

## A PROVIDER OF MICROFLUIDIC COMPONENTS AND SYSTEM DESIGN SERVICES

Pumps • Valves • Intelligent Drive Controllers • Thermal Controllers • Probes • Tubing & Fittings



<b>10+</b> 10-Year Experience In Microfluidics	<b>60+</b> 60+ Software Copyrights	<b>2500+</b> 2500+ Cumulative Customers	<b>5000+</b> 5000+ Products
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Founded in 2012, Shenzhen Foreach Technology Co., Ltd. focuses on the research & development and production of precise control technology in microfluidics and key components of medical devices, environmental and laboratory equipment, etc. Foreach provides a variety of products including pumps, valves, probes, tubing & fittings. Piston pumps are widely used in the fields of biochemistry, chemiluminescence, etc., and Foreach's piston pumps have been dominating the Chinese IVD market for years, thereby having become a preference in the industry. With our cutting-edge Inner Wall Polishing, Foreach's sampling probes have excellent performance and customization is available. With thousands of tubing & fittings, Foreach has replaced most of homogeneous products of foreign brands. Foreach always treats innovation as the foundation, continuously invests in the research and development of cutting-edge microfluidic technology, conducts foreseeing scientific research, and builds up new standards for microfluidic applications. Foreach has become a microfluidic component provider with comprehensive products and high brand recognition in the Chinese market.

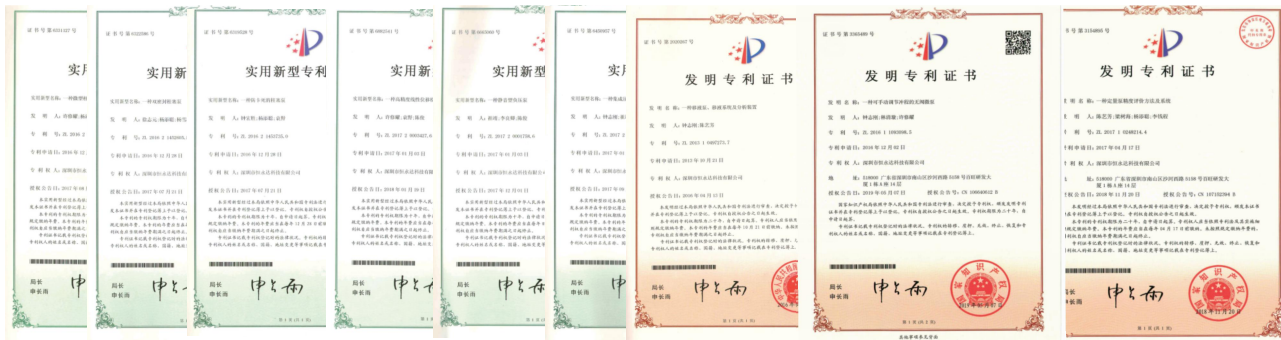
Foreach is determined to become the leader in microfluidics. With rich technological creativity, Foreach will continue committing to opening the intelligent era of microfluidic control together with our customers, and be dedicated to enabling our partners' success.

- Vision:** To be the leader in microfluidics
- Value:** Practicality and Honesty, Pursuing Excellence and Enabling Customers' Success
- Code of Conduct:** Focused, Original, Reliable, Excellent, Active, Cooperative, and Honest

**Mission:** Foreach is committed to having an in-depth insight into global microfluidic demands of automated analytical instruments, carrying out deep research to break through technical barriers, providing our customers with excellent and reliable products and system solutions, and dedicated to enable our partners' success.

# Qualification & Certificates

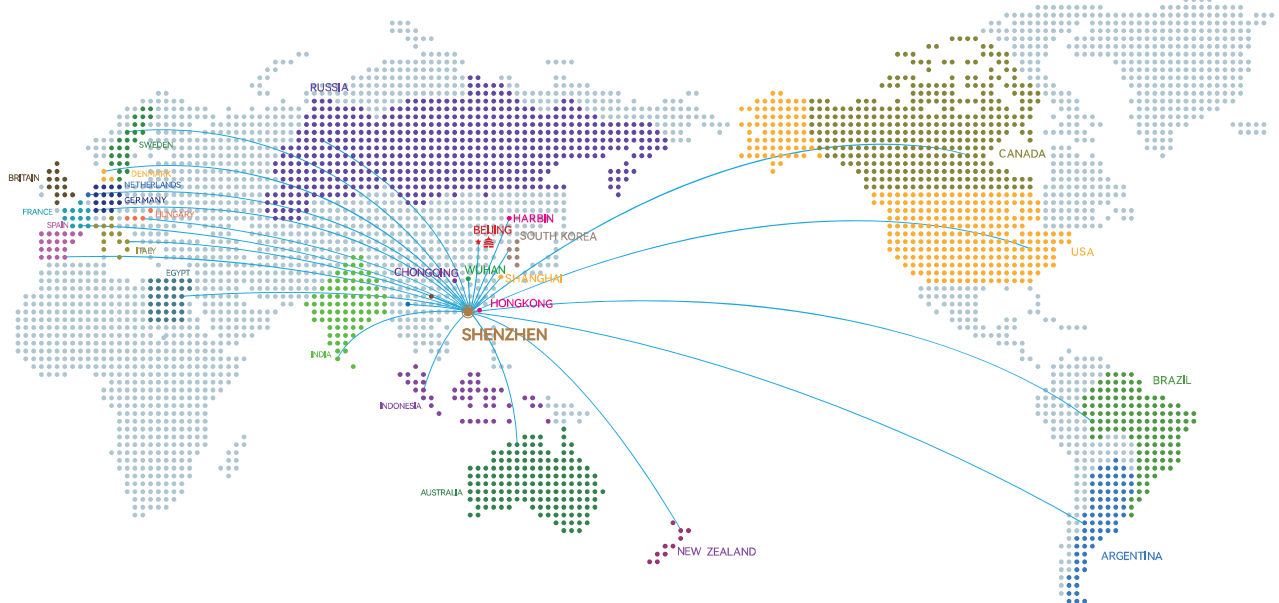
We work and grow together with our customers, and provide excellent service to them with Foreach's spirit of concentration, professionalism and efficiency.



# TO BE THE LEADER IN MICROFLUIDICS

## Taking the long view & Serving the world

Commit to providing complete solutions to our partners from around the globe, in order to assist our customers' improvement and sustainable development.



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PUMPS



VALVES



INTELLIGENT SENSORS & CONTROLLERS



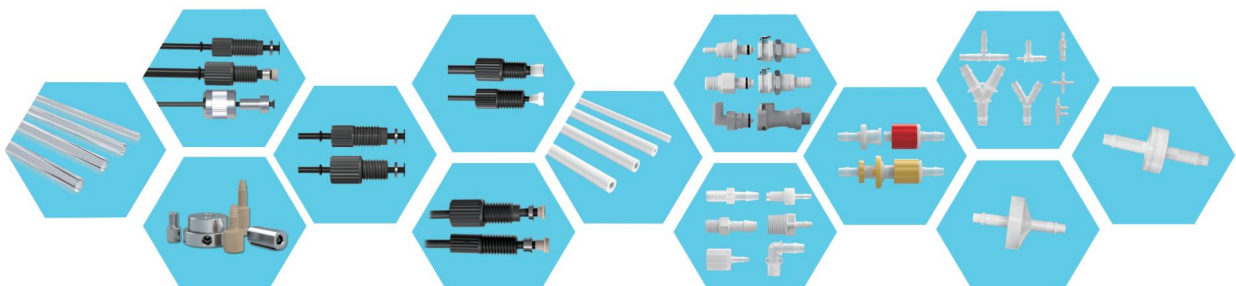
THERMAL CONTROLLERS & DEHUMIDIFIER



PROBES



TUBING & FITTINGS





# 1 PUMPS

## ▶ ALS - Zero Backlash Piston Pump



### ACCURACY

ACC < 0.5% (at full stroke)

### PRECISION

CV < 0.5% (at full stroke)

### ZERO BACKLASH

No backlash compensation

Stable Performance

Range	μL	50	100	250	500	1000
Piston Material	/	Ceramics (ZrO <sub>2</sub> or Al <sub>2</sub> O <sub>3</sub> ), PEEK, sapphire				
Stroke	mm	12.7				
Recommended Max. Speed	rpm	600				
Step Angle	°	0.9				
Lead	mm	1				
Precision (at full stroke)	%	≤0.5				
Backlash (at full stroke)	%	≤0.5				
Total Number of Steps	Step	5080				
Fluid Pressure	MPa	≤0.3				
Lifetime	Cycles	5 Million				
Port	/	2 x 1/4 28UNF, 2 x M6				



► **TM - Ultra-micro Piston Pump**



**ACCURACY**

ACC < 0.5% (at full stroke)

**LIGHTWEIGHT**

96 grams

**RANGE**

50, 100, 250 and 500µL

Compact and lightweight  
Preference of POCT devices

Range	µL	50	100	250	500
Piston Material	/	Ceramics (ZrO <sub>2</sub> or Al <sub>2</sub> O <sub>3</sub> ), PEEK, sapphire			
Stroke	mm	12.7			
Recommended Max. Speed	rpm	600			
Step Angle	°	1.8			
Lead	mm	1			
Precision (at full stroke)	%	<0.5			
Backlash (at full stroke)	%	<2			
Total Number of Steps	/	2540			
Fluid Pressure	MPa	<0.3			
Lifetime	Cycles	3 Million			
Port	/	6-40UNF			





► SM - Micro Piston Pump



**ACCURACY**

ACC < 0.5% (at full stroke)

**PRECISION**

CV < 0.5% (at full stroke)

**RANGE**

50, 100, 250, 500 and 1000µL

Compatible with solenoid valves  
ISC micro stepper motor driver available

Range	µL	50	100	250	500	1000
Piston Material	/	Ceramics (ZrO <sub>2</sub> or Al <sub>2</sub> O <sub>3</sub> ), PEEK, sapphire				
Stroke	mm	12.7				
Recommended Max. Speed	rpm	600				
Step Angle	°	1.8				
Lead	mm	1.27				
Precision (at full stroke)	%	0.5				
Backlash (at full stroke)	%	<1				
Total Number of Steps	/	2000				
Fluid Pressure	MPa	≤0.3				
Lifetime	Cycles	5 Million				
Port	/	M6 or 1/4-28UN				



► EA - Standard Piston Pump



**ACCURACY**

ACC < 0.5% (at full stroke)

**PRECISION**

CV < 0.5% (at full stroke)

**RANGE**

50, 100, 250, 500, 1000, 2500, 5000, 10000 and 20000µL

Various piston materials such as PEEK and sapphire

Compatible with solenoid valves and ISC micro stepper motor driver

Range	µL	50	100	250	500	1000	2500	5000	10000	20000
Piston Material	/	Ceramics (ZrO <sub>2</sub> or Al <sub>2</sub> O <sub>3</sub> ), PEEK, or sapphire								
Stroke	mm	12.7					12.7	12.7	25.4	25.4
Recommended Max. Speed	rpm	600					600	600	600	300
Step Angle	°	1.8								
Lead	mm	1.27					1.27	1.27	1.27	2.54
Precision (at full stroke)	%	0.5								
Backlash (at full stroke)	%	<1								
Total Number of Steps	/	2000					2236	2000	4000	4000
Fluid Pressure	MPa	≤0.3								
Lifetime	Cycles	5 Million								
Port	/	M6 or 1/4-28UNF								



► RPL - Valveless Pump



- ▲ Accurate and stable, high reliability
- ▲ Great chemical compatibility, wide range of applicable fluids
- ▲ Adjustable revolution rate and volume, flexible and easy to use
- ▲ Volume adjustment without disassembling the pump

Range	μL	50-300	300-1200
Speed	rpm	5-300	
Accuracy (at full stroke)	%	< 2	
Precision (at full stroke)	%	< 0.5	
Proof Pressure	kPa	150	
Lifetime	Cycles	20 Million	
Dimensions	mm	78x78x145	78x78x160
Port of Operating Fluid	/	1/4-28UNF	G1/8 (with default quick disconnects)
Port of Washing Fluid	/	1/4-28UNF	

► DRPL - Valveless Pump



- ▲ Fluid ratio options: 1:9 and 1:19
- ▲ Accurate and stable, high reliability
- ▲ Great chemical compatibility, wide range of applicable fluids
- ▲ Adjustable revolution rate and volume, flexible and easy to use

Fluid Ratio	/	1:9	1:19
Speed	rpm	60-300	
Accuracy (at full stroke)	%	2	
Precision (at full stroke)	%	0.5	
Flow Rate Qmin	mL/min	60	72
Flow Rate Qmax	mL/min	300	360
Dimensions	mm	180x83.7x75	
Lifetime	Cycles	20 Million	
Port of Operating Fluid	/	1/4-28UNF (of Reagent A), G1/8 (of Reagent B)	
Port of Washing Fluid	/	1/4-28UNF (of Reagent A), 1/4-28UNF (of Reagent B)	



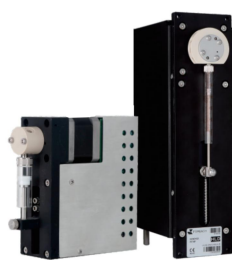
► HMD - Syringe Pump with Solenoid Valves



- ▲ Single, 2, 3, 4, 6 and 8 channels available
- ▲ Short turn time and long lifetime
- ▲ Syringe sizes from 25µL to 25mL
- ▲ RS-232, RS-485 and CAN interface
- ▲ Excellent chemical compatibility

Travel	mm	30	60
Number of Channels	/	1	1- 8
Full Stroke Time	s	1.2 - 1200	1.2 - 9600
Plunger Speed	mm/s	0.025 - 60	0.00625 - 60
Resolution	/	Standard mode: 3000 or 6000 increments; Microstep mode: 24000 or 48000 increments	
Range (glass syringe)	/	25µL - 25mL	
Accuracy (at full stroke)	%	≤0.05 (250µL or above), ≤0.1 (100µL or below)	
Valve Configuration	/	2-port or 3-port	2-port non-distribution or 3-port distribution
Operating Pressure	/	-75kPa - 0.2MPa	-75kPa - 0.1MPa
Interface	/	RS-232, RS-485, CAN	

► HLD - Syringe Pump with Rotary Valves



- ▲ Little dead volume of rotary valves
- ▲ Short turn time
- ▲ Syringe sizes from 25µL to 25mL
- ▲ Excellent chemical compatibility

