

Introduction

Thank you for purchasing Perista pump, ATTO scientific instrument. The product is delivered to you along with the device manual to support full utilization of the product in your laboratory. Not only first-time users of the product but also experienced users are asked to read and understand thoroughly this manual before use. This manual is configured in a read-through style. Before using the device for the first time, please read this manual from beginning to end. Furthermore, this manual contains instructions and information on maintenance, the warranty, and service, in addition to the operation. Keep this manual at hand for effective use. Feel free to contact us for enquiries about your purchased product or the manual.

Instruction Manual







Please read this manual thoroughly to become acquainted with the proper use of the product. 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. Every effort has been made to prepare this manual accurately and completely, but if any points of query, errors, or omissions are found, please notify us.

Safety Precautions

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





The following symbols are used in this manual and on the product to assure and maintain safety in the use of the device.

	Failure to observe this precaution could lead to an imminent risk of death or serious injury.
	Failure to observe this precaution could lead to risk of death or injury.
	Failure to observe this precaution could lead to the damage of property.
	This symbol indicates important information.
	This symbol indicates tips and hint.
	This symbol indicates prohibited acts







Operation Precautions

These precautions are necessary to prevent fire, electric shock, or other accidents and failures. It is essential to understand and observe these precautions.









Danger

	Main body Do not insert a foreign material into the device. It causes electrical shock or failure of the device. Do not use the device in wet condition. These causes electrical shock or failure.
	Power connection Do not use this type of power cable, of which terminals and plugs are deformed or corroded, or of which insulation cover is separated or damaged. It causes electrical shock or fire due to poor contact. Refrain from using the device and contact us. After turning off the device, disconnect the power cable from the receptacle. On unplugging the power cable, hold the plug, but do not pull on the cable.
	No wet hand Do not operate the device with wet hands. Also do not touch the power plugs and terminals with wet hands. It causes electrical shock or failure of the device.
	Maintenance Please quit using the device immediately if anything abnormal happens during device usage or if any abnormality/failure is suspected. Also, do not use the device if you find any failure at inspection. Also, check whether there are any abnormalities at regular intervals by visual inspection, such as whether there is no abnormal sound or smoke from this device or liquid leakage while using this device. 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. It causes electrical shock failure by leaking liquid or falling down.
	Main body This device is not an explosion-proof structure. Install this device away from any places with the possibility of exposure to fire or flammable gasses. When the device is moved from a low-temperature area (lowtemp. room, cold out-door, 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 device, get it dry sufficiently. It causes electrical shock or failure.
	Migration Do not move the device while it's operating. It may cause a tubing and cords to get tangled and fall. In addition, the cords 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 Please be sure to turn the Unit power switch OFF and pull out the cable before performing maintenance and cleaning.
	Disassemble Prohibition Do not disassemble or modify this device. Do not remove the pump cover or panel. Our engineers are in charge of internal adjustment and repair of this product. Please contact us if adjustment or repair is required. We are not responsible for any accidents or damage caused by disassembly or modification of this equipment.
	Seals Never peel off the Warning Seal. The seals indicate dangerous areas. If any seal comes off, please contact us.

Warning

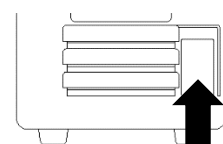
	Power cable When using outside of Japan, prepare a power cable adapted to the country standards which is used. Using a non-standard power cable may cause overheating or ignition. Please contact us if you are unsure.
	Pump position Use it without tilting forward. If tilted forward, leakage by tube wear will not be emitted to the outside and causes damage.
	liquid leakage If liquid leaks, remove the cassette immediately and clean each part. In particular, make sure that the leak holes do not remain dirty.
	Main unit Do not pour any solution on the front panel. It may cause damage.
	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 pressing rollers at equal intervals not to touch each other. Do not let the rollers touch each other during rotation. It may cause wear or damage. 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 A tubing is a consumable item. Change the squeezing position or replace 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 met.
	Cassette There may be noise from the cassette during use. If you wipe the squeezing roller, noise may not be generated.

Important

	Seals The nameplate seal is important information for product maintenance and control. Please do not remove.
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Other Precautions

AC cable



Connect the supplied power cable to the power connector on the back of the pump. Connect the power plug to a power outlet with a ground terminal. Make sure to insert the power plug till its end.

