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Warford Transmission Installation Instructions

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These instructions are expected to provide guidance in the process of installing a new KC Warford transmission. There will be differences between the installation procedures for different body styles and different model years of Model Ts. Please read completely through the instructions to learn the basics and try to identify any unique characteristics of your installation project.

Basic Processes to accomplish

- Remove differential and install shortened drive shaft and radius rods.
- Install Transmission onto the Model T engine.
- Reinstall the rebuilt differential.



Remove and Rebuild Differential

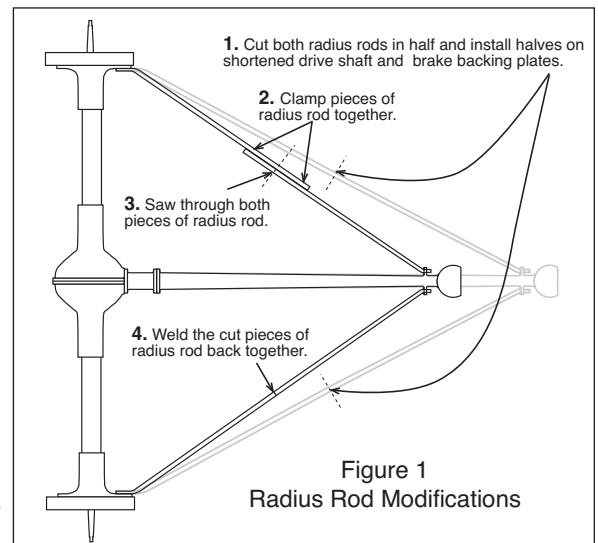
Remove the differential from your car as described in the “Model T Ford Service Book” in paragraphs 34, 56, and 57. If you are overhauling the differential, refer to the “Model T Ford Service Book” in Chapter XV. If your differential is in good condition, the portions of Chapter XV that will apply are those dealing with removing and replacing the drive shaft (paragraphs 566 and 575 – 593 and 621– 629).

When you buy a new Warford Transmission, Texas T Parts will shorten your torque tube at no charge if you will send it to us. You will only be charged for the freight charges to return the shortened tube and shaft to you. You will need to purchase a new driveshaft from us or have your local machine shop shorten the driveshaft. The Warford drive shaft normally sells for \$120 but, when you purchase a new Warford transmission, we will sell one to you for \$95.00. Using the shortened drive shaft and torque tube, assemble your differential. If you choose to cut your own drive shaft and torque tube you will need to remove 12 inches from both. We cut 12” out of the torque tube about 4” in front of the rear flange. You will need to make sure to weld the two pieces back together so the flange is returned to a position perpendicular to the length. Dont forget to orient the holes in the rear flange to the front of the torque tube as they were before cutting it. You will need to drill the hole for the universal joint pin after you assemble the driveshaft. You will want to install the torque tube upside down so that the grease fitting is on the bottom of the universal joint. Otherwise, it would be under the front seat and be inaccessible for you to add grease. It would be wise to use a modern Zerk fitting rather than the grease cup.

In order to accommodate the shorter drive shaft, you will need to cut off your radius rod as described below. We suggest that you cut the rods in two pieces about midway on their length. Then fasten both ends of the rods in place (front and back ends) and let the cut ends overlap. (See Figure 1) Measure the distance from a center point on the drive shaft near the universal joint to a similar spot on each brake backing plate. If necessary, adjust the position of the drive shaft until the two dimensions are equal (within 1/8”). Clamp the overlapping ends of the radius rod halves together tightly and use a hacksaw to cut through both halves in one cut. If you remove the rods to weld them, be sure to keep the two right radius rod halves and left radius rod halves identified and get them welded back together to create the two shortened radius rods you need. They can be welded in place if you have welding capabilities in your shop.

A new hole will need to be drilled in the front of the driveshaft after the torque tube and the differential is assembled. Actually, if you are using any of the modern pinion bearings that are locked to the driveshaft with a lock ring in front of the bearing, you will not need a universal joint pin and the universal may float within the assembly without being pinned.

If you are using the original style bronze bushing as your bearing on the front of the driveshaft, you will need to install the universal joint pin. To drill the hole for the pin, place the universal joint on the front of the driveshaft and drill a hole for the pin using the hole in the universal joint as a guide for locating the hole in the driveshaft. You will be using the hole for the universal joint housing plug to get to the shaft to drill it. It will be easiest to clean the drill shavings out of the front of the torque tube if you have cleaned the torque tube and



universal joint of grease beforehand. Either way, you need to clean the shavings from drilling out of the assembly.