Travel	mm	30	60
Number of Channels	/	1	
Full Stroke Time	s	1.2 - 1200	1.2 - 9600
Plunger Speed	mm/s	0.025 - 60	0.00625 - 60
Resolution	/	Standard mode: 3000 or 6000 increments, Microstep mode: 24000 or 48000 increments	
Range (glass syringe)	/	25µL - 25mL	
Accuracy (at full stroke)	%	≤0.05 (250µL or above), ≤0.1 (100µL or below)	
Valve Configuration	/	3-port non-distribution (Y-shaped) or 9-port distribution	
Operating Pressure	/	-75kPa - 0.68MPa	
Interface	/	RS-232, RS-485, CAN	





► **EB - Upright Syringe Pump**



- ▲ Zero dead volume
- ▲ Compact design, easy to install
- ▲ Syringe sizes from 5mL to 25mL
- ▲ Excellent corrosion resistance and chemical compatibility
- ▲ Stable performance

Range	mL	5	12.5	25
Proof Pressure	MPa	0-0.8 (positive pressure), 0-0.06 (negative pressure)		
Rated Travel	mm	30		
Total Number of Steps	/	12000		
Accuracy (at full stroke)	%	≤ 1		
Precision (at full stroke)	%	0.3-0.7		
Backlash (at full stroke)	%	< 1		
Lifetime	Cycles	3 Million (1 full stroke counted as 1 cycle)		
Wetted Materials	/	Borosilicate Glass, PTFE, Polypropylene, EPDM, Viton, FFKM		
Syringe Number	/	1		
Port	/	1/4-28UNF or M6 Internal Thread (Depth of 8mm)		

► **SP - Syringe**



- ▲ Volume: 25μL-25mL
- ▲ Available Strokes: 30mm and 60mm
- ▲ Plunger Shapes: flat or conical surface
- ▲ Pushrod Fixing: 6-32UNC, pin hole, flange, etc.
- ▲ Plunger Materials: PTFE, HDPE, etc.
- ▲ Terminations: fixed, replacement and Luer lock

Stroke	/	XLP (60mm)	XC (30mm)
Volume	/	25μL, 50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5 mL, 5mL, 10mL, 25mL	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5mL
Operating Temperature	°C	10 - 40	
Storage Temperature	°C	-25 - 85	



► SMTP0 - Pipetting Pump



- ▲ Prevent cross contamination
- ▲ No tubing, priming- and maintenance-free
- ▲ Accurate, stable, lightweight and compact

Volume	μL	50	100	250	500	1000
Drive Design	/	Bipolar lead screw stepper motor with 4 leads				
Motor Speed	pps	1 - 3000				
Resolution	μL/step	0.02	0.05	0.125	0.25	0.5
Total Number of Steps	/	2000				
Operating Noise	dBA	<60				
Operating Environment	/	15°C to 40°C and 20% to 95% RH at 40°C, non condensing				
Storage Environment	/	-20°C to 65°C and 30% to 85% RH, non condensing				
Media Temperature	°C	15 - 40				
Power Requirement	/	24V DC, 500 mA				

► SMTP2 - Pipetting Pump



- ▲ Liquid level detection using pressure, capacitance, or a Hybrid mode
- ▲ Real-time pressure data streaming for dispense and aspirate verification or blocked tip detection
- ▲ Allow for daisy-chaining of up to 16 pumps
- ▲ Cover kits and disposable tips available

Volume	μL	250, 1000
Drive Design	/	Bipolar lead screw stepper motor with 4 leads
Liquid Level Detection	/	Pressure based (pLLD), capacitive (cLLD), hybrid (hLLD)
Resolution	/	Standard mode 0.319 μL/step with 3143 increments/full stroke, High-Resolution mode 0.02 μL/microstep with 48000 increments/full stroke
Interface	/	RS232, RS485, CAN
Addressing	/	Up to 16 pumps
Operating Environment	/	15°C to 40°C and 20% to 95% RH at 40°C, non condensing
Storage Environment	/	-20°C to 65°C and 30% to 85% RH, non condensing
Power Requirement	/	24V DC, 500 mA



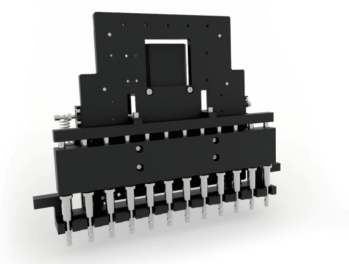
► SMTP4 - Pipetting Pump



- ▲ No tubing or priming
- ▲ Accurate and stable
- ▲ Lightweight, compact and maintenance-free
- ▲ Integrated tip ejection

Volume	μL	100	500
Drive Design	/	Bipolar lead screw stepper motor with 4 leads	
Motor Speed	pps	1 - 3000	
Resolution	μL/step	0.05	0.25
Total Number of Steps	/	2000	
Steps of Tip Ejection	/	550	
Operating Environment	/	15°C to 40°C and 20% to 95% RH at 40°C, non condensing	
Storage Environment	/	-20°C to 65°C and 30% to 85% RH, non condensing	
Power Requirement	/	24V DC, 500 mA	

► SSTP - 12-channel Pipetting Pump

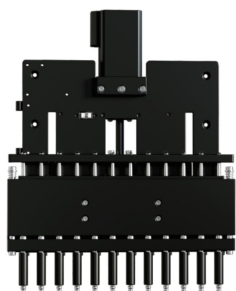


- ▲ Maintenance-free and long lifetime
- ▲ No tubing or priming
- ▲ Integrated tip ejection

Number of Channels	/	12
Inter-Channel Spacing	mm	18
Volume	μL	300
Resolution	μL/step	0.25
Stroke	mm	15.29
Max. Number of Full Steps	/	1203
Accuracy (at full stroke)	/	3
Precision (at full stroke)	/	1
Lifetime	Cycles	500,000



► SSTP2 - 12-channel Pipetting Pump



- ▲ High-accuracy control by closed-loop motor with encoder
- ▲ Integrated tip ejection
- ▲ Position detection, lost speed precaution and lost speed detection

Number of Channels	/	12		
Inter-Channel Spacing	mm	18		
Volume	μL	400		
Resolution	μL/Step	0.126		
Stroke	mm	31.85		
Accuracy of Each Channel	μL	v ≤ 10	v ≤ 50	v > 50
	%	Δ < ±10	Δ < ±5	Δ < ±3
Precision of Each Channel	μL	v ≤ 10	v ≤ 50	v > 5
	%	Cv < 3	Cv < 2	Cv < 2
Lifetime	Cycles	1.7 Million		

► AP - Micro Diaphragm Air Pump



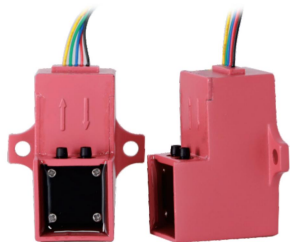
- ▲ Oil-free and maintenance-free design, long lifetime
- ▲ Low noise and vibration
- ▲ High corrosion resistance
- ▲ Compact design

Model	/	A22-1314	A22-1334B	A22-1215-B	A22-1215-BL	A22-1215-BX
Motor Type	/	Brushed motor	Brushless motor	Brushed motor	Brushless motor	Brushless motor
Rated Voltage	V	4.5	5	4.5	5	5
Operating Voltage	V	4 - 8	4 - 6	4 - 6	2.3 - 6	2.3 - 6
Rated Current	mA	100	100	150	140	140
Rated Flow	mL/min	750	450	400	1200	1000
Max. Vacuum	/	25% local atm. pressure			40% local atm. pressure	
Operating Temperature	°C	-10 - 60	-10 - 60	-10 - 60	-10 - 60	-10 - 60
Seal Material	/	EPDM	EPDM	EPDM	EPDM	EPDM
Nominal Diameter	mm	2 - 3	2 - 3	3 - 4	3 - 4	3 - 4





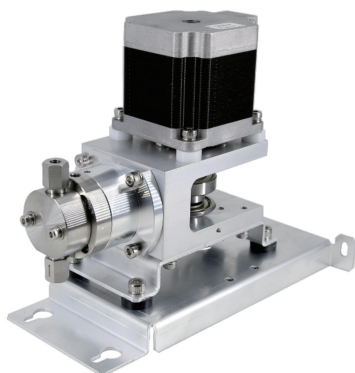
► TP - Micro Diaphragm Pump



- ▲ Proof against water, explosion and smoke
- ▲ Oil-free and maintenance-free design
- ▲ Low noise
- ▲ Lightweight and efficient
- ▲ Stable operation

Motor Type	/	Brushless motor
Rated Voltage	V	5
Operating Voltage	V	4 - 6
Rated Current	mA	100
Rated Flow	mL/min	600
Max. Vacuum	/	40% local atm. pressure
Proof Pressure	Bar	0.35
Operating Temperature	°C	-30 - 60
Seal Materials	/	EPDM
Tube ID	mm	2 - 3

► HPP - High Pressure Pump



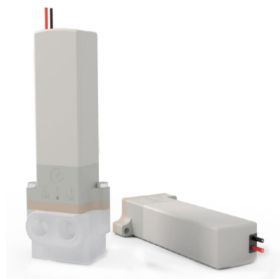
- ▲ Pressure range from 0 to 40MPa
- ▲ Constant priming without pressure fluctuation
- ▲ Wetted materials: stainless steel and sapphire
- ▲ Self-cleaning function of the plunger
- ▲ Compact design, easy to install and disassemble fittings

Model	/	HPP-1PS1
Volume	μL	7.85
Accuracy	%	2
Precision	%	1
Operating Pressure	MPa	0-40
Lifetime	Cycles	50 Million
Port	/	10-32UNF
Wetted Materials	/	Stainless steel, sapphire and inert plastics
Plunger Materials	/	Sapphire



## 2 VALVES

### ▶ 6010 - Rocker Type Solenoid Valve



- ▲ Reliable performance, easy to install
- ▲ Compact and lightweight
- ▲ Stand-alone or integrated installation, suitable for various applications
- ▲ Compatible with VFC power saver module, which enables it to continuously work for a long time
- ▲ Short response time and low pumping volume

Type	/	Base mounted (with or without sub-plate), body ported (for flexible tubing)
Valve Construction	/	Rocker type diaphragm valve
Operating Pressure	/	-75kPa - 0.25MPa
Response Time	ms	15
Orifice Diameter	mm	1.4
Flow Rate	Cv	0.03
Rated Voltage	V	12, 24
Allowable Voltage Fluctuation	/	±10% of rated voltage
Diaphragm Materials	/	EPDM, Viton, FFKM
Proof Pressure	MPa	0.38

### ▶ 6907 Solenoid Valve

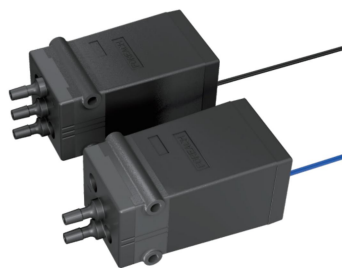


- ▲ Reliable performance
- ▲ Super-compact and lightweight
- ▲ Stand-alone or integrated installation
- ▲ Short response time

Valve Construction	/	Direct operated diaphragm valve
Operating Pressure	MPa	-0.075 - 0.15
Response Time	ms	< 10
Orifice Diameter	mm	0.8
Flow Rate	Cv	0.005
Rated Voltage	V	24
Allowable Voltage Fluctuation	/	±10% of rated voltage
Diaphragm Materials	/	EPDM, FFKM, Viton
Proof Pressure	MPa	0.2



► 6VMK - Solenoid Valve



- ▲ Long lifetime
- ▲ Short response time
- ▲ Type: 2-port N.C., 3-port

Type	/	2-port N.C.	3-port
Rated Voltage	V	12, 24	
Power	W	2.8	3.4
Operating Pressure	kPa	-70 - 200	
Flow Rate (Air)	Cv	0.08	
Orifice Diameter	mm	2	
Response Time	ms	≤30	
Ambient Temperature	°C	5 - 50	
Diaphragm Materials	/	EPDM, Viton	
Lifetime	Cycles	5 Million	

► 699001&699002 - Pinch Valve



- ▲ Reliable performance, easy to install, low noise
- ▲ Compatible with VFC power saver module
- ▲ Little vibration when switching, short response time
- ▲ Easy tubing replacement, reliable installation
- ▲ Zero dead volume

Model	/	699001	699002
Valve Construction	/	2-position 3-port	
Rated Voltage	V	12 (±5%)	24 (±5%)
Response Time	ms	≤200	
Type of Actuation	/	Direct operated	
Max. Tube Ineffective Area Ratio	/	0.2	
Coil Power Consumption	W	3.5	
Type of Coil Insulation	/	Class F (155°C)	
Clamping Force	daN	≥2.2	
Proof Pressure	kPa	150	



► **699003 - Pinch Valve**



- ▲ Reliable, easy to install, low noise, wide applications
- ▲ Compatible with VFC power saver module
- ▲ Little vibration when switching, short response time
- ▲ Easy tubing replacement, reliable installation
- ▲ Zero dead volume

Model	/	699003
Valve Construction	/	2-position 3-port
Rated Voltage	V	12 (±5%)
Response Time	ms	≤200
Type of Actuation	/	Direct operated
Max. Tube Ineffective Area Ratio	/	0.2
Coil Power Consumption	W	8
Type of Coil Insulation	/	Class F (155°C)
Clamping Force	daN	≥2.2
Proof Pressure	kPa	150

► **MRV3 - Rotary Valve**



- ▲ Little dead volume
- ▲ Corrosion-resistant and high-temperature resistant wetted materials
- ▲ Select the optimal switching path automatically
- ▲ Distribution and non-distribution available

Number of Ports	/	4 6 8 10	24
Diameter of Ports	mm	0.8, 1.5	0.5
Inner Volume	μL	8, 27	3
Thread	/	1/4-28UNF	6-40UNF
Proof Pressure	Mpa	0.68	
Wetted Materials	/	PEEK, UPE, sapphire	
Turn Time	s/Cycle	≤2	
Motor Reduction Ratio	/	1:10	
Starting Torque	N·m	0.6	
Interface	/	RS232, RS485	
Power	W	12.5	





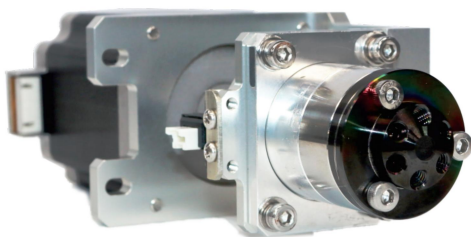
► **SRV2 - Rotary Valve Component**



- ▲ Great chemical compatibility
- ▲ No leakages or blockages, little dead volume
- ▲ Distribution & Non-distribution
- ▲ Compatible with syringe series XLP, XC, HLD3/6, etc.

