Dealer's Manual

MTB Rear Derailleur

MTB SHADOW RD+

RD-M986
RD-M820
RD-M786
RD-M675
RD-M640

New
RD-M615

MTB SHADOW RD

RD-M981
RD-M781
RD-M670

New
RD-M610
RD-M4000

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IMPORTANT NOTICE

- **This dealer's manual is intended primarily for use by professional bicycle mechanics.**
  Users who are not professionally trained for bicycle assembly should not attempt to install the components themselves using the dealer's manuals.
  If any part of the information on the manual is unclear to you, do not proceed with the installation. Instead, contact your place of purchase or a local bicycle dealer for their assistance.
- Make sure to read all instruction manuals included with the product.
- Do not disassemble or modify the product other than as stated in the information contained in this dealer's manual.
- All dealer's manuals and instruction manuals can be viewed on-line on our website (**http://si.shimano.com**).
- Please observe the appropriate rules and regulations of the country, state or region in which you conduct your business as a dealer.

For safety, be sure to read this dealer's manual thoroughly before use, and follow it for correct use.

The following instructions must be observed at all times in order to prevent personal injury and physical damage to equipment and surroundings.
The instructions are classified according to the degree of danger or damage which may occur if the product is used incorrectly.

⚠ DANGER

Failure to follow the instructions will result in death or serious injury.

⚠ WARNING

Failure to follow the instructions could result in death or serious injury.

⚠ CAUTION

Failure to follow the instructions could cause personal injury or physical damage to equipment and surroundings.

TO ENSURE SAFETY

⚠ WARNING

- **When installing components, be sure to follow the instructions that are given in the instruction manuals.**
  It is recommended that you use only genuine Shimano parts. If parts such as bolts and nuts become loose or damaged, the bicycle may suddenly fall over, which may cause serious injury.
  In addition, if adjustments are not carried out correctly, problems may occur, and the bicycle may suddenly fall over, which may cause serious injury.
-  Be sure to wear safety glasses or goggles to protect your eyes while performing maintenance tasks such as replacing parts.
- After reading the dealer's manual thoroughly, keep it in a safe place for later reference.

Be sure to also inform users of the following:

- ***Maintenance interval depends on the usage and riding circumstances. Clean regularly the chain with an appropriate chain cleaner. Never use alkali based or acid based solvents such as rust cleaners. If those solvent be used chain might break and cause serious injury.***
- Check the chain for any damage (deformation or crack), skipping, or other abnormalities such as unintended gear shifting. If any problems are found, consult a dealer or an agency. The chain may break, and you may fall.

⚠ CAUTION

For Installation to the Bicycle, and Maintenance:

- When installing and removing the plate and the plate unit, be careful to avoid injury such as getting your fingers caught by the strong reaction force of the plate tension spring.

NOTE

Be sure to also inform users of the following:

- When installing the SHADOW RD+, be sure to install the plate unit cover before riding the bicycle.
- If gear shifting operations cannot be carried out smoothly, clean the derailleur and lubricate all moving parts.
- If the amount of looseness in the links is so great that adjustment is not possible, you should replace the derailleur.
- Products are not guaranteed against natural wear and deterioration from normal use and aging.
- For maximum performance we highly recommend Shimano lubricants and maintenance products.

For Installation to the Bicycle, and Maintenance:

- Depending on the shape of the frame, the rear derailleur may interfere with the chain stay.
- Because the high cable resistance of a frame with internal cable routing would impair the SIS function, this type of frame should not be used.
- Grease the inner cable and the inside of the outer casing before use to ensure that they slide properly.
- Do not let dust adhere on the inner cable. If the grease on the inner cable is wiped off, the application of SIS SP41 grease (Y04180000) is recommended. Do not use DURA-ACE grease or other types of grease, otherwise they may cause deterioration in gear shifting performance.
- For smooth operation, use the specified outer casing and the bottom bracket cable guide.
- Use an outer casing which still has some length to spare even when the handlebars are turned all the way to both sides. Furthermore, check that the shifting lever does not touch the bicycle frame when the handlebars are turned all the way.
- If gear shifting adjustment cannot be carried out, check the degree of parallelism at the rear end of the bicycle. Also check if the cable is lubricated and if the outer casing is too long or too short.
- You should periodically clean the derailleur and lubricate all moving parts (mechanism and pulleys).
- Depending on the model, the guide pulley has arrows on it to indicate the direction of rotation. Install the guide pulley so that the arrows are pointing counterclockwise when looking at the outer side of the derailleur.
- The tension pulley has an arrow on it to indicate the direction of rotation. Install the tension pulley so that the arrow is pointing clockwise when looking at the outer side of the derailleur.
- If you hear abnormal noise as a result of looseness in a pulley, you should replace the pulley.

The actual product may differ from the illustration because this manual is intended chiefly to explain the procedures for using the product.

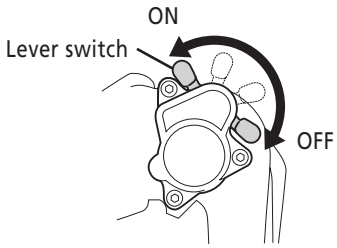
INSTALLATION

List of tools to be used

The following tools are needed to assemble this product.

Where to use	Tool
Bracket axle	5 mm Allen key
Mode converter	2 mm Allen key (RD-M820)
B-tension adjustment screw	Screwdriver #2
	3 mm Allen key (RD-M820)
Bump stopper	3 mm Allen key
	1.5 mm Allen key
Plate stopper pin	Screwdriver #2
Plate unit cover bolt	2 mm Allen key
Plate axle	4 mm Allen key
Guide pulley/Tension pulley	3 mm Allen key
Top/Low adjustment screw	Screwdriver #2

Move the lever switch to the OFF position before installing the SHADOW RD+.

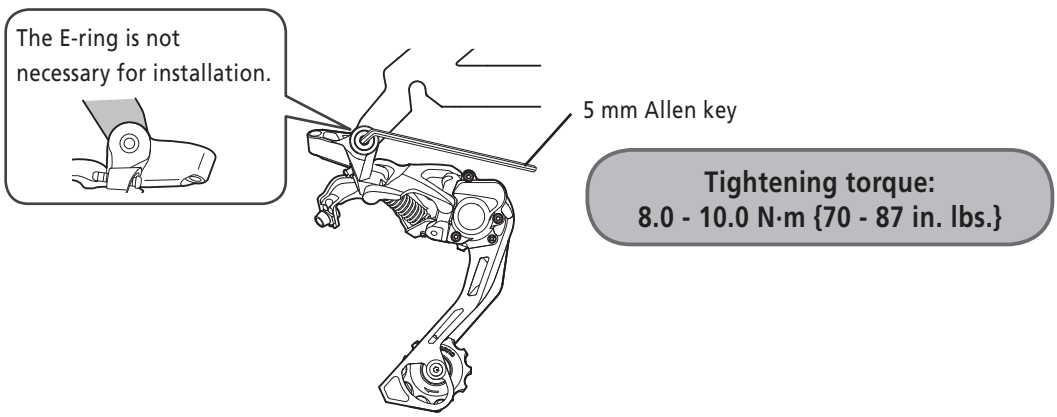


Refer to "REAR DERAILLEUR FOR MTB/TREKKING" in the General Operations for installation to the frame.

