5X Racing 1990-1997 Mazda Miata Shifter Rebuild Kit Installation Instructions

Thank you for purchasing our Miata shifter rebuild kit for the 1990-1997 Mazda Miata! These instructions will guide you on how to properly rebuild the shifter assembly in your Miata.

DISCLAIMER! We aim for these instructions to be guidelines based on how we perform the installation. They are not meant to be the official method of work performed. Please use and follow the Factory Service Procedures when applicable, and please be careful when using the tools involved in this procedure. We take no liability for any injuries incurred while following these guidelines.

Tools Needed:

- *10mm socket and ratchet (1/4" recommended)*
- *Phillips head screwdriver*
- *Flat head screwdriver (small tip)*
- *Razor knife*
- *WD-40 spray or equivalent*
- *Bulb-Type Fluid Sucker (Turkey Baster)*
- *Paper towels*

Special Information Regarding our Kits:

Our kits include all OEM Mazda components - except for our upgraded Bronze shifter bushing if you chose that option - which ensure proper fit and quality. The original components of your Miatas shifter *might* look different from the components you'll receive in our kit - and perhaps even different than the components pictured within this guide by the time of reading - and here's why:

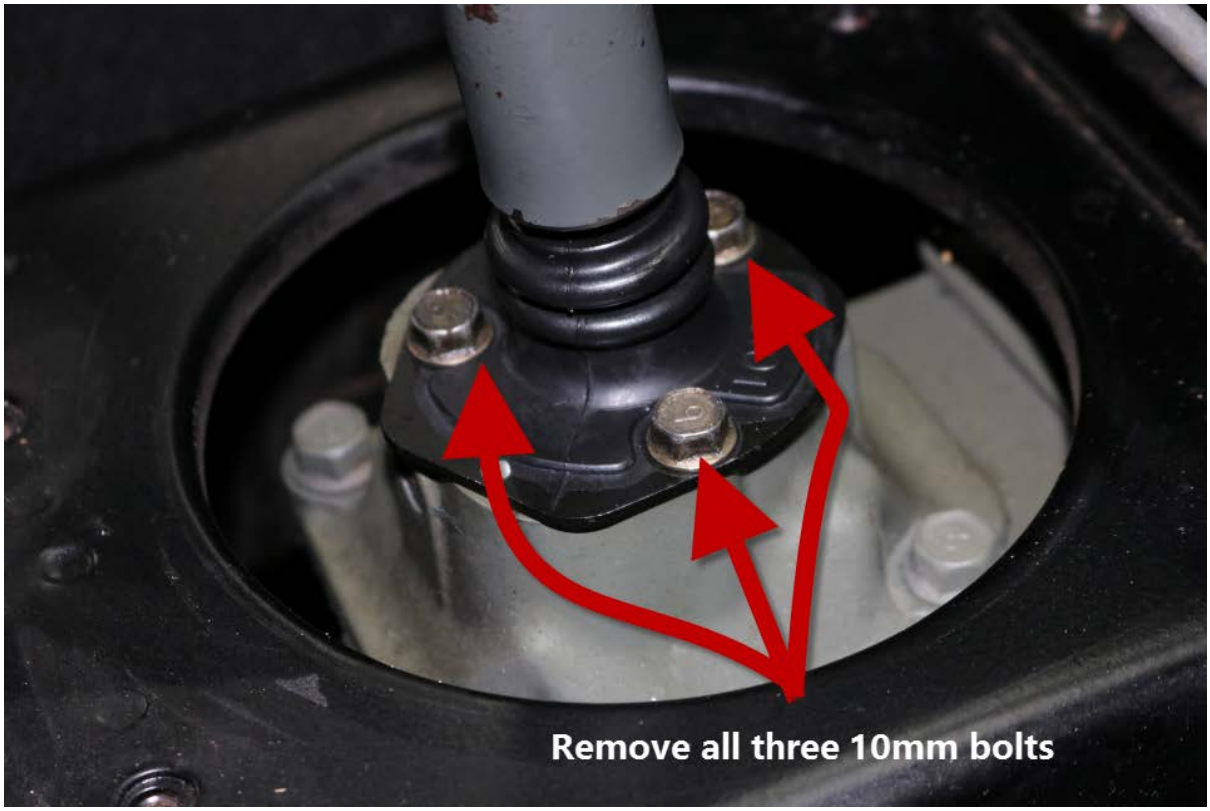
- Since the release of the original 1990 Miata, Mazda may have updated the components of the shifter assembly and superseded some of the original parts with newer or revised parts in-between model years. This is normal practice for a manufacturer to do, and especially with cars that are upwards of 20-years old now. In addition to manufacturer supersession, we did the additional research and testing and substituted certain components for our kits to improve them over their original configurations. Here is a brief outline of those changes:
    - **Lower Shift Boot:** The most noticeable part we substitute is the lower shifter boot. The 2006+ Mazda MX-5 uses the same bolt pattern as the 90-05 Miata, and is a much more affordable and superior option to the original lower boots of the 90-05 Miatas. We've tested this boot extensively and can verify that it is an improvement over the original lower boots.
    - **Adjustment Shims:** This is covered in detail within the guide, but we found the shims might not be a necessary item in most applications, so we started providing only one shim in our kits and might eventually eliminate them altogether as we prove they're not needed over time. These could have been a correction needed in early models that was fixed in later models, so most cars might not need them making the extra cost unnecessary to the majority of customers.
    - **Bronze Shifter Bushings**: Once we started racing, we saw the immediate need for a stronger shifter tip bushing as we were breaking the original plastic bushings during our races. Thus came the creation of our bronze shifter bushings. We offer both the OEM plastic bushing and our bronze bushing as a choice when you purchase our kits, and we of course recommend our bushing over the plastic one to anyone who drives enthusiastically, participates in track events, or simply wants a solid feeling shifter and lifetime bushing.


