

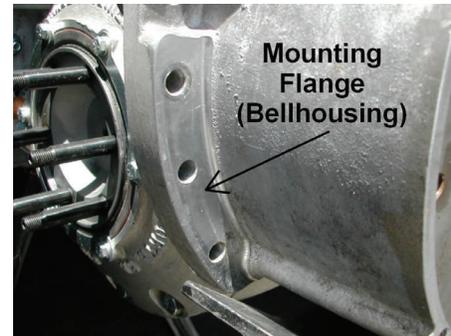


## *RaceAuto Sequential 3-Speed Transaxle Installation and Setup Instructions*

### 1. General Mounting Guidelines

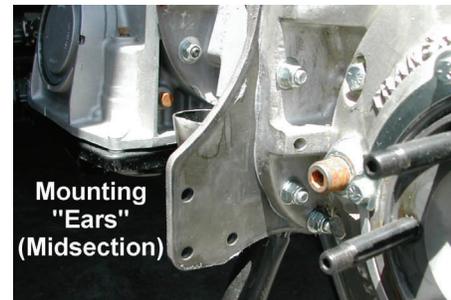
Mount the Raceauto Transaxle to the vehicle using the mounting flanges on the sides of the bellhousing, and the mounting “ears” on the sides of the midsection steel plate as shown.

**Warning:** Do **not** under any circumstances attempt to create or use additional mounting points in the automatic transmission section. This will cause extensive damage to the unit.



### 2. Axle Plunge Travel

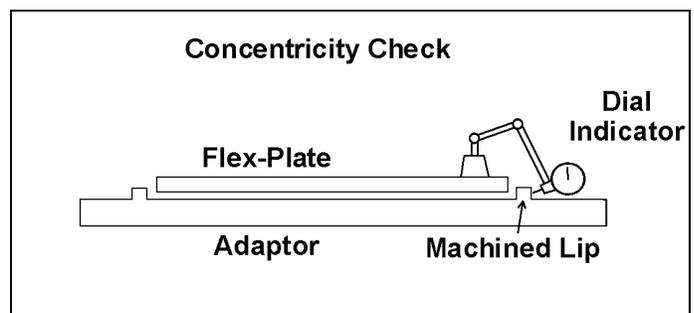
Verify the amount of **axle plunge** (the axle’s travel between the shortest suspension length at the “axle level” position and full droop). If your vehicle uses limit straps to control the axle’s downward travel, be sure to allow for any stretch in these limit straps.



### 3. Concentricity Check

We recommend checking the adaptor / flex-plate **concentricity** (centering) to be sure that the crankshaft is centered in the adaptor and bellhousing. To check the centering, attach a magnetic base dial indicator to the flex-plate with the probe resting on the “locating lip”. The locating lip is the 11.104 inch diameter “ring” machined on the face of the adaptor which centers the assembly in the bellhousing.

Once the dial indicator is in place and the dial “zeroed out”, simply rotate the crankshaft one full revolution and measure the movement of the dial indicator needle. .004” to .005” is the maximum allowable runout.

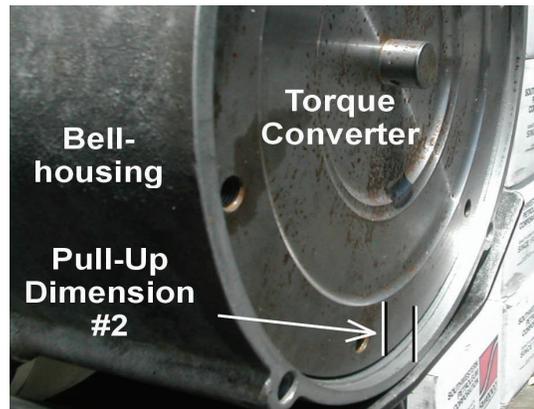
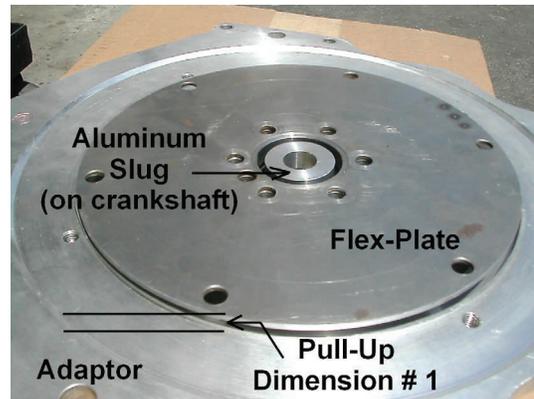
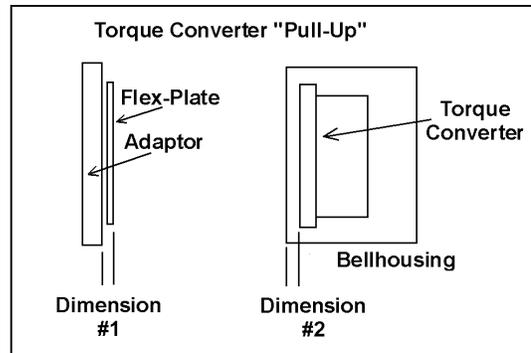


