

# Subsea Ball Valves

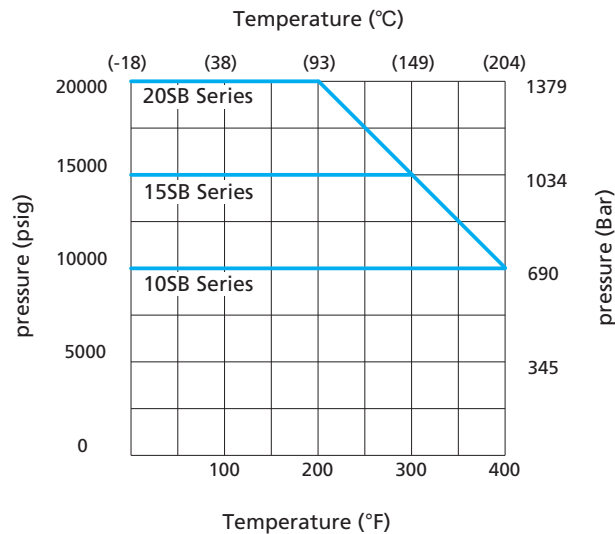
## 2-way Valves, 3-way Valves

### Features

- ⦿ Working pressure up to 20,000 psig (1379 bar)
- ⦿ Maximum external pressure: 6,000 psig (414 bar)
- ⦿ NBR O-ring for operation from -10 to 250°F (-23 to 121°C); other O-ring materials available
- ⦿ High tensile 316 stainless steel or S17400 stainless steel as standard material for valve body
- ⦿ NACE MR0175 optional
- ⦿ Paddle assembly (PA) optional
- ⦿ PEEK seats offer excellent resistance against chemicals, heat and abrasion
- ⦿ Full-port flow path to minimize pressure drop
- ⦿ 2-way and 3-way valve configurations
- ⦿ Bidirectional flow for 2-way valves
- ⦿ Wide selection of tube and pipe end fittings available
- ⦿ A variety of wetted materials optional
- ⦿ Maximum water depth: 13,800 ft. (4200 m)



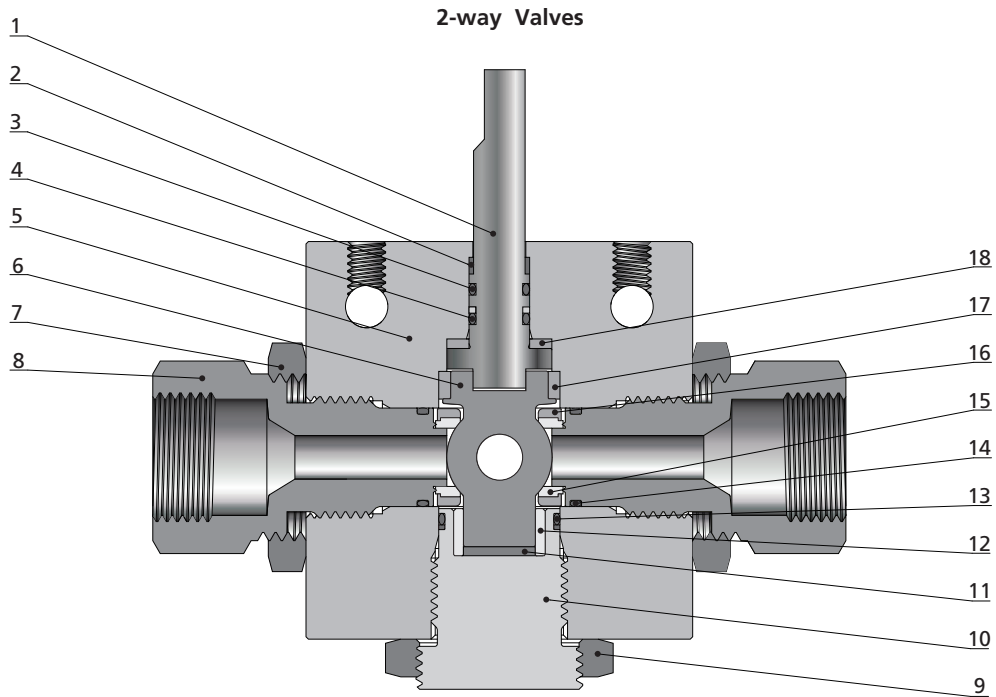
### Pressure vs. Temperature Curve



NOTE: The maximum allowable working pressure drops if the side connection works as inlet.