■ Direct mount

Note:

Direct mount rear derailleurs can only be mounted on direct-mount compatible frames.

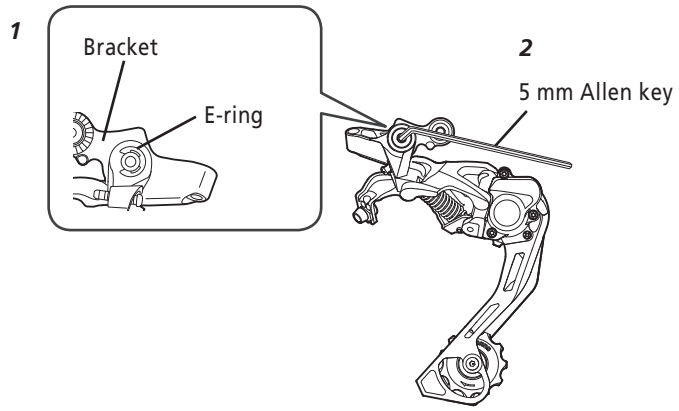


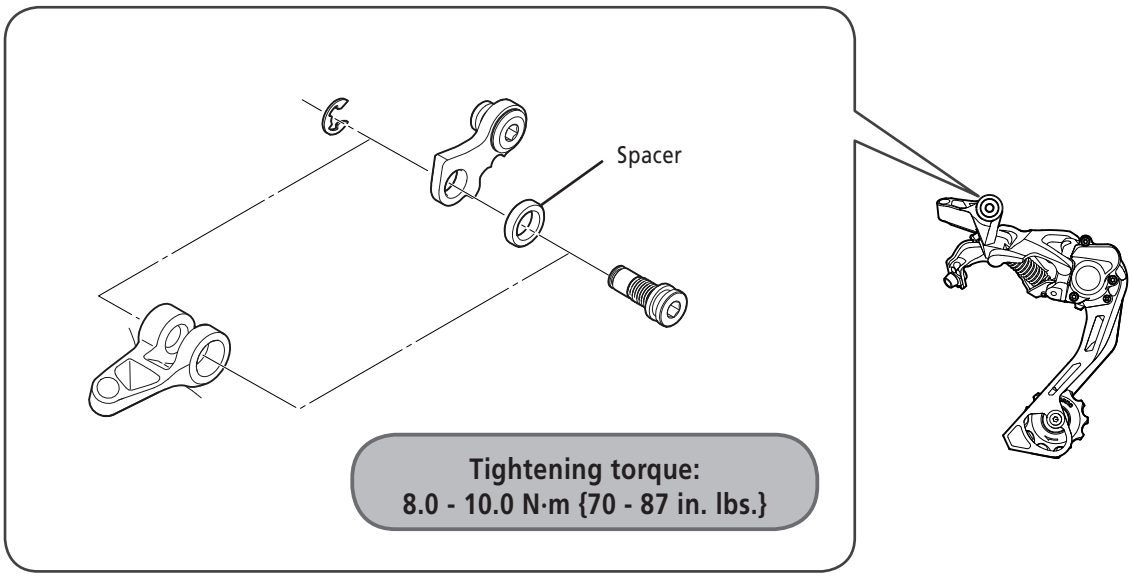
■ Replacing with direct mount type

1. If there is an E-ring attached, use a flat-head screwdriver to remove it.

2. Using a 5 mm Allen key, remove the bracket axle.

- If there is a spacer, remove it.
- The E-ring is not necessary for installation.





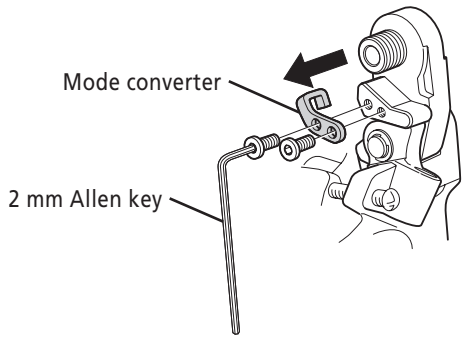
When replacing the direct mount type with the bracket-equipped type, reverse the procedure.

- For models with a spacer, insert the spacer into the correct position.

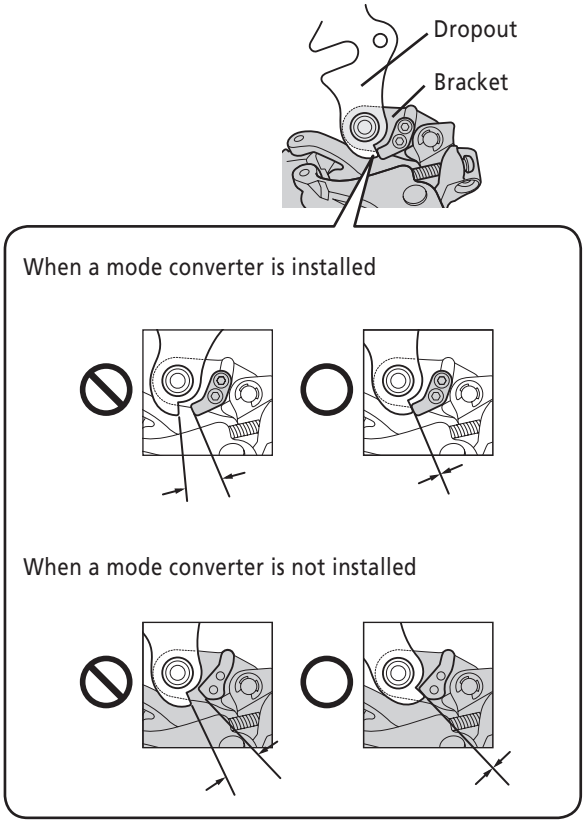
■ Mode converter (RD-M820)

This derailleur is compatible with two types of sprockets: Freeride mode (11-32T/11-34T/11-36T) and downhill mode (11-23T/12-25T/11-28T).
If using the freeride mode sprockets, you will also need to use the mode converter.

Removing the mode converter



Tightening torque:
1.0 - 1.5 N·m {9 - 13 in. lbs.}



ADJUSTMENT

This section describes the adjustment procedure for the SHADOW RD+.
Refer to "Rear derailleur" in the General Operations for items not explained in this section.

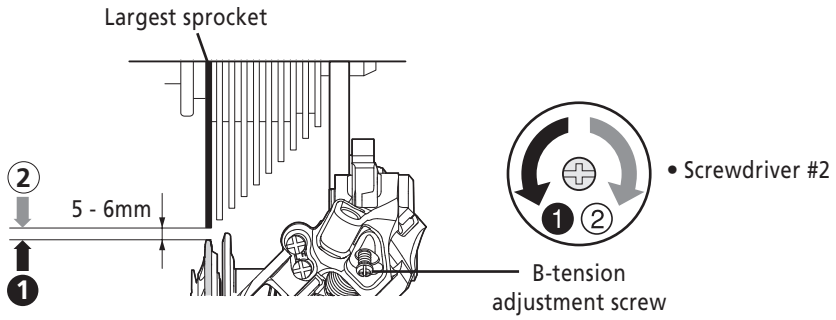
■ How to use the B-tension adjustment screw (SHADOW RD+)

Note:

Move the lever switch to the OFF position to reduce the tension of the plate tension spring before carrying out this adjustment.
If the lever switch remains at the ON position so that the screw is difficult to turn, the screw may become damaged if you try to force it to turn.

