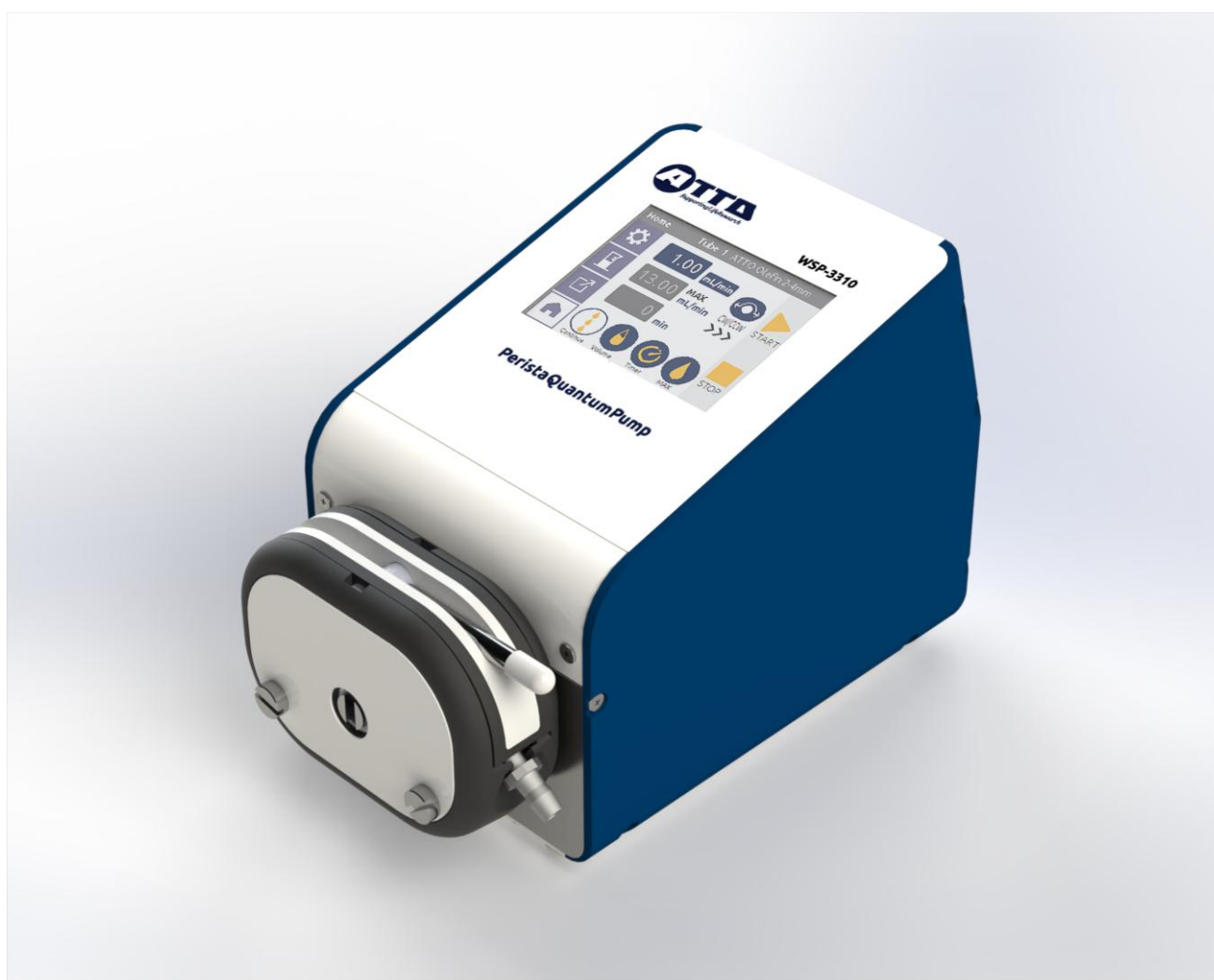

Instruction Manual

WSP-3310

PeristaQuantumPump



Edition 2.20 , July 7, 2025



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Specification.....	46

Introduction

Thank you for purchasing ATTO PeristaQuantumPump. This instruction manual is delivered to you so that you can make full use of the instrument.

Not only those of you who use this instrument for the first time, but also those who have used it before, should read this document carefully to understand the contents. Please keep it handy all the time to make its full use.

If you have any inquiries on your purchased product or the instruction manual, please feel free to contact us (refer to the back cover).

Safety Precautions

Correct operation is prerequisite in order to use this instrument safely. Please read through this instruction manual before use, and do not use the instrument until you fully understand the contents. How to use and the safety precautions listed on this manual are specific to usage of this particular instrument only. Never use the instrument for other purposes than those listed on this manual. Any other usages of this instrument than those listed on this manual would be strictly at your own responsibility.

The first-time user is asked to receive guidance from a person with correct knowledge and understand principle and method before use. Both the fresh users and experienced users keep this manual at hand for effective use. The only way to avoid electric shock and malfunction of the unit is to operate it correctly in accordance with this manual.

Feel free to contact us for any questions about principle of electrophoresis, operation, maintenance and inspection.

Safety Notation

The following signs are used on this instruction manual for your safe use and maintenance of the instrument. Please ensure your understanding of the meaning of these signs and follow each item correctly.

Symbol	Description
 Danger	This indicates that a high risk of human death or serious injury is likely occurring if handled incorrectly or by neglecting this indication.
 Warning	This indicates that human death or injury is possible if handled incorrectly or by neglecting this indication.
 Caution	This indicates that the risk of property damage is expected if mishandled or by neglecting this indication.
	This indicates information related to the important portion.
	This indicates some hint related to operation.
	This indicates prohibited activities.

CE Complies with the provisions of following Directives as completed equipment under evaluation of conformity based on the following harmonized standard.

Directive	Standard
Low Voltage Directive, 2014/35/EU	EN 61010-1:2010
EMC Directive, 2014/30/EU	EN 61326-1:2013
RoHS Directive, 2011/65/EU	EN IEC 63000:2018



Indicate disposal instruction.

DO NOT throw this unit into a municipal trash bin when this has reached the end of its lifetime. To ensure utmost protection of the global environment and minimize pollution, please recycle this unit.

Use Precautions

These are precaution items to prevent fire, electrical shock, other type of accident and failure. Please be sure to follow and understand these items.



Power connection 	Please check visually if any deformation or corrosion exists on an electrode terminal or power plug, any blemish on the power cable, or any peel-off of the insulating sheath before actuating the unit. These might cause fire because of poor contact or electrical shock. In such a case, please contact us after stopping the use of the unit and unplugging the power plug from the outlet. Be sure to turn off the power switch, firmly hold the power plug itself, and unplug it without pulling the cable.
No wet hand 	Never operate the unit with wet hands. In addition, never touch the power plug or connecting terminal with wet hands. These can cause electrical shock or failure. Never use the unit in wet condition. These can cause electrical shock or failure.
Main body 	Never remove the top lid of the main body nor the rear panel. These can cause electrical shock or failure.
Main body 	Never put foreign materials into the airflow orifice. This can cause an electrical shock or failure.
Maintenance 	Please quit using the unit immediately if anything abnormal happens during unit usage or if any abnormality/failure is suspected. Also, do not use the unit if you find any failure at inspection. These can cause electrical shocks or damage to the unit. Please visually check that there are no abnormalities or leaks during use. Contact us if you detect any abnormality, trouble or failure.

 Warning

Installation location 	Please avoid installation on places such as a wobbling table, tilted location, or heavily vibrating place. Install the unit on horizontal places with safe and hard surfaces, such as a lab bench.
Main body 	This unit is not an explosion-proof structure. Install this unit away from any places with the possibility of exposure to fire or flammable gasses.
Migration 	Never move the unit during operation. Cords may get entangled, which might cause rollover. Or, cords may be damaged, which might cause fire or electrical shock. Please make sure to turn the unit power switch OFF, and pull out the AC adapter and all wiring cables before migration.
Carrying 	If you carry this unit, it may cause injury or equipment damage due to falling, so hold it firmly with both hands.
Maintenance 	Please be sure to turn the unit power switch OFF and pull out the AC adapter before performing maintenance and cleaning. These might cause electrical shock.
Disassemble prohibition 	Never disassemble or modify the unit. Adjustment and repair work of the product should be done by our service staff in charge. When adjustment or repair is required, please ask our company. Any accident caused by your disassembling or modification would be outside of our responsibility.
Seal group 	Never peel off the Warning Seal. The seals indicate dangerous areas. If any seal comes off, please contact us.

 Caution

Dew condensation 	When the unit is quickly moved from a low-temperature area (low- temp. room, cold outdoor, etc.,) to a high-temperature area (warm room, etc.,), there is possibility of [Condensation], i.e. moisture in the air becomes water drops. If condensation happens within the unit, some parts may short out. When the unit is moved from a low-temperature area to a high- temperature area, set the unit where there is plenty of ventilation and away from direct sunlight, and turn the unit power on AFTER the unit gets to the same temperature as the room temperature.
Pump posture 	Do not use the pump upside down or on its side. Leakage due to tube wear will not be released to the outside and may cause a malfunction.
Leakage 	If liquid leaks, clean each part and the surrounding area immediately. In particular, make sure that no dirt remains on the rollers.
Touch panel 	Do not splash the solution on the touch panel. It may cause a malfunction.
Tube presser 	Do not wash the tube presser with an organic solvent, but wipe it gently with a cloth coated with a neutral detergent. It may cause damage.
Tube 	The tube is a consumable item. After using it for a certain period of time, shift the squeezing position or replace it with a new tube. Also, if you use a tube other than the one provided by us, it may not meet the specifications.

 Notice

Seals 	Never peel off nameplate seals. These indicate important information for maintenance and control of the unit.
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Other Precautions

Application

The WSP-3310 Perista Quantum Pump can be used to deliver solutions or liquids containing fine solids. Please check the chemical resistance of the tube before use. Please note that it cannot be used for medical purposes.

Export

Export of specific work and cargo are controlled by Foreign Exchange Laws and Cabinet Order/Ministerial Orders of Foreign Trade Control Laws and those controls are applied to this unit.

Even if the unit is not applicable to the Cabinet Order, it is required to submit documents accordingly and if it is applicable, then obtain export license from the Ministry of Economy, Trade and Industry, and then submit the license to the customs office.

When you export our product, please confirm with your supplier or our customer service department in advance.

Trademarks and Copyright

You are hereby notified that any distribution, copying or forwarding of this manual is strictly prohibited without permission of ATTO Corporation. Information in this manual or specification of the product is subject to change without notice.

1. Overview

1.1 Purpose of Application

The Perista Quantum Pump is a product intended for the delivery of solutions. Please be sure to confirm in advance that the solution can actually be sent by referring to the chemical resistance table of the tube. Also, the attached standard tube is limited to use for research purposes. When using for the production of foods and pharmaceuticals, please use officially approved tubes. It cannot be used to send flammable gas or explosive gas. In addition, please use in the presence of the person in charge of management when sending solutions containing poisonous and deleterious substances.



2. Unpacking

2.1 Confirmation When Unpacking

Upon arrival of the product, please confirm whether the main body and accessories are packed correctly or if any defects exist.