- Fittings
- Tubing
- Quick Couplings
- Line Filters
- Valves
- Sour Service Products
- Subsea Valves
- Tools and Installation Instructions
- Technical Information
- Part Number Crossover Charts

## Standard Materials of Construction

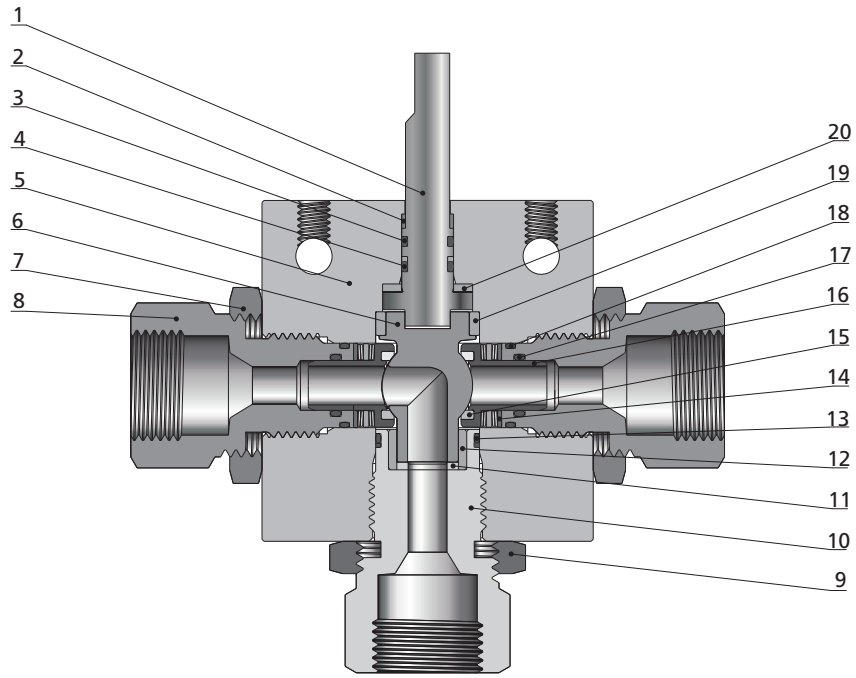


| Item | Component                   | Material Grade                                     |
|------|-----------------------------|----------------------------------------------------|
| 1    | <i>Ball Stem</i>            | 316SS                                              |
| 2    | StemBackup                  | PEEK                                               |
| 3    | O-Ring                      | NBR                                                |
| 4    | <i>O-Ring</i>               | <i>NBR</i>                                         |
| 5    | <i>Body</i>                 | <i>316 SS / S17400 SS(For Orifice No. 16 only)</i> |
| 6    | <i>Ball</i>                 | <i>316SS</i>                                       |
| 7    | LockNut                     | 316 SS                                             |
| 8    | <i>SeatGland</i>            | <i>316 SS / S17400 SS(For Orifice No. 16 only)</i> |
| 9    | LockingPiece                | 316SS                                              |
| 10   | <i>BottomGland</i>          | <i>316 SS / S17400 SS(For Orifice No. 16 only)</i> |
| 11   | <i>Bottom Thrust washer</i> | <i>PEEK</i>                                        |
| 12   | <i>Bearing</i>              | <i>PEEK</i>                                        |
| 13   | <i>O-Ring</i>               | <i>NBR</i>                                         |
| 14   | <i>O-Ring</i>               | <i>NBR</i>                                         |
| 15   | <i>Seat</i>                 | <i>PEEK</i>                                        |
| 16   | <i>Seat Retainer</i>        | <i>316SS</i>                                       |
| 17   | <i>Bearing</i>              | <i>PEEK</i>                                        |
| 18   | <i>Thrust Washer</i>        | <i>PEEK</i>                                        |
|      | Lubricant                   | MolybdenumDisulfide#luorinated-based               |

*Wetted components listed in italics.*

|                                     |
|-------------------------------------|
| Fittings                            |
| Tubing                              |
| Quick Couplings                     |
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3-way Valves

