

INSTALLING A 2000 OR 2300 C.C. PINTO 4 CYLINDER ENGINE IN A JEEP



The Pinto 4 cyl. engines can be installed in any CJ or military with a T90 transmission. The swap is fairly inexpensive as swaps go. The Pinto is not recommended for Jeep station wagons or trucks because these vehicles are heavier than CJs. The results related to performance and fuel consumption are disappointing on station wagon and truck installations because of the weight of these vehicles.

Kit #PC1A is for the 4-3/8" (112mm) bellhousing bore engines only. The bellhousing must measure 7 inches long (front to back). No other bellhousing will work with this kit. The above described bellhousing will not fit all Pinto engines. This adapter does not require an input (main drive) gear change for adapting these engines to either the Jeep T90 or T84 3 speed transmissions.

The biggest difference between the 2000 and 2300 cc engines (as far as the conversion into a Jeep is concerned) is oil filter location. The 2000 has the filter towards the front of the engine, the 2300 at the back of the engine. The filter is on the drivers side of both engines. The rear located filter on the 2300 will interfere with the stock Jeep steering gear. Even when using the shortest filter available, the 2300 on some military models may require relocation towards the passenger side (common on V8 swaps) or installation of different steering gear.

The original "needle type" pilot bearing must be removed from the Pinto crankshaft and replaced with the special pilot bushing supplied with the kit. The original pilot bearing is best removed with the proper puller. Removal of the original pilot bearing should not be attempted with a punch, chisel, or by trying to collapse it by driving something between the bearing and crank bore. The bearing race is much harder than the crankshaft and the bearing bore in the crank will surely be damaged if the proper puller is not used. This could cause problems when the conversion bushing is installed that probably would not show up until after the conversion is running.

IMPORTANT: We have noticed an increase in problems on Pinto swaps related to bell housings being improperly machined by Ford. It seems that the locating bore in the rear of the bellhousing may be out of location by as much as .042 total indicator reading when checked with a dial indicator. Misalignment greater than .005 total indicator reading can cause premature failure of the transmission, clutch disc, and pilot bushing. Unfortunately, few people take the time or have the necessary dial indicator to check for this misalignment. This type of misalignment causes our adapter to come under suspicion as being the cause of the misalignment, but we assure you that our adapters are machined to .003 total indicator reading and any misalignment that may exist is due either to faulty machining of the bellhousing by Ford, or damage to the bellhousing from an accident, if the engine was removed from a wreck.

NOTE: When "piecing" a standard shift engine together from an engine that originally had an automatic, it will be found that on the 2000 cc engines there was a flywheel change for 1972 and newer engines that consisted of locating the starter ring gear on the opposite side of the flywheel. This necessitated a change in starters also and dictates a 1971 starter be used with the 1971 flywheel. 1971 flywheels and starter will interchange with 1972 and newer units, but both the starter and flywheel must be changed.

1971 Pinto 4's used a 2" diameter fuel pump and newer engines use a 3" pump. Maximum motormount clearance is obtained when using



the 2" diameter fuel pump, if mounting at left front of engine. If mounts are made that use any of the stock mounting pads, then either fuel pump will work.

The rear of the engine will hit the firewall, preventing the front from being raised enough to provide sufficient front driveshaft clearance. This can be overcome in two ways -- either modify the firewall for clearance or relocate the rear crossmember 1" to 1-3/4" forward as required. The driveshafts will accommodate about 1" of movement — if more than 1" is required, then driveshaft length modifications will be necessary. 1" is sufficient for the T90. T84 transmission will require at least 1-3/4" forward movement.