In case there is any inadequacy, deficiency, etc., please inform your supplier or our company immediately.

Please perform your confirmation as above at the time of unpacking within one week upon arrival of the unit. Confirmation after more than one week may result in not receiving compensation for defects or missing articles.

2.2 Product Component

Main body

Product name	Quantity
WSP-3310 PeristaQuantumPump	1

Accessories

Product name	Quantity
AC adapter	1
ATTO genuine standard tubing (olefin). Inner diameter 4 mm / Outer diameter 6 mm. (With 82mm lure fitting for the WSP-3310).	1
ATTO genuine standard tube (olefin). Inner diameter 4mm/outer diameter 6mm (1m) can be used for both WSP-3300 and WSP-3310.	1
WSP-3310 PeristaQuantumPump Instruction Manual	1

3.Name and Function of Each Part

3.1 Front Panel

① Touch panel

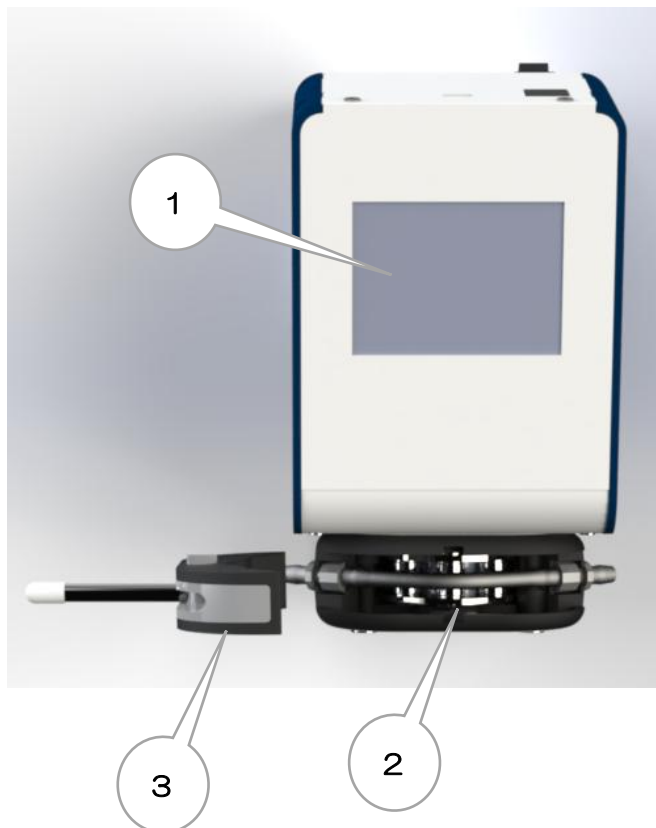
Touch the buttons and icons displayed on the screen to perform operations such as flow rate setting, liquid feeding direction, START, and STOP. During operation, the set flow rate, liquid feed time (remaining liquid feed time), and liquid feed direction are displayed.

② Roller

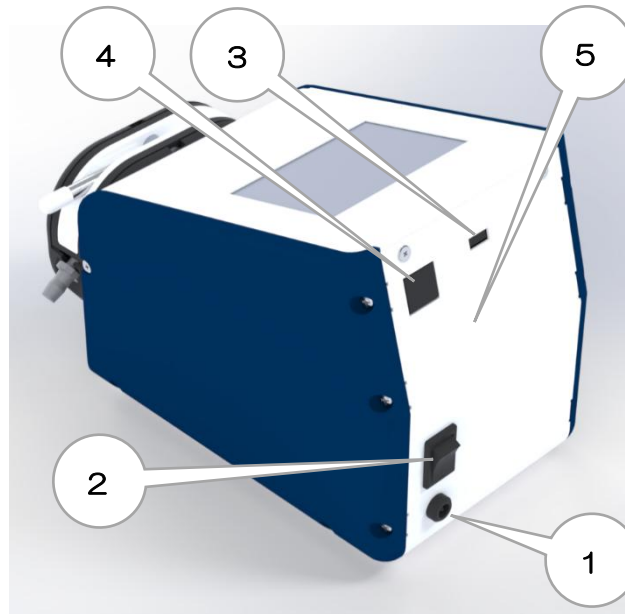
Six stainless steel (SUS304) rollers rotate and feed liquid in the direction of rotation. You can use a tube with “2mm inner diameter and 4mm outer diameter” or “4mm inner diameter and 6mm outer diameter” .

③ Tube presser

The tube presser is a plate for evenly crushing the tube (The photo shows one end of the tube presser set).



3.2 Back of pump



① Power connector

Connect the included AC adapter (DC24V 1.5A).



Warning

Be sure to use the included AC adapter.

If you use an AC adapter other than the included one, there is a risk of malfunction or output failure or damage to the power supply unit, or deterioration or damage to the AC adapter.

① Power switch

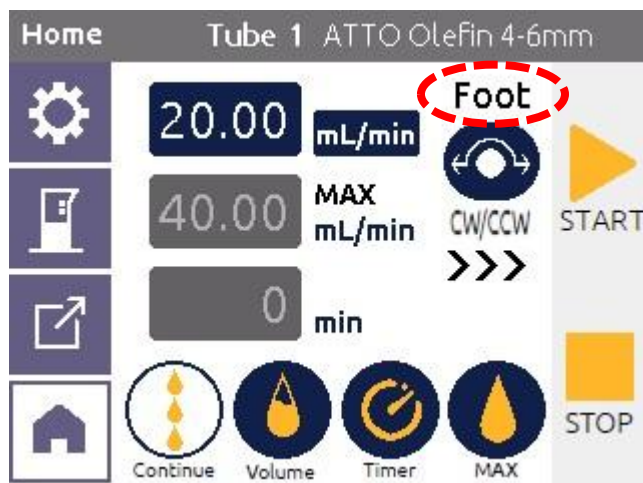
When the AC adapter is connected, press the side marked “I” to turn on the power.

② USB Type C terminal for external control

USB2.0 standard cable can be used.

③ Foot switch terminal

The foot switch has an alternate operation method. Each time you press the switch button, it toggles between the "ON" and "OFF" states. When the foot switch connector is connected to the pump, "Foot" will be appeared on the touch panel.



④ Nameplate

The model number, serial number, input voltage, company name, and country of manufacture of the peristaltic quantum pump are listed.

3.3 Right Side

① Tube presser fixing handle

The handle crushes the set tube to secure the tube presser.



3.4 Options

Code No.	Product name
1221441	Additional pump headset (for WSP-3310)
1221442	Replacement pump head (for WSP-3310)
1221443	2 sets of fixed studs (for WSP-3310)
1221444	2 sets of mounting bolts (for WSP-3310)
1221445	Parts to maintain levelness when using 2 channels (for WSP-3310)
1221446	Foot switch (for WSP-3310)
1221447	AC adapter (for WSP-3310)
1221462	Olefin tube 2/4(5m) for WSP-3310/WSP-3300 (Note1)
1221464	Olefin tube 4/6(5m) for WSP-3310/WSP-3300 (Note2)
1221465	Olefin tube 2/4 with 82mm lure (for WSP-3310) (10 pieces). (Note1)
1221466	Olefin tube 4/6 with 82mm lure (for WSP-3310) (10 pieces). (Note2)
1221471	Silicon tube 4/6(5m) for WSP-3310/WSP-3300 (Note2)
1221476	Silicon tube 2/4(5m) for WSP-3310/WSP-3300 (Note1)
1221473	Silicon tube 4/6 with 82mm lure (for WSP-3310) (10 pieces). (Note2)
1221478	Silicon tube 2/4 with 82mm lure (for WSP-3310) (10 pieces). (Note1)
1221438	PQP control software (for PC, with USB cable for WSP-3310). (Note3, 4)
1221448	USB cable for WSP-3310
1221417	USB hub for WSP-3300/3310. (The hub is used for multiple connection of up to four pumps.)

Note1: 2/4 ⇒ Inner diameter 2 mm / Outer diameter 4 mm

Note2: 4/6 ⇒ Inner diameter 4 mm / Outer diameter 6 mm

Note3: PQP stands for PeristaQuantumPump.

Note4: This software can control up to 4 pumps.

4. Preparations

4.1 Installation Environment

Usage environment	Indoor use only. Location where direct sunlight is shut. Contamination level 2 of the place of use.
Temperature	4°C~40°C
Humidity	Up to 90%RH, free from condensation

 Warning	Never install the unit in the atmosphere of flammable gases. This can cause explosion or fire since the unit is not of an explosion-proof structure. Install the unit in the environment where no flammable gas is contactable. Never install the unit in a corrosive gas atmosphere. This can cause conductor corrosion or bad connector contact in the product. This, in turn, may cause malfunction, trouble or fire. Never install the unit in an environment where a lot of dust and dirt exist. Dust and dirt will stick to the unit and can cause electrical shock, fire or other problems.
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 Caution	Never use the unit in areas where strong magnetic or electric field exists or where a lot of waveform distortion or noise exists. These might cause malfunction. Never install the unit where a direct sunlight hit, temperature suddenly varies or humidity is high. Never use it if condensation happens.
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4.2 AC adapter Connection

AC adapter type

The AC adapter included with this product can be used in Japan. When using the product overseas, use an electric AC adapter that complies with the standards of the country in which it will be used.

AC adapter connection

Before connecting the AC adapter, make sure the power switch on the back of the unit is turned off.

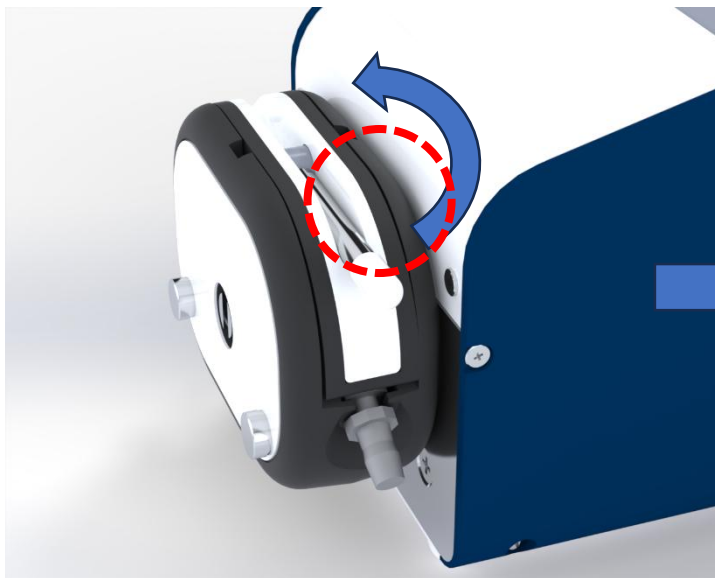
Connect the DC jack of the included AC adapter to the power connector on the back of PeristaQuantumPump. Connect the power plug to an AC outlet. Make sure to insert the power plug securely.

 Warning	The AC adapter included with PeristaQuantumPump is for use in Japan. When using the product overseas, please use an AC adapter that complies with the standards of the country in which it will be used.
--	--

4.3 How to attach the tube

Raise the handle of the tube presser up until it is vertical, and while lifting the handle, raise the tube presser as shown in the figure (keep your hands on this). Remove the tube presser upward from this state.

