



A **NAVISTAR** COMPANY

WORKHORSE CUSTOM CHASSIS SERVICE BULLETIN

BULLETIN NO: 51101-C

September 1, 2010

BULLETIN TYPE: Safety Campaign

SUBJECT: Replacement of Bosch Service Brake Calipers

MODELS: All 2001 through 2011 Model Year W20, W21, W22, and W22D Motor Home Chassis Equipped with Bosch Brake Calipers

Workhorse Custom Chassis (Workhorse) has decided that a defect which relates to motor vehicle safety exists in the Bosch ZOPS and ZOHT slide-pin hydraulic disc brake systems. These service brake systems were installed on the Workhorse incomplete-vehicle chassis identified below and were subsequently used in the manufacturing of motor homes.

The pistons inside the brake caliper may stick in the applied position. If this were to occur, the service brakes may overheat - which may result in damage to other brake components and possibly lead to brake fluid boiling during normal operating conditions. If conditions described above were to occur, the performance of the service brakes may be reduced and the brake pedal may feel "soft" or "spongy." Anticipated braking distance may also increase which may result in a crash that may cause property damage, personal injury, or death.

VEHICLES INVOLVED

Certain W20, W21, W22 and W22D motor home chassis built from July 24, 2000, through August 2, 2010.

Dealers must check the WOW system to determine if the vehicle is affected by this safety recall and requires the final remedy to be performed.

OWNERS NOTIFICATION

Workhorse will notify owners and body companies regarding safety recall 51101-C. Attached is a copy of the owner's letter and accompanying instructions.

DEALER RESPONSIBILITY

The National Traffic and Motor Vehicle Safety Act, as amended, provides that each vehicle that is subject to a vehicle recall campaign must be adequately repaired within a reasonable time after the owner has tendered it for repair. A failure to adequately repair within 60 days after a tender of a vehicle is prima facie evidence of failure to repair within a reasonable time. If the condition is not adequately repaired within 60 days, the owner may be entitled to replacement with an identical or reasonable equivalent vehicle at no charge, or to a refund of the purchase price less a reasonable allowance for depreciation.

Dealers must correct all vehicles subject to this campaign at no charge to the owner, regardless of mileage, age of vehicle, or ownership, from this time forward.

Dealers should proceed immediately to make necessary correction to units in their inventory. All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer, or delivery. If vehicles have been sold or transferred, and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, the appropriate personnel at the transfer location or the customer must be notified immediately by your dealership.

Dealers must make every effort to promptly schedule an appointment with each owner to repair their vehicle as soon as possible. However, consistent with the customer notification, dealers are expected to complete the repairs on the mutually agreed upon service date.

SERVICE PROCEDURE

The service procedure for this safety campaign requires the replacement of all four Bosch service brake calipers; bleed the brake system; apply the campaign completion sticker to the vehicle, and test drive the vehicle to verify brake system operation. Once the vehicle has been test driven, verify that there are no leaks in the hydraulic brake system. Use labor operation code T5024 on the final remedy invoice submitted to Workhorse for payment.

If Campaign 50401-C is Still Open on Customer's Vehicle

For all affected 2001 through 2003 model year, incomplete-vehicle chassis built between August 10, 2000, through, July 29, 2002; a review of the VIN profile must be

performed to verify the completion of safety campaign 50401-C. The following steps must be performed if the remedy procedure for this campaign has not been completed:

1. Inspect the caliper assemblies to determine if ZOPS slide pin(s) are installed; and
2. Replace all ZOPS slide pins with ZOH-T slide pins by following the service procedure described in Bulletin Number 50401-C, dated September 15, 2004, on the WOW message board.

(See illustrations 1.1/A, 1.1/B, and 1.1/C for identifying ZOPS slide pins, ZOH-T slide pins, and leading and trailing position in procedure 1.1 of this bulletin)

After inspection and or replacement of the slide pins continue completion of campaign 51101-C as outlined in the service bulletin.

Use labor operation code T5002 for submission to Workhorse for payment if the slide pins were replaced as described above.

