

**Precision Valveless
Plunger Pump**



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.

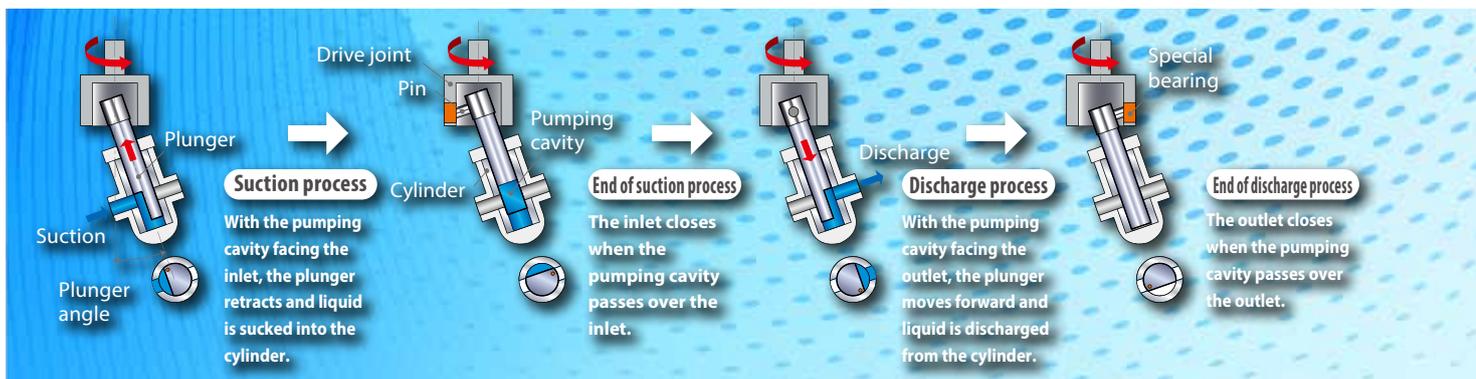
- Accuracy of injection into vacuum may vary depending on piping conditions.

Original Structure-Gas Lock Free

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

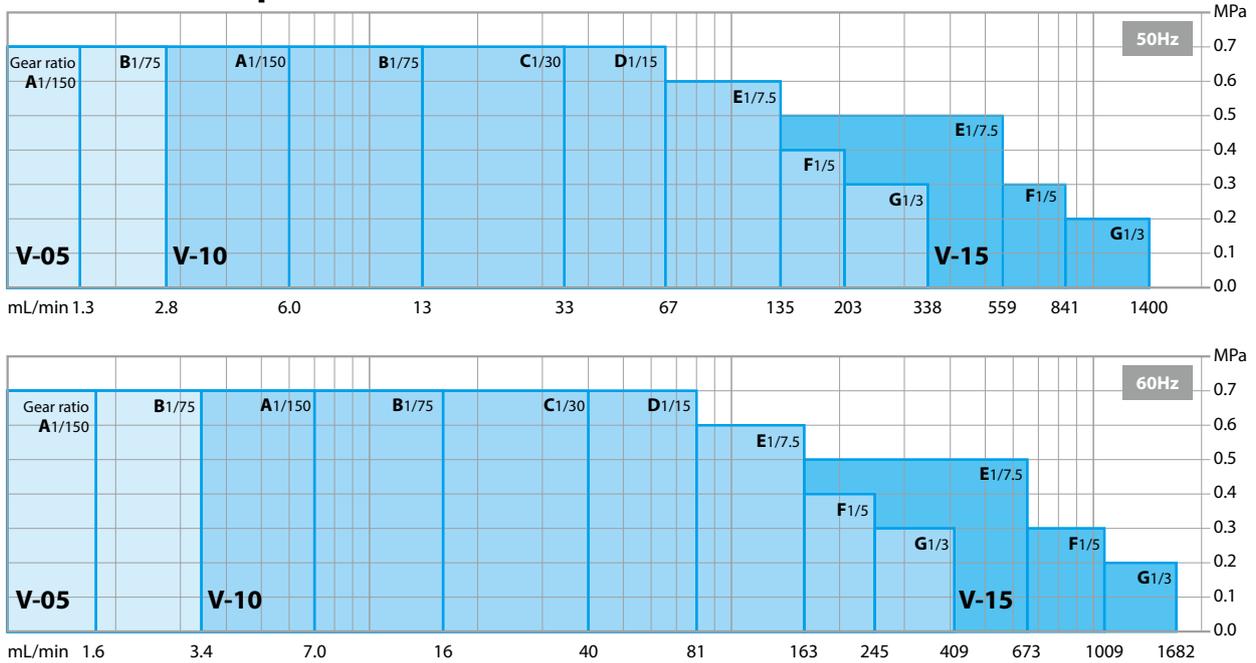
- Depending on the installation conditions or the liquid being handled, there are times gas cannot be discharged smoothly. Contact us for more details.