1990-1997 5-Speed Basic Rebuild Kit Contents
Upper Change Bushing
Lower Change Bushing
Non-Tabbed Wave Washer
Tabbed Wave Washer
Adjustment Shim
OEM Plastic Shifter Bushing
Anti-Rotation Bushing

1990-1997 5-Speed Race Spec Rebuild Kit Contents

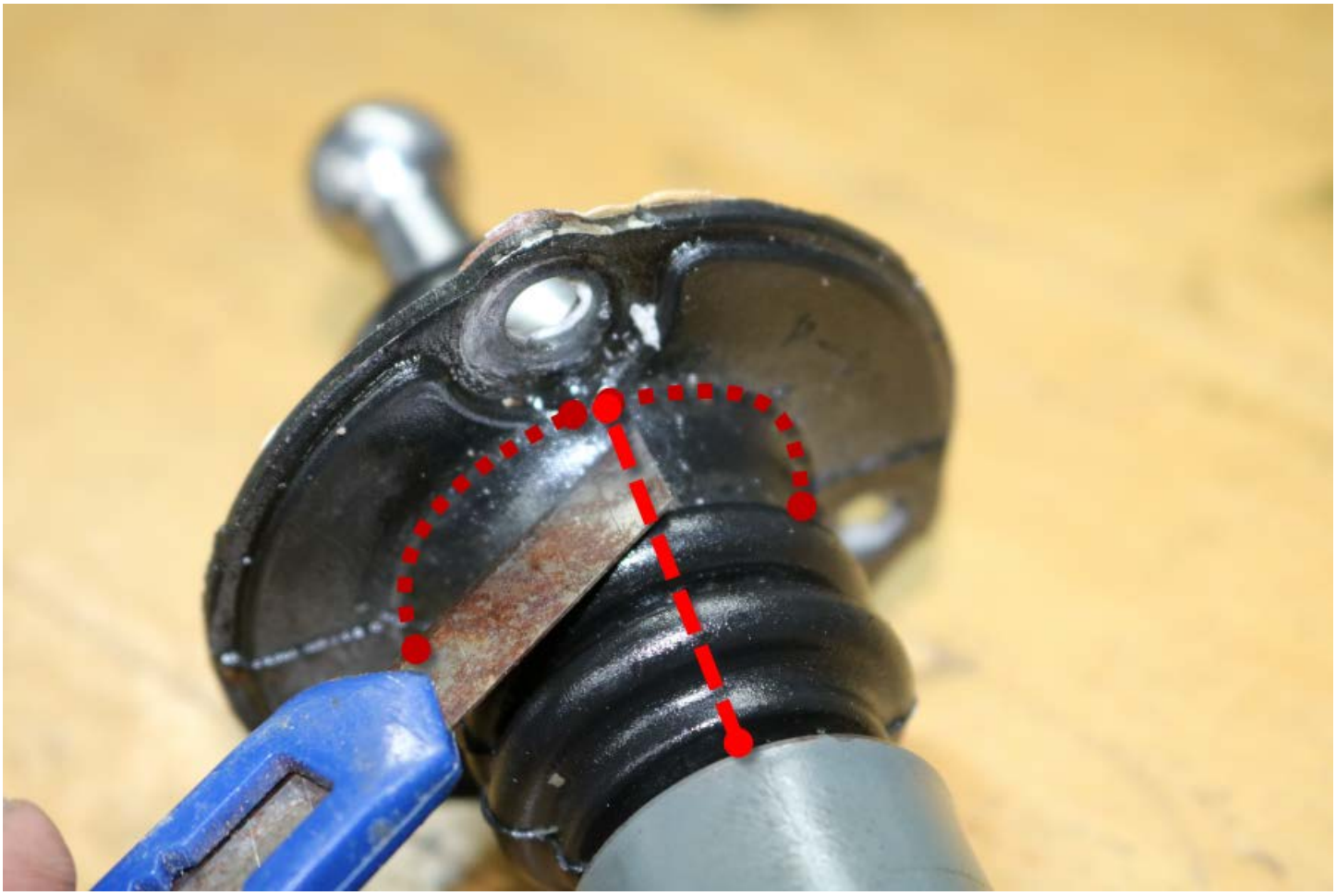
1. Remove the shift knob by unscrewing it counter-clockwise