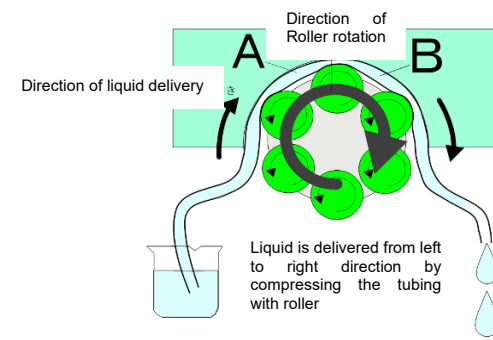
Application

This device is for research use only. It cannot be used for medical actions such as medical judgment or confirmation of therapeutic effects.

Proprietary · Copyright

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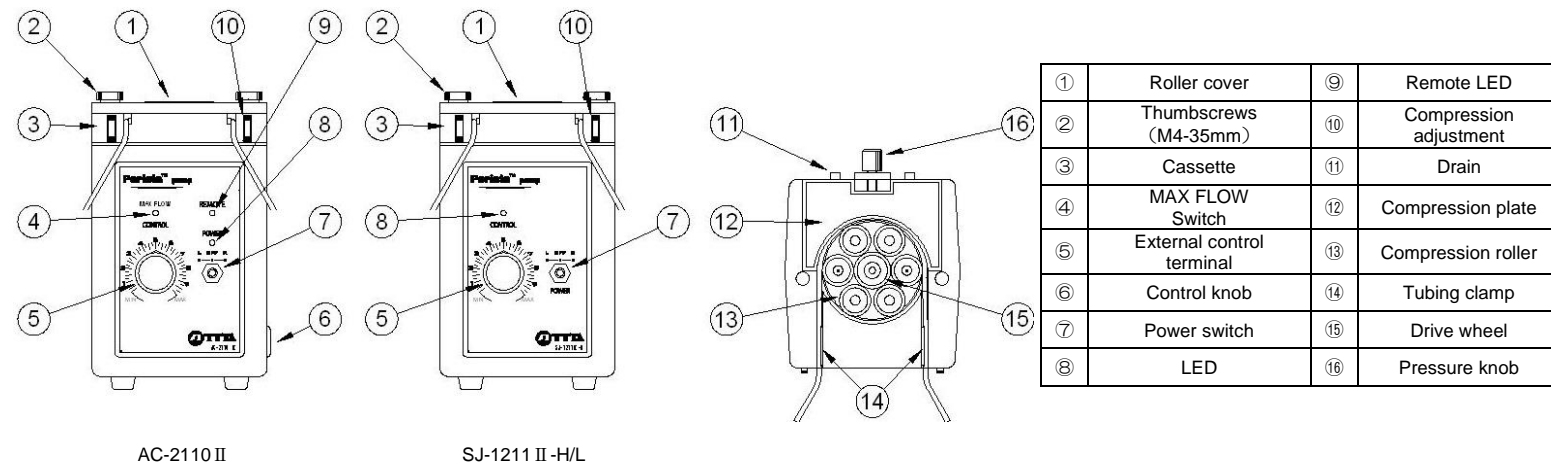
Application



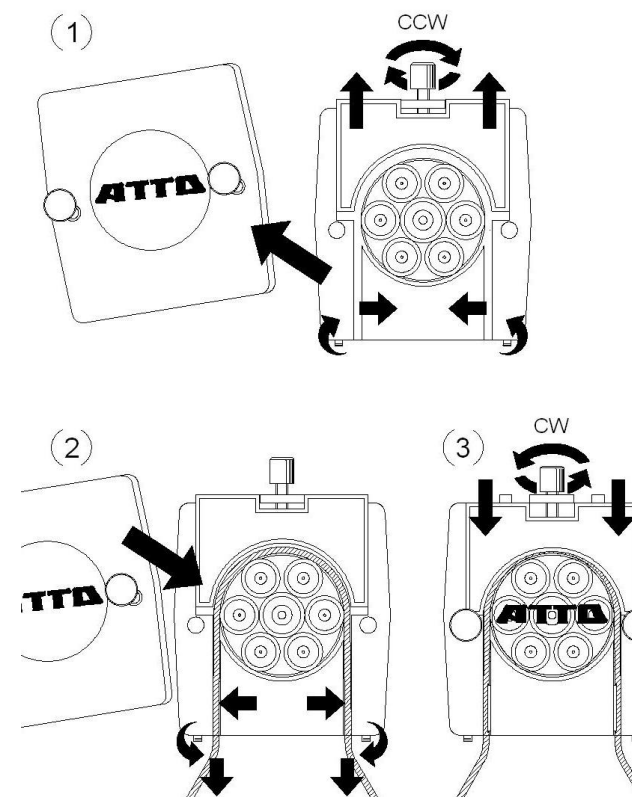
The perista pump (AC-2110II / SJ-1211II-H / SJ-1211II-L) is a peristaltic pump by compressing a tube such as silicon with a roller. The maximum flow rate varies depending on a tubing diameter. Since the cassette is simple design, tube replacement is a quite easy. Moreover, the device has a unique compressing mechanism that keeps the tubing life. The perista pump (AC-2110II / SJ-1211II-H / SJ-1211II-L) is widely used from laboratory to production plant, such as a pump of column chromatography, aseptic delivery of cell culture media, deliver of fermentation broth, chemical perfusion.

