



VTY Micro Vacuum Pump Series User Guide

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Hilintec

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About This Document

Purpose

This document is related to the VTY micro vacuum pump products, which is used to guide relevant technical personnel to initially understand the characteristics of the product.

Intended Audience

This document is intended for technical personnel. You should have a good understanding of your product and have a clear concept of the relevant parameters, specifications, and other information of the applications of the micro pump.

Keyword

High negative pressure, voltage speed control, key parameters, operation instructions

Change History

The change history accumulates each update of this document. The latest version of the document contains all the previous updates.

Issue	Date	Product Version	Modification
01	20221031	1.0	First official release
02	20221118	1.0	Revised size drawing

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1

Characteristics



1. 1 Long Lifespan,Low Interference

This model is driven by brushless motors which have the advantages of long service life, low interference and high reliability.

1. 2 High Negative Pressure

VTY9009A negative pressure can reach -90kPa, achieving high vacuum and large flow in compact size

1. 3 Speed Control Function

The flow can be adjusted by changing the motor speed through the input voltage signal.

1.4 Protections

It has overload protection and anti-power reverse connection protection functions to protect the pump from being easily damaged

1.5 Maintenance Free,Pollution-free Transmission

There is no need to add lubricating oil and maintenance, and it does not pollute the medium.

1.6 Water Vapor Medium Available

Without fear of moist gas, the gas can be rich in water vapor

1.7 Good Corrosion Resistance

The materials of the wetted parts: reinforced nylon and EPDM rubber, which have certain corrosion resistance

1.8 Unlimited Installation

It can be installed in any direction

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Certifications

EMC	Electro Magnetic Compatibility
Note: EMC certified products need to be customized	

RoHS	Restriction Of Hazardous Substances
Note: RoHS certified products need to be customized	

3

Technical Specifications

3.1 Key Specifications

Model	Voltage (V DC)	Load Current (mA)	Flow Rate (L/min)		Relative Vacuum (-kPa)	Weight (g)
			Peak Flow	Average Flow		
VTY9009A	24	≤500	≥9	≥5	≥90	≈400
VTY7611A	24	≤500	≥11	≥10	≥76	
VTY7915A	24	≤500	≥15	≥11	≥79	

Note: 1. The input voltage requires $24V \pm 10\%$.

2. Unless otherwise specified, the technical parameters are measured under the conditions of temperature 20°C and standard atmospheric pressure of 101.325kPa.

3. The peak flow rate in the table refers to the flow value measured with a rotameter, and the average flow rate is measured with a soap film flow-meter.

4. Do not change the connection mode between the two pump heads, otherwise the pump will be easily damaged

3.2 Versions Description

Only standard version is available now

Version		Standard Version
Configuration	Motor quality	BLDC ★★★★
	Diaphragm performance	★★★★
	Bearing performance	★★★★
Performance	Motor lifespan	>15000 小时
	Noise and Vibration	★★★★
	EMC	▲▲▲
	Overload protection	Yes
	Anti-power reverse connection protection	Yes
	Warranty	1 Year

Note: 1. The more ★, the better performance of this item.

2. The less ▲, the lower EMC of this item

3.3 Working Conditions

1. Environment: This series of products can be divided into three types according to the working environment temperature: low temperature environment type, normal temperature environment type and high temperature environment type. If not specified, it is the normal temperature environment type. Low temperature environment type and high temperature environment type need to be customized. Such as VTY9009A (high temperature environment type).

Type	Permissible medium temperature range	Cautions
low temperature environment (standard version)	-10℃～50℃	It is forbidden to contain solid particles such as ice particles in the medium!
normal temperature environment (standard version)	0℃～40℃	
high temperature environment (standard version)	0℃～55℃	

1.The permissible relative humidity of all pumps in this series is $\leq 90\%$, no condensation. The pump should not be exposed to the sun, and should work in a clean and ventilated environment.

2.Medium: The permissible gas medium is allowed to be rich in water vapor, but cannot contain particles.The permissible liquid medium cannot contain particles.

