Meritor
Foundation Brake Training

Jason Baumann – Trainer
Vaughn Holdsworth – Specialty Service Manager
Matt Long – Specialty Field Service
Agenda

- Meritor Foundation Brake (Cam Brake) (8:30-11:00)
  - Component Identification
  - Basic Operation
  - Diagnosis and Setup
- Meritor Air Disc Brake Overview (11:00-12:00)
  - Component Identification
  - Basic Operation
  - Diagnostics and Setup
- Lunch (12:00-1:00)
- Hands On / Lab Instruction (1:00-2:30)
- Meritor Support / Q&A (2:30-3PM)
  - OnTrac Technical Support / Warranty
  - Bullpen Online Training
Meritor Foundation
Brake Training
Cam Operated Foundation Brakes

▪ Most important feature of a cam brake is its simplicity
  • Easy to maintain
  • Provides good durability through simple design and minimal parts

▪ Limitations include:
  • Limited stroke
  • Contact forces
The air chamber connects the air system to the cam brakes

A pushrod in the air chamber actuates the brake
A clevis is either threaded or welded onto the pushrod.

A clevis pin connects the push rod to the automatic slack adjuster – which enables the slack adjuster to pivot.
The slack adjuster is splined to the camshaft which is mounted in a bracket and supported by two bushings.

One end of each brake shoe is supported on the camshaft head through the two rollers.
The brake shoes are mounted to the brake spider by anchor pins which enable the shoes to pivot on the anchor pins during operation.

The brake spider is either bolted to or welded to the axle end.
The S shaped cam rotates as brakes are applied and force the brake shoes into the drum.

When the brake shoes are forced into the drum, friction is created that slows the movement of the drum, which stops the vehicle.
Cam Brake Shoes

- Structure that holds and applies the linings to the drum

- Primary Shoe
  - AKA Leading shoe
  - First shoe after the cam in the direction of the wheel rotation
  - Provides greater (primary) output

- Secondary Shoe
  - AKA Trailing shoe
  - After the cam in the direction opposite of wheel rotation
Cam Brake Identification

- Different ways to identify a Meritor Brake
  - Lining information
  - Brake Shoe Tag
  - Camshaft tube tag
  - Slack Adjuster Tag

- If all else fails, check the axle model #
  - Many Meritor model numbers will tell you what type of brake was used during production.
Cam Brake Identification

- **Assembly Tag**

  - Letters other than these are for older Q design (not Q Plus™)
    - P = Plus
    - L = Lx500
    - V = MX500
    - Q = Quick Change
    - S = Stamped Spider
    - K = Integral Knuckle
    - C = Cast Plus

  - XXXX 1657 1234

  - QPH-1657-1234 = Heavy Duty Q Plus™ (with or without chambers or automatic slack adjusters)
  - QPT-1540-1234 = TracLok™ (with or without chambers or automatic slack adjusters)
  - QP6-1658-1234 = 16-1/2 x 8-5/8 Q Plus™
  - QP6-16508-1234 = 16-1/2 x 8 Q Plus™

  - Specification Number
  - Place holder needed for 16506 brakes

  - 1 = With Manual Slack (Export Only)
  - 2 = With Automatic Slack
  - 3 = With Manual Slack and Air Chamber
  - 4 = With Automatic Slack and Air Chamber
  - 5 = Less Slack but with Air Chamber Supplied
  - 6 = Less Slack and Less Air Chamber
    - A thru Z
    - H = Heavy Duty Features
    - T = TracLok™ Feature

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Cam Brake Lining Identification

- The information that exists on the edge code of the lining is listed in the following order.
  - Meritor stamped logo
  - Lining mix designation
  - Friction code
  - Friction Material Standards Institute (FMSI) number, four to eight spaces
  - Block type
  - Meritor part number, last four digits
  - Word drawing engineering change letter
  - Julian date, four or five characters
Cam Brakes Identification

- Tag on Shoe
Friction Material Designations

- **MAXXX** – “Meritor Approved”
- **SORXXX** – “Spec Only Release”
- **RXXX** – “Rockwell Released”

- **MA2XX** – 20,000 lbs Rated Material
- **MA3XX** – 23,000 lbs Rated Material
- **MA4XX** – High Friction Material
- **MA5XX** – Wedge Brake Material
- **MA6XX** – Specialty Material
- **MA7XX** – Disc Brake Material
Brake Chamber Operation Review

Spring brake applied

No air applied to the chamber. Parking or Spring brake is applied. Vehicle parked.

