



**PANAM**

ENGINEERING  
BEYOND  
LIMITS

# Needle Valves (HB Series)

Maximum Working Pressure upto  
10000 psi (689 bar)



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Rev/04/2023

## Introduction

**PANAM**<sup>®</sup> has emerged as renowned name in global market for 'Instrumentation Fittings & Valves'. Since its inception in 1998 to present day, **PANAM**<sup>®</sup> has added new product every year and has broadened its product portfolio and its clientele base by supplying to potential customers worldwide. Key core values like Timely Delivery, Quality Consistency, Product Improvisation and After Sales Service has been instrumental in the phase wise evolution of company. Continuous improvement is the key to success, Customer feedback are taken with positive attitude and product are constantly groomed to a new quality and performance level to cope up with the competition. Our products are known for providing high-quality, high-reliability, low-cost options for the oil and gas industry. Over the year, the company has evolved from a product based company to a complete system solution provider. Over the coming years the entity of the company will attain state of the art operational efficiency for maintaining a competitive edge, with the advent increase in the utilization of its products in oil, gas and power sector.

**PANAM**<sup>®</sup> is having state of the art manufacturing facility span over an area of 65,000 sqft with a fleet of CNC Machines, VMC Machines, Semi-Automatic Lathe Machines, High Pressure Test Bench with SCADA Control, Configuration Centre for Transmitters and dedicated R&D Team.

**PANAM**<sup>®</sup> offers a large variety of Needle Valves HB Series from different materials like Stainless Steel, Carbon Steel, Monel 400, Hastelloy C276, Inconel 625, Inconel 825, Duplex and Super duplex as per the customer's requirements.

**PANAM**<sup>®</sup> offers Needle Valves HB Series with a variety of end connections including NPT Tapered, ISO Tapered (BSPT), ISO Parallel (BSPP), Metric Thread.

**PANAM**<sup>®</sup> Needle Valves HB Series are 100% factory tested, comply with NACE MR0175 / ISO 15156 with Heat Code Traceability. Maximum Working Pressure up to 10000 psi (689 bar). The product meets and even exceeds the requirements of ASME. All materials are supplied in compliance with ASTM Specifications and verified by NABL approved third party laboratories.

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## Description

**PANAM**<sup>®</sup> Needle Valves HB Series are designed for connecting the gauges (pressure gauges, etc) to process lines in hazardous and corrosion media under pressure of 10000 psi (689 bar). They are designed for easy block, bleed of pressure during maintenance and calibration of pressure transmitters or gauges. They are ruggedly manufactured and precision machined to the most exacting dimensional tolerance to ensure perfect installation and application. Needle Valves HB Series are available in SS 316, CS, Monel 400, Hastelloy C276, Inconel 625, Inconel 825, Duplex and Super Duplex. Valve Manifolds have high durability, maximum efficiency in operation, high quality and afford ability.

**PANAM**<sup>®</sup> offers Needle Valves HB Series with a variety of end connections including NPT Tapered, ISO Tapered (BSPT), ISO Parallel (BSPP), Metric Thread.

NACE-MR-01-75 Complied Needle Valve are also available (For sour gas).

## Characteristics

- Standard body material – Stainless Steel SS 316
- Maximum Working Pressure 10000 psi (689 bar) with modified PTFE stem packing
- PTFE / PCTFE / Grafoil valve stem packing (PTFE as standard stem packing)
- Working temperature: from -54°C to 232°C (-65°F to 450°F) with PTFE stem packing
- Working temperature: from -60°C to + 149°C (-76°F to + 300°F) with PCTFE stem packing
- Working temperature: from -40°C to + 648°C (-40°F to + 1198°F) with Grafoil stem packing
- Connection sizes: 1/8", 1/4", 3/8", 1/2", 3/4", 1" and M20X1.5.
- Connection options: female thread, male thread, male/female thread, female/male thread
- Thread types - NPT tapered threads, ISO tapered threads (BSPT), ISO parallel threads (BSPP), metric thread.
- Other types of valve stem seals for other temperature ranges possible upon request

