



• When it is also necessary to replace the nipple:

- Slide the nipple into the rim as far as the valve hole (Fig. 26).
- Rest the wheel on a surface that will not damage the rim and let it bounce from 2 cm/1 inch max (Fig. 26) until the nipple comes out of the valve hole.
- Slide out the spoke to replace (Fig. 27).
- Screw the magnet-attracting nipple insert firmly onto the new nipple (Fig. 28).

- Insert the nipple into the valve hole and use the magnet contained in the package to guide the nipple as far as the spoke hole (Fig. 29).
- Bring the nipple out of the hole (Fig. 29) and remove the nipple-magnet coupling pin.
- Screw the nipple about two turns onto the new spoke.
- Insert the spoke into the hub (Fig. 30). Be sure that the head of the spoke is correctly positioned.
- Put the rubber insert (D - Fig. 31) into the anchor spoke hole, following the steps below:

- a) holding insert with tweezers, put it into the anchor spoke hole (1 - Fig. 31).
- b) push it gently with the tweezers until it is completely inside the hole (2 and 3 - Fig. 31).

Note
Take care not to scratch the hub.

- Screw the nipple fully in using a spoke wrench (Fig. 32).
- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible. The ring is provided with 3 grooves so that it can be used with 3 different types of spoke; the groove to use for spokes for the Zonda™ wheel is the one marked by the letter B (Fig. 33).

- Following the operations described in chapter 10:
- Carry out the tensioning and balancing of the spokes;
- Check the centering and dish of the wheel.
- After replacing the spoke and tensioning and centering the wheel, it is necessary to carry out the adjustment of the hub (see chapter 7).

8.2 - REAR WHEEL ON FREEWHEEL SIDE

- Before replacing a spoke, refer to the technical specifications to find 1) the type and length of the spoke to be replaced, 2) the recommended spoke tension value and the maximum tension value not to exceed.
- Check that there are no residues of sand or of other impurities in the rim; if necessary eliminate them with a jet of compressed air.
- Get an original spare spoke.

Note
Do not scratch the rim with the spokes.

- Unscrew the nipple corresponding to the spoke to be replaced using a spoke wrench (Fig. 26).

- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible. The ring is provided with 3 grooves so that it can be used with 3 different types of spoke; the groove to use for spokes for the Zonda™ wheel is the one marked by the letter B (Fig. 33).

- If the nipple is not damaged and can be reused:
- Grip the nipple firmly so as not to allow it to slide into the rim.
- Slide out the spoke to replace (Fig. 34).

- Note**
If necessary, first remove the spoke above the one to be replaced and, after fitting the new spoke, reposition it in the same place.

- Screw the nipple about two turns onto the new spoke.
- Insert the spoke into the hub (Fig. 35). Be sure that the head of the spoke is correctly positioned.

- Screw the nipple fully in using a spoke wrench (Fig. 32).

- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible.

- When it is also necessary to replace the nipple:

- Slide the nipple into the rim as far as the valve hole (Fig. 26).
- Rest the wheel on a surface that will not damage the rim and let it bounce from 2 cm/1 inch max (Fig. 26) until the nipple comes out of the valve hole.
- Slide out the spoke to replace (Fig. 34).

- Note**
If necessary, first remove the spoke above the one to be replaced and, after fitting the new spoke, reposition it in the same place.

- Screw the magnet-attracting nipple insert firmly onto the new nipple (Fig. 28).
- Insert the nipple into the valve hole and use the magnet contained in the package to guide the nipple as far as the spoke hole (Fig. 29).
- Bring the nipple out of the hole (Fig. 29) and remove the nipple-magnet coupling pin.
- Screw the nipple about two turns onto the new spoke.
- Insert the spoke into the hub (Fig. 35). Be sure that the head of the spoke is correctly positioned.
- Screw the nipple fully in using a spoke wrench (Fig. 32).

- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible.

