

Dealer's Manual

ROAD	GRAVEL	MTB
E-BIKE	LIFESTYLE	GENERAL

RX815 Series

GRX

ST-RX815
FD-RX815
RD-RX815
RD-RX817

SHIMANO

SW-R9150
SM-BCC1
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

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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 distributor for assistance.

- Make sure to read all manuals included with each product.
- Do not disassemble or modify the product other than as stated in the information contained in this dealer's manual.
- All manuals and technical documents are accessible online at <https://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[®] word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc. and any use of such marks by SHIMANO INC. is under license.

Other trademarks and trade names are those of their respective owners.

- ANT[®] and ANT+[®] are trademarks or registered trademarks of ANT Wireless.

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

The following instructions must be observed at all times in order to prevent personal injury and physical damage to equipment and surroundings.

The instructions are classified according to the degree of danger or damage which may occur if the product is used incorrectly.

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

TO ENSURE SAFETY

DANGER

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 expose it to flames. If this is not observed, combustion or bursting of the battery 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 injury to occur.
- 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 or overheating may occur, resulting in burns or other injury.
- If any liquid leaking from the battery gets into your eyes, immediately wash the affected area thoroughly with clean water such as tap water without rubbing your eyes, and seek medical attention immediately. If this is not done, the battery liquid may damage your eyes.

■ 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 and do not touch or hold it while it is wet or with wet hands. If this is not observed, issues 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 5.0 V DC and a current equal to or higher than 1.0 A DC. 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 manuals when installing the product.**

Only use SHIMANO genuine parts. If a component or replacement part is incorrectly assembled or adjusted, it can lead to component failure and cause the rider to lose control and crash.

-  Wear approved eye protection while performing maintenance tasks such as replacing components.
- 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 (<https://si.shimano.com>).

Be sure to also inform users of the following:

- Clean the chain with an appropriate chain cleaner regularly. Intervals between maintenance depend on the use and riding circumstances.
- Never use alkali- 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. You may fall and be seriously injured.
- Check the chain for any damage (deformation or cracking), skipping, or other abnormalities such as unintended gear shifting. 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.

■ 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 leaked fluid gets on your skin or clothes, wash it off immediately with clean water. The leaked fluid may damage your skin.
- Do not use the battery outside its operating temperature ranges. If a battery is used or stored in temperatures which are outside these ranges, fire, injury or problems with operation may occur. The operating temperature ranges are given below:

(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 of charging, 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 symptoms are observed, stop using the device and contact your place of purchase. A fire or electric shock may be caused.
 - * If heat, acrid smell, or smoke is coming out from the power plug.
 - * There may be a bad connection inside the power plug.
- Do not overload the electrical outlet with appliances beyond its rated capacity, and use only a 100 V - 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, process, forcibly bend, twist or pull it, bring it near hot objects, place heavy objects on it or bundle it tightly together. If it is 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). 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 symptoms are observed, stop using the device and contact your place of purchase. A fire or electric shock may be caused.

- * If heat, acrid smell, or smoke is coming out from the power plug.
- * There may be 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 5.0 V DC and a current equal to or higher than 1.0 A DC. 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.
- Do not use a USB hub when connecting the cable to a PC USB port. This may cause a charging error or fire due to overheating.
- Be careful not to damage the charging cable. Do not damage, process, forcibly bend, twist or pull it, bring it near hot objects, place heavy objects on it or bundle it tightly together. If they are used while damaged, fire, electric shocks or short circuits may occur.

■ Brake

- Because each bicycle may handle slightly differently depending on the model, 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, which could lead to serious injury due to a fall or collision.
- Do not apply the front brake too strongly. If you do so, the front wheel may lock and the bicycle may fall forward, and serious injury may result.
- Because the required braking distance will be longer during wet weather, reduce your speed and apply the brakes early and gently. Failure to do so may result in serious injury due to a fall or collision.

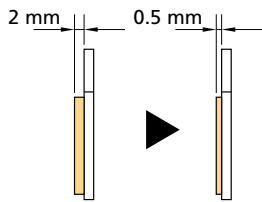
- A wet road surface may cause tires to lose traction; therefore, to avoid this, reduce your speed and apply the brakes early and gently. If the tires lose traction, it may result in serious injury due to a fall or collision.

■ Hydraulic disc brake

- Keep your fingers away from rotating disc brake rotors. The disc brake rotor is sharp enough to inflict severe injury to your fingers if caught within the openings of the moving rotor.



- Do not touch the calipers or disc brake rotor while riding or immediately after dismounting from the bicycle. The calipers and disc brake rotor will become hot when the brakes are operated, so you may get burned if you touch them.
- Do not allow any oil or grease to get onto the disc brake rotor and brake pads. Riding the bicycle with oil or grease on the disc brake rotor and brake pads may prevent the brakes from operating and result in serious injury due to a fall or collision.
- Check the thickness of the brake pads and do not use them if they have a thickness of 0.5 mm or less. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.



- Do not use the disc brake rotor if it is cracked or deformed. The disc brake rotor may break, and result in serious injury due to a fall.
- Do not use the disc brake rotor if its thickness is 1.5 mm or less. Also do not use it if the aluminum surface becomes visible. The disc brake rotor may break, and result in serious injury due to a fall or collision.
- Do not continuously apply the brakes. Doing so may cause a sudden increase in the brake lever stroke, preventing the brakes from operating and resulting in serious injury due to a fall or collision.
- Do not use the brakes with fluid leaking. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.

For installation to the bicycle and maintenance

- **When operating the shift switch, be careful not to allow your fingers to be caught in the derailleur. The motor in the derailleur is powerful enough to be operated without stopping until the shifting position is reached, and may cause serious injury if your fingers interfere with the shifting motion.**

■ Hydraulic disc brake

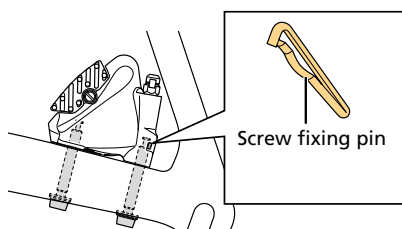
- Please make sure to keep your fingers away from the rotating disc brake rotor during installation or maintenance of the wheel. The disc brake rotor is sharp enough to inflict severe injury to your fingers if caught within the openings of the moving rotor.



- Do not use the disc brake rotor if it is cracked or warped. The disc brake rotor may break, and result in serious injury due to a fall.
- Do not use the disc brake rotor if its thickness is 1.5 mm or less. Also do not use it if the aluminum surface becomes visible. The disc brake rotor may break, and result in serious injury due to a fall or collision.

- 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.
- Do not use oil other than SHIMANO genuine mineral oil. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.
- Use only mineral oil from a container that has been stored in a clean and sealed state. Doing otherwise may prevent the brakes from operating and result in serious injury due to a fall or collision.
- Do not let water or air bubbles get into the brake system. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.
- If the quick release lever is on the same side as the disc brake rotor, confirm that it does not interfere with the disc brake rotor. Otherwise, the bicycle may fall forward, and serious injury may result.
- Do not use with a tandem bicycle. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.
- When installing the brake caliper using screw fixing pins, be sure to use fixing screws of the appropriate length.

If not, the screw fixing pins may not be securely fastened, and the screws may fall out.

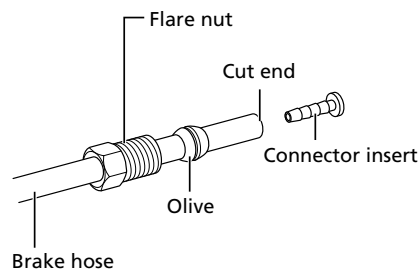


■ Brake hose

- 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 piece or the connector insert when reinstalling. Doing so may prevent the brakes from operating and result in serious injury due to a fall or collision.



- 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. Fluid leaks may prevent the brakes from operating and result in serious injury due to a fall or collision.



■ Points to note about the handlebars

EW-RS910 (Built-in bar end type)

- Handlebar inner diameter: Ø20.5 - 21.5 mm

- Handlebar outer diameter: Ø23.8 - 24.2 mm

CAUTION

Be sure to also inform users of the following:

■ Lithium-ion battery

- Store the product in a safe place out of 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 when performing maintenance.

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

- Use appropriate eye protection when handling, and avoid contact with eyes. In the event of eye contact, flush with fresh water and seek medical assistance immediately. Contact with eyes may result in irritation.
- Use gloves when handling. In the event of skin contact, wash well with soapy water. Contact with skin may cause a rash and discomfort.
- Cover nose and mouth with a respirator type mask and use in a well ventilated area. Inhalation of mineral oil mist or vapors may cause nausea. If mineral oil mist or vapor is inhaled, go immediately to an area with fresh air. Cover up with a blanket. Stay warm and stable and seek professional medical advice.

Bed-in period

- Disc brakes have a bed-in period, and the braking force will gradually increase as the bed-in period progresses. You may lose control of the bicycle, which can result in serious injury due to a fall or collision. The same thing will happen when the brake pads or disc brake rotor are replaced.

For installation to the bicycle and maintenance

■ Hydraulic disc brake

Handling SHIMANO genuine mineral oil

- Do not drink. May cause vomiting or diarrhea.
- Keep out of reach of children.
- Do not cut, let near heat, weld or pressurize the SHIMANO genuine mineral oil container. Doing so may cause an explosion or fire.
- Disposal of used oil: Follow local county and/or state codes for disposal. Use caution when preparing the oil for disposal.
- Directions: 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.
- For cleaning brake hoses exposed to mineral oil, or cleaning and maintaining tools, use isopropyl alcohol or a dry cloth. Do not use commercially available brake cleaners. Doing so may cause damage to plastic parts.

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 arm when carrying out any operations which are related to gear shifting.
- The connectors are small and waterproof, so do not connect and disconnect electric wires except when necessary. Doing so may impair the waterproofing.
- Be careful not to get water into the E-TUBE ports.
- 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 wash. If water gets into any of the components, operating problems or rusting may result.
- Be sure to keep rotating the crank arm during gear shifting operations.
- Handle the components carefully, and avoid subjecting them to strong shock.
- Do not use the thinners or harsh solvents to clean the products. Such solvents may damage the surface.
- If gear shifting operation does not feel smooth, consult the place of purchase for assistance.
- Keep away from magnetic objects. If not observed, problems with operation may occur.

When installing a product that uses a magnet, make sure the magnet is set in the specified location before installing the product.

- 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 battery level. 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.
- When the battery is completely depleted, 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 charging after repeated use. If the length of time that the battery can be used and its traveling distance become extremely short, contact the place of purchase.
- 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. It is recommended that you charge the battery every six months.

- If the storage temperature is too 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 too 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 to each port.
- The charging time of an AC adapter with a USB port is about 1.5 hours, and that of a PC USB port type about 3 hours. (Note that the actual time will vary depending on the amount of charge remaining in the battery. 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.)

■ Battery charger / battery charger cord

- Use this instrument under the direction of a safety supervisor or the direction for use. Do not allow anyone (including children) with reduced physical, sensory, or mental capacity, or those without experience or knowledge, 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 main body on dusty floors when using it.
- Place the main body on a stable surface such as a table when using it.
- Do not place any objects on top of the main body or its cable.
- Do not bundle the cables.
- Do not hold the main body by the cables when carrying it.
- Do not apply excessive tension to the cables.
- Do not wash the main body or wipe it using detergents.

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

- Connect the battery charger 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 main body 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 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 devices are connected at the same time, 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 operation does not feel smooth, consult the place of purchase for assistance.
- If you feel the chain or other drivetrain components skipping, consult the place of purchase for assistance.
- If the pulleys of the derailleur develop excess play or noise, consult the place of purchase for assistance.
- 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.

■ 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 a place of purchase.
- When conducting maintenance, do not use commercially available brake cleaners or silencing agents, as they can cause damage to parts such as the seals.

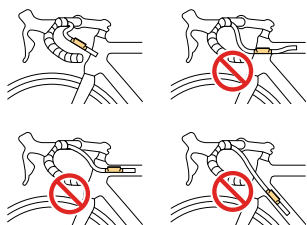
■ Wireless unit

- 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

- The connectors are small and waterproof, so do not connect and disconnect electric wires except when necessary. Doing so may impair the waterproofing.
- Be careful not to get water into the E-TUBE ports.
- 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 wash. If water gets into any of the components, operating problems or rusting may result.
- Handle the components carefully, and avoid subjecting them to strong shock.
- 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 the thinners or harsh solvents to clean the products. Such solvents may damage the surface.
- 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.
- Contact SHIMANO INC. 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 dual control levers do not touch the bicycle frame when the handlebars are turned all the way.
- The clamp band, clamp screw and clamp nut are not compatible with other products. Be sure to always use the clamp band, clamp screw and clamp nut which is specific to each product.

■ 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. If so, 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 a poor connection.

■ Rear derailleur

- Be sure to adjust the high limit screw and the low limit screw according to the instructions given in the adjustment section.

If these instructions are not observed, the chain may become clamped between the spokes and the largest sprocket and the wheel may lock, or the chain may fall off the small sprocket.

- Periodically clean the shifting unit and lubricate all moving parts (mechanism and pulleys).
- If gear shifting adjustments cannot be carried out, check the degree of parallelism of the dropout.
- Some pulleys have arrows on them to indicate the direction of rotation. In that case, install the pulleys so that the rotation directions of the pulleys match the direction of the arrows when the crank is turned in the forward direction.

■ 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 normal. Use a flat-shaped tool to push back the brake pad, while being careful not to damage the surface 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.)

When pushing back the brake pads or pistons, do so with an oil funnel attached to the brake lever. (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 reinstalled 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 malfunction is observed, use E-TUBE PROJECT to update the firmware of each component to the latest version and perform a check again. Also, make sure that E-TUBE PROJECT is the latest version. If the software is not the latest version, the component compatibility or the product functions may not be available.

Be sure to also inform users of the following:

■ 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 one 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 one 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 one 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 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 version of E-TUBE PROJECT and the 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

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

- E-TUBE PROJECT: Application for smartphones
- Firmware: Software inside each component

- Disconnect the Bluetooth® LE connection when not using E-TUBE PROJECT.

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:
(https://bike.shimano.com/e-tube/project/compatibility.html#guide_list)

■ About the multi-shifting function

- Connecting this system to E-TUBE PROJECT and switching [Multi shift] to [ON] will allow you to continuously shift gears while the shift 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 crankset 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 teeth
- The cassette may deform
- The chain may break

- Fully understand the features of the gear-shifting interval, 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	- Quick multi shift is possible - The rider can quickly adjust the cadence or traveling speed in response to changes in the riding conditions	- A high cadence is required when gear shifting - Unintended over-shifting occurs easily
Slow setting	Gear shifting can be performed reliably	Gear shifting takes some time

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
	Internal snap ring pliers (1.8 mm)

Dual control lever, satellite switch

Tool	
	TL-EW02
	SM-DISC
	TL-BH62
	TL-BT03 / TL-BT03-S
	Funnel adapter
	2 mm hexagon wrench

List of tools to be used

Tool	
	2.5 mm hexagon wrench
	5 mm hexagon wrench
	7 mm box 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
	Cross head screwdriver [#2]
	Hexalobular [#30]
	5.5 mm spanner

Installation / removal

Overall wiring diagram (external battery types)

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

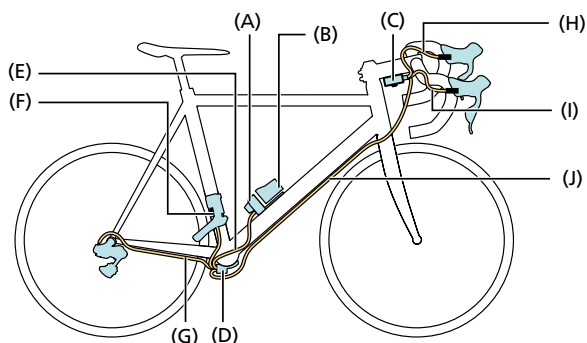
- When passing the wires through the inside of the frame, especially when pulling junction [B] into the frame, it is necessary to finish wiring and check the connection before installing the bottom bracket. This is particularly important when you use a press-fit bottom bracket.

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

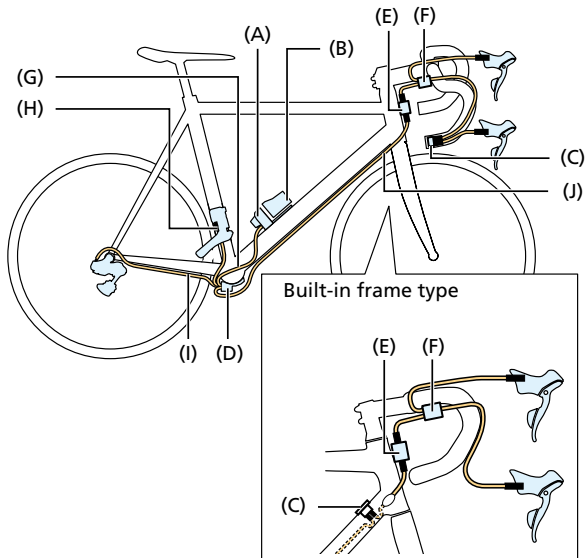
Electric wire (EW-SD50)

(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

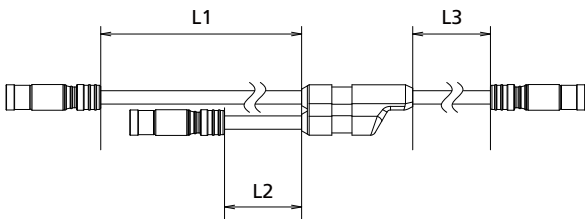
(A)	Battery mount: SM-BMR2 / BM-DN100	(B)	Lithium-ion battery (external type): SM-BTR1
(C)	Junction [A]: EW-RS910 (built-in bar end type / built-in frame type)	(D)	Junction [B]: SM-JC40
(E)	Wireless unit: EW-WU111	(F)	Branch type junction: EW-JC130

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

	L1 (mm)	L2 (mm)	L3 (mm)
EW-JC130-MM	550	50	550

TECH TIPS

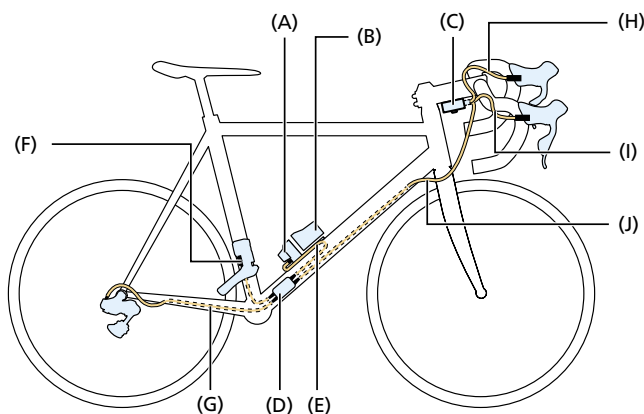
- If using EW-WU111, use it in combination with BT-DN110, BT-DN110-A or BM-DN100.
- Refer to the dealer's manual for EW-WU101 (<https://si.shimano.com/dm/RBWU001/>) for information on wiring when using EW-WU101 as the wireless unit.

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)

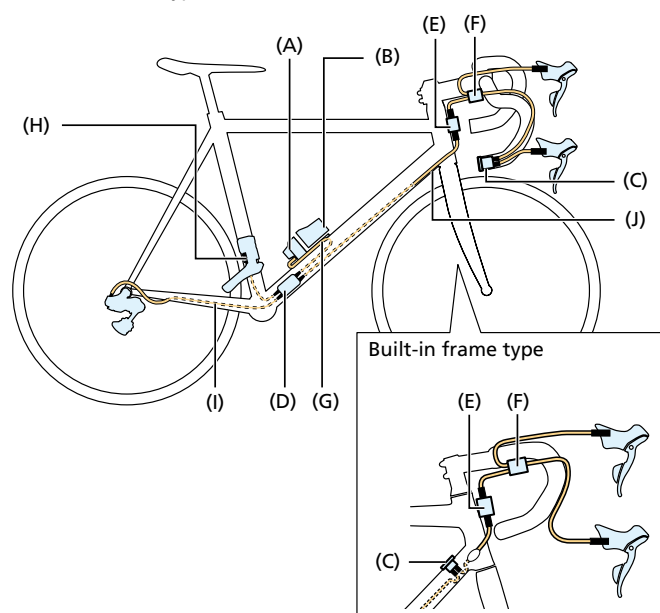
(E)	From built-in type battery to junction [B]	(E) + (F) ≤ 1,500 mm
(F)	From front derailleur to junction [B]	(E) + (G) ≤ 1,700 mm
(G)	From rear derailleur to junction [B]	
(H)	From dual control lever to junction [A]	(H), (I) ≤ 500 mm
(I)	From dual control lever to junction [A]	
(J)	From junction [A]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

TECH TIPS

- For EW-JC130, refer to " [About the branch type junction \(EW-JC130\)](#)."
- 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 (<https://si.shimano.com/dm/RBWU001/>) for information on wiring when using EW-WU101 as the wireless unit.

Overall wiring diagram (built-in battery types)

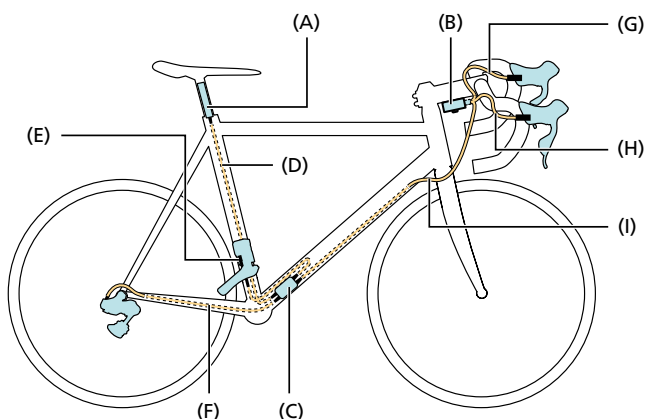
When routing wires through the inside of the frame, be sure to do so before installing each component. The wiring diagram for using a built-in type battery is shown below.

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		

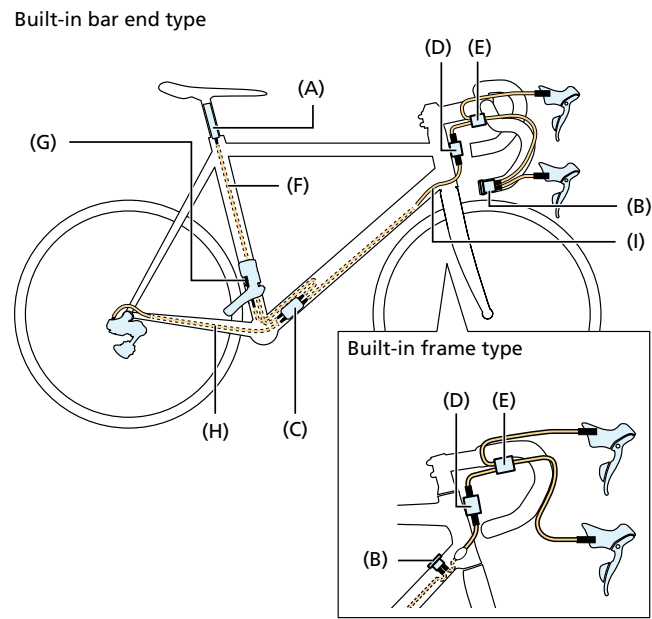
Electric wire (EW-SD50 / EW-SD50-I)

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

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.

Installation / removal Overall wiring diagram (built-in battery types)



Wiring component parts

(A)	Lithium-ion battery (built-in type): BT-DN110 / BT-DN110-A	(B)	Junction [A]: EW-RS910 (built-in bar end type / built-in frame type)
(C)	Junction [B]: SM-JC41	(D)	Wireless unit: EW-WU111
(E)	Branch type junction: EW-JC130		

Electric wire (EW-SD50-I)

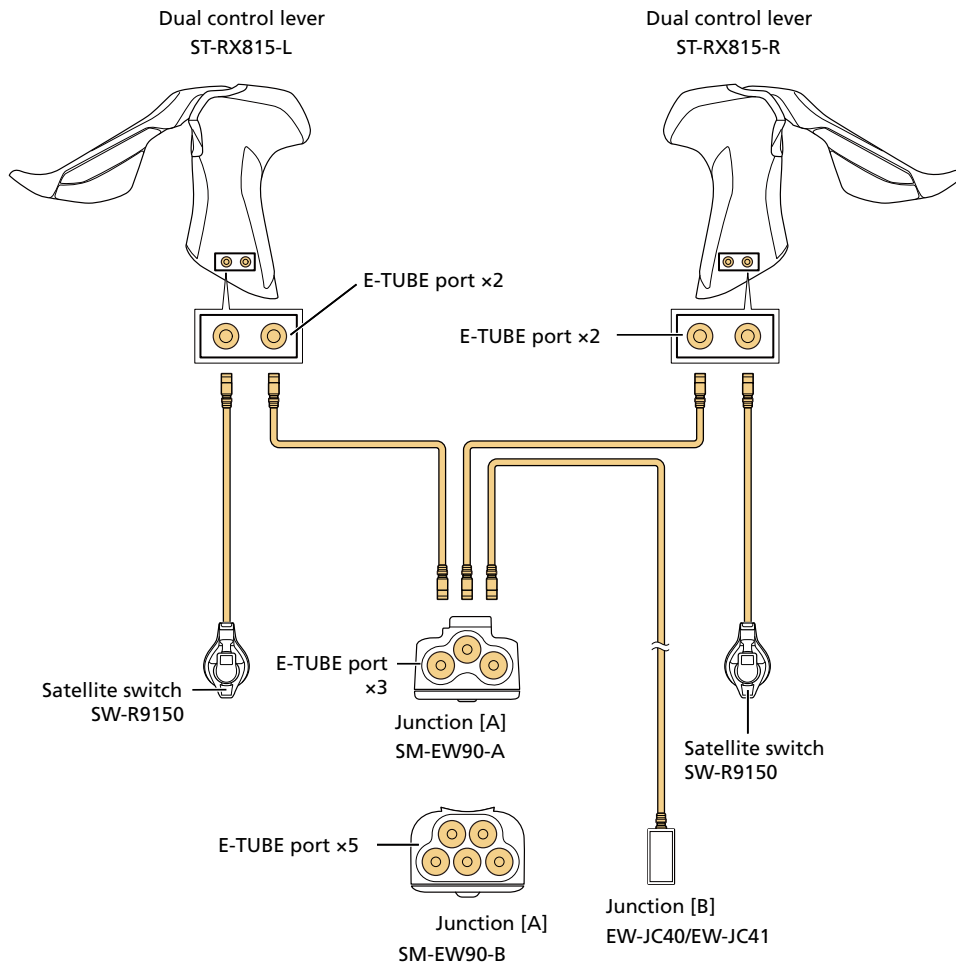
(F)	From built-in type battery to junction [B]	(F) + (G) ≤ 1,500 mm (F) + (H) ≤ 1,700 mm
(G)	From front derailleur to junction [B]	
(H)	From rear derailleur to junction [B]	
(I)	From wireless unit to junction [B]	(I) ≤ 1,400 mm

TECH TIPS

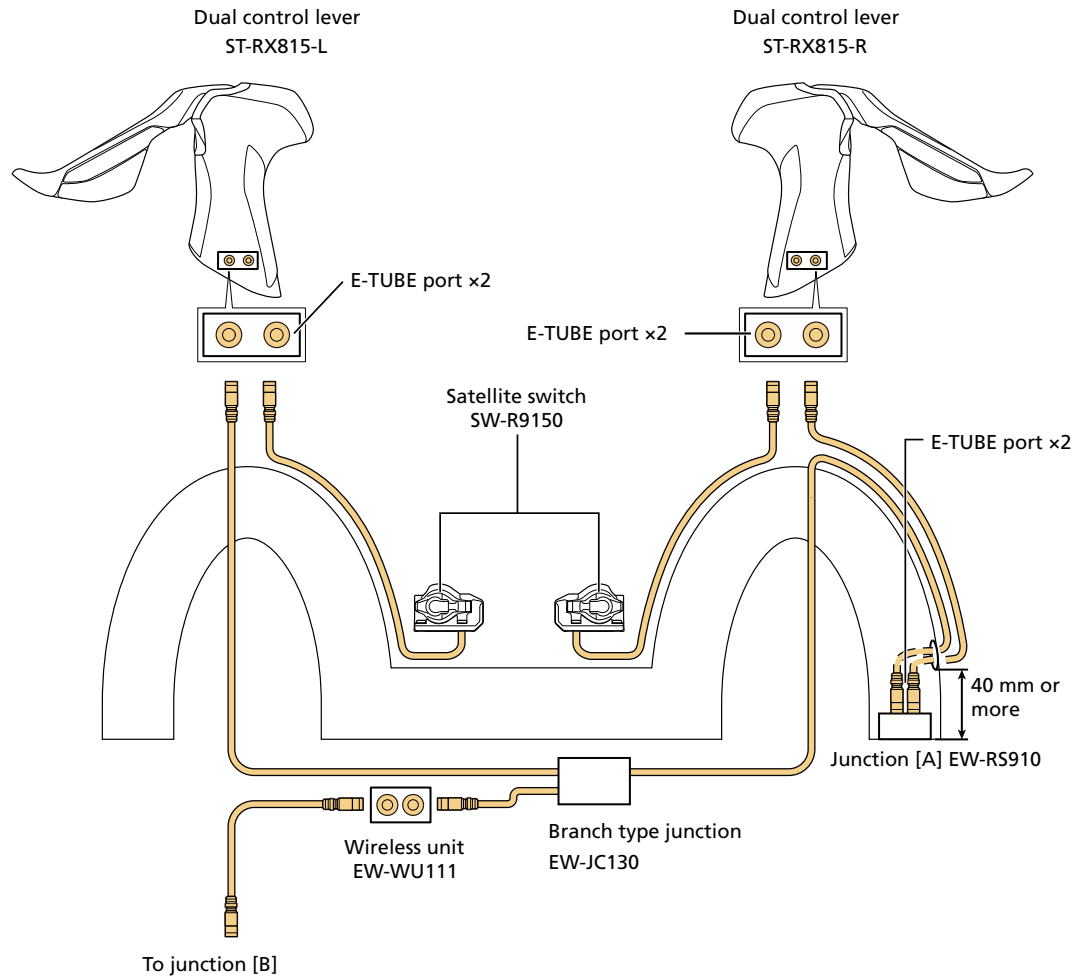
- For EW-JC130, refer to " [About the branch type junction \(EW-JC130\).](#) "
- If using EW-WU111, use it in combination with BT-DN110, BT-DN110-A or BM-DN100.
- Refer to the dealer's manual for EW-WU101 (<https://si.shimano.com/dm/RBWU001/>) for information on wiring when using EW-WU101 as the wireless unit.

