

# Dealer's Manual

ROAD	MTB	Trekking
City Touring/ Comfort Bike	URBAN SPORT	E-BIKE

## SHIMANO **GRX** RX815 series

### SHIMANO GRX

ST-RX815

FD-RX815

RD-RX815

RD-RX817

### SHIMANO

SW-R9150

SM-EW90-A

SM-EW90-B

EW-RS910

EW-WU111

EW-SD50

EW-SD50-I

EW-JC130

SM-EWC2

SM-JC40

SM-JC41

SM-BTR1

BT-DN110

BT-DN110-A

BM-DN100

SM-BA01

SM-BCR1

SM-BCR2

SM-BCC1

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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 bicycle dealer for their assistance.

- Make sure to read all owner's manuals included with products.
- Do not disassemble or modify the product other than as stated in the information contained in this dealer's manual.
- All owner's manuals and dealer's manuals can be viewed on-line on our website (<http://si.shimano.com>).
- For consumers who do not have easy access to the internet, please contact a SHIMANO distributor or any of the SHIMANO offices to obtain a hardcopy of the user's manual.
- Please observe the appropriate rules and regulations of the country, state or region in which you conduct your business as a dealer.
- The Bluetooth® wordmark and logo are registered trademarks owned by Bluetooth SIG, Inc., and are used under a licensing agreement by SHIMANO INC.  
Other trademarks and trade names belong to their respective owners.

**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.

 <b>DANGER</b>	Failure to follow the instructions will result in death or serious injury.
 <b>WARNING</b>	Failure to follow the instructions could result in death or serious injury.
 <b>CAUTION</b>	Failure to follow the instructions could cause personal injury or physical damage to equipment and surroundings.

# TO ENSURE SAFETY



## Be sure to also inform users of the following:

### ■ Lithium-ion battery

Be sure to observe the following instructions in order to avoid burns or other injury from fluid leakage, overheating, fire, or explosion.

- Use the designated battery charger to charge the battery. If any non-specified items are used, fire, overheating or leakage may occur.
- Do not heat the battery or throw it into fire. If this is not observed, fire or bursting may occur.
- Do not deform, modify, disassemble or apply solder directly to the battery. Do not use or leave the battery in places which may exceed 60°C in temperature, such as places which are exposed to direct sunlight, inside vehicles on hot days or near stoves. If this is not observed, leakages, overheating or bursting may cause fire, burns, or other injuries.
- Do not connect the (+) and (-) terminals with metallic objects. Do not carry or store the battery together with metallic objects such as necklaces or hairpins. If this is not observed, short-circuits, overheating, burns or other injury may occur.
- If any liquid leaking from the battery gets into the eyes, immediately wash the affected area with clean water without rubbing the eyes, and then seek medical attention.

### ■ Battery charger/Battery charger cord

Be sure to observe the following instructions in order to avoid burns or other injury from fluid leakage, overheating, fire, or explosion.

- Do not get the battery charger wet or use it while it is wet, and do not touch or hold it with wet hands. If this is not observed, problems with operation or electric shocks may occur.
- Do not use the battery charger when it is covered with a cloth or other material. If this is not observed, heat may build up and the case may become deformed, or fire, ignition, or overheating may occur.
- Do not disassemble or modify the battery charger. If this is not observed, electric shocks or injury may occur.
- Use the battery charger at the specified power supply voltage only. If a power supply voltage other than that specified is used, fire, destruction, smoke, overheating, electric shocks or burns may occur.

- Do not touch the metallic parts of the device or the power plug on the AC adapter or other parts if there is a lightning storm. If lightning strikes, electric shocks may occur.


## ■ SM-BCR2: Battery charger for SM-BTR2/BT-DN110/BT-DN110-A

- Use an AC adapter with a USB port that has a voltage of 5.0Vdc and a current equal to or higher than 1.0A<sub>dc</sub>. If the one with a current lower than 1.0 A is used, the AC adapter may heat up, potentially causing a fire, smoke, overheating, destruction, electric shock, or burns.

### **WARNING**

- Be sure to follow the instructions provided in the owner's manuals when installing the product.

It is recommended to use SHIMANO genuine parts only. If parts such as bolts and nuts become loose or damaged, or if adjustments are not carried out correctly, 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.
- This dealer's manual is for use with the SHIMANO GRX RX815 series (electronic gear shifting system) only.  
For information on products not explained in this manual, search for the model on our website (<http://si.shimano.com>).
- 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:

- *Intervals between maintenance depend on the use and riding circumstances. Clean the chain with an appropriate chain cleaner regularly. Never use alkali based or acid based solvents such as rust cleaners. If those solvents are used the chain might break and cause serious injury.*
- Check that the wheels are fastened securely before riding the bicycle. If the wheels are loose in any way, they may come off the bicycle 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 your place of purchase or a distributor.
- The chain may break, and you may fall.
- Be careful not to let the hemming of your clothes get caught in the chain while riding. Otherwise, you may fall off the bicycle.



## ■ About the multi-shifting function

- Connecting this system to E-TUBE PROJECT and switching [Multi shift mode setting] to [ON] will allow you to continuously shift gears while the shifting switch is held down. When modifying this setting, carefully read "Items configurable in E-TUBE PROJECT" in this dealer's manual.

## ■ Gear-shifting interval

- [Gear-shifting interval] can be set to one of five levels as a multi-shifting function setting in E-TUBE PROJECT: [Very Fast], [Fast], [Normal], [Slow], or [Very Slow] (Default: [Normal]).
- A faster [Gear-shifting interval] setting will result in faster gear shifting. The rider can quickly adjust the traveling speed and the speed at which the front chainwheel turns ("cadence" below) in response to changes in riding conditions.

However, if a gear shifting operation is performed at an insufficient cadence when the system is set to a fast gear-shifting interval, the chain may be unable to follow the movement of the rear derailleur, resulting in the following problems.

- The chain may slip over the tip of the cassette sprocket teeth
  - The cassette sprocket may deform
  - The chain may break
- Fully understand the features of the gear-shifting interval, and then set the gear-shifting interval according to the riding conditions, such as the terrain and the riding style of the rider.

Gear-shifting interval	Benefits	Drawbacks
Fast setting	<ul style="list-style-type: none"> <li>• Quick multi-shifting is possible</li> <li>• The rider can quickly adjust the cadence or traveling speed in response to changes in the riding conditions</li> </ul>	<ul style="list-style-type: none"> <li>• A high cadence is required when gear shifting</li> <li>• Unintended over-shifting occurs easily</li> </ul>
Slow setting	<ul style="list-style-type: none"> <li>• Gear shifting can be performed reliably</li> </ul>	<ul style="list-style-type: none"> <li>• Gear shifting takes some time</li> </ul>

## ■ Lithium-ion battery

- Do not place the battery into fresh water or sea water, and do not allow the battery terminals to get wet. If this is not observed, fire, bursting, ignition, or overheating may occur.
- Do not use the battery if it has any noticeable scratches or other external damage. If this is not observed, bursting, overheating or problems with operation may occur.

- Do not throw or subject the battery to strong shock. If this is not observed, bursting, overheating or problems with operation may occur.
- Do not use the battery if leakages, discoloration, deformation or any other abnormalities occur. If this is not observed, bursting, overheating or problems with operation may occur.
- If any battery fluid gets on your skin or clothes, wash it off immediately with clean water. The leaked fluid may damage your skin.
- The operating temperature ranges for the battery are given below. Do not use the battery in temperatures outside these ranges. If it is used or stored in temperatures which are outside these ranges, fire, injury or problems with operation may occur.
  1. During discharge: -10°C - 50°C
  2. During charging: 0°C - 45°C

**SM-BTR1: Lithium-ion battery (external type)**

- If the battery does not become fully charged within the charging time, stop charging. If this is not observed, fire, bursting, ignition, or overheating may occur.

**SM-BTR2/BT-DN110/BT-DN110-A: Lithium-ion battery (built-in type)**

- If the battery does not become fully charged after 4 hours, stop charging. If this is not observed, fire, bursting, ignition, or overheating may occur.

**■ Battery charger/Battery charger cord**

**SM-BCR1: Battery charger for SM-BTR1**

- Hold the power plug when connecting or disconnecting from the electrical outlet. Failure to do so may cause a fire or electric shock.
- If the following occurs, stop using the device and contact your place of purchase. A fire or electric shock may occur.
  - \* If heat or acrid-smelling smoke is coming out from the power plug.
  - \* There is a bad connection inside the power plug.
- Do not overload the electrical outlet with appliances beyond its rated capacity, and use only a 100 - 240 V AC electrical outlet. If the electrical outlet is overloaded by connecting too many appliances using adapters, overheating resulting in fire may occur.
- Do not damage the power cord or power plug. (Do not damage, modify, let near hot objects, bend, twist or pull them; do not place heavy objects on top or bundle them tightly.) If they are used while damaged, fire, electric shocks or short-circuits may occur.
- Do not use the battery charger with commercially-available electrical transformers designed for overseas use (travel converters), as they may damage the battery charger.
- Always be sure to insert the power plug as far as it will go. If this is not observed, fire may occur.

**SM-BCR2: Battery charger for SM-BTR2/BT-DN110/BT-DN110-A**

- Do not use any USB cable other than the USB cable which is supplied with the PC linkage device. This may cause a charging error, fire, or failure to connect to PC due to overheating.
- Do not connect the battery charger to PC when it is on standby. This may cause a PC failure depending on its specifications.
- When connecting or disconnecting the USB cable or the charging cable, be sure to hold the cable by the plug. Failure to do so may cause a fire or electric shock.

If the following occurs, stop using the device and contact your place of purchase. A fire or electric shock may occur.

\* If heat or acrid-smelling smoke is coming out from the power plug.

\* There is a bad connection inside the power plug.

- If it thunders while charging with an AC adapter with a USB port, do not touch the device, bicycle, or the AC adapter. If lightning strikes, electric shocks may occur.
- Use an AC adapter with a USB port that has a voltage of 5.0Vdc and a current equal to or higher than 1.0Adc. If the one with a current lower than 1.0Adc is used, a charging error may occur or the AC adapter may heat up, leading to a fire.
- Do not use a USB hub when connecting the cable to a computer USB port. This may cause a charging error or fire due to overheating.
- Be careful not to damage the charging cable. (Do not damage, modify, let near hot objects, bend, twist or pull them; do not place heavy objects on top or bundle them tightly.) If they are used while damaged, fire, electric shocks or short-circuits may occur.

**■ Brake**

- Each bicycle may handle slightly differently depending on the model. Therefore, be sure to learn the proper braking technique (including brake lever pressure and bicycle control characteristics) and operation of your bicycle. Improper use of your bicycle's brake system may result in a loss of control or a fall, which could lead to severe injury. For proper operation, consult a professional bicycle dealer or the bicycle's owner's manual. It is also important to practice riding and braking, etc.
- If the front brake is applied too strongly, the front wheel may lock and the bicycle may fall forward, and serious injury may result.
- Always make sure that the front and rear brakes are working correctly before riding the bicycle.
- The required braking distance will be longer during wet weather. Reduce your speed and apply the brakes early and gently.

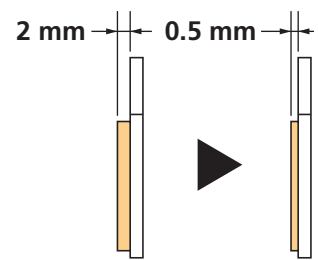
- If the road surface is wet, the tires will skid more easily. If the tires skid, you may fall off the bicycle; therefore, to avoid this, reduce your speed and apply the brakes early and gently.

## ■ Hydraulic disc brake

- Please make sure to keep your fingers away from the rotating disc brake rotor. The disc brake rotor is sharp enough to inflict severe injury to your fingers if caught in the openings of the disc brake rotor while it is moving.
- The calipers and disc brake rotor will become hot when the brakes are operated; do not touch them while riding or immediately after dismounting from the bicycle. Otherwise, you may get burned.
- Be careful not to allow any oil or grease to get onto the disc brake rotor and brake pads. Otherwise, the brakes may not work correctly.
- If any oil or grease does get on the brake pads, you should consult a place of purchase or a distributor. Otherwise, the brakes may not work correctly.



- If noise occurs during brake operation, the brake pads may have been worn down to the usable limit. Check that the brake system temperature has cooled down sufficiently, and then check the thickness of the brake pad. If the thickness is 0.5 mm or less, the brake pad needs to be replaced with a new one. Consult a place of purchase or a distributor.



- If the disc brake rotor is cracked or deformed, immediately stop using the brakes and consult a place of purchase or a distributor.
- If the disc brake rotor becomes worn down to a thickness of 1.5 mm or less, or if the aluminum surface appears, immediately stop using the brakes and consult a place of purchase or a distributor. The disc brake rotor may break, and you may fall off the bicycle.
- Vapor lock may occur if the brakes are applied continuously; therefore, please refrain from doing this.

**Vapor lock occurs when the oil inside the brake system becomes heated, which causes the water or air bubbles inside the brake system to expand. This can then result in a sudden increase in the brake lever stroke.**


- The disc brake is not designed to work when the bicycle is upside down. If the bicycle is turned upside down or on its side, the brake may not work correctly, and a serious accident could occur. Before riding the bicycle, be sure to depress the brake lever a few times to check that the brakes operate normally. If the brakes do not operate normally, stop using the brakes and consult a place of purchase or a distributor.

- If you feel no resistance when depressing the brake lever, immediately stop using the brakes and consult a place of purchase or a distributor.
- If fluid leaks occur, immediately stop using the brakes and consult a place of purchase or a distributor.

## For installation to the bicycle, and maintenance:

- When the shifting switch is operated, the powerful motor which drives the front derailleur will operate to the shifting position without stopping, so be careful not to get your fingers caught.

### ■ Hydraulic disc brake

- Please make sure to keep your fingers away from the rotating disc brake rotor during installation or maintenance of the wheel. The disc brake rotor is sharp enough to inflict severe injury to your fingers if caught in the openings of the disc brake rotor while it is moving.
- 
- If the disc brake rotor is cracked or warped, be sure to replace the disc brake rotor with a new one.
  - If the disc brake rotor becomes worn down to a thickness of 1.5 mm or if the aluminum surface becomes visible on one side, be sure to replace the disc brake rotor with a new one.
  - Check that the brake system has cooled down sufficiently before attempting brake system maintenance.
  - Use only SHIMANO genuine mineral oil. If other types of oil are used, it may cause problems with brake operation, and cause vapor lock or the brake system to be unusable.
  - Be sure to use only oil from a freshly-opened container, and do not re-use oil which has been drained from the bleed nipple. Old or reused oil may contain water, which could cause vapor lock in the brake system.
  - Be careful not to let water or air bubbles get into the brake system. Otherwise, vapor lock may occur. Be particularly careful when removing the cover of the reservoir tank.
  - If cutting the hose in order to adjust the length of the brake hose, or when changing over the brake hose from left to right or vice versa, be sure to bleed the air from the hose according to the steps in "Adding mineral oil and bleeding air".

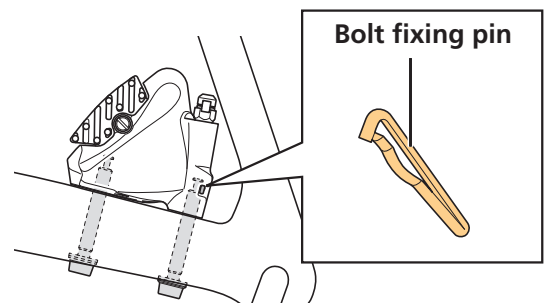
- When turning the bicycle upside down or on its side, the brake system may have some air bubbles inside the reservoir tank which are still there when the bleed screw is closed, or which accumulate in various parts of the brake system when it is used for long periods. This disc brake system is not designed to work with the bicycle upside down. If the bicycle is turned upside down or on its side, any air bubbles inside the reservoir tank may move in the direction of the calipers and if the bicycle is ridden in this condition, there is a danger that the brakes may not operate and a serious accident could occur. If the bicycle has been turned upside down or on its side, be sure to operate the brake lever a few times to check that the brakes operate normally before riding the bicycle, and if the brakes do not operate normally, adjust them according to the following procedure.

**If brake does not seem to work (feels sluggish) when the brake lever is depressed**

Set the bleed section of the brake lever so that it is parallel to the ground, and then gently depress the brake lever several times and wait for the air bubbles to return to the reservoir tank.

If the brakes lever still feels sluggish, bleed the air (refer to "Adding mineral oil and bleeding air").

- If the quick release lever on the hub is on the same side as the disc brake rotor, they may interfere with each other, which is dangerous, so check that they do not.
- SHIMANO disc brake systems are not compatible with tandem bicycles. Because tandem bicycles are heavier, the stress on the brake system increases during brake operation. If hydraulic disc brakes are used with tandem bicycles, the oil temperature will become too high and vapor locks or ruptures in the brake hoses may occur, causing the brakes to fail.
- When installing the brake caliper using bolt fixing pins, be sure to use mounting bolts of the appropriate length.  
If not, the bolt fixing pins may not be securely fastened, and the bolts may fall out.



## ■ Brake hose

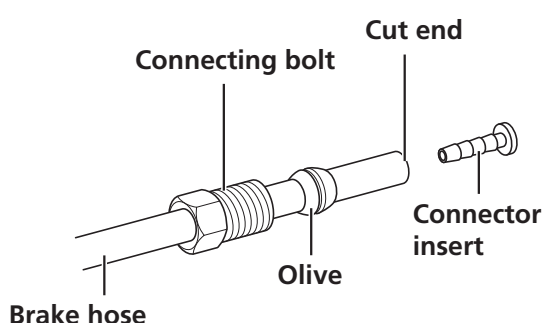
- After installing the brake hose to the brake unit, adding SHIMANO genuine mineral oil and bleeding air bubbles, depress the brake lever several times to check that the brakes are operating normally and there are no fluid leaks from the hose or the system.

- The connector insert is for this brake hose only. Use an appropriate connector insert according to the following table. Use of a connector insert incompatible with the brake hose may cause fluid leaks.

Model number	Length	Color
SM-BH90-JK-SSR	11.2 mm	Silver

- Do not reuse the olive or the connector insert when reinstalling. A damaged or reused olive, or connector insert, may not provide a secure brake hose connection, possibly causing the brake hose to disconnect from the calipers or brake lever.

If the brake hose becomes disconnected, there is a danger that the brakes may suddenly stop working.



- Cut the brake hose so that the cut end is perpendicular to the length of the hose. If the brake hose is cut at an angle, fluid leaks may result.



## ■ Points to note about the handlebars

### EW-RS910 (Built-in bar end type)

- Handle inner diameter:  $\varnothing 20.5 - 21.5$  mm
- Handle outer diameter:  $\varnothing 23.8 - 24.2$  mm

## ⚠ CAUTION

## Be sure to also inform users of the following:

### ■ Lithium-ion battery

- Store the battery in a safe place away from the reach of infants and pets.

**SM-BTR1: Lithium-ion battery (external type)**

- When you do not use the battery for a long period, remove and charge the battery before storage.

**SM-BTR2/BT-DN110/BT-DN110-A: Lithium-ion battery (built-in type)**

- When you do not use the battery for a long period, charge the battery before storage.

**■ Battery charger/Battery charger cord****SM-BCR1: Battery charger for SM-BTR1**

- Disconnect the power plug from the electrical outlet before cleaning the battery charger.

**SM-BCR2: Battery charger for SM-BTR2/BT-DN110/BT-DN110-A**

- Disconnect the USB cable or the charging cable when performing maintenance.

**■ Hydraulic disc brake****Cautions on SHIMANO genuine mineral oil**

- Contact with eyes may result in irritation. In the event of contact with eye, wash with water and seek medical attention immediately.
- Contact with skin may cause a rash and discomfort. In the event of contact with skin, wash well with soap and water.
- Inhalation of SHIMANO genuine mineral oil mist or vapors may cause nausea. Cover your nose and mouth with a respirator type mask and use in a well-ventilated area. If SHIMANO genuine mineral oil vapor is inhaled, go immediately to an area with fresh air and cover up with a blanket. Stay warm and calm, and seek professional medical advice.

**Burn-in period**

- Disc brakes have a burn-in period, and the braking force will gradually increase as the burn-in period progresses. Make sure that you are aware of any such increases in braking force when using the brakes during the burn-in period.

**For installation to the bicycle, and maintenance:****■ Hydraulic disc brake****Handling SHIMANO genuine mineral oil**

- Contact with eyes may result in irritation. Use safety glasses when handling, and avoid contact with eyes.

In the event of contact with eye, wash with water and seek medical attention immediately.

- Contact with skin may cause a rash and discomfort. Use gloves when handling.

In the event of contact with skin, wash well with soap and water.



- Do not drink. May cause vomiting or diarrhea.
- Keep out of reach of children.
- Do not cut, let near heat, weld or pressurize the mineral oil container, as this may cause explosion or fire.
- Disposal of Used Oil: Follow local county and/or state codes for disposal.
- Storage method: Keep the container sealed to prevent foreign objects and moisture from getting inside, and store it in a cool, dark area away from direct sunlight or heat.  
Keep from heat or flame, Petroleum Class III, Danger level III

#### **Brake hose**

- When cutting the brake hose, handle the knife carefully so as not to cause injury.
- Be careful to avoid injury from the olive.

### ***NOTICE***

#### **Be sure to also inform users of the following:**

- Be sure to rotate the crank while performing all switch operations related to gear shifting.
- This is a small waterproof connector, so do not repeatedly connect and disconnect the electric wire too often. It may impair the function.
- Be careful not to let water get into the E-TUBE port area.
- The components are designed to be fully waterproofed to withstand wet weather riding conditions; however, do not deliberately place them into water.
- Do not clean the bicycle with a high-pressure washer. If water gets into any of the components, operating problems or rusting may result.
- Be sure to keep turning the crank during gear shifting operations.
- Handle the product carefully, and avoid subjecting it to any strong shocks.
- Do not use thinners or similar substances to clean the products. Such substances may damage the surfaces.
- If gear shifting operations do not feel smooth, wash the derailleur and lubricate all moving parts.

- Keep away from magnetic objects. If this is not observed, problems with operation may occur.

If the product includes a magnet, make sure to use the included magnet to install it in the specified location.

- Contact the place of purchase for updates of the component software. The most up-to-date information is available on the SHIMANO website.
- 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.

## ■ Lithium-ion battery

- Lithium-ion batteries are recyclable, valuable resources.  
For information on used batteries, contact the place of purchase or a distributor.
- Charging can be carried out at any time regardless of the amount of charge remaining. Always be sure to use the special battery charger to charge the battery until it is fully recharged.
- The battery is not fully charged at the time of purchase. Before riding, be sure to fully charge the battery.
- If the battery has become completely empty, charge it as soon as possible. If you leave the battery without charging it, it will cause the battery to deteriorate.
- The battery is an exhaustible item. The battery will gradually lose its capacity to charge after repeated use. If the length of time that the battery can be used becomes extremely short, it has probably reached the end of its life, and so you will need to purchase a new battery.
- The life of the battery will vary depending on factors such as the storage method, the usage conditions, the surrounding environment and the characteristics of the individual battery pack.
- If storing the battery away for a long period, remove it when the battery level is 50% or higher or when the green indicator is illuminating in order to prolong its useful life; and it is recommended that you charge the battery about every six months.
- If the storage temperature is high, the performance of the battery is reduced, and its useable time will be shorter. When you use the battery after a long storage period, store the battery indoors where the battery will not be exposed to direct sunlight or rain.
- If the ambient temperature is low, the battery's usable time will be shorter.

**SM-BTR1: Lithium-ion battery (external type)**

- When storing the battery away, remove the battery from the bicycle and install the terminal cover first.
- The charging time is approximately 1.5 hours. (Note that the actual time will vary depending on the remaining battery charge.)
- If the battery feels difficult to insert or remove, apply specified grease (premium grease) to the part that touches the O-ring at the side.

**SM-BTR2/BT-DN110/BT-DN110-A: Lithium-ion battery (built-in type)**

- After removing the battery from the bicycle for storage, install a dummy plug.
- The charging time of an AC adapter with a USB port is approximately 1.5 hours, and that of a computer USB port type is approximately 3 hours. (Note that the actual time will vary depending on the remaining battery charge. Depending on the specifications of the AC adapter, recharging via the AC adapter may require as much time (about 3 hours) as recharging via PC.)

**■ Battery charger/Battery charger cord**

- Use this instrument under the direction of a safety supervisor or the directions for use. Do not allow physically, sensory, or mentally impaired persons, inexperienced persons, or persons with no required knowledge, including children, to use the product.
- Do not allow children to play near the product.

**Disposal information for countries outside the European Union**

This symbol is only valid within the European Union.

Contact the place of purchase or a distributor for advice on disposing.

- Charge the battery indoors to avoid exposure to rain or wind.
- Do not use outdoors or in environments with high humidity.
- Do not place the battery charger on dusty floors when using it.
- Place the battery charger on a stable surface such as a table when using it.
- Do not place any objects on top of the battery charger or its cable.
- Do not bundle the cables.
- Do not hold the battery charger by the cables when carrying it.
- Do not apply excessive tension to the cables.
- Do not wash the battery charger or wipe it using detergents.

**SM-BCR2: Battery charger/PC linkage device for SM-BTR2/BT-DN110/BT-DN110-A**

- Connect the PC linkage device directly to the USB port on a PC, without using an intermediate device such as a USB hub.
- Do not ride the bicycle while the PC linkage device and cable are still connected to it.
- Do not connect two or more of the same units to the same connection point. If this is not done, the units may not operate correctly.
- Do not connect or disconnect the units again while unit recognition is in progress or after recognition is complete. If this is not done, the units may not operate correctly.

Check the procedures which are given in the user's manual for the E-TUBE PROJECT when connecting and disconnecting units.

- The tightness of the PC link cable will tend to drop after repeated connections and disconnections. If this happens, replace the cable.
- Do not connect two or more PC linkage devices at the same time. If two or more PC linkage device units are connected, they will not operate correctly. In addition, the PC may need to be restarted if operating errors occur.
- PC linkage devices cannot be used while the battery charger is connected.

**■ Rear derailleur**

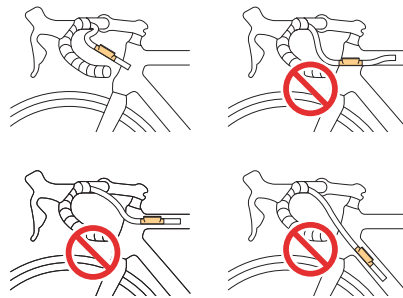
- If gear shifting operations do not feel smooth, wash the derailleur and lubricate all moving parts.
- If the chain keeps skipping, ask the place of purchase to replace the gears and the chain.
- If there is a large gap in the pulleys which causes a lot of noise, ask the place of purchase to replace the pulleys.
- The gears should be periodically washed with a neutral detergent. In addition, cleaning the chain with neutral detergent and lubricating it can be an effective way of extending the life of the gears and the chain.
- If looseness in the links is so great that gear shifting adjustments cannot be made, replace the derailleur.

**■ Hydraulic disc brake**

- When the bicycle wheel has been removed, it is recommended that pad spacers are installed. Do not depress the brake lever while the wheel is removed. If the brake lever is depressed without the pad spacers installed, the pistons will protrude further than normal. If that happens, consult the place of purchase.
- Use soapy water and a dry cloth when cleaning and carrying out maintenance of the brake system. Do not use commercially available brake cleaners or silencing agents, as they can cause damage to parts such as seals.

## ■ Wireless unit

- If using EW-WU111, use it together as a set with one of the following units.  
External type: BM-DN100, built-in type: BT-DN110/BT-DN110-A
- This is a small waterproof connector, so do not repeatedly connect and disconnect the electric wire too often. It may impair the function.
- Be careful not to let water get into the E-TUBE port area.
- The components are designed to be fully waterproofed to withstand wet weather riding conditions; however, do not deliberately place them into water.
- Do not clean the bicycle with a high-pressure washer. If water gets into any of the components, operating problems or rusting may result.
- Handle the product carefully, and avoid subjecting it to any strong shocks.
- As shown in the figure, install the product so that it does not reach the side of the bicycle body.  
Otherwise, it could be damaged if the bicycle tips over and it is pinched between the frame and curb.



- Do not use thinners or similar substances to clean the products. Such substances may damage the surfaces.
- Do not leave the product in an area exposed to strong sunlight for an extended period of time.
- Do not disassemble the product as it cannot be reassembled.
- When cleaning the product, use a cloth moistened with a diluted neutral detergent.
- Contact the place of purchase for updates of the component software. The most up-to-date information is available on the SHIMANO website.

## For installation to the bicycle, and maintenance:

- Be sure to attach dummy plugs to any unused E-TUBE ports.
- Be sure to use SHIMANO original tool TL-EW02 to remove the electric wires.

- The motor unit cannot be disassembled and repaired.
- Contact SHIMANO for information regarding the shipment of the battery charger to South Korea and Malaysia.
- Use a brake hose/outer casing which still has some length to spare even when the handlebars are turned all the way to either side. Furthermore, check that the shifting lever does not touch the bicycle frame when the handlebars are turned all the way to either side.
- Use the specified cable for smooth operation.
- The clamp band, clamp bolt, and clamp nut are not compatible with other products. Do not use them in combination with components used with other products.

### ■ Electric wires/Electric wire covers

- Secure the electric wires with a zip tie so that they do not interfere with the gears or tires.
- The strength of the adhesive is fairly weak to prevent the paint on the frame from being peeled off when removing the electric wire cover, such as when replacing the electric wires. If the electric wire cover is peeled off, replace it with a new one. When removing the electric wire cover, do not peel it off too vigorously. Otherwise, the paint on the frame will peel off, too.
- Do not remove the wire holders which are attached to the built-in type electric wires (EW-SD50-I). The wire holders prevent the electric wires from moving inside the frame.
- When installing to the bicycle, do not forcibly bend the electric wire plug. It may result in poor contact.

### ■ Rear derailleur

- Be sure to adjust the top adjustment bolt and the low adjustment bolt according to the instructions given in the adjustment section.  
If these are not adjusted, the chain may become clamped between the spokes and the largest sprocket and the wheel may lock, or the chain may slip onto the small sprocket.
- Periodically clean the derailleur and lubricate all moving parts (mechanism and pulleys).
- If gear shifting adjustments cannot be carried out, check the degree of parallelism of the dropout.
- The guide pulley and tension pulley have an arrow on one side to indicate the direction of rotation. When installing the pulleys, install so that the surfaces with arrows are on the inner side when looking from the outer side of the derailleur.

## ■ Hydraulic disc brake

- If the brake caliper mounting boss and the dropout are not of standard dimensions, the disc brake rotor and caliper may touch.
- When the bicycle wheel has been removed, it is recommended that pad spacers are installed. The pad spacers will prevent the piston from coming out if the brake lever is depressed while the wheel is removed.
- If the brake lever is depressed without the pad spacers installed, the pistons will protrude further than is normal. Use a slotted screwdriver or other tool to push open the brake pads, while being careful not to damage the surfaces of the brake pads. (If the brake pads are not installed, use a flat-shaped tool to push the pistons straight back in, while being careful not to damage them.)

If it is difficult to push the brake pads or pistons back, remove the bleed screws and then try again. (Note that some oil may overflow from the reservoir tank at this time.)

- Use isopropyl alcohol, soapy water or a dry cloth when cleaning and carrying out maintenance of the brake system. Do not use commercially available brake cleaners or silencing agents. Such substances can cause damage to parts such as seals.
- If the disc brake rotor is worn, cracked or warped, it should be replaced.

## ■ Dual control lever

- Dummy plugs are installed at the time of shipment from the factory. Do not remove them except when necessary.
- When routing the electric wires, take care to ensure that they do not interfere with the brake levers.

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

## For installation to the bicycle:

### ■ Notes on reinstalling and replacing components

- When the product is reassembled or replaced, it is automatically recognized by the system to allow operation according to the settings.
- If the system does not operate after reassembly and replacement, follow the system power reset procedure below to check the operation.
- If the component configuration changes or a malfunction is observed, use the E-TUBE PROJECT software to update the firmware of each component to the latest version and perform a check again. Also, make sure that the E-TUBE PROJECT software is the latest version. If the software is not the latest version, component compatibility or product functionality may suffer.

## Be sure to also inform users of the following:

### ■ About used batteries

- Lithium-ion batteries are recyclable, valuable resources.  
For information on used batteries, contact the place of purchase or a distributor.

### ■ About system power reset

- When the system fails to operate, it may be recovered by resetting the system power.
- After the battery is removed, approximately 1 minute is usually required for the system power to reset.

#### In the case of using SM-BTR1

- Remove the battery from the battery mount. After approximately 1 minute, install the battery.

#### If using SM-BTR2/BT-DN110/BT-DN110-A

- Disconnect the plug from SM-BTR2/BT-DN110/BT-DN110-A. After approximately 1 minute, insert the plug.

### ■ Connection and communication with PC

- PC linkage devices can be used to connect a PC to the bicycle (system or components), and an E-TUBE PROJECT can be used to carry out tasks such as customizing single components or the whole system and updating their firmware.

If your versions of E-TUBE PROJECT software and firmware for each component are not up to date there could be problems operating the bicycle. Check the software version and update it to the latest one.

	PC linkage device	E-TUBE PROJECT	Firmware
SM-BMR2/SM-BTR2	SM-PCE1/SM-BCR2	Version 3.4.0 or later	Version 3.0.0 or later
BT-DN110/BT-DN110-A/BM-DN100			Version 4.0.0 or later



## ■ Connection and communication with smartphone or tablet

- E-TUBE PROJECT for smartphones/tablets can be used to carry out tasks such as updating firmware and customizing single components or the whole system, after connecting the bicycle (system or components) to a smartphone or tablet via Bluetooth® LE.

- E-TUBE PROJECT: Application for smartphones/tablets

- Firmware: Software inside each component

- Disconnect the Bluetooth LE connection when not using E-TUBE PROJECT for smartphones/tablets.

Using a wireless unit without disconnecting the Bluetooth LE connection could increase battery consumption.

### About compatibility with E-TUBE



- Check the following website for information on compatibility with each unit and functional limitations.

([http://e-tubeproject.shimano.com/guide/#guide\\_list](http://e-tubeproject.shimano.com/guide/#guide_list))



# LIST OF TOOLS TO BE USED

The following tools are needed for installation, adjustment, and maintenance purposes.


## Junction [A]

Tool	
	TL-EW02
	2 mm hexagon wrench






## Junction [B]

Tool	
	TL-EW02
	3 mm hexagon wrench









## Wireless unit

Tool	
	TL-EW02




## Battery, battery mount

Tool	
	TL-EW02
	2 mm hexagon wrench
	2.5 mm hexagon wrench
	3 mm hexagon wrench
	Snap ring pliers (with a claw diameter 2 mm or less)









## Dual control lever, shifting switch

Tool	
	TL-EW02
	SM-DISC
	TL-BH62
	2 mm hexagon wrench
	2.5 mm hexagon wrench
	5 mm hexagon wrench
	7 mm socket wrench
	8 mm spanner

## Front derailleur

Tool	
	TL-EW02
	2 mm hexagon wrench
	5 mm hexagon wrench

## Rear derailleur

Tool	
	TL-EW02
	2 mm hexagon wrench
	3 mm hexagon wrench
	4 mm hexagon wrench
	5 mm hexagon wrench
	Screwdriver [#2]
	Hexalobular [#30]
	5.5 mm spanner

# INSTALLATION/REMOVAL

## OVERALL WIRING DIAGRAM (external battery specifications)

When routing wires through the inside of the frame, be sure to do so before installing each component. The wiring diagram for using an external battery is shown below.

### NOTICE

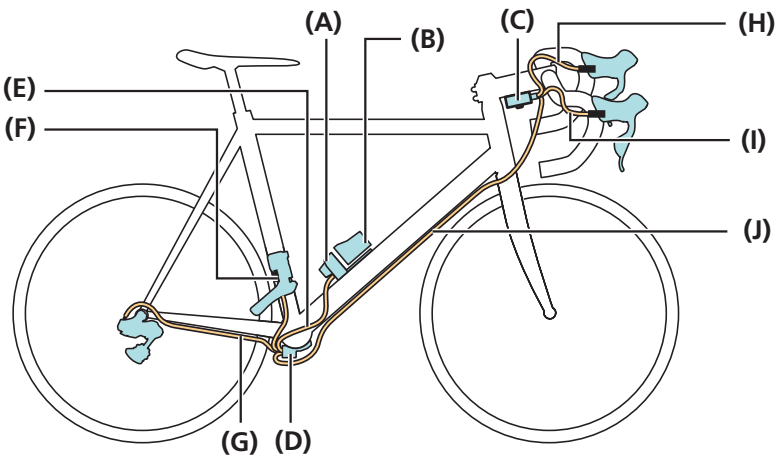
- When passing the wires through the inside of the frame, especially when pulling junction [B] into the frame, it is necessary to finish wiring and check the connection before installing the bottom bracket. This is particularly important when you use a press-fit bottom bracket.

## Wiring example for installing junction [B] on the outside

In this wiring example, junction [B] is located on the lower side of the frame. In many cases, most of the wiring will be external.

### ► When using junction [A] on the outside

Use an external type junction [A]. In this wiring example, all electric wires are external.



### Wiring component parts

(A)	Battery mount: SM-BMR2/BM-DN100	(B)	Lithium-ion battery (external type): SM-BTR1
(C)	Junction [A]: SM-EW90-A/SM-EW90-B	(D)	Junction [B]: SM-JC40

### Electric wire (EW-SD50)

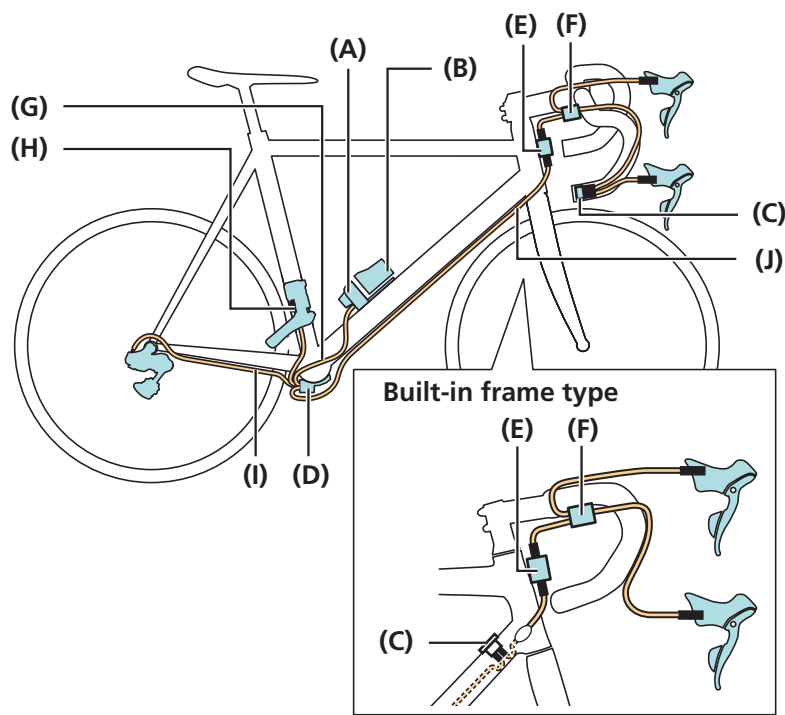
(E)	From battery mount to junction [B]	(E) + (F) ≤ 900 mm (E) + (G) ≤ 1,100 mm
(F)	From front derailleur to junction [B]	
(G)	From rear derailleur to junction [B]	
(H)	From dual control lever to junction [A]	(H), (I) ≤ 500 mm
(I)	From dual control lever to junction [A]	
(J)	From junction [A] to junction [B]	(J) ≤ 1,400 mm

### ▶ When using junction [A] on the inside

Use a built-in type junction [A]. In this wiring example, some of the wiring will be inside the handlebar.

The wireless unit can be used to send the current gear position and other information to an external device.

Built-in bar end type



### Wiring component parts

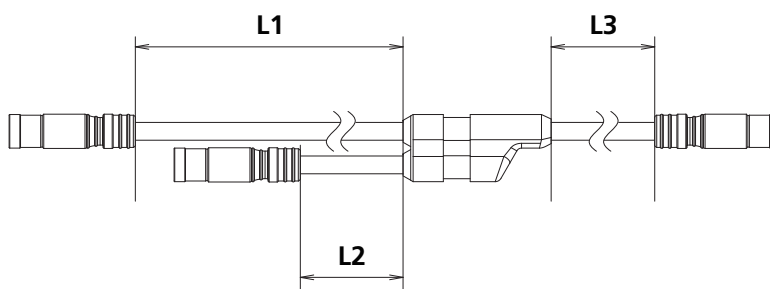
(A)	Battery mount: SM-BMR2/BM-DN100	(B)	Lithium-ion battery (external type): SM-BTR1
(C)	Junction [A]: EW-RS910 (Built-in bar end type/built-in frame type)	(D)	Junction [B]: SM-JC40
(E)	Wireless unit: EW-WU111	(F)	Branch type junction: EW-JC130

## Electric wire (EW-SD50/EW-SD50-I)

(G)	From battery mount to junction [B]	(G) + (H) ≤ 900 mm (G) + (I) ≤ 1,100 mm
(H)	From front derailleur to junction [B]	
(I)	From rear derailleur to junction [B]	
(J)	From wireless unit to junction [B]	(J) ≤ 1,400 mm

## ▶ About the branch type junction (EW-JC130)

Three types of EW-JC130 are available.



	L1 (mm)	L2 (mm)	L3 (mm)
EW-JC130-SS	350	50	250
EW-JC130-SM	350	50	450
EW-JC130-MM	550	50	550

### TECH TIPS

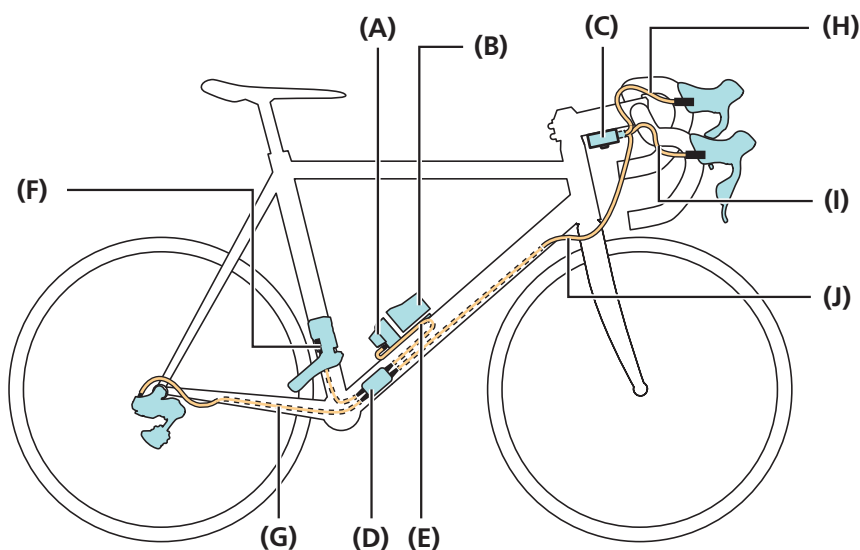
- If using EW-WU111, use it in combination with BT-DN110, BT-DN110-A or BM-DN100.
- Refer to the dealer's manual for EW-WU101 for information on wiring when using EW-WU101 as the wireless unit.

## Wiring example for installing junction [B] on the inside

In this wiring example, most of the wires are routed through the inside of the frame by installing junction [B] inside the frame.

### ▶ When using junction [A] on the outside

Use an external type junction [A]. This wiring example shows a configuration where most of the wiring (except for around the battery and cockpit) is inside the frame.



### Wiring component parts

(A)	Battery mount: SM-BMR2/BM-DN100	(B)	Lithium-ion battery (external type): SM-BTR1
(C)	Junction [A]: SM-EW90-A/SM-EW90-B	(D)	Junction [B]: SM-JC41

### Electric wire (EW-SD50/EW-SD50-I)

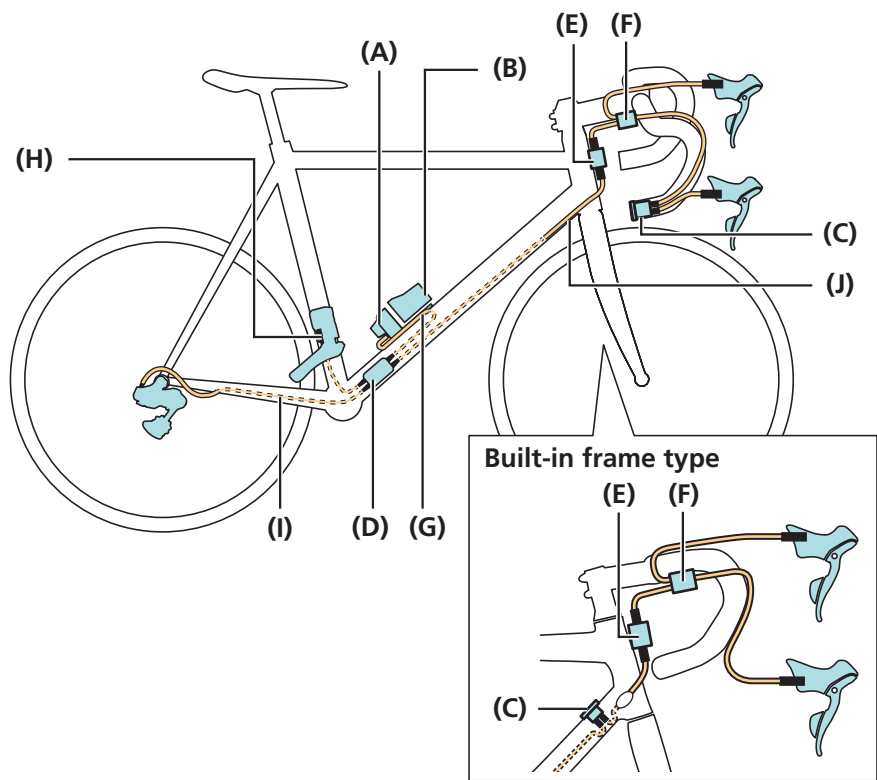
(E)	From built-in battery to junction [B]	(E) + (F) ≤ 1,500 mm (E) + (G) ≤ 1,700 mm
(F)	From front derailleur to junction [B]	
(G)	From rear derailleur to junction [B]	
(H)	From dual control lever to junction [A]	(H), (I) ≤ 500 mm
(I)	From dual control lever to junction [A]	
(J)	From junction [A] to junction [B]	(J) ≤ 1,400 mm



# ▶ When using junction [A] on the inside

Use a built-in type junction [A]. This wiring example shows a configuration where most of the wiring (except for around the battery and cockpit) is inside the frame. The wireless unit can be used to send the current gear position and other information to an external device.

Built-in bar end type



## Wiring component parts

(A)	Battery mount: SM-BMR2/BM-DN100	(B)	Lithium-ion battery (external type): SM-BTR1
(C)	Junction [A]: EW-RS910 (Built-in bar end type/built-in frame type)	(D)	Junction [B]: SM-JC41
(E)	Wireless unit: EW-WU111	(F)	Branch type junction: EW-JC130

## Electric wire (EW-SD50-I)

(G)	From battery mount to junction [B]	(G) + (H) ≤ 1,500 mm (G) + (I) ≤ 1,700 mm
(H)	From front derailleur to junction [B]	
(I)	From rear derailleur to junction [B]	
(J)	From wireless unit to junction [B]	(J) ≤ 1,400 mm

### TECH TIPS

- Refer to "About the branch type junction (EW-JC130)" for information on EW-JC130.
- If using EW-WU111, use it in combination with BT-DN110, BT-DN110-A or BM-DN100.
- Refer to the dealer's manual for EW-WU101 for information on wiring when using EW-WU101 as the wireless unit.

## OVERALL WIRING DIAGRAM (built-in battery specifications)

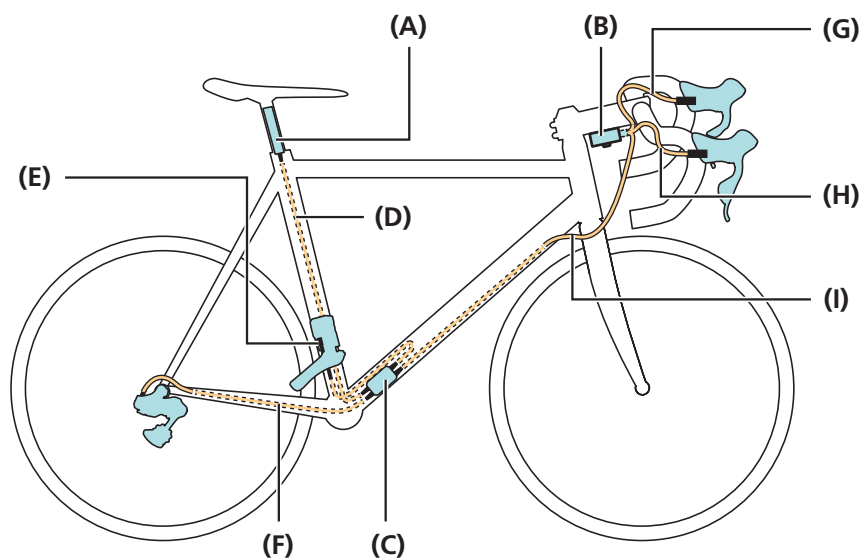
When routing wires through the inside of the frame, be sure to do so before installing each component. The wiring diagram for using a built-in battery is shown below.

### NOTICE

- When passing the wires through the inside of the frame, especially when pulling junction [B] into the frame, it is necessary to finish wiring and check the connection before installing the bottom bracket. This is particularly important when you use a press-fit bottom bracket.

### Wiring example for installing junction [A] on the outside

Use an external type junction [A]. In this wiring example, most of the wires excluding the wires around the cockpit are routed through the inside of the frame.



## Wiring component parts

(A)	Lithium-ion battery (built-in type): BT-DN110/BT-DN110-A	(B)	Junction [A]: SM-EW90-A/SM-EW90-B
(C)	Junction [B]: SM-JC41		

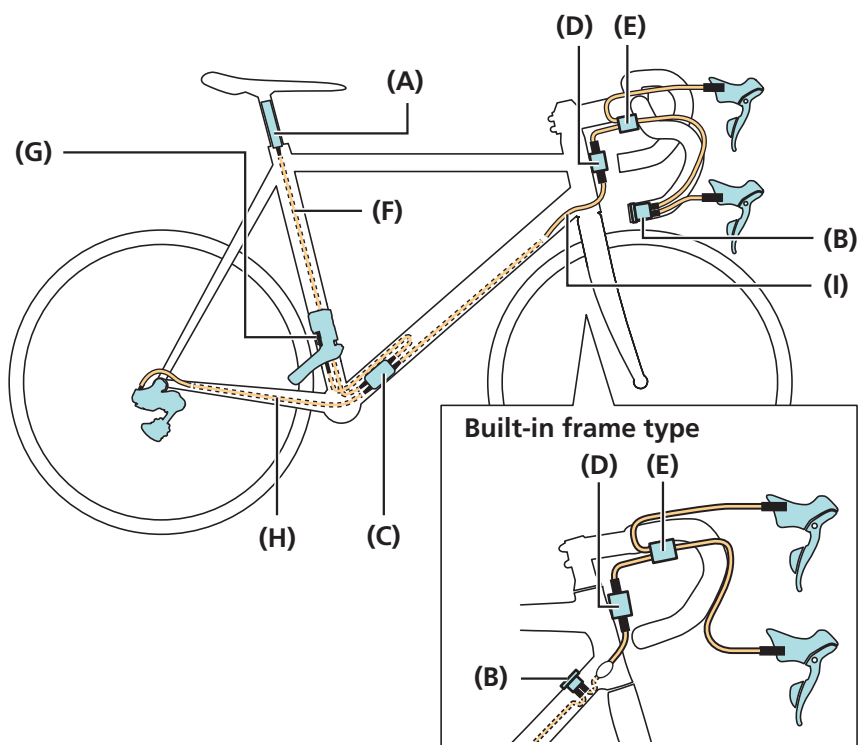
## Electric wire (EW-SD50/EW-SD50-I)

(D)	From built-in battery to junction [B]	(D) + (E) ≤ 1,500 mm (D) + (F) ≤ 1,700 mm
(E)	From front derailleur to junction [B]	
(F)	From rear derailleur to junction [B]	
(G)	From dual control lever to junction [A]	(G), (H) ≤ 500 mm
(H)	From dual control lever to junction [A]	
(I)	From junction [A] to junction [B]	(I) ≤ 1,400 mm

## Wiring example for installing junction [A] on the inside

Use a built-in type junction [A]. In this wiring example, as many wires as possible as well as the battery are routed through the inside of the frame. The wireless unit can be used to send the current gear position and other information to an external device.

