

## **Dealer's Manual**

# **Mechanical Disc Brake**

BR-CX77  
BR-CX75  
BR-R517  
BR-R515  
BR-R317  
BR-R315  
BR-TX805

## IMPORTANT NOTICE

- This dealer's manual is intended primarily for use by professional bicycle mechanics.

Users who are not professionally trained for bicycle assembly should not attempt to install the components themselves using the dealer's manuals.

If any part of the information on the manual is unclear to you, do not proceed with the installation. Instead, contact your place of purchase or a local bicycle dealer for their assistance.

- Make sure to read all instruction manuals included with the product.
- Do not disassemble or modify the product other than as stated in the information contained in this dealer's manual.
- All dealer's manuals and instruction manuals can be viewed on-line on our website (<http://si.shimano.com>).
- Please observe the appropriate rules and regulations of the country, state or region in which you conduct your business as a dealer.

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

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

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

 **DANGER**

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

 **WARNING**

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

 **CAUTION**

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

# TO ENSURE SAFETY

## WARNING

- **When installing components, be sure to follow the instructions that are given in the instruction manuals.**

It is recommended that you use only genuine Shimano parts. If parts such as bolts and nuts become loose or damaged, the bicycle may suddenly fall over, which may cause serious injury.

In addition, if adjustments are not carried out correctly, problems may occur, and the bicycle may suddenly fall over, which may cause serious injury.

-  Be sure to wear safety glasses or goggles to protect your eyes while performing maintenance tasks such as replacing parts.
- After reading the dealer's manual thoroughly, keep it in a safe place for later reference.

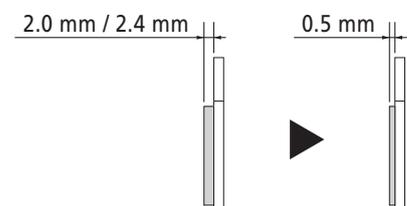
### Be sure to also inform users of the following:

- Please use extra caution to keep your fingers away from the rotating disc brake rotor. The disc brake rotor is sharp enough to inflict severe injury to your fingers if caught within the openings of moving rotor.



- The calipers and disc brake rotor will become hot when the brakes are operated, so do not touch them while riding or immediately after dismounting from the bicycle, otherwise you may get burned.
- Be careful not to allow any oil or grease to get onto the disc brake rotor and brake pads, otherwise the brakes may not work correctly.
- If any oil or grease does get on the pads, you should consult a dealer or an agency. There is the danger that the brakes may not work correctly.

- If noise occurs during brake operation, the pads may have been worn down to the usable limit. Check that the brake system temperature has been cooled down sufficiently, and then check that the thickness of each pad is 0.5 mm or more. (However, if the pad clearances have been adjusted without using the tool, check that the pad thicknesses are 2 mm or more (for models: BR-CX77/R517/R317) or 1.3 mm or more (for model: BR-TX805).) Or, consult a dealer or an agency.



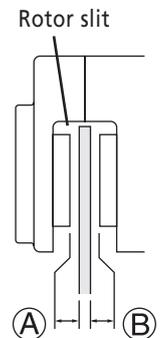
\* The thickness of the brake pads when they are new differs depending on the model.

- If the pad clearances have been adjusted without using the tool, check that the brake pad thicknesses are 2 mm or more (for models: BR-CX77/R517/R317) or 1.3 mm or more (for model: BR-TX805) before riding the bicycle. Continuing to ride the bicycle with brake pad thicknesses less than 2 mm is dangerous as it may result in the brakes not functioning. This is because the disc brake rotor contacts the calipers during braking.
- For information on how to perform adjustment without using the tool, refer to the section "When not using a tool" in "Adjustment". (P. 11)
- If the disc brake rotor cracks or changes shape, please cease to use immediately and consult a dealer or an agency.
- If the disc brake rotor becomes worn down to a thickness of 1.5 mm or if one of the aluminum surfaces becomes visible, immediately stop using the brakes and consult a dealer or an agency.
- Check the brake cable for rust, fraying, and cracks, and contact the place of purchase or a bicycle dealer if any such problems are found. If this is not done, the brakes may not work correctly.
- It is important to completely understand the operation of your bicycle's brake system. Improper use of your bicycle's brake system may result in a loss of control or a fall, which could lead to severe injury. Because each bicycle may handle differently, be sure to learn the proper braking technique (including brake lever pressure and bicycle control characteristics) and operation of your bicycle. This can be done by consulting your professional bicycle dealer and the bicycle's owners manual, and by practicing your riding and braking technique.