2. Remove the center console by locating the 5 screws and removing them. This procedure is outlined in your repair manual and we won't go into depth on it besides these simple steps:
    a. Remove the two screws on the side of the console in line with the shifter
    b. Remove the one screw under the ash tray area.
    c. There are two screws located inside the floor of the armrest compartment under the flip up lid
    d. Snap the front of the console up, lift the shifter boot over the shifter threaded end, then slide it forward towards the radio while guiding it over the trunk and fuel door release levers at the rear of the console. Remove and set aside
3. Remove the four 10mm bolts holding the upper shift boot to the chassis
    a. Pull the boot gently upwards (if it is not being replaced), turning it inside out over the top of the shifter to gain access to the lower shift boot bolts.
4. Remove the three 10mm bolts holding the lower shift boot to the transmission



5. Pull the entire shifter assembly with the boots attached out of the transmission and out of the car. Be careful of dripping transmission oil left over on the bottom of the shifter. Set assembly aside
6. If your OEM plastic shifter bushing is still intact, it will be snapped onto the bottom of the shifter when you remove it from the transmission. If it is NOT there, it is most likely broken and one of two things have happened:
    a. There are pieces of it located within the shifter turret recess where the bushing is normally located. If this is the case, remove them with needle nose pliers or tweezers
    b. It has completely disintegrated and has fallen to the bottom of the turret in pieces. No need to try and find them as they'll not interfere with anything

7. Remove the transmission fluid from the turret area at least low enough to expose the change mechanism where the shifter bushing sits. This can be done with a turkey baster or bulb type “sucker”, or in a pinch, a bunch of paper towels to absorb the fluid.
8. Take your shifter assembly to a work bench and remove the shifter bushing (if still snapped onto the shifter) by knocking it off with a rubber hammer, wooden hammer handle, or with a pair of Channel-Lock pliers. Be careful not to damage the tip of the shifter if using pliers
9. Remove the Upper Shift Boot
    a. **If it is still in good condition:** Remove by spraying WD-40 on the shifter shaft and underneath the white collar that clamps the rubber boot to the shifter. Use the flat blade screwdriver to lift the rubber under the collar so the WD-40 can penetrate underneath the collar. Slide the upper shift boot up and over the shaft of the shifter and remove it slowly taking care not to damage the rubber boot that is clamped around the shaft
    b. **If it is damaged and bad:** simply cut the white collar with wire cutters or a knife and remove it
10. We need to remove the lower boot to allow removal and reinstallation of the upper wave washer and change bushing that sits on top of the shifter pivot ball, so the lower shift boot will need to be destroyed to be removed, which is why we include them in every kit. We find that using a razor to cut around the base of the lower boot is easiest. Also cut the accordion part of the boot down the middle and remove it along with the lower boot base