If the VIN profile indicates safety campaign 50401-C was completed, but the vehicle is still equipped with ZOPS slide Pins, complete steps 1 and 2 described above. Apply additional time to the final remedy invoice T5024 (add labor operation code “Y” – Slide Pin Replacement, 0.4 hours) and submit to Workhorse for payment.

Follow the Bosch campaign diagnostic trouble tree if collateral damage is identified at a wheel end. The diagnostic trouble tree has been provided to assist the service technician with diagnosis, inspection of brake components, torque and fluid specifications, and ABS code criteria. The trouble tree can be found at www.dealers.workhorse.com on the WOW message board under the service tab.



CAUTION: TO PREVENT SERIOUS EYE INJURY, ALWAYS WEAR PROPER EYE PROTECTION WHEN YOU PERFORM VEHICLE MAINTENANCE OR SERVICE.

The service information provided in this Bulletin 51101-C is to serve as a guideline to assist in completion of the final remedy. Refer to the Workhorse Service Manual for further repair information, as well as, applicable warnings and cautions.

WARRANTY INFORMATION

Claim Description: --- Complete Customer Safety Recall Notice 51101-C; Replace all four Bosch service brake caliper assemblies; bleed the brake system; test brake performance; and utilize the trouble tree for diagnostic assistance.

Claim Type Submission: Safety Campaign

Labor Operation: ---**T5024**--- 3.0 hours - Bosch Brake Caliper Replacement

Includes:

1. Replacement of all four calipers;
2. Determine the completion status of safety campaign 50401-C;
3. Bleed brake hydraulic system;
4. Test drive to verify brake performance;
5. Inspection of the brakes after the test drive to verify no hydraulic fluid leaks; and
6. Data entry on the campaign completion label and application of the label to the vehicle.

Information: Note any collateral damage to a wheel end including any ZOH-T slide pin replacements outside of completing campaign 50401-C as described above will require authorization by your Regional Service Manager. T5024 allows for additional add labor operations, per wheel end, for replacement of additional component(s). Follow the Workhorse retention policy and guidelines under warranty submission (potential audit review) for all components replaced as described above.

Labor Operation: ---**T5002**--- 0.4 Hours - Replacement of ZOPS slide pins with ZOHT pins 2001-2003 vehicles where 50401-C is open

Note: Any additional time required to replace the slide pins to complete 50401-C must be submitted under this labor operation.

PART INFORMATION

| <u>Caliper Kit</u> | <u>Quantity per Vehicle</u> | <u>Description</u> |
|--------------------|-----------------------------|--------------------------------|
| W8006753 | 2 | Bosch Brake Caliper Kit |

Caliper Kit Includes

| <u>Quantity per Kit</u> | <u>Description</u> |
|-------------------------|-----------------------------|
| 2 | Bosch Brake Calipers |
| 2 | Brake Bleeder Screws |
| 1 quart | DOT 3 Brake Fluid |
| 1 per 2 kits | Campaign Completion Sticker |

Information: Caliper kits will be supplied at no charge to dealer. A handling fee of \$40 (\$10 per corner) will be applied for warranty claim submission.

SLIDE PINS IF REQUIRED TO CLOSE 50401-C OR REPLACE ZOPS PINS TO ZOH-T

| <u>Part Number</u> | <u>Quantity per Vehicle</u> | <u>Description</u> |
|--------------------|-----------------------------|----------------------|
| W8000352 | 4 | Slide Pin Kit |

REPAIR PROCEDURE

Brake Caliper Replacement

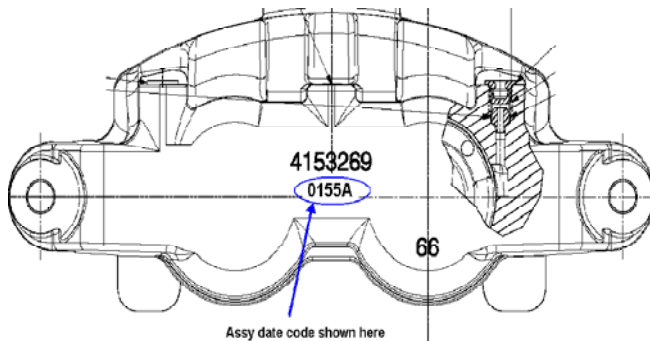
The removal and installation instructions only serve as a guide. Additional operations may be required to perform this repair. Properly lifting and supporting the vehicle, removing wheel and tire assemblies to gain access to the Bosch brake calipers. Refer to the Workhorse Service Manual for further information, including warning and/or cautions.