① How to remove the tube presser

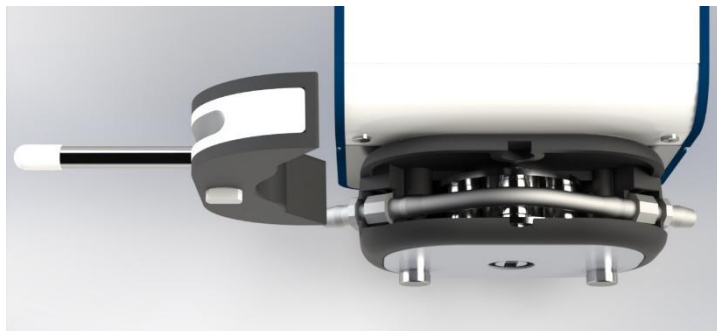


Raise the handle of the tube presser up until it is vertical.



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

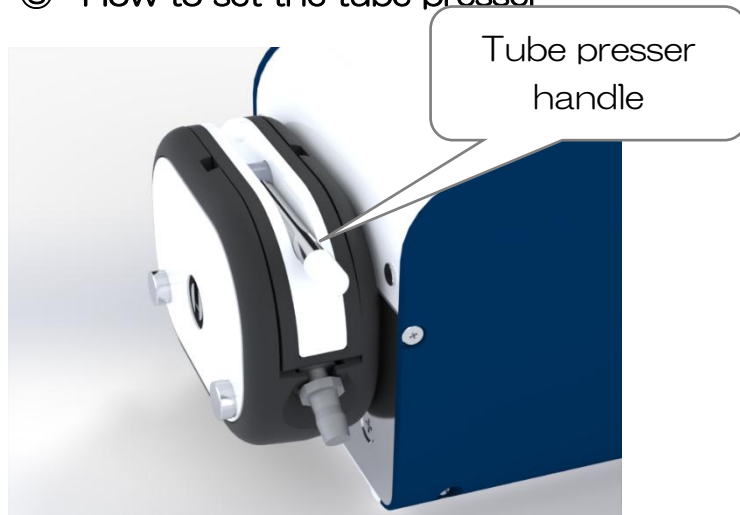
② How to set olefin tube with lure



While stretching the standard tube, fix the connector part to the tube holder.

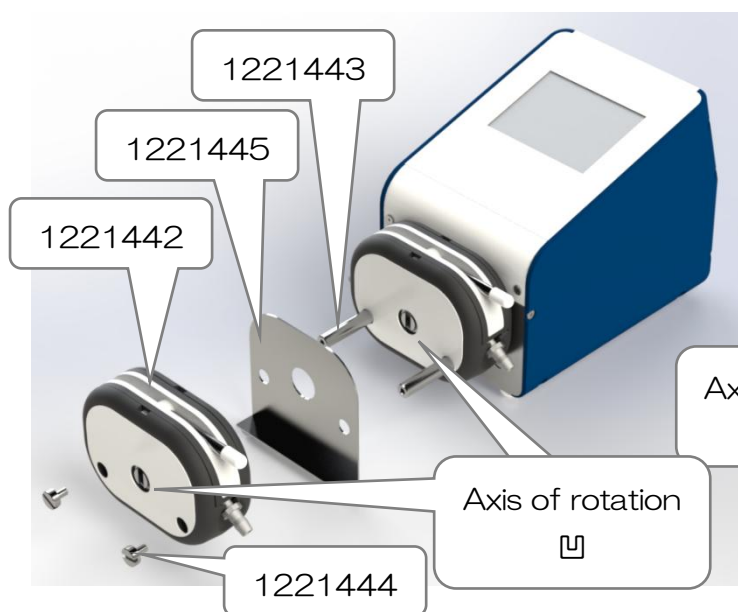
It's easier to set up if you attach the tube to the female connector first.

③ How to set the tube presser

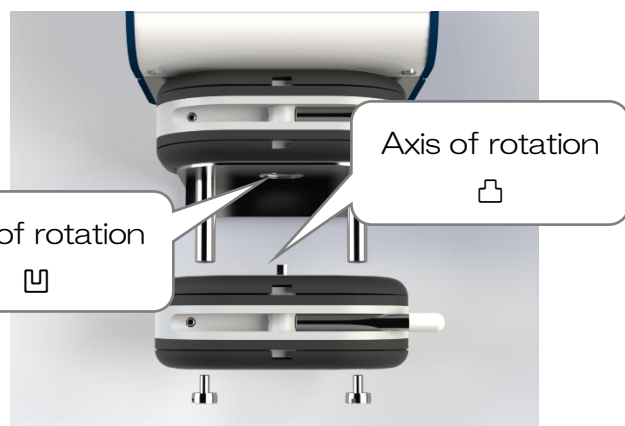


Set the tube presser and tilt the tube presser handle sideways as shown in the illustration to secure it.

④ Expansion



Up to 2 channels can be expanded using additional pump heads.



Note: The number is an option code.

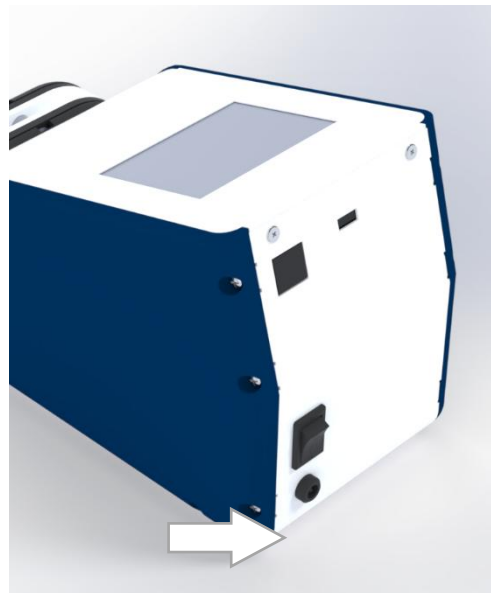
増設時は出力軸の向きにご注意下さい。

5. Operations

5.1 Start up

After connecting the AC adapter, turn on the power switch on the back of the main unit. It is turned on when the "1" side is pressed.

After the startup screen is displayed on the front panel of the main unit, the first time it starts with the continuous liquid supply mode selected. After that, it will start in the mode used last.



5.2 Operation of Screen

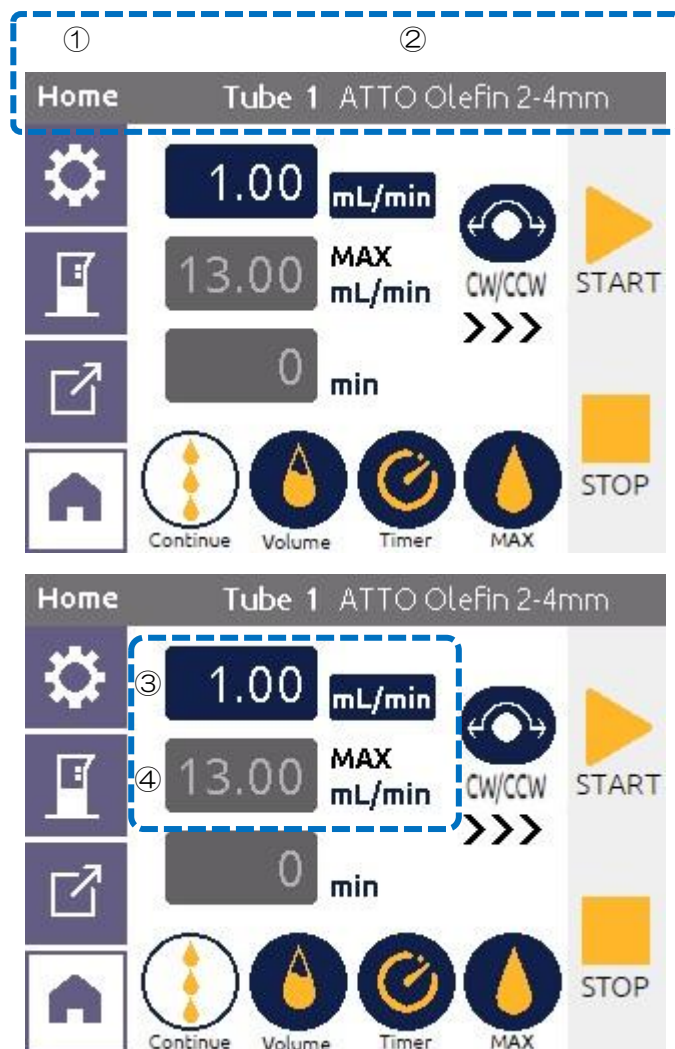
Tap the buttons on the screen with your finger to operate.

It can be operated even with your fingers with gloves, also operated with a thinner stick.

**Caution**

Do not tap the screen with sharp tips. The screen may get scratched.

5.3 Explanation of operation screen



① Home screen

Setting mode and operation mode are displayed.

② Selected tube

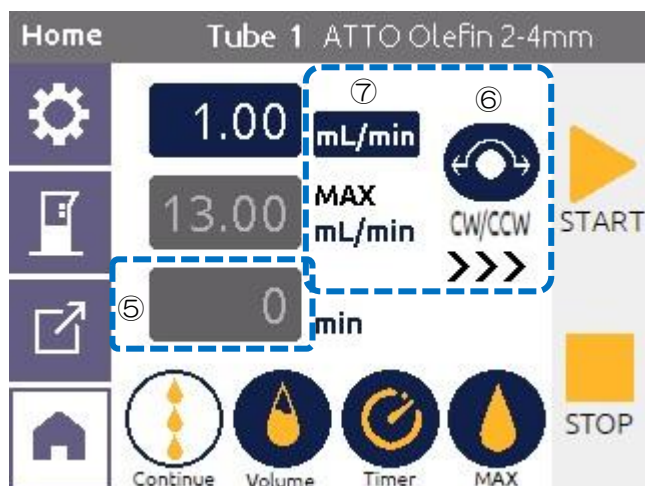
The name of Tube1 (ATTO Olefin 2-4mm) registered in the main unit is selected.

③ How to set the liquid flow rate

Set the flow rate. (Example: Setting example of 1.00mL/min))

④ Display of maximum flow rate

Display of the maximum flow rate of the tube used.



⑤ Display of liquid delivery time

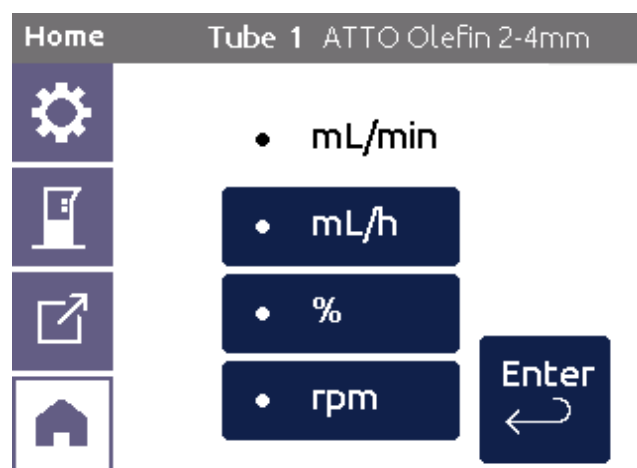
Depending on the liquid feeding mode, the elapsed liquid feeding time, the remaining time until the liquid feeding is stopped, and the remaining capacity until the liquid feeding is stopped are displayed in this part.

