Takasago Fluidic Systems

PRODUCT INFORMATION

TAKASAGO Overview 1-19

Fluidic Components 2014-16 p20-76

Environment

Preserve clean air and water for future generations

Our products are installed into many kinds of environment-related applications like water quality analyzers, automotive emissions etc. to protect the environment.

Health

For mankind's well-being

We hope our products are used to improve people's health and happiness. e.g. in blood analyzers, dialysis machines and other medical / diagnostic applications.

Technology

Small, Fast, Highly Accurate

We, as a high-tech fluidic control system manufacturer, always aim to achieve the most advanced technological standards.

TAKASAGO
ELECTRIC, INC.

Having developed in excess of 5000 different valves over 50 years, Takasago has established itself as a leading manufacturer of valves and other fluidic devices. With this experience and knowledge about fluid-handling and precision control, we can provide our customers with high quality custom-made products. The products listed in this brochure represent only a small part of our product range.
Various applications of our products include :

- Diagnostic instruments such as clinical chemistry/immunoassay analyzers
- Environmental measuring instruments for water, air, flue gas or automotive exhaust gas
- Analytical instruments including liquid/gas chromatographs
- Medical instruments including dialysis machines
- Biotechnology equipment for DNA analysis, cell culture, cell handling, etc.
- Semiconductor and LCD manufacturing equipment
- Ink-jet printers
- Fluid control devices for beverages, etc.
- etc.

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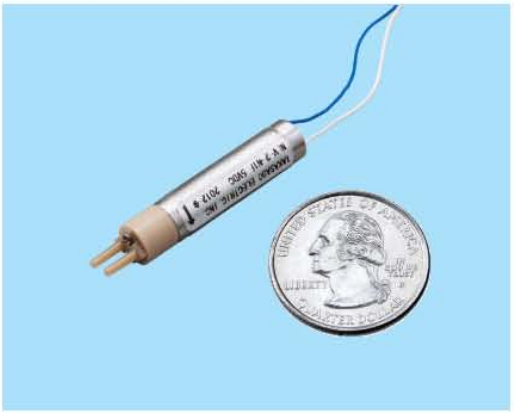
Innovatively Small and Highly Fun

NV NLV Series



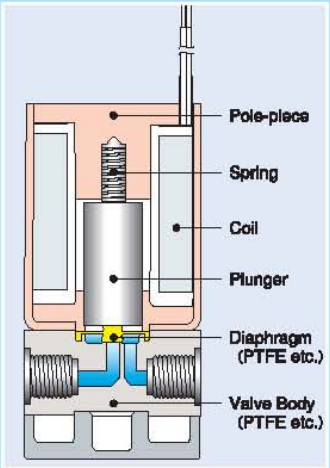
	NV Series	NLV Series
Dimensions (mm)	ϕ5.7 x H 32.5*1	
Orifice Diameter (mm)	ϕ0.4	
Port Connection	Barb	
Pressure	0 ~ 100 kPa	
Voltage	6 VDC, 12 VDC, 24 VDC	5 VDC
Power Consumption	1 W	1.5 W when energized (Latching Solenoid*2)

*1.Dimensions of NV-2-N1G and NLV-2-N1G *2.Please refer to page12 on the latching solenoid.

KV Series

Dimensions (mm)	W 6 x L 50x H 12.5
Orifice Diameter (mm)	ϕ0.8
Port Connection	O-ring
Pressure	0 ~ 100 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	1.8 W

Miniature Isolation Valves



Our solenoid valve consists of two sections ; one is the valve part made of highly inert plastics like PTFE or PEEK, which opens and closes a flow path. The other is the actuator made of a coil and metallic parts, driving the valve part. In order to preserve the purity of the fluid, a diaphragm is installed between the two sections in our isolation valves. The diaphragm prevents the fluids from flowing into the actuator and protects the metallic parts from being corroded. Also, metal dust generated in the actuator does not contaminate the fluid. This structure is ideal for analytical and diagnostic applications which are sensitve to particles. It is also suitable for handling acids and chemicals which erode metals.

By reducing the size of these isolation valves, we have been able to reduce the dead volume, improve the control of the pumping volume, and reduce the installation area, thereby improving accuracy and avoiding wasting chemicals and solvents.

ctional : Miniature Isolation Valves

EXAK Series

Dimensions (mm)	ϕ12× H 48.1
Orifice Diameter (mm)	ϕ0.8
Port Connection	Barb, M5
Pressure	−40 ~ 100 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	0.94 W

WTE Series

Dimensions (mm)	W19 × L11 × H 31.3
Orifice Diameter (mm)	ϕ1
Port Connection	Gasket
Pressure	−65 ~ 100 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	1.5 W

Pumping Volume

The diaphragm produces a pumping effect on the fluid as the valve opens and closes. As some valve models pump several microliters of fluid at one time, the pumping volume forms a negative factor in metering an accurate fluid volume, and also in preventing fluid from dripping from a dispensing nozzle.
Some of the valve models we provide have remarkably small pumping volumes due to their unique internal structures or miniaturized dimensions. The EXAK series has a distinctive design called a "zero-pumping-volume structure" that allows the pumping volume to run 100 times smaller than our standard valves. Rocker valves (page 9) and non-diaphragm inert valves (made of inert materials like stainless steel) have very small pumping volumes due to no volumetric change in the valve chamber during an operation. We also provide slider valves (page 10) with pumping volumes that have been ultimately reduced to an immeasurable level.

unit:μl

TYPE	PORT	ON-1	OFF-1	ON-2	OFF-2	ON-3	OFF-3
Zero-pumping-volume type (EXAK-3)	COM.	0.002	-0.015	0.002	-0.015	0.002	-0.015
	N.C.	0.024	-0.01	0.024	-0.01	0.024	-0.01
	N.O.	0.005	-0.005	0.005	-0.005	0.005	-0.005
Rocker solenoid type (Low pumping volume model)	COM.	0	0	0	0	0	0
	N.C.	0.103	-0.18	0.137	-0.263	0.145	-0.213
	N.O.	-0.059	0.103	-0.027	0.025	-0.033	0.027
Non-diaphragm valve	IN	-0.009	0.018	-0.018	0.009	-0.017	0.018
	OUT	-0.725	0.81	-0.71	0.826	-0.708	0.849
Conventional type (MTV-3R)	COM.	2.346	2.609	2.425	2.604	2.427	2.661
	N.C.	2.63	2.317	2.481	2.293	2.521	2.34
	N.O.	7.238	7.373	7.443	7.395	7.506	7.388

Diaphragm Valves with High Rel

EXV Series

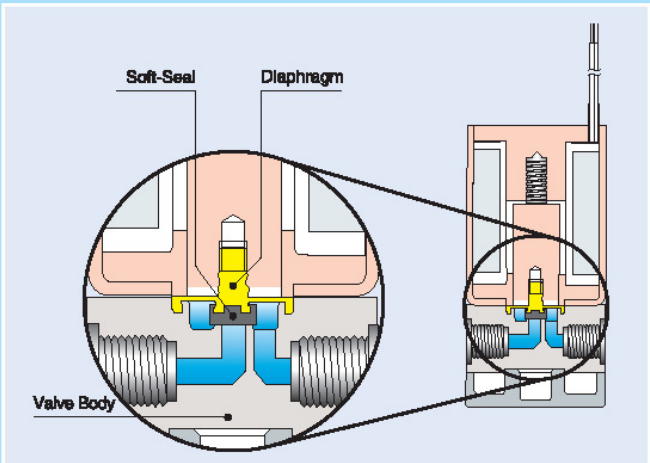
Dimensions (mm)	W 14 × L 25.0 × H 31.7
Orifice Diameter (mm)	ϕ1
Port Connection	Gasket
Pressure	−50 ~ 200 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	2.8 W

STV CTV Series

	❶ STV Series	❷ CTV Series
Dimensions (mm)	ϕ20 × H 42.5	ϕ21 × H 59.8 (excluding projection parts)
Orifice Diameter (mm)	ϕ1.2	ϕ1.6
Port Connection	M6, 1/4-28UNF, Barb	
Pressure	−50 ~ 200 kPa	
Voltage	12 VDC, 24 VDC	
Power Consumption	2.5 W	3.5 W

*Manifold-mountable models are also available.

Soft-Seal



Problems can arise with PTFE diaphragm valves when scratches on the seal part of the valve, due to dust or crystals in the fluid, cause the valve to leak. Takasago offers an optional "Soft-Seal" to protect the sealing surface from being scratched by covering it with perfluoroelastomer, which is a special elastomer that has outstanding resistance to most chemicals and solvents. The chemical inertness of the perfluoroelastomer is almost equal to PTFE. It has a high reputation for use with chemicals in analytical or semi-conductor industries. FPM (FKM) is also available for the Soft-Seal material.

iability and Outstanding Inertness

MTV Series

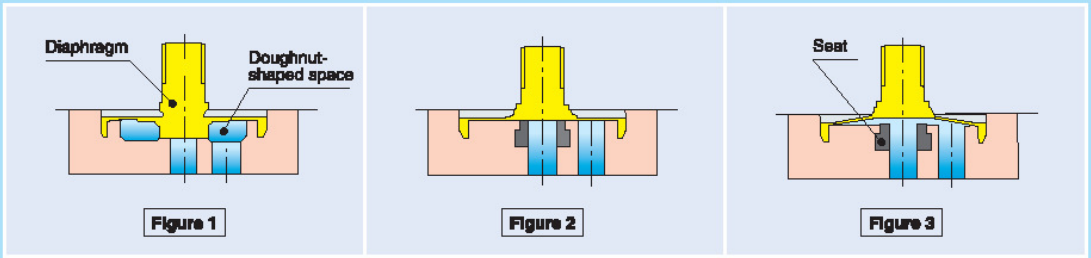
Dimensions (mm)	ϕ26 × H 53.2
Orifice Diameter (mm)	ϕ1.6 ~ ϕ2
Port Connection	M6, 1/4-28UNF, Barb
Pressure	−90 ~ 300 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	1.9 W, 2.8 W

*Manifold-mountable models are also available.

PKV Series

	1 PKV-2	2 PKV-3
Dimensions (mm)	W 43 × L 36 × H 71	W 43 × L 36 × H 62
Orifice Diameter (mm)	ϕ4 ~ ϕ6	
Port Connection	Rc1/8, Rc1/4, 1/8-27NPT, 1/4-18NPT, Barb	
Pressure	−50 ~ 200 kPa	−50 ~ 100 kPa
Voltage	12 VDC, 24 VDC	
Power Consumption	6 W, 10 W	10 W

Zero-Internal-Volume Design



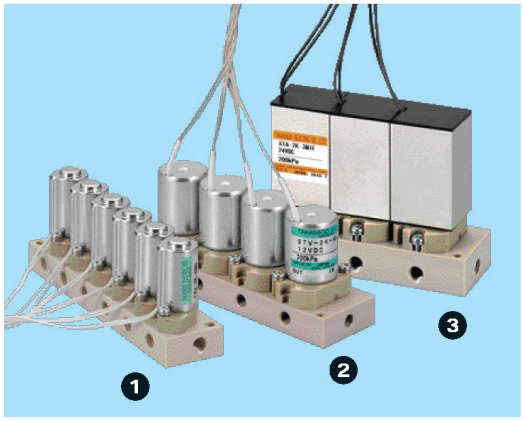
■ **Applicable models**

- **STV Series** (2-way type only)
- **MTV Series**
- **MLV Series**

A diaphragm solenoid valve normally has a doughnut-shaped space right under the diaphragm, through which fluids flow to the outlet port (Figure 1). This space, often called a "valve chamber", works as excess internal volume to waste solvents and samples. Fluids tend to stay in this dead space and therefore decrease the purity of each fluid. In addition, air bubbles may be trapped in this valve chamber and can have a negative effect on analytic accuracy. To conclude a valve chamber causes various undesirable results for applications. To overcome these problems, Takasago has designed the Zero-Internal-Volume Valve, in which a special structure is employed to eliminate the valve chamber (Figure 2). On opening, the diaphragm is lifted and the space is formed for the fluid to stream (Figure 3).
(Note) This Zero-Internal-Volume structure is patented.

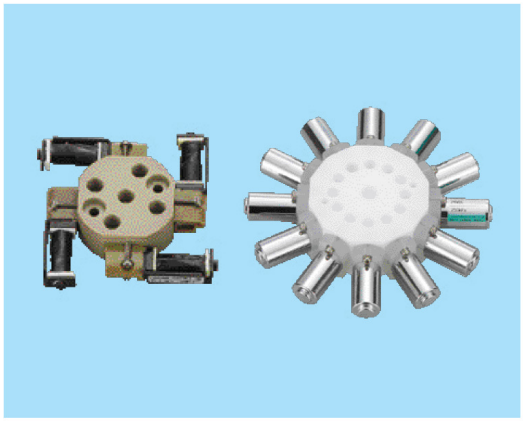
Products to Meet Your

Standard Manifolds



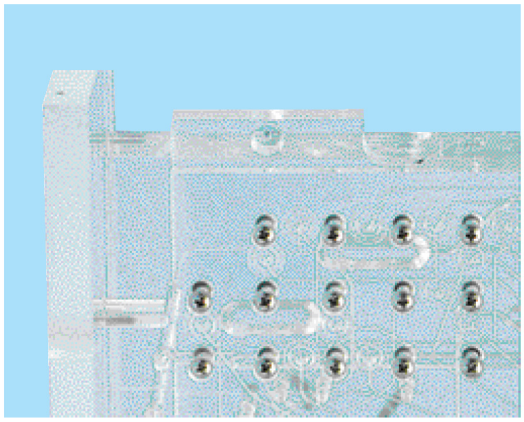
	❶ EXV Series	❷ STV Series	❸ XTA Series
Orifice Diameter(mm)	φ1	φ1.2	φ2
Port Connection	M6, 1/4-28UNF		
Pressure	−20 ~ 200 kPa	−50 ~ 200 kPa	−50 ~ 200 kPa
Voltage	12 VDC, 24 VDC		
Power Consumption	2.8 W x (No. of valve)	2.5 W x (No. of valve)	2.8 W x (No. of valve)
Max. number of valves	6		

Custom Manifolds

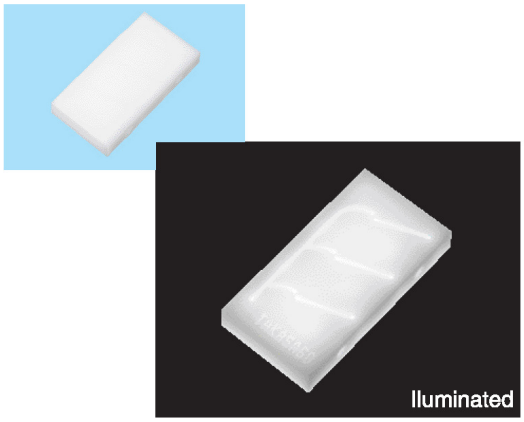


If you wish install valves compactly and connect flow-paths over a short distance, the manifold is the best choice. If you let us know the flow diagram you require, we can design and produce the manifold to meet your requirements. A variety of shapes, materials, and structural methods are available and we are also capable of equipping the manifold with components like pumps. Please contact us for further details.

Multi-layer Bonded Manifold



Bonded PTFE Manifold

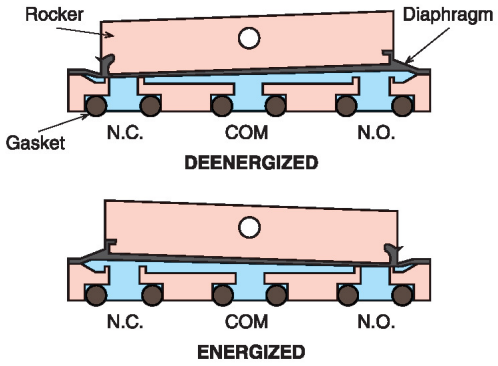


These multi-layer manifolds are made by bonding layers that have channels engraved on the surface. The result is a highly integrated manifold with freely curving channels that could not be fabricated through a conventional drilling process. The bonding process does not use any adhesive in order to utilize the pure characteristics of each material. Materials available are PMMA, mpatibility, in this way.

Requirements Flexibly

Rocker Solenoid Valve RVA Series

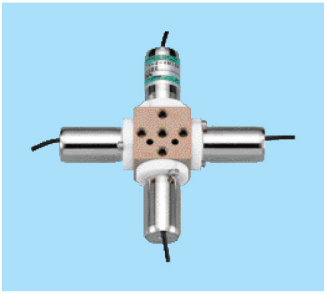
■Cross-sectional Image of Rocker Structure

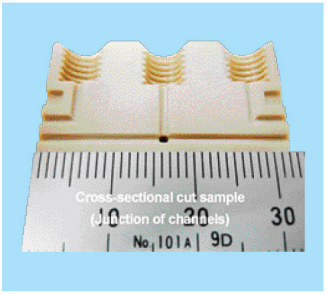


Dimensions (mm)	W 16 × L 27× H 46
Orifice Diameter (mm)	ϕ1.6
Port Connection	Gasket
Pressure	−95 ~ 200 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	3.4 W (Standard) with built-in "hit & hold" circuit (page 13): 0.85 W

- Width of 16 mm enables efficient mounting of rocker valves on a manifold.
- The rocker moves like a seesaw inside the valve and alternately seals the left and right valve seats.
- COM., N.C. and N.O. ports are all rated to the same operating pressure. Can be pressurized from any direction.
- High pressure models (600 kPa, orifice diameter 0.8 mm) are available.
- Small pumping volume due to no volumetric change in the valve chamber during an operation. Lower pumping volume models are also available.

Molded Quaternary Valve



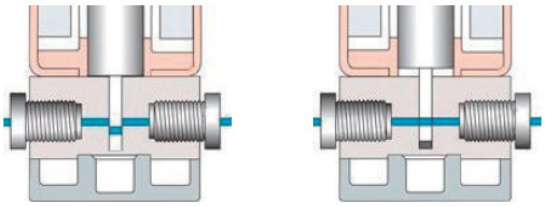


Dimensions (mm)	W 117 × L 117 × H 31
Orifice Diameter (mm)	ϕ1.2
Port Connection	M6, 1/4-28UNF
Pressure	0 ~ 300 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	3.5 W × 4
Wetted Materials	PTFE, PEEK, Perfluoroelastomer

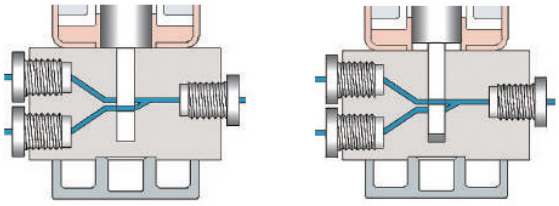
A quaternary valve, in which the four channels from the valves all join at one point and connect to the common port, requires a high processing accuracy at the junction of the channels. Thus the manifold bases of almost all conventional models, including those of other manufacturers, are manufactured by machining, which results in an increased cost. With advanced molding techniques, TAKASAGO has achieved the molding of this junction in PEEK, enabling us to provide our quaternary valves at prices conventional models cannot match.

Solenoid-driven Slider Valves

●2-way (N.C.)



●3-way



This is a kind of shear valve in which a shutter called a "slider" moves vertically and shuts off the flow path. The pumping volume* and the dead volume are reduced to almost zero, preventing reduction of accuracy in analysis or fluid dispensation. It features an excellent fluid exchangeability compared to a diaphragm solenoid valve due to its almost linear flow path and very small internal volume.

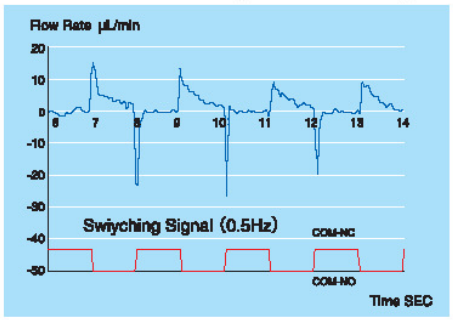
*Please refer to page 5 for more details on the pumping volume.

	MTV	NRV
Dimensions (mm)	W 33 × L 25 × H 62	W 41 × L 38 × H 86
Orifice Diameter (mm)	φ0.4	φ1.0
Port Connection	No. 10-32UNF	M6, 1/4-28UNF
Pressure	0 ~ 500 kPa	0 ~ 300 kPa
Voltage	12 VDC, 24 VDC	
Power Consumption*	18 W (Intermittent : 45 s*)	18 W (Intermittent : 2 min*)
Wetted Materials	PTFE, PEEK, Al_2O_3	PTFE, PEEK, SiC

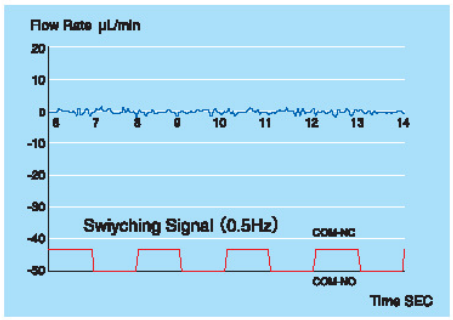
Patented *Continuous operation possible with a "hit and hold" circuit (page 13)

■Pumping Volume Comparison (Diaphragm Valve vs. Slider Valve)

(Flow rate at the N.C. port when turning a 3-way valve on/off)



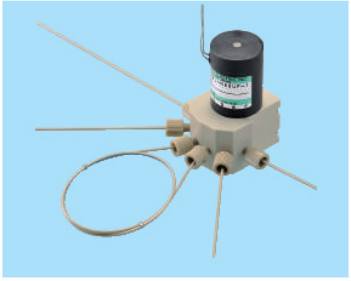
<Diaphragm Valve (KV-3K Series)>

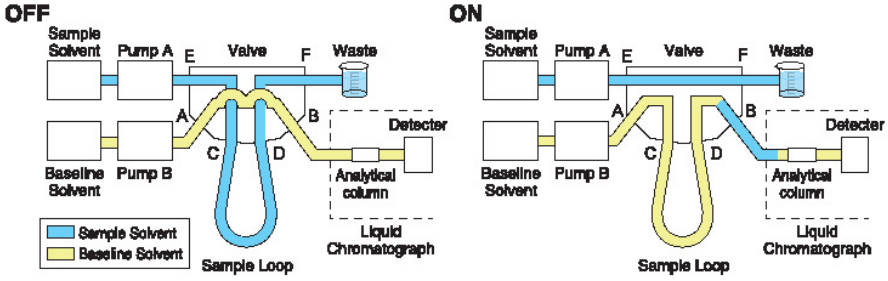


<Slider Valve (MTV-3SL Series)>

These data are provided by Fuji T. Lab, Institute of Industrial Science, the University of Tokyo.

Solenoid-driven Injection Valve

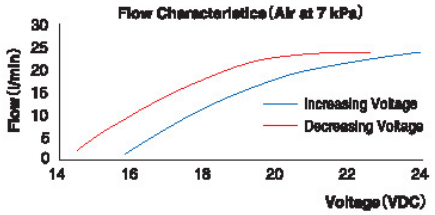




The valve in the photograph is a 2-Position 6-Port valve that employs the technology of a solenoid-driven slider valve. As the solenoid driven actuator requires no driver or external stepper motor, it is more economical and easier to operate than a conventional motor-driven rotary valve. It is suitable for sample metering/injection in a liquid chromatograph. A 2-Position 4-Port type injection valve is also available. Please consult with us for details.

s Including Slider Valves

Proportional Diaphragm Valve



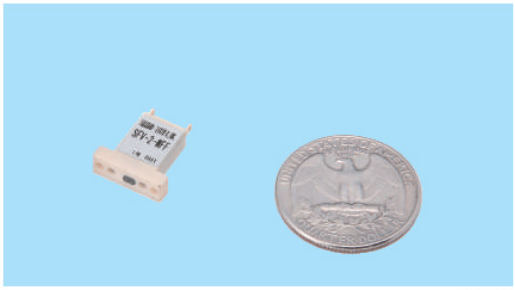
Push-in Fitting Diaphragm Valve

- Just insert plastic tubing into ports and you are connected. No special preparation of the tubing is required, such as enlarging the connection end.
- For disconnection, simply pull out the tubing while pushing in the port ends.
- Applicable to O.D. 2 mm PTFE/PFA tubing.
- High chemical resistance due to PPS, FPM (FKM) and PTFE wetted materials.
- Integral molding eliminates the concern of leakage between the fittings and the body.

Air Operated Valves

		❶ PDT	❷ PMDP
Dimensions	(mm)	ϕ44.5 × H 52 ~ 67	ϕ25 × H 42 ~ 49
Orifice Diameter	(mm)	ϕ3 ~ 5	ϕ2
Fluid Flow Connection		Rc1/8, Rc1/4	M5, 1/4-28UNF, Barb
Operating Pressure		0 ~ 300 kPa	−90 ~ 500 kPa
Port Connection for air pressure		Rc1/8	M5, M6, 1/4-28UNF
Air Pressure for actuation		300 ~ 600 kPa	300 ~ 600 kPa

Low Power Consumption Miniature Valve



Patented

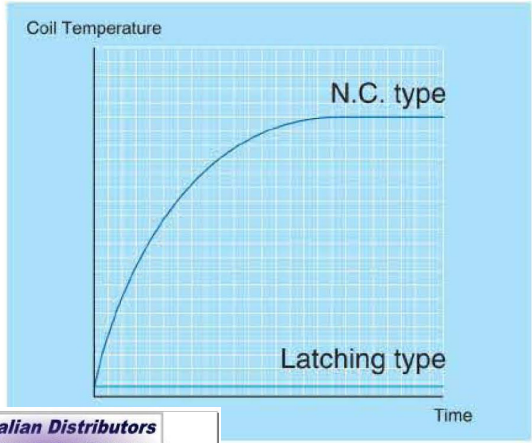
Dimensions (mm)	W 4 × L 16 × H 16.5
Orifice Diameter (mm)	ϕ0.4
Driving Current	250 mA
Operating Frequency	0.5 Hz or less
Power Consumption	0.3 W or less

Pinch Valves

	❶ PE Series	❷ PSK Series	❸ PMK Series	❹ PK Series	❺ NP Series	❻ EPK Series
Dimensions (mm)	ϕ14 × H 55.1	ϕ20 × H 51	ϕ26 × H 61.5	W 40 × L 36 × H 65 ~ 88.3	W 40 × L 36 × H 65 ~ 88.3	ϕ64 × H 112 ~ 132
Tube Material	Silicone	Silicone, PharMed®	Silicone, PharMed®	Silicone	Silicone	Silicone
Tube Diameter (mm)	ϕ0.8 × ϕ2.4	ϕ1 ×ϕ3 ϕ1.6 × ϕ3.2	ϕ0.8 × ϕ2.4 ϕ1 × ϕ3	ϕ3 × ϕ5 ϕ6 × ϕ8	ϕ3 × ϕ5 ϕ6 × ϕ8	ϕ10 × ϕ13 ϕ15 × ϕ19
Pressure	0 ~ 100 kPa	0 ~ 150 kPa	0 ~ 150 kPa	0 ~ 50 kPa	0 ~ 50 kPa	0 ~ 50 kPa
Voltage	12 VDC, 24 VDC	12 VDC, 24 VDC	12 VDC, 24 VDC, 100 VAC	12 VDC, 24 VDC, 100 VAC	12 VDC, 24 VDC, 100 VAC	12 VDC, 24 VDC, 100 VAC
Power Consumption	2.8 W	3 W	4.4 W	10 W	10 W	60 W (intermittent : 5 min.)

Latching Solenoid Valves

	Orifice Diameter or Tube Diameter (mm)	Valve Type
❶ FLV Series	ϕ0.4	Diaphragm valve
❷ WLB Series	ϕ2	Diaphragm valve
❸ PL Series	ϕ1 ×ϕ3, ϕ3 ×ϕ5	Pinch valve
❹ EL Series	ϕ10 ×ϕ13	Pinch valve



In the case of a conventional (e.g. N.C. - Normally Closed) solenoid valve, continuous energization is required to maintain open status. The latching solenoid does not require a power supply for the purpose of maintaining open status through the utilization of a permanent magnet. Suitable for applications where the power consumption and the effect of

ing Items and Accesories

Example of Custom Pinch Valve

(PL Series, Small Latching Pinch Valve)

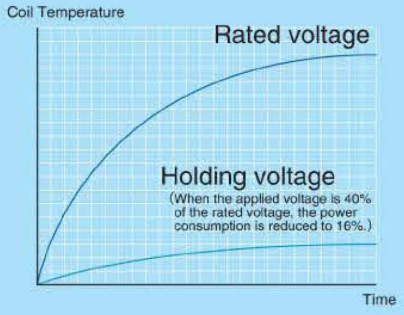
Dimensions (mm)	W 45 x L 29.7 x H 66.5
Tube Material	PharMed®
Tube Diameter (mm)	ϕ3 x ϕ5
Pressure	−55 ~ 80 kPa
Voltage	12 VDC, 24 VDC
Power Consumption	8 W when energized (Latching Solenoid)

ß-Titanium Probes

1. **Non-bending piercing probe**
   Long-lasting due to its shape recovery characteristics with respect to bending (high tensile strength and superior spring characteristics), which contributes to longer life expectancy compared to stainless steel probes.
2. **Non-magnetic**
   Having absolutely no magnetism makes it particularly suitable for analyzers that use magnetic particles, like an immunoassay system.
3. **Finely polished titanium**
   The fine bore polishing (Ra 0.02 at minimum) reduces the carryover of samples (especially proteins), system flushing time and sample loss.

