

LATE MODEL POWER STEERING 605 CONVERSION FOR 1958-1964, PART I



Denny Williams - Technical Writer

Denny is first and foremost a dyed-in-the-wool Chevy enthusiast. He is an author (How To Restore Your 1957 Chevy), a restorer and a walking encyclopedia on Classic Chevys.

Denny's knowledge was instrumental in developing the 1000 point judging system for our Chevrolet hobby. Be sure and throw him a challenging question when you see him at one of our shows. Denny also heads up Eckler's Late Great Chevy Product Development and Technical Services department.

Many Late Great owners want to change their standard steering 1958-1964 Chevy to power steering. Also, many with original power steering want to upgrade to later model power steering because they want to eliminate the leaky control valve and hydraulic cylinder.

We have a great conversion for your 1958-1964 passenger cars. This conversion can be done on cars with small blocks or big blocks. Cars with air conditioning can also be converted. It uses GM's "605" steering box, which has "the power" right in the box. The 605 power steering boxes were used on mid-sized GM cars produced in the mid to late 1970's and throughout most of the 1980's. (See Step #17 for more information.)

The basic conversion requires a bracket for mounting the 605 to the frame. We have a bracket cast out of a high strength alloy (Al-Mg 535), which is an aluminum and magnesium alloy. One of the things that make our bracket the best you can purchase, is that you mount the bracket to the 605 using the original threaded holes of the 605. (All other brackets require drilling out the threads of the 605 mounting holes. When mounting the 605 to the bracket, the bolt heads are not against a flat surface and that can create problems.)

Our bracket kit (P/N 553005) allows you to bolt-on a late model power steering box at a very reasonable price. It comes with the mounting hardware required to install the 605 box. Late model technology is now available for your Late Great Chevy. For complete kits, they are available for either small block or big block cars. (Visit www.LateGreatChevy.com for information

on the complete kits.) This conversion requires that the car have the standard steering linkage between the wheels. Specifically it must have a standard steering pitman arm, drag link, and idler arm.

Tools Needed:

Various 12-Point Sockets and Ratchet (5/16" to 11/16")
Various 12-Point Wrenches (5/16" to 11/16")

Various Line Wrenches
Various Taps or Thread Chasers (5/16"-24, 3/8"-16, 7/16"-14)
Pitman Arm Puller



#561365

605 Conversion Parts List:

Catalog price Member price

- 561365 Complete 605 Conversion Kit, Small Block V8
- 561366 Complete 605 Conversion Kit, Big Block V8 (348/409)
- 561367 Complete 605 Conversion Kit, Big Block V8 (396/427/454)
- 563650 Crankshaft Pulley, Double Groove (GM Track #1 & #2)
- 563652 Water Pump Pulley, Double Groove (GM Track #1 & #2)
- 564207 Crankshaft Pulley, Single Groove (GM Track #3)
- 563943 Water Pump Pulley, Single Groove (GM Track #1)
- 553071 1955-72 Pump Pulley, Double Groove (GM Track #2 & #3)
- 561350 Stud, Power Steering Pump
- 553005 1958-64 605 Style Steering Box Mounting Bracket Kit
- 553030 1958-64 605 Power Steering Box To Original Column Shaft & Coupler

Time Frame:

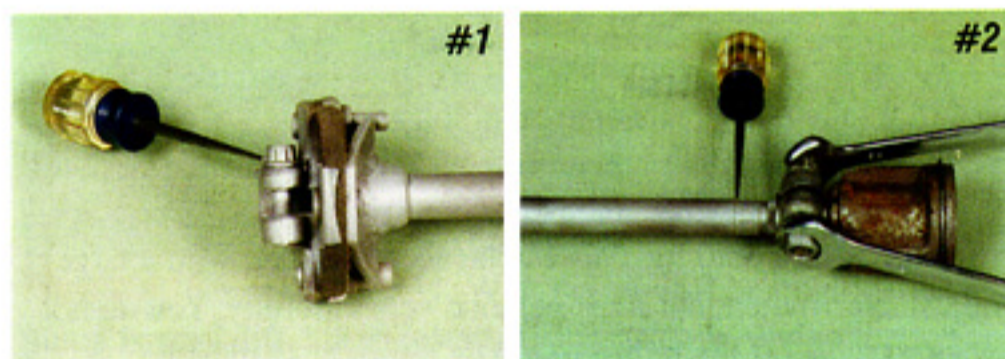
4.5 hours

This installation takes some time and can be a bit difficult because there is not a lot of room for your hands and tools. That is why following the procedure outlined in this article will really help. The order of installing the various parts can be crucial. The photos were taken on an open frame so that you can see exactly how every thing goes together. You need to work slowly. Here are a couple of other suggestions which will help: Use taps and dies to clean all threads that will be used. Order or collect all of the parts before you start this conversion. You will not want to be

in the middle of the project and be missing one small item. Read through the article and the list of parts before making up your parts order. The list also includes the water pump and harmonic balancer double groove pulleys that you might need. Most cars require double pulleys at the water pump and harmonic balancer. A/C cars will require a third track at the harmonic balancer.

Step 1. If your car has air conditioning, loosen and remove the A/C belt. Loosen and remove the generator or alternator belt. Temporarily remove the alternator or generator from the bracket at the exhaust manifold. Since you just want the alternator or generator out of the way during the installation, you do not completely disconnect and remove.

Step 2. Using a 1/2" socket, remove the four 5/16-24 x 3/4" bolts and lock washers, which secure the fan and water pump pulley. Remove the fan and pulley. Using a 9/16" deep socket, remove the three 3/8-24 x 1" bolts and lock washers, which secure the crank (harmonic balancer) pulley. Remove the crank pulley.



