

CHAIN CLEANING



Always wear safety glasses and gloves.
Pay particular attention to your fingers while working with the motorcycle chain and sprockets.

If the chain is not too dirty, lubrication is normally sufficient to clean the chain. When the accumulation of dirt on the chain (sand, mud, asphalt particles or other materials) is excessive, the chain must be washed with soft brush and kerosene. After washing, the chain has to be dried immediately with a jet of compressed air. After off-road use, when the dirt built up is heavy, wash the chain with a water jet, then dry it immediately with compressed air.

WARNING

- Avoid the use of steam, petrol or solvents.
- When cleaning O-Ring chains, avoid the use of hard brushes or other methods that could damage the rubber O-Rings (compressed air should be kept at 30 cm/1 ft distance minimum). After washing, immediately lubricate the chain as explained in the next paragraph.

CHAIN LUBRICATION

BRUSH LUBRICATION

To obtain good performance and long life, chain must always be lubricated when in service. A well lubricated chain keeps the friction between the working surfaces to a minimum by creating a protective surface between the sliding surfaces of the pin and bushing and also between the bushing and roller.

A lack of lubrication increases friction between these surfaces, resulting in a higher absorption of energy and hence increase in the working temperature of the components. This higher than normal increase in temperature will result in the lubricant burning and becoming less effective this increasing chain wear. If your chain is dry, squeaks when operating or shows signs of rust (reddish areas on the chain surfaces) or is elongating faster than expected, the chain should be cleaned and re-lubricated. In the O-Ring chains, lubrication is provided by grease sealed in the working area by O-Rings. However, it is still necessary to provide periodic lubrication to the chain.

Lubricant between rollers and bushings will decrease friction and heat, and will improve the efficiency of the drive, extending chain and sprockets life.

Lubrication also keeps O-Rings in good condition and protects the metallic components from rust and corrosion.

Use **SAE 80W-90** mineral oil or motorcycle chain specific lubricants safe for O-Rings.

For a proper lubrication follow the steps below.

1. Brush the chain with oil over its entire length, both inside and outside.
2. After some hours, wipe away the excessive lubricant with a clean rag.

Maintenance



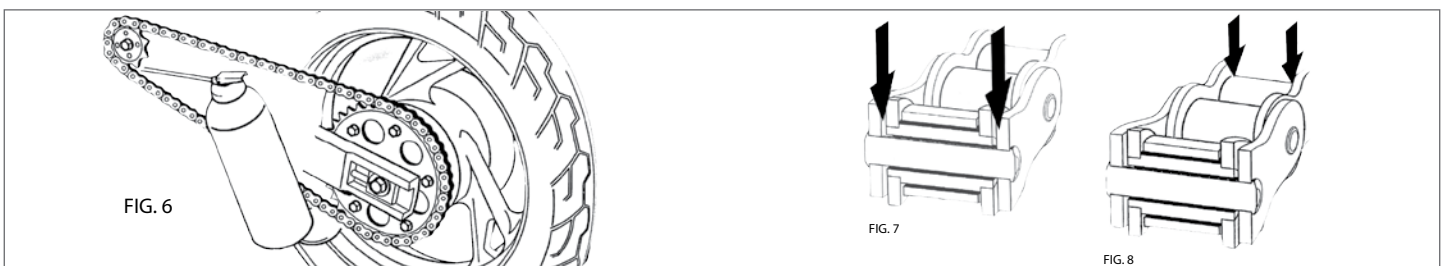
Always wear safety glasses and gloves.
Pay particular attention to your fingers while working with the motorcycle chain and sprockets.

LUBRICATION WITH SPRAY

1. Place the motorcycle on a stand so the rear wheel can rotate.
2. Spin the rear wheel in the reverse direction while applying the lubricant.
3. Spray the lubricant inside the chain between the inner and the outer plates (fig. 7), just before the front sprocket (fig. 6); the centrifugal force introduces the lubricant into the pin/bushing area, assuring complete lubrication.
4. Repeat the point n.3 to lubricate the chain rollers as well, spraying the lubricant in the middle part of the chain (fig. 8).
5. After lubrication, please wait 10 -15 minutes to allow solvents in the lubricant to evaporate before using the motorcycle.
6. Any excess lubricant should be wiped away with a clean rag.

