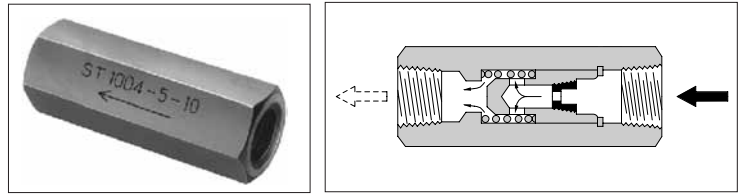


# ACCESSORIES & OTHERS

|  |      |
|--|------|
| <b>■ Accessories</b>                               | Page |
| ● Air Bleed Valves .....                           | 820  |
| ● “F3” Series Pipe Flange Kits .....               | 821  |
| ● “F5” Series Pipe Flange Kits .....               | 824  |
| ● “F6” Series Pipe Flange Kits .....               | 829  |
| <b>■ Data Sheet</b>                                |      |
| ● Size of O-Ring .....                             | 833  |
| ● SAE J1926-1 SAE Straight Thread O-Ring Port..... | 835  |

## Air Bleed Valves

These air bleed valves are designed to use, at the start-up of the pumps, to bleed off the air enclosed in the suction line or the other lines in the system.



### Specifications

| Model Numbers | Max. Operating Pressure<br>MPa (PSI) | Reseating Pressure<br>MPa (PSI) | Cracking Pressure<br>MPa (PSI) | Flow Rate to Reseating<br>L/min (U.S.GPM) | Range of Usage to Pump Output Flow           | Approx. Mass<br>kg (lbs.) |
|---------------|--------------------------------------|---------------------------------|--------------------------------|---|--|---------------------------|
| ST1004-5-10*  | 25 (3630)                            | 0.15 (22)                       | 0.34 (49)                      | 5 (1.32)                                  | For 20 to 75 L/min<br>(5.28 to 19.8 U.S.GPM) | 0.2 (.44)                 |
| ST1004-10-10* |                                      |                                 |                                | 10 (2.64)                                 | For Over 75 L/min<br>(19.8 U.S.GPM)          |                           |

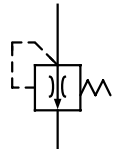
### Model Number Designation

| ST1004                            | -5   | -10           | *   |
|-----------------------------------|--|---------------|---|
| Series Number                     | Flow Rate to Reseating   | Design Number | Design Standards  |
| <b>ST1004:</b><br>Air Bleed Valve | <b>5:</b> 5 L/min<br>(1.32 U.S.GPM)<br><b>10:</b> 10 L/min<br>(2.64 U.S.GPM) | <b>10</b>     | <b>None:</b> Japanese Standard "JIS"<br><b>80:</b> European Design Standard<br><b>90:</b> N. American Design Standard |

### Instructions

When the valve is used to bleed off the air from the pump, connect the inlet port of the valve to the discharge port of the pump as close as possible. When removing the air from the pipes, install the valve at the highest position of the system. In either case, the outlet port of the valve must be connected to the tank, the end of which is located below the oil level in the reservoir.

### Graphic Symbol



### Hydraulic Fluids

#### Type of Hydraulic Fluids

Petroleum Base Oils .....Use R & O (Rust and Oxidation inhibitor) type oils or anti-wear type oils (equivalent to ISO VG-32 or 46)

Synthetic Fluids .....Use phosphate ester type fluid or polyol ester type fluids.

Water Containing Fluids ..Use water glycol type fluids or water in oil emulsion type fluids.

Other Special Fluids .....Consult factory for information.

#### Recommended viscosity and Oil Temperatures

Viscosity ranging between 15 and 400 mm<sup>2</sup>/s (77 and 1800 SSU).

Oil temperatures between -15 and +70°C (5 and 160°F)

Use hydraulic fluids which satisfy the recommended viscosity and oil temperatures given above.

#### Filtration Recommended...25 microns or less.

ST1004-\*-10/1080/1090

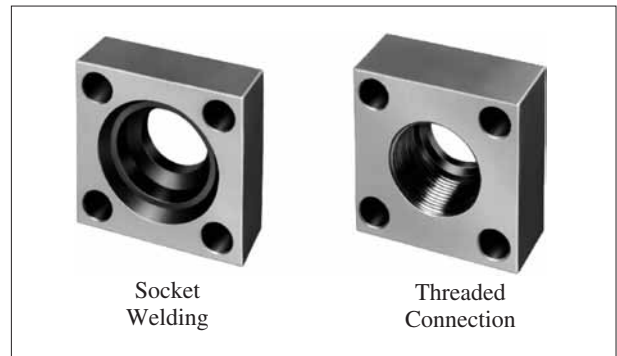
| Model Numbers | "A" Thd. | mm (Inches) |           |
|---------------|----------|-------------|-----------|
|               |          | B           | C         |
| ST1004-*-10   | Rc 3/8   | 70 (2.76)   | 24 (.94)  |
| ST1004-*-1080 | 3/8 BSPF | 82 (3.23)   | 27 (1.06) |
| ST1004-*-1090 | 3/8 NPT  | 70 (2.76)   | 24 (.94)  |

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

## “F3” Series Pipe Flange Kits

### Specifications

- Max. Operating Pressure...25 MPa (3630 PSI)



### Model Number Designation

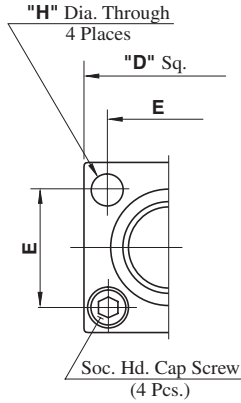
| F-   | F3            | -03W   | -A                               | -N  | -11           | *   |
|--|---------------|--|----------------------------------|---|---------------|---|
| Material of Seal   | Series Number | Flange Size  | Type of Pipe Connection          | O-Ring & Bolts  | Design Number | Design * Standards  |
| <b>None:</b><br>Standard NBR (Buna N) Seal<br><br><b>F:</b><br>FPM (Viton) Seal (For Synthetic fluids) | F3            | 03W, 03, 06V<br>06W, 06, 10W<br>10, 16W, 16<br>24W, 24 | <b>A:</b><br>Pipe Socket Welding | <b>None:</b><br>With O-Ring and Mounting Bolts<br><br><b>N:</b><br>No O-Ring and Mounting Bolts | 11            | <b>None:</b><br>Japanese Standard "JIS" & European Design Standard                      |
|  |               | 03W, 03, 06W<br>06, 10W, 10<br>16W, 16, 24W<br>24      |                                  |   |               | <b>C:</b><br>Block Type   |
|  |               | 03W, 03, 06V<br>06W, 06, 10W<br>10, 16W, 16<br>24W, 24 | <b>B:</b><br>Threaded Connection | <b>None:</b><br>With O-Ring and Mounting Bolts<br><br><b>N:</b><br>No O-Ring and Mounting Bolts | 11            | <b>None:</b><br>Japanese Standard "JIS"   |
|  |               | 03W, 03, 06W<br>06, 10W, 10<br>16W, 16, 24W<br>24      |                                  |   |               | <b>80:</b><br>European Design Standard<br><br><b>90:</b><br>N. American Design Standard |

★ Three different design standards are available as shown blow. Select the suitable design standard to your requirement.

| Type of Pipe Connection        | Design Standard                                    | Pipe Thread | Mounting Bolt (Socket Head Cap Screw) |
|--------------------------------|--|-------------|---------------------------------------|
| Pipe Socket Welding Block Type | Japanese Standard "JIS" & European Design Standard | —           | Metric Thd.                           |
|                                | N. American Design Standard                        | —           | Unified Thd.                          |
| Threaded Connection            | Japanese Standard "JIS"                            | Rc          | Metric Thd.                           |
|                                | European Design Standard                           | BSP,F       | Metric Thd.                           |
|                                | N. American Design Standard                        | NPT         | Unified Thd.                          |

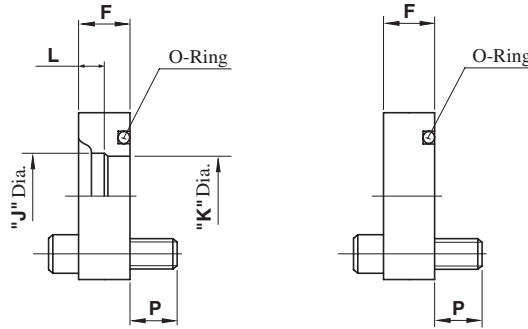
■ Pipe Socket Welding

F3-\*-A\*-11/1190



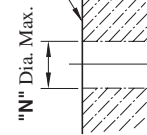
■ Block Type

F3-\*-C\*-11/1190



Customer's Mounting Surface

Surface should have a good machined finish.



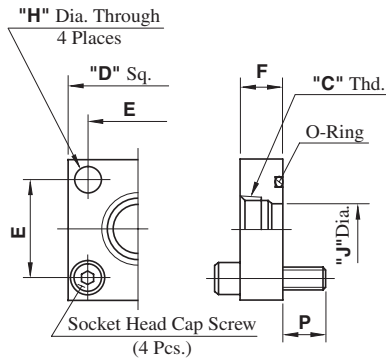
| Kit Numbers   | Piping Size   | Dimensions mm (Inches) |               |              |               |                |                       |                |                |                | O-Ring    | Socket Head Cap Screw | Approx.* Mass kg (lbs.) |                       |
|---------------|---------------|------------------------|---------------|--------------|---------------|----------------|-----------------------|----------------|----------------|----------------|-----------|-----------------------|-------------------------|-----------------------|
|               |               | D                      | E             | F            | H             | J              | K                     | L              | N              | P              |           |                       |                         |                       |
| F3-03W-*-11   | 1/4           | 54<br>(2.13)           | 36<br>(1.42)  | 21<br>(.83)  | 11<br>(.43)   | 14.3<br>(.56)  | 11<br>(.43)           | 8<br>(.31)     | 15<br>(.59)    | 14<br>(.55)    | SO-NB-G25 | M10 × 35 Lg.          | 0.5 (1.1)               |                       |
| F3-03W-*-1190 |               |                        |               |              |               | 17.1<br>(.67)  | 17.8<br>(.70)         | 12.5<br>(.49)  |                | 9<br>(.35)     |           | 14<br>(.55)           |                         | 3/8-16UNC × 1-1/2 Lg. |
| F3-03-*-11    | 3/8           | 58<br>(2.28)           | 40<br>(1.57)  | 21<br>(.83)  | 11<br>(.43)   | 17.8<br>(.70)  |                       |                | 12.5<br>(.49)  |                |           | 9<br>(.35)            |                         | 14<br>(.55)           |
| F3-03-*-1190  |               |                        |               |              |               | 17.1<br>(.67)  | 3/8-16UNC × 1-1/2 Lg. |                |                |                |           |                       |                         |                       |
| F3-06V-*-11   | 3/8           | 58<br>(2.28)           | 40<br>(1.57)  | 21<br>(.83)  | 11<br>(.43)   | 17.8<br>(.70)  | 12.5<br>(.49)         | 9<br>(.35)     | 20<br>(.79)    | 14<br>(.55)    | SO-NB-G30 | M10 × 35 Lg.          | 0.8 (1.8)               |                       |
| F3-06W-*-11   | 1/2           |                        |               |              |               | 22.2<br>(.87)  | 16<br>(.63)           | 11<br>(.43)    |                | 14<br>(.55)    |           | 3/8-16UNC × 1-1/2 Lg. |                         |                       |
| F3-06W-*-1190 |               |                        |               |              |               | 3/4            | 27.7<br>(1.09)        | 20<br>(.79)    |                | 12<br>(.47)    |           | 14<br>(.55)           |                         | M10 × 35 Lg.          |
| F3-06-*-11    | 17.1<br>(.67) |                        |               |              |               |                | 3/8-16UNC × 1-1/2 Lg. |                |                |                |           |                       |                         |                       |
| F3-10W-*-11   | 1             | 76<br>(2.99)           | 56<br>(2.20)  | 27<br>(1.06) | 13.5<br>(.53) | 34.5<br>(1.36) | 25<br>(.98)           | 14<br>(.55)    | 31.5<br>(1.24) | 18<br>(.71)    | SO-NB-G40 | M12 × 45 Lg.          | 1.4 (3.1)               |                       |
| F3-10W-*-1190 | 1-1/4         |                        |               |              |               | 17.5<br>(.69)  | 43.2<br>(1.70)        | 31.5<br>(1.24) |                | 16<br>(.63)    |           | 18<br>(.71)           |                         | 1/2-13UNC × 1-3/4 Lg. |
| F3-10-*-11    |               |                        |               |              |               | 2              |                       |                |                |                |           | 18<br>(.71)           |                         | M12 × 45 Lg.          |
| F3-10-*-1190  | 17.5<br>(.69) |                        |               |              |               |                | 1/2-13UNC × 1-3/4 Lg. |                |                |                |           |                       |                         |                       |
| F3-16W-*-11   | 1-1/2         | 100<br>(3.94)          | 73<br>(2.87)  | 35<br>(1.38) | 17.5<br>(.69) | 49.1<br>(1.93) | 37.5<br>(1.48)        | 18<br>(.71)    | 50<br>(1.97)   | 25<br>(.98)    | SO-NB-G60 | M16 × 60 Lg.          | 2.7 (6.0)               |                       |
| F3-16W-*-1190 |               |                        |               |              |               | 2              | 22.1<br>(.87)         | 61.1<br>(2.41) |                | 47.5<br>(1.87) |           | 20<br>(.79)           |                         | 22.1<br>(.87)         |
| F3-16-*-11    | 3             |                        |               |              |               |                | 25<br>(.98)           |                |                |                |           |                       |                         | M16 × 60 Lg.          |
| F3-16-*-1190  |               |                        |               |              |               | 22.1<br>(.87)  | 8/5-11UNC × 2-1/4 Lg. |                |                |                |           |                       |                         |                       |
| F3-24W-*-11   | 2-1/2         | 140<br>(5.51)          | 103<br>(4.06) | 44<br>(1.73) | 24<br>(.94)   | 77.1<br>(3.04) | 60<br>(2.36)          | 22<br>(.87)    | 75<br>(2.95)   | 36<br>(1.42)   | SO-NB-G85 | M22 × 80 Lg.          | 5.8 (12.8)              |                       |
| F3-24W-*-1190 |               |                        |               |              |               | 3              | 38.6<br>(1.52)        | 90.0<br>(3.54) |                | 71<br>(2.80)   |           | 25<br>(.98)           |                         | 36<br>(1.42)          |
| F3-24-*-11    | 3             |                        |               |              |               |                | 36<br>(1.42)          |                |                |                |           |                       |                         | M22 × 80 Lg.          |
| F3-24-*-1190  |               |                        |               |              |               | 38.6<br>(1.52) | 7/8-9UNC × 3-1/4 Lg.  |                |                |                |           |                       |                         |                       |

★ Approx. mass is the value including socket head cap screws (4 Pcs.).

