

CTC Coventry

Tips for maintaining and adjusting chains and gears

1. **Definitions:** a **sprocket** is an individual toothed gear wheel on the back wheel; the **cassette**, or **block** is the cluster of sprockets fitting on to the splined shaft on the back wheel; a **chainring** is an individual toothed gear wheel fitted to the crank – there may be one, two or three chainrings in a **chainset**. The whole drive chain consisting of front and rear gear change mechanisms, a chain, a rear cassette and a chainset is collectively called the **groupset**.
2. **Gear overview:** top gear is selected when the chain is running on the biggest chainring and the smallest sprocket. Bottom gear is the exact opposite when the chain is running on the smallest chainring and the largest sprocket. Intermediate gears may be duplicated by different combinations of chainring and sprocket.
 - 2.1. If you position the chain on the largest chainring and largest sprocket you will notice two things: the tension arm of the rear changer is pulled forward excessively and the chain is running significantly out of line. You could achieve a similar gear ratio by moving the chain onto the next smaller chainring and onto the next smaller sprocket, or perhaps two smaller sprockets. In this configuration the chain runs much less out of line and the gear mechanism is under less stress.
 - 2.2. Similarly, when the chain is on the smallest chainring and the smallest sprocket it is significantly out of line, the tension arm is folded right back and not able to apply any tension to the chain. Sometimes the chain rubs against itself by the top jockey wheel and looks as though it might go unstable. Also, the chain may well rub against the front changer, which makes an irritating noise and creates undue wear on the front mech. As with the large/large scenario it makes sense to change up a chainring and down a couple of rear sprockets.
 - 2.3. In summary, respect your gears by not using the extreme diagonal gear selections. You just need to be constantly aware of the position of your chain and plan your next gear change to optimise the alignment of the chain.
 - 2.4. Minimise the chance of shipping your chain by anticipating a gear change in advance of the need and move the lever gently.
3. Both front and rear gear mechanisms have adjusters to stop the chain from jumping off either side of the cassette, or off the chainrings. However, it does happen from time to time – the first thing to do is stop pedalling. If you don't, the chain can be forced into a **very tight jam** which can be quite hard to free. There is also an adjuster to control the chain tension to a limited extent.
 - 3.1. Assuming the chain is not jammed, it's usually possible to reload the chain without getting covered in oil.
 - 3.2. If the chain has overshot the small chainring, move the front changer (with the gear lever) towards the large chainring, which will push the chain against the chainrings. Ask someone to lift the back wheel off the ground and turn the cranks forward by hand. Normally the chain will catch on the teeth of the chainrings and wind itself back on. You may end up in the wrong gear, but at least it's all working, and your hands are still clean.
 - 3.3. It's a similar procedure if the chain has gone over the big ring, except you move the gear mechanism to the small chainring and wind the chain back on.
 - 3.4. You can do the same thing with a rear over-run except there's a greater chance of the chain being jammed. If the chain has gone over the small sprocket you might have to remove the rear wheel to free the chain and it will probably involve oily hands to get it back on.
 - 3.5. If the chain has gone into the spokes, you might free the jam by moving the rear mechanism up two gears and increasing the chain tension by pressing down on the chain with your foot and use the winding on technique. If this doesn't work, you may have to remove the wheel and slide off the cassette – easily said and you may well not have the necessary tools to hand. Time to ring for help!