This series of products are divided into two types: normal temperature medium type and high temperature medium type according to the medium temperature that can be tolerated. If not specified, it is the normal temperature medium type. The high temperature medium type needs to be customized and specified, such as VTY9009A (high temperature medium type).

Type	Permissible medium temperature range	Cautions
normal temperature medium (standard version)	0℃～50℃	It is forbidden to contain solid particles such as ice particles in the medium!
high temperature medium (standard version)	0℃～100℃	

When pumping high-temperature water, the space will be occupied due to gas precipitation in the water, which will reduce the pumping flow.

3.Load: the suction port can run with full load (ie completely block the inlet), But the applied load pressure must be between the pump's maximum vacuum, The exhaust port must be kept open! Otherwise please choose the micro compressor pump. The pump can be started at the ultimate negative pressure

3. 4 Pump Materials

1.The materials of the wetted parts: fiber reinforced nylon, EPDM rubber, All materials have certain corrosion resistance, Please check the chemical resistance and compatibility of the medium according to the wetted material.

2. The material of the plastic parts of the pump body is fiber reinforced nylon, and the material of the shock absorb foot is PVC.

3. 5 Filtering problem

When the pump works for a period of time, the solid impurities contained in the pump cavity, which will destroy the air tightness of the pump and reduce the flow rate and vacuum degree. A filter must be installed at the pump inlet. the gas that we generally think is very clean which still contains dust impurities, and it also needs to be filtered to ensure the normal operation of the precision air-tight components inside the pump. After the filter is used for a period of time, the resistance increases due to the adhesion of impurities, which makes the flow rate and vacuum degree of the system decrease significantly, and the filter should be replaced immediately. Filter life depends on the cleanliness of the medium.

3. 6 Noise and Silencer

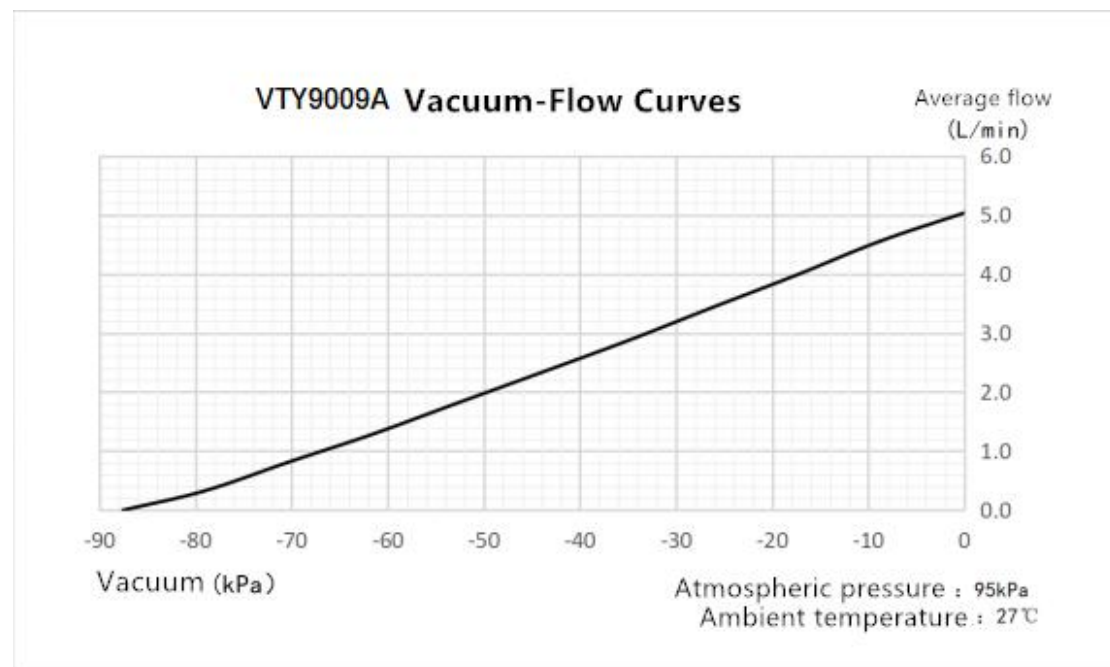
Choose high-end pump, less noise. When there is a large air flow through the pump, the noise is louder, and the noise will be reduced when the pumping is close to a vacuum. Connecting the silencer to the piping system will have a certain effect. According to the specific conditions of the pipeline system, the noise reduction effect is different.