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.

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

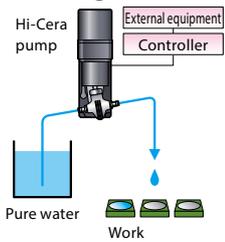
Capacitor

Injection of phosphoric acid liquid

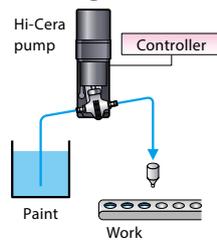
Liquid waste treatment facility

Injection of polymer flocculants/slaked limes

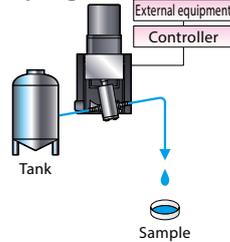
Cleaning



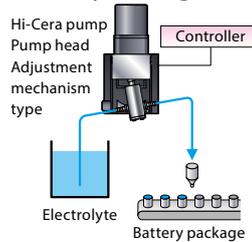
Marking



Sampling



Electrolyte filling



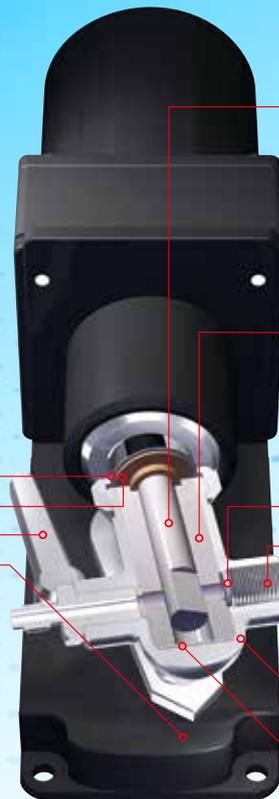
Max. discharge capacity : 2.8/3.4 mL/min
 Max. discharge pressure : 0.7 MPa
 (50/60Hz)

Max. discharge capacity : 338/409 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 ₂ O ₃	SiC	Al ₂ O ₃
Cylinder	SiC	SiC	Al ₂ O ₃	SiC	Al ₂ O ₃
Head seal	PTFE				
Back sheet	PTFE				
Tube joint	SUS316				
Joint seal	PTFE				
Lip seal	PTFE				



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 (Al₂O₃).



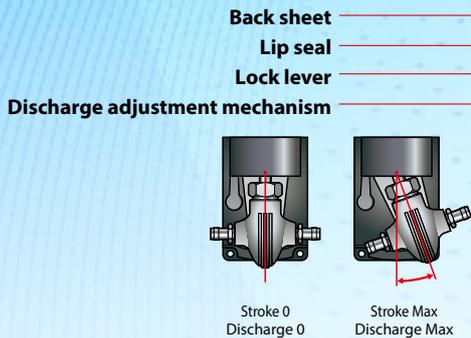
Cylinder
Like the plunger, the cylinder is also processed using high-precision technology.



Joint seal
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.



Pump head
Head seal



Identification

V - 05 S L P 1 A 1 - X
1 2 3 4 5 6 7 8

Standard combination	1 Plunger diameter	2 Material (Plunger/Cylinder material)	3 Pump head material	4 Flushing port
05SL	05: Ø5mm	S: SiC/SiC	L: SCS14 Stainless steel casing	_ : Unavailable
05SLP				P : Available
10AL	10: Ø10mm	A: Al ₂ O ₃ /Al ₂ O ₃	L: SCS14 Stainless steel casing	_ : Unavailable
10ALP				P : Available
10SL		S: SiC/SiC		_ : Unavailable
10SLP				P : Available
15AS	15: Ø15mm	A: Al ₂ O ₃ /Al ₂ O 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.

- 5** Joint.....Adaptation pump
1: Ø6 SUS hose V-05, V-10 Gear ratio 1/150 - 1/15
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
- 6** Gear ratio.....Adaptation pump
A: 1/150.....V-05, V-10
B: 1/75V-05, V-10
C: 1/30V-10
D: 1/15.....V-10
E: 1/7.5.....V-10, V-15
F: 1/5V-10, V-15
G: 1/3V-10, V-15
- 7** Power voltage
1: AC100V single phase
3: AC200V three phase
- 8** Special specifications
X: Special specifications
 Contact us for details.

