

Introduction

Thank you for purchasing ATTO Scientific equipment, Perista Pump (AC-2110 II • SJ-1211 II-H • SJ-1211 II-L). This instruction manual is delivered together with this equipment so that customers can use this equipment thoroughly. Not only those who are using this equipment for the first time but also those who have already used it, please read this manual carefully and understand the contents. If you are using this equipment for the first time, read it from the beginning. In addition to usage, this manual includes information on maintenance, warranty, service, etc., so please keep this manual at hand for effective use. Please do not hesitate to contact us if you have any questions about the equipment you purchased or the instruction manual.

Instruction manual

Please read this manual carefully before use. After reading, keep this manual readily available for reference. If the product is to be relocated, make sure to include this manual with the product. If missing pages or binding errors are found, lost or damaged, a new copy will be provided. Please contact your sales agency or us and give the product name and model name. If there are any suspicious points, errors or omissions, please contact us.

Safety precautions

Proper operation of the equipment assures your safety. Please read this manual carefully before use and do not operate until you fully understand it. Also, the usage and safety precautions described in this manual relate only to the use of this equipment for the specified purpose of use. Do not use this equipment for any purpose other than those described in this manual. If this equipment is used in a method or purpose not described in this manual, all necessary safety measures are the responsibility of the operator.

If you are operating the equipment for the first time, please receive the guidance of an experienced person with the correct knowledge and understand the principles and methods. Also, not only those who operate for the first time but also those who have experience of using specialized education, please use this manual at hand.

Safety symbols

To use this device safely and to keep it safe, the following symbols are displayed on this manual and the device. Please understand the meaning of the symbols and observe each item.

	Danger	Ignoring this indication and mishandling it could lead to an imminent risk of death or serious injury.
	Warning	Ignoring this indication and mishandling it could lead to risk of death or injury.
	Caution	Ignoring this indication and mishandling it could lead to the physical damage.
		This symbol indicates prohibited acts.
		This symbol indicates important information.
		This symbol indicates tips and hint.

Operation precautions

These are precautions to prevent fires, electric shocks, other accidents, and breakdowns. Please understand the contents and be sure to follow them.

Danger

Main body 	Do not remove the main unit panel cover or allow foreign objects to enter the ventilation opening. It may cause an electric shock or malfunction. Do not use the device when it is wet. It may cause an electric shock or failure.
Power connection  	Do not use a power plug that is deformed or corroded, or that has a damaged or peeled insulation film. There is a risk of fire or electric shock due to poor contact. Stop using this device and contact us. After use, be sure to turn off the power switch and disconnect it from the electrical outlet. When disconnecting the power plug from the outlet, be sure to turn off the power switch and hold the plug. Do not pull the cable.
No wet hand 	Do not operate the device with wet hands or touch the power plug with wet hands. There is a risk of electric shock or failure.

Maintenance 	If a malformation occurs while using this device, or if you suspect an abnormality or malfunction, stop using it immediately. Also, do not use this device if you find any problems during inspection. While using this device, check for any abnormalities such as abnormal sounds and smoke from this device at regular intervals, and whether there is any liquid leakage from this device. If there is any abnormality, failure, or malfunction, stop using the device and contact us.
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Warning

Installation location 	Avoid installing the device on a wobbling table, tilted surface, or place with strong vibration. Install on a lab bench with a horizontal, stable hard surface. There is a risk of electric shock from falling or leaking.
Main body 	This device is not an explosion-proof structure. Install in a place where there is no risk of exposure to fire or flammable gases. When the device is moved from a low-temperature area to a high-temperature area, there is a possibility of condensation. If condensation occurs, dry it completely. There is a risk of electric shock or failure.
Relocation 	Do not move the device during operation. It may cause the tubes and cords to get tangled and fall. Also, the cables may be damaged, resulting in a fire or electric shock. Before moving this device, be sure to turn off the power switch, disconnect the power cable, and disconnect all wiring cables.
Maintenance 	Be sure to turn off the power switch and unplug the power cable before performing maintenance or cleaning.
Disassemble Prohibition 	Do not disassemble or modify this device. Do not remove the pump cover or panel. Please contact us if adjustment or repair is required. We are not responsible for any accidents or malfunctions caused by disassembly or modification of this device.
Seal group 	Do not remove the Warning Seal. The seals indicate the hazardous part of the device. If it is peeled off or dirty and cannot be read, please contact us.