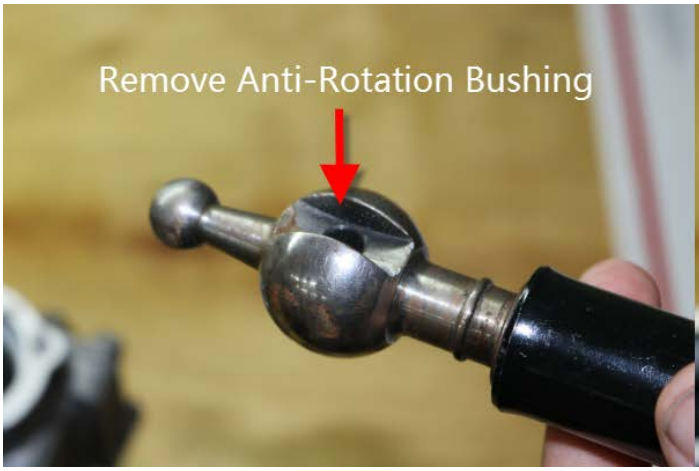






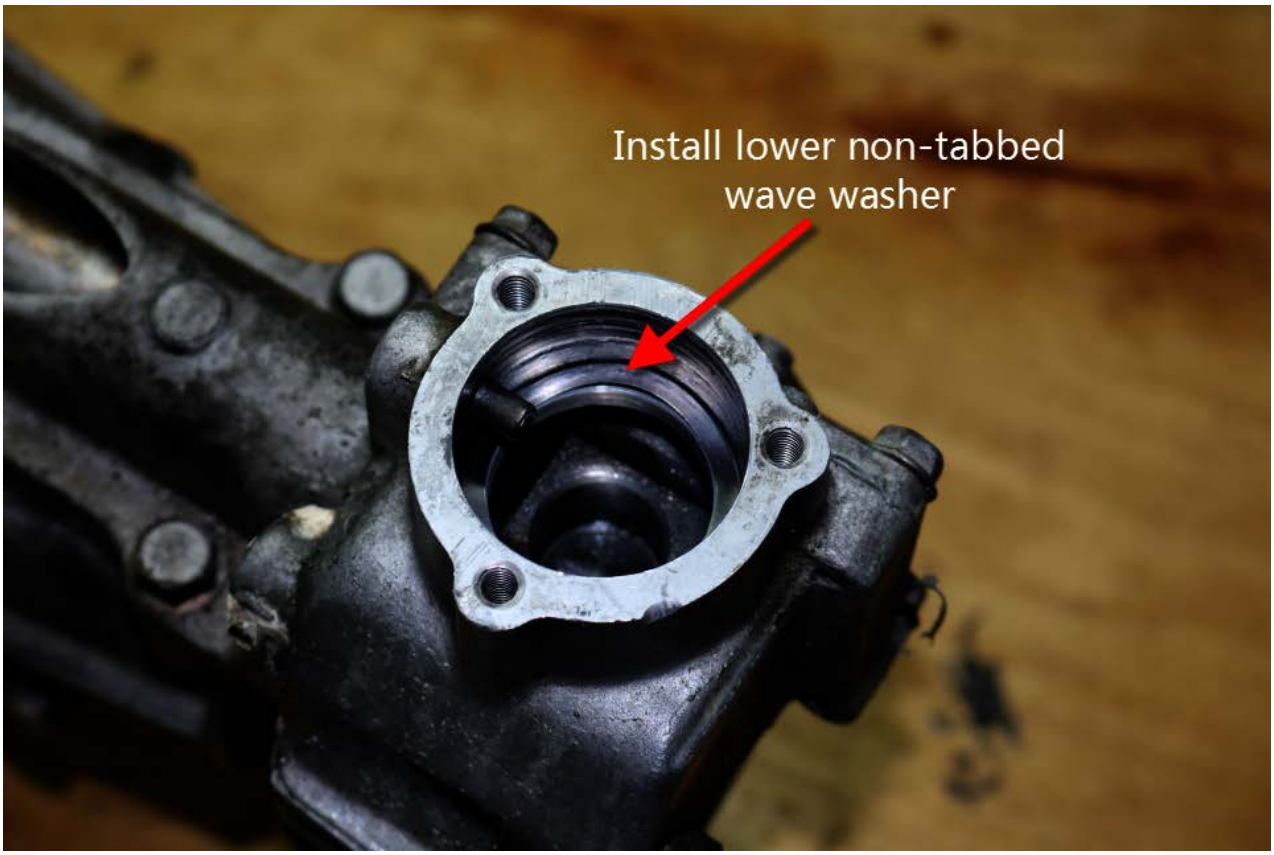
11. Remove the upper change bushing/wave washer assembly and any shims that might be installed from the assembly, then clean the entire portion of the shifter to remove the oil and WD-40 residue

12. Remove old Anti-Rotation bushing from the shifter pivot ball with a small flat-blade screwdriver or razors edge, and snap the new bushing into place. Set shifter assembly aside