Parts names

Main unit



How to Use



Confirmation when unpacked

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.

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		
Silicone tube	φ5-3, φ4-2, φ3-1mm 1m ea.		
Instruction manual	1		

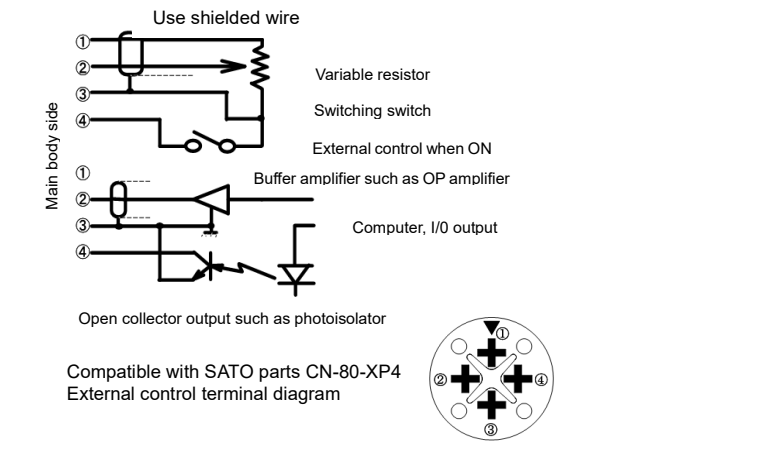
- Loosen the Thumbscrews and remove the Roller cover.
- Turn the Pressure knob counterclockwise to loosen the Compression plate.
- Check that the distance between the six Compression rollers is equal. If they are touching each other, be sure to reinsert them.
- Turn the left and right Compression adjustment upward to loosen the Tubing clamp.
- Place a tubing in the groove.
- Pull a tubing lightly toward to you, turn the left and right Compression adjustment downward, and fix a tubing by lightly pressing it with the Tubing clamp.
- Fix the Roller cover at the correct setting direction with the Thumbscrews.
- Turn the Power switch OFF (neutral) and turn the Control knob counterclockwise to the end (MIN side).
- Connect the power plug to the power outlet.
- Tilt the Power switch to the right (R) or left (L) to turn it on. Confirm the LED light is on. Roll the Control knob is gradually to the MAX direction, the roller will start moving.
- Refer to the Flow Rate Chart below and set the required flow rate with the Control knob.
- Slowly turn the pressure knob clockwise. A tubing is compressed and liquid delivery start.
 - CAUTION Do not tighten the pressure knob until the liquid feed does not flow backward. Excessive tightening will extremely shorten the life of a tubing.
- Make the flow rate equally between cassettes by the following procedure.
- Measure the flow rate individually and use the cassette with the lowest flow rate and regard it as a standard.
- Loosen the Tubing clamp of the cassette which flow rate is higher than the standard flow rate, and fix a tubing with the Tubing clamp not to pull back them. Extending the tubing reduces the inner diameter of the tubing and reduces flow.
 - CAUTION Since the cassette and pump are made of resin, do not use them under direct sunlight or high temperature. When dirty, use detergent and do not use organic solvents.

Functions of external control terminals (AC-2110 II only)

The flow rate of this device can be controlled by an external signal.

- When the external control switching terminal (2) is connected to the 0V (common) terminal (3), the flow rate of this device is controlled by the flow control voltage applied to the flow control terminal.
- When the external control switching terminal (2) and the 0V (common) terminal (3) are disconnected, the flow of this device is controlled by the setting value of the control knob.

Controllers that use external signals must be manufactured by the customer with reference to the following example. ① to ④ correspond to the terminal numbers in the following table.



