Maintenance Manual MM-0409
Wheel-End Components
Meritor Conventional and Unitized Wheel Ends
Revised 07-19
About This Manual

This manual provides maintenance and service information for the Meritor front non-drive steer axle, tag and rear drive axle wheel-end components.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.
3. Follow your company’s maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

Hazard Alert Messages and Torque Symbols

⚠️ WARNING
A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

⚠️ CAUTION
A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

 Pistol Grip This symbol alerts you to tighten fasteners to a specified torque value.

How to Obtain Additional Maintenance, Service and Product Information

Visit Literature on Demand at meritor.com to access and order additional information.

Contact the Meritor OnTrac™ Customer Call Center at 866-668-7221 (United States and Canada); 001-800-889-1834 (Mexico); or email OnTrac@meritor.com.


If Tools and Supplies are Specified in This Manual

Contact Meritor’s Commercial Vehicle Aftermarket at 888-725-9355.
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>Section 1: Exploded Views</strong></td>
</tr>
<tr>
<td></td>
<td>Exploded Views</td>
</tr>
<tr>
<td></td>
<td>Conventional MFS Series Wheel End — Front Non-Drive Steer Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional MFS Series Wheel End — Front Non-Drive Steer Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional MFS Series Wheel End — Front Non-Drive Steer Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional MS and RS Series Wheel End — Rear Drive Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional MS and RS Series Wheel End — Rear Drive Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional MS and RS Series Wheel End — Rear Drive Axle</td>
</tr>
<tr>
<td></td>
<td>PreSet® Hub — MC Series Tag Axle with EX+ Brakes</td>
</tr>
<tr>
<td></td>
<td>Conventional or PreSet® Hub — FL, FG, MFS Series Front Axle with EX+ Brakes</td>
</tr>
<tr>
<td></td>
<td>PreSet® Hub — Rear Drive Axle with DiscPlus™ Brakes</td>
</tr>
<tr>
<td></td>
<td>United Wheel End — FH Series Front Tag Axle with EX+ Brakes</td>
</tr>
<tr>
<td></td>
<td>United Wheel End — MC Series Tag Axle with EX+ Brakes</td>
</tr>
<tr>
<td><strong>12</strong></td>
<td><strong>Section 2: Introduction</strong></td>
</tr>
<tr>
<td></td>
<td>Technical Publications</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>Conventional Wheel-End Components</td>
</tr>
<tr>
<td><strong>13</strong></td>
<td>Unitized Wheel-End Components</td>
</tr>
<tr>
<td><strong>14</strong></td>
<td>Identification</td>
</tr>
<tr>
<td></td>
<td>Front and Rear Axle Wheel Ends</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td><strong>Section 3: Inspection</strong></td>
</tr>
<tr>
<td></td>
<td>Inspection</td>
</tr>
<tr>
<td></td>
<td>ABS Warning Signal</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Press-Fit Style)</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Bolt-On Style)</td>
</tr>
<tr>
<td></td>
<td>United Wheel End</td>
</tr>
<tr>
<td></td>
<td>Basic Inspection</td>
</tr>
<tr>
<td></td>
<td>Wheel-to-Hub Mounting</td>
</tr>
<tr>
<td></td>
<td>Wheel Adapter Fasteners Inspection</td>
</tr>
<tr>
<td></td>
<td>Detailed Inspection</td>
</tr>
<tr>
<td></td>
<td>PreSet® Wheel Hub Assemblies</td>
</tr>
<tr>
<td></td>
<td>Inspection Guidelines</td>
</tr>
<tr>
<td><strong>21</strong></td>
<td>Every 12 Months or 100,000 Miles (Whichever Occurs First)</td>
</tr>
<tr>
<td><strong>23</strong></td>
<td><strong>Section 4: Disassembly</strong></td>
</tr>
<tr>
<td></td>
<td>Removal</td>
</tr>
<tr>
<td></td>
<td>MFS Series Wheel End — Front Non-Drive Steer Axle</td>
</tr>
<tr>
<td></td>
<td>MS and RS Series Wheel End — Rear Drive Axle</td>
</tr>
<tr>
<td></td>
<td>Conventional Wheel End — Front and Tag Axles with EX+ Brakes</td>
</tr>
<tr>
<td></td>
<td>PreSet® Wheel Hub Assemblies</td>
</tr>
<tr>
<td></td>
<td>United Wheel End — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle</td>
</tr>
<tr>
<td></td>
<td>Removing a United Wheel End with a Meritor Rotor</td>
</tr>
<tr>
<td></td>
<td>Seized to the Hub — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Press-Fit Style)</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Bolt-On Style)</td>
</tr>
<tr>
<td><strong>33</strong></td>
<td><strong>Section 5: Prepare Parts for Assembly</strong></td>
</tr>
<tr>
<td></td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>Worn or Damaged Parts</td>
</tr>
<tr>
<td></td>
<td>Clean, Dry and Inspect Parts</td>
</tr>
<tr>
<td></td>
<td>Ground or Polished Parts</td>
</tr>
<tr>
<td></td>
<td>Rough Parts</td>
</tr>
<tr>
<td></td>
<td>Dry Cleaned Parts</td>
</tr>
<tr>
<td></td>
<td>Prevent Corrosion on Cleaned Parts</td>
</tr>
<tr>
<td><strong>34</strong></td>
<td>Inspection</td>
</tr>
<tr>
<td></td>
<td>Wheel-End Components</td>
</tr>
<tr>
<td><strong>36</strong></td>
<td><strong>Section 6: Assembly</strong></td>
</tr>
<tr>
<td></td>
<td>Installation</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Press-Fit Style)</td>
</tr>
<tr>
<td></td>
<td>ABS Tone Ring (Bolt-On Style)</td>
</tr>
<tr>
<td></td>
<td>MFS Series Wheel End — Front Non-Drive Steer Axle</td>
</tr>
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<td>MS and RS Series Wheel End — Rear Drive Axle</td>
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</tr>
<tr>
<td></td>
<td>PreSet® Wheel Hub Assemblies</td>
</tr>
<tr>
<td></td>
<td>United Wheel End — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle</td>
</tr>
<tr>
<td><strong>52</strong></td>
<td>Studs and Nuts</td>
</tr>
<tr>
<td><strong>56</strong></td>
<td>Stud Replacement Procedures</td>
</tr>
<tr>
<td><strong>59</strong></td>
<td><strong>Section 7: Adjustment</strong></td>
</tr>
<tr>
<td></td>
<td>Check and Adjust the Wheel Bearings</td>
</tr>
<tr>
<td></td>
<td>Front Axles</td>
</tr>
<tr>
<td></td>
<td>Drive Axles</td>
</tr>
<tr>
<td><strong>63</strong></td>
<td><strong>Section 8: Troubleshooting</strong></td>
</tr>
<tr>
<td></td>
<td>Troubleshooting</td>
</tr>
<tr>
<td></td>
<td>Diagnostic Chart</td>
</tr>
</tbody>
</table>
Asbestos and Non-Asbestos Fibers

ASBESTOS FIBERS WARNING
The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary
Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestos (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices
1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels.

DANGER: ASPBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY

2. Respiratory Protection. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheel.

   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
   c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own procedures for servicing brakes, provided that the exposure levels associated with the employer’s procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
   d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when greasing or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
   e. NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
   f. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. NEVER use compressed air or dry wiping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
   g. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
   h. Waste Disposal. Dispose of discarded linings, used rags, clothes and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance
References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

NON-ASBESTOS FIBERS WARNING
The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary
Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices
1. Separate Work Areas. Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.

2. Respiratory Protection. OSHA has set a maximum allowable level of exposure for silica of 0.1 f/cc as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers’ recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

   a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
   b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
   c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.

   d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.

   e. NEVER use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

   f. Cleaning Work Areas. Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. NEVER use compressed air or dry wiping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.

   g. Worker Clean-Up. After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.

   h. Waste Disposal. Dispose of discarded linings, used rags, clothes and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance
References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Meritor Maintenance Manual MM-0409 (Revised 07-19)
Exploded Views

Conventional MFS Series Wheel End — Front Non-Drive Steer Axle

**MFS-08-113 (QUADRAULIC™ DISC BRAKE)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Capscrew and Flat Washer</td>
</tr>
<tr>
<td>2</td>
<td>Hubcap</td>
</tr>
<tr>
<td>3</td>
<td>Gasket</td>
</tr>
<tr>
<td>4</td>
<td>Outer Wheel Bearing Jam Nut</td>
</tr>
<tr>
<td>5</td>
<td>Tabbed Lock Washer</td>
</tr>
<tr>
<td>6</td>
<td>Pierced Lock Ring with Keyway Tab</td>
</tr>
<tr>
<td>7</td>
<td>Outer Wheel Bearing Adjusting Nut</td>
</tr>
<tr>
<td>8</td>
<td>Outer Wheel Bearing</td>
</tr>
<tr>
<td>9</td>
<td>Outer Race</td>
</tr>
<tr>
<td>10</td>
<td>Hub</td>
</tr>
<tr>
<td>11</td>
<td>Inner Race</td>
</tr>
<tr>
<td>12</td>
<td>Inner Wheel Bearing</td>
</tr>
<tr>
<td>13</td>
<td>Grease Seal</td>
</tr>
<tr>
<td>14</td>
<td>Brake Rotor</td>
</tr>
<tr>
<td>15</td>
<td>Capscrew and Washer</td>
</tr>
<tr>
<td>16</td>
<td>Capscrew and Washer</td>
</tr>
<tr>
<td>17</td>
<td>Backing Plate</td>
</tr>
<tr>
<td>18</td>
<td>ABS Sensor</td>
</tr>
<tr>
<td>19</td>
<td>Torque Plate</td>
</tr>
<tr>
<td>20</td>
<td>Quadraulic Disc Brake Caliper Assembly</td>
</tr>
<tr>
<td>21</td>
<td>Knuckle</td>
</tr>
</tbody>
</table>

Meritor Maintenance Manual MM-0409 (Revised 07-19)
### Conventional MFS Series Wheel End — Front Non-Drive Steer Axle

**MFS-12-122 (Q+™ CAM BRAKE)**

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<tr>
<th>Item</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brake Drum</td>
<td>15</td>
<td>Q+ Cam Brake Assembly</td>
</tr>
<tr>
<td>2</td>
<td>Capscrew and Flat Washer</td>
<td>16</td>
<td>Backing Plate</td>
</tr>
<tr>
<td>3</td>
<td>Hubcap</td>
<td>17</td>
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</tr>
<tr>
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<td>Gasket</td>
<td>18</td>
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</tr>
<tr>
<td>5</td>
<td>Outer Wheel Bearing Jam Nut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>D-Style Lock Washer</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>D-Style Pierced Lock Ring</td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Outer Wheel Bearing Adjusting Nut</td>
<td></td>
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</tr>
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<td>9</td>
<td>Outer Wheel Bearing</td>
<td></td>
<td></td>
</tr>
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<td>Outer Race</td>
<td></td>
<td></td>
</tr>
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<td></td>
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<tr>
<td>12</td>
<td>Inner Race</td>
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<td></td>
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Meritor Maintenance Manual MM-0409 (Revised 07-19)
Conventional MFS Series Wheel End — Front Non-Drive Steer Axle

MFS-06-162 (REACTION BEAM – B-FRAME DISC BRAKE)

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<tr>
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<td>Tabbed Lock Washer</td>
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<tr>
<td>6</td>
<td>Pierced Lock Ring with Keyway Tab</td>
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<tr>
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</tr>
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<td>18</td>
<td>Reaction Beam Disc Brake Assembly</td>
</tr>
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</tr>
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Conventional MS and RS Series Wheel End — Rear Drive Axle

**Item** | **Description** | **Item** | **Description**
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1 | Capscrew | 12 | Inner Race |
2 | Axle Shaft | 13 | Inner Wheel Bearing |
3 | RTV Gasket Material | 14 | Oil Seal |
4 | Capscrew and Washer | 15 | Spindle |
5 | Outer Wheel Bearing Jam Nut | 16 | Reaction Beam Brake Caliper Assembly |
6 | Tabbed Lock Washer | 17 | Backing Plate |
7 | Outer Wheel Bearing Adjusting Nut | 18 | Integral Caliper Bracket |
8 | Outer Wheel Bearing | 19 | ABS Sensor |
9 | Outer Race | 10 | Hub |
11 | Disc Brake Rotor | 11 | Disc Brake Rotor |
Conventional MS and RS Series Wheel End — Rear Drive Axle

RS-19-145 AND RS-13-120 (QUADRAULIC DISC BRAKE)

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</tr>
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Meritor Maintenance Manual MM-0409 (Revised 07-19)
### Conventional MS and RS Series Wheel End — Rear Drive Axle

#### RS-21-145 (Q+ CAM BRAKE)

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<td>3</td>
<td>Tapered Dowel</td>
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<td>Axle Shaft</td>
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<td>Gasket</td>
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<td>6</td>
<td>Outer Wheel Bearing Jam Nut</td>
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<td>7</td>
<td>Tabbed Lock Washer</td>
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<td>Pierced Lock Ring with Keyway Tab</td>
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<td>Hub</td>
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<td>Inner Race</td>
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<td>Inner Wheel Bearing</td>
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4004350a
PreSet® Hub — MC Series Tag Axle with EX+ Brakes

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<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>2</td>
<td>Hubcap</td>
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<td>3</td>
<td>PRO-TORQ™ Spindle Nut</td>
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<td>Rotor-to-Hub Capscrew</td>
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<td>6</td>
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<td>Torque Plate-to-Spindle Capscrew</td>
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<td>Torque Plate-to-Caliper Capscrew</td>
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Conventional or PreSet® Hub — FL, FG, MFS Series Front Axle with EX+ Brakes

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<tr>
<th>Item</th>
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<tbody>
<tr>
<td>1</td>
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<td>Inner Nut</td>
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<td>PRO-TORQ™ Nut for PreSet® Hub</td>
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**PreSet® Hub — Rear Drive Axle with DiscPlus™ Brakes**

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<td>PreSet® Hub</td>
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## Exploded Views

### Unitized Wheel End — FH Series Front Tag Axle with EX+ Brakes

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<td>Inspection Plug</td>
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<td>Wheel Adapter</td>
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<td>Rotor</td>
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<td>Keeper</td>
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<td>PRO-TORQ™ Spindle Nut</td>
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<td>9</td>
<td>Unitized Hub Bearing</td>
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<td>EX+ Brake Assembly</td>
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<td>Torque Plate-to-Spindle Capscrew</td>
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<td>Torque Plate-to-Brake Caliper Capscrew</td>
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<td>FH Series Knuckle</td>
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### Unitized Wheel End — MC Series Tag Axle with EX+ Brakes

<table>
<thead>
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<th>Item</th>
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<td>Unitized Hub Bearing</td>
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<td>Torque Plate</td>
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<td>Torque Plate-to-Brake Caliper Capscrew</td>
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<tr>
<td>14</td>
<td>Spindle</td>
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</table>
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle only supported by jacks. Jacks can slip or fall over. Serious personal injury and damage to components can result.

Technical Publications

Additional reference documentation is required to perform the various wheel-end service and maintenance procedures contained within this manual. Refer to the publications in Table A. To obtain these publications, refer to the Service Notes page on the front inside cover of this manual.

Table A: Publications

<table>
<thead>
<tr>
<th>Reference</th>
<th>Document Title</th>
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<tbody>
<tr>
<td>MM1</td>
<td>Preventive Maintenance and Lubrication</td>
</tr>
<tr>
<td>MM2</td>
<td>Front Non-Drive Steer Axle</td>
</tr>
<tr>
<td>MM5A</td>
<td>Single Reduction Rear Differential Carrier</td>
</tr>
<tr>
<td>MM23</td>
<td>Bus and Coach Front Axles</td>
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<tr>
<td>Pneumatic ABS</td>
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<tr>
<td>MM-0112</td>
<td>E-Version ABS for Trucks, Tractors and Buses</td>
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<td>MM30</td>
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<td>MM28</td>
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<td>MM38</td>
<td>C-Version HABS for Medium Duty-Trucks; Buses and Motor Home Chassis</td>
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<td>MM39</td>
<td>D-Version HABS for Medium-Duty Trucks; Buses and Motor Home Chassis</td>
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<td>Q+™ Cam Brake</td>
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<tr>
<td>MM-0328</td>
<td>Reaction Beam Hydraulic Disc Brake Caliper Assembly</td>
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</table>

Reference Document Title

- MM-2075 Four-Piston Quadraulic™ Disc Brake Caliper
- MM-0467 EX+™ Air Disc Brake

Description

Conventional Wheel-End Components

The descriptions and procedures contained in this maintenance manual are applicable to the Meritor front non-drive steer, tag and rear drive axle wheel-end components.

Conventional wheel ends have the hub, seal lubricant and bearings installed onto the axle spindle as separate components. Figure 2.1. These bearings and seals require periodic inspections and lubrication to maintain performance.

![Figure 2.1](image1)

The front non-drive axle wheel bearings, and related components, are grease-lubricated. Figure 2.2.