Wiring diagram around the cockpit

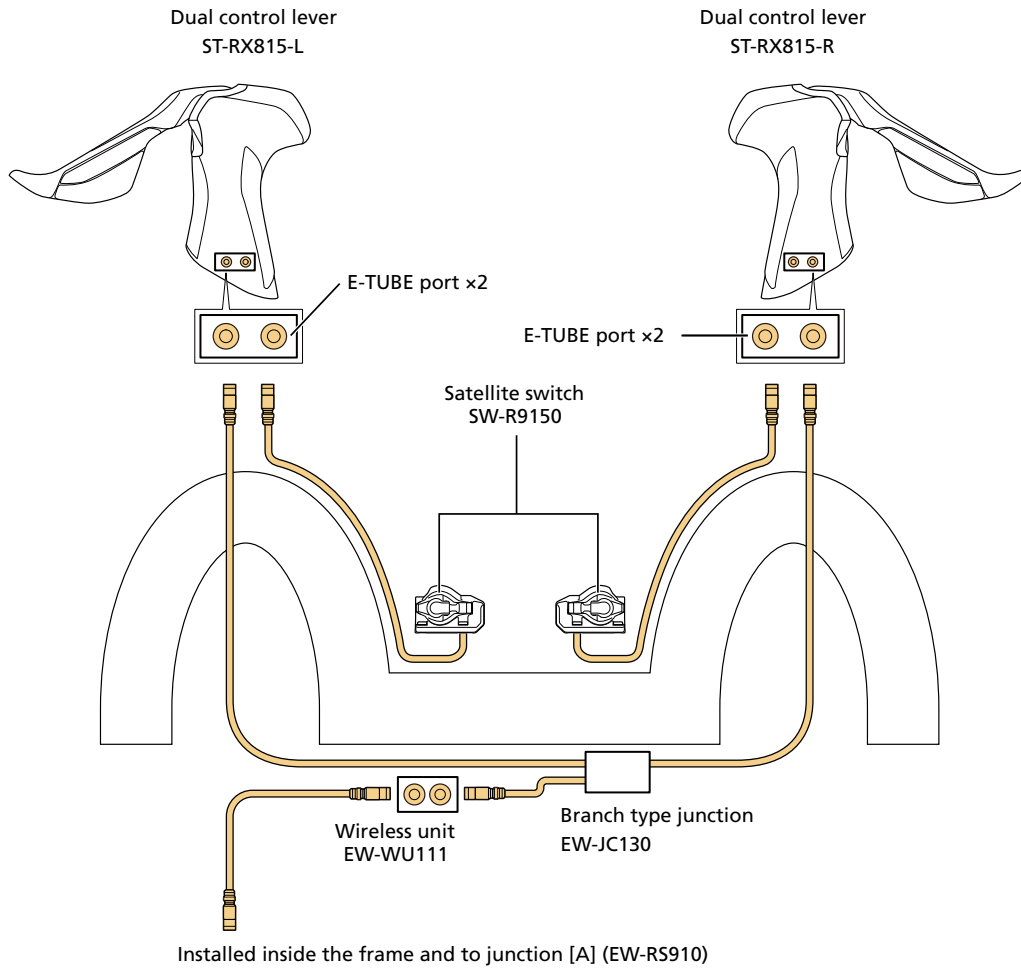
Wiring example for installing junction [A] on the outside



Wiring example for installing junction [A] inside the handlebar



Wiring example for installing junction [A] inside the frame



Handling electric wires

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

NOTICE

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

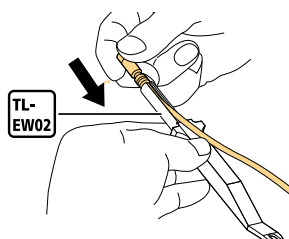
Connecting the electric wire

Connect the electric wire to the E-TUBE port.

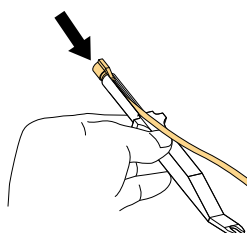
1. Set the plug part of the electric wire to the SHIMANO original tool.

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

Without alignment tab on plug

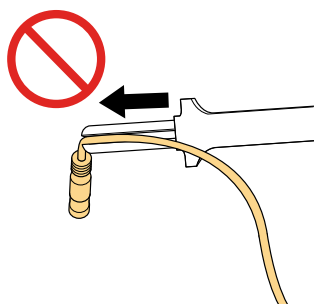
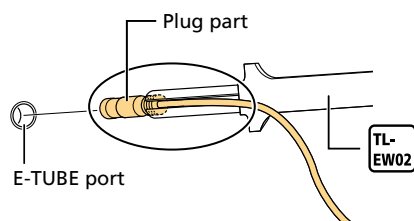


With alignment tab on plug



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.



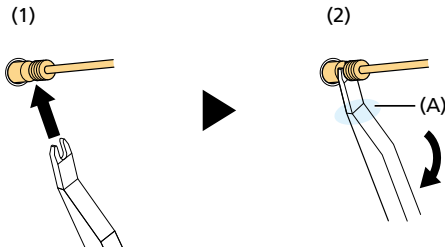
Disconnecting the electric wire

1. Disconnect the electric wire.

- Insert the SHIMANO original tool into the groove on the plug part of the electric wire.
- Disconnect the electric wire from the E-TUBE port.

* As shown in the figure, use part (A) of the SHIMANO original tool as a fulcrum and move it like a

lever, then disconnect it. If there is limited space to insert the tool, lift the SHIMANO original tool straight up and disconnect the electric wire.

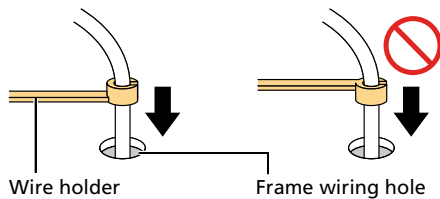


NOTICE

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

Insertion direction of the electric wires for internal use

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



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.

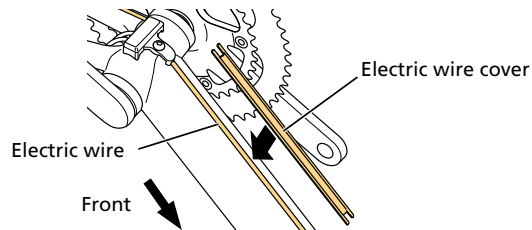
Refer to each section in this chapter for details. Perform the procedure with the electric wire temporarily secured to the frame using tape with low adhesion, etc.

2. After installing and connecting all the components, perform the procedures in “[Checking connections.](#)”

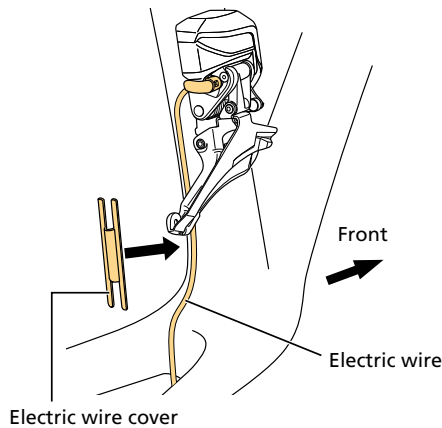
3. Remove the temporary tape, and affix the electric wire cover to the locations on the frame.

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

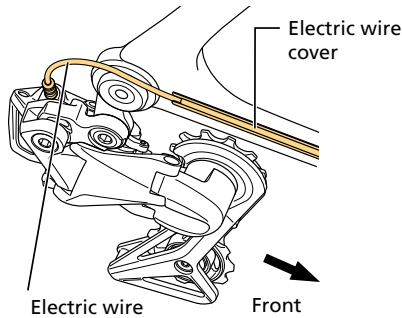
Example of affixing to the lower side of the down tube
(wiring to junction [B])



Example of affixing to the seat tube
(wiring to the front derailleur)



Example of affixing to the chainstay
(wiring to the rear derailleur)



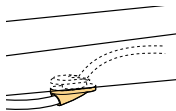
NOTICE

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

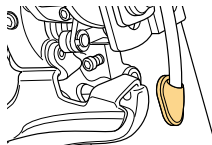
Finishing for internal wiring

When routing 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)

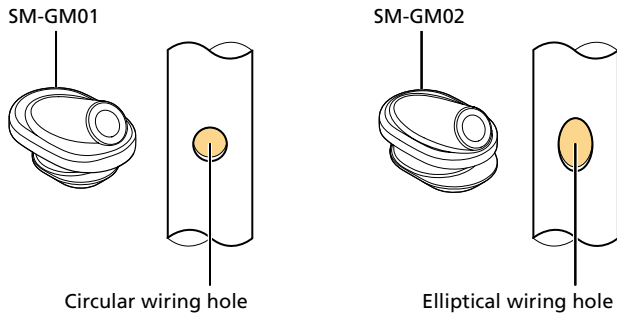


Installation example to the seat tube
(wiring to the front derailleur)



TECH TIPS

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



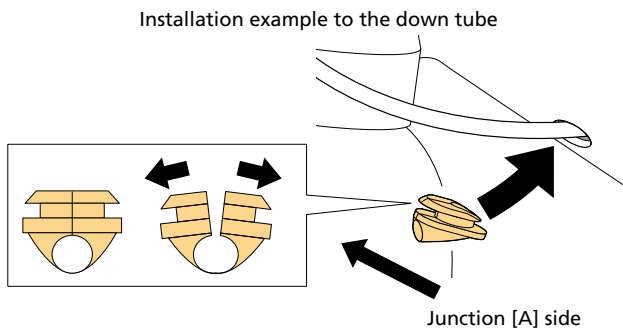
1. Install each component and connect the electric wire.

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.](#)”

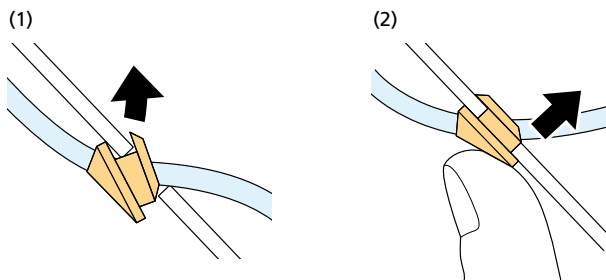
3. Open the grommet from the center, and place it over the electric wire in the appropriate position.

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.



TECH TIPS

- If the grommet is difficult to insert, spray it with isopropyl alcohol to aid installation.

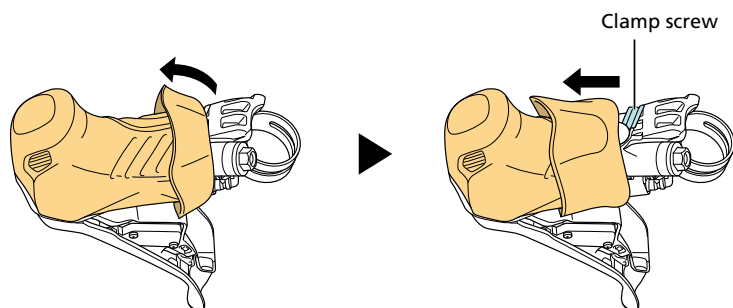
Temporarily installing the dual control levers

Temporarily install the dual control levers. You will need to check the connections and install the brake hose before proceeding to "[Securing the dual control levers](#)."

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.

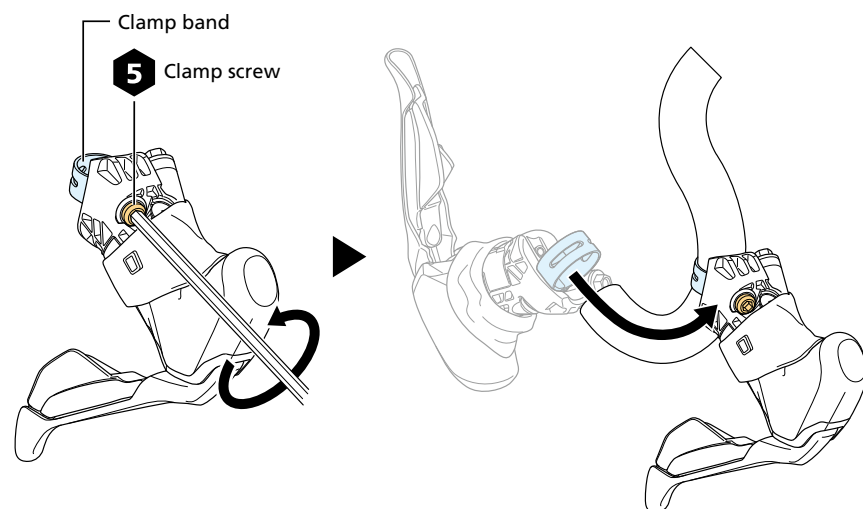


NOTICE

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

2. Loosen the clamp screw and pass the clamp band over the handlebar.

The clamp screw is found on top of the lever bracket when the bracket cover is turned over.

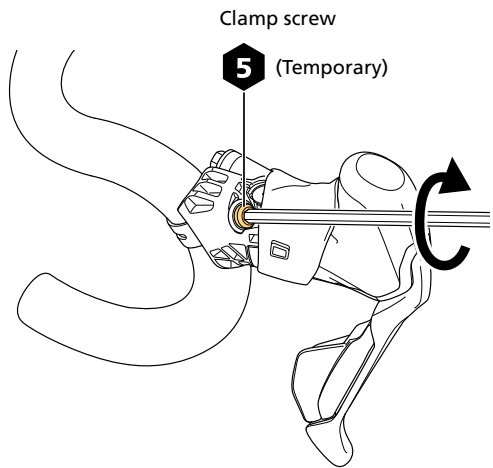


NOTICE

- Be sure to loosen the clamp screw sufficiently. Otherwise the handlebar may be damaged when passing the clamp band over the drop handlebar.

3. Temporarily install the lever to the handlebar.

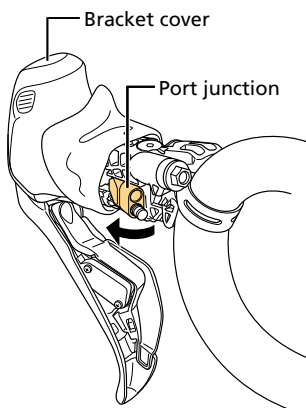
Temporarily install the lever so that it cannot move.



NOTICE

- The clamp band, clamp screw and clamp nut are not compatible with other products. Be sure to always use the clamp band, clamp screw and clamp nut which is specific to each product.

4. Lift up the port junction.

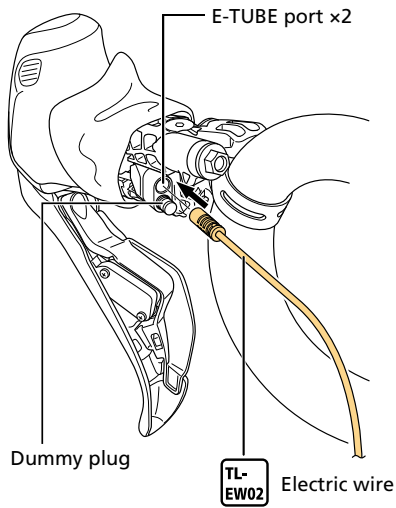


NOTICE

- When removing / inserting dummy plugs or electric wires, be sure the port junction is firmly supported by hand or by the bracket body. Otherwise you may cause damage to the inner connecting wires of the dual control levers.

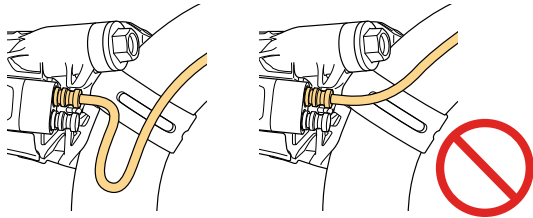
5. Connect the electric wire. If required, first remove the dummy plug.

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 levers 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 satellite switch (next section) or connect a PC linkage device when performing maintenance. Leave the dummy plug attached to the unused E-TUBE port.

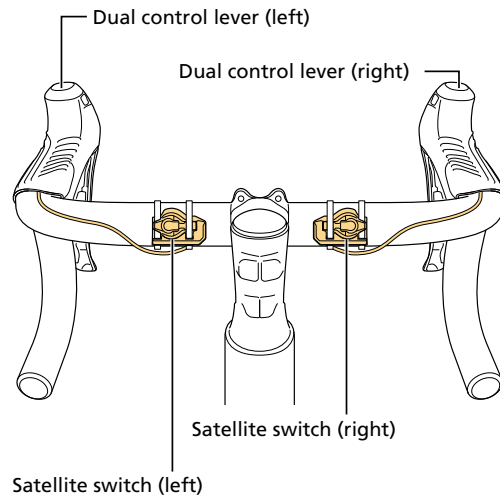
Installing the satellite switch

This section describes how to add a satellite switch.

SW-R9150

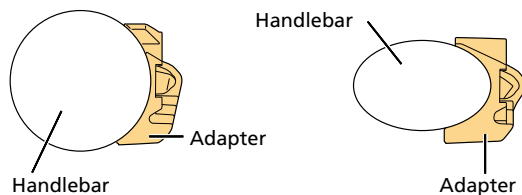
Routing map

A routing example of the satellite switch is shown below.



TECH TIPS

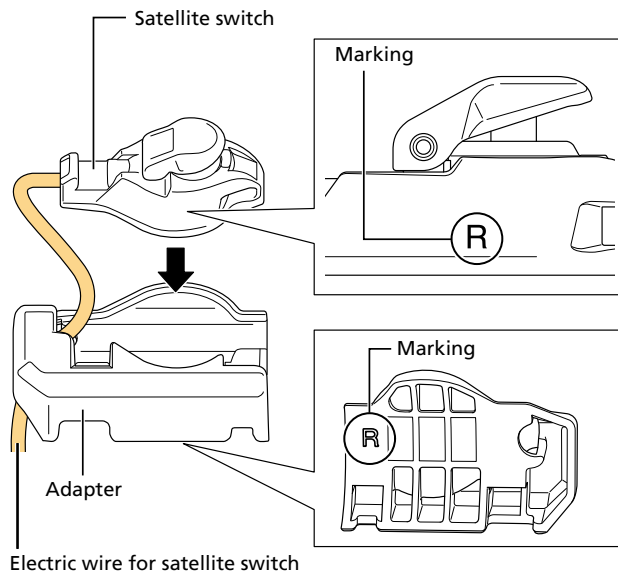
- Two types of adapters for installing the satellite switch to the handlebar are included in the product. Select the adapter according to the cross-section of the handlebar.



Connection method

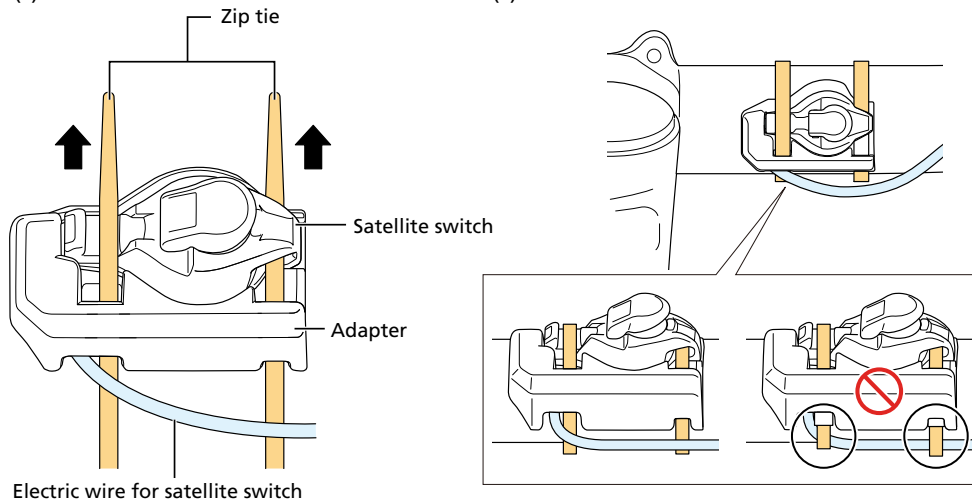
1. Set the satellite switch to the adapter.

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



2. Secure the satellite 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.



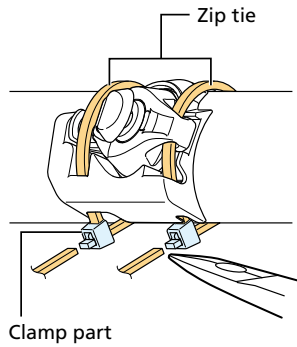
NOTICE

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

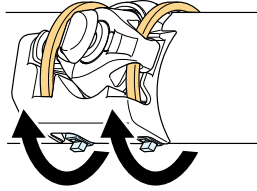
3. Perform post-processing of the zip tie.

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

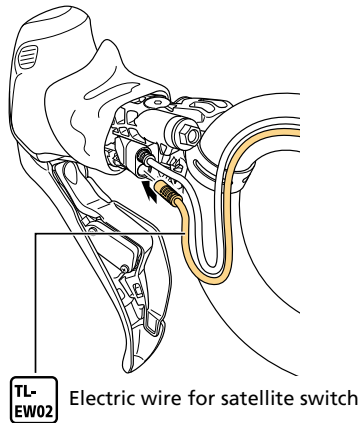
(1)



(2)



4. **Connect the electric wire of the satellite 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 satellite switch, retaining it on the dual control lever side will make it easier to remove and insert wiring when performing maintenance.

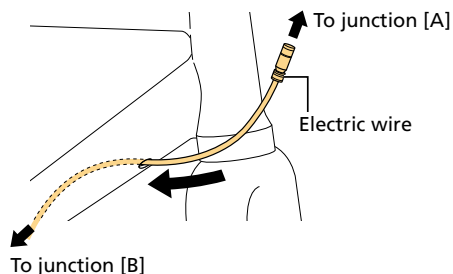
Installing junction [A]

External type

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

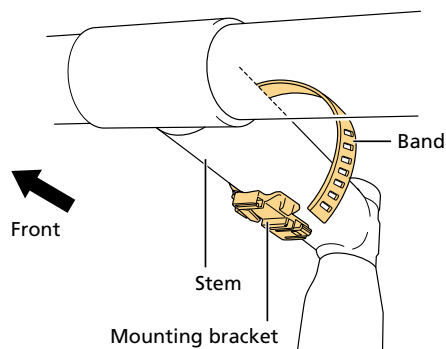
1. Check the electric wire that will be connected to junction [A].

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

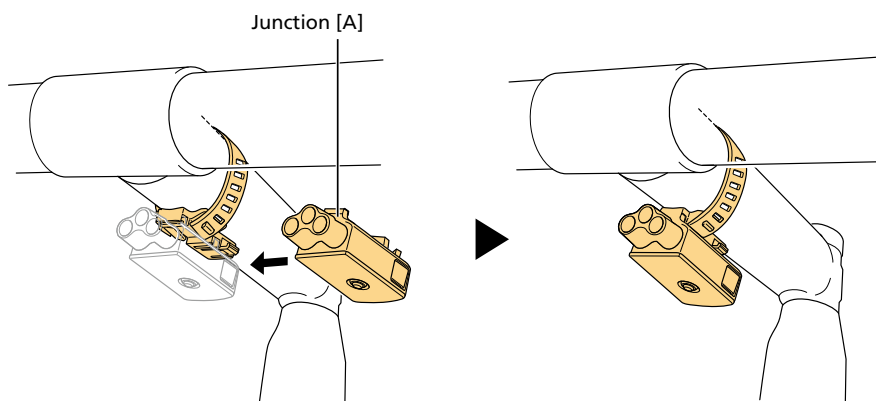


2. Install the band and mounting bracket to the stem.

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

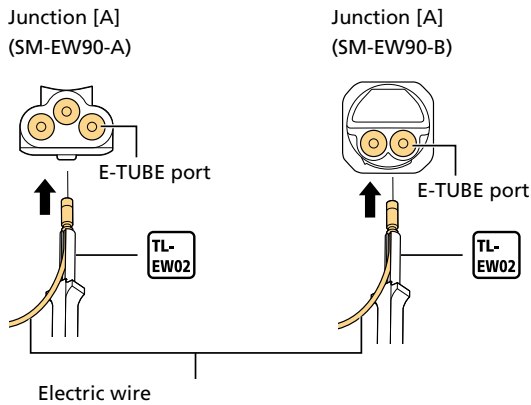


3. Slide junction [A] into the rail section of the mounting bracket to install it.



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

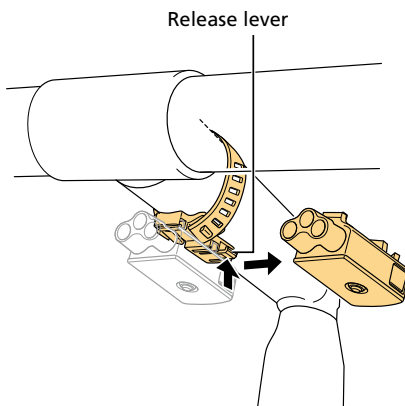
Check the wiring diagram, and connect the electric wire to the E-TUBE port of junction [A]. Be sure to push it in firmly until you feel a click.



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 mounting bracket.



NOTICE

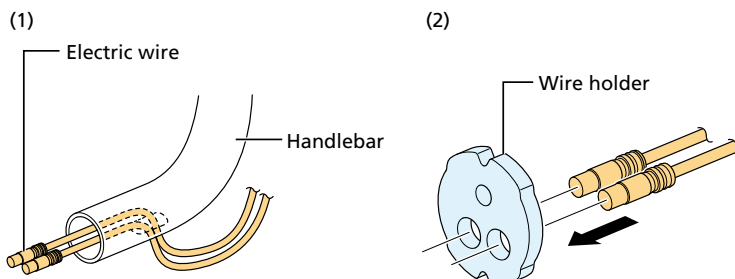
- Do not push the release lever strongly. Doing so may cause the release lever to break.

Built-in bar end type

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

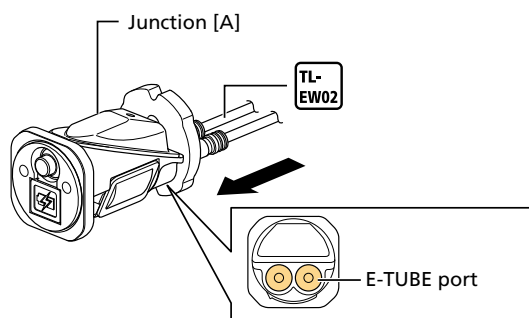
1. Prepare the wires.

- (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.