Caution

Power cable 	When using outside Japan, prepare a power cable that conforms to the standards of the country of use. Using a nonstandard power cable may cause overheating or fire. Please contact us if you are unsure.
Pump position 	Use it without tilting forward. If it is tilted forward, leakage due to tube damage will not be released to the outside, causing failure.
Leakage 	If liquid leaks, remove the pump head immediately and clean each part. In particular, make sure that the leak holes do not remain dirty.
Main body 	Do not pour any solution on the front panel. It may cause a failure.
Roller cover 	Do not wash the roller cover with an organic solvent, but with a neutral detergent. It may cause damage.
Compression roller 	Set the compression rollers at equal intervals so that they do not touch each other. Rotating in contact will damage the gears on each roller. The roller will wear out depending on the usage conditions. If worn, replace with a new roller. The internal gear may wear out if it is operated for a long time. Please contact us when replacing parts.
Tube 	The tube is a consumable item. Change the compression position or replace it with a new tube after a certain period of use. Also, when using tubes other than those provided by us, the specifications may not be satisfied.
Pump head 	There may be a crackling sound from the pump head during use. If you wipe the compression roller, noise can be stopped.

Important

Seals 	The nameplate seal is important information for product maintenance and management. Please do not remove it.
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Other precautions

AC cable



Connect the provided power cable to the power connector on the back of the pump. Connect the power plug to a power outlet with a ground terminal. Ensure that the power plug is fully inserted.

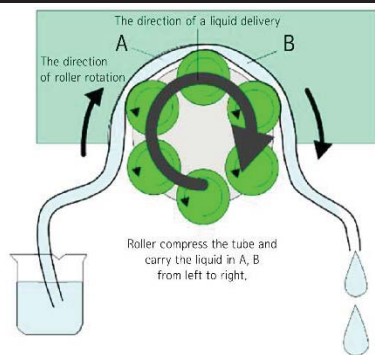
Application

This device is a laboratory device for research. Since it is not a medical device, it cannot be used for medical practices such as medical judgments and confirmation of treatment effects.

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Application



The Perista pump (AC-2110 II • SJ-1211 II-H • SJ-1211 II-L) is a peristaltic pump that uses a roller to compress silicon tube. The maximum liquid delivery volume varies depending on the tube diameter.

The pump head is easy to handle, so tube replacement is easy. Also, it uses its own compression method to maintain tube life.

It is widely applied from laboratories to factories for sterile liquid delivery of substances in biotechnology, liquid delivery pump in column chromatography, liquid delivery in fermentation broth, and chemical perfusion experiments, and so on.

Confirmation when unpacking

When you receive the product, make sure that the main unit and accessories are included correctly or are not damaged. If there is any defect or damage, please contact your dealer or use immediately.

Please make sure that the product is unpacked within a week after the product arrives. After a week, damage or missing items may not be guaranteed.

Equipment configuration

Main body (Product name: Perista Pump)

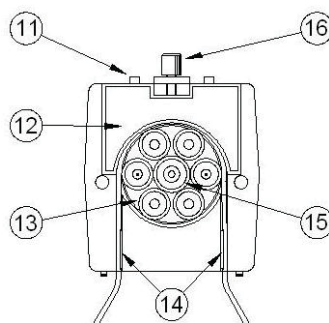
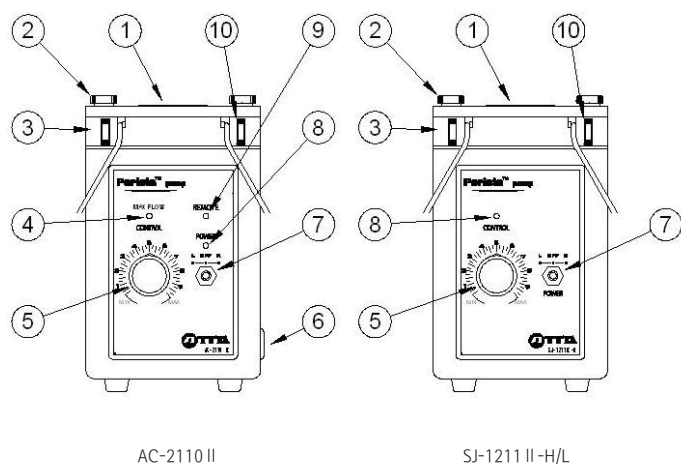
Model	AC-2110 II	SJ-1211 II -H	SJ-1211 II -L
Main body	Perista Pump		