Terminal Number	Name	Function
①	5V Power	Power supply for flow control.
②	Flow rate control terminal	Apply 0-5V, DC flow control voltage.
③	0V (Common) terminal	
④	External control switch terminal	When connected to the common terminal, it switches to external control.

Apply 5V at the Max flow rate. Apply 0V between ② and ③ at 0 flow rate

Specification

Model	AC-2110 II	SJ-1211 II-H	SJ-1211 II-L
Channels	1-4 Channels	1 Channel	1-4 Channels
Flow Rate	5-1500ml	7-700ml	0.7-100ml
Flow Rate Variable Range	x1 to x45	x1 to x20	x1 to x30
Accuracy of Flow Rate	Accuracy of Repetition within ±1%		
Vertical pumping Height	21m		
Maximum Pressure	Discharge 205.9kPa(2.1kg/cm ²) / Suction 9.8kPa(0.1kg/cm ²)		
Viscosity of Transported Fluid	1.5Pa·S(1500cP)		
Motor Type	DC motor	AC induction motor	
Drive Circuit	DC servo system	Constant Rotation Automatic Control Circuit	
Environmental Temperature	0-40°C (No condensation)		
Power	AC100-240V 50/60Hz 12VA(with AC100V)	AC100V/50/60Hz 12VA(with AC100V)	
Dimensions	110mm(W)x150mm(D)x180mm(H)		
Weight	1.5kg	2.0kg	2.1kg
Applicable tube	φ5mm~φ3mm 1mm Thickness		
Standard Accessories	Silicone tube φ5-3, φ4-2, φ3-1 1each/1m Instruction Manual x1		

Performance such as flow rate, flow rate accuracy, maximum lift, and maximum pressure may be influenced by the inner diameter of a tubing, the pressing pressure of the Compression plate, the tension when setting a tubing, and degree of cable deterioration.

*The power consumption listed is the value when one cassette (standard composition) is set.