Spring Brake released

Air applied to the parking or spring brake side of the chamber. The spring is compressed to release the brakes.
Spring brake released. Air applied to the parking or spring brake side of the chamber. (driving)

Service brake application. Air is applied to the service side of the chamber. (air applied to spring brake)
The caging or release tool is used during brake repair to release the spring brake. Caging or releasing the spring allows the brake to be serviced, or to move a vehicle in a no air emergency. The tool is stored in the chamber body.
DANGER: Powerful expansion spring could cause severe personal injury and/or property damage.

DISPOSAL?
Brake Chamber Disarming Tool
Long Stroke Air Brake Chambers

Spring brake chamber identification

Long Stroke

Permanent Identification the brake Chamber

Square Port Boss

Standard Stroke

Round Port Boss

Proprietary ©Meritor, Inc., 2019
Long Stroke Air Brake Chambers

Service brake chamber identification
- Determines adjustment on power stroke (brake application)
- Adjusts on brake return stroke
- Uses internal adjusting pistons to provide consistent adjustment throughout lining life
Meritor Automatic Slack Adjuster

- Puncture Resistant Boot
- Improved Clevis Pin Bushing
- Redesigned Housing - Lightest Weight ASA
- Variety of Pistons
- Lubrication Holes and Groove
- Improved Gear Face Seals
- Improved Worm Seal
- Buttress-Type Worm Gear
- Manual Adjusting Nut
- Meritor Automatic Slack Adjuster
Pull Pawls

- Pull pawls are spring loaded.

- Pry the pull pawl out at least 1/32” to disengage the teeth.

- The earlier style (pre ‘93) automatic slack adjuster can be retrofitted with this new type.
### Piston height determines adjustment

#### PISTON ACTUATORS

![Diagram showing piston height and dimensions](image)

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>END TO CENTER OF PIN HOLE</th>
<th>TOP OF ROD CAVITY TO TOP OF PISTON</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2230-C-159</td>
<td>7/16&quot;</td>
<td>7/32&quot;</td>
<td>Blue</td>
</tr>
<tr>
<td>2297-H-2842</td>
<td>15/32&quot;</td>
<td>1/4&quot;</td>
<td>Green</td>
</tr>
<tr>
<td>2230-N-1054</td>
<td>15/32&quot;</td>
<td>1/4&quot;</td>
<td>Yellow</td>
</tr>
<tr>
<td>2297-W-3637</td>
<td>15/32&quot;</td>
<td>1/4&quot;</td>
<td>Red</td>
</tr>
<tr>
<td>2297-B-4188</td>
<td>15/32&quot;</td>
<td>1/4&quot;</td>
<td>Black</td>
</tr>
</tbody>
</table>

- **47/64"**
- **45/64"**
- **11/16"**
- **43/64"**
- **41/64"**
- **5/8"**
Piston color identification

Current Design

24 = Chamber Size
30 = Chamber Size
A28 1152S = Assembly Number
DR = Drum
03212 = Julian Date (212th day of 2003)
YEL = Piston Color (Yellow)
2R801073 = Aftermarket Part Number
▪ **De-adjustment**
  - Pull pawls are spring loaded.
  - Pry the pull pawl out at least 1/32” to disengage the teeth when de-adjusting the brake.

▪ **Adjustment**
  - Turn manual adjusting nut counterclockwise until the linings touches the drum
  - Turn the adjusting nut 1/2 turn for drum brakes
  - Check free stroke
Camshaft

- Rotated by ASA, separates the rollers
- Camshafts are directional
  - Observe camshaft profile to determine whether left or right handed
- Desired application is to have camshaft rotate in the same direction as the wheel end
Cam Rotation

Right hand camshaft

Left hand camshaft
***Use the schedule that requires the most frequent inspection and lubrication from the list below***

- Vehicle manufacturer’s schedule
- Fleet’s schedule
- Every six months
- A minimum of four times during the life of the linings
Refer to MM4 for Meritor Grease recommendations

*Note: Release the parking brake before greasing brake components.