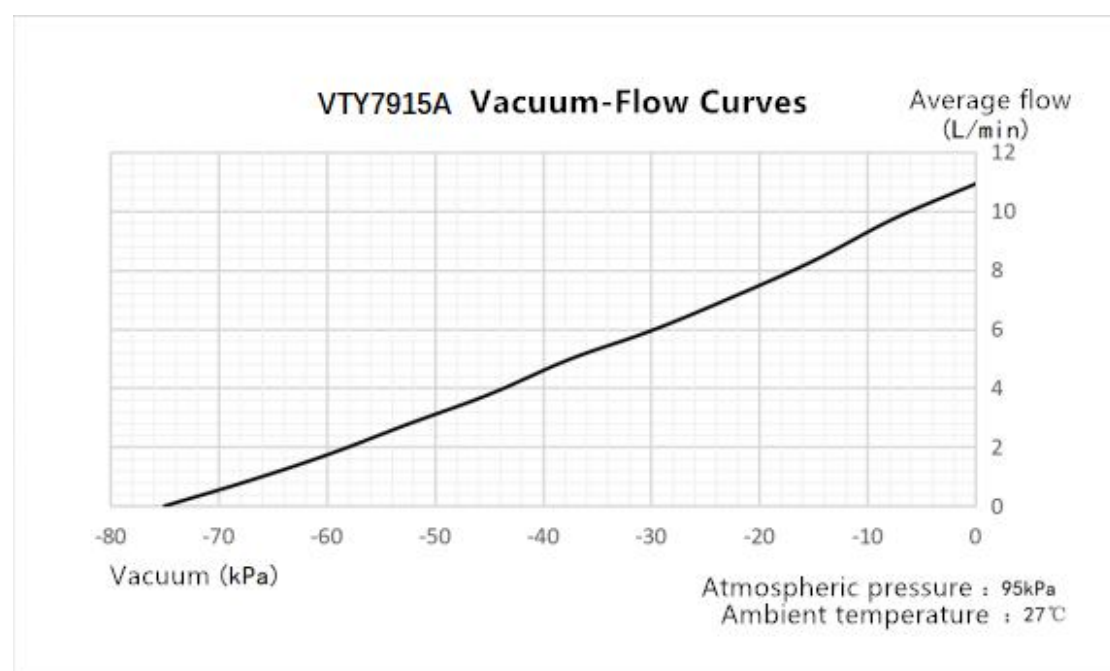
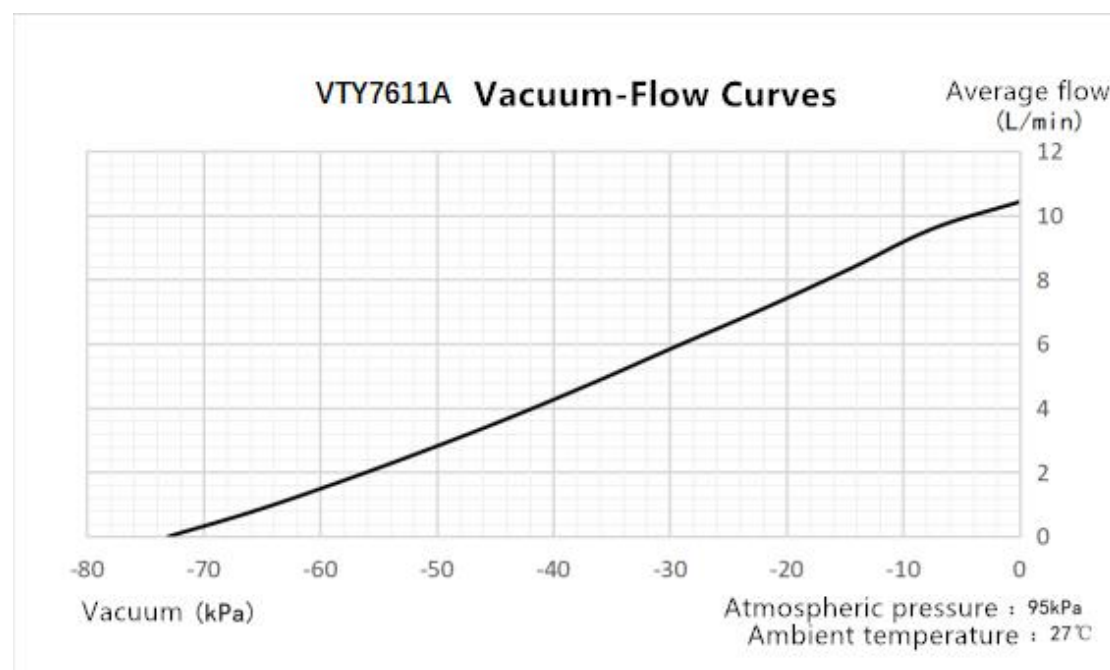
3.7 Tube diameter