WARNING

- On O-Ring chains use only chain lubricant labelled "safe for O-Rings". Use of any other of non-specific lubricant spray could damage the O-Rings, due to the solvents used.
- The chain should be lubricated every 400 Km (250 miles) or more frequently if necessary, and if the motorcycle is used in high ambient temperatures (40°C) or after long distance on the highway.
- If possible, lubricate the chain immediately after use, do not allow the chain to cool down, but lubricate it while it is still warm. The lubricant will be more fluid and will better penetrate into the chain articulation.
- Do not use the motorcycle immediately after chain lubrication. The lubricant, being more fluid (due to high temperature and/or to the presence of solvent not completely evaporated), would be immediately loose from the chain to the wheel and other parts of the motorcycle if ridden.



Maintenance

CHAIN INSPECTION



Always wear safety glasses and gloves.
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The chain should be inspected frequently to check for excessive wear, tight joints, missing or damaged O-Rings and worn/damaged components (with particular attention to the connecting/rivet link). To test if a chain is worn it is necessary to measure how much it has elongated. The following method of inspection is simple, reliable and effective.

First of all the chain must be cleaned and lubricated, then follow the steps below:

1. Place the chain under tension. If the chain is assembled on the motorcycle, tension the upper strand by placing the transmission in a low gear and rotate the rear wheel (fig. 9). If the chain is disassembled, place the chain on table, securing it at one end and applying a tension load of approx. 20 kg (45 lbs) at the opposite end (fig. 10).
2. By using calipers or a precision millimeter scale, measure the distance between two pins center at a number (N) of links a part (see table).

WARNING

You can obtain the number N by counting both inner and outer plates (on one side) or simply by counting the pins (fig. 11).

3. Check that the measure is not greater than the "maximum accepted length" as indicated on the table. If the distance is greater, the chain must be replaced.

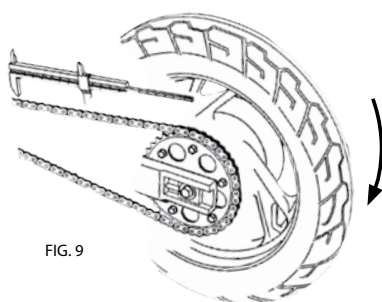


FIG. 9

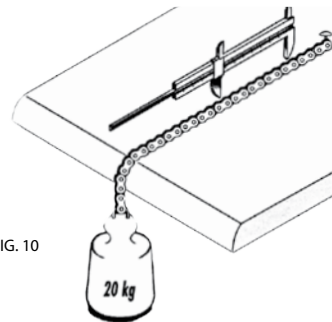
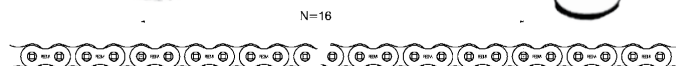


FIG. 10



N=16

FIG. 11

| RIFERIMENTO REGINA REGINA REF. | RIFERIMENTO INTERNAZIONALE INTERNATIONAL REF. | PASSO DELLA CATENA CHAIN PITCH | | N | NON O-RING LUNGHEZZA MASSIMA ACCETTABILE | | O-RING LUNGHEZZA MASSIMA ACCETTABILE | |
|--------------------------------------|---|-----------------------------------|------|----|---|---------|---|---------|
| | | mm | in. | | mm | in. | mm | in. |
| 54-90-124-125-126 | 415-420-425-428 | 12,70 | 1/2" | 23 | 298,00 | 11.732" | 295,00 | 11.615" |
| 135-137-136-136.2 | 520-525-530-532 | 15,875 | 5/8" | 16 | 259,00 | 10.197" | 256,50 | 10.098" |
| 138-138.2 | 630-632 | 19,05 | 3/4" | 16 | - | - | 307,80 | 12.118" |

Maintenance

CHAIN TENSIONING



Always wear safety glasses and gloves.
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Correct tensioning of the chain is extremely important for the safety, efficiency and durability of the drive. Checking and adjusting the chain tension must be done according to the following schedule:

- **road:** initially at 100 Km (60 mi.), then every 400 Km (250 mi.).
- **off-road:** every time the motorcycle has been ridden.