Photos #1 & #2: Step 3. For those with 1959-1964 cars, the next piece to remove is the lower (or intermediate) steering shaft. (For those of you with 1958 cars, skip to Step 4) The lower shaft is made so that you can remove the shaft without removing the steering box, but sometimes it can be difficult. Using a twelve-point 7/16" deep socket remove the special bolt, which secures the lower end of the shaft (Photo 1). Use a large flat-blade screwdriver to spread the clamp. A clamp at the upper end of the intermediate shaft must be loosened. Use 5/8" and 11/16" wrenches or sockets to remove the bolt, flat washer, and nut (Photo 2). Use a large flat-blade screwdriver to spread the clamp. Slide the cup and clamp assembly down the shaft until they reach the end of the milled down area of the shaft. (Notice where the awl is pointing in Photo 2.) Slide the shaft toward the firewall and off of the steering box. (The upper cup and clamp should slide far enough to allow the lower end to slide off of the steering box.) You may have to use a rubber hammer to drive the shaft off. Don't get frustrated; if it does not come off just go to the next step.

Step 4. Use a large wrench or socket to remove the sector shaft nut and lock washer which secure the pitman arm. Using a pitman arm puller, remove the pitman arm from the steering box. (You probably may have to use a hammer to loosen the pitman arm from the steering box. As you tighten the bolt on the puller, hammer the end of the bolt once or twice.) Use a 9/16" socket to

remove the three bolts, which secure the original steering box to the frame. Usually two of the bolts have large flat washers and the other bolt has a small flat washer. Carefully lower the steering box. If the intermediate shaft is still connected, tap it off with the hammer. Remove the original steering box completely out of the car.



Photo #3: Step 5. Now the pump brackets will be installed. The brackets will be secured with two 3/8-16 x 1 1/4" bolts with lock washers (at the front left of the small block) and one 3/8-16 x 7/8" bolt with lock washer (at the forward location of the left side motor mount).

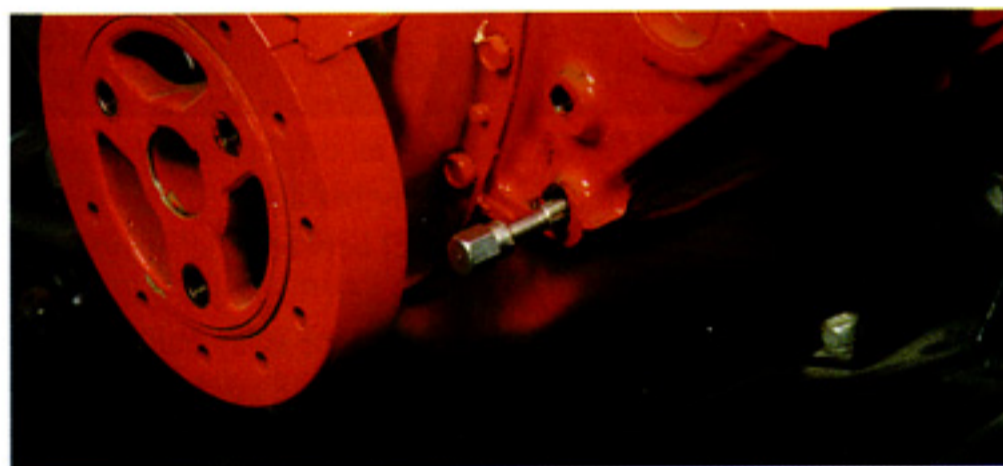


Photo #4: The reproduction brackets mount the same way that the original brackets mount. As suggested in the introduction, clean the threads (3/8-16) of these locations with some kind of thread chaser or tap. Temporarily remove the forward top bolt of the left side motor mount. (Each motor mount is secured with three of these bolts.)



Photo #5: Step 6. Position the two brackets and start to thread the two 1 1/4" bolts and lock washers into the front of the block. The bolts go through the forward bracket, then through the rear bracket, and then into the block.

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Photo #6: Do not tighten at this time. Install the 7/8" bolt with lock washer through the rear hole in the rear pump bracket, through the motor mount, and then into the block. Now tighten all three bolts, which secure the pump brackets.



Photos #7 & #8: Step 7. If your car has an original front sway bar, spacers are required to drop the sway bar about 1/8". A spacer will be installed at each frame rail between the sway bar bracket and the frame. From experience, here is a very good way of removing the two bolts securing each of the sway bar brackets. Use a 1/2" short socket on a 1/4" drive ratchet to hold the heads of the two 5/16-18 bolts. These are accessible through two large holes in the outside of the frame. Use 1/2" wrench or socket to remove the nut. After removing the two bolts, position the spacer and secure with the same two bolts. Repeat this procedure for the other side of the sway bar.

