IWAKI

Hi-Cera Pumps

Hi-Cera Pump V

Precision Valveless Plunger Pump

The Heart of Industry

Ultra-High Precision Valveless Plunger Pump

The Iwaki Hi-Cera pump is a compact metering pump that employs a fine ceramic plunger. The unique valveless construction eliminates problems caused by clogging and jamming that commonly occur in conventional metering pumps. The precision micron-machining on the main ceramic parts ensures a high degree of discharge accuracy. The versatility of the Iwaki Hi-Cera pump makes it ideal for micro-chemical feeding as well as high-viscosity liquid feeding.

Ultra-High Precision Dosing of ±0.5% (Reference)

Capable of ultra-high precision dosing at a micro discharge capacity. Simple adjustment of the discharge capacity by changing the angle of the pump head. (Other than V-07)

Higher Corrosion Resistance–Perfect for Handling a Variety of Liquids

Ceramics and PTFE resins are used on the wetted surface, lending greater resistance when pumping acid, alkaline, organic solvents, and other liquids.

Max. 20,000 mPa·s High Viscous Liquid Transfer

The unique valveless structure enables the smooth metering transfer of high viscous liquid at a maximum of 20,000 mPa·s.

- The handling of viscous liquid is limited to the motor type with a speed reducer.
- The transfer of viscous liquid requires verification with actual liquid.

Compact Design–Ideal for Built-in Applications

The compact and light, making them ideal for built-in applications. The reversible motor direction allows you to reverse the flow without needing to change the piping.

Discharge into a Vacuum and Suction From High Pressure Sources

Because there are no suction / discharge valves, the pump is able to discharge directly into a vacuum (negative pressure) without the need for electromagnetic valves. Maintains a constant flow even if the suction / discharge pressure fluctuates.

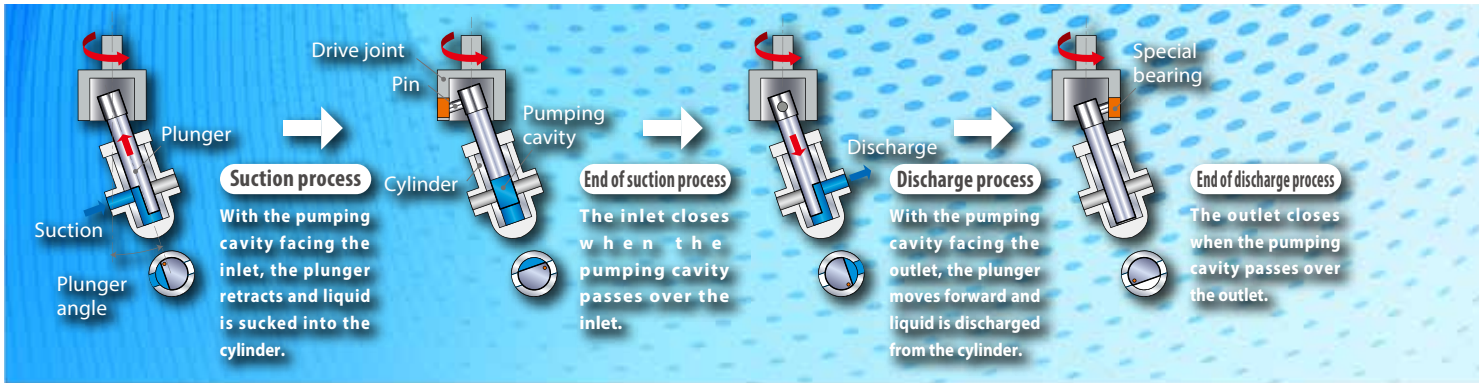
- Accuracy of injection into vacuum may vary depending on piping conditions.

Original Structure–Gas Lock Free

This pump enables air to be automatically discharged from the outlet, thereby preventing problems caused by gas lock.

- Depending on the installation conditions or the liquid being handled, there are times gas cannot be discharged smoothly. Contact us for more details.