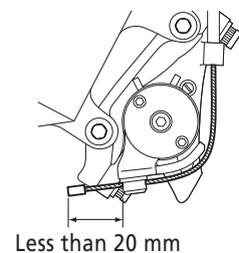
- If the front brake is applied too strongly, the front wheel may lock and the bicycle may fall forward, and serious injury may result.
- Always make sure that the front and rear brakes are working correctly before you ride the bicycle.
- The required braking distance will be longer during wet weather. Reduce your speed and apply the brakes early and gently.
- If the road surface is wet, the tires will skid more easily. If the tires skid, you may fall off the bicycle. To avoid this, reduce your speed and apply the brakes early and gently.

**For Installation to the Bicycle, and Maintenance:**

- When installing the caliper to the frame, position the disc brake rotor in the center of the caliper rotor slit.
- Adjust the right and left clearances between the disc brake rotor and the brake pads to be equal. When the brake pads are worn down, make sure to adjust clearances A and B evenly at the same time in order to prevent the brake pads from making contact on only one side with the rotor.  
(A side: pad adjustment screw, B side: arm adjustment bolt / cable adjustment barrel)  
Adjusting only one of the right and left clearances may cause the clearances to become unequal and cause the brakes to fail before the brake pads are worn down to the minimum working thickness (0.5 mm).



- Adjust the inner cable so that the protruding length is less than 20 mm (3/4 inch). If the protruding length is any longer, the end of the inner cable may become stuck in the disc brake rotor, which could cause the wheel to lock and the bicycle could fall forward causing serious injuries.



- Disc brakes are designed for optimum performance when used in the configurations shown in the recommendation tables. Be sure to confirm the recommendation tables. In the case of brake levers, use 2-finger levers in combination with brake calipers. If used in combination with 4-finger levers, braking force will be higher. Accordingly, certain riding positions, overall weight, and other factors may cause a fall resulting in injury.

	Model No.	Brake lever type	
ROAD	BR-CX77 / R517 / R317	Lever for drop handlebars	ST-9070 / 9001 / 9000 / 6800 / 5700 / 4600 / 4603 / 3500 / 2400 / 2403 / R460 / R350 / R353 / S705-R / S705-L
		Lever for TT	ST-9071 BL-TT79
		Lever for flat handlebars	ST-R240* / ST-R243* BL-4600* / 3500* / 2400* / R780*
MTB	BR-TX805	Lever for flat handlebars	ST-M4000 / TX800 / M410 / M390 / M370 / M360-2A / M310-2A / EF51-2A / EF41 / EF40 / EF65-2A / EF51-2A BL-T4000 / M421 / T610 / MX70 / F800 ST-R240* / ST-R243* BL-4600* / 3500* / 2400* / R780*

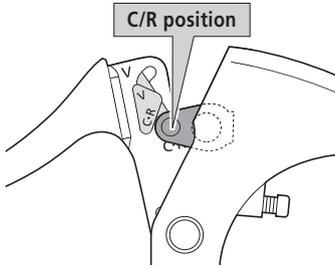
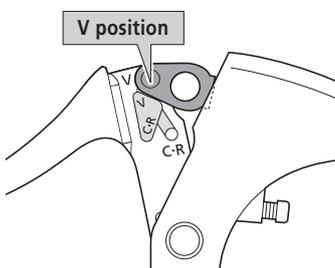
\* are mode switching type brake levers. Refer to the table on the next page.

- If the quick release lever on the hub is on the same side as the disc brake rotor, it may interfere with the disc brake rotor, which is dangerous, so check that it does not interfere.

- The brake levers are equipped with a mode switching mechanism to make them compatible with cantilever brakes and roller brakes or V-BRAKE brakes with power modulator.
- For mechanical disc brakes for road use mode position C/R, for mechanical disc brakes for MTB use mode position V.

**If the incorrect mode is selected it may cause either excessive or insufficient braking force to occur, which could result in dangerous accidents.**

**Be sure to select the mode in accordance with the instructions given in the table below.**

Mode position	Applicable brake
<p><b>C</b> : Mode position for compatibility with cantilever brakes</p> <p><b>R</b> : Mode position for compatibility with roller brakes</p> 	BR-CX77 / R517 / R317
<p><b>V</b> : Mode position for compatibility with V-BRAKE brakes with power modulator</p> 	Mechanical Disc Brake for MTB

Use the brake levers with mode switching mechanism in the combinations given above.

**CAUTION**

Be sure to also inform users of the following:

**■ Burn-in period**

- Disc brakes have a burn-in period, and the braking force will gradually increase as the burn-in period progresses. Make sure that you are aware of any such increases in braking force when using the brakes during the burn-in period. The same thing will happen when the brake pads or disc brake rotor are replaced.