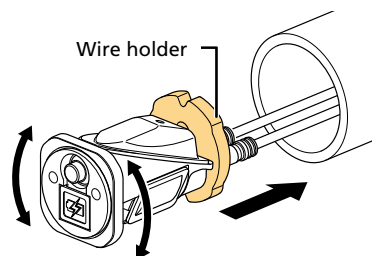
2. Connect the electric wire to the E-TUBE port of junction [A].

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.

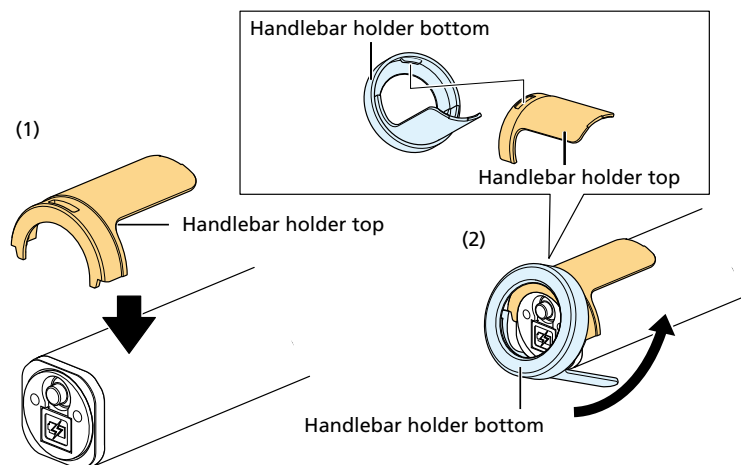


NOTICE

- Do not tap junction [A] with a hammer or similar tool when inserting it. If not observed, problems with operation may occur.
- Perform the following steps after "[Checking connections](#)." Double check the connections to junction [A] before proceeding to the next step.

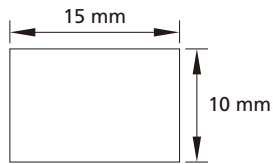
4. Attach the handlebar holder to the bar end.

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



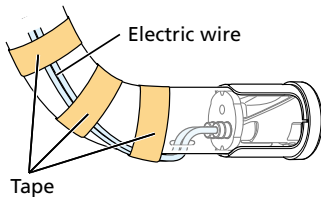
TECH TIPS

- If the adhesive force of the double-sided tape on the handlebar holders has weakened, cut some commercially-available double-sided tape as shown in the figure 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.

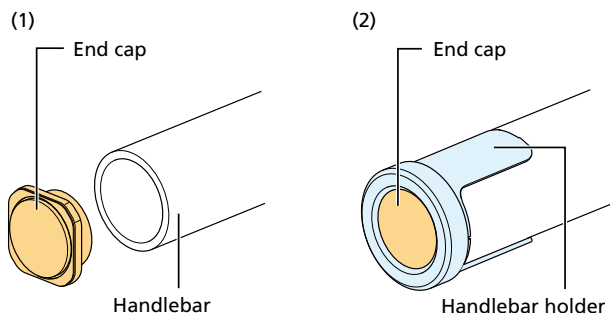


TECH TIPS

- If there is length to spare in the electric wire, retaining it inside the handlebar will make it easier to remove and insert wiring when performing maintenance.

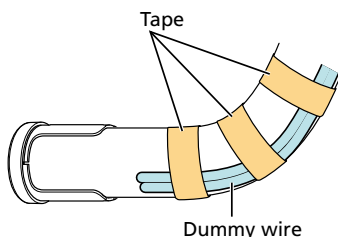
6. Attach the end cap and handlebar holder to the bar end on the opposite side.

- (1) Insert the end cap into the bar end without junction [A] installed.
- (2) Refer to step [4](#) to attach the handlebar 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 wire

- 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.

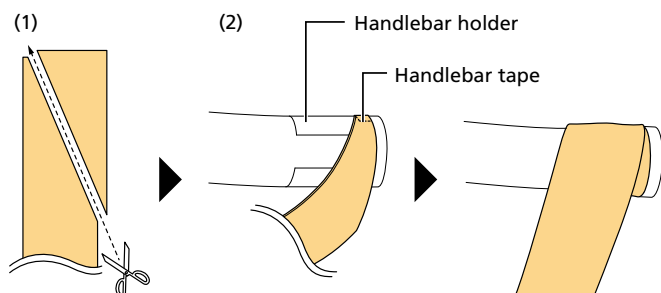
Finally, wrap the handlebar with the handlebar tape, after installing the hydraulic brake system.

TECH TIPS

- For information on wrapping the handlebar with the handlebar tape, refer to the instruction manual included with the handlebar tape. SHIMANO recommends the following method for wrapping the handlebar with the handlebar tape.

(1) Cut off the end of the handlebar tape diagonally.

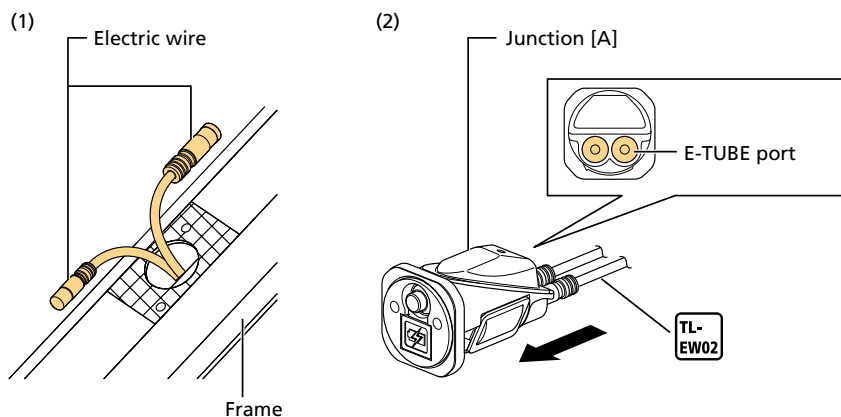
(2) Wrap the handlebar with the handlebar tape over the handlebar holders.



Built-in frame type

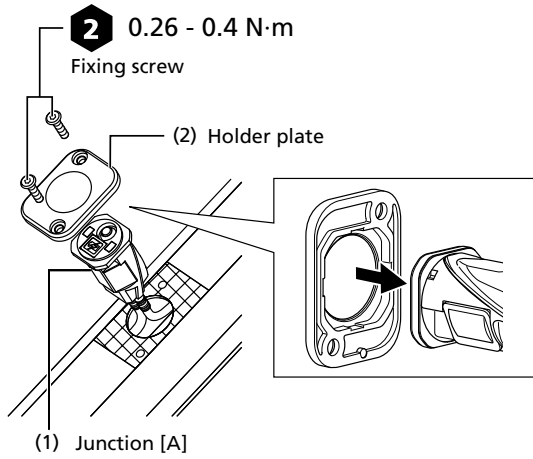
1. Connect the electric wire to junction [A].

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



2. Install junction [A] to the frame.

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



NOTICE

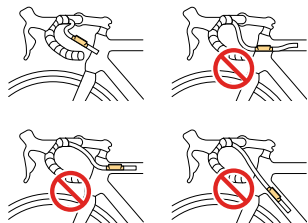
- When installing parts onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

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 (<https://si.shimano.com/dm/RBWU001/>).

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.

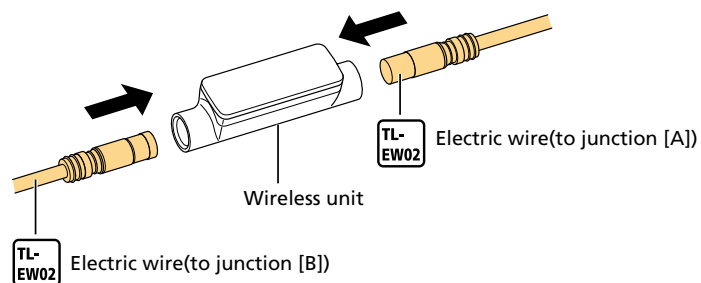


1. Connect the electric wire to the wireless unit.

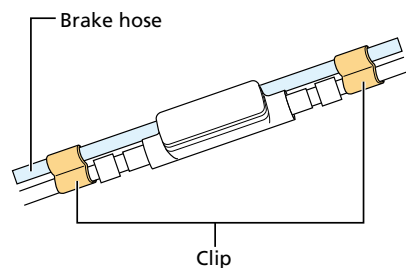
- Check the electric wire that will be connected to the wireless unit.
- Connect the electric wire to the E-TUBE port of the wireless unit.

* 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), 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](#)", then complete installing the front derailleur.

When there is a mounting boss on the seat tube

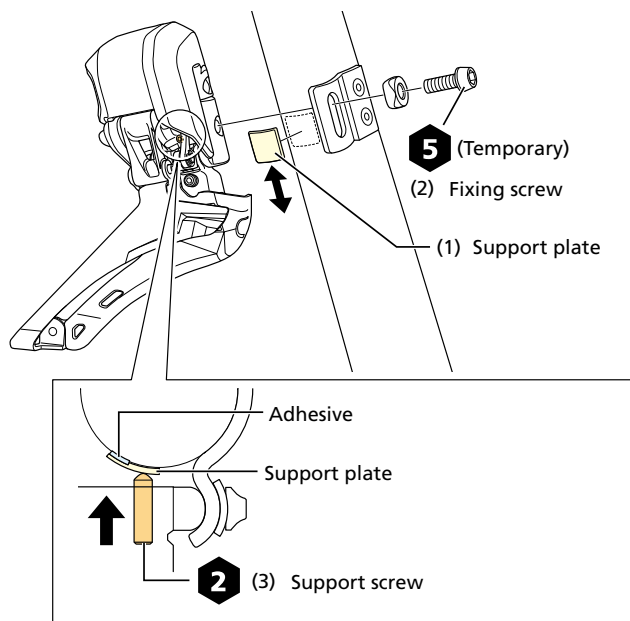
Be sure to install the support plate to prevent the frame from being damaged by pressure from the support screw.

1. Check the installation position.

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

2. Temporarily install the front derailleur.

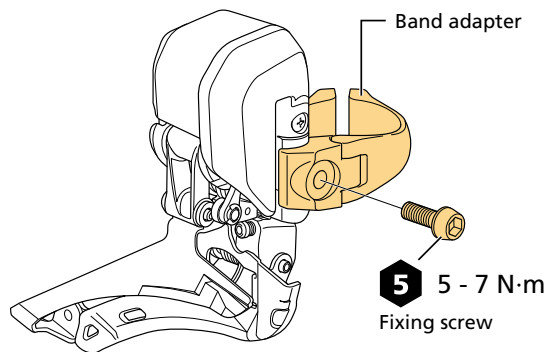
- (1) Peel the film off the back of the support plate, then attach it to the seat tube.
 - * Avoid positioning the adhesive on the support plate between the contact point of the support screw and the frame.
- (2) Temporarily install the front derailleur.
- (3) Tighten the support screw until it touches the support plate.



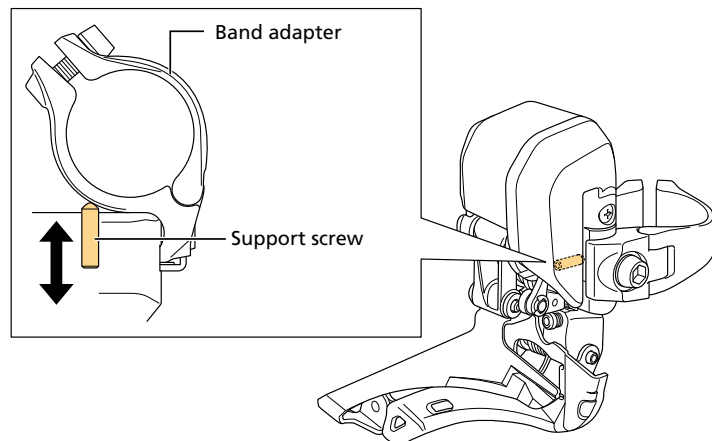
When there is no mounting boss on the seat tube

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

1. Install the band adapter to the front derailleur.

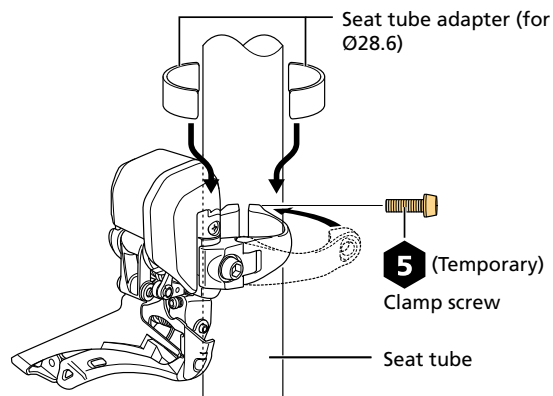


2. Tighten the support screw until it touches the band adapter.



3. Temporarily install the front derailleur to the seat tube.

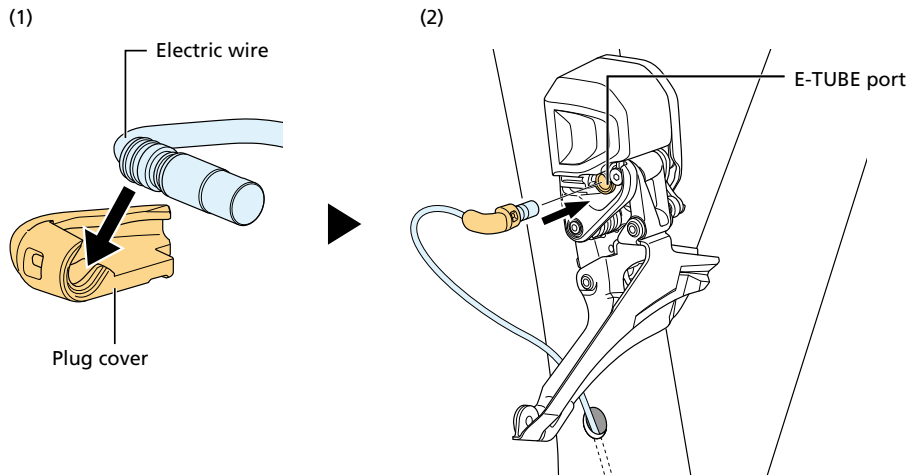
- (1) Remove the clamp screw, and expand the clamp band of the band adapter.
 - (2) Set the clamp band to the frame, and reinstall the clamp screw.
- * Use a seat tube adapter (for Ø28.6) according to the size of the seat tube.



Connecting the electric wire

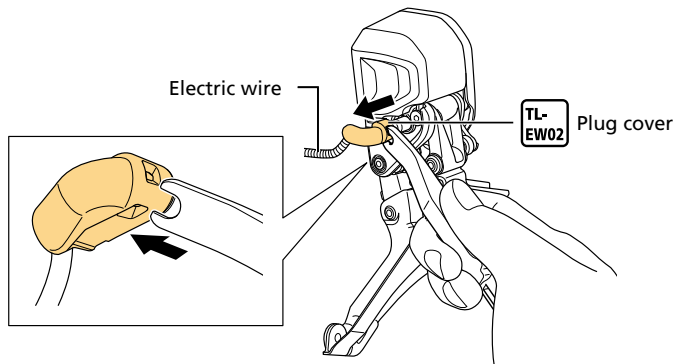
1. Connect the electric wire.

- (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.



TECH TIPS

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



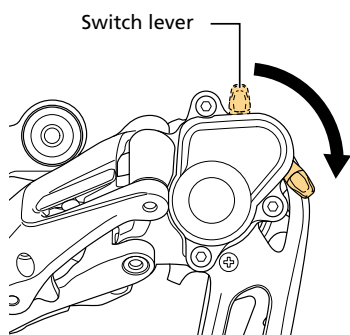
Installing the rear derailleur

TECH TIPS

- The rear derailleur will not shift properly if the derailleur hanger is not straight. Use TL-RD11 to check whether the derailleur hanger is straight or not.
- It is recommended to move the switch lever to the ON position while riding to reduce chain slap and to help prevent the chain from falling off the sprockets.

Standard type

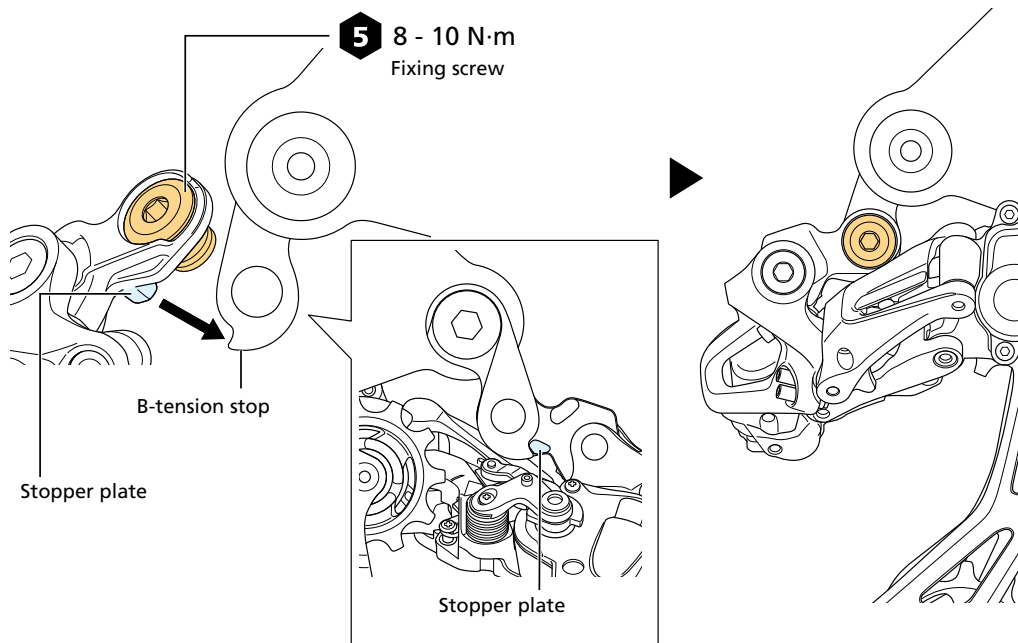
1. Set the switch lever in the OFF position.



2. Secure the rear derailleur.

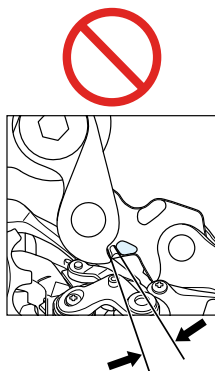
Be careful not to insert the fixing screw in the derailleur hanger at an angle.

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



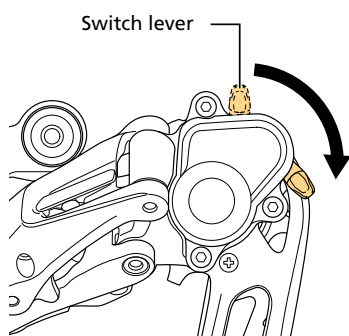
NOTICE

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

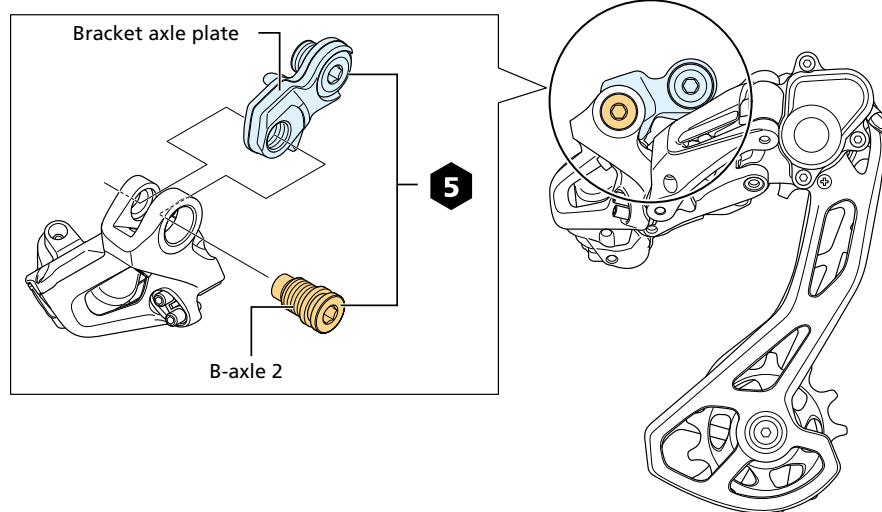


Direct mount type

- Set the switch lever in the OFF position.

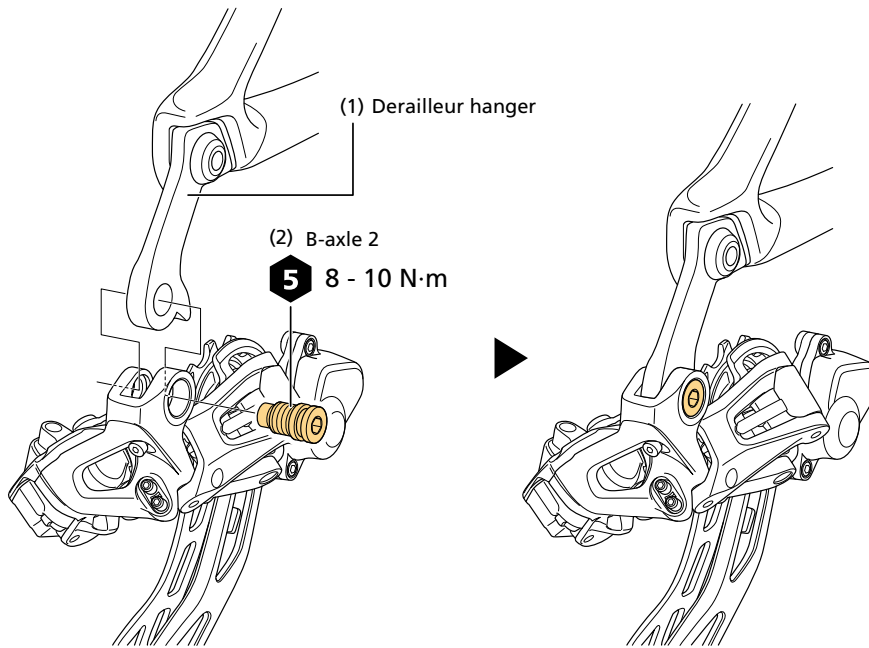


- Remove the bracket axle plate.



- Install the rear derailleur.

- Insert the derailleur hanger into the installation part for direct mount of the rear derailleur.
- Install the rear derailleur with the B-axle 2.

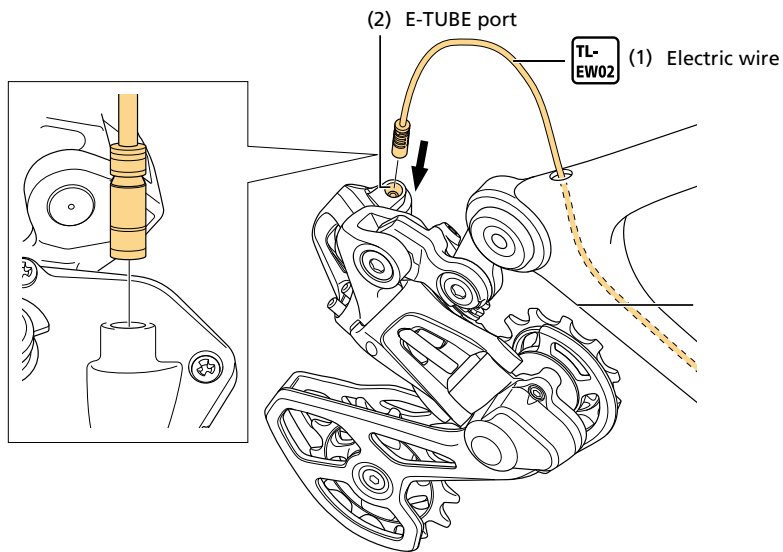


Connecting the electric wire

1. Connect the electric wire.

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

Example when the wiring is built into the frame



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 the manufacturer of the frame.

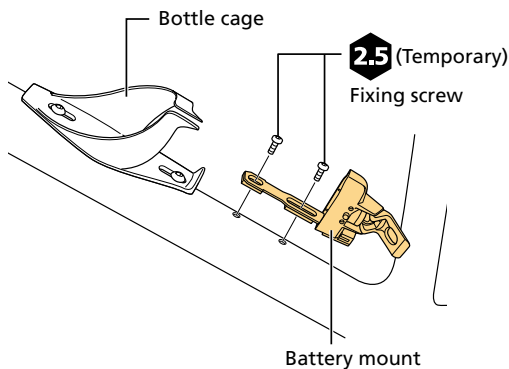
Install the built-in type battery after installing the internal type junction [B]. Refer to “ [Installing the built-in type battery.](#)”

When the wiring to the battery is external

1. Temporarily install the battery mount.

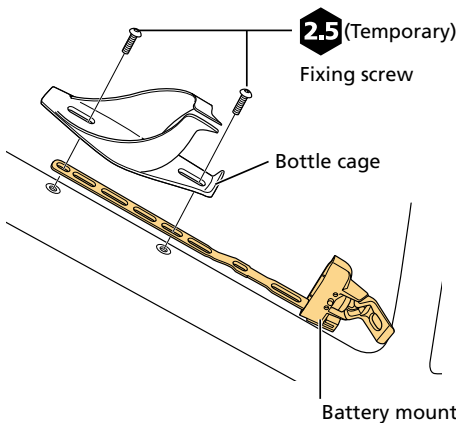
Short type

Use the fixing screw included with the battery mount.



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

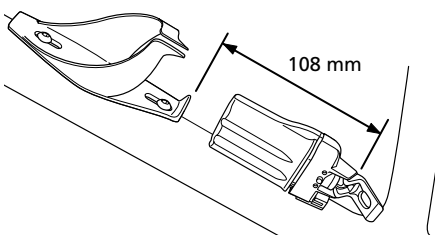
Tighten it together with the bottle cage using the fixing screw included with the frame.



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.

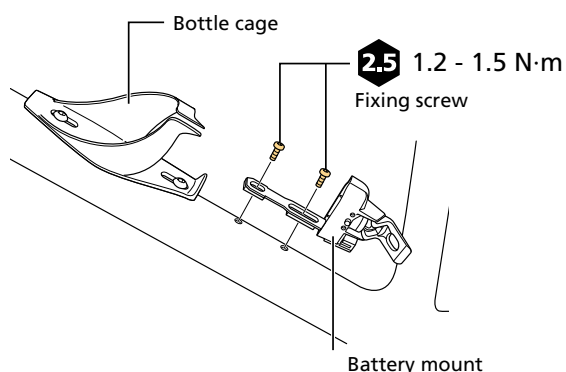
Attach and remove the battery to check the space.



3. Secure the battery mount.

Short type

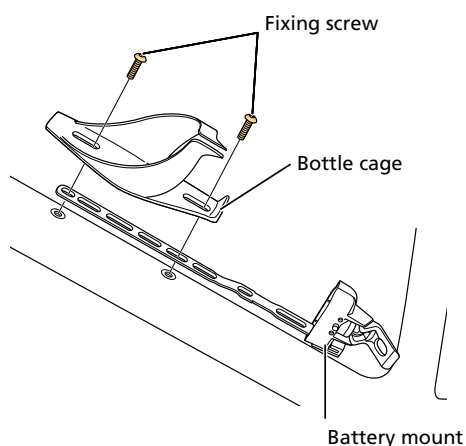
This completes the installation process for the short type.



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.



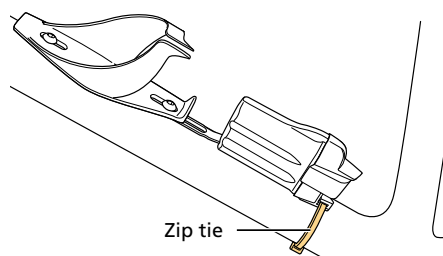
NOTICE

- When installing parts onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

4. Secure the rear of the battery mount.

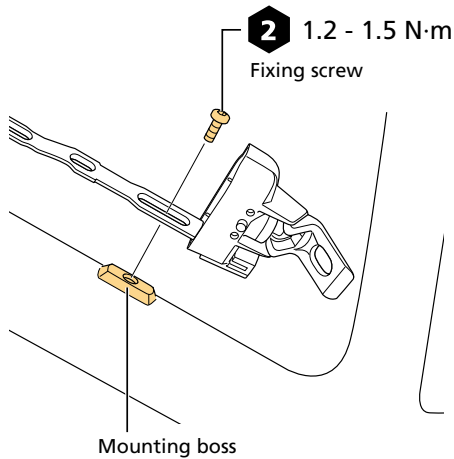
For the long type, secure the rear of the battery mount.

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 fixing screw.