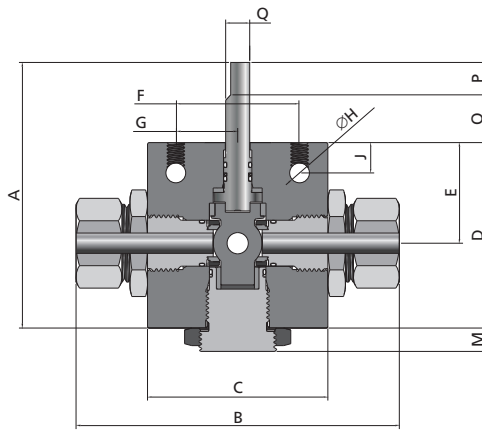


| Item | Component                   | Material Grade                        |
|------|-----------------------------|---------------------------------------|
| 1    | <i>Ball Stem</i>            | 316 SS                                |
| 2    | Stem Backup                 | PEEK                                  |
| 3    | O-Ring                      | NBR                                   |
| 4    | <i>O-Ring</i>               | <i>NBR</i>                            |
| 5    | <i>Body</i>                 | <i>316 SS</i>                         |
| 6    | <i>Ball</i>                 | <i>316 SS</i>                         |
| 7    | Lock Nut                    | 316 SS                                |
| 8    | <i>SeatGland</i>            | <i>316 SS</i>                         |
| 9    | Locking Piece               | 316SS                                 |
| 10   | <i>Bottom Gland</i>         | <i>316SS</i>                          |
| 11   | <i>Bottom Thrust washer</i> | <i>PEEK</i>                           |
| 12   | <i>Bearing</i>              | <i>PEEK</i>                           |
| 13   | O-Ring                      | NBR                                   |
| 14   | <i>Belleville Washer</i>    | <i>S17700</i>                         |
| 15   | <i>Seat</i>                 | <i>PEEK</i>                           |
| 16   | <i>Seat Retainer</i>        | <i>S17700</i>                         |
| 17   | O-Ring                      | NBR                                   |
| 18   | O-Ring                      | NBR                                   |
| 19   | <i>Bearing</i>              | <i>PEEK</i>                           |
| 20   | <i>Thrust Washer</i>        | <i>PEEK</i>                           |
|      | Lubricant                   | MolybdenumDisulfide/Fluorinated-based |

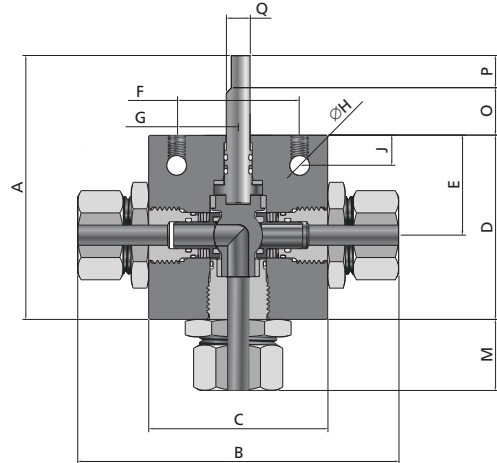
Wetted components listed in italics.

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# Dimensions



2-way Valves



3-way Valves

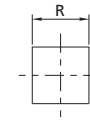
| Flow Pattern | Orifice No. | Dimensions, in. (mm) |               |              |              |             |            |              |             |             |             |                 |
|--------------|-------------|----------------------|---------------|--------------|--------------|-------------|------------|--------------|-------------|-------------|-------------|-----------------|
|              |             | A                    | B             | C            | D            | E           | F          | G            | H           | J           | M           | Block Thickness |
| 2-way        | 4           | 4.31 (109.3)         | 4.20 (106.8)  | 2 (50.8)     | 2.53 (64.2)  | 1.28 (32.5) | 1.5 (38.1) | 0.75 (19.05) | 0.28 (7.1)  | 0.43 (10.9) | 0.35 (8.8)  | 1 (25.4)        |
|              | 6           | 5.94 (150.8)         | 5.53 (140.4)  | 3 (76.2)     | 3.43 (87.3)  | 1.78 (45.2) | 2.5 (63.5) | 1.25 (31.75) | 0.31 (7.9)  | 0.41 (10.3) | 0.35 (8.8)  | 1.38 (34.9)     |
|              | 8           | 6.67 (169.5)         | 7.72 (196.2)  | 4.12 (104.6) | 4.23 (107.5) | 2.07 (52.4) | 3 (76.2)   | 1.5 (38.1)   | 0.31 (7.9)  | 0.5 (12.7)  | 0.61 (15.5) | 1.75 (44.5)     |
|              | 16          | 10.82 (274.8)        | 12.30 (312.4) | 6.24 (158.6) | 6.65 (169.0) | 3.20 (81.3) | 4 (101.6)  | 2 (50.8)     | 0.41 (10.4) | 0.63 (15.9) | 0.89 (22.5) | 3.38 (85.7)     |
| 3-way        | 4           | 4.34 (110.2)         | 4.70 (119.5)  | 2.5 (63.5)   | 2.56 (65)    | 1.34 (34)   | 2 (50.8)   | 1 (25.4)     | 0.28 (7.1)  | 0.41 (10.3) | 1.1 (28)    | 1 (25.4)        |
|              | 8           | 6.67 (169.5)         | 7.72 (196.2)  | 4.12 (104.6) | 4.23 (107.5) | 2.07 (52.4) | 3 (76.2)   | 1.5 (38.1)   | 0.31 (7.9)  | 0.5 (12.7)  | 1.45 (36.8) | 1.75 (44.5)     |