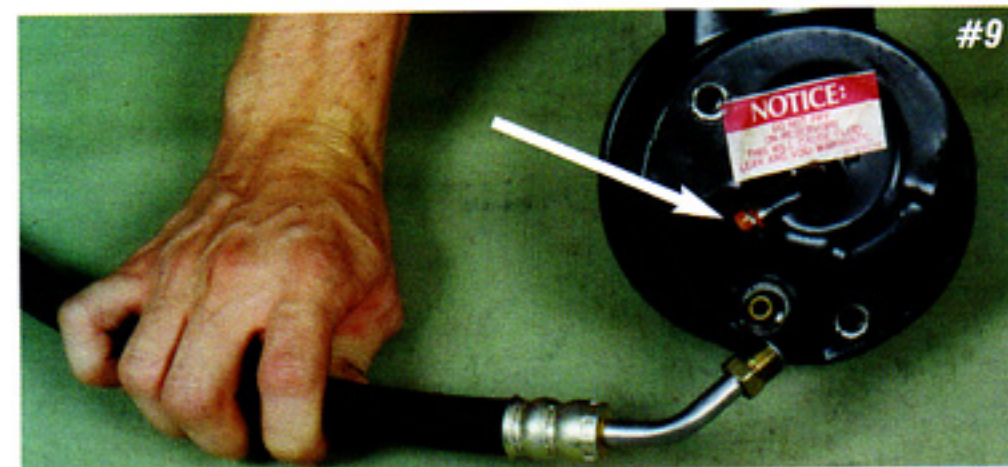
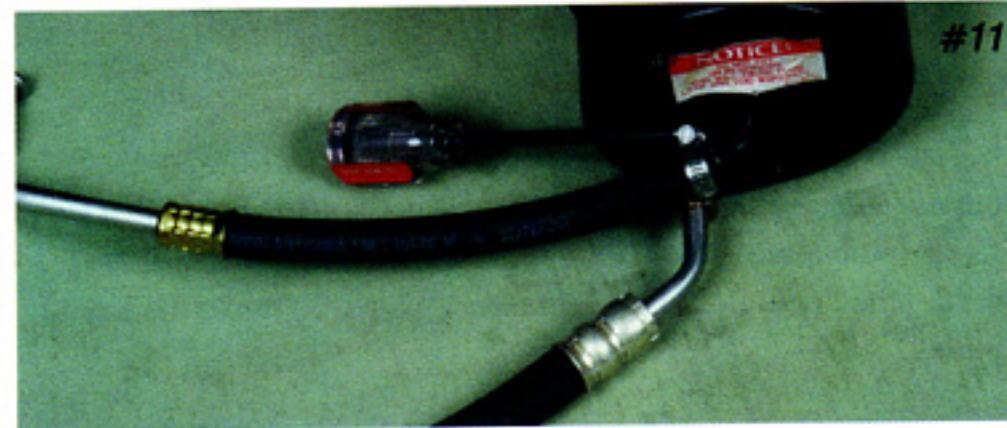
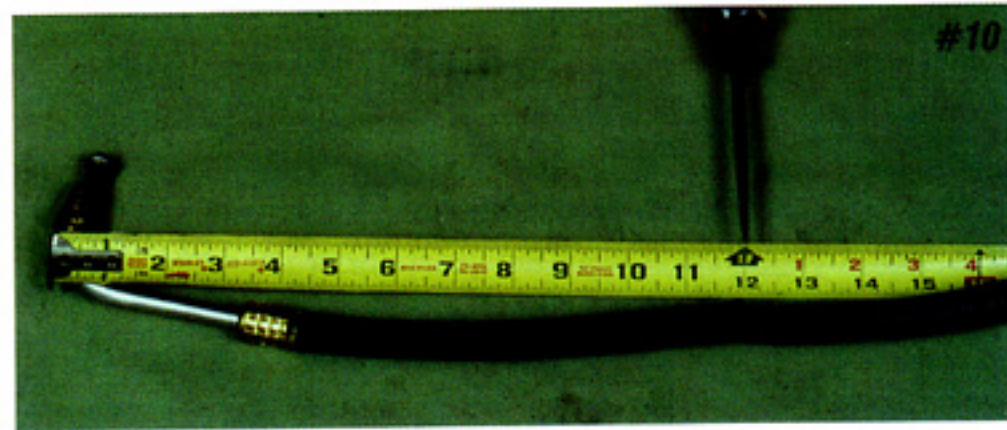


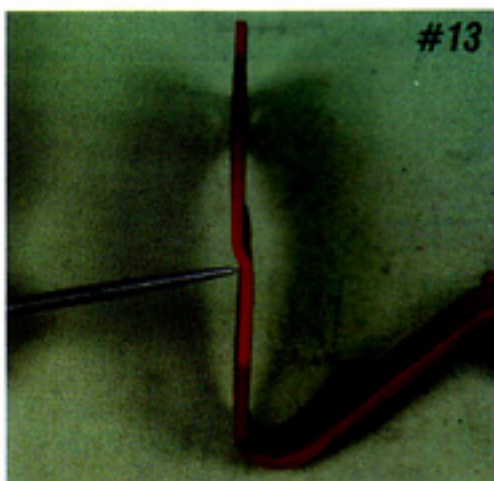
Photo #9: Step 8. Since there is so little working space, it is best to install the hoses onto the pump before installing the pump into the pump brackets. The pressure line is installed into the female flare fitting at the lower rear of the pump. Tighten until it is just snug. (For those with original pumps, an adaptor fitting may be required to mate the pump and new hose. This fitting is available at many auto parts stores).



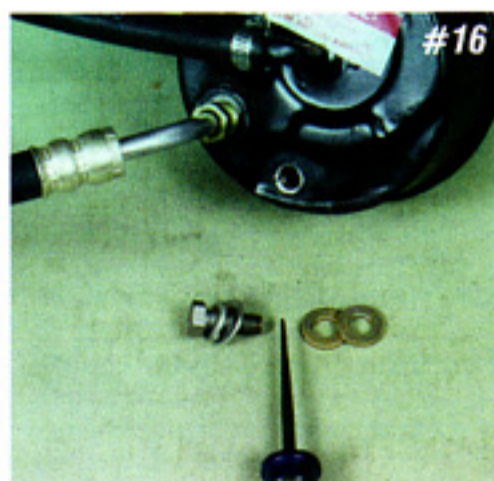
Photos #10 & #11: Step 9. On many of the pumps available, the return line on the back of the pump points to the 9 o'clock position. For the pump to be used with these original-type pump brackets, the line needs to be pointing to the 8 o'clock position (See arrow in Photo 9). This can be accomplished with a large adjustable wrench, but must be done very carefully. You do not want to twist off the return line. The return hose must be shortened to 12" before installing it onto the pump. Place the measuring tape at the 90 degree bend and cut at 12" (Photo 10). Apply some grease onto the pump's return fitting. Position a small hose clamp onto the hose and slide the hose onto the pump's return fitting. (The 605 box fitting of the return hose should be pointing toward the front of the pump.) This hose clamp needs to be oriented as it is in Photo 11 so that you can get to the clamp once the pump is installed. Tighten the hose clamp.



