

MANUAL

Ver 1.8
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CE RT-13



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■ PREFACE

Thank you for purchasing Refraction Unit RODEK® RT 13.

As compact design, optimized unit table to make better use the space for Ref/kerato-meters, Phoropter, and Chart Projector.

🔗 Operation environment

- ✓ Use the system in normal living conditions;
Operation : +10 to +40°C, 30 to 75% r.h., 70 to 106 kPa
- ✓ For smooth operation, install the system horizontal and stable.
- ✓ Make sure the system properly connected to electricity.
- ✓ Power Supply (SMPS) Voltage should be within the range
220-240V~ 50/60Hz
- ✓ Keep the Power OFF when the system not in used

■ SAFETY ALERT SIGNS

In the Operation Manual and at the main body of the system, there stated important alerts to prevent property damages and for the safety of operator and other peoples.

Please read carefully of the "Safety Precautions", and fully understand and follow the safety indication and symbols.

🔗 Indications and their meaning

	Warning	Warning indicates death, severe personal injury can result in if proper precautions are not taken
	Caution	Caution indicates minor personal injury or property damage can result in if proper precautions are not taken.

Symbols and their meaning

	<p>Template for a prohibition sign (red circle and diagonal);</p> <p>The black symbol or text shall be placed centrally on the background and shall not obliterate the cross bar, or a supplementary text next to the sign.</p>
	<p>Template for a mandatory action sign (blue background); The white symbol or text shall be placed centrally on the background, or a supplementary text next to the sign.</p>
	<p>Template for a warning sign (yellow background and black triangle); The black symbol or text shall be placed centrally on the background, or a supplementary text next to the sign.</p>
	Follow instructions for use
	Manufacturer
	Date of Manufacture
	Serial no.
	Indicates a medical device that needs protection from light sources.
	No pushing
	Indicates the temperature limits to which the medical device can be safely exposed.
	Indicates the range of humidity to which the medical device can be safely exposed.

	<p>Warning - Disposal of waste products</p> <ol style="list-style-type: none"> 1. When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2012/19/EU. 2. All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. 3. The correct disposal of your waste products will help prevent potential negative consequences for the environment and human health. 4. For more detailed information about disposal of your waste products, please contact your city office, waste disposal service or the shop where you purchased the product.
	<p>Type B applied part (Patient chair)</p>

■ SAFETY PRECAUTIONS

Symbols	Prohibit items
	<p>Do not disassemble the unit for repairing. Electric shock is possible. Contact the sales shop for the repairing.</p>
	<p>Do not place the unit at the water or other liquid spraying area. Fire or electric shock is possible.</p>
	<p>Connect the unit to single-phase AC power plug. Elsewhere, can cause fire and electric shock.</p>
	<p>Replace the fuse only after power cord unplugged. Otherwise, an electric shock may occur. Use a rated fuse.</p>
	<p>Unplug the power cord immediately when smokes or any other problem occurs. Otherwise there is a danger of fire. Please contact the sales shop for the repairing.</p>

	Do not place the equipment unstable or slanted over 5 °. The equipment can cause injury to you.
	Do not place heavy material over the specified weight on the table. The equipment can cause injury to you.
	Do not put your fingers to the running machine. The equipment can cause injury to you.
	Do not open the cover as you can get the electric shock. Contact sales shop when the repairing needed.
	Tighten the PHOROPTER hanger bolt securely. Fall off may cause injury.
	Do not hang heavy material of over 7Kg on the PHOROPTER ARM. Fall off may cause injury.
	To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.
Symbols	Prohibit items
	Malfunction may happen due to electromagnetic interferences caused by high frequency equipment, such as mobile phones. Be sure to keep away from such a high frequency equipment.
	Connecting electrical equipment to the multiple socket-outlet effectively leads to creating a medical electrical system, and can result in a reduced level of safety. The responsible organization (accountable for the use and maintenance of a medical electrical system) shall be referred to EN 60601-1, 3rd edition for requirements.
	The external and internal socket-outlets shall be connected with ophthalmic instruments only complying with IEC 60601-1.

■ MANAGEMENT

Ⓜ Operator's Management

Other than that indicated in this manual, for safety reason, do not perform the administrative maintenance tasks on the equipment except for qualified service man. However, customers can manage the items listed below:

✓ **Replace of the Fuse**

The fuse is replaceable item. Refer to its handling method in the textbook.

✓ **Replace of the Light Bulb**

Refer to its handling method in the textbook.

Ⓜ Disclaimer

- ✓ We do not take responsibility for the damages caused by fire, earthquakes, acts by third parties, or other accidents, and damages caused by negligence, or misuse in abnormal condition.
- ✓ We do not take responsibility for the damages caused by abnormal use of the machine that are not described in the instruction manual.
- ✓ We do not take responsibility for bad treatment result as it is due to the doctors' diagnostic and responsible by the doctor.

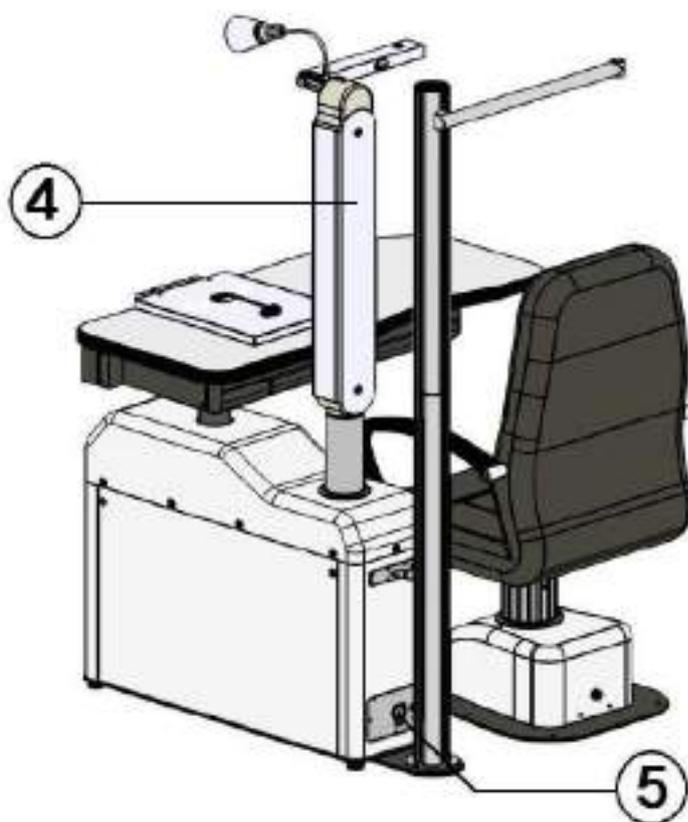
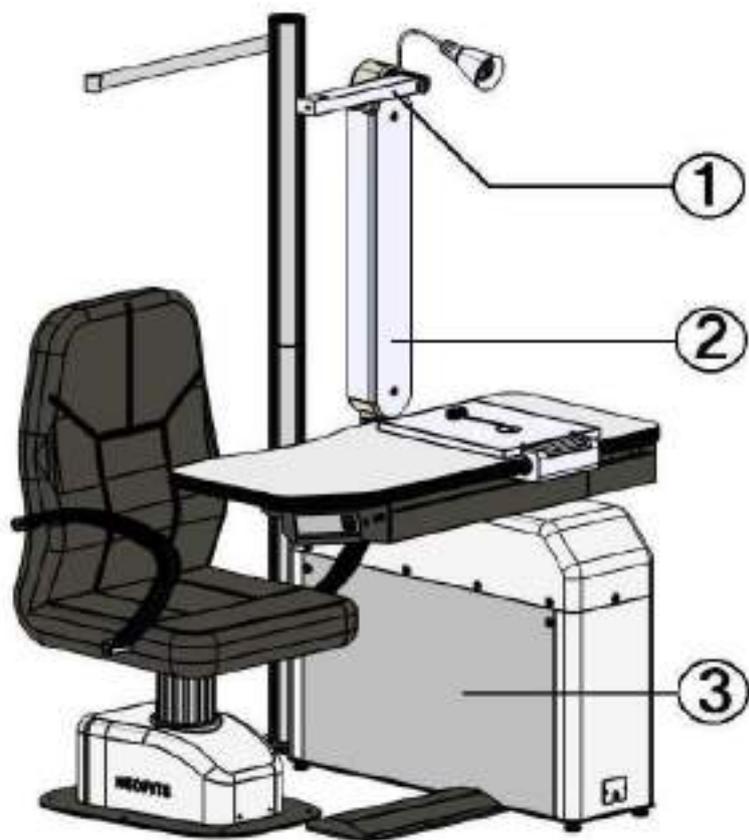
■ ALARM INDICATION and ITS LOCATION

For safety reason, there are alarm indications on the equipment. Please follow the indications. If you find any discrepancy in the indication sign, please inform it to us with the detail status.

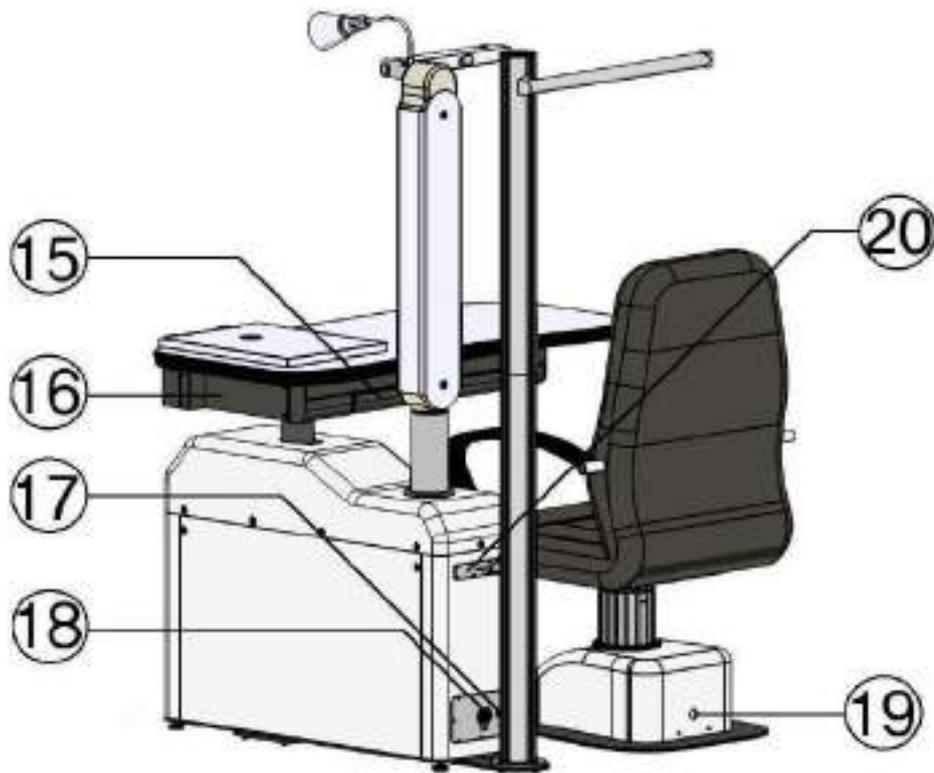
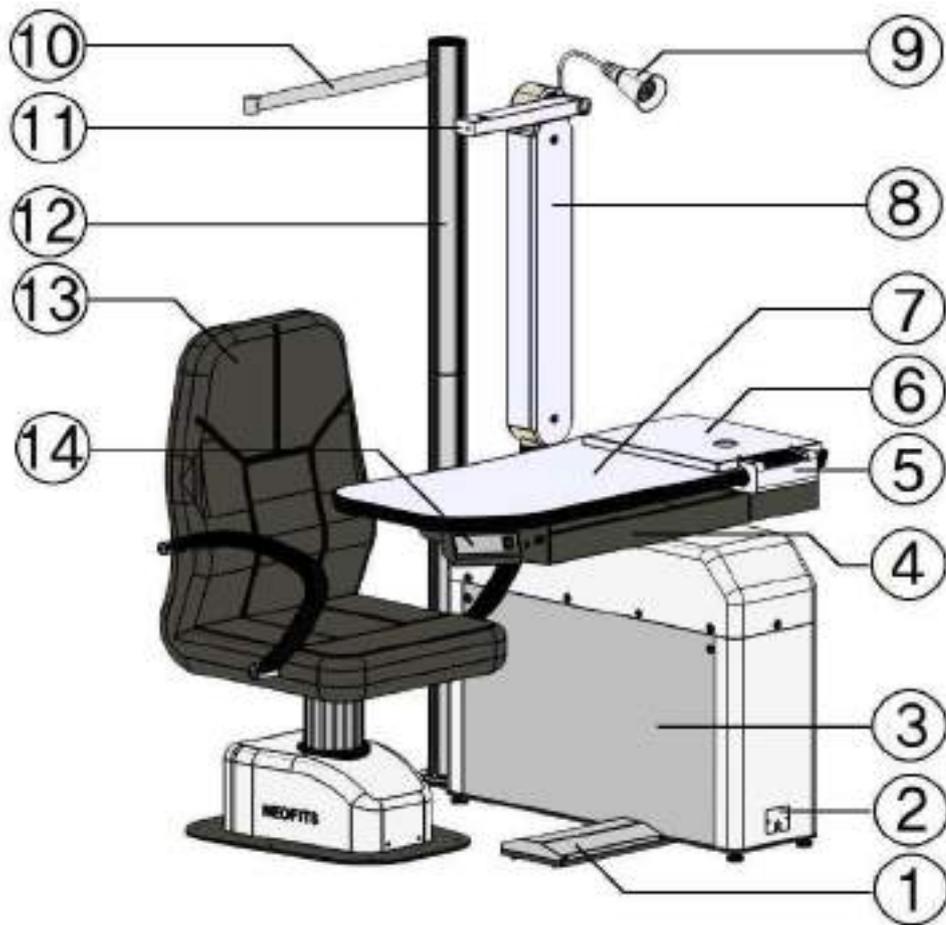
ALARM INDICATION

	Caution	<p>① Tighten the assembly bolts of Vision Tester. Fall down may cause injury.</p> <p>② Do not give excessive load to the arm such as hang on or pull down. Fall down of arm may cause injury.</p> <p>③ Do not open the cover as it may cause electric shock. Repairing should be done by service technician.</p> <p>④ Do not access to rotation range of arm as there's a risk of injury due to collision. In addition, do not use the rotation range in excess of specified range ($16^{\circ} \pm 3^{\circ}$) when positioning to treatment suspension. There is a risk of collision to side wall or to other material.</p> <p>⑤ Replacing of the fuse should be done after disconnecting electricity, otherwise electric shock may occurs.</p>
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④ Location of Warning signs



■ THE NAME and FUNCTION OF EACH PART

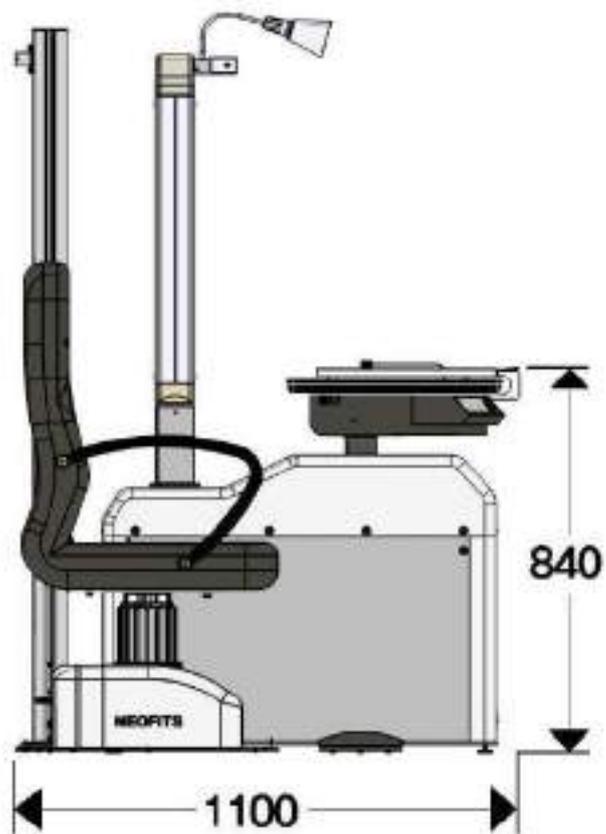
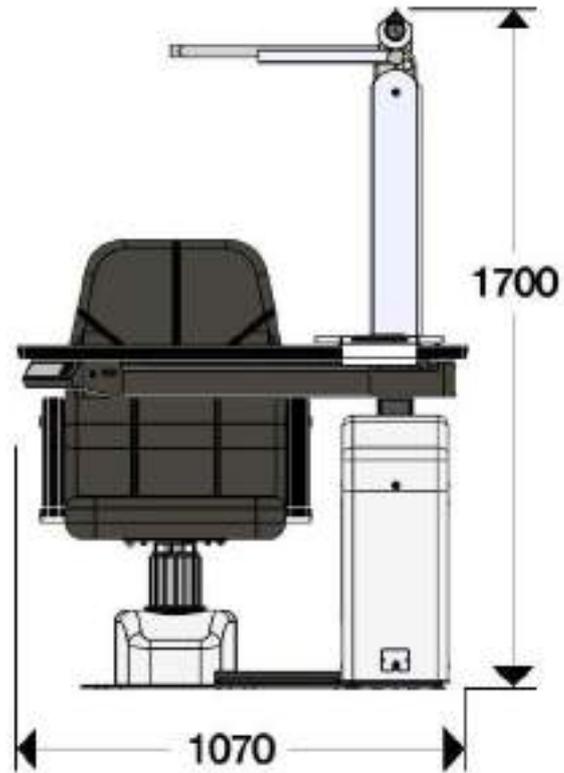


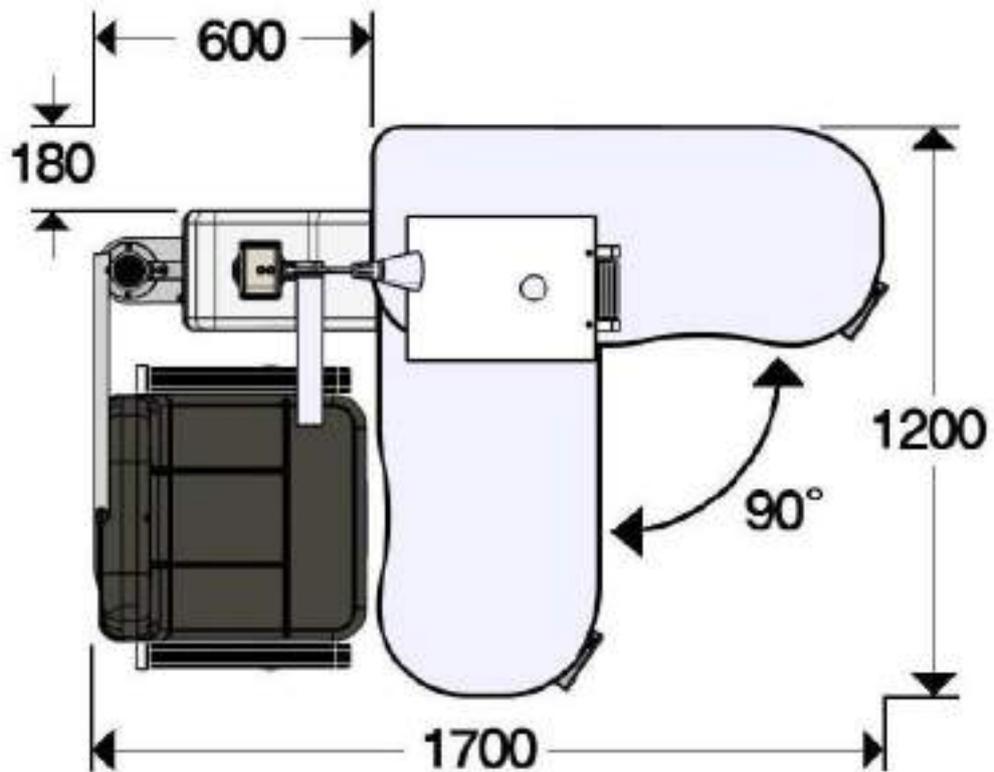
④ The name and function of each part

- ① Foot Rest: It support the weight of main body
- ② Cable Outlet: Internal cable can be out of main body.
- ③ Main body Cover: Hardware to control the medical device,
Power and input & output control.
- ④ Drawer: Has a feature to keep the medical supplies needed
for the treatment.
- ⑤ Locking device for optometry mounting equipment:
It allows the optometry equipment to lock at desired position.
- ⑥ Mounting base for optometry equipment: optometry
equipment can be mounted and can move to eye
inspection position and suspension position side to side.
- ⑦ Medical treatment table: The table can be rotated 90 ° to
allow eye treatment. It is consist of mounting base for eye
inspection unit, drawer, and the operation panel to control
medical devices.
- ⑧ Phoropter arm: It is for the attaching of phoropter and lamp
- ⑨ Lamp: The lamp for optometry is equipped.
- ⑩ Chart Arm: It is for the attaching of Chart Projector
- ⑪ Phoropter Arm Link Bar
- ⑫ Stand for chart projector: Auto chart projector is ready
to be attached.
- ⑬ Chair: The chair is for patient seating during optometry

- ⑭ Control panel: It is equipped with Main power ON / OFF switch, phorofter arm positioning, Treat / Rest of treatment positioning, UP / DOWN of the chair, and the lamp ON / OFF.
- ⑮ Safety switch: Safety switch is equipped so as the chair lifting to halt when patient's knee touches the table.
- ⑯ Table Cover
- ⑰ Power inlet socket: 220-240V~ 50/60Hz power inlet socket is equipped.
- ⑱ Chair connector to the equipment side: The connector of connecting motor power and control line between the unit and chair is equipped
- ⑲ Chair connector: The connector in between the unit and chair.
- ⑳ Chart arm Bracket

■ Dimension(Measurement : mm)





Ⓢ Standard Accessories and Spare parts

Check the following standard accessories.

Parentheses Indicates the quantity of parts.

- ✓ User's Guide (1EA)
- ✓ Light Bulb of 3W LED (1EA)
- ✓ Glass tube fuse 250V F5AL (2EA)
- ✓ Chair control Cable (1EA)

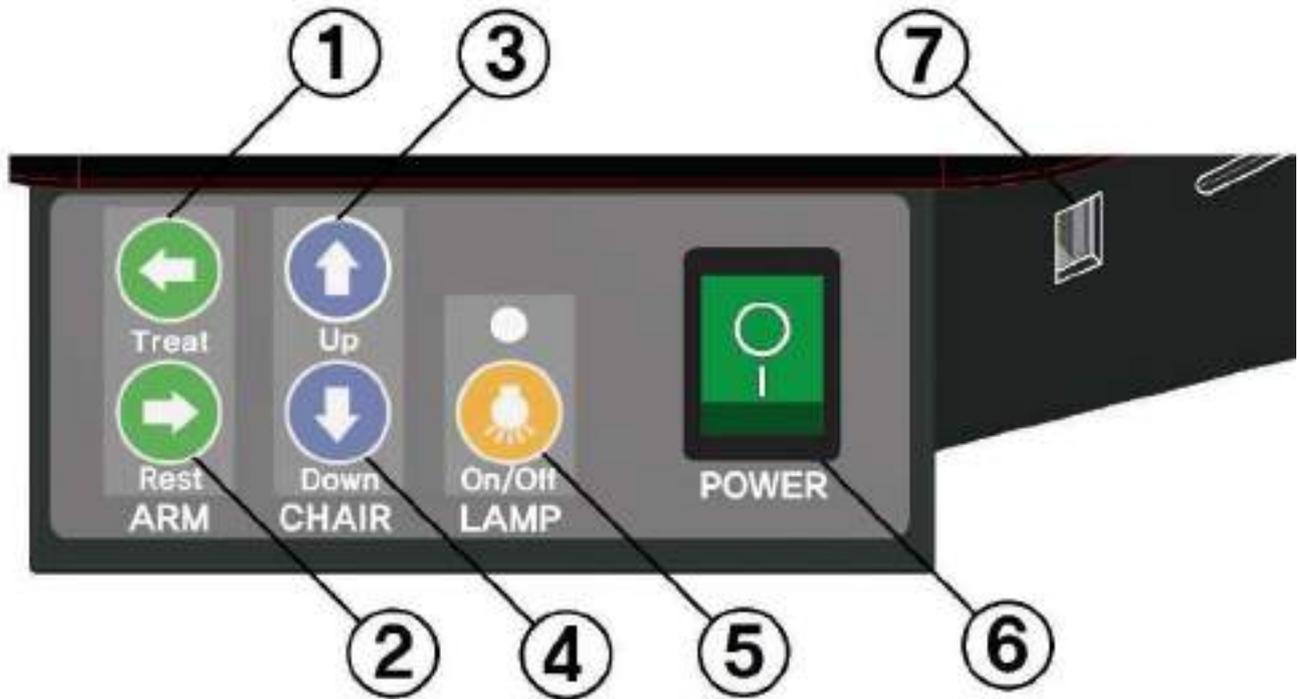
■ USER'S GUIDE

Ⓢ Before use

Make sure that the power cord is correctly plugged

Check whether the following functions work correctly; ascending, descending and rotation of the Phoropter arm, up and down of chair.

④ Operation method



- ① Treatment positioning switch of Phoropecter arm: Phoropecter arm will come to treatment position when the button is pushed
- ② Treatment suspension positioning switch of Phoropecter arm: Phoropecter arm will come to treatment suspension position when the button is pushed
- ③ Chair ascending switch: Chair will keep ascending when the button is pushed
- ④ Chair descending switch: Chair will keep descending when the button is pushed
- ⑤ Lamp switch: First touch= 50% illuminance.
Second touch =100% illuminance.
Third touch : Lamp OFF
- ⑥ Main power switch: The switch to turn ON & OFF the main power.
- ⑦ USB Charging Port.

■ PROBLEMS

🔗 Solution to the problem

	Warning	Do not disassemble the unit. You may get electric shock. Contact the sales shop for repairing
	Caution	Do not open the cover. You may get electric shock. Contact the sales shop for repairing

Please refer to the following check list when problem happens.

For other cases, contact the sales shop.

✓ Checklist

Problem	Check item	Treatment	Ref.
Ascending/ descending of the chair do not work properly	Check The power connection	Turn off the power switch, and connect the power	
	Check whether the main switch is ON	Turn ON the main switch	
	Check the fuse	Refer to "how to replace the fuse"	
	Check the Lap safety sensor switch	Adjust the screw located backside of the chair	

🔗 In the event of a problem or accident when using a product.

