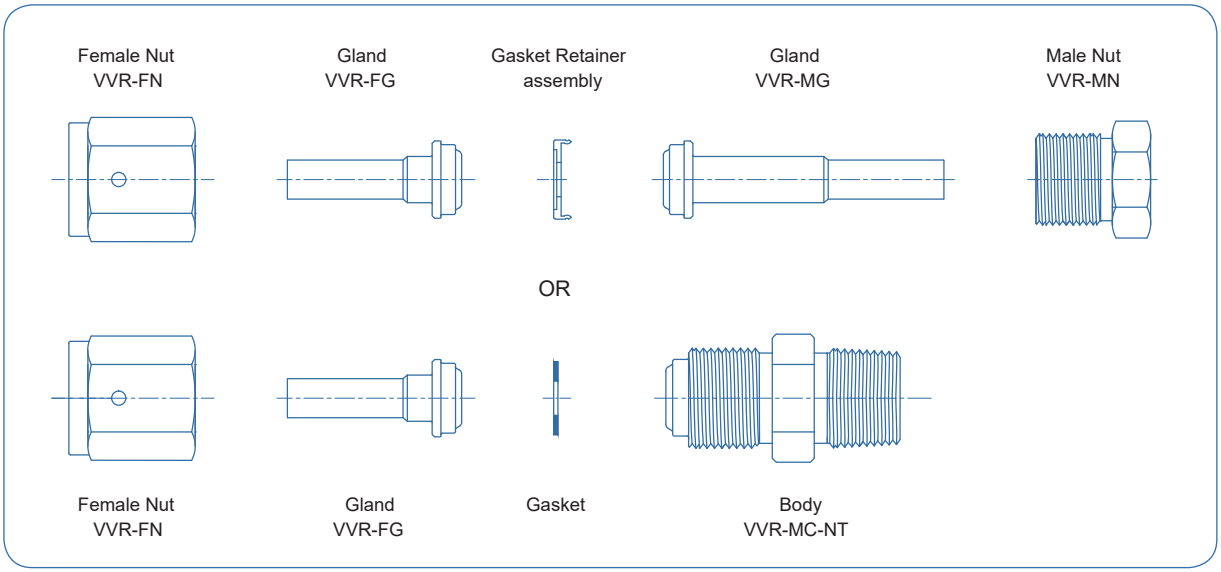
### Testing

The VFS assembly with silver plating has been helium leak tested to a rate of $4x10^{-9}$ mbar l/s He and the unplated gasket to a rate of $4x10^{-11}$ mbar l/s He without leakage.




## Typical VFS Assemblies

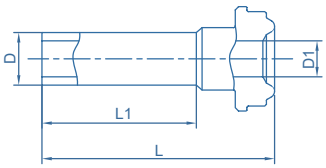
VFS assemblies are made up of four or five basic components.



# Face Seal Fittings
# VVR Series

## Glands

### Short Tube Butt Weld




| D Tube OD in. | Wall Thickness in. | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L1 | D1 | L | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|
| 1/8 | 0.028 | 1/8 | 316L | VVR-FG2-TB2 ① | 0.75 | 0.07 | 1.08 | 8500 |
| | | | 316L secondary remelt | VVR-FG2-TB2-SLV ① | (19.1) | (1.8) | (27.4) | (585) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-FG4-TB4 | 0.75 | 0.18 | 1.10 | 5100 |
| | | | 316L secondary remelt | VVR-FG4-TB4-SLV | (19.1) | (4.6) | (27.9) | (351) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-FG4-TB4-L18 | 0.38 | 0.18 | 0.72 | 5100 |
| | | | 316L secondary remelt | VVR-FG4-TB4-L18-SLV | (9.6) | (4.6) | (18.3) | (351) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-FG4-TB4-L15 | 0.25 | 0.18 | 0.60 | 5100 |
| | | | 316L secondary remelt | VVR-FG4-TB4-L15-SLV | (6.4) | (4.6) | (15.2) | (351) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-FG8-TB4 | 0.75 | 0.18 | 1.12 | 4300 |
| | | | 316L secondary remelt | VVR-FG8-TB4-SLV | (19.1) | (4.6) | (28.4) | (296) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-FG8-TB4-L15 | 0.25 | 0.18 | 0.62 | 4300 |
| | | | 316L secondary remelt | VVR-FG8-TB4-L15-SLV | (19.1) | (4.6) | (15.7) | (296) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-FG8-TB4-L19 | 0.75 | 0.18 | 0.76 | 4300 |
| | | | 316L secondary remelt | VVR-FG8-TB4-L19-SLV | (19.1) | (4.6) | (19.4) | (296) |
| 3/8 | 0.035 | 1/2 | 316L | VVR-FG8-TB6 | 0.75 | 0.31 | 1.12 | 3300 |
| | | | 316L secondary remelt | VVR-FG8-TB6-SLV | (19.1) | (7.9) | (28.4) | (227) |
| 3/8 | 0.035 | 1/2 | 316L | VVR-FG8-TB6-L15 | 0.25 | 0.31 | 0.62 | 3300 |
| | | | 316L secondary remelt | VVR-FG8-TB6-L15-SLV | (6.4) | (7.9) | (15.7) | (227) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-FG8-TB8 | 0.75 | 0.40 | 1.12 | 3700 |
| | | | 316L secondary remelt | VVR-FG8-TB8-SLV | (19.1) | (10.2) | (28.4) | (254) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-FG8-TB8-L18 | 0.38 | 0.40 | 0.74 | 3700 |
| | | | 316L secondary remelt | VVR-FG8-TB8-L18-SLV | (9.6) | (10.2) | (18.8) | (254) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-FG8-TB8-L15 | 0.25 | 0.40 | 0.62 | 3700 |
| | | | 316L secondary remelt | VVR-FG8-TB8-L15-SLV | (6.4) | (10.2) | (15.7) | (254) |
| 3/4 | 0.065 | 3/4 | 316L | VVR-FG12-TB12 | 0.81 | 0.62 | 1.25 | 2400 |
| | | | 316L secondary remelt | VVR-FG12-TB12-SLV | (20.6) | (15.7) | (32) | (165) |
| 1 | 0.065 | 1 | 316L | VVR-FG16-TB16 | 0.75 | 0.87 | 1.51 | 1900 |
| | | | 316L secondary remelt | VVR-FG16-TB16-SLV | (19.1) | (22.1) | (38.6) | (130) |

① not design for gasket retainer assembly

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VVR-FG4-TB4-BA



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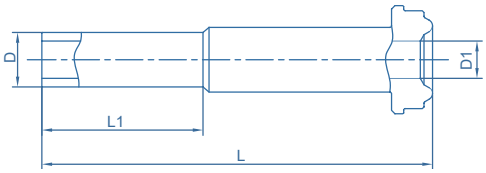
The product is fabricated in compliance with the VS001A process specification.

## Glands

### Long Tube Butt Weld




| D Tube OD in. | Wall Thickness in. | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L1 | D1 | L | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|
| 1/8 | 0.028 | 1/8 | 316L | VVR-MG2-TB2 ① | 0.75 | 0.07 | 1.42 | 8500 |
| | | | 316L secondary remelt | VVR-MG2-TB2-SLV ① | (19.1) | (1.8) | (36.1) | (585) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-MG4-TB4 | 0.75 | 0.18 | 1.70 | 5100 |
| | | | 316L secondary remelt | VVR-MG4-TB4-SLV | (19.1) | (4.6) | (43.2) | (351) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-MG4-TB4-L33 | 0.38 | 0.18 | 1.32 | 5100 |
| | | | 316L secondary remelt | VVR-MG4-TB4-L33-SLV | (9.6) | (4.6) | (33.5) | (351) |
| 1/4 | 0.035 | 1/4 | 316L | VVR-MG4-TB4-L30 | 0.25 | 0.18 | 1.20 | 5100 |
| | | | 316L secondary remelt | VVR-MG4-TB4-L30-SLV | (6.4) | (4.6) | (30.5) | (351) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-MG8-TB4 | 0.75 | 0.18 | 1.79 | 4300 |
| | | | 316L secondary remelt | VVR-MG8-TB4-SLV | (19.1) | (4.6) | (45.5) | (296) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-MG8-TB4-L32 | 0.75 | 0.18 | 1.28 | 4300 |
| | | | 316L secondary remelt | VVR-MG8-TB4-L32-SLV | (19.1) | (4.6) | (32.7) | (296) |
| 1/4 | 0.035 | 1/2 | 316L | VVR-MG8-TB4-L37 | 0.75 | 0.18 | 1.47 | 4300 |
| | | | 316L secondary remelt | VVR-MG8-TB4-L37-SLV | (19.1) | (4.6) | (37.4) | (296) |
| 3/8 | 0.035 | 1/2 | 316L | VVR-MG8-TB6 | 0.75 | 0.31 | 1.79 | 3300 |
| | | | 316L secondary remelt | VVR-MG8-TB6-SLV | (19.1) | (7.9) | (45.5) | (227) |
| 3/8 | 0.035 | 1/2 | 316L | VVR-MG8-TB6-L32 | 0.25 | 0.31 | 1.29 | 3300 |
| | | | 316L secondary remelt | VVR-MG8-TB6-L32-SLV | (6.4) | (7.9) | (32.8) | (227) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-MG8-TB8 | 0.75 | 0.40 | 1.79 | 3500 |
| | | | 316L secondary remelt | VVR-MG8-TB8-SLV | (19.1) | (10.2) | (45.5) | (241) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-MG8-TB8-L35 | 0.38 | 0.40 | 1.41 | 3500 |
| | | | 316L secondary remelt | VVR-MG8-TB8-L35-SLV | (9.6) | (10.2) | (35.8) | (241) |
| 1/2 | 0.049 | 1/2 | 316L | VVR-MG8-TB8-L32 | 0.25 | 0.40 | 1.29 | 3500 |
| | | | 316L secondary remelt | VVR-MG8-TB8-L32-SLV | (6.4) | (10.2) | (32.8) | (241) |
| 3/4 | 0.065 | 3/4 | 316L | VVR-MG12-TB12 | 0.75 | 0.65 | 2.03 | 2400 |
| | | | 316L secondary remelt | VVR-MG12-TB12-SLV | (19.1) | (16.5) | (51.6) | (165) |
| 1 | 0.065 | 1 | 316L | VVR-MG16-TB16 | 0.75 | 0.87 | 2.32 | 2400 |
| | | | 316L secondary remelt | VVR-MG16-TB16-SLV | (19.1) | (22.1) | (58.9) | (165) |

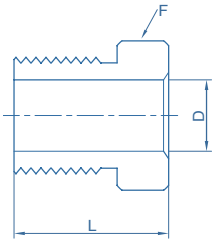
① not design for gasket retainer assembly

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VVR-MG4-TB4-BA

Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

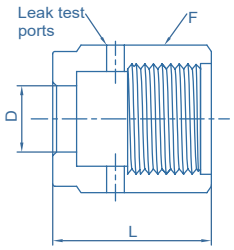
# Face Seal Fittings
# VVR Series

## Male Nut



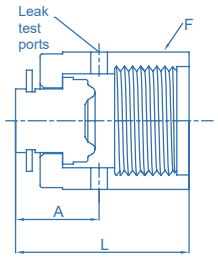

| VFS Size in. | Ordering Number | Material | F Hex Flat | Dimensions, in.(mm) L | D |
|---|---|---|---|---|---|
| 1/8 | VVR-MN2 | 316L | 3/8 | 0.50 (12.7) | 0.21 (5.3) |
| 1/4 | VVR-MN4 | | 5/8 | 0.71 (18.0) | 0.36 (9.1) |
| 1/2 | VVR-MN8 | | 15/16 | 0.81 (20.6) | 0.61 (15.5) |
| 3/4 | VVR-MN12 | | 1-5/16 | 1.00 (25.4) | 0.89 (22.6) |
| 1 | VVR-MN16 | | 1-5/8 | 1.19 (30.2) | 1.20 (30.5) |

## Female Nut




| VFS Size in. | Ordering Number | Material | F Hex Flat | Dimensions, in.(mm) L | D |
|---|---|---|---|---|---|
| 1/8 | VVR-FN2 | 316L | 7/16 | 0.53 (13.5) | 0.21 (5.3) |
| 1/4 | VVR-FN4 | | 3/4 | 0.81 (20.6) | 0.36 (9.1) |
| 1/2 | VVR-FN8 | | 1-1/16 | 0.88 (22.4) | 0.61 (15.5) |
| 3/4 | VVR-FN12 | | 1-1/2 | 1.12 (28.4) | 0.89 (22.6) |
| 1 | VVR-FN16 | | 1-3/4 | 1.34 (34.0) | 1.20 (30.5) |

## Cap




| VFS Size in. | Ordering Number | Material | F Hex Flat | Dimensions, in.(mm) L | A |
|---|---|---|---|---|---|
| 1/8 | VVR-C2 | 316L | 7/16 | 0.63 (16.0) | 0.30 (7.6) |
| 1/4 | VVR-C4 | | 3/4 | 0.94 (23.9) | 0.44 (11.2) |
| 1/2 | VVR-C8 | | 1-1/16 | 1.01 (25.6) | 0.45 (11.4) |
| 3/4 | VVR-C12 | | 1-1/2 | 1.29 (32.8) | 0.54 (13.7) |
| 1 | VVR-C16 | | 1-3/4 | 1.54 (39.1) | 0.63 (16.0) |



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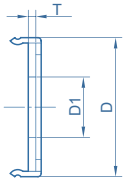
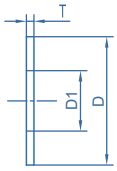
The product is fabricated in compliance with the VS001A process specification.

