



WSP-3300

PeristaQuantumPump

Peristaltic pump with high flow precision
3-channel type with long tube life

PeristaQuantumPump

Easy operation with touch panel
Attach and detach tubes with one-
touch operation

WSE-3310 **PeristaQuantumPump**

New Product





A Fusion of Over 60 years of Technological Accumulation and Innovation

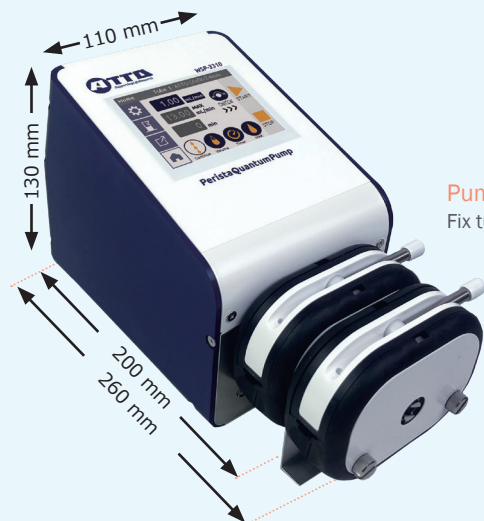
Combining our 60 years of development experience since our founding with the latest technology, we have evolved into an innovative, compact, high-performance digital pump that has been refined and combines ease of use and high performance. Adopting a new roller system, it achieves highly reproducible flow accuracy and stability while reducing the effects of pulsation. Furthermore, in pursuit of intuitive and simple operability, the convenience of attaching and detaching tubes with one hand and with a single touch, and the touch panel that anyone can easily use. PeristaQuantumPump is an innovative fluid control solution that combines ease of use and performance for users who demand reliability and convenience.

- ▶ Automatic operation enables timer liquid feeding and fixed volume liquid feeding.
- ▶ Compatible with various solutions by using olefin tube with high chemical resistance and durability
- ▶ Adoption of stepping motor improves durability and extends lifespan
- ▶ One-touch tube attachment/detachment allows quick replacement
- ▶ Achieves fixed-quantity liquid transfer with high flow rate accuracy and flow stability
- ▶ Easy calibration with semi-automatic operation

Flow range: 0.01 to 40 mL/min *1
 Pump rotation speed: 0.005 to 50 rpm
 Flow stability: $\pm 1\%/h$
 *1 Depends on tube diameter
 *2 Display is 0.01 to 50 rpm

3.5 inch touch panel

Since it is a pressure-sensitive type, it can be used with gloves on, and operate the flow rate, liquid feeding direction, time, START/STOP, etc.



WSP-3310-2
PeristaQuantumPump
 (2 channels)

Roller part

Six stainless steel rollers rotate and feed liquid in the direction of rotation.

Pump head

Fix tube and pump the liquid

Tube presser

A plate that evenly compresses tubes.

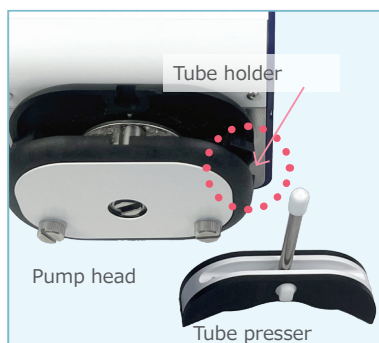


WSP-3310
PeristaQuantumPump

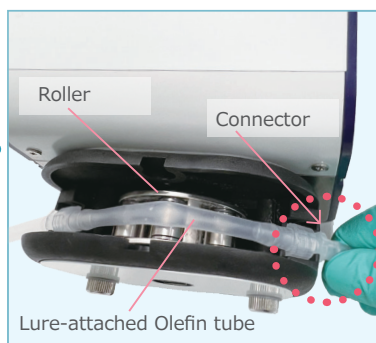
Olefin tube with lure

This is a standard tube that arrives at the compression section.