| Flow Pattern | Orifice No. | Dimensions, in. (mm) |             |             |              |
|--------------|-------------|----------------------|-------------|-------------|--------------|
|              |             | O                    | P           | Q           | R            |
| 2-way        | 4           | 1.278 (32.5)         | 0.50 (12.7) | 0.25 (6.35) | 0.22 (5.48)  |
|              | 6           | 1.24 (31.7)          | 1.25 (31.8) | 0.44 (11.1) | 0.38 (9.35)  |
|              | 8           | 1.56 (39.7)          | 0.88 (22.2) | 0.62 (15.9) | 0.44 (11.13) |
|              | 16          | 2.41 (61.3)          | 1.75 (44.5) | 1.25 (31.8) | 1.00 (25.4)  |
| 3-way        | 4           | 1.28 (32.5)          | 0.5 (12.7)  | 0.25 (6.35) | 0.22 (5.49)  |
|              | 8           | 1.56 (39.7)          | 0.88 (22.2) | 0.62 (15.9) | 0.44 (11.13) |

Ball stem connection



Orifice 4



Orifice 6/8

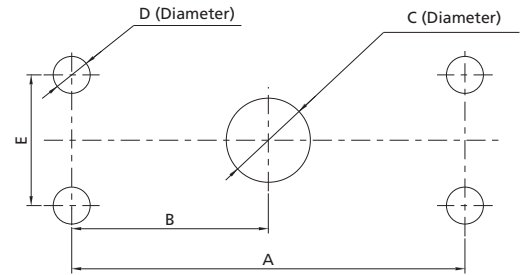
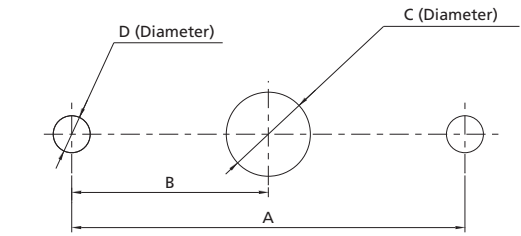
All dimensions are for reference only and are subject to change.

|                                     |
|-------------------------------------|
| Fittings                            |
| Tubing                              |
| Quick Couplings                     |
| Line Filters                        |
| Valves                              |
| Sour Service Products               |
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## Ball Valve Panel Mounting Dimensions

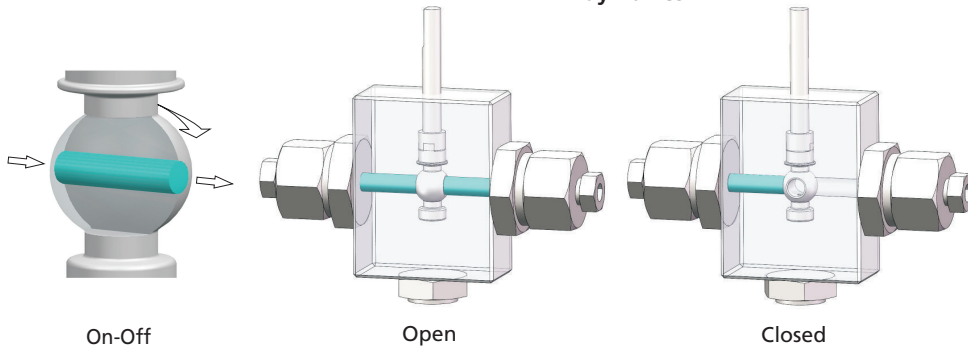
| Flow Pattern | Orifice No. | Dimensions, in. (mm) |                 |               |               |
|--------------|-------------|----------------------|-----------------|---------------|---------------|
|              |             | A                    | B               | C             | D             |
| 2-way        | 4           | 1.5<br>(38.1)        | 0.75<br>(19.05) | 0.31<br>(7.9) | 0.28<br>(7.1) |
| 3-way        | 4           | 2<br>(50.8)          | 1<br>(25.4)     | 0.31<br>(7.9) | 0.28<br>(7.1) |