## Gasket Retainer Assembly




| VFS Size in. | Ordering Number | Material | Dimensions, in.(mm) D1 | T | D |
|---|---|---|---|---|---|
| 1/4 | VVR-GKR-G4<br>VVR-GKR-G4-NI | 316L<br>Nickel | 0.24 (6.1) | 0.028 (0.7) | 0.50 (12.7) |
| 1/2 | VVR-GKR-G8<br>VVR-GKR-G8-NI | 316L<br>Nickel | 0.44 (11.2) | 0.028 (0.7) | 0.79 (20.1) |
| 3/4 | VVR-GKR-G12<br>VVR-GKR-G12-NI | 316L<br>Nickel | 0.66 (16.8) | 0.028 (0.7) | 1.14 (29.0) |
| 1 | VVR-GKR-G16<br>VVR-GKR-G16-NI | 316L<br>Nickel | 0.89 (22.6) | 0.028 (0.7) | 1.40 (35.6) |

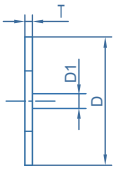
## Filter Gaskets




| VFS Size in. | Ordering Number | Material | Dimensions, in.(mm) D1 | T | D |
|---|---|---|---|---|---|
| 1/4 | VVR-GKF-G4<br>VVR-GKRF-G4 | 316L | 0.22 (5.6) | 0.028 (0.7) | 0.47 (11.9) |
| 1/2 | VVR-GKF-G8<br>VVR-GKRF-G8 | 316L | 0.44 (11.2) | 0.028 (0.7) | 0.78 (19.8) |

* Element Nominal Pore Size (Optaion) : 0.5μm / 2μm / 5μm / 10μm / 20μm / 60μm
Ordering Example: VVR-GKF-G4-0.5

## Flow-limiting Gaskets




| VFS Size in. | Ordering Number | Material | Dimensions, in.(mm) D1 | T | D |
|---|---|---|---|---|---|
| 1/8 | VVR-GK-G2-O-*<br>VVR-GK-G2-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 0.26 (6.6) |
| 1/4 | VVR-GK-G4-O-*<br>VVR-GK-G4-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 0.47 (11.9) |
| | VVR-GK-G4-12.7-O-*<br>VVR-GK-G4-12.7-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 0.50 (12.7) |
| 1/2 | VVR-GK-G8-O-*<br>VVR-GK-G8-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 0.78 (19.8) |
| 3/4 | VVR-GK-G12-O-*<br>VVR-GK-G12-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 1.14 (29.0) |
| 1 | VVR-GK-G16-O-*<br>VVR-GK-G16-NI-O-* | 316L<br>Nickel | * | 0.028 (0.7) | 1.40 (35.6) |

* Please consult the manufacturer for gasket size.

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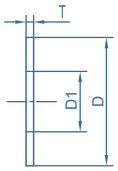
The product is fabricated in compliance with the VS001A process specification.

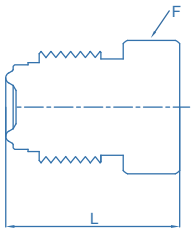
# Face Seal Fittings
# VVR Series

## Gaskets




| VFS Size in. | Ordering Number | Material | Dimensions, in.(mm) D1 | T | D |
|---|---|---|---|---|---|
| 1/8 | VVR-GK-G2<br>VVR-GK-G2-NI | 316L<br>Nickel | 0.09 (2.3) | 0.028 (0.7) | 0.26 (6.6) |
| 1/4 | VVR-GK-G4<br>VVR-GK-G4-NI | 316L<br>Nickel | 0.22 (5.6) | 0.028 (0.7) | 0.47 (11.9) |
| | VVR-GK-G4-12.7<br>VVR-GK-G4-12.7-NI | 316L<br>Nickel | 0.22 (5.6) | 0.028 (0.7) | 0.50 (12.7) |
| 1/2 | VVR-GK-G8<br>VVR-GK-G8-NI | 316L<br>Nickel | 0.44 (11.2) | 0.028 (0.7) | 0.78 (19.8) |
| 3/4 | VVR-GK-G12<br>VVR-GK-G12-NI | 316L<br>Nickel | 0.66 (16.8) | 0.028 (0.7) | 1.14 (29.0) |
| 1 | VVR-GK-G16<br>VVR-GK-G16-NI | 316L<br>Nickel | 0.89 (22.6) | 0.028 (0.7) | 1.40 (35.6) |

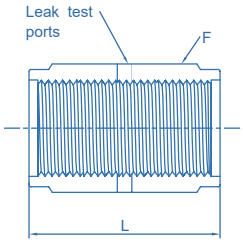
## Plug




| VFS Size in. | Ordering Number | Material | Dimensions, in.(mm) F Hex Flat | L |
|---|---|---|---|---|
| 1/8 | VVR-P2 ① | 316L | 3/8 | 0.68 (17.3) |
| 1/4 | VVR-P4 ② | | 5/8 | 0.92 (23.4) |
| 1/2 | VVR-P8 | | 15/16 | 1.08 (27.4) |
| 3/4 | VVR-P12 | | 1-5/16 | 1.43 (36.3) |
| 1 | VVR-P16 | | 1-5/8 | 1.52 (38.6) |

① Not designed for gasket retainer assembly.
② Also available as a rotatable plug.
Ordering number: VVR-P8-R

## Coupling




| VFS Size in. | Material | Ordering Number | Dimensions, in.(mm) L | F |
|---|---|---|---|---|
| 1/8 | 316L | VVR-FU2 | 0.66 (16.8) | 7/16 |
| 1/4 | | VVR-FU4 | 1.19 (30.2) | 3/4 |
| 1/2 | | VVR-FU8 | 1.31 (33.3) | 1-1/16 |
| 3/4 | | VVR-FU12 | 1.68 (42.7) | 1-1/2 |
| 1 | | VVR-FU16 | 2.04 (51.8) | 1-3/4 |



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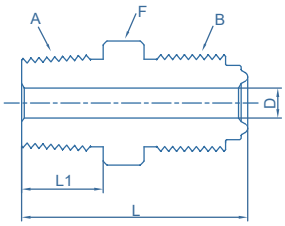
## Male NPT Connectors ①

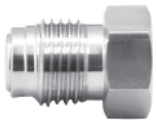


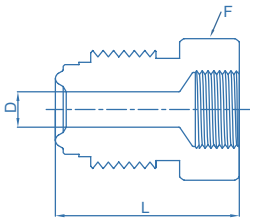

| A NPT Size in. | B VFS Size in. | Material | Ordering Number | Dimensions, in.(mm) L | L1 | D | F | Working Pressure psig (bar) NI | SS |
|---|---|---|---|---|---|---|---|---|---|
| 1/16 | 1/8 | 316L | VVR-MC2-M1 ① | 1.07 (27.2) | 0.38 (9.6) | 0.09 (2.3) ③ | 3/8 | 9000 (620) | 9000 (620) |
| 1/8 | 1/8 | | VVR-MC2-M2 ② | 1.07 (27.2) | 0.38 (9.6) | 0.09 (2.3) ③ | 7/16 | 9000 (620) | 9000 (620) |
| 1/8 | 1/4 | | VVR-MC4-M2 | 1.31 (33.3) | 0.38 (9.6) | 0.18 (4.6) | 5/8 | 10000 (689) | 6400 (440) |
| 1/4 | 1/4 | | VVR-MC4-M4 | 1.49 (37.8) | 0.56 (14.2) | 0.18 (4.6) | 5/8 | 10000 (689) | 6400 (440) |
| 1/4 | 1/2 | | VVR-MC8-M4 | 1.65 (41.9) | 0.56 (14.2) | 0.28 (7.1) ③ | 15/16 | 4300 (296) | 2800 (192) |
| 3/8 | 1/2 | | VVR-MC8-M6 | 1.65 (41.9) | 0.56 (14.2) | 0.38 (9.6) | 15/16 | 4300 (296) | 2800 (192) |
| 1/2 | 1/2 | | VVR-MC8-M8 | 1.84 (46.7) | 0.75 (19.1) | 0.4 (10.2) | 15/16 | 4300 (296) | 2800 (192) |
| 3/4 | 3/4 | | VVR-MC12-M12 | 2.19 (55.6) | 0.75 (19.1) | 0.62 (15.7) | 1-5/16 | 3700 (254) | 2400 (165) |
| 1 | 1 | | VVR-MC16-M16 | 2.47 (62.7) | 0.94 (23.9) | 0.87 (22.1) | 1-5/8 | 2400 (165) | 3000 (206) |

① VFS components with fixed threads must remain stationary during installation.
These fitting connections should be assembled only to glands with rotating male or female threaded nuts.
② Not designed for gasket retainer assembly
③ May lontain internal diumeter transitions

To order fittings manufactured for Surface finish Ra(Average)<0.4 add BA to the ordering number.
Example: VVR-MC4-M4-BA

## Female NPT Connectors ①





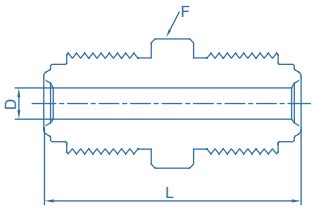

| NPT Size in. | VFS Size in. | Material | Ordering Number | Dimensions, in.(mm) L | D | F flat | Working Pressure psig (bar) NI | SS |
|---|---|---|---|---|---|---|---|---|
| 1/16 | 1/8 | 316L | VVR-MC2-F1 ① | 1.10 (27.9) | 0.09 (2.3) | 7/16 | 6700 (461) | 6700 (461) |
| 1/8 | 1/8 | | VVR-MC2-F2 ② | 1.19 (30.2) | 0.09 (2.3) | 9/16 | 6500 (447) | 6500 (447) |
| 1/8 | 1/4 | | VVR-MC4-F2 | 1.41 (35.8) | 0.18 (4.6) | 5/8 | 8000 (551) | 8000 (551) |
| 1/4 | 1/4 | | VVR-MC4-F4 | 1.54 (39.1) | 0.18 (4.6) | 3/4 | 6600 (454) | 6600 (454) |
| 3/8 | 1/2 | | VVR-MC8-F6 | 1.76 (44.7) | 0.40 (10.2) | 15/16 | 3500 (241) | 4300 (296) |
| 1/2 | 1/2 | | VVR-MC8-F8 | 1.99 (50.5) | 0.40 (10.2) | 1-1/16 | 3500 (241) | 4300 (296) |
| 3/4 | 3/4 | | VVR-MC12-F12 | 2.36 (59.9) | 0.62 (15.7) | 1-5/16 | 3000 (206) | 3700 (254) |
| 1 | 1 | | VVR-MC16-F16 | 2.51 (63.8) | 0.87 (22.1) | 1-5/8 | 2400 (165) | 3000 (206) |

① VFS components with fixed threads must remain stationary during installation.
These fitting connections should be assembled only to glands with rotating male or female threaded nuts.
② Not designed for gasket retainer assembly

To order fittings manufactured for Surface finish Ra(Average)<0.4 add BA to the ordering number.
Example: VVR-MC4-F4-BA

# Face Seal Fittings
# VVR Series

## Male Union ①

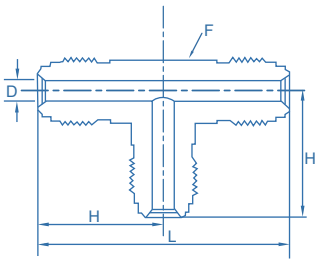



| VFS Size in. | Material | Ordering Number | Dimensions, in.(mm) | | | Working Pressure psig (bar) | |
|---|---|---|---|---|---|---|---|
| | | | L | D | F | NI | SS |
| 1/8 | 316L | VVR-MU2 ② | 1.13 (28.7) | 0.09 (2.3) | 3/8 | 9000 (620) | 11200 (771) |
| 1/4 | | VVR-MU4 | 1.55 (39.4) | 0.18 (4.6) | 5/8 | 8000 (551) | 10000 (689) |
| 1/2 | | VVR-MU8 | 1.84 (46.7) | 0.40 (10.2) | 15/16 | 3500 (241) | 4300 (296) |
| 3/4 | | VVR-MU12 | 2.44 (62.0) | 0.62 (15.7) | 1-5/16 | 3000 (206) | 3700 (254) |
| 1 | | VVR-MU16 | 2.59 (65.8) | 0.87 (22.1) | 1-5/8 | 2400 (165) | 3000 (206) |

① VFS components with fixed threads must remain stationary during installation.
These fitting connections should be assembled only to glands with rotating male or female threaded nuts.
② Not designed for gasket retainer assembly

To order fittings manufactured for Surface finish Ra(Average)<0.4 add BA to the ordering number.
Example: VVR-MU4-BA

## Male Union Tee


| VFS Size in. | Material | Ordering Number | Dimensions, in.(mm) | | | | Working Pressure psig (bar) | |
|---|---|---|---|---|---|---|---|---|
| | | | L | D | F | H | NI | SS |
| 1/8 | 316L | VVR-MUT-2 | 1.78 (45.2) | 0.09 (2.3) | 7/16 | 0.89 (22.6) | 9000 (620) | 11200 (771) |
| 1/4 | | VVR-MUT-4 | 2.14 (54.4) | 0.18 (4.6) | 1/2 | 1.07 (27.2) | 8000 (551) | 10000 (689) |
| 1/2 | | VVR-MUT-8 | 2.90 (73.7) | 0.40 (10.2) | 13/16 | 1.45 (36.8) | 3500 (241) | 4300 (296) |
| 3/4 | | VVR-MUT-12 | 3.84 (97.5) | 0.62 (15.7) | 1-1/4 | 1.92 (48.8) | 3000 (206) | 3700 (254) |
| 1 | | VVR-MUT-16 | 4.00 (102) | 0.87 (22.1) | 1-11/16 | 2.00 (50.8) | 2400 (165) | 3000 (206) |

To order fittings manufactured for Surface finish Ra(Average)<0.4 add BA to the ordering number.
Example: VVR-MUT-4-BA

## Fitting Lock Device

This device is intended for use on VIGOUR VFS metal gasket face seal assemblies with standard male and female nuts.

| Size in. | Material | Ordering Number |
|---|---|---|
| 1/4 | 316L | VVR-FLD-4 |
| 1/2 | 316L | VVR-FLD-8 |

| Size in. | Material | Matching product | Ordering Number |
|---|---|---|---|
| 1/4 | 316L | VDV32 | VVR-FLD-DV32-4 |
| | | VDV33 | VVR-FLD-DV33-4 |
| 1/2 | 316L | VDV32 | VVR-FLD-DV32-8 |
| | | VDV33 | VVR-FLD-DV33-8 |



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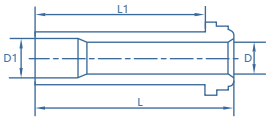
The product is fabricated in compliance with the VS001A process specification.