## Features and Benefits

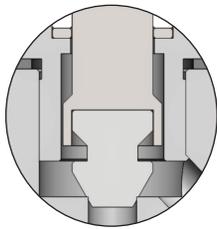
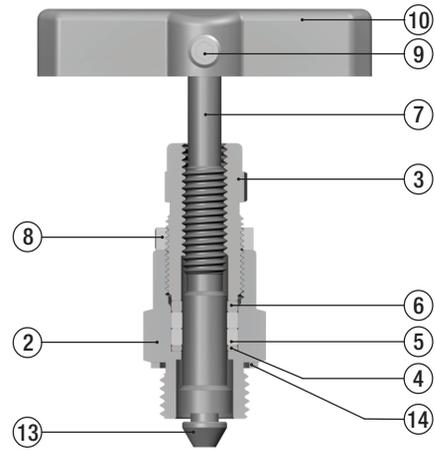
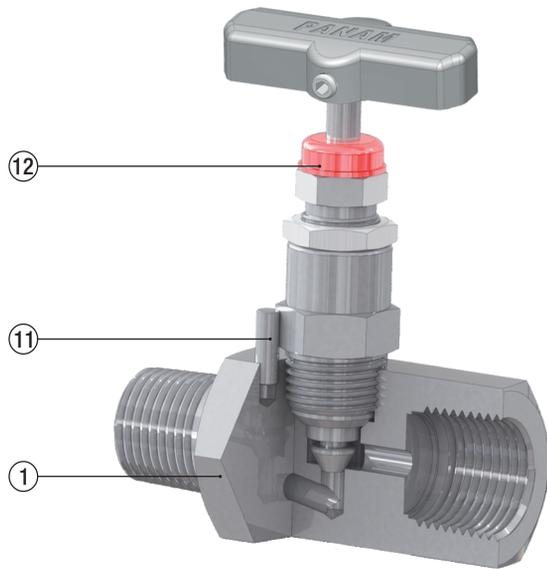
- Non Rotating Vee / Ball Tip Design - Which forms a bearing joint with the stem, eliminates rotation between plug & seat at closure. This prevents scoring and galling up the valve seat and ensure long life in repetitive shut off service.
- Safety Bonnet Lock - Prevents accidental disassembly.
- Stem Thread Rolled & Hard Plated - Provides additional strength & maximum service life.
- Mirror Finish Stem, Furnished to a 16RMS - Extends packing life and smooth stem operation.
- Adjustable Packing Below Stem Threads - Prevents stem lubrication washout and isolate threads from process contamination.
- Safety Back Seating - Provides secondary stem seal in full open position, prevents stem blow out.
- Stainless Steel Handle - For proper actuation.
- Body to Bonnet Seal - Metal to metal constant compression, Isolate bonnet threads from system fluids and eliminates possible tensile.
- Dust Cap - Prevents contaminants and lubricant washout of bonnet assembly.
- Heat Code Traceability.

## Testing

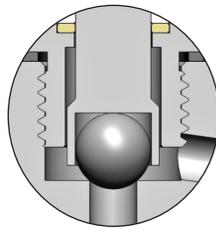
Each Valve is hydrostatically tested in accordance with MSS-SP-99. This procedure includes testing of the body cavity and spindle leaks. Other tests like Vibration, Temperature, Helium are available upon request.

Hydrostatic test is performed with pure water or other liquids of similar or lower viscosity at 1.5 times and seat leakage test at 1.1 times of the maximum working pressure. Each valve is also tested with Nitrogen Gas at 6.9 MPa (1000 psi) for seat, seal, and shell leakage.

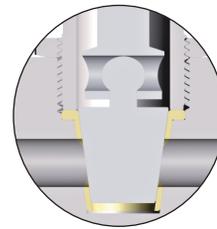
## Material of Construction



Non-Rotating V Tip



Non-Rotating Ball Tip

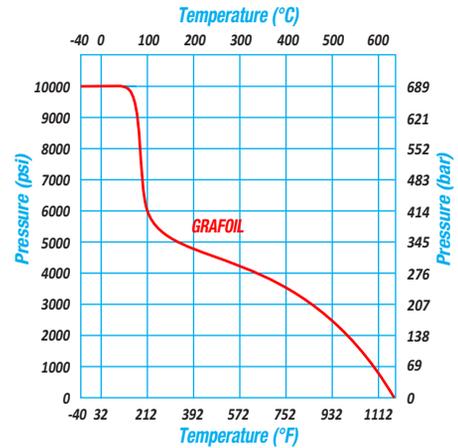
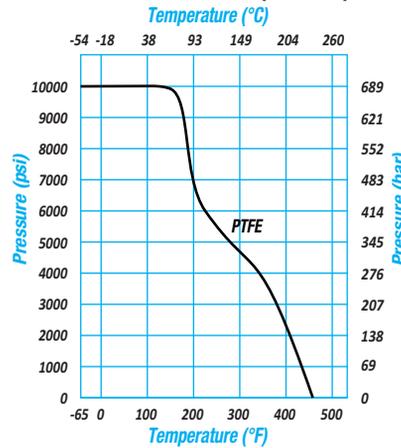
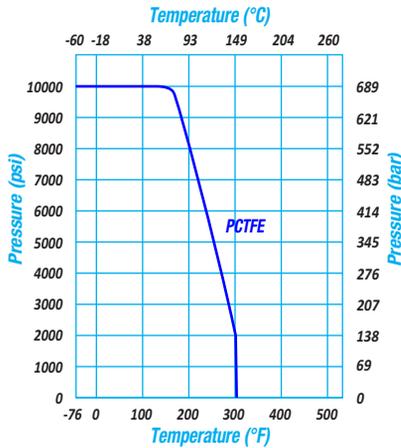


