

# Installing Engine and Transmission

1. Installing the transmission and engine as one unit is a little easier than dealing with them as two separate components (Fig.1). If you are installing them on the floor without a lift, you will need two floor jacks, one supporting the transmission and one supporting the engine. Using two jacks will allow you to pitch the engine and transmission to the necessary angle it takes to install the transmission over the rear axle beam. Be sure to use a piece

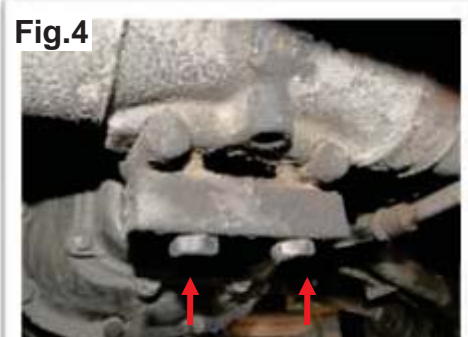
of wood or rubber between the jack and oil pan so you do not dent or scar up the metal surfaces.

2. Slide the engine and transmission under the van to the approximate location of where it will need to be in order to install it (Fig. 2). Set up your engine hoist system or support bar and chain from above on the engine deck so you can hang the engine in there while you install the engine carrier bar later. Have everything ready to attach so when you raise the engine and transmission up on the two jacks, you can attach the support system to the engine quickly.

3. Lift the transmission first, at an angle so the input shaft on the top of the transmission goes over the axle beam, and the support fork goes under the axle beam (Fig.3).

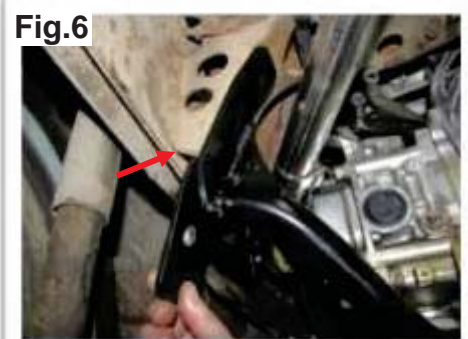
4. Once the input shaft is over the axle beam and the bottom support fork is under the axle beam, start the shift linkage onto to the input shaft.

5. Lift the engine jack and raise the engine up to approximately where it will mount in the vehicle. This will level out the engine and transmission. Locate the mounting holes and start the bolts for the bottom transmission mounting block (Fig.4). Thread the bolts in half to  $\frac{3}{4}$  of the way so they have enough strength to hold the transmission up in there while you attach the engine support/hoist. After you have the engine hoist attached to the engine, raise the engine a little higher than where it will be positioned so there is room to install the engine carrier bar.



# Installing Engine and Transmission (cont. A)

6. With the engine supported from above, temporarily mount the engine carrier bar to the engine on the motor mounts. You may have to unbolt it again to do the final aligning of the side brackets to body of the van. (Fig.5).
7. Insert the small backing plates into the small cavity in the cross member on the sides just inside of the shock (Fig.6), and start the bolts with washers. The backing plate has a small bend in it and that is the top. It should be installed with that small bend first into the cross member cavity. The backing plates have welded nuts on one side which should be facing towards the outside perimeter of the van so that it can accept the bolts with washers from the inside. The side of the carrier bar, and the backing plate, have a small hole underneath the two large holes. These holes are for the provided 6x1.0 bolt with 10mm head that will help align the two together while you thread in the mounting bolts (Fig.7). A nut and washer are also provided for this bolt to tighten it down and keep it aligned. Start the bolts but leave them loose so there is movement in the bar. This will allow you to have play in the carrier bar and align the other mounting bolts.
8. Repeat this step for the opposite side, and again, leave the bolts loose.
9. There is another bracket that attaches to the carrier bar with two circular holes on one end and two slotted holes on the other end. Install the bracket with the slotted holes pointing towards the front of the van and the circular holes towards the back (Fig.8). Start the bolts and washers on the carrier bar side of the bracket. Thread them into the welded nuts on the carrier bar and leave loose.
10. Repeat this step for the opposite side of the carrier bar.



# Installing Engine and Transmission (cont. B)

11. Starting the two bolts in the front of the side bracket where it attaches to the carrier bar (Fig.9) and leaving them loose will allow movement in the entire side bracket to position it correctly and attach to the body of the van.
12. Locate the two existing holes in the lower interior part of the engine bay (Fig.10). Notice the two holes in the back end of the engine carrier support bracket. Use the provided backing plate and hardware to attach the back end of the side bracket to the van.
13. There are bolts, nuts, and washers provided to attach the rear of the side bracket. The side bracket and backing plate will sandwich the rear structural part of the van (Fig.11). This is the final attachment for the engine carrier bar and engine carrier bar support bracket. Repeat this step for the other side.
14. Once you have all the mounting bolts started you can torque all of them down tight. Be sure to double check all of them. There are three locations on each side where you have installed mounting bolts. In the little side cavity where you installed the carrier bar with welded nut backing plate, you can now remove the small bolt you used to align the backing plate in the cavity (Fig.12).
15. Torque the bolts through the support block on the lower front of transmission which holds the support fork of the transmission.



# Installing Engine and Transmission (cont. C)

15. The final step in installing your engine is to lower it from the hoist and/or support up top from the engine deck where you have it supported. Your engine mount studs should be close to the carrier bar holes at this point. Once they are through the slots in the carrier bar you can start the provided nuts and washers on each side but do not tighten at this time (Fig. 13).

Fig.13



16. The engine itself is bolted to the transmission, and the transmission has upper mounts that hold it in to the van. Install these upper transmission bolts now. (Fig. 14). Without any support from underneath, the weight of the engine and transmission will pull on these transmission mounts excessively. While installing the carrier bar, you will have tension on the motor from the hoist or support bar up above on the engine deck to provide clearance between the motor mount studs and the carrier bar for installation of the carrier bar. After the carrier bar is installed and it is time to lower the engine onto the bar, use the provided spacer shims (Fig.15) to compensate for the tension and load on the upper transmission mounts and the gap between the motor mounts under the engine between the engine and the carrier bar. You have been provided with two shims for each side. Determine how many shims you will need by completely lowering the engine onto the bar and checking how much tension is applied to the upper transmission mounts. This will have to be done visually by estimating the sag in the motor as it is released from the upper support or hoist. Distance in sag and the amount of tension applied or released will also be affected by the condition of the existing upper transmission mounts. This is an additional reason for providing you with multiple shims.

Fig.14



Fig.15



17. Once the engine is lowered onto the carrier bar and you have determined the correct number of shims to use, you can apply the final torque to the motor mount nuts (Fig.16). Double check the upper transmission mounting nuts and bolts to confirm they are torqued sufficiently. Take a step back and look at the position of the motor and how it is mounted in the van. If it is higher or lower on one side, loosen the motor mount nuts and physically push up on the motor on the lower side so that the engine sits in there evenly.

Fig.16