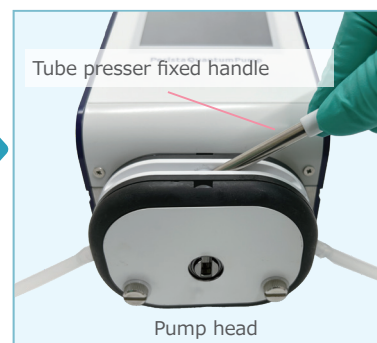
Complete tube set with one-touch operation



Lift the fixed handle and remove the tube presser from the pump head.



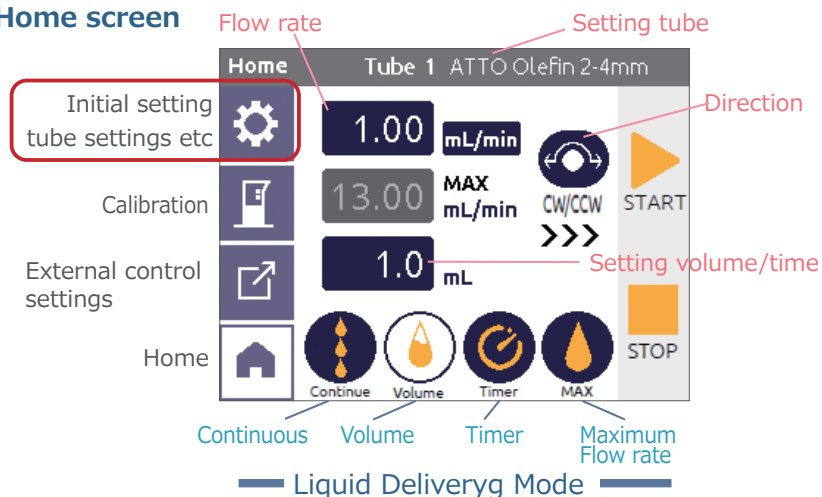
Fix the connector part of the lure-attached olefin tube to the tube holder.



Fold down and secure the tube presser fixed handle.

Easy operation with intuitive setting

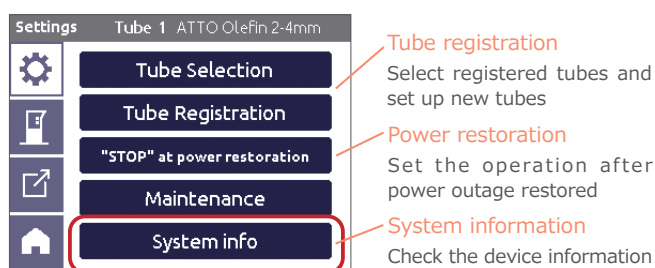
Home screen



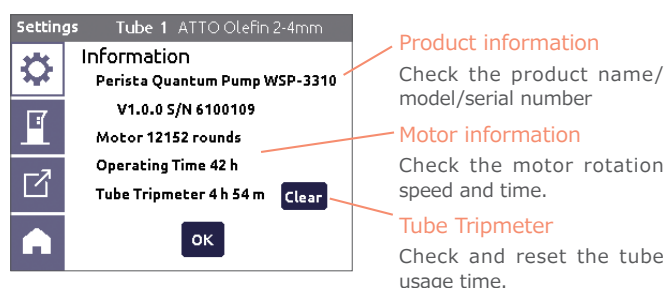
Liquid Delivery Mode

- ▶ **Continuous liquid delivery**
The liquid is delivered at the set flow rate, and it stops when you tap the stop button.
- ▶ **Volumetric liquid delivery**
The liquid is delivered at the set flow rate, and when the set volume is reached, the liquid delivery stops automatically.
- ▶ **Timer liquid delivery**
The liquid is delivered at the set flow rate, and when the set time is reached, the liquid delivery stops automatically.
- ▶ **Maximum liquid delivery**
The liquid will be delivered at maximum flow rate and will stop when you tap the stop button.

