

# **SPINDLE REMOVAL AND REPLACEMENT FOR VOLKSWAGEN BUSES THROUGH 1967**

## **TOOLS NEEDED:**

- 1 – 11mm Tubing Wrench
- 1 – 14mm Open/Box End Wrench
- 1 – 15mm Open/Box End Wrench
- 2 – 17mm Open/Box End Wrenches
- 1 – 15mm Socket
- 1 – 17mm Socket
- 1 – Torque Wrench (Foot-Pounds)
- 1 – Large Jaw Pliers
- 1 – Needle Nose Pliers
- 1 – Large Blade Screwdriver
- 1 – Hubcap Puller
- 1 – Lug Wrench
- 1 – Diagonal Wire Cutter
- 1 – Hammer
- 1 – Rubber Mallet (Medium size)
- 1 – Small Chisel
- 1 – Medium Flat Punch
- 1 – Tie Rod End Puller
- 1 – Vise
- 1 – Ruler w/mm measurements
- 1 – Straight Edge
- 1 – Floor Jack
- 2 – Jack Stands
- 1 – Level
- 1 – Tape Measure
- 1 – Grease Gun

## **ADDITIONAL PARTS NEEDED:**

- 2 – Spindle Nut Lock Tabs (Part# 211-405-681 for Buses to 62, Part# 111-405-681 for Buses 64-67)
- 6 – Small Cotter Pins
- 1 – Adjustable Tie Rod

## **REMOVING YOUR SPINDLES:**

1. Remove the hubcaps and break the lug bolts free.
2. Using the floor jack, raise the front of the Bus and place a jack stand on each end of the front beam. Be sure to check that they are secure before letting the Bus down on them.
3. Remove the cotter pin or “C” clip from the speedometer cable in the left bearing dust cap. Pull the cable through the backside of the spindle and out of the way.

4. Using the large jaw pliers, pull both bearing dust caps off. Using a small chisel and the hammer, bend the axle nut lock tabs out away from the axle nut. Remove the outer axle nut, lock tab, inner axle nut, thrust washer and outer wheel bearing. Place them in a clean location away from the work site to prevent them from getting dirty.
5. Remove the front drums. If you are having problems removing the drums, you may need to back off the brake shoe adjustment stars with a large blade screwdriver. They are located at the top and bottom of the backing plate. They are accessible through the large hole in the drum.
6. Remove the brake hose bracket from the spindle using a 17mm open/box end wrench on the zerk fitting. With brake hose free, re-install the zerk fitting onto the spindle.
7. Using the 15mm socket, remove both wheel cylinder bolts from each backing plate. This will also allow the backing plate to be removed from the spindle by pulling it over the spindle and letting it hang out of the way.
8. Remove the tie rod end using your 17mm wrench and the tie rod end puller.
9. Using both the 17mm open/box end wrench and a 17mm socket/ratchet, remove the pinch bolts from the torsion trailing arms and the spindle. NOTE: A small cotter pin on the bolts has to be removed first.
10. Using the rubber mallet, carefully and uniformly tap the link pins out of the trailing arms. Then using the hammer and flat punch, carefully tap the link pins free from the spindle. Now remove the link pin needle bearings.
11. If you are reusing your old link pins, you will need to press the needle bearing races out of your old spindles and press them into the new spindles. If you are installing new link pins and the related hardware, proceed to the next section.

#### **INSTALLING THE LINK PIN NEEDLE BEARING RACES:**

1. Place the bearing cages over the link pin, then the outer bearing race over the needle bearing cages.
2. Have a friend hold the spindle over a vise. The link pin hole should rest on the jaws of the vise with the jaws open just enough to allow the link pin to clear.
3. Place the link pin assembly into the link pin hole. Be sure to align the grease hole with the zerk fitting in the spindle.
4. Using the mallet, tap the link pin, which will in turn drive the bearing race into the hole. It is very important that you start the bearing race straight, not angled into the hole. Keep tapping the link pin until the bearing race is flush on both ends of the link pin hole on the spindle.
5. Remove the link pin with the needle-bearing cage and repeat the procedure on the remaining link pin holes.

