



Patriot 2 KT100 Engine Clutch Owners Manual

Thank you for your purchase of a Patriot Two Cycle engine clutch. The Patriot clutch owners manual will explain how to properly install, maintain and achieve the maximum performance from your Patriot clutch. The Patriot can be used in multiple Yamaha classes with just some small changes including spring size and clutch slip (explained later) -

Class	Spring Size
Yamaha Rookie Sportsman 3 Hole	.085, .091
Yamaha Jr. Sportsman 4 Hole	.085, .091
Yamaha Junior or Senior Sportsman	.091

Installing the clutch

1. Slide the clutch spacer onto the PTO shaft with the chamfer side towards the engine and the flat side to the outside. Make sure you use the proper spacer for the sprocket being installed.
2. Take a small amount of bearing grease or graphite grease and wipe a thin, even coat on the drum bushing then slide the drum onto the PTO shaft until the sprocket is against the clutch spacer.*
- *On a new KT100 crank the Patriot drum bushing can be very tight, the drum bushing is clearanced to fit properly on a crank that has some time on it (which is the majority of cranks). If you are putting the Patriot drum on a new crank you will most likely have to sand the bushing a little bit too properly clearance the bushing to the new crank.
3. Place the woodruff key into the PTO shaft keyway. It is easiest to install the key and clutch if you turn the PTO shaft with the keyway facing up at a 12 o'clock position.
4. Carefully slide the clutch onto the PTO shaft with the clutch hub keyway at the 12 o'clock position, make sure you have the key on the PTO shaft lined up with the keyway on the clutch hub. You will also have to make sure that the disks are properly lined up with the drum slots or the clutch will not slide all the way onto the PTO shaft. Once the clutch is all the way onto the PTO shaft, make sure the key is properly in the keyway, it is easy to shove the key out of the PTO shaft keyway.
5. Install the starter nut on the PTO shaft. Use the clutch holder wrench to keep the clutch from turning for proper tightening. The clutch nut needs tightened to 420 inch lbs (35 foot lbs) with a torque wrench, we also recommend a drop of red thread locker on the starter nut threads prior to installing the nut.
6. Once the clutch is on and tight check the drum end play. There should be between .004" to .006" of drum end play. To little end play will cause the clutch to run in direct drive and wear parts quickly. Too much end play will cause the sprocket to not align properly with the rear axle sprocket and will cause the drum to rock on the crank.

If the clutch has too little end play make sure the spacer is the proper diameter for the sprocket being used and is installed correctly. If the spacer is correct then you will need to file the spacer down some to increase the end play of the clutch. If there is too much end play, make sure the clutch is properly installed on the PTO shaft and that the clutch is tight. If everything is correct then you will need a thicker drum spacer.

Using your Patriot clutch

The Patriot clutch is designed to run within a certain stall speed depending on the class it is used in. The stall speed is the RPM at which the clutch engages and starts to accelerate the kart. Too little stall speed will make the kart slow to takeoff and make the engine sound "boggy", too high of a stall speed will cause the clutch to keep slipping without engaging and will make the kart slow to takeoff while building a lot of heat in the clutch and prematurely wearing out the friction disks on the clutch.

There are a couple ways to check your clutches stall speed. You will have to have a tachometer on the kart to know what the stall speed of the kart is. The easiest method for checking stall speed is while running on track, look at the tach coming off the tightest corner on the track, the tach should hang on at a specific RPM, that is the stall speed. The other method is to check the kart in the pits. Be careful of pedestrians, vehicles and other things that you can hit or that can hit you. Place the kart on the ground, start the engine and have the driver accelerate on a flat section of asphalt about 20 feet. If the engine runs clean the tach will "stall" at a particular RPM number before the engine begins to accelerate again, that is the stall speed of the clutch. If you check the clutch in the pits make sure you allow the clutch a few minutes between clutch test runs to cool down. The clutch can be very hot very quickly testing it in this fashion.

Patriot Clutch recommended stall speed by class -

Class	Stall Speed Range
Yamaha Rookie Sportsman 3 Hole	7000-7400 rpm
Yamaha Jr. Sportsman 4 Hole	7500-7800 rpm
Yamaha Junior or Senior Sportsman	8500-8800 rpm

Adjusting the stall speed



Your Patriot clutch spring heights have been preset at the factory and should require minimal adjustment. That measurement is taken from the top of the aluminum spring cap to the bottom of the red lever plate and is set at .650".

Raising or lowering the stall speed is achieved by turning the bolts heads on the end of the adjustment springs. The more you turn the bolt in and "tighten" the spring the higher the stall speed goes. Turn the adjustment spring bolt out to lower the stall speed. The most important part of adjusting the spring tension is to move each adjuster the exact same amount. This allows for even lockup around the entire clutch. If one spring is looser than the others it will have less tension and the clutch will start to lockup sooner on that side of the clutch. This will make the clutch lockup uneven so the clutch loses efficiency and the clutch will also wear unevenly. There are two ways to quickly adjust the clutch and keep the adjustments the same on each spring. One is to count "flats" on the hex part of the 1/8" allen. You can adjust the clutch 1 flat, 3 flats, etc. on each adjuster. The other option is to turn the wrench a 1/4 turn, 1/2 turn etc. This allows you to quickly adjust the clutch stall speed without having to take a pair of dial calipers and measure each spring as you adjust the clutch. Just make sure if you move one spring a 1/4 turn, you turn all the springs 1/4 turn.

The springs typically measure from .500-.510 when they are new, off the clutch. The springs should be replaced when they lose .010" or more of free length.