Number of Ports	/	3	4	6	9
Diameter of Ports	mm	1			
Proof Pressure	MPa	0.4			
Dead Volume	μL	6			
Wetted Materials	/	PEEK, UPE			
Port Fittings	/	1/4-28UNF			
Replaceable Part	/	Rotor			
Driving Torque Needed	N·m	0.2-0.4			
Weight	g	30-60			
Operating Temperature	°C	15-40			
Operating Humidity	%RH	20-80 (40°C, no condensation)			

► **HRV - High Pressure Rotary Valve**



- ▲ Great chemical compatibility, suitable for high pressure application
- ▲ Precise rotation and stable injection
- ▲ Replaceable rotors

Number of Ports	/	6	
Diameter of Ports	mm	0.4	
Thread	/	10-32UNF	
Proof Pressure	MPa	10 (Distribution)	14 (Non-distribution)
Wetted Materials	/	Stainless steel, inert plastics	
Turn Time	s/Cycle	≤2	
Lifetime	Cycles	50,000 (Rotor), 1 Million (Stator)	
Operating Torque	N·m	0.35	
Starting Torque	N·m	0.6	



# 3 INTELLIGENT SENSORS & CONTROLLERS

## ▶ PDM - Pressure Sensor



- ▲ Compact, fast and accurate
- ▲ Threshold values can be set
- ▲ Great chemical compatibility
- ▲ Simple and easy-to-read signals

Pressure Range	kPa	200	400	500	700
Body Materials	/	PEEK, Acetal			
Rated Voltage	V	5			
Output Signal	V	5			
Interface	/	UART, RS232			
Protocol	/	Modbus RTU, customized			

## ▶ LLD - Liquid Level Sensor

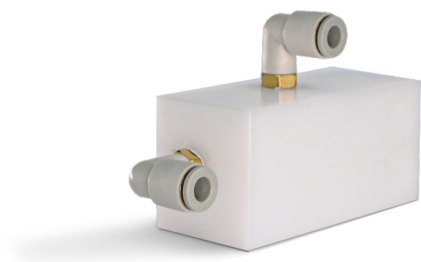


- ▲ Precise capacitance measuring with a resolution of 1 fF
- ▲ One-side detection available
- ▲ Modbus RTU protocol communication frame structure
- ▲ Cascading of multiple servers available
- ▲ Liquid level detection, collision detection, dual signal of liquid level and collision output function available

Measuring Range	pF	±16
Min. Volume of Liquid	L	100
Rated Voltage	V	5
Output Signal	V	5
Interface	/	RS232, RS485
Protocol	/	Modbus RTU



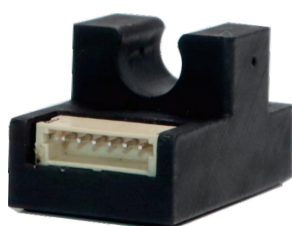
► TDS - Water Quality Sensor



- ▲ Accurate, stable and fast
- ▲ Threshold values can be set
- ▲ Easy connection

Measuring Range	μs/cm	0.01-5
Body Materials	/	Acetal
Resolution	μs/cm	0.01
Rated Voltage	V	5
Output Signal	V	5
Interface	/	RS232, UART
Dimensions	mm	99.5 x 34 x 57
Tube ID	mm	4.0, 12.7

► ABD - Bubble Detector



- ▲ Threshold values can be set
- ▲ Open collector output
- ▲ Compact, precise and stable
- ▲ Various standard tubing sizes available

Tube OD	mm	1.6	2.0	2.5	3.2	4.8	6.0	6.4
Tubing Materials	/	PU, PVC, PTFE, PFA, FEP, etc. (transparent tubing)						
Rated Voltage	V	5						
Output Signal	V	5						
Interface	/	UART						
Output	/	Open collector output						



► **ISC - Micro Stepper Motor Driver**



- ▲ Supports offline operation
- ▲ High precision motor algorithm
- ▲ Supports cascading of multiple devices
- ▲ Strong aluminum housing and good heat dissipation
- ▲ Integrated two 24V PWM adjustable output interface, two 5V digital signal inputs

Model	/	ISC1000	ISC2000
Rated Voltage	V	24	
Rated Current	A	0-2	0-4
Housing Materials	/	Aluminum	
Protocol	/	Customized, CANopen	
Interface	/	RS232, RS485, CAN	

► **VFC - Power Saver Module for Solenoid Valves**



- ▲ Energy-saving solution for solenoid valves
- ▲ Waterproof and insulated
- ▲ Remarkably shortens response time of valves

Input Voltage	V	8-30
Energy-saving Ratio	%	4, 9, 12 (customization available)
IP Rating	/	IP55



## 4 THERMAL CONTROLLERS & DEHUMIDIFIER

### ► Condenser



- ▲ The parallel arrangement of the heat sinks reduces air resistance with fins
- ▲ Multiple tubing in parallel with large liquid flow, less dirt or clogging
- ▲ Built-in copper, no extra thermal resistance
- ▲ Higher heat exchange efficiency due to spiral structure in the conduit

Dimensions	mm	150 × 120 × 24	270 × 120 × 24	150 × 120 × 45
Heat Dissipation Power	W	300	600	500
Length of Fans	mm	120	120	120
Number of Fans	/	1	2	1
Materials	/	Copper		
Thread	/	G1/4-19 (Internal thread)		
Flow Rate	Cv	0.29	0.29	0.255
Proof Pressure	MPa	0.3		

### ► TH - 96-well Thermal Cycle Module



- ▲ Compact design
- ▲ Fast temperature change, small temperature difference
- ▲ Unique process of heat dissipation, excellent heat dissipation efficiency
- ▲ Thermal pads to prevent heat transfer

Sample Capacity	/	96 wells
Sample Volume	μL	15-100
Applicable Consumables	/	0.2ml PCR tubes, tubes of 8 strips, 96-well plate
Temperature Range	°C	5-99
Max. Heating Speed	°C/s	4.5
Max. Cooling Speed	°C/s	4.5
Temperature Accuracy	°C	±0.3 at 55
Temperature Uniformity	°C	±0.3 at 55, ±0.3 at 77, ±0.5 at 95
Rated Voltage	V	24
Rated Current	A	45±10%
Noise	dBA	<60



► **Thermoelectric Cooler**



- ▲ Highly efficient fluid heat transfer
- ▲ Column spoilers have low heat dissipation pressure and uniform heat dissipation
- ▲ Less temperature loss with the heat preservation cotton at the cold end
- ▲ Fully closed design of cold plate to eliminate the impact of moisture condensation
- ▲ COP of cooling up to: 0.2 - 0.5

Rated Voltage	V	12
Rated Current	A	4.5
Heat Dissipation Capacity	W	45
Resistance	Ω	2.15±10%
Number of TEC	/	1
Materials	/	Aluminum alloy
Operating Humidity	%RH	5-80
Flow Rate	Cv	0.4
Proof Pressure	MPa	0.35

► **THSHC2302 - Dehumidifier**



- ▲ Easy to install and operate
- ▲ Compact design
- ▲ Self-adjusting operating humidity
- ▲ Threshold values can be set to turn on or off automatically

Ambient Temperature	°C	10-30
Ambient Humidity	%RH	≤85
Dehumidifying Capacity	%	≤30
Max. Dimensions	mm	642 x 200 x 170
Rated Voltage	V	24
Rated Current	A	0.8 ±10%
Noise	dBA	< 60



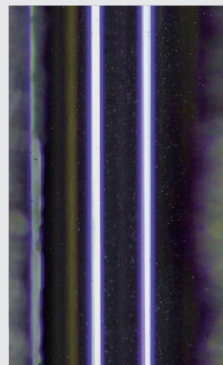


## 5 PROBES

Special mirror polishing technology with inner and outer wall roughness up to Ra0.01, effectively improves inner and outer wall finish and reduces the risk of system cross contamination; precise capacitance matching technology can stabilize capacitance accuracy  $\pm 2\text{pF}$ ; customized process and tooling can ensure consistency in mass production.

# INNER WALL POLISHING

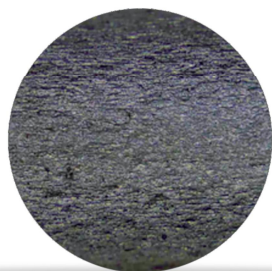
Reduce the risk of cross contamination and liquid hanging, better cleaning effect of probe core



Inner Wall Polishing Sample



Reducing Region Polishing Sample



Raw Materials





### Sampling Probe

1. For reagents or samples
2. Inner and outer wall roughness Ra0.1- Ra0.01
3. Min. diameter: 0.3, Min. volume of suction and discharge: 1.5 $\mu$ L
4. The probe core can be indented, and the probe tip shape can be selected according to different volume requirements, including tip V and straight reducer



### Puncturing Probe

1. Sampling probes for puncturing, multiple exhaust port directions available, and pressure relief groove optional
2. Thick wall without deformation
3. Surface can be chrome-plated to increase the number of the punctures
4. Laser welding, neat and beautiful



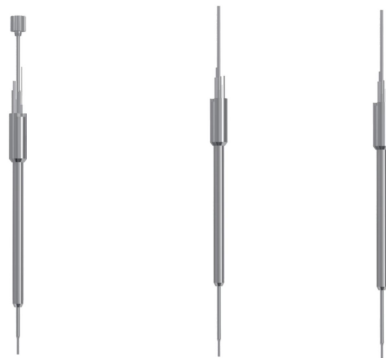
### Cleaning Probe

1. Single, double, and multiple heads available
2. Various coatings available
3. Laser welding, neat and beautiful



### Stirrer

1. Flat, spiral, and perpendicular blades available
2. Integral molding, high coaxiality
3. Good mixing effect
4. Various coating colors available



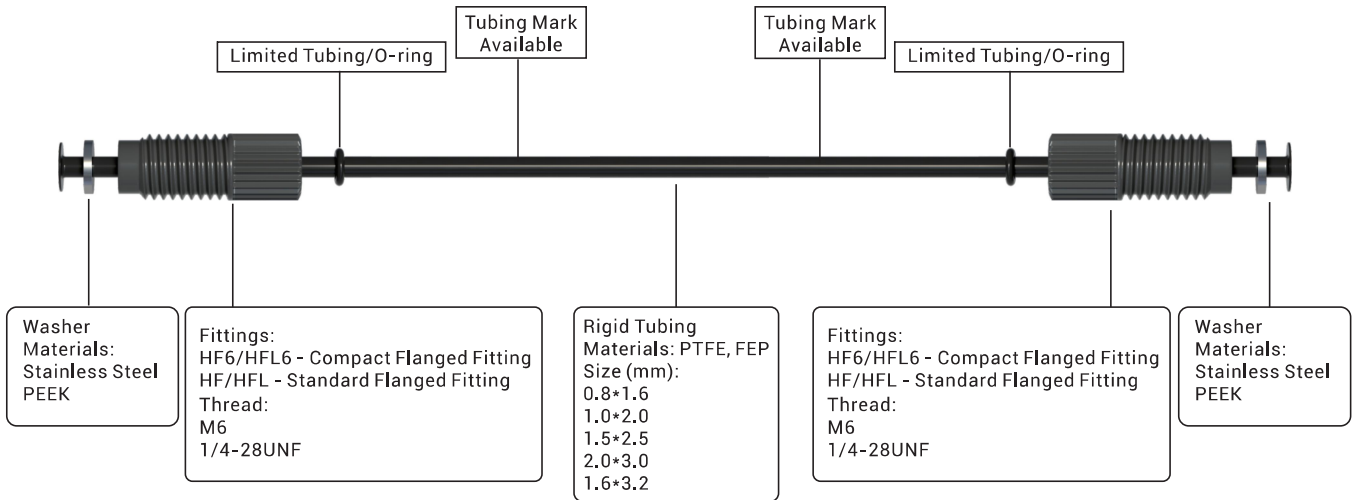
### Heating Probe

1. Heating function
2. Probe tip reducer available, integrated molding, non-welding
3. Built-in NTC thermistor, heating coil, temperature protection switch
4. Connected to liquid level detection cable, compatible with liquid level sensor



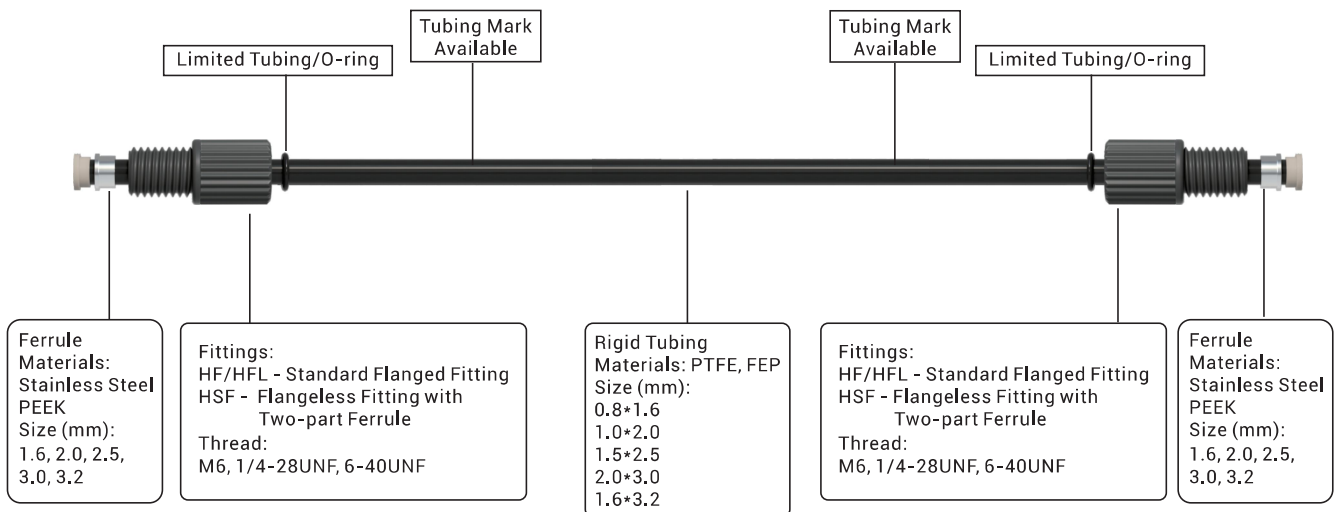
# 6 TUBING & FITTINGS

## ► TA - Flanged Tubing Assemblies



- ▲ Flange sealing for reliable connection
- ▲ Stable performance, secure connection under vibration
- ▲ Easy to install, can be used repeatedly