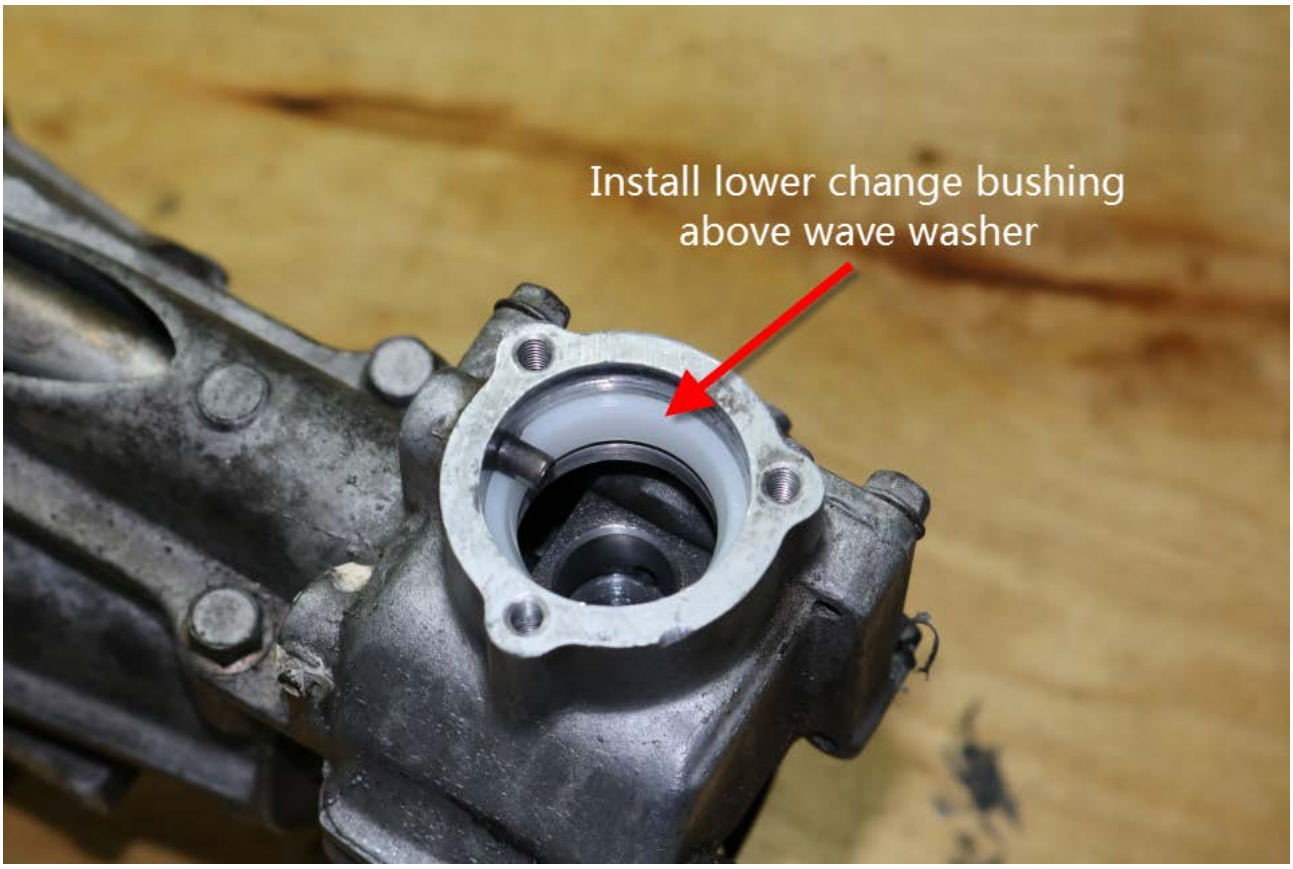


13. Remove the existing lower change bushing, wave washer, and any shims that might be installed, and clean the “shelf” area of the turret

14. Find the non-tabbed wave washer and slip it onto the shelf in the turret, sliding it underneath the dowel pin first



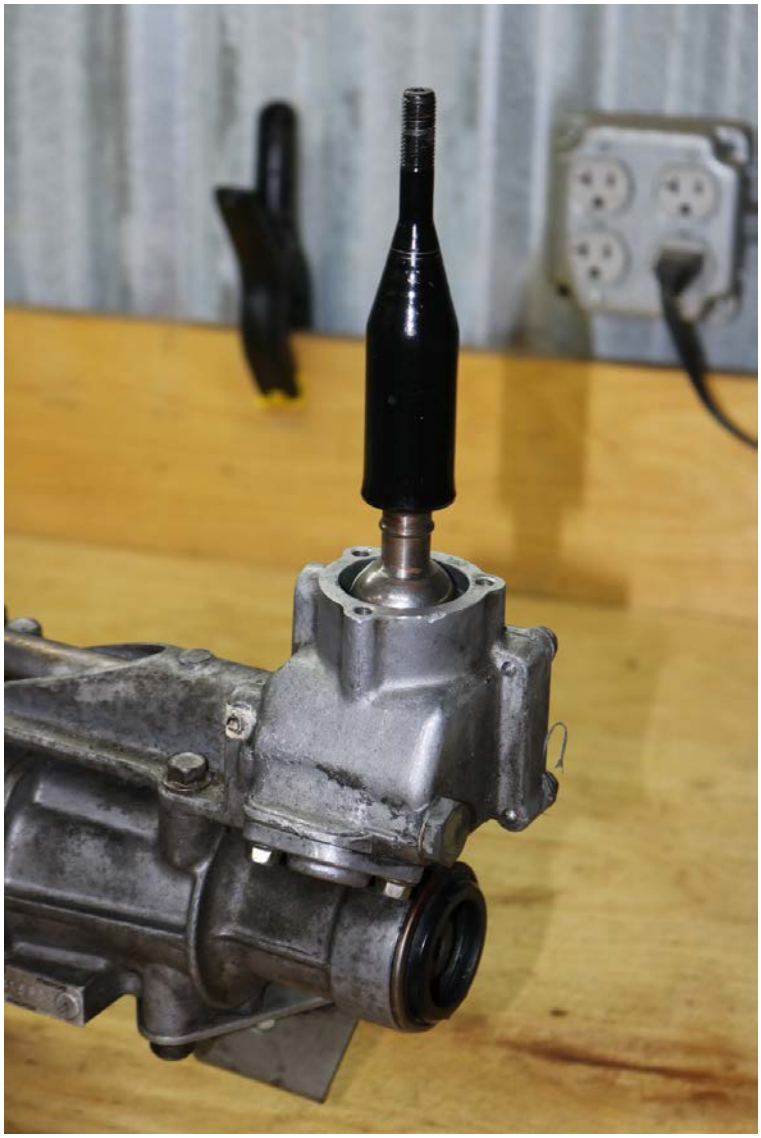
15. Install lower change bushing on top of the wave washer, making sure the divot in the bushing is underneath the dowel pin. This is a one-way fit, as the bushing will not install if it is not correctly aligned