### Built-in bar end type



## Wiring component parts

(A)	Lithium-ion battery (built-in type): BT-DN110/BT-DN110-A	(B)	Junction [A]: SM-EW90-A/SM-EW90-B
(C)	Junction [B]: SM-JC41	(D)	Wireless unit: EW-WU111
(E)	Branch type junction: EW-JC130		

## Electric wire (EW-SD50-I)

(F)	From built-in battery to junction [B]	(F) + (G) ≤ 1,500 mm (F) + (H) ≤ 1,700 mm
(G)	From front derailleur to junction [B]	
(H)	From rear derailleur to junction [B]	
(I)	From wireless unit to junction [B]	(I) ≤ 1,400 mm

### TECH TIPS

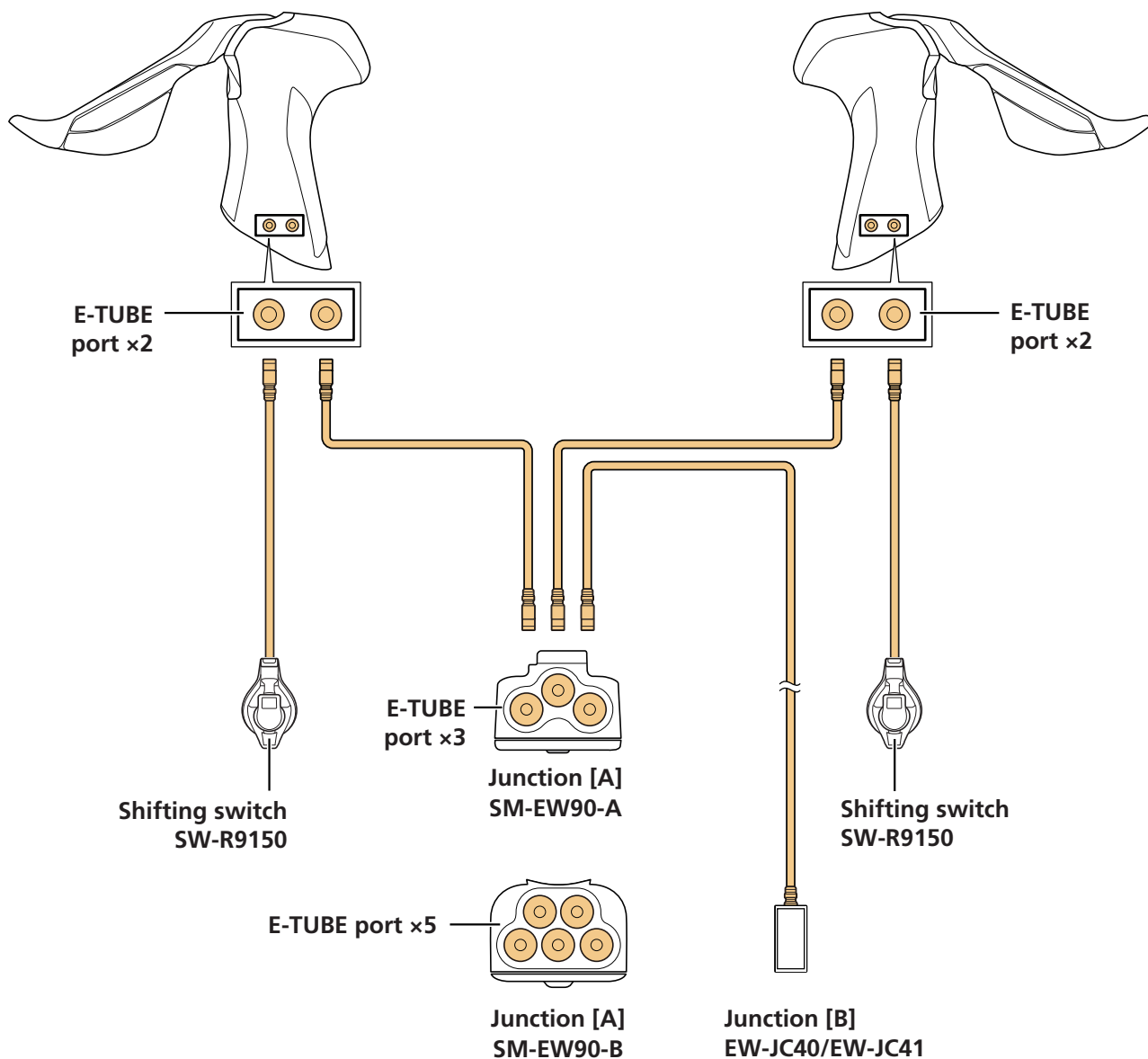
- Refer to "About the branch type junction (EW-JC130)" for information on EW-JC130.
- If using EW-WU111, use it in combination with BT-DN110, BT-DN110-A or BM-DN100.
- Refer to the dealer's manual for EW-WU101 for information on wiring when using EW-WU101 as the wireless unit.

# Wiring diagram around the cockpit

## Wiring example for installing junction [A] on the outside

Dual control lever ST-RX815-L

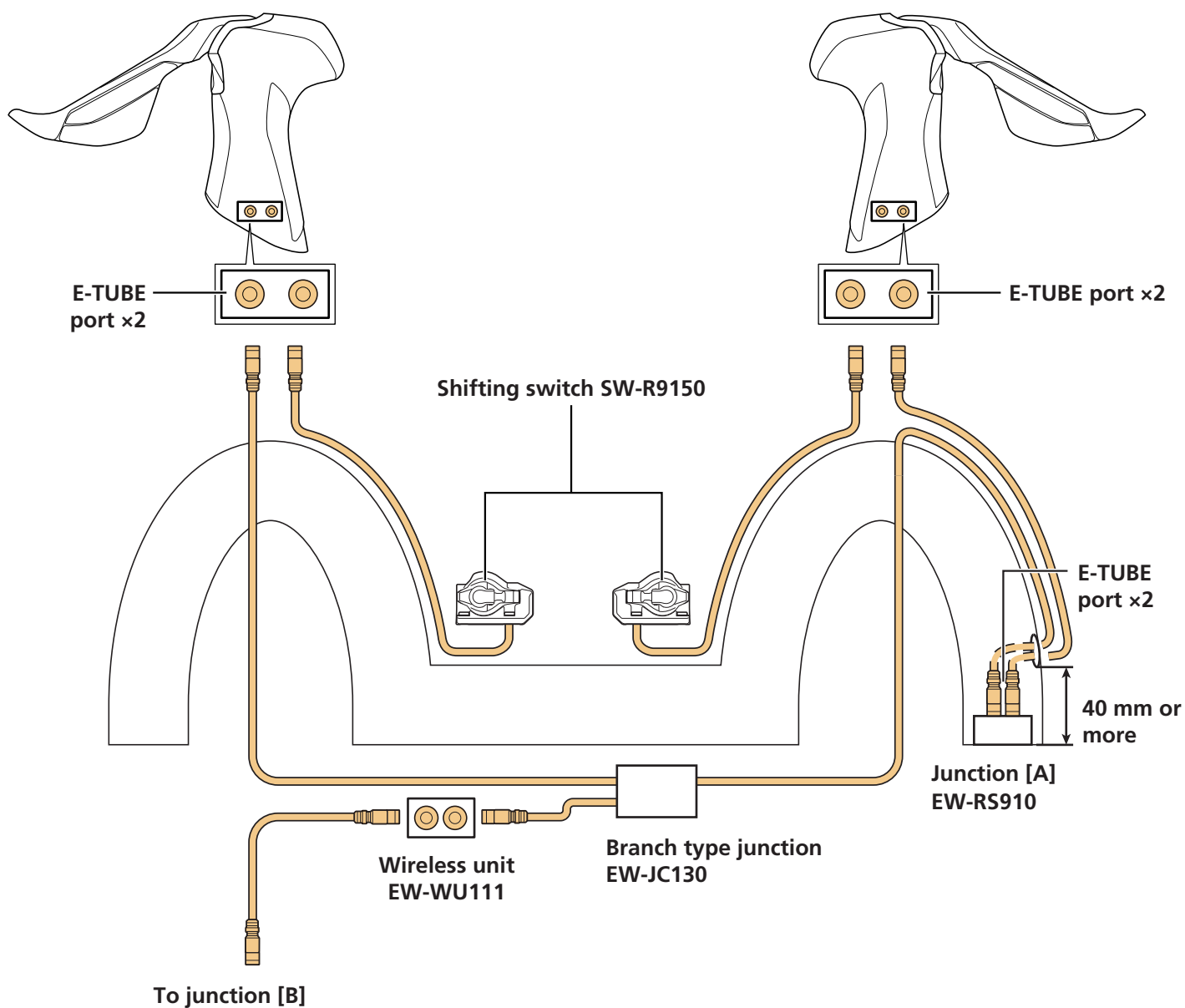
Dual control lever ST-RX815-R



## Wiring example for installing junction [A] inside the handlebar

Dual control lever ST-RX815-L

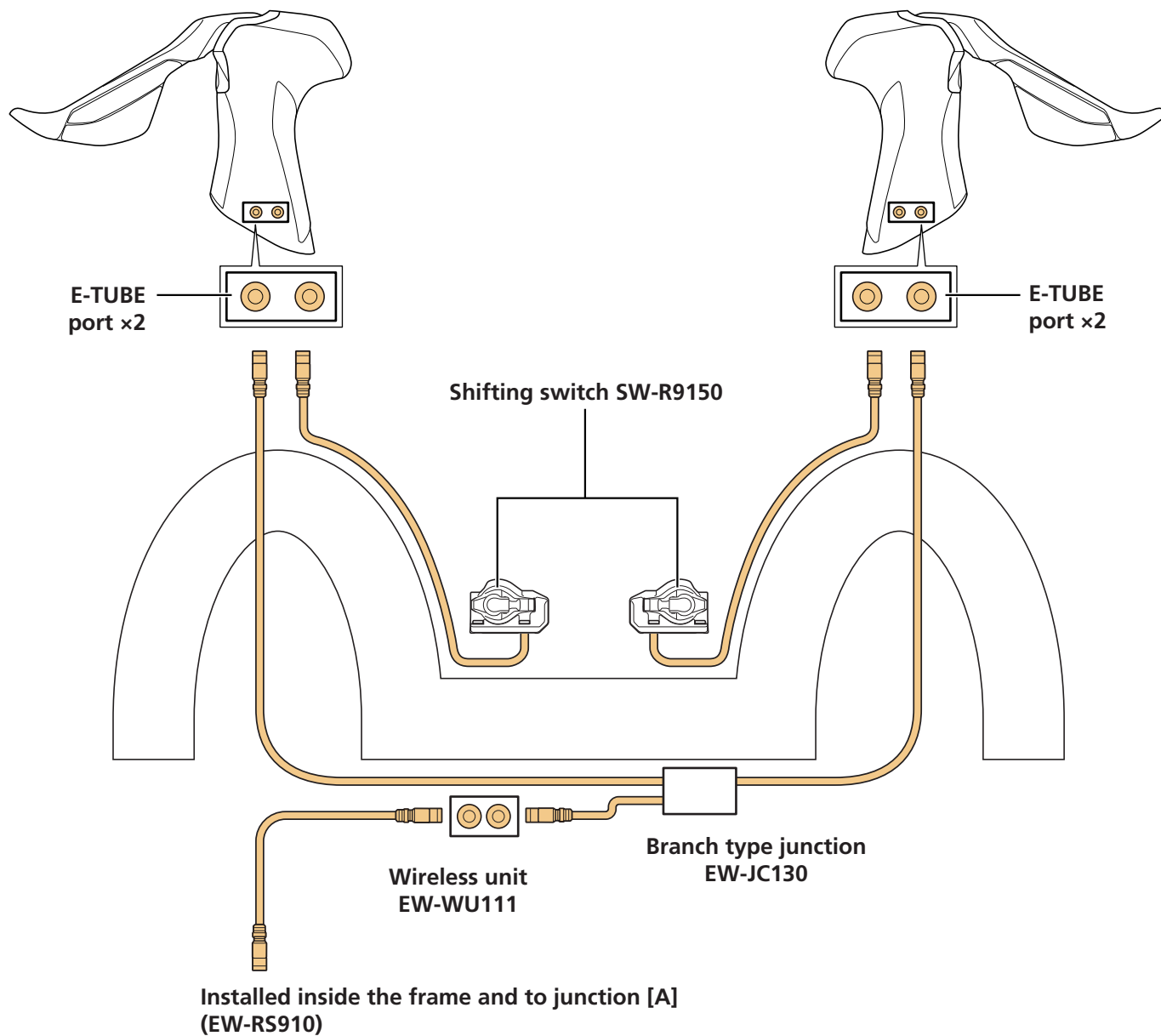
Dual control lever ST-RX815-R



## Wiring example for installing junction [A] inside the frame

Dual control lever ST-RX815-L

Dual control lever ST-RX815-R



# Handling electric wires

Be sure to use the SHIMANO original tool to remove and insert electric wires.

## NOTICE

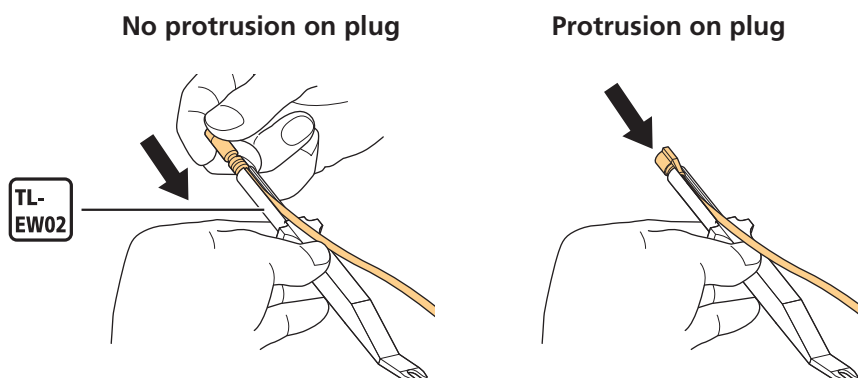
- When connecting and disconnecting electric wires, do not forcibly bend the plug part. It may result in a poor connection.

## Connecting the electric wire

Connect the electric wire to the E-TUBE port.

### 1. Set the plug part of the electric wire to the SHIMANO original tool

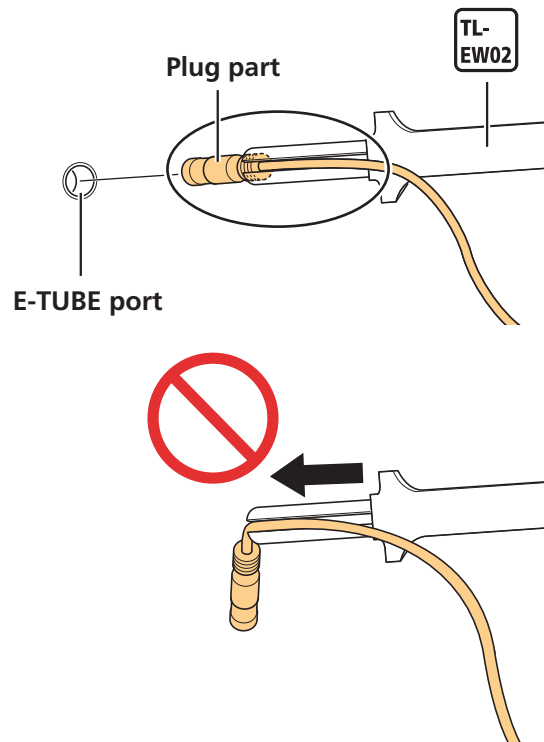
If there is a protrusion on the plug part of the electric wire, set it aligned with the groove on the SHIMANO original tool.





## 2. Insert the plug part on the electric wire into the E-TUBE port.

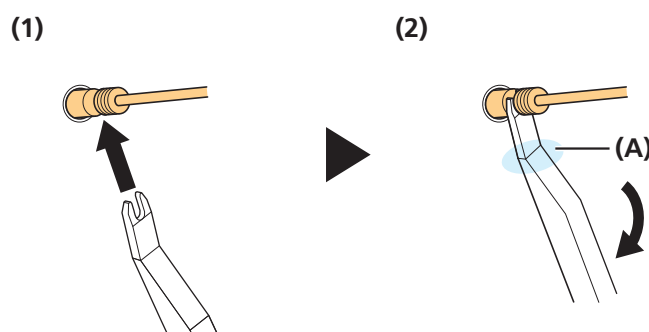
Push it straight in until you feel it click into place.



## Disconnecting the electric wire

### 1. Disconnect the electric wire.

- (1) Insert the SHIMANO original tool into the groove on the plug part of the electric wire.
  - (2) Disconnect the electric wire from the E-TUBE port.
- \* As shown in the figure, use part (A) of the SHIMANO original tool as an axle and move it like a lever, and then disconnect it. If there is limited space to insert the tool, lift the SHIMANO original tool straight up and disconnect the electric wire.

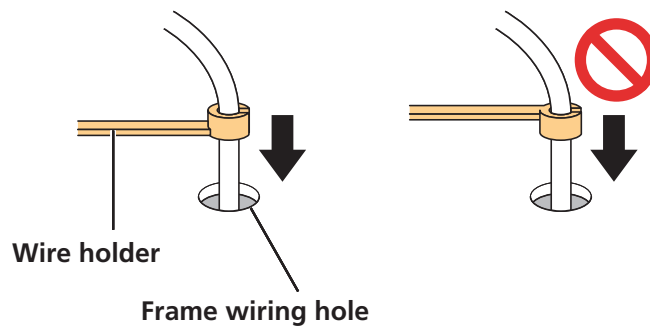


**NOTICE**

- Do not repeatedly connect and disconnect the electric wire too often. The connector may become worn or deformed, and affect the waterproof performance or connection performance.

## Insertion direction of the electric wires for built-in use

Electric wires for built-in use come with wire holders to prevent the electric wires from moving inside the frame. When passing the electric wire for built-in use through the frame, insert in the direction shown in the figure below.



## Finishing for external wiring

When wiring the electric wire outside the frame, use an electric wire cover.

### 1. Install each component and connect the electric wire.

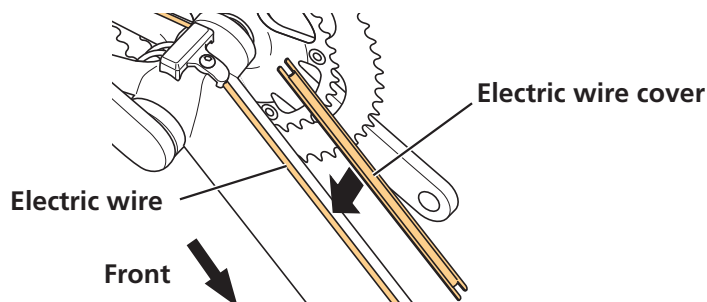
Refer to each section in this chapter for details. Perform the procedure with the electric wire temporarily secured to the frame using tape with low adhesion, etc.

### 2. After installing and connecting all the components, perform the procedures in "Checking connections".

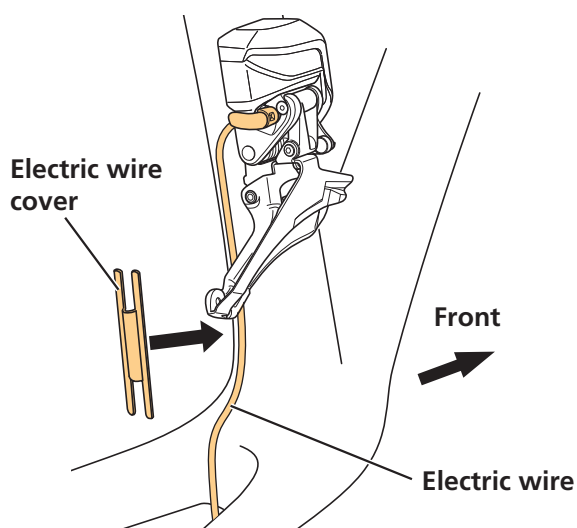
### 3. Remove the temporary tape, and affix the electric wire cover to the locations on the frame.

Affix the electric wire cover after peeling off the release liner from the back side.

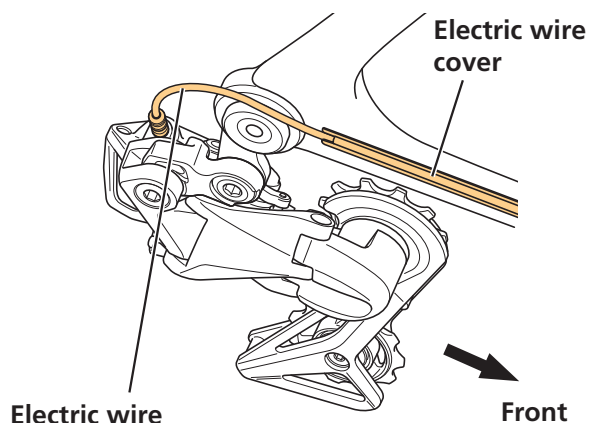
Installation example to the lower side of the down tube  
(wiring to junction [B])



Installation example to the seat tube  
(wiring to the front derailleur)



Installation example to the chainstay  
(wiring to the rear derailleur)



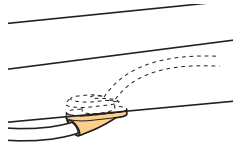
#### NOTICE

- To ensure adhesion, before affixing the electric wire cover, wipe off the grease on the frame with alcohol or a cleaner.

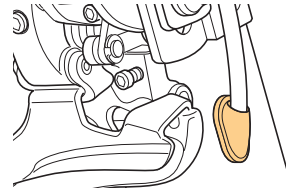
## Finishing for internal wiring

When wiring the electric wire inside the frame, install a grommet to the wiring hole of the frame for protective purposes after passing the electric wire through the frame.

Installation example to the chainstay  
(wiring to the rear derailleur)



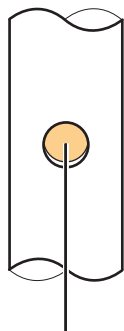
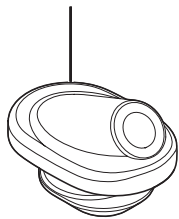
Installation example to the seat tube  
(wiring to the front derailleur)



### TECH TIPS

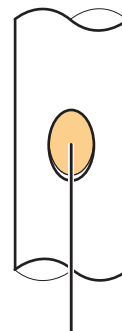
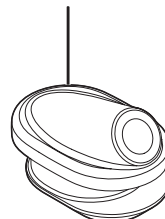
- There are two types of grommets as shown in the figure below. Use the correct one according to the shape of the wiring hole.

SM-GM01



Circular wiring hole

SM-GM02



Elliptic wiring hole

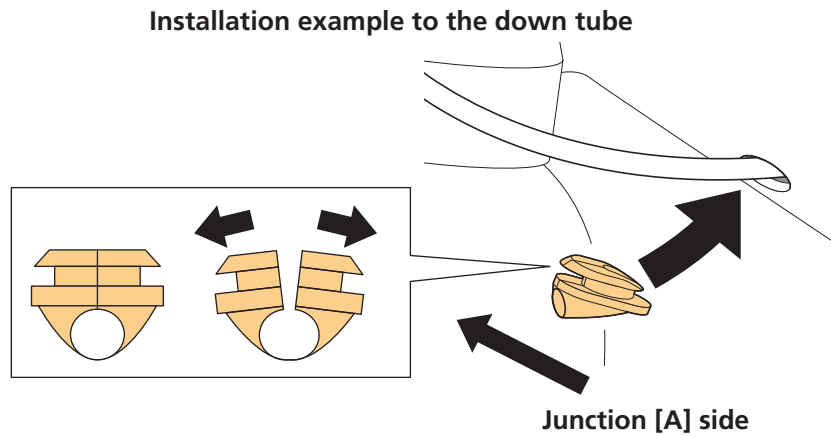
## 1. Install each component and connect the electric wire.

Refer to each section in this chapter for details. Pass the electric wire through the inside of the frame as indicated in the wiring diagram, and connect each component.

## 2. After installing and connecting all the components, perform the procedures in "Checking connections".

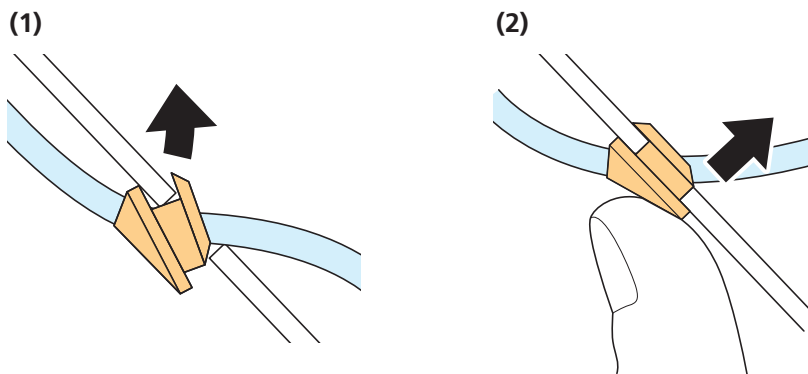
### 3. Open the grommet from the center, and place it over the electric wire in the appropriate position.

Perform the procedure after determining the length of the electric wire to expose from the frame in advance.



### 4. Install the grommet.

- (1) Insert the grommet so that it hooks onto the wiring hole of the frame.
- (2) Push in the grommet with your finger.



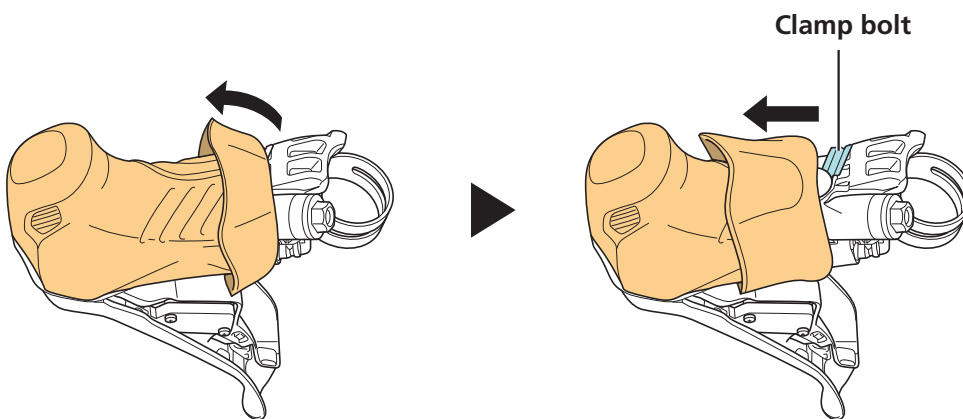
# Temporarily installing the dual control lever

Temporarily install the dual control lever. You will need to check the connections and install the brake hose before proceeding to "Securing the dual control lever".

## ST-RX815

### 1. Turn over the bracket cover from the back side.

Gently turn over the ends of the bracket cover with both hands and slowly push them down.

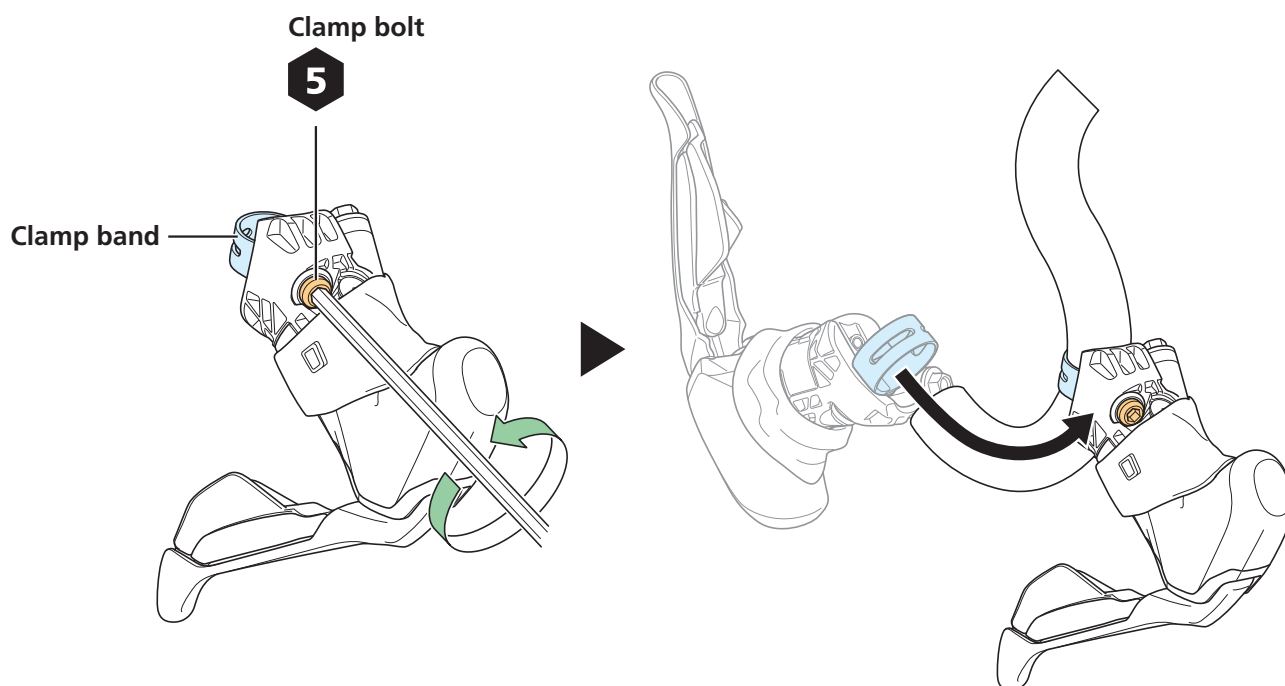


#### NOTICE

- Forcibly pulling it may cause damage to the bracket cover because of its material properties.

## 2. Loosen the clamp bolt, and pass the clamp band through the handlebar.

The clamp bolt is on top of a bracket which has had its bracket cover turned over.

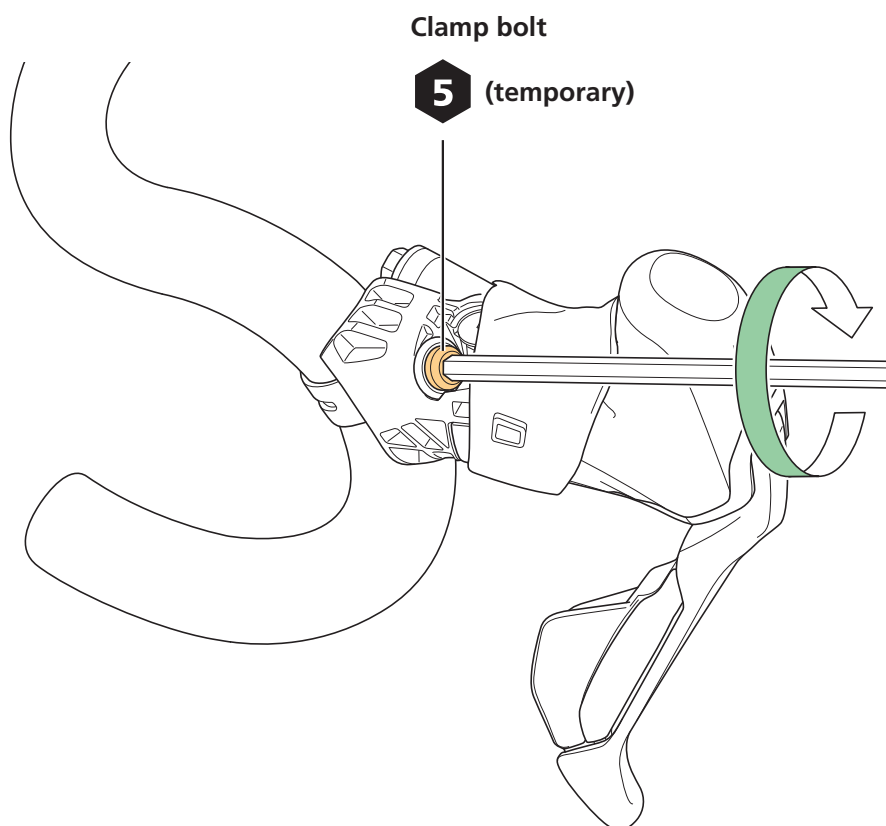


### NOTICE

- Loosen the clamp bolt sufficiently. The handlebar may be damaged when passing the clamp band through the drop handlebar.

### 3. Temporarily install the lever to the handlebar.

Temporarily install the lever so that it cannot move.

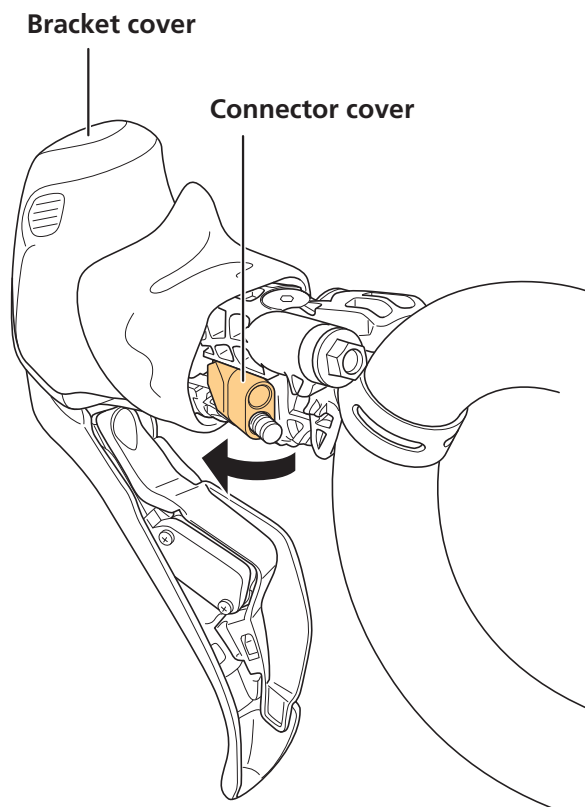


#### **NOTICE**

- The clamp band, clamp bolt, and clamp nut are not compatible with other products. Do not use them in combination with components used with other products.

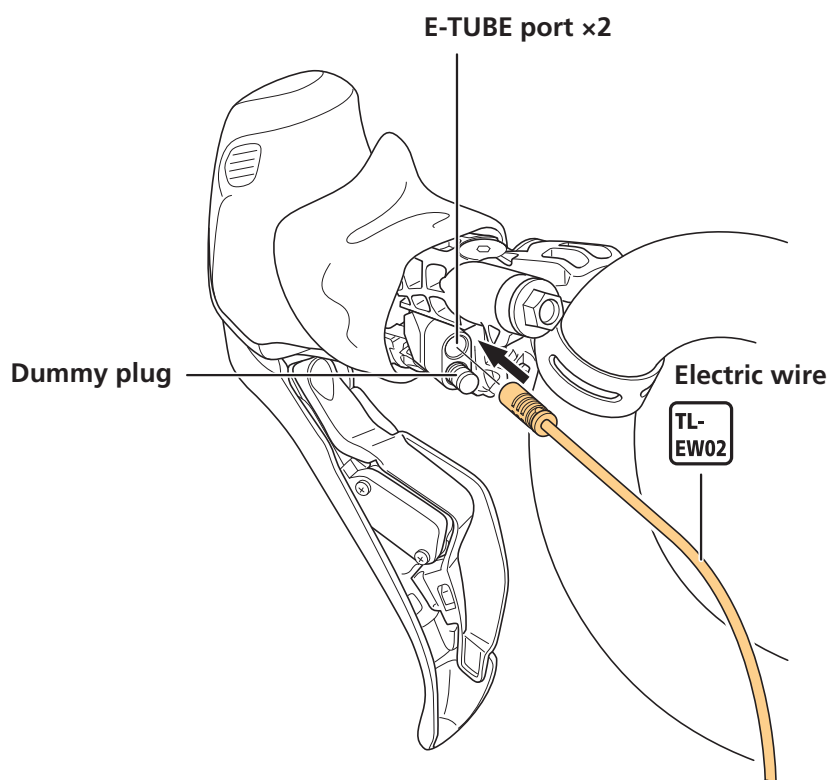


#### 4. Lift up the connector cover.



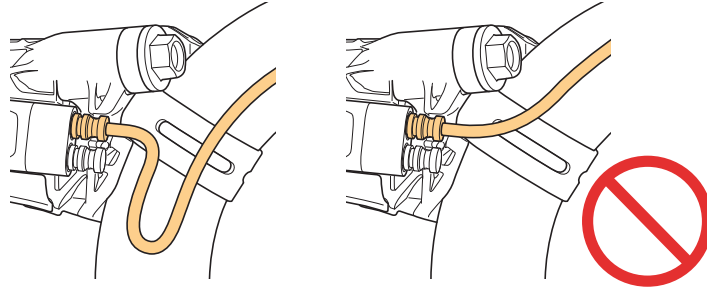
#### 5. Remove the dummy plug, and connect the electric wire.

Be sure to push it in firmly until you feel a click.



### TECH TIPS

- Ensure that the electric wire to connect to the dual control lever has extra length to make it easier to remove and insert when performing maintenance.



- The remaining E-TUBE port can be used to connect a shifting switch (next section) or connect a PC linkage device for maintenance. Leave the dummy plug attached to the unused E-TUBE port.

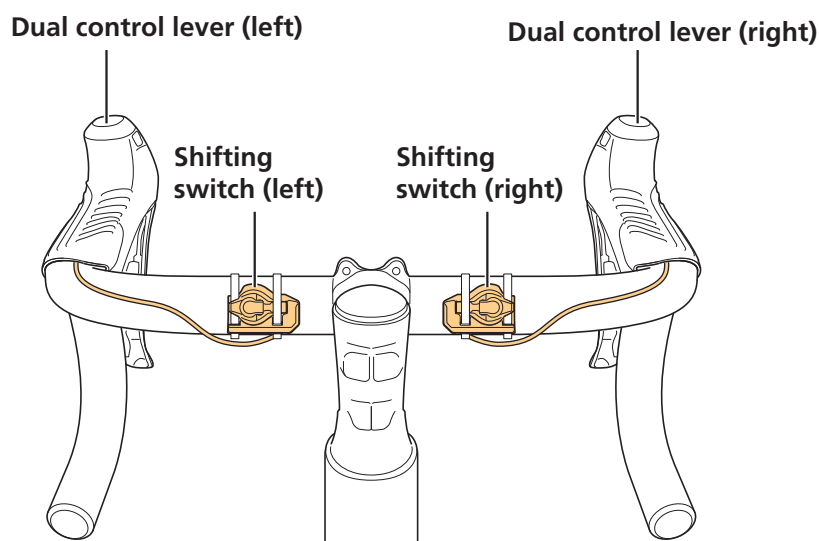
## Installing the shifting switches

This section describes how to add shifting switches.

### SW-R9150

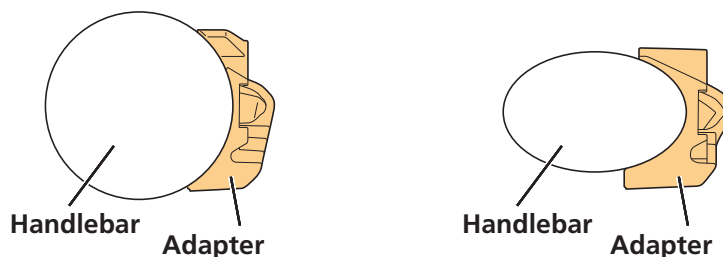
#### ► Routing map

A routing example of the shifting switches is shown below.



## TECH TIPS

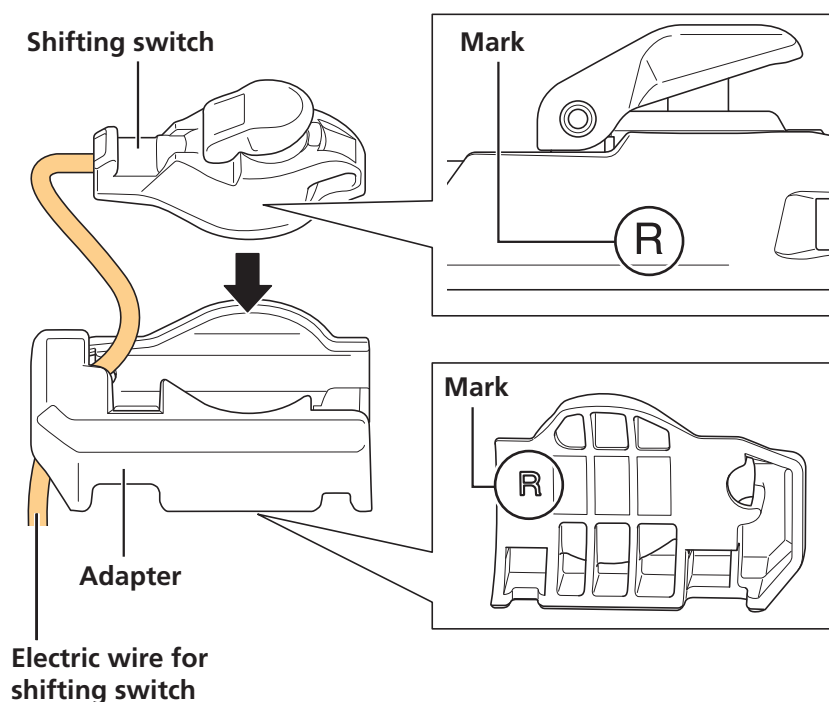
- Two types of adapters for connecting the shifting switches to the handlebar are included in the product. Select the adapter according to the cross-section of the handlebar.



## ▶ Connection method

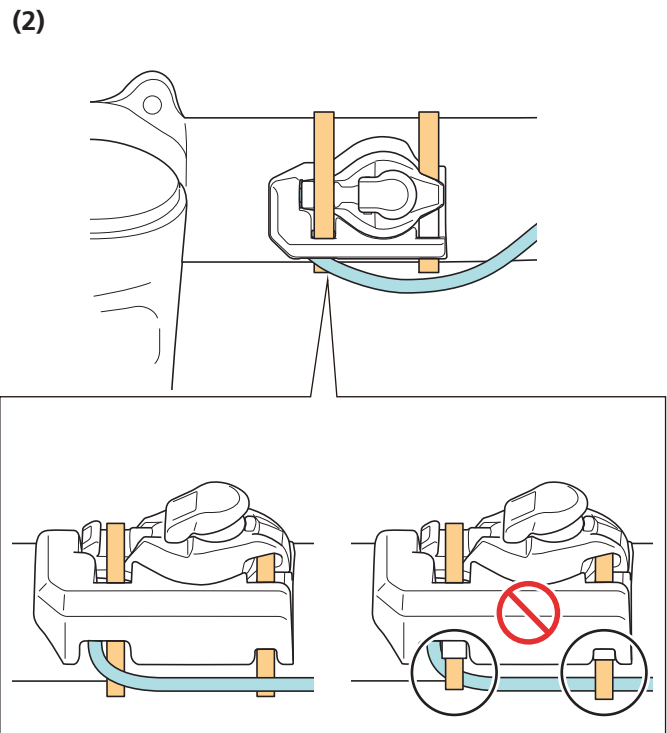
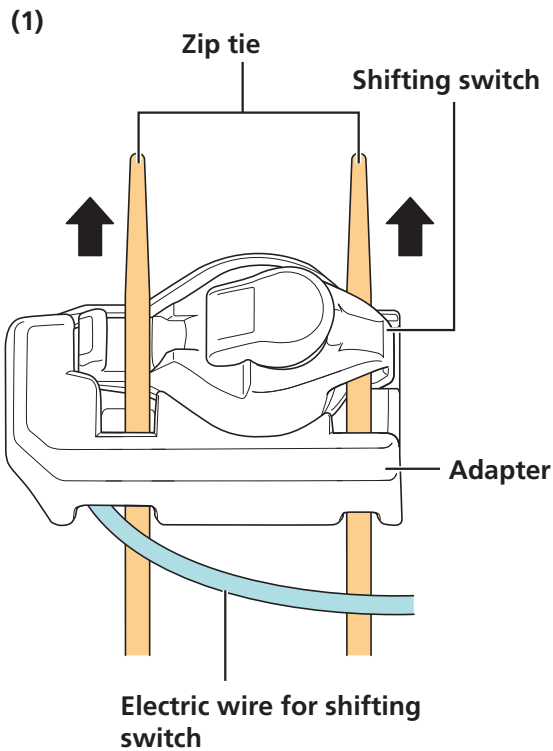
### 1. Set the shifting switch to the adapter.

- (1) Check the marks (R/L) on the shifting switch and the adapter.
- (2) Set the shifting switch to the adapter.



## 2. Secure the shifting switch and adapter to the handlebar with a zip tie.

- (1) Pass the zip tie through.
- (2) Check that the zip tie has been passed through correctly, and tighten the zip tie.

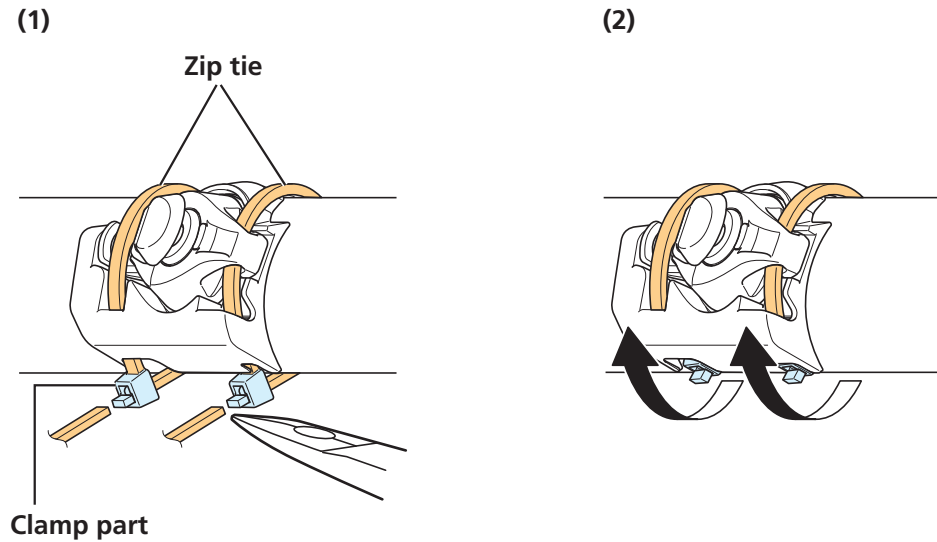


### NOTICE

- When tightening the zip tie, take care not to also tighten the electric wire. Failure to do so will cause operation failure.

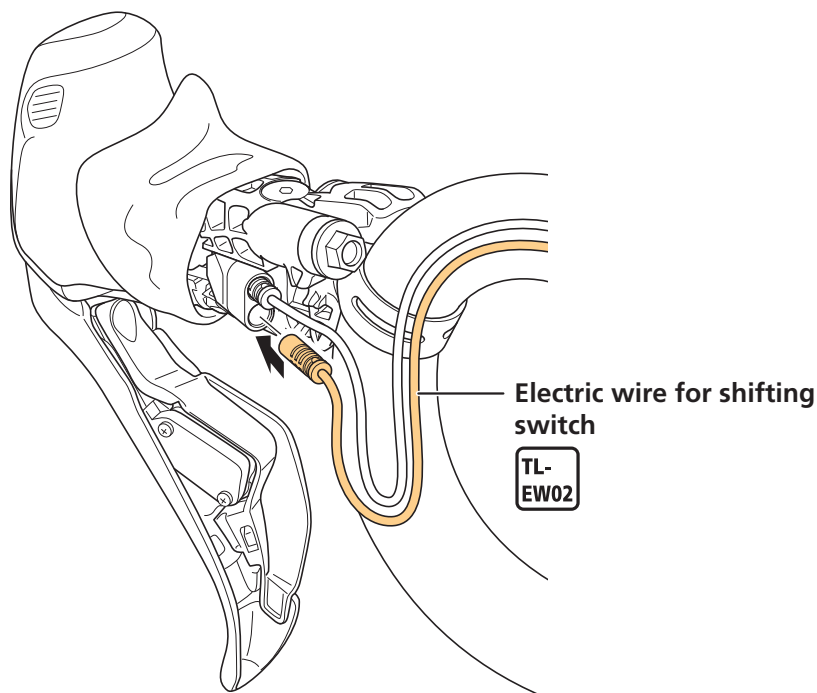
### 3. Perform post-processing of the zip tie.

- (1) Cut the remaining part of the zip tie using nippers, etc.
- (2) Rotate the zip tie, and insert the clamp part into the hole of the adapter.



### 4. Connect the electric wire of the shifting switch to the E-TUBE port of the dual control lever.

Be sure to push it in firmly until you feel a click.



**TECH TIPS**

- If there is length to spare in the electric wire of the shifting switch, retaining it on the dual control lever side will make it easier to remove and insert wiring when performing maintenance.

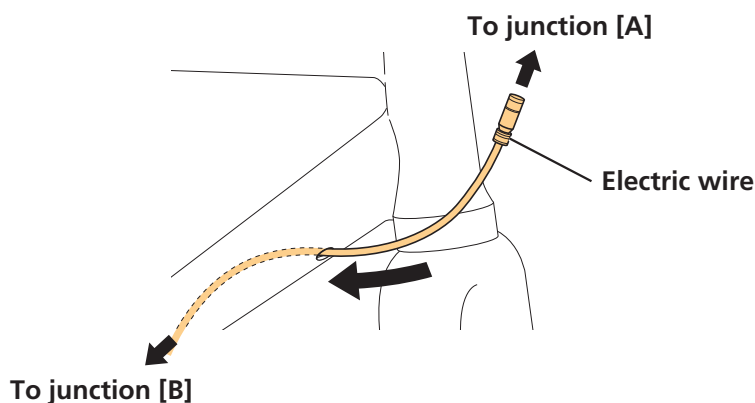
## Installing junction [A]

### External type

Install external type junction [A] to the bottom of the stem. A band and hook to use for installation is included.

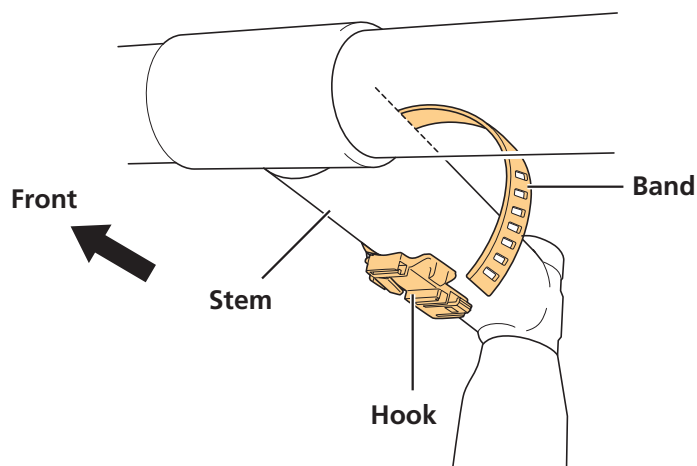
#### 1. Check the electric wire that will be connected to junction [A].

The figure below is an example of placing the electric wire inside the frame.

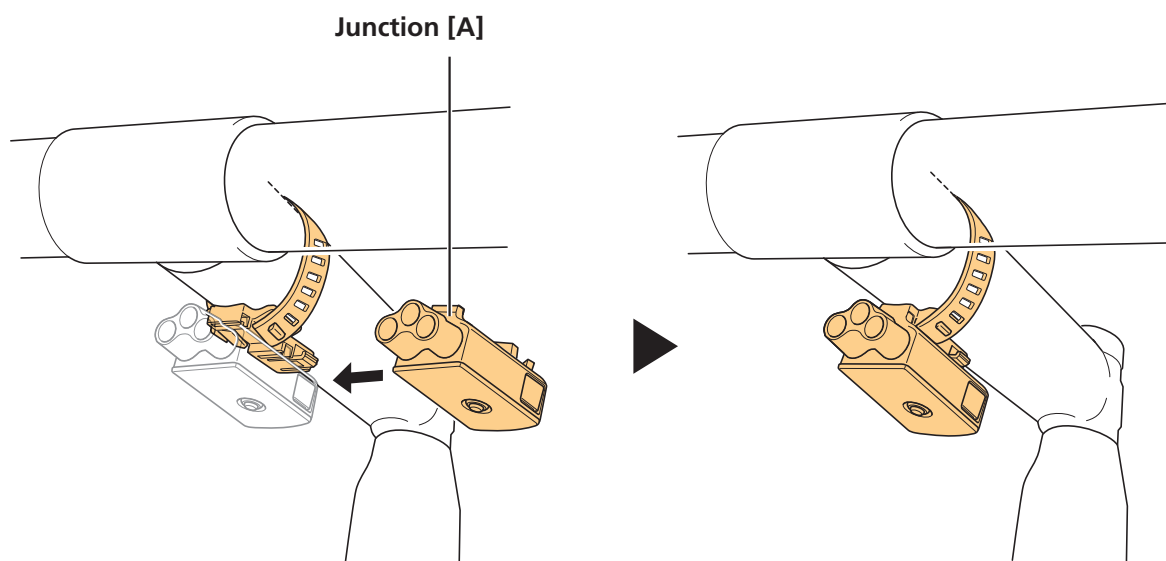


## 2. Install the band and hook to the stem.

- (1) Set the hook on the band.
- (2) Adjust the length of the band according to the thickness of the stem, hook it on the hook and wind it. Pull the hook with your hand so that it does not become displaced, and install it securely.

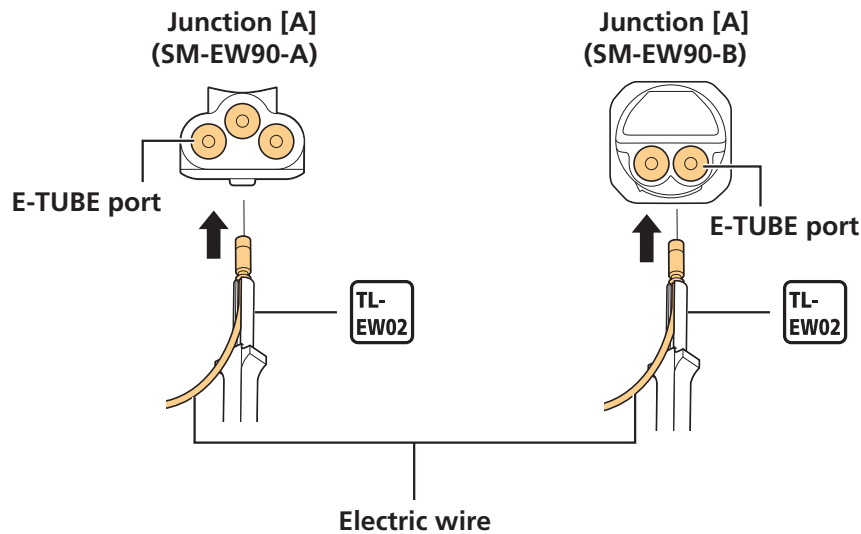


## 3. Slide junction [A] into the rail section of the hook to install it.



#### 4. Connect the electric wire to the E-TUBE port of junction [A].

Check the wiring diagram, and connect the electric wire to the E-TUBE port of junction [A]. Be sure to push it in firmly until you feel a click.

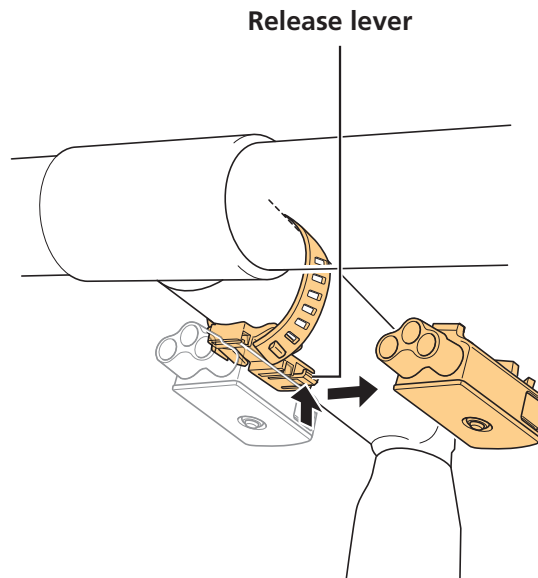


### ▶ Removal

#### 1. Remove the electric wire connected to junction [A].

#### 2. Remove junction [A].

Slide junction [A] to remove it while gently pushing the release lever of the hook.



#### NOTICE

- Do not push the release lever strongly. Doing so may cause the release lever to break.