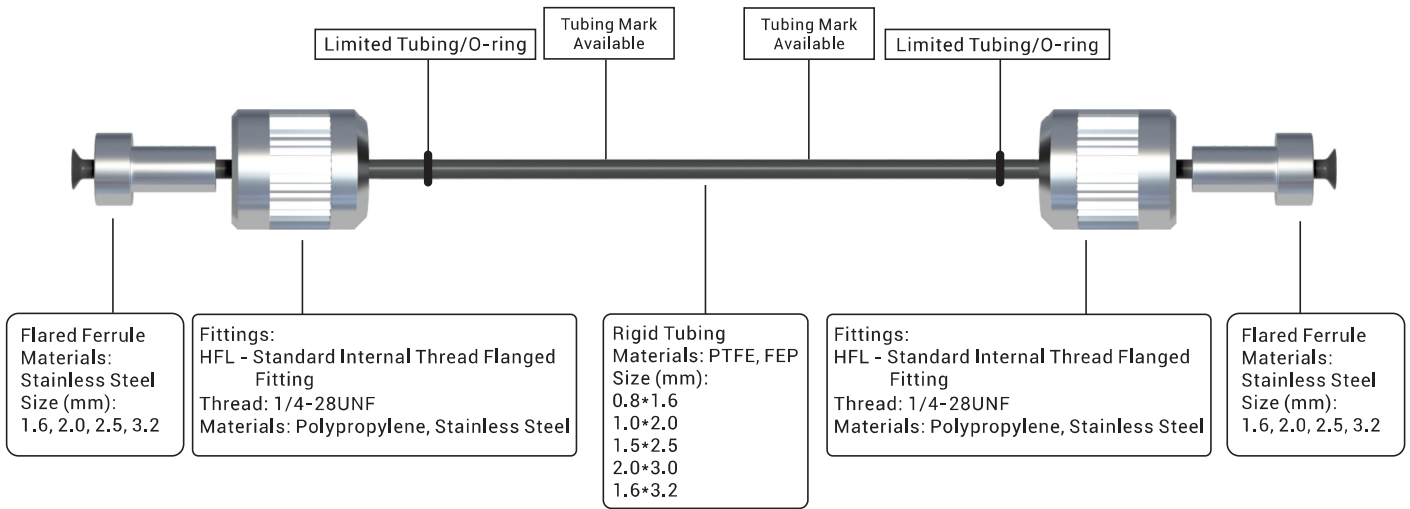
## ► TA - Flangeless Tubing Assemblies with Two-part Ferrule



- ▲ Flange sealing for reliable connection
- ▲ Stable performance, secure connection under vibration
- ▲ Easy to install, can be used repeatedly

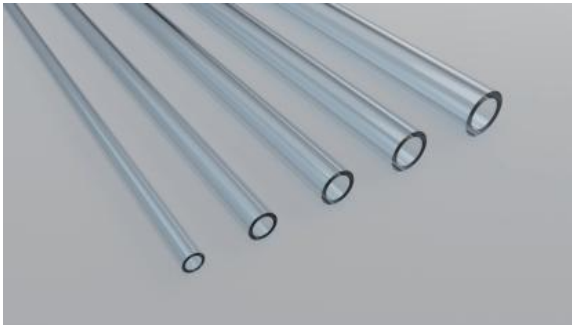


► TA - Flare-flanged Tubing Assemblies



- ▲ Tapered sealing for reliable connection
- ▲ Easy and quick to install without tool
- ▲ Tubing flanged in 109°, suitable for coned external thread

► PVC Tubing

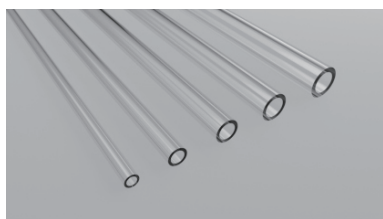


- ▲ Smooth inner wall, transparent and soft
- ▲ No phthalate esters
- ▲ Crack-resistant and durable
- ▲ Anti-oxidation and anti-pollution
- ▲ Easy to insert and unplug fittings with reliable connection
- ▲ Excellent chemical compatibility

Density	g/cm <sup>3</sup>	1.18
Tensile Strength	MPa	14.3
Flexural Strength	MPa	68
Dielectric Constant	KV/mm	4
Water Absorption	%	0.12
Operating Temperature	°C	-42 - 120
Coefficient of Linear Expansion	cm/cm/°C	6X10 <sup>-5</sup>
Melting Temperature	°C	185
Brittleness Temperature	°C	-46
Hardness	A	55, 65



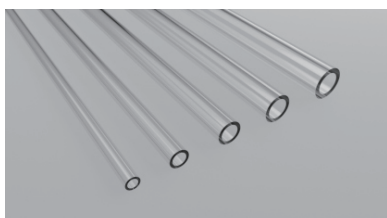
► TPE Tubing



- ▲ High flexibility
- ▲ Excellent flexural strength
- ▲ High stability over a wide range from 0°C to 135°C
- ▲ Excellent chemical compatibility
- ▲ Firm connection to fittings

Density	g/cm <sup>3</sup>	1.7
Tensile Strength	MPa	3.8
Flexural Strength	MPa	34
Dielectric Constant	KV/mn	10
Water Absorption	%	0.3 (ASTM D570)
Hardness	A	50, 60
Operating Temperature	°C	0-135
Coefficient of Linear Expansion	cm/cm/°C	1.1X10 <sup>-4</sup>
Melting Temperature	°C	195

► TPU Tubing

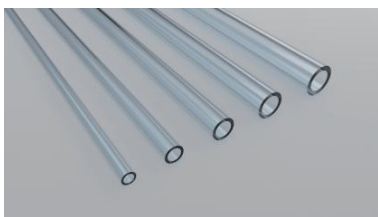


- ▲ High chemical resistance and abrasion resistance, lightweight, anti-staining and anti-flatulence
- ▲ Remarkable hydrolysis resistance
- ▲ Medium flow is clearly visible due to high transparency of tubing
- ▲ Widely used in medical machinery, food, water quality and environmental protection industries, etc.

Density	g/cm <sup>3</sup>	1.22
Tensile Strength	MPa	46
Flexural Strength	MPa	83
Dielectric Constant	KV/mm	2.8
Water Absorption	%	1.5 (ASTM D570)
Hardness	/	80A, 85A, 95A, 64D
Operating Temperature	°C	-30 - 70
Coefficient of Linear Expansion	cm/cm/°C	9X10 <sup>-5</sup>
Melting Temperature	°C	185
Brittleness Temperature	°C	-40



### ► PU Tubing



- ▲ Less compression set
- ▲ Better stability, chemical resistance, resilience and mechanical properties
- ▲ High hardness and flexibility
- ▲ Resistant to oil, abrasion, low temperature and aging

Density	g/cm <sup>3</sup>	1.22
Tensile Strength	MPa	46
Flexural Strength	MPa	83
Dielectric Constant	KV/mm	2.8
Water Absorption	%	1.5 (ASTM D570)
Hardness	/	80A, 95A, 64D
Operating Temperature	°C	-30 - 70
Coefficient of Linear Expansion	cm/cm/°C	9X10 <sup>-5</sup>
Melting Temperature	°C	185

### ► Silicone Tubing



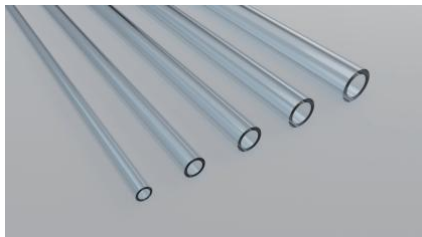
- ▲ Smooth, transparent and soft inner wall
- ▲ Crack-resistance, long lifetime
- ▲ Anti-oxidation and anti-pollution
- ▲ Harmless, non-toxic, odorless
- ▲ Excellent chemical compatibility
- ▲ High abrasion resistance

Density	g/cm <sup>3</sup>	1.14
Tensile Strength	MPa	6.2
Flexural Strength	MPa	9
Dielectric Constant	KV/mm	25
Hardness	A	50
Operating Temperature	°C	-23 - 121
Coefficient of Linear Expansion	cm/cm/°C	5.5X10 <sup>-4</sup>
Melting Temperature	°C	270
Brittleness Temperature	°C	-70





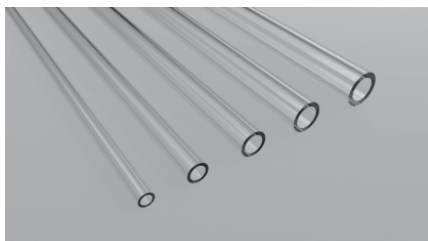
► PTFE Tubing



- ▲ Operating temperature from -101 to 260°C
- ▲ Excellent chemical resistance and inertness
- ▲ Extremely low coefficient of friction, difficult for liquids to adhere
- ▲ High pressure resistance

Density	g/cm <sup>3</sup>	2.2
Tensile Strength	MPa	27.6
Flexural Strength	MPa	174 (ASTM D790)
Dielectric Constant	KV/mm	2.1 (IEC60243-1)
Water Absorption	%	0.05 (ASTM D570)
Hardness	D	50, 65
Operating Temperature	°C	-101 - 260
Coefficient of Linear Expansion	cm/cm/°C	1.2X10 <sup>-5</sup>
Melting Temperature	°C	327

► FEP Tubing



- ▲ Wide range of operating temperature, excellent performance at low temperature
- ▲ Excellent chemical resistance and inertness
- ▲ Slippery surface, non-stick to liquid
- ▲ High transparency
- ▲ UV-resistant

Density	g/cm <sup>3</sup>	2.13
Tensile Strength	MPa	27.6
Flexural Strength	MPa	18.5 (ASTM D790)
Dielectric Constant	KV/mm	2.1 (IEC60243-1)
Water Absorption	%	0.01 (ASTM D570)
Hardness	D	50, 60
Operating Temperature	°C	-230 - 205
Coefficient of Linear Expansion	cm/cm/°C	9.9X10 <sup>-5</sup>
Melting Temperature	°C	260
Brittleness Temperature	°C	-250



► **ETFE Tubing**



- ▲ Good heat and chemical resistance and electrical insulation properties
- ▲ Particularly excellent performance in HPLC applications
- ▲ High toughness and high burst pressure resistance

Density	g/cm <sup>3</sup>	1.7
Tensile Strength	MPa	46 (ASTM D790)
Flexural Strength	MPa	83 (ASTM D570)
Dielectric Constant	KV/mm	16
Water Absorption	%	0.02 (ASTM D570)
Operating Temperature	°C	-101 - 150
Coefficient of Linear Expansion	cm/cm/°C	9X10 <sup>-5</sup>
Melting Temperature	°C	225

► **PEEK Tubing**



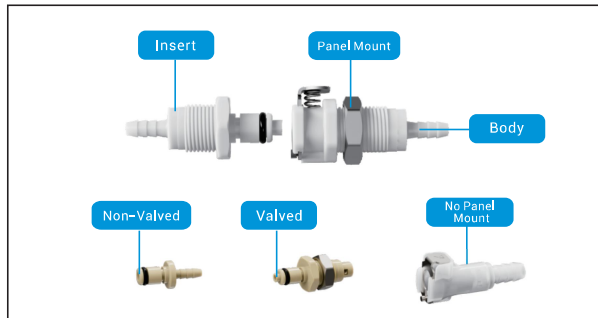
- ▲ Resistant to halogenated salts, strong acids and alkalis, strong cache liquid and other liquids
- ▲ Excellent mechanical properties
- ▲ Operating temperature from -180 to 225°C, good self-lubrication, radiation resistance

Density	g/cm <sup>3</sup>	1.32
Tensile Strength	MPa	180
Flexural Strength	MPa	265 (ASTM D790)
Dielectric Constant	KV/mm	24
Water Absorption	%	0.2 (ISO 62)
Operating Temperature	°C	-180 - 225
Coefficient of Linear Expansion	cm/cm/°C	4.5X10 <sup>-5</sup>
Melting Temperature	°C	343



### ► Q20 - Quick Disconnect Coupling

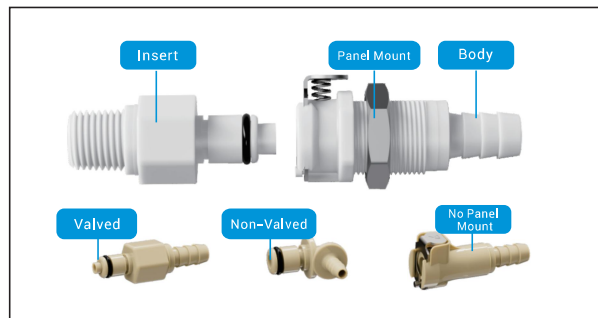
- ▲ One-handed connect/disconnect operation
- ▲ Suitable for multiple tubing sizes
- ▲ Panel Mount and valved available
- ▲ Interchangeable with corresponding product series on the market



<b>Q20</b>	-	<b>02</b>	-	<b>P</b>	-	<b>M</b>	-	<b>V</b>	-	<b>S</b>	-	<b>AC</b>	-	<b>N</b>
<b>Q20 Series</b>		<b>Tube ID or Thread</b>		<b>Insert/Body</b>		<b>Panel Mount</b>		<b>Valved</b>		<b>Shape</b>		<b>Material</b>		<b>Seal</b>
<b>Quick Disconnect Coupling</b>		<b>01</b> 1/16" (1.6mm)		<b>P</b> Insert		<b>M</b> Panel Mount		<b>V</b> Valved		<b>S</b> In-line		<b>AC</b> Acetal		<b>N</b> Buna-N
		<b>02</b> 1/8" (3.2mm)		<b>S</b> Body		<b>N</b> No Panel Mount		<b>X</b> Non-valved		<b>L</b> Elbow		<b>PP</b> Polypropylene		<b>E</b> EPDM
		<b>03</b> 3/16" (4.8mm)												<b>F</b> Viton
		<b>04</b> 1/4" (6.4mm)												
		<b>18N</b> 1/8"-27NPT												

