



IMPORTANT SAFETY RECALL

18V-750

[Month Day, 2018]

This notice applies to your vehicle(s), VIN(s): _____

Dear **[Proterra Customer Name]**:

This notice is sent to you in accordance with the National Traffic and Motor Vehicle Safety Act.

Proterra has decided that a defect, which relates to motor vehicle safety, exists in certain Catalyst 40' and Catalyst 35' buses built in 2015, 2016 and 2017 and equipped with ZF rear axles with radial air disk brakes. As a result, Proterra is conducting a safety recall. We apologize for this inconvenience. We are committed to your safety, the safety of your customers, and your continued satisfaction with our products, and we request that you remedy your bus(es) promptly.

IMPORTANT

- Your 2015, 2016 and/or 2017 Catalyst 40' and/or Catalyst 35' Bus is involved in safety recall 18V-750.
- Replacement parts to remedy the issue are available. Service instructions are provided in revised service bulletin SB-18-75 dated December 21, 2018.
- This remedy will be provided free of charge (parts and labor).
- Contact Proterra's customer service team at 864-438-0000 or ServiceParts@Proterra.com if you have any questions.

Why is your vehicle being recalled?

Proterra's axle supplier, ZF, has identified that improper surface roughness of a guide pin in radial brake calipers supplied by Knorr-Bremse may cause increased friction, creating noise and, if undetected, potentially leading to breaking of the brake carriage guide pin support bolt, uneven brake pad wear, tapered wear of the brake pads, and brake pad contact with the surface of the wheel.

As a result, the vehicle could experience reduced brake function and/or suddenly lose tire pressure, increasing the risk of crash. The vehicle may also experience reduced parking brake functionality.

What will Proterra do?

Proterra will provide you with a repair kit containing replacement calipers and Guide Pins Repair Kit Bendix K170658 (SB 7 Recall Guide Pin Kit). This repair kit is provided for you at no charge. Service repair instructions are provided in revised service bulletin SB-18-75 dated December 21, 2018. Proterra customers should submit a warranty claim for the labor associated with the repair, which is



estimated to be approximately 3.5 hours. The repair involves removal and reinstallation of the wheels and brake calipers plus replacing the guide pins.

What should you do?

You should contact your [**Proterra Transit Customer Name**] service manager to ensure that a service repair is made as soon as possible. If you notice excessive noise during braking or any decreased brake function, do not operate the vehicle; arrange for the vehicle to be towed for service.

What if you have already repaired the defect?

Proterra has begun mailing repair kits to affected customers. If you have completed the recall repair with the Proterra-supplied repair kit but have not yet submitted a warranty claim, please do so at your earliest opportunity.

If you have previously paid for a repair that addresses the defect described in this letter, you still need to have this recall performed with the Proterra-supplied repair kit to ensure the correct parts were used. However, you may be eligible for a reimbursement of the previous repair. Please contact Proterra’s customer service team at **864-438-0000** or ServiceParts@Proterra.com to verify eligibility and process your reimbursement request.

Do you have questions?

Please contact Proterra’s customer service team at **864-438-0000** or ServiceParts@Proterra.com with any questions or concerns about this information.

If, after contacting Proterra’s customer service team, you are still not satisfied that we have done our best to remedy this condition without charge and within a reasonable time, you may write the Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, or call the toll-free Vehicle Safety Hotline at 1.888.327.4236 (TTY 1.800.424.9153), or go to <http://www.safercar.gov>. The National Highway Traffic Safety Administration Campaign ID Number for this recall is 18V-750.

Federal regulation requires that any vehicle lessor receiving this recall notice must forward a copy of this notice to the lessee within ten days.

Sincerely,

John Casey
National Quality Director
Proterra Inc



ORIGINAL ISSUE DATE:	10/12/2018
REVISION DATE:	12/21/2018
SUBJECT:	ZF Rear Axle Caliper Swap Recall Campaign
RATIONALE:	Increased friction on caliper guide pins due to surface roughness creates a safety defect
VINS AFFECTED:	Proterra Specified 2015, 2016 & 2017 Catalyst Buses
COMPLETE BY:	Earliest Opportunity
SERVICE BULLETIN #:	SB-18-75 A
NHTSA RECALL NUMBER:	18V750
REVISION DESCRIPTION:	This Service Bulletin has been revised to clarify that these work instructions are provided pursuant to a Proterra initiated recall campaign and to specify that the required remedy be completed at the earliest opportunity. Please disregard earlier copies of Service Bulletin SB-18-75.
REMEDY KIT NAME / NUMBER:	Rear Axle Brake Calipers: RH=026230, LH=026231
ESTIMATED LABOR TIME:	3.5 Hours per Vehicle

