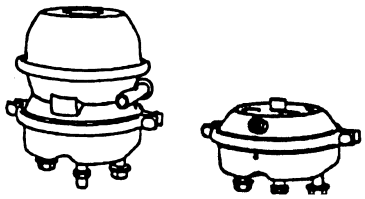


# MGM Brakes

A Division of Indian Head Industries, Inc.

# SERVICE MANUAL

**SUBJECT: MGM Brakes S-Cam Drum & Disc Actuator Service Manual**

This manual provides instructions for proper inspection and service of MGM Brakes S-Cam Drum and Disc actuators. The following sections provide a guide for brake actuator inspection, service, and disposal.

***WARNING*** **- Before performing any work on the vehicle's air brake system, or any pressurized component, understand and follow the vehicle manufacturer's recommendations for placing the vehicle in a safe working condition.**

***WARNING*** **- Do not attempt to remove or install any brake actuator until you understand the recommended procedure. Use only the proper tools and observe all precautions pertaining to the use of those tools.**

***WARNING*** **– Always wear appropriate personal protection equipment (PPE) when performing inspections and maintenance.**

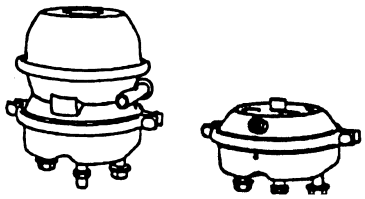
***WARNING*** **- Always block wheels to prevent vehicle rollaway when performing any brake inspection or maintenance.**

***WARNING*** **- Replace any damaged or failed brake actuator with an approved replacement brake actuator of the same size, and type as originally installed on the vehicle.**

***WARNING*** **- MGM Brakes parking actuators include a tamper resistant spring chamber which has been factory sealed for your protection. There are no user-serviceable parts inside the spring brake chamber. If you experience any damage or failure of your spring brake chamber, remove either the entire actuator as described in Section 3 or the parking spring brake chamber (piggyback) as in Section 6 of this manual. Reference Section 8 of this manual for proper disposal instructions. NEVER attempt to disassemble the spring brake chamber as serious personal injury could result from accidental sudden release of the high energy spring.**

***Contact MGM Brakes Customer Service at (800) 527-1534 ext. 6021 for product questions and technical support.***

***Service bulletins are available on www.mgmbrakes.com***



**MGM Brakes**
A Division of Indian Head Industries, Inc.

# SERVICE MANUAL

**SUBJECT: MGM Brakes S-Cam Drum & Disc Actuator Service Manual**

## SECTION 1: Actuator Feature Identification

This manual covers use, inspection, and installation of the following MGM Brakes actuator types as seen in Figure 1:

| Double Diaphragm | | |
|---|---|---|
| TR | TRB | LTS |
|  |  |  |

| Piston | | Service Chamber | |
|---|---|---|---|
| MJS | MJB | C | CSB |
|  |  |  |  |

**FIGURE 1**

## 1.1 Rated Stroke Identification

It is important to identify the rated stroke of the actuator to ensure replacement parts are correct. Always ensure that each actuator on the same axle has the same rated operating stroke. Mixing actuators with different stroke ratings can result in an imbalanced braking condition during panic stop situations.

MGM Brakes uses the following features to identify the actuator rated stroke:

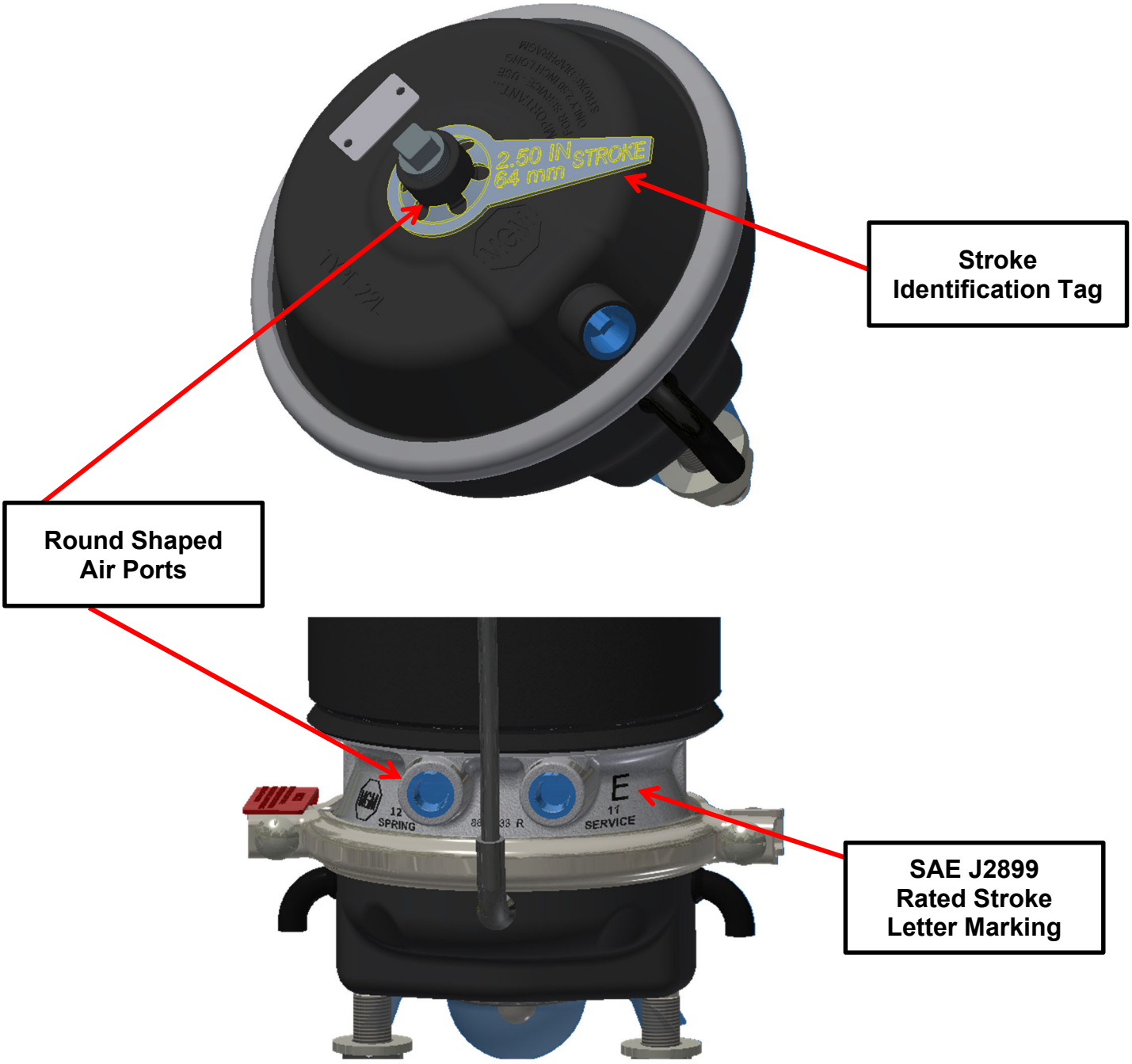
- Square Shaped Air-Ports or Embossment
- Stroke Identification Tag
- SAE J2899 Rated Stroke Letter Code

Each actuator assembly will include at least two of these identification features.