- Put back the spoke above the one to be removed it in the first place.
- Following the operations described in chapter 10:
- Carry out the tensioning and balancing of the spokes;
- Check the centering and dish of the wheel.
- After replacing the spoke and tensioning and centering the wheel, the hub must then be adjusted (see chapter 7).

9. CHANGING THE RIM

⚠ WARNING!
A deformed rim when the distance between the rim shoulders exceeds 15.5 mm (Fig. 36). A deformed rim may cause the clincher to suddenly come out of its seat, resulting in an accident, personal injury or death.

- Before proceeding with the disassembly of the wheel, note the original orientation of the rim and the spoke arrangement on a sheet of paper to assist you in reassembling the wheel correctly.
- Get an original spare rim.



WARNING!

Always wear gloves and protective goggles when working with the spokes.

Note
Do not scratch the rim with the spokes.

9.1 - FRONT RIM

- For each spoke, take the rubber insert out of the anchor hole (D - Fig. 37), following the steps below:
- slacken the spoke using a spoke wrench (C - Fig. 32)

- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible. The ring is provided with 3 grooves so that it can be used with 3 different types of spoke; the groove to use for spokes for the Zonda™ wheel is the one marked by the letter B (Fig. 33).
- ease the insert slightly out of its anchor hole (D - Fig. 37) by gently moving the spoke backwards and forwards (Fig. 37)
- Note**
Take care not to damage the spoke.
- use tweezers to pull the insert out completely (D - Fig. 38).
- Note**
Take care not to scratch the hub.

- For each spoke:
- fully unscrew the nipple using a spoke wrench (Fig. 32).
- Slide the spoke out of the hub (Fig. 27).
- Slide the nipple into the rim as far as the valve hole (Fig. 26).
- Rest the wheel on a surface that will not damage the rim and let it bounce from 2 cm/1 inch max (Fig. 26) until the nipple comes out of the valve hole.

- Carry out the operations indicated in the previous point for all the spokes.
- Get the new rim.
- For each spoke:
- Screw the magnet-attracting nipple insert firmly onto the new nipple (Fig. 28).
- Insert the nipple into the valve hole and use the magnet contained in the package to guide the nipple as far as the spoke hole (Fig. 29).
- Bring the nipple out of the hole and remove the nipple-magnet coupling pin (Fig. 29).
- Screw the nipple about two turns onto the spoke.

- Carry out the operations indicated in the previous point for all the spokes.
- Fit the spokes one by one into the hub (Fig. 30). Be sure that the heads of the spokes are correctly positioned.
- Note**
The rim has oriented holes (Fig. 39). When inserting the spokes onto the hub, follow the natural inclination of the holes.
- For each spoke, put the rubber insert (D - Fig. 31) into the anchor spoke hole, following the steps below:
- a) holding insert with tweezers, put it into the anchor spoke hole (1 - Fig. 31).
- b) push it gently with the tweezers until it is completely inside the hole (2 and 3 - Fig. 31).

- Note**
Take care not to scratch the hub.
- Screw each nipple on to each spoke using a spoke wrench (Fig. 32). To prevent the spoke from turning and avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to each nipple as possible.

- ⚠ WARNING!**
Check that there are no signs of wear, damage or deformation on the braking track on the side of the rim. A damaged rim may break suddenly, resulting in an accident, personal injury or death.
- Follow the operations described in chapter 10:
- Carry out the tensioning and balancing of the spokes;
- Check the centering and dish of the wheel.

9.2 - REAR RIM

⚠ WARNING!
Some factors must be kept in mind when replacing the rear rim:
- The spokes are assembled 3 by 3. The 2 external spokes are always right-hand, the central spoke is always left-hand (Fig. 40).
- To determine the right (FW) side of the rim, keep the rim in your hands as shown in Fig. 40 and verify that the valve hole (B - Fig. 40) is on the right of the group of 3 spokes.

