



## Audi Bronze Caliper Guide Pin Bushing Kit Installation



Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

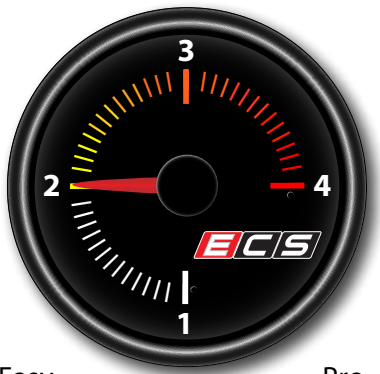
## INTRODUCTION

### Audi Bronze Caliper Guide Pin Bushing Kit

The Bronze Caliper Guide Pin Bushing Kit for your Audi offers the following features:

- Oil Impregnated Bronze Caliper Bushings
- Precision ground 304 Stainless Steel Guide Pins
- Enhanced pedal feel
- Reduced uneven pad wear
- Lessens caliper deflection
- Rubber dust cap and O-ring for maximum protection against contamination
- Allows for better braking force for enhanced overall braking performance

### ECS Difficulty Gauge



1 - Easy                      Pro - 4

**2 - Moderate**          Advanced - 3

Replacing the caliper guide pin bushings on your Audi is a rewarding project that an experienced technician will be able to complete in an afternoon, plan accordingly based on your experience level. Before you begin, read and familiarize yourself with these instructions and make sure you have all the required tools on hand. Thank you for purchasing our Bronze Caliper Guide Pin Bushing Kit, we appreciate your business!

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## Symbols:

The following symbols may be used throughout these instructions indicating special attention:



**FORK IN THE ROAD:** When there are different options within any given kit, we will direct you to the proper page and step to continue.



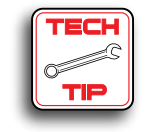
**YIELD:** Pause for a moment to double check component installation before you continue. Ignoring this can cost you time later during the installation.



**CAUTION:** Pay close attention to these warnings and instructions. Difficult installation, personal injury or component damage may occur if ignored.



**STOP:** The upcoming steps require specific preparation and/or assistance in the interest of safety. Please read ahead in the instructions and prepare before continuing.



**TECH TIP:** Tips and tricks to make the job go much easier.



**NOTE:** Additional information that may be useful to the installation depending on your application.

## TECHNICAL NOTES

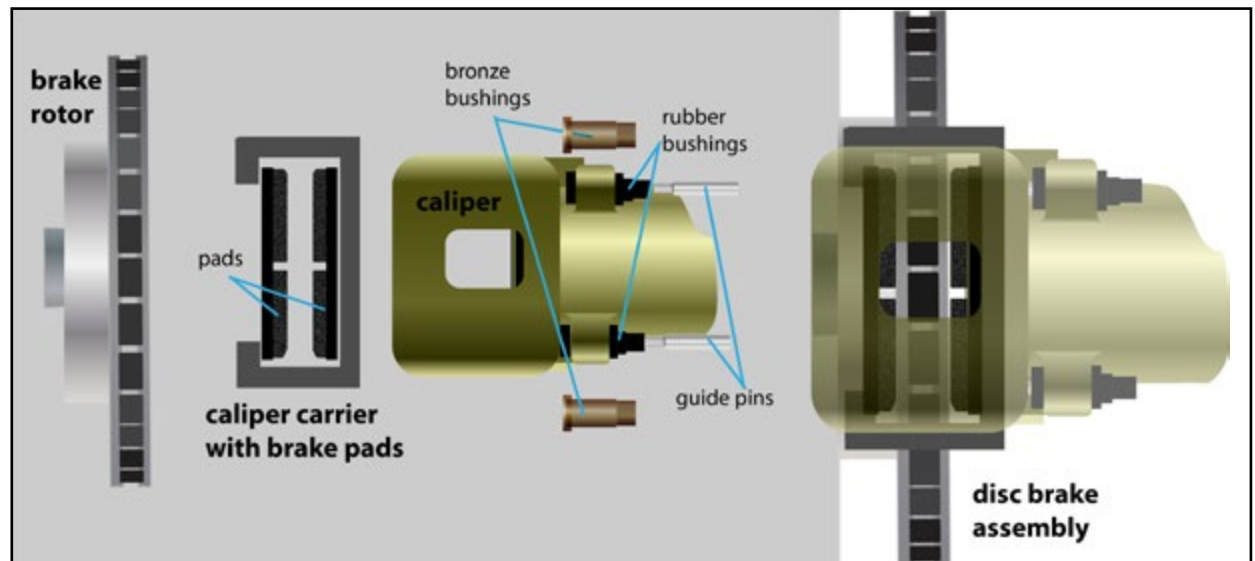
Audis leave the factory with rubber guide pin bushings in their calipers. The bushings are the contact sleeves for polished caliper guide pins, which are used to mount the calipers to the caliper carriers. The guide pins allow the caliper body to self-center as the brakes are applied, dividing braking force evenly between the inner and outer brake pads.

