

General Safety Information

WARNING

- The fixing bolt for the left-side crank arm must be tightened to 45 – 55 N·m using a torque wrench. After the bicycle has been ridden for approximately 100 km (60 miles) or in the event of a crash, the fixing bolt should be rechecked using a torque wrench. Inadequate tightening of the fixing bolt could cause the crank arm to fall off while riding, resulting in a serious accident.
- Before riding, you should carefully check your crankset to make sure that there are no cracks, and if you find any sign of a crack or any other unusual condition, do NOT use the bicycle.
- Be careful not to let the cuffs of your clothes get caught in the chain while riding, otherwise you may fall off the bicycle.
- Check that the tension of the chain is correct and that the chain is not damaged. If the tension is too weak or the chain is damaged, the chain should be replaced. If this is not done, the chain may break cause serious injury.
- Obtain and read the service instructions carefully prior to installing the parts. Loose, worn, or damaged parts may cause injury to the rider. We strongly recommend only using genuine Shimano replacement parts.
- Read these Technical Service Instructions carefully, and keep them in a safe place for later reference.

Note

- Make sure that the chainring combination matches the front chainwheel tooth configuration in the Product specifications table. If other combinations are used, the distance between the chainrings will be incorrect and the chain might slip off and get caught in between them.
- When the chain is in the position shown in the illustration, the chain may contact the front chainrings or front derailleur and generate noise. If the noise is a problem, shift the chain onto the next-larger rear sprocket or the one after.
- Before riding the bicycle, check that there is no play or looseness in the connection. Also, be sure to retighten the crank arm fixing bolt at periodic intervals. (BB-FC, FC-PD)
- If you feel any looseness in the bottom bracket axle, the bottom bracket should be replaced.
- In addition, if pedaling performance does not feel normal, check this once more.
- Do not wash the bottom bracket with high-pressure jets of water.
- Apply grease to the bottom bracket before installing it.
- To ensure the best performance, be sure to use only the specified type of chain. The wide type of chain cannot be used.
- If the chain keeps coming off the chainrings during use, replace the chainrings and the chain.
- You should periodically wash the chainrings in a neutral detergent and then lubricate them again. In addition, cleaning the chain with neutral detergent and lubricating it can be an effective way of extending the useful life of the chainrings and the chain.
- Parts are not guaranteed against natural wear or deterioration resulting from normal use.
- 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.

Technical Service Instructions

SI-15H0A

FC-M970

Front chainwheel

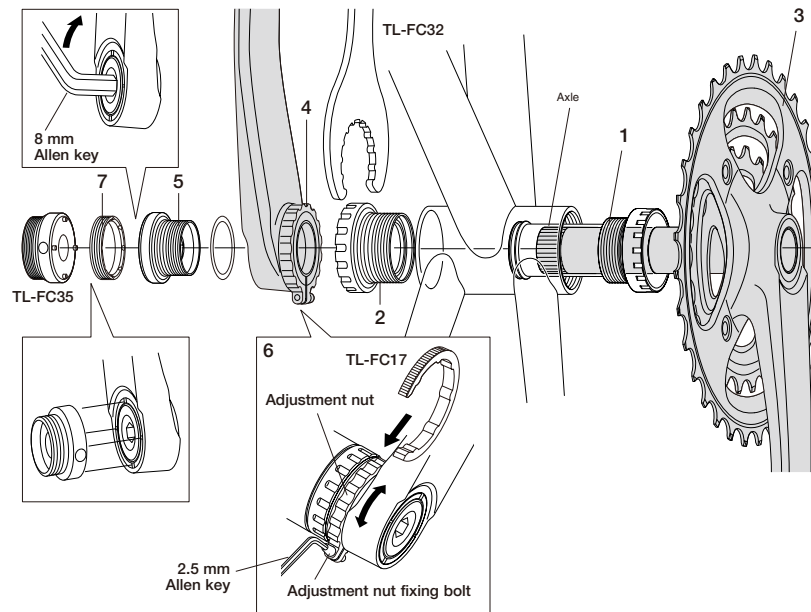
Specifications

Model number	FC-M970
Chainwheel tooth combination	44-32-22T / 44-32-24T
Bolt circle diameter	104 mm / 64 mm
Crank arm length	165 mm, 167.5 mm, 170 mm, 172.5 mm, 175 mm, 177.5 mm, 180 mm
Chain line	50 mm
Shell width	68, 73 mm
Thread dimensions	BC1.37 (68, 73 mm)

Installation of the front chainwheel

Follow the procedure in the figure.