Install Transmission

** Procedures will vary slightly on different models of cars. **

It is necessary to cut out and remove the center section of the running board brace/frame cross member nearest to the universal joint in order to install your Warford Transmission. This can be done with a "Sawzall" or a hacksaw if you are working on an assembled car. After removing the center of the cross brace, temporarily attach the transmission box (without the shift lever/coverplate) to the back of the hogshead and engine pan using four 3/8" x 1-1/2" bolts and nylock nuts provided. You will probably not be able to set the shift lever into place due to interference with a body cross member below the front of your front seat. It is necessary to remove a portion of the body cross member to provide clearance around the shift lever. Mark the appropriate places where you will need to cut metal or wood to provide clearance for the shifter. Remove the transmission so you won't get trash in it when you make the cuts to provide clearance. After removing sufficient material to provide for clearance, install the Warford permanently to the back of the engine. Be sure to use the appropriate universal joint gaskets. Place the 4" O-ring over the front lip on the transmission. The O-ring helps center the transmission and reduced noise that sometimes results if the driveshaft of the transmission does not line up well with the engines tailshaft. Again, use the 3/8" x 1-1/2" bolts with nylock nuts to bolt the transmission to the engine.

On many cars, the shift lever can be installed on the transmission case after it is bolted to the engine. On some cars however, you will need to bolt the shift mechanism to the transmission case before installing the transmission. On a Fordor Sedan for example, it will be necessary to remove the engine mounting bolts and slide the engine forward about 3 inches in order to install the transmission with the shift mechanism attached. You will not be able to install the shifter after the transmission box is bolted in place. Insert the square drive on the front of the Warford into the transmission shaft of the Ford engine.

Reinstall Differential

Note: We suggest that you install your torque tube on your differential assembly upside down with the grease fitting on the bottom side of the front bushing. Since the torque tube is shorter than before, the grease fitting will be under the front seat and almost impossible to reach to grease it. We recommend a modern zerk fittings on both the front drive shaft bushing and the U-joint rather than the original grease cups. **Caution:** When you turn the torque tube upside down the hole in the torque tube ball may no longer line up with the grease hole in the ball cap. Check this situation and, if necessary, re-drill a hole in the torque tube ball to allow grease to get in to the U-joint.

Also, be sure to grease your universal joint on a regular basis. If you have become accustomed to the universal joints getting lubrication from the oil coming through the 4th main, remember it will no longer keep the U-joint lubricated with the new Warford in place.

Reinstalling your modified differential is no different than installing a standard differential assembly. Installation of the differential is described in the "Model T Ford Service Book" in paragraph 624.

Slide the rebuilt differential assembly underneath the car and carefully align the universal joint and slip it into the back of the Warford Transmission. Shouting and swearing will not simplify this process. However, by putting the Warford in neutral, the process will be easier than a normal installation. Wash your hands and apply ice to any smashed fingers.

Continue installing the drive shaft ball, using locking nuts and on all four bolts. Re-attach the rear spring to either the spring shackles or frame u-bolts, depending on how it was removed. Install your rear wheels in the normal fashion.

Check all connections that had to be loosened or removed and make sure nuts and bolts are tightened and secure. Make sure cotter pins are installed where needed. Add 85W-140 Gear Oil in the 3/4" NPT fill plug until it runs out the 1/4" NPT overflow plug. Replace both plugs and give it a test drive.

Thanks, and Smooth Running,

Sincerely,



Ben Hardeman

KC Warford Transmission (Hi-1st Version)

Engine RPM at Selected Speeds

MPH	Ford High Warford Low 3.63 : 1 Ring Gear 3 : 1* Ring Gear		Ford High Warford 2nd 3.63 : 1 Ring Gear 3 : 1* Ring Gear		Ford High Warford High 3.63 : 1 Ring Gear 3 : 1* Ring Gear	
	Engine RPM	Engine RPM	Engine RPM	Engine RPM	Engine RPM	Engine RPM
5	377	310	206	169	171	140
10	753	621	411	339	341	281
15	1131	931	617	508	512	421
20	1506	1242	822	678	682	563
25	1884	1552	1028	847	853	703
30	2261	1864	1234	1017	1024	844
35	2637	2173	1439	1186	1194	984
40	3014	2485	1645	1356	1365	1125
45	3390	2794	1850	1525	1535	1265
50	3767	3104	2056	1694	1706	1405
55	4145	3416	2262	1864	1877	1547
60	4521	3725	2467	2033	2047	1687
65	4898	4035	2673	2202	2218	1827

We consider 2,000 RPM to be RED LINE. Red line on your engine will depend on components you have installed.

* We DO NOT recommend the use of a 3:1 high speed ring & pinion gear unless you have both a very light weight car and a very strong engine with a high compression head.

Gear Ratio Comparisons Ford - Warford - Ruckstell

(Hi-1st Version)

	Ford		KC Warford		Ruckstell	
Ring Gear	3.63	3.00	3.63	3.00 *	3.63	3.00
Ford Low	10.00	8.24	W-1st 15.72	12.70	R-1st 15.40	12.70
			W-2nd 10.00	8.24	R-2nd 10.00	8.24
			W-3rd 8.31	6.85		
Ford High	3.63	3.00	W-1st 5.72	4.60	R-1st 5.50	4.60
			W-2nd 3.63	3.00	R-2nd 3.63	3.00
			W-3rd 3.02	2.49		

Gear Ratios in **BOLD** denote gear settings used most often in routine driving.

* We DO NOT recommend the use of a 3:1 high speed ring & pinion gear unless you have both a very light weight car and a very strong engine with a high compression head.