

## Forward & Reverse Twin Stick Shift Kit Instructions

### ***Important – Read Before Installing***

1. **Do not** disassemble your already assembled shift kit **except at:** upper bell crank arm, lower bell crank. Your kit has been correctly preassembled prior to shipment.
2. **Prior to installation:** remove the assembly from the box and lay it out on a workbench or tabletop. Orient the shift lever facing forward and to the right. Remove the 7/16” bolt that secures the upper bell crank arm to the shift lever cross shaft and separate the lever from the shaft.

**Caution** – before removing the arm - note the angle of the bell crank arm in relation to the shift lever – this angle must be maintained when reinstalling the bellcrank arm. Note bellcrank arm faces forward towards the front of the motorcycle.

Remove the lower bellcrank arm from the frame bracket (note the 3/8” Nylock nut **is not** tightened down – this helps you identify the correct place to remove the bell crank off of.

Caution: Note bellcrank “short” arm faces forward when reinstalling bellcrank onto frame bracket pivot stud.

3. Begin your conversion by draining the gas tank and removing the tank from the motorcycle. Use **caution** when doing this to avoid the possibility of fire. **Do not decant fuel in a closed room!** Keep a fire extinguisher handy. It’s a **smart** idea to disconnect the battery before draining fuel.
4. Once the tank is off the machine, remove the top engine mount – keeping the bolt, nut and both steel and rubber washers for attaching the mast tube. Note the position of the bolt, nut, steel washer & rubber washers are used in the same sequence when attaching the twin stick shifter mast tube.
5. Assuming you have separated upper bellcrank arm from the shift arm cross shaft (note this connection is a hex shaped joint) –bolt the mast tube bracket onto the frame using the same rubbers etc as on the original mount.

Your mast tube will have shift levers, drag link and transmission reverse lever on the right side of the motorcycle. Next - re install upper bellcrank arm. Bellcrank **MUST** go back on at same angle it came off. Tighten upper bell crank securing bolt to 65 In.Lb. Make sure flat washer

and star washer are under the bolt head. Don't forget ground wire (pre 2007 bikes).

- 6 With the mast tube on, upper bellcrank arm on - its time to align the mast. Accomplish this by first tightening the rubber biscuit connection. Next, straddle the motorcycle and looking straight down – make the mast tube parallel to the crankcase ignition cover contact surface (slotted mast tube bracket allows for this). Once aligned, tighten the two nuts holding the mast tube to the engine at 170 In.Lb. Make sure you have a flat washer and a lock washer under each nut.

- 7 Next, remove the reverse shift arm – **do this in the neutral (out of gear) position!**

Once the original reverse arm is removed, install the modified reverse arm on the splined transmission shaft. Note the new reverse lever is attached by drag link to the reverse operating lever which is equipped with a shift knob.

It is helpful to loosen the RH foot peg securing nut and let the peg swing down out of the way when doing this operation. Do note the position of the foot peg so it can be returned to its original position once the new lever is in place.

Drag link ball end is on the inside (towards the transmission) of the modified reverse lever. Position the lever on transmission shaft splines so that the ball joint mounting bolt is aimed at the transmission rear cover/case intersection (12:30 O'clock position). Use same hardware to secure reverse lever as used on the original lever.

**Caution: transmission must be in neutral and reverse disengaged when doing this operation!**

- 8 Next, install lower bellcrank bracket. It requires removing the partially installed U bolt nuts on the bell crank bracket. Remove the U bolt off the bracket. Remove the front lower engine mounting stud nut. Loosen the exhaust pipe bracket clamp bolt and rotate the bracket off the motor stud.

Remove the crash bar. Fit the bracket over the motor mount stud with the bell crank pivot arm stud facing outwards. Slip the exhaust pipe clamp onto the motor mount stud. Install the motor mount stud nut and tighten until the nut is just flush with the stud end. **This is important as if the stud extends through the nut – it will foul the bell crank action.** You will need to tighten the nut on the right side of the same stud to make the assembly tight. Note there will be a gap between the bracket and crash bar mounting lug. Washers are supplied with the kit to take up this gap –

fit only as many washers as to prevent excess bending of the bracket when the crash bar is refitted.

Fit the U bolt around the main frame tube and secure with nuts washers provided. Tighten securely – 165 In. Lb torque. Refit the crash bar and necessary spacer washers and tighten in place.

9. Attach the bell crank arm next Make sure 3/8” flat washer is on outside of bell crank. Tighten the Nylock nut down until there is as little free play as possible in bellcrank movement – **do not tighten so as to cause any bind in bellcrank movement else shifting will be affected!**
- 10 Now remove the original shift pedal from the transmission. Observe carefully its mounting angle. If the rear pedal of the shifter is horizontal then the shifter is still in its original orientation. This is the angle the modified shift lever **must** go back on

Once the pedal is on – it’s time to check action and movement. Drag link and tie rods all have ball joint ends. Grasping a tie rod or drag link between thumb and forefinger – they should be able to be rotated slightly around their axis. If there is any bind, correct by unloosing the jam nuts and recenter the axial movement. Job is OK when there is the slight non binding axial movement on all three rods.

**Beware of flex caused by binding of moving shifter components – if you are flexing the shifter bellcrank bracket – look for the cause & correct it!**

- 11 Test the system thus. With the machine on is center stand, in neutral and reverse disengaged - have a helper rock the rear wheel forward and backward. Shift into reverse by pulling up on the **short** shift lever. You should feel it shift into reverse and the rear wheel will “lock”. Push the lever down and it should go into neutral easily.

Next, pull main gear shift lever back towards the rear of the motorcycle – all the while rocking the rear wheel. There should be no binding and you should feel the transmission select low gear (again the rear wheel will “lock”). Once shifted, release the lever and it should center itself. Continue rocking the rear wheel and push the shift lever forward to get 2<sup>nd</sup> 3<sup>rd</sup> and 4<sup>th</sup> gears. Carefully observe shifter action to see that the shift lever returns to center once released.

Important – there must be no binding in the shift actions – if there is check for fouling (inadvertent contact) with non shift system parts of the motorcycle.

12 Complete the conversion by installing gas tank and check each fastener in the system plus any parts of the motorcycle you loosened off in the installation.

A word of caution: Do not “Gorilla” the shift lever. If the transmission gears are internally not aligned for shifting, forcing the lever will not make them align. Instead – either rock the bike (as when first going into gear) or “sneak” the clutch out a bit to turn the transmission gears to allow alignment. Forcing only bends parts. Shifting on the fly requires a reasonably firm push or pull and the “feel” of the gear engaging before releasing the lever. Remember – forward gears are shifted “one at a time” with the lever released between each shift.

“Goon bar” shifting (i.e. swatting the lever) will ruin parts early on so use reasonable smoothness and force in shifting.

Neutral is easily found with the bike in first or second gear by cycling the reverse lever. Trying this from 3<sup>rd</sup> or 4<sup>th</sup> gears is tough on the system so don't do it

Your foot shift pedal can still be used as it was originally if you choose to do so.

Enjoy!

**Problems? Call our help line at 503 588 7227 – ask for Jim**