OEM rubber bushings are somewhat compliant, and selected because they provide a brake feel that is considered to be suitable for the average motorist who uses the car as a daily driver.

When the rubber bushings wear or compress, however, braking response can turn from pleasant and effective to soft and unpredictable. Bushing bores enlarged by wear and compression can let the caliper body rock on its slide pins. This reduces braking efficiency and often leads to uneven pad wear.

Even if the stock rubber bushings are not worn or hardened, motorists who take their car to the track for the occasional "spirited" driving session, may find brake pedal feel and braking performance below expectations, even if they have upgraded to premium brake pads and rotors.

One option for a brake repair and performance upgrade is to replace the original equipment rubber with bushings made of bronze. The inner bore of the bronze bushing is precision machined for a tight fit, so calipers slide smoothly on their pins, without rocking. This gives the brake pedal a harder and more responsive feel.



This illustration shows the front disc brake components. The rubber bushings are adequate, but can be replaced with bronze bushings to improve pedal feel.

## KIT CONTENTS



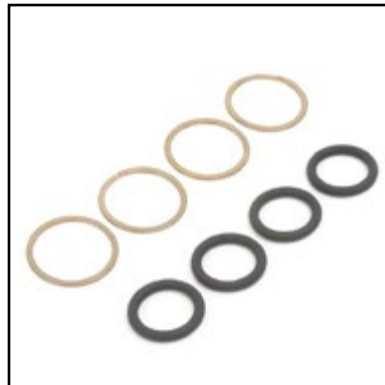
Guide Pin Bushings



Guide Pins



Protective Caps



Retaining Clips and O-Rings

## REQUIRED TOOLS

Note: The tools required for each step will be listed by the step number throughout these instructions.

We recommend that you have a complete selection of tools and equipment necessary for automotive repair. Below is a list of the tools we used to install the Audi Bronze Caliper Guide Pin Bushing kit. Additional tools may be required for any issues that arise during installation such as rust, corrosion, or broken and stripped fasteners.

- 17mm Protecta-Socket (for lug nuts)..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2221243](#)
- 3/8" Drive Ratchet ..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2765902](#)
- 3/8" Drive Torque Wrench ..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2221245](#)
- 1/2" Drive Breaker Bar ..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2776653](#)
- 1/2" Drive Torque Wrench ..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2221244](#)
- Flat and Phillips Blade Screwdriver(s)..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2225921](#)
- Wheel Hanger..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2636260](#)
- Caliper Hangers
- Hex Bit Socket: 7mm
- Die Grinder with Wire Brush

## SHOP SUPPLIES AND MATERIALS

- Hand Cleaner/Degreaser..... Available at [ecstuning.com](http://ecstuning.com)..... [ES#2167336](#)
- Aerosol Brake Cleaner..... Available at your local auto parts store
- Shop Rags ..... Available at your local auto parts store
- Aerosol Spray Lubricant/Penetrating Oil..... Available at your local auto parts store

## INSTALLATION NOTES

- **RH** refers to the *passenger side* of the vehicle.
- **LH** refers to the *driver side* of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process **BEFORE** you begin.

## GENERAL PREPARATION AND SAFETY INFORMATION

ECS Tuning cares about your health and safety. Please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- **ALWAYS** wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- If using an automotive lift, be sure and utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- When lifting a vehicle using a jack, always utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear. **ALWAYS** support the vehicle with jack stands.
- **ALWAYS** read and follow all safety information and warnings for the equipment you are using.



**Never get underneath a vehicle that is supported only by a jack. Always make sure that the vehicle is securely supported on jack stands.**



## REMOVING THE STOCK BUSHINGS

**Step 1:** 1/2" Breaker Bar, 17mm Socket, Wheel Hanger

Safely raise and support the vehicle, then remove the front wheels.

