# Dealer's Manual

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<td>E-BIKE</td>
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## REAR DERAILLEUR

**XTR**
- RD-M9100
- RD-M9120
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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, consult a place of purchase or a distributor for their assistance.

• Make sure to read all instruction manuals included with the product.

• Do not disassemble or modify the product other than as stated in the information contained in this dealer's manual.

• All dealer's manuals and instruction manuals can be viewed on-line on our website (http://si.shimano.com).

• Please observe the appropriate rules and regulations of the country, state or region in which you conduct your business as a dealer.

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

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

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

**WARNING**

- Be sure to follow the instructions provided in the manuals when installing the product. It is recommended to use SHIMANO genuine parts only. If parts such as bolts and nuts become loose or damaged, the bicycle may suddenly fall over, which may cause serious injury. In addition, if adjustments are not carried out correctly, problems may occur, and the bicycle may suddenly fall over, which may cause serious injury.

- Be sure to wear safety glasses or goggles to protect your eyes while performing maintenance tasks such as replacing parts.

- After reading the dealer's manual thoroughly, keep it in a safe place for later reference.

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

- Intervals between maintenance depend on the use and riding circumstances. Clean the chain with an appropriate chain cleaner regularly. Never use alkali based or acid based solvents such as rust cleaners. If those solvents are used the chain might break and cause serious injury.

- Check the chain for any damage (deformation or crack), skipping, or other abnormalities such as unintended gear shifting. If any problems are found, consult your place of purchase or a distributor. The chain may break, and you may fall.

**NOTE**

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

- For SHADOW RD+, be sure to check that the plate unit cover and the plate unit cap are installed before riding the bicycle.

- If gear shifting operations do not feel smooth, wash the derailleur and lubricate all moving parts.

- If looseness in the links is so great that gear shifting adjustments cannot be made, replace the derailleur.

- Products are not guaranteed against natural wear and deterioration from normal use and aging.

- For maximum performance we highly recommend SHIMANO lubricants and maintenance products.
For Installation to the bicycle, and maintenance:

• Depending on the shape of the frame, the rear derailleur may interfere with the chainstay.

• Grease the inner cable and the inside of the outer casing before use to ensure that they slide properly.
  Do not let dust adhere to the inner cable. If the grease on the inner cable is wiped off, the application of SIS SP41 grease (Y04180000) is recommended.

• Use an OT-SP41 cable and a cable guide (SM-SP17/SP18) for smooth operation.

• Use an outer casing which still has some length to spare even when the handlebars are turned all the way to both sides. Furthermore, check that the shifting lever does not touch the bicycle frame when the handlebars are turned all the way.

• If gear shifting adjustments cannot be carried out, check that the rear dropout is aligned. Check whether the cable clean and greased, and if the outer casing is too long or short.

• Periodically clean the derailleur and lubricate all moving parts (mechanism and pulleys).

• Depending on the model, the pulleys have arrows on them to indicate the direction of rotation. Install so that the guide pulley moves counterclockwise and the tension pulley moves clockwise when viewed from the outer side of the derailleur.

• If you hear abnormal noise as a result of looseness in a pulley, you should replace the pulley.

The actual product may differ from the illustration because this manual is intended mainly to explain the procedures for using the product.
LIST OF TOOLS TO BE USED

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

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 mm hexagon wrench</td>
</tr>
<tr>
<td>3</td>
<td>3 mm hexagon wrench</td>
</tr>
<tr>
<td>4</td>
<td>4 mm hexagon wrench</td>
</tr>
<tr>
<td>5</td>
<td>5 mm hexagon wrench</td>
</tr>
<tr>
<td>9 2</td>
<td>Screwdriver [#2]</td>
</tr>
<tr>
<td>27</td>
<td>Hexalobular [#27]</td>
</tr>
<tr>
<td>TL-CT12</td>
<td>TL-CT12</td>
</tr>
</tbody>
</table>
INSTALLATION

Installing the rear derailleur

1. Set the switch lever in the OFF position.

2. Tighten the rear derailleur fixing bolt.

   Be careful not to insert rear derailleur fixing bolt in the derailleur hanger at an angle. In addition, be sure to install the rear derailleur so that the stopper plate tab contacts the B-tension stop, with no gap in between.
NOTE

• Periodically check to make sure that there is no gap between the B-tension stop and the stopper plate tab. If there is a gap in this location, it may result in a drop in gear shifting performance.
ADJUSTMENT

Adjusting the stroke on the top side

1. Adjust by turning the top adjustment bolt.
   Adjust so that the center of the guide pulley is aligned with the outer line of smallest sprocket when viewed from the rear side.

![Diagram of top adjustment bolt and guide pulley]
Installing the chain

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

Checking the chain length

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

In order to check the length at the rear of the cassette sprocket, mount the chain from the rear of the cassette sprocket as shown in the figure.