#### **INSTALLATION OF THE SPINDLES:**

1. Using a clean rag and solvent, thoroughly clean the ends of the torsion trailing arms. **WARNING – DO NOT USE GASOLINE AS A CLEANING AGENT!**
2. Using the straight edge, place it against the bottom-trailing arm, point it up towards the top trailing arm (See Figure A). Using a ruler with millimeter markings, measure over from the straight edge to the top trailing arm. Do this a couple of times to make sure you have the correct reading. Write this measurement down in the appropriate space on the Offset Chart. Do this on both sides of the Bus. This is called the offset.
3. Using the Offset Chart and Figure B in these instructions and referring to the Shim Chart as a guide, enter the appropriate number of shims to use for each side of your Bus.
4. Using the Offset Chart and Figure B as a guide, place the appropriate number of shims and the link pins onto the spindles. NOTE: The pinhead goes through the king pin side that has the three streak marks in it.



4. Using the large jaw pliers, pull both bearing dust caps off. Using a small chisel and the hammer, bend the axle nut lock tabs out away from the axle nut. Remove the outer axle nut, lock tab, inner axle nut, thrust washer and outer wheel bearing. Place them in a clean location away from the work site to prevent them from getting dirty.
5. Remove the front drums. If you are having problems removing the drums, you may need to back off the brake shoe adjustment stars with a large blade screwdriver. They are located at the top and bottom of the backing plate. They are accessible through the large hole in the drum.
6. Remove the brake hose bracket from the spindle using a 17mm open/box end wrench on the zerk fitting. With brake hose free, re-install the zerk fitting onto the spindle.
7. Using the 15mm socket, remove both wheel cylinder bolts from each backing plate. This will also allow the backing plate to be removed from the spindle by pulling it over the spindle and letting it hang out of the way.
8. Remove the tie rod end using your 17mm wrench and the tie rod end puller.
9. Using both the 17mm open/box end wrench and a 17mm socket/ratchet, remove the pinch bolts from the torsion trailing arms and the spindle. NOTE: A small cotter pin on the bolts has to be removed first.
10. Using the rubber mallet, carefully and uniformly tap the link pins out of the trailing arms. Then using the hammer and flat punch, carefully tap the link pins free from the spindle. Now remove the link pin needle bearings.
11. If you are reusing your old link pins, you will need to press the needle bearing races out of your old spindles and press them into the new spindles. If you are installing new link pins and the related hardware, proceed to the next section.

#### **INSTALLING THE LINK PIN NEEDLE BEARING RACES:**

1. Place the bearing cages over the link pin, then the outer bearing race over the needle bearing cages.
2. Have a friend hold the spindle over a vise. The link pin hole should rest on the jaws of the vise with the jaws open just enough to allow the link pin to clear.
3. Place the link pin assembly into the link pin hole. Be sure to align the grease hole with the zerk fitting in the spindle.
4. Using the mallet, tap the link pin, which will in turn drive the bearing race into the hole. It is very important that you start the bearing race straight, not angled into the hole. Keep tapping the link pin until the bearing race is flush on both ends of the link pin hole on the spindle.
5. Remove the link pin with the needle-bearing cage and repeat the procedure on the remaining link pin holes.

#### **INSTALLATION OF THE SPINDLES:**

1. Using a clean rag and solvent, thoroughly clean the ends of the torsion trailing arms. **WARNING – DO NOT USE GASOLINE AS A CLEANING AGENT!**
2. Using the straight edge, place it against the bottom-trailing arm, point it up towards the top trailing arm (See Figure A). Using a ruler with millimeter markings, measure over from the straight edge to the top trailing arm. Do this a couple of times to make sure you have the correct reading. Write this measurement down in the appropriate space on the Offset Chart. Do this on both sides of the Bus. This is called the offset.
3. Using the Offset Chart and Figure B in these instructions and referring to the Shim Chart as a guide, enter the appropriate number of shims to use for each side of your Bus.
4. Using the Offset Chart and Figure B as a guide, place the appropriate number of shims and the link pins onto the spindles. NOTE: The pinhead goes through the king pin side that has the three streak marks in it.