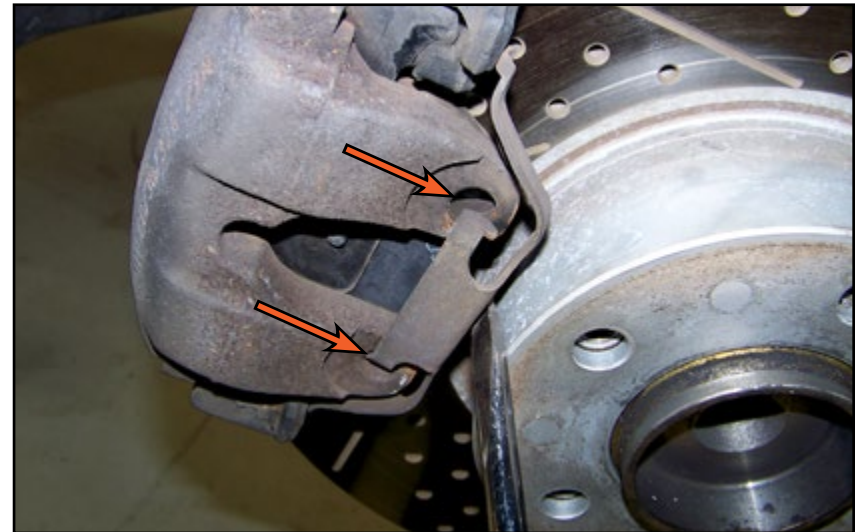


The photos in this installation may not represent your application, they are meant to be used as a guide.



**Step 2:** Flat Blade Screwdriver

To remove the caliper spring clip, pry back slightly to take the tension off of the spring, then pop its arms from the holes in the caliper (arrows).

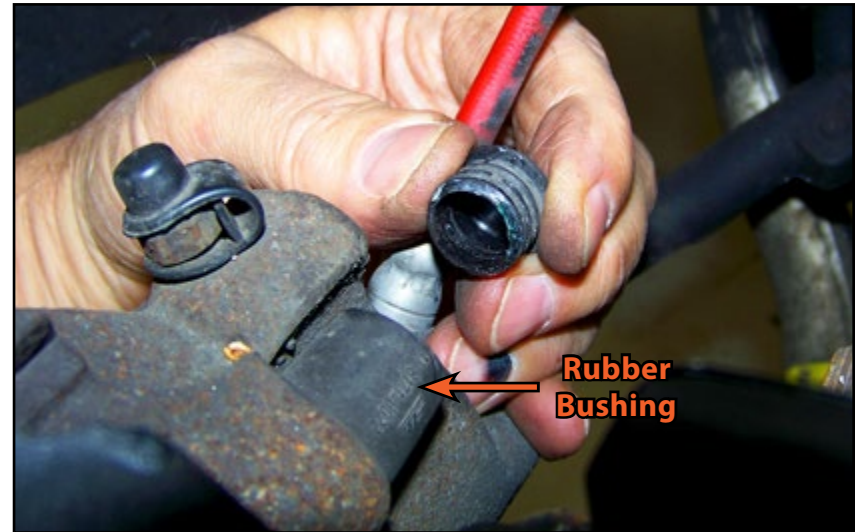




## REMOVING THE STOCK BUSHINGS

### Step 3: Flat Blade Screwdriver

Gently pry the black protective caps from the ends of each rubber guide pin bushing, there are two per caliper.

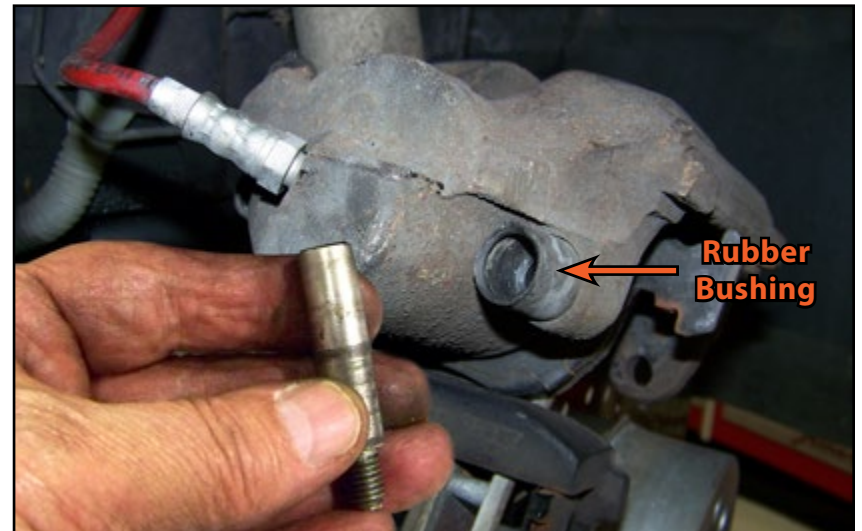


### Step 4: 3/8" Ratchet, 7mm Hex Bit Socket, Caliper Hanger

Loosen and remove both guide pins from each caliper, then pull the caliper body off of the rotor, and remove the brake pads from the caliper. Finally, hang the caliper from the strut to protect the brake hose.