In the event of a major device-related accident to the user and/or patient, the user and/or patient shall be reported to the manufacturer and competent authority of the established Member State.

■ REFERENCE DATA

🔗 Optional Accessories

- ✓ ACP pole: This can be used when using the Auto Chart Projector.

🔗 Specification and performance

- ✓ Up and down moving range of the chair: $250\pm 10\text{mm}$

- ✓ Moving range of Phorofter arm:

Rotation range: Treatment position $18^\circ\pm 3^\circ$

Treatment suspension position $16^\circ\pm 3^\circ$

- ✓ Table size: $1070\times 490\times 31.5\text{mm}$

- ✓ Size of optometry moving table: $375\times 285\times 20\text{mm}$

- ✓ Light: Light Bulb; 3W

- ✓ Power supply: $220\text{-}240\text{V}\sim 50/60\text{Hz}$

- ✓ Total weight: approx. 150Kg (unit: 115kg, chair:35kg)

- ✓ Max. permitted load for external socket-outlet: 3A

- ※ Specifications and appearance of the product are subject to change without notice for improvement.

🔗 Operation condition

- ✓ $+10$ to $+40$ °C, 10 to 85% r.h., 50 to 106 kPa

■ CLASSIFICATION

- ✓ Protection against electric shock: Class I equipment and Type B applied part (Patient chair);

- ✓ Protection against harmful ingress of water: Ordinary (IPX0);

- ✓ Method of sterilization: Not applicable;

- ✓ Stability of use in an Oxygen Rich Environment: Not suitable;

- ✓ Mode of operation: Continuous operation.

■ MANAGEMENT and INSPCETION

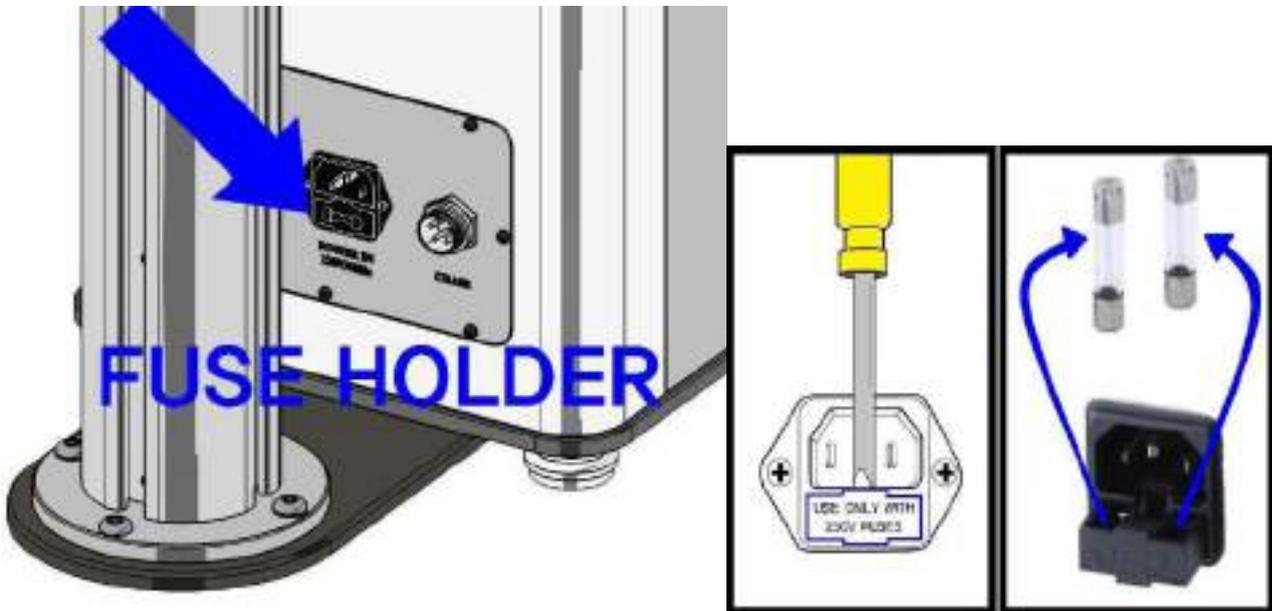
Ⓜ Daily management

- ✓ Turn off the power switch when the equipment not in used
- ✓ Do not locate the equipment in dusty area

Ⓜ Fuse replacement

	Warning	Turn off the power switch, before replacing the fuse, otherwise, electric shock may occur. Rated fuse should be used.
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Pull off the power cord after confirming the power is OFF.



- ✓ Open the fuse holder located at the bottom of power input socket by a driver or sharp pointed tool.
- ✓ Replace the fuse with a new one (250V F5AL 2EA).

Cleaning of the external cover

	Caution	Do not open the cover as electric shock is possible. Contact sales shop for repairing.
	Caution	Do not install the equipment in chemical storage or the area gas occurs. Install in a dry place that is not near to moist. Install in a place that does not cause any adverse effects such as from barometric pressure, temperature, humidity, sunlight, salinity, ion composition, and the air. Disconnect the power cord when not in use.

When cleaning the external cover or operation panel, use a soft cotton cloth and, if the dirt is severe, apply kitchen detergent to the cloth and wipe out carefully.

Ⓜ Replacing of the light bulb

	Warning	Make sure to turn off the power switch, otherwise you may get electric shock. Avoid replacing the bulb immediately after turning off the light so as not to get a burn.
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Make sure that the power switch is turned off.



- ✓ Turn off the light bulb and take out the bulb by turning it counter-clockwise.
- ✓ Put a new light bulb by turning it clockwise.
- ✓ Use only the light bulb of 3W LED

■ WARRANTY PERIOD

The warranty period is 1 year, in which all the parts of fault would be provided free of charge only if both parties agree to judge that is a flaw in the parts. However it can apply to the technical support of providing information on set-up and maintenance, not a visit to your company.

■ PRECAUTIONS WHEN USING

1. Immediately stop operation and evacuate patient first when any abnormality found to the equipment.
Disconnect power and contact the sales shop for solution.
2. Use the rated electricity required for the equipment. The equipment may not work properly if the electric power is too low or too high.
3. Use the rated fuse requested in the operation manual.
4. Never place heavy material on the treatment table.
5. Do not disassemble the equipment by unqualified people, which may cause break down or malfunction of the equipment.
6. Do not modify the equipment or its part randomly for other purpose not specified in the manual.
7. Do not let the equipment be operated by unqualified people, and prohibit children from randomly access to and playing with the equipment.

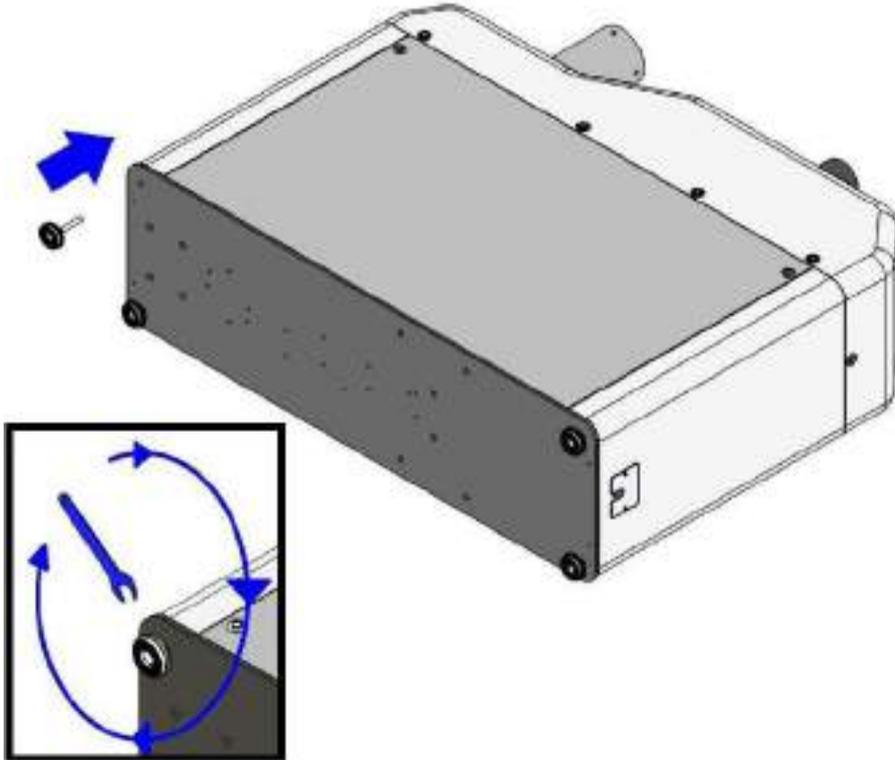
■ STORAGE AFTER USE & MAINTENANCE

1. After the treatment, the patient chair should be returned to its lowest position.
2. Treatment table should be returned to its lowest position after use.
3. Keep the water far from the equipment.
4. Keep the equipment in room temperature.
5. Cover the equipment with clean cloth or equivalent one if not in used for long period of time.
6. Completely disconnect the electric power when not in used.
7. Avoid installation or keeping of the equipment at the place exposed to excessive moisture or direct sunlight.
8. Environmental conditions:
 - Storage & transportation : -10 to +55 °C, 10 to 95% r.h., 50 to 106 kPa
9. Upon request, circuit diagrams, component part lists, descriptions, calibration instructions, or other information will be provided to assist service personnel to repair parts of the equipment that are designated by RODEK as repairable by service personnel

■ INSTALLATION GUIDE

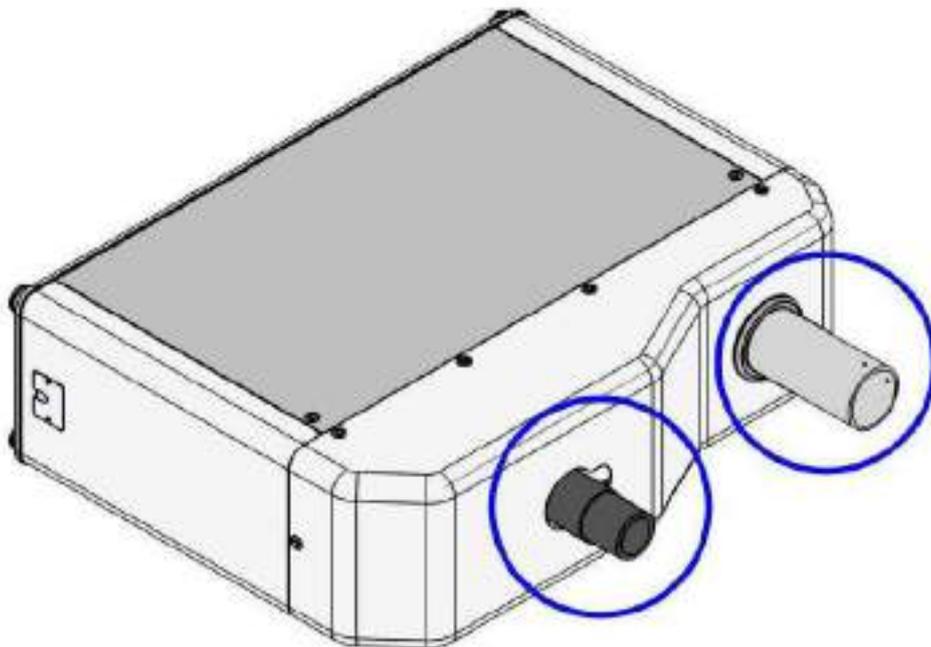
1. Tighten leveling foot(4 pcs) on the bottom of main body.

✓ You may adjust the height using leveling foot.



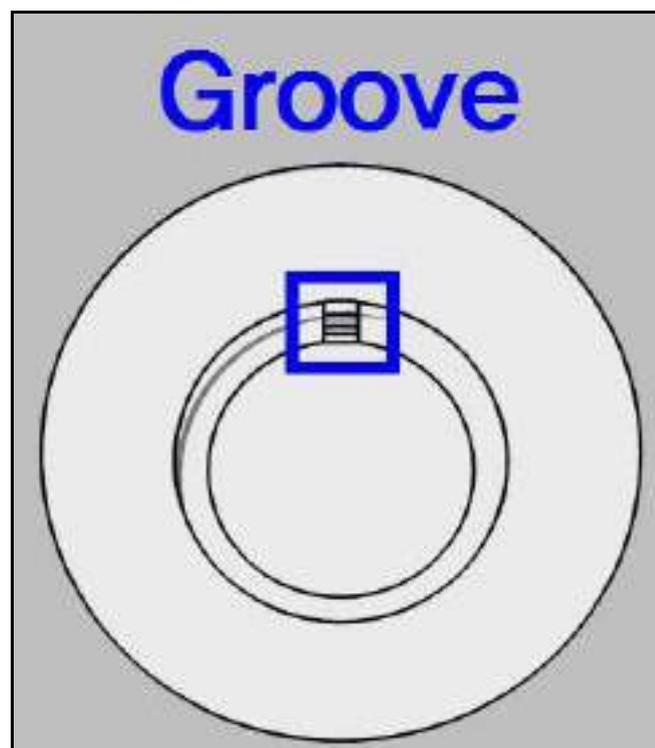
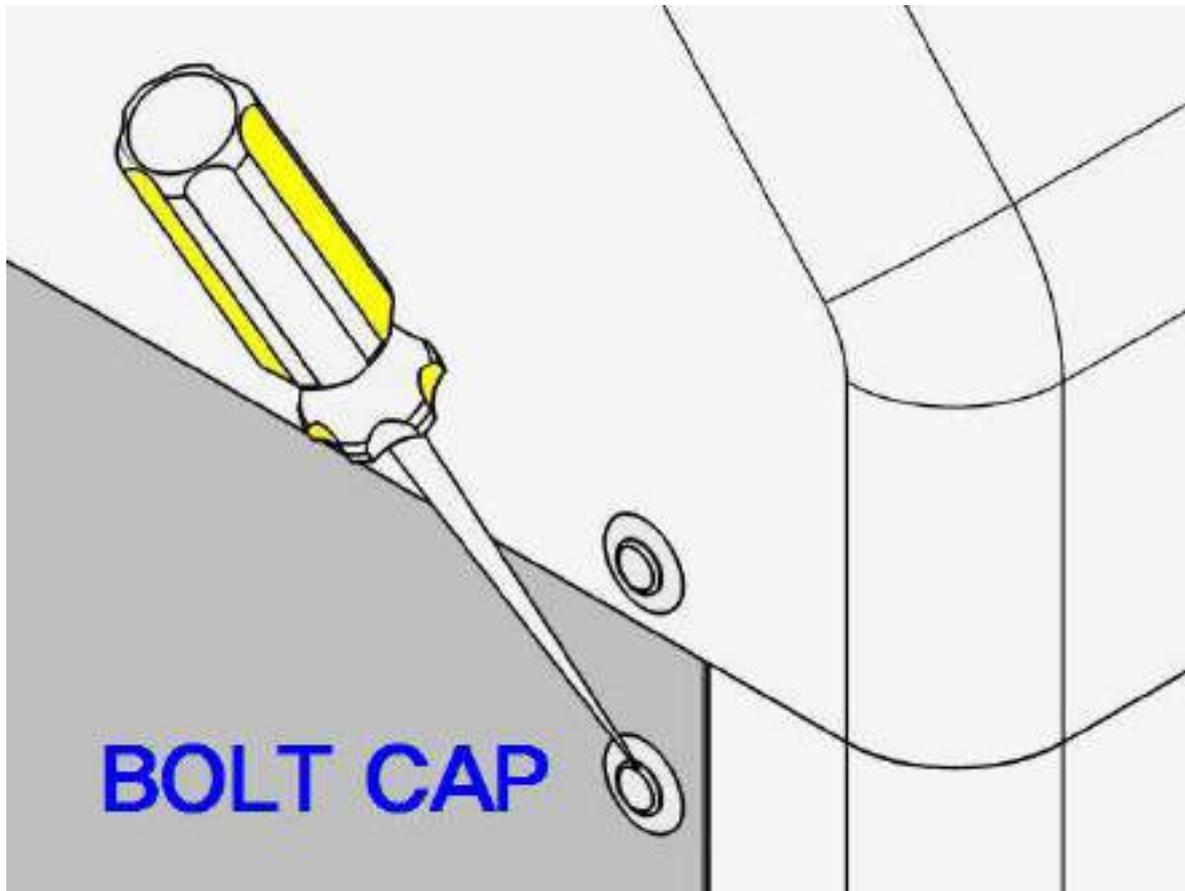
2. Stand up the main body.

✓ Main body must be raised up holding bar, which is circled.

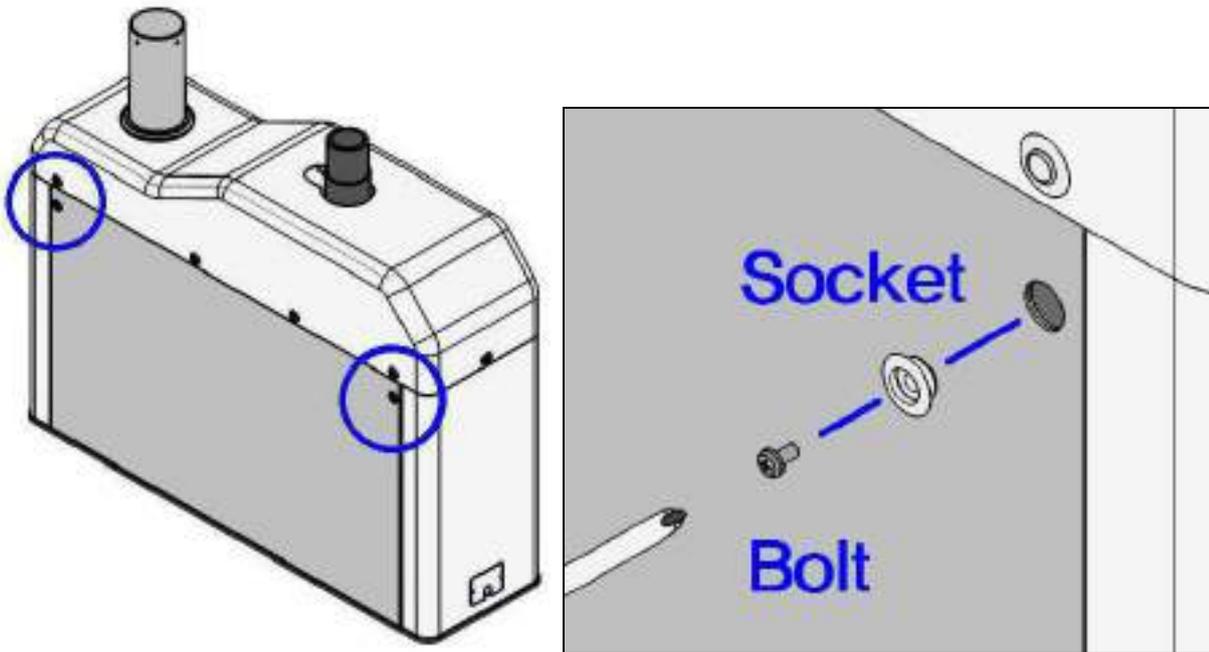


3. Open main body cover ; Use awl-shaped, screwdriver(+)

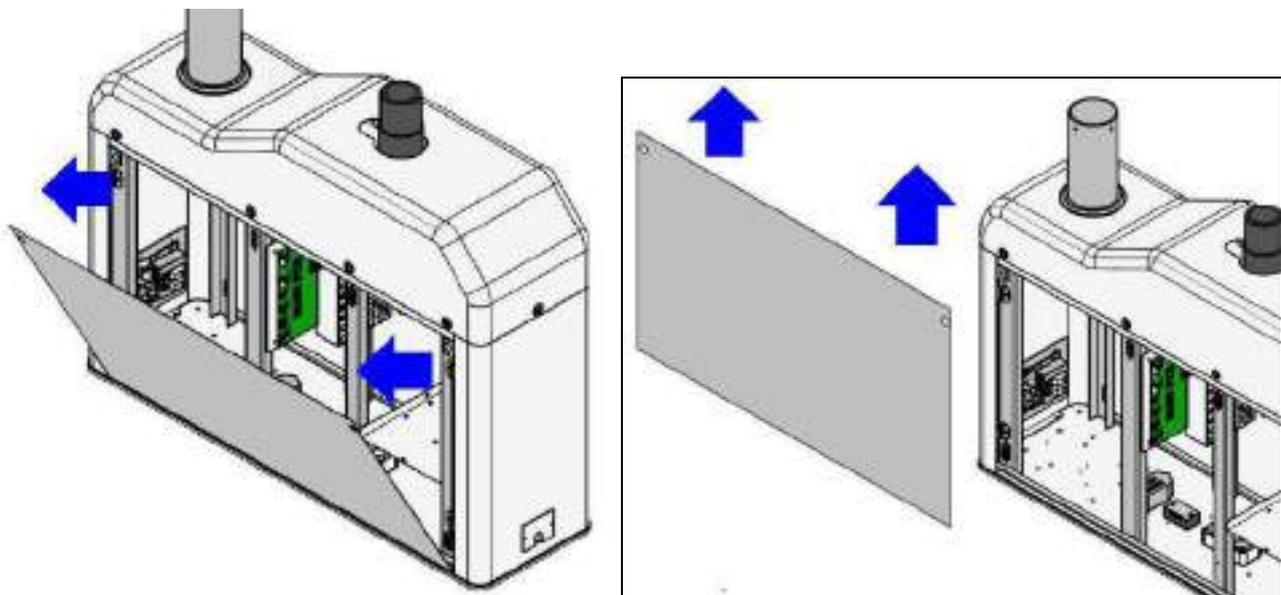
- ✓ Disconnect the bolt cap using awl-shaped tool



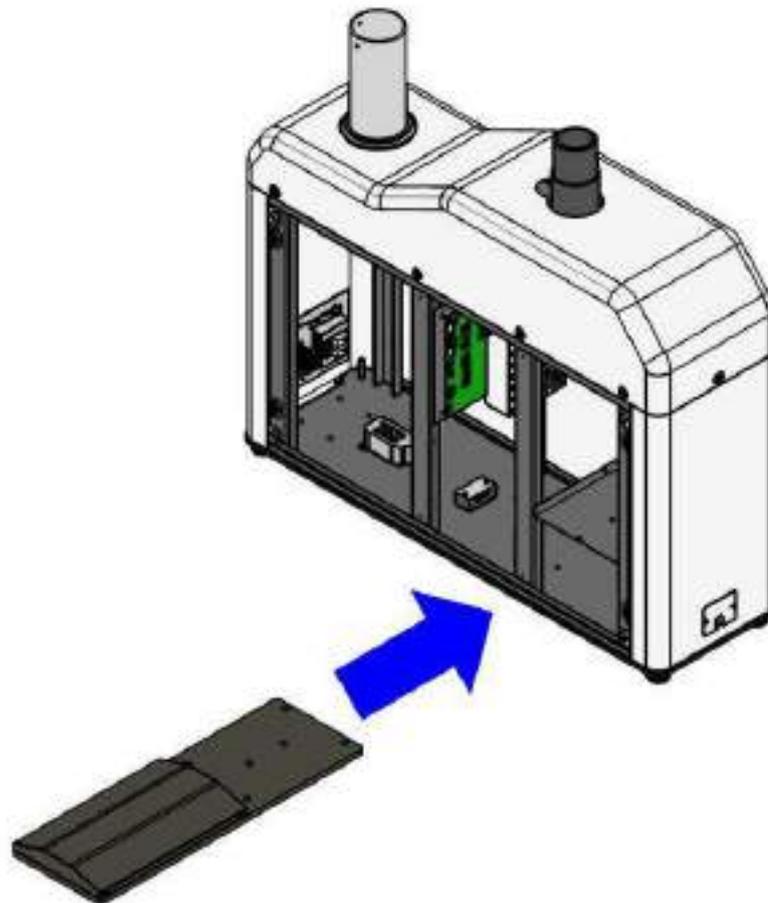
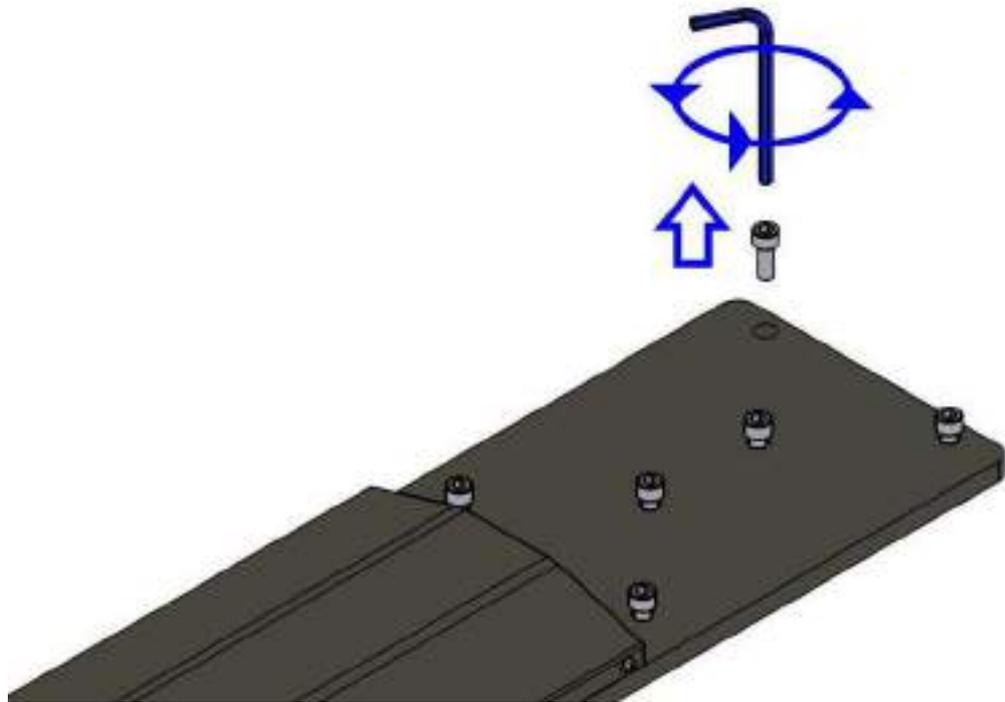
- ✓ Open the cover of main body after disconnection the bolts and sockets.



