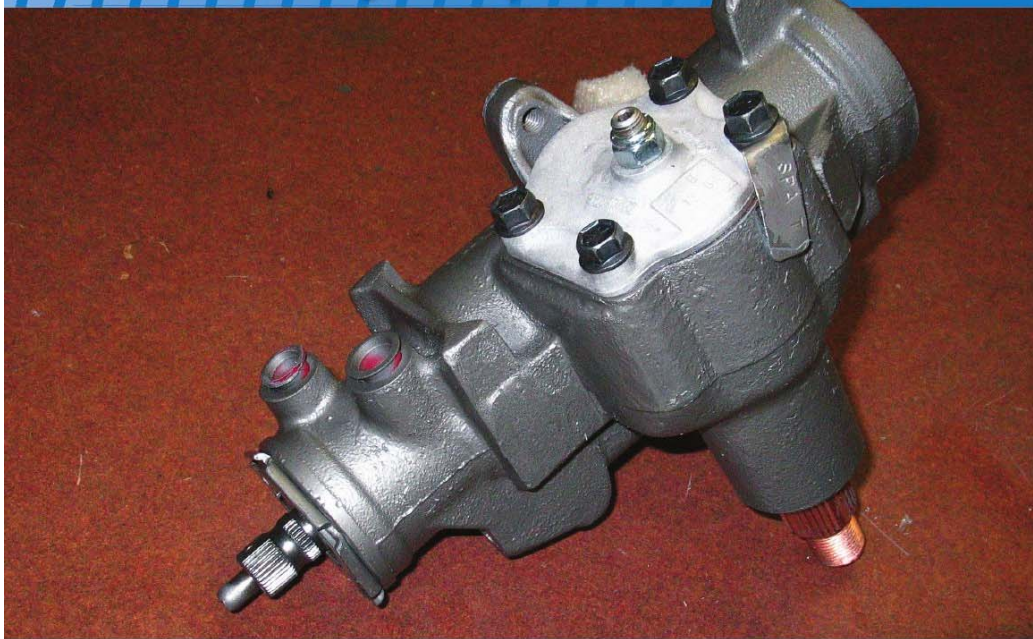


TECHNICAL Steering Box Fix-Up



It wasn't just Quadrajet carbs that Ford has sourced from GM. This 1971-'73 Mustang integral steering box is built by Saginaw, a GM division. Internally, they are the same, but the cases have different mounting points, so they are not interchangeable. Used in most of the high-volume musclecars of the '60s, there are lots of service parts available for them, including a slick conversion to a quicker 12:1 ratio.

STEERING BOX FIX-UP

A SLICK TRICK TO STEER QUICK IN YOUR 1971-'73 MUSTANG

Text and photography by Tom Shaw

If there's one thing that drives us crazy about our vintage Mustangs, it's the sloppiness in most of those old steering systems. Most of us mean well by trying to address the problem with ball joint and tie rod end kits, but there's really more to it than that.

If it hasn't been done recently, the steering box needs to be rebuilt on just about every Mustang out there. For 1965-'70 Mustangs equipped with Ford's popular optional power steering, Ford used a somewhat complex non-integral system with a manual steering box and hydraulic ram for the power assist. This system has lots of hoses and connections and is leak prone.

The 1971-'73 Mustangs have a better, integral system that pumps pressure right into the steering box. On these models, the steering assist happens

within the steering box. It's simpler and has fewer hoses and parts. More good news is that the basic box design is still in production and there are plenty of service parts for it.

Here's a big bonus. Mustang guys generally don't know this, but there is a seamless upgrade available from the stock 24:1 constant ratio or 16:1 variable ratio to a quick 12:1 constant ratio. There is no downside to the conversion and the steering feel is improved.

"It's firmer, and quicker—not easier, but quicker," says Chip Woyner of Power

Steering Services, Inc. in Springfield, Missouri.

No other parts need changed for the quick-ratio conversion.

To get the conversion, just send Chip your tired, worn-out, slow-ratio steering box, and he'll be happy to completely rebuild it, fix all the leaks, replace all the worn-out bearings and seals, and send it back to you in tip-top working order with a lifetime warranty. Chip is no newbie. He's been working on these boxes for decades, and has done hundreds of the Saginaw integral power steering boxes. They're a very good design that can be made even better.

We spent a day with Chip, who let us look over his shoulder as a Mustang/Saginaw power steering box rebuild and conversion was on the agenda. Here's how it went.

Steering Box Fix-Up TECHNICAL



1 With the box out of the car, clean the case thoroughly. Disassembly begins by pulling the Pitman arm off with a puller—no pickle fork or hammer because they'll damage your case. Up top is the side cover. Remove its four bolts, then use an Allen wrench to turn the adjuster counterclockwise and remove the side cover.

2 The Pitman shaft is tapped out from the bottom with a copper mallet. Old steering boxes can dry out and accumulate moisture inside which corrodes the shaft. This one is in good shape, but Chip may have to replace heavily corroded shafts with parts from a core. With the shaft out, use an aluminum driver and a hammer to tap out the bearing, seals, and washers.

3 A pin punch and hammer will loosen

the snap ring. A hole is cast in the case for access.