Initial settings screen



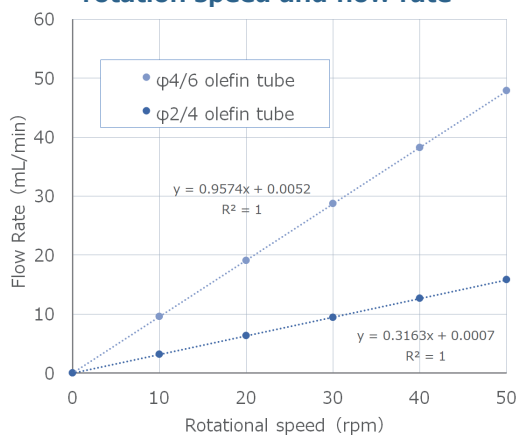
System information



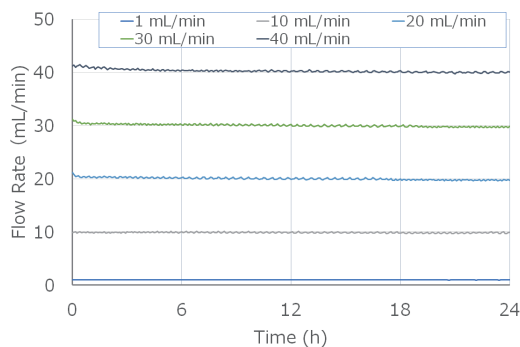
Achieves high flow rate accuracy in a wide flow range

The "WSP-3310 peristaQuantumPump" operates within a wide range of 0.01 rpm to 50 rpm (a maximum adjustment range of 5,000 times), where the flow rate is proportional to the pump's rotation speed, exhibiting consistent linearity (R-squared coefficient = 1). In long-term liquid delivery experiments conducted at set flow rates from 1 mL/min to 40 mL/min, excluding the initial 1 hour until the tube stabilized, it was confirmed that very stable flow control is possible with a CV value of 1.07%. Additionally, upon evaluating the effects of liquid temperature, it was demonstrated that stable liquid delivery can be achieved under consistent temperatures. These results indicate that the peristaQuantumPump can achieve high precision and stable liquid delivery across a broad range of flow rates.

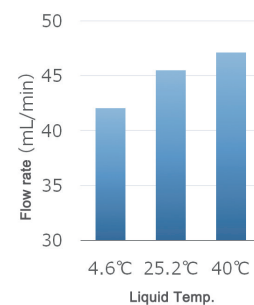
Correlation between pump rotation speed and flow rate



Flow stability



Effect of liquid temp.

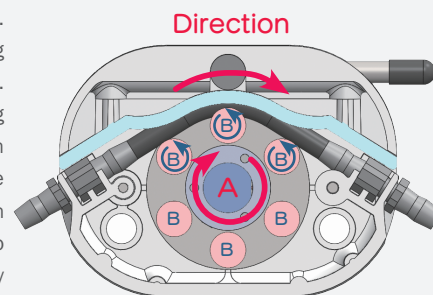


Setting	1 mL/min	10 mL/min	20 mL/min	30 mL/min	40 mL/min
Condition	Measurement time : 1 ~ 24 hours Interval : 5 minutes Lure-attached Olefin tube 4/6				
Average	1.0 mL/min	9.9 mL/min	20.0 mL/min	30.0 mL/min	40.2 mL/min
SD	0.007	0.106	0.206	0.220	0.241
CV(%)	0.75%	1.07%	1.03%	0.73%	0.60%