TENSIONING PROCEDURE

1. The chain must be placed at its maximum tension condition. This occurs when the engine and wheel sprockets are at the maximum distance from each other. To obtain this, load the rear wheel (for example placing a person on the motorcycle) until the centers of the engine sprocket, the swing arm pivot and the rear wheel axle are on the same axis (fig. 12).
2. Turn the tensioning bolts or cams until the center lower strand of the chain can move freely up and down (by hand with a low pressure) from 10 to 15 mm (0,4"-0,6"). The upper strand must be tight (fig. 13).
3. Tighten the rear axle, securing the rear wheel.
4. Check once more in three different points the slack of the chain as indicated in point "2", then tighten bolts and nuts of the tensioning system.

FIG.12

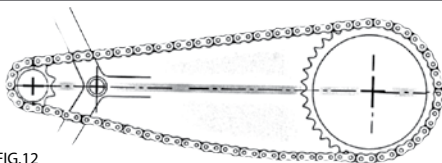
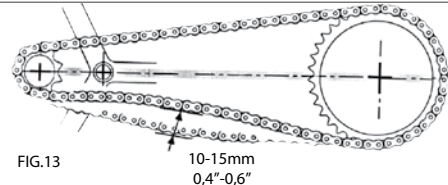


FIG.13



EXCESSIVE CHAIN TENSIONING

Excessive chain tensioning increases the working loads between pins and bushings, overheating the chain thus consuming the lubricant. This causes the chain to wear faster. If the motorcycle is ridden on rough roads or trails, the chain is subjected to extremely hard shocks by the up and down lever action of the swing arm. This can lead to premature failure of the chain and damaging of other parts of the motorcycle (sprockets, hub, bearings).

EXCESSIVE CHAIN SLACK

An excessively loose chain is subjected to hard whiplash (shocks) during acceleration. This adds to the force applied to the chain, causing the chain to jump over the sprocket teeth and possibly causing damage to the vehicle or rider.

WARNING

The procedure indicated above is suitable for every kind of motorcycle, even if some components of the rear axle (wheel, dumper, tire, transmission ratio) has been modified.

Chain and sprockets replacement

CHAIN REPLACEMENT



Always wear safety glasses and gloves.
Pay particular attention to your fingers while working with the motorcycle chain and sprockets.

REPLACING A CHAIN WITH SPRING CLIP CONNECTING LINK

Disassembling

1. Set the motorcycle on a stand with the rear wheel free from the ground and rotate.
2. Free to rotate the wheel until the connecting link is on the rear sprocket.
3. By using pliers, remove the spring clip. Disassemble the connecting plate and the connecting link fork (fig. 14).

Installation

1. Put the head of the new chain on the rear sprocket, on the tooth next to the end of the used chain (fig. 15).
2. By using the old connecting link (A), connect temporarily the end of the old chain with the head of the new chain (since it is only temporary, there is no need to secure the plate with the spring clip).
3. Slowly pull the other end of the old chain until the new chain rides around the front sprocket; proceed until the new chain reaches the rear sprocket.
4. Disassemble the old connecting link and remove it along with the old chain.
When the number of links of the new chain is longer than the one required, the excess length has to be cut off.
Follow the instructions for chain disassembling. See chapter "replacement of an endless riveted chain".
5. Wrap both ends of the chain on the rear sprocket so as to position them one after the other on two consecutive teeth.
6. Take out the new connecting link from the plastic bag.