Soft Seat - Large Bore

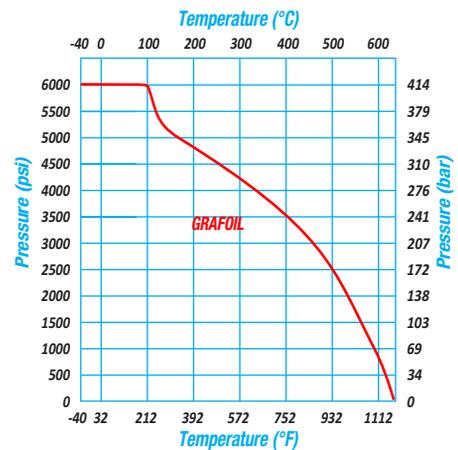
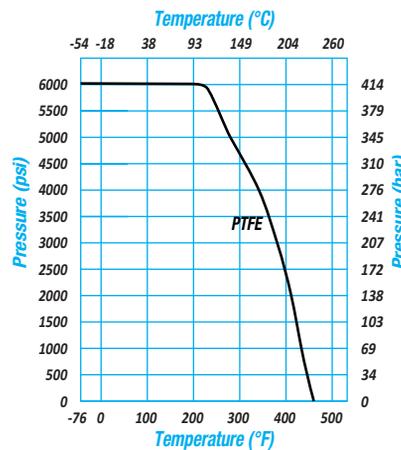
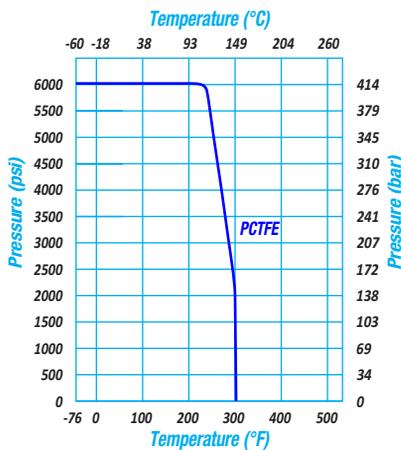
| No  | Part             | Qty. | Material               |
|-----|------------------|------|------------------------|
| 1.  | Body             | 1    | A479-316 / A-105       |
| 2.  | Gland Body       | 1    | A479-316 / A-105       |
| 3.  | Gland Retainer   | 1    | A479-316 / A-105       |
| 4.  | Washer           | 1    | A479-316 / A-105       |
| 5.  | Packing          | 1    | PTFE / PCTFE / Grafoil |
| 6.  | Packing Washing  | 1    | A276-316 / A-105       |
| 7.  | Spindle          | 1    | A276-316               |
| 8.  | Lock Nut         | 1    | A479-316 / A-105       |
| 9.  | Grub Screw       | 1    | Steel                  |
| 10. | Handle           | 1    | A276-304 / A-105       |
| 11. | Lock Pin         | 1    | A479-316 / A-105       |
| 12. | Dust Cap         | 1    | Nylone                 |
| 13. | Non Rotating Tip | 1    | A564 - 630             |
| 14. | Gasket Washer    | 1    | A276-316 / A-105       |

## Pressure & Temperature

### Needle Valves HB Series - 10000 (689 bar) Material SS 316



### Needle Valves HB Series - 6000 psi (414 bar) Material SS 316



## Sealing Material Characteristics

### PTFE (Polytetrafluoroethylene)

PTFE is an excellent material for applications in clean environments.

- It is highly resistant to the chemical effects of many organic and inorganic reagents and solvents.
- It has a low coefficient of deformation, increased strength and abrasion resistance, and a low friction coefficient

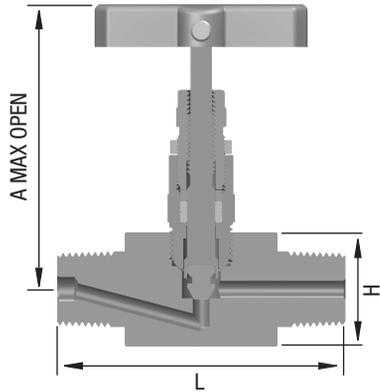
### PCTFE (Polychlorotetrafluoroethylene)

- high resistance to chemical attack and low temperatures
- Very low moisture absorption, resistance to hydrolysis and hot steam, ability to maintain strength and flexibility at low temperatures (operating temperature range -60°C to + 149°C (-76°F to + 300°F).