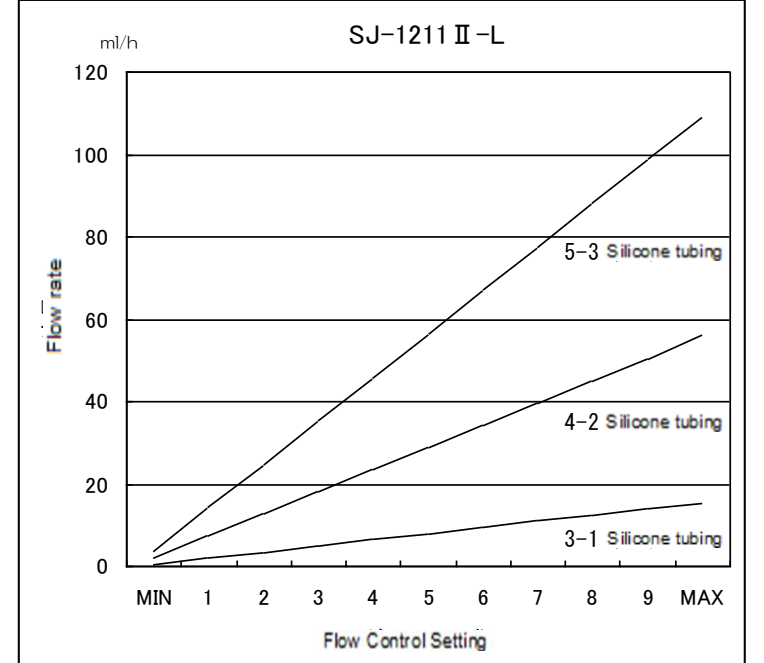
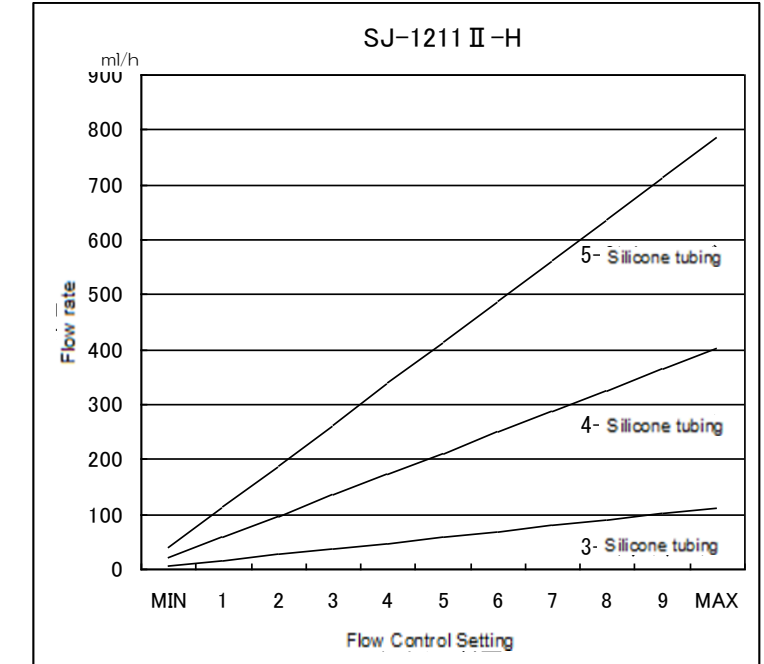
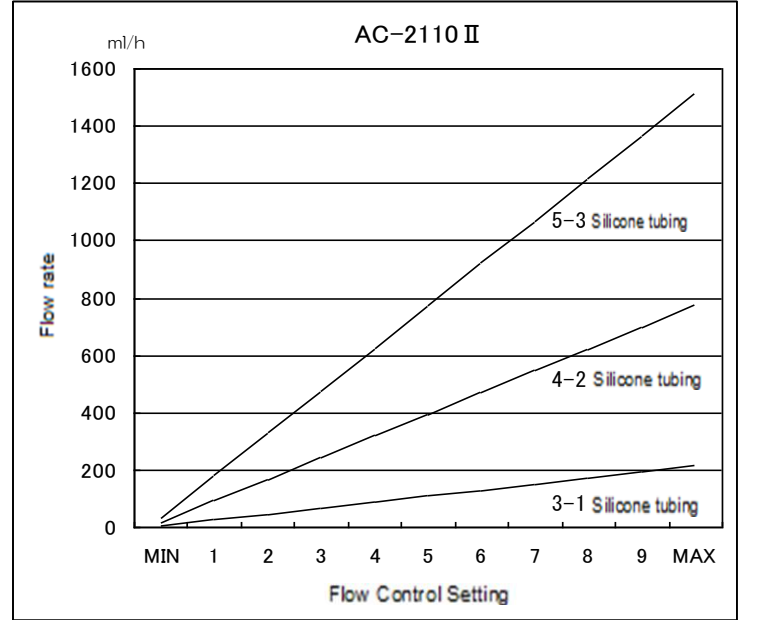
*The weight listed is the value when one cassette (standard composition) is set. If the cassette is increased by one step, the weight will increase by 250g.

Consumption · Maintenance parts

Code#	Product name
1292231	Set of cassette(A part, Upper stage) for Perista I/II
1292232	Set of cassette(B part, Middle stage) for Perista I/II
1292233	Set of Rollers(A part, Upper stage) for Perista I/II
1292234	Set of Rollers(B part, Middle stage) for Perista I/II
1292235	Cover plate (Clear)for Perista I / II
1292133	Mounting bolt x2
1292213	Fixed stud x2
1292119	3mm, 5m Silicone Tube
1292120	1mm,50m silicone Tube
1292121	1mm,5m silicone Tube
1292290	External terminal connector CN-80-XP4

Flow Rate Charts

The graph below shows the approximate correlation with the setting value of a tubing diameter / Control knob. The flow rate is influenced by the tolerance of a tubing diameter and the setting conditions. Obtain the exact flow rate by actual measurement.



Maintenance

Cleaning

Before use, inspect a tubing for cracks and overall malfunction. Replace with a new tube if necessary. After use, turn the pressure knob counterclockwise to loosen a tubing to release the compression. Keep a tubing compressed will shorten the term of a tubing usage.

Maintenance / Repair

As maintenance parts (performance parts for repairing), 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 do 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 abnormality or failure occurs, or if you notice any problems during maintenance. If repairment is necessary, please contact us.

Security

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

Warranty period

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

The warranty period for unit that has been repaired for free will be either three months after the repair or the remaining warranty period of the main unit. The longer term will be adapted.

Warranty range

Even if sold by Atto, together with the main unit, other companies' products will not be eligible for free repairs. Third-party products are covered by the warranty specified by each company.