**SUBJECT: MGM Brakes S-Cam Drum & Disc Actuator Service Manual**

### 1.1.1 MGM Brake Actuator *STANDARD STROKE* Identification Features Shown in Figure 2:

**FIGURE 2**



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### 1.1.2 MGM Brake Actuator *LONG STROKE* Identification Features Shown in Figure 3:

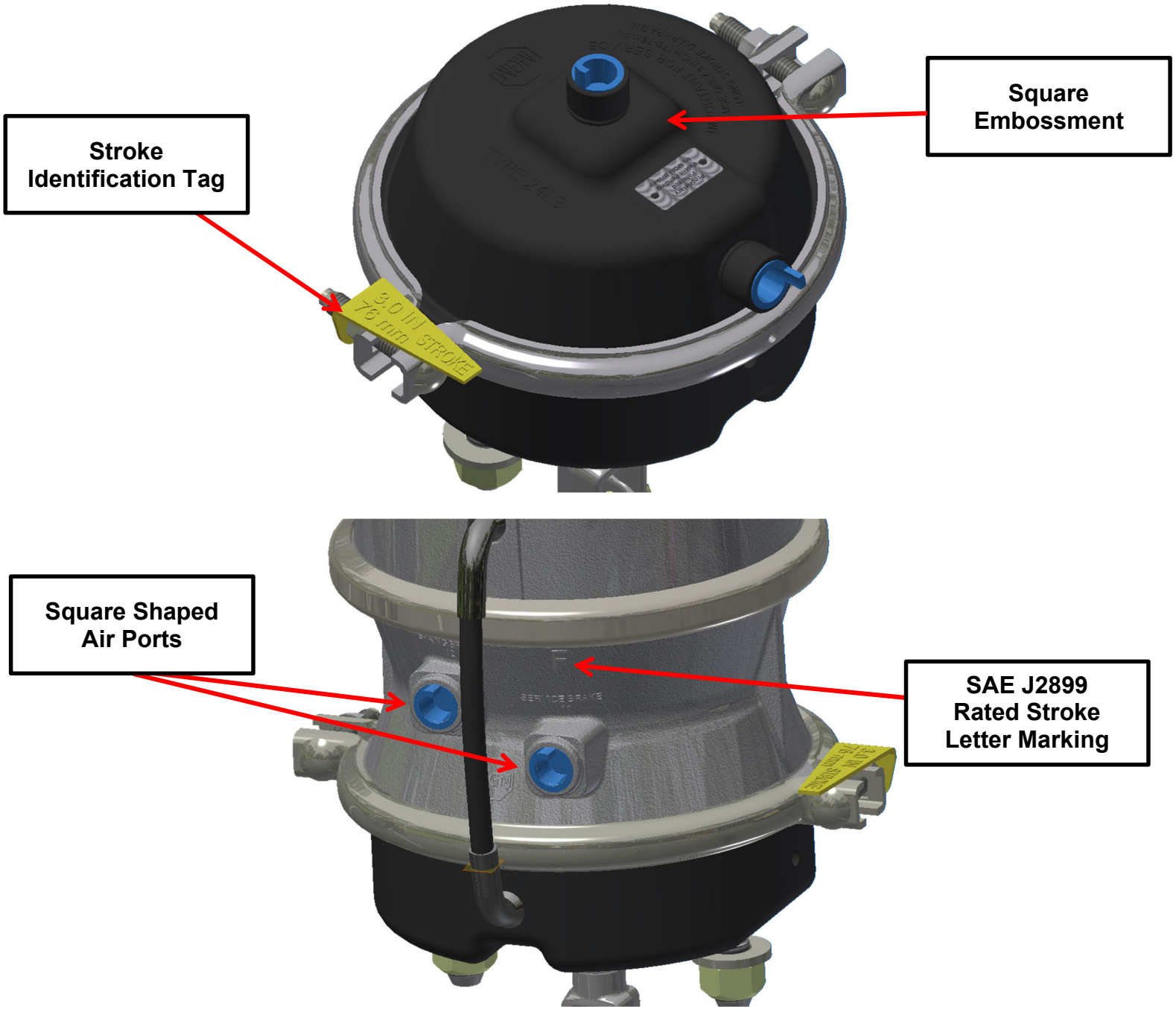


**FIGURE 3**

## 1.2 Service Chamber Components Shown in Figure 4:

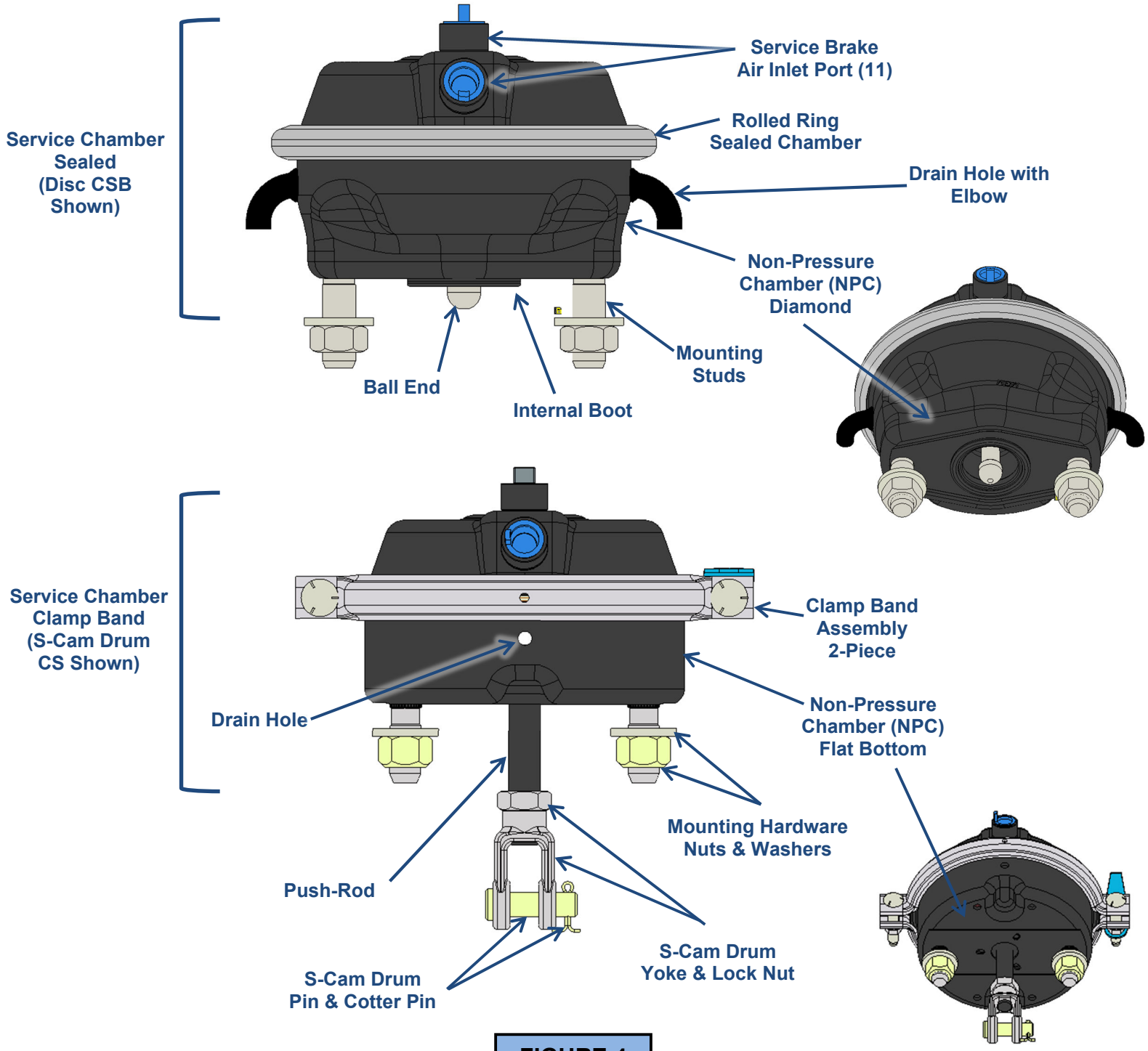


