914 Side-Shifter Transmission Conversion

It's not a simple project but you can update a good early 914 with the improved later gearbox

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One of the problems with a mid-engine production car is the long distance the gearshift mechanism has to reach from the driver's position past the engine and back to the rear-mounted transmission. Early 914 models from 1970 through 1972 had a multiple link gearshift rod which extended through the tunnel and joggled past the engine to the rear of the aft-mounted transmission. This "tail-shifter" arrangement resulted in less than precise feel during gearshifting as well as long gearshift throws.

In 1973, one of the major production changes in the 914 model line was a totally redesigned gearshift mechanism, referred to as a "side-shifter," that had fewer parts, and was stiffer and shorter in length. The attachment to the transmission was moved forward on the left side. The result was improved shifting with more precision and shorter throws.

A number of owners of early cars (including 914/6 models) have converted their gearshift mechanisms over to the later design. The conversion process is fairly complex since it involves complete drivetrain removal from the car plus a large number of parts changes. The

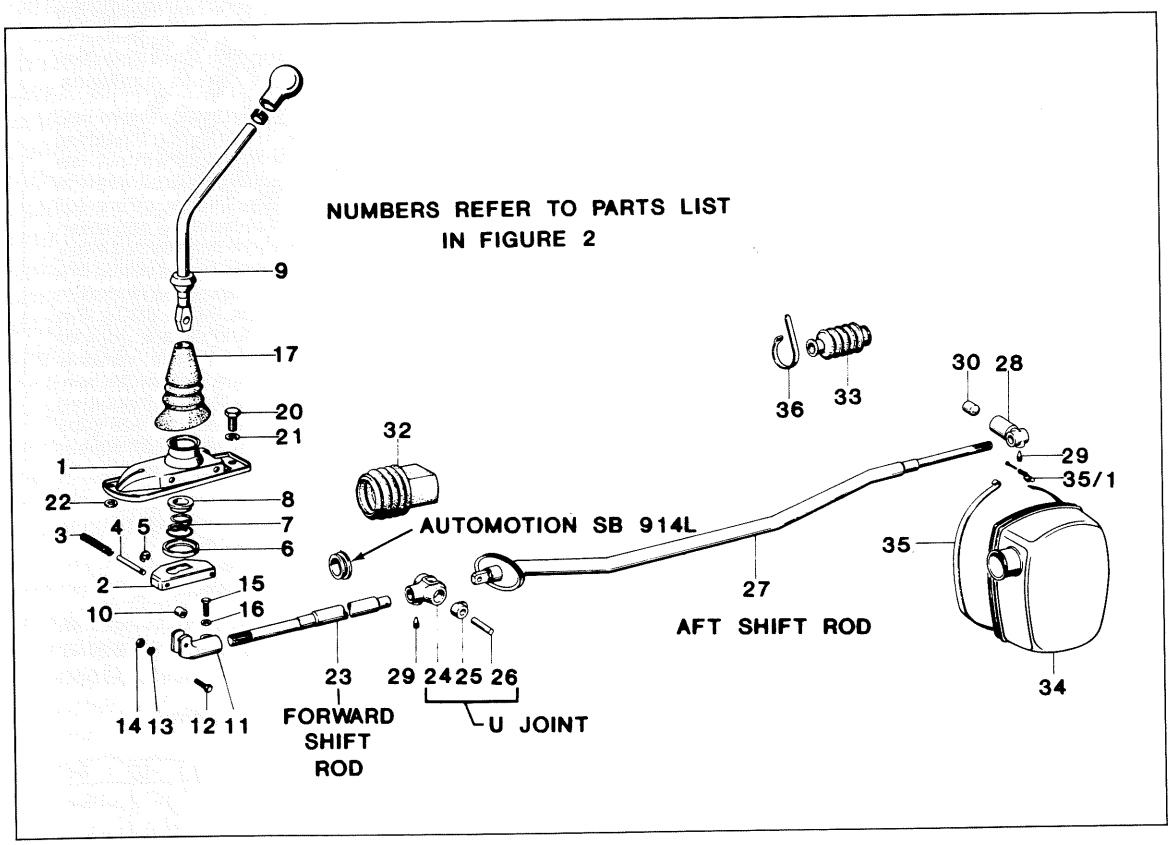

FIGURE 1. 914 Side Shifter Linkage Parts

Item*	Quantity	Part Number	Description
1	1	914.424.019.02	Shift lever housing
2	1	901.424.017.00	Stop plate
3	2	911.424.133.04	Thrust Spring
4	2	901.424.115.00	Guide pin
5	5	900.116.004.01	Lock Washer 5
6	**	914.424.343.00	Guide plate 1.2 mm
6	**	914.424.343.01	Guide plate 2.3 mm
6	**	914.424.343.02	Guide plate 3.4 mm
7	1	914.424.131.00	Thrust spring
8	1	901.424.132.00	Guide for thrust spring
9	1	914.424.016.02	Gear shift lever
10	1	914.424.169.01	Spacer sleeve
11	1	914.424.171.01	Gear shift rod fork
12	1	900.074.128.02	Bolt, hex head M 8x35
13	1	900.027.015.01	Spring ring B 8
14	1	900.076.025.02	Hex nut M 8
15	1	900.075.079.02	Bolt, hex head M 8x22
16	1	999.523.102.01	Locking washer
17	1	914.424.901.00	Rubber shift boot—salvage
(17)	1	914.559.444.10	Leather shift boot—optional to 17
(17)	1	914.559.440.10	Leather shift boot for console
20	3	900.075.078.02	Bolt, hex head M 8x15
21	3	900.027.015.01	Spring ring B 8
22	2	900.025.007.02	Washer 8.4
23	1	914.424.065.00	Gear shift rod, forward
24	1	911.424.221.00	Housing for joint
25	2	911.424.223.03	Bush
26	1	900.092.002.00	Pin 12x45 (Items 24,25 and 26 make up U joint)
27	1	914.424.063.00	Gear shift rod, aft
28	1	914.424.241.02	Gear shift rod head
29	2	901.424.229.00	Cone screw (one goes with U joint)
30	1	914.424.110.00***	Ball cup
—	1	Automotion SB 914L	Sliding bushing
32	1	914.424.169.02	Rubber sleeve (late side-shifter U joint boot)
33	1	914.424.239.02	Rubber sleeve
34	1	914.424.501.01	Protection Cap
35	1	914.424.503.01	Hose clamp—strap
35/1	1	N 14.059	Hose clamp lock
36	2	999.513.002.40	Cable holder (wire tie)