Standard hose connector (material: reinforced nylon), can match 4*8mm or 5*9mm silicone hose. Do not change the connection between the two pump heads, otherwise the pump will be easily damaged!

3.8 Vacuum-Flow Curves

There are individual differences between different micro pumps, so this curve is a statistical value, only used as a technical reference for users to confirm the working point. The "flow" mentioned in this section refers to the "average flow".





3. 9 Motor Starting Current

1. The maximum starting current of this series of pumps is <10A.
2. The starting current of the motor is the maximum current generated when the motor is in a static state and suddenly connected to the rated voltage. This current is a basic parameter of the motor determined by the motor manufacturer.
3. When the motor is turned on during use, other auxiliary circuits are connected at the same time, such as: speed regulation, control, etc., which will generate additional surge current superimposed on the starting current of the motor, which will increase the starting current a lot .

For users with limited starting current, the pump with "start/stop" function terminal should control the "start/stop" function terminal of the motor, rather than control the current on and off.

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Electrical Connection

4.1 Signal Wire Instruction

S. N	Wire	Function	Signal Definition	Description
1	White	Control motor start and stop	NC or VIH (2.5 ~ 4V) start, GND or VIL (0 ~ 0.8V) stop	This signal wire can be used to control the start and stop of the pump, especially for frequent start and stop. If this wire is not used, it must be insulated and wrapped.
2	Yellow	Voltage speed control	The Voltage Control range is 0~4V, corresponding to the speed of 3100-1250rpm	If the input signal is PWM signal, it is calculated according to the effective voltage. Signal levels exceeding the permissible range will cause permanent damage to the motor!
3	Black	Power wire, negative pole。		
4	Red	Power wire, positive pole, +24V($\pm 10\%$)		If the pump does not work for a long time, the red power cord should be disconnected

If the speed control function is not used, the white wire is insulated and wrapped, and the yellow wire is connected to the negative pole, the pump will run at the maximum speed.

It is equipped with a signal line when leaving the factory, and the customer can connect his own signal line to it.

Warning: Hot swap is prohibited! It is strictly forbidden to connect or disconnect the motor wire while the power is on! All connection or disconnection must be carried out with the power supply completely cut off! Otherwise it will burn the motor! Do not connect the positive and negative poles in reverse, otherwise the motor will be burned!

5

Cautions



Please read the instructions in this chapter carefully and follow the instructions strictly before use.