Threaded Connection

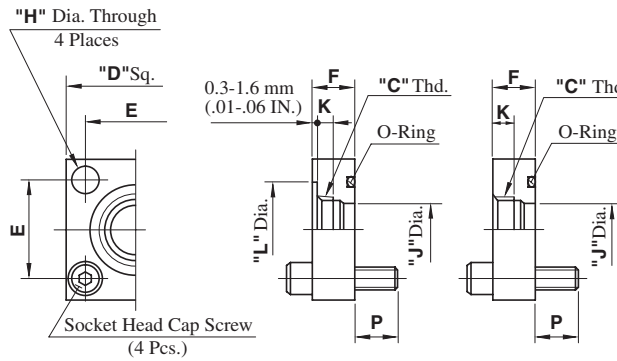
Japanese Standard "JIS" & N. American Design Standard

F3-\*-B\*-11/1190



European Design Standard

F3-\*-B\*-1180

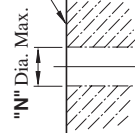


Piping Size:  
03W to 10

Piping Size:  
16W to 24

Customer's Mounting Surface

Surface should have a good machined finish.



| Kit Numbers    | Piping Size "C" Thd. | Dimensions mm (Inches) |            |          |            |             |          |             |   |             | O-Ring | Socket Head Cap Screw | Approx.* Mass kg (lbs.) |                       |            |
|----------------|----------------------|------------------------|------------|----------|------------|-------------|----------|-------------|---|-------------|--------|-----------------------|-------------------------|-----------------------|------------|
|                |                      | D                      | E          | F        | H          | J           | K        | L           | N | P           |        |                       |                         |                       |            |
| F3-03W-B*-11   | Rc 1/4               |                        |            |          |            | 11 (.43)    | —        | —           |   |             |        | 14 (.55)              | SO-NB-G25               | M10 × 35 Lg.          | 0.5 (1.1)  |
| F3-03W-B*-1180 | 1/4 BSPF             |                        |            |          |            | 11.5 (.45)  | 12 (.47) | 21 (.83)    |   |             |        | 17.1 (.67)            |                         | 3/8-16UNC × 1-1/2 Lg. |            |
| F3-03W-B*-1190 | 1/4 NPT              | 54 (2.13)              | 36 (1.42)  | 21 (.83) | 11 (.43)   | 11 (.43)    | —        | —           |   | 15 (.59)    |        | 14 (.55)              |                         | M10 × 35 Lg.          |            |
| F3-03-B*-11    | Rc 3/8               |                        |            |          |            | 14 (.55)    | —        | —           |   |             |        | 17.1 (.67)            |                         | 3/8-16UNC × 1-1/2 Lg. |            |
| F3-03-B*-1180  | 3/8 BSPF             |                        |            |          |            | 15 (.59)    | 14 (.55) | 24.3 (.96)  |   |             |        |                       |                         |                       |            |
| F3-03-B*-1190  | 3/8 NPT              |                        |            |          |            | 14 (.55)    | —        | —           |   |             |        |                       |                         |                       |            |
| F3-06V-B*-11   | Rc3/8                |                        |            |          |            | 14 (.55)    | —        | —           |   |             |        | 14 (.55)              | SO-NB-G30               | M10 × 35 Lg.          | 0.8 (1.8)  |
| F3-06W-B*-11   | Rc 1/2               |                        |            |          |            | 17.5 (.69)  | —        | —           |   |             |        | 14 (.55)              |                         | M10 × 35 Lg.          |            |
| F3-06W-B*-1180 | 1/2 BSPF             |                        |            | 21 (.83) | 11 (.43)   | 19 (.75)    | 17 (.67) | 29 (1.14)   |   |             |        | 17.1 (.67)            |                         | 3/8-16UNC × 1-1/2 Lg. |            |
| F3-06W-B*-1190 | 1/2 NPT              | 58 (2.28)              | 40 (1.57)  |          |            | 17.5 (.69)  | —        | —           |   | 20 (.79)    |        | 13 (.51)              |                         | M10 × 40 Lg.          |            |
| F3-06-B*-11    | Rc 3/4               |                        |            |          |            | 23 (.91)    | —        | —           |   |             |        | 17.5 (.69)            |                         | 3/8-16UNC × 1-3/4 Lg. |            |
| F3-06-B*-1180  | 3/4 BSPF             |                        |            |          |            | 24.5 (.96)  | 20 (.79) | 35.5 (1.40) |   |             |        |                       |                         |                       |            |
| F3-06-B*-1190  | 3/4 NPT              |                        |            |          |            | 23 (.91)    | —        | —           |   |             |        |                       |                         |                       |            |
| F3-10W-B*-11   | Rc 1                 |                        |            |          |            | 29 (1.14)   | —        | —           |   |             |        | 18 (.71)              | SO-NB-G40               | M12 × 45 Lg.          | 1.4 (3.1)  |
| F3-10W-B*-1180 | 1 BSPF               |                        |            |          |            | 30.5 (1.20) | 21 (.83) | 43.5 (1.71) |   |             |        | 17.5 (.69)            |                         | 1/2-13UNC × 1-3/4 Lg. |            |
| F3-10W-B*-1190 | 1 NPT                | 76 (2.99)              | 56 (2.20)  |          | 13.5 (.53) | 29 (1.14)   | —        | —           |   | 31.5 (1.24) |        | 15 (.59)              |                         | M12 × 50 Lg.          |            |
| F3-10-B*-11    | Rc 1-1/4             |                        |            |          |            | —           | —        | —           |   |             |        | 15.8 (.62)            |                         | 1/2-13UNC × 2 Lg.     |            |
| F3-10-B*-1180  | 1-1/4 BSPF           |                        |            |          |            | 31.5 (1.24) | 22 (.87) | 53 (2.09)   |   |             |        |                       |                         |                       |            |
| F3-10-B*-1190  | 1-1/4 NPT            |                        |            |          |            | —           | —        | —           |   |             |        |                       |                         |                       |            |
| F3-16W-B*-11   | Rc 1-1/2             |                        |            |          |            | 43.5 (1.71) | —        | —           |   |             |        | 25 (.98)              | SO-NB-G60               | M16 × 60 Lg.          | 2.7 (6.0)  |
| F3-16W-B*-1180 | 1-1/2 BSPF           |                        |            |          |            | 45 (1.77)   | 22 (.87) | —           |   |             |        | 28.5 (1.12)           |                         | 5/8-11UNC × 2-1/2 Lg. |            |
| F3-16W-B*-1190 | 1-1/2 NPT            | 100 (3.94)             | 73 (2.87)  |          | 17.5 (.69) | 43.5 (1.71) | —        | —           |   | 50 (1.97)   |        | 21 (.83)              |                         | M16 × 60 Lg.          |            |
| F3-16-B*-11    | Rc 2                 |                        |            |          |            | —           | —        | —           |   |             |        | 24.5 (.96)            |                         | 5/8-11UNC × 2-1/2 Lg. |            |
| F3-16-B*-1180  | 2 BSPF               |                        |            |          |            | 47.5 (1.87) | 22 (.87) | —           |   |             |        |                       |                         |                       |            |
| F3-16-B*-1190  | 2 NPT                |                        |            |          |            | —           | —        | —           |   |             |        |                       |                         |                       |            |
| F3-24W-B*-11   | Rc 2-1/2             |                        |            |          |            | 70 (2.76)   | —        | —           |   |             |        | 36 (1.42)             | SO-NB-G85               | M22 × 80 Lg.          | 5.8 (12.8) |
| F3-24W-B*-1180 | 2-1/2 BSPF           |                        |            |          |            | 72.5 (2.85) | 20 (.79) | —           |   |             |        | 38.6 (1.52)           |                         | 7/8-9UNC × 3-1/4 Lg.  |            |
| F3-24W-B*-1190 | 2-1/2 NPT            | 140 (5.51)             | 103 (4.06) |          | 24 (.94)   | 70 (2.76)   | —        | —           |   | 75 (2.95)   |        | 31 (1.22)             |                         | M22 × 80 Lg.          |            |
| F3-24-B*-11    | Rc 3                 |                        |            |          |            | —           | —        | —           |   |             |        | 33.6 (1.32)           |                         | 7/8-9UNC × 3-1/4 Lg.  |            |
| F3-24-B*-1180  | 3 BSPF               |                        |            |          |            | 71 (2.80)   | 20 (.79) | —           |   |             |        |                       |                         |                       |            |
| F3-24-B*-1190  | 3 NPT                |                        |            |          |            | —           | —        | —           |   |             |        |                       |                         |                       |            |

\* Approx. Mass is the value including socket head cap screws (4 Pcs.).

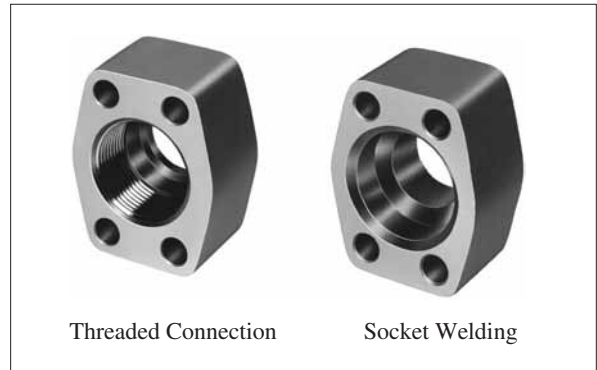
## ■ “F5” Series Pipe Flange Kits

The dimensions of the flange mounting surface are based upon SAE 4 Bolt Split Flange (Standard Pressure Series).

### ■ Specifications

#### ● Max. Operating Pressure

Maximum operation pressure varies with the type of pipe connection or flange size. Refer to the applicable installation drawings.



### ■ Model Number Designation

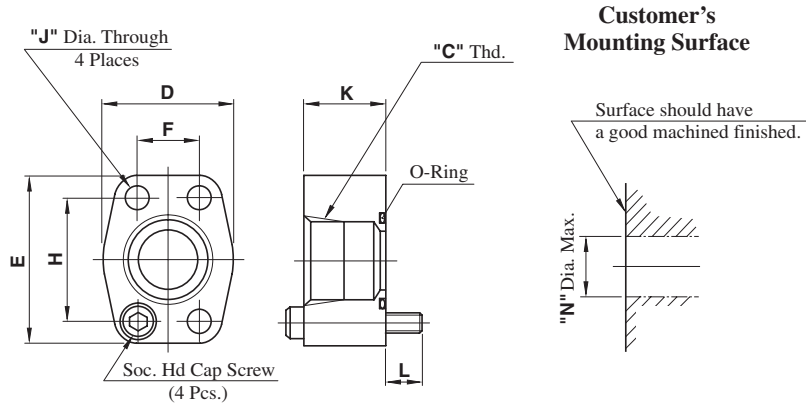
| F-  | F5            | -06   | -A                      | -10           | *  |
|---|---------------|---|-------------------------|---------------|--|
| Material of Seal                                    | Series Number | Flange Size   | Type of Pipe Connection | Design Number | Design Standards*  |
| None:<br>Standard NBR<br>(Buna N) Seal              | F5            | 04W, 04, 06X<br>06, 08, 08W,10<br>12, 16, 16W, 20<br>24, 28, 32 | A: Threaded Connection  | 10            | None:<br>Japanese Standard "JIS"   |
|   |               | 04, 06, 08<br>10, 12, 16<br>20                                  |                         |               | 80:<br>European Design Standard  |
|   |               | 04W, 04, 06<br>08, 10, 12<br>16, 16W, 20<br>24, 28, 32          |                         |               | 90:<br>N. American Design Standard   |
| F:<br>FPM (Viton) Seal<br>(For Synthetic<br>Fluids) |               | 04W, 04, 06X<br>06, 08, 08W,10<br>12, 16, 16W, 20<br>24, 28, 32 | B: Socket Welding       | 10            | None:<br>Japanese Standard "JIS" &<br>European Design Standard                                       |
|   |               | 04W, 04, 06<br>08, 10, 12<br>16, 16W, 20,24<br>28, 32           |                         |               | 90:<br>N. American Design Standard   |
|   |               | 04, 06, 08<br>10, 12, 16<br>20                                  | C: Butt Welding         | 10            | None:<br>Japanese Standard "JIS" &<br>European Design Standard<br>90:<br>N. American Design Standard |

★ Three different design standards are available as shown below. Select the suitable design standard to your requirement.

| Type of Pipe Connection             | Design Standard                                       | Pipe Thread | Mounting Bolt (Socket Head Cap Screw) |
|-------------------------------------|---|-------------|---------------------------------------|
| Threaded Connection                 | Japanese Standard "JIS"                               | Rc          | Metric Thd.                           |
|                                     | European Design Standard                              | BSP.F       | Metric Thd.                           |
|                                     | N. American Design Standard                           | NPT         | Unified Thd.                          |
| Pipe Socket Welding<br>Butt Welding | Japanese Standard "JIS" &<br>European Design Standard | —           | Metric Thd.                           |
|                                     | N. American Design Standard                           | —           | Unified Thd.                          |

Threaded Connection

Japanese Standard "JIS" : F5-\*-A-10  
 N. American Design Standard : F5-\*-A-1090