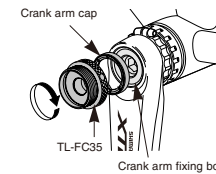
- 1, 2 Use the special tool TL-FC32 to install the right adapter (counterclockwise thread) and the left adapter (clockwise thread).
Tightening torque: 35 - 50 N·m {305 - 435 in. lbs.}
- 3 Insert the right crank unit.
- 4 Before installing the left-side crank arm, check that there is no gap between the adjustment nut and the crank arm (the nut should be fully tightened), and then set the left-side crank arm so that the axle of the right-side crank arm unit is aligned correctly with the serrations of the left-side crank arm.
- 5 Insert an 8 mm Allen key and turn it clockwise to tighten the crank arm fixing bolt.
Note: The crank arm fixing bolt should be periodically retightened.
Tightening torque: 45 - 55 N·m {392 - 479 in. lbs.}
- 6 Use the TL-FC17 to turn the adjustment nut in order to adjust the play, and then tighten the adjustment nut fixing bolt (2.5 mm Allen key).
Tightening torque: Adjustment nut / 1 - 1.5 N·m {8.7 - 13 in. lbs.}
Adjustment nut fixing bolt / 1 - 1.2 N·m {8.7 - 10.4 in. lbs.}
- 7 Turn the TL-FC35 counterclockwise to install the crank arm cap.
Note: At the time of shipment from the factory, the crank arm cap is installed to the crank arm, and so use the TL-FC35 to check that it is securely tightened.



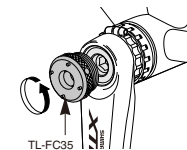
Removal

- 1 Turn the TL-FC35 clockwise to remove the crank arm cap.

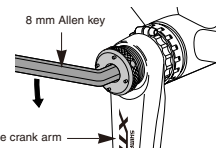
Note: The crank arm cap and the TL-FC35 screw have a left-hand thread [reverse thread]. This is to prevent the crank arm from turning also when removing the crank arm fixing bolt.



- 2 Turn the TL-FC35 counterclockwise to tighten it as far as it will go. Check that the TL-FC35 turns 3.5 times or more at this time. (Because of the design, the thread may become stripped if less than 3.5 threads are engaged.)

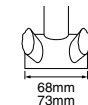


- 3 Fit an 8 mm Allen key and turn it counterclockwise to remove the left-side crank arm.

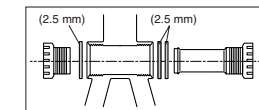


Spacer installation method

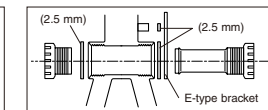
- 1 Check whether the width of the bottom bracket shell is 68 mm or 73 mm.
- 2 Next, install the adapter while referring to the illustrations below.



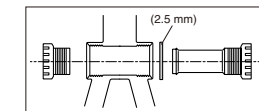
68 mm (Band Type)



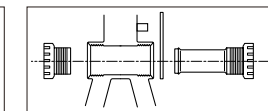
68 mm (Bracket Type)



73 mm (Band Type)

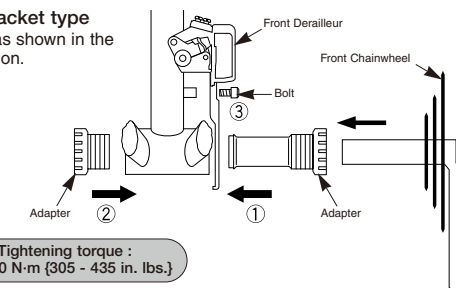


73 mm (Bracket Type)



For bracket type

Install as shown in the illustration.



Tightening torque :
35 - 50 N·m {305 - 435 in. lbs.}

- Be sure to read the service instructions for the Front Drive System in conjunction with these service instructions.

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