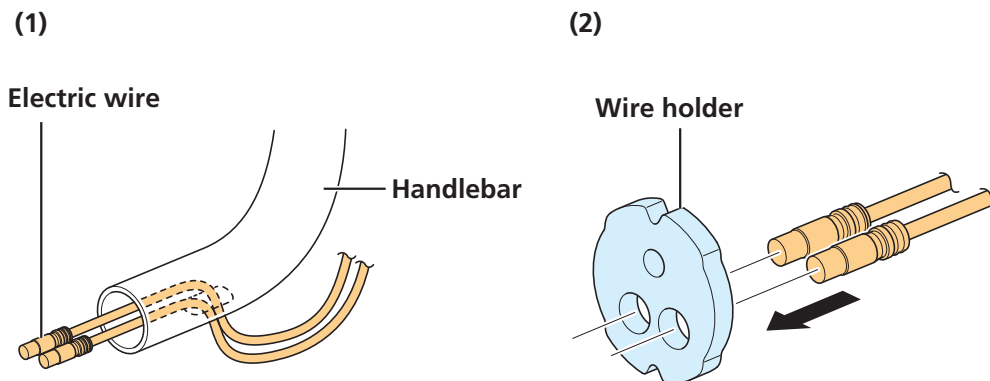


## Built-in bar end type

When installing a built-in bar end type junction [A], use a compatible handlebar.

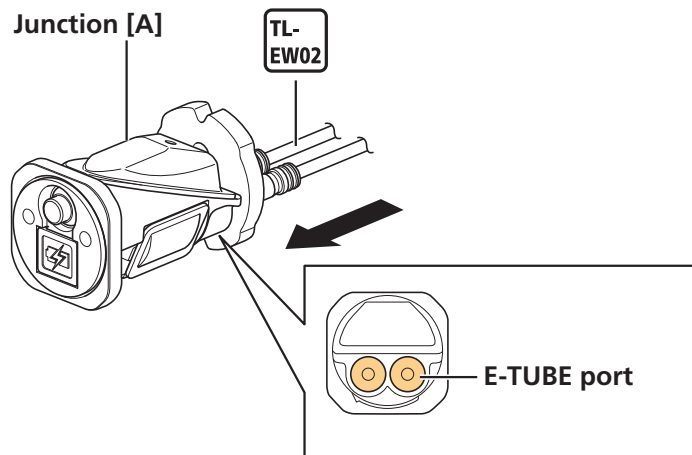
### 1. Prepare the wires.

- (1) Pass the electric wires through the wiring hole in the handlebar and pull them out from the bar end.
- (2) Attach the wire holder to the electric wires.



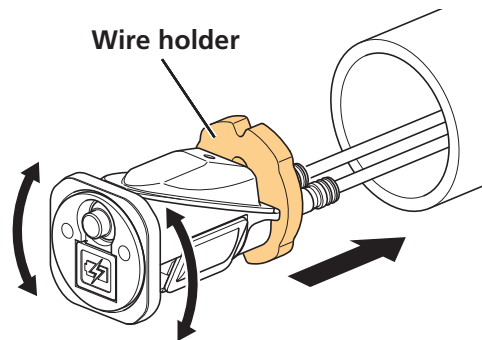
### 2. Connect the electric wires to the E-TUBE port on junction [A].

Be sure to push it in firmly until you feel a click.



### 3. Insert junction [A] into the handlebar using a gentle twisting motion.

Insert junction [A] fully and securely ensuring the wire holder does not become crooked in the handlebar.

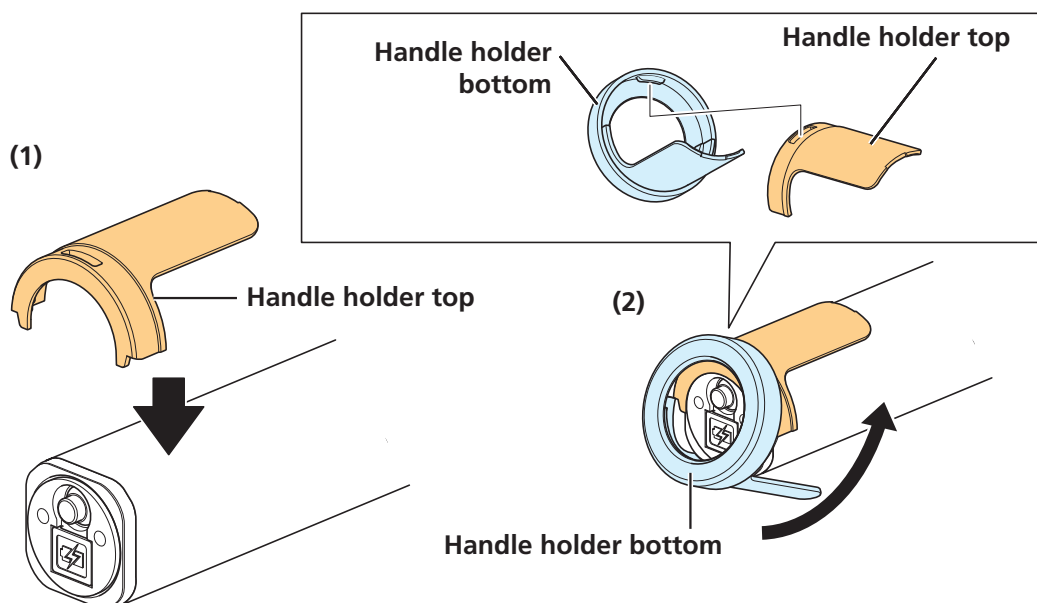


#### NOTICE

- Do not tap junction [A] with a hammer or similar tool when inserting it. Doing so may cause damage.
- Perform the following steps after "Checking connections".

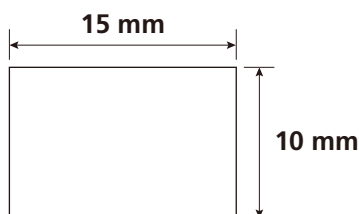
### 4. Attach the handle holder to the bar end.

- (1) Peel the release liner on the back and attach the upper handle holder to the handlebar.
- (2) In the same manner, attach the lower handle holder. Combine the upper and lower handle holders by hooking the lower handle holder into the groove in the upper handle holder as shown in the figure, then attach it.
- (3) After attaching the handle holders, hold them down with your finger for approximately 1 minute.



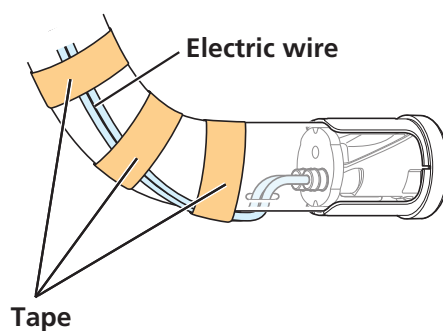
### TECH TIPS

- If the adhesive force of the double-sided tape on the handle holders has weakened, cut some commercially-available double-sided tape as shown in the figure below and replace them.



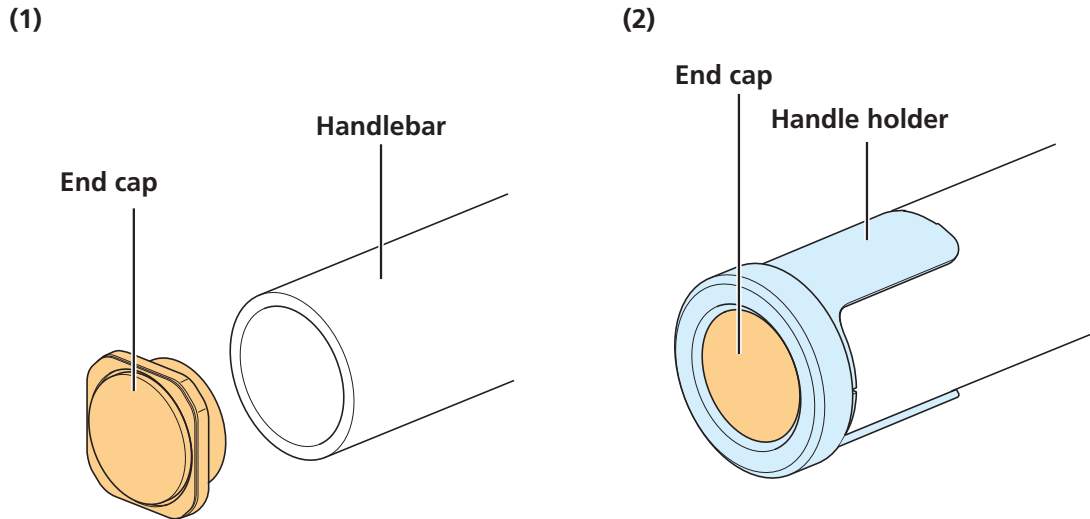
## 5. Temporarily secure the electric wires to the handlebar.

- (1) Adjust the length of the electric wires by tucking any excess length into the handlebar etc.
- (2) Temporarily secure the electric wires to the handlebar using tape or a similar material.



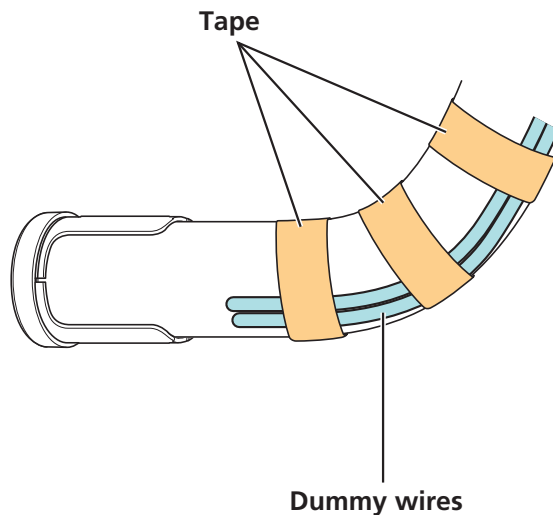
## 6. Attach the end cap and handle holder to the bar end on the opposite side.

- (1) Insert the end cap into the bar end without junction [A] installed.
- (2) Refer to Step 4 to attach the handle holder.



## 7. Temporarily secure the dummy wires to the handlebar as necessary.

Route and temporarily secure the dummy wires in the same manner as the electric wires.



### TECH TIPS

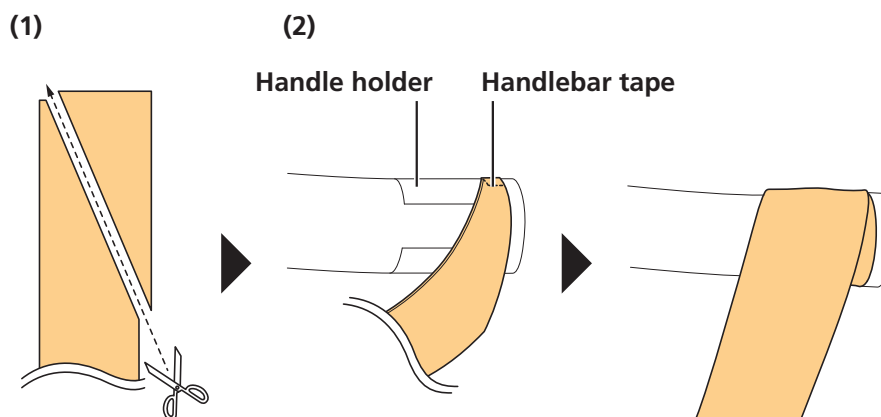
#### Dummy wires

- Dummy wires are attached to give the handlebar end not fitted with junction [A] the same thickness of the electric wires so that the rider does not feel the difference between the left and right handlebar grips. Route and temporarily secure the dummy wires in the same manner as the electric wires.

## 8. Wrap the handlebar with the handlebar tape.

Finally, wrap the handlebar with the handlebar tape, after installing the hydraulic brake system.

- (1) Cut off the end of the handlebar tape diagonally.
- (2) Wrap the handlebar with the handlebar tape over the handle holders.



## Built-in frame type

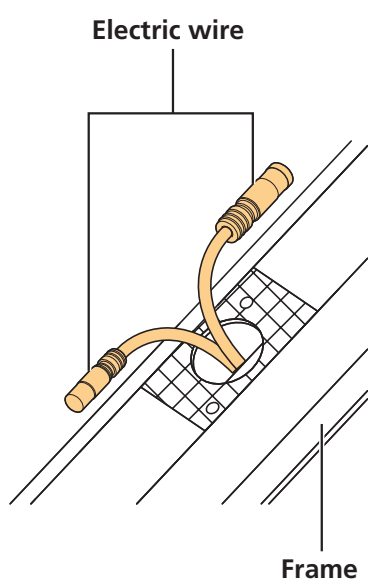
When installing junction [A] of a built-in frame type, prepare a compatible frame.

### 1. Connect the electric wire to junction [A].

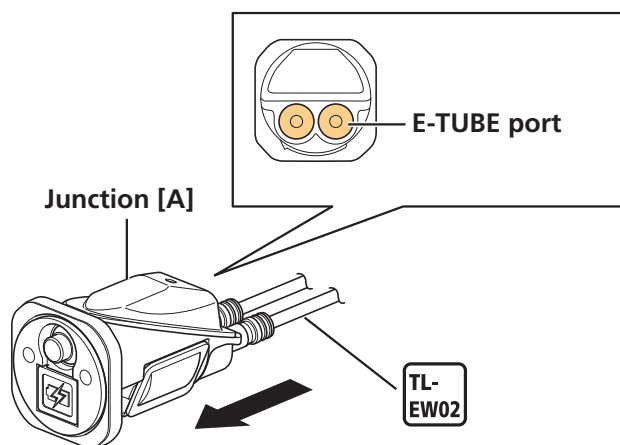
- (1) Check the electric wire that will be connected to junction [A].
- (2) Connect the electric wire to the E-TUBE port of junction [A].

\* Be sure to push it in firmly until you feel a click.

(1)

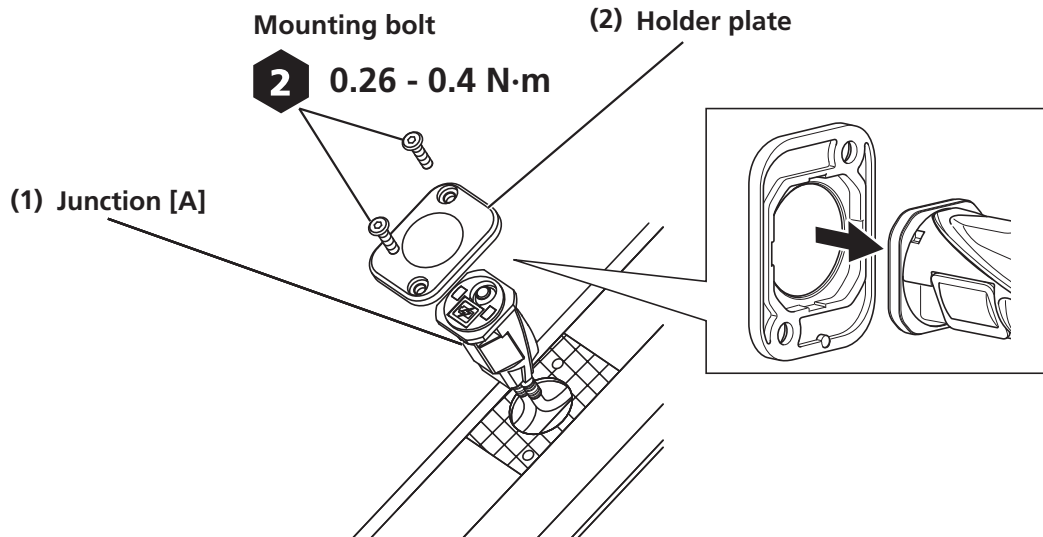


(2)



## 2. Install junction [A] to the frame.

- (1) Insert junction [A] into the frame.
- (2) Install the holder plate.



### NOTICE

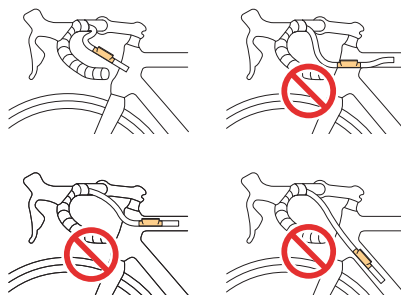
- When installing parts on a carbon frame/handlebars, confirm the recommended tightening torque with the carbon frame or part manufacturer in order to prevent damage to the carbon material due to overtightening or inadequate securing of the components due to insufficient tightening torque.

## Installing the wireless unit

This section describes how to install EW-WU111. When using EW-WU101, refer to the dealer's manual for EW-WU101.

### NOTICE

- Position the wireless unit so that it is not on the side of the bicycle. Otherwise, it could be damaged if the bicycle tips over and it is pinched between the frame and curb.

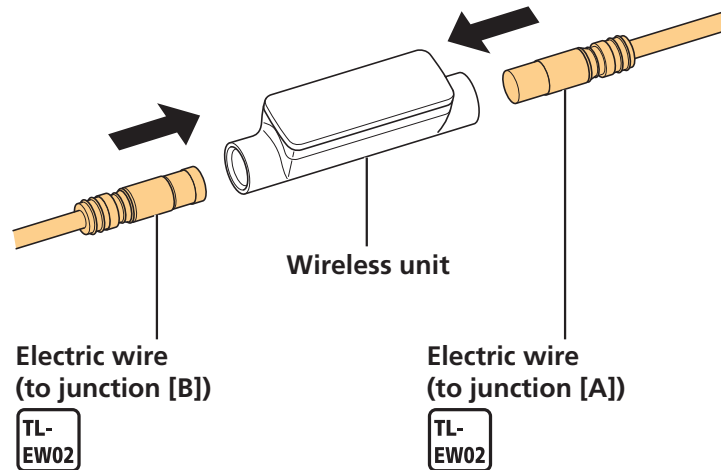


## 1. Connect the electric wire to the wireless unit.

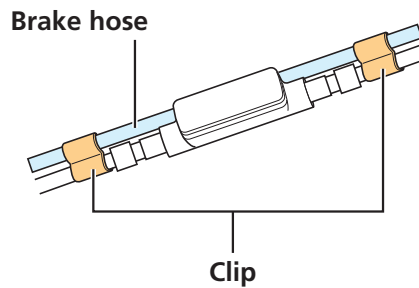
- (1) Check the electric wire that will be connected to the wireless unit.
- (2) Connect the electric wire to the E-TUBE port of the wireless unit.

\* Be sure to push it in firmly until you feel a click.

Perform the subsequent steps after installing the brake hose.



## 2. Secure the electric wire and brake hose with clips.





# Temporarily installing the front derailleur

The recommended installation order for the front derailleur varies depending on whether the wiring is inside or outside the frame.

- If the wiring is inside the frame, temporarily install the front derailleur as described here, check all connections (including with other components), and then proceed to "Securing the front derailleur".
- If the wiring is outside the frame, refer to the information here as well as the information in "Securing the front derailleur", and then complete installing the front derailleur.

## When there is a mounting boss on the seat tube

Be sure to install the backup plate to prevent the frame from being damaged by pressure from the support bolt.

### 1. Check the installation location.

Check where the support bolt makes contact with the seat tube when adjusting the front derailleur support bolt.

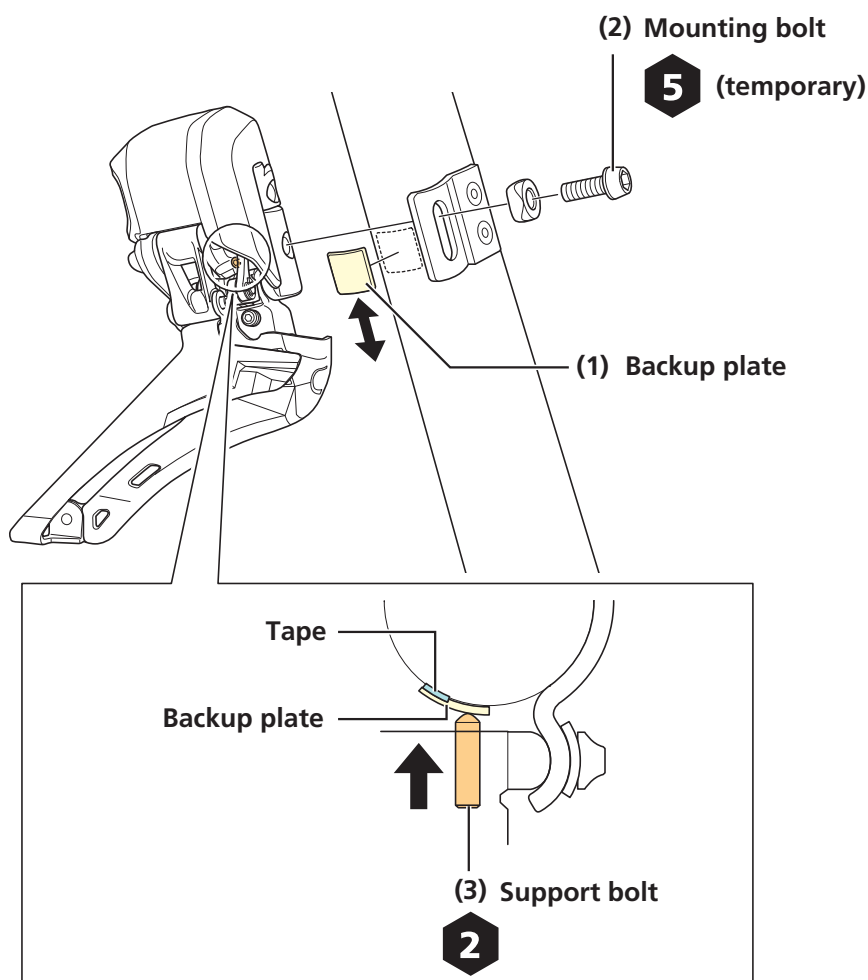
## 2. Temporarily install the front derailleur.

(1) Peel the release liner on the back, and then attach the backup plate to the seat tube.

\* Avoid positioning the tape that attaches the backup plate to the seat tube in the location where the support bolt directly touches the frame.

(2) Temporarily install the front derailleur.

(3) Tighten the support bolt until it touches the backup plate.



## When there is no mounting boss on the seat tube

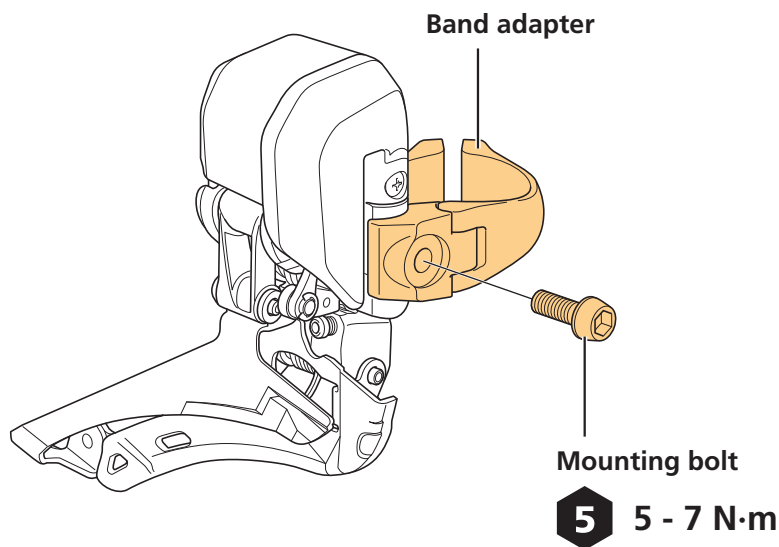
When there is no mounting boss on the seat tube, use a band adapter (SM-AD91).

### 1. Check the installation location.

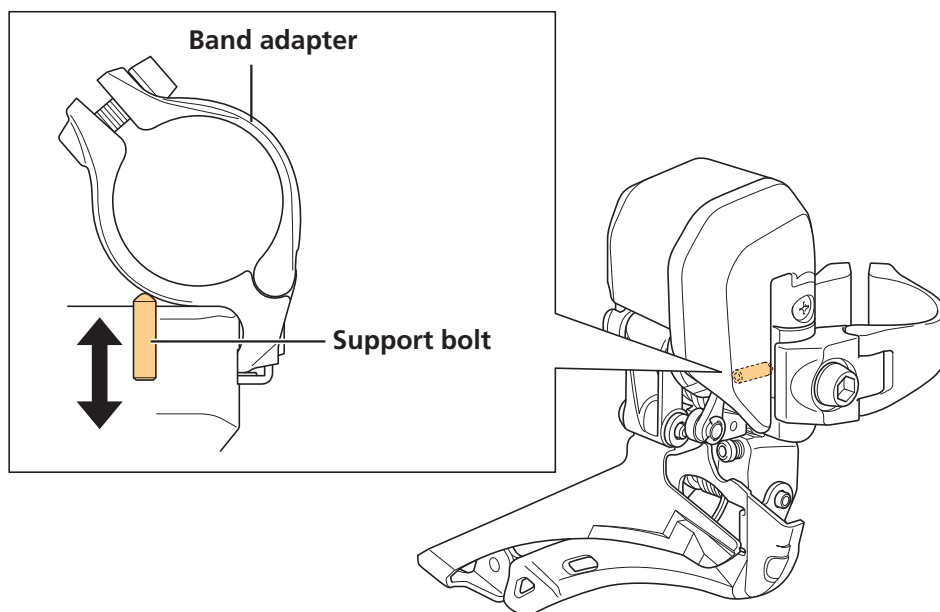
Check the position where the support bolt directly touches the band adapter when the support bolt of the front derailleur is being adjusted.

## 2. Install the band adapter to the front derailleur.

- (1) Refer to Step 2 of "When there is a mounting boss on the frame" to attach the backup plate to the band adapter.
- (2) Install the band adapter to the front derailleur.



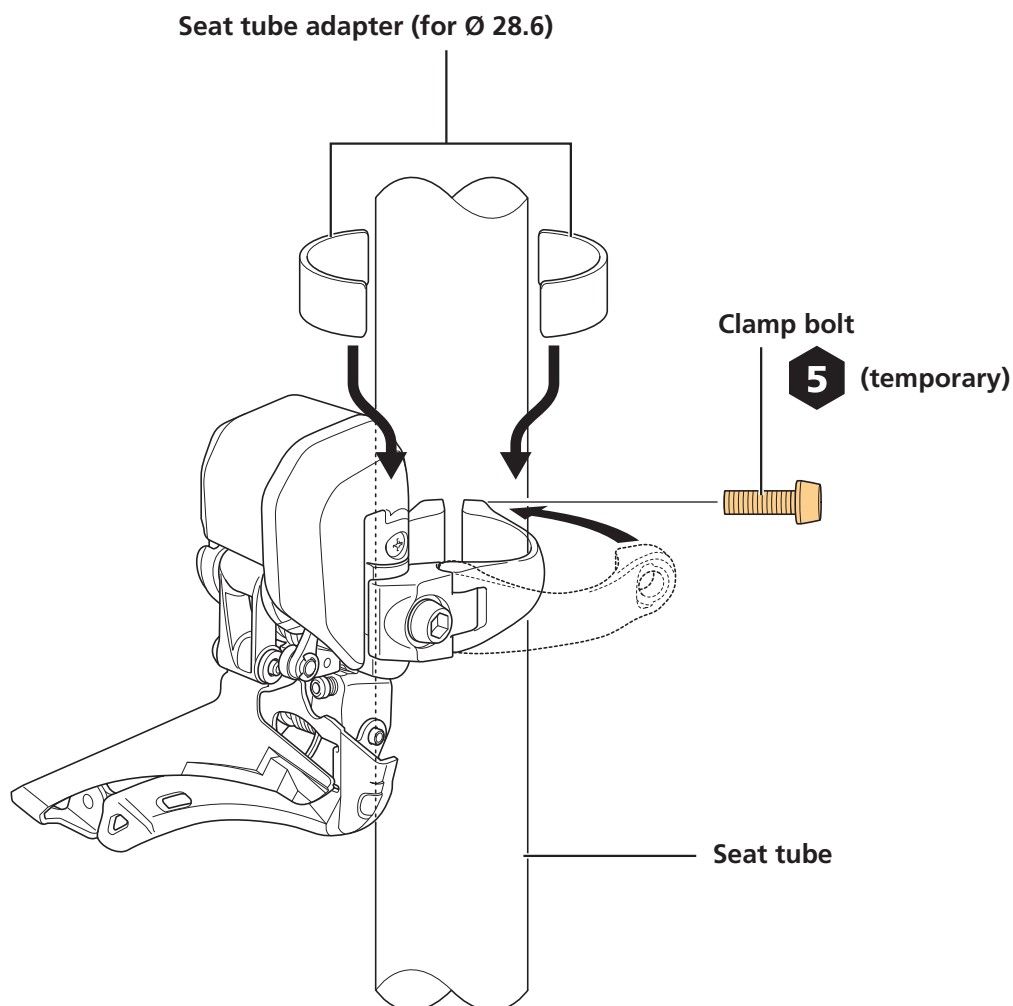
## 3. Tighten the support bolt until it touches the backup plate.



## 4. Temporarily install the front derailleur to the seat tube.

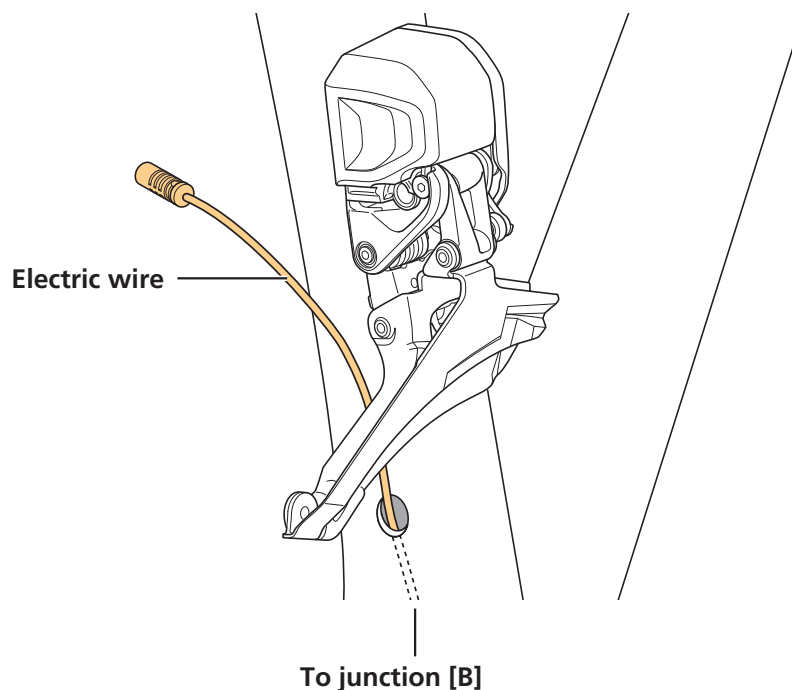
- (1) Remove the clamp bolt, and expand the clamp band of the band adapter.
- (2) Set the clamp band to the frame, and reinstall the clamp bolt.

\* Use a seat tube adapter (for Ø28.6) according to the size of the seat tube.



## Connecting the electric wire

### 1. Check the electric wire that will be connected to the front derailleur.

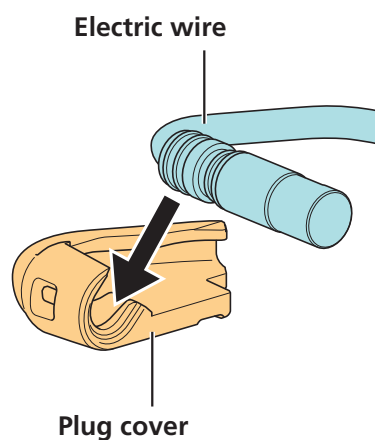


### 2. Connect the electric wire.

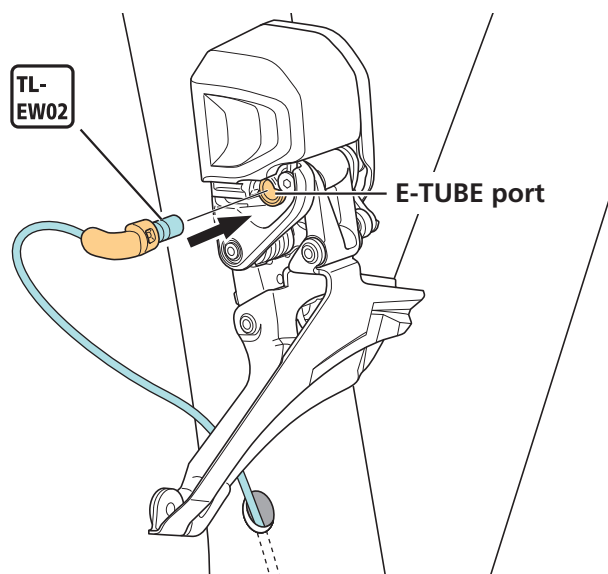
- (1) Install the electric wire to the plug cover.
- (2) Connect the electric wire with the plug cover to the E-TUBE port of the front derailleur.

\* Be sure to push it in firmly until you feel a click.

(1)

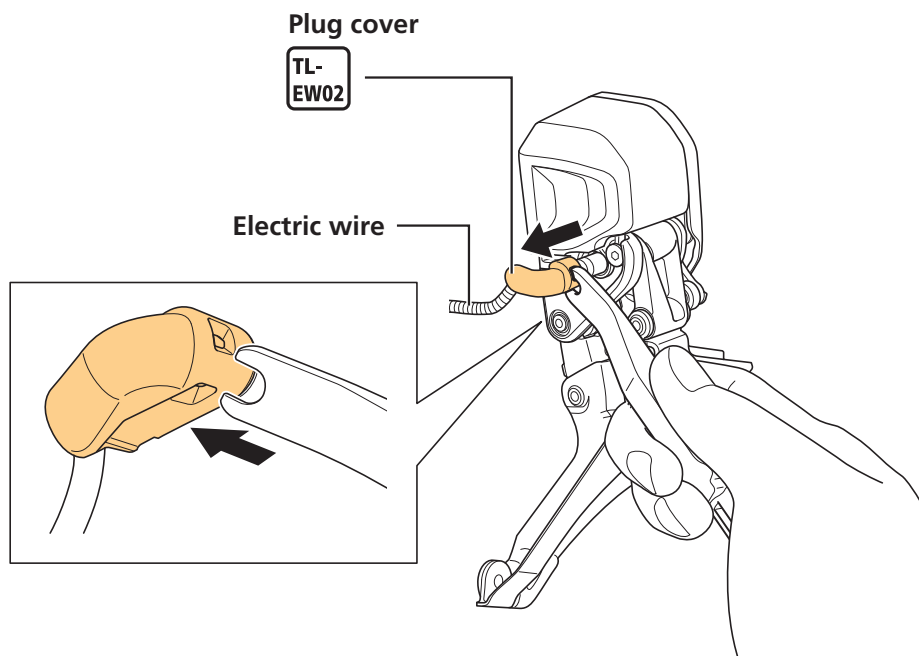


(2)



## TECH TIPS

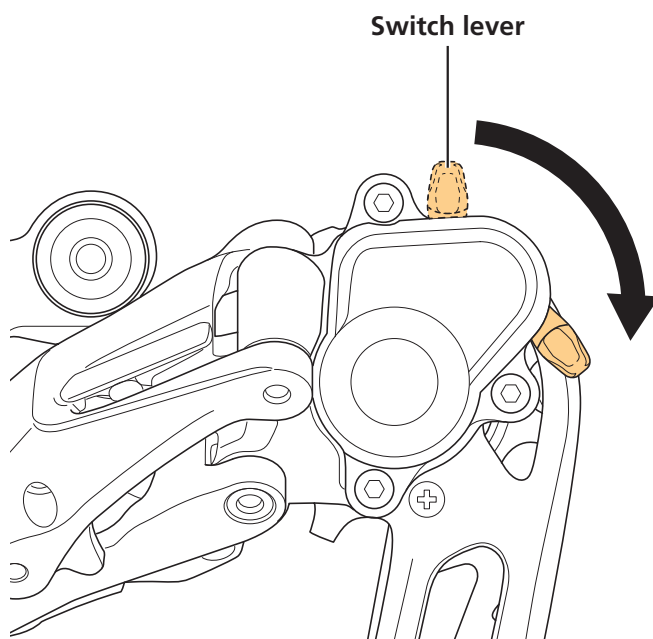
- When removing the electric wire of the front derailleur, insert the SHIMANO original tool into the two holes of the plug cover.



# Installing the rear derailleur

## Standard type

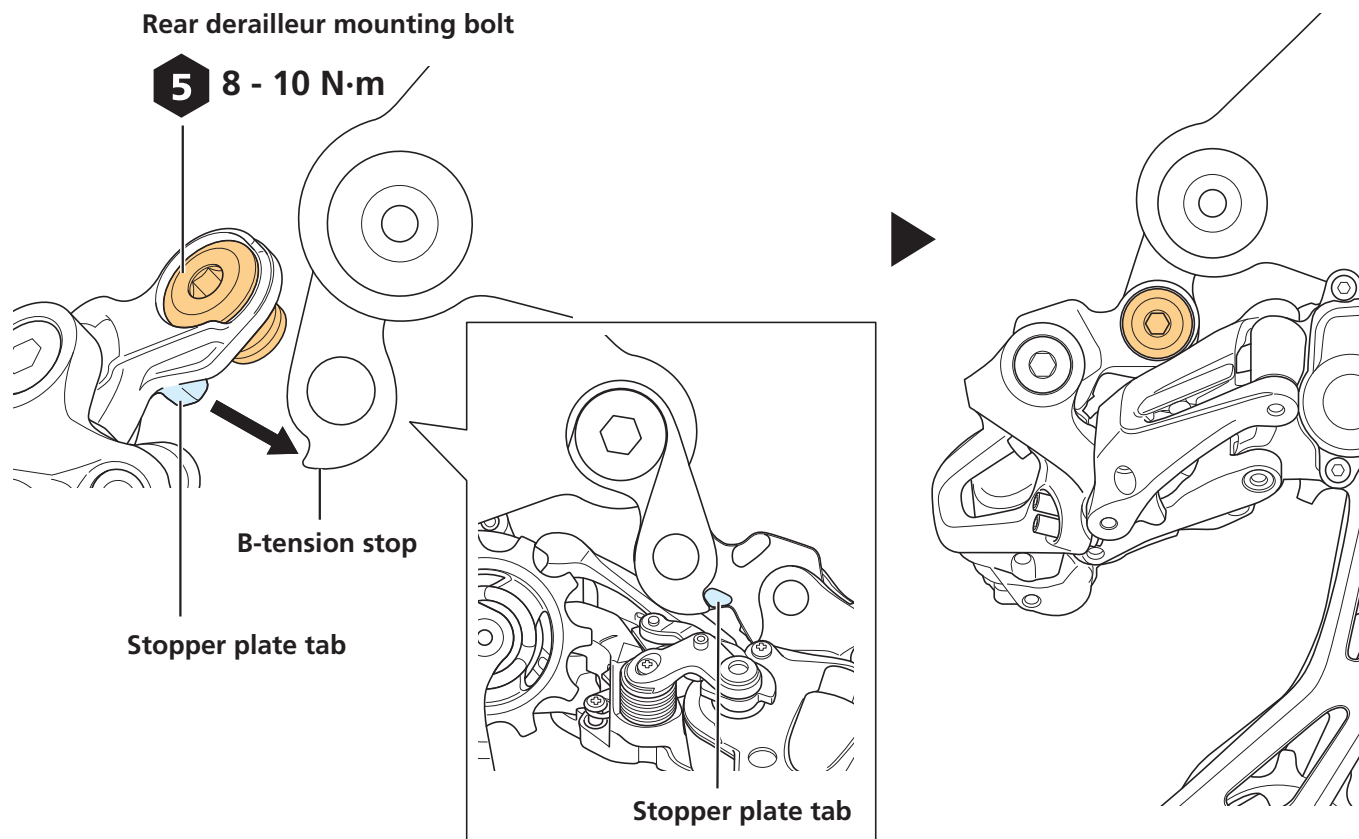
1. Set the switch lever in the OFF position.



## 2. Secure the rear derailleur.

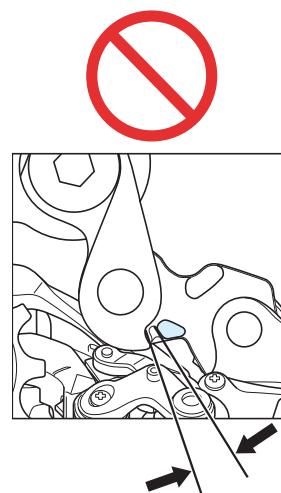
Be careful not to insert the rear derailleur mounting bolt in the derailleur hanger at an angle.

In addition, be sure to install the rear derailleur so that the stopper plate tab contacts the B-tension stop, with no gap in between.



### NOTICE

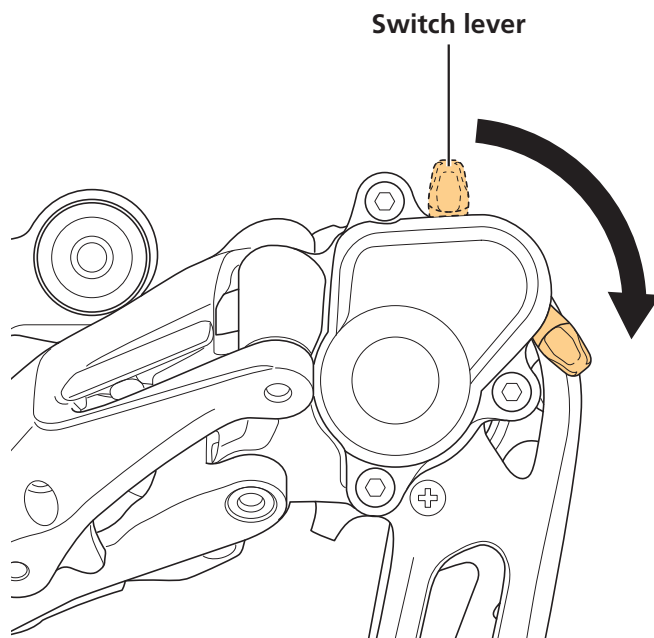
- Periodically check to make sure that there is no gap between the B-tension stop and the stopper plate tab. If there is a gap between these two parts, problems with gear shifting performance may occur.



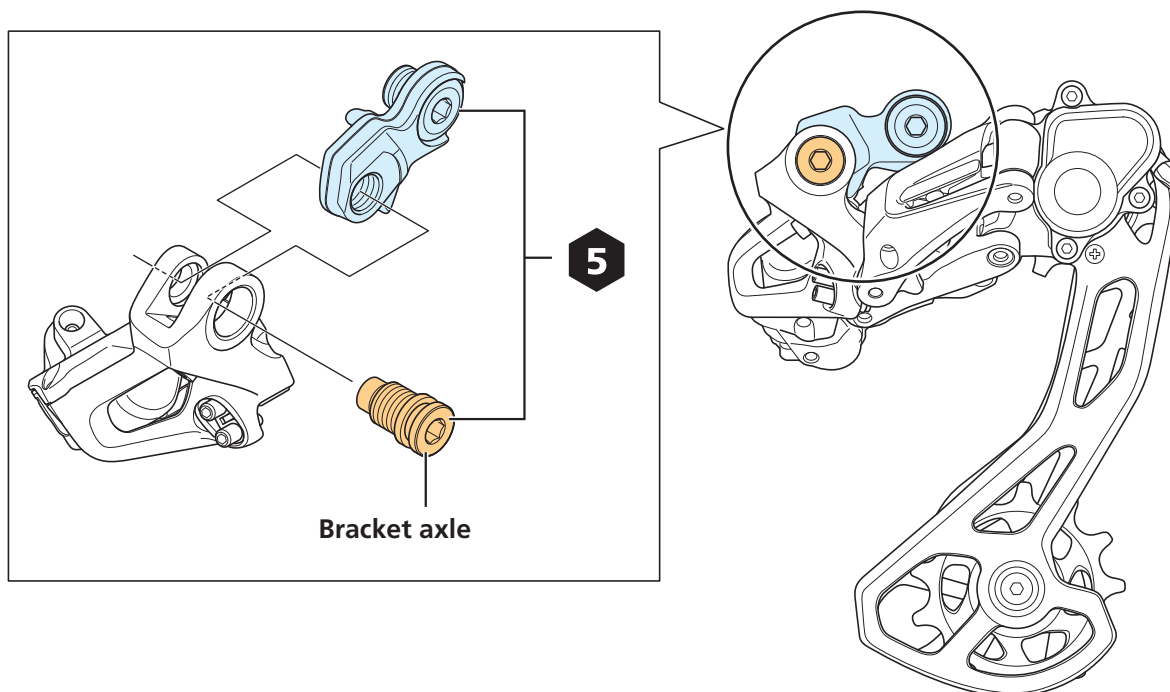


## Direct mount type

1. Set the switch lever in the OFF position.

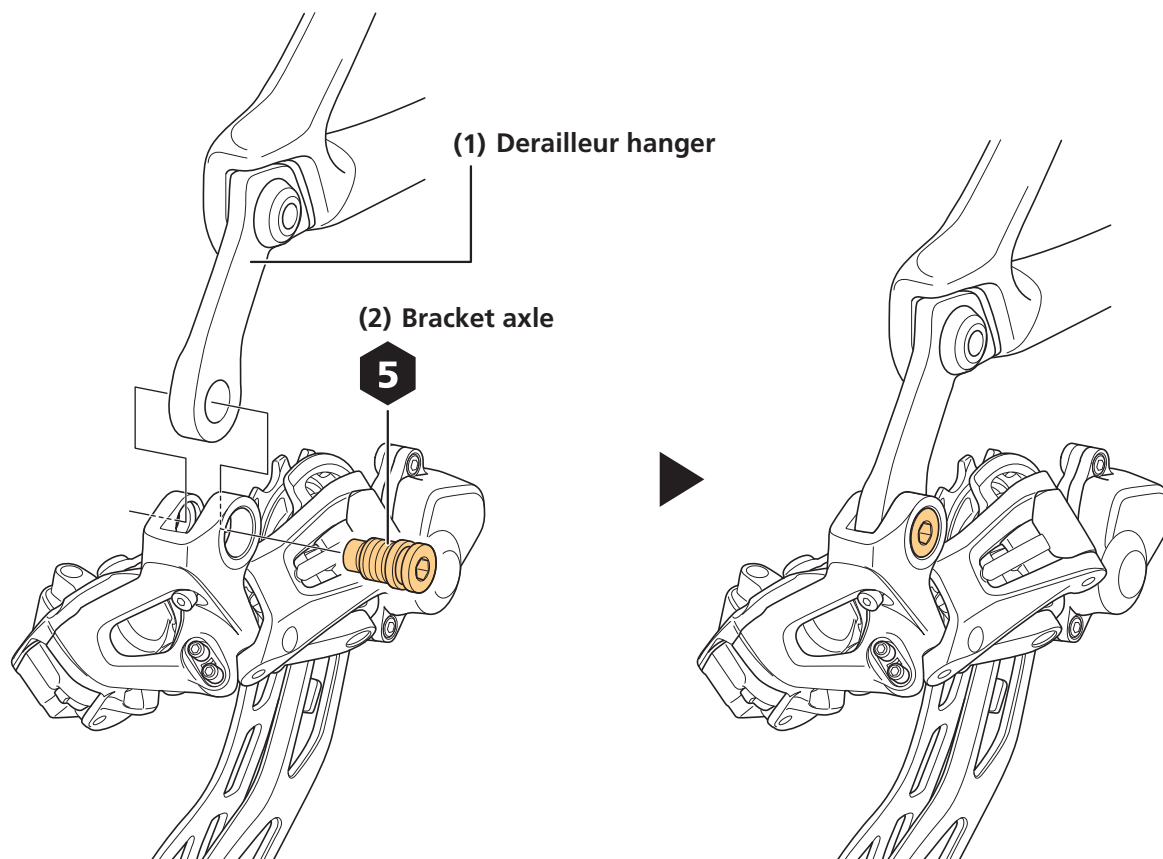


2. Remove the bracket axle.



### 3. Install the rear derailleur.

- (1) Insert the derailleur hanger into the installation part for direct mount of the rear derailleur.
- (2) Install the rear derailleur with the bracket axle.



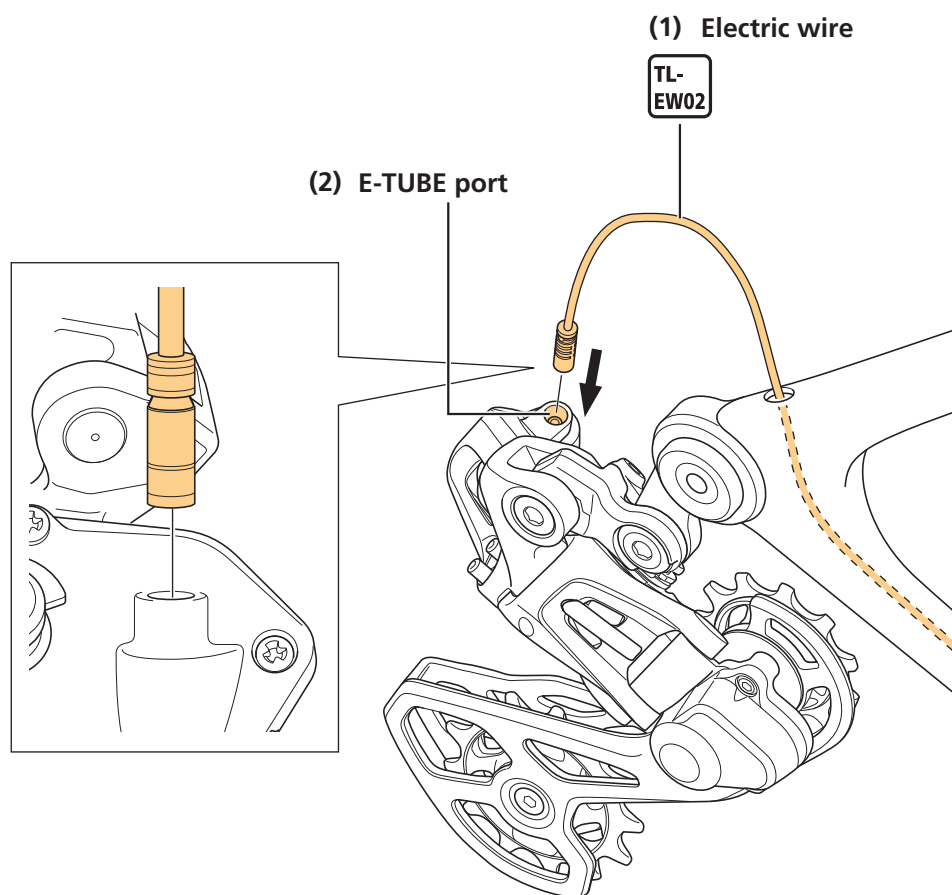
## Connecting the electric wire

### 1. Connect the electric wire.

- (1) Check the electric wire that will be connected to the rear derailleur.
- (2) Connect the electric wire to the E-TUBE port of the rear derailleur.

\* Be sure to push it in firmly until you feel a click.

**Example when the wiring is built into the frame**



# Installing the battery

## Installing the external battery

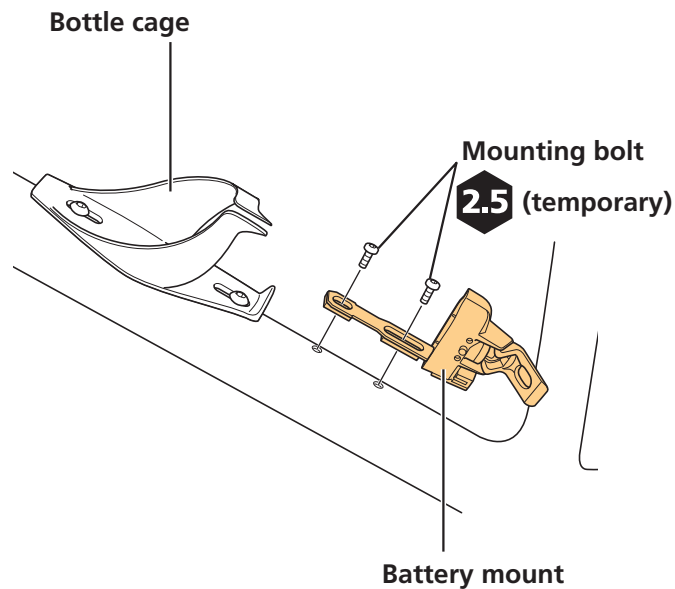
This section describes how to install the battery near the bottle cage on the down tube. Depending on the frame, the way the battery is installed may differ. For details, contact a manufacturer of completed bicycles.

### ► When the wiring to the battery is external

#### 1. Temporarily install the battery mount.

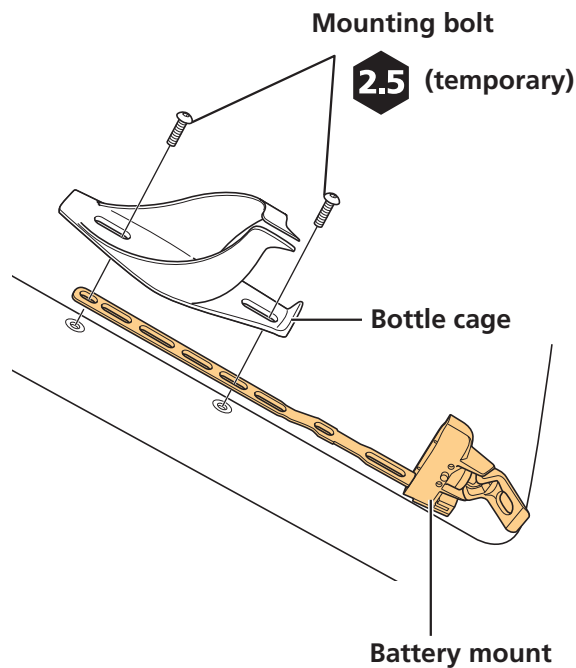
##### Short type

Use the mounting bolt included with the battery mount.



### Long type (temporarily installing the front of the battery mount)

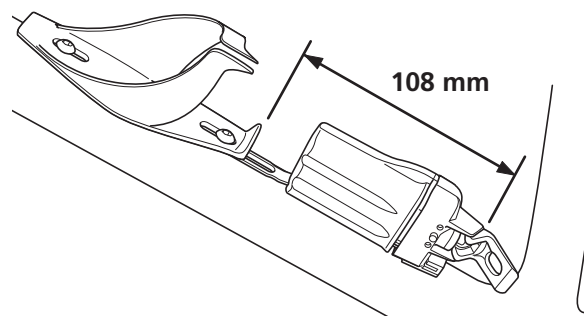
Tighten it together with the bottle cage using the mounting bolt included with the frame.



## 2. Adjust the position of the battery mount and bottle cage so there is enough space to attach and remove the battery.