4 With the locknut and snap ring off, lightly fasten a pair of small Vise Grips to the input shaft and rotate it. This will push out the convex end cap. Keep rotating it and the rack-piston assembly will come out next. Handle it with care and set it aside in a clean area.

5 Grip the piston tightly with a shop rag and use an impact driver and hardened socket to remove this end cap. Next, use a pick to remove the Teflon and O-ring seals from the piston.

6 On the opposite end, a hammer and a big, ugly screwdriver will loosen the lock ring, then a spanner wrench will loosen

the thrust bearing adjuster/bearing seal retainer.

7 Chip threads the retainer into a jig made from an old case he bolted to his bench. He removes the seals and bearing. Without the jig, you could flip the retainer around and thread it back into the case to hold it while you remove the seals and bearing. Be careful not to score the castings.

8 With the wooden hammer handle, the spool valve assembly is carefully tapped out and disassembled. Seals and O-rings are removed with a pick.

9 With the spool valve assembly out, the worm gear is removed. This is the part that determines the box's ratio. It's going to be changed.

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10 With all the seals, washers, bearings, and other parts out of the case, all the parts to be reused will go into a strong hot detergent bath. Then, they spend some quality time in the parts washer. Some get a cleanup on the wire wheel, and the castings are carefully checked for cracks and heavy wear that will require more than a light hone. Heavy wear means using a replacement part from a core or sleeving the cylinder.

11 With all reusable parts now cleaned and prepped, re-assembly begins. The O-rings go onto the spool valve, followed by the Teflon seals which go over the top of the O-rings.

12 These three worm gears are used in the Saginaw integral box. From left to right, their ratios are 24:1, 16:1, and 12:1. The 12:1 is distinguished from the 16:1 by the two light grooves in the spiral. It is a direct

replacement for the slower worm gears and requires no other mods.

13 The new quick-ratio worm gear fits into the spool valve. Machined cylinders inside the case are coated with grease and oil to ease assembly and make sure the box has lube in the critical areas at startup. Also, if the box needs to be stored for a while during restoration, lube prevents corrosion of the machined surfaces.

14 Chip flips the case over in the vise and drives the new Pitman shaft bearing down into its bore. It must be seated all the way down. Keep it square to the bore and don't get carried away with the hammer.

15 Bearings and thrust washers are slid over the worm gear, then the assembled spool valve assembly is slid carefully into the case. Extra care must be taken to prevent the seals from getting pinched and damaged.

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16 The bearing is installed into the adjuster/retainer with a press, then the O-ring and seals are installed and held in place with a snap ring. The bearing and seals are lubed, then the adjuster/retainer is carefully slipped over the input shaft and threaded into the case.

17 Setting up the preload on the input shaft is a critical adjustment, and one that Chip makes by feel based on his extensive experience. He works the input shaft all the way through both directions of travel. It must operate smoothly all the way, in both directions. Once he's got the adjustment just right, the lock ring is tightened to prevent the adjustment from changing. Chip checks it once more to make sure it is still spot-on.

18 Seals are installed on the rack piston,

then it is filled with hydraulic fluid and slipped carefully back into its bore using a compression sleeve to compress the piston's seals. Spinning the input shaft draws it back into position.

19 Next, the case, its internals, and the Pitman shaft are generously lubricated, then the shaft is carefully lowered into place. The input shaft is again rotated lock to lock to make sure everything is moving smoothly. If it's tight, Chip adjusts the shaft-to-bearing clearance.

20 The end cap nut is now threaded into the rack piston and tightened with an impact driver.

21 Chip lubes the end cover's O-ring and taps it with a copper mallet to get it seated. The snap ring holds it in place.

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22 Lube is applied to the internal area of the side cover, and the O-ring is installed.

23 An Allen wrench on the lash adjuster draws the side cover down into place—the reverse of Step 1, then four new bolts secure it to the case. Silicone and power steering systems do not mix! Here is the one and only place Chip uses a small dab of it—on the lash adjuster. It helps seal the case and prevent leaks, and it cannot get inside.

24 Now it's time to adjust the preload on the Pitman shaft. This is another critical adjustment done by hand after years of experience. This is the adjustment that shade tree mechanics attempt in search of tighter steering on their older cars, but by the time a steering box may need an adjustment here, the rest of the box is in need of a rebuild, so you're probably wasting your time. Chip won't even attempt to set this adjustment with the box on the car. Once the adjustment is made, Chip again tests the steering lock to lock. On this job, all's well, and the mechanical portion is done.

25 With the box all buttoned up and adjusted, Schrader (air) valves are temporarily installed at the hose connections, and the box is pressurized with 110psi and sprayed with water to check the seals. Bubbling means it has to come back apart to repair the seal. This box passes the test with flying colors. Now it's off to the paint room for a fresh coat of cast iron gray.

26 Rebuilt and ready to install, the box is warranted to the original purchaser for the life of the car, as long as it's not modified or used commercially. NOTE—this is time to rebuild or replace the power steering pump, too. It's just as cruddy and worn out as the box and full of contaminated fluid. Don't cut corners here. Also, be sure to install a new "rag joint" coupling on the steering shaft.

SOURCE

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