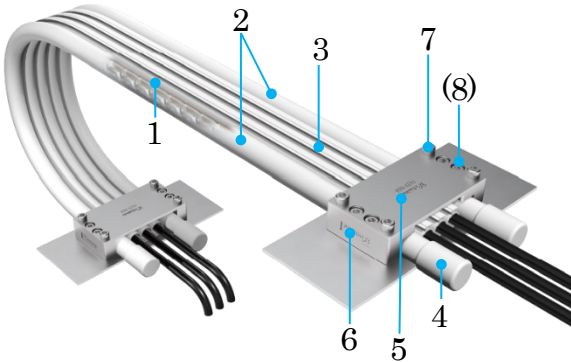


# Tsubaki Instruction Manual

## FLATVEYOR ZP Type

Caution: Always wear the appropriate protective gear (safety glasses, gloves, safety shoes, etc.) when working.

### 1 Construction • Part name

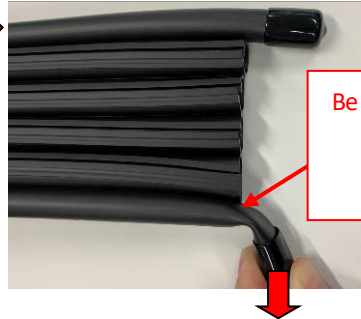


Main unit		Bracket	
No.	Part name	No.	Part name
1	Support member	5	Plate
2	Support member tube	6	L-block
3	Openable tube	7	Plate fixing bolts
4	Cap	(8)	(Bolts(M5) for fixing bracket to equipment are not included. Please procure them separately.)

\*The brackets do not come assembled.

### 2 Precautions

Since welded ends tend to peel off in the tearing direction, do not allow forces in the tearing direction to work on the welded ends.  
Please handle cables and tubes with care when wiring or installing them in equipment.



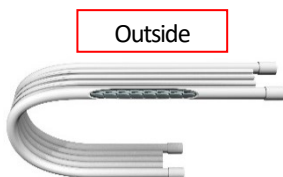
Be careful not to allow forces in tearing direction.

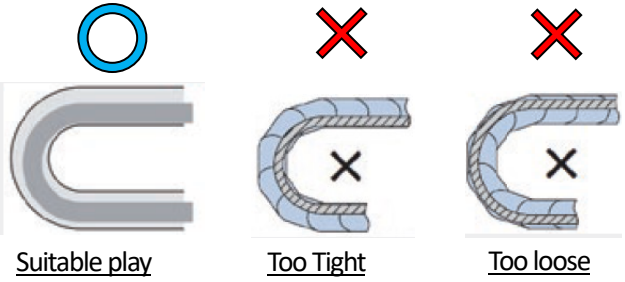
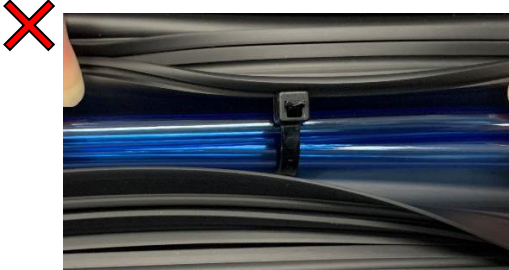

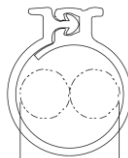


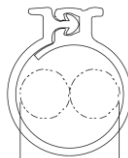


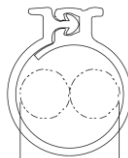

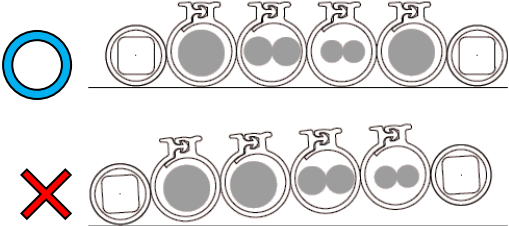
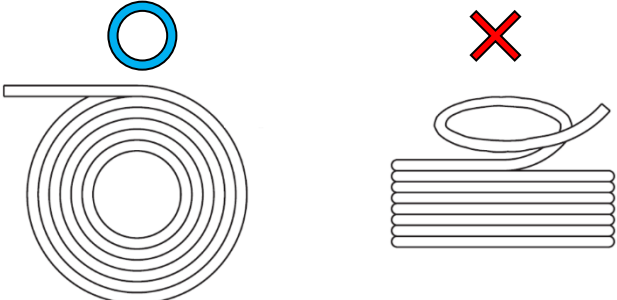
Make sure to fix to the equipment in a bent position with the locking part facing outward.  
Fixing one end (fixed or moving end) to the equipment while the FLATVEYOR is extended could cause the support member to be fixed in a direction other than the bending direction.  
Bending in this state could damage the support member.