| Flow Pattern | Orifice No. | Dimensions, in. (mm) |                 |                |                |                |
|--------------|-------------|----------------------|-----------------|----------------|----------------|----------------|
|              |             | A                    | B               | C              | D              | E              |
| 2-way        | 6           | 2.5<br>(63.5)        | 1.25<br>(31.75) | 0.5<br>(12.7)  | 0.33<br>(8.5)  | 0.88<br>(22.3) |
|              | 8           | 3<br>(76.2)          | 1.5<br>(38.1)   | 0.69<br>(17.5) | 0.33<br>(8.5)  | 1<br>(25.4)    |
|              | 16          | 4<br>(101.6)         | 2<br>(50.8)     | 1.38<br>(35.0) | 0.39<br>(10.0) | 1.50<br>(38.1) |
| 3-way        | 8           | 3<br>(76.2)          | 1.5<br>(38.1)   | 0.69<br>(17.5) | 0.33<br>(8.5)  | 1<br>(25.4)    |

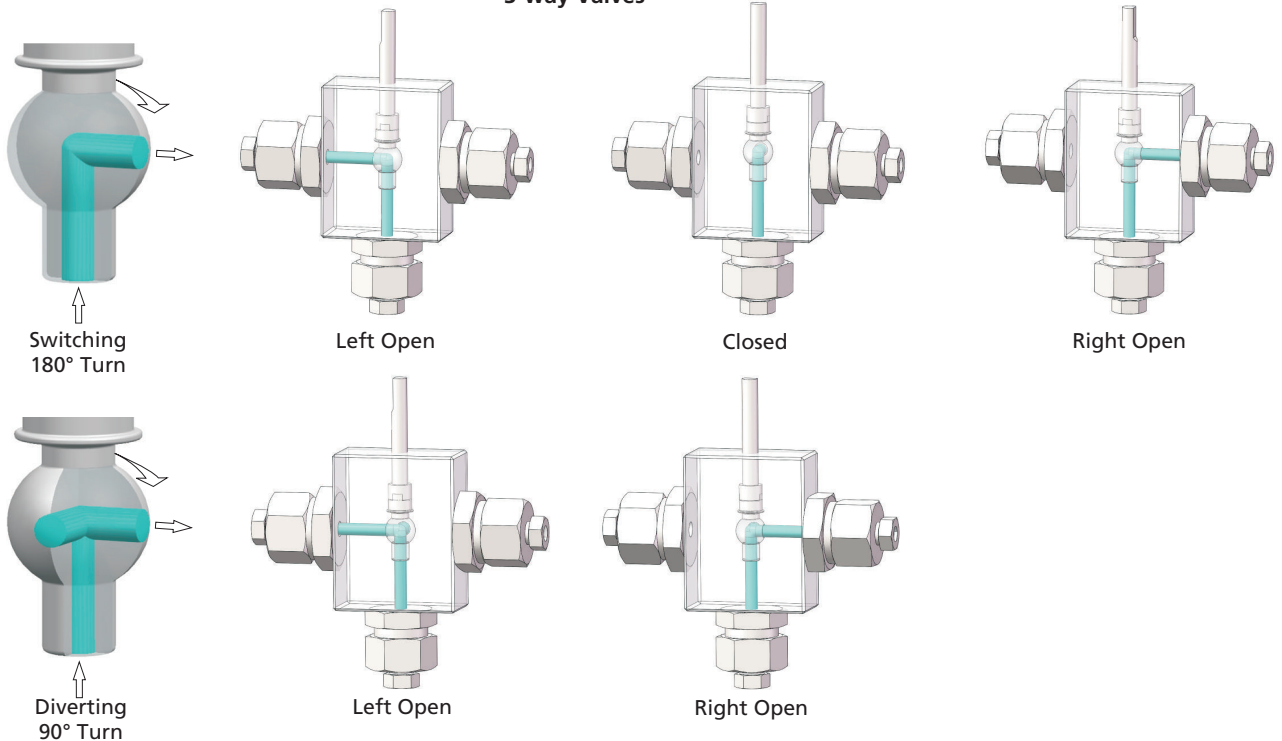


## Flow Configuration

### 2-way Valves



### 3-way Valves



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## Ordering Information and Dimensions