![Figure 2.2](image2)
The rear drive axle wheel bearings, and related components, are oil-lubricated. Lubrication of these components occurs as fluid is circulated from the differential carrier or housing oil fill bowl out to the hub and wheel bearings and then back to the carrier or housing. Figure 2.3.

Unitized Wheel-End Components

Certain Meritor FH Series front and tag axle, and MC Series rear drive axle models are equipped with unitized wheel ends.

Unitized wheel-end components include a wheel adapter, rotor and unitized hub bearing mounted to a knuckle or spindle. There are two different spindle nut designs used on unitized wheel ends, double nut pack and PRO-TORQ™ nut. They are different and not interchangeable. Figure 2.4, Figure 2.5 and Figure 2.6.
Wheel ends with unitized hub bearings are sealed and greased for life and do not require lubrication. These unitized wheel ends require periodic inspections to maintain performance.

**Identification**

**Front and Rear Axle Wheel Ends**

The axle build information and assembly date for Meritor front non-drive steer and rear drive axles is on the axle identification tag, Figure 2.7 and Figure 2.8.
The identification tag is fastened to the center of the beam at the front surface. The axle assembly date is located in either the lower right-hand or left-hand corner of the tag.

The Julian method is used to indicate the axle assembly date and is shown in Figure 2.7. The first two digits indicate the year, and the last three digits indicate the day of the year.

In the following example, 01 is the year 2001 and 327 refers to November 22.

To identify the model number, refer to the identification plate on the front of the beam. Use the complete model number to obtain parts.
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

- Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

- Release all air from the air suspension system before you raise the vehicle or remove any components. Pressurized air can cause serious personal injury.

- Verify that all personnel are clear of the vehicle before you inflate or deflate the air springs. The air suspension system has various pinch points that can cause serious personal injury.

- Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Inspection

ABS Warning Signal

Inspect the wheel end for smooth rotation, movement and bearing end play if a driver reports that an ABS light has been coming on and ABS diagnostics indicates excessive sensor gap.

ABS Tone Ring (Press-Fit Style)

1. Wear safe eye protection.
2. Inspect the ABS tone ring for any damage that may have occurred during operation or hub removal.
   - If the ABS tone ring is damaged. Remove it and install a new one using the steps in Section 4 and Section 6.
3. Inspect the ABS tone ring for a gap greater than 0.125” (3 mm) between the tone ring and the mounting seat shoulder of the hub. Figure 3.1.

ABS Tone Ring (Bolt-On Style)

1. Wear safe eye protection.
2. Inspect the ABS tone ring mounting face and teeth as well as the mating face on the rotor for corrosion or damage.
   - If the ABS tone ring has damage or corrosion that would cause an ABS sensor fault: Remove it and install a new one using the steps in Section 4 and Section 6.
Unitized Wheel End
These procedures apply to bus and coach FH Series front and tag axles, and MC Series tag axles equipped with unitized wheel ends.

⚠️ WARNING
The unitized wheel end is sealed and greased for life and does not require lubrication. If you disassemble, or attempt to repair or lubricate a unitized wheel-end assembly, you will void the Meritor warranty.

- Unitized wheel ends are not adjustable.
- Do not attempt to set or adjust the end play.

You must perform detailed and basic inspections at the following intervals. In addition to scheduled preventive maintenance, if driver reports indicate the ABS light has been coming on, and ABS diagnostics indicate the sensor gap is out of adjustment, check for possible wheel end looseness as the cause.

Detailed Inspections
- After the initial 100,000 miles (160 900 km) of operation or one year, whichever comes first
- After every additional 100,000 miles (160 900 km) of operation or one year, whichever comes first

Unitized Wheel-End Bearing Replacement (North America Applications Only)
Meritor recommends the following guidelines for replacing unitized wheel-end bearings.

- Replace the bearings at 500,000 miles (804 682 km) or after five years of service, whichever comes first. This is to help ensure maximum bearing reliability while the vehicle is in service.
- Replace all unitized wheel end bearings that are exposed to extreme temperatures during operation. High temperatures can result from brake drag, which can cause excessive brake pad and rotor wear, and possible heat checking on the rotor.

Unitized Wheel-End Bearing Monitoring Using Wheel-End Monitor Units
Meritor recommends the use of wheel-end monitor units. A unit is mounted onto the outboard side of each unitized wheel end and continuously monitors bearing vibration changes. Figure 3.3.

A green light indicates the bearing is in good condition, a red light indicates a potential bearing problem, and a blinking red light signals that the bearing needs to be replaced at the next service interval.

How to Obtain Wheel-End Monitor Units and Additional Information
Wheel-end monitor units, and installation and operating instructions can be obtained through the OEM.

Wheel Adapter Fasteners Inspection
- Recheck the torque on the wheel adapter bolts every 30,000 miles (48 280 km), or sooner.
- Refer to the procedure in this section.

Unitized Wheel-End Bearings — Basic Inspections
- Perform basic inspections between detailed inspections but not to exceed 30,000 miles (48 280 km) or six months of operation, whichever comes first.
- For vehicles operating on rough terrains, such as gravel roads, for significant periods, the basic inspection interval should be reduced to 20,000 miles (32 187 km).

Basic Inspection
1. Park the vehicle on a level surface. Block the rear wheels to prevent the vehicle from moving.
2. Raise the vehicle so that the inspected axle is off the ground. Support the vehicle with safety stands. Do not use a jack to support the vehicle.
3. Back off the brake caliper until the rotor is clear from the pad linings about 1/16-inch (1.588 mm) gap or more. Refer to Maintenance Manual MM-0467, EX+™ EX225 Air Disc Brake, for more information about EX225 disc brake inspection and adjustment. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

4. Visually inspect the unitized wheel end as you rotate the tire. Verify that it rotates smoothly and without noise.
   - If a clicking sound is detected during rotation: This does not necessarily indicate a hub problem.

5. While rotating the wheel, grasp the brake chamber to feel for unitized wheel-end hub vibration.
   - If the tire and unitized wheel-end assembly does not rotate smoothly, or you hear noise such as wheel bearing grind or feel wheel-end hub vibration during rotation: Replace the unitized wheel-end hub. Refer to Section 4, Disassembly; and Section 6, Assembly, for the procedures.
   - If the wheel end rotates smoothly: Proceed to Step 6.

6. Grasp the tire and wheel-end assembly at the nine and three o’clock positions. Check for vertical and horizontal movement. With your hands, apply approximately 50 lb (23 kg) of force to the assembly. You should not feel or see any looseness or movement.
   - If you feel or see any movement or looseness in the tire and wheel-end assembly: Perform more inspections to determine the cause of the movement. Check for worn king pin bushings or pins; wheel-to-hub-mounting end play; unitized hub bearing end play; or a combination of them all. To determine unitized hub bearing end play, refer to the detailed inspection procedure in this section.

Wheel-to-Hub Mounting

Before proceeding with the detailed inspection, first check the wheel-to-hub mounting.

1. Verify that the wheel is mounted correctly and all wheel-end fasteners and hardware are tightened to the correct specification. Figure 3.4.
2. Grasp the tire and wheel-end assembly at the nine and three 
o’clock positions. Check for vertical and horizontal movement. 
With your hands, apply approximately 50 lb (23 kg) of force to 
the assembly. You should not feel or see any looseness or 
movement.

- **If you detect movement or looseness on a tag axle:** 
  Proceed to the Detailed Inspection.

- **If you detect movement or looseness on a front axle:** 
  Inspect the king pin, bushings and seals for wear, leakage 
or damage. Refer to the procedures in Maintenance Manual 
23, Bus and Coach Front Axles. To obtain this publication, 
refer to the Service Notes page on the front inside cover of 
this manual.

- **If applying the service brake eliminates movement or 
  looseness:** Proceed to the detailed inspection procedures 
to determine the unitized hub bearing end play.

**Wheel Adapter Fasteners Inspection**

1. Park the vehicle on a level surface. Block the wheels to prevent 
the vehicle from moving. Set the parking brake.

2. Using a calibrated torque wrench, tighten the wheel adapter 
bolts in a star pattern to 275 ± 25 lb-ft (373 ± 34 N·m). Repeat 
to ensure consistent torques.

**NOTE:** It is important that the torque on the wheel adapter 
bolts be rechecked every 30,000 miles (48 280 km), or sooner.

**Detailed Inspection**

1. Park the vehicle on a level surface. Block the rear wheels to 
prevent the vehicle from moving.

2. Raise the vehicle so that the inspected axle is off the ground. 
Support the vehicle with safety stands. Do not use a jack to 
support the vehicle.

3. Back off the brake caliper until the rotor is clear from the pad 
linings about 1/16-inch (1.588 mm) gap or more. Refer to 
Maintenance Manual MM-0467, EX+™ EX225 Air Disc Brake, 
for more information about EX225 disc brake inspection and 
adjustment. To obtain this publication, refer to the Service 
Notes page on the front inside cover of this manual.

4. Verify that the unitized wheel end rotates smoothly and without 
noise.

If a clicking sound is detected during rotation, this does not 
necessarily indicate a hub problem.

While rotating the wheel, grasp the brake chamber to feel for 
unitized wheel-end hub vibration.

- **If the tire and unitized wheel end assembly does not 
  rotate smoothly, or you hear noise such as wheel 
  bearing grind or feel wheel-end hub vibration during 
  rotation:** Replace the unitized hub bearing. Inspect the 
  unitized hub bearing before installing it. Refer to the new 
  hub inspection procedure in Section 6.

- **If the wheel end rotates smoothly:** Proceed to Step 5.

5. Use a 5/16-inch drive tool to remove the pipe plug at the 
center of the wheel adapter. Install and tighten the adapter 
fitting into the hole. Refer to Figure 11.14 in Section 11.

6. Attach the dial indicator. Loosen the locking set screw and 
slowly slide the dial indicator through the fitting hole. Position 
the dial indicator against the hub face and tighten the locking 
set screw as the needle starts moving. Set the dial indicator to 
ZERO. Do not rotate the wheel end. Figure 3.5.

7. Place your hands on the wheel hub at the nine and three 
o’clock positions. Push the wheel end straight IN. Note the 
reading. Then pull the wheel end straight OUT. Note the 
reading. The difference between the first and second readings 
in the total bearing end play.

Take at least two readings to obtain a correct end play 
measurement.

- **If the total movement of the dial indicator is 
  0-0.002-inch (0.05 mm):** The inspection is complete. Go 
to Step 8.
3 Inspection

- If the total movement of the dial indicator is greater than 0.002-inch (0.05 mm) but less than 0.004-inch (0.1 mm): Check and retighten the spindle nut to specifications. Set the dial indicator to ZERO and measure the end play again. Take at least two readings and record the measurement in a maintenance log. Perform another detailed inspection at the next regularly-scheduled maintenance interval, or up to 50,000 miles (80 467 km), whichever comes first.

- If the total movement of the dial indicator is equal to or greater than 0.004-inch (0.1 mm): Replace the unitized hub bearing as soon as possible. The unitized hub bearing may not be safe to operate. Refer to Section 6.

8. Remove the dial indicator and adapter fitting.

9. Apply a thin coat of sealant to the pipe plug threads. Install it into the wheel adapter and tighten it to a minimum of 15 lb-ft (20.34 Nm).

PreSet® Wheel Hub Assemblies

ConMet® PreSet® hubs are the same as conventional wheel bearing hubs except that all PreSet® hubs come complete with pre-installed bearings, cups, cones and oil seals. These hubs have a precision tubular spacer between the bearings which eliminates the need for manual bearing adjustment.

The ConMet® PreSet® hubs are currently used on Meritor bus and coach MC12, FG952 tag and RC rear drive axles.

Refer to the ConMet® Service Manual for PreSet® Hub Assemblies for inspection, preventive maintenance and service procedures. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Inspection Guidelines

NOTE: Operating temperature can be checked as the vehicle enters the service area following a normal run. If the hub is running in excess of 150°F above the ambient temperature in normal operating conditions, service is required.

There are three levels of inspection criteria for PreSet® hub assemblies. Follow this schedule of inspection and maintenance for PreSet® hub assemblies.

- Driver pre-trip
- In conjunction with preventive maintenance schedule
- Every 12 months or 100,000 miles (whichever comes first)

Perform a Pre-Trip Visual Inspection

Each time before operating a vehicle on the road, perform this pre-trip inspection.

1. Park the vehicle on a level surface. Set the parking brake.

2. Walk around the vehicle and visually inspect each wheel assembly for the following conditions.
   - Loose, damaged or missing fasteners
   - Loose, damaged or missing hubcaps
   - Oil leaks at hubcap, axle flange gasket or fill plug
   - Lubricant on the hub, brake components or inside of wheel and tire
   - Insufficient oil level and poor oil condition

If You Find Any of the Conditions Listed Above

1. Place the vehicle out-of-service.

2. Repair the vehicle as necessary before returning the vehicle to service.

In Conjunction with Preventive Maintenance Schedule

Wheel end inspections should be conducted during any routine preventive maintenance on the vehicle.

1. Check all items listed in the driver pre-trip visual inspection.

2. Lift and support the axle and rotate the wheel. Check that the wheel rotates freely. Listen and feel for any signs of rough bearing operation or vibration.

3. On oil-lubricated steer and trailer hubs, place a magnet through the hubcap fill plug into the lubricant. Check for any signs of metal picked up by the magnet.

4. Push and pull on top of the tire or use a pry bar to lift the bottom of the tire to check for loose bearings or “chucking”.

If any of these conditions are found, the vehicle should be placed out of service until the item can be repaired.
Every 12 Months or 100,000 Miles (Whichever Occurs First)

⚠️ WARNING
Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the axle until the tires are off the floor.
4. Place safety stands under the trailer frame or under each axle spring seat. Figure 3.6.
5. Remove the tire and wheel assembly using procedures specified by the wheel manufacturer. Figure 3.7.

Inspect Components
Check for the following conditions.

- Loose, damaged or missing fasteners
- Loose, damaged or missing hubcaps

Inspect for Leaks
1. Check that no lubricant is present around the hubcap or on the wheel.
   - If lubricant is present: Investigate the cause and take corrective action.
2. Check that no lubricant is present on the hub, brake hardware or brake shoes.
   - If lubricant is present: Check the inboard seal and replace as necessary.

Inspect for Correct Lubricant Level and Condition
1. Allow any air in the lubricant to escape prior to inspection. Visually inspect the lubricant for discoloration. Under normal conditions, the lubricant will darken. A white or milky appearance indicates water contamination.
2. Visually inspect the lubricant for foreign materials such as metal shavings, rust or other contaminants. A magnet can be used to detect any metallic materials that may be present in the lubricant.
   - If the inspection indicates contamination: Service the wheel hub according to the instructions outlined in the ConMet® Service Manual for PreSet® Hub Assemblies. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

⚠️ CAUTION
Do not mix different types of lubricants. Only use lubricants approved by the seal manufacturer. Damage to components can result.

3. On wheel ends filled with semi-fluid grease, remove the hubcap and verify that sufficient grease is flowing through the bearing rollers and that the ends of the bearing are lubricated. Check to be sure there are no signs of contamination present.
   - If additional grease is required: Use the fill hole in the barrel of the hub to add additional grease until grease flows from the outboard bearing.

Figure 3.6

Figure 3.7
3 Inspection

⚠️ CAUTION
Use caution not to overfill the hub as it could lead to incorrect venting and seal leaks. Damage to components can result.

Functional Checks
Rotate the hub and check for free, smooth and quiet rotation. If rotation is hampered, PreSet® hubs should be serviced immediately.

Check End Play

⚠️ WARNING
Always install a new spacer before you adjust or retighten the spindle nut. If you do not install a new spacer, the wheel bearings can become damaged, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

If you find the spindle nut is loose when you attempt to remove a PreSet® hub, you must discard the old spacer and replace it with a new spacer before you reinstall the PreSet® hub and tighten the spindle nut. If you do not install a new spacer, the wheel bearings can become damaged, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

1. Remove the hubcap or drive axle shaft. Use an appropriate container to catch the lubricant. Attach the magnetic base of the dial indicator to the spindle. Touch the dial indicator stem to the hubcap mounting surface. Figure 3.8.

2. Grasp two wheel studs across from each other. Pull and push while oscillating the hub.

3. Measure the end play by calculating the difference between the minimum and maximum dial indicator readings.

- If the end play measurement does NOT exceed 0.006-inch (0.15 mm): No additional service is necessary. Do not adjust or retighten the spindle nut.
- If end play measurement exceeds 0.006-inch (0.15 mm): Service the hub. Refer to the ConMet® Service Manual for PreSet® Hub Assemblies. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Release all air from the air suspension system before you raise the vehicle or remove any components. Pressurized air can cause serious personal injury.