⑥ Selection of liquid delivery direction

When you touch the liquid feeding direction setting button, the direction of the START button and the liquid feeding direction will change.

>>> Liquid delivery to the right

<<< Liquid delivery to the left

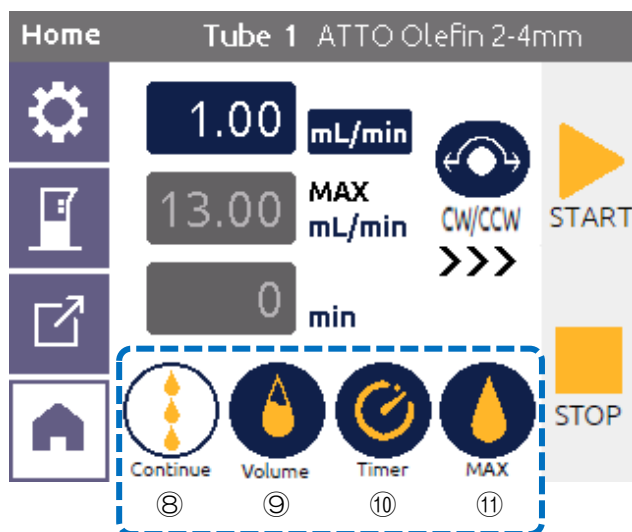


⑦ Flow rate unit switching

Touch the **mL/min** button to select the unit.

You can choose one unit from "mL/min", "mL/h", "%" (maximum flow is 100%) or "rpm" (maximum is 50 rpm, if the tube is selected the ATTO olefine 4-6mm).

5.3 Explanation of operation screen



⑧ Continuous liquid feeding mode

Start feeding the liquid by pressing the START button. Stop the liquid feeding with the STOP button.

⑨ Capacity liquid transfer mode

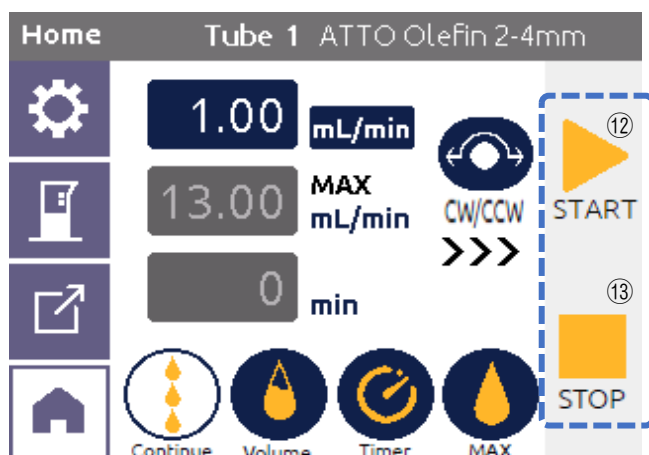
Continue feeding until the set capacity is reached.

⑩ Timer liquid feed mode

Continue feeding until the set time is reached.

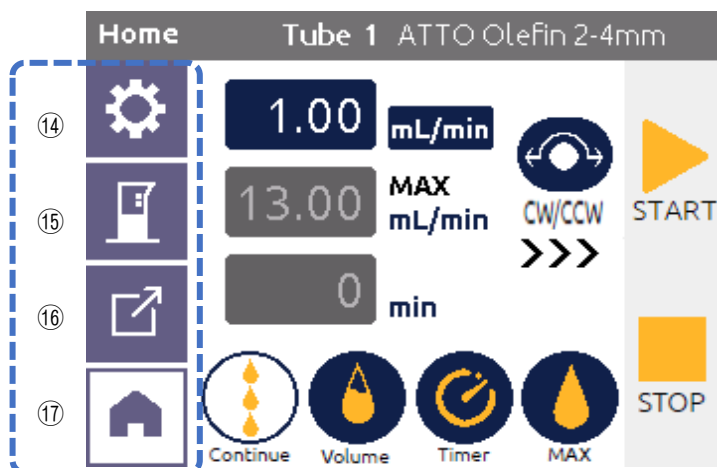
⑪ Maximum flow rate liquid feed mode

Deliver at maximum flow rate of selected tubing.



⑫ Start button

⑬ Stop button



⑭ Initial setting button

⑮ Flow rate calibration mode button

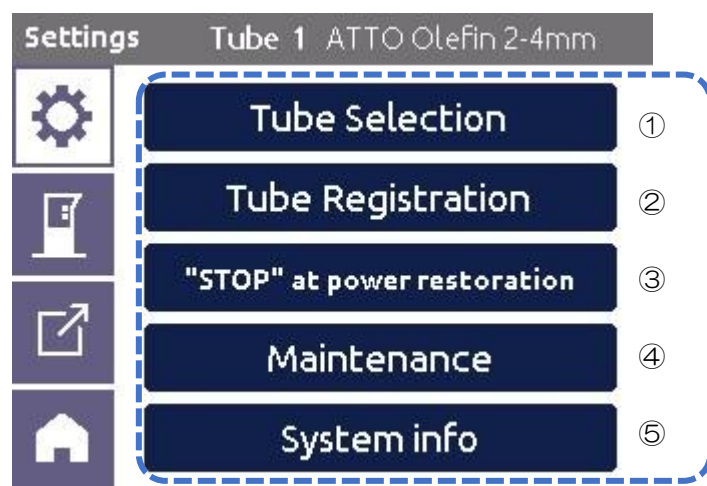
⑯ External control reception mode button

⑰ Home button

5.4 Initial setting

Click the HOME button to change various settings and display information..

Five types of menus will be displayed.



① Tube Selection

Select the registered tube.

Two types of Olefin tubes are registered at the time of shipment. For these registered tubes, the representative value of the maximum flow rate that can be sent is input in advance. The inner diameter of the tube varies slightly, so if you need to feed the liquid at the correct flow rate, calibrate the flow rate.

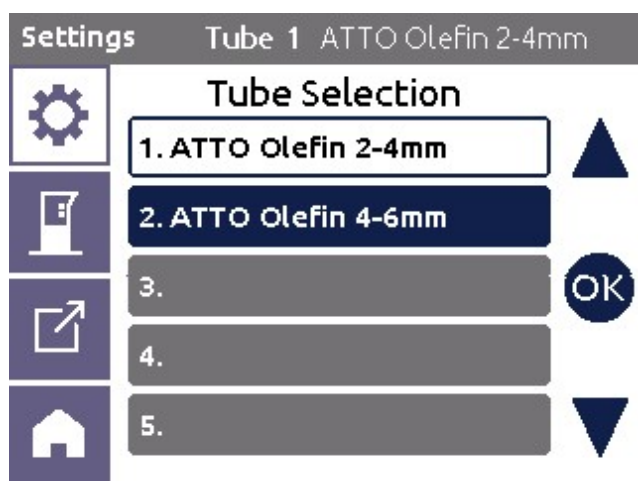


When you touch “Tube selection”, registered tubes will be displayed.

1. ATTO Olefin 2-4mm

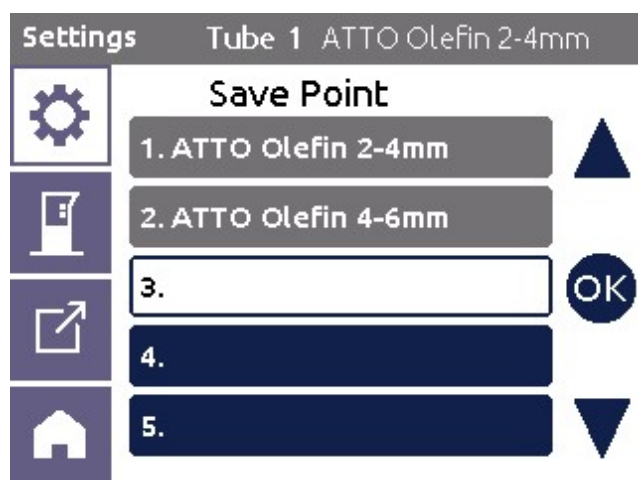
2. ATTO Olefin 4-6mm.

Note: 2-4mm means inner diameter 2mm / outer diameter 4mm.



If you touch “ATTO Olefin 2-4mm” and the background changes to white, it means it has been selected.

Touch “OK” to confirm your selection.

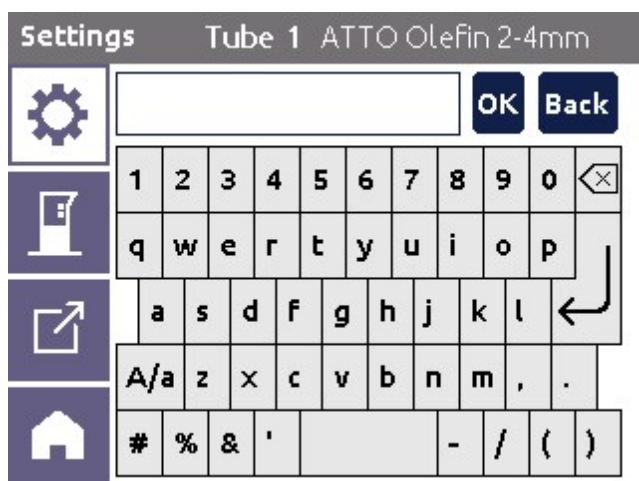


② Tube registration

This is a new tube registration.

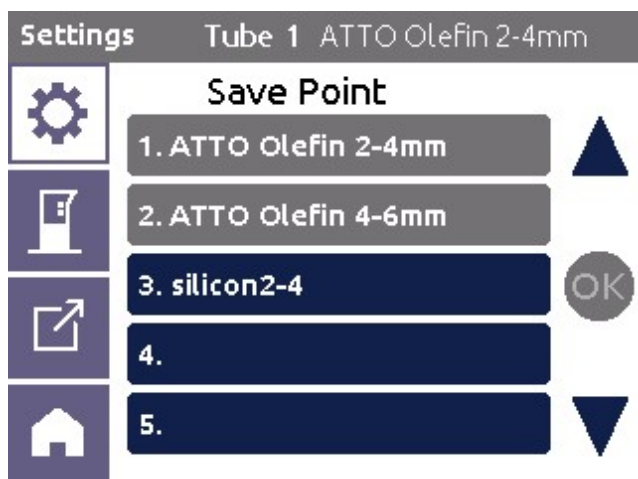
When you touch “Tube Registration” a new blank save point will appear.

Touch the “OK” button to display the keyboard.