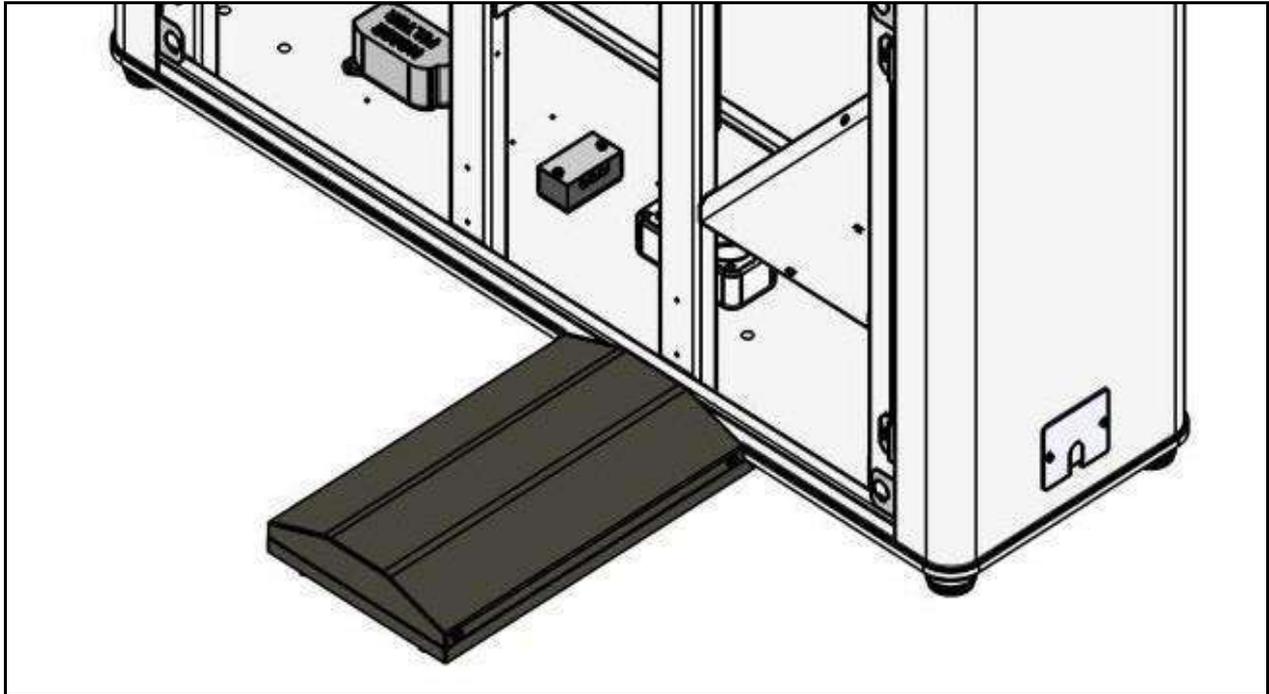
- ✓ Pull on the upper side of cover and lift the bottom side.



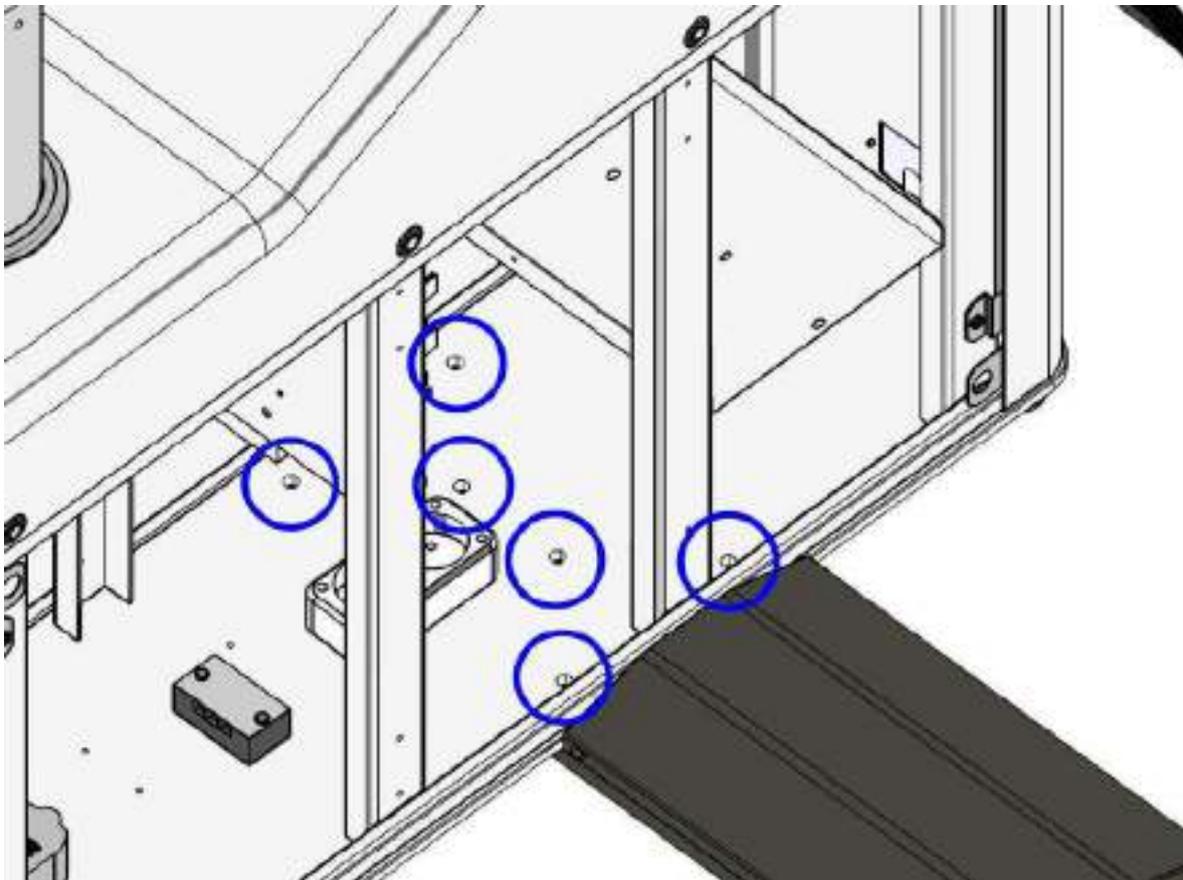
4. Assemble the main body and foot rest; Use wrench driver
✓ Disconnect 6 bolts that are screwed on the foot rest



- ✓ Push the foot rest into the bottom of main body



- ✓ Tighten the bolts firmly(securely) at the circled marking with blue color

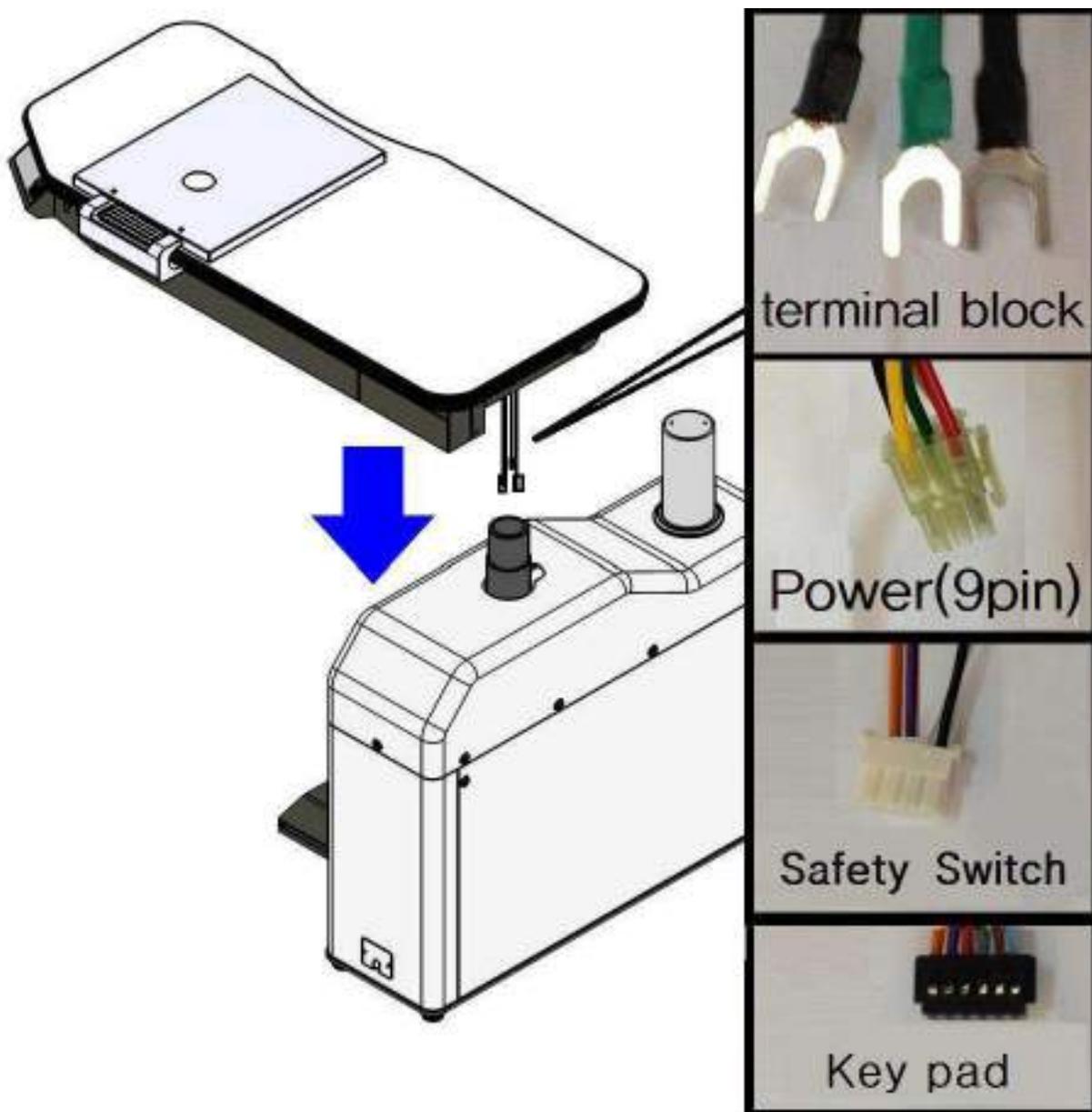


- ✓ Disconnect bolts from the box of footrest
- ✓ Adjust the horizontality adjusting set screw after disconnection cover of foot rest
- ✓ Screw the cover of foot rest box after adjustment of horizontality

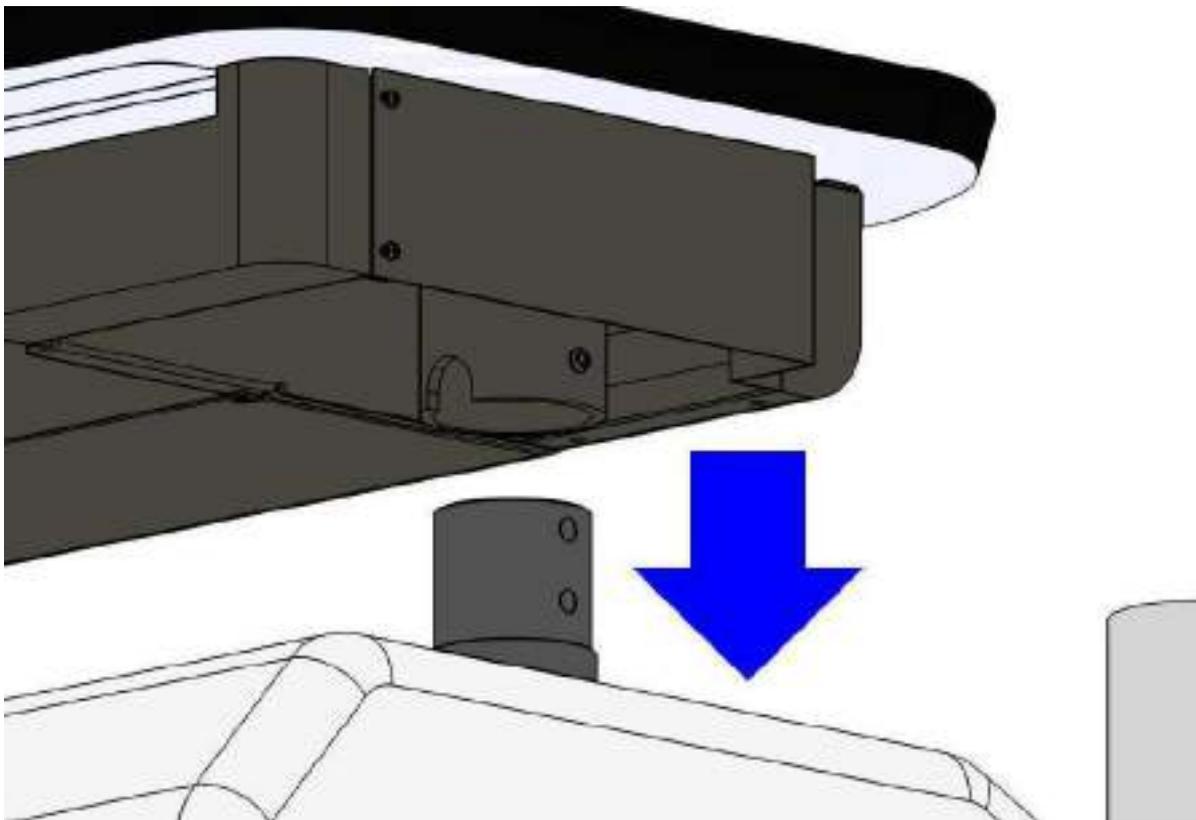
④ Assemble main body and table for treatment.

1. Insert the table for treatment into main body

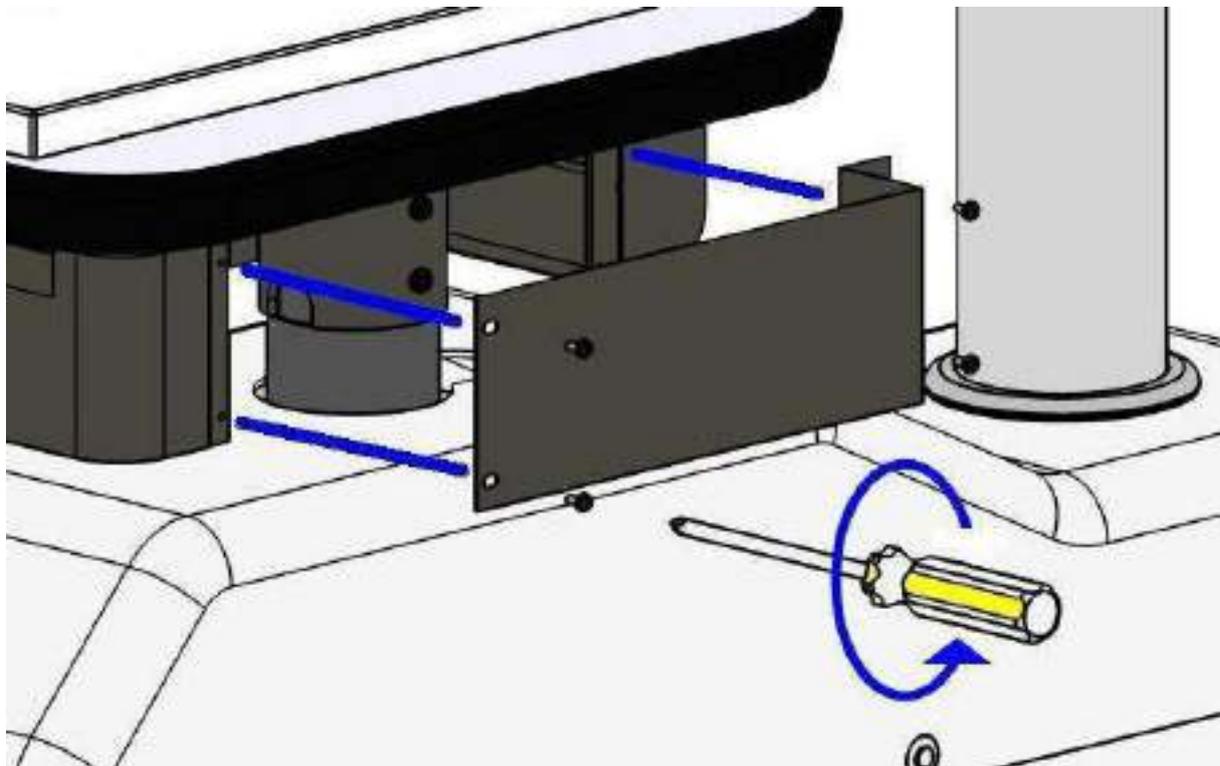
- ✓ Insert cable of treatment table into hole of main body



- ✓ Assemble the main body and treatment table like following pictures.

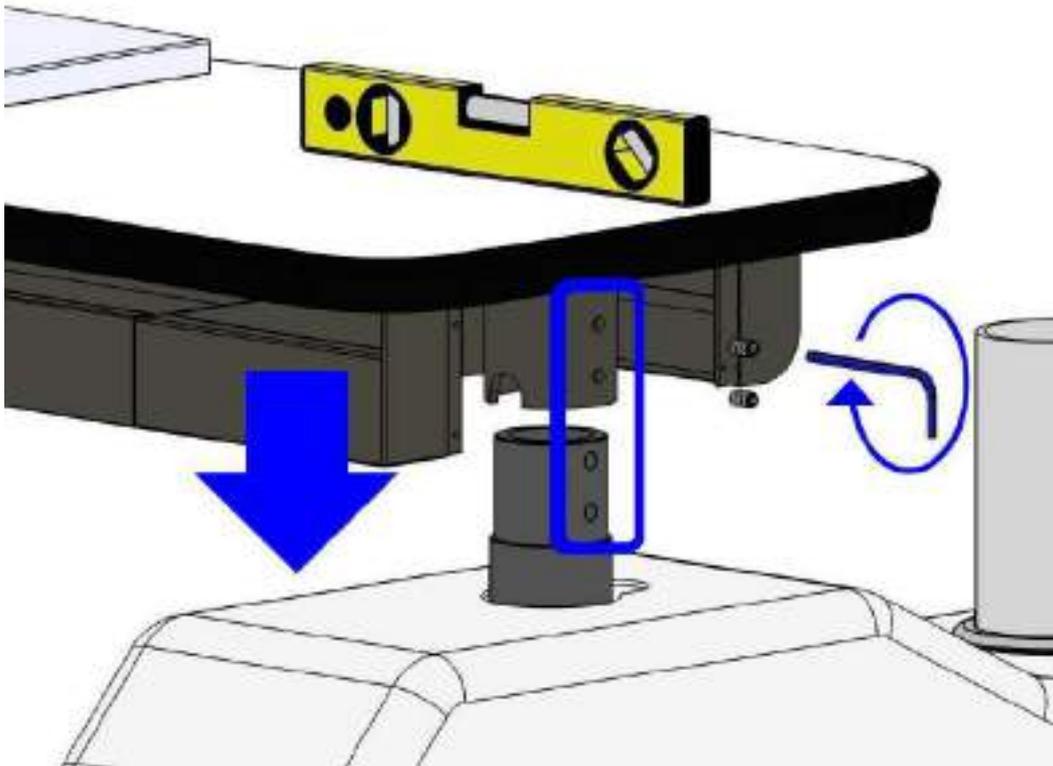


2. Disconnect side cover of treatment table ; Use driver(+)

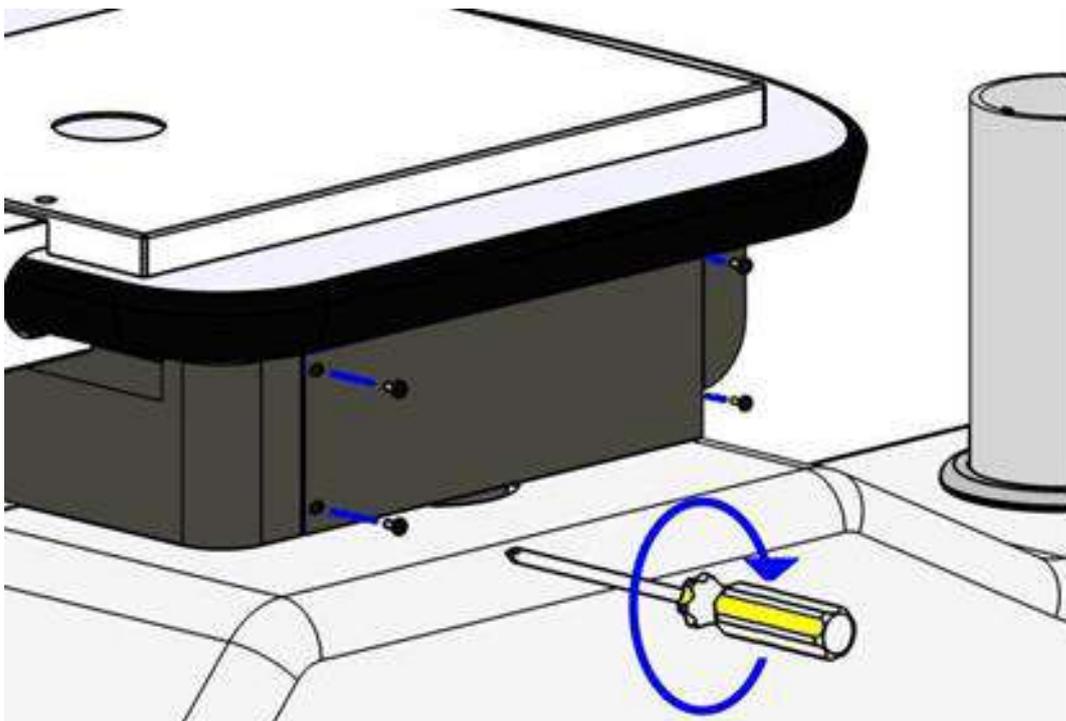


3. Align the rotation axis of main body and home of treatment table. Then insert and tighten the set screws ; Use wrench driver

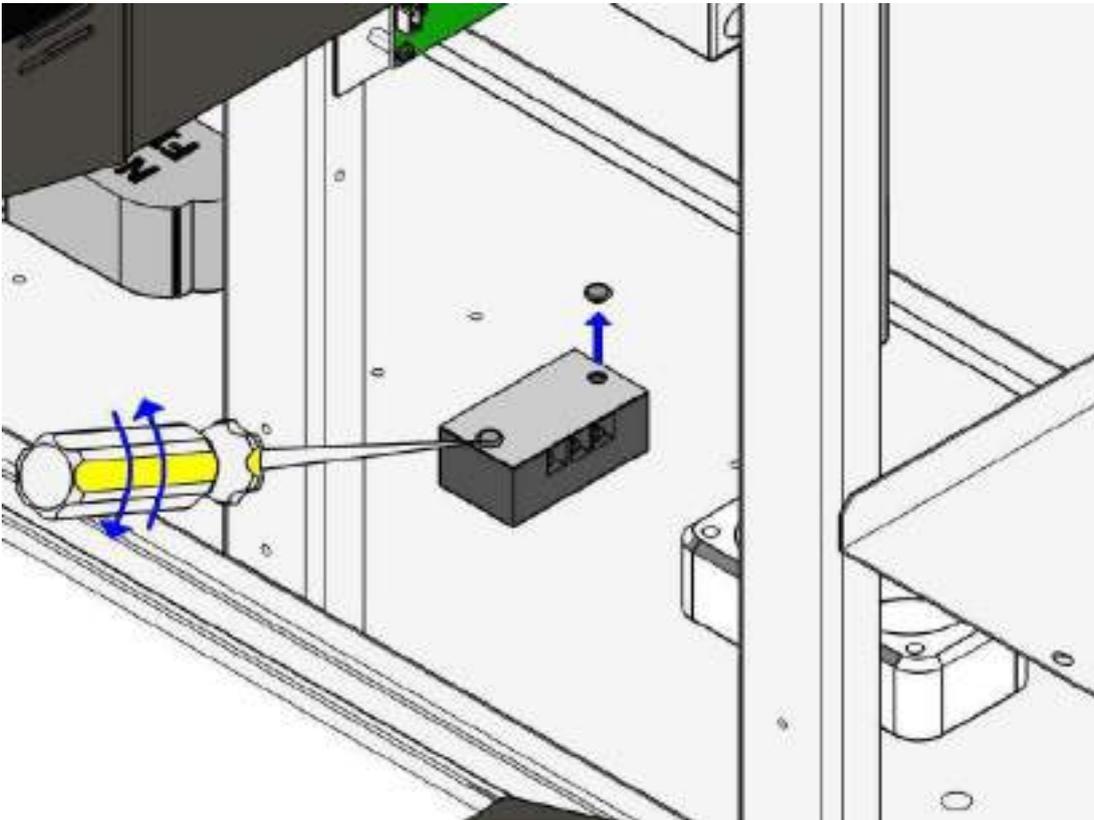
- ✓ **Tighten screws while maintaining a horizontal table**



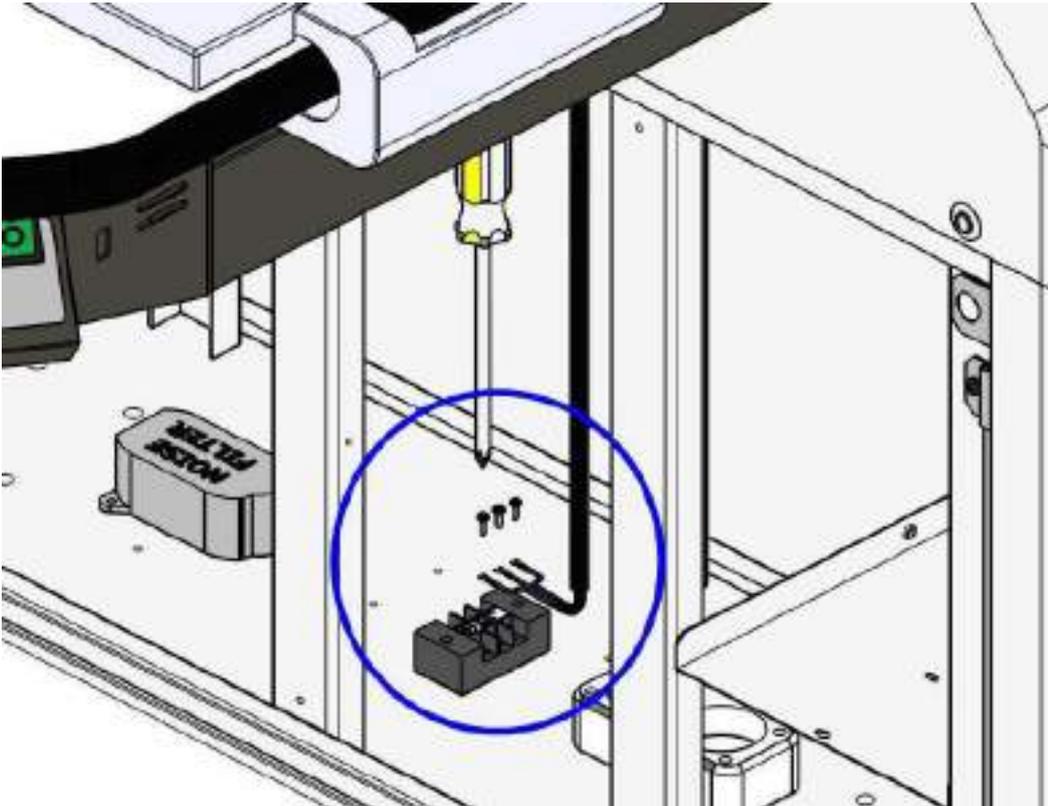
- ✓ **Close the side cover; Use driver(+)**