**NOTE**

Be sure to also inform users of the following:

- 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:**

- If the brake caliper mounting boss and the dropout are not parallel, the disc brake rotor may come into contact with the caliper.
- Use rotors described as "RESIN PAD ONLY" only in combination with resin pads. Combining them with metal pads will cause them to wear out rapidly.

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

# INSTALLATION

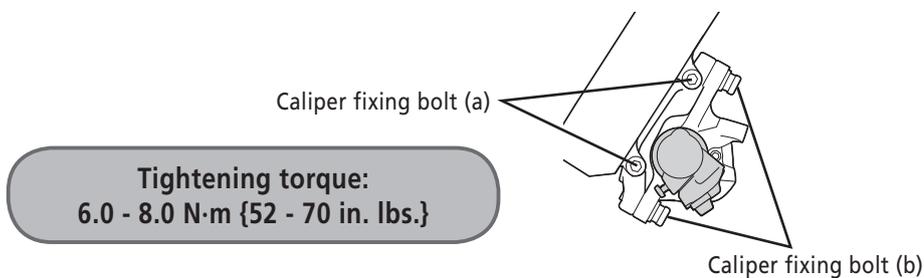
Refer to the section on brakes in the General Operations for installation methods not explained in this section.

The following tools are needed to assemble this product.

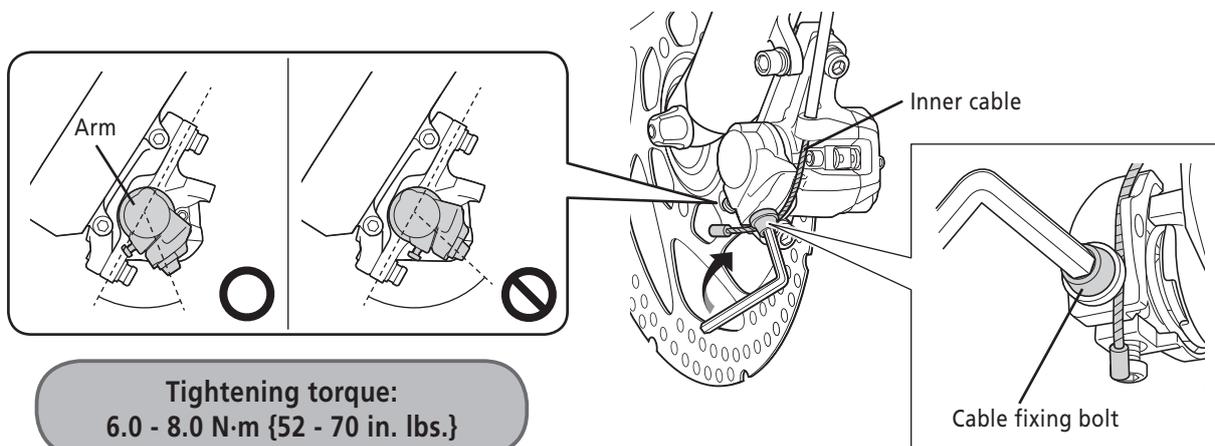
Usage location	Tool
Caliper fixing bolt	5 mm Allen key (BR-R517 / R317 / TX805)
	4 mm Allen key (BR-CX77)
Cable fixing bolt	5 mm Allen key (BR-R517 / R317 / CX77)
	10 mm Wrench / 5 mm Allen key (BR-TX805)
Pad adjustment screw	3 mm Allen key (BR-R517 / R317 / CX77)
	5 mm Allen key (BR-TX805)
Pad axle	3 mm Allen key (BR-R517 / R317)
	Slotted screwdriver (BR-CX77)
	Needle-nose pliers (BR-TX805)
Arm adjustment bolt	2.5 mm Allen key (BR-R517 / CX77)

## ■ Installing the calipers

1. Tighten the caliper fixing bolt (a).  
Then, temporarily tighten the caliper fixing bolt (b) with some play left in the caliper.

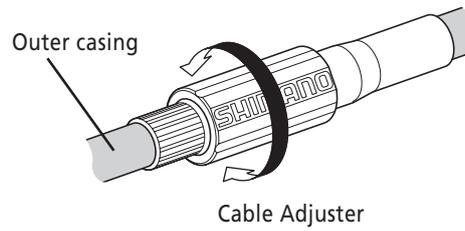


2. Pass the inner cable through, then with the arm in the initial position, tighten the cable fixing bolt.



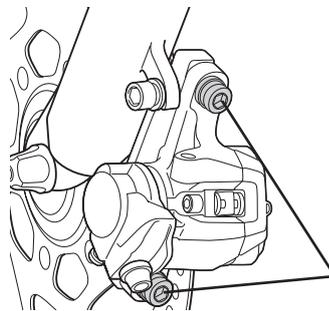
### < BR-CX77 / BR-R517 >

When using a drop handlebar, you can adjust the cable with a cable adjuster such as SM-CB70. Connect the cable adjuster to the outer casing then pass the inner cable through. With the caliper arm in the initial position, tighten the cable fixing bolt. For details on installation, refer to the cable adjuster manual.