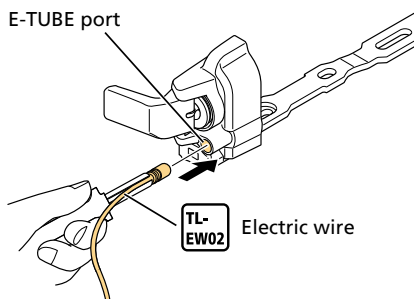


NOTICE

- When installing parts onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

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.

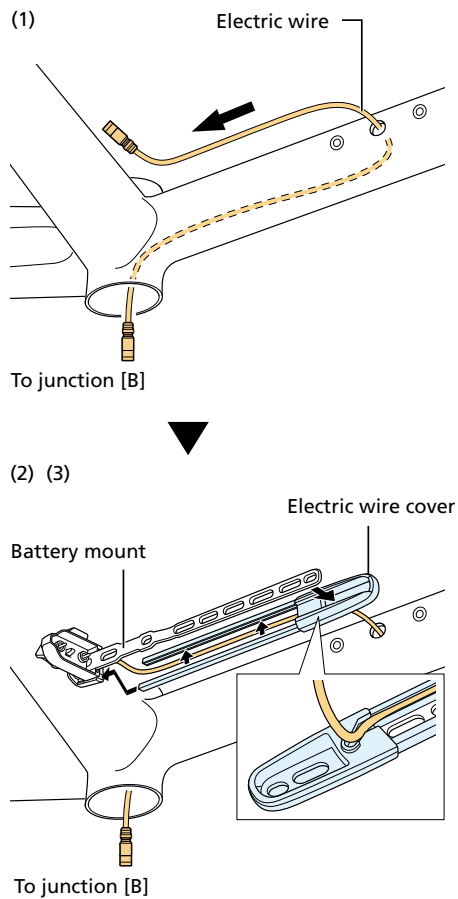


When the wiring to the battery is built into the frame

If the frame wiring hole is between the mounting 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.

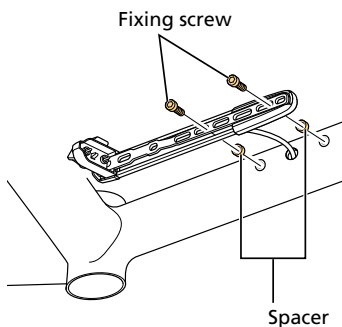


2. Connect the electric wire to the E-TUBE port of the battery mount.

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 onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

4. Secure the rear of the battery mount.

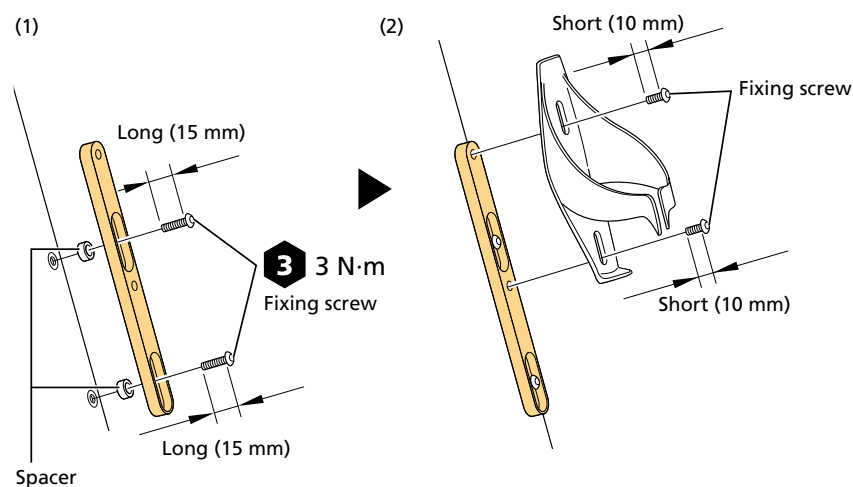
Refer to step [4](#) of "When the wiring to the battery is external."

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 - 50 mm using the bottle cage adapter.

1. Install the bottle cage adapter.

- (1) Use the longer fixing screw 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 fixing screw 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 onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

Installing junction [B]

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

External type junction [B]

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

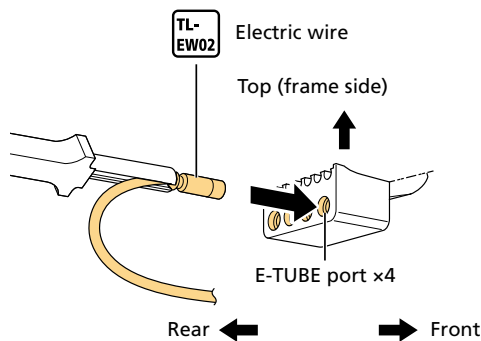
1. Check the electric wire that will be connected to junction [B].

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].

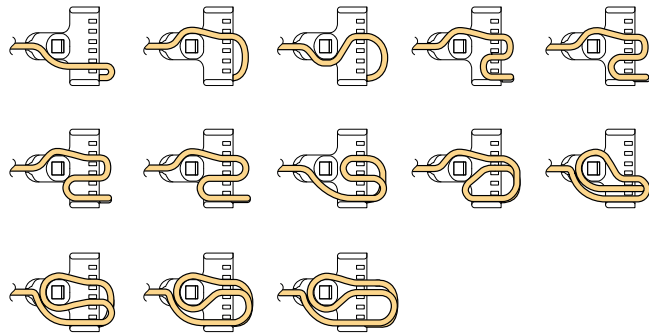
Be sure to push it in firmly until you feel a click.



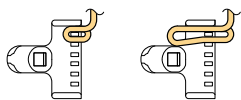
3. Adjust the excess length of the electric wire.

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

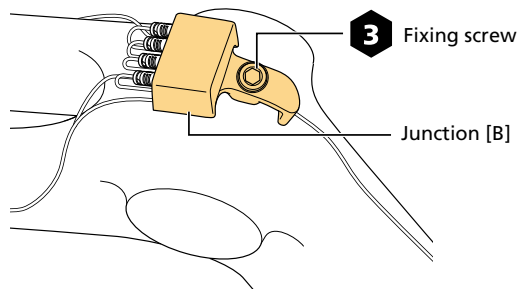
Example of adjusting the length of the electric wire to the front side



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



4. Install junction [B] to the frame.



Internal type junction [B]

NOTICE

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

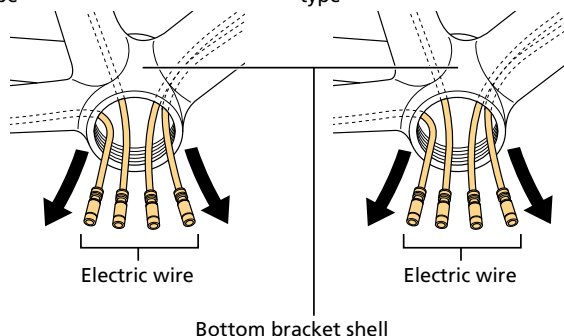
1. Check the electric wire that will be connected to junction [B].

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

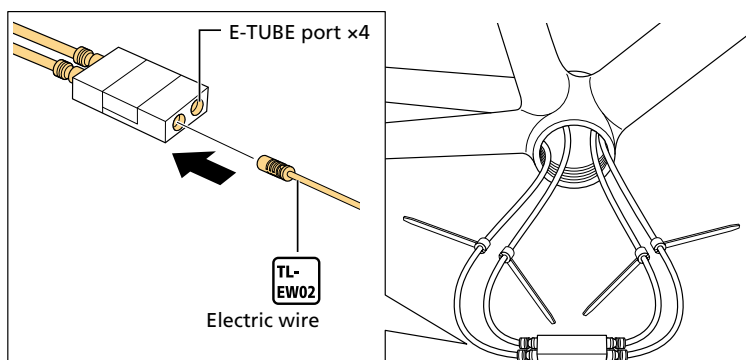
When the battery is an external type

When the battery is a built-in type



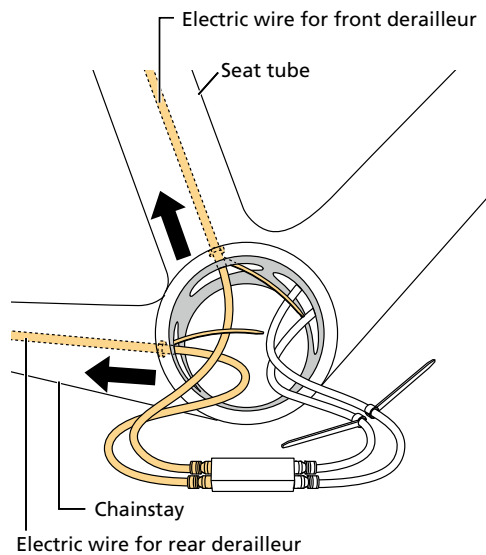
2. Connect the electric wires to the E-TUBE port on junction [B].

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

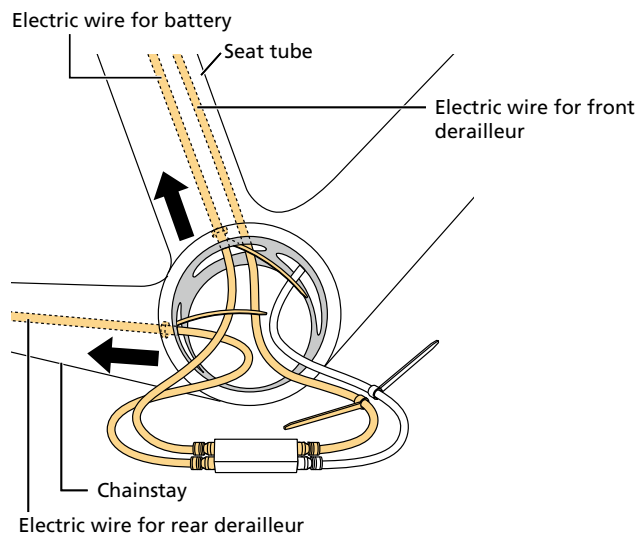


3. Pull the seat tube side and chainstay side electric wires into the frame.

When the battery is an external type



When the battery is a built-in type



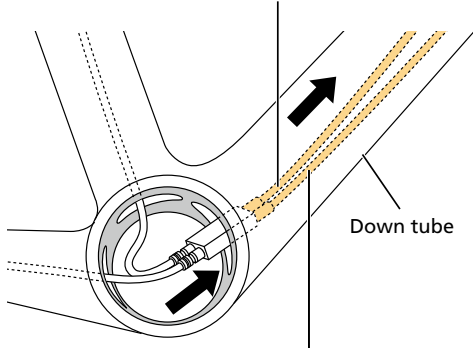
4. Pull in junction [B] toward the down tube side.

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.

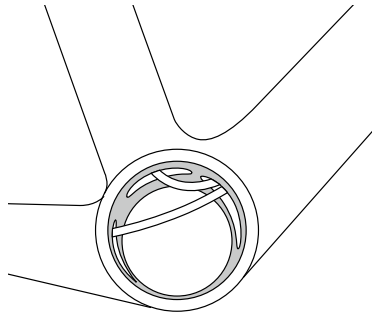
(1)

Electric wire for junction [A]



Electric wire for battery mount

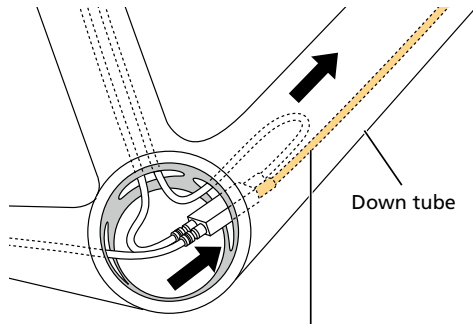
(2)



When the battery is a built-in type

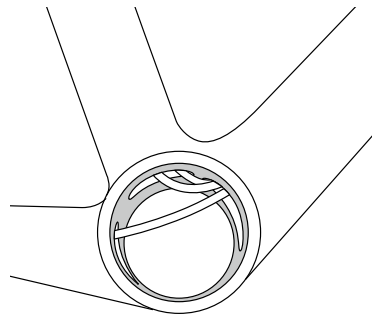
- (1) Pull in the electric wire on the down tube side.
- (2) Store junction [B] inside the down tube and arrange the wires so that only the seat tube side and chainstay side electric wires are visible inside the bottom bracket shell.

(1)



Electric wire for junction [A]

(2)



Installing the built-in type battery

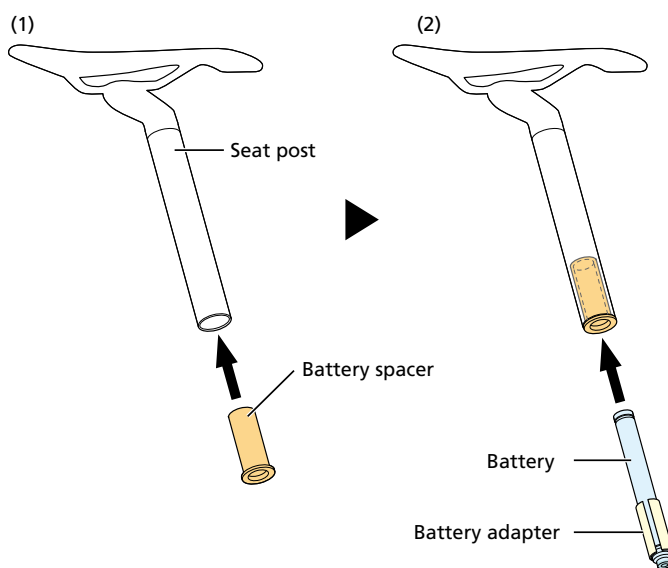
This section describes how to install the battery inside the seat post. Depending on the frame, the way the battery is installed may differ. For details, contact the manufacturer of the frame. Refer to "[Installing the external battery](#)" when installing the external battery.

TECH TIPS

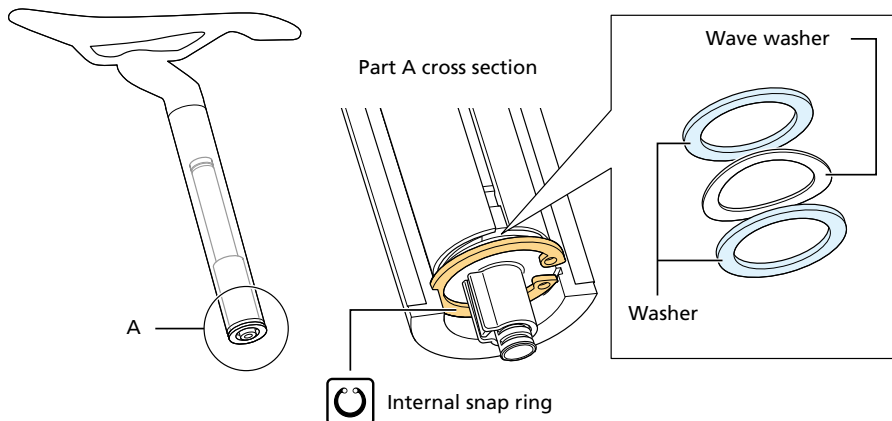
- Prepare a seat post compatible with Di2 (SM-BTR2 / BT-DN110 / BT-DN110-A). If you have any questions, consult the manufacturer of the seat post.

1. Insert the battery into the seat post.

- (1) Insert the battery spacer into the seat post.
- (2) Insert the battery into the seat post.



2. Secure the battery with the internal snap ring.

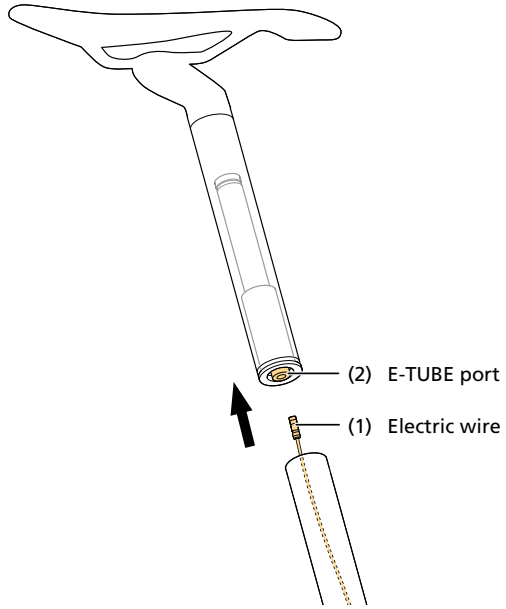


TECH TIPS

- Use internal snap ring pliers (1.8 mm) to mount the internal snap ring.

3. Connect the electric wire to the battery.

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



4. Insert the seat post into the frame.

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 derailleurs.
- (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 external battery](#) ."

CAUTION

- Make sure to remove the battery when performing a procedure at a position near the front derailleur, such as installation and removal of the crankset and front derailleur, chain installation, and length adjustment. If the front derailleur is accidentally triggered while performing a maintenance procedure, your fingers could get caught in the front derailleur and be injured.

Securing the front derailleur

Preparations

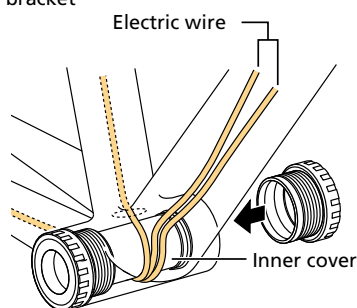
1. Install the bottom bracket and crankset to the frame.

- Refer to the [dealer's manual for the bottom bracket and crankset](#) .
- If the front derailleur interferes with the installation of the crankset, temporarily remove it to aid the installation process.

NOTICE

- Make sure the electric wires exposed in the bottom bracket shell pass around the inner cover of the bottom bracket.

Installation example to the thread type bottom bracket



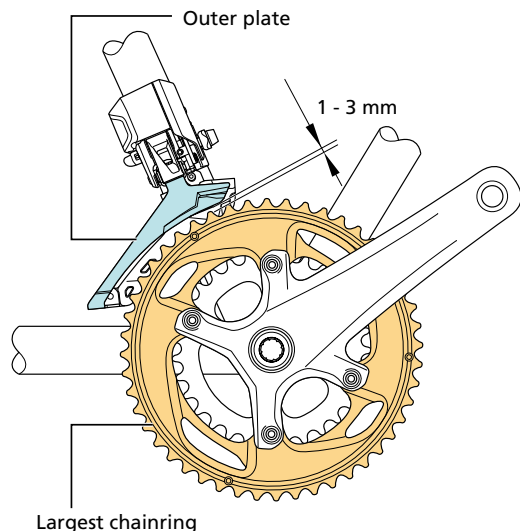
- If using a frame which does not have enough space between the inner wall of the bottom bracket shell and the inner cover to route the electric wires, use an inner cover which is sold separately.

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 gap of 1 - 3 mm between the outer plate and the tip of the tallest teeth of the largest chainring.

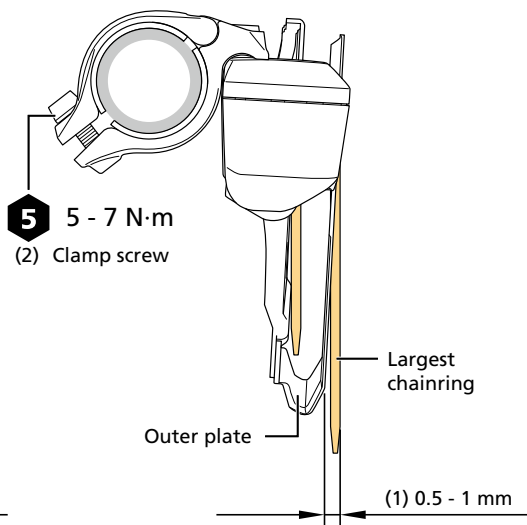
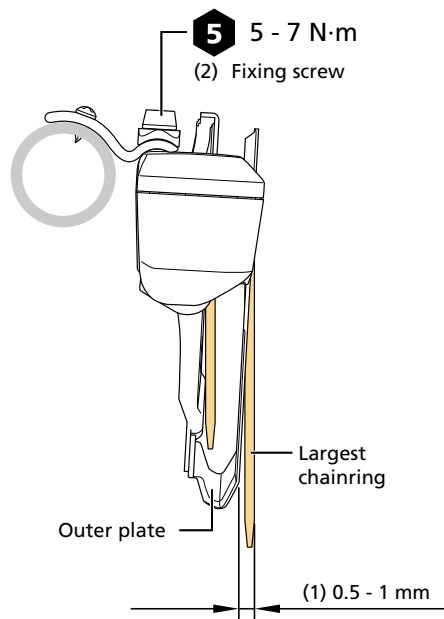


2. Adjust the installation angle and secure the front derailleur.

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

With mounting boss (direct mount)

Without mounting boss (use band adapter)

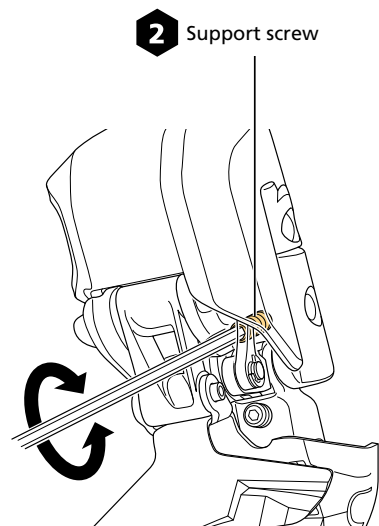


NOTICE

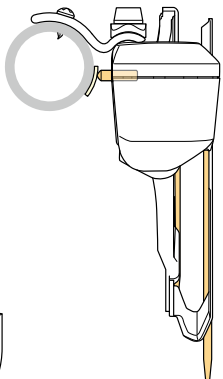
- When installing parts onto a carbon frame / handlebar, confirm the recommended tightening torque with the carbon frame or handlebar manufacturer. This will prevent damage to the frame/handlebar due to over-torquing or inadequate securing of the components.

3. Readjust the position of the outer plate.

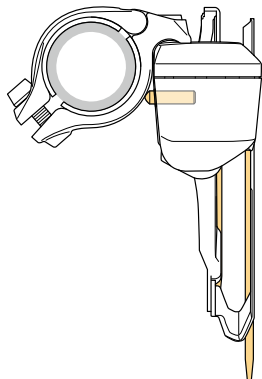
Adjust the support screw so that the flat surface of the outer plate is aligned with the surface of the largest chainring. Make sure that the support screw is in contact with the support plate or the band adapter.



With mounting boss
(direct mount)

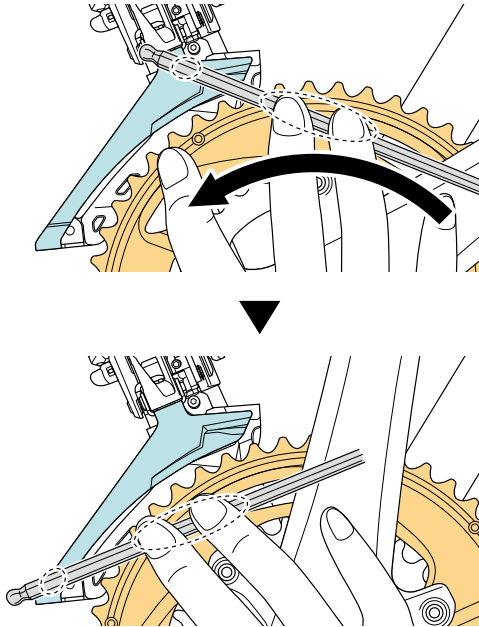


Without mounting boss
(use band adapter)



4. Check the installation position.

As shown in the figure, hold a tool such as a hexagon wrench against the flat surface of the largest chainring and make sure that the outer plate of the front derailleur is installed so that it is parallel with the chainring.



Installing the disc brake rotor

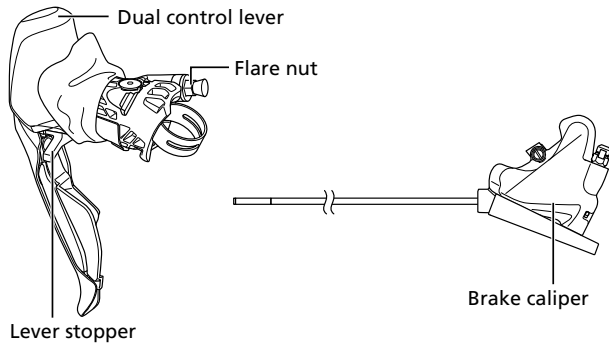
Refer to the [dealer's manual for the wheel set \(disc brake\)](#) to install and remove the disc brake rotor.

Installing the brake calipers

Refer to the [dealer's manual for the hydraulic disc brake / dual control lever](#) to install and remove the brake caliper.

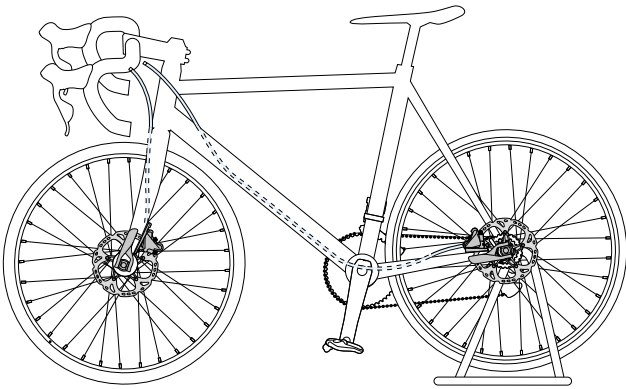
Installing the brake hose

Overview of the easy hose joint system



Checking the length of the hose

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



NOTICE

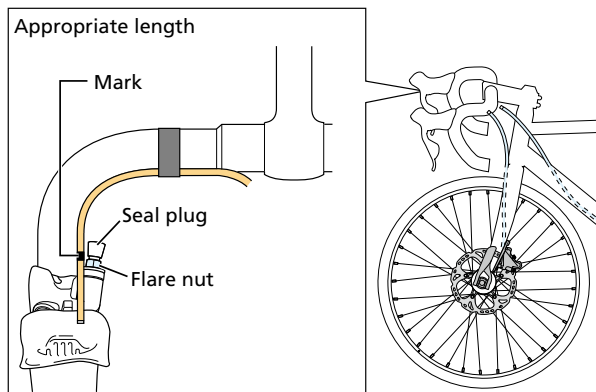
- This figure is only for explanatory purposes. For details on how to route the brake hoses, consult the manufacturer of the bicycle or refer to the bicycle's manual.

2. Check the appropriate length of the brake hose.

Secure the lever in the position used when riding.

Check the mark on the brake hose with the edge of the brake lever flare nut.

- * 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.

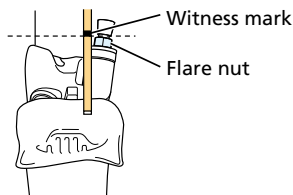


Cutting the hose

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

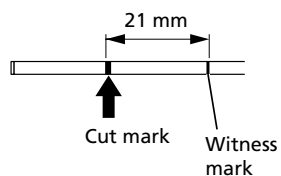
1. Determine the appropriate length and add a witness mark on the brake hose.

Add the witness mark so it is aligned with the edge of the flare nut.



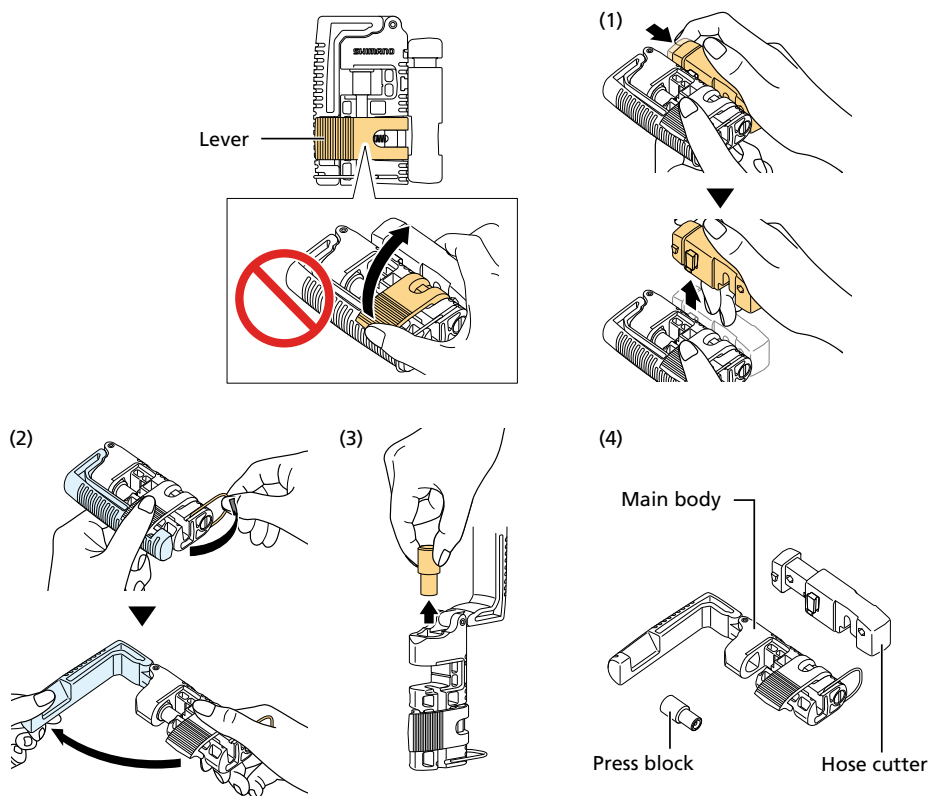
2. Add a cut mark.