### ► Q40 - Quick Disconnect Coupling

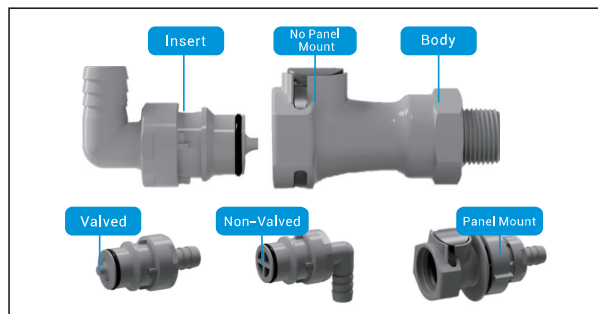
- ▲ One-handed connect/disconnect operation
- ▲ Suitable for multiple tubing sizes
- ▲ Panel Mount and valved available
- ▲ Interchangeable with corresponding product series on the market



<b>Q40</b>	-	<b>04</b>	-	<b>P</b>	-	<b>M</b>	-	<b>V</b>	-	<b>S</b>	-	<b>AC</b>	-	<b>E</b>
<b>Q40 Series</b>		<b>Tube ID or Thread</b>		<b>Insert/Body</b>		<b>Panel Mount</b>		<b>Valved</b>		<b>Shape</b>		<b>Material</b>		<b>Seal</b>
<b>Quick Disconnect Coupling</b>		<b>04</b> 1/4" (6.4mm)		<b>P</b> Insert		<b>M</b> Panel Mount		<b>V</b> Valved		<b>S</b> In-line		<b>AC</b> Acetal		<b>N</b> Buna-N
		<b>05</b> 5/16" (7.9mm)		<b>S</b> Body		<b>N</b> No Panel Mount		<b>X</b> Non-valved		<b>L</b> Elbow		<b>PP</b> Polypropylene		<b>E</b> EPDM
		<b>06</b> 3/8" (9.5mm)												<b>F</b> Viton
		<b>14N</b> 1/4"-18NPT												

### ► Q60 - Quick Disconnect Coupling

- ▲ One-handed connect/disconnect operation
- ▲ Suitable for multiple tubing sizes
- ▲ Panel Mount and valved available
- ▲ Interchangeable with corresponding product series on the market

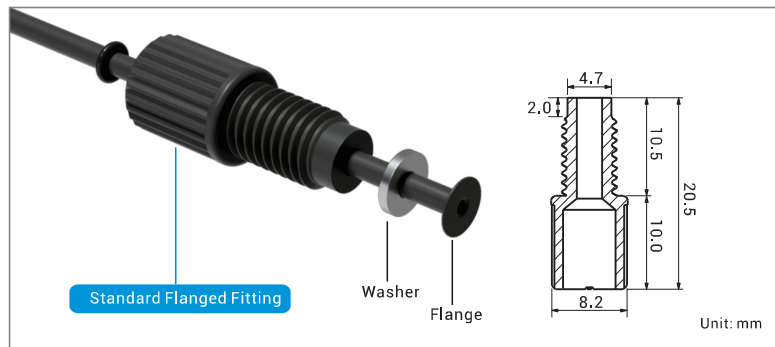


<b>Q60</b>	-	<b>06</b>	-	<b>P</b>	-	<b>M</b>	-	<b>V</b>	-	<b>S</b>	-	<b>PP</b>	-	<b>E</b>
<b>Q60 Series</b>		<b>Tube ID or Thread</b>		<b>Insert/Body</b>		<b>Panel Mount</b>		<b>Valved</b>		<b>Shape</b>		<b>Material</b>		<b>Seal</b>
<b>Quick Disconnect Coupling</b>		<b>06</b> 3/8" (9.5mm)		<b>P</b> Insert		<b>M</b> Panel Mount		<b>V</b> Valved		<b>S</b> In-line		<b>PP</b> Polypropylene		<b>E</b> EPDM
		<b>08</b> 1/2" (12.7mm)		<b>S</b> Body		<b>N</b> No Panel Mount		<b>X</b> Non-valved		<b>L</b> Elbow				<b>F</b> Viton
		<b>12</b> 3/4" (19.0mm)												
		<b>38N</b> 3/8"-3/8NPT												
		<b>12N</b> 1/2"-14NPT												



► HF - Standard Flanged Fitting

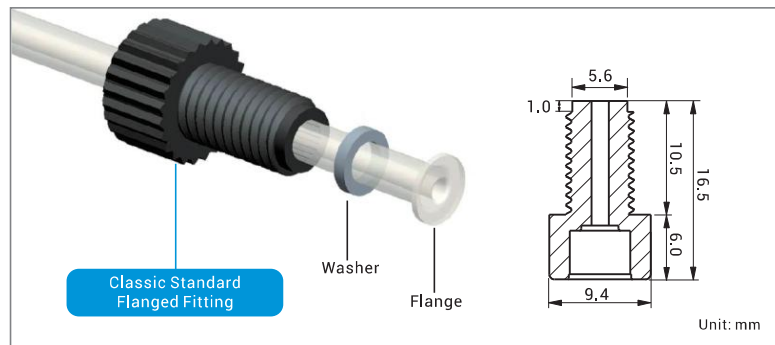
- ▲ Suitable for rigid tubing, eg. PTFE, FEP, PFA tubing
- ▲ Flange sealing for reliable connection
- ▲ Thread: 1/4-28UNF, M6, M5



<b><u>H</u></b>	-	<b><u>F</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		F Standard Flanged Fitting		M6 M6 U28 1/4-28UNF		16 1.6mm 20 2.0mm 25 2.5mm 30 3.0mm 32 3.2mm		PV PVDF PS PPS PK PEEK		N Natural B Black

► HFL - Classic Standard Flanged Fitting

- ▲ Suitable for rigid tubing, eg. PTFE, FEP, PFA tubing
- ▲ Flange sealing for reliable connection
- ▲ Thread: 1/4-28UNF, M6, M5

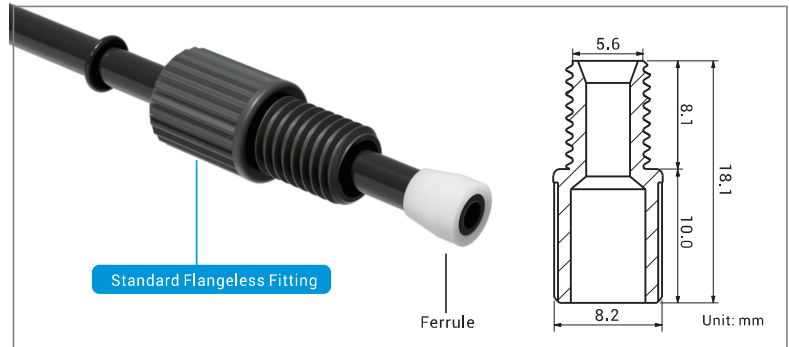


<b><u>H</u></b>	-	<b><u>FL</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		FL Classic Standard Flanged Fitting		M5 M5 M6 M6 U28 1/4-28UNF		16 1.6mm 20 2.0mm 25 2.5mm 30 3.0mm 32 3.2mm		PV PVDF PS PPS PK PEEK		N Natural B Black



► **HN - Standard Flangeless Fitting**

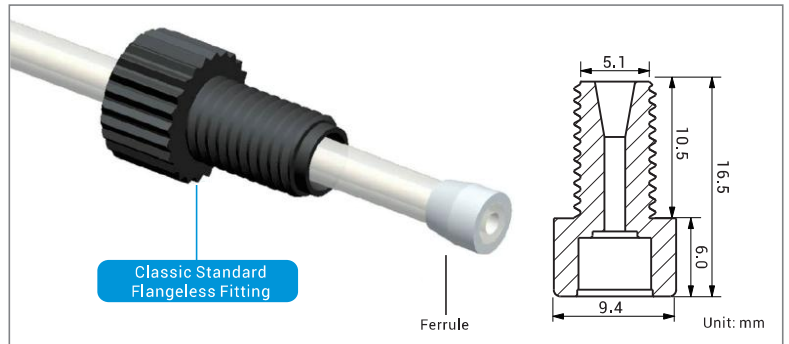
- ▲ Easy to install, no specialized tools required
- ▲ Material: PVDF, PPS, etc.
- ▲ Thread: 1/4-28UNF, M6



<b><u>H</u></b>	-	<b><u>N</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		<b>N</b> Standard Flangeless Fitting		<b>M6</b> M6 <b>U28</b> 1/4-28UNF		<b>16</b> 1.6mm <b>20</b> 2.0mm <b>25</b> 2.5mm <b>30</b> 3.0mm <b>32</b> 3.2mm		<b>PV</b> PVDF <b>PS</b> PPS <b>PK</b> PEEK <b>AC</b> Acetal		<b>N</b> Natural <b>B</b> Black

► **HNF - Classic Standard Flangeless Fitting**

- ▲ Easy to install, no specialized tools required
- ▲ Material: PVDF, PPS, etc.
- ▲ Thread: 1/4-28UNF, M6

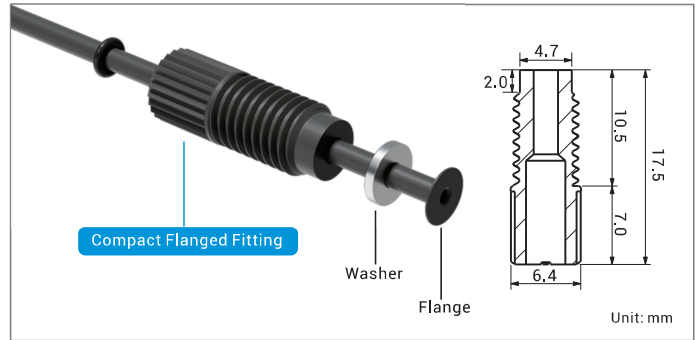


<b><u>H</u></b>	-	<b><u>NF</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		<b>NF</b> Classic Standard Flangeless Fitting		<b>M6</b> M6 <b>U28</b> 1/4-28UNF		<b>16</b> 1.6mm <b>20</b> 2.0mm <b>25</b> 2.5mm <b>30</b> 3.0mm <b>32</b> 3.2mm		<b>PV</b> PVDF		<b>N</b> Natural <b>B</b> Black



► HF6 - Compact Flanged Fitting

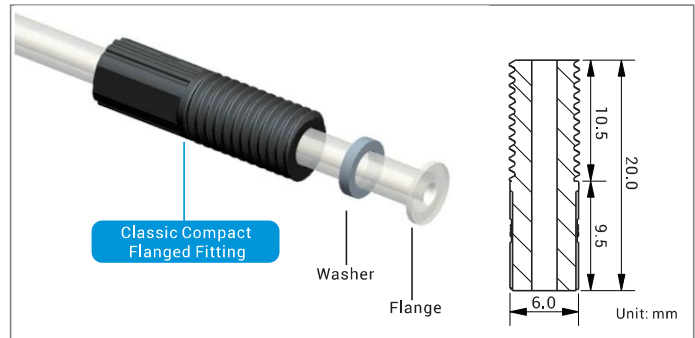
- ▲ Flange sealing, compact design
- ▲ Suitable for rigid tubing, e.g. PTFE, FEP, PFA tubing
- ▲ Thread: 1/4-28UNF, M6, 6-40UNF



<b><u>H</u></b>	-	<b><u>F6</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		<b>F6</b> Compact Flanged Fitting		<b>M6</b> M6 <b>U28</b> 1/4-28UNF		<b>16</b> 1.6mm <b>20</b> 2.0mm <b>25</b> 2.5mm <b>30</b> 3.0mm <b>32</b> 3.2mm		<b>PV</b> PVDF <b>PS</b> PPS <b>PK</b> PEEK		<b>N</b> Natural <b>B</b> Black

► HFL6 - Classic Compact Flanged Fitting

- ▲ Flange sealing, compact design
- ▲ Suitable for rigid tubing, e.g. PTFE, FEP, PFA tubing
- ▲ Thread: 1/4-28UNF, M6, 6-40UNF

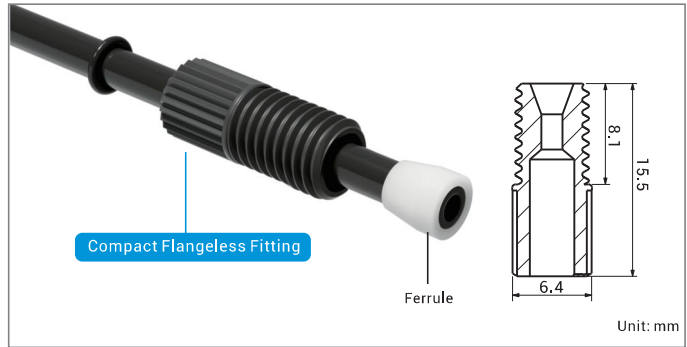


<b><u>H</u></b>	-	<b><u>FL6</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PV</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b>		<b>Thread</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		<b>FL6</b> Classic Compact Flanged Fitting		<b>M6</b> M6 <b>U28</b> 1/4-28UNF <b>U40</b> 6-40UNF		<b>16</b> 1.6mm <b>20</b> 2.0mm <b>25</b> 2.5mm <b>30</b> 3.0mm <b>32</b> 3.2mm		<b>PV</b> PVDF <b>PS</b> PPS <b>PK</b> PEEK		<b>N</b> Natural <b>B</b> Black <b>U</b> Blue



► **HN6 - Compact Flangeless Fitting**

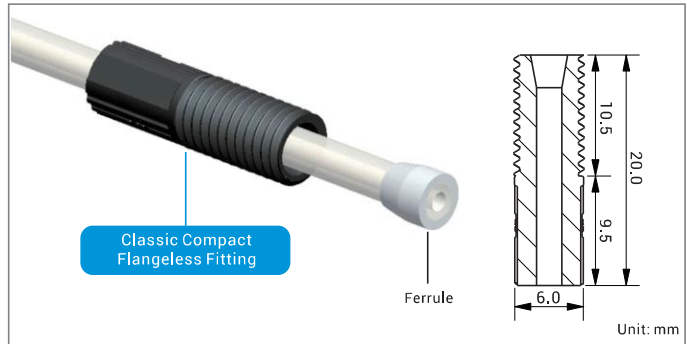
- ▲ Compact design, suitable for applications in limited space
- ▲ No flange, used with ferrules
- ▲ Thread: 1/4-28UNF, M6



