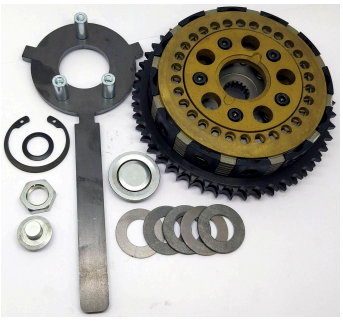
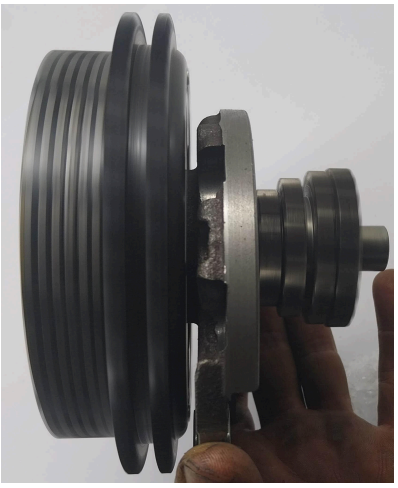
Instructions



Thank you for purchasing the AF Python Clutch. I hope it improves your control over your engine and your riding enjoyment.

The Kit supplied should contain the following, please check before you try to fit the clutch:
The Python Clutch assembly with GP top bearing fitted, a thin clutch nut, and bevel washer, an Li top for the bearing, a special end plate circlip, a set of wide clutch shims, and a clutch holding tool.



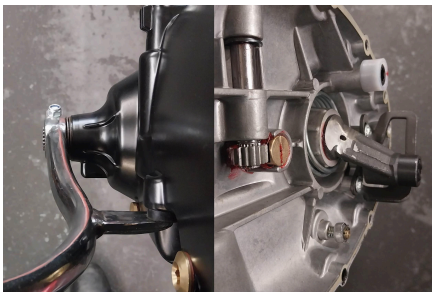
Important notes:

- You do not need to take the clutch cassette apart in order to fit the clutch. If you '*must'* take it apart, refer to the section on changing plates to see how to safely take the cassette apart without damage.
- You do not need to 'soak' the clutch plates. We recommend Rock Oil Gearaxl S75w90 gear oil.
- You must use a wider clutch shim (as supplied with the clutch).
- Clutch nut torque is, 50ftlb, (68Nm).
- **Ensure the clutch has clearance to rotate freely,** before building into the engine. Build it on to the end plate with the thinnest shim and tighten it down. Then spin it. Correct any clearance issues now, (layshaft top hat and circlip inner bore need to be checked). If the clutch rubs, you will experience **clutch judder on launch,** correct it now. If in doubt send me your endplate and I will match it for you.
- The Casa Gear end plate and some spanish end plates would require machining for clearance.
- You lose little time by reading the instructions, you may lose much more by skipping them.

Additional parts and tools you may require to fit your new clutch:
Crankcase gasket, and a bottle of 75w90 gear oil, medium strength thread lock, 10mm,13mm,14mm and 22mm sockets and wrench, a pair of external circlip pliers, a pair of internal circlip pliers, small flat blade screwdriver, large flat blade screwdriver, a torque wrench capable of 50ftlb (68Nm), a plug spanner, and a digital caliper. You need a clutch compressing tool for safe removal of the original clutch, it is not required for fitting the Python Clutch, but is useful for testing the clutch operation in test 1.

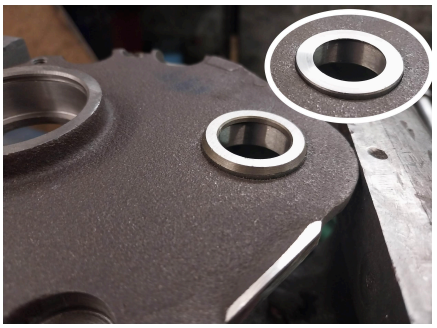
Removing your old Clutch:

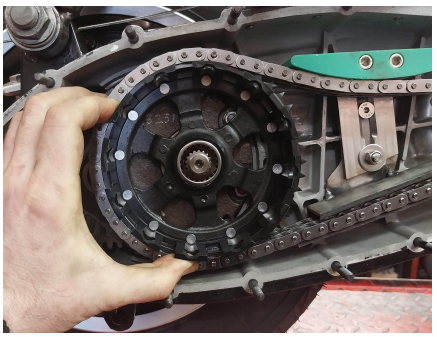
1. Remove your drain plug and drain the crankcase oil into a container to responsibly dispose of. Remove the right hand side footboard, remove the exhaust, remove the crankcase cover.
2. Inspect the inside of the crankcase cover and identify if you have the GP Bronze pressure bush fitted into the cover, or the Li/SX/GT/TV type cover.
3. **Inspect for any damage and or worn components that should be replaced or repaired**. Special attention to the top of the clutch and the back of the kickstart shaft, to ensure they have not been rubbing. Check the kickstart shaft is all the way home. If not, push it through and increase the number of kickstart shims



fitted and replace the circlip, ensuring the circlip is located in its groove. **If needed, relieve the back of the kickstart shaft where it is close to the clutch.**

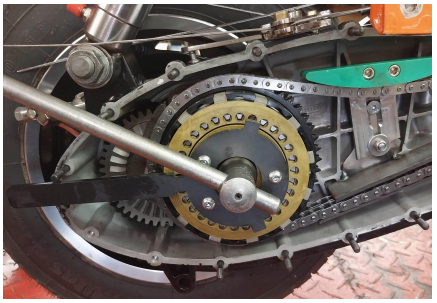
4. Remove the original clutch. A clutch compressing tool makes this job both safer and easier.
5. Remove the clutch shim fitted, and the gear end plate circlip.
6. Check that you have the same number of teeth on your old crownwheel and the new one you are about to fit. If not, ensure you have the correct chain and guides to suit fitting the combination of sprockets you plan to run. (Our Clo5e Ratio instructions can help you make an educated decision regarding gearing or phone us for advice).



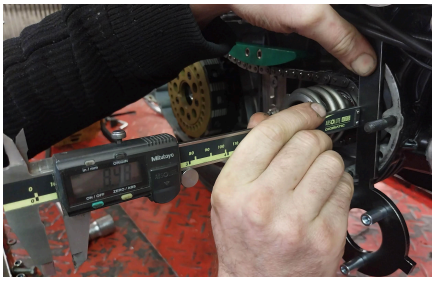


Fitting Your new Clutch:

1. Replace the gear end plate circlip with the new Circlip supplied. If the layshaft top hat is very proud (protrudes more than 2mm), it can be worth skimming its surface down to give greater clearance. Ensure you leave enough material to retain the layshaft needle roller bearing.
2. Measure the clutch shim originally fitted, and select the same thickness shim from the new wide shims supplied. Alternatively, the 1.2mm is a good starting point. Fit the new shim in place. **Remove any burr on the edge of the shim.**
3. Using a small flat blade screwdriver and the cut out tabs in the clutch top, remove the top bearing. If you have the Li/SX/GT/TV type cover you will need to remove the flat GP top from the top bearing and replace it with the Li Type supplied.
4. Loosen your chain guide, remove your spark plug, push the clutch cassette out of the crownwheel. Squirt some 75w90 oil into the bearing and fit the crownwheel in place on top of the fitted shim and with the chain looped around it.
5. Fit the clutch centre, look through the splined hole to see the alignment with the gear cluster spline, and hold the crownwheel concentric to the gear cluster. Locate the clutch cassette tabs in the slots of the crownwheel and push down until the cassette is within the crownwheel.
6. Fit the bevel washer supplied and the 22mm nut supplied to the end of the cluster (we will be putting thread lock on this nut on the last fitment, but not yet). Nip the nut down (we do not need to torque it down yet). Check the cluster does not stick though the end of the clutch nut by more than 2 threads. (Some spanish clusters are longer than standard and may need to be shortened slightly to allow the clutch to operate correctly).
7. Adjust the chain guide, to take out slack, not too tight, the chain should be able to be lifted and dropped by about 4mm. Tighten the chain guide fixings and use threadlock where appropriate.
8. **Time to check the sprocket alignment**. This is easiest to do by using a straight edge across the clean crankcase gasket surface. The supplied clutch holding tool is good enough, just make sure it is flat against the gasket surface. The crownwheel has 0.2mm of ‘float’, so push down on the chain so it’s at its lowest point, release and then measure. Use the digital caliper to measure the



depth to the chain as it sits on the sprocket, measuring to the centre of a flat plate. Then spin the sprocket and measure a new place, I'd recommend 3 equidistant points (if the difference between the 3 points is high and you can see run out in the sprocket when it is rotated your crankshaft may be out of true). Note the 3 figures down and then take an average. Do the same with the crown wheel. I'd aim to have the alignment within 0.4mm, we have shims to allow you 0.2mm accuracy this is better, but not necessary.