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**Lubrication**

**Cam Brakes**

Refer to Table H for grease specifications.

**Table H: Cam Brake Grease Specifications**

<table>
<thead>
<tr>
<th>Components</th>
<th>Meritor Specification</th>
<th>NLGI Grade</th>
<th>Grease Type</th>
<th>Outside Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retainer Clips</td>
<td>0-704</td>
<td>2</td>
<td>Calcium Sulfonate</td>
<td>Down to −30°F (−34.4°C)</td>
</tr>
<tr>
<td>Anchor Pins</td>
<td></td>
<td></td>
<td>Complex</td>
<td></td>
</tr>
<tr>
<td>Rollers (Journals Only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camshaft Bushings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camshaft Splines</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic Slack Adjusters*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Inspect the clevis pins for rotation and lubricate with Anti-Seize
Free Stroke and Applied Stroke
Meritor TP-0879 Provides Free Stroke Information
Meritor TP-0879 Provides Applied Stroke Limits

MAXIMUM ADJUSTMENT LIMITS FOR S-CAM AIR BRAKES WITH CLAMP-TYPE CHAMBERS

You can determine the type (or size) of brake chamber 3 ways:
1. Use a special tool.
2. Look for the word "TYPE" followed by a number (e.g., 8, 15, 18, 20, 24, 30, 38) on the clamp or body of the brake chamber, or
3. Ask a certified brake technician.

NOTE: Although multiple types of the same common brake chamber, there are others.
Check with a certified brake technician if you are uncertain about the style, type and maximum applied stroke of brake chambers installed on your vehicle.

STANDARD Stroke Brake Chambers

Standard stroke brake chambers generally have:
- ROUND ports,
- NO SPECIAL TAG or service instructions embossed on flange case.

LONG Stroke Brake Chambers

Look for one of the following three features. They generally distinguish a long stroke brake chamber from a standard stroke brake chamber (SAE J1817):
1. Raised SQUARE port on spring brake chamber (NOTE: used on Type 24" and Type 30L chambers ONLY) or Raised SQUARE embossment (service brake chamber)
2. TRAPEZOID-shaped tag
3. INSTRUCTIONS EMBOSSED on flange case (Example: "Use only 3 inch long stroke diaphragm")

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Brake Adjustment Limit @ 80-100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1-3/4 inches (35 mm)</td>
</tr>
<tr>
<td>12</td>
<td>1-3/4 inches (35 mm)</td>
</tr>
<tr>
<td>15</td>
<td>1-3/4 inches (35 mm)</td>
</tr>
<tr>
<td>18</td>
<td>1-3/4 inches (35 mm)</td>
</tr>
<tr>
<td>20</td>
<td>1-3/4 inches (45 mm)</td>
</tr>
<tr>
<td>24</td>
<td>1-3/4 inches (45 mm)</td>
</tr>
<tr>
<td>30</td>
<td>2.0 inches (51 mm)</td>
</tr>
<tr>
<td>38</td>
<td>2-1/4 inches (57 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TYPE</th>
<th>Brake Adjustment Limit @ 80-100 psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>12L</td>
<td>1-3/4 inches (45 mm)</td>
</tr>
<tr>
<td>15L</td>
<td>2.0 inches (51 mm)</td>
</tr>
<tr>
<td>20L</td>
<td>2.0 inches (51 mm)</td>
</tr>
<tr>
<td>24L</td>
<td>2.0 inches (51 mm)</td>
</tr>
<tr>
<td>24</td>
<td>2-1/2 inches (64 mm)</td>
</tr>
<tr>
<td>For 3&quot; maximum stroke Type 24 chambers</td>
<td>2-1/2 inches (64 mm)</td>
</tr>
<tr>
<td>30L</td>
<td>2-1/2 inches (64 mm)</td>
</tr>
</tbody>
</table>

A WARNING: Self-adjusting brake adjusters should only need manual readjustments when they are first installed and when brakes are relined. Only perform a "temporary" moderate manual re-adjustment to safely drive the vehicle directly to a certified shop for troubleshooting and repair.