The guide pins can be hard to remove even when screwed all the way out if the bushings are dry or have heavy accumulations of road salt and dirt. It may be necessary to help them along with pliers in extreme cases.



## REMOVING THE STOCK BUSHINGS

### Step 5: Pliers

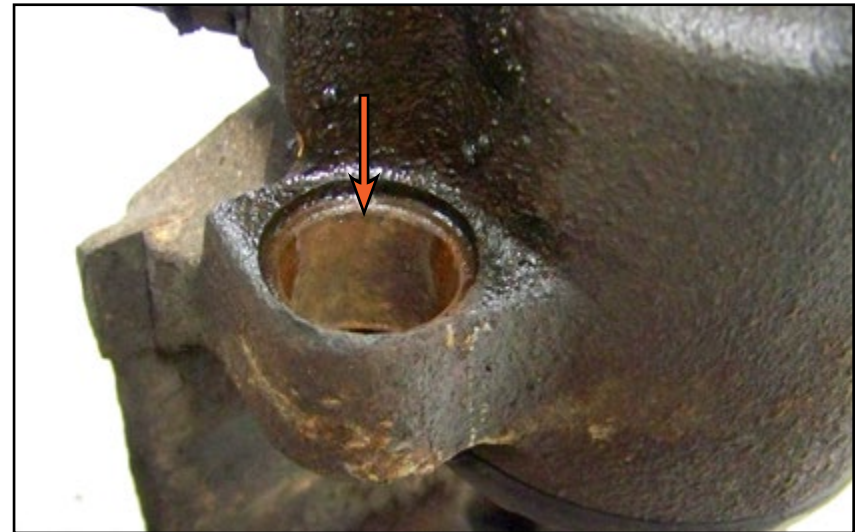
Remove the old bushings from the caliper by grabbing the rubber, then twisting and pulling them out of their bore. Note how much rust has accumulated between the bushing and the caliper (arrow).

**NOTE** We have removed the caliper from the vehicle to provide better photos for these instructions, but in most cases you can remove and install the bushings with the brake hose still connected, eliminating the need to bleed the brakes afterwards. Please ensure that the caliper is suspended properly during this installation and is not hanging from the hose.



### Step 6: Wire Brush or Small Sanding Barrel, Die Grinder

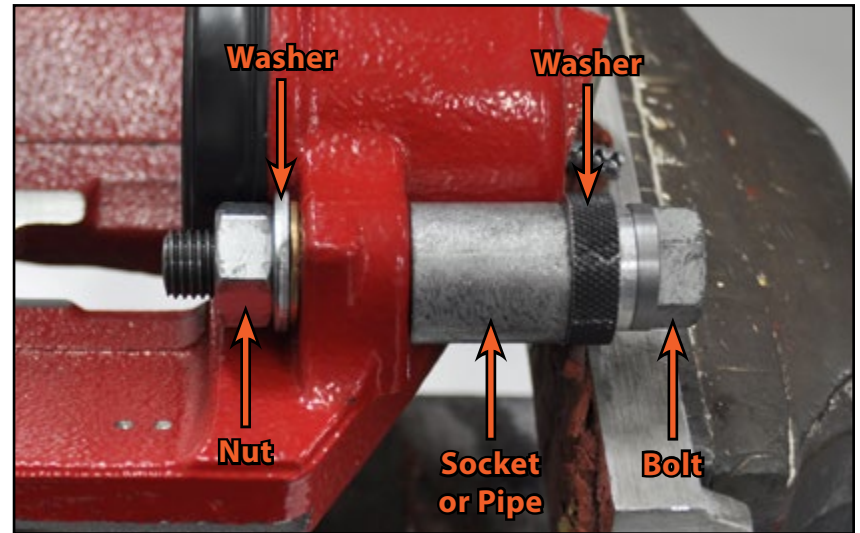
Remove the rust from the bushing bores in the caliper (arrow), but be careful to not remove too much metal, the goal is simply to remove the rust from the hole, the bushing needs to fit snugly in place.