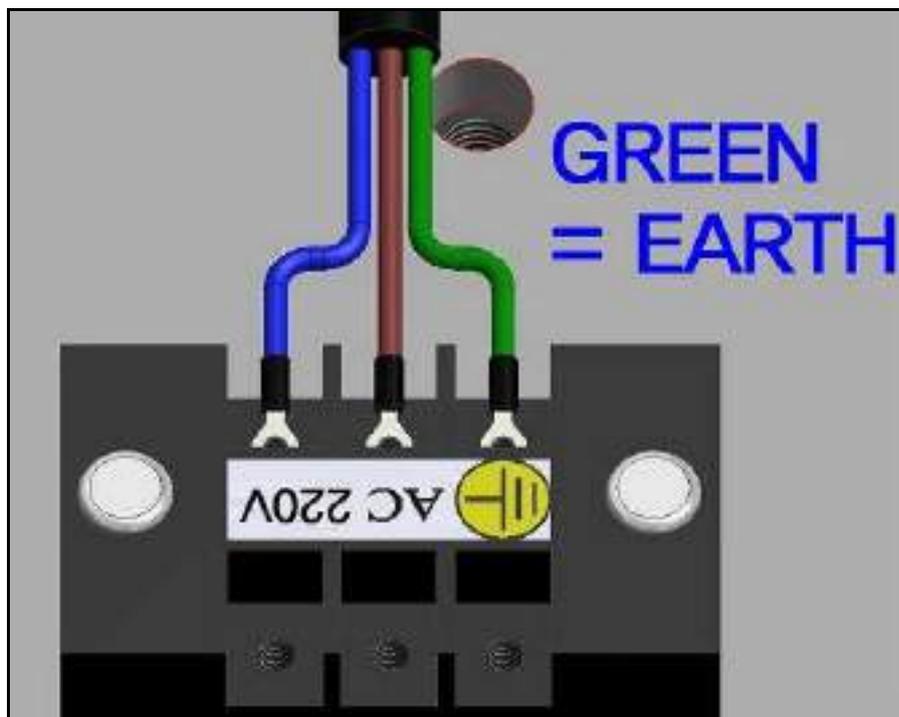
- 4. Connect the power cables of Keratometer with terminal block**
✓ **Disconnect the cover of terminal block using sharp-shaped tool**



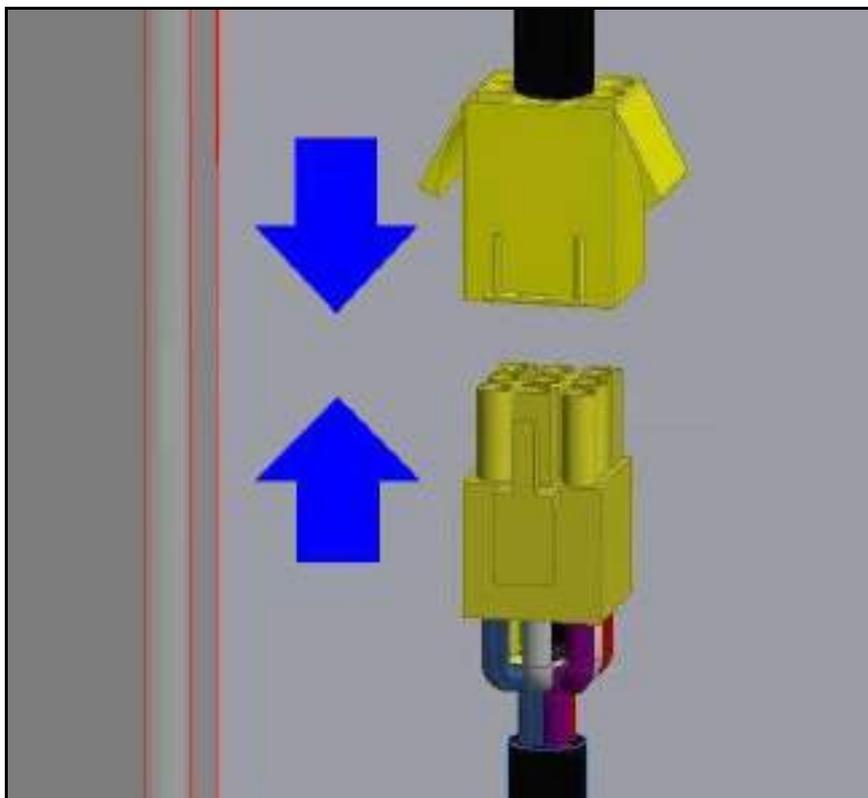
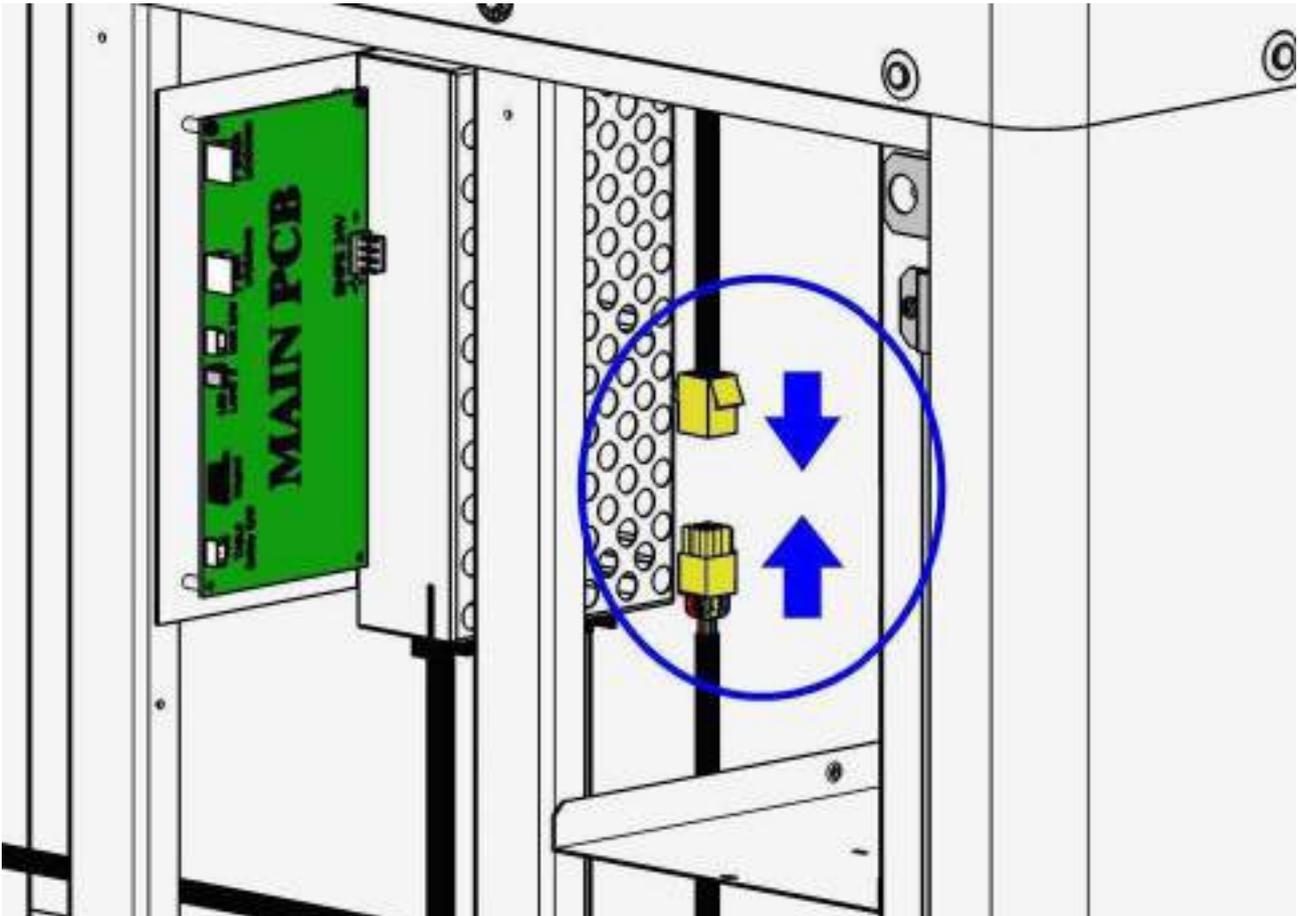
- ✓ **Fix the terminal block after tightening bolts**



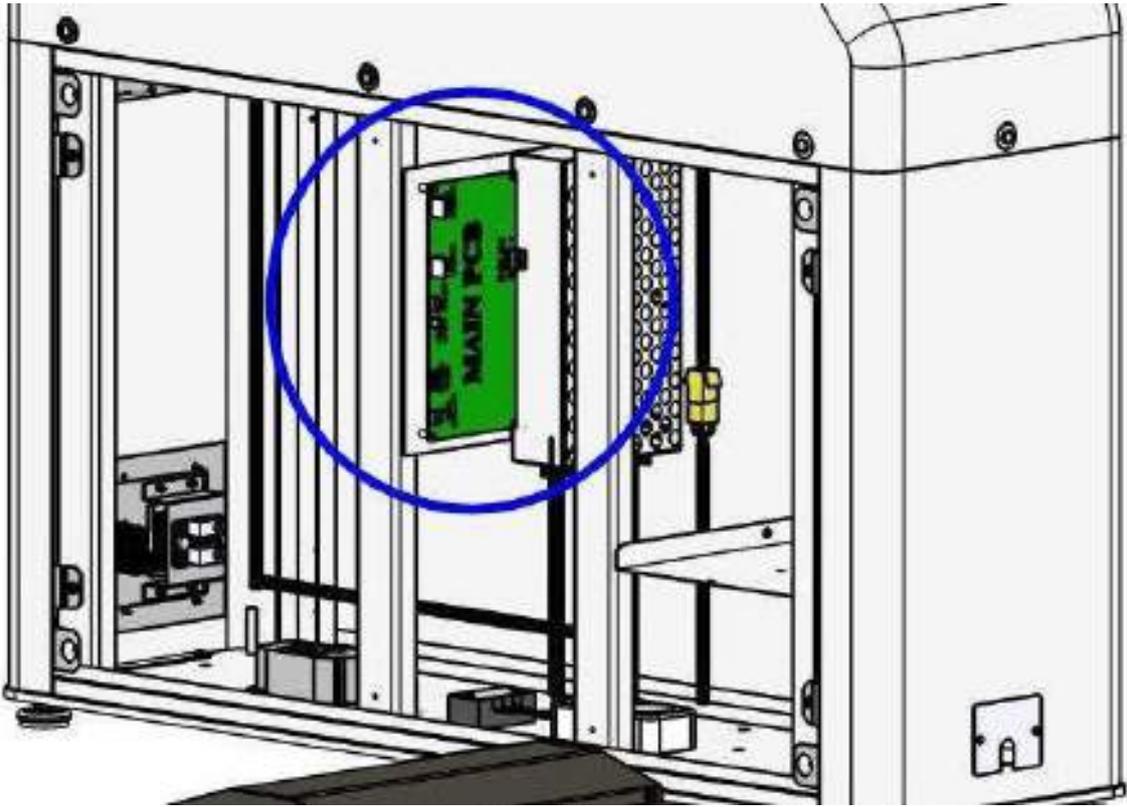
✓ Close the cover of terminal block



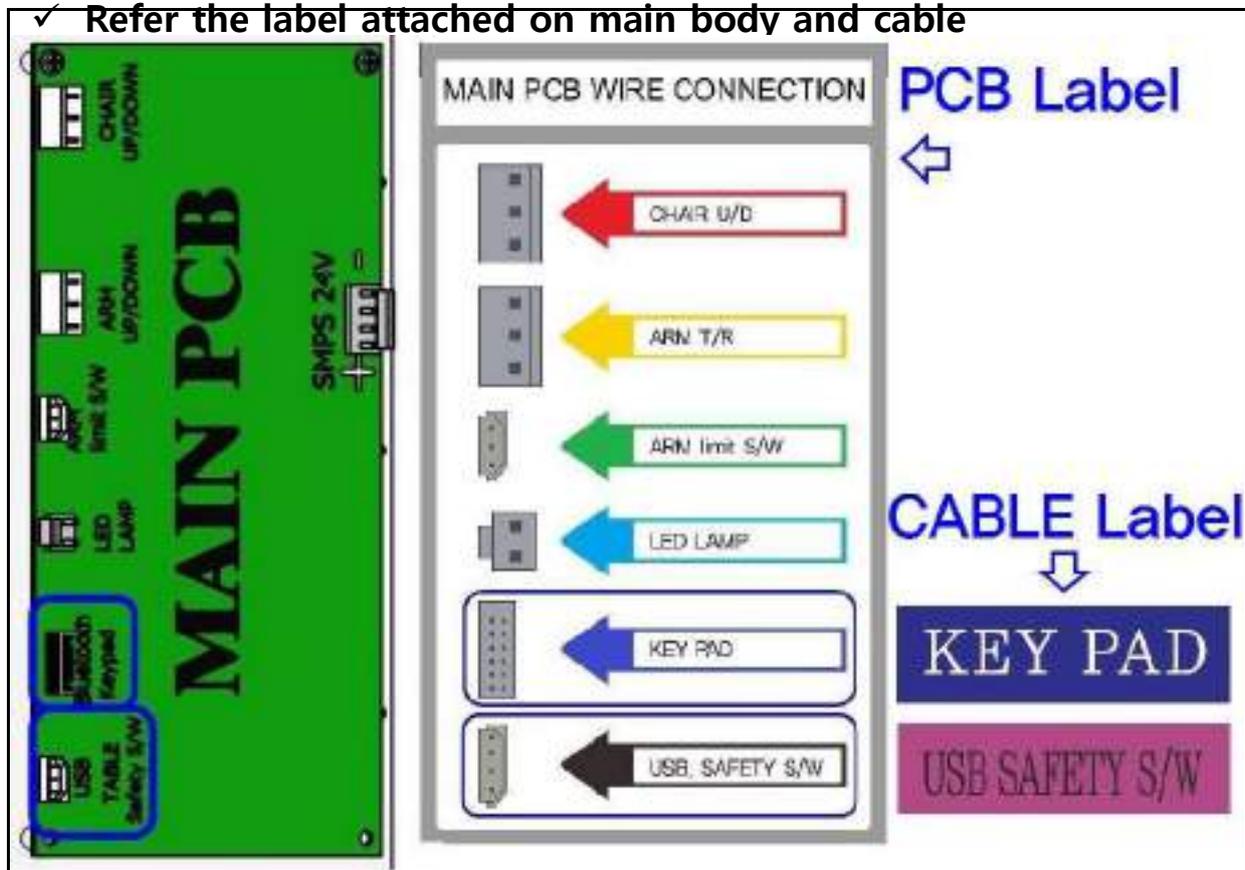
5. Tighten power connector (9 pin) each other.



6. Tighten table connector with main PCB

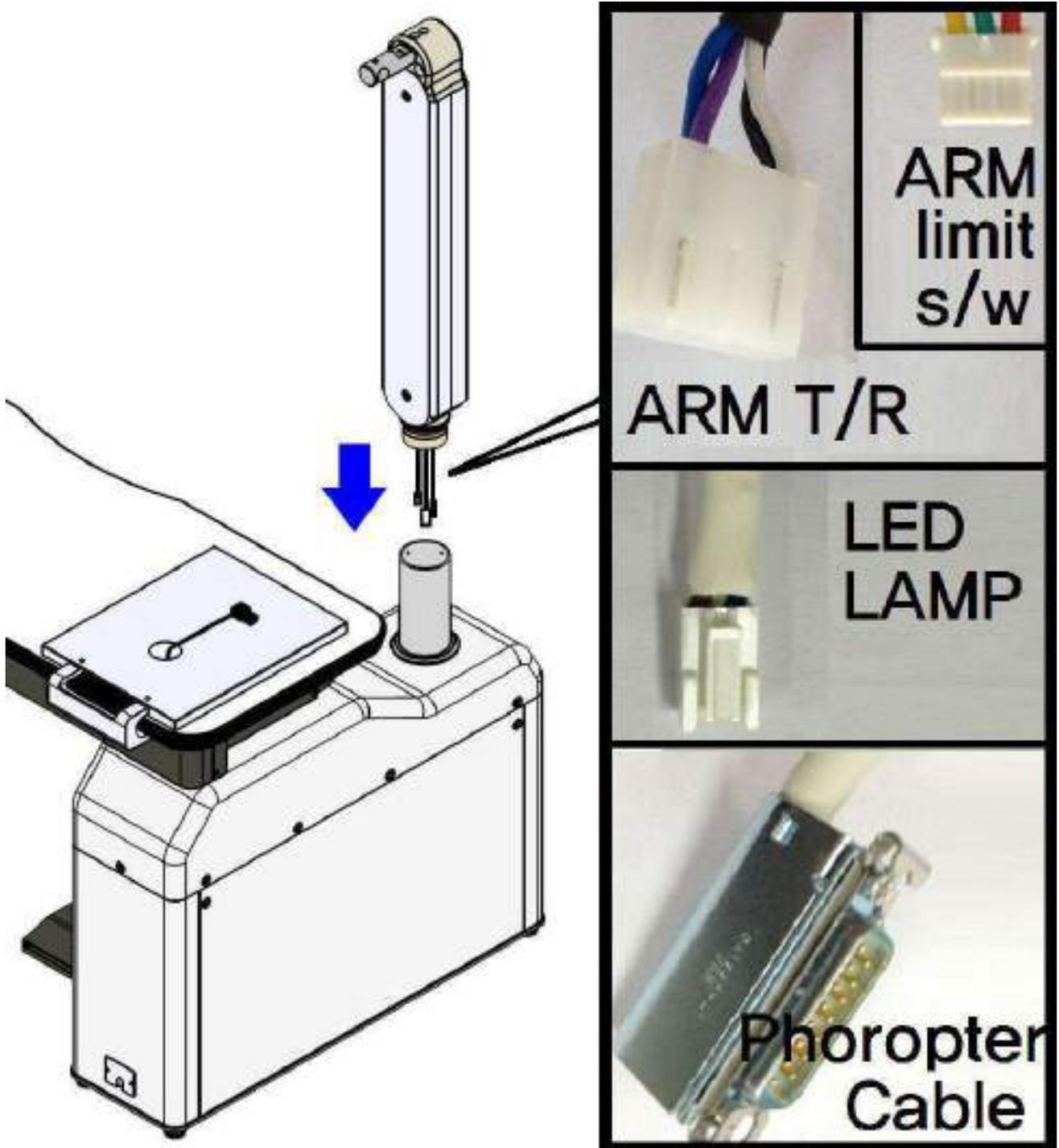


✓ Refer the label attached on main body and cable

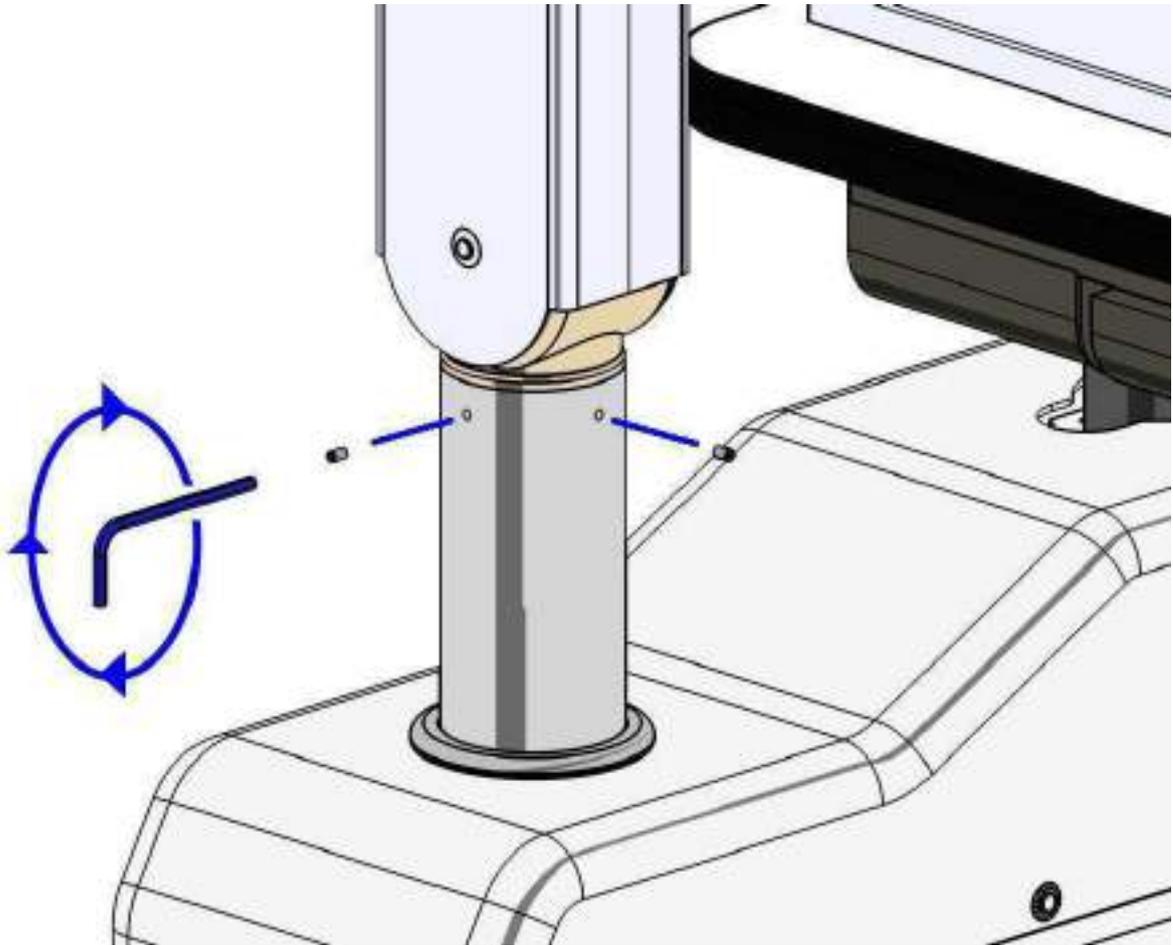


④ Phorofter Arm & assemble of main body

1. Insert Phorofter Arm into hole of phorofter arm.

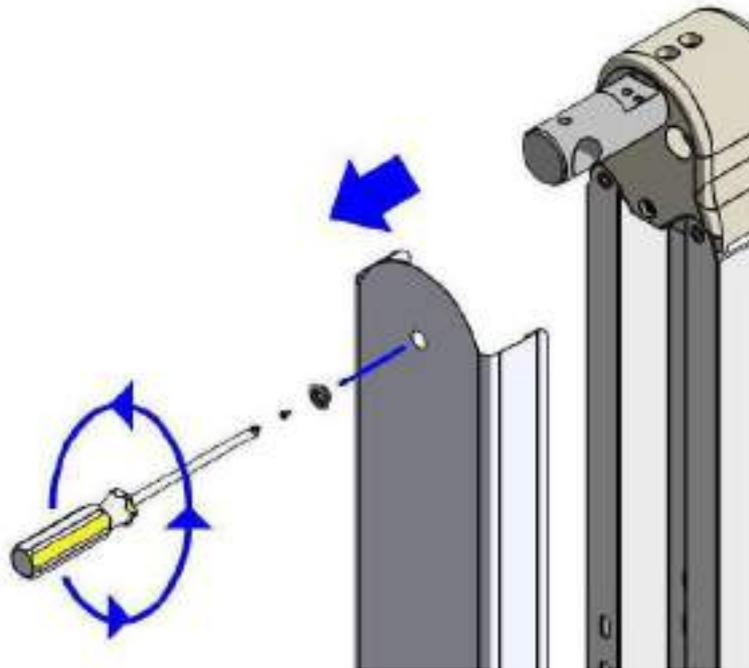


- ✓ Tighten the set screw ; Use Wrench driver

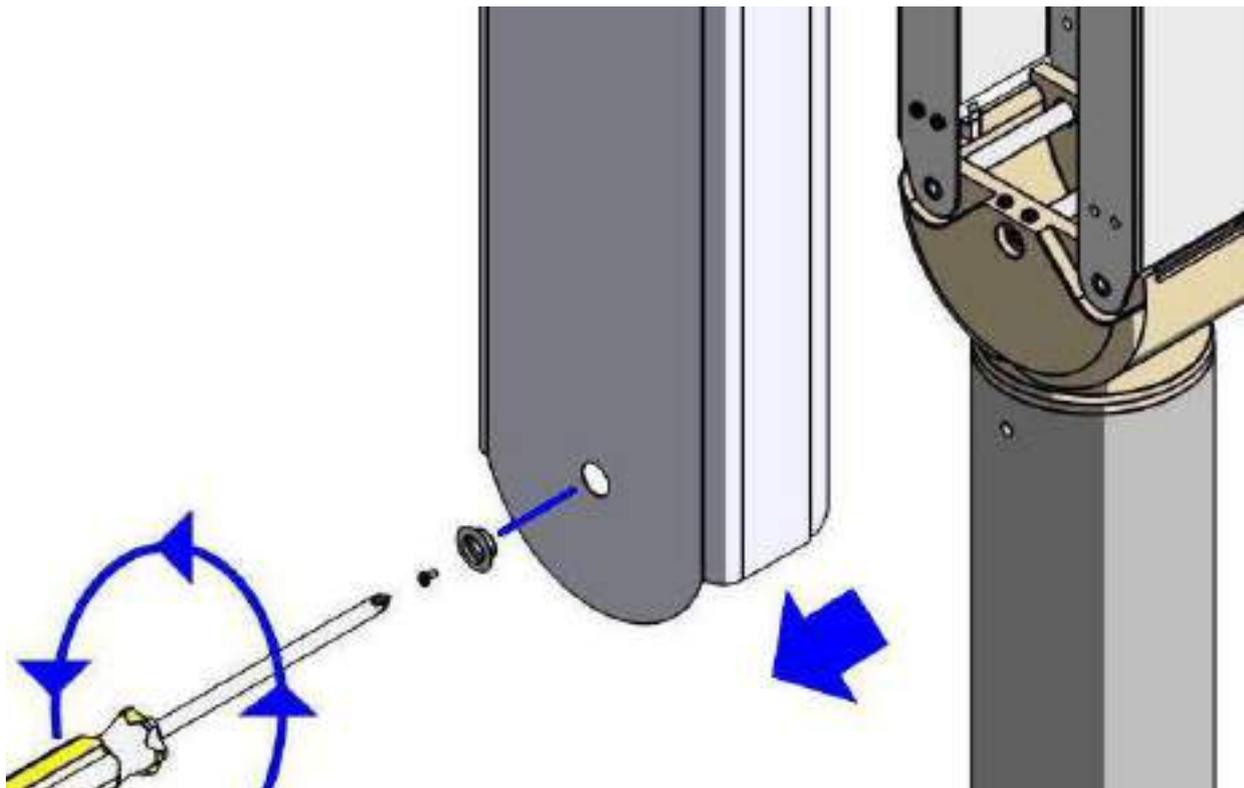


2. Disconnect Phoropter Arm ; Use awl, driver(+)

- ✓ The same way to disconnect the main body.



