

**USUN**<sup>®</sup>

# USUN FLUID CONTROL EQUIPMENT CO LTD

Professional manufacturer for  
Ultra high pressure fittings and  
Valves



## Usun Fluid Control Equipment Co Ltd

**Add:** 4th Floor Chuang Ying Building , Panlong Road liaoBu town,  
DongGuan city , GuangDong Province , China  
**E-mali:** Sunny@u-sun.cn  
**Tel:** 0086 0769 33388195 /15876407183  
**web:** www.u-sun.cn

CHINA · DONGGUAN  
2024 version

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A corner of workshop



High Precision Lathe



Warehouse



Three Coordinate Measuring Machine



VMC



## COMPANY PROFILE

USUN Pumps has more than 10 years of hydraulic and pneumatic engineering experience in the design and manufacture of pumps and systems for pressure testing and chemical injection. Continuous investment in new machinery and advanced technology keeps USUN Pumps at the forefront of our field.

We offer one of the most complete range of Air Driven Pumps & Boosters in the industry measured for:

- Capability of ultimate pressure, flow or output

horsepower.

- Compatibility with a broad variety of liquids and gases.

With a predominately online sales channel that allows us to keep costs down, we provide full technical support for via:

- Online selection guides (liquid pumps & gas boosters) and product comparison charts
- 24/7 technical email support system
- Phone-based technical support
- Web-based technical chat facility

## OUR HISTORY

USUN Pumps is a famous Brand, USUN Fluid Control Equipment Co Ltd has manufactured high quality chemical injection pumps and high pressure fittings and valve for more than 8 years. Prior to becoming a high-pressure pump manufacturer, USUN roots go back over 10 years,

mainly as the technical distributor for Haskel Air Driven Liquid Pumps, Gas Booster High Pressure Valves and Fittings. USUN have designed numerous high and low pressure hydraulic, chemical, liquid and gas booster systems as well as many off-shore wellhead systems.

## Flow Coefficients

The flow coefficient CV is a valve sizing designation commonly determined by laboratory test. It corresponds to the flow rate of water through a valve in US gallons per minute at 60° F with a differential pressure drop of one psi.

Liquid flow capacity in US Gallons Per minute	CV-	Valve flow coefficient
$Q1=CV \cdot \sqrt{\frac{\Delta P}{G}}$	GV-	Specific gravity of fluid
Valve pressure fluctuation(Liquid pressure)	$\Delta P$ -	Differential valve pressure (psi)
$\Delta P=G \cdot \frac{Q1^2}{Cv^2}$	P-	Valve inlet pressure (psi)
Gas flow capacity in standard cubic feet per hour (SCFH)	QI-	Liquid flow in US gallons per Minute (GPM)
$Qg=1360 \cdot Cv \cdot \sqrt{\frac{P \cdot \Delta P}{T \cdot G \cdot Z}}$	Qg-	Gas flow in standard cubic feet <b>Per hour</b> (SCFH)
Valve pressure fluctuation(Gas pressure)	T-	System temperature(°R)
$\Delta P=\frac{T \cdot G \cdot Z}{P} \cdot \left(\frac{Qg}{1360 \cdot Cv}\right)^2$	Z-	Compressed gas coefficient at working condition
1gal/ min=3.79 L/min 1SCFH/h=28.32L/H 1 Kg/cm <sup>2</sup> =0.1Mpa=1Bar=14.7Psi		

### Temperature Equivalents

°F	°C	°R	°K
0	-18	460	255
32	0	492	273
-460	-273	0	0
°C=5/9(°F-32);°K=°C+273.2;°R=°F+459.7			

### Linear Equivalents

in	m	cm	mm
1	0.0254	2.54	25.4
39.37	1	100	1000
0.3937	0.01	1	10

### Pressure Equivalents

Mpa	bar	kg/cm <sup>2</sup>	psi
1	10	10.197	145.04
0.1	1	1.0197	14.504
0.09807	0.9807	1	14.223
psi=1B/in <sup>2</sup> Gage			

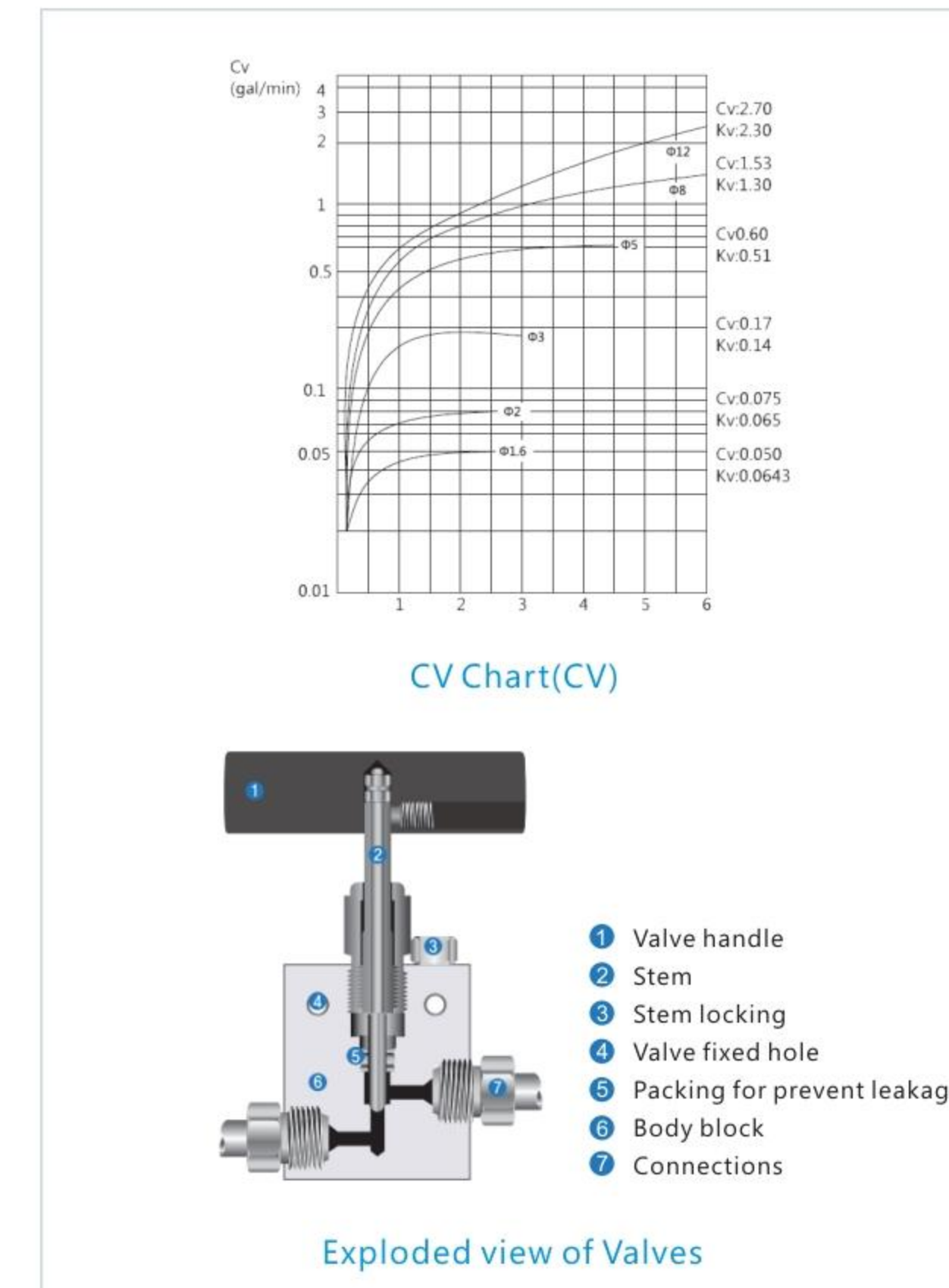
### Volume Equivalents

m <sup>3</sup>	gal	L	cc
1	264.2	1000	1*10 <sup>6</sup>
3.79*10 <sup>-3</sup>	1	3.79	3785
1*10 <sup>3</sup>	0.2642	1	1000

## Manual needle valves

### Features:

- ★ Maximum working pressure: 60,000 psi.
- ★ Standard operating temperature: -50°C~200°C (-58° F~392°F)
- ★ The valve body is made of 316L stainless steel with excellent corrosion resistance.
- ★ Metal hard seal with a high level of safety and reliability for both gas and liquid needle and seat with longer life and durability.
- ★ Non-rotating stem prevents wear between stem and port.
- ★ Adopt stainless steel stem with aluminum bronze gland for optimal threaded cycle life and reduced torque.
- ★ Ensure traceability through fully recorded data (Batch No.,Maximum Pressure Material No.,Type Name).
- ★ All needle valves are fitted with nut and collar sleeve.



OD. Size in.	Connection Type	Orifice Size (mm)	Rated CV	Pressure/Temp Rating psi
1/4" (6.35)	LF4	2.7	0.31	20,000
3/8" (9.53)	LF6	4.5	0.5	20,000
9/16" (14.29)	LF9	7.5	1.3	20,000
3/4" (19.05)	LF12	11.1	2.5	20,000
1"(25.4)	LF16	14.3	4.4	20,000

OD. Size in.	Connection Type	Orifice Size (mm)	Rated CV	Pressure/Temp Rating psi
1/8"	HF2	1.2	0.04	30,000
1/4"	HF4	2.4	0.12	30,000
3/8"	HF6	3.2	0.23	30,000
9/16"	HF9	3.2	0.33	30,000


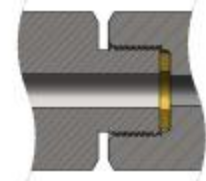

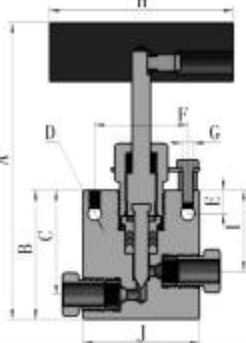
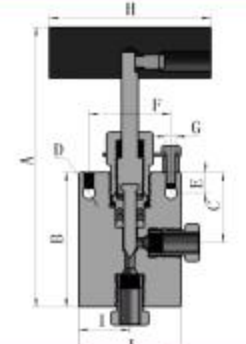
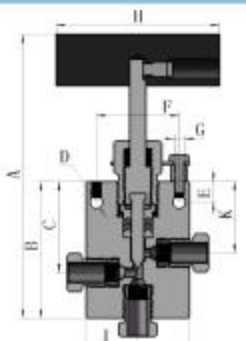
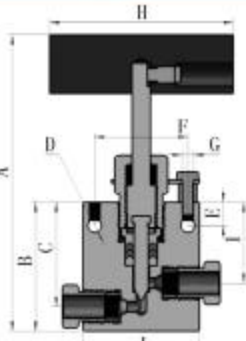
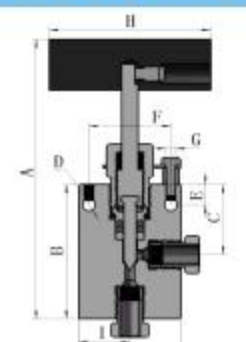
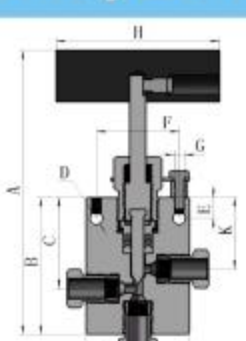
OD. Size in.	Connection Type	Orifice Size (mm)	Rated CV	Pressure/Temp Rating psi
1/4"	HF4	2	0.14	60,000
3/8"	HF6	3	0.14	60,000
9/16"	HF9	2	0.23	60,000

**Remark:**the CV values of list values are suitable for straight valves and for Angle type valves, the CV valves will increase by 50% based on this

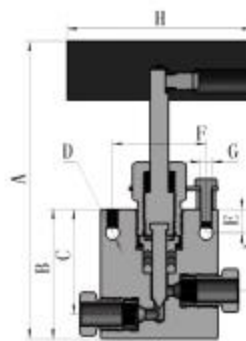
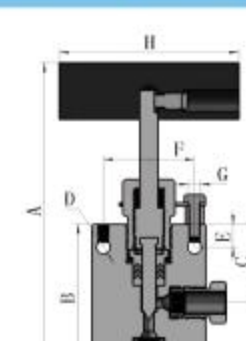
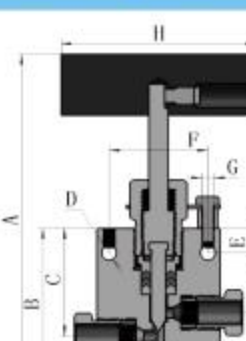
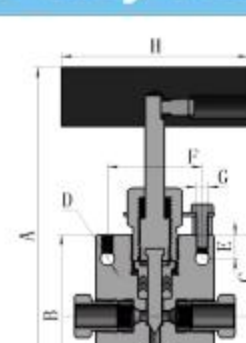
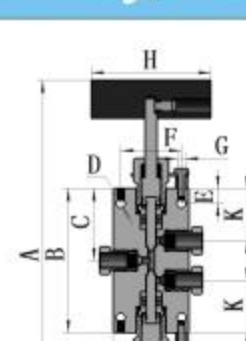
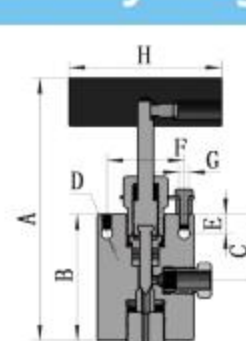
### Model Selection Example:HS20121

Control Type	Working pressure	Common code	Connection tube OD	Needle valve type	Connection port size	Valve function
HS Manual needle valves	10:10,000psi	1	1:1/8"O.D.	1:2- Way Straight	None	H:High temperature valve
	20:15,000psi	1	2:1/4"O.D.	2:2- Way Angle	T:NPT	L:Low temperature valve
	20,000psi	1	3:3/8"O.D.	3:3- Way/2 on Pressure Type	R-RP BSPP flat top washer	H2:Hydrogen gas Service
	30:30,000psi	1	4:9/16"O.D.	4:3- Way One on Pressure Type	R-RG BSPP Bronzer washer	O <sub>2</sub> :Oxygen gas service
	60:60,000psi	1	1/2"O.D.	5:3- Way,two stem manifold	C:BSPT,RC-ZG	
				6:3/4"O.D.	6:Replaceable metal seat	K:Single Ferrule type
			8:1"			

Low Pressures to 15,000 psi (1,034bar)

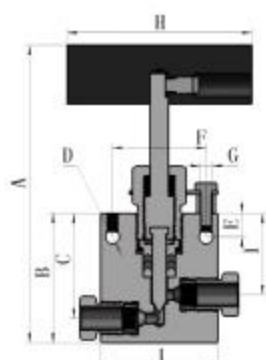
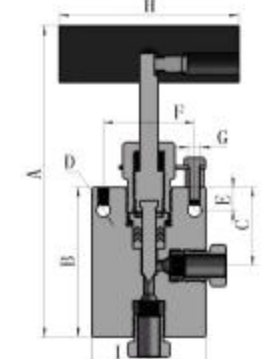
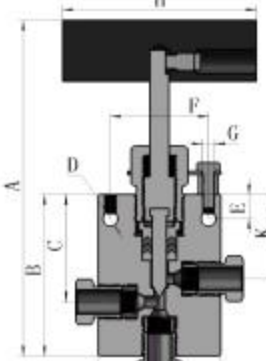
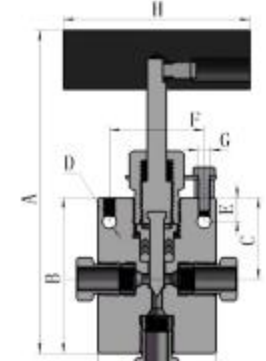
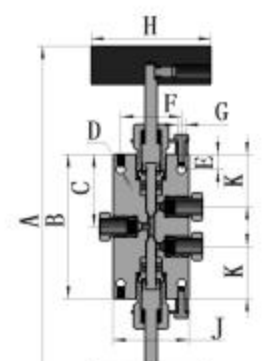
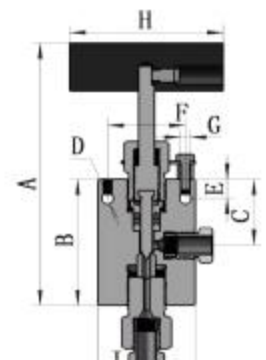
Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
<b>BSP CONNECTIONS[#refer port Type/-RP:10,000psi/-RG:30,000psi/-120°:43500psi]</b>																
																
<b>-RP washer port</b>		<b>-RG washer port</b>		<b>-120° conic thread</b>												
<b>2-Way Straight</b>																
	HS15121-R-#	1/4"	2.8	125	55	43	6	10	40	M5	79	34.5	50	/	23.5	24
	HS15131-R-#	3/8"	4.5	126	55	44.5	6	10	40	M5	79	34.5	50	/	23.5	24
	HS15141-R-#	9/16"	7.5	154	73.5	60	8.8	13	35	M5	115	44.5	65	/	25	26
	HS15161-R-#	3/4"	11.1	173	95	76	10.5	20.5	56.5	M10	231	57	76	/	35	35
	HS15181-R-#	1"	14.3	222.5	117.5	95	14.3	28.5	63.5	M5	260	71.5	105	/	40	45
<b>2-Way Angle</b>																
	HS15122-R-#	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15132-R-#	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15142-R-#	9/16"	7.5	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS15162-R-#	3/4"	11.1	197.6	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS15182-R-#	1"	14.3	250.3	130	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45
<b>3-Way 2 on Pressure Type</b>																
	HS15124-R-#	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15134-R-#	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15144-R-#	9/16"	7.5	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS15164-R-#	3/4"	11.1	183	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS15184-R-#	1"	14.3	232.9	138	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45
<b>NPT CONNECTIONS( 15,000 PSI )</b>																
<b>2-Way Straight</b>																
	HS15121-T	1/4"	2.8	125	55	43	6	10	40	M5	79	34.5	50	/	23.5	24
	HS15131-T	3/8"	4.5	126	55	44.5	6	10	40	M5	79	34.5	50	/	23.5	24
	HS15141-T	9/16"	7.5	154	73.5	60	8.8	13	35	M5	115	44.5	65	/	25	26
	HS15161-T	3/4"	11.1	173	95	76	10.5	20.5	56.5	M10	231	57	76	/	35	35
	HS15181-T	1"	14.3	222.5	117.5	95	14.3	28.5	63.5	M5	260	71.5	105	/	40	45
<b>2-Way Angle</b>																
	HS15122-T	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15132-T	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15142-T	9/16"	7.5	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS15162-T	3/4"	11.1	197.6	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS15182-T	1"	14.3	250.3	130	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45
<b>3-Way 2 on Pressure Type</b>																
	HS15124-T	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15134-T	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS15144-T	9/16"	7	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS15164-T	3/4"	11.1	183	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS15184-T	1"	14.3	250.3	138	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45

Medium Pressures to 20,000 psi (1,379bar)

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
<b>2-Way Straight</b>																
	HS20121	1/4"	2.8	126	55	43	6	10	40	M5	79	34.5	50	/	23.5	24
	HS20131	3/8"	4.5	126	55	44.5	6	10	40	M5	79	34.5	50	/	23.5	24
	HS20141	9/16"	7	154	73.5	60	8.8	13	35	M5	115	44.5	65	/	25	26
	HS20161	3/4"	11.1	173	95	76	10.5	20.5	56.5	M10	231	57	76	/	35	35
	HS20181	1"	14.3	222.5	117.5	95	14.3	28.5	63.5	M5	260	71.5	105	/	40	45
<b>2-Way Angle</b>																
	HS20122	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20132	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20142	9/16"	7	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS20162	3/4"	11.1	197.6	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS20182	1"	14.3	250.3	130	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45
<b>3-Way 2 on Pressure Type</b>																
	HS20123	1/4"	2.8	139	60	42	6	10	40	M5	79	25	50	34.5	23.5	24
	HS20133	3/8"	4.5	146	66	44	6	10	40	M5	79	25	50	34.5	23.5	24
	HS20143	9/16"	7	173	92	60	8.8	13	35	M5	115	32.5	65	44.5	25	26
	HS20163	3/4"	11.1	180.5	117.5	76	10.5	20.5	56.5	M10	231	38	76	57	35	35
	HS20183	1"	14.3	251.9	149	95	14.3	28.5	63.5	M5	260	52.5	105	71.5	40	45
<b>3-Way 1 on Pressure Type</b>																
	HS20124	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20134	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20144	9/16"	7	166	85	44.5	8.8	13	35	M5	115	32.5	65	/	25	26
	HS20164	3/4"	11.1	183	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS20184	1"	14.3	232.9	130	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45
<b>3-Way,2-Stem Manifold</b>																
	HS20125	1/4"	2.8	229	90	45	6	10	40	M5	79	/	50	34.5	23.5	24
	HS20135	3/8"	4.5	236	95	47.5	6	10	40	M5	79	/	50	34.5	23.5	24
	HS20145	9/16"	7	292	130	65	8.8	13	35	M5	110	/	65	44.5	25	26
	HS20165	3/4"	11.1	317	165	82.5	10.5	20.5	56.5	M10	231	/	76	57	35	35
	HS20185	1"	14.3	396.8	191	104.8	14.3	28.5	63.5	M5	260	/	105	71.5	40	45
<b>2-Way Angle Replaceable Seat</b>																
	HS20126	1/4"	2.8	131	60	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20136	3/8"	4.5	137	66	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS20146	9/16"	7	166	85.5	44.5	8.7	13	35	M5	115	32.5	65	/	25	26
	HS20166	3/4"	11.1	212	108	57	10.5	20.5	56.5	M10	231	38	76	/	35	35
	HS20186	1"	14.3	242	130	71.5	14.3	28.5	63.5	M5	260	52.5	105	/	40	45

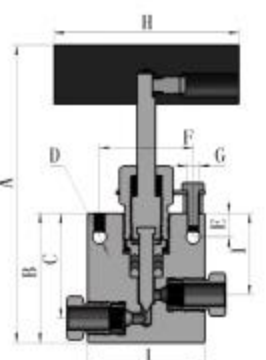
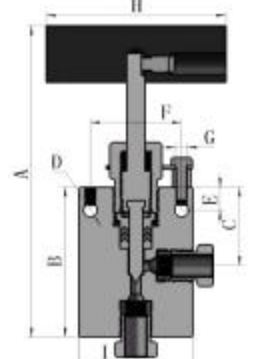
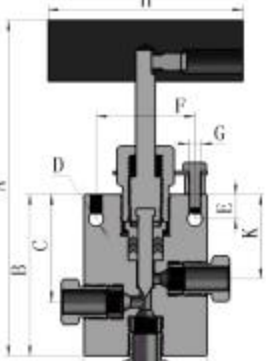
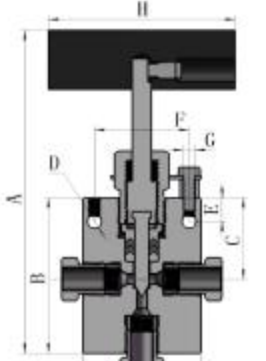
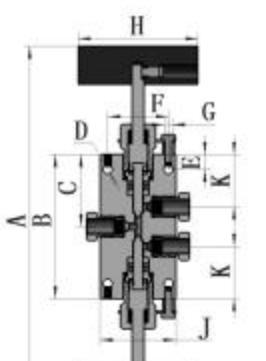
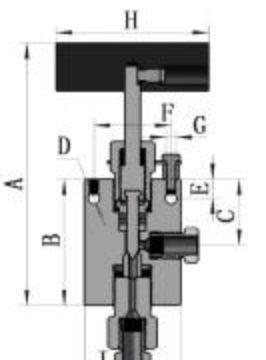
# MANUAL NEEDLE VALVES

## High Pressures to 30,000 psi (2,069bar)

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
<b>2-Way Straight</b>																
	HS30111	1/8"	1.2	109	50	40	6	10	30	M5	63.5	34.5	50	/	19	20
	HS30121	1/4"	2.4	125	55	43	6	10	40	M5	79	34.5	50	/	23.5	24
	HS30131	3/8"	3.2	133	62	46	6	10	40	M5	79	36.5	60	/	23.5	30
	HS30141	9/16"	3.2	141	70	46	6	10	40	M5	79	35	65	/	23.5	38
<b>2-Way Angle</b>																
	HS30112	1/8"	1.2	110	53	34.5	6	10	30	M5	63.5	20	40	/	19	24
	HS30122	1/4"	2.4	125	55	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS30132	3/8"	3.2	137	66	36.5	6	10	40	M5	79	30	60	/	23.5	30
	HS30142	9/16"	3.2	141	70	34.5	6	10	40	M5	79	32.5	65	/	23.5	38
<b>3-Way 2 on Pressure Type</b>																
	HS30113	1/8"	1.2	110	53	34.5	6	10	30	M5	63.5	20	40	34.5	19	20
	HS30123	1/4"	2.4	130	60	43	6	10	40	M5	79	25	50	34.5	23.5	24
	HS30133	3/8"	3.2	146	75	46	6	10	40	M5	79	30	60	36.5	23.5	30
	HS30143	9/16"	3.2	151	80	45	6	10	40	M5	79	32.5	65	34.5	23.5	38
<b>3-Way 1 on Pressure Type</b>																
	HS30114	1/8"	1.2	110	53	34.5	6	10	30	M5	63.5	20	40	/	23.5	24
	HS30124	1/4"	2.4	125	55	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS30134	3/8"	3.2	137	66	36.5	6	10	40	M5	79	30	60	/	23.5	30
	HS30144	9/16"	3.2	141	70	34.5	6	10	40	M5	79	32.5	65	/	23.5	38
<b>3-Way, 2-Stem Manifold</b>																
	HS30115	1/8"	1.2	208	90	45	6	10	30	M5	63.5	/	40	34.5	19	20
	HS30125	1/4"	2.4	229	90	45	6	10	40	M5	79	/	50	34.5	23.5	24
	HS30135	3/8"	3.2	242	100	50	6	10	40	M5	79	/	60	36.5	23.5	30
	HS30145	9/16"	3.2	251	109	54.5	6	10	40	M5	79	/	65	34.5	23.5	38
<b>2-Way Angle Replaceable Seat</b>																
	HS30116	1/8"	1.2	119	60	34.5	6	10	30	M5	63.5	20	40	/	19	20
	HS30126	1/4"	2.4	136.5	66.5	34.5	6	10	40	M5	79	25	50	/	23.5	24
	HS30136	3/8"	3.2	137.5	66.5	36.5	6	10	40	M5	79	30	60	/	23.5	30
	HS30146	9/16"	3.2	143	73	34.5	6	10	40	M5	79	32.5	65	/	23.5	38

# MANUAL NEEDLE VALVES

## Ultra high Pressures to 60,000 psi (4,137bar)

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
<b>2-Way Straight</b>																
	HS60121	1/4"	2	125	55	43	6	10	40	M5	79	34.5	50	/	23.5	26
	HS60131	3/8"	2	133	62	43	6	10	40	M5	79	34.5	60	/	23.5	30
	HS60141	9/16"	2.4	141	70	46	6	10	40	M5	79	35	65	/	23.5	38
<b>2-Way Angle</b>																
	HS60122	1/4"	2	125	55	34.5	6	10	40	M5	79	35	50	/	23.5	26
	HS60132	3/8"	2	133	62	34.5	6	10	40	M5	79	30	60	/	23.5	30
	HS60142	9/16"	2.4	141	70	34.5	6	10	40	M5	79	32.5	65	/	23.5	38
<b>3-Way 2 on Pressure Type</b>																
	HS60123	1/4"	2	130.5	60.5	43	6	10	40	M5	79	25	50	34.5	23.5	26
	HS60133	3/8"	2	137	66	43	6	10	40	M5	79	30	60	34.5	23.5	30
	HS60143	9/16"	2.4	151	80	46	6	10	40	M5	79	32.5	65	35	23.5	38
<b>3-Way 1 on Pressure Type</b>																
	HS60124	1/4"	2	125	55	34.5	6	10	40	M5	79	25	50	/	23.5	26
	HS60134	3/8"	2	133	62	34.5	6	10	40	M5	79	30	60	/	23.5	30
	HS60144	9/16"	2.4	141	70	35	6	10	40	M5	79	32.5	65	/	23.5	38
<b>3-Way, 2-Stem Manifold</b>																
	HS60125	1/4"	2	230	90	45	6	10	40	M5	79	/	50	34.5	23.5	26
	HS60135	3/8"	2	238	96	48	6	10	40	M5	79	/	60	34.5	23.5	30
	HS60145	9/16"	2.4	171	109	52.5	6	10	40	M5	79	/	65	35	23.5	38
<b>2-Way Angle Replaceable Seat</b>																
	HS60126	1/4"	2	136.5	66.5	34.5	6	10	40	M5	79	25	50	/	23.5	26
	HS60136	3/8"	2	137.5	66.5	34.5	6	10	40	M5	79	30	60	/	23.5	30
	HS60146	9/16"	2.4	143	73	34.5	6	10	40	M5	79	32.5	65	/	23.5	38

# TAPER SEAL NEEDLE VALVES

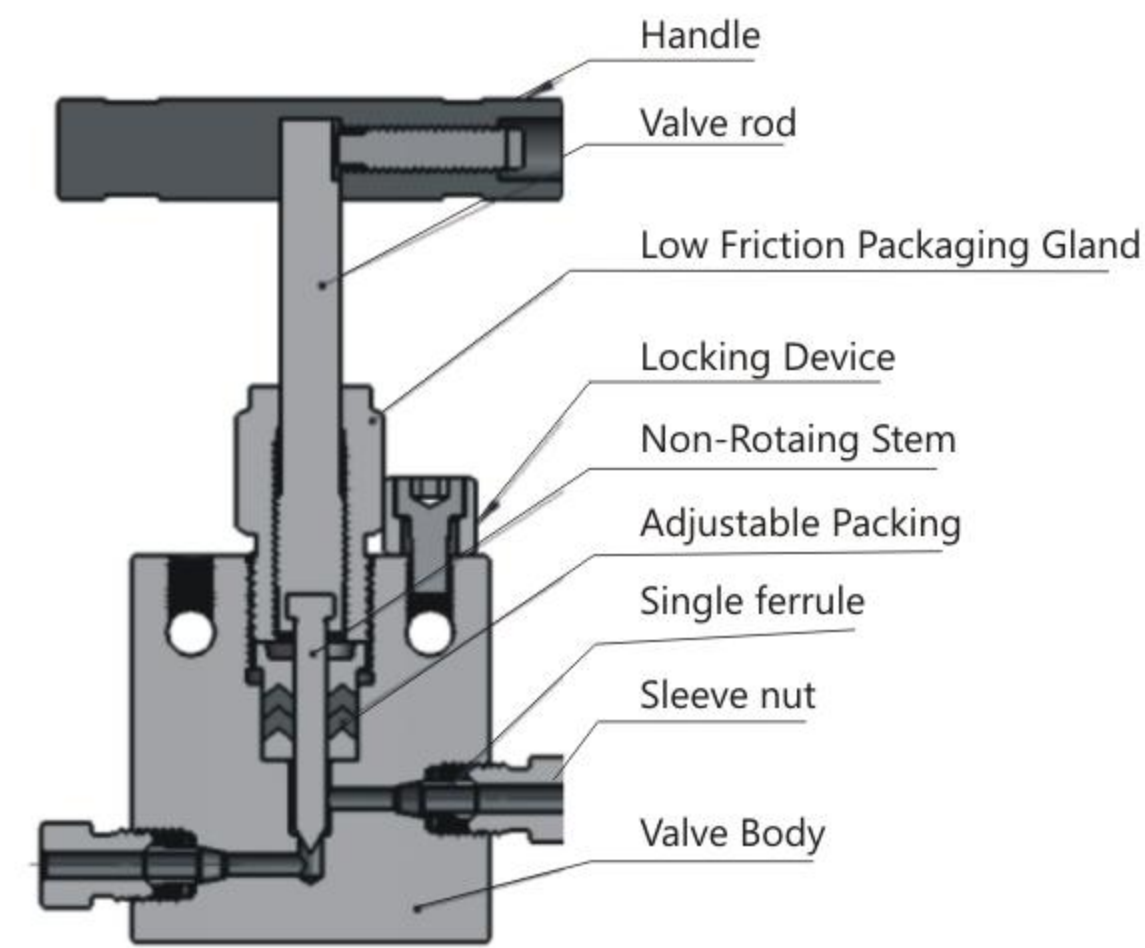
## Taper seal needle valves

### Description:

Taper Seal components use a compression type tubing connection that requires no special tooling for tubing preparation. Taper Seal valves are available for 1/8", 1/4" and five patterns to satisfy widely varying requirements. A line of fittings is available to facilitate adapting to NPT, Medium or High Pressure pipe system.

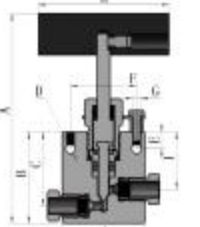
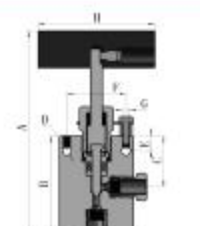
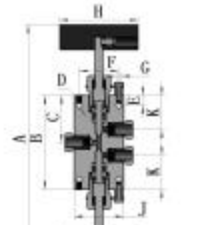
### Features:

- ★ Non-rotating slotted stem design, Taper sleeve connection.
- ★ Suitable for gas and water or oil service.
- ★ the standard operating temperature :-50°C-200°C(-58°F-39.2°F)
- ★ Packing below stem threads.
- ★ Type 316L high tensile bodies and needle is made of 17-4PH.
- ★ Positive gland lock device.
- ★ No stem adjustment needed.
- ★ Maximum pressure up to 10000 PSI.



Model selection example:HS10121-K

HS	10	1	2	1	K	
Control Type	Working pressure	None	Connection tube OD	Needle valve type	Connection port size	Valve application
HS Manual needle valves	10:10,000psi		1:1/8"O.D.	1:2- Way Straight	K:Single sleeve type	H:High temperature valve
			2:1/4"O.D.	2:2- Way Angle		L:Low temperature valve
				3:3- Way/2 on Pressure Type		
				4:3- Way One on Pressure Type		
				5:3- Way,two stem manifold		
				6:Replaceable metal seat		

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
<b>2-Way Straight</b>																
	HS10111-K	1/8"	2.7	111	50	40	6	10	30	M5	63.5	31.5	45	/	16.5	20
	HS10121-K	1/4"	3.2	107	50	40	6	10	30	M5	63.5	31.5	45	/	16.5	20
<b>2-Way Angle</b>																
	HS10112-K	1/8"	2.7	111	50	31.5	6	10	30	M5	63.5	31.5	45	22.5	16.5	20
	HS10122-K	1/4"	3.2	123	62	31.5	6	10	30	M5	63.5	31.5	45	22.5	16.5	20
<b>3-Way, 2 Stem manifold</b>																
	HS10115-K	1/8"	2.7	198	80	40	6	10	30	M5	63.5	/	45	31.5	16.5	20
	HS10125-K	1/4"	3.2	203	85	42.5	6	10	30	M5	63.5	/	45	31.5	16.5	20

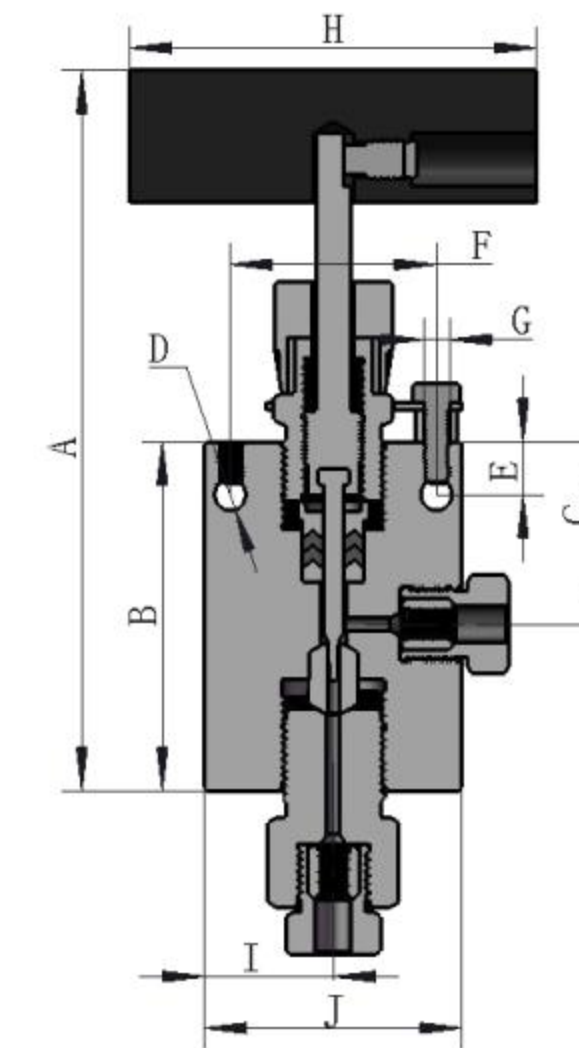
# MICRO METERING NEEDLE VALVE

## Micro Metering Needle Valve

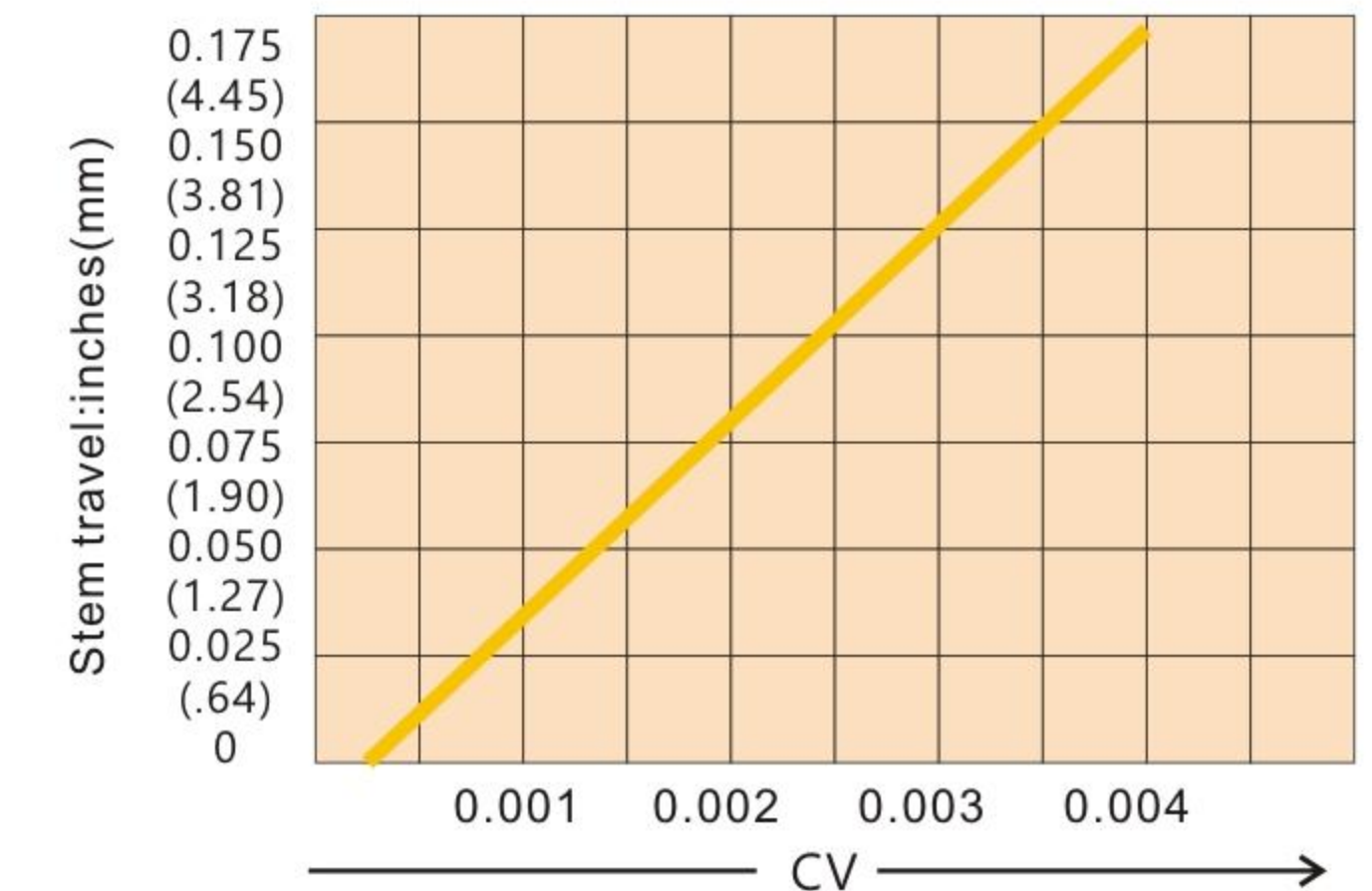
### Features:

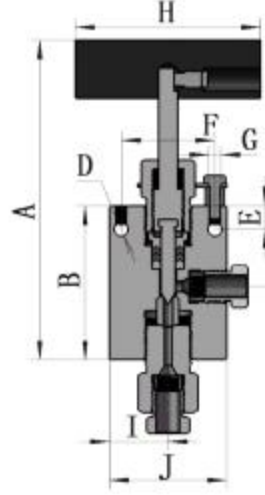
- ★ Maximum working pressure: **60,000 psi.**
- ★ Micro Metering Needle Valve are designed for more precise control of low flow applications.
- ★ Needles with special angles act on replaceable seats that are precisely matched to form throttles, allowing wide flow regulation and smooth differential pressure changes.
- ★ These valves are only used for metering and cannot be used as shutoff valves. The minimum flow is set by the factory and acts at 0. Do not operate the valve below 0, otherwise it will cause damage. When shutdown operation is required, USUN valves shall be installed in series with precision metering valves.

### Exploded View :



Generalized Flow Coefficient Curves(cv)



Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)											Valve Panel Hole	Block Thickness
				A	B	C	D	E	F	G	H	I	J	K		
	HS10116-K-F	1/8"	1.57	136.5	66.5	33.3	6	10	40	M5	79	25	50	/	24	24
	HS20126-T-F	1/4" NPT	1.57	136.5	66.8	33.3	6	10	40	M5	79	25	50	/	24	24
	HS30126-F	1/4"	1.57	136.5	66.8	33.3	6	10	40	M5	79	25	50	/	24	24
	HS60126-F	1/4"	1.57	136.5	66.8	33.3	6	10	40	M5	79	25	50	/	24	24
	HS60136-F	3/8"	1.57	137	66.8	33.3	6	10	40	M5	79	30	60	/	24	24

# EXTREME TEMPERATURES NEEDLE VALVES

## Extreme temperatures needle valves

### Description:

The Extreme Temperature Extension provides a means to move the packing area away from the hot or cold zone of a valve. Fins are provided around the packing area to dissipate heat or cold with this option.

### Features:

- ★ **Suitable Temperature range:** -100°F(-73°C) to 800°F(427°C).
- ★ **Size range:** Extreme temperature extensions are available for 1/4" O.D., 3/8" O.D., 9/16" O.D. tubing size valves in the 20,000 PSI, 30,000 psi, 60,000 psi series and for all High Pressure series valves.
- ★ **Materials and features:** Standard packing is Grafoil and Teflon. Nonrotating tip stems prevent galling at the seats and minimize torque requirements for positive shut off.
- ★ **When ordering:** simply add the suffix **"-H" or "-L"** to the standard valve catalog number (example: **HS20121-H**).

### Exploded View :



Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	Dimensions (mm)										Valve Panel Hole	Block Thickness		
				A	B	C	D	E	F	G	H	I	J			K	
20,000	HS2012#-H/L	1/4"	2.8	172	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS2013#-H/L	3/8"	4.5	176	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS2014#-H/L	9/16"	7	160	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS2016#-H/L	3/4"	11.1	160	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS2018#-H/L	1"	14.3	160	*	*	*	*	*	*	*	*	*	*	*	*	*
30,000	HS3012#-H/L	1/4"	2.4	172	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS3013#-H/L	3/8"	3.2	176	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS3014#-H/L	9/16"	3.5	176	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS6012#-H/L	1/4"	2	172	*	*	*	*	*	*	*	*	*	*	*	*	*
60,000	HS6013#-H/L	3/8"	2	172	*	*	*	*	*	*	*	*	*	*	*	*	*
	HS6014#-H/L	9/16"	3	176	*	*	*	*	*	*	*	*	*	*	*	*	*

**Notes:** # refer valve type like Straight ,angle etc.\* Valve body sizes are same as Manual needle valve and see pages 3,4,5,6.

# STANDARD AIR OPERATED NEEDLE VALVES

## Standard Air operated Needle Valves

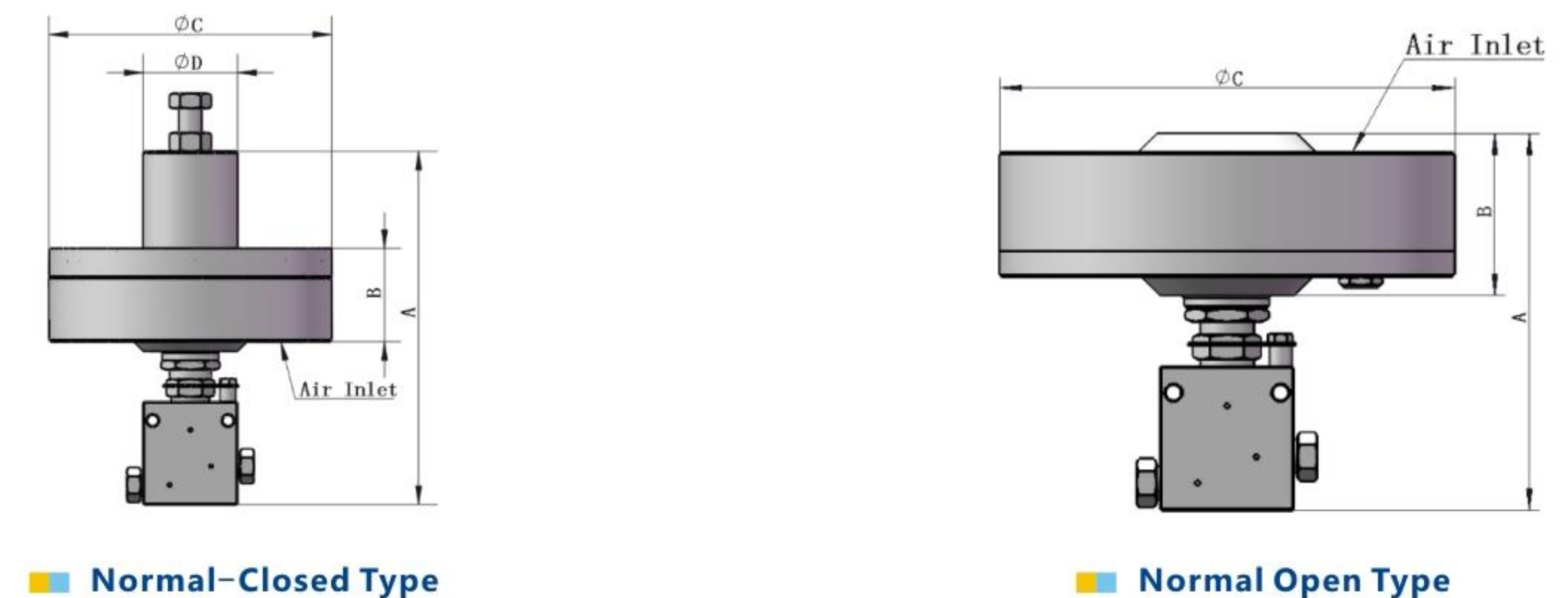
### Description:

- ★ SI Type Air automatic valve that automatically open and closed the valve using air pressure.
- ★ Piston-type pneumatic valves offer unique and reliable designs that are longer than diaphragm valves.
- ★ Suitable for high pressure gas and liquid control system or test system.
- ★ The underbody of AOV where liquid or gas passes through also have 4 types as needle valve.

### Main technical parameters

- ★ Actuator maximum allowable working pressure: 100 psi (6.8 bar).
- ★ Maximum working pressure: 60,000 psi (4,137bar).
- ★ Standard operating temperature: -50°C ~ 200°C(-58°F ~ 392°F).
- ★ 2 Patterns Body Types.(Normal Open, Normal Closed Type)
- ★ Normal Open Type : When valve is open in normal, if air is supplied, it will be close automatically.
- ★ Normal Closed Type : When valve is closed in normal, if air is supplied, it will be open automatically.
- ★ The minimum working pressure of air is 6 bar.
- ★ Driven by air, the explosion-proof valve is safer than electric type which may explode.
- ★ A valve using stainless steel 316 cold material for excellent corrosion resistant.

### Exploded View :



### Model selection example:SI20121-NC-T

Control Type	Working pressure	Common code	Connection tube OD	Needle valve type	Valve Type	Connection port size	Valve function
SI Type Air operated needle valve	10:10,000psi	1	1:1/8"O.D.	1: 2-Way Straight	NC Normal closed valves	None	H: High temperature valve
	20:15,000psi	1	2:1/4"O.D.	2: 2-Way Angle	NO Normal Open valves	T:NPT	L: Low temperature valve
	20,000psi	1	3:3/8"O.D.	3: 3-Way/2 on Pressure Type	F Micro metering needle valve	R-RP BSPP bronze washer	H2: Hydrogen gas valve
	30:30,000psi	1	4:9/16"O.D.	4: 3-Way One on Pressure Type	H High temperature valve	R-RG BSPP Bronzer washer	OL: Oxggen gas valve
	60:60,000psi	1	1/2"O.D.		L Low temperature valve	R-RZ BSPP washer gasket	
				6:3/4"O.D.	5: 3-Way,two stem manifold	K Single Ferrule type	
			8:1"O.D.	6: Replaceable metal seat	K Taper seal needle		

### Remark:

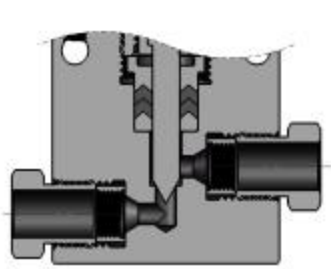
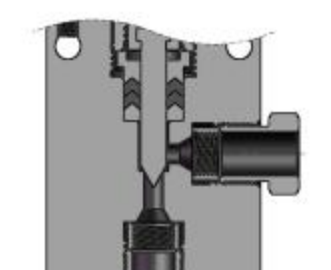
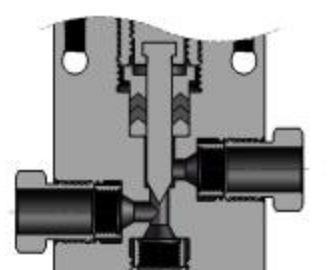
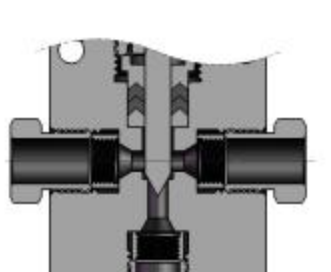
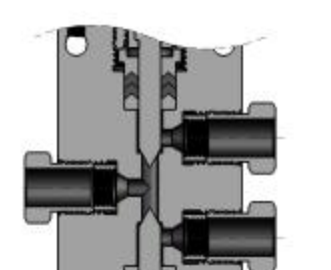
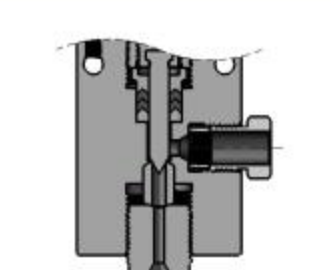
- 1.Air needle Valve body dimension same as Manual needle valves see page 3,4,5,6.
- 2.Ordering codes listed are standard. Other sizes, materials and types are available upon request. For special requirements, please contact us.