### Grafoil

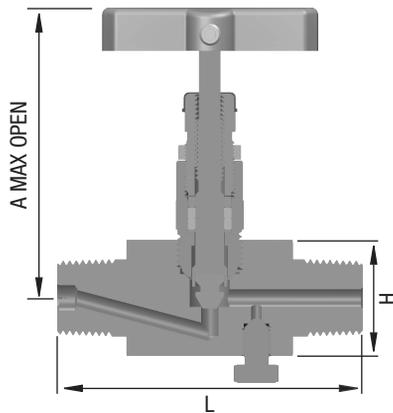
- Grafoil (thermally expanded graphite) is a material with resistance to high temperature and chemical impacts.
- Due to its unique features, this material is used in high temperatures and corrosive environments
- Thermally expanded graphite is one of the safest materials for sealing systems in liquid environments. Seals from the thermally expanded graphite is used in applications of highly volatile liquids and at extremely high temperatures

## Dimensions



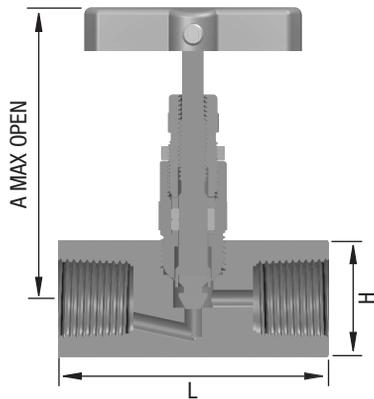
### Hard Seat Needle Valve (Male x Male)

| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PNV-HB-H-S-02-MM  | 1/8"           | 1/8"    | 3.2          | 65.0       | 25.4 | 85.0  |
| PNV-HB-H-S-04-MM  | 1/4"           | 1/4"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PNV-HB-H-S-06-MM  | 3/8"           | 3/8"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PNV-HB-H-S-08-MM  | 1/2"           | 1/2"    | 4.8          | 80.0       | 32.0 | 86.0  |
| PNV-HB-H-S-20M-MM | M20X1.5        | M20X1.5 | 4.8          | 80.0       | 32.0 | 86.0  |
| PNV-HB-H-S-12-MM  | 3/4"           | 3/4"    | 6.4          | 85.0       | 36.0 | 92.0  |
| PNV-HB-H-S-16-MM  | 1"             | 1"      | 9.5          | 110.0      | 46.0 | 110.0 |



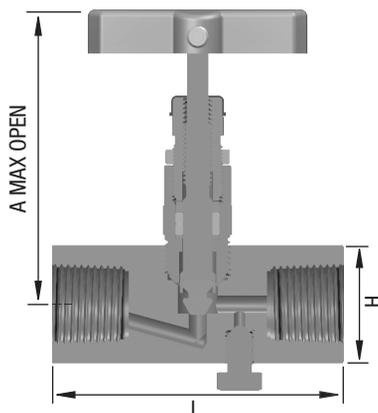
### Hard Seat Block & Bleed (Male x Male)

| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PBB-HB-H-S-02-MM  | 1/8"           | 1/8"    | 3.2          | 70.0       | 25.4 | 85.0  |
| PBB-HB-H-S-04-MM  | 1/4"           | 1/4"    | 4.0          | 70.0       | 25.4 | 85.0  |
| PBB-HB-H-S-06-MM  | 3/8"           | 3/8"    | 4.0          | 70.0       | 25.4 | 85.0  |
| PBB-HB-H-S-08-MM  | 1/2"           | 1/2"    | 4.8          | 85.0       | 32.0 | 86.0  |
| PBB-HB-H-S-20M-MM | M20X1.5        | M20X1.5 | 4.8          | 85.0       | 32.0 | 86.0  |
| PBB-HB-H-S-12-MM  | 3/4"           | 3/4"    | 6.4          | 90.0       | 36.0 | 92.0  |
| PBB-HB-H-S-16-MM  | 1"             | 1"      | 9.5          | 115.0      | 46.0 | 110.0 |