**FIGURE 4**

## 1.3 TR Actuator Components Shown in Figure 5:

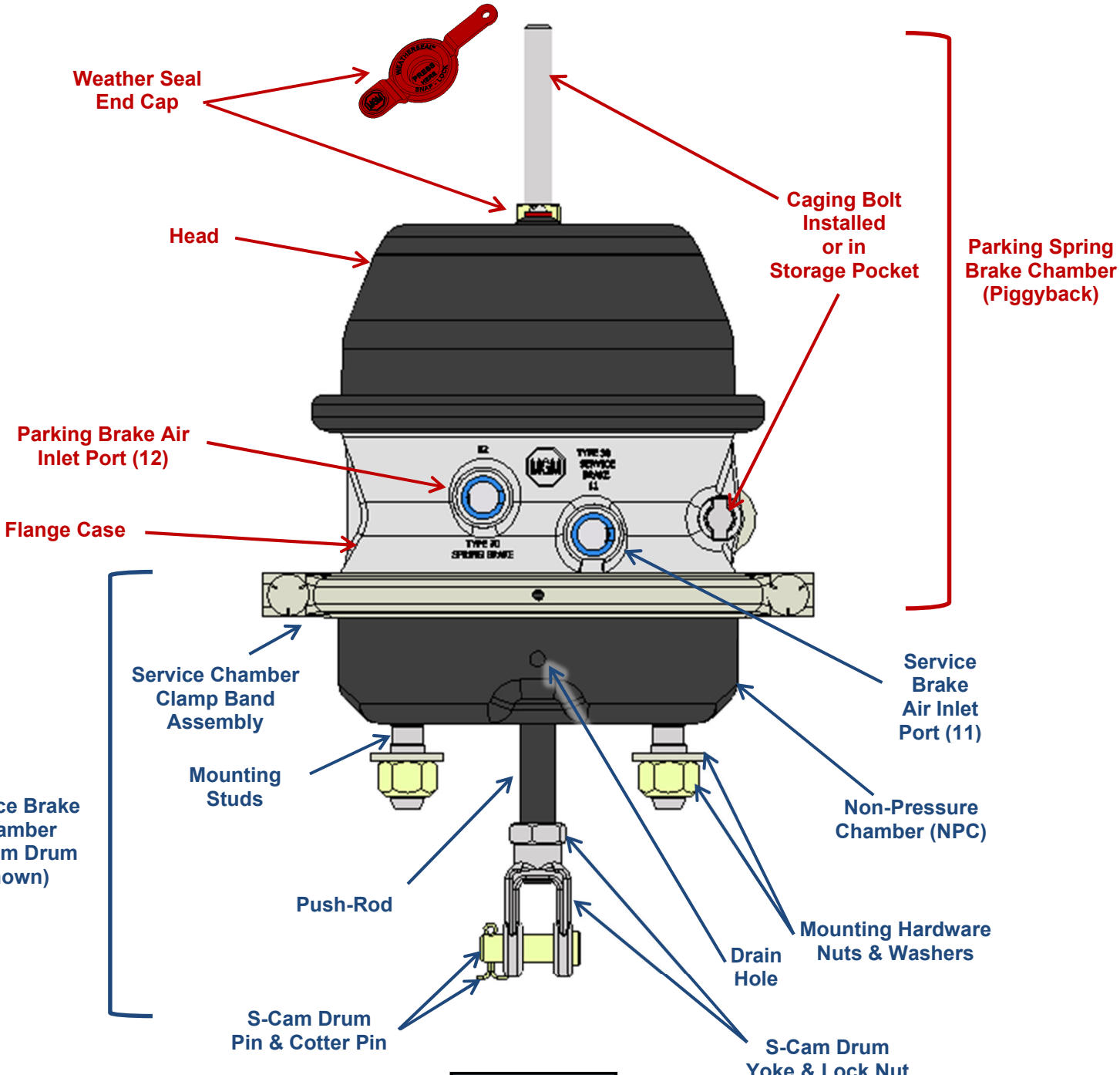


**FIGURE 5**

## 1.4 MJ Actuator Components Shown in Figure 6:

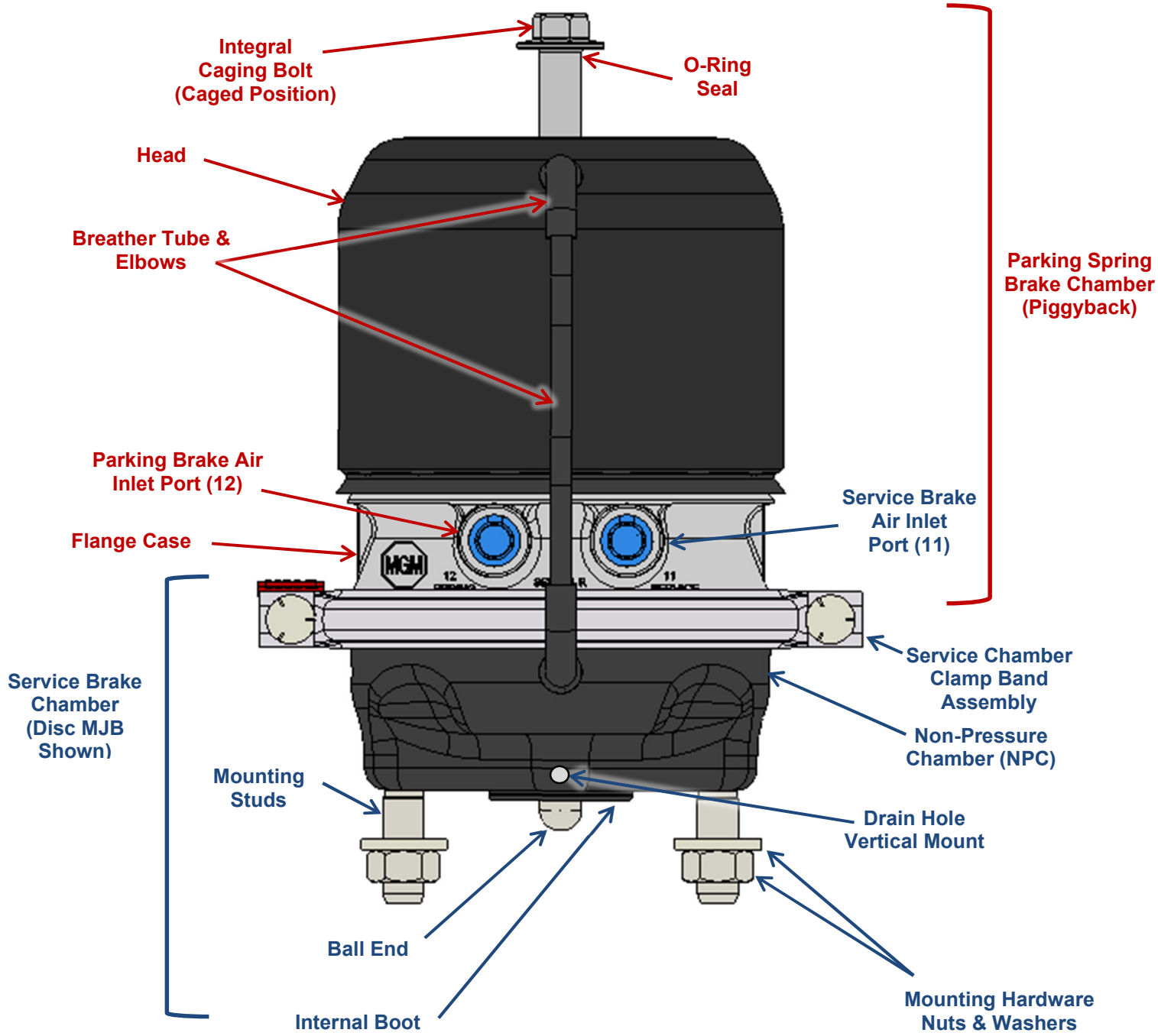


**FIGURE 6**

**SUBJECT: MGM Brakes S-Cam Drum & Disc Actuator Service Manual**

## 1.5 LT Actuator Components Shown in Figure 7:

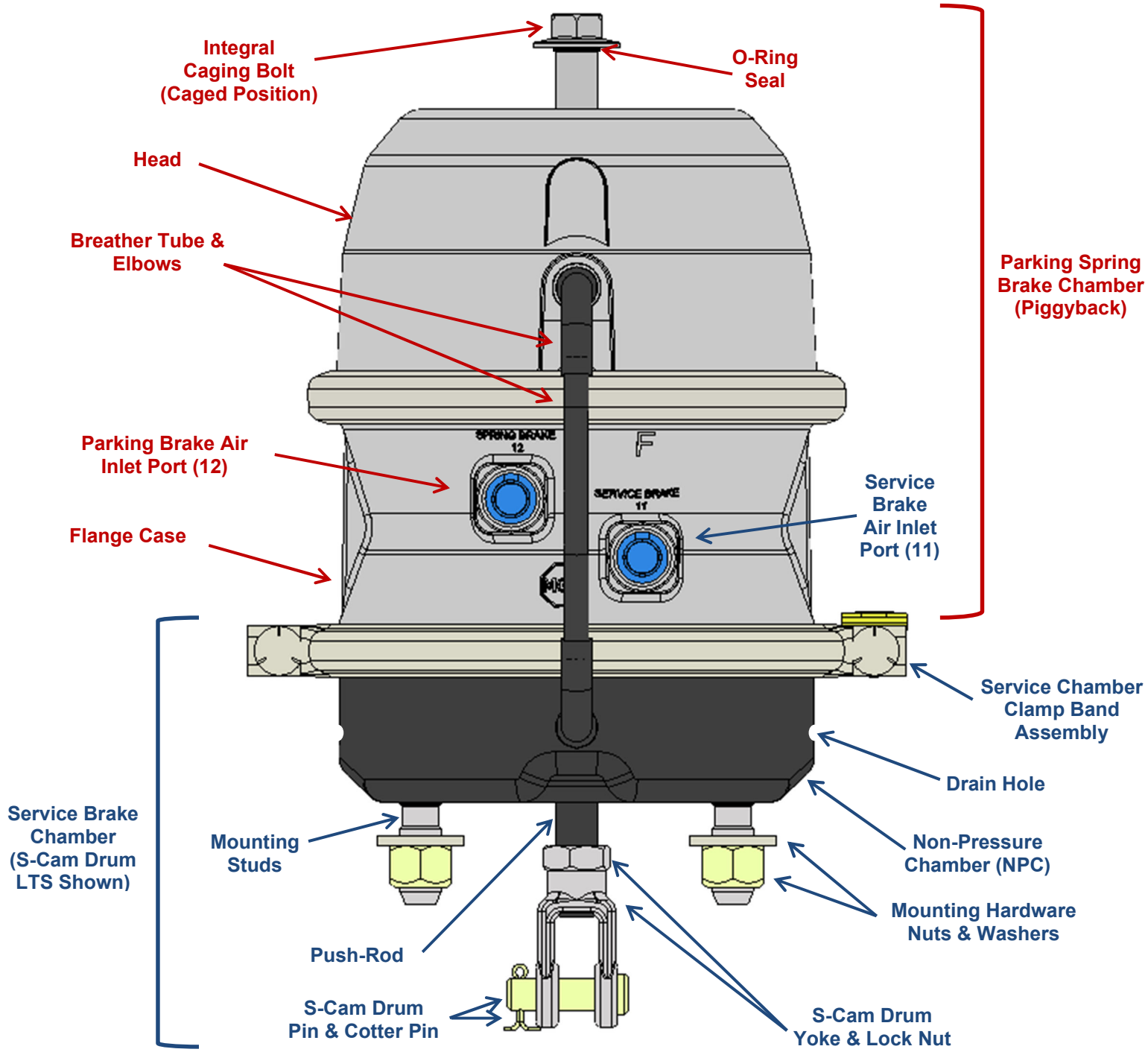


**FIGURE 7**

## SECTION 2: Recommended Actuator Inspection Points

***WARNING* – Always block wheels to prevent vehicle rollaway when performing any brake inspection or maintenance.**

### 2.1 Visual Inspection Points:

Carefully inspect the following actuator features which were illustrated in Section 1. Reference Figures 4-7 for visible actuator features and components. If any damage is observed or suspected, carefully remove and replace the brake actuator by following the directions in this manual.