Verify that all personnel are clear of the vehicle before you inflate or deflate the air springs. The air suspension system has various pinch points that can cause serious personal injury.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Removal

MFS Series Wheel End — Front Non-Drive Steer Axle

Model MFS-08-113 — Quadraulic Disc Brake

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Raise the front of the vehicle until the front wheels are off the ground. Support the vehicle with safety stands.
3. Remove the tire and wheel assembly.
4. Remove the four fasteners securing the Quadraulic disc brake caliper assembly to the torque plate.
5. Remove the caliper assembly from the torque plate.
6. Remove the four fasteners securing the hubcap to the hub. Remove the hubcap and gasket.
7. Remove the fastening hardware securing the wheel bearings.
   A. Bend the tabs of the tabbed lock washer away from the outer wheel bearing jam nut.
   B. Remove the outer wheel bearing jam nut, the tabbed lock washer, the pierced lock ring with keyway tab and the outer wheel bearing adjusting nut from the spindle.
8. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing. Remove the hub and rotor assembly.

9. Using a seal puller, remove the inner wheel bearing grease seal from the hub. Discard the seal.

10. Remove the inner wheel bearing.

11. Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

**NOTE:** Worn or damaged wheel-end components must be replaced as a set.

12. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

13. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.

**Model MFS-06-162 — Reaction Beam (B-Frame) Disc Brake**

- Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
- Raise the front of the vehicle until the front wheels are off the ground. Support the vehicle with safety stands.
- Remove the tire and wheel assembly.
- Remove the four fasteners securing the reaction beam disc brake caliper assembly to the integral torque plate.
- Remove the caliper assembly from the torque plate.
- Remove the four fasteners securing the hubcap to the hub. Remove the hubcap and gasket.
- Remove the fastening hardware securing the wheel bearings.
  - Bend the tabs of the tabbed lock washer away from the outer wheel bearing jam nut.
  - Remove the outer wheel bearing jam nut, the tabbed lock washer, the pierced lock ring with keyway tab and the outer wheel bearing adjusting nut from the spindle.
- Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing. Remove the hub and rotor assembly.
- Using a seal puller, remove the inner wheel bearing grease seal from the hub. Discard the seal.
- Remove the inner wheel bearing.
- Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

**NOTE:** Worn or damaged wheel-end components must be replaced as a set.

12. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

13. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.
NOTE: It is not necessary to remove the brake shoes and backing plate to perform a wheel-end component inspection.

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.

2. Raise the front of the vehicle until the front wheels are off the ground. Support the vehicle with safety stands.

3. Remove the tire and wheel assembly.

4. Remove the brake drum.

5. Remove the six fasteners securing the hubcap to the hub. Remove the hubcap and gasket.

6. Remove the fastening hardware securing the wheel bearings.
   A. Bend the D-style lock washer away from the outer wheel bearing jam nut.
   B. Remove the outer wheel bearing jam nut, the D-style lock washer, the pierced D-style lock ring and the outer wheel bearing adjusting nut from the spindle.

7. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing. Remove the hub assembly.

8. Using a seal puller, remove the inner wheel bearing grease seal from the hub. Discard the seal.

9. Remove the inner wheel bearing.

10. Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

NOTE: Worn or damaged wheel-end components must be replaced as a set.

11. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

12. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.

MS and RS Series Wheel End — Rear Drive Axle

MS-12-113 — Reaction Beam (B-Frame) Disc Brake
1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.

2. Raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.

3. Remove the tire and wheel assembly.

4. Remove the four fasteners securing the reaction beam disc brake caliper assembly to the torque plate.

5. Remove the caliper assembly from the knuckle.

6. Remove the eight fasteners securing the axle shaft to the hub. Remove the axle shaft.

7. Remove the fastening hardware securing the wheel bearings.
   A. Bend back the tabs of the tabbed lock washer holding the outer wheel bearing jam nut.
   B. Remove the outer wheel bearing jam nut, the tabbed lock washer and the outer wheel bearing adjusting nut from the spindle.

8. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing. Remove the hub and rotor assembly.

9. Using a seal puller, remove the inner wheel bearing oil seal from the hub. Discard the seal.

10. Remove the inner wheel bearing.

11. Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

NOTE: Worn or damaged wheel-end components must be replaced as a set.

12. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

13. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.

RS-19-145 — Quadraulic Disc Brake

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.

2. Raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.

3. Remove the tire and wheel assembly.

4. Remove the four fasteners securing the Quadraulic disc brake caliper assembly to the torque plate.

5. Remove the caliper assembly from the torque plate.

6. Remove the 12 nut fasteners and star lock washers securing the axle shaft to the hub.

NOTE: These nuts cannot be reused and must be replaced during assembly.

7. Tap the axle shaft flange on the strike bars to loosen the tapered dowels.

8. Remove the tapered dowels, axle shaft and gasket.
9. Remove the fastening hardware securing the wheel bearings.
   A. Bend back the tabs of the tabbed lock washer holding the outer wheel bearing jam nut.
   B. Remove the outer wheel bearing jam nut, the tabbed lock washer, the pierced lock ring with keyway tab and the outer wheel bearing adjusting nut from the spindle.

10. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing, the hub and rotor assembly.

11. Using a seal puller, remove the inner wheel bearing oil seal from the hub. Discard the seal.

12. Remove the inner wheel bearing.

13. Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

   **NOTE:** Worn or damaged wheel-end components must be replaced as a set.

14. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

15. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.

**RS-21-145 — Q+ Cam Brake**

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.

2. Raise the vehicle until the wheels are off the ground. Support the vehicle with safety stands.

3. Remove the tire and wheel assembly.

4. Cage the brake chamber.

5. Remove the brake drum.

6. Remove the eight nuts and star lock washers securing the axle shaft to the hub.

7. Tap the axle shaft flange on the strike bars to loosen the tapered dowels.

8. Remove the tapered dowels, axle shaft and gasket.

9. Remove the fastening hardware securing the outer wheel bearing.
   A. Bend back the tabs of the tabbed lock washer holding the outer wheel bearing jam nut.
   B. Remove the outer wheel bearing jam nut.
   C. Remove the tabbed lock washer, the pierced lock ring with keyway tab and the outer wheel bearing adjusting nut from the spindle.

10. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing and hub.

11. Using a seal puller, remove the inner wheel bearing oil seal from the hub. Discard the seal.

12. Remove the inner wheel bearing.

13. Inspect the bearings, races and spindle for signs of damage. Refer to Section 5.

   **NOTE:** Worn or damaged wheel-end components must be replaced as a set.

14. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.

15. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.
Conventional Wheel End — Front and Tag Axles with EX+ Brakes

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Raise the front of the vehicle until the front wheels are off the ground. Support the vehicle with safety stands.
3. Remove the tire and wheel assembly.
4. Remove the fasteners securing the brake caliper assembly to the torque plate.
5. Remove the caliper assembly from the torque plate.
6. Remove the hubcap and gasket.
7. Remove the fastening hardware securing the wheel bearings.
8. Carefully rock the hub from side-to-side to free the outer wheel bearing. Remove the outer wheel bearing. Remove the hub and rotor assembly.
9. Using a seal puller, remove the inner wheel bearing seal from the hub. Discard the seal.
10. Remove the inner wheel bearing.
11. Inspect the bearings, races and spindle for signs of damage. Worn or damaged wheel-end components must be replaced as a set. Refer to Section 5.
12. If damage to either race is observed, tap out the inner and outer races with a brass drift and discard.
13. Use the correct cleaning solution to remove the old lubricant from all parts. Refer to Section 5.

PreSet® Wheel Hub Assemblies

ConMet® PreSet® hubs are the same as conventional wheel bearing hubs except that all PreSet® hubs come complete with pre-installed bearings, cups, cones and oil seals. These hubs have a precision tubular spacer between the bearings which eliminates the need for manual bearing adjustment.

The ConMet® PreSet® hubs are currently used on Meritor bus and coach MC12, FG952 tag and RC rear drive axles.

Refer to the ConMet® PreSet® Hub Service Manual for inspection, preventive maintenance and service procedures.

For PreSet® hubs with PRO-TORQ™ spindle nuts, refer to the PRO-TORQ™ nut steps in the unitized wheel-end procedures.

Unitized Wheel End — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle

These procedures apply to bus and coach FH Series front and tag axles, and MC Series tag axles equipped with unitized wheel ends.

⚠️ WARNING
You must follow the unitized wheel-end maintenance and inspection procedures provided in this manual to prevent serious personal injury and damage to components.

The unitized wheel end is sealed and greased for life and does not require lubrication. If you disassemble, or attempt to repair or lubricate a unitized wheel-end assembly, you will void the Meritor warranty.

⚠️ CAUTION
There are two different spindle nut designs used on unitized wheel ends, double nut pack and PRO-TORQ™ nut. They are different and not interchangeable. You must replace components with the same type and follow the correct tightening procedure for the nut system used to prevent damage to components.

Models with a Double Nut Pack

1. Park the vehicle on a level surface. Block the rear wheels to prevent the vehicle from moving.
2. Raise the vehicle so that the axle is off the ground. Support the vehicle with safety stands. Do not use a jack to support the vehicle.
3. Remove the brake caliper assembly. Refer to Maintenance Manual MM-0467, EX+™ Air Disc Brake. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.
4. Remove the wheel adapter and rotor. Inspect the rotor for cracks and signs of wear. Replace the rotor if necessary. Figure 4.7.
5. Use a 3.5-inch (89 mm) socket wrench to remove the jam nut, “D” lock washer and adjusting nut. Figure 4.8.

6. Remove the thick washer and unitized hub bearing.

Models with a PRO-TORQ™ Nut

1. Park the vehicle on a level surface. Block the rear wheels to prevent the vehicle from moving.

2. Raise the vehicle so that the axle is off the ground. Support the vehicle with safety stands. Do not use a jack to support the vehicle.

3. Remove the brake caliper assembly. Refer to Maintenance Manual MM-0467, EX+™ Air Disc Brake. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

4. Remove the wheel adapter and rotor. Inspect the rotor for cracks and signs of wear. Replace the rotor if necessary. Figure 4.9.

Rotor Removal

- Rotors shipped prior to 2011 have a 0.85” pilot length at the hub bearing interface. These rotors only have two M14x2.0 jack screw holes. These may not provide enough force where heavy corrosion exists. If this is the case, remove the rotor using the “Rotor seized to hub” procedure at the end of this section.
Rotors shipped after 2011 have a shorter 0.20" pilot length at the hub bearing interface. The rotor has been updated to have four M16x2.0 jack screw holes to generate more force to remove the rotor. You can also remove the rotor using the "Rotor seized to hub" procedure at the end of this section.

**CAUTION**

Remove the keeper from the PRO-TORQ™ nut before you attach the nut to the axle spindle, or tighten and loosen the nut, to prevent damage to the nut and axle spindle.

5. Remove the keeper from the PRO-TORQ™ nut. Use a screwdriver to pry out the keeper arm from the groove on each side of the nut until the keeper is released. Meritor recommends replacing the keeper with a new one each time the PRO-TORQ™ nut is removed to maintain the integrity of the locking mechanism. Use a 3.5-inch (89 mm) socket wrench to remove the PRO-TORQ™ nut. Figure 4.10.

6. Remove the thick washer and unitized hub bearing.
Removing a Unitized Wheel End with a Meritor Rotor Seized to the Hub — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle

1. Park the vehicle on a level surface. Block the rear wheels to prevent the vehicle from moving.

2. Raise the vehicle so that the axle is off the ground. Support the vehicle with safety stands. Do not use a jack to support the vehicle.

3. Remove the brake caliper assembly. Refer to Section 5 of Maintenance Manual MM-0467, EX+™ Air Disc Brake. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

4. Remove the wheel adapter.

5. Remove the keeper from the PRO-TORQ™ nut. Use a screwdriver to pry out the keeper arm from the groove on each side of the nut until the keeper is released. Meritor recommends replacing the keeper with a new one each time the PRO-TORQ™ nut is removed to maintain the integrity of the locking mechanism.

6. Use a 3.5-inch (89 mm) socket wrench to remove the PRO-TORQ™ nut.

7. Remove the thick washer.

8. Remove the rotor and unitized bearing as an assembly.

9. Place the rotor and hub assembly flange face down on a bench or the floor.

10. Apply and saturate the inner portion of the hub barrel with penetrating oil. AeroKroil is preferred. Let the oil soak for at least 30 minutes. Figure 4.11.

11. Once the soak is complete, place the rotor into an arbor press with the back face of the rotor facing down and supported correctly.

12. Place the tool on top of the rotor and hub assembly. Refer to Figure 11.15 in Section 11 for a tool drawing. Figure 4.12.

13. Apply pressure until the hub assembly is free from the rotor.

ABS Tone Ring (Press-Fit Style)

**NOTE:** Hubs manufactured after July 2017 have Loctite® 620 retaining compound applied during tone ring mounting. Removal of the tone ring will require much higher force which may result in damage to the hub. A new hub with a tone ring already installed may be required to complete the repair.

1. Use a small pry bar or hammer and chisel to remove the ABS tone ring from the hub. Use care with the tool to avoid bending and damaging both components. Use a circular pattern around the wheel to remove it from the hub. Figure 4.13.
2. Thoroughly clean and degrease the ABS tone ring seat on the hub using a non-flammable solvent.

3. Inspect the ABS tone ring seat on the hub for damage or fretting from tone ring rotation.
   - **If the ABS tone ring seat on the hub is damaged:**
     Replace the hub.

4. Remove all debris and clean the outside diameter of the hub where the ABS tone ring seats using a Scotch-Brite™ pad or 3M brand cleaning pad. Make sure it is clear of all grime or contaminants. If necessary, use a mild-abrasive wire wheel to remove any surface rust. Figure 4.14 and Figure 4.15.

**Figure 4.13**

**Figure 4.14**

**Figure 4.15**

**Figure 4.16**

**ABS Tone Ring (Bolt-On Style)**

1. Remove the mounting bolts and remove the tone ring from the rotor. Figure 4.16.

2. Thoroughly clean and degrease the ABS tone ring seat on the rotor using a non-flammable solvent.

3. Inspect the ABS tone ring seat on the rotor for damage or fretting from tone ring rotation.
   - **If the ABS tone ring seat on the rotor is damaged:**
     Replace the rotor.
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Replace damaged or out-of-specification axle components. Do not bend, repair or recondition axle components by welding or heat-treating. A bent axle beam reduces axle strength, affects vehicle operation and voids Meritor’s warranty. Serious personal injury and damage to components can result.

Replace Worn or Damaged Parts

Do not repair or recondition wheel-end components. Replace damaged, worn or out-of-specification components. Do not mill or machine any components.

⚠️ WARNING
Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer’s instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer’s instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

⚠️ CAUTION
Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts can result.

Clean, Dry and Inspect Parts

Ground or Polished Parts

1. Use a cleaning solvent to clean the ground or polished parts and surfaces. Kerosene or diesel fuel can be used for this purpose. DO NOT USE GASOLINE.
2. Do NOT clean ground or polished parts in a hot solution tank or with water, steam or alkaline solutions. These solutions will cause corrosion of the parts.
3. Thoroughly clean the hub cavity with spray degreaser. The cavity must be free of any metal chips or dirt.
4. To remove grease from a wheel end, use a stiff fiber brush, not steel, and kerosene or diesel fuel, not gasoline. Allow the parts to dry. Note that any solvent residue must be completely wiped dry since it may either dilute the grease or oil or prevent the lubricant from correctly adhering to the wheel-end components.
5. Clean and inspect the wheel bearings, race, spindle bearing journals and hub. Bearings should be cleaned in a suitable non-flammable solvent and dried with either compressed air or a lint-free rag.

NOTE: If compressed air is used, do not spin dry the bearings as the rollers may score due to lack of lubricant. Ensure that the air line is moisture free.

Rough Parts

Rough parts can be cleaned with the ground or polished parts. Rough parts also can be cleaned in hot solution tanks with a weak alkaline solution. Parts must remain in the hot solution tanks until they are completely cleaned and heated.

Dry Cleaned Parts

Parts must be dried immediately after cleaning. Dry parts with clean paper or rags, or compressed air. Do not dry bearings by spinning with compressed air.

Prevent Corrosion on Cleaned Parts

Apply a light oil to cleaned and dried parts that are not damaged and are to be immediately assembled. Do NOT apply oil to the brake linings or the brake drums.
5 Prepare Parts for Assembly

If the parts are to be stored, apply a good corrosion preventative to all surfaces. Do NOT apply the material to the brake linings or the brake drums. Store the parts inside special paper or other material that prevents corrosion.

**NOTE:** All tapered joints must be clean and dry with no lubrication or corrosion preventative applied to the mating surfaces.

**Inspection**

**Wheel-End Components**

1. Following disassembly and cleaning of the wheel-end components, inspect the spindle journals, hub and wheel bearings for signs of wear and damage.

**NOTE:** Damage to either the wheel bearing or race will require replacement of both bearings and races as a set.

2. Inspect the cup, the cone and the rollers and cage of the wheel bearings for the following defects.
   - Cracked or broken separators
   - Broken or cracked rollers
   - Flaked areas on rollers or races
   - Spalled rollers or races
   - Overheated bearings
   - Brinelled races
   - Scored or etched rollers or races
   - Pitting of rollers or races
   - Wear bands on critical surfaces
   - Rust or corrosion on critical surfaces

If any of the following conditions exist, you must replace the bearing.