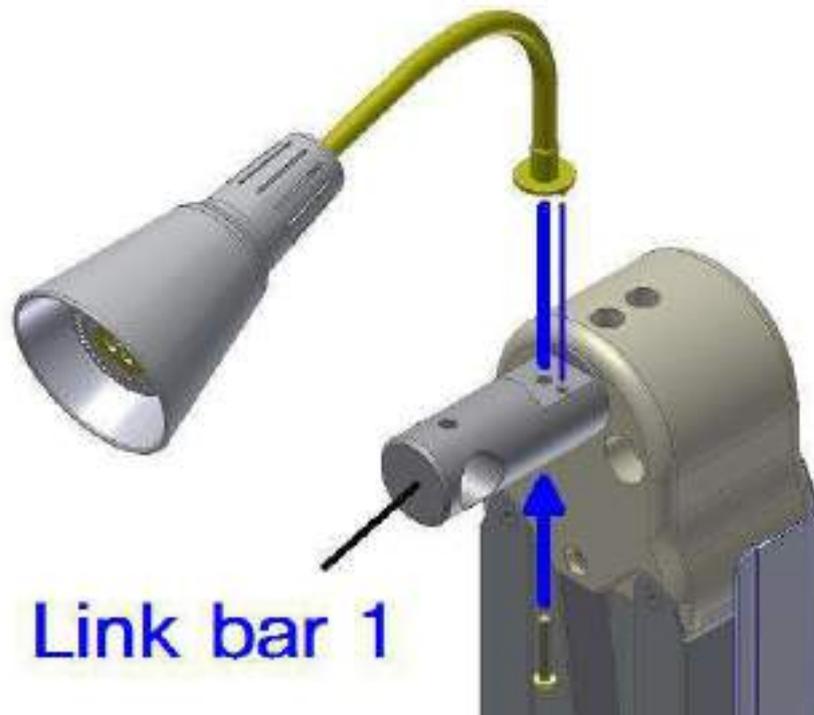
✓ Use the same way to disconnect, Phoroceptor Arm bottom cover



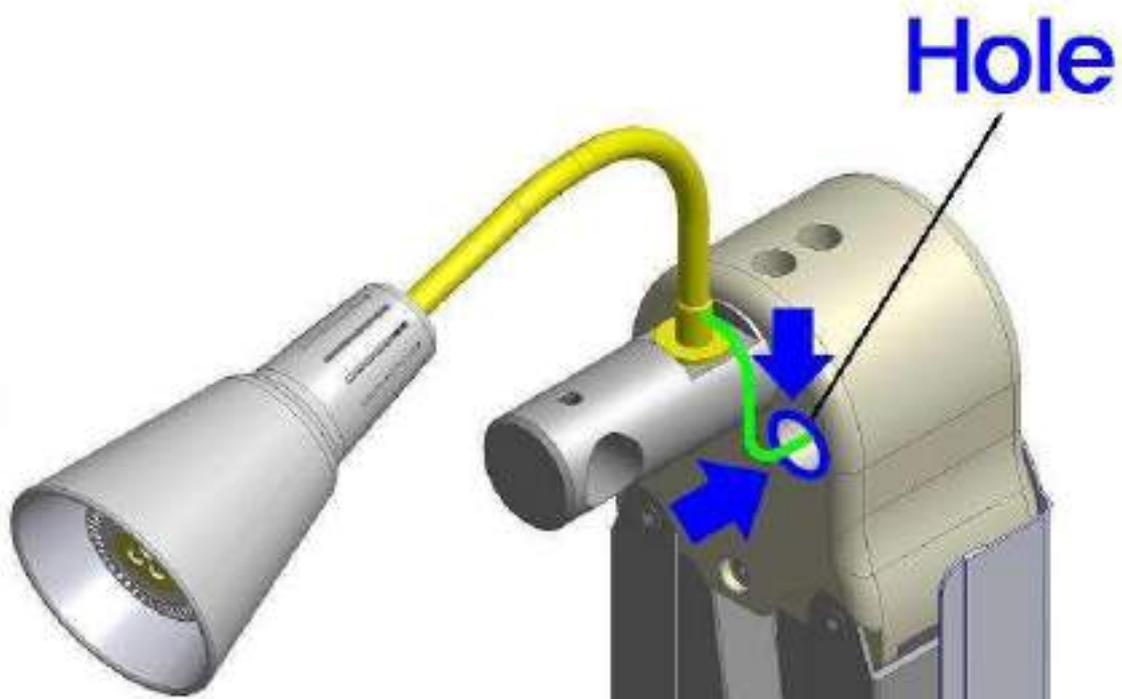
3. Tighten stand lamp with phoroceptor arm link bar 1;

Use driver(+)

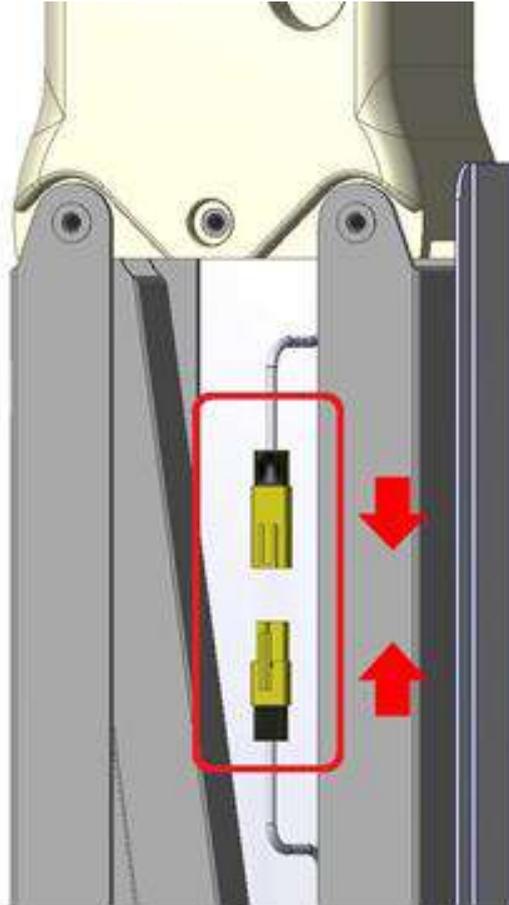
✓ **Set the home of the two in the bottom of stand lamp.**



4. Push and insert the cable of stand lamp into upper hole of phoropter arm

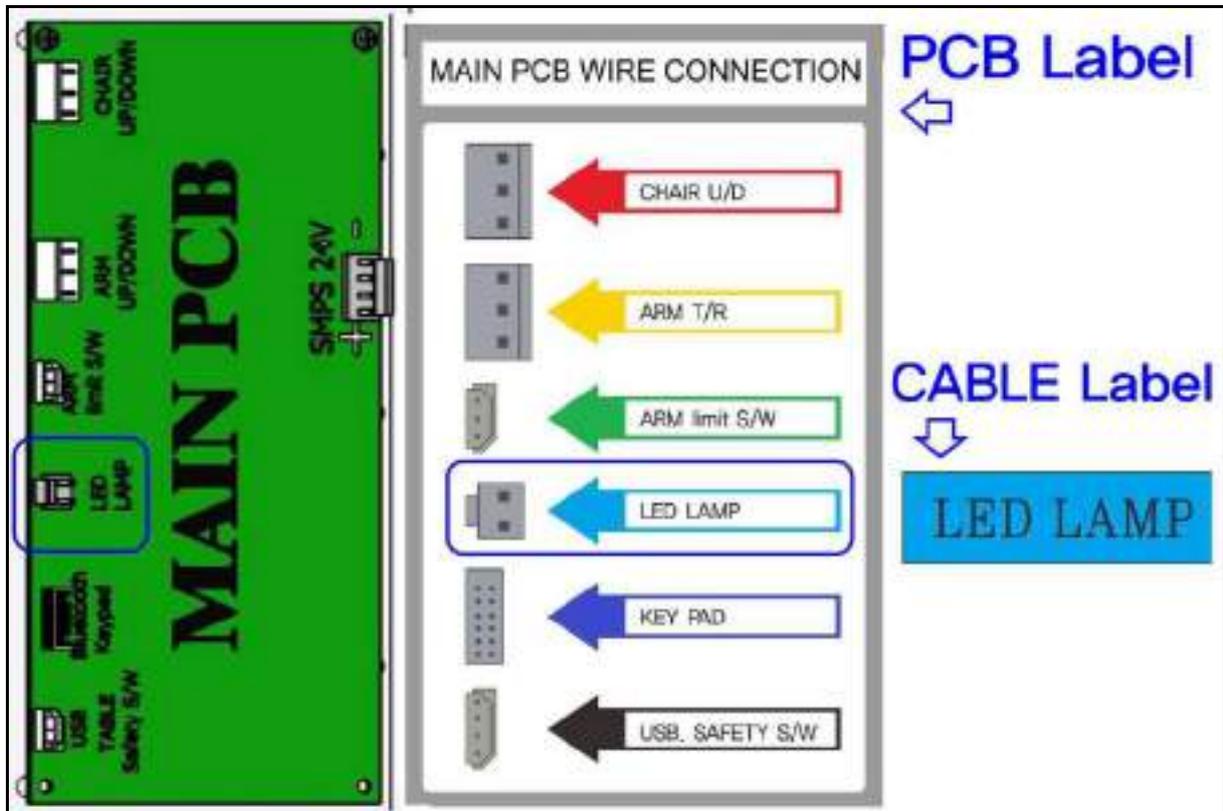
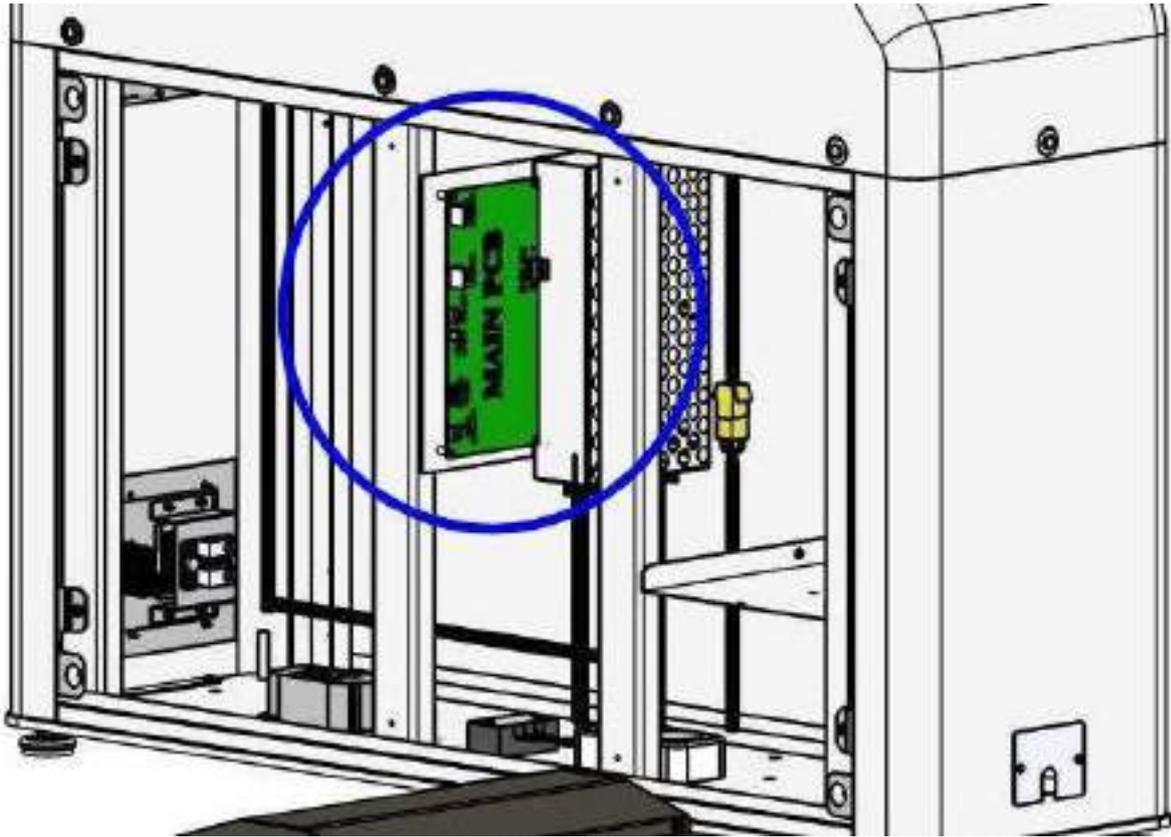


5. Tighten the connector of stand lamp.



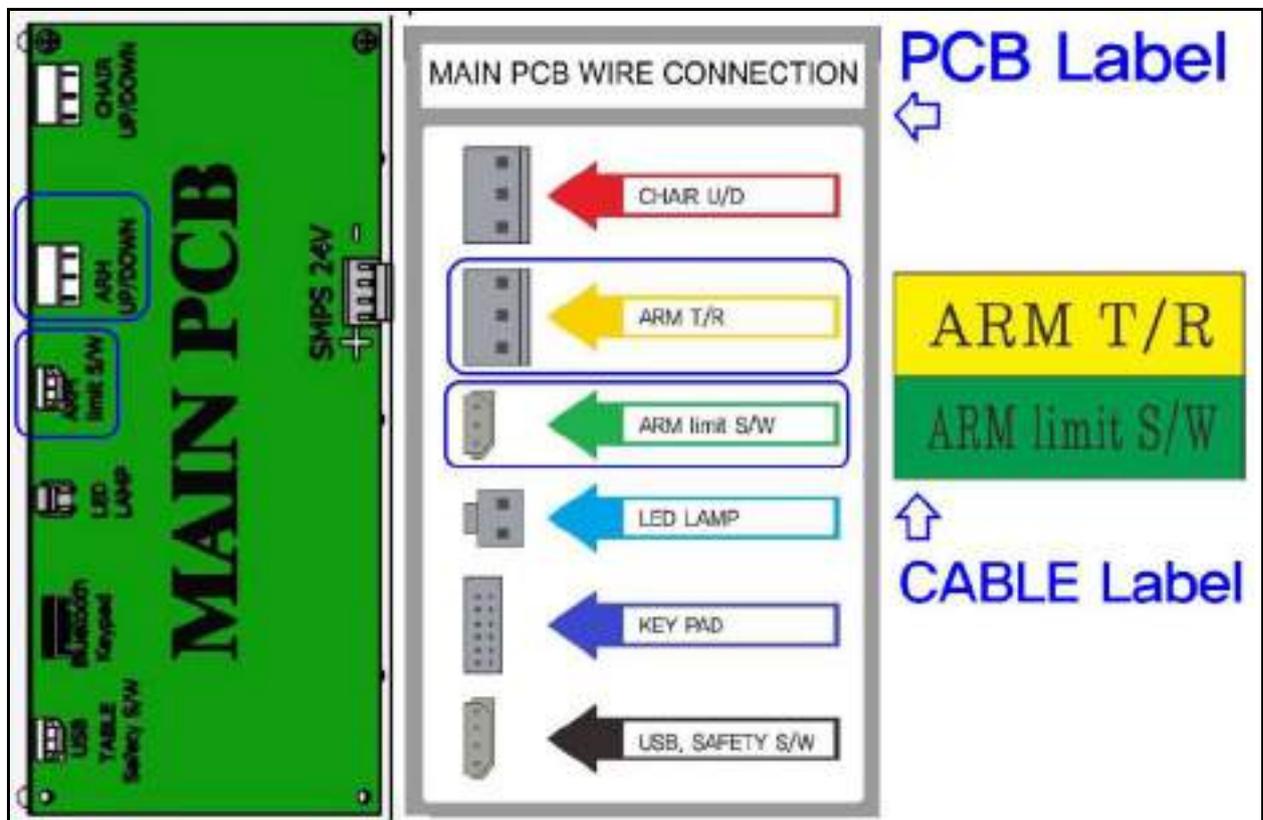
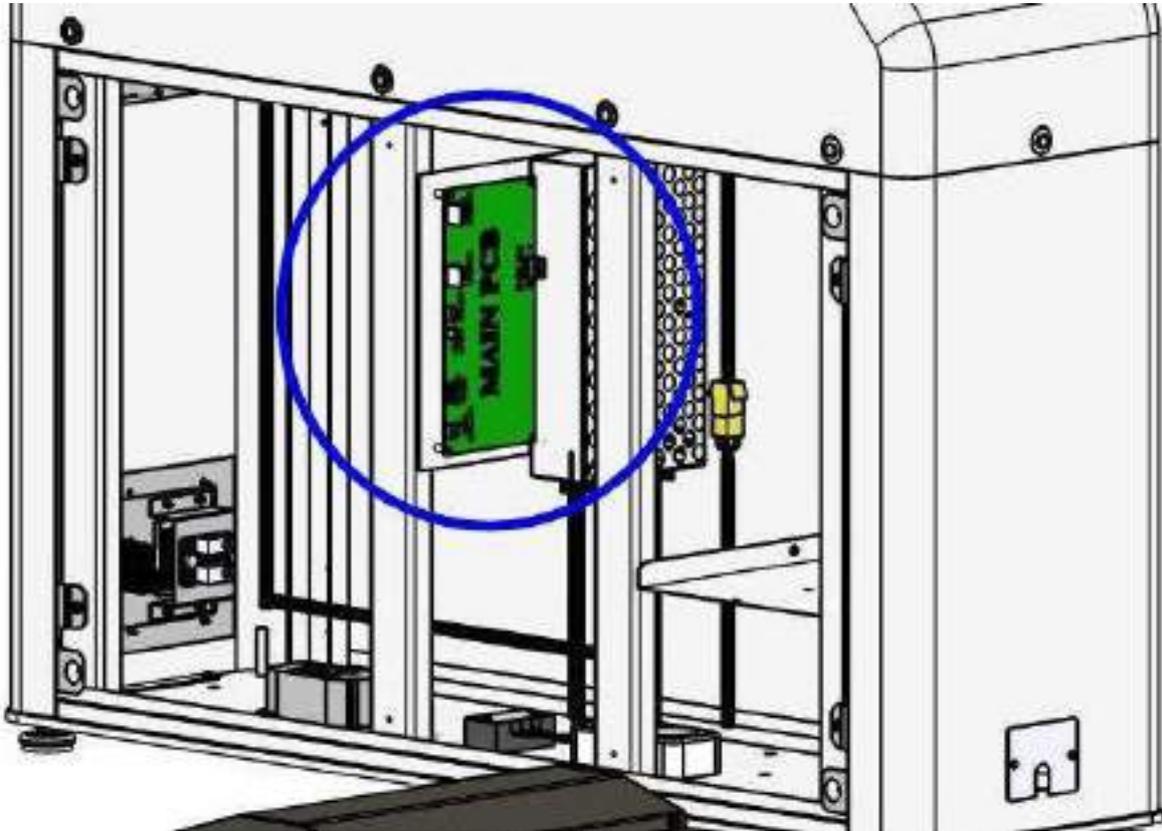
6. Connect stand lamp cable(2pin) into PC.

- ✓ Refer the label, attached on cable and inside of main body.

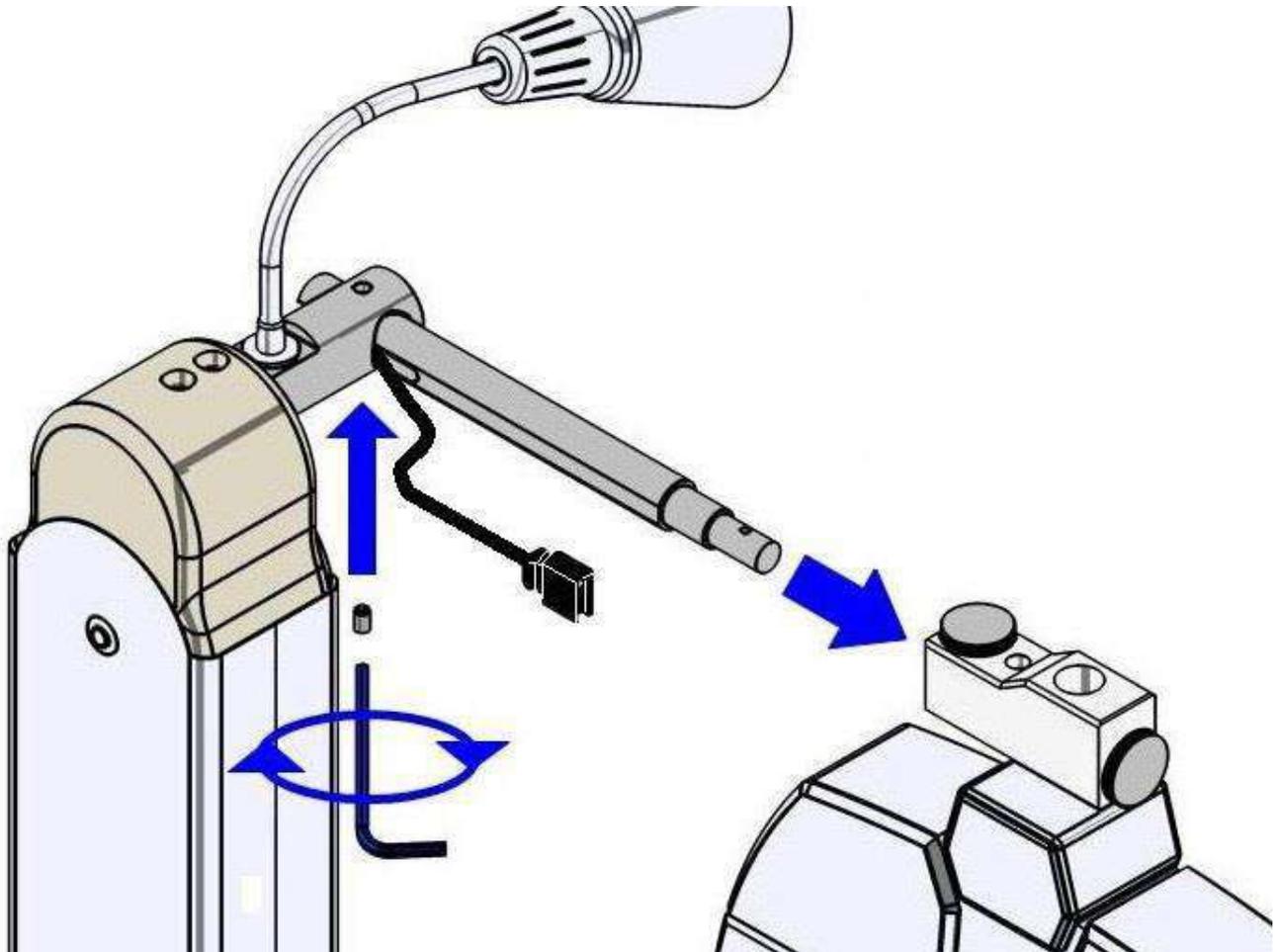


7. Tighten Phorofter Arm connector with main PCB

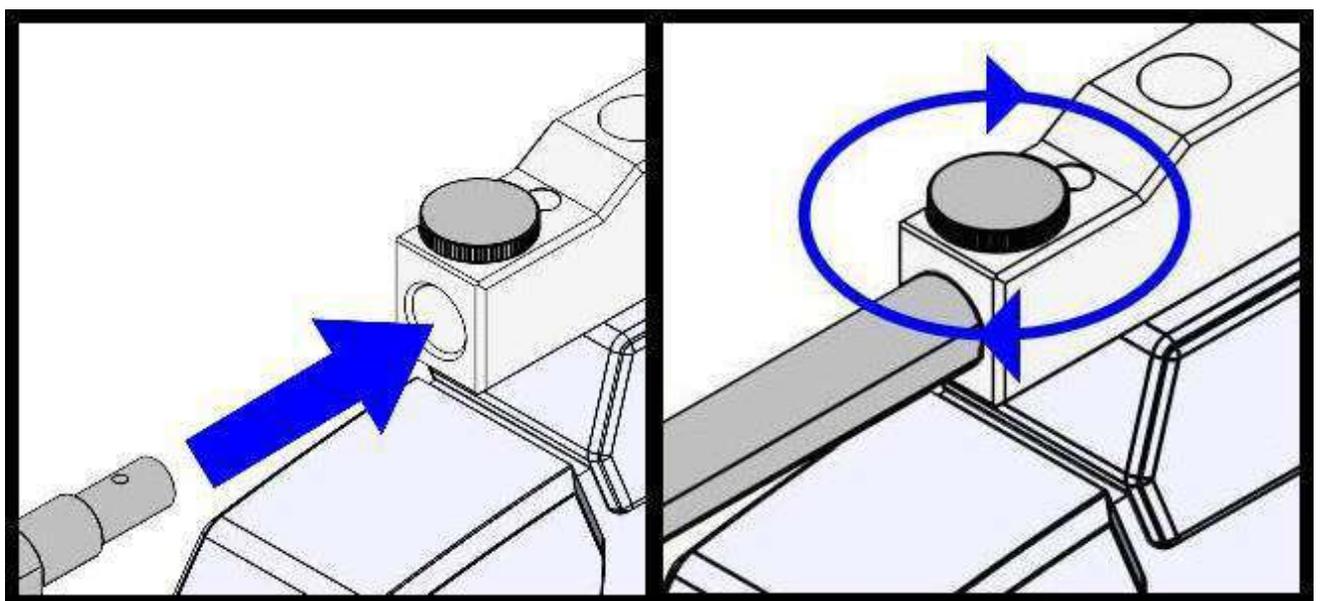
- ✓ Refer the label, attached on cable and inside of main body.