Do not fix one end of the FLATVEYOR while it is straightened.

When the support member is fixed in a direction that is not the bending direction, it will break if bent in that condition.


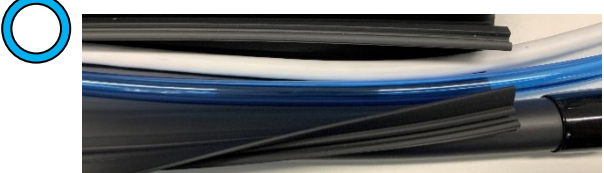
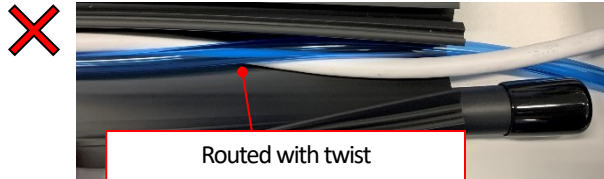
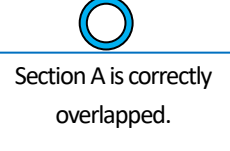
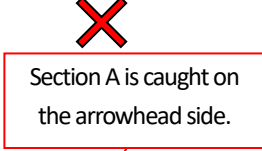
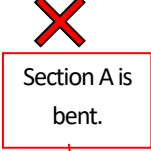
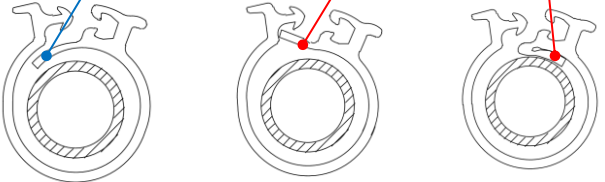




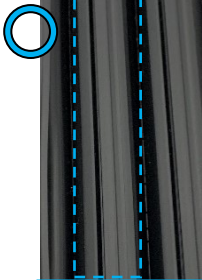
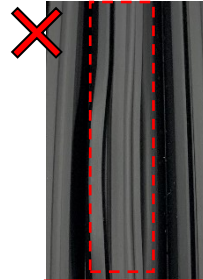
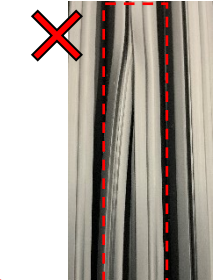


<p>When fixing cables and tubes, make sure to provide a suitable amount of play. Otherwise, the openable tube could tear, or the locking part could open.</p>	 <p>Suitable play      Too Tight      Too loose</p>												
<p>Do not fix cables or tubes inside the openable tubes using cable ties or similar implements. Doing so could cause the openable tube to tear.</p>													
<p>Refer to the table on the right for the cable/tube to be installed in the openable tube. When multiple cables/tubes are to be installed, the difference in outer diameter should be 5 mm or less.</p>	<table border="1" data-bbox="871 824 1525 1167"> <thead> <tr> <th colspan="3">Number of cables/tubes stored</th> </tr> <tr> <th>1 pc</th> <th>2 pcs</th> <th>3 pcs</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>φ11 or less</td> <td>side-by-side 13mm or less</td> <td>φ4 or less and 3 pcs or less</td> </tr> </tbody> </table>	Number of cables/tubes stored			1 pc	2 pcs	3 pcs				φ11 or less	side-by-side 13mm or less	φ4 or less and 3 pcs or less
Number of cables/tubes stored													
1 pc	2 pcs	3 pcs											
													
