Bellhousing Alignment for Your LGT-700 Transmission Warranty

Before installing your new Legend LGT-700 transmission, it is very important to make sure that your bellhousing or scattershield is properly aligned with the centerline of the crankshaft. The alignment process is called “dial indicating”. **“The concentric and parallel alignment MUST be documented for your transmission warranty with your Legend Distributor”.** If you are using a stock GM bellhousing, Lakewood, McLeod, or QuickTime scattershield, dial indicating is necessary before installing your transmission.

A bellhousing that is not concentric or parallel with the crankshaft centerline will have a poor shift quality. Examples may include, but not limited to: clutch dis-engagement/engagement problems, worn pilot bearing/bushing, as well as accelerated wear on the transmission itself. You may also experience a neutral noise at an idle when the transmission is warmed up to operating temperature.

Unfortunately, checking the bellhousing alignment can be a tedious task, especially if the engine is still in the car. To check for proper bellhousing alignment, you will need a dial indicator, some basic tools, and a bit of patience.

Standard Automotive Bellhousing Alignment Specifications:
Concentric: +/-.005” or .010” TIR
Parallel: +/-.001” or .002” TIR

Hi-Performance 7,500+ RPM Bellhousing Alignment Specifications:
Concentric: +/-.0025” or .005” TIR
Parallel: +/-.0005” or .001” TIR

Checking Bellhousing Concentric Alignment

1. The stock dowel pins need to be clean, free of dirt, rust, and paint. Check the block, bellhousing, and block plate for burrs and nicks that would prevent the bellhousing from mounting flush to the engine. Secure the bellhousing to the engine block and torque all bellhousing to engine bolts to specification. If using a scattershield, make sure the block plate is installed.
   Note: The stock dowel pins must protrude out past the block plate/scattershield and locate on the cylindrical part of the dowel pins, not the tapered end. If the scattershield is resting on the tapered end, it will cause an inaccurate alignment reading. If necessary, tap the stock dowel pins rearward, just enough for the tapered end to protrude through the scattershield.

2. With the engine on TDC (Top Dead Center), install the dial indicator base on the flywheel. Adjusting the plunger to contact the inside edge of the bellhousing transmission register hole at 12:00. If needed, removing two flywheel bolts 180* apart for the dial indicator to sit flush on the flywheel is OK. **see figure 1**
   Note: TDC/12:00 dial indicator setup will allow better communication with your helper to stop at TDC/12:00 for the repeatability checks.
   Aluminum Flywheel Users: you will need to remove your flywheel for the alignment check. The magnetic base indicator will not attach to an aluminum flywheel.

3. With the dial indicator on (0) zero and mounted securely at 12:00, your helper can rotate the crankshaft 360* slowly. Your job is to note the dial indicator reading, you are looking for the most (-) negative number on the dial indicator as it rotates the 360*. When your helper rotating the crankshaft stops on TDC, your dial indicator should read (0) zero at 12:00. If you read (0) zero, then you have verified your dial indicator is mounted securely. Do another crankshaft rotation to double check your dial indicator still reads (0) zero at 12:00.

4. With the dial indicator still secured at 12:00; note the most (-) negative number of the dial indicator during your next 360* rotations. Once you are certain where the most (-) negative number is, mark the bellhousing. This most (-) negative number will be your new dial indicator (0) zero location.
   Note: The most (-) negative number dial indicator reading can be at any location within your 360* rotation.

Bellhousing Mis-Alignment Exercise Example:

5. If you have determined your most (-) negative number is at 8:00; rotate the crankshaft until the dial indicator is at 8:00 and (0) zero the dial indicator. As your helper rotates the crankshaft from the new 8:00 (0) zero location, your most (+) positive number should be roughly at 2:00 or 180* from the new 8:00 (0) zero location. The TIR (Total Indicator Reading) of the dial indicator needle from 8:00 to 2:00 is your bellhousing register hole to crankshaft centerline misalignment. If the TIR was +.028” on the dial indicator, you divide .028” / 2 = .014”. and .014” would be the needed offset dowel pin to correct your bellhousing concentric misalignment. The .014” offset dowel pins would also point towards 2:00 to correct the bellhousing mis-alignment.

Checking Bellhousing Parallel Alignment

1. With the engine on TDC and the dial indicator base still mounted on the flywheel, adjust the plunger to contact the front face of the bellhousing at 12:00. ***see figure 2***
   Note: The bellhousing front face is the contact area your transmission mounts to. You can add a piece of packaging tape to cover the clutch fork pivotball threaded hole. The packaging tape will also allow the plunger to glide over the hole opening.

2. With the dial indicator on (0) zero and mounted securely at 12:00, your helper can rotate the crankshaft 360* slowly. As before, your job is to note the dial indicator reading, you are looking for the most (-) negative number on the dial indicator as it rotates the 360*. When your helper rotating the crankshaft stops on TDC, your dial indicator should read (0) zero at 12:00. If you read (0) zero, then you have verified your dial indicator is mounted securely. Do another crankshaft rotation to double check your dial indicator still reads (0) zero at 12:00.

3. Your most (-) negative number will require shims between the engine block and bellhousing to correct the parallel alignment.

Bellhousing Alignment Helpful Hints

1. Do the concentric bellhousing alignment check but, do not make any offset dowel pin corrections at this time.

2. Do a parallel alignment check and if needed, shim the bellhousing to achieve parallel alignment specs. ***Note:*** Aligning a bellhousing to within parallel specs will change the bellhousing concentric reading.

3. Do another concentric alignment check and use the correct offset alignment dowel pins to achieve your concentric alignment specifications

4. TIR = "Total Indicator Reading". The needed "Offset Dowels" to achieve the concentric alignment specs will always be ½ of your TIR. TIR of .028" will use a .014" offset dowel pin to correct the concentric misalignment.

5.

Total Indicator Reading	½ of TIR	Use Offset Dowels
.012" to .020"	.006" to .010"	.007"
.022" to .034"	.011" to .017"	.014"
.036" to .052"	.018" to .026"	.021"

6. The better a bellhousing is indexed and dial indicated to the crankshaft, the smoother performance, higher RPM shifts, and transmission longevity you will experience.

7. See the attached reference pictures on the next page.

8. Contact your Legend Gear distributor if you have any alignment questions.

9. **You MUST report your bellhousing alignment specs to your "Legend Distributor" to honor your transmission warranty.**

figure 1

figure 2

Happy Shifting,
Jody Haag
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