Holding Voltage and "Hit & Hold" Circuit

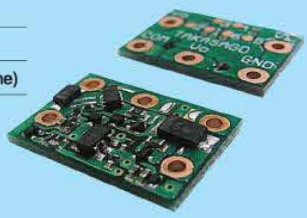
Once switched to ON-position by energizing at the rated voltage, a solenoid valve can hold the ON-position status even after the applied voltage is dropped to a lower voltage. For example, in case that a 2-way normally closed valve with a rated voltage of 24 VDC is switched to ON-position, it can hold the ON-position even after the applied voltage is dropped to around 10 VDC (Holding Voltage). Using this characteristic, various benefits are achieved, such as low power consumption, reduction of coil heat-generation (see graph below), improvement of response time, increase of operating pressure, minimization of size, etc. This requires you to control the applied voltage. As an alternative to controlling the voltage at the equipment side we can offer you a "Hit & Hold" circuit, which can be simply attached to a valve. This circuit automatically drops the applied voltage to a lower value after a very short period of time (Inrush Time).



■Standard specifications of our "Hit & Hold" circuit

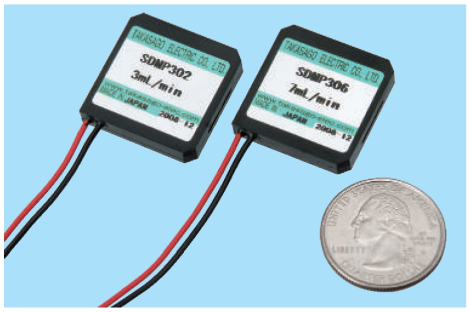
Input	5 VDC ~ 27 VDC
Inrush Time	100 ms, 300 ms
Output	40 % of Input (after Inrush Time)

■Dimensions



A Wide Range of Sma

Piezoelectric Micro Pumps



The SDMP302/306/320 and APP-20KG are piezoelectric diaphragm micro pumps. The main features are as follows;

- Small-sized, lightweight and thin
- No metal parts in contact with fluid. The APP-20KG has particularly high chemical compatibility and can be used for wide range of fluids.
- Quiet and low power consumption
- Flow controllable by adjusting drive voltage and drive frequency
- Self-priming

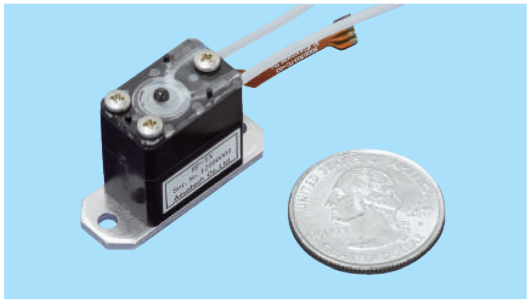
The SDMP302D/306D is the same as the SDMP302/306 but with a built-in driving circuit. When 2.5-6 VDC is applied, the pump starts operating at a fixed voltage and frequency.

Replaceable-cartridge types available upon request.

	SDMP302	SDMP306	SDMP320	APP-20KG
Pump Type	Piezoelectric diaphragm pump			
Typical Flow Rate	3 ml/min	7 ml/min	20 ml/min	15 ml/min
Typical Pump Pressure	40 kPa	45 kPa	35 kPa	25 kPa
Voltage	60 ~ 250 Vp-p			
Drive Frequency	10 ~ 60 Hz			
Typical Suction Load Pressure	-1.0 kPa			
Operating Temparature	5 ~ 50 °C			
Wetted Materials	COC (Cyclic Olefin Copolymer) EPDM (Ethylene Propylene Diene Monomer)			PTFE, PEEK, and Perfluoroelastomer
Dimensions (mm)	25 × 25 × 4.8		33 × 33 × 5.5	33 × 33 × 9
Weight	Approx. 4 g		Approx. 9 g	Approx. 17 g
Input / Output Pipes (mm)	I.D. 0.6 × O.D. 1.2 × L 2.5	I.D. 1.2 × O.D. 2.2 × L 3.5	I.D. 1.8 × O.D. 2.8 × L 0.5	

*The specifications above are based on sine wave drive. Flow rate and pump pressure are larger if driven by Takasago Standard wave.

Micro Peristaltic Pump RP-TX Series



- The world's lowest level of flow for a peristaltic pump on the market: 0.1 ~ 40 µl/min
- A replaceable pump head, which includes tubing.
- Compact size: Dimensions of 33 × 12 × 21.5 mm
- An easy-to-use controller is available upon request. (Sold separately)

Flow Rate	0.1~40 µl/min ±15 % (Water at 25 °C, Pulse speed:3~1000 pps)
Tubing Material	Silicone or Olefine (I.D. 0.5 mm)
Pump Pressure	30 kPa or more
Motor	Stepper motor
Voltage	3 VDC

Miniature Peristaltic Pump RP-Q1 Series

Model Number	RP-Q1-S-P45A-DC3V	RP-Q1.2N-P20A-DC3V
Flow Rate	0.45 ml/min ±15 % (water at 20 °C)	0.20 ml/min ±15 % (water at 20 °C)
Tubing Material	Silicone (I.D. 1.5 mm)	Norprene (I.D. 1.2 mm)
Discharge Pressure	50 kPa	
Motor	DC Geared Motor	
Voltage	DC 3 V	
Power Consumption	0.12 W	
Dimensions (mm)	W12 × L30 × H14	

*This is a product of Aquatech Co., Ltd.

ll-sized Liquid Pumps

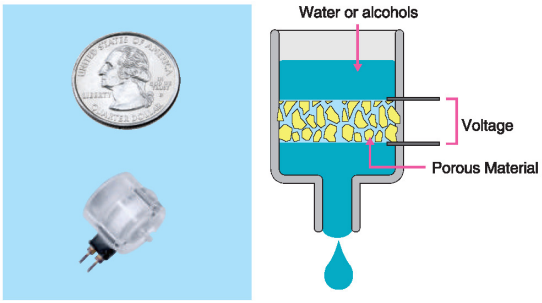
Pen Type Syringe Pump

This is a remarkably small syringe pump with an outer diameter of 12 mm and a built-in stepper motor. The theoretical resolution is as small as 0.105 nl at 1/100 micro-step. Different needle lengths and thicknesses are available along with various port connections (ex. screws) . The SAP series with the ultra-small outer diameter of 8.8 mm is also available by custom order. Please contact us for details.

Specifications (Needle Type)

Model Number	**SBP-100G-N**
Syringe Capacity	**100μl**
Dimensions (mm)	**φ12 × L 170 (Excluding needle and sensor case)**
Theoretical Resolution	**0.105 nl at 1/100 micro-step 10.5 nl at full step**
Wetted Materials	**Glass(barrel), PTFE(tip, seal), Stainless Steel(needle)**
Needle Size	**22G (I.D. 0.40 × O.D. 0.72) × L 51 mm**

Electro-Osmotic Micro Pump [Under Development]

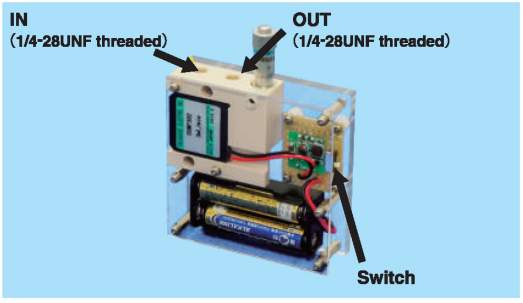


This pump utilizes an electro-osmotic flow induced by applying an external electric field on a charged solid-liquid interface of narrow channels inside a porous material.

Features

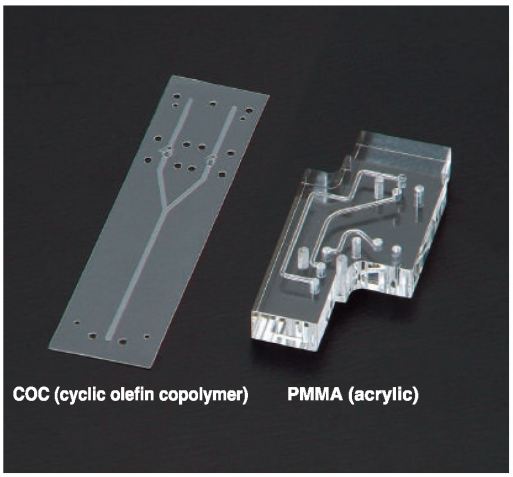
- Zero-pulsation flow and no operating noise due to no mechanical parts.
- Small size (a few millimeters) and lightweight (a few grams).
- Adjustable flow. Linearly proportional to applied voltage.

Manually Adjustable Low Pulsation Micro Pump Unit



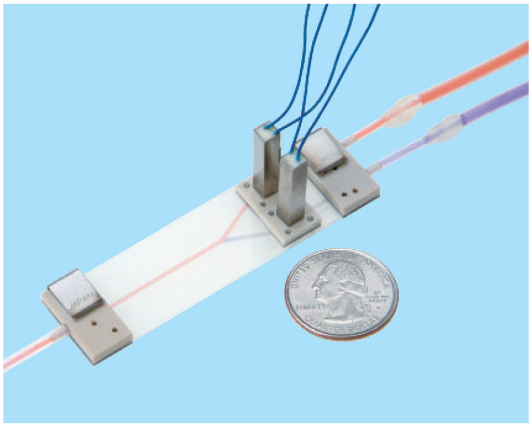
- Suitable for lab-on-a-chip devices, cell culture media circulation, etc.
- Flow from a piezoelectric micro pump is adjusted by a micro needle valve.
- Can adjust flow from sub-microliter level to around 1.5 ml/min.
- Flow pulsation at low flow rates is drastically reduced by the micro needle valve.
- Stand-alone functionality powered by AAA or R03 batteries.
- Compact size: Dimensions of 70 x 25 x 94 mm

Microfluidic Chips



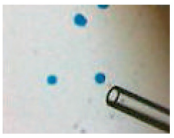
These are chips made by bonding plastic or elastomer layers. The layers can be made by machining for prototypes or injection molding for production. Available in the following materials : PMMA (acrylic) , COC (cyclic olefin copolymer) , PDMS (silicone) , PI (polyimide) , PEN (polyethylene naphthalate) , PC (polycarbonate) , ceramic, etc. In addition to bonding plastic + plastic or elastomer + elastomer, special bonding of plastic + elastomer is also possible.

Example of Module with Film Chip

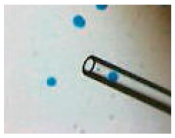


This is a demo module exhibiting the introduction and mixing of two liquids in the internal channels of a film chip of just 225 µm thickness. The flow of each liquid can be controlled by opening and closing the mounted ultra-small solenoid valves. A "clip-on" connection is adopted for easy interface between the film chip and tube connection barbs.

PicoPipet



1. Target



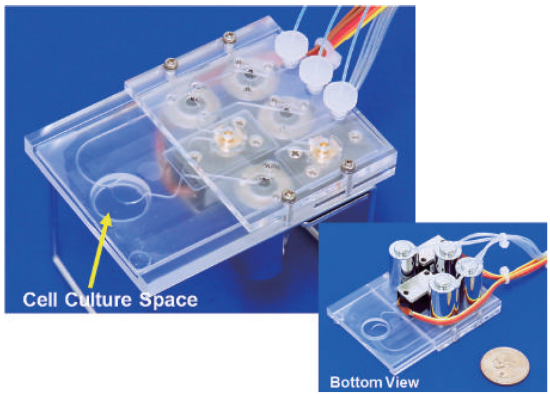
2. Suck & hold

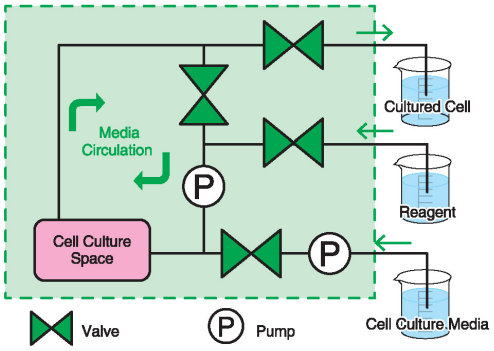
3. Discharge at intended position

- Simplify single cell isolation & transfer
- Requires an extremely small volume of cell culture media during a cell/bacteria transfer, which contributes to mitigating contamination.
- Flow range is 1 nl/min – 12 µl/min.
- Simple operation. Just turn the dial, or push the buttons for preset volumes of suction or discharge.
- Optional accessories further simplify precise handling of a single cell

ic Devices

All-in-one Disposable PDMS Chip【Under Development】





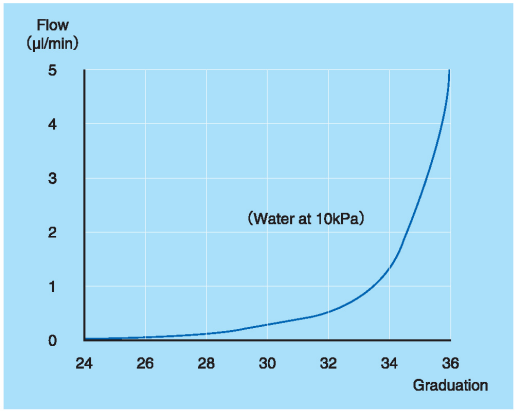
This all-in-one system on a disposable PDMS chip is a microfluidic module designed for cell culture. It has peristaltic pumps, miniature valves, and a built-in cell culture space which can be observed under a microscope. The replaceable chip is sterilizable before use. A remote controller using an Android application is available for this module upon request.

This is just an example of our integrated fluid control systems. Other microfluidic systems can be designed and manufactured in accordance with your requirements.

This system is jointly developed with Aquatech Co., Ltd. and Fukoku Bussan Co., Ltd.

Micro Needle Valve

< Example Flow Data* >

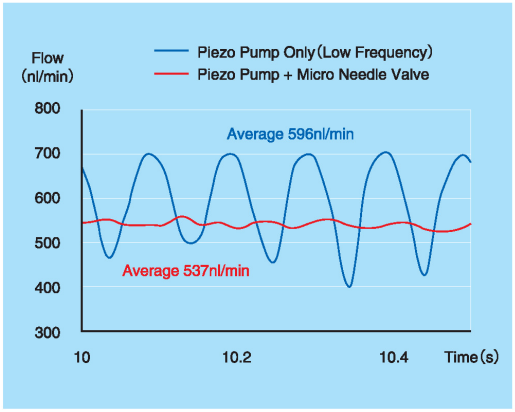


*Flow-graduation relationship varies according to valve.

- Allows the adjustment of flows below 1 µl/min.
- Reduces flow pulsation.
- Only Perfluoroelastomer and PEEK as the wetted materials. (The pipe insert type includes stainless steel.)

< Example of Reduced Pulsation >

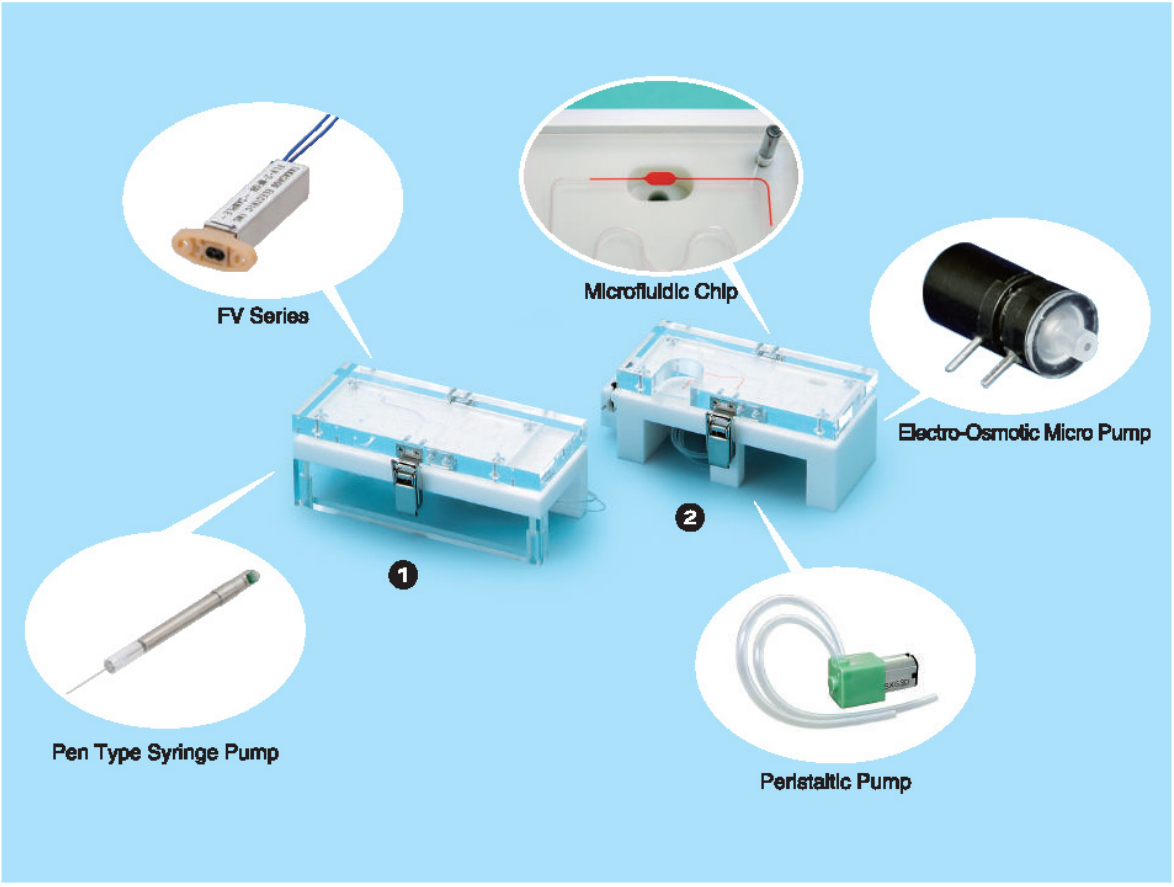
By incorporating a micro needle valve on the discharging side of a piezoelectric micro pump, the significant pulsations created by the low flow operation of a piezoelectric pump are eliminated and a low flow rate with almost no pulsation can be achieved. The graph below is an example of this remarkable reduction in pulsation. Pulsation can also be reduced when combined with other kinds of pumps, such as peristaltic pumps.



Microfluidic Device Specialist

Microfluidic control devices are our key products. The trend of minimization and modularization is prevailing in markets worldwide. Our products are supplied not only as standalone equipment and components, but also in the form of integrated modules combining such products with other devices. We serve our customers with elegant and sophisticated solutions for various applications; presenting modules of integrated devices designed to solve the particular microfluidic control challenge posed. The below is an example of one such microfluidic control module.

Example of Microfluidic Control Module

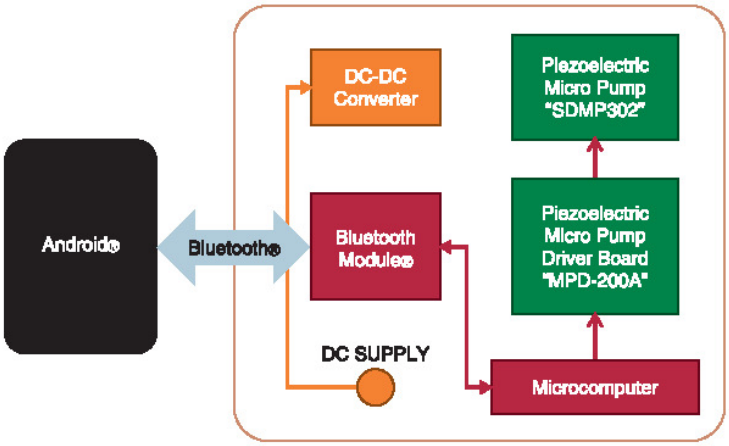


1. This is a demo module in which a plastic chip is prefilled with a reagent. It is constructed from a pen type syringe pump and an ultra-small inert 3-way valve.

2. This module demonstrates the basic processes including sample introduction, mixing with a reagent, and detection, by using a chip with Y-shaped internal channels. A sample is introduced into the chip by an ultra-small peristaltic pump and, after being metered in accordance with the length of the channel, transported and mixed with the pre-filled reagent by a pair of electro-osmotic pumps. The flow is switched by ultra-small valves. The chip is designed to be disposable and can be easily fixed on the module by the holding plate.

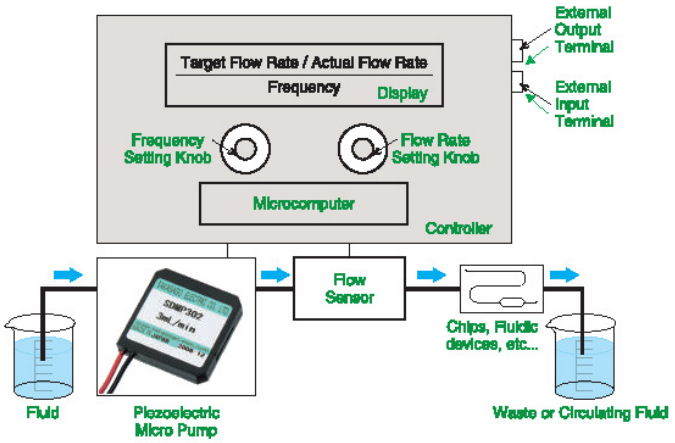
lution Provider

Remote Control System <Android® Application>



This Android® application is for the remote control of Takasago piezoelectric micro pumps. Your Android® device wirelessly connects to a microcomputer, and allows you to easily switch on/off and adjust the drive voltage and drive frequency. A ready-to-use sample package that includes a Bluetooth® module, a microcomputer and a driver board is available upon request. Consult with us for developing other systems to control pumps, valves, etc.

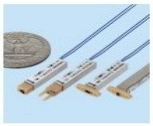
Flow Control System for Piezoelectric Micro Pump【Under development】

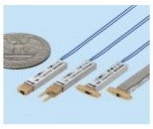


- Automatically adjusts the flow to the target rate set manually by the flow setting knob. Flow remains stable even when the liquid levels of the vessel change.
- Programmed flow control using an external input is also possible.
- The flow data can be exported through the external output terminal.
- Applicable to Takasago piezoelectric micro pump models SDMP302, SDMP308 and APP-20KG.
- The flow sensor can be selected from Sensirion LG16-0150 or LG16-1000. These support a range of flow rates from a few hundred nl/min to 7 µl/min and from a few µl/min to 1 ml/min, respectively.
- The wetted materials of the flow sensors are PEEK and glass, and those of the pumps are plastics and elastomers. The highly inert model allows the handling of a wide range of fluids.

TSJ Fluidics Components 2016

Solenoid Valves


FV Series 283KB


FLV Series 294KB


NLV Series 208KB


KV Series 262KB


LV Series 113KB


EXV Series 43KB


PKV Series 264KB


Solenoid Proportional Valve NPV Series 230KB


High-Temperature High-Pressure Valve 171KB

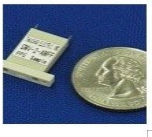

CTV-2-4MICK 238KB

Pinch Valves


PM Series 747KB

Others

Shape Memory Alloy Valve


SMV Series 187KB

Solenoid Pumps

Small Syringe Pumps

Pen-Type Syringe Pumps

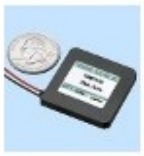

SBP Series 209KB


SAP Series 207KB

Transfer Pumps

Piezoelectric Micro Pumps


SDMP302/306 Series 287KB


SDMP320 330W 342KB


Cartridge Type Piezo Pump 321KB

Highly Inert Piezoelectric Micro Pumps


APP Series 252KB

Peristaltic Pumps


RP-Q1 Series 200KB

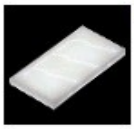

RP-TX Series 307KB

Pump Unit


Manually Adjustable Low Pulsation Micro Pump Unit 279KB

Miscellaneous

Bonded PTFE Manifold


Bonded PTFE Manifold 159KB

Others

Module


All-in-one Disposable PDMS Chip Valve 335KB

2-Position 6-Port Valve


2-Position 6-Port Valve 300KB

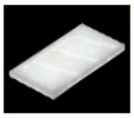
Solenoid-driven Slider Valve


Solenoid-driven Slider Valve 384KB

Solenoid-driven Sample Injector


Solenoid-driven Sample Injector 233KB

Bonded PTFE Manifold


Bonded PTFE Manifold 159KB

Others

Module


All-in-one Disposable PDMS Chip Valve 335KB

2-Position 6-Port Valve


2-Position 6-Port Valve 300KB

Solenoid-driven Slider Valve


Solenoid-driven Slider Valve 384KB

Solenoid-driven Sample Injector


Solenoid-driven Sample Injector 233KB

Solenoid PINCH Valves

PE Series
The smallest pinch valve in our product range with an actuator of 14 mm in diameter.See more details.

Tubing I.D.	0.8 mm
Tubing O.D.	2.4 mm
Tubing material	silicone
Pressure	0 ~ 100 kPa
Power consumption	2.8 W
Outer dimensions	21 × 26 × 55.1 mm

PS Series
This is a standard miniature pinch valve for small diameter tubing. There are three types - NC (Normally Closed), NO (Normally Open) and Dual which has both an N.O. and N.C. side that are simultaneously operated.See more details.

Tubing I.D.	0.8 ~ 1.6 mm
Tubing O.D.	2.4 ~ 3.2 mm
Tubing material	silicone, PharMed®
Pressure	0 ~ 150 kPa
Power consumption	3 W
Outer dimensions	26 × 39.2 × 49.5 mm

PSK Series
This is the PS pinch valve with the tube holding feature.See more details.

Tubing I.D.	0.8 ~ 1.6 mm
Tubing O.D.	2.4 ~ 3.2 mm
Tubing material	silicone, PharMed®
Pressure	0 ~ 150 kPa
Power consumption	3 W
Outer dimensions	26 × 39.2 × 49.5 mm

PM Series
This valve supports a wide range of tubing materials such as silicone, PharMed® and Tygon®.This pinch valve can be freely used as an NC/NO type with a single tube or as a Dual type with two tubes. It can also be configured as a 3-way valve by using a Y-shaped fitting.See more details.

Tubing I.D.	0.8 ~ 1.6 mm
Tubing O.D.	2.4 ~ 3.2 mm
Tubing material	silicone, PharMed® ,Tygon®
Pressure	0 ~ 150 kPa
Power consumption	4.4 W
Outer dimensions	26 × 40 × 60 mm

PMK Series
This is the PM pinch valve with the tube holding feature.See more details.

Tubing I.D.	0.8 ~ 1.6 mm
Tubing O.D.	2.4 ~ 3.2 mm
Tubing material	silicone, PharMed® ,Tygon®
Pressure	0 ~ 150 kPa
Power consumption	4.4 W

PL Series
This is a pinch valve adopting a latching solenoid, which maintain the valve open or closed state through the utilization of a permanent magnet.See more details.

Tubing I.D.	0.8 ~ 2.0 mm
Tubing O.D.	2.4 ~ 4.0 mm
Tubing material	silicone
Pressure	0 ~ 150 kPa
Power consumption	8 W (when energized)
Outer dimensions	30.4 × 30.4 × 61.7 mm

PK Series
This is a standard pinch valve for medium diameter tubing (Inner diameter of around 3-6mm).See more details.

Tubing I.D.	1.6 ~ 6.4 mm
Tubing O.D.	4.8 ~ 9.6 mm
Tubing material	silicone
Pressure	0 ~ 50 kPa
Power consumption	10 W
Outer dimensions	36 × 40 × 65 ~ 88.3 mm

NP Series
This is an improved model of the PK series. There is a slit in the tube holder by which to insert tubing from the side of the pinch valve.See more details.