CAUTION: DO NOT WORK UNDER A VEHICLE SUPPORTED ONLY BY JACKS. JACKS CAN SLIP OR FALL OVER CAUSING SERIOUS INJURY OR DEATH.

Remedy Bosch Brake Caliper Identification

Part Number W8006753 (Caliper Kit)

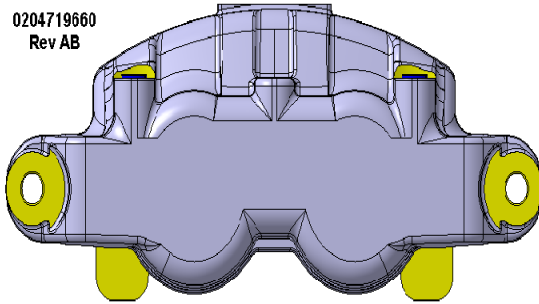


The first date code was 0155A.

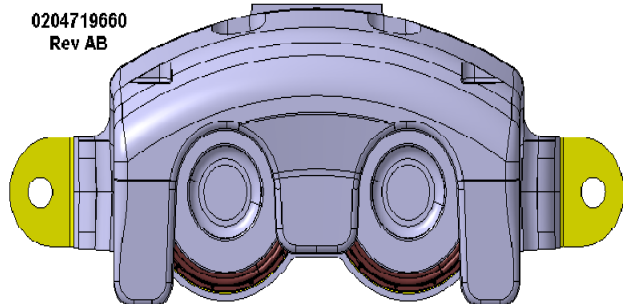


The pistons have the letter "B" molded in three locations at the bottom of the piston.