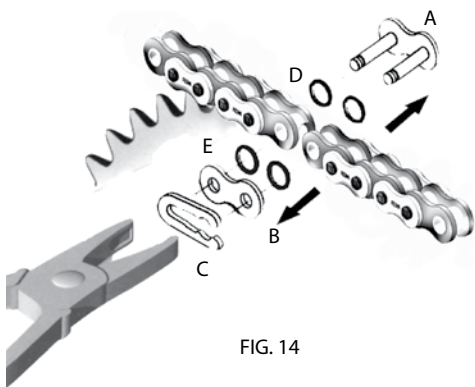
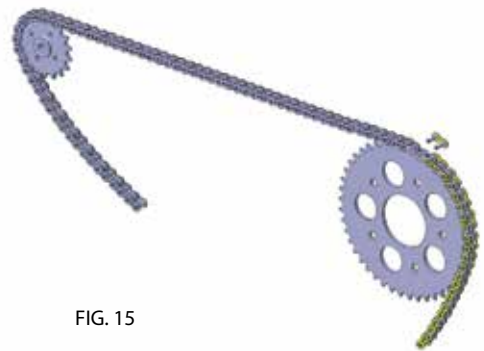


FIG. 14



FIG. 15



WARNING

The connecting link is supplied lubricated with a special grease that guarantees long life. Avoid wiping off any lubricant from the pin surfaces, as this would seriously reduce the connecting link operational life.

Chain and sprockets replacement

Non O-Ring chains

7. Insert the new connecting link (A) from the back.
8. Install the connecting plate (B).
9. Install the spring clip (C) with the edges in the direction opposite to the chain rotation, using pliers (fig. 16).
10. Check that the newly installed joint is flexible.

O-Ring chains

7. Ensure that two O-Rings (D) have been assembled on the connecting link fork (A) (one on each pin) and fully inserted until they touch the plate.
8. Insert the connecting link fork (A) from the back of the chain, avoiding contact with the pins, as this could remove some grease.
9. Set the other two O-Rings (E) on the pins until they stay over the extended ends of each bushing. Then install the connecting plate (fig. 17).
10. If using a slip fit **type 26** link, with the help of special pliers (P/N 805203) strongly press together the two plates of the connecting link overcoming the elastic resistance of the O-Rings and expose the grooves on the pins (fig. 16). If using a press fit **type 42** link, use the tool P/N 805187 with the special punch P/N 805187-4-B to rightly position the external plate. If the tool is not available, strongly clamp the plates together until, the outer plate touches against the purpose-built larger diameter of the pin.
11. Install the spring clip (C) with the edges in the direction opposite to the chain rotation, using pliers (fig. 16).
12. Check that the newly installed joint is flexible and that O-Rings are properly positioned and not damaged.

WARNING

Be careful not to bend or damage the spring clip when assembling. Check that it is properly seated into the pin P.N. grooves. A spring clip should not be used more than once.

- Like most bike components, the spring clip of the connecting link is subjected to continuous vibration: check it frequently for wear.
- Check that during operation the chain does not touch metallic parts of the vehicle, such as the engine casting, swinging arm, guides, tensioners, bolts and so on.
- Do not use the pliers (P/N 805203) together with the press fit (type 42) or rivet links.