- Visually inspect the exterior surfaces of the brake actuator for signs of damage, cracks, non-manufactured holes, excessive corrosion, or missing parts.

- **Mounting Hardware:** Check to ensure the mounting studs and nuts are present and are tightened to 133-155 ft-lbs [180-210 Nm] torque using a 15/16-inch or 24mm wrench.

- **Integrated Caging Bolt (MJ / LT Models):** Check to ensure the integrated caging bolt is seated against head insert and tightened to 50-60 ft-lbs [68-81 Nm] torque using a 3/4-inch or 19mm wrench. This ensures the parking brake will have full stroke capability and the caging bolt O-ring is seated sealing out contaminants.

- **Removable Caging Bolt (TR Models):** Ensure the weather seal end cap is present and undamaged. The end cap includes a rubber O-ring and must be snapped tight into place to ensure proper sealing of the spring chamber. MGM Brakes offers a weather seal end cap service kit if required.

  Check to ensure the removable release-bolt, flat washer and nut are properly secured in the flange case storage pocket. MGM Brakes recommends tightening the release bolt assembly into the storage pocket with 10 ft-lbs [14 Nm] torque.

- **Breather Tube:** If equipped, check the parking brake actuator external breather tube to ensure there is no damage or cracks in the rubber elbows or tube. Ensure the tube is securely engaged a minimum of 0.5-inch [12.7 mm] into the rubber elbows and glued in place. Use a high-quality rubber cement or a hose clamp to secure the tube in the elbow. MGM Brakes offers a breather tube service kit if required.

- **Service Chamber Drain Hole:** Inspect service chamber to ensure a drain hole is present on the bottom of the actuator assembly which allows for water to drain. The drain hole should be within 30 degrees of bottom orientation. The drain hole should be free from obstruction from a plug, dirt or debris. Some actuators may include an elbow in the drain hole. Note that vertical mount actuators must have the NPC drain holes positioned at the bottom of the sidewall near the actuator mounting surface.

- **S-Cam Drum Brake Actuators:** Inspect the push-rod to be sure it is working free and not bent or binding. The push-rod must be square to the brake actuator mounting surface and remain within ±3° in any direction at any point in the stroke. If the push-rod is not square, make corrections by repositioning the brake actuator on the mounting bracket and/or the slack adjuster on the cam shaft.

  Inspect the push-rod yoke assembly. Ensure the yoke pin is installed and retained in place with a cotter pin. Verify the yoke pin can be moved within the yoke when the brakes are fully released. Verify proper brake adjustment if the yoke pin is bound.

  Verify that the yoke locknut is present and tightened to 25-50 ft-lbs [34-68 Nm] torque for threaded push-rods. Replace any damaged, worn, or missing parts.

  On S-cam drum brake actuators equipped with a dust boot, check the boot for damage and replace it as necessary.

  If any damage is observed or suspected, carefully remove and replace the brake actuator by following the directions in this manual.

## 2.2 Leak Check Inspection Points:

Using vehicle system air, apply 90-100 psi [6.2 – 6.9 BAR] pressure to the brake actuator service and parking chambers. Test for air leaks with soapy water or leak detection solution. Never use oil as a leak check solution. Conduct leak check inspection with the service chamber followed by the parking chamber.

Disc brake actuators are not serviceable and must be replaced if a leak is detected. Some S-Cam Drum brake actuator leaks may be serviced by referencing Section 6. Replace the brake actuator if air inlet fitting re-torqueing or replacement does not correct the leak. Repair or replace hoses and fittings as required.

**Service Chamber Leak Checks:**

- Sealed Service Chambers – If bubbles appear around the service chamber roll-over, then the brake actuator must be replaced.
- Clamp Band – If bubbles appear around clamp band, release air pressure from service chamber and tighten clamp band nuts to 30-35 ft-lbs [41-48 Nm] torque using 9/16-inch wrench. Recheck for leaks.
- Inspect air lines, hoses and fittings attached to each chamber.
- Air Inlet Fittings - Tighten fittings if a leak is found but do not over-torque. Reference Table 1 below for fitting torque. Remove air pressure when tightening fittings. Ensure thread sealant is present with NPT threads.

**Table 1: Air Inlet Fitting Installation Torque Specifications**

| Fitting | Installation Torque |
|---|---|
| 3/8-18 NPTF | 25-30 ft-lbs [34-41 Nm] |
| M16x1.5-6H | 13-15 ft-lbs [18-20 Nm] |
| M22x1.5-6H | 27-33 ft-lbs [37-45 Nm] |

**Parking Chamber Leak Checks:**

- Head / Flange Case Rolled Interface – Replace the brake actuator if a leak is detected.
- Breather Tube Vent Elbow – If equipped, disconnect breather tube elbow from service chamber non-pressure housing (NPC) and check for leak from inside tube. Replace the brake actuator if a leak is detected.
- Center Seal – Check for continuous discharge from the service side (11) vehicle quick release valve. Replace the brake actuator if a leak is detected.

## SECTION 3: Actuator Removal Instructions

### 3.1 Parking Spring Chamber Caging Instruction:

***WARNING* - MGM Brakes parking actuators include a tamper resistant spring chamber which has been factory sealed for your protection. There are no user-serviceable parts inside the spring brake chamber. If you experience any damage or failure of your spring brake chamber, remove either the entire actuator as described in Section 3 or the parking spring brake chamber (piggyback) as in Section 6 of this manual. Reference Section 8 of this manual for proper disposal instructions. Never attempt to disassemble the spring brake chamber as serious personal injury could result from accidental sudden release of the high energy spring.**

***WARNING* - Always block wheels to prevent vehicle rollaway when performing any brake inspection or maintenance.**

***WARNING* - Parking actuators must have the parking spring caged prior to removal.**

- Both integral and removable caging bolts can be manually operated to cage the parking spring without air pressure.

