



What good is having 150 hp if you can't transfer that power to the road? It isn't just drag racing riders who are faced with this issue – clutches on conventional on-road motorcycles must also be able to deliver a top performance every time the motorcycle moves off or accelerates so that all the power from the crankshaft is transmitted to the gearbox. The function of the clutch is based on the physical principle of friction and so clutches are 'wearing' parts. The more we ask of them, the earlier we need to replace them.

Please note:

The technical tips describe general procedures which may not apply to all vehicles or individual components. Therefore, we cannot guarantee that the information provided as part of the technical tips is universally correct. If you are in any doubt, TRW strongly recommends that maintenance and repair work is carried out by trained specialists as per the specific vehicle manufacturer's guidelines. Thank you for your understanding.

Clutches are subject to particularly high loads when moving off from traffic lights at high engine speeds. It might sound good if the needle on the engine speed gauge is moving towards the red area as you move off with the clutch lever only halfway engaged, but in reality, by doing this only half the power is directed to the powertrain; the rest goes to waste as heat and clutch disc wear. This not only means that the disc will wear out and need replacing more quickly, it also means that the one time you actually require full throttle, the noise is deafening, but the power to the rear wheel is delayed.

Our grandfathers weren't faced with this issue because early motorcycles didn't have a clutch. If you wanted to stop, you had to switch off the engine. Moving off afterwards often resembled a rodeo show, which would be much too dangerous on today's roads with the amount of traffic. It is for precisely this reason that a fully functional clutch is paramount.

With the exception of a few models that use other clutch types, the wet multi-disc clutch is the dominant design in modern motorcycles.

The best way of imagining this type of clutch is to visualize a big, round multi-layer bacon sandwich.

Instead of bacon, imagine friction discs and instead of bread, picture steel discs. These are compressed by a pressure plate and several springs. When compressed, the link between the engine and the gearbox is engaged and it is disengaged as soon as you pull the clutch lever to relieve the discs from the spring pressure. The size, number and surface of the discs is precisely matched to the engine output. This allows us to smoothly move off, without any jolts, as the engine's torque is safely transferred.

The clutch also has protective features in case you should stall the engine. In this case, the occurring slip protects the gears from increased loads. A good clutch is only effective if it can be activated properly. For correct hydraulic clutch operation, we need to follow the same rules as for disc brakes: the hydraulic fluid must not be older than two years; there must be no air in the system; all seals must be intact and the pistons must not have seized up. Here, there is no need to set the clearance after replacements as a hydraulic system adjusts it automatically. This isn't the case with mechanical, cable-operated systems though. In addition to the (ideal) PTFE guided or greased Bowden cable, the clearance setting is crucial. Insufficient clearance means the linings slip when

the clutch is warm, causing them to wear out prematurely and destroying the steel clutch discs by overheating them (blue discoloration, deformed discs). On the other hand, excessive clearance will lead to gearshift issues. In this case, the motorcycle will tend to move off when the clutch is still disengaged and it will be hard to put it into neutral. The reason for this is obvious - the clutch can't disengage properly. This may also occur if the steel clutch discs have deformed. In the majority of cases, jolts when engaging or disengaging the clutch indicate a damaged clutch cage and / or inner basket.

On most motorcycles, clutches can be serviced and linings replaced without having to remove the engine; so anyone not afraid of getting their hands dirty and boasting a fair amount of mechanical skill and experience can do it themselves. As always though, TRW strongly recommends that those without the necessary skills and experience do not attempt this work themselves, but seek expert support and of course, always follow the vehicle manufacturer's guidelines.



1. Prepare required tools – cover floor – drain oil



2. Remove clutch case cover



3. Disassemble clutch

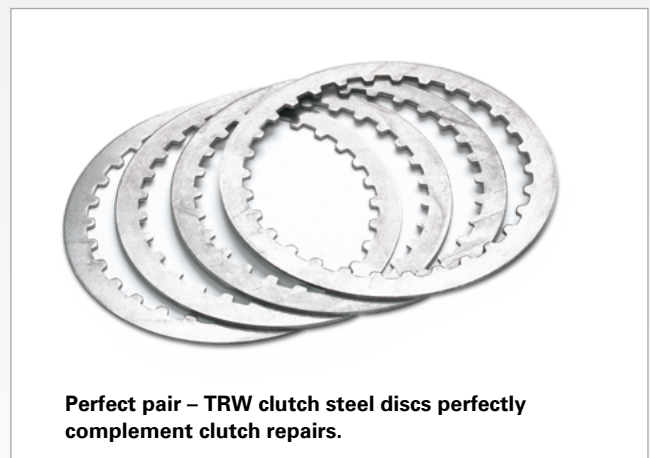
Proceed as follows:

Before you start, check your vehicle's maintenance manual to see whether or not you require any special tools. Fortunately, motorcycles like the 1994 Honda CB 500 model, in which the clutch pressure plate is secured by a special type of nut, are the exception. Obtain information about tightening torques and particular installation and adjustment regulations that apply specifically to your vehicle. Also remember to protect your garage floor from unintentional oil spill before draining the engine oil into a suitable container; which is best done when the engine is warm. While the engine is cooling down, you can start by exposing the clutch lid and clean the components around it. In most cases, you need to remove a foot rest, potentially also the kick starter. Also remove any fitted lids from the clutch release mechanism and its adjustment unit. And now, down to business:

1. Undo and remove each lid screw individually using suitable tools. Screws that were tightened using power tools or painted screws may be hard to loosen. In these cases, gently hitting the screw head usually helps. We recommend using an impact screwdriver to undo Phillips head screws.

2. To remove the clutch case cover from its adapter sleeves, take a mallet and carefully hit all around until it comes loose. Important: only use a screwdriver to lever out the cover if the cover and the housing feature corresponding gaps or recesses. Never attempt to drive the screwdriver between the sealing surfaces as this will cause irrevocable damage! If it's absolutely impossible to remove the lid, you probably forgot to undo a screw! Usually the seal adheres to one of the two surfaces and rips apart. Always replace the seal. Then carefully use sealing agent remover or brake cleaner and a seal scraper to remove any residue without damaging the sealing surfaces. Use a new seal during re-installation. Also remember to keep the adapter sleeves safe.

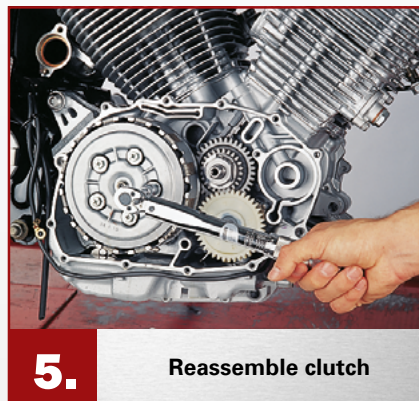
3. Now you have exposed the clutch cage. To access the inside of the clutch cage, you first need to remove the clutch pressure plate. For this purpose, undo a certain number of screws or, in rare cases, a central nut. Always undo screws gradually and cross-wise (each in steps of 2 rotations). If the clutch cage also rotates when you are undoing the screws, engage first gear and block the foot brake. Remove the pressure springs and the pressure plate once all screws have been undone. You can now remove the steel and friction discs from the clutch. Please position all components on a clean newspaper sheet or a cloth so you will be able to remember the installation sequence.



Perfect pair – TRW clutch steel discs perfectly complement clutch repairs.



4. Check components for wear



5. Reassemble clutch



6. Adjust free play

4. Now check the components: Clutch springs wear out and shrink over time. For this purpose, measure their length and compare the values with the wear limit from your maintenance manual. If you are in any doubt, we recommend replacing them as worn springs cause clutch slip. The steel discs fitted between the friction discs may deform as a result of heat. In these cases, they are likely to feature blue discolouration. Check this using a feeler gauge and a straightening plate. You could also use a glass pane or mirror instead of the straightening plate.

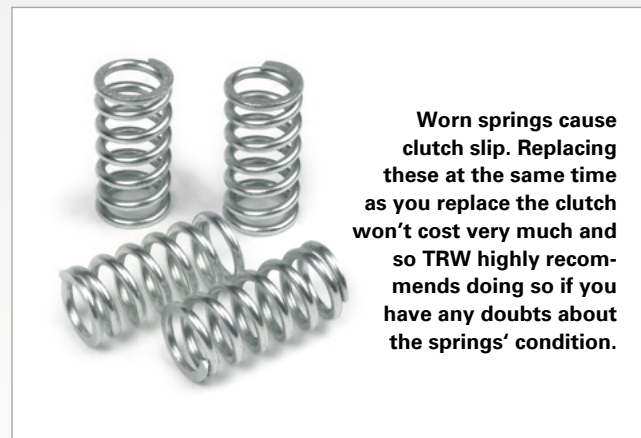
Slightly press the clutch discs onto the glass pane and try to determine the clearance between both components using a feeler gauge. In most cases, slight deformation is still within tolerance. Please refer to your vehicle's operating instructions for the exact values. Replace discoloured or deformed discs with new parts. This also applies to worn clutch cages and inner clutch baskets