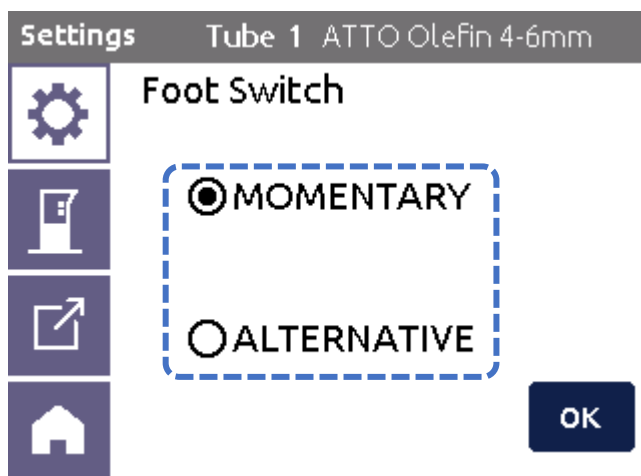
Use the displayed keyboard to register a new tube name (ex:silicon2-4).

Touch “OK” to register. Then touch “Back” to return to the previous screen.



[silicon2-4] has been registered.

Touch “OK” to finish.



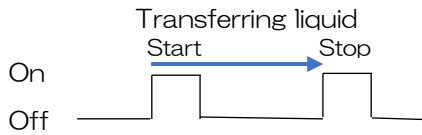
③ Foot switch operation method selection

Touch the MOMENTARY foot switch to select the operation mode of the foot switch. The factory setting is that it operates only while it is pressed and stops when released (MOMENTARY). You can also select a mode that switches ON/OFF each time you press it (ALTERNATE).

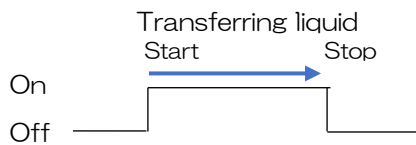
Touch OK to finish.

- Two types of foot switch methods

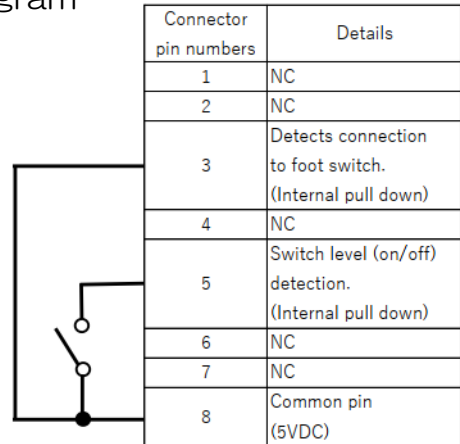
① Momentary



② ALTERNATE



- DIN connector foot switch connection diagram



④ “STOP” at power restoration

This is the pump operation setting after the power is restored.

The factory setting is the stopped state (STOP) after the power is restored.

If you select “CONTINUE”, you can continue feeding the liquid after recovering from a power outage

Continuous operation mode is not recommended after power outage is restored, especially when pumping dangerous liquids.

Touch “OK” to finish.



⑤ Maintenance

If you touch “Maintenance”, you can rotate the roller part with the tube presser removed.

Touching the triangular button will rotate it slightly in that direction.

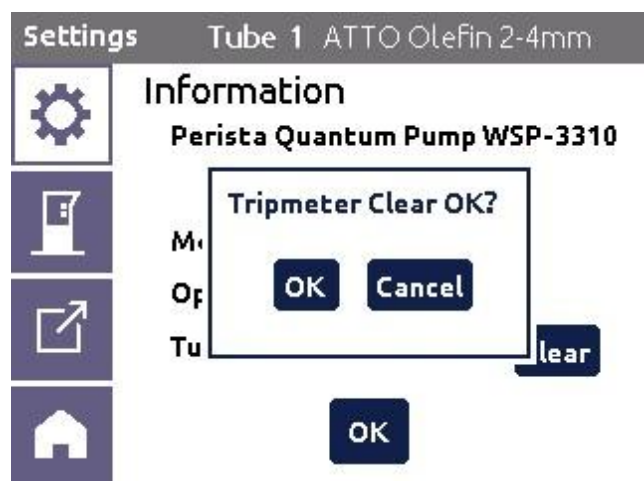
Used when cleaning the roller section.

Touch “OK” to finish.

⑥ System info

When you touch "System Info", the following information will be displayed...

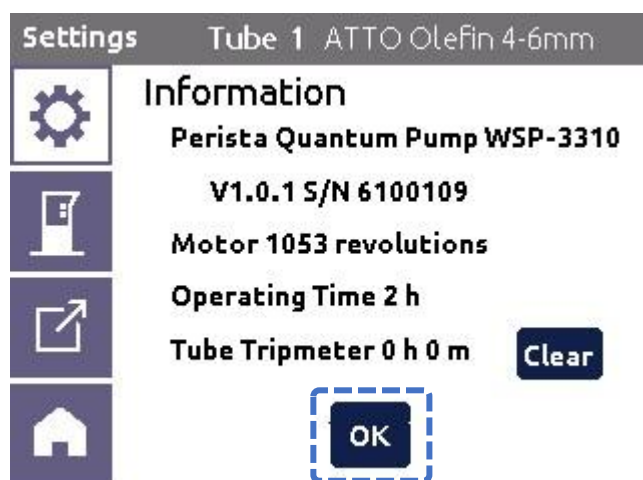
- Product name/model name
- System version/serial number
- Motor revolutions
- Operating time
- Tube trip meter



A trip meter is available to determine when to replace the olefin tube with lure.

The tube trip meter adds usage time when you press the "START" button.

When you touch the "Clear" button, a confirmation window will appear. Touch "OK" to clear the trip meter.



Touch "OK" to finish.

5.5 How to calibrate flow rate

If accurate flow rate is required, set the newly registered tube and perform flow rate calibration.

The calibration method involves pumping liquid for a certain period of time and registering the weight of the pumped liquid in the pump. After that, the liquid is sent at the amount set in the pump. Therefore, please prepare a weighing scale that is as accurate as possible.

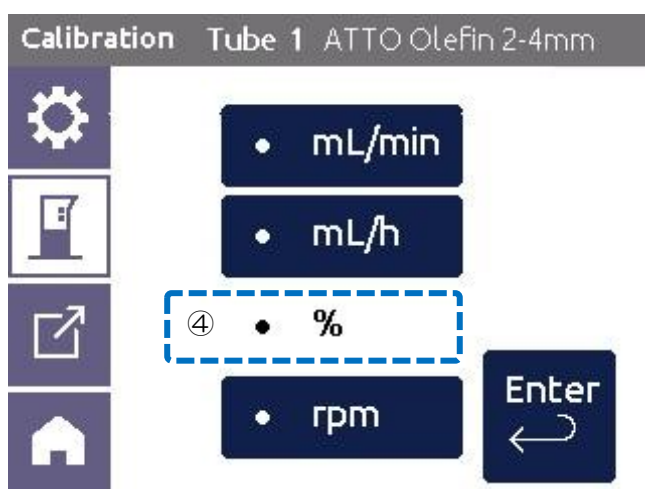
If you want to use a new tube that is not registered, please register the tube first. After setting the new ATTO standard olefin tube, aging at maximum rotation speed for 1 hour will stabilize liquid delivery. Wait until the flow rate is stable before calibrating the flow rate.



Touch the button indicated by ① to enter flow rate calibration mode.

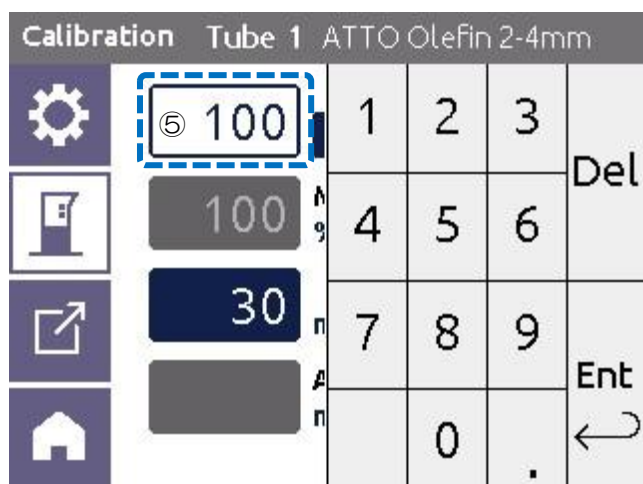
Touch the button indicated by ② to determine the direction of liquid delivery.

Touch the button indicated by ③ to enter the unit change screen.



Next, touch the button indicated by ④, click “%” for the unit, and click “Enter” .

Note: If the tube is not registered, the initial display will be “%” .



When you touch the button indicated by ⑤, a numeric keypad will be displayed. Use the numeric keypad to set the liquid flow rate during calibration to 100%.

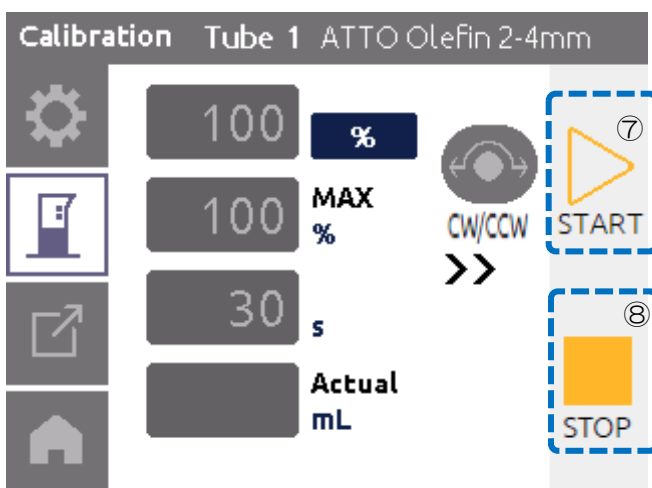
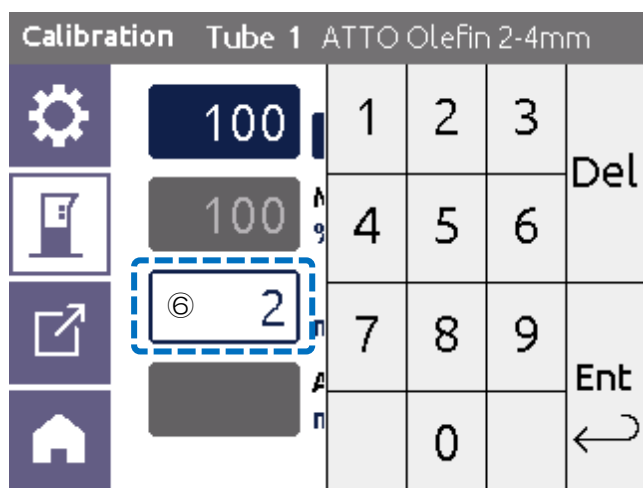
When you touch the button indicated by ⑥, a numeric keypad will be displayed. Enter the liquid delivery time. The unit is minutes

It is necessary to set an appropriate flow rate for the liquid delivery time according to the inner diameter of the tube.