<b><u>H</u></b>	-	<b><u>N6</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PS</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b> N6 Compact Flangeless Fitting		<b>Thread</b> M6 M6 U28 1/4-28UNF		<b>Tube OD</b> 16 1.6mm 20 2.0mm 25 2.5mm 30 3.0mm 32 3.2mm		<b>Material</b> PS PPS AC Acetal PK PEEK PV PVDF		<b>Color</b> B Black N Natural

► **HNF6 - Classic Compact Flangeless Fitting**

- ▲ Compact design, suitable for applications in limited space
- ▲ No flange, used with ferrules
- ▲ Thread: 1/4-28UNF, M6



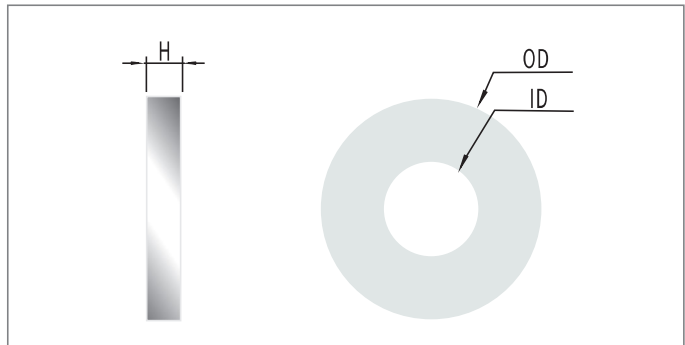
<b><u>H</u></b>	-	<b><u>NF6</u></b>	-	<b><u>U28</u></b>	-	<b><u>16</u></b>	-	<b><u>PS</u></b>	-	<b><u>N</u></b>
<b>Fittings for Rigid Tubing</b>		<b>Version</b> NF6 Classic Compact Flangeless Fitting		<b>Thread</b> M6 M6 U28 1/4-28UNF		<b>Tube OD</b> 16 1.6mm 20 2.0mm 25 2.5mm 30 3.0mm 32 3.2mm		<b>Material</b> PS PPS PK PEEK PV PVDF		<b>Color</b> B Black N Natural U Blue





► **WS - Washer**

- ▲ Used with flanged tubing and HFL/HFL6 fittings
- ▲ Various materials including stainless steel and PEEK
- ▲ Stable performance, secure connection under vibration
- ▲ Suitable for various applications

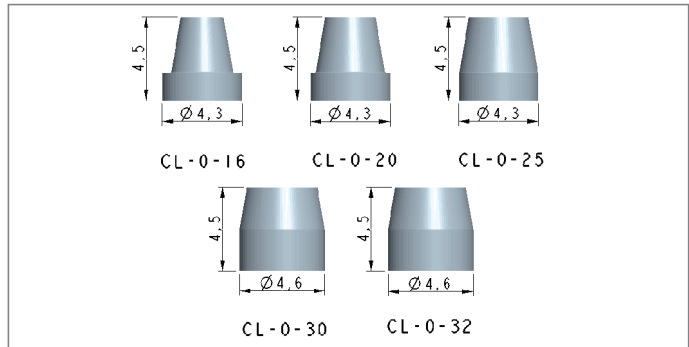


<b><u>WS</u></b>	-	<b><u>51</u></b>	-	<b><u>18</u></b>	-	<b><u>09</u></b>	-	<b><u>SS</u></b>	-	<b><u>N</u></b>
<b>Washer</b>		<b>Outer Diameter</b>		<b>Inner Diameter</b>		<b>Thickness</b>		<b>Material</b>		<b>Color</b>
		38 3.8mm		18 1.8mm		08 0.8mm		SS Stainless Steel		N Natural
		46 4.6mm		21 2.1mm		09 0.9mm		PK PEEK		
		51 5.1mm		26 2.6mm				PU TPU		
				33 3.3mm				PT PTFE		

Note:  
Washer of OD 5.1mm matches 1/4-28UNF threaded fittings; washer of OD 4.6mm matches M6 threaded fittings; washer of OD 3.8mm matches M5 threaded fittings.

► **CL - Ferrule**

- ▲ Used with HN/HN6 fittings
- ▲ Suitable for various rigid tubing OD
- ▲ Various materials including Polypropylene and ETFE

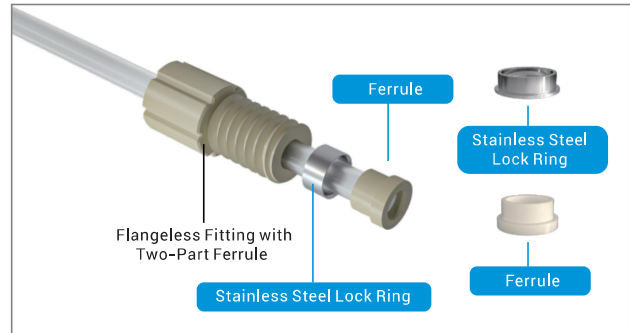


<b><u>CL</u></b>	-	<b><u>0</u></b>	-	<b><u>18</u></b>	-	<b><u>PP</u></b>	-	<b><u>N</u></b>
<b>Ferrule</b>		<b>Style</b>		<b>Tube OD</b>		<b>Material</b>		<b>Color</b>
		0X		16 1.6mm		PP Polypropylene		N Natural
		0		20 2.0mm		ET ETFE		Y Yellow
				25 2.5mm				
				30 3.0mm				
				32 3.2mm				



► **CL-1 - Two-part Ferrule**

- ▲ Interference fit to form contact seal
- ▲ Simple design, suitable for high pressure applications
- ▲ Stable performance, secure connection under vibration
- ▲ Easy to install, no tubing distortion, reusable



CL  
Ferrule

-

1  
Style

- 1S Two-part Ferrule (1/4-28UNF and M6)
- 1X Two-part Ferrule (6-40UNF)
- 1 Two-part Ferrule

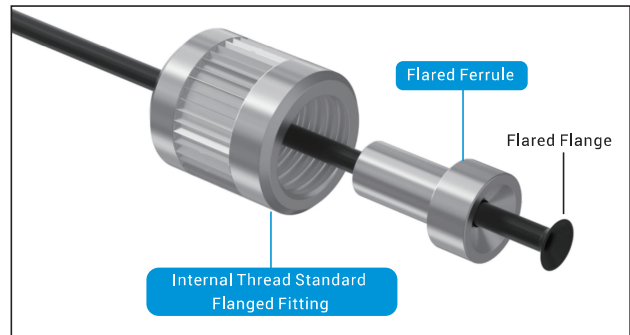
-

16

- Tube OD
- 16 1.6mm
  - 20 2.0mm
  - 25 2.5mm
  - 30 3.0mm
  - 32 3.2mm

► **CL-3 - Flared Ferrule**

- ▲ Tubing flanged in 109°
- ▲ Suitable for coned external thread (M8X1)
- ▲ Stable performance, secure connection under vibration



CL  
Ferrule

-

3  
Style

- 3 Flared Ferrule

-

16

- Tube OD
- 16 1.6mm
  - 25 2.0 or 2.5mm
  - 32 3.0 or 3.2mm

-

SS

- Material
- SS Stainless Steel

-

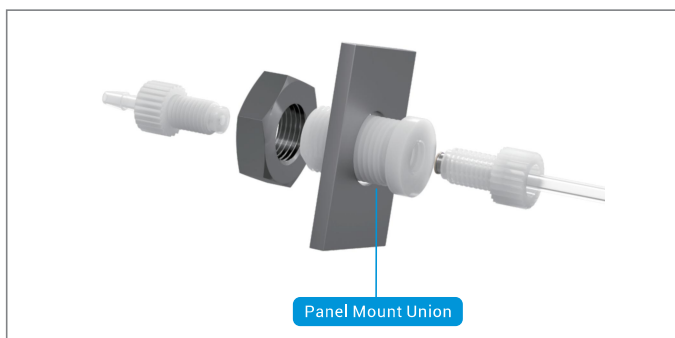
N

- Color
- N Natural



► **PMU - Panel Mount Union**

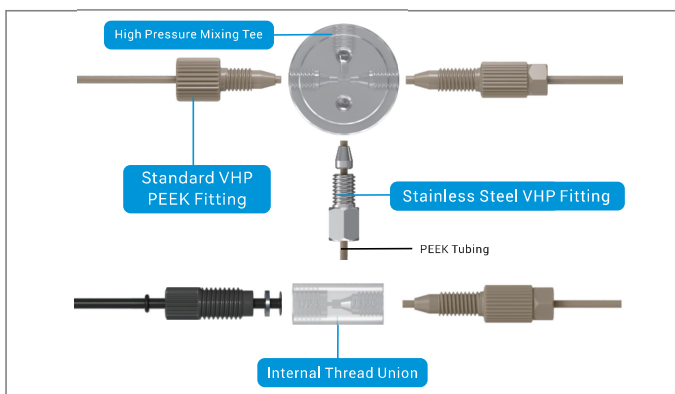
- ▲ Leak-free mutual-rotating connection
- ▲ Suitable for rigid and flexible tubing connection systems
- ▲ Suitable for internal and external threaded connection
- ▲ Thread: 1/4-28UNF



**PMU** - **M12** - **U28** - **20** - **PP** - **N**  
**Panel Mount Union**    **Panel Mount Thread**    **Thread**    **Tube OD**    **Material**    **Color**  
M12 M12x1.5    U28 1/4-28UNF    20 2.0mm    PP Polypropylene    N Natural

► **PNC - High Pressure Fitting**

- ▲ Leak-free mutual-rotating connection
- ▲ Suitable for rigid and flexible tubing connection systems
- ▲ Suitable for internal and external threaded connection
- ▲ Thread: 10-32UNF

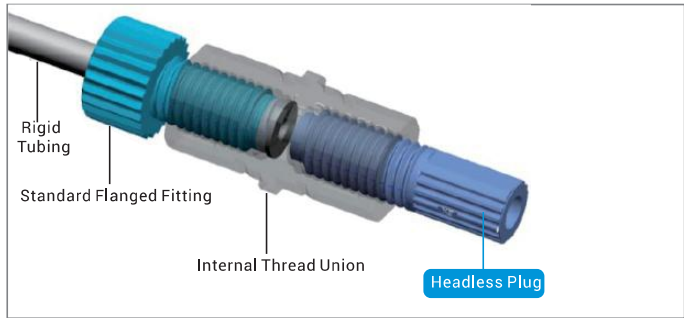


**P**    **NC**    -    **U32**    -    **16**    -    **PK**    -    **N**  
**High Pressure Fitting**    **Style**    **Thread**    **Tube OD**    **Material**    **Color**  
NC Standard VHP PEEK Fitting    U32 10-32UNF    16 1.6mm    SS Stainless Steel    N Natural  
NC6 Headless VHP PEEK Fitting    08 0.8mm    PK PEEK  
U Internal Thread Union  
UT Internal Thread Tee  
NF Stainless Steel VHP Fitting



► **HBL6 - Headless Plug**

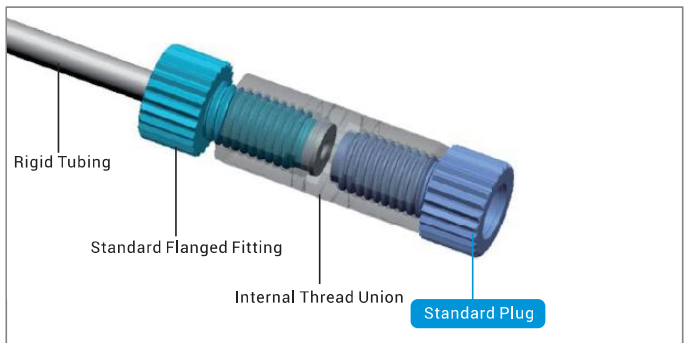
- ▲ Compact design
- ▲ Various materials including PVDF, PEEK, PPS
- ▲ Thread: 1/4-28UNF, M6, 6-40UNF, etc.



<u><b>H</b></u>	-	<u><b>BL6</b></u>	-	<u><b>U28</b></u>	-	<u><b>PV</b></u>	-	<u><b>N</b></u>
Fittings for Rigid Tubing		Style <b>BL6</b> Headless Plug <b>BL6X</b> Setscrew Plug		Thread <b>M6</b> M6 <b>U28</b> 1/4-28UNF <b>U40</b> 6-40UNF		Material <b>PV</b> PVDF <b>PS</b> PPS <b>PK</b> PEEK		Color <b>N</b> Natural <b>B</b> Black

► **HBL - Standard Plug**

- ▲ Material: PVDF
- ▲ Great corrosion resistance
- ▲ Thread: 1/4-28UNF, M6, etc.

