WEMC

WALTHER ENGINEERING & MANUFACTURING COMPANY



Dura-Force™ Disc Brake System Service Manual

TS-20809_a

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⚠ CAUTION

Failure to follow the procedures in this manual or the vehicle manufacturer's manual can result in personal injury, death, or damage to components, vehicles or personal property.

⚠ CAUTION

When using compressed air for any purpose appropriate safety glasses must be worn.

General Description

Walther EMC's Dura-Force™ Disc Brake System for medium-duty vehicles features a four piston radial mount hydraulic caliper with uni-cast construction. The uni-cast construction enhances caliper stiffness, optimizes packaging and offers design flexibility for radial mounting. The radial mounting system provides ease of access to caliper mounting bolts for service and OE installation and allows the caliper to package in a much smaller envelope. The radial mount system also utilizes both bolts and pins resulting in a joint where the bolts are not in shear. The four piston design reduces drag and therefore offers substantial improvements to lining life verses a pin-slide caliper. The top loading linings allow for easy lining changes and do not require caliper removal. The Dura-Force™ calipers and torque plates are non-wearing components and require no periodic lubrication during their service life.

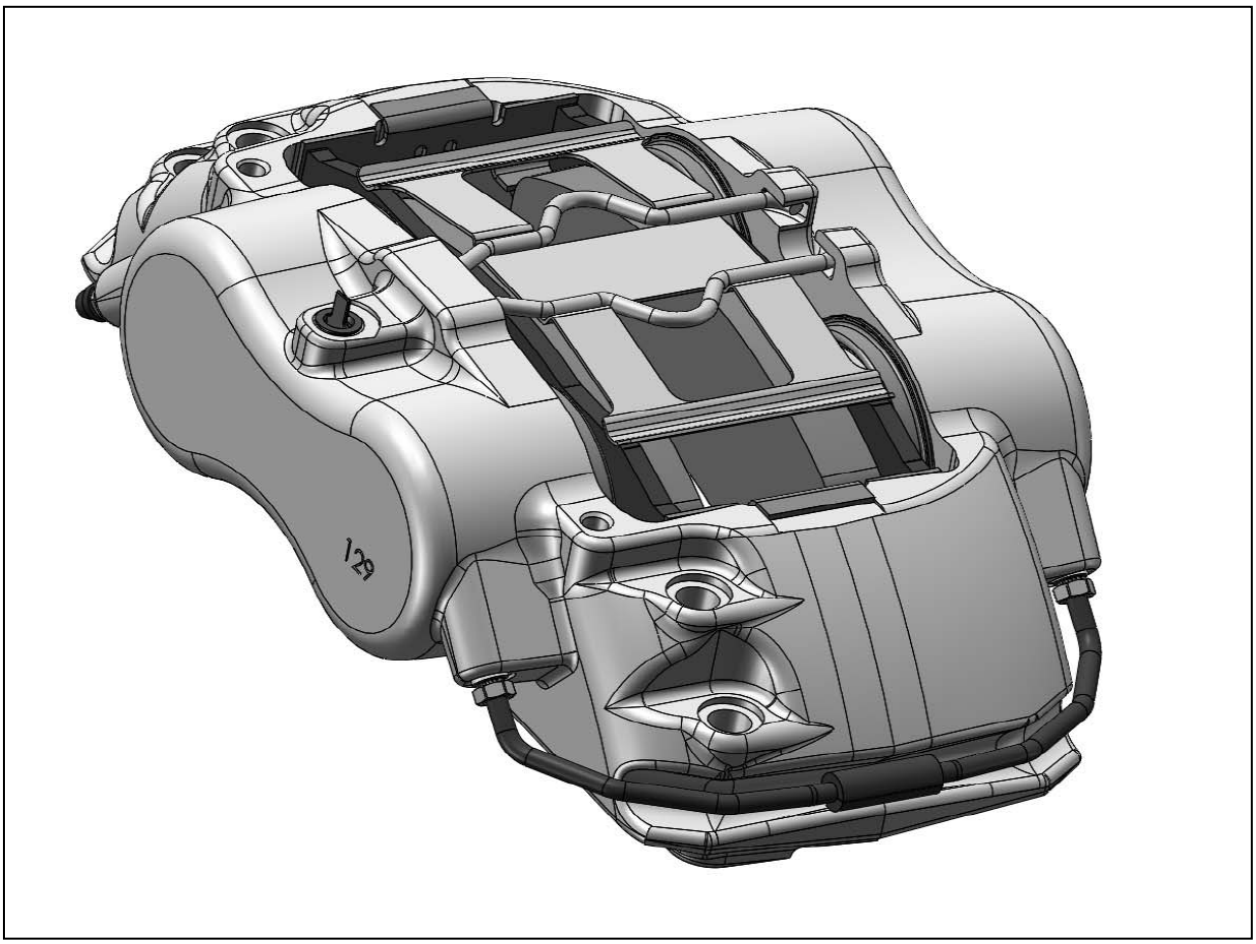


Figure 1: Standard Right Hand Caliper Assembly

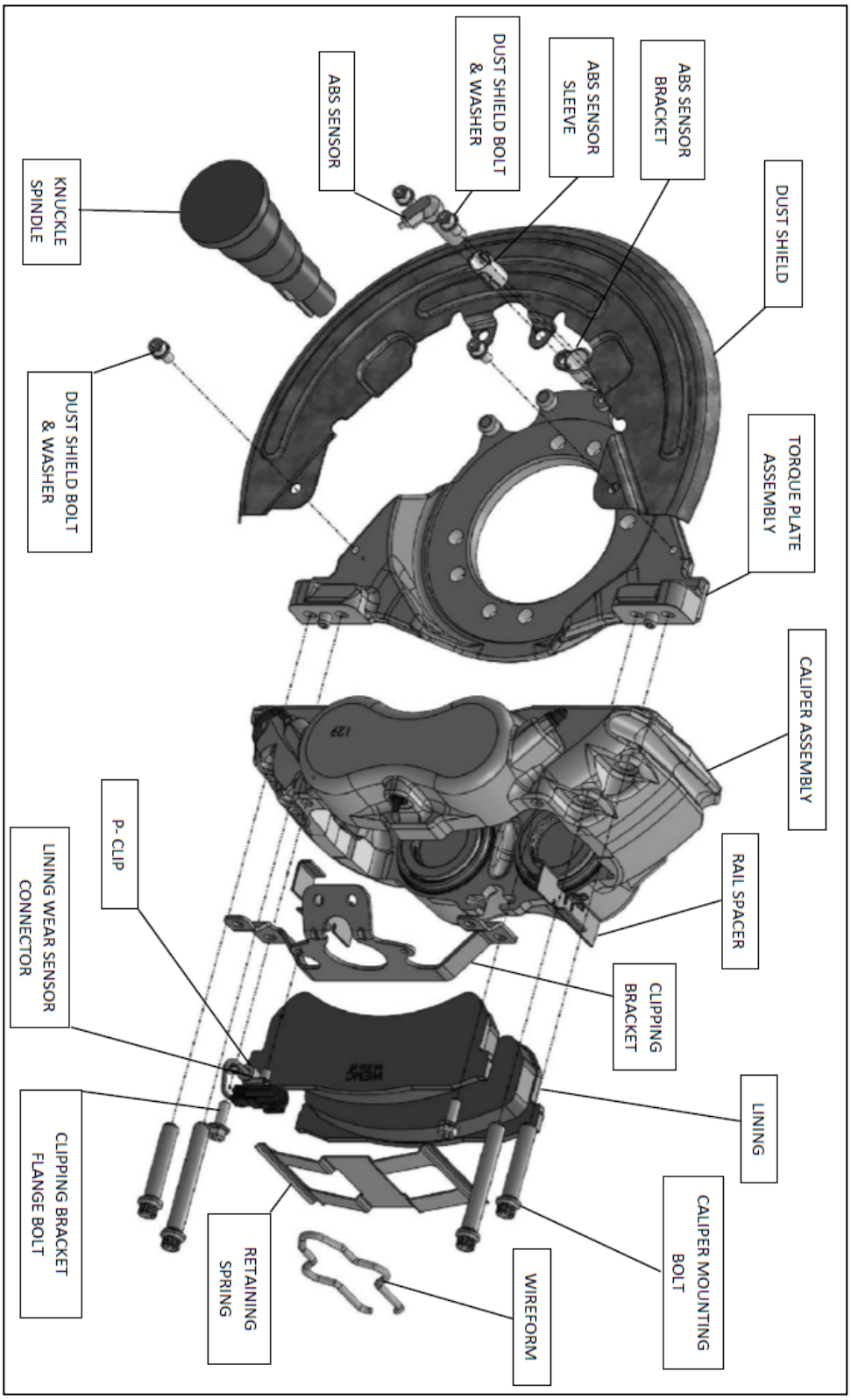


Figure 2: Typical exploded view of Right Front Brake Assembly

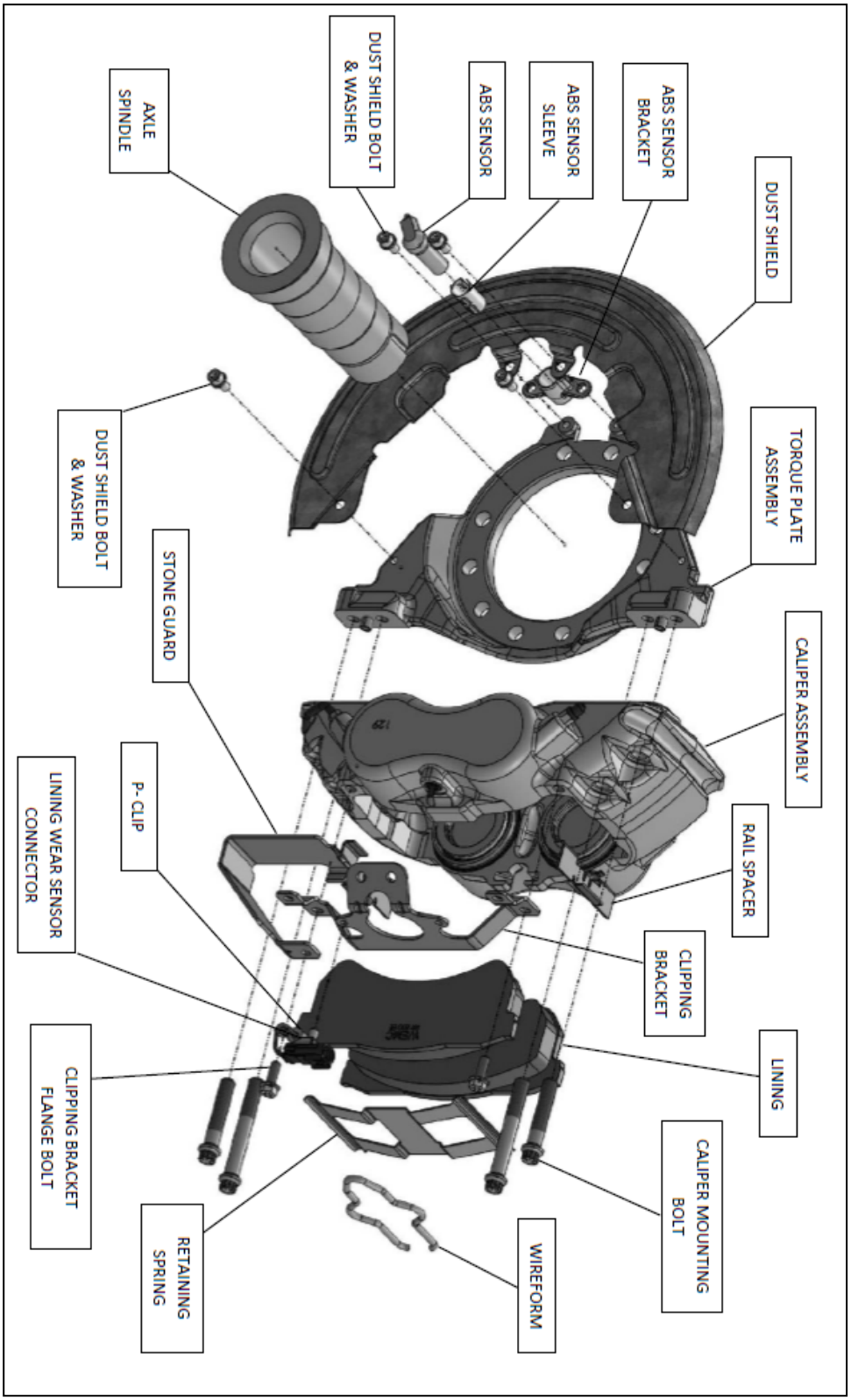


Figure 3: Typical exploded view of Right Rear Brake Assembly

Fastener Torque Chart

Description	Fastener Size	Torque (Lb.-Ft.)
Caliper Mounting Bolts	1/2 -13	75-85
Dust Shield Mounting Bolt	5/16 -18	14-18
Clipping Bracket Flange Bolt	5/16 -18 X 7/8 LG	14-18
Bleeder Screws	7/16 -24	12-15
Front Torque Plate to Knuckle	See Note #1	See Note #1
Rear Torque Plate to Axle	See Note #1	See Note #1

Note #1: Use the axle manufacturer or truck OEM bolt and torque requirements.

Brake Lining Pad Replacement Procedure