Accessories

Model	AC-2110 II	SJ-1211 II -H	SJ-1211 II -L
AC cable	1 ea.		
Silicon tube	φ5-3, φ4-2, φ3-1mm 1m each		
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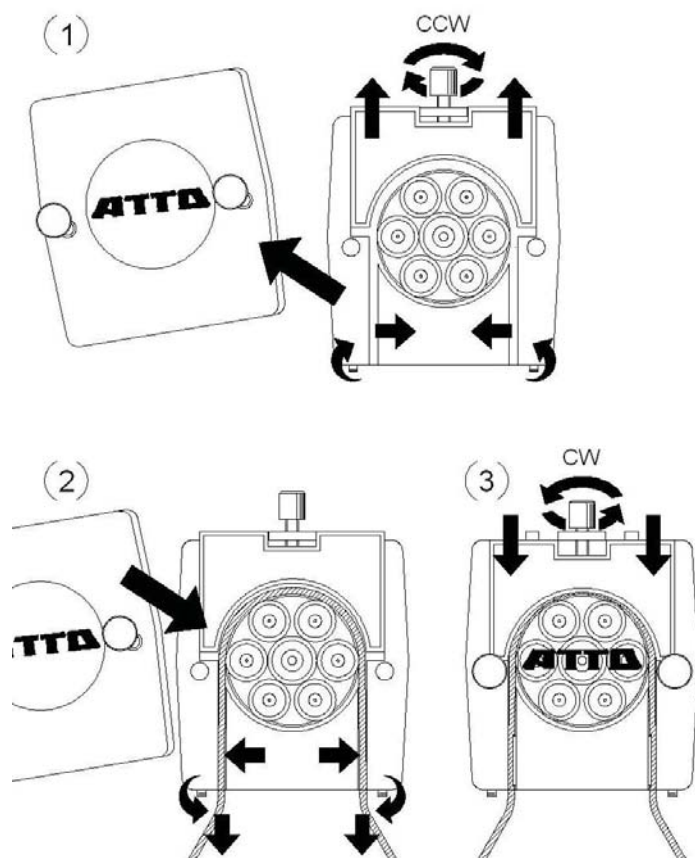
Name and function of each parts

Main body



①	Roller cover	⑨	REMOTO LED
②	Mounting bolt (M4-35 mm)	⑩	Tube setter
③	Pump head	⑪	Leakage hole
④	MAX FLOW switch	⑫	Compression plate
⑤	Flow rate control knob	⑬	Compression roller
⑥	External control terminal	⑭	Tube clamp
⑦	POWER switch	⑮	Center roller
⑧	POWER LED	⑯	Compression knob