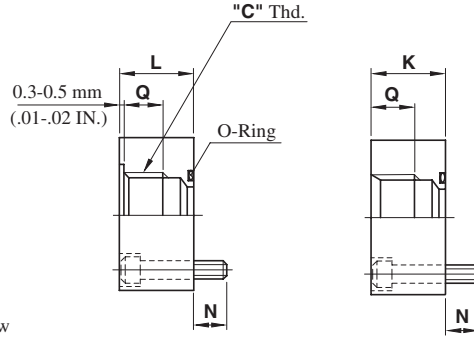
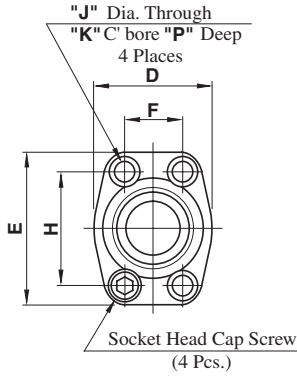
| Kit Numbers   | Piping Size "C" Thd. | Dimensions mm (Inches) |               |                 |                  |                |               |               |               | Socket Head Cap Screw (4 Pcs.) | O-Ring                | Max. Operating Pressure MPa (PSI) | Approx. Mass kg (lbs.) <sup>*1</sup> | Recommended Tightening Torque (Tolerance ±10%) Nm (IN.lbs.) <sup>*2</sup> |                        |
|---------------|----------------------|------------------------|---------------|-----------------|------------------|----------------|---------------|---------------|---------------|--------------------------------|-----------------------|-----------------------------------|--------------------------------------|---|------------------------|
|               |                      | D                      | E             | F               | H                | J              | K             | L             | N             |                                |                       |                                   |                                      |   |                        |
| F5-04W-A-10   | Rc 3/8               | 40<br>(1.57)           | 54<br>(2.13)  | 17.5<br>(.689)  | 38.1<br>(1.500)  | 8.8<br>(.346)  | 30<br>(1.18)  | 10<br>(.39)   | 13<br>(.51)   | M8 × 40 Lg.                    | SO-NB-P22             | 28<br>(4060)                      | 0.5<br>(1.1)                         | 35<br>(310)   |                        |
| F5-04-A-10    | Rc 1/2               |                        |               |                 |                  |                |               | 14.5<br>(.57) |               | 5/16-18UNC × 1-3/4 Lg.         |                       |                                   |                                      |   |                        |
| F5-04W-A-1090 | 3/8 NPT              |                        |               |                 |                  |                |               |               |               |                                |                       |                                   |                                      |   |                        |
| F5-04-A-1090  | 1/2 NPT              |                        |               |                 |                  |                |               |               |               |                                |                       |                                   |                                      |   |                        |
| F5-06X-A-10   | Rc 3/4               | 48<br>(1.89)           | 65<br>(2.56)  | 22.2<br>(.874)  | 47.6<br>(1.874)  | 11<br>(.433)   | 8.8<br>(.346) | 15<br>(.59)   | 19<br>(.75)   | M8 × 45 Lg.                    | SO-NB-G30             | 28<br>(4060)                      | 0.7<br>(1.5)                         | 35<br>(310)   |                        |
| F5-06-A-10    |                      |                        |               |                 |                  |                | 11<br>(.433)  | 30<br>(1.18)  |               | M10 × 45 Lg.                   |                       |                                   |                                      | 68.5<br>(606)   |                        |
| F5-06-A-1090  |                      |                        |               |                 |                  |                | 3/4 NPT       | 14.5<br>(.57) |               | 3/8-16UNC × 1-3/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-08W-A-10   | Rc 3/4               | 55<br>(2.17)           | 70<br>(2.76)  | 26.2<br>(1.031) | 52.4<br>(2.063)  | 11<br>(.433)   | 30<br>(1.18)  | 15<br>(.59)   | 26<br>(1.02)  | M10 × 45 Lg.                   | SO-NB-G35             | 28<br>(4060)                      | 0.9<br>(2.0)                         | 68.5<br>(606)   |                        |
| F5-08-A-10    | Rc 1                 |                        |               |                 |                  |                |               | 14.5<br>(.57) |               | 3/8-16UNC × 1-3/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-08-A-1090  | 1 NPT                |                        |               |                 |                  |                |               |               |               |                                |                       |                                   |                                      |   |                        |
| F5-10-A-10    | Rc 1-1/4             | 64<br>(2.52)           | 80<br>(3.15)  | 30.2<br>(1.189) | 58.7<br>(2.311)  | 11<br>(.433)   | 38<br>(1.50)  | 17<br>(.67)   | 32<br>(1.26)  | M10 × 55 Lg.                   | SO-NB-G40             | 28<br>(4060)                      | 1.2<br>(2.6)                         | 68.5<br>(606)   |                        |
| F5-10-A-1090  | 1-1/4 NPT            |                        |               |                 |                  |                |               | 12<br>(.472)  |               | 19.2<br>(.76)                  |                       |                                   |                                      |   | 7/16-14UNC × 2-1/4 Lg. |
| F5-12-A-10    | Rc 1-1/2             | 72<br>(2.83)           | 94<br>(3.70)  | 35.7<br>(1.406) | 69.9<br>(2.752)  | 13.5<br>(.531) | 38<br>(1.50)  | 17<br>(.67)   | 38<br>(1.50)  | M12 × 55 Lg.                   | SO-NB-G50             | 21<br>(3050)                      | 1.5<br>(3.3)                         | 118<br>(1044)   |                        |
| F5-12-A-1090  | 1-1/2 NPT            |                        |               |                 |                  |                |               | 19.2<br>(.76) |               | 1/2-13UNC × 2-1/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-16W-A-10   | Rc 1-1/2             | 85<br>(3.35)           | 102<br>(4.02) | 42.9<br>(1.689) | 77.8<br>(3.063)  | 13.5<br>(.531) | 38<br>(1.50)  | 48<br>(1.89)  | 51<br>(2.01)  | M12 × 55 Lg.                   | SO-NB-G60             | 21<br>(3050)                      | 1.8<br>(4.0)                         | 118<br>(1044)   |                        |
| F5-16-A-10    | Rc 2                 |                        |               |                 |                  |                |               | 51<br>(2.01)  |               |                                |                       |                                   |                                      |   | SO-NB-G65              |
| F5-16W-A-1090 | 1-1/2 NPT            |                        |               |                 |                  |                |               | 19.2<br>(.76) |               | 51<br>(2.01)                   | 1/2-13UNC × 2-1/4 Lg. | SO-NB-G60                         | 21<br>(3050)                         |   | 1.8<br>(4.0)           |
| F5-16-A-1090  | 2 NPT                |                        |               |                 |                  |                |               |               |               |                                |                       |                                   |                                      |   |                        |
| F5-20-A-10    | Rc 2-1/2             | 102<br>(4.02)          | 114<br>(4.49) | 50.8<br>(2.000) | 88.9<br>(3.500)  | 13.5<br>(.531) | 48<br>(1.89)  | 17<br>(.67)   | 63<br>(2.48)  | M12 × 65 Lg.                   | SO-NB-G75             | 17.5<br>(2540)                    | 2.0<br>(4.4)                         | 118<br>(1044)   |                        |
| F5-20-A-1090  | 2-1/2 NPT            |                        |               |                 |                  |                |               | 21.8<br>(.86) |               | 1/2-13UNC × 2-3/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-24-A-10    | Rc 3                 | 116<br>(4.57)          | 135<br>(5.31) | 61.9<br>(2.437) | 106.4<br>(4.189) | 17<br>(.67)    | 76<br>(2.99)  | 19.2<br>(.76) | 88<br>(3.46)  | M16 × 70 Lg.                   | SO-NB-G85             | 3.5<br>(510)                      | 2.7<br>(6.0)                         | 287<br>(2540)   |                        |
| F5-24-A-1090  | 3 NPT                |                        |               |                 |                  |                |               |               |               | 5/8-11UNC x 2-3/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-28-A-10    | Rc 3-1/2             | 134<br>(5.28)          | 153<br>(6.02) | 69.9<br>(2.752) | 120.7<br>(4.752) | 17<br>(.67)    | 53<br>(2.09)  | 19.2<br>(.76) | 88<br>(3.46)  | M16 × 70 Lg.                   | SO-NB-G100            | 3.5<br>(510)                      | 3.4<br>(7.5)                         | 287<br>(2540)   |                        |
| F5-28-A-1090  | 3-1/2 NPT            |                        |               |                 |                  |                |               |               |               | 5/8-11UNC x 2-3/4 Lg.          |                       |                                   |                                      |   |                        |
| F5-32-A-10    | Rc 4                 | 150<br>(5.91)          | 162<br>(6.38) | 77.8<br>(3.068) | 130.2<br>(5.126) | 17<br>(.67)    | 101<br>(3.98) | 19.2<br>(.76) | 101<br>(3.98) | M16 × 70 Lg.                   | SO-NB-G115            | 3.5<br>(510)                      | 3.7<br>(8.2)                         | 287<br>(2540)   |                        |
| F5-32-A-1090  | 4 NPT                |                        |               |                 |                  |                |               |               |               | 5/8-11UNC x 2-3/4 Lg.          |                       |                                   |                                      |   |                        |

\*1. Approx. mass is the value including socket head cap screws (4 Pcs.).

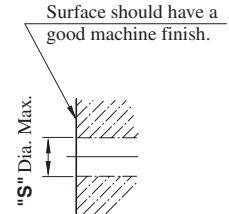
\*2. The values of recommended tightening torque are for socket head cap screws and apply to when these flanges are used for pressure line.

■ Threaded Connection

European Design Standard  
F5-\*-A-1180



Customer's  
Mounting Surface



Piping Size:  
1/2 to 1-1/2

Piping Size:  
2 & 2-1/2

| Kit Numbers  | Piping Size "C" Thd. | Dimensions mm (Inches) |               |                 |                 |                |               |              |               |               |              | Socket Head Cap Screw (4 Pcs.) | O-Ring       | Max. Operating Pressure MPa (PSI) | Approx. Mass kg (lbs.) |              |
|--------------|----------------------|------------------------|---------------|-----------------|-----------------|----------------|---------------|--------------|---------------|---------------|--------------|--------------------------------|--------------|-----------------------------------|------------------------|--------------|
|              |                      | D                      | E             | F               | H               | J              | K             | L            | N             | P             | Q            |                                |              |                                   |                        | S            |
| F5-04-A-1080 | 1/2 BSP.F            | 40<br>(1.57)           | 59<br>(2.32)  | 17.5<br>(.689)  | 38.1<br>(1.500) | 8.8<br>(.346)  | 14<br>(.55)   | 31<br>(1.22) | 12.6<br>(.50) | 8.6<br>(.34)  | 17<br>(.67)  | 15<br>(.59)                    | M8 × 35 Lg.  | SO-NB-P22                         | 28<br>(4060)           | 0.5<br>(1.1) |
| F5-06-A-1080 | 3/4 BSP.F            | 48<br>(1.89)           | 72<br>(2.83)  | 22.2<br>(.874)  | 47.6<br>(1.874) | 11<br>(.433)   | 17.5<br>(.69) | 31<br>(1.22) | 14.8<br>(.58) | 10.8<br>(.43) | 20<br>(.79)  | 19<br>(.75)                    | M10 × 35 Lg. | SO-NB-G30                         | 28<br>(4060)           | 0.7<br>(1.5) |
| F5-08-A-1080 | 1 BSP.F              | 55<br>(2.17)           | 77<br>(3.03)  | 26.2<br>(1.031) | 52.4<br>(2.063) | 11<br>(.433)   | 17.5<br>(.69) | 31<br>(1.22) | 14.8<br>(.58) | 10.8<br>(.43) | 21<br>(.83)  | 25<br>(.98)                    | M10 × 35 Lg. | SO-NB-G35                         | 28<br>(4060)           | 0.9<br>(2.0) |
| F5-10-A-1080 | 1-1/4 BSP.F          | 64<br>(2.52)           | 83<br>(3.27)  | 30.2<br>(1.189) | 58.7<br>(2.311) | 11<br>(.433)   | 17.5<br>(.69) | 39<br>(1.54) | 16.8<br>(.66) | 10.8<br>(.43) | 22<br>(.87)  | 32<br>(1.26)                   | M10 × 45 Lg. | SO-NB-G40                         | 28<br>(4060)           | 1.2<br>(2.6) |
| F5-12-A-1080 | 1-1/2 BSP.F          | 72<br>(2.83)           | 99<br>(3.90)  | 35.7<br>(1.406) | 69.9<br>(2.752) | 13.5<br>(.531) | 21<br>(.83)   | 41<br>(1.61) | 17.5<br>(.69) | 13.5<br>(.53) | 22<br>(.87)  | 38<br>(1.50)                   | M12 × 45 Lg. | SO-NB-G50                         | 21<br>(3050)           | 1.6<br>(3.5) |
| F5-16-A-1080 | 2 BSP.F              | 85<br>(3.35)           | 107<br>(4.21) | 42.9<br>(1.689) | 77.8<br>(3.063) | 13.5<br>(.531) | 21<br>(.83)   | 41<br>(1.61) | 17.5<br>(.69) | 13.5<br>(.53) | 31<br>(1.22) | 50<br>(1.97)                   | M12 × 45 Lg. | SO-NB-G65                         | 17.5<br>(2540)         | 1.8<br>(4.0) |
| F5-20-A-1080 | 2-1/2 BSP.F          | 102<br>(4.02)          | 118<br>(4.65) | 50.8<br>(2.000) | 88.9<br>(3.500) | 13.5<br>(.531) | 21<br>(.83)   | 46<br>(1.81) | 17.5<br>(.69) | 13.5<br>(.53) | 31<br>(1.22) | 63<br>(2.48)                   | M12 × 50 Lg. | SO-NB-G75                         | 17.5<br>(2540)         | 1.9<br>(4.2) |

★ Approx. mass is the value including socket head cap screws (4 Pcs.).