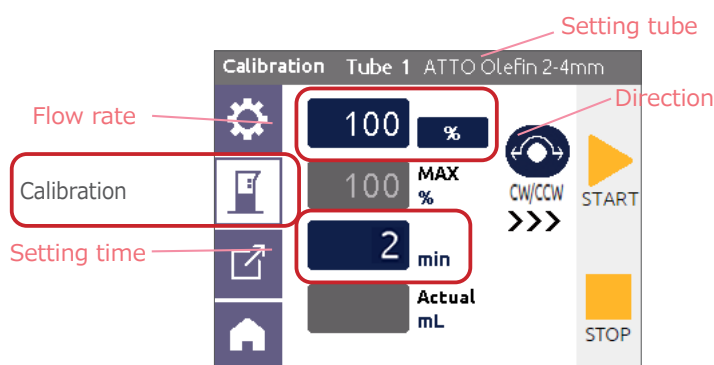
Fluid control with PeristaQuantumPump

PeristaQuantumPump, like other tube-based pumps, utilize the elasticity of the tube to transport fluids. The core mechanism of this pump involves the continuous compression of the tube by rollers moving along it. This action, combined with the pressure exerted and the tube's restorative force, propels the fluid. PeristaQuantumPump employs self-propelled rollers. When the main shaft (A) rotates, the surrounding rollers (B) move in the direction of the shaft's rotation. Upon contacting the tube, rollers (B) rotate in the opposite direction of the main shaft (A) while compressing the tube. As the tube passes through the compression section, a negative pressure is created inside, drawing in liquid, and the rotational motion expels the liquid on the outlet side. Since the liquid only travels inside the tube and does not come into contact with other parts of the pump, the risk of contamination is extremely low. Additionally, simply replacing the tube allows for easy cleaning and maintenance. The elasticity of the tube also enables the transport of viscous liquids or liquids containing particles.

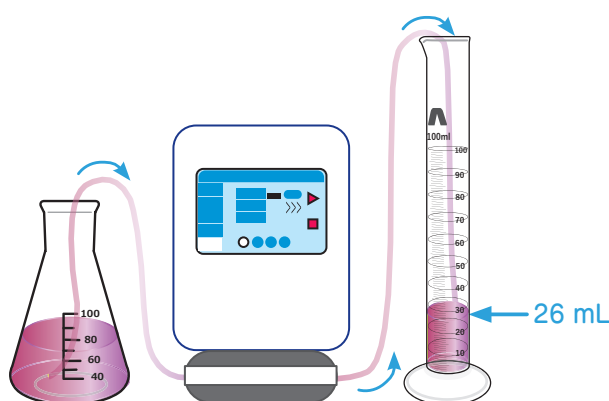
PeristaQuantumPump offers precise flow control and high reproducibility, making them suitable for a wide range of applications in the medical, research, and industrial fields.



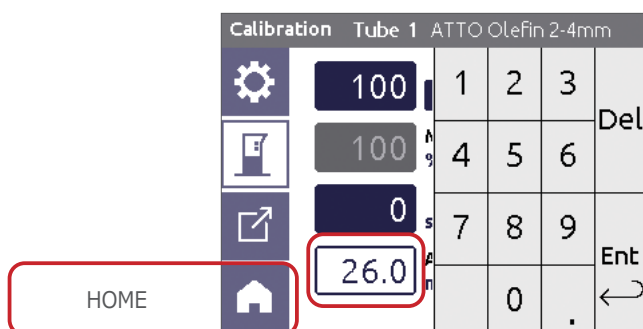
Simple calibration with semi-automatic operation



When you tap the input space for flow rate (%) and liquid delivery time, a numeric keypad will be displayed, so enter the desired values. Check the liquid feeding direction and tap the start button. It will automatically stop when the set time ends.



Set the solution to be sent and set a measuring cylinder etc. on the discharge side. Measures the amount of solution after the liquid feeding is completed. You can also measure the weight of the delivered solution and convert it from the specific gravity.



Enter the amount of solution delivered using the numeric keypad and confirm. Tap Home to start pumping.

Precise flow control using Olefin tube with luer

The specialized tube optimized to achieve high reproducibility and flow precision in PeristaQuantumPumps is the “Olefin tube with luer.” This tube is designed to achieve optimal compression by the roller section when set in the pump, preventing excessive friction and thus enabling a longer life. It is highly resistant to organic solvents, strong acids, or strong alkaline chemicals and is made from materials with superior durability to physical forces.