16. Take the 5X Racing Bronze Shifter Bushing and install it within the shifter bushing "cup" at the bottom of the turret. The best way to do this is to put the bushing on your fingertip and "point" it into the cup, then wiggle your finger back and forth to free the bushing. It should settle flush into the cup, with the top of the bushing even with the bottom of the bevel on the top of the bushing cup
    a. If you purchased the OEM shifter (basic) option, install the OEM plastic shifter bushing onto the tip of the shifter at this time. Simply place the bushing open side up on a bench, place the tip of the shifter (small ball) on top of the shifter bushing and push it into the bushing. It should snap in. If you cannot push it in, you can give the top of the shifter a tap to snap it in

the above pictures were from the 99-05 installation pictures and show oil in the turret. Disregard the oil as we simply want to highlight the process of installing the bushing

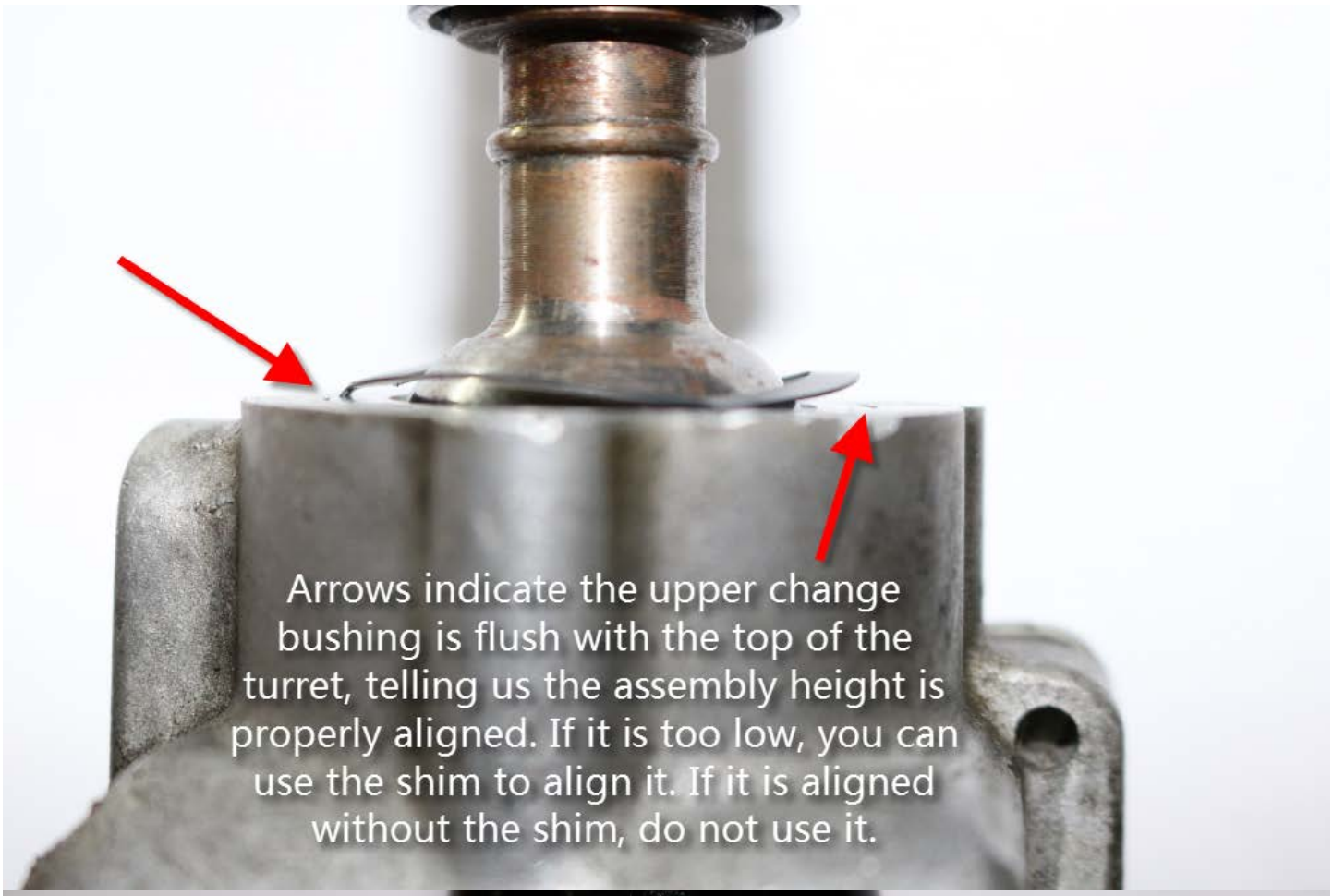
17. Take the shifter assembly and install it temporarily into the turret with the newly installed wave washer and lower change bushing.