ZF REAR AXLE CALIPER SWAP RECALL CAMPAIGN

Condition:

Proterra has decided that a defect, which relates to motor vehicle safety, exists in certain Catalyst 40' buses equipped with ZF rear axles with radial air disk brakes. As a result, Proterra is conducting a safety recall. We request that you remedy your bus(es) promptly. Proterra's axle supplier, ZF, has identified that improper surface roughness of a guide pin in radial brake calipers supplied by Knorr-Bremse may cause increased friction, creating noise and, if undetected, potentially leading to breaking of the brake carriage guide pin support bolt, uneven brake pad wear, tapered wear of the brake pads, and brake pad contact with the surface of the wheel. As a result, the vehicle could experience reduced brake function and/or suddenly lose tire pressure, increasing the risk of collision. The vehicle may also experience reduced parking brake functionality.

Retrofit Description:

Please follow the instructions prepared by ZF, and provided in this Service Bulletin, to swap the brake calipers with the Proterra supplied parts. You should follow your own internal safety procedures for any repair work.

If you have questions about the procedures specified by ZF, please contact ZF directly for clarification at the contact phone number or email provided. Proterra is not responsible for ZF's content.

ZF CV Technical Service Group Contact Information:

Phone: (800) 451-2595

Email: VHL-CV-TechSupport-NA@zf.com

IMPORTANT!

Proterra customers DO NOT need to complete the rebushing procedure referred to in the ZF instructions! You will swap out the old calipers to a new set provided by Proterra.

Reporting Work Completion:

ZF REPORTING REQUIREMENT: The provided Form MUST BE COMPLETED

for each Brake Caliper on the ZF Rear Axle:

(One (1) Claim Form per Caliper – Two (2) Claim Forms per Vehicle Axle)

Swap out both the left and right rear brake calipers on the axle before reporting work completion. Please collect all relevant data regarding the repair as specified in the ZF Work instructions, and report all work completion and claims to Proterra using the *PROTERRA – ZF REAR AXLE BRAKE CALIPER VERIFICATION FORM* (provided in this bulletin and as a separate document) promptly upon completion of the work. Proterra will report work completion to ZF.

If you have any questions, please contact the Proterra Customer Service Team at **864-438-0000** or Service@Proterra.com.

ZF Knorr SB7 Caliper Recall Campaign Work Instructions

This Service Bulletin describes the work instructions for the ZF – Knorr SB7 brake caliper recall:

1. Identification

Identification of affected buses

1. Affected rear drive, center axles and Knorr radial brake caliper information will be provided by ZF/OEM
2. Documentation of completed service to be logged on affected axle spreadsheet provided by ZF/OEM
3. Training documentation and instructional video will be available through ZF/OEM



Knorr Brake Caliper Version SB7 identification City Bus application

- ✓ Caliper identification: - SB7 (**S**cheiben**B**remse)
- ✓ The Knorr type plate includes brake type, Knorr-Bremse part number, axle or vehicle manufacturer's identification number and Knorr-Bremse date of manufacture
- ✓ Radial disc brake SB7 caliper are installed on rear axles (center/drive) with radial mounted service/parking brake chamber

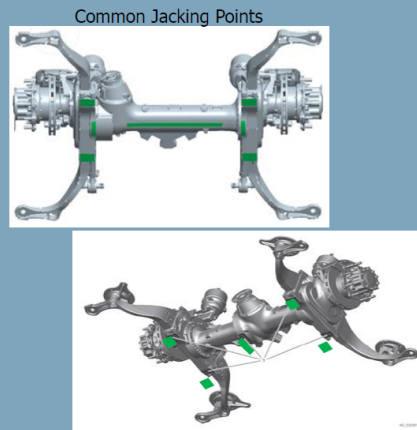
Identification Plate variations

Radial disc brake SB7

2. Preparing the Bus

Jacking up the vehicle

1. Place lifting platforms under each single wheel and secure the vehicle against rolling away
2. Ensure by all means that ignition of the vehicle is OFF
3. Hoist the lifting platforms equally
4. Afterwards secure the vehicle with additional supports Increase the number of supports accordingly for an articulated bus (6 or 8 pieces)
5. Choose the correct supporting points of the vehicle Observe the vehicle manufacturer's instructions and stick to the markings
6. Place the support in a way to prevent it from being an obstacle
7. If using additional supports to secure the axle on the axle housing refer to ZF AV Axle Operating instructions manual for correct jacking points