5. Place a link pin seal onto the seal ring. Then slide the ring onto the pin with the rubber edge of the seal against the king pin. On 64-67 Buses, install the small o-ring around the pin up against the seal ring and then slide the small conical washer against the small o-ring cupping the o-ring. NOTE: On models through 1963, only the large seal ring is used.
6. Place the spindle onto the trailing arms, tapping it and the link pins evenly with a mallet through the trailing arms. There is a notch on the link pin seal ring that fits into the slot on the trailing arm, be sure to align the notch and the slot as you are tapping the link pins onto the trailing arm.
7. Turn the end of each link pin with the crescent wrench while looking through the pinch bolt hole on the trailing arm. Turn the link pin until the bolt slides through. Now turn the link pin end so that the spindle sucks up against the trailing arm. Using the 17mm open/box end wrench and 17mm socket/ratchet, tighten the pinch bolts and be sure to remember to replace/install the cotter pin on the upper and lower trailing arm pinch bolt nuts. Note that on the lower arm, the bolt goes up through the arm and on the upper arm; the bolt goes down through the arm. Now install the dust caps into the king pins. This will take a hammer and some patience.
8. Turn your spindle and reinstall your tie rod ends. Tighten these just snug, as you might have to take them back off for a final adjustment.
9. Re-install the backing plates with the bleeder down and the hose on the top. Tighten with a 15mm socket using the torque wrench. Tighten these between 40-43 ft. lbs. After the backing plate is on re-install the brake hose into its holder. The holder is held onto the spindle by the large grease zerk on the spindle.
10. If necessary, replace the wheel seals, clean and repack both the inner and outer wheel bearings. If the thrust washer is worn, replace that too. Re-install the drum onto the spindle, then the outer wheel bearing, the thrust washer and the first axle lock nut.
11. To adjust your wheel bearings, tighten the axle lock nut all the way then line up your handle with one of the lug nut holes and back off the nut a 1/5 of a turn, or until the handle lines up with the next hole.
12. After adjustment, install the new lock plate and bend one of the tabs of the first lock nut. Sometimes you can get it to bend over the flat of the nut but it's OK to bend it over the angle, just as long as it's locked in place with the lock tab. Now install the second axle lock nut so that it is just snug against the lock tab. Bend the other end of the lock tab over the sides. Before installing the left side bearing dust cap, the speedometer cable should be threaded through the left spindle. Pull it out a couple of inches from where it would normally be with the cap on. Now place the cap over the cable, with the cable square end coming through the cap. As you push and tap the cap back onto the drum, it will push the cable and housing back to its proper location. Be sure to replace the cotter pin (or "C" clip) on the cable end.
13. Now jack up the Bus by the middle of the axle beam. Place jack stands under the lower arms where the shocks come out. Let the jack down slowly. Leave the jack about 2" from the beam; so if the Bus falls off the stands the jack will catch it, push down on the front bumper. This is all to simulate ride height. Now take a level and level the Bus side to side. You might have to rearrange the jack stands. Spend some time here or it will throw everything else off. Take the level and place it on a flat area of the drum (level should be up and down). It should be real close to level or slightly off with the bottom of the drum tilted out. If this is what you have, tighten the link pin bolts again and the tie rod end, putting the cotter pin in if it takes one. If it is not close to level, then go back to the chart and try the next arrangement of shims. We understand this part gets confusing, so if you are lost, call us and we will help you over the phone.
14. Adjust your brake shoes. To do this, use a large blade screwdriver and spin the brake adjustment star until the drum locks up and the star will no longer turn as well. This sets the brake shoe. Back off the adjustment star until you can spin the drum **without** any drag. Repeat the procedure on the remaining star and then again on the two stars on the opposite drum.
15. We have found this to be the best way to bleed the brakes. Get an empty soft drink bottle and fill it a 1/4 full of brake fluid. Using a 3 ft. piece of VW fuel hose (5mm), place one end of the hose in the bottle, submerging the end into the fluid. Connect the other end to the bleeder valve on the wheel cylinder. Using the 11mm tubing wrench, you can open the valve to bleed the brakes this way: Have a friend get



in and start to pump the brake pedal about a dozen times and then have your friend hold the pedal. Open the bleeder valve to release the pressure and the pedal will go to the floor. Pump the pedal slowly until you can no longer see any air bubbles in the bottle of fluid. **Do not forget to add fluid into the reservoir while doing this – if not, you will quickly start pumping air through the lines!** It is also important that the hose end in the bottle stay submerged throughout this procedure. Hold the pedal to the floor and tighten bleeder. When you are finished, repeat the procedure on the other side.

