

TOYOTA LAND CRUISER FJ40 SAGINAW STEERING INSTRUCTIONS

Advance Adapters has been manufacturing steering conversion parts for the installation of the Saginaw steering boxes into Toyota vehicles for more than fifteen years. The parts we furnish are of the highest quality available and we utilize only proven design components for our kits. Before you consider the conversion, we recommend that you thoroughly read and understand the complete procedures. **DO NOT TAKE SHORT CUTS** on steering installations and have the work performed by qualified personnel only. All universal joints must be safety wired for double protection. **DO NOT** overlook any details. Remember, the control of your vehicle depends on the steering performance. If your steering system fails, severe damage and possible injury is most likely to occur.

All of the Toyota FJ40 Land Cruiser vehicles have basically the same stock steering configuration. This is simply a box at the base of the steering column which controls a drag link towards the front of the vehicle and a bellcrank mounted on the front crossmember. The bellcrank actuates the tie rods to the front wheels with a push/pull effect. Because there are so many motions to go through with the stock system, quite a bit of free play and backlash develops. The new system simply requires the elimination of the stock gear box and bellcrank. A Saginaw steering box can then be mounted to the inside of the frame rails. Although this sounds simple, there are several things that must be considered before the installation can be completed, such as:

POWER STEERING	STEERING BOX LOCATION
MANUAL STEERING	WINCH CLEARANCES
DRIVE SHAFT ROUTING	
STEERING COLUMN TYPE	
TIE ROD LENGTHS & SIZES	
CUSTOM STEERING WHEELS, ETC. &	
MOTOR MOUNT CLEARANCE TO DRIVE SHAFT	

Saginaw steering conversions are very popular in vehicles simply because they allow you to have better control of your vehicle both on and off the highways. The use of the front mounted Saginaw steering box eliminates the stock drag link between the stock box and the front stock bellcrank. We currently offer two types of kits: **Manual steering Saginaw box & Power steering Saginaw box.**

There are limitations to both and we suggest that you read the information thoroughly before ordering any parts or kits.

Both the manual and power steering conversions can be performed with the original 6 cylinder engine. There will be slight modifications required to the driver's side engine mount for clearance of the steering drive shaft. On 3 speed Land Cruisers equipped with column transmission controls, you will need to change to the floor shifter. On power conversions, a special pump bracket will be required for use with the stock engine. We have had customers use the bracketry from the late model FJ60's that have a similar steering design that requires a hydraulic pump.

The power steering conversions are more complicated to install due to the mounting of the hydraulic pump and the connection of the hoses. The power conversions are the most popular in the Land Cruiser vehicles.

POWER STEERING BOX SELECTIONS:

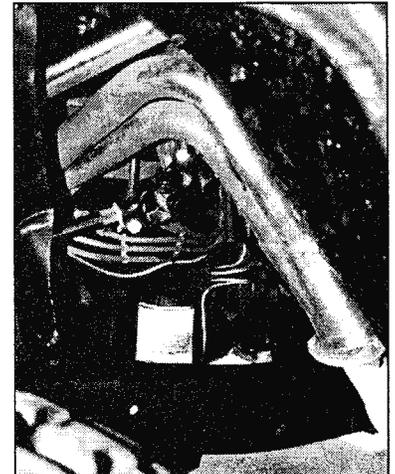
Make sure that the box you select has the same basic configuration as the one illustrated. There are several types and styles, so make sure you purchase the right one. It is a good idea to get the pump from the same installation so the steering box will be compatible. Select a steering box from vehicles which had the steering boxes originally mounted on the inside of the frame rail. In 1976, General Motors changed their truck design to boxes that were mounted on the outside of the frame rail and these boxes are not compatible with our conversion. The cars and S10-S15 4WD vehicles are equipped with steering boxes that mount on the inside of the frame rail. The spline sizes on boxes 1975 and newer, are always 30 splines. All power steering kits are furnished with 36 spline couplers, unless otherwise specified. If you have already selected your hoses, you will find that there are two different sizes that thread into the steering box. Make sure that you obtain a steering box that is compatible with your hoses.