0204719660
Rev AB



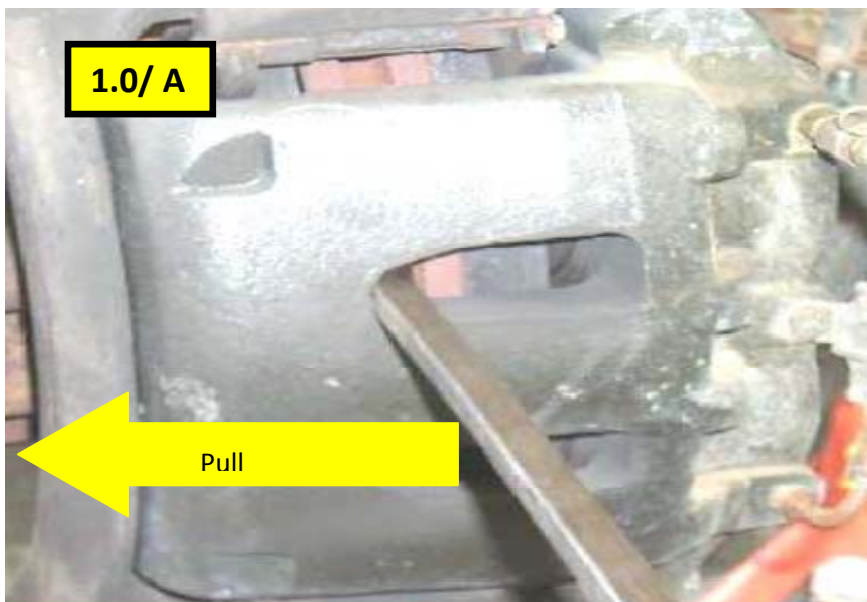
0204719660
Rev AB



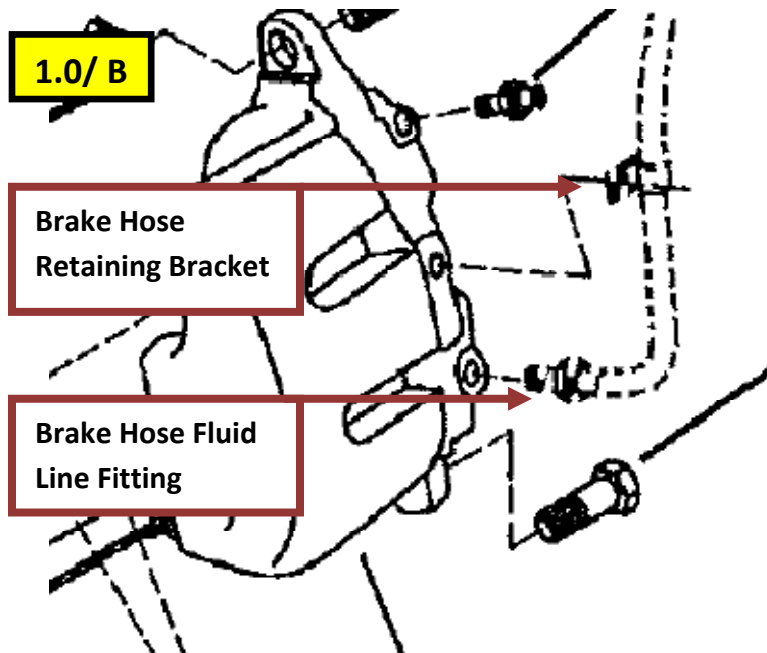
Caliper machined areas shown in yellow are not plated.

1.0 Caliper removal procedure

1. Remove two thirds of brake fluid from master cylinder.
2. Raise the vehicle, Refer to *Lifting and Jacking the Vehicle* in General Information in the service manual.
3. Support the vehicle with safety stands.
4. Mark relationship of the wheel to hub.
5. Remove the tire and wheel assembly, Refer to *Tire and Wheel Removal and Installation* in the service manual.
6. Compress caliper pistons using a disc brake caliper pad spreader, caliper dual piston compressor tool, c-clamp, pry bar, or other similar equipment. Compress until the pistons bottoms in the bore. (Shown in photo 1.0 / A)



7. Remove the tool used to compress the caliper pistons.
8. Remove the brake hose retaining bracket fastener from the caliper. (View Illustration 1.0/ B)



9. Disconnect brake hose fluid line fitting from caliper and cap off to prevent brake fluid leakage or contamination in the line. Do not allow the brake line hose to become pinched or kinked during the remedy procedure. (View Illustration 1.0/ B)
10. Remove the upper (top) caliper mounting bolt securing the caliper to the upper guide pin. (Shown in Photo 1.0/ C)
11. Remove the lower (bottom) caliper mounting bolt securing the caliper to the lower guide pin.



12. Move caliper assembly away from rotor.
13. Remove upper and lower caliper mounting pins and pin boots from anchor plate.

14. Clean the machined surface of the anchor plate with wire brush. (See photo 1.0/D)
15. Clean and lubricate the anchor plate bores with silicone brake grease.



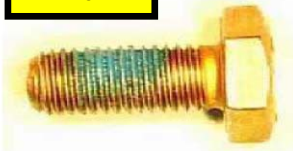
1.1 Caliper Slide Pin Verification

If the chassis model year is 2004 or newer (chassis build date after June 3, 2003) move to section 1.2 Caliper Installation.

ZOPS vs. ZOH-T For vehicles built from August 10, 2000, through July 29, 2002, and the VIN profile indicates 50401-C is open, or 50401-C shows completed but the vehicle is still equipped with ZOPS slide pins, perform the following procedures:

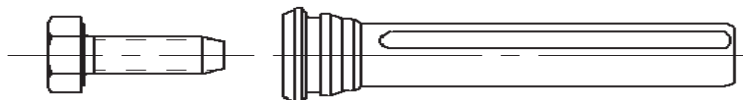
1. If the bolt thread is coarse as shown below in illustration (1.1/A) it is a ZOPS type slide pin and will have the same pin for the leading and trailing position.