* Corresponding component no. in Figure 1.
** As Required
*** Or an identical and cheaper 911.424.139.00

FIGURE 2. 914 Side-Shifter Parts
Parts Required from Shift Knob to Side-Shifter Input
Parts Catalog Section 7/2/1

purpose of this article is to summarize the changes required in the conversion and some of the past approaches that have worked best so that new or newly-interested owners of these cars can get an idea of what is involved.

Total shift mechanism transplant

In accomplishing the conversion, all of the shift mechanism from the shift knob to the attachment to the transmission requires replacement and the transmission either modified or replaced. In addition, the forward engine mount must be changed on four-cylinder cars. The project can best be started by removing the engine and transmission, followed by removal of the shift linkage. A factory workshop manual (with possibly a Haynes manual as back-up) should be used as a check list for step-by-step drivetrain removal and replacement instructions.

After drivetrain removal, begin at the front of the shift linkage by removing and saving the shift knob. Follow this step by lifting the tunnel carpet and removing the shift lever, which necessitates loosening the shift rod clamping bolt (13 mm) and removing two mounting bolts (10 and 13 mm). The forward shift rod can then be pulled out of the tunnel through the engine compartment.

Once the old parts have been removed, installation of new parts can be initiated. Figure 1 shows a sketch of replacement parts for the side-shifter linkage. Part numbers corresponding to individual numbered components in Figure 1 are tabulated in Figure 2. Required replacement parts may be available from a wrecking yard or may be ordered new from PCNA.

First, the nylon bushing located in the firewall should be removed and replaced with the special bushing available from Automotion (Automotion part number SB-914L). This bushing is required due to the smaller diameter of the replacement forward shift rod but with an outside diameter to fit the 1970 to 1972 body opening. The new forward shift rod and shift lever can then be installed but the clamping bolt should not yet be tightened as it will be needed for adjustment.

Some owners have experienced rubbing interference in the tunnel between the new forward shift rod and the tunnel internal structure. This can be solved by cutting a three-inch hole in the top of the tunnel and using a grinder to enlarge the internal opening that the shift rod goes through. This need be done on only those cars which encounter interference.

Changes to the 914/4 engine

Parts required for changes to the 914/4 engine include the main engine mount and attachments from the engine mount to the engine and body. The early engine mount was a welded steel box beam (some late 1972 models used a cast iron beam) that rigidly attached to the engine with a single bracket and was supported by rubber mounts on each end where the mount was attached to the body.