Photo #12: Step 10. Each of the pump brackets has an offset to accommodate the mounting studs on the back of original pumps. Original pumps used special studs (P/N 561350) at the upper and lower locations on the rear of the pump.



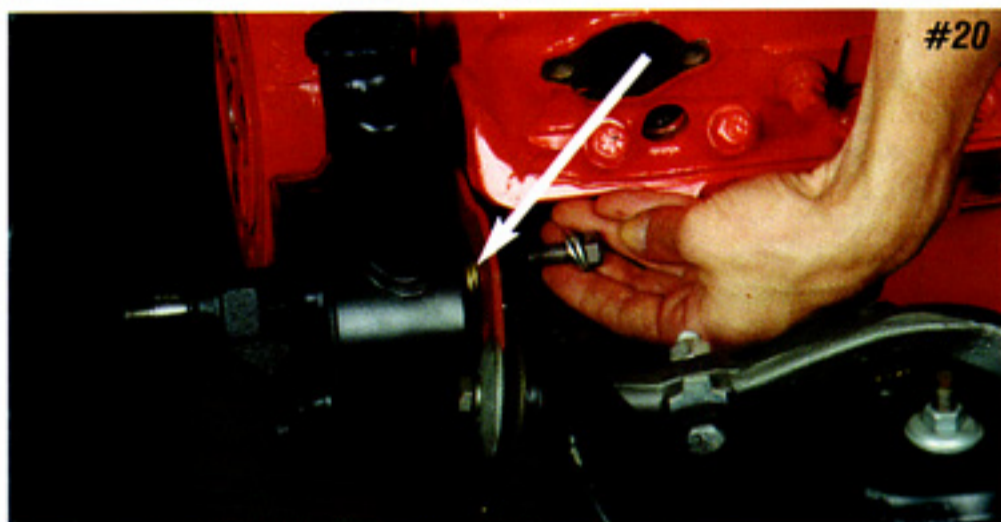
Photos #13 & #14: The forward bracket has an offset at the rear slot and the rear bracket has one at the upper (belt adjusting) location. The replacement pumps do not have the special studs as a result; you must do one of two things to install the pump. The two choices are explained in the next step.



Photos #15 & #16: Step 11. With two studs like original, the pump is very difficult to install. Using just one stud in the lower position makes the installation the easiest. So using one of the special studs is best. Use it in the lower rear position. The hardware required to finish the lower rear location is a flat washer, lock washer, and nut. If you do not use a stud in the lower rear position, two flat washers can be used to take up the space of the stud. The hardware required to finish the lower rear location is a 3/8-16 x 3/4" bolt, flat washer, and lock washer. (In Photo 16; the awl points to the location of the bracket.)



Photos #17 & #18: Step 12. The upper rear location hardware is a 3/8-16 x 3/4" bolt and lock washer with two flat washers used as spacers between the pump and rear bracket (Photo #18). The lower forward location hardware is a 3/8-16 x 1" bolt, flat washer, and lock washer (Photo 19).



Photos #19 & #20: Step 13. Now that all of the pump hardware is ready, there is one other thing that you can do to prepare for the pump installation. Using a 3/8-16 tap, chase the threads of the two pump locations where the bolts will be installed. I have seen a few pumps where the holes were filled with dirt and grime even after being rebuilt. I could hardly install a bolt. When you are trying to install the pump in tight quarters, the last thing you want to do is work hard to install a bolt. (Apply a small amount of grease to the bolts just before installing them.) With the hoses pointed toward the rear of the car, position the pump and install the hardware (Photo 20). Notice the two washers that act as a spacer as pointed out with the arrow in Photo 21. Do not tighten any of the three locations until you have them all started. (Make all three locations snug, but do not tighten at this time.)

Step 14. Next, select the pulleys at the water pump and the harmonic balancer. (See detailed information in the second part to this article.) The alternator or generator uses GM's track #1 and the belt goes around the water pump, the harmonic balancer, and the alternator or generator. The A/C uses GM's track #2 and the belt goes around the water pump, the harmonic balancer, and the A/C compressor.

Congratulations on completing the first part of your Late Model Power Steering 605 Conversion. Look in an upcoming issue for Part II, continuing with Step 15, to complete your project. ▾

LATE MODEL POWER STEERING 605 CONVERSION FOR 1958-1964, PART II



Denny Williams - Technical Writer
 Denny is first and foremost a dyed-in-the-wool Chevy enthusiast. He is an author (How To Restore Your 1957 Chevy), a restorer and a walking encyclopedia on Classic Chevys. Denny's knowledge was instrumental in developing the 1000 point judging system for our Chevrolet hobby. Be sure and throw him a challenging question when you see him at one of our shows. Denny also heads up Eckler's Late Great Chevy Product Development and Technical Services department.