Difference between Pump head and Olefin tube with luer

The table below shows a comparative evaluation when replacing the pump head of a peristaltic quantum pump, and the results of a comparative evaluation of flow rates using 10 olefin tubes with lueres of the same standard. Even if the olefin tube with luer was replaced or the pump head was replaced, the same flow rate was shown. Both the pump head and the olefin tube with luer are strictly standardized and quality controlled, so even after replacement, the flow rate can be controlled with the same accuracy.

	Pump head difference (n=8)	Olefin tube with luer 4/6 difference (n=10)
Average	47.40 mL/min	47.96 mL/min
Standard deviation	0.225	0.210
CV(%)	0.47%	0.44%



Pump head



Olefin tube with luer

Difference between Channels

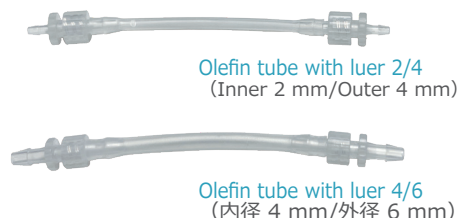
The table below presents the results of a comparative evaluation of flow rates using either one (1 channel) or both (2 channels) of a two-channel PeristaQuantumPump (WSP-3310-2) equipped Olefin tubes with lueres. The findings indicate that the flow rate remains consistent irrespective of the channel used. Additionally, there is no variance in the flow rate delivered to each channel, whether one or two channels are operated simultaneously.

Difference between channels		Channel 1	Channel 2
1channel liquid transfer 50 rpm (n=6) Olefin tube with luer 4/6	Average	46.94 mL/min	47.04 mL/min
	Standard deviation	0.220	0.205
	CV	0.47%	0.44%
2 channels simultaneous liquid transfer 50 rpm (n=5) Olefin tube with luer 4/6	Average	46.50 mL/min	46.48 mL/min
	Standard deviation	0.111	0.112
	CV	0.24%	0.24%



1 channel liquid transfer: Liquid transfer using either channel
2-channel liquid transfer: Liquid transfer using both channels
*Evaluate each flow path individually

Olefin tube with luer



Chemical resistance

	Olefin	Silicon
Isopropyl alcohol	○	×
Ethanol	○	○
Methanol	○	△
Hydrochloric acid (20%, 20℃)	○	×
Sulfuric acid (10%, 20℃)	○	○
Sodium hydroxide (10%, 20℃)	○	×
Potassium hydroxide	△	×
Toluene	△	×

Standards and performance of Olefin tube with luer

Name	Olefin tube with luer 2/4	Olefin tube with luer 4/6
Code	WSP-3300 : 1221461 WSP-3310 : 1221465	WSP-3300 : 1221463 WSP-3310 : 1221466
Material	Olefin resin	
Inner diameter	2 mm (± 0.1 mm)	4 mm (± 0.1 mm)
Outer diameter	4 mm	6 mm
Thickness	1mm (± 0.05 mm)	
Length	WSP-3300 : 95 mm WSP-3310 : 82 mm	
Standard pressure	0 ~ 0.2 MPa	0 ~ 0.1 MPa
Burst pressure	0.8 MPa<	0.4 MPa<
Operating temperature limit	4 ~ 40℃	
Allowable bending radius	15 mm (20℃)	30 mm (20℃)
Maximum flow rate	WSP-3300 : 13 mL/min WSP-3310 : 13 mL/min	WSP-3300 : 35 mL/min WSP-3310 : 40 mL/min
Minimum flow rate	WSP-3300 : 0.1 mL/min WSP-3310 : 0.1 mL/min	WSP-3300 : 0.1 mL/min WSP-3310 : 0.1 mL/min
Discharge pressure (50rpm)	WSP-3300 : 0.35MPa WSP-3310 : 0.20MPa	WSP-3300 : 0.35MPa WSP-3310 : 0.30MPa