# STANDARD AIR OPERATED NEEDLE VALVES

Medium Pressures to 20,000 psi (1,379bar)

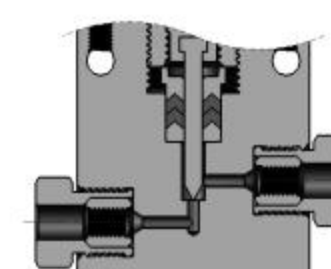
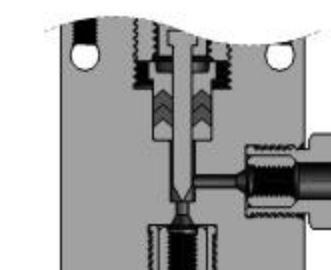
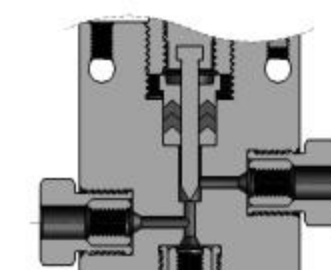
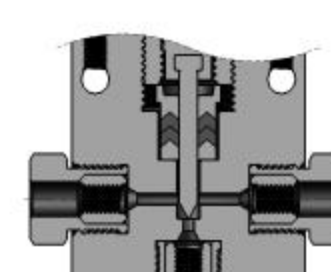
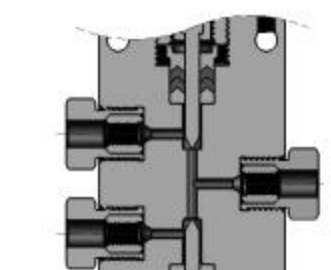
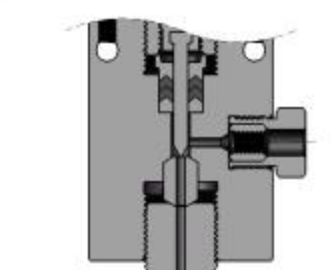
## SI type AOV/Air to Open, Air to Close

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	NC-Dimensions (mm)				NO-Dimensions (mm)				Air pressure required to open Valve (psi)	Max. Pressure (psi)	
				A	B	C	D	A	B	C	D			
<b>2-Way Straight</b>														
	SI20121-NC/NO	1/4"	2.8	192.5	105	150	50	144.5	60	170	/	70~100	20,000	
	SI20131-NC/NO	3/8"	4.5	192.5	105	150	50	144.5	60	170	/	70~100	20,000	
	SI10141-NC/NO	9/16"	7.5	212	106.5	170	60	163	60	170	/	70~100	10,000	
<b>2-Way Angle</b>														
	SI20122-NC/NO	1/4"	2.8	197.5	105	150	50	149.5	60	170	/	70~100	20,000	
	SI20132-NC/NO	3/8"	4.5	203.5	105	150	50	155.5	60	170	/	70~100	20,000	
	SI10142-NC/NO	9/16"	7.5	224	106.5	170	60	174.5	60	170	/	70~100	10,000	
<b>3-Way 2 on Pressure Type</b>														
	SI20123-NC/NO	1/4"	2.8	197.5	105	150	50	149.5	60	170	/	70~100	20,000	
	SI20133-NC/NO	3/8"	4.5	203.5	105	150	50	155.5	60	170	/	70~100	20,000	
	SI10143-NC/NO	9/16"	7.5	231	106.5	170	60	181.5	60	170	/	70~100	10,000	
<b>3-Way 1 on Pressure Type</b>														
	SI20124-NC/NO	1/4"	2.8	197.5	105	150	50	149.5	60	170	/	70~100	20,000	
	SI20134-NC/NO	3/8"	4.5	203.5	105	150	50	155.5	60	170	/	70~100	20,000	
	SI10144-NC/NO	9/16"	7.5	224	106.5	170	60	174.5	60	170	/	70~100	10,000	
<b>3-Way,2-Stem Manifold</b>														
	SI20125-NC/NO	1/4"	2.8	227.5	105	150	50	179.5	60	170	/	70~100	20,000	
	SI20135-NC/NO	3/8"	4.5	232.5	105	150	50	184.5	60	170	/	70~100	20,000	
	SI10145-NC/NO	9/16"	7.5	269	106.5	170	60	219.5	60	170	/	70~100	10,000	
<b>2-Way Angle/Replaceable Seat</b>														
	SI20126-NC/NO	1/4"	2.8	197.5	105	150	50	149.5	60	170	/	70~100	20,000	
	SI20136-NC/NO	3/8"	4.5	203.5	105	150	50	155.5	60	170	/	70~100	20,000	
	SI10146-NC/NO	9/16"	7.5	224.5	106.5	170	60	175	60	170	/	70~100	10,000	

# STANDARD AIR OPERATED NEEDLE VALVES

High Pressure to 30,000 psi (2,069bar)

## SI Ttype AOV / Air to Open, Air to Close

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	NC-Dimensions (mm)				NO-Dimensions (mm)				Air pressure required to open Valve (psi)	Max. Pressure (psi)	
				A	B	C	D	A	B	C	D			
<b>2-Way Straight</b>														
	SI30111-NC/NO	1/8"	1.2	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30121-NC/NO	1/4"	2.4	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30131-NC/NO	3/8"	3.2	194.5	105	150	50	146.5	60	170	/	70~100	30,000	
	SI30141-NC/NO	9/16"	3.5	207.5	105	150	50	159.5	60	170	/	70~100	30,000	
<b>2-Way Angle</b>														
	SI30112-NC/NO	1/8"	1.2	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30122-NC/NO	1/4"	2.4	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30132-NC/NO	3/8"	3.2	194.5	105	150	50	146.5	60	170	/	70~100	30,000	
	SI30142-NC/NO	9/16"	3.5	207.5	105	150	50	159.5	60	170	/	70~100	30,000	
<b>3-Way 2 on Pressure Type</b>														
	SI30113-NC/NO	1/8"	1.2	197.5	105	150	50	149.5	60	170	/	70~100	30,000	
	SI30123-NC/NO	1/4"	2.4	197.5	105	150	50	149.5	60	170	/	70~100	30,000	
	SI30133-NC/NO	3/8"	3.2	212.5	105	150	50	164.5	60	170	/	70~100	30,000	
	SI30143-NC/NO	9/16"	3.5	217.5	105	150	50	169.5	60	170	/	70~100	30,000	
<b>3-Way 1 on Pressure Type</b>														
	SI30114-NC/NO	1/8"	1.2	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30124-NC/NO	1/4"	2.4	192.5	105	150	50	144.5	60	170	/	70~100	30,000	
	SI30134-NC/NO	3/8"	3.2	199.5	105	150	50	151.5	60	170	/	70~100	30,000	
	SI30144-NC/NO	9/16"	3.5	207.5	105	150	50	159.5	60	170	/	70~100	30,000	
<b>3-Way,2-Stem Manifold</b>														
	SI30115-NC/NO	1/8"	1.2	227.5	105	150	50	179.5	60	170	/	70~100	30,000	
	SI30125-NC/NO	1/4"	2.4	227.5	105	150	50	179.5	60	170	/	70~100	30,000	
	SI30135-NC/NO	3/8"	3.2	237.5	105	150	50	189.5	60	170	/	70~100	30,000	
	SI30145-NC/NO	9/16"	3.5	246.5	105	150	50	198.5	60	170	/	70~100	30,000	
<b>2-Way Angle Replaceable Seat</b>														
	SI30116-NC/NO	1/8"	1.2	197.5	105	150	50	149.5	60	170	/	70~100	30,000	
	SI30126-NC/NO	1/4"	2.4	204	105	150	50	156	60	170	/	70~100	30,000	
	SI30136-NC/NO	3/8"	3.2	204	105	150	50	156	60	170	/	70~100	30,000	
	SI30146-NC/NO	9/16"	3.5	210.5	105	150	50	162.5	60	170	/	70~100	30,000	

# STANDARD AIR OPERATED NEEDLE VALVES

Ultra high Pressures to 60,000 psi (4,137bar)

## SI Type AOV / Air to Open, Air to Close

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	NC-Dimensions (mm)				NO-Dimensions (mm)				Air pressure required to open Valve (psi)	Max. Pressure (psi)
				A	B	C	D	A	B	C	D		
<b>2-Way Straight</b>													
	SI60121-NC/NO	1/4"	2	192.5	105	150	50	144.5	60	170	/	70~100	60,000
	SI60131-NC/NO	3/8"	2	194.5	105	150	50	146.5	60	170	/	70~100	60,000
	SI60141-NC/NO	9/16"	3	209	106.5	170	60	159.5	60	170	/	70~100	60,000
<b>2-Way Angle</b>													
	SI60122-NC/NO	1/4"	2	198	105	150	50	150	60	170	/	70~100	60,000
	SI60132-NC/NO	3/8"	2	199.5	105	150	50	151.5	60	170	/	70~100	60,000
	SI60142-NC/NO	9/16"	3	209	106.5	170	60	159.5	60	170	/	70~100	60,000
<b>3-Way 2 on Pressure Type</b>													
	SI60123-NC/NO	1/4"	2	198	105	150	50	150	60	170	/	70~100	60,000
	SI60133-NC/NO	3/8"	2	203.5	105	150	50	155.5	60	170	/	70~100	60,000
	SI60143-NC/NO	9/16"	3	209	106.5	170	60	169.5	60	170	/	70~100	60,000
<b>3-Way 1 on Pressure Type</b>													
	SI60124-NC/NO	1/4"	2	198	105	150	50	150	60	170	/	70~100	60,000
	SI60134-NC/NO	3/8"	2	199.5	105	150	50	151.5	60	170	/	70~100	60,000
	SI60144-NC/NO	9/16"	3	219	106.5	170	60	159.5	60	170	/	70~100	60,000
<b>3-Way, 2-Stem Manifold</b>													
	SI60125-NC/NO	1/4"	2	227.5	105	150	50	179.5	60	170	/	70~100	60,000
	SI60135-NC/NO	3/8"	2	233.5	105	150	50	185.5	60	170	/	70~100	60,000
	SI60145-NC/NO	9/16"	3	248	106.5	170	60	198.5	60	170	/	70~100	60,000
<b>2-Way Angle Replaceable Seat</b>													
	SI60126-NC/NO	1/4"	2	204	105	150	50	156	60	170	/	70~100	60,000
	SI60136-NC/NO	3/8"	2	204	105	150	50	156	60	170	/	70~100	60,000
	SI60146-NC/NO	9/16"	3	212	106.5	170	60	162.5	60	170	/	70~100	60,000

# STENT AIR OPERATED VALVES

## Stent Air operated needle valves

### HI type Air Driven Needle Valves features

- ★ Pneumatic valve actuators are all piston type design, reliable operation, long life.
- ★ Mounted on manual valves to provide remote control.
- ★ Separated stem design, easy to adjust the stroke and replace the stem.
- ★ The actuator is made of anodized alumina, which has good corrosion resistance and is more portable.

### Main technical parameters

- ★ Actuator maximum allowable working pressure: 100 psi (6.89 bar).
- ★ Allowable piston temperature range: -29°C~ 93°C (-20°F ~ 200°F).
- ★ Maximum working pressure: 60,000 psi (4,137 bar)
- ★ Working medium: gas, oil and water.
- ★ Standard operating temperature: -50°C~200°C (-58°F ~ 392°F).

### Product display

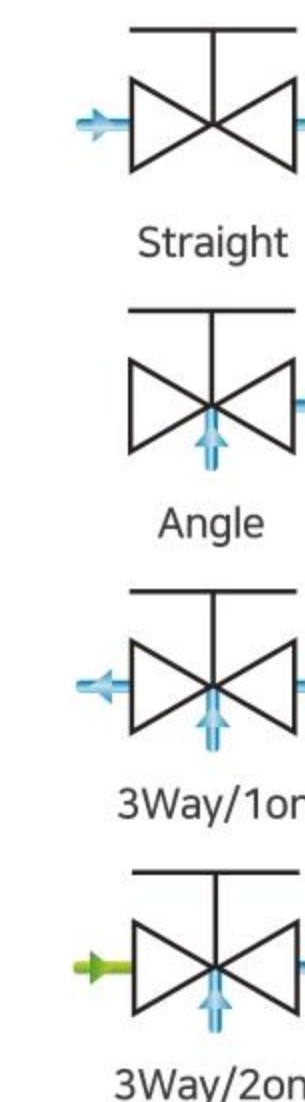


Normally Open type



Normally closed type

### Port Type



### Model selection example: HI20131-NO-T

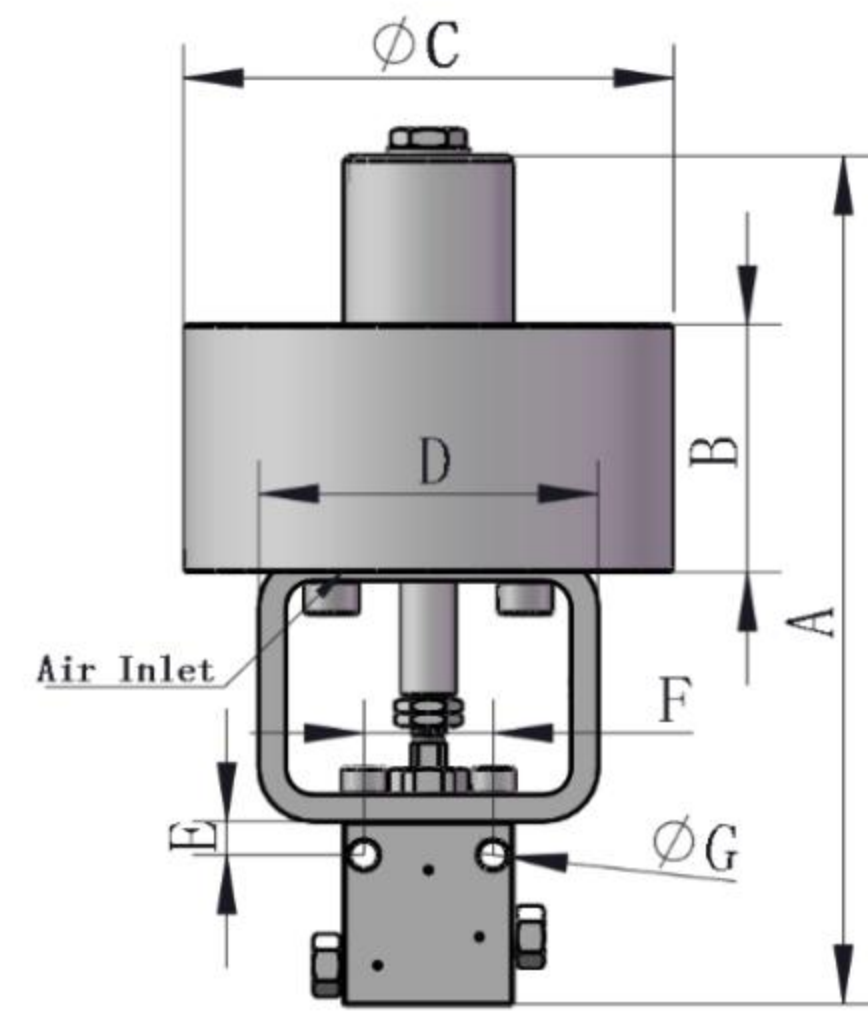
Control Type	Working pressure	Common code	Connection tube OD	Needle valve type	Valve Type	Valve driven type	Connection port size	Valve function	Valve switch
HI type Stent Pneumatic driven Needle valve	20:10,000psi	1	1:1/8"O.D.	1: 2-Way Straight	NC: Normally closed	None	None	H: High temperature valve	SQ: single point
	15,000psi	1	2:1/4"O.D.	2: 2-Way Angle	NO: Normally Open	H: heavy puty	T: NPT	L: Low temperature valve	SQ2: DOUBLE Point
	20,000psi	1	3:3/8"O.D.	3: 3-Way/2 on Pressure Type		E: Super Heavy puty	R-RP: BSPP Bronze washer	H2: Hydrogen gas valve	
	30:30,000psi	1	4:9/16"O.D.	4: 3-Way One on Pressure Type		-H/-E Refer valve size: 9/16"-1"o.D with pressure range of 10-20k PSI	R-RG: BSPP Bronze washer		
	60:60,000psi	1	6:3/4"O.D.	5: 3-Way, two stem manifold			R-RZ: BSPP Bronze gasket		
			8:1"O.D.	6: Replaceable metal seat			CRC, RT Or ZG		

# STENT AIR OPERATED NEEDLE VALVES

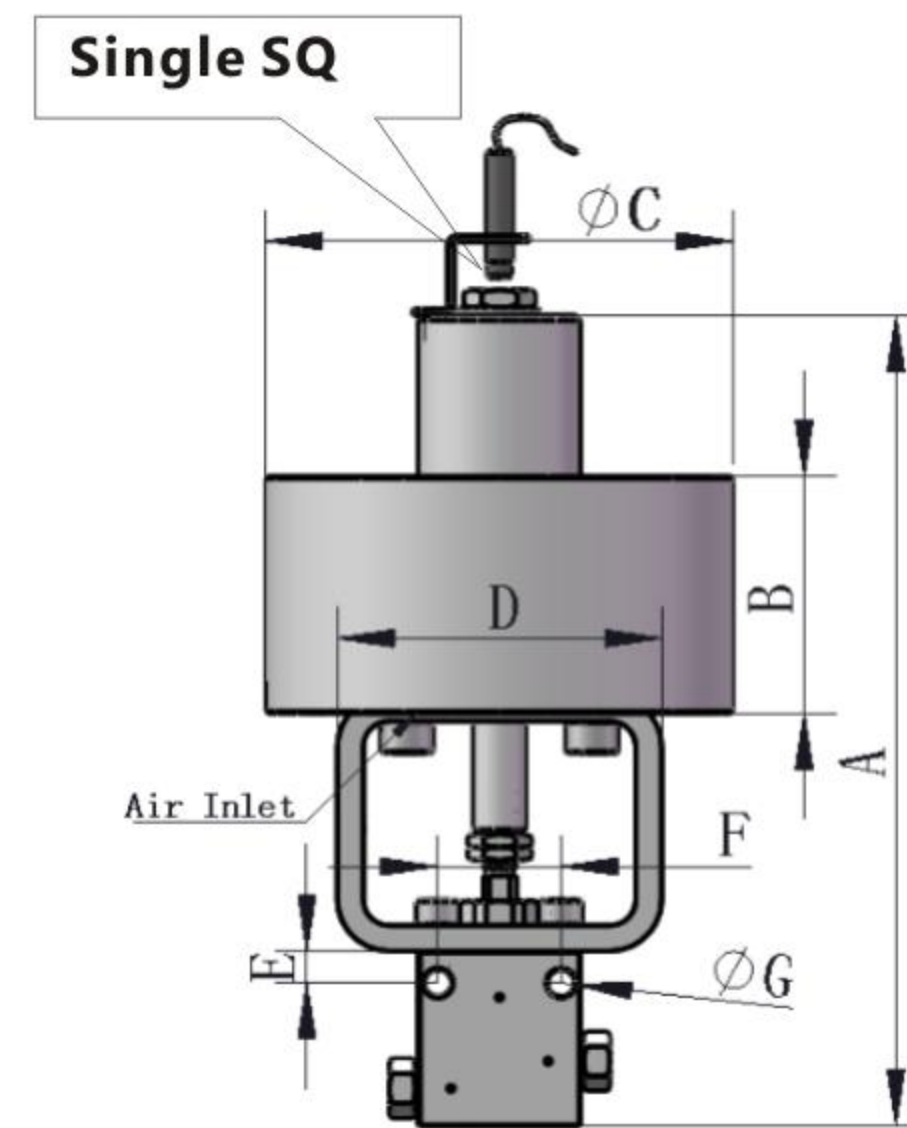
## Stent Air operated needle valves

### Exploded View:

#### HI TYPE AOV / Normally close air to open

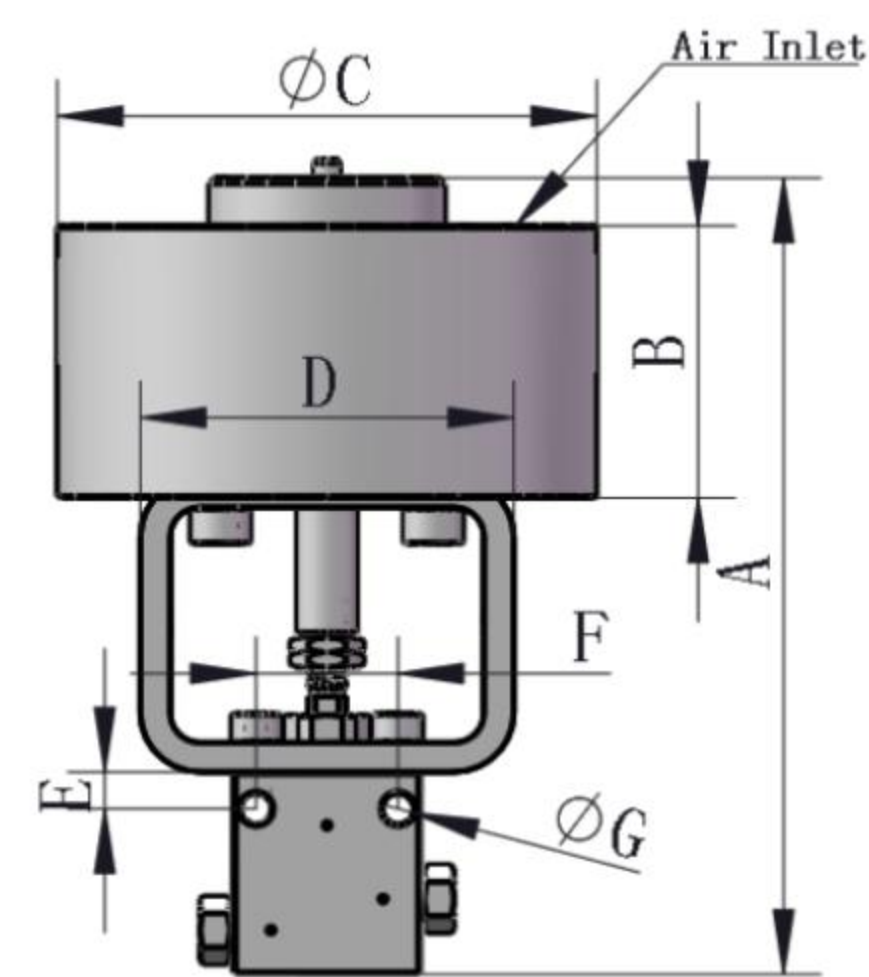


Medium Duty Valve Actuator

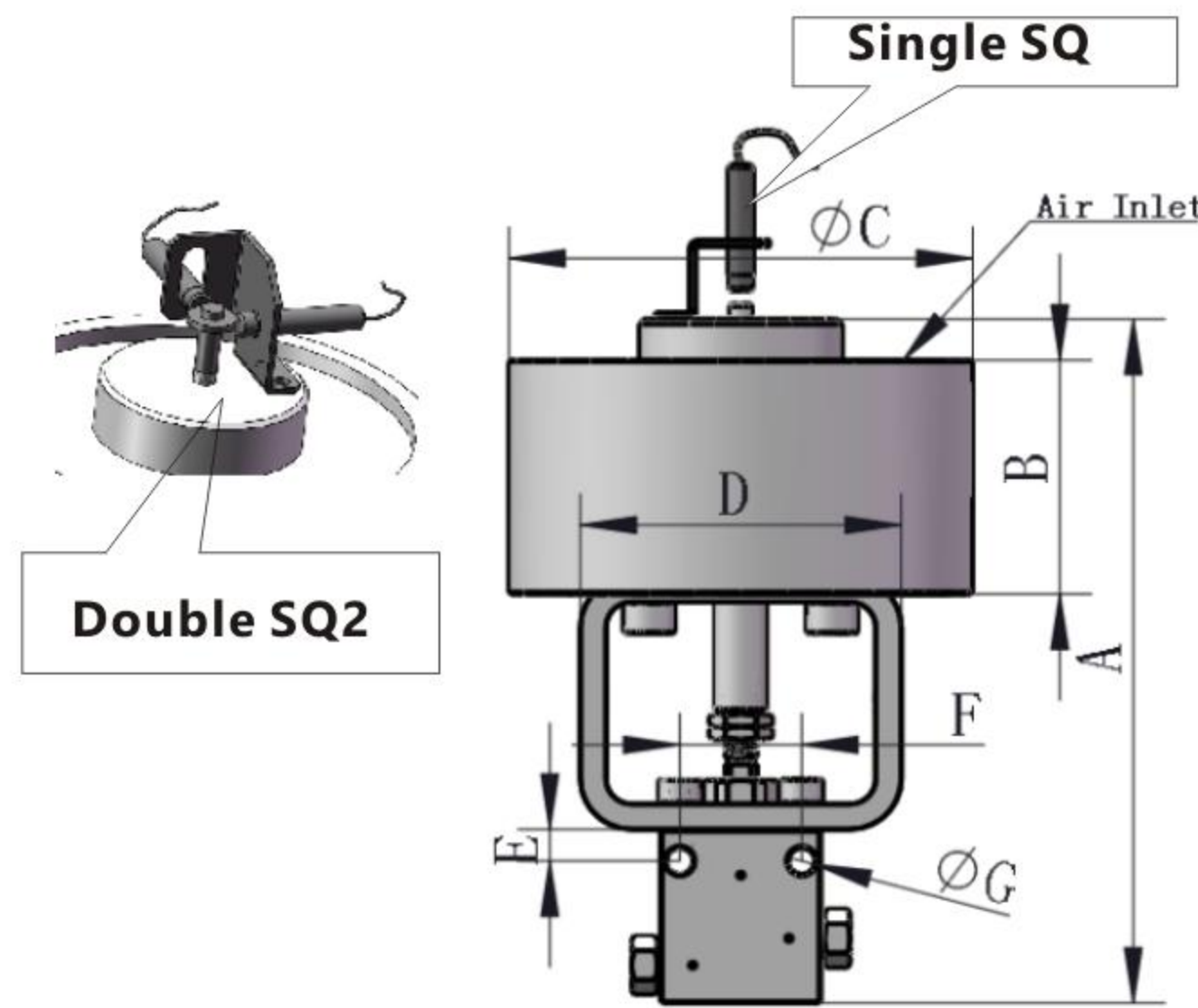


Heavy Duty Valve Actuator

#### HI TYPE AOV / Normally open air to close



Medium valve Actuator



Heavy Duty valve Actuator

**Important Notes:** HI type Air actuated needle valve air Driven port are all on back side of the valves and connection sizes are NPT1/8 and valve body dimension same as Manual needle valve and see pages 3,4,5,6.

# STENT AIR OPERATED NEEDLE VALVES

## Low Pressures to 20,000 psi (1,379bar)

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	NC-Dimensions (mm)			NO-Dimensions (mm)			NC/NO Dimensions (mm)				Air pressure required to open Valve (psi)	Max. Pressure (psi)	Valve Actuator
				A	B	C	A	B	C	D	E	F	G			
<b>2-Way Straight</b>																
	HI20121-NC/NO	1/4"	2.8	371.5	74	144.5	216	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20131-NC/NO	3/8"	4.5	371.5	74	144.5	216	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty

<b>2-Way Angle</b>																
	HI20122-NC/NO	1/4"	2.8	376.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20132-NC/NO	3/8"	4.5	382.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty

<b>3-Way 2 on Pressure Type</b>																
	HI20123-NC/NO	1/4"	2.8	376.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20133-NC/NO	3/8"	4.5	382.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty

<b>3-Way 1 on Pressure Type</b>																
	HI20124-NC/NO	1/4"	2.8	376.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20134-NC/NO	3/8"	4.5	382.5	74	144.5	227	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty

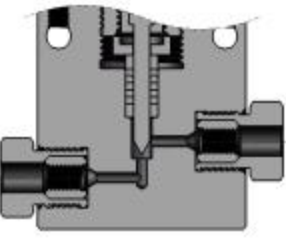
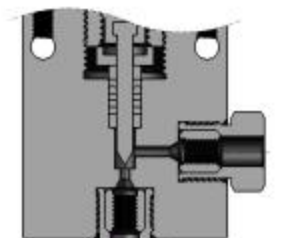
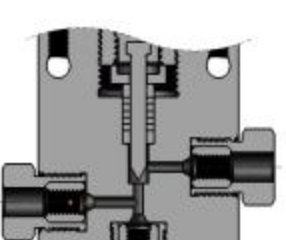
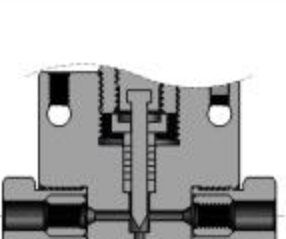
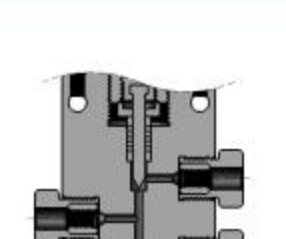
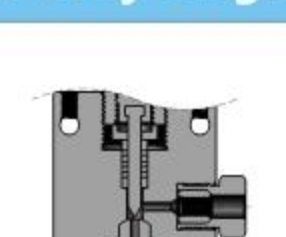
<b>3-Way,2-Stem Manifold</b>																
	HI20125-NC/NO	1/4"	2.8	568.5	72	144.5	413	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20135-NC/NO	3/8"	4.5	573.5	72	144.5	418	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty

<b>2-Way Angle Replaceable Seat</b>																
	HI20126-NC/NO	1/4"	2.8	374.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty
	HI20136-NC/NO	3/8"	4.5	380.5	74	144.5	227	74	144.5	100	10	38	8.5	70~100	20,000	Medium Duty



## Ultra high Pressures to 60,000 psi (4,137bar)

### HI type AOV / air to open, air to close

Valve Pattern	Catalog Number	O.D. Tube	Orifice (mm)	NC-Dimensions (mm)			NO-Dimensions (mm)			NC/NO Dimensions (mm)				Air pressure required to open Valve (psi)	Max. Pressure (psi)	Valve Actuator
				A	B	C	A	B	C	D	E	F	G			
<b>2-Way Straight</b>																
	HI60121-NC/NO	1/4"	2	371.5	74	144.5	216	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60131-NC/NO	3/8"	2	378.5	74	144.5	223	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60141-NC/NO	9/16"	3	438.5	127	148	283	127	148	100	11	44	11	70~100	60,000	Heavy Duty
<b>2-Way Angle</b>																
	HI60122-NC/NO	1/4"	2	371.5	74	144.5	216	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60132-NC/NO	3/8"	2	379	74	144.5	223.5	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60142-NC/NO	9/16"	3	438.5	127	148	283	127	148	100	11	44	11	70~100	60,000	Heavy Duty
<b>3-Way 2 on Pressure Type</b>																
	HI60123-NC/NO	1/4"	2	376.5	74	144.5	221	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60133-NC/NO	3/8"	2	382.5	74	144.5	227	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60143-NC/NO	9/16"	3	448.5	127	148	293	127	148	100	11	44	11	70~100	60,000	Heavy Duty
<b>3-Way 1 on Pressure Type</b>																
	HI60124-NC/NO	1/4"	2	371.5	74	144.5	216	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60134-NC/NO	3/8"	2	378.5	74	144.5	223	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60144-NC/NO	9/16"	3	438.5	127	148	283	127	148	100	11	44	11	70~100	60,000	Heavy Duty
<b>3-Way, 2-Stem Manifold</b>																
	HI60125-NC/NO	1/4"	2	576.5	74	144.5	412	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60135-NC/NO	3/8"	2	575.5	74	144.5	420	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60145-NC/NO	9/16"	3	690.5	127	148	535	127	148	100	11	44	11	70~100	60,000	Heavy Duty
<b>2-Way Angle Replaceable Seat</b>																
	HI60126-NC/NO	1/4"	2	384.5	74	144.5	229	74	144.5	100	10	38	8.5	70~100	60,000	Medium Duty
	HI60136-NC/NO	3/8"	2	384.5	74	144.5	229	74	144.5	100	11	44	11	70~100	60,000	Medium Duty
	HI60146-NC/NO	9/16"	3	441.5	127	148	286	127	148	100	11	44	11	70~100	60,000	Heavy Duty

## MI Type Mini Air operated valves

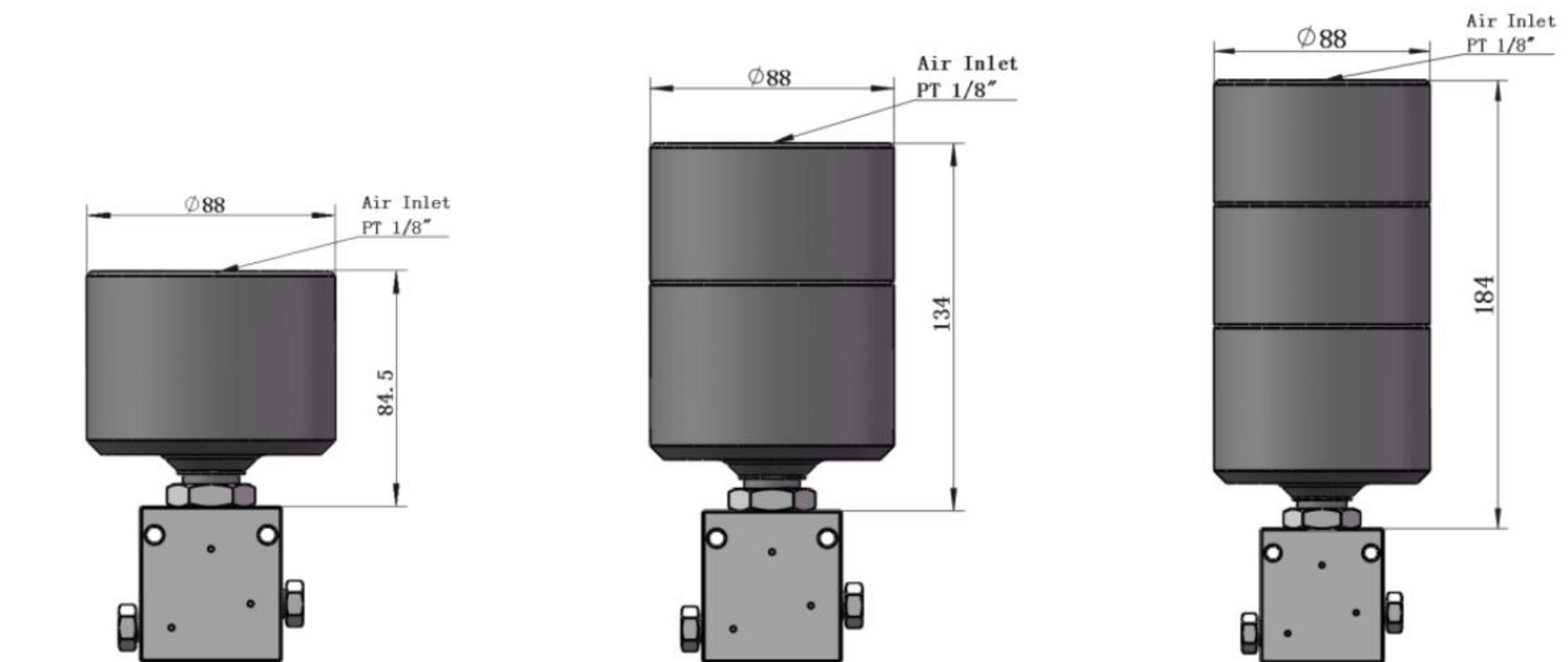
### Mini Air Driven Needle Valves features

- ★ Pneumatic valve actuators are all piston type design, reliable operation, long life.
- ★ Open or close the return air with a spring.
- ★ Smaller size, easy to carry and install in a small space.
- ★ The actuator is made of anodized alumina, which has good corrosion resistance and is more portable.

### Main technical parameters

- ★ Actuator maximum allowable working pressure: 100 psi (6.8 bar).
- ★ Allowable piston temperature range: -29°C ~ 93°C (-20°F ~ 200°F).
- ★ Maximum working pressure: 6,0000 psi (4,137 bar).
- ★ Working medium: gas, oil and water.
- ★ Standard operating temperature: -50°C ~ 200°C (-58°F ~ 392°F).

### Exploded View:



■ Single drive

■ Double Drive

■ Triple drive

### Model selection Example:MI06121-NC-T(single drive , NPT connection)

Control Type	Working pressure	Common code	Connection tube OD	Needle valve type	Actuator Type	Valve function	Connection port size	Valve function
MI:Mini Pneumatic needle valve	06:6,000psi	1	1:1/8"O.D.	1: 2-Way Straight	None:Single Drive	NC:Normally closed valves	None	H:High temperature valve
	10:10,000psi	1	2:1/4"O.D.	2: 2-Way Angle	D:Double Drive	NO:Normally Open valves	T:NPT	L:Low temperature valve
	15:15,000psi	1	3:3/8"O.D.	3:3-Way/2 on Pressure Type	T:Triple Drive		R-RP: BSPP Bronze washer	
	20:20,000psi	1		4:3-Way One on Pressure Type			R-RG: BSPP Bronze washer	
	30:30,000psi	1		5:3-Way,two stem manifold			R-RZ: BSPP Bronze gasket	
	60:60,000psi	1		6: Replaceable metal seat			C:RC,RT Or ZG	
							K:Single Ferrule type	

**Important notes:**Valve body sizes are same as needle valve and see pages 3.4.5.

# MINI AIR OPERATED VAVES

## MI Type Normally closed, air to open

Air operator	Pressure	Tubing OD	Orifice						
				2-Way Straight	2-Way Angle	3-Way 1 on Pressure	3-Way 2 on Pressure	3-Way 2-Stem Manifold	2-Way Angle /Replaceable Seat
100psi	psi	inch	mm	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
Sing Drive	6000	3/8	4.5	MI06131-NC	MI06132-NC	MI06133-NC	MI06134-NC	MI06135-NC	MI06136-NC
	15,000	1/4	2.7	MI15121-NC	MI15122-NC	MI15123-NC	MI15124-NC	MI15125-NC	MI15126-NC
Double Drive	15,000	3/8	4.5	MI15131-D-NC	MI15132-D-NC	MI15133-D-NC	MI15134-D-NC	MI15135-D-NC	MI15136-D-NC
	20,000	1/4	2.7	MI20121-D-NC	MI20122-D-NC	MI20123-D-NC	MI20124-D-NC	MI20125-D-NC	MI20126-D-NC
	30,000	1/4	2.4	MI30121-D-NC	MI30122-D-NC	MI30123-D-NC	MI30124-D-NC	MI30125-D-NC	MI30126-D-NC
Triple Drive	30,000	3/8	3.2	MI30131-T-NC	MI30132-T-NC	MI30133-T-NC	MI30134-T-NC	MI30135-T-NC	MI30136-T-NC
	30,000	9/16	3.2	MI30141-T-NC	MI30142-T-NC	MI30143-T-NC	MI30144-T-NC	MI30145-T-NC	MI30146-T-NC
	60,000	1/4	2	MI60121-T-NC	MI60122-T-NC	MI60123-T-NC	MI60124-T-NC	MI60125-T-NC	MI60126-T-NC
	60,000	3/8	2	MI60131-T-NC	MI60132-T-NC	MI60133-T-NC	MI60134-T-NC	MI60135-T-NC	MI60136-T-NC

## MI Type Normally open, air to close

Air operator	Pressure	Tubing OD	Orifice						
				2-Way Straight	2-Way Angle	3-Way 1 on Pressure	3-Way 2 on Pressure	3-Way 2-Stem Manifold	2-Way Angle /Replaceable Seat
100psi	psi	inch	mm	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
Sing Drive	6000	3/8	4.5	MI06131-NO	MI06132-NO	MI06133-NO	MI06134-NO	MI06135-NO	MI06136-NO
	15,000	1/4	2.7	MI15121-NO	MI15122-NO	MI15123-NO	MI15124-NO	MI15125-NO	MI15126-NO
Double Drive	15,000	3/8	4.5	MI15131-D-NO	MI15132-D-NO	MI15133-D-NO	MI15134-D-NO	MI15135-D-NO	MI15136-D-NO
	20,000	1/4	2.7	MI20121-D-NO	MI20122-D-NO	MI20123-D-NO	MI20124-D-NO	MI20125-D-NO	MI20126-D-NO
	30,000	1/4	2.4	MI30121-D-NO	MI30122-D-NO	MI30123-D-NO	MI30124-D-NO	MI30125-D-NO	MI30126-D-NO
Triple Drive	30,000	3/8	3.2	MI30131-T-NO	MI30132-T-NO	MI30133-T-NO	MI30134-T-NO	MI30135-T-NO	MI30136-T-NO
	30,000	9/16	3.2	MI30141-T-NO	MI30142-T-NO	MI30143-T-NO	MI30144-T-NO	MI30145-T-NO	MI30146-T-NO
	60,000	1/4	2	MI60121-T-NO	MI60122-T-NO	MI60123-T-NO	MI60124-T-NO	MI60125-T-NO	MI60126-T-NO
	60,000	3/8	2	MI60131-T-NO	MI60132-T-NO	MI60133-T-NO	MI60134-T-NO	MI60135-T-NO	MI60136-T-NO

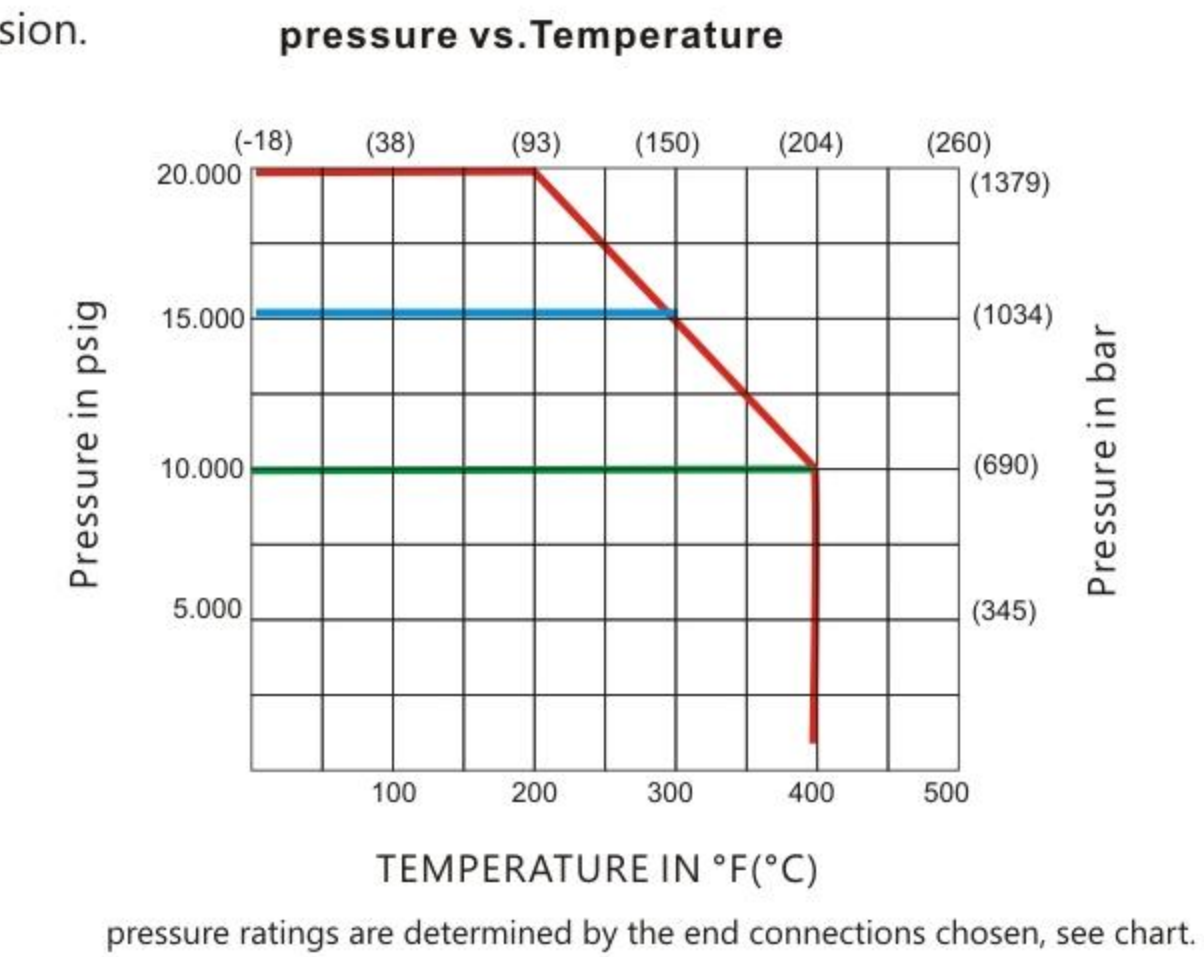
# HIGH PRESSURE BALL VALVES

## High pressure ball valves

Manual valve which is used to open or close the flow of fluids by the turning 1/4"(90) or 1/2"(180) with valve handle.  
Ball valve is a manual valve which is used to open or dose the flow of Fluids by the turning 1/4"(90) or 1/2"(180) with valve handle. USUN valve is using trunnion-type ball with seat and possible to use in the low pressure and high pressure environment without leakage.

### Features

- ★ Maximum working pressure: 20,000 psi (1,379 bar).
- ★ Standard working temperature: -17.8°C ~ 204°C (0°F ~ 400°F).
- ★ 316 cold working stainless steel structure.
- ★ PEEK seats offer excellent resistance to chemicals, heat, and wear/abrasion.
- ★ Full-port flow path minimizes pressure drop.
- ★ Wide selection of tube and pipe end connections available.