MANUAL STEERING BOX SELECTIONS:

The box can be found in vehicles 1966 and newer and must have the same configuration as the one illustrated. The shaft stick out length must be approximately 3" and have the small splines on the end approximately 1" long. These splines can either be 30 or 36 tooth. All manual steering kits are furnished with 36 spline couplers unless otherwise specified. The optional 30 spline couplers are available when required.

MANUAL STEERING:

The use of a manual Saginaw steering box offers the driver the advantage of being able to feel the steering requirements. Quite often, your vehicle will have specific steering requirements that can be felt through the steering wheel and when manual steering is used, this relationship can be easily determined. On power steering, the requirement is overcome by the power assist. The manual steering is usually less expensive, since there are no pumps or hoses required.



Advance headers exiting over Saginaw steering yoke.

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STEERING COLUMNS:

The stock steering columns are by far the easiest to use and components furnished with the kit are designed strictly for stock steering columns. The stock steering column protrudes through the firewall and into the engine compartment where it enters the stock Toyota worm gear mechanism. There are two basic column designs and Advance Adapters provides a different procedure for each of the two configurations. Vehicles prior to September 1972, were one style and vehicles after this date were another. Below, we have listed the recommended procedure for column modifications.

STEERING COLUMNS - September 1972 & Earlier

These earlier models are equipped with a steering mechanism that clamps directly onto the Toyota gear box. The firewall mounting plate bolts through the firewall with either four bolts or six bolts depending on the actual year. In order to install Saginaw steering, you must install a Universal yoke on the end of the steering column. We suggest that you follow the *step-by-step* procedures listed below:

- STEP 1:** Using a hacksaw or torch, remove the steering column and shaft from the original steering gear box. Make the cut as close as possible to the steering box so that adequate length will be available if necessary.
- STEP 2:** Remove the original Land Cruiser gear box, pitman arm, drag link, bellcrank, pivot apparatus, stock stabilizer and front tie rod.
- STEP 3:** Remove the firewall dust boot and retainer plates.
- STEP 4:** Remove the dashboard column mount.
- STEP 5:** In order to relocate the steering column after it has been removed, we suggest that you wrap a piece of masking tape around the column as a guide to the original location. This will provide a means of relocating the column back to the original location.
- STEP 6:** Using the new column mounting plate provided, you can now slip the plate onto the column making sure that it can be adjusted to the proper angle for reassembly onto the firewall.
- STEP 7:** Slip the column and the plate back into the vehicle to the original location. Tack weld the column and column mounting plate into position. Using the nut plates on the engine compartment side of the firewall, you can now locate the hole locations required for bolting the mounting plate into position. We suggest the use of 3/16" drill through the nuts into the mounting plate, or use the original retainer as a template.
- STEP 8:** Once again, remove the column and finish welding the mounting plate to the column tube. Drill the mounting holes out to a larger size for use with the original bolts.
- STEP 9:** Determining the length of the column tube and 3/4" column shaft and cut to the necessary length. We recommend that the column protrude 2" from the face of the firewall and the shaft protrude 2" beyond the end of the tube. On various installations, this length may vary to allow for engine mount and steering drive shaft clearances.
- STEP 10:** Install the brass bushing provided with the steering kit into the bottom of the steering column tube. Make sure the clearance between

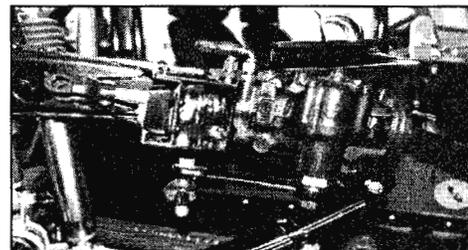
the bushing and the shaft is sufficient. You may need to sand the column to obtain the proper fit. In our experience with the stock Toyota column shaft, we found the size to be approximately .007" larger than the 3/4" bushing and yoke.