High performance digital pump with high rigidity mechanism

This is the original peristaQuantumPump, a condensation of Ato's technological essence. With 12 rollers minimizing the effects of pulsation, it achieves reproducible liquid delivery with high flow rate precision. Proper compression control extends the tube's lifespan to over two weeks, even with continuous operation at maximum flow rate, while maintaining flow rate precision and stability. Utilizing three flow paths, it allows for the delivery of multiple targets under identical conditions with even flow rates or the delivery of multiple solutions at the same flow rate. Moreover, with the PQP support program, external control can be easily programmed. As a fluid control solution ideal for applications requiring precise flow control, it is a product that professionals prioritizing reliability can depend on.

- ▶ Achieved low pulsation flow with 12 rotating roller system
- ▶ Achieving high flow rate accuracy through quantitative flow rate stability and high flow rate reproducibility
- ▶ Longer tube life with appropriate discharge pressure control
- ▶ Easy touch panel operation and settings
- ▶ BioSafe sterile, contamination-free, and hygienic liquid delivery
- ▶ Improve productivity with external control, foot switches, and remote control

Flow range: 0.01 to 35 mL/min *1
Pump rotation speed: 0.005 to 50 rpm
Flow stability: $\pm 1\%/h$
*1 Depends on tube diameter
*2 Display is 0.01 to 50 rpm

WSP-3300 PeristaQuantumPump

4.3 inch touch panel

Since it is a pressure-sensitive type, it can be used with gloves on, and operate the flow rate, liquid feeding direction, time, START/STOP, etc.

Roller part

12 stainless steel rollers rotate and feed liquid in the direction of rotation.

Tube presser

A plate that evenly compresses tubes.

Olefin tube with lure

This is a standard tube that arrives at the compression section.

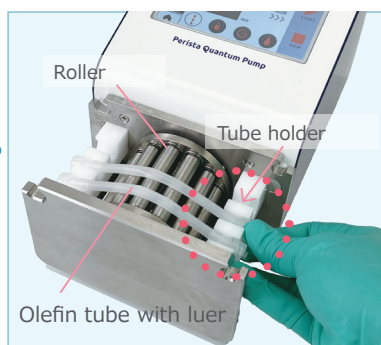
3 channels connected

The flow rate in each of the three channels is equal. Whether using one channel or three channels, liquid can be delivered with high flow rate accuracy and reproducibility.

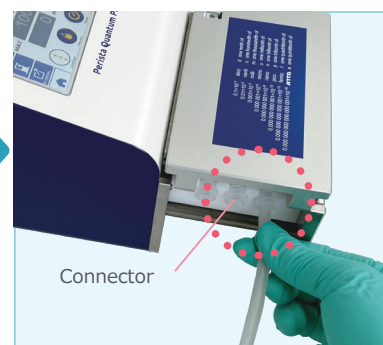
Tube setting with simple operations



Lift the fixed handle of the tube presser vertically to remove the presser.



Fix the connector part of the olefin tube with luer to the tube holder.

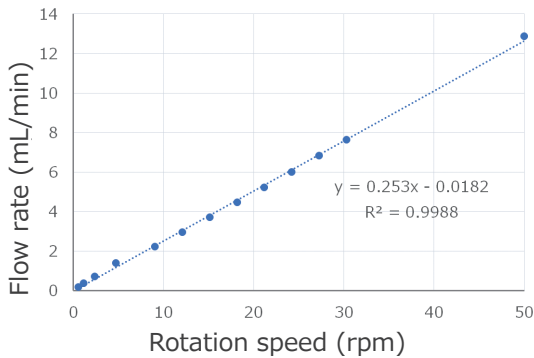


Connect and lock the tube with the olefin tube with luer

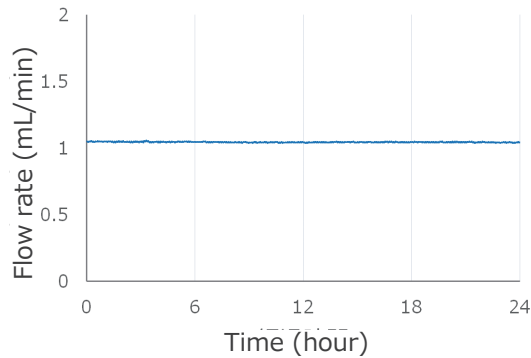
High flow rate stability and high correlation