Checking and Maintaining Airgap



The clutch airgap is the space from the top of the floater and disk stack to the bottom of the pressure plate. The airgap is set at .022-.026" from the factory. The airgap is easy to check with a set of feeler gauges. Try different thickness feeler gauges until the feeler gauge will just snugly fit between the top of the friction disk and the pressure plate.

As the disks wear the airgap will increase. As the airgap increases the clutch has to compress farther to properly engage the disks and floaters. This makes the clutch slip more, which hurts acceleration and also builds heat. We recommend a maximum airgap of .032".

Adjusting the airgap requires a thicker floater, as an example, if the airgap is .030" and you want to take it down to .025" you can change the .095" thick floater to a .100" thick floater. This will decrease the airgap of the clutch. You can continue to swap out the floater to a thicker floater up to a maximum floater thickness of .105". After you run out of thicker floaters and the airgap is still too much you will have to change out the disks to new disks. At that point you will also have to go back to the stock .095" floater so your airgap is back in the .022-.026" range.

Removing the Clutch

1. Remove the third bearing support from the end of the starter nut and place the clutch holder wrench over the spring plate of the clutch.
2. Break the starter nut loose using an impact, torque wrench or breaker bar. If the clutch nut was installed with threadlocker you might need to use a little heat from a propane torch to get the starter nut hot enough to break down the threadlocker.
3. Remove the starter nut (if you used a torch it might be hot!) then in a triangle pattern remove three of the central 10-32 bolts with a 5/32" wrench. You only need to remove three of the inner bolts, not all six.
4. Once the three bolts are removed screw the three bolts in the clutch removal tool into the three empty bolt holes. Make sure you screw the three bolts into the clutch at least a 1/4". Then using an impact wrench zip the center bolt into the end of the PTO shaft and the clutch will shove off the taper of the shaft.

Clutch Maintenance and Additional Information

The drum sprocket has a brass bushing that must be lubricated **before every session** on track. We recommend Tri-Flow, a Teflon based lubricant to keep your bushing lubricated. You need to use the lubricant can's straw to spray the gap between the clutch spacer and the sprocket. Take care not to spray the clutch disks or hub, this will cause the clutch to slip to high. If you do get overspray on the clutch disks or hub you can spray the clutch off with brake cleaner.

To prolong the life of the clutch sprocket be sure to spray your chain every single time before you go out on the track. Lack of chain lubrication is a major cause of sprocket wear and failure. Use a quality chain spray like Blendzall or Xeramic. WD-40 should never be used as a chain or sprocket lubricant.


The Patriot drum is designed with 6 friction disk slots, this allows you to move the friction disk tabs to the next set of slots as the drum wears, this doubles the life of the drum. Periodically check the slot wear on the clutch, if the tab slot wears enough the disk tab can get caught in the worn spot on the drum which will affect clutch engagement.

The Patriot drum has a removable sprocket that you can replace as the sprocket wears out or if you want to change from one size sprocket to another. The sprocket bolts have red threadlocker on them from the factory. If you want to change the sprocket you will need to carefully use a torch to heat the bolts and breakdown the threadlocker. We recommend that you use new bolts every time you change the sprocket and always use a red threadlocker. Use extreme caution when using the torch.



The Patriot is a racing clutch and is not designed for prolonged idling while the kart is stationary. This will cause the clutch to overheat. Once you start the engine the kart should be moving within 5-10 seconds. Use of this clutch in a non-racing environment like a field, driveway or yard will destroy the clutch in a short amount of time. The clutch can also overheat if the kart goes off track and gets stuck but the driver continues to try and get the kart going again. In the event that you get hung up off track you are best off to let the engine stop and bring the kart back to the grid and restart.

See your local dealer for more information or visit patriotclutches.com

Patriot 2 Parts List and Breakdown



A.	P0018 Clutch Spacer .135" for 10t #219 Drum
	P0019 Clutch Spacer .145" for 11t #219 Drum
B.	P0001 Two Disk, Six Spring Drive Hub
C.	P0004 Floater .090"
	P0005 Floater .095" - Stock Thickness
	P0006 Floater .100"
	P0007 Floater .105"
D.	P0012 Friction Disk
E.	P0003 Six Spring Pressure Plate
F.	P0014 .085" Spring
	P0015 .091" Spring
	P0029 .085" Spring Set of 6, Matched
	P0030 .091" Spring Set of 6, Matched
G.	P0013 Spring Cap
H.	P0022 Adjuster Spring Flathead Bolt
I.	P0002 Six Spring Aluminum Lever Plate
J.	P0020 Lever Weight
K.	P0021 Lever Weight Pin
L.	P0023 Clutch Center Socket Head Bolt
M.	P0008 Clutch Drum Only, Two Disk
N.	P0016 Sprocket and Drum Assembly, Two Disk 10t #219
	P0017 Sprocket and Drum Assembly, Two Disk 11t #219
O.	P0009 Replacement Sprocket Only with Bolts 10t #219
	P0010 Replacement Sprocket Only with Bolts 11t #219
P.	P0028 Sprocket Bolt

Q.	P0011 Starter Nut
	P0024 Patriot Six Spring Aluminum Clutch Holder Wrench
	P0025 Patriot Clutch Puller, Steel with Bolts
	P0026 Patriot 2, Two Disk Clutch, .091 Springs, Yamaha Senior or Junior, 10t #219
	P0027 Patriot 2, Two Disk Clutch, .091 Springs, Yamaha Senior or Junior, 10t #219
	P0031 Patriot 2, Two Disk Clutch, .085 Springs, Yamaha Sportsman/Rookie, 10t #219
	P0032 Patriot 2, Two Disk Clutch, .085 Springs, Yamaha Sportsman/Rookie, 11t #219