### 3. Secure the caliper to the frame.

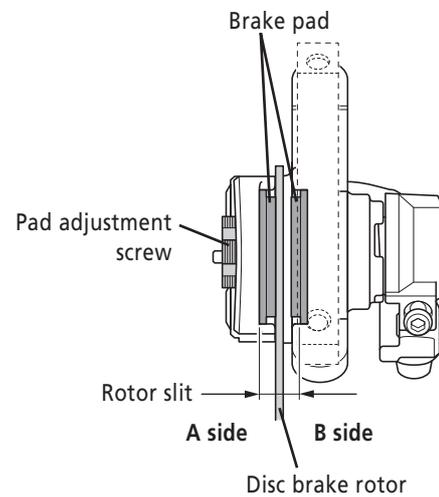
Depress the brake lever until the brake pads are pressed firmly against the disc brake rotor. While depressing the brake lever, tighten the two caliper fixing bolts (b) alternately by small amounts each time. Securely tighten the caliper fixing bolts to the specified tightening torque.



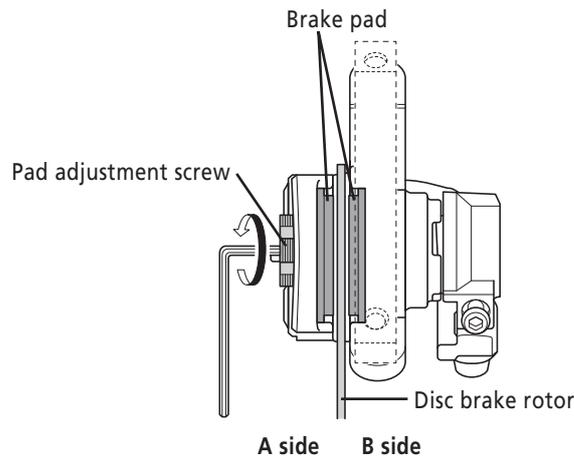
**Tightening torque:  
6.0 - 8.0 N·m {52 - 70 in. lbs.}**

Caliper fixing bolts (b)

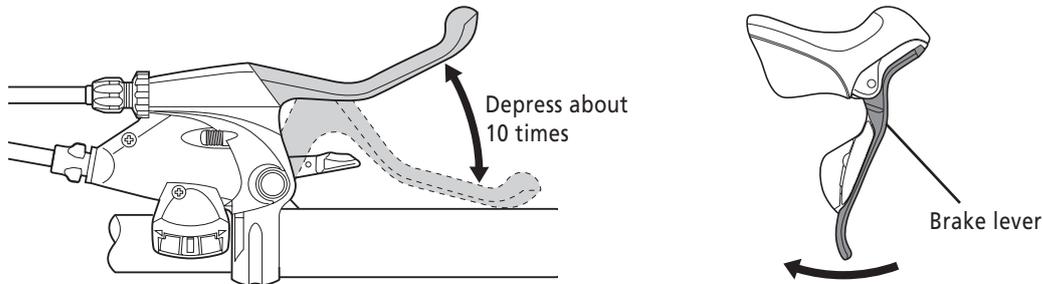
\* This operation makes the caliper parallel to the disc brake rotor.  
Check that the disc brake rotor is positioned in the center of the caliper.  
At this point, there is some clearance on the B side but not on the A side between the disc brake rotor and brake pads.



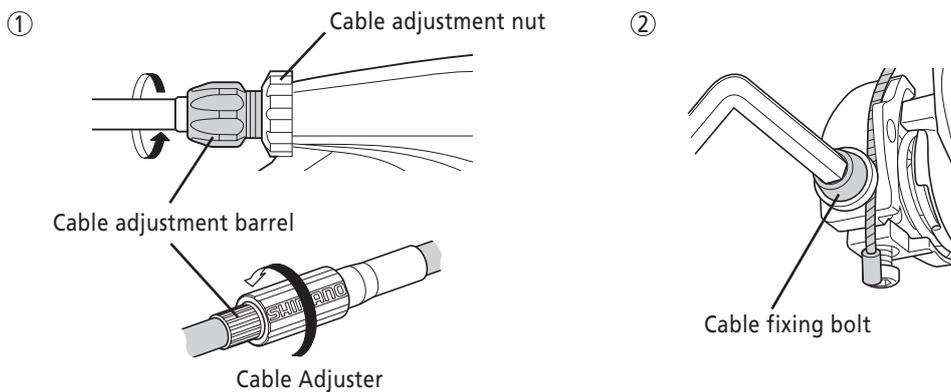
4. Loosen the pad adjustment screw counterclockwise by one or two clicks. This operation creates appropriate clearance on the A side (where the pad adjustment screw is mounted) between the brake pad and disc brake rotor. Check that clearances A and B between the disc brake rotor and brake pads are equal.