## INSTALLING THE NEW BUSHINGS

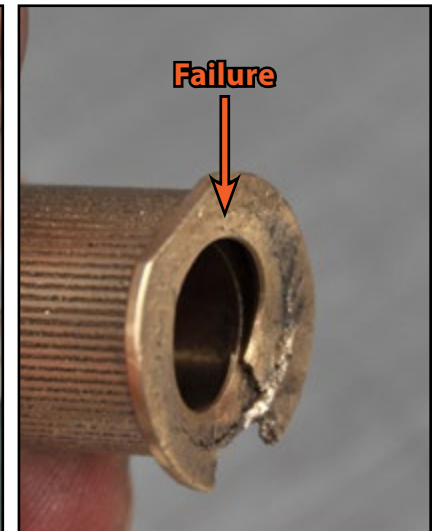
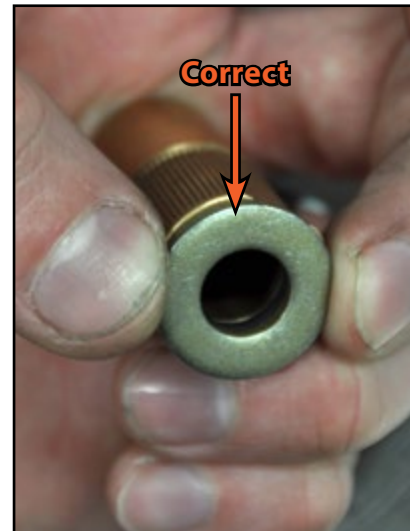
### Step 1:

Before we install the bronze bushings, let's review a few important facts and warnings: The bronze bushings are a "press fit" part, which means they will not slide in without some sort of mechanical assistance. There are several ways to achieve this: A long bolt with a nut and washers at both ends, with a socket used to "capture" the bushing as it is being pushed through, OR a C-Clamp can be used in place of the nut and bolt, also with a socket used to "capture" the bushing as it is being pushed through. Please reference the photo to see what we have used to install these bushings on our shop vehicles.



### Step 2:

It is extremely important to use washers of an appropriate size to prevent the bushing from being crushed as shown in the photo. Use a thick washer which covers as much of the bushing as possible without interfering with the caliper, it may be necessary to notch out a small section of the washer to match the flat spot on the bushing.





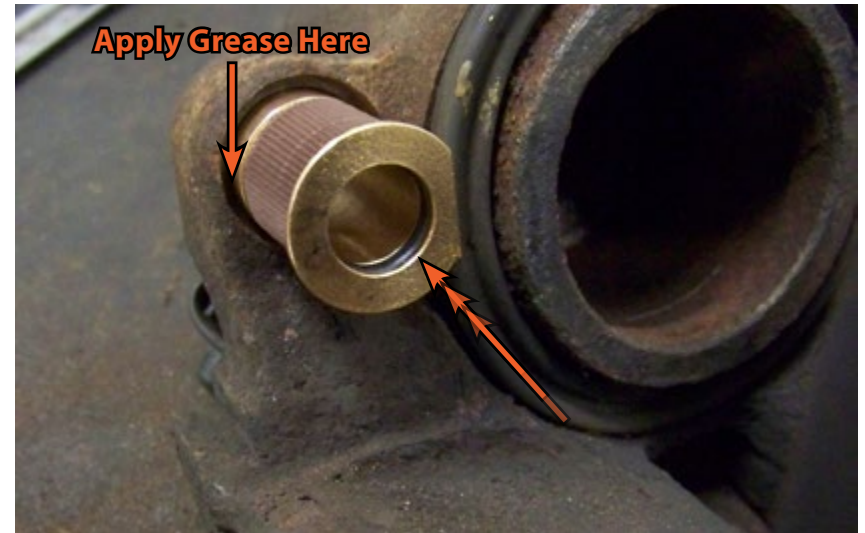
## INSTALLING THE NEW BUSHINGS

### Step 3:

Apply a very thin film of high-temperature brake grease to the bushing bore, then slide a new bronze bushing into the caliper as far as you can by hand. Please note the orientation of the bushing in the photo, and notice that the bushing is inserted from the inside (piston side) of the caliper and pushed through to the outside of the caliper, do not install the bushing backwards in the caliper.



There is a flat edge on one side of the bushing to allow it to slide past a raised section of the caliper casting.