- STEP 11:** In order to retain the bushing in the end of the column, you will need to weld a flat washer onto the steering column shaft. This washer must be flush with the bushing and welded 360 degrees around the shaft. Before welding the washer into position, have someone press down on the steering wheel to take out any excessive play.
- STEP 12:** See Step #5 below.
- STEP 13:** Reinstall the column back into the vehicle and bolt the mounting plate into position.

STEERING COLUMNS - October 1972 & Newer:

These later models are equipped with a steering column that uses a 4-bolt mounting plate to the firewall and a special coupler for connecting to the stock steering box. Vehicles equipped with this particular model will be able to leave the column in the vehicle, while making the necessary modifications. We suggest that you follow the *step-by-step* procedures as listed below.

- STEP 1:** Using a hacksaw, remove the special coupler from the end of the shaft. Make sure the cut is as close as possible to the coupler.
- STEP 2:** Remove the 4 nuts that hold the column mounting plate in position and install the new A/A brass casting. The original bolts should be long enough for use with our new casting. We have had a few occasions where customers have required longer bolts. Make sure that at least one thread is showing on each of the 4 bolts after assembly.
- STEP 3:** Check to make sure that the bushing and shaft have sufficient clearance for a smooth operation. You may need to clean and sand the steering column shaft to obtain the proper clearance needed.
- STEP 4:** Determine the length of the steering column shaft best suited for your engine location. Cut the shaft to the appropriate length and once again debur and clean for a slip fit of the 3/4" Universal yoke.
- STEP 5:** A 3/4" Double "D" yoke has been provided for this application. The 3/4" column shaft will need to be modified to fit the Double "D" yoke. With a disk grinder, grind 2 flats about .100" deep on each side of your stock column shaft. There are two set screws in the new Universal yoke assembly. Mark the location on the steering shaft where these two set screws are located. Remove the Universal yoke and spot drill two recesses for the set screw installation approximately 3/16" deep. Reinstall the universal yoke and set both of the two set screws and lock nuts. Loc-Tite should be used on both set screw installations.



Power steering box with special spud shaft.

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CUSTOM STEERING COLUMNS:

Although we do not recommend the use of custom columns, they do offer several distinct advantages, such as locks, tilts, flashers and custom vehicle appearance. However, they do create some problems and require careful consideration when mounting them to the floorboard and Universal joint connection. **YOU MUST MAKE SURE THAT THE YOKE CONNECTION TO THE BOTTOM OF THE CUSTOM STEERING COLUMN BE EQUIPPED WITH A SPECIAL OUTPUT YOKE THAT CAN BE ATTACHED IN A SECURE POSITION.** New yokes are now available. Refer to the Advance Adapter's Buyer's Guide for sizes.

STEERING DRIVE SHAFT:

The control shaft between the end of the column and the steering box spud shaft is defined as the "drive shaft." With each kit, we have provided a shaft with a length that will work for various installations. If necessary, the shaft may be shortened to the correct length for your installation.

Routing the shaft directly to the steering box may sound simple, but care should be taken when determining your actual requirements. On some Toyota installations, it may be necessary to go directly through the motor mount, while most will have the steering shaft well above the engine mount position. Routing may be adjusted by changing the angle of the steering box slightly or by moving the upper Universal yoke closer or further away from the firewall. Before the final routing, be sure to allow for suspension travel and engine movement.

PART NO. 716862 Drive Shaft Assembly with Slip Yoke

STEERING BOX LOCATION:

The power steering box will require every bit of space between the bumper and crossmember and will usually require the lower flange of the front bumper to be notched for added clearance. The manual box should have plenty of room for use of the Advance Adapter coupler. The actual positioning of the steering box should be accomplished by bolting the box to the plate provided and then temporarily clamping the plate and box to the inner frame rail until an ideal position is achieved. Once in position, the plate must be completely welded to the frame.

We have included a pair of frame enclosures to box in both of your frame rails and provide a good base for the steering box plate. On vehicles equipped with winches, it may be

necessary to offset the winch bumper to allow for clearance of the steering box.