| Ordering Number  | Flow Pattern | Connection | Orifice No.  | Orifice size in. (mm) | Cv           | Working Pressure psig (bar) |      |
|------------------|--------------|------------|--------------|-----------------------|--------------|-----------------------------|------|
| 10SBSS-MF12-8-1  | 2-way        | MF12       | 8            | 0.5 (12.7)            | 10.2         | 10,000 (690)                |      |
| 10SBSS-MF16-8-1  |              | MF16       |              | 0.5 (12.7)            | 10.2         |                             |      |
| 10SBSS-FNS12-8-1 |              | FNS12      |              | 0.5 (12.7)            | 10.2         |                             |      |
| 10SBSS-FNS16-8-1 |              | FNS16      |              | 0.5 (12.7)            | 10.2         |                             |      |
| 10SB4P-MF24-16-1 |              | MF24       | 16           | 0.94 (23.8)           | 30.0         |                             |      |
| 10SBSS-MF12-8-2  | 3-way        | MF12       | 8            | 0.5 (12.7)            | 10.2         |                             |      |
| 15SBSS-DFF4-4-1  | 2-way        | DFF4       | 4            | 0.128 (3.25)          | 0.26         | 15,000 (1034)               |      |
| 15SBSS-DFF6-4-1  |              | DFF6       |              | 0.25 (6.35)           | 1.51         |                             |      |
| 15SBSS-FNS4-4-1  |              | FNS4       |              | 0.25 (6.35)           | 1.51         |                             |      |
| 15SBSS-FNS6-4-1  |              | FNS6       |              | 0.25 (6.35)           | 1.51         |                             |      |
| 15SBSS-FNS8-4-1  |              | FNS8       |              | 0.25 (6.35)           | 1.51         |                             |      |
| 15SBSS-FNS4-6-1  |              | FNS4       | 6            | 0.375 (9.52)          | 3.51         |                             |      |
| 15SBSS-FNS6-6-1  |              | FNS6       |              | 0.375 (9.52)          | 3.51         |                             |      |
| 15SBSS-FNS8-6-1  |              | FNS8       |              | 0.375 (9.52)          | 3.51         |                             |      |
| 15SBSS-MF12-8-1  |              |            | MF12         | 8                     | 0.5 (12.7)   |                             | 10.2 |
| 15SBSS-FNS4-4-2  |              | 3-way      | FNS4         | 4                     | 0.188 (4.77) |                             | 0.5  |
| 15SBSS-FNS4-4-2D |              |            |              |                       |              |                             |      |
| 15SBSS-FNS6-4-2  | FNS6         |            | 0.188 (4.77) |                       | 0.5          |                             |      |
| 15SBSS-FNS6-4-2D |              |            |              |                       |              |                             |      |
| 20SBSS-MF4-4-1   | 2-way        | MF4        | 4            | 0.109 (2.77)          | 0.36         | 20,000 (1379)               |      |
| 20SBSS-MF6-4-1   |              | MF6        |              | 0.203 (5.16)          | 1.23         |                             |      |
| 20SBSS-MF9-4-1   |              | MF9        |              | 0.25 (6.35)           | 1.51         |                             |      |
| 20SBSS-HF4-4-1   |              | HF4        |              | 0.094 (2.39)          | 0.26         |                             |      |
| 20SBSS-HF6-4-1   |              | HF6        | 0.125 (3.17) | 0.47                  |              |                             |      |
| 20SBSS-MF6-6-1   |              | MF6        | 6            | 0.203 (5.16)          | 1.23         |                             |      |
| 20SBSS-MF9-6-1   |              | MF9        |              | 0.312 (7.92)          | 2.93         |                             |      |
| 20SBSS-MF12-6-1  |              | MF12       |              | 0.375 (9.52)          | 3.51         |                             |      |
| 20SBSS-MF4-4-2   | 3-way        | MF4        | 4            | 0.109 (2.77)          | 0.17         |                             |      |
| 20SBSS-MF4-4-2D  |              |            |              |                       |              |                             |      |