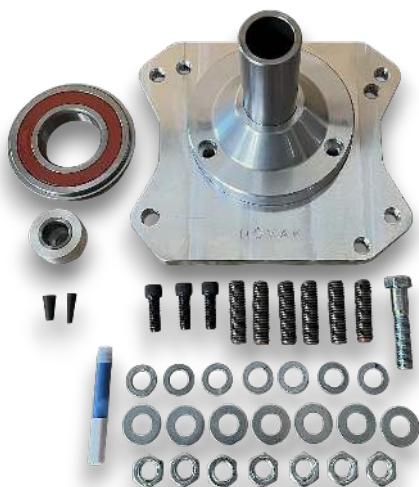
If crossmember-gearbox relocation is chosen over modifying the firewall, the forward movement of the engine-gearbox assembly is best accomplished by drilling four new mounting holes in the underside of the frame the required amount forward of the original holes. The crossmember is then mounted at this new location. The transmission and transfer case should be mounted on the rear crossmember in the new location prior to assembling the engine to the transmission. This will anchor the rear of the engine in the proper location and will facilitate assembly of the front motormounts. The driveshaft splines will allow for the 1" forward movement of the engine-gearbox assembly. The rear shaft will require no modification. The front shaft should have about 5/8" sawed off or ground off the ends of the splines to eliminate the possibility of the shaft bottoming out in its yoke. The frame bracket for the clutch pivot tube should be moved forward to match the engine movement. This is done by simply drilling two new 5/16" holes in the side of the frame.

There are several ways the engine can be mounted and the method chosen will depend on tools and equipment available, and whether Jeep or Saginaw steering will be used, as well as the location of the mounting pads on the particular Pinto engine. Motormount location and bolt patterns vary considerably depending on when the engine was made. Because of the number of changes in the Pinto engines, we no longer make motormount.

The motormounts should be designed to mount the front of the engine as high as possible to provide maximum driveshaft to starter clearance. Keep in mind the difference the weight of the engine and front sheetmetal will make on the "ride height." The springs may be 2" or more up when unloaded. The engine can be as much as 5 degrees high in front when mounted with its weight on the frame.

When building mounts for any 4 cylinder engine, the characteristic vibration factor of a 4 cylinder must be kept in mind. If the engine is mounted too rigidly, vibration will be transmitted to the frame with resulting inability to keep bolts, etc. on the engine and mounts tight. The ideal set of mounts should be designed with both sides opposite each other on the engine using the original bosses on the engine and soft insulators to absorb the vibration.

With the engine mounted front and rear, the conversion can proceed to the connection of various control systems, etc. The clutch can be connected by two different methods. One way is to use the stock Pinto cable assembly by making an adapter to attach the cable to the Jeep clutch pedal brackets. The other way would be to weld a new arm on the clutch pivot tube about 180 degrees from the original Jeep arm. This converts the linkage to push and a rod can be used to actuate the Pinto clutch. A clevis can be welded onto the rod for clutch adjustment. The Pinto cable throttle setup, complete with accelerator pedal and brackets, works well.



The Pinto alternator could be mounted on either side of the engine. A special bracket must be made to mount the alternator on the drivers side. If the alternator will be on the passenger side, it can be mounted using a stock Pinto alternator bracket. Although this is simpler than making a special bracket, it mount the alternator low and causes lower radiator hose clearance problems. This can be overcome by making a special bracket that raises the alternator mount location to be above the lower radiator hose.

The stock Jeep radiator is more than ample for the Pinto engine and the conversion shows no tendency to overheat. The radiator remains in its stock location fore and aft, and there is more than ample clearance between the fan and the radiator core. In order to have the fan close to the center of the radiator core, it is advisable to mount the radiator an inch or two lower than the original location. The lower radiator hose outlet on the radiator must be changed to the passenger side and its diameter must be changed to coincide with the Pinto waterpump. The outlet should be located as close to the edge of the tank as possible to clear the fan. Some of the early fans had only two blades and these should be changed to the newer fans or heavy duty fans used on air conditioned models.

The PC1A adapter positions the engine in the vehicle with a slight tilt (about 3 degrees) towards the drivers side of the vehicle. This improves driveshaft to starter clearance and air cleaner to hood clearance. Additional driveshaft clearance can be obtained by sawing off the center bolt on the starter, if desired.

