



Final Drive Chain Maintenance Precautions

All Models and Model Years (Except XDiavel)

Service Repair Bulletin SRV-SRB-18-030

Date: November 8, 2018
To: Dealer Principal, General Manager, Service Manager, North American Dealer Network
From: Richard Kenton, Technical Director
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Dear Dealers,

The bulletin is to present comprehensive information for the proper maintenance of the final drive chain installed on the entire Ducati range. The following recommendations ensure top performance and a long life of the chain.

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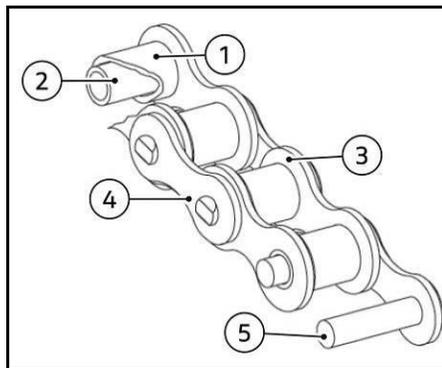
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Construction and Designations

Chains installed on Ducati models are roller chains designed according to ISO/DIN/BS standards. These chains are made up of alternating internal links and external links, connected by pins.

The **internal links (3)** are made of two plates fastened to each other through two **bushings (2)**; each bushing houses a **roller (1)**.

The **external links (4)** are made of two external plates fastened to each other through two **pins (5)** and four **O-rings (6)**. The O-Rings have a twofold role as they not only hold the lubricant but also prevent any foreign objects from entering the pin-bushing area.



This type of chain is characterized by two key parameters:

- pitch length
- link internal width

A standardized 3-digit numerical code is used to indicate these two values (for example: 415, 420, 428, 520, 525, 530)



NOTE

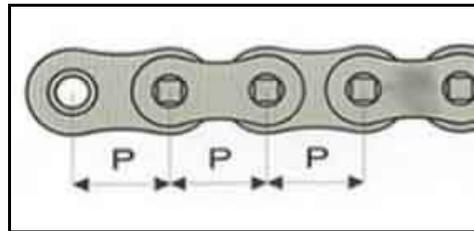
For the Regina chains, different references are used compared to international coding standards.



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According to the international coding standard, the first digit is the **chain pitch (P)**, defined as the distance between centers of two consecutive pins



Chain pitch is calculated by multiplying 1/8 inch by the first of the three numbers punched on the link (**520**)



$$P = 1/8" \times 5 = 5/8"$$

The chain displayed is manufactured with a 5/8" pitch

To obtain pitch in centimeters, multiply the obtained value in inches by the conversion factor 2.54: $P = 5/8" \times 2.54 = 1.5875 \text{ cm} \rightarrow 1.59 \text{ cm}$

Below is a table summarizing chain pitch values

Regina standard	International standard	Chain Pitch
54 – 90 – 124 – 125 – 126	415 – 420 – 425 – 428	1/2" = 1.2700 cm
135 – 136 – 136.2 – 137	520 – 525 – 530 – 532	5/8" = 1.5875 cm
138 – 138.2	630 – 632	3/4" = 1.9050 cm

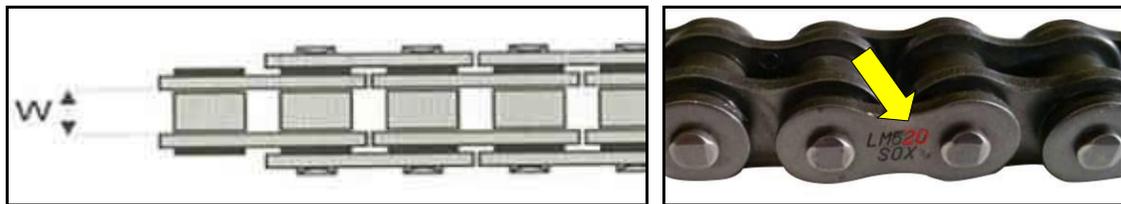


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The second and third numbers are the **internal width (W)** of the chain according to the international coding standard. The higher the number, the higher the distance between the two internal plates

Internal width is calculated by multiplying 1/8 inch by the second and third digits (520) after adding a decimal separator between the two digits (2.0 – 2.5 – 3.0)



$$W = 1/8" \times 2.0 = 1/4" = 1/4" \times 2.54 = 0.635 \text{ cm}$$

For a 530 chain, pitch is the same, but width is different

For example: $W = 1/8" \times 3.0 = 3/8" = 3/8" \times 2.54 = 0.952 \text{ cm}$



WARNING

Changing the internal distance between the links will change the space available for the teeth of the sprockets. It is always mandatory to ensure that the chain and sprockets installed have the same pitch and width rating