Visually inspect all lining pads, lining pads should be replaced when the remaining lining reaches 1/8 inch thickness or the wear out sensor indicator is on. It is recommended that all lining pads be replaced at the same time, this will maintain original balance. If a complete vehicle lining pad replacement is not necessary or desirable, be sure to replace the lining pads on both wheel ends on the same axle.

1. Remove the master cylinder reservoir filler cap. Check the brake fluid level in the reservoir. If necessary, remove fluid to keep the reservoir from overflowing when compressing pistons into the caliper.

2. Remove the lining pad retaining spring.

3. Compress the caliper pistons. Do not pry against the rotor as this may damage the rotor surface.

4. Remove the brake lining pads.

5. Inspect the rotor for scoring, warping, cracks, bluing, heat spots or other damage or defects and minimum thickness, replace if necessary.

6. Inspect the calipers for leakage or damage to the piston boots, pistons, crossover tube, and bleeder screws. Replace the caliper if required.

7. Clean and inspect the rail spacers. If they are bent or cracked they must be replaced.

8. Install the brake lining pads; make sure that the friction surface is against the rotor. The inboard and outboard brake pads are identical except on vehicles equipped with lining wear out sensors.

   In the case of a vehicle equipped with lining wear out sensors, make sure you have the correct lining pad part numbers. The sensor should be on the inboard side of the caliper and on the leading end of the caliper. Run the wire through the P-Clip and attach the Lining Wear out Sensor Connector to the Clipping Bracket.

9. Reinstall the lining retaining spring and wireform.

10. Fill the master cylinder reservoir with clean DOT-3 or DOT-4 brake fluid, whichever is recommended by the vehicle manufacturer. Make several brake applications to move the pistons and lining pads out into contact with the brake rotors. Brake lining pad clearance adjustment is automatic. Re-check master cylinder reservoir and fill to manufacturers recommended level.

Brake Bleeding Procedure

Note #2: Refer to the manufacturer's service information for ABS bleeding instructions.