### Hard Seat Needle Valve (Female x Female)

| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PNV-HB-H-S-02-FF  | 1/8"           | 1/8"    | 3.2          | 55.0       | 25.4 | 85.0  |
| PNV-HB-H-S-04-FF  | 1/4"           | 1/4"    | 4.0          | 55.0       | 25.4 | 85.0  |
| PNV-HB-H-S-06-FF  | 3/8"           | 3/8"    | 4.0          | 55.0       | 25.4 | 85.0  |
| PNV-HB-H-S-08-FF  | 1/2"           | 1/2"    | 4.8          | 75.0       | 32.0 | 86.0  |
| PNV-HB-H-S-20M-FF | M20X1.5        | M20X1.5 | 4.8          | 75.0       | 32.0 | 86.0  |
| PNV-HB-H-S-12-FF  | 3/4"           | 3/4"    | 6.4          | 75.0       | 36.0 | 92.0  |
| PNV-HB-H-S-16-FF  | 1"             | 1"      | 9.5          | 110.0      | 46.0 | 110.0 |

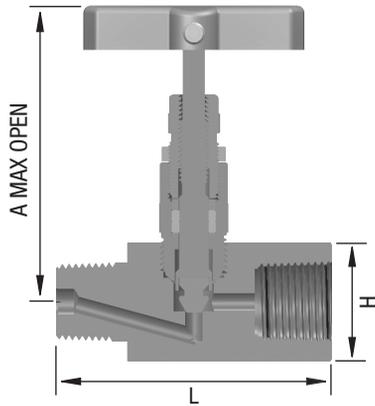


### Hard Seat Block & Bleed (Female x Female)

| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PBB-HB-H-S-02-FF  | 1/8"           | 1/8"    | 3.2          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-04-FF  | 1/4"           | 1/4"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-06-FF  | 3/8"           | 3/8"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-08-FF  | 1/2"           | 1/2"    | 4.8          | 80.0       | 32.0 | 86.0  |
| PBB-HB-H-S-20M-FF | M20X1.5        | M20X1.5 | 4.8          | 80.0       | 32.0 | 86.0  |
| PBB-HB-H-S-12-FF  | 3/4"           | 3/4"    | 6.4          | 80.0       | 36.0 | 92.0  |
| PBB-HB-H-S-16-FF  | 1"             | 1"      | 9.5          | 115.0      | 46.0 | 110.0 |

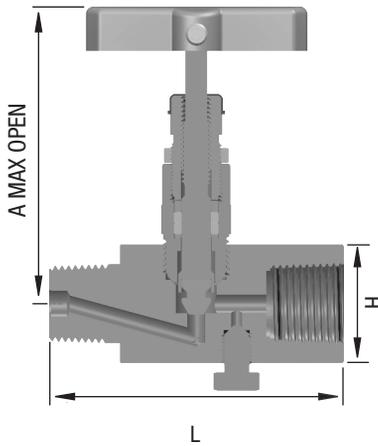
## Dimensions

### Hard Seat Needle Valve (Male x Female)



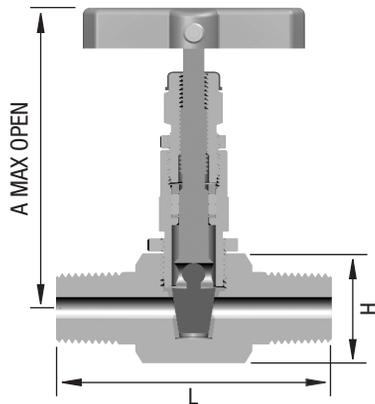
| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PNV-HB-H-S-02-MF  | 1/8"           | 1/8"    | 3.2          | 60.0       | 25.4 | 85.0  |
| PNV-HB-H-S-04-MF  | 1/4"           | 1/4"    | 4.0          | 60.0       | 25.4 | 85.0  |
| PNV-HB-H-S-06-MF  | 3/8"           | 3/8"    | 4.0          | 60.0       | 25.4 | 85.0  |
| PNV-HB-H-S-08-MF  | 1/2"           | 1/2"    | 4.8          | 75.0       | 32.0 | 86.0  |
| PNV-HB-H-S-20M-MF | M20X1.5        | M20X1.5 | 4.8          | 75.0       | 32.0 | 86.0  |
| PNV-HB-H-S-128-MF | 3/4"           | 1/2"    | 4.8          | 75.0       | 32.0 | 86.0  |
| PNV-HB-H-S-12-MF  | 3/4"           | 3/4"    | 6.4          | 80.0       | 36.0 | 92.0  |
| PNV-HB-H-S-16-MF  | 1"             | 1"      | 9.5          | 110.0      | 46.0 | 110.0 |