It is not possible to install a 520 chain on 530-pitch sprockets or vice versa



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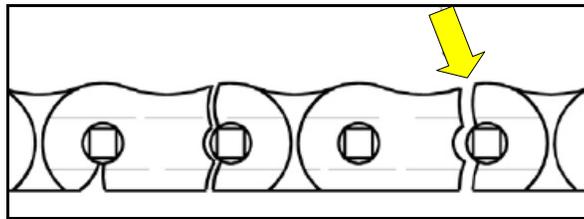
Cleaning the Chain

Statistically, it has been found that the average service life of a final drive chain is about 20,000 km, only if it is periodically maintained in accordance with the instructions given in the Owner's Manual of the motorcycle.

To ensure top performance and long life of the chain, follow the instructions relating to washing, lubrication, inspection and tensioning of the chain described below.

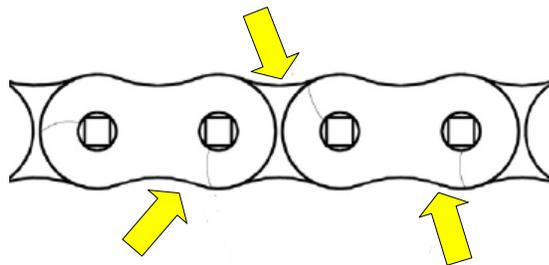
The cleaning of the chain is crucial for its life. Use a jet of water to remove any mud, soil, sand or dirt build-up and immediately dry the chain using compressed air, blown from a distance of at least 30 cm.

In case of Off-Road use, there may be excessive wear of the links due to the contact with the chain guide shoe. The friction could in fact cause chain overheating that would alter the heat treatment of the links making them particularly fragile. In extreme cases, the link failure will likely occur vertically on the link. The transverse cracks start from the base of the link and then extend until they affect the seat of the pin.



NOTE

Avoid the use of steam, fuels, solvents, hard brushes or other methods that may damage the O-rings. Also avoid direct contact with the battery acid as it could cause small fractures of the links.





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Lubricating the Chain

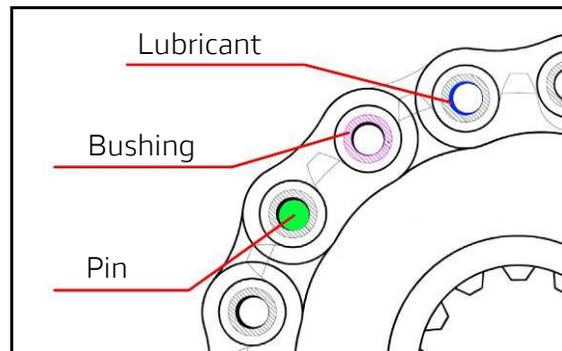
Once the chain has been washed and cleaned, proceed with lubrication.

Lubricate the chain at least every 400 km or more frequently if the motorcycle is used in conditions of high ambient temperature (40°C) or after long trips on the highway at high speed.

Lubricate the chain without waiting for it to cool down after use, so that the new lubricant can better go through the internal and external links and enhance its protective action.

Do not use the motorcycle immediately after lubricating the chain as the lubricant would still be fluid and it would hence be ejected outwards by centrifugal force, possibly staining with oil the rear wheel or the rider footpeg.

The pin-bushing area is the critical point where the greatest stresses occur due to high operating loads and high temperatures. These stresses will reduce the anti-wear effect of the oil film present on all parts of the chain.



The O-Rings present in all OE chains of the Ducati models play a twofold role as they hold the lubricant and prevent foreign objects enter the pin-bushing area.

In case of poor lubrication, you might experience the following symptoms:

- reddish areas (due to oxidation)
- squeaks and noise
- stretching
- stiffer joints





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Lubrication is very important as it:

- reduces friction and heat build-up
- keeps the O-Rings soft thereby avoiding cracking and consequent failure
- protects against oxidation of metal parts
- increases drive efficiency
- increases the service life of the whole drive system

Chain can be lubricated according to either of these two methods:

A. Lubrication by brush:

When using a brush, apply a film of oil throughout the length of the chain; then use a clean cloth to eliminate any excess oil.