A REMEMBER: Brake adjustment problems could be caused by the adjuster; the chamber; the foundation brake; or other parts of the brake system.

A REMEMBER: Manually re-adjusting a self-adjusting brake adjuster does not fix the problem; will not keep the brake in adjustment; may contribute to abnormal wear of the internal adjusting mechanism; and could cause the brake to fail.
**Reassembly tips:**

- Lightly lubricate S-cam bushings and seal lips prior to S-cam installation
- Do not use vice grips, side cutters or screw drivers to install springs
- Remember to lube anchor pins and roller ends only
- Rotate the S-cam so the brake shoes are down in each “Pocket” to make spring installation easier
- Point the “open ends” of the return spring away from the center of the axle
- Use recommended tools to make the job safer and easier
Apply Anti-Seize to the anchor pins and High heat grease to the ends of the brake rollers – NOT THE ROLLER BODY! Done at Meritor Plant!
- With the brakes released, what angle is the automatic slack adjuster set at?
- This **directly effects** how the ASA will function
Meritor ASA’s must be set at 101 degree angle on truck, tractor, bus and coach, 105 degrees on a trailer

• Baseline 101 / 105 degrees.
• Less (95, 90 etc.) will create a tighter clearance.
• More (110, 115 etc.) will create a greater clearance.
• Proper ASA set up will allow a design clearance of .030” between the brake lining and the drum.
Meritor ASA set up

- Meritor ASA can be set up with two tools:
  - Meritor ASA template
  - Tape measure
    - BSAP-brake slack adjuster position
Clevis Design

• Since the development of the long stroke chamber in the industry, an additional brake clevis was created to allow proper set-up and operation of actuator type ASA’s.
• The previous clevis was a 1.38 inch clevis (distance from centerline of each clevis pin). The new clevis is 1.30 inch or 0.080 inch less than the previous clevis. There are now 2 clevis’ in the industry, the 1.38 and 1.30 inch.
• Each Clevis has a specific setting on the pushrod.
  - Truck / tractor: Brown or Grey Template or BSAP
  - Trailer: Tan Template
Meritor ASA Templates: Truck and Tractor Only

- The 1.38 inch clevis must be used with a BSAP of 2 ¾” using the Meritor dark brown ASA template (TP-4786).

- The 1.30 inch clevis must be used with a BSAP of 2 ¼” using the Meritor grey ASA template (TP-10130).
Meritor Stroke Sensing ASA

Meritor ASA Templates in detail

Meritor Automatic Slack Adjuster Installation Template for Trucks/Tractors with Drum Brakes with 1.38" Hole Clevis

Meritor Automatic Slack Adjuster Installation Template for Trucks/Tractors with Drum Brakes with 1.30" Hole Clevis

Proprietary ©Meritor, Inc., 2019
Refer to Meritor MM-4 for other ASA lengths and chamber bracket offsets.
Manual Adjustment:
• Turn manual adjusting nut counter-clockwise until the linings touch the drum
• Turn the adjusting nut 1/2 turn for drum brakes

Free Stroke Check:
• With parking brakes released
• Pull the pushrod out until linings touch the drum
• Must be ½” to 5/8” movement

Applied Stroke Check:
• With parking brakes released
• Air system regulated to 90-100 PSI
• Verify applied stroke is within limits based on chamber size and type
*Always thread jam nut on before cutting to aid in cleaning threads from the cutting process

*Spring brake must be fully caged and released before cutting pushrod

Figure 5.17

6. Verify that the push rod does not extend through the clevis more than 0.125-inch (3.2 mm).
   - If the push rod extends through the clevis more than 0.125-inch (3.2 mm): Cut the push rod or install a new air chamber and push rod.

Figure 10
- Proper measurement is critical to brake performance

- Cut at X on new chamber
- Ensure new chamber is fully released before cutting
• Be aware of other BSAP dimensions.
• This is a partial list only.