605 Conversion Parts List:

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- 561367 Complete 605 Conversion Kit, Big Block V8 (396/427/454)
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- 563652 Water Pump Pulley, Double Groove (GM Track #1 & #2)
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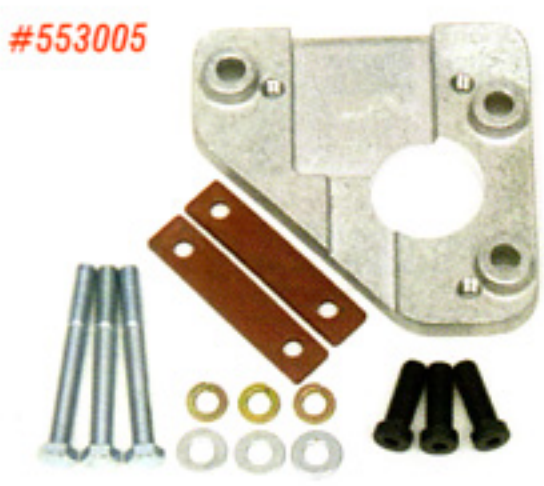
Tools Needed:

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 Various 12-Point Wrenches (5/16" to 11/16")

Various Line Wrenches
 Various Taps or Thread Chasers (5/16"-24, 3/8"-16, 7/16"-14)
 Pitman Arm Puller

Time Frame:

4.5 hours



#553005
 "605" steering box, which has "the power" right in the box. The 605 power steering boxes were used on mid-sized GM cars produced in the mid to late 1970's and throughout most of the 1980's. (Recall Step #17, in Part I, for more information.)

As discussed, the basic conversion requires a bracket for mounting the 605 to the frame. Our bracket, cast out of a high strength alloy (Al-Mg 535), is one of the best you can purchase, because it mounts the bracket to the 605 using the original threaded holes of the 605.

Our bracket kit (**P/N 553005**) allows you to bolt-on a late model power steering box and comes with the mounting hardware required to install the 605 box. This conversion requires that the car have the standard steering linkage between the wheels. Specifically it must have a standard steering pitman arm, drag link and idler arm.

In Part I of this tech article, which ran in August 2006, we brought you information about our great conversion for your 1958-1964 passenger cars. As we stated, this conversion can be done on cars with small blocks or big blocks. Cars with air conditioning can be converted also. It uses GM's



P/N 518024



P/N 563650

#21



P/N 564207



P/N 553071

#22



Photos #21, #22 & #23: With A/C. The following is what you need if you have A/C: a water pump double pulley (GM tracks #1 and #2) which is our **P/N 563652** and a harmonic balancer double pulley (GM tracks #1 and #2) which is our **P/N 563650**. You will also need another harmonic pulley (GM track #3) which is our **P/N 564207** (Photos 21-23). The power steering pump uses GM's track #3 and the belt goes around the harmonic balancer and the power steering pump. The only pulley still available for the pump is a double pulley (GM's tracks #2 and #3) which is **P/N 553071**. (Photo 22)

Without A/C. The following is what you need if you do not have A/C: a water pump single pulley (GM track #1) which is **P/N 563943** and a harmonic balancer double pulley (GM tracks #1 & #2) which is **P/N 563650**. The first track belt goes around the water pump, crank and alternator or generator (Photos 21-23). The power steering pump uses GM's track #2 and the belt goes around the harmonic balancer and the power steering pump. The only pulley still available for the pump is a double pulley (GM's tracks #2 and #3) which is **P/N 553071** (Photo # 22)



Photo #24: Step 15. Install the correct pulley or pulleys at the harmonic balancer. Secure with the three 3/8-24 x 1" bolts and lock washers. The crank pulley bolts should be tightened to 45 foot-pounds.

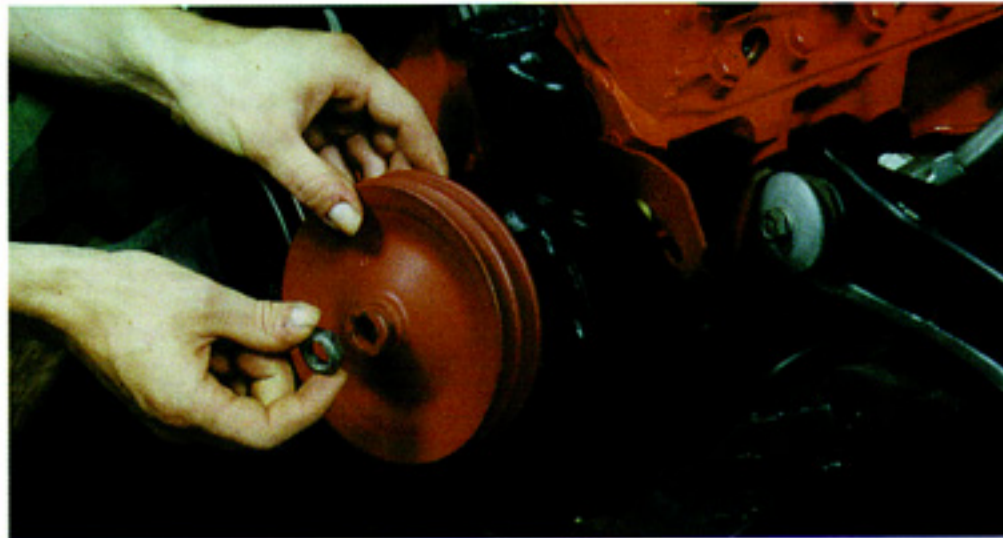
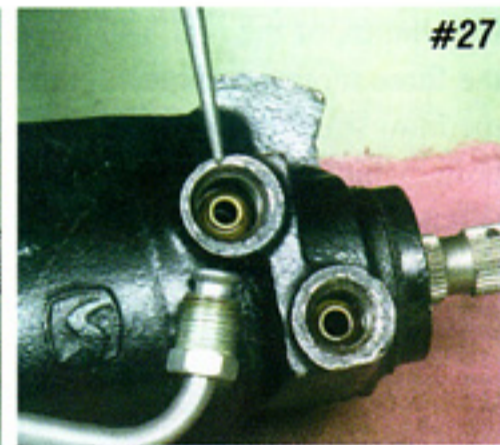
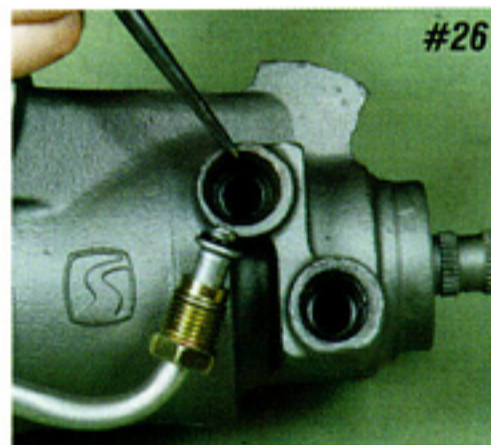