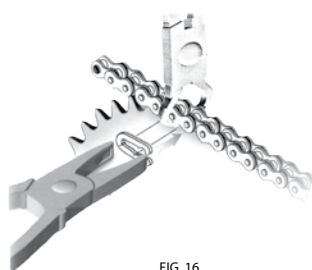


FIG. 16

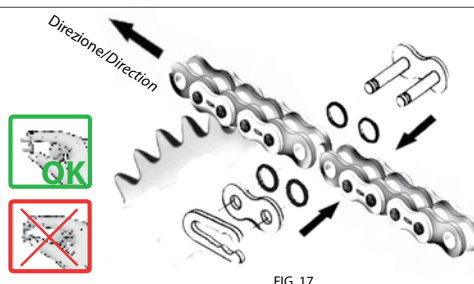


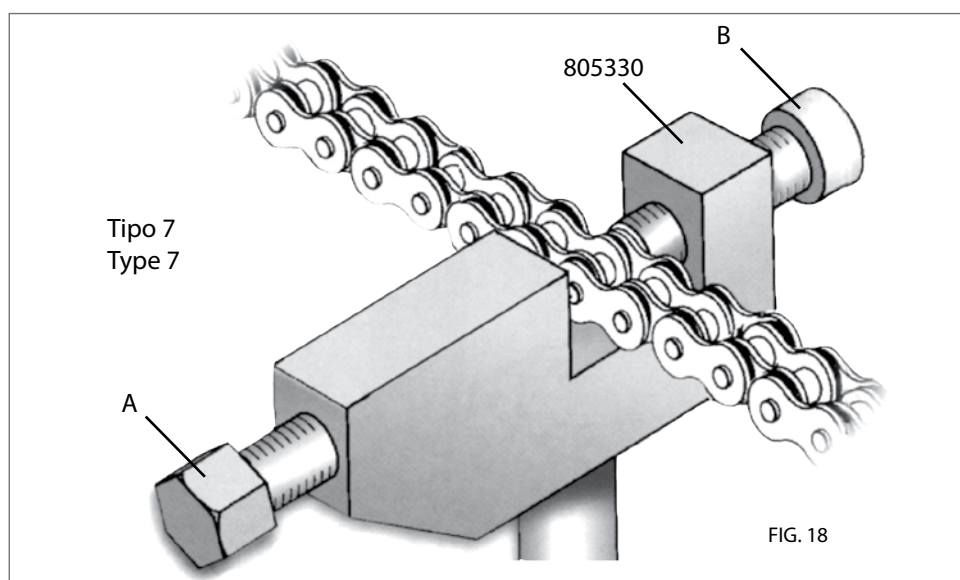
FIG. 17

Chain and sprockets replacement

REPLACEMENT OF A RIVETED CHAIN

Disassembling

1. Set the motorcycle on a stand with the rear wheel free from the ground and able to rotate. To disassemble an endless riveted chain, you have to cut one link by using a chain breaker such as the Type 7 (P/N 805330). Instructions for this tool follow.
2. Unscrew bolt (A) so that the tip is retracted into the hex nut.
3. Unscrew shoulder bolt (B) and position the chain breaker so that the ends of the chain pin can fit into the holes of the hex nut and bolt (B) (fig. 18).
4. Thread shoulder bolt (B) in until the chain is clamped in place, against the hex nut.
5. Turn bolt (A) to force the chain pin out of the plates (be sure that the tip of the pusher bears on the head of the chain pin).
6. Unscrew bolt (A) until the pusher is out of the chain.
7. Unscrew bolt (B) until the chain is free.



Installation

Point 1-5: see page 22.

WARNING

- The connecting link is supplied lubricated with a special grease that guarantees long life. Avoid wiping off any lubricant from the pin surfaces, as this would seriously reduce the connecting links operational life.
- Never re-use an old rivet link or old outer plate previously disassembled from the chain.



Chain and sprockets replacement

Non O-Ring chains

Insert the new connecting link fork from the back side (fig. 19), avoiding any contact with the pins in order to not remove the lubricant.