<table>
<thead>
<tr>
<th>Stroke</th>
<th>Model</th>
<th>Y-Dimension</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5&quot;</td>
<td>C30</td>
<td>2.25&quot;</td>
<td>Most</td>
</tr>
<tr>
<td>3.0&quot;</td>
<td>TR3030LP3</td>
<td>3.063&quot;</td>
<td>Thomas Bus</td>
</tr>
<tr>
<td>3.0&quot;</td>
<td>TR3030LP3T</td>
<td>2.87&quot;</td>
<td>Autocar, Paccar</td>
</tr>
<tr>
<td>3.0&quot;</td>
<td>TR3030LP3THD</td>
<td>4.20&quot;</td>
<td>Mack</td>
</tr>
</tbody>
</table>
Replacing a Brake Chamber

- Proper measurement is critical to brake performance
  - Cut at X on new chamber
  - Ensure new chamber is fully released before cutting
Brake Camshaft

Cam Rotation

- Cam Same
- Tire Rotation
- Cam Opposite

Leading Shoe
Trailing Shoe

Leading Shoe
Trailing Shoe
Brake Camshaft

Vector* Comparison

*Vector: A force with both length and direction
Q: Why have a cam opposite brake if it is a disadvantage?

A: Some suspension systems do not have enough clearance to allow the chamber brackets to be mounted in the proper location to allow cam same brakes.
Meritor ASA under adjusting

- ASA *set up* issue, brake system issue, chamber issue, incorrect ASA application (length/piston color).
- **DO NOT** adjust brakes and let go, fix the problem.

Diagnostics

- Check ASA set up with template, procedure or by dimensional set up (BSAP).
- Check for excessive looseness in the camshaft splines, camshaft bushings, or clevis pin.
- Check for weak brake shoe return spring or brake chamber return spring.
- Check for inoperative automatic slack adjuster.
- Check for incorrect ASA application (length/piston color).
Brake Noise / Shimmy

Symptom:
Shimmy or vibration occurs when brakes are applied.

Possible Causes:

- Radial wheel end runout is excessive (as measured on the friction surface of an assembled drum).
- The hub-piloted brake drum is mounted incorrectly.
- Wheel bearing end play is excessive.
- Brake drum runout is over 0.020" (0.508 mm).
- Drum is out of balance or missing weights.
- Discrepancies exist in brake adjustment.
- Brake wear is inconsistent.
- Brake components (i.e. springs, rollers retainers) are broken or missing.
- Different length slack adjusters are used on the same axle.
- Different brake chamber sizes are used on the same axle.
- Brake attaching hardware is broken, loose or missing.
- Wheel/Tire lateral or radial runout is excessive.
- Vehicle is out of alignment.
- Steering or suspension hardware or components are loose.
Brake Pull (balance)

Symptom:
Brake squeal/chatter/noise occurs upon brake application.

Possible Causes:
- Brake components (i.e. springs, rollers retainers) are broken or missing.
- Brake attaching hardware is broken, loose or missing.
- Brake wear is inconsistent.
- Linings are glazed (20% or less of lining friction surface).
- Linings are glazed (greater than 20% of lining friction surface).
- Lining selection is incorrect.
- The drum brake surface is aligned with shoe high spots on the brake lining.
Rockwell ADB 1560 Model ADB
Specialty Commercial Vehicles
Rockwell ADB 1560 Model Air Disc Brake

- Manufacturer - Rockwell (Meritor)
- Production Years - 1981 to 2007
- Typical Application - Fire Truck
- Maintenance Manual 4M
- Service Kits Parts Catalog - PB-8857
Rockwell ADB 1560 Model Air Disc Brake

Models
- ADB 1540
- ADB 1560 (most common)
- ADB 1760

Ref. Maintenance Manual 4M
Rockwell ADB 1560 Model Air Disc Brake

- Meritor Automatic Slack Adjuster
  - Front steer axle
    - Green piston
  - Rear drive axle with T30 chamber
    - Blue piston
- Single piece bridge and carrier
- Exposed slide pins
The air chamber push rod rotates the ASA attached to the powershaft.

The powershaft threads the nut actuator towards the rotor.

The nut actuator forces the brake piston and inboard lining against the rotor.

The force between the inboard lining and rotor pulls the caliper along the slide pins and pulls the outboard lining into the rotor.
Rockwell ADB 1560 Model Air Disc Brake

• Installation of ASA
  • Release spring brake.
  • Install ASA, spacer washers, and snap ring.
  • Set BSAP
  • ASA clearance: check for 0.062” of clearance between washer & snap ring.
Checking Brake Free Stroke

- Clearance between lining and rotor.
- Initial Free Stroke of 7/8”-1 1/8”.
- In service Free Stroke of 3/4”-7/8”.