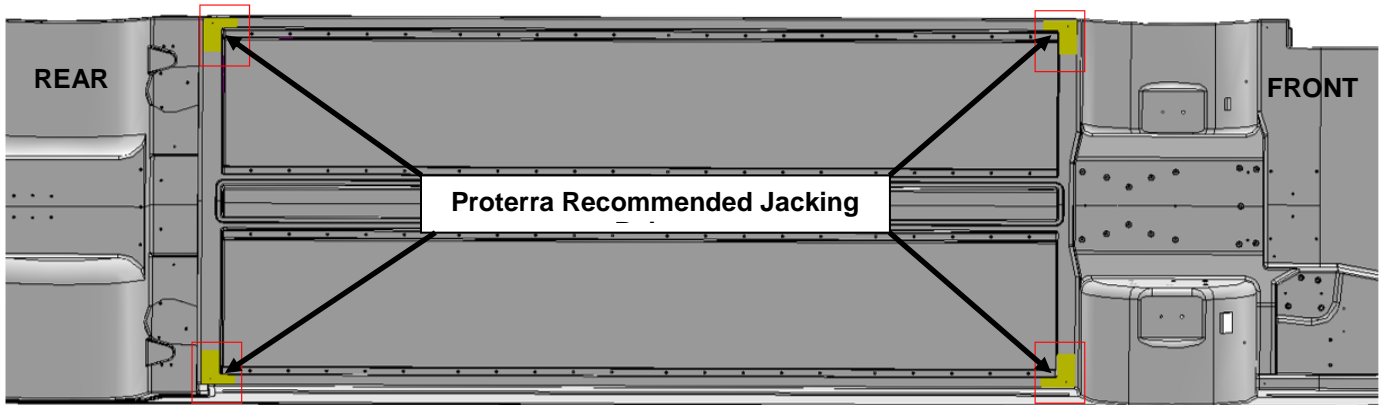


3. Proterra-Specific Jacking Information



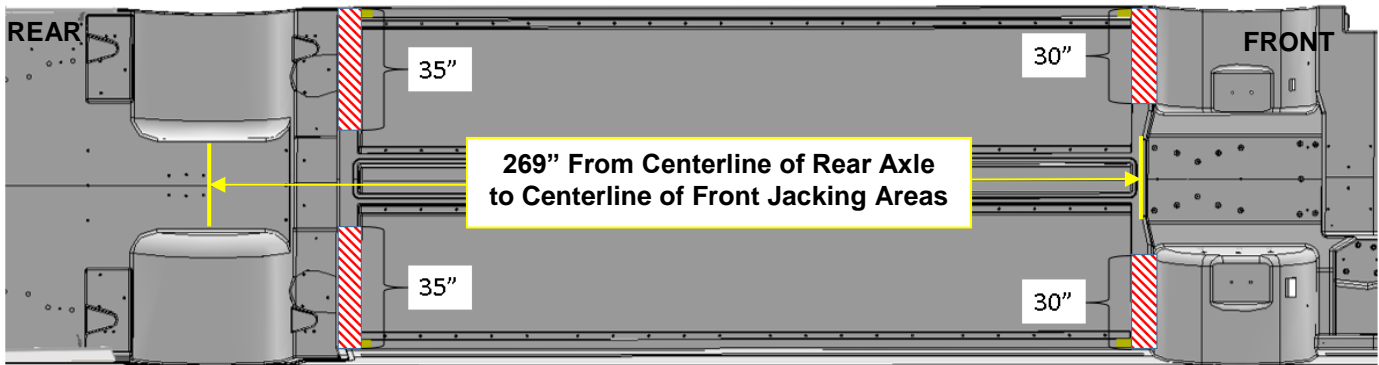
WARNING! Lifting the bus improperly can cause serious damage to the bus and may be hazardous to personnel. Proper Jack Points and equipment must be used to lift the bus safely.