### Model selection example: BV15-LP4-06-316

Valve Name	Working pressure	Connection size	Orifice	Valve type	Valve material
HP Ball valve	10 10,000psi	LPF2 1/8"O.D.	For 2-way	Straight	316 316ss
	15 15,000psi	LPF4 1/4"O.D.	06:1/4"	3 3-Way	
	20 20,000psi	LPF6 3/8"O.D.	10:3/8"		
		LPF8 1/2"O.D.	13:1/2"		
		MPF6 3/8"O.D.	For 3-way		
		MPF9 9/16"O.D.	05:3/16"		
		MPF12 3/4"O.D.	10:3/8"		
		MPF16 1"O.D.	13:1/2"		
		HPF4 1/4"O.D.			
		HPF6 3/8"O.D.			
		HPF9 9/16"O.D.			
		FNPT2 1/8" Female NPT			
		FNPT4 1/4" Female NPT			
		FNPT6 3/8" Female NPT			
		FNPT8 1/2" Female NPT			
		FNPT12 3/4" Female NPT			
	FNPT16 1"Female NPT				

# HIGH PRESSURE BALL VALVES

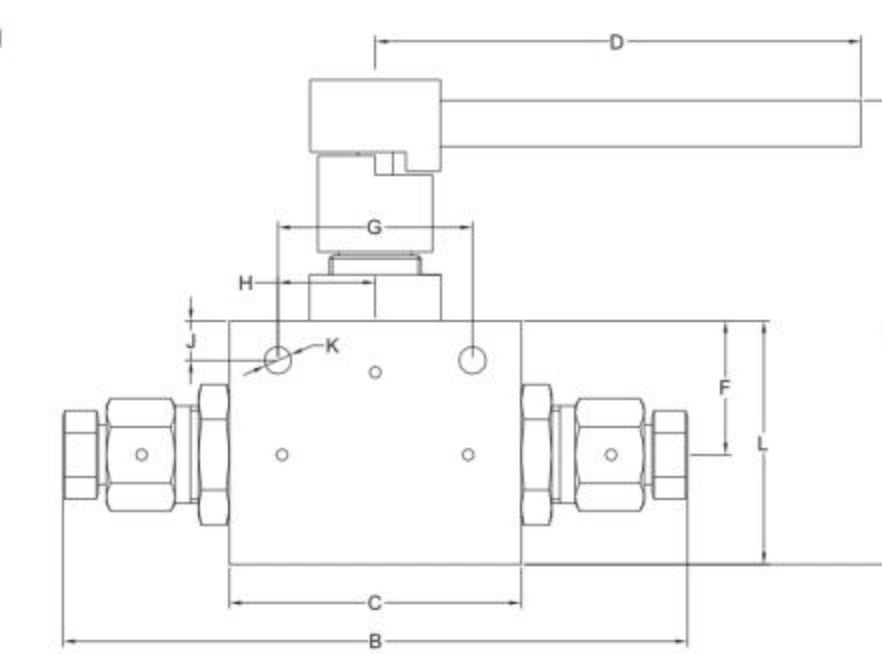
## High Pressure Ball Valves

Part No.	Connection Type and Size	Orifice mm	CV	Rated Pressure psi
BV10-MPF12-13-	MPF12	12.7	10.2	10,000
BV10-MPF16-13-	MPF16			
BV10-FNPT12-13-	3/4 Female NPT			
BV10-FNPT16-13-	1 Female NPT			
BV10-MPF12-13-3-	MPF12			
BV10-MPF16-13-3-	MPF16			
BV10-FNPT12-13-3-	3/4 Female NPT			
BV10-FNPT16-13-3-	1 Female NPT			
BV15-LPF2-06-	LPF2	2.4	0.26	15,000
BV15-LPF4-06-	LPF4	3.25	0.26	
BV15-LPF6-06-	LPF6	6.35	1.51	
BV15-LPF8-06-	LPF8			
BV15-FNPT2-06-	1/8 Female NPT			
BV15-FNPT4-06-	1/4 Female NPT			
BV15-FNPT6-06-	3/8 Female NPT			
BV15-FNPT8-06-	1/2 Female NPT			
BV15-LPF8-10-	LPF8	9.5	3.51	
BV15-FNPT4-10-	1/4 Female NPT			
BV15-FNPT6-10-	3/8 Female NPT			
BV15-FNPT8-10-	1/2 Female NPT			
BV15-LPF2-05-3-	LPF2	2.4	0.13	
BV15-LPF4-05-3-	LPF4	3.25	0.23	
BV15-LPF6-05-3-	LPF6	4.8	0.5	
BV15-LPF8-05-3-	LPF8			
BV15-FNPT2-05-3-	1/8 Female NPT			
BV15-FNPT4-05-3-	1/4 Female NPT			
BV15-FNPT6-05-3-	3/8 Female NPT			
BV15-FNPT8-05-3-	1/2 Female NPT			
BV15-LPF8-10-3-	LPF8	8.3	2.1	
BV15-MPF6-10-3-	MPF6	5.2	0.8	
BV15-MPF9-10-3-	MPF9	7.9	1.9	
BV15-MPF12-10-3-	MPF12	8.3	2.1	
BV15-FNPT4-10-3-	1/4 Female NPT			
BV15-FNPT6-10-3-	3/8 Female NPT			
BV15-FNPT8-10-3-	1/2 Female NPT			
BV20-MPF4-06-	MPF4	0.11 (2.8)	0.36	20,000
BV20-MPF6-06-	MPF6	0.2 (5.2)	1.23	
BV20-MPF9-06-	MPF9	0.25 (6.35)	1.51	
BV20-HPF4-06-	HPF4	0.094 (2.4)	0.26	
BV20-HPF6-06-	HPF6	0.125 (3.2)	0.47	
BV20-HPF9-06-	HPF9	0.19 (4.8)	1.05	
BV20-MPF6-06-	MPF6	0.2 (5.2)	1.23	
BV20-MPF9-10-	MPF9	0.31 (7.9)	2.93	
BV20-MPF12-10-	MPF12	0.375 (9.5)	3.51	
BV20-MPF4-05-3-	MPF4	0.11 (2.8)	0.17	
BV20-MPF6-05-3-	MPF6	4.8	0.5	
BV20-MPF9-05-3-	MPF9			
BV20-HPF4-05-3-	HPF4	0.094 (2.4)	0.26	
BV20-HPF6-05-3-	HPF6	0.125 (3.2)	0.47	
BV20-HPF9-05-3-	HPF9	0.19 (4.8)	0.5	

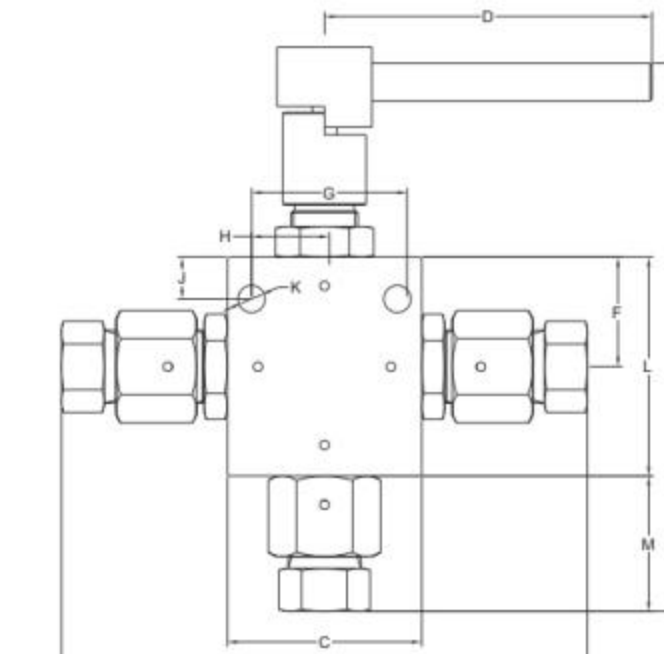
# HIGH PRESSURE BALL VALVES

## High pressure ball valves

### Overall Dimensi



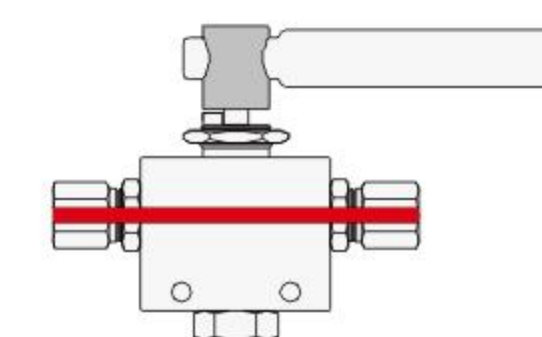
2-Way Valve



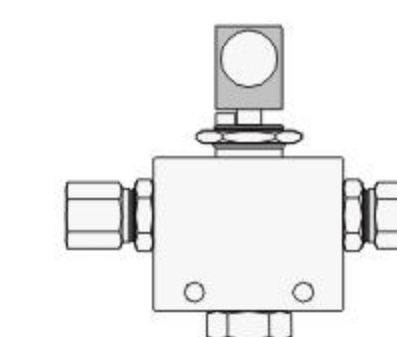
3-Way Valve

Medium Flow Type	Orifice (mm)	A	B	C	D	F	G	H	J	K	L	M	Thickness
		mm											
2-Way	06	110	106.5	50.8	85.6	28.6	38.1	19.1	10.9	7.1	48.4	/	25.4
	10	126.3	140.4	76.2	126.8	34.9	50.8	25.4	10.3	7.1	63.5	/	34.9
	13	151.1	196.5	104.8	130.2	44.7	76.2	38.1	12.7	7.1	78.6	/	44.5
3-Way	05	143.4	119.9	63.5	85.6	28.6	38.1	19.1	10.9	7.1	57.2	24.6	25.4
	10	166.4	140.8	76.2	126.8	34.9	50.8	25.4	10.3	7.1	73	30.2	34.9
	13	198.8	197.4	104.8	130.2	42.2	76.2	38.1	12.7	7.1	84.9	43.2	44.5

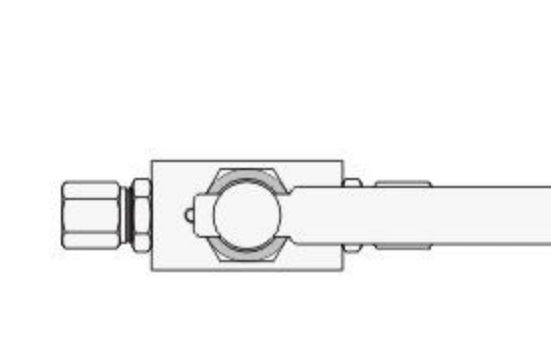
### 90° 2-Way Trunnion



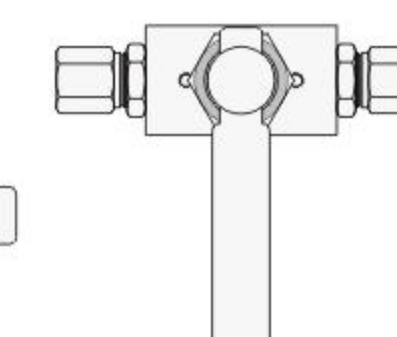
Open



Closed



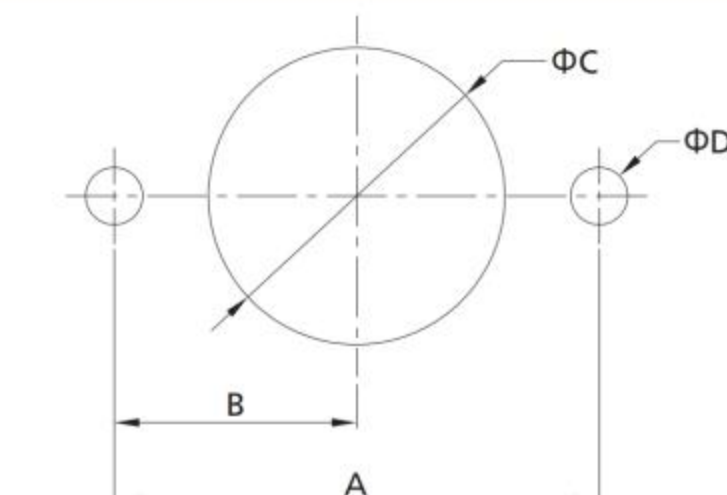
Open



Closed

### Panel Hole mounting size

Medium Flow Type	Orifice (mm)	A	B	C	D
		mm			
2-Way	06	38.1	19.1	26.9	7.1
	10	50.8	25.4	38.1	7.1
	13	76.2	38.1	47.6	7.1
3-Way	05	38.1	19.1	26.9	7.1
	10	50.8	25.4	38.1	7.1
	13	76.2	38.1	47.6	7.1



## High Pressure Soft seat check valves

### Description

Check valve, a valve to prevent the reverse flow of fluid (gas) is designed to block the flow in one direction and to promote the flow in the opposite direction. All check valves come with a check bonnet and ring. These check valves are not intended to be used as relief valves.

### Main technical parameters

- ★ Maximum working pressure: 60,000 psi (4,137 bar).
- ★ Opening pressure: 20 psi (1.38 bar) ±30%. Also available for higher opening pressures (up to 100 psi (6.8 bar)).
- ★ Standard operating temperature: -50° C ~150° C (-58° F ~ 302° F). Additional instructions are required for higher temperature.
- ★ Working medium: gas, oil and water.
- ★ Material: valve body is made of stainless steel S31603 [Ni>=12.5%], the spring using stainless steel 316L series material. specially for hydrogen applications

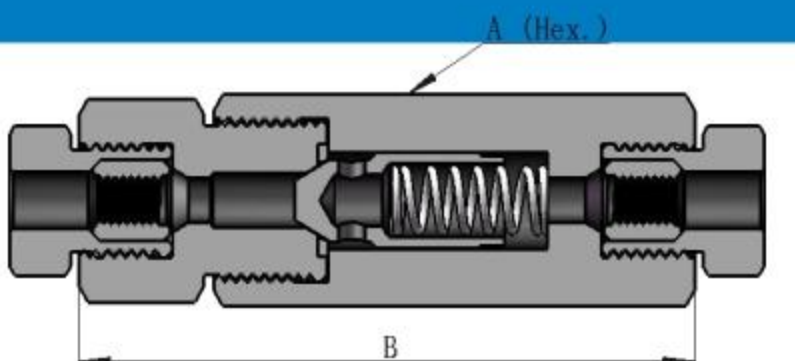
### 20,000psi Medium pressure C&V Connections

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Rated (Cv)	Dimensions (mm)	
					A (Hex.)	B
D202	20,000	LF4	2.7	0.27	27	71
D203	20,000	LF6	5.1	0.84	27	87
D204	20,000	LF9	7.8	2.3	36	105
D206	20,000	LF12	11.1	4.7	55	128
D208	20,000	LF16	14.3	7.4	55	161



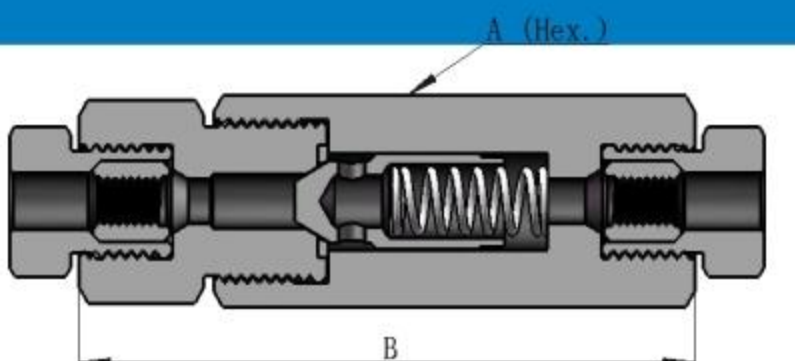
### 30,000 PSI High pressure C&V Connections

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Rated (Cv)	Dimensions (mm)	
					A (Hex.)	B
D302	30,000	HF4	2.4	0.12	36	83
D303	30,000	HF6	4.8	0.58	36	83
D304	30,000	HF9	6.3	0.99	45	99



### 60,000PSI High pressure C&V Connections

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Rated (Cv)	Dimensions (mm)	
					A (Hex.)	B
D602	60,000	HF4	2.4	0.15	36	83
D603	60,000	HF6	3.2	0.28	36	83
D604	60,000	HF9	4.5	0.63	45	99



### Model selection Example : D602

Type	Working pressure	Connection tube OD	Connection port size	Valve function
soft seat D: Check valve	20:20,000psi	1:1/8"O.D.	None	H:High temperature valve
	30:30,000psi	2:1/4"O.D.		L:Low temperature valve
	60:60,000psi	3:3/8"O.D.		H2:Hydrogen gas valve
		4:9/16"O.D.		
		(1/2"O.D)		
		6:3/4"O.D.		
	8:1"O.D.			

## Soft seat check valves

### Description

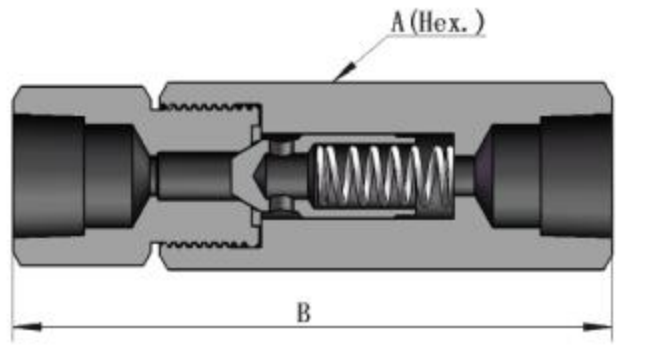
Especially for hydrogen applications, if the best sealing capacity of the same kind is required, USUN has developed its conical check valve series design with a soft sealing system with high media compatibility and an improved spring guide system. The connection range is 1/4" O.D. to 1" O.D.

### Main technical parameters

- Maximum working pressure: 15,000psi (1,379bar)
- Opening pressure: 20 psi (1.38 bar) ±30%.
- Also available for higher opening pressures (up to 100 psi (6.89 bar))
- Standard operating temperature: -50° C ~150° C (-58° F ~302° F) Additional instructions are required for higher temperature.
- Working medium: gas, oil and water.
- The valve body and spring are made of stainless steel 316L material.

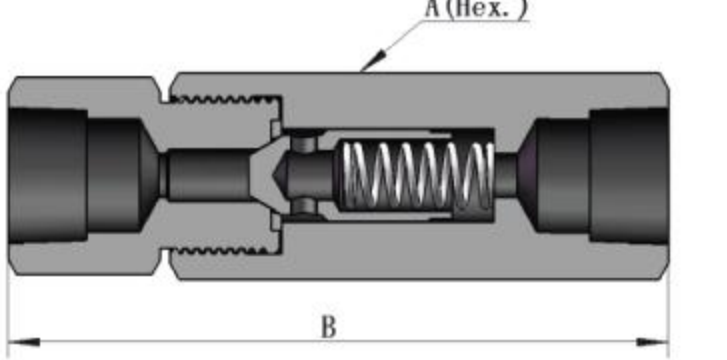
### NPT connections

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Rated (Cv)	Dimensions (mm)	
					A (Hex.)	B
D202-T	15,000	1/4"FNPT	5.1	0.28	27	71
D203-T	15,000	3/8"FNPT	7.9	0.84	36	105
D204-T	15,000	1/2"FNPT	7.9	2.3	36	105
D206-T	15,000	3/4"FNPT	13	4.7	45	128
D208-T	15,000	1"FNPT	17.4	7.4	54	161



### BSPP connections

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Rated (Cv)	Dimensions (mm)	
					A (Hex.)	B
D102-R	10,000	G1/4"	5.1	0.28	27	71
D103-R	10,000	G3/8"	7.9	0.84	36	105
D104-R	10,000	G1/2"	7.9	2.3	36	105
D106-R	10,000	G3/4"	13	4.7	45	128
D108-R	10,000	G1"	17.4	7.4	54	161



### Model selection: Example D202-T-H2

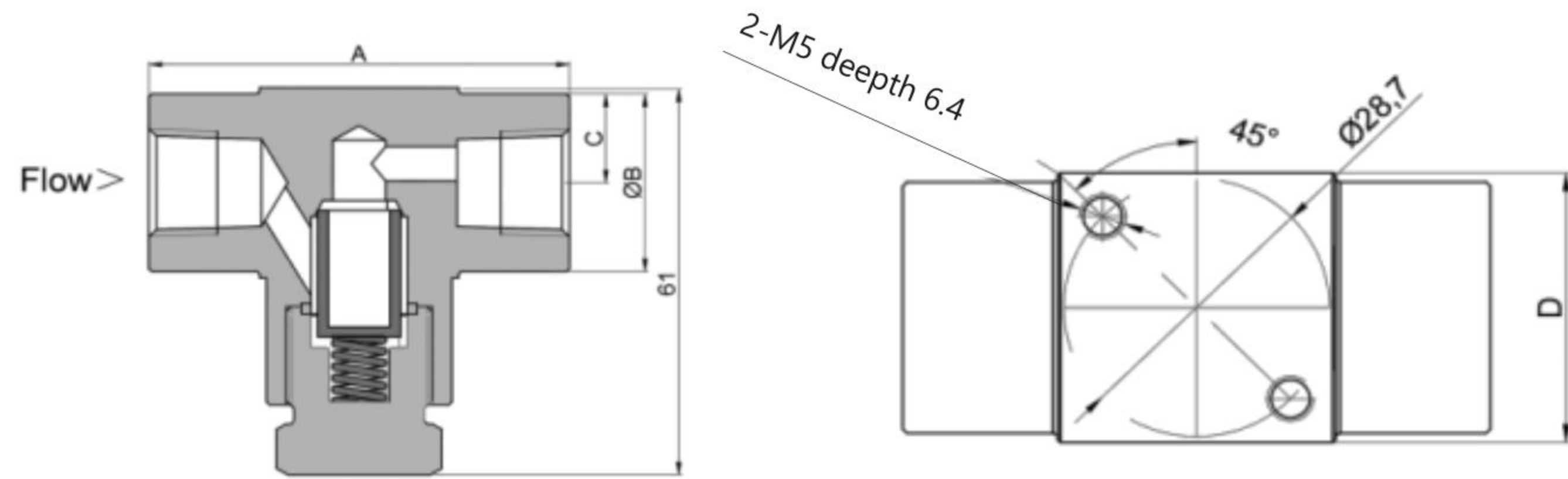
Type	Working pressure	Connection tube OD	Connection port size	Valve function
D: Soft seat Check valve	10 10,000psi	1:1/8"O.D.	T:NPT	H:high Temperature
	20 15,000psi	2:1/4"O.D.	R:G. BSPP	L:low Temperature
		3:3/8"O.D.	C:Rc.RTRG	H2:Hydrogen gas service
		4:1/2"O.D	K:Single	
		6:3/4"O.D.	Ferrule Type	
		8:1"O.D.		



# TF06 SERIES HIGH PRESSURE FILTERS

## TF 06 series 6,000 psi high pressure filters

- ★ Maximum working pressure: 6,000ps(413bar).
- ★ Nominal hole sizes for filter elements are 7um, 40um and 60um.
- ★ Operating temperature:-50~150C(-58F~302°F).
- ★ The filter element can be replaced removing the filter during installation.
- ★ Working medium: gas, oil and water.
- ★ The filter is recommended for high pressure systems that require both large filter area and high flow rate. It is widely used in chemical treatment and industrial applications. The effective filter area of this cup design is about 6 times that of the disc filter.



Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Filtered Micro Size (μm)	Dimensions (mm)			
					A	B	C	D
TF062-T-7um	6,000	FNPT 1/4"	4.4	7	63.5	28	14	30
TF062-T-40um				40				
TF062-T-60um				60				
TF063-T-7um	6,000	FNPT 3/8"	5.4	7	63.5	28	14	30
TF063-T-40um				40				
TF063-T-60um				60				
TF064-T-7um	6,000	FNPT 1/2"	6.4	7	63.5	28	14	30
TF064-T-40um				40				
TF064-T-60um				60				
TF062-SK-7um	6,000	1/4"O.D double ferrule	4.4	7	63.5	28	14	30
TF062-SK-40um				40				
TF062-SK-60um				60				
TF063-SK-7um	6,000	3/8"O.D double ferrule	5.4	7	63.5	28	14	30
TF063-SK-40um				40				
TF063-SK-60um				60				

### Model Selection [Example : TF062-T-40 μm]

Type	Working pressure	Connection tube OD	Connection port size	Filtered Micro Size
TF06-Type filters	06 6,000PSi	1 1/8"	T: NPT	7 μm
		2 1/4"	SK:double ferrule	40 μm
		3 3/8"		60 μm
		4 1/2"		

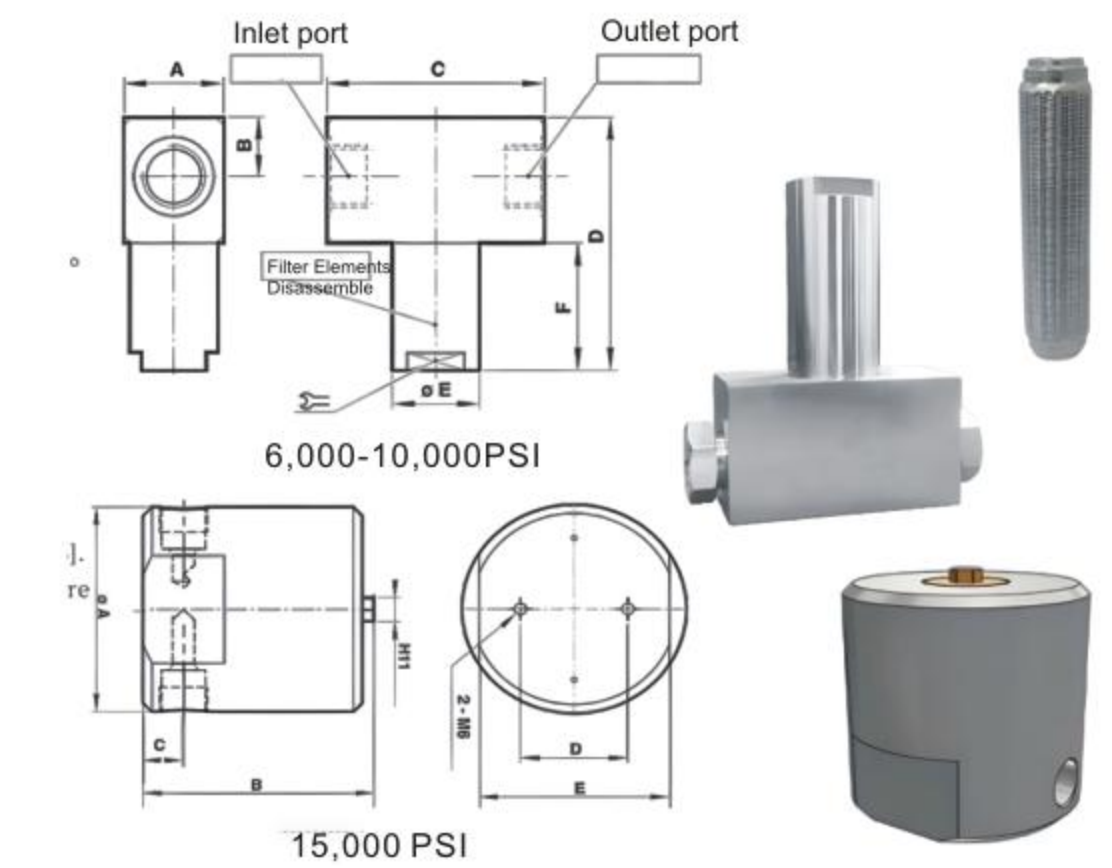
# TF10/15 SERIES HIGH PRESSURE FILTERS

## TF10/15 Series High Pressure Filters

Particle contamination under high pressure can reduce the service life of hydrogen control equipment, while smaller particles require higher filtration quality, resulting in higher density of the filtration material and increased pressure loss. The USUN TF10/20 series filter compensates for pressure loss when the fluid flows through the filter by increasing the filtration area, keeping pressure loss as low as possible. The TF10/20 series filter is suitable for high flow systems that are resistant to high pressure differences. Particle contamination under high pressure can reduce the service life of hydrogen control equipment, while smaller particles require higher filtration quality resulting in higher density of the filtration material and increased pressure loss. The USUN TF10/20 series filter compensates for pressure loss when the fluid flows through the filter by increasing the filtration area, loss as low as possible. The TF10/20 series keeping pressure filter is suitable for high flow systems that are resistant to high pressure differences.

### Main Technical Parameters

- ★ Maximum working pressure: 15,000psi(1,034bar)
- ★ Filtration accuracy: 5um, 15um and 25um.
- ★ Temperature range:-30C~-100C(-22°F~212°F)
- ★ Material:The main material is S31603 [Ni>12%, Niag>28.5%]
- ★ The filter element is easy to disassemble and does not require disassembly from the pipeline, making it easy to maintain.
- ★ Medium: Gases, Hydrogen, neutral non-aggressive gases.



Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Filtered Micro Size (μm)	Dimensions (mm)						
					A	B	C	D	E	F	
TF103-T-5um	10,000	FNPT3/8"	10	5	38	17	65	103	32	66	24
TF103-T-15um				15							
TF103-T-25um				25							
TF104-T-5um	10,000	FNPT1/2"	10	5	38	17	65	103	32	66	24
TF104-T-15um				15							
TF104-T-25um				25							
TF066-T-5um	6,000	FNPT 3/4"	16	5	55	33	120	141	48	71	36
TF066-T-15um				15							
TF066-T-25um				25							
TF068-T-5um	6,000	FNPT 1"	24	5	55	33	120	141	48	71	36
TF068-T-15um				15							
TF068-T-25um				25							
TF153-5um	15,000	LF6	5	5	74.5	94.6	17.5	45	60.5		
TF153-10um				10							
TF153-25um				25							
TF154-5um	15,000	LF9	9.2	5	94	99.6	17.5	45	80		
TF154-10um				10							
TF154-25um				25							

### Model Selection [Example : TF103-T-15 μm]

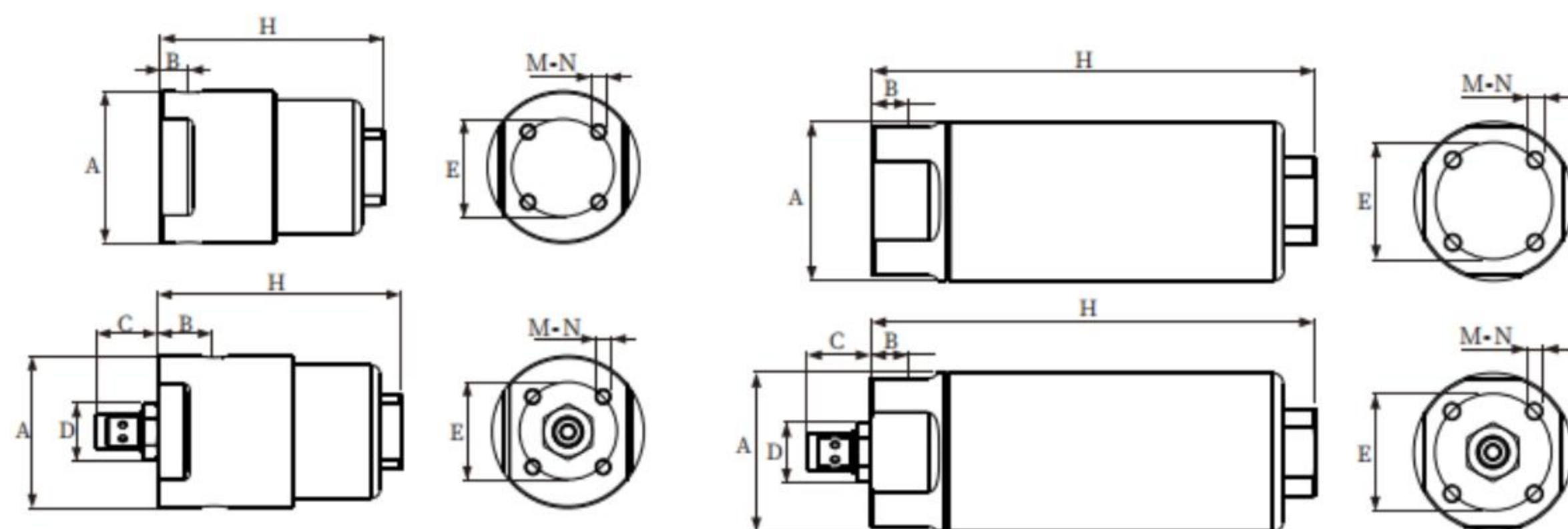
Type	Working pressure	Connection tube OD	Connection port size	Valve function	Filtered Micro Size
TF 10/15 Type filters	06 6,000PSi	3 3/8"	None	H:High temperature valve	5 5 μm
	10 10,000PSi	4 9/16"	T: NPT	L:Low temperature valve	15 15 μm
	15 15,000psi	1/2"		H <sub>2</sub> :Hydrogen gas valve	25 25 μm
			6 3/4"		
		8 1"			

## GSR 30000 PSI high pressure filter

GSR filters are used to filter gases or liquids in high-pressure systems. The filter element can be easily replaced on site without the need to disassemble the main body from the system. The filtering unit is made of sintered materials (316 sintered elements, 316 stainless steel mesh elements, and fiberglass elements).

### Main Technial Paramenters

- ★ Maximum working pressure: 30,000psi(2,069bar)
- ★ Nominal hole sizes for filter elements are 5um, 40um and 60um
- ★ Operating temperature: -30 °C to 100 °C(-22°F to 212°F)
- ★ Filters with indicator available .
- ★ Filters with drain available



10,000 psi filters Dimensions (mm)		
size	Without Indicator	With Indicator
A	84	84
B	15.5	31.5
C	-	34.3
D	-	32
E	55	55
M-N	4-M8	4-M8
H (5L/min)	95	142
H (10L/min)	123	170
H (15L/min)	151	198
H (25L/min)	210	255
Inlet/Outlet port	1/4,3/8,1/2 FNPT	1/4,3/8,1/2 FNPT

20,000 psi filters Dimensions (mm)		
size	Without Indicator	With Indicator
A	75	75
B	19	32
C	-	34.3
D	-	32
E	75	75
M-N	4-M8	4-M8
H (5L/min)	144	192
H (10L/min)	161	209
H (15L/min)	178	226
H (25L/min)	210	258
Inlet/Outlet port	3/8"MP C&T	3/8 C&T

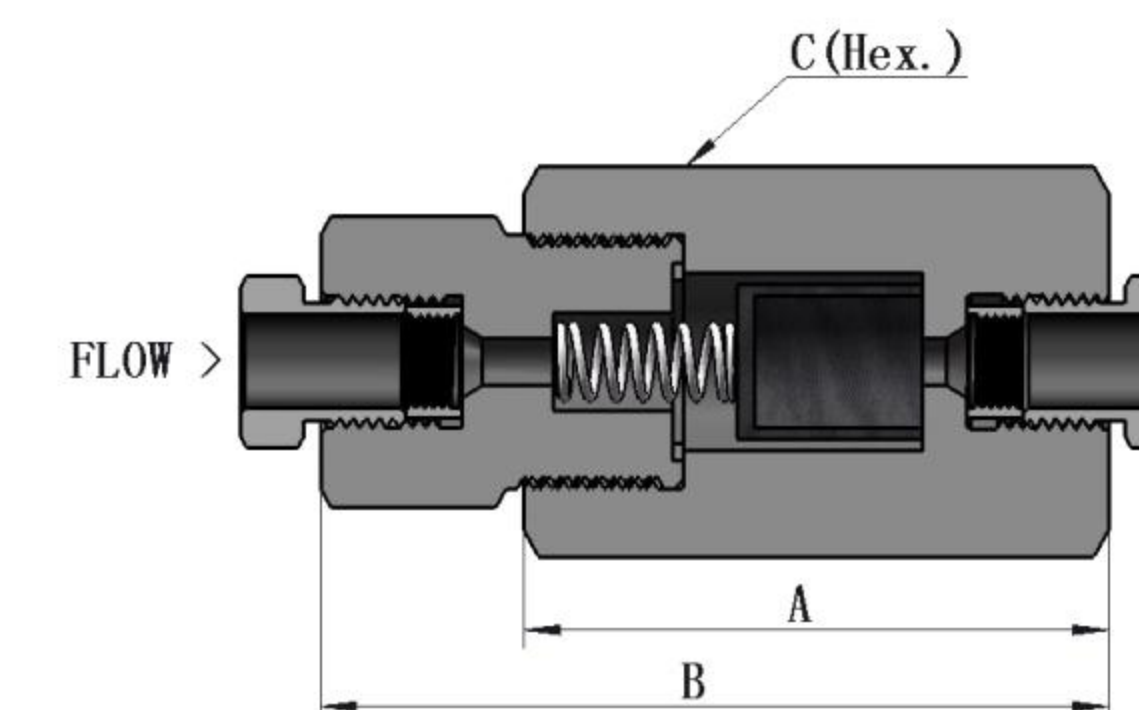
### Model Selection [Example : GSR102-T-7 μm-K]

Serial Type	Working pressure	Connection OD	Connection Type	Rated flow rate	Filtered Micro size	Seals Material	Body Material	visual indicator
GSR High pressure filter	10 10,000psi	2 1/4"O.D	None	5 5L/mim	7 7 μm	k:NBR H:HNBR	SS:316	None
	20 20,000psi	3 3/8"O.D	T NPT	10 10L/mim	40 40 μm	E:FPM Q:low temperature	6L:316L	VI5 5bar
	30 30,000psi	4 1/2"FNPT		15 15L/mim	60 60 μm	D:FEP S:Special Ssels	D5:2205 Dual phase steel	VI10 10bar
				25 25L/mim			D7:2507 Dual phase steel	
							S174:17-4PH	

## High Pressure Line Filters

### Main technical parameters

- ★ Maximum working pressure: 60,000 psi (4,137 bar).
- ★ Nominal hole sizes for filter elements are 7 μm, 40 μm and 60 μm.
- ★ Operating temperature: -50°C to 150°C(-58°F to 302°F).
- ★ Under flow conditions, the pressure difference shall not exceed 10,00 psi (69 bar).
- ★ Working medium: gas, oil and water.
- ★ The filter is recommended for high pressure systems that require both large filter area and high flow rate. It is widely used in chemical treatment and industrial applications. The effective filter area of this cup design is about 6 times that of the disc filter.



### Technical parameter

Catalog Number	Pressure Rating(psi)	Connection Type	Orifice (mm)	Filtered Micro Size (μm)	Filtered area (mm <sup>2</sup> )	Dimensions (mm)		
						A	B	C (Hex.)
G202-7 μm	20,000	LF4	2.7	7	530	66	89	36
G202-40 μm				40				
G202-60 μm				60				
G203-7 μm	20,000	LF6	5.1	7	530	66	89	36
G203-40 μm				40				
G203-60 μm				60				
G204-7 μm	20,000	LF9	7.8	7	1000	70	98	36
G204-40 μm				40				
G204-60 μm				60				
G206-7 μm	20,000	LF12	11.1	7	3960	122	161	54
G206-40 μm				40				
G206-60 μm				60				
G208-7 μm	20,000	LF16	14.3	7	3960	122	161	54
G208-40 μm				40				
G208-60 μm				60				

Catalog Number	Pressure Rating(psi)	Connection Type	Orifice (mm)	Filtered Micro Size (μm)	Filtered area (mm <sup>2</sup> )	Dimensions (mm)		
						A	B	C (Hex.)
G302/602-7 μm	30/60,000	Hf4	2.3	7	530	62	85	36
G302/602-40 μm				40				
G302/602-60 μm				60				
G303/603-7 μm	30/60,000	HF6	3.2	7	530	66	89	36
G303/603-40 μm				40				
G303/603-60 μm				60				
G304/604-7 μm	30/60,000	HF9	4.8	7	530	72/70	G304:98 G604:85.5	45
G304/604-40 μm				40				
G304/604-60 μm				60				

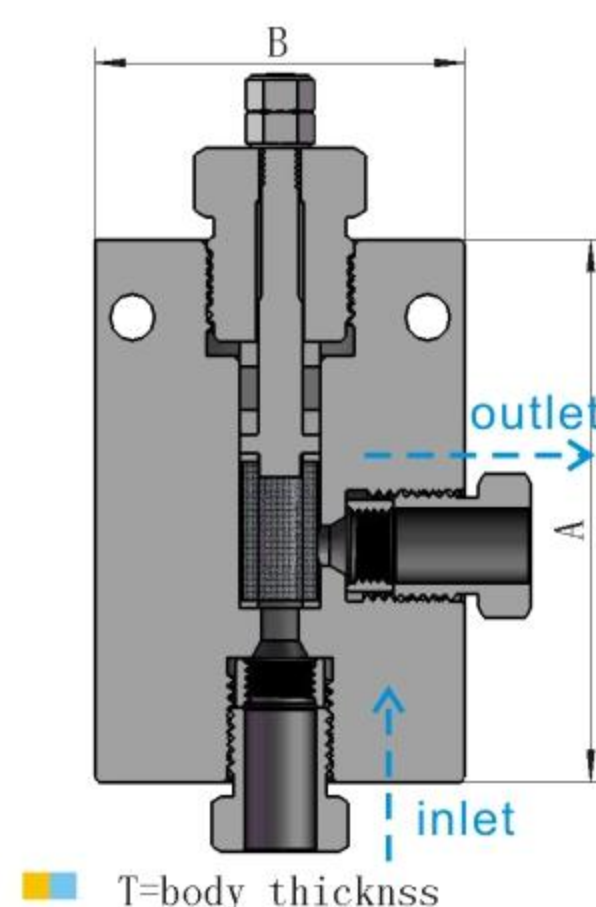
## Angle Type High pressure Line Filters

### Product Description

Angle filter is used to filter gas or liquid in high-pressure system. The filter element can be easily replaced on site. The special design allows the exchange of filter elements without first removing the filter in front of the tube. The filter unit is made of sintered materials with pore diameters of 5µm、40µm or 60µm. All angle filters are equipped with nuts and screw sleeves.

### Features:

- ★ Maximum working pressure: 60,000 psi (4,137 bar).
- ★ Nominal hole sizes for filter elements are 5µm, 40µm and 60µm.
- ★ Operating temperature: -50 °C to 200 °C (-58°F to 392°F).
- ★ Working medium: gas, oil and water.



### 30,000psi technical parameter

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Filtered Micro Size (µm)	Filtered area (mm <sup>2</sup> )	Dimensions (mm)		
						A	B	T
GL302-5 µm	30,000	HF4	2.4	5	530	70	50	24
GL302-40 µm				40				
GL302-60 µm				60				
GL303-5 µm	30,000	HF6	3.5	5	530	70	50	24
GL303-40 µm				40				
GL303-60 µm				60				
GL304-5 µm	30,000	HF9	6	5	530	80	67	40
GL304-40 µm				40				
GL304-60 µm				60				

### 60,000psi technical parameter

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Filtered Micro Size (µm)	Filtered area (mm <sup>2</sup> )	Dimensions (mm)		
						A	B	T
GL602-5 µm	60,000	HF4	2.3	5	530	70	50	24
GL602-40 µm				40				
GL602-60 µm				60				
GL603-5 µm	60,000	HF6	3.2	5	530	70	50	24
GL603-40 µm				40				
GL603-60 µm				60				
GL604-5 µm	60,000	HF9	4.8	5	530	80	67	40
GL604-40 µm				40				
GL604-60 µm				60				

The maximum filter is designed to remove a small amount of process particles. The pressure difference between each filter element should not exceed 1000 psi. All dimensions are for reference only and may change without notification

### Model selection : Example G203-7µm or GL302-40µm

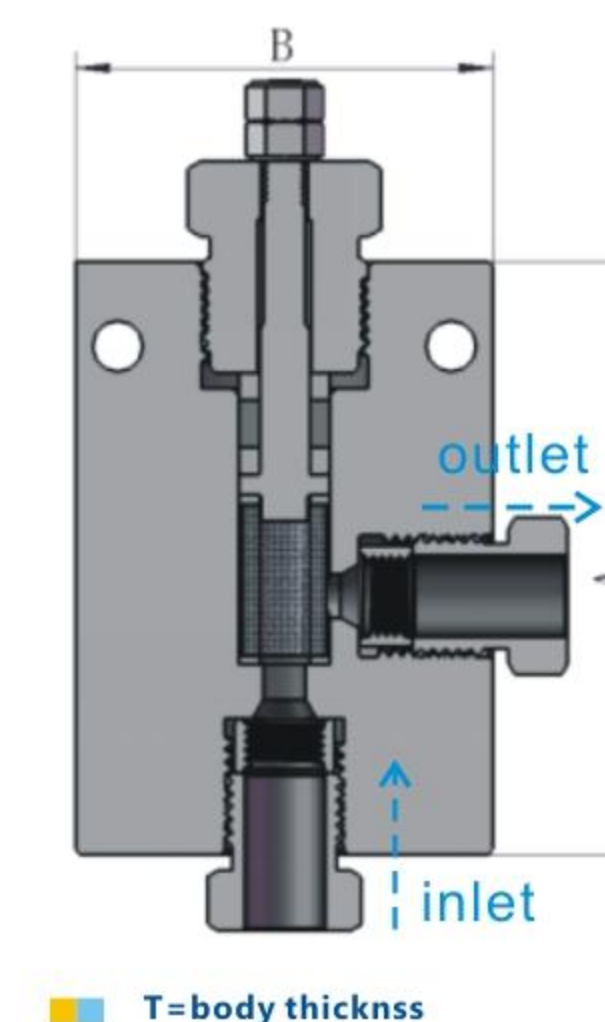
Type	Working pressure	Connection tube OD	Connection port size	Valve function	Filtered Micro Size
G:Filters & GL (angle type)	20:15,000psi	1:1/8"O.D.	None	H:High temperature valve	7 7 µm
	20,000psi	2:1/4"O.D.	T: NPT	L:Low temperature valve	40 40 µm
	30:30,000psi	3:3/8"O.D.	R: G , BSPP	H <sub>2</sub> :Hydrogen gas valve	60 60 µm
	60:60,000psi	4:9/16"O.D.	C: RC,RT , ZG		5 5 µm
		(1/2"O.D)			
		6:3/4"O.D.			
		8:1"O.D.			

## High Pressure In Line Filters

Angle filter is used to filter gas or liquid in high-pressure system. The filter element can be easily replaced on site. The special design allows the exchange of filter elements without first removing the filter in front of the tube. The filter unit is made of sintered materials with pore diameters of 5 µm、40µm or 60 µm. All angle filters are equipped with nuts and screw sleeves.

### Features:

- ★ Maximum working pressure: 20,000 psi (1,379 bar).
- ★ Nominal hole sizes for filter elements are 5µm, 40µm and 60µm.
- ★ Operating temperature: -50 °C to 204 °C (-58°F to 392°F).
- ★ Working medium: gas, oil and water.
- ★ Nominal hole size of the filter element: The maximum pore size calculated from the pressure required to form bubbles from the surface of the filter element by dipping the filter element into the test liquid.



### 20000psi version Technical parameter

Catalog Number	Pressure Rating (psi)	Connection Type	Orifice (mm)	Filtered Micro Size (µm)	Filtered area (mm <sup>2</sup> )	Dimensions (mm)		
						A	B	T
GL202-5 µm	20,000	LF4	2.7	5	530	70	50	24
GL202-40 µm				40				
GL202-60 µm				60				
GL203-5 µm	20,000	LF6	5.1	5	530	70	50	24
GL203-40 µm				40				
GL203-60 µm				60				
GL204-5 µm	20,000	LF9	7.8	5	1000	85	65	26
GL204-40 µm				40				
GL204-60 µm				60				
GL206-5 µm	20,000	LF12	11.1	5	3960	138	90	57
GL206-40 µm				40				
GL206-60 µm				60				
GL208-5 µm	20,000	LF16	14.3	5	3960	138	90	57
GL208-40 µm				40				
GL208-60 µm				60				

# ADJUSTABLE SAFETY PRESSURE RELIEF VALVES (FIELD SET)

## Adjustable Safety Pressure Relief Valves (Field set)

### Operating pressure range:

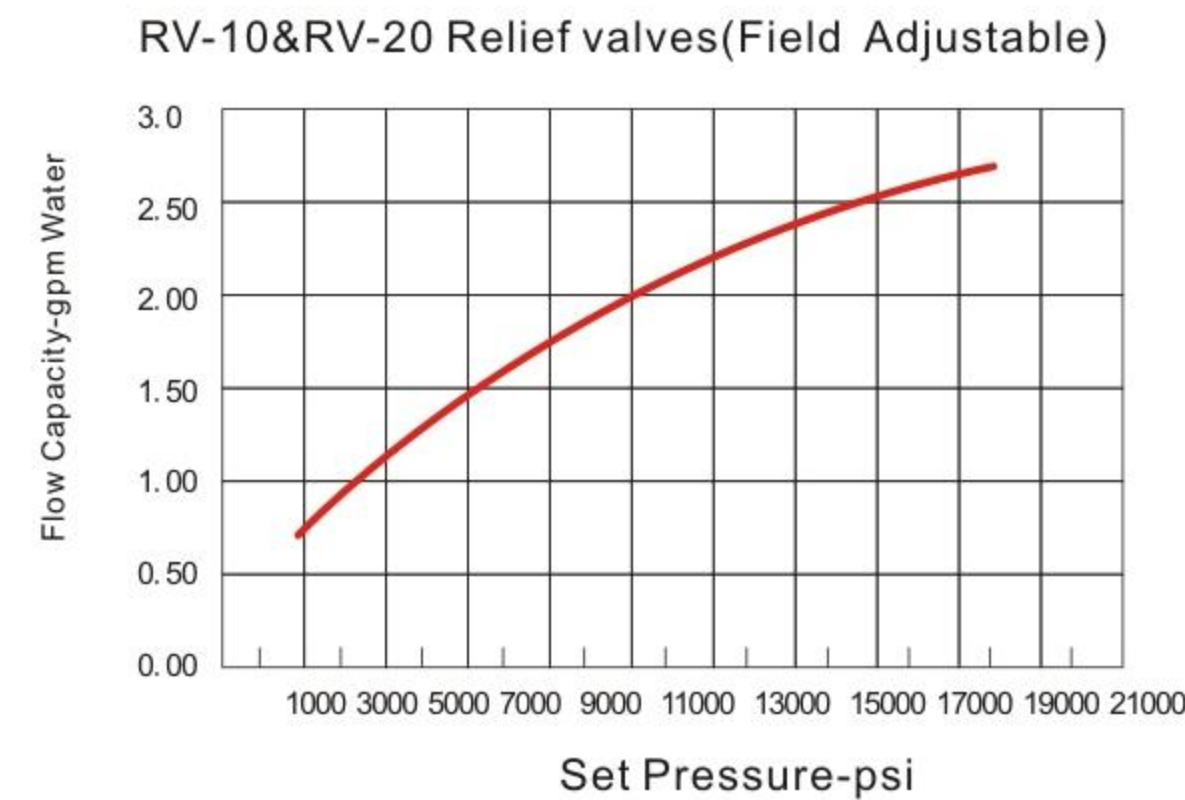
Safety valve that protects the system by venting the pressure when over pressure occurs. It vents the pressure when the pressure is over than setting pressure and protects the pressure the system and equipment with venting. it hold the lower pressure than setting pressure after venting. Easy to set pressure with using bolt on the top.

### Features:

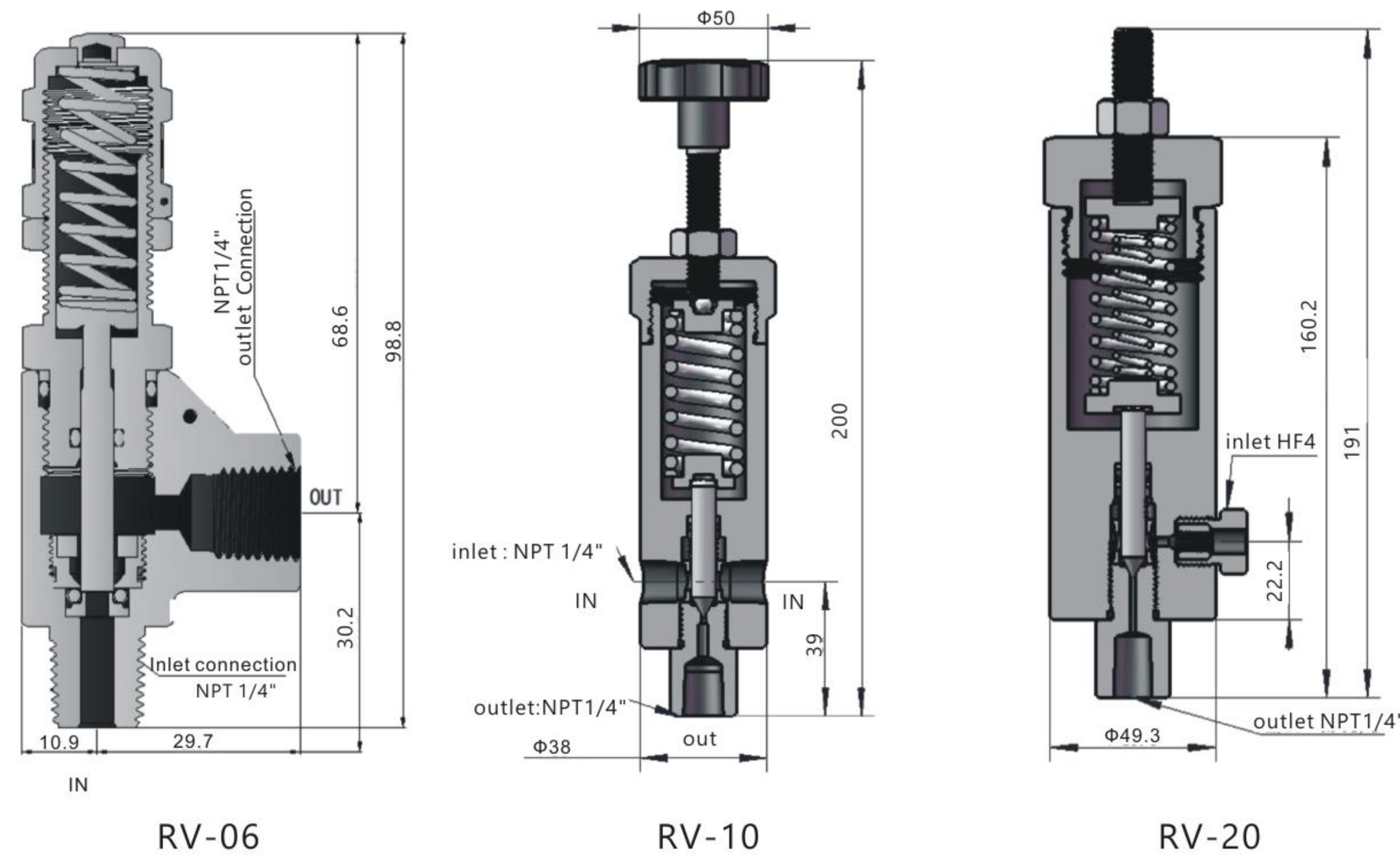
- ★ Operating pressure range: 50 to 20,000 PSI.
- ★ Inlet port: NPT1/4" Female, Outlet port: NPT1/4" Female.
- ★ Standard material: Stainless steel 316 and NBR, PTFE packing And nylon seat.