- When possible, apply 90-100 psi [6.2 – 6.9 BAR] of air pressure to the spring air inlet port (12). This pneumatically “releases” the parking brake and compresses the parking spring which allows the caging bolt to move easier.

**Integrated Caging Bolt (MJ / LT Models):**

- Manually cage the spring by turning the integral caging bolt counter-clockwise using a 3/4-inch or 19mm socket wrench until the spring is fully caged.

***WARNING* – Do not use an impact wrench.**

***WARNING* - Do not exceed 74 ft-lbs [100 Nm] torque on the caging bolt at any time or damage may occur which could affect the performance of the spring brake chamber. If this occurs, replacement of the actuator is required.**

- The integral caging bolt includes a dual thread which reduces the travel of the release bolt by a factor of 2.4. Reference Table 2 below for caging bolt full release length requirements. Reference Figure 8 on page 16 for additional description of integral caging bolt operation.

| Table 2: Integral Caging Bolt Height Specifications | | |
|---|---|---|
| **Rated Stroke** | **Caging Bolt Height** | **Number of Turns** |
| **2.50 in [63.5 mm]** | **1.1 in [28.0 mm]** | **18-19** |
| **3.00 in [76.2 mm]** | **1.3 in [33.0 mm]** | **22-23** |

**Shown in Figure 8: Integral Caging Bolt**

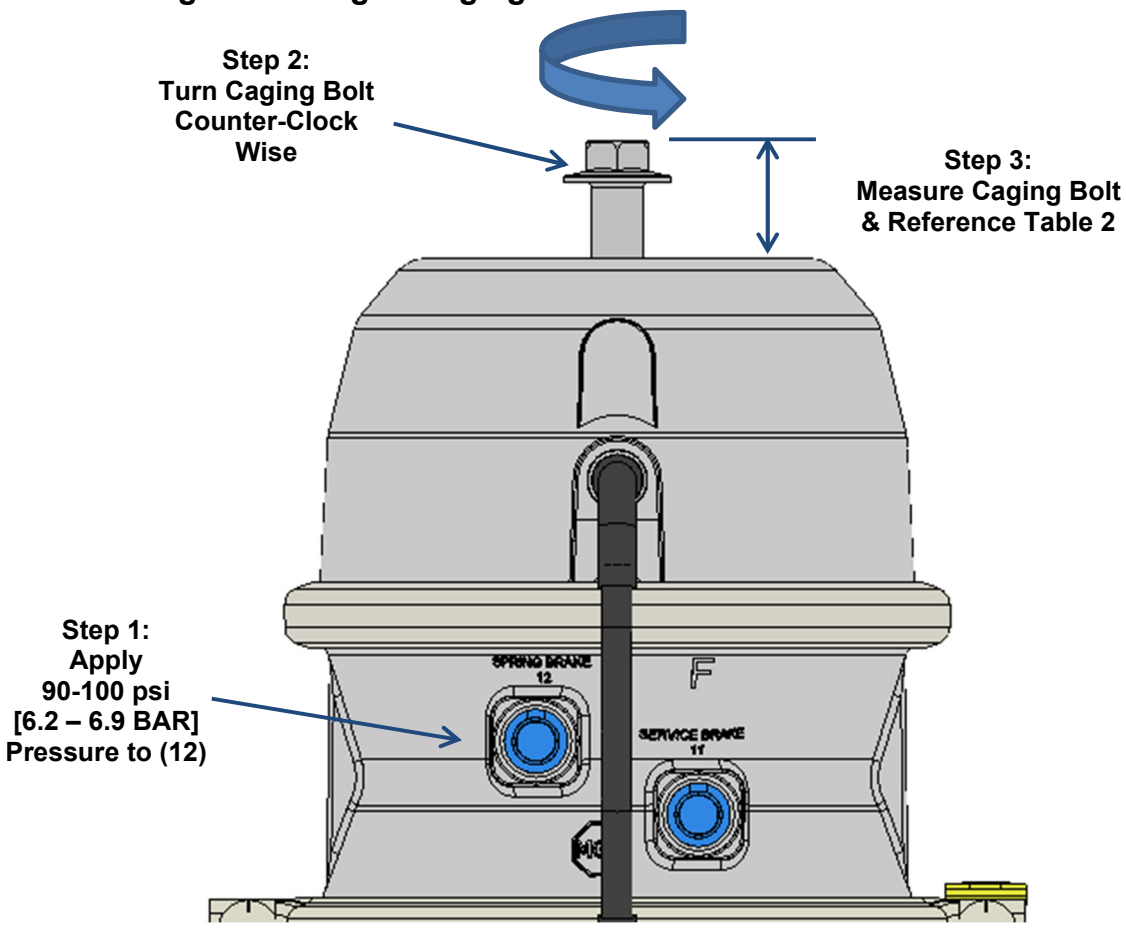


**FIGURE 8**

**Removable Caging Bolt (TR Models):**

- Remove the release bolt assembly from the storage pocket on the side of the actuator. Check the vehicle toolbox or service department if the parts are not found on the actuator.

  ***IMPORTANT* – Use of MGM Brakes release bolt is required for proper fit and operation. The spring brake cannot be manually released without the proper release bolt assembly.**

- Remove the weather seal end cap from the spring brake chamber head.

- Insert the “T” end of the release-bolt into the center hole of the head. Ensure that the formed “T” end of the bolt has entered the hole in the piston inside the chamber until bottomed out. Turn the release-bolt 1/4 turn clockwise and pull the bolt out to lock the formed end into the piston.

- Holding the bolt locked into the piston, install the flat washer and nut on the release-bolt. Turn down the nut against the flat washer and head until finger tight.

***WARNING* – Do not use an impact wrench.**

- Using a 3/4-inch or 19mm (15/16-inch for TRxx36 models) hand wrench turn the release-nut clockwise until the following length of bolt extends above the nut. Reference Table 3 below for caging bolt full release length requirements. Reference Figure 9 below for additional description of removable caging bolt operation.

| Table 3: Removable Caging Bolt Height Specifications | |
|---|---|
| **Actuator Size** | **Caging Bolt Height** |
| **Type xx24 and Type xx30** | **3.25 in [82.6 mm]** |
| **Type xx36** | **4.00 in [101.6 mm]** |

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***WARNING*** **– Do not exceed these lengths or exceed 50 ft-lbs [68 Nm] torque on release bolt nut at any time or damage may occur, which could prevent future releasing of the spring brake chamber.**