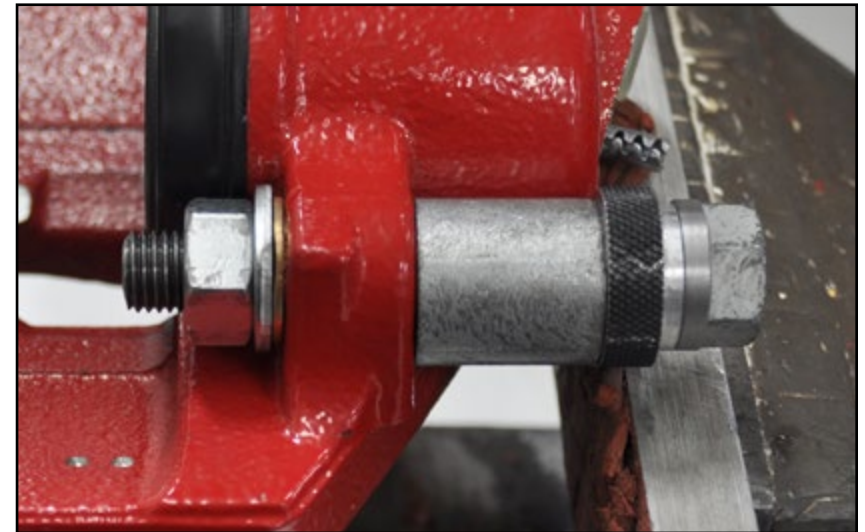


### Step 4:

Press the bushing into the caliper with an appropriate tool as discussed in step 1. Use extreme caution and work slowly to press the bushing into place, and STOP tightening as soon as the bushing stops moving, it is made of bronze and can be crushed VERY easily. Repeat this step to install the other caliper bushing into the bore.



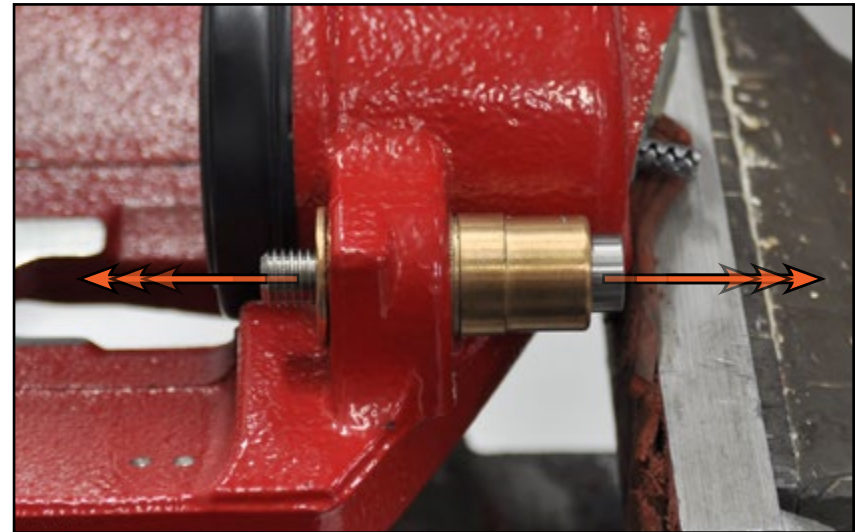
DO NOT install the o-rings into the bushings before this step, they will be damaged if a bolt is used as shown in the photo.



## INSTALLING THE NEW BUSHINGS

### Step 5:

Install the guide pins into each bushing and try to slide them back and forth, they should move freely in and out by hand. Due to manufacturing tolerances on the bronze bushings and the brake calipers, the bushings may deform inward slightly after installation, preventing the guide pins from moving freely. If you experience this, it may be necessary to press the bushings out of the caliper and back in again to remove excess bronze from the bushing. An alternative would be cleaning the inside of the bushing with a wire brush until the pins move freely, but be sure to blow out any removed material with compressed air or a mild parts cleaner.



### Step 6:

Install the supplied o-ring into each bronze bushing, ensure the o-ring is completely seated before continuing to the next step.



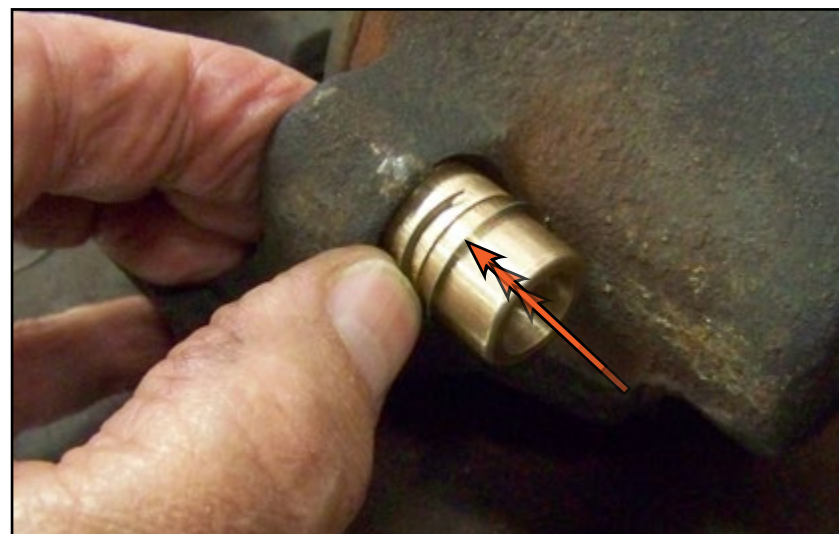
This photo was taken with the bushings out of the caliper for better visibility. **DO NOT** install the o-rings until the bushings have been installed into the caliper and you have test fit the guide pins.