Fittings

Tubing

Quick Couplings

Line Filters

Valves

Sour Service Products

Subsea Valves

Tools and Installation Instructions

Technical Information

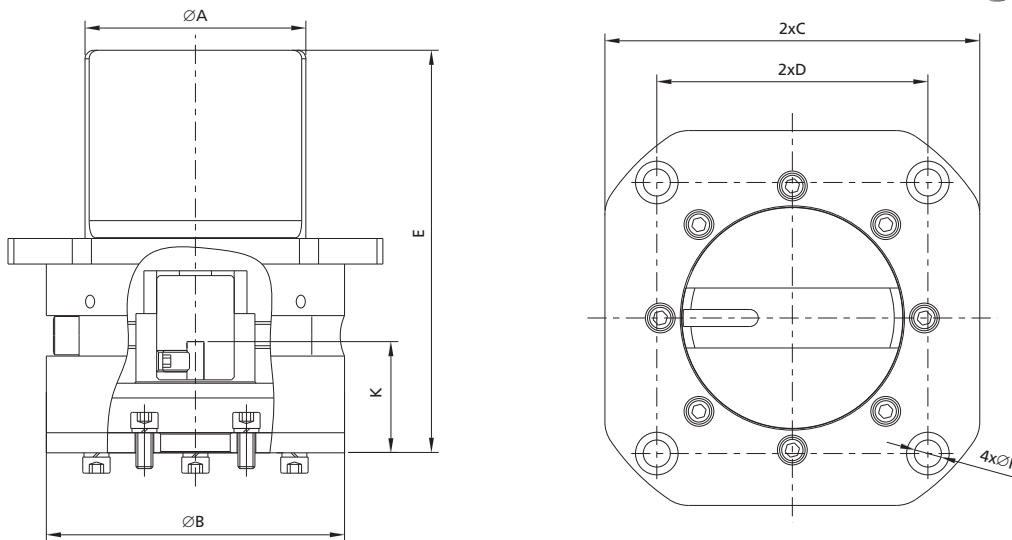
Part Number Crossover Charts

## Ordering Information and Dimensions (continued)

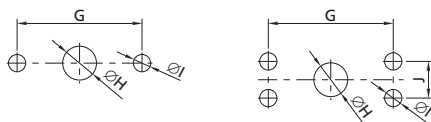
| Ordering Number | Flow Pattern | Connection | Orifice No. | Orifice size in. (mm) | Cv   | Working Pressure psig (bar) |
|-----------------|--------------|------------|-------------|-----------------------|------|-----------------------------|
| 20SBSS-MF6-4-2  | 3-way        | MF6        | 4           | 0.188 (4.77)          | 0.5  | 20,000 (1379)               |
| 20SBSS-MF6-4-2D |              |            |             |                       |      |                             |
| 20SBSS-MF9-4-2  |              | MF9        |             | 0.188 (4.77)          | 0.5  |                             |
| 20SBSS-MF9-4-2D |              |            |             |                       |      |                             |
| 20SBSS-HF4-4-2  |              | HF4        |             | 0.094 (2.39)          | 0.13 |                             |
| 20SBSS-HF4-4-2D |              |            |             |                       |      |                             |
| 20SBSS-HF6-4-2  |              | HF6        |             | 0.125 (3.17)          | 0.22 |                             |
| 20SBSS-HF6-4-2D |              |            |             |                       |      |                             |

### Paddle Assembly (PA) Options

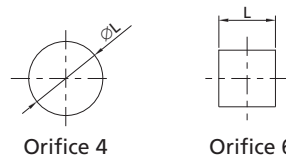
Paddle Assembly (PA) installed on the valve, is suitable for ROV or diver operation to complete the opening and closing or reversing of underwater valves. PA is made of stainless steel, which has good corrosion resistance in the submarine environment. The limit design is adopted in the structure to prevent the overtorque of ROV from affecting the normal use of the valve, meeting API 17H specification of ROV interface tooling.