1. Set the rear derailleur to the low gear.

2. After stopping the wheel, check that the distance between the tip of the guide pulley and the tip of the gear is within the range shown in the illustration.



3. Turn the crank to shift gears to check that other gears do not have a rough feel.

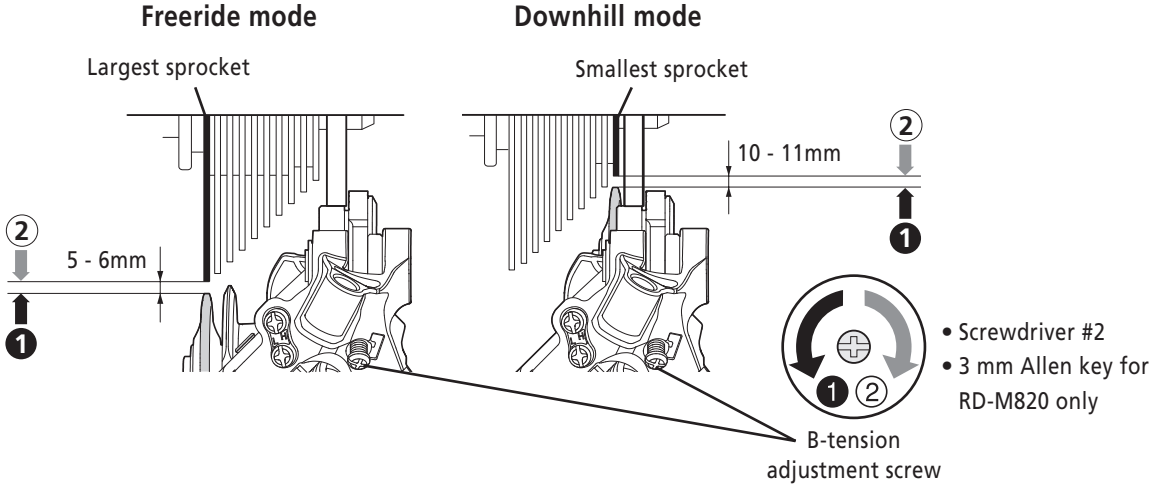
Checking the distance between the sprocket and the guide pulley (RD-M820/M640)

Note:

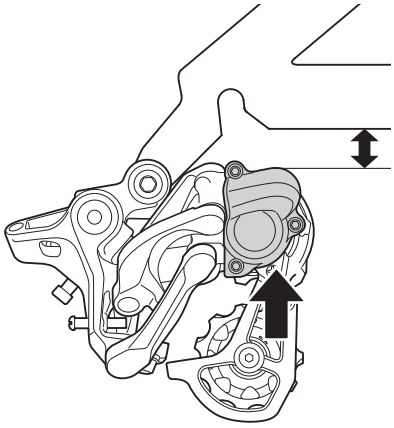
If the number of teeth for the cassette sprocket is changed, carry out this setting again.

1. Set the rear derailleur to the largest (at freeride mode) or the smallest (at downhill mode) gear position.

2. Stop the wheel from turning, and then check that the distance from the edge of the guide pulley to the edge of the sprocket is within the range as shown in the illustration.



3. If the frame interferes with the rear derailleur on models with a bump stopper when the plate unit is lifted up, turn the B-tension adjustment screw until there is no interference.



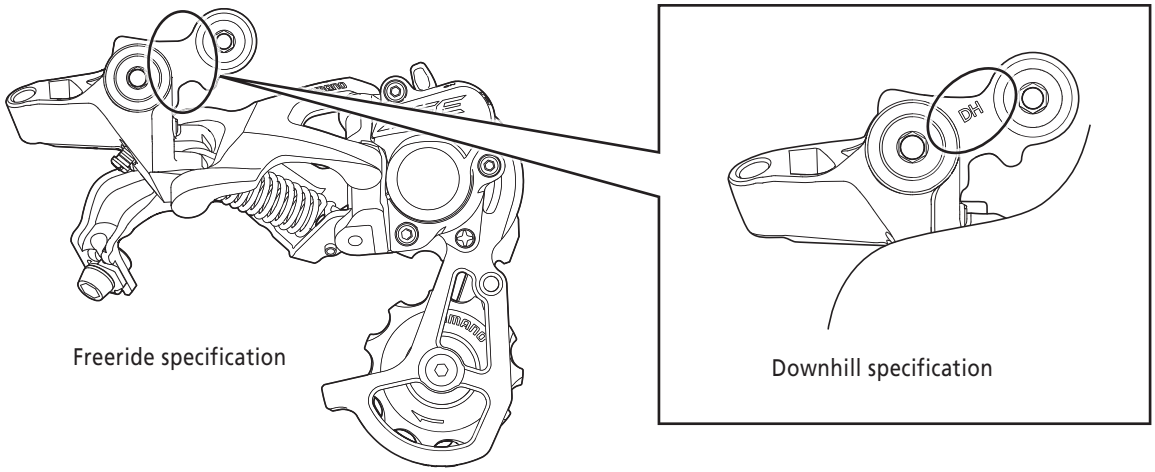
The frame and the rear derailleur should not interfere.

Load:
approx. 49 - 78.4 N

4. Turn the crank arm to shift gears and check that there is no roughness in the feel.

Note: RD-M640 About freeride specification/downhill specification

RD-M640 differs between freeride specification and downhill specification.
The specification cannot be changed by replacing the bracket only.
A mode converter is not equipped, either.



Freeride specification

Downhill specification

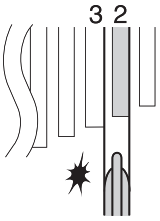
■ SIS Adjustment (SHADOW RD+)

1. **Set the lever switch to OFF.**

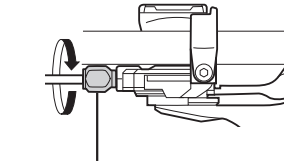
2. Operate the shifting lever once to move the chain to the 2nd sprocket.

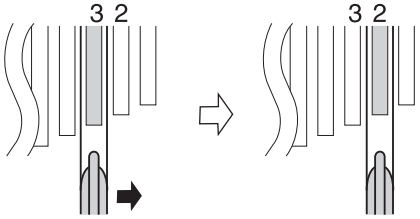
3. Then, while pressing the lever just enough to take up the play in the lever, turn the crank arm.

- The best setting is when the shifting lever is operated just enough to take up the play and the chain touches the 3rd sprocket and makes noise.