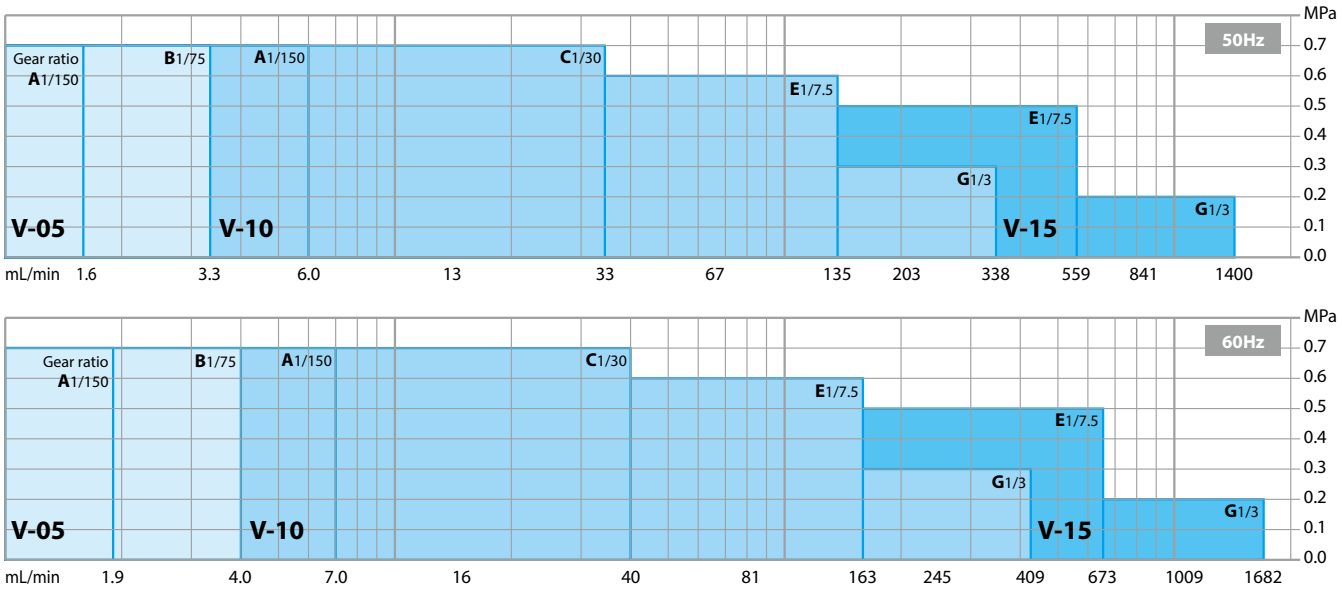
Ultra-High Precision Mechanism



The plunger is connected to the drive joint via a special bearing and pin. When the drive joint rotates, the plunger rotates and moves up and down inside the cylinder. The plunger angle determines how far down the cylinder the plunger moves while the driving joint rotates. This unique structure eliminates the need for the valve system normally employed in other pumps.

AC motor

Performance Graph



Applications

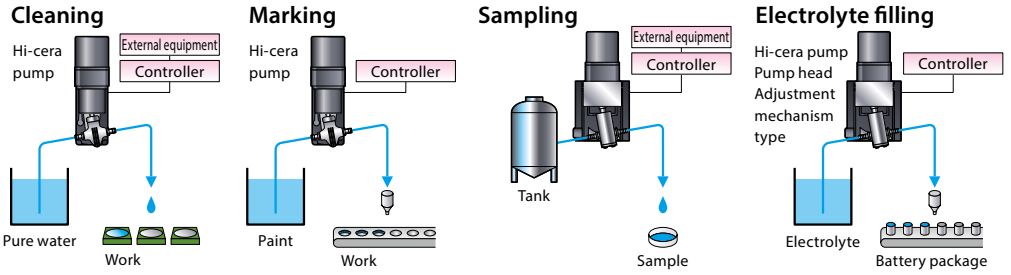
Secondary cell
Filling and pumping the electrolyte solutions of a lithium cell
Injection of gel-like liquid at a constant rate