The figure shows the short type, but performs the same position adjustment for the long type.

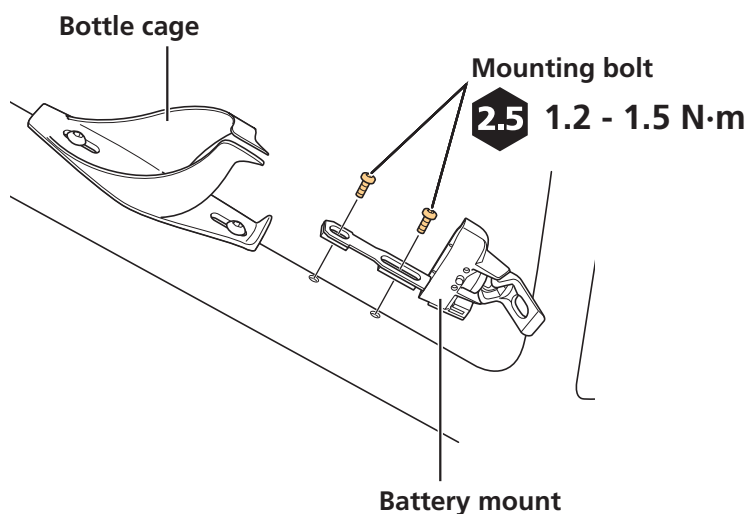
Attach and remove the battery to check the space.



### 3. Secure the battery mount.

#### Short type

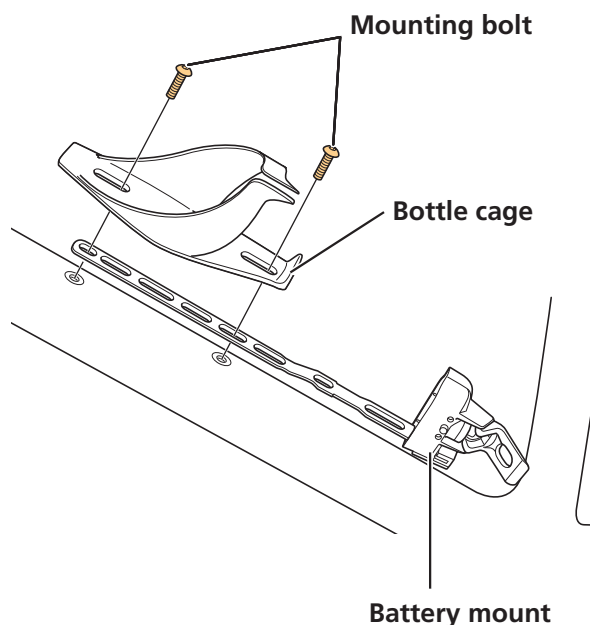
This completes the installation process for the short type.



#### Long type (securing the front of the battery mount)

Refer to the owner's manual for the bottle cage for details on the tightening torques.

For the long type, also perform the following procedure.



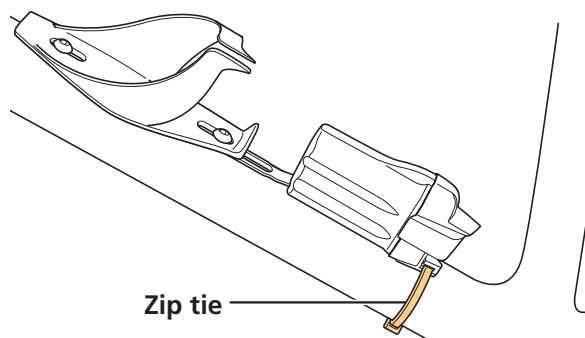
#### NOTICE

- When installing parts on a carbon frame/handlebars, confirm the recommended tightening torque with the carbon frame or part manufacturer in order to prevent damage to the carbon material due to overtightening or inadequate securing of the components due to insufficient tightening torque.

## 4. Secure the rear of the battery mount.

For the long type, secure the rear of the battery mount.

**When using a zip tie**

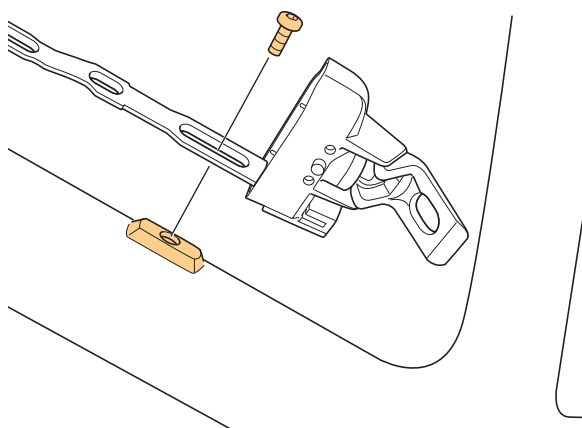


**When there is a mounting boss on the frame**

If there is a mounting boss on the frame, the rear of the battery mount can be secured to the frame with a mounting bolt too.

Mounting bolt

**2** 1.2 - 1.5 N·m



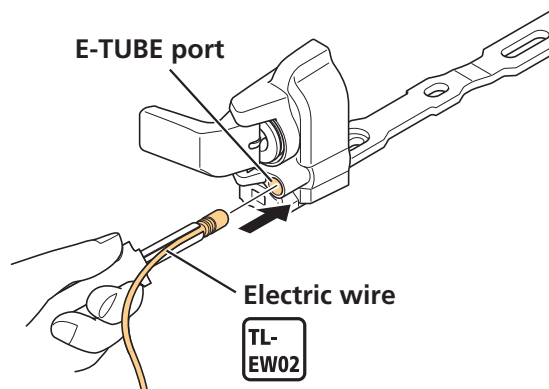
Mounting boss

### NOTICE

- When installing parts on a carbon frame/handlebars, confirm the recommended tightening torque with the carbon frame or part manufacturer in order to prevent damage to the carbon material due to overtightening or inadequate securing of the components due to insufficient tightening torque.

## 5. Connect the electric wire to the E-TUBE port of the battery mount.

Be sure to push it in firmly until you feel a click.



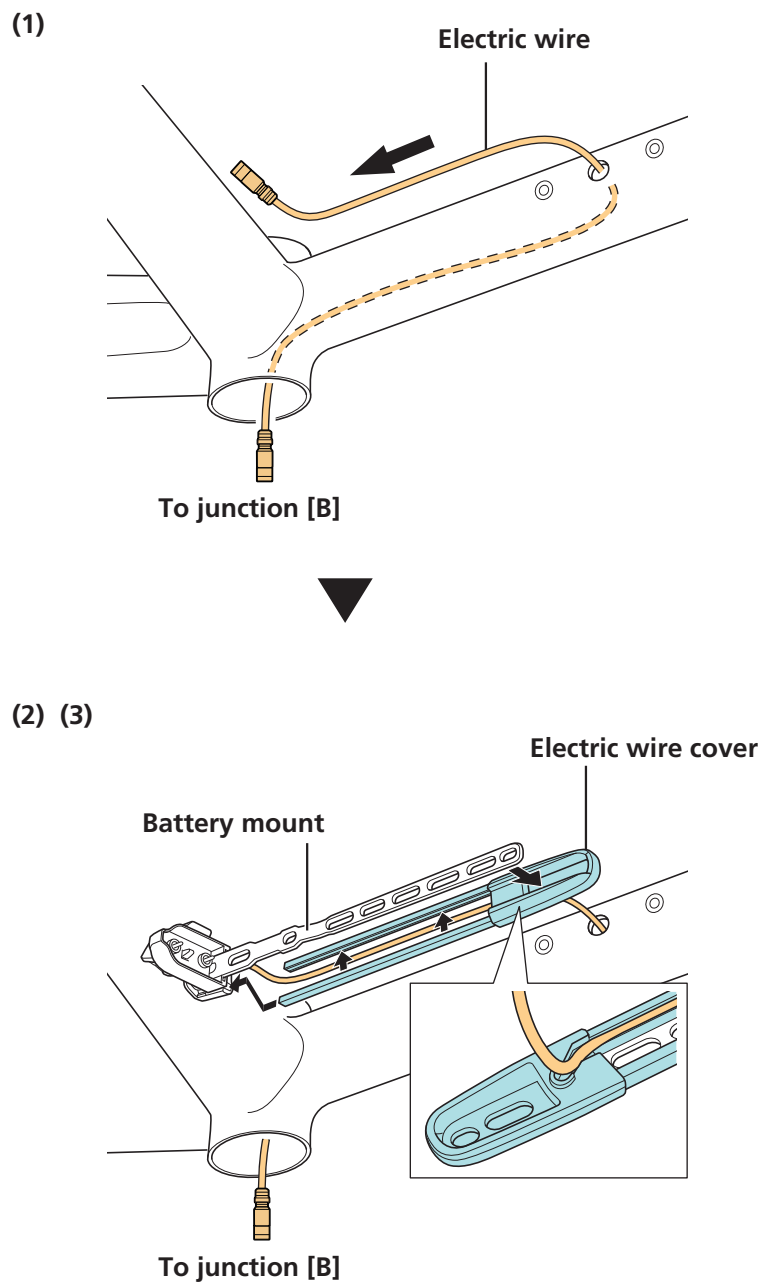


## ▶ When the wiring to the battery is built into the frame

If the frame wiring hole is between the installation holes of the bottle cage, you can use an electric wire cover for the battery mount.

### 1. Set the electric wire to the electric wire cover.

- (1) Check the electric wire that will be connected to the battery.
- (2) Set the electric wire to the groove of the electric wire cover.
- (3) Install the electric wire cover to the battery mount.

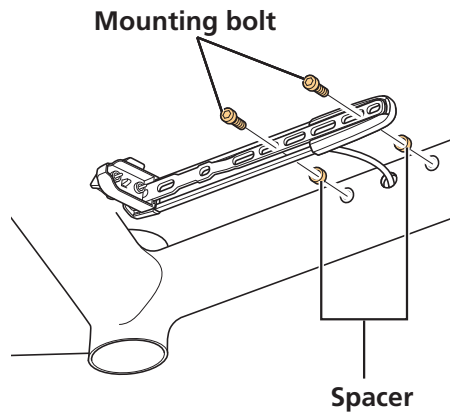


### 2. Connect the electric wire to the E-TUBE port of the battery mount.

Refer to Step 5 of "When the wiring to the battery is external".

### 3. Secure the front of the battery mount together with the included spacer.

Tighten them together when installing the bottle cage. Refer to the owner's manual for the bottle cage for details on the tightening torques.



#### **NOTICE**

- When installing parts on a carbon frame/handlebars, confirm the recommended tightening torque with the carbon frame or part manufacturer in order to prevent damage to the carbon material due to overtightening or inadequate securing of the components due to insufficient tightening torque.

### 4. Secure the rear of the battery mount.

Refer to Step 4 of "When the wiring to the battery is external".

## ▶ Installation of the bottle cage adapter

If the bottle cage or bottle which is installed to the seat tube interferes with the external battery, move the position of the bottle cage upwards within a range of 32 mm - 50 mm using the bottle cage adapter.

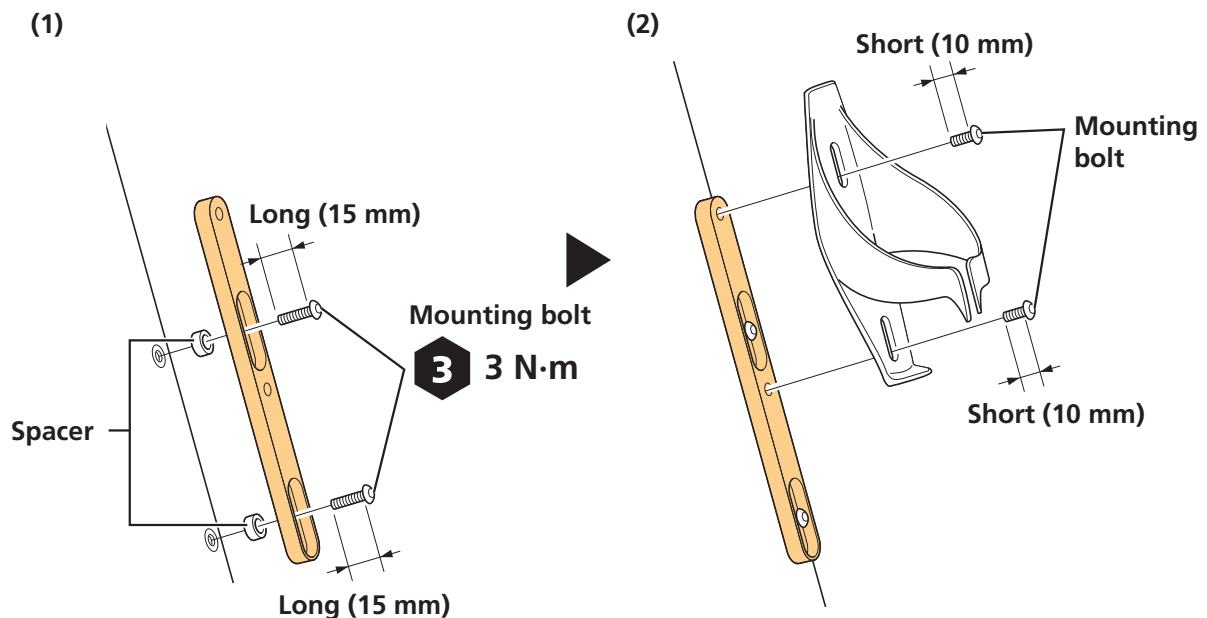
### 1. Install the bottle cage adapter.

(1) Use the longer mounting bolt to install the bottle cage adapter.

\* If it interferes with the mounting boss for the front derailleur, use the included spacer.

(2) Use the short mounting bolt to install the bottle cage.

\* Refer to the owner's manual for the bottle cage for details on the tightening torques.



#### NOTICE

- When installing parts on a carbon frame/handlebars, confirm the recommended tightening torque with the carbon frame or part manufacturer in order to prevent damage to the carbon material due to overtightening or inadequate securing of the components due to insufficient tightening torque.

## Installing the built-in battery

This section describes how to place the battery inside the seat post. Depending on the frame, the way the battery is installed may differ. For details, contact a manufacturer of completed bicycles.

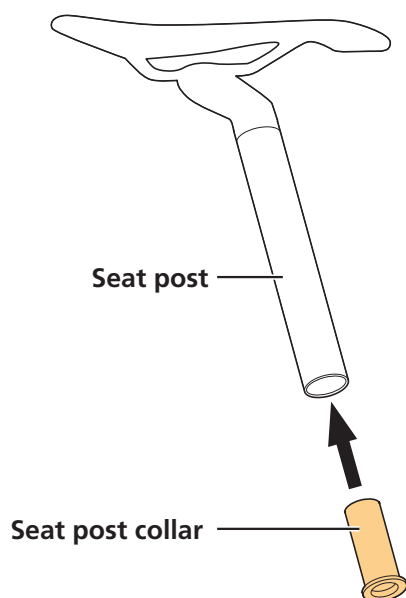
### TECH TIPS

- Prepare a seat post compatible with DI2 (SM-BTR2/BT-DN110/BT-DN110-A). If you have any questions, consult with the manufacturer of the seat post.

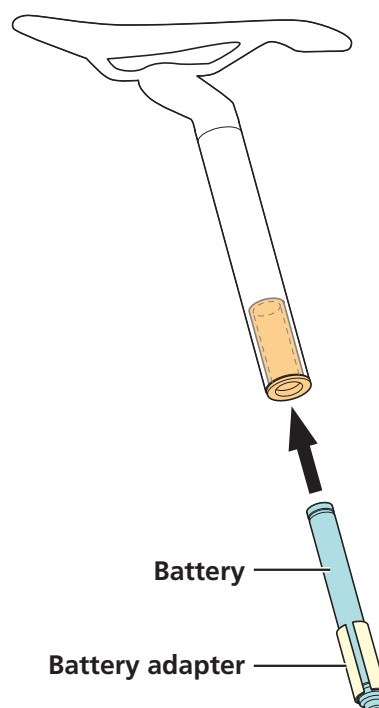
### 1. Insert the built-in battery into the seat post.

- (1) Insert the seat post collar into the seat post.
- (2) Insert the built-in battery into the seat post.

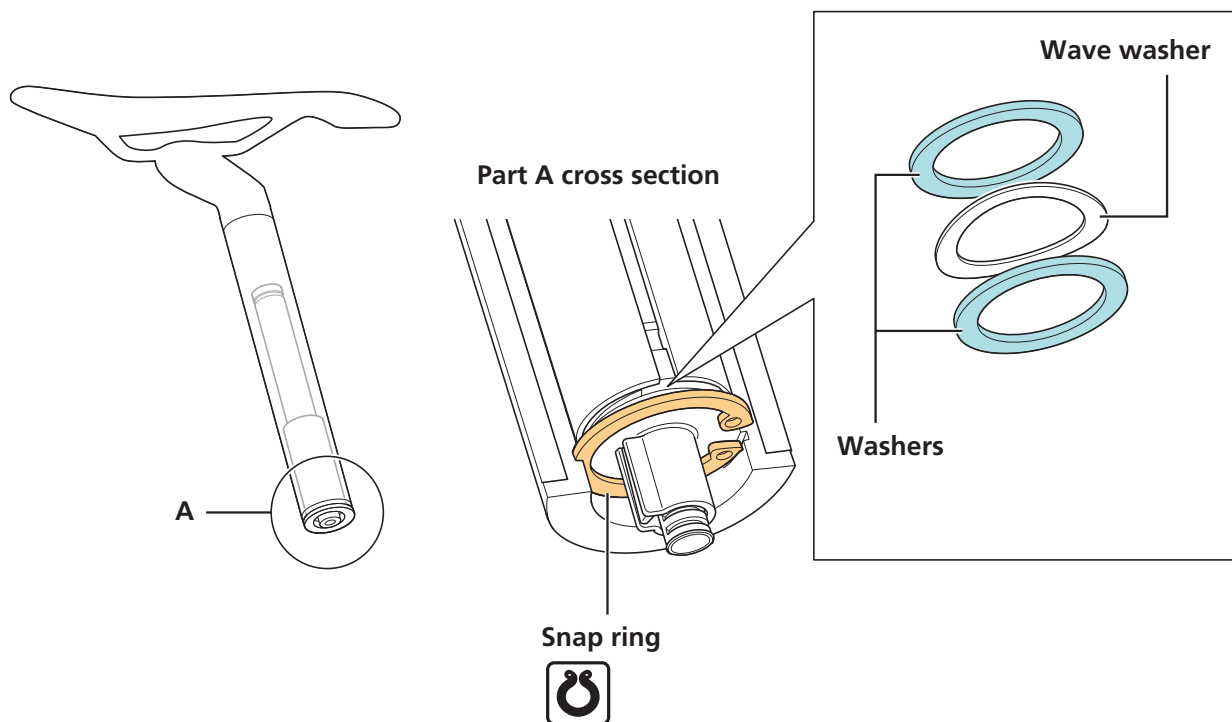
(1)



(2)



## 2. Secure the battery with a snap ring.

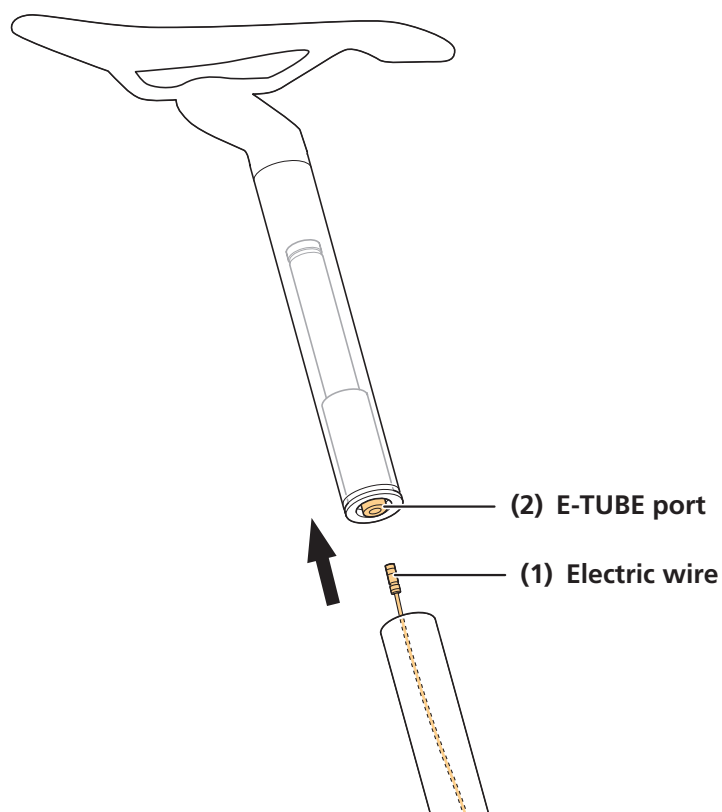


### TECH TIPS

- Use snap ring pliers with a claw diameter of 2 mm or less to mount the snap ring.

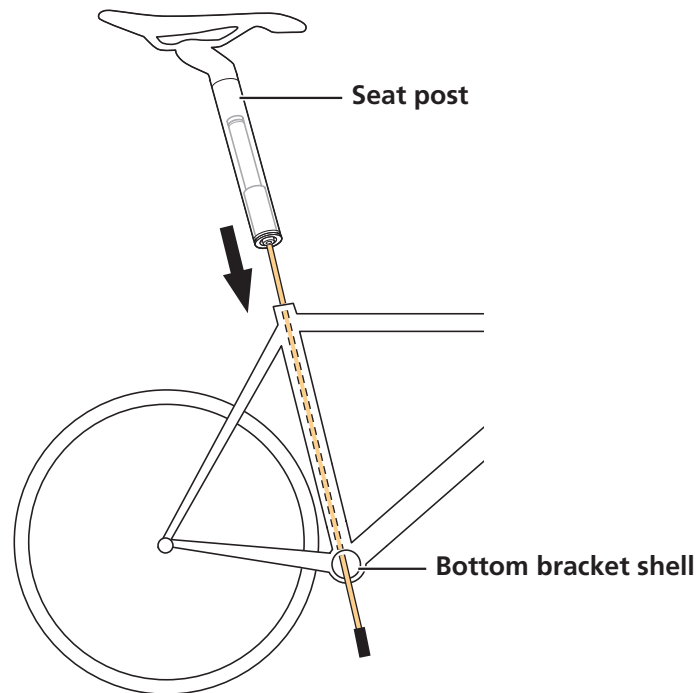
### 3. Connect the electric wire to the battery.

- (1) Check the electric wire that will be connected to the battery.
- (2) Connect the electric wire to the E-TUBE port of the battery.  
\* Be sure to push it in firmly until you feel a click.



#### 4. Insert the seat post.

Insert the seat post while pulling out the electric wire from the bottom bracket shell.



## Installing junction [B]

When installing junction [B], connect the electric wires first, then install on the frame.

### External type

Install external type junction [B] to the bottom of the bottom bracket shell. If a wire guide is attached to the bottom of the bottom bracket shell, remove it in advance.

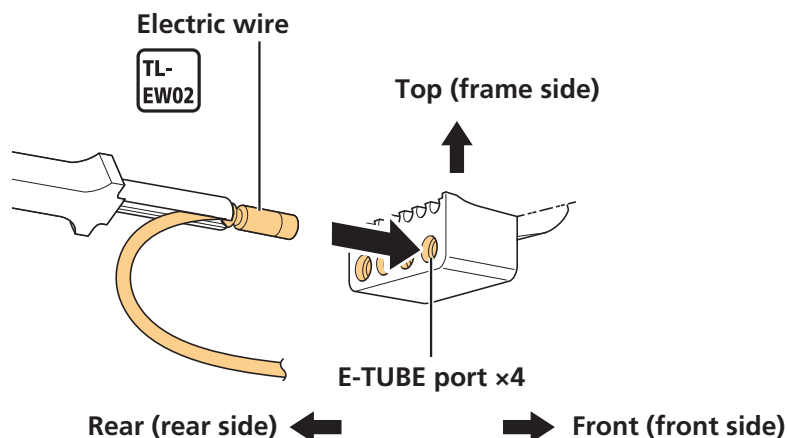
#### 1. Check the electric wire that will be connected to junction [B].

Connect the electric wires indicated below to junction [B].

- Electric wire between junction [B] and junction [A] (or wireless unit)
- Electric wire between junction [B] and the battery
- Electric wire between junction [B] and the front derailleur
- Electric wire between junction [B] and the rear derailleur

## 2. Connect the electric wires to the E-TUBE port on junction [B].

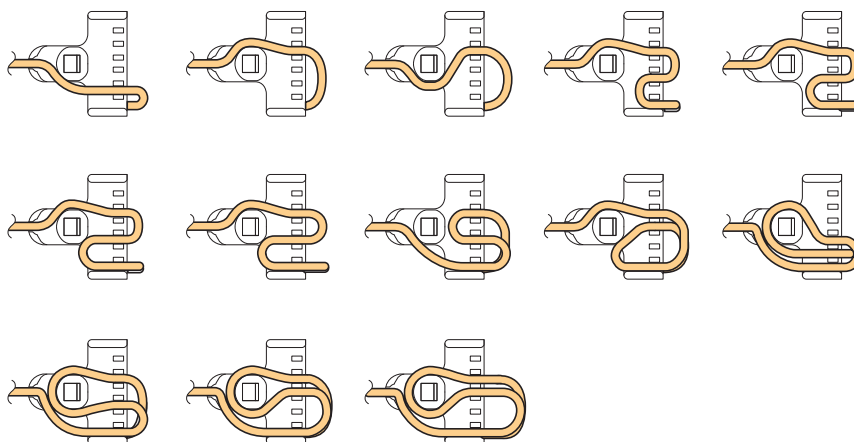
Be sure to push it in firmly until you feel a click.



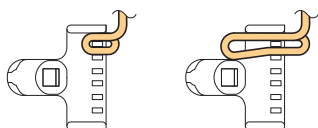
## 3. Adjust the excess length of the electric wire.

Wind any excess length of the electric wire to the groove on the top of junction [B] as indicated in the figure below, and adjust the length.

Example of adjusting the length of the electric wire to the front side

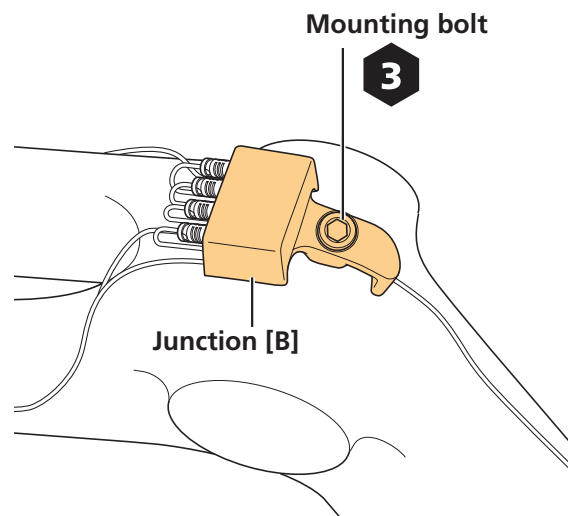


Example of adjusting the length of the electric wire to the rear side





## 4. Install junction [B] to the frame.



## Built-in type

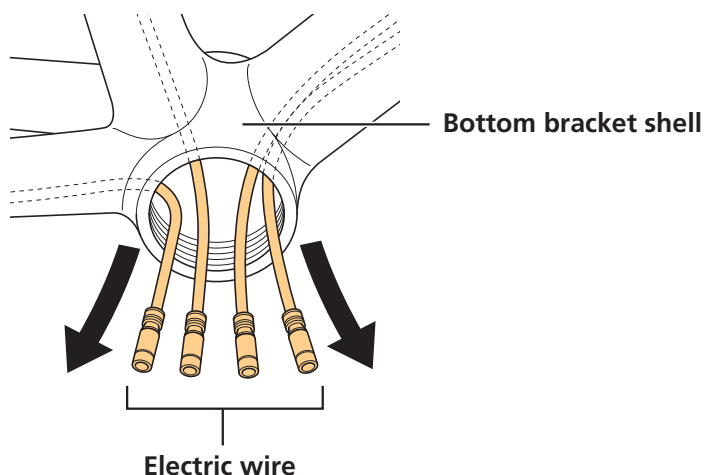
### NOTICE

- The inner wall of the bottom bracket shell is threaded. Be careful not to damage the electric wires.

### 1. Check the electric wire that will be connected to junction [B].

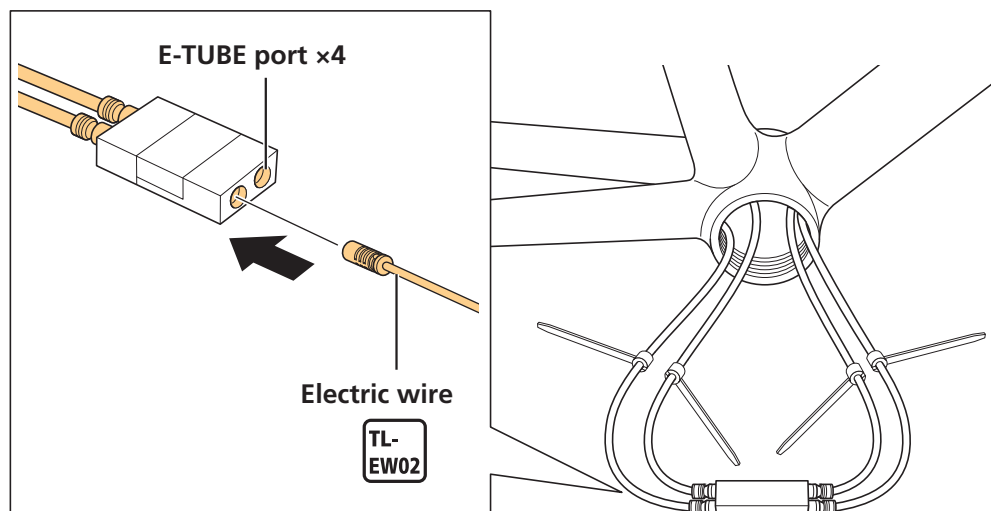
Pull out the following electric wires from the bottom bracket shell.

- Electric wire between junction [B] and junction [A] (or wireless unit)
- Electric wire between junction [B] and the battery
- Electric wire between junction [B] and the front derailleur
- Electric wire between junction [B] and the rear derailleur



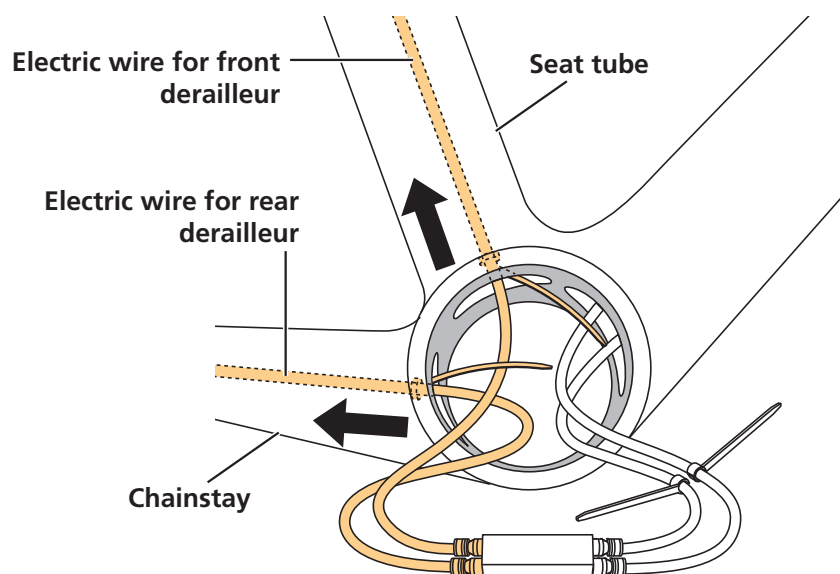
## 2. Connect the electric wires to the E-TUBE port on junction [B].

Be sure to push it in firmly until you feel a click.

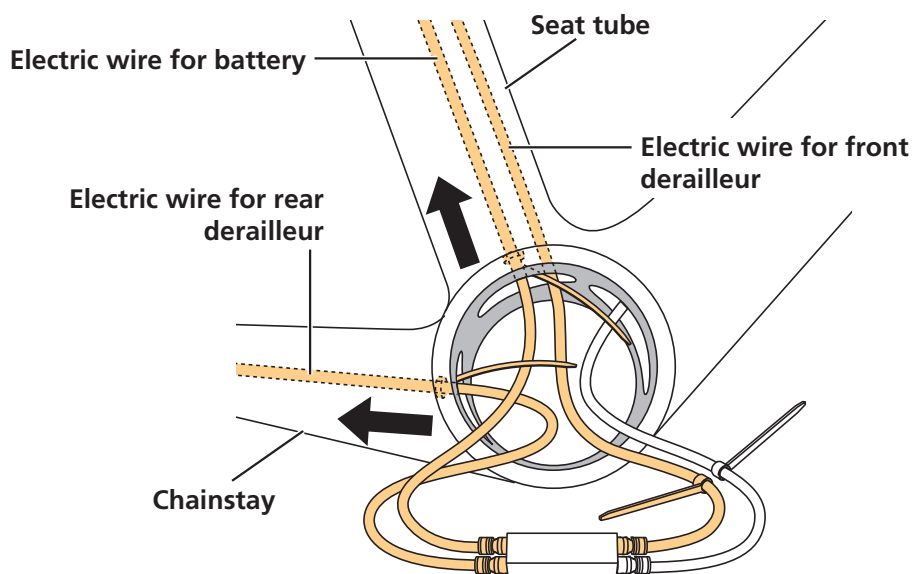


## 3. Pull the seat tube side and chainstay side electric wires into the frame.

When the battery is an external type



## When the battery is a built-in type

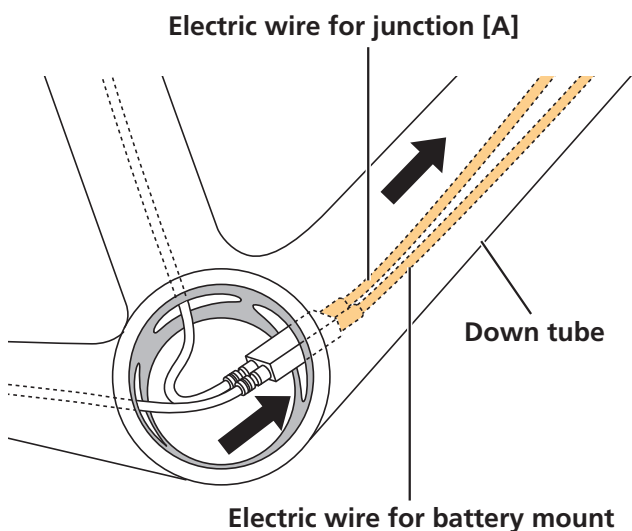


## 4. Pull in junction [B] toward the down tube side.

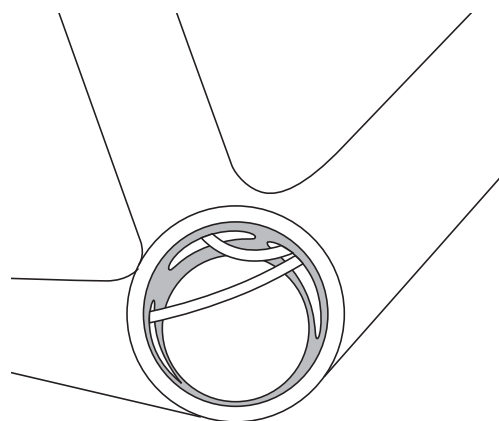
### When the battery is an external type

- (1) Pull in the electric wire on the down tube side.
- (2) Store junction [B] inside the down tube and arrange the wires so that only the seat tube side and chainstay side electric wires are visible inside the bottom bracket shell.

(1)



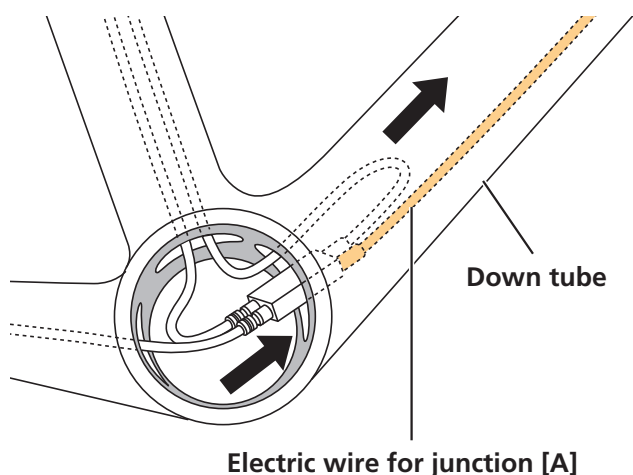
(2)



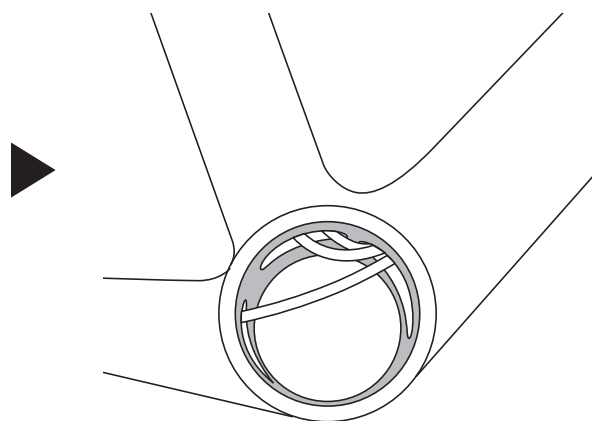
### When the battery is a built-in type

- (1) Pull in the electric wire on the down tube side.
- (2) Store junction [B] inside the down tube and arrange the wires so that only the seat tube side and chainstay side electric wires are visible inside the bottom bracket shell.

(1)



(2)



## Checking connections

After connecting the electric wires to all of the components, check the operation.

### 1. Check the connection for each component.

- (1) Refer to the user's manual of the dual control lever to operate the shift switch and confirm the operation of the derailleur.
- (2) Refer to the user's manual of the junction [A] to check the operation of the LED, etc.
- (3) If a wireless unit is connected, refer to "CONNECTION AND COMMUNICATION WITH DEVICES" to check whether you can connect to the tablet version of E-TUBE PROJECT.

### When there is a problem with a component connection

Return to the installation procedure for each component, and check the electric wire connections.

## 2. When checking of the connections is complete, temporarily remove the battery.

Refer to "Installing the battery".

### CAUTION

- Make sure to remove the battery when performing procedures in a position near the front derailleur, such as installing or removing the front chainwheel and front derailleur, or installing the chain and adjusting its length. If the front derailleur begins to operate while performing a procedure because of an incorrect operation etc., your fingers could get caught in the front derailleur and become injured.

# Securing the front derailleur

## Preparations

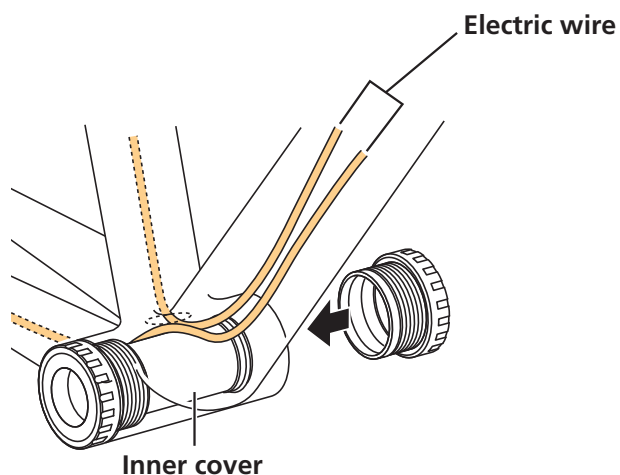
### 1. Install the bottom bracket and front chainring to the frame.

- Refer to the dealer's manual for the bottom bracket and front chainring.
- If the front derailleur interferes with the front chainwheel, temporarily remove it or loosen the mounting bolt and move the front derailleur to the seat post side.

**NOTICE**

- Make sure that the electric wire exposed in the bottom bracket shell passes over the top of the inner cover of the bottom bracket.

Installation example to the thread type bottom bracket



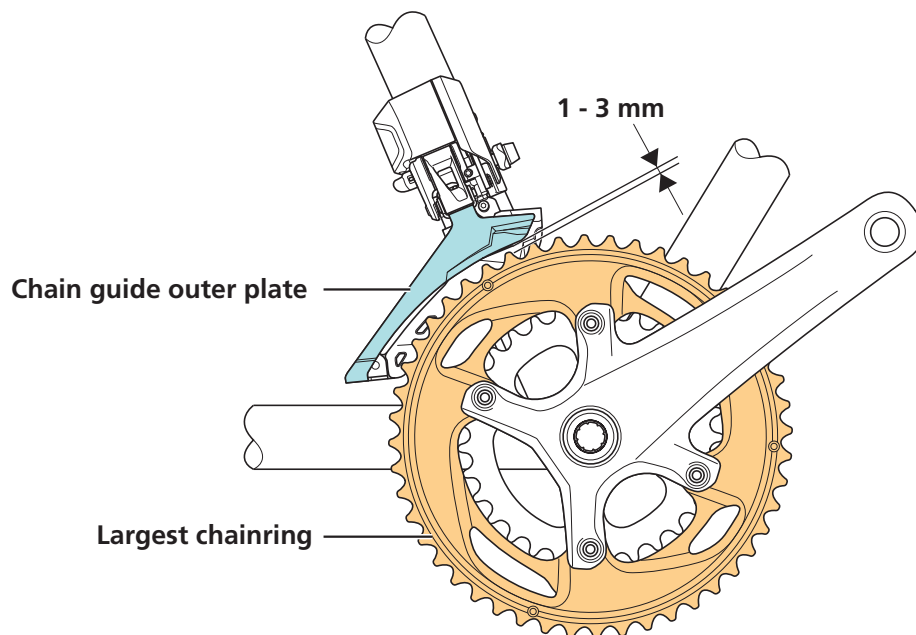
- If using a frame which does not have enough space between the inner wall of the bottom bracket shell and the inner cover to route the electric wires use an inner cover which is sold separately.

## Securing the front derailleur

Before starting the work, check that the procedures in "Temporarily installing the front derailleur" have been completed.

### 1. Adjust the installation height.

Adjust so that there is a clearance of 1 - 3 mm between the chain guide outer plate and the tip of the teeth of the largest chainring.

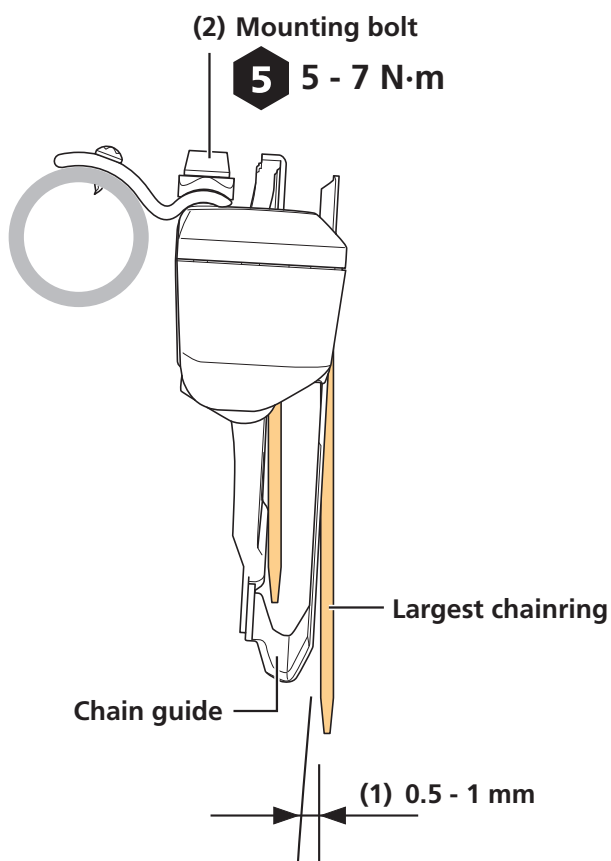




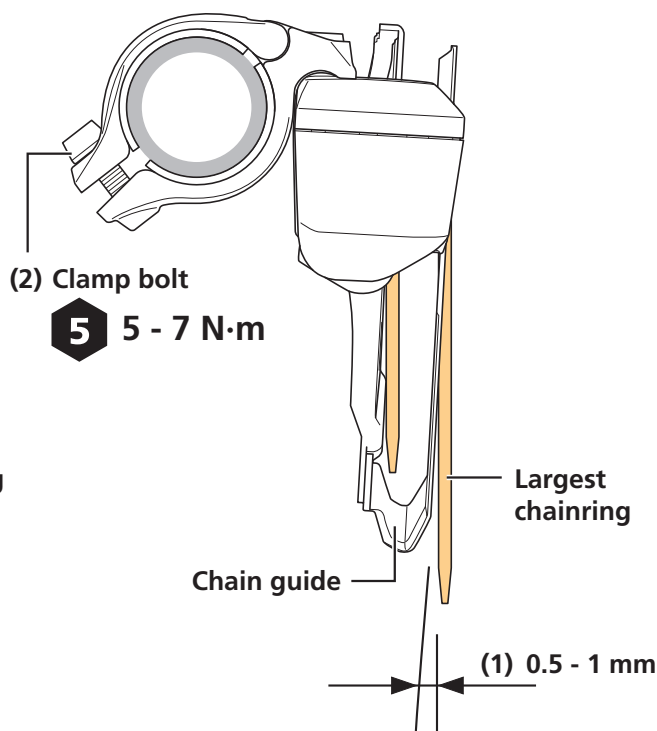
## 2. Adjust the installation angle and secure the front derailleur.

- (1) Perform adjustment so that the flat surface of the chain guide outer plate is in a position directly above the largest chainring and that the rear edge of the chain guide is inwards by 0.5 to 1 mm compared to the front edge.
- (2) Secure the front derailleur with a mounting bolt or clamp bolt.

With mounting boss (direct mount)



Without mounting boss (use band adapter)

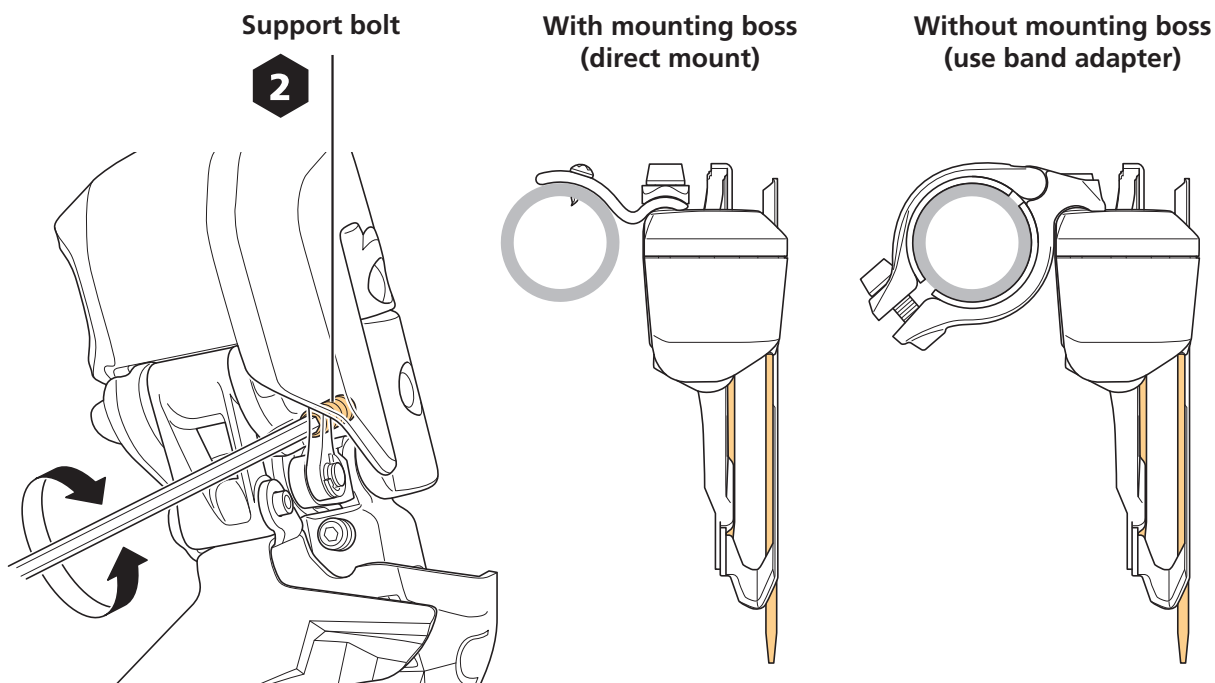


### NOTICE

- With a carbon frame, even the recommended tightening torque may be too tight and cause damage to the frame, or too loose and not sufficiently attached to the frame. For information on the appropriate torque value, consult with the manufacturer of the completed bicycle.

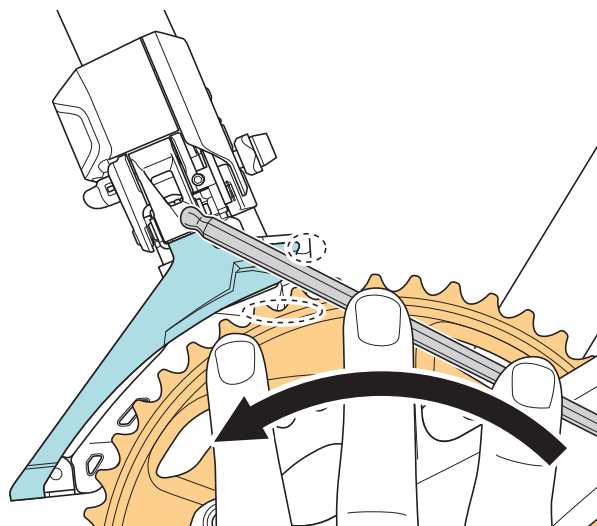
### 3. Readjust the position of the chain guide.

Adjust the support bolt so that the flat portion of the chain guide outer plate is aligned with the surface of the largest chainring. Make sure that the support bolt is in contact with the backup plate.



#### TECH TIPS

- Check the adjustment position by pressing a hexagon wrench or other tool to the flat portion of the largest chainring.



# Installing the disc brake rotor

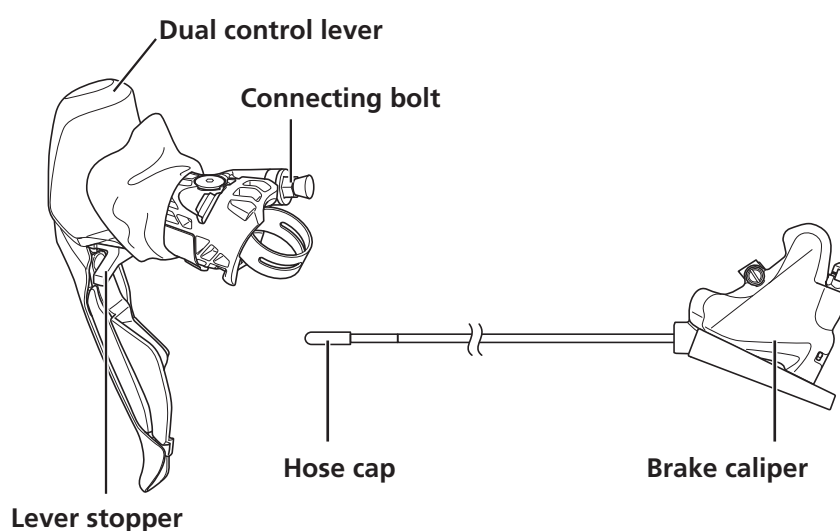
Refer to the dealer's manual for the wheels to install and remove the disc brake rotor.

# Installing the brake caliper

Refer to the dealer's manual for the brake caliper to install and remove the brake caliper.

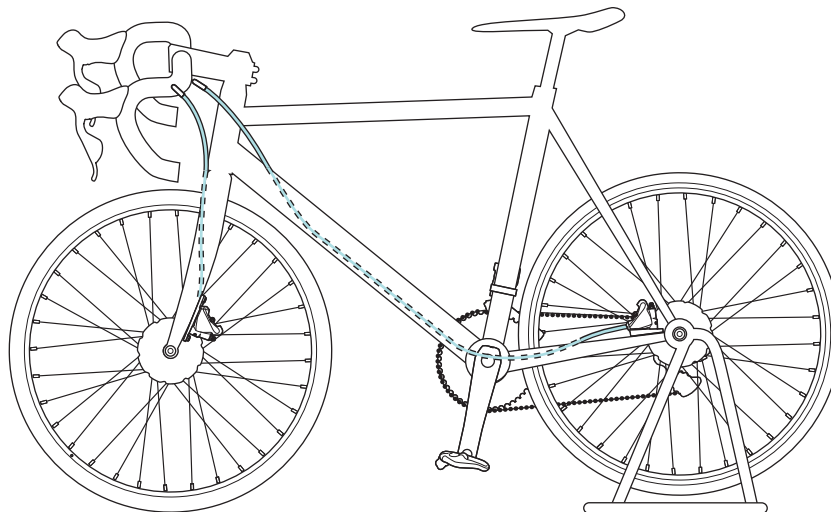
# Installing the brake hose

## Overview of the easy hose joint system



## Checking the length of the hose

### 1. Route the brake hose into the final installation position.



#### **NOTICE**

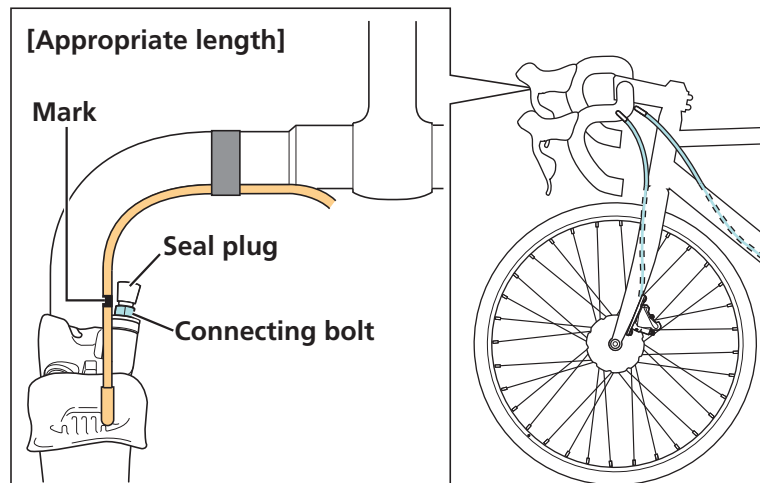
- This illustration is only for explanatory purposes. For details on how to route the brake hoses, consult the manufacturer of the bicycle or refer to the bicycle's owner's manual.
- Do not remove the hose caps from the ends of the brake hoses.