9. Fit the correct shim to get the alignment within 0.4mm. (Perfect would be 0.1mm greater measurement on the crownwheel, i.e. the crownwheel is 0.1mm closer to the gearbox than the front sprocket. It has a 0.2mm float and you pushed it back into the engine to take your measurement). Then turn the engine over several full revolutions of the crownwheel ensuring nothing is catching, or rubbing. Find and correct any noises or clearance issues. Chain rollers catching on the layshaft top hat in the gear end plate is quite common. It is ok to relieve the layshaft top hat (pictured earlier) if it catches as long as the relief does not break through to the bearing surface. Alternatively a larger clutch shim can be fitted along with a corresponding shim on the oil thrower washer. This will maintain alignment but may cause clearance issues with the crankcase cover.
10. Remove the clutch nut, put a little medium strength thread lock on the nut and refit. Torque to 50ftlb, (68Nm) using the holding tool supplied.
11. Fit the top bearing into the clutch centre.
12. **Time to do the 1st clutch test** if you have a compressing tool, otherwise skip this test. Fit the clutch compressing tool, and compress the clutch. Lock the gearbox, either by placing a large screw driver to prevent 1st rotating or by putting the bike into gear. (If you put the bike into gear take care that it will not come off its stand if/when the rear wheel rotates).
13. Now the gearbox is locked, and no spark plug is fitted, and the compressing tool is compressing the clutch, check the plates can lift up and down freely (approx. 2mm or so of play). Now try to tighten the front sprocket. You should encounter a little 'stiction' then the sprocket should spin freely and the chain and crownwheel should spin with it. But the clutch centre stays still with the gearbox. If this does not happen, investigate now, there is a problem. Spin through several revolutions to ensure no issues can be found then remove the compression tool.
14. Fit a new crankcase gasket (I like to use a very small layer of silicone sealant on the gasket, this helps both to ensure a seal and makes it easier to remove in one piece for servicing).

15. Fit the crankcase cover and the 10mm M6 fixings that retain it. Fit the clutch cable and adjust so there is a little free play in the lever (i.e. the clutch is not being compressed at all). Fit the spark plug back and tighten.
16. **Time to do the 2nd clutch test**. Pull the clutch lever into the handle bar. The clutch inner cable should have moved 13mm or more (for further information check the Multi clutch instructions). Now with the ignition still in the off position, and the clutch lever still pulled, and plug fitted. Push down on the kickstart lever. You should feel a little 'stiction' then the kickstart lever should push down to the ground without the engine turning over. Watch through the flywheel cowling to see that the flywheel isn't rotating.

17. Listen carefully. Push the kickstart down several times, the clutch should be slipping, the engine should not be turning over, there should be no grinding or rubbing sounds. If you feel or hear any scraping then take the crankcase cover back off and find out what is rubbing and correct it. Now release the clutch lever, and use the kickstart to check the engine does turn against the compression.
18. Occasionally if a very large clutch shim has been used or the kickstart shaft cannot be safely relieved any further (as per removing the old clutch step 3) using a thicker crankcase gasket or fitting 2 or 3 crankcase gaskets together can achieve the needed clearance.
19. Fit your magnetic drain plug back into the engine, and remove the breather and pour in 700ml of new 75w90 gear oil, and re-fit the breather.
20. Refit your exhaust and footboard.

First Test ride:

1. Choose a quiet bit of road where you have a good amount of space.
2. Start the bike, push the bike off the stand, get the bike rolling forward.
3. With the bike rolling forward, sit on it, pull the clutch in and select 1st gear.
4. Keep the clutch held in and brake to a stop. If you have adjusted the clutch correctly you should now be stationary with the engine running in 1st gear. You are ready now to slowly release the clutch lever and do your first launch. Once you have released the clutch you should be able to accelerate hard without the clutch slipping. I.e. The rpm of the engine rises linearly with road speed, and the engine does not have the 'automatic' sound of revving higher, then the rpm dropping as the bike speed catches up.
5. After the first test ride, put the bike back on its stand, allow the bike to cool down, then remove the crankcase level plug. Allow any excess oil to drain out until the oil is at the level, and no longer drips out. Then replace the level plug. Top up if the oil does not reach the level.