1.1 / A



ZOPS Bolt: heavy hex head, yellow in color, coarse thread, thread patch (M12x1.75x30)

ZOPS Leading AND Trailing Guide Pin



2. If the vehicle has the ZOPS slide pins installed, remove and replace with the ZOH-T type slide pin shown in illustration (1.1/B). If required order slide pin and boot kit (PN W8000352) which can be ordered through Workhorse Parts.

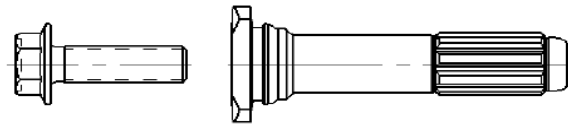
3. If the bolt thread is fine and the bolt dark in color as shown below it is a ZOH-T type slide pin shown in illustration (1.1/B). The leading and trailing pin are different and required to be in the correct position shown in illustration (1.1/C).

1.1 / B

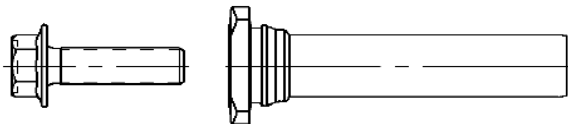
ZOH-T Caliper guide pins and mounting bolt used after June 3, 2003



ZOH-T Bolt: flange head, dark in color, fine thread, may have thread patch as shown (M12x1.25x40).



ZOH-T Trailing Guide Pin



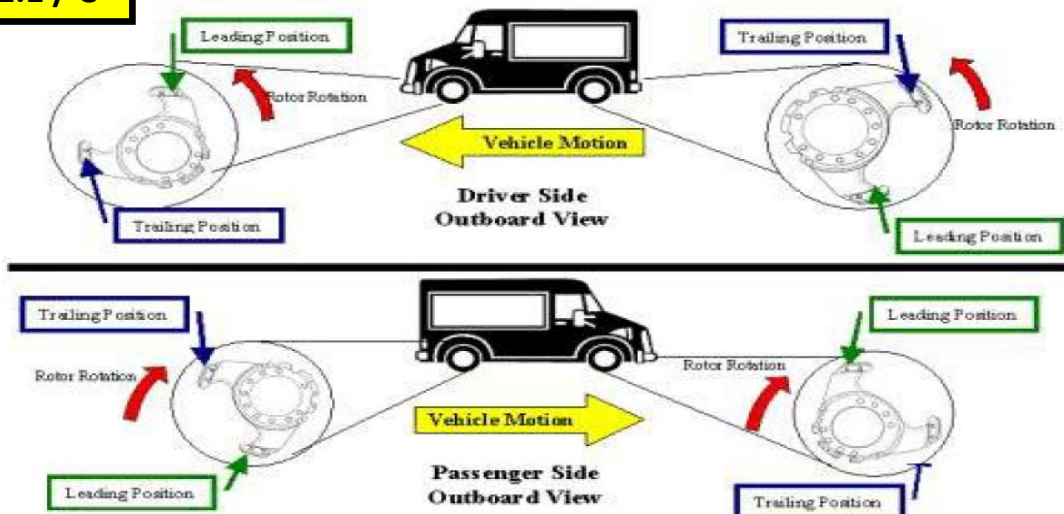
ZOH-T Leading Guide Pin

- Unique guide pins for leading and trailing anchor plate positions.

IMPORTANT: The ZOH-T leading bolt must be tightened first during the assembly process after both leading and trailing bolts are installed finger tight.