2. Check the length of the chain.

With the zero point set on the largest sprocket as shown in the figure, the proper chain length is equal to the length of the chain with links added according to the bike type.

Hardtail bikes
Full suspension bikes

* For full suspension bikes, check the length without any load applied to the suspension.

<table>
<thead>
<tr>
<th>Bike type</th>
<th>Number of links added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardtail bikes</td>
<td>4 to 5 links + a QUICK-LINK</td>
</tr>
<tr>
<td>Full suspension bikes</td>
<td>5 to 6 links + a QUICK-LINK</td>
</tr>
</tbody>
</table>
• The rear derailleur plate assembly is equipped with a pin or plate that prevents chain derailment. When passing the chain through the rear derailleur, pass it through the main body of the rear derailleur instead of through the chain derailment prevention plate as shown in the figures.

• If the chain is not passed through the correct position, damage may be caused to the chain or the rear derailleur.

• For full suspension bikes, length [a] will vary according to the movement of the rear suspension. After shifting to the largest chainring and the largest sprocket, make sure that the chain length is not too short when dimension [a] is at its maximum extension. If the length of the chain is too short, an excessive load may be placed on the drive system.
Connection and securing of the inner cable

Outer casing length

1. Loosen the end adjustment screw to the position shown in the figure.
   Make sure that tab of the stopper plate touches the bracket body without leaving a gap.

   ![Diagram of stopper plate tab and bracket body](image)

   Stopper plate tab
   Bracket body
   End adjustment screw

2. Determine the length of the outer casing.
   Align the outer casing to which the sealed outer cap has been fitted with the bottom edge of the outer casing holder on the rear derailleur.
   When doing so, make sure to leave enough slack in the outer casing.

   ![Diagram of outer casing, outer casing holder, and sealed outer cap](image)

   Outer casing
   Outer casing holder
   Sealed outer cap

**NOTE**

- The length of the outer casing may be insufficient when the rear suspension moves, so determine the length at the point where the length is at its greatest.
3. Cut off any excess outer casing with the cable cutter.
Cut the end of the outer casing that is opposite to the end with the marking.
After cutting, return the outside of the outer casing to a perfect circle so that the inside of the hole has a uniform shape.

4. Install the sealed outer cap to the end of the outer casing.
Route the inner cable through the outer casing.
5. Install the sealed outer cap with tongue and rubber shield onto the outer casing stopper of the frame.

Be careful not to bend the tongue.

Connection and securing of the inner cable

1. Set the shifting lever in its initial position.

Operate the release lever 11 times or more for a 12-speed or 10 times or more for an 11-speed.

2. Secure the inner cable to the rear derailleur.
NOTE
• Replacing the cover with tongue is recommended when replacing the inner cable.
• Fuzz may be generated when assembling the inner cable or when the coating is damaged during use, but this will not affect the function of the part.

3. Remove the initial slack from the inner cable as shown in the figure.
   When using a full outer casing, secure the rear derailleur so that it will not move, and then push the main lever several times to remove the initial slack.

4. Re-secure the inner cable to the rear derailleur.
   While pulling the inner cable, be sure that it is secured along the groove.
5. Cut the inner cable so that the protruding length is approximately 20 mm.

Install the inner end cap.

NOTE

- Check that the inner cable does not interfere with the spokes of the wheel.
- Do not allow the wheel to turn while carrying out this step.
Adjusting the stroke on the low side

1. Adjust by turning the low adjustment bolt.
   Adjust so that the center of the guide pulley is aligned with the center of the largest sprocket.

Adjusting the end adjustment screw

1. Set the chain on the smallest chainring and the largest sprocket.
   Turn the crank arm and shift the gears.
2. Adjust the end adjustment screw.

For RD-M9100-GS/sprocket, 10-45T and RD-M9100-SGS/sprocket 12-speed, 10-51T combinations
Align the white line on the inner side of the outer plate with the tip of the highest tooth on the largest sprocket.

For RD-M9120-SGS/sprocket 12-speed, 10-45T combinations
Align the contour of the outer plate and the tip of the highest tooth on the largest sprocket between the triangle marks on the inner side of the outer plate.

For the following combinations
Set the distance between the tip of the highest tooth on the largest sprocket and the center of the guide pulley in the following manner.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sprocket</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-M9100-SGS</td>
<td>11-speed, 10-45T</td>
<td>52 mm</td>
</tr>
<tr>
<td>RD-M9120-SGS</td>
<td>12-speed, 10-45T</td>
<td>46 mm</td>
</tr>
<tr>
<td>(Using the front chainwheel of a single gear)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SIS adjustment

1. Set the switch lever in the OFF position.

2. Operate the shifting lever several times to shift the chain to any gear that is five to seven steps from the largest sprocket.

   Shift to the largest chainring for bicycles with a front double.

   Then, turn the crank.