1. The suction port can be operated at full load (completely blocking the suction port), but the load applied cannot exceed the maximum vacuum degree of the pump! The exhaust port must be kept open.
2. Do not change the connection mode between the two pump heads by yourself, otherwise the pump will be easily damaged!
3. This product has no waterproof, dust-proof, and explosion-proof functions and cannot be used in flammable and explosive environments!
4. Foreign matter must not fall into the hydraulic connectors, and there should be no solid particles in the medium, otherwise the micro pump will be damaged!
5. When this product is used to transfer harmful medium, it must be double-sealed to ensure personal safety!
6. The matching piping components and containers must have sufficient strength to ensure personal safety!
7. Built-in precision control circuit, need to use high-quality DC power supply to power the pumps!
8. Hot swap is prohibited! It is strictly forbidden to connect or disconnect the motor wire while the power is on! All connection or disconnection must be carried out with the power supply completely cut off! Otherwise it will burn the motor! Do not connect the positive and negative poles in reverse, otherwise the motor will be burned!
9. Users should take anti-static measures!

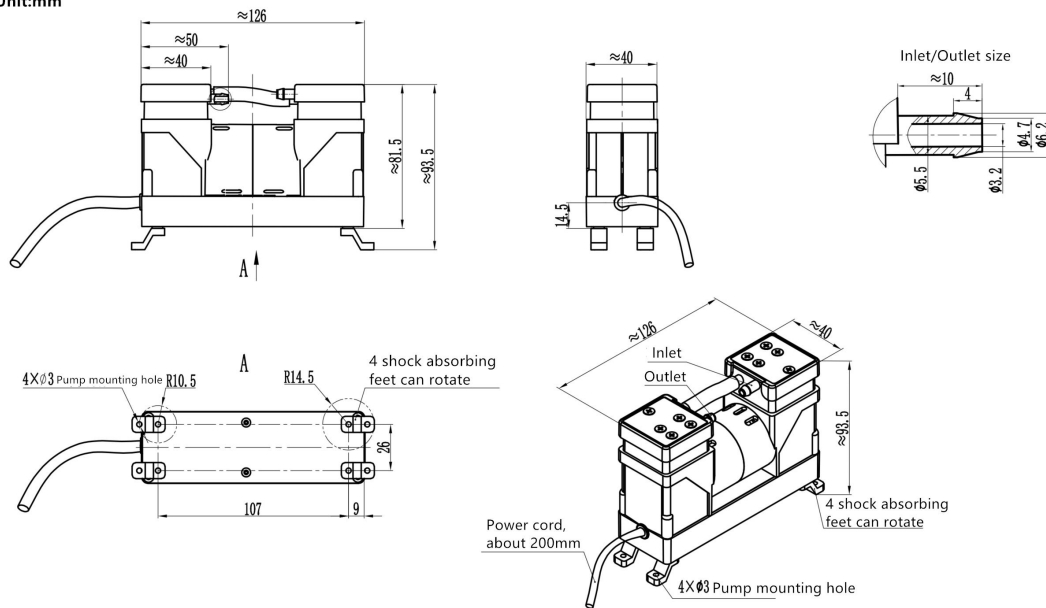
10. Please follow the instructions strictly!