φ11 or less	side-by-side 13mm or less	φ4 or less and 3 pcs or less											
<p>For installation of cables and tubes, ensure that the cable weight is symmetrically distributed across the width of the FLATVEYOR. It may cause the bending section of the FLATVEYOR to tilt and the unsupported length to twist.</p>													
<p>Cables and tubes should be routed without twisting. Do not pull out from the drum or coil in a spiral pattern because this will cause the cable or tube to be routed with a twist. The cable/tube winding tendency may cause the bending section of the FLATVEYOR to tilt and the unsupported length to twist.</p>													

- Use cables/tubes that are flexible, repeatedly bendable, durable, and slippery.
- Please remove any inclusions on the floor or operating area where the Flatveyor is installed, as they may cause damage.
- Do not install any object on the inner side of the Flatveyor that may contact it.
- Periodically check that the locking part of the openable tube is not open, that there are no inclusions that could damage on the floor or operating area where the Flatveyor is installed, and that the cable/tube is not pulled into the openable tube. If any abnormality is found during the inspection, maintenance should be performed.


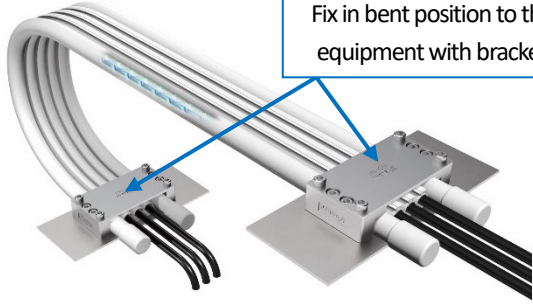

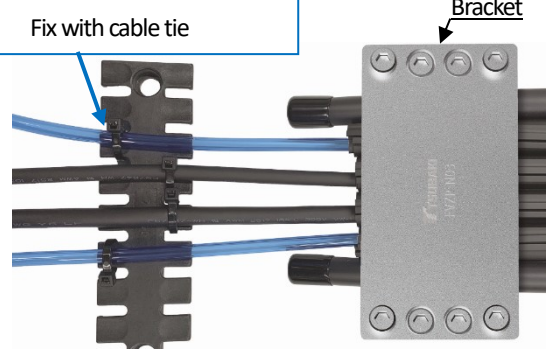
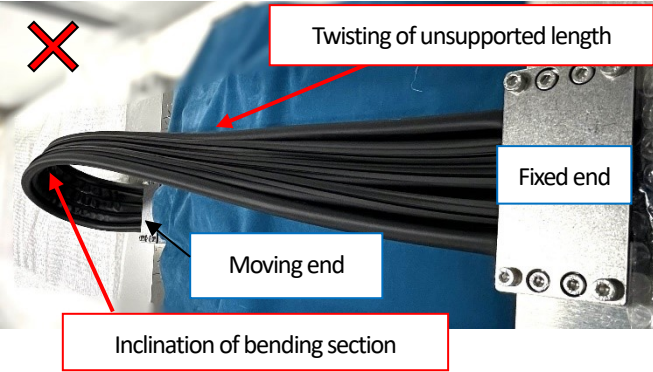
**3**

**Cable/tube installation**

<p>① Open the locking part from the end of the openable tube.</p>	
<p>② Install the cables or tubes inside the openable tube. When installing multiple cables or tubes in a single openable tube, install by keeping the cables or tubes aligned. Installing cables while they are twisted could cause premature breakage due to entanglement of cables in the openable tube.</p>	  <p>Routed with twist</p>
<p>③ Make sure that section A of the locking part is correctly overlapped. If not correctly overlapped, the locking part could open.</p>	 <p>Section A is correctly overlapped.</p>  <p>Section A is caught on the arrowhead side.</p>  <p>Section A is bent.</p> 
<p>④ Close the openable tube temporarily by hand and close the locking part with closing tool. (Also closable by hand.) After closing the locking part, ensure that the cable or tube does not exert any outward force on the locking part end. Otherwise, the locking part could open.</p>  <p>※The closing tool is not supplied with the product. Please order it separately.</p>	  
<p>⑤ Make sure that the locking part is closed properly. If the gap between the locking part is not uniform or if a locking part opens, section A may not be overlapped correctly. Correctly overlap section A and close the locking part again.</p>	 <p>Uniform gap</p>  <p>Gap is not uniform</p>  <p>Open</p>

## 4 Installation procedure

When installing, mount the bracket in the position indicated in our drawing or catalogs.