## 2. Check the appropriate length of the brake hose.

Secure the lever in the position used when riding.

Check the appropriate length of the brake hose by aligning the mark added beforehand on the brake hose with the edge of the lever connecting bolt.

- \* If the hose is at the appropriate length, proceed to "Connecting the hose".
- \* If the hose needs to be shortened, proceed to "Cutting the hose".
- \* If the hose length is insufficient, replace it with a hose that has an appropriate length.

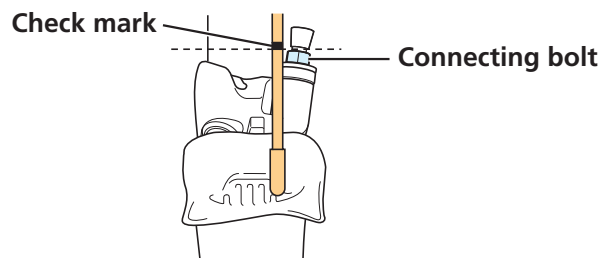


## Cutting the hose

Use care when cutting the hose, as oil may leak when the hose is cut.

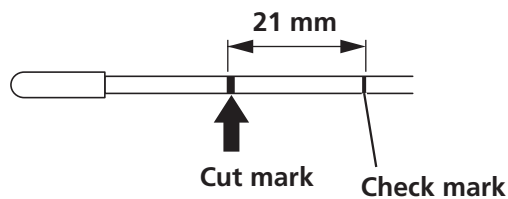
### 1. Determine the appropriate length and add a check mark on the brake hose.

Add the check mark so it is aligned with the edge of the connecting bolt.



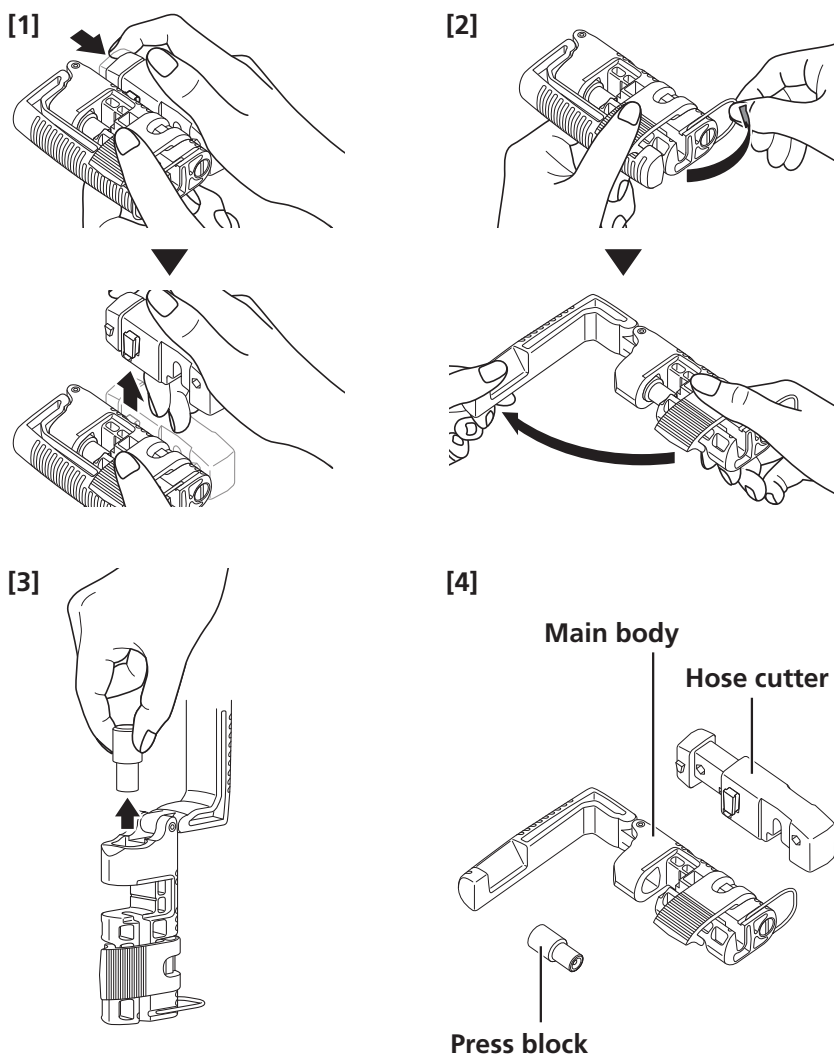
## 2. Add a cut mark.

Mark the hose at a position 21 mm from the check mark towards the end of the hose.



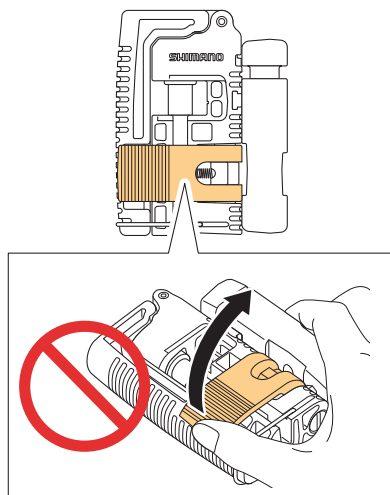
## 3. Prepare the SHIMANO original tool TL-BH62.

Disassemble the tool as shown in the figure.

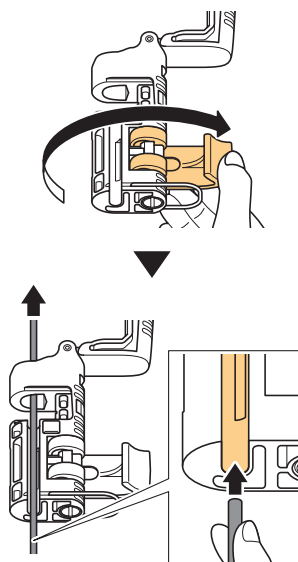


**NOTICE**

- Make sure to also refer to the owner's manual for SHIMANO original tool TL-BH62.
- Do not move the lever indicated in the figure before disassembling SHIMANO original tool TL-BH62.

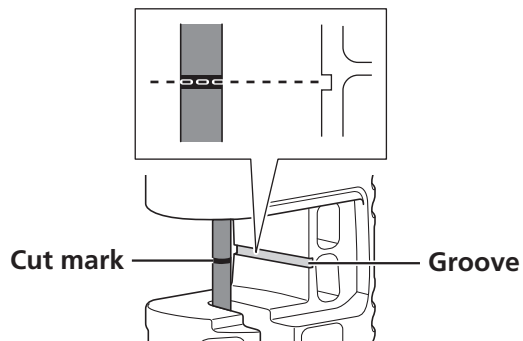


**4. Place the brake hose in SHIMANO original tool TL-BH62.**

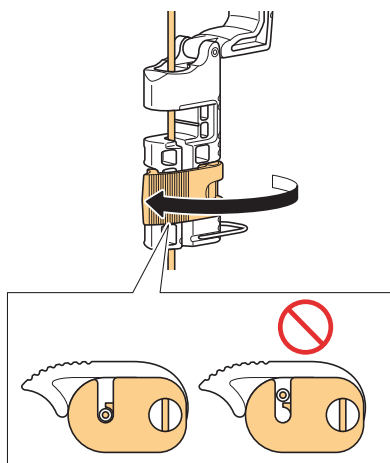


**NOTICE**

- When inserting the brake hose, make sure that the cut mark is parallel with the groove in the tool.

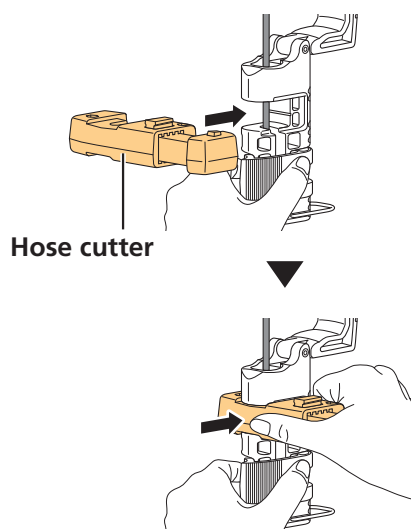


**5. Check the cut location and secure the brake hose in place.**

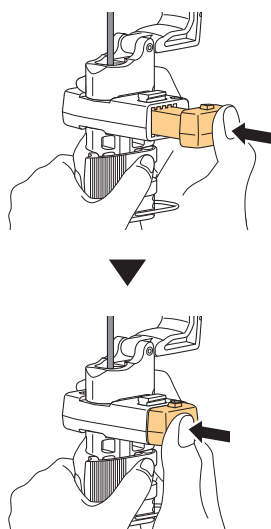




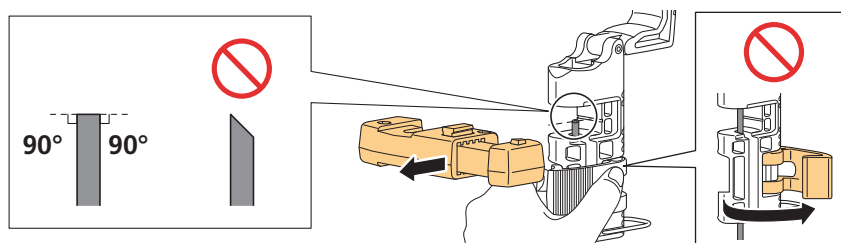
**6.** Check that the hose is secure, and then install the hose cutter.



**7.** Press the hose cutter as shown in the figure to cut the brake hose.

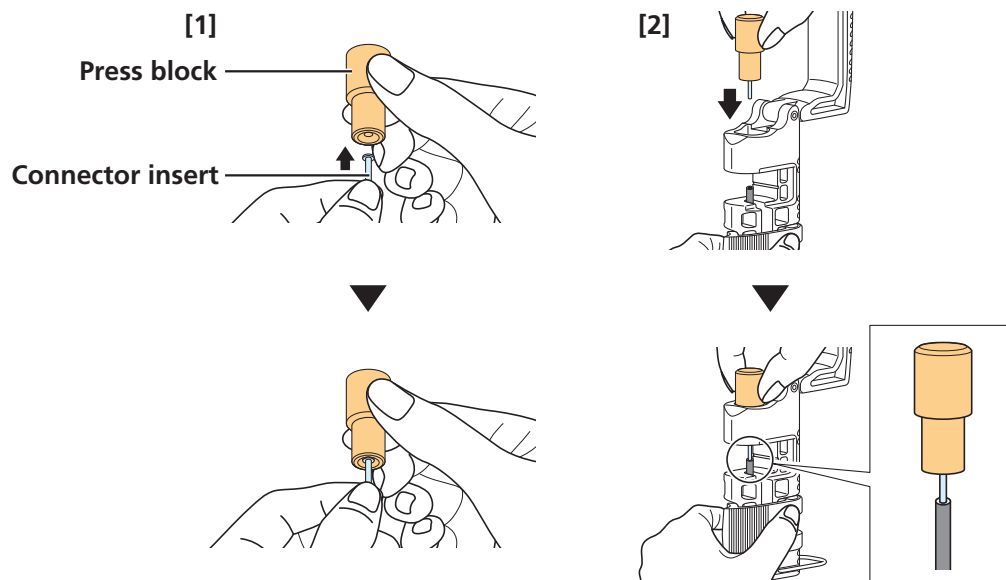


**8.** Remove the hose cutter and check that the cut end is even.



## 9. Install the connector insert in the press block, and then set the press block in SHIMANO original tool TL-BH62.

Make sure that the tip of the connector insert is correctly positioned inside the opening of the brake hose.

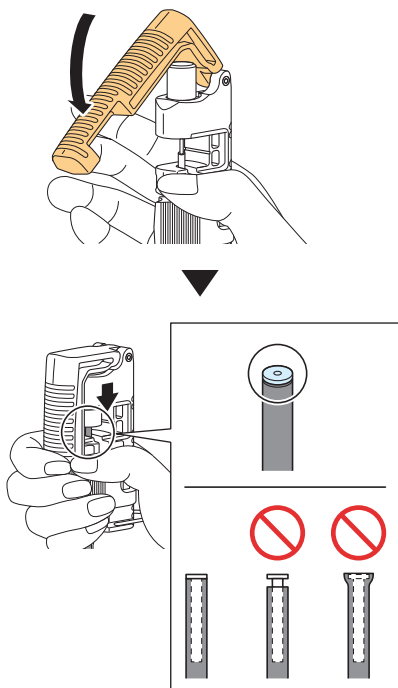


### NOTICE

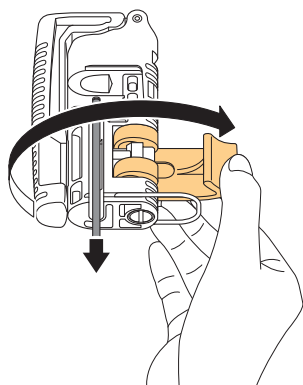
- When connecting with an easy hose joint system, a specialized connector insert (Y8JA98020/color: silver) must be used. Use of any connector insert other than the specified one may produce a loose assembly, leading to oil leaks or other problems.

# 10. Depress the lever on SHIMANO original tool TL-BH62 to install the connector insert in the brake hose.

Check that the connector insert is installed correctly.



# 11. Remove the brake hose from SHIMANO original tool TL-BH62.



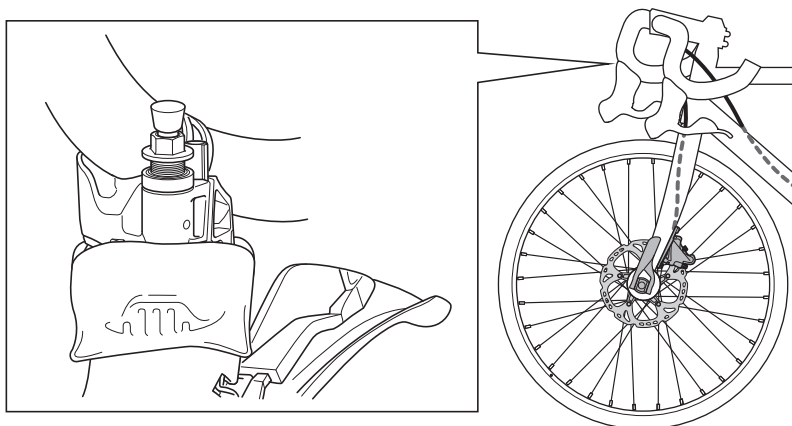
## Connecting the hose

### 1. Remove the hose cap.

If the brake hose was cut, it is not necessary to remove the hose cap.

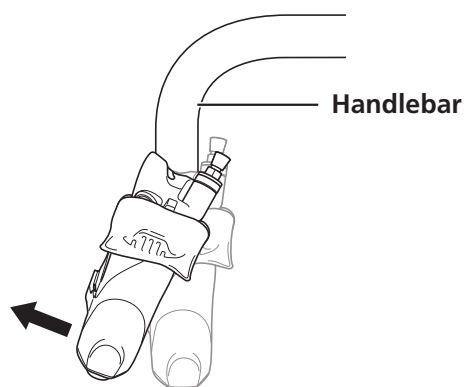


## 2. Fix the lever with the hose connector facing up by changing the angle of the handle, etc.



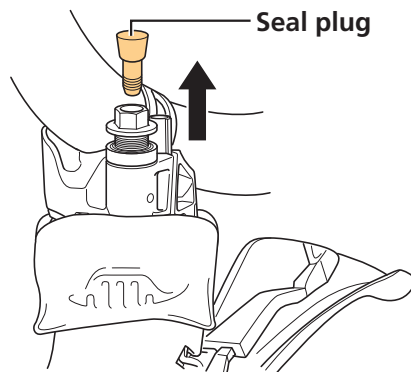
### NOTICE

- When attaching to the handlebar, adjust the angle of the bracket by tilting the bracket from the handlebar so that you can turn the spanner. When doing so, take care not to damage the handle, etc.



### 3. Remove the seal plug.

Cover the seal plug with a waste cloth while conducting this procedure as oil that has adhered to the seal plug may leak.

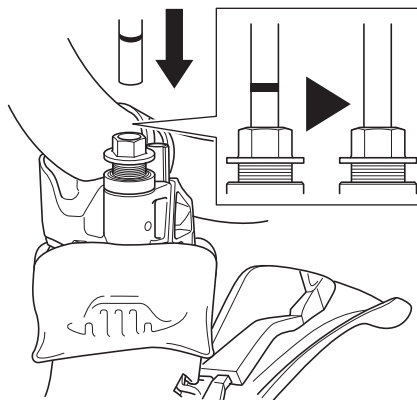


### 4. Insert the brake hose in the brake hose connection port.

It comes with a built-in olive. Insert the hose so that it does not become snagged on the olive.

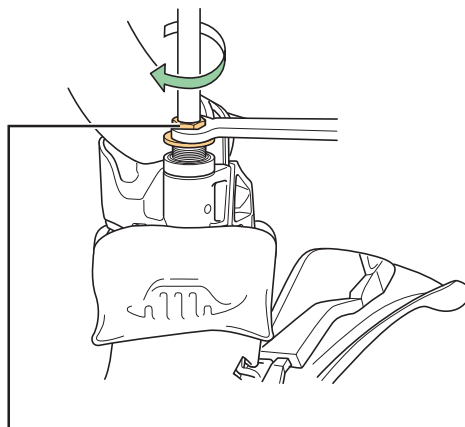
Insert the hose until the check marks on the surface of the hose are covered.

Cover with a waste cloth while conducting this procedure as some of the internal oil may leak.



## 5. Tighten the connecting bolt with flange.

Tighten the bolt while pushing the brake hose in.



Connecting bolt with flange



5 - 6 N·m

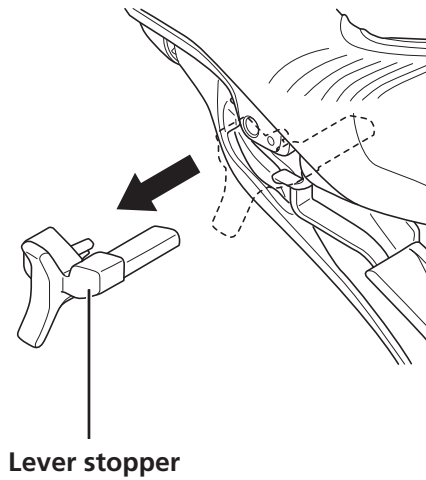
### NOTICE

- Make sure to insert the brake hose and tighten the connecting bolt. Otherwise, oil leaks or insufficient braking force may occur.

## 6. Wipe away any oil.

## 7. Remove the lever stopper.

Pull out the lever stopper by means of short back and forth movements. Take care to not depress the lever.



### NOTICE

- After removing the lever stopper, check that the pad spacer is installed on the caliper side and that the caliper is installed on the bicycle with the disc brake rotor between both sides of the caliper before depressing the lever. After installation to the bicycle, make sure to check that the lever stopper is removed.

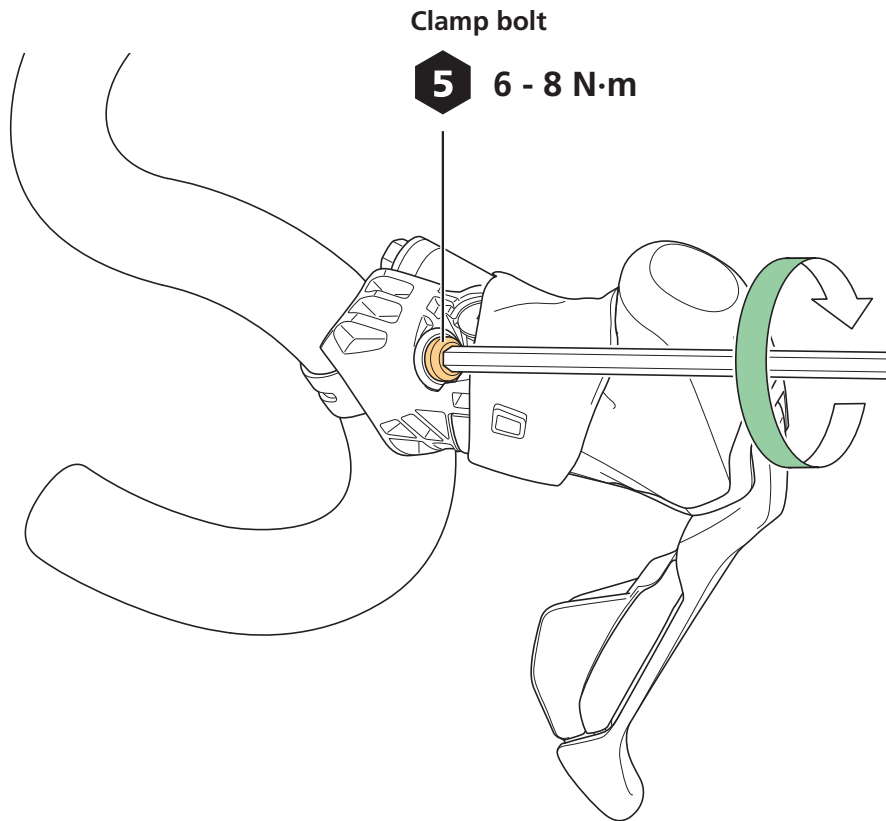
## 8. Check that the lever has become stiff.

If it does not become stiff, refer to the procedure in "Adding mineral oil and bleeding air" to bleed the air.

# Securing the dual control lever

When connection of the brake hose is complete, secure the dual control lever in the appropriate position.

## 1. Secure the dual control lever to the handlebar.



## 2. The installation procedure is complete after finishing the wiring, etc.

For information on finishing the wiring, refer to "Finishing for external wiring" or "Finishing for internal wiring".

Also, the method for winding the handlebar tape is listed at the end of "Built-in bar end type".



# HOW TO OPERATE

## Gear position control

[Gear position control] in this system is set to [Set] by default. Therefore, if you try to shift into gear positions that would lower the chain tension, shifting switches may shift differently from the basic operations.

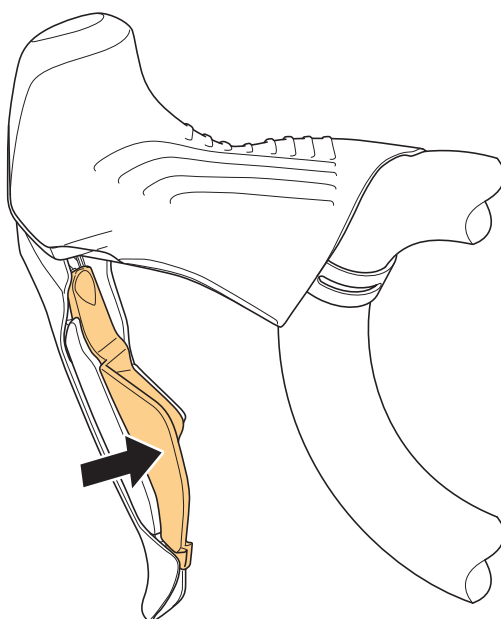
The figure below shows the gear positions that would lower the chain tension and the shifting operations performed when you shift into those gears.

### Points to remember when shifting the front

When you shift the front into the smallest chainring, shifting is controlled as follows.

#### Gear position control (during front gear shifting)

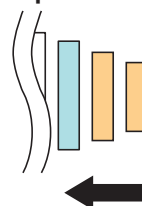
Gear shifting status of the rear	When the front is shifted into the smallest chainring
From the smallest to the 2nd sprocket	<ul style="list-style-type: none"> <li>•The front derailleur <b>does not shift</b>.</li> <li>•Instead, <b>the rear derailleur is shifted down through 2 gears.</b></li> </ul>
Other than those mentioned above	The front gear shifts to the smallest chainring (normal operation)



Intended operation on front



Rear gear shifting operations



**TECH TIPS**

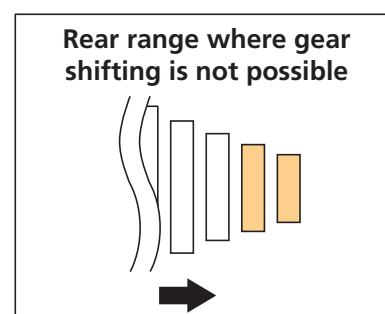
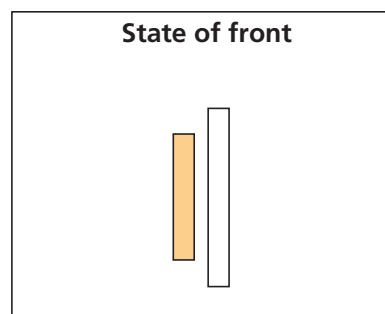
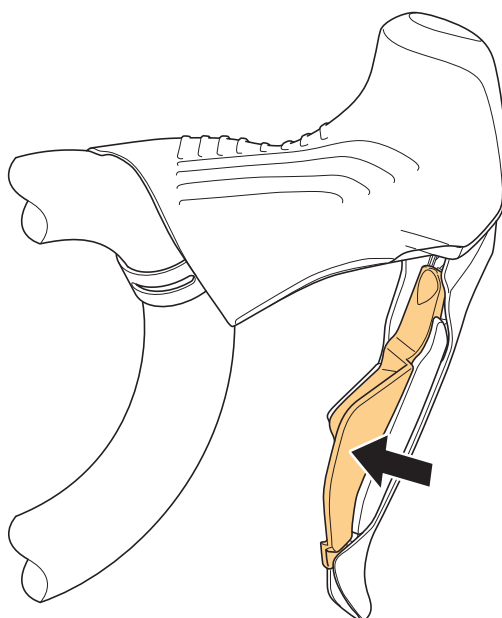
- [Gear position control] can be disabled in E-TUBE PROJECT. However, it may not be possible to disable this, depending on the combination between the product and tooth combination.
- If you use combinations of front and rear derailleurs besides those recommended, the number of gears affected by the gear position control may become larger. In this case, the number of gears that can be shifted freely becomes smaller.

## Points to remember during rear gear shifting

When shifting the rear to the smallest sprocket, the following gear shifting control is performed.

### Gear position control (during rear gear shifting)

Gear shifting status of the front	When the rear is shifted toward the smallest sprocket
Smallest chainring	Does not shift to the smallest sprocket and 2nd sprocket



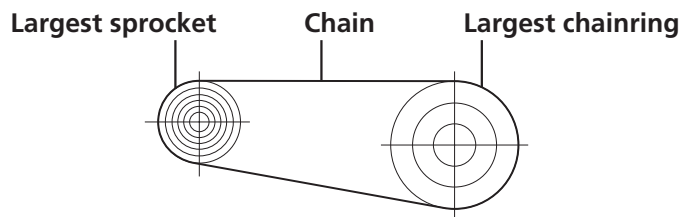
# ADJUSTMENT

## Installing the chain

Refer to the dealer's manual for the chain to install/remove the chain.

## Checking the chain length

1. Set the chain on the largest sprocket and the largest chainring.



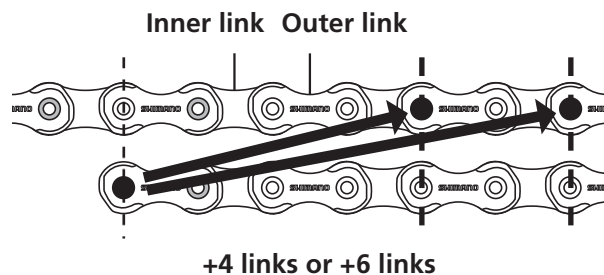
2. Check the length of the chain.

Add 4 to 6 links to set the length of the chain as shown in the figure.

**If the inner links and outer links match when mounting the chain**

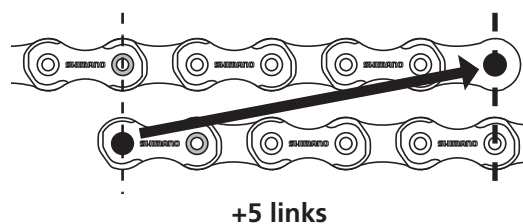
Add 4 to 6 links to set the length.

When setting to the length with 4 links added, if you are concerned about drive wandering after mounting the chain on the largest sprocket and largest chainring, set it to a length with another 2 links added.



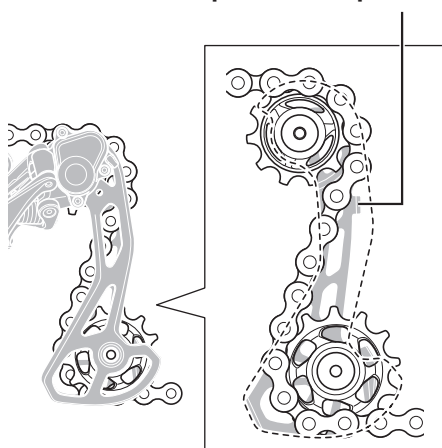
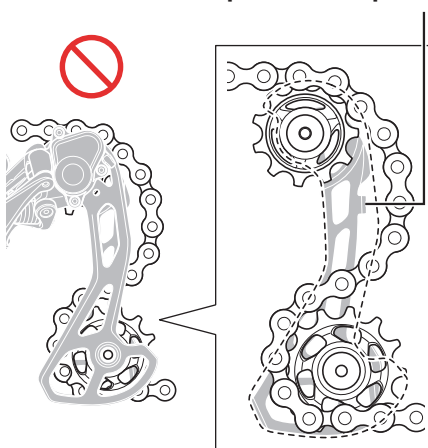
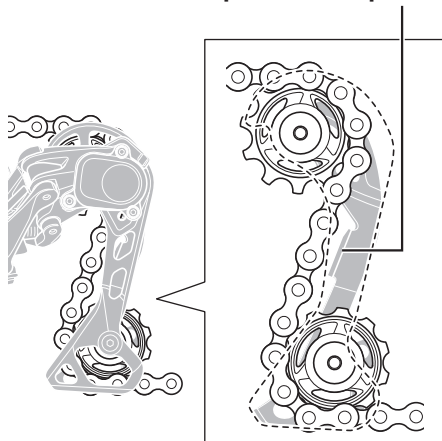
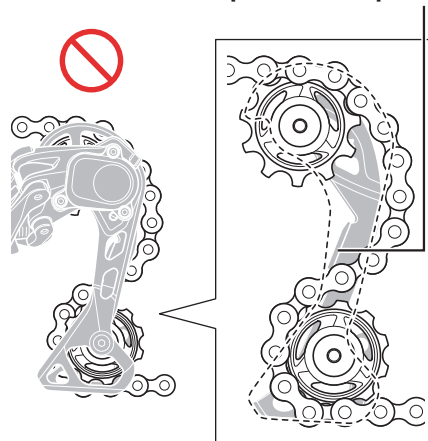
**If the inner links match together and the outer links match together**

Add 5 links to set the length.



**NOTICE**

- The rear derailleur plate assembly is equipped with a pin or plate that prevents the chain from derailing. When passing the chain through the rear derailleur, pass it through the main body of the rear derailleur from the side of the chain derailment prevention plate as shown in the figure.
- If the chain is not passed through the correct position, damage may be caused to the chain or rear derailleur.

**RD-RX815****Chain derailment prevention plate****Chain derailment prevention plate****RD-RX817****Chain derailment prevention plate****Chain derailment prevention plate**

# Adjusting the rear derailleur

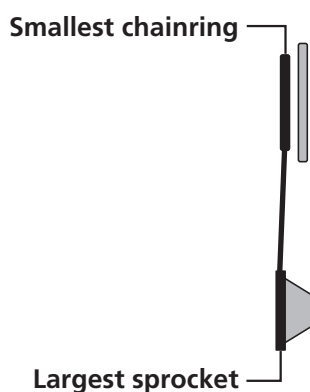
## Adjusting the end adjustment screw

### 1. Install the battery.

Refer to "Installing the battery".

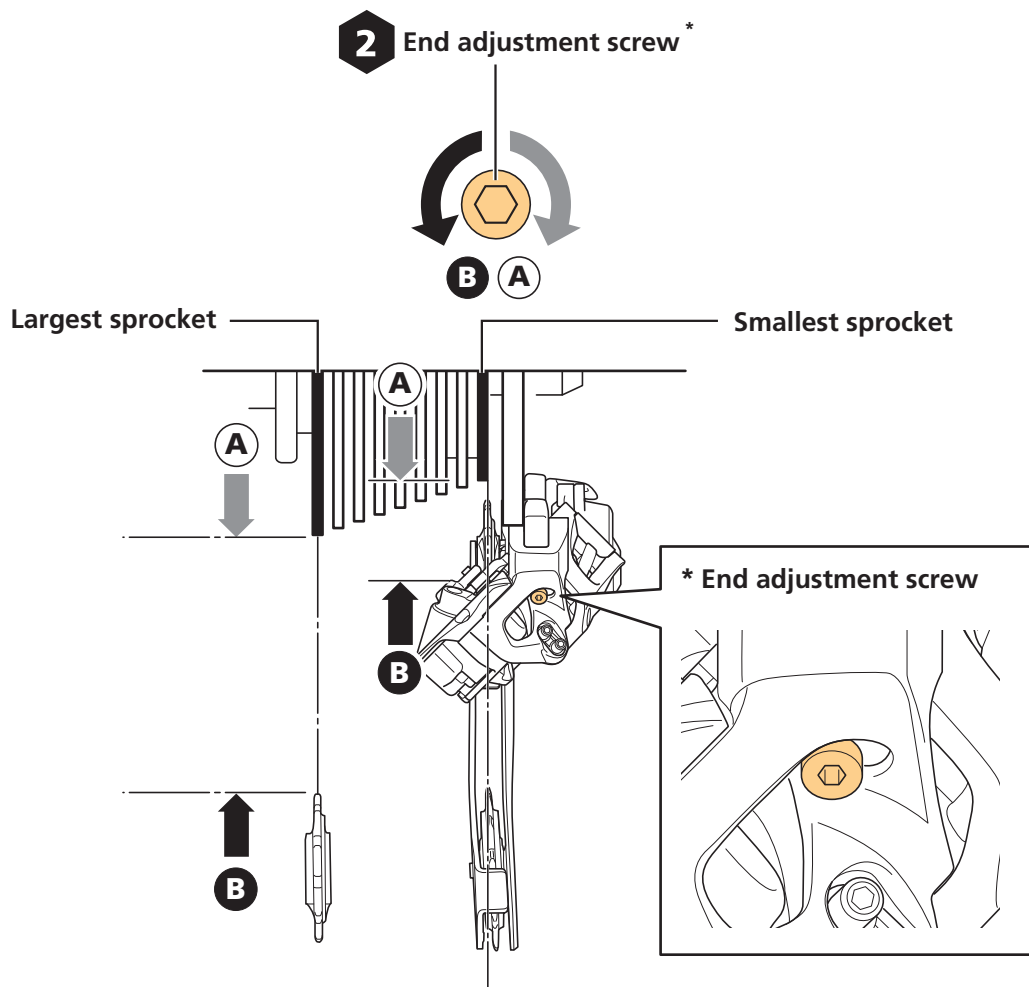
### 2. Set the chain on the smallest chainring and the largest sprocket.

Turn the crank arm in reverse.



### 3. Adjust the end adjustment screw.

Bring the guide pulley close to the gear to a position where the chain does not jam.



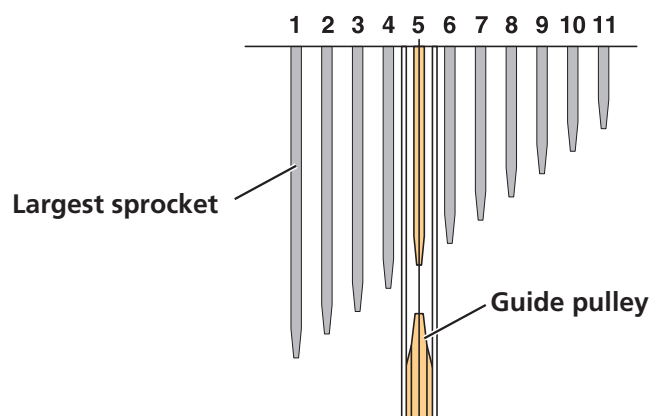
### 4. Check that the chain does not jam even at the smallest sprocket.

If there is some slack in the chain, adjust the end adjustment screw to remove the slack from the chain.

If the frame interferes with the rear derailleur, adjust by turning the end adjustment screw until they do not interfere.

## Gear shifting adjustment in adjustment mode

1. Shift the rear derailleur to the 5th gear position from the largest sprocket.

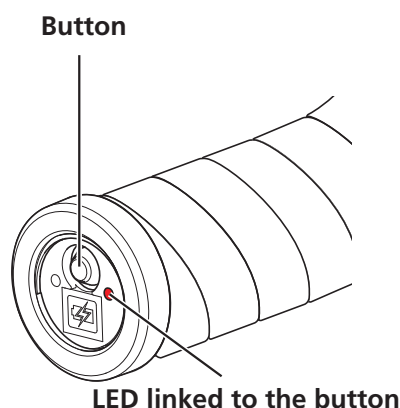
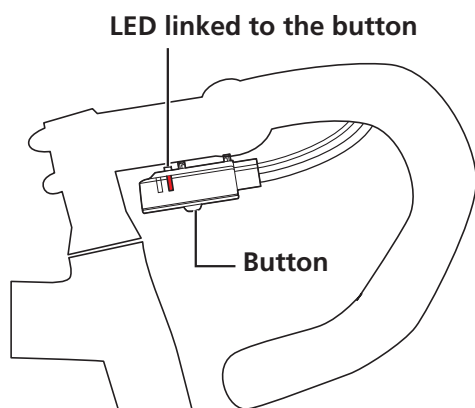


2. Switch the gear shifting system to adjustment mode.

Press and hold the button on junction [A] until the LED linked to the button lights up red.

For external type

For built-in bar end or built-in frame type

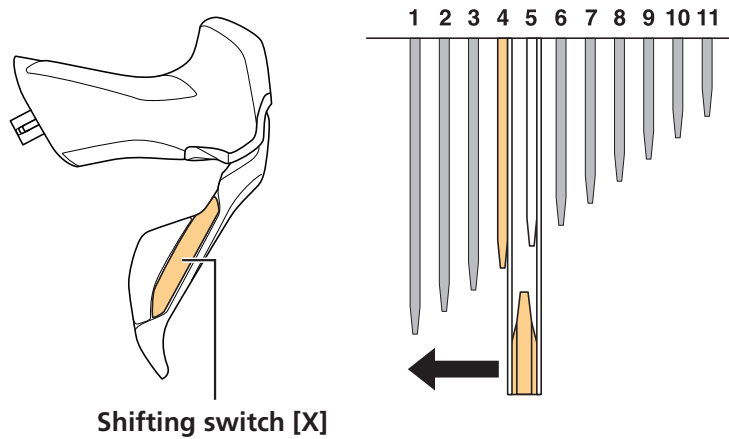


### NOTICE

- The button operation may differ depending on the connected battery. Refer to the user's manual for junction [A] for details.
- If you keep pressing the button after the LED linked to the button lights up red, RD protection reset will begin. Refer to the user's manual for the rear derailleur (DI2) for details. If you accidentally started RD protection reset, press the button again to switch back to normal mode and start over.

### 3. Press shift switch [X] while turning the crank, and move the guide pulley toward the largest sprocket.

Move it to the position where the chain makes contact with the 4th gear and a subtle noise is heard.

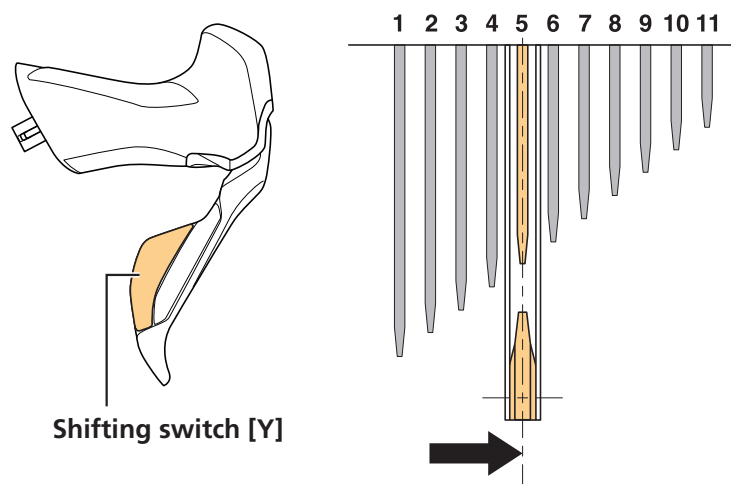


#### TECH TIPS

- It can move 16 steps inward and 16 steps outward from the initial position, for a total of 33 positions.
- In adjustment mode, the guide pulley will overrun slightly and then move back in an exaggerated manner so that you can check the adjustment direction. When checking the positions of the guide pulley and the gear, perform the check when the rear derailleur has come to a stop.

### 4. Press shift switch [Y] five times while turning the crank, and move the guide pulley five steps toward the smallest sprocket.

This position will serve as the target for adjustment.

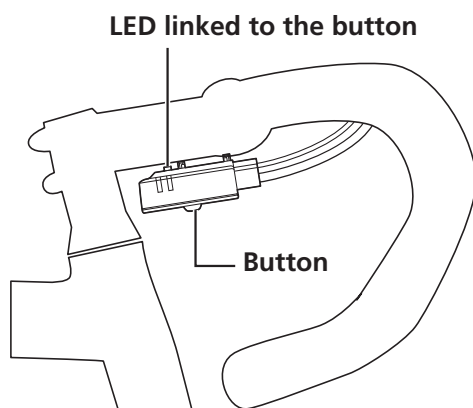




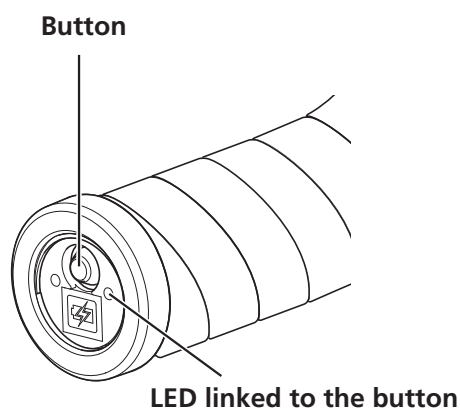
## 5. Switch the gear shifting system back to normal mode.

Press the button on junction [A] and check that the LED linked to the button is turned off.

For external type



For built-in bar end or built-in frame type



## 6. Shift to each gear and check that no noise is generated at any sprocket position.

If fine adjustment is needed, switch back to adjustment mode and readjust the rear derailleur.

## Adjusting the stopper bolt

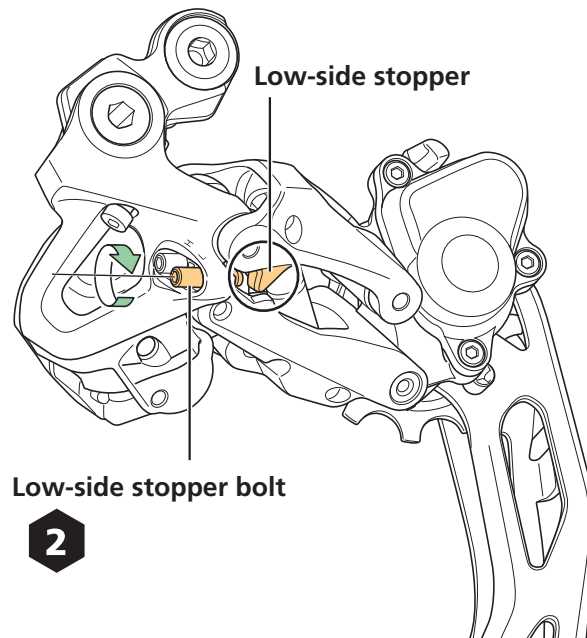
### NOTICE

Possible occurrences if the stopper bolt is overtightened

- Gears do not shift to the smallest sprocket or largest sprocket. Even if the gears are shifted, the gear may shift back by 1 gear after approximately 5 seconds.
- Noise does not stop.
- The battery level drops quickly because a load is being placed on the motor.
- The motor may be damaged due to overload (irreparable).

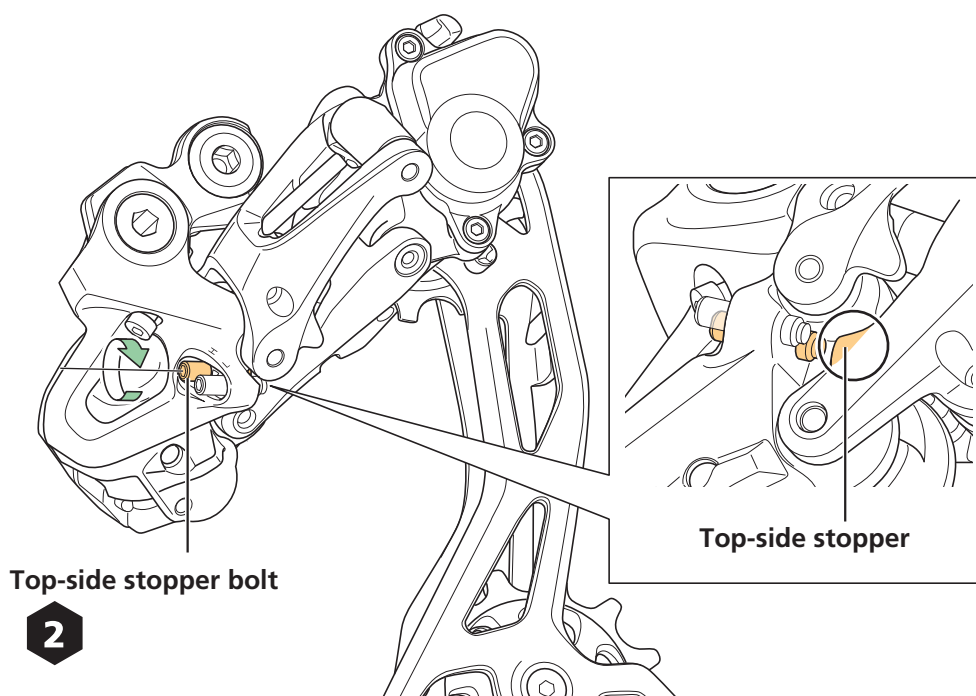
## 1. Adjust the low-side stopper bolt.

- (1) Shift the rear derailleur to the largest sprocket.
- (2) Then, tighten the low-side stopper bolt until it just touches the low-side stopper.



## 2. Adjust the top-side stopper bolt.

- (1) Shift the rear derailleur to the smallest sprocket.
- (2) Then, tighten the top-side stopper bolt until it just touches the top-side stopper.
- (3) Turn the top-side stopper bolt counterclockwise one turn from position (2) so that an over-stroke allowance can be maintained.



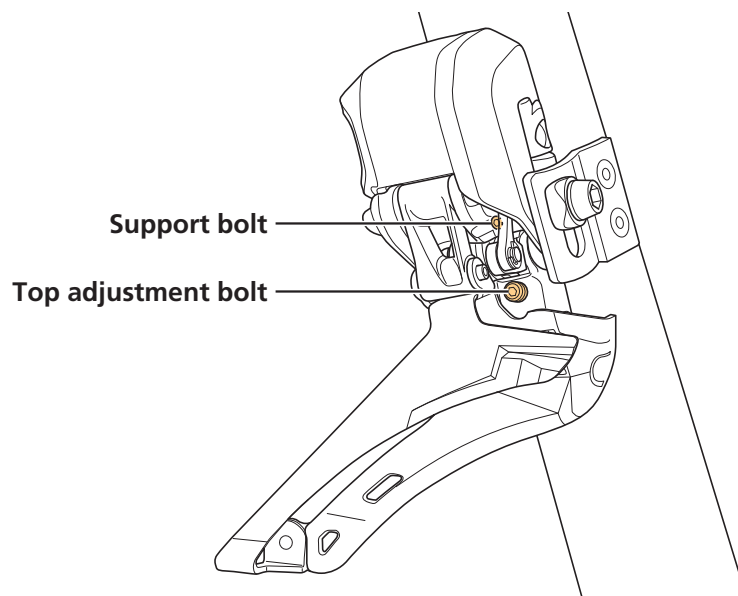
**TECH TIPS****Over-stroke**

- By shifting from the largest sprocket to the smallest sprocket, the rear derailleur moves past the top position toward the outside by the over-stroke allowance and then moves back.

## Adjusting the front derailleur

### Checking bolt positions

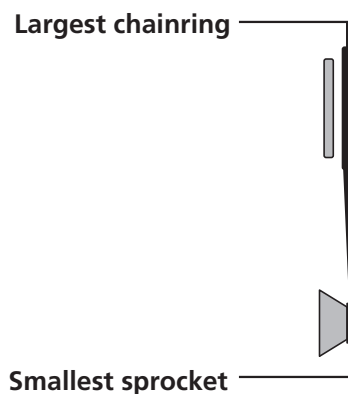
The top adjustment bolt and the support bolt are close to each other. Make sure that you are adjusting the correct bolt.



## Adjusting the top side

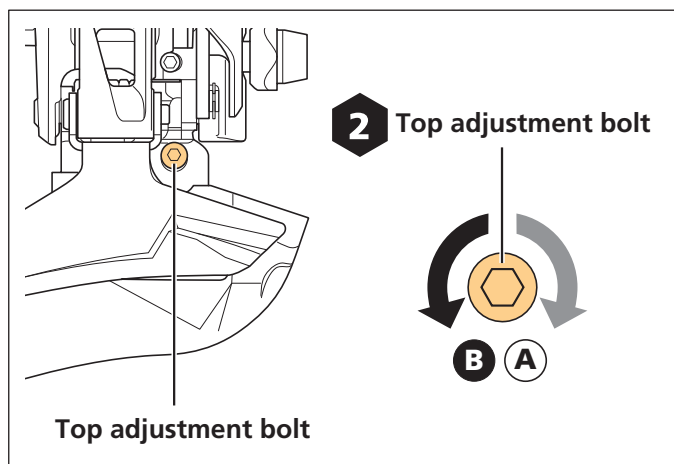
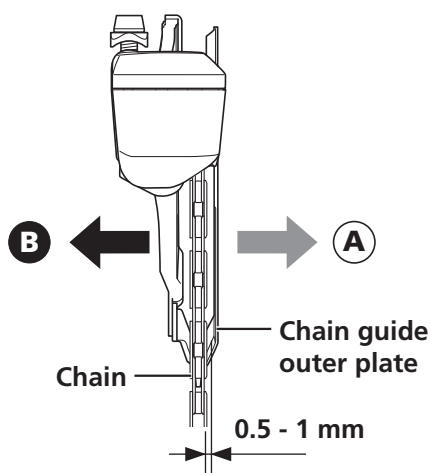
### 1. Set the chain on the largest chainring and the smallest sprocket.

Turn the crank arm in reverse.



### 2. Adjust the clearance between the chain and chain guide outer plate.

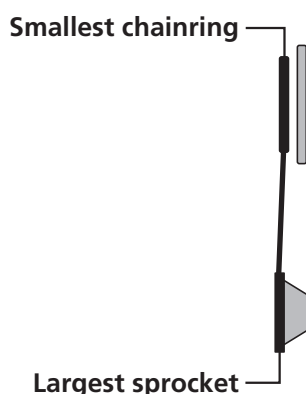
Adjust the clearance to 0.5 - 1 mm.



## Adjusting the lowest position in adjustment mode

### 1. Set the chain on the smallest chainring and the largest sprocket.

Turn the crank arm in reverse.

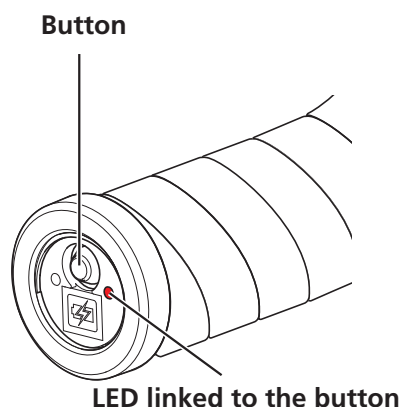
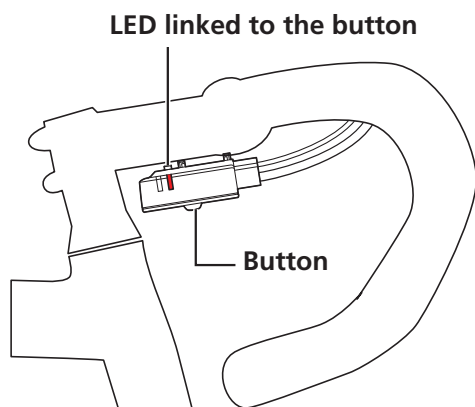


### 2. Switch the gear shifting system to adjustment mode.

Press and hold the button on junction [A] until the LED linked to the button lights up red.

For external type

For built-in bar end or built-in frame type

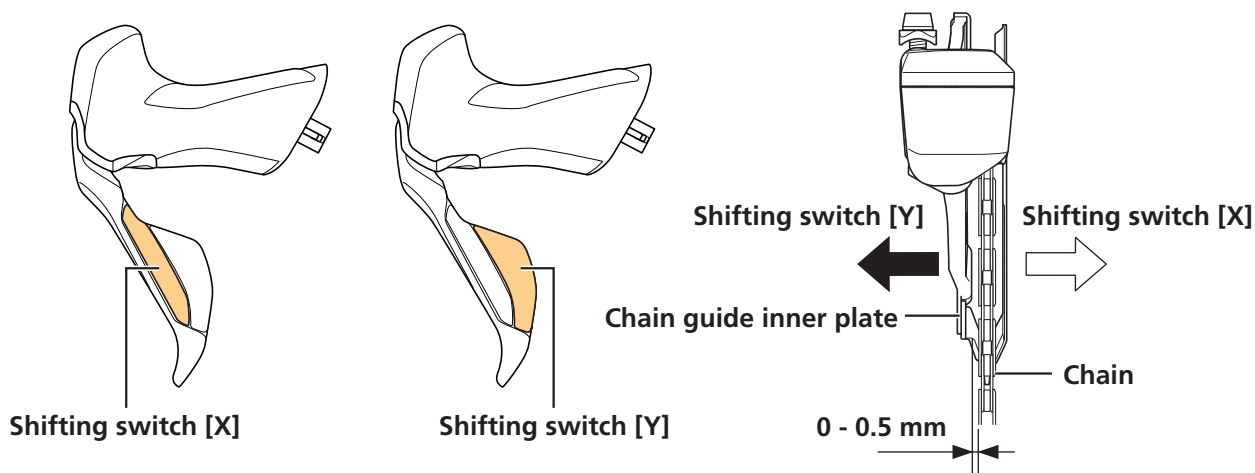


#### NOTICE

- The button operation may differ depending on the connected battery. Refer to the user's manual for junction [A] for details.
- If you keep pressing the button after the LED linked to the button lights up red, RD protection reset will begin. Refer to the user's manual for the rear derailleur (DI2) for details. If you accidentally started RD protection reset, press the button again to switch back to normal mode and start over.