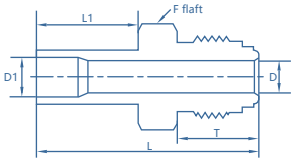
## High-Flow Connections

### Glands
### Tube Butt Weld



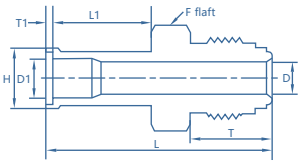

| Tube Size in. | Nomlnal Wall Thickness | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | L1 | D | D1 | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 0.035 | 1/4 | 316L | HVVR-HG4-TB6-L15 | 0.60 (15.2) | 0.41 (10.4) | 0.25 (6.4) | 0.31 (7.9) | 3300 (227) | 3300 (227) |
| 3/8 | 0.035 | 1/4 | 316L | HVVR-HG4-TB6-L30 | 1.19 (30.2) | 1.00 (25.4) | 0.25 (6.4) | 0.31 (7.9) | 3300 (227) | 3300 (227) |
| 3/8 | 0.035 | 1/4 | 316L | HVVR-HG4-TB6-L33 | 1.31 (33.3) | 1.12 (28.4) | 0.25 (6.4) | 0.31 (7.9) | 3300 (227) | 3300 (227) |

### Bodies
### Tube Butt Weld




| Tube Size in. | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | L1 | T | D | D1 | F | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1/4 | 316L | HVVR-MG4-TB6 | 1.68 (42.7) | 0.75 (19.1) | 0.62 (15.7) | 0.25 (6.4) | 0.31 (7.9) | 5/8 | 3300 (227) | 3300 (227) |

### Bodies
### Automatic Tube Weld



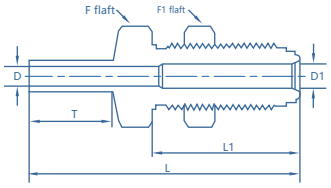

| Tube Size in. | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | L1 | T | T1 | D | D1 | F | H | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1/4 | 316L | HVVR-AHG4-TW6 | 1.71 (43.4) | 0.75 (19.1) | 0.62 (15.7) | 0.03 (0.8) | 0.25 (6.4) | 0.31 (7.9) | 5/8 | 0.41 (10.4) | 3300 (227) | 3300 (227) |

Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

# Face Seal Fittings
# HVVR Series

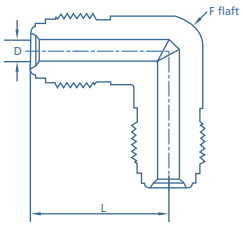
## High-Flow Connections

### Bodies
### Bulkhead Connector



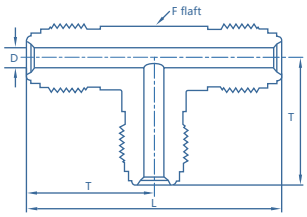

| Tube Size in. | VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | L1 | T | D | D1 | F | F1 | Panel Hole Dia | Max Panel Thickness | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 1/4 | 316L | HVVR-BMG4-TB6 | 2.36 (59.9) | 1.30 (33.0) | 0.75 (19.1) | 0.31 (7.9) | 0.25 (6.4) | 3/4 | 3/4 | 19/32 (15.0) | 0.44 (11.2) | 3300 (227) | 3300 (227) |

### Union Elbow




| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | D | F | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|
| 1/4 | 316L | HVVR-UE4 | 1.07 (27.2) | 0.25 (6.4) | 1/2 | 8000 (551) | 10000 (689) |

### Union Tee




| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | T | D | F | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|---|---|
| 1/4 | 316L | HVVR-UT4 | 2.14 (54.4) | 1.07 (27.2) | 0.25 (6.4) | 1/2 | 8000 (551) | 10000 (689) |



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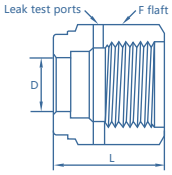
## High-Flow Connections

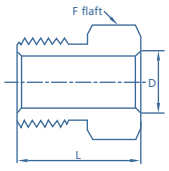
### Nuts Female




| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | D | F |
|---|---|---|---|---|---|
| 1/4 | 316L | HVVR-FN4 ① | 0.81 (20.6) | 0.39 (9.9) | 3/4 |

① Use for High Flow Connections: Glands Tube Butt Weld

### Nuts Male

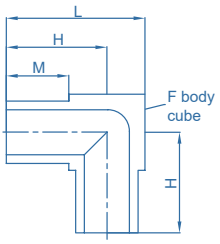



| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | D | F |
|---|---|---|---|---|---|
| 1/4 | 316L | HVVR-MN4 | 0.71 (18.0) | 0.39 (9.9) | 5/8 |

Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

# Micro Weld fittings
# VMW Series

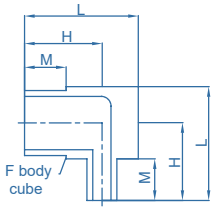
## Union Elbow


| Tube OD in. | Wall Thickness in. | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 1/8 | 0.028 | VMW-UE2<br>VMW-UE2-SLV | 0.56 (14.2) | 0.25 (6.4) | 5/16 | 0.41 (10.4) | 8500 (585) |
| 1/4 | 0.035 | VMW-UE4<br>VMW-UE4-SLV | 0.56 (14.2) | | 5/16 | 0.41 (10.4) | 5100 (351) |
| 3/8 | 0.035 | VMW-UE6<br>VMW-UE6-SLV | 0.69 (17.5) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | VMW-UE8<br>VMW-UE8-SLV | 0.81 (20.6) | | 9/16 | 0.53 (13.5) | 3700 (254) |
| 3/4 | 0.065 | VMW-UE12<br>VMW-UE12-SLV | 1.06 (27.0) | | 13/16 | 0.66 (16.6) | 2400 (165) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-UE6-BA

## Reducing Elbow


| Tube OD in. | Wall Thickness in. | Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|---|
| 1/4 | 0.035 | 1/8 | 0.028 | VMW-RE4-2<br>VMW-RE4-2-SLV | 0.56 (14.2) | 0.25 (6.4) | 5/16 | 0.41 (10.3) | 3300 (227) |
| 3/8 | 0.035 | 1/4 | 0.035 | VMW-RE6-4<br>VMW-RE6-4-SLV | 0.69 (17.5) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.035 | VMW-RE8-4<br>VMW-RE8-4-SLV | 0.81 (20.6) | | 9/16 | 0.53 (13.5) | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.035 | VMW-RE8-6<br>VMW-RE8-6-SLV | 0.81 (20.6) | | 9/16 | 0.53 (13.5) | 3300 (227) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-RE6-4-BA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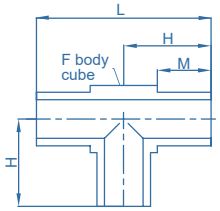
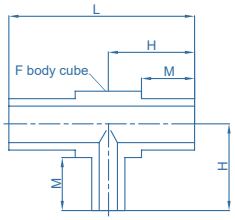
The product is fabricated in compliance with the VS001A process specification.

## Union Tee


| Tube OD in. | Wall Thickness in. | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 1/8 | 0.028 | VMW-UT2<br>VMW-UT2-SLV | 0.82 (20.8) | 0.25 (6.4) | 5/16 | 0.41 (10.4) | 8500 (585) |
| 1/4 | 0.035 | VMW-UT4<br>VMW-UT4-SLV | 0.82 (20.8) | | 5/16 | 0.41 (10.4) | 5100 (351) |
| 3/8 | 0.035 | VMW-UT6<br>VMW-UT6-SLV | 0.94 (23.9) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | VMW-UT8<br>VMW-UT8-SLV | 1.06 (26.9) | | 9/16 | 0.53 (13.5) | 3700 (254) |
| 3/4 | 0.065 | VMW-UT12<br>VMW-UT12-SLV | 1.31 (33.3) | | 13/16 | 0.65 (16.6) | 2400 (165) |

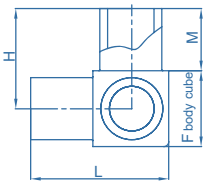
## Reducing Tee


| Tube OD in. | Wall Thickness in. | Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|---|
| 1/4 | 0.035 | 1/8 | 0.028 | VMW-RT4-2<br>VMW-RT4-2-SLV | 0.81 (20.6) | 0.25 (6.4) | 5/16 | 0.41 (10.3) | 3300 (227) |
| 3/8 | 0.035 | 1/4 | 0.035 | VMW-RT6-4<br>VMW-RT6-4-SLV | 0.94 (23.9) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.035 | VMW-RT8-4<br>VMW-RT8-4-SLV | 1.06 (26.9) | | 9/16 | 0.53 (13.5) | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.035 | VMW-RT8-6<br>VMW-RT8-6-SLV | 1.06 (26.9) | | 9/16 | 0.53 (13.5) | 3300 (227) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-RT6-4-BA

## Tribow

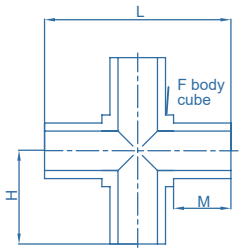

| Tube OD in. | Wall Thickness in. | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 1/4 | 0.035 | VMW-TB4<br>VMW-TB4-SLV | 0.56 (14.2) | 0.25 (6.4) | 5/16 | 0.41 (10.4) | 5100 (351) |
| 3/8 | 0.035 | VMW-TB6<br>VMW-TB6-SLV | 0.69 (17.5) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | VMW-TB8<br>VMW-TB8-SLV | 0.81 (20.6) | | 9/16 | 0.53 (13.5) | 3700 (254) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-TB6-BA

Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

# Micro Weld fittings
# VMW Series

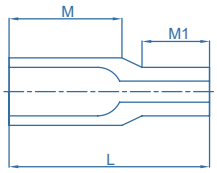
## Cross Union


| Tube OD in. | Wall Thickness in. | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 1/8 | 0.028 | VMW-CU2<br>VMW-CU2-SLV | 0.82 (20.8) | 0.25 (6.4) | 5/16 | 0.41 (10.4) | 8500 (585) |
| 1/4 | 0.035 | VMW-CU4<br>VMW-CU4-SLV | 0.82 (20.8) | | 5/16 | 0.41 (10.4) | 5100 (351) |
| 3/8 | 0.035 | VMW-CU6<br>VMW-CU6-SLV | 0.94 (23.9) | | 7/16 | 0.47 (11.9) | 3300 (227) |
| 1/2 | 0.049 | VMW-CU8<br>VMW-CU8-SLV | 1.06 (26.9) | | 9/16 | 0.53 (13.5) | 3700 (254) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-CU4-BA

## Reducing Union


| Tube OD in. | Wall Thickness in. | Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | M1 | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|
| 1/4 | 0.035 | 1/8 | 0.028 | VMW-RU4-2<br>VMW-RU4-2-SLV | 0.75 (19.0) | 0.42 (10.7) | 0.25 (6.4) | 5100 (351) |
| 3/8 | 0.035 | 1/4 | 0.035 | VMW-RU6-4<br>VMW-RU6-4-SLV | | | | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.035 | VMW-RU8-4<br>VMW-RU8-4-SLV | | | | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.035 | VMW-RU8-6<br>VMW-RU8-6-SLV | | | | 3300 (227) |
| 3/4 | 0.065 | 1/4 | 0.035 | VMW-RU12-4<br>VMW-RU12-4-SLV | | | | 2400 (165) |
| 3/4 | 0.065 | 3/8 | 0.035 | VMW-RU12-6<br>VMW-RU12-6-SLV | | | | 2400 (165) |
| 3/4 | 0.065 | 1/2 | 0.049 | VMW-RU12-8<br>VMW-RU12-8-SLV | | | | 2400 (165) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VMW-RU6-4-BA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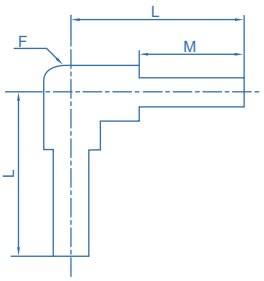
Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

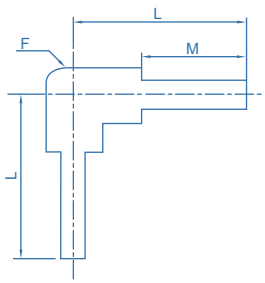
## Long Elbow 90°


| Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | F | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|
| 1/4 | 0.035 | VTW-LE4 | 1.23 (31.2) | | 7/16 | 5100 (351) |
| 3/8 | 0.035 | VTW-LE6 | 1.20 (30.5) | | 7/16 | 3300 (227) |
| 1/2 | 0.049 | VTW-LE8 | 1.34 (34.0) | 0.75 (19.0) | 11/16 | 3700 (254) |
| 3/4 | 0.065 | VTW-LE12 | 1.46 (37.1) | | 15/16 | 2400 (165) |
| 1 | 0.065 | VTW-LE16 | 1.34 (34.0) | | 1-1/4 | 1900 (130) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VTW-LE4-BA