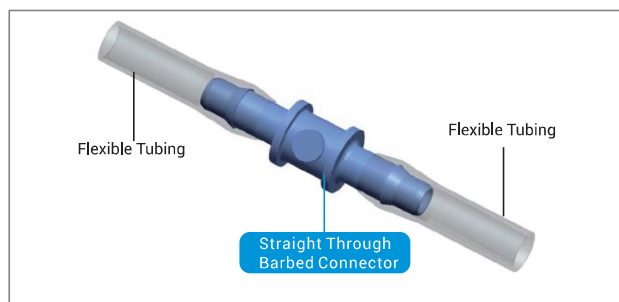


<u><b>H</b></u>	-	<u><b>BL</b></u>	-	<u><b>U28</b></u>	-	<u><b>PV</b></u>	-	<u><b>N</b></u>
Fittings for Rigid Tubing		Style <b>BL</b> Standard Plug		Thread <b>M6</b> M6 <b>U28</b> 1/4-28UNF <b>U40</b> 6-40UNF		Material <b>PV</b> PVDF <b>PS</b> PPS <b>PK</b> PEEK		Color <b>N</b> Natural <b>B</b> Black



► **BA - Straight Through Barbed Connector**

- ▲ Materials: polypropylene, nylon
- ▲ Suitable for various flexible tubing ID
- ▲ Reducer available



<b><u>B</u></b>	<b><u>A</u></b>	-	<b><u>32F</u></b>	-	<b><u>64F</u></b>	-	<b><u>PP</u></b>	-	<b><u>N</u></b>
<b>Barbed Connector</b>	<b>Style</b>		<b>Tube ID of Barb 1</b>		<b>Tube ID of Barb 2</b>		<b>Material</b>		<b>Color</b>
	A Straight Through		16 1.6mm		16 1.6mm		PP Polypropylene		N Natural
			24 2.4mm		24 2.4mm		PA Nylon		W White
			32 3.2mm		32 3.2mm				
			40 4.0mm		40 4.0mm				
			48 4.8mm		48 4.8mm				
			64 6.4mm		64 6.4mm				
			79 7.9mm		79 7.9mm				
			95 9.5mm		95 9.5mm				
			127 12.7mm		127 12.7mm				

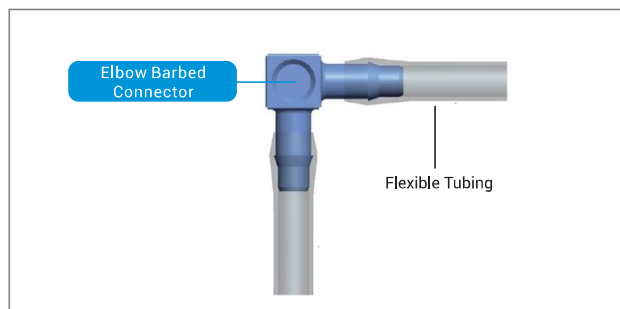
Note:

1. The letter "F" after tube ID represents the barb type.

Barb Type	C	F	D	V	X/N
Expansion Ratio	33%-50%	25%	21%-50%	21%-63%	21%-63%

► **BL - Elbow Barbed Connector**

- ▲ Materials: polypropylene, nylon
- ▲ Reducer available



<b><u>B</u></b>	<b><u>L</u></b>	-	<b><u>32F</u></b>	-	<b><u>40F</u></b>	-	<b><u>PP</u></b>	-	<b><u>N</u></b>
<b>Barbed Connector</b>	<b>Style</b>		<b>Tube ID of Barb 1</b>		<b>Tube ID of Barb 2</b>		<b>Material</b>		<b>Color</b>
	L Elbow		16 1.6mm		16 1.6mm		PP Polypropylene		N Natural
			24 2.4mm		24 2.4mm		PA Nylon		W White
			32 3.2mm		32 3.2mm				
			40 4.0mm		40 4.0mm				
			48 4.8mm		48 4.8mm				
			64 6.4mm		64 6.4mm				
			79 7.9mm		79 7.9mm				
			95 9.5mm		95 9.5mm				
			127 12.7mm		127 12.7mm				

Note:

1. The letter "F" after tube ID represents the barb type.

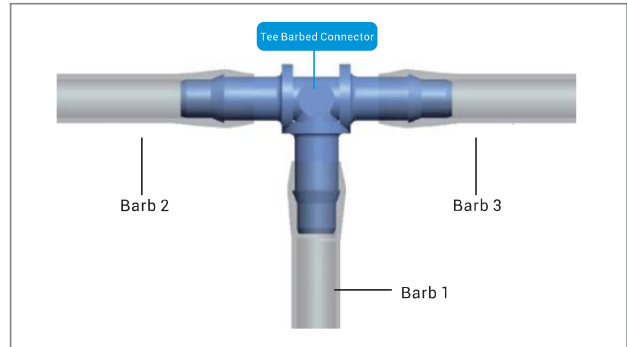
2. For equal diameter barbed connector, BL-16F-PP-N means BL-16F-16F-PP-N.

Barb Type	C	F	D	V	X/N
Expansion Ratio	33%-50%	25%	21%-50%	21%-63%	21%-63%



► **BT - Tee Barbed Connector**

- ▲ Materials: polypropylene, nylon
- ▲ Suitable for various flexible tubing ID, reducer available
- ▲ Various colors



<b>B</b>	<b>T</b>	-	<b>64F</b>	-	<b>32F</b>	-	<b>32F</b>	-	<b>PP</b>	-	<b>N</b>
<b>Barbed Connector</b>	<b>Style Tee</b>		<b>Tube ID of Barb 1</b>		<b>Tube ID of Barb 2</b>		<b>Tube ID of Barb 3</b>		<b>Material</b>		<b>Color</b>
			16 1.6mm		16 1.6mm		16 1.6mm		PP Polypropylene		N Natural
			24 2.4mm		24 2.4mm		24 2.4mm		PA Nylon		W White
			32 3.2mm		32 3.2mm		32 3.2mm				
			40 4.0mm		40 4.0mm		40 4.0mm				
			48 4.8mm		48 4.8mm		48 4.8mm				
			64 6.4mm		64 6.4mm		64 6.4mm				
			79 7.9mm		79 7.9mm		79 7.9mm				
			95 9.5mm		95 9.5mm		95 9.5mm				
			127 12.7mm		127 12.7mm		127 12.7mm				

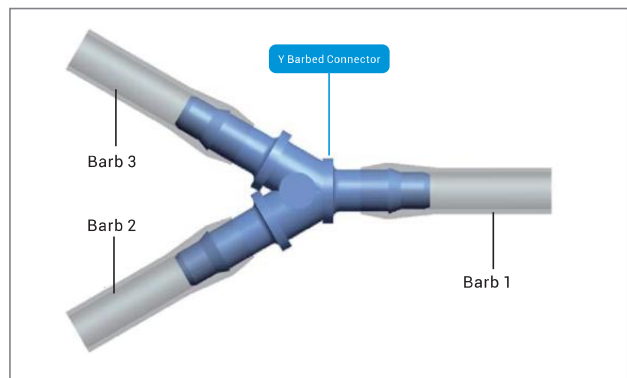
Note:

1. The letter "F" after tube ID represents the barb type.

Barb Type	C	F	D	V	X/N
Expansion Ratio	33%-50%	25%	21%-50%	21%-63%	21%-63%

► **BY - Y Barbed Connector**

- ▲ Materials: polypropylene, nylon
- ▲ Suitable for various flexible tubing ID, reducer available



<b>B</b>	<b>Y</b>	-	<b>64F</b>	-	<b>32F</b>	-	<b>32F</b>	-	<b>PP</b>	-	<b>N</b>
<b>Barbed Connector</b>	<b>Style Y</b>		<b>Tube ID of Barb 1</b>		<b>Tube ID of Barb 2</b>		<b>Tube ID of Barb 3</b>		<b>Material</b>		<b>Color</b>
			16 1.6mm		16 1.6mm		16 1.6mm		PP Polypropylene		N Natural
			24 2.4mm		24 2.4mm		24 2.4mm		PA Nylon		W White
			32 3.2mm		32 3.2mm		32 3.2mm				
			40 4.0mm		40 4.0mm		40 4.0mm				
			48 4.8mm		48 4.8mm		48 4.8mm				
			64 6.4mm		64 6.4mm		64 6.4mm				
			79 7.9mm		79 7.9mm		79 7.9mm				
			95 9.5mm		95 9.5mm		95 9.5mm				
			127 12.7mm		127 12.7mm		127 12.7mm				

Note:

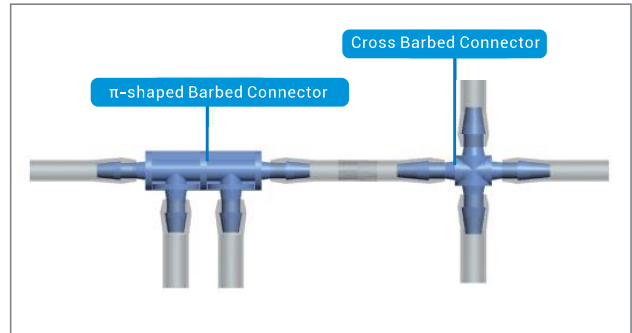
1. The letter "F" after tube ID represents the barb type.

Barb Type	C	F	D	V	X/N
Expansion Ratio	33%-50%	25%	21%-50%	21%-63%	21%-63%



► **BF4/BX4 - Four-port Barbed Connector**

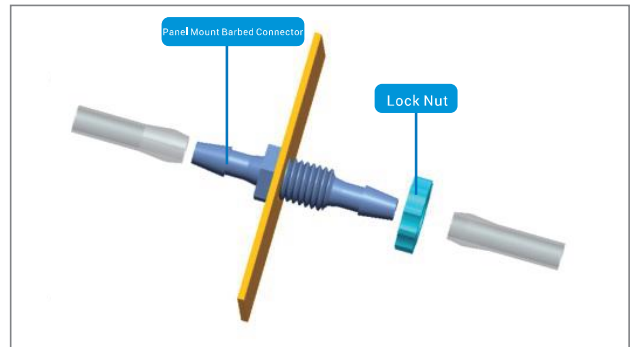
- ▲ Four-port thru flow manifold
- ▲ Cross style and π-shaped available
- ▲ Multiple tubing sizes



<b><u>B</u></b>	<b><u>F4</u></b>	-	<b><u>32</u></b>	-	<b><u>PP</u></b>	-	<b><u>N</u></b>
<b>Barbed Connector</b>	<b>Style</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>
	F4 π-shaped		16 1.6mm		PP Polypropylene		N Natural
	X4 Cross style		24 2.4mm				
			32 3.2mm				
			40 4.0mm				
			48 4.8mm				

► **PMB - Panel Mount Barbed Connector**

- ▲ Suitable for flexible tubing and can be mounted on panels
- ▲ Multiple tubing sizes
- ▲ Lock nuts available



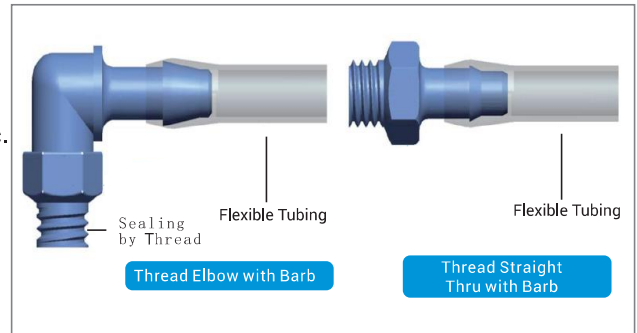
<b><u>PMB</u></b>	-	<b><u>U28</u></b>	-	<b><u>32</u></b>	-	<b><u>PP</u></b>	-	<b><u>N</u></b>
<b>Style</b>		<b>Thread</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>
PMB Panel Mount Barbed Connector		U28 1/4-28UNF		16 1.6mm		PP Polypropylene		N Natural
PMBSN Hexagonal Lock Nut				24 2.4mm		PA Nylon		W White
				32 3.2mm				





► SA - Thread with Barb

- ▲ Sealing by thread with Teflon tape, thread sealant, etc.
- ▲ Available materials: polypropylene, nylon, PVDF, etc.
- ▲ Various colors



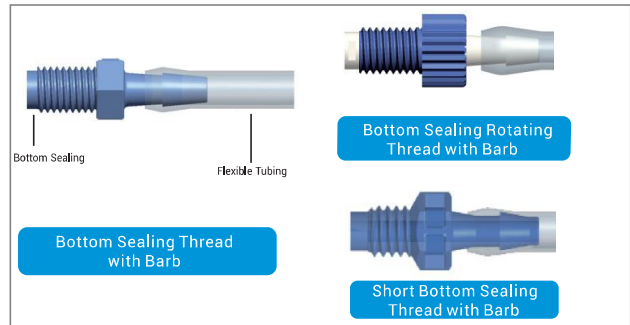
<b>S</b>	<b>A</b>	<b>L</b>	-	<b>U32</b>	-	<b>16D</b>	-	<b>PP</b>	-	<b>N</b>
<b>Thread with Barb</b>	<b>Sealing by Thread</b>	<b>Style</b>		<b>Thread</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>
		/ Straight Thru L Elbow		U32 10-32UNF U28 1/4-28UNF 1/8NPT 1/8-27NPT 1/4NPT 1/4-18NPT G1/8 G1/8		16 1.6mm 24 2.4mm 32 3.2mm 40 4.0mm 48 4.8mm 64 6.4mm 79 7.9mm 95 9.5mm		PP Polypropylene PA Nylon PV PVDF		N Natural W White

Note:  
1. The letter "D" after tube ID represents the barb type.

