SSS clutch for KT100J Yamaha

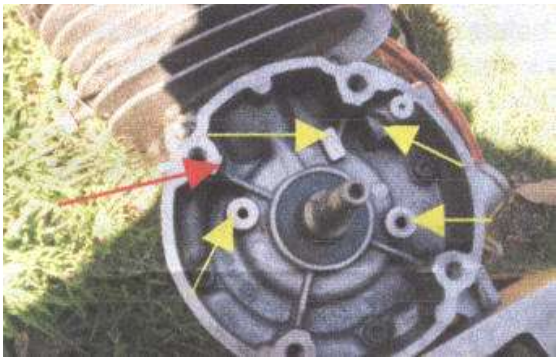
The SSS clutch is designed so that the clutch drum rotates within the outside body of the crankcase. This has been done to provide for neat installation and also to bring the drive sprocket inwards to the engine to prevent excessive bending loads on the crankshaft. For the clutch to clear the crankcase it is necessary to machine some areas off the crankcase. Other than that, the clutch will fit directly to the existing crankshaft without any modifications. It must be pointed out that the crankshaft in the area inboard of the taper must be in good condition as the clutch drum rotates over this section.

METHOD OF FITTING a **SSS clutch** to a 100J kart engine & its operation.

- Machining of the crankcases can be performed using either a lathe (the engine must be disassembled) , or if the engine is to remain together, a milling machine or by hand using a die grinder with a rotary cutter. If you feel that you do not have the adequate facilities to do this yourself, then have it done by a machine shop. The following photo shows the crankcase after machining. The four yellow areas are areas where material has been removed down to a level the same as the main central boss (crank seal face). The red arrow shows one of the four bosses that have been machined to provide a diameter greater than 98.5mm to clear the clutch drum. This diameter must also be machined down to 1mm below the seal level and be concentric with crankshaft axis. (diagrams are below with indicator arrows etc. shown)
- Ensure that both the bore in the shoe assembly and the 20mm OD section of the crankshaft are dry and oil and grease free. Fit the clutch shoe assembly over the crankshaft ensuring that the screws (which are offset to the shoe centreline) are towards the crankcase. This results in the shoes being in a "leading" position. Note that this is the way that clutch has been designed as fitting them in a reversed or trailing position will not allow proper clamping on the shaft due to the offset screw design used. At this point, lightly tighten (using a 6mm Allen key) the two M8 clamp screws and slide the shoe assembly inwards until it touches the crankcase. Then slide out by 1mm and progressively tighten the screws, ensuring that the gap between the two shoes is approximately equal. Finally tighten the screws to a torque of 22 - 24Nm (16 - 18 ft lb). Both screws must be tightened. Another method of positioning the shoes is to fit a 1mm spacer made from plastic, cardboard, etc. on the crankcase boss and slide the shoe assembly up to this prior to tightening. The spacer must be removed after tightening. This completes the installation of the shoe assembly.
- The next step is to fit the clutch drum. Before fitting, the shaft must be checked for any damage or imperfections. Any nicks or damage must be removed by careful rubbing with wet and dry paper, with a final finish using 1200 grade paper. This should bring the surface up to a very smooth finish. After cleaning, lightly grease the shaft and the inside of the bearing or bronze bush inside the clutch drum and fit the drum to the crankshaft. The drum should spin freely and contact the shoe assembly when pushed fully inwards. If the drum contacts the crankcase, it means that the shoe assembly is not out far enough (the 1mm in the previous step) or the crankcase was not adequately machined. With the slight variation in crankshaft size where the bearing / bronze bush runs, it may be necessary to increase the bore size of the bronze bush. This may be done with an expanding reamer. If the drum is a perceived loose fit on the crankshaft , it is quite possible that the crankshaft is undersize, as this are is

sometimes cleaned up when the crank is rechromed. The crank size should be not less than 14.275mm OD. If it is less than this, the only option is to use a bush.

- Screw on the adjusting nut (the longer of the two nuts supplied) with the open end towards the clutch drum. Tighten this up by hand then back off by one flat (one sixth of a turn) to provide the necessary end float. Then screw on the lock nut. With two 19mm spanners, lock the two nuts against each other with a torque of 25Nm (18 ft lb). Check the end float, which should be around 0.2mm (0.008 inches).



OPERATION :

- **Minimize slipping**. The SSS clutch has been designed to allow the engine to be started with the kart stationary and idled for a reasonably short period of time and then driving away smartly, to prevent prolonged slippage. Extended high load slipping will cause the clutch to overheat and significant premature wear of shoe lining material. Slipping generates heat. Once engaged, the clutch generates no heat (as evidenced by the fact that the clutch is cool after finishing a track session).
- **Lubrication**. The 12 and 13 tooth drums use a roller bearing and this requires minimal lubrication, just a small spray of chain lube several times each day directed closely between the sprocket and the adjusting nut. The 11 tooth clutch drum has a plain bearing that requires frequent lubrication. Lubricate the clutch bearing when ever the chain is lubricated. This is every time the kart goes onto the track. Lubrication is best done with a spray can lubricant. DO NOT USE CHAIN OIL. A 3 to 4 second duration spray, directed closely between the sprocket and the adjusting nut, is required each time.
- **Starting**. The engine must be started by external means, which usually means an electric starter with an extended shaft that passes through a hole in the side pod, or a pull-starter fitted to the engine. If an external electric starter is used, it is imperative that it have a one way clutch (sprag) to allow the engine to run faster than the starter motor. If this is not used, the locknuts will repeatedly come loose and/or the starter motor may be damaged through over speeding. A 19mm socket drive is required on the starter - (The original sprocket nut may be used as the lock nut, in which case a 17mm socket drive will be needed).
- **Chain guard**. As a regular engine mounted finger guard will not clear the clutch drum, it is necessary to use the type of guard that clips to the side pod mounting tube. These are readily available from any kart shop. This will need to have a hole drilled to allow the starter shaft to meet the crankshaft nut if an external electric starter is to be used.
- **Idle speed**. The idle speed is to be set as low as possible, in the range of 2000-2200rpm. As the clutch has been designed with an initial engagement speed of 3000rpm (an AKA requirement), an idle speed any higher will cause the clutch to excessively drag. On some engines it appears that leaning off the primary jet by half a turn will improve idle quality and starting. Obviously this will need to be wound out by this amount once the kart is underway or just before.
- **Stopping the engine**. Because the engine cannot be stalled as with a direct drive, there are two ways to stop the engine. The first is to have a switch that earth's the spare female connector on the ignition wiring loom. The other is to simply stop the airflow to the engine by blocking the air inlet tubes on the air box.
- **Chain tension**. Excessive tension will cause premature wear on both the engine crankshaft and bearings and also the clutch bush/bearing. Ensure that there are NO tight spots in the chain over a couple of wheel rotations.

WARNING:

Do NOT run the clutch without the clutch drum in place !! If it is run without the drum in place, the shoes will fling outwards unconstrained and terminally destroy the engine and , most likely, any person in the vicinity. Note that this warning applies to any engine mounted centrifugal clutch, including Rotax MAX, ARC, X30 Leopard and Comer.