Tubing I.D.	2.0 ~ 6.4 mm
Tubing O.D.	4.0 ~ 9.6 mm
Tubing material	silicone
Pressure	0 ~ 50 kPa
Power consumption	10 W
Outer dimensions	36 × 40 × 64.5 ~ 87.5 mm

EPK Series
This is a standard pinch valve for large diameter tubing.See more details.

Tubing I.D.	10.0 ~ 15.0 mm
Tubing O.D.	13.0 ~ 19.0 mm
Tubing material	silicone
Pressure	0 ~ 50 kPa
Power consumption	60 W
Outer dimensions	φ64 × 112 ~ 132 mm

EL Series
This is an equivalent model to the EPK series (for large diameter tubing) but with latching solenoid. See more details.

Tubing I.D.	10.0 ~ 15.0 mm
Tubing O.D.	13.0 ~ 19.0 mm
Tubing material	silicone
Pressure	0 ~ 50 kPa
Power consumption	15 W (when energized)
Outer dimensions	φ64 × 128.7 ~ 140.7 mm

* Tygon® and Pharmed® are registered trademarks of Saint-Gobain Performance Plastics.

Solenoid ISOLATION Valves - Diaphram

Orifice smaller than 1mm

FV Series

This is an innovative and groundbreaking ultra-small solenoid diaphragm valve, with size of just 4.2 mm square. The internal volume is now only 1.1 µl - contributes to reductions in reagent and improvements in accuracy.

Orifice diameter	0.4 mm
IN port pressure	0 ~ 100 kPa
Power consumption	1 ~ 1.2 W
Outer dimensions	4.2 x 4.2 x 23.1 mm

FLV Series

This valve is a latching solenoid valve in which the open and closed status of the valve is maintained by magnetic force. Contributes low power consumption, because electricity is consumed only when energized. With the size of 4.2 mm square, it is an ultra-small solenoid valve of an internal volume just 1.1 µl. It is suitable for microfluidic control.

Orifice diameter	0.4 mm
IN port pressure	0 ~ 100 kPa
Power consumption	2.4 ~ 3 W(when energized)
Outer dimensions	4.2 x 4.2 x 23.1 mm

KV Series

This is a diaphragm valve of just 6 mm width. substantial shortening of the flow-path between ports and reduction in mounting space are made possible by the manifold-mountable type. The internal volume is just 10 µl on both the IN and OUT port.

Orifice diameter	0.8 mm
IN port pressure	0 ~ 100 kPa
Power consumption	1.8 W
Outer dimensions	6.0 x 50.0 x 12.5 mm

LV Series

This manifold mountable diaphragm valve is just 8.9 x 10.4 mm, giving a footprint of less than 1cm2. It simultaneously realizes a very small internal volume of 3.3 µl at the IN port and 8.3 µl at the OUT port, and a shortening of the flow-path between ports.

Orifice diameter	0.8 mm
IN port pressure	0 ~ 100 kPa
Power consumption	1.2 W
Outer dimensions	8.9 x 10.4 x 28 mm

EXAK Series

This is a zero-pumping volume type of diaphragm isolation valves. Fluoropolymer is used for all of the wetted parts giving it great chemical compatibility. The size of this valve is quite small.

Orifice diameter	0.8 mm
IN port pressure	-40 ~ 100 kPa
Power consumption	0.94 W
Outer dimensions	12 x 26.0 x 35.45 mm

EXAKN Series

This is a zero-pumping volume type of diaphragm valves. Perfluoroelastomer is used for the seal part and the valve has increased sealing ability. The outer dimensions are a very compact.

Orifice diameter	0.8 mm
IN port pressure	-40 ~ 300 kPa
Power consumption	1.2 W
Outer dimensions	φ14.0 x 42.3 mm

EXV Series

This is a diaphragm isolation manifold mountable valve with a molded body. It is small with dimensions of W14 mm x H32 mm. You can choose the body material from the highly chemically resistant PEEK or PPS.

Orifice diameter	1.0 mm
IN port pressure	-20 ~ 200 kPa
Power consumption	2.8 W
Outer dimensions	14.0 x 25.0 x 31.7 mm

Orifice of 1-2mm

STV Series

This is a diaphragm isolation valve of outer dimensions φ20.0 x 42.5 mm. Highly chemically compatible materials PTFE, PEEK, PPS, etc. are available for the valve body material. This valve is a popular model among small inert solenoid valves and is playing an active role in a wide range of applications.

Orifice diameter	1.0 ~ 1.2 mm
IN port pressure	-50 ~ 200 kPa
Power consumption	1.7 ~ 2.9 W
Outer dimensions	φ20.0 x 42.5 mm

XTA Series

This is a diaphragm valve with a built-in microcomputer control circuit as standard. By making use of the circuit, we have added various features to this series, such as a silent type, high pressure type, and low power consumption type. Various body materials and port connections are available. While the open frame solenoid gives the XTA series a good cost performance, it is also covered by a stainless steel case of refined design.

Orifice diameter	1.2 ~ 2.0 mm
IN port pressure	-50 ~ 600 kPa
Power consumption	0.8 ~ 3.1 W
Outer dimensions	24.0 x 20.6 x 53.9 mm

MTV Series

This solenoid valve represents TAKASAGO brand. The PTFE machined diaphragm has a high chemical compatibility. There are a wide variety of valve bodies such as molded or machined bodies, thread port or hose barb connections, etc.

Orifice diameter	1.0 ~ 2.0 mm
IN port pressure	-100 ~ 600 kPa
Power consumption	1.9 ~ 4.4 W
Outer dimensions	φ26.0 x 57 mm

JTV Series

This is a miniature 2-way elastomer diaphragm valve. The hose barb connection enables you to connect silicone tubing directly to the valve.

Orifice diameter	1.2 mm
IN port pressure	0 ~ 80 kPa
Power consumption	1.0 W
Outer dimensions	φ14.5 x 34.1 mm

WTA · WTB Series

For the purpose of cost reduction, this valve adopts a open framed solenoid, which is covered by a plastic case.

Orifice diameter	1.6 ~ 2.0 mm
IN port pressure	-90 ~ 200 kPa
Power consumption	2.8 ~ 3.4 W
Outer dimensions	W27.5 ~ 28.2 x L24 ~ 24.5 x H47 ~ 61.7 mm

WLB Series

This is a latching solenoid valve. Electricity is consumed when energization is only required just an instant opening or closing, so heat generation is very limited.

Orifice diameter	2.0 mm
IN port pressure	-50 ~ 200 kPa
Power consumption	8.0 W (when energized)
Outer dimensions	25.0 x 26.0 x 55.9 mm

Solenoid ISOLATION Valves - Diaphram

Orifice greater than 2mm

MCV Series

This is an elastomer diaphragm valve with a diameter of φ26.0 mm. There are a wide variety of body materials or port connections etc.

Orifice diameter	2.0 mm
IN port pressure	-27 ~ 100 kPa
Power consumption	2.6 W
Outer dimensions	φ26.0 x 48.7 mm

MLV Series

The outer dimensions of this solenoid diaphragm valve are φ30.0 x 57.2 mm. The PTFE machined diaphragm has a high chemical compatibility. The port connection can be selected from M8, 5/16-24UNF, Rc1/8 and 1/8-27NPT.

Orifice diameter	2.5 mm
IN port pressure	-40 ~ 200 kPa
Power consumption	3.1 ~ 4.4 W
Outer dimensions	φ30.0 x 57.2 mm

ACV Series

This is a 2-way solenoid valve with a moulded actuator, a molded body and an elastomer diaphragm. The port connections are the hose barbs to which silicone tubing can be connected directly.

Orifice diameter	3.0 mm
IN port pressure	-55 ~ 100 kPa
Power consumption	5.0 W
Outer dimensions	34.0 x 47.0 x 62.0 mm

YTV Series

The outer dimensions of this diaphragm valve are 40 x 40 x 90 mm. A PTFE machined diaphragm is used in this solenoid valve. 2-way and 3-way versions are available for this series.

Orifice diameter	3.0 mm
IN port pressure	-100 ~ 150 kPa
Power consumption	5.0 W
Outer dimensions	40.0 x 50.0 x 77.0 mm

WBV Series

Suitable for dialysis machines & waste lines. Can be mounted directly on a balance chamber. An improved internal structure enables the following features in this valve.

1. Compact size with a larger flow
2. Bi-directional - up to 300 kPa for both IN and OUT ports

Orifice diameter	4.0 mm
IN port pressure	-90 ~ 300 kPa
Power consumption	5.8 W
Outer dimensions	48 ~ 57 x 33 x 84.8 mm

NPV Series

This is a solenoid-driven proportional diaphragm valve for chemical fluids whose flow is controllable by changing the input voltage. It has a comparatively large orifice diameter of 4 mm. It has excellent chemical compatibility because PTFE (teflon) is used for all the wetted parts.

Orifice diameter	4.0 mm
IN port pressure	0 ~ 100 kPa
Power consumption	7 W (at 24 VDC)
Outer dimensions	φ40 × **L** 95 mm

NRV Series

The orifice diameter of this diaphragm valve is φ4-6 mm. Valve bodies machined from a variety of materials are available. Select the port connection from Rc1/4, 1/4-15NPT, Rc1/8, 1/8-27NPT.

Orifice diameter	4.0 ~ 6.0 mm
IN port pressure	-90 ~ 200 kPa
Power consumption	5.5 ~ 10.0 W
Outer dimensions	φ44.0 ~ 45.0 x 80.0 ~ 84.0 mm

PKV Series

This is a diaphragm valve with a wide range of orifice diameters from φ3.5 - 6 mm and outer dimensions of 66.0 x 45.0 x 75.0 mm. The standard materials are PEEK for the body and PTFE for the diaphragm.

Orifice diameter	4.0 ~ 6.0 mm
IN port pressure	-90 ~ 200 kPa
Power consumption	6.0 ~ 21.0 W
Outer dimensions	40.0 x 42.0 x 71.0 mm

HTV Series

This 2way diaphragm isolation valve has a large orifice diameter of φ10.0 mm. The PTFE machined diaphragm used for this model has a high chemical compatibility.

Orifice diameter	10.0 mm
IN port pressure	-90 ~ 100 kPa
Power consumption	10 W
Outer dimensions	60.0 x 75.0 x 124.0 mm

Solenoid ISOLATION Valves - nonDiaphram

UDV Series

This is a main model among our non-diaphragm valves. It is a 2 mm orifice-size class valve and both types of a moulded plastic body and a stainless steel body are available.See more details.

Orifice diameter	2.0 mm
IN port pressure	0 ~ 600 kPa
Power consumption	2.4 ~ 3.1 W
Outer dimensions	25 x 22 x 52.2 mm

Metering PUMPS - Diaphram

MCP Series

This is a diaphragm pump with a maximum pumped volume of 50 µl. The adjustable range of pumped volume per shot is 5 - 50µl. See more details.

Adjustable range of pumped volume	5 ~ 50µl
Max. operating frequency	4 Hz
Outer dimensions	30.0 x 26 x 63.5 mm

MLP Series

This is a diaphragm pump with a maximum pumped volume of 200 µl. The adjustable range of pumped volume per shot is 10 - 200µl.See more details.

Adjustable range of pumped volume	10 ~ 200 µl
Max. operating frequency	2 Hz
Outer dimensions	36.0 x 50.0 x 70.0 mm

PKP Series

This is a diaphragm pump with a maximum pumped volume of 500 µl. The adjustable range of pumped volume per shot is 50 - 500µl. See more details.

Adjustable range of pumped volume	50 ~ 500 µl
Max. operating frequency	2 Hz
Outer dimensions	36.0 x 43.0 x 78.0 mm

MiniPERISTALTIC PUMPS

RP-TX Series

RP-TX Series has the lowest level of flow for a peristaltic pump on the market. Its pump head, including tubing, is replaceable. An easy-to-use controller is available upon request (sold separately).See more details.

Flow rate	0.1 ~ 40 µl/min
Motor	Stepper motor
Tubing material	Silicone
Outer dimensions	30.0 x 12.0 x 21.5 mm

RP-Q1 Series

This is a peristaltic pump so compact that it can sit on the tip of a finger.It is small and reasonably priced, making it an easy-to-use pump.See more details.

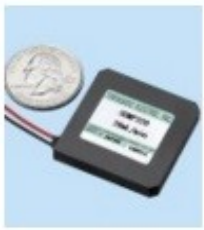
Flow rate	0.2 or 0.45 ml/min
Motor	DC geared motor
Tubing material	Norprene,Silicone
Outer dimensions	30.0 x 12.0 x 14.0 mm

Piezoelectric Micro PUMPS

Standard type

This is a miniature, slim and lightweight diaphragm micro pump driven by piezoelectric element. The driving voltage and frequency for operating the piezoelectric micro pump can be arbitrarily set by an external control signal, which enables a flow rate control. It is very suitable for integration into small equipment. See more details.

Standard flow rate	3 or 7 ml/min
Max. pump pressure	45 kPa
Outer dimensions	25 x 25 x 4.8 mm



Large flow type

This is a diaphragm micro pump driven by piezoelectric element, which is a larger size than the standard type so as to pump a larger flow rate. See more details.

Standard flow rate	20 ml/min
Max. pump pressure	35 kPa
Outer dimensions	33 x 33 x 5.5 mm

Built-in driver type

This is a piezoelectric micro pump with a built-in driver board. The driver board enables the delivery of a constant flow rate by operating the pump at a constant voltage and constant frequency signal generated by a direct current voltage supply without making the particular waveform for the piezoelectric element. Flow rate and pressure range are not able to be adjusted. See more details.

Standard flow rate	3 or 7 ml/min
Max. pump pressure	40 kPa
Outer dimensions	25 x 25 x 8.2 mm

Highly inert type

This type uses highly chemically inert materials such as PEEK and Perfluoroelastomer etc. for the wetted parts in order to improve its chemical inertness above that of the standard type. It is most suitable for the delivery of chemical reagents and solvents etc. See more details.

Standard flow rate	15 ml/min
Max. pump pressure	25 kPa
Outer dimensions	33 x 33 x 9 mm

Driver and Controller
for Piezoelectric Micro PUMPS

Driver Board MPD-200A

The MPD-200A is a thin, compact and lightweight driver board. It is a high voltage circuit board, specifically designed for the piezoelectric micro pumps. From a regular 5 VDC input, it readily generates approximately the 250 Vp-p, 40 Hz necessary for driving the pump.

Item	Specifications
Input voltage	5 VDC ±5%
Output frequency	1 ~ 60 Hz
Output voltage	50 ~ 340 Vp-p
The maximum number of pumps	2 pieces
External dimensions	30 x 30 x 18 mm
Weight	Approximately 9 g

Controller MPC-200A

The MPC-200A is a compact and lightweight controller that can provide the high voltage power output necessary to drive the piezoelectric micro pumps. It is user-friendly with a front panel digital display for configuring the output voltage and output frequency, and a memory function to store the most recently used settings.

Item	Specifications
Input voltage	5 VDC ±5%
Output frequency	1 ~ 60 Hz
Output voltage	60 ~ 300 Vp-p
The maximum number of pumps	2 pieces
External dimensions	75 x 30 x 89 mm
Weight	Approximately 140 g
Attachment	AC adapter (100 ~ 240 VAC)

Accessory for Piezoelectric Micro Pumps

Tygon® tubing (Accessory, sold separetely)

Material： Tygon® 2001 (for use with methanol, water and most general uses)
Size: I.D. 0.79 mm (for SDMP302 and SDMP302D), I.D. 1.59 mm (for SDMP306 and SDMP306D)

Material： Tygon® 2375 (for use with methanol, water and most general uses)
I.D. 2.38 mm (for SDMP320 and APP-20KG)

*Note: TYGON® is a trademark of Saint-Gobain Performance Plastics.
*Note : If the flow is decreased with the above tubing, please use the larger size tubing.

Fittings for PTFE Tubing

SM Series
This is a flare type fitting for a flat bottom thread. Simply insert the flange-shaped moulded seal part ("Seal Joint") into the end of the tubing for use. See more details.

Tubing I.D.	1.0 ~ 4.0 mm
Tubing O.D.	2.0 ~ 5.0 mm
Thread size	M6, 1/4-28UNF, M8 P=1, 5/16-24UNF, M5

FM Series
It is necessary for the user to enlarge the end of the PTFE tubing into a trumpet shape before using this fitting. See more details.

Tubing I.D.	1.0 ~ 4.0 mm
Tubing O.D.	2.0 ~ 5.0 mm
Thread size	M6, 1/4-28UNF, M8 P=1, 5/16-24UNF, M5

SMC Series
This is a straight fitting for a taper pipe thread. It is made from machined fluoropolymers, so it has high chemical compatibility. See more details.

Tubing I.D.	1.0 ~ 10.0 mm
Tubing O.D.	2.0 ~ 12.0 mm
Thread size	R1/8, R1/4, R3/8

>

SML Series
This is an elbow fitting for a taper pipe thread. It is useful for limited plumbing space. See more details.

Tubing I.D.	1.0 ~ 10.0 mm
Tubing O.D.	2.0 ~ 12.0 mm
Thread size	R1/8, R1/4, R3/8

>

Accessory for Piezoelectric Micro Pumps

Tygon® tubing (Accessory, sold separetely)

Material： Tygon® 2001 (for use with methanol, water and most general uses)
Size: I.D. 0.79 mm (for SDMP302 and SDMP302D), I.D. 1.59 mm (for SDMP306 and SDMP306D)

Material： Tygon® 2375 (for use with methanol, water and most general uses)
I.D. 2.38 mm (for SDMP320 and APP-20KG)

*Note: TYGON® is a trademark of Saint-Gobain Performance Plastics.
*Note : If the flow is decreased with the above tubing, please use the larger size tubing.

Manifolds - Solenoid Valves

Standard Manifolds

Our standard range consists of line-type manifolds mounted with EXV series, STV series and WTA series valves. These products achieve a shorter delivery time compared to custom-made manifold valve units. See more details.

Custom Manifolds

Using our precise processing machines, we manufacture Custom Manifolds according to your requirements. In addition to solenoid valves and pumps, sensors, filters, or fittings can also be mounted on the Custom Manifolds. We are pleased to offer you manifolds with flow channel configuration suitable to applications.
See more details.

Bonded PTFE Manifold

This is a 100% PTFE manifold, with internal channels made by the bonding of two layers of modified PTFE. The internal channels are pre-machined on the bonding surfaces. Due to excellent chemical resistance, this product is compatible with a wide range of fluids. See more details.

Our standard product range consists of in line manifolds mounted with EXV series, STV series and WTA series valves. These products achieve a shorter delivery time compared to customized manifold valve units.

Characteristics of Standard Manifolds

Chemical compatibility

The manifold is made from PEEK, giving it a high level of chemical resistance. FPM and perfluoroelastomer can be chosen for the sealing material.

Channel configuration

A flow channel configuration with a common inlet or a common outlet is available. Please choose M6 or 1/4-28UNF for the port connections.

Number of mounted valves

From 2 to 6 valves can be mounted on the manifold, according to your requirements.

For details of the mounted valves

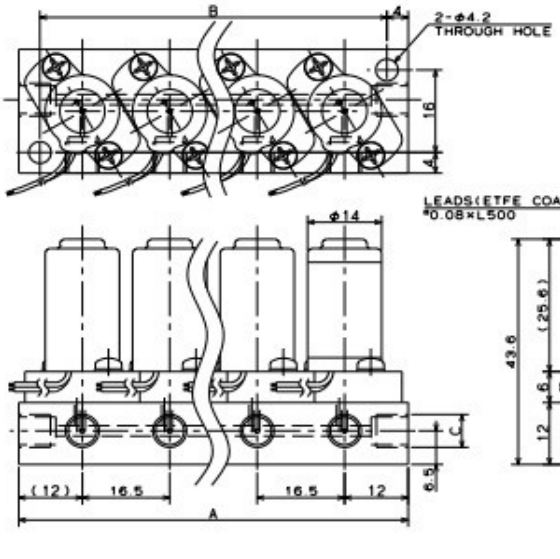
Please see the drawings at the links below.

EXV Series: EXV-2X-XXX

STV Series: STV-2K-XXIX

Manifolds - Solenoid Valves

FOR REFERENCE ONLY



SOLENOID VALVE

SPECIFICATIONS for MODEL EXV-2X-XXX

ORIFICE DIAMETER	:	1mm
PORT CONNECTION	:	M6. 1/4-28UNF
OPERATING PRESSURE RANGE	:	IN -20 ~ 200kPa (-150mmHg ~ 2bar)
FLUID MEDIA	:	FLUIDS CHEMICALLY COMPATIBLE WITH MATERIALS BELOW
MEDIA TEMPERATURE RANGE	:	5 ~ 40℃
AMBIENT TEMPERATURE RANGE	:	5 ~ 40℃
RATED VOLTAGE	:	12VDC. 24VDC
POWER CONSUMPTION	:	2.8W×n
DUTY CYCLE	:	CONTINUOUS
COIL TEMPERATURE INCREASE	:	MAX. 110℃ FROM ROOM TEMPERATURE
INSULATION CLASS	:	CLASS F
DIELECTRIC STRENGTH	:	1500VAC FOR 60s

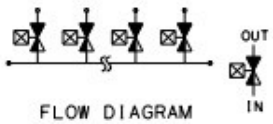
NOTES

EXV-2x-xxx

BODY MATERIAL		NUMBER OF VALVES	PORT CONNECTION		SOFT SEALER MATERIAL	
K	PEEK	2	M	M6	F	FPM
R	PPS	3	U	1/4-28UNF	G	DAIEL●PERFLUOR
		4				
		5				
		6				

DIMENSION TABLE

n	DIMENSION		
	A	B	C
2	40.5	32.5	M6. 1/4-28UNF
3	57.0	49.0	M6. 1/4-28UNF
4	73.5	65.5	M6. 1/4-28UNF
5	90.0	80.0	M6. 1/4-28UNF
6	106.5	88.5	M6. 1/4-28UNF



FLOW DIAGRAM

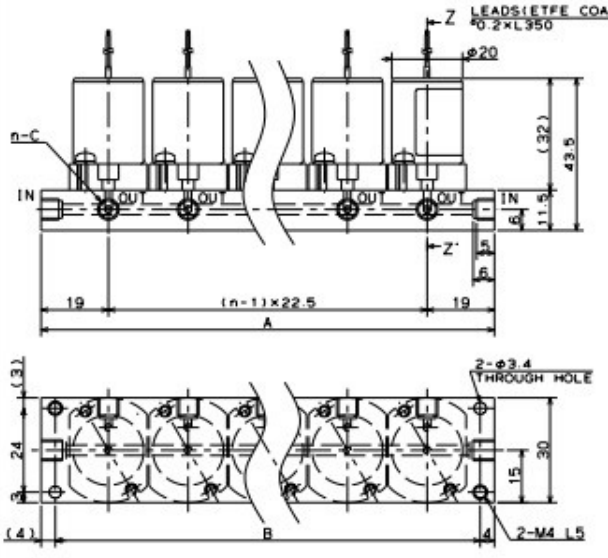
WETTED MATERIALS

PART NAME	MATERIAL	REQD.	NOTE
DIAPHRAGM	PTFE	n	
SOFT SEAL	FPM/DAIEL●PERFLUOR	n	
GASKET	FPM/DAIEL●PERFLUOR	n	
VALVE BODY	PEEK/PPS	n	
MANIFLOD	PEEK	1	

SOLENOID VALVE

EXV-2X-XXX

FOR REFERENCE ONLY



SOLENOID VALVE

SPECIFICATIONS for MODEL STV-2K-XXIX

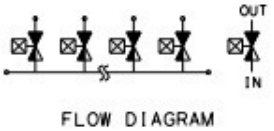
ORIFICE DIAMETER	:	1.2mm
PORT CONNECTION	:	M6. 1/4-28UNF
OPERATING PRESSURE RANGE	:	IN -50 ~ 200kPa (-375mmHg ~ 2bar)
		OUT 0 ~ 50kPa (0 ~ 0.5bar)
FLUID MEDIA	:	FLUIDS CHEMICALLY COMPATIBLE WITH MATERIALS BELOW
MEDIA TEMPERATURE RANGE	:	5 ~ 50℃
AMBIENT TEMPERATURE RANGE	:	5 ~ 50℃
RATED VOLTAGE	:	12VDC. 24VDC
POWER CONSUMPTION	:	2.5W×n
DUTY CYCLE	:	CONTINUOUS
COIL TEMPERATURE INCREASE	:	MAX. 80℃ FROM ROOM TEMPERATURE
INSULATION CLASS	:	CLASS B
DIELECTRIC STRENGTH	:	1500VAC FOR 60s

STV-2K-xxIx

NUMBER OF VALVES	PORT CONNECTION		COMMON INLET SOFT SEAL MATERIAL	
2	M	M6	F	FPM
3	U	1/4-28UNF	G	DAIEL●PERFLUOR
4				
5				
6				

DIMENTION TABLE

n	DIMENTIONS		
	A	B	C
2	60.5	52.5	M6. 1/4-28UNF
3	83.0	75.0	M6. 1/4-28UNF
4	105.5	97.5	M6. 1/4-28UNF
5	128.0	120.0	M6. 1/4-28UNF
6	150.5	142.5	M6. 1/4-28UNF



FLOW DIAGRAM

WETTED MATERIALS

PART NAME	MATERIAL	REQD.	NOTE
DIAPHRAGM	PTFE	n	
SOFT SEAL	FPM/DAIEL●PERFLUOR	n	
VALVE BODY	PEEK	n	
O RING	FPM/DAIEL●PERFLUOR	2n	
MANIFLOD	PEEK	1	

SOLENOID VALVE

STV-2K-XXIX

Manifolds - Custom

We not only provide our customers with components such as valves, pumps etc., but also design and manufacture Custom Manifolds to satisfy our customers' requirements. These manifolds contribute to decrease in plumbing and minimization of the internal volume. Depending on the manufacturing technologies a manifold with channels of the minimum width as narrow as 0.2 mm is also possible to provide.

Chemical Compatibility

Suitable, highly chemically inert materials such as PEEK, PPS, PTFE, etc can be chosen for the manifold.

Channel Configuration

Flow channel configurations with a common inlet or a common outlet, and a radial type or a line type are available according to your requirements. Through the use of a bonding technique, 3D flow channel configurations that cannot be produced by machining process are possible.

Number of Mounted Valves

The number of mounted valves can be selected. We have the experience of manufacturing a manifold unit with 192 valves.

Manifolds - Custom Types

Built-in Type

The valve mechanism is built into the manifold to make a single integrated unit.

【Advantages】

Easy to design an economical model in comparison to a valve mounted type as the structure is simple.

Fewer parts are used, which contributes to a compact size.

【Disadvantages】

Mounted valves are unable to be exchanged for repair.

Unsuitable for complicated channel configurations.

Valve Mounted Type

Multiple valves are mounted on a manifold in which only the channels are machined. Gaskets (mainly elastomers) are used for the channel connection parts. (Advantages) Mounted valves can be replaced for repair. Suitable for a manifold unit using lots of valves. The photo is an example of a manifold mounted with 196 valves.

【Advantages】

Mounted valves can be replaced for repair.

Suitable for a manifold unit using lots of valves.

The photo is an example of a manifold mounted with 196 vales.

Can combine bonded chips, manifolds made of special materials such as ceramics, and other components such as pumps etc. and various structures of manifold can be produced.

【Disadvantages】

Gaskets (mainly elastomers) are necessary. Therefore, chemical compatibility may be restricted.

In-line Type

By directly connecting each port of multiple valves in line, a flow channel is produced. A manifold block is not used.

【Advantages】

Manifold block is not used meaning less space is required.

Valves are able to be replaced for repair.

【Disadvantages】

Gaskets (mainly elastomers) are necessary for the connecting parts. Therefore, chemical compatibility may be restricted.