Specifications (50/60Hz)

Model	Gear ratio	Rotation speed rpm ^{Note2}	Max. discharge capacity mL/min	Max. discharge pressure MPa	Tube joint ^{Note3} mm	Standard motor ^{Note4}	Mass kg
V-05SL1A1	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	2.3(100V) 3.0(200V)
V-05SL1B1	1/75	19/23	2.8/3.4				
V-10 □ L1A1 ^{Note1}	1/150	9/11	6.0/7.0		Ø6 SUS316 made hose joint type		
V-10 □ L1B1 ^{Note1}	1/75	19/23	13/16				
V-10 □ L1C1 ^{Note1}	1/30	48/58	33/40		Ø10 SUS316 made hose joint type		
V-10 □ L1D1 ^{Note1}	1/15	96/116	67/81				
V-10 □ L2E1 ^{Note1}	1/7.5	193/232	135/162	0.6			
V-10 □ L2F1 ^{Note1}	1/5	290/348	203/245	0.4	Ø13 SUS316 made hose joint type	Induction motor AC100V single phase 25W AC200V three phase 25W	3.0
V-10 □ L2G1 ^{Note1}	1/3	483/580	338/409	0.3			
V-15 □ S3E1 ^{Note1}	1/7.5	193/232	559/673	0.5	Ø13 SUS316 made hose joint type	Induction motor AC100V single phase 40W AC200V three phase 40W	8.0
V-15 □ S3F1 ^{Note1}	1/5	290/348	841/1,009	0.3			
V-15 □ S3G1 ^{Note1}	1/3	483/580	1,400/1,682	0.2			

Note1 : The model code is entered in the box (A: Al₂O₃, S: SiC).

Note2 : The number of revolutions in the table is when the pump load is small, and may decrease as the load increases.

Note3 : 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)

Note4 : Other motors can be used to accommodate non-standard orders. Contact us for details.

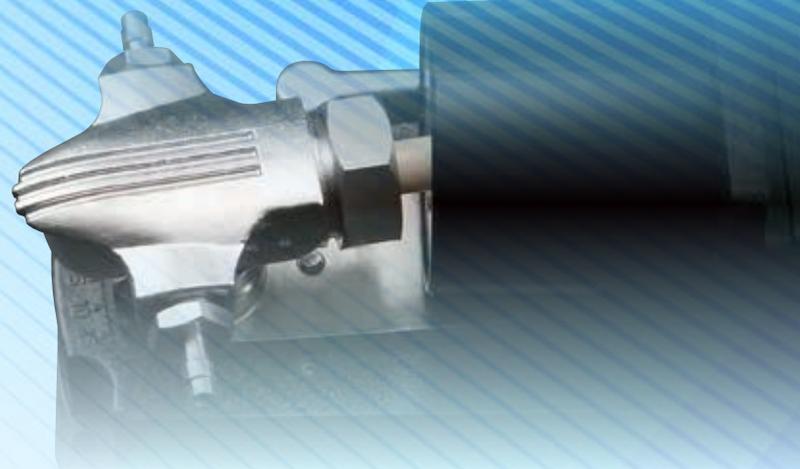
The fitting type and motor power supply can be selected. Please refer to the identification for details.

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)

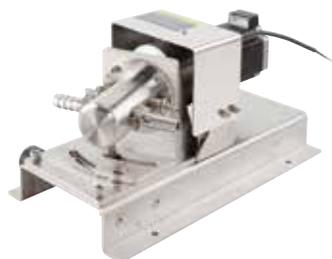
The variable volume controller located at the top of the motor makes it easy to control the number of the revolutions.



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 hybrid 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



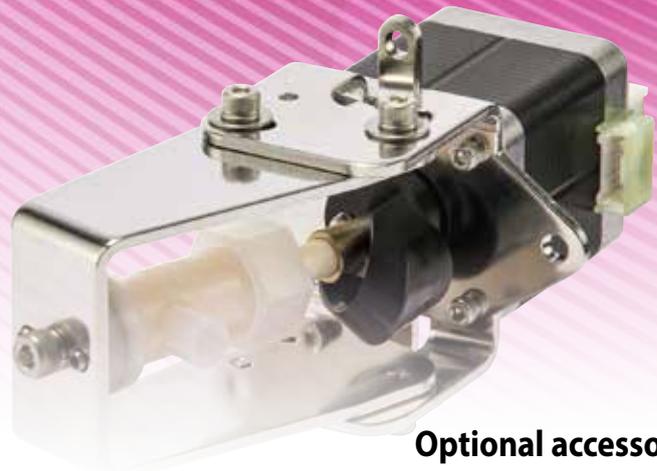
High precision metering pump optimized for dialysis machines

Application : Delivery of A and B dialysates and ultrafiltration

Hot water washable

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

DC motor

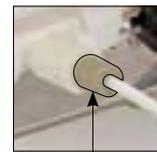


Materials

Model	V-05ZFP	V-07AEP	V-07AFP
Pump head	PVDF	ECTFE	PVDF
Plunger	ZrO ₂	Al ₂ O ₃	Al ₂ O ₃
Cylinder	Al ₂ O ₃	Al ₂ O ₃	Al ₂ O 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