16. Using your grease gun, grease all of the zerk fittings on both spindles until you start to see the grease “bleed” from the joints and king/link pin seals. While your Bus is in the air, it is also a good idea to grease the rest of the zerks on the front beam, the center swing lever pin and if so equipped the tie rod ends and drag link ends. Always do this with your Bus raised on jack stands.
17. Re-install your wheels and semi-tighten your lug bolts. Lower the Bus to the ground. Now with your torque wrench and a 19mm socket, torque your lug nuts to 80 ft. lbs.
18. To get the toe-in close, use a friend and a tape measure. Jack the Bus back up and place the jack stands under the shock mounts as you had it before. Leave the jack under the beam so if the Bus falls off the jack stands the jack will still hold it up. Have your friend hold the tape on a spot in the tread on the rear side of the tire. Stretch the tape across to the other tire as high and as level as you can without hitting the frame. Pick a spot you like in the tread and record the measurement. Duplicate the same thing in the back. You should be 1/16” toe in if not zero. If you are not there, which you probably are not, turn the steering wheel so it is centered (count the turns lock to lock and divide by 2). Then adjust the tie rods until everything is lined up. Do not forget to tighten the lock nuts on the tie rods when you are done.



## **WOLFGANG INTERNATIONAL**

***Manufacturers of Custom &  
Reproduction VW Products***

**1117 Parkview Ave.**

**Redding, CA 96001**

**(530) 246-GANG (4264)**

**Fax 244-7261**

**E-mail [wolf@c-zone.net](mailto:wolf@c-zone.net)**

**[www.wolfgangint.com](http://www.wolfgangint.com)**



## SHIM CHART

OFFSET IN mm	UPPER ARM		LOWER ARM	
	A	B	C	D
5	1	7	5	3
5.5	2	6	5	3
6	2	6	4	4
6.5	3	5	4	4
7	3	5	3	5
7.5	4	4	3	5
8	4	4	2	6
8.5	5	3	2	6
9	5	3	1	7

## OFFSET CHART

DRIVER'S SIDE OFFSET	UPPER INNER A	UPPER OUTER B	LOWER INNER C	LOWER OUTER D
-------------------------	------------------	------------------	------------------	------------------

---

PASSENGER SIDE OFFSET	UPPER INNER A	UPPER OUTER B	LOWER INNER C	LOWER OUTER D
--------------------------	------------------	------------------	------------------	------------------