## Reducing Long Elbow

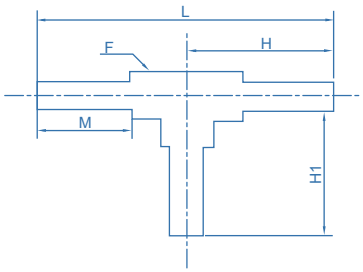




| Tube OD in. | Wall Thickness in. | Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | F | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|
| 3/8 | 0.039 | 1/4 | 0.039 | VTW-RLE6-4 | 0.98 (25) | | 6/16 | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.039 | VTW-RLE8-4 | 1.06 (27) | | 7/16 | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.039 | VTW-RLE8-6 | 1.06 (27) | | 7/16 | 3300 (227) |
| 3/4 | 0.065 | 1/4 | 0.039 | VTW-RLE12-4 | 1.24 (31.5) | 0.75 (19.0) | 15/16 | 2400 (165) |
| 3/4 | 0.065 | 3/8 | 0.039 | VTW-RLE12-6 | 1.24 (31.5) | | 15/16 | 2400 (165) |
| 3/4 | 0.065 | 1/2 | 0.049 | VTW-RLE12-8 | 1.24 (31.5) | | 15/16 | 2400 (165) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VTW-RLE6-4-BA

# Tube Butt Weld fittings
# VTW Series

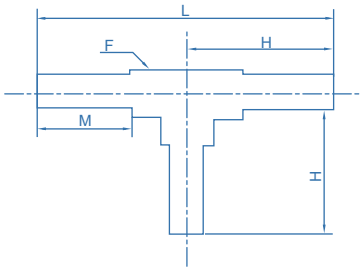
## Long Tee


| Tube OD in. | Wall Thickness in. | Ordering Number | Dimensions, in.(mm) L | M | F | H | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 1/4 | 0.035 | VTW-LT4 | 2.46 (62.5) | 0.75 (19.0) | 7/16 | 1.23 (31.2) | 5100 (351) |
| 3/8 | 0.035 | VTW-LT6 | 2.40 (61.0) | | 7/16 | 1.20 (30.5) | 3300 (227) |
| 1/2 | 0.049 | VTW-LT8 | 2.68 (68.1) | | 11/16 | 1.34 (34.0) | 3700 (254) |
| 3/4 | 0.065 | VTW-LT12 | 2.91 (73.9) | | 15/16 | 1.46 (37.1) | 2400 (165) |
| 1 | 0.065 | VTW-LT16 | 2.68 (68.1) | | 1-1/4 | 1.34 (34.0) | 1900 (130) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VTW-LT4-BA

## Reducing Long Tee

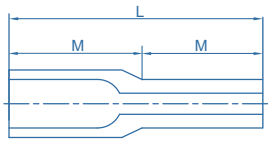

| Tube OD in. | Wall Thickness in. | Tube OD | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | M | F | H | H1 | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 0.035 | 1/4 | 0.035 | VTW-RLT6-4 | 2.39 (60.7) | 0.75 (19.0) | 7/16 | 1.20 (30.5) | 1.23 (31.2) | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.035 | VTW-RLT8-4 | 2.67 (67.8) | | 11/16 | 1.34 (34.0) | 1.34 (34.0) | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.035 | VTW-RLT8-6 | 2.67 (67.8) | | 11/16 | 1.34 (34.0) | 1.35 (34.3) | 3300 (227) |
| 3/4 | 0.065 | 1/4 | 0.035 | VTW-RLT12-4 | 2.91 (73.9) | | 15/16 | 1.46 (37.1) | 1.48 (37.6) | 2400 (165) |
| 3/4 | 0.065 | 3/8 | 0.035 | VTW-RLT12-6 | 2.91 (73.9) | | 15/16 | 1.46 (37.1) | 1.48 (37.6) | 2400 (165) |
| 3/4 | 0.065 | 1/2 | 0.049 | VTW-RLT12-8 | 2.48 (63.0) | | 15/16 | 1.24 (31.5) | 1.24 (31.5) | 2400 (165) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VTW-RLT6-4-BA



Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

## Reducing Long Union

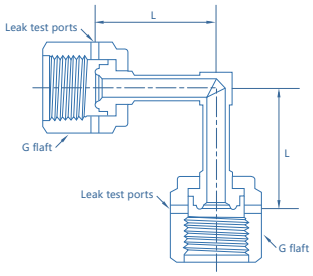

| Tube OD in. | Wall Thickness in. | Tube OD in. | Wall Thickness mm | Ordering Number | Dimensions, in.(mm) L | Dimensions, in.(mm) M | Working Pressure psig (bar) |
|---|---|---|---|---|---|---|---|
| 3/8 | 0.035 | 1/4 | 0.035 | VTW-RLU6-4 | | | 3300 (227) |
| 1/2 | 0.049 | 1/4 | 0.035 | VTW-RLU8-4 | | | 3700 (254) |
| 1/2 | 0.049 | 3/8 | 0.035 | VTW-RLU8-6 | | | 3300 (227) |
| 3/4 | 0.065 | 1/4 | 0.035 | VTW-RLU12-4 | | | 2400 (165) |
| 3/4 | 0.065 | 3/8 | 0.035 | VTW-RLU12-6 | 1.50 (38.1) | 0.75 (19.0) | 2400 (165) |
| 3/4 | 0.065 | 1/2 | 0.049 | VTW-RLU12-8 | | | 2400 (165) |
| 1 | 0.065 | 1/4 | 0.035 | VTW-RLU16-4 | | | 2400 (165) |
| 1 | 0.065 | 3/8 | 0.049 | VTW-RLU16-6 | | | 2400 (165) |
| 1 | 0.065 | 1/2 | 0.049 | VTW-RLU16-8 | | | 2400 (165) |
| 1 | 0.065 | 3/4 | 0.049 | VTW-RLU16-12 | | | 2400 (165) |

To order fittings manufactured for Surface Finish Ra(Average)＜0.4 add BA to the ordering number.
Example: VTW-RLU6-4-BA

# Weld Assembiles
# VWR Series

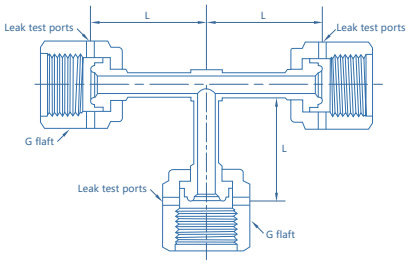
## Welded Assembiles

### Female Elbow




| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | G | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|
| 1/4 | 316L | VWR-FE4 | 1.00 (25.4) | 3/4 | 8000 (551) | 10000 (689) |

### Female Tee




| VFS Size in. | Material | Qrdering Number | Dimensions, in.(mm) L | G | Working Pressure psig (bar) Ni | 316L |
|---|---|---|---|---|---|---|
| 1/4 | 316L | VWR-FT4 | 1.00 (25.4) | 3/4 | 8000 (551) | 10000 (689) |



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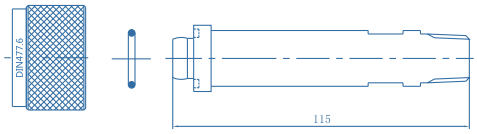
Dimensions are for reference only and may change without prior notice.
The product is fabricated in compliance with the VS001A process specification.

## Product Feature

- Cylinder Connections
- Connect to a cylinder valve
- The product is fabricated in compliance with the VS001A process specification
- 1/4” NPT male / 6mm tube fitting / 6mm OD tube connection
- All connections are degrease to oxygen service
- 15μin. Ra max., 10μin. Ra average surface finish




Hand tight nut & nipple
(Example: VCC-C-HNN-DIN477.6)

## Ordering Information

**VUC - S - N - CGA580 - TF6M**

### Material

S: 316L

### Parts Code

N: nut
NN: nut + nipple
HN: hand tight nut
HNN: hand tight nut + nipple
NNP: nut + nipple, plug
NNGP: nut + nipple, gasket, plug
G: gasket

### Inlet Connection

None: 1/4” NPT(M)
6M: 6mm tube fitting
TW6M: 6mm tube weld
TW4: 1/4” tube weld

### Cylinder Connection

Detailed description of the cylinder connection including the relevant standard and number of the connection

# Cylinder Connections
# VUC DISS Series

## Technical Data

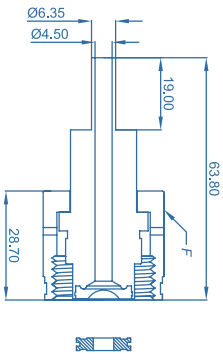
| Materials of Construction | |
|---|---|
| Wetted | |
| Nuts | 316 Stainless Steel |
| Nipples | 316L Stainless Steel |
| Outlet Adapters | 316L Stainless Steel |
| Cylinder Valve Outlet Caps | 316L Stainless Steel |
| Gaskets | Nickel Standard* |

* Contact factory for other materials available.

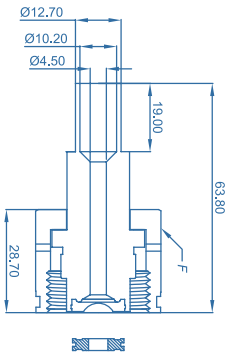
The product is fabricated in compliance with the VS001A process specification.

### Nut,Nipple and Nickel Gasket Assembly

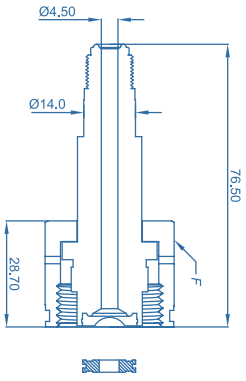
| CGA/DISS Number | End Connection | F Hex Flat in. |
|---|---|---|
| 632 ~ 642 | 1/4" Tube Weld<br>1/2" Tube Weld<br>1/4" VFS Male<br>1/4" NPT Male | 1-1/4 |
| 712 ~ 728 | 1/4" Tube Weld<br>1/2" Tube Weld<br>1/4" VFS Male<br>1/4" NPT Male | 1-3/8" |



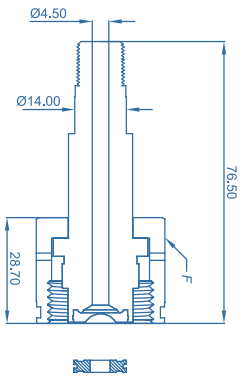

1/4" Tube Weld



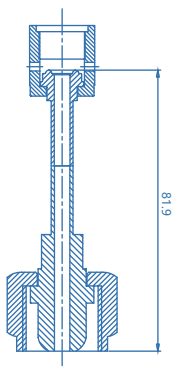

1/2" Tube Weld




1/4" VFS Male



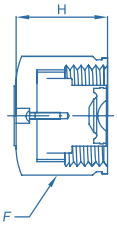

1/4" NPT Male




Cylinder Connections to 1/4" VFS Female

### CAPS

| CGA/DISS Number | Ordering Number | Material | F Hex Flat in. | H Length in. | Gas Tight |
|---|---|---|---|---|---|
| 632 ~ 642 | VUC-DISS-C-63 | Nickel / PTFE | 1-1/4 | 0.98 | Yes |
| 712 ~ 728 | VUC-DISS-C-71 | | 1-3/8 | | |



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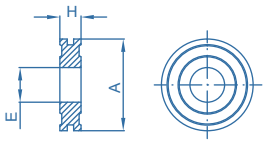
## GASKETS

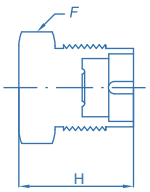
| Material | Ordering Number | A | H | E |
|---|---|---|---|---|
| Nickle | VUC-DISS-G-NI | 0.56 | 0.105 | 0.21 |
| PCTFE | VUC-DISS-G-PC | | 0.125 | |

* Hardness Max. 105 Vickers.