Cleaning equipment
Injection of detergent / rinsing chemical

Paper manufacturing
Injection of paper strength additives at a constant rate
Injection of dye at a constant rate
Injection of slime control agent

Capacitor
Injection of phosphoric acid liquid

Liquid waste treatment facility
Injection of polymer flocculants / slaked limes



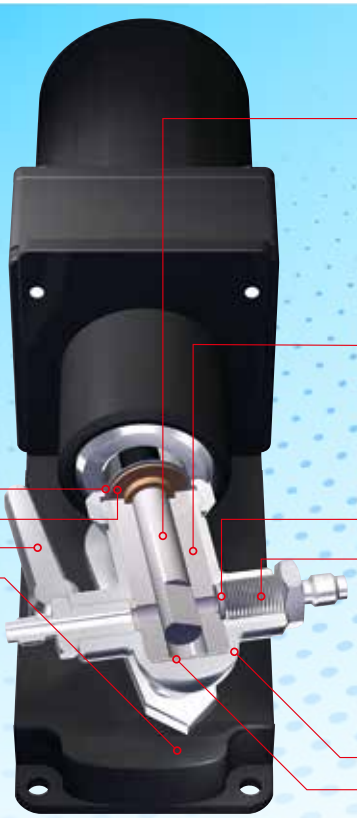
Max. discharge capacity : 2.8/3.4 mL/min
Max. discharge pressure : 0.7 MPa
(50/60Hz)

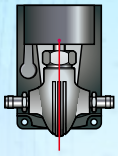
Max. discharge capacity : 338/406 mL/min
Max. discharge pressure : 0.7 MPa
(50/60Hz)

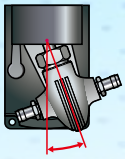
Max. discharge capacity : 1,400/1,682 mL/min
Max. discharge pressure : 0.5 MPa
(50/60Hz)

Materials

Model	V-05	V-10		V-15	
Pump head	SCS14			SUS304	
Plunger	SiC	SiC	Al_2O_3	SiC	Al_2O_3
Cylinder	SiC	SiC	Al_2O_3	SiC	Al_2O_3
Head seal	PTFE				
Back sheet	PTFE				
Tube joint	SUS316				
Joint seal	PTFE				
Lip seal	PTFE				




Stroke 0
Discharge 0


Stroke Max
Discharge Max

Plunger
The plunger is processed using micron order high-precision technology, leading to a higher degree of discharge precision. It is made of SiC or alumina ceramic (Al_2O_3).


SiC, Al_2O_3

Cylinder
Like the plunger, the cylinder is also processed using high-precision technology.


SiC, Al_2O_3

Tube joint
We offer a standard stainless steel hose joint (SUS316) and a stainless steel female adapter (SUS316) that can be connected to commercial tube fitting.


Tube connection, Female adapter

Identification

V - 05 S L P 1 A 1 - X
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

Standard combination	❶ Plunger diameter	❷ Material (Plunger/Cylinder material)	❸ Pump head material	❹ Flushing port
05SL	05: Ø5mm	S: SiC/SiC	L: SCS14 Stainless steel casing	_ : Unavailable
05SLP				P : Available
10AL	10: Ø10mm	A: Al_2O_3/Al_2O_3	L: SCS14 Stainless steel casing	_ : Unavailable
10ALP				P : Available
10SL		S: SiC/SiC		_ : Unavailable
10SLP				P : Available
15AS	15: Ø15mm	A: Al_2O_3/Al_2O_3	S: SUS304 Machined	_ : Unavailable
15ASP				P : Available
15SS		S: SiC/SiC		_ : Unavailable
15SSP				P : Available

The table above lists the plunger diameter, plunger / cylinder materials, and pump head materials. It also indicates whether a flushing port is equipped.