O-Ring chains

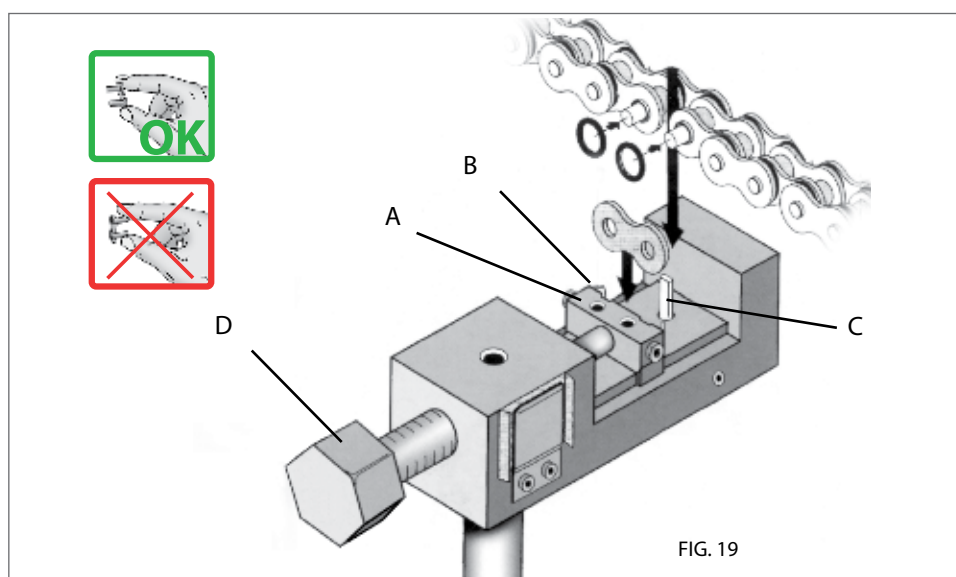
6. Check that the new connecting link fork has the O-Rings (one for each pin) fully inserted in contact with the plate.
7. Insert the new rivet connecting link fork from the back side of the chain (fig. 19), avoiding any contact with the pins in order to not remove the lubricant.
8. Fit the other two O-Rings on the extended ends of the bushings. Rotate the rear wheel so that the rivet link is positioned in the lower strand of the chain where there is more room to work.

CLOSING THE RIVET LINK

Use the professional tools **P/N 805181** for 12,70 mm (1/2") pitch chains, **P/N 805187** for 15,875 mm (5/8") pitch chains, **P/N 805183** for 19,05 (3/4") pitch chains.

1. Insert the outer plate between the holding blades (B) of the link plate carrier (A), checking that it is correctly located (fig. 19).
2. Position the chain in the tool, slide the rollers of the link over the centering pin (C) to align the rivet link plate with the rivet fork (fig. 19).
3. Thread in bolt (D) by hand until the outer plate holes contact the ends of the pins of the rivet fork.
4. With a wrench thread in the bolt (D) until the pin ends bottom out on the blind-end of the holes in the link plate carrier (A). This places the link plate at the correct depth on the fork.
5. Unscrew the bolt (D) and remove the tool from the chain.

Use tool **P/N 805199** for the rivet link type 44 following the attached instructions.



Chain and sprockets replacement

Riveting

Use Regina professional Rivet Tools **P/N 805184** for 12,70 mm (1/2") pitch chains, **P/N 805185** for 15,875 mm (5/8") pitch chains, **P/N 805186** for 19,05 mm (3/4") pitch chains, operating as follows (fig. 20):

1. Pull the plate (A) to open the positioning rods (B) and insert the chain into the tool. The chain should be correctly inserted into the tool and kept in place by rods (B).
2. Slide punch (C) to contact the head of the pin to be riveted.
3. With a hammer, give a sharp blow to punch (C) to deform the head of the rivet pin.
4. Rotate punch (C) approx. 45° and repeat operation "3".
5. Repeat operation "4" two more times, each time rotating punch (C) approx 45°.
6. Release the chain by retracting plate (A) to open the positioning rods (B) and repeat the operation cycle on the second pin to be riveted.
7. Check for smooth flexing of the link and that the O-Rings are correctly positioned and not damaged or cut.
After riveting, the chain must be correctly tensioned and the rear wheel axle must be tightened as indicated in the previous paragraph.

Use tool **P/N 805199** for the rivet link type 44 following the attached instructions.

WARNING

Carefully check that the chain, when in motion, does not touch any metal part of the vehicle, such as the engine casting, the swing arm, chain guides, tensioners or other parts.