1. The locations shown below are the Proterra Recommended jacking/hoisting locations:



NOTICE! If the Jacking Plates can't be used, the preferred method to lift the bus is by using the Rear Axle and the Front 30" Lifting Areas shown below. The 35" Rear Lifting Areas may also be used if you can't lift by the Rear Axle.

2. The bus may be picked up by the following locations, but **MUST** have a surface area of no less than 5 square inches per mounting pad that contacts the bus body. The zones shown below are acceptable lifting areas:



3. The bus should never be lifted by the front suspension A-arms. The following photographs show front end damage due to improper lifting.



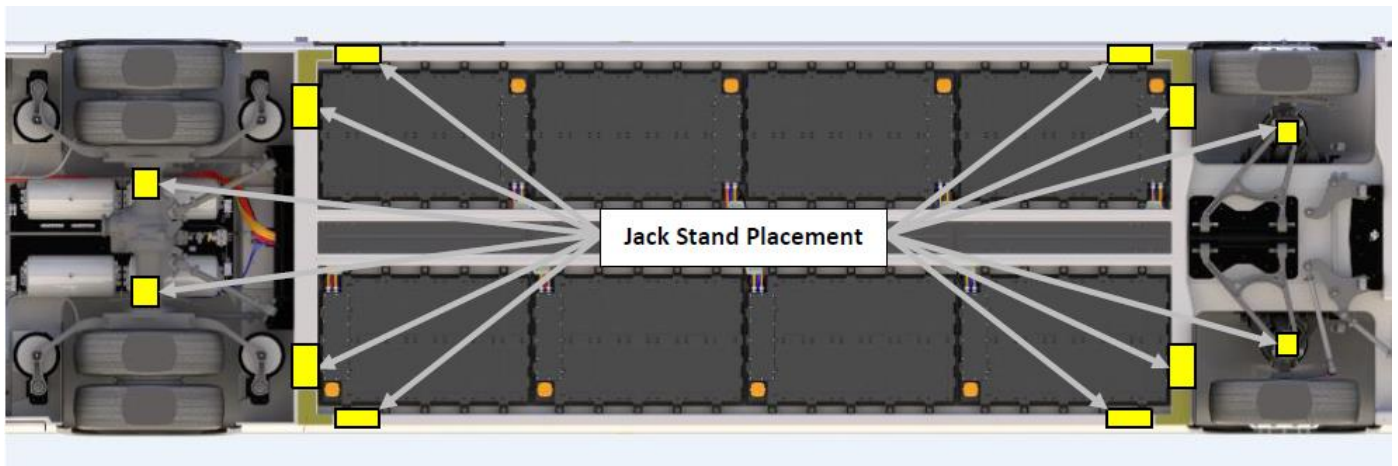
NOTICE! If it is necessary to lift by the front suspension, only lift with the jack placed on the knuckle.

When supporting the bus on jack stands, it is recommended to place the stands as close as possible to the designated jacking points. The jack stands may be placed on the outer edge of the composite body structure or along the inner edge of the forward/rear bulkhead as shown below.

WARNING! Be aware of the location of the battery pack enclosures and mounting brackets and **DO NOT** place the jack stands in a location that may contact these components.

If placing jack stands under the rear axle, place the jack stands as far out toward the outside edge of the rear axle as possible. If placing a jack stand under the front suspension, place the jack stands on the front suspension knuckles.

WARNING! Never support the bus using the front suspension A-arms or in any other location not designated below. Serious damage or personal injury may occur.



CAUTION! If the front suspension is not supported when lifting or placed on jack stands, you must drain the air from the front air bags to prevent damage to the front shock absorbers.

4. Verifying/Recording Axle Serial Number

Verify the affected axle serial no. on the type plate

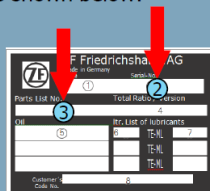
Containment:

Production data from Knorr indicates that ZF has received possible affected brake calipers within the following time period:

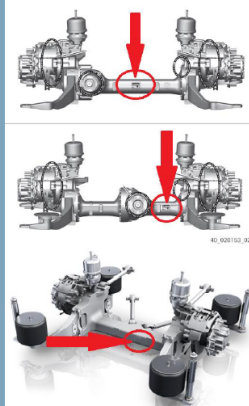
Production plant ZF Passau/Germany:
(ZF drive AV132/133 and center AVN132 axles)
Jan.2015 – Feb.2017
serial no. 3048079 – 3976077