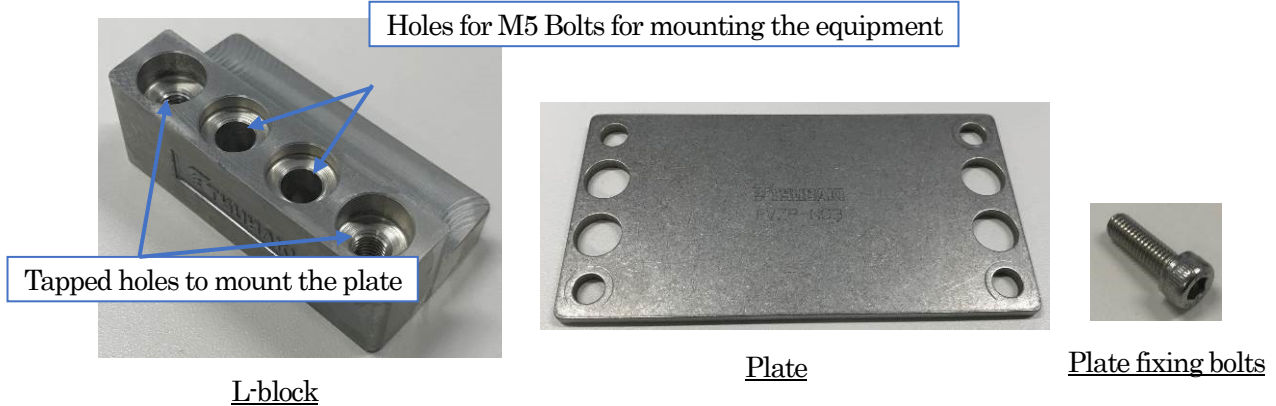
<p>① After inserting the cable/tube and before mounting it on the equipment, the locking part of the openable tube should be facing outward, and the FLATVEYOR should be bent as shown right.</p>	<p>Locking part to face outside</p> 
<p>② Fix the fixed end and moving end in bent position to the equipment with bracket.</p>	<p>Fix in bent position to the equipment with bracket</p> 
<p>③ Ensure that the locking part of the openable tube is properly closed. Close properly if it is open.</p>	 <p>Locking part is open.</p>
<p>④ Fix each cable/tube at both the fixed end and the moving end using a cable tie or similar implements, so that unnecessary tension is not applied on it. Fixing them under tension and operating could cause the openable tube to tear.</p>	<p>Fix with cable tie</p> <p>Bracket</p> 
<p>⑤ After fixing the fixed end and moving end, check that the bending section of the FLATVEYOR is not tilted and that the unsupported length is not twisted. Then, move the FLATVEYOR slowly to ensure that each cable/tube is not pulled into the openable tube. Also, check that there are no other operation abnormalities.</p>	 <p>Twisting of unsupported length</p> <p>Fixed end</p> <p>Moving end</p> <p>Inclination of bending section</p>

## 5 Bracket components

Refer to this page when using the brackets.

The brackets do not come assembled. The bolts for attaching the bracket to the equipment are not included. Please procure them separately. We recommend M5 bolts, depending on your equipment.

You will need a total of 8 bolts for both the fixed and moving ends.