#### 4. Torque Converter “Pull-up”

“Pull-up” is the **space** between the flex-plate and the torque converter. First, measure the distance between the adaptor’s face (the portion that will mate to the bellhousing) and the flex-plate surface. Then, measure the distance between the torque converter to the bellhousing face (this distance is also marked or stamped onto the face of the torque converter). The **difference** between these two dimensions is the torque converter pull-up.

The ideal dimension is .040” however any dimension between .030” and .080” is acceptable. The pull-up clearance can be adjusted if necessary by machining down the spacer behind the flex-plate. Be certain that the torque converter bushing (aluminum “slug”) is properly fitted into the crankshaft when these measurements are taken.

**Warning:** Failure to verify the correct dimensions for concentricity and pull-up in steps 3 and 4 above can result in **physical damage** to the stator support and torque converter, and can cause excessive **wear** resulting in dangerous **metallic contamination** of the entire unit.



#### 5. Oil Cooling and Plumbing

##### Heat Exchanger / Main Cooling

The use of a water/oil **heat exchanger** is strongly recommended for all liquid cooled engine installations. These devices very efficiently maintain ideal transaxle oil (ATF fluid) temperatures.

Water/oil heat exchangers take up very little space and more importantly they are not subject to airflow requirements or fan cooling and the installation/operational problems related to these additional needs. The heat exchanger cooling lines should be plumbed in -8 fittings and 1/4 npt threads.

## 5. Oil Cooling / Plumbing (cont'd)

### Ports

The ports on the top of the bellhousing are stamped with the letters **B** for bypass oil outflow, and **M** for main cooling oil outflow.

Attach the main oil cooling flow lines to the heat exchanger as shown in the plumbing diagrams.

- The outflow rate from the **bypass** port is just a dribble (assuming a good torque converter bushing fit).
- The outflow rate from the **main** oil cooling port is approximately 2 quarts per minute at idle.

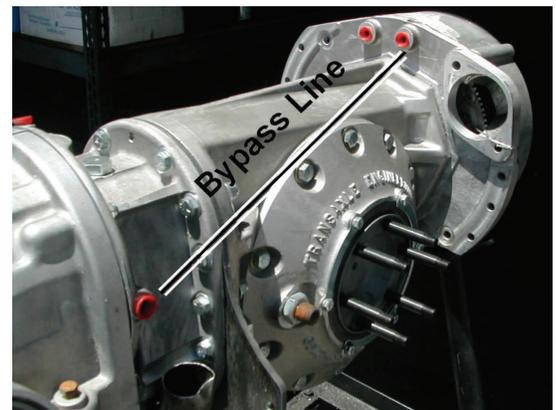
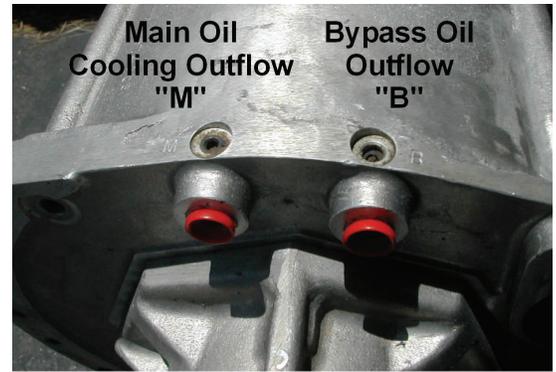
**Note:** On initial startup of a **new** installation, be sure to verify and check the main oil cooling outflow and “burp” out any air pockets or bubbles. To do this, pre-fill the automatic transmission section with one gallon of **ATF** fluid, disconnect the ATF main oil return line (at the side of the automatic transmission section), and put the disconnected end into a bucket. Run until a cup or so of ATF fluid has come out of the line with no air bubbles.

Reconnect the line to the automatic transmission section, and then “top off” with ATF. Be sure to keep the automatic section topped off with ATF fluid at all times.

