

Electric Motor to Transmission Mount

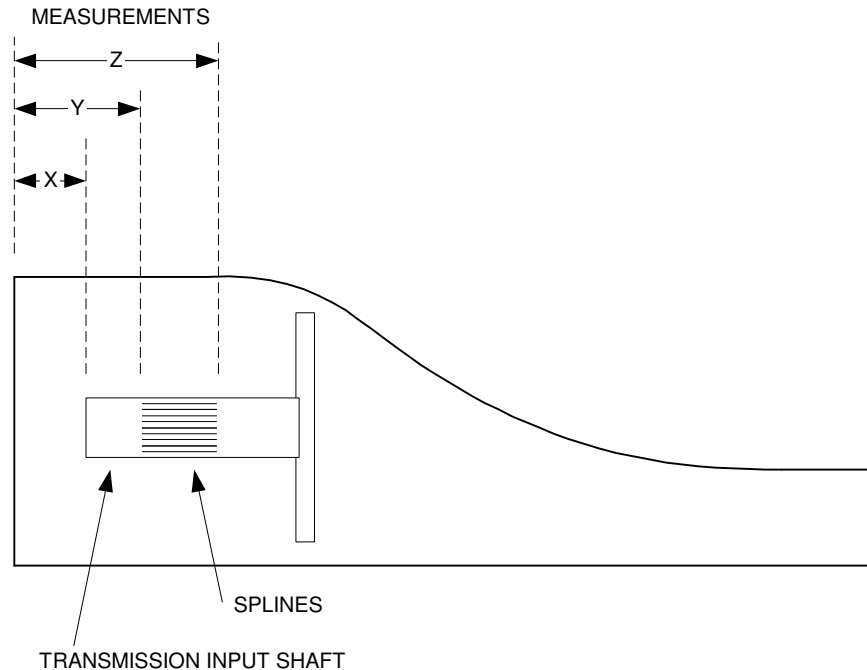
One way to install an electric motor is to connect it to the vehicle's original transmission via a custom adapter assembly. A machine shop will make several pieces:

1. The motor to transmission plate.
2. A coupler that mounts on the electric motor's output shaft.
3. A round plate that will bolt to the original clutch's pressure plate.
4. Round spacer(s) to locate the pressure plate over the transmission's input shaft splines.

Please refer to the exploded "motor to transmission mount" diagram below.

1. The motor to transmission plate is a heavy piece of aluminum strong enough to support the weight of the electric motor. Typically it will measure 14" by 14" by 1/2" thick; make it big enough to cover the whole bell-housing opening of the transmission. Centered in the plate are mounting holes for the motor and an output shaft hole plenty large enough to clear the coupler. Get the correct measurements from the motor's datasheet.
2. The coupler slips over and clamps down onto the keyed motor output shaft. Our motor has a 3/4" diameter shaft about two inches long with a 1/4" keyway. The coupler has a flange for bolting to the parts that locate the clutch pressure plate.
3. The clutch pressure plate is used because it is splined to slip over the transmission's input shaft, and because it has springs that cushion shock between the motor and transmission. It is bolted to a round flat plate.
4. Spacers between the coupler and the clutch pressure plate ensure that the pressure plate is centered over the transmission's input shaft splines. The spacers were made of plastic. The number and widths of spacers depend upon the transmission used; the figure below shows how to measure and are needed for the fabricator to determine spacer sizing:
 - Lay a straightedge across the transmission's mounting flange.
 - Measure "X" from the straightedge to the leading edge of the input shaft.
 - Measure "Y" from the straightedge to the leading edge of the splines.
 - Measure "Z" from the straightedge to the trailing edge of the splines.
 - Note that if the input shaft sticks out beyond the mounting flange, your measurement should be expressed as a negative number.

