



## Gen II Multistage Clutch Installation for GS1100/1150

MTC Engineering's Gen II multistage is designed to provide you with improved reaction times and better E.T.'s. This new generation of multistage clutch runs on motor RPM instead of input shaft RPM. The unit operates wet and is totally enclosed in the stock clutch cavity with the addition of a specially designed cover plate. All MTC Gen II multistage clutches and components are covered under U.S. Patents.

There are several things that need mentioning before you use this Gen II Multistage clutch so you will not make any mistakes.

1. This clutch operates on engine RPM. Make sure you have set up the dynamic springs so that the engine RPM's do not try to pull the clutch lever out of your hand at the line.
2. Always make sure you put the spacer in the bottom of the basket or you will instantly break fibers and the clutch will not lock up.
3. Make sure the air gap between the hat and pressure plate buttons is between 0.100' -0.120'' so that the arms will engage correctly and apply repeatable pressure.
4. At high engine RPM's there is a lot of force on the pressure plate. Do not try to pull in the clutch until the engine RPM's have dropped.
5. Make sure that you can reach an ignition kill switch without removing your hands from the controls.
6. Make sure you remove the static spring compression bolts before operating the clutch.

### 1-B. INSTALLATION OF GEN II CLUTCH IN A GS1100/1150

- A. When installing a Gen II basket into a GS1100/1150, it will require you to check clearance of the cases to prevent the O.D. of the basket from touching the inside of the clutch cavity, a minimum of 1/32" is required.
- B. Installing the clutch basket to the transmission shaft and installing clutch cover is the same as with the stock engine. The GS1100/1150 engines require shimming of the clutch basket end play to provide .003 to .006 clearances. Follow GS 1150 shimming procedures. The GS1150 has a shorter primary drive gear spacer with the 2-6mm tapped holes.
- C. Replace the hardened steel spacer that goes between the face of the clutch basket and the inner hub with the three (3) piece needle bearing spacer supplied with your unit. **Make sure the needle bearing faces the clutch basket and the large thrust washer contacts the inner hub.** Install the Gen II modified inner stock hub. Tighten the locking nut to the factory specification. Check to make sure you have the correct end play on your basket after tightening. If you don't have .003 to .006'' end play clearance, the inner hub will not rotate when the nut on the input shaft is tight. If the basket has too much end play, it could cause damage to the clutch or engine.
- D. Use the provided extended puller in the pressure plate with the bearing and the thrust washer. Make sure the thrust washer is next to the pressure plate.

- E. Install the bottom spacer into the basket making sure the dowel pins are in the holes drilled at the bottom of the basket. Check to make sure the spacer is sitting flat on the bottom of the inside of the basket. This is critical to make sure the clutch stack up is correct. Install friction and metal plates same as with stock procedure except start with a fiber, then hard chrome plated steel, then fiber, then hard chrome plate continue till you end with a fiber. The GS1100/1150 Gen II has 7 steels (0.078" thick) and 8 fiber (0.119" thick) plates. We recommend all hard chrome plates for the serious racer. The total clutch pack should be approximately 1.498".
- F. Install the pressure plate and hat assembly as one piece on top of the last fiber. Because the basket sits behind the wall of the cases, the assembly must be rotated so the flats on the hat assembly clear the side of the cases and inserted into the basket at an angle. Check to make sure the hat clears the threaded boss on the case (See Fig.1 & 2). If it does not clear, grind the back side of the thread boss until it clears the hat. **Make sure the cover screw that goes into that boss is shorter than the length of the boss or it will hit the clutch hat.** The height from the top of the tang on the pressure plate to the top of the basket should be between 0.110"-0.120" (See Fig.3). Apply hand pressure to the extended puller, while measuring, to make sure the plate is tight against the fiber. This will give you an air gap below your arms to the buttons between 0.110"-0.120". On the GS1100/1150 Gen II this can be checked after the hat and pressure plate is installed due to the open side flats in the hat.