1 2 3 4 5 6 7 8

1 Plunger diameter 05: Ø5mm 07: Ø7mm	2 Material (Plunger/Cylinder material) A: Al ₂ O ₃ /Al ₂ O ₃ Z: ZrO ₂ /Al ₂ O ₃	3 Pump head material E: ECTFE F: PVDF	4 Flushing port _: Unavailable P: Available	5 Joint.....Adaptation pump 0: Male thread/Tube.....V-07AEP, V-07AFP 6: Female thread.....V-05ZEP/ZE, V-07AFP/AF	6 Volume/shot 01: 0.1mL/shot 02: 0.2mL/shot 03: 0.3mL/shot
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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

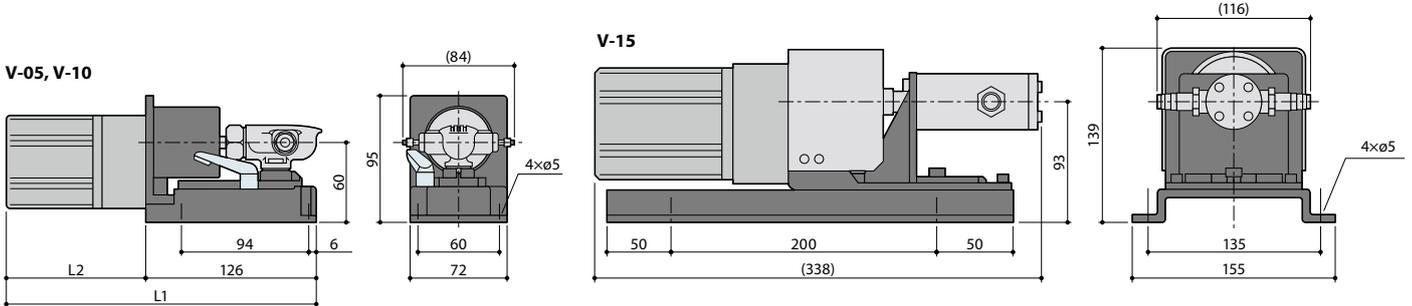
Note1 : Use the optional conversion joint when using the standard joint.

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, 10 (15W motor type)

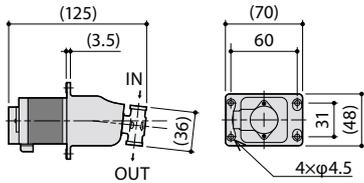
Gear ratio	L1	L2
1/15	(238)	(112)
1/30, 1/75, 1/150	(248)	(122)

V-05, 10 (25W motor type)

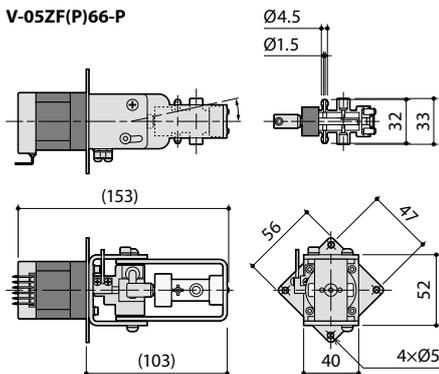
Gear ratio	L1	L2
1/3	(247)	(121)
1/5, 1/7.5	(258)	(132)

DC motor

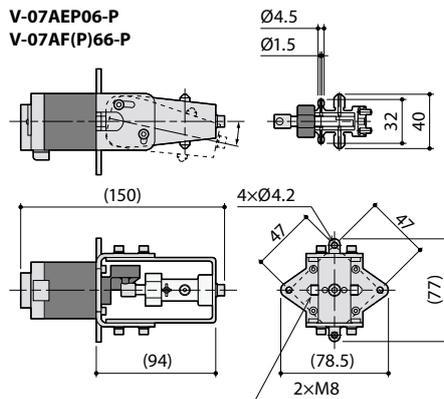
V-07AF4



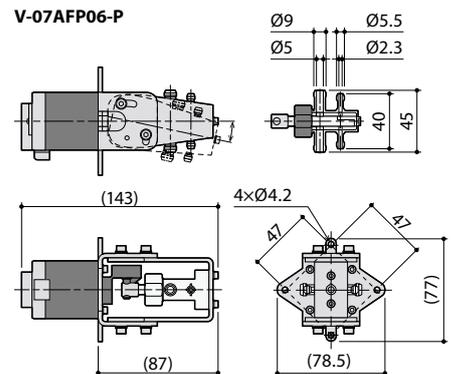
V-05ZF(P)66-P



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



V-07AFP06-P



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