- The center of the large diameter end of the rollers is worn level or below the outer surface. Figure 5.1.
- The radius at the large diameter end of the rollers is worn to a sharp edge. Figure 5.1.
- There is a visible roller groove in the cup or the cone inner race surfaces. The groove can be seen at the small or large diameter end of both parts.
- There are deep cracks or breaks in the cup, the cone inner race or the roller surfaces. Figure 5.2.
- There are bright wear marks on the outer surface of the roller cage. Figure 5.3.
- There is damage on the rollers and on the surfaces of the cup and the cone inner race that touch the rollers. Figure 5.4.
- There is damage on the cup and the cone inner surfaces that touch the rollers. Figure 5.5.
WEAR MARKS

ETCHING AND PITTING

SPALLING AND FLAKING
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

**WARNING**
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Installation

ABS Tone Ring (Press-Fit Style)

If a tone ring was removed, use the following procedure to install a new one.

**WARNING**
Wear heat-resistant gloves and appropriate protective clothing when working with heating equipment and heated parts. Coming into contact with hot surfaces and parts can result in serious personal injury.

1. Apply Loctite® 620 adhesive sealant to the ABS tone ring hub seat in a continuous band 0.12″ wide (3 mm) 360 degrees around the hub.

**CAUTION**
Only use an appropriate oven to heat the tone ring; do not use a torch or flame. Using a torch or flame can warp the tone ring or damage the tone ring coating.

2. Heat the ABS tone ring in an appropriate oven approximately 20 minutes until the ring reaches a temperature of 350°F (177°C). Do not use a torch or flame to heat the tone ring. Do not allow the tone ring to exceed a temperature of 400°F (204°C). Using correct personal protection thermal gloves, drop the ABS tone ring onto the hub journal and press down with hand force. The tone ring must seat against the mounting seat shoulder of the hub. Figure 6.1.

**CAUTION**
When heating the tone ring, do not allow the tone ring to exceed a temperature of 400°F (204°C) or damage to the tone ring coating can occur.

3. Allow the tone ring and hub to cool before you continue servicing the hub.

4. Check the hub for any gaps between the ABS tone ring and the hub seat.

5. Use a 0.005” (0.127 mm) feeler gauge as shown at four places 90 degrees apart to ensure the tone ring is fully seated and is not cocked on the hub. Figure 6.2 and Figure 6.3.

**NOTE:** Some tone rings are seated against the hub top and require the gap to be checked as shown in Figure 6.4.

- If a gap between the tone ring and the hub seat shoulder greater than 0.005” (0.127 mm) is found: Use the appropriate driver to seat the ABS tone ring against the hub seat shoulder. Figure 6.5 and Figure 6.6.
- If the ABS tone ring cannot be seated with less than 0.005” (0.127 mm) gap: Remove the tone ring and install a new one.
CAUTION

Use care to ensure the ABS tone ring is not damaged. If the tone ring is damaged, replace it with a new tone ring.

6. Continue the hub assembly and installation in this section.
ABS Tone Ring (Bolt-On Style)

If a tone ring was removed, use the following procedure to install a new one.

1. Place the tone ring in position on the rotor and align the mounting bolt holes.
2. Apply Loctite® 680 threadlocker to the tone ring mounting bolts if there is no locking patch on the threads.
3. Install and tighten the tone ring mounting bolts in a cross pattern as shown in Figure 6.7. Refer to Section 9 for torque specifications. Retighten starting at the bolt at the end of the sequence. Continue the hub assembly and installation in this section.

MFS Series Wheel End — Front Non-Drive Steer Axle

MFS-08-113 — Quadraulic™ Disc Brake

1. If removed during the previous wheel-end disassembly procedure, install the torque plate and backing plate onto the knuckle.
2. Lubricate both the inner and outer wheel bearings. Refer to Section 10.
   - If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.
3. Use a pressure packer to force the specified grease from the large end of the cones into the cavities between the rollers and cage. Pack the hub between the bearing cups with grease to the level of the smallest diameter of the cups.
   - If a pressure packer is not available: Grease the bearings by hand. Wear the correct protection.
4. Insert the inner wheel bearing into the hub bore.
5. Install a new grease seal using the correct seal driver. Refer to Section 11.
6. Carefully install the hub and rotor assembly onto the spindle. Ensure that the assembly is correctly seated.

7. Insert the outer wheel bearing into the hub bore.

8. Secure the hub and rotor assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the hubcap. Tighten finger-tight.

9. Tighten the outer wheel bearing adjusting nut to 150 lb-ft (203 N\(\cdot\)m) while rotating the hub a minimum of five complete turns. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

10. Back off the outer wheel bearing adjusting nut one complete turn. Retighten to 50 lb-ft (68 N\(\cdot\)m) while rotating the hub.

11. Back off the outer wheel bearing adjusting nut 1/3 turn.

12. Install the pierced lock ring so that the inner tab locks into the spindle keyway and the outer wheel bearing adjusting nut nipple engages one of the through holes on the lock ring.

13. Install a new tabbed lock washer onto the spindle so that the two nipples engage the through holes on the lock ring.

14. Install the outer wheel bearing jam nut. Tighten to 150-225 lb-ft (203-305 N\(\cdot\)m). Refer to Section 9.

15. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

16. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

17. Bend two opposed lock washer tabs over the outer wheel bearing jam nut to lock it in position.

18. Install the gasket and hubcap with four capscrews and flat washers. Tighten to 12-16 lb-ft (16-22 N\(\cdot\)m).

19. Install the Quadraulic disc brake caliper assembly onto the torque plate with four fasteners and washers. Tighten to 320-360 lb-ft (435-490 N\(\cdot\)m). Refer to Section 9.

1. Lubricate both the inner and outer wheel bearings. Refer to Section 10.
   - If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.

2. Use a pressure packer to force the specified grease from the large end of the cones into the cavities between the rollers and cage. Pack the hub between the bearing cups with grease to the level of the smallest diameter of the cups.
   - If a pressure packer is not available: Grease the bearings by hand. Wear the correct protection.

3. Insert the inner wheel bearing into the hub bore.

4. Install a new grease seal using the correct seal driver. Refer to Section 11.
5. Carefully install the hub and rotor assembly onto the spindle. Ensure that the assembly is correctly seated.

6. Insert the outer wheel bearing into the hub bore.

7. Secure the hub and rotor assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the hubcap. Tighten finger-tight.

8. Tighten the outer wheel bearing adjusting nut to 150 lb-ft (203 N·m) while rotating the hub a minimum of five complete turns. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

9. Back off the outer wheel bearing adjusting nut one complete turn. Retighten to 50 lb-ft (68 N·m) while rotating the hub.

10. Back off the outer wheel bearing adjusting nut 1/3 turn.

11. Install the pierced lock ring so that the inner tab locks into the spindle keyway and the outer wheel bearing adjusting nut nipple engages one of the through holes on the lock ring.

12. Install a new tabbed lock washer onto the spindle so that the two nipples engage the through holes on the lock ring.

13. Install the outer wheel bearing jam nut. Tighten to 150-225 lb-ft (203-305 N·m). Refer to Section 9.

14. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

15. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

16. Bend two opposed lock washer tabs over the outer wheel bearing jam nut to lock it in position.

17. Install the gasket and hubcap with four capscrews and flat washers. Tighten to 12-16 lb-ft (16-22 N·m).

18. Install the reaction beam (B-frame) disc brake caliper assembly onto the knuckle with four fasteners and washers. Tighten to 81-96 lb-ft (110-130 N·m). Refer to Section 9.

1. Lubricate both the inner and outer wheel bearings. Refer to Section 10.

   • If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.

2. Use a pressure packer to force the specified grease from the large end of the cones into the cavities between the rollers and cage. Pack the hub between the bearing cups with grease to the level of the smallest diameter of the cups.

   • If a pressure packer is not available: Grease the bearings by hand. Wear the correct protection.

3. Insert the inner wheel bearing into the hub bore.

4. Install a new grease seal using the correct seal driver. Refer to Section 11.

5. Carefully install the hub assembly onto the spindle. Ensure that the assembly is correctly seated.
6. Insert the outer wheel bearing into the hub bore.

7. Secure the hub assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the hubcap. Tighten finger-tight.

8. Tighten the outer wheel bearing adjusting nut to 150 lb-ft (203 N·m) while rotating the hub a minimum of five complete turns. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

9. Back off the outer wheel bearing adjusting nut one complete turn. Retighten to 50 lb-ft (68 N·m) while rotating the hub.

10. Back off the outer wheel bearing adjusting nut 1/3 turn.

11. Install the D-style pierced lock ring so that it passes through the flat on the spindle. Ensure that the outer wheel bearing adjusting nut nipple engages one of the through holes on the lock ring.

12. Install a new D-style lock washer so that it passes through the flat on the spindle.

13. Install the outer wheel bearing jam nut. Tighten to 200-300 lb-ft (271-407 N·m). Refer to Section 9.

14. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

15. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

16. Bend one side of the D-style lock washer over the outer wheel bearing jam nut to lock it in position.

17. Install the gasket and hubcap with six capscrews and flat washers. Tighten to 12-16 lb-ft (16-22 N·m).

18. Install the brake drum onto the hub.

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**MS and RS Series Wheel End — Rear Drive Axle**

**MS-12-113 — Reaction Beam (B-Frame) Disc Brake**

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1. Lubricate both the inner and outer wheel bearings. Dip the wheel bearings into the same lubricant as used in the differential carrier housing. Refer to Section 10.

   - **CAUTION**
   
   Do not assemble dry. Damage to wheel end components may result.

2. Insert the inner wheel bearing into the hub bore.

3. Install a new oil seal using the correct seal driver. Refer to Section 11.

4. Carefully install the hub and rotor assembly onto the spindle. Ensure that the assembly is correctly seated.
5. Before the outer wheel bearing is installed, fill the wheel cavity with the same lubricant as used in the differential carrier housing. Typically, one-half pint of lubricant is required.

6. Insert the outer wheel bearing into the hub bore.

7. Secure the hub and rotor assembly on the spindle with the outer wheel bearing adjusting nut. Tighten finger-tight.

8. Tighten the outer wheel bearing adjusting nut to 200 lb-ft (272 N·m) while rotating the hub in both directions. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

9. Back off the outer wheel bearing adjusting nut one full turn.

10. Retighten the outer wheel bearing adjusting nut to 50 lb-ft (68 N·m) while rotating the hub a minimum of five complete turns.

11. Back off the outer wheel bearing adjusting nut 1/4 turn.

12. Install a new tabbed lock washer onto the spindle.

13. Install the outer wheel bearing jam nut. Tighten to 100-150 lb-ft (136-203 N·m). Refer to Section 9.

14. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

15. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

16. Bend two opposed lock washer tabs over the outer wheel bearing jam nut to lock it in position.

17. Apply a bead of RTV gasket material around the circumference of the inside surface of the axle shaft flange.

18. Install the axle shaft with eight capscrews. No flat or lock washers are required. Tighten to 85-95 lb-ft (115-130 N·m).

19. Install the reaction beam (B-frame) disc brake caliper assembly onto the torque plate with four fasteners and washers. Tighten to 81-96 lb-ft (110-130 N·m). Refer to Section 9.

20. Check the rear end differential fluid level by removing the oil fill plug from the carrier or housing bowl. If necessary, add the specified fluid through the carrier or housing bowl oil fill hole. Fill so that the fluid level is even with the bottom of the fill plug hole.

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**RS-19-145 and RS-13-120 — Quadrailic Disc Brake**

1. If removed during the previous wheel-end disassembly procedure, install the torque plate and backing plate onto the knuckle.

2. Lubricate both the inner and outer wheel bearings. Dip the wheel bearings into the same lubricant as used in the differential carrier housing. Refer to Section 10.

   • If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.

3. Insert the inner wheel bearing into the hub bore.

4. Install a new oil seal using the correct seal driver. Refer to Section 11.

5. Carefully install the hub and rotor assembly onto the spindle. Ensure that the assembly is correctly seated.
**CAUTION**

Do not assemble dry. Damage to wheel end components may result.

6. Before the outer wheel bearing is installed, fill the wheel cavity with the same lubricant as used in the differential carrier housing. Typically, one-half pint of lubricant is required.

7. Insert the outer wheel bearing into the hub bore.

8. Secure the hub and rotor assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the axle shaft flange. Tighten finger-tight.

9. Tighten the outer wheel bearing adjusting nut to 200 lb-ft (272 N·m) while rotating the hub in both directions. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

10. Back off the outer wheel bearing adjusting nut one full turn.

11. Retighten the outer wheel bearing adjusting nut to 50 lb-ft (68 N·m) while rotating the hub a minimum of five complete turns.

12. Back off the outer wheel bearing adjusting nut 1/4 turn.

13. Install the pierced lock ring so that the inner tab locks into the spindle keyway and the outer wheel bearing adjusting nut nipple engages one of the through holes on the lock ring.

14. Install a new tabbed lock washer onto the spindle.

15. Install the outer wheel bearing jam nut. Tighten to 100-200 lb-ft (136-272 N·m). Refer to Section 9.

**NOTE:** For axle model RS-13-120, tighten the outer wheel bearing jam nut to 100-150 lb-ft (136-203 N·m).

16. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

17. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

18. Bend two opposed lock washer tabs over the outer wheel bearing jam nut to lock it in position.

19. Install the axle shaft and gasket.

20. Install the tapered dowels.

21. Secure the axle shaft with 12 star lock washers and 12 new nuts. Tighten to 75-115 lb-ft (102-156 N·m).

22. Install the Quadraulic disc brake caliper assembly onto the torque plate with four fasteners and washers. Tighten to 320-360 lb-ft (435-490 N·m). Refer to Section 9.

23. Check the rear end differential fluid level by removing the oil fill plug from the carrier or housing bowl. If necessary, add the specified fluid through the carrier or housing bowl oil fill hole. Fill so that the fluid level is even with the bottom of the fill plug hole.

RS-21-145 — Q+ Cam Brake

1. Lubricate both the inner and outer wheel bearings. Dip the wheel bearings into the same lubricant as used in the differential carrier housing. Refer to Section 10.

- If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.

2. Insert the inner wheel bearing into the hub bore.
3. Install a new oil seal using the correct seal driver. Refer to Section 11.

4. Carefully install the hub assembly onto the spindle. Ensure that the assembly is correctly seated.

⚠️ CAUTION

Do not assemble dry. Damage to wheel end components may result.

5. Before the outer wheel bearing is installed, fill the wheel cavity with the same lubricant as used in the differential carrier housing. Typically, one-half pint of lubricant is required.

6. Insert the outer wheel bearing into the hub bore.

7. Secure the hub assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the axle shaft flange. Tighten finger-tight.

8. Tighten the outer wheel bearing adjusting nut to 200 lb-ft (272 N·m) while rotating the hub a minimum of five complete turns. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

9. Back off the outer wheel bearing adjusting nut one full turn.

10. Retighten the outer wheel bearing adjusting nut to 50 lb-ft (68 N·m) while rotating the hub.

11. Back off the outer wheel bearing adjusting nut 1/4 turn.

12. Install the pierced lock ring so that the inner tab locks into the spindle keyway and the outer wheel bearing adjusting nut nipple engages one of the through holes on the lock ring.

13. Install a new tabbed lock washer onto the spindle.

14. Install the outer wheel bearing jam nut. Tighten to 100-200 lb-ft (136-272 N·m). Refer to Section 9.

15. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

16. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

17. Bend two opposed lock washer tabs over the outer wheel bearing jam nut to lock it in position.

18. Install the axle shaft and gasket.

19. Install the tapered dowels.

20. Secure the axle shaft with eight star lock washers and nuts. Tighten to 150-230 lb-ft (203-312 N·m).

21. Install the brake drum onto the hub.

22. Check the rear end differential fluid level by removing the oil fill plug from the carrier or housing bowl. If necessary, add the specified fluid through the carrier or housing bowl oil fill hole. Fill so that the fluid level is even with the bottom of the fill plug hole.

**Conventional Wheel End — Front and Tag Axles with EX+ Brakes**

1. Lubricate both the inner and outer wheel bearings. Refer to Section 10.

   - If race or wheel bearing replacement is required as a result of damage observed during the disassembly procedure: Replace these components as a set. If necessary, drive new inner and outer bearing races into the hub.

2. Insert the inner wheel bearing into the hub bore.

3. Install a new grease seal using the correct seal driver. Refer to Section 11.

4. Carefully install the hub and rotor assembly onto the spindle. Ensure that the assembly is correctly seated.

5. Insert the outer wheel bearing into the hub bore.

6. Secure the hub assembly on the spindle using the outer wheel bearing adjusting nut. The adjusting nut must be installed so that the nipple faces outward toward the hubcap. Tighten finger-tight.

7. Tighten the adjusting nut to 100 lb-ft (136 N·m) while rotating the hub in both directions. This will ensure correct bearing-to-hub bore contact. Refer to Section 9.

8. Loosen the adjusting nut completely. Retighten to 20 lb-ft (27 N·m) while rotating the hub.

9. Back off the outer wheel bearing adjusting nut 1/3 turn.

10. Install the D-style pierced lock ring so that it passes through the flat on the spindle. Ensure that the adjusting nut nipple engages one of the through holes on the lock ring.