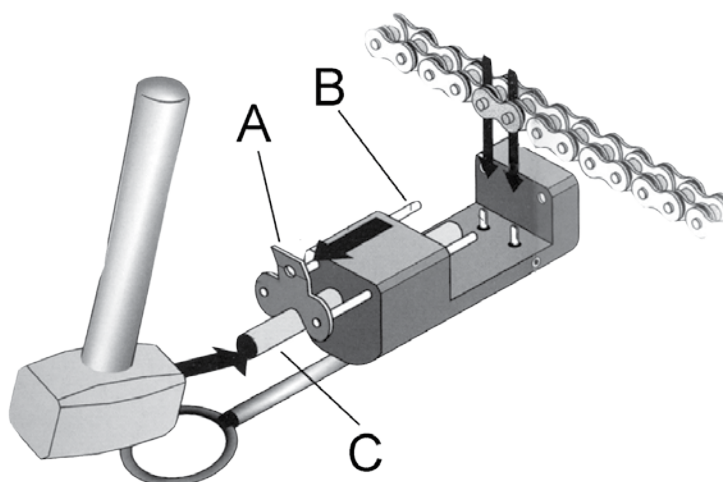


FIG. 20

Chain and sprockets replacement

SPROCKETS INSPECTION AND REPLACEMENT



Always wear safety glasses and gloves.
Pay particular attention to your fingers while working with the motorcycle chain and sprockets.

Frequently check the wear on the front and rear sprocket teeth. Examine both the tooth profile and the thickness. These components must be replaced if there are missing or broken teeth, or if they show noticeable wear or other damage. It is recommended to replace worn or damaged bolts, nuts and washers.

Once new sprockets have been installed, make sure that they don't have any eccentricity or wobble while rotating. Check the alignment between front and rear sprockets using a straight bar of sufficient length:

1. Place the bar on the side of the rear sprocket as near as possible to the rotation centre in order to obtain the longest bearing surface;
2. Check that the gap between the bar and the front sprocket is lower 1mm/0,04" (fig. 21);
3. Adjust the alignment using the tensioning screws or shims, without compromising the alignment of the wheels.

WARNING

A new chain will wear quickly if assembled on worn or damaged sprockets. In order to get the maximum chain life, when replacing a chain also replace the sprockets. This ensures a proper uniformity of the whole transmission system.

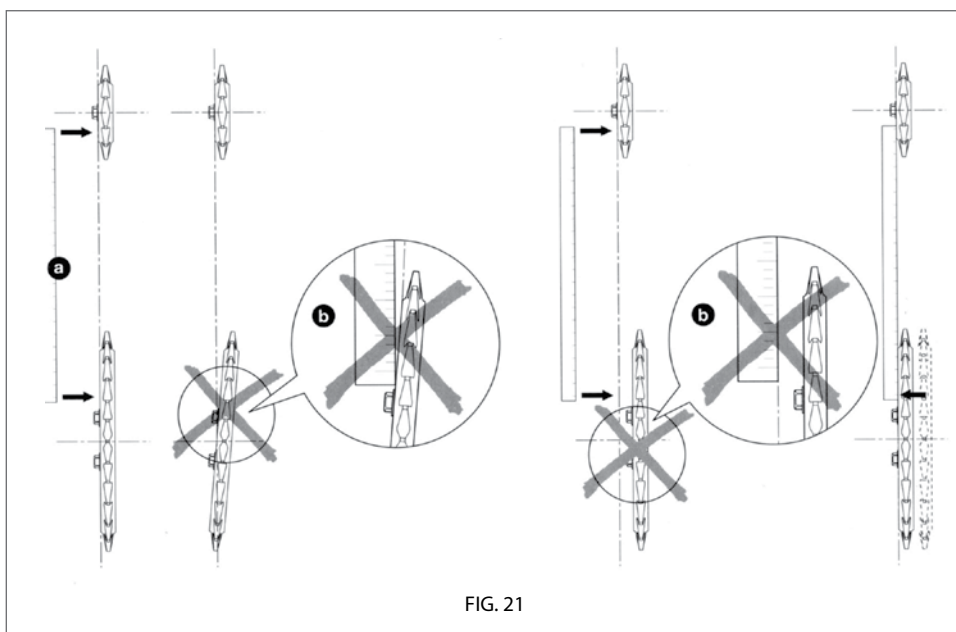


FIG. 21

Possible causes of chain drive malfunctioning

NOISY DRIVE

- *improper chain tension (too much or too little)*
- *insufficient lubrication*
- *sprockets misalignment*
- *mis-matching the size of chain with the sprocket size (i.e. 530/136 and 532/136.2)*
- *chain touching other parts of the motorcycle*
- *worn sprockets*
- *worn chain*
- *wear, failure or misalignment of other components of the drive (guides, tensioners or swing arm bearings).*