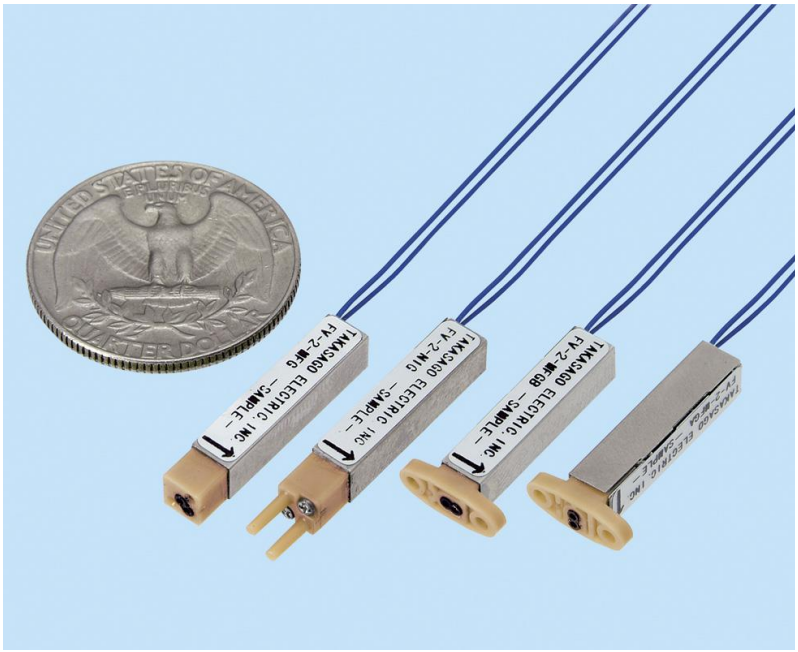
Basically, only a line-type of flow configuration is available.

Unsuitable for a manifold unit using many valves.

(Patented in the United States)

Ultra-small Diaphragm-isolation Solenoid Valve

FV Series



1. 4.2mm square: 4.2×4.2×23.1mm*1

An innovative and groundbreaking ultra-small solenoid valve - can be mounted in the smallest of spaces, minimizing the manifold size and shortening the length of flow paths.

*1 Dimensions for FV-2-MFG, not including wire connections

2. Diaphragm valve

Excellent chemical resistance – PEEK and perfluoroelastomer are used for wetted materials (materials can be changed according to your requirements).

3. Internal volume only 1.1µl*2

Through pursuing miniaturization to the uttermost limits, internal volume is now only 1.1µl – contributes to reductions in reagent and sample quantities and improvements in analysis accuracy.

*2：value for FV-2-MFGA(B). FV-2-N1G: 4.3㎕、FV-2-MFG: 1.5㎕

REMARKS

The FLV series is a model that uses a latching solenoid. This FV series is a normal solenoid valve. This product doesn't require a polarity change, which is necessary for the actuation of the FLV series.

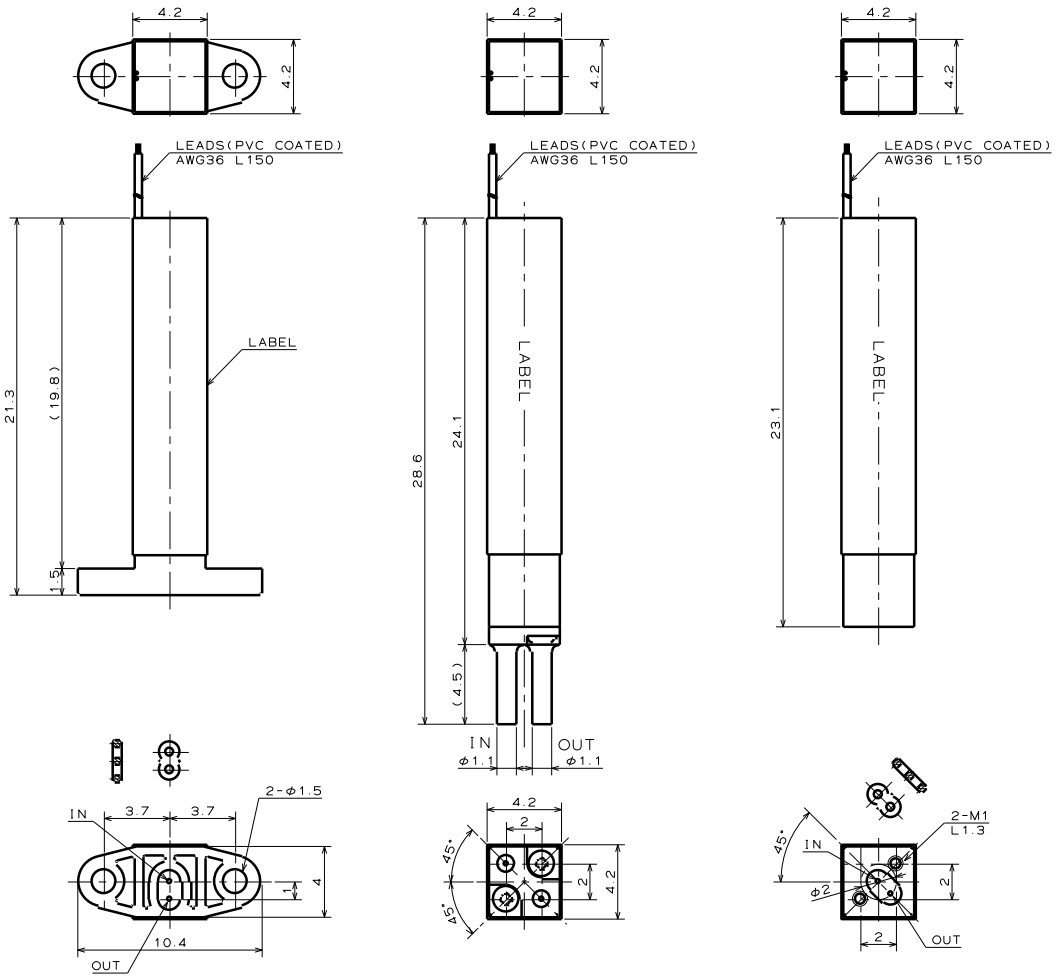
Note: Details including specifications may change without notification

Specifications

Model number	FV-2-N1G	FV-2-MFGA(B)*1	FV-2-MFG
Type	2 Way N.C.		
Orifice Diameter	0.4mm		
Port Connection	Hose Barb	Gasket	
Operating Pressure Range	IN:0 - 100kPa		
	OUT:0 - 50kPa		
Fluid Temp. Range	10 - 50°C		
Ambient Temp. Range	10 - 50°C		
Voltage	5VDC		
Power Consumption	1W		
Duty Cycle	Intermittent ED=40%		
Coil Temp. Increase	Max. 80 °C From Ambient Temperature (when energized for 1.5 minutes at rated voltage)		
Max. Energizing Time	1.5 minutes		
Diaphragm Material	Perfluoroelastomer (Optionally FPM)		
Body Material	PEEK (Optionally PPS)		
Hose Barb Material	PEEK (Optionally PPS)	—	

*1 A and B have a 90° difference in port orientation.

Dimensions

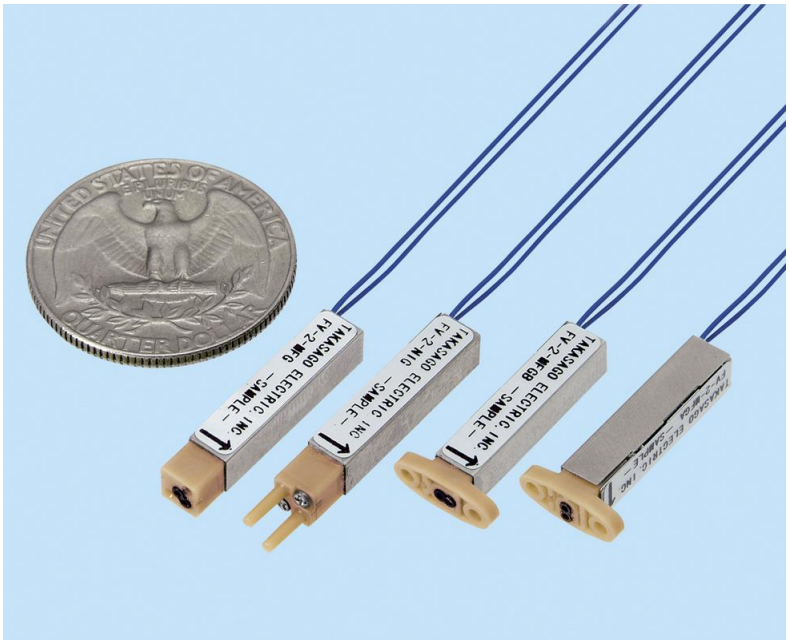


FV-2-MFGA FV-2-N1G FV-2-MFG

(Patented in the United States)

Ultra-small Diaphragm-isolation Latching Solenoid Valve

FLV Series



1. 4.2mm square: 4.2×4.2×23.1mm*1

An innovative and groundbreaking ultra-small solenoid valve - can be mounted in the smallest of spaces, minimizing the manifold size and shortening the length of flow paths.

*1 Dimensions for FLV-2-MFG, not including wire connections

2. Diaphragm valve

Excellent chemical resistance – PEEK and Perfluoroelastomer are used for wetted materials (materials can be changed according to your requirements).

3. Internal volume only 1.1µl*2

Through pursuing miniaturization to the uttermost limits, internal volume is now only 1.1µl – contributes to reductions in reagent and sample quantities and improvements in analysis accuracy.

*2：value for FLV-2-MFGA(B). FLV-2-N1G: 4.3㎕、FLV-2-MFG: 1.5㎕

4. Latching Solenoid Valve

The open status of valve is maintained by magnetic force. No energization is required to maintain the valve status. Contributes to energy saving and lower heat generation through energization.

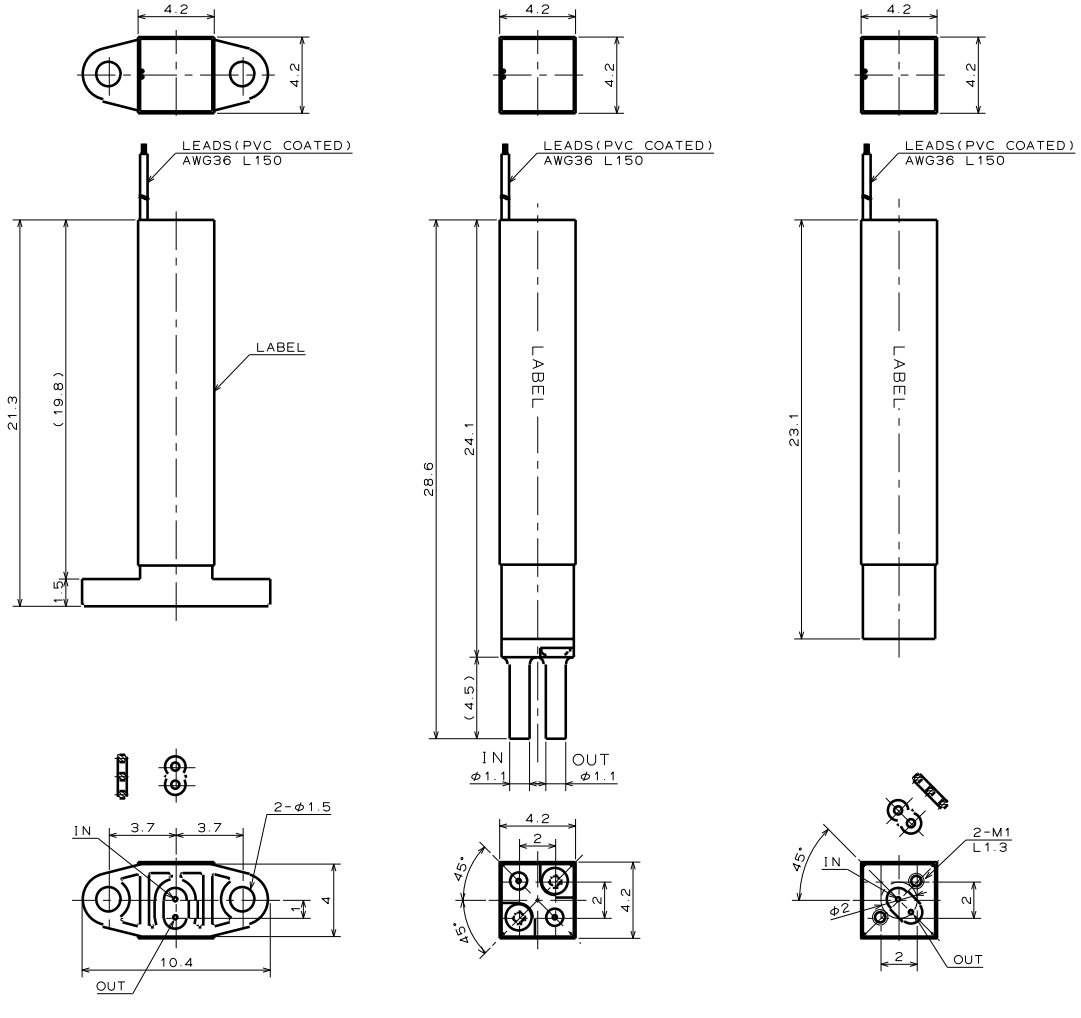
See page 3.

Specifications

Model number	FLV-2-N1G	FLV-2-MFGA(B)*1	FLV-2-MFG
Type	2 Way		
Orifice Diameter	0.4mm		
Port Connection	Hose Barb	Gasket	
Coil Type	Latch Type Solenoid		
Operating Pressure Range	IN:0 – 100kPa		
	OUT:0 – 50kPa		
Fluid Temp. Range	10 - 50°C		
Ambient Temp. Range	10 - 50°C		
Voltage	12VDC		
Power Consumption	2.4W (When energized)		
Diaphragm Material	Perfluoroelastomer (Optionally FPM)		
Body Material	PEEK		
Hose Barb Material	PEEK	—	

*1 A and B have a 90° difference in port orientation.

Dimensions



FLV-2-MFGA FLV-2-N1G FLV-2-MFG

Latching Solenoid Valve

In the case of a normally closed type of conventional solenoid valve, continuous energization is required to maintain open status. The latching solenoid doesn't require a power supply for the purpose of maintaining open status through the utilization of a permanent magnet.

Merits of the Latching Solenoid Valve

1. Energy saving

Valve does not require energizing to maintain its state, so for applications where a conventional valve would require long periods of energization the economical benefits are significant.

Note: Power is required during changing of state (Open to Closed, Closed to Open). Also, it is necessary to reverse the polarity of the current to change the state.

2. Low heat generation, decreased thermal influence on surroundings

As energization is not required to maintain state, the heat generation associated with energization is reduced. Suitable for analytical fields and other applications where the effect of temperature on a fluid is a concern.

Slim Diaphragm-isolated Solenoid Valve

KV Series

1. 6mm Slim Design

This small valve enables you to reduce not only the installation space but also internal pipe length of your manifold by making it possible to mount at 6mm intervals.

2. Capacity for Bilateral Connection

Easy to make manifolds (see page 3)

3. Small Internal Volume

Only 10 micro liters (each port)

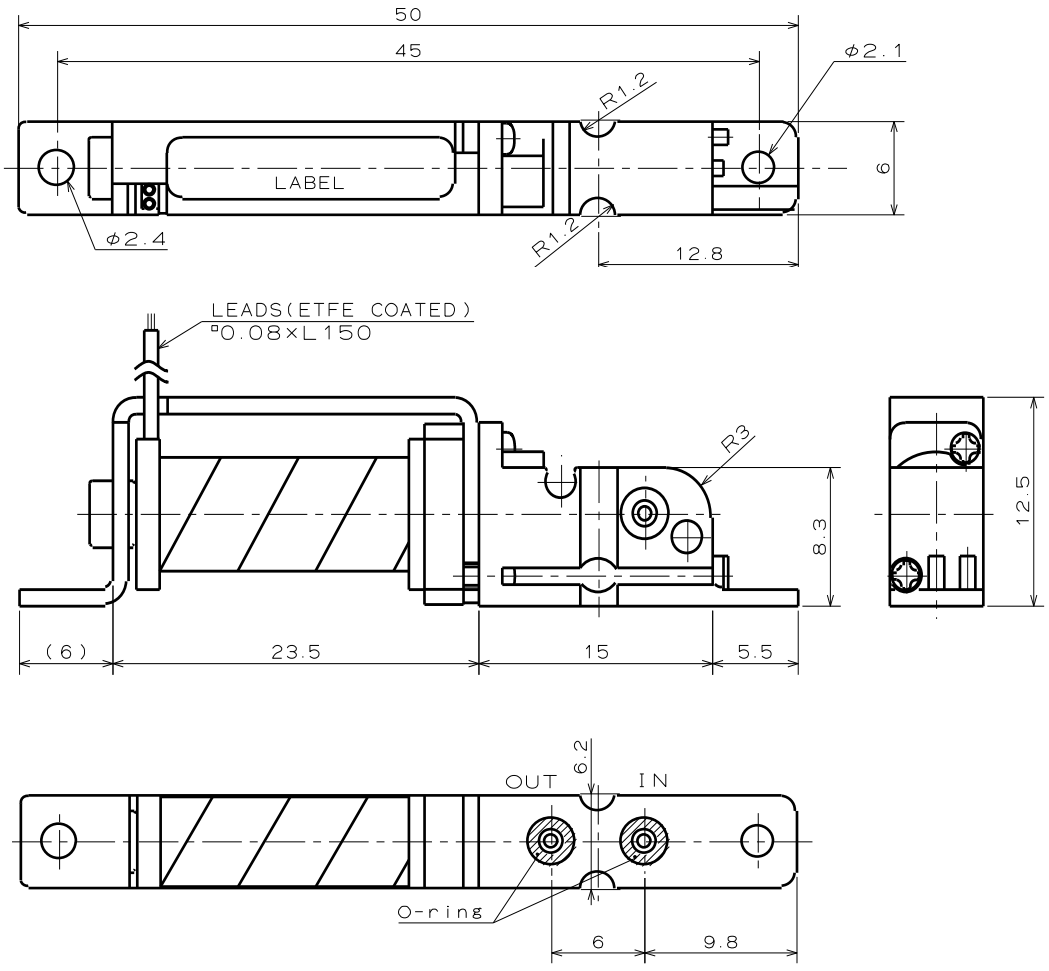
4. Excellent Chemical Resistance

PEEK molded body and Perfluoroelastomer diaphragm

Specifications

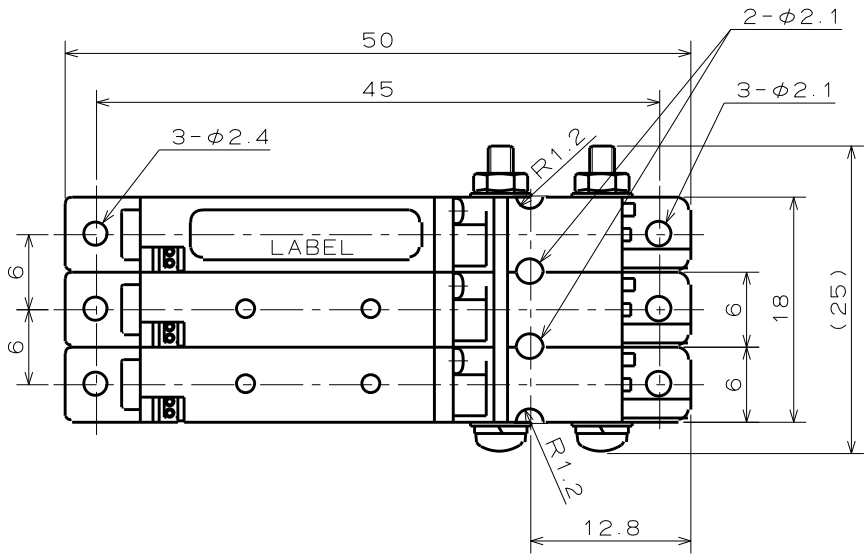
Model Number	KV-2-NCG	
Type	2-way N. C.	
Orifice Diameter	0.8mm	
Port Connection	O-ring Seal	
Operating Pressure Range	IN: 0 - 100kPa OUT: 0 - 50kPa	
Fluid Temp. Range	0 – 50 °C	
Ambient Temp. Range	0 – 40 °C	
Voltage	12VDC, 24VDC	
Power Consumption	1.8W	
Duty Cycle	Continuous Duty	
Coil Temp. Increase	Max. 90 °C From Ambient Temperature	
Internal Volume	Inlet: 10 micro liters Outlet: 10 micro liters	
Insulation Class	Class B	
Dielectric Strength	1500VAC for 60s	
Weight	8g	
Wetted Materials	Diaphragm	Perfluoroelastomer
	O-ring	Perfluoroelastomer
	Body	PEEK (poly ether ether ketone)

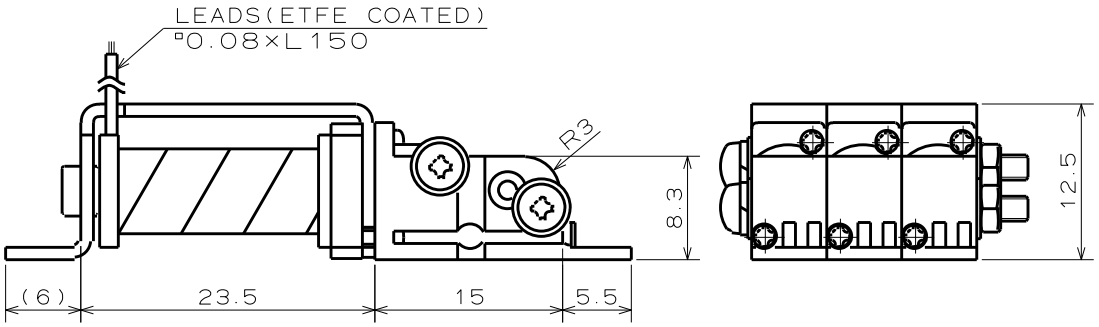
Dimensions

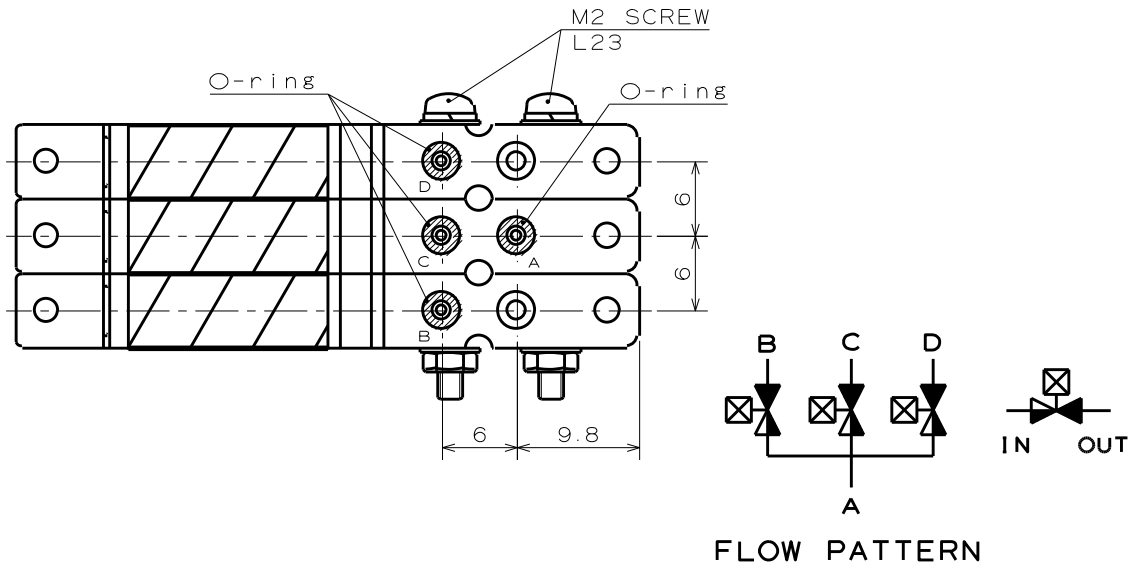


Example of Manifold Configuration

3-valve manifold clamped by screws







Ultra-Small Inert Solenoid Valve

LV Series

1. This manifold mountable diaphragm valve is just 8.9 mm x 10.4 mm (Width X Depth), giving a footprint of less than 1 cm^2. Because it can be mounted in the smallest of spaces, miniaturization of manifolds and shortening the flow-path between ports are possible.

2. The internal volume is just 3.3µl on the inlet side, and it is 8.3µl on the outlet side.

3. Shortening the flow-path between ports helps to reduce the volume of samples and reagents in use, whilst also greatly increasing analysis accuracy.

4. The body material is PEEK and the diaphragm material is perfluoroelastomer meaning this valve is highly chemically inert. (The body material can be changed according to your preferences.)

The specifications of the product may be changed without a notice.

Chemically Inert Moulded Body Solenoid Valve

PKV Series

2-way hose barb type 3-way threaded type (New line-up)

Moulded 3-way PKV series valve now available

Features

ϕ4-6mm is its orifice diameter, which enables it to be used in a wide-range of fluid control applications for various kinds of analysis, IVD diagnostics, medical, and other life science instruments, etc., which necessitate such large orifice. An elastomer is employed for the seal material, reducing damage to the valve seat by foreign matters in the fluid and the associated leak trouble.

Specifications

Model Number	PKV-2(21)×-B×××	PKV-02(021)×-D×××	PKV-3(31)×-B×××	PKV-3(31)×-D×××
Type	2-way N.C.	2-way N.O.	3-way	
Orifice Diameter	4 mm equiv.	6 mm equiv.	4 mm equiv.	6 mm equiv.
Port Connection	Rc1/8, Rc1/4, 1/8-27NPT, 1/4-18NPT, (※) hose barb <※ only available for 2-way>			
Operating Pressure Range	IN: -90 ~ 200 kPa OUT: 0 ~ 50 kPa	IN: -50 ~ 200 kPa OUT: 0 ~ 50 kPa	COM: -90 ~ 100 kPa N.C., N.O.: 0 ~ 50 kPa	COM: -50 ~ 100 kPa N.C., N.O.: 0 ~ 50 kPa
Fluid Temp. Range	0 ~ 60 °C (5 ~ 60 °C in the case the seal material is perfluoroelastomer)			
Ambient Temp. Range	0 ~ 60 °C	0 ~ 40 °C		
Rated Voltage	12VDC, 24VDC, 90VDC, 100VAC (50/60Hz, with a rectifier)			
Power Consumption	6 W	10 W		
Duty Cycle	Continuous			
Insulation Class	Class B			
Dielectric Strength	1500 VAC for 60 s			
Diaphragm Material	PTFE			
Seal Material	EPDM, FPM, Perfluoroelastomer			
Body Material	PPS, PEEK			

Note: Specifications etc. may be changed at any time without notice.

Model Number

PKV－××－××××

Type

02	2-way N.O.
021	2-way N.O.(※)
2	2-way N.C.
21	2-way N.C.(※)
3	3-way
31	3-way(※)

※Available only when seal material is "G".