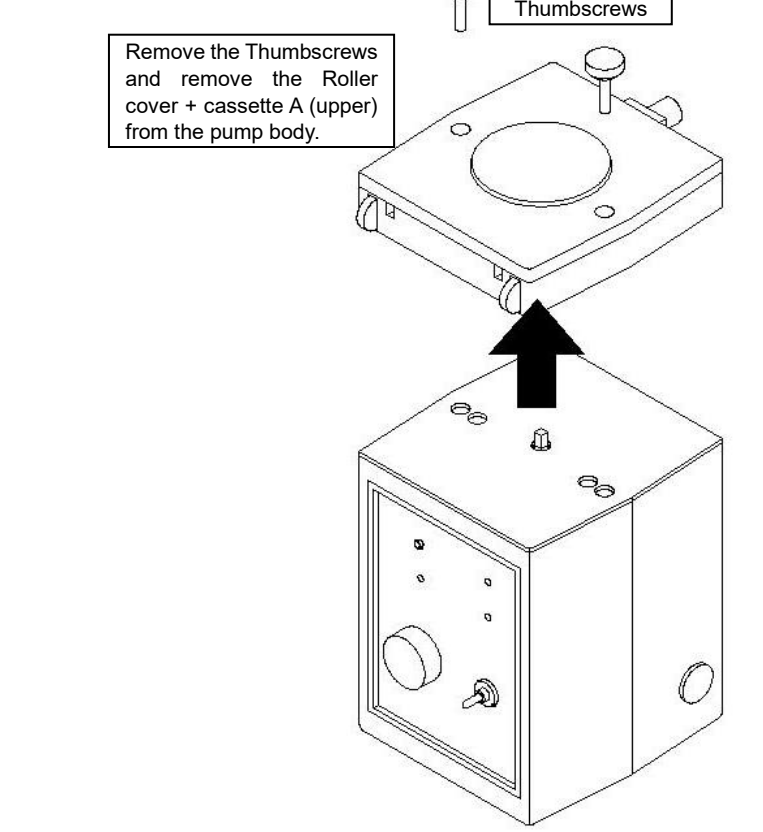
Other

If there is no special request, we will pick up the parts removed for repair.

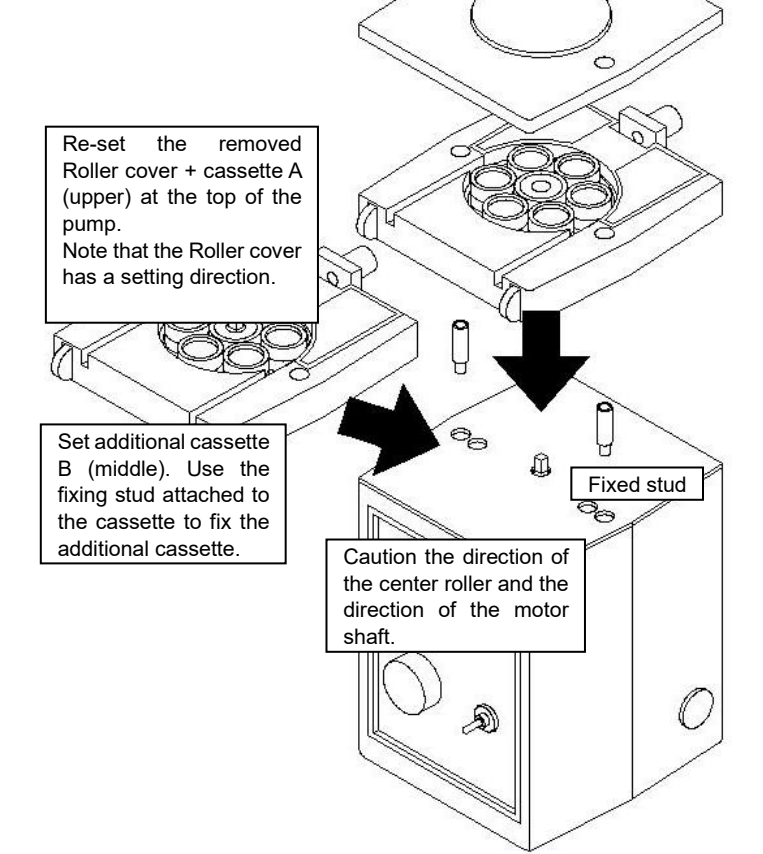
The purpose of repair is to repair and maintain the product and performance, and the maintenance parts (performance parts for repair) use new parts with the same functions and performance or parts that are quality-guaranteed (reuse parts) as well as new parts.

Additional Cassette

Disassembly



Addition of cassettes



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