Rockwell ADB 1560 Model Air Disc Brake

MEASURE "FREE STROKE"

INITIAL: Y MINUS X MUST = 7/8-1-1/8"
IN SERVICE: Y MINUS X MUST = 3/4-7/8"
• Checking Brake Applied Stroke
  • Measure pushrod w/brake released.
  • Apply 100 psi brake pressure.
  • Measure pushrod w/brake applied.

Table E: “Standard Stroke” Clamp-Type Brake Chamber Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Outside Diameter (inches)</th>
<th>Brake Adjustment Limit (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>6-3/8</td>
<td>1-3/4</td>
</tr>
<tr>
<td>20</td>
<td>6-25/32</td>
<td>1-3/4</td>
</tr>
<tr>
<td>24</td>
<td>7-7/32</td>
<td>1-3/4</td>
</tr>
<tr>
<td>30</td>
<td>8-3/32</td>
<td>2</td>
</tr>
<tr>
<td>36</td>
<td>9</td>
<td>2-1/4</td>
</tr>
</tbody>
</table>

Table F: “Long Stroke” Clamp-Type Brake Chamber Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Outside Diameter (inches)</th>
<th>Brake Adjustment Limit (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>6-3/8</td>
<td>2.0</td>
</tr>
<tr>
<td>20</td>
<td>6-25/32</td>
<td>2.0</td>
</tr>
<tr>
<td>24</td>
<td>7-7/32</td>
<td>2.0</td>
</tr>
<tr>
<td>24*</td>
<td>7-7/32</td>
<td>2.5</td>
</tr>
<tr>
<td>30</td>
<td>8-3/32</td>
<td>2.5</td>
</tr>
</tbody>
</table>

* For 3" maximum stroke type 24 chambers
• Lubrication of Caliper

  • 3 Designs

    • Before 1985 – One Grease Fitting on caliper w/ Relief Valve

    • 1985 to mid 1992 – One Grease Fitting on powershaft cap w/ Relief Valve

    • 1992 to 2007 – Two Grease Fittings, one on caliper and one on cap w/ Relief Valve
All Designs

- Turn adjuster to extend powershaft; linings contacting the rotor.
- Hold finger over relief valve and lubricate fitting(s) until new grease flows from the seal at the Powershaft cap (if 2 fittings, grease caliper fitting first then cap fitting).
- Remove relief valve and disengage pull pawl.
- Bleed or Force any excess grease from Caliper by turning ASA adjusting nut to retract lining from rotor.
- Clean Excess Grease.
- Install Relief Valve.
- Adjust Brake Lining to Rotor Clearance.
Other Lubrication

- Slide Pins require NO lubricant
  - Make certain they are clean and dry.
  - Slide pins will attract dirt, sand, etc. if lubricated.
Preventive Maintenance-Wheels Off

Rotor Measurements

Solid Minimum = 0.779”
Vented Minimum = 1.626”

Maximum = 0.020” - TIR
Available Lining
- Direct visual inspection (1/8” of slide pin visible inboard, wheel off inspection required.

Running Clearance
- In service free stroke 3/4” to 7/8”

Seized mechanism
- The brake lever should be able to cycle by hand with the clevis detached and pads removed

Slide pins
- The caliper should slide freely by hand with the pads removed
• Dragging brake, caliper hanging up, brake not releasing.

  • Check slide pin condition.
  
  • Check slide pin bushing wear.

  • Check chamber for release issue.

  • Check for improper caliper greasing technique.

  • Check or install slide pin return helper springs. Small end outboard, large end inboard.
EX-225 Air Disc Brake

- Component Overview
- Serviceability Features
- Visual Pad Wear Indicator
- Wheels-On Inspection
Brake System Efficiency

Cam = 55% Efficient

Wedge = 90% Efficient

Disc = 93+% Efficient
Air Disc Brake Evolution

1980
External Slack
External Auto Adjust

1990
External Lever
Internal Auto Adjust

2000
Internal Lever
Internal Auto Adjust
Performance

- Disc brakes are more efficient than drum brakes.
- Disc brakes perform with virtually no fade.
- Disc brakes perform better in wet conditions.
- Disc brake shoe (pad) replacement is a simple task.
Air Disc Brakes Common Components.