   **NOTE**
   - If the chain touches the next largest even numbered sprocket in step 2 and it makes noise, tighten the cable adjustment barrel until the noise is no longer present.
     (Clockwise)

3. Loosen the cable adjustment barrel until there is noise.
   (Counterclockwise)
4. The best setting is when the cable adjustment barrel is rotated five clicks in the tightening direction (clockwise).

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

6. Set the switch lever in the ON position, and then check that there are no problems with gear shifting during normal riding conditions.
Replacing the pulley

1. Replace the guide pulley and tension pulley.
   Pay attention to the direction of the arrows on the pulleys when installing the pulleys.

Guide pulley

Tension pulley

Guide pulley (inner plate side)  Tension pulley (inner plate side)

\[ 2.5 - 5 \text{ N\cdot m} \]
Replacing the B-axle

1. Push the B-axle from the inner side and use a tool such as a slotted screwdriver to widen and remove the C-ring.

![C-ring and B-axle diagram]

2. With the stopper plate held down, remove the B-axle by turning it with a hexagon wrench.

Replace the B-axle with a new one and install it in the reverse order from the removal procedure.

![Stopper plate and B-axle diagram]
Replacing the bumper

There is no bumper on RD-M9120.

1. Remove the bumper so that it flips forward as shown in the figure.

2. Install a new bumper by sliding it on from the side as shown in the figure.
Applying grease to the chain stabilizer

If the friction changes or noise is generated, the grease may be discolored or insufficient. Apply grease.

* Perform the assembly in the reverse order from the disassembly procedure.

1. Set the switch lever in the OFF position.

2. Remove the plate unit cover.
3. Remove the cam unit and the chain stabilizer.

4. Apply grease to the clutch side.

**NOTE**
- Be careful not to get grease inside the outer portion of the roller clutch. Failure to do so will cause the clutch to malfunction.
MAINTENANCE
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.

Friction adjustment

1. Set the switch lever in the ON position.

2. Remove the plate unit cap by hand as shown in the figure.

3. Turn the friction adjustment bolt with a hexagon wrench to adjust the friction.
**NOTE**

- Do not adjust the friction with a torque of 0.25 N·m or higher. Turning the bolt excessively may cause damage.

4. **Check the friction torque.**

RD-M9100

Insert a hexalobular wrench into the outer plate and check the friction torque.

RD-M9120

(1) Remove the inner plate, guide pulley, and tension pulley.
(2) Insert a hexalobular wrench into the outer plate and check the friction torque.

![Outer plate with wrench](image)

3.5 - 5.4 N·m

(3) Install the inner plate, guide pulley, and tension pulley.

**NOTE**

- Refer to "Replacing the pulley" to install the inner plate, guide pulley, and tension pulley.

5. Install the plate unit cap as shown in the figure.
Replacing the plate, plate tension spring, and switch lever

Removal

1. Set the switch lever in the OFF position.

![Switch lever diagram]

**NOTE**

- If operating the switch lever while the plate unit cover is removed, hold the friction unit down with your finger so that it does not fly out.

2. Remove the plate stopper pin with a screwdriver.

![Plate stopper pin diagram]
3. Turn the plate to loosen the plate tension spring.
   As shown in the figure, squeeze the outer casing holder and cable attachment portion together to move the link and turn the plate.

4. Remove the plate unit cover bolts.

5. Remove the plate unit cover.
6. Remove the cam unit and chain stabilizer.

7. Remove the plate axle.
8. Remove the retaining plate and the switch lever.

9. The unit can be disassembled as shown in the figure.
Installation

Perform the installation in the reverse order from the removal procedure.

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

   ![Diagram of plate axle with grease application area]

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

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

   ![Diagram of RD-M9100 and RD-M9120 with plate axle, plate tension spring, and plate]

   **NOTE**
   - 7.8 - 9.8 N·m
3. **Install the switch lever and engage the retaining plate.**

   Set the switch lever in the OFF position.

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

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

   **NOTE**
   - Do not set in the cam unit with the convex section positioned as shown in the figure below.
5. **Align the holes of the cam unit and chain stabilizer with the protrusions on the plate unit, and then install.**

Pay attention to the position of the convex section on the cam unit when installing.

**NOTE**

- Do not install the plate unit cover with the cam unit only partially connected to the base of the plate unit. Insufficient sealing may cause rust to form on the internal structure and the plate may become stuck.
• When installing, it helps to move the plate while holding down 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 position of the convex section on the cam unit, and then reinstall the components.

6. **Apply grease to the plate unit cover gasket and install.**

Check that the plate unit cover gasket is installed along the groove in the plate unit.

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**TECH TIPS**

- **Plate unit cover gasket**
  
  Grease number: premium grease (Y04110000)
7. Install the plate stopper pin.

8. Install the plate unit cover bolts.

9. Check the friction, and adjust as necessary.

Refer to "Adjusting friction" for the friction adjustment method.