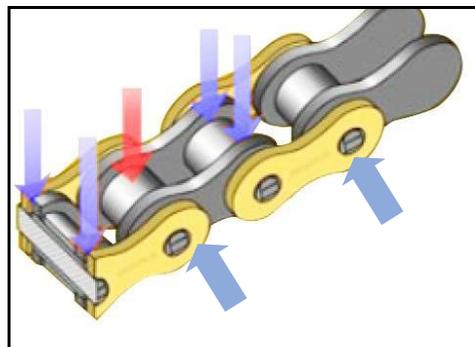
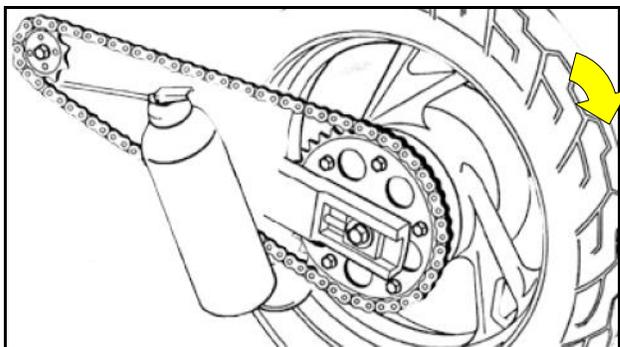


WARNING

Use mineral oil SAE 80W-90 or specific chain lubricants. Ensure that they do not contain any additives that might damage the O-rings.

B. Lubrication by spray:

1. Position the bike on the rear paddock stand
2. Quickly spin the rear wheel in the direction opposite to the direction of travel
3. Spray the lubricant inside the chain, between internal and external links, at the point immediately upstream of the sprocket meshing point. Due to the centrifugal force, the lubricant (made fluid by the solvents contained in the spray) will expand in the area between the pin and the bushing, thereby ensuring perfect lubrication
4. Repeat the operation by aiming the lubricant spray pattern on the central part of the chain in order to lubricate the rollers and on the external plates



5. When lubrication is completed, wait 10-15 minutes to allow the lubricant to spread on the internal and external surfaces of the chain and then remove any excess lubricant with a clean cloth



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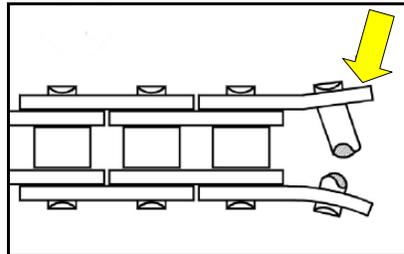
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Checking the chain

The chain should be frequently inspected to ensure that there are no stiff joints, missing or damaged O-rings, or other worn-out components (especially the closing link).

The wear of a chain can easily be checked by measuring its stretch.

If the chain stretches beyond the expected limits, the mechanism will become unreliable, the pitch will no longer be accurate, and the chain could jump on the next tooth of the sprocket and cause breakage and other damage.



NOTE

Before measuring, it is necessary to properly clean and lubricate the drive chain.



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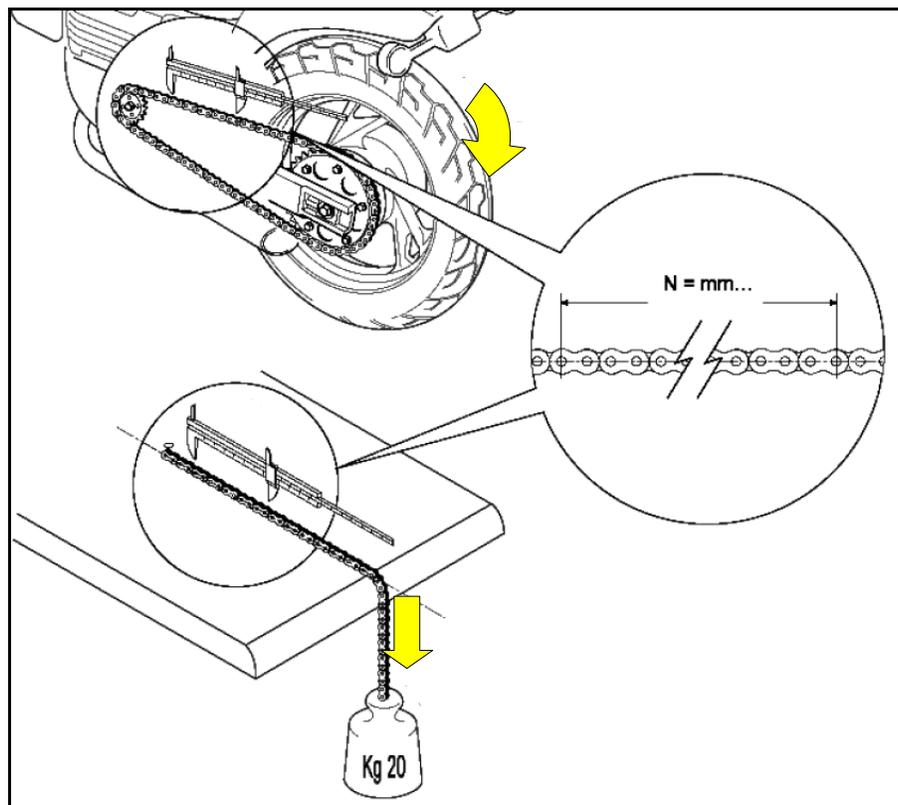
To inspect the final drive chain, follow the procedure below:

