R660 英文 2000.07.22 9:15 PM ページ 1

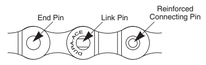
⚠ WARNING

- Use neutral detergent to clean the chain. Do not use alkali-based or acid based detergent such as rust cleaners as it may result in damage and/or failure of the chain.
- Use the reinforced connecting pin only for connecting the narrow type of chain.
- There are two different types of reinforced connecting pin available. Be sure to check the table below before selecting which pin to use. If connecting pins other than reinforced connecting pins are used, or if a reinforced connecting pin or tool which is not suitable for the type of chain is used, sufficient connection force may not be obtained, which could cause the chain to break or fall off.

Chain	Reinforced connecting pin		Chain tool
9-speed super narrow chain such as CN-7700 / CN-HG92	6.5mm	Silver	TL-CN31/TL-CN22
8-/7-/6-speed narrow chain such as CN-HG50 / CN-IG51	7.1mm	Black	TL-CN31/TL-CN22 and TL-CN30/TL-CN21

- If it is necessary to adjust the length of the chain due to a change in the number of sprocket teeth, make the cut at some other place than the place where the chain has been joined using a reinforced connecting pin or an end pin. The chain will be damaged if it is cut at a place where it has been joined with a reinforced connecting pin or an end pin.

- Obtain, read and carefully service instructions when installing parts. A loose, worn, or damaged parts may cause injury to the rider.
  We strongly recommend that only genuine Shimano replacement parts be used.



SERVICE INSTRUCTIONS SI-R660E

Rear Drive System

Before use, read these instructions carefully, and follow them for correct use.

In order to realize the best performance, we recommend that the following combination be used.

Series	XTR
Rapidfire M9	ST-M952 / SL-M952
Outer casing	SP40 sealed outer casing / Rubber shield
Rear derailleur	RD-M952 / RD-M953
Type	SGS / GS
Freehub	FH-M950
Gears	9
Cassette sprocket	CS-M952 / CS-M953
Chain	CN-7700
Bottom bracket guide	SM-SP17 / SM-BT17

Specifications

Rear Derailleur

Model number	RD-M952 / RD-M953	
Type	SGS	GS
Gears	9	
Total capacity	43T (42T M953)	33T
Largest sprocket	34T	34T
Smallest sprocket	11T	11T
Front chainwheel tooth difference	22T	22T

Cassette sprocket tooth combination

Model number	Group name	Gears	Tooth combination
CS-M952 / CS-M953	ap	9	12, 14, 16, 18, 20, 23, 26, 30, 34T

Shifting lever

Model number	ST-M952 / SL-M952
Gears	9

Freehub

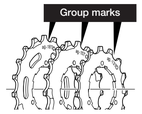
Model number	FH-M950
Gears	9
No. of spoke holes	36 / 32

⚠ CAUTION

- **Use a front chainwheel which is compatible with 9-speed chains in conjunction with Shimano CN-7700, CN-HG92 and CN-HG72 chains. If a chainwheel for an 8-speed chain or less is used, front chainwheel gear shifting problems may occur, or the chain pins might fall out, causing the chain to break.**

Note

- Adjust the RD-M953 Rapid Rise rear derailleur (reverse spring type) from the low side.
- Because the high cable resistance of a frame with internal cable routing would impair the SIS function, this type of frame should not be used.
- Always be sure to use the sprocket set bearing the same group marks. Never use in combination with a sprocket bearing a different group mark.
- 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.
- Grease the inner cable and the inside of the outer casing before use to ensure that they slide properly.
- **For smooth operation, use the specified outer casing and the bottom bracket cable guide.**
- Operation of the levers related to gear shifting should be made only when the front chainwheel is turning.
- If the brake fluid used in the oil disc brakes is of a type which tends to adhere to the plastic parts of the shifting lever, this may cause the plastic parts to crack or become discolored. Therefore, you should make sure that the brake fluid does not adhere to these plastic parts.
  The mineral oil which is used in SHIMANO disc brakes does not cause cracking or discoloration if it adheres to plastic parts, but such parts should be cleaned with alcohol beforehand to prevent foreign particles from adhering.
- For maximum performance we highly recommend Shimano lubricants and maintenance products
- For any questions regarding methods of installation, adjustment, maintenance or operation, please contact a professional bicycle dealer.



This service instruction explains how to use and maintain the Shimano bicycle parts which have been used on your new bicycle. For any questions regarding your bicycle or other matters which are not related to Shimano parts, please contact the place of purchase or the bicycle manufacturer.