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



3. Prepare tool TL-BH62 for the cutting of the brake hose.

Do not move the lever indicated in the figure before disassembling TL-BH62.

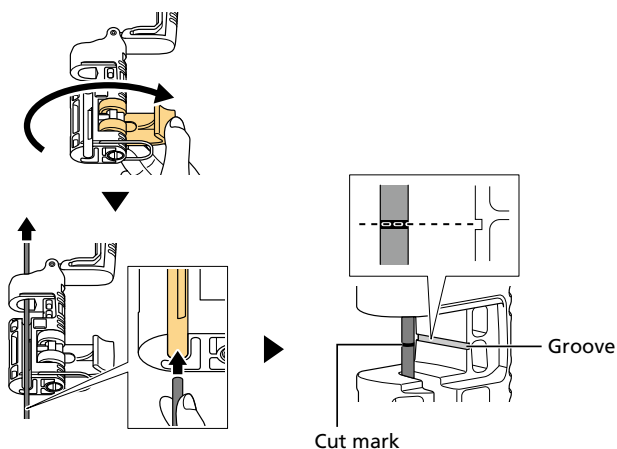


NOTICE

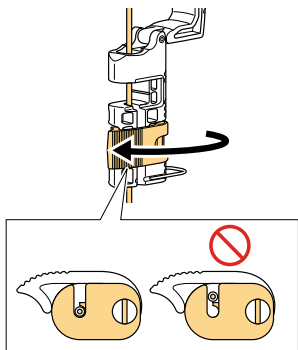
- Make sure to also refer to the manual for TL-BH62.

4. Insert the brake hose into the TL-BH62.

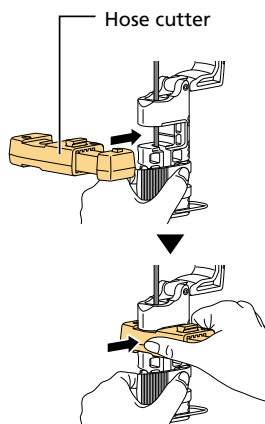
When inserting the brake hose, make sure that the cut mark is parallel with the indicator groove in the tool.



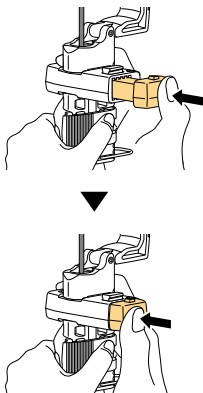
5. Check the cut location and secure the brake hose in place.



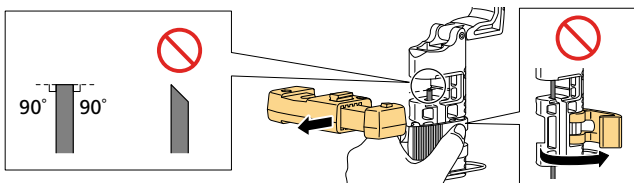
6. Check that the hose is secure, then install the hose cutter.



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

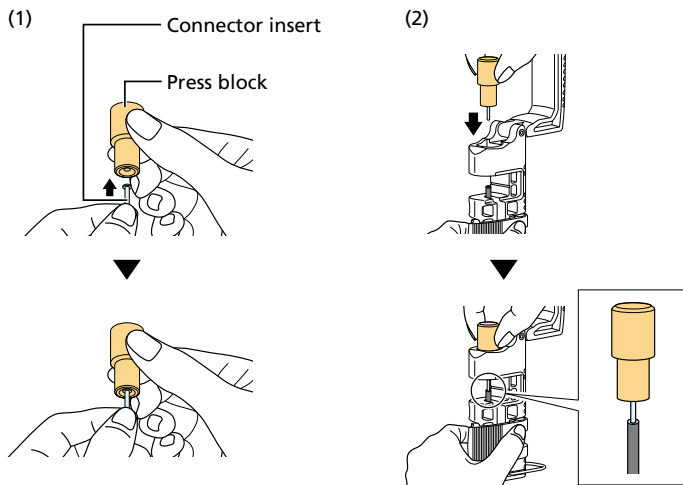


8. Remove the hose cutter and check that the cut end is even.



9. Install the connector insert in the press block, then set the press block in the TL-BH62.

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

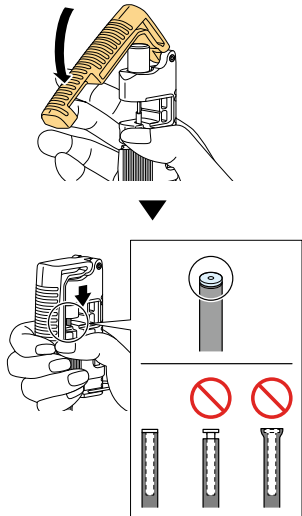


NOTICE

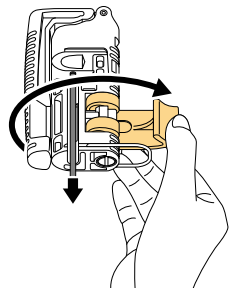
- When connecting with an easy hose joint system, a specialized Connector Insert (Y8JA98020 / color: silver) must be used. Use of any connector insert other than the specified one may lead to oil leakage and other malfunctions.

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

Check that the connector insert is installed correctly.

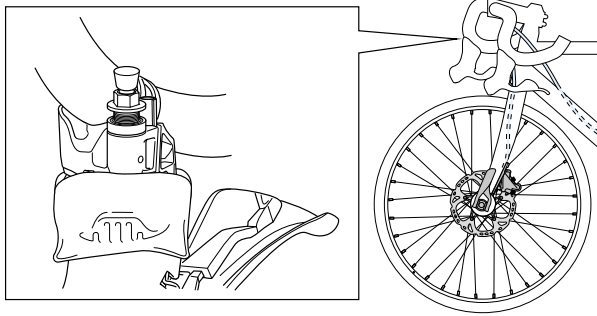


11. Remove the brake hose from the TL-BH62.



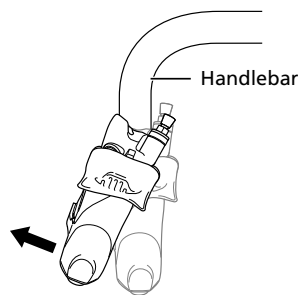
Connecting the hose

- Secure the lever with the hose connector facing up by changing the angle of the handlebar, etc.



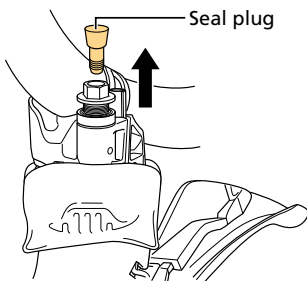
NOTICE

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



2. Remove the seal plug.

Use a clean rag to keep oil from dripping off the seal plug.

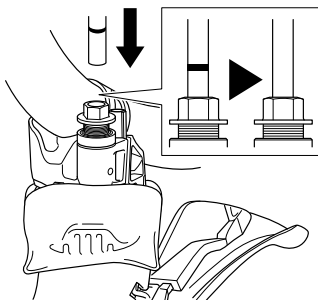


3. Insert the brake hose into the brake hose connection port.

The lever comes with a pre-installed olive. When inserting the hose, ensure it does not snag on the olive.

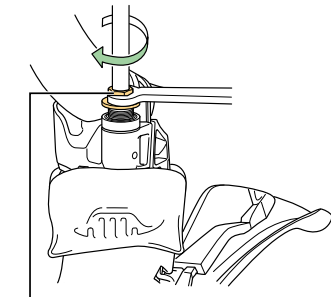
Insert hose up to the witness mark on the outer hose casing.

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



4. Tighten the flare nut with flange.

Tighten the flare nut with flange while pushing the brake hose in.



5 - 6 N·m

Flare nut with flange

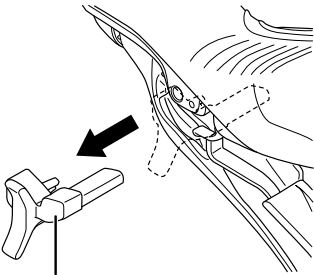
NOTICE

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

5. **Wipe away any excess oil.**

6. **Remove the lever stopper.**

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



Lever stopper

7. **Check that the pad spacer is installed on the caliper and that the disc brake rotor is between the two sides of the caliper.**

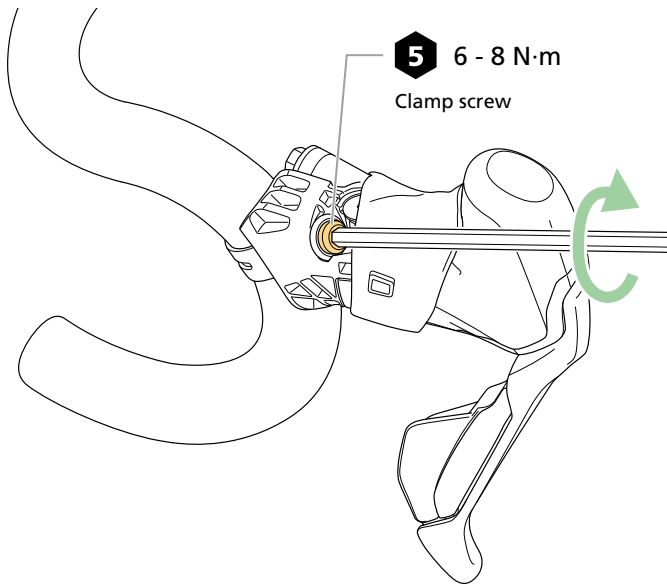
8. **Operate the brake lever several times and check that the brake pads grip the disc brake rotor and that the lever becomes stiff.**

If the lever does not become stiff, refer to " [Adding mineral oil and bleeding air](#) " and bleed the air from the system.

Securing the dual control levers

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

1. Secure the dual control levers 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 wrapping 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 [Yes] by default. Therefore, if you try to shift into gear positions that would lower the chain tension, shift switches may shift differently from the basic operations.

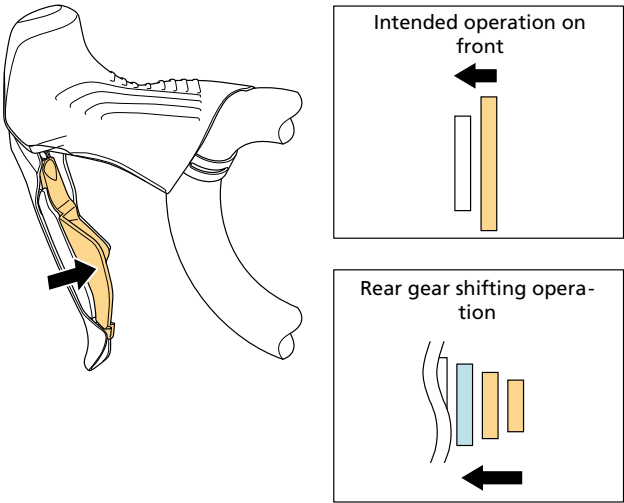
The figure below shows the gear positions that would lower the chain tension and the shifting operations performed when you shift into those gears.

Points to remember when shifting the front derailleur

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

Gear position control (during front gear shifting)

Gear position in the rear	When the front is shifted into the smallest chainring
Smallest or 2nd smallest sprocket	- The front derailleur does not shift. - Instead, the rear derailleur is shifted down through 2 gears.
Sprockets other than the smallest two	The front gear shifts to the smallest chainring (normal operation).



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.

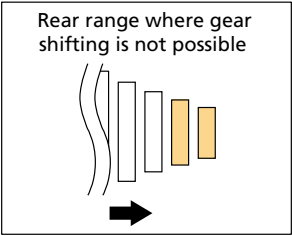
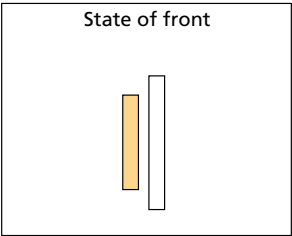
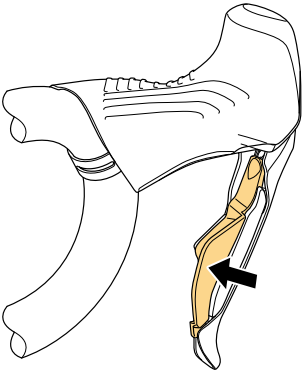
Points to remember when shifting the rear derailleur

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

Gear position control (during rear gear shifting)

How to operate
Gear position control

Gear position in the front	When the rear is shifted toward the smallest sprocket
Smallest chainring	Does not shift to the smallest two sprockets.



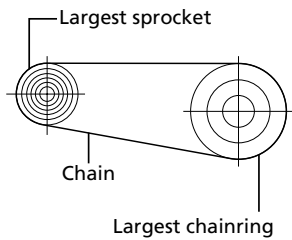
Adjustment

Installing the chain

Refer to the dealer's manual for the chain (<https://si.shimano.com/dm/CN0001/>) to find instructions on installing / removing the chain.

Checking the chain length

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



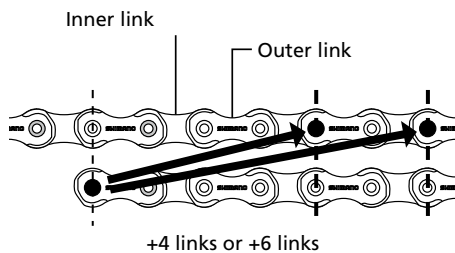
2. Check the length of the chain.

Add 4 - 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

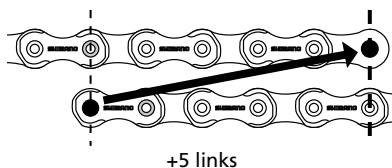
Add 4 or 6 links to set the length.

When setting the chain length with 4 links added, if you are concerned about turbulence in the drivetrain components when the chain is on the largest sprocket and largest chainring, set the chain length with 6 links added.



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

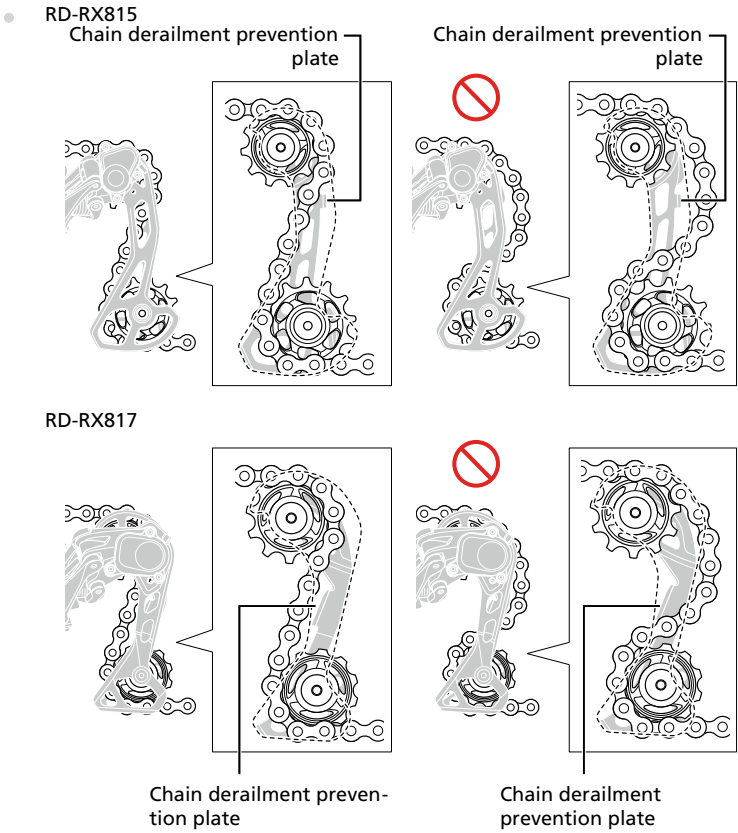
Add 5 links to set the length.



NOTICE

- The rear derailleur plate assembly is equipped with a pin or plate that prevents chain derailment. When routing the chain through the rear derailleur plate assembly, route it so that it is on the rear derailleur body 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 the rear derailleur.

Adjustment
Checking the chain length



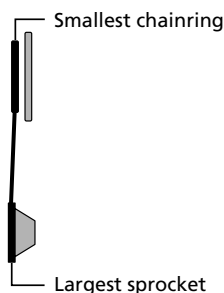
Adjusting the rear derailleur

Adjusting the B-screw

1. Install the battery.

Refer to " [Installing the external battery](#)."

2. Shift the chain to the smallest chainring and the largest sprocket.



NOTICE

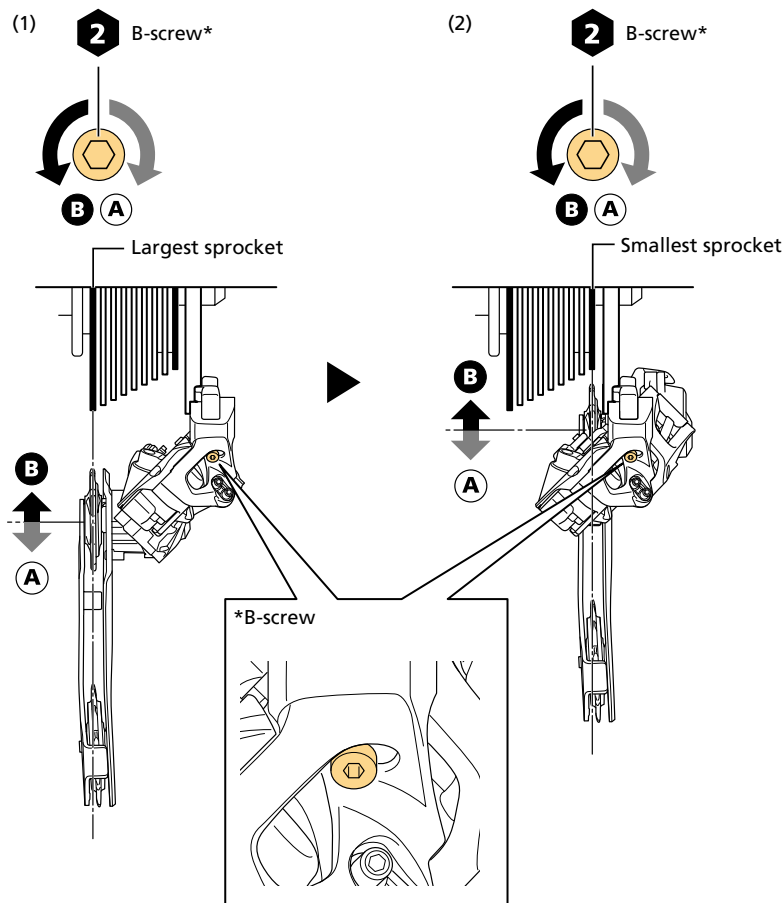
- If there is interference between the sprocket and pulley cage when gear shifting, tighten the B-screw to a position that eliminates the interference.

3. Adjust the B-screw.

- (1) Bring the guide pulley as close to the largest sprocket as possible without any turbulence between the pulley and sprocket.
- (2) Set the chain on the largest chainring and smallest sprocket. Then check that there is no turbulence between the chain and small sprocket.

* If the frame interferes with the rear derailleur, adjust by turning the B-screw until they do not interfere.

Adjustment Adjusting the rear derailleur



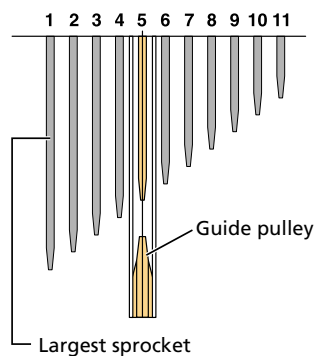
4. Turn the crank arm and shift through all the gears to ensure the shifting is smooth.

NOTICE

- Perform this adjustment again when using a cassette with a different number of teeth.

Gear shifting adjustment in adjustment mode

1. Shift to the fifth largest sprocket.



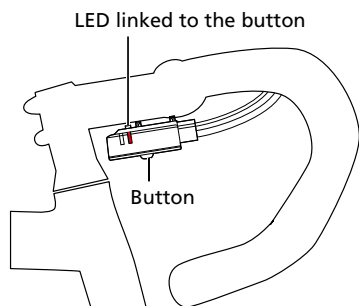
2. Switch the gear shifting system to adjustment mode.

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

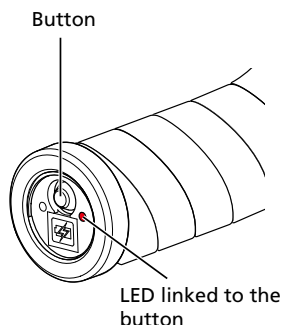
Adjustment

Adjusting the rear derailleur

For external type



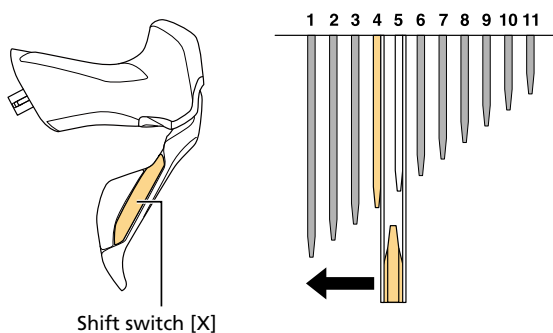
For built-in bar end or built-in frame types



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 solid 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 fourth gear and a subtle noise is heard.

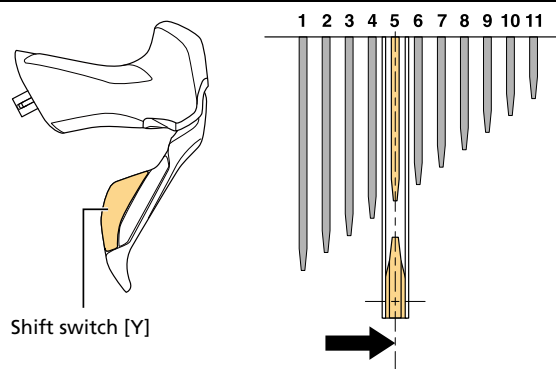


TECH TIPS

- The derailleur 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, 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.

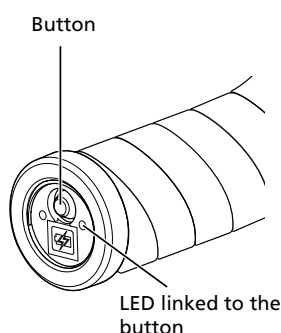
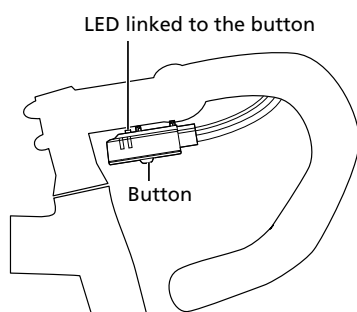


5. Switch the gear shifting system back to normal mode.

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 types



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.

If shifting is not possible for some gears even after adjustment, the gear shifting position may be misaligned.

Use E-TUBE PROJECT Professional to conduct an error check.

For details on the error check, refer to the [user's manual for E-TUBE PROJECT Professional](#).

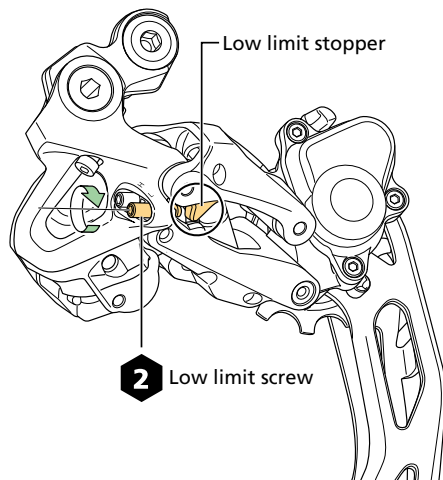
Adjusting the low / high limits

NOTICE

- The following issues may occur if the low / high limits are not properly adjusted:
 - Shifting to the smallest or largest sprocket is not possible. 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 an undue load is being placed on the motor.
 - The motor may be damaged due to overload (irreparable).

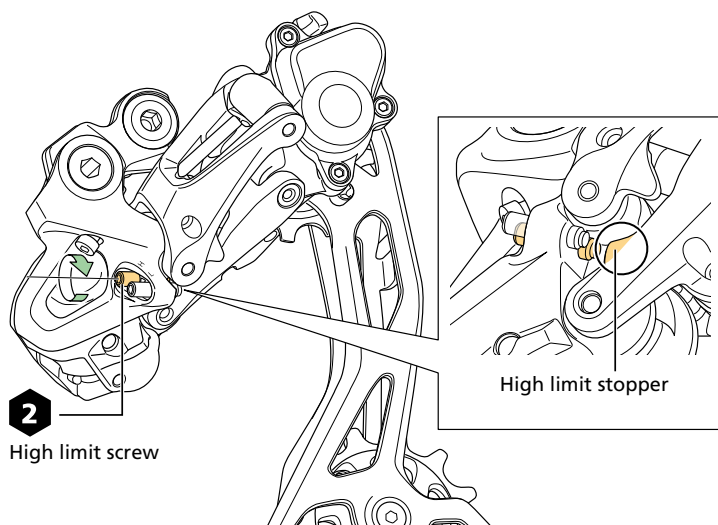
1. Adjust the low limit.

- (1) Shift the rear derailleur to the largest sprocket.
- (2) Tighten the low limit screw until it just touches the low limit stopper.



2. Adjust the high limit.

- (1) Shift the rear derailleur to the smallest sprocket.
- (2) Tighten the high limit screw until it just touches the high limit stopper.
- (3) Turn the high limit screw counterclockwise one turn from position (2) so that an over-stroke allowance can be maintained.



TECH TIPS

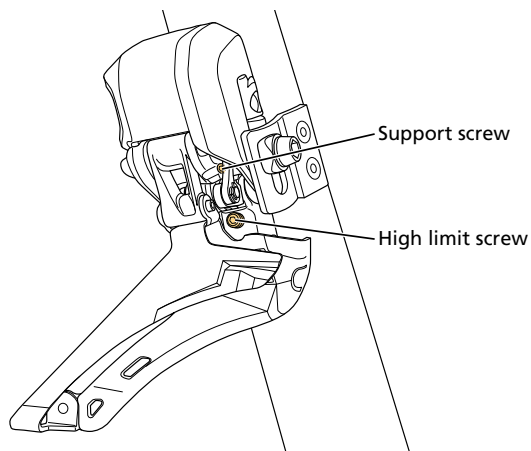
Over-stroke allowance

- When shifting from larger sprockets into smaller sprocket, the rear derailleur briefly moves past the target position towards the outside of the bicycle. This distance is referred to as the "over-stroke allowance." The derailleur then moves back and settles in the target position.

Adjusting the front derailleur

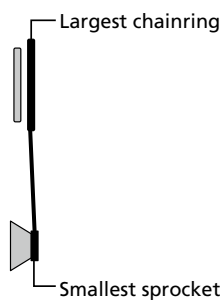
Checking screw positions

The high limit screw and the support screw are close to each other. Make sure that you are adjusting the correct screw.



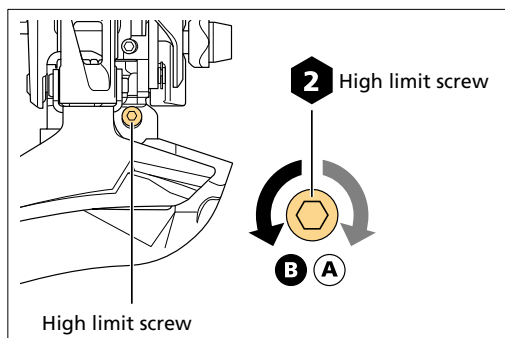
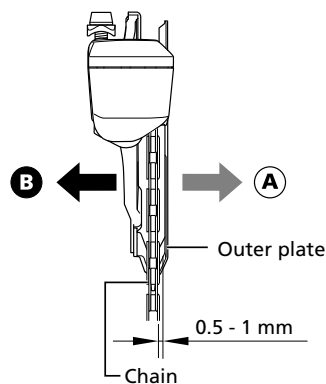
Adjusting the high limit

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



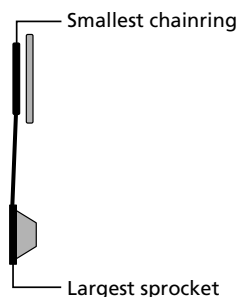
2. Adjust the gap between the chain and outer plate.