Photo #25: Step 16. Install the pulley on the power steering pump. Make sure that the Woodruff key is positioned on the pump shaft before installing the pulley. Check the alignment of the pulleys with respect to each other. The tracks need to be lined up. Select the pump belt that you will use. The length of this belt is critical. The amount of adjustment is minimal. The belt has to be long enough to be installed, but not so long that it is impossible to tighten. (I used a flat-blade screwdriver to "pry" the belt into position.) This belt will be installed later.



Photos #26, #27 & #28: Step 17. There are two 605 boxes, one has flare-type hose fittings and one has O-ring fittings. The flare-type boxes were used in the early years and the O-ring style in the later years. The flare style will have the brass seats and the O-ring will not have the seats. The 605 boxes in our kits are the O-ring type (Photos #26 & 27). All of the 605 boxes will have "605" cast (5/16" high numbers) in the housing (Photo # 28). If you are looking for such a box at a junkyard, the "605" will be visible as you look over the fender down on the box.



Photos #29, #30, #31 & #32: Step 18. Just before starting the installation of the 605, use a 7/16-14 tap to clean the threads of the three mounting holes in the 605 box (Photo 29). Use a medium strength Loctite product on the three black socket-head bolts, which will secure the box to the special Al-Mg 535 bracket (Photo 30). Position the bracket onto the 605 box and start each of the three socket-head bolts (Photos 31 & 32).



Photo #33: After starting all three bolts, use a 7/32-inch hex wrench to tighten each of the three bolts (Photo 33). Make sure that these three bolts are very tight.

Step 19. There are 3.5 turns from lock-to-lock on these boxes. While protecting the upper shaft with a rag, use a pair of vise grips to position the sector shaft at the midway point. To make sure that the 605 box is halfway, turn the upper shaft until the sector shaft is either at the end of the “right turn” or “left turn”, then turn the shaft in the opposite direction 1 1/4 turns. The sector shaft has four flat areas on the splined end (see arrow in Photo 33). At the midway point, one of those flat areas will be pointing toward the front of the car when the box is on the frame.



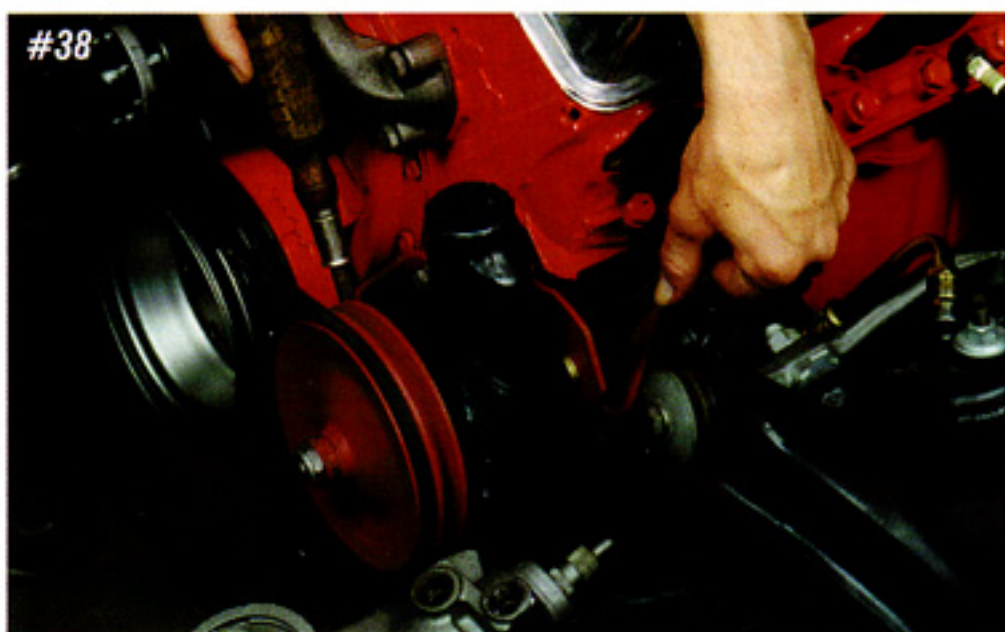
Photo #34: Step 20. Now the box bracket assembly can be bolted to the frame. The three 3/8-16 x 3 1/4” bolts, provided in the bracket kit, will be installed in the original holes in the frame.



Photo #35: Each of the bolts should have a flat washer and lock washer in place as you begin to secure the box bracket. These bolts will be screwed into the Al-Mg bracket. As you position the box/bracket assembly, place the pitman arm onto the sector shaft. (At this time the pitman arm does not have to be completely installed onto the sector shaft.) Leave each of the bolts loose until all three are started into the bracket. You may have to wiggle the box/bracket assembly a little to get all three bolts started. Tighten these mounting bolts to 30 foot-pounds of torque.