Here we introduce the performance evaluation results of the “WSP-3300 peristaQuantumPump.” This pump demonstrates a high correlation between rotation speed and flow rate over a wide range (0.01 rpm to 50 rpm, a 5,000-fold range), with confirmed linearity. In long-term liquid delivery experiments set at a flow rate of 1 mL/min, it was proven that liquid delivery is possible with a very stable flow rate, evidenced by a CV value of 0.32%. This stability has also been observed to last for more than two weeks. These results indicate that the peristaQuantumPump can provide high precision and stable liquid delivery across a broad range of flow rates.

Correlation between rotation speed and flow rate



Flow rate stability

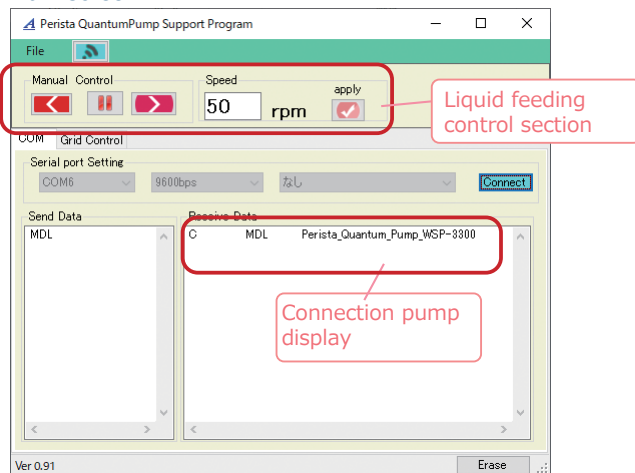


Flow rate	1.0 mL/min
Time	24 hours
Intervals	1 min
Average	1.0 mL/min
SD	0.00337
CV (%)	0.32%
Stability	± 1.0%/h

PQP support program to create external control programs

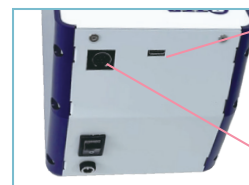
The peristaQuantumPump enables external control through a USB connection to a PC, allowing for flow control via complex liquid delivery methods. By using the dedicated programming software “PQP Support Program (optional),” it is possible to remotely control the pump’s START/STOP, CW/CCW (clockwise/counterclockwise) control, flow rate, rotation speed, and automate liquid delivery using a timetable.

Main screen



External control terminal for each device

The peristaQuantumPump is equipped with a USB port and a mini DIN connector terminal on the rear panel. Through these terminals, it is possible to connect to a PC for external control of the pump, or to connect to a foot switch for START/STOP control.



WSP-3310 back

USB Type-C
Connect to PC and control externally using PQP support program, etc.

ini DINConnector 8P
Connect Foot switch etc.



WSP-3300 back

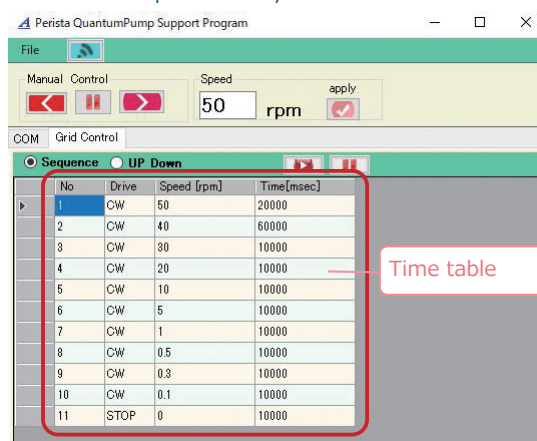
USB Type-B
Connect to PC and control externally using PQP support program, etc.