Adjust the clearance to 0.5 - 1 mm.



Adjusting the low limit in adjustment mode

1. Shift the chain to the smallest chainring and the largest sprocket.

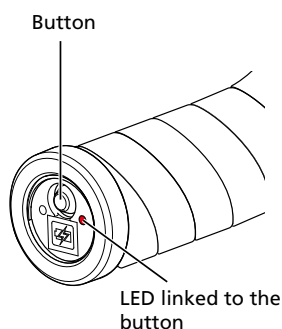
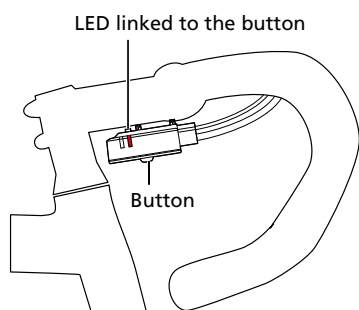


2. Switch the gear shifting system to adjustment mode.

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

For external type

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

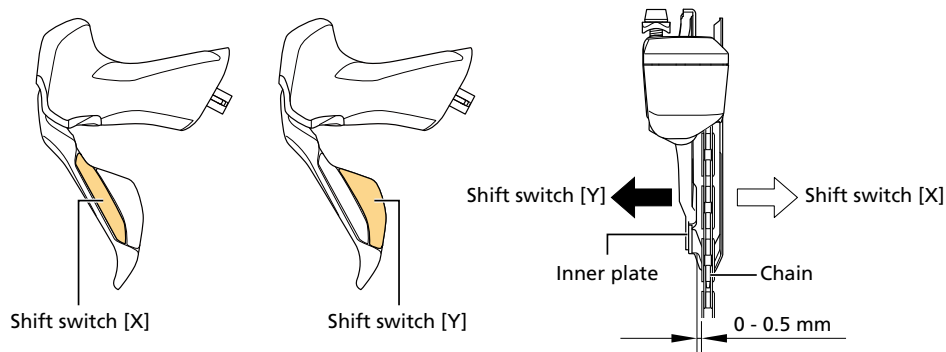


NOTICE

- 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 solid 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 gap between the chain and inner plate.

Adjust the clearance to 0 - 0.5 mm.



TECH TIPS

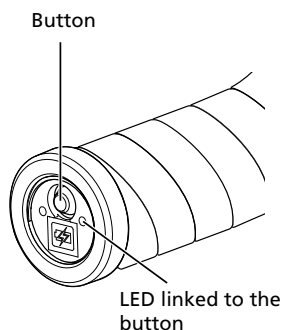
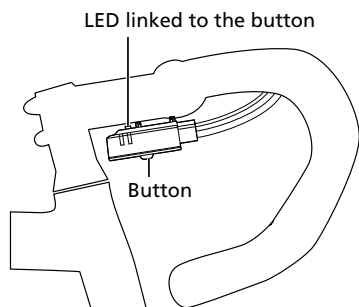
- The derailleur can adjust 18 steps inward and 18 steps outward from the initial position, for a total of 37 positions.
- In adjustment mode, the chain guide will overrun slightly then move back in an exaggerated manner so that you can check the adjustment direction. When checking the positions of the 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 types

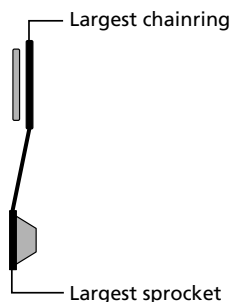


5. Shift the front derailleur and the rear derailleur to all gears to make sure that the chain does not contact the inner or outer plates.

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

Adjusting the high limit in adjustment mode

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



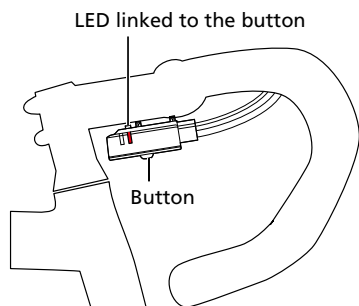
2. Switch the gear shifting system to adjustment mode.

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

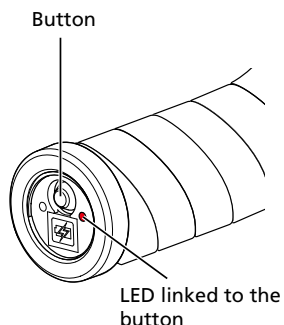
Adjustment

Adjusting the front derailleur

For external type



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

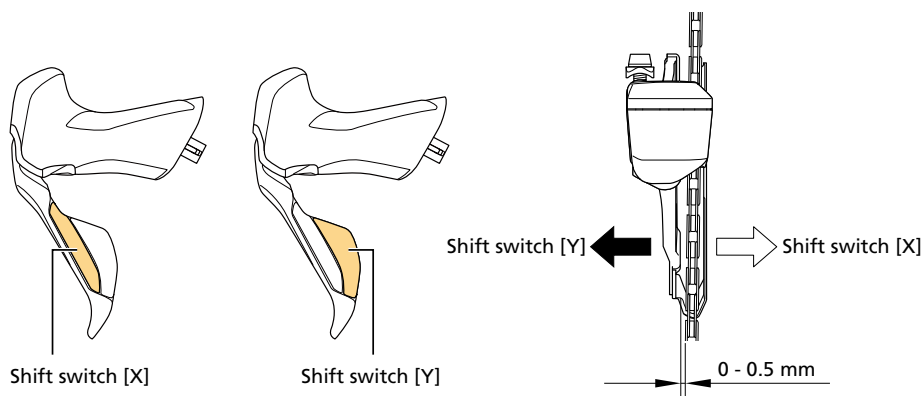


NOTICE

- 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 solid 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 gap between the chain and inner plate.

Adjust the clearance to 0 - 0.5 mm.



TECH TIPS

- The derailleur 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 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.

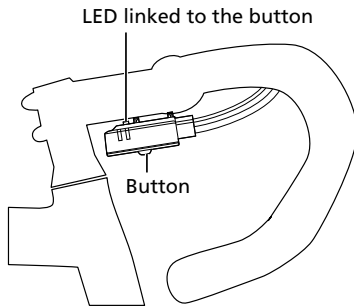
4. Switch the gear shifting system back to normal mode.

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

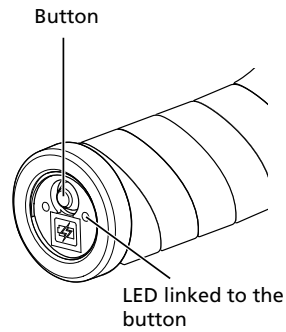
Adjustment

Adjusting the front derailleur

For external type



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



5. **Shift the front derailleur and the rear derailleur to all gears to make sure that the chain does not contact the inner or outer plates.**

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

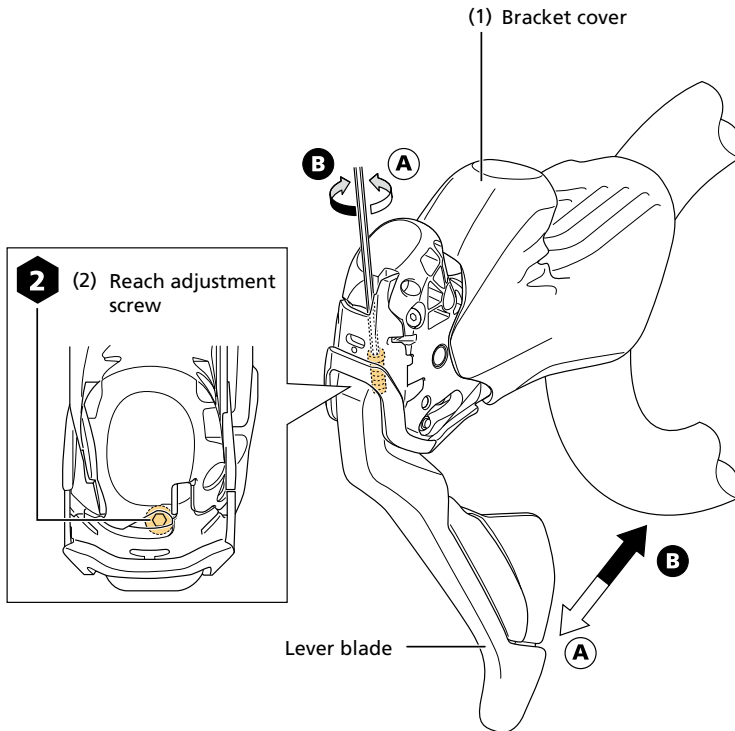
Adjusting the dual control levers

Adjusting the reach

Adjust the reach of the lever.

1. Adjust the position of the lever blade.

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



NOTICE

- Make sure that braking operates properly after the adjustment.

Adjusting the free stroke

Adjust the range (play) of travel of the lever until the brake pad and disc brake rotor come into contact. The left-hand lever is used as an example for this explanation. The free stroke adjustment screw is outside of the bracket body.

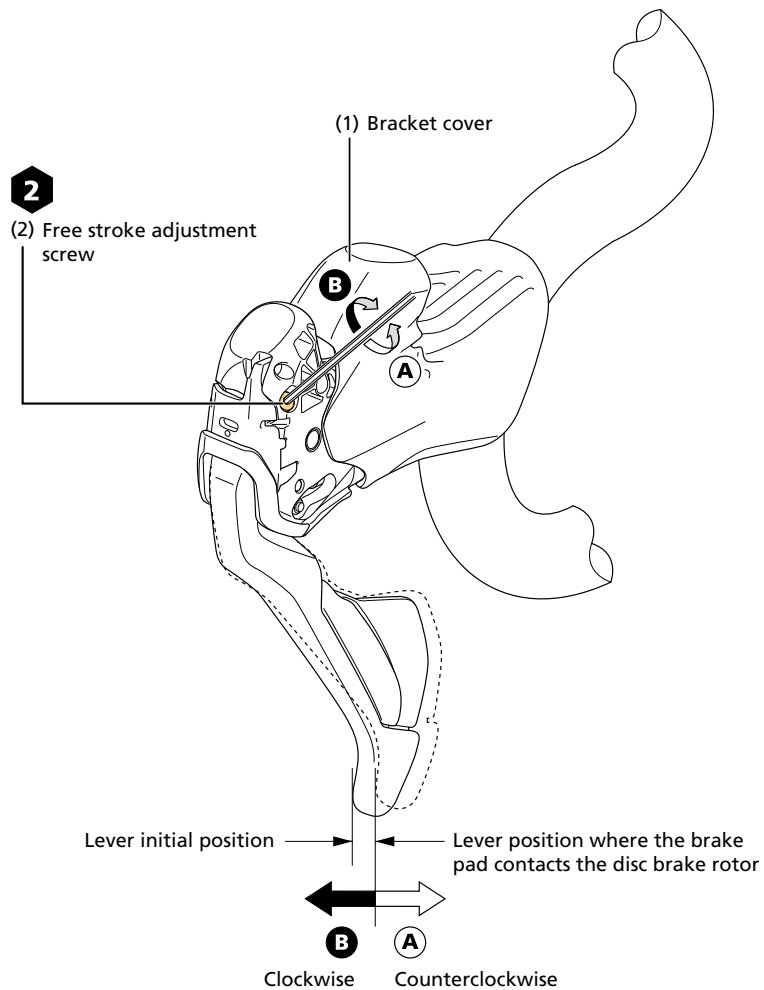
TECH TIPS

- The initial position of the brake lever changes when performing the free stroke adjustment. Therefore, also perform reach adjustment.

1. Adjust the free stroke.

- (1) Turn over the bracket cover from the front side.

(2) Adjust the stroke of the lever with the free stroke adjustment screw.



NOTICE

- Stop loosening the free stroke adjustment screw when the stroke 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

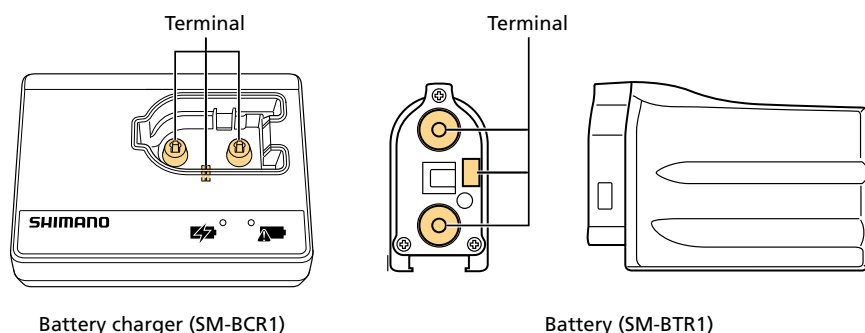
External type

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

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

NOTICE

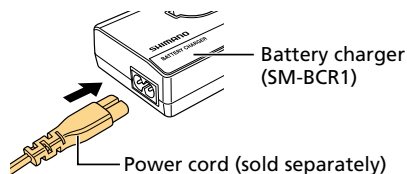
- Make sure to charge the external type battery (SM-BTR1) using the dedicated battery charger (SM-BCR1).
- If the terminals of the battery and battery charger are modified or damaged, problems with operation will occur. Be very careful when handling them.



- 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 the power cord in firmly as far as it will go.

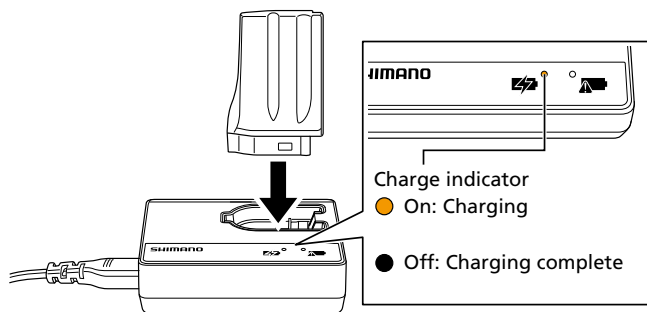


2. Connect the plug of the power cord to the electrical outlet.

3. Installing the battery to the battery charger.

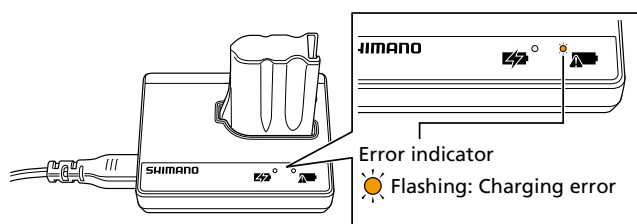
Insert the battery in firmly as far as it will go.

Charging begins when 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

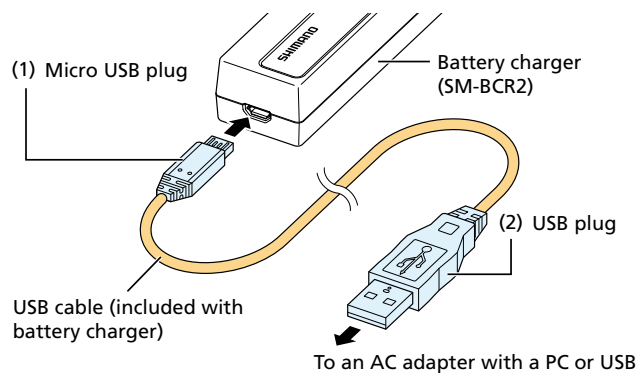
* 1 Depending on the specifications of the AC adapter, recharging via the AC adapter may require as much time (approximately 3 hours) as recharging via PC.

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.

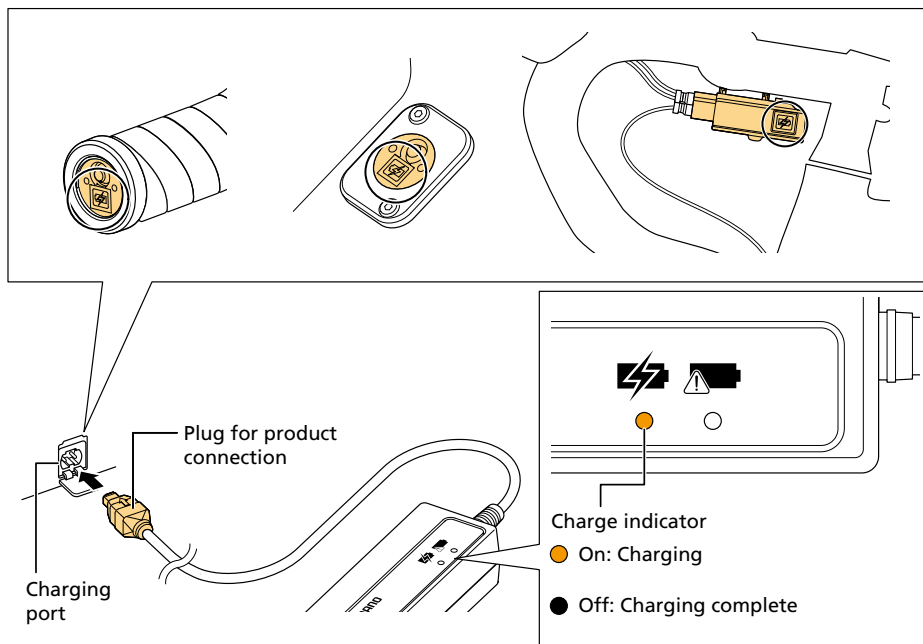
- (1) Connect the micro USB plug on the USB cable to the battery charger.
* Insert it in firmly as far as it will go.
- (2) Connect the USB plug on the USB cable to a PC or an AC adapter with a USB port.
* When using an AC adapter with a USB port, plug the AC adapter into an electrical outlet.



2. Insert the plug for product connection into the charging port on junction [A].

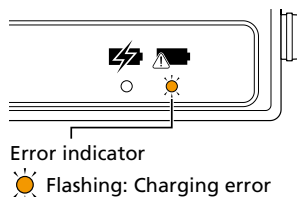
The position of the charging port differs depending on which junction [A] is used. Insert the plug for product connection in firmly as far as it will go.

Charging begins when the charge indicator lights up. When charging is complete, the charge indicator will turn off.

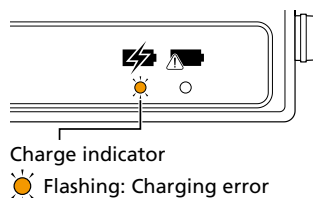


NOTICE

- If the error indicator flashes, 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 flashes, 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 1.0 A DC.
 - 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 the support website (<https://bike.shimano.com/e-tube/project.html>).

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

TECH TIPS

- The SM-PCE1, SM-PCE02 or SM-BCR2 can be used to connect the entire bicycle to a PC. To connect individual components, the SM-PCE1 or SM-PCE02 must be used.
- When using the SM-PCE1 / SM-PCE02 to connect to the entire bicycle, an SM-JC40 / JC41 and EW-SD50 wire are required if there are no unused E-TUBE ports available.
- 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 version and update them to the latest ones.

Wireless function

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 computer model. For details, refer to the owner's manual for the cycle computer.

Function

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 may be used if a Bluetooth[®] LE connection is established with a smartphone.

Items configurable in E-TUBE PROJECT

Display settings	Display time setting	Sets the time until the display turns off when the display monitor is left unattended.
Switch function setting		Modify the shift switch function settings.
Shift mode setting		Modify the shift mode (synchronized shift) settings.
Multi-shift mode setting	Multi-shifting mode 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 shift switch is pressed and held.

Shift mode setting (synchronized shift)

The shift mode can be registered in E-TUBE PROJECT to maintain the ideal front and rear gear positions by synchronizing the shifting between the front and rear derailleurs.

- Up to two shift modes can be registered in E-TUBE PROJECT. For the setting procedure, refer to the user's manual for E-TUBE PROJECT.
- The shift mode can be switched by using the button on junction [A]. Consult the user's manual for junction [A] for the details of this operation.

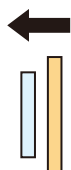
Semi-synchronized shift

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

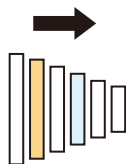
When shifting from the largest chainring to the smallest chainring

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

Front shifting functionality



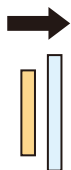
Rear synchronization shift



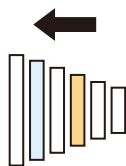
When shifting from the smallest chainring to the largest chainring

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

Front shifting functionality



Rear synchronization shift



Synchronized shift

The front derailleur automatically shifts gears in synchronization with rear derailleur gear shifting. The switching gear position for synchronized shift is configured as shown in the figure by default.

Gear position (cassette)		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 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

⚠ CAUTION

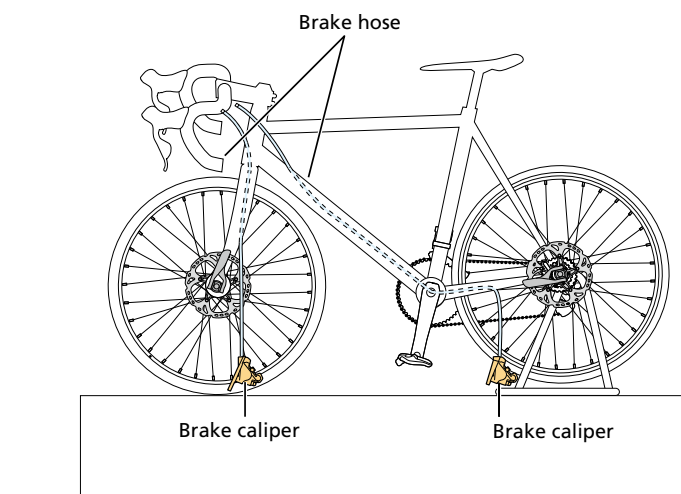
- Note the following cautions when handling SHIMANO genuine mineral oil:
 - Do not drink. May cause vomiting or diarrhea.
 - Keep out of reach of children.
 - Do not cut, let near heat, weld or pressurize the SHIMANO genuine mineral oil container. Doing so may cause an explosion or fire.
 - Disposal of used oil: Follow local county and/or state codes for disposal. Use caution when preparing the oil for disposal.
 - Directions: 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.
 - For cleaning brake hoses exposed to mineral oil, or cleaning and maintaining tools, use isopropyl alcohol or a dry cloth. Do not use commercially available brake cleaners. Doing so may cause damage to plastic parts.

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.

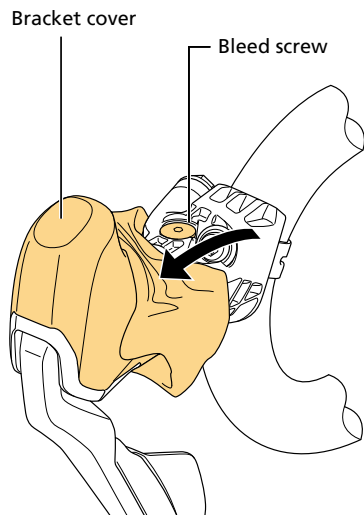
1. Position the bicycle as shown in the figure.

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

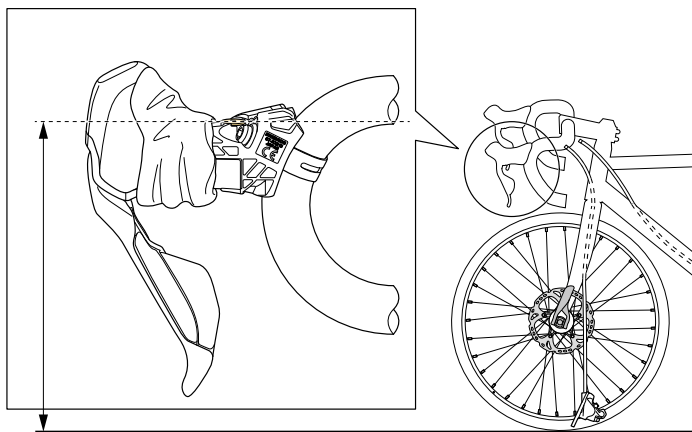


2. Turn over the bracket cover from the back side.

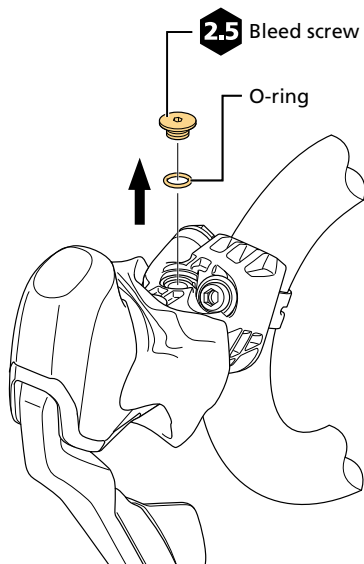
Turn it over until the bleed screw is exposed.



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.

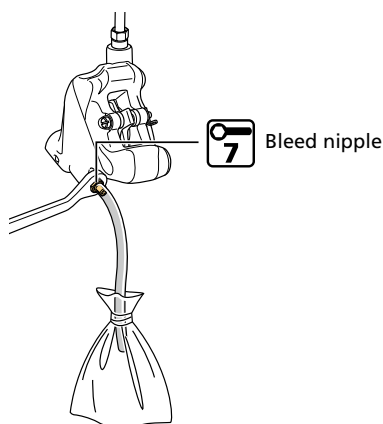


NOTICE

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

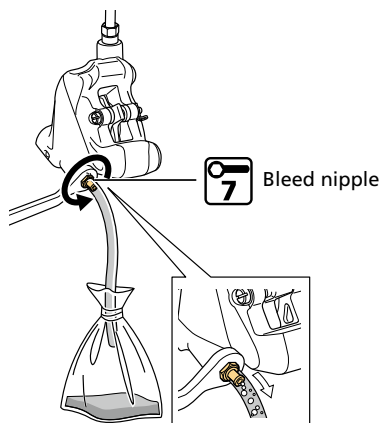
5. Install a bag and tube on the bleed nipple.

- (1) Place a 7 mm box wrench in the position shown in the figure.
- (2) Connect the tube with bag attached 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 quickly.



Adding mineral oil and bleeding air

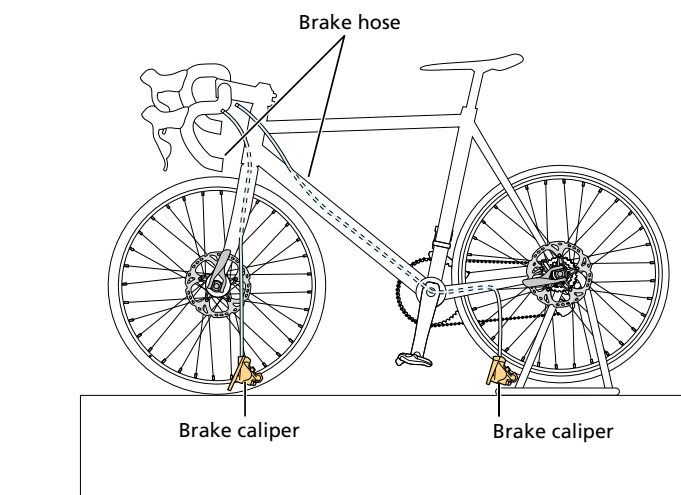
Use only SHIMANO genuine mineral oil.

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.

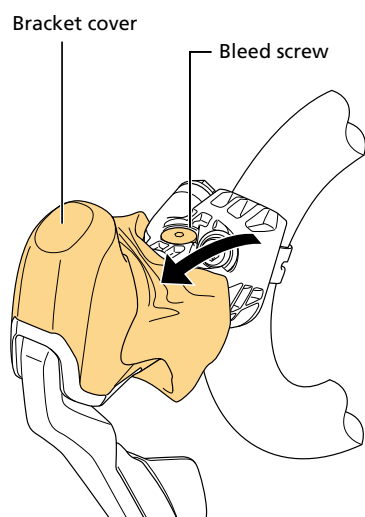
1. Position the bicycle as shown in the figure.