### Hard Seat Block & Bleed (Male x Female)



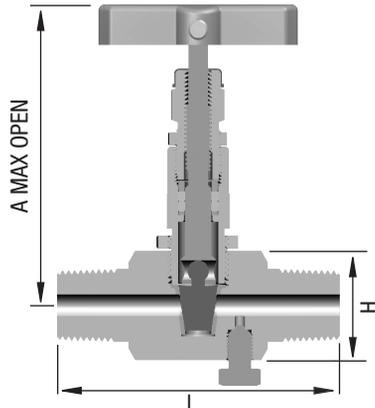
| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PBB-HB-H-S-02-MF  | 1/8"           | 1/8"    | 3.2          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-04-MF  | 1/4"           | 1/4"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-06-MF  | 3/8"           | 3/8"    | 4.0          | 65.0       | 25.4 | 85.0  |
| PBB-HB-H-S-08-MF  | 1/2"           | 1/2"    | 4.8          | 80.0       | 32.0 | 86.0  |
| PBB-HB-H-S-20M-MF | M20X1.5        | M20X1.5 | 4.8          | 80.0       | 32.0 | 86.0  |
| PBB-HB-H-S-128-MF | 3/4"           | 1/2"    | 4.8          | 80.0       | 32.0 | 86.0  |
| PBB-HB-H-S-12-MF  | 3/4"           | 3/4"    | 6.4          | 85.0       | 36.0 | 92.0  |
| PBB-HB-H-S-16-MF  | 1"             | 1"      | 9.5          | 115.0      | 46.0 | 110.0 |

### Soft Seat Needle Valve (Male x Male)



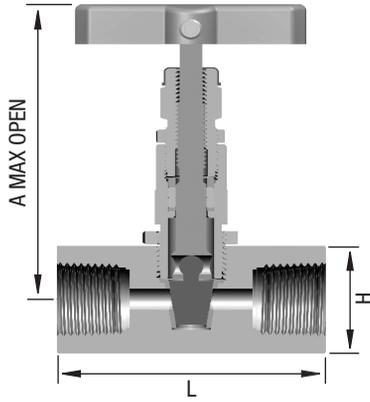
| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PNV-HB-S-S-04-MM  | 1/4"           | 1/4"    | 4.8          | 65.0       | 27.0 | 92.0  |
| PNV-HB-S-S-06-MM  | 3/8"           | 3/8"    | 4.8          | 65.0       | 27.0 | 92.0  |
| PNV-HB-S-S-08-MM  | 1/2"           | 1/2"    | 6.4          | 65.0       | 32.0 | 98.0  |
| PNV-HB-S-S-20M-MM | M20X1.5        | M20X1.5 | 6.4          | 80.0       | 32.0 | 98.0  |
| PNV-HB-S-S-12-MM  | 3/4"           | 3/4"    | 9.5          | 90.0       | 42.0 | 130.0 |
| PNV-HB-S-S-16-MM  | 1"             | 1"      | 11.0         | 100.0      | 46.0 | 130.0 |

### Soft Seat Block & Bleed (Male x Male)



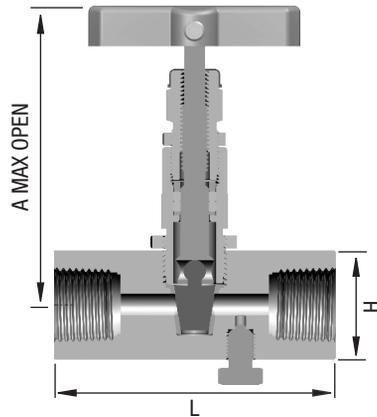
| Part Number       | End Connection |         | Orifice<br>E | Dimensions |      |       |
|-------------------|----------------|---------|--------------|------------|------|-------|
|                   | Inlet          | Outlet  |              | L          | H    | A     |
| PBB-HB-S-S-04-MM  | 1/4"           | 1/4"    | 4.8          | 70.0       | 27.0 | 92.0  |
| PBB-HB-S-S-06-MM  | 3/8"           | 3/8"    | 4.8          | 70.0       | 27.0 | 92.0  |
| PBB-HB-S-S-08-MM  | 1/2"           | 1/2"    | 6.4          | 85.0       | 32.0 | 98.0  |
| PBB-HB-S-S-20M-MM | M20X1.5        | M20X1.5 | 6.4          | 85.0       | 32.0 | 98.0  |
| PBB-HB-S-S-12-MM  | 3/4"           | 3/4"    | 9.5          | 95.0       | 42.0 | 130.0 |
| PBB-HB-S-S-16-MM  | 1"             | 1"      | 11.0         | 110.0      | 46.0 | 130.0 |