Changing plates and maintenance:

1. Remove the clutch from the bike.
2. Loosen the five 4mm (M5) allen bolts in a star pattern over several stages so the force of the springs are evenly released. Removing bolts one at a time will result in breaking the clutch bell.
3. Once the five bolts are removed the clutch top and springs can be removed. Now the clutch can be split and the plates, springs or other components can be replaced.
4. Reassemble the clutch inside the crownwheel to ensure the clutch tab alignment. Tighten the five M5 bolts in the same star pattern over several stages as you did in the disassembly.

Features:

This clutch builds upon the design of our popular 6 plate AF Road clutch. It shares the advantages of simple fitment and removal. The top bearing, the clutch top, the plates, and springs are all compatible. The improved design elements are reduced mass, increased number of plates, tighter tolerances, and a needle roller bearing instead of a bush.

The Python Clutch has 8 plates and fits without a crankcase spacer (just like the 6 plate Road clutch). The python clutch is able to control increased torque without increasing the clutch lever weight. The increased surface area (more plates) also makes for a smooth engagement and longer service life.

The Python crownwheel has a steel ring gear and a CNC, heat treated and hard anodized aluminium basket, to reduce the mass and maintain durability. Reducing the mass of the clutch reduces the inertia of the drivetrain. This makes the engine more responsive and reduces the

loading on the gearbox. The result is the gearbox will also have an improved service life and be less likely to be damaged in an extreme event (like a missed gear change).

Standard 47 tooth GP clutch weighs 1.97kg
AF Road 6 Plate clutch weighs 1.54kg
Python 46 tooth clutch weighs 1.435kg
Python 47 tooth clutch weighs 1.488kg

Two year reigning Bsso Champion Steve Wright (Titch) has been running the development versions and then the final version to championship success in Group 6. He is happy to recommend the clutch 'feel' and the control it has given him over his RB25 Race engine maintained by Team DSC.

If you are running a GP crankcase cover the UNI Multi Clutch kit offers another level of control over the lever 'feel' and 'bite'.

Additional notes:

- If you have a GP crankcase cover the UNI multi clutch can provide another level of control and allow you to adjust the leverage applied to the clutch, changing the lever weight and the bite point 'feel'.
- Stronger springs are available (30% increase), to further increase the clutch's torque carrying capacity. The Python clutch has a very light lever feel. You may prefer a heavier lever, or if you have a very powerful engine or particular application (drag racing etc.) it may be desirable to fit them.
- Higher friction plates can be fitted, the surflex plates used in our 6 plate clutch can be used as long as the bottom two have their diameter reduced from 126mm to 123.4mm. This will make the bite point of the clutch sharper and increase the torque carrying capacity.
- Lower friction plates can also be used. The AF Road plates with the bottom two plates diameter reduced from 126mm to 123.4mm, will give a softer bite point for a better low rpm smooth launch.

Fitting Issues & Frequently asked questions:

- Casa gear end plates and some spanish gear end plates are thicker around the 6004 bearing and will not have adequate clearance without some machining.
- Some gear end plates are cut with a shallow circlip position. This can make the back of the crownwheel tough against the circlip. If this happens, the circlip can be relieved to give clearance (pictured).

- Do not over adjust the clutch. If the cable is too tight it is possible to compress the clutch too far. This can allow the bottom of the clutch bell to touch the crownwheel. No permanent damage will occur but the clutch will appear to drag slightly when fully compressed.
- First launch clutch judder/pulse (on / off feel, not a smooth engagement). This could be the clutch touching on the kickstart shaft, and can also just be a small burr of the plates not releasing cleanly. If you have checked the clearance and know the clutch is not rubbing, then launching the bike several times and using the clutch will usually wear in any burr very quickly. Alternatively if the symptom is only present on gentle launches when the engine is cold, change from ST90 gear oil to a 75w90 (we recommend Rock Oil Gearaxl S 75w90. For competition use and drag racing a lower viscosity oil can also be beneficial.