**8. Assemble link bar like following pictures ;
Use wrench driver, driver(+)**

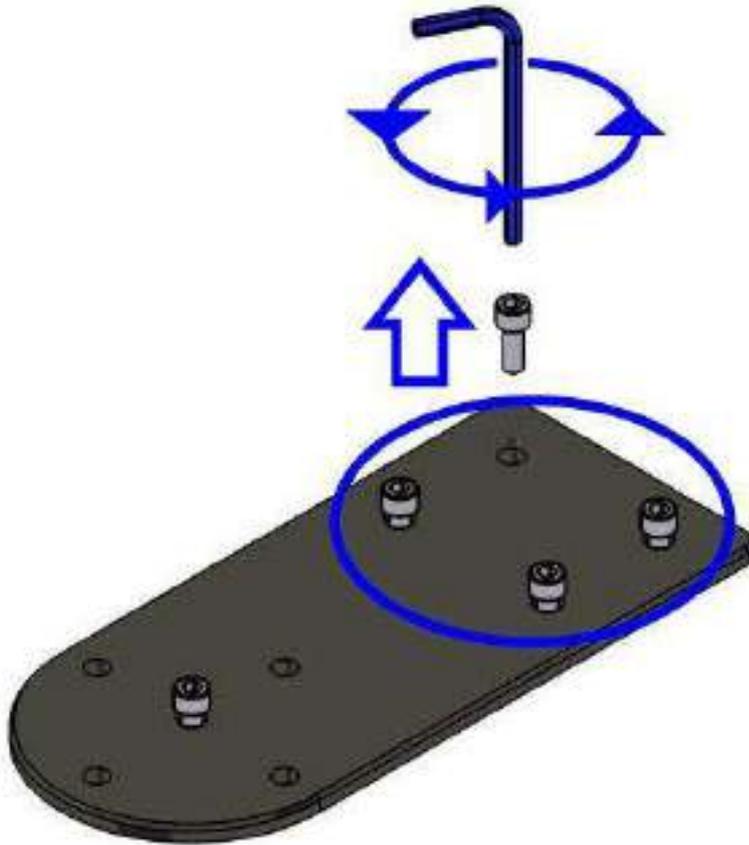


✓ **Fix it with set screws after tighten the phoropter**

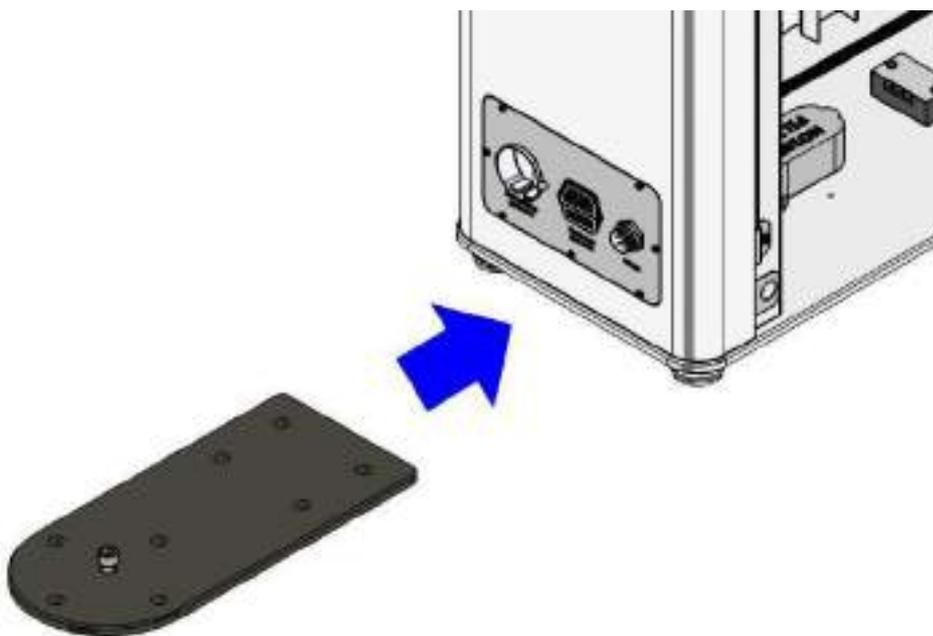


④ Chart Arm and Main Body assemble

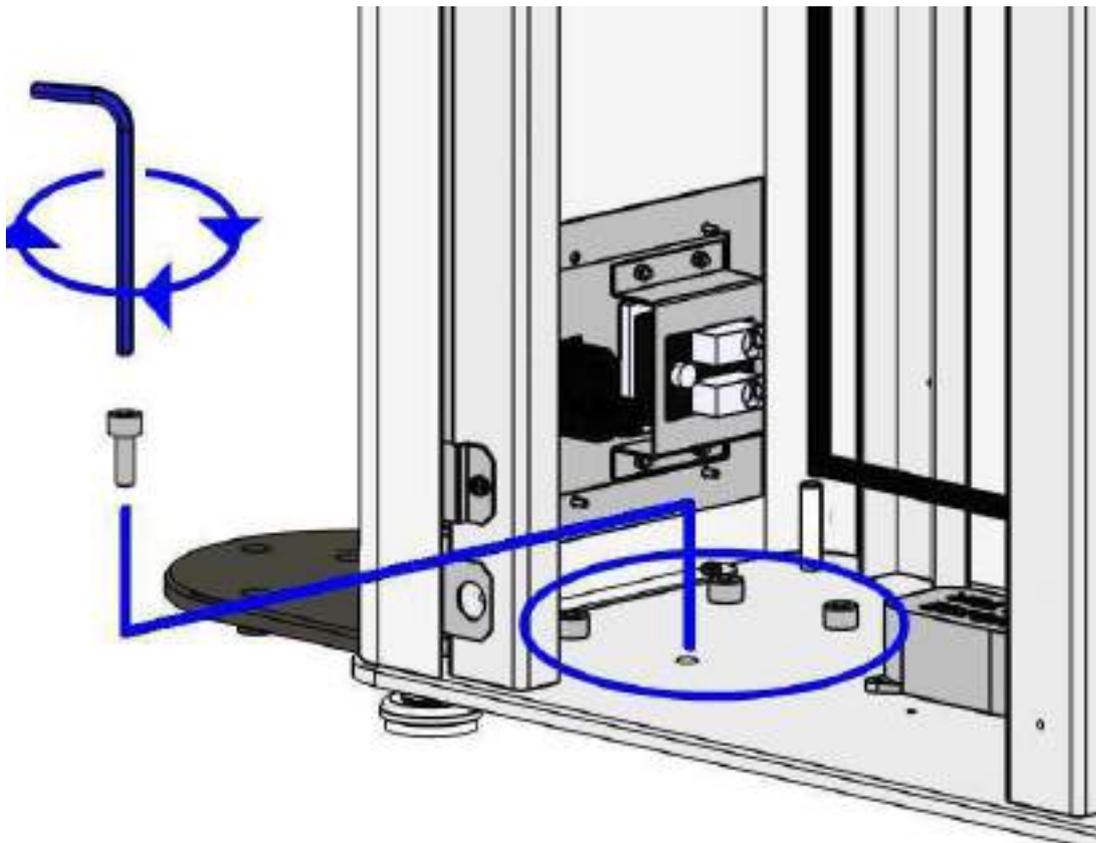
1. Disconnect the bolts(4 pcs), tightened on chart arm base.



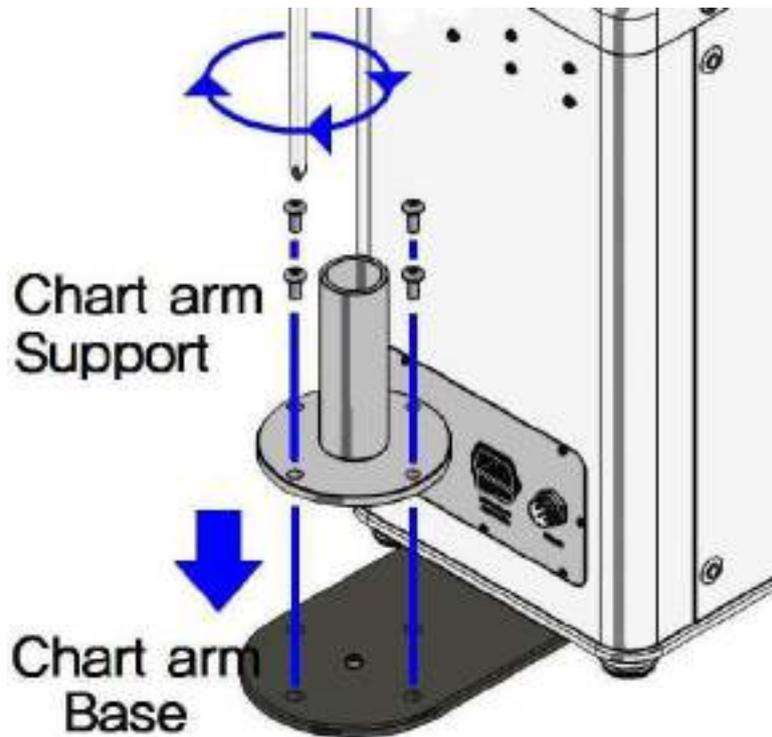
2. Push and insert the chart arm base into back side's lower of main body



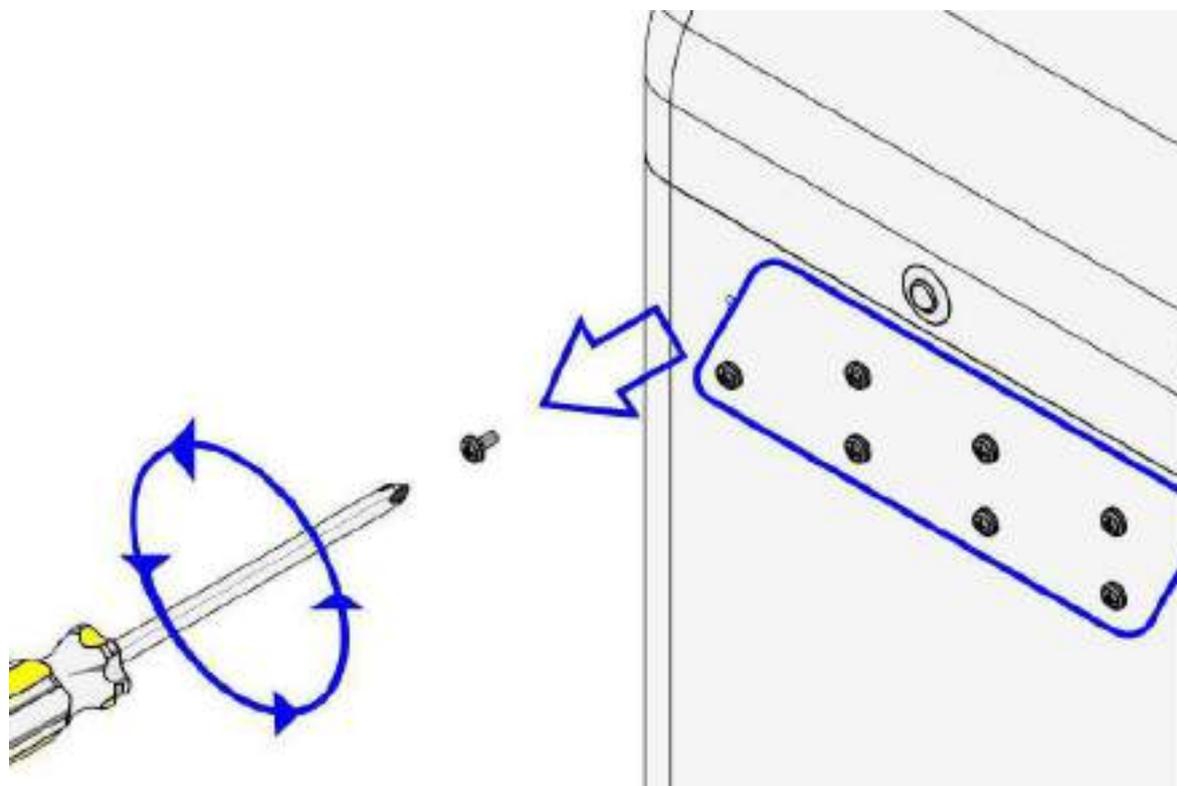
- ✓ Tighten chart arm base at inside of main body



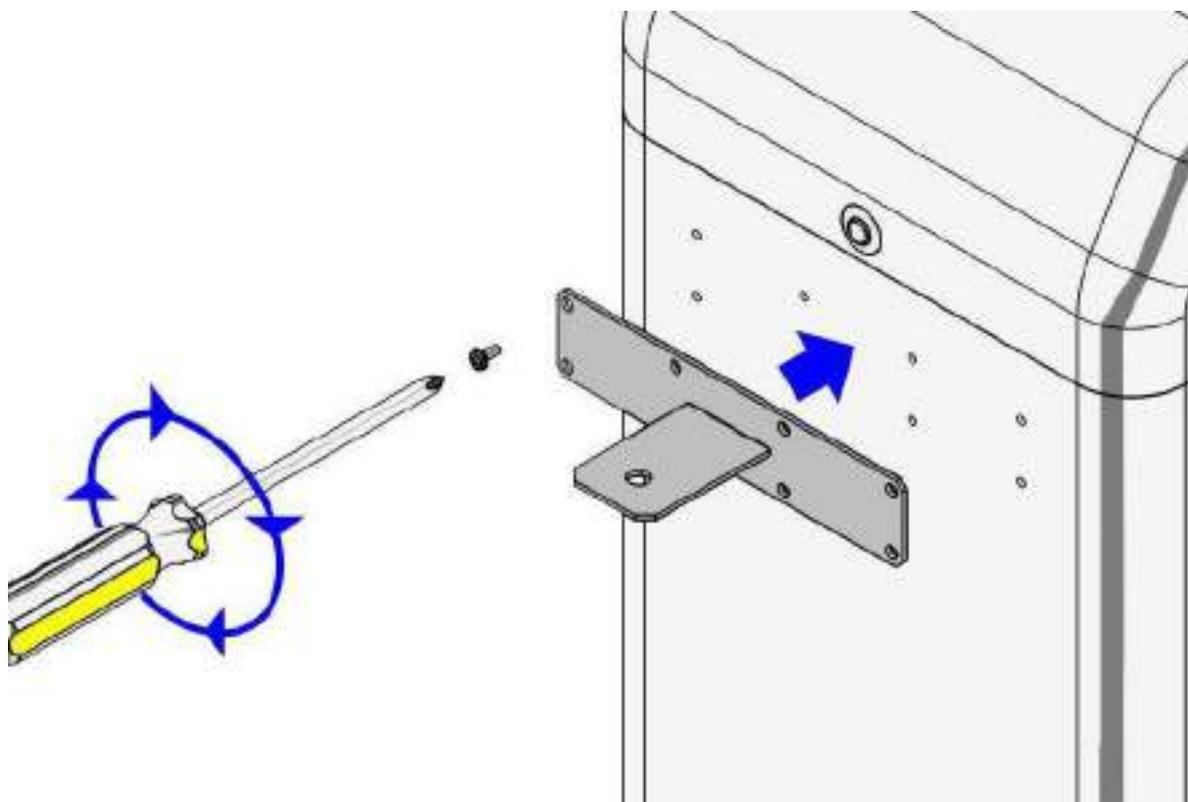
- 3. Fix the support on the chart arm base
; Use driver (+)



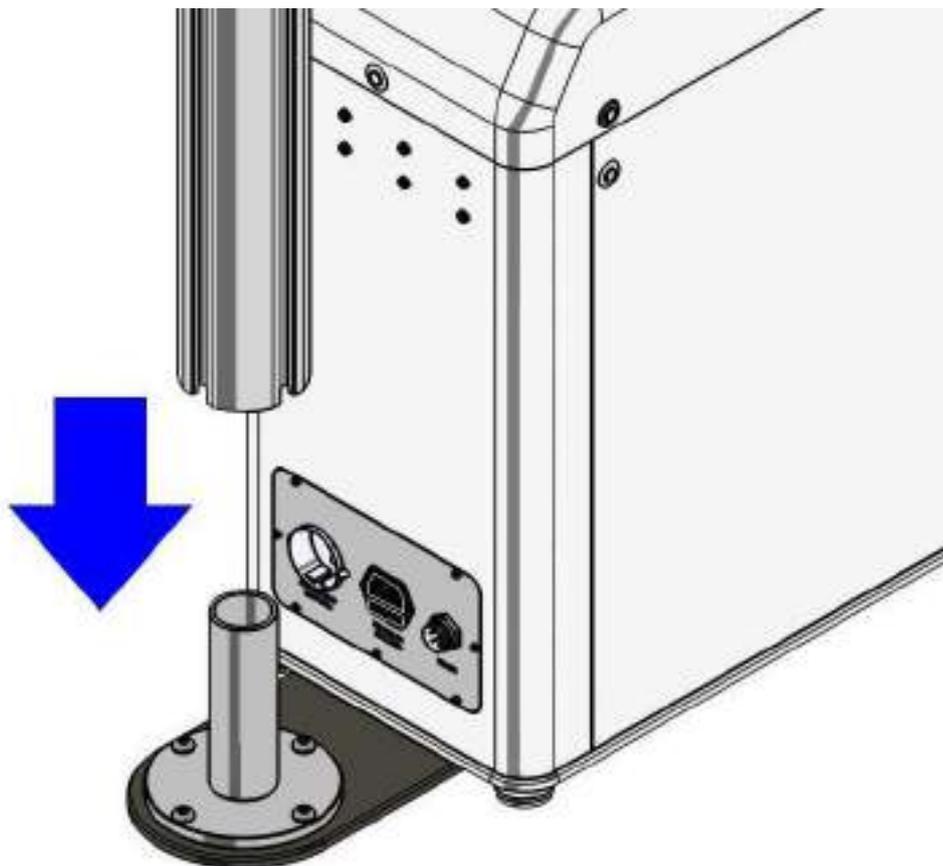
- ✓ **Disconnect the bolts(8 pcs), which are screwed at the back side of main body**



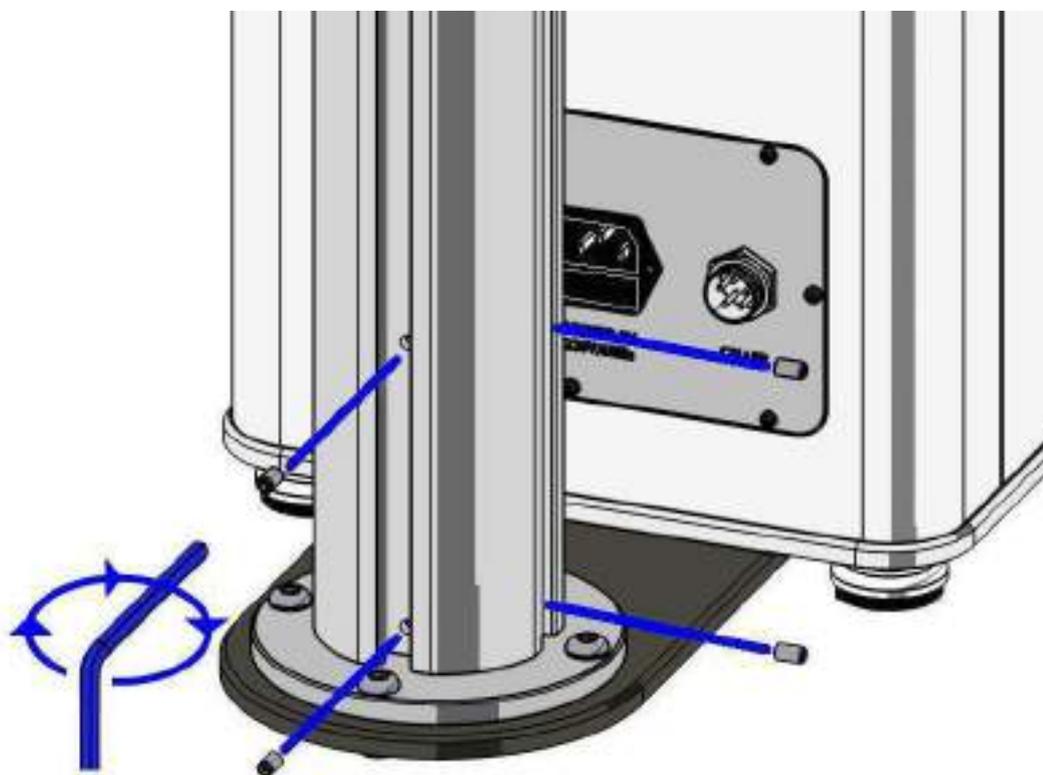
4. Mount support bracket at the back side of main body



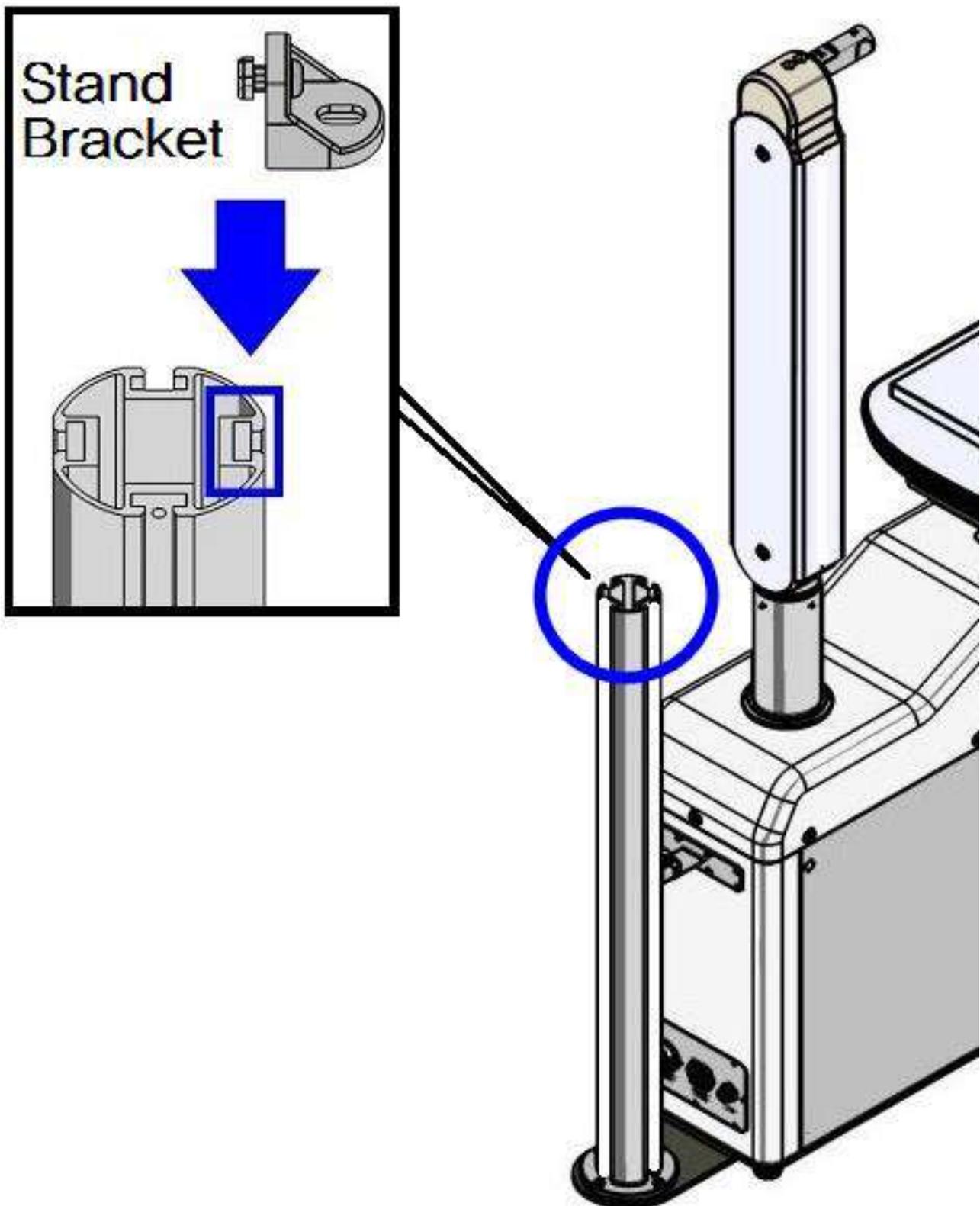
5. Insert chart arm stand into chart arm support



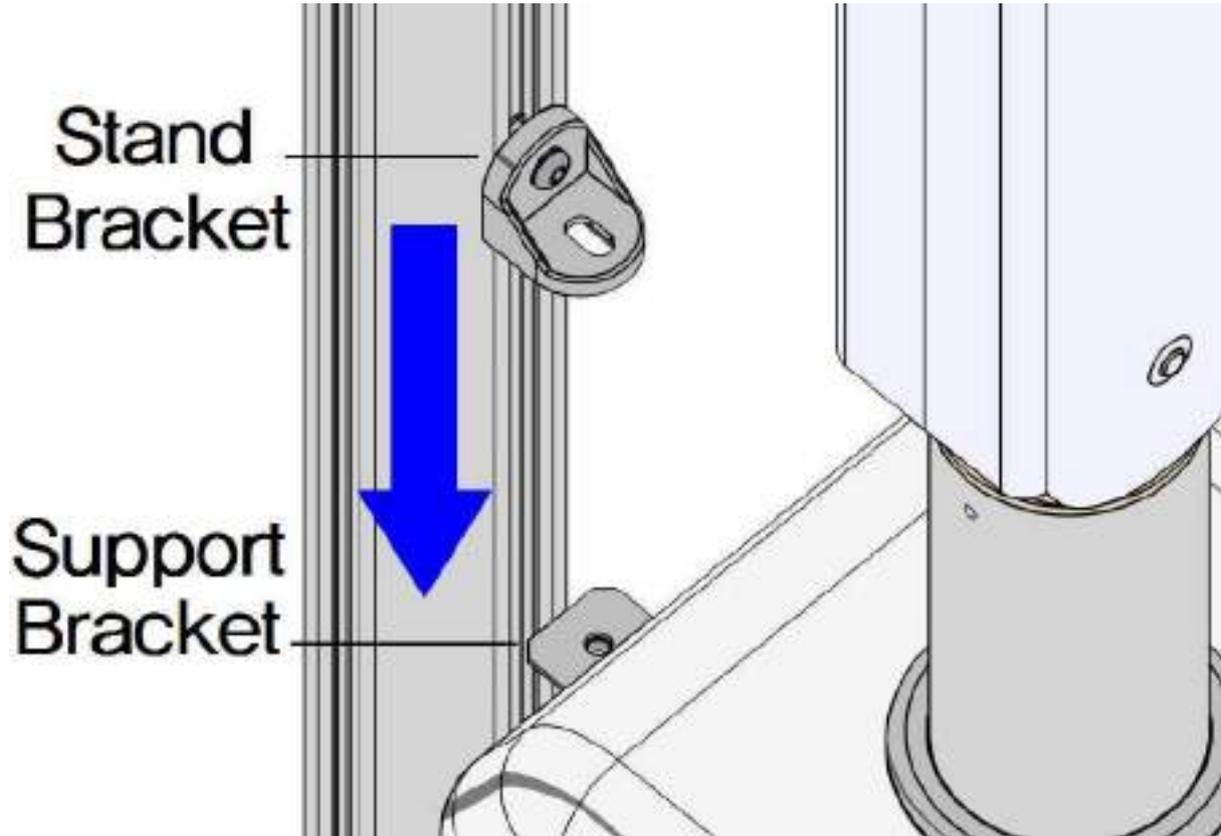
- ✓ Fix the chart arm stand tightening set screws (4 pcs)