1. If the chain is installed to the motorcycle, tension the upper or lower branch by engaging a low gear and turn the rear wheel, respectively, clockwise or counter clockwise. If the chain is not installed to the motorcycle, it is necessary to position it on a horizontal surface, fix it at one end and tension it by means of a weight of about 20 kg applied at the opposite end
2. Using a millimeter precision gauge or ruler, measure the distance between centers of two pins separated by a number "N" of links.



NOTE

The number "N" of links can be calculated by counting the pins. The number of pins "N" to be considered for the measurement depends on the type of chain.





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Ensure that the measured value does not exceed the maximum acceptable length specified in the table below:

Regina standard	International standard	N (number of pins)	<u>Maximum acceptable length</u> (chain with O-Rings)
54 – 90 – 124 – 125 – 126	415 – 420 – 425 – 428	23	29.5000 cm
135 – 136 – 136.2 – 137	520 – 525 – 530 – 532	16	25.6500 cm
138 – 138.2	630 – 632	16	30.0780 cm

The chain must be changed if measurement exceeds the maximum specified length.

In addition to measuring the length, a visual inspection of the plates, pins, O-rings and bushings can be carried out to check chain wear.

If any of the following are present the drive chain must be replaced:

- cracks on the plates
- cracks on the pins
- spinning pins
- damaged O-Rings
- scratched rollers

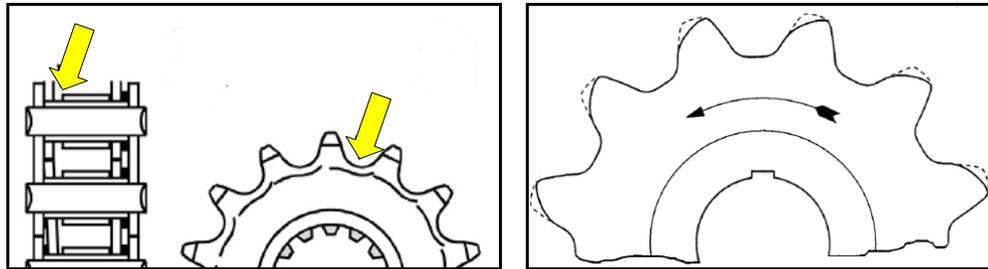


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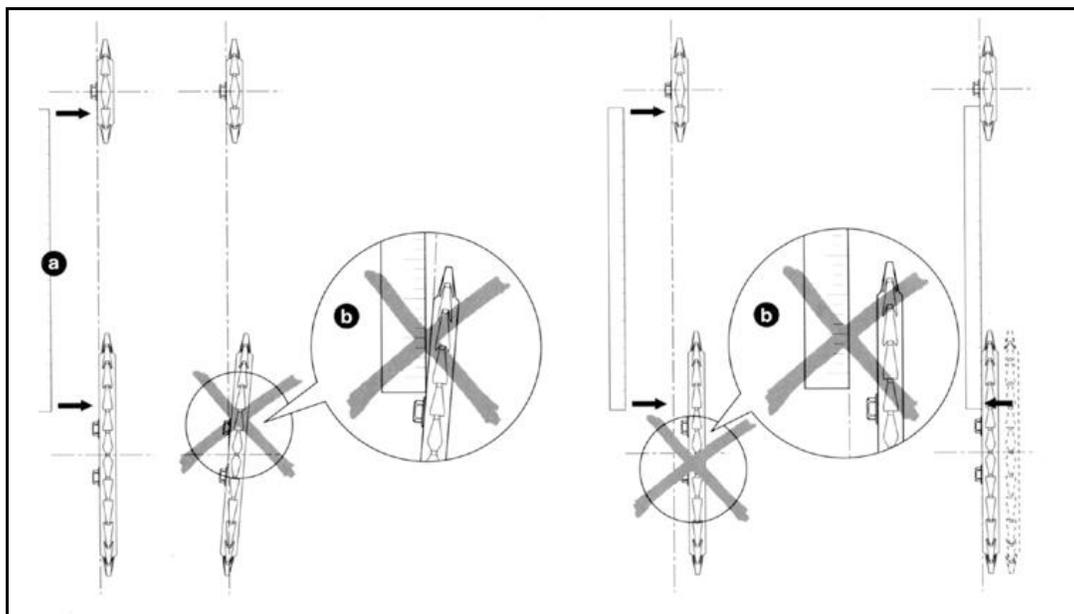
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Checking the sprockets