Before the box can be mounted to the frame rails, you will need to torch or drill two large clearance holes into the front crossmember. These holes will provide clearance for the steering box spud shaft to go beneath the radiator and enter into the engine compartment area. The hole on the front side should be at least 2-1/2" in diameter, while the backside hole can be 1-1/2" in diameter. If you have moved your radiator from the original location, you may require radiator modifications. The upper bumper gusset will need to be sectioned for the mounting of the steering box plate.

The spud shaft can now be installed onto the steering box and the steering box bolted to the mount plate. Install the assembly through the clearance holes so the spud shaft clamp is located inside the crossmember on manual conversions and directly in front on power installations. The mounting plate will locate itself on the top of the frame rail and can now be "C" clamped into position prior to welding. **DO NOT WELD UNTIL FINAL POSITION HAS BEEN DETERMINED.** The steering box may need to be slightly angled for better universal joint alignment and clearance. Make sure the clamp and bolt have sufficient clearance for rotating.

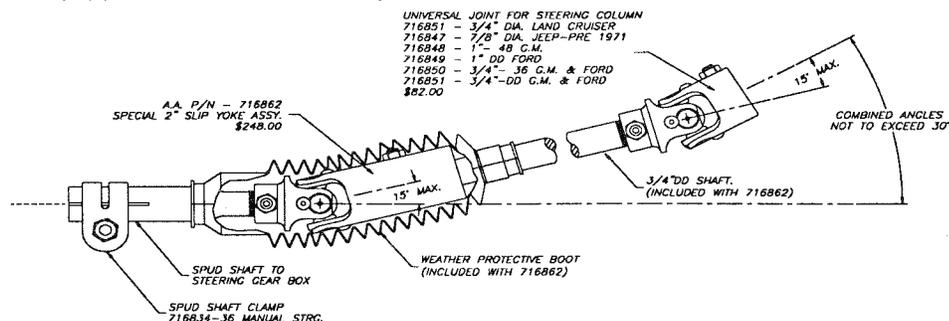
We have provided you with four (4) 7//16"-14 x 1-1/4" socket head cap screws with high collar lock washers to be used when mounting the steering box.

ASSEMBLY OF STEERING BOX

Part No.	Description
Part No. 716838	Steering Box Mounting Plate
Part No. 716825	Frame Enclosures
Part No. 716834-36	Manual Steering Spud Shaft
Part No. 716834-30	Universal Steering Spud Shaft
Part No. 716835	Power Steering Spud Shaft - 36T

STEERING BOX INSTALLATION SUMMARY:

- STEP 1: Remove upper bumper gusset.
- STEP 2: Drill the 2 clearance holes.
- STEP 3: Weld frame enclosures on both sides.
- STEP 4: Assemble steering box to mounting plate.
- STEP 5: Assemble spud shaft to steering box.
- STEP 6: Install and "C" clamp complete steering box assembly.
- STEP 7: Install Univ. yoke to spud shaft using bolt & lock washer.



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TIE RODS:

Each kit from Advance Adapters, includes the necessary tie rod for each conversion. A tie rod end is included since the Toyota Land Cruiser taper is incorrect for use with the steering box Pitman arm. The stock tie rod connects the two wheels, while the new tie rod connects the Pitman arm to the passenger's side steering knuckle. This new tie rod is furnished with a metric left hand thread for installation onto the existing Toyota tie rod end. The other end of the tie rod has an 11/16" American thread for use with a new tie rod end that has the proper taper for connecting to the new Pitman arm. In some cases, it may be necessary to use two or three washers on the top side of the pitman arm so threads on the tie rod end will secure the proper fit. All tie rod ends must have castle nuts with cotter pins. The stock Toyota Land Cruiser tie rod ends will not fit the new steering box Pitman arm.

PART NO. 716831 - Short Tie Rod

PITMAN ARMS:

The steering box Pitman arms vary from power to manual and are not interchangeable. We *do not* include the correct Pitman arm for each conversion. There are many styles available if your installation cannot be completed with the one. We suggest that you use caution when selecting Pitman arms. **WE DO NOT FIND IT ACCEPTABLE TO CUT OR BEND PITMAN ARMS.** Be sure the Pitman arm is installed so that it has equal travel. This is obtained by pacing the tie-rod and Pitman arm together in the center of the steering box travel with the wheels directly forward.