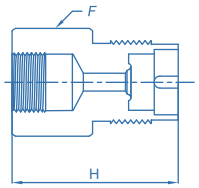



## Plugs and Adapters

| CGA/DISS Number | Ordering Number | End Connection | H Overal Length | F Hex Flat in. |
|---|---|---|---|---|
| 632 ~ 642 | VUC-DISS-BP-63<br>VUC-DISS-A-F4-63 | Plug<br>1/4" NPT Female | 1.53<br>1.85 | 1-1/8 |
| 712 ~ 718 | VUC-DISS-BP-71<br>VUC-DISS-A-F4-71 | Plug<br>1/4" NPT Female | 1.53<br>1.85 | 1-1/4 |
| 720 ~ 728 | VUC-DISS-BP-72<br>VUC-DISS-A-F4-72 | Plug<br>1/4" NPT Female | 1.53<br>1.85 | 1-1/4 |




Plug




Adaptor

## Ordering Information

**VUC-DISS- NNG - CGA632 - TW4 - Ni**

### Parts Code

N: nut
P: plug
NNG: nut + nipple, gasket
NNGP: nut + nipple, gasket, plug

### CGA Number

| | | |
|---|---|---|
| CGA632 | CGA642 | CGA720 |
| CGA634 | CGA712 | CGA722 |
| CGA636 | CGA714 | CGA724 |
| CGA638 | CGA716 | CGA726 |
| CGA640 | CGA718 | CGA728 |

### Gasket Material

Ni: Nickle
PC: PCTFE

### End Connection

MV4: 1/4" VFS male
TW4: 1/4" tube weld
TW8: 1/2" tube weld
FV4: 1/4" VFS Female
M4: 1/4" NPT male

* Other connection standard,consult factory

# Pressure Gauge
# VGU/VRU/VGT/VRT/VG/VR Series

## Product Feature

- UHP “clean” for semiconductor gas applications, in accordance with SEMI/SEMATECH
- Purged with nitrogen
- Protective cap over threaded connection
- The product is fabricated in compliance with the VS001A process specification
- 100% factory calibrated and helium leak tested to a maximum rate of 1x10$^{-9}$ mbar l/s He

VRU

VGU

## Technical Data

| | |
|---|---|
| Type | pressure gauge |
| Materials: | |
| End connection | 316L VAR,electropolished |
| Bourdon tube | 316L SS |
| Case | 304 SS |
| Lens | polycarbonate |
| Movement | stainess steel |
| Dial & Pointer | aluminum |
| Scale | psig/bar dual scale |
| Dial size | 2" |
| Accuracy | Grade A per ASME B40.1 |
| Ambient temperature | –40°F to 140°F (–40°C to 60°C) |

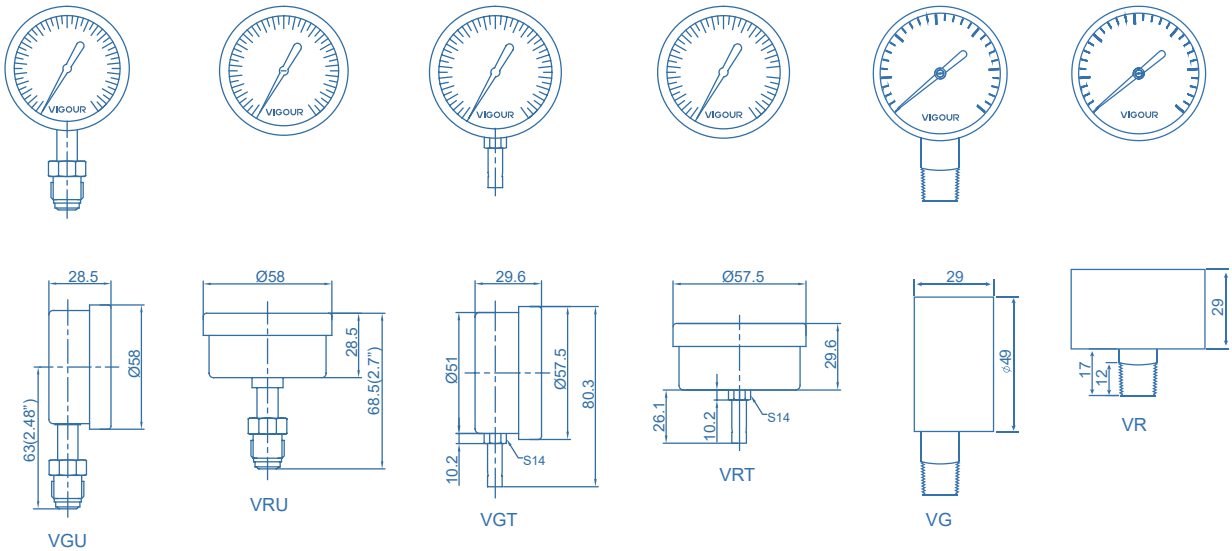
VRT

VGT

VR

VG

## Dimensions



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## Ordering Information

### VGU/VRU Series (Ultra High Purity)

| Ordering Number | Inlet Connection | Pressure Range (bar/psig) |
|---|---|---|
| **VGU Series, Lower Mount, VFS End** | | |
| VGU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-FV4 | 1/4" VFS female | 0~1.6/2.5/4/6/7/10/14/16/25/35/60 bar<br>0~23/30/60/86/100/140/200/230/350/500/860 psig |
| VGU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-MV4 | 1/4" VFS male | |
| VGU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-RMV4 | 1/4" rotatable VFS male | |
| VGU20S-100/150/250/315/400B-FV4 | 1/4" VFS female | 0~100/150/250/315/400 bar<br>0~1500/2000/3500//4500/5800 psig |
| VGU20S-100/150/250/315/400B-MV4 | 1/4" VFS male | |
| VGU20S-100/150/250/315/400B-RMV4 | 1/4" rotatable VFS male | |
| VGU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-FV4 | 1/4" VFS female | Vac~1.6/2.5/4/6/7/10/14/16 bar<br>Vac~23/30/60/86/100/140/200/230 psig |
| VGU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-MV4 | 1/4" VFS male | |
| VGU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-RMV4 | 1/4" rotatable VFS male | |
| **VRU Series, Center-Back Mount, VFS End** | | |
| VRU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-FV4 | 1/4" VFS female | 0~1.6/2.5/4/6/7/10/14/16/25/35/60 bar<br>0~23/30/60/86/100/140/200/230/350/500/860 psig |
| VRU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-MV4 | 1/4" VFS male | |
| VRU20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-RMV4 | 1/4" rotatable VFS male | |
| VRU20S-100/150/250/315/400B-FV4 | 1/4" VFS female | 0~100/150/250/315/400 bar<br>0~1500/2000/3500/4500/5800 psig |
| VRU20S-100/150/250/315/400B-MV4 | 1/4" VFS male | |
| VRU20S-100/150/250/315/400B-RMV4 | 1/4" rotatable VFS male | |
| VRU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-FV4 | 1/4" VFS female | Vac~1.6/2.5/4/6/7/10/14/16 bar<br>Vac~23/30/60/86/100/140/200/230 psig |
| VRU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-MV4 | 1/4" VFS male | |
| VRU20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-RMV4 | 1/4" rotatable VFS male | |

### VGT/VRT Series(Tube Connection)

| Ordering Number | Inlet Connection | Pressure Range (bar/psig) |
|---|---|---|
| **VGT Series, Lower Mount, Tube End** | | |
| VGT20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-T4 | 1/4"tube | 0~1.6/2.5/4/6/7/10/14/16/25/35/60 bar<br>0~23/30/60/86/100/140/200/230/350/500/860 psig |
| VGT20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-T6M | 6mm tube | |
| VGT20S-100/150/250/315/400B-T4 | 1/4"tube | 0~100/150/250/315/400 bar<br>0~1500/2000/3500//4500/5800 psig |
| VGT20S-100/150/250/315/400B-T6M | 6mm tube | |
| VGT20S-V2.5/V4/V16B-T4 | 1/4"tube | Vac~1.6/2.5/4/6/7/10/14/16 bar<br>Vac~23/30/60/86/100/140/200/230 psig |
| VGT20S-V2.5/V4/V16B-T6M | 6mm tube | |
| **VRT Series, Center-Back Mount, Tube End** | | |
| VRT20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-T4 | 1/4"tube | 0~1.6/2.5/4/6/7/10/14/16/25/35/60 bar<br>0~23/30/60/86/100/140/200/230/350/500/860 psig |
| VRT20S-1.6/2.5/4/6/7/10/14/16/25/35/60B-T6M | 6mm tube | |
| VRT20S-100/150/250/315/400B-T4 | 1/4"tube | 0~100/150/250/315/400 bar<br>0~1500/2000/3500/4500/5800 psig |
| VRT20S-100/150/250/315/400B-T6M | 6mm tube | |
| VRT20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-T4 | 1/4"tube | Vac~1.6/2.5/4/6/7/10/14/16 bar<br>Vac~23/30/60/86/100/140/200/230 psig |
| VRT20S-V1.6/V2.5/V4/V6/V7/V10/V14/V16B-T6M | 6mm tube | |

### VG/VR Series(NPT Connection)

| Ordering Number | Inlet Connection | Pressure Range (bar/psig) |
|---|---|---|
| **VG Series, Lower Mount, NPT End** | | |
| VG20S-1.6/2.5/4/6/10/16/25/35/60B-M4 | 1/4"male NPT | 0~1.6/2.5/4/6/10/16/25/35/60 bar<br>0~23/30/60/86/140/230/350/500/860 psig |
| VG20S-100/150/250/315/400B-M4 | 1/4"male NPT | 0~100/150/250/315/400 bar<br>0~1500/2000/3500//4500/5800 psig |
| VG20S-V1.6/V2.5/V4/V6/V10/V16B-M4 | 1/4"male NPT | Vac~1.6/2.5/4/6/10/16 bar<br>Vac~23/30/60/86/140/230 psig |
| **VR Series, Center-Back Mount, NPT End** | | |
| VR20S-1.6/2.5/4/6/10/16/25/35/60B-M4 | 1/4"male NPT | 0~1.6/2.5/4/6/10/16/25/35/60 bar<br>0~23/30/60/86/140/230/350/500/860 psig |
| VR20S-100/150/250/315/400B-M4 | 1/4"male NPT | 0~100/150/250/315/400 bar<br>0~1500/2000/3500/4500/5800 psig |
| VR20S-V1.6/V2.5/V4/V6/V10/V16B-M4 | 1/4"male NPT | Vac~1.6/2.5/4/6/10/16 bar<br>Vac~23/30/60/86/140/230 psig |

# Contact Gauges
# VGU20SE / VRU20SE Series

## Product Feature

- Contact gauge (KI) with inductance contact
- For monitoring gas supply pressure and shortage
- standard surface finish 10μin. (0.25μm) Ra
- For inert, combustible, oxidizing, and corrosive gases and gas mixtures
- The product is fabricated in compliance with the VS001A process specification
- Line 0.5m
- With NAMUR sensor
- Set point adjustable over 0~24% of scale
- Tested for use with oxygen


VGU

VRU

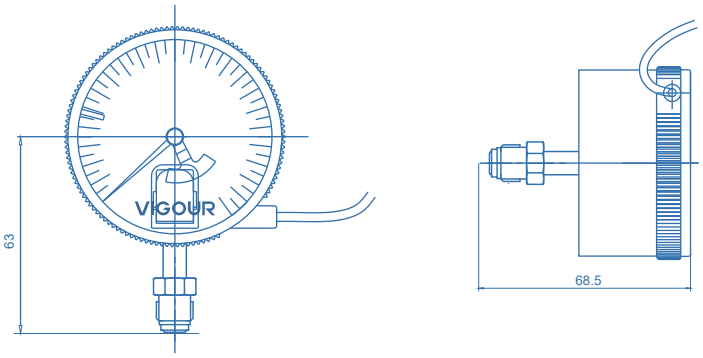
## Typical Applications

Gas panels may be optionally equipped with contact pressure gauges. Contact pressure gauges combine the advantages of in situ readings with the demands of electrical signal transmissions. In combination with signal boxes, this creates visual and acoustic warning signals in the case of pres-sure drop and the monitoring of line pressure according to adjustable thresholds.

## Technical Data

| | |
|---|---|
| Dual scale: | bar / psi |
| Connection: | 1/4" VFS Male / 1/4" VFS Female |
| Size: | 2” |
| Accuracy: | ±2.5% |
| Body Material: | 316L |
| Switching function: | NC |
| Outlet type: | NAMUR |
| Temperature: | -25~100°C |

## Dimensions (mm)




## Ordering Information

**VGU 20 SE - 400**

**Series**
GU: radial direction
RU: axial direction

**Material**
S: 316L EP

**Pressure Range**
400: 0~5800 psig (400bar)
250: 0~3500 psig (250bar)
60: 0~870 psig (60bar)
25: 0~360 psig (25bar)

## Product Features

- Contact gauge (KI) with inductance contact
- For monitoring gas supply pressure and shortage
- For inert, combustible, oxidizing, and corrosive gases and gas mixtures
- The product is fabricated in compliance with the VS001A process specification
- standard surface finish 10μin. (0.25μm) Ra
- internals are electropolishod to optionally meet purrty standards
- 100% helium-leak-tested

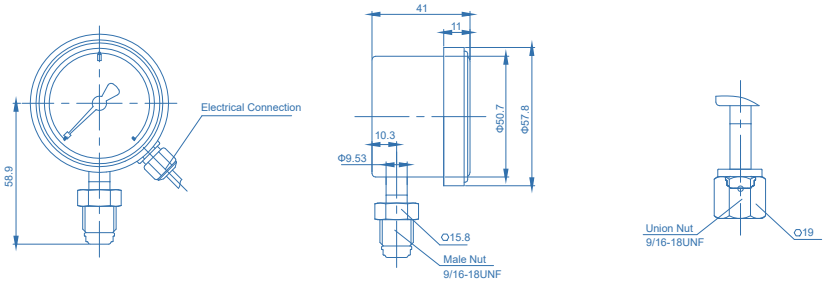
## Typical Applications

Gas panels may be optionally equipped with contact pressure gauges. Contact pressure gauges combine the advantages of in situ readings with the demands of electrical signal transmissions. In combination with signal boxes, this creates visual and acoustic warning signals in the case of pres-sure drop and the monitoring of line pressure according to adjustable thresholds.

## Technical Data

| | |
|---|---|
| Dual scale: | bar / psi |
| Connection: | VFS connection |
| Size: | 2” |
| Accuracy: | Grade A per ASME B40.1 |
| Body Material: | 316L |
| Switching function: | NC / NO |
| Electrical rating | switching voltage ≤ AC 24V / DC 24V<br>switching current ≤ 0.5A<br>switching power ≤ 10VA / W |

## Dimensions (mm)




## Ordering Information

**VCG20 S - 400 - FV4 - NC**

**Series**
CG: radial direction
RG: axial direction

**Material**
S: 316L EP

**Pressure Range**
400: 0~5800 psig (400bar)
250: 0~3500 psig (250bar)
60: 0~870 psig (60bar)
25: 0~360 psig (25bar)
V2.5 : Vac~36 psig (2.5 bar)
V4 : Vac~60 psig (4 bar)
V7 : Vac~100 psig (7 bar)
V10 : Vac~150 psig (10 bar)
V16 : Vac~230 psig (16 bar)
V25 : Vac~360 psig (25 bar)

**End Connection**
FV4: 1/4” VFS female
RMV4: 1/4” VFS male (rotatable)

**Optional**
None: NC/NO
NC: normally closed
NO: normally opened

**Scope**

This document specifies guidelines used by VIGOUR Company for producing ultrahigh-purity (UHP) electropolished stainless steel products as well as ultrahigh-purity plastic products. This document must be used in conjunction with product catalogs, technical bulletins, and reports for complete product information.