The flow rate also changes depending on the tube material. As the flow rate value at maximum rotation,

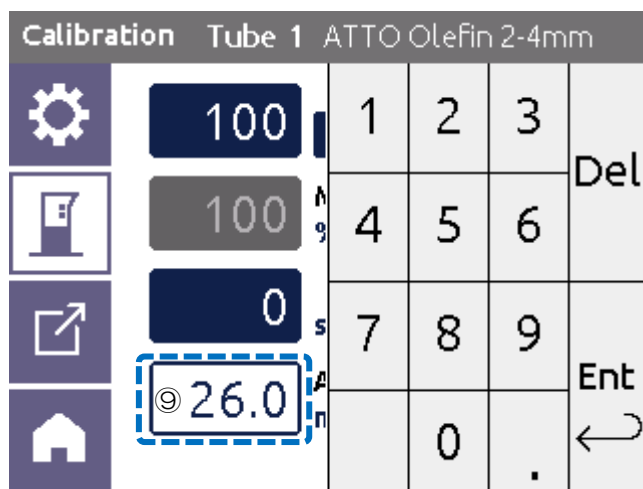
- The flow rate of a tube with an inner diameter of 2 mm and an outer diameter of 4 mm is 13 mL/min.
- The flow rate of a tube with an inner diameter of 4 mm and an outer diameter of 6 mm is 40 mL/min.

Please use this as a guide. Determine the liquid delivery time using the flow rate as a guide.

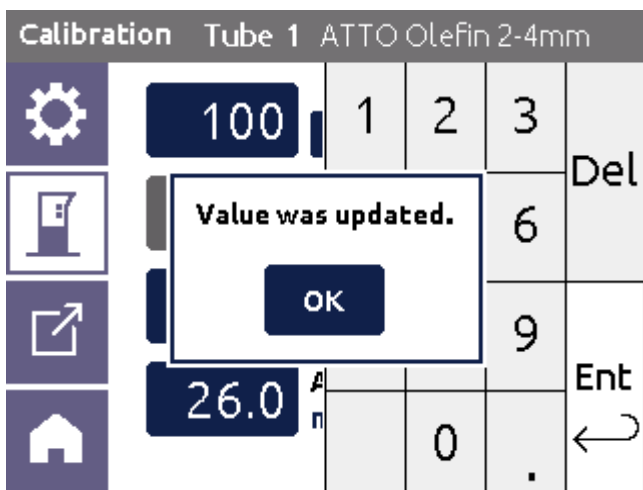


⑦Touch the “START” button to start liquid feeding. At that time, the liquid delivery time will change to a timer countdown display. An alarm will sound when liquid feeding is completed.

(If you touch ⑧“STOP” before the liquid feeding ends, the liquid feeding will stop, and if you touch ⑧“STOP” again, you can calibrate again.)

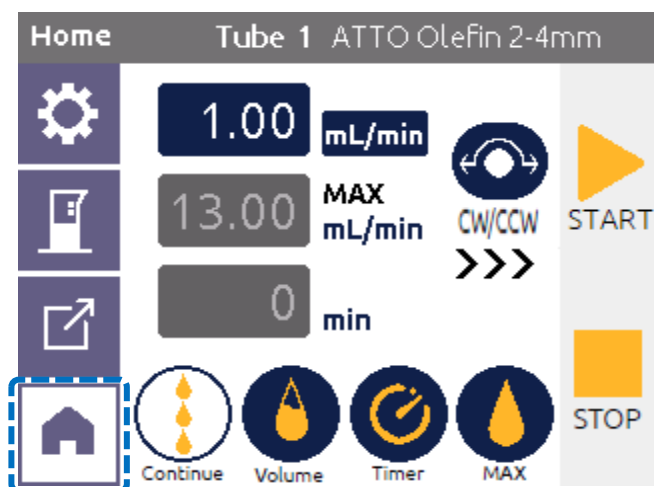


Touch the area indicated by ⑨, enter the weight measured with the weighing scale, and touch Enter to complete..



Touch the "OK" button to update the values.

If it is a newly registered tube, the "OK" button will not be displayed..

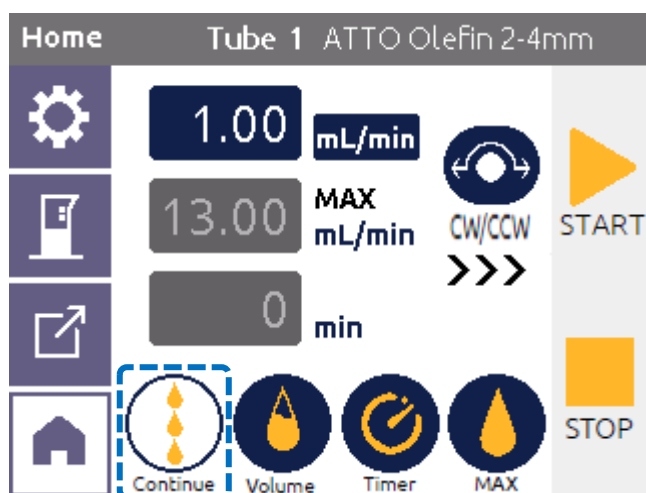


Touch the "HOME" button to return to the screen where you can start liquid delivery.

5.6 Liquid feeding operation (Home screen)

There are four liquid delivery modes (Continue, Volume, Timer and MAX) at the bottom of the screen that appears when you touch the “Home” button. Liquid feeding direction (CW/CCW) can be set in all modes. There are also 4 types of flow rate display modes (mL/min, mL/h, % and rpm).

① Continuous liquid feeding mode (Continue)



Touch the “Continue” button. The liquid delivery flow rate can be set up to the maximum flow rate that can be delivered through the tubing.

After confirming the liquid feeding direction, touch the “START” button.

Liquid delivery will begin and the elapsed time will be displayed.

If you touch the “STOP” button during liquid transfer, the processing will differ depending on the number of times you touch it. It is explained below.

First touch of “STOP” button : Stops the liquid feeding while displaying the elapsed (liquid feeding) time. If you touch the “START” button, liquid feeding will resume and continue from the elapsed time.

Second touch of “STOP” button : While liquid feeding is stopped while displaying the elapsed (liquid feeding) time, the elapsed (liquid feeding) time will be cleared to 0 by touching the “STOP” button for the second time.

If the liquid delivery time exceeds 9999 minutes, the display changes to hours (minutes are rounded down).

② Capacity liquid transfer mode (Volume)



Touch the "Volume" button.

Set the liquid flow rate.

The liquid delivery flow rate can be set up to the maximum flow rate that can be delivered through the tubing.

After confirming the liquid feeding direction, touch the "START" button.

Liquid feeding will begin and the remaining volume of liquid feeding will be displayed.

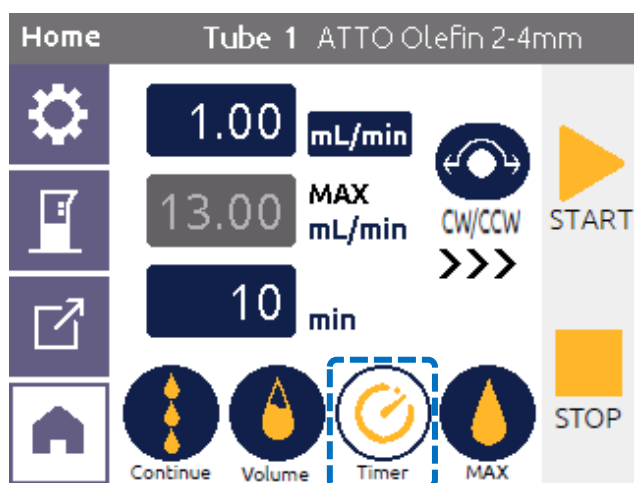
If you touch the "STOP" button during liquid transfer, the processing will differ depending on the number of times you touch it. It is explained below.

First touch of "STOP" button : Stops liquid delivery while displaying the remaining capacity. If you touch the "START" button, liquid feeding will resume and the remaining capacity display will continue. You may also change the remaining capacity at this time.

Second touch of "STOP" button : Return to the Capacity liquid transfer mode start screen.

It will automatically stop when the set volume has been delivered. After that, touch the "STOP" button to return to the Capacity liquid transfer mode start screen.

③ Timer liquid feeding mode (Timer)



Touch the "Timer" button.

Set the liquid delivery time. (The unit is minutes only).

The liquid delivery flow rate can be set up to the maximum flow rate that can be delivered through the tubing.

After confirming the liquid feeding direction, touch the "START" button.

Once the liquid transfer starts, the remaining time for liquid transfer will be displayed.

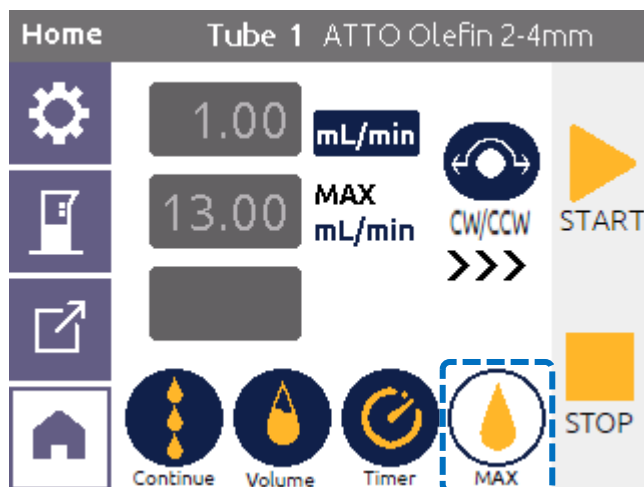
If you touch the "STOP" button during liquid transfer, the processing will differ depending on the number of times you touch it. It is explained below.

First touch of "STOP" button : Stops liquid feeding while displaying the remaining time. If you touch the "START" button, liquid feeding will resume and the remaining time display will continue. You may also change the remaining time at this time.

Second touch of "STOP" button : Return to the Timer liquid feeding mode start screen.

It will automatically stop after sending liquid for the set time. After that, touch the "STOP" button to return to the Timer liquid feeding mode start screen.

④ Maximum flow rate mode (MAX)



Touch the "MAXr" button.

This mode sends liquid at the maximum flow rate regardless of the set flow rate. The liquid is pumped at the motor's maximum speed of 50 rpm.

After confirming the liquid feeding direction, touch the "START" button.

Liquid feeding begins at maximum flow rate.

If you touch the "STOP" button during liquid feeding, liquid feeding will stop.

5.7 External control

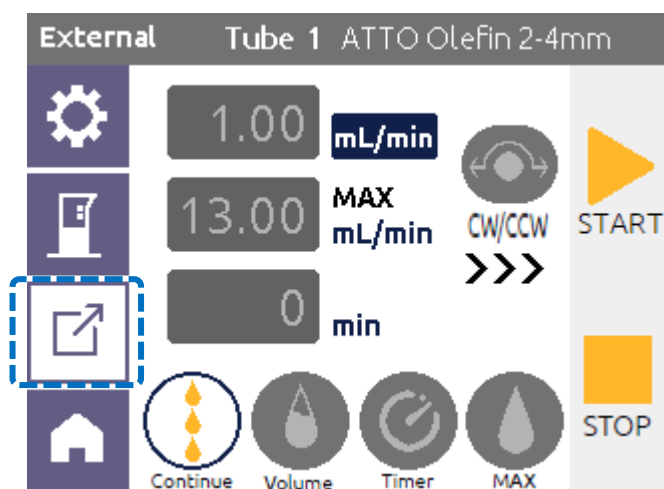
The external control program “PQP SupportProgram” is available separately.