11. Install a new D-style lock washer so that it passes through the flat on the spindle.

12. Install the outer wheel bearing jam nut. Tighten to 200-300 lb-ft (271-407 N·m). Refer to Section 9.
13. Measure bearing end play with a dial indicator. Bearing end play should be 0.001 to 0.005-inch (0.025-0.127 mm). Refer to Section 7.

14. If necessary, adjust bearing end play to obtain the correct dial indicator reading. Refer to Section 7.

15. Bend one side of the D-style lock washer over the outer wheel bearing jam nut to lock it in position.

16. Install the gasket and hubcap with the capscrews and flat washers. Tighten the capscrews to 6 lb-ft (8.13 N·m) maximum using a star pattern. Then use a star pattern to apply a final torque of 15-18 lb-ft (20.34-24.4 N·m). For models with CR Zytel hubcaps, apply a final torque of 12-16 lb-ft (16.27-21.7 N·m).

17. Install the disc brake caliper assembly onto the torque plate. Refer to Maintenance Manual MM-0467, EX+™ Disc Brake, for more information.

**PreSet® Wheel Hub Assemblies**

ConMet® PreSet® hubs are the same as conventional wheel bearing hubs except that all PreSet® hubs come complete with pre-installed bearings, cups, cones and oil seals. These hubs have a precision tubular spacer between the bearings which eliminates the need for manual bearing adjustment.

The ConMet® PreSet® hubs are currently used on Meritor bus and coach MC12, FG952 tag and RC rear drive axles.


For ConMet® PreSet® hubs with PRO-TORQ™ spindle nuts (MC12 and FG952 tag axles), tighten the PRO-TORQ™ nut to a minimum of 250 lb-ft (339 N·m). DO NOT BACK OFF THE SPINDLE NUT. Insert and engage the keeper, then advance the nut until engagement takes place and the nut is locked.

For ConMet® PreSet® hubs with PRO-TORQ™ spindle nuts on RC rear drive axles, tighten the PRO-TORQ™ nut to a minimum of 300 lb-ft (406 N·m) +/- 30 lb-ft (40 N·m). DO NOT BACK OFF THE SPINDLE NUT. Insert and engage the keeper, then advance the nut until engagement takes place and the nut is locked.

**Unitized Wheel End — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle**

These procedures apply to bus and coach FH Series front and tag axles, and MC Series tag axles equipped with unitized wheel ends.

⚠️ **WARNING**

You must follow the unitized wheel-end maintenance and inspection procedures provided in this manual to prevent serious personal injury and damage to components.

The unitized wheel end is sealed and greased for life and does not require lubrication. If you disassemble, or attempt to repair or lubricate a unitized wheel-end assembly, you will void the Meritor warranty.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer’s instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin. If Loctite® adhesive material gets into your eyes, follow the manufacturer’s emergency procedures. Have your eyes checked by a physician as soon as possible.

Carefully follow the manufacturer’s application and curing (drying) instructions when you apply an anaerobic sealant. Incorrectly applied sealant or an insufficient cure time can cause fasteners and mating surfaces to loosen during vehicle operation. Serious personal injury and damage to components can result.

⚠️ **CAUTION**

There are two different spindle nut designs used on unitized wheel ends, double nut pack and PRO-TORQ™ nut. They are different and not interchangeable. You must replace components with the same type and follow the correct tightening procedure for the nut system used to prevent damage to components.

**Models with a Double Nut Pack**

1. Inspect the new unitized hub bearing. Remove the replacement hub from the box and place it onto a clean surface. Examine the hub to verify the following.

   A. All bearing seals and the O-ring seal are clean and show no signs of damage.
B. The O-ring is correctly installed into the groove at the inner bearing shoulder prior to installation onto the spindle.

C. The bearing mounting face and bore are clean with no seal coating, dirt or dust.

D. The tooth wheel is not damaged or bent.

2. Apply a light coat of anti-seize lubricant such as Molykote-D paste to the bearing bore and to the O-ring before installing the hub and spindle. Do not apply any lubricant to the spindle or on the bearing end face. The spindle should be clean and free of any contamination. Figure 6.14.

3. Verify the O-ring is correctly seated before installing the bearing onto the spindle.

4. Install the unitized hub bearing onto the knuckle spindle. Use care to avoid damaging the O-ring on the spindle threads. Figure 6.15.
5. Install the spindle nut onto the spindle threads.

6. Install the double nut pack onto the spindle. Figure 6.16.
   A. Apply Never-Seez™ to the spindle threads.
   B. Install the thick washer and the adjusting nut onto the spindle.
   C. Rotate the hub while tightening the adjusting nut to $600 \pm 75$ lb-ft ($813 \pm 101$ N·m).
   D. Install a new “D” lock washer and jam nut onto the spindle.
   E. Tighten the jam nut to $250 \pm 50$ lb-ft ($339 \pm 68$ N·m).
   F. Bend the “D” lock washer tabs over the flat sides of the jam nut and adjusting nut. Ensure that the washer tabs secure a minimum of one flat side on each nut.

7. Apply a bead of anaerobic sealant such as Loctite® 518 Gasket Eliminator 360 degrees around the rotor on both mating surfaces and on the inside of the bolt circle. Figure 6.17. You must apply the sealant before you assemble the rotor and wheel adapter to prevent moisture from entering into the bearing. Do not use any type of gasket sealant other than anaerobic sealant.
8. Install guide pins (optional) into the unitized hub bearing to aid in the alignment and installation of the rotor and wheel adapter. Refer to Section 11. Figure 6.18.

9. Install the rotor onto the unitized hub bearing. Figure 6.19.

10. Install the wheel adapter onto the rotor. Figure 6.20.

11. Install the fasteners. Slightly tighten the fasteners in a star pattern to seat the rotor and wheel adapter correctly. If used, remove the guide pins and install the remaining fasteners. Tighten the fasteners in a star pattern to 275 ± 25 lb-ft (373 ± 34 N·m).

12. Verify the end play of the new bearing. The end play must be 0.000-0.002-inch (0-0.0508 mm). Refer to Section 3.

13. Install the wheel and check if the ABS is operating correctly.

- If the warning lamp remains illuminated or comes on during vehicle operation: Check for possible tooth wheel damage or a sensor gap out of specification. Refer to your vehicle ABS version and the appropriate maintenance manual. To obtain the publication, refer to the Service Notes page on the front inside cover of this manual.
Models with a PRO-TORQ™ Nut

1. Inspect the new unitized hub bearing. Remove the replacement hub from the box and place it onto a clean surface. Examine the hub to verify the following.
   A. All bearing seals and the O-ring seal are clean and show no signs of damage.
   B. The O-ring is correctly installed into the groove at the inner bearing shoulder prior to installation onto the spindle.
   C. The bearing mounting face and bore are clean with no seal coating, dirt or dust.
   D. The tooth wheel is not damaged or bent.

2. Apply a light coat of anti-seize lubricant such as Molykote-D paste to the bearing bore and to the O-ring before installing the hub and spindle. Do not apply any lubricant to the spindle or on the bearing end face. The spindle should be clean and free of any contamination. Figure 6.21.

3. Verify the O-ring is correctly seated before installing the bearing onto the spindle.

4. Install the unitized hub bearing onto the knuckle spindle. Use care to avoid damaging the O-ring on the spindle threads. Figure 6.22.
Remove the keeper from the PRO-TORQ™ nut before you attach the nut to the axle spindle, or tighten and loosen the nut, to prevent damage to the nut and axle spindle.

5. Install the PRO-TORQ™ nut. Figure 6.23.
   A. Apply Never-Seez™ to the spindle threads.
   B. Remove the keeper from the PRO-TORQ™ nut. Use a screwdriver to pry out the keeper arm from the groove on each side of the nut until it is released. Meritor recommends replacing the keeper with a new one each time the PRO-TORQ™ nut is removed to maintain the integrity of the locking mechanism.
   C. Install the thick washer and the PRO-TORQ™ nut onto the spindle.
   D. Rotate the bearing while tightening the PRO-TORQ™ nut to 600 ± 75 lb-ft (813 ± 101 N·m). ☭
   E. Install a new keeper against the nut with the orange side facing OUT. Align the flat of the keeper with the flat on the spindle. Insert the single keeper tab into the undercut groove on the nut. Engage the mating teeth.
   F. Use a screwdriver to compress and insert the keeper arms one at a time into the undercut groove on the nut. Ensure that the keeper tab and arms are fully seated into the undercut groove.
6. Apply a bead of anaerobic sealant such as Loctite® 518 Gasket Eliminator 360 degrees around the rotor on both mating surfaces and on the inside of the bolt circle. Figure 6.24. You must apply the sealant before you assemble the rotor and wheel adapter to prevent moisture from entering into the bearing. Do not use any type of gasket sealant other than anaerobic sealant.

7. Install guide pins (optional) into the unitized hub bearing to aid in the alignment and installation of the rotor and wheel adapter. Refer to Section 11. Figure 6.25.

8. Install the rotor onto the unitized hub bearing. Figure 6.26.

9. Install the wheel adapter onto the rotor. Figure 6.27.

10. Install the fasteners. Slightly tighten the fasteners in a star pattern to seat the rotor and wheel adapter correctly. If used, remove the guide pins and install the remaining fasteners. Tighten the fasteners in a star pattern to 275 ± 25 lb-ft (373 ± 34 N·m). 

11. Verify the end play of the new bearing. The end play must be 0.000-0.002-inch (0-0.0508 mm). Refer to Section 3.

12. Install the wheel and check if the ABS is operating correctly.

- If the warning lamp remains illuminated or comes on during vehicle operation: Check for possible tooth wheel damage or a sensor gap out of specification. Refer to your vehicle ABS version and the appropriate maintenance manual. To obtain the publication, refer to the Service Notes page on the front inside cover of this manual.
Studs and Nuts

The following warnings are to alert you to stud and nut conditions and maintenance procedures that can affect your safety and the integrity of the vehicle and its components.

Carefully read the warnings before you install disc wheels.

⚠️ WARNING

Replace bent, loose, broken or stripped studs. When you replace a stripped stud, always replace the stud on each side of the stripped stud as well. Even if the adjoining studs are not cracked, they have sustained fatigue damage, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Always replace a serrated stud, bolt, with a new one. Do not reuse a serrated stud, which will not tighten correctly and can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Do not apply paint to mounting surfaces, studs or nuts. Paint decreases a fastener assembly's capability to maintain clamp load, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Ensure that you do not damage the stud threads. Damaged threads will not allow the stud to provide the required clamp load to support the wheel retention system. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Check that stud standout is correct for stud-piloted wheels. If standout exceeds specifications even though the correct torque is used, the cap nut can bottom against the hub stud and loosen both wheels and the brake drum, which will cause the wheels to separate from the vehicle. If standout is too short, the cap nut will overload and crack, causing the inner and dual wheels to separate from the vehicle. Serious personal injury and damage to components can result.

Install right-hand studs onto the right side of the vehicle and left-hand studs onto the left side of the vehicle. Studs that are not installed correctly can loosen, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

If the wheel studs are being reused, apply two drops of oil to the last two or three threads at the end of each stud. Do not over lubricate the studs or nut threads. Over lubricating the fasteners can cause excessive clamp load. The studs can break and cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

If the wheel studs are being reused, apply two drops of oil to the last two or three threads at the end of each stud. Do not over lubricate the studs or nut threads. Over lubricating the fasteners can cause excessive clamp load. The studs can break and cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Install aluminum wheel nuts onto an aluminum disc wheel. Do not install steel wheel nuts. Steel wheel nuts can damage an aluminum wheel or cause the dual wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Install steel wheel nuts onto steel wheels. Do not install aluminum wheel nuts. The extension on an aluminum wheel nut can bottom against the hub flange or brake drum before the disc wheel is clamped correctly, which can cause the wheels to separate from the vehicle. Serious personal injury and damage to components can result.

Install the nuts with the correct thread size onto the studs. A nut with an incorrect thread size will not turn freely on the stud or will fit loosely on the stud. The thread can strip, which can cause loss of clamp load. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Install the correct wheel system components for the application. Do not mix wheel system components. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Apply two drops of oil between the nut flange and the hex portion of the swivel area at each installation if you reinstall the two-piece flange nuts that have been in service. Without lubricant, the fasteners may not produce adequate clamp load, and a wheel can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Lightly lubricate the hub pilots to ease wheel installation and removal. Do not lubricate the mounting face of the drum or wheel. Lubricant on the drum or wheel mating surfaces can reduce friction and cause the components to slip during operation. Serious personal injury and damage to components can result.
1. Check the studs. Repair or replace loose, bent, stripped or broken studs.

2. Check for correct serrated stud standout.
   A. Figure 6.28 shows correct standout.
   B. Figure 6.29 and Figure 6.30 show incorrect standout.

   ![Correct Stud Standout](4001688a)
   ![Incorrect Stud Standout: Stud Too Long; Bottoms in Cap Nut](4001689a)

3. Check for **R** and **L** stamped in the end of the stud. Figure 6.31. Install right-hand studs onto the right side of the vehicle, and left-hand studs onto the left side of the vehicle.

   ![Right- and Left-Hand Fasteners](4001691a)

   ![Incorrect: Stud Too Short; Inadequate Support for Cap Nut](4001690a)

4. Some manufacturers color code studs. Check the manufacturer's instructions to verify the color code used.

5. Install the correct nut into all applications. Do not install rusty, galled or worn nuts. Ensure that you use the correct nuts in the following installations.
   - Install 33 mm hex two-piece flange nuts into ISO 285.75 mm bolt circle diameter (BC) and ISO 335 mm BC systems.
• Install 1-1/2-inch hex two-piece flange nuts into a 275 mm system with M22 x 1.5 serrated studs. Do not install 1-1/2-inch hex two-piece flange nuts onto M22 x 1.5 serrated studs when 33 mm two-piece hex nuts are used on the CentroMount-8™ system.

6. Install aluminum wheel nuts onto aluminum wheels. Do not install steel wheel nuts. An aluminum wheel nut has an extension to accommodate the thickness of the aluminum. Figure 6.32 and Figure 6.33.

7. Install steel wheel nuts onto steel wheels. Do not install aluminum wheel nuts. The extension of the aluminum wheel nut can bottom against the hub flange or brake drum before the disc is clamped correctly. Figure 6.34 and Figure 6.35.

8. Install nuts with the correct thread size onto the studs. A correct thread size enables the nut to turn freely on the stud. An incorrect nut will fit very loosely on the stud thread, which can cause the thread to strip.

9. Check the extension of the stud through the nut after you tighten the nut to the specified torque.

• If less than two threads extend through the nut, or more than 3/8-inch (9.5 mm) of the stud extends through the nut: Check all parts to verify that they are correct for the wheel system you will install onto the vehicle.

10. Ensure that the nut and wheel mate correctly. Ensure that you install the correct components onto the wheel systems. Figure 6.36 and Figure 6.37.

• If the wheel has a ball seat bolt hole pattern: The nut must have a spherical surface that seats in the ball seat.
If the wheel has a cylindrical bolt hole pattern: The nut must have a flat surface that seats against the wheel.

**Figure 6.36**

CORRECT: BALL SEAT WHEEL ON BALL SEAT HUB

INCORRECT: HUB-PILOTED WHEEL ON BALL SEAT HUB

11. Follow the disc wheel manufacturer’s fastener tightening sequence when you install fasteners to help ensure a higher and more uniform clamp load. Figure 6.38. Always check fasteners at the wheel manufacturer’s recommended service intervals.

**Figure 6.38**

STUD-PILOTED AND HUB-PILOTED SINGLE AND DUAL WHEELS

CORRECT: HUB-PILOTED WHEELS ON HUB-PILOTED HUB

INCORRECT: BALL SEAT WHEELS ON HUB-PILOTED HUB

4001699b
Apply two drops of oil between the nut flange and the hex portion of the swivel area at each installation if you reinstall the two-piece flange nuts that have been in service. Without lubricant, the fasteners may not produce adequate clamp load, and a wheel can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

12. Apply two drops of oil between the nut flange and the hex portion of the swivel area at each installation if you reinstall the two-piece flange nuts that have been in service.

13. Apply two drops of oil to the last two or three threads at the end of each stud.

Lightly lubricate the hub pilots to ease wheel installation and removal. Do not lubricate the mounting face of the drum or wheel. Lubricant on the drum or wheel mating surfaces can reduce friction and cause the components to slip during operation. Serious personal injury and damage to components can result.

14. Lightly lubricate the hub pilots to ease wheel installation and removal. Do not lubricate the mounting face of the drum or wheel.

15. Retighten all wheel nuts on all systems at 50-100 miles (80-160 km) to the correct torque specifications.

16. Use the correct installation tools.

17. Ensure that the gross weight does not exceed gross vehicle weight (GVW). Ensure that the axle loads do not exceed gross axle weight ratings (GAWR).

Stud Replacement Procedures

Do not use a hammer to remove or install studs. A hammer can cause impact damage to the bearing raceway, which will reduce bearing life. Serious personal injury and damage to components can result.

Ensure that you do not damage stud threads during installation procedures. Damaged threads will not allow the stud to provide the required clamp to support the wheel retention system. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

If a stud is stripped and needs replacement, use one of the following procedures.