### Specifications:

Catalog Number	Pressure Range(psi)	Orifice (mm)	CV	working temperature °C	Using media
RV-06	50~6,000	3.6	0.27	-1~121°C	Gas or liquid
RV-10	1,000~10,000	1.6	0.12	-17~121°C	
RV-20	10,000~20,000	1.6	0.12		



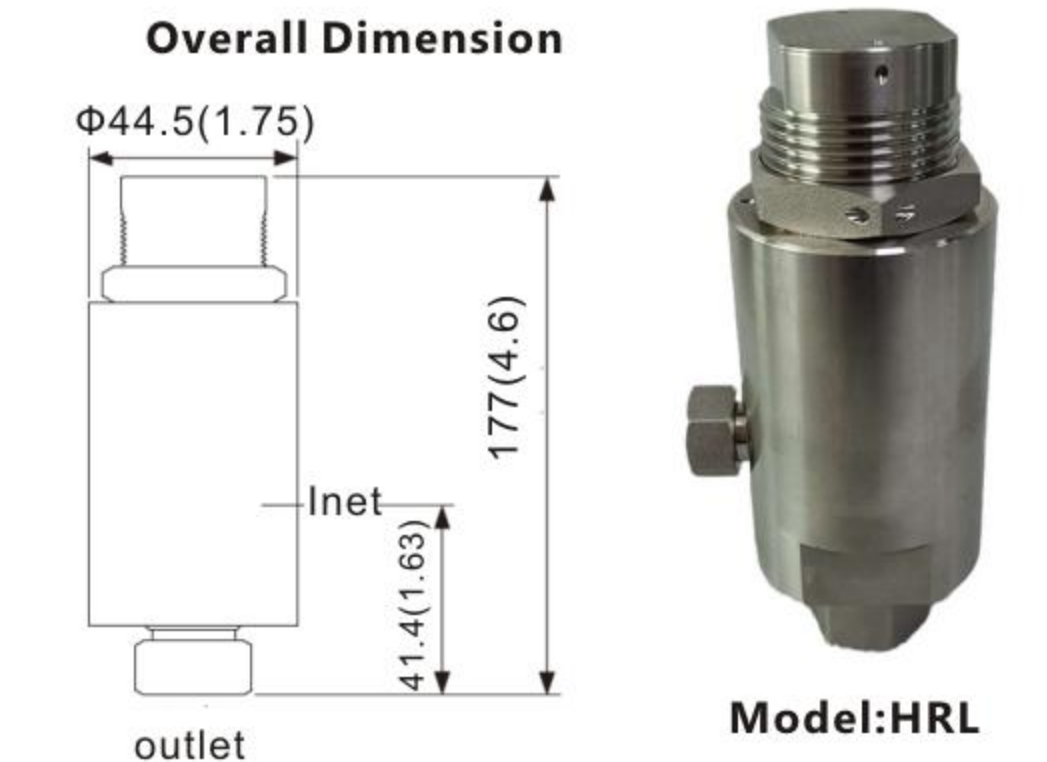
### Exploded View:



# SAFETY PRESSURE RELIEF VALVE

## Low flow HRL type adjustable Safety relief valve

Set Pressure psi(bar)	Orifice mm(in.)	seat type	Ordering code
5000-10000(345-689)	3.20(0.13)	Metal Seat	HRL2HF4
10000-15000(689-1034)	2.50(0.10)		HRL3HF4
15000-20000(1034-1379)	2.20(0.09)		HRL4HF4
20000-30000(1379-2069)	1.80(0.07)		HRL5HF4
30000-45000(2069-3102)	1.50(0.06)		HRL6HF4
45000-60000(3102-4137)	1.30(0.05)		HRL7HF4

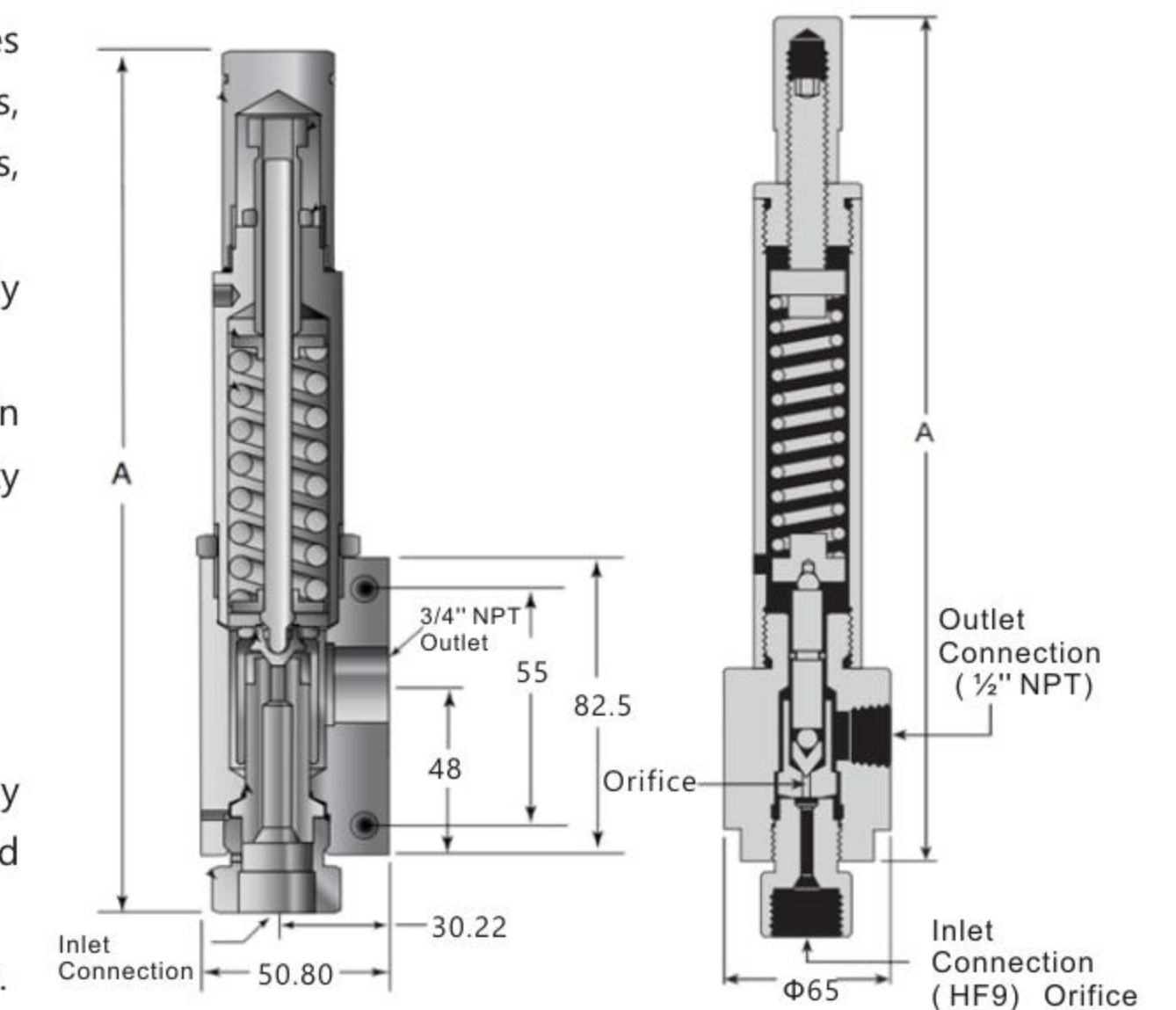


- 1) Standard valves with 1/4" HF connection inlet and 3/8" female NPT outlet.
- 2) Working temperature ranges from -40°F to 250°F ( 40°C to 120°C) for standard valves.

small size ,easy to carry (net weight0.95-2kgs )

## High Flow FRV type adjustable safety relief valve (Factory set)

- ★ The FRV series of relief valves provide reliable exhaust. These precision valves are designed for pressurized gas design systems, cryogenic systems, petrochemical applications and other special systems. Able to handle air, gas, steam and liquid.
- ★ The FRV10/FRV20/FRV30 relief valve features a soft seat design that reliably discharges gas at set pressures(3,000 psi to 30,000 psi).
- ★ Soft seat design provides airtight seal for repeatable ejection and reset. In addition, soft-seated valves have a higher cycle life than metal-seated safety valves and are not recommended for use with liquid nitrogen or liquid CO<sub>2</sub>.
- ★ FRV45 relief valve with metal seat design, Operating temperature range: -17°C(30°F)~204°C(400°F).
- ★ Diameter size range from 1.57mm to 7.92mm.
- ★ The relief valve opens in proportion to the increase in pressure. Therefore, they are not recommended for applications where full valve flow is required immediately at a set pressure (decomposition polymerization, etc ).
- ★ The full flow of the relief valve is defined as exceeding 10% of the set pressure.



FRV 10/20/30

FRV 45

### Technical parameter:

Catalog Number	Connection Size and Type		Orifice Diameter inches (mm)	Pressure Rating psi			Dimension Inches (mm) A	Suitable Working Temperature (°C)
	Inlet Connection	Outlet Connection NPT		Minimum Setting	Maximum Setting	Maximum Back Pressure		
FRV-10	LF9	NPT3/4"	6.35	3,000	11,000	500	239	-200~204
FRV-20	LF9	NPT3/4"	3.96	11,000	21,000	500	239	
FRV-30	HF9	NPT3/4"	3.18	21,000	30,000	500	251.5	-17~204
FRV-45	HF9	NPT1/2"	2.7	30,000	45,000	500	330	

# ADJUSTABLE PRESSURE SENSING VALVE

## Adjustable Pressure Sensing Valve

### Description

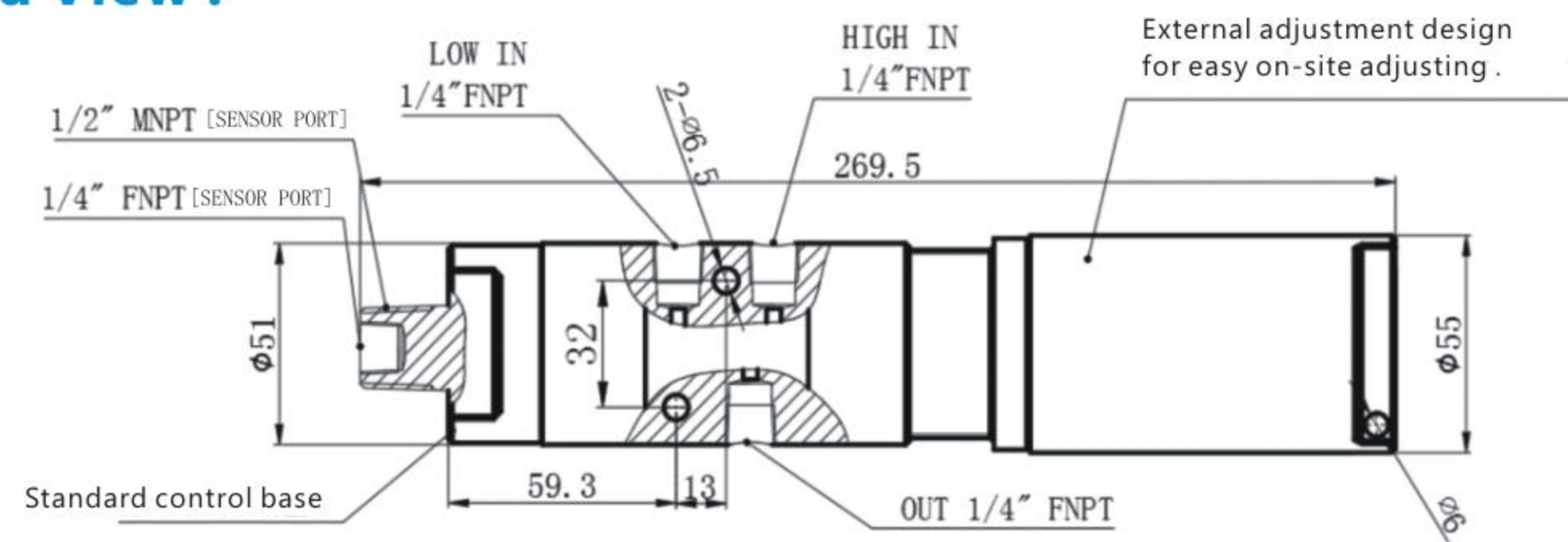
The USUN pneumatic pressure switch is a three-way module and a vent valve operated by pressure acting on the opposing piston with adjustable spring force. Its function can be normally closed or normally open; When the valve is opened, it depends on which of the two ports of the meter is supplying pressure. When the sensing pressure signal reaches the set pressure, it can control the output direction of the low pressure air source. The mechanical structure is stable and reliable, with long service life and maintenance-free.

### Main technical parameters:

- ★ Functional form: normally open or normally closed, depending on the connection port
- ★ Standard pressure range of sensor ports is 10-10,000 psi
- ★ Optional working pressure range 5 to 20000 psi
- ★ Working temperature: -30~100 °C
- ★ The repeatability of the set point is about 1%
- ★ No control zone: 5% of the range
- ★ The material is 316L stainless steel.
- ★ Maximum air supply pressure : 150 Psi
- ★ Optional tamper resistant locking device available upon request
- ★ If a piston seal leak occurs, the exhaust port above the sensing piston can prevent high pressure from entering the instrument power supply



### Exploded View :



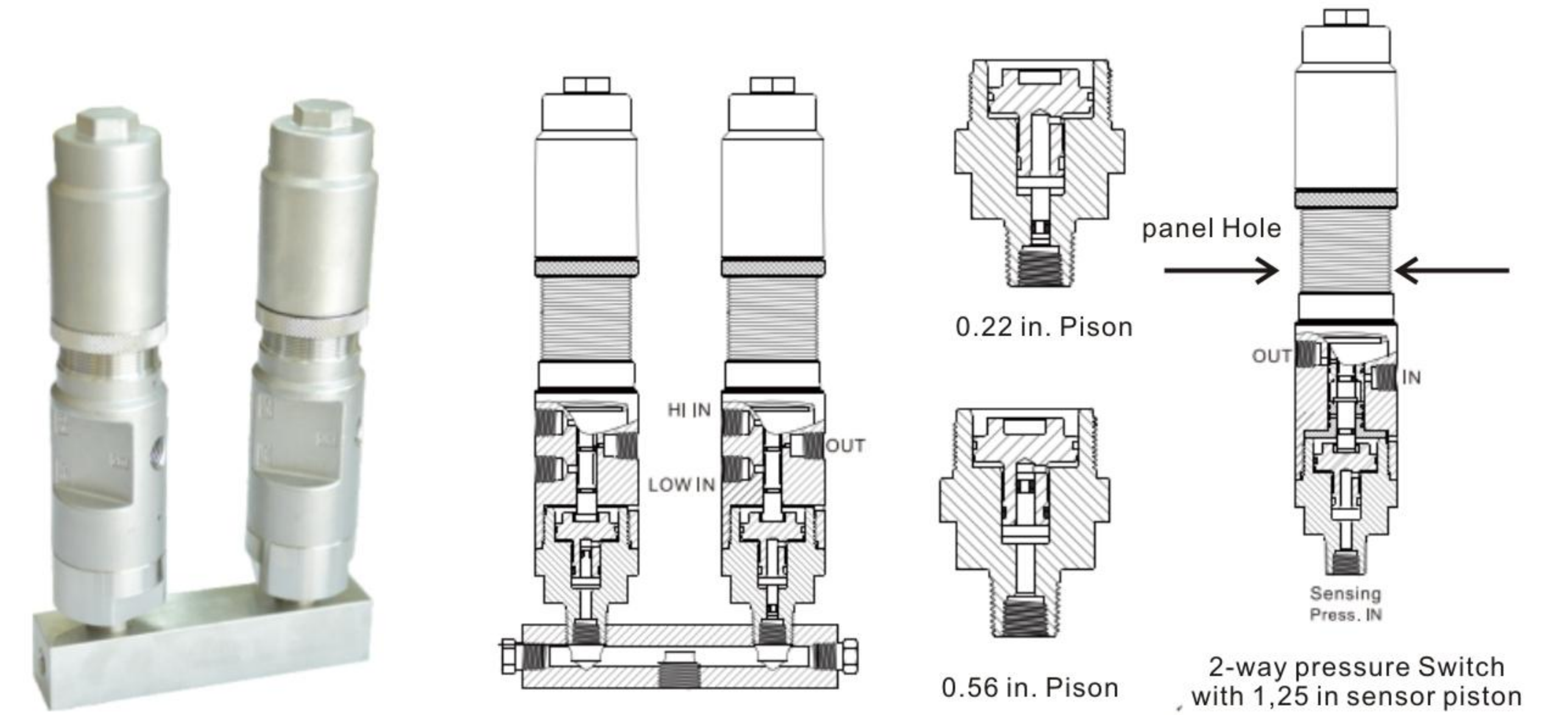
### Technical specification

Model	Sensing pressure range	Air valve maximum pressure	Air valve flow rate CV
APSV-10-Y-025	5~20psi	150PSI	0.2
APSV-10-T-025	4~40psi		
APSV-10-N-025	10~80psi		
APSV-10-P-025	10~115psi		
APSV-10-U-025	20~230psi		
APSV-10-R-025	50~450psi		
APSV-10-S-025	200~750psi		
APSV-10-F-025	500~1500psi		
APSV-10-L-025	1000~3000psi		
APSV-10-M-025	2000~5000psi		
APSV-10-H-025	3500~9000psi		
APSV-10-B-025	5000~10,000psi		
APSV-20-G-025	8500~20,000psi		

# ADJUSTABLE PRESSURE SENSING VALVE MANIFOLD

## Adjustable pressure sensing valve

These valves are operated by the pressure applied to the sense port acting on a piston opposing an adjustable spring force. 3 way valve is a block and bleed valve. It functions as either a normally closed or normally open valve, depending on through which port the instrument pressure is supplied. These ports are marked 'HI IN' or 'LOW IN' on the switch body. The output port, marked 'OUT' on the switch body, is the same for either mode of operation. 2 way valve functions as a normally closed or normally open valve, depending on customer requirement. See Valve Ordering Code.



High/Low Pressure Switch Valve Assembly (3-way valves)

### Main technical parameters:

- ★ Functional form: normally open or normally closed, depending on the connection port.
- ★ Standard pressure range of sensor ports is 10-10,000 psi.
- ★ Optional working pressure range 5 to 2,0000 psi.
- ★ Working temperature: -18~120C.
- ★ The repeatability of the set point is about 1%.
- ★ No control zone: 5% of the range.
- ★ The material is 316 stainless steel.
- ★ Maximum pressure of air valve: 3-way valves: 150psi, 2-way valves: 6,000psi
- ★ Optional tamper resistant locking device available upon request.
- ★ If a piston seal leak occurs, the exhaust port above the sensing piston can prevent high pressure from entering the instrument power supply.

Model		Sensing pressure range	Air valve maximum pressure	Air valve flow rate CV
3-way valves	2-way valves			
APSV-SS-3P-3A	APSV-SS-3P-2A/2B*	10~45psi	3-way valves : 150psi 2-way valves : 6,000psi	3-way valves : 0.09 2-way valves : 0.2
APSV-SS-3G-3A	APSV-SS-3G-2A/2B*	30~100psi		
APSV-SS-3R-3A	APSV-SS-3R-2A/2B*	80~100psi		
APSV-SS-2G-3A	APSV-SS-2G-2A/2B*	200~450psi		
APSV-SS-2R-3A	APSV-SS-2R-2A/2B*	400~900psi		
APSV-SS-2Y-3A	APSV-SS-2Y-2A/2B*	750~1500psi		
APSV-SS-1G-3A	APSV-SS-1G-2A/2B*	1500~3000psi		
APSV-SS-1R-3A	APSV-SS-1R-2A/2B*	3000~6000psi		
APSV-SS-1Y-3A	APSV-SS-1Y-2A/2B*	6000~10,000psi		

2-way valve add suffix 2A /2B: A stands for NO ,B stands for NC

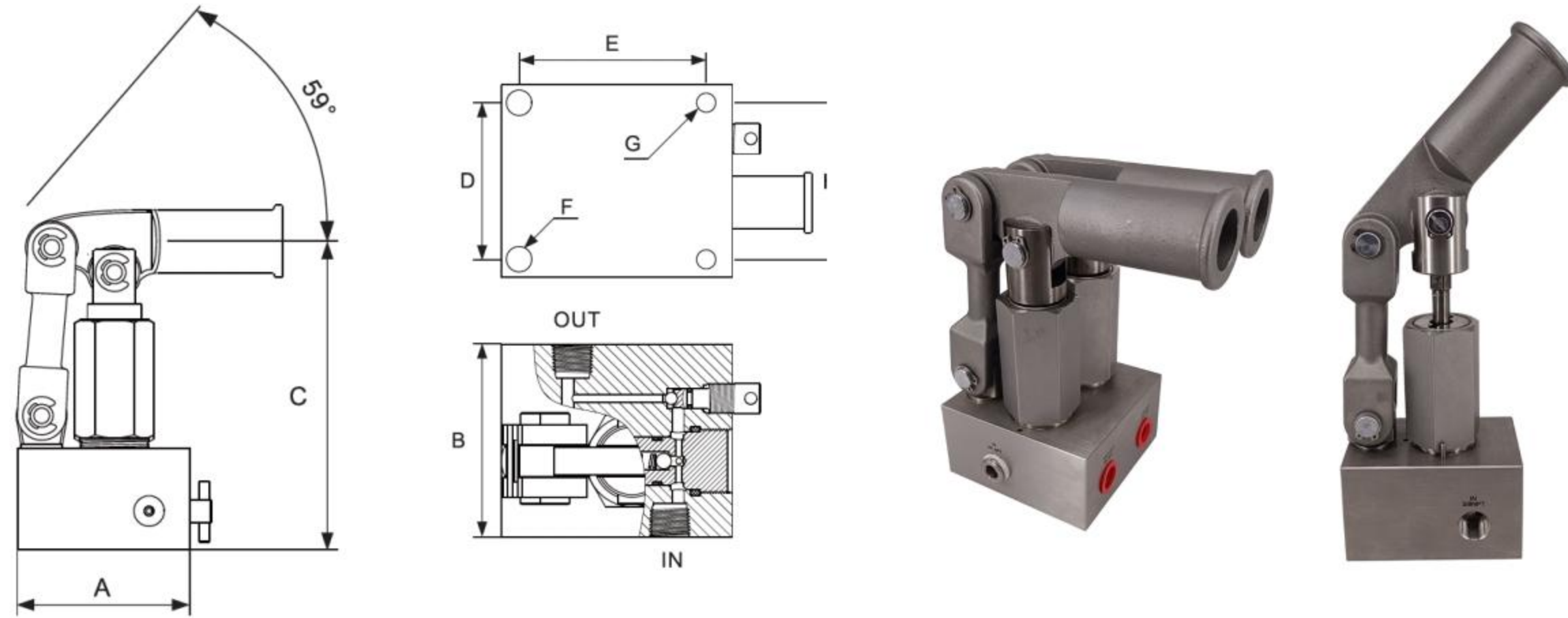
# HIGH PRESSURE MANUAL PUMP

## High pressure manual pump

USUN manual pump is a small hydraulic pump that converts manual mechanical energy into hydraulic energy. When using matching cylinders and specialized tools, various operations can be carried out, such as lifting, bending, straightening, shearing, riveting, assembly, disassembly, valve opening, and some construction, military construction, process control, etc. It can also be used as a hydraulic backup power source for manual emergency supply when there is no external supply. The pressure range is wide, with different working pressures.

### Main technical parameters:

- ★ Can be used for most liquids such as oil or water. It has a variety of working pressures and a maximum output pressure of up to 30,000 psi (207 Mpa).
- ★ The Manual pump is equipped with a handlebar.
- ★ Can be repaired without removing the pump from system.
- ★ Piston hardened and ground.
- ★ There are single-stage pump and double-stage pump (low pressure and large flow, high pressure and small flow, automatic switching between these two states during operation) and there are optional configurations such as pressure unload valve and relief valve.



Ordering Code	Max pressure	Vol Per stroke	Connection ports	Handle Load per 100 PSI	Dimensions (mm)							
					A	B	C	D	H	F	G	
HP-SS-0A	20000 PSIG	2.6ML	FNPT3/8 female	0.27KG								
HP-SS-1A	10000PSIG	4.1ML	FNPT3/8 female	0.51KG	95.5	60°	169.5	57.2	43.5°	M12	M8	
HP-SS-2A	5000PSIG	9.2ML	FNPT3/8 female	1.05KG		80°						63.5°
HP-SS-3A	2500PSIG	17.7ML	FNPT3/8 female	2.5KG								
HP-SS-1D	10000PSIG	17.7ML under 2500PSIG 4.1ML up 2500PSIG	FNPT3/8 female	2.1KG under 2500PSIG 0.51Kg up 2500PSIG								
HP-SS-2D	20000PSIG	9.2ml under 5000psig 2.6 ml up 5000psig	FNPT3/8 female inlet and HF6 3/8" OD high pressure outlet	1.05KGS under 5000PSIG 0.27kg up 5000psig	100	100	213.5	77.2	83.5	M12	M8	
HP-SS-3D	30000PSIG	9.2ml under 5000psig 1.7 ml up 5000psig	FNPT3/8 female inlet and HF6 3/8" OD high pressure outlet	1.05KGS under 5000PSIG 0.27kg up 5000psig								

Remark: In table B "a" indicate size without relief valve, "b" indicate size with relief valve.

### Model Selection

Type	Body Material	Pressure Range	Relief Valve(optional)
HP manulump	SS 316SS	OA 20,000 Single	-None
	6L 316L	1A 10,000 Single	-R (relief valve)
	S4 304SS	2A 5,000 Single	
	CS Carbon steel	3A 25,000 Single	
		1D 10,000psi Double	
		2D 20,000psi Double	
		3D 30,000Psi Double	

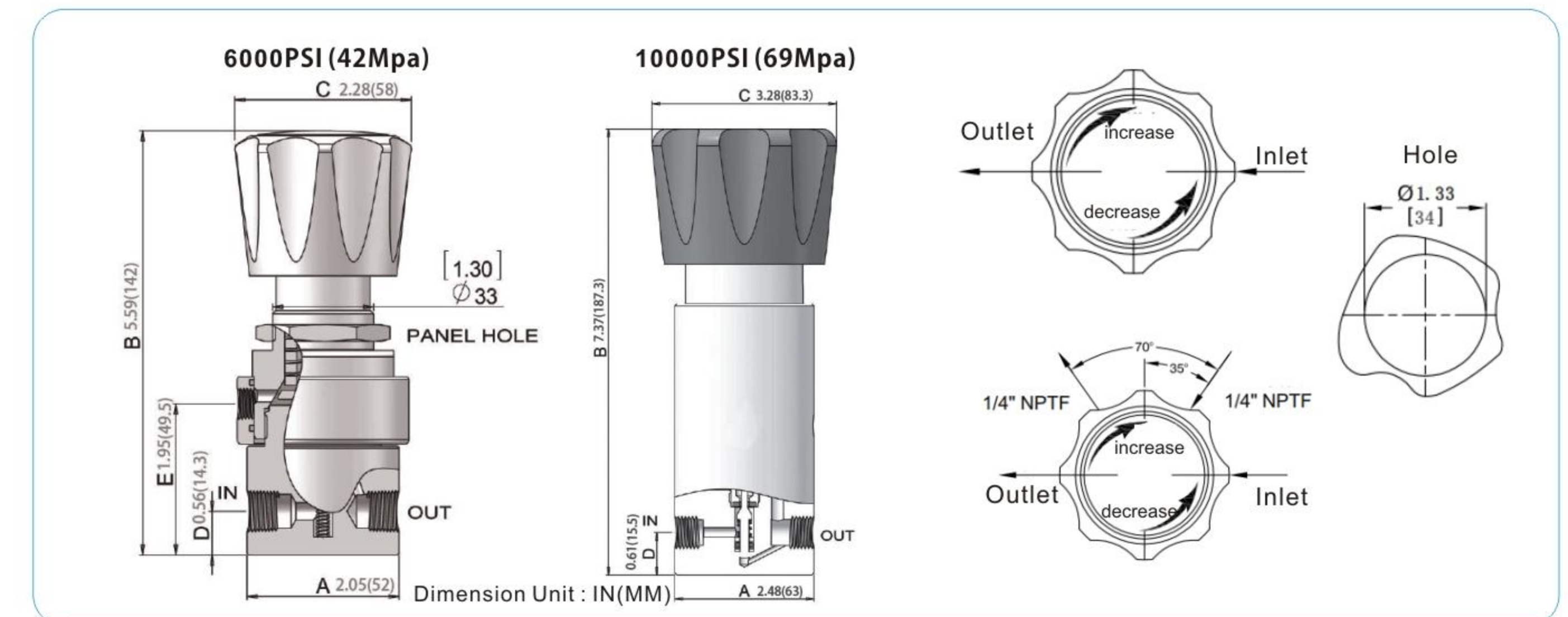
# PRESSURE REDUCING VALVE

## High Pressure reducing regulator valve

A pressure reducing and regulating valve is a mechanical device that reduces a higher upstream pressure to a lower downstream pressure. USUN pressure reducing and regulating valves can maintain downstream pressure setting points under varying inlet pressure conditions of different media in various industry applications (including high-precision applications and hazardous environment applications).

### Main technical parameters:

- ★ 316 stainless steel construction makes the valve has good corrosion resistance.
- ★ Maximum inlet pressure: 10000 psig (689 bar).
- ★ Six outlet pressure ranges: 1 (200-10000 psig), 2 (50-6000 psig), 3 (25-4000 psig), 4 (15-2500 psig), 5 (10-1500 psig), 6(5-800 psig).
- ★ Working temperature: -15°F~165°F(-26°C~74°C).
- ★ Flow coefficient : CV=0.12



### Ordering code : PRV10SS1FNPT4-V

PRV	10 (Inlet pressure)	SS (Body Material)	1 (Outlet pressure)	FNPT 4 (Connection size)	V (Optional)
PRV Reducing valve	06-6000psig	SS 316SS	1) 200-10000psi	FNPT4-FNPT1/4	V-Vent ( NPT1/4)
	10-10000psig		2) 50-6000psi	FNPT6-FNPT3/8	None- Without vent
			3) 25-4000psi	FNPT8--FNPT1/2	
			4)15-2500psi		
			5)10-1500psi		
			6)5-800psi		
			7)0-500psi		
			8)0-300psi		

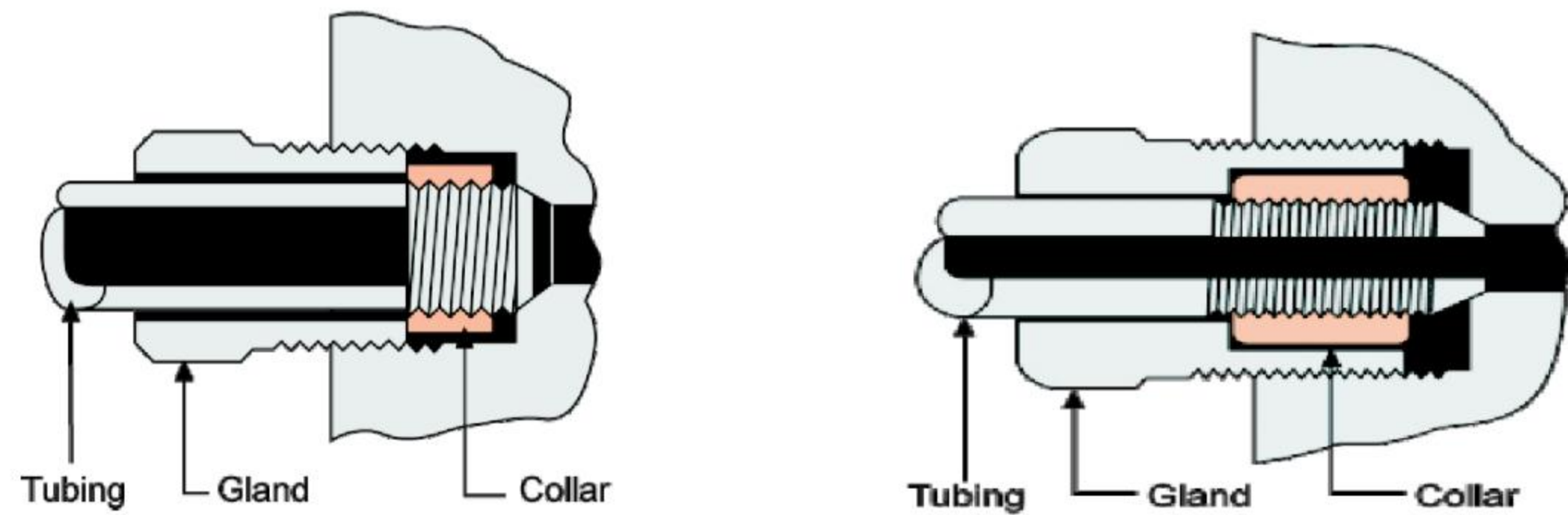
Connection Assembly Instructions

Medium Pressure

- ★ This taper threaded connection allows for an infinite number of repeated disassembly and connections, and the alignment of the bushing and pressing nut minimizes the thickness of the connected element.
- ★ Medium-pressure cone and thread end connections are rated to 20,000 psi(1378 bar).

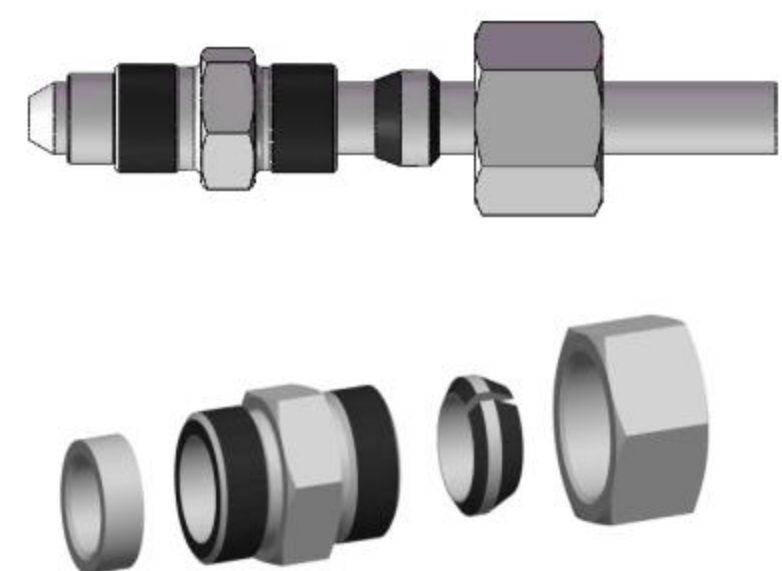
High Pressure

- ★ High-pressure cone and thread end connections are rated to 60,000 psi(4134 bar).

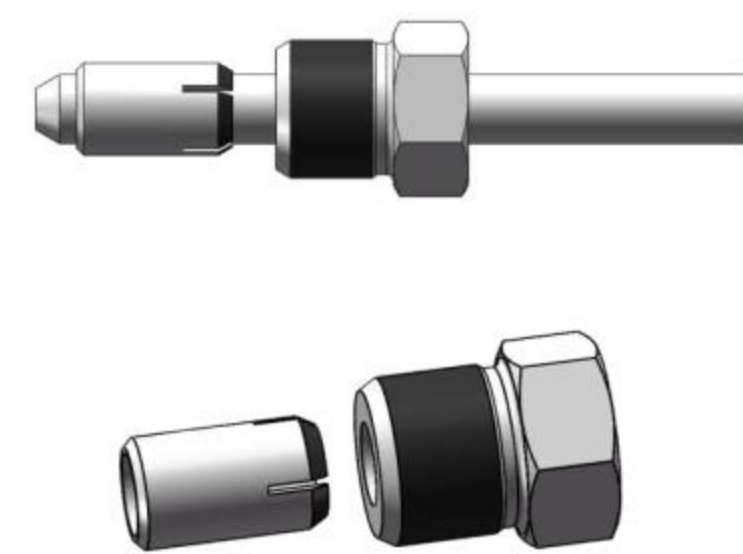


Assembly of Anti-Vibration Collet Gland Connections

The tubing systems that are subjected to extreme vibration or shock, such as mobile. Pressure systems or long tubing runs culminating at a compressor, will be prevented by using Anti-Vibration Gland Assemblies. These assemblies use the same reliable connection geometries as the standard USUN fittings with the added advantage of essentially unlimited Vibrational fatigue life.



Medium Pressure  
Pressures to 20,000 (1379 bar)

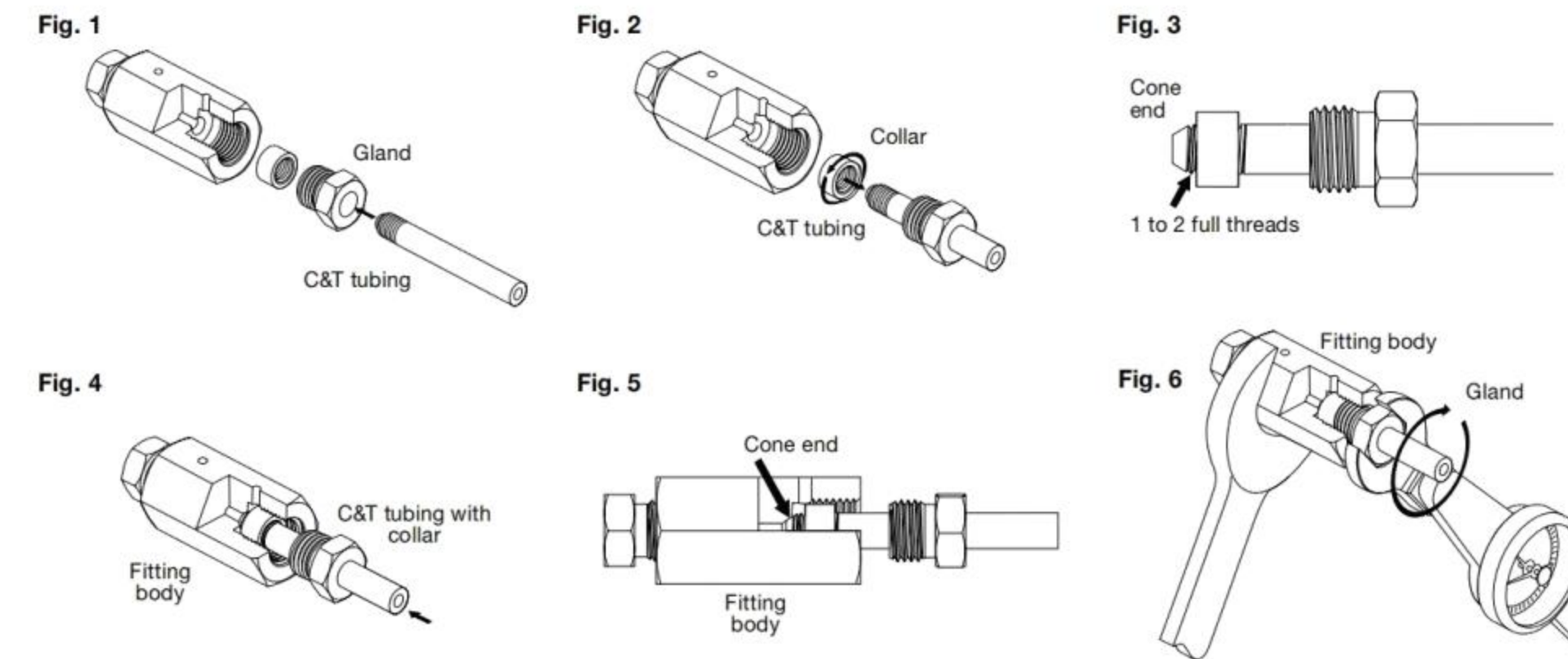


High Pressure  
Pressures to 60,000 (4137 bar)

Connection Assembly Instructions

Medium Pressure

Suitable for: 1/4"O.D,3/8"O.D,9/16"O.D,3/4"O.D,installation.



1 Lubricate all external threads with anti-seize lubricant.

2 or standard pipe fittings, slide the pipe into the Gland(Figure 1).The anti vibration option(seeFigure above)slides the anti vibration gland and Collar tubing. For medium pressure anti vibration fittings, slide the anti-vibration chuck body onto the Ss pipe. Notes: Ensure the correct orientation of the Collar valve body. The surface of the Conical chuck body needs to fit with the chuck.

3 Put the sleeve into the steel pipe by counterclockwise direction.(left)(See figure 2)

4 Until the collar front end exposes 1 to 2 teeth.(Figure 3)

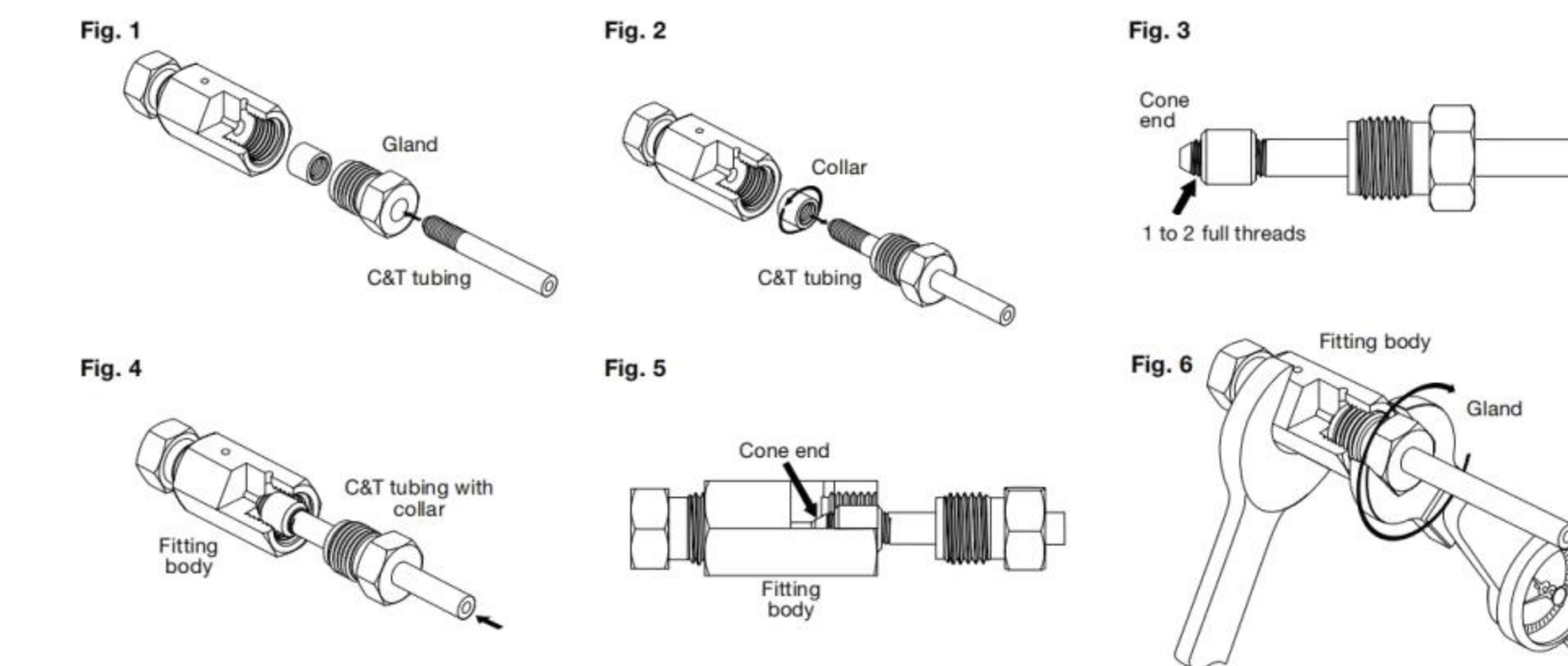
5 Insert the Tube which comes with collar and gland into valve body.(See Fig 4)

6 Ensure a firm connection between the S pe cone and the valve cone.(See page 5)

7 For standard pipe fittings, insert the sleeve thread into the valve body tightly.Hold the connector body firmly and tighten the Gland(Figure 6)to the requires torque.

High Pressure

Suitable for: 1/4"O.D,3/8"O.D,9/16"O.D,installation.



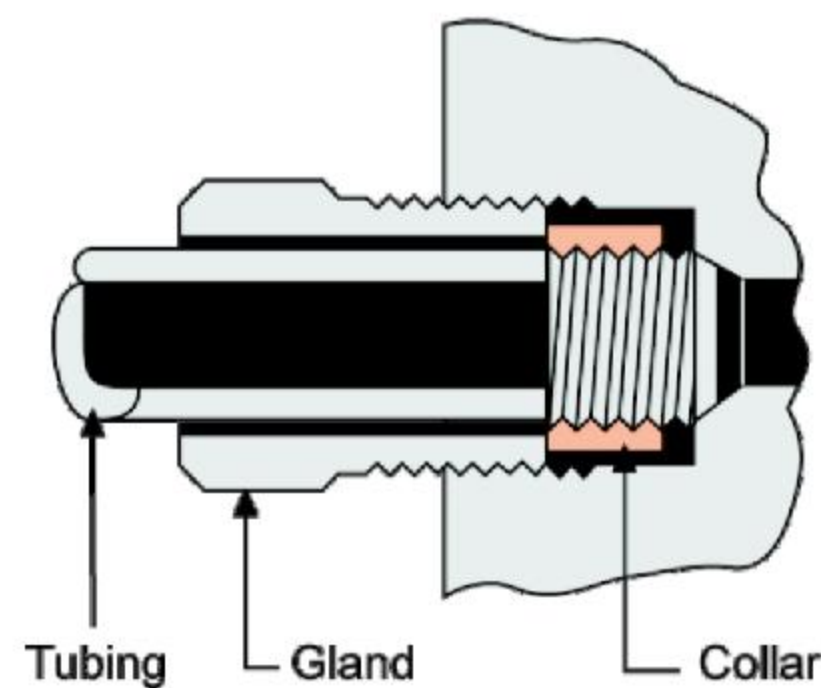
For high pressure Anti vibration connections, screw the Nuts into valve body. Maintain body stability and tighten the gland to the required torque.The threaded anti vibration joint for medium pressure Anti vibration fittings is screwed into the valve body.The threaded anti vibration joint for medium pressure a Anti vibration fittings isscrewed into the valve body until hand tight.Tighten the Anti vibration Chuck body to the specified position torque.Then, thread the anti vibration gland nut into the steel pipe until it is tightened by hand.Use a torque wrench to tighten the Gland to the required torque.

Fitting Size in.	Required Torque ft.lb(N.m)	
	Medium-Pressure C&T Fitting	High-Pressure C&T Fitting
1/4	20.7(28)	25(33.9)
3/8	33(45)	50(67.8)
9/16	60.5(82)	107(145)
3/4	107(145)	--
1	228(310)	--

Medium Pressure Connections

20,000 psi					
LF4 1/4" O.D. Tubing	LF6 3/8" O.D. Tubing	LF9 9/16" O.D. Tubing	LF12 3/4" O.D. Tubing	LF16 1" O.D. Tubing	LF24 1 1/2" O.D. Tubing
<b>Female Opening Detail</b>					
<b>Gland</b>					
<b>Collar</b>					
<b>Plug</b>					
<b>Tube End Prep</b>					

High pressure pipe diameter. 1/4"O.D,3/8"O.D,3/4"O.D,9/16"O.D, and 1"O.D.connection forms. This connection has become the pneumatic and hydraulic connection in high pressure and high temperature application of industry standard. It can be repeatedly disassembled and reassembled. The thread is right. The nut, and the screw sleeve and pipe thread is left-handed, so as to prevent the screw sleeve rotates during installation.



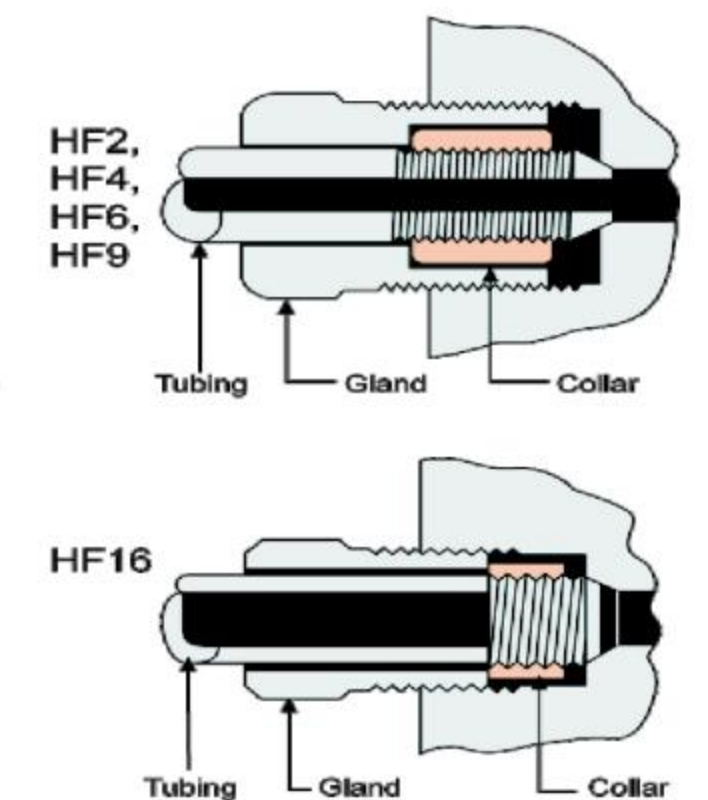
All components required for high-pressure connections(nuts,screw sleeves, plugs) are made of 316L stainless steel.

High Pressure Connections

30,000 & 60,000 psi				40,000 psi	30,000 psi
HF2 1/8" O.D. Tubing	HF4 1/4" O.D. Tubing	HF6 3/8" O.D. Tubing	HF9 9/16" O.D. Tubing	HF9 9/16" O.D. Tubing	HF16 1" O.D. Tubing
<b>Female Opening Detail</b>					
<b>Gland</b>					
<b>Collar</b>					
<b>Plug</b>					
<b>Tube End Prep</b>					

The high pressure tubing connection is available for 1/8"O.D,1/4"O.D,3/8"O.D,9/16"O.D, 1"O.D. This connection has been the standard application for high pressure and high temperature in the pneumatic hydraulic industry.

It may be disassembled and re-tightened indefinitely. The threads of the gland nut are right-hand while the threads of the collar and tubing are left-hand to prevent rotation of the collar during assembly.