The side-shifter engine mounting arrangement consists of a cast iron beam that is rigidly attached at each end to the body, but has the center mounts to the engine cushioned by two "silentbloc" rubber mounts. The side-shifter engine mount beam has a large opening to allow the aft shift rod to pass through the beam. Figure 3 shows a photo of the engine mount and attachments to the engine. Figure 4 contains a total list of parts that have to be changed.

Changing the engine mount is accomplished by removing the old bar from the engine support bracket and the bracket from the engine. This does not require removal of the blower housing. The two new brackets and silentbloc rubber mounts can then be installed, followed by attaching the later version main mount bar. The final step to engine modification is replacement of sheet metal in the area of the temperature sensitive bellows on the left side which controls cooling air flow to the engine. The sheet metal replacement (022.119.356 B) has a concave indentation for clearance with the new aft shift rod.

At this point, it might be worthwhile to mention engine mount maintenance on the four-cylinder cars. The silentbloc rubber blocks have 8-mm studs fused into each end that connect the engine brackets to the main engine mount. Engine weight is normally resting on the blocks, putting them into compression. Once installed, the silentbloc rubber separators are difficult to visually inspect because of their location on top of the mount,

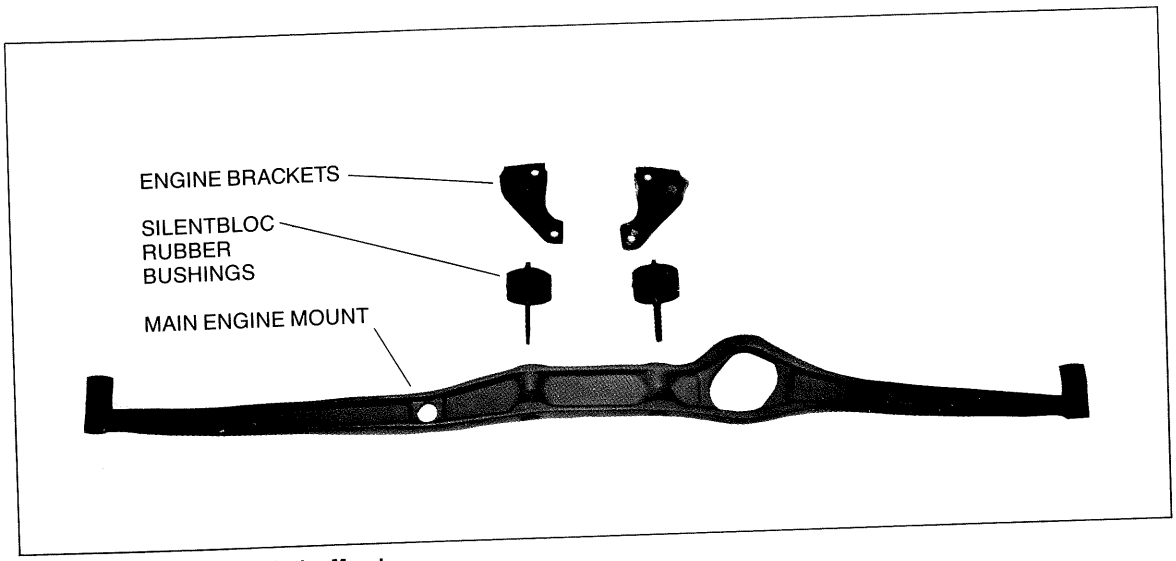

FIGURE 3. 914/4 Side Shifter-Engine Mount

Item	Quantity	Part Number	Description
(1)	1	039.199.221	Support—left
1	1	039.199.222	Support—right
2	2	039.199 231	Silentbloc (rubber mount)
4	4	N14.329.1	Bolt, hex head M8x20 self-locking
5	2	N11.008.8	Nut, hex head M8
6	2	N12.228.2	Spring washer B8
7	2	311.101.463	Nut, hex head M8
9	1	914.375.161.04	Engine carrier (Main motor mount)
11	2	914.375.181.00	Support at end of mount to body
17	2	900.074.068.02	Bolt, hex head M10x85
18	2	900.025.008.02	Washer 10.5
19	2	900.276.006.02	Nut, hex head M10 self-locking
20	4	900.075.085.02	Bolt, hex head M8x20
22	4	914.375.162.00	Washer
23	4	999.084.008.02	Nut, hex head U12.8
Parts Catalog Section 1/11A			
(12)	1	022.119.356 B	Deflector plate—lower

Note: Some nuts, bolts and washers are salvageable from the original installation.

FIGURE 4. 914 Side-Shifter Conversion Parts
Parts Required for Changes to the Engine
Parts Catalog Section 1/2A

but, like the early rubber mounts at the ends of the engine mount beam, should be periodically checked for integrity.