## Dimensions



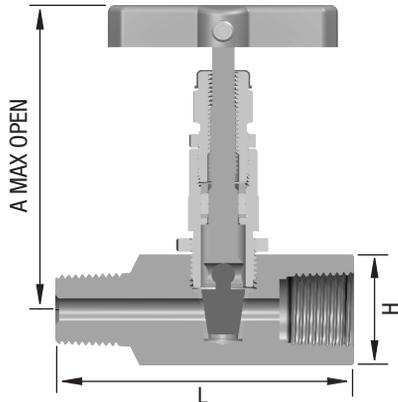
### Soft Seat Needle Valve (Female x Female)

| Part Number       | End Connection |         | Orifice | Dimensions |      |       |
|-------------------|----------------|---------|---------|------------|------|-------|
|                   | Inlet          | Outlet  | E       | L          | H    | A     |
| PNV-HB-S-S-04-FF  | 1/4"           | 1/4"    | 4.8     | 55.0       | 27.0 | 92.0  |
| PNV-HB-S-S-06-FF  | 3/8"           | 3/8"    | 4.8     | 55.0       | 27.0 | 92.0  |
| PNV-HB-S-S-08-FF  | 1/2"           | 1/2"    | 6.4     | 70.0       | 32.0 | 98.0  |
| PNV-HB-S-S-20M-FF | M20X1.5        | M20X1.5 | 6.4     | 70.0       | 32.0 | 98.0  |
| PNV-HB-S-S-12-FF  | 3/4"           | 3/4"    | 9.5     | 80.0       | 42.0 | 130.0 |
| PNV-HB-S-S-16-FF  | 1"             | 1"      | 11.0    | 100.0      | 46.0 | 130.0 |



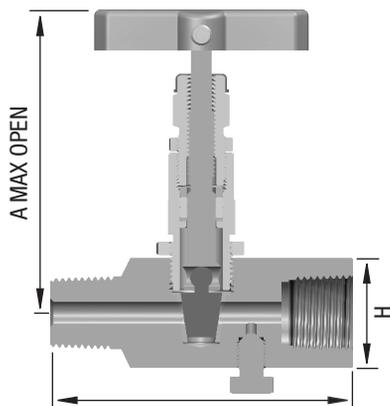
### Soft Seat Block & Bleed Valve (Female x Female)

| Part Number       | End Connection |         | Orifice | Dimensions |      |       |
|-------------------|----------------|---------|---------|------------|------|-------|
|                   | Inlet          | Outlet  | E       | L          | H    | A     |
| PBV-HB-S-S-04-FF  | 1/4"           | 1/4"    | 4.8     | 60.0       | 27.0 | 92.0  |
| PBV-HB-S-S-06-FF  | 3/8"           | 3/8"    | 4.8     | 60.0       | 27.0 | 92.0  |
| PBV-HB-S-S-08-FF  | 1/2"           | 1/2"    | 6.4     | 75.0       | 32.0 | 98.0  |
| PBV-HB-S-S-20M-FF | M20X1.5        | M20X1.5 | 6.4     | 75.0       | 32.0 | 98.0  |
| PBV-HB-S-S-12-FF  | 3/4"           | 3/4"    | 9.5     | 85.0       | 42.0 | 130.0 |
| PBV-HB-S-S-16-FF  | 1"             | 1"      | 11.0    | 110.0      | 46.0 | 130.0 |



### Soft Seat Needle Valve (Male x Female)

| Part Number       | End Connection |         | Orifice | Dimensions |      |       |
|-------------------|----------------|---------|---------|------------|------|-------|
|                   | Inlet          | Outlet  | E       | L          | H    | A     |
| PNV-HB-S-S-04-MF  | 1/4"           | 1/4"    | 4.8     | 60.0       | 37.0 | 92.0  |
| PNV-HB-S-S-06-MF  | 3/8"           | 3/8"    | 4.8     | 60.0       | 37.0 | 92.0  |
| PNV-HB-S-S-08-MF  | 1/2"           | 1/2"    | 6.4     | 80.0       | 32.0 | 98.0  |
| PNV-HB-S-S-20M-MF | M20X1.5        | M20X1.5 | 6.4     | 80.0       | 32.0 | 98.0  |
| PNV-HB-S-S-128-MF | 3/4"           | 1/2"    | 6.4     | 80.0       | 32.0 | 98.0  |
| PNV-HB-S-S-12-MF  | 3/4"           | 3/4"    | 9.5     | 85.0       | 42.0 | 130.0 |
| PNV-HB-S-S-16-MF  | 1"             | 1"      | 11.0    | 100.0      | 46.0 | 130.0 |