Production plant ZF Gainesville/USA:
(only New Flyer with the AVN132 center axle)
Dec.2014 – March.2017
serial no. 301522 – 311709

Serial number (2) and parts list number (3) information can be located on the I.D plate as shown below:



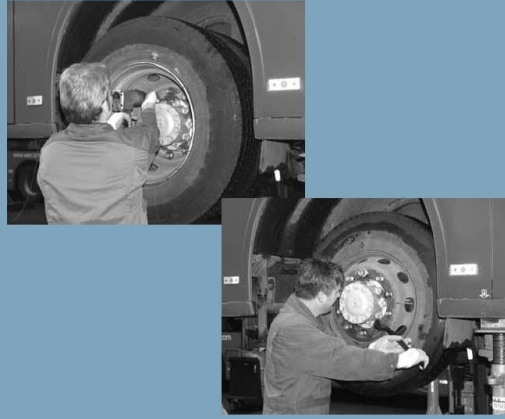
Type plate location



5. Executing the Repair

Removing the left and right wheels

1. Completely loosen the Lug nuts, but do not fully remove one of the nuts (in 12-o'clock position)
2. Support the wheel by a wheel lift, loosen the remaining Lug Nut and remove the wheel
3. Pay attention that the second wheel does not drop!
4. If the second wheel got stuck, screw in a Lug nut in 12 o'clock position by some thread turns
5. Then loosen the wheel by means of a suitable assembly lever
6. Support the wheel by means of a wheel lift. Unscrew remaining Lug nut and remove the releasing wheel

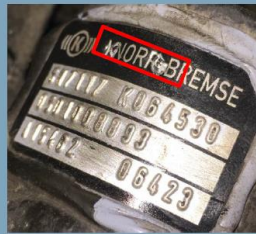


Verification of the affected Knorr brake caliper production no.

- ✓ Remove caliper type plate protective film and note caliper information on check sheet
- ✓ The brakes possibly affected are 22.5" Radial disc brakes SB7XXX, manufactured between 01.01.2015 and 16.01.2017
- ✓ The production date of the disc brakes can be determined from the serial number. The first 6 digits of the serial number can be decrypted as follows:
 - ✓ Digit 1: A, L, or C for the manufacturer
 - ✓ Digit 2 + 3: Year of manufacture e.g. 15 = 2015
 - ✓ Digit 4 + 5: Production week, e.g. 36 = 36th week in the year of manufacture
 - ✓ Digit 6: Day in the production week 1 = Monday, 2 = Tuesday, etc.
- ✓ Parts manufactured during this period have a manufacturer code beginning with an A or L followed by 15xxx xxx and ending with an A or L followed by 17031

NOTICE

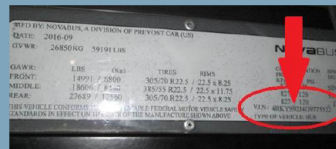
If the caliper has been already modified no modification needed (visible with a punch on the type plate)



Collect all relevant data

- ✓ Please collect all relevant information
- ✓ Requirement is to submit 1 claim per caliper (2 claims per axle)
- ✓ Must provide Knorr caliper type plate information including removed and replacement caliper information (where applicable)
- ✓ Please provide information listed below as well:
 1. Vehicle in service date (provided by depot)
 2. Vehicle fleet number
 3. Chassis no. (VIN number)
 4. Vehicle mileage
 5. Axle part list number
 6. Axle serial number
 7. Date of re-bushing

Typical VIN location



Dash Mileage readout



Complete the **PROTERRA – ZF REAR AXLE BRAKE CALIPER VERIFICATION FORM**

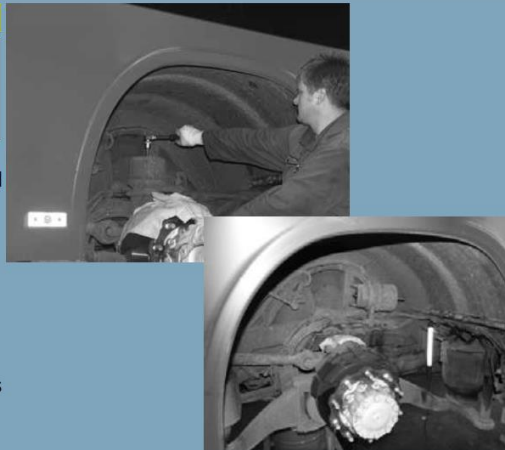
Removal of the brake chambers left and right side

1. Cage the parking brake

Caution!