### 3. Adjust the clearance between the chain and chain guide inner plate.

Adjust the clearance to 0 - 0.5 mm.



#### TECH TIPS

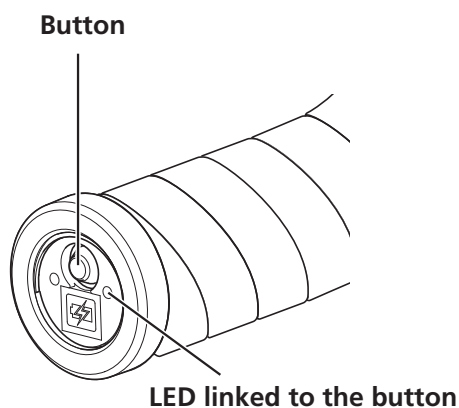
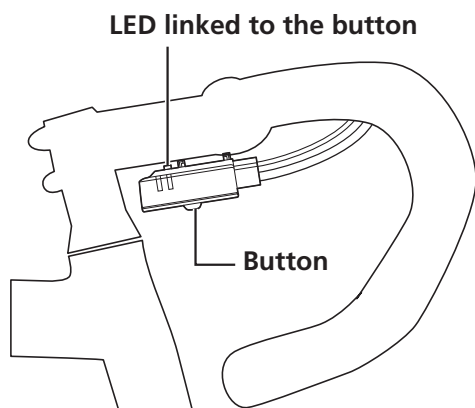
- It can move 18 steps inward and 18 steps outward from the initial position, for a total of 37 positions.
- In adjustment mode, the chain guide will overrun slightly and then move back in an exaggerated manner so that you can check the adjustment direction. When checking the positions of the chain guide and the chain, perform the check when the front derailleur has come to a stop.

### 4. Switch the gear shifting system back to normal mode.

Press the button on junction [A] and check that the LED linked to the button is turned off.

For external type

For built-in bar end or built-in frame type



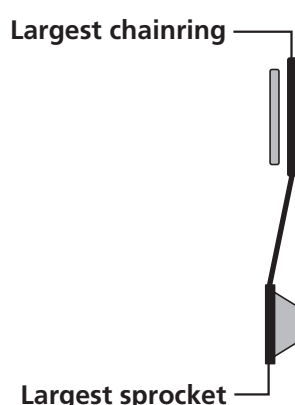
## 5. Shift the front derailleur and the rear derailleur to all gears to make sure that the chain does not contact the chain guide.

If fine adjustment is needed, switch back to adjustment mode and readjust the front derailleur.

## Adjusting the top position in adjustment mode

### 1. Set the chain on the largest chainring and the largest sprocket.

Turn the crank arm in reverse.

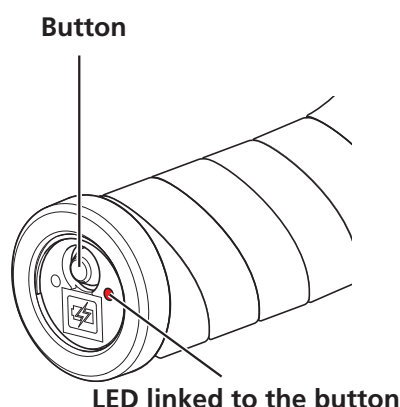
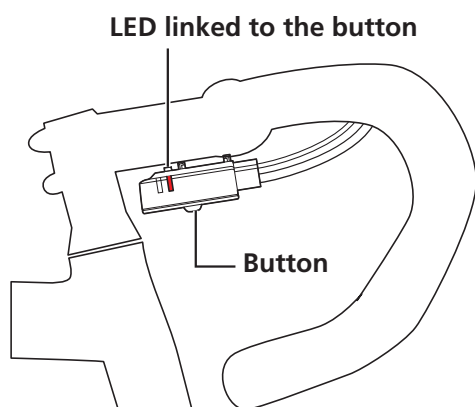


### 2. Switch the gear shifting system to adjustment mode.

Press and hold the button on junction [A] until the LED linked to the button lights up red.

For external type

For built-in bar end or built-in frame type

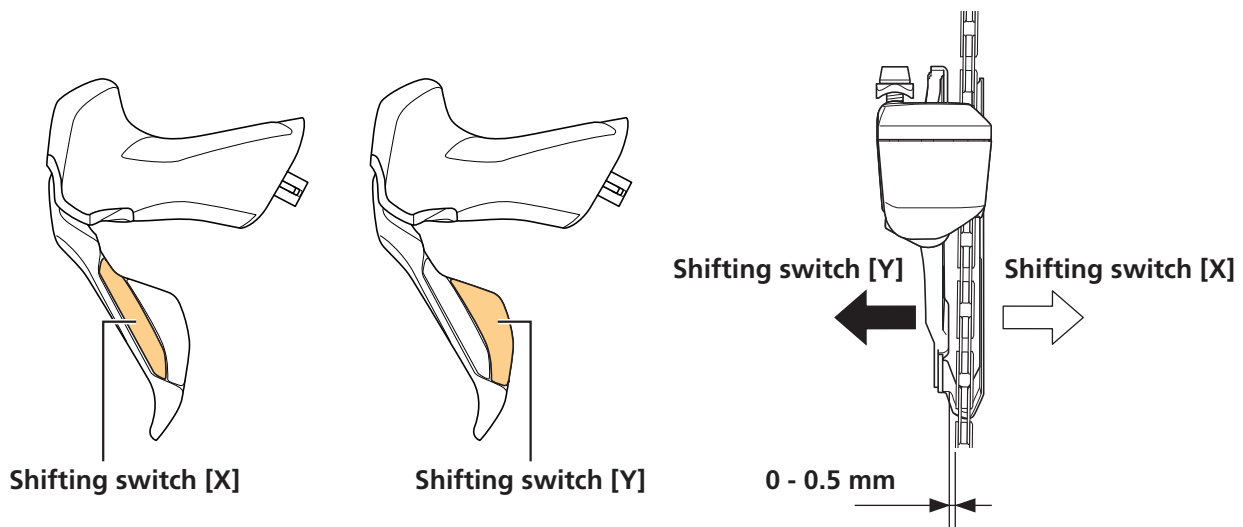


**NOTICE**

- The button operation may differ depending on the connected battery. Refer to the user's manual for junction [A] for details.
- If you keep pressing the button after the LED linked to the button lights up red, RD protection reset will begin. Refer to the user's manual for the rear derailleur (DI2) for details. If you accidentally started RD protection reset, press the button again to switch back to normal mode and start over.

### 3. Adjust the clearance between the chain and chain guide inner plate.

Adjust the clearance to 0 - 0.5 mm.

**TECH TIPS**

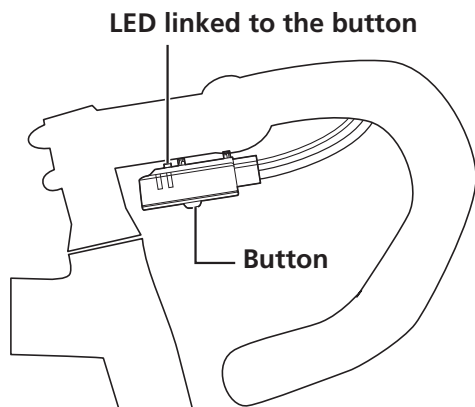
- It can move 12 steps inward and 12 steps outward from the initial position, for a total of 25 positions.
- In adjustment mode, the chain guide will overrun slightly and then move back in an exaggerated manner so that you can check the adjustment direction. When checking the positions of the chain guide and the chain, perform the check when the front derailleur has come to a stop.



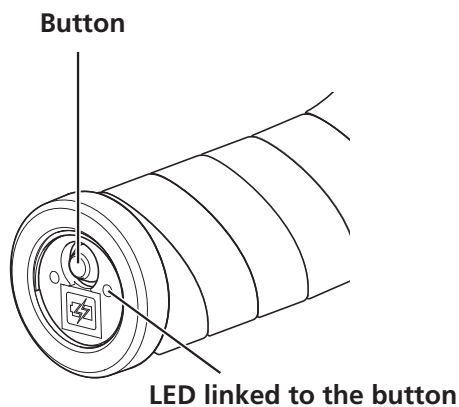
#### 4. Switch the gear shifting system back to normal mode.

Press the button on junction [A] and check that the LED linked to the button is turned off.

For external type



For built-in bar end or built-in frame type



#### 5. Shift the front derailleur and the rear derailleur to all gears to make sure that the chain does not contact the chain guide.

If fine adjustment is needed, switch back to adjustment mode and readjust the front derailleur.

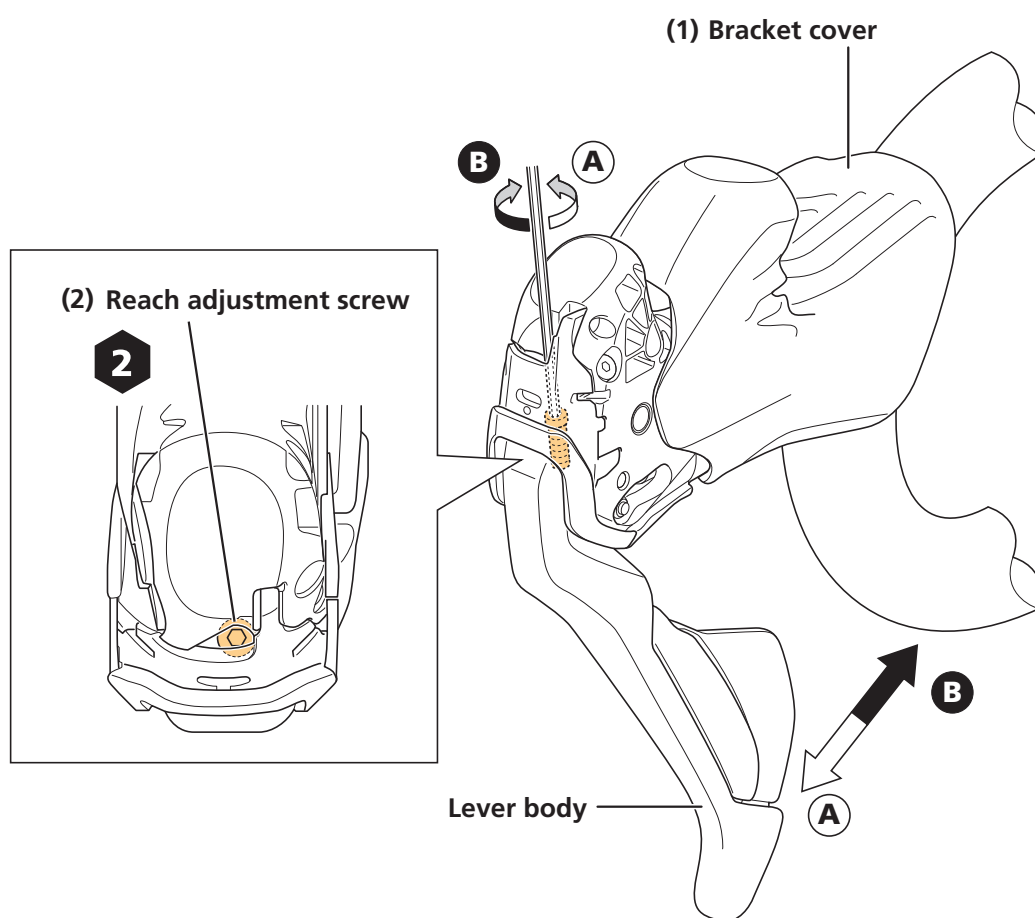
# Adjusting the dual control lever

## Adjusting the reach

Adjust the reach of the lever.

### 1. Adjust the position of the lever body.

- (1) Turn over the bracket cover from the front side.
- (2) Adjust the position of the lever body using the reach adjustment screw.



#### NOTICE

- Make sure that braking operates properly after the adjustment.

## Adjusting the free stroke

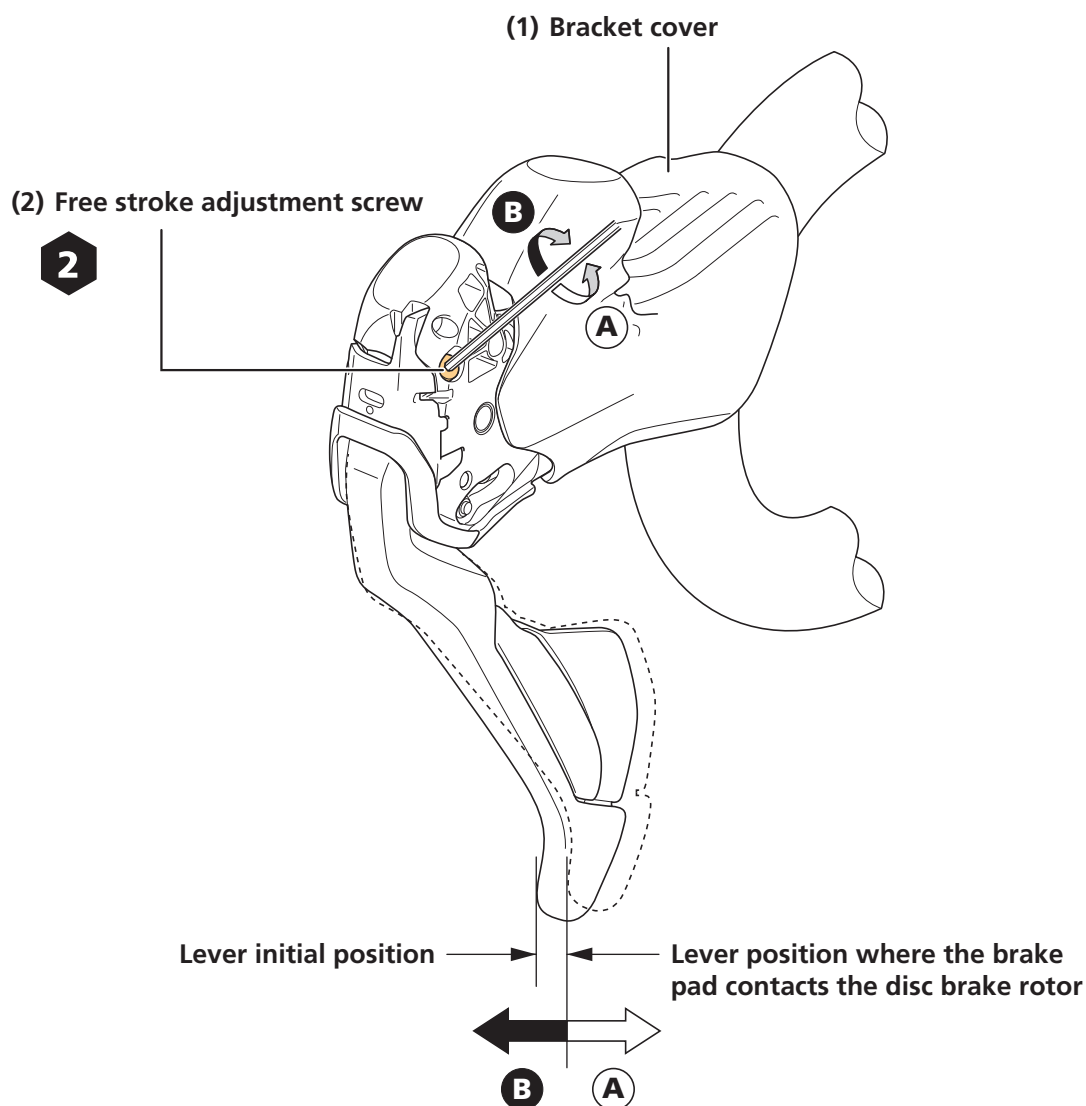
Adjust the range (gap) of travel of the lever until the brake pad and disc brake rotor come into contact.

### TECH TIPS

- Perform reach adjustment if the initial position of the lever changes when performing the free stroke adjustment.

### 1. Adjust the free stroke.

- (1) Turn over the bracket cover from the front side.
- (2) Adjust the gap of the lever with the free stroke adjustment screw.



**NOTICE**

- Stop loosening the free stroke adjustment screw when the gap stops increasing. Loosening it excessively may cause the free stroke adjustment screw to fall out.
- Do not forcibly tighten the free stroke adjustment screw. Otherwise, the free stroke adjustment screw may be damaged.
- Do not remove the washer from the free stroke adjustment screw.
- Position the free stroke adjustment screw so that it does not interfere with the bracket cover.

# Charging the battery

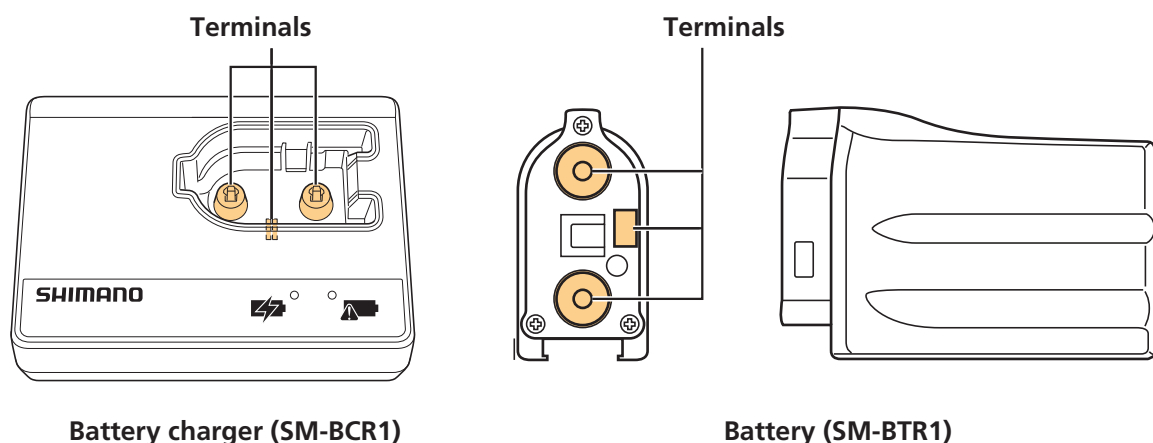
## External type

Remove the external type battery (SM-BTR1) from the bicycle and then charge it.

It can be charged in approximately 1.5 hours. The charging time differs according to the battery level.

### NOTICE

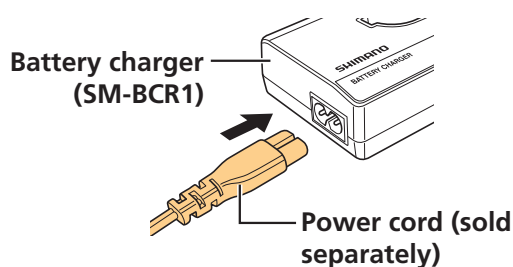
- Make sure to charge the external type battery (SM-BTR1) using the dedicated battery charger (SM-BCR1).
- If the terminals of the battery and battery charger are modified or damaged, problems with operation will occur. Be very careful when handling them.



- Refer to the user's manual of the battery and battery charger, and be careful of the operating temperature and storage temperature when handling them.

### 1. Connect the power cord to the battery charger.

Insert it in firmly as far as it will go.

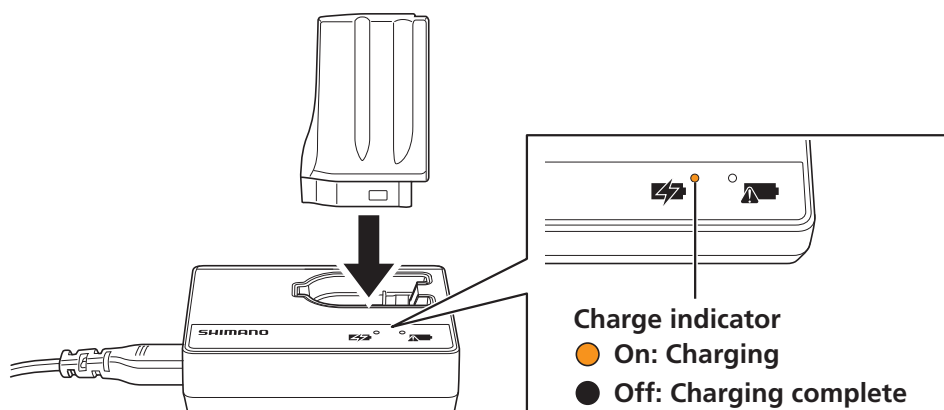


### 2. Connect the plug of the power cord to the electrical outlet.

### 3. Installing the battery to the battery charger.

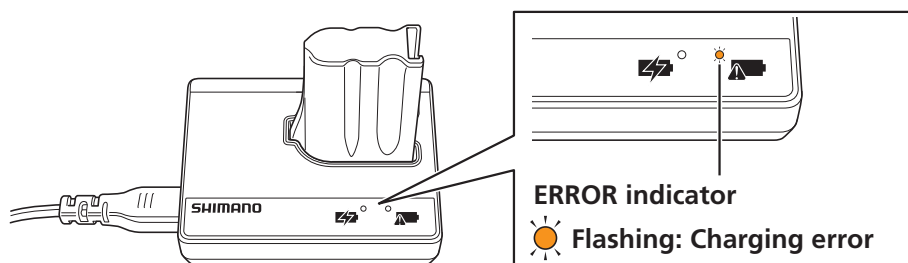
Insert it in firmly as far as it will go.

Charging starts and the charge indicator lights up. When the charge indicator turns off, charging is complete.



#### NOTICE

- If the ERROR indicator lights up, remove the battery from the battery charger, and remove the power cord from the electrical outlet. Then repeat the charging procedure from Step 1. If charging is still not possible, the ambient temperature may be too low or too high, or there may be a problem with the battery.



- When charging is complete, make sure to remove the power cord from the electrical outlet.

## Built-in type

Built-in type batteries (SM-BTR2/BT-DN110/BT-DN110-A) can be charged while mounted on the bicycle. The charging time is as follows. The charging time differs according to the battery level.

When charging by connecting to a PC	Approximately 3 hours
When charging with an AC adapter with a USB port	Approximately 1.5 hours*1

\*1 Depending on the specifications of the AC adapter, recharging via the AC adapter may require as much time (approximately 3 hours) as recharging via PC.

**NOTICE**

- Always use the designated battery charger (SM-BCR2) when charging built-in type batteries (SM-BTR2/BT-DN110/BT-DN110-A).
- Wipe off any dirt or water on junction [A] or the charging port on the system information display before charging. Failure to do so may cause damage.
- Refer to the user's manual of the battery and battery charger, and be careful of the operating temperature and storage temperature when handling them.
- Do not connect two or more SM-BCR2 units to a PC at the same time.
- When charging by connecting to a PC, E-TUBE PROJECT cannot be used while charging.

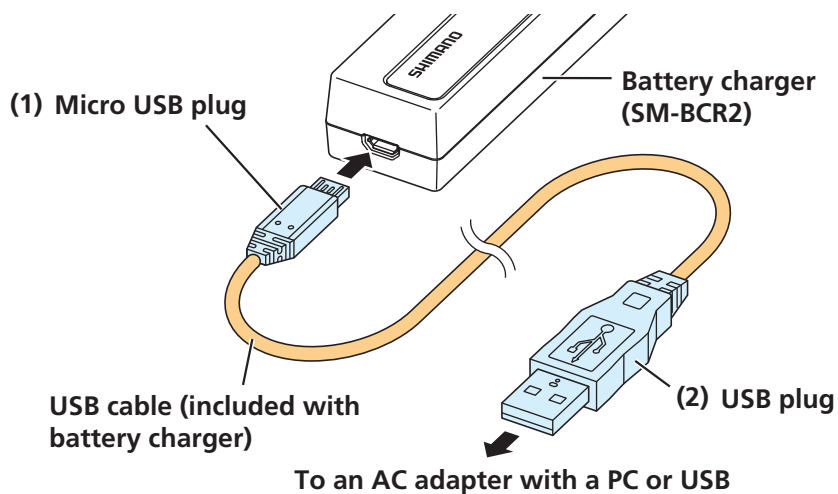
## 1. Prepare the battery charger.

- (1) Connect the micro USB plug on the USB cable to the battery charger.

\* Insert it in firmly as far as it will go.

- (2) Connect the USB plug on the USB cable to a PC or an AC adapter with a USB port.

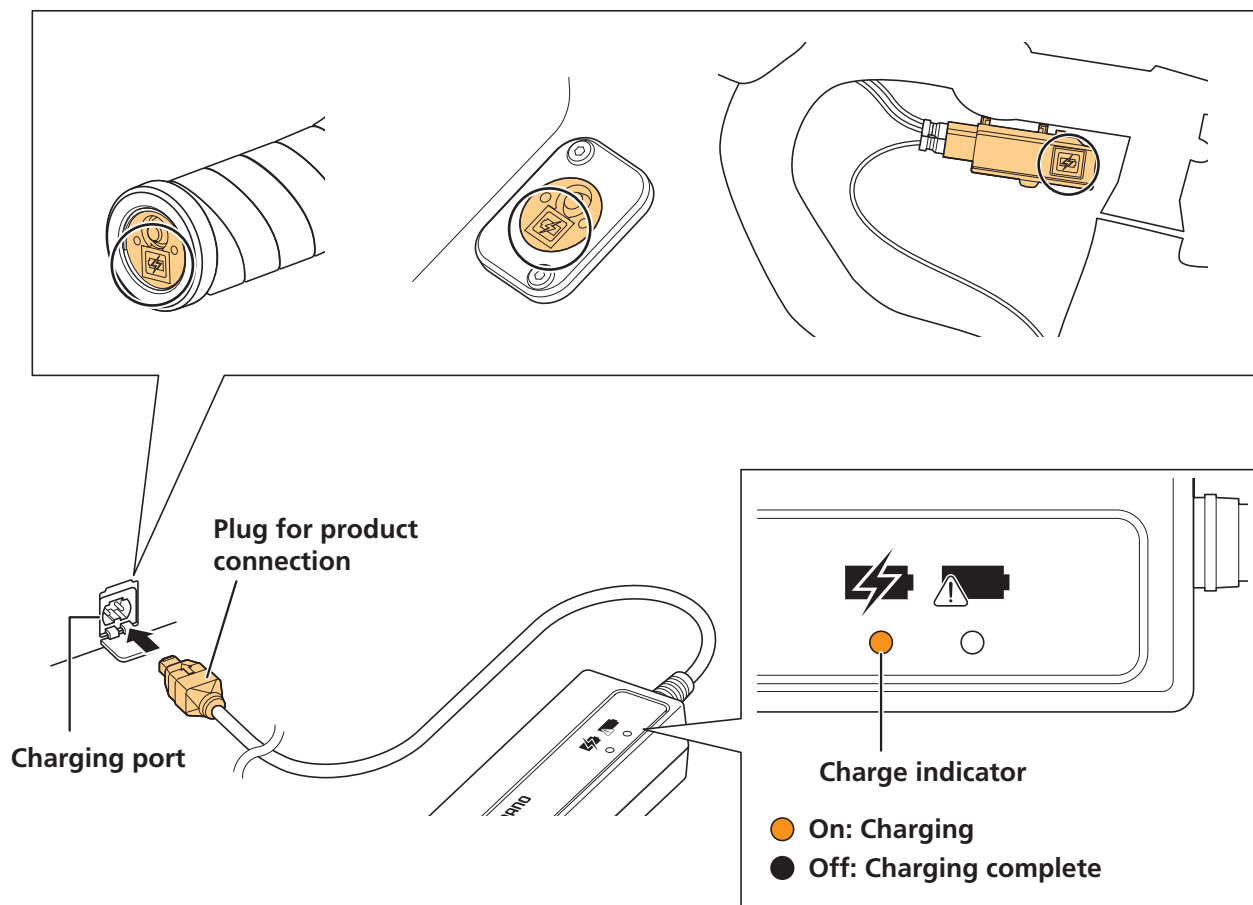
\* When using an AC adapter with a USB port, plug the AC adapter into an electrical outlet.



## 2. Connect the plug for product connection on the battery charger to the charging port on the product.

The position of the charging port differs depending on the product. Insert it in firmly as far as it will go.

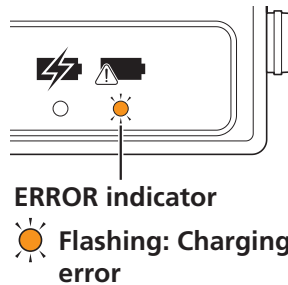
Charging starts and the charge indicator lights up. When the charge indicator turns off, charging is complete.



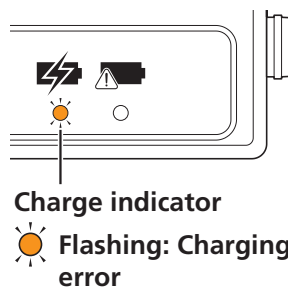


**NOTICE**

- If the ERROR indicator blinks, the ambient temperature during charging may be outside the operating temperature range. If the ambient temperature is within the specified range, there is a problem with the battery or the connected product.



- If the charge indicator blinks, the following conditions may have caused a charging problem. If the following conditions are not found, there is a problem with the battery or the connected product.
  - The current capacity of your AC adapter with a USB port is lower than 1.0Adc
  - A USB hub is connected to SM-BCR2.



- If the charge indicator does not light up or goes out soon, the battery may be fully charged. Check the remaining battery level. If the battery is low or dead, contact your distributor.
- Once charging is complete, always remove the USB cable from the AC adapter or PC.

# CONNECTION AND COMMUNICATION WITH DEVICES

## E-TUBE PROJECT

Connecting the bicycle to a device allows you to update the settings and firmware, and more.

E-TUBE PROJECT is needed to configure the settings and update firmware.

Download E-TUBE PROJECT from our support website (<http://e-tubeproject.shimano.com>).

For information on how to install E-TUBE PROJECT, check the support website.

### TECH TIPS

- SM-PCE1/SM-PCE02/SM-BCR1 is needed to connect a bicycle (entire bicycle or a component) to a PC.
- If there are no unused E-TUBE ports available on the bicycle, SM-JC40/JC41 is needed.
- Firmware is subject to change without notice.

## System requirements

	PC linkage device	E-TUBE PROJECT	Firmware
SM-BMR2/SM-BTR2	SM-PCE1/SM-PCE02/ SM-BCR2	Version 3.4.2 or later	Version 3.0.0 or later
BT-DN110/BT-DN110-A/BM-DN100			Version 4.0.0 or later

### NOTICE

- If your versions of E-TUBE PROJECT software and firmware for each component are not up to date there could be problems operating the bicycle. Check the versions and update them to the latest ones.

# About wireless functions

## Compatible cycle computers

A D-FLY compatible cycle computer is required to establish communication between the wireless unit and the cycle computer. The types of information displayed on the cycle computer vary by product. For details, refer to the owner's manual for the cycle computer.

## Functions

You can check the latest functions by using E-TUBE PROJECT to update the software.

### ▶ ANT connection

The wireless unit transmits the following three types of information to cycle computers or receivers via ANT connection.

- Gear position information (front and rear)
- DI2 battery level information
- Adjustment mode information

The types of information displayed on the receiving side differ depending on the product. Refer to the owner's manual for your cycle computer or receiver.

### ▶ Bluetooth® LE connection

E-TUBE PROJECT for smartphones/tablets may be used if a Bluetooth LE connection is established with a smartphone/tablet.

## Items configurable in E-TUBE PROJECT

Display settings	Display time	Sets the time until the display turns off when the display monitor is left unattended.
Switch function setting		Modify the shifting switch function settings.
Shift mode setting		Modify the shift mode (synchronized shift) settings.
Multi shift mode setting	Multi-shifting ON/OFF	Select whether or not to use multi-shifting.
	Gear-shifting interval	Sets the gear-shifting interval for multi-shifting.
	Gear number limit	Sets the limit on the number of gears shifted when the shifting switch is held down.

## Shift mode setting (synchronized shift)

The [Shift mode setting] can be registered in E-TUBE PROJECT to maintain the ideal front and rear gear positions synchronized with front derailleur and rear derailleur gear shifting.

- Up to two shift mode settings can be registered in E-TUBE PROJECT. Refer to the help manual for E-TUBE PROJECT for information on how to configure this.
- Operate the junction [A] button to switch to the shift mode registered in E-TUBE PROJECT. Refer to the user's manual for junction [A] for details.

## Semi-synchronized shift

The rear derailleur automatically shifts gears in synchronization with front derailleur gear shifting. The rear derailleur can be set to automatically shift from 0 to 4 gears. (2 gear positions is the default.)

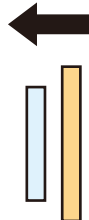
### TECH TIPS

- The setting for the number of gears shifted varies depending on the combination of the number of teeth on the chainring and sprocket.

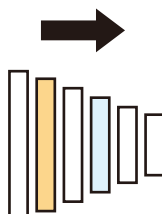
## ► When shifting from the largest chainring to the smallest chainring

The rear derailleur shifts from 0 to 4 gears outward. (2 gear positions is the default.)

Front shifting functionality



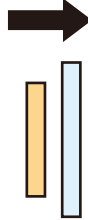
Rear movements in conjunction



## ► When shifting from the smallest chainring to the largest chainring

The rear derailleur shifts from 0 to 4 gears inward. (2 gear positions is the default.)

Front shifting functionality



Rear movements in conjunction



# Synchronized shift

The front derailleur automatically shifts gears in synchronization with rear derailleur gear shifting. The numbers of switch gears for synchronized shift are configured by default as shown in the figure below.

Gear position (cassette sprocket)		Smallest chainring (inner)	Largest chainring (outer)
Largest sprocket (low)	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
Smallest sprocket (top)	11		

: Shifting up 
 : Shifting down 
 : Combination with unused gear

The figure above shows the following operations following rear gear shifting.

- Shifting up: When the front is on the smallest chainring and the rear is shifted up to 7th gear, the following operation is performed.
  - The front automatically switches to the largest chainring.
  - The rear also automatically switches to 5th gear.
- Shifting down: When the front is on the largest chainring and the rear is shifted down to 2nd gear, the following operation is performed.
  - The front automatically switches to the smallest chainring.
  - The rear also automatically switches to 4th gear.

# MAINTENANCE

## Replacing the brake pads

Refer to the dealer's manual for the brake caliper and replace the brake pads in the following situations.

- When oil adheres to the brake pads
- When the brake pads are worn down to a thickness of 0.5 mm
- When the brake pad presser spring is interfering with the disc brake rotor

## SHIMANO genuine mineral oil replacement

It is recommended to change your oil when the oil in the reservoir tank becomes noticeably discolored.

### Draining the mineral oil

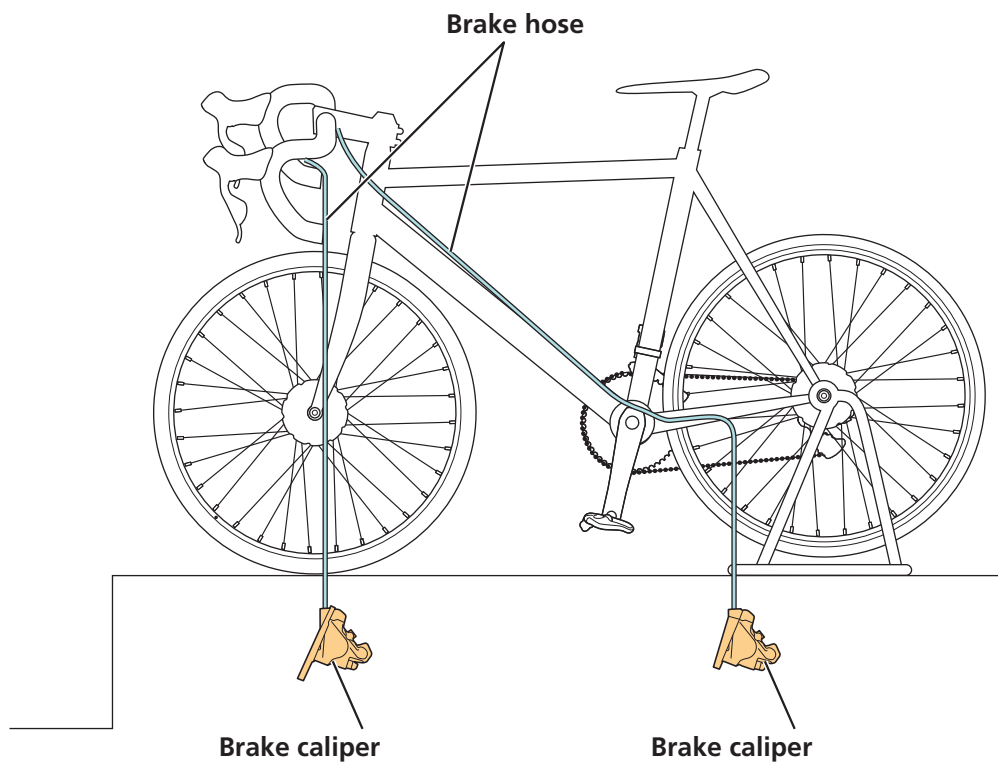
Follow local county and/or state codes for disposal of used oil.

#### **NOTICE**

- When changing the lever installation angle, be careful not to apply excessive force to the brake hose or electric wire. Doing so may cause damage or disconnection.

## 1. Position the bicycle as shown in the figure.

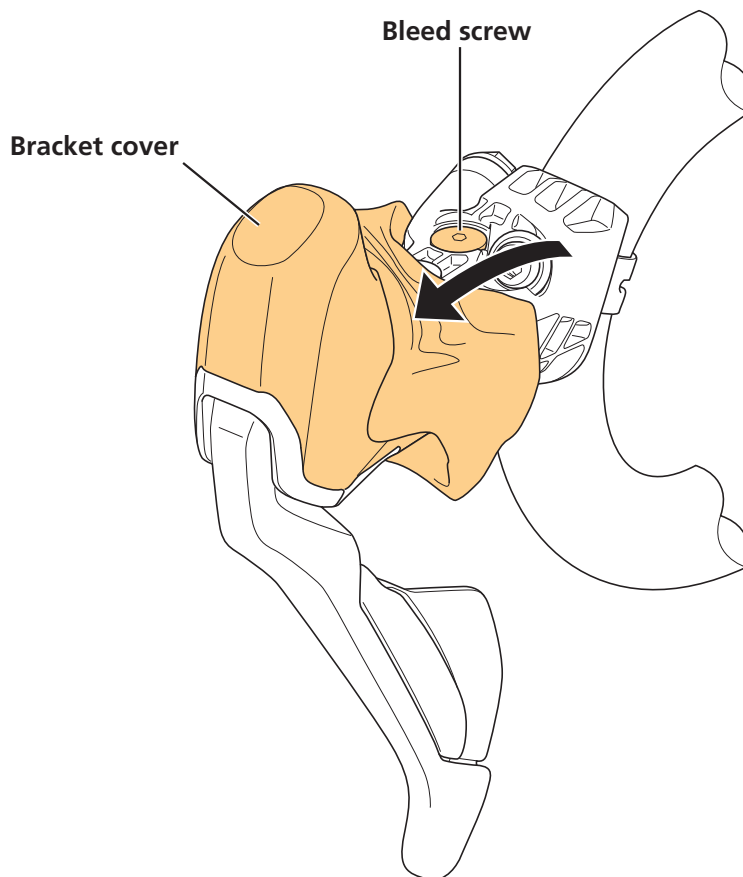
Install a bleed spacer (yellow) to the caliper and secure the bicycle with a stand, etc.



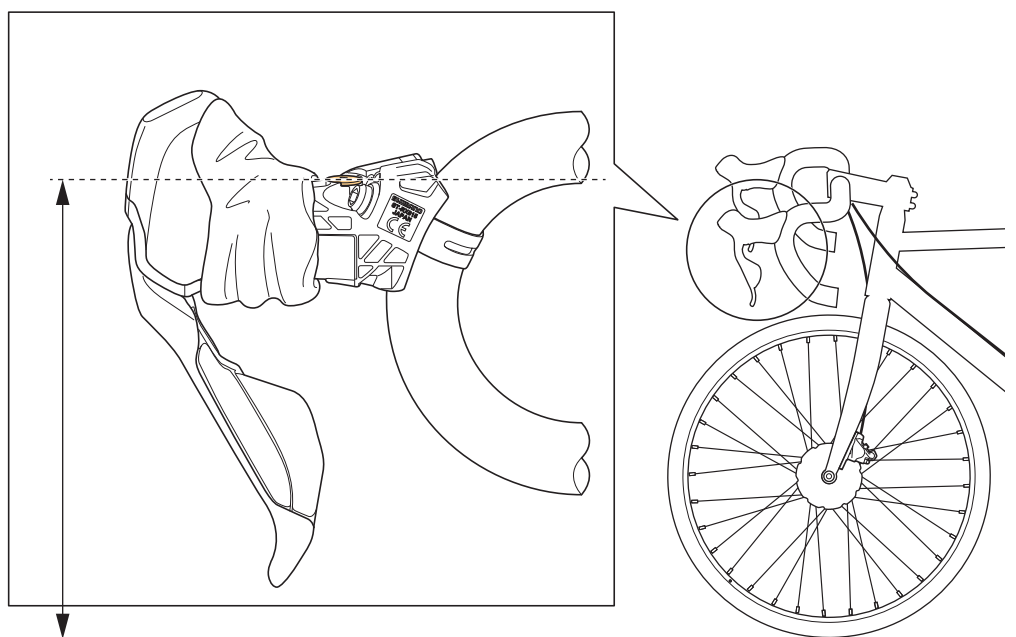


## 2. Turn over the bracket cover from the back side.

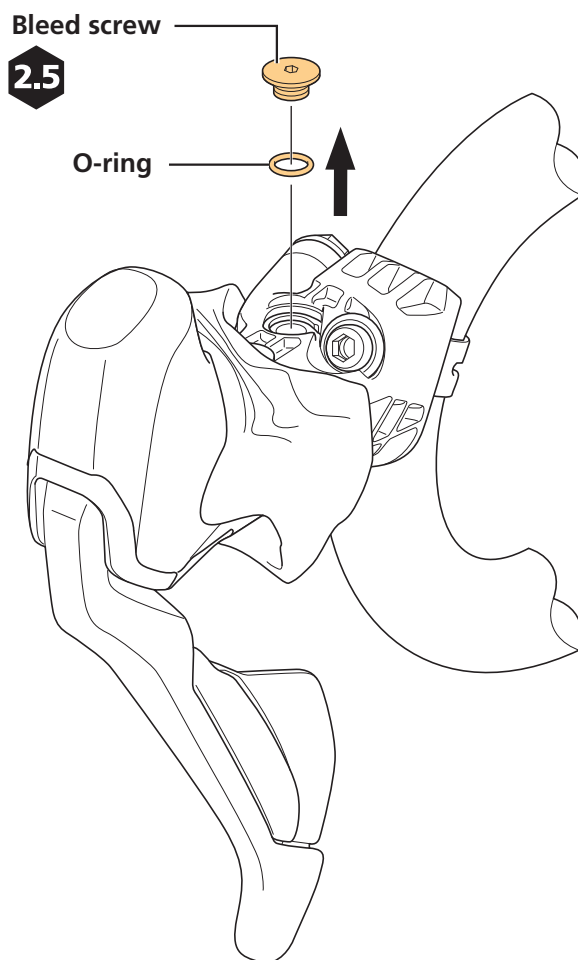
Turn it over until the bleed screw is exposed.



## 3. Set the lever in a position where the top surface of the bleed screw is parallel with the ground.



## 4. Remove the bleed screw and O-ring.

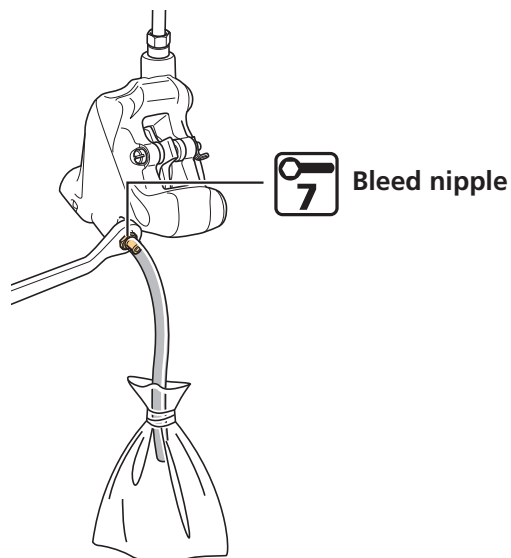


### NOTICE

- Be careful not to lose the bleed screw or O-ring.
- Be careful not to dirty or damage the O-ring.

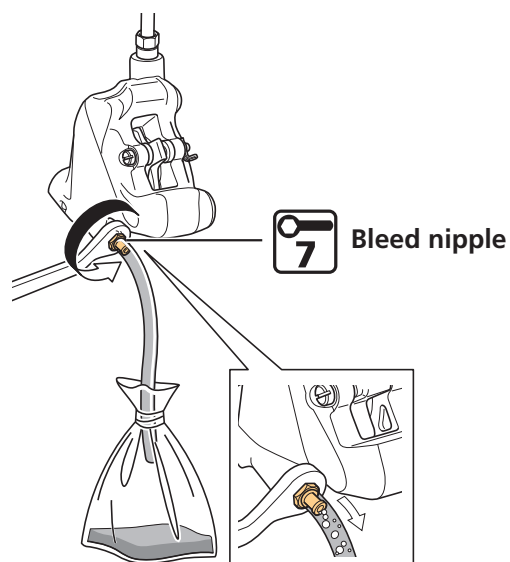
## 5. Install a bag and tube on the bleed nipple.

- (1) Place a 7 mm socket wrench in the position shown in the figure.
- (2) Connect the bag and attached tube to the bleed nipple.



## 6. Loosen the bleed nipple.

The oil will begin to drain. Operating the brake lever while the oil drains will allow the oil to drain more easily.



## Adding mineral oil and bleeding air

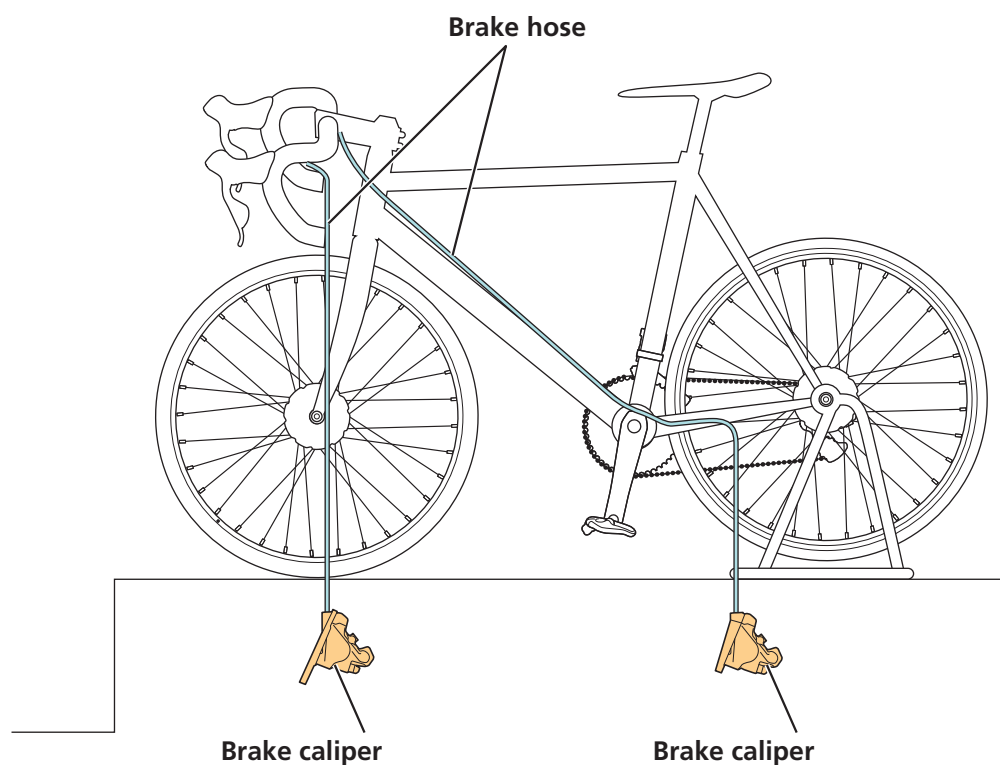
Use only SHIMANO genuine mineral oil.

### NOTICE

- When bleeding air out of the caliper, you will need the SM-DISC (oil funnel and oil stopper).
- When changing the lever installation angle, be careful not to apply excessive force to the brake hose or electric wire. Doing so may cause damage or disconnection.

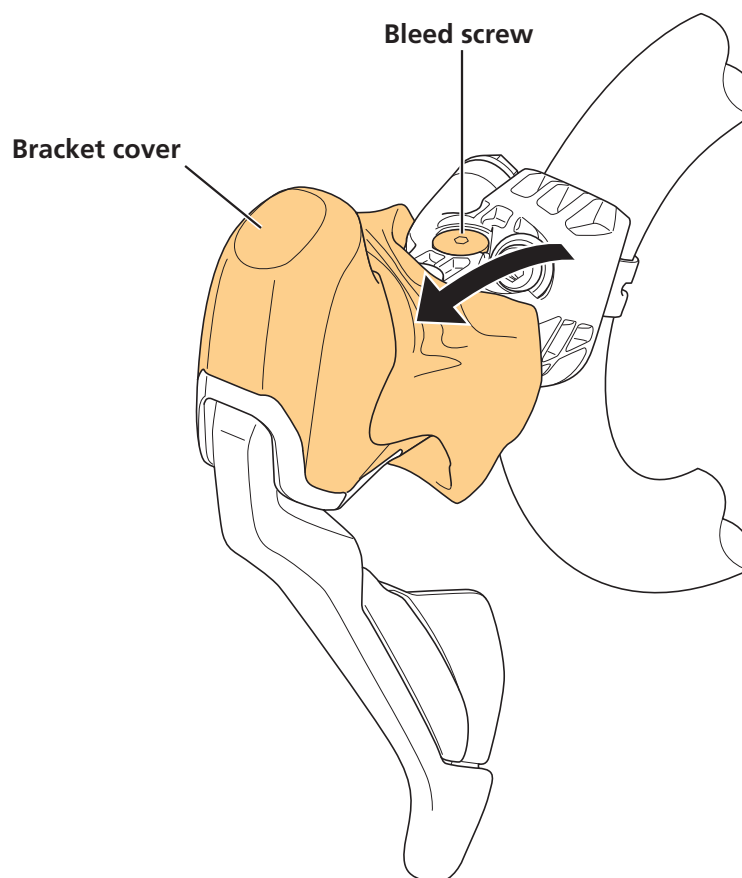
### 1. Position the bicycle as shown in the figure.

Install a bleed spacer (yellow) to the caliper and secure the bicycle with a stand, etc.

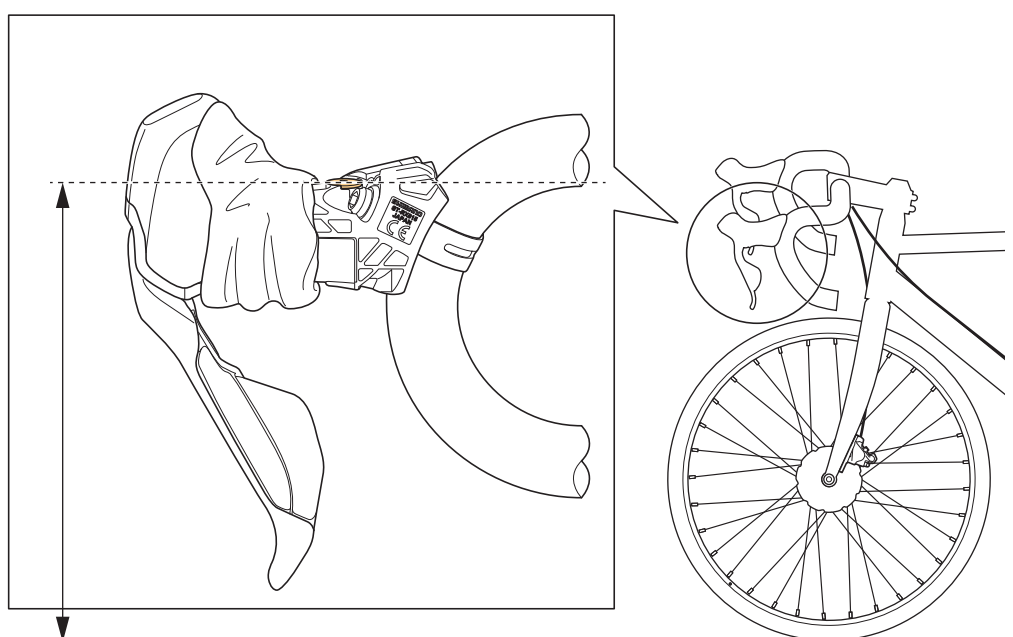


## 2. Turn over the bracket cover from the back side.

Turn it over until the bleed screw is exposed.