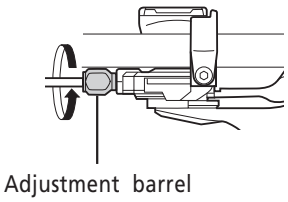


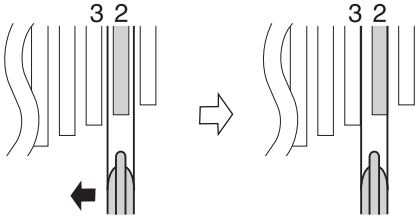
- **When shifting to 3rd**
  Tighten the outer casing adjustment barrel until the chain returns to the 2nd sprocket. (clockwise)





- **When no sound at all is heard**
  Loosen the outer casing adjustment barrel until the chain touches the 3rd sprocket and makes noise. (counterclockwise)





4. Return the lever to its original position (the position where the lever is at the 2nd sprocket setting and it has been released) and then turn the crank arm clockwise.
- If the chain is touching the 3rd sprocket and making noise, turn the outer casing adjustment barrel clockwise slightly to tighten it until the noise stops and the chain runs smoothly.

5. Operate lever to change gears, and check that no noise occurs in any of the gear positions.

6. **Set the lever switch to ON, and then ride the bicycle normally and check that there are no problems with gear shifting.**

7. For the best SIS performance, periodically lubricate all power-transmission parts.

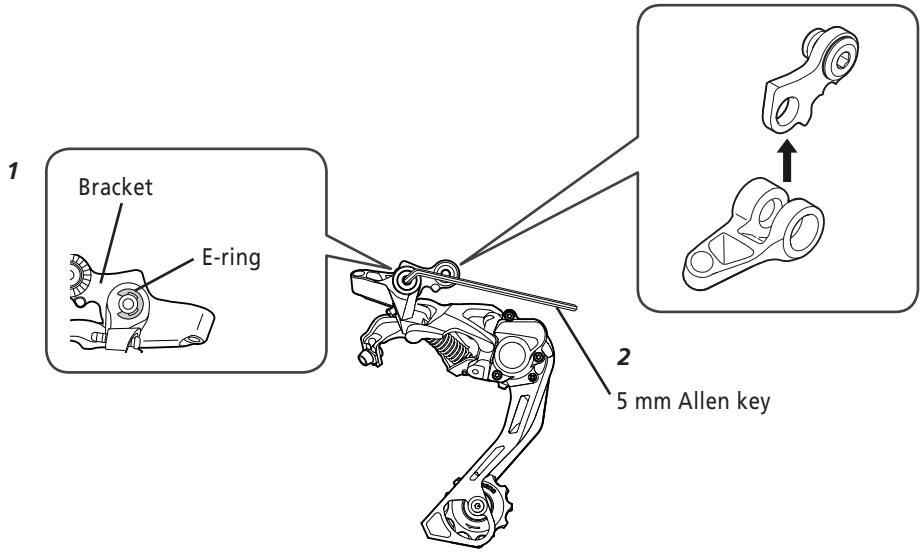
■ Replacing the bump stopper/holder (RD-M820)

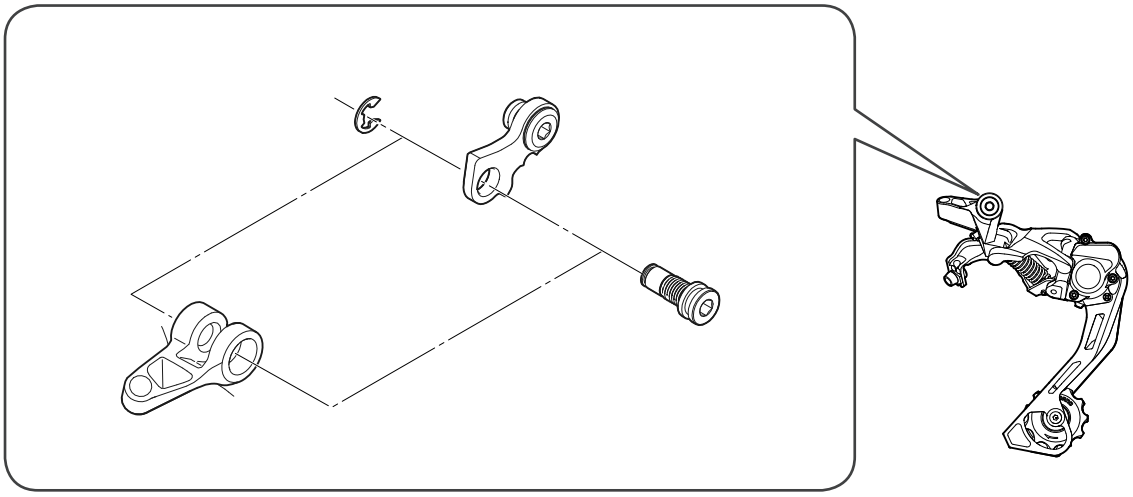
Note: Remove the rear derailleur from the frame before replacement.

1. Using a flat-head screwdriver, remove the E-ring.

2. Remove the bracket axle with a 5 mm Allen key and remove the bracket.

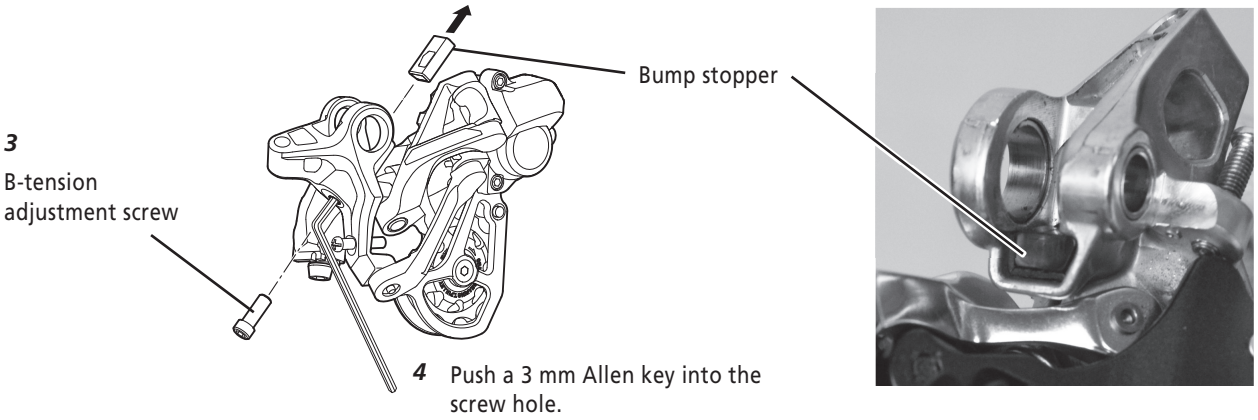
- If there is a spacer, remove it.