❺ **Joint**.....Adaptation pump
1: Ø6 SUS hose.....V-05, V-10 Gear ratio 1/150 - 1/30
2: Ø10 SUS hose.....V-10 Gear ratio 1/7.5 - 1/3
3: Ø13 SUS hose.....V-15
4: Rc1/4 SUS female adapter.....V-05, V-10
5: Rc3/8 SUS female adapter.....V-15

❻ **Gear ratio**.....Adaptation pump
A: 1/150.....V-05, V-10
B: 1/75.....V-05
C: 1/30.....V-10
E: 1/7.5.....V-10, V-15
G: 1/3.....V-10, V-15

❼ **Power voltage**
1: AC100V single phase
3: AC200V three phase

❽ **Special specifications**
X: Special specifications
Contact us for details.

Specifications (50/60Hz)

Model	Gear ratio Note3	Rotation speed rpm	Max. discharge capacity mL/min	Max. discharge pressure MPa	Tube joint Note4 mm	Standard motor Note5	Mass kg
V-05SL1A1 Note1	1/150	9/11	1.3/1.6	0.7	Ø6 SUS316 made hose joint type	Induction motor AC100V single phase 15W AC200V three phase 25W	2.7
V-05SL1B1 Note1	1/75	19/23	2.8/3.4				
V-10□L1A1 Note2	1/150	9/11	6.0/7.0	0.7	Ø6 SUS316 made hose joint type		2.7
V-10□L1C1 Note2	1/30	48/58	33/40				
V-10□L2E1 Note2	1/7.5	193/232	135/162	0.6	Ø10 SUS316 made hose joint type	Induction motor AC100V single phase 25W AC200V three phase 25W	3.1
V-10□L2G1 Note2	1/3	483/580	338/406	0.3			
V-15□S3E1 Note2	1/7.5	193/232	559/672	0.5	Ø13 SUS316 made hose joint type	Induction motor AC100V single phase 40W AC200V three phase 40W	8.8
V-15□S3G1 Note2	1/3	483/580	1,400/1,682	0.2			

Note1 : The fitting type and motor power supply can be selected. Please refer to the identification for details.
Note2 : The model code is entered in the □ box (A: Al_2O_3, S: SiC).
Note3 : The number of revolutions in the table is when the pump load is small, and may decrease as the load increases.
Note4 : Stainless steel (SUS) female adapters as well as a standard tube joint can be used. (V-05, V-10 : Rc1/4, V-15 : Rc3/8)
Note5 : Other motors can be used to accommodate non-standard orders. Contact us for details.

- The performance values in the table represent the values for when clear water is pumped at an ambient temperature.
- Discharge capacity per revolution: approx. 0.15 mL/rev for V-05 (swing angle of 18 degrees), approx. 0.70 mL/rev for V-10, approx. 2.90 mL/rev for V-15 (swing angle of 20 degrees)
- The suction capacity of the pump is 4m or more at a suction pressure of -0.04MPa or less. Note that suction ability varies depending on the liquid that is used.
- Be sure to clean the inside of the pump when transferring crystalline liquid or liquid that easily sticks. We also recommend using a flushing port.

Special Specification Examples

Specifications for special motors

Special specifications are required for non-standard motors.
Contact us for details about these specifications.

Stepping motor type

Allows for high precision injection at the ultra-precision level.

Speed control motor type

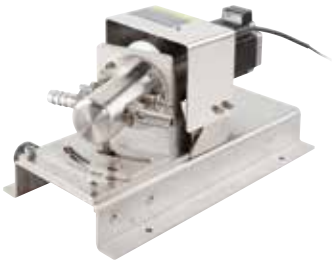
(Equipped with a controller)

The variable volume controller located at the top of the motor makes it easy to control the number of the revolutions.

Secondary / lithium cell

Pump equipped with a pump head adjustment mechanism

This type has an adjustable knob used to change the swing angle of the pump head, allowing for the fine adjustment of the stroke length.