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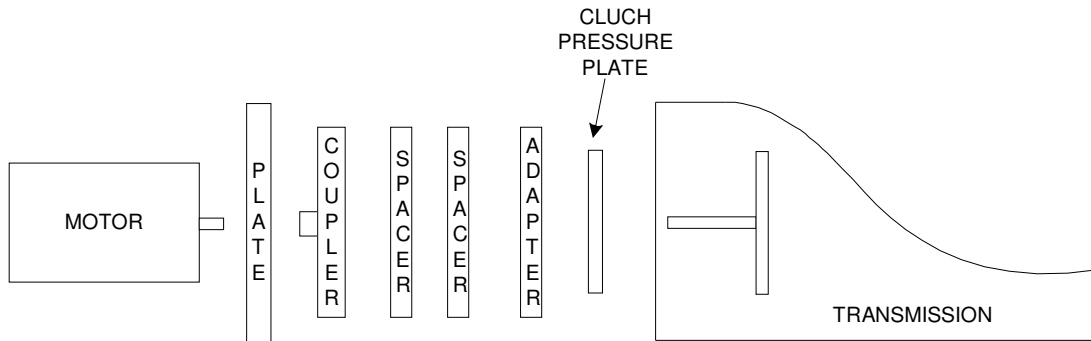


Other considerations:

- When calculating spacer thickness, add some extra space so that the motor shaft and transmission shaft cannot touch each other. Note that metal expands when it gets hot, so leave room for that too.
- All fasteners should be grade 8. Also use a thread sealer that can be disassembled, like blue Loctite.
- The 14" by 14" motor to transmission plate will need to be drilled and trimmed to fit the transmission's mounting flange. Line up and clamp the plate to the transmission, making sure that it is centered. Mark each transmission mounting hole, and trace the outline of the bellhousing onto the plate. Remove the plate and you can drill the holes and cut off the excess plate. File sharp edges.
- For convenience, when marking the transmission mounting holes and bellhousing pattern onto the plate, position the plate so that the electric motor's cable connectors are pointed up. Generally, battery pack connectors (A1 and S1) are in the ten o'clock position and motor field coil connectors (A2 and S2) are in the two o'clock position. This makes cable installation easier under the hood.

Assembly was done on top of a cart. The motor has vent holes around the front part of its case. We loosened a sheet metal cover, fitted plastic window screen material over the holes, and reinstalled the cover to hold it. The screen helps keep junk out of the motor. Then we installed the coupler onto the motor. We bolted the motor to the plate and bolted the pressure plate onto its adapter, then bolted it and the spacers to the coupler.

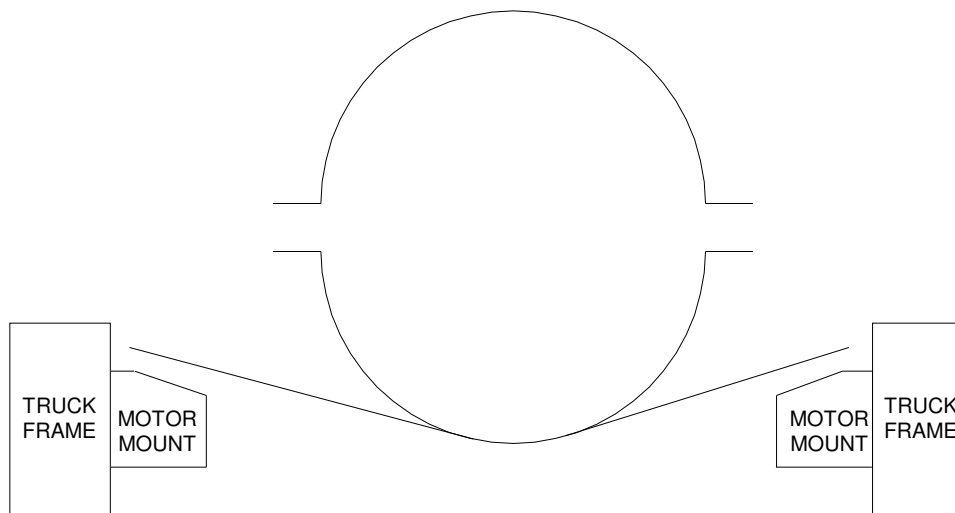
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EXPLODED VIEW: MOTOR TO TRANSMISSION MOUNT

(NOT TO SCALE)

Next we go under the hood of the vehicle. The transmission was already in place, its front temporarily supported by a strap. We bolted the lower half of the electric motor mount to the truck frame, onto the original gasoline motor mounts (see the diagram below). We hoisted the motor assembly into the engine bay, aligned the clutch plate over the transmission input shaft splines, and slid it all together. We bolted the plate to the transmission. We installed the upper half of the motor mount and removed the transmission strap. With the truck up on jackstands (wheels off the ground) we spun the motor via its front shaft to make sure the rear wheels turned.



EXPLODED VIEW: ELECTRIC MOTOR MOUNT

(NOT TO SCALE)