5. Depress the brake lever about 10 times until it touches the grip, and check that there are no problems with any components, and also that the disc brake rotors and the brake pads do not interfere with each other when the wheel is rotated.



6. If the cable slackens in step 5, remove the slack by performing one of the following procedures.
- ① Turn the cable adjustment bolt counterclockwise to adjust the slack in the cable, then manually tighten the cable adjustment nut if a cable adjustment nut is provided.
  - ② Loosen the cable fixing bolt, retighten the cable, and retighten the cable fixing bolt.



If the stroke of the brake lever is too long:

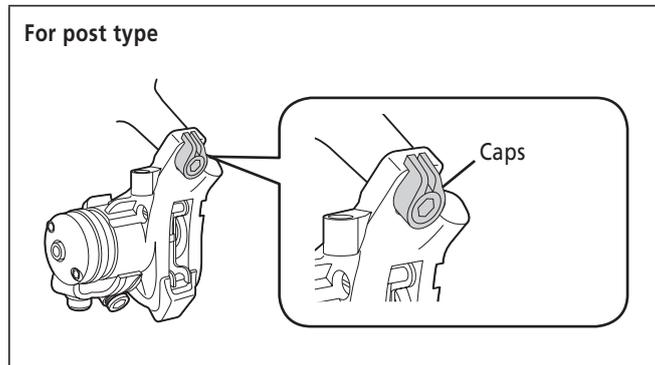
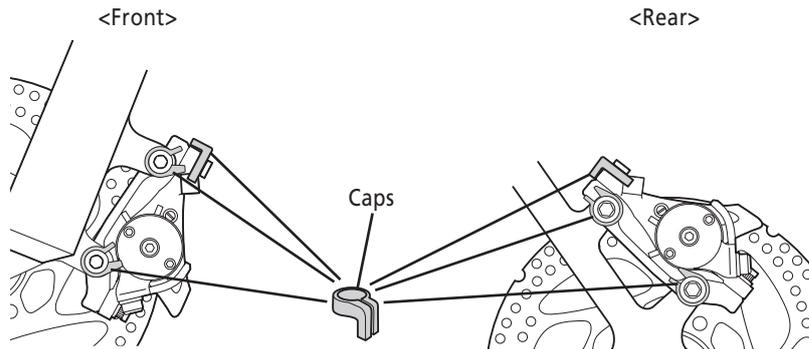
If the stroke of the brake lever is too long even after the above adjustment, perform the following procedure. You can set a proper stroke by reducing the initial pad clearances.

- Turn the pad adjustment screw clockwise to press the brake pads against the disc brake rotor before going on to step 2.
- With the brake pads pressed against the disc brake rotor, turn the pad adjustment screw counterclockwise by one or two clicks.

7. Secure the three bolts with caps or a length of wire in order to prevent the bolts from coming loose.

< BR-R517 / BR-R317 / BR-TX805 >

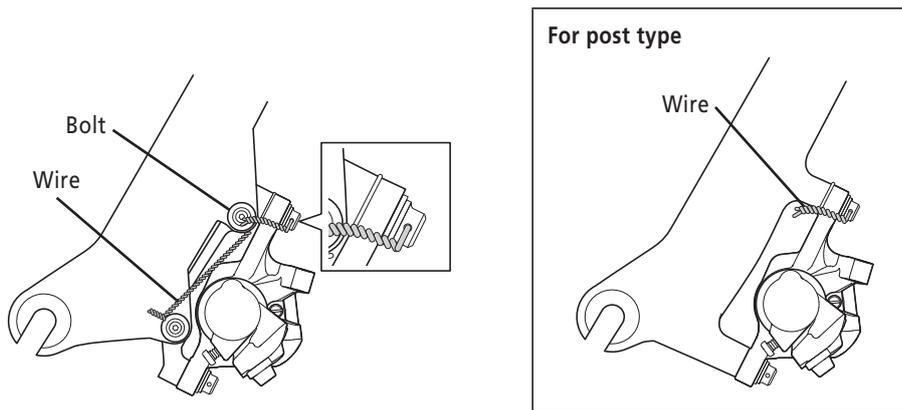
■ Cap method



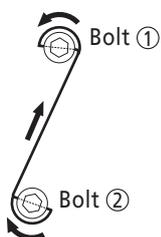
< BR-CX77 >

■ Wiring method

Adjust the length of the wire as shown in the illustration and wind the wire around the three bolts (or one bolt for the post type) in order to prevent the bolts from coming loose.