Dialyzer

Pump for artificial dialysis

V-15 for drug solution / dialysate

V-10 for drainage / dialysate

This type consists of a PVDF pump head and 24 VDC stepping motor. It is mounted on an artificial dialyzer for use as a ultrafiltration pump or dialysate pump.

Compact and Ideal for Device Installation
V-05 / 07 Series

The compact and lightweight V-05 / 07 series is a compact plunger pump that is ideal for incorporating into equipment. Since it is driven by a DC motor, highly accurate discharge rate control is possible. It has a variable discharge rate function and a flushing port can be selected, so it is possible to inject chemicals cleanly. Since there are a wide variety of fittings, it can be incorporated into various devices.

Variable discharge volume

The discharge amount per rotation can be selected by adjusting the swing angle of the pump head. (Select when ordering) See the specifications on page 6 for details.
Note : V-07AF4 is not included.

Flushing port

The cleaning/flush port reduces seizing of the plunger. The plunger surface is kept clean at all times, allowing it to operate freely whenever needed.
Note : V-07AF4 is not included.

High torque motor

A high-torque hyblid stepping motor is used. Trouble such as plunger lock is solved. (V-07 only)

Rotation sensor

With the rotation sensor equipped as standard, the pump quickly detects errors and easily monitors discharge rates.

V-07AF4

Fuel Cell-Only Pump

Application : Fixed-quantity injection of fuel-cell reformed water

Long life design, Low power consumption, lightweight

V-07AF4 is a long-life design with a design life of 95,000 hours. (Conventional type "V-07AF3": 90,000 hours)
Features a lightweight design utilizing an aluminum die cast frame, and includes a lock-type connector on the motor and sensor.

V-05ZF(P)66-P
V-07AEP06-P
V-07AF(P)66-P

V-07AF66-P01

High precision metering pump optimized for immunoassay analyzers

Application : Injection of reagent, cleaning solution, buffer solution, saline solution, etc.

High corrosion resistance

PVDF or ECTFE is used for the pump head material. Supports the transfer of strong alkaline.

V-07AFP06-P

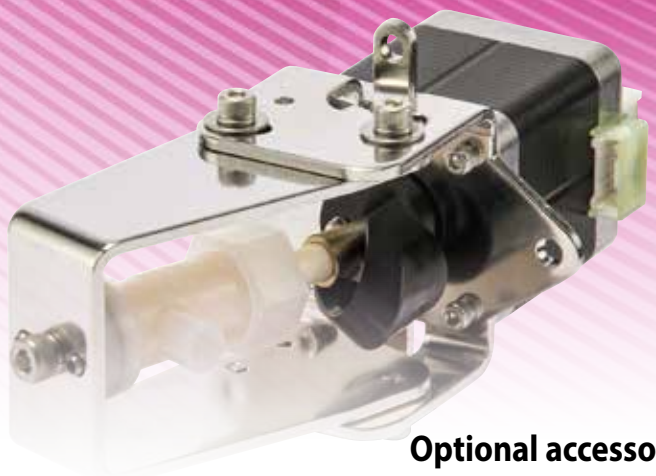
High precision metering pump optimized for dialysis machines

Application : Delivery of A and B dialysates and ultrafiltration

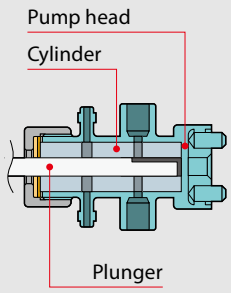
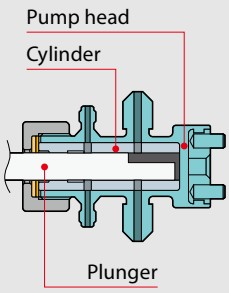
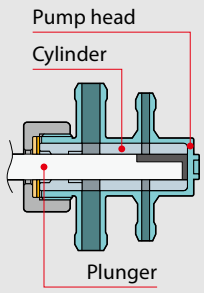
Hot water washable

Can be cleaned with water as hot as 95˚C.