Bridge

Carrier

Caliper

Operating lever, bearings, pistons or tappets, seals, self adjuster, manual adjuster.

Brake pads, hold down springs and hold down bracket.
Meritor EX Identification

Caliper Identification

Meritor ADB rear view.
1- Adjuster cover.
2- Solid cast housing.
3- Slide pin caps.
4- Electronic wear sensor plug.

Meritor 17mm hex head bolt.
Meritor EX Nomenclature

Caliper Identification

Use model number for parts procurement.
EX-225 Serviceability Features

- Visual wear indicator reduces brake inspection time
- Visual wear indicator helps measure brake wear without removing the wheel from the vehicle
1. Deadjust the brake ¼ turn counter-clockwise.
2. Apply 1-2 moderate brake applications.
3. The wrench must move clockwise as the running clearance is diminished.
The caliper should slide freely by hand with the pads removed.
Wheels-Off Inspection
Radial End Play Check

0.078” is the max allowed reading

Section 5 of MM-0467
Wheels-Off Inspection
Lateral End Play Check

0.118” is the max allowed reading

Section 5 of MM-0467
The piston and slide pin boots should be free of all damage and
Meritor EX+ Model

Preventive Maintenance-Wheels Off

Pad Abutments

Excessive wear = replace caliper assembly

Maximum 0.079” wear depth (per TMC RP 652).
EX-225 Air Chamber

- When replacing a caliper, the transit plug must be removed prior to installing the air chamber.

- When drain plugs are present after chamber installation, remove whichever plug is at the lowest position.
- Disc brakes can be outfitted with service only or Service/Parking brake assemblies.

- Typical sizes are T-20 and T-24.

- Typically these are long stroke chambers.

- Direct mounted ADB chambers are fitted with additional seals internally and at the caliper mounting area.

- Due to wheel end packaging often a special left or right side chamber is required for proper air hose routing.
EX-225 Air Chamber

Service and Repair Tips

- Some air brake chambers are equipped with a loose pushrod tappet.
- When removing or installing the chamber make certain the tappet does not fall out and is installed upon re-installation of the chamber on the caliper.
EX-225 Rotor Maintenance

THICKNESS MEASUREMENT

MINIMUM THICKNESS FOUND ON ROTOR CASTING

VENTED ROTOR

MICROMETER

OK

REPLACE
Preventive Maintenance-Wheels On

Rotor Inspection

Replace or resurface rotor:
1. Cracks= greater than=0.020”+75% of surface.
2. Cracks= extend through the rotor edge.
3. Scores= greater than 0.020”.
4. No heavy rusting.
Meritor EX-225 Tech Tips

Caliper LH/RH Mounting Position

Leading slide pin = long  Trailing slide pin = short
Meritor Support

- OnTrac Technical Support
- Warranty
- Parts
- Driveforce Network
- Meritor Bullpen Technical Training
Support – Technical Assistance / Warranty

1-866-668-7221

- OnTrac – Warranty and Technical Support
- Guidance on troubleshooting and diagnostics
- Guidance on repair strategies
- Providing service manuals, parts books, and service literature
- Validating warranty coverage
OnTrac’s Warranty Process

1. Broken component on truck or trailer
2. Technician gathers data and calls OnTrac
3. OnTrac agent opens claim and provides technical repair information
4. Technician performs necessary repairs
5. When repairs are complete technician calls OnTrac to close claim
6. Repair is complete and vehicle leaves the shop

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Support – OnTrac Warranty

What information does OnTrac need?