Wind a wire around the fixing bolt between the adapter and the frame as shown in the illustration.



If bolt ① tries to loosen (turn in the counterclockwise direction), force is applied via the wire to turn bolt ② in the tightening direction (clockwise). However, bolt ② cannot turn any further in the tightening direction.

Accordingly, this prevents bolt ① from turning in the loosening direction because it is also connected via the wire.

If either one of the bolts tries to loosen, this causes a force to be applied to the other bolt to turn it in the tightening direction. In other words, this system prevents the bolts from loosening.

# ADJUSTMENT

## ■ Adjusting when the brake pads are worn

### When using a tool

Adjust the clearances when the brake pads are worn down. Make sure to adjust both clearances A and B concurrently. Adjusting only one of the clearances A or B may cause the following problems.

- ① Contact between the pads and the disc brake rotor may occur during operations other than braking.
- ② Sufficient braking force may not be obtained when the clearance becomes much greater on one side.
- ③ The disc brake rotor contacts the calipers during braking.

- The brake pads can be used as long as their thickness is 0.5 mm or more.
- Adjust clearances A and B between the disc brake rotor and brake pads so that they are equal.

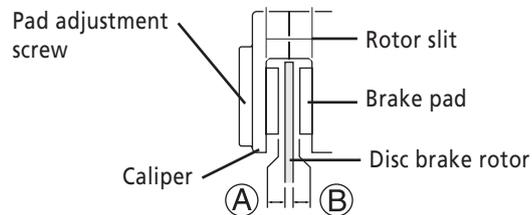
Model No.	Pad clearances (A, B)
BR-CX77 / R517 / R317	0.2 mm - 0.4 mm
BR-TX805	0.2 mm - 0.5 mm

#### < A side >

Tighten the pad adjustment screw to adjust.

#### < B side >

Refer to the table and adjust the appropriate adjustment bolt or screw.

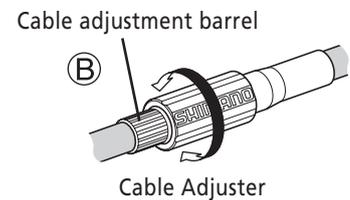
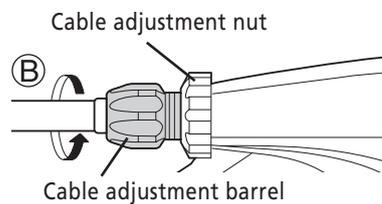
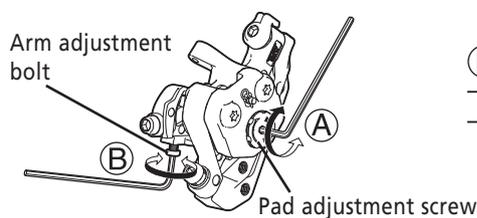


The procedure for adjusting clearance B differs depending on the model. Refer to the table below.

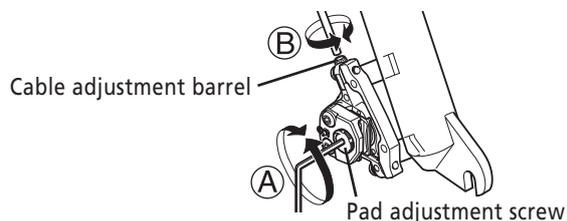
	A		B		
	Brake caliper	Brake caliper		Brake lever for flat handlebars	Brake lever for drop handlebars
	Pad adjustment screw	Arm adjustment bolt	Cable adjustment barrel	Cable adjustment barrel	Cable Adjuster
BR-CX77	X	X		X	X
BR-R517	X	X		X	X
BR-R317	X		X	X	X
BR-TX805	X		X	X	

X: OK

#### < BR-CX77 / BR-R517 >



#### < BR-R317 / BR-TX805 >



## When not using a tool

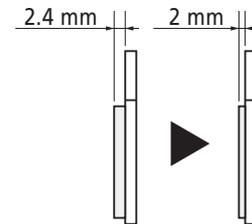
### Note:

Adjustment without using tools raises the minimum working thickness of the brake pads compared to adjustment with tools.

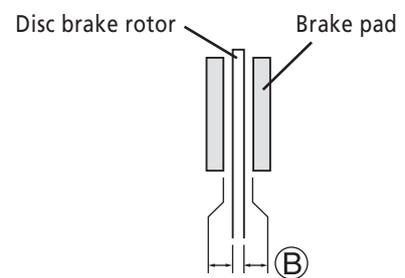
### < BR-CX77 / R517 / R317 >

#### WARNING

If the pad clearances have been adjusted without using the tool, check that the brake pad thicknesses are 2 mm or more before riding the bicycle. Continuing to ride the bicycle with brake pad thicknesses less than 2 mm is dangerous as it may result in the brakes not functioning. This is because the disc brake rotor contacts the calipers during braking.