**Design**

Products are designed with specific functional industry standards in mind. Where specific test results exist in the literature, the following standards are applicable:

Stainless Steel Products:

- Moisture analysis in accordance with ASTM F1397,"Standard Test Method for Determination of Moisture Contribution by Gas Distribution System Components"
- Hydrocarbon analysis in accordance with ASTM F1398,"Standard Test Method for Determina tion of Total Hydrocarbon Contribution by Gas Distribution System Components"
- Ionic cleanliness in accordance with ASTM F1374, "Standard Test Method for the Determina tion of Ionic/Organic Extractables of Internal Surfaces—IC/GC/FTIR for Gas Distribution Systems Components"

**Materials Guidelines**

Stainless steel is the industry-preferred material for UHP products used in gas systems due to the inherent properties of corrosion and oxidation resistance. AISI type 316L (UNS S31603) low-carbon stainless steel is most commonly used in industry due to the resistance to intergranular corrosion following welding or stress relieving.

- Stainless steel bar stock conforms to the following standards:
  - ASTM A479, "Stainless and Heat-Resisting Bars and Shapes for Use in Boilers and Other ressure Vessels"
  - ASTM A484, "Specification for General Requirements for Stainless and Heat-Resisting Bars, Billets, and Forgings"
  - ASTM A276, "Stainless and Heat-Resisting Bars and Shapes"
- Plastic material chemical composition is in accordance with:
  - ASTM D3294, "Standard Specification for PTFE Resin Molded Sheet and Molded Basic Shapes"
  - ASTM D4894, "Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials" for Type I, Grade 1 polytetrafluoroethylene.
- 316L VAR and 316L VIM-VAR bar stock conform to SEMI F20, "Specification for 316L Stainless Steel Bar, Forgings, Extruded Shapes, Plate, and Tubing for Components Used in General Purpose, High Purity, and Ultra-High Purity Semiconductor Manufac turing Applications".
- Primary steel processing is either argon oxygen decarburization (AOD) or vacuum induction melting (VIM). A secondary remelt operation such as vacuum arc remelt (VAR) may be used for additional cleanliness of wetted components.
- Key requirements of certain elements within the chemical make-up have been tightened by VIGOUR for more consistency of chemical make-up throughout UHP products; see Table 1.

Table 1: VIGOUR Specifications, wt %

| Element | 316 AOD | 316L AOD | 316L VAR | 316L VIM-VAR |
|---|---|---|---|---|
| C (carbon) | 0.035%~0.050% | 0.015%~0.030% | 0.015%~0.030% | 0.015%~0.030% |
| S (sulfur) | 0.020%~0.030% | 0.005%~0.030% | 0.005%~0.012% | 0.005%~0.010% |
| Mn (manganese) | 1.50%~2.00% | 1.00%~1.50% | 1.00%~1.50% | 0.15%~0.40% |

Verifications of stainless steel products include but are not limited to the following:

- Material conformity is verified in accordance with Practice A of ASTM A262, "Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels."
- Chemical composition is verified in accordance with ASTM A751, "Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products."

- Surface quality is verified through ultrasonic testing in accordance with ASTM E214, “Practice for Immersed Ultrasonic Testing by the Reflection Method Using Pulsed Longitudinal Waves”.
- Inclusions are detected by performing a JK Test in accordance with ASTM E45, “Standard Practice for Determining the Inclusion Content of Steel, Method A,”with ratings based on Plate I-r.

**Manufacturing and Surface Finish**

During manufacturing, dimensions and surface finishes are monitored closely. Each machined component has extremely fine surface finishes, smooth transitions, fully swept flow paths, and square weld ends to minimize the number of entrapped or generated particles.

- Stainless Steel Product—criteria of SEMI F19, “Specification for the Surface Condition of the Wetted Surfaces of Stainless Steel Components” and the procedures of SEMI F37, “Method for Determination of Surface Roughness Parameters for Gas Distribution System Components”
- The wet surface roughness Ra of ultra-high purity stainless steel products after electrolytic polishing is less than 8μin (0.20μm), and the wet surface roughness Ra without electrolytic polishing is less than 15μin (0.40μm).
- VIGOUR roughness numbers published in product catalogs refer to the process mean, or the roughness value that represents the arithmetic average for a given production process in accordance with SEMI F37.
- Surface roughness/finish is verified using a copy machine in accordance with ASME B 46.1, measured using the maximum available length of the joint or valve bore, excluding conical surfaces, intersections or welds.

**Electropolishing and Passivation**

The wetted surfaces of fittings and valve bodies are electropolished to improve surface conditions and to form a corrosion resistant surface layer of chromium oxide. After electropolishing, all surfaces are passivated to remove free iron.

- Electropolishing processes are based on ASTM E1558,“Electrolytic Polishing of Metallographic Specimens” and are processed using custom fixturing.
- Passivation processes are based on ASTM A380,“Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.”
- Verification of electropolishing and passivation is performed in accordance with Table 2.

Table 2: Verification Methods and Specifications

| Parameter | Specification | Test Method |
|---|---|---|
| Chromium-to-iron (Cr/Fe) | Ratio > 2.0 | ESCA (electron spectroscopy for chemical analysis) based on SEMI F60 |
| Chromium oxide to-iron oxide (CrO/FeO) | Ratio > 2.0 | |
| Oxide thickness | ≥ 15A | AES (Auger electron spectroscopy) based on SEMI F72 |
| Surface defect analysis | Maximum of 40 defects, over 5 sample areas | SEM (scanning electron microscopy) based on SEMI F73 |
| Appearance | All parts will be highly reflective, mirror-like, with consistent roughness and a uniform, lustrous finish | Finished parts are visually inspected by the unaided eye using additional bright light |

**Electrochemical Critical Pitting Temperature**

The electrochemical critical pitting temperature (CPT) test, based on ASTM G150, “Standard Test Method for Electrochemical Critical Pitting Temperature of Stainless Steels,” is used to determine resistance to localized pitting corrosion. The CPT test measures the temperature at which
the current density increases rapidly beyond a set limit at a set electrical potential. Sodium chloride solution is used, and electrical potential is held constant in the passivation region. The critical corrosion temperature should be greater than 13℃.

**Cleaning and Drying**

The DI water cleaning system is closed to the outside environment and thereby limits particle contamination. Products move through a series of ultrasonic washing and multistage DI water rinse tanks to a drying chamber. The DI water characteristics are based on the guidelines of:

- Stainless steel components—SEMI E49.6, “Guide for Subsystem Assembly and Testing Procedures—Stainless Steel Systems”.

Table 3: DI Water Characteristics

| Characteristic | Capabilities |
|---|---|
| Resistivity | ≥ 17.5MΩ.cm (25℃) |
| Total organic carbon (TOC) | < 20ppb |
| Silica | < 5ppb |
| Bacteria | < 10 colonies per 100 milliliters |
| Hot DI water temperature | ≥ 60℃ |

**Assembly and Testing**

To protect parts from airborne contamination, parts are protected and transported directly from the established cleaning system to a clean environment for assembly and testing.

**Packaging and Identification**

- SEMI E49.6, “Guide for Subsystem Assembly and Testing Procedures—Stainless Steel Systems”for stainless products.
- Identification and traceability information is visible without opening the product package to reduce the chances for contamination of the product and the system to which it is being assembled.

**Scope**

This document specifies guidelines used by VIGOUR Company for producing stainless steel products intended for photovoltaic (PV) applications. This document must be used in conjunction with product catalogs, technical bulletins, and reports for complete product information. Application of this document is limited to wetted system components.

**Design**

Products are designed with specific functional industry standards in mind. Where specific test results exist in the literature, the following standards are applicable:

- Moisture analysis in accordance with ASTM F1397,"Standard Test Method for Determination of Moisture Contribution by Gas Distribution System Components"
- Hydrocarbon analysis in accordance with ASTM F1398,"Standard Test Method for Determination of Total Hydrocarbon Contribution by Gas Distribution System Components"
- Ionic cleanliness in accordance with ASTM F1374,"Standard Test Method for the Determination of Ionic / Organic Extractables of Internal Surfaces—IC/GC/FTIR for Gas Distribution Systems Components."

**Materials Guidelines**

Stainless steel is the industry-preferred material for UHP products used in gas systems due to the inherent properties of corrosion and oxidation resistance. AISI type 316L (UNS S31603) low-carbon stainless steel is most commonly used in industry due to the resistance to intergranular
corrosion following welding or stress relieving.

Stainless steel bar stock conforms to the following standards:

- ASTM A479, "Stainless and Heat-Resisting Bars and Shapes for Use in Boilers and Other Pressure Vessels"
- ASTM A484, "Specification for General Requirements for Stainless and Heat-Resisting Bars, Billets, and Forgings"
- ASTM A276, "Stainless and Heat-Resisting Bars and Shapes"
- SEMI F20-0305, "Specification for 316L Stainless Steel Bar, Forgings, Extruded Shapes, Plate, and Tubing for Components Used in General Purpose, High Purity, and Ultra-High Purity Semiconductor Manufacturing Applications."
- Primary steel processing is either argon oxygen decarburization (AOD) or vacuum induction melting (VIM). A secondary remelt operation such as vacuum arc remelt (VAR) may be used for additional cleanliness of wetted components.
- Key requirements of certain elements within the chemical make-up have been tightened by VIGOUR for more consistency of chemical make-up; see Table 1.

Table 1: VIGOUR Specifications, wt %

| Element | 316 AOD | 316L AOD | 316L VAR | 316L VIM-VAR |
|---|---|---|---|---|
| C (carbon) | 0.035%~0.050% | 0.015%~0.030% | 0.015%~0.030% | 0.015%~0.030% |
| S (sulfur) | 0.020%~0.030% | 0.005%~0.030% | 0.005%~0.012% | 0.005%~0.010% |
| Mn (manganese) | 1.50%~2.00% | 1.00%~1.50% | 1.00%~1.50% | 0.15%~0.40% |

Verifications of stainless steel products include but are not limited to the following:

- Material conformity is verified in accordance with Practice A of ASTM A262, "Standard Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels."
- Chemical composition is verified in accordance with ASTM A751, "Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products."
- Surface quality is verified through ultrasonic testing in accordance with ASTM E214, "Practice for Immersed Ultrasonic Testing by the Reflection Method Using Pulsed Longitudinal Waves" or through an eddy current test performed in accordance with Swagelok standards.
- Inclusions are detected by performing a JK test in accordance with ASTM E45, "Standard Practice for Determining the Inclusion Content of Steel, Method A," with ratings based on Plate I-r.

**Manufacturing and Surface Finish**

During manufacturing, dimensions and surface finishes are monitored closely. Each machined component has extremely fine surface finishes, smooth transitions, fully swept flow paths, and square weld ends to minimize the number of entrapped or generated particles.

- Surface roughness/finish criteria are based on SEMI F19,“Specification for the Surface Condition of the Wetted Surfaces of Stainless Steel Components”and the procedures of SEMI F37, “Method for Determination of Surface Roughness Parameters for Gas Distribution System Components.”
- The wet surface roughness Ra of ultra-high purity stainless steel products after electrolytic polishing is less than 8μin (0.20μm), and the wet surface roughness Ra without electrolytic polishing is less than 15μin (0.40μm).
- VIGOUR roughness numbers published in product catalogs refer to the process mean, or the roughness value that represents the arithmetic average for a given production process in accordance with SEMI F37.
- Surface roughness/finish is verified by using a suitable profiling instrument in accordance with ASME B46.1. Measurements are taken over the maximum available length of the fitting or valve bore, excluding tapered surfaces, intersections, or welds.

**Electropolishing and Passivation**

This section refers to electropolished products only.

The wetted surfaces of fittings and valve bodies are electropolished to improve surface conditions and to form a corrosion resistant surface layer of chromium oxide. After electropolishing, all surfaces are passivated to remove free iron.

- Electropolishing processes are based on ASTM B912,“Standard Specification for Passivation of Stainless Steels Using Electropol ishing” and are processed using custom fixturing.
- Passivation and pre-electropolishing cleaning processes are based on ASTM A380, “Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.”
- Verification of electropolishing and passivation is performed in accordance with test methods in section 6 of ASTM B912, “Standard Specification for Passivation of Stainless Steels Using Electropolishing.”

**Electrochemical Critical Pitting Temperature**

This section refers to electropolished products only.

The electrochemical critical pitting temperature (CPT) test, based on ASTM G150, is used to determine resistance to localized pitting corrosion. The CPT test measures the temperature at which the current density increases rapidly beyond a set limit at a set electrical potential. Sodium chloride solution is used, and the electrical potential is held constant in the passivation region. The critical corrosion temperature should be greater than 10℃.

**Cleaning and Drying**

The DI water cleaning system is closed to the outside environment and thereby limits particle contamination. Products are cleaned in multistep processes through a series of heated ultrasonic washing, DI water rinsing, and a filtered drying chamber. Cleaning agents are selected in accordance with ASTM G127.

- The DI water characteristics are based on the guidelines of ASTM D5127 Type E-3, “Standard Guide for Ultra Pure Water Used in the Electronics and Semiconductor Industries.”