Orifice

B	φ4mm
D	φ6mm

Body Material

R	PPS
K	PEEK

Port Connection

1/8	Rc1/8
1/4	Rc1/4
1/8N	1/8-27NPT
1/4N	1/4-18NPT
N2	Hose barb (only available for 2-way)

Installation Method

3-way	-	Frame and Underside M4 screws
	B	with mounting base
2-way	-	Frame M4 screws
	A	Underside M4 screws
	B	with mounting base

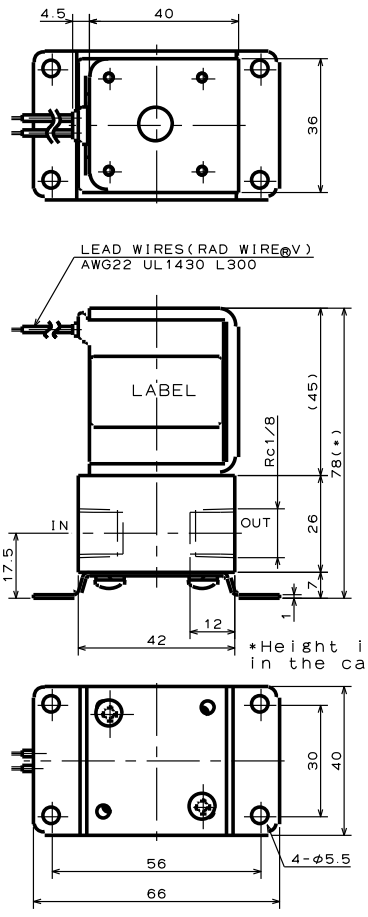
Seal Material

E	EPDM
F	FPM
G	Perfluoroelastomer

Dimensions

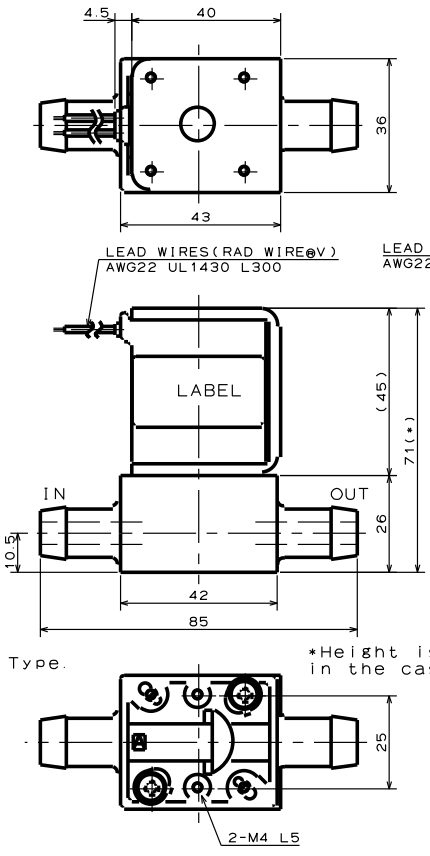
PKV-2K-B1/8GB

(2-way N.C., Rc1/8, with mounting base)



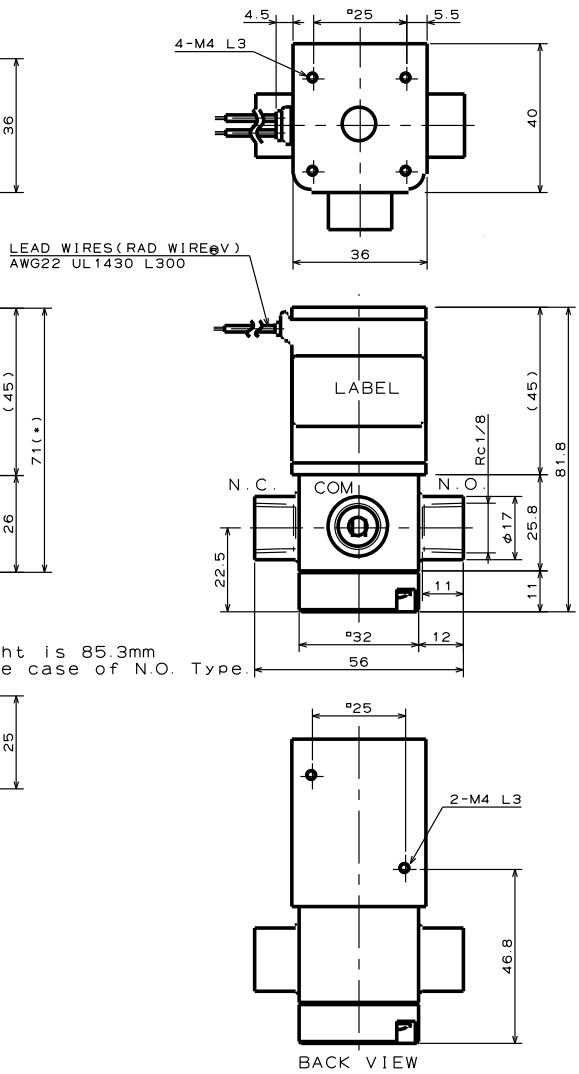
PKV-2K-DN2GA

(2-way N.C., Hose barb, Underside M4 screws)



PKV-3R-B1/8F

(3-way, Rc1/8, Frame and, Underside M4 screws)

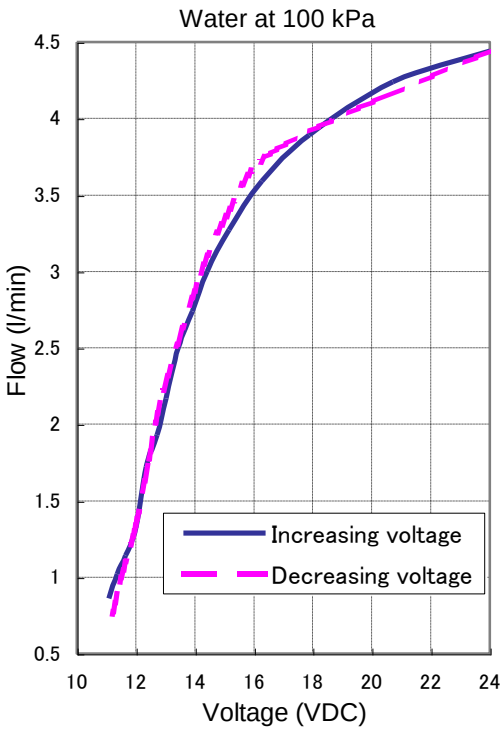


Proportional Diaphragm Valve
NPV Series

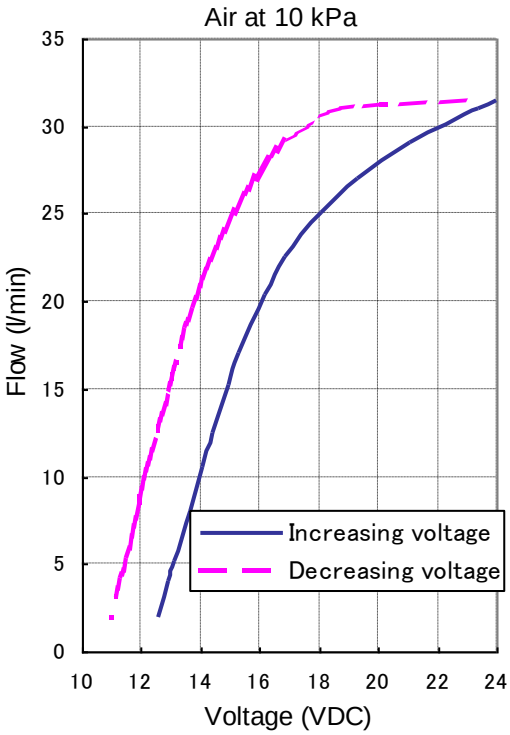
Features

- Has a very high chemical resistance due to all PTFE wetted parts.
- Flow controllable by changing the input voltage.
- Has a comparatively large orifice diameter of 4mm, which can cover a wide range of flows.

Flow Characteristics



* Volume flowing in 1 minute measured by gravimetry



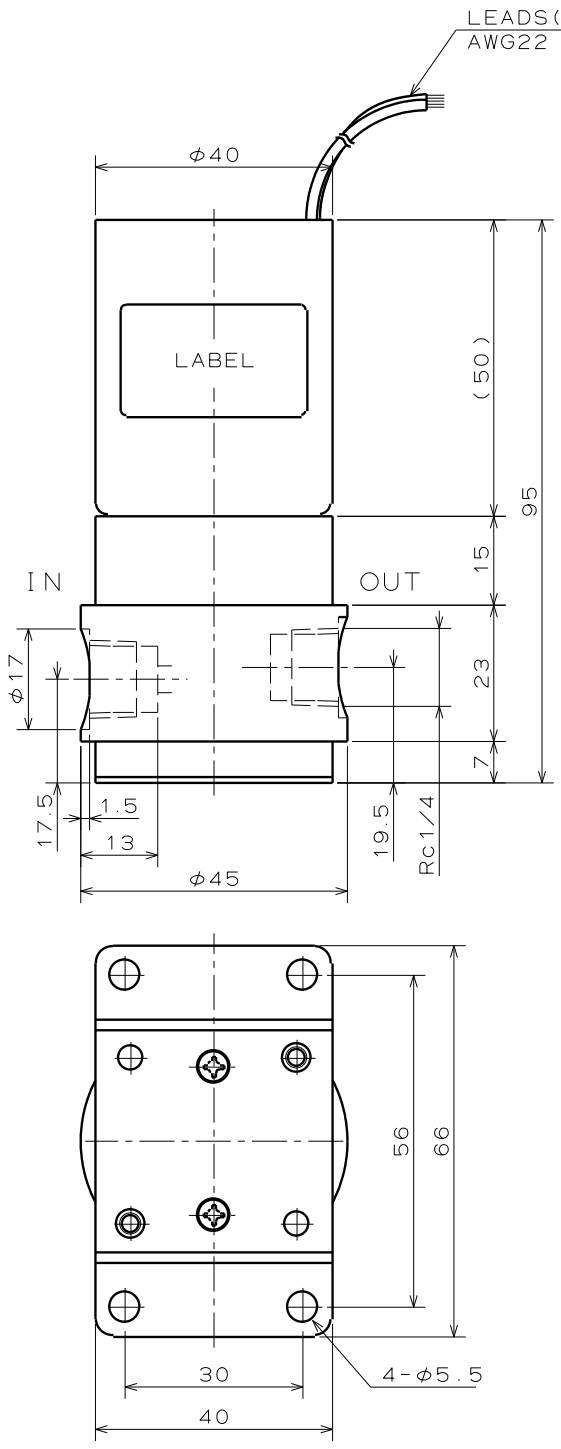
*Measured by a rotameter

Specifications

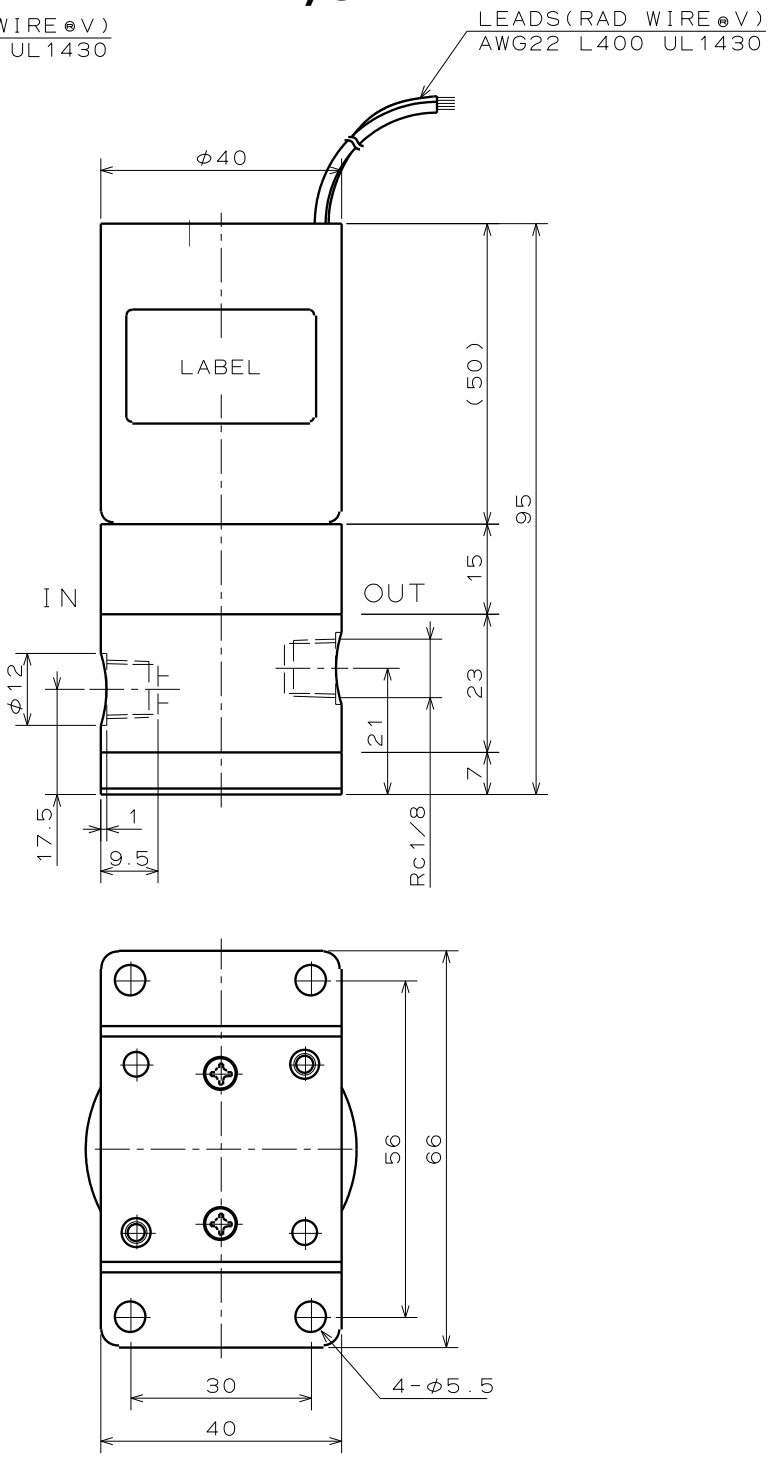
Model Number	NPV-4T1/8 (1/4)
Type	N.C. (Normally Closed) Proportional type
Orifice Diameter	4 mm
Wetted Material	PTFE (Valve Body, Diaphragm)
Operating Pressure Range	0 — 100 kPa
Flow Control Range	0 — 30 l/min (ΔP=10 kPa, Air) 0 — 4 l/min (ΔP=100 kPa, Water)
Power Consumption	7 W (at 24 VDC)

Dimensions

NPV-4T1/4



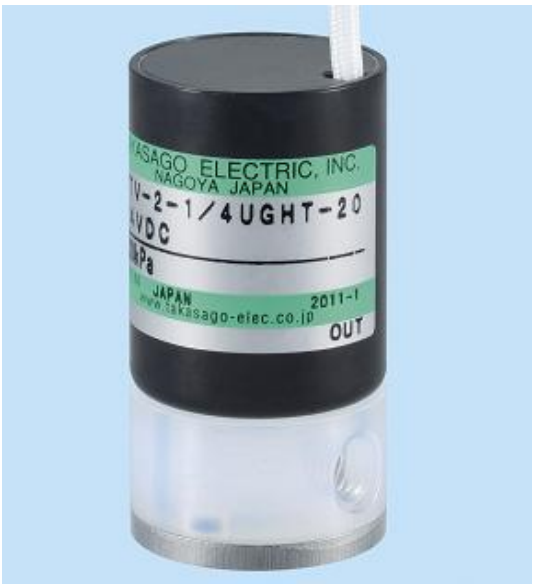
NPV-4T1/8



Note: Details including specifications may change without notification.

Chemically Inert Solenoid Valve

High-Temperature High-Pressure Valve



Up to 180°C & 800 kPa

Features

- Employs a unique mechanism to absorb the dimensional changes of the plastic body caused by temperature changes. No leakage with high temperature fluids.
- Most suitable for the case sulfuric acid is heated for COD Measurement.
- An elastomer is employed for the seal material, reducing damage to the valve seat by foreign matters in the fluid and associated leakage problem.

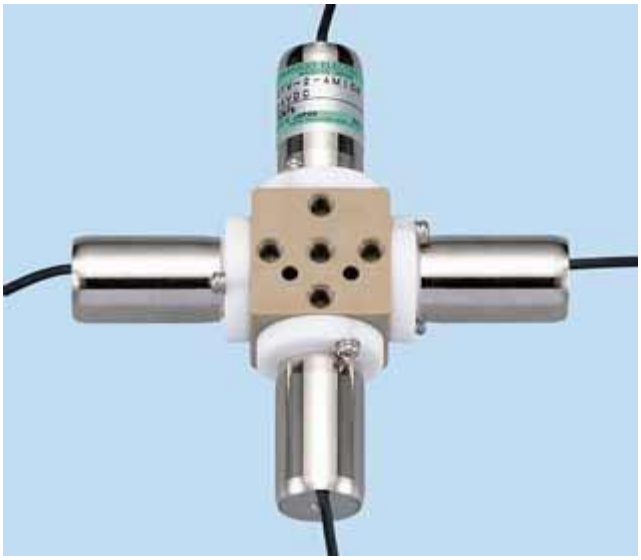
Specifications

Model Number	MTV-2-M6(1/4U)GHT-20
Type	2-way Normally Closed
Orifice Diameter	1.8 mm
Port Connection	M6 or 1/4-28UNF
Operating Pressure Range	IN:0 ~ 800 kPa OUT:0 ~ 100 kPa
Fluid Temp. Range	5 ~ 180 °C
Ambient Temp. Range	5 ~ 40 °C
Rated Voltage	12 or 24 VDC
Power Consumption	7.6 W
Duty Cycle	ED=20 %, Maximum ON time: 5 min (Continuous operation possible with an optional circuit)
Insulation Class	Class H
Dielectric Strength	1500 VAC for 60 s
Wetted Materials	PFA, Perfluoroelastomer
Outer Dimensions	ϕ25 x 47.5 mm

Note: Details including specifications may change without notification.

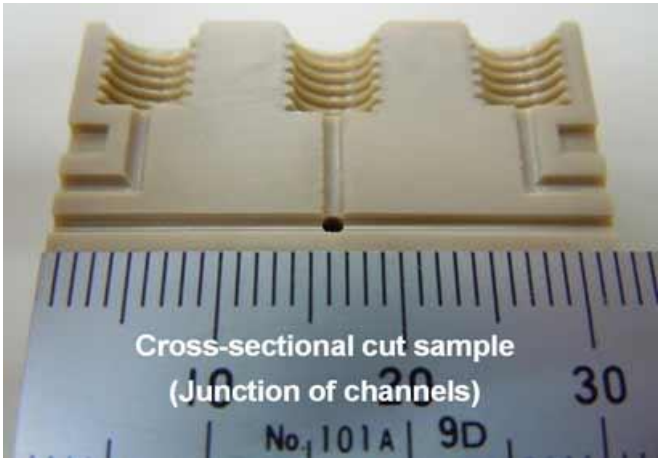
MOULDED QUATERNARY VALVE

CTV-2-4MICK



For Cost Reduction of a Gradient Unit in a LC

The Quaternary Valve is a kind of manifold valve where, due to its structure, the four channels from the valves all join at one point and connect to the common port. The lengths of the four channels are the same and the flow rate of each is almost identical. This structure is designed to maintain a high accuracy of the mixing ratio. The product is often used to mix several kinds of eluant gradually in a low pressure gradient unit in a liquid chromatograph. Since a high processing accuracy is required at the junction of the channels, the manifold bases of almost all conventional models, including those of other manufacturers, are manufactured by machining, which results in an increased cost. With advanced moulding techniques, TAKASAGO has achieved the moulding of this junction in PEEK, and we are pleased to provide our Quaternary Valve at prices conventional models cannot match.

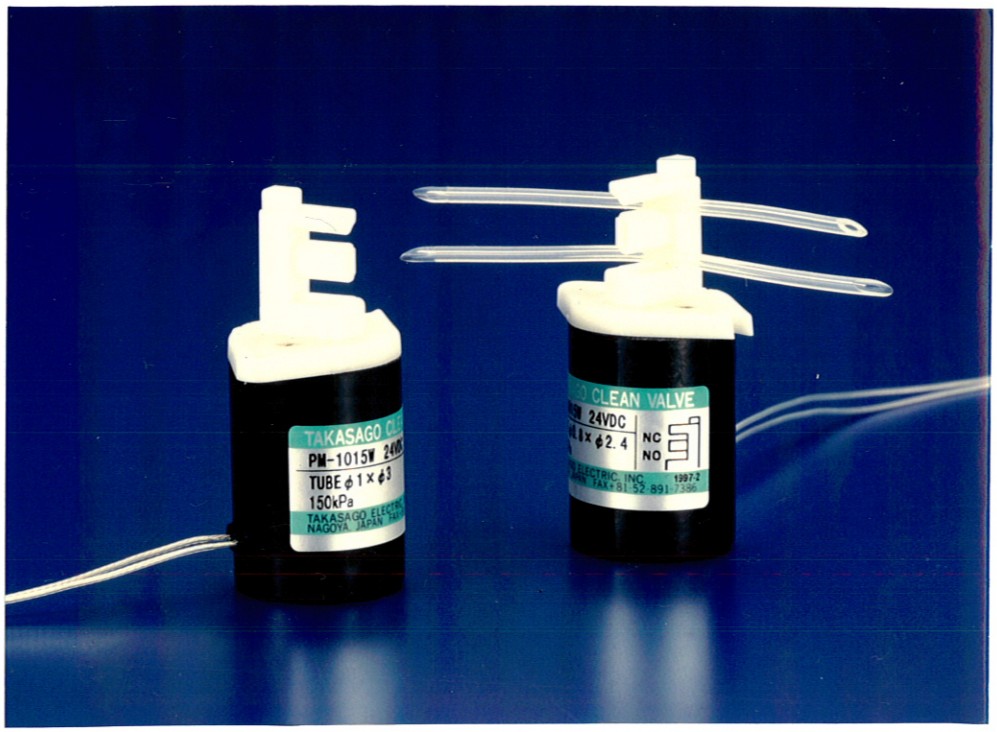


Various customisations are also possible, including improvement of the response time of the valves. Please feel free to ask us for the details.

TAKASAGO

Small Double–Tube Pinch Valve PM Series

PM–1015W
PM–0815W



- Dual–tubing : Normally closed and Normally open
  3–way valve operation available with Y–shape fitting
- Also suitable for single tube valve use (N.C. or N.O.)
- Compact size and reasonable price achieved by our moulding technology
- Pressure : 150 kPa (1.5 bar)
- Long life made possible by using PharMed™ tube

TAKASAGO ELECTRIC, INC.

66 KAKITSUBATA, NARUMI-CHO, MIDORI-KU, NAGOYA, 458-8522 JAPAN

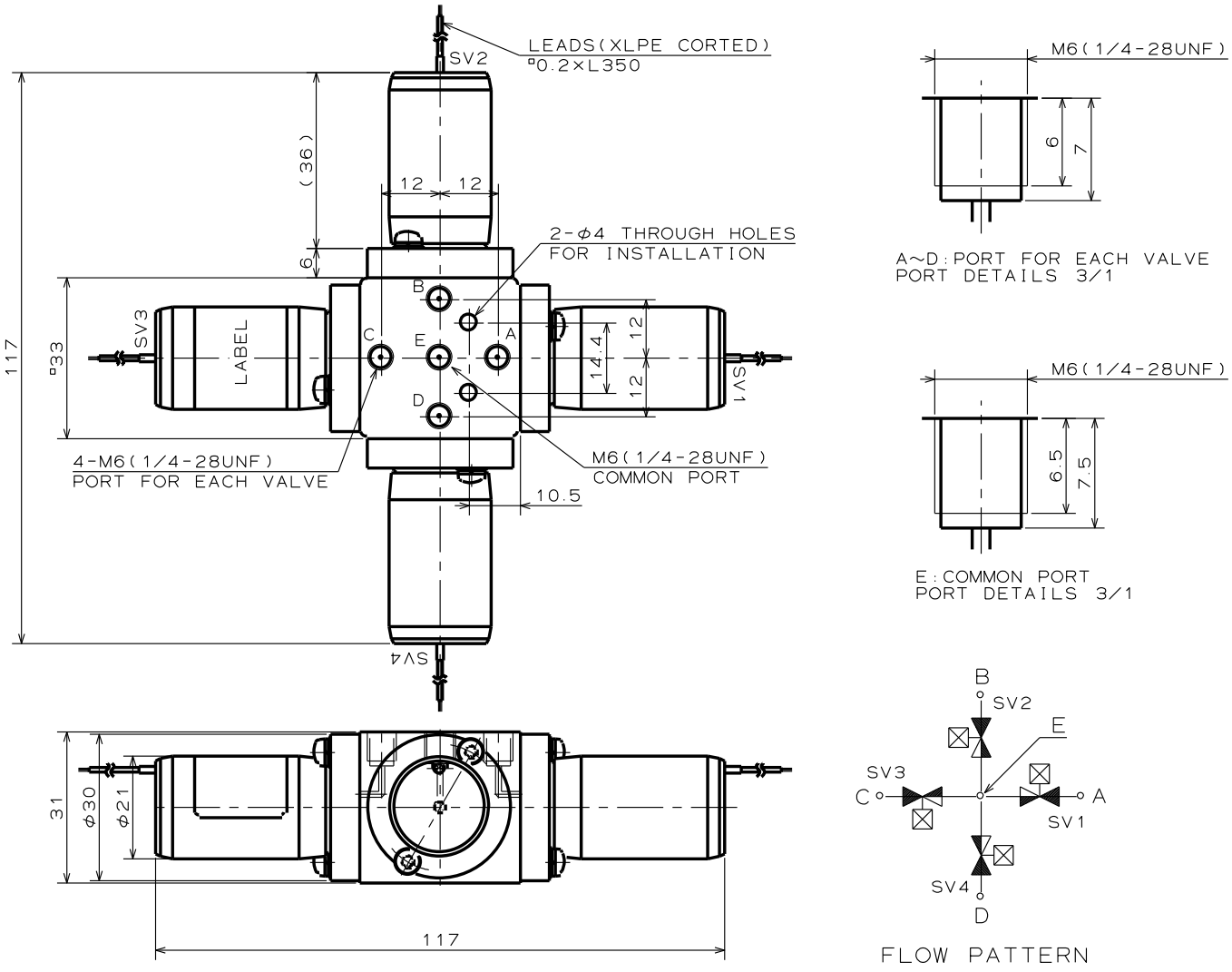
TEL: +81 52 891 2301 FAX: +81 52 891 7386

E-mail: info@takasago-elec.co.jp URL : http://www.takasago-elec.co.jp

Specifications

Model Number	CTV-2-4MICK
Type	2-way N.C. (Normally Closed)
Orifice Diameter	1.2 mm
Port Connection	M6 (Optionally 1/4-28UNF)
Operating Pressure Range	A ～ D： 0 ～ 50 kPa E： -65 ～ 150 kPa
Fluid / Ambient Temp. Range	5 ～ 40 °C
Rated Voltage	12 VDC, 24 VDC
Power Consumption	3.5 W × 4
Duty Cycle	Continuous
Insulation Class	Class B
Dielectric Strength	1500 VAC for 60 seconds
Wetted Materials	PTFE / PEEK / Perfluoroelastomer (Partially used as a gasket at the connection between the individual valves and the manifold base. It is not directly exposed to the flow path.)

Dimensions and Flow Pattern



A～D：PORT FOR EACH VALVE
PORT DETAILS 3/1

E：COMMON PORT
PORT DETAILS 3/1

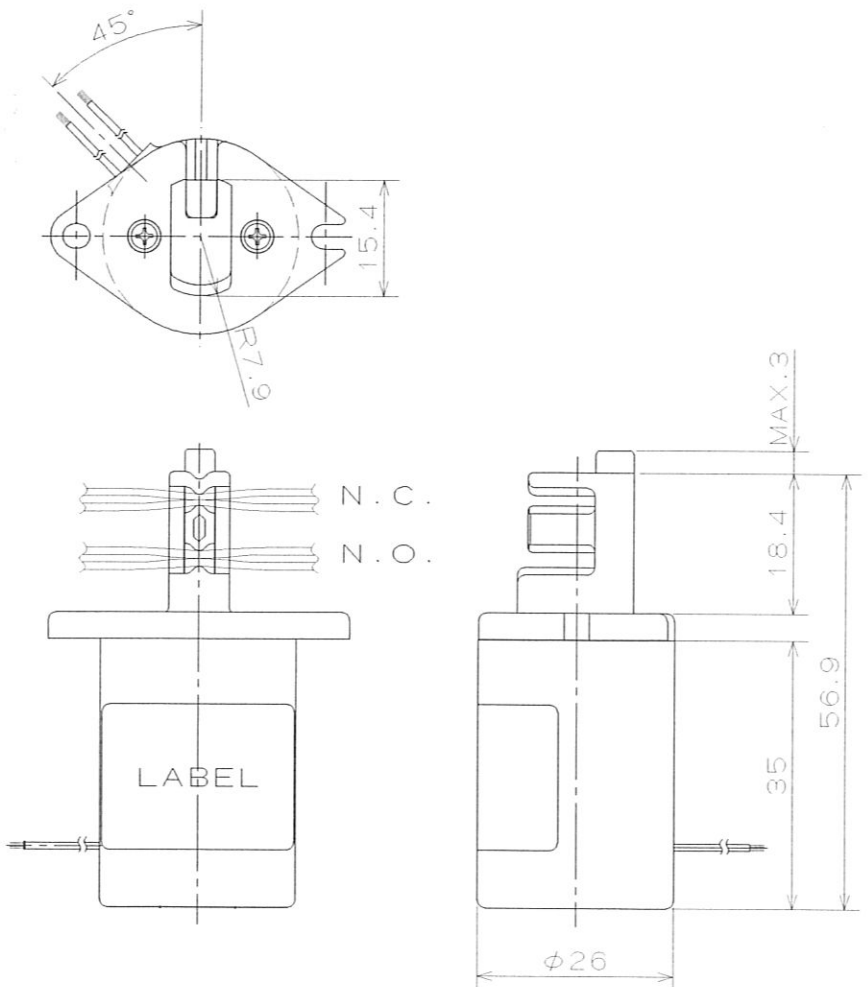
FLOW PATTERN

Note: Details including specifications may change without notification.