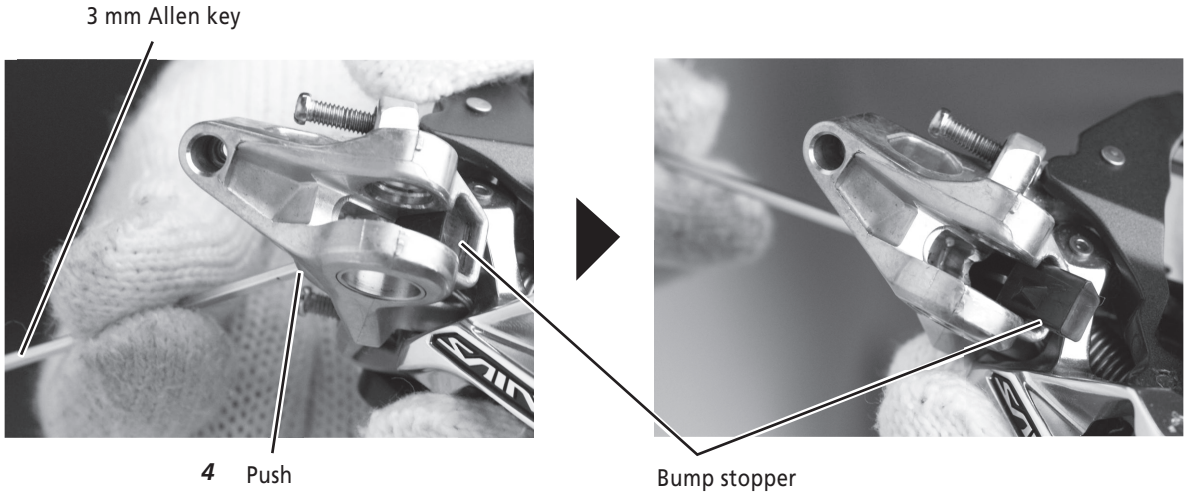




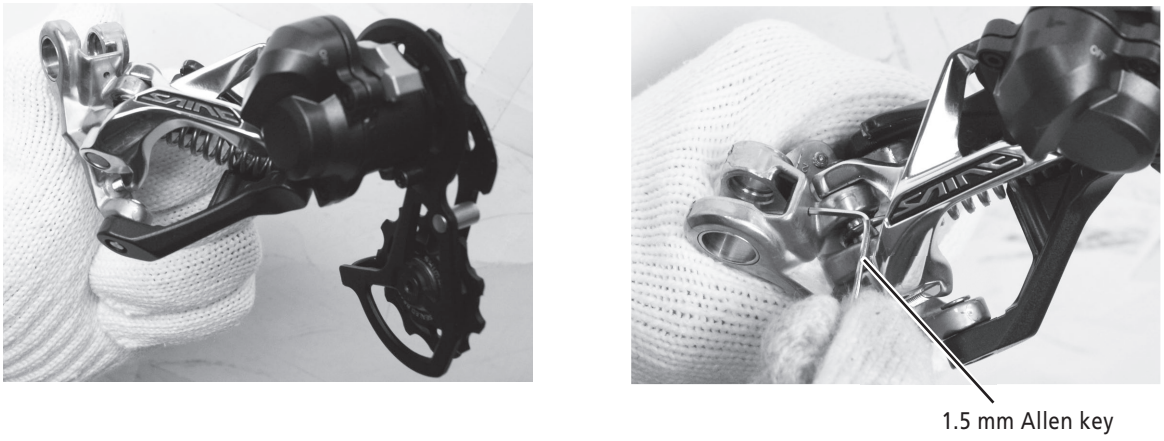
3. Using a 3 mm Allen key, remove the B-tension adjustment screw.

4. Using a 3 mm Allen key, push the bottom of the bump stopper to remove it.

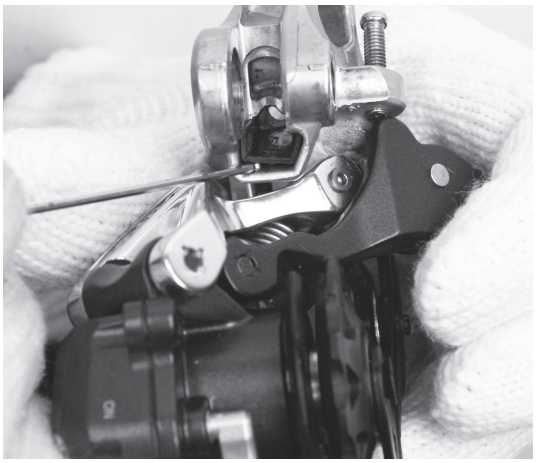


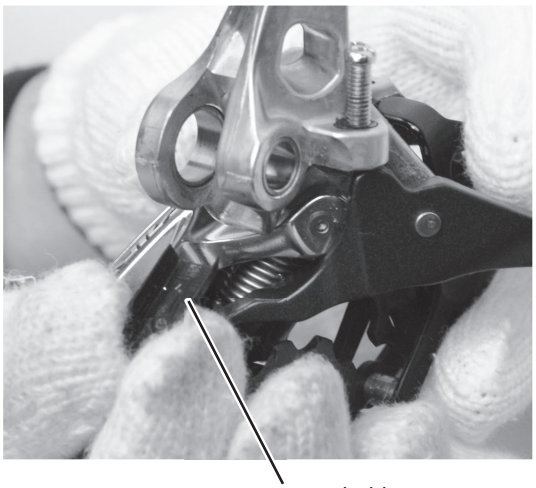


5. Push in the bump stopper with a 1.5 mm Allen key in the low state as shown in the illustration.



6. Remove the bump stopper holder with a narrow-tipped tool.



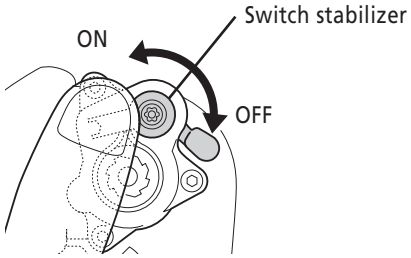


* Reassemble by carrying out the removal procedure in reverse.

■ Replacement of the plate and the plate tension spring (RD-M986)

⚠ CAUTION

- Always ensure that the lever switch is in the OFF position before starting work.
- If operating the lever switch while the plate unit cover is removed, press the switch stabilizer with your finger so that it does not fly out.

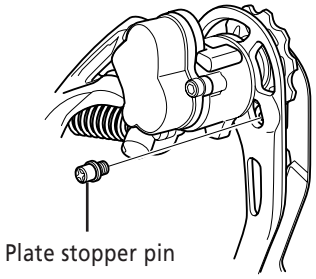


Removing the plate and the plate tension spring

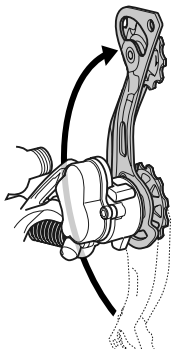
1. Remove the plate stopper pin.

Screwdriver #2

Tightening torque:
1.0 N·m {9 in. lbs.}



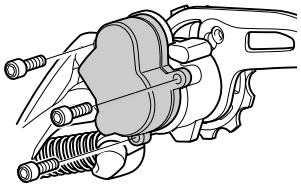
2. Turn the plate to loosen the plate tension spring as shown in the illustration.