The studs need to be locked into the adapter with Loctite®. The four-stud-side goes towards the transmission. The side with the Novak name goes towards the engine as is held on the bellhousing with the other three studs and one hex-head bolt. If the studs are removed

from the adapter for any reason, it is important that they be reinstalled properly and that the studs do not protrude through the adapter. The shifter oil seal should be removed from its bore in Pinto bellhousing equipped with this seal.

The stock 8-1/2" 4 cylinder Jeep clutch disc is used in the Pinto clutch. All other parts are standard shift Pinto, except the pilot bushing supplied with the kit. Be sure to check for flywheel bolt to clutch disc hub clearance. This should be 1/16" minimum. If necessary, grind flywheel bolt heads to provide clearance or use a different make of clutch disc with smaller size hub springs.

Due to variations in clutch hub length in clutch discs of various manufacturers, it is advisable to check for clearance between the clutch disc hub and the pilot bushing. This can easily be checked after the flywheel and pilot bushing have been installed on the engine. Hold the clutch disc with its engine side against the flywheel and use a piece of welding rod with about a half-inch of one end bent at 90 degrees to check this clearance through the hole where the clutch gear goes. There should be a minimum of 1/16" clearance to as much as 1/8" clearance between the hub and the pilot bushing. If clearance is less than 1/16", grind the engine side of the hub to provide the required 1/16 to 1/8" clearance.

Before the engine and transmission are assembled, install the sealed bearing for the input, the two small plugs for sealing and the retainer provided. It is recommended that the felt seal be replaced while it is accessible. This felt seal has a neoprene surface on one side only. This neoprene should face the retainer and should be installed dry. The felt side should be lightly oiled. The seal should be installed on the gear, followed by the retainer. If silicone sealer is used on the retainer gasket surface, make certain it does not plug the oil return hole.

The engine can now be bolted up to the transmission and the front located for installation on the motor mounts while checking clearance between the air cleaner and the hood, as well as front driveshaft to starter clearance.

The Jeep must be converted to 12 volt electrical system (if not so originally). The Pinto alternator and regulator are used with appropriate wiring changes which can be found in any number of shop manuals. The Pinto engine has an ignition system that operated on about 7.5 volts. This lower voltage is best obtained by the use of an ignition resistor rather than by using the special resistance wire used between the ignition switch and the coil on the stock Pinto. This resistor is available at most auto parts stores.

The exhaust pipe clears everything quite well if it is routed out over the frame to a muffler hung under the passenger side of the body.

These are basically the same T90 3 speed transmission as CJ's but they have 2 plugs that screw into the front of the shifter cover that protrude far enough to hit the back face of the Pinto bellhousing. These can be ground off to clear or replaced with flush-head style pipe plugs. Also the front of the shifter may hit the adapter casting. The casting can be cut away for clearance, as required.

WORLD WAR II JEEPS WITH T84 3 SPEED TRANSMISSION

When installing Pinto engines in WWII Jeeps with T84 trans, a total movement of about 2-3/4" forward is required in lieu of reworking the firewall. This is due to the shorter case of the T84. The rear crossmember on these Jeeps can be located slightly diagonal to accommodate the movement required. The mount under the transmission can be extended back to the crossmember with a piece of plate. We strongly advise the replacement of the T84 with the stronger, and easier to obtain parts for, T90 transmission.

IMPORTANT: Because of shift rod protrusion on the T84, a special clearance notch is required in the adapter. We can provide this notch on special order for a nominal fee.

Clutch Hub Information

Due to variations in clutch hub length in clutch discs of various manufacturers, it is advisable to check for clearance between the clutch disc hub and the pilot bushing. This can easily be checked after the flywheel and pilot bushing have been installed on the engine. Hold the clutch disc with its engine side against the flywheel and use a piece of welding rod with about a half-inch of one end bent at 90 degrees to check this clearance through the hole where the clutch gear goes. There should be a *minimum* of 1/16" clearance to as much as 1/8" clearance between the hub and the pilot bushing. If clearance is less than 1/16" grind the engine side of the hub to provide the required 1/16 to 1/8" clearance.