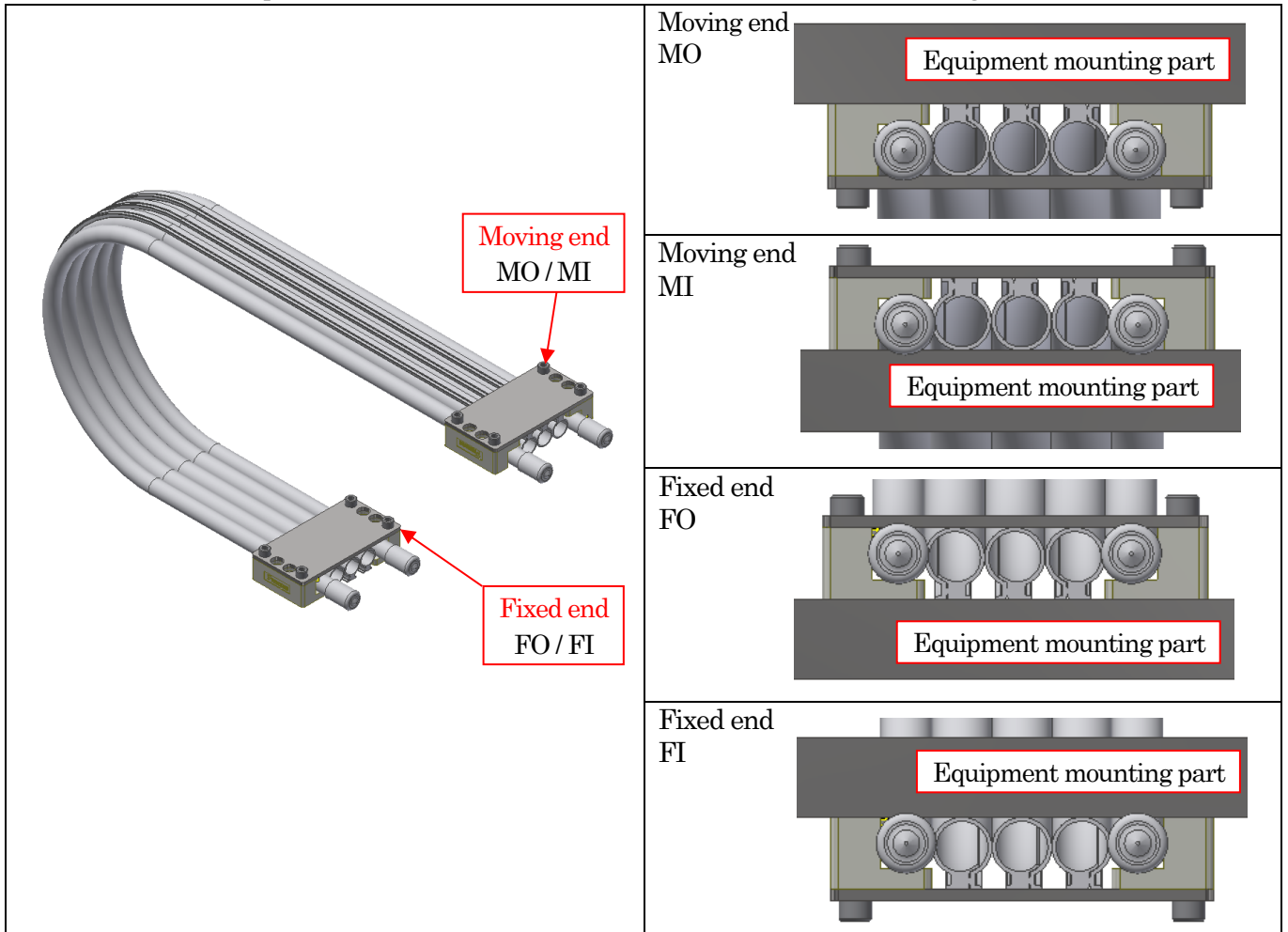


## 6 Precautions to mount bracket

<p>Make sure to fix to the equipment in a bent position with the locking part facing outward.</p> <p>Fixing one end (fixed or moving end) to the equipment while the FLATVEYOR is extended could cause the support member to be fixed in a direction other than the bending direction.</p> <p>Bending in this state could damage the support member.</p>	<p>In a bent position with the locking part facing outward</p>
<p>Make sure that the direction of the L-block differs depending on the direction of the locking part of the openable tube.</p>	<p>The locking part of the openable tube</p> <p>A side</p> <p>B side</p>
<p>Make sure there are no gaps between the L-block side wall and the support member tube.</p> <p>If there is a gap, the FLATVEYOR may not be fixed correctly and may fall off.</p>	<p>Gaps</p>
<p>Be careful not to let the support member tube get caught in the bracket.</p> <p>The FLATVEYOR may not be fixed and fall off, and the support member tube may break.</p>	<p>Support member tube jamming</p>