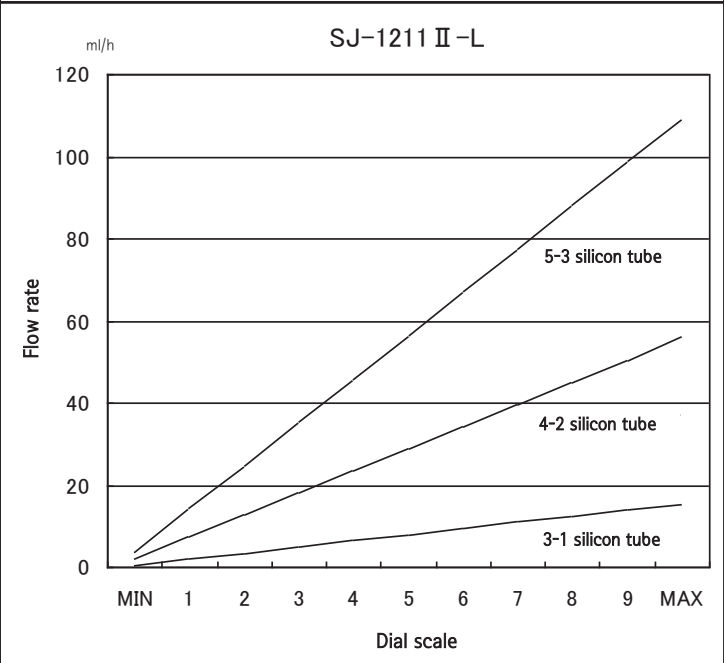
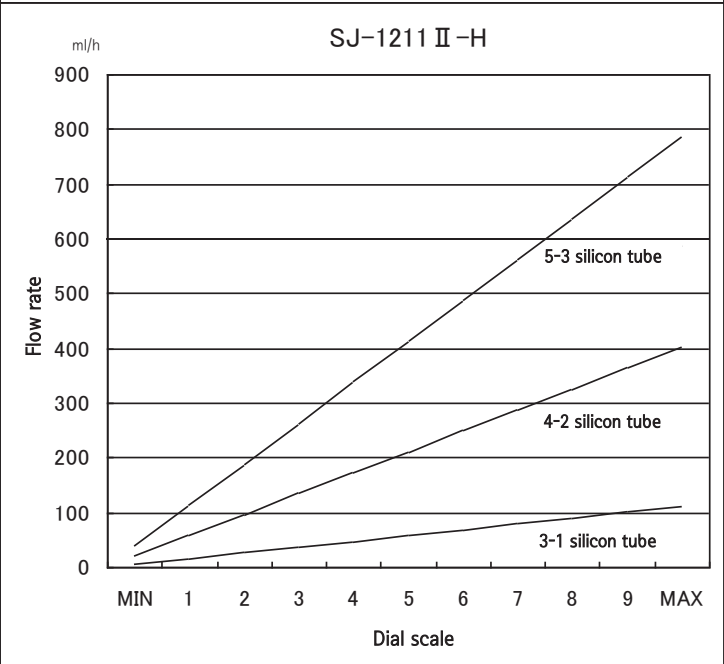
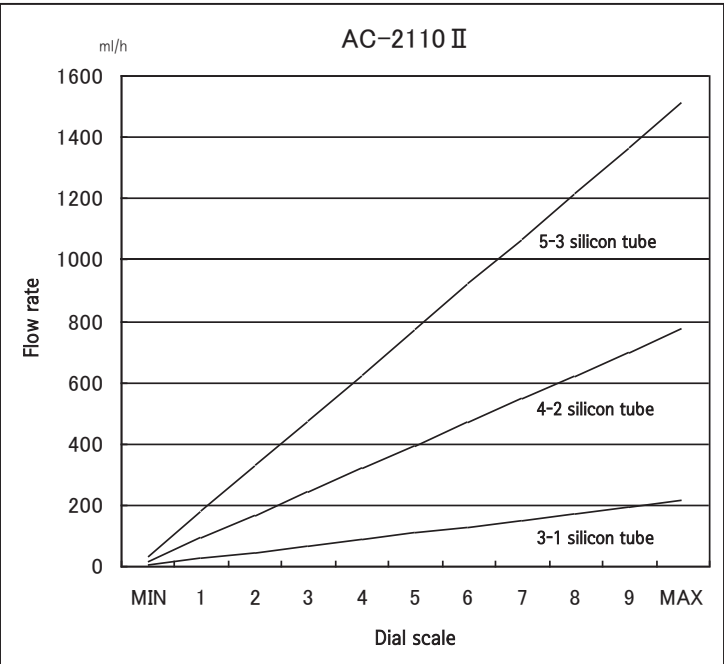
Instructions