CHAIN VIBRATION OR WHIPPING

- *excessive chain slack*
- *sprockets misalignment*
- *non uniform wear of chain or sprockets*
- *tight joints.*

THE CHAIN JUMPS THE SPROCKET TEETH

- *excessive sprockets wear*
- *excessive chain elongation due to wear*
- *improper chain tension (too slack)*
- *sprockets misalignment*
- *guides or tensioner misalignment*
- *bent, damaged or wrong size sprockets*
- *foreign material between chain and sprocket pockets.*

WEAR ON THE INSIDE PLATES OF CHAIN, WEAR ON ONE SIDE OF FRONT SPROCKET AND ON OPPOSITE SIDE OF REAR SPROCKET

- *sprockets misalignment.*

Possible causes of chain drive malfunctioning

TIGHT JOINTS IN THE CHAIN (KINKING)

- excessive chain tension
- insufficient lubrication
- sprockets misalignment
- chain corrosion, rust
- wrong choice of chain (too weak for the engine power)
- failure of O-Rings
- wrong assembly of rivet link or connecting link
- foreign material (sand, mud) in the chain joints.

FAILURE OF CHAIN PINS, ROLLERS OR BUSHINGS

- excessive loads, heavy shock loads (for motorcycles without cushioning in drive train)
- excessive sprocket wear or damage
- excessive chain elongation due to wear
- insufficient lubrication
- improper chain tension
- sprockets misalignment
- guides or tensioner misalignment
- mis-matching the chain size with the sprocket size (i.e. 530/136 and 532/136.2)
- front sprocket with less than 15 teeth
- foreign objects between chain and sprocket.

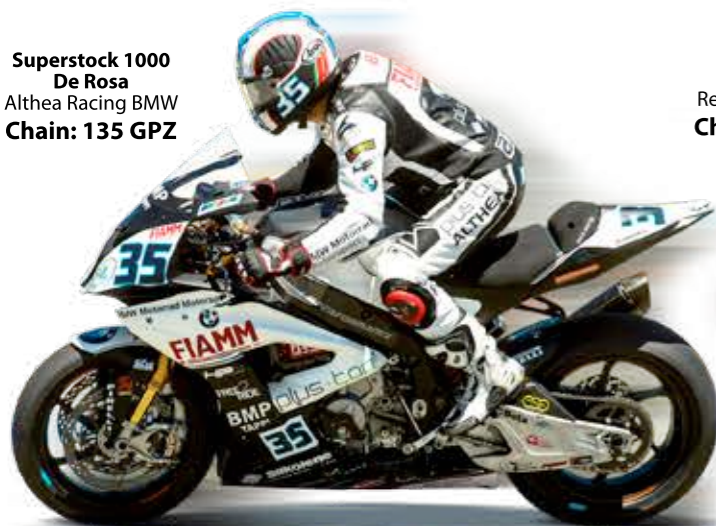
FAILURE OF CHAIN LINKPLATES

- chain touches or rubs against parts of the motorcycle
- excessive chain tension
- foreign objects between chain and sprockets
- sprockets misalignment
- wrong choice of chain (too weak for the engine power)
- corrosion due to battery acid, fuel or other chemicals.



PERFORMANCE IN MOTION

Superstock 1000
De Rosa
Althea Racing BMW
Chain: 135 GPZ



Moto 3
Binder
Red Bull KTM Ajo
Chain: 90 GP4



MX2
Herlings
KTM RedBull
Chain: 135 RX3



Supermotard
Cheryere
TM Racing
Chain: 135 RX3



Enduro E1
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