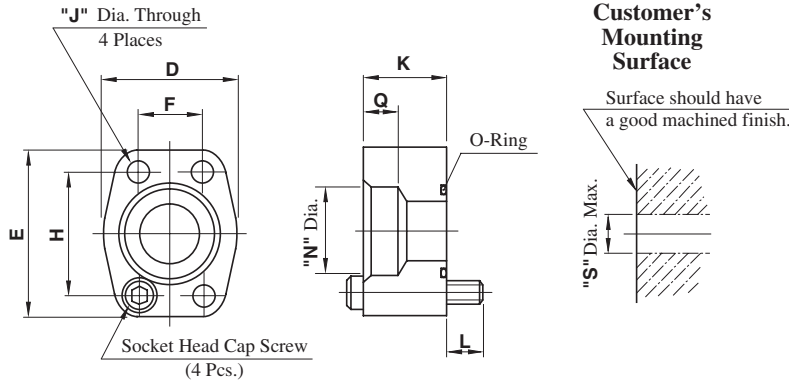
● Recommended Tightening Torque  
For Socket Head Cap Screw

| Kit Numbers  | Tightening Torque           |           |
|--------------|-----------------------------|-----------|
|              | Recommendation Nm (IN.lbs.) | Tolerance |
| F5-04-A-1080 | 35 (310)                    | ±10%      |
| F5-06-A-1080 | 68.5 (606)                  |           |
| F5-08-A-1080 |                             |           |
| F5-10-A-1080 |                             |           |
| F5-12-A-1080 | 118 (1044)                  |           |
| F5-16-A-1080 |                             |           |
| F5-20-A-1080 |                             |           |

Note: The values of tightening torque above apply to when these flanges are used for pressure line.



■ Socket Welding  
 Japanese Standard "JIS" &  
 European Design Standard : F5- \*-B-10  
 N. American Design Standard : F5- \*-B-1090



● Recommended Tightening Torque  
 For Socket Head Cap Screw

| Kit Numbers                               | Tightening Torque              |           |
|---|--------------------------------|-----------|
|   | Recommendation<br>Nm (IN.lbs.) | Tolerance |
| F5-04W-B<br>F5-04-B<br>F5-06X-B           | 35 (310)                       | ±10%      |
| F5-06-B<br>F5-08W-B<br>F5-08-B<br>F5-10-B | 68.5 (660)                     |           |
| F5-12-B<br>F5-16W-B<br>F5-16-B<br>F5-20-B | 118 (1044)                     |           |
| F5-24-B<br>F5-28-B<br>F5-32-B             | 287 (2540)                     |           |

Note: The values of tightening torque above apply to when these flanges are used for pressure line.

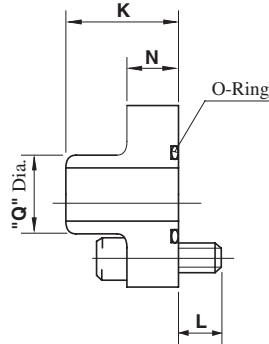
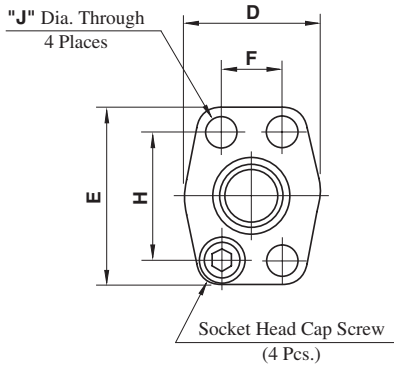
| Kit Numbers   | Piping Size  | Dimensions mm (Inches) |               |                 |                  |                               |              |                              |                                    |                            |   | Socket Head Cap Screw (4 Pcs.) | O-Ring  | Max. Operating Pressure MPa(Psi) | Approx. Mass kg (lbs.)       |              |
|---|--------------|------------------------|---------------|-----------------|------------------|-------------------------------|--------------|------------------------------|------------------------------------|----------------------------|---|--------------------------------|---|----------------------------------|------------------------------|--------------|
|   |              | D                      | E             | F               | H                | J                             | K            | L                            | N                                  | Q                          | S |                                |   |                                  |                              |              |
| F5-04W-B-10<br>-----<br>F5-04W-B-1090                       | 3/8          |                        |               |                 |                  |                               |              | 10<br>(.39)                  | 17.8<br>(.701)                     | 9<br>(.35)                 |   |                                |   | SO-NB-P22                        | 28<br>(4060)                 | 0.5<br>(1.1) |
| F5-04-B-10<br>-----<br>F5-04-B-1090                         | 1/2          | 40<br>(1.57)           | 54<br>(2.13)  | 17.5<br>(.689)  | 38.1<br>(1.500)  | 8.8<br>(.346)                 | 30<br>(1.18) | 10<br>(.39)<br>14.5<br>(.57) | 22.2<br>(.874)                     | 11<br>(.43)                |   | 13<br>(.51)                    | M8 × 40 Lg.<br>-----<br>5/16-18UNC × 1-3/4 Lg.<br>-----<br>M8 × 40 Lg.<br>-----<br>5/16-18UNC × 1-3/4 Lg. |                                  |                              |              |
| F5-06X-B-10<br>-----<br>F5-06-B-10<br>-----<br>F5-06-B-1090 | 3/4          | 48<br>(1.89)           | 65<br>(2.56)  | 22.2<br>(.874)  | 47.6<br>(1.874)  | 8.8<br>(.346)<br>11<br>(.433) | 30<br>(1.18) | 15<br>(.59)<br>14.5<br>(.57) | 27.7<br>(1.091)                    | 12<br>(.47)                |   | 19<br>(.75)                    | M8 × 45 Lg.<br>-----<br>M10 × 45 Lg.<br>-----<br>3/8-16UNC × 1-3/4 Lg.                                    | SO-NB-G30                        | 28<br>(4060)<br>14<br>(2030) | 0.7<br>(1.5) |
| F5-08W-B-10<br>-----<br>F5-08-B-10<br>-----<br>F5-08-B-1090 | 3/4<br><br>1 |                        |               |                 |                  |                               |              | 15<br>(.59)<br>14.5<br>(.57) | 27.7<br>(1.091)<br>34.5<br>(1.358) | 12<br>(.47)<br>14<br>(.55) |   | 26<br>(1.02)                   | M10 × 45 Lg.<br>-----<br>3/8-16UNC × 1-3/4 Lg.  | SO-NB-G35                        | 28<br>(4060)<br>14<br>(2030) | 0.9<br>(2.0) |
| F5-10-B-10<br>-----<br>F5-10-B-1090                         | 1-1/4        | 64<br>(2.52)           | 80<br>(3.15)  | 30.2<br>(1.189) | 58.7<br>(2.311)  | 11<br>(.433)<br>12<br>(.472)  | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 43.2<br>(1.701)                    | 16<br>(.63)                |   | 32<br>(1.26)                   | M10 × 55 Lg.<br>-----<br>7/16-14UNC × 2-1/4 Lg.   | SO-NB-G40                        | 14<br>(2030)                 | 1.2<br>(2.7) |
| F5-12-B-10<br>-----<br>F5-12-B-1090                         | 1-1/2        | 72<br>(2.83)           | 94<br>(3.70)  | 35.7<br>(1.406) | 69.9<br>(2.752)  | 13.5<br>(.531)                | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 49.1<br>(1.933)                    | 18<br>(.71)                |   | 38<br>(1.50)                   | M12 × 55 Lg.<br>-----<br>1/2-13UNC × 2-1/4 Lg.  | SO-NB-G50                        | 14<br>(2030)                 | 1.5<br>(3.3) |
| F5-16W-B-10<br>-----<br>F5-16W-B-1090                       | 1-1/2        |                        |               |                 |                  |                               |              | 17<br>(.67)<br>19.2<br>(.76) | 49.1<br>(1.933)                    | 18<br>(.71)                |   | 48<br>(1.89)                   | M12 × 55 Lg.<br>-----<br>1/2-13UNC × 2-1/4 Lg.  | SO-NB-G60                        | 21<br>(3050)                 | 1.8<br>(3.7) |
| F5-16-B-10<br>-----<br>F5-16-B-1090                         | 2            | 85<br>(3.35)           | 102<br>(4.02) | 42.9<br>(1.689) | 77.8<br>(3.063)  | 13.5<br>(.531)                | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 61.1<br>(2.406)                    | 20<br>(.79)                |   | 51<br>(2.01)                   | M12 × 55 Lg.<br>-----<br>1/2-13UNC × 2-1/4 Lg.  | SO-NB-G65                        | 10.5<br>(1520)               | 1.7<br>(3.8) |
| F5-20-B-10<br>-----<br>F5-20-B-1090                         | 2-1/2        | 102<br>(4.02)          | 114<br>(4.49) | 50.8<br>(2.000) | 88.9<br>(3.500)  | 13.5<br>(.531)                | 48<br>(1.89) | 17<br>(.67)<br>21.8<br>(.86) | 77.1<br>(3.035)                    | 22<br>(.87)                |   | 63<br>(2.48)                   | M12 × 65 Lg.<br>-----<br>1/2-13UNC × 2-3/4 Lg.  | SO-NB-G75                        | 7<br>(1020)                  | 2.0<br>(4.4) |
| F5-24-B-10<br>-----<br>F5-24-B-1090                         | 3            | 116<br>(4.57)          | 135<br>(5.31) | 61.9<br>(2.437) | 106.4<br>(4.189) | 17.5<br>(.689)                | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 90.0<br>(3.543)                    | 25<br>(.98)                |   | 76<br>(2.99)                   | M16 × 55 Lg.<br>-----<br>5/8-11UNC × 2-1/4 Lg.  | SO-NB-G85                        | 3.5<br>(510)                 | 2.7<br>(6.0) |
| F5-28-B-10<br>-----<br>F5-28-B-1090                         | 3-1/2        | 134<br>(5.28)          | 153<br>(6.02) | 69.9<br>(2.752) | 120.7<br>(4.752) | 17.5<br>(.689)                | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 102.8<br>(4.047)                   | 28<br>(1.10)               |   | 88<br>(3.46)                   | M16 × 55 Lg.<br>-----<br>5/8-11UNC × 2-1/4 Lg.  | SO-NB-G100                       | 3.5<br>(510)                 | 3.4<br>(7.5) |
| F5-32-B-10<br>-----<br>F5-32-B-1090                         | 4            | 150<br>(5.91)          | 162<br>(6.38) | 77.8<br>(2.063) | 130.2<br>(5.126) | 17.5<br>(.689)                | 38<br>(1.50) | 17<br>(.67)<br>19.2<br>(.76) | 115.5<br>(4.547)                   | 31.5<br>(1.24)             |   | 101<br>(3.98)                  | M16 × 55 Lg.<br>-----<br>5/8-11UNC × 2-1/4 Lg.  | SO-NB-G115                       | 3.5<br>(510)                 | 3.7<br>(8.2) |

★ Approx. mass is the value including socket head cap screws (4 Pcs.).

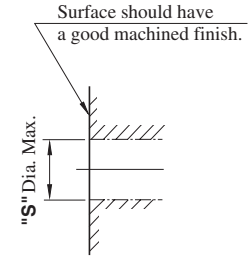
**■ Butt Welding**

Japanese Standard "JIS" & European Design Standard : F5- \*-C-10

N. American Design Standard : F5- \*-C-1090



**Customer's  
Mounting Surface**



| Kit Numbers                         | Piping Size | Dimensions mm (Inches) |               |                 |                 |                              |              |                              |             |                |              | Socket Head Cap Screw<br>(4 Pcs.)               | O-Ring    | Max. Operating Pressure<br>MPa (PSI) | Approx.*<br>Mass<br>kg (lbs.) |
|-------------------------------------|-------------|------------------------|---------------|-----------------|-----------------|------------------------------|--------------|------------------------------|-------------|----------------|--------------|---|-----------|--------------------------------------|-------------------------------|
|                                     |             | D                      | E             | F               | H               | J                            | K            | L                            | N           | Q              | S            |   |           |                                      |                               |
| F5-04-C-10<br>-----<br>F5-04-C-1090 | 1/2         | 40<br>(1.57)           | 54<br>(2.13)  | 17.5<br>(.689)  | 38.1<br>(1.500) | 8.8<br>(.346)                | 39<br>(1.54) | 13<br>(.51)<br>14.8<br>(.58) | 17<br>(.67) | 21.7<br>(.85)  | 13<br>(.51)  | M8 × 30 Lg.<br>-----<br>5/16-18UNC × 1-1/4 Lg.  | SO-NB-P22 | 28<br>(4060)                         | 0.25<br>(.6)                  |
| F5-06-C-10<br>-----<br>F5-06-C-1090 | 3/4         | 48<br>(1.89)           | 65<br>(2.56)  | 22.2<br>(.874)  | 47.6<br>(1.874) | 11<br>(.433)                 | 41<br>(1.61) | 16<br>(.63)<br>19.1<br>(.75) | 19<br>(.75) | 27.2<br>(1.07) | 19<br>(.75)  | M10 × 35 Lg.<br>-----<br>3/8-16UNC × 1-1/2 Lg.  | SO-NB-G30 | 28<br>(4060)                         | 0.35<br>(.8)                  |
| F5-08-C-10<br>-----<br>F5-08-C-1090 | 1           | 55<br>(2.17)           | 70<br>(2.76)  | 26.2<br>(1.031) | 52.4<br>(2.063) | 11<br>(.433)                 | 42<br>(1.65) | 16<br>(.63)<br>19.1<br>(.75) | 19<br>(.75) | 34<br>(1.34)   | 26<br>(1.02) | M10 × 35 Lg.<br>-----<br>3/8-16UNC × 1-1/2 Lg.  | SO-NB-G35 | 28<br>(4060)                         | 0.45<br>(1.0)                 |
| F5-10-C-10<br>-----<br>F5-10-C-1090 | 1-1/4       | 64<br>(2.52)           | 80<br>(3.15)  | 30.2<br>(1.189) | 58.7<br>(2.311) | 11<br>(.433)<br>12<br>(.472) | 44<br>(1.73) | 16<br>(.63)<br>19.1<br>(.75) | 19<br>(.75) | 42.7<br>(1.68) | 32<br>(1.26) | M10 × 35 Lg.<br>-----<br>7/16-14UNC × 1-1/2 Lg. | SO-NB-G40 | 28<br>(4060)                         | 0.63<br>(1.4)                 |
| F5-12-C-10<br>-----<br>F5-12-C-1090 | 1-1/2       | 72<br>(2.83)           | 94<br>(3.70)  | 35.7<br>(1.406) | 69.9<br>(2.752) | 13.5<br>(.531)               | 50<br>(1.97) | 18<br>(.71)<br>16.1<br>(.63) | 22<br>(.87) | 48.6<br>(1.91) | 38<br>(1.50) | M12 × 40 Lg.<br>-----<br>1/2-13UNC × 1-1/2 Lg.  | SO-NB-G50 | 21<br>(3050)                         | 1.3<br>(2.9)                  |
| F5-16-C-10<br>-----<br>F5-16-C-1090 | 2           | 85<br>(3.35)           | 102<br>(4.02) | 42.9<br>(1.689) | 77.8<br>(3.063) | 13.5<br>(.531)               | 50<br>(1.97) | 18<br>(.71)<br>16.1<br>(.63) | 22<br>(.87) | 60.5<br>(2.38) | 51<br>(2.01) | M12 × 40 Lg.<br>-----<br>1/2-13UNC × 1-1/2 Lg.  | SO-NB-G65 | 17.5<br>(2540)                       | 1.3<br>(2.9)                  |
| F5-20-C-10<br>-----<br>F5-20-C-1090 | 2-1/2       | 102<br>(4.02)          | 114<br>(4.49) | 50.8<br>(2.000) | 88.9<br>(3.500) | 13.5<br>(.531)               | 50<br>(1.97) | 20<br>(.79)<br>19.5<br>(.77) | 25<br>(.98) | 76.3<br>(3.00) | 63<br>(2.48) | M12 × 45 Lg.<br>-----<br>1/2-13UNC × 1-3/4 Lg.  | SO-NB-G75 | 14<br>(2030)                         | 1.4<br>(3.1)                  |

★ Approx. mass is the value including socket head cap screws (4 Pcs.).