SHIMANO®
SHIMANO AMERICAN CORPORATION
One Holland Irvine CA 92618 U.S.A. Phone 949-951-5003
SHIMANO EUROPA
Industrieweg 24 NL-8071 CT Nunspeet Holland Phone 31-341-272222
SHIMANO INC.
77 Oimatsu-cho 3-cho Sakai Osaka 590-8577 Japan Phone 0722-23-3243

These service instructions are printed on recycled paper and can be recycled again

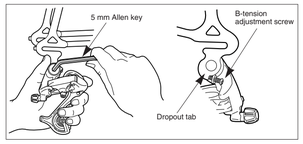
Please note: specifications are subject to change for improvement without notice. (English)
© Jun. 2000 by Shimano Inc. XBC SZK Printed in Japan

Installation of the rear derailleur

When installing, be careful not to let the B-tension adjustment screw come into contact with the dropout tab, otherwise deformation may result.

For the RD-M953
Do not remove the Pro-Set alignment block at this time.

Bracket spindle Tightening torque : 8 - 10 Nm {70 - 86 in. lbs.}



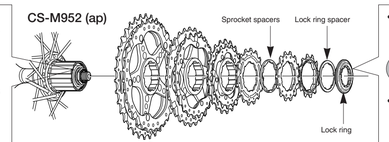
Installation of the sprockets

For each sprocket, the surface that has the group mark should face outward and be positioned so that the wider part of each sprocket and the A part (where the groove width is wide) of the freewheel body are aligned.

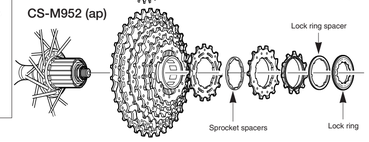
The groove is wide at one place only. A

Wide part

CS-M952 (ap)



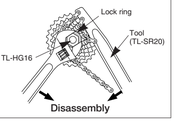
CS-M952 (ap)



- For installation of sprockets, use the special tool (TL-HG16) to tighten the lock ring.

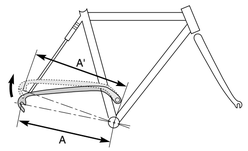
Tightening torque : 30 - 50 Nm {261 - 434 in. lbs.}

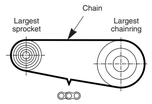
- To replace sprockets, use the special tool (TL-HG16) and TL-SR20 to remove the lock ring.



Chain length on bicycles with rear suspension

The length of A will vary depending on the movement of the rear suspension. Because of this, an excessive load may be placed on the drive system if the chain length is too short. Set the length of the chain by adding two links to the chain when the rear suspension is at a position where dimension "A" is longest and the chain is on the largest sprocket and the largest chainring. If the amount of movement of the rear suspension is large, the slack in the chain may not be taken up properly when the chain is on the smallest chainring and smallest sprocket.





Add 2 links (with the chain on both the largest sprocket and the largest chainring)

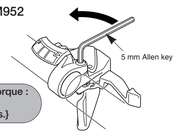
Installation of the brake lever

Use a handlebar grip with a maximum outer diameter of 32 mm.

SL-M952
Install the brake lever in a position where it will not obstruct brake operation. Do not use in a combination which causes brake operation to be obstructed.

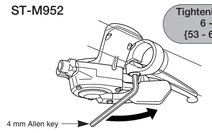
Tightening torque : 5 Nm {44 in lbs.}

SL-M952



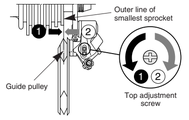
ST-M952

Tightening torque : 6 - 8 Nm {53 - 69 in. lbs.}

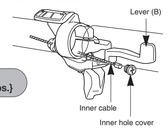


SIS Adjustment (RD-M952)

1. Top adjustment
Turn the top adjustment screw to adjust so that the guide pulley is in line with the outer line of the smallest sprocket when looking from the rear.

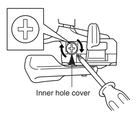


2. Connecting and securing the inner cable
Operate lever (B) eight times or more, and check on the indicator that the lever is at the highest position. Then remove the inner hole cover and connect the inner cable.



Tightening torque : 5 - 7 Nm {44 - 60 in. lbs.}

Install the inner hole cover by turning it as shown in the illustration until it stops.
Do not turn it any further than this, otherwise it may damage the screw thread.