- For each spoke on the side opposite the freewheel, take the rubber insert out of the anchor hole (D - Fig. 37), following the steps below:
- slacken the spoke using a spoke wrench (C - Fig. 32)
- Note**
To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to the nipple as possible. The ring is provided with 3 grooves so that it can be used with 3 different types of spoke; the groove to use for spokes for the Zonda™ wheel is the one marked by the letter B (Fig. 33).
- ease the insert slightly out of its anchor hole (D - Fig. 37) by gently moving the spoke backwards and forwards (Fig. 37)
- Note**
Take care not to damage the spoke.
- use tweezers to pull the insert out completely (D - Fig. 38).
- Note**
Take care not to scratch the hub.

- For each spoke:
- Fully unscrew the nipple using a spoke wrench (Fig. 32).
- Slide the spoke out of the hub (Fig. 34).
- Slide the nipple into the rim as far as the valve hole (Fig. 26).
- Rest the wheel on a surface that will not damage the rim and let it bounce from 2 cm/1 inch max (Fig. 26) until the nipple comes out of the valve hole.

- Carry out the operations indicated in the previous point for all the spokes.

- Get the new rim.
- For each spoke:
- Screw the magnet-attracting nipple insert firmly onto the new nipple (Fig. 28).
- Insert the nipple into the valve hole and use the magnet contained in the package to guide the nipple as far as the spoke hole (Fig. 29).
- Bring the nipple out of the hole (Fig. 29) and remove the nipple-magnet coupling pin.
- Screw the nipple about two turns onto the spoke.
- Note**
 - **FW side (right) spokes: L. 280.**
 - **Side opposite the FW (left) spokes: L. 275.**
- Carry out the operations indicated in the previous point for all the spokes.
- Beginning with the freewheel side, insert the spokes into the hub (Fig. 35). Be sure that the head of the spokes is correctly positioned.
- Note**
There is a groove with two different depths in the hub on the freewheel side. Insert first the spokes which are housed in the deeper grooves (Fig. 41).

- Then continue with the insertion of the spokes on the side opposite the freewheel.
- For each spoke on the side opposite the freewheel, put the rubber insert (D - Fig. 31) into the anchor spoke hole, following the steps below:
- a) holding the insert with tweezers, put it into the anchor spoke hole (1 - Fig. 31).
- b) push it gently with the tweezers until it is completely inside the hole (2 and 3 - Fig. 31).

- Note**
Take care not to scratch the hub.
- Fully screw each nipple using a spoke wrench (Fig. 32). To prevent the spoke from turning and to avoid any damage, position the provided spoke antirotation ring (C - Fig. 32) as close to each nipple as possible.

⚠ WARNING!

Check that there are no signs of wear, damage or deformation on the braking track on the side of the rim. A damaged rim may break suddenly resulting in an accident, personal injury or death.

- Carry out the operations indicated in the previous point for all the spokes.
- Follow the operations described in chapter 10:
- Carry out the tensioning and balancing of the spokes;
- Check the centering and dish of the wheel.

10. ADJUSTMENT OF SPOKES TENSION AND WHEEL CENTERING

- Centering the wheel involves checking and correcting axial (centering) and radial (roundness) offsets (Fig. 42).

⚠ WARNING!

This is one of the most important stages in assembling the wheel. Using wheels that have not been centered properly or which have broken or damaged spokes may result in an accident, personal injury or death.