**Shown in Figure 9: Removable Caging Bolt**

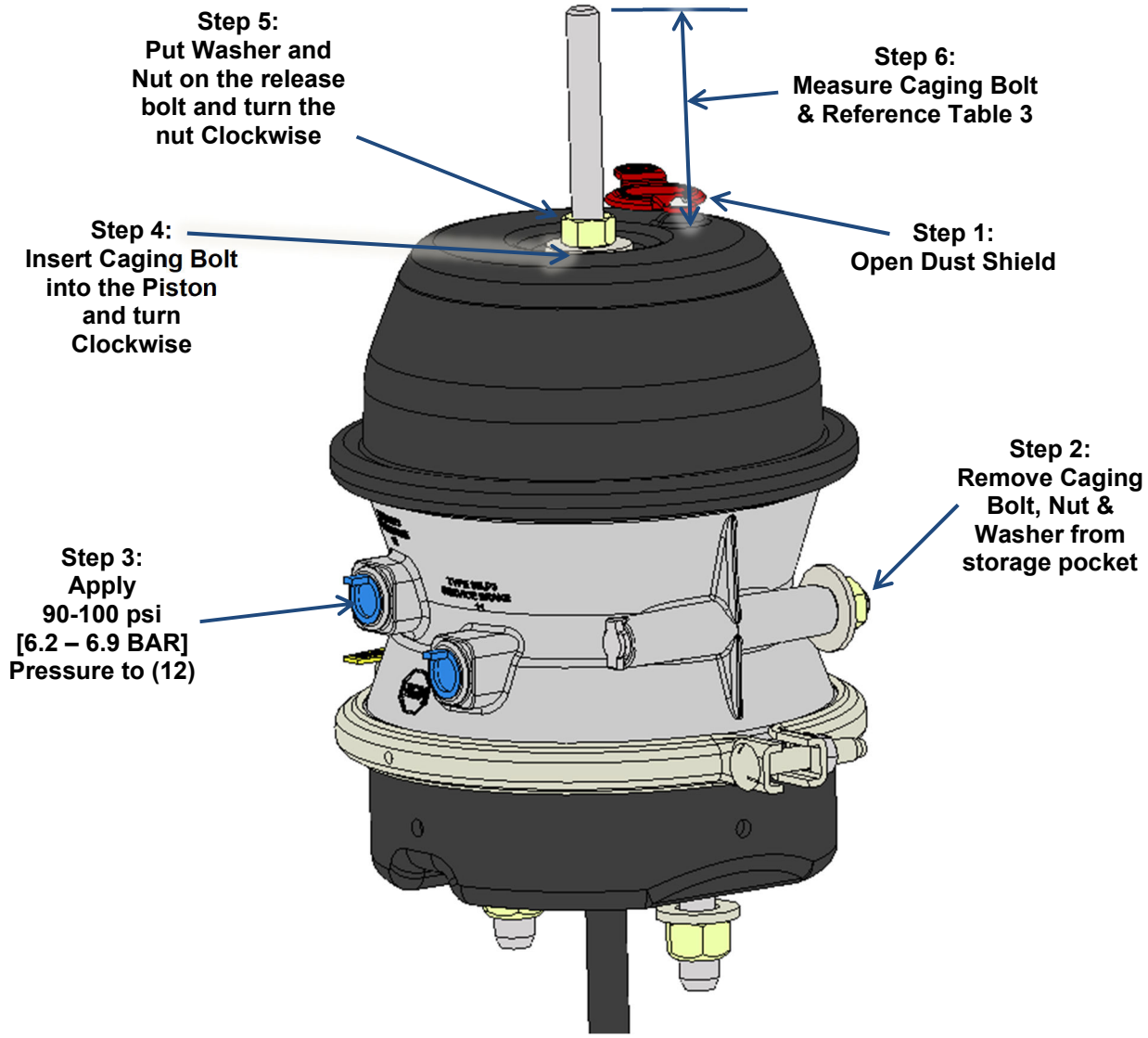



**FIGURE 9**

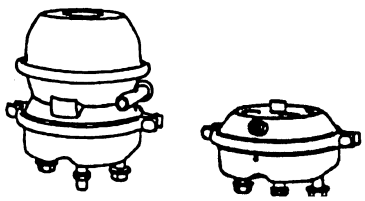
### 3.2 Brake Actuator Removal:

- After ensuring the parking spring is properly caged, drain all air pressure from the service and spring chambers of the actuator. Mark each air-line with air-inlet port designations. Remove the air lines from the air-inlet ports.

- Where equipped, remove the cotter pin and yoke pin from the s-cam drum slack adjuster.

  ***NOTE* - Observe if the yoke pin hole remains aligned with the slack adjuster hole after the pin is removed. If not, then the actuator set up may have been pre-stroked which should be accounted for with the push-rod measurement and threaded yoke adjustment.**

- Remove and discard mounting stud nuts using a 15/16-inch or 24mm wrench and carefully remove the old actuator from the mounting bracket or caliper.



MGM Brakes
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# SERVICE MANUAL

**SUBJECT: MGM Brakes S-Cam Drum & Disc Actuator Service Manual**

## SECTION 4: Actuator Installation Instructions

***WARNING*** **- Improper installation of the new actuator could result in malfunctioning brakes or premature failure of the braking system.**

***IMPORTANT*** **- It is important to replace the retired brake actuator with an approved replacement actuator of the same size and type as originally installed on the vehicle.**

***IMPORTANT*** **- When replacing any other model brake actuator with a piston (MJ Series) model actuator it is recommended that both actuators on the same axle be replaced to ensure braking stability. The parking brake force of MJ series actuator is significantly different than a double diaphragm actuator of the same size. Using two different actuator types on the same axle could cause brake pull during an emergency brake application.**

***IMPORTANT*** **– All disc brake actuators contain an internal boot to seal the service chamber to the caliper. Do not attempt to disassemble disc actuator service chambers for service or air-port / clamp band rotation. Disassembly could result in sealing boot damage. Do not use clamping tools such as vice grips to hold the push-rod as damage to the boot may occur. Only actuate the disc actuator while mounted to the caliper or boot damage could occur.**

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Before installing the brake actuator, ensure the brake actuator mounting surface as well as the caliper or mounting bracket surface is clean, dry, and free of corrosion. Take necessary precautions to keep dirt and debris out of the disc caliper while cleaning.

**Disc Actuator** - Grease the lever arm and conduct inspection and adjustment of the caliper in accordance with the caliper manufacturer's service recommendations.