In order to guarantee top performance and a long life of the chain, it is necessary to frequently check teeth wear on both sprockets, their profile and thickness and replace them if required. Sprocket teeth wear can be identified with a visual inspection because worn teeth are typically shaped like a "hook".



When installing new sprockets, it is necessary to turn the rear wheel and inspect for side clearance or runout issues. A misalignment could trigger axial thrusts on the internal link of the chain, which can be detected by lateral wear of the teeth of the sprockets.



NOTE

A new chain installed to worn or damaged sprockets will wear or become damaged quickly. To obtain top performance, it is necessary to install new sprockets when replacing a drive chain to obtaining the same level of wear and reliability for all the components of the drive system.



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Tensioning the chain

The correct tensioning of the chain is an extremely important factor for its life and efficiency. The inspection and chain tensioning must be carried out in case of use:

- on the road, after the first 100 km and every 400 km thereafter
- off-road, after each use

Prior to tensioning, the chain must be set to the position where it is most taut



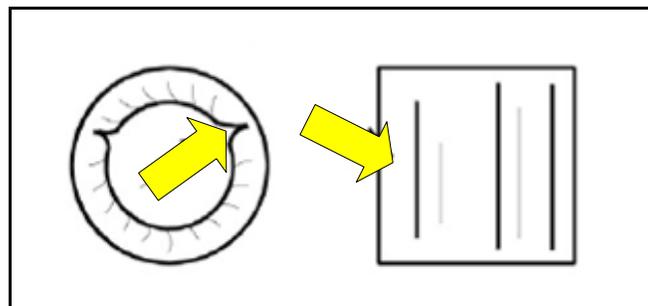
NOTE

The Specified chain tension value for each model and variation is provided in Section 4: "Maintenance operations - Adjusting the chain tension" in the Workshop Manual, and on the relevant adhesive label on the swingarm.

Excessive chain tensioning will cause an increase in the work load between the pins and the bushings, overheating the chain and prematurely consuming the lubricant film resulting in increased wear of the chain itself.

Below are some phenomena that could occur in the event of incorrect tensioning of the chain:

- A. Micro cracks in the chain rollers, which are not visible to the naked eye; however, when the chain is inspected, deep scratches can be found on the roller surface.

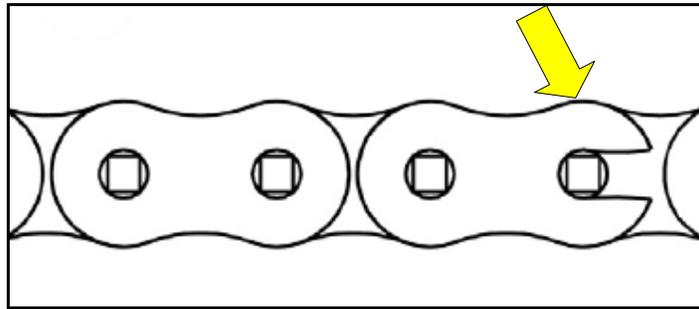




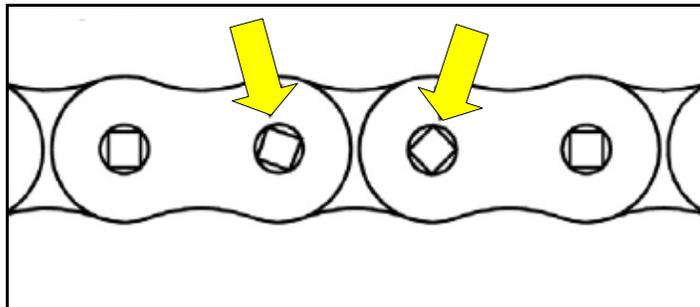
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B. Breakage of the link in the longitudinal direction due to excessive stress.