**● Recommended Tightening Torque  
For Socket Head Cap Screw**

| Kit Numbers | Tightening Torque              |           |
|-------------|--------------------------------|-----------|
|             | Recommendation<br>Nm (IN.lbs.) | Tolerance |
| F5-04-C     | 35 (310)                       | ±10%      |
| F5-06-C     | 68.5 (660)                     |           |
| F5-08-C     |                                |           |
| F5-10-C     |                                |           |
| F5-12-C     | 118 (1044)                     |           |
| F5-16-C     |                                |           |
| F5-20-C     |                                |           |

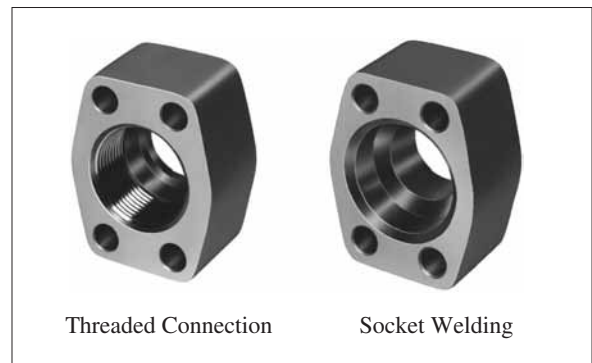
Note: The values of tightening torque above apply to when these flanges are used for pressure line.

## “F6” Series Pipe Flange Kits

The dimensions of the flange mounting surface are based upon SAE 4 Bolt Split Flange (High Pressure Series).

### Specifications

| Model Numbers        | Max. Operating Pressure MPa (PSI) | Remarks             |
|----------------------|-----------------------------------|---------------------|
| F6-*A-*-10/1080/1090 | 31 (4500)                         | Threaded Connection |
| F6-*-B-*-10/1090     | 42 (6090)                         | Pipe Socket Welding |



### Model Number Designation

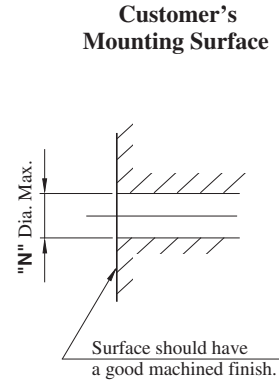
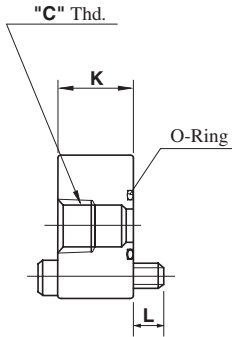
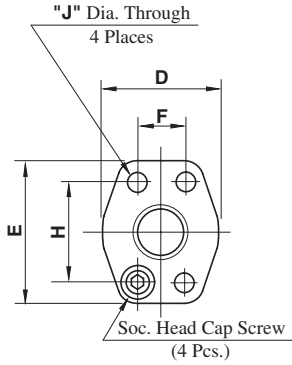
| F-   | F6            | -06   | -A                           | -M                    | -10           | *  |
|--|---------------|---|------------------------------|-----------------------|---------------|--|
| Material of Seal   | Series Number | Flange Size   | Type of Pipe Connection      | Type of Mounting Bolt | Design Number | Design Standards   |
| <b>None:</b><br>Standard NBR<br>(Buna N) Seal              | F6            | 04W, 04<br>06W, 06<br>08W, 08<br>10W, 10<br>12W, 12 | A:<br>Threaded<br>Connection | M: Metric Thd.        | 10            | <b>None:</b><br>Japanese Standard "JIS"                                  |
|  |               | 04W, 04<br>06W, 06<br>08W, 08<br>10W, 10<br>12W, 12 |                              | M: Metric Thd.        |               | 80:<br>European Design<br>Standard                                       |
|  |               | 04W, 04<br>06W, 06<br>08W, 08<br>10W, 10<br>12W, 12 |                              | U: Unified Thd.       |               | 90:<br>N. American Design<br>Standard                                    |
| <b>F:</b><br>FPM (Viton) Seal<br>(For Synthetic<br>Fluids) |               | 04W, 04<br>06W, 06<br>08W, 08<br>10W, 10<br>12W, 12 | B:<br>Pipe Socket<br>Welding | M: Metric Thd.        | 10            | <b>None:</b><br>Japanese Standard "JIS"<br>& European Design<br>Standard |
|  |               | 04W, 04<br>06W, 06<br>08W, 08<br>10W, 10<br>12W, 12 |                              | U: Unified Thd.       |               | 90:<br>N. American Design<br>Standard                                    |

★ Three different design standards are available as shown below. Select the suitable design standard to your requirement.

| Type of Pipe Connection | Design Standard                                    | Pipe Thread | Mounting Bolt (Socket Head Cap Screw) |
|-------------------------|--|-------------|---------------------------------------|
| Threaded Connection     | Japanese Standard "JIS"                            | Rc          | Metric Thd.                           |
|                         | European Design Standard                           | BSP.F       | Metric Thd.                           |
|                         | N. American Design Standard                        | NPT         | Unified Thd.                          |
| Pipe Socket Welding     | Japanese Standard "JIS" & European Design Standard | —           | Metric Thd.                           |
|                         | N. American Design Standard                        | —           | Unified Thd.                          |

■ Threaded Connection

Japanese Standard "JIS" : F6-\*-A-M-10  
 N. American Design Standard : F6-\*-A-U-1090



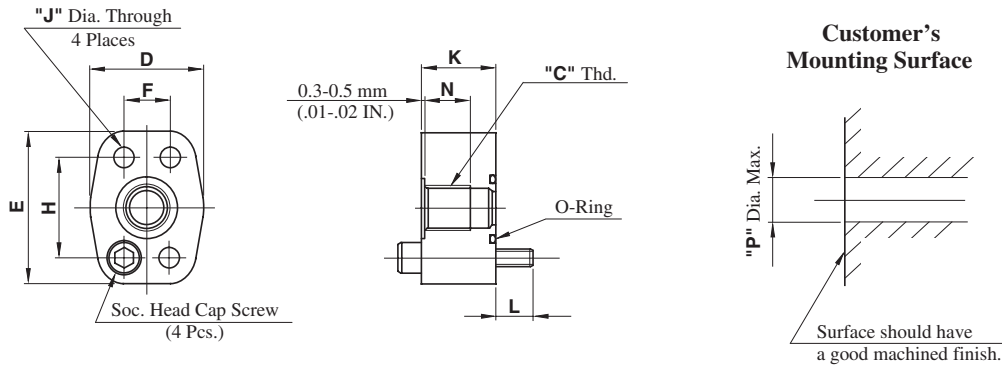
| Kit Numbers     | Piping Size "C" Thd. | Dimensions mm (Inches) |                |                 |                 |                |                |                      |              | Socket Head Cap Screw (4 Pcs.) | O-Ring    | Approx. Mass <sup>*1</sup> kg (lbs.) | Recommended Tightening Torque <sup>*2</sup> (Tolerance ±10%) Nm (IN.lbs.) |
|-----------------|----------------------|------------------------|----------------|-----------------|-----------------|----------------|----------------|----------------------|--------------|--------------------------------|-----------|--------------------------------------|---|
|                 |                      | D                      | E              | F               | H               | J              | K              | L                    | N            |                                |           |                                      |   |
| F6-04W-A-M-10   | Rc 3/8               | 48<br>(1.89)           | 56.5<br>(2.22) | 18.2<br>(.717)  | 40.5<br>(1.594) | 8.8<br>(.346)  | 28<br>(1.10)   | 12<br>(.47)          | 15<br>(.59)  | M8 × 40 Lg                     | SO-NB-P22 | 0.4<br>(.9)                          | 35<br>(310)   |
| F6-04-A-M-10    | Rc 1/2               |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-04W-A-U-1090 | 3/8 NPT              |                        |                |                 |                 |                | 26<br>(1.02)   | 12.1<br>(.48)        |              | 5/16-18UNC × 1-1/2 Lg          |           |                                      |   |
| F6-04-A-U-1090  | 1/2 NPT              |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-06W-A-M-10   | Rc 1/2               | 57.5<br>(2.26)         | 77.5<br>(3.05) | 23.8<br>(.937)  | 50.8<br>(2.000) | 11<br>(.433)   | 30             | 15<br>(.59)          | 21<br>(.83)  | M10 × 45 Lg                    | SO-NB-G30 | 0.9<br>(2.0)                         | 68.5<br>(606)   |
| F6-06-A-M-10    | Rc 3/4               |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-06W-A-U-1090 | 1/2 NPT              |                        |                |                 |                 |                | 14.5<br>(.57)  | 3/8-16UNC × 1-3/4 Lg |              |                                |           |                                      |   |
| F6-06-A-U-1090  | 3/4 NPT              |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-08W-A-M-10   | Rc 3/4               | 65<br>(2.56)           | 81<br>(3.19)   | 27.8<br>(1.094) | 57.2<br>(2.252) | 13.5<br>(.531) | 30<br>(1.18)   | 15<br>(.59)          | 26<br>(1.02) | M12 × 45 Lg.                   | SO-NB-G35 | 1.1<br>(2.4)                         | 118<br>(1044)   |
| F6-08-A-M-10    | Rc 1                 |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-08W-A-U-1090 | 3/4 NPT              |                        |                |                 |                 |                | 26.5<br>(1.04) | 18<br>(.71)          |              | 7/16-14UNC × 1-3/4 Lg.         |           |                                      |   |
| F6-08-A-U-1090  | 1 NPT                |                        |                |                 |                 |                | 34<br>(1.34)   | 16.8<br>(.66)        |              | 7/16-14UNC × 2 Lg.             |           |                                      |   |
| F6-10W-A-M-10   | Rc 1                 | 72<br>(2.83)           | 95<br>(3.74)   | 31.8<br>(1.252) | 66.7<br>(2.626) | 13.5<br>(.531) | 34<br>(1.34)   | 16<br>(.63)          | 34<br>(1.34) | M12 × 50 Lg.                   | SO-NB-G40 | 1.3<br>(2.9)                         | 118<br>(1044)   |
| F6-10-A-M-10    | Rc 1-1/4             |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-10W-A-U-1090 | 1 NPT                |                        |                |                 |                 |                | 34<br>(1.34)   | 16.8<br>(.66)        |              | 1/2-13UNC × 2 Lg.              |           |                                      |   |
| F6-10-A-U-1090  | 1-1/4 NPT            |                        |                |                 |                 |                | 39<br>(1.54)   | 18.2<br>(.72)        |              | 1/2-13UNC × 2-1/4 Lg.          |           |                                      |   |
| F6-12W-A-M-10   | Rc 1-1/4             | 90<br>(3.54)           | 113<br>(4.45)  | 36.5<br>(1.437) | 79.4<br>(3.126) | 17.5<br>(.689) | 34<br>(1.34)   | 21<br>(.83)          | 44<br>(1.73) | M16 × 55 Lg.                   | SO-NB-G50 | 1.5<br>(3.3)                         | 287<br>(2540)   |
| F6-12-A-M-10    | Rc 1-1/2             |                        |                |                 |                 |                |                |                      |              |                                |           |                                      |   |
| F6-12W-A-U-1090 | 1-1/4 NPT            |                        |                |                 |                 |                | 34<br>(1.34)   | 23.2<br>(.91)        |              | 5/8-11UNC × 2-1/4 Lg.          |           |                                      |   |
| F6-12-A-U-1090  | 1-1/2 NPT            |                        |                |                 |                 |                | 39<br>(1.54)   | 24.5<br>(.96)        |              | 5/8-11UNC × 2-1/2 Lg.          |           |                                      |   |

★1. Approx. mass is the value including socket head cap screws (4 Pcs.).

★2. The values of recommended tightening torque are for socket head cap screws.