- Loosen the mounting bolts and remove the roller cover.
 - Rotate the compression knob counterclockwise to loosen the compression plate.
 - Verify that the interval between the six compression rollers is equal. If they are in contact with each other, make sure to reinsert them.
 - Rotate the left and right tube setters upward to loosen the tube clamp.
 - Install the tube.
 - Gently pull the tube forward and turn the left and right tube setters downward until the tube is lightly pressed with the tube clamp.
 - Fix the roller cover with a mounting bolt.
 - Turn the POWER switch off (neutral) and rotate the flow rate control knob to full counterclockwise (MIN side).
 - Connect the power plug to a power outlet.
 - Turn on the POWER switch to the right (R) or left (L). The POWER LED lights at this time. Slowly rotate the flow rate control knob toward the MAX direction and the roller begins to move.
 - Refer to the flow rate guide graph, set the required flow rate with flow rate control knob.
 - Gently turn the compression knob clockwise. The tube is compressed and delivery begins.
- ⚠ Caution Do not tighten the compression knob until the liquid does not flow backward. Excessive tightening can extremely shorten tube life.
- Use the following procedure to make the same amount of liquid flow between pump heads.
 - Measure the flow rate individually and use the pump head with the smallest flow rate as a reference.
 - Loosen the tube clamp of the pump head with the above pump head as a reference. And fix the tube so that both sides of the tube are not pulled back. By stretching the tube, the inner diameter of the tube decreases and the flow rate decreases.
 - The pump head and main body are made of resin and should not be used in direct sunlight or under high temperatures. If it is dirty, use a detergent and do not use organic solvents.

Flow rate guide graph

The diagram below shows the approximate relationship between the tube diameter and flow rate of the dial scale of the flow rate control knob. The amount of liquid delivered varies depending on the tolerance of the tube diameter and the setting conditions. Obtain the exact flow rate by actual measurement.



Specifications

Model	AC-2110 II	SJ-1211 II-H	SJ-1211 II-L
Channel	1~4 ch	1 ch	1~4 ch
Flow rate	5~1,500 mL/hr	7~700 mL/hr	0.7~100 mL/hr
Flow rate variable range	From ×1 to ×45	From ×1 to ×20	From ×1 to ×30
Accuracy of flow rate	Accuracy of repetition within ±1%		
Vertical pumping height	Max. 21 m		
Maximum pressure	Discharge 205.9 kPa (2.1 kg/cm ²) / Suction 9.8 kPa (0.1 kg/cm ²)		
Viscosity of transported fluid	Max. 1.5 Pa · s (1,500 cP)		
Motor	DC motor	AC induction motor	
Driving circuit	DC servo system	Constant rotation automatic control circuit	
Environmental temperature	0~40°C, without condensation		
Power	AC 100~240 V, 50/60 Hz 12VA (when using 100 V)	AC 100 V, 50/60 Hz 12VA (when using 100 V)	
Dimensions	110 (W) × 150 (D) × 180 (H) mm		
Weight	1.5 kg	2.0 kg	2.1 kg
Application tube	Outer diameter φ3 mm ~ φ5 mm, thickness 1 mm		
Standard accessories	Silicon tube φ5-3, φ4-2, φ3-1, each 1 m		
	Instruction manual 1 copy		

- ※ Performance levels such as flow rate, accuracy of flow rate, vertical pumping height, and maximum pressure may vary depending on the inner diameter of the tube, the pressure of the compression plate, the tension when the tube is set, and the degree of abrasion of the tube.
- ※ The power consumption described is the value when one pump head (standard configuration) is installed.
- ※ The weight described is the value when one pump head (standard configuration) is installed. If the pump head is increased by one step, the weight will increase by 250 g.

Consumables and maintenance parts

Code No.	Description
1292231	Pump head A (upper) for Perista I / II
1292232	Pump head B (middle) for Perista I / II
1292233	Roller A set (upper) for Perista I / II
1292234	Roller B set (middle) for Perista I / II
1292235	Roller cover (clear) for Perista I / II
1292133	Mounting bolt (2 pcs)
1292213	Fixing stud (2 pcs)
1292119	Silicon tube φ5-3, 5 m
1292120	Silicon tube φ4-2, 5 m
1292121	Silicon tube φ3-1, 5 m
1292308	Silicon tube φ5-3, 10 m
1292305	Silicon tube φ4-2, 10 m
1292302	Silicon tube φ3-1, 10 m
1292309	Silicon tube φ5-3, 20 m
1292306	Silicon tube φ4-2, 20 m
1292303	Silicon tube φ3-1, 20 m
1292307	Silicon tube φ5-3, 50 m
1292304	Silicon tube φ4-2, 50 m
1292301	Silicon tube φ3-1, 50 m
1292124	Silicon tube φ5-3, φ4-2, φ3-1, 1 m each