DC motor

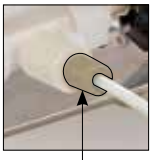


Materials

Model	V-05ZFP	V-07AEP	V-07AFP
			
Pump head	PVDF	ECTFE	PVDF
Plunger	ZrO_2	Al_2O_3	Al_2O_3
Cylinder	Al_2O_3	Al_2O_3	Al_2O_3

Optional accessory

Conversion joints for V-07AEP06-P



Connect with commercially available fittings. (1/4-28 UNF flat bottom fitting)

Commercially available fittings

Identification

V - 07 A E P 0 6 - P 01
❶ ❷ ❸ ❹ ❺ ❻

❶ Plunger diameter
05: Ø5mm
07: Ø7mm

❷ Material (Plunger/Cylinder material)
A: Al_2O_3/Al_2O_3
Z: ZrO_2/Al_2O_3

❸ Pump head material
E: ECTFE
F: PVDF

❹ Flushing port
_: Unavailable
P: Available

❺ Joint ..... Adaptation pump
0: Male thread/Tube V-07AEP, V-07AFP
6: Female thread V-05ZEP/ZE, V-07AFP/AF

❻ Volume/shot
01: 0.1mL/shot
02: 0.2mL/shot
03: 0.3mL/shot

Specification

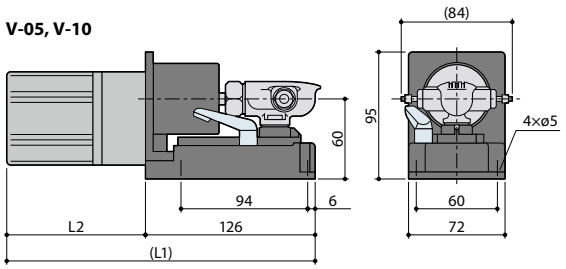
Applications	Model	Joint	Volume/shot mL	Flow range mL/min	Rotation speed rpm	Repeatability	Max. discharge pressure kPa	Mass g
Fuel-cell	**V-07AF4**	**Quick fastener** (P7)	0.1	1 - 20	10 - 200	±3% or below[Note2]	40	About 480
Immunoassay analyzers	**V-05ZF(P)66-P**	**Female thread** (1/4-28 UNF)	0.1	0.5 - 30	10 - 300	±1.5% or below[Note3]	150	About 820
	V-07AF(P)66-P01	**Female thread** (1/4-28 UNF)	0.1	0.5 - 30	5 - 300	±1.5% or below[Note3]	150	About 700
	V-07AF(P)66-P02		0.2	1 - 60				
	V-07AF(P)66-P03		0.3	1.5 - 90				
	V-07AEP06-P01	**Male thread** [Note1] (Dedicated joint)	0.1	0.5 - 30	10 - 300	±1.5% or below[Note3]	150	About 700
	V-07AEP06-P02		0.2	1 - 60				
	V-07AEP06-P03		0.3	1.5 - 90				
Dialysis machines	**V-07AFP06-P01**	**Tube** (Ø5.5)	0.1	0.5 - 30	5 - 300	±1% or below[Note3]	200	About 700
	V-07AFP06-P02		0.2	1 - 60				

• Liquid temperature Other than V-07AFP06-P : 0 - 60°C (Non condensing) V-07AFP06-P : 10 - 40°C (Max flushing temperature is 95°C for 30 min at a maximum.)
• Ambient temperature V-07AF4 : 0 - 60°C V-05ZF(P)66-P, V-07AEP06-P, V-07AF(P)66-P : 0 - 40°C V-07AFP06-P : 0 - 50°C
• Motor V-05 : 2-phase unipolar stepping motor V-07 : Two-phase bipolar stepper motor
• Power voltage : DC24V
Note1 : Use the optional conversion joint when using the standard joint.
Note2 : Based on the clockwise operation when viewed from the front of the pump, at 200min^{-1} with opened suction/discharge lines.
Note3 : Based on the counterclockwise operation when viewed from the front of the pump, at 100min^{-1} with opened suction/discharge lines.