C. Spinning pins.





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Changing the chain

Any dedicated motorcycle chain tool publicly available can be used to replace the final drive chain, as there is no specific tool sold directly by Ducati for this operation.

After removing the chain master link, follow the procedure below:

1. Using the fork of the old outer link or master link, connect one end of the chain to be replaced with the new chain
2. Slowly pull the other end of the old chain until the new chain is wrapped around the front sprocket; continue until the end of the new chain is on the rear sprocket
3. Remove the old fork together with the old chain
4. Wrap the other end of the new chain around the rear sprocket so that the two ends are positioned one after the other on two consecutive teeth
5. Take the new link to be riveted and make sure that the two O-rings resting on the plate are in place on the fork

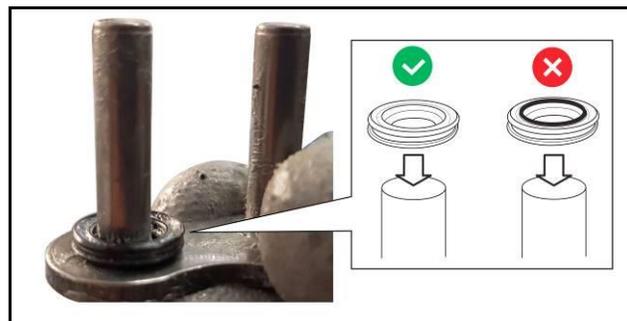


NOTE

In the specific case of Regina chains, special O-rings can be used which, in addition to guaranteeing a better sealing of the lubricant, are handed so they must also be installed in a specific direction.



The two special O-rings to be inserted on the master link must have the protruding side facing the internal link, as shown in the figure:

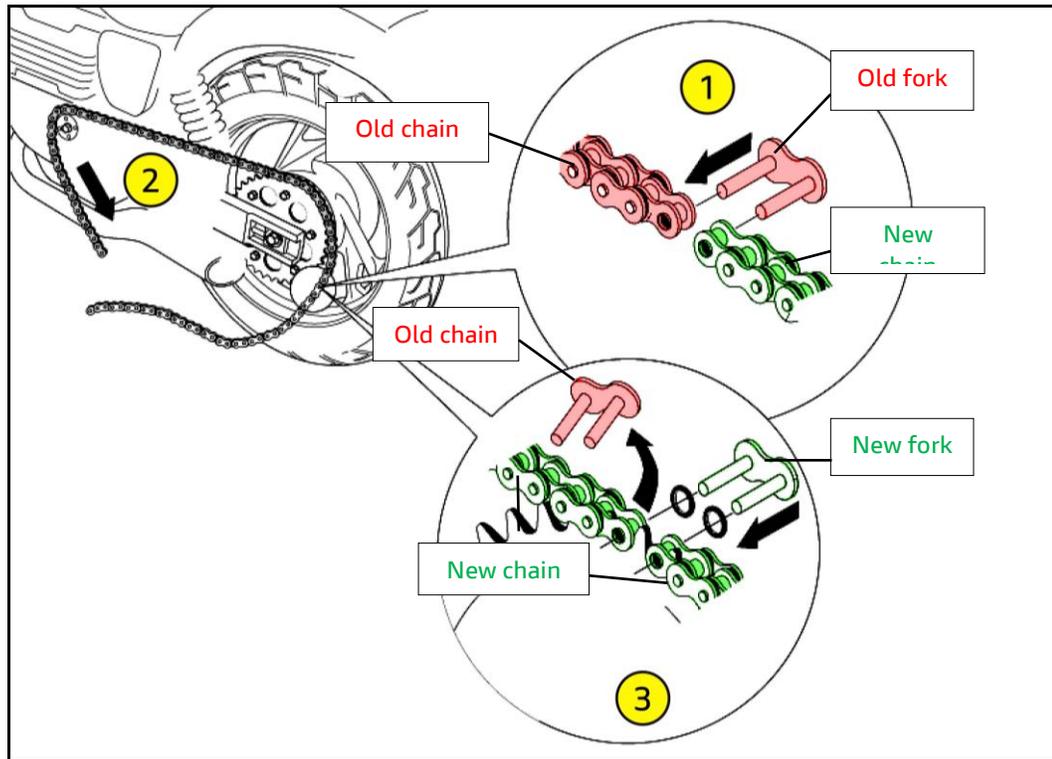




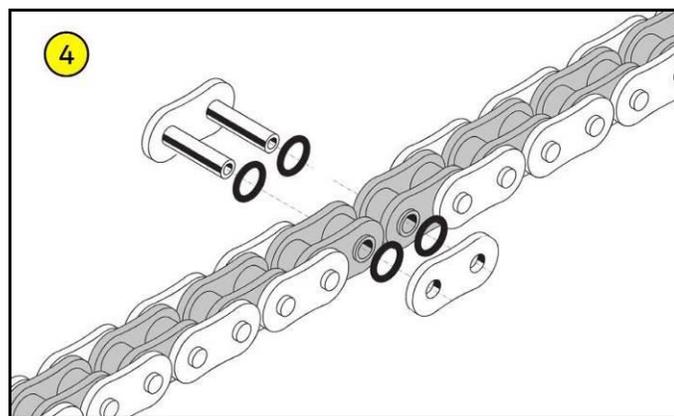
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6. Insert the fork of the new master link from the rear part of the chain, avoiding any contact with the pins so as not to remove any lubricant.



7. Install the other two new O-Rings, one on each bushing and finally fit the closing plate.





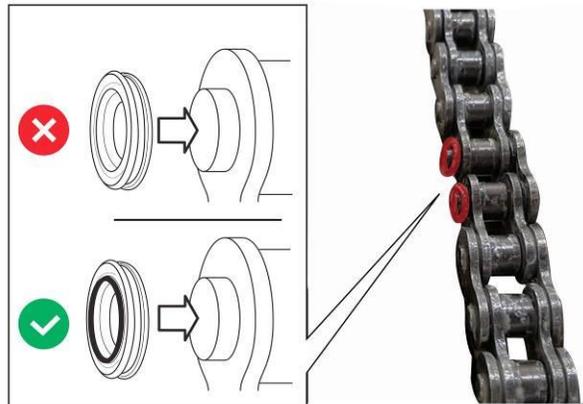
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NOTE

If special O-rings are required for the Regina chains, install them on the opposite side of the master link, with the protruding side facing out, as shown in the figure:



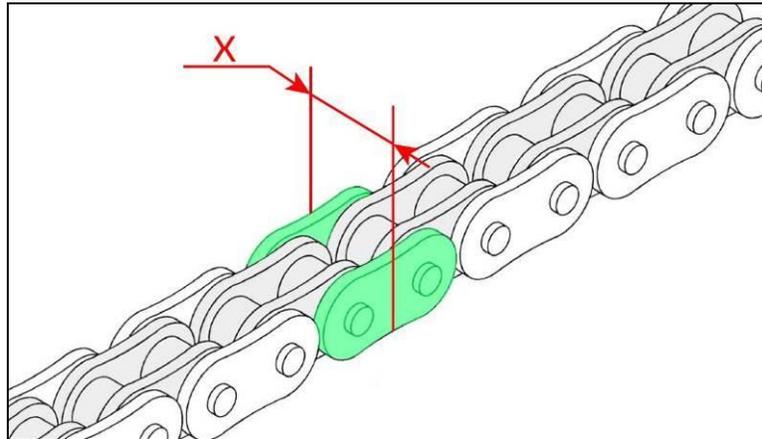
8. Spin the rear wheel so that the link to be riveted is in the chain lower branch, i.e. in a position allowing you to easily work with the tools required to install the chain link plates



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- Use the chain tool for closing the chains to tighten the assembly in a few steps (possibly applying a higher tightening torque) to ensure that **distance X between the two external links** is adjusted to the range specified in the table on page 17



		Distance between the external plates X (mm)	
		min.	max.
Regina	530 ZRP B2	22.55	22.70
	525 ZRPK	20.15	20.30
	530 ZRPB	22.55	22.70
	520 ZRDK	18.20	18.35
	520 ORAW2	16.68	16.83
DID	525 HV3	19.50	19.70
	525 HV2	19.50	19.70
	520 V6 KAI	17.10	17.35
	520 VP2-T	16.70	16.90
	520 VF	16.46	16.66
	525 HV3	19.50	19.70
	525 VAZ	18.75	18.95