1. Check the master cylinder reservoir and fill if necessary with clean DOT 3 or DOT 4 brake fluid, whichever is recommended by the vehicle manufacturer.

2. Bleed the brakes in the following order: right rear, left rear, right front, left front.

3. Each four piston caliper is equipped with two bleeder screws. Loosen the inboard bleeder screw and purge the air then tighten it loosely.

4. Open the outboard bleeder screw and purge the air then torque to 12-15 ft. lbs.

5. Again open the inboard bleeder screw and purge the air then torque to 12-15 ft. lbs.

6. Repeat this procedure for all other brakes in the sequence specified in Step 2.

7. Test brakes prior to returning the vehicle to service. A firm pedal should be felt during brake application.

Caliper Removal/ Replacement Procedure

1. Remove the brake hose/ tube from caliper.
2. Remove the four caliper mounting bolts.
3. Inspect the caliper for leakage, damage and defects. If there is leakage, damage or defects then caliper replacement may be required.
4. To install, reverse the removal procedure. Make sure the mating surfaces of the caliper and torque plate are clean and free of grease, oil or rust. Torque the mounting bolts to 75-85 ft.-lbs.
5. Bleed the brake system in accordance with the “Brake Bleeding Procedure” outlined above and road test the vehicle.

Torque Plate Removal/ Replacement Procedure

1. Remove the Caliper from vehicle as described in the Caliper Removal/ Replacement Procedure.
2. Remove the Dust Shield if installed.
3. Remove the hub and rotor assembly according to the manufacturer’s recommended service procedure.
4. Remove ABS sensor.
5. Remove the Torque Plate Mounting Bolts.
6. Reverse Steps 1-5 to install the Torque Plate. Use the axle manufacturer bolt and torque requirements to mount the Torque Plate. Torque the Dust Shield Mounting Bolts to 14-18 ft. lbs.

Caliper Disassembly

⚠ CAUTION

When using compressed air to extend the pistons do not place your hands or fingers near the piston bores, serious personal injury can result. If too much pressure is applied the pistons could break causing projectiles. Wear safety glasses during this procedure.

1. Remove the caliper per caliper removal procedure.

2. Drain all fluids from the caliper.

3. Push all four pistons to the bottom of their bores.

4. Remove the piston boots by prying the metal ring portion of the boot out of the bore with a screwdriver, as shown below in Figure 4. Use care to avoid damages to the piston or bore. Discard the boots.



Figure 4: Example of using a screwdriver for boot removal

5. Place a block of wood (7-$^{3}/_{4}$" X 3-$^{3}/_{4}$" X 2.70" thick) between the caliper pistons. Use a clamp to hold the block of wood against the piston on one side of the caliper. The clamp must be between the pistons on the opposite side to avoid interference with the pistons. See Figure 5.

6. Apply low air pressure (no more than 25 psi) to the fluid port in the caliper to extend the pistons out to the wood block.