Preferred Method — Replacing Studs with the Hub Installed onto the Vehicle

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.

2. Raise the vehicle so that the front wheels are off the ground. Support the vehicle with safety stands.

3. Mark the wheel and hub relationship. Remove the wheel and tire assembly. Use a paint stick to mark the wheel studs you are removing. Figure 6.39. Do not reuse the studs.

4. If necessary, back off the brake at the slack adjuster until the brake shoes retract and the drum clears the linings. Figure 6.40.
5. Remove the brake drum. Figure 6.41.

6. Use a 1/2-inch (12.7 mm) drive impact wrench and a ball joint removal kit to remove the studs. Figure 6.42.

7. Use a crocus cloth to clean all the flat surfaces on the wheel and hub.

8. Position the new studs into the hub. Align the stud knurls with the impressions in the hub stud hole. Figure 6.43.

9. Add two drops of oil between the nut flange and the hex portion of the swivel area on the two-piece flange nuts. Do not use more than two drops of oil. Figure 6.44.

**WARNING**

Do not lubricate studs or nut threads. Lubricants will not enable you to tighten fasteners correctly, which causes excessive clamp load. Studs can break and cause wheels to loosen and separate from the vehicle. Serious personal injury can result.
**WARNING**
Install nuts with the correct thread size onto the studs. A nut with an incorrect thread size will not turn freely on the stud or will fit loosely on the stud. The thread can strip, which can cause loss of clamp load. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

10. Position the nuts onto the studs. Use a 1/2-inch (12.7 mm) drive impact wrench to draw the stud into the hub. Do not exceed 300 lb-ft (408 N·m). Figure 6.45.

11. Use a 0.0015-inch (0.0381 mm) feeler gauge to check that the stud is correctly seated. Figure 6.46.

- **If the stud is not correctly seated:** Remove the stud, clean all surfaces and install a new stud as described previously.

- **If the stud is still not correctly seated:** Replace the hub.

12. Remove all the nuts. Install the wheel and tire assembly.

13. Discard all removed studs.
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

When you perform a wheel bearing adjustment, observe the following guidelines.

- Always use the correct size wrench socket.
- Always use a torque wrench to tighten the adjusting nuts to their correct adjusting torque.
- Do not tighten or loosen the adjusting nuts by hitting the nuts with a hammer or by hitting a chisel or a drift placed against the nuts with a hammer. Damage to the nuts can result. Damaged adjusting nuts can prevent a correct wheel bearing adjustment, cause possible loss of vehicle wheel-end equipment and cause serious personal injury.

Check and Adjust the Wheel Bearings

Refer to technical publication TP-89159, Axle Wheel Bearing Installation Specifications, for a summary of all wheel end installation specifications. To obtain this publication, refer to the service notes page on the front inside cover of this manual.

The most accurate bearing end play measurement is obtained with the brake drum and tires removed.

- If the brake drum and tires are installed and the bearing end play is greater than 0.003-inch (0.0762 mm): Remove the brake drum and the tire-wheel assembly. Recheck bearing end play.

Front Axles

⚠️ WARNING
Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.

2. Raise the vehicle so that the wheels are off the floor. Support the vehicle with safety stands.
3. Remove the capscrews and remove the gasket and the cap from the hub.
4. Verify that the brake drum and the hub fasteners are tightened to the manufacturer’s specifications.
5. Attach a dial indicator with the magnetic base at the bottom of the hub or the brake drum. Adjust the dial indicator so that the pointer is against the center of the knuckle. Set the dial indicator on ZERO. Figure 7.1.

6. Measure the end play by pushing and pulling on each side of the hub or drum while looking at the dial indicator. The end play is the total travel observed.

- If the end play is 0.001-0.005-inch (0.025-0.127 mm): The bearings do not need adjustment.
- If the end play is not 0.001-0.005-inch (0.025-0.127 mm): Adjust the wheel bearings. Figure 7.1.

7. On double nut and lock fasteners: Bend the lock washer off the wheel bearing nut. Remove the wheel bearing nut, the lock washer and the pierced lock ring. Figure 7.2.
8. For disc brake wheel ends, back off the brake caliper until the rotor is clear from the pad linings about 1/16-inch (1.588 mm) gap or more. Refer to Maintenance Manual MM-0467, EX+™ Air Disc Brake, for more information about EX225 disc brake inspection and adjustment. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual. Figure 7.3.

9. Use a torque wrench to tighten the adjusting nut to 150 lb-ft (203 N·m) while rotating the tire a minimum of five revolutions. Figure 7.4.

10. Back off the nut one complete turn. Tighten the nut to 50 lb-ft (68 N·m). Figure 7.4.

11. Perform the following adjustment procedure.
   A. Back off the adjusting nut.
      - For spindle thread diameters of 1-1/8-inches (28.6 mm) and 1-1/2-inches (38.1 mm): Back off the nut 1/3 turn.
      - For spindle thread diameters of 1-3/4-inches (44.45 mm) and more: Back off the nut 1/4 turn.
   B. Install the pierced lock ring, the lock washer and the wheel bearing nut.
   C. Tighten the wheel bearing nut.
      - For MFS-06/07/08 with spindle thread diameters of 1-1/8-inches (28.6 mm): Tighten the nut to 150-225 lb-ft (203-305 N·m).
      - For spindle thread diameters over 1-1/8-inches (28.6 mm) up to 2-5/8-inches (66.67 mm): Tighten the nut to 200-300 lb-ft (271-407 N·m).
      - For spindle thread diameters of 2-5/8-inches (66.67 mm) and more: Tighten the nut to 250-400 lb-ft (339-542 N·m).
D. Measure the end play. The end play must be 0.001-0.005-inch (0.025-0.127 mm). Refer to Step 5 and Step 6. Readjust if necessary.

E. If the end play is to specification, bend the washer to at least one flat edge of the outer wheel bearing nut. Figure 7.2.

12. Install the gasket and the cap onto the hub. Install the capscrews and tighten to 12-16 lb-ft (16-22 N•m).

13. Lower the vehicle to the ground. Check for correct vehicle operation.

**Drive Axles**

1. If not already installed, install the inner wheel bearing adjusting nut onto the spindle and against the outer bearing so that the pin in the inner bearing adjusting nut is pointing away from the bearing. Figure 7.5.

2. Tighten the adjusting nut to 200 lb-ft (272 N•m) while rotating the hub a minimum of five revolutions to fully seat the wheel bearings.

3. Loosen the inner adjusting nut one full turn.

4. Retighten to 50 lb-ft (68 N•m).

5. Loosen the inner adjusting nut 1/4 turn.

6. Install the lock washer. If the hole in the washer is not aligned with the inner adjusting nut pin, remove the washer, turn the washer over and reinstall it. The pin and the hole should now be aligned. If not, slightly adjust the inner adjusting nut. Use whichever lock washer side causes the least movement of the adjusting nut. Figure 7.6.

7. Assemble the stamped retainer and the outer wheel bearing adjusting nut onto the spindle.

8. Tighten the outer nut.

   - If the thread pitch diameter is 2.62-inches or greater:
     Tighten the outer nut to 100-200 lb-ft (136-272 N•m).
   - If the thread pitch diameter is 1.12-2.61-inches:
     Tighten the outer nut to 100-150 lb-ft (136-203 N•m).

9. Check and adjust the wheel end play to ensure it is 0.001-0.005 inch (0.025-0.127 mm). Use the following procedure to check the end play.

   A. Attach the magnetic base of a dial indicator to the hub face. Touch the dial indicator stem against the end of the spindle.
   
   B. Slightly rotate the hub in both directions while pushing inward until the dial indicator does not change. Set the dial indicator to ZERO.
   
   C. Slightly rotate the hub in both directions while pulling OUTWARD until the dial indicator does not change.
   
   D. Read the end play measurement on the dial indicator.
7 Adjustment

- **If end play does not meet specification:** Remove the outer wheel bearing adjusting nut, the stamped retainer and the lock washer. Tighten or loosen the inner adjusting nut as required to set the correct end play. Repeat Step 6 through Step 8.

**NOTE:** If you rotate the inner adjusting nut by one hole position, the end play setting will change by approximately 0.005-inch (0.127 mm). If the lock washer is turned over and installed, the end play setting will change by approximately 0.002 inch (0.051 mm).

10. When end play is correct, bend the two opposing tabs on the stamped retainer over the flats of the outer wheel bearing adjusting nut.

11. For optional grease-lubricated wheel ends, install a new grease seal onto the hub studs and the housing spindle.

12. Install the axle shafts, gasket and tapered dowels at each stud.

13. Install the nuts and the washers onto the studs. Tighten the nuts to the correct torque value. Refer to Section 9.
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

⚠️ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Table B: Wheel-End Component Troubleshooting

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tires wear out quickly or have uneven tire tread wear.</td>
<td>Tires have incorrect air pressure.</td>
<td>Place the specified air pressure in the tires.</td>
</tr>
<tr>
<td></td>
<td>Tires are out-of-balance.</td>
<td>Balance or replace the tires.</td>
</tr>
<tr>
<td></td>
<td>Tandem axle alignment is incorrect.</td>
<td>Align the tandem axles.</td>
</tr>
<tr>
<td></td>
<td>Toe-in setting is incorrect.</td>
<td>Adjust the toe-in to the specified setting.</td>
</tr>
<tr>
<td></td>
<td>Steering arm geometry is incorrect.</td>
<td>Service the steering system as necessary.</td>
</tr>
<tr>
<td></td>
<td>Wheel end play is excessive.</td>
<td>Readjust the wheel bearings.</td>
</tr>
<tr>
<td></td>
<td>Power steering system pressure is low.</td>
<td>Repair the power steering system.</td>
</tr>
<tr>
<td></td>
<td>Steering gear linkage is not assembled correctly.</td>
<td>Assemble the steering gear correctly.</td>
</tr>
<tr>
<td></td>
<td>Steering linkage needs lubrication.</td>
<td>Lubricate the steering linkage.</td>
</tr>
<tr>
<td></td>
<td>King pins are binding.</td>
<td>Replace the king pins.</td>
</tr>
<tr>
<td></td>
<td>Steering arm geometry is incorrect.</td>
<td>Service the steering system as necessary.</td>
</tr>
<tr>
<td></td>
<td>Caster is out-of-adjustment.</td>
<td>Adjust the caster as necessary.</td>
</tr>
<tr>
<td></td>
<td>Tie rod ends are hard to move.</td>
<td>Replace the tie rod ends.</td>
</tr>
<tr>
<td></td>
<td>Thrust bearing is worn.</td>
<td>Replace the thrust bearing.</td>
</tr>
<tr>
<td></td>
<td>Tie rod ends require lubrication.</td>
<td>Lubricate the ends of the cross tube. Verify that the lubrication schedule is followed.</td>
</tr>
<tr>
<td></td>
<td>Operating conditions are severe.</td>
<td>Increase the frequency of inspection and lubrication intervals.</td>
</tr>
<tr>
<td></td>
<td>Boot on the tie rod end is damaged.</td>
<td>Replace the boot.</td>
</tr>
</tbody>
</table>

Troubleshooting

Diagnostic Chart

Significant wheel end component wear may enable the ABS warning light and cause a fault code to be set. Slow return of the steering wheel to its neutral position following completion of a turn may be another indication of wheel end component wear. Refer to Table B.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bent or broken cross tube, tie rod end ball stud, steering arm or tie rod end. Component requires replacement.</td>
<td>Too much pressure exists in the power steering system. Pressure exceeds the vehicle manufacturer’s specification.</td>
<td>Adjust the power steering system to the specified pressure.</td>
</tr>
<tr>
<td></td>
<td>Power steering system cut-off pressure is out of adjustment.</td>
<td>Adjust the power steering system to the specified pressure.</td>
</tr>
<tr>
<td></td>
<td>Vehicle is operated under severe conditions.</td>
<td>Verify that the vehicle is operated correctly.</td>
</tr>
<tr>
<td></td>
<td>Add-on type of power steering system is not installed correctly.</td>
<td>Correctly install the add-on power steering system.</td>
</tr>
<tr>
<td></td>
<td>Steering gear overtravel poppets are incorrectly set or malfunctioning.</td>
<td>Check for correct operation or adjust the overtravel of the poppets to the vehicle manufacturer’s specifications.</td>
</tr>
<tr>
<td></td>
<td>Axle stops are incorrectly set.</td>
<td>Set the axle stops to the vehicle manufacturer’s specification.</td>
</tr>
<tr>
<td>Worn or broken steering ball stud.</td>
<td>Drag link fasteners are tightened higher than the vehicle manufacturer specified.</td>
<td>Tighten the drag link fasteners to the vehicle manufacturer’s specified torque.</td>
</tr>
<tr>
<td></td>
<td>Lubrication is lacking or incorrect.</td>
<td>Lubricate the linkage with the specified lubricant.</td>
</tr>
<tr>
<td></td>
<td>Power steering stops are out-of-adjustment.</td>
<td>Adjust the stops to the specified dimension.</td>
</tr>
<tr>
<td>Worn king pins and king pin bushings.</td>
<td>Seals and gaskets are worn or missing.</td>
<td>Replace the seals and gaskets.</td>
</tr>
<tr>
<td></td>
<td>Lubricant is incorrect.</td>
<td>Lubricate the axle with the specified lubricant.</td>
</tr>
<tr>
<td></td>
<td>Axle is not lubricated at the scheduled frequency.</td>
<td>Lubricate the axle at the scheduled frequency.</td>
</tr>
<tr>
<td></td>
<td>Use of incorrect lubrication procedures.</td>
<td>Use the correct lubrication procedures.</td>
</tr>
<tr>
<td></td>
<td>Lubrication schedule does not match operating conditions.</td>
<td>Change the lubrication schedule to match the operating conditions.</td>
</tr>
<tr>
<td>Vibration or shimmy of front axle during operation.</td>
<td>Caster is out-of-adjustment.</td>
<td>Adjust the caster.</td>
</tr>
<tr>
<td></td>
<td>Wheels or tires are out-of-balance.</td>
<td>Balance or replace the wheels or tires.</td>
</tr>
<tr>
<td></td>
<td>Shock absorbers are worn.</td>
<td>Replace the shock absorbers.</td>
</tr>
</tbody>
</table>
Specifications

Wheel-End Components

Specifications can also be found in Technical Publication TP-89159, Axle Wheel Bearing Installation Specifications. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Table C: Rotor Attachment Torque Specifications

<table>
<thead>
<tr>
<th>Rotor Attachment Bolt Size</th>
<th>Rotor Attachment Bolt Torque Lb-Ft (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2-13</td>
<td>75-100 (102-136)</td>
</tr>
<tr>
<td>9/16-12</td>
<td>100-125 (136-169)</td>
</tr>
<tr>
<td>9/16-18</td>
<td>70-95 (95-129)</td>
</tr>
<tr>
<td>5/8-18</td>
<td>220-240 (298-325)</td>
</tr>
</tbody>
</table>

NOTE: Refer to the procedures in the Assembly and Adjustment sections for correct tightening instructions.

Table D: Tone Ring Attachment Torque Specifications

<table>
<thead>
<tr>
<th>Thread</th>
<th>Torque Lb-In (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#10-24</td>
<td>45-59 (5.08-6.66)</td>
</tr>
<tr>
<td>M5x0.8 mm</td>
<td>85-105 (9.6-11.86)</td>
</tr>
<tr>
<td>1/4x20</td>
<td></td>
</tr>
<tr>
<td>M6x1.0 mm</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Refer to the procedures in the Section 6 for correct tightening instructions.

Table E: Axle Shaft Attachment Torque Specifications

<table>
<thead>
<tr>
<th>Axle Shaft Attachment Nut Size</th>
<th>Axle Shaft Attachment Nut Torque Lb-Ft (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M12x1.75</td>
<td>85-95 (115-129)</td>
</tr>
<tr>
<td>1/2-20</td>
<td>75-115 (102-156)</td>
</tr>
<tr>
<td>5/8-18</td>
<td>150-230 (203-312)</td>
</tr>
</tbody>
</table>

NOTE: Refer to the procedures in the Assembly and Adjustment sections for correct tightening instructions.