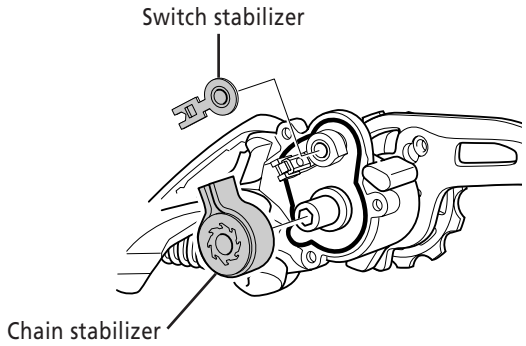
3. Remove the plate unit cover bolts.

2 mm Allen key

Tightening torque:
1.0 - 1.5 N·m {9 - 13 in. lbs.}

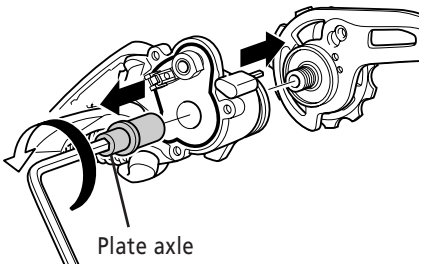


4. Remove the switch stabilizer and the chain stabilizer.



5. Use a 4 mm Allen key to remove the plate axle.

Tightening torque:
8.0 - 10.0 N·m {70 - 87 in. lbs.}



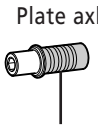
Reassembly

Carry out the removal procedure in reverse.

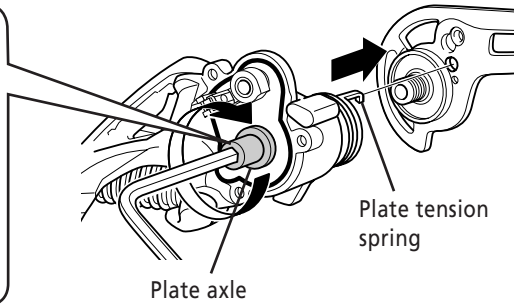
Note:

- Apply grease to the plate axle.
- When reassembling, insert the end of the plate tension spring into the groove in the plate.

DO NOT apply grease.
If the outer surface of the roller clutch with non groove part gets grease on it, it will slip and the friction function will not work.



- Grease number:
  DURA-ACE grease
  (Y04110000)

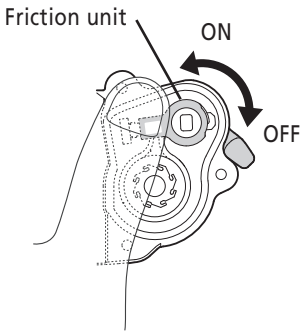


Be sure to install the switch stabilizer. If you try to operate the lever switch without the switch stabilizer installed, it will damaged the product.

■ Replacement of the plate and the plate tension spring (except RD-M986)

⚠ CAUTION

- Always ensure that the lever switch is in the OFF position before starting work.
- If operating the lever switch while the plate unit cover is removed, press the friction unit with your finger so that it does not fly out.

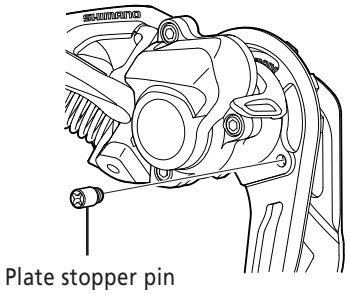


Removing the plate and the plate tension spring

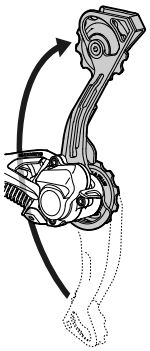
1. Remove the plate stopper pin.

Screwdriver #2

Tightening torque:
1.0 N·m {9 in. lbs.}



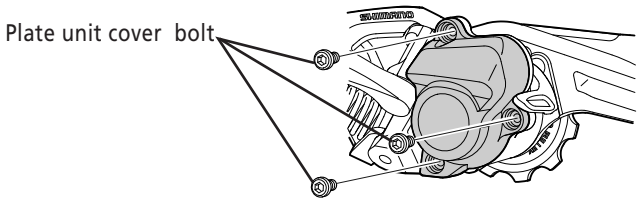
2. Turn the plate to loosen the plate tension spring as shown in the illustration.



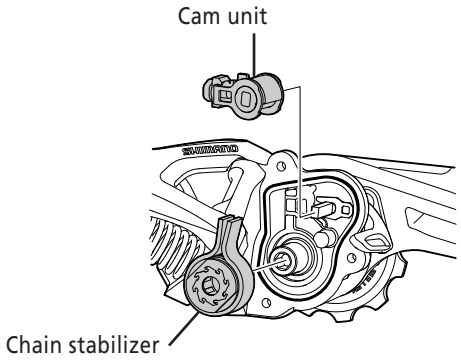
3. Remove the plate unit cover bolts.

2 mm Allen key

Tightening torque:
1.0 - 1.5 N·m {9 - 13 in. lbs.}

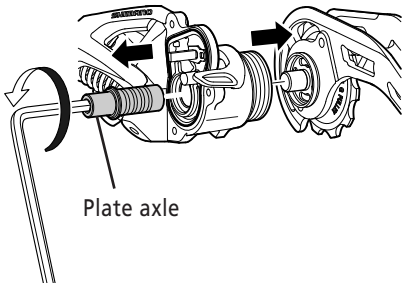


4. Remove the cam unit and the chain stabilizer.



5. Use a 4 mm Allen key to remove the plate axle.

Tightening torque:
8.0 - 10.0 N·m {70 - 87 in. lbs.}

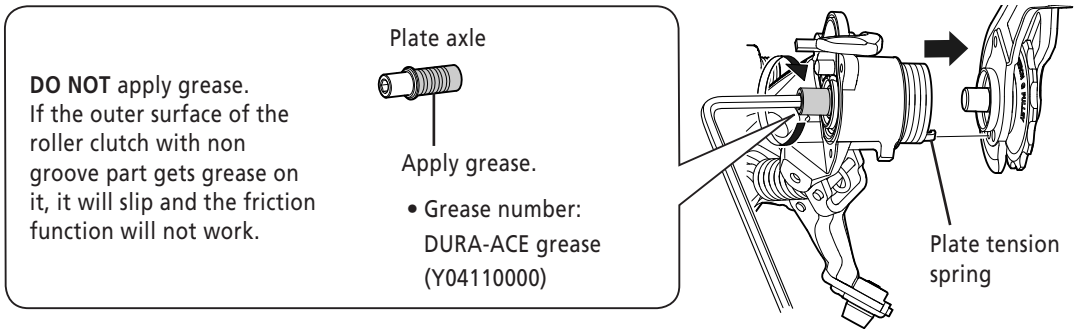


Reassembly

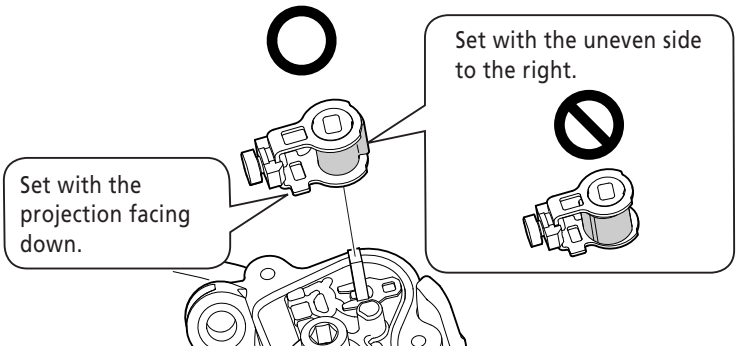
Carry out the removal procedure in reverse.