■ Threaded Connection

European Design Standard : F6- \*-A-M-1080



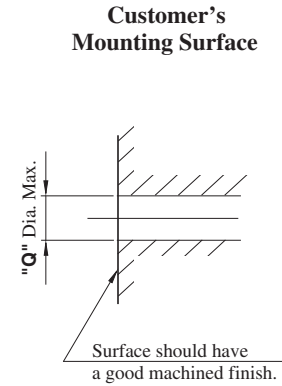
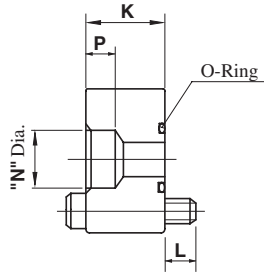
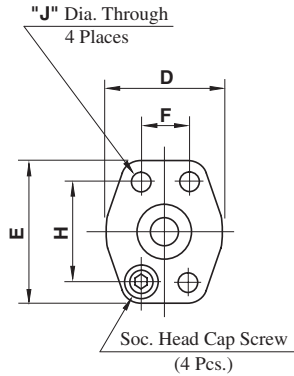
| Kit Numbers     | Piping Size "C" Thd. | Dimensions mm (Inches) |                |                 |                 |                |              |             |             |              |              | Socket Head Cap Screw (4 Pcs.) | O-Ring    | Approx. Mass kg (lbs.) <sup>*1</sup> | Recommended Tightening Torque (Tolerance ±10%) Nm (IN.lbs.) <sup>*2</sup> |
|-----------------|----------------------|------------------------|----------------|-----------------|-----------------|----------------|--------------|-------------|-------------|--------------|--------------|--------------------------------|-----------|--------------------------------------|---|
|                 |                      | D                      | E              | F               | H               | J              | K            | L           | N           | P            |              |                                |           |                                      |   |
| F6-04W-A-M-1080 | 3/8 BSP.F            | 48<br>(1.89)           | 56.5<br>(2.22) | 18.2<br>(.717)  | 40.5<br>(1.594) | 8.8<br>(.346)  | 28<br>(1.10) | 12<br>(.47) | 14<br>(.55) | 15<br>(.59)  |              | M8 × 40 Lg.                    | SO-NB-P22 | 0.4<br>(.9)                          | 35<br>(310)   |
| F6-04-A-M-1080  | 1/2 BSP.F            |                        |                |                 |                 |                |              |             | 17<br>(.67) |              |              |                                |           |                                      |   |
| F6-06W-A-M-1080 | 1/2 BSP.F            | 57.5<br>(2.26)         | 77.5<br>(3.05) | 23.8<br>(.937)  | 50.8<br>(2.000) | 11<br>(.433)   | 30<br>(1.18) | 15<br>(.59) | 17<br>(.67) | 21<br>(.83)  |              | M10 × 45 Lg.                   | SO-NB-G30 | 0.9<br>(2.0)                         | 68.5<br>(606)   |
| F6-06-A-M-1080  | 3/4 BSP.F            |                        |                |                 |                 |                |              |             | 20<br>(.79) |              |              |                                |           |                                      |   |
| F6-08W-A-M-1080 | 3/4 BSP.F            | 65<br>(2.56)           | 81<br>(3.19)   | 27.8<br>(1.094) | 57.2<br>(2.252) | 13.5<br>(.531) | 30<br>(1.18) | 15<br>(.59) | 20<br>(.79) | 26<br>(1.02) |              | M12 × 45 Lg.                   | SO-NB-G35 | 1.1<br>(2.4)                         | 118<br>(1044)   |
| F6-08-A-M-1080  | 1 BSP.F              |                        |                |                 |                 |                | 34<br>(1.34) | 16<br>(.63) | 21<br>(.83) |              | M12 × 50 Lg. |                                |           |                                      |   |
| F6-10W-A-M-1080 | 1 BSP.F              | 72<br>(2.83)           | 95<br>(3.74)   | 31.8<br>(1.252) | 66.7<br>(2.626) | 13.5<br>(.531) | 34<br>(1.34) | 16<br>(.63) | 21<br>(.83) | 34<br>(1.34) |              | M12 × 50 Lg.                   | SO-NB-G40 | 1.3<br>(2.9)                         | 118<br>(1044)   |
| F6-10-A-M-1080  | 1-1/4 BSP.F          |                        |                |                 |                 |                | 39<br>(1.54) |             | 22<br>(.87) |              | M12 × 55 Lg. |                                |           |                                      |   |
| F6-12W-A-M-1080 | 1-1/4 BSP.F          | 90<br>(3.54)           | 113<br>(4.45)  | 36.5<br>(1.437) | 79.4<br>(3.126) | 17.5<br>(.689) | 34<br>(1.34) | 21<br>(.83) | 22<br>(.87) | 44<br>(1.73) |              | M16 × 55 Lg.                   | SO-NB-G50 | 1.5<br>(3.3)                         | 287<br>(2540)   |
| F6-12-A-M-1080  | 1-1/2 BSP.F          |                        |                |                 |                 |                | 39<br>(1.54) |             |             |              | M16 × 60 Lg. |                                |           |                                      |   |

★1. Approx. mass is the value including socket head cap screws (4 Pcs.).

★2. The values of recommended tightening torque are for socket head cap screw.

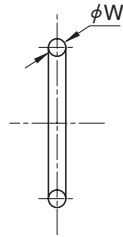
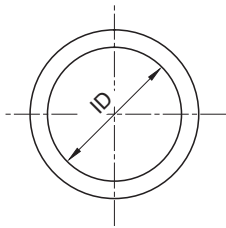
**Socket Welding**

Japanese Standard "JIS" & European Design Standard : F6-*\**-B-M-10  
 N. American Design Standard : F6-*\**-B-U-1090



| Kit Numbers                               | Piping Size | Dimensions mm (Inches) |                |                 |                 |                |                |               |                 |             |              | Socket Head Cap Screw (4 Pcs.) | O-Ring    | Approx. Mass kg (lbs.) <sup>*1</sup> | Recommended Tightening Torque (Tolerance ±10%) Nm (IN.lbs.) <sup>*2</sup> |             |                        |               |
|---|-------------|------------------------|----------------|-----------------|-----------------|----------------|----------------|---------------|-----------------|-------------|--------------|--------------------------------|-----------|--------------------------------------|---|-------------|------------------------|---------------|
|   |             | D                      | E              | F               | H               | J              | K              | L             | N               | P           | Q            |                                |           |                                      |   |             |                        |               |
| F6-04W-B-M-10<br>-----<br>F6-04W-B-U-1090 | 3/8         | 48<br>(1.89)           | 56.5<br>(2.22) | 18.2<br>(.717)  | 40.5<br>(1.594) | 8.8<br>(.346)  | 28<br>(1.10)   | 12<br>(.47)   | 17.8<br>(.701)  | 9<br>(.35)  | 15<br>(.59)  | M8 × 40 Lg.                    | SO-NB-P22 | 0.4<br>(.9)                          | 35<br>(310)   |             |                        |               |
| F6-04-B-M-10<br>-----<br>F6-04-B-U-1090   |             |                        |                |                 |                 |                | 26<br>(1.02)   | 12.1<br>(.48) |                 |             |              | 22.2<br>(.874)                 |           |                                      |   | 11<br>(.43) | 5/16-18UNC × 1-1/2 Lg. |               |
| F6-06W-B-M-10<br>-----<br>F6-06W-B-U-1090 | 1/2         | 57.5<br>(2.26)         | 77.5<br>(3.05) | 23.8<br>(.937)  | 50.8<br>(2.000) | 11<br>(.433)   | 30<br>(1.18)   | 15<br>(.59)   | 27.7<br>(1.091) | 12<br>(.47) | 21<br>(.83)  | M10 × 45 Lg.                   |           |                                      |   | SO-NB-G30   | 0.9<br>(2.0)           | 68.5<br>(606) |
| F6-06-B-M-10<br>-----<br>F6-06-B-U-1090   |             |                        |                |                 |                 |                | 14.5<br>(.57)  | 15<br>(.59)   |                 |             |              | 14.5<br>(.57)                  |           |                                      |   |             |                        |               |
| F6-08W-B-M-10<br>-----<br>F6-08W-B-U-1090 | 3/4         | 65<br>(2.56)           | 81<br>(3.19)   | 27.8<br>(1.094) | 57.2<br>(2.252) | 13.5<br>(.531) | 30<br>(1.18)   | 15<br>(.59)   | 27.7<br>(1.091) | 12<br>(.47) | 26<br>(1.02) | M12 × 45 Lg.                   | SO-NB-G35 | 1.1<br>(2.4)                         | 118<br>(1044)   |             |                        |               |
| F6-08-B-M-10<br>-----<br>F6-08-B-U-1090   |             |                        |                |                 |                 |                | 26.5<br>(1.04) | 18<br>(.71)   |                 |             |              | 34.5<br>(1.358)                |           |                                      |   |             |                        |               |
| F6-10W-B-M-10<br>-----<br>F6-10W-B-U-1090 | 1           | 72<br>(2.83)           | 95<br>(3.74)   | 31.8<br>(1.252) | 66.7<br>(2.626) | 13.5<br>(.531) | 34<br>(1.34)   | 16<br>(.63)   | 34.5<br>(1.358) | 14<br>(.55) | 34<br>(1.34) | M12 × 50 Lg.                   |           |                                      |   | SO-NB-G40   | 1.3<br>(2.9)           | 118<br>(1044) |
| F6-10-B-M-10<br>-----<br>F6-10-B-U-1090   |             |                        |                |                 |                 |                | 16.8<br>(.66)  | 16<br>(.63)   |                 |             |              | 43.2<br>(1.701)                |           |                                      |   |             |                        |               |
| F6-12W-B-M-10<br>-----<br>F6-12W-B-U-1090 | 1-1/4       | 90<br>(3.54)           | 113<br>(4.45)  | 36.5<br>(1.437) | 79.4<br>(3.126) | 17.5<br>(.689) | 34<br>(1.34)   | 21<br>(.83)   | 49.1<br>(1.933) | 18<br>(.71) | 44<br>(1.73) | M16 × 55 Lg.                   | SO-NB-G50 | 1.5<br>(3.3)                         | 287<br>(2540)   |             |                        |               |
| F6-12-B-M-10<br>-----<br>F6-12-B-U-1090   |             |                        |                |                 |                 |                | 23.2<br>(.91)  | 21<br>(.83)   |                 |             |              | 23.2<br>(.91)                  |           |                                      |   |             |                        |               |

★1. Approx. mass is the value including socket head cap screws (4 Pcs.).  
 ★2. The values of recommended tightening torque are for socket head cap screws.



### O-ring Symbol

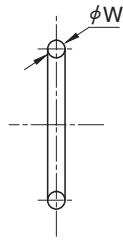
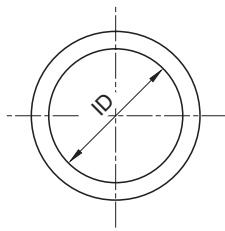
**SO - N A - P 90**

- Size
- Classification by use
  - P:** For Moving (Packing)
  - G:** For Fixing (Gasket)
- Durometer
  - A:** A70
  - B:** A90
- Material
  - N:** Nitrile Rubber (NBR)
  - F:** Fluororubber (FPM)
- O-Ring

| SO-NA/NB-P* |                        | SO-FA/FB-P* |            |
|-------------|------------------------|-------------|------------|
| Size Number | Dimensions mm (Inches) |             |            |
|             | ID                     | W           |            |
| P 3         | 2.8 ( .110 )           |             | 1.9 (.075) |
| P 4         | 3.8 ( .150 )           |             |            |
| P 5         | 4.8 ( .189 )           |             |            |
| P 6         | 5.8 ( .228 )           |             |            |
| P 7         | 6.8 ( .268 )           |             |            |
| P 8         | 7.8 ( .307 )           |             |            |
| P 9         | 8.8 ( .346 )           |             |            |
| P 10        | 9.8 ( .386 )           |             |            |
| P 10A       | 9.8 ( .386 )           |             |            |
| P 11        | 10.8 ( .425 )          |             |            |
| P 11.2      | 11.0 ( .433 )          |             | 2.4 (.094) |
| P 12        | 11.8 ( .465 )          |             |            |
| P 12.5      | 12.3 ( .484 )          |             |            |
| P 14        | 13.8 ( .543 )          |             |            |
| P 15        | 14.8 ( .583 )          |             |            |
| P 16        | 15.8 ( .622 )          |             |            |
| P 18        | 17.8 ( .701 )          |             |            |
| P 20        | 19.8 ( .780 )          |             |            |
| P 21        | 20.8 ( .819 )          |             |            |
| P 22        | 21.8 ( .858 )          |             |            |
| P 22A       | 21.7 ( .854 )          |             | 3.5 (.138) |
| P 22.4      | 22.1 ( .870 )          |             |            |
| P 24        | 23.7 ( .933 )          |             |            |
| P 25        | 24.7 ( .972 )          |             |            |
| P 25.5      | 25.2 ( .992 )          |             |            |
| P 26        | 25.7 ( 1.012 )         |             |            |
| P 28        | 27.7 ( 1.091 )         |             |            |
| P 29        | 28.7 ( 1.130 )         |             |            |
| P 29.5      | 29.2 ( 1.150 )         |             |            |
| P 30        | 29.7 ( 1.169 )         |             |            |
| P 31        | 30.7 ( 1.209 )         |             | 5.7 (.224) |
| P 31.5      | 31.2 ( 1.228 )         |             |            |
| P 32        | 31.7 ( 1.248 )         |             |            |
| P 34        | 33.7 ( 1.327 )         |             |            |
| P 35        | 34.7 ( 1.366 )         |             |            |
| P 35.5      | 35.2 ( 1.386 )         |             |            |
| P 36        | 35.7 ( 1.406 )         |             |            |
| P 38        | 37.7 ( 1.484 )         |             |            |
| P 39        | 38.7 ( 1.524 )         |             |            |
| P 40        | 39.7 ( 1.563 )         |             |            |
| P 41        | 40.7 ( 1.602 )         |             | 8.4 (.331) |
| P 42        | 41.7 ( 1.642 )         |             |            |
| P 44        | 43.7 ( 1.720 )         |             |            |
| P 45        | 44.7 ( 1.760 )         |             |            |
| P 46        | 45.7 ( 1.799 )         |             |            |
| P 48        | 47.7 ( 1.878 )         |             |            |
| P 49        | 48.7 ( 1.917 )         |             |            |
| P 50        | 49.7 ( 1.957 )         |             |            |
| P 48A       | 47.6 ( 1.874 )         |             |            |
| P 50A       | 49.6 ( 1.953 )         |             |            |
| P 52        | 51.6 ( 2.031 )         |             | 5.7 (.224) |
| P 53        | 52.6 ( 2.071 )         |             |            |
| P 55        | 54.6 ( 2.150 )         |             |            |
| P 56        | 55.6 ( 2.189 )         |             |            |
| P 58        | 57.6 ( 2.268 )         |             |            |
| P 60        | 59.6 ( 2.346 )         |             |            |
| P 62        | 61.6 ( 2.425 )         |             |            |
| P 63        | 62.6 ( 2.465 )         |             |            |
| P 65        | 64.6 ( 2.543 )         |             |            |
| P 67        | 66.6 ( 2.622 )         |             |            |
| P 70        | 69.6 ( 2.740 )         |             |            |
| P 71        | 70.6 ( 2.780 )         |             |            |
| P 75        | 74.6 ( 2.937 )         |             |            |
| P 80        | 79.6 ( 3.134 )         |             |            |
| P 85        | 84.6 ( 3.331 )         |             |            |