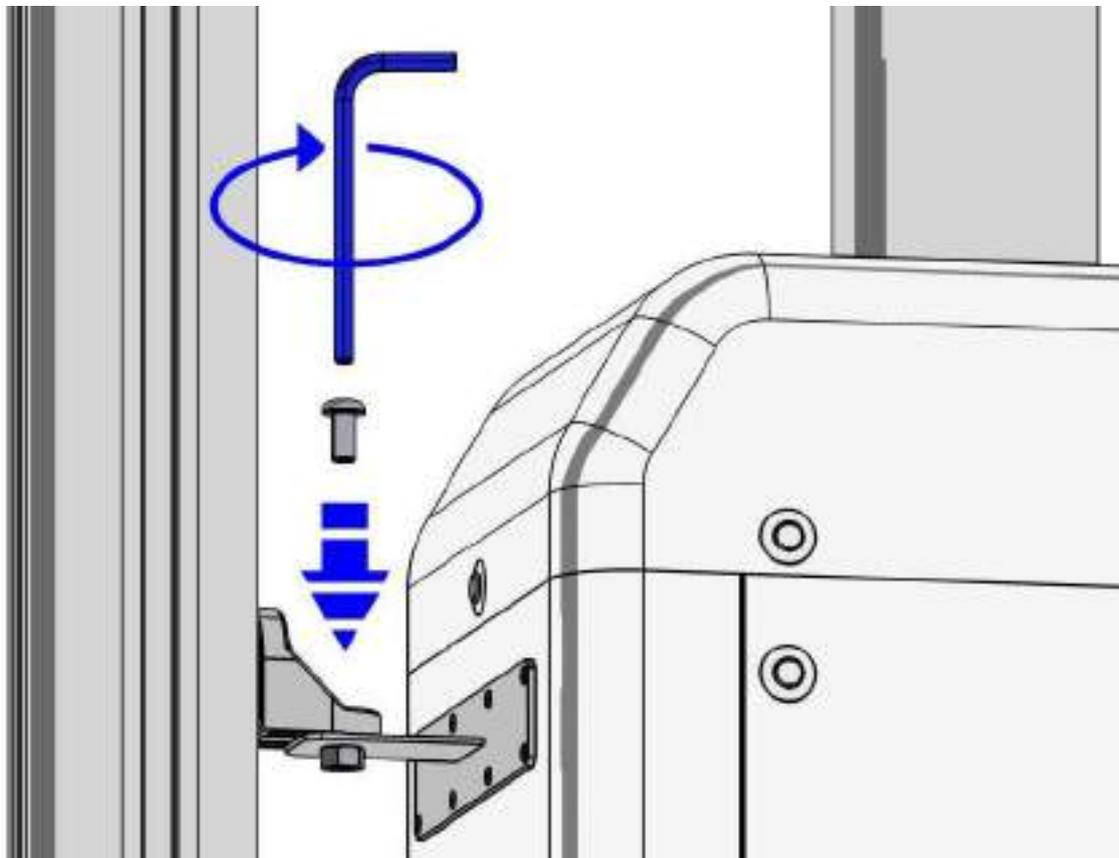
6. Insert stand bracket into upper side of stand pole lower
✓ Pull down the stand bracket at the position of support bracket



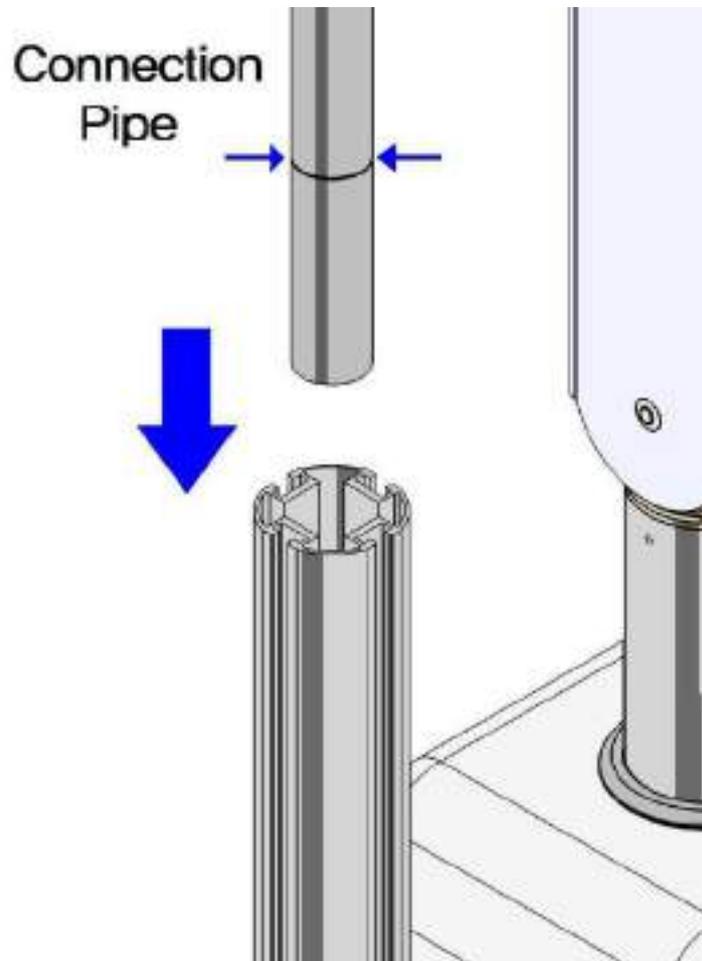
7.Pull down the stand bracket at the position of support bracket



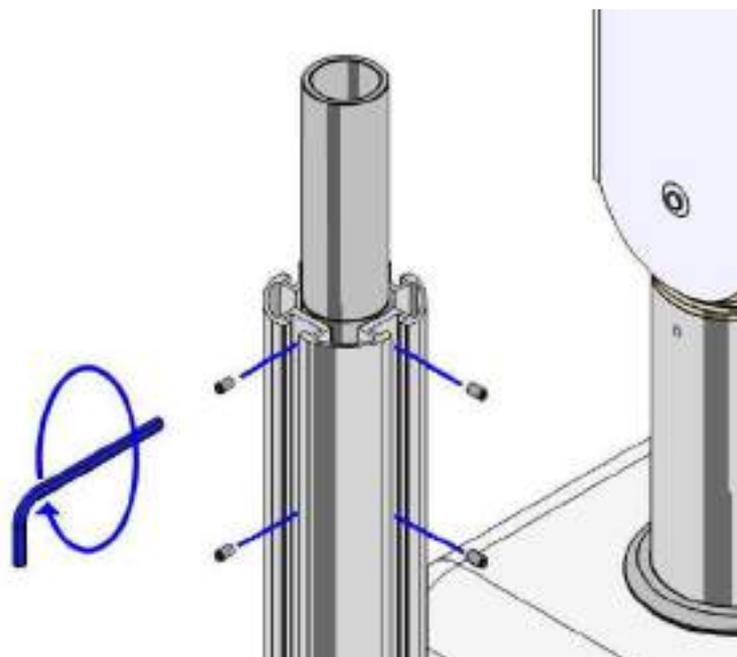
- ✓ **Fix the chart arm stand tightening set screws (4 pcs)**



8. Insert the connection pipe by marking line at lower of chart arm stand.

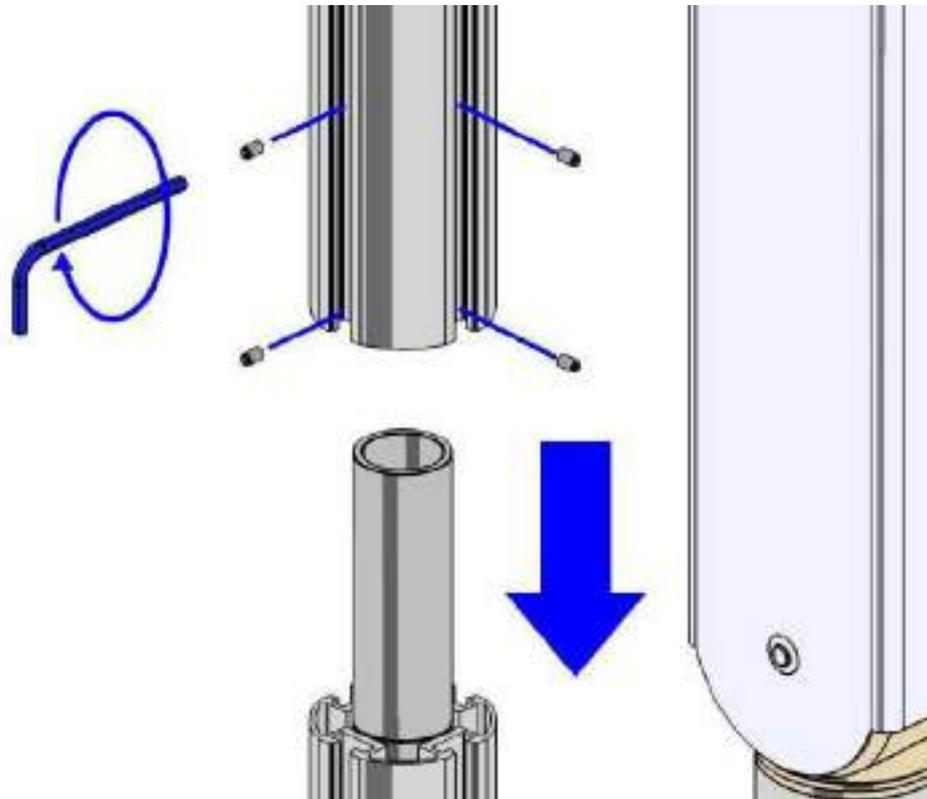


✓ **Fix and tighten the set screws (4 pcs); Use wrench driver**

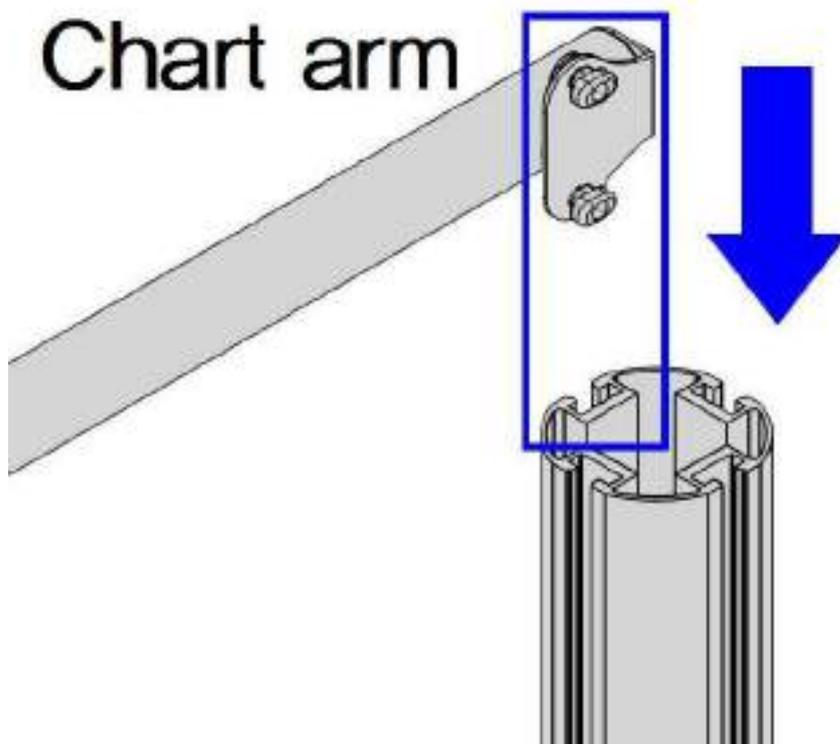


9. Insert chart arm upper into connection pipe

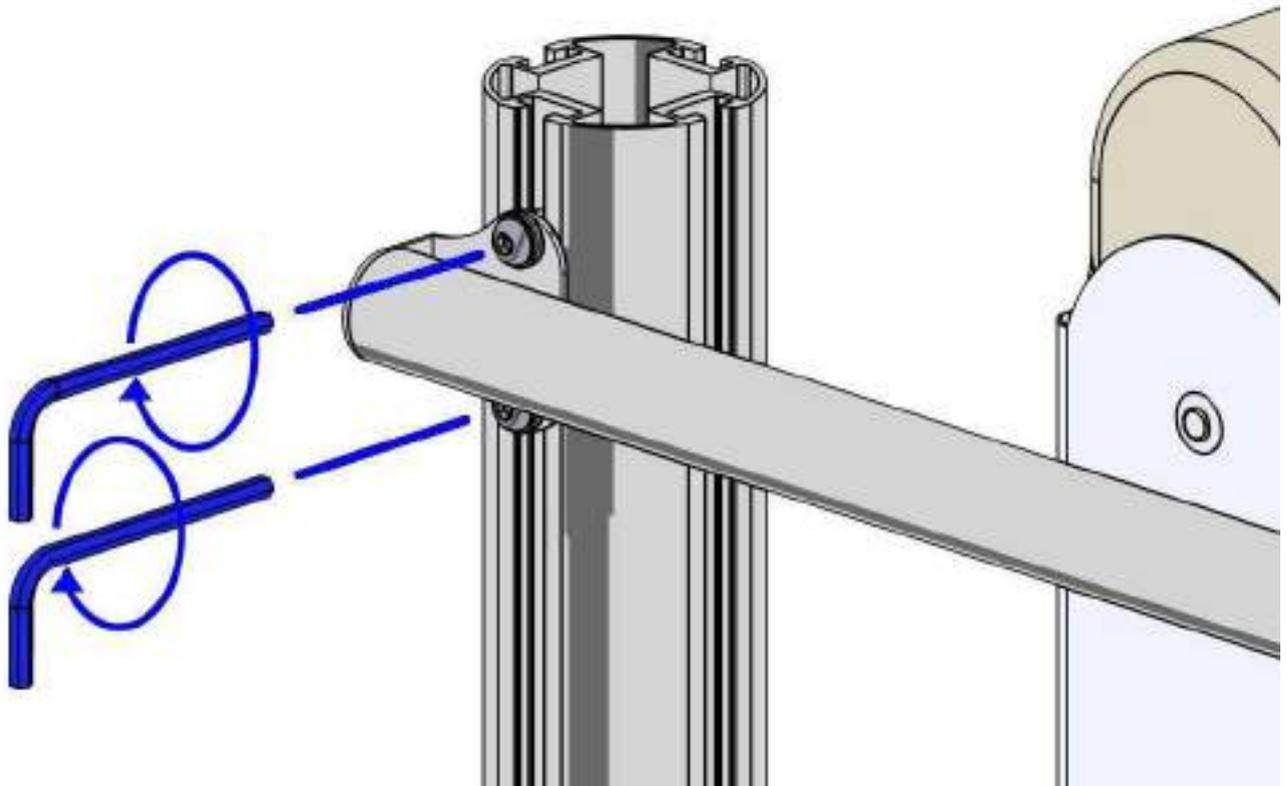
- ✓ Fix and tighten the set screws (4 pcs); Use wrench driver



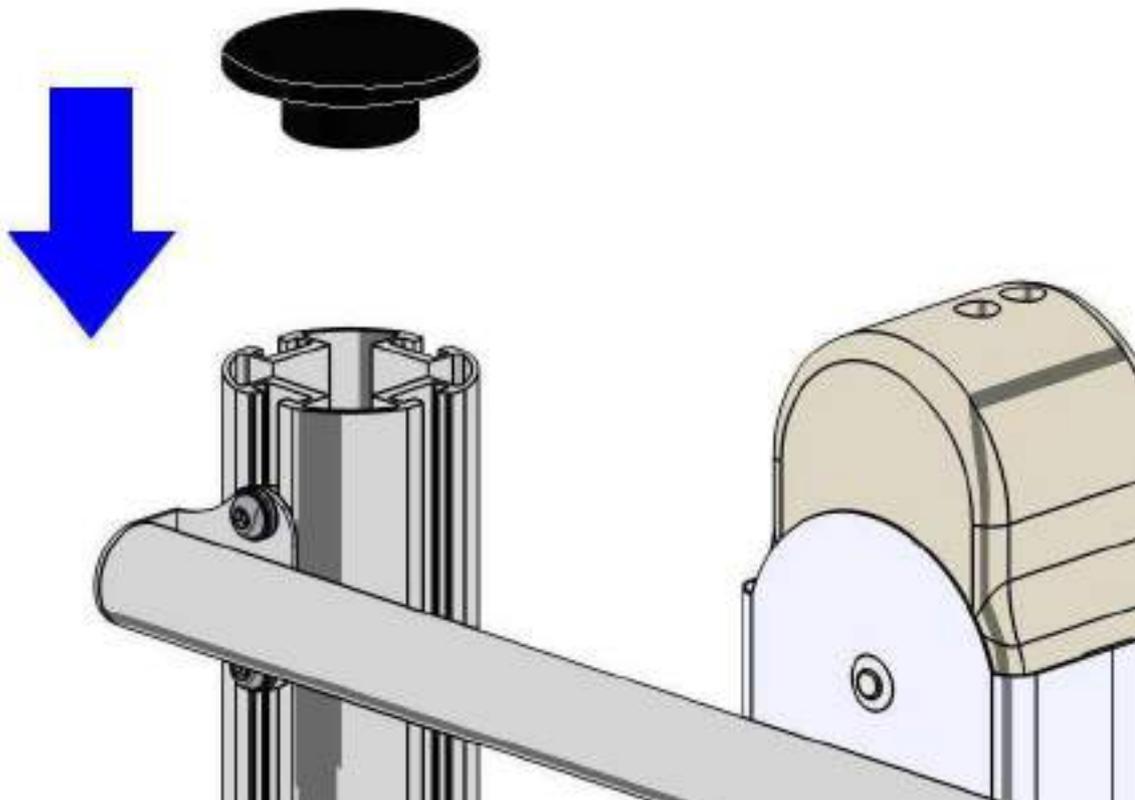
10. Insert chart arm into top of chart arm stand



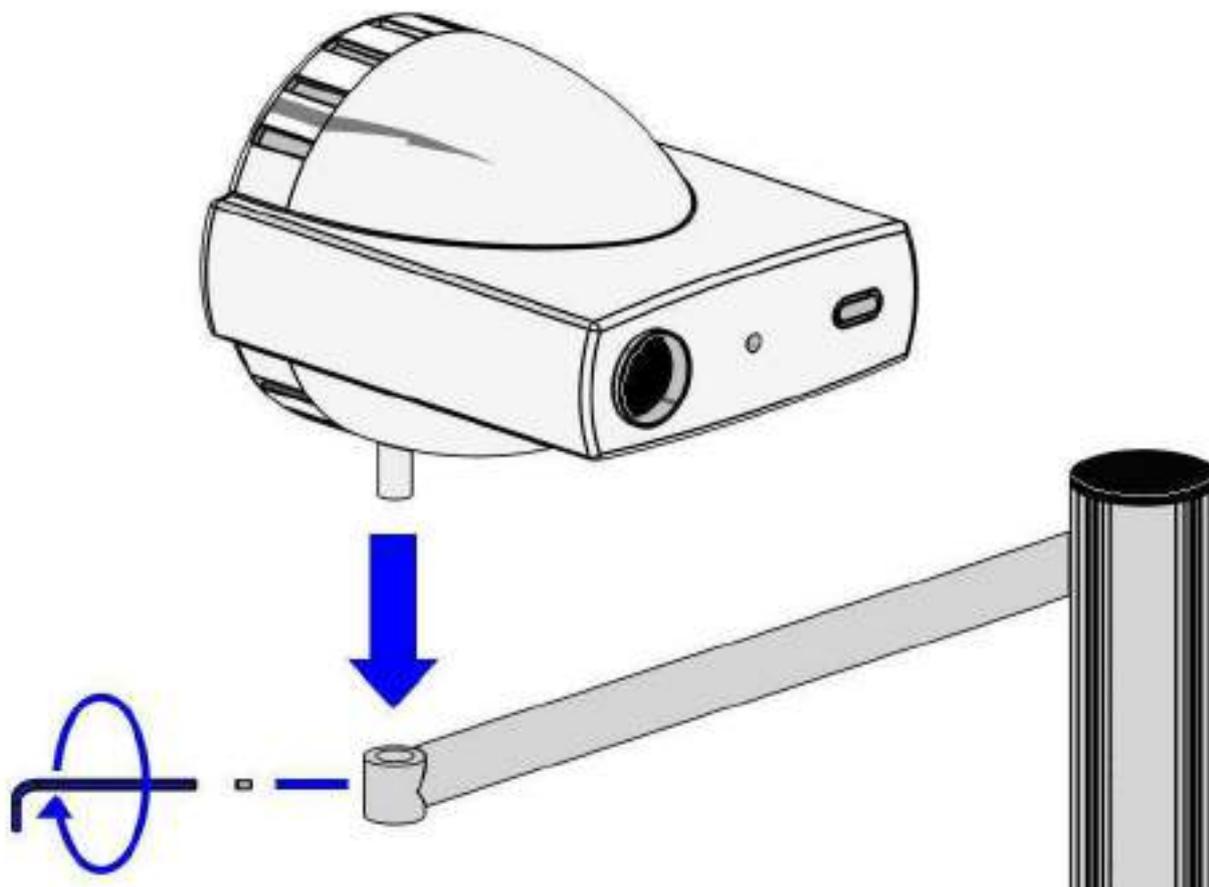
11. Fix chart arm with bolts; Use wrench driver



12. Insert stand cover into top of chart arm stand



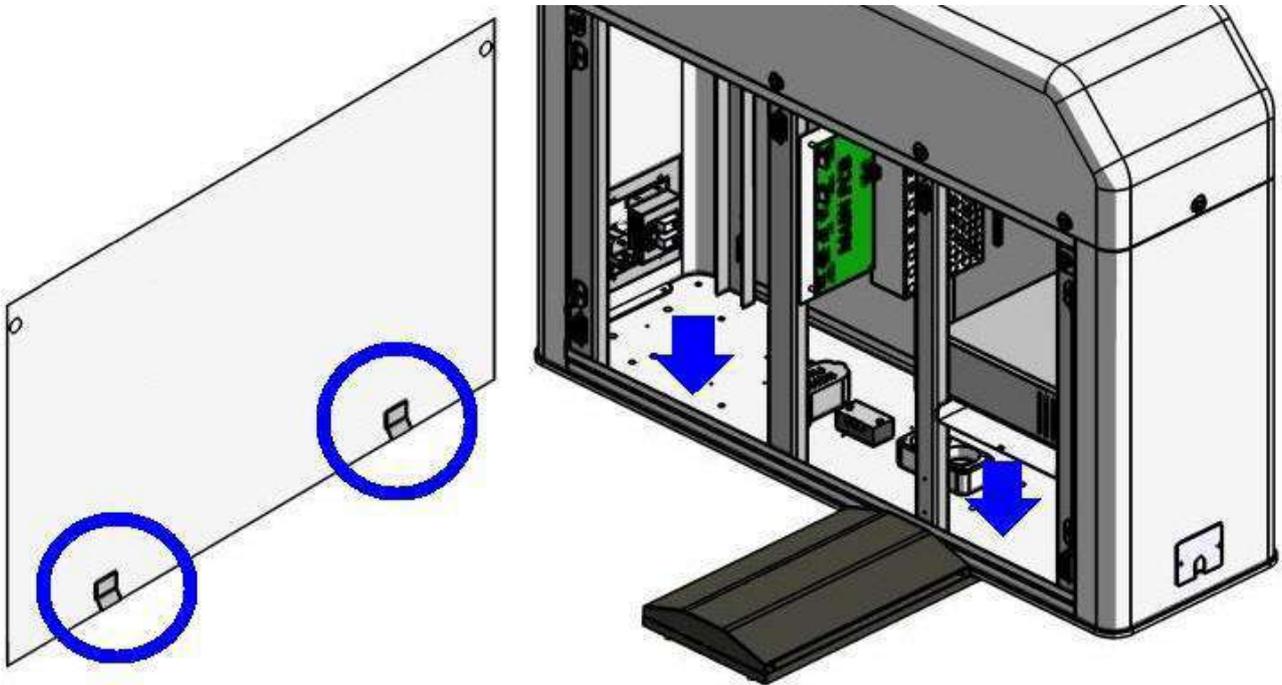
**13. Mount the chart projector like following picture;
use wrench driver**



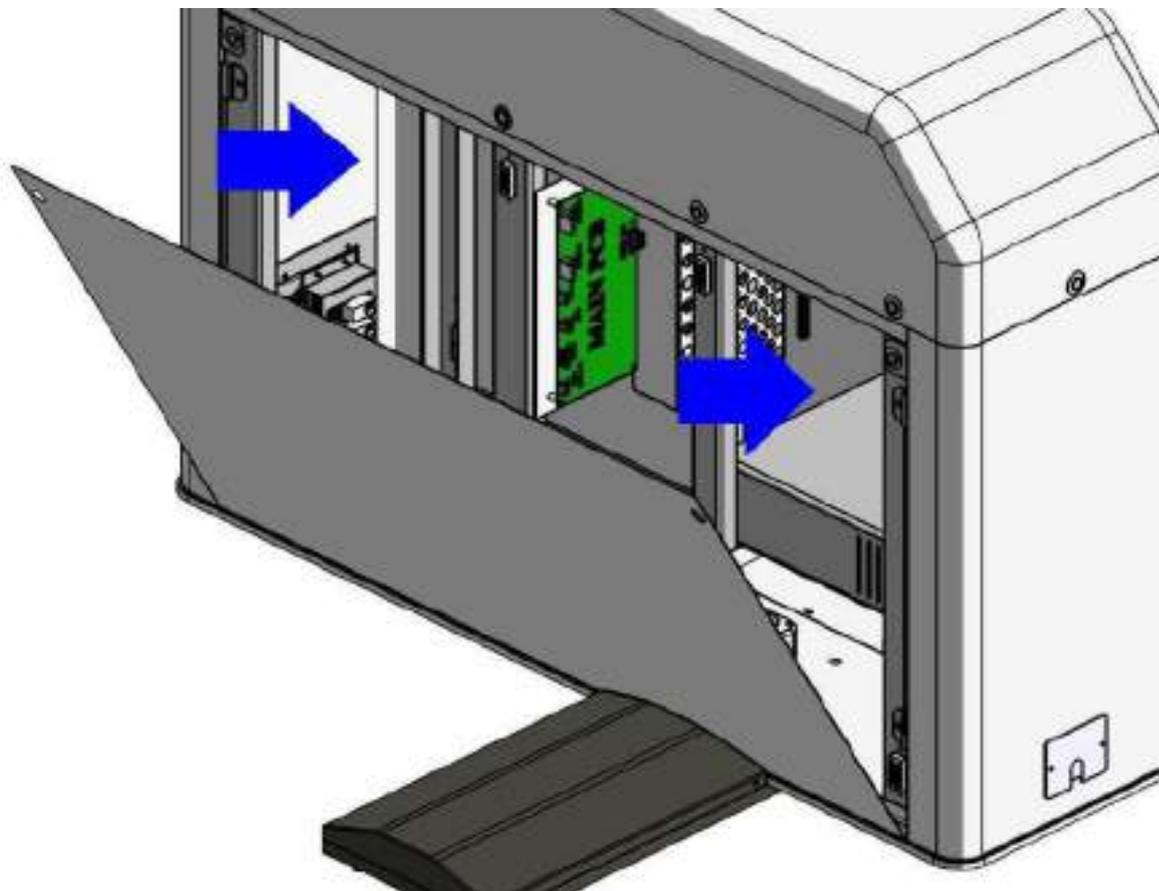
14. Handle the chart projector cable using profile cover.