Barb Type	C	F	D	V	X/N
Expansion Ratio	33%-50%	25%	21%-50%	21%-63%	21%-63%

► SB - Bottom Sealing Thread with Barb

- ▲ Thread: 1/4-28UNF, M6, etc.
- ▲ Materials: polypropylene, acetal, PVDF, etc.
- ▲ Various colors

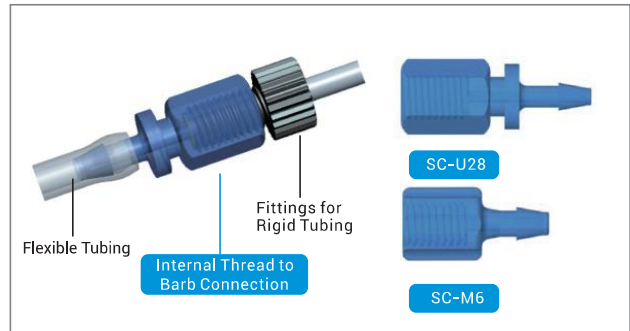


<b>SB</b>	<b>S</b>	-	<b>U28</b>	-	<b>16</b>	-	<b>PP</b>	-	<b>N</b>
<b>Bottom Sealing Thread with Barb</b>	<b>Style</b>		<b>Thread</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>
	/ Straight S Short R Rotating		M5 M5 M6 M6 U28 1/4-28UNF		16 1.6mm 24 2.4mm 32 3.2mm 40 4.0mm		PP Polypropylene PA Nylon AC Acetal PV PVDF		N Natural W White B Black



► **SC - Internal Thread to Barb Connector**

- ▲ Thread: M6, 1/4-28UNF, etc.
- ▲ Multiple tubing sizes
- ▲ Connection between rigid and flexible tubing

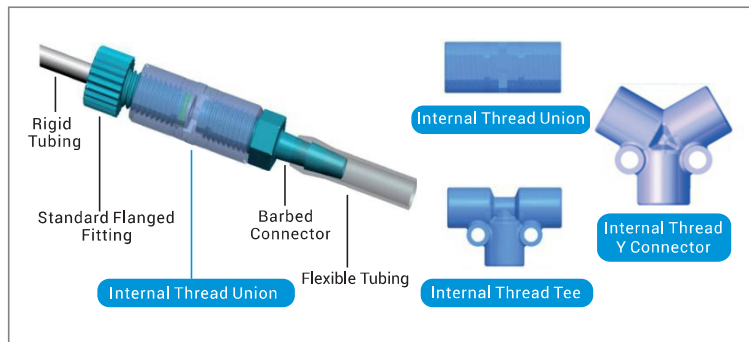


**S**  
Thread with Barb

**C** - **U28** - **16** - **PP** - **N**  
**Style**                      **Thread**                      **Tube ID**                      **Material**                      **Color**  
 C Internal Thread      M6 M6                      16 1.6mm                      PP Polypropylene                      N Natural  
                                  U28 1/4-28UNF                      24 2.4mm                      32 3.2mm

► **U - Union**

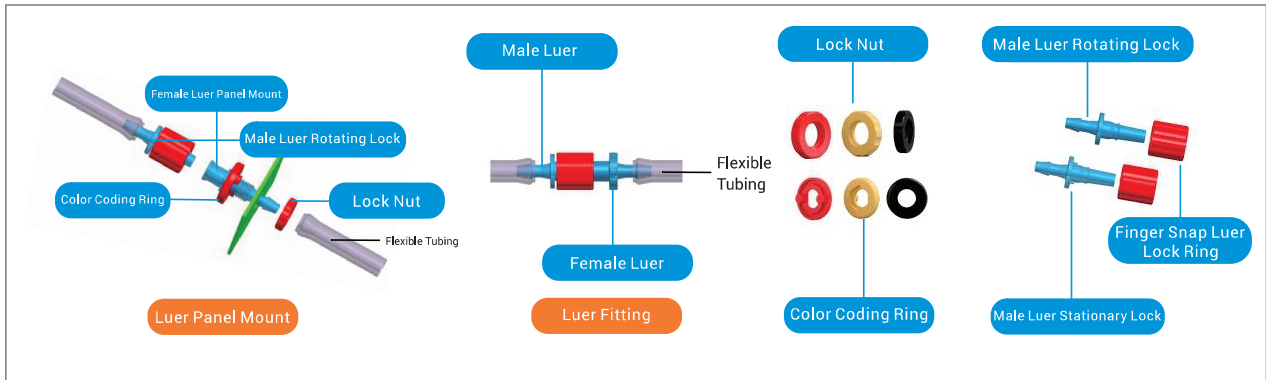
- ▲ Materials: acetal, polypropylene, PPS, etc.
- ▲ Thread: M6, 1/4-28UNF, etc.
- ▲ Various colors



**U** - **U28** - **M6** - **20** - **AC** - **N**  
**Style**                      **Thread**                      **Thread**                      **Nominal Diameter**                      **Material**                      **Color**  
 U Internal Thread Union      M6 M6                      M6 M6                      05 0.5mm                      PP Polypropylene                      N Natural  
 US Internal Squared Thread Union      U28 1/4-28UNF                      U28 1/4-28UNF                      10 1.0mm                      PS PPS                      B Black  
 UT Internal Thread Tee                                                                15 1.5mm                      AC Acetal  
 UY Internal Thread Y Connector                                                                20 2.0mm



► LUER - Luer Fitting

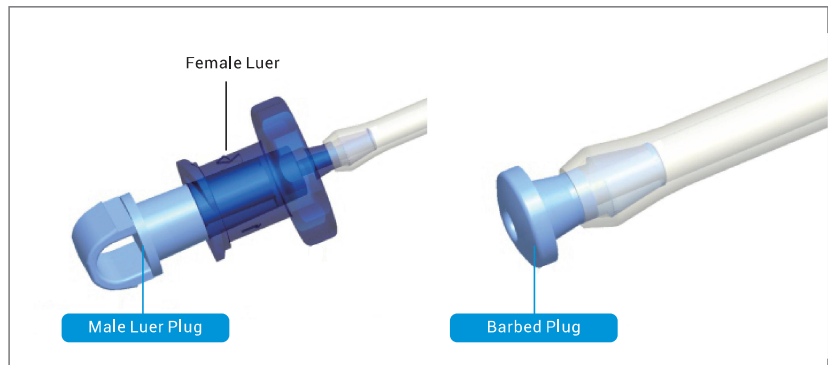


- ▲ Various colors
- ▲ Multiple tubing sizes
- ▲ Various materials
- ▲ Rotating, stationary and integral lock available

<b>PMLS</b>	-	<b>U28</b>	-	<b>16</b>	-	<b>PP</b>	-	<b>N</b>	
<b>Style</b>		<b>Thread</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>	
LSL		U28	1/4-28UNF	16	1.6mm	PP	Polypropylene	N	Natural
LRL				24	2.4mm	PA	Nylon	Y	Yellow
LPR				32	3.2mm	PV	PVDF	R	Red
LPS				40	4.0mm			G	Green
LS				48	4.8mm			U	Blue
PMLS				64	6.4mm			W	White
LP								B	Black
								O	Orange

► LPBL - Male Luer Plug / BBL - Barbed Plug

- ▲ Materials: polypropylene, nylon
- ▲ Multiple tubing sizes
- ▲ Various colors

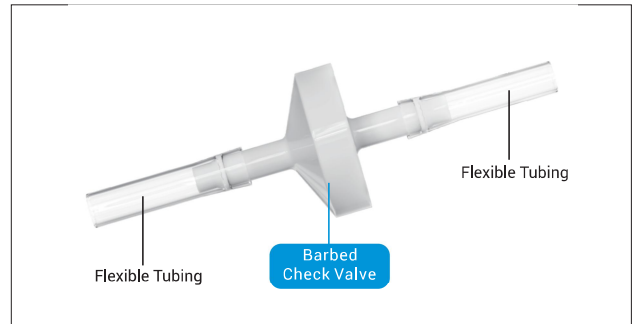


<b>BBL</b>	-	<b>16D</b>	-	<b>PP</b>	-	<b>N</b>	
<b>Style</b>		<b>Tube ID</b>		<b>Material</b>		<b>Color</b>	
BBL		16	1.6mm	PP	Polypropylene	N	Natural
LPBL		24	2.4mm	PA	Nylon	W	White
		32	3.2mm				



► **CV - Barbed Check Valve**

- ▲ Low forward opening pressure
- ▲ Low reverse cutoff pressure
- ▲ Multiple models



**CV** -  
Barbed Check Valve

**B**  
Seal Type  
B Diaphragm  
D Duck-billed  
S Spring loaded

**E**  
Diaphragm  
E EPDM  
F Viton

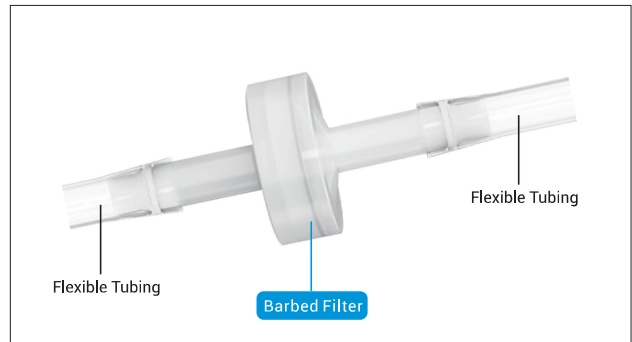
**16** -  
Tube ID  
16 1.6mm  
24 2.4mm  
32 3.2mm  
40 4.0mm  
48 4.8mm  
64 6.4mm

**PP** -  
Material  
PP Polypropylene

**N**  
Color  
N Natural

► **F - Barbed Filter**

- ▲ Filter Precision: 40-100µm
- ▲ Compact design, easy to install



**F** -  
Barbed Filter

**SS** -  
Filter Materials  
SS Stainless Steel  
PE HDPE

**60** -  
Filter Precision  
60 40-60µm  
100 80-100µm

**16** -  
Tube ID  
16 1.6mm  
24 2.4mm  
32 3.2mm  
40 4.0mm  
48 4.8mm  
64 6.4mm

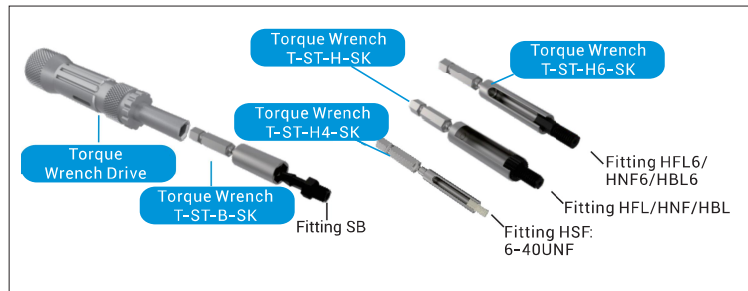
**PP** -  
Material  
PP Polypropylene

**N**  
Color  
N Natural



### ► T - Torque Wrench Drive

- ▲ Greatly improves the efficiency
- ▲ Easy to carry, fulfils most of the customers' routine needs
- ▲ Easy to use



**T**  
Tool

**ST**  
Style

- DT** Screw Bit of Electric Screwdriver
- ST** Torque Wrench
- D** Electric Screwdriver
- S** Torque Wrench Drive

**H6**  
Compatible Fitting

- FN** Fitting HF/HN
- FN6** Fitting HF6/HN6
- H** Fitting HBL/SBR
- H6** Fitting HBL6
- H4** Fitting HSF (6-40UNF)
- B** Fitting SB

**Torque Wrench Drive**

- 60** Torque 0-60cN·M

**Elbow Screwdriver**

- 90** 90°, 153mm
- 105** 105°, 60mm
- L105** 105°, 140mm

**SK**  
Material

- SS** SUS304
- SK** SKD61
- /** Others

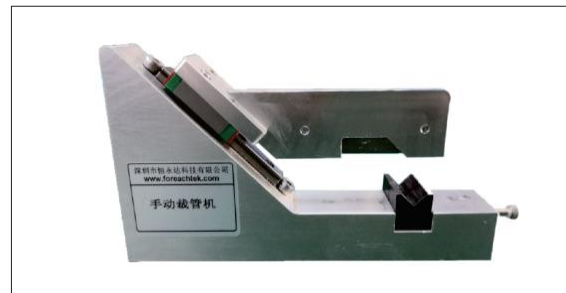
### ► T - Snap-ring Forcep

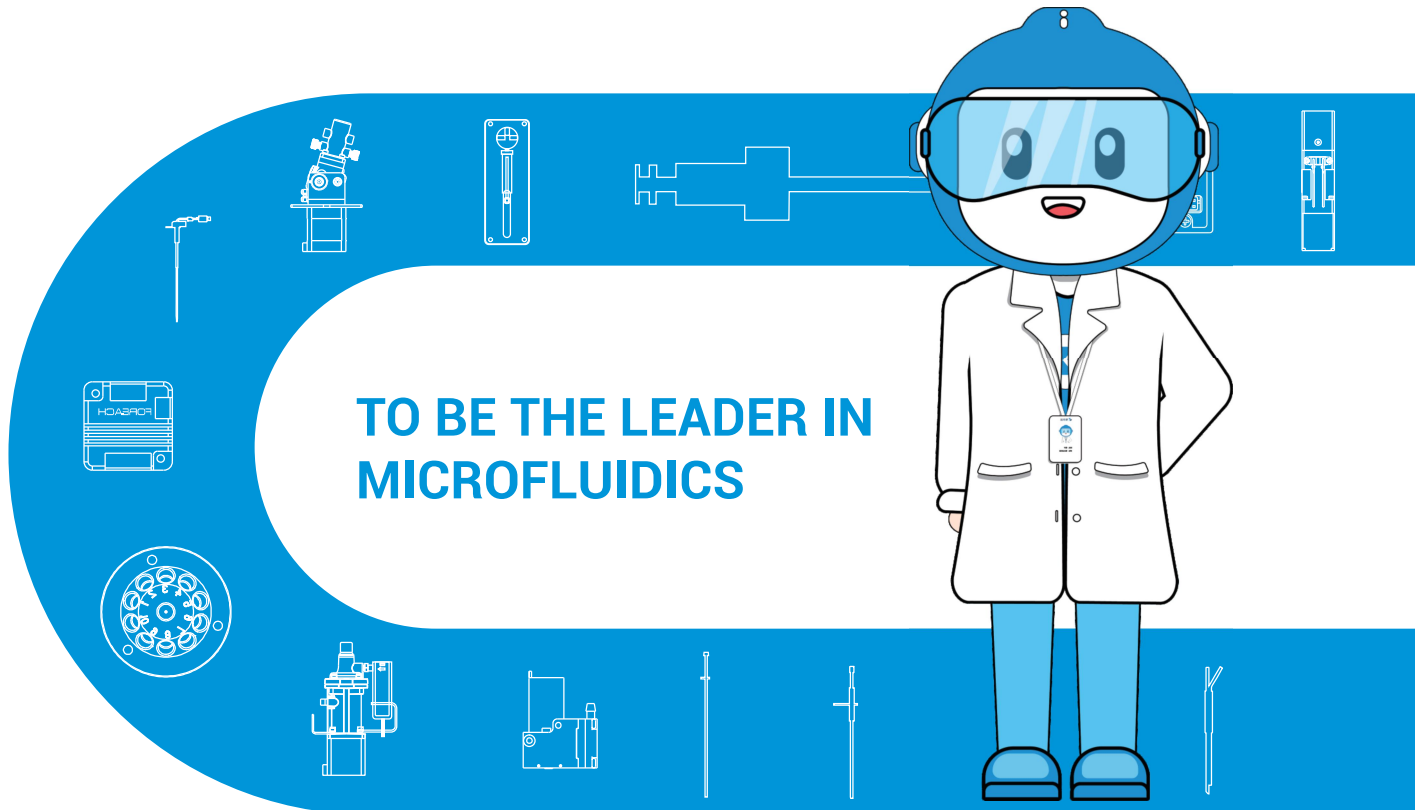
- ▲ Necessary tool for two-part ferrules
- ▲ Easy operation



### ► T - Tubing Cutter

- ▲ Easy operation, high efficiency
- ▲ Flat cuts due to smart design





# TO BE THE LEADER IN MICROFLUIDICS

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