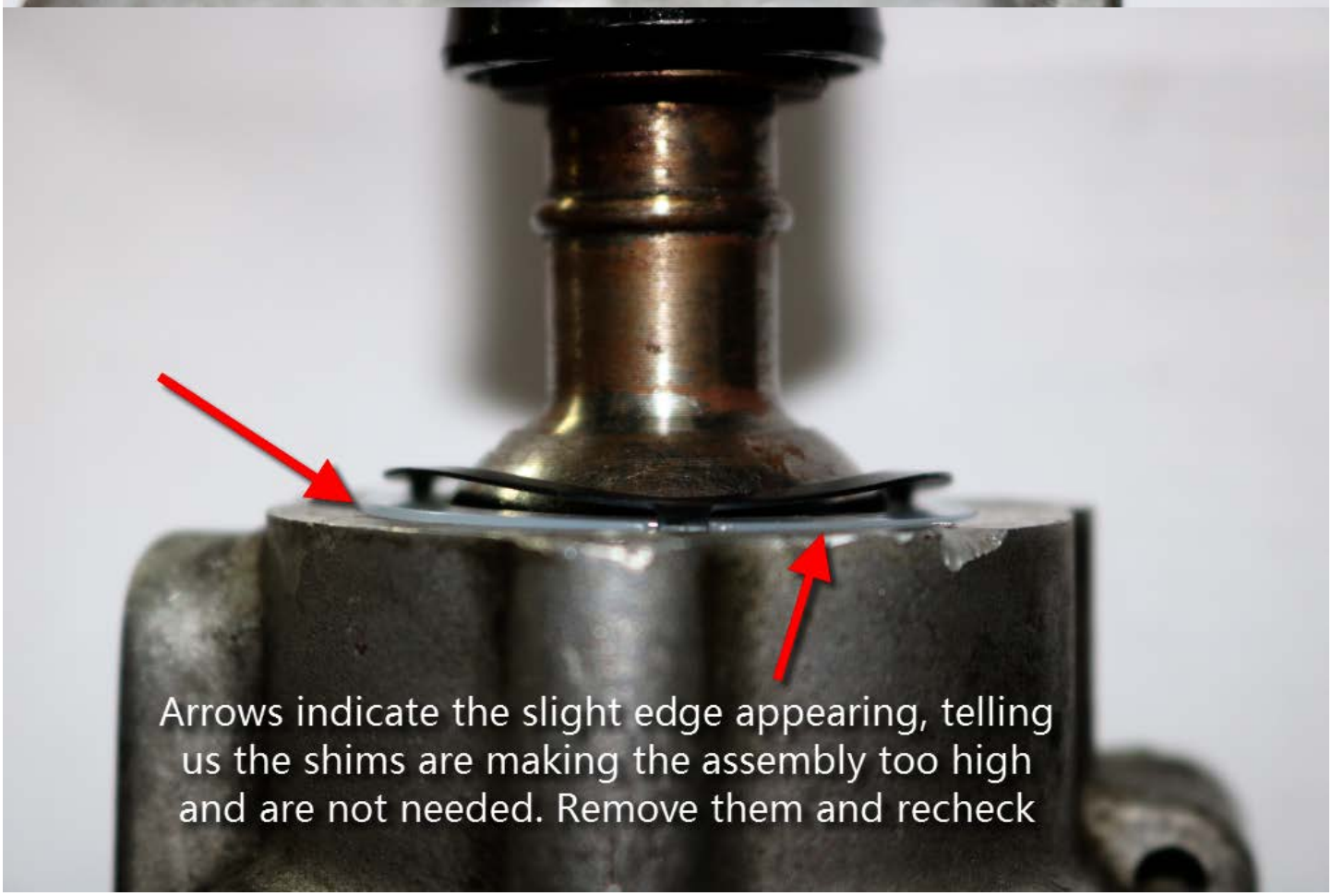


18. Take the tabbed wave washer and snap it onto the upper change bushing

19. Slide the upper change bushing/wave washer assembly over and onto the shifter and into the groove around the pivot ball in the turret, ensuring the wave washer is on top. It might take a bit of wiggling, but it should install rather easily and rest on top of the shifter pivot ball as it sits within the turret