SPECIFICATIONS

	PM-1015W	PM-0815W
Tube Size	ID 1.0 mm × OD 3.0 mm	ID 0.8 mm × OD 2.4 mm
Tube Material	Silicone Rubber PharMed™	Silicone Rubber PharMed™ ,Tygon™
Operating Pressure Range	0 - 150 kPa (0 - 1.5 bar)	
Ambient Temperature Range	10 - 50℃	
Rated Voltage	12VDC, 24VDC, 100VAC	
Power Consumption	4.4W (100VAC : 5W)	
Operating Duty	Continuous Duty	
Coil Temperature Increase	Max. 75℃ From Room Temperature (When continuously energied)	
Insulation Class	Class B	
Insulation Resistance	50 MΩ (using 500VDC Megger)	
Dielectric Strength	1500VAC for 1min	
Weight	89 g	

DIMENSIONS



* "PharMed" , "Tygon" : T.M. of Norton Company

PEN-TYPE SYRINGE PUMP

SBP Series

Extremely Compact and High Resolution

Features

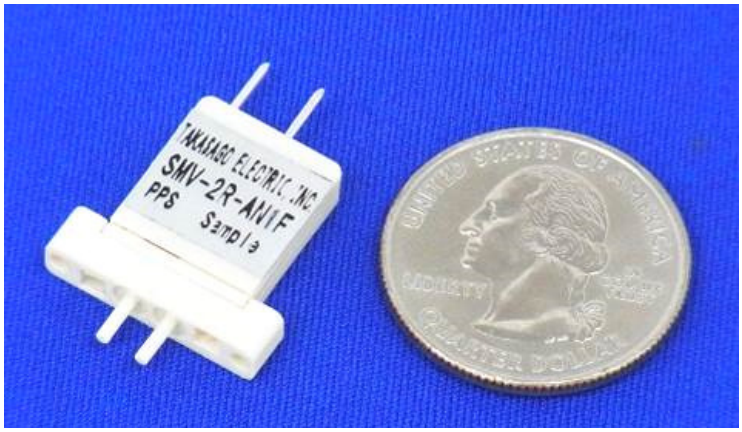
- High resolution provides smooth flow (theoretical resolution: 0.105 nl at 1/100 micro-step).
- Remarkably small outer dimensions of Dia. 12 x L 170 mm (threads model), now with a built-in 2-phase stepper motor with a reduction gear. Suitable for portable devices.
- An ultra-small type with an outer diameter of 8.8 mm is also available by custom order. (Please contact us for details of the micro-stepper drive mode.)
- Various syringe terminations: needle, Luer Lock, M6 or 1/4-28UNF threads, disposable tip adaptor, attachment for our ultra-small 3-way valve, etc. See reverse page.
- Has a built-in sensor to prevent overrun.
- An easy-to-use controller is available upon request.

Use the QR code on the right or the link below to see a video.
http://www.takasago-elec.co.jp/movie/SBP-e.wmv

MINIATURE LOW-COST VALVE

SMV Series

(Patented)



Features

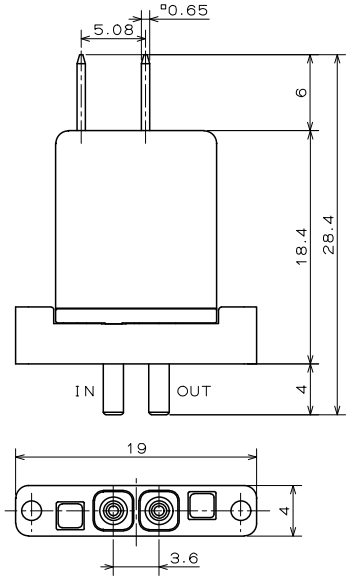
This valve is driven by a piece of shape memory alloy, giving it the following features:

- Compact and light weight: 19 x 18.4 x t4 mm and 1.5 g (approx.).
- Silent operation
- Low power consumption – 0.3 W or less.
- Low cost and disposable.

Specifications

Type		2-Way N.C.		
Model		Standard	High pressure	
Orifice Diameter (mm)		0.4, 0.8	0.4	0.8
Port Connection		Hose pipe, O-ring (Manifold mount)		
Operating Pressure Range (kPa)	IN	0 ~ 100	0 ~ 250	0 ~ 200
	OUT	0 ~ 50	0 ~ 100	
Operating Temp. Range		5 ~ 40 °C		
Electrical Supply		Current 250 mA *1		
Response Time(Typ.) *2		ON: 600 ms, OFF: 600 ms		
Wetted Materials	Body	PPS *3		
	Diaphragm	FPM or EPDM *3		

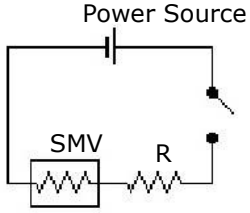
Dimensions



*1: Please see "Cautions concerning Power Supply" below.
*2: Response times vary depending on the ambient temperature. The values above are measured at 30°C. Can be improved by controlling the applied current (e.x. PWM, a spike & hold circuit, etc.). Please contact us for details.
*3: PEEK & Perfluoroelastomer are optionally available.

Cautions concerning Power Supply

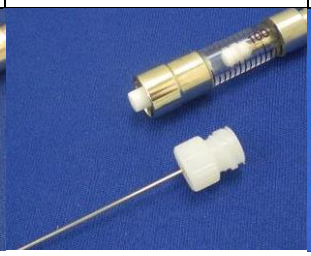
1. Power supply by a constant current circuit is recommended.
2. Operation by 12 VDC power supply or batteries is also possible, but a resistor must be inserted between the valve and the power source. See diagram on right.
3. If you operate the valve by any other method, the shape memory alloy may burn out, resulting in the valve malfunctioning.



Power Source	Resistor	
12 VDC Power Supply	45 Ω	5 W
AA battery x 2	10 Ω	1 W

Note: Details including specifications may change without notification.

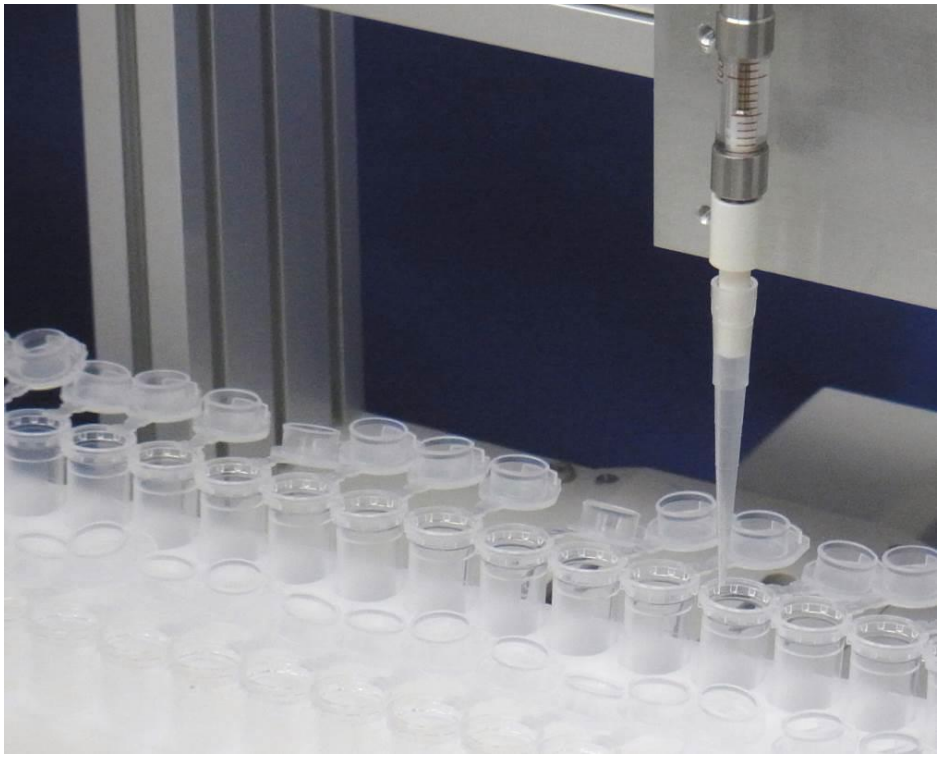
Specifications

Model Number	SBP-100G-N	SBP-100G-LL	SBP-100G-M6(1/4U)F	SBP-100G-DT
Outer Dimensions (excluding sensor case)	Dia. 12 x L165 mm (excluding needle)		Dia. 12 x L170 mm	Dia. 12 x L183 mm
Syringe Capacity	100 µl			
Theoretical Resolution	At 1/100 micro-step: 0.105 nl At full step: 10.5 nl			
Wetted Materials	Glass (barrel) PTFE (tip, seal) Stainless steel (needle)	Glass (barrel) PTFE (tip, seal) PVDF, Stainless steel (attached needle)	Glass (barrel) PTFE (tip, seal) PEEK (port)	Glass (barrel) PTFE (tip, seal) *Samples only contact with a disposable tip (material: PP).
Syringe Termination	Needle 22G (I.D. 0.40 x O.D. 0.72 x L51 mm)	Luer Lock (with needle)	M6 or 1/4-28UNF female threads *1	Adapter for disposable tip (Eppendorf®, epT.I.P.S., 2-200 µl) *2
				

*1 Male threads also available.
*2 Disposable tip not included with this product.

Image of SBP-100G-DT with a Disposable Tip

The Pen-type Syringe Pump can be directly installed onto a moving arm. Therefore, a tip is attached just below the pump, reducing the air gap between the syringe and the sample to a minimum and resulting in higher accuracy.



Note: Details including specifications may change without notification.

Pen-Type Glass Syringe Pump

Features

- Remarkably small outer dimensions of Dia. 8.8 x L 121 mm, now with a built-in 2-phase stepper motor (with a reduction gear).
- With a lightweight of only 33 g, this pump is very suitable for installation on a microscope stage, inside an incubator, or on moving parts, etc.
- Continuous microlitre transfer system can also be made possible by operating 2 pieces of syringe pumps alternately.
- Theoretical resolution is 21 nl.
- Has a built-in sensor that enables zero-point detection.
- In addition to the needle model in the above picture, a No.6-40UNF threaded port model and a special attachment model to connect with our small 3-way valve are also available.
- A driver for operating this pump has also been prepared.

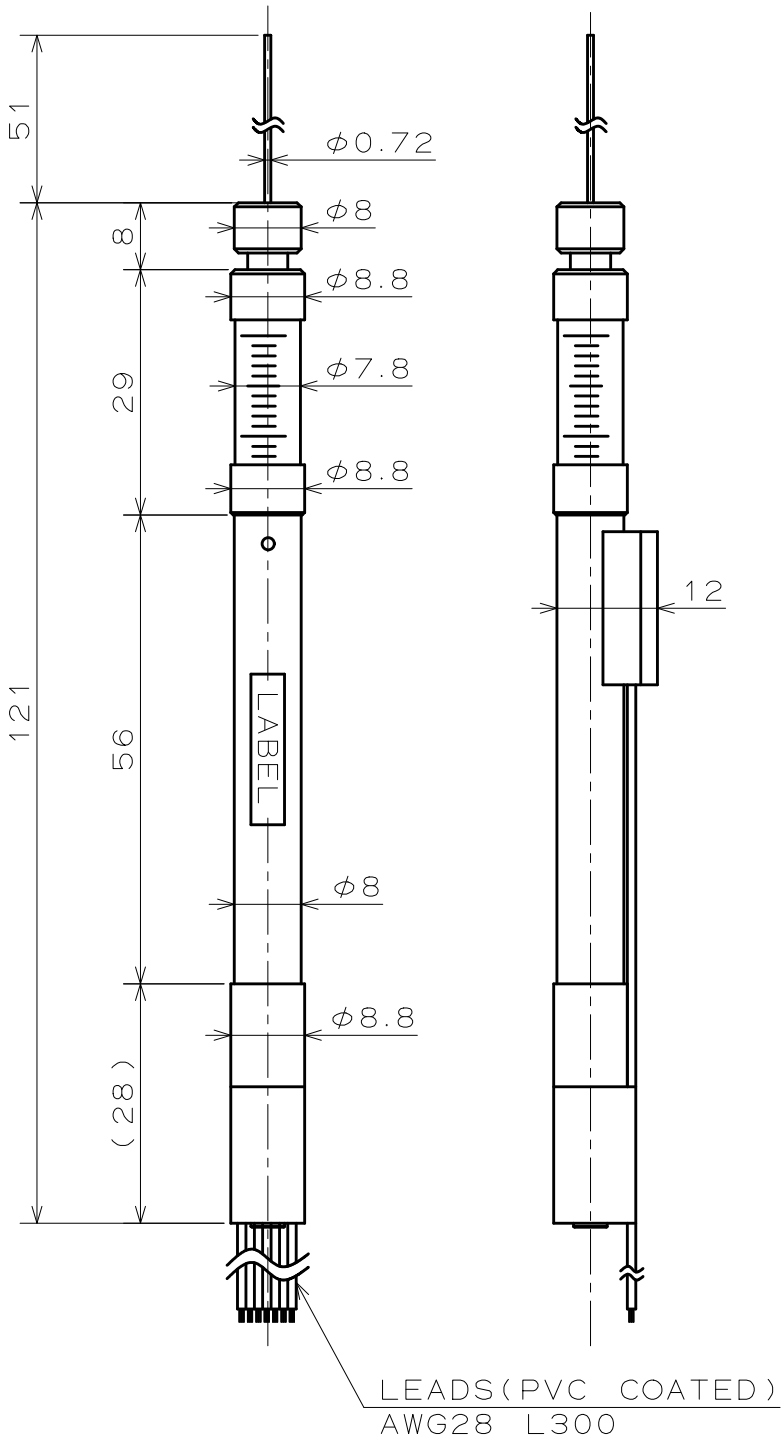
Specifications

Model Number	SAP-100G-N
Syringe Capacity	100 µ l
Theoretical Resolution	21 nl
Duty Cycle	10 s　ED＝33%
Maximum Frequency	1500 Hz
Wetted Materials	Glass (barrel), PTFE (tip), Stainless Steel (needle) • Extremely small amount of silicone oil applied to the tip as lubricant.
Outer Dimensions	Dia. 8.8 × L121 mm (excluding the needle)
Needle Size	22G（I.D. 0.4　× O.D. 0.72 × L51mm）
Weight	33 g

Note: Details including specifications may change without notification.

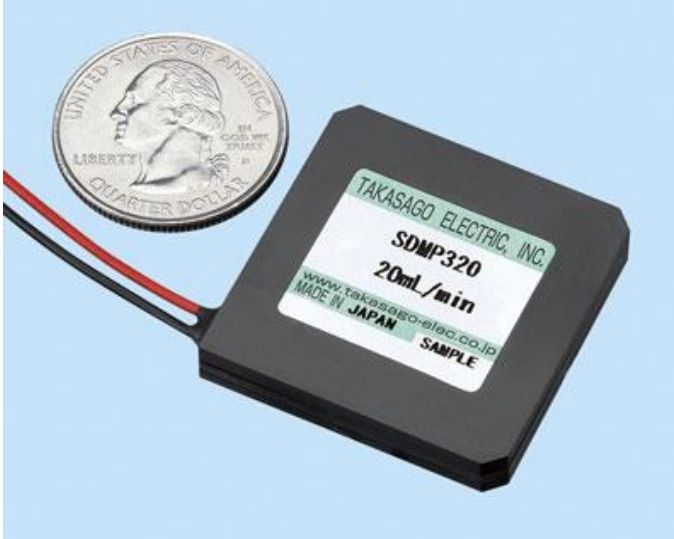
Dimensions

Needle Type



PIEZOELECTRIC MICRO PUMPS

SDMP320/330W



Features

· Small-sized, lightweight and slim.
· No metal is used as wetted materials.
· Low noise and low power consumption.
· Flow rate is adjustable by changing drive voltage or drive frequency.
· Self-priming is possible.

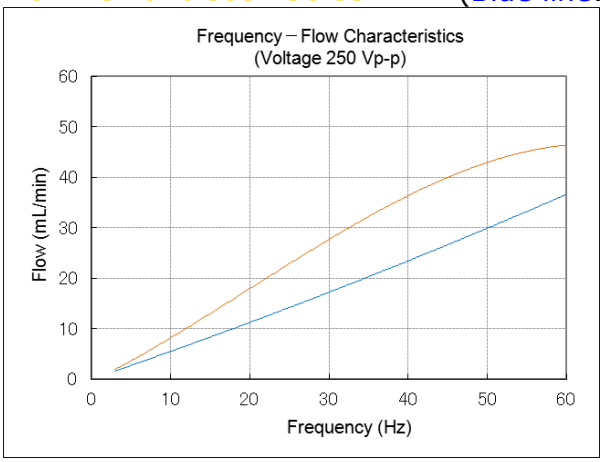
Specifications

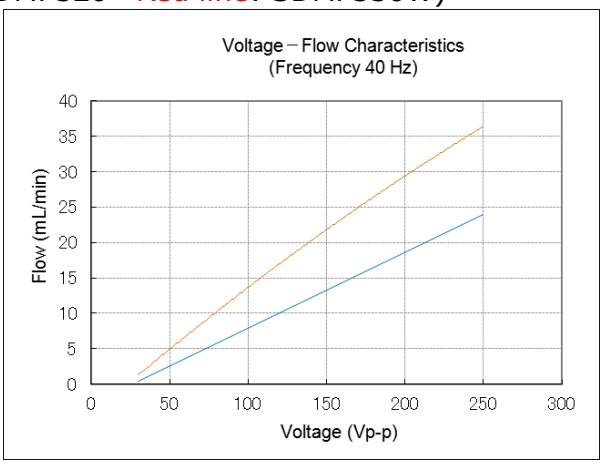
Model Number	SDMP320	SDMP330W <Under Development>
Pump Type	Piezoelectric Diaphragm Pump (Unimorph)	Piezoelectric Diaphragm Pump (Bimorph)
Typical Flow Rate	20 ml/min	30 ml/min
Typical Pump Pressure	35 kPa	-
Drive Voltage	60 ~ 250 Vp-p	
Drive Frequency	10 ~ 60 Hz	
Typical Suction Load Pressure	-1.0 kPa	
Operating Temp.	5 ~ 50 °C	
Wetted Materials	COC (Cyclic Olefin Copolymer) EPDM (Ethylene Propylene Diene Monomer)	
External Dimensions	33 × 33 × 5.5 mm	
Weight	Approx. 9 g	Approx. 12 g
Input / Output Pipes	φ1.8 – φ2.8 – L5.0 mm	

*1. The data above are based on sine wave drive. Flow rate and pump pressure are larger if driven by Takasago Standard wave.
*2. SDMP330W is under development and some of the specifications are not fixed.
*3. Smaller models (Typical flow rate: 3 or 7ml/min) are also available.

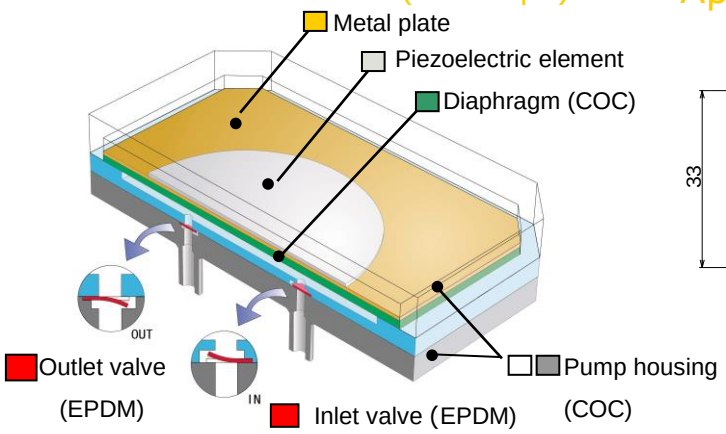
Note: Details including specifications may change without notification.

Flow Characteristics (Blue line: SDMP320 Red line: SDMP330W)

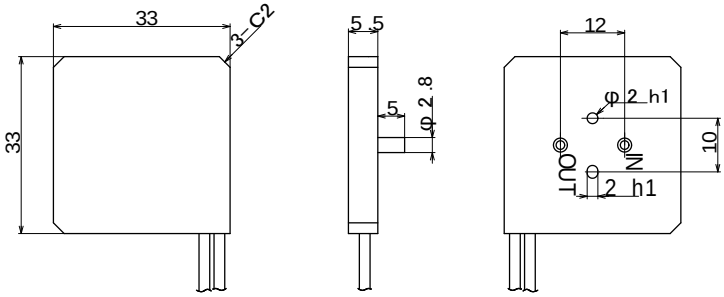




Internal Structure (Unimorph)



Appearance and Dimensions



Driver Board MPD-200A

This driver board is a thin, compact and lightweight, yet high-voltage circuit board, designed for the piezoelectric micro pumps. From a regular 5 VDC input voltage, it can easily generate the high voltage supply of approximately 250 Vp-p, 40 Hz necessary for driving the micro pumps.

Item	Specifications
Input Voltage	5 VDC ± 5%
Output Frequency	1 ~ 60 Hz
Output Voltage	50 ~ 340 Vp-p
Number of Pumps Connectable	2 pieces (maximum)
External Dimensions, Weight	30 x 30 x 18 mm, approx. 9 g

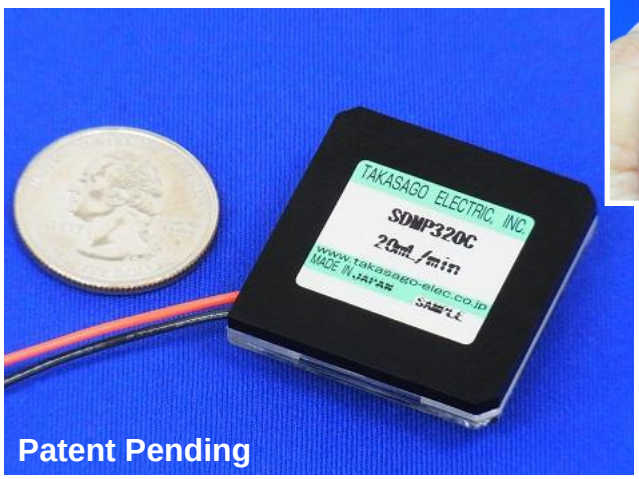
Controller MPC-200A

This is a compact and lightweight controller that can provide the high voltage power necessary for driving the micro pumps. It is user-friendly with a front panel digital display for configuring the output voltage and output frequency, and a memory function to store the latest setting used.

Item	Specifications
Input Voltage	5 VDC ± 5%
Output Frequency	1 ~ 60 Hz
Output Voltage	60 ~ 300 Vp-p
Number of Pumps Connectable	2 pieces (maximum)
External Dimensions, Weight	75 x 30 x 89 mm, approx. 140 g
Attachment	AC adapter

PIEZOELECTRIC MICRO PUMP **(Under Development)**

Cartridge Type Piezo Pump SDMP320C



Patent Pending

Can be easily replaced for each fluid

Features

- A built-in magnet enables the pump cartridge to be easily removed from and attached to an actuator with a piezoelectric element.
- Sterilisation of the pump cartridge prior to use is possible.
- No metal is used as wetted materials.
- Self-priming is possible.
- Flow rate is adjustable by changing drive voltage or drive frequency.
- Small-sized, lightweight and slim.
- Low noise and low power consumption.

Use the QR code on the right or the link below to see the movie "How to use"
https://youtu.be/0XMQHMF_qu8

Specifications (Target Values)

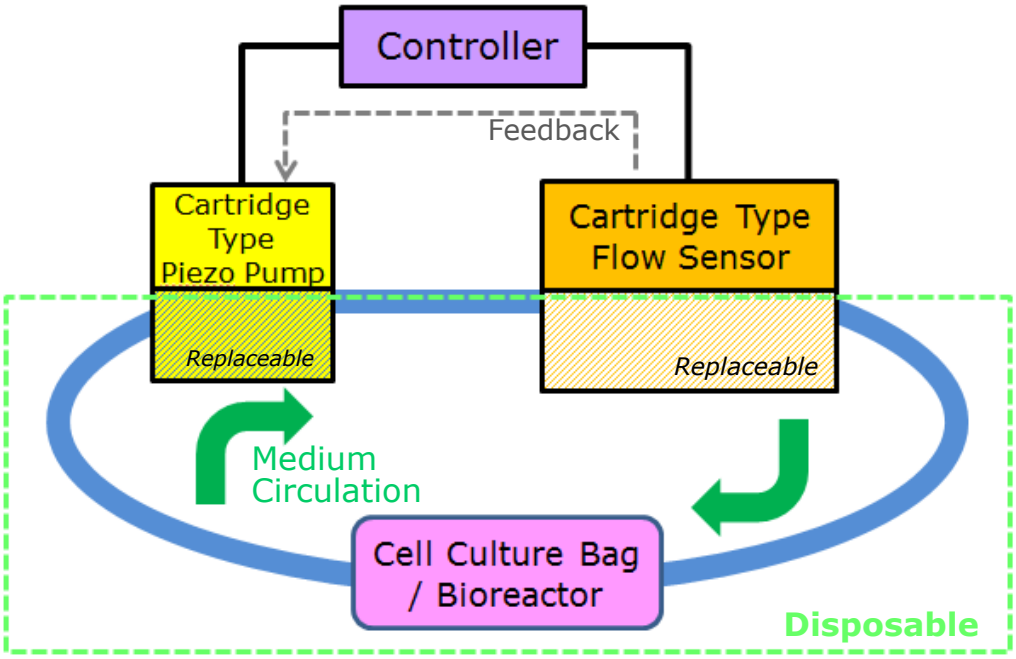
Model Number	SDMP320C
Pump Type	Piezoelectric Diaphragm Pump
Typical Flow Rate	20 ml/min
Typical Pump Pressure	20 kPa
Drive Voltage	60 to 250 Vp-p
Drive Frequency	10 to 60 Hz
Typical Suction Load Pressure	-1.0 kPa
Operating Temp.	5 to 50 °C
Wetted Materials	COC (Cyclic Olefin Copolymer) EPDM (Ethylene Propylene Diene Monomer)
External Dimensions	33 x 33 x 6.9 mm
Weight	Approx. 13 g
Input / Output Pipes	φ1.8-φ2.8-L5.0 mm

The data above are based on sine wave drive. Flow rate and pump pressure are larger if driven by Takasago Standard wave.

Note: Details including specifications may change without notification.

Application Example

●Flow Control System for a Biotech Application



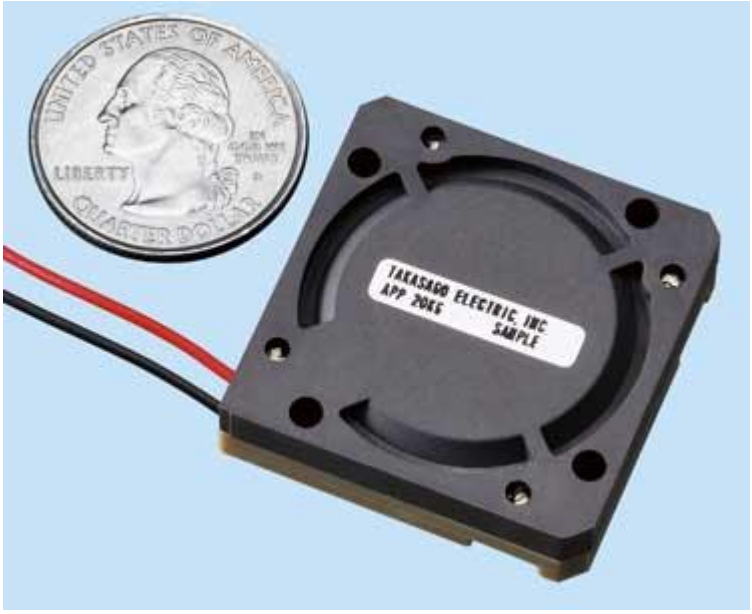
The features of the Cartridge Type Piezo Pump are most useful for applications sensitive to cross-contamination, for example, biotech devices. It also works most effectively when used with other replaceable items as a system. The system in the photo above is one example; a circulation system of culture medium, which consists of a cartridge type flow sensor, the Cartridge Type Piezo Pump, and a controller. As the flow sensor monitors the flow and the controller adjusts the output of the pump accordingly, the flow remains very stable even over a long period, despite changes in the liquid level. Programmed flow control using an external input is also possible. All wetted parts can be replaced after each cell/tissue culturing cycle is completed.