Repeat this procedure to eliminate any air pockets any time the oil lines are disconnected for service or repair. This will also help flush out any minor contamination in the oil system.

### Closed Loop Ports

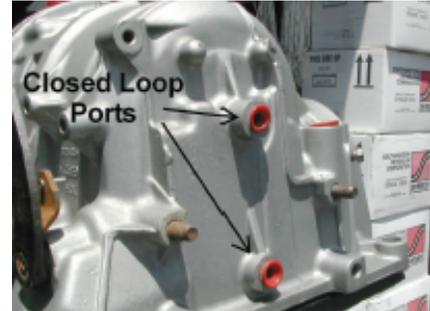
The two ports on the end of the automatic transmission section require an oil line “loop” connecting these two ports. The ports can **not** be plugged or restricted otherwise the transaxle will be **damaged**.



## 5. Oil Cooling / Plumbing (cont'd)

### Auxiliary “Air to Oil” Cooler Option

When plumbing your air to oil cooler in the front of the auto section use -8 fittings 1/4 npt threads. The top port is in, bottom port is out. When mounting your air to oil cooler, make sure the fittings are facing up or to the roof of the car. This is so we do not get drain back when the car is shut off.



If an **oil temperature** gauge is installed (highly recommended) we recommend that you install the oil temperature sender in the return line where it exits the heat exchanger or oil cooler.

## 6. Oil Requirements

Oil levels (ATF oil and Gear oil) should be established and stabilized with the engine running and the transmission in “Park” before shifting into driving gear.

- The **automatic transmission** section will usually require approximately 2 gallons of ATF fluid, depending on the size of the oil cooler(s) and the oil line length and diameter. We use and recommend Swepco 714-30.
- The **differential section** quickchange housing will hold approximately 1 gallon of SAE 140 gear oil (GL-4 minimum rating). We use and recommend Swepco 203-140.



## 7. Temperature Range

After installation, oil temperatures should always be **verified** with a “point and shoot” Infra-Red thermometer gun. We do recommend a transaxle oil temperature gauge, but even a brand new gauge cannot automatically be assumed to be accurate. Verify the gauge’s accuracy with the Infra-Red gun and put calibration marks on the gauge as needed.

Normal operating range is **160-210 degrees F**, assuming the oil sender is installed in the oil return line after (downstream of) the oil cooler/heat exchanger. If the sender is installed in the automatic transmission oil pan this range will be approximately **10% higher** (due to the “heat sink” effect of the aluminum housing). Note that whenever the torque converter is loaded below its stall RPM there is a large amount of **heat** being generated. To prevent this overheating you must back off the throttle or downshift (Yes, we *know* how hard it is to make that decision in a race environment!)

## 8. Flex-plate to Torque Converter Fit

Always be sure to check the **fit** between the flex-plate and the torque converter for **bolt alignment** and **bolt length** before installing on the crankshaft.

## 9. LS-1 Engine Installations

The LS-1 engines require machining a **clearance** on the side of the engine block to allow access to the torque converter bolts. Adaptors by any other manufacturer than **Kennedy Engineered Products** may require a one inch access hole (made with a holesaw) in the same area where the original Chevrolet starter was located. Use the flex-plate to determine the centerline for the torque converter bolt circle.

A far **easier** alignment option for the LS-1 engine is to use 7/16 – 20 by 3/4" or 7/8" long Allen head set screws as a “stud” in the torque converter. Matching 7/16 – 20 thin “stop nuts” or “jam nuts” (such as MS21042-7) will provide the necessary clearance to the adaptor face. This will allow you to **pre-fit**, **locate**, and **index** the flex-plate over the set screw “studs” before you install the flex-plate on the crankshaft. After proper alignment is achieved, the stop nuts can then be installed on the studs (through the access window) to secure the installation.

Note: Be sure that the aluminum “slug” bushing for centering the torque converter is flush with the face of the flex-plate.

## 10. Plumbing the two Vent Lines

The first vent line is for the differential section. It is located on the side of the main case, stamped with a "V". Plumb this line into a vented catch can. This will catch blow by gear oil that sometimes will flow after shut down. The second vent is stamped with a "V" on top of the quick change housing. This is the vent for the automatic section ("ATF"). This needs to be separately from the diff vent. Catch can is optional. In a buggy application, we would run a 3/8 hose alongside the fuel tank vent up and over the roof line of the car and down to the bottom.

## Technical Assistance

If you need technical assistance feel free to call John at 818-998-2739 or email at [transaxleengineering@gmail.com](mailto:transaxleengineering@gmail.com).