PART NO. 716816 - Manual Steering Pitman Arm

PART NO. 716817 - Power Steering Pitman Arm

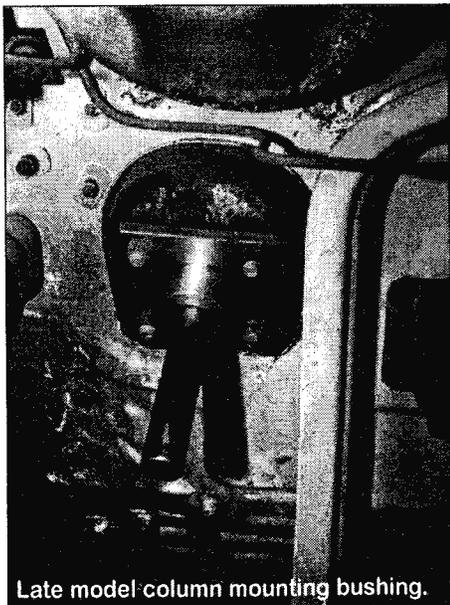
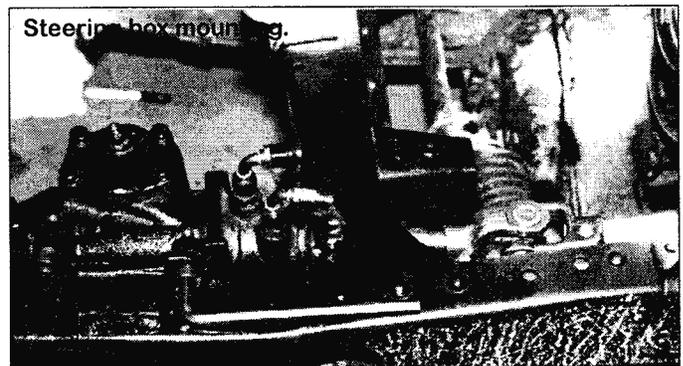
POWER STEERING PUMPS:

There are only a few pumps available and most are interchangeable. We recommend the purchase of the power pump and steering box (pair) if possible. Special hoses will probably have to be made. The original Chevy and Ford V-8 brackets can be retained for pump mounting. Stock 6 cylinder applications require you to fabricate or modify an existing bracket. The original applications require you to fabricate or modify an existing bracket. The original smog pump bracket can be easily modified for use with Chevy Saginaw steering pumps used with the original 6 cylinder engines. The Toyota 6 cylinder FJ60 power steering pump can be used with the GM Saginaw steering gear boxes.

FRAME ENCLOSURES:

We have included a pair of 3/16" thick steel plates for use in enclosing the frame horns where the steering box is going to be mounted. The mounting plate must have a solid surface for welding and positioning. The extra plate is simply supplied for enclosing of the rider's side frame horn.

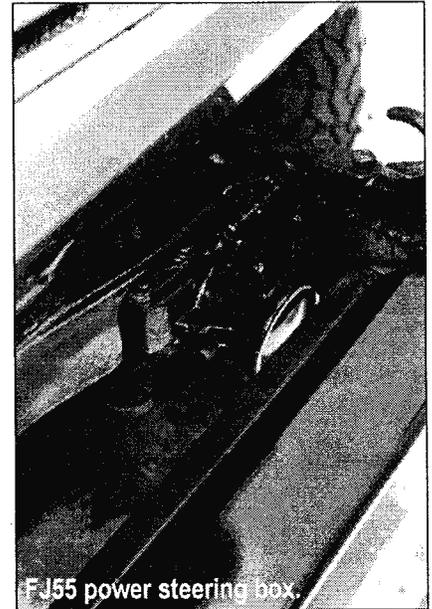
PART NO. 716825 - Frame Enclosures (1 pair)



Late model column mounting bushing.



Early model column mounting bushing.



FJ55 power steering box.