Note:

- The controller is compatible with other Takasago piezoelectric micro pumps. It is also customisable for other flow sensors. Please contact us for details.
- The flow sensor in the photo above is manufactured by Aichi Tokei Denki Co., Ltd. and is currently under development. More information is available on request.

PIEZOELECTRIC MICRO PUMP

Highly Inert Models APP Series



Uses only PTFE, PEEK and Perfluoroelastomer as wetted materials.
Most suitable for aggressive chemicals, solvents, etc.

Features

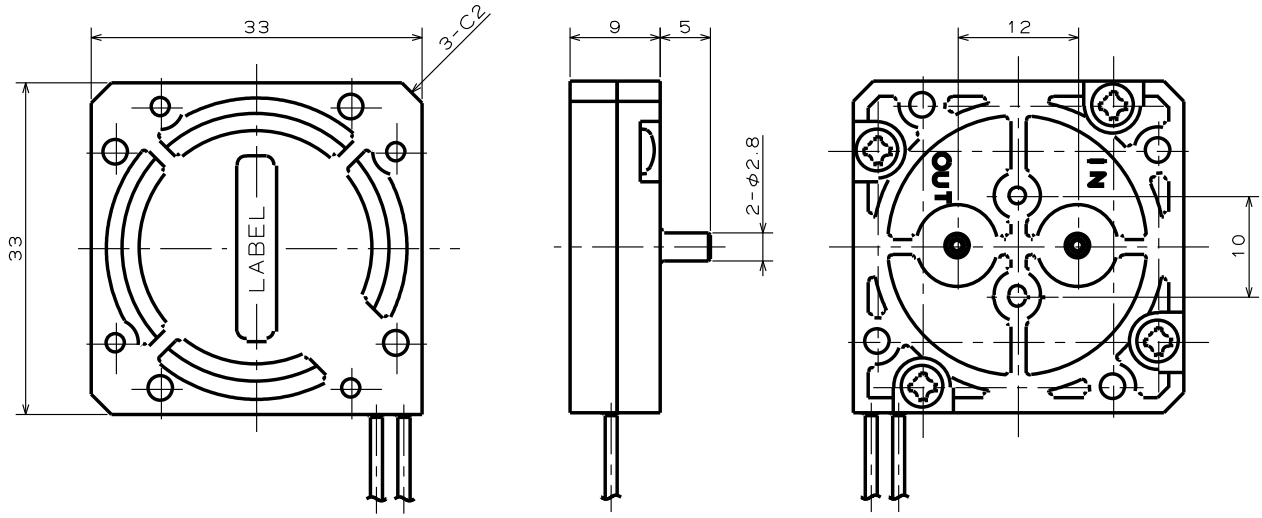
- Small-sized, lightweight and slim.
- Typical flow is 15 ml/min, which is adjustable by changing drive voltage or drive frequency.
- Low noise and low power consumption.
- Self-priming is possible.

Specifications

Model Number	APP-20KG
Pump Type	Piezoelectric Diaphragm Pump
Flow Rate	15 ml/min (typical)
Pump Pressure	25 kPa
Drive Voltage	60 ~ 250 Vp-p
Drive Frequency	10 ~ 60 Hz
Suction Load Pressure	−1.0 kPa
Operating Temperature	5 ~ 50 °C
Wetted Materials	PTFE, PEEK (polyether ether ketone) and Perfluoroelastomer
External Dimensions	33 × 33 × 9 mm
Weight	17 g

Note: Details including specifications may change without notification.

Appearance and Dimensions



Driver board MPD-200A

This driver board is a thin, compact and lightweight, yet high-voltage circuit board, designed for the piezoelectric micro pumps. From a regular 5 VDC input voltage, it can easily generate the high voltage supply of approximately 250 Vp-p, 40 Hz necessary for driving the micro pumps.

Item	Specifications
Input Voltage	5 VDC ± 5%
Output Frequency	1 ~ 60 Hz
Output Voltage	50 ~ 340 Vp-p
Number of Pumps Connectable	2 pieces (maximum)
External Dimensions, Weight	30 x 30 x 18 mm, approx. 9 g

Controller MPC-200A

This is a compact and lightweight controller that can provide the high voltage power necessary for driving the micro pumps. It is user-friendly with a front panel digital display for configuring the output voltage and output frequency, and a memory function to store the latest setting used.

Item	Specifications
Input Voltage	5 VDC ± 5%
Output Frequency	1 ~ 60 Hz
Output Voltage	60 ~ 300 Vp-p
Number of Pumps Connectable	2 pieces (maximum)
External Dimensions, Weight	75 x 30 x 89 mm, approx. 140 g
Attachment	AC adapter

Tygon® tubing (accessory)

Product Name ： Tygon® 2375 (for use with methanol, water and most general uses)

Size: I.D. 2.38 mm

＊Note ：If the flow decreases with the above tubing, please use the larger size tubing.

＊Tygon® is a trademark of Saint-Gobain Performance Plastics.

Miniature Peristaltic Pump

RP-Q1

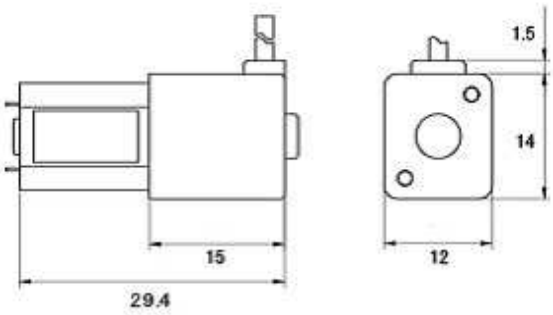
Features

- Compact size: Dimensions of 30 mm X 12 mm X 14 mm
- Low Power consumption: only 0.12 W

Specifications

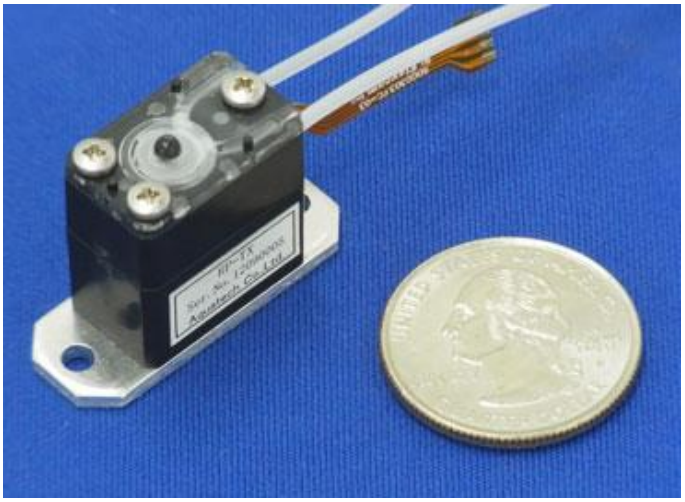
Discharge Rate	0.45 ml/min ±15 % (tap water at 20 ℃)
Discharge Pressure	50 kPa
Tube Material	Silicone (I.D. 1.5 mm)
Motor	DC geared motor
Rated Voltage	DC 3 V
Power Consumption	0.12 W
Weight	11 g

Dimensions



Note: Details including specifications etc. may be changed at any time without notice.

MICRO PERISTALTIC PUMP
RP-TX Series



Pulse Speed Display
& Controller

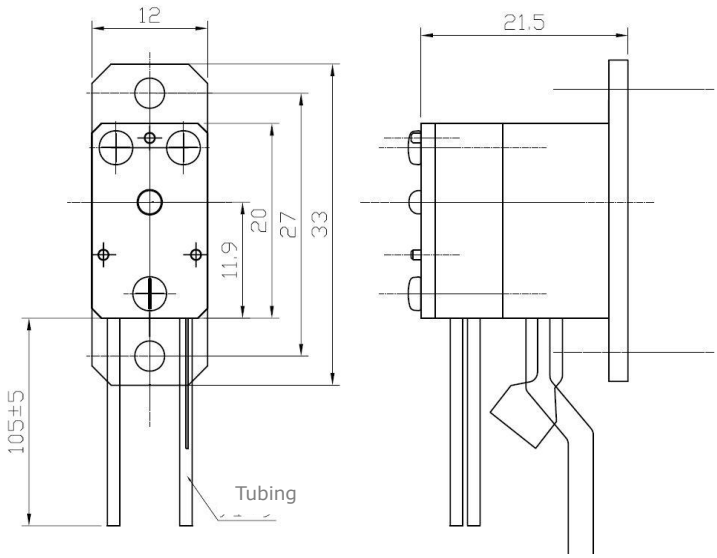
Features

- The world's lowest level of flow for a peristaltic pump on the market: 0.1 ~ 40 µl/min
- A replaceable pump head, which includes tubing.
- Compact size: Dimensions of 33 × 12 × 21.5 mm
- An easy-to-use controller is available upon request. (Sold separately)

Specifications

Flow Rate	0.1 ~ 40 µl/min ±15 % (Water at 25 °C, Pulse speed: 3 ~ 1000 pps)
Tubing Material	Silicone or Olefine (I.D. 0.5 mm)
Pump Pressure	30 kPa or more
Motor	Stepper motor
Rated Voltage	3 VDC

Dimension

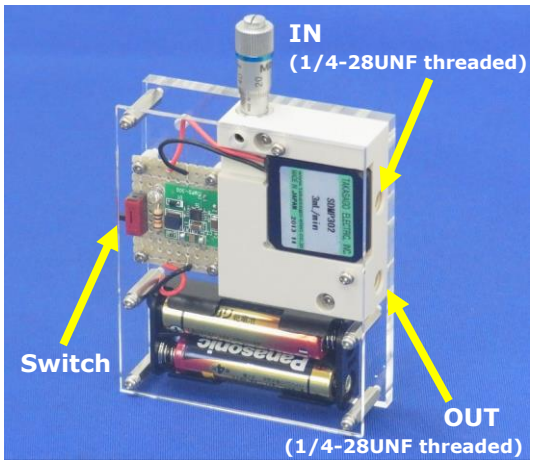


Note: Specifications etc. may be changed at any time without notice.
This is a product of Aquatech Co., Ltd.

Ring Pump
Aquatech Co., Ltd.

INTEGRATED PRODUCT

Manually Adjustable Low Pulsation Micro Pump Unit



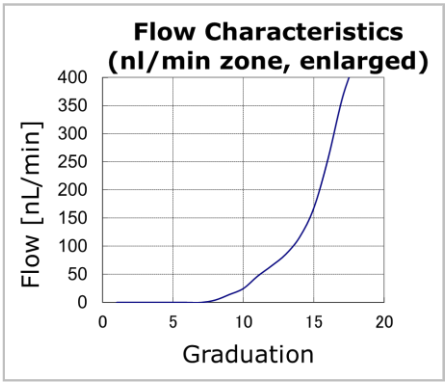
Suitable for Lab-on-a-Chip Devices, Cell Culture Media Circulation, etc.

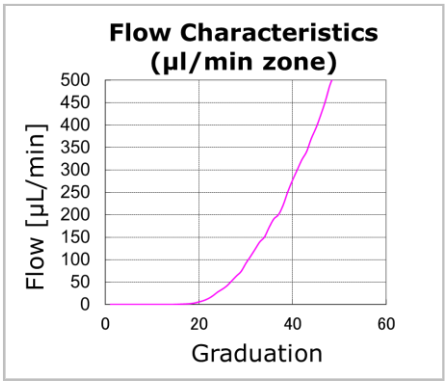
Features

- Flow from a piezoelectric micro pump is adjusted by a micro needle valve.
- Can adjust flow from nl/min level to around 1.5 ml/min manually.
- Flow pulsation at low flow rates is drastically reduced by a micro needle valve (See the graph at the bottom).
- Usable as a stand alone by AAA or R03 batteries.
- Compact size: Dimensions of 66 x 25 x 105 mm
- Maximum pump pressure is around 35 kPa (The value varies depending on the flow channel configuration and fluid characteristics).

Demonstration video is available at the following website.
http://www.takasago-elec.co.jp/movie/low_pulsation_pump_unit-e.wmv

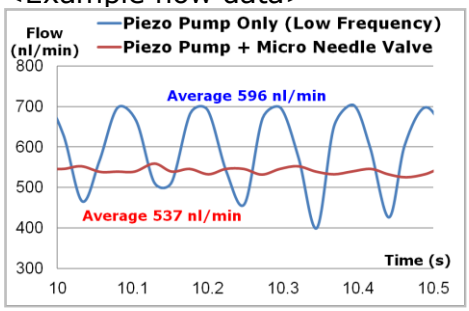
Flow Characteristics <Example flow data>





Reduction of Flow Pulsation

<Example flow data>

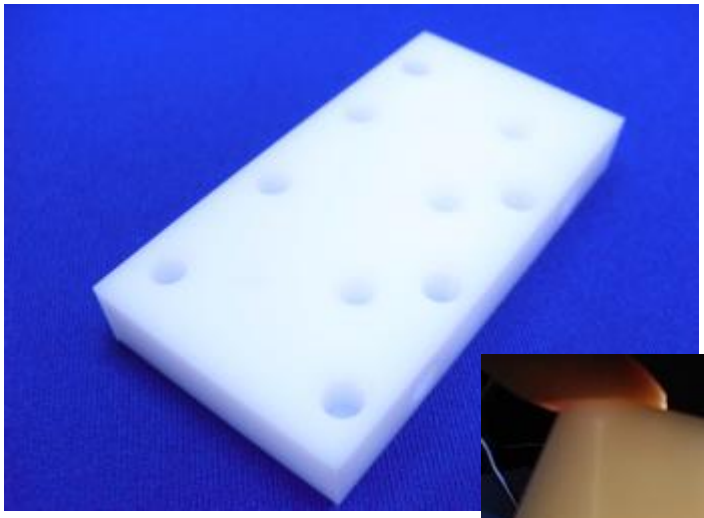


Similar Item

Unit of a piezo pump and a needle valve is also available (Either a driver or a controller is separately needed).

Note: Details including specifications may change without notification.

Bonded PTFE Manifold

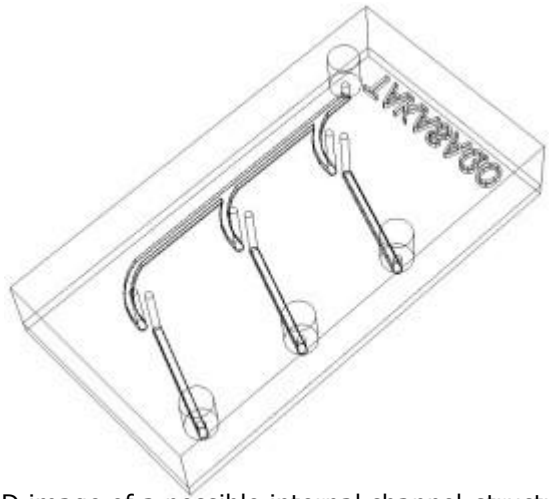


Features

- This is a 100% PTFE manifold, with internal channels made by the bonding of two layers of modified PTFE. Due to excellent chemical resistance, this product is compatible with a wide range of fluids.

- Highly integrated manifolds with freely curving channels that could not be fabricated through the conventional drilling process are now made available.

- Bonding is achieved through the use of a special technique that does not use adhesive, so the channels are absolutely contamination-free. The bonding method is highly reliable such that the bonding surfaces are unified so well that the point of joining can be hardly distinguished.



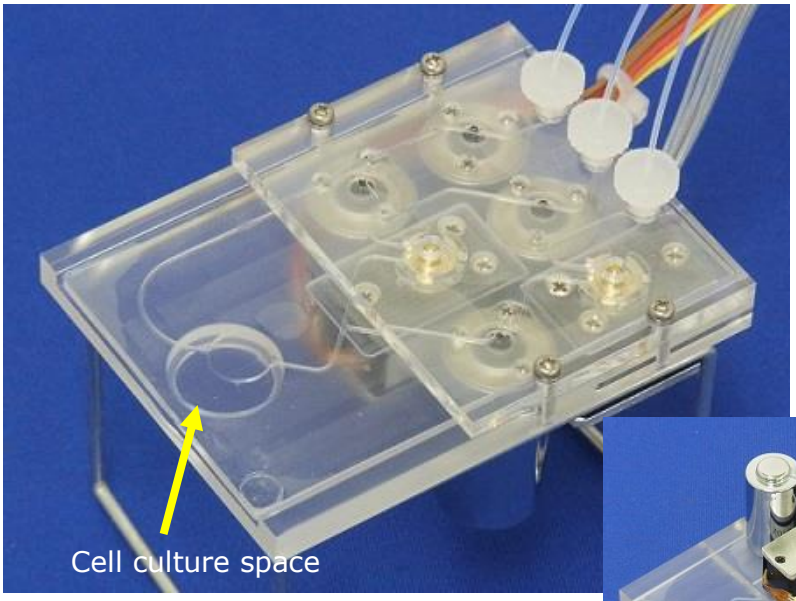
A 3D image of a possible internal channel-structure

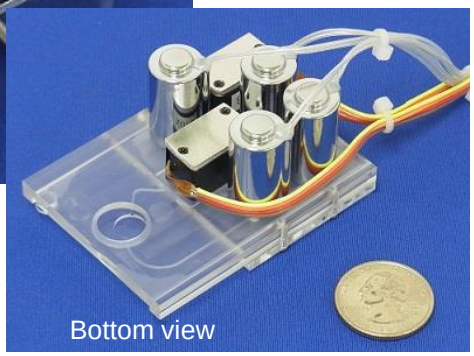
Note: Specifications etc. may be changed at any time without notice.

(Under development)

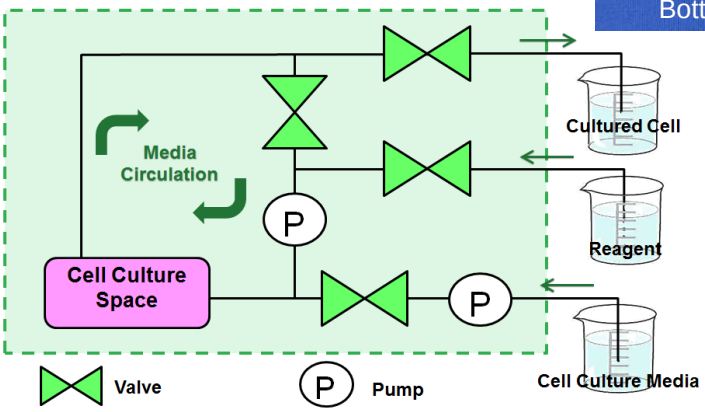
INTEGRATED PRODUCT

All-in-one Disposable PDMS Chip





Flow Diagram



This all-in-one system on a disposable PDMS chip is a microfluidic module designed for cell culture. It has peristaltic pumps, miniature valves, and a built-in cell culture space which can be observed under a microscope. The replaceable chip is sterilisable before use. A remote controller using an Android application is available for this module upon request.

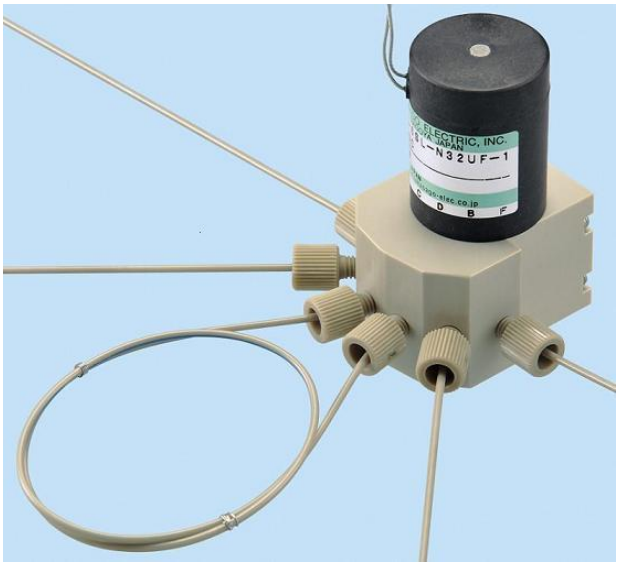
This is just an example of our integrated fluid control systems. We design and manufacture systems for various microfluidic operations in accordance with your requirements. Please feel free to contact us.

Note:

1. This system is jointly developed with Aquatech Co., Ltd. and Fukoku Bussan Co., Ltd.
2. Details including specifications may change without notification.

SOLENOID-DRIVEN SHEAR VALVE

2-Position 6-Port Valve



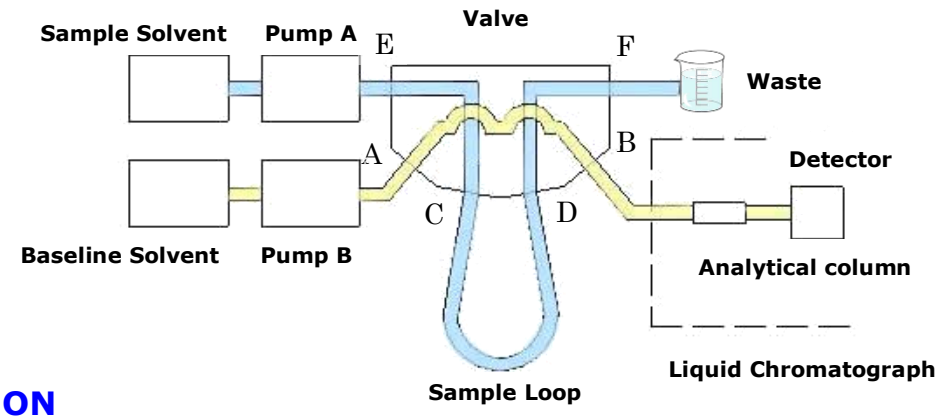
For Sample Injection or Metering in a LC

Features

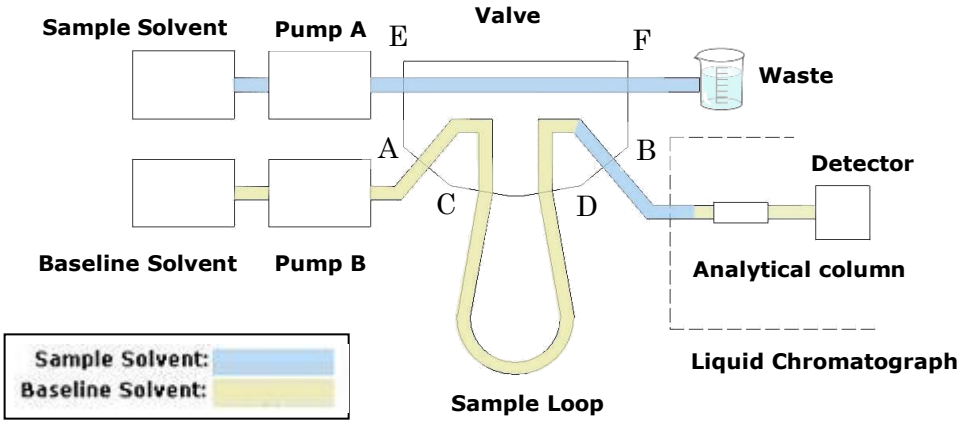
This is the first solenoid-driven linearly-actuating valve that realises the same functions as a motor-driven rotary valve. As it is solenoid-driven, a stepper motor or a driver is not required. It is economical and easy to operate, comparing to the conventional rotary valve.

Example of Connections

OFF

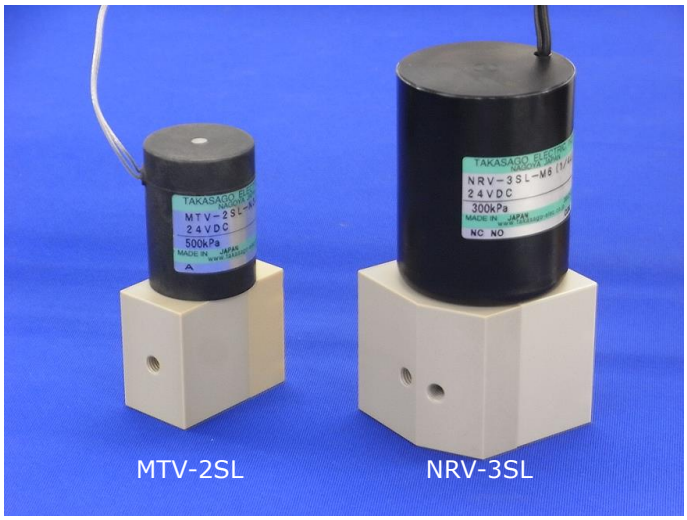


ON



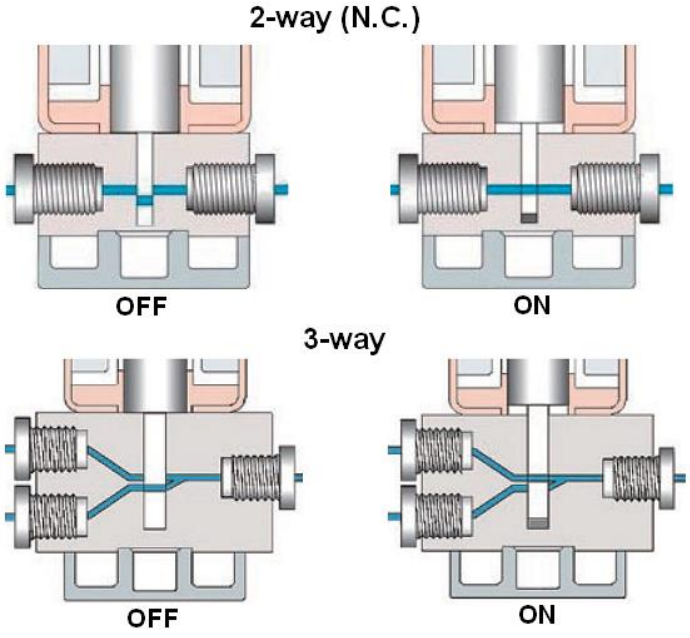
Solenoid-Driven Slider Valve

(Patented)



The solenoid-driven slider valve is a kind of shear valve in which a shutter called a "slider" moves vertically and shuts off the flow path. The pumping volume which occurs when a diaphragm valve opens and closes, or the dead volume in which some fluid may stay in the valve is reduced to almost zero, preventing reduction of accuracy in analysis or fluid dispensation. Furthermore, the pressure capability of this slider valve is greatly improved.

Image of Internal Structure



Features

- No pumping volume, as there is no structural change in the internal volume when the valve operates.
- An excellent fluid exchangeability compared to a diaphragm solenoid valve due to its almost linear flow path and very small internal volume.
- Easily controlled compared to a motor-driven rotary type shear valve because the slider valve is simply driven by the ON-OFF operation of a solenoid and no special driver is required. It is also compact in size.