Photo #36: Step 21. Line up the matching flat areas of the sector shaft and pitman arm. Install and tighten the large lock washer and nut, which secures the pitman arm.



Photos #37 & #38: Step 22. At this time, the belts will be installed. The photo showing the tightening of the power steering belt does not show the alternator belt or the A/C belt, but these do need to be "installed" before the power steering belt is installed. Hang the belts over the harmonic balancer and the water pump: these will be installed later. The reason for doing it this way is that tightening the power steering belt is easier without the fan and water pump pulley in place. Notice in Photo 37 the bolt, flat washer and lock washer, which will tighten the power steering belt. Position the power steering belt. Use the shortest belt that you can pry over the pulley. There is very little space for tightening the belt. Be careful where you pry to tighten the belt. Use a large flat-blade screwdriver as shown in Photo 38 to tighten the power steering belt. Use a 9/16" wrench or socket to tighten the upper bolt on the rear of the power steering pump. At this time, tighten the lower rear nut and the lower front bolt on the power steering pump. Make sure that the pulley does not come in contact with the 605 box and that all of the pulleys line up.

Step 23. Install the fan and the correct water pump pulley with four 5/16-24 x 3/4" bolts and lock washers. The water pump pulley bolts should be tightened to 20 foot-pounds of torque. Make sure to check the alignment of the pulleys with respect to each other. The tracks need to be lined up.

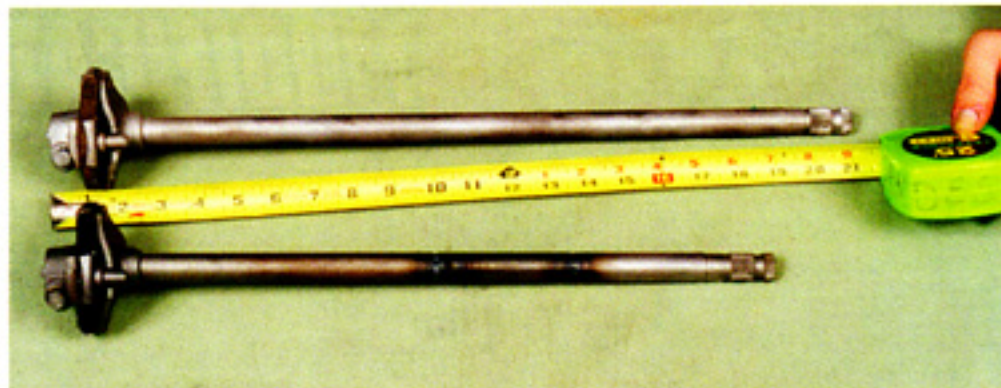


Photo #39: Step 24. The intermediate steering shaft must be shortened. You can measure for your own application. I have found that if the shaft is shortened to 19", it works very well. The length is an overall length, end-to-end.

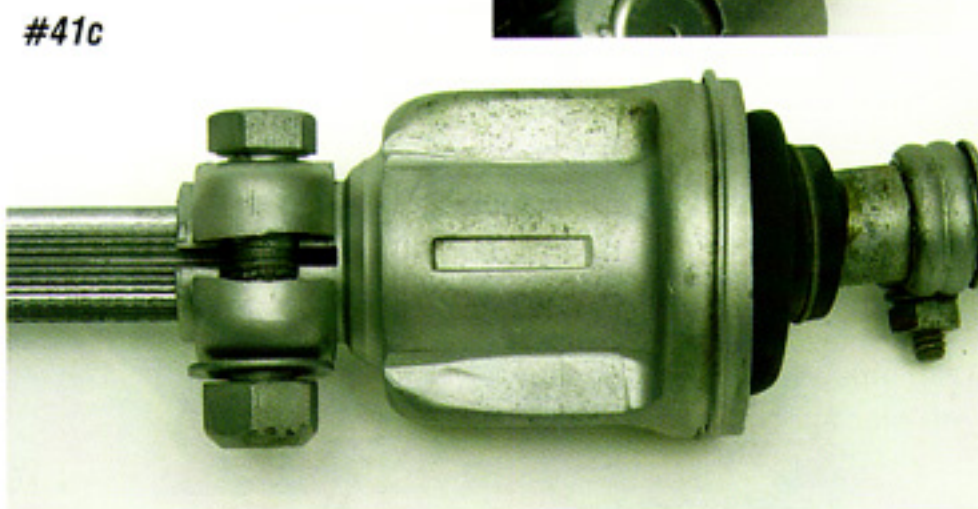
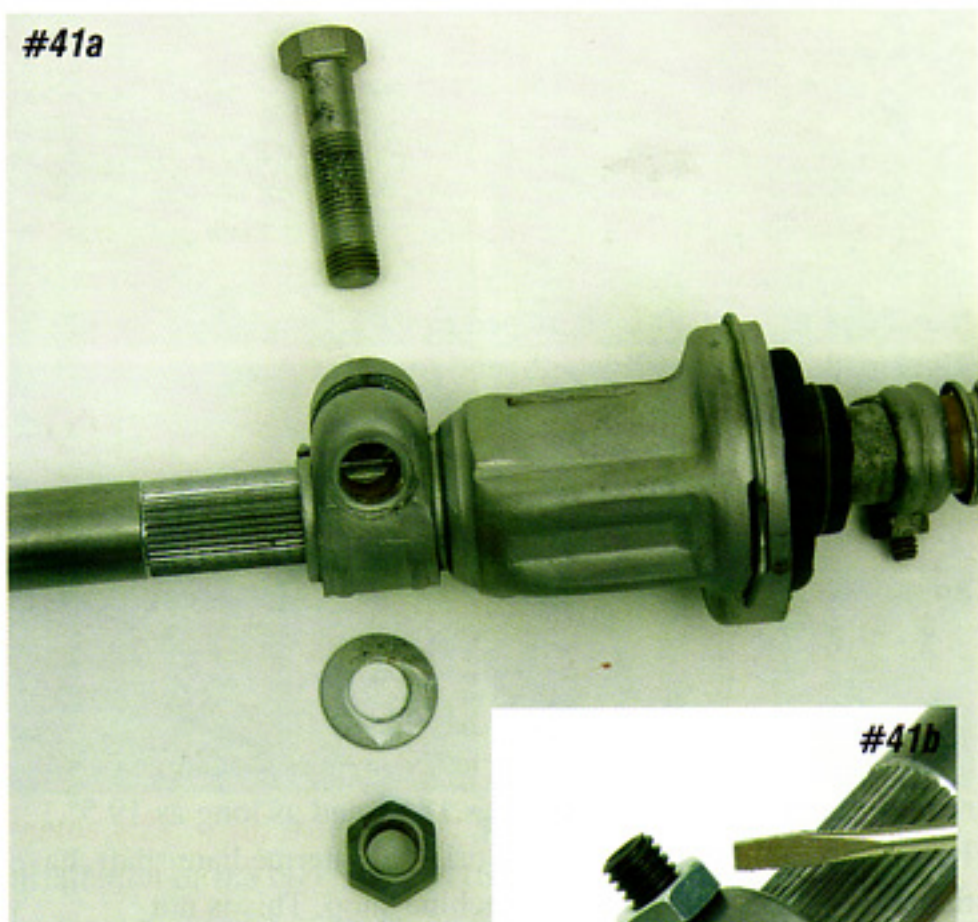