- Carry out the operations indicated in the previous point for all the spokes.
 - Follow the operations described in chapter 10:
 - Carry out the tensioning and balancing of the spokes;
 - Check the centering and dish of the wheel.
- To center, place the wheel on a rigid wheel-centering support (A - Fig. 43), lock it by means of the quick release skewer and check the axial and radial offsets using a dial gauge (Fig. 43).
 - To correct excessive axial deformation to the left part of the wheel, adjust the spoke in the deformed area by either increasing the tension of the right-handed spoke or reducing the tension of the left-handed spoke.
 - Carry out this operation over the whole surface of the wheel, bearing in mind that the decision to increase or decrease tension in the spokes also directly influences the **wheel dish**.
 - To correct excessive outwards radial deformation, adjust the pair of spokes in the area in question by increasing their tension; to correct excessive inwards radial deformation, adjust the pair of spokes in the area in question by reducing their tension.
 - Repeat checking the axial and radial trueness until an error of less than 0.4 mm is obtained.
 - Balance the wheel as described in para 10.1.
 - **Alternate between nipple tensioning and checking for trueness and circularity until the correct spoke tension is obtained, and the deformation error is within the following limits:**
 - centering (axial offset): 0.3 mm
 - circularity (radial offset): 0.4 mm
 - Repeat balancing, making all necessary corrections, until the wheel is properly centered (Fig. 44).

10.1 - BALANCING THE WHEELS

⚠ WARNING!

This is one of the most important stages in assembling the wheel. Incorrect balancing may damage the wheel or cause the wheel to unexpectedly fail, resulting in an accident, personal injury or death.

- To carry out this operation, the wheel must be fitted on a very rigid wheel centering support (A - Fig. 44).
- **Spoke after spoke**, pull the rim forcefully with both hands from the side opposite the spoke (B - Fig. 45) to balance.
- Repeat the operation from the other side of the wheel (Fig. 45).

10.2 - CHECKING WHEEL DISH

- To check wheel dish, use a template (A - Fig. 46) and place it on one side of the wheel. Screw or unscrew the measuring screw until it touches the nut or the counter-cup of the hub.
- Place the template on the other side of the wheel and check that the measuring screw (B - Fig. 46) rests on the nut or counter-cup of the hub. If there is any distance between the screw and hub, the wheel dish must be corrected.
- The maximum permitted wheel dish tolerance is 1 mm.
- **Front wheels:** if the rim axis is excessively displaced to one side, slacken all the spoke nipples on the same side by approximately one-quarter turn. Then tighten all the spoke nipples on the opposite side by approximately one-quarter turn. Check the dish again and repeat the operation as required, taking care not to excessively tighten the spokes.
- **Rear wheels:** if the rim axis is excessively displaced to one side, slacken all the spoke nipples on the same side by approximately one-half turn and simultaneously tighten all the spoke nipples on the opposite side by approximately one-quarter turn. Remember that the different angle of the right and left spokes (shallower and steeper, respectively) significantly affects wheel dish; therefore, never increase the left spoke nipples by more than approximately one-quarter turn to avoid difficulties in setting the wheel dish. Repeat the operation as required, taking care not to excessively tighten the spokes

CAUTION

The values given above (approximately 1/2 turn and approximately 1/4 turn) are suggestive. However, bear in mind that if the tension of the right-hand spokes is changed in one direction, then the tension of the left-handed spokes must be changed almost twice as much in the opposite direction.

- Note**
After tensioning and centering the wheel, always use a thread lock in the spoke-nipple interface.

11. BRAKES

11.1 - CAMPAGNOLO® BRAKES

⚠ WARNING!

- Before every ride, check your brake pads and cables to be sure they are in good condition. In addition, test your brakes in the beginning of your ride to make sure they are operating properly.
- Make sure that the brake pads are perfectly aligned with the wheel braking surface, adjust the brake pads so that they are centered in height in relation to the braking surface of the rim and parallel to it horizontally and vertically and make sure that they are about 1 mm from the surface of the rim (Fig. 47).
- Check the wear status of the brake pads at regular intervals and replace them when the braking surfaces reach the limit marked by the wording "WEAR LIMIT" or if braking power is in any way insufficient (consult the brake instruction leaflet).
- Check the tension of the brake control cables at regular intervals.
- Keep the braking surface of the rim and the brake pads free from oil and grease.
- Using a file, periodically remove any traces of debris or sand from the brake pads which could lead to deep scoring on the sides of the rims, reduce the braking efficiency and adversely affect the integrity of the rim itself.
- Check the brake cable for any evidence of wear or stretching, and replace the cables if necessary. In addition, check that the screw locking the cable to the brake is correctly tensioned (consult the brake instruction leaflet).
- Check torque setting(s) of the brake, brake pad and cable locking screws at regular intervals.
- When riding in wet conditions, remember that the stopping power of your brakes is greatly reduced and the adherence of the tires to the ground is considerably reduced. Also bear in mind that because of the progressive drying of the braking surface during braking itself, braking power may vary sharply. This makes it harder to control and stop your bicycle. Extra care is required when riding your bicycle in wet conditions to avoid an accident. An accident could result in severe personal injury or death.
- For further information please consult the instruction sheet supplied with the brakes.