---



FIG. A

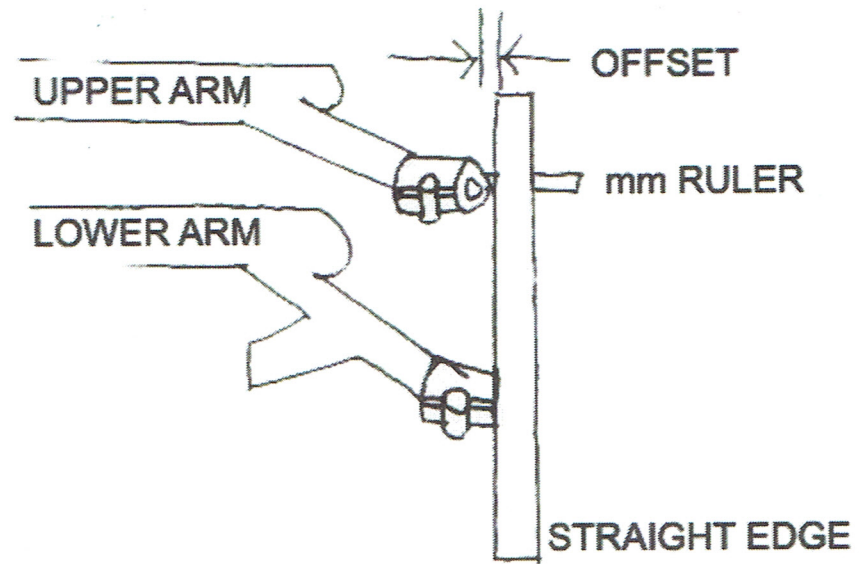
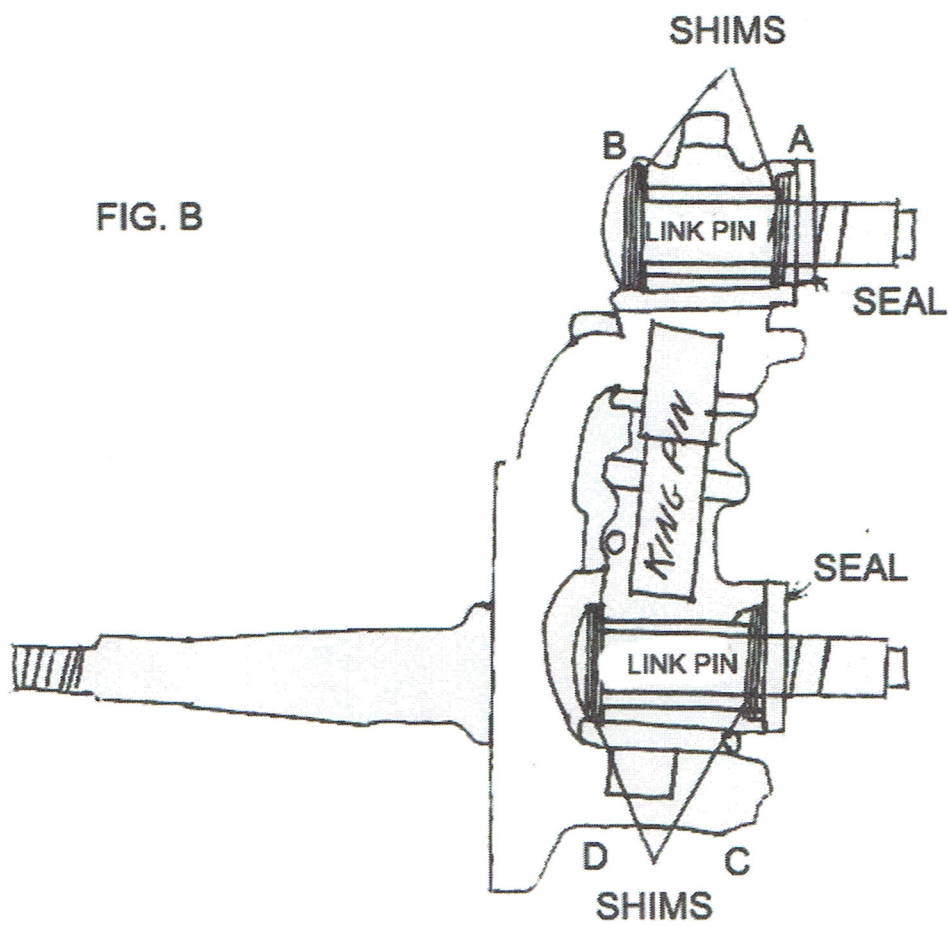


FIG. B





## BUS SPINDLE CORE POLICY

A core by definition is a rebuildable or remanufacturable item of the same sold that was rebuilt or remanufactured. Any core that is not rebuildable or remanufacturable, as is, will have a discount amount charged against it. Wolfgang International takes all cores apart once a week. Once a core has been cleared as being good, a refund by credit card (if used) or check will be made to the retailer or customer. If you bought this product from someone other than us direct, it is their responsibility to refund your money, we do not do second party refunds. If you are having a problem with the retailer, let us know and we will take action.

Bad cores result in a partial credit. We will pay you for the parts that are of good rebuildable stock. All paper work of partial credit will be sent to the retailer you bought the product from and should be included with your refund.

If you would like to sell us cores, please contact us.

WOLFGANG INTERNATIONAL  
1117 PARKVIEW AVENUE  
REDDING, CA 96001  
TEL (530) 246-4264 or FAX (530) 244-7261  
[wolf@c-zone.net](mailto:wolf@c-zone.net)

Customer \_\_\_\_\_ Invoice # \_\_\_\_\_

Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Core Deposit Paid \$ \_\_\_\_\_

\_\_\_ UPPER KING PIN      -\$50.00      \_\_\_\_\_

\_\_\_ LOWER KING PIN      -\$50.00      \_\_\_\_\_

\_\_\_ SPINDLE      -\$25.00      \_\_\_\_\_

\_\_\_ OTHER      \_\_\_\_\_

**Total Refund** \$ \_\_\_\_\_