If the rear of the car is raised by placing a floor jack under the engine, part of the weight of the aft section of the car is carried by the silentblocs in tension, putting an extra strain on the rubber blocks that will contribute to early failure. Failed rubber motor mounts on either the early or side-shifter cars can result in the engine shifting slightly. Even a slight shift can cause both the clutch cable and throttle cable ends to move just enough to put the clutch and throttle out of adjustment and prevent permanent readjustment until new mounts are installed. The preferred method for raising a side-shifter 914 with a floor jack is by placing the lift pad under the front mount bar center.

Finding a transmission

The easiest way to convert to the side-shifter transmission is to obtain a 1973 or later transmission (914/12) from a Porsche reclamation yard and install it. However, conversion of the earlier version (914/11) is not too difficult, especially if it is done in conjunction with an overhaul. All three internal shift rods must be replaced and the internal input shift rod removed. Also, the side-shifter input mechanism has to be installed. The rear gearbox cover may be retained without modification if desired, but a more professional appearing unit is obtained if the cover is replaced with the later version.

In modifying a transmission, the factory repair manual should be closely followed. Unless there is some concern over the differential, it need not be removed from the housing. After completing the installation, the adjustment procedure in the factory shop manual should be followed to complete the job.

Conversion of the 914/6 to the side-shifter is accomplished in a similar manner to the four-cylinder version. The 914/6 has a unique front engine mount consisting of a single attachment bracket around the crankshaft pulley that fastens to the body through a rubber mount with a single vertical bolt. No change is required to the engine mount for the conversion. However, the side-shifter aft shift rod, part number 914.424.063.00, must be modified to fit between the engine and the left-hand heat exchanger.

This was accomplished in one of our local conversions by first tack-welding a piece of angle iron to the new shift rod near each end to fix the dimensional relationship between the ends. Then the center section of the new shift rod (which has quite a bend in it) was cut out with a hack saw and a straight piece of tubing or a similar length portion of the original 914/6 shift rod welded in its place. The result was a modified bar with new ends the right distance apart using the original shaped center section.

An optional finishing touch

Once you get this far with either the four or six-cylinder cars, the job is essentially completed except for

FIGURE 5. 914 Side-Shifter Shift Rod Attachment at Firewall

one optional finishing touch. The conversion leaves the shift rod universal joint (items 24, 25 and 26 in Figures 1 and 2) exposed to the elements as it is located aft of the firewall and there is no convenient attachment for the late model rubber boot cover. To complete the job and provide protection for the U-joint, an adapter plate can be built which will allow use of the production side-shifter boot (part number 32 in Figure 1, 914.424.169.02).

Figure 5 is a photograph of a completed installation in a 1972 four-cylinder 914. To build and install the adapter plate and boot, the following materials are required:

1. Approximately one square foot of eighth-inch thick aluminum plate. (Steel will work equally well, but aluminum is lighter weight and is easier to machine.)
2. One 12-mm x 30-mm long bolt.
3. Three 12-mm flat washers.
4. One 12-mm spring washer.
5. Four 4-mm x 18-mm machine screws with matching nuts (I like to keep things metric), or 6/32 x 3/4 inch machine screws with matching nuts.
6. One shifter boot, part number 914.424.169.02.

The following tools are suggested, but the parts can be made by hand with other tools available.

1. Hacksaw
2. Mill file
3. 1.5, 2.25, and 3-inch hole saws
4. 1/8, 1/4, and 1/2-inch drills
5. Screwdriver and wrenches to assemble and install the adapter plate.

Using the hack saw and file, manufacture a part to the approximate dimensions shown in Figure 6. It's easier to do with a saber saw, if you have one. This part will