If you start the external control program after “① Remote control method”, you can remotely control the pump. Please refer to the separate document for remote control methods. Please contact our customer service center for external control programs and remote control methods.

We also provide support for customers to create their own control programs. The outline is as follows. For detailed information, please contact our customer service department.

Touching the external button selects external control mode and allows remote control from the outside.

① Remote control method



Performs remote control by communicating via USB serial from an external PC.

Works with Windows 10/11 standard driver. (Not compatible with Windows 7/8)

The port settings are 9600bps, 8bit, no parity, stop bit 1 and no flow.

The following explanation is an overview to help customers create external control programs. If you use the external control program provided by ATTO, the explanations before “5.8 Olefin tube with lure” are unnecessary.

Please send the line feed code as LF or CR+LF. The controller returns CR+LF.

Commands are not case sensitive. The notation shall be in uppercase.

The maximum communication buffer size is 64 Bytes. Please do not send more than 64 bytes of data in one transmission.

Please leave an interval of 10ms or more between consecutive transmissions.

② Send and receive

Returns a one-line response to a one-line command.

Returns NAK for blank lines.

Returns an error for commands that do not exist.

If an error is detected during operation, no error will be issued.

③ Notation of special characters

The carriage return line feed at the end of the line is CR + LF.

The delimiter is Tab.

④ Command

Commands for external control are as follows.

Customers can create external control programs.

Command		
Type	Description	Function
Drive	RUN	Start the pump
	STP	Stop the pump
	C_W	Set the rotation direction clockwise.
	CCW	Set the rotation direction counterclockwise.
	SPD	Set the rotation speed (speed is a number from 1 to 10000)
	FLW	Set the flow rate (flow rate is a real number from 0.01 to the maximum of the tube).
	TMC	Clear the trip meter.
Information	MDL	Returns the model name.
	VER	Returns the firmware version.
	SNO	Returns the serial number.
	STS	Returns the status.
	MXF	Returns the maximum flow rate.
	MNF	Returns the minimum flow rate.
	***	The command does not exist.

Note : Drive commands are valid only in external mode.

5.8 ATTO genuine standard tubing (olefin)

A dedicated tube with an olefin connector developed for PeristaQuantumPump.

This tube is for research purposes only. If you wish to send liquid at a stable flow rate, please age it for approximately 1 hour at maximum rotation of PeristaQuantumPump. However, this aging time is for water at 25°C.

Product name	ATTO genuine standard tubing(olefin) Inner diameter 2 mm, outer diameter 4 mm (for WSP-3310)	ATTO genuine standard tubing(olefin) Inner diameter 4 mm, outer diameter 6 mm (for WSP-3310)
Code	1221465	1221466
Material	Olefin resin	Olefin resin
Inner diameter	2mm (Tolerance ± 0.1 mm)	4mm (Tolerance ± 0.1 mm)
Outer diameter	4mm	6mm
Thick	1mm (Tolerance ± 0.05 mm:Average)	1mm (Tolerance ± 0.05 mm:Average)
Length	82mm	82mm
Normal operating presser	0~0.2Mpa	0~0.1Mpa
Plosive presser	0.8Mpa	0.4Mpa
Operating temperature limit	4 ~ 40°C	4 ~ 40°C
Allowable bend radius	15mm(20°C)	30mm(20°C)
Maximum flow (representative value)	About 13mL/min	About 40mL/min
Minimum flow	0.1mL/min	0.1mL/min
Discharge pressure (50rpm)	0.2MPa	0.3MPa
Flow rate variations between standard tubings	About $\pm 5\%$	About $\pm 5\%$

5.9 ATTO genuine standard tubing (silicon)

A dedicated tube with a silicon connector developed for PeristaQuantumPump.

This tube is for research purposes only. If you wish to send liquid at a stable flow rate, please age it for approximately 1 hour at maximum rotation of PeristaQuantumPump. However, this aging time is for water at 25°C.

Product name	ATTO genuine standard tubing(silicon) Inner diameter 2 mm, outer diameter 4 mm (for WSP-3310)	ATTO genuine standard tubing(silicon) Inner diameter 4 mm, outer diameter 6 mm (for WSP-3310)
Code	1221478	1221473
Material	Silicon resin	Silicon resin
Inner diameter	2mm (Tolerance ± 0.1 mm)	4mm (Tolerance ± 0.1 mm)
Outer diameter	4mm	6mm
Thick	1mm (Tolerance ± 0.05 mm:Average)	1mm (Tolerance ± 0.05 mm:Average)
Length	82mm	82mm
Normal operating presser	-	-
Plosive presser	-	-
Operating temperature limit	4 ~ 200°C	4 ~ 200°C
Allowable bend radius	-	-
Maximum flow (representative value)	About 13mL/min	About 30mL/min
Minimum flow	0.1mL/min	0.1mL/min
Discharge pressure (50rpm)	0.2MPa	0.1MPa
Flow rate variations between standard tubings	About $\pm 5\%$	About $\pm 5\%$

5.10 Regarding disposal

When disposing of the tube, follow the laws and regulations of each local government as industrial waste.

5.11 Chemical resistance table

The criteria for this chemical resistance list are created under certain conditions. Therefore, depending on the actual usage environment, usage conditions, usage period, etc., even if the judgment standard is "O", it may not be suitable.

Please be sure to check under the actual usage conditions before using.

Unless otherwise specified, the aqueous solution concentration of the chemicals in the list is saturated.

The numbers in () indicate the concentration and test temperature. The blank test temperature is the maximum operating temperature of the hose.

This list is a chemical resistance list of materials and does not show the transmittance when the chemical is a gas. Do not use chemicals (active gas, etc.) that are dangerous if permeated.

5.11 Chemical resistance table

5.11.1 Olefin tube chemical resistance table

Acrylonitrile	△	Chromic acid (2%, 70°C)	△	naphtha	△
Acetylene	○	Chromic acid (2%, 50°C)	△	naphthalene	△
Acetaldehyde	△	Chromic acid (10%, 70°C)	×	Ethylene dichloride	△
Acetone	○	Chromic acid (25%, 70°C)	×	Nitrobenzene	○
Aniline	○	Chlorosulfuric acid	×	Carbon disulfide	×
Flaxseed oil	○	Chloroform	△	Perchloroethylene	△
Amyl alcohol	△	Sodium silicate	○	Palmitic acid	○
Sulfurous acid	△	Kerosene (kerosene)	×	Picric acid	△
Sulfurous acid gas	△	Mineral oil	△	Arsenic acid	△
Sodium sulfite	△	Acetic acid (10%, 20°C)	○	Hydrazine	△
benzoic acid	○	Acetic acid (50%, 20°C)	○	Pyridine	○
Ammonia gas (cool)	△	Acetic acid (50%, 70°C)	×	Phenol	○
Ammonia gas (hot)	×	Acetic acid (100%, 20°C)	×	Aluminum gliding	○
Sulfur	○	Aluminum acetate	△	Hydrofluoric acid (10%, 20°C)	△
Carbon monoxide	○	Ethyl acetate	△	Hydrofluoric acid (20%, 20°C)	△
Isopropyl alcohol	○	Calcium acetate	○	Hydrofluoric acid (40%, 20°C)	△
Ethyl alcohol (ethanol)	○	Lead acetate	△	Boron boric acid	○
Ethyl ether (diethyl ether)	△	Salicylic acid	○	Fluorine	×
ethylene glycol	○	oxygen	△	Butyl alcohol (butanol)	○
Ethylene oxide	△	Sodium hypochlorite (5%, 20°C)	○	Furfural	×
Ethylenediamine	△	Sodium hypochlorite (5%, 70°C)	△	Hexane	△
Zinc chloride	○	Copper cyanide	○	Heptane	×
Aluminum chloride	○	Carbon tetrachloride	△	benzyl alcohol	△
Ammonium chloride	○	Cyclohexanol	○	Benzaldehyde	△
Potassium chloride	○	Cyclohexanone	△	Benzene (benzol)	△
Calcium chloride	○	Dibutyl phthalate	△	Borax	○
Ditin chloride	○	fatty acid	△	Boric acid	○
Mercury chloride	○	Dimethylformamide	△	Formaldehyde (40%, 20°C)	○
Ferric chloride	○	Hydrogen bromide (20%,	△	Maleic acid	○
Copper chloride	○	Hydrogen bromide (20%,	△	Water (24°C)	○
Nickel chloride	○	Hydrogen bromide (37%,	△	Akira	○
Barium chloride	○	Oxalic acid	○	methane	○
Magnesium chloride	○	bromine	△	Methyl alcohol (methanol)	○
Methyl chloride	○	Nitric acid (10%, 20°C)	○	Methyl isobutyl ketone (MIBK)	△
Hydrochloric acid (10%, 20 °C)	○	Nitric acid (10%, 70°C)	△	Methyl ethyl ketone (MEK)	△
Hydrochloric acid (20%, 20 °C)	○	Nitric acid (30%, 20°C)	○	Monochloroacetic acid	×
Hydrochloric acid (20%, 80	×	Nitric acid (30%, 70°C)	×	Tethyl acid	△
Hydrochloric acid (38%, 20 °C)	○	Nitric acid (61%, 20°C)	○	Sodium sulfide	△
Chlorine gas (dry)	△	Nitric acid (smoke, 20°C)	×	Hydrogen sulfide	○
Chlorine gas (wet)	△	Ammonium nitrate	△	Barium sulfide	△
aqua regia	△	Calcium nitrate	○	Sulfuric acid (10%, 20°C)	○
Ozone (gas 50ppm)	△	Potassium nitrate	○	Sulfuric acid (10%, 70°C)	×
oleic acid	○	silver nitrate	○	Sulfuric acid (30%, 20°C)	○
Seawater	○	Sodium nitrate	○	Sulfuric acid (30%, 70°C)	×
Perchloric acid	△	Lead nitrate	△	Sulfuric acid (98%, 20°C)	○
Hydrogen peroxide (5%, 20°C)	○	Salt	○	Sulfuric acid (smoke, 20°C)	×
Hydrogen peroxide (5%, 50)	○	mercury	○	Aluminum sulphate	○
Hydrogen peroxide (30%, 20°C)	○	Potassium hydroxide	△	Ammonium sulphate	○
Sodium peroxide	△	Magnesium hydroxide	△	Potassium sulphate	○
Caustic soda (10%, 20 °C)	○	Calcium hydroxide	△	Ferric sulfate	○
Caustic soda (30%, 20 °C)	○	Barium hydroxide	△	Copper sulphate	○
Caustic soda (30%, 70 °C)	△	hydrogen	○	Sodium sulfate (Glauber's	○
gasoline	×	Cellosolve	△	Nickel sulphate	△
Potassium permanganate (5%, 20	△	Carbonated	△	Barium sulphate	△
Formic acid (25%, 20 °C)	○	Ammonium carbonate	△	Magnesium sulfate	○
Formic acid (50%, 20 °C)	○	carbon dioxide gas	○	Phosphoric acid (30%, 80°C)	×
Formic acid (90%, 20 °C)	△	sodium carbonate	○	Phosphoric acid (50%, 20°C)	○
Xylene	△	sodium thiosulfate	○	Phosphoric acid (50%, 70°C)	○
citric acid	○	Decalin	△	Phosphoric acid (75%, 20°C)	○
glucose	○	Tetrahydrofuran	○	Phosphoric acid (85%, 80°C)	×
Glycerin	○	Natural gas	△	Ammonium phosphate	○
Cresol	△	Kerosene	×	Sodium phosphate	○
		toluene	△		