## INSTALLING THE NEW BUSHINGS

### Step 7: Small Pick or Small Flat Blade Screwdriver

Install the circular spring retainer clip onto the new bushing. It is easiest to open the end of the clip slightly and spiral it over the bushing as shown in the photo.



### Step 8: Small Flat Blade Screwdriver

Press the spring clip inward until it snaps into the groove in the bushing, then repeat this process to install the spring clip into the other bushing.

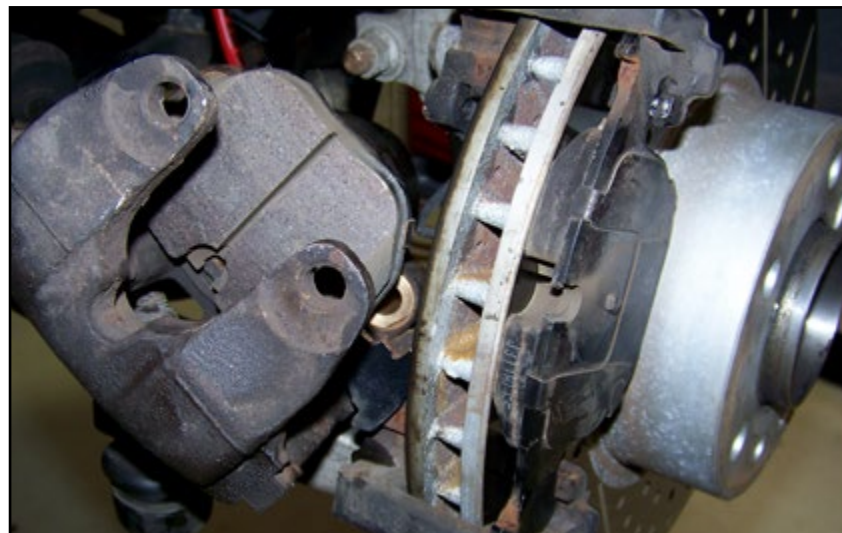




## INSTALLING THE NEW BUSHINGS

### Step 9:

Reinstall the brake pads into the caliper and caliper carrier.



### Step 10:

Apply a film of high-temperature brake grease to the new guide pins as shown in the photo.



## INSTALLING THE NEW BUSHINGS

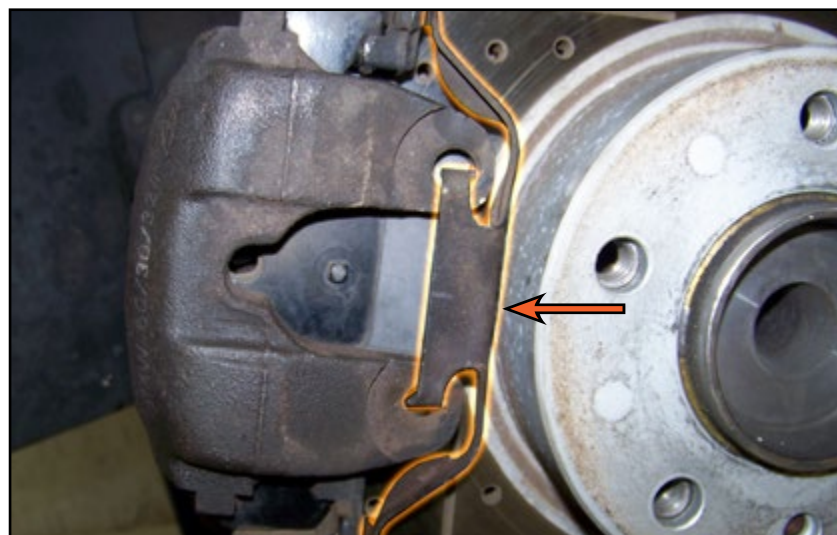
**Step 11:** 3/8" Torque Wrench, 7mm Hex Bit Socket

Slide the pins into the new bushings, then screw them into the caliper carrier by hand to prevent cross-threading them. Finally, torque the pins to 30 Nm (25 Ft-lbs).



**Step 12:**

Reinstall the caliper spring clip.