- Meritor Dealer ID
- Vehicle VIN
- Time in service
- Vehicle mileage/hours
- Component model/serial number
Support – Parts / Part Numbers

1-888-725-9355

• Op. 2 (Order Pricing/Availability)
• - Op. 3 (Specifications)

- Model/serial number located on ID tag of component.
- Description of what part you will need.
The DriveForce Focus

New Truck Components

OEM Sales → OEMs

DriveForce

OEMs → National Accounts
OEMs → Dealers
OEMs → Fleets

Proprietary ©Meritor, Inc., 2019
110+ Dedicated DriveForce Sales and Service Representatives Across The United States And Canada Focused On Our End Customers: Fleets/Dealers
Driveforce Footprint

Director of National Accounts
Ken Edwards

National Account Managers
Bart Hakenewert
Michael Hayes
Rick Hoffman
Tim Jeffords
Ken Samples
Kurt Swisher
Terry Tosie
Jack Vander Giessen

Director of Field Sales
Western, Central, Easter Regions
John Hinesley

Central Region
Devon Delcourt

Canadian Region
Dean Stratton

Eastern Region
Ben Bradley

Drivorce Footprint
# The DriveForce Focus

## Aftermarket Parts

### Brake & Wheel End
- **Wheel End**
  - Brake Shoes/Kits
  - Hubs/Drums
  - Wheel Seals
  - Bearings
  - Camshafts
  - Wheel Bearing Adjustment System
- **Disc Brake (Hydraulic and Air)**
  - Calipers
  - Rotors
  - Wheel Cylinders
  - Brake Hardware
  - Disc Pads
- **Air System**
  - Compressors
  - Air Dryers
  - ECU's
  - Valves
  - Cartridges
  - Sensors

### Drivetrain
- **Driveline**
  - Universal Joints
  - Center Bearings
  - Tubing
  - Yokes
  - Flanges
  - Spline Plugs
  - Bearing Stub Shafts
  - Yoke Shafts
- **Drive Axle**
  - Axles
  - Differentials
  - Gear Sets
  - Gearing
  - Seals and Bearings
  - Overhaul Kits
  - Axle Shafts

### Steering & Suspension
- **Steering**
  - FastSet™ No-Ream King Pin Kits
  - ReadySet™ No-Ream King Pin Kits
  - Ream King Pin Kits
  - Tie Rod End
  - Drag Links
  - Cross Tubes
  - Steering Arms
- **Suspension and Trailer**
  - Air Springs
  - U-Bolts and Threaded Rods
  - Equalizers
  - Hanger Brackets and Hardware
  - Hangers
  - Bushings
  - Torque Rods
  - Shock Absorbers
  - Trailer Axles
  - Meritor MTA Series Suspension Systems
  - MTIS and Components

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Training – Meritor BullPen Overview

WHAT IS THE BULLPEN?

The Meritor BullPen is a convenient web portal designed for dealers, fleets, service garages and alike to access Meritor’s product information and training in one central location.

- Axles
- Brakes
- Drivelines
- Trailer
- ABS Training
- Online Training
- Instructor Led Training
- Meritor on the Move
- Literature on Demand
- Updates
- Quick Links
- News & Events
- Training Progress
Training – Meritor BullPen Access

- Access the BullPen
  - MeritorBullPen.com
  - From links posted on Meritor.com
  - From email signatures
  - Through Meritor Mobile
  - From promotional material
Instructor-Led Training Schedule

- In-depth, hands-on training from industry experts
- Sessions are conducted at Meritor’s Headquarters in Troy, Michigan
- For more information and to register, visit MeritorBullpen.com

**January 15th - 16th**
Brakes, Cam & Disc

**February 20th - 21st**
Steer Axles and Drive Axles

**March 19th - 21st**
T-Case & Drive Steer Axles

**April 9th - 10th**
Trailer Suspensions

**May 7th - 8th**
Brakes, Cam & Disc

**July 23rd - 24th**
Steer Axles and Drive Axles

**August 13th - 15th**
T-Case & Drive Steer Axles

**September 24th - 25th**
Driveline, NVH, Failure Analysis

**October 22nd - 23rd**
Brakes, Cam & Disc
Web Based Interactive Training Schedule

- Live monthly seminars and product updates brought right to your device
- Second Wednesday of every month 11 A.M. EST
- For more information and to register, visit MeritorPartsXpress.com

January
Driveline

February
Steer Axle King Pins

March
Reduced Stopping Distance

April
Cam Brake Diagnosis

May
Air Disc Brake (ADB)

June
Suspensions

July
Air Systems

August
Hydraulic Brake

September
Slack Adjusters

October
Drive Axle

November
Wheel End

December
Air Disc Brake (ADB)