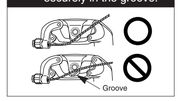
Tightening torque : 0.3 - 0.5 Nm {3 - 4 in. lbs.}

Connect the cable to the rear derailleur and, after taking up the initial slack in the cable, re-secure to the front derailleur as shown in the illustration.

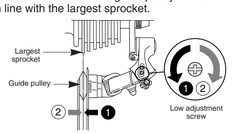
Tightening torque : 5 - 7 Nm {44 - 60 in. lbs.}



Note: Be sure that the cable is securely in the groove.

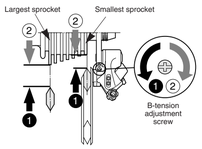


3. Low adjustment
Turn the low adjustment screw so that the guide pulley moves to a position directly in line with the largest sprocket.

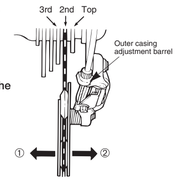


SIS Adjustment (RD-M952)

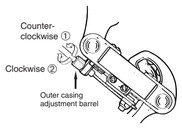
4. How to use the B-tension adjustment screw
Mount the chain on the smallest chainring and the largest sprocket, and turn the crank arm backward. Then turn the B-tension adjustment screw to adjust the guide pulley as close to the sprocket as possible but not so close that it touches. Next, set the chain to the smallest sprocket and repeat the above to make sure that the pulley does not touch the sprocket.



5. SIS Adjustment
(1) Operate the shifting lever to move the chain from the top gear to the 2nd gear.
* If the chain will **not move to the 2nd gear,** turn the outer casing adjustment barrel to increase the tension-----① **(counter clockwise)**
* If the chain **moves past the 2nd gear,** decrease the tension---② **(clockwise)**



(2) Next with the chain on the 2nd gear, increase the inner cable tension ① while turning the crank arm forward. Stop turning the outer casing adjustment barrel **just before the chain makes noise against the 3rd gear.**
This completes the adjustment.

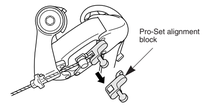


For the best SIS performance, periodically lubricate all power-transmission parts.

SIS Adjustment (RD-M953)

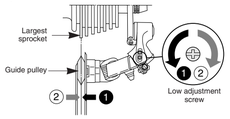
Installation of the chain

Install the chain with the Pro-Set alignment block still attached. After installing, remove the Pro-Set alignment block.

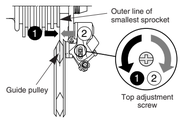


Turn the crank arm to set the derailleur to the low position.

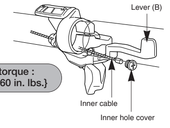
1. Low adjustment
Turn the low adjustment screw so that the guide pulley moves to a position directly in line with the largest sprocket.



2. Top adjustment
Turn the crank arm while pulling the derailleur with your hand to move the derailleur to the top position, and then turn the top adjustment screw to adjust so that the guide pulley is in line with the outer line of the smallest sprocket when looking from the rear. Turn the crank arm to set the derailleur to the low position.

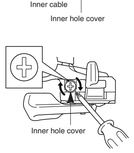


3. Connecting and securing the inner cable
Operate lever (B) eight times or more, and check on the indicator that the lever is at the lowest position. Then remove the inner hole cover and connect the inner cable.

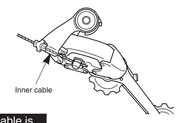


Tightening torque : 5 - 7 Nm {44 - 60 in. lbs.}

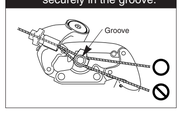
Install the inner hole cover by turning it as shown in the illustration until it stops.
Do not turn it any further than this, otherwise it may damage the screw thread.



Connect the inner cable to the derailleur as shown in the illustration.



Note: Be sure that the cable is securely in the groove.



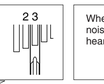
Connect the cable to the rear derailleur and, after taking up the initial slack in the cable, re-secure to the rear derailleur as shown in the illustration.

Tightening torque: 5 - 7 Nm {44 - 60 in. lbs.}

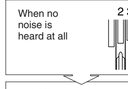


4. SIS adjustment
Push lever (B) while turning the crank arm to move the derailleur to the largest sprocket. Then operate lever (A) once to move the derailleur to the 2nd-gear sprocket. After this, operate lever (A) just as far as the extent of play, and then turn the crank arm.