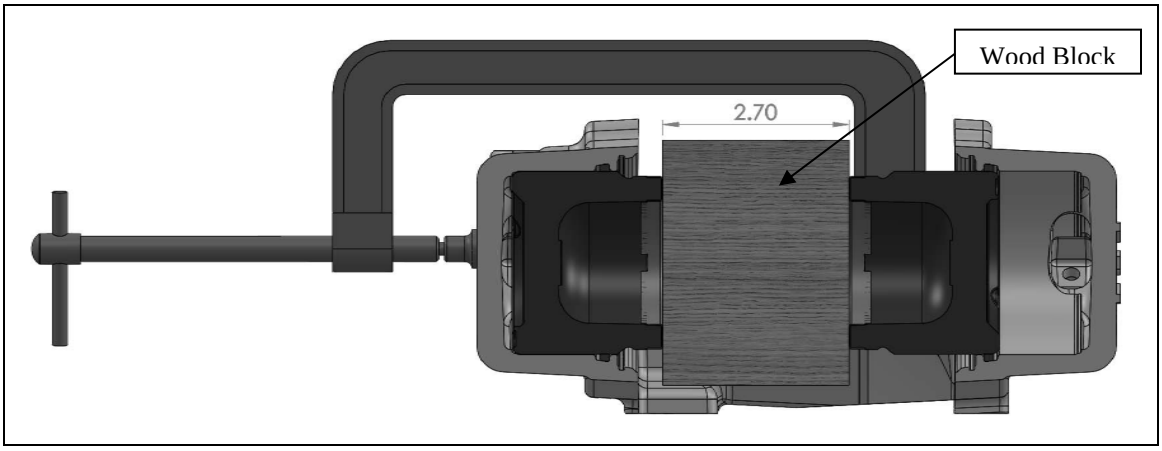


Figure 5: Illustration of Steps 5 and 6.

7. With the pistons in contact with the wood block there will be a small amount of seal engagement remaining. Remove the clamp and the wood block. The pistons may now be removed by hand.

8. To remove the pistons from the other side of the caliper, place the block of wood over the empty bores with a thick sheet of soft (40A durometer or less) rubber (7-$^{3}/_{4}$" X 4" X $^{3}/_{8}$"thick) between the wood and the caliper bores. Use a clamp to hold the block of wood in position. The clamp must be between the pistons on the opposite side to avoid interference with the pistons. See Figure 6.

9. Apply low air pressure (no more than 25 psi) to the fluid port of the caliper to extend the caliper pistons to the wood block.

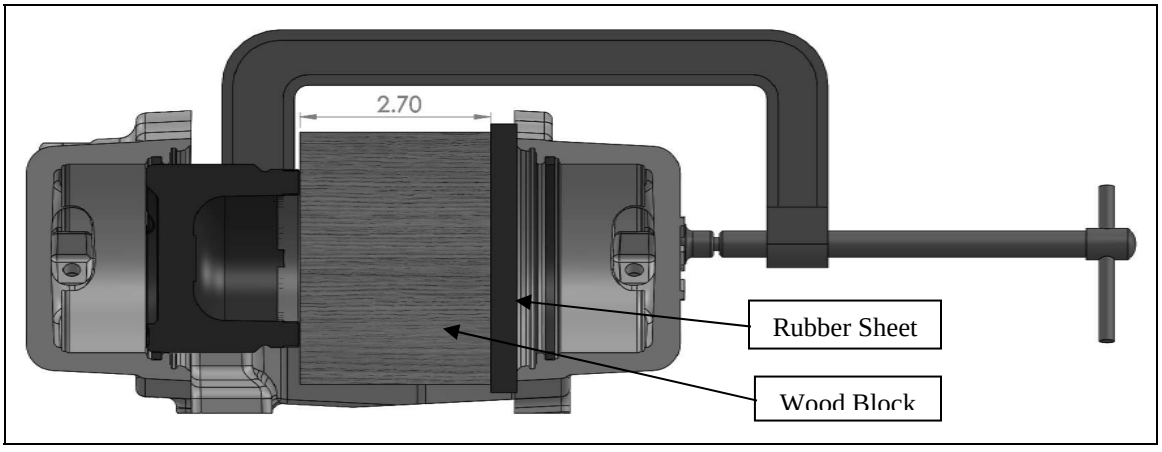


Figure 6: Illustration of Steps 8 and 9.

10. With the pistons in contact with the wood block there will be a small amount of seal engagement remaining. Remove the C-clamp and the wood block. The pistons may now be removed by hand.

11. Remove the piston seals with a non- metallic devise and discard them.

Caliper Assembly

1. Clean the caliper, caliper piston bores, and fluid ports with solvent. Use compressed air to clean out and dry grooves and passages.

   Note #3: When using compressed air, use air lines that are completely free of oil and moisture. All brake parts must be clean and completely dried of cleaning fluid. Use only Walther EMC replacement parts to assure proper caliper performance.