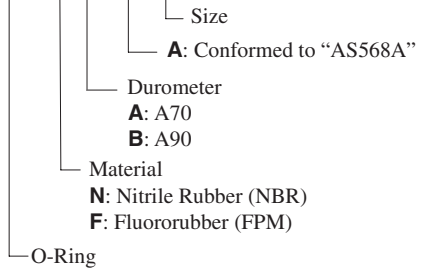
| SO-NA/NB-P* |                        | SO-FA/FB-P* |            |
|-------------|------------------------|-------------|------------|
| Size Number | Dimensions mm (Inches) |             |            |
|             | ID                     | W           |            |
| P 90        | 89.6 ( 3.528 )         |             | 5.7 (.224) |
| P 95        | 94.6 ( 3.724 )         |             |            |
| P100        | 99.6 ( 3.921 )         |             |            |
| P102        | 101.6 ( 4.000 )        |             |            |
| P105        | 104.6 ( 4.118 )        |             |            |
| P110        | 109.6 ( 4.315 )        |             |            |
| P112        | 111.6 ( 4.394 )        |             |            |
| P115        | 114.6 ( 4.512 )        |             |            |
| P120        | 119.6 ( 4.709 )        |             |            |
| P125        | 124.6 ( 4.906 )        |             |            |
| P130        | 129.6 ( 5.102 )        |             |            |
| P132        | 131.6 ( 5.181 )        |             |            |
| P135        | 134.6 ( 5.299 )        |             | 8.4 (.331) |
| P140        | 139.6 ( 5.496 )        |             |            |
| P145        | 144.6 ( 5.693 )        |             |            |
| P150        | 149.6 ( 5.890 )        |             |            |
| P150A       | 149.5 ( 5.886 )        |             |            |
| P155        | 154.5 ( 6.083 )        |             |            |
| P160        | 159.5 ( 6.280 )        |             |            |
| P165        | 164.5 ( 6.476 )        |             |            |
| P170        | 169.5 ( 6.673 )        |             |            |
| P175        | 174.5 ( 6.870 )        |             |            |
| P180        | 179.5 ( 7.067 )        |             |            |
| P185        | 184.5 ( 7.264 )        |             |            |
| P190        | 189.5 ( 7.461 )        |             |            |
| P195        | 194.5 ( 7.657 )        |             |            |
| P200        | 199.5 ( 7.854 )        |             |            |
| P205        | 204.5 ( 8.051 )        |             |            |
| P209        | 208.5 ( 8.209 )        |             |            |
| P210        | 209.5 ( 8.248 )        |             |            |
| P215        | 214.5 ( 8.445 )        |             |            |
| P220        | 219.5 ( 8.642 )        |             |            |
| P225        | 224.5 ( 8.839 )        |             |            |
| P230        | 229.5 ( 9.035 )        |             |            |
| P235        | 234.5 ( 9.232 )        |             |            |
| P240        | 239.5 ( 9.429 )        |             |            |
| P245        | 244.5 ( 9.626 )        |             |            |
| P250        | 249.5 ( 9.823 )        |             |            |
| P255        | 254.5 ( 10.020 )       |             |            |
| P260        | 259.5 ( 10.217 )       |             |            |
| P265        | 264.5 ( 10.413 )       |             |            |
| P270        | 269.5 ( 10.610 )       |             |            |
| P275        | 274.5 ( 10.807 )       |             |            |
| P280        | 279.5 ( 11.004 )       |             |            |
| P285        | 284.5 ( 11.201 )       |             |            |
| P290        | 289.5 ( 11.398 )       |             |            |
| P295        | 294.5 ( 11.594 )       |             |            |
| P300        | 299.5 ( 11.791 )       |             |            |
| P315        | 314.5 ( 12.382 )       |             |            |
| P320        | 319.5 ( 12.579 )       |             |            |
| P335        | 334.5 ( 13.169 )       |             |            |
| P340        | 339.5 ( 13.366 )       |             |            |
| P355        | 354.5 ( 13.957 )       |             |            |
| P360        | 359.5 ( 14.154 )       |             |            |
| P375        | 374.5 ( 14.744 )       |             |            |
| P385        | 384.5 ( 15.138 )       |             |            |
| P400        | 399.5 ( 15.728 )       |             |            |

| SO-NA/NB-G* |                        | SO-FA/FB-G* |            |
|-------------|------------------------|-------------|------------|
| Size Number | Dimensions mm (Inches) |             |            |
|             | ID                     | W           |            |
| G 25        | 24.4 ( .961 )          |             | 3.1 (.122) |
| G 30        | 29.4 ( 1.157 )         |             |            |
| G 35        | 34.4 ( 1.354 )         |             |            |
| G 40        | 39.4 ( 1.551 )         |             |            |
| G 45        | 44.4 ( 1.748 )         |             |            |
| G 50        | 49.4 ( 1.945 )         |             |            |
| G 55        | 54.4 ( 2.142 )         |             |            |
| G 60        | 59.4 ( 2.339 )         |             |            |
| G 65        | 64.4 ( 2.535 )         |             |            |
| G 70        | 69.4 ( 2.732 )         |             |            |
| G 75        | 74.4 ( 2.929 )         |             |            |
| G 80        | 79.4 ( 3.126 )         |             |            |
| G 85        | 84.4 ( 3.323 )         |             | 5.7 (.224) |
| G 90        | 89.4 ( 3.520 )         |             |            |
| G 95        | 94.4 ( 3.717 )         |             |            |
| G100        | 99.4 ( 3.913 )         |             |            |
| G105        | 104.4 ( 4.110 )        |             |            |
| G110        | 109.4 ( 4.307 )        |             |            |
| G115        | 114.4 ( 4.504 )        |             |            |
| G120        | 119.4 ( 4.701 )        |             |            |
| G125        | 124.4 ( 4.898 )        |             |            |
| G130        | 129.4 ( 5.094 )        |             |            |
| G135        | 134.4 ( 5.291 )        |             |            |
| G140        | 139.4 ( 5.488 )        |             |            |
| G145        | 144.4 ( 5.685 )        |             |            |
| G150        | 149.3 ( 5.878 )        |             | 5.7 (.224) |
| G155        | 154.3 ( 6.075 )        |             |            |
| G160        | 159.3 ( 6.272 )        |             |            |
| G165        | 164.3 ( 6.469 )        |             |            |
| G170        | 169.3 ( 6.665 )        |             |            |
| G175        | 174.3 ( 6.862 )        |             |            |
| G180        | 179.3 ( 7.059 )        |             |            |
| G185        | 184.3 ( 7.256 )        |             |            |
| G190        | 189.3 ( 7.453 )        |             |            |
| G195        | 194.3 ( 7.650 )        |             |            |
| G200        | 199.3 ( 7.846 )        |             |            |
| G210        | 209.3 ( 8.240 )        |             |            |
| G220        | 219.3 ( 8.634 )        |             |            |
| G230        | 229.3 ( 9.028 )        |             |            |
| G240        | 239.3 ( 9.421 )        |             |            |
| G250        | 249.3 ( 9.815 )        |             |            |
| G260        | 259.3 ( 10.209 )       |             |            |
| G270        | 269.3 ( 10.602 )       |             |            |
| G280        | 279.3 ( 10.996 )       |             |            |
| G290        | 289.3 ( 11.390 )       |             |            |
| G300        | 299.3 ( 11.783 )       |             |            |



### O-ring Symbol

SO - N A - A 012

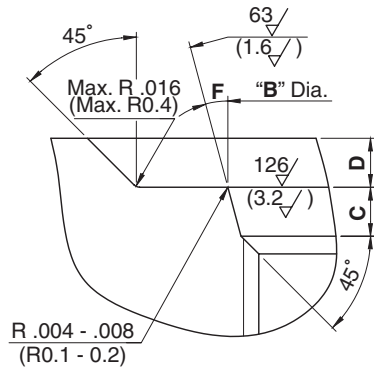


| SO-NA/NB-A* |                        | SO-FA/FB-A* |  |
|-------------|------------------------|-------------|--|
| Size Number | Dimensions mm (Inches) |             |  |
|             | ID                     | W           |  |
| A006        | 2.90 (.114)            | 1.78 (.070) |  |
| A007        | 3.68 (.145)            |             |  |
| A008        | 4.47 (.176)            |             |  |
| A009        | 5.28 (.208)            |             |  |
| A010        | 6.07 (.239)            |             |  |
| A011        | 7.65 (.301)            |             |  |
| A012        | 9.25 (.364)            |             |  |
| A013        | 10.82 (.426)           |             |  |
| A014        | 12.42 (.489)           |             |  |
| A015        | 14.00 (.551)           |             |  |
| A016        | 15.60 (.614)           |             |  |
| A017        | 17.17 (.676)           |             |  |
| A018        | 18.77 (.739)           |             |  |
| A019        | 20.35 (.801)           |             |  |
| A020        | 21.95 (.864)           |             |  |
| A021        | 23.52 (.926)           |             |  |
| A022        | 25.12 (.989)           |             |  |
| A023        | 26.70 (1.051)          |             |  |
| A024        | 28.30 (1.114)          |             |  |
| A025        | 29.87 (1.176)          |             |  |
| A026        | 31.47 (1.239)          |             |  |
| A027        | 33.05 (1.301)          |             |  |
| A028        | 34.65 (1.364)          |             |  |
| A029        | 37.82 (1.489)          |             |  |
| A030        | 41.00 (1.614)          |             |  |
| A031        | 44.17 (1.739)          |             |  |
| A032        | 47.35 (1.864)          |             |  |
| A033        | 50.52 (1.989)          |             |  |
| A034        | 53.70 (2.114)          |             |  |
| A035        | 56.87 (2.239)          |             |  |
| A036        | 60.05 (2.364)          |             |  |
| A037        | 63.22 (2.489)          |             |  |
| A038        | 66.40 (2.614)          |             |  |
| A039        | 69.57 (2.739)          |             |  |
| A040        | 72.75 (2.864)          |             |  |
| A041        | 75.92 (2.989)          |             |  |
| A042        | 82.27 (3.239)          |             |  |
| A043        | 88.62 (3.489)          |             |  |
| A044        | 94.97 (3.739)          |             |  |
| A045        | 101.32 (3.989)         |             |  |
| A046        | 107.67 (4.239)         |             |  |
| A047        | 114.02 (4.489)         |             |  |
| A048        | 120.37 (4.739)         |             |  |
| A049        | 126.72 (4.989)         |             |  |
| A050        | 133.07 (5.239)         |             |  |
| A110        | 9.19 (.362)            | 2.62 (.103) |  |
| A111        | 10.77 (.424)           |             |  |
| A112        | 12.37 (.487)           |             |  |
| A113        | 13.94 (.549)           |             |  |
| A114        | 15.54 (.612)           |             |  |
| A115        | 17.12 (.674)           |             |  |
| A116        | 18.72 (.737)           |             |  |
| A117        | 20.29 (.799)           |             |  |
| A118        | 21.89 (.862)           |             |  |
| A119        | 23.47 (.924)           |             |  |
| A120        | 25.07 (.987)           |             |  |
| A121        | 26.64 (1.049)          |             |  |
| A122        | 28.24 (1.112)          |             |  |
| A123        | 29.82 (1.174)          |             |  |
| A124        | 31.42 (1.237)          |             |  |
| A125        | 32.99 (1.299)          |             |  |
| A126        | 34.59 (1.362)          |             |  |
| A127        | 36.17 (1.424)          |             |  |
| A128        | 37.77 (1.487)          |             |  |
| A129        | 39.34 (1.549)          |             |  |
| A130        | 40.94 (1.612)          |             |  |
| A131        | 42.52 (1.674)          |             |  |
| A132        | 44.12 (1.737)          |             |  |
| A133        | 45.69 (1.799)          |             |  |
| A134        | 47.29 (1.862)          |             |  |