6 Dimensions

Overall Dimensions of VTY9009A

Unit:mm

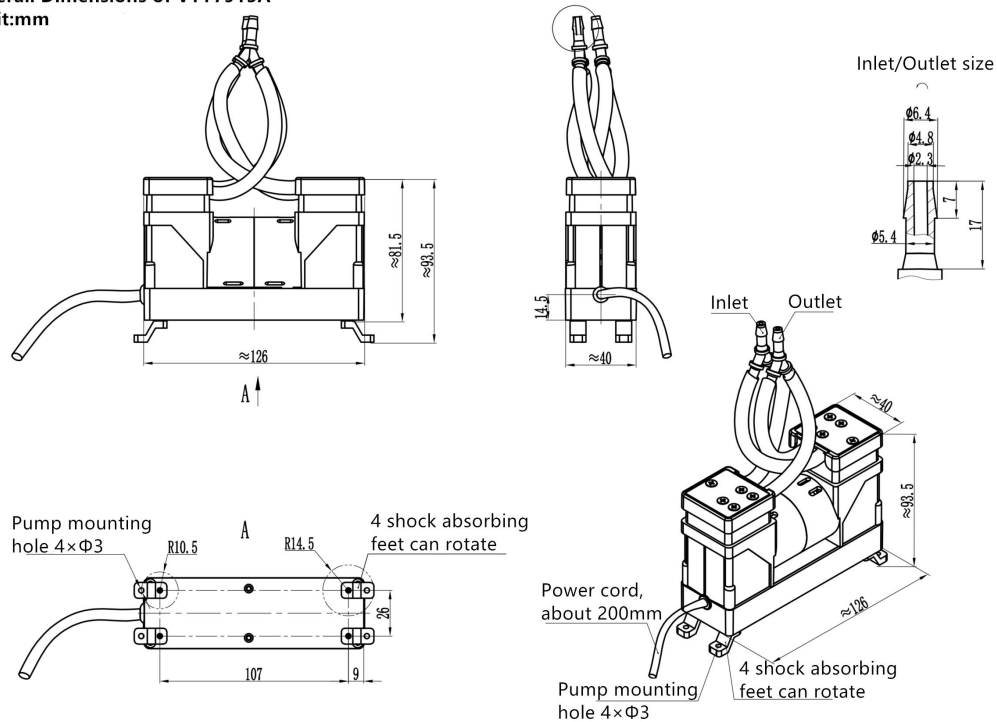
Unit:mm



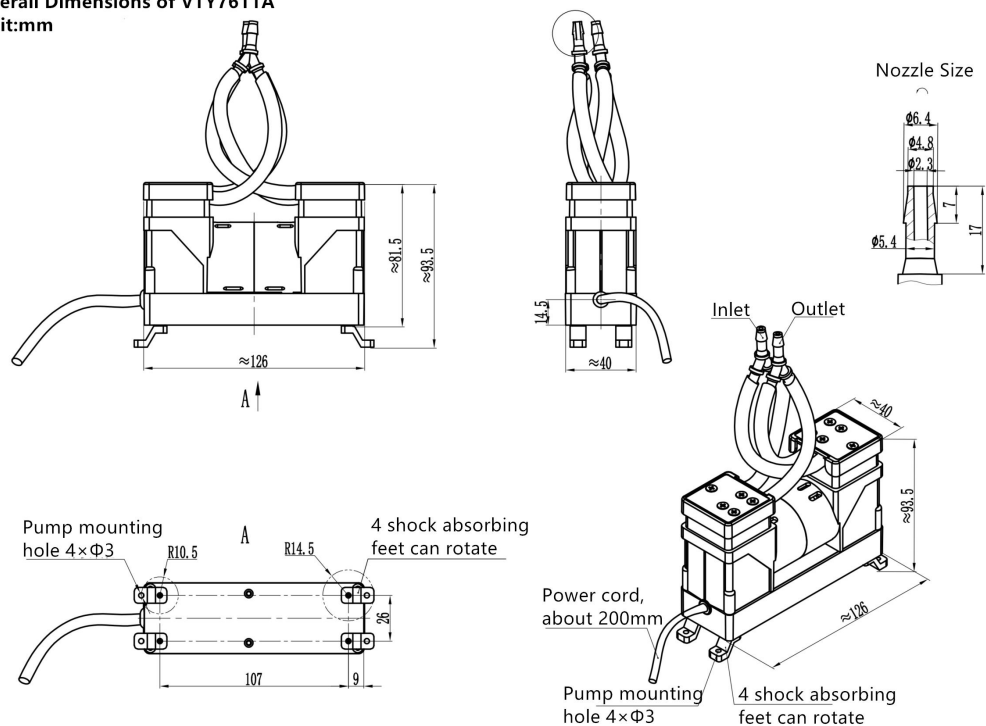
Installation instructions:

The mounting holes are self-tapping screw holes, not suitable for repeated tightening and disassembly, otherwise the installation will be loose and unreliable.