P/N 553030

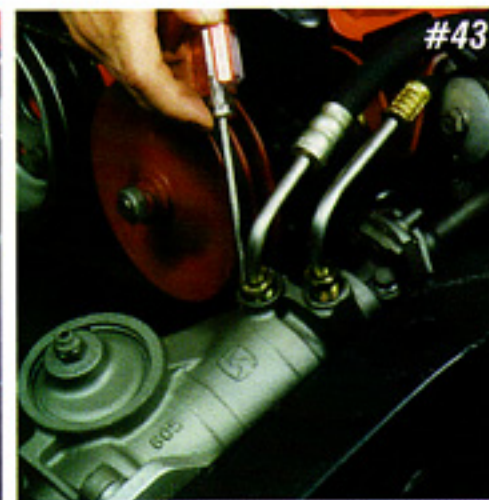
Photo #40: (I have heard from a few installers that some cars require shafts that were as short as 18.5" and as long as 19.5".) If you choose to use a shortened original intermediate shaft, have the shaft shortened by a good machine shop. This is not something you just cut and weld: remember this is a steering shaft. A much better idea is to use the new shaft provided in our kits or order **P/N 553030**.



Photo #41: Step 25. Install the new Borgeson coupler onto the 605 box, but do not tighten the set screw at this time. Position the new shaft along the side of the lower (Borgeson) and upper (original) couplers. Determine how much of the splined ends need to be removed for a proper, no-bind fit. If the splined end protrudes into the center portion of the coupler it will inhibit the swivel action of the coupler. For this installation it was necessary to cut about 1" from each end. This is best accomplished with a power cutoff wheel. File or grind the raw cuts for a smoother installation.



Photos #41a & #41b & #41c: Step 26. Install the splined shaft into the upper (original) coupler and slide it up far enough so that the shaft can slip down into the lower (Borgeson) coupler on the box (Refer to Step 3, in Part I, August 2006). Position the shaft and the couplers so that neither is hitting the steering box nor binding. Mark the upper splined area on the shaft for the upper bolt groove (Photo 41a). Remove the shaft and grind a notch at the marked area on the shaft. This will allow the upper clamp bolt to be installed. Install the shaft again along with the original upper coupler assembly with the clamp. Tighten the set screws and locking nuts on the Borgeson coupler (Photo 41b). Tighten the upper coupler bolt and nut. (Photo 41c)



Photos #42 & #43: Step 27. Make sure one last time that you have the correct hoses for the 605 box (Refer to Step 17). Connect the return hose to the 605 box (Photo 42). The correct hole will be the position closest to the frame. Do not tighten at this time. Connect the pressure line to the 605 box. The correct hole will be the position closest to the engine (Photo 43). Tighten the pressure line so that it is not in contact with anything, specifically the engine or A-arm. Tighten the return line so that it lines up with the pressure line. Make sure that this hose does not come in contact with anything, specifically the engine, A-arm or steering shaft. Tighten both of the hoses at the back of the pump.

Step 28. If applicable, position the A/C belt (GM track #2) and tighten. Install the alternator or generator. Position the alternator or generator belt (GM track #1) and tighten. Check all clearances and alignment of the tracks. Fill the pump with power steering pump fluid. Cycle the steering wheel from side-to-side two to four times to pre-bleed the system. Refill the pump and repeat the cycling process. Check the fluid one more time.

Step 29. I suggest that you check all of the bolts, nuts and fittings one last time. Make sure that they are tight and that all clearances are maintained. Have someone cycle the steering wheel from side-to-side while you watch the 605 box. Make sure that the box and bracket are tight and that there is no play or flexing going on as the box is cycled. Carefully test your new steering system. I also suggest that the front end be aligned. The alignment specs are: Caster is 2.5-3.5 degrees, Camber is 0.5 degrees positive and Toe-in is 0.1875-0.500". You should now have a great late-model power steering system in your Late Great! 