Table F: Conventional, Unitized and ConMet Wheel-End System Torque Specifications

<table>
<thead>
<tr>
<th>Axle</th>
<th>Initial Adjusting Nut Torque¹</th>
<th>Final Adjusting Nut Torque²</th>
<th>Spindle Thread Diameter</th>
<th>Jam Nut Torque Specification</th>
<th>Acceptable End Play Range²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive axles without lock washers</td>
<td>200 lb-ft (272 N·m) Back off 1 turn</td>
<td>50 lb-ft (68 N·m) Back off 1/4 turn</td>
<td>Less than 2-5/8&quot; (66.67 mm)</td>
<td>200-300 lb-ft (272-408 N·m)</td>
<td>0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
<tr>
<td>Drive axles with bendable lock washers</td>
<td>200 lb-ft (272 N·m) Back off 1 turn</td>
<td>50 lb-ft (68 N·m) Back off 1/4 turn</td>
<td>Less than 2-5/8&quot; (66.67 mm)</td>
<td>100-150 lb-ft (136-204 N·m)</td>
<td>0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
</tbody>
</table>

¹ Back off 1 turn
² Back off 1/4 turn
³ Less than 2-5/8" (66.67 mm) and over
⁴ 2-5/8" (66.67 mm) and over
⁵ 2-5/8" (66.67 mm) and over
### Specifications

<table>
<thead>
<tr>
<th>Axle</th>
<th>Initial Adjusting Nut Torque</th>
<th>Final Adjusting Nut Torque</th>
<th>Spindle Thread Diameter</th>
<th>Jam Nut Torque Specification</th>
<th>Acceptable End Play Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front non-drive steer axles</td>
<td>150 lb-ft (203 N·m) Back off 1 turn</td>
<td>50 lb-ft (68 N·m) Back off 1/3 turn for 1-1/8&quot; (28.6 mm), 1-1/2&quot; (38.1 mm) Back off 1/4 turn for 1-3/4&quot; (44.45 mm) and over</td>
<td>1-1/8&quot; (28.6 mm) MFS-06, MFS-07, MFS-08</td>
<td>150-225 lb-ft (203-305 N·m)</td>
<td>0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
<tr>
<td>Trailer axles</td>
<td>200 lb-ft (272 N·m) Back off 1 turn</td>
<td>50 lb-ft (68 N·m) Back off 1/4 turn</td>
<td>2-5/8&quot; (66.67 mm) and over</td>
<td>200-300 lb-ft (272-408 N·m)</td>
<td>0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
<tr>
<td>PRO-TOR™ front and drive axles</td>
<td>200 lb-ft (272 N·m) Back off 1 turn</td>
<td>100 lb-ft (136 N·m) Back off 1/6 turn</td>
<td>Less than 2-5/8&quot; (66.67 mm)</td>
<td>NA</td>
<td>0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
</tbody>
</table>

**Unitized Wheel-End System**

| PRO-TOR™ front and tag axles | 600 ±75 lb-ft (813 ±102 N·m) | NA | FH941/946 MC14 and MC16 wheel ends | NA | 0.002" (0.051 mm) |

**ConMet Wheel-End System**

| PRO-TOR™ drive axles | 330 ±30 lb-ft (447 ±41 N·m) | NA | RC23162 wheel end | NA | 0.006" (0.152mm) |

**NOTE:** For disc brake wheel ends, back off the brake caliper until the rotor is clear from the pad linings about 1/16-inch (1.588 mm) gap or more. Refer to Maintenance Manual MM-0467, EX+™ Air Disc Brake, for more information. To obtain this publication, visit Literature on Demand at meritor.com.

1 Rotate the hub a minimum of five complete turns while tightening the nut.
2 The nut may need to be slightly tightened or loosened to meet the required end play.
<table>
<thead>
<tr>
<th></th>
<th>Inner Nut Torque Specification¹</th>
<th>Outer Nut Torque Specification</th>
<th>Out-of-service End Play Criteria²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front non-drive steer (Easy Steer Plus™)</td>
<td>500-700 lb-ft (680-952 N·m)</td>
<td>200-300 lb-ft (272-408 N·m)</td>
<td>0.006&quot; (0.1524 mm) or more</td>
</tr>
<tr>
<td>Trailer (TB Series)</td>
<td>700-750 lb-ft (952-1020 N·m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Adjusting Nut Torque</td>
<td>150-200 lb-ft (204-272 N·m)</td>
<td>50-60 lb-ft (68-82 N·m) Back off 1/8 turn Back off until loose</td>
<td>20-25 lb-ft (27-34 N·m) 50 lb-ft (68 N·m) 0.001&quot;-0.005&quot; (0.025-0.127 mm)</td>
</tr>
<tr>
<td>Adjusting Nut Torque³⁴</td>
<td></td>
<td>Out-of-Service End Play Criteria</td>
<td></td>
</tr>
<tr>
<td>Trailer (TRIAD™ wheel-end system)</td>
<td>810-850 lb-ft (1100-1150 N·m)</td>
<td>Greater than 0.003&quot; (0.08 mm)</td>
<td></td>
</tr>
<tr>
<td>Inner Spindle Nut Torque¹</td>
<td>300 lb-ft (408 N·m)</td>
<td>200 lb-ft (272 N·m)</td>
<td>0.006&quot; (0.1524 mm) or more, service the PreSet hub assembly</td>
</tr>
</tbody>
</table>

NOTE: For disc brake wheel ends, back off the brake caliper until the rotor is clear from the pad linings about 1/16-inch (1.588 mm) gap or more. Refer to Maintenance Manual MM-0467, EX+™ Air Disc Brake, for more information. To obtain this publication, visit Literature on Demand at meritor.com.

1 Rotate the hub a minimum of five complete turns while tightening the nut.
2 After the retightening procedure is complete.
3 Rotated counter-clockwise against the retainer nut.
4 Use a hammer and staking tool to stake the stake washer to the spindle nut in three positions.
### FH and MC Series Wheel-End Components

**Table H: Wheel-End Torque Specifications**

<table>
<thead>
<tr>
<th>Axle Model</th>
<th>Bolt Joint</th>
<th>Fastener Size</th>
<th>Torque Lb-Ft</th>
<th>Torque N·m</th>
</tr>
</thead>
<tbody>
<tr>
<td>FH Series</td>
<td>Torque Plate-to-Knuckle</td>
<td>0.75 x 16</td>
<td>310-400</td>
<td>420-540</td>
</tr>
<tr>
<td>FH Series</td>
<td>Brake Spider-to-Knuckle</td>
<td>0.75 x 16</td>
<td>310-400</td>
<td>420-540</td>
</tr>
<tr>
<td>MC12</td>
<td>Torque Plate/Spindle/Frame Flange</td>
<td>0.625 x 11</td>
<td>180-230</td>
<td>245-310</td>
</tr>
<tr>
<td>MC12</td>
<td>Brake Spider/Spindle/Frame Flange</td>
<td>0.625 x 11</td>
<td>180-230</td>
<td>245-310</td>
</tr>
<tr>
<td>MC14/MC16</td>
<td>Torque Plate/Spindle/Frame Flange</td>
<td>0.75 x 10</td>
<td>326-420</td>
<td>440-570</td>
</tr>
<tr>
<td>MC14/MC16</td>
<td>Brake Spider/Spindle/Frame Flange</td>
<td>0.75 x 10</td>
<td>326-420</td>
<td>440-570</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>UWE Bearing/Rotor/Wheel Adapter</td>
<td>M18 x 1.5</td>
<td>250-300*</td>
<td>340-410*</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>UWE PRO-TORQ™ Nut</td>
<td>2.25-12</td>
<td>525-675**</td>
<td>714-918**</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>UWE Wheel Adapter Inspection Plug</td>
<td>0.375-18</td>
<td>25 Min</td>
<td>34 Min</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>EX225H Carrier-to-Torque Plate Bolts</td>
<td>M20 x 1.5</td>
<td>350-450</td>
<td>475-610</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>Hub Cap</td>
<td>0.31 x 18</td>
<td>12-18</td>
<td>16-24</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>Hub Cap</td>
<td>0.375-16</td>
<td>12-18</td>
<td>16-24</td>
</tr>
<tr>
<td>FH and MC Series</td>
<td>Hub Cap Filler Plug</td>
<td>—</td>
<td>15-25</td>
<td>20-34</td>
</tr>
</tbody>
</table>

* Tighten bolts in a star pattern, repeat pattern to verify. Re-check torques every 30,000 miles, or before.

** Assemble PRO-TORQ™ nut with anti-seize compound on the threads.
### Drive Axle Wheel-End Components

#### Table I: Axle Shaft Torque Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
<th>Torque Range*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle Shaft-to-Flange Capscrew</td>
<td></td>
<td>Lb-ft</td>
<td>N-m</td>
</tr>
<tr>
<td>0.312&quot;-24</td>
<td>18-24</td>
<td>24-33</td>
<td></td>
</tr>
<tr>
<td>0.50&quot;-13</td>
<td>85-115</td>
<td>115-156</td>
<td></td>
</tr>
<tr>
<td>Axle Shaft-to-Flange Nut (Plain Nut)</td>
<td>0.438&quot;-20</td>
<td>50-75</td>
<td>68-102</td>
</tr>
<tr>
<td>0.50&quot;-20</td>
<td>75-115</td>
<td>102-156</td>
<td></td>
</tr>
<tr>
<td>0.562&quot;-18</td>
<td>110-165</td>
<td>149-224</td>
<td></td>
</tr>
<tr>
<td>0.625&quot;-18</td>
<td>150-230</td>
<td>203-312</td>
<td></td>
</tr>
<tr>
<td>Axle Shaft-to-Flange Nut (Locknut)</td>
<td>0.438&quot;-20</td>
<td>40-65</td>
<td>54-88</td>
</tr>
<tr>
<td>0.50&quot;-20</td>
<td>65-100</td>
<td>88-136</td>
<td></td>
</tr>
<tr>
<td>0.562&quot;-18</td>
<td>100-145</td>
<td>136-197</td>
<td></td>
</tr>
<tr>
<td>0.625&quot;-18</td>
<td>130-190</td>
<td>176-258</td>
<td></td>
</tr>
</tbody>
</table>

*Target the middle torque value in the range shown.*
Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

**WARNING**

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Conventional Wheel Ends

Wheel-End Maintenance

Grease-Lubricated Wheel Bearings

1. Park the vehicle on a level surface. Place blocks under the wheels to prevent the vehicle from moving.
2. Raise the vehicle so that the wheels are off the ground. Support the vehicle with safety stands.
3. Remove the tire and wheel assembly. Remove and disassemble the hub.
4. Use the correct cleaning solvent to remove the old grease from all parts. Discard the seals. Inspect the wheel bearings for wear or damage. Replace worn or damaged bearings.
5. Before installing the wheel bearings, lubricate the bearing journals on the spindle with the grease that is used for the bearings. Figure 10.1.
6. Use a pressure packer to force the specified grease from the large end of the cones into the cavities between the rollers and cage. Pack the hub between the bearing cups with grease to the level of the smallest diameter of the cups.
7. If a pressure packer is not available: Grease the bearings by hand.
8. Install the inner and outer bearing cones into the cups in the hubs. The bearing cups must be pressed tight against the shoulder in the hubs.
9. Install new wheel seals into the hubs.
10. Install the hub and the wheel and tire assembly. Install the outer wheel bearing cone into the hub. Install the adjusting nut.

Oil-Lubricated Wheel Bearings — Recommended Hub Fill Procedure for Drive Axles Equipped With Hub or Axle Shaft Fill Plugs

1. Park the vehicle on a level surface. Place blocks under the wheels to prevent the vehicle from moving.
2. Rotate the hub until the fill plugs are at the top.
3. Remove the oil fill plugs. Fill each hub cavity with two pints (1 L) of rear axle lubricant. Figure 10.2.
4. Install and tighten the fill plugs to 10 lb-ft (13.8 N·m) minimum.
5. Road test the vehicle after the initial hub fill in an unloaded condition for one to two miles at safe speeds, but no higher than 25 mph (40 km/h). During the road test, make at least four full left turns and four full right turns with some articulation each time between left and right sides.
6. Wait approximately ten minutes after completing the road test for the oil to settle. Remove the oil fill plug in the axle housing and check the axle oil level.

7. If necessary, add oil so the oil level is at the bottom of the fill plug.

8. Install and tighten the axle fill plug. Refer to Section 9 for the correct torque values.

Oil-Lubricated Wheel Bearings — Recommended Hub Fill Procedures for Drive Axles Without Hub or Axle Shaft Fill Plugs

Option A

1. Park the vehicle on a level surface. Place blocks under the wheels to prevent the vehicle from moving.

WARNING
Verify the vehicle is unloaded before you raise the end of an axle. A loaded vehicle can change an axle's center of gravity and safe allowable tilt angle. If the axle of a loaded vehicle is raised, the vehicle can tip over. Serious personal injury and damage to components can result.

Ensure the tilt angle of the vehicle does not exceed the maximum allowable angle when the end of the axle is raised. A vehicle tilted beyond the maximum allowable angle can lose stability and cause the vehicle to tip over. Serious personal injury and damage to components can result.

2. Verify the vehicle is unloaded. Ensure the tilt of the vehicle does not exceed the maximum allowable angle. Raise one end of an axle 11-12-inches (28-31 cm). Hold the axle in that position for at least 15 minutes to allow the oil to flow out to the wheel hub. Repeat the procedure on the other end of the axle. Figure 10.2.

3. Check the oil level in the axle housing and refill to the bottom of the fill plug. Install and tighten the axle fill plug. Refer to Section 9 for the correct torque values.

4. Road test the vehicle after the initial hub fill in an unloaded condition for one to two miles (1.6-3.2 km) at speeds not more than 25 mph (40 km/h). Recheck the lubricant levels and all of the fasteners. Adjust as necessary.

5. Wait approximately ten minutes after completing the road test for the oil to settle. Remove the oil fill plug in the axle housing and check the axle oil level.

6. If necessary, add oil so the oil level is at the bottom of the fill plug.

7. Install and tighten the axle fill plug. Refer to Section 9 for the correct torque values.

8. Road test the vehicle in an unloaded condition for one to two miles (1.6-3.2 km) at speeds not more than 25 mph (40 km/h). Recheck the lubricant levels and all of the fasteners. Adjust as necessary.

Option B

1. Park the vehicle on a level surface. Place blocks under the wheels to prevent the vehicle from moving.

2. Remove the axle shaft fasteners and slide the axle shaft out of the drive axle assembly.

3. Remove the wheel end nuts and lock washers.

4. Remove the outer bearing cone.

5. Insert a filling nozzle into the hub cavity and fill with approximately 6-9 oz. (177-266 ml) of axle lubricant. Figure 10.3.

6. Place a drain pan under the hub. Continue to fill until you observe fluid beginning to flow out of the hub cavity down the face of the hub. Some fluid loss is to be expected.

7. Install the outer bearing cone, wheel end nuts and lock washers. Refer to Section 6 for procedures.

8. Thoroughly clean the hub so it is free of any lubricant or debris. Reinstall the axle shaft gasket and axle shaft.

Figure 10.3
9. Road test the vehicle in an unloaded condition for one to two miles (1.6-3.2 km) at speeds not more than 25 mph (40 km/h). Recheck the lubricant levels and all of the fasteners. Adjust as necessary.

Lubrication Intervals and Specifications

For military on/off highway and military severe duty applications, refer to TP-10109. For a copy of this technical bulletin, contact the Meritor OnTrac™ Customer Call Center at 866-OnTrac1 (668-7221).

Table J: Wheel-End Axle Greasing Intervals and Specifications

<table>
<thead>
<tr>
<th>Greasing Interval</th>
<th>Grease</th>
<th>Meritor Specification</th>
<th>NLGI Grade</th>
<th>Grease Description</th>
<th>Typical Application</th>
<th>Outside Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whichever comes first:</td>
<td>Multi-Purpose Grease¹</td>
<td>0-617-A, preferred, or 0-617-B, acceptable</td>
<td>1 or 2</td>
<td>Lithium 12-Hydroxy Stearate or Lithium Complex</td>
<td>Wheel Bearings, Hubs, Spindle</td>
<td>Refer to the grease manufacturer’s specifications for the temperature service limits.</td>
</tr>
<tr>
<td>Replacing Seals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>King Pins, Tie Rod Ends, Brake, Anchor Pins, Brake Camshafts</td>
<td></td>
</tr>
<tr>
<td>Relining Brakes</td>
<td></td>
<td>0-704, recommended</td>
<td>2</td>
<td>²TEK-678 Calcium Sulfonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-Highway: 30,000 miles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(48 000 km)/Once a year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On/Off Highway and Off-Highway:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,000 miles (24 140 km)/Twice a year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Meritor recognizes that industry trends are moving toward increased selection and usage of synthetic grease in vehicle maintenance. However, some seals are known to expand when in contact with synthetic grease. Consult your local Meritor representative for synthetic grease application references before using any synthetic grease when performing wheel-end service and maintenance.