## Connection Components

### 20000psi Connection Components

Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland
LG4	1/4"		LC4	1/4"		LP4	1/4"	
LG6	3/8"		LC6	3/8"		LP6	3/8"	
LG9	9/16"		LC9	9/16"		LP9	9/16"	
LG12	3/4"		LC12	3/4"		LP12	3/4"	
LG16	1"		LC16	1"		LP16	1"	

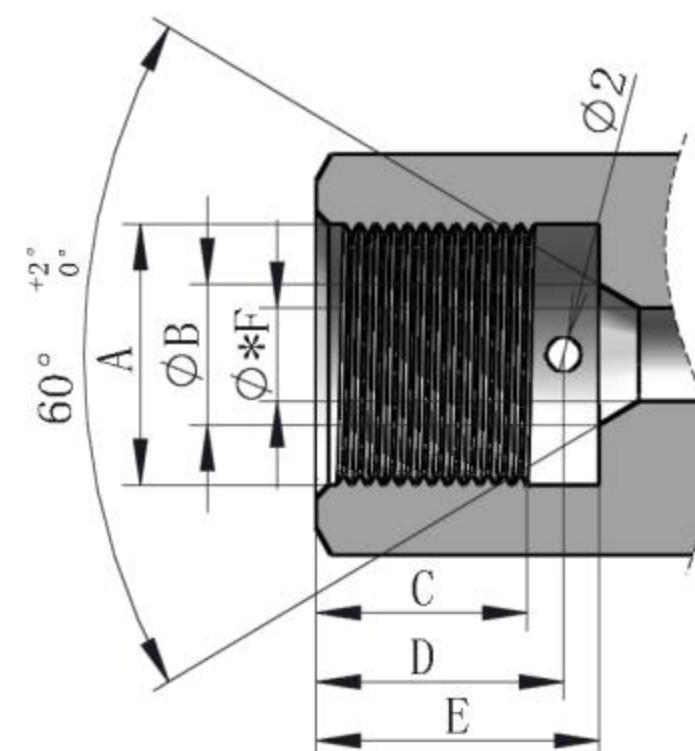
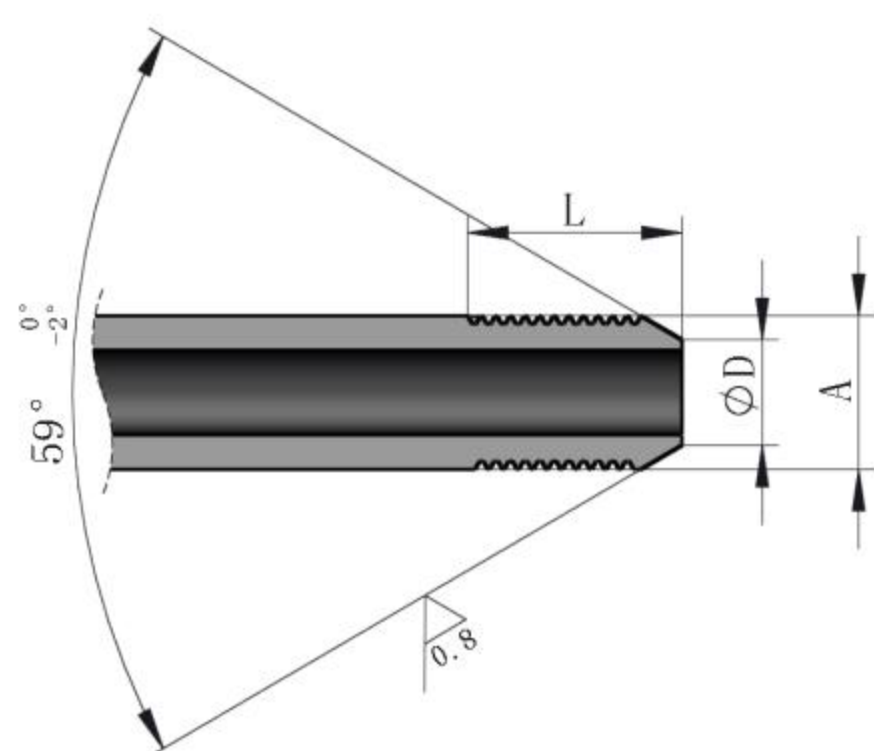
### 30000psi Connection Components

Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland
HG2	1/8"		HC2	1/8"		HP2	1/8"	
HG4	1/4"		HC4	1/4"		HP4	1/4"	
HG6	3/8"		HC6	3/8"		HP6	3/8"	
HG9	9/16"		HC9	9/16"		HP9	9/16"	

### 60000psi Connection Components

Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland	Catalog No.	Tube Size	Gland
HG2	1/8"		HC2	1/8"		HP2	1/8"	
HG4	1/4"		HC4	1/4"		HP4	1/4"	
HG6	3/8"		HC6	3/8"		HP6	3/8"	
HG9	9/16"		HC9	9/16"		HP9	9/16"	

## SS tube and valve or tube fitting connection size:



Tubing Size O.D. x I.D in. (mm)	Pressure psi (bar)@R.T	Dimension in. (mm)			Orifice	Orifice	Dimension in. (mm)					
		D	L	A			A	B	C	D	E	*F
<b>Medium Pressure Connection form (type)</b>												
1/4" x 0.109 (6.35 x 2.79)	20,000	0.141 (3.6)	0.344 (8.7)	1/4"-28- L.H	1/4"O.D	1/4"O.D	7/16"-20	0.19 (4.7)	0.28 (7)	0.37 (9.5)	0.51 (13)	0.109 (2.7)
3/8" x 0.209 (9.53 x 5.31)		0.250 (6.4)	0.438 (11.1)	3/8"-24- L.H	3/8"O.D	3/8"O.D	9/16"-18	0.31 (7.7)	0.38 (9.6)	0.50 (12.7)	0.62 (15.7)	0.203 (5.1)
9/16" x 0.312 (14.29 x 7.93)		0.406 (10.3)	0.500 (12.7)	9/16"-18- L.H	9/16"O.D	9/16"O.D	13/16"-16	0.50 (12.7)	0.44 (11.2)	0.59 (15.1)	0.75 (19.1)	0.312 (7.8)
3/4" x 0.438 (19.05 x 11.12)		0.562 (14.3)	0.625 (15.9)	3/4"-16- L.H	3/4"O.D	3/4"O.D	3/4"-14 NPSM	0.62 (15.7)	0.50 (12.7)	0.72 (18.3)	0.94 (23.9)	0.438 (11.1)
1" x 0.562 (25.4 x 14.27)		0.719 (18.3)	0.781 (19.8)	1"-14- L.H	1"O.D	1"O.D	1-3/8"-12	0.88 (22.4)	0.81 (20.6)	1.06 (27)	1.31 (33.3)	0.562 (14.3)

## High Pressure connection form type

Tubing Size O.D. x I.D in. (mm)	Pressure psi (bar)@R.T	Dimension in. (mm)			Orifice	Orifice	Dimension in. (mm)					
		D	L	A			A	B	C	D	E	*F
<b>High Pressure type</b>												
1/8" x 0.046 (3.17 x 1.16)	30,000	0.062 (1.6)	0.438 (11.1)	1/8"-40- L.H	1/8"O.D	1/8"O.D	1/2"-20	0.093 (2.4)	0.354 (9)	0.354 (9)	0.406 (10.3)	0.046 (1.16)
1/4" x 0.092 (6.35 x 2.35)		0.141 (3.6)	0.562 (14.3)	1/4"-28- L.H	1/4"O.D	1/4"O.D	9/16"-18	0.185 (4.7)	0.39 (10)	0.39 (10)	0.45 (11.5)	0.094 (2.3)
3/8" x 0.248 (9.53 x 3.5)		0.219 (5.6)	0.750 (19.1)	3/8"-24- L.H	3/8"O.D	3/8"O.D	3/4"-16	0.283 (7.2)	0.53 (13.5)	0.53 (13.5)	0.63 (16)	0.118 (3)
9/16" x 0.188 (14.29 x 6.3)		0.281 (7.1)	0.938 (23.8)	9/16"-18- L.H	9/16"O.D	9/16"O.D	1-1/8"-12	0.405 (10.3)	0.62 (15.7)	0.62 (15.7)	0.75 (19.1)	0.188 (4.8)
1/4" x 0.083 (6.35 x 2.11)		0.125 (3.2)	0.562 (14.3)	1"-4-28 L.H	1/4"O.D	1/4"O.D	9/16"-18	0.17 (4.2)	0.39 (10)	0.39 (10)	0.45 (11.5)	0.094 (2.3)
3/8" x 0.125 (9.53 x 3.17)	60,000	0.219 (5.6)	0.750 (19.1)	3/8"-24- L.H	3/8"O.D	3/8"O.D	3/4"-16	0.26 (6.5)	0.53 (13.5)	0.53 (13.5)	0.63 (16)	0.118 (3)
9/16" x 0.188 (14.29 x 4.77)		0.281 (7.1)	0.938 (23.8)	9"-16-18 L.H	9/16"O.D	9/16"O.D	1-1/8"-12	0.38 (9.7)	0.62 (15.7)	0.62 (15.7)	0.75 (19.1)	0.188 (4.8)

**Remark:** the port diameter may vary depending on the specific valve or matching components forms

# NPT PIPE FITTINGS

Pipe Fittings are designed for liquid and gas applications. The P Series Fittings are available from 1/4" to 1" NPT to 15,000 psi (1,034 bar). NPT threads must be sealed using a high quality PTFE tape and or Paste product. Sealing performance may vary and based on many factors such as pressure, temperature, media, thread quality, thread Material, proper thread engagement and proper use of thread sealant.

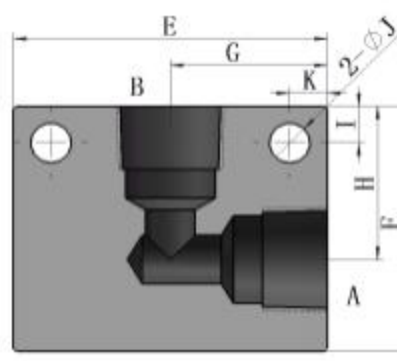
## Pipe Coupling

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	K	J	Thickness
T20F2-TF2-T	15,000	1/4" O.D.	5.1	NPT1/4"	40	-	-	-	-	-	-	30
T20F3-TF3-T	15,000	3/8" O.D.	7.9	NPT3/8"	41.3	-	-	-	-	-	-	27
T20F4-TF4-T	15,000	9/16" O.D.	7.9	NPT1/2"	50	-	-	-	-	-	-	30
T20F6-TF6-T	15,000	3/4" O.D.	17.4	NPT3/4"	69	-	-	-	-	-	-	36
F20F8-TF8-T	15,000	1" O.D.	17.4	NPT1"	54	-	-	-	-	-	-	50



## Pipe Elbow

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	K	J	Thickness
T2022-T	15,000	1/4" O.D.	5.1	NPT1/4"	40	30	20	20	20	6	6	20
T2032-T	15,000	3/8" O.D.	7.9	NPT3/8"	50	38	25	25	25	6	6.5	24
T2042-T	15,000	9/16" O.D.	7.9	NPT1/2"	76	48	38	38	32	10	9	35
T2062-T	15,000	3/4" O.D.	17.4	NPT3/4"	76	57	38	38	38	12.6	9	35
T2082-T	15,000	1" O.D.	17.4	NPT1"	105	64	52.5	52.5	40	12	13.50	45



## Pipe Tee

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	K	J	Thickness
T2023-T	15,000	1/4" O.D.	5.1	NPT1/4"	40	30	20	6	20	6	6.5	20
T2033-T	15,000	3/8" O.D.	7.9	NPT3/8"	50	38	25	6	25	6	6.5	24
T2043-T	15,000	9/16" O.D.	7.9	NPT1/2"	76	48	38	10	32	12.50	9	35
T2063-T	15,000	3/4" O.D.	17.4	NPT3/4"	76	57	38	12.6	38	12.6	9	35
T2083-T	15,000	1" O.D.	17.4	NPT1"	105	64	52.5	12	40	17.5	13.50	45



## Pipe Cross

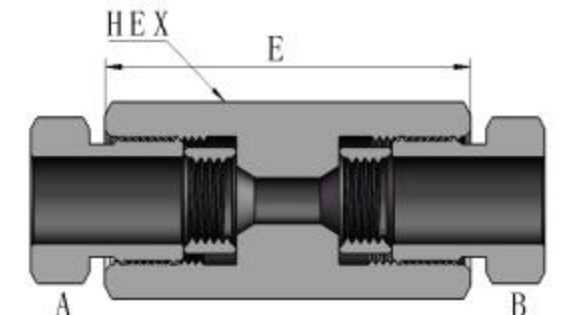
Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	K	J	Thickness
T2024-T	15,000	1/4" O.D.	5.1	NPT1/4"	40	40	20	20	6	6	6.5	30
T2034-T	15,000	3/8" O.D.	7.9	NPT3/8"	50	50	25	25	6	6	6.5	27
T2044-T	15,000	9/16" O.D.	7.9	NPT1/2"	63.5	63.5	31.75	31.75	10	12.50	9	30
T2064-T	15,000	3/4" O.D.	17.4	NPT3/4"	76	76	38	38	12.6	12.6	9	36
T2084-T	15,000	1" O.D.	17.4	NPT1"	105	80	52.5	40	12	17.5	13.50	50



# HIGH PRESSURE FITTING

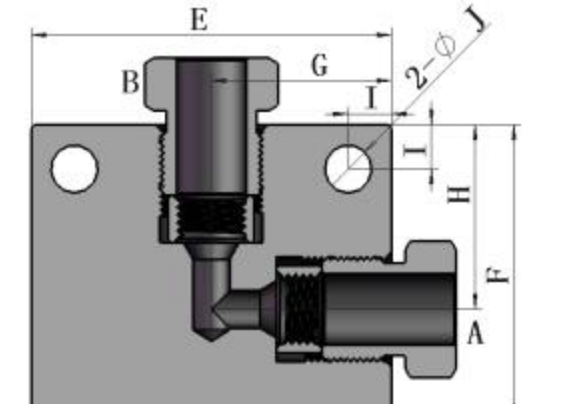
## Medium Pressure Through

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T2021	20,000	1/4" O.D. TUBE	2.7	LF4	41	-	-	-	-	-	19
T2031	20,000	3/8" O.D. TUBE	5.1	LF6	44.5	-	-	-	-	-	19
T2041	20,000	9/16" O.D. TUBE	7.9	LF9	54	-	-	-	-	-	27
T2061	20,000	3/4" O.D. TUBE	11.1	LF12	63.5	-	-	-	-	-	36
T2081	20,000	1" O.D. TUBE	14.3	LF16	88.9	-	-	-	-	-	46



## Medium Pressure Elbows

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Thickness
T2022	20,000	1/4" O.D. TUBE	2.7	LF4	40	30	20	20	6	6.5	20
T2032	20,000	3/8" O.D. TUBE	5.1	LF6	50	35	25	25	6	6.5	24
T2042	20,000	9/16" O.D. TUBE	7.9	LF9	63.5	45	31.75	32	6	6.5	26
T2062	20,000	3/4" O.D. TUBE	11.1	LF12	76	57	38	38	8	8.5	35
T2082	20,000	1" O.D. TUBE	14.3	LF16	105	76	52.5	52.5	17.5	12.5	45



## Medium Pressure Tees

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Thickness
T2023	20,000	1/4" O.D. TUBE	2.7	LF4	40	30	20	20	6	6.5	20
T2033	20,000	3/8" O.D. TUBE	5.1	LF6	50	35	25	25	6	6.5	24
T2043	20,000	9/16" O.D. TUBE	7.9	LF9	63.5	45	31.75	32	6	6.5	26
T2063	20,000	3/4" O.D. TUBE	11.1	LF12	76	57	38	38	8	8.5	35
T2083	20,000	1" O.D. TUBE	14.3	LF16	105	76	52.5	52.5	17.5	12.5	45



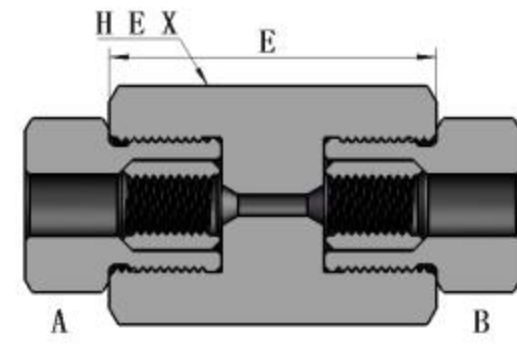
## Medium Pressure Crosses

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Thickness
T2024	20,000	1/4" O.D. TUBE	2.7	LF4	40	40	20	20	6	6.5	20
T2034	20,000	3/8" O.D. TUBE	5.1	LF6	50	50	25	25	6	6.5	24
T2044	20,000	9/16" O.D. TUBE	7.9	LF9	63.5	63.5	31.75	31.75	6	6.5	26
T2064	20,000	3/4" O.D. TUBE	11.1	LF12	76	76	38	38	8	8.5	35
T2084	20,000	1" O.D. TUBE	14.3	LF16	105	105	52.5	52.5	17.5	12.5	45



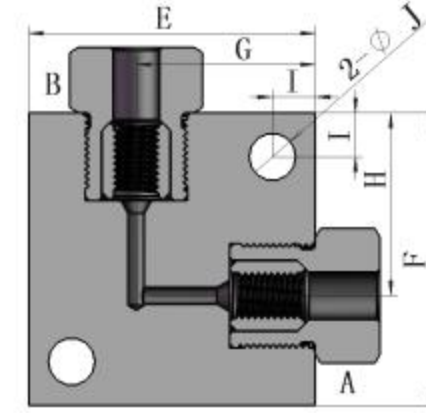
## High Pressure Through

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T3011	30,000	1/8" O.D. TUBE	1	HF2	30	-	-	-	-	-	22
T3021	30,000	1/4" O.D. TUBE	2.4	HF4	35	-	-	-	-	-	22
T3031	30,000	3/8" O.D. TUBE	4.8	HF6	45	-	-	-	-	-	27
T3041	30,000	9/16" O.D. TUBE	6.3	HF9	55	-	-	-	-	-	36



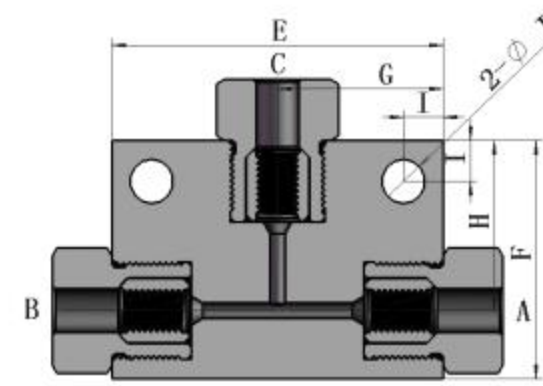
## High Pressure Elbows

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T3012	30,000	1/8" O.D. TUBE	1	HF2	35	30	20	20	6	6.5	20
T3022	30,000	1/4" O.D. TUBE	2.4	HF4	40	40	25	25	6	6.5	24
T3032	30,000	3/8" O.D. TUBE	4.8	HF6	50	44	30	30	6	6.5	30
T3042	30,000	9/16" O.D. TUBE	6.3	HF9	65	50	45	29	7	6.5	40



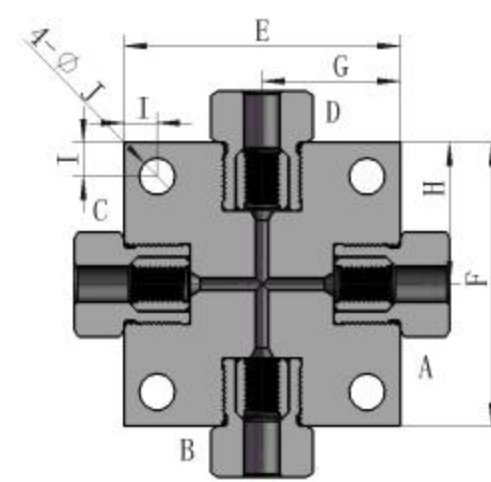
## High Pressure Tees

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T3013	30,000	1/8" O.D. TUBE	1	HF2	40	30	20	20	6	6.5	20
T3023	30,000	1/4" O.D. TUBE	2.4	HF4	50	35	25	25	6	6.5	24
T3033	30,000	3/8" O.D. TUBE	4.8	HF6	60	45	30	30	6	6.5	30
T3043	30,000	9/16" O.D. TUBE	6.3	HF9	80	54	40	35	7	6.5	40



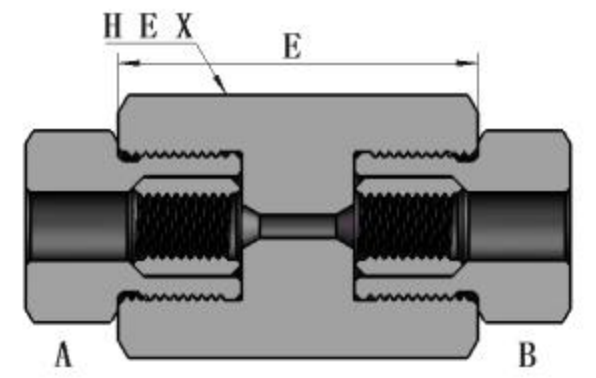
## High Pressure crosses

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T3014	30,000	1/8" O.D. TUBE	1	HF2	40	40	20	20	6	6.5	20
T3024	30,000	1/4" O.D. TUBE	2.4	HF4	50	50	25	25	6	6.5	24
T3034	30,000	3/8" O.D. TUBE	4.8	HF6	60	60	30	30	6	6.5	30
T3044	30,000	9/16" O.D. TUBE	6.3	HF9	80	80	40	35	7	6.5	40



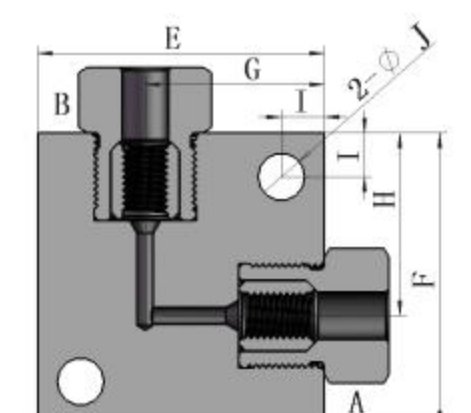
## High Pressure Through

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T6011	60,000	1/8" O.D. TUBE	0.5	HF2	30	-	-	-	-	-	22
T6021	60,000	1/4" O.D. TUBE	2.3	HF4	35	-	-	-	-	-	22
T6031	60,000	3/8" O.D. TUBE	3.2	HF6	45	-	-	-	-	-	27
T6041	60,000	9/16" O.D. TUBE	4.8	HF9	55	-	-	-	-	-	36



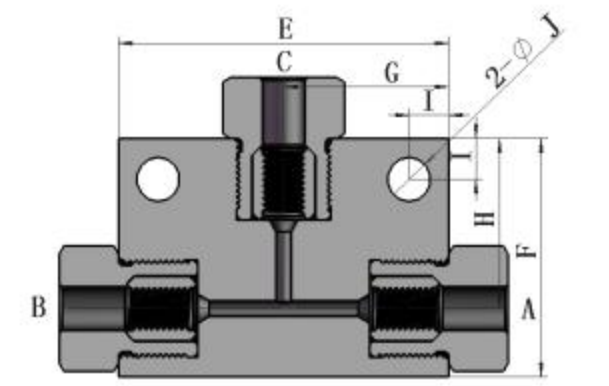
## High Pressure Elbows

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T6012	60,000	1/8" O.D. TUBE	0.5	HF2	35	30	20	20	6	6.5	20
T6022	60,000	1/4" O.D. TUBE	2.3	HF4	40	40	25	25	6	6.5	24
T6032	60,000	3/8" O.D. TUBE	3.2	HF6	50	44	30	30	6	6.5	30
T6042	60,000	9/16" O.D. TUBE	4.8	HF9	65	50	45	29	7	6.5	40



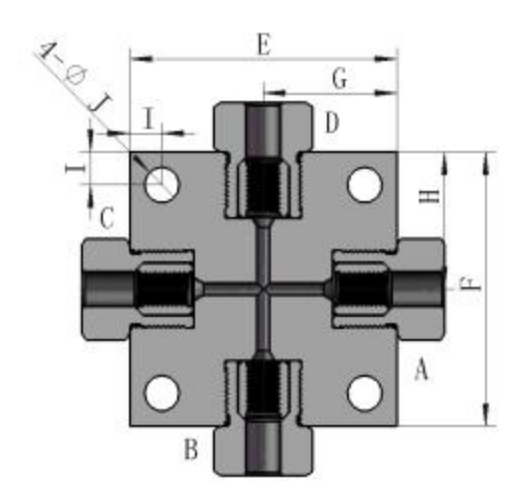
## High Pressure Tees

Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T6013	60,000	1/8" O.D. TUBE	0.5	HF2	40	30	20	20	6	6.5	20
T6023	60,000	1/4" O.D. TUBE	2.3	HF4	50	35	25	25	6	6.5	24
T6033	60,000	3/8" O.D. TUBE	3.2	HF6	60	45	30	30	6	6.5	30
T6043	60,000	9/16" O.D. TUBE	4.8	HF9	80	54	40	35	7	6.5	40



## High Pressure Crosses

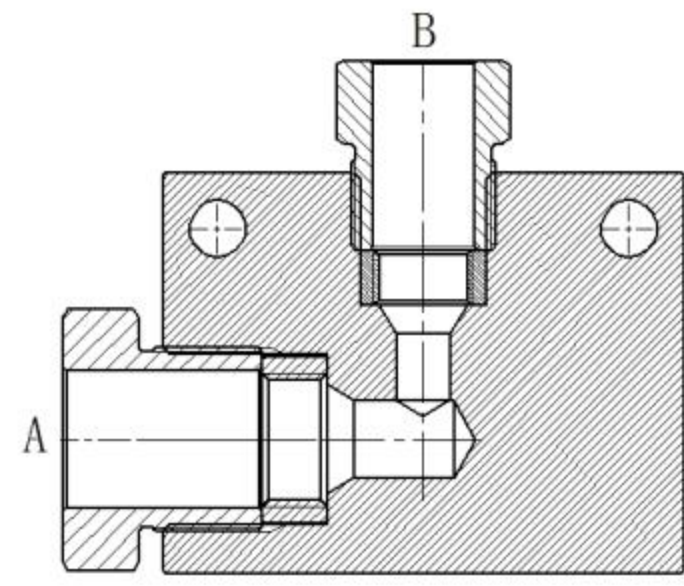
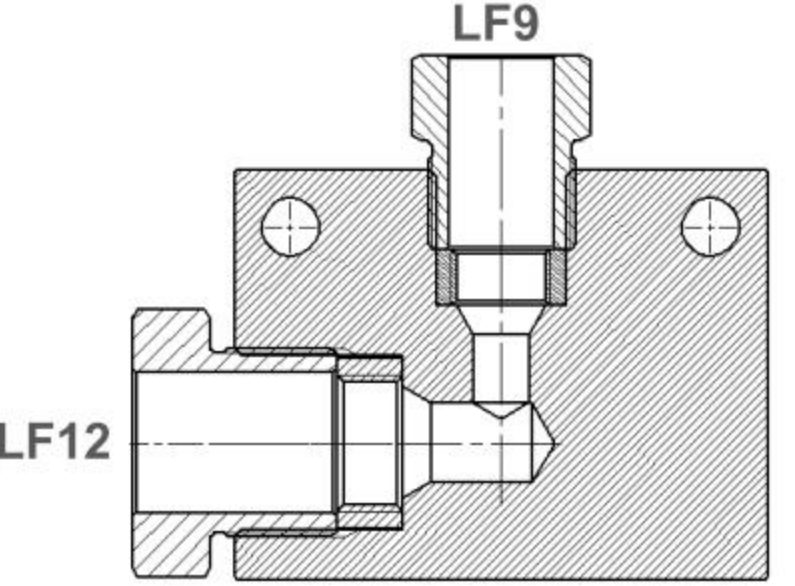
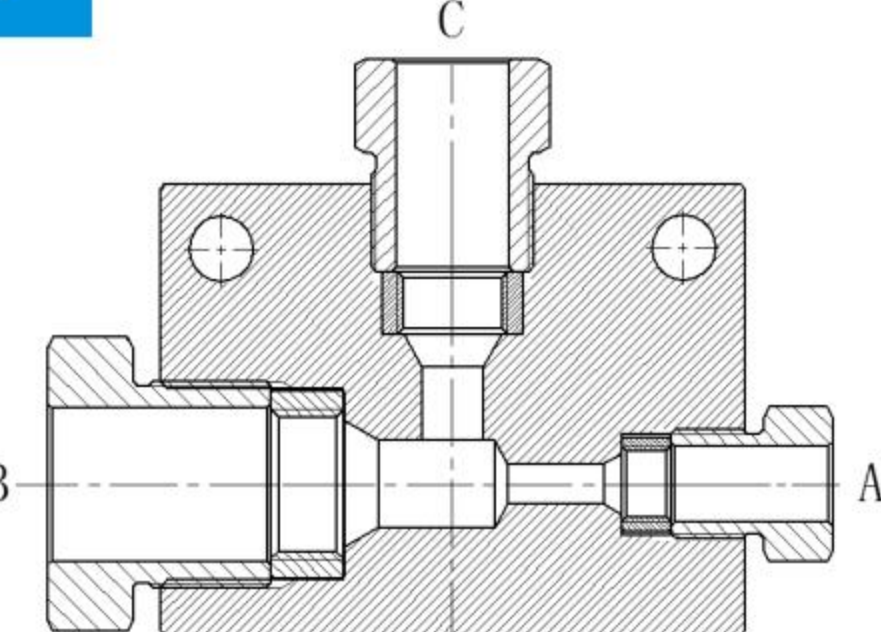
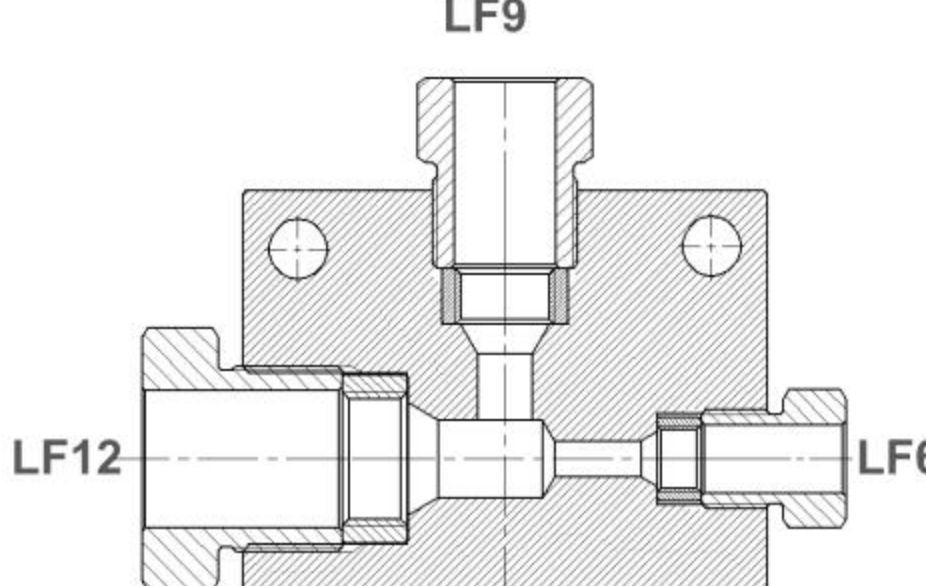
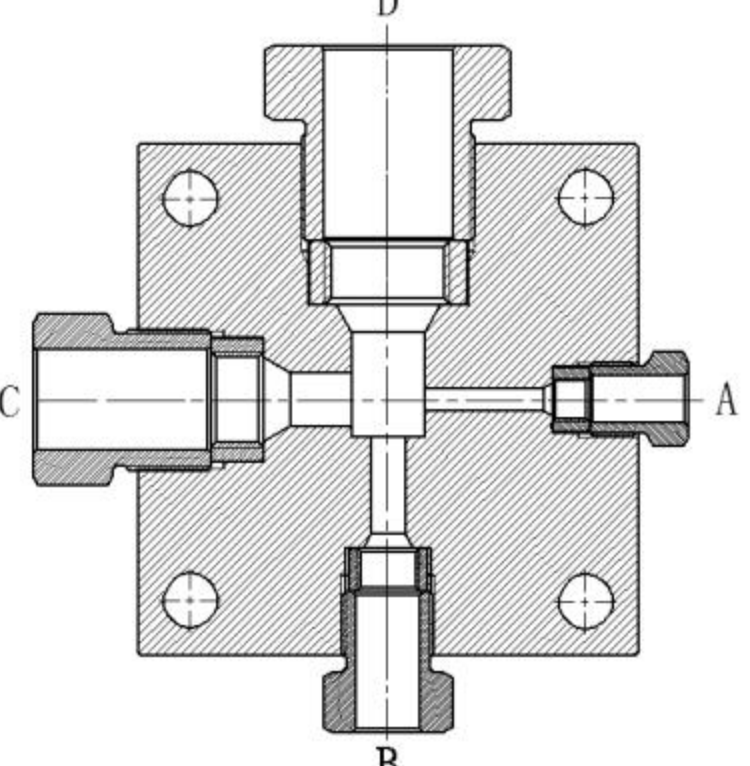
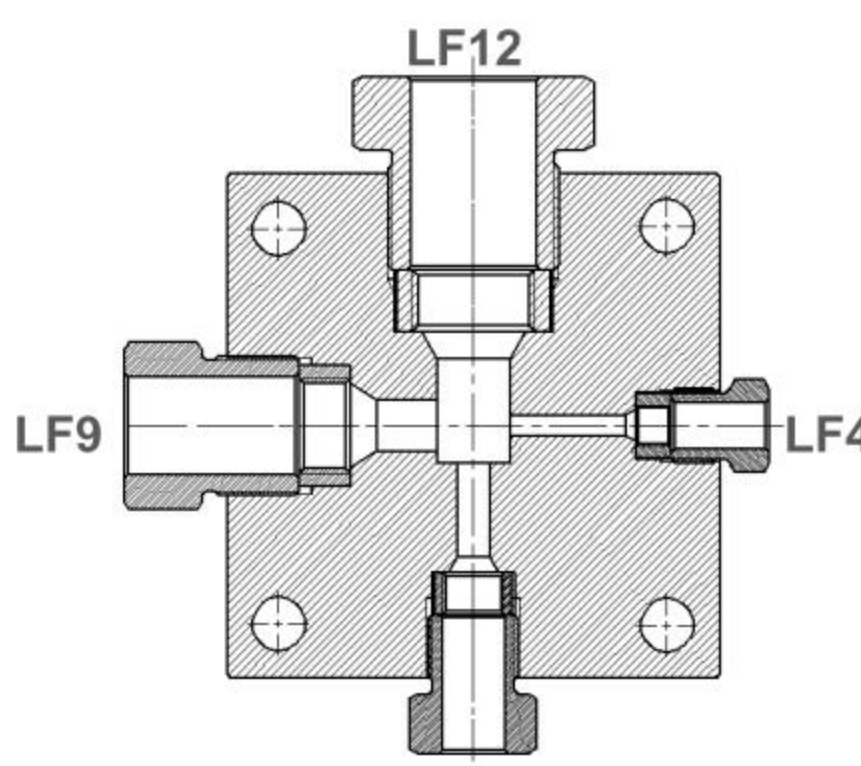
Catalog No.	Pressure Rating psi	Connections	Orifice (mm)	A-B	E	F	G	H	I	J	Hex size
T6014	60,000	1/8" O.D. TUBE	0.5	HF2	40	40	20	20	6	6.5	20
T6024	60,000	1/4" O.D. TUBE	2.3	HF4	50	50	25	25	6	6.5	24
T6034	60,000	3/8" O.D. TUBE	3.2	HF6	60	60	30	30	6	6.5	30
T6044	60,000	9/16" O.D. TUBE	4.8	HF9	80	80	40	35	7	6.5	40



## Selection Instructions for Reducing Multiway

The overall size of the high pressure fittings depends on the maximum connection type. All medium pressure fittings are conical and threaded connections. All mounting holes are standard.

Port size	code
1/4"O,D	2
3/8"O,D	3
9/16"O,D	4
3/4"O,D	6
1"O,D	8

<p><b>Elbow</b></p> <p><b>Body structure</b></p>  <p>Catalog Number T20□2- B □</p>	<p><b>Example</b></p> 	<p><b>Catalog Number</b> T2062-B4</p> <p>A B</p> <p><b>Max imum pipe diameter connection</b></p>
<p><b>Tee</b></p> <p><b>Body structure</b></p>  <p>Catalog Number T20□3- A□-C□</p>	<p><b>Example</b></p> 	<p><b>Catalog Number</b> T2063-A3-C4</p> <p>B A C</p> <p><b>Max imum pipe diameter connection</b></p>
<p><b>Cross</b></p> <p><b>Body structure</b></p>  <p>Catalog Number T20□4- A□-B□-C□</p>	<p><b>Example</b></p> 	<p><b>Catalog Number</b> T2063-A3-B3-C4</p> <p>D A B C</p> <p><b>Max imum pipe diameter connection</b></p>

## Ultra High Pressure Tubing

(1)Tube is sold in a 6000mm (6M) unit and normally tube will be packed in a 2000mm (2M) or 1000 (1M) for easy transportation.

(2)Using stainless steel 316 cold material for excellent corrosion resistant.

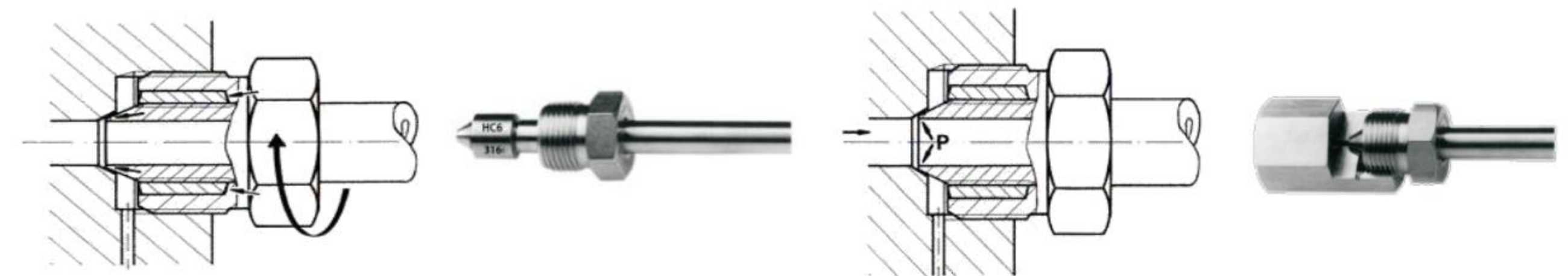
(3)Suitable for chemical, oil refining, research, oil and gas companies, this product is used for various pressures. Our products generally are produced with Stainless steel materials, but they can be manufactured with other materials on demand so that various and gases can be use.



## Tubing size and ordering code

Pressure Rating psi	Tube O/D	Tube I/D	Part NO.	Material
20,000	1/4"(6.35mm)	0.11"(2.79mm)	G2014316-L G2014316-03	<b>Add suffix</b> <b>1) -L : 316 L</b> <b>2) -03 : S31603</b>  (Nickle content >12.5% , Nickle Equivalent>28.5% , This type material are specially suitable for Hydrogen service) Pressure range with in 20K PSI
	3/8"(9.53mm)	0.20"(5.31mm)	G2038316-L G2038316-03	
	9/16"(14.3mm)	0.31"(7.94mm)	G2012316-L G2012316-03	
	3/4"(19.05mm)	0.44"(11.13mm)	G2034316-L G2034316-03	
	1"(25.4mm)	0.56"(14.3mm)	G2088316-L G2088316-03	
15,000	1"(25.4mm)	0.668"(17.47mm)	G1588316-L G1588316-03	
30,000	1/8"(3.18mm)	0.03"(0.85mm)	G3018316-L	
	1/4"(6.35mm)	0.09"(2.35mm)	G3014316-L	
	3/8"(9.53mm)	0.14"(3.5mm)	G3038316-L	
	9/16"(14.3mm)	0.25"(6.3mm)	G3012316-L	
60,000	1/4"(6.35mm)	0.08"(2.13mm)	G6014316-L	
	3/8"(9.53mm)	0.13"(3.17mm)	G6038316-L	
	9/16"(14.3mm)	0.19"(4.74mm)	G6012316-L	

## Super high pressure pipe fitting



## Technical features

When tighten the nut(right -hand)compression nut, screw sleeve and pipe through the left hand thread connection(anti-loosing purpose)forcing pipe at the front end of the conical surface(59° 0/-2°)pressed the valve cone(60°)by tightening the two conical metal line contact seal, it can be installed and dismantled repeatedly by fine tuning screw sleeve on the steel pipe position is reached.

## High Pressure Nipples

USUN can provide coned and thread nipples for easy fluid testing system setup.

### Features:

- (1)Using stainless steel 316 cold material for excellent corrosion resistant.
- (2)Can be ordered one side and both sides types &Please let us know the length you need when order it.
- (3)Our products Generally are produced with Stainless steel materials, but they can be manufactured with other materials on demand so that various and gases can be used.



### Conical tubing size and Ordering Code:

Pressure Rating psi	Tube O/D	Tube I/D	Part NO.	Length	Material
<b>20,000</b> (Regular stock Item )	1/4"(6.35mm)	0.11"(2.79mm)	G2014316-#-75-S	75mm	# refer tube material type 1)-L : 316 L 2)-03 : S31603
	3/8"(9.53mm)	0.20"(5.31mm)	G2038316-#-80-S	80mm	
	9/16"(14.3mm)	0.31"(7.94mm)	G2012316-#-100-S	100mm	
	3/4"(19.05mm)	0.44"(11.13mm)	G2034316-#100-S	100mm	
	1"(25.4mm)	0.56"(14.3mm)	G2088316-#-110-S	110mm	
<b>30,000</b> (Out of stock Item)	1/8"(3.18mm)	0.03"(0.85mm)	G3018316L-75-S	75mm	
	1/4"(6.35mm)	0.09"(2.35mm)	G3014316L-75-S	75mm	
	3/8"(9.53mm)	0.14"(3.5mm)	G3038316L-80-S	80mm	
	9/16"(14.3mm)	0.25"(6.3mm)	G3012316L-100-S	100mm	
<b>60,000</b> (Regular stock)	1/4"(6.35mm)	0.08"(2.13mm)	G6014316L-75-S	75mm	
	3/8"(9.53mm)	0.13"(3.17mm)	G6038316L-80-S	80mm	
	9/16"(14.3mm)	0.19"(4.74mm)	G6012316L-100-S	100mm	

## Tools&Installation

USUN can provide complete Ultra high pressure manual tooling set. They are applicable for processing an outward cone onto high pressure tubing end with CTA Conical tooling and processing a left-hand thread onto high pressure tubing ends with TT serial threading tooling. The complete set tooling will be Put in a black case which is easy to carry and convenient to us.

**Table 1:Manual tooling set item list(CTA-F)**

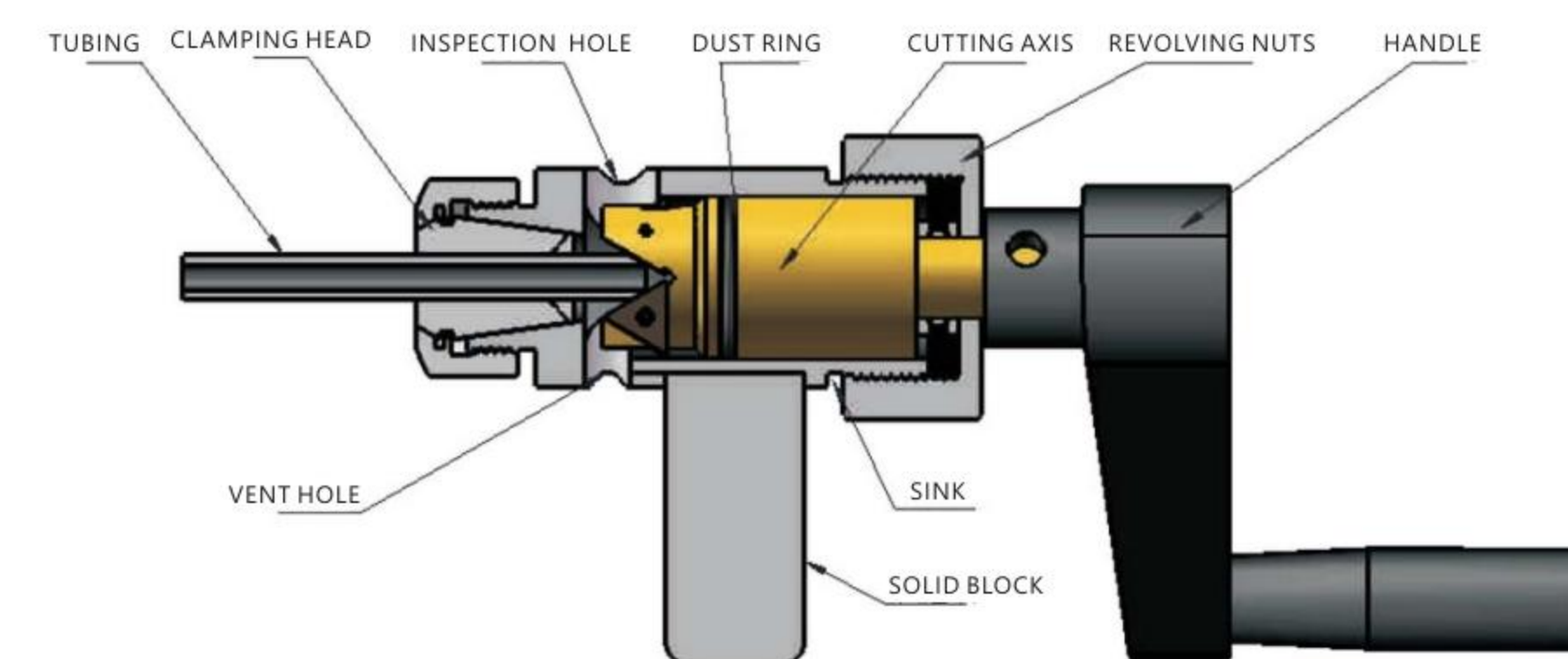
Number	Product Name	Specification	Size	Quantities
1	Conical manual tool	CTA	1/4"-9/16"	1 Set
2	Spare cutter	TNMG331MS	VP15TF	2 pcs
3	Spare cutter screws	MH3X10	M3X10	2 PCS
4	Collet head	ER25-1/4	1/4"OD	1 set
5	Collet head	ER25-3/8	3/8"OD	1 set
6	Collet head	ER25-9/16	9/16"OD	1 set
7	Spanner	ER25UM	ER25UM	1 set
8	Box spanner	MHBS10	T110	1 set
9	Threading oil	SKR.T.O	500ML	1 Bottle
10	Threading tool	TT4	1/4"OD	1 PC
11	Threading tool	TT6	3/8"OD	1 PC
12	Threading tool	TT9	9/16"OD	1PC
13	Die thread	1/4"OD	1/4"-28-LH	1 PC
14	Die thread	3/8"OD	3/8"-24-LH	1 PC
15	Die thread	9/16"OD	9/16"-16LH	1 PC



### 1.Manual tooling set application:

The Coning tool is designed for preparing to cone on the tubing ends for the 20,000 psi, 60,000 psi and ultra high pressure connections. The cone degrees are approximately 57 to 59 degree .The cutter and collets are interchangeable each other .

### 2. CTA exploded view



### 3.Conical tool operation guides:

- (1)First: Clamping fixed block of coning tool.
- (2)Adjust the sink width is slightly larger than the length of the cutting cone, loosen the clamping gland, put the tube into the collets inside, lock clamping nuts.
- (3)Through the inspection hole drop in the cutting oil so that cutting edges maintain lubricating.
- (4)Right hand turn the handle, at the same time left hand rotation screw gland nut(clockwise),at the beginning of the handle feels heavier, when the rotary gland is screwed almost to the end, speed up the rotation speed of the handle, When handle feels relaxed, show that complete the cutting, loosen the gland, pull out the tube and check the cone if is suitable, if not, continue above operation.

Tooling installation

4.SS tubing processing(CTA tool)step:

- (1)cone on the tubing ends.
- (2)left-hand thread onto high pressure tubing ends.

5.Processing tubes tips :

- (1)It is necessary to add tapping oil or lubrication oil for lubrication to prevent cutter wear and ensure cutting quality .
- (2)When cutting steel pipes, tighten the clamp nuts.
- (3)When rotating the rocker arm during cutting operation, the force and speed should be uniform. Slowly rotate and tighten the nut, control the feed amount, and visually measure the processing situation from the inspection hole;
- (4)Regularly (six months) disassemble tools to clean dirt, apply Lubricating grease to thrust bearings and cutting shaft rotating parts.



CTA conical tool assembly picture 1



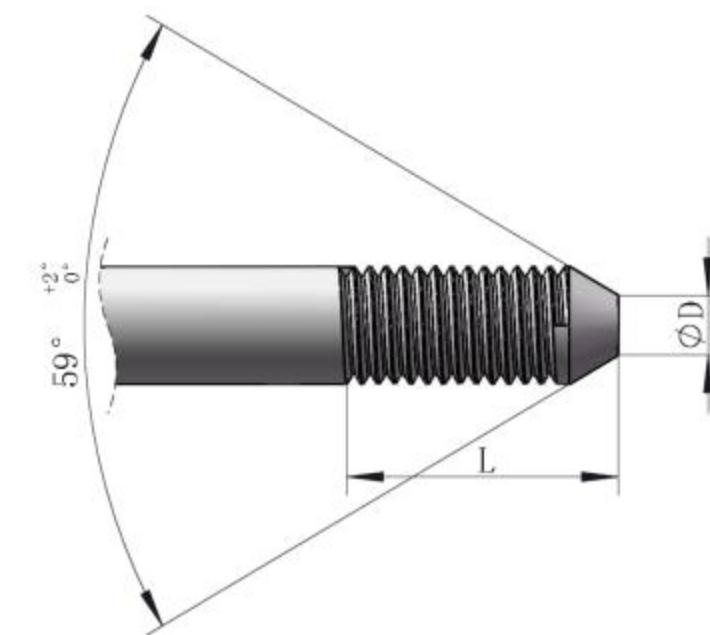
Manual Threading tool assembly picture 2

6.SS tube threading operation tips:

Threading Tool can be threaded manual making LH Screw is an essential tool for high pressure Tubing, Design of the guide sleeve, ensure the concentricity of processing.

7.Threading tool Operation guides:

- (1)Clamping fixed block of coning tool (horizontal or vertical installation).
- (2)Loosen the tighten nuts and remove the handle together.
- (3)The pipe cone inserts into the chuck outward and lock the nuts.(picture 2)
- (4)In the inspection hole drops into the cutting oil to maintain lubricating on blade teeth.
- (5)Hold the handle with both hands, the threading hole pressing totrap the cone end, in a counter clockwise rotating forcibly tools, turn back after each turn 1~2 rounds.
- (6)Chip cutting discharge, then turned into, according to the required length of the left-hand thread cutting out, finally inversion tools completely out.



Important tips:

- (1)The threading should be lubricated with tapping oil and the set screw should be locked tightly.
- (2)During operation, try to keep the end surface of the wrench perpendicular to the stainless steel tube.

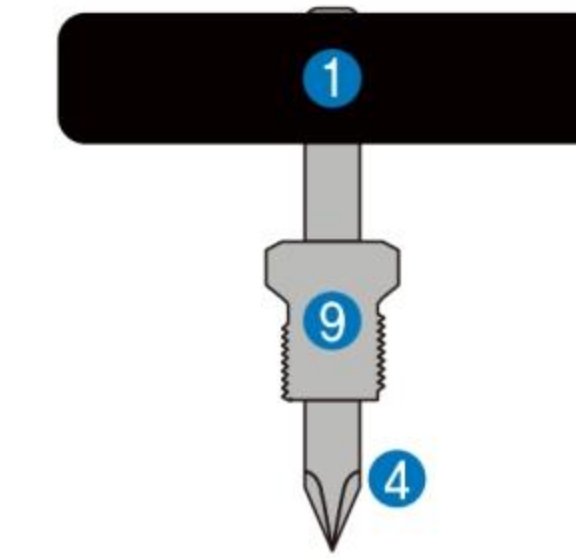
Table 2:Threading and conical surface size

O.DxI.D inch.	Size			Thread size inch
	Working pressure psi	D	L	
1/4"x0.109	20,000	3.6	8.7	1/4"-28-L.H
1/4"x0.083	60,000	3.2	14.3	1/4"-28-L.H
3/8"x0.203	20,000	6.4	11.1	3/8"-24-L.H
3/8"x0.125	60,000	5.6	19.1	3/8"-24-L.H
9/16"x0.312	20,000	10.3	12.7	9/16"-18-L.H
9/16"x0.187	60,000	7.1	23.8	9/16"-18-L.H

Reseating tool

Description:

USUN'S reseating tools are specially designed for medium pressure or high pressure female connections. The tools can be used to repair the inner cones of medium pressure or high pressure female connections manually. The tool taper is 60 degrees. Spring loaded design for better quality of internal cone.