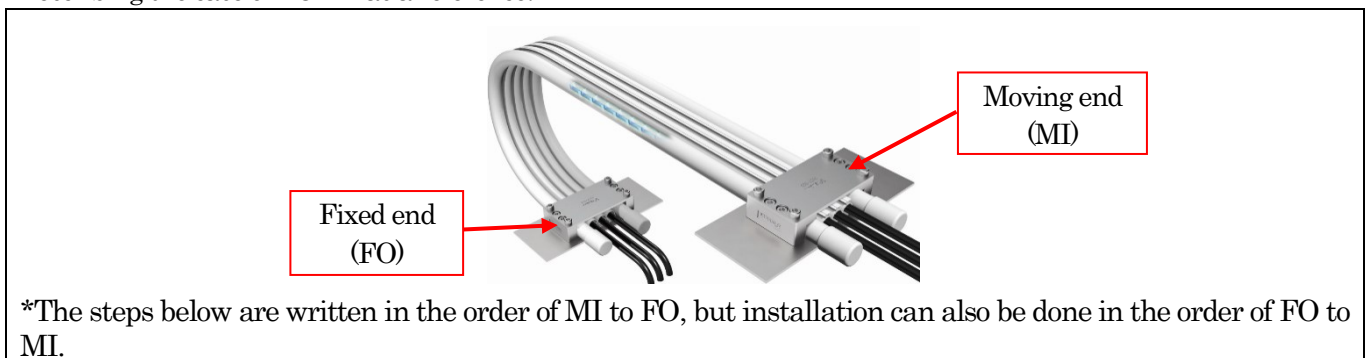
## 7 Reference of bracket installation direction

The same bracket components can be used for the fixed ends FO and FI and the moving ends MO and MI.

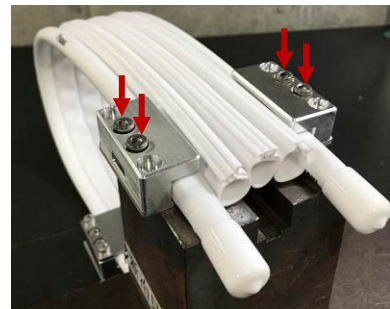


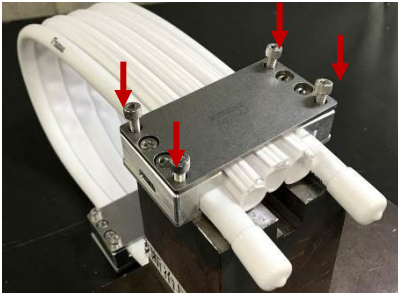


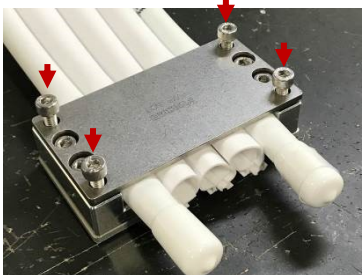
## 8 Bracket Installation Instructions

Describing the case of FO-MI as a reference.



- ① MI installation procedure.1  
Place the FLATVEYOR in the equipment in a bent position and fix it to the equipment using the two tapped holes in the L-block.  
\*Reference torque : 5N·m  
Note: The tightening torque varies depending on the equipment specifications and bolt type. Please use this value as a reference.  
The bolts for attaching the bracket to the equipment are not included.



<p>② MI Installation procedure.2 Use the included plate fixing bolts to mount the plate. *Specified torque : 5N·m</p> <p>Note that if the tightening torque is too strong, it may damage the L-block tap or bolt.</p>	
<p>③ FO Installation procedure.1 Fix the FO to the equipment using the two tapped holes of L-block. *Reference torque : 5N·m</p> <p>Note: The tightening torque varies depending on the equipment specifications and bolt type. Please use this value as a reference. The bolts for attaching the bracket to the equipment are not included.</p>	
<p>④ FO Installation procedure.2 Install the FLATVEYOR.</p>	
<p>⑤ FO Installation procedure.3 Use the included plate fixing bolts to mount the plate. *Specified torque : 5N·m</p> <p>Note that if the tightening torque is too strong, it may damage the L-block tap or bolt.</p>	

## 9 Maintenance check

- Be sure to check that all bolts are not loose before operation.
- Be sure to retighten the bolts periodically.
- Repeated attachment/detachment of the L-blocks, plates, and plate fixing bolts may cause wear out or the seating surface to collapse. Therefore, replace them after approximately 10 attachment/detachment with the specified torque.  
Replace the product if the screw threads become worn or the seating becomes to collapse even after less than 10 times of attachment/detachment.
- If a thread locker is used to mount the L-block and plate fixing bolts, there is a possibility that the threads may be damaged when removing them. In this case, we recommend replacing the L-block and plate fixing bolts.