² Engineered Custom Lubricants (ECL), 45800 Mast Street, Plymouth, MI 48170, 734-451-2800, www.eclube.com

Table K: Wheel-End Oil Change Intervals and Specifications

<table>
<thead>
<tr>
<th>Operation</th>
<th>On-Highway</th>
<th>Off-Highway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Oil Level</td>
<td>1,000 miles (1600 km)</td>
<td>1,000 miles (1600 km)</td>
</tr>
</tbody>
</table>
**Table L: Approved Lubricants**

<table>
<thead>
<tr>
<th>Meritor Specifications</th>
<th>Military/SAE Specifications</th>
<th>Oil Description</th>
<th>°F</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-76-A Gear Oil</td>
<td>MIL-PRF-2105-E and SAE J2360</td>
<td>GL-5, SAE 85W/140</td>
<td>−10</td>
<td>−12</td>
</tr>
<tr>
<td>O-76-D Gear Oil</td>
<td></td>
<td>GL-5, SAE 80W/90</td>
<td>−15</td>
<td>−12</td>
</tr>
<tr>
<td>O-76-E Gear Oil</td>
<td></td>
<td>GL-5, SAE 75W/90</td>
<td>−40</td>
<td>−26</td>
</tr>
<tr>
<td>O-76-J Gear Oil</td>
<td></td>
<td>GL-5, SAE 75</td>
<td>−40</td>
<td>−26</td>
</tr>
<tr>
<td>O-76-M Full-Synthetic Oil</td>
<td></td>
<td>GL-5, SAE 75W/140</td>
<td>−40</td>
<td>−26</td>
</tr>
<tr>
<td>O-76-N Full-Synthetic Oil</td>
<td></td>
<td>GL-5, SAE 75W/90</td>
<td>−40</td>
<td>−26</td>
</tr>
<tr>
<td>Heavy-Duty Engine Oil</td>
<td>MIL-L-2104 E or F</td>
<td>A.P.I. -CD, -CE, -SG, -SH or -SJ SAE 40 or 50&lt;sup&gt;1&lt;/sup&gt;</td>
<td>−10</td>
<td>−12</td>
</tr>
<tr>
<td>Heavy-Duty Engine Oil</td>
<td>MIL-L-210 E or F</td>
<td>A.P.I. -CD, -CE, -SG, -SH or -SJ SAE 30&lt;sup&gt;2&lt;/sup&gt;</td>
<td>−15</td>
<td>−26</td>
</tr>
</tbody>
</table>

<sup>1</sup> Current designations are acceptable. Multi-grade engine oils are acceptable if the SAE rating ends in 40 or 50.

<sup>2</sup> Current designations are acceptable. Multi-grade engine oils are acceptable if the SAE rating ends in 30.
### Description

**Wheel-End Seal Driver Application Chart**

To obtain these tools, refer to the Service Notes page on the front inside cover of this manual.

**Table M: Seal Drivers and Corresponding Axle Models**

<table>
<thead>
<tr>
<th>Seal Driver Figure Reference</th>
<th>Base Axle Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 11.1</td>
<td>MS-12-113</td>
</tr>
<tr>
<td>Figure 11.2</td>
<td>RS-17-145 and RS-19-145</td>
</tr>
<tr>
<td>Figure 11.3 and Figure 11.4</td>
<td>RS-13-120</td>
</tr>
<tr>
<td>Figure 11.5</td>
<td>RS-21-145 Cam Brake and Disc Brake</td>
</tr>
<tr>
<td>Figure 11.6</td>
<td>MFS-6</td>
</tr>
<tr>
<td>Figure 11.7</td>
<td>MFS-8</td>
</tr>
<tr>
<td>Figure 11.8</td>
<td>MFS-10</td>
</tr>
<tr>
<td>Figure 11.9</td>
<td>MFS-12</td>
</tr>
<tr>
<td>Figure 11.10</td>
<td>RS-23-186</td>
</tr>
<tr>
<td>Figure 11.11</td>
<td>MS-30-185</td>
</tr>
<tr>
<td>Figure 11.12</td>
<td>FH and FL Series</td>
</tr>
<tr>
<td>Figure 11.13</td>
<td>71163KX, 71163WX and 71163RX</td>
</tr>
</tbody>
</table>
Figure 11.1

1  2.17" (55 MM)
2  0.079" (2 MM) RADIUS
3  5.9" (150 MM)
4  1.18" (30 MM)
5  0.2" (5 MM)
6  0.06" (1.5 MM)
7  1.02" (26 MM)
8  0.55" (14 MM)
9  R 0.06" (1.5 MM)
10 R 0.06" (1.5 MM)
11 R 0.2" (5 MM)
12 4.96" (126 MM)
13 8.22" (82 MM) ± 0.004" (0.1 MM)
14 2.49" (63.3 MM)
15 1.57" (40 MM)
16 1.5" (38 MM)
1  6" (152.4 MM) SPHERE RADIUS
2  1.75" (44.45 MM) DIAMETER
3  2.25" (57.15 MM) DIAMETER
4  0.06" (1.52 MM) X 45° TYP
5  0.06" (1.52 MM) X 45°
6  0.13" (3.3 MM) RADIUS
7  COARSE KNURL
8  0.5" (12.7 MM) RADIUS
9  0.25" (6.35 MM) X 45°
10  0.03" (0.76 MM) X 45°
11  0.06" (1.52 MM) R-TYP
12  0.25" (6.35 MM) RADIUS
13  1.25" (31.75 MM)
14  2.75" (69.85 MM)
15  3.24" (82.296 MM) DIAMETER
16  5.25" (133.1 MM) DIAMETER
17  5.63" (143 MM) DIAMETER
18  3.5" (88.9 MM)
19  0.25" (6.35 MM) X 30°
20  3.25" (82.55 MM)
21  3.37" (85.6 MM)
22  4.25" (107.95 MM)
23  6.25" (158.75 MM)
24  11" (279.4 MM)
25  11.25" (285.75 MM)
26  11.75" (298.45 MM)
27  12.5" (317.5 MM)
Figure 11.3

RS-13-120 AXLE
EXCLUDES MERITOR RS-13-120 AXLES EQUIPPED WITH WHEEL SEAL
PART NUMBER A1205W1557; AND HINO RS-13-120 AXLES

1  0.13" (3.3 MM) RADIUS (2)
2  0.06" (1.524 MM) X 45° CHAMFER (2)
3  6" (152.4 MM) SPHERE RADIUS ± 0.25" (6.35 MM)
4  2" (50.8 MM) DIAMETER
5  2.5" (63.5 MM) DIAMETER
6  COARSE KNURL
7  0.25" (6.35 MM) X 45° CHAMFER
8  0.12" (3.05 MM) R. POLISH
9  0.6" (1.52 MM) R-TYP
10 0.25" (6.35 MM)
11 1.5" (38.1 MM) DIAMETER
12 2.38" (60.45 MM) DIAMETER
13 2.87/2.872" (72.9/72.95 MM) DIAMETER
14 3.26" (82.8 MM) DIAMETER
15 4.5" (114.3 MM) DIAMETER
16 4.75" (120.65) DIAMETER
17 0.25" (6.35 MM) X 30°
18 1.43" (36.32 MM)
19 1.63" (41.4 MM)
20 2" (50.8 MM)
21 2.1" (53.34 MM)
22 2.25" (57.15 MM)
23 3" (76.2 MM)
24 7" (177.8 MM)
25 7.5" (190.5 MM)
26 8.25" (209.55 MM)
27 45°
RS-13-120 AXLE WITH QUADRAULIC DISC BRAKES
INCLUDES MERITOR RS-13-120 AXLES EQUIPPED WITH WHEEL SEAL
PART NUMBER A1205W1557; AND HINO RS-13-120 AXLES

1. 8.5" (215.9 MM)
2. 7.75" (196.85 MM)
3. 7.25" (184.15 MM)
4. 2.7" (68.58 MM)
5. 2.5" (63.5 MM)
6. 2.35" (59.69 MM)
7. 1.5" (38.1 MM)
8. 0.25" (6.35 MM)
9. 5.87" (149.1 MM) ± 0.001" DIAMETER
10. 5.3" (134.62 MM) DIAMETER
11. 4.79" (121.67 MM) DIAMETER
12. 4.25" (107.95 MM) DIAMETER
13. 3.405" (86.487 MM) DIAMETER
14. 2.871" (72.923 MM) ± 0.001" DIAMETER
15. 2.38" (60.452 MM) DIAMETER
16. 30°
17. 45°
18. 2.25" (57.15 MM)
19. 0.965" (24.511 MM) ± 0.005" SEAL DEPTH
20. 0.67" (17.018 MM)
21. 6.0" (152.4 MM) RADIUS
22. 1.5" (38.1 MM) DIAMETER
23. 2.0" (50.8 MM) DIAMETER
24. 2.5" (63.5 MM) DIAMETER
25. KNURLED SURFACE ON HANDLE

Figure 11.4
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6” (152.4 MM) SPHERE RADIUS</td>
</tr>
<tr>
<td>2</td>
<td>1.75” (44.45 MM) DIAMETER</td>
</tr>
<tr>
<td>3</td>
<td>2.25” (57.15 MM) DIAMETER</td>
</tr>
<tr>
<td>4</td>
<td>0.06” (1.524 MM) X 45° TYP</td>
</tr>
<tr>
<td>5</td>
<td>0.06” (1.524 MM) X 45° TYP</td>
</tr>
<tr>
<td>6</td>
<td>0.13” (3.302 MM) RADIUS</td>
</tr>
<tr>
<td>7</td>
<td>COARSE KNURL</td>
</tr>
<tr>
<td>8</td>
<td>0.5” (12.7 MM) RADIUS</td>
</tr>
<tr>
<td>9</td>
<td>0.25” (6.35 MM) X 45°</td>
</tr>
<tr>
<td>10</td>
<td>0.02” (0.5 MM) X 45° CHAMFER (2)</td>
</tr>
<tr>
<td>11</td>
<td>0.12” (3.05 MM) RADIUS</td>
</tr>
<tr>
<td>12</td>
<td>0.25” (6.35 MM) RADIUS</td>
</tr>
<tr>
<td>13</td>
<td>1.25” (31.75 MM) DIAMETER</td>
</tr>
<tr>
<td>14</td>
<td>3.25” (82.55 MM) DIAMETER</td>
</tr>
<tr>
<td>15</td>
<td>3.745” (95.123 MM) DIAMETER</td>
</tr>
<tr>
<td>16</td>
<td>5.775” (146.685 MM) DIAMETER</td>
</tr>
<tr>
<td>17</td>
<td>5.875” (149.225 MM) DIAMETER</td>
</tr>
<tr>
<td>18</td>
<td>6.25” (158.75 MM) DIAMETER</td>
</tr>
<tr>
<td>19</td>
<td>0.25” (6.35 MM) X 30°</td>
</tr>
<tr>
<td>20</td>
<td>2.75” (69.85 MM)</td>
</tr>
<tr>
<td>21</td>
<td>60°</td>
</tr>
<tr>
<td>22</td>
<td>0.11” (2.79 MM)</td>
</tr>
<tr>
<td>23</td>
<td>2.75” (69.85 MM)</td>
</tr>
<tr>
<td>24</td>
<td>2.81” (71.374 MM)</td>
</tr>
<tr>
<td>25</td>
<td>3.62” (91.95 MM)</td>
</tr>
<tr>
<td>26</td>
<td>5.75” (146.05 MM)</td>
</tr>
<tr>
<td>27</td>
<td>10.5” (266.7 MM)</td>
</tr>
<tr>
<td>28</td>
<td>10.75” (273.1 MM)</td>
</tr>
<tr>
<td>29</td>
<td>11.25” (285.75 MM)</td>
</tr>
<tr>
<td>30</td>
<td>12” (304.8 MM)</td>
</tr>
</tbody>
</table>
Figure 11.6

1. 5.9” (150 MM)
2. 1.02” (26 MM)
3. R 0.2” (5 MM)
4. 0.13” (8 MM)
5. 0.75” (19 MM)
6. 1.85” (47 MM)
7. R 0.06” (1.5 MM)
8. R 0.2” (5 MM)
9. 1.5” (38 MM)
10. 1.1” (28 MM)
11. 1.77” (45 MM)
12. 2.26” (57.3 MM) ± 0.01” (0.25 MM)
13. 3.66” (93 MM)
14. R 0.08” (2 MM)
Figure 11.7

1  6” (152.4 MM) SPHERE RADIUS
2  1.5” (38.1 MM) DIAMETER
3  2” (50.8 MM) DIAMETER
4  0.06” (1.52 MM) X 45° TYP
5  R 0.13” (3.3 MM)
6  COARSE KNURL
7  R 0.5” (12.7 MM)
8  0.25” (6.35 MM) X 45° TYP
9  0.25” (6.35 MM) X 60°
10  0.03” (0.76 MM) X 45°
11  1” (25 MM) DIAMETER-8.5” (216 MM) DEEP
12  2.16” (54.8 MM) DIAMETER
13  3.29” (83.57 MM)
14  4.5” (114 MM)
15  R 0.25” (6.35 MM)
16  0.1” (2.54 MM)
17  0.75” (19.1 MM)
18  2” (50.8 MM)
19  10” (254 MM)
20  5” (127 MM)
21  0.5” (12.7 MM)
22  0.75” (19.1 MM)
Figure 11.8

1. 0.13" (3.3 MM) RADIUS (2)
2. 0.6" (1.52 MM) X 45° CHAMFER (2)
3. 6" (152.4 MM) SPHERE RADIUS ± 0.25" (6.35 MM)
4. 2" (50.8 MM) DIAMETER
5. 2.5" (63.5 MM) DIAMETER
6. COARSE KNURL
7. 0.25" (6.35 MM) X 45° CHAMFER
8. 0.03" (0.76 MM) X 45° CHAMFER (2)
9. 0.12" (3.05 MM) X 45° CHAMFER
10. 1.5" (38.1 MM) DIAMETER
11. 2" (50.8 MM)
12. 2.62/2.622" (66.55/66.6 MM) DIAMETER
13. 4.5" (114 MM) DIAMETER
14. 5" (127 MM) DIAMETER
15. 2.25" (57.2 MM)
16. 2.75" (69.9 MM)
17. 2.85" (72.4 MM)
18. 3.5" (88.9 MM)
19. 7.5" (190.5 MM)
20. 8" (203.2 MM)
21. 8.75" (222.25 MM)

MFS-10 AXLE
1  0.13” (3.3 MM) RADIUS (2)
2  0.06” (1.52 MM) X 45° CHAMFER (2)
3  6” (152.4 MM) SPHERE RADIUS ˚ 2.5
4  2” (50.8 MM)
5  2.5” (63.5 MM) DIAMETER
6  COARSE KNURL
7  0.03” (0.76 MM) X 45° CHAMFER (2)
8  0.06” (1.52 MM) R-2PLS
9  0.12” (3.05 MM) X 30°
10  0.25” (6.35 MM) R
11  1.5” (38.1 MM) DIAMETER
12  2” (50.8 MM) DIAMETER
13  2.60/2.622” (66.55/66.6 MM) DIAMETER
14  4.4” (111.76 MM) DIAMETER
15  4.865” (123.57 MM) DIAMETER
16  5.38” (136.65 MM) DIAMETER
17  0.03” (0.76 MM) R. MAX.
18  2.25” (57.15 MM)
19  2.5” (63.5 MM)
20  2.62” (69.85 MM)
21  2.75” (69.85 MM)
22  3.5”” (88.9 MM)
23  7.5” (190.5 MM)
24  8” (203.2 MM)
25  8.75” (222.25 MM)
Figure 11.10

RS-23-186 AXLE

TOOL NUMBER 911013
USE TO INSTALL HUB SEAL, PART NUMBER A-1205-R-2410

- Ø3.75" (94.996 MM)
- Ø3.25" (82.55 MM)
- Ø5.885" (149.479 MM)
- Ø3.74" (94.996 MM)
- Ø6.30" (160.02 MM)
- Ø2.50" (63.5 MM)
- Ø2.00" (50.8 MM)
- Ø0.609" (15.469 MM)
- Ø0.38" (9.652 MM)
- R0.09" (2.286 MM)
- 0.25" (6.35 MM) X 30°
- 0.60" (15.24 MM) X 30°
- 8.88" (225.552 MM)
- 0.50" (12.7 MM)
- 0.06" (1.524 MM) X 45° TYP
- R1.00" (25.4 MM)
- 0.70" (17.78 MM)
- 0.60" (1.524 MM) X 30°

68 (1) REQ'D 7075-T651 ALUMINUM ROUND

4012855a
RS-30-185 AXLE TOOL NUMBER TL 910385D
USE TO INSTALL HUB SEAL,
PART NUMBER A-1205-U-1659

Figure 11.11

Meritor Maintenance Manual MM-0409 (Revised 07-19)
71163KX, 71163WX AND 71163RX AXLES

TOOL NUMBER 910257 DET 009
USE TO INSTALL HUB SEAL,
PART NUMBERS A-1205-L-2716
(71163KX AXLES ONLY),
A-1205-L-1546 AND A-1205-P-666
(71163WX AND 71163RX AXLES)

4.06" X 45°
(1.524 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
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(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)

6.50" DIA.
(165.1 MM)

0.06" R (0.762 MM)

1.000-1.002" DIA.
(25.4-25.5 MM)

4.843" DIA.
(123.0 MM)

5.52" DIA.
(140.2 MM)

5.887-5.890" DIA.
(149.5-149.6 MM)
Unitized Wheel-End Dial Indicator Adapter Fitting

Figure 11.14

5/8" (15.88 MM)

11/16" (17.46 MM)

13/32" (10.32 MM)

SET SCREW (SIZE OPT)

1/2" (12.7 MM)

1-1/8" (28.58 MM)

3/8" (9.53 MM)

3/8 - 18 PTF

4005546a
Tool for Removal of Rotors Seized on Unitized Wheel Ends — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle
Guide Pin for Unitized Wheel Ends — Bus and Coach FH Series Front and Tag Axle, and MC Series Tag Axle

Figure 11.16

HEAVY HMIS 85 MM BALL JOINT DRIVER
QTY (1)
MATERIAL: 01 RC 40-45