Table 2: DI Water Characteristics

| Characteristic | Capabilities |
|---|---|
| Resistivity | ≥ 12MΩ·cm (25℃) |
| Total organic carbon (TOC) | < 300ppb |
| Silica | < 50ppb |
| Bacteria | < 50 colonies per 100 milliliters |

**Assembly and Testing**

To protect parts from airborne contamination, parts are covered and transported directly from the established cleaning system to a clean work cell for assembly and testing.

**Packaging and Identification**

- Packaging and identification procedures meet the requirements of SEMI E49.6, “Guide for Subsystem Assembly and Testing Procedures—Stainless Steel Systems”for stainless products.
- products are packaged to keep products free from outside contaminants during shipping. Identification and traceability information is visible without opening the product.

# Material Compatibility

| Material Compatibility | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Process Gas | chemical formula | materials | | | | | | | |
| | | metal | | | plastic | | | synthetic rubber | |
| | | stainless steel | nickel | hastelloy | PCTFE | VESPEL | PFA | FKM | EPDM |
| Ammonia | $NH_3$ | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 1 |
| Argon | Ar | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Arsine | $AsH_3$ | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 0 |
| Boron Trichloride | $BCl_3$ | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 0 |
| Boron Trifluoride | $BF_3$ | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Carbon Dioxide | $CO_2$ | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| Carbon Monoxide | CO | 1 | 2 | 2 | 1 | 1 | 1 | 2 | 2 |
| Carbon Tetraflouride | $CF_4$ | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Chlorine | $Cl_2$ | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 3 |
| Diborane | $B_2H_6$ | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 0 |
| Dichlorosilane | $SiH_2Cl_2$ | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Fluorine | $F_2$ | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Freon 23 Trifluoromethane | $CHF_3$ | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Freon 116 Hexafluoroethane | $C_2F_6$ | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Germane | $GeH_4$ | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Helium | He | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Hydrogen | $H_2$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Hydrogen Bromide | HBr | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Hydrogen Chloride | HCl | 2 | 1 | 1 | 1 | 0 | 1 | 2 | 0 |
| Hydrogen Fluoride | HF | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 3 |
| Hydrogen Sulfide | $H_2S$ | 1 | 1 | 0 | 1 | 0 | 1 | 3 | 1 |
| Krypton | Kr | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Methane | $CH_4$ | 1 | 1 | 0 | 1 | 1 | 1 | 3 | 2 |
| Methyl Fluoride | $CH_3F$ | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| Nitric Oxide | NO | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Nitrogen | N2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Nitrogen Trifluoride | NF3 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Nitrous Oxide | N2O | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 |
| Neon | Ne | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Oxygen | $O_2$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Ozone | $O_3$ | 2 | 2 | 1 | 1 | 0 | 1 | 2 | 1 |
| Perflouropropane | $C_3F_8$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| Phosphine | $PH_3$ | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 |
| Phosphorus Trifluoride | $PF_3$ | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| Silane | $SiH_4$ | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Silicon Tetrachloride | $SiCl_4$ | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| Silicon Tetrafluoride | $SiF_4$ | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 1 |
| Sulfur Hexafluoride | $SF_6$ | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| Tetraethyl Orthosilicate | TEOS | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| Trichlorosilane | $SiHCl_3$ | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 0 |
| Tungsten Hexafluoride | $WF_6$ | 2 | 1 | 1 | 1 | 0 | 1 | 0 | 0 |
| Xenon | Xe | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

"0" no data / "1" recommend to use / "2" Part resistant, can be used / "3" Unavailable

# Pressure Regulator and Valve Selection Guide

| Process Gas | Max. Flow (slpm) | Source Valves UA/UB/UC | Max. Flow (slpm) | Distribution Valves UA/UB/UC | Max. Flow (slpm) | Source Regulator UA/UB/UC | Max. Flow (slpm) | Distribution Regulator UA/UB/UC |
|---|---|---|---|---|---|---|---|---|
| Acetylene (C2 H2) | 200 | VDV33 1/4" | 25 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | 45 | VDV32 1/2" | 50 | VSR-410S | 6 | VSR-100S HF |
| | 280 | VDV33 1/2" | 400 | VDV37 PC | 75 | VSR-210S | 50 | VSR-410S |
| | | | | VDV37 M | | | 75 | VSR-210S |
| | | | | VDV39 | | | 95 | VSR-210S HF |
| Air | 150 | VDV33 1/4" | 90 | VDV32 1/4" | 30 | VSR-510S | 30 | VSR-100S |
| | | | 160 | VDV32 1/2" | 100 | VSR-510S HF | 50 | VSR-100S HF |
| | 250 | VDV33 1/2" | | VDV37 M | 200 | VSR-410S | 150 | VSR-410S |
| | | | 890 | VDV37 PC | 800 | VSR-210S | 400 | VSR-210S |
| | 500 | VDV33 1/2" | | VDV37 M | | | 600 | VSR-210S HF |
| | | | | VDV39 | | | | |
| Ammonia (NH3) | 250 | VDV32 1/4" | 100 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | VDV33 1/4" | | | 50 | VSR-410S | 30 | VSR-100S HF |
| | 450 | VDV32 1/2" | 225 | VDV32 1/2" | 75 | VSR-210S | 60 | VSR-410S |
| | | | | | 400 | VSR-210S | 125 | VSR-210S |
| | 1000 | VDV38 | 1000 | VDV37 PC | 600 | VSR-210S HF | 250 | VSR-210S HF |
| | | | | VDV37 M | 1100 | VSR-910S | 500 | VSR-210S FC |
| | | | | VDV39 | | | 1000 | VSR-910S |
| Argon (Ar) | 200 | VDV33 1/4" | 80 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 100 | VSR-510S HF | 25 | VSR-100S HF |
| | 350 | VDV33 1/2" | 150 | VDV32 1/2" | 250 | VSR-510S HF | 50 | VSR-410S |
| | | VDV33 1/4" | | | 600 | VSR-210S | 100 | VSR-210S |
| | 1000 | VDV38H | 800 | VDV37 PC | | | 200 | VSR-210S HF |
| | | | | VDV37 M | | | 400 | VSR-210S FC |
| | | | | VDV39 | | | 1000 | VSR-910S |
| Arsine (AsH3) | 140 | VDV32 1/4" | 55 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | VDV33 1/4" | | | 40 | VSR-410S | 20 | VSR-100S HF |
| | 240 | VDV32 1/2" | 95 | VDV32 1/2" | | | | |
| Arsine Mixtures (Nitrogen Balance ) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 15 | VSR-510S | 15 | VSR-100S |
| | | | | | 50 | VSR-510S HF | 50 | VSR-100S HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | 150 | VSR-410S | 150 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Boron Trichloride (BCl3) | 20 | VDV32 1/2" | 15 | VDV32 1/2" | 6 | VSR-410S-VC2 | 6 | VSR-410S-VC2 |
| Boron Trichloride Mix (Nitrogen Balance) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 15 | VSR-510S | 15 | VSR-100S |
| | | | | | 60 | VSR-410S | 30 | VSR-100S HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | | | 60 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Boron Trifluoride (BF3) | 115 | VDV33 1/4" | 60 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | | | | 25 | VSR-410S | 10 | VSR-100S HF |
| | 145 | VDV33 1/2" | 100 | VDV32 1/2" | | | 25 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Boron 11 Trifluoride (11BF3) | 115 | VDV33 1/4" | 60 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | | | | 25 | VSR-410S | 10 | VSR-100S HF |
| | 145 | VDV33 1/2" | 100 | VDV32 1/2" | | | 25 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Butadiene (C4 H6) | 60 | VDV32 1/2" | 60 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 40 | VSR-410S | 5 | VSR-100S HF |

# Pressure Regulator and Valve Selection Guide

| Process Gas | Max. Flow (slpm) | Source Valves UA/UB/UC | Max. Flow (slpm) | Distribution Valves UA/UB/UC | Max. Flow (slpm) | Source Regulator UA/UB/UC | Max. Flow (slpm) | Distribution Regulator UA/UB/UC |
|---|---|---|---|---|---|---|---|---|
| Fluorine Mixtures (20% maximum F2) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 5 | VSR-510SH | 5 | VSR-510H |
| | | | | | 50 | VSR-510SH HF | 10 | VSR-510H HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | | | 50 | VSR-410SH |
| | | VDV33 1/4" | | | | | | |
| Germane (GeH4) | 10 | VDV32 1/4" | 4 | VDV32 1/4" | 1 | VSR-100S | 1 | VSR-100S |
| | | VDV33 1/4" | | | 7 | VSR-410S-VC2 | 7 | VSR-410S-VC2 |
| | 18 | VDV32 1/2" | 7 | VDV32 1/2" | | | | |
| Germane Mixtures (Nitrogen Balance) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 20 | VSR-510S HF | 20 | VSR-100S HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | 50 | VSR-410S | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Halocarbon 12 (CCl2 F2) | 55 | VDV32 1/2" | 40 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | | | | | | | 50 | VSR-410S |
| Halocarbon 12B2 (CBr2 F2) | 15 | VDV32 1/2" | 15 | VDV32 1/2" | 5 | VSR-410SA | 5 | VSR-410S-VC2 |
| Halocarbon 13 (CClF3) | 140 | VDV33 1/4" | 40 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | 170 | VDV33 1/2" | 70 | VDV32 1/2" | | | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Halocarbon 13B1 (CBrF3) | 110 | VDV32 1/4" | 35 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | 190 | VDV32 1/2" | 65 | VDV32 1/2" | | | 50 | VSR-410S |
| Halocarbon 14 (CF4) | 10 | VDV33 1/4" | 50 | VDV32 1/4" | 10 | VSR-510S | 5 | VSR-100S |
| | | | | | 40 | VSR-510S HF | 15 | VSR-100S HF |
| | 200 | VDV33 1/2" | 100 | VDV32 1/2" | 80 | VSR-510S HF | 30 | VSR-410S |
| | | VDV33 1/4" | | | 500 | VSR-210S | 60 | VSR-210S |
| | 600 | VDV38H | 500 | VDV37 PC | | | 100 | VSR-210S HF |
| | | | | VDV37 M | | | 250 | VSR-210S FC |
| | | | | VDV39 | | | 500 | VSR-910S |
| Halocarbon 21 (CHCl2F) | 25 | VDV32 1/2" | 15 | VDV32 1/2" | 5 | VSR-410S-VC2 | 5 | VSR-410S-VC2 |
| Halocarbon 23 (CHF3) | 115 | VDV33 1/4" | 145 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 50 | VSR-410S | 20 | VSR-100S HF |
| | 140 | VDV33 1/2" | 250 | VDV32 1/2" | | | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Halocarbon 32 (CH2 F2) | 140 | VDV33 1/4" | 55 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 6 | VSR-100S HF |
| | 175 | VDV33 1/2" | 100 | VDV32 1/2" | 75 | VSR-210S | 50 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Halocarbon 114 (C2 ClF4) | 30 | VDV32 1/2" | 25 | VDV32 1/2" | 7 | VSR-410S-VC2 | 1 | VSR-100S |
| | | | | | | | 7 | VSR-410S-VC2 |
| Halocarbon 115 (C2 ClF5) | 60 | VDV32 1/2" | 40 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | | | | | 75 | VSR-210S | 50 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Halocarbon 116 (C2 F6) | 60 | VDV33 1/4" | 40 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 10 | VSR-100S HF |
| | 100 | VDV33 1/2" | 80 | VDV32 1/2" | 75 | VSR-210S | 25 | VSR-410S |
| | | VDV33 1/4" | | | 125 | VSR-210S HF | 50 | VSR-210S |
| | 275 | VDV38 | 400 | VDV37 PC | | | 90 | VSR-210S HF |
| | | | | VDV37 M | | | | |
| | | | | VDV39 | | | 175 | VSR-210S FC |
| | | | | | | | 450 | VSR-910S |