Identifying Slide Pin Leading and Trailing Positions

1.1 / C

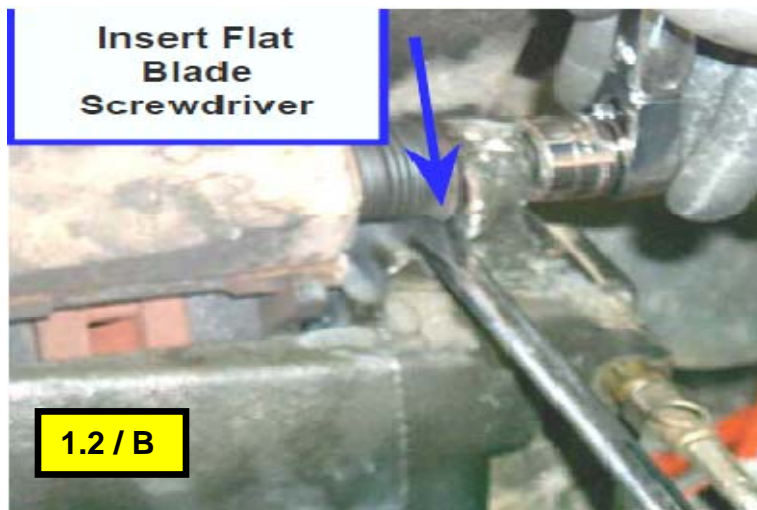


1.2 Caliper Installation Procedure

1. Inspect and lubricate the caliper slide pins with silicone brake grease.
2. When reusing the ZOH-T slide pin mounting bolt clean the threads and apply Loctite 2440 adhesive on bolt threads.
3. Align flat on upper (top) slide pin boss with the flat on the caliper housing upper (top) guide pin boss. Be careful when positioning caliper over disk brake pads, rotor and upper (top) guide pin to avoid tearing or dislodging piston boots or guide pin boots. (View Photo 1.2 / A)



4. Install upper (top) mounting bolt "finger" tight.
5. Align the flat on the lower pin flange, and then carefully rotate the caliper closed and install lower mounting bolt "finger" tight. Utilize a flat blade screwdriver to retain the slide pin during the torque procedure. (Shown in photo 1.2 / B)

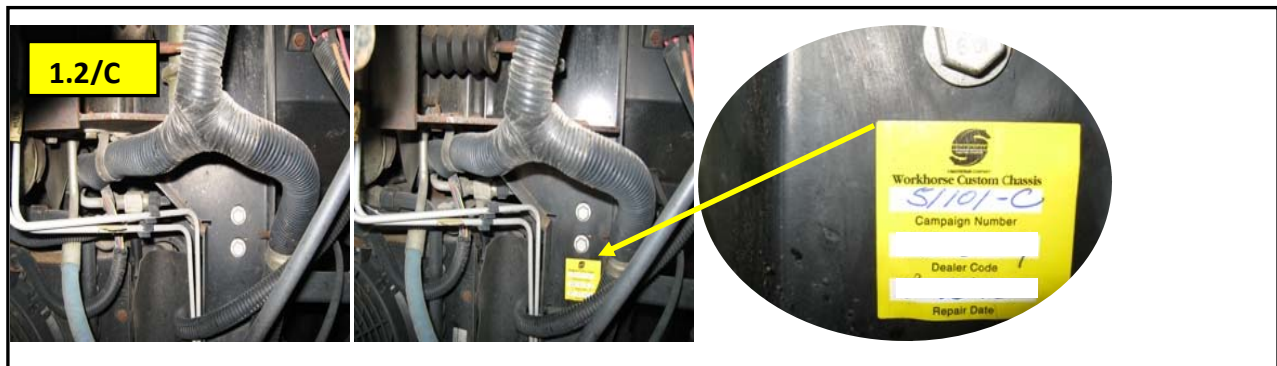


6. Torque the ZOH-T mounting bolts as follows:
 - a. Torque leading bolt to 93-107 lb-ft (126-145 N-m)
 - b. Torque trailing bolt to 93-107 lb-ft (126-145 N-m)
 - c. See Leading and Trailing bolt position illustration (1.1 / C)
7. Connect the brake hose fitting to the fluid inlet port on the caliper and torque to 14-17 lb-ft (20-24 N-m). (See illustration 1.0 / B)
8. Reconnect the brake hose retaining bracket to the caliper using the original bolt removed. (See illustration 1.0 / B)
9. Bleed brake system torque bleeder screw to 8-15 lb-ft. (10-20 N-m)
10. Install the tire and wheel assembly and torque the wheel lug nuts to 450-500 lb-ft.
11. Lower the vehicle.