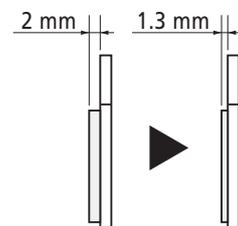
1. If the brake pads are worn, use the cable adjustment bolt to adjust so that the clearance B is 0.2 - 0.4 mm.
2. If the brake pads are worn down to a thickness of 2 mm, replace the brake pads.



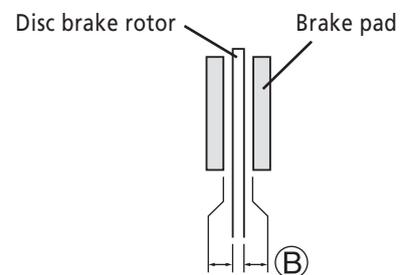
### < BR-TX805 >

#### WARNING

If the pad clearances have been adjusted without using the tool, check that the brake pad thicknesses are 1.3 mm or more before riding the bicycle. Continuing to ride the bicycle with brake pad thicknesses less than 1.3 mm is dangerous as it may result in the brakes not functioning. This is because the disc brake rotor contacts the calipers during braking.



1. If the brake pads are worn, use the cable adjustment bolt to adjust so that the clearance B is 0.2 - 0.5 mm.
2. If the brake pads are worn down to a thickness of 1.3 mm, replace the brake pads.

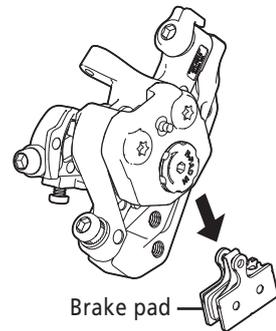
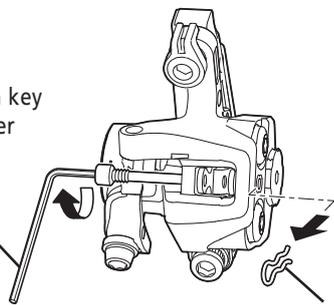


# MAINTENANCE

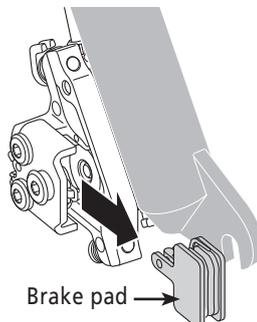
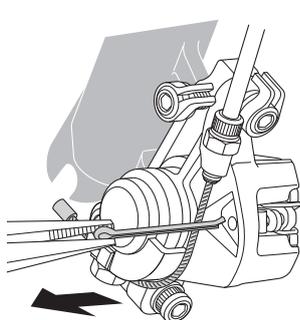
## ■ Replacing the brake pads

1. Remove the bicycle wheel from the frame, and then remove the brake pads as shown in the illustration.

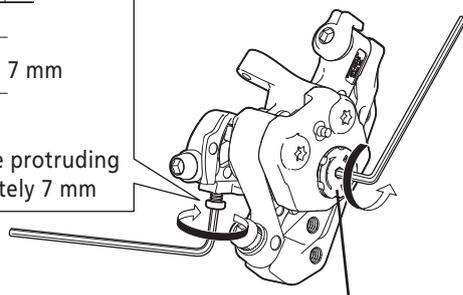
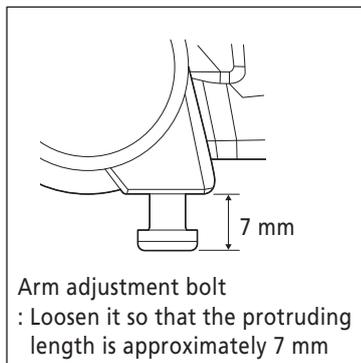
R517 / R317 Pad axle: 3 mm Allen key  
CX77 Pad axle: Slotted screwdriver



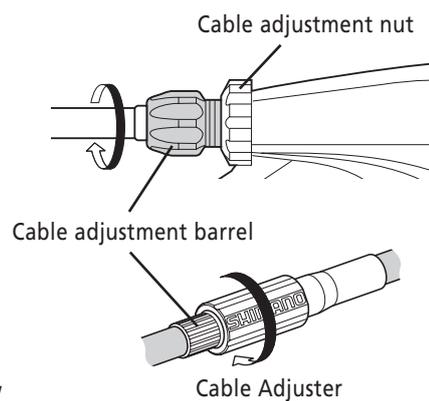
< For split pin >



2. Loosen the pad adjustment screw and the arm adjustment bolt counterclockwise. Then, turn the cable adjustment barrel for the brake lever or the adjustment screw for the cable adjuster clockwise.