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

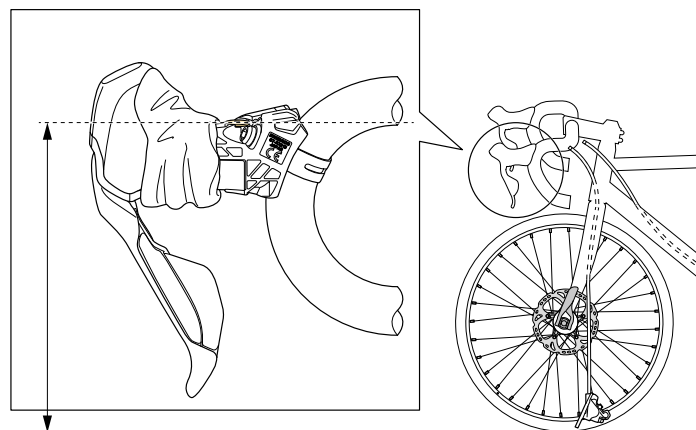


2. Turn over the bracket cover from the back side.

Turn it over until the bleed screw is exposed.

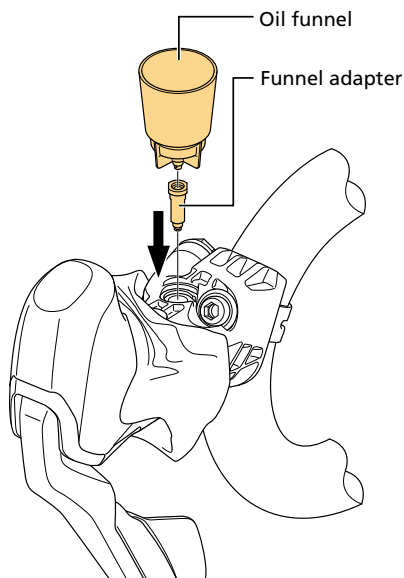


3. Set the lever in a position where the top surface of the bleed screw is parallel with the ground.



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

Attach the funnel adapter to the oil funnel.

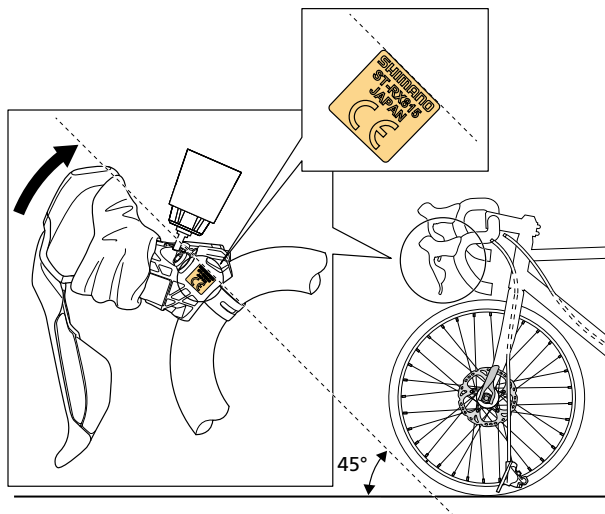


NOTICE

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

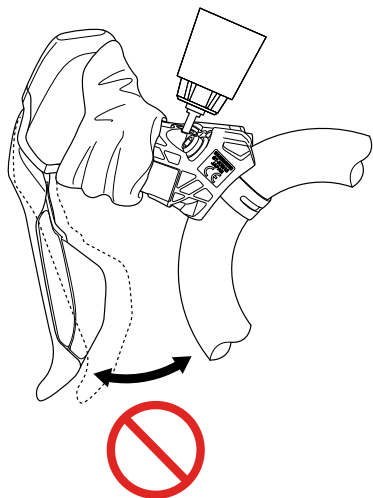
5. Set the lever in the position where the bracket is at 45°, as shown in the figure.

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

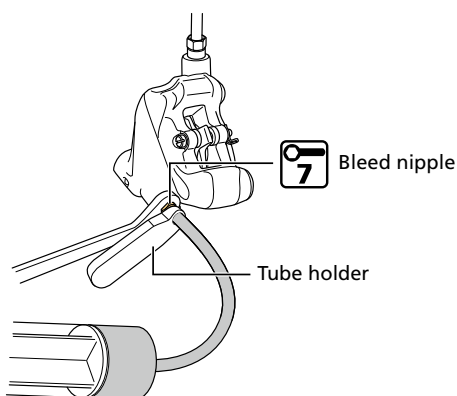


6. Inject oil from the brake caliper side.

Do not depress and release the lever repeatedly. 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. (If the lever was depressed and released repeatedly, drain out all of the oil then add the oil again.)



- (1) Place a 7 mm box wrench in the position shown in the figure.
- (2) Fill a syringe with oil, 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.

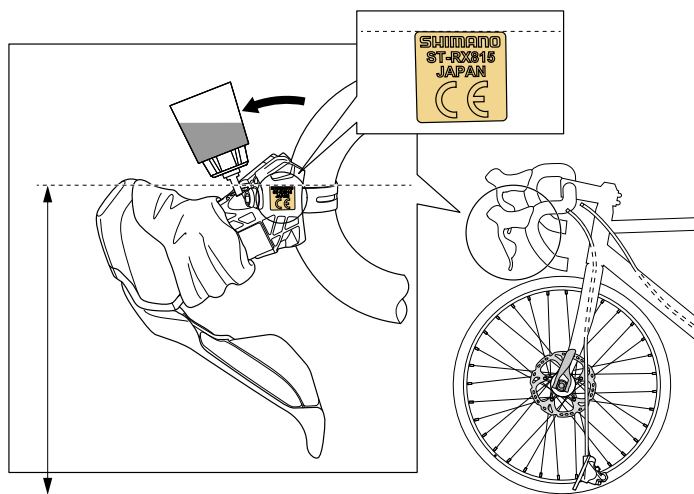


TECH TIPS

- If possible, secure the brake caliper body to prevent the tube from being accidentally disconnected.

7. Once there are no more air bubbles mixed in with the oil, set the lever in a position where the label on the bracket (highlighted in the figure) is parallel with the ground, as shown in the figure.

Perform adjustment by changing the angle of the handlebar, 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.

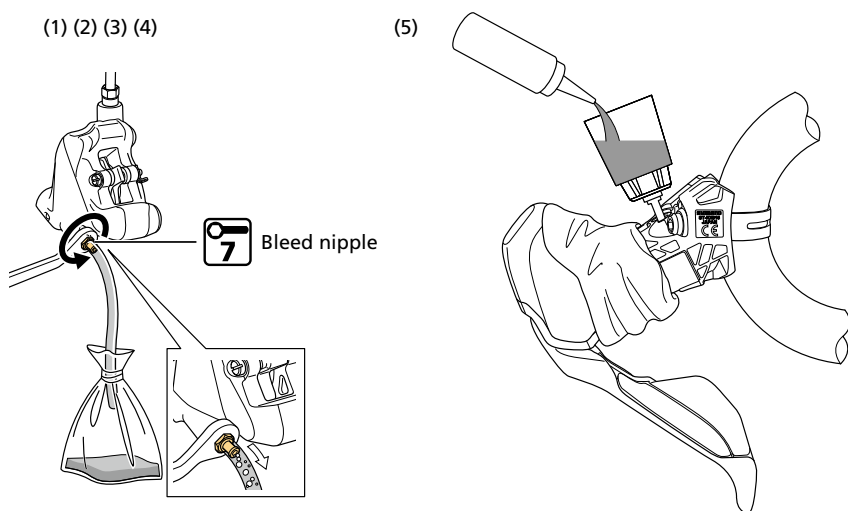
9. Remove the syringe.

Cover the end of the syringe with a clean rag to prevent spilling any oil.

10. Bleed the air.

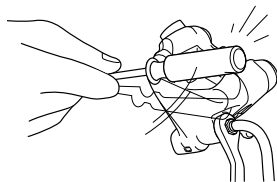
Most of the air bubbles remaining inside the brake system can be bled by performing the following operation:

- (1) Place a 7 mm box wrench in the position shown in the figure.
- (2) Connect the tube with bag attached 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) As the oil level drops in the funnel, add oil to maintain the oil level and prevent air from getting into the system.

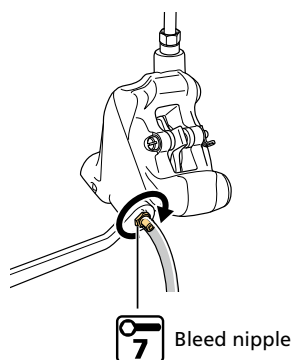


TECH TIPS

- It may help to gently shake the hose or lightly tap the lever bracket or caliper with a non-marring screwdriver handle. Changing the caliper position may also improve results.

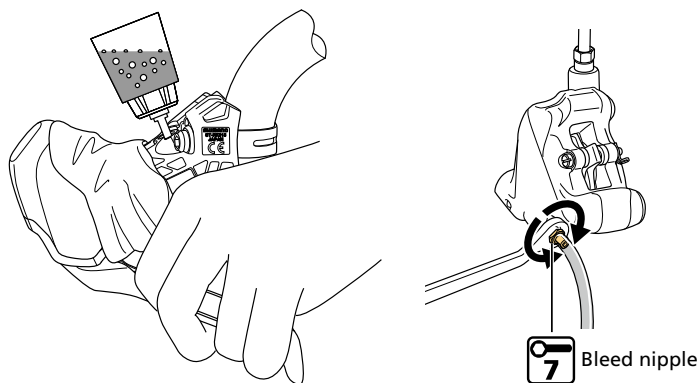


11. Once no more air bubbles come out from the bleed nipple, temporarily tighten the bleed nipple.

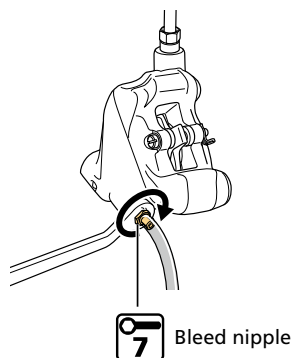


12. With the lever depressed, loosen and tighten the bleed nipple in rapid succession.

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

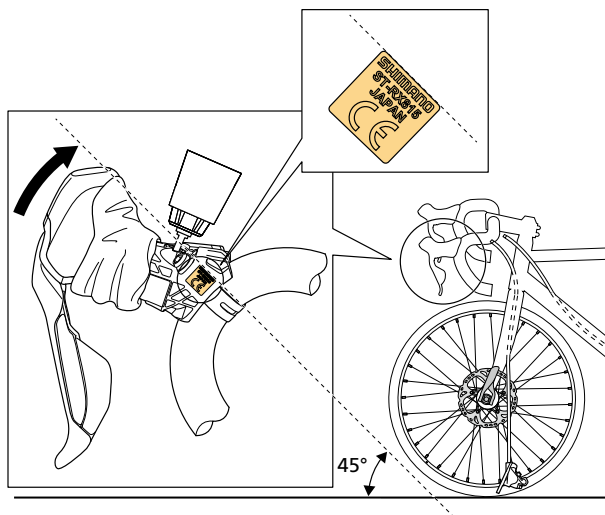


13. Repeat step 12 two to three times, then tighten the bleed nipple.



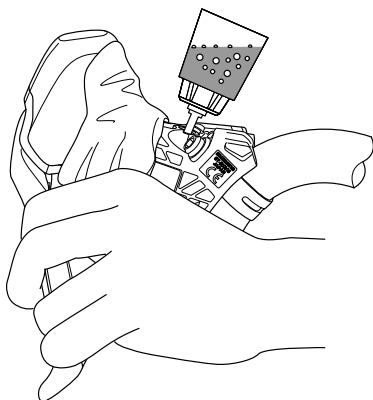
14. Set the lever in the position where the bracket is at 45°, as shown in the figure.

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



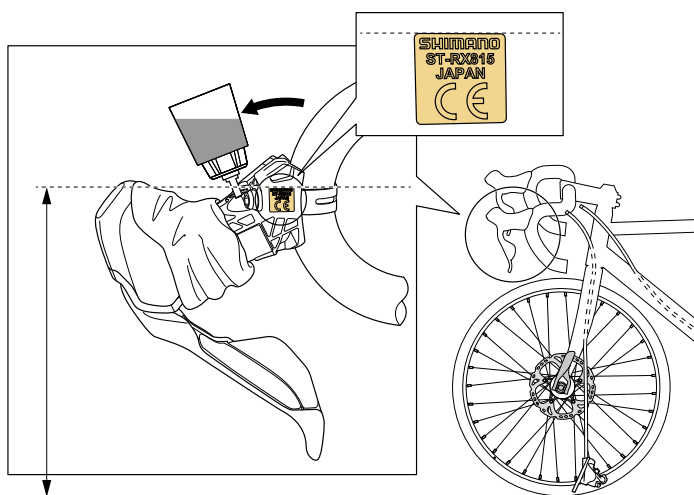
15. Operate the lever.

Slowly repeat until no more air bubbles appear.



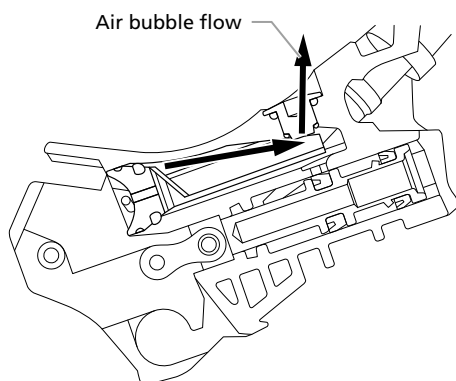
16. Set the lever in a position where the label on the bracket (highlighted in the figure) is parallel with the ground, as shown in the figure.

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



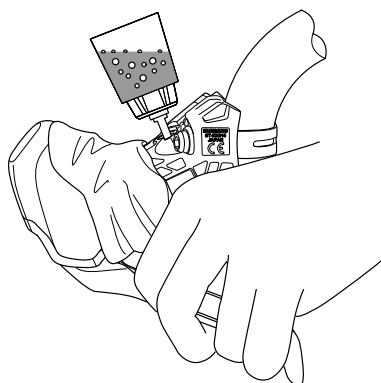
⚠ WARNING

- Make sure to set the lever to the specified position before bleeding air. If you bleed air without setting the lever to the specified position, air bubbles may remain in the brake system. Air bubbles remaining in the brake system may prevent the brakes from operating and result in serious injury due to a fall or collision.



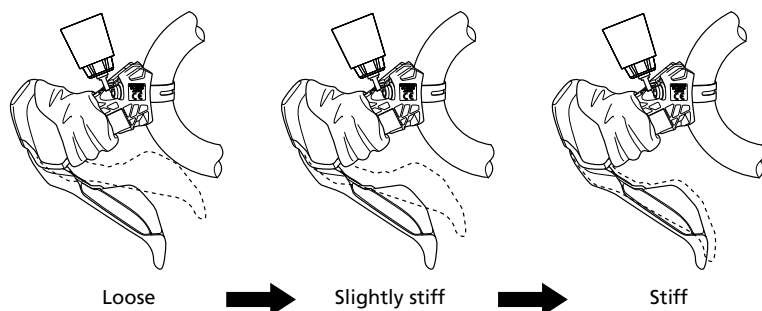
17. Operate the lever.

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



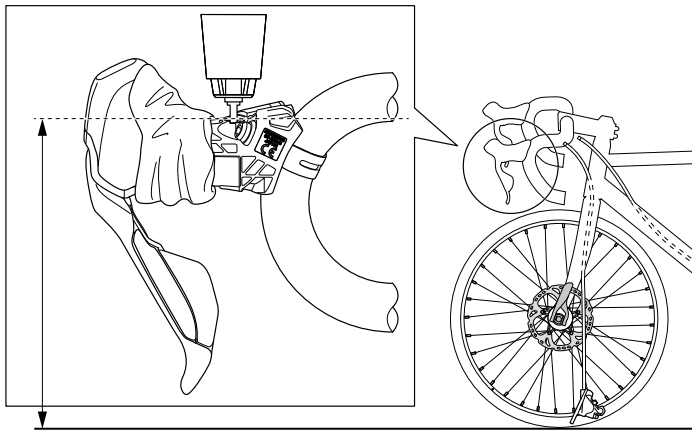
18. Operate the brake lever several times and check that the brake pads grip the disc brake rotor and that the lever becomes stiff.

If the lever does not become stiff, repeat the procedures from step [10](#).



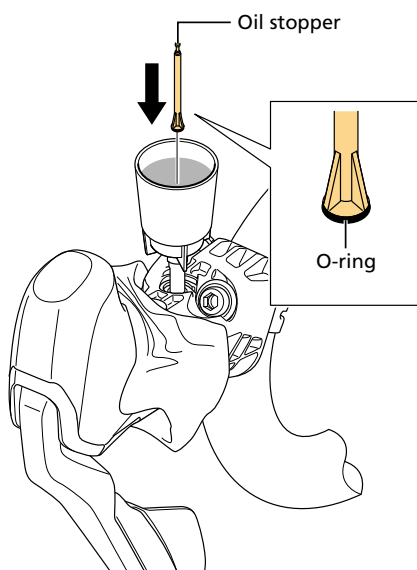
19. Set the lever in a position where the top surface of the bleed screw is parallel with the ground.

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



20. Plug the oil funnel with the oil stopper.

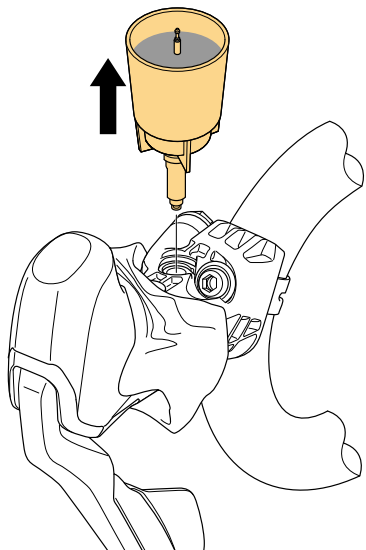
Make sure that the side of the oil stopper with the O-ring attached is facing downward.



21. Remove the oil funnel.

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

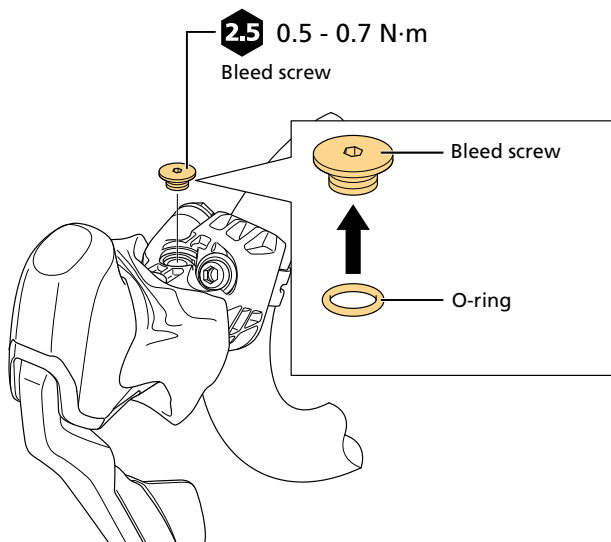
Tuck a clean rag between the bracket cover and oil port to prevent any excess oil from seeping under the bracket cover.



22. Install a bleed screw with O-ring.

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

Do not operate the brake lever. If operated, there is a risk of air bubbles entering the cylinder.



23. Wipe away any oil that has overflowed.

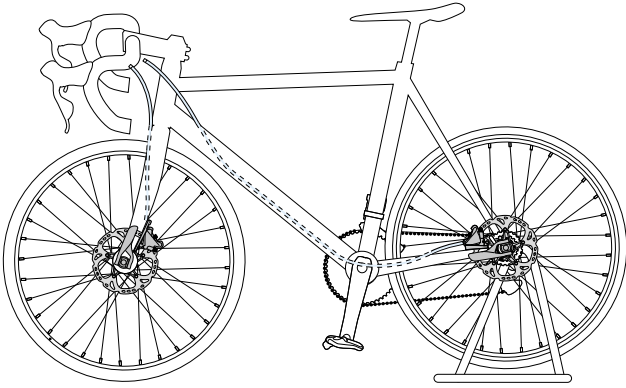


Replacing the brake hose

After replacing the brake hose, refer to “ [SHIMANO genuine mineral oil replacement](#) ” to inject the mineral oil and bleed the air from the system.

Checking the hose length and cutting the hose

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

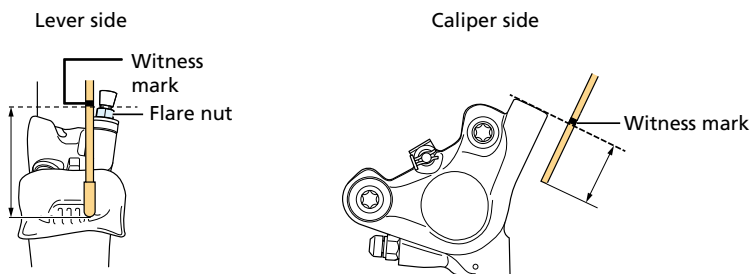


NOTICE

- This figure 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 manual.

2. After determining the appropriate length, add a witness mark on the brake hose as shown in the figure.

Add marks to both the lever side and caliper side of the hose.

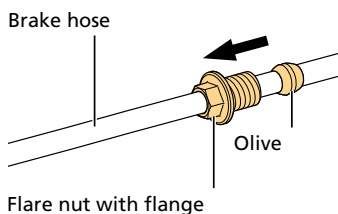


3. Cut the brake hose.

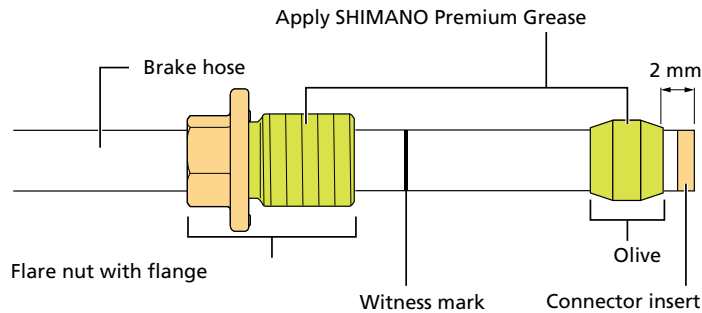
Refer to “ [Cutting the hose](#) ” in “Installing the brake hose.”

Assembly to the brake lever

1. Pass the flare nut with flange and olive over the brake hose.



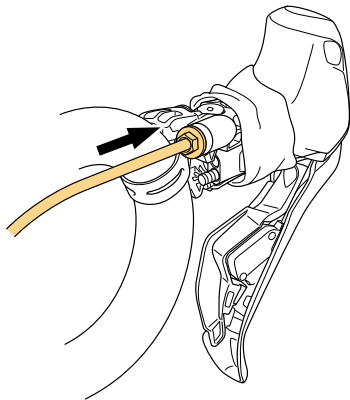
2. After checking that the olive is positioned as shown in the figure, apply SHIMANO Premium Grease as shown in the figure.



3. Install the brake hose in the lever.

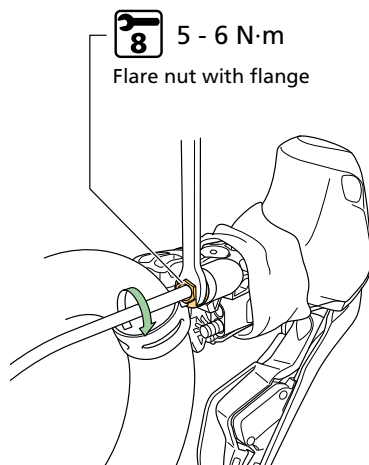
Secure the lever to the handlebar or in a vise and insert the brake hose straight.

Insert the hose up to the witness mark on the outer hose casing.



4. Tighten the flare nut with flange to the lever while pushing the brake hose.

Make sure the brake hose is straight when pushing.



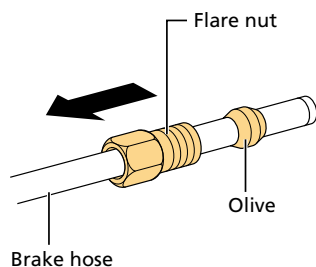
NOTICE

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

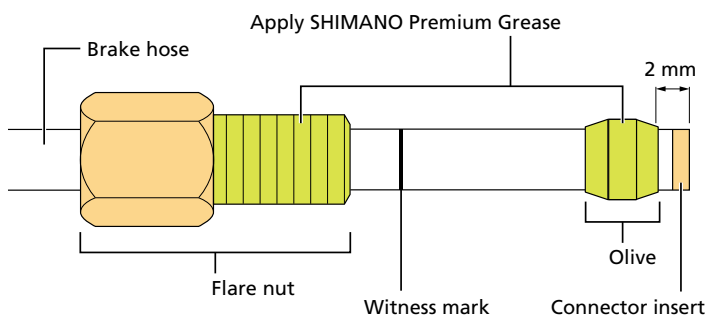
5. Temporarily attach the brake hose to the handlebar using tape, etc.

Assembly to the brake caliper

1. Pass the flare nut and olive over the brake hose in the order shown below.

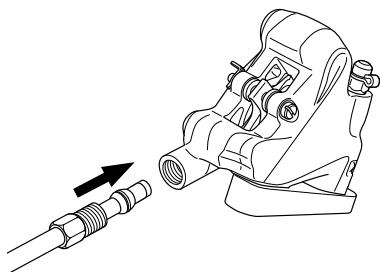


2. After checking that the olive is positioned as shown in the figure, apply SHIMANO Premium Grease as shown in the figure.



3. Install the brake hose in the caliper.

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

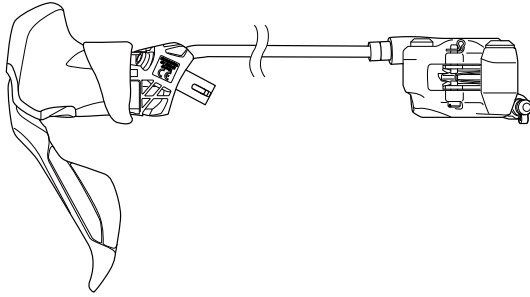


NOTICE

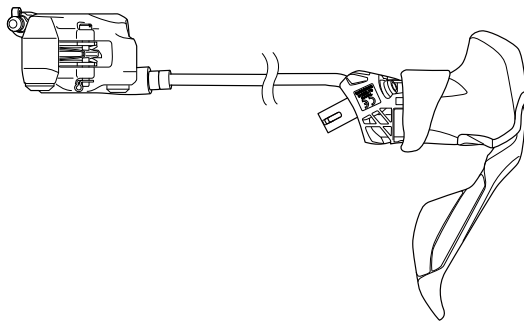
- Do not let the brake hose become twisted when installing it.

When the caliper and brake lever are not installed on the bicycle, there should be no twist in the hose if the caliper and brake lever are in the positions shown in the figure below.

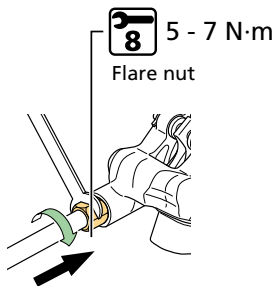
Left-hand lever



Right-hand lever



4. Tighten the flare nut while pushing the brake hose in.



Caliper piston maintenance

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.

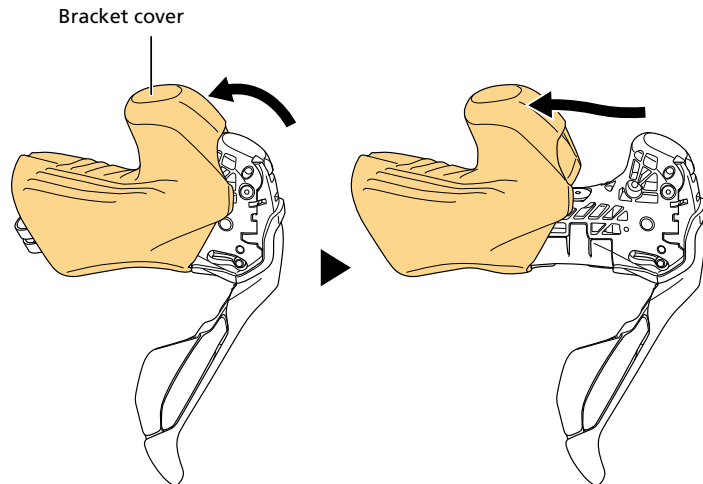
Replacing the bracket cover

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

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

2. Remove the lever from the handlebar.

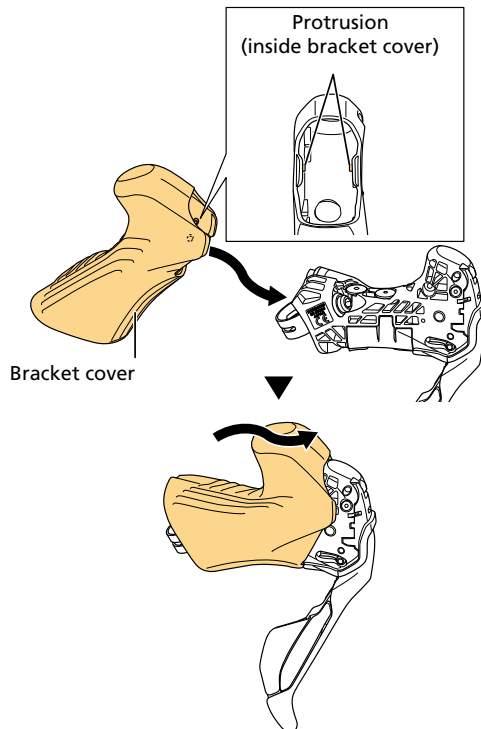
3. Remove the bracket cover.