Note:

- Apply grease to the plate axle.
- When reassembling, insert the end of the plate tension spring into the groove in the plate.



- Set the cam unit as shown in the illustration.

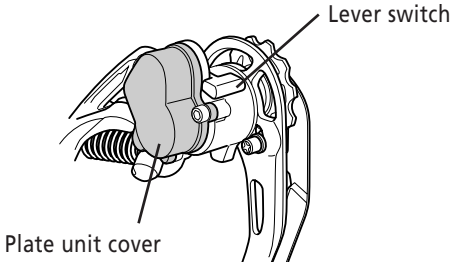


■ Friction adjustment (RD-M986)

The friction amount can be adjusted as desired.
Furthermore, you can also adjust after a change of the friction occurs during use.

1. Set the lever switch to OFF.

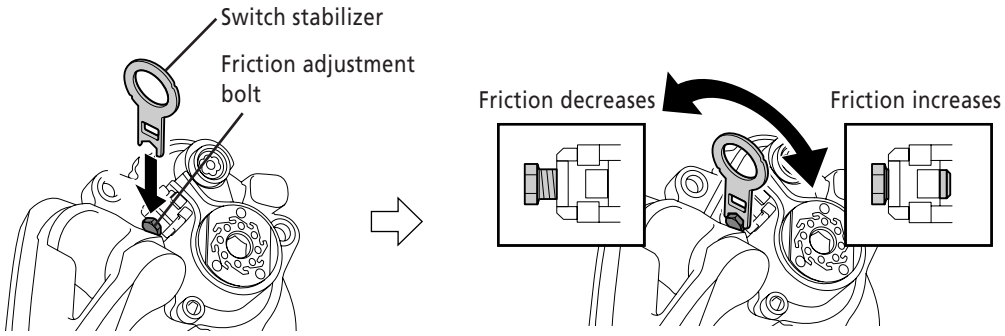
2. Using a 2 mm Allen key, remove the plate unit cover.



3. Remove the switch stabilizer.

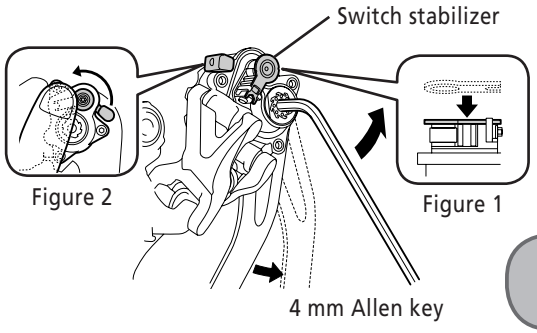
4. Move the friction adjustment bolt to adjust the friction.

* The switch stabilizer can be used as a tool to carry out the adjustment.



5. Check the friction torque.

- Securely install the switch stabilizer as shown in Figure 1.
- While pressing the switch stabilizer with your finger as shown in Figure 2, set the lever switch to the ON position and check the friction torque.



Friction torque:
3.5 - 5.4 N·m {31 - 47 in. lbs.}

Note:

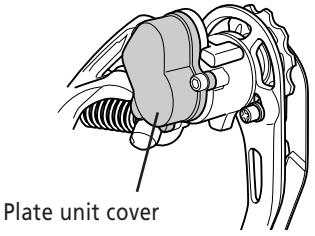
If adjusting the friction once more, be sure to **set the lever switch to the OFF position** while pressing the switch stabilizer with your finger before making the adjustment.

6. Check that the switch stabilizer is securely installed.

7. Install the plate unit cover.

2 mm Allen key

Tightening torque:
1.0 - 1.5 N·m {9 - 13 in. lbs.}

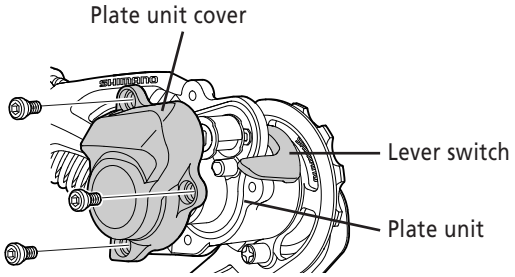


■ Friction adjustment (except RD-M986)

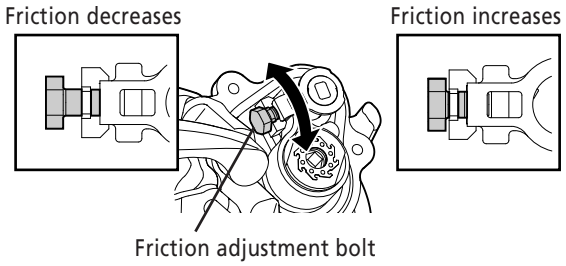
The friction amount can be adjusted as desired.
Furthermore, you can also adjust after a change of the friction occurs during use.

1. Set the lever switch to OFF.

2. Using a 2 mm Allen key, remove the plate unit cover.

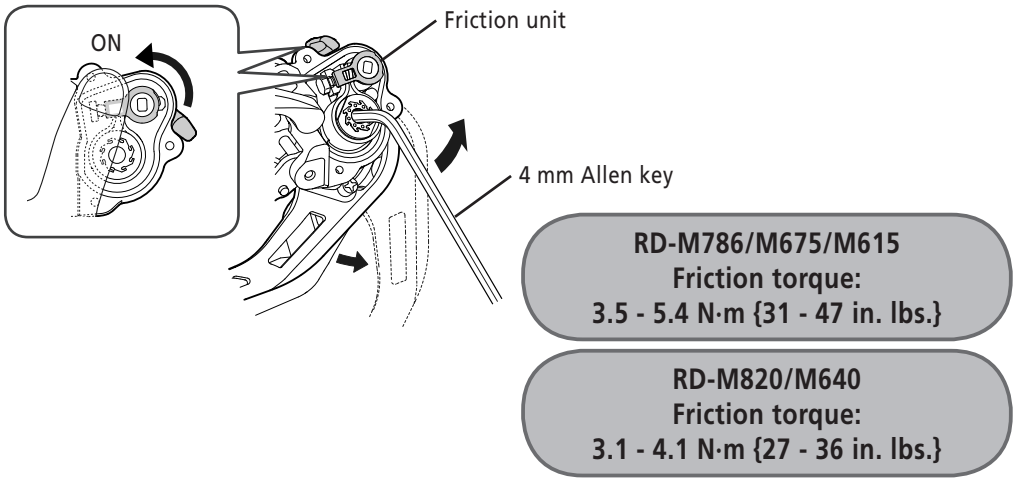


3. Using 5.5 mm wrench, move the friction adjustment bolt to adjust the friction.



4. Check the friction torque.

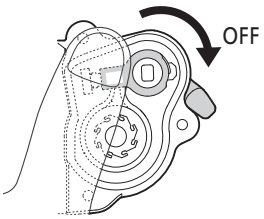
- While pressing the friction unit with your finger as shown in the illustration, set the lever switch to the ON position and check the friction torque.