4. Chains

- 4.1. First don a pair of surgical gloves.
- 4.2. Different width chains are used according to the number of sprockets in the cassette: 7/8, 9, 10 or 11.
- 4.3. Chains elongate with use
 - 4.3.1. The bearing surface on each link wears away gradually causing the overall length of the chain to increase. This is not strictly “stretching” of the chain. At the same time the teeth on the sprockets and chainrings also wear to match the shape of the chain.
 - 4.3.2. Chainrings and sprockets wear at different rates because of their different diameters and some gear combinations are used more than others.
 - 4.3.3. In time this can make gear changes difficult, causes some gear combinations to run unevenly giving an uncomfortable ride and ultimately the chain may slip in certain gears. Time to replace some, or all the components of the groupset (cassette, chain and chainset).
 - 4.3.4. The life of a groupset can be extended by replacing the chain (the cheapest component) before the cassette and chainset wear out and you can check when the time is right with a chain wear indicator costing about £2 like this one from Wiggle: https://www.wiggle.co.uk/lifeline-chain-wear-indicator?lang=en&curr=GBP&dest=1&sku=105205769&utm_source=google&utm_term=&utm_campaign=&utm_medium=base&gclid=CjwKCAiAm7OMBhAQEiwArvGi3LLoz-z8lxrbjz9z7H_wsd395HQS7Mf--3tCHgrXEoDte6bYBjbuVBoCzScQAvD_BwE&gclsrc=aw.ds
 - 4.3.5. The indicator shows an elongation of 0.7% and 1.0%, which gives a warning that the chain should be replaced and that it’s too late – if you put a new chain on an old cassette the chain will jump continuously, but this will not happen at the 0.7% milestone.
 - 4.3.6. When replacing a chain it is necessary to split the old chain prior to removal by opening the split link with master link pliers from Wiggle: <https://www.wiggle.co.uk/park-tool-master-link-pliers-mlp-12>
 - 4.3.7. Count the links on the old chain and remove excess links from the new chain which you can do with a chain riveting tool from Wiggle: <https://www.wiggle.co.uk/park-tool-mini-chain-tool-ct-5>
 - 4.3.8. To join up the new chain into a continuous loop you will need a split link of the correct size: <https://www.wiggle.co.uk/kmc-e1nr-ept-missing-link> . They generally snap together OK, by you might need to help the process with your master link pliers.

5. Gear Mechanisms

- 5.1. When buying a new front changer, it is necessary to specify the number of rear sprockets (which controls chain width), whether it is for a double, or treble chainset and the teeth difference between the biggest and smallest chainrings.
- 5.2. Similarly, for a suitable rear changer, we need the number of rear sprockets, the teeth difference between the largest and smallest sprockets and the teeth difference between the largest and smallest chainrings. For example: a 14-32t rear block has a teeth difference of 18t and a 44-32-22 front changer has a teeth difference of 22t. That’s a total difference of 40t. Each chain link is ½ inch long and if we assume the chain wraps halfway round each sprocket means there are 10 ins of chain to be managed between the max/max and min/min positions. Not every rear mechanism can handle that amount of **chain slack**.
- 5.3. Both front and rear changers have adjusters to stop the chain over running the maximum and minimum positions. The intermediate positions are controlled by cable tension – there is usually an adjuster in the cable similar to brake cable adjusters.

6. Setting up the front changer

- 6.1. When the chain is on the middle chainring and middle sprocket it should be parallel to the centre line of the bike. This is achieved by selecting a suitable length bottom bracket axle, but that's beyond the scope of this article because there are several different types of bottom bracket and it's not the sort of thing you would change beside the road.
- 6.2. The height of the changer should be 1-2mm above the large chainring, but it mustn't hit the chainstay in the small chainring position - if this happens the changer must be raised up – it's all about compromise. Also, check that the chain does not rub the top of the changer when the chain is on the large sprocket.
- 6.3. The mechanism should be rotated on the down tube until it is parallel to the chainrings and should not be allowed to hit the crank as it rotates.
- 6.4. Without the cable attached, adjust the low stop so that the chain just does not rub on the cage when the chain is on the biggest sprocket and smallest chainring.
- 6.5. Ensure that the left gear lever is in the lowest gear position. Attach the cable without any slack in it.
- 6.6. Adjust the high stop so that the chain just does not rub on the cage when the chain is on the smallest sprocket and biggest chainring.
- 6.7. Check that the chain doesn't jump off the biggest, or smallest chainrings when changing gear. Adjust the over-ride stops as necessary.
- 6.8. Set up the rear mechanism now and then carry out the following steps to complete the front changer adjustment.
- 6.9. Check the chain runs smoothly on the middle chainring in all gears and adjust accordingly using the cable adjuster. Some gear change levers on the left side have a nudge facility so you can stop the chain rubbing without moving it onto another chainring.

7. Setting up the rear gear mechanism.

- 7.1. Put the chain in the middle chainring and without the cable attached, adjust the high stop so that the chain runs smoothly and stays on the smallest sprocket.
- 7.2. Ensure that the right gear lever is in the highest gear position. Attach the cable without any slack in it and change gear to the largest sprocket. Adjust the low stop so that the chain runs smoothly but doesn't jump over the top and into the spokes when it is changed.
- 7.3. Check that the chain does not rattle on the intermediate sprockets and use the cable adjuster to adjust the position of the rear mechanism – view the chain position looking forward from the back of the bike to see whether the chain needs to be moved to left, or right.