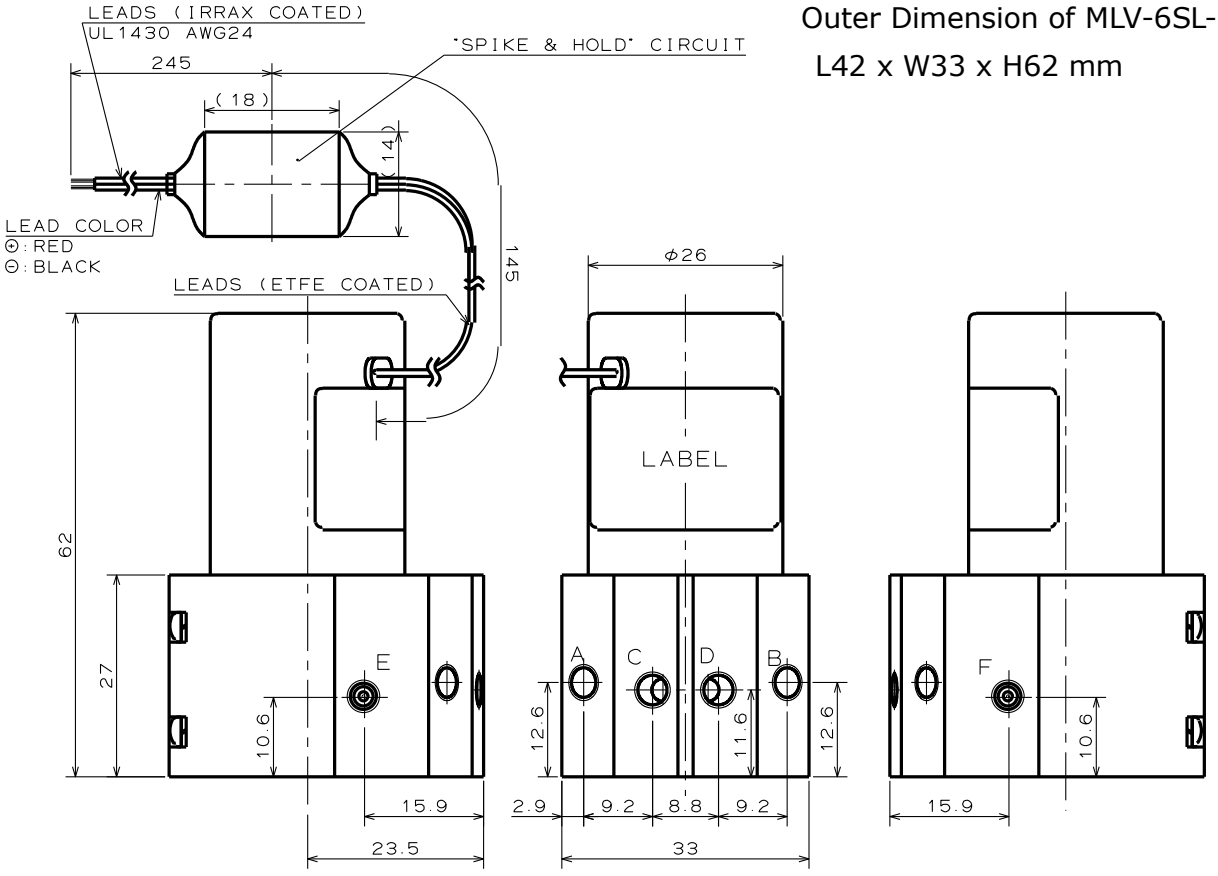
Specifications

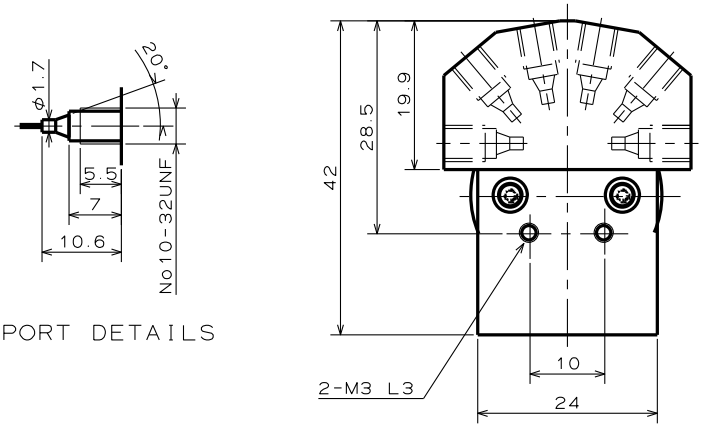
Model Number	MTV-6SL-N32UF-1	MLV-6SL-32UFH-1
Orifice Diameter	0.4 mm	
Port Connection	No.10-32UNF	
Operating Pressure Range	0 ～ 500 kPa	0 ～ 2.5 MPa
Fluid Temp. Range	5 ～ 50 °C	
Ambient Temp. Range	5 ～ 50 °C	
Rated Voltage	12VDC, 24VDC	
Power Consumption	23 W (3.6 W holding with power save electronics)	18 W (3 W holding with power save electronics)
Internal Volume	9.0 µl	
Life Expectancy	100 thousand cycles（not guaranteed value）	
Wetted Materials	PTFE, PEEK, SiC (Silicon Carbide)	

* This product carries a circuit that controls the voltage by timer. It is not recommendable to run the ON / OFF cycles at over 0.5 Hz.

Dimensions (MTV-6SL-N32UF-1)

Outer Dimension of MLV-6SL-32UFH-1:
L42 x W33 x H62 mm

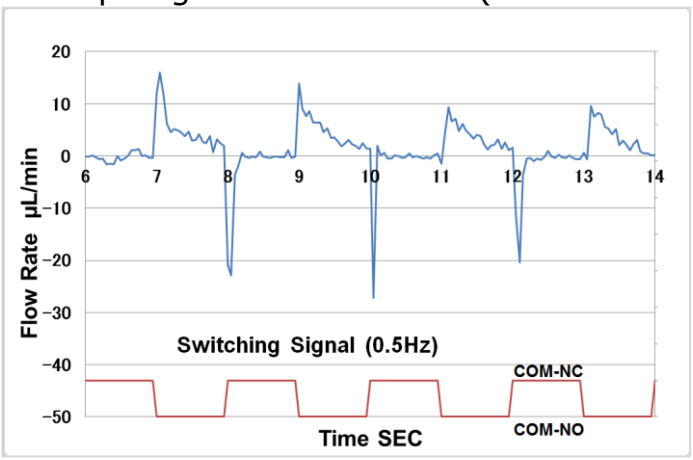




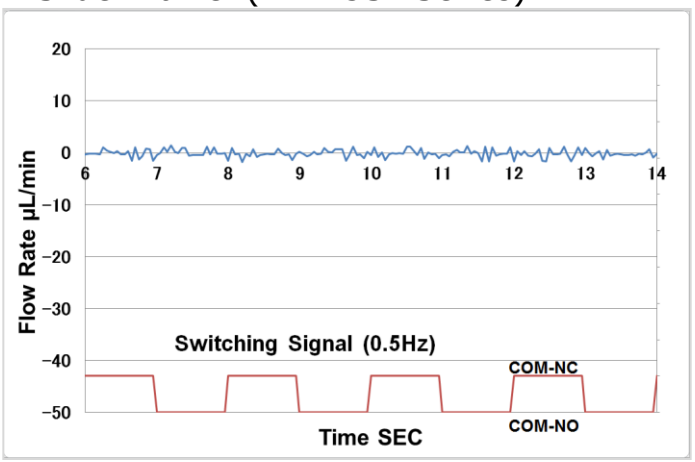
Note: Details including specifications may change without notification.

Pumping Volume Comparison (Flow rates of the N.C. ports when turning on/off 3-way valves)

< Diaphragm Isolation Valve (KV-3K Series) >



<Slider Valve (MTV-3SL Series) >



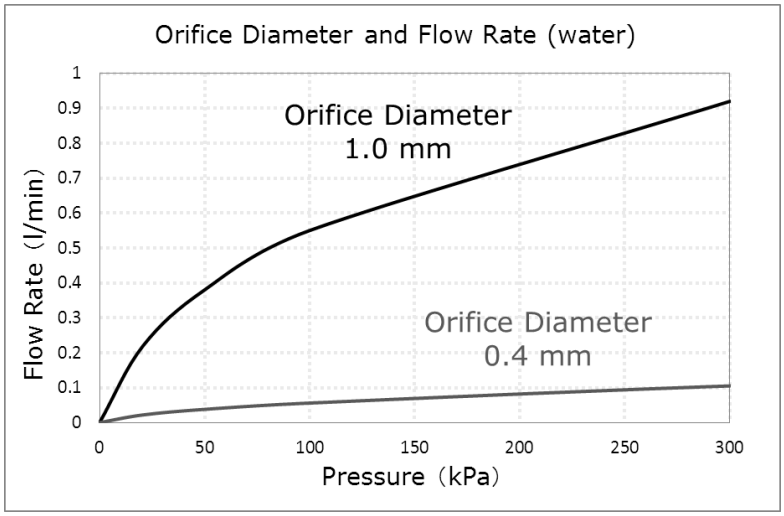
Measurement method: Measure the flow rates at the N.C. ports with a micro flowmeter when turning the valves on/off while filled with water and with the COM. and N.O. ports plugged.

These data are provided by Fujii T. Lab, Institute of Industrial Science, the University of Tokyo.

Specifications

Model Number	MTV-2SL-N32UF-1	MTV-3SL-N32UF-2	NRV-2SL-M6(1/4U)	NRV-3SL-M6(1/4U)
Type	2-way (N.C.)	3-way	2-way (N.C.)	3-way
Orifice Diameter	0.4 mm		1.0 mm	
Port Connection	No.10-32UNF		M6, 1/4-28UNF	
Operating Pressure Range	0 ~ 500 kPa		-90 ~ 300 kPa	
Media/Ambient Temp. Range	10 ~ 50 °C			
Rated Voltage	12 VDC, 24 VDC			
Power Consumption	18 W		16 W	
Duty Cycle	Intermittent (ED = 15 %), Maximum ON time: 45 s *Incorporation of our hit and hold circuit (option) allows a continuous energisation at the rated voltage.		Intermittent (ED = 33 %), Maximum ON time: 2 minutes *Incorporation of our hit and hold circuit (option) allows a continuous energisation at the rated voltage.	
Internal Volume	1.5 µl	3.7 µl	16.5 µl	36.2 µl
Wetted Material	PTFE, PEEK, Al_2O_3		PTFE、PEEK、SiC（Silicon Carbide）	
Outer Dimensions (mm)	L24 x W34 x H62	L24 x W38.5 x H62	L38 x W38 x H86	L38 x W41 x H86
Life Expectancy	200 thousand cycles (not guaranteed value)		100 thousand cycles (not guaranteed value)	

Flow Rate (Comparison of Orifice Diameter 0.4 mm and 1.0 mm)



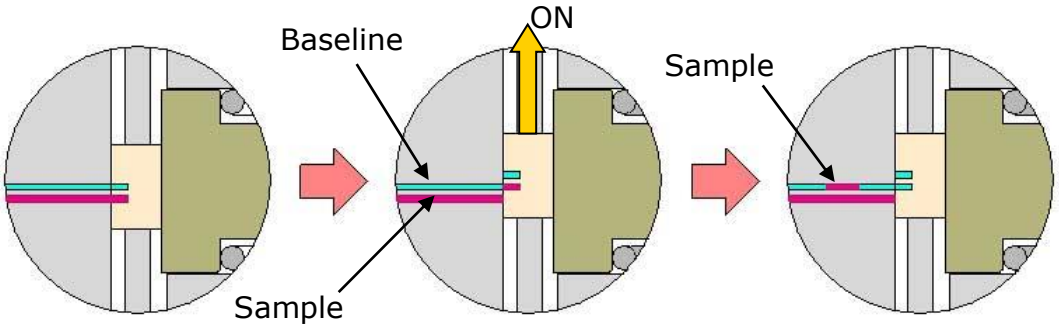
Note: Details including specifications may change without notification.

For liquid chromatography

Solenoid-driven Sample Injector

This is a solenoid driven injector for injecting a small volume of samples into a baseline in various analytical instruments, such as those for liquid chromatography. As it is driven by a solenoid, it is more economical and easier to operate compared to a conventional stepper motor driven injector.

Image of the internal structure



Features

- Volume of injection variable from 0.2 to 1.0µl
- Small with outer dimensions of L39.1 x W30 x H62.5 mm
- Controlled just by the ON and OFF operations of a DC power supply

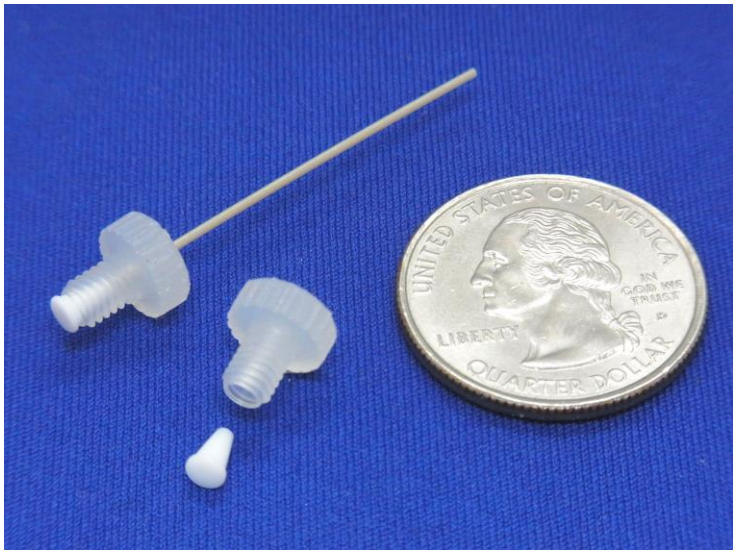
Specifications

Operating Pressure Range	0 - 300kPa
Port Connection	10-32UNF (Standard)
Voltage	12VDC, 24VDC
Power Consumption	18W
Duty Cycle	Intermittent (ED=15%)
Max. Continuous Energising Time	45 s
Wetted Materials	PTFE, PEEK, Al_2O_3
Lifetime	100 thousand operations (Experimental result)

Note: Specifications etc. may be changed at any time without notice.

CAPILLARY TUBE FITTINGS

CJ Series

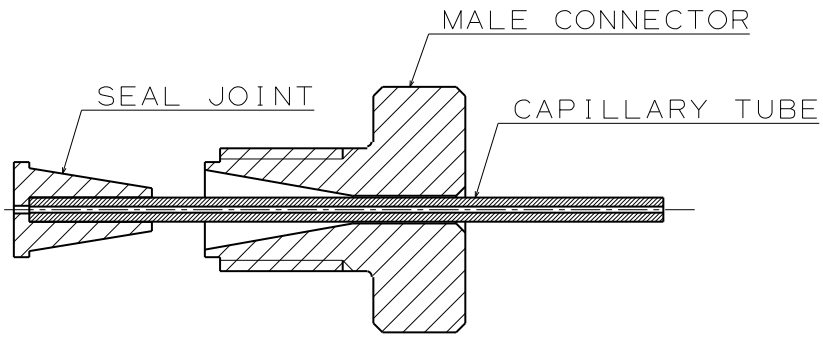


Connects Glass/PEEK Capillary Tubes Easily

Features

- Pressure capability of -90 ～ 700 kPa at temperature range of 5 ～ 60 degrees C.
- Flat bottom seal design that enables easier machining on female port compared to tapered seal design.
- Customization to meet customer's tubing diameters is possible.

How to Connect



*You can connect this fitting to a female port by simply screwing it into the port after a capillary tube is inserted into the seal joint and the male connecter.

Standard Models and Applicable Tubing Diameters

Model Number	Tubing Outer Diameter	Tubing Inner Diameter	Seal Joint Inner Diameter	Port Connection
CJM4-0375	0.375 mm	0.1 - 0.15 mm	0.2 mm	M4
CJM6-1/32	1/32 inch (0.79 mm)	0.012 - 0.016 inch (0.3 - 0.4 mm)	0.4 mm	M6

Note: Details including specifications may change without notification.

MICRO NEEDLE VALVE

MNV Series

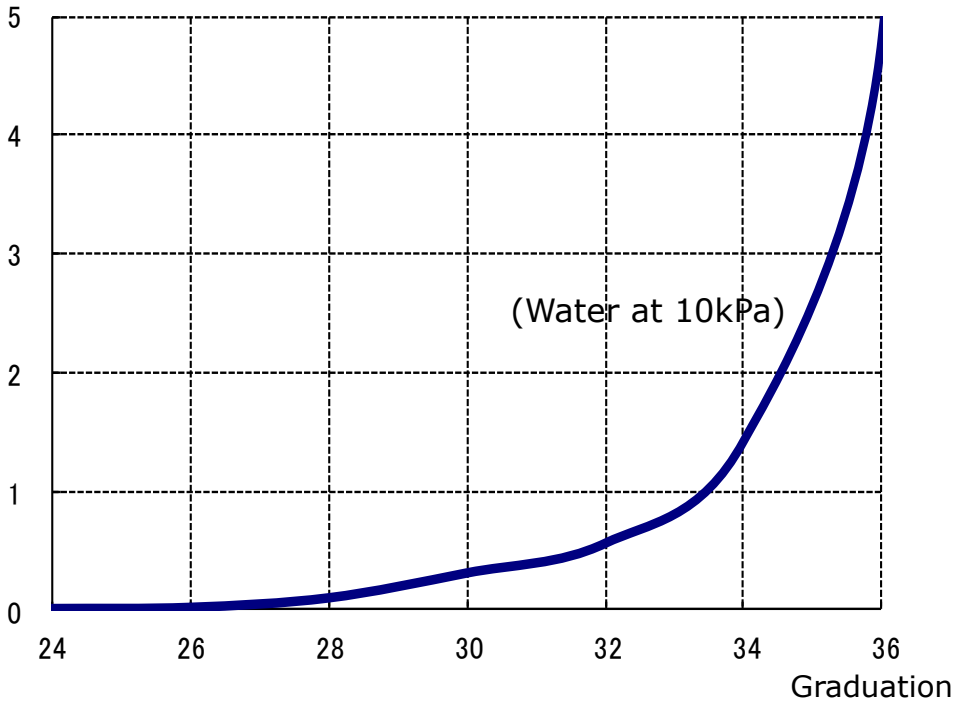
Features

- Fine manual adjustment of flows below 1 µl/min
- Reduced flow pulsation by restricting flow
- Wetted materials: Perfluoroelastomer, PEEK and stainless steel
- Operating pressure range: 0 ～ 200 kPa

Flow Characteristics

<Example Flow Data*>

Flow (µL/min)



*Flow-graduation relationship varies according to valve.

Note: Details including specifications may change without notification.

Reduction of Flow Pulsation

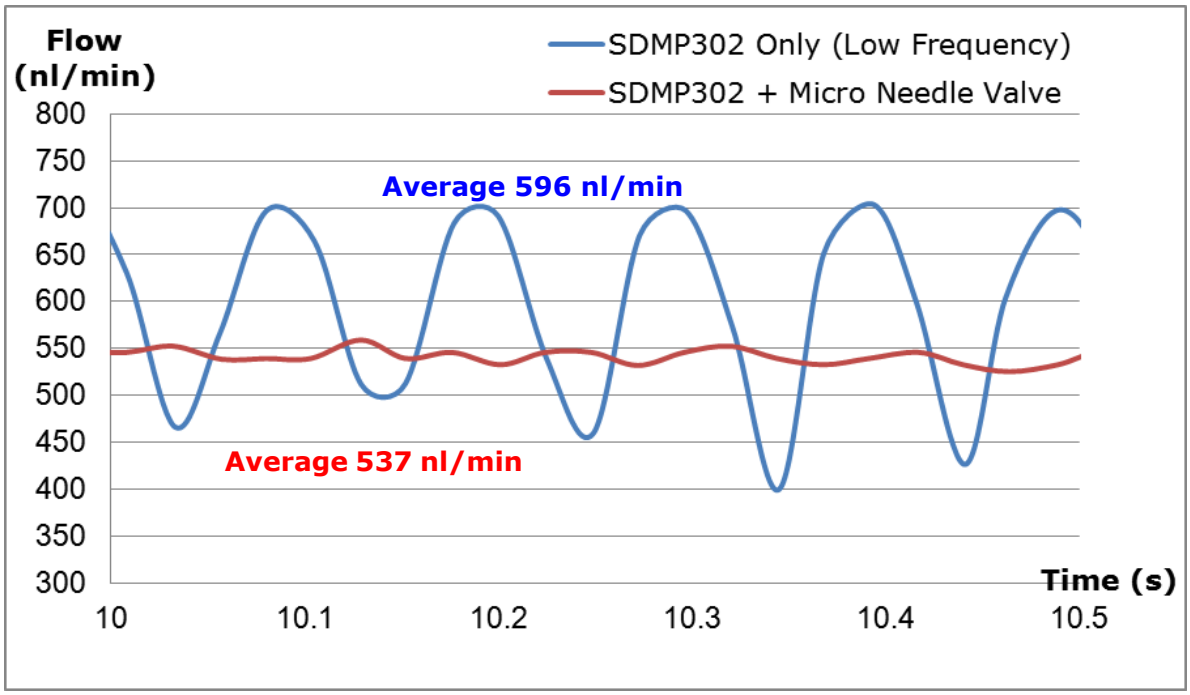
<Example of Combination with Piezoelectric Micro Pump>

Piezoelectric micro pumps are small-sized, lightweight and slim diaphragm micro pumps driven by piezoelectric element. By considerably reducing the drive frequency and the drive voltage from the standard operating ranges, a piezoelectric micro pump alone can transfer µl/min level flows. However, significant pulsation is created at a low flow rate as represented by the blue line in the graph below.

By incorporating a micro needle valve on the discharging side of a piezoelectric micro pump, a low flow rate with almost no pulsation can be achieved. The red line on the graph below is an example that shows this remarkable reduction in pulsation. Pulsation can also be reduced when combined with other kinds of pumps, such as peristaltic pumps.

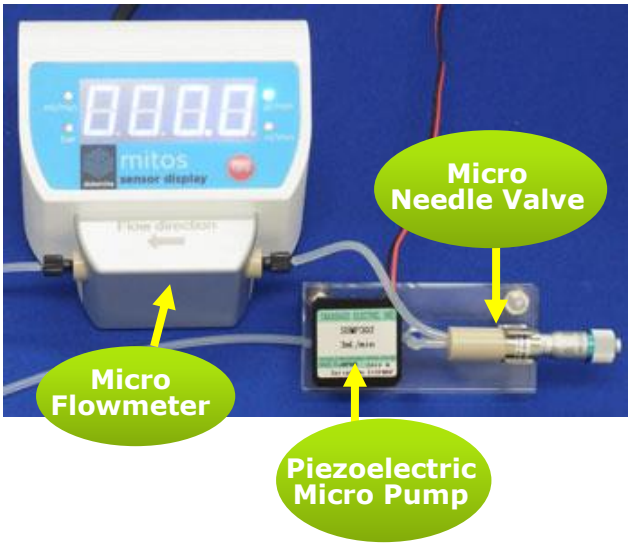
Note: The actual effect may change depending on the flow rates, pumps, types of tubing, etc. Please consult with us for more details.

Flow Data of Piezoelectric Micro Pump SDMP302 (at 10 Hz, 150 Vp-p)



Low Pulsation Micro Pump Module

<Piezoelectric Micro Pump + Micro Needle Valve + Micro Flowmeter>

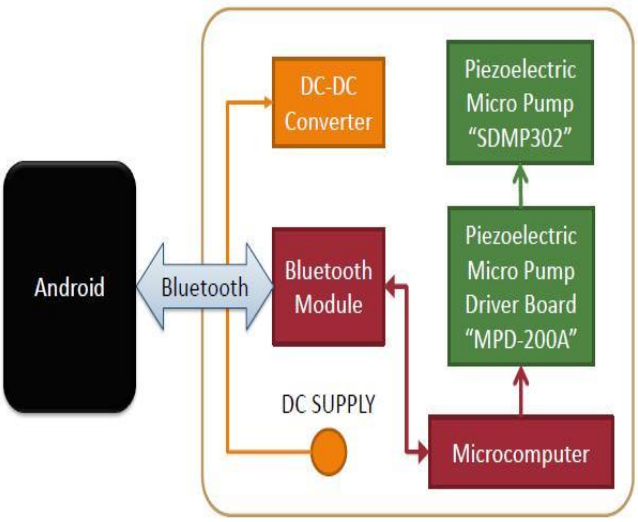


The Low Pulsation Micro Pump Module is a module to adjust the flow of a piezoelectric micro pump at the µl/min level using a micro needle valve. In the setup in the left picture, the output flow from the module is being measured by a micro flowmeter. The features of this module make it suitable for various fields, such as flow cytometers, cell culture equipment, etc.

ANDROID APPLICATION **(For R&D)**

Micro Pump Remote Control System

Operation Screen Image



Control System Block Diagram

Just Drag the Bars to Adjust the Flow

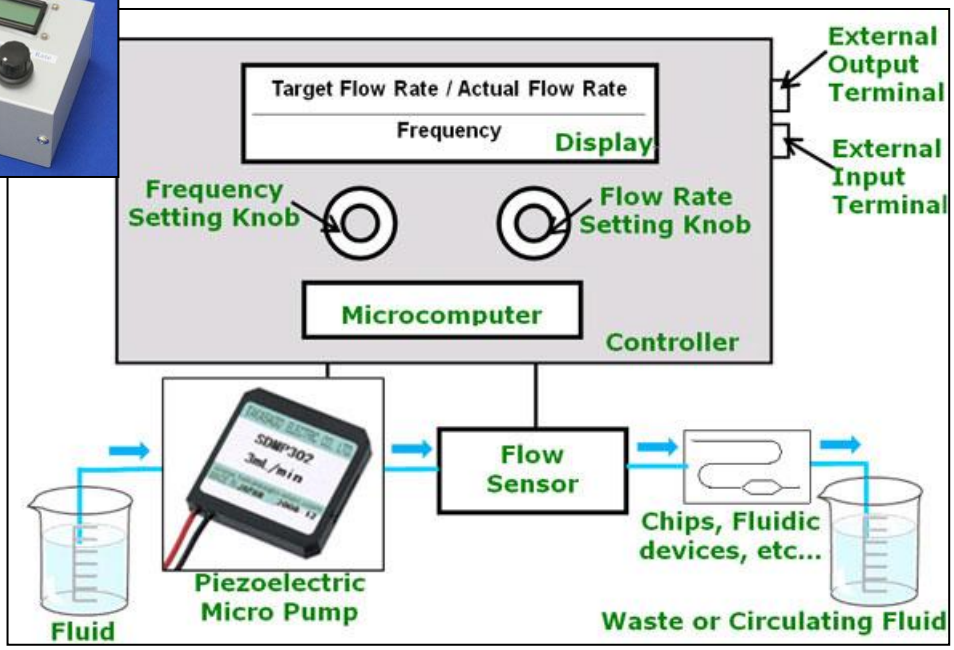
This Android application is for the remote control of Takasago piezoelectric micro pumps. Your Android device* wirelessly connects to a microcomputer, and allows you to easily switch on/off and adjust the drive voltage and drive frequency. A ready-to-use sample package** that includes a Bluetooth module, a microcomputer and a driver board is available upon request.

This specific system for piezoelectric micro pumps is just an example of our Android-controlled fluidic systems. Consult with us for developing other systems to control pumps, valves, etc.

* This application requires Android platform version 2.3.6 or later and a Bluetooth terminal.

** Sample package is for sale. Pumps are not included in the package.

Flow Control System for Piezoelectric Micro Pump



Automatically Adjust to a Target Flow Rate

Features

- Automatically adjusts the flow to the target rate set manually by the flow setting knob. Flow remains stable even when the liquid levels of the vessel change.
- Programmed flow control using an external input is also possible.
- The flow data can be exported through the external output terminal.
- Applicable to Takasago piezoelectric micro pump models SDMP302, SDMP306 and APP-20KG.
- The flow sensor can be selected from Sensirion LG16-0150 or LG16-1000. These support a range of flow rates from a few hundred nl/min to 7 µl/min and from a few µl/min to 1 ml/min, respectively. Please consult us for more details.
- The wetted materials of the flow sensors are PEEK and glass, and those of the pumps are plastics and elastomers. The highly inert model allows the handling of a wide range of fluids. For the details, please refer to the user's manual of each piezoelectric micro pump.

Note:
The flow rate of a piezoelectric micro pump is adjustable by changing either the drive voltage or drive frequency. However, the automatic flow control of this system is enabled by the adjustment of drive voltage only. Thus, the range of automatic flow control is restricted to within the adjustable range of the drive voltage. Please manually adjust the drive frequency when you require flow rates outside of this range.

*Details including specifications may change without notification.

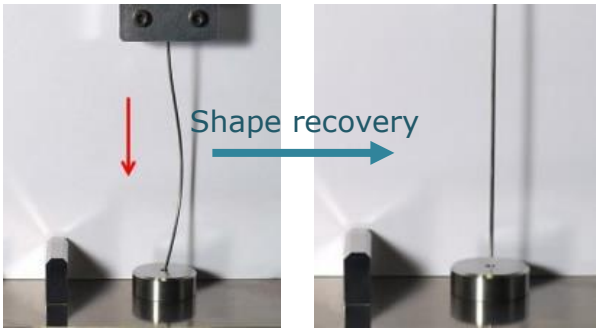
TITANIUM TUBING

β-Titanium Probes

Non-bending and Absolutely Non-magnetic Features

1. Non-bending piercing probe

Long-lasting due to its shape recovery characteristics with respect to bending (high tensile strength and superior spring characteristics), which contributes to longer life expectancy compared to stainless steel probes.



2. Non-magnetic

Having absolutely no magnetism makes it particularly suitable for analyzers that use magnetic particles, like an immunoassay system.

3. Finely polished titanium

The fine bore polishing (Ra 0.02 at minimum) reduces the carryover of samples (especially proteins), system flushing time and sample loss.

Comparison with Stainless Steel

	Elasticity	Magnetism	Corrosion resistance
β-Titanium	Good	Non-magnetic	Excellent
Stainless stl.	Bad	Can be magnetic	Good

Made to order. Please contact us for more details.