11.2 - BRAKES OF OTHER MANUFACTURERS

Please consult the instruction sheet supplied by the manufacturer.

12. PERIODICAL WHEEL MAINTENANCE

- After using the wheel for the first time, check wheel trueness and circularity.

⚠ WARNING!

Using wheels that have not been centred or balanced properly or which have broken, damaged or incorrectly tensioned spokes may result in accidents, personal injury or death.

- After every ride, check the condition of the tires and inflation pressure.
- Periodically take your bicycle to a qualified mechanic to lubricate the hubs. Check with your mechanic to select a schedule that is best for you (approximately every 2,000/5,000 km - 1,200/3,000 miles).
- Every 10,000/20,000 km (6,000/12,000 miles) please take your bicycle to a qualified mechanic to lubricate, remove, disassemble and check the hubs.
- Have your mechanic periodically check every component that is subject to wear (rims, ball bearings, brake pads). If necessary, have them replaced.
- At least once each month, please take your bicycle to a qualified mechanic to check the tension of the spokes, wheel centering and wheel dish and correct as necessary.
- Periods and riding distances are purely indicative and may be significantly different in relation to conditions of use and the intensity of your activity (for example: racing, rain, salted Winter roads, weight of the rider etc.). Check with your mechanic to select a schedule that is best for you.

12.1 - CLEANING THE WHEELS

When cleaning the wheels, only use non-abrasive, non-corrosive products such as water and neutral soap, or specific products specially designed for cleaning bicycles. Never use abrasive or metal sponges. Dry with a soft cloth.

- NOTE**
Never spray your bicycle with water under pressure. Pressurized water, even from the nozzle of a small garden hose, can pass seals and enter into the components of your bicycle, damaging them beyond repair. Wash your bicycle and Campagnolo® wheels by wiping them down with water and neutral soap.

12.2 - TRANSPORT AND STORAGE

When transporting the wheel separately from the bike or if the wheel will not be used for a long period of time, store it in a wheelbag to protect it against impacts and dirt.

This product is protected by one or more of the following:

- **Patents:** DE 20121866.6 - DE 20221235.1 - EP 1201458 - FR 9810117 - IT 1296196 - IT 1320727 - MX 230355 - TW 240364 - US 5997104 - US 6491350
- **Patent applications:** AU 2004202807 - AU 79331/01 - CN 01123351.6 - CN 0410062041.X - CN 0510074749.1 - CN 0510096673.2 - CN 2003101148987 - CZ 00012243 - DE 1982809.2 - EP 0402586.9 - EP 03009131.9 - EP 03425407.2 - EP 04425633.5 - EP 05425353.8 - IT 00425686.9 - IT 20201A000210 - JP 10217047 - JP 2001-204664 - JP 2003-378755 - JP 2004-189995 - JP 2005-155510 - JP 2005-251583 - JP 92130587 - TW 93118094 - TW 94113301 - TW 94129965 - US 10704467 - US 10/877024 - US 11/136237 - US 11/216611
- **Designs:** CZ 30719 - IT 80805 - JP 1162273 - JP 1162274 - TP 30294 - TW 086727 - TW 086729 - US D458202 S - US D472507 S
- **Design applications:** EM 000047683 - II DM/056139

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