2. Dip the piston seals in clean DOT 3 or DOT 4 hydraulic brake fluid, whichever is recommended by the vehicle manufacturer, and install in the piston seal groove in the caliper piston bores. Make sure that they are properly seated. Apply a thin film of silicon grease or brake fluid to the caliper bore seal land between the piston boot and seal groove. Apply grease or brake fluid around the entire circumference of the caliper bore.

3. Install the piston boot onto the piston making sure that the boot is seated in the boot groove of the piston. See Figure 7.



Figure 7: Piston boot installed onto the piston.

4. Place the assembled piston and boot in the cylinder bore with the piston resting squarely on the seal. Press the piston into the bore being careful not to cock the piston in the bore. See Figures 8 & 9.



Figure 8: Assembled piston and boot in the cylinder bore with piston resting squarely on the seal

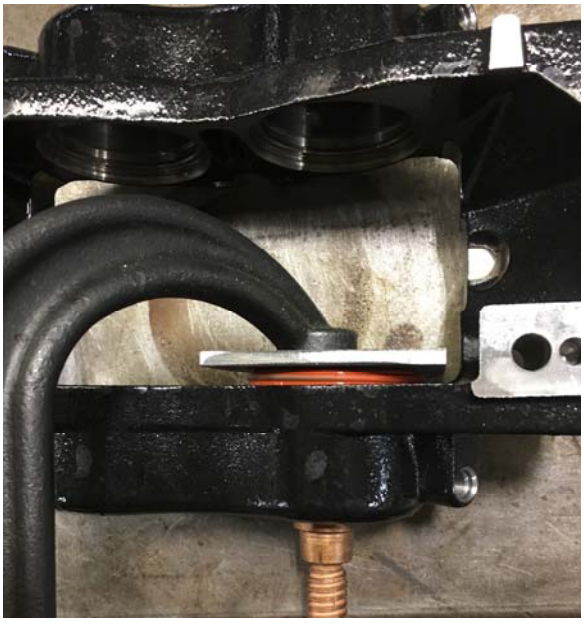


Figure 9: Assembled piston pressed into the bore.

5. Using an appropriately sized tapered roller bearing cup (18720 recommended) seat the piston boot fully into the caliper boot recess. See Figure 10.

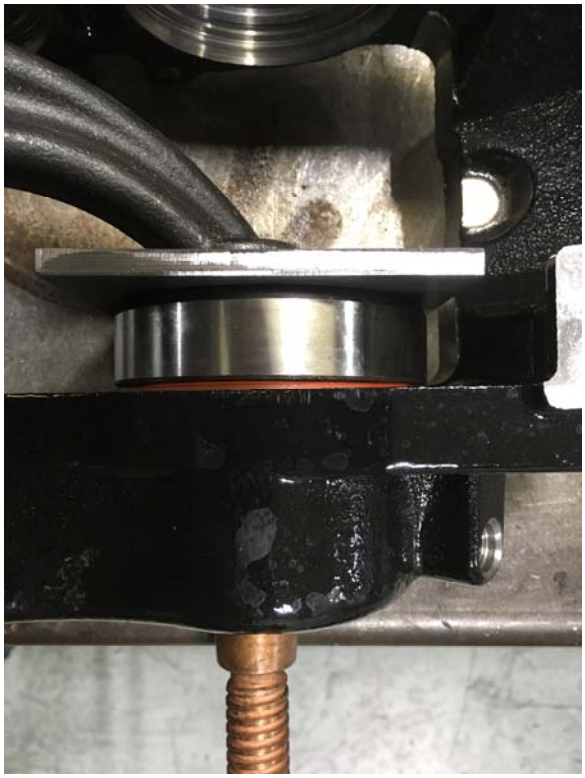


Figure 10: Example of using a tapered roller bearing cup to seat the piston boot.

Note #4: Inspect the caliper prior to reinstalling it on the torque plate. Pistons must be fully retracted into the caliper. Piston boots must be fully seated in the caliper boot groove.