# Pressure Regulator and Valve Selection Guide

| Process Gas | Max. Flow (slpm) | Source Valves UA/UB/UC | Max. Flow (slpm) | Distribution Valves UA/UB/UC | Max. Flow (slpm) | Source Regulator UA/UB/UC | Max. Flow (slpm) | Distribution Regulator UA/UB/UC |
|---|---|---|---|---|---|---|---|---|
| Halocarbon 125 (C2 HF5) | 180 | VDV32 1/2" | 70 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 25 | VSR-410S | 5 | VSR-100S HF |
| | | | | | 75 | VSR-210S | 25 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Halocarbon 134A (C2 H2 F4) | 55 | VDV32 1/2" | 40 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | VDV38 | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | | | | | 75 | VSR-210S | 50 | VSR-410S |
| | 350 | VDV37 PC | 230 | VDV37 PC | | | 75 | VSR-210S |
| | | VDV37 M | | VDV37 M | | | | |
| Halocarbon R218 (C2 F8) | 35 | VDV32 1/4" | 20 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | VDV33 1/4" | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | 60 | VDV32 1/2" | 40 | VDV32 1/2" | 75 | VSR-210S | 50 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Halocarbon C318 (C4 F8) | 25 | VDV32 1/2" | 20 | VDV32 1/2" | 6 | VSR-410S-VC2 | 6 | VSR-410S-VC2 |
| Halocarbon C1418 (Octafluorocyclopentene ) (C5 F8) | 7 | VDV32 1/2" | 7 | VDV32 1/2" | 3 | VSR-410S-VC2 | N/A | Regulator not required |
| Helium (He) | 750 | VDV33 1/4" | 250 | VDV32 1/4" | 125 | VSR-510S | 65 | VSR-100S |
| | | | | | 500 | VSR-510S HF | 125 | VSR-100S HF |
| | 1000 | VDV33 1/2" | 450 | VDV32 1/2" | 2000 | VSR-210S | 275 | VSR-410S |
| | | | | | | | 625 | VSR-210S |
| | 2500 | VDV38H | 2500 | VDV37 PC | | | 900 | VSR-210S HF |
| | | | | VDV37 M | | | 1200 | VSR-210S FC |
| | | | | VDV39 | | | 2500 | VSR-910S |
| Hexafluoropropane (C3 H2 F6) | 20 | VDV32 1/2" | 15 | VDV32 1/2" | 6 | VSR-410S-VC2 | 6 | VSR-410S-VC2 |
| Hexafluoropropylene (C3 F6) | 60 | VDV32 1/2" | 40 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | | | | | 75 | VSR-210S | 50 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Hydrogen (H2) | 800 | VDV33 1/4" | 300 | VDV32 1/4" | 125 | VSR-510S | 65 | VSR-100S |
| | | | | | 500 | VSR-510S HF | 125 | VSR-100S HF |
| | 1600 | VDV33 1/2" | 600 | VDV32 1/2" | 1200 | VSR-210S | 275 | VSR-410S |
| | | VDV33 1/4" | | | | | 625 | VSR-210S |
| | 3000 | VDV33 1/4" | 3000 | VDV33 1/4" | | | 900 | VSR-210S HF |
| | | VDV38H | | VDV37 PC | | | | |
| | | | | VDV37 M | | | 1200 | VSR-210S FC |
| | | | | VDV39 | | | 3000 | VSR-910S |
| Hydrogen Bromide (HBr) | 155 | VDV33 1/4" | 55 | VDV32 1/4" | 1 | VSR-510SH | 1 | VSR-510H |
| | | | | | 30 | VSR-410S | 2 | VSR-510H HF |
| | 190 | VDV33 1/2" | 95 | VDV32 1/2" | 50 | VSR-210SH | 30 | VSR-410S |
| | | VDV33 1/4" | | | | | 50 | VSR-210SH |
| Hydrogen Chloride (HCl) | 350 | VDV33 1/4" | 75 | VDV32 1/4" | 2 | VSR-510SH | 8 | VSR-510H |
| | | | | | 90 | VSR-410S | 20 | VSR-510H HF |
| | 500 | VDV33 1/2" | 150 | VDV32 1/2" | 150 | VSR-210SH | 40 | VSR-410SH |
| | | VDV33 1/4" | | | 600 | VSR-210SH HF | 85 | VSR-210SH |
| | 2000 | VDV38 | 850 | VDV37 PC | 2000 | VSR-910S | 160 | VSR-210SH HF |
| | | | | VDV37 M | | | 300 | VSR-210SH FC |
| | | | | VDV39 | | | 800 | VSR-910SH |

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| Process Gas | Max. Flow (slpm) | Source Valves UA/UB/UC | Max. Flow (slpm) | Distribution Valves UA/UB/UC | Max. Flow (slpm) | Source Regulator UA/UB/UC | Max. Flow (slpm) | Distribution Regulator UA/UB/UC |
|---|---|---|---|---|---|---|---|---|
| Hydrogen Chloride Mixtures (Nitrogen Balance) | 210 | VDV33 1/4" | 105 | VDV32 1/4" | 10 | VSR-510SH | 10 | VSR-510H |
| | | | | | 20 | VSR-510SH HF | 20 | VSR-510H HF |
| | 265 | VDV33 1/2" | 190 | VDV32 1/2" | 40 | VSR-410S | 40 | VSR-410SH |
| | | VDV33 1/4" | | | | | | |
| Hydrogen Fluoride (HF) | 20 | VDV32 1/2" | 20 | VDV32 1/2" | 5 | VSR-410S-VC2 | 5 | VSR-410S-VC2 |
| Hydrogen Selenide (H2 Se) | 125 | VDV32 1/4" | 55 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | VDV33 1/4" | | | 40 | VSR-410S | 20 | VSR-100S HF |
| | 215 | VDV32 1/2" | 95 | VDV32 1/2" | | | 40 | VSR-410S |
| Hydrogen Selenide Mixtures (Nitrogen Balance) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 20 | VSR-510S HF | 20 | VSR-100S HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | 50 | VSR-410S | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Hydrogen Sulfide (H2 S) | 210 | VDV33 1/4" | 80 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | | | | 40 | VSR-410S | 10 | VSR-100S HF |
| | 260 | VDV33 1/2" | 140 | VDV32 1/2" | | | 40 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Krypton (Kr) | 105 | VDV33 1/4" | 50 | VDV32 1/4" | 20 | VSR-510S | 20 | VSR-100S |
| | | | | | 60 | VSR-410S | 30 | VSR-100S HF |
| | 130 | VDV33 1/2" | 90 | VDV32 1/2" | | | 60 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Methane (CH4) | 245 | VDV33 1/4" | 120 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 20 | VSR-510S HF | 20 | VSR-100S HF |
| | 295 | VDV33 1/2" | 210 | VDV32 1/2" | 40 | VSR-410S | 40 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Methanol (CH3 OH) | 70 | VDV32 1/2" | 40 | VDV32 1/2" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| Methyl Bromide (CH3 Br) | 25 | VDV32 1/2" | 15 | VDV32 1/2" | 5 | VSR-410S-VC2 | 5 | VSR-410S-VC2 |
| Methyl Chloride (CH3 Cl) | 60 | VDV32 1/2" | 45 | VDV32 1/2" | 1 | VSR-100S | 10 | VSR-410S-VC2 |
| | | | | | 10 | VSR-410S-VC2 | | |
| Methysilane (CH3 SiH3) | 200 | VDV32 1/4" | 70 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | 350 | VDV32 1/2" | 120 | VDV32 1/2" | 75 | VSR-210S | 50 | VSR-410S |
| | | | | | | | 75 | VSR-210S |
| Methyl Fluoride 甲基氟 (CH3 F) | 400 | VDV33 1/4" | 120 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | | | | 50 | VSR-410S | 10 | VSR-100S HF |
| | 490 | VDV33 1/2" | 200 | VDV32 1/2" | | | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Neon (Ne) | 215 | VDV33 1/4" | 110 | VDV32 1/4" | 20 | VSR-510S | 20 | VSR-100S |
| | | | | | 40 | VSR-510S HF | 40 | VSR-100S HF |
| | 260 | VDV33 1/2" | 190 | VDV32 1/2" | 300 | VSR-210S | 100 | VSR-410S |
| | | VDV33 1/4" | | | | | | |
| Nitrogen (N2) | 250 | VDV33 1/4" | 100 | VDV32 1/4" | 50 | VSR-510S | 25 | VSR-100S |
| | | | | | 50 | VSR-710S | 50 | VSR-100S HF |
| | 400 | VDV33 1/2" | 200 | VDV32 1/2" | 250 | VSR-510S HF | 150 | VSR-410S |
| | | VDV33 1/4" | | | 1000 | VSR-210S | 250 | VSR-210S |
| | 1000 | VDV38H | 1000 | VDV37 PC | | | 300 | VSR-210S HF |
| | | | | VDV37 M | | | 300 | 1300S |
| | | | | VDV39 | | | 400 | VSR-210S FC |
| | | | | | | | 1000 | VSR-910S |

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|---|---|---|---|---|---|---|---|---|
| Nitrogen Dioxide ($NO_2$) | 60 | VDV32 1/2" | 60 | VDV32 1/2" | 4 | VSR-510S | 4 | VSR-100S |
| | | | | | 45 | VSR-410S | 6 | VSR-100S |
| Nitrogen Trifluoride ($NF_3$) | 75 | VDV33 1/4" | 60 | VDV32 1/4" | 5 | VSR-510S | 6 | VSR-100S |
| | | | | | 60 | VSR-410S | 15 | VSR-100S HF |
| | 100 | VDV33 1/2" | 110 | VDV32 1/2" | 150 | VSR-410S | 30 | VSR-410S |
| | | VDV33 1/4" | | | 400 | VSR-210S | 75 | VSR-210S |
| | 350 | VDV38H | 500 | VDV37 PC | 1000 | VSR-910S | 125 | VSR-210S HF |
| | | VDV38H | | VDV37 M | | | 250 | VSR-210S FC |
| | | | | VDV39 | | | 600 | VSR-910S |
| Nitric Oxide (NO) | 310 | VDV33 1/4" | 75 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | | | | 50 | VSR-410S | 6 | VSR-100S HF |
| | 380 | VDV33 1/2" | 125 | VDV32 1/2" | 75 | VSR-210S | 50 | VSR-410S |
| | | VDV33 1/4" | | | | | 75 | VSR-210S |
| Nitrous Oxide ($N_2O$) | 300 | VDV33 1/4"VS | 70 | VDV32 1/4" VS | 3 | VSR-510S VS | 8 | VSR-100S VS |
| | | | | | 60 | VSR-410S VS | 20 | VSR-100S HF VS |
| | 500 | VDV33 1/2"VS | 140 | VDV32 1/2" VS | 100 | VSR-210S VS | 35 | VSR-410S VS |
| | | | | | 150 | VSR-210S HF VS | 85 | VSR-210S VS |
| | 1500 | VDV38 VS | 750 | VDV37 PC VS | 500 | VSR-210S HF VS | 160 | VSR-210S HF VS |
| | | | | VDV37 M VS | 1000 | VSR-910S VS | 320 | VSR-210S FC VS |
| | | | | VDV39 VS | | | 800 | VSR-910S VS |
| Oxygen ($O_2$) | 250 | VDV33 1/4" | 75 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 80 | VSR-510S HF | 25 | VSR-100S HF |
| | 400 | VDV33 1/2" | 150 | VDV32 1/2" | 150 | VSR-510S HF | 50 | VSR-410S |
| | | VDV33 1/4" | | | 1000 | VSR-210S | 120 | VSR-210S |
| | | | 1000 | VDV37 PC | | | 200 | VSR-210S HF |
| | | | | VDV37 M | | | 400 | VSR-210S FC |
| | | | | VDV39 | | | 1000 | VSR-910S |
| Perfluoropropane ($C_3F_8$) | 70 | VDV32 1/4" | 35 | VDV32 1/4" | 2 | VSR-510S | 2 | VSR-100S |
| | | VDV33 1/4" | | | 20 | VSR-410S | 4 | VSR-100S HF |
| | 125 | VDV32 1/2" | 60 | VDV32 1/2" | | | 20 | VSR-410S |
| Perfluorobutadiene ($C_4F_6$) | 25 | VDV32 1/2" | 25 | VDV32 1/2" | 5 | VSR-410S-VC2 | 5 | VSR-410S-VC2 |
| Phosphine ($PH_3$) | 320 | VDV33 1/4" | 80 | VDV32 1/4" | 5 | VSR-510S | 5 | VSR-100S |
| | | | | | 40 | VSR-410S | 10 | VSR-100S HF |
| | 390 | VDV33 1/2" | 145 | VDV32 1/2" | | | | |
| | | VDV33 1/4" | | | | | | |
| Phosphine Mixtures (Nitrogen Balance) | 185 | VDV33 1/4" | 90 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 20 | VSR-510S HF | 20 | VSR-100S HF |
| | 225 | VDV33 1/2" | 160 | VDV32 1/2" | | | | |
| | | VDV33 1/4" | | | | | | |
| Phosphorous Pentafluoride ($PF_5$) | 15 | VDV33 1/4" | 5 | VDV32 1/4" | 10 | VSR-510S | 10 | VSR-100S |
| | | | | | 20 | VSR-510S HF | 20 | VSR-100S HF |
| | 19 | VDV33 1/2" | 9 | VDV32 1/2" | | | | |
| | | VDV33 1/4" | 52 | VDV37 PC | | | | |
| | 41 | VDV38H | | VDV37 M | | | | |
| | | | | VDV39 | | | | |
| Propane ($C_3H_8$) | 65 | VDV32 1/4" | 42 | VDV32 1/4" | 3 | VSR-510S | 3 | VSR-100S |
| | | VDV33 1/4" | | | 50 | VSR-410S | 5 | VSR-100S HF |
| | 115 | VDV32 1/2" | 75 | VDV32 1/2" | | VSR-210S | 50 | VSR-410S |

# Product Warranty Service

### 1. Warranty Term

One year after purchase. For any malfunction of a product purchased from VIGOUR that occurs during the warranty term as a result of failure, at the time of delivery, to fulfill the specifications intended, VIGOUR will repair or replace the product at no charge.

### 2. Range of Warranty

The warranty is limited to our products that were produced at and delivered from our VIGOUR.

Regardless of the warranty term, this warranty does not cover troubles or accidents, or any customer's opportunity loss, lost profit, secondary damage or damage to anything other than our products, as well as replacement work, readjustment of local machinery or quipment or trial operation by the customer. Safety management associated with the use of a product purchased from VIGOUR and peripheral equipment will be the responsibility of the user.

### [Exclusions]

The warranty does not cover any of the following cases, even if it occurs during the term of the warranty.

1) Cases where failure occurs resulting from the replacement (maintenance) of parts by a person other than a VIGOUR engineer.
2) Cases where failure occurs due to a natural disaster or force majeure.
3) Cases where failure occurs due to misuse of the product or not taking the required precautions in handling the product.
4) Cases where the product is used or stored in an unsuitable environment.
5) Cases where the product is used for purposes other than the designated objectives, the product is used at s range exceeding the range of conditions specified in the design, or a purchased product is modified.
6) Cases where corrosion and failure occurs due to external factors or a corrosive liquid.
7) Any other case judged to be outside of the responsibility of VIGOUR.

VIGOUR

we offer solutions regarding your ideas!

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NOTE:
Product availability and specifications contained herein are subject to change without notice.
Consult local distributor or factory for potential revisions and/or service related issues.



VUPS Catalog EN Ver 4.0 CATA# **11182024**