- 1 Handle Set
- 4 Cutter
- 9 Guiding Bushing

Ordering Information

Part NO.	For Tubing Size
RT2	1/8"O.D
RT4	1/4"O.D
RT6	3/8"O.D
RT9	9/16"O.D

Bending tool

Description:

A lever bender is a tool that specifically bends a tube. Two long handles act as levers, reducing the force of bending the tube. A special arc is designed to match the diameter of the tube, so the tube will not be crushed when it is bent. The disc is engraved with an angular scale that helps us bend the tube to the angle we need. USUN's lever benders can be used to manually bend steel tubes, copper tubes, stainless steel tubes and other metal tubes.



Ordering Information

Part NO.	Tubing Size
BT4	1/4"O.D
BT6	3/8"O.D
BT9	9/16"O.D

# HIGH PRESSURE GAUGES

## High pressure gauges

### Product Description

USUN EN series pressure gauges provide economical reliable service in a wide variety of application including liquid pumps, compressors, oil industrial and etc . Pressure gauge refers to an instrument that uses elastic elements as sensitive elements to measure and indicate pressure higher than the ambient pressure. It is extremely popular, and it covers almost all industrial processes and scientific research fields . It can be seen every where in the fields of heating pipe network, oil and gas transmission, water and gas supply system, vehicle repair and maintenance factories and stores .

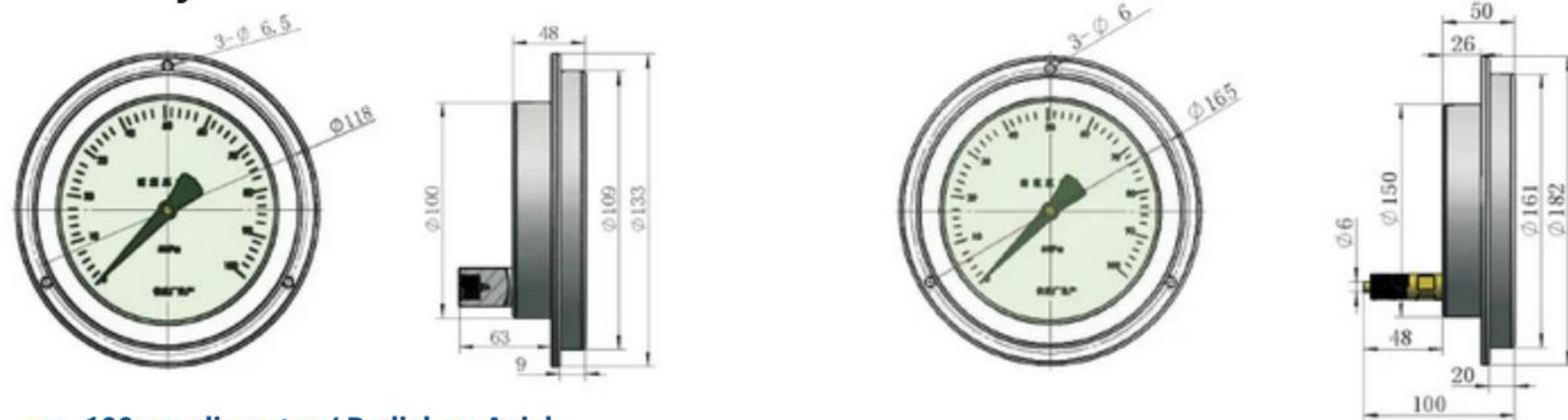
### Main features :

- ★ USUN Ultra high pressure gauge can reach a maximum pressure of up to 4000bar .
- ★ USUN provides various pressure gauges for measuring system pressures, as shown in the figure.
- ★ The dial and connecting parts are made of stainless steel material.
- ★ The pressure gauge has a safety glass layer, with an accuracy of 1.6% and 2.5%.



■ Radial connection ■ Axial connection

### Product Layout size



■ 100mm diameter / Radial or Axial

■ 150mm diameter / Radial or Axial

### Radial bottom connection type

Model	Dial Diameter	Pressure Range	Precision	Body Material	Connection Size
EN100-100-G1/2,HF4 or M20X1.5	100	100	0.016	304	G1/2,(Male) HF4,(Female) M20x1.5,(Male)
EN100-160-G1/2,HF4 or M20X1.5	100	160	0.016	304	
EN100-200-G1/2,HF4 or M20X1.5	100	200	0.016	304	
EN100-250-G1/2,HF4 or M20X1.5	100	250	0.025	304	
EN100-300-G1/2,HF4 or M20X1.5	100	300	0.025	304	
EN100-400-G1/2,HF4 or M20X1.5	100	400	0.025	304	
EN150-250-G1/2,HF4 or M20X1.5	150	250	0.025	304	
EN150-400-G1/2,HF4 or M20X1.5	150	400	0.025	304	

Model Example :EN100-100-HF4(First 100 refer dial diameter, second 100 refer pressure range ,HF4 refer connection type)

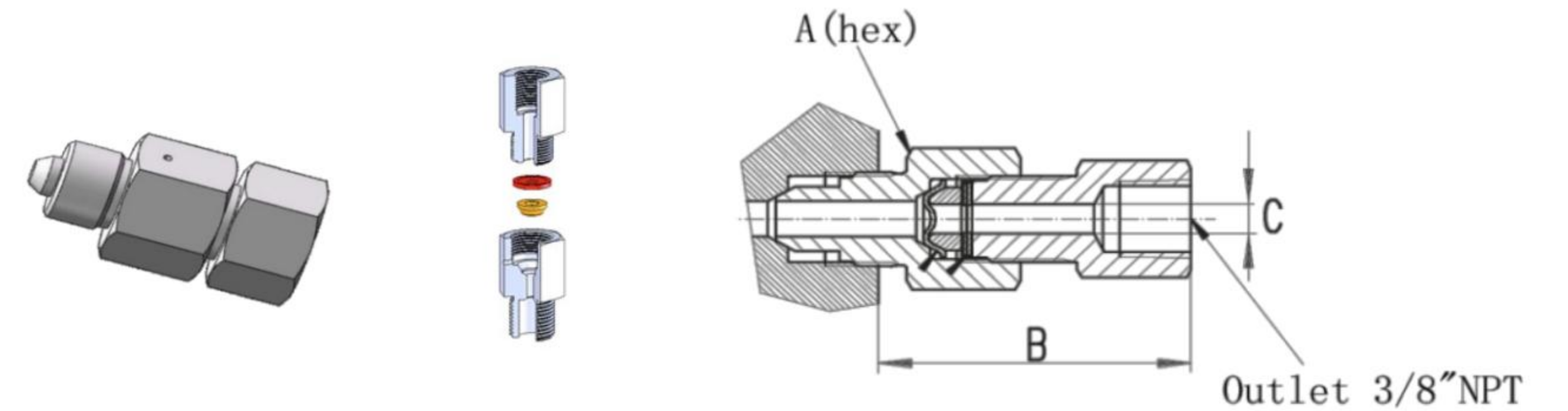
### Axial panel mounting connection type

Model	Dial Diameter	Pressure Range	Precision	Body Material	Connection Size
EN100-100-G1/2,HF4 or M20X1.5	100	100	0.016	304	G1/2,(Male ) HF4,(Female) M20x1.5,(Male)
EN100-160-G1/2,HF4 or M20X1.5	100	160	0.016	304	
EN100-200-G1/2,HF4 or M20X1.5	100	200	0.016	304	
EN100-250-G1/2,HF4 or M20X1.5	100	250	0.025	304	
EN100-300-G1/2,HF4 or M20X1.5	100	300	0.025	304	
EN100-400-G1/2,HF4 or M20X1.5	100	400	0.025	304	
EN150-250-G1/2,HF4 or M20X1.5	150	250	0.025	304	
EN150-400-G1/2,HF4 or M20X1.5	150	400	0.025	304	

# SAFETY HEAD ASSEMBLY AND RUPTURE DISCS

## Safety Head Assembly

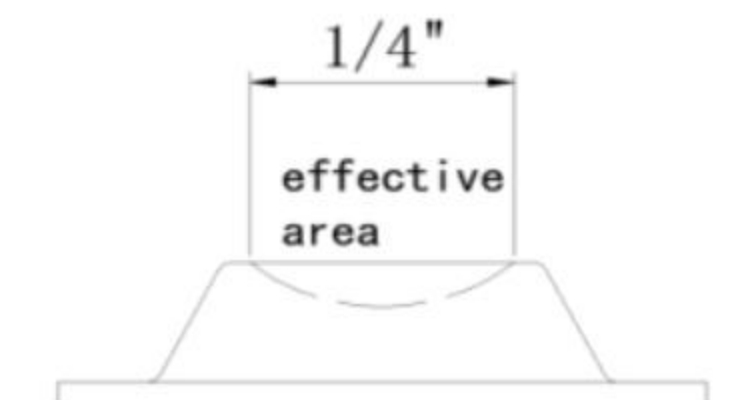
The safety head assembly is used to provide overpressure protection for high pressure systems. These safety head assemblies are used with suitable rupture discs.



Catalog No.	Tube O,D	Orifice(mm)	A	B	C
20SH-LM4	1/4"	2.8	25.4	84	6.4
20SH-LM6	3/8"	3.2	25.4	83	6.4
20SH-LM9	9/16"	3.2	25.4	80	6.4
30SH-HM4	1/4"	2.4	25.4	83	6.4
30SH-HM6	3/8"	3.2	25.4	51	6.4
30SH-HM9	9/16"	3.2	30.2	75	6.4
60SH-HM4	1/4"	2.4	25.4	75	6.4
60SH-HM6	3/8"	3.2	25.4	51	6.4
60SH-HM9	9/16"	3.2	34.9	71	6.4

## HIGH PRESSURE RUPTURE DISCS

- ★ Special bursting safety devices are required to provide protection against extremely high pressures. Our product range includes two different designs
- ★ Flat high-pressure rupture discs - bursting pressure up to 600 bar (8700 psi)
- ★ Hat-shaped high-pressure rupture discs - bursting pressure up to 6000 bar (87000psi) - which satisfy the extreme requirements by means of a conical seal seating.
- ★ Both types are made of stainless steels. Each rupture disc can also be supplied with a type plate which is attached to the bursting disc holder.
- ★ This makes it much easier to recognise and re-order the item after the element has burst.



## Rapture pressure range (PSI)

725	1160	1450	2175	2900	3625	4350	5075	5800	6525
7250	10160	11600	14500	15225	18125	21750	23200	25375	29000
32625	36250	43500	47125	50750	58000	61625	65250	87000	101500

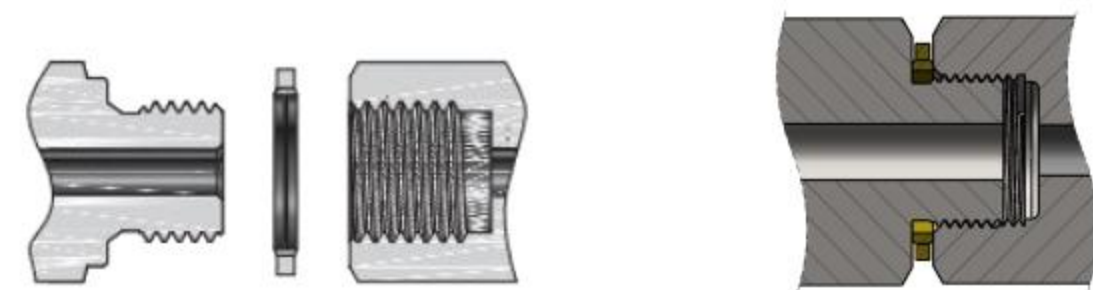
★ Rapture tolerance +/- 10%

Component Type	Pressure	Component Type	Connection Size	"A""B" Type
T=Adaptors	10=10,000psi	F=female	1=1/8"O.D	-T=NPT
	20=20,000psi =15,000psi	M=male	2=1/4"O.D	-C=BSPT
			3=3/8"O.D	-R=BSPP/G
	30=30,000psi		4=9/16"O.D	20-M=M20x1.5
	60=60,000psi		=1/2"O.D	J2=JIC4
			6=3/4"O.D	J3=JIC6
			8=1"O.D	J4=JIC8
				J5=JIC10
			J6=JIC12	
			J8=JIC16	

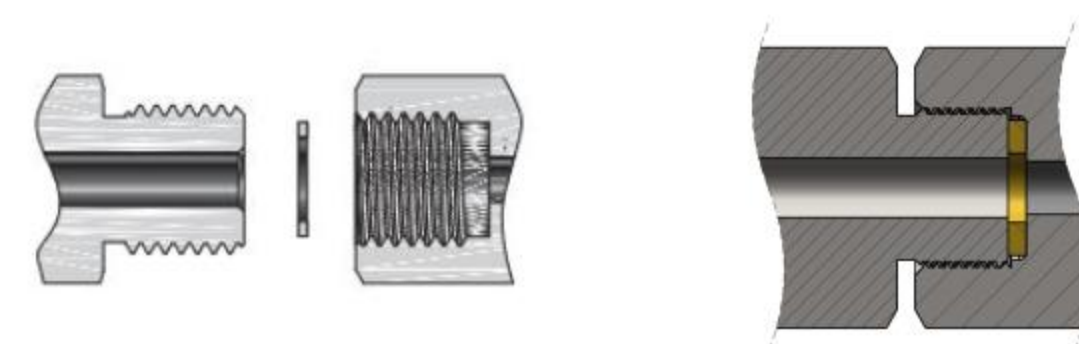
End Component	Configuration	Size	End Component	Configuration	Size	Working Pressure (psi)
Female NPT Thread		1/8":F1-T	Male NPT Thread		1/8":M1-T	15,000
		1/4":F2-T			1/4":M2-T	
		3/8":F3-T			3/8":M3-T	
		1/2":F4-T			1/2":M4-T	
		3/4":F6-T			3/4":M6-T	
Female Medium Pressure		1/4":F2	Male Medium Pressure		1/4":M2	20,000
		3/8":F3			3/8":M3	
		9/16":F4			9/16":M4	
		3/4":F6			3/4":M6	
Female High Pressure		1/8":F1	Male High Pressure		1/8":M1	60,000
		1/4":F2			1/4":M2	
		3/8":F3			3/8":M3	
		9/16":F4			9/16":M4	
Female JIC		7/16"-20:F2J	Male JIC		7/16"-20:F2J	20,000
		9/16"-18:F3J			9/16"-18:F3J	20,000
		3/4"-14:F4J			3/4"-14:F4J	20,000
		7/8"-14:F5J			7/8"-14:F5J	20,000
		1-1/16"-12:F6J			1-1/16"-12:F6J	15,000
1-5/16"-12:F8J	1-5/16"-12:F8J	15,000				

Parallel thread sealing Type

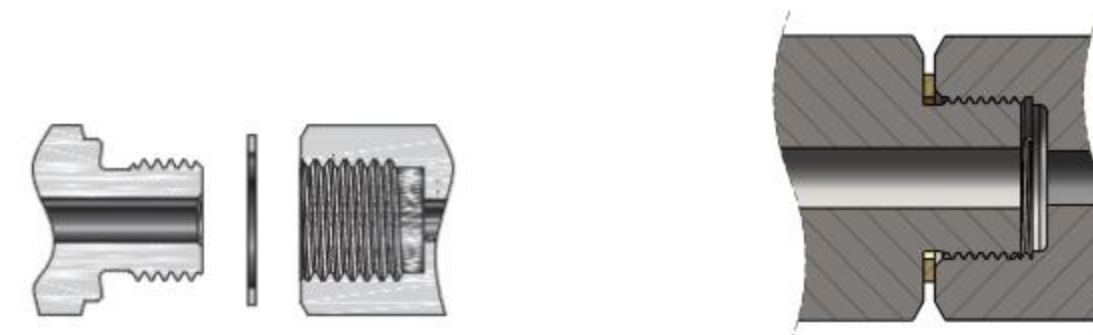
1.Flat top gasket sealing Type (Washer gasket :**RZ**)  
BSPP male x Washer gasket x BSPP Female



3.Flat bottom bronze washer sealing type (Bronze washer -**RG**) BSPP Male x BSPP Female X Bronze washer



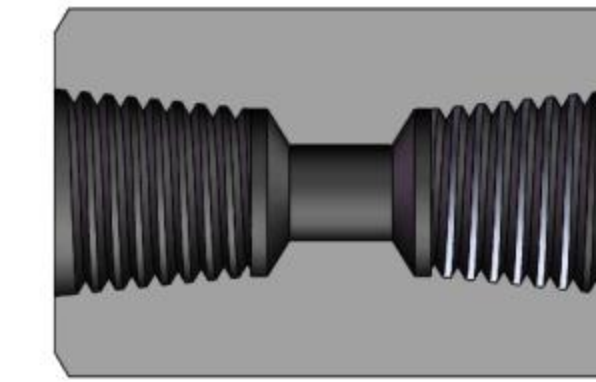
2.Flat top bronze washer sealing Type (Bronzer Washer -**RP**) BSPP male x Bronze washer x BSPP female



Couplings (female to female)

1.Using stainless steel 316 cold material for all High pressure adaptors and other material can be customized base on customer's requirements  
2.If used for hydrogen application ,should add suffix "-H<sub>2</sub>" after the part number. Example: **T15F2TF3-H2**.  
For BSPT threading Type Ordering code :T refer NPT , C refer BSPT and if need to change NPT to be BSPT , just change T to **C**. Example **T15F2TF3 to T15F2CF3**

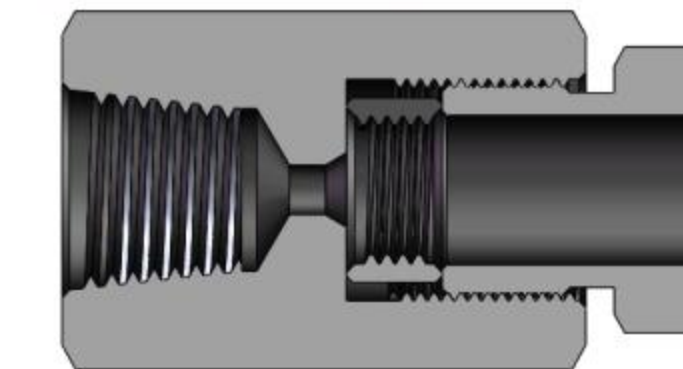
"A"  
Connection  
Female



"B"  
Connection  
Female

Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Pipe / 15,000 psi (1,034 bar)		Female Pipe / 10,000 psi (689 bar)		
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
Female Pipe							
1/4"NPT	NF4	15,000 psi(1034bar)	T15F2-TF2-T	T15F2-TF3-T	T15F2-TF4-T	T10F2-TF6-T	T10F2-TF8-T
3/8"NPT	NF6	15,000 psi(1034 bar)		T15F3-TF3-T	T15F3-TF4-T	T10F3-TF6-T	T10F3-TF8-T
1/2"NPT	NF8	15,000 psi(1034 bar)			T15F4-TF4-T	T10F4-TF6-T	T10F4-TF8-T
3/4"NPT	NF12	10,000 psi(689 bar)				T10F6-TF6-T	T10F6-TF8-T
1"NPT	NF16	10,000 psi(689 bar)					T10F8-TF8-T

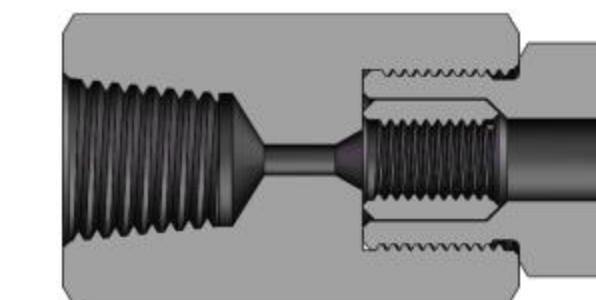
"A"  
Connection  
Female



"B"  
Connection  
Female

Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Medium / 20,000 psi (1,379 bar)		Female Pipe / 10,000 psi (689 bar)		
			1/4"LF4	3/8"LF6	9/16"LF9	3/4"LF12	1"LF16
Female Pipe							
1/4"NPT	NF4	15,000 psi(1034 bar)	T15F2-TF2	T15F2-TF3	T15F2-TF4	T15F2-TF6	T15F2-TF8
3/8"NPT	NF6	15,000 psi(1034 bar)	T15F3-TF2	T15F3-TF3	T15F3-TF4	T15F3-TF6	T15F3-TF8
1/2"NPT	NF8	15,000 psi(1034 bar)	T15F4-TF2	T15F4-TF3	T15F4-TF4	T15F4-TF6	T15F4-TF8
3/4"NPT	NF12	10,000 psi(689bar)	T10F6-TF2	T10F6-TF3	T10F6-TF4	T10F6-TF6	T10F6-TF8
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TF2	T10F8-TF3	T10F8-TF4	T10F8-TF6	T10F8-TF8

"A"  
Connection  
Female



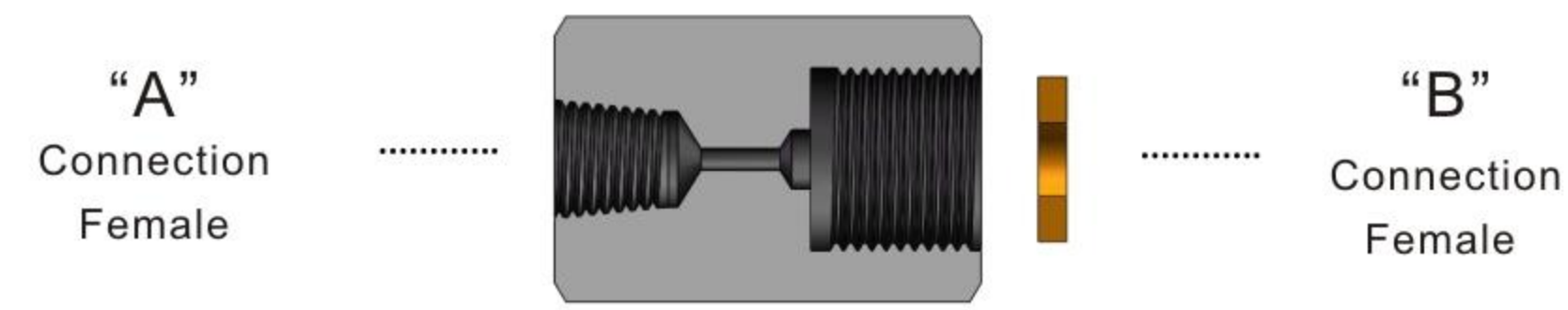
"B"  
Connection  
Female

Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female High / 60,000 psi (4,138 bar)				
			1/4"HF4	3/8"HF6	9/16"HF9		
Female Pipe							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-HF	T15F2-TF3-HF	T15F2-TF4-HF		
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF2-HF	T15F3-TF3-HF	T15F3-TF4-HF		
1/2"NPT	NF8	15,000 psi(1,034 bar)	T15F4-TF2-HF	T15F4-TF3-HF	T15F4-TF4-HF		
3/4"NPT	NF12	10,000 psi(689bar)	T10F6-TF2-HF	T10F6-TF3-HF	T10F6-TF4-HF		
1"NPT	NF16	10,000 psi(689bar)	T10F8-TF2-HF	T10F8-TF3-HF	T10F8-TF4-HF		

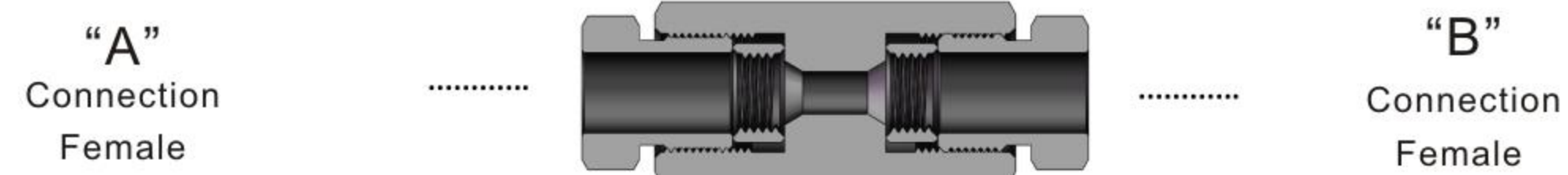


# ADAPTERS AND COUPLINGS

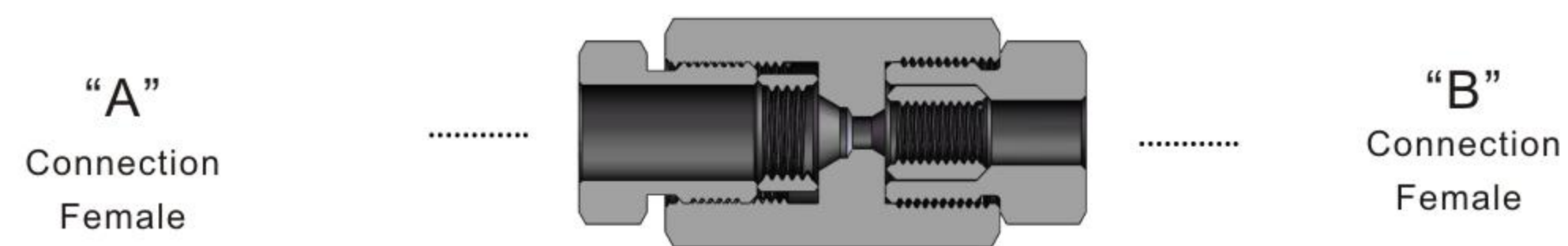
## Couplings (female to female)



Female Connection A			Female Connection B					
			Female British Standard Pipe / 30,000 psi (2,068 bar)					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/8" BSPP	1/4" BSPP	3/8" BSPP	1/2" BSPP	3/4" BSPP	1" BSPP
<b>Female Medium</b>								
1/4" NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF1-R-RG	T15F2-TF2-R-RG	T15F2-TF3-R-RG	T15F2-TF4-R-RG	T15F2-TF6-R-RG	T15F2-TF8-R-RG
3/8" NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF1-R-RG	T15F3-TF2-R-RG	T15F3-TF3-R-RG	T15F3-TF4-R-RG	T15F3-TF6-R-RG	T15F3-TF8-R-RG
1/2" NPT	NF8	15,000 psi(1,034 bar)	T15F4-TF1-R-RG	T15F4-TF2-R-RG	T15F4-TF3-R-RG	T15F4-TF4-R-RG	T15F4-TF6-R-RG	T15F4-TF8-R-RG
3/4" NPT	NF12	10,000 psi(689 bar)	T10F6-TF1-R-RG	T10F6-TF2-R-RG	T10F6-TF3-R-RG	T10F6-TF4-R-RG	T10F6-TF6-R-RG	T10F6-TF8-R-RG
1" NPT	NF16	10,000 psi(689 bar)	T10F8-TF1-R-RG	T10F8-TF2-R-RG	T10F8-TF3-R-RG	T10F8-TF4-R-RG	T10F8-TF6-R-RG	T10F8-TF8-R-RG



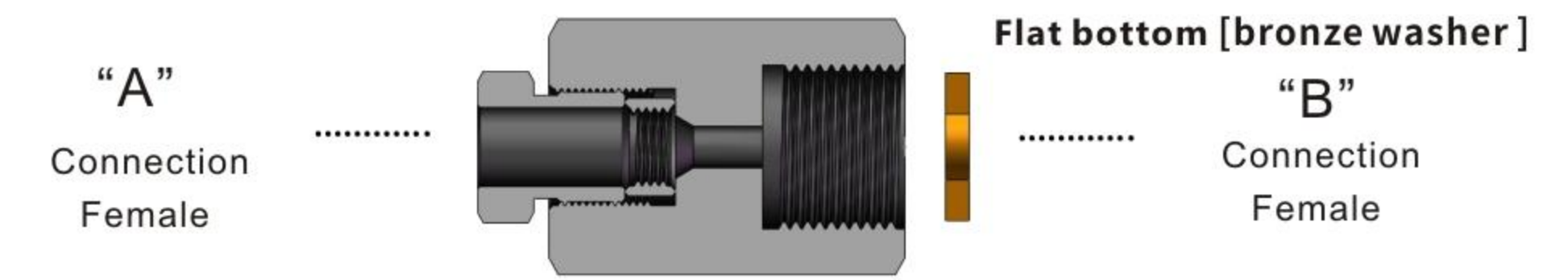
Female Connection A			Female Connection B				
			Female Medium / 20,000 psi (1,379 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" LF4	3/8" LF6	9/16" LF9	3/4" LF12	1" LF16
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T2021	T20F2F3	T20F2F4	T20F2F6	T20F2F8
3/8"	LF6	20,000 psi(1,379 bar)		T2031	T20F3F4	T20F3F6	T20F3F8
9/16"	LF9	20,000 psi(1,379 bar)			T2041	T20F4F6	T20F4F8
3/4"	LF12	20,000 psi(1,379 bar)				T2061	T20F6F8
1"	LF16	20,000 psi(1,379 bar)					T2081



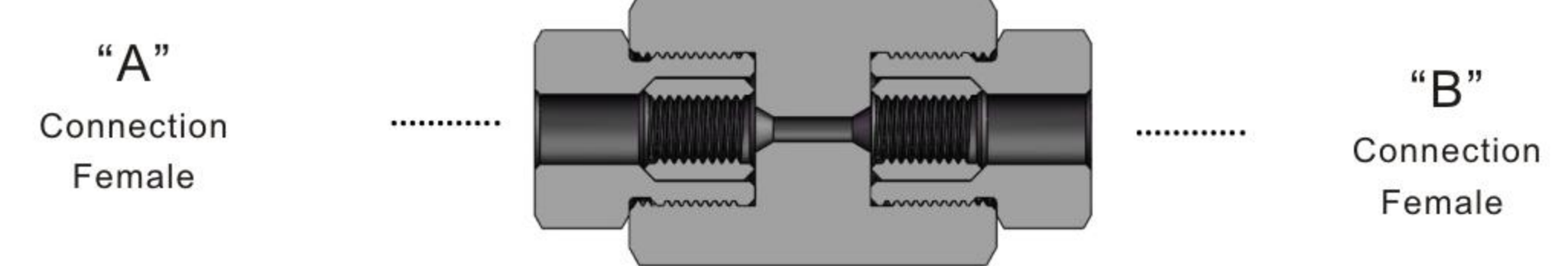
Female Connection A			Female Connection B				
			Female High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HF4	3/8" HF6	9/16" HF9		
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2F2-HF	T20F2F3-HF	T20F2F4-HF		
3/8"	LF6	20,000 psi(1,379 bar)	T20F3F2-HF	T20F3F3-HF	T20F3F4-HF		
9/16"	LF9	20,000 psi(1,379 bar)	T20F4F2-HF	T20F4F3-HF	T20F4F4-HF		
3/4"	LF12	20,000 psi(1,379 bar)	T20F6F2-HF	T20F6F3-HF	T20F6F4-HF		
1"	LF16	20,000 psi(1,379 bar)	T20F8F2-HF	T20F8F3-HF	T20F8F4-HF		

# ADAPTERS AND COUPLINGS

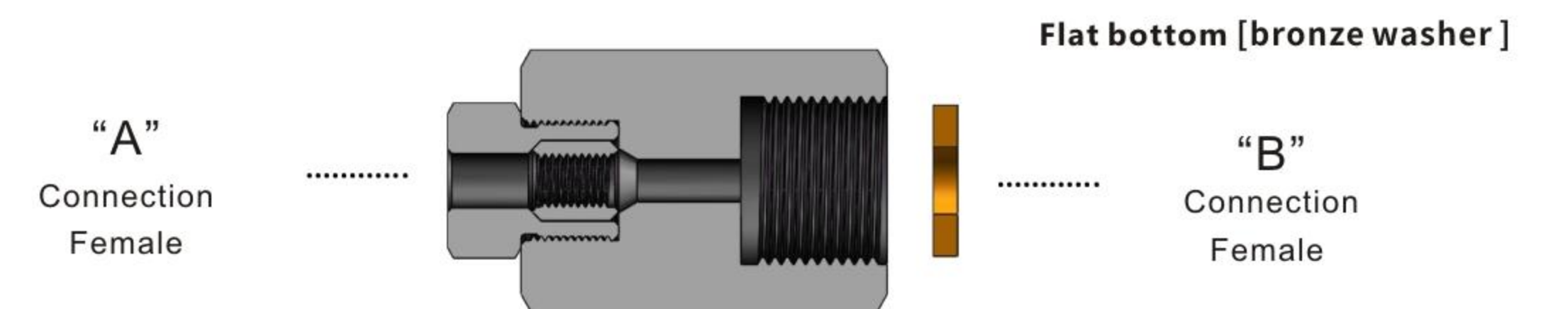
## Couplings (female to female)



Female Connection A			Female Connection B					
			Female British Standard Pipe / 30,000 psi (2,068 bar)					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/8" BSPP	1/4" BSPP	3/8" BSPP	1/2" BSPP	3/4" BSPP	1" BSPP
<b>Female Medium</b>								
1/4"	LF4	20,000 psi(1,379 bar)	T20F2F1-R-RG	T20F2F2-R-RG	T20F2F3-R-RG	T20F2F4-R-RG	T20F2F6-R-RG	T20F2F8-R-RG
3/8"	LF6	20,000 psi(1,379 bar)	T20F3F1-R-RG	T20F3F2-R-RG	T20F3F3-R-RG	T20F3F4-R-RG	T20F3F6-R-RG	T20F3F8-R-RG
9/16"	LF9	20,000 psi(1,379 bar)	T20F4F1-R-RG	T20F4F2-R-RG	T20F4F3-R-RG	T20F4F4-R-RG	T20F4F6-R-RG	T20F4F8-R-RG
3/4"	LF12	20,000 psi(1,379 bar)	T20F6F1-R-RG	T20F6F2-R-RG	T20F6F3-R-RG	T20F6F4-R-RG	T20F6F6-R-RG	T20F6F8-R-RG
1"	LF16	20,000 psi(1,379 bar)	T20F8F1-R-RG	T20F8F2-R-RG	T20F8F3-R-RG	T20F8F4-R-RG	T20F8F6-R-RG	T20F8F8-R-RG



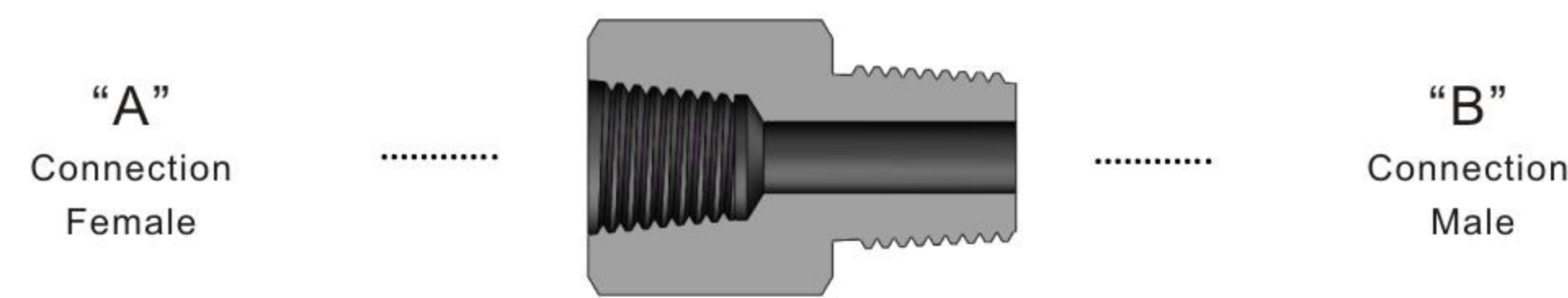
Female Connection A			Female Connection B				
			Female High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HF4	3/8" HF6	9/16" HF9		
<b>Female High</b>							
1/4"	HF4	60,000 psi(4,138 bar)	T6021	T60F2F3	T60F2F4		
3/8"	HF6	60,000 psi(4,138 bar)		T6031	T60F3F3		
9/16"	HF9	60,000 psi(4,138 bar)			T6041		



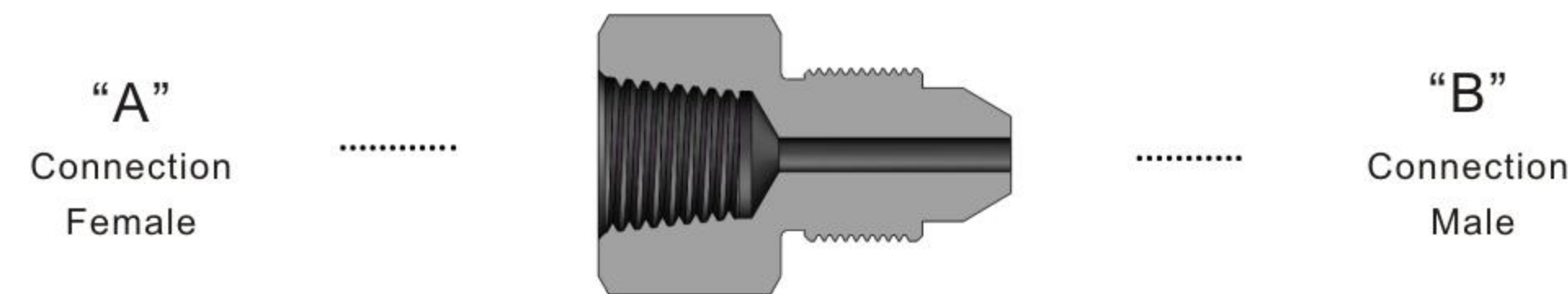
Female Connection A			Female Connection B					
			Female British Standard Pipe / 30,000 psi (2,068 bar)					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/8" BSPP	1/4" BSPP	3/8" BSPP	1/2" BSPP	3/4" BSPP	1" BSPP
<b>Female High</b>								
1/4"	HF4	60,000 psi(4,138 bar)	T30F2F1-R-RG	T30F2F2-R-RG	T30F2F3-R-RG	T30F2F4-R-RG	T30F2F6-R-RG	T30F2F8-R-RG
3/8"	HF6	60,000 psi(4,138 bar)	T30F3F1-R-RG	T30F3F2-R-RG	T30F3F3-R-RG	T30F3F4-R-RG	T30F3F6-R-RG	T30F3F8-R-RG
9/16"	HF9	60,000 psi(4,138 bar)	T30F4F1-R-RG	T30F4F2-R-RG	T30F4F3-R-RG	T30F4F4-R-RG	T30F4F6-R-RG	T30F4F8-R-RG

# ADAPTERS AND COUPLINGS

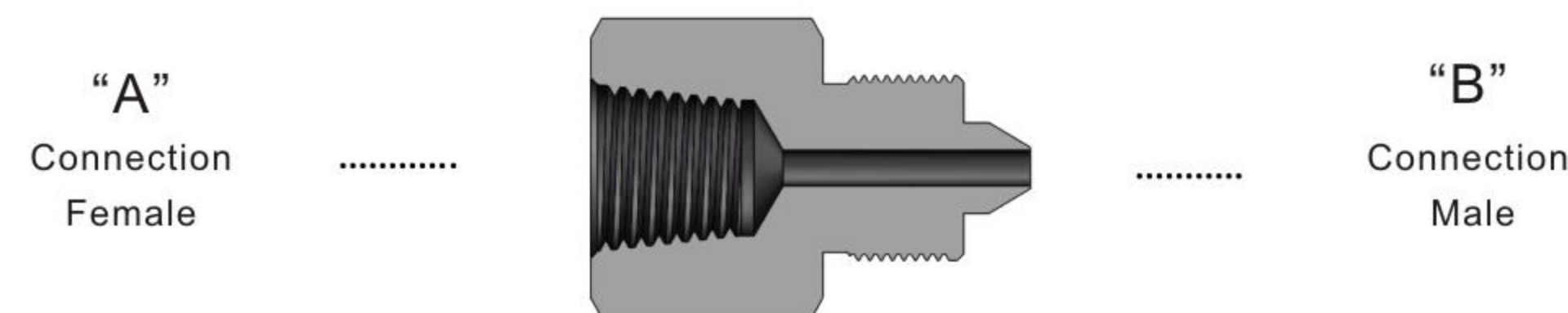
## HIGH PRESSURE COUPLINGS (FEMALE TO MALE)



Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Pipe / 15,000 psi (1,034bar)			Female Pipe / 10,000 psi (689 bar)	
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TM2-T	T15F2-TM3-T	T15F2-TM4-T	T15F2-TM6-T	T15F2-TM8-T
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TM2-T	T15F3-TM3-T	T15F3-TM4-T	T15F3-TM6-T	T15F3-TM8-T
1/2"NPT	NF8	15,000 psi(1,034 bar)	T15F4-TM2-T	T15F4-TM3-T	T15F4-TM4-T	T15F4-TM6-T	T15F4-TM8-T
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TM2-T	T10F6-TM3-T	T10F6-TM4-T	T10F6-TM6-T	T10F6-TM8-T
1"NPT	NF16	10,000 psi(689bar)	T10F8-TM2-T	T10F8-TM3-T	T10F8-TM4-T	T10F8-TM6-T	T10F8-TM8-T



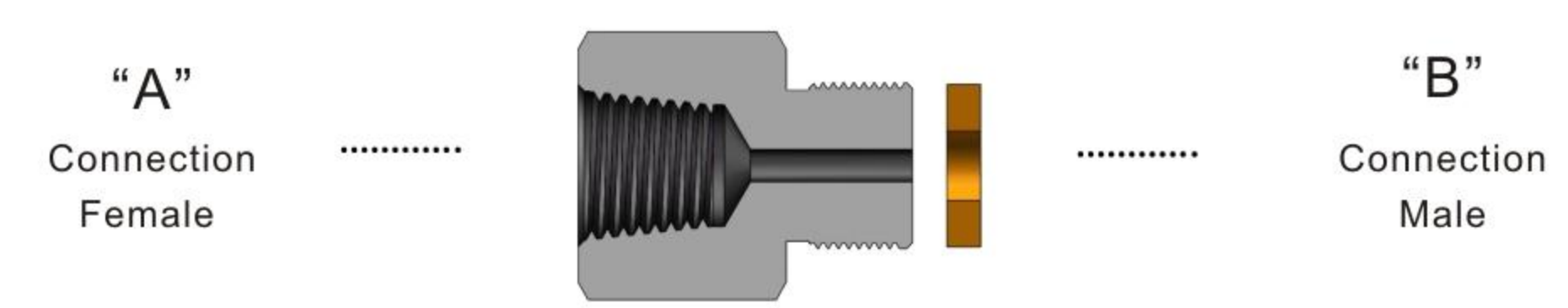
Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Medium / 20,000 psi (1,379 bar)			Female Pipe / 10,000 psi (689 bar)	
			1/4"LM4	3/8"LM6	9/16"LM9	3/4"LM12	1"LM16
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TM2	T15F2-TM3	T15F2-TM4	T15F2-TM6	T15F2-TM8
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TM2	T15F3-TM3	T15F3-TM4	T15F3-TM6	T15F3-TM8
1/2"NPT	NF8	15,000 psi(1,034 bar)	T15F4-TM2	T15F4-TM3	T15F4-TM4	T15F4-TM6	T15F4-TM8
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TM2	T10F6-TM3	T10F6-TM4	T10F6-TM6	T10F6-TM8
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TM2	T10F8-TM3	T10F8-TM4	T10F8-TM6	T10F8-TM8



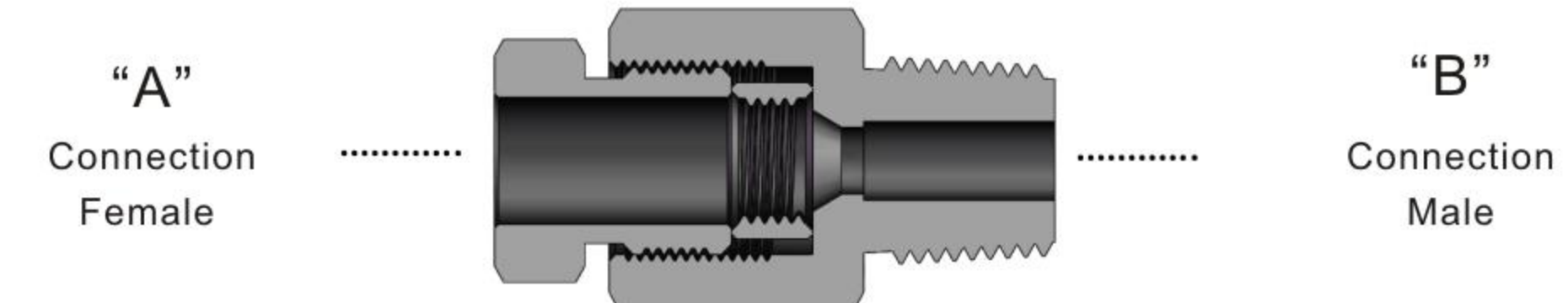
Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male High / 60,000 psi (4,138 bar)				
			1/4"HM4	3/8"HM6	9/16"HM9		
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TM2-HF	T15F2-TM3-HF	T15F2-TM4-HF		
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TM2-HF	T15F3-TM3-HF	T15F3-TM4-HF		
1/2"NPT	NF8	15,000 psi(1,034 bar)	T15F4-TM2-HF	T15F4-TM3-HF	T15F4-TM4-HF		
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TM2-HF	T10F6-TM3-HF	T10F6-TM4-HF		
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TM2-HF	T10F8-TM3-HF	T10F8-TM4-HF		

# ADAPTERS AND COUPLINGS

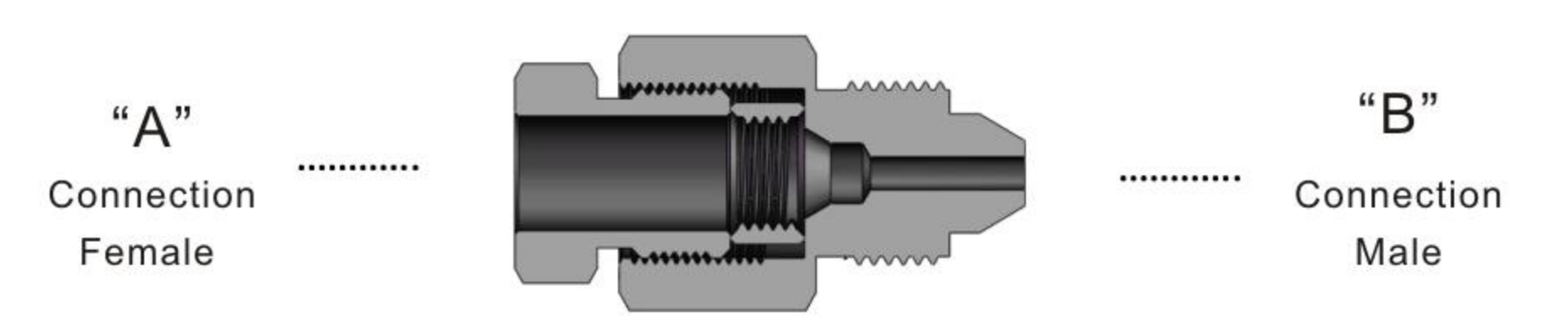
## COUPLINGS (FEMALE TO MALE)



Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male British Standard Pipe /30,000 psi (2,068bar)				
			1/4"BSPP	3/8"BSPP	1/2"BSPP	3/4"BSPP	1"BSPP
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TM2-R-RG	T15F2-TM3-R-RG	T15F2-TM4-R-RG	T15F2-TM6-R-RG	T15F2-TM8-R-RG
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TM2-R-RG	T15F3-TM3-R-RG	T15F3-TM4-R-RG	T15F3-TM6-R-RG	T15F3-TM8-R-RG
1/2"NPT	NF8	15,000 psi(1,034 bar)	T15F4-TM2-R-RG	T15F4-TM3-R-RG	T15F4-TM4-R-RG	T15F4-TM6-R-RG	T15F4-TM8-R-RG
3/4"NPT	NF12	15,000 psi(1,034 bar)	T10F6-TM2-R-RG	T10F6-TM3-R-RG	T10F6-TM4-R-RG	T10F6-TM6-R-RG	T10F6-TM8-R-RG
1"NPT	NF16	15,000 psi(1,034 bar)	T10F8-TM2-R-RG	T10F8-TM3-R-RG	T10F8-TM4-R-RG	T10F8-TM6-R-RG	T10F8-TM8-R-RG



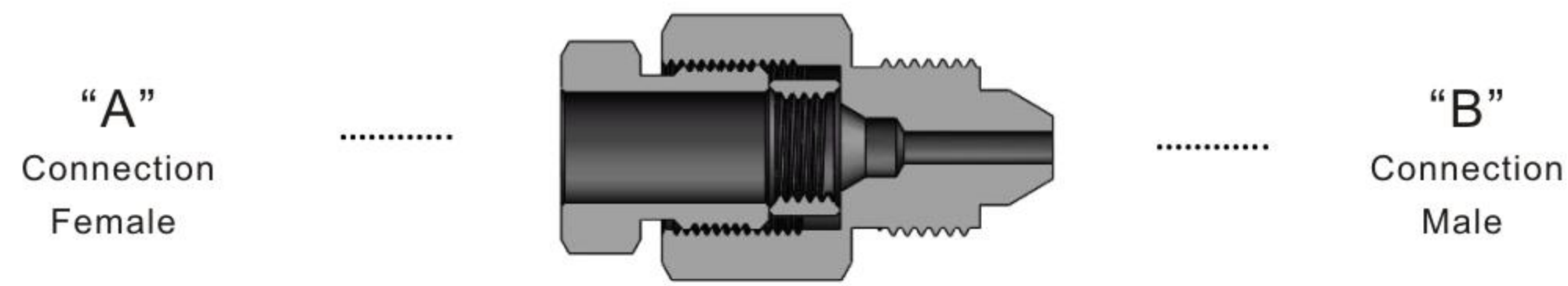
Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Medium / 15,000 psi (1,034 bar)			10,000 psi (689 bar)	
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T15F2M2-T	T15F2M3-T	T15F2M4-T	T10F2M6-T	T10F2M8-T
3/8"	LF6	20,000 psi(1,379 bar)	T15F3M2-T	T15F3M3-T	T15F3M4-T	T10F3M6-T	T10F3M8-T
9/16"	LF9	20,000 psi(1,379 bar)	T15F4M2-T	T15F4M3-T	T15F4M4-T	T10F4M6-T	T10F4M8-T
3/4"	LF12	20,000 psi(1,379 bar)	T15F6M2-T	T15F6M3-T	T15F6M4-T	T10F6M6-T	T10F6M8-T
1"	LF16	20,000 psi(1,379 bar)	T15F8M2-T	T15F8M3-T	T15F8M4-T	T10F8M6-T	T10F8M8-T