Mini DINConnector 4 P
Connect Foot switch etc.



Foot switch
(option)

Timeline of liquid delivery



Name	PeristaQuantumPump		
Model	WSP-3310	WSP-3310-2	WSP-3300
No. of channels	1 channel	2 channels	3 channels
Flow rate		82mm Olefin tube with lure 2/4: 0.01~13 mL/min	95mm Olefin tube with lure 2/4: 0.01~13 mL/min
		82mm Olefin tube with lure 4/6: 0.01~40 mL/min	95mm Olefin tube with lure 4/6: 0.01~35 mL/min
Flow rate variable range	Flow rate	4000x (82mm Olefin tube with lure 4/6)	3500x (95mm olefin tube with lure 4/6)
		1300x (82mm Olefin tube with lure 2/4)	1300x (95mm olefin tube with lure 2/4)
	% of Max flow rate	1000 times	1000 times
	No. of revolutions	5000 times	5000 times
Number of revolutions		0.01~50rpm (When controlling the main unit)	
		0.005~50rpm during external control)	
Flow stability		Olefin tube with 82mm lure 4/6: $\pm 1\%/h$	95mm olefin tube with lure 2/4: $\pm 1\%/h$
Lifting height		Extrusion: 21m Suction: 6m	
Roller		6 pieces SUS304	12 pieces SUS304
Compatible viscosity		1.5Pa·s Max 1500cP	
Maximum discharge pressure		82mm Olefin tube with lure 2/4: 0.34 Mpa	95mm olefin tube with lure 2/4: 0.5 Mpa
		82mm olefin tube with lure 4/6: 0.22 Mpa	95mm olefin tube with lure 4/6: 0.4 Mpa
Tube	ATTO dedicated tube	Olefin tube 2/4 (5m) (for WSP-3300/3310) Olefin tube 4/6 (5m) (for WSP-3300/3310)	
Tube life		7 days (at maximum capacity)	14 days (at maximum capacity)
Motor		Stepping motor	
Drive circuit		Micro stepping drive	
Touch panel		3.5 inch pressure sensitive	4.3 inch pressure sensitive
Setting	Flow rate	mL/min, mL/h	
	% of Flow rate	0.1 to 100%	
	No. of revolutions	0.01 ~ 50rpm	
Fixed amount liquid delivery	Continuous	Flow rate, % of maximum flow rate, rotation speed	
	Volumetric	0.1~9999mL	
	Timer liquid	0.1 ~ 9999min	
Feeding direction		CW/CCW	
LCD display content		Flow rate (mL/min, mL/h), liquid feeding direction, % of maximum flow rate, rotation speed, actual flow rate, remaining time/remaining capacity	
External control		USB Type-C terminal START/STOP control, CW/CCW control, flow velocity, rotation speed, etc.	USB Type-B terminal Function control similar to WSP-3310
		Mini DIN connector 8P START/STOP control	Mini DIN connector 4P START/STOP control
Usage environment		4-40°C non-condensing	
Body material		AL・SUS・ST・PET/GF・POM	AL・SUS・SPCC・POM
AC adapter		Input: 100 to 240V ($\pm 10\%$) compatible, 50/60Hz ($\pm 5\%$) Output: DC24V/1.5A	
Power consumption	13.3VA	14.4VA	20VA 12W
Dimensions /weight	Main unit: 110 (W) x 200 (D) x 130 (H) mm 2.6 kg AC adapter: 36 (W) x 95 (D) x 31 (H) mm 0.14 kg	Main unit: 110 (W) x 260 (D) x 130 (H) mm 2.6 kg AC adapter: 36 (W) x 95 (D) x 31 (H) mm 0.14 kg	Main unit: 130 (W) x 260 (D) x 135 (H) mm 5 kg AC adapter: 36 (W) x 95 (D) x 31 (H) mm 0.14 kg

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