20. With the assembly temporarily in place, we now need to inspect the installed height of the shifter assembly within the turret. The goal here is to ensure the top of the upper change bushing is flush even with the flat machined top of the turret where the shifter boot bolts to. Please understand that the wave washers will provide a sprung "cushion" for the assembly and will flex to accommodate the pressure of the lower shifter boot when it's bolted down, however it is always good to ensure the assembly is not too low or high. Too high of an assembly will cause a "sticky" shifter feel. ***NOTE*: We are going to evaluate the use of the shims after writing this guide and determine if they are even worth including in the kits, so if you are reading this and your kit does not have shims, skip to step 21 because we eliminated them from the kits and they are not deemed necessary anymore.***
    a. With the shifter assembly installed, get to eye level with the top of the turret and observe the installed height of the top part of the upper change bushing.
        i. If the white change bushing is even with the machined top of the turret, it is aligned properly
            1. Proceed to step 21
        ii. If the white change bushing is recessed and sunken drastically below the top of the turret, install the shim BELOW the bottommost non-tabbed wave washer on the turret "shelf" following these steps:
            1. Remove the shifter assembly and set aside
            2. Repeat step 13 (without cleaning)
            3. Install the shim on the shelf. It will fit loosely which is ok
            4. Repeat steps 14 and 15
            5. Recheck the installed height again. If it is still lower than the top of the turret, this isn't a big concern as the wave washer will tension should fill the gap once bolted down
        iii. If the assembly is too high, ensure all original washers or shims were removed and the lower change bushing is fully seated within the shelf and properly aligned with the dowel pin


Arrows indicate the upper change bushing is flush with the top of the turret, telling us the assembly height is properly aligned. If it is too low, you can use the shim to align it. If it is aligned without the shim, do not use it.


Arrows indicate the slight edge appearing, telling us the shims are making the assembly too high and are not needed. Remove them and recheck

21. The shifter height is not as critical as it seems, as the shifter will work even if the assembly is too high or too low. The main emphasis is to try to achieve a flush upper change bushing so the lower shifter boot does not squeeze the assembly too tight when it is bolted down, which will cause a “sticky” shifter feel. If the bushing is recessed, you will most likely not even notice a difference in feel as the wave washer springs will close the gaps left by the bushing being lower than flush (*notice the wave washer is much higher than the surface of the turret?).* Once you’re satisfied with the installed height of the shifter, proceed to install the lower shift boot
    a. Remove assembly from the transmission temporarily being certain you don’t pull up the bronze bushing with it and let us drop in the open turret. If it sticks to the shifter tip (some might), pull it up with the assembly and remove it from the shifter and reinstall into the cup
    b. Refill the turret with transmission fluid. It should take less than a half a quart, or just enough to cover the mechanism where the shifter bushing cup is located ensuring the shifter bushing is lubricated. Any transmission fluid can be used as it is not lubricating gears and won’t see the shearing forces that the fluid in the gearbox will see, so it’s not as important what brand you use
    c. Reinstall the shifter assembly into the transmission
    d. Find the lower shift boot, spray WD-40 liberally to the interior of the “accordion” part of the boot, and slide it base side down over the shifter. The top of the accordion should “snap” into place just below the thick part of the shifter and settle into the smaller portion below it
    e. Rotate the boot on the shifter until the bolt holes line up. The orientation of the boot does not matter
    f. Find the three 10mm bolts and tighten them carefully. The metal in the turret is soft and they could easily strip if you use too much pressure. We recommend a ¼” ratchet and 10mm socket for this

22. Reinstall the upper shift boot in the same manner as the lower boot by spraying WD-40 in and around the inner portion of the hole in the boot. Slide the boot over the shifter with the narrow end of the base pointing towards the rear of the car and aligned with the bolt holes in the transmission tunnel.
    a. Press the collar down until you feel it catch on the flared bottom of the shifter shaft. Pressing down too far will cause the boot lip to snap down to where the lower boot lip is and it’s hard to get back up

23. Install the four 10mm gold bolts for the upper shift boot. These can be made tight, they won't strip
24. Reinstall your center console in the reverse order you removed it
25. Reinstall your shift knob

This completes the installation of your 5X Racing Shifter Rebuild kit! We're sure you are going to love the feel of your rehabilitated shifter, especially if you've upgraded to our bronze bushing!

If you have any questions or feedback in regards to our kit or the process outlined in these instructions, please email us at 5xracing@gmail.com or submit an inquiry through the "Contact Us" page of our website www.5xracing.com

Thanks again, and enjoy!
5X Racing Team