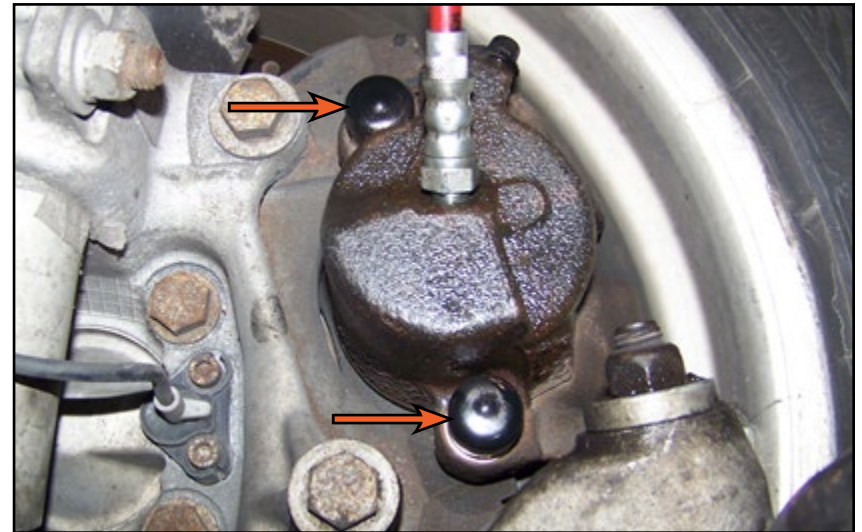


## INSTALLING THE NEW BUSHINGS

**Step 13:** 1/2" Torque Wrench, 17mm Socket

Slide the new black protective caps over the ends of the bronze bushings to keep water and dirt away from the guide pins. Repeat this process on the opposite side of the vehicle.

Torque the wheels to 120 Nm (89 Ft-lbs).





















## TORQUE SPECIFICATIONS

Brake Caliper Guide Pins .....	30 Nm (25 Ft-lbs) .....	<a href="#">(Page 16)</a>
Wheels.....	120 Nm (89 Ft-lbs) .....	<a href="#">(Page 17)</a>

# SCHWABEN - BUILD THE ULTIMATE TOOL COLLECTION

At ECS Tuning, we carry a line of high quality Schwaben Tools and Equipment to help you build your ultimate tool collection. Never before has affordability and quality been so closely related. Our entire Schwaben line is subjected to strict in house testing for strength and durability. See what we have to offer and equip your garage without breaking the bank.

					
	<ul style="list-style-type: none"> <li><a href="#">Breaker Bar</a></li> <li><a href="#">Creepers</a></li> <li><a href="#">Gloves</a></li> <li><a href="#">Engine Bars</a></li> <li><a href="#">Screwdrivers</a></li> <li><a href="#">Pressure Bleeders</a></li> <li><a href="#">Lighting</a></li> <li><a href="#">Pry Bars</a></li> <li><a href="#">Coil Spring Compressors</a></li> <li><a href="#">Camber Gauge</a></li> <li><a href="#">Hose Pinch Pliers</a></li> <li><a href="#">Wheel Bolt Pattern Gauge</a></li> <li><a href="#">Ball Joint Separator</a></li> <li><a href="#">Vanos Solenoid Socket</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Scraper, Hook, &amp; Pick Set</a></li> <li><a href="#">Camshaft Tools</a></li> <li><a href="#">Fan Clutch Wrenches</a></li> <li><a href="#">Tie Rod Tools</a></li> <li><a href="#">Brake Fluid Catch Bottle</a></li> <li><a href="#">Tubing Cutter</a></li> <li><a href="#">Booster Cables</a></li> <li><a href="#">Oil Filter Tools</a></li> <li><a href="#">Service Carts</a></li> <li><a href="#">Battery Charger</a></li> <li><a href="#">Stethoscope</a></li> <li><a href="#">Battery Terminal Brush</a></li> <li><a href="#">Wheel Chocks</a></li> <li><a href="#">Torx Sockets</a></li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Sockets</a></li> <li><a href="#">E-Drive Sockets</a></li> <li><a href="#">Car Ramps</a></li> <li><a href="#">Torx Drivers</a></li> <li><a href="#">Jack Stands</a></li> <li><a href="#">Circuit Tester</a></li> <li><a href="#">Ratchets</a></li> <li><a href="#">Exhaust Hanger Pliers</a></li> <li><a href="#">Bubble Flaring Tool</a></li> <li><a href="#">Thread Chaser</a></li> <li><a href="#">Drain Pans</a></li> <li><a href="#">Wrenches</a></li> <li><a href="#">Impact Sockets</a></li> <li><a href="#">Torque Wrenches</a></li> </ul>		
					
					
					



## Your Bronze Caliper Guide Pin Bushing Kit installation is complete!



These instructions are provided as a courtesy by ECS Tuning

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