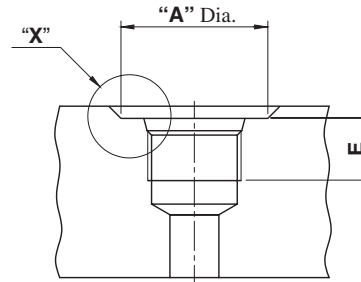
| SO-NA/NB-A* |                        | SO-FA/FB-A* |  |
|-------------|------------------------|-------------|--|
| Size Number | Dimensions mm (Inches) |             |  |
|             | ID                     | W           |  |
| A135        | 48.90 (1.925)          | 2.62 (.103) |  |
| A136        | 50.47 (1.987)          |             |  |
| A137        | 52.07 (2.050)          |             |  |
| A138        | 53.64 (2.112)          |             |  |
| A139        | 55.24 (2.175)          |             |  |
| A140        | 56.82 (2.237)          |             |  |
| A141        | 58.42 (2.300)          |             |  |
| A142        | 59.99 (2.362)          |             |  |
| A143        | 61.60 (2.425)          |             |  |
| A144        | 63.17 (2.487)          |             |  |
| A145        | 64.77 (2.550)          |             |  |
| A146        | 66.34 (2.612)          |             |  |
| A147        | 67.94 (2.675)          |             |  |
| A148        | 69.52 (2.737)          |             |  |
| A149        | 71.12 (2.800)          |             |  |
| A150        | 72.69 (2.862)          |             |  |
| A151        | 75.87 (2.987)          |             |  |
| A152        | 82.22 (3.237)          |             |  |
| A153        | 88.57 (3.487)          |             |  |
| A154        | 94.92 (3.737)          |             |  |
| A155        | 101.27 (3.987)         |             |  |
| A156        | 107.62 (4.237)         |             |  |
| A157        | 113.97 (4.487)         |             |  |
| A158        | 120.32 (4.737)         |             |  |
| A159        | 126.67 (4.987)         |             |  |
| A160        | 133.02 (5.237)         |             |  |
| A161        | 139.37 (5.487)         |             |  |
| A162        | 145.72 (5.737)         |             |  |
| A163        | 152.07 (5.987)         |             |  |
| A164        | 158.42 (6.237)         |             |  |
| A165        | 164.77 (6.487)         |             |  |
| A166        | 171.12 (6.737)         |             |  |
| A167        | 177.47 (6.987)         |             |  |
| A168        | 183.82 (7.237)         |             |  |
| A169        | 190.17 (7.487)         |             |  |
| A170        | 196.52 (7.737)         |             |  |
| A171        | 202.87 (7.987)         |             |  |
| A172        | 209.22 (8.237)         |             |  |
| A173        | 215.57 (8.487)         |             |  |
| A174        | 221.92 (8.737)         |             |  |
| A175        | 228.27 (8.987)         |             |  |
| A176        | 234.62 (9.237)         |             |  |
| A177        | 240.97 (9.487)         |             |  |
| A178        | 247.32 (9.737)         |             |  |
| A210        | 18.64 (.734)           | 3.53 (.139) |  |
| A211        | 20.22 (.796)           |             |  |
| A212        | 21.82 (.859)           |             |  |
| A213        | 23.39 (.921)           |             |  |
| A214        | 24.99 (.984)           |             |  |
| A215        | 26.57 (1.046)          |             |  |
| A216        | 28.17 (1.109)          |             |  |
| A217        | 29.74 (1.171)          |             |  |
| A218        | 31.34 (1.234)          |             |  |
| A219        | 32.92 (1.296)          |             |  |
| A220        | 34.52 (1.359)          |             |  |
| A221        | 36.09 (1.421)          |             |  |
| A222        | 37.69 (1.484)          |             |  |
| A223        | 40.87 (1.609)          |             |  |
| A224        | 44.04 (1.734)          |             |  |
| A225        | 47.22 (1.859)          |             |  |
| A226        | 50.39 (1.984)          |             |  |
| A227        | 53.57 (2.109)          |             |  |
| A228        | 56.74 (2.234)          |             |  |
| A229        | 59.92 (2.359)          |             |  |

| SO-NA/NB-A* |                        | SO-FA/FB-A* |  |
|-------------|------------------------|-------------|--|
| Size Number | Dimensions mm (Inches) |             |  |
|             | ID                     | W           |  |
| A230        | 63.09 (2.484)          | 3.53 (.139) |  |
| A231        | 66.27 (2.609)          |             |  |
| A232        | 69.44 (2.734)          |             |  |
| A233        | 72.62 (2.859)          |             |  |
| A234        | 75.79 (2.984)          |             |  |
| A235        | 78.97 (3.109)          |             |  |
| A236        | 82.14 (3.234)          |             |  |
| A237        | 85.32 (3.359)          |             |  |
| A238        | 88.49 (3.484)          |             |  |
| A239        | 91.67 (3.609)          |             |  |
| A240        | 94.84 (3.734)          |             |  |
| A241        | 98.02 (3.859)          |             |  |
| A242        | 101.19 (3.984)         |             |  |
| A243        | 104.37 (4.109)         |             |  |
| A244        | 107.54 (4.234)         |             |  |
| A245        | 110.72 (4.359)         |             |  |
| A246        | 113.89 (4.484)         |             |  |
| A247        | 117.07 (4.609)         |             |  |
| A248        | 120.24 (4.734)         |             |  |
| A249        | 123.42 (4.859)         |             |  |
| A250        | 126.59 (4.984)         |             |  |
| A251        | 129.77 (5.109)         |             |  |
| A252        | 132.94 (5.234)         |             |  |
| A253        | 136.12 (5.359)         |             |  |
| A254        | 139.29 (5.484)         |             |  |
| A255        | 142.47 (5.609)         |             |  |
| A256        | 145.64 (5.734)         |             |  |
| A257        | 148.82 (5.859)         |             |  |
| A258        | 151.99 (5.984)         |             |  |
| A259        | 158.34 (6.234)         |             |  |
| A260        | 164.69 (6.484)         |             |  |
| A261        | 171.04 (6.734)         |             |  |
| A262        | 177.39 (6.984)         |             |  |
| A263        | 183.74 (7.234)         |             |  |
| A264        | 190.09 (7.484)         |             |  |
| A265        | 196.44 (7.734)         |             |  |
| A266        | 202.79 (7.984)         |             |  |
| A267        | 209.14 (8.234)         |             |  |
| A268        | 215.49 (8.484)         |             |  |
| A269        | 221.84 (8.734)         |             |  |
| A270        | 228.19 (8.984)         |             |  |
| A271        | 234.54 (9.234)         |             |  |
| A272        | 240.89 (9.484)         |             |  |
| A273        | 247.24 (9.734)         |             |  |
| A274        | 253.59 (9.984)         |             |  |
| A901        | 4.70 (.185)            | 1.42 (.056) |  |
| A902        | 6.07 (.239)            | 1.63 (.064) |  |
| A903        | 7.64 (.301)            | 1.63 (.064) |  |
| A904        | 8.92 (.351)            | 1.83 (.072) |  |
| A905        | 10.52 (.414)           | 1.83 (.072) |  |
| A906        | 11.89 (.468)           | 1.98 (.078) |  |
| A907        | 13.46 (.530)           | 2.08 (.082) |  |
| A908        | 16.36 (.644)           | 2.21 (.087) |  |
| A909        | 17.93 (.706)           | 2.46 (.097) |  |
| A910        | 19.18 (.755)           | 2.46 (.097) |  |
| A911        | 21.92 (.863)           | 2.95 (.116) |  |
| A912        | 23.47 (.924)           |             |  |
| A913        | 25.04 (.986)           |             |  |
| A914        | 26.59 (1.047)          |             |  |
| A916        | 29.74 (1.171)          |             |  |
| A918        | 34.42 (1.355)          |             |  |
| A920        | 37.46 (1.475)          | 3.00 (.118) |  |
| A924        | 43.69 (1.720)          |             |  |
| A928        | 53.09 (2.090)          |             |  |
| A932        | 59.36 (2.337)          |             |  |





Detail "X"

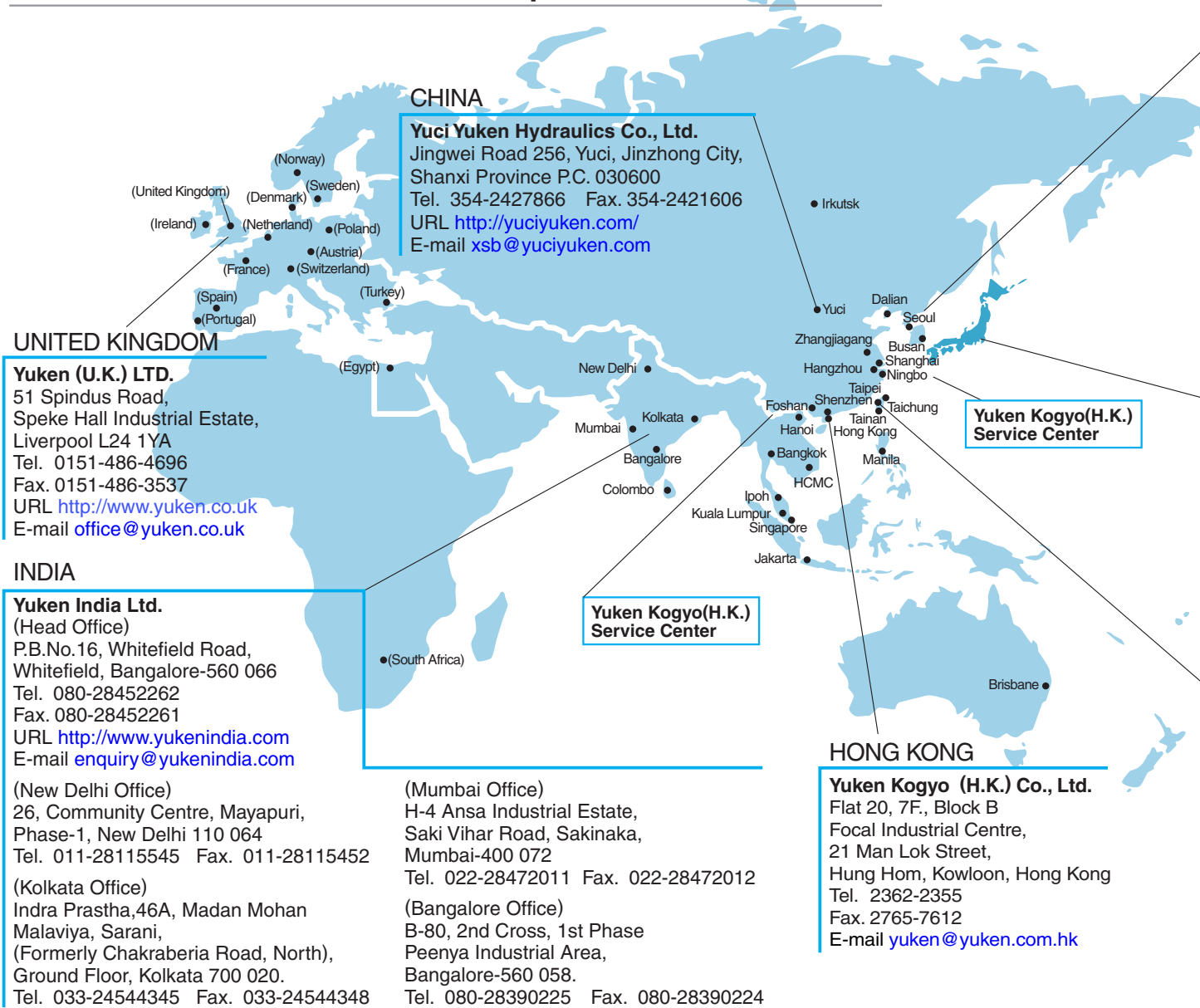


DIMENSIONS IN  
 INCHES (MILLIMETRES)

| Nominal Tube OD |       | Thread Size     | Dimensions Inch (mm) |               |                           |            |             |     | O-Ring Size (Hs 90) |
|-----------------|-------|-----------------|----------------------|---------------|---------------------------|------------|-------------|-----|---------------------|
|                 |       |                 | A*                   | B             | C                         | D          | E           | F   |                     |
| Dash Size       | Inch  |                 | (Min.)               | ±.002 (±0.05) | +0.15<br>0<br>(+0.4<br>0) | (Max.)     | (Min.)      | ±1° |                     |
| -2              | 1/8   | 5/16-24 UNF-2B  | .669 (17)            | .360 (9.15)   | .075 (1.9)                | .063 (1.6) | .394 (10)   | 12  | AS568-902           |
| -3              | 3/16  | 3/8-24 UNF-2B   | .748 (19)            | .423 (10.75)  | .075 (1.9)                | .063 (1.6) | .394 (10)   | 12  | AS568-903           |
| -4              | 1/4   | 7/16-20 UNF-2B  | .827 (21)            | .490 (12.45)  | .094 (2.4)                | .063 (1.6) | .453 (11.5) | 12  | AS568-904           |
| -5              | 5/16  | 1/2-20 UNF-2B   | .906 (23)            | .553 (14.05)  | .094 (2.4)                | .063 (1.6) | .453 (11.5) | 12  | AS568-905           |
| -6              | 3/8   | 9/16-18 UNF-2B  | .984 (25)            | .618 (15.7)   | .098 (2.5)                | .063 (1.6) | .453 (11.5) | 12  | AS568-906           |
| -8              | 1/2   | 3/4-16 UNF-2B   | 1.181 (30)           | .813 (20.65)  | .098 (2.5)                | .095 (2.4) | .500 (12.7) | 15  | AS568-908           |
| -10             | 5/8   | 7/8-14 UNF-2B   | 1.339 (34)           | .945 (24)     | .098 (2.5)                | .095 (2.4) | .563 (14.3) | 15  | AS568-910           |
| -12             | 3/4   | 1-1/16-12 UN-2B | 1.614 (41)           | 1.150 (29.2)  | .130 (3.3)                | .095 (2.4) | .657 (16.7) | 15  | AS568-912           |
| -14             | 7/8   | 1-3/16-12 UN-2B | 1.772 (45)           | 1.276 (32.4)  | .130 (3.3)                | .095 (2.4) | .748 (19)   | 15  | AS568-914           |
| -16             | 1     | 1-5/16-12 UN-2B | 1.929 (49)           | 1.400 (35.55) | .130 (3.3)                | .126 (3.2) | .748 (19)   | 15  | AS568-916           |
| -20             | 1-1/4 | 1-5/8-12 UN-2B  | 2.283 (58)           | 1.715 (43.55) | .130 (3.3)                | .126 (3.2) | .748 (19)   | 15  | AS568-920           |
| -24             | 1-1/2 | 1-7/8-12 UN-2B  | 2.559 (65)           | 1.965 (49.9)  | .130 (3.3)                | .126 (3.2) | .748 (19)   | 15  | AS568-924           |
| -32             | 2     | 2-1/2-12 UN-2B  | 3.465 (88)           | 2.589 (65.75) | .130 (3.3)                | .126 (3.2) | .748 (19)   | 15  | AS568-932           |

★ If face of boss is on a machined surface, dimensions "A" and "D" need not apply as long as corner radius R .0004 - .0008 inches (R 0.1 - 0.2 mm) is maintained.

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