Undo the central nut to remove the clutch cage. For this purpose, secure the clutch cage using a special tool. Please refer to your operating instructions for more detailed information. Also check the condition of the jerk damper on the clutch cage. Rattling noises when the engine is running already suggest damage due to wear. When fitted, the clutch cage should have some clearance without feeling unstable and wobbly if you forcefully turn and pull on it.

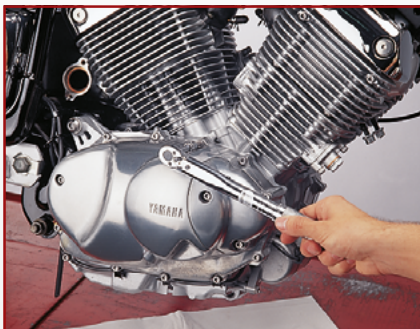
5. After deciding which parts need replacing, you can focus on assembly. Clean wear residue and dirt from used parts using cleaning solvent or brake cleaner. Now assemble the clean and greased components in reverse sequence. For this purpose, carefully check the maintenance manual: observe potential markings on components that may indicate they must be installed in a certain position. If the clutch cage hasn't been removed, it's quite simple. Firstly, insert the clutch discs, starting and finishing with a friction lining (never a steel disc). Then position the pressure plate as well as the springs and screws (it's highly likely that you will have to apply some pressure). Observe potential markings when you subsequently position the pressure plate.

In a final step, tighten the screws individually in cross-wise sequence. If your maintenance manual specifies a torque value, you must use a torque wrench. In all other cases, tighten carefully and do not apply excessive force – the threads are positioned in relatively small recesses on the inside of the clutch basket.

6. If the clutch is actuated using a Bowden cable, clutch clearance adjustment is essential. Adjust it using either: the adjustment screw in the centre of the clutch cage, the adjustment screw on the engine side or the release mechanism inside the clutch cover. Always observe the corresponding manufacturer specifications.



Worn springs cause clutch slip. Replacing these at the same time as you replace the clutch won't cost very much and so TRW highly recommends doing so if you have any doubts about the springs' condition.



7. Remount clutch case cover – tighten screws stepwise



8. Adjust Bowden cable



9. Refill oil

7. Re-position the clutch cover once you have cleaned the sealing surfaces and inserted the correct seal. Don't forget the adapter sleeves! Position the screws, initially manually tighten them and then carefully tighten them or use a torque wrench as per manufacturer specifications.

8. Adjust the Bowden cable so that the clutch lever has approximately 4 mm clearance before force is applied to the lever (refer to the operating instructions for the exact measurement for your vehicle). In doing this, it shouldn't be necessary to excessively screw out the hollow screw from its thread.

9. Now you can fill the oil. But be careful! Only use oils approved for use in motorcycle engines with wet clutches.

Ensure the oil drain plug is securely fastened. In a final step, refit the foot rests, kick starter, etc. and unblock any brakes and the rear wheel. Check your installation before you once again take to the road: pull the brake and disengage the clutch, start the engine in neutral, and then smoothly engage first gear. If you are able to accelerate without any slip or jolts, you have done everything correctly and can once again look forward to many more happy miles on your bike!

The work steps in brief:



1. Prepare required tools, cover floor, drain oil.



2. Dismantle screws stepwise, remove clutch case cover, clean sealing surface, pay attention to fitting sleeves



3. Remove clutch pressure plate and clutch discs. Assort in correct mounting sequence.



4. Check: free length of springs and wear of steel discs, clutch cage and inner basket. Replace parts if required.



5. Start reassembly with friction disc, tighten screws at clutch pressure plate stepwise.



6. Adjust clutch free play at clutch release mechanism, procedure may vary model specific.



7. Remount clutch case cover using new gasket, pay attention to fitting sleeves, tighten screws stepwise.



8. Adjust Bowden cable to 4mm free play.



9. Refill oil, get motorcycle ready to start, test run.