***IMPORTANT* – Ensure the boot seal has a minimum height of 3mm [0.118 in] from the mounting surface prior to reuse. Reference Figure 10 below. Verify the boot seal height and inspect for damage, cracks, or tears. The disc actuator must be replaced if the boot seal is compromised.**

**Shown in Figure 10: Boot Seal Height Measurement**

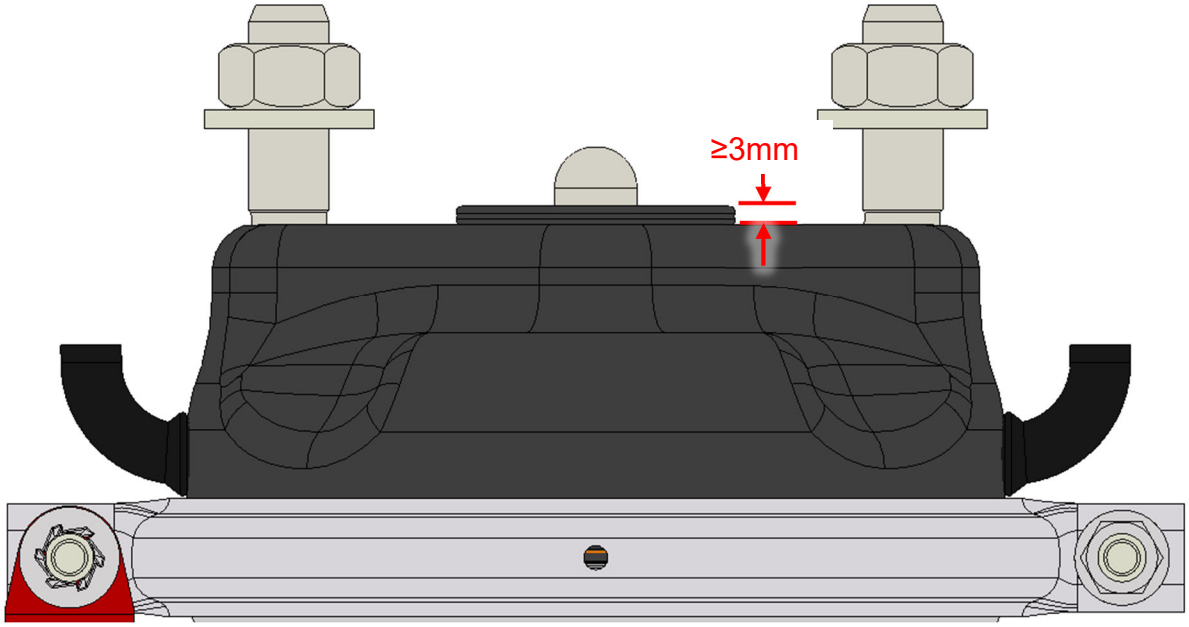


**FIGURE 10**

***NOTE* - Reference Section 5 for s-cam drum piston-rod length measurement and adjustment instructions.**

***NOTE* - Reference Section 6 for s-cam drum air-port and clamp band orientation adjustment instructions.**

- Remove mounting hardware from the mounting studs of the actuator.

- Install the actuator on the caliper or mounting bracket while ensuring the actuator air-inlet ports are properly aligned with the vehicle air lines.

***IMPORTANT* – Ensure that actuators with an external breather tube are installed with the tube oriented up and away from the road surface. This ensures proper venting. Failure to comply will void the MGM Brakes warranty on these models. Reference Figure 11 for proper breather tube orientation.**

**Shown in Figure 11: Proper Breather Tube Orientation**

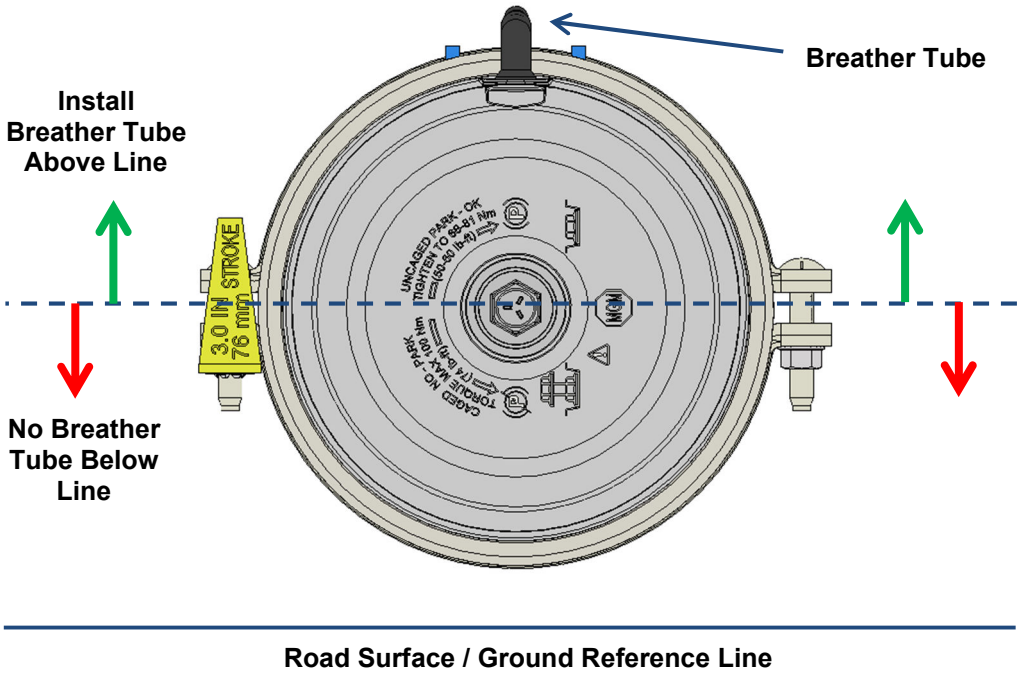


**FIGURE 11**

***IMPORTANT* – Ensure that a drain hole is present and unobstructed on the bottom of the service chamber assembly to allow for water to drain. Reference section 2.1 for inspection recommendations.**

- Install mounting hardware on mounting studs using a 15/16-inch or 24mm wrench. Alternate sides when applying torque. First snug the mounting hardware to approximately 25 ft lbs [34 Nm], then apply final torque to 133-155 ft-lbs [180-210 Nm].

**S-Cam Drum Actuator**:

- Connect the push-rod yoke to the s-cam drum slack adjuster.

  Inspect the push-rod to be sure it is working free and not bent or binding. The push-rod must be square to the brake actuator mounting surface and remain within ±3° in any direction at any point in the stroke. If the push-rod is not square, make corrections by repositioning the brake actuator on the mounting bracket and/or the slack adjuster on the cam shaft.

***NOTE* - Ensure that the correct diameter and length of yoke pin is installed into the correct hole in the slack adjuster. The yoke pin hole should align with the slack adjuster hole with proper push-rod yoke adjustment. The yoke position on the push-rod may require adjustment in order to properly align the pin holes with the slack adjuster. Secure the yoke pin with a new cotter pin.**

***IMPORTANT* - When making a reconnection to an automatic slack adjuster follow the vehicle manufacturer's recommendations for installation and set-up.**

- Install air lines to the actuator making sure each is mated to the correct air inlet port according to markings made earlier. Make note of the actuator inlet port markings on the actuator as shown in Figure 12.

**Shown in Figure 12: Actuator Air Inlet Port Markings**