Cleaning

Before use, inspect the tube for cracks and overall malfunction. Replace with a new tube if necessary. After use, turn the compression knob counterclockwise to loosen the tube to release the compression. Keeping the tube compressed will shorten the tube life.

Maintenance and repair

As maintenance parts (performance parts for repair), we will hold new parts with the same functions and performance, or parts with quality assurance as well as new parts (reusable parts) for 10 years after the end of production announcement, and perform maintenance inspections.

Please contact us for product maintenance after 10 years. Please contact us if you use the product according to this manual and if any abnormalities or failures occur, or if you notice any problems during maintenance. In principle, if repair is necessary, send the product to us. If you want to make an on-site repair, a separate travelling expenses will be required.

Refer to the end of this document for contact information.

Warranty

Please see the warranty card attached to the product for free repair regulations.

Warranty period

The warranty period for the product and optional items is as described in this warranty.

The warranty period for equipment that has been repaired free of charge will be 3 months after repair or the remaining warranty period of the product, whichever is longer.

Warranty coverage

Even if sold by ATTO KOREA together with the product, other companies' products will not be eligible for free repairs. Other companies' products are covered by the warranty specified by each company.

Other

If there is no special request, parts removed for repair will be taken back on us.

The purpose of repair is to repair and maintain the product and performance, and the maintenance parts (performance parts for repair) use new parts with the same functions and performance, or parts that are quality-guaranteed (reuse parts) as well as new parts. We will replace it with a defective part.

Contact us

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December. 19th, 2017 Ver.12

0,000 001 = 10⁻⁶ micro
0,000 000 001 = 10⁻⁹ nano
0,000 000 000 001 = 10⁻¹² pico
0,000 000 000 000 001 = 10⁻¹⁵ femto
0,000 000 000 000 000 001 = 10⁻¹⁸ ATTO

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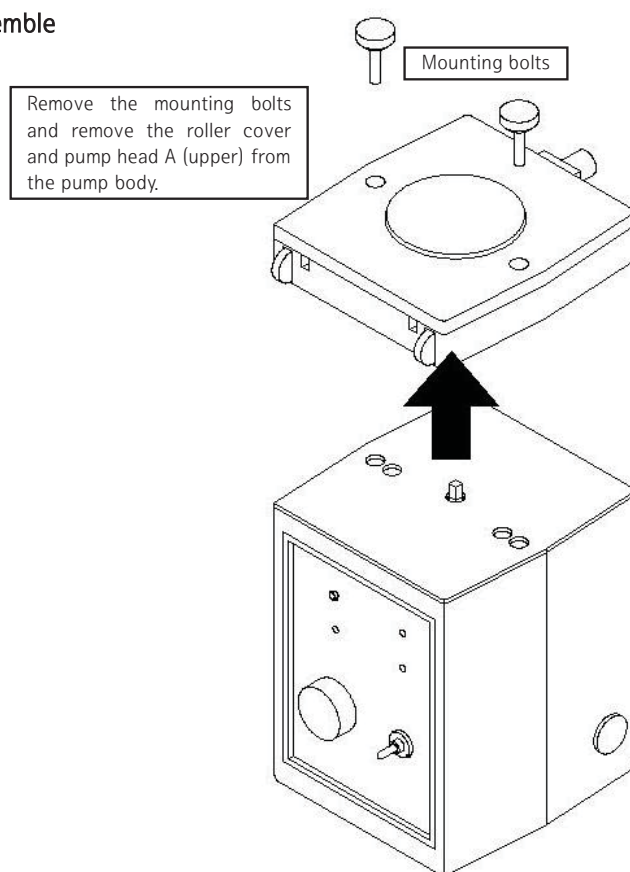
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Addition