4. Install a new bracket cover.

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

The inside of the bracket cover has a marking indicating the left side or right side.



TECH TIPS

- It is easier to perform installation if isopropyl 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.

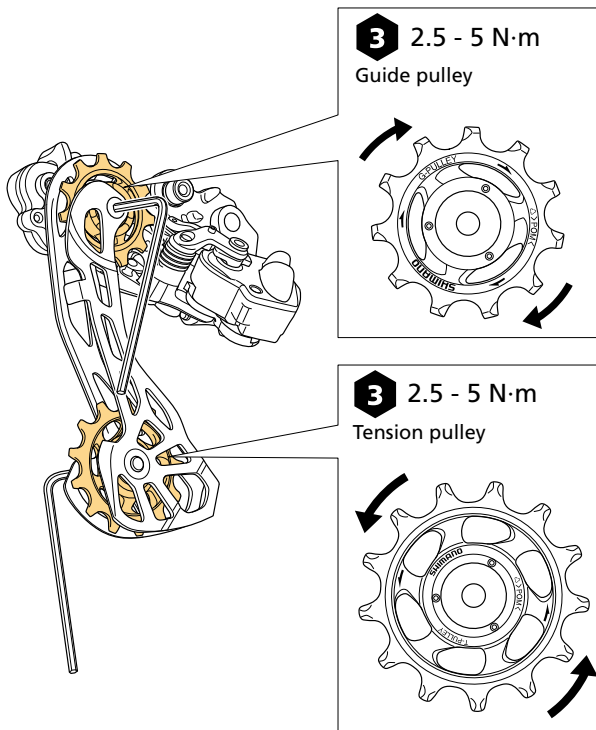
NOTICE

- A new olive and connector insert are 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 / tension pulley.

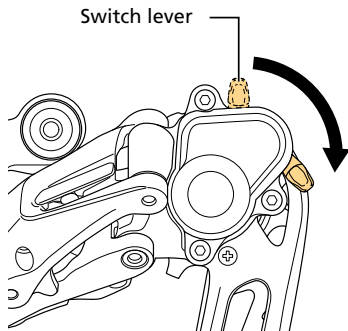
When installing the pulleys, check the direction of the arrows on them (the rotation direction of the pulleys when the crank is turned in the forward direction).



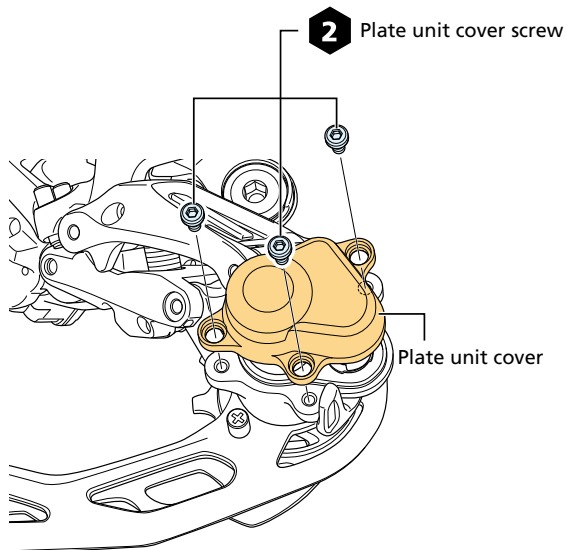
Applying grease to the chain stabilizer

If there is a noticeable change in friction in the chain stabilizer assembly, or if it starts to make noise, you may need to add grease to the chain stabilizer.

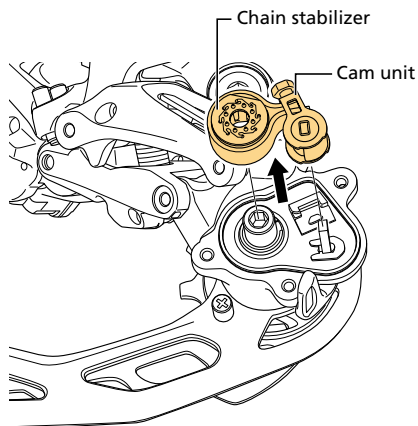
1. Set the switch lever in the OFF position.



2. Remove the plate unit cover.

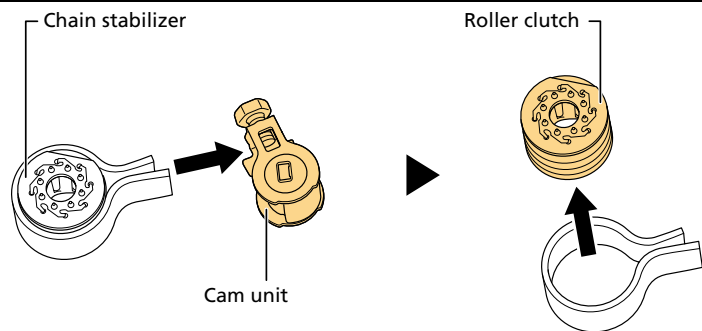


3. Remove the chain stabilizer and cam unit.

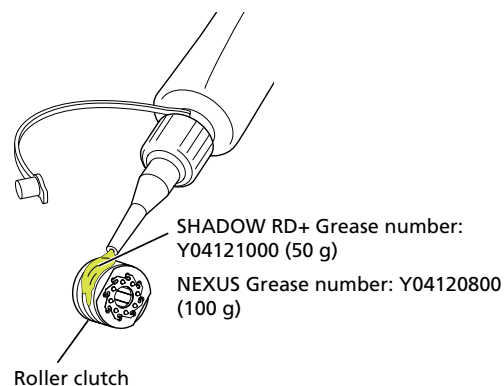


4. Disassemble the chain stabilizer as shown in the figure.

- (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.

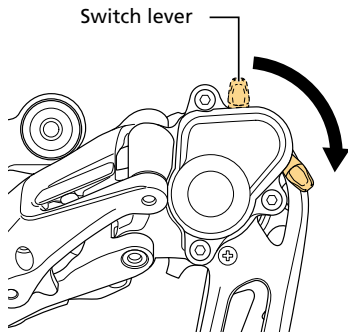
- For installing the chain stabilizer and cam unit, refer to step [5](#) in "Installation" in "Replacement of the plate and the P-tension spring."
- For installing the plate unit cover, refer to step [6](#) in "Adjusting friction."

Adjusting friction

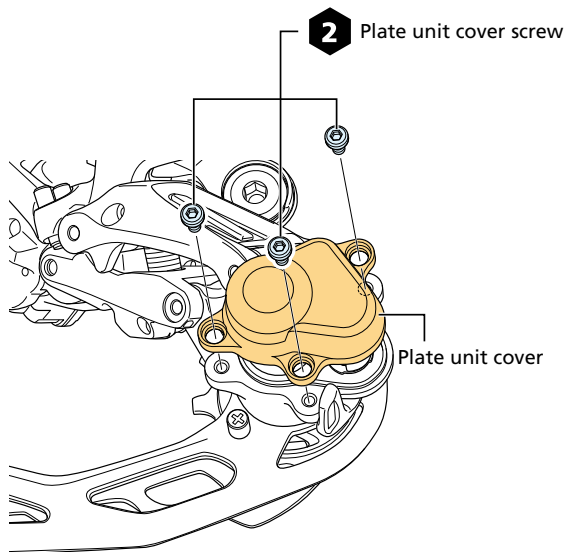
The level of friction can be adjusted as desired. Furthermore, the friction can also be adjusted when it changes during use.

RD-RX815

1. Set the switch lever in the OFF position.

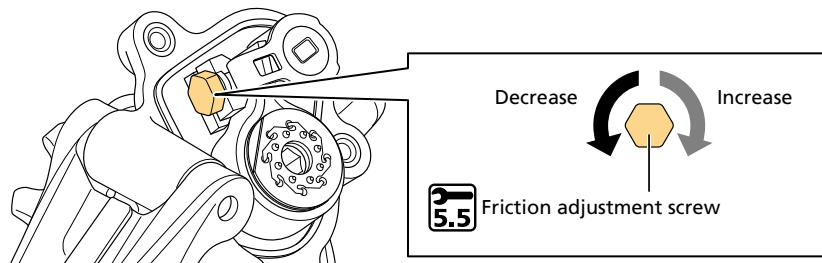


2. Remove the plate unit cover.



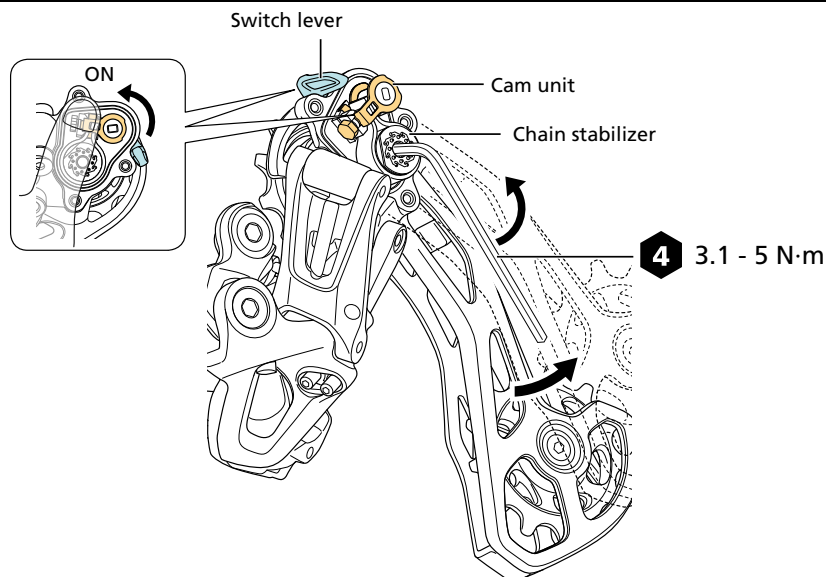
3. Adjust the friction.

RD-RX815



4. Check the friction torque.

Use your finger to hold the cam unit securely in place, then set the switch lever to the ON position and check the friction torque.

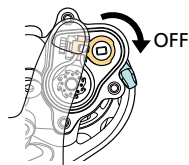


NOTICE

- 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.

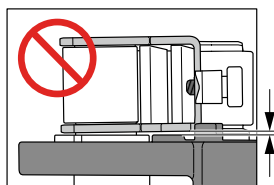
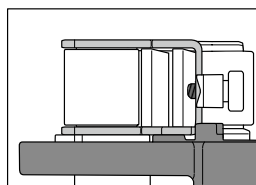
5. Set the switch lever in the OFF position.

Set the switch lever to the 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.

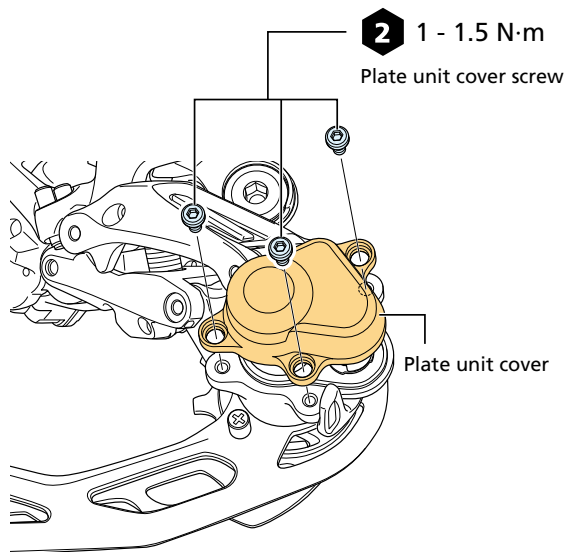


NOTICE

- Do not install the plate unit cover if the plate unit is not fully seated against the switch base. This may result in insufficient sealing, which can lead to corrosion and malfunction of the chain stabilizer assembly.



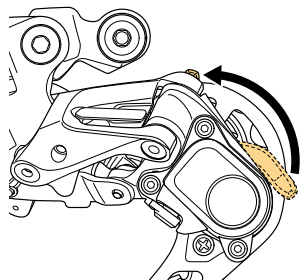
6. Install the plate unit cover.



RD-RX817

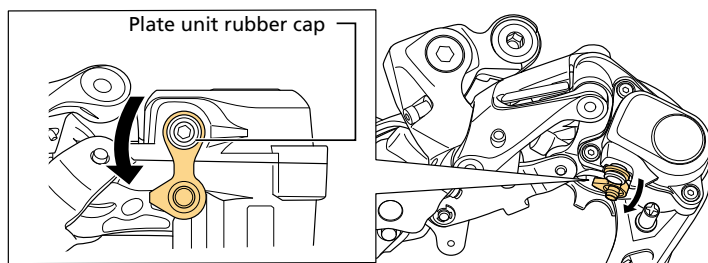
The friction can be adjusted for RD-RX817 without removing the plate unit cover.

1. Set the switch lever in the ON position.



2. Open the plate unit rubber cap.

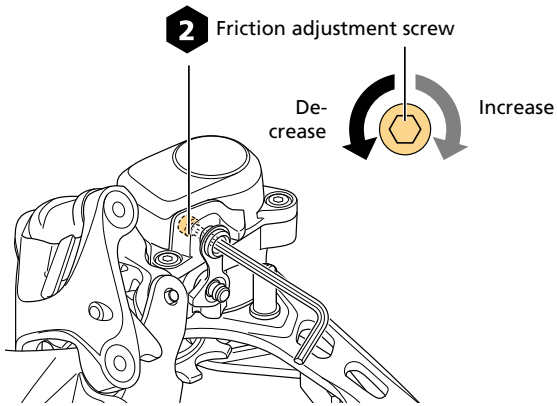
The plate unit rubber cap can be opened by hand.



NOTICE

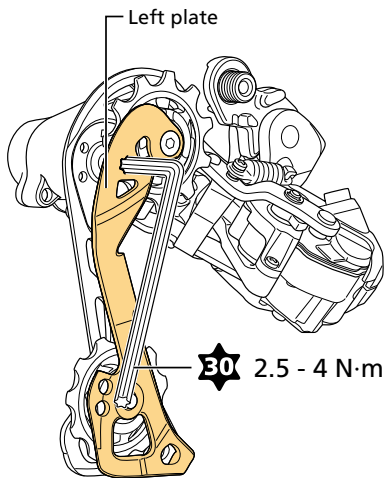
- The plate unit rubber cap can be completely removed. However, be careful not to lose it. If the cap comes off when riding the bicycle, problems with operation will occur.

3. Adjust the friction.

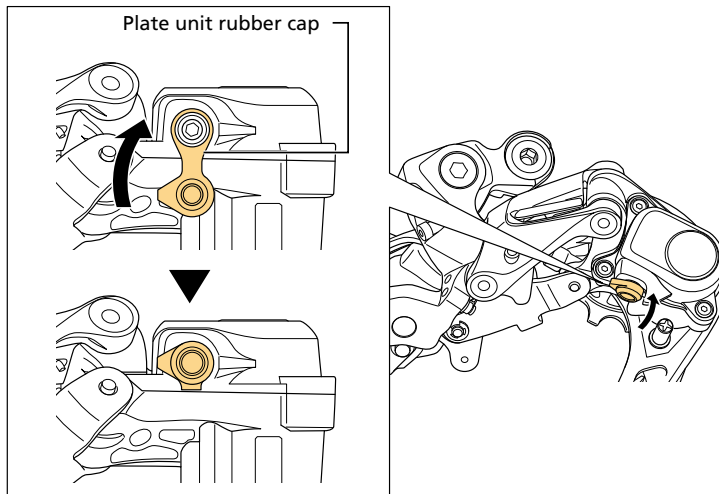


4. Check the friction torque.

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



5. Install the plate unit rubber cap as shown in the figure.

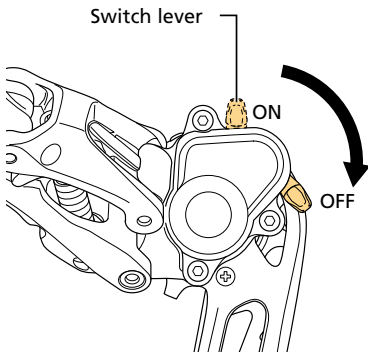


Replacement of the plate and the P-tension spring

Removal

Before replacing the plate or P-tension spring, remove the rear wheel and chain, and shift the rear derailleur to the low side (largest sprocket) position.

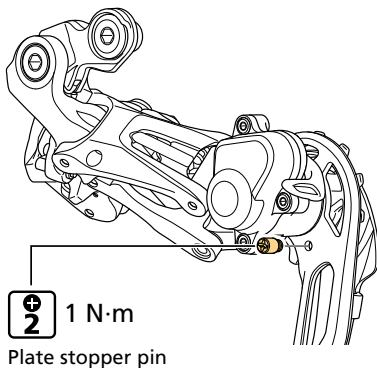
1. Set the switch lever in the OFF position.



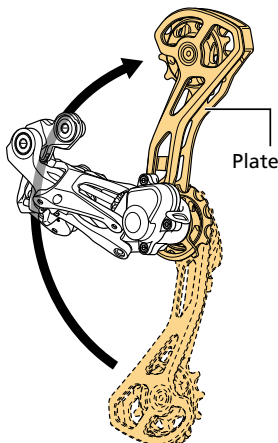
NOTICE

- 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 slide out.

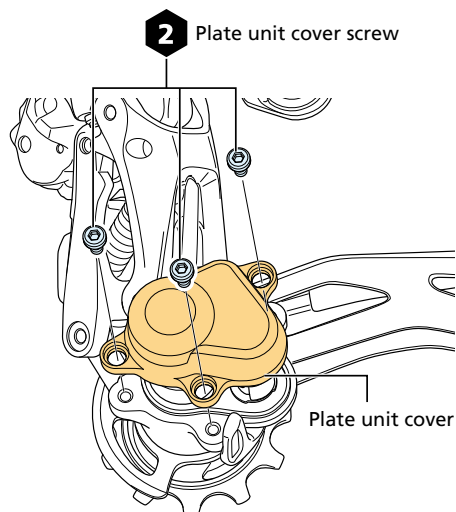
2. Remove the plate stopper pin.



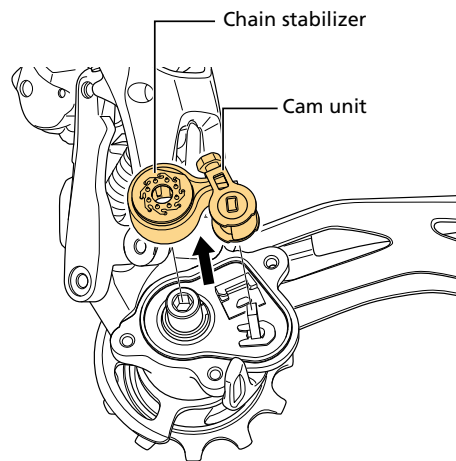
3. Turn the plate to loosen the P-tension spring.



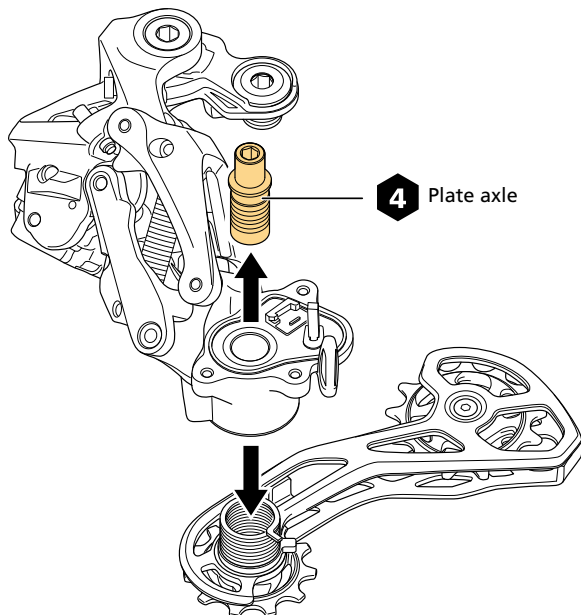
4. Remove the plate unit cover.



5. Remove the chain stabilizer and cam unit.



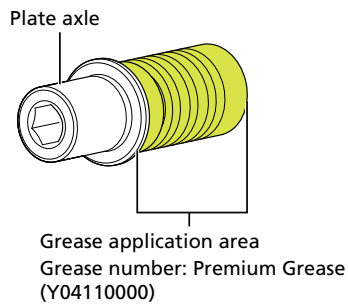
6. Remove the plate axle.



Installation

When removing it, reverse the procedure.

1. Apply the dedicated grease to the plate axle.

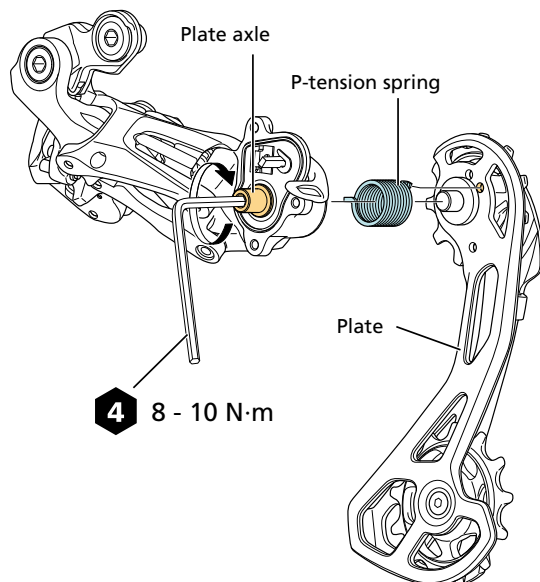


NOTICE

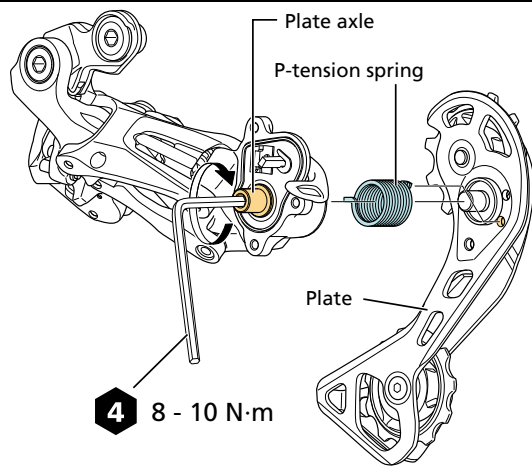
- Do not apply grease outside of the application area indicated above. If grease is applied here, it will get inside the roller clutch and friction will be lost.

2. Insert the plate axle, then fit the tip of the P-tension spring in the hole of the plate.

RD-RX815

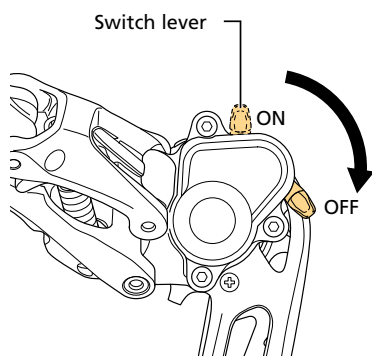


RD-RX817



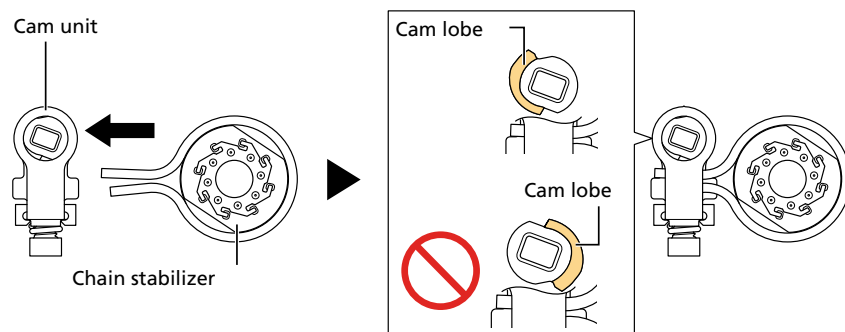
3. Check that the switch lever is in the OFF position.

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



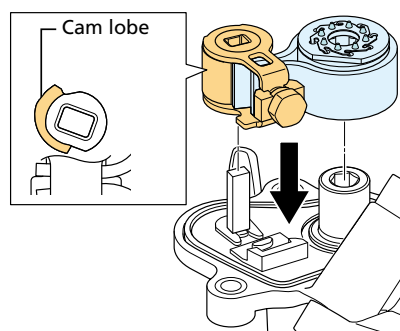
4. Set the chain stabilizer into the cam unit as shown in the figure.

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



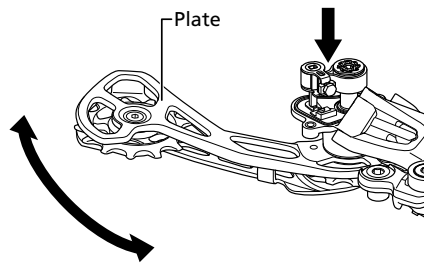
5. Install the cam unit and chain stabilizer.

Pay attention to the positioning of the cam lobe of the cam unit.

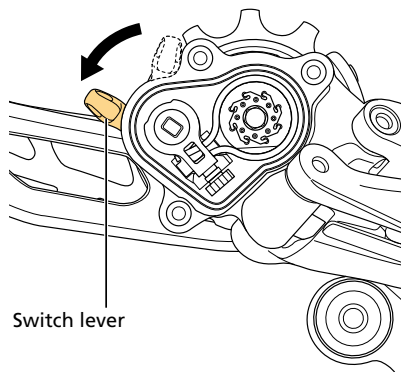


TECH TIPS

- When installing, it helps to move the plate back and forth while pushing on the cam unit and chain stabilizer.

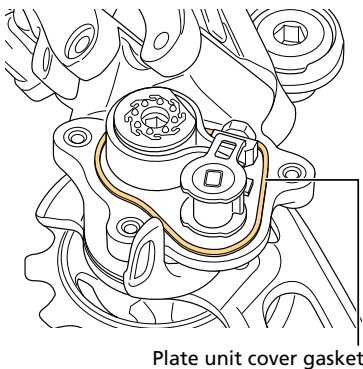


- If there is resistance when moving the switch lever to the ON position, the components are installed correctly. If there is no resistance, check the position of the cam lobe of the cam unit and reinstall the components.

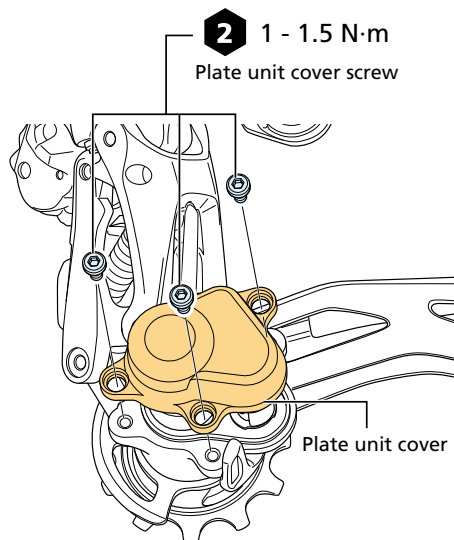


6. Install the plate unit cover gasket.

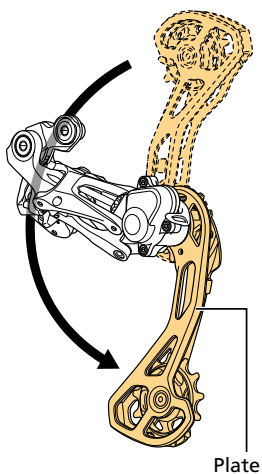
Check that it is installed along the groove in the plate unit.



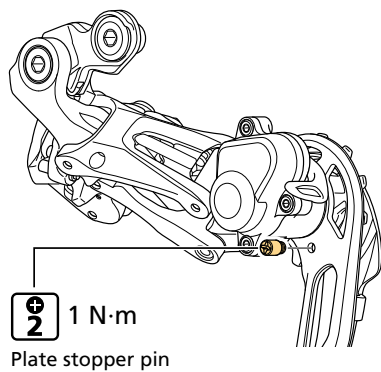
7. Install the plate unit cover.



8. Turn the plate to tighten the P-tension spring.



9. Install the plate stopper pin.



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