*Ensure that the park brake is engaged and the spring chamber is released by compressed air
Note: Without air-released spring brake, the caging bolt will be difficult and time consuming to release.*

2. Do not use "power tools"!
3. Clean the surrounding of the attachment areas in order to avoid ingress of dirt into the interior of the brake
4. Loosen the locknuts and remove brake chamber
5. Fix brake chamber with suitable aids (e.g. wire, rope) in the wheel house and cover the openings
6. Inspect mounting face on the brake caliper for any signs of moisture (rust) or contamination
7. If corrosion or contamination is discovered inside the caliper, replace the caliper assembly per the manufacturer's instructions
8. Protect the mounting face on the brake caliper by an adequate protective cover or cloth



Remove electrical wear sensor connections or potentiometer connections

1. Loosen the screws at the potentiometer (wear indicator) and pull off the releasing plug
2. Inspect for any bent pins or corrosion at the plug
3. Replace harness as necessary if damage or corrosion is discovered

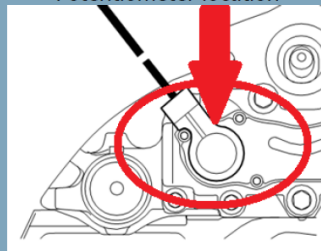
Removal of potentiometer screws



NOTICE

Pad wear may be monitored on certain busses through the dash. If reading is N/A in any position, potentiometer must be tested for correct function

Potentiometer location

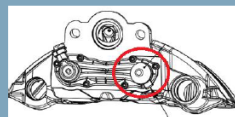


Remove the brake pads

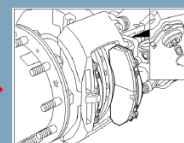
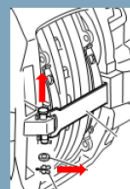
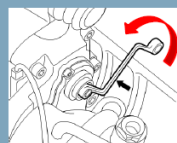
✓ To remove brake pads proceed as follows:

1. Remove adjuster rubber cap
2. Turn adjuster (10mm) in counterclockwise direction manually until contact is obtained
3. Remove spring split pin.
4. Remove washer and pin
5. Remove pad retainer bar
6. Remove brake pads

Slack adjuster location



Back off slack adjuster and remove the pad retainer bar in order to remove pads



Remove the 6 bolts of the carrier towards the drive/center axle

- ✓ To remove the caliper and carrier together proceed as follows:
 1. Loosen 6 hexagon bolts and fit bolt on the brake caliper carrier
 2. If the threads of the bolts or the bore is not damaged or corroded, the bolts can be reused
 3. Remove brake caliper and carrier from axle

NOTICE

Pay close attention to the position of the fit bolt. Carrier bracket has small recess only in one location for position of the fit bolt



CAUTION

Hold Caliper only at its outer side. Never get your fingers between Caliper and Carrier!

NOTICE! The Proterra vehicles WILL NOT require re-bushing per the Knorr-Bremse Repair Manual as the entire caliper assembly will be replaced as part of this Service Bulletin.

Refit the brake chamber

- ✓ To install brake chamber proceed as follows:
 1. Ensure that the spring brake is still released by compressed air
 2. Mount brake chamber with the connections in direction as removed
 3. Fix brake chamber on brake caliper by means of new locknuts
 4. Tightening torque (M16x1.5) MA = 195 ± 15 Nm
 5. Release the caging bolt to the brake release position with the tightening torque specified by the manufacturer

Note:

Different manufacturers may call for different torques and the actuator is not always included in ZF's delivery scope

6. Install the potentiometer (wear indicator) electrical connector and tighten the two screws

Install new locknuts and torque



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Reinstall the wheels

- ✓ To reinstall wheels proceed as follows:
 1. Use a suitable wheel lift to mount both wheels one after another, afterwards bolt wheel nuts on wheel studs
 2. Make sure that contact faces are clean and valves of the wheels are in opposite position. Tighten wheel nuts crosswise
 3. For tightening torque refer to manufacturers specification
 4. Retighten wheel nuts after 30 miles of travel!