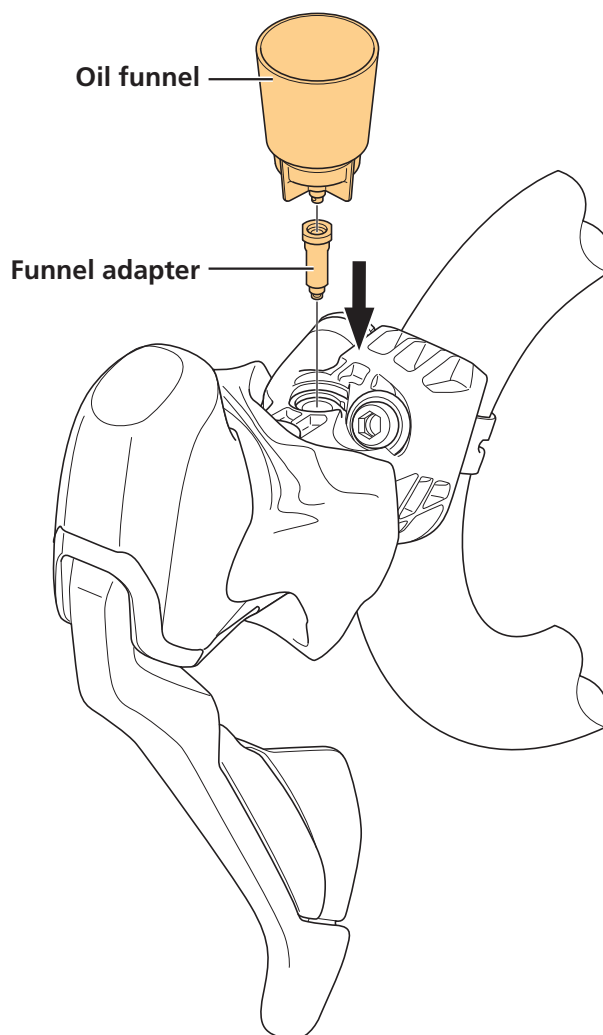


## 3. Set the lever in a position where the top surface of the bleed screw is parallel with the ground.



#### 4. Remove the bleed screw and O-ring, and set the oil funnel.

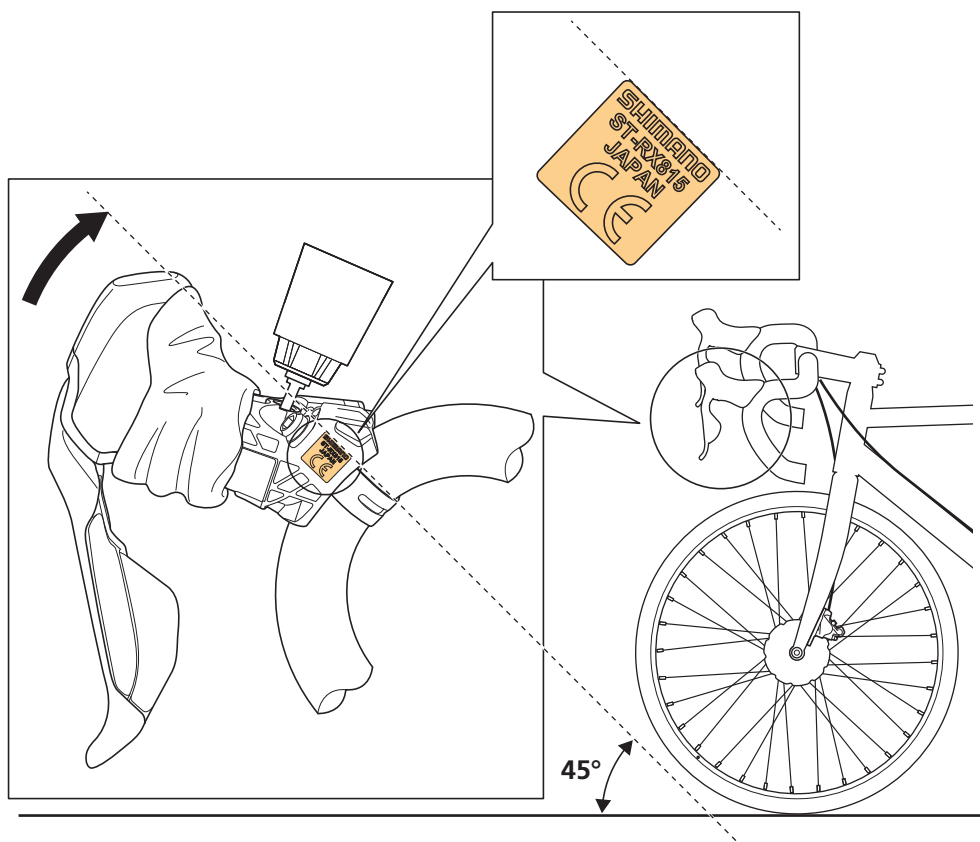
Attach the funnel adapter to the oil funnel.

**NOTICE**

- Be careful not to lose the bleed screw or O-ring.

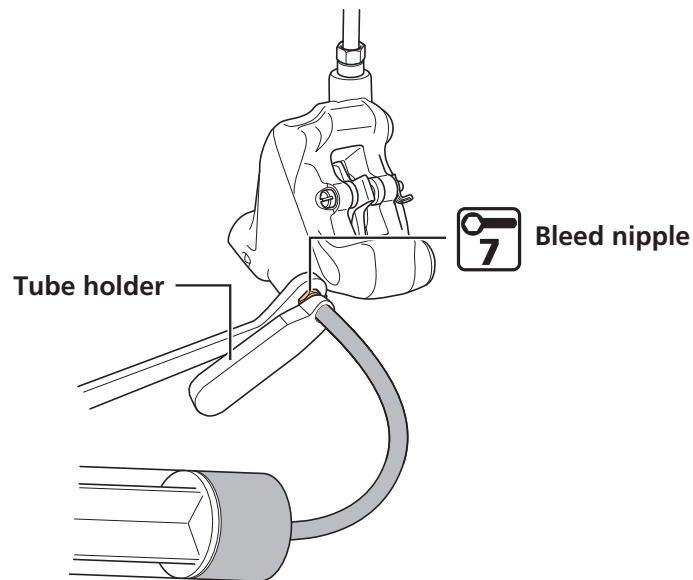
## 5. Set the lever in the position where the bracket is at 45°, as shown in the figure.

Perform adjustment by changing the angle of the handle, etc.



## 6. Inject oil from the brake caliper side.

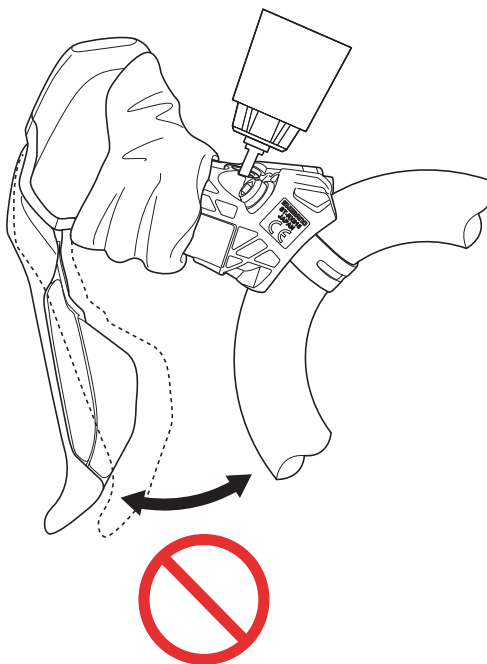
- (1) Place a 7 mm socket wrench in the position shown in the figure.
- (2) Fill a syringe with oil, and then connect the tube to the bleed nipple.
  - \* Fix the tube with a tube holder so that it does not come loose.
- (3) Loosen the bleed nipple by 1/8 of a turn.
- (4) Push the piston of the syringe to add the oil.
- (5) Oil will start to come out from the oil funnel. Continue adding the oil until there are no more air bubbles in the oil that is coming out.





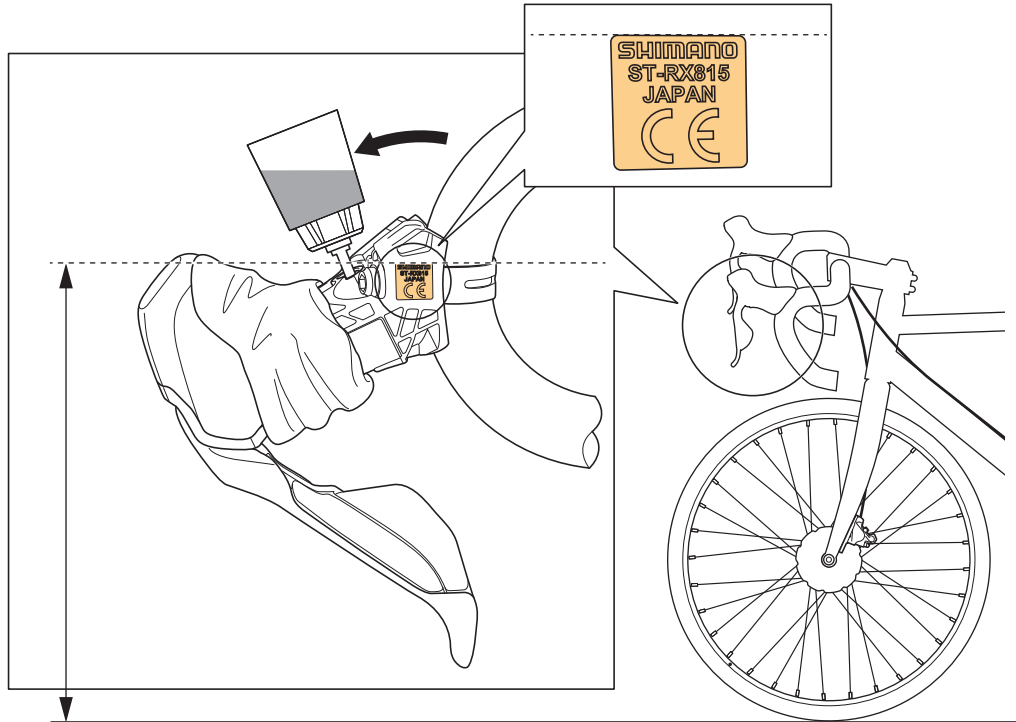
**NOTICE**

- Secure the brake caliper main body in a clip to prevent the tube from being disconnected accidentally.
- Do not operate the lever repeatedly while injecting oil. Doing so will lengthen the amount of time needed to bleed the air as it will cause air bubbles to remain inside the brake caliper, even if no bubbles appear within the oil funnel. If the lever was operated, drain out all of the oil and then add the oil again.



- 7.** Once there are no more air bubbles mixed in with the oil, set the lever in a position where the bracket surface indicated in the figure is parallel with the ground.

Perform adjustment by changing the angle of the handle, etc.



- 8.** Fill the oil funnel with oil until there are no more air bubbles mixed in with the oil, and temporarily close the bleed nipple.

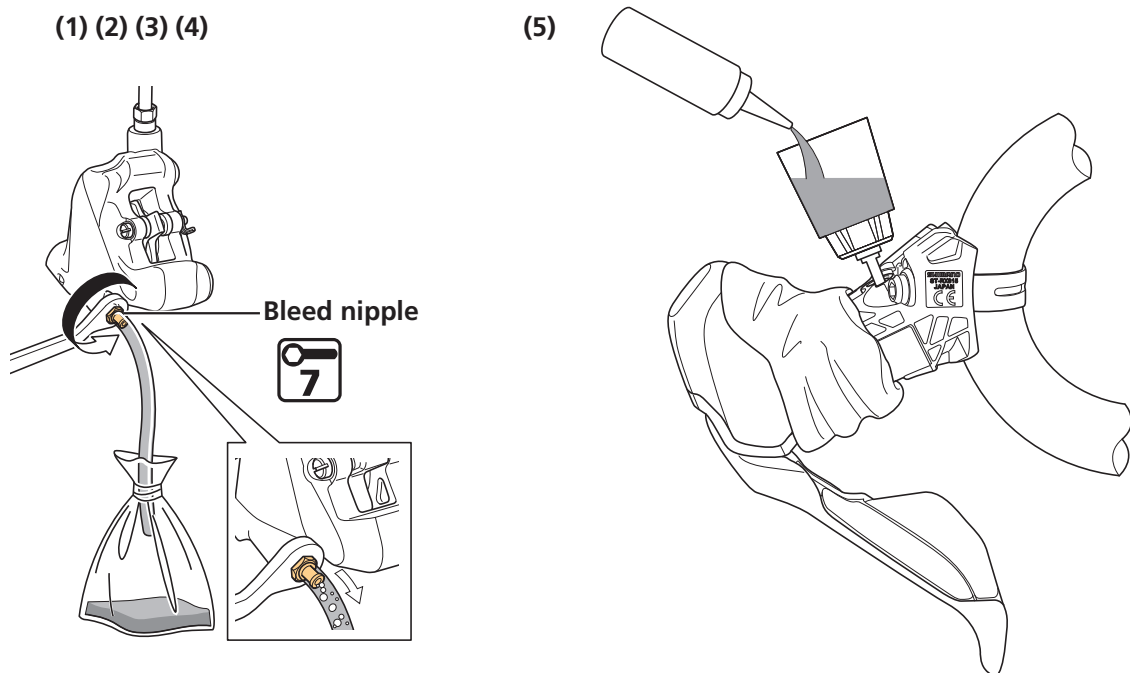
- 9.** Remove the syringe.

Hold the tip of the syringe tube with a waste cloth, etc. so that the oil does not scatter.

## 10. Bleed the air.

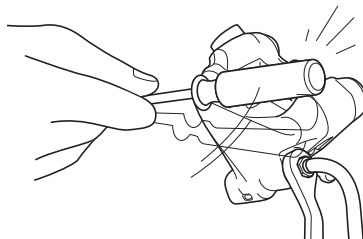
Most of the air bubbles remaining inside the brake system can be bled by performing the following operation.

- (1) Place a 7 mm socket wrench in the position shown in the figure.
- (2) Connect the bag and attached tube to the bleed nipple.
- (3) Loosen the bleed nipple.
- (4) After a little while, the oil and air bubbles will flow naturally from the bleed nipple into the tube.
- (5) The oil level drops in the oil funnel. Keep adding oil to maintain the oil level to prevent air from getting in.

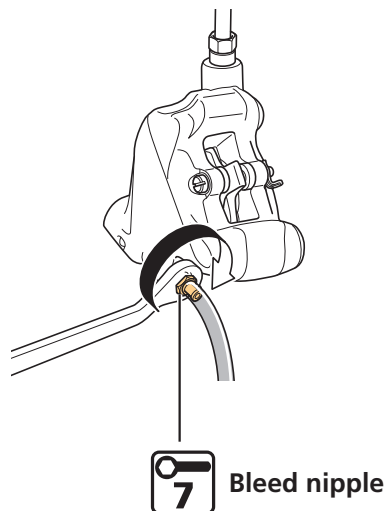


### TECH TIPS

- It may be effective to shake the brake hose gently, to tap the bracket of the lever and caliper gently with a screwdriver, or to move the position of the calipers.

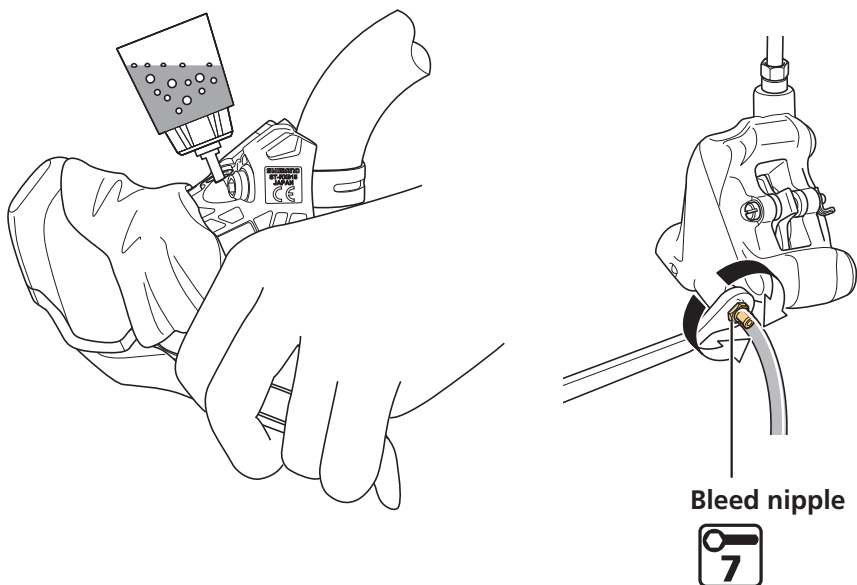


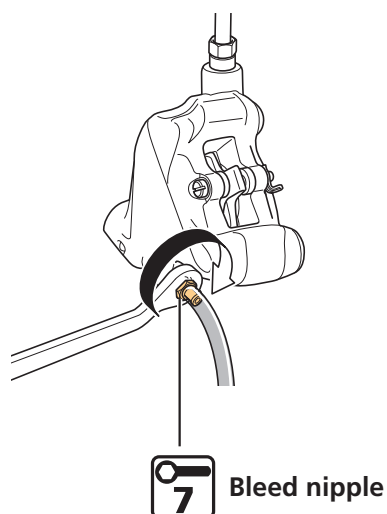
11. Once no more air bubbles come out from the bleed nipple, temporarily tighten the bleed nipple.



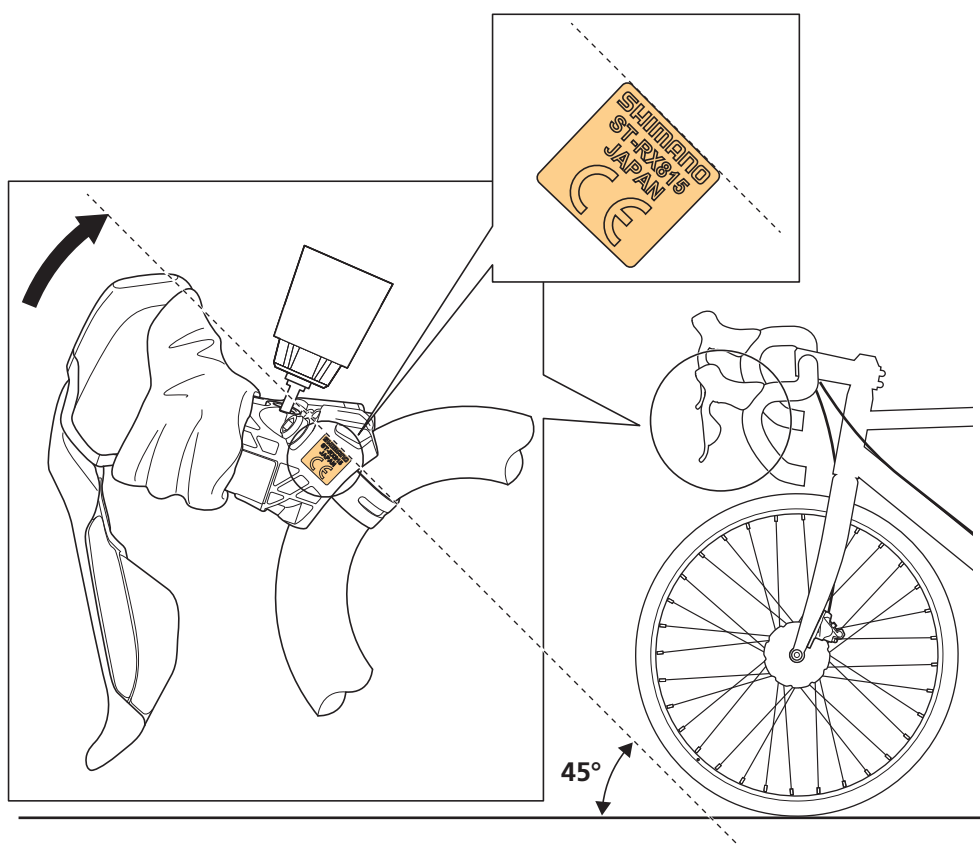
12. With the lever depressed, loosen and tighten the bleed nipple in rapid succession.

Loosen and tighten for approximately 0.5 seconds each time to release any air bubbles inside the caliper.



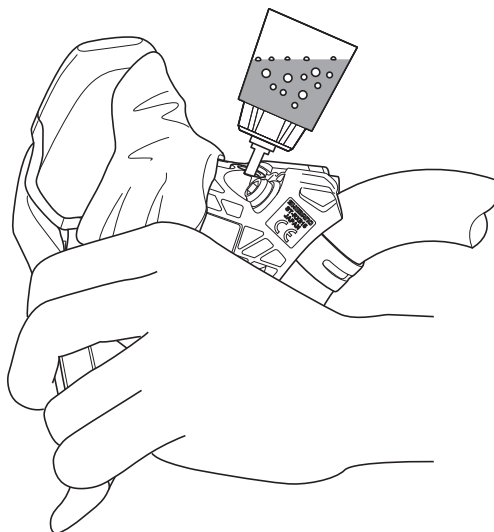
**13. Repeat step 12 two to three times, and then tighten the bleed nipple.****14. Set the lever in the position where the bracket is at 45°, as shown in the figure.**

Perform adjustment by changing the angle of the handle, etc.



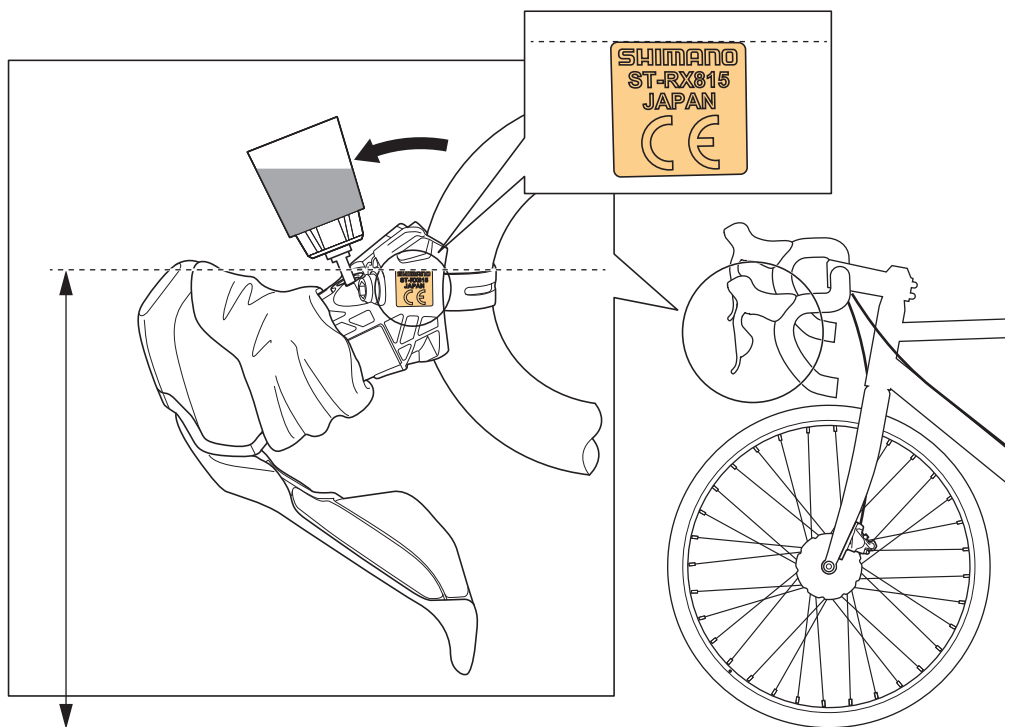
## 15. Operate the lever.

Slowly repeat until no more air bubbles appear.



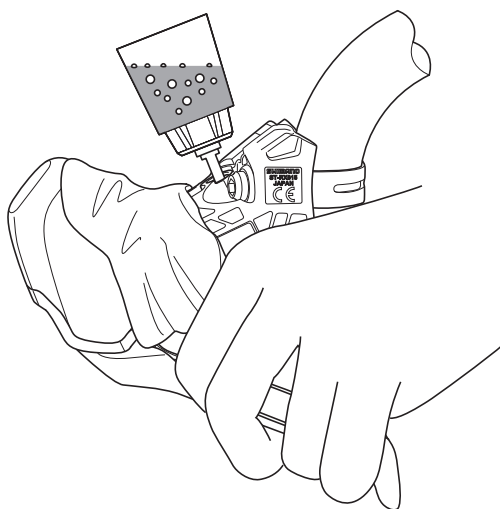
## 16. Set the lever in a position where the bracket surface indicated in the figure is parallel with the ground.

Perform adjustment by changing the angle of the handle, etc.

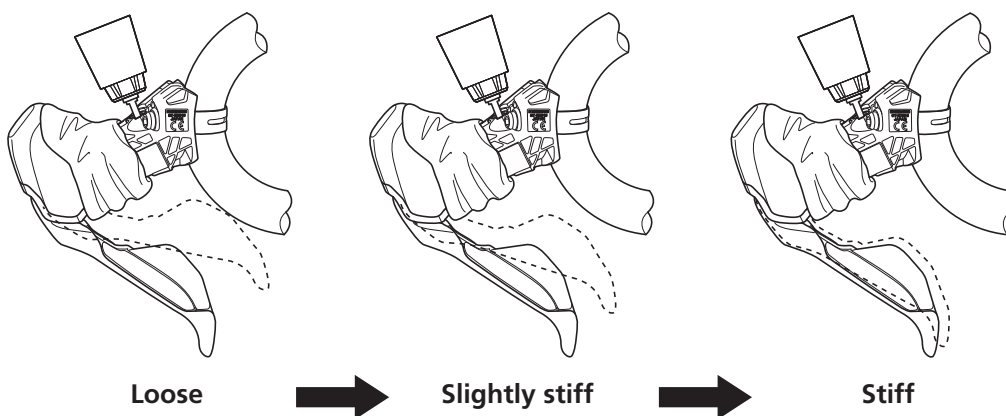


## 17. Operate the lever.

Air bubbles in the system rise up through the port into the oil funnel. Slowly repeat until no more air bubbles appear.



## 18. Check that the lever has become stiff.

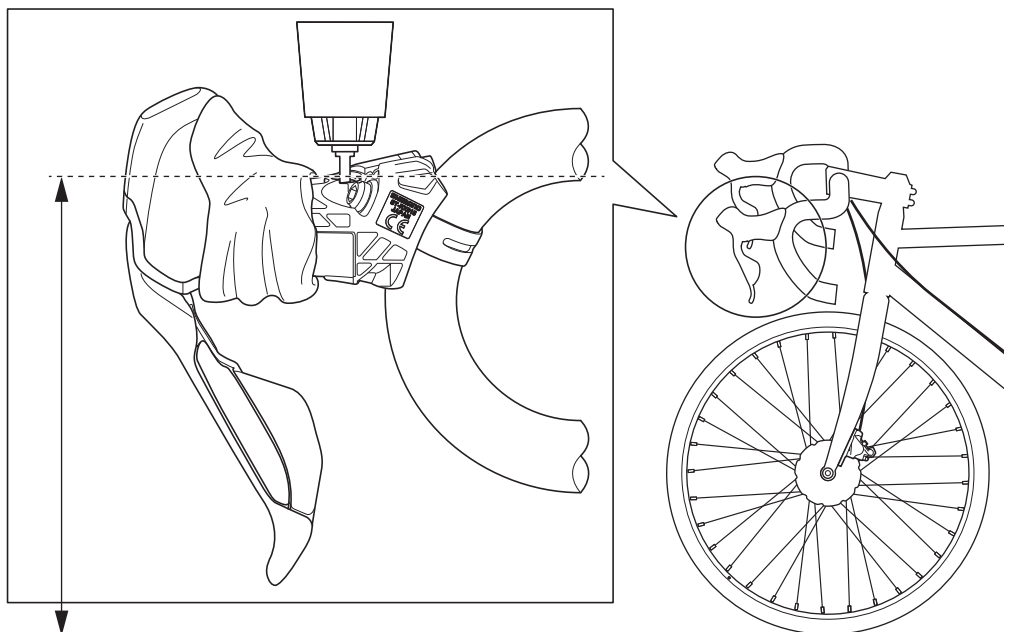


### NOTICE

- If the lever has not become stiff, repeat the procedures from Step 10.

**19. Set the lever in a position where the top surface of the bleed screw is parallel with the ground.**

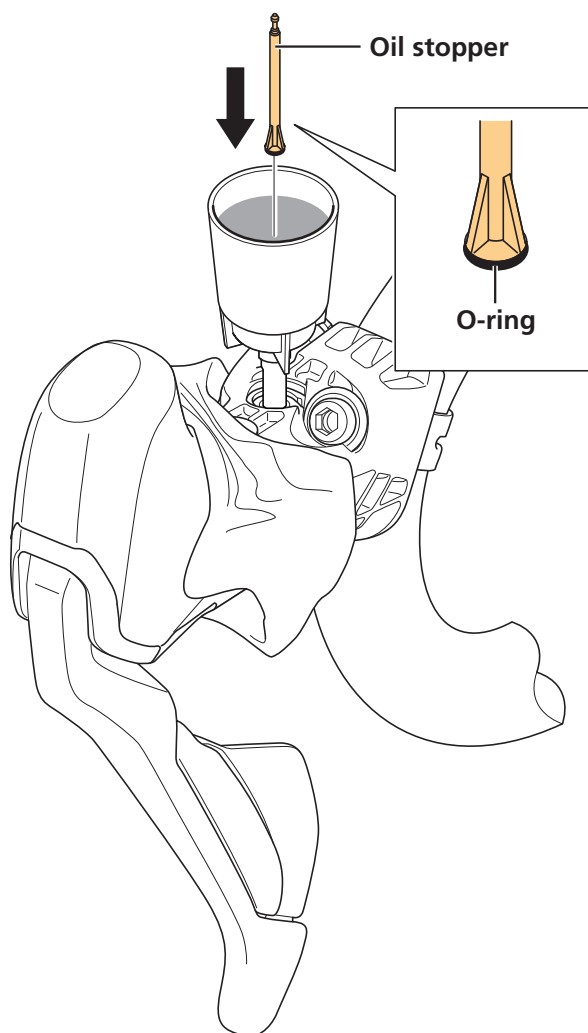
Perform adjustment by changing the angle of the handle, etc.





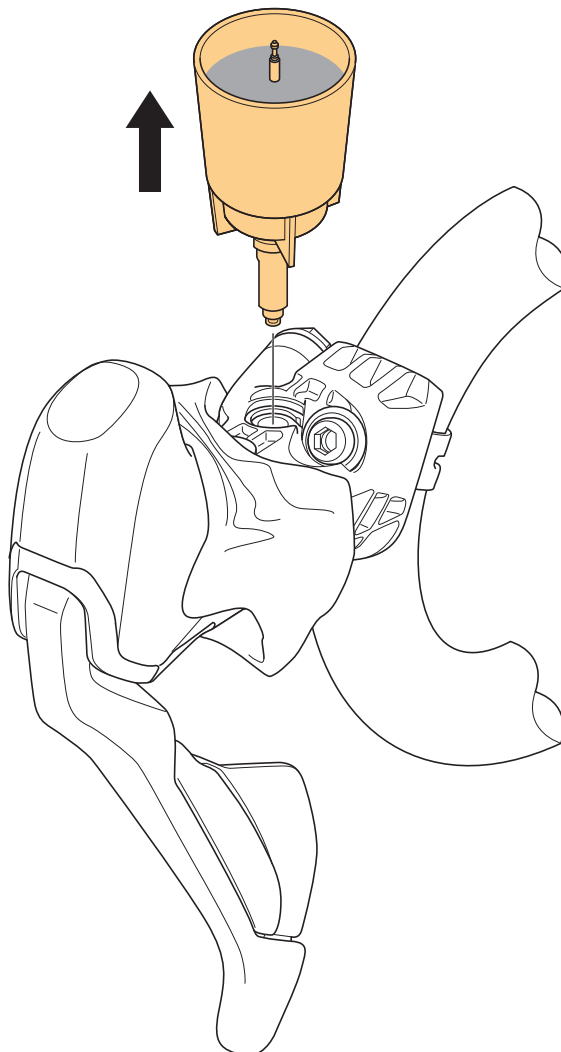
## 20. Plug the oil funnel with the oil stopper.

Make sure that the side of the oil stopper with the O-ring attached is facing downward.



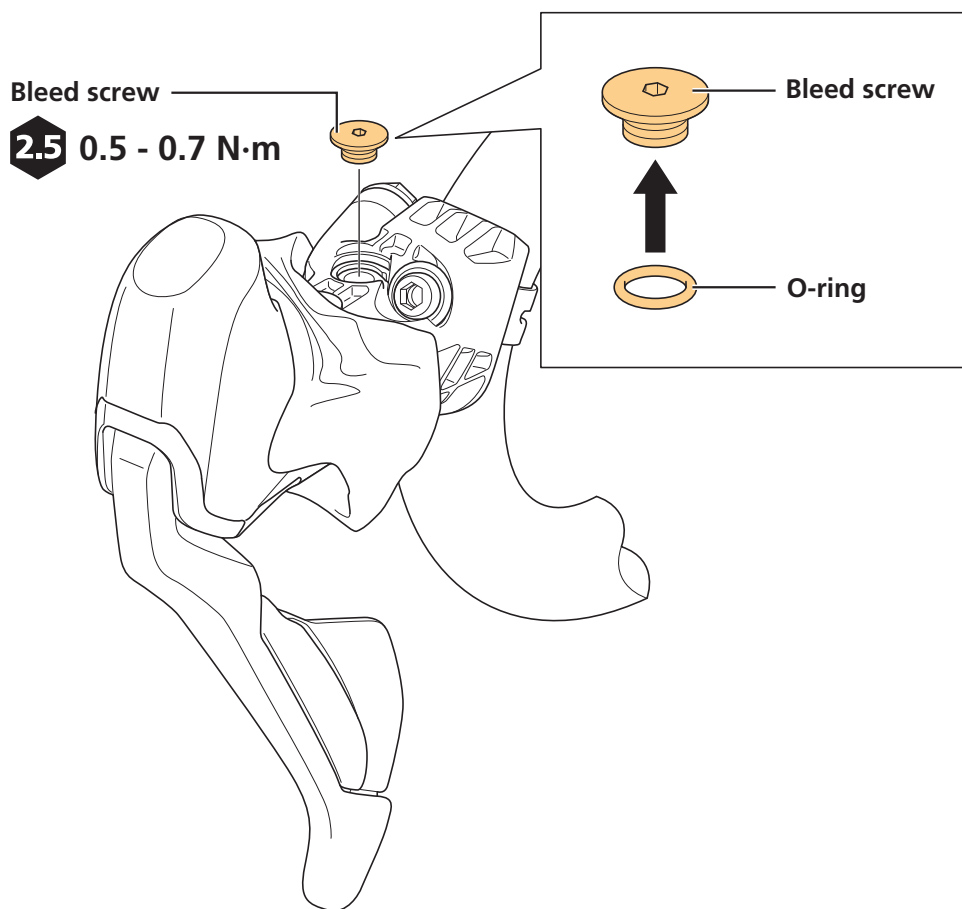
## 21. Remove the oil funnel.

Remove the oil funnel while it is still plugged by the oil stopper.



## 22. Tighten with a bleed screw to which an O-ring has been attached.

Tighten with a bleed screw until oil flows out to make sure that no air bubbles remain inside the reservoir tank.



### NOTICE

- Do not operate the lever. If operated, there is a risk that air bubbles may enter the cylinder.

## 23. Wipe away any oil that has overflowed.

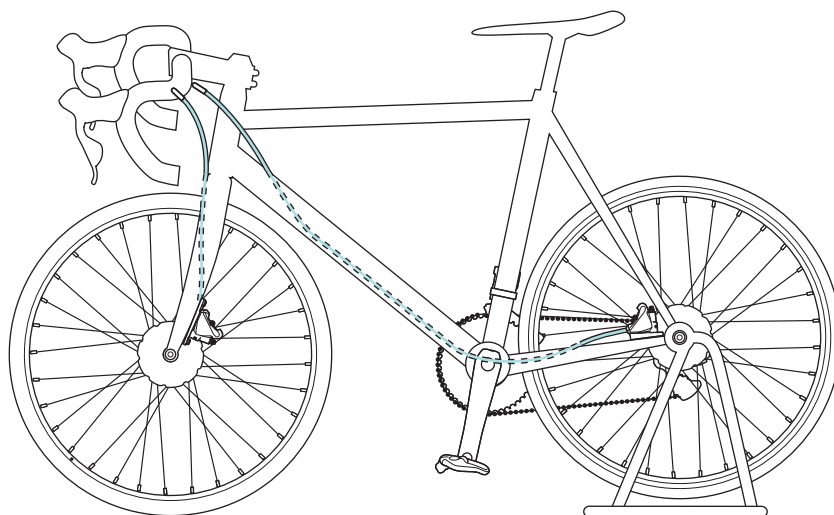


# Replacing the brake hose

After replacing the brake hose, refer to "SHIMANO genuine mineral oil replacement" to replace the mineral oil and bleed the air from the system.

## Checking and cutting the hose length

### 1. Route the brake hose into the final installation position.

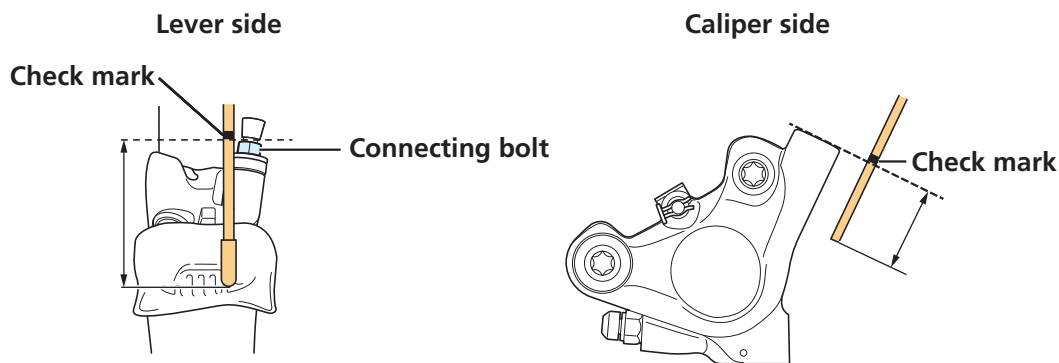


### NOTICE

- This illustration is only for explanatory purposes. For details on how to route the brake hoses, consult the manufacturer of the bicycle or refer to the bicycle's owner's manual.

## 2. Determine the appropriate length of the brake hose and add a check mark on the brake hose.

Determine the appropriate length of the brake hose as shown in the following figure. Add marks to both the lever side and caliper side of the hose.

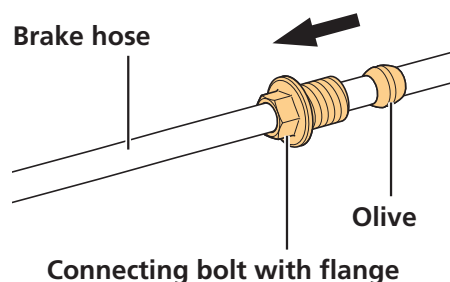


## 3. Cut the brake hose.

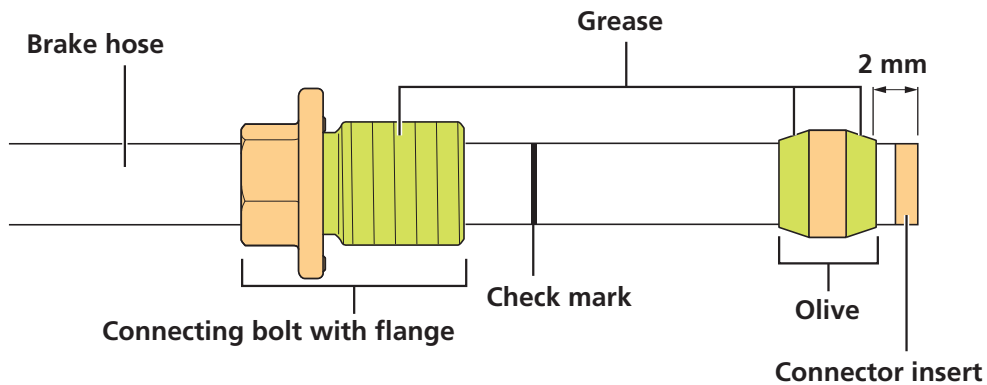
Refer to "Cutting the hose" in "Installing the brake hose".

## Installing the brake hose (lever side)

### 1. Pass the connecting bolt with flange and olive over the brake hose.



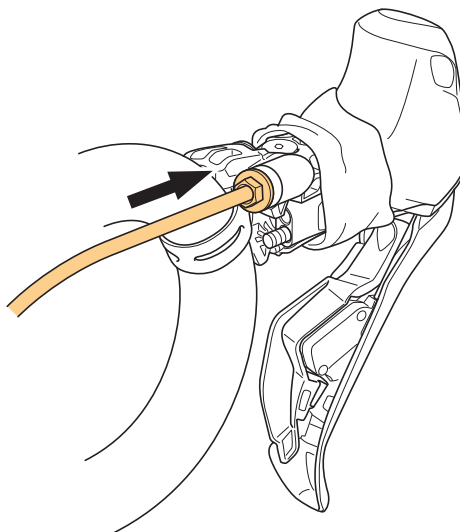
- 2.** After checking that the olive is positioned as shown in the figure, apply grease as shown in the figure.



- 3.** Install the brake hose in the lever.

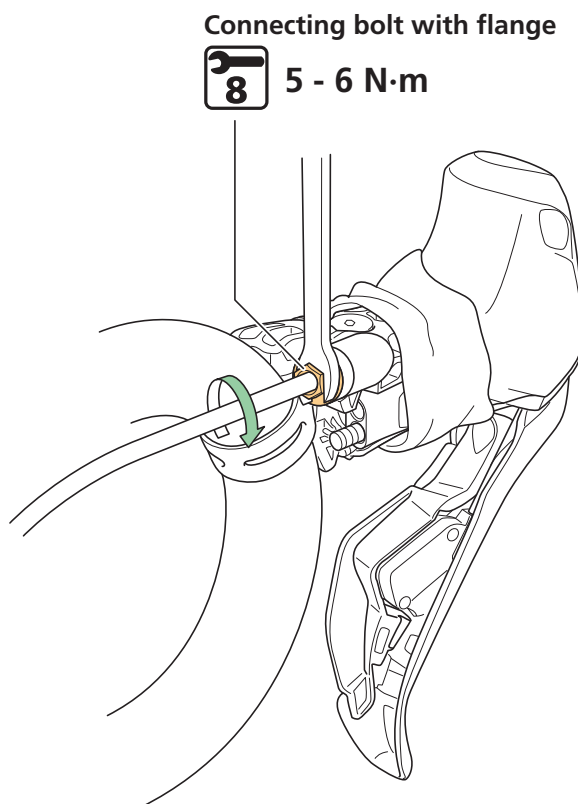
Secure the lever to the handlebar or in a vise and insert the brake hose straight.

Insert the hose until the check marks added beforehand on the surface of the hose are covered.



#### 4. Tighten the connecting bolt with flange while pushing on the brake hose.

Make sure the brake hose is straight when pushing.



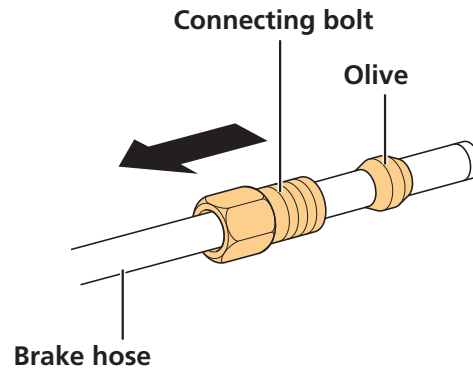
#### NOTICE

- When attaching to the handlebar, adjust the angle of the bracket by tilting the bracket from the handlebar so that you can turn the spanner. At that time, be careful not to damage the handlebar and other parts.

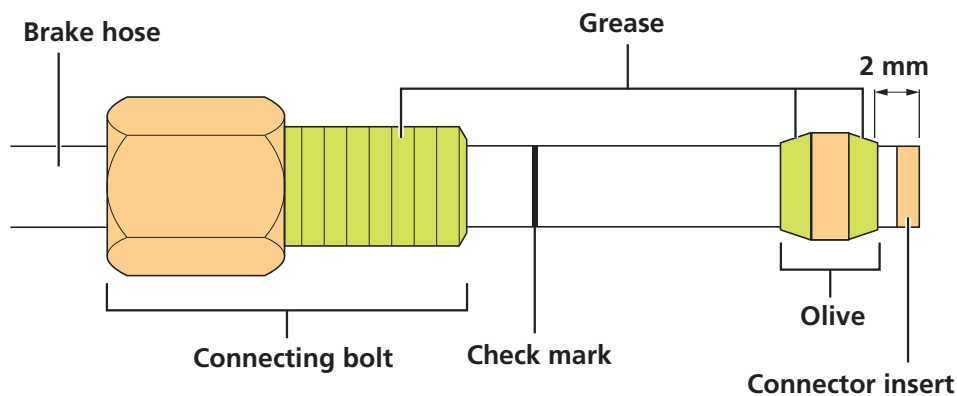
#### 5. Temporarily attach the brake hose to the handlebar using tape, etc.

## Installing the brake hose (caliper side)

1. Pass the connecting bolt and olive over the brake hose.

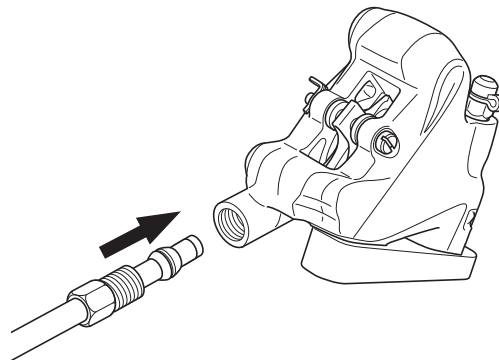


2. After checking that the olive is positioned as shown in the figure, apply grease as shown in the figure.



3. Install the brake hose in the caliper.

Insert the hose until the check marks added beforehand on the surface of the hose are covered.

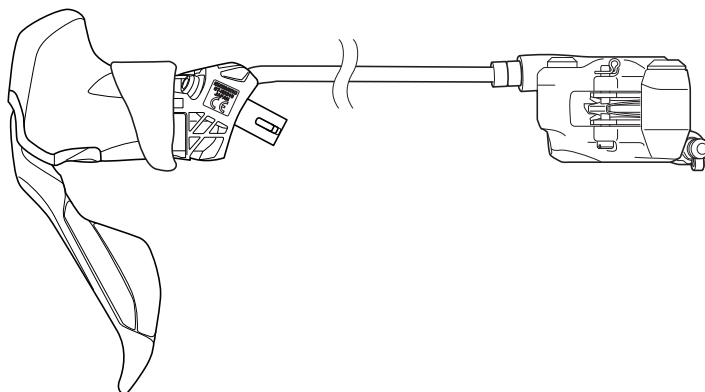




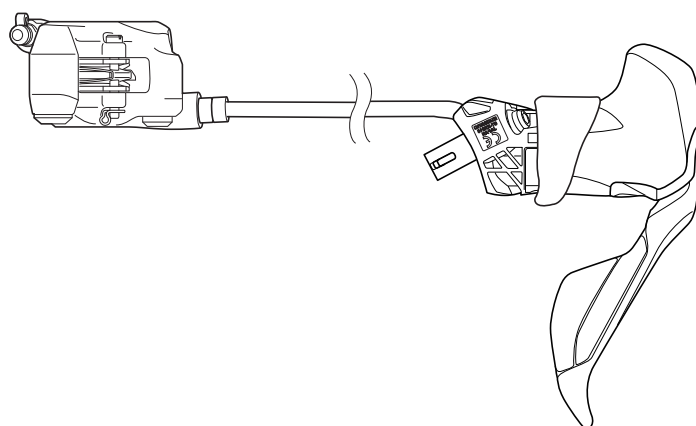
**NOTICE**

- Do not let the brake hose become twisted when installing it.  
Make sure that the calipers and levers are in the positions shown in the figures.

Left hand lever

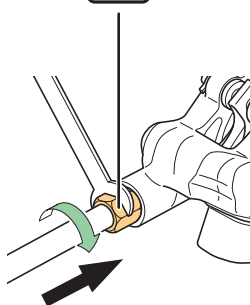


Right hand lever



#### 4. Tighten the connecting bolt while pushing on the brake hose.

Connecting bolt

 5 - 7 N·m


## Adjustment when the pistons are not operating correctly

The caliper mechanism includes two pistons. If these pistons do not operate properly or if they protrude unevenly, or if the brake pads remain in contact with the disc brake rotor, refer to the dealer's manual for the brake caliper to adjust the pistons.

## Replacing the bracket cover

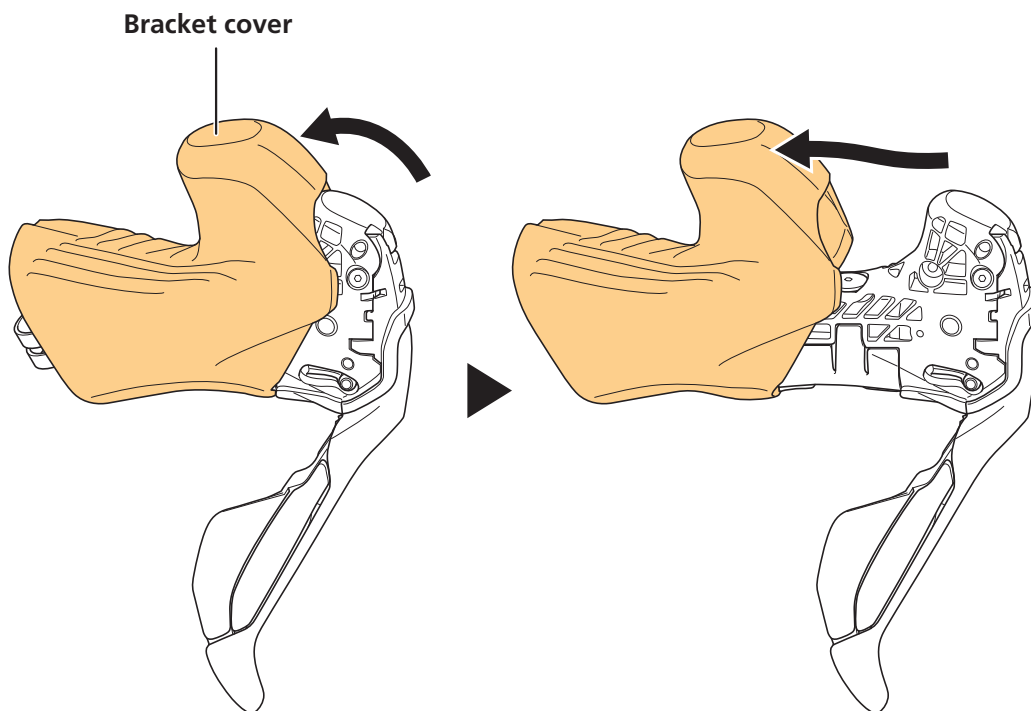
1. Remove the brake hose and electric wire from the lever.

### NOTICE

- Be careful so that oil does not spill from the lever or removed brake hose.

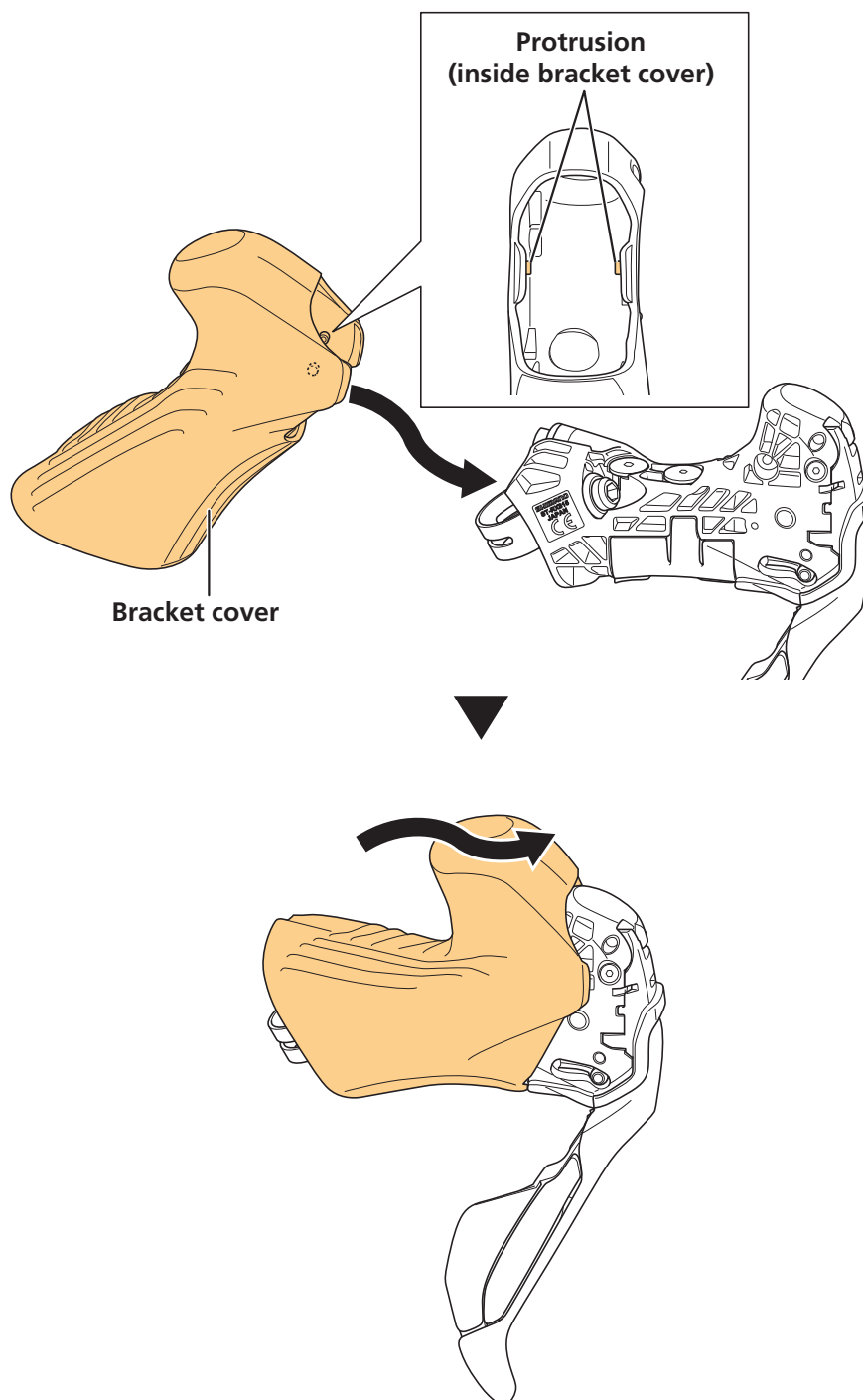
2. Remove the lever from the handlebar.

3. Remove the bracket cover.



## 4. Install a new bracket cover.

Insert the protrusions on the bracket cover into the hollows in the bracket body when fitting on the bracket cover.



### TECH TIPS

- The inside of the bracket cover has a mark indicating the left side or right side.
- It is easier to perform installation if alcohol is applied to the inside of the bracket cover.

## 5. Return the lever to its original position.

- (1) Install the lever to the handlebar.
- (2) Install the electric wire and brake hose to the lever.