Bottom Mounting Hole



Stem Port



Orifice 4

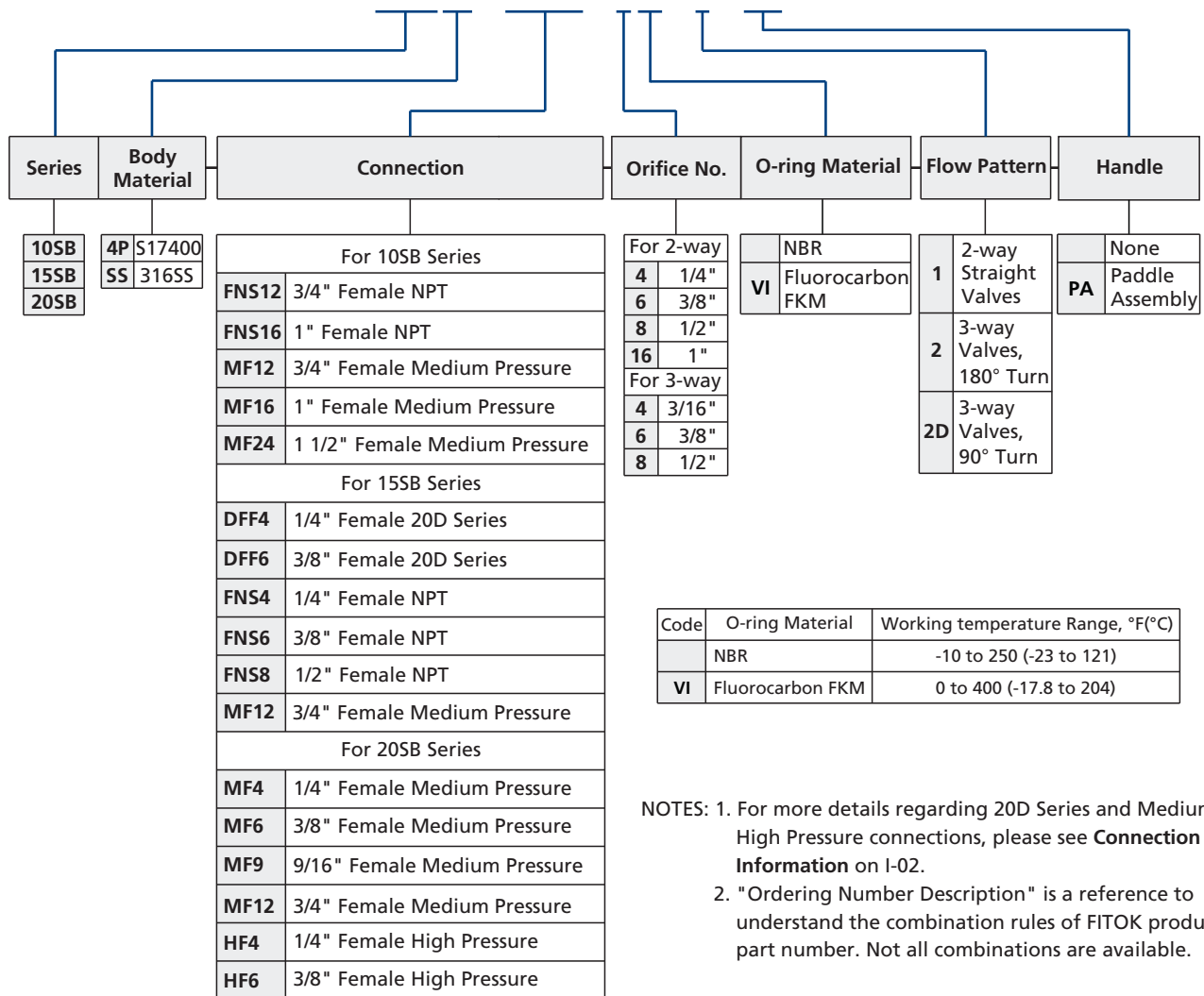
Orifice 6

Note: To order valves with paddle assembly, add "-PA" to the valve ordering number. Example: 20SBSS-MF4-4-1-PA.

| Ordering Number | Flow Pattern | Orifice No. | Dimensions, in. (mm) |            |            |            |           |           |            |             |            |             |             |             |
|-----------------|--------------|-------------|----------------------|------------|------------|------------|-----------|-----------|------------|-------------|------------|-------------|-------------|-------------|
|                 |              |             | A                    | B          | C          | D          | E         | F         | G          | H           | I          | J           | K           | L           |
| SS-PA-4-1       | 2-way        | 4           | 3.19 (81)            | 4.33 (110) | 5.51 (140) | 3.98 (101) | 5.9 (150) | 0.39 (10) | 1.5 (38.1) | 1.02 (26)   | 0.28 (7.1) | —           | 1.78 (45.2) | 0.25 (6.35) |
| SS-PA-6-1       |              | 6           | 3.19 (81)            | 4.33 (110) | 5.51 (140) | 3.98 (101) | 5.9 (150) | 0.39 (10) | 2.5 (63.5) | 1.44 (36.5) | 0.33 (8.5) | 0.88 (22.3) | 2.5 (63.5)  | 0.38 (9.35) |
| SS-PA-4-2       | 3-way        | 4           | 3.19 (81)            | 4.33 (110) | 5.51 (140) | 3.98 (101) | 5.9 (150) | 0.39 (10) | 2 (50.8)   | 1.44 (36.5) | 0.28 (7.1) | —           | 1.78 (45.2) | 0.25 (6.35) |

## Ordering Number Description

15SBSS - MF12 - 8VI - 1 - PA



|                                     |
|-------------------------------------|
| Fittings                            |
| Tubing                              |
| Quick Couplings                     |
| Line Filters                        |
| Valves                              |
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