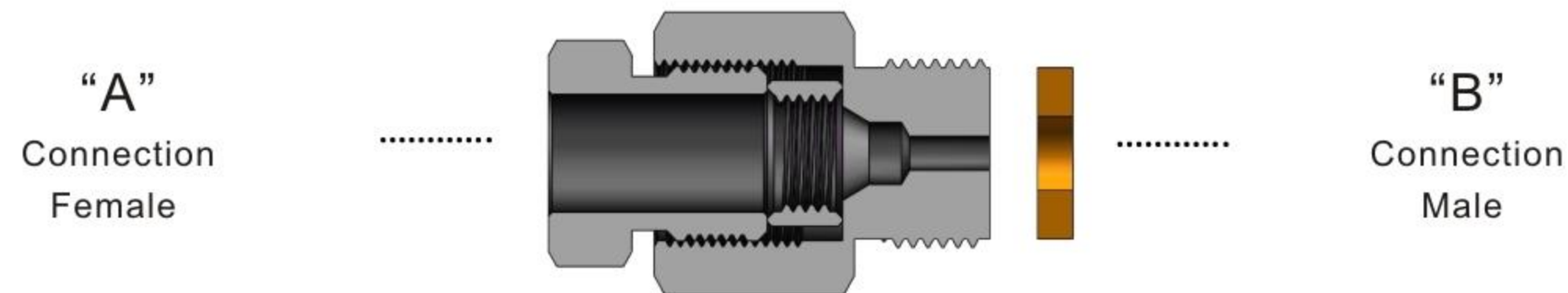
Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male High / 20,000 psi (1,379 bar)				
			1/4"LM4	3/8"LM6	9/16"LM9	3/4"LM12	1"LM16
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2M2	T20F2M3	T20F2M4	T20F2M6	T20F2M8
3/8"	LF6	20,000 psi(1,379 bar)	T20F3M2	T20F3M3	T20F3M4	T20F3M6	T20F3M8
9/16"	LF9	20,000 psi(1,379 bar)	T20F4M2	T20F4M3	T20F4M4	T20F4M6	T20F4M8
3/4"	LF12	20,000 psi(1,379 bar)	T20F6M2	T20F6M3	T20F6M4	T20F6M6	T20F6M8
1"	LF16	20,000 psi(1,379 bar)	T20F8M2	T20F8M3	T20F8M4	T20F8M6	T20F8M8

# ADAPTERS AND COUPLINGS

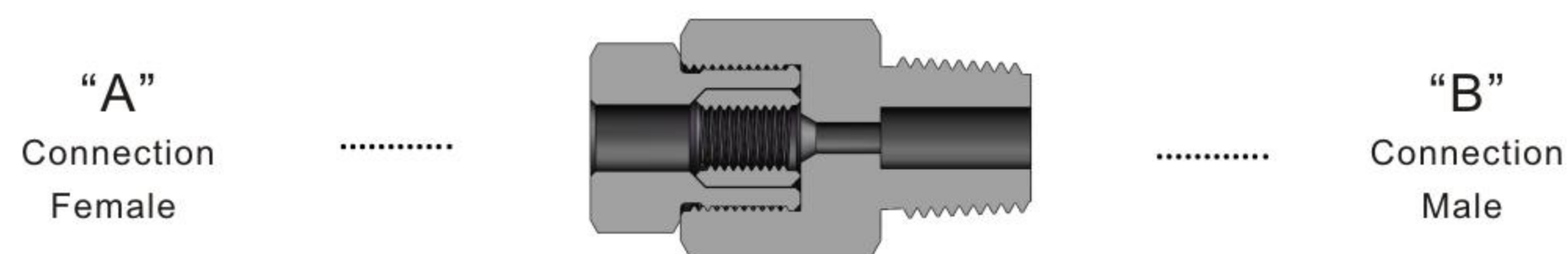
## COUPLINGS (FEMALE TO MALE)



Female Connection A			Male Connection B				
			Male High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HM4	3/8" HM6	9/16" HM9		
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2M2-HF	T20F2M3-HF	T20F2M4-HF		
3/8"	LF6	20,000 psi(1,379 bar)	T20F3M2-HF	T20F3M3-HF	T20F3M4-HF		
9/16"	LF9	20,000 psi(1,379 bar)	T20F4M2-HF	T20F4M3-HF	T20F4M4-HF		
3/4"	LF12	20,000 psi(1,379 bar)	T20F6M2-HF	T20F6M3-HF	T20F6M4-HF		
1"	LF16	20,000 psi(1,379 bar)	T20F8M2-HF	T20F8M3-HF	T20F8M4-HF		



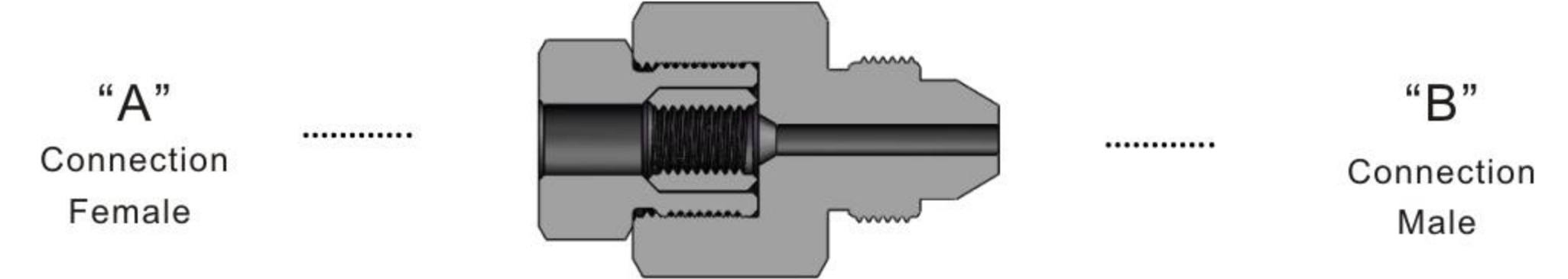
Female Connection A			Male Connection B				
			Male British Standard Pipe /30,000 psi (2,068bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" BSPP	3/8" BSPP	1/2" BSPP	3/4" BSPP	1" BSPP
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2M2-R-RG	T20F2M3-R-RG	T20F2M4-R-RG	T20F2M6-R-RG	T20F2M8-R-RG
3/8"	LF6	20,000 psi(1,379 bar)	T20F3M2-R-RG	T20F3M3-R-RG	T20F3M4-R-RG	T20F3M6-R-RG	T20F3M8-R-RG
9/16"	LF9	20,000 psi(1,379 bar)	T20F4M2-R-RG	T20F4M3-R-RG	T20F4M4-R-RG	T20F4M6-R-RG	T20F4M8-R-RG
3/4"	LF12	20,000 psi(1,379 bar)	T20F6M2-R-RG	T20F6M3-R-RG	T20F6M4-R-RG	T20F6M6-R-RG	T20F6M8-R-RG
1"	LF16	20,000 psi(1,379 bar)	T20F8M2-R-RG	T20F8M3-R-RG	T20F8M4-R-RG	T20F8M6-R-RG	T20F8M8-R-RG



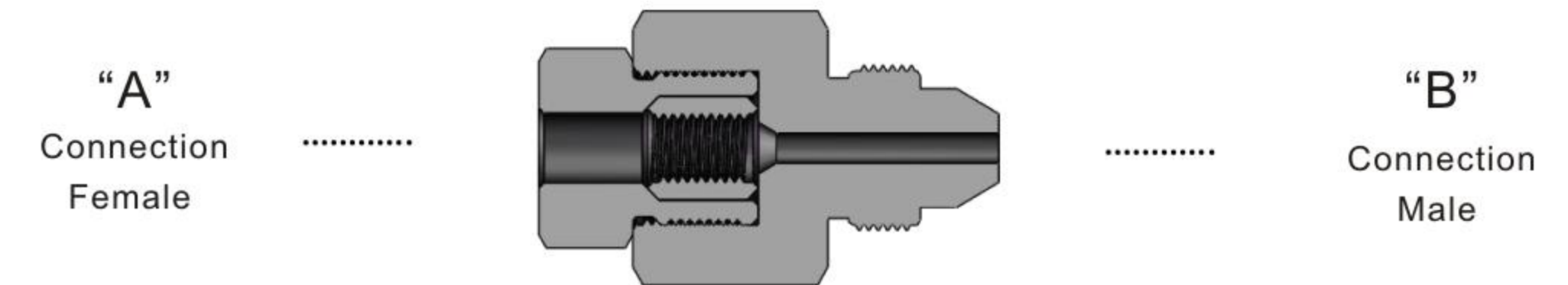
Female Connection A			Male Connection B				
			Male Pipe /15,000 psi (1,034bar)		Male Pipe /10000 psi (689bar)		
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female High</b>							
1/4"	HF4	60,000 psi (4,138 bar)	T15F2-HFM2-T	T15F2-HFM3-T	T15F2-HFM4-T	T10F2-HFM6-T	T10F2-HFM8-T
3/8"	HF6	60,000 psi (4,138 bar)	T15F3-HFM2-T	T15F3-HFM3-T	T15F3-HFM4-T	T10F3-HFM6-T	T10F3-HFM8-T
9/16"	HF9	60,000 psi (4,138 bar)	T15F4-HFM2-T	T15F4-HFM3-T	T15F4-HFM4-T	T10F4-HFM6-T	T10F4-HFM8-T

# ADAPTERS AND COUPLINGS

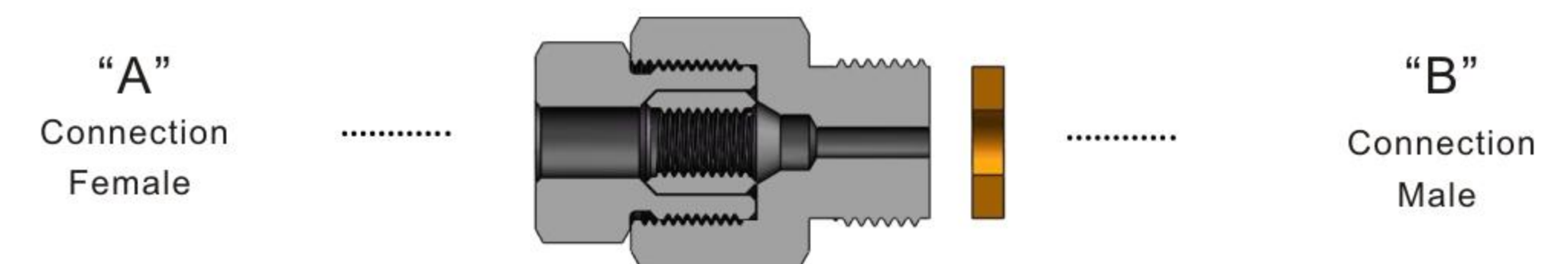
## COUPLINGS (FEMALE TO MALE)



Female Connection A			Male Connection B				
			Male Medium / 20,000 psi (1,379 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" LM4	3/8" LM6	9/16" LM9	3/4" LM12	1" LM16
<b>Female High</b>							
1/4"	HF4	60,000 psi(4,138 bar)	T20F2-HFM2	T20F2-HFM3	T20F2-HFM4	T20F2-HFM6	T20F2-HFM8
3/8"	HF6	60,000 psi(4,138 bar)	T20F3-HFM2	T20F3-HFM3	T20F3-HFM4	T20F3-HFM6	T20F3-HFM8
9/16"	HF9	60,000 psi(4,138 bar)	T20F4-HFM2	T20F4-HFM3	T20F4-HFM4	T20F4-HFM6	T20F4-HFM8

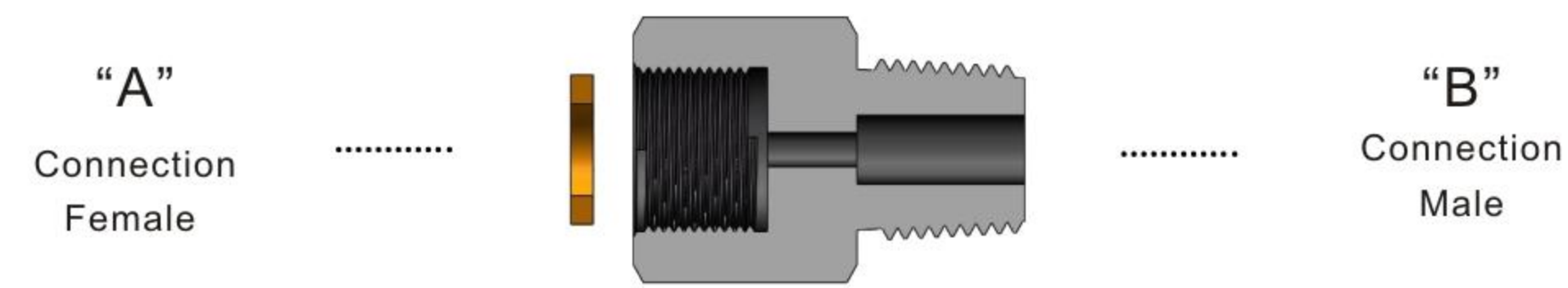


Female Connection A			Male Connection B				
			Male High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HM4	3/8" HM6	9/16" HM9		
<b>Female High</b>							
1/4"	HF4	60,000 psi(4,138 bar)	T60F2M2	T60F2M3	T60F2M4		
3/8"	HF6	60,000 psi(4,138 bar)	T60F3M2	T60F3M3	T60F3M4		
9/16"	HF9	60,000 psi(4,138 bar)	T60F4M2	T60F4M3	T60F4M4		

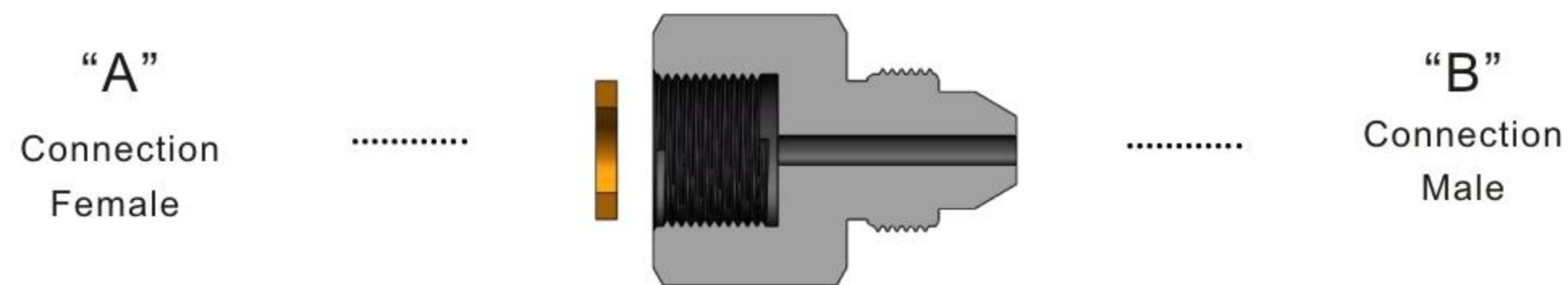


Female Connection A			Male Connection B				
			Male British Standard Pipe/30,000 psi (2,068bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" BSPP	3/8" BSPP	1/2" BSPP	3/4" BSPP	1" BSPP
<b>Female High</b>							
1/4"	HF4	60,000 psi(4,138 bar)	T30F2 M2-R-RG	T30F2 M3-R-RG	T30F2 M4-R-RG	T30F2 M6-R-RG	
3/8"	HF6	60,000 psi(4,138 bar)	T30F3 M2-R-RG	T30F3 M3-R-RG	T30F3 M4-R-RG	T30F3 M6-R-RG	
9/16"	HF9	60,000 psi(4,138 bar)	T30F4 M2-R-RG	T30F4 M3-R-RG	T30F4 M4-R-RG	T30F4 M6-R-RG	

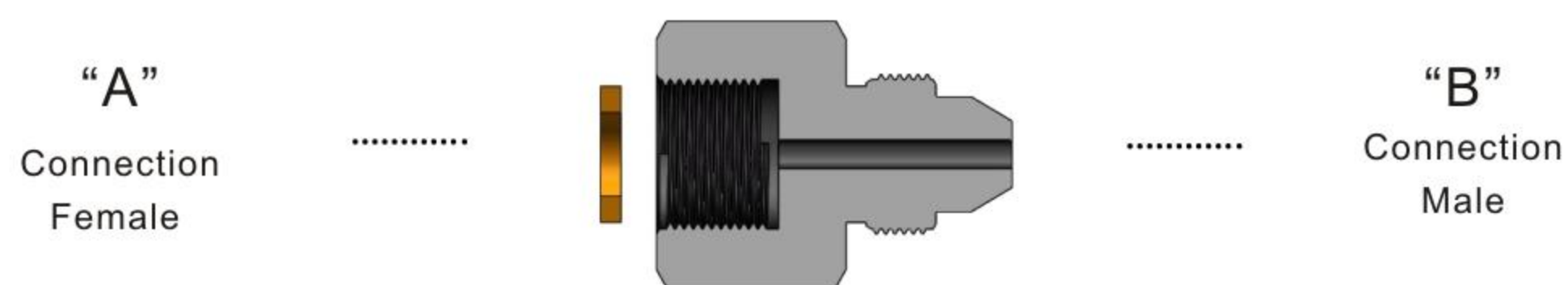
## ADAPTERS AND COUPLINGS COUPLINGS (FEMALE TO MALE)



Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Pipe / 15,000 psi (1,034 bar)		Male Pipe / 10,000 psi (689 bar)		
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female British Standard Pipe</b>							
1/4"	BSPP	30,000 psi(2,068 bar)	T15F2-R-RGM2-T	T15F2-R-RGM3-T	T15F2-R-RGM4-T	T10F2-R-RGM6-T	T10F2-R-RGM8-T
3/8"	BSPP	30,000 psi(2,068 bar)	T15F3-R-RGM2-T	T15F3-R-RGM3-T	T15F3-R-RGM4-T	T10F3-R-RGM6-T	T10F3-R-RGM8-T
1/2"	BSPP	30,000 psi(2,068 bar)	T15F4-R-RGM2-T	T15F4-R-RGM3-T	T15F4-R-RGM4-T	T10F4-R-RGM6-T	T10F4-R-RGM8-T
3/4"	BSPP	30,000 psi(2,068 bar)	T15F6-R-RGM2-T	T15F6-R-RGM3-T	T15F6-R-RGM4-T	T10F6-R-RGM6-T	T10F6-R-RGM8-T
1"	BSPP	30,000 psi(2,068 bar)	T15F8-R-RGM2-T	T15F8-R-RGM3-T	T15F8-R-RGM4-T	T10F8-R-RGM6-T	T10F8-R-RGM8-T

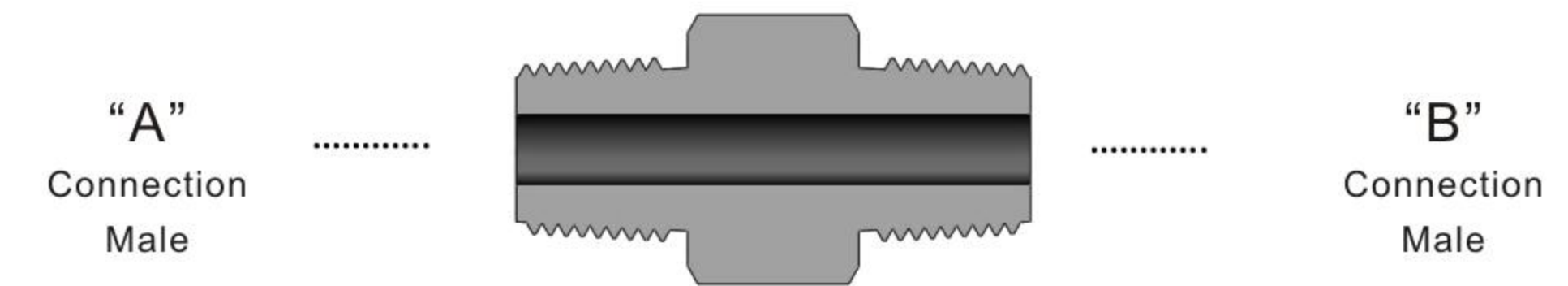


Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Medium / 20,000 psi (1,379 bar)				
			1/4"LM4	3/8"LM6	9/16"LM9	3/4"LM12	1"LM16
<b>Female British Standard Pipe</b>							
1/4"	BSPP	30,000 psi(2,068 bar)	T20F2-R-RGM2	T20F2-R-RGM3	T20F2-R-RGM4	T20F2-R-RGM6	T20F2-R-RGM8
3/8"	BSPP	30,000 psi(2,068 bar)	T20F3-R-RGM2	T20F3-R-RGM3	T20F3-R-RGM4	T20F3-R-RGM6	T20F3-R-RGM8
1/2"	BSPP	30,000 psi(2,068 bar)	T20F4-R-RGM2	T20F4-R-RGM3	T20F4-R-RGM4	T20F4-R-RGM6	T20F4-R-RGM8
3/4"	BSPP	30,000 psi(2,068 bar)	T20F6-R-RGM2	T20F6-R-RGM3	T20F6-R-RGM4	T20F6-R-RGM6	T20F6-R-RGM8
1"	BSPP	30,000 psi(2,068 bar)	T20F8-R-RGM2	T20F8-R-RGM3	T20F8-R-RGM4	T20F8-R-RGM6	T20F8-R-RGM8

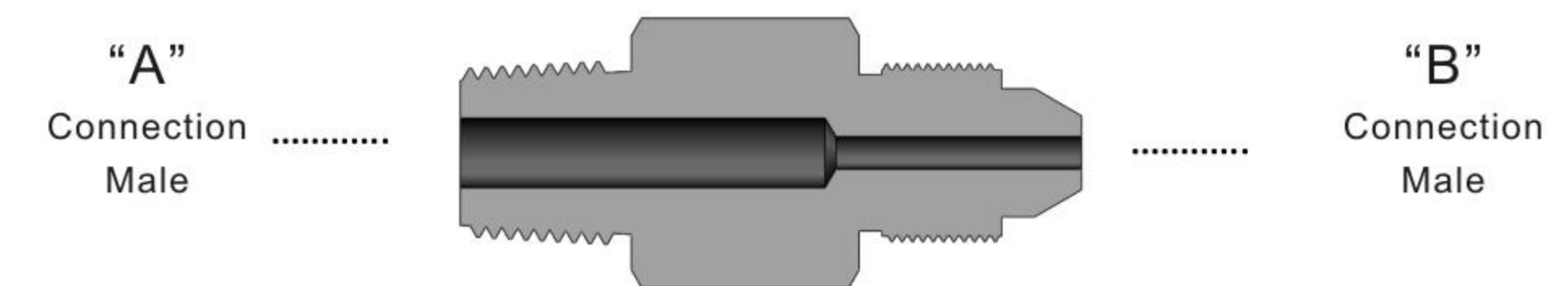


Female Connection A			Male Connection B		
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male High / 60,000 psi (4,138 bar)		
			1/4"HM4	3/8"HM6	9/16"HM9
<b>Female British Standard Pipe</b>					
1/4"	BSPP	30,000 psi(2,068 bar)	T30F2-R-RGM2	T30F2-R-RGM3	T30F2-R-RGM4
3/8"	BSPP	30,000 psi(2,068 bar)	T30F3-R-RGM2	T30F3-R-RGM3	T30F3-R-RGM4
1/2"	BSPP	30,000 psi(2,068 bar)	T30F4-R-RGM2	T30F4-R-RGM3	T30F4-R-RGM4
3/4"	BSPP	30,000 psi(2,068 bar)	T30F6-R-RGM2	T30F6-R-RGM3	T30F6-R-RGM4
1"	BSPP	30,000 psi(2,068 bar)	T30F8-R-RGM2	T30F8-R-RGM3	T30F8-R-RGM4

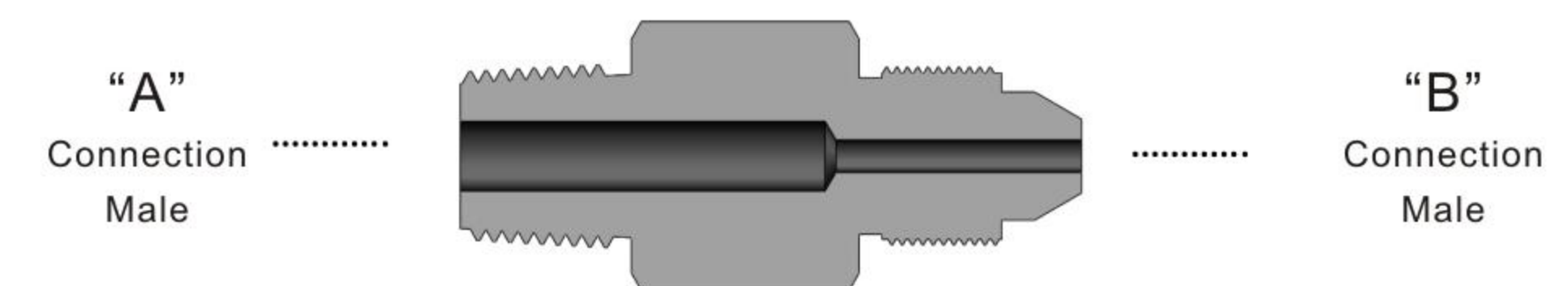
## ADAPTERS AND COUPLINGS COUPLINGS (MALE TO MALE)



Male Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Pipe/15,000 psi (1,034bar)		Male Pipe/10,000 psi (689bar)		
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Male Pipe</b>							
1/4"NPT	NM4	15,000 psi(1,034 bar)	T15M2-TM2-T	T15M2-TM3-T	T15M2-TM4-T	T10M2-TM6-T	T10M2-TM8-T
3/8"NPT	NM6	15,000 psi(1,034 bar)		T15M3-TM3-T	T15M3-TM4-T	T10M3-TM6-T	T10M3-TM8-T
1/2"NPT	NM9	15,000 psi(1,034 bar)			T15M4-TM4-T	T10M4-TM6-T	T10M4-TM8-T
3/4"NPT	NM12	10,000 psi(689 bar)				T10M6-TM6-T	T10M6-TM8-T
1"NPT	NM16	10,000 psi(689 bar)					T10M8-TM8-T

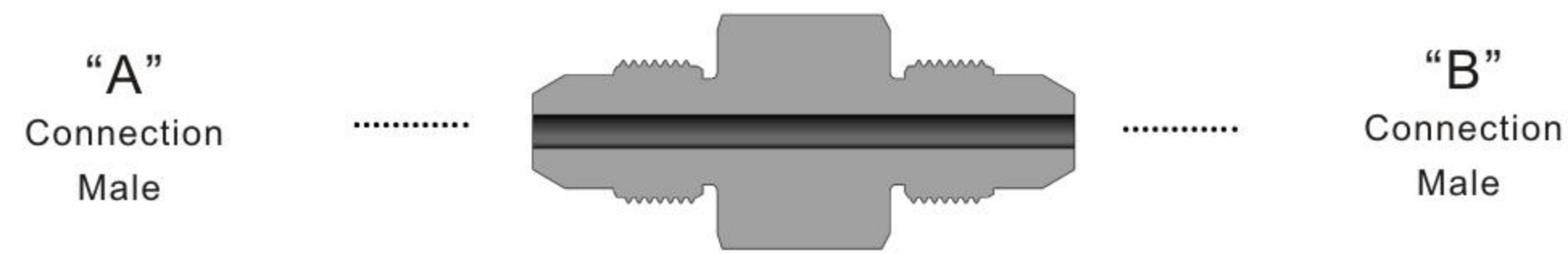


Male Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male Medium / 20,000 psi (1,379 bar)			Male High /10,000 psi (689 bar)	
			1/4"LM4	3/8"LM6	9/16"LM9	3/4"LM12	1"LM16
<b>Male Pipe</b>							
1/4"NPT	NM4	15,000 psi(1,034 bar)	T15M2-TM2	T15M2-TM3	T15M2-TM4	T10M2-TM6	T10M2-TM8
3/8"NPT	NM6	15,000 psi(1,034 bar)	T15M3-TM2	T15M3-TM3	T15M3-TM4	T10M3-TM6	T10M3-TM8
1/2"NPT	NM9	15,000 psi(1,034 bar)	T15M4-TM2	T15M4-TM3	T15M4-TM4	T10M4-TM6	T10M4-TM8
3/4"NPT	NM12	10,000 psi(689 bar)	T10M6-TM2	T10M6-TM3	T10M6-TM4	T10M6-TM6	T10M6-TM8
1"NPT	NM16	10,000 psi(689bar)	T10M8-TM2	T10M8-TM3	T10M8-TM4	T10M8-TM6	T10M8-TM8

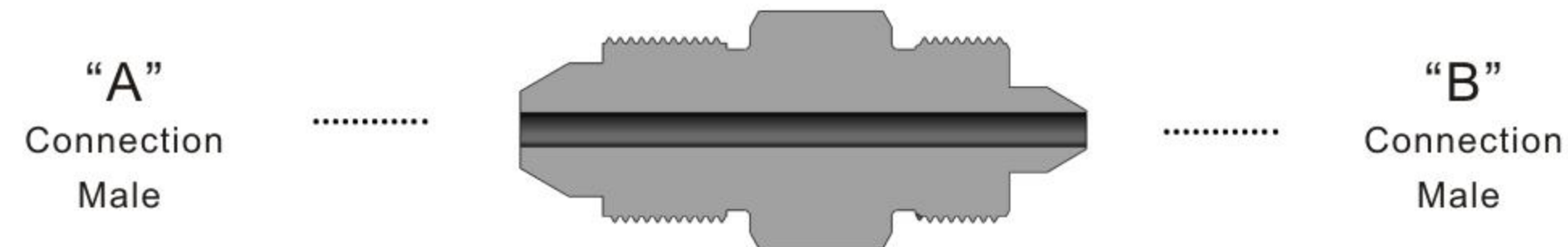


Male Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male High / 60,000 psi (4,138 bar)			Male High /10,000 psi (689 bar)	
			1/4"HM4	3/8"HM6	9/16"HM9		
<b>Male Pipe</b>							
1/4"NPT	NM4	15,000 psi(1,034 bar)	T15M2-TM2-HF	T15M2-TM3-HF	T15M2-TM4-HF		
3/8"NPT	NM6	15,000 psi(1,034 bar)	T15M3-TM2-HF	T15M3-TM3-HF	T15M3-TM4-HF		
1/2"NPT	NM9	15,000 psi(1,034 bar)	T15M4-TM2-HF	T15M4-TM3-HF	T15M4-TM4-HF		
3/4"NPT	NM12	10,000 psi(689 bar)	T10M6-TM2-HF	T10M6-TM3-HF	T10M6-TM4-HF		
1"NPT	NM16	10,000 psi(6894 bar)	T10M8-TM2-HF	T10M8-TM3-HF	T10M8-TM4-HF		

## ADAPTERS AND COUPLINGS COUPLINGS (MALE TO MALE)



Male Connection A			Male Connection B				
			Male Medium/20,000 psi (1,379 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"LM4	3/8"LM6	9/16"LM9	3/4"LM12	1"LM16
<b>Male Medium</b>							
1/4"	LM4	20,000 psi(1,379 bar)	T20M2M2	T20M2M3	T20M2M4	T20M2M6	T20M2M8
3/8"	LM6	20,000 psi(1,379 bar)		T20M3M3	T20M3M4	T20M3M6	T20M3M8
9/16"	LM9	20,000 psi(1,379 bar)			T20M4M4	T20M4M6	T20M4M8
3/4"	LM12	20,000 psi(1,379 bar)				T20M6M6	T20M6M8
1"	LM16	20,000 psi(1,379 bar)					T20M8M8

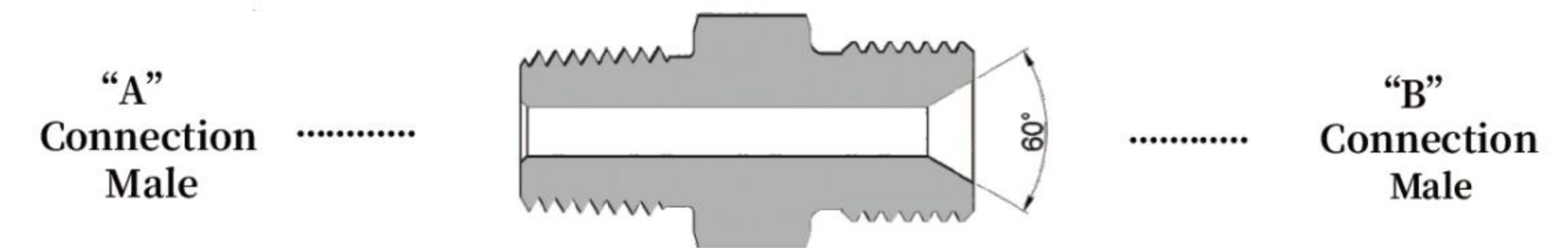


Male Connection A			Male Connection B				
			Male High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"HM4	3/8"HM6	9/16"HM9		
<b>Male Medium</b>							
1/4"	LM4	20,000 psi(1,379 bar)	T20M2M2-HF	T20M2M3-HF	T20M2M4-HF		
3/8"	LM6	20,000 psi(1,379 bar)	T20M3M2-HF	T20M3M3-HF	T20M3M4-HF		
9/16"	LM9	20,000 psi(1,379 bar)	T20M4M2-HF	T20M4M3-HF	T20M4M4-HF		
3/4"	LM12	20,000 psi(1,379 bar)	T20M6M2-HF	T20M6M3-HF	T20M6M4-HF		
1"	LM16	20,000 psi(1,379 bar)	T20M8M2-HF	T20M8M3-HF	T20M8M4-HF		

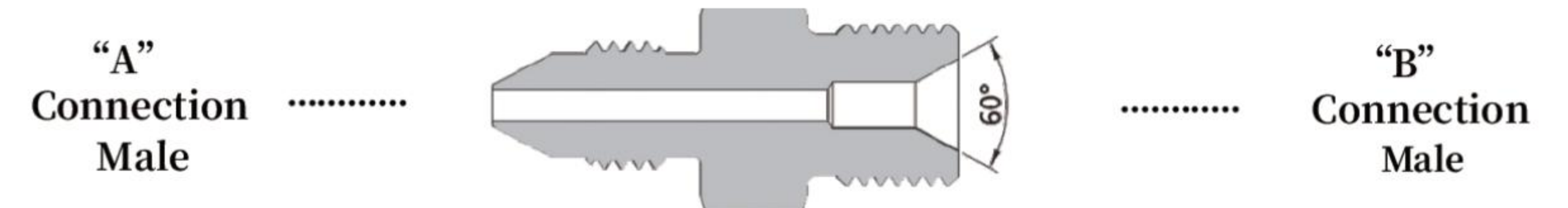


Male Connection A			Male Connection B				
			Male High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"HM4	3/8"HM6	9/16"HM9		
<b>Male High</b>							
1/4"	HM4	60,000 psi (4,138 bar)	T60M2M2	T60M2M3	T60M2M4		
3/8"	HM6	60,000 psi (4,138 bar)		T60M3M3	T60M3M4		
9/16"	HM9	60,000 psi (4,138 bar)			T60M4M4		

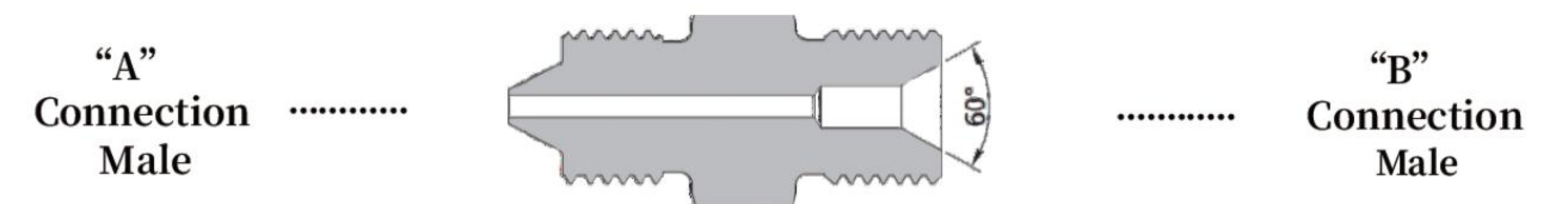
## ADAPTERS AND COUPLINGS COUPLINGS (MALE TO MALE)



Male Connection A			Male Connection B		
			Male British Standard Pipe/60,000 psi (4,138 bar)		
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"BSPP	3/8" BSPP	1/2" BSPP
<b>Male Pipe</b>					
1/4"NPT	NM4	15,000 psi (1,034 bar)	T15M2-TM2-R-60°	T15M2-TM3-R-60°	T15M2-TM4-R-60°
3/8"NPT	NM6	15,000 psi (1,034 bar)	T15M3-TM2-R-60°	T15M3-TM3-R-60°	T15M3-TM4-R-60°
1/2"NPT	NIM8	15,000 psi (1,034 bar)	T15M4-TM2-R-60°	T15M4-TM3-R-60°	T15M4-TM4-R-60°
3/4"NPT	NM12	10,000 psi (689 bar)	T10M6-TM2-R-60°	T10M6-TM3-R-60°	T10M6-TM4-R-60°
1"NPT	NM16	10,000 psi (689 bar)	T10M8-TM2-R-60°	T10M8-TM3-R-60°	T10M8-TM4-R-60°

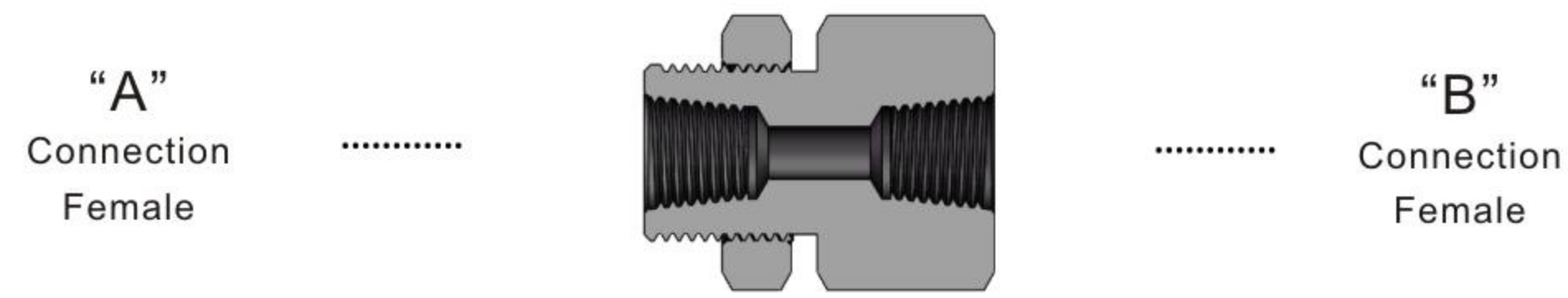


Male Connection A			Male Connection B		
			Male British Standard Pipe/60,000 psi (4,138 bar)		
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"BSPP	3/8" BSPP	1/2" BSPP
<b>Male Medium</b>					
1/4"	LM4	20,000 psi (1,379 bar)	T20M2M2-R-60°	T20M2M3-R-60°	T20M2M4-R-60°
3/8"	LM6	20,000 psi (1,379 bar)	T20M3M2-R-60°	T20M3M3-R-60°	T20M3M4-R-60°
9/16"	LM8	20,000 psi (1,379 bar)	T20M4M2-R-60°	T20M4M3-R-60°	T20M4M4-R-60°
3/4"	LM12	20,000 psi (1,379 bar)	T20M6M2-R-60°	T20M6M3-R-60°	T20M6M4-R-60°
1"	LM16	20,000 psi (1,379 bar)	T20M8M2-R-60°	T20M8M3-R-60°	T20M8M4-R-60°

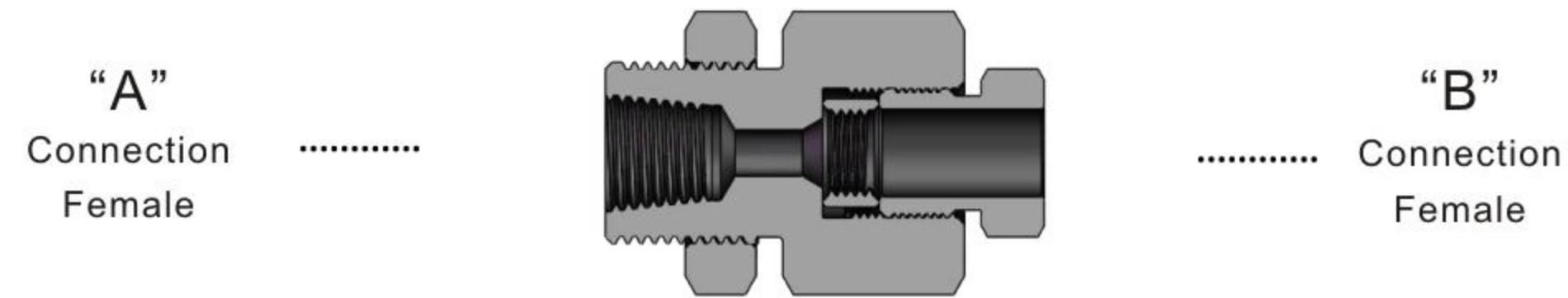


Male Connection A			Male Connection B		
			Male British Standard Pipe/60,000 psi (4,138 bar)		
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"BSPP	3/8" BSPP	1/2" BSPP
<b>Male High</b>					
1/4"	HM4	60,000 psi (4,138 bar)	T60M2M2-R-60°	T60M2M3-R-60°	T60M2M4-R-60°
3/8"	HM6	60,000 psi (4,138 bar)	T60M3M2-R-60°	T60M3M3-R-60°	T60M3M4-R-60°
9/16"	HM9	60,000 psi (4,138 bar)	T60M4M2-R-60°	T60M4M3-R-60°	T60M4M4-R-60°

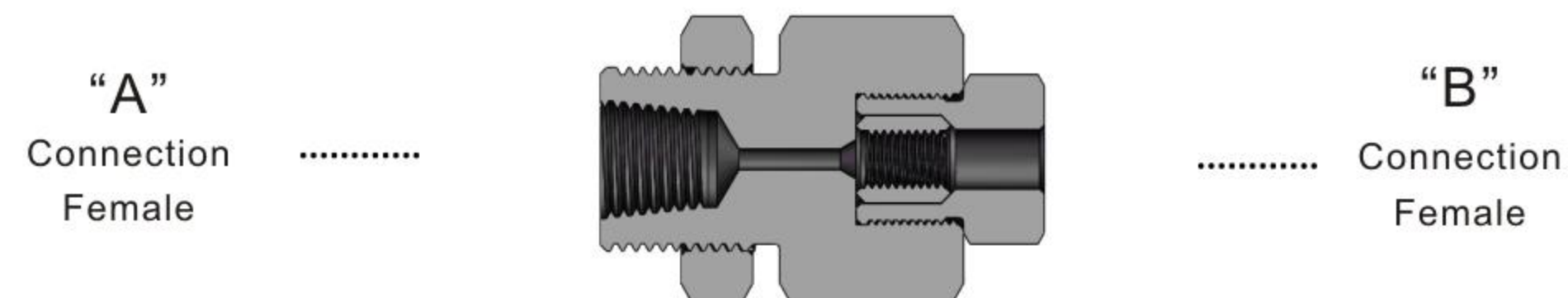
# ADAPTERS AND BULKHEAD COUPLING COUPLINGS (FEMALE TO FEMALE)



Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Pipe / 15,000 psi (1,034 bar)				
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-T-B	T15F2-TF3-T-B	T15F2-TF4-T-B	T10F2-TF6-T-B	T10F2-TF8-T-B
3/8"NPT	NF6	15,000 psi(1,034 bar)		T15F3-TF3-T-B	T15F3-TF4-T-B	T10F3-TF6-T-B	T10F3-TF8-T-B
1/2"NPT	NF9	15,000 psi(1,034 bar)			T15F4-TF4-T-B	T10F4-TF6-T-B	T10F4-TF8-T-B
3/4"NPT	NF12	10,000 psi(689bar)				T10F6-TF6-T-B	T10F6-TF8-T-B
1"NPT	NF16	10,000 psi(689 bar)					T10F8-TF8-T-B

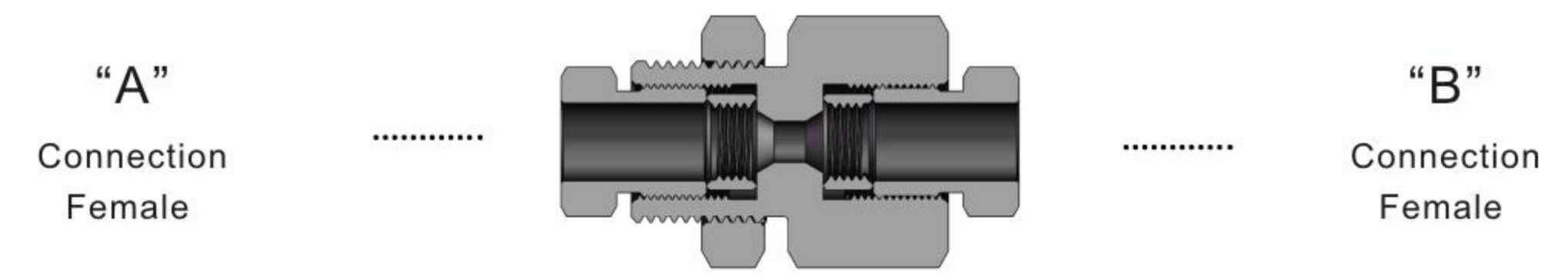


Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Medium / 20,000 psi (1,379 bar)				
			1/4"LF4	3/8"LF6	9/16"LF9	3/4"LF12	1"LF16
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-B	T15F2-TF3-B	T15F2-TF4-B	T15F2-TF6-B	T15F2-TF8-B
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF2-B	T15F3-TF3-B	T15F3-TF4-B	T15F3-TF6-B	T15F3-TF8-B
1/2"NPT	NF9	15,000 psi(1,034 bar)	T15F4-TF2-B	T15F4-TF3-B	T15F4-TF4-B	T15F4-TF6-B	T15F4-TF8-B
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TF2-B	T10F6-TF3-B	T10F6-TF4-B	T10F6-TF6-B	T10F6-TF8-B
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TF2-B	T10F8-TF3-B	T10F8-TF4-B	T10F8-TF6-B	T10F8-TF8-B

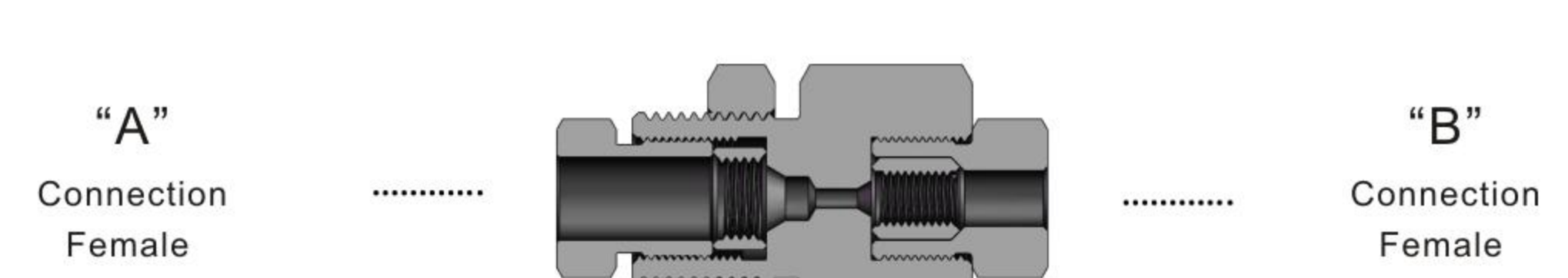


Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Medium / 60,000 psi (4,138 bar)				
			1/4"HF4	3/8"HF6	9/16"HF9		
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-HF-B	T15F2-TF3-HF-B	T15F2-TF4-HF-B		
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF2-HF-B	T15F3-TF3-HF-B	T15F3-TF4-HF-B		
1/2"NPT	NF9	15,000 psi(1,034 bar)	T15F4-TF2-HF-B	T15F4-TF3-HF-B	T15F4-TF4-HF-B		
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TF2-HF-B	T10F6-TF3-HF-B	T10F6-TF4-HF-B		
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TF2-HF-B	T10F8-TF3-HF-B	T10F8-TF4-HF-B		

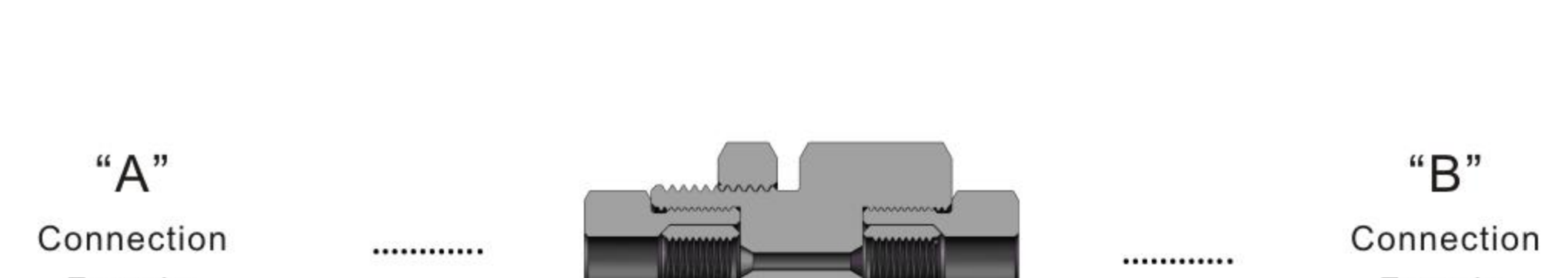
# ADAPTERS AND COUPLINGS COUPLINGS (FEMALE TO FEMALE)



Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female High / 20,000 psi (1,379 bar)				
			1/4"LF4	3/8"LF6	9/16"LF9	3/4"LF12	1"LF16
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2F2-B	T20F2F3-B	T20F2F4-B	T20F2F6-B	T20F2F8-B
3/8"	LF6	20,000 psi(1,379 bar)		T20F3F3-B	T20F3F4-B	T20F3F6-B	T20F3F8-B
9/16"	LF9	20,000 psi(1,379 bar)			T20F4F4-B	T20F4F6-B	T20F4F8-B
3/4"	LF12	20,000 psi(1,379 bar)				T20F6F6-B	T20F6F8-B
1"	LF16	20,000 psi(1,379 bar)					T2F8F8-B



