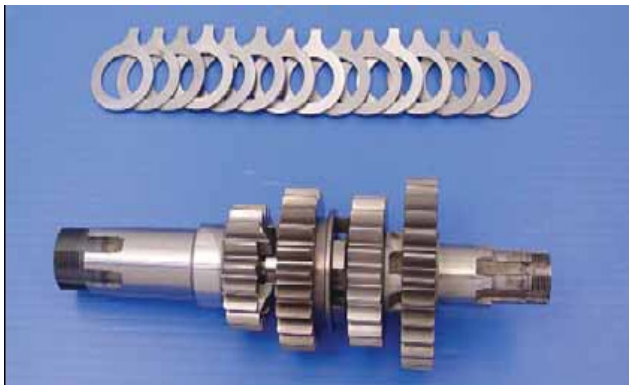
Motor Shop Services Sportster 4-Speed Mainshaft and Countershaft Gear Cluster Assemblies. Each shaft is assembled with correct thickness thrustwashers and snap ring for proper gear clearance. Also included is shaft end play washer assortment for proper end play shimming during installation.



Mainshaft Assemblies
VT No. Year
17-1250 1956-69 XLCH
17-1251 1967-70 XLH Only
17-1252 1971-E84
17-1253 L1984-86
17-1254 1987-90

4-Speed Transmission Installation Tips

VT No. 17-0028, 17-0027, 17-0032, 17-0030, 17-0033, 17-0034, 17-0031, 17-0029
All XL Transmission assemblies are bench tested for positive gear engagement and disengagement but it is always best for a final check after unpacking transmission before being installed.

All V-Twin Transmissions are assembled with late style shifter cam plate that uses welded in pin for neutral switch indicator. On some early (Pre 1974) case this pin may have to be shortened or removed to allow cam plate to move freely. Failure to check this will cause transmission to not completely shift through all gears. This should be checked first prior to assembly.

Gear Engagement Check

Rotate pawl carrier (EE) until pawl carrier contacts lifter arm (Y+X). Hold the shifter cam (D) with opposite hand to prevent cam follower (I) from completing gearshifts. If hand pressure is released from shifter cam the gears will be drawn into complete engagement and all inspection procedures will be performed incorrectly. Shift transmission into first gear then check gear to dog Pocket Engagement. Correct engagement should be 25%. Shift transmission into all other gears checking Pocket Engagement, which must be at least 50%. Filing of lifter arms (Y+X) will produce changes in Pocket Engagement.

Establishing Mainshaft and Countershaft End play

Use the thinnest low gear washer and mainshaft washer. On 1954-early 84 models the mainshaft thrust washer must be installed with Tang Down. For 1954-early 1984 models the mainshaft needle bearing will have to be installed. Temporarily install access cover to crankcase with all transmission parts. Carefully align Cover Dowel Pins and with a rawhide mallet tap into position and install four cap screws. When installing transmission into case check shift fork shaft for correct alignment to case. Do not force transmission into case if shift fork shaft will not go in to case. If shift fork shaft is forced into case damage or bending to shaft will happen causing shifter roller finger to bind against shifter cam plate or shifter fork binging on shaft or with pawl carrier assembly.

On 1954-E84 Models Inspect case race and rollers, if badly pitted scored or worn they should be replaced. Correct fit of main bearing is . 0006in-.0014in. If clearance is beyond specified limit a new race and bearings must be installed, and line lapped for proper fit.

Note: Fitment of door to case may sometimes requires reaming of holes in access door or removal of alignment pins from case. If removal of dowel pins is necessary tapping dowel pin holes and use of additional bolts is suggested. Note also that even during factory assembly process several access doors were tried before final assembly. Using a Dial Indicator measure mainshaft end play from sprocket side of shaft, press against clutch gear so that bearing seats against lock ring in access cover. Move shaft back and forth and measure end play while holding clutch gear in. If end play is not with specification (see chart) install thrust washer of suitable size. With access cover still in place bend a discarded spoke or other suitable wire and wedge into hole on end of countershaft. Push and pull countershaft and measure end play with dial indicator. If end play is not within specification (see chart) install countershaft washer of suitable size. After countershaft end play has been established install oiler plug in access cover with oil hole up.

Note: On 1959-early 84 models the clutch must be temporarily installed and the 1984-85 models the Stator spacing ring and the Stator must be installed on access door before above End play clearances can be established.

When Mainshaft and Countershaft end play established install "**new"** shifter shaft into the crankcase so that the shifter lever arm is centered. Using a grease pencil mark the shaft at the 12 o'clock position by marking the shaft you can tell if the shifter lever arm position changes when installing the transmission. Correct shaft to shifter pawl yoke engagement is important for proper gear shifting. Install transmission and rotate countershaft slowly to check that the gear shift arm is engaged with shifter pawl. To do so rotate shift lever, a noticeable resistance to movement indicates proper engagement.