Note:

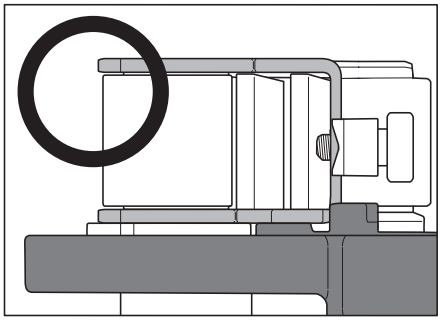
If adjusting the friction once more, be sure to **set the lever switch to the OFF position** while pressing the friction unit with your finger before making the adjustment.

5. While pressing the friction unit with your finger, set the lever switch to the OFF position. At that time, make sure that the friction unit is in contact with the bottom of the plate unit.

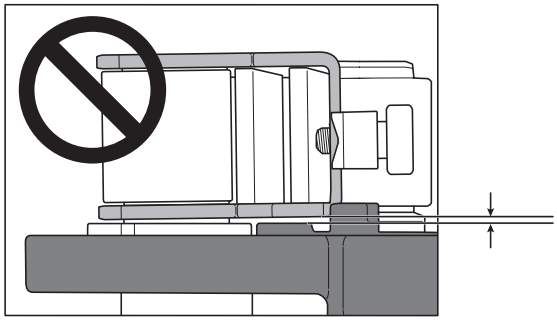


Note:

Do not install the plate unit cover with the switch base floating off the bottom of the plate unit. Sufficient sealing performance will not be obtained, which will cause rust to appear in the inner mechanism, potentially resulting in the adhesion of the plate.

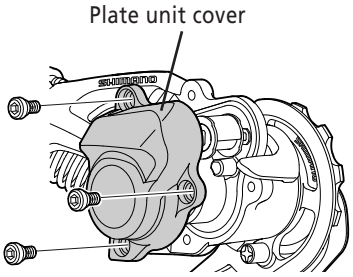


OK



Not OK

6. Install the plate unit cover.



2 mm Allen key

Tightening torque:
1.0 - 1.5 N·m {9 - 13 in. lbs.}

■ Applying grease to the chain stabilizer

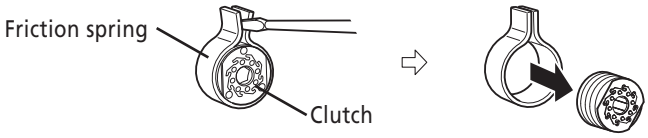
If the friction changes or noise is generated, the grease may have become discolored or may have disappeared. Apply more grease.

1. After carrying out steps 1, 2 and 3 in "Friction adjustment", remove the chain stabilizer.



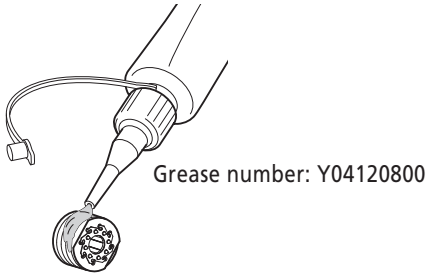
2. Use a flat-tipped screwdriver or similar tool to separate the friction spring and the clutch.

- Be careful not to bend the friction spring with the tip of the flat-tipped screwdriver at this time.



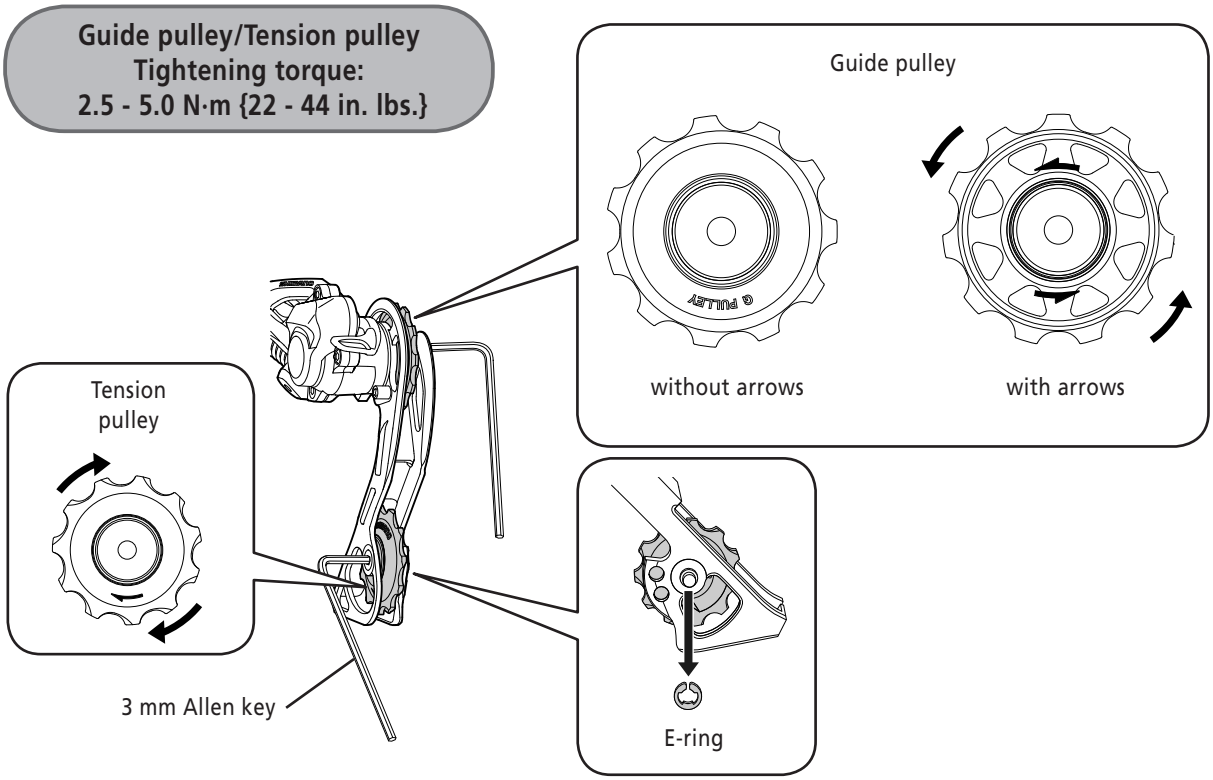
3. Apply grease to the clutch.

- Make sure that no grease gets inside the clutch at this time. If grease gets inside the clutch, it will cause the clutch to malfunction.



* Reassemble by carrying out the disassembly procedure in reverse.

■ Replacement of the pulley



Note (RD-M986/M981/M820):

• When removing the tension pulley, remove the E-ring first.

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