Deceleration test

- ✓ Perform deceleration test of service brake and parking brake after completion of caliper replacement/re-bushing and ensure that the decelerations meet the pass criteria's

Brake Meter test printout

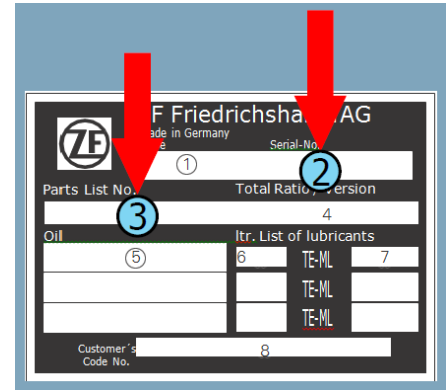
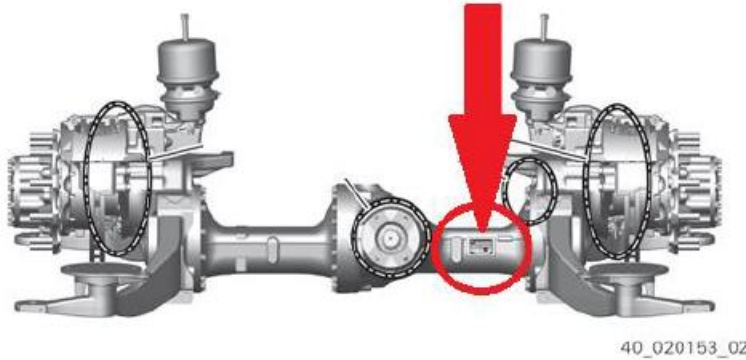


PROTERRA – ZF REAR AXLE BRAKE CALIPER VERIFICATION FORM (Service Bulletin SB-18-75)

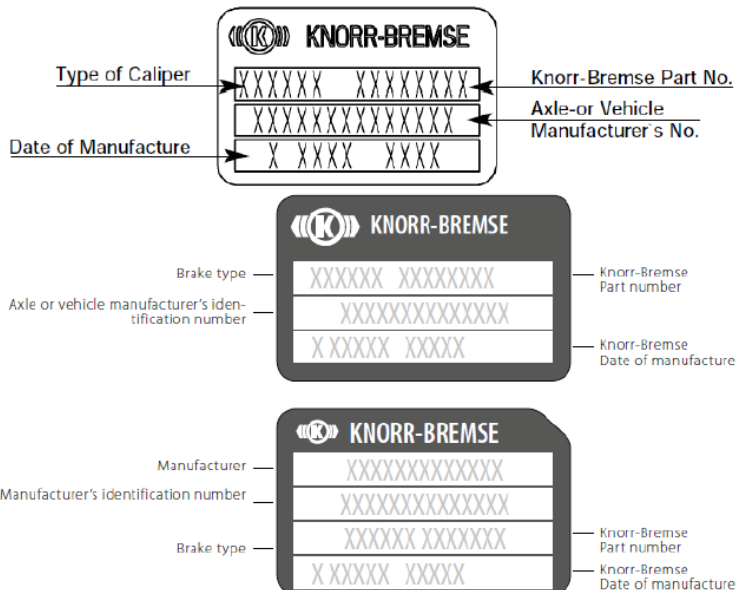
IMPORTANT! This form **MUST BE COMPLETED** for each Brake Caliper on the ZF Rear Axle
(One (1) Claim Form per Caliper – Two (2) Claim Forms per Vehicle Axle)

Transit Agency: _____ Date Claim Completed: _____
 Fleet Number: _____ VIN Number: _____
 Vehicle Mileage: _____ Vehicle In-Service Date: _____

Record 1:	Record the ZF Axle Serial Number and Parts List Number		
	Location 2	Serial-No.	
	Location 3	Parts List No.	



Record 2:	Record the Knorr-Bremse Brake Caliper Serial Numbers (Removed/Installed)		
		Circle One Side	Serial No.
	Removed Brake Caliper SN:	Curb Side / Street Side	
	Installed Brake Caliper SN:		



REQUIRED: When this Verification Form has been completed, send to:
 Sarah Hulseman-Coletti (Proterra Field Service)
 1 Whitlee Court, Greenville, SC 29607
shulseman@proterra.com (864) 238-5632