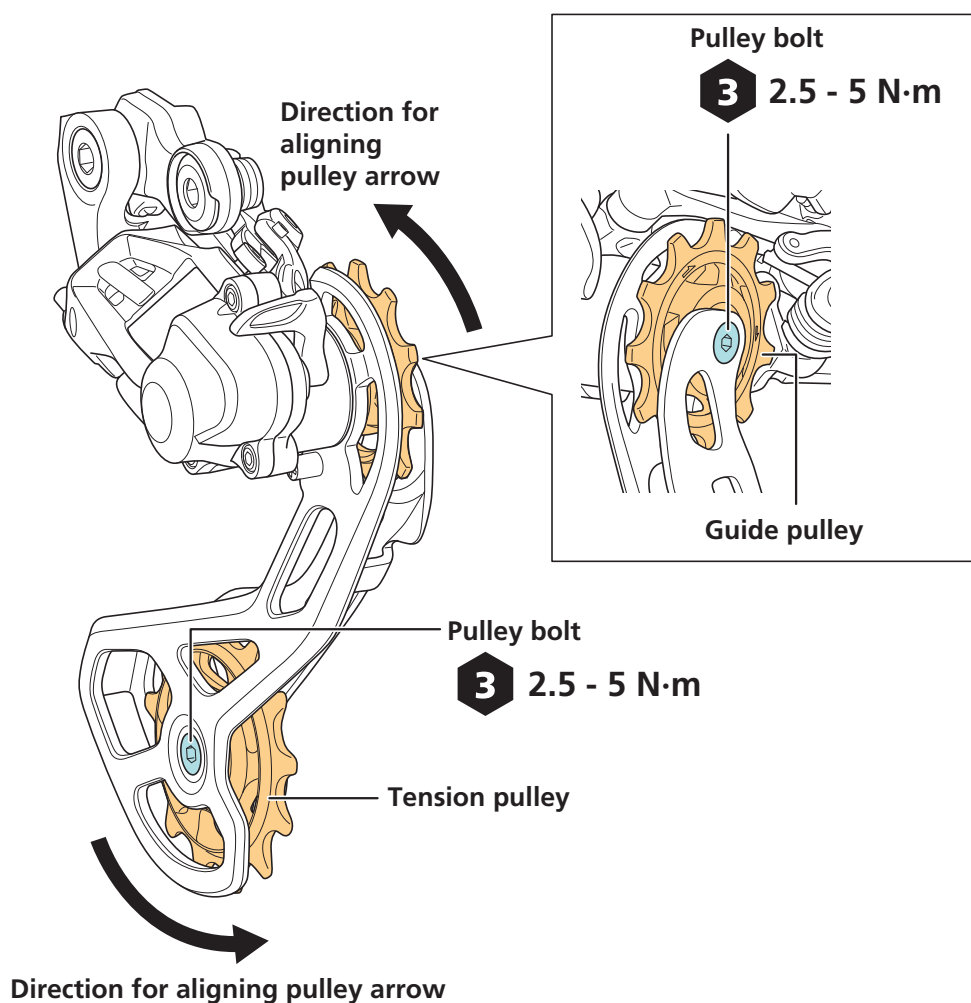
### NOTICE

- A new olive is required to reinstall the brake hose.
- Make sure to perform the procedure in "Adding mineral oil and bleeding air".

## Replacing the pulleys

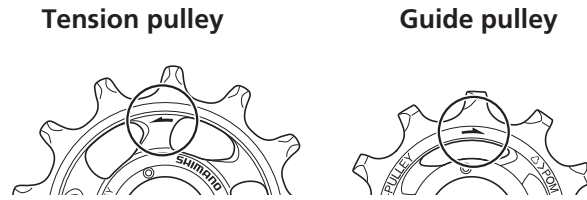
### 1. Replace the guide pulley and tension pulley.

Install the pulley with the side with the arrow facing the bicycle side. Check that the direction of the arrow in the figure below matches the direction of the arrow on the pulley.



**TECH TIPS**

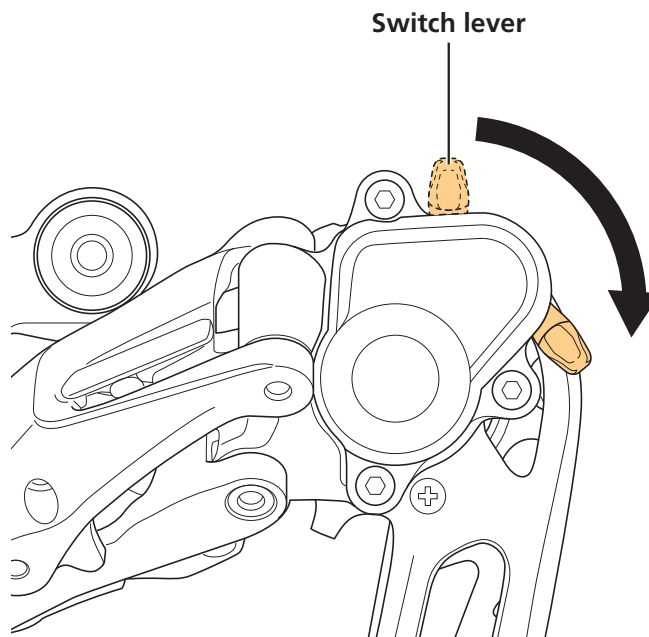
- The arrow on the pulley indicates the rotation direction when the bicycle travels forward.



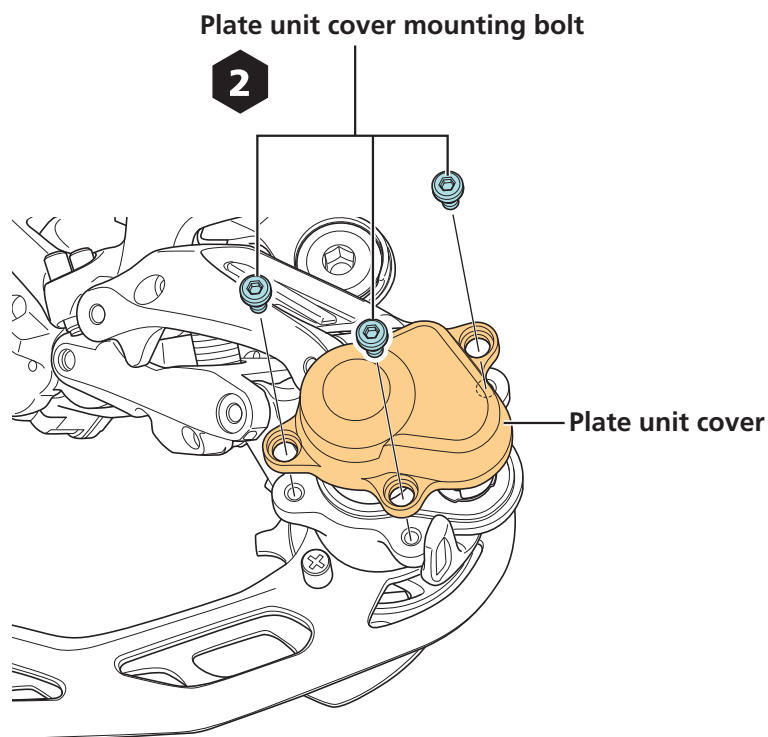
## Applying grease to the chain stabilizer

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

1. Set the switch lever in the OFF position.

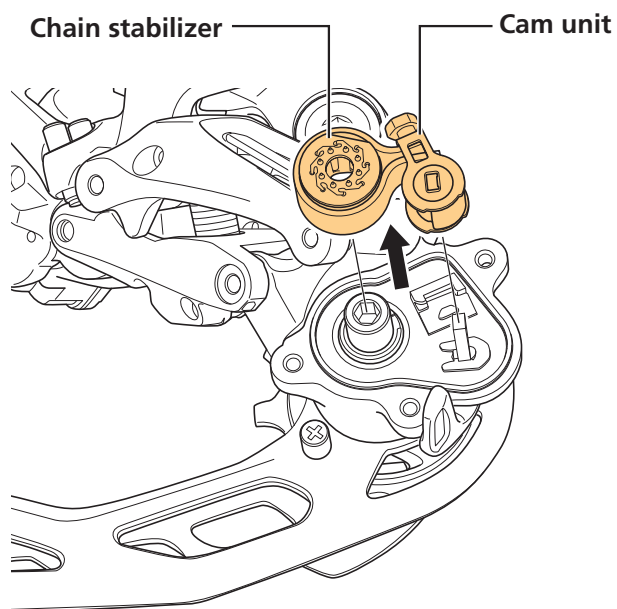


## 2. Remove the plate unit cover.



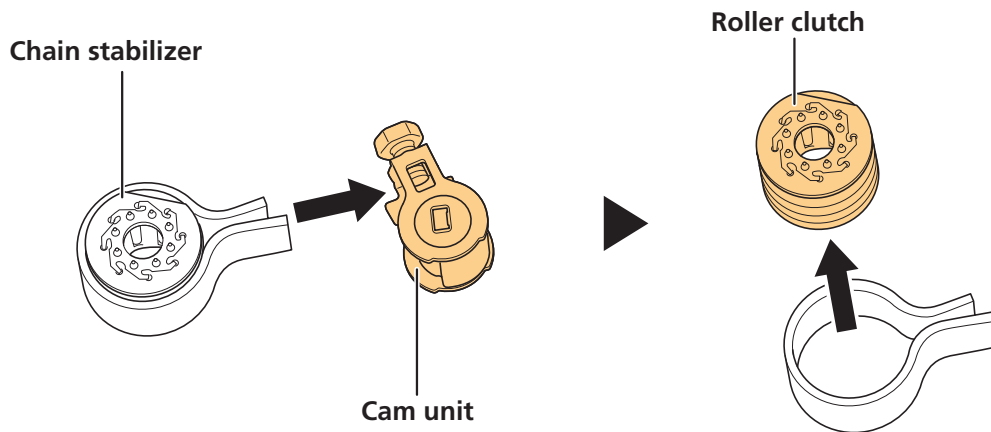
## 3. Remove the chain stabilizer.

Remove the cam unit together.

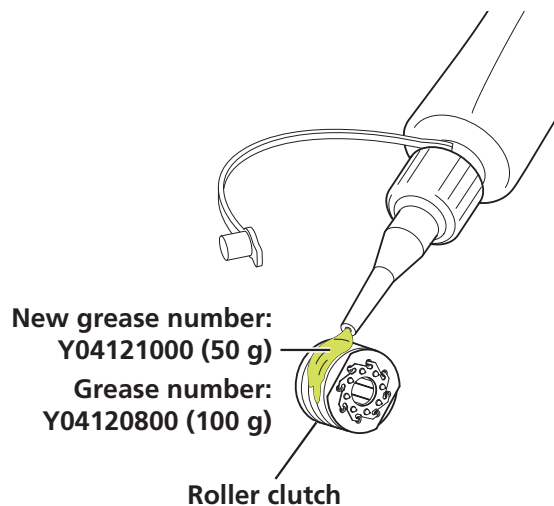


#### 4. Disassemble the chain stabilizer as shown in the figure below.

- (1) Remove the cam unit.
- (2) Remove the roller clutch from the chain stabilizer.



#### 5. Apply grease to the circumference of the roller clutch.



#### NOTICE

- Be careful not to get grease inside the roller clutch. Otherwise, the clutch could stick, slip, or otherwise malfunction.

#### 6. Install the removed parts to their original position.

Install it in the reverse order from the removal procedure.

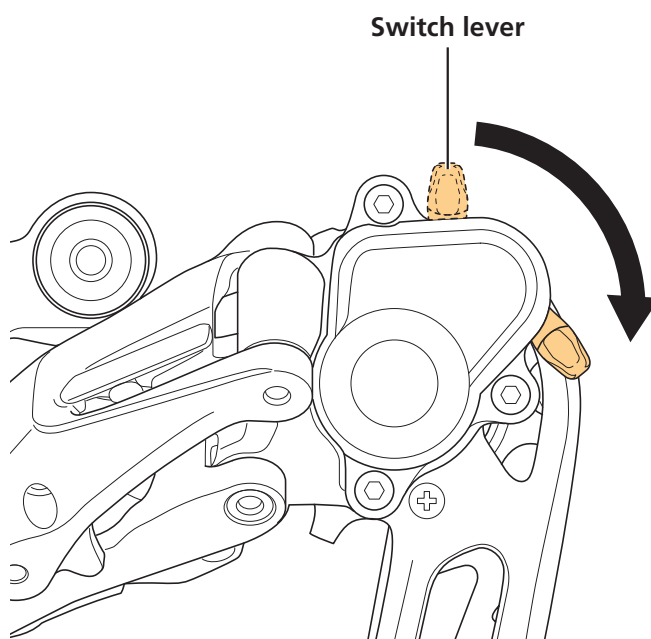
- For installing the chain stabilizer and cam unit, refer to Step 5 in "Installation" in "Replacement of the plate and the plate tension spring".
- For installing the plate unit cover, refer to Step 6 in "Adjusting friction".

# Adjusting friction

The level of friction can be adjusted as desired. Furthermore, the friction can also be adjusted when it changes during use.

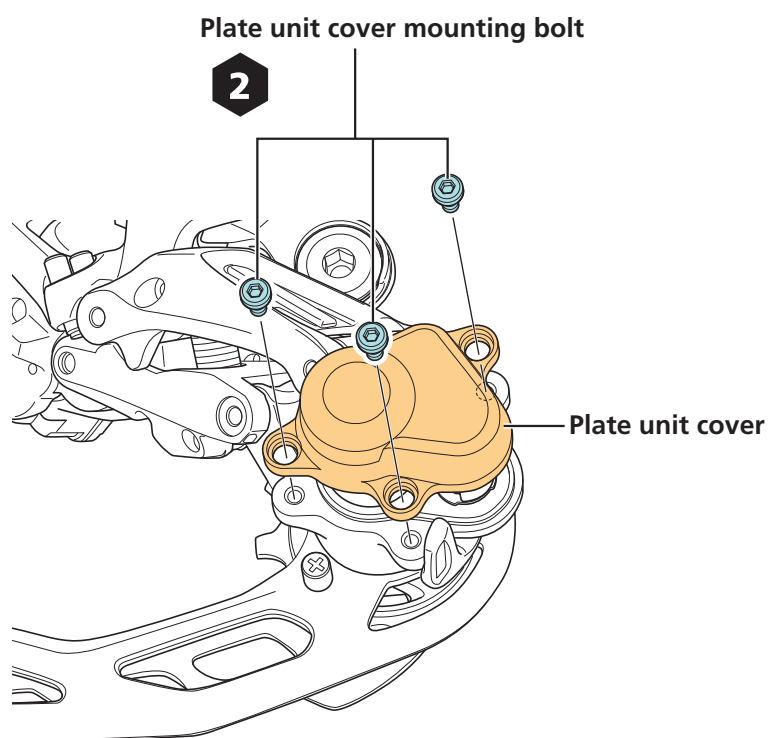
## RD-RX815

1. Set the switch lever in the OFF position.

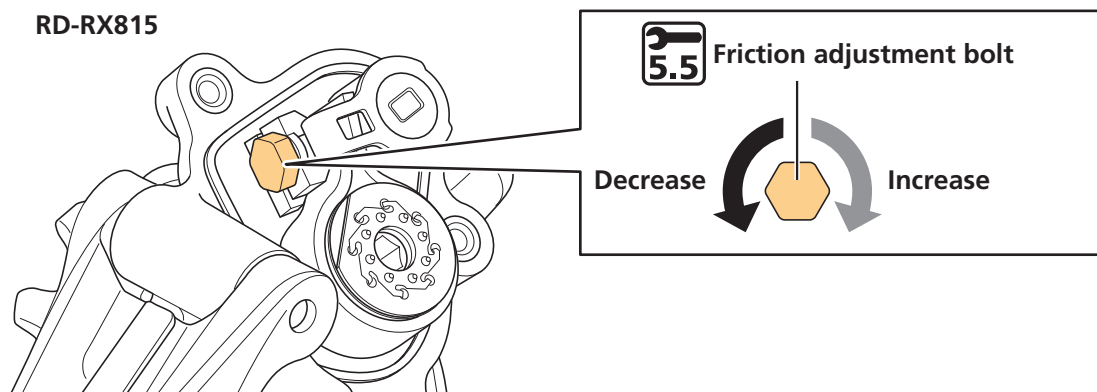




## 2. Use a 2 mm hexagon wrench to remove the plate unit cover.

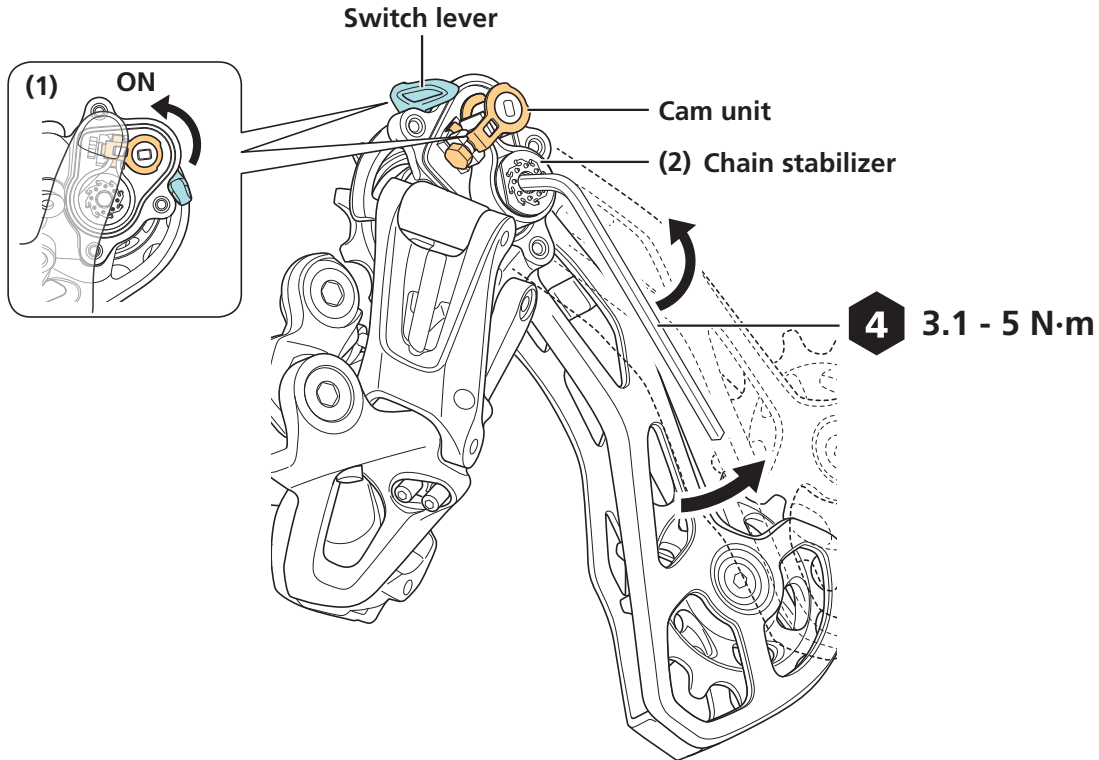


## 3. Adjust the friction.



## 4. Check the friction torque.

- (1) While pressing the cam unit with your finger, set the switch lever to the ON position.
- (2) Insert a 4 mm hexagon wrench into the chain stabilizer, and check the friction torque.

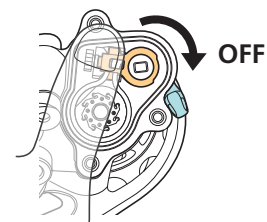


### NOTICE

- If operating the switch lever while the plate unit cover is removed, hold the friction unit down with your finger. Failure to do so may cause the friction unit to jump out.
- If adjusting the friction once more, be sure to set the switch lever to the OFF position while pressing the cam unit with your finger before making the adjustment.

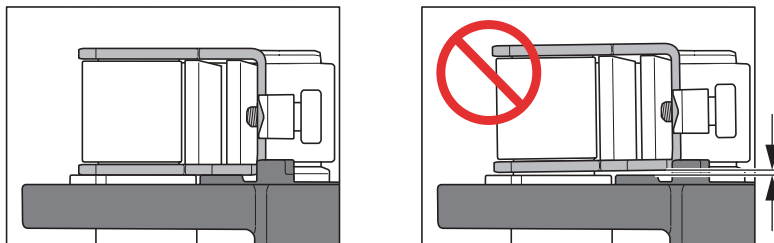
## 5. Set the switch lever in the OFF position.

Set the switch lever to OFF position while pressing the cam unit with your finger. At that time, make sure that the cam unit is in contact with the bottom of the plate unit.

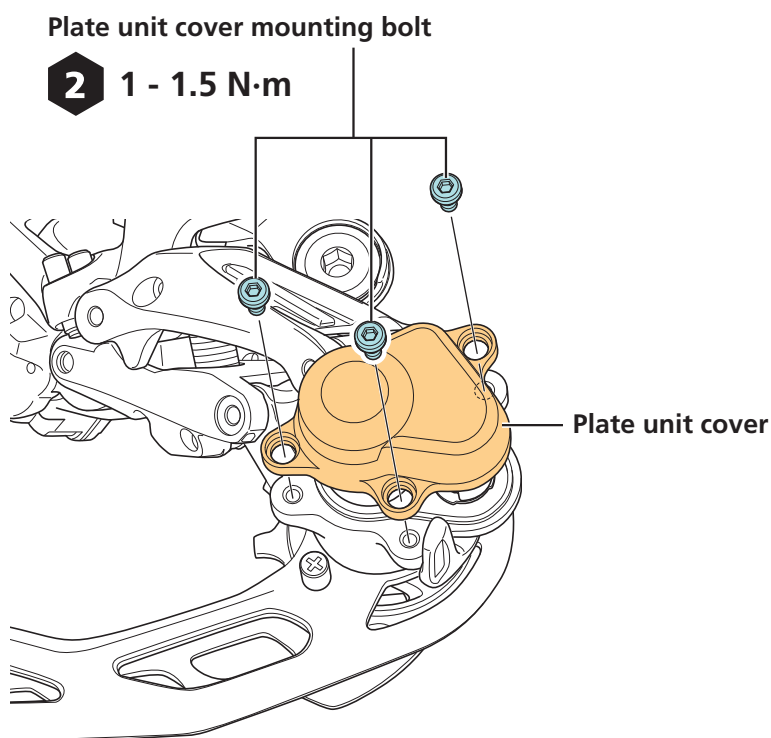


# **NOTICE**

- Do not install the plate unit cover with a gap between the switch base and the bottom of the plate unit. It may not seal sufficiently, which will cause the inner mechanism to rust, potentially resulting in the adhesion of the plate.



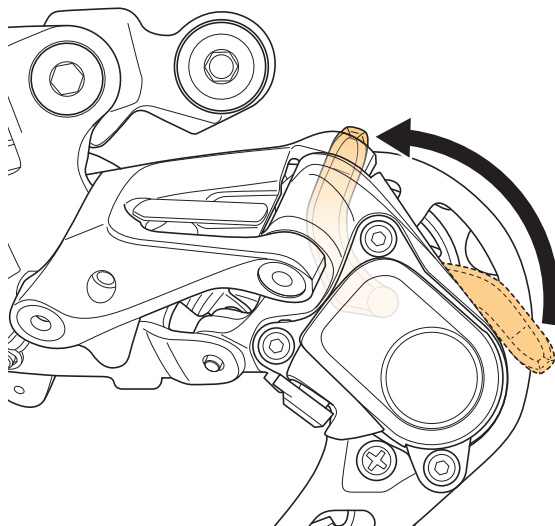
## **6. Install the plate unit cover.**



## RD-RX817

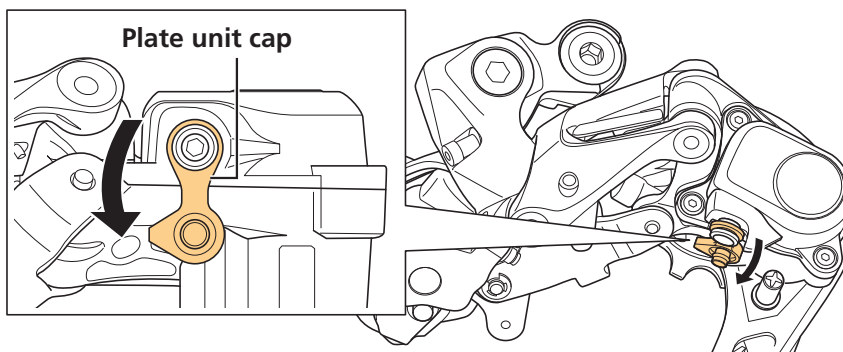
The friction can be adjusted for RD-RX817 without removing the plate unit cover.

### 1. Set the switch lever in the ON position.



### 2. Open the plate unit cap.

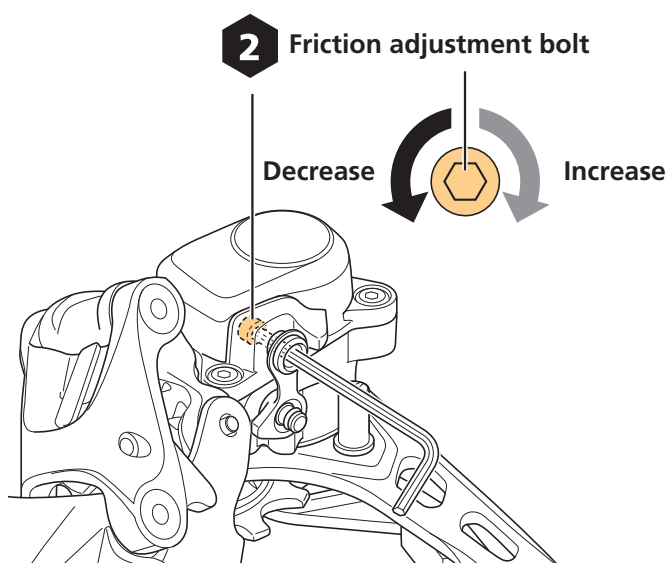
The plate unit cap can be opened by hand.



#### NOTICE

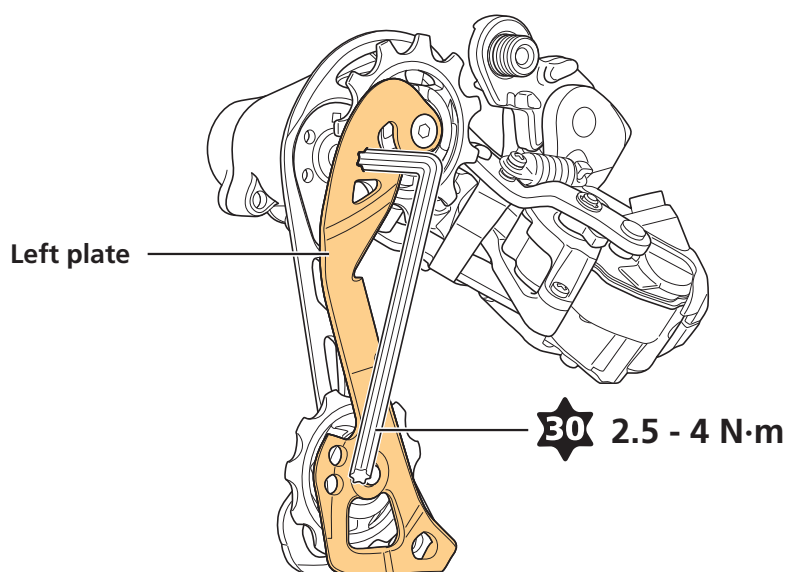
- The plate unit cap can be completely removed. However, be careful not to lose it. If the cap comes off when riding the bicycle, problems with operation will occur.

### 3. Adjust the friction.

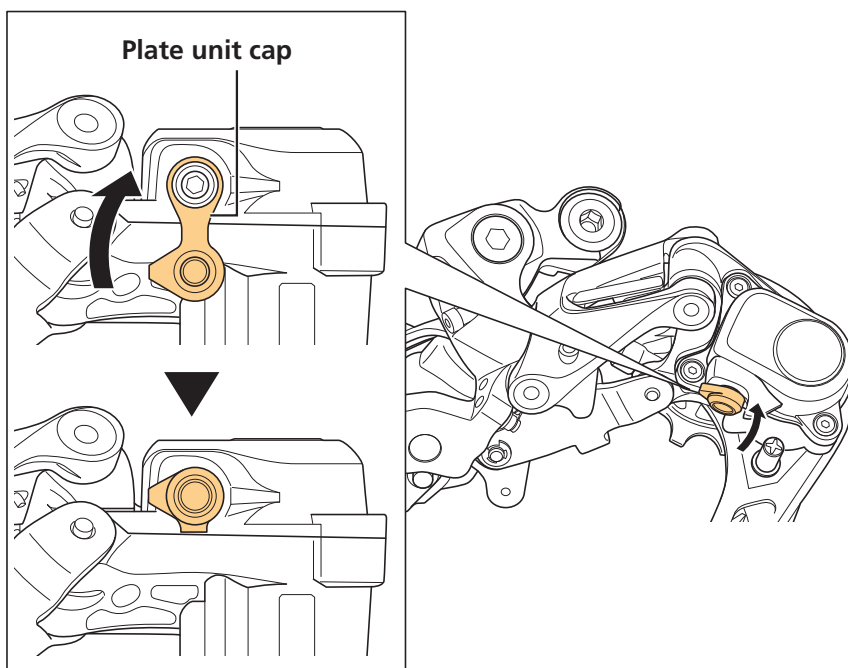


### 4. Check the friction torque.

Use the hexalobular hole on the left plate to check the friction torque.



## 5. Close the plate unit cap as it was before.

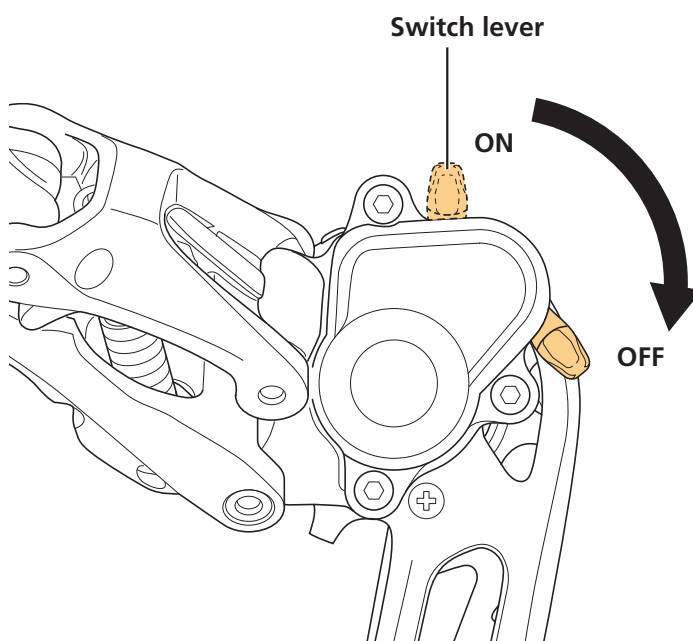


# Replacement of the plate and the plate tension spring

## Removal

Before starting the work, shift the gear of the rear derailleur to the largest sprocket.

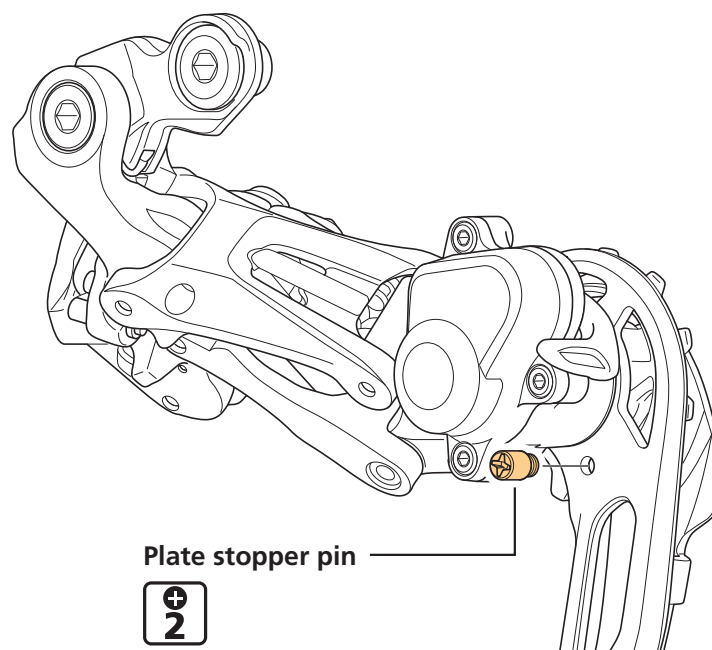
### 1. Set the switch lever in the OFF position.



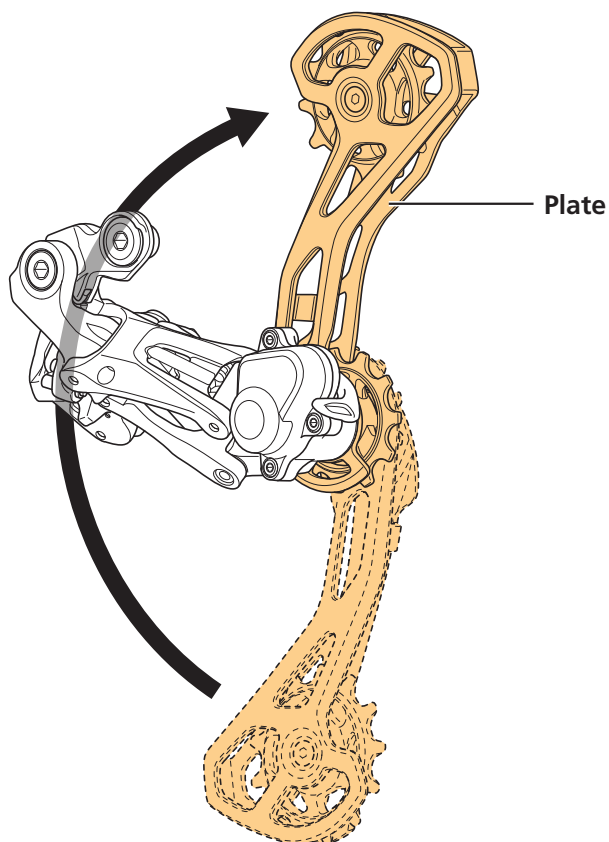
#### **NOTICE**

- If operating the switch lever while the plate unit cover is removed, hold the cam unit down with your finger. Failure to follow these instructions may cause the cam unit to jump out.

## 2. Remove the plate stopper pin.

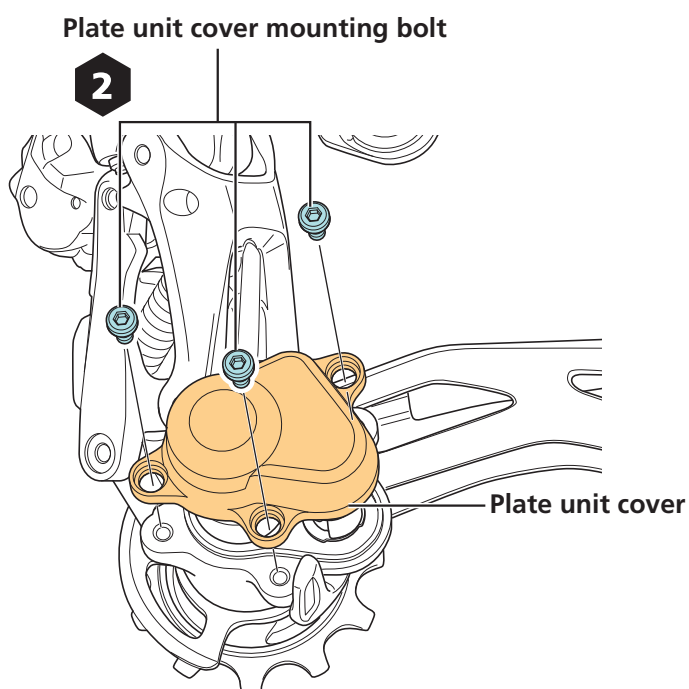


## 3. Turn the plate to loosen the plate tension spring.

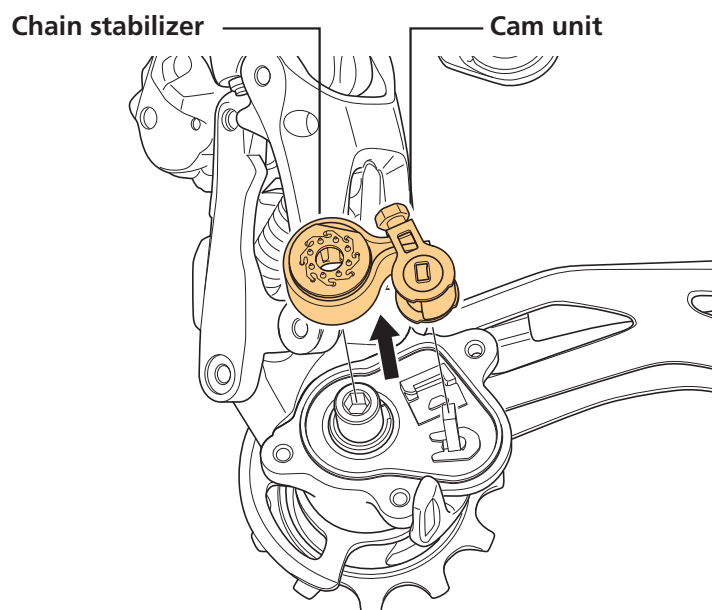




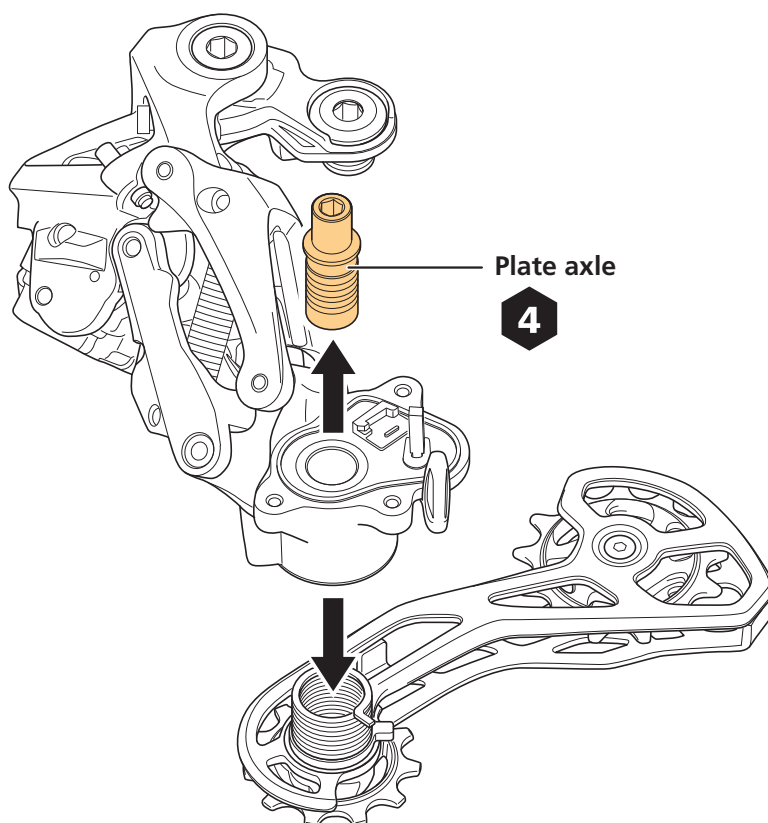
## 4. Remove the plate unit cover.



## 5. Remove the cam unit and chain stabilizer.



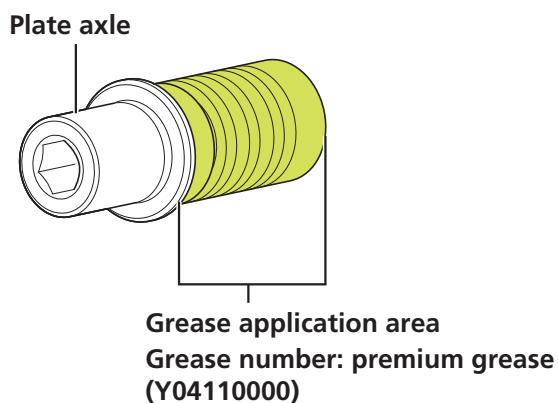
## 6. Remove the plate axle.



## Installation

Carry out the removal procedure in reverse.

### 1. Apply grease to the plate axle.

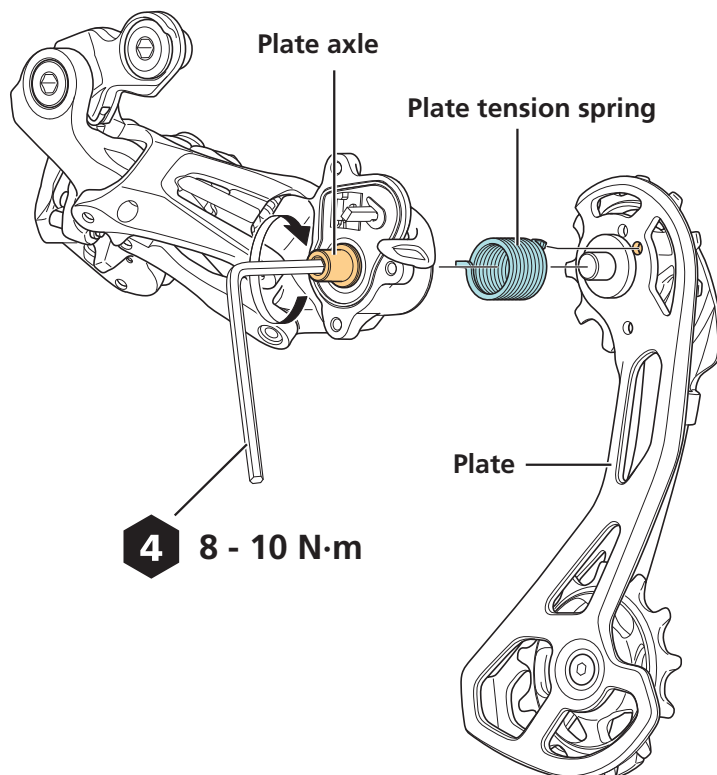


**NOTICE**

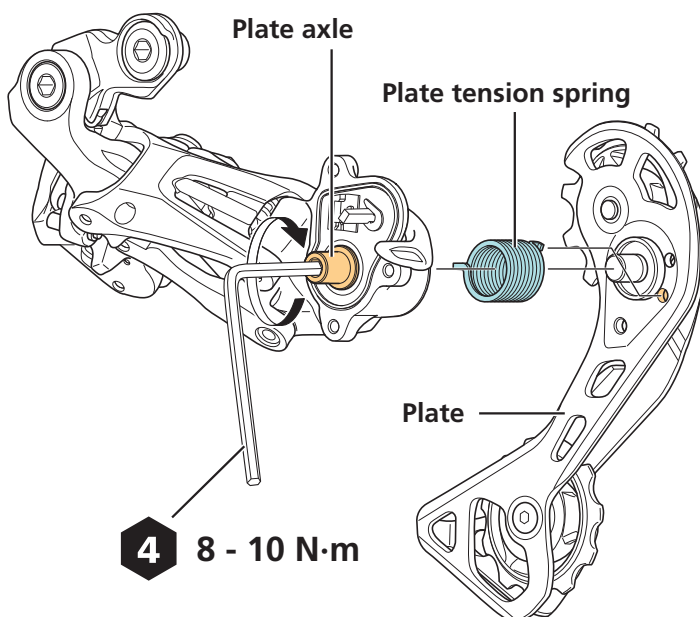
- Do not apply grease outside of the application area indicated above. If grease is applied here, it will get inside the roller clutch and friction will be lost.

**2. Insert the plate axle, and then fit the tip of the plate tension spring in the hole of the plate.**

RD-RX815

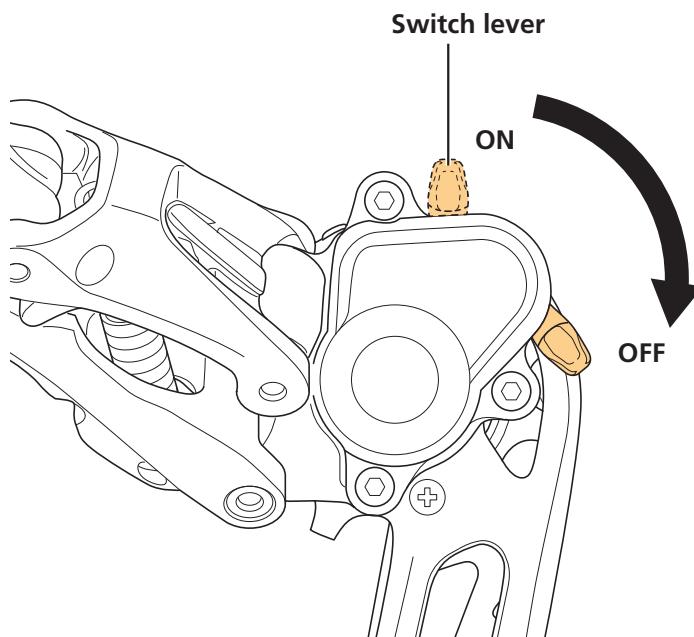


RD-RX817



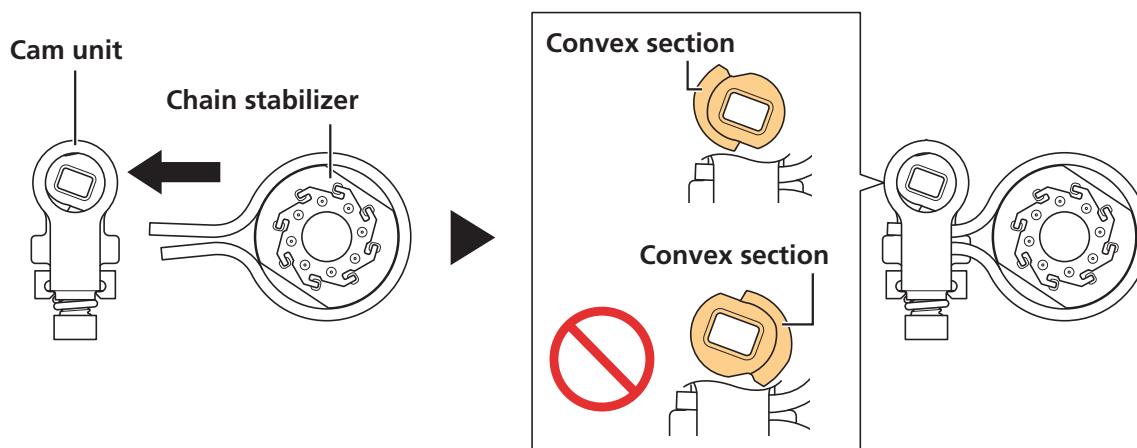
### 3. Check that the switch lever is in the OFF position.

If the switch lever is in the ON position, be sure to set it to the OFF position.



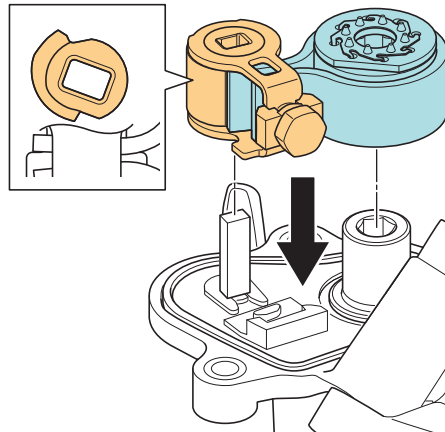
### 4. Set the chain stabilizer into the cam unit as shown in the figure.

Check that the convex section of the cam unit is in the position shown in the figure.



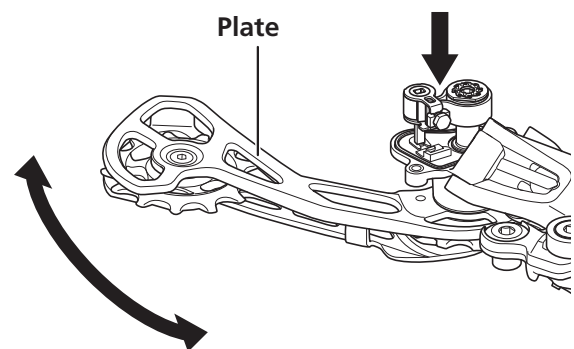
## 5. Install the cam unit and chain stabilizer.

Pay attention to the positioning of the convex section of the cam unit

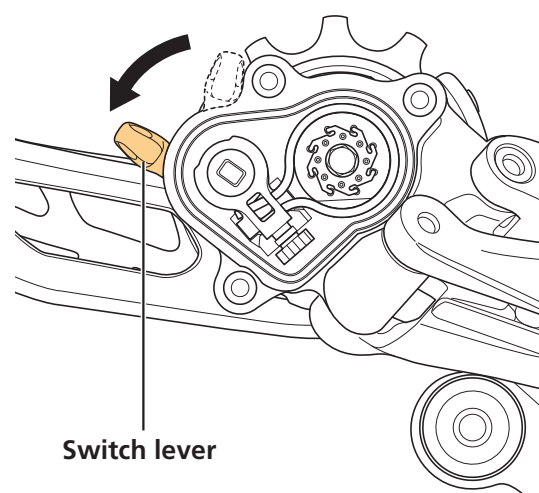


### TECH TIPS

- When installing, it helps to move the plate while holding down the cam unit and chain stabilizer.

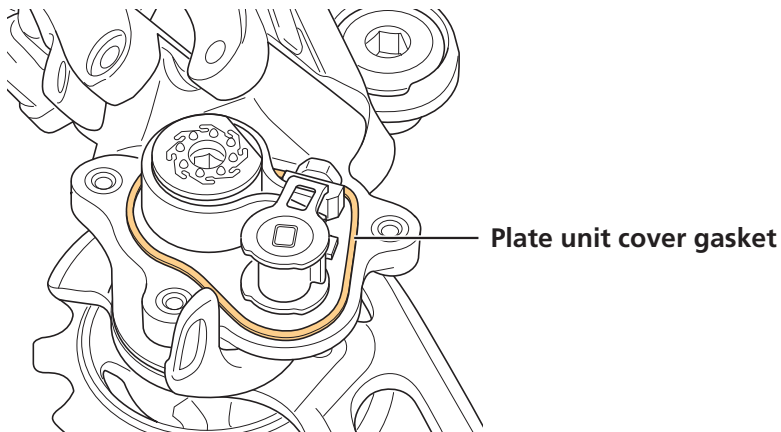


- If there is resistance when moving the lever switch to the ON position, the components are installed correctly. If there is no resistance, check the position of the convex section of the cam unit and then reinstall the components.



## 6. Install the plate unit cover gasket.

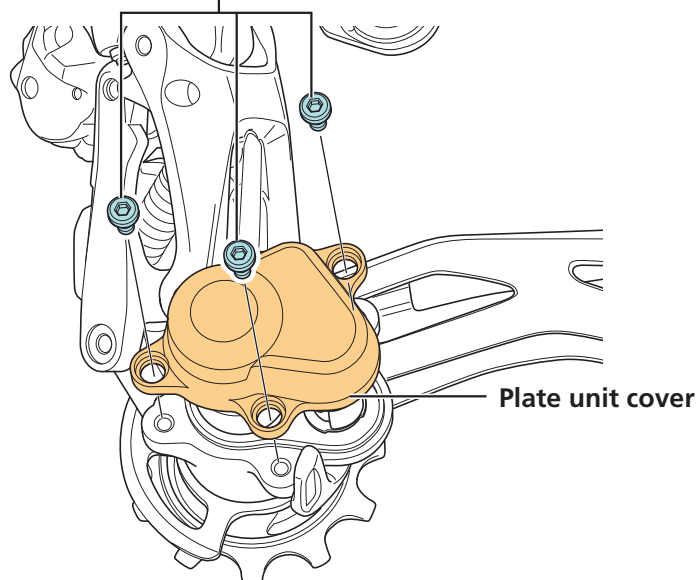
Check that it is installed along the groove in the plate unit.



## 7. Install the plate unit cover bolts.

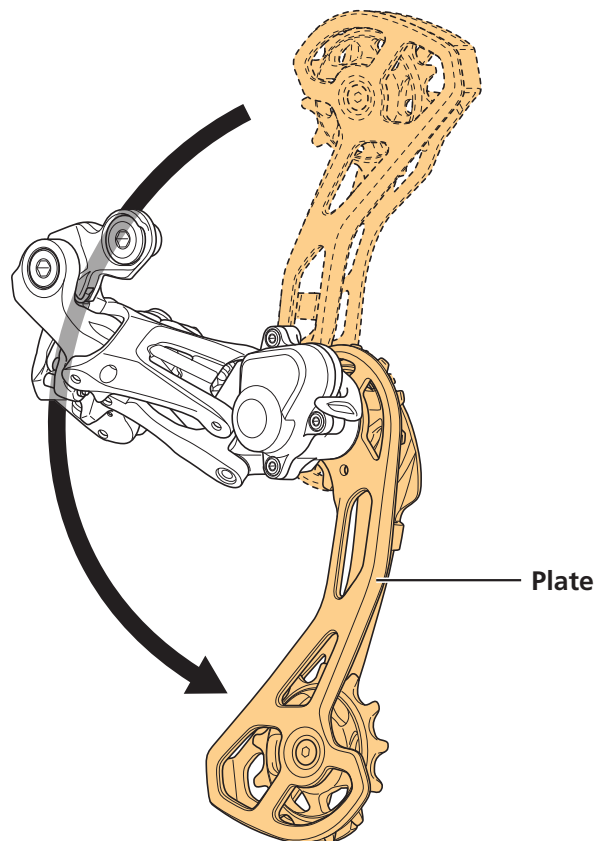
Plate unit cover mounting bolt

**2** 1 - 1.5 N·m

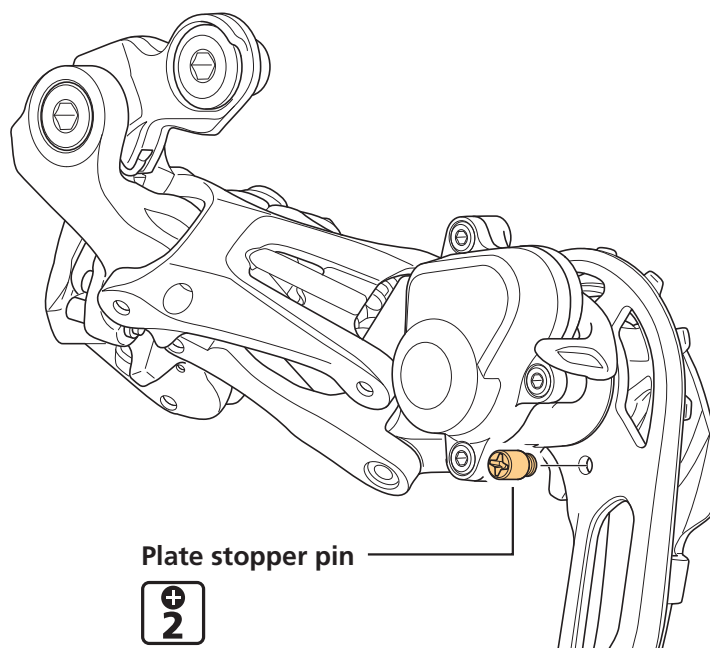


## 8. Turn the plate to tighten the plate tension spring.

Tighten the plate tension spring so that it is not loose, and then insert the plate.



## 9. Install the plate stopper pin.





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