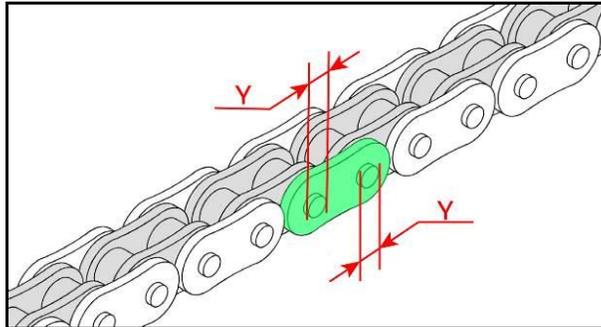
- if X is lower than the minimum value in the table, it is necessary to remove the link, check O-Rings for wear (change them, if damaged) and repeat the operation
- if X is higher than the maximum value in the table, tighten to a higher torque until you reach the proper value indicated in the table



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10. Use the chain tool for closing the chains to rivet the two pins in a few steps to ensure that the value of the **diameter Y of the two riveted pins** is included in the range specified in the table on page 18



		Pin diameter Y (mm)	
		min.	max.
Regina	530 ZRP B2	5.45	5.65
	525 ZRPK	5.45	5.65
	530 ZRPB	5.45	5.65
	520 ZRDK	5.45	5.65
	520 ORAW2	5.50	5.65
DID	525 HV3	5.50	5.80
	525 HV2	5.55	5.75
	520 V6 KAI	5.40	5.60
	520 VP2-T	5.40	5.80
	520 VF	5.45	5.80
	525 HV3	5.50	5.80
	525 VAZ	5.70	6.00

- If the measured Y value is lower than the minimum value given in the table, continue to rivet the two pins by applying a higher tightening torque until the correct value is detected
- If the measured Y value is higher than the maximum value given in the table, remove the link, order a new riveting link and repeat the entire operation



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NOTE

Use a magnifying glass to make sure there are no cracks on the circular surface of the riveted area, as shown



11. Once steps 9 and 10 are complete, apply a certification mark on the closing link as shown





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- **FAQ (Frequently Asked Questions)**

1) When is it necessary to change the final drive kit?

If any of the following are present:

- cracks on the plates
- cracks on the pins
- spinning pins
- damaged O-Rings
- scratched rollers
- front sprocket teeth wear
- rear sprocket teeth wear
- drive chain stretch beyond the allowed limit

2) What are the causes of an excessive noise of the drive chain?

- Improper tensioning (chain too taut or slack)
- Insufficient lubrication
- Improper front to rear sprocket alignment
- Improper size match between the chain and the sprockets
- Chain hitting or scraping onto vehicle parts
- Wear of the front or rear sprocket
- Wear of the chain
- Wear, failure or misalignment of other drive system parts

3) What are the causes of an excessive oscillation of the drive chain?

- Improper tensioning of the chain (too taut or slack)
- Improper front to rear sprocket alignment
- Uneven wear of the chain, front or rear sprockets
- Presence of stiff joints

4) What are the causes of the chain possibly jumping a tooth on the sprockets?

- Excessive wear of the front or rear sprocket
- Excessive stretch of the chain due to wear
- Insufficient tensioning of the chain
- Improper front to rear sprocket alignment
- Incorrect positioning of sliders, chain guide or tensioners
- Wrong sprocket size; bent, waved, damaged sprockets
- Presence of foreign objects between the chain and the sprockets



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- 5) **What are the causes of front sprocket wear on just one side and rear sprocket wear on the opposite side?**
 - Improper front to rear sprocket alignment

- 6) **What are the causes of stiffer joints of the drive chain?**
 - Excessive tensioning of the chain
 - Insufficient lubrication
 - Improper front to rear sprocket alignment
 - Oxidation of chain joints
 - Incorrect chain rating for stress the demand of the vehicle application
 - Broken or missing O-rings
 - Improper installation
 - Foreign objects or material (sand, mud) in chain joints

- 7) **What are the causes of a possible breakage of the chain pins, rollers or bushings?**
 - Excessive load or load applied in a violent manner
 - Excessive wear of the front or rear sprocket
 - Excessive stretch of the chain due to wear
 - Insufficient lubrication
 - Improper tensioning of the chain
 - Improper front to rear sprocket alignment
 - Improper size match between the chain and the sprockets
 - Number of teeth of the front sprocket lower than the suggested minimum
 - Presence of foreign objects between the chain and the sprockets

- 8) **What are the causes of a possible failure of the drive chain links?**
 - Chain hitting or scraping onto vehicle parts
 - Excessive tensioning of the chain
 - Presence of foreign objects between the chain and the sprockets
 - Considerable front to rear sprocket misalignment
 - Incorrect chain rating for stress the demand of the vehicle application
 - Corrosion caused by external factors (battery acid, fuel or other fluids)

For questions about this Service Bulletin,
please contact your Service Area Manager