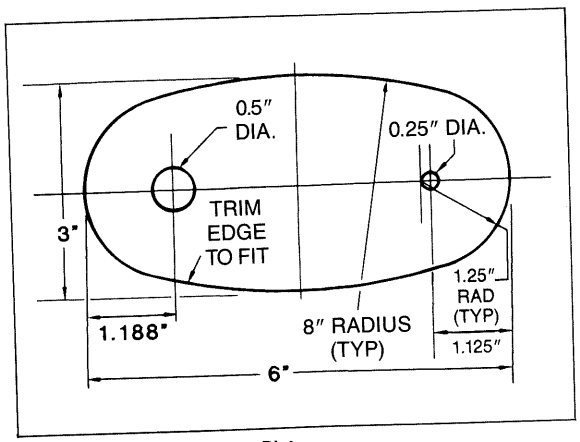

FIGURE 6. Elliptical Adapter Plate

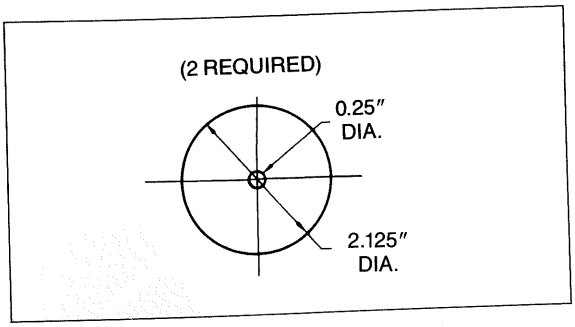

FIGURE 7. Small Washer

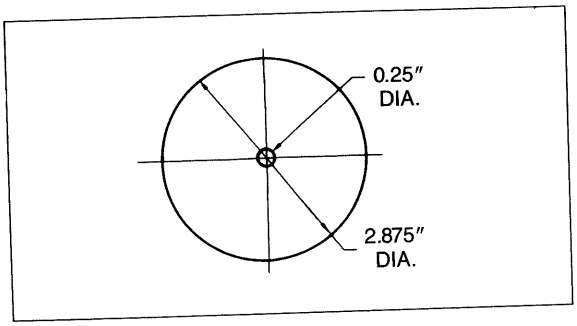

FIGURE 8. Large Washer

have to be tailored to a snug fit in the recess of the elliptical support for the original boot.

Next, using the 2.25-inch hole saw, cut two washers to the dimensions outlined in Figure 7. The last part required is the large washer in Figure 8 that can be made with the three-inch hole saw.

Subsequent to the manufacture of the four parts and ascertaining a net fit of the Figure 6 part, nest the four parts together with the two smaller diameter washers set between the elliptical plate and the larger diameter washer. Insert a quarter-inch bolt through the center holes of these parts and tighten a nut on the bolt. Drill four eighth-inch diameter holes through the assembly as shown in Figure 9. Insert and tighten the four 4-mm x 18-mm machine screws in these holes and remove the quarter-inch bolt.

Now, utilizing the 1.5-inch hole saw with the quarter-inch hole as a pilot, cut this hole through all four parts. Alternatively, the unit can be disassembled and the 1.5-inch hole cut through each part separately. After the machining is finished, smooth out the surfaces and remove all burrs. Next, clean all parts to remove cutting oils, etc., and reassemble with a sealing compound between all mating surfaces. Tighten the small machine screws, and paint the assembly.

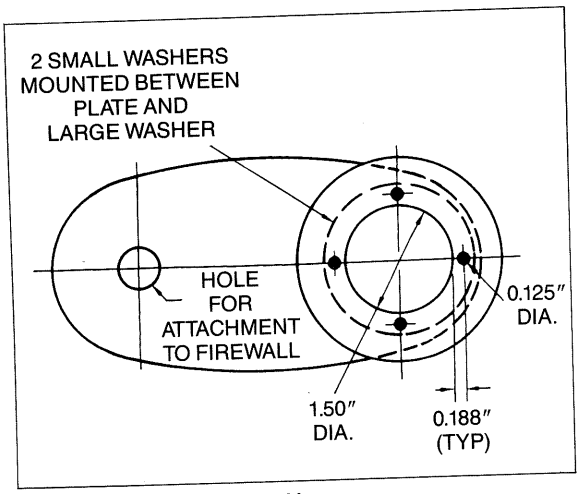

FIGURE 9. Adapter Final Assembly

For installation, separate the forward and aft shift rods at the universal joint by removing the Allen head set screw. This separation will have to be made to fit-check the elliptical plate. Place the boot over the aft shift rod and insert the new assembly into the elliptical recess on the firewall after having placed the spring washer and one flat washer on the 12-mm bolt, inserting it into the plate and placing the remaining two flat washers over the bolt on the forward side of the elliptical plate. Screw the 12-mm bolt into the tapped hole which was formerly used to mount the early model linkage ball joint. Torque the bolt in place.

To finish the job, reconnect the universal joint to the forward shift rod and stretch the forward end of the boot over the large washer. Follow this by connecting the aft end of the boot to the elliptical member attached to the aft shift rod. You now have a neat installation which will protect the universal joint and which will be pleasing to anyone inspecting the installation.

The side-shifter conversion for early 914 cars is not a simple project and for many owners, may best be accomplished with some professional help for part or all of the job. However, it does provide a way of updating a good early 914 to the improved gearshifting system available in the later models.