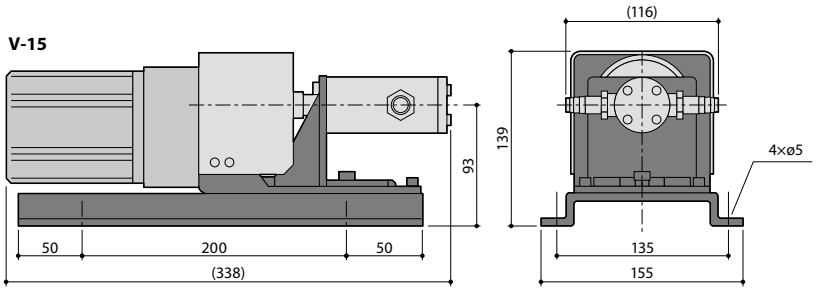
Dimensions in mm

AC motor

V-05, V-10



V-15

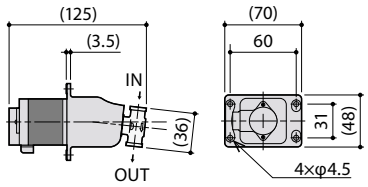


Model	Standard motor	L1	L2
V-05	AC100V 15W	238 (248)Note	112 (122)Note
V-10□L1	AC100V 15W	238 (248)Note	112 (122)Note
V-10□L2	AC100V 25W	247 (258)Note	117 (128)Note

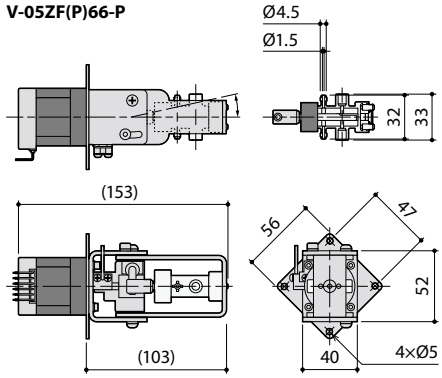
Note : Shows the dimensions when the reduction ratio is 1/30 to 1/150.

DC motor

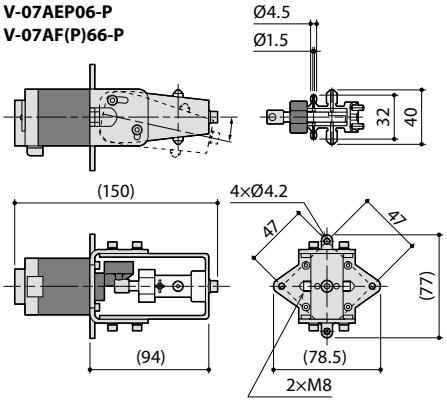
V-07AF4



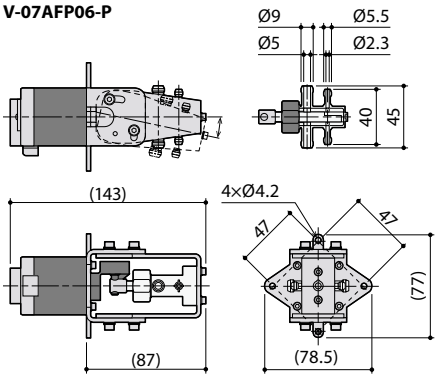
V-05ZF(P)66-P



V-07AEP06-P
V-07AF(P)66-P



V-07AFP06-P



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( )Country codes

Caution for safety use:
Before use of pump, read instruction manual carefully to use the product correctly.

Legal attention related to export.

Our products and/or parts of products fall in the category of goods contained in control list of international regime for export control. Please be reminded that export license could be required when products are exported due to export control regulations of countries.