Overall Dimensions of VTY7915A
Unit:mm



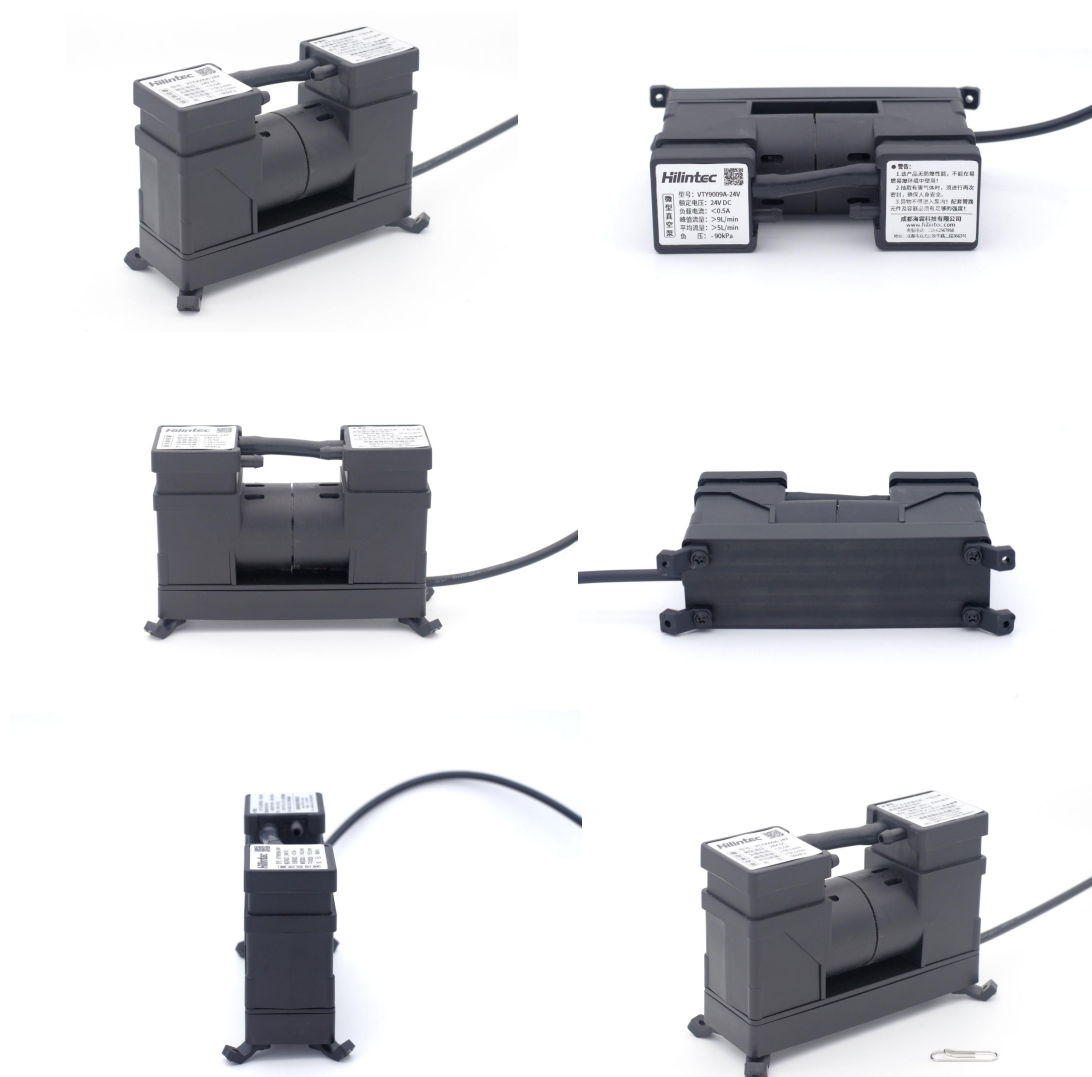
Overall Dimensions of VTY7611A
Unit:mm



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Appearance

VTY9009A



VTY7915A



VTY7611A