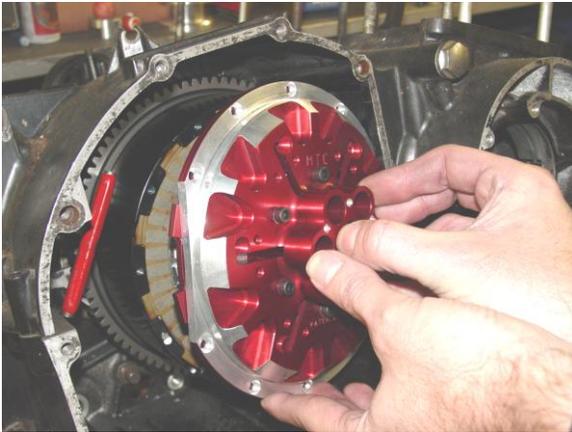


Fig. 1



Fig. 2

- G. Attach the hat assembly on the basket and tighten the ten (10) allen head cap screws to secure it.
- H. The air gap between the arms and the pressure plate buttons can be measured using the thin bottom section of a caliper. Stick the caliper rod into the slot opening just behind the arm (See Fig. 4) until it hits the top of the button on the pressure plate. Take a height reading to the top of the Gen II hat, this reading should be between 0.490"-0.510". This gives an air gap of 0.100"-0.120". It is better to start with an air gap of 0.100" to compensate for clutch wear. This technique can be used to maintain the air gap, after repeated runs, without removing any part of the clutch.
- I. **Remove the six bolts which were holding the static springs in compression.** Failure to remove these bolts will result in a nonfunctioning clutch. Keep these bolts to use when you disassemble the clutch.



- J. If you are using an aftermarket billet cover or a modified stock cover, make sure it clears the arms on the clutch when you install the cover.
- K. Before starting engine turn engine over by hand, and make sure that basket or inner hub is not binding.



Fig. 3

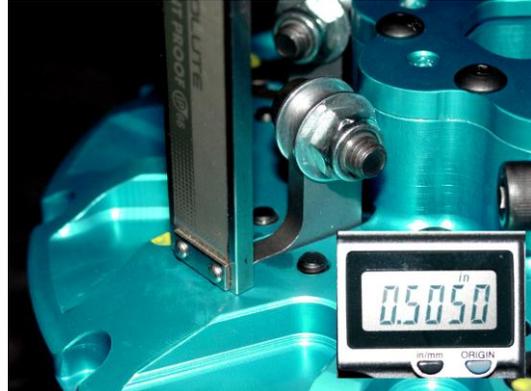


Fig. 4

## MULTI-STAGE USER GUIDE

- 1) If you want to get aggressive with the clutch lever, you will need to soften up the amount of clutch clamping force at launch. On the Gen II, the launch pressure is a combination of the static pressure and arm pressure. The biggest cause of burnt plates is riding the lever too far, because the clutch pressure is too high. You want to rely on arm pressure, more so than static pressure since static pressure is just that, static. The arms provide progressive increase in clamping force as RPM increases. Static adjustments are made to provide minor tweaking of the clutch pressure without changing the curve of the arm pressure.
- 2) Unlike the regular Multistage Lockup, the arms assist in the launch of the bike, so you must manage the clutch pressure to get the best launch. Example, if you spin the tire instantly or wheelie, take clutch pressure out. If it seems lazy, add pressure. This can be done simply by altering the launch RPM by 100-200, up with increase the launch pressure, down will lower it slightly.
- 3) A great tuning tool is our Clutch Graph 2010 Simulation software. This program allows you to plug in your current Gen II clutch setup and then make an alternate setup. These will be displayed together on the screen so you can see how the clutch clamping force will be affected without making a run. It will show you if you are making the right changes to soften or stiffen the setup. Please contact Sales for more information.
- 4) The small springs included with your lockup are to adjust when the arms apply. The lower the number, the softer the spring, the sooner the arms will apply. The higher the numbers, the stiffer the springs, the later (higher RPM) the arms will apply. Free length of multistage springs are #3-0.935", #5-0.990", #7-1.040", #9-1.083", #11-1.134", #13-1.192", #15-1.224", #18-1.321", #21-1.397" (measurements are taken in inches). These springs will lose some length after being installed over time. Always replace all the same number springs when replacing springs. We now have #23, #25, and #27 springs available.
- 5) We recommend that you keep equal weight on all the arms. If you add or remove weight, do it to all of the arms.
- 6) To run a lockup, you will need to run either an air shifter or electric shifter.
- 7) Should you require any additional support, please feel free to call us or email us at [ClutchSupport@mtceng.com](mailto:ClutchSupport@mtceng.com).