CAUTION: Before moving the vehicle, pump the brake pedal several times to insure the pedal feels “firm.” Do not move the vehicle until a “firm” pedal is obtained. Check the brake fluid level in the master cylinder after pumping the brakes.

12. Complete the Recall Campaign Completion label and attach to the vehicle bulk head in a visible area near the chassis fuse box / Maxi Booster mounting bracket (Shown in photo 1.2/ C). One completion label (PN W8001493) will be shipped with every two caliper kits ordered.



1.3 Bosch Brake Campaign Trouble Tree

The Brake Trouble Tree will assist the service technician with diagnosis, brake components review, torque specifications, fluid specifications, and ABS code criteria. The diagnostic trouble tree can be found at www.dealers.workhorse.com on the WOW message board under the service tab. See table 1.3/A below for an outline of the Brake Trouble Tree.

The links within the tree will direct the technician to more information (i.e. pictures, torque specifications, diagnostics, etc).

| 1.3/A | | | | |
|-------|--|---|---------|---------|
| Steps | Description | Notes | Yes | No |
| 1 | Is ABS Light On | | Step 2 | Step 10 |
| 2 | Does the unit have abs codes 21, 25, 31, 35 | Record codes on tech hard copy | Step 4 | Step 3 |
| 3 | Record abs codes and proceed to strategy based diagnostics | This will be done at the customer's expense. Failure is not due to caliper failure. | Step 4 | Step 4 |
| 4 | Do Cracks go all the way through rotor web | | Step 6 | Step 5 |
| 5 | Does Rotor show signs of severe pad Transfer | | Step 6 | Step 14 |
| 6 | Does ABS Sensor show signs of heat damage | | Step 7 | Step 19 |
| 7 | Does front hub oil cap show signs of leaking or lens discoloration | | Step 8 | Step 9 |
| 8 | Replace Rotor, hub oil cap, inboard seal, speed sensor, and pads | Covered | Done | Done |
| 9 | Replace Rotor, inboard seal, speed sensor, and pads | Covered | Done | Done |
| | | | | |
| | No Speed Sensor Codes | | | |
| 10 | Do Cracks go all the way through rotor web | | Step 12 | Step 11 |
| 11 | Does Rotor show signs of severe pad Transfer | | Step 12 | Step 12 |
| 12 | Does front hub oil cap show signs of leaking or lens discoloration | | Step 13 | Step 22 |
| 13 | Replace Rotor, hub oil cap, inboard seal, and pads | Covered | Done | Done |
| | (continued on next page) | | | |
| | No Pad or Rotor Damage | | | |
| 14 | Does ABS Sensor show signs of heat damage | | Step 15 | Step 19 |
| 15 | Does front hub oil cap show signs of leaking or lens discoloration | | Step 16 | Step 22 |
| 16 | Does caliper show signs of heat damage | If No step 17 is CP | Step 17 | Step 22 |

| Steps | Description | Notes | Yes | No |
|-------|--|-------------------------------|---------|---------|
| 17 | Replace Hub oil cap, speed sensor | If 16 was yes this is covered | Done | Done |
| | | | | |
| | Hub Oil Seal Damage | | | |
| 19 | Does front hub oil cap show signs of leaking or lens discoloration | | Step 20 | Step 22 |
| 20 | Does caliper(s) show signs of heat damage | If No step 21 is CP | Step 21 | Step 22 |
| 21 | Replace hub oil cap | If 20 was yes this is covered | Done | Done |
| | | | | |
| | NO CIRCUMSTANTIAL DAMAGE | | | |
| 22 | Replace calipers per instructions on campaign | Covered | Done | Done |
| | | | | |