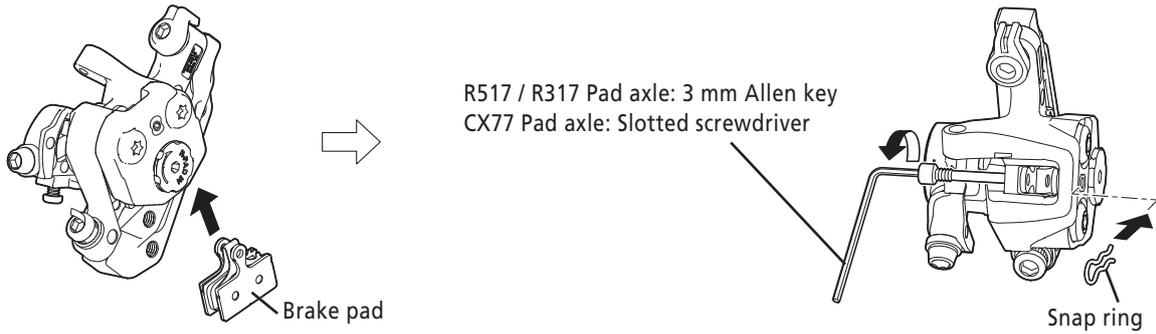


Pad adjustment screw  
: Loosen the pad adjustment screw  
until it makes a clicking sound



**3.** Install the new brake pads.

- Be careful not to forget to install the snap ring at this time.



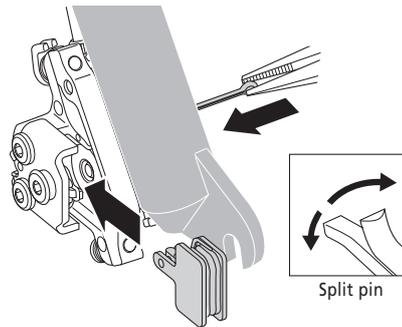
R517 / R317 Pad axle: 3 mm Allen key  
CX77 Pad axle: Slotted screwdriver

R517/R317 Pad axle: 3 mm Allen key  
Tightening torque:  
2.0 - 4.0 N·m {17 - 35 in. lbs.}

CX77 Pad axle: Slotted screwdriver  
Tightening torque:  
0.2 - 0.4 N·m {1.8 - 3.5 in. lbs.}

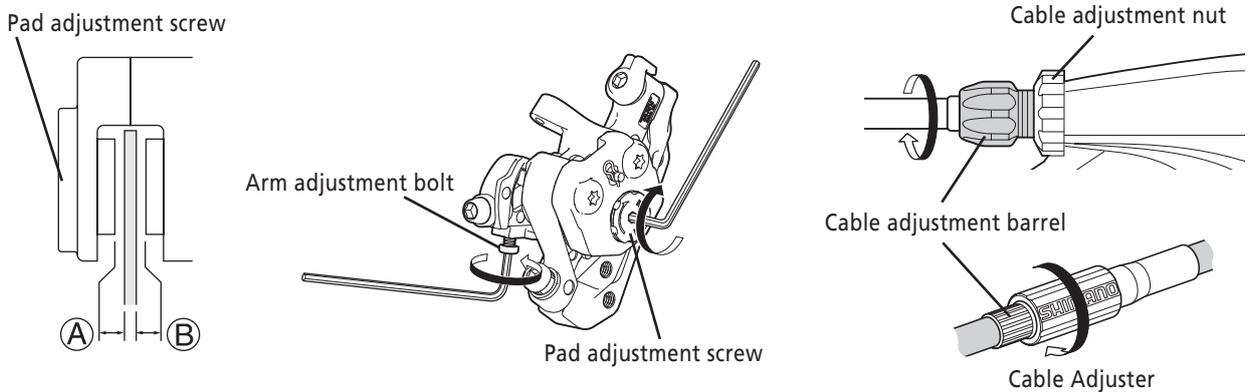
< For split pin >

- Bend open the split pin.



**4.** Adjust clearances A and B between the disc brake rotor and brake pads so that they are equal.

The procedure for adjusting pad clearances and clearance B differs depending on the model. For details on the adjustment procedure, refer to the section "Adjusting when the brake pads are worn".



**5.** After checking that the brake pad and the disc brake rotor are not contacting each other, check that there are no problems when the brake lever is depressed.

# SHIMANO

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Please note: specifications are subject to change for improvement without notice. (English)

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