When changing to 3rd

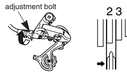


When no noise is heard at all





Turn the cable adjustment bolt clockwise to tighten it until the chain returns to the 2nd sprocket.
* Turn the adjustment bolt together with the outer casing adjustment barrel cover.



Turn the cable adjustment bolt counterclockwise to loosen it until the chain touches a sprocket and generates noise.
* Turn the adjustment bolt together with the outer casing adjustment barrel cover.

Best setting
The best setting is when the cable adjustment bolt is tightened (turned clockwise) until noise occurs without lever (A) being operated, and then loosened (turned counterclockwise) 90 - 180 degrees from that point.

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

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

(RD-M952 / RD-M953)

Inserting the inner cable
Insert the inner cable into the outer casing from the end with the marking on it. Apply grease from the end with the marking in order to maintain cable operating efficiency.



Cutting the outer casing
When cutting the outer casing, cut the opposite end to the end with the marking. After cutting the outer casing, make the end round so that the inside of the hole has a uniform diameter.



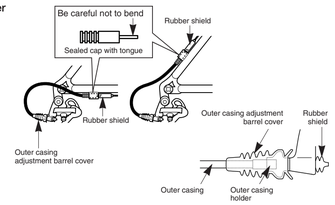
Attach the same outer end cap to the cut end of the outer casing.



Note regarding the sealed cap with tongue, rubber shield and outer casing adjustment barrel cover

1. The sealed cap with tongue and the rubber shield should be installed to the outer casing stopper of the frame.

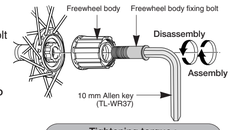
2. Pass the outer casing through the outer casing adjustment barrel cover. At this time, check that the outer casing fits securely into the outer casing holder on the rear derailleur side.



Replacement of the freewheel body

After removing the hub axle, remove the freewheel body fixing bolt (inside the freewheel body), and then replace the freewheel body.

Note: Do not attempt to disassemble the freewheel body, because it may result in a malfunction.

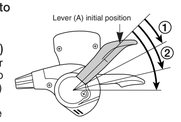


Tightening torque : 35 - 50 Nm {305 - 434 in. lbs.}

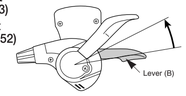
Gear shifting operation

Both lever (A) and lever (B) always return to the initial position when they are released after shifting. When operating one of the levers, always be sure to turn the crank arm at the same time.

To shift from a large sprocket to a smaller sprocket (RD-M953)
To shift from a small sprocket to a larger sprocket (RD-M952)
To shift one step only, press lever (A) to the (1) position. To shift two steps at one time, press to the (2) position.
A maximum four-step shift can be made in this manner.



To shift from a small sprocket to a larger sprocket (RD-M953)
To shift from a large sprocket to a smaller sprocket (RD-M952)
Press lever (B) once to shift one step from a larger to a smaller sprocket.



Replacement of the shifting lever unit and indicator

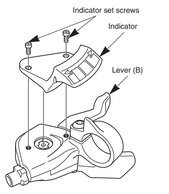
Disassembly and reassembly should only be carried out when replacing the indicator.

Removal of the indicator

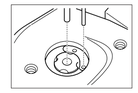
1. Remove the two indicator set screws which are securing the indicator.

Tightening torque : 0.3 - 0.5 Nm {3 - 4 in. lbs.}

2. Remove the indicator unit as shown in the illustration.
3. Operate lever (B) at least eight times to set the lever to the highest position.



4. After checking that the indicator needle is at the left edge, install the indicator as shown in the illustration.
5. Check the operation of the indicator. If it does not operate correctly, re-install the indicator while taking particular note of steps 3. to 4.



Disassembly and reassembly should only be carried out when replacing the shifting lever unit.

Replacement of the shifting lever unit

1. Loosen the cable fixing bolt (nut) of the rear derailleur, and then pull the inner cable out of the shifting lever unit in the same way as when installing the inner cable.
2. Carry out steps 1 - 2 for replacement of the indicator.
3. Remove the three shifting lever mounting screws, and then remove the shifting lever unit as shown in the illustration.

Tightening torque : 0.5 Nm {4 in. lbs.}

4. To assemble, align the shifting lever unit and the brake lever bracket and then secure the shifting lever mounting screws.
5. Carry out steps 3 - 4 for replacement of the indicator.

Do not disassemble the indicator and shifting lever unit, as this may damage them or cause mis-operation.