○ : Available, △ : Sufficient confirmation required, × : Unavailable, — : No data

5.11 Chemical resistance table

5.11.2 Silicon tube chemical resistance table

Sodium sulfite	○	Ethyl acetate	×	Sulfur dioxide	◇
Asphalt	×	Sodium acetate	△	Nitrobenzene	×
Acetaldehyde	×	Butyl acetate	×	Lactic acid	○
Acetone	×	Propyl acetate	×	Hydroquinone	△
Aniline	×	Pentyl acetate	×	Paraldehyde	×
Linseed oil	○	Methyl acetate	×	Paraformaldehyde	×
2-Aminoethanol	△	Calcium hypochlorite	×	Palmitic acid	△
Sulfurous acid	◇	Sodium hypochlorite	×	Pitch	×
Sodium sulfite	○	Diamylamine	○	Castor oil	○
Ammonia	△	1,2-Dichloroethane	×	Phenol	△
Ammonia water	×	Dichloropentane	×	Butadiene	×
Isobutane	×	Dipentane	×	Butanol	◇
Ethyl alcohol (ethanol)	△	Fatty acid	△	Butane	×
Ethylene glycol	△	Dimethyl phthalate	◇	Furfural	×
Hydrochloric acid	×	Nitric acid	×	2-Propanol	△
Chlorine (wet)	○	Silicone oil	◇	Benzene	×
Chlorinated insulating oil	△	Ammonium hydroxide	○	Pentanol	△
Octanol	○	Potassium hydroxide	×	Pentane	×
Oleic acid	△	Sodium hydroxide	×	Aromatic Hydrocarbons	×
Hydrogen peroxide	△	10% Sodium hydroxide	×	Maleic acid	○
Formic acid	◇	Magnesium hydroxide	◇	Chromium trioxide	○
Xylene	×	Styrene	×	Acetic anhydride	△
Volatile oil	×	Stearic acid	◇	Phthalic anhydride	△
Glycerol	○	Ammonium carbonate	○	Methanol	○
Creosote	×	Tannic acid	○	Methyl isobutyl ketone	×
Chloroacetic acid	△	Diesel oil	△	Methyl Ethyl Ketone	×
Chloroform	×	Molasses	○	2-Methylpropene	×
Chlorobenzene	×	Triethanolamine	○	Melamine Resin	△
Chloromethane	×	Triethylamine	○	Molten Sulfur	◇
Kerosene	×	Triol	×	Potassium phosphate	◇
Coal tar	◇	Trichloroethane	×	Cottonseed oil	○
Fish oil	◇	Trichloroacetic acid	◇	0-10% sulfuric acid	○
Acetic acid	△	Naphtha	×	10-50% sulfuric acid	◇
				50% sulfuric acid	×

○ : Available, △ : Sufficient confirmation required, ◇ : Some degree of infiltration, not recommended, × : Unavailable

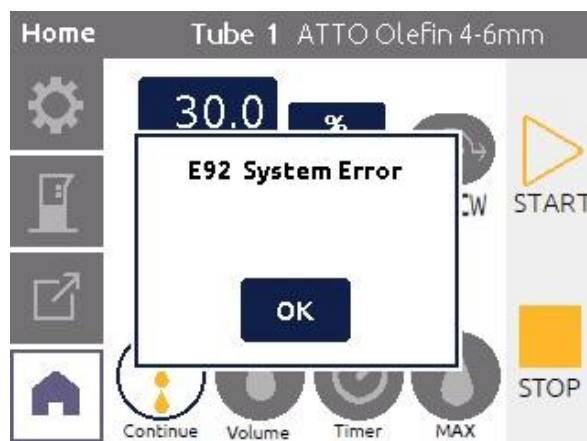
6. Troubleshooting

First, check the information in this section, and if you cannot resolve the issue, please check the model and serial number written on the label on the back of the device, and then contact our customer service (see the back cover of this manual).

- (1) Periodically check that the AC adapter is properly connected all the way to the device's connector, and that it is also properly connected to the outlet.

6.1 Error code

If PeristaQuantumPump detects an abnormality, an error code will be appeared. Please take action according to the error message.



Error #	Content	Correspondence
E01	Command Error	Appear when the command cannot be received correctly. Please check the sent command in the command table.
E11	External Mode Error	Appear when external mode is not selected. Please check the external mode is selected.
E12	Starting Error	Appear when the command cannot be received because the pump is operating. Please resend the command after the pump has stopped.

E21	Step out Detection	Appear when the motor driver detects motor step-out. Please check that the tube is not entangled with the rollers. If you are involved. Remove it and install a new tube. Please Check for bulls sticking to the rollers using maintenance mode. If there is any deposit, wipe it off.
E31	Over Flow	Appear when the set flow rate exceeds the maximum flow rate. Note : In external mode, issue it as a command error.
E32	Under Flow	Appear when the set flow rate falls below the minimum flow rate. Note : In external mode, issue it as a command error.
E90 E91 E92 E93	System Error	A system error of some kind was detected. Please note the error number, turn off the pump, and will contact ATTO.

6.2 Tube breakage

If used continuously for a long period of time, the tube will definitely break.

If the tube breaks, the solution will flow out to the bottom of the main unit depending on the position of the bottle containing the solution.

Please be careful not to allow the spilled solution to flow into power sources such as electrical outlets or place highly reactive substances in the vicinity.

For reference, the lifespan of an olefin tube when used continuously is approximately 7 days at maximum rotation.

However, the life of the tube will vary greatly depending on the conditions, so please be careful not to break the tube during operation.

7.Maintenance

7.1 Maintenance

Please check for dirt and clean regularly.



Warning

Please turn off the power switch and remove the power cable before cleaning the device.

Exterior surface

If the exterior surface becomes dirty, wipe it gently with a soft cloth dampened with a neutral detergent diluted with water.

Touch panel LCD

If the touch panel becomes dirty, wipe it gently with a paper towel dampened with water. Also, if the product gets wet with liquid such as water, wipe it off immediately.

Tube presser

Solid matter adheres to tube pressers due to tube wear. Wipe it off with a damp paper towel.

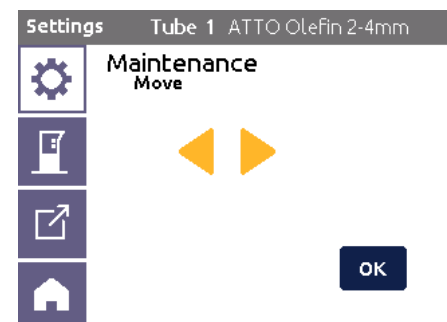
Roller

Solid matter adheres to the rollers due to tube wear.

Wipe off any solid matter adhering to the rollers while rotating them in maintenance mode.

AC adapter

Make sure the AC adapter is not damaged.



7.2 Inspection

Always check for tube breaks during operation. If there is any liquid leakage, immediately turn off the power and unplug the AC adapter from the outlet.

By performing regular maintenance and inspections, you can prevent breakdowns and accidents, and you can use your equipment with peace of mind. Depending on the frequency and length of use, we recommend periodic inspections to maintain performance. If you find any abnormality, please do not use this product and contact us.

For contact information, please see the back cover of this book.

7.3 Maintenance • Repair

The repair period is 7 years after delivery. As a general rule, we do not accept repairs on equipment that has been used for more than 7 years. Even if the product was delivered within 7 years, it may not be possible to repair it if parts are difficult to obtain.

Maintenance parts (performance parts for repair) will be retained for 7 years after production ends. For externally procured parts, the period of manufacture may be less than 7 years.

If you use the product in accordance with this instruction manual, and if an abnormality or failure occurs, or if you notice a problem during maintenance or inspection, please check the [Troubleshooting] items and contact us.

If the product requires repair, please send it to our maintenance service group. If you wish to have the repair done on-site, a separate travel fee will be required.

For contact information, please see the back cover of this book.

7.4 Warranty

For warranty terms and warranty period, please refer to the warranty card attached to the product.

8. Specification

Specification

Product name	PeristaQuantumPump	
Model name	WSP-3310	WSP-3310-2
Number of Channels	1 channel	2 channels
Flow rate	If inner diameter 2 mm, outer diameter 4 mm, 0.01~13mL/min. If inner diameter 4 mm, outer diameter 6 mm, 0.01~40mL/min.	
Flow rate variable range	mL/mm:1300 times (Inner diameter 2 mm/Outer diameter 4 mm of 82mm fitting) mL/mm:4000 times (Inner diameter 4 mm/Outer diameter 6 mm of 82mm fitting) % : 1000 times (0.1%~100%) rpm : 5000 times (0.01rpm~50rpm)	
Number of revolutions	0.01~50rpm (for main unit control)	
	0.005~50rpm (for external control)	
Flow stability	±1%/h	
Lifting height	Extrusion 21m / Suction 6m	
Roller	6 pieces, SUS304	
Compatible viscosity	15Pa • s (1500cP) or less	
Tube	ATTO genuine standard tubing(olefin or silicon) Inner diameter 2 mm, outer diameter 4 mm (5m) ATTO genuine standard tubing(olefin or silicon) Inner diameter 4 mm, outer diameter 6 mm (5m)	
Tube life time	7 days (when used continuously at maximum flow rate).	
Operating temperature and humidity	4 ~ 40°C, non-condensing.	
motor	Stepper motor	
Drive control	Micro stepping drive	
Touch panel	3.5 inch resistive type	
Liquid delivery	Flow rate : mL/min or mL/h	

setting	% : 0.1%~100% (Maximum flow rate is 100%) rpm : 0.01rpm~50rpm	
Liquid feeding method	Continuous operation : Flow rate, % of maximum flow rate, revolutions Volume: 0.1-9999mL Timer liquid feeding: 0.1 to 9999 minutes	
Liquid feeding direction	CW / CCW	
LCD display content	Flow rate (mL/min, mL/h), liquid feeding direction, % of maximum flow rate, revolutions, actual flow rate, revolutions speed	
External control	USB Type-C: Start, Stop, CW/CCW, flow rate, flow rate, revolutions speed Mini DIN connector (8 pin): Start/Stop control	
Body material	AL • SUS • Steel • PET/GF • POM	
AC adapter	Input: AC100 ~ 240V, 50/60Hz, Output: DC24V/1.5A	
Power consumption	1 3. 3VA	1 4. 4VA
Dimensions	110mm(W) x 200mm(D) s 130mm(H)	110mm(W) x 260mm(D) s 130mm(H)
Weight	2.2kg	2.6kg



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