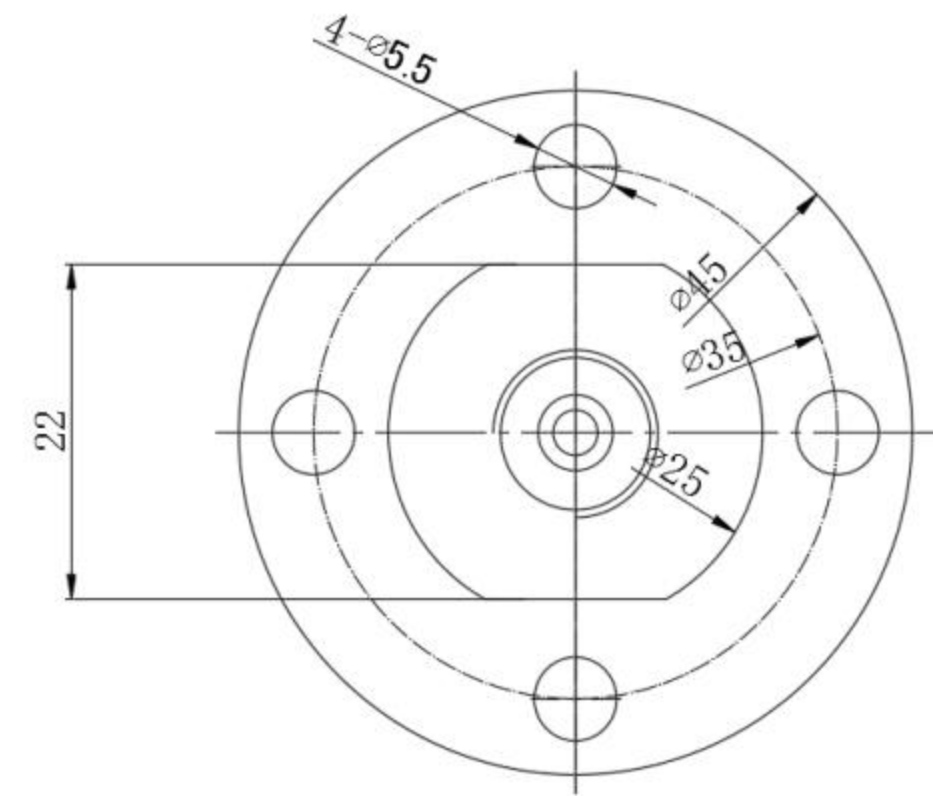
Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female High / 60,000 psi (4,138 bar)				
			1/4"HF4	3/8"HF6	9/16"HF9		
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379 bar)	T20F2F2-HF-B	T20F2F3-HF-B	T20F2F4-HF-B		
3/8"	LF6	20,000 psi(1,379 bar)	T20F3F2-HF-B	T20F3F3-HF-B	T20F3F4-HF-B		
9/16"	LF9	20,000 psi(1,379 bar)	T20F4F2-HF-B	T20F4F3-HF-B	T20F4F4-HF-B		
3/4"	LF12	20,000 psi(1,379 bar)	T20F6F2-HF-B	T20F6F3-HF-B	T20F6F4-HF-B		
1"	LF16	20,000 psi(1,379 bar)	T20F8F2-HF-B	T20F8F3-HF-B	T20F8F4-HF-B		



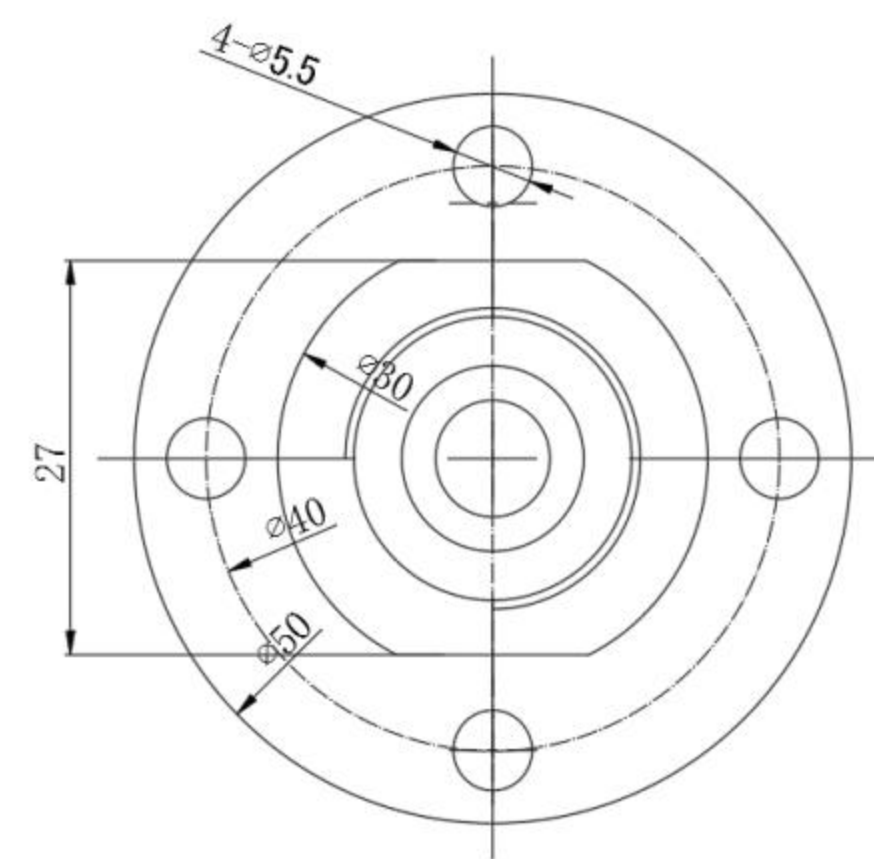
Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female High / 60,000 psi (4,138 bar)				
			1/4"HF4	3/8"HF6	9/16"HF9		
<b>Female High</b>							
1/4"	HF4	60,000 psi (4,138 bar)	T60F2F2-B	T60F2F3-B	T60F2F4-B		
3/8"	HF6	60,000 psi (4,138 bar)		T60F2F3-B	T60F3F4-B		
9/16"	HF9	60,000 psi (4,138 bar)			T60F4F4-B		

# HIGH PRESSURE FITTINGS

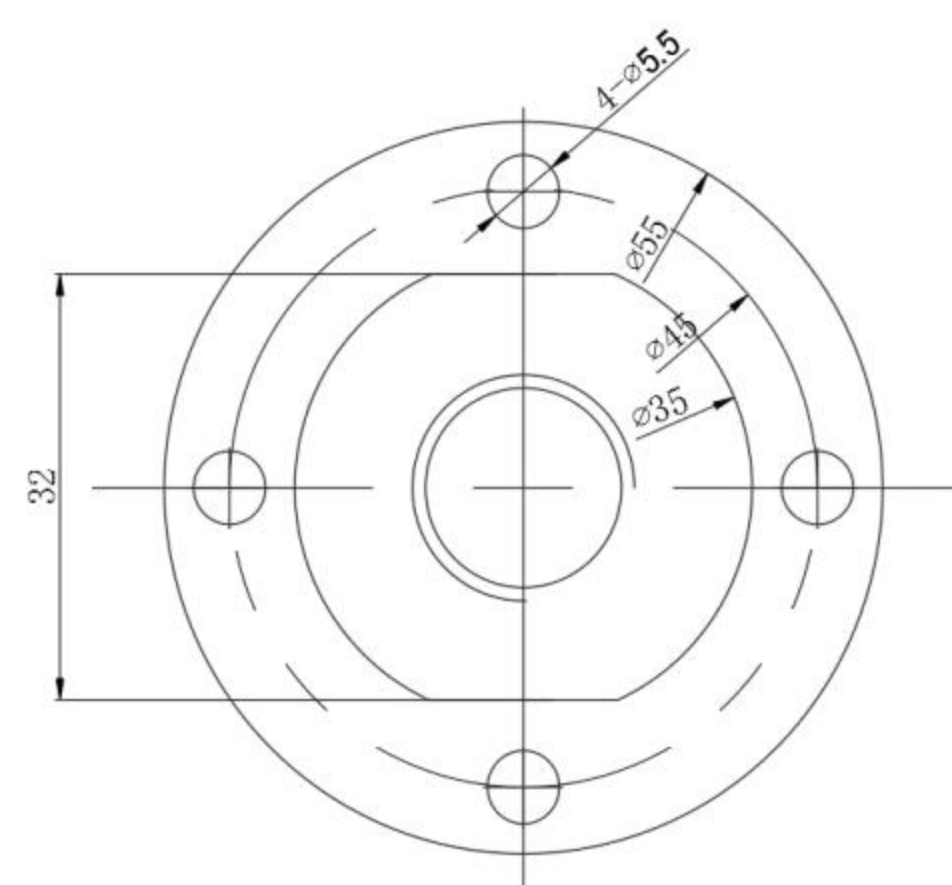
## Flange type bulkhead couplings panel hole size



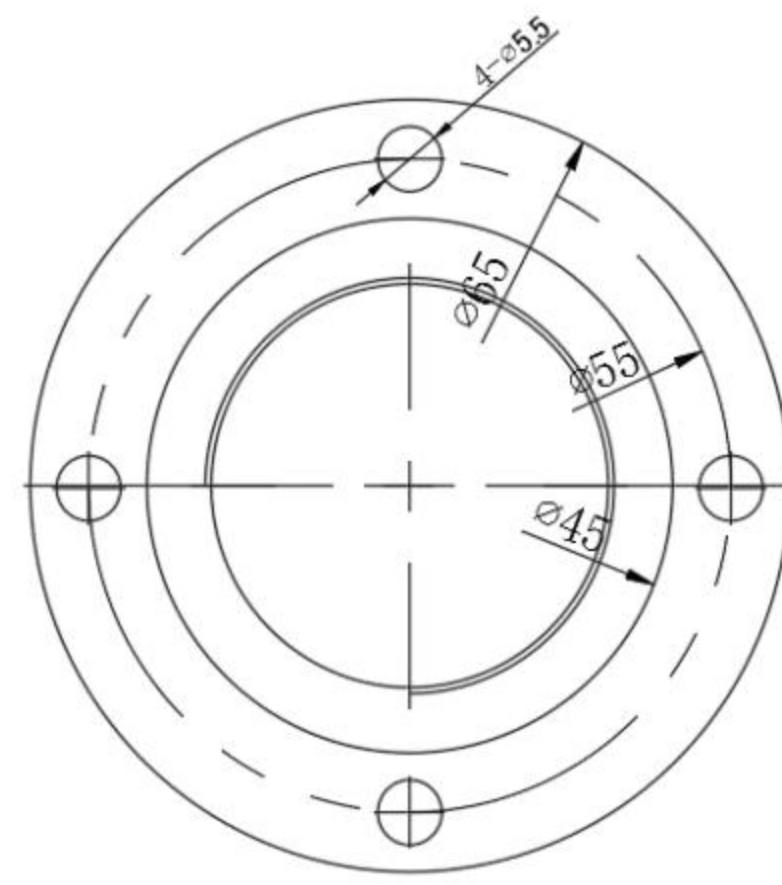
15,000PSI :FNPT:1/4"-3/8"  
20,000PSI:1/4"-3/8" panel hole size  
60,000PSI:1/4" panel hole size



15,000PSI :FNPT1/2"  
20,000PSI:9/16" panel hole size  
60,000PSI:3/8" panel hole size



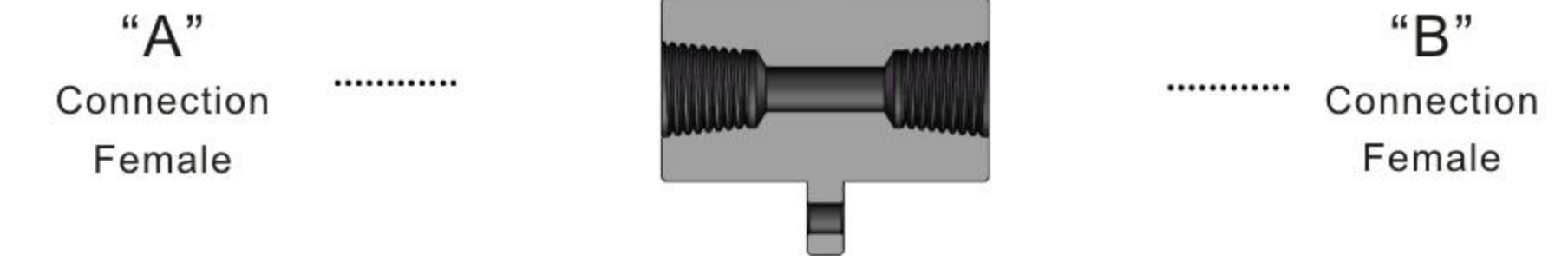
15,000PSI :FNPT3/4"  
20,000PSI:3/4" panel hole size  
60,000PSI:9/16" panel hole size



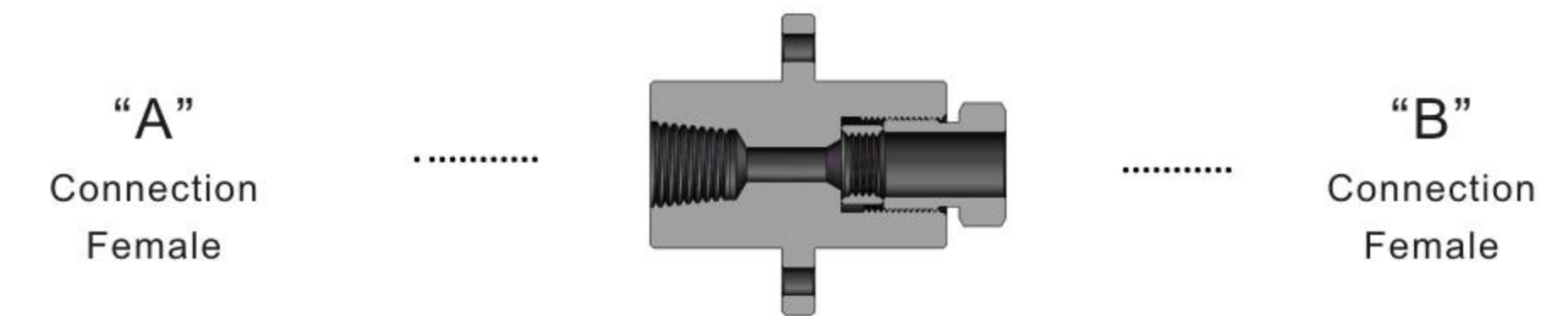
15,000PSI :FNPT1"  
20,000PSI:1"

- Notes :The reducing adaptor use the maximum connecting pipeline as the standard.
- As all sizes are for reference, they can be changed without any notification

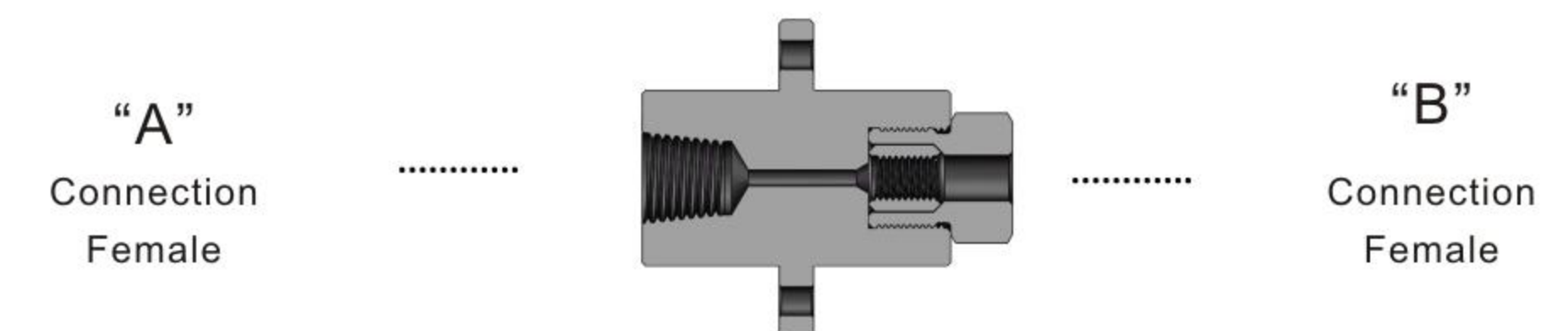
# ADAPTERS AND BULKHEAD COUPLING BULKHEAD COUPLINGS (FEMALE TO FEMALE)



Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Pipe / 15,000 psi (1,034 bar)				
			1/4"NPT	3/8"NPT	1/2"NPT	3/4"NPT	1"NPT
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-T-FB	T15F2-TF3-T-FB	T15F2-TF4-T-FB	T10F2-TF6-T-FB	T10F2-TF8-T-FB
3/8"NPT	NF6	15,000 psi(1,034 bar)		T15F3-TF3-T-FB	T15F3-TF4-T-FB	T10F3-TF6-T-FB	T10F3-TF8-T-FB
1/2"NPT	NF9	15,000 psi(1,034 bar)			T15F4-TF4-T-FB	T10F4-TF6-T-FB	T10F4-TF8-T-FB
3/4"NPT	NF12	10,000 psi(689 bar)				T10F6-TF6-T-FB	T10F6-TF8-T-FB
1"NPT	NF16	10,000 psi(689 bar)					T10F8-TF8-T-FB

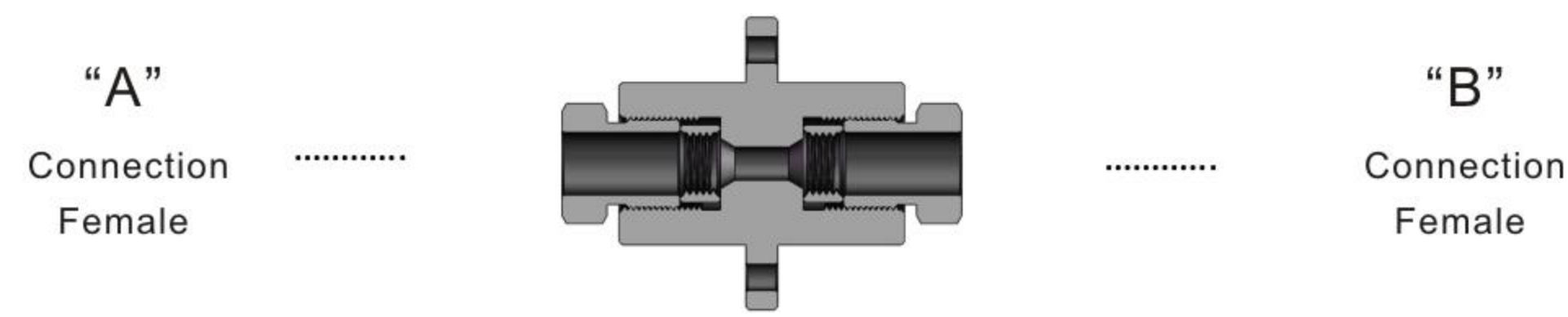


Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female Medium / 20,000 psi (1,379 bar)				
			1/4"LF4	3/8"LF6	9/16"LF9	3/4"LF12	1"LF16
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-FB	T15F2-TF3-FB	T15F2-TF4-FB	T15F2-TF6-FB	T15F2-TF8-FB
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF2-FB	T15F3-TF3-FB	T15F3-TF4-FB	T15F3-TF6-FB	T15F3-TF8-FB
1/2"NPT	NF9	15,000 psi(1,034 bar)	T15F4-TF2-FB	T15F4-TF3-FB	T15F4-TF4-FB	T15F4-TF6-FB	T15F4-TF8-FB
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TF2-FB	T10F6-TF3-FB	T10F6-TF4-FB	T10F6-TF6-FB	T10F6-TF8-FB
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TF2-FB	T10F8-TF3-FB	T10F8-TF4-FB	T10F8-TF6-FB	T10F8-TF8-FB

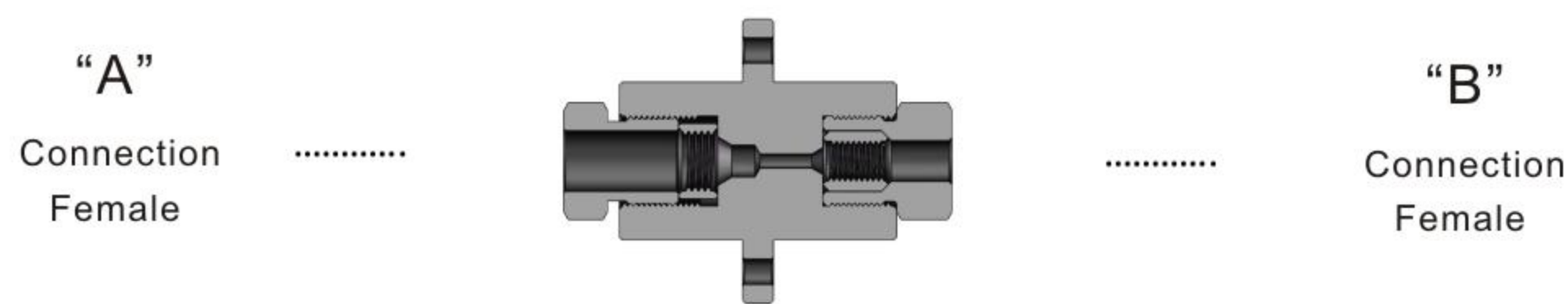


Female Connection A			Female Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Female High / 60,000 psi (4,138 bar)				
			1/4"HF4	3/8"HF6	9/16"HF9		
<b>Female Pipe</b>							
1/4"NPT	NF4	15,000 psi(1,034 bar)	T15F2-TF2-HF-FB	T15F2-TF3-HF-FB	T15F2-TF4-HF-FB		
3/8"NPT	NF6	15,000 psi(1,034 bar)	T15F3-TF2-HF-FB	T15F3-TF3-HF-FB	T15F3-TF4-HF-FB		
1/2"NPT	NF9	15,000 psi(1,034 bar)	T15F4-TF2-HF-FB	T15F4-TF3-HF-FB	T15F4-TF4-HF-FB		
3/4"NPT	NF12	10,000 psi(689 bar)	T10F6-TF2-HF-FB	T10F6-TF3-HF-FB	T10F6-TF4-HF-FB		
1"NPT	NF16	10,000 psi(689 bar)	T10F8-TF2-HF-FB	T10F8-TF3-HF-FB	T10F8-TF4-HF-FB		

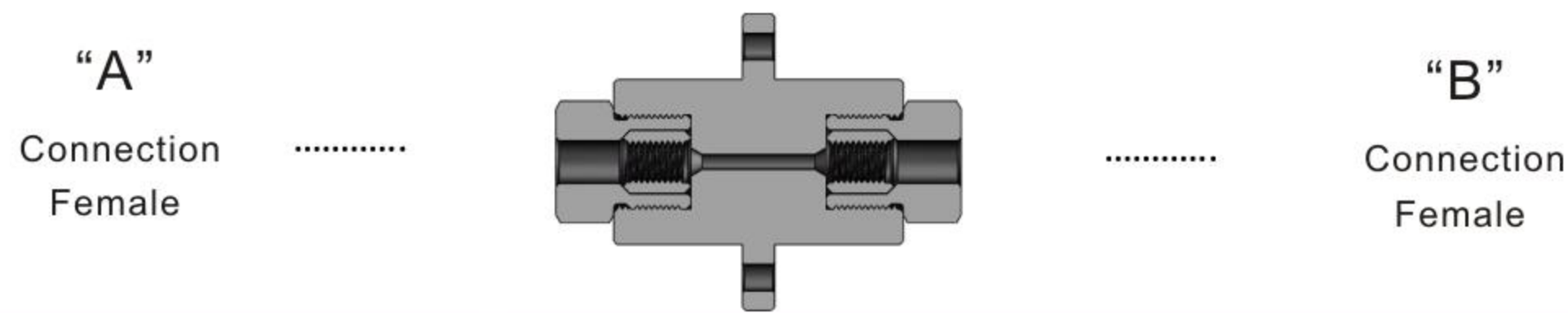
## ADAPTERS AND BULKHEAD COUPLING COUPLINGS (FEMALE TO FEMALE)



Female Connection A			Female Connection B				
			Female High / 20,000 psi (1,379 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" LF4	3/8" LF6	9/16" LF9	3/4" LF12	1" LF16
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379bar)	T20F2F2-FB	T20F2F3-FB	T20F2F4-FB	T20F2F6-FB	T20F2F8-FB
3/8"	LF6	20,000 psi(1,379bar)		T20F3F3-FB	T20F3F4-FB	T20F3F6-FB	T20F3F8-FB
9/16"	LF9	20,000 psi(1,379bar)			T20F4F4-FB	T20F4F6-FB	T20F4F8-FB
3/4"	LF12	20,000 psi(1,379bar)				T20F6F6-FB	T20F6F8-FB
1"	LF16	20,000 psi(1,379bar)					T20F8F8-FB

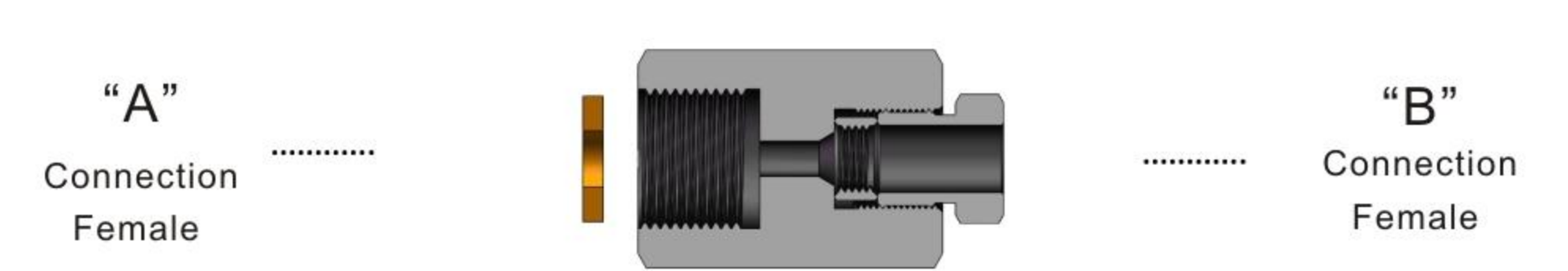


Female Connection A			Female Connection B				
			Female High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HF4	3/8" HF6	9/16" HF9		
<b>Female Medium</b>							
1/4"	LF4	20,000 psi(1,379bar)	T20F2F2-HF-FB	T20F2F3-HF-FB	T20F2F4-HF-FB		
3/8"	LF6	20,000 psi(1,379bar)	T20F3F2-HF-FB	T20F3F3-HF-FB	T20F3F4-HF-FB		
9/16"	LF9	20,000 psi(1,379bar)	T20F4F2-HF-FB	T20F4F3-HF-FB	T20F4F4-HF-FB		
3/4"	LF12	20,000 psi(1,379bar)	T20F6F2-HF-FB	T20F6F3-HF-FB	T20F6F4-HF-FB		
1"	LF16	20,000 psi(1,379bar)	T20F8F2-HF-FB	T20F8F3-HF-FB	T20F8F4-HF-FB		

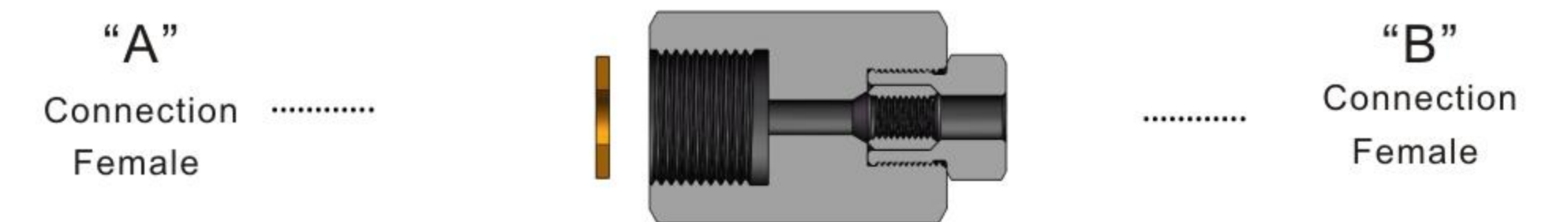


Female Connection A			Female Connection B				
			Female High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HF4	3/8" HF6	9/16" HF9		
<b>Female High</b>							
1/4"	HF4	60,000 psi (4,138 bar)	T60F2F2-FB	T60F2F3-FB	T60F2F4-FB		
3/8"	HF6	60,000 psi (4,138 bar)		T60F3F3-FB	T60F3F4-FB		
9/16"	HF9	60,000 psi (4,138 bar)			T60F4F4-FB		

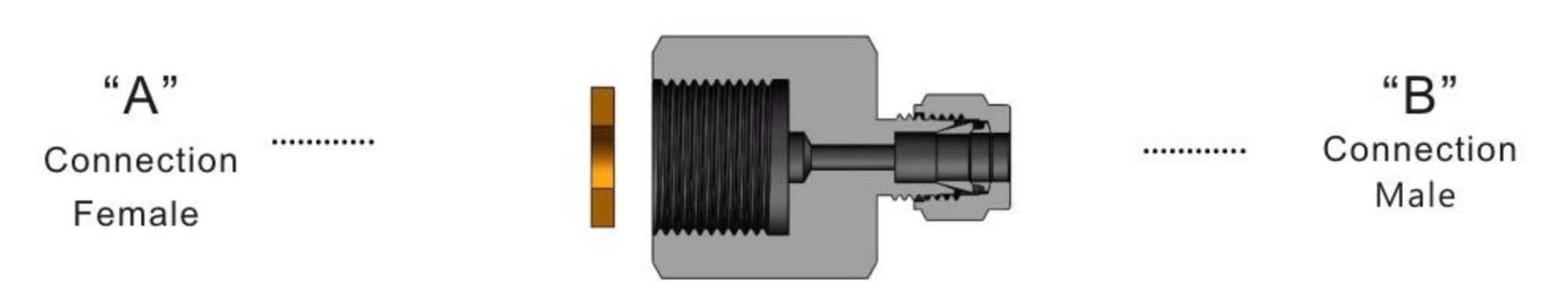
## ADAPTERS AND COUPLINGS GAUGE CONNECTORS



Female Connection A			Female Connection B				
			Female High / 20,000 psi (1,379 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" LF4	3/8" LF6	9/16" LF9	3/4" LF12	1" LF16
<b>Female with copper gasket</b>							
G1/4"		30,000 psi (2,069 bar)	T20F2-RF2-YB				
G1/2"		30,000 psi (2,069 bar)	T20F4-RF2-YB	T20F4-RF3-YB	T20F4-RF4-YB	T20F4-RF6-YB	T20F4-RF8-YB
M20x1.5		30,000 psi (2,069 bar)	T20F20-MF2-YB	T20F20-MF3-YB	T20F20-MF4-YB	T20F20-MF6-YB	T20F20-MF8-YB



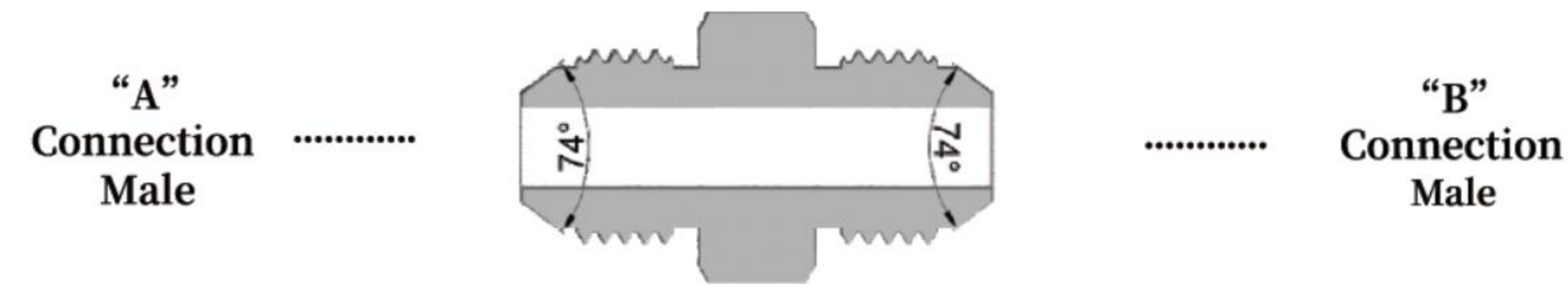
Female Connection A			Female Connection B				
			Female High / 60,000 psi (4,138 bar)				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4" HF4	3/8" HF6	9/16" HF9		
<b>Female with copper gasket</b>							
G1/4"		30,000 psi (2,069 bar)	T60F2-RF2-YB				
G1/2"		30,000 psi (2,069 bar)	T60F4-RF2-YB	T60F4-RF3-YB	T60F4-RF4-YB		
M20x1.5		30,000 psi (2,069 bar)	T60F20-MF2-YB	T60F20-MF3-YB	T60F20-MF4-YB		



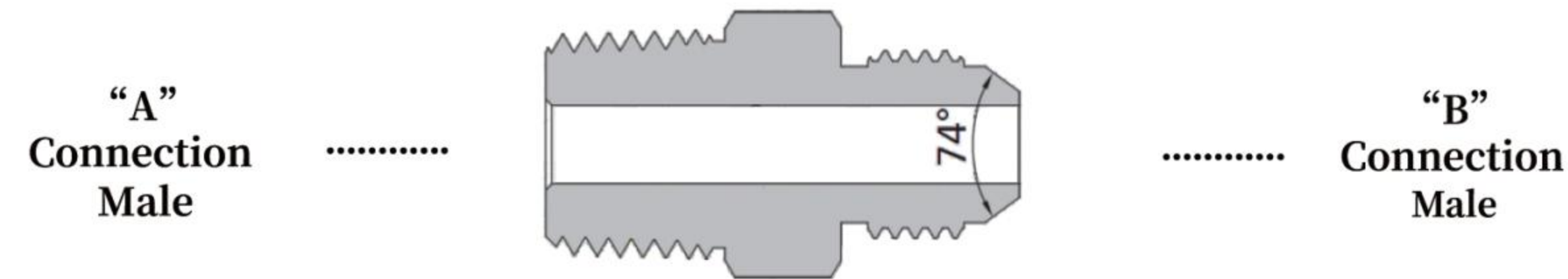
Female Connection A			Male Connection B	
			Double ferrule / 6,000 psi (413.7 bar)	
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	1/4"	3/8"
<b>Female with copper gasket</b>				
G1/4"		30,000 psi (2,069 bar)	T06F2-RM2-SK-YB	T06F2-RM3-SK-YB
G1/2"		30,000 psi (2,069 bar)	T06F4-RM2-SK-YB	T06F4-RM3-SK-YB
M20x1.5		30,000 psi (2,069 bar)	T06F20-MM2-SK-YB	T06F20-MM3-SK-YB



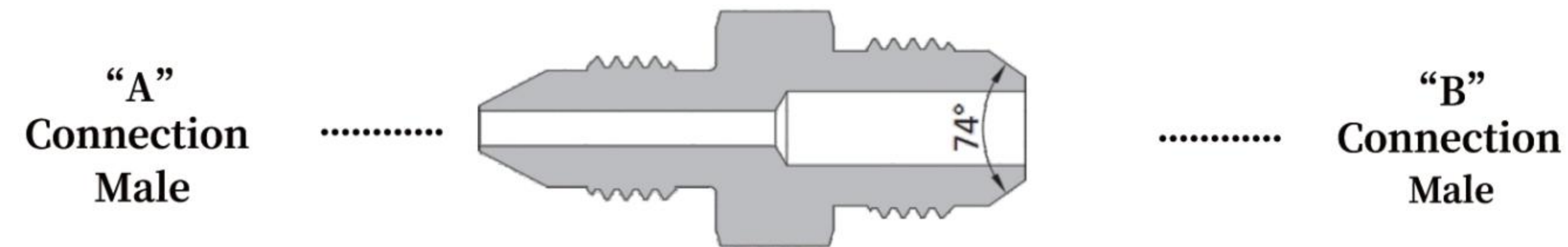
## ADAPTERS AND JIC COUPLING COUPLINGS (MALE TO MALE)



Male Connection A			Male Connection B					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male JIC/20,000 psi (1,379bar)				JIC/15,000 psi (1,034 bar)	
			1/4" JIC	3/8" JIC	1/2" JIC	5/8" JIC	3/4" JIC	1" JIC
<b>Male Jic</b>								
1/4" JIC	JIC 04	20,000 psi (1,379bar)	T20M2-JM2-J	T20M2-JM3-J	T20M2-JM4-J	T20M2-JM5-J	T15M2-JM6-J	T15M2-JM8-J
3/8" JIC	JIC 06	20,000 psi (1,379bar)		T20M3-JM3-J	T20M3-JM4-J	T20M3-JM5-J	T15M3-JM6-J	T15M3-JM8-J
1/2" JIC	JIC 08	20,000 psi (1,379bar)			T20M4-JM4-J	T20M4-JM5-J	T15M4-JM6-J	T15M4-JM8-J
5/8" JIC	JIC 10	20,000 psi (1,379bar)				T20M5-JM5-J	T15M5-JM6-J	T15M5-JM8-J
3/4" JIC	JIC 12	15,000 psi (1,034 bar)					T15M6-JM6-J	T15M6-JM8-J
1" JIC	JIC 16	15,000 psi (1,034 bar)						T15M8-JM8-J

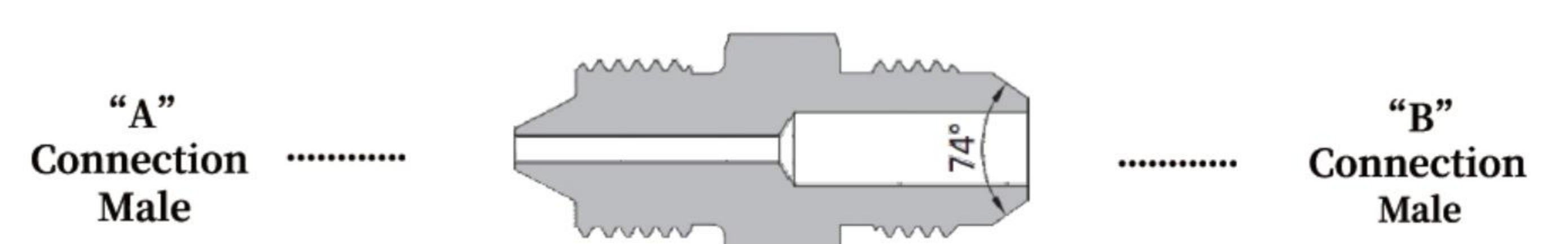


Male Connection A			Male Connection B					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male JIC/20,000 psi (1,379bar)				JIC/15,000 psi (1,034 bar)	
			1/4" JIC	3/8" JIC	1/2" JIC	5/8" JIC	3/4" JIC	1" JIC
<b>Male Pipe</b>								
1/4" NPT	NM4	15,000 psi (1,034 bar)	T15M2-TM2-J	T15M2-TM3-J	T15M2-TM4-J	T15M2-TM5-J	T15M2-TM6-J	
3/8" NPT	NM6	15,000 psi (1,034 bar)	T15M3-TM2-J	T15M3-TM3-J	T15M3-TM4-J	T15M3-TM5-J	T15M3-TM6-J	
1/2" NPT	NM8	15,000 psi (1,034 bar)	T15M4-TM2-J	T15M4-TM3-J	T15M4-TM4-J	T15M4-TM5-J	T15M4-TM6-J	

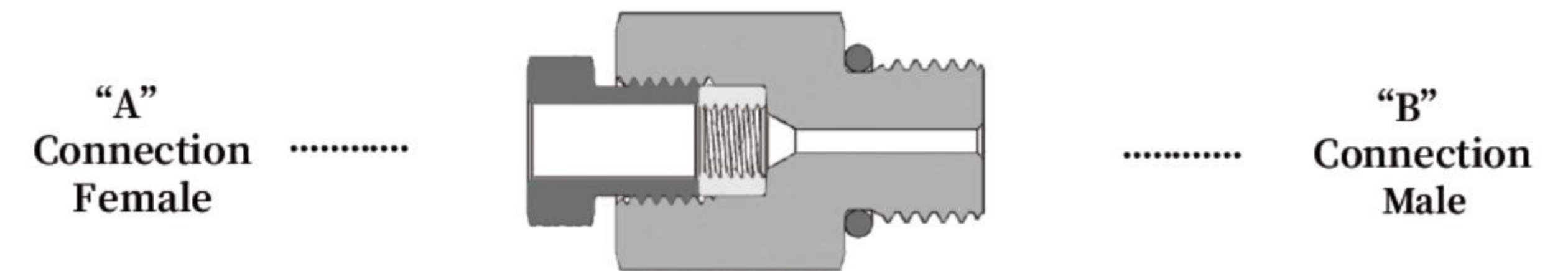


Male Connection A			Male Connection B					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male JIC/20,000 psi (1,379bar)				JIC/15,000 psi (1,034 bar)	
			1/4" JIC	3/8" JIC	1/2" JIC	5/8" JIC	3/4" JIC	1" JIC
<b>Male Medium</b>								
1/4"	LM4	20,000 psi (1,379 bar)	T20M2M2-J	T20M2M3-J	T20M2M4-J	T20M2M5-J	T15M2M6-J	T15M2M8-J
3/8"	LM6	20,000 psi (1,379 bar)	T20M3M2-J	T20M3M3-J	T20M3M4-J	T20M3M5-J	T15M3M6-J	T15M3M8-J
9/16"	LM9	20,000 psi (1,379 bar)	T20M4M2-J	T20M4M3-J	T20M4M4-J	T20M4M5-J	T15M4M6-J	T15M4M8-J
3/4"	LM12	20,000 psi (1,379 bar)	T20M6M2-J	T20M6M3-J	T20M6M4-J	T20M6M5-J	T15M6M6-J	T15M6M8-J
1"	LM16	20,000 psi (1,379 bar)	T20M8M2-J	T20M8M3-1	T20M8M4-J	T20M8M5-I	T15M8M6-J	T15M8M8-T

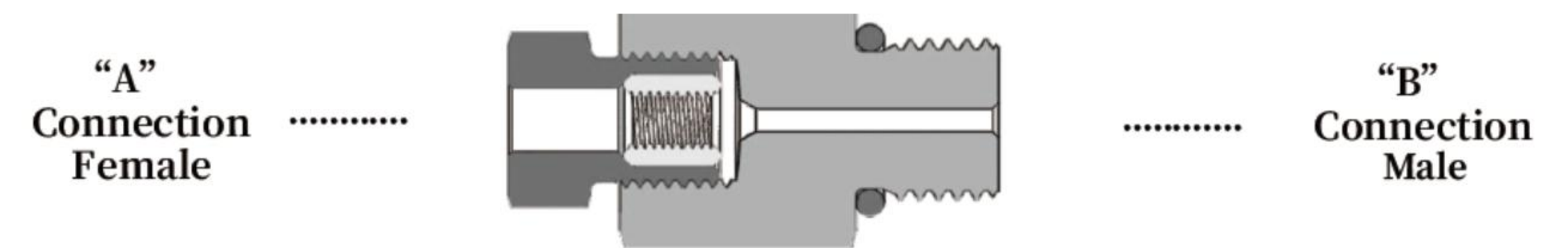
## ADAPTERS AND JIC COUPLING COUPLINGS (MALE TO MALE)



Male Connection A			Male Connection B					
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Male JIC/20,000 psi (1,379bar)				JIC/15,000 psi (1,034 bar)	
			1/4" JIC	3/8" JIC	1/2" JIC	5/8" JIC	3/4" JIC	1" JIC
<b>High</b>								
1/4"	HM4	60,000 psi (4,138 bar)	T20M2-HFM2-J	T20M2-HFM3-J	T20M2-HFM4-J	T20M2-HFM5-J		
3/8"	HM6	60,000 psi (4,138 bar)	T20M3-HFM2-J	T20M3-HFM3-J	T20M3-HFM4-J			
1/2"	HM9	60,000 psi (4,138 bar)	T20M4-HFM2-J	T20M4-HFM3-J	T20M4-HFM4-J			



Female Connection A			Male Connection B				
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	SAE/MS Thread Size/10,000 psi (690bar)				
			1/8" SAE	1/4" SAE	3/8" SAE	1/2" SAE	5/8" SAE
<b>Female</b>							
1/4"	LF4	20,000 psi (1,379 bar)	T10F2M1-SAE	T10F2M2-SAE	T10F2M3-SAE		
3/8"	LF6	20,000 psi (1,379 bar)	T10F3M1-SAE	T10F3M2-SAE	T10F3M3-SAE	T10F3M4-SAE	
9/16"	LF9	20,000 psi (1,379 bar)		T10F4M2-SAE	T10F4M3-SAE	T10F4M4-SAE	T10F3M6-SAE
3/4"	LF12	20,000 psi (1,379 bar)				T10F6M4-SAE	T10F6M5-SAE T10F6M6-SAE
1"	LF16	20,000 psi (1,379 bar)					T10F8M5-SAE T10F8M6-SAE



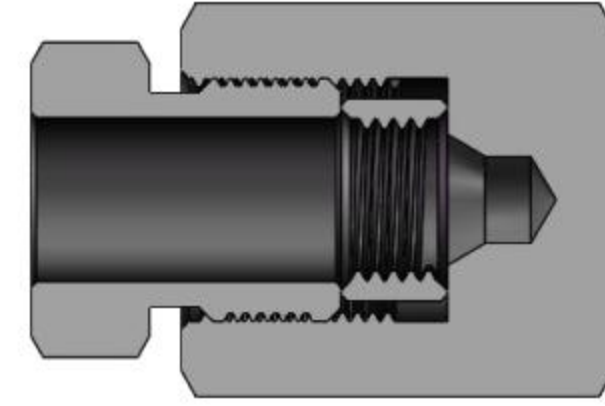
Female Connection A			Male Connection B			
Tube Size in.	Connection Type	Maximum Pressure psi(bar)	SAE/MS Thread size /10,000 psi (689bar)			
			1/8" SAE	1/4" SAE	3/8" SAE	1/2" SAE
<b>Female High</b>						
1/4"	HF4	60,000 psi (4,138 bar)		T10F2-HFM2-SAE	T10F2-HFM3-SAE	
3/8"	HF6	60,000 psi (4,138 bar)		T10F3-HFM2-SAE	T10F3-HFM3-SAE	
9/16"	HF9	60,000 psi (4,138 bar)				

## ADAPTERS/COUPLINGS - FEMALE TUBE / CAPS

USUN provide various Type Tube caps for sealing tube end

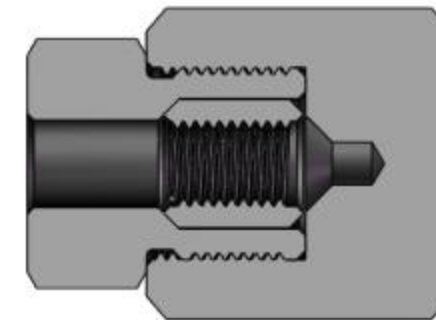
### Female Tube Caps - Medium Pressure

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	LF4	20,000 psi (1,379 bar)	20CP-4M
3/8"	LF6	20,000 psi (1,379 bar)	20CP-6M
9/16"	LF9	20,000 psi (1,379 bar)	20CP-9M
3/4"	LF12	20,000 psi (1,379 bar)	20CP-12M
1"	LF16	20,000 psi (1,379 bar)	20CP-16M



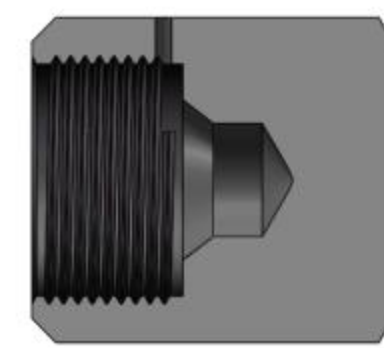
### Female Tube Caps - High Pressure Tube Caps

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	HF4	60,000 psi (4,138 bar)	60CP-4H
3/8"	HF6	60,000 psi (4,138 bar)	60CP-6H
9/16"	HF9	60,000 psi (4,138 bar)	60CP-9H



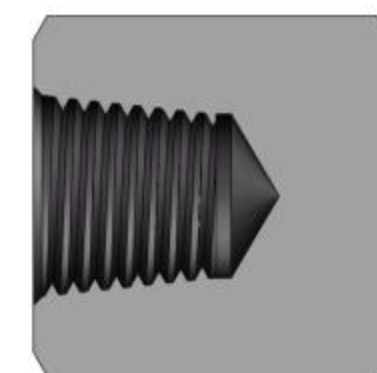
### Female Tube Caps - JIC

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	JIC4	20,000 psi (1,379 bar)	20CP-J4
3/8"	JIC6	20,000 psi (1,379 bar)	20CP-J6
1/2"	JIC8	20,000 psi (1,379 bar)	20CP-J8



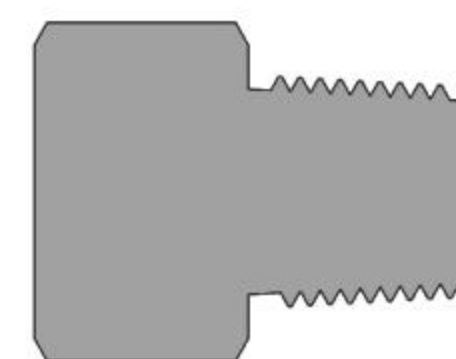
### Female Tube Caps - NPT

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	NPT1/4"	15,000 psi (1,034 bar)	15CP-NF4
3/8"	NPT3/8"	15,000 psi (1,034 bar)	15CP-NF6
1/2"	NPT1/2"	15,000 psi (1,034 bar)	15CP-NF8



### Male NPT Pipe Plug - NPT

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	NPT1/4"	15,000 psi (1,034 bar)	15P-NM4
3/8"	NPT3/8"	15,000 psi (1,034 bar)	15P-NM6
1/2"	NPT1/2"	15,000 psi (1,034 bar)	15P-NM8
3/4"	NPT3/4"	15,000 psi (689 bar)	10P-NM12
1"	NPT1"	15,000 psi (689bar)	10P-NM16

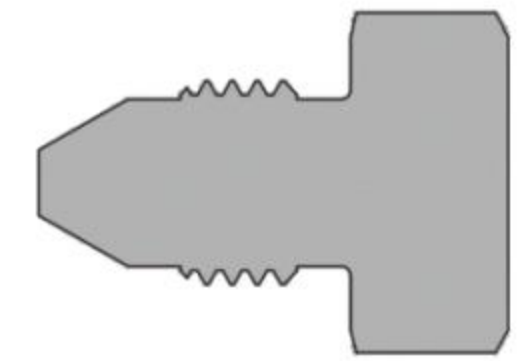


## ADAPTERS/COUPLINGS - FEMALE TUBE CAPS / PLUGS

USUN provide various Type Tube caps for sealing tube end

### Male Plug - Medium Pressure

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	LM4	20,000 psi (1,379 bar)	20PL-4M
3/8"	LM6	20,000 psi (1,379 bar)	20PL-6M
9/16"	LM9	20,000 psi (1,379 bar)	20PL-9M
3/4"	LM12	20,000 psi (1,379 bar)	20PL-12M
1"	LM16	20,000 psi (1,379 bar)	20PL-16M



### Male Plug - High Pressure Tube Caps

Tube Size in.	Connection Type	Maximum Pressure psi(bar)	Catalog Number
1/4"	LM4	60,000 psi (4,138 bar)	60PL-4H
3/8"	LM6	60,000 psi (4,138 bar)	60PL-6H
9/16"	LM9	60,000 psi (4,138 bar)	60PL-9H