Ⓜ Tighten the cover with main body

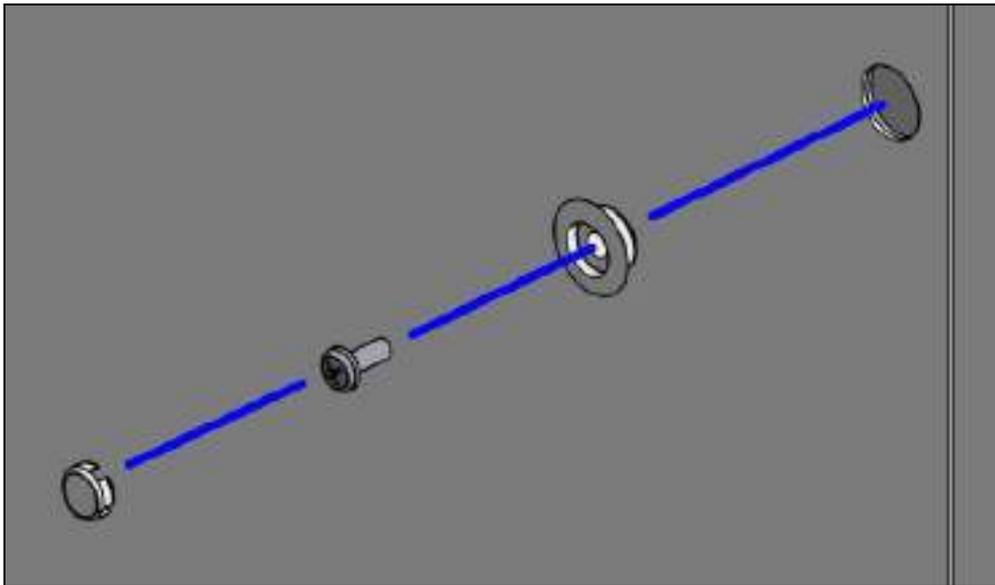
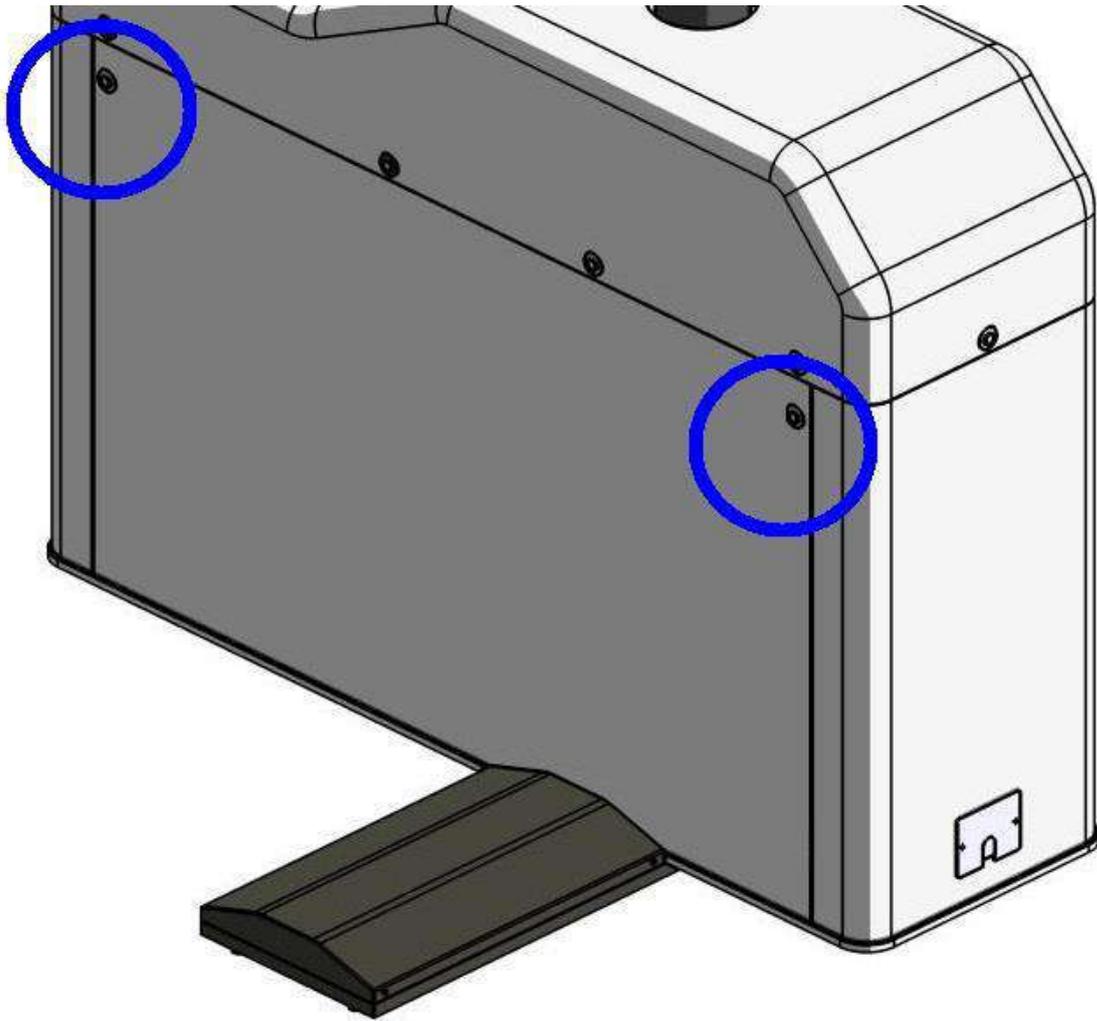
1. Insert into bottom of main body



2. Tighten the cover after attach the upper side of cover.



3. Tighten the Cover(bolt cap)

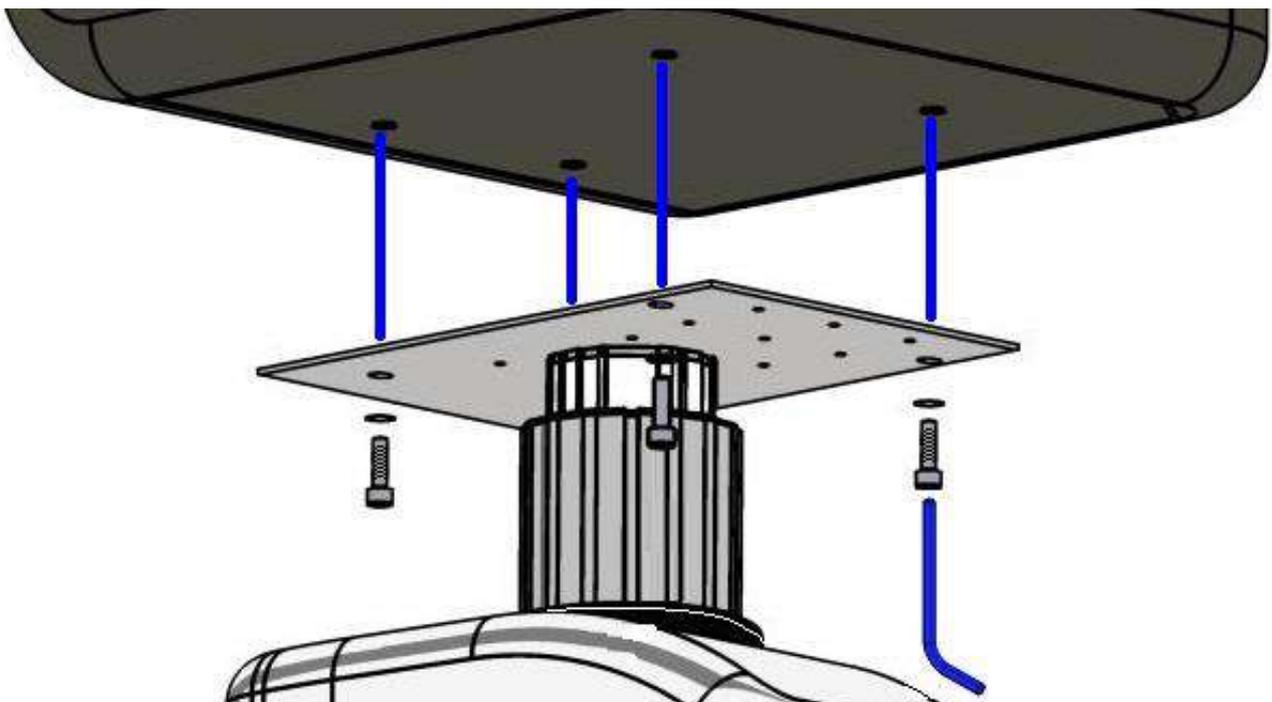


④ Chair Installation

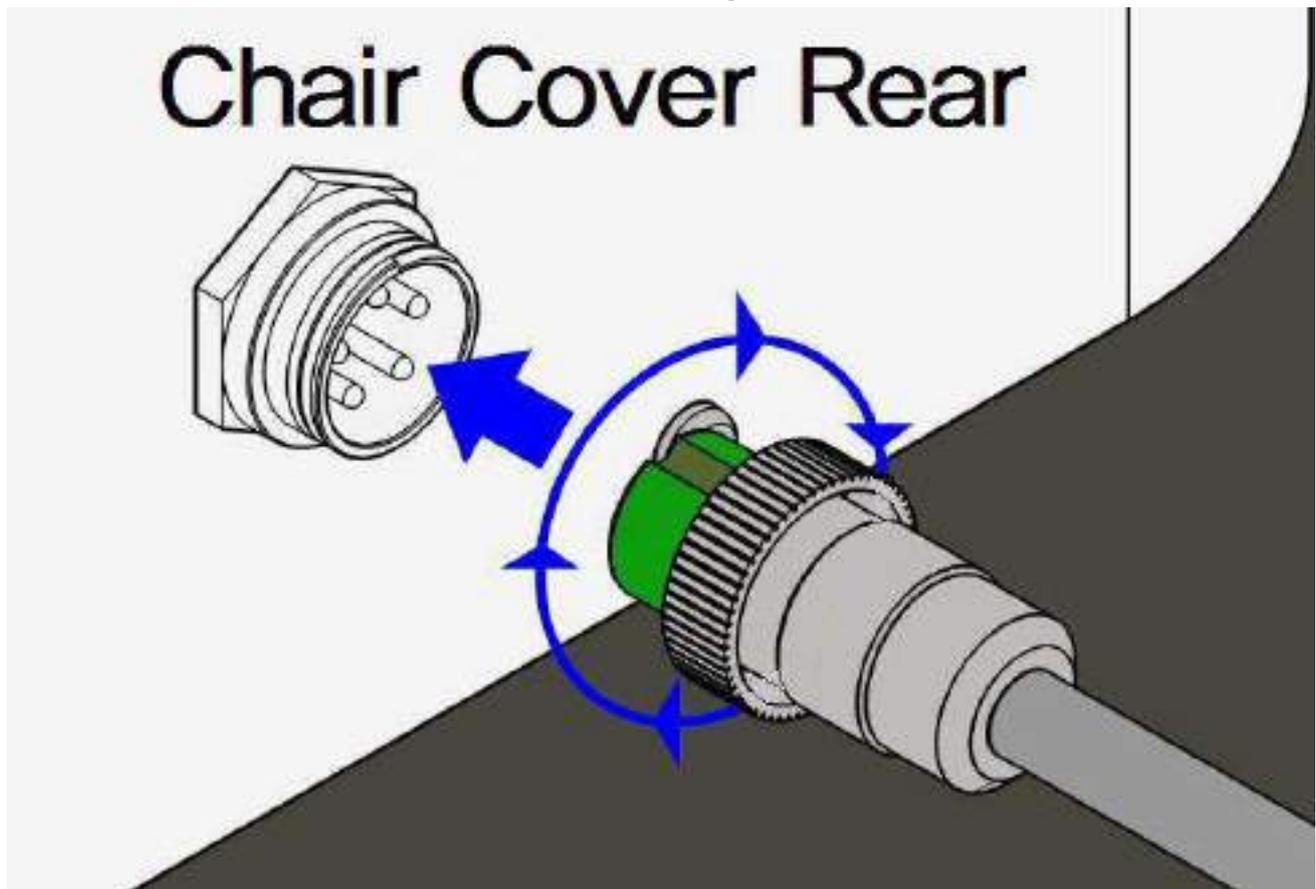
1. Take up a chair seat to the seat plate



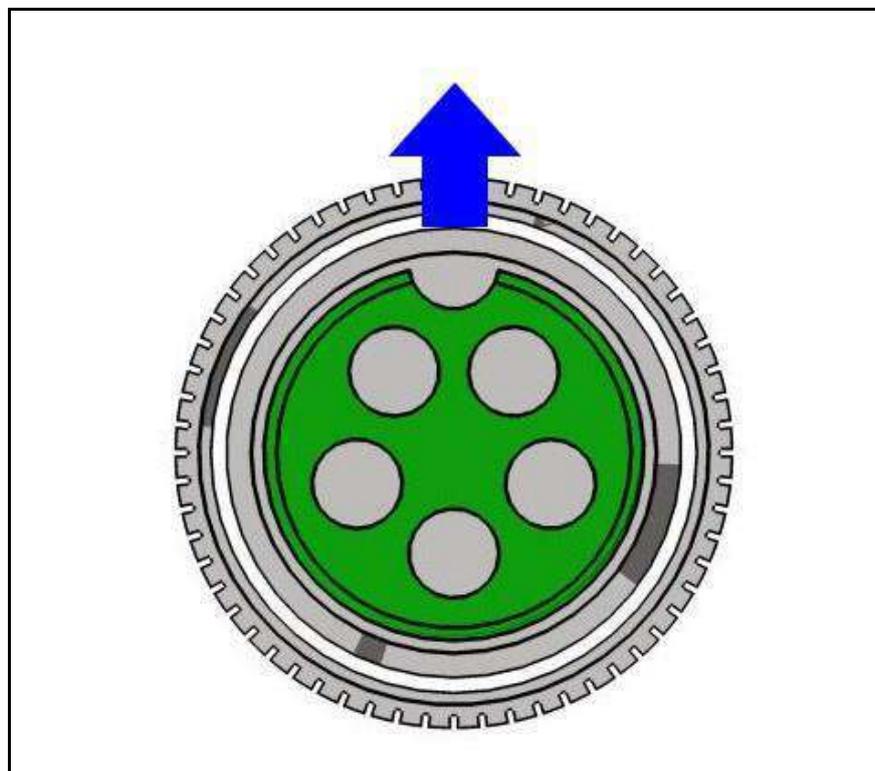
2. Tighten the chair seat to the seat plate; Use wrench driver



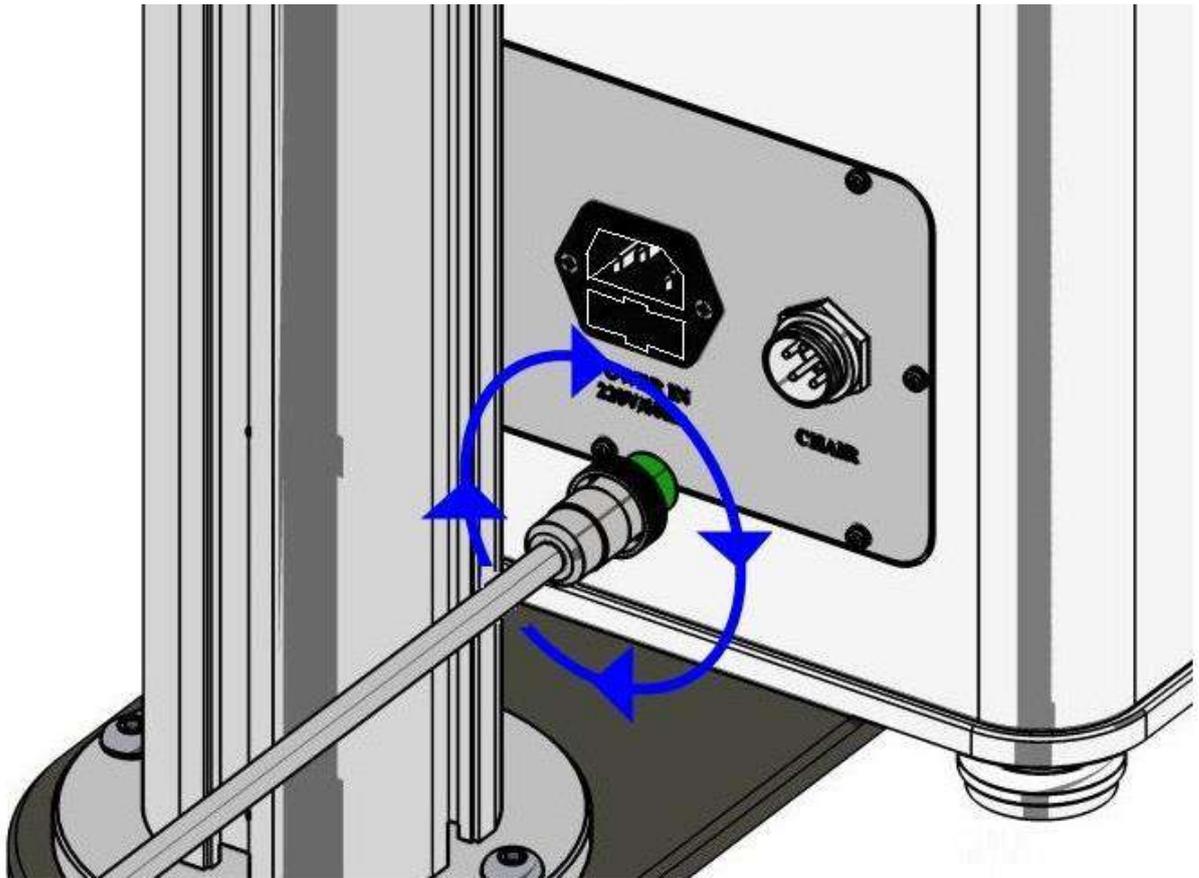
3. Connect chair cable with main body connector



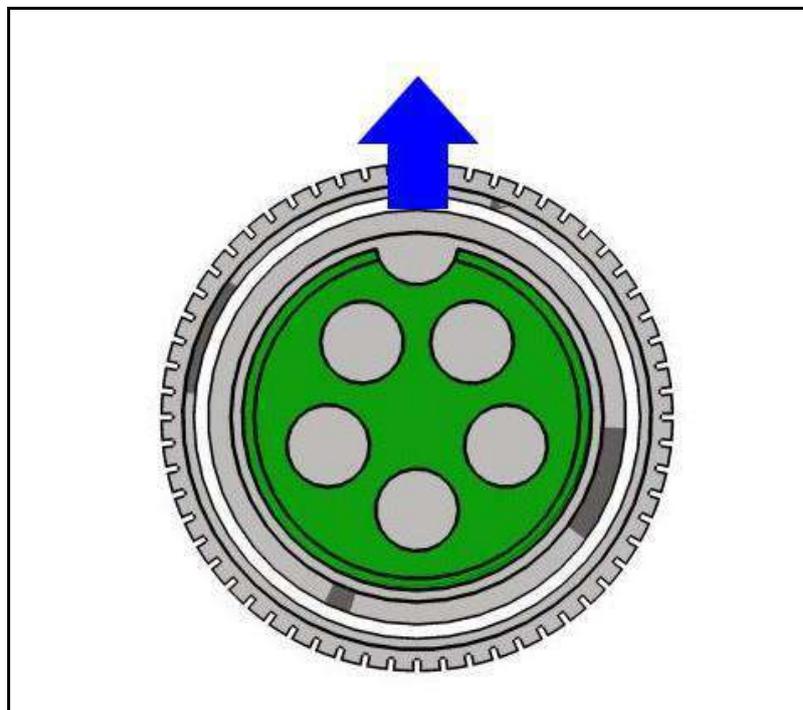
- ✓ Insert and to the home is facing a 12 o'clock



4. Connect chair cable with main body connector

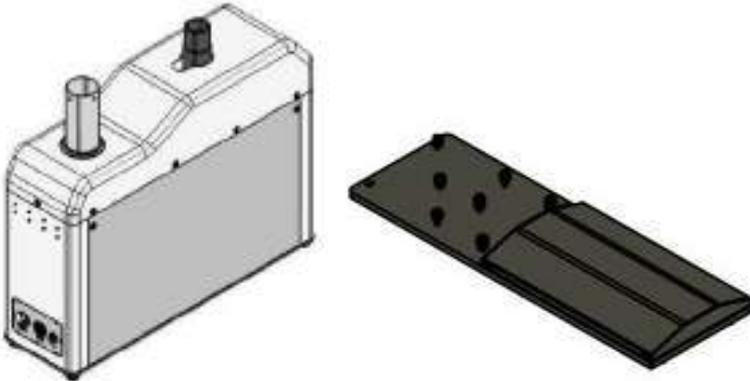


- ✓ Insert and to the home is facing a 12 o'clock



■ BOX COMPONENTS

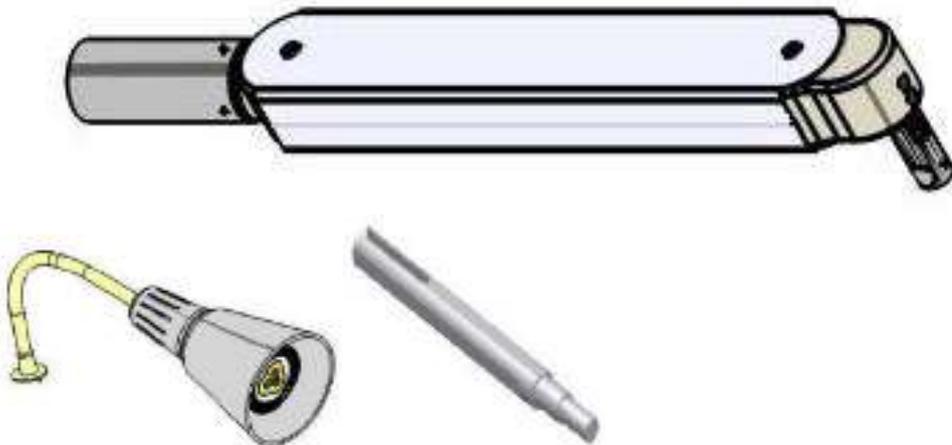
Number ① box: Main body, Foot rest



Number ② box: Treatment table



Number ③ box: Front arm, link bar, stand lamp



M10x10L set Screw(2EA), M6x6L set screw(2EA),
M8x20L Wrench bolt(6EA), Bolt Cap(6EA)



Fuse 5A (2EA), Main Cable (1EA), Chair cable(1EA)



Level foot (4EA)



Anti-slip table, Bolt cap(12EA)

※ Attach the Anti-slip tape between the base plate and floor.

**Number ④ Box [optional] : chart project arm,
Chart arm bracket, Chart arm base, all parts**



Number ⑤ box: Chair sheet, Motor cover



■ DETAIL DESCRIPTION

1. **Product Name <Model>**: Refraction Unit <RT-13>
2. **Manufacturers name and address**
 - Company name: RODEK Co.,Ltd.
 - Address: 61, Jikji-daero 456 beon-gil, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28580, Republic of KOREA
 - TEL: +82-43-274-2520 • FAX: +82-43-275-2520
 - Website: <http://www.Rodek.co.kr>
3. **Item Permit No.:** 10-345
 - Intended use: The medical device and chair that is used in eye check-up and treatment. It is consisted with treatment system.
4. **Production No., date of production, weight, package unit:**

Stated in the factory during the manufacturing.
5. **Capacity and operation method:** refer to the Operation Manual
6. **Precautions for use:** refer to the Operation Manual
7. **Other necessary details**
 - 1) Rated power: 220-240V~ 50/60Hz
 - 2) Power consumption: 220-240V~ 50/60Hz 200VA
 - 3) Protection for the type and degree of electricity:
 - Class 1 equipment B-type compartment
8. **Attachment position:** Backside of the product
9. **This product is a medical device.**
10. **Revision Date of Operating Manual:** 2020/04 (VER 1.8)

ROUGH MAP OF COMPANY