### Soft Seat Block & Bleed Valve (Male x Female)

| Part Number       | End Connection |         | Orifice | Dimensions |      |       |
|-------------------|----------------|---------|---------|------------|------|-------|
|                   | Inlet          | Outlet  | E       | L          | H    | A     |
| PBB-HB-S-S-04-MF  | 1/4"           | 1/4"    | 4.8     | 60.0       | 37.0 | 92.0  |
| PBB-HB-S-S-06-MF  | 3/8"           | 3/8"    | 4.8     | 60.0       | 37.0 | 92.0  |
| PBB-HB-S-S-08-MF  | 1/2"           | 1/2"    | 6.4     | 85.0       | 32.0 | 98.0  |
| PBB-HB-S-S-20M-MF | M20X1.5        | M20X1.5 | 6.4     | 85.0       | 32.0 | 98.0  |
| PBB-HB-S-S-128-MF | 3/4"           | 1/2"    | 6.4     | 85.0       | 32.0 | 98.0  |
| PBB-HB-S-S-12-MF  | 3/4"           | 3/4"    | 9.5     | 90.0       | 42.0 | 130.0 |
| PBB-HB-S-S-16-MF  | 1"             | 1"      | 11.0    | 110.0      | 46.0 | 130.0 |

## Ordering Information Needle Valve HB Series

**PNV-HB-H-S-08-FF-SG-10K**

**PANAM®**

### Valve

**PNV** - Needle Valve  
**PBB** - Block & Bleed Valve

### Series

**HB** - Hex Body

### Seat

**H** - Hard Seat                      **S1** - Soft Seat - PCTFE  
**S** - Soft Seat - Delrin (Standard)    **S2** - Soft Seat - PEEK

### Material

**S** - SS 316                              **F53** - Super Duplex - UNS S32750  
**CS** - Carbon Steel (ASTM A105N)    **F55** - Super Duplex - UNS S32760  
**MO** - Monel 400                      **6MO** - UNS S31254  
**HC** - Hastelloy C276                **INC625** - Inconel 625  
**F51** - Duplex - UNS S31803        **INC825** - Inconel 825

### Connection Size

**02** - 1/8"      **06** - 3/8"      **12** - 3/4"      **128** - 3/4" x 1/2"  
**04** - 1/4"      **08** - 1/2"      **16** - 1"      **20M** - M20 x 1.5

### Connection Type

**MM** - Male x Male                  **MF** - Male x Female              **PSW** - Pipe Socket Weld  
**FF** - Female x Female              **FM** - Female x Male              **TSW** - Tube Socket Weld

### Options

**LH** - Locking Arrangement      **XLT** - Low Temperature Application  
**SG** - Nace MR0175                **HT** - Grafoil Seal for High Temperature (Hard Seat Only)  
**ATK** - Anti-Temper Key          **OXY** - Oxygen Cleaning  
**BT** - Ball Tip

### Working Pressure

- - Working Pressure - 6000 psi (414 bar)      **10K** - Working Pressure - 10000 psi (689 bar)

## Safety

Pressure and Temperature rating are selected from ANSI B16.34 for standard class valves based on ANSI B16-Class 2500. Option SG - for sour gas service, in accordance with NACE STD MR-01-75. For safe operation of **PANAM®** Needle Valve SB series shall be adequately selected. When choosing materials operating conditions, compatibility of materials, purpose and product specifications shall be considered. Installation and maintenance of products shall be carried out by qualified personnel. Wrong selection, poor installation or incorrect operation and maintenance may result in accident, causing personal injury and result in material damage. **PANAM®** provides a guarantee for their products, but is not responsible for the wrong selection, installation, operation and maintenance of the supplied products.

## Other Products



2-3-5 VALVE MANIFOLDS



BELLOW SEAL VALVES



GAUGE ROOT VALVES



NEEDLE VALVES



HP NEEDLE VALVES



BALL VALVES



HP BALL VALVES



DOUBLE BLOCK & BLEED VALVES



MONO FLANGE VALVES



CHECK VALVES



RELIEF VALVES



FILTERS



TUBE FITTINGS



PIPE FITTINGS



HP PIPE FITTINGS



SWIVEL FITTINGS



JIC FITTINGS



WELD FITTINGS



HIGH PRESSURE FITTINGS



GAUGE SAVERS



PRESSURE GAUGES



TEMPERATURE GAUGES



PRESSURE TRANSMITTERS



TEMPERATURE TRANSMITTERS



PRESSURE REGULATORS



CONDENSATE POTS



AIR HEADERS



GRAB SAMPLING SYSTEM



PRE-FABRICATED HOOK UPS



FLANGE ADAPTERS



SWIVEL GAUGE ADAPTERS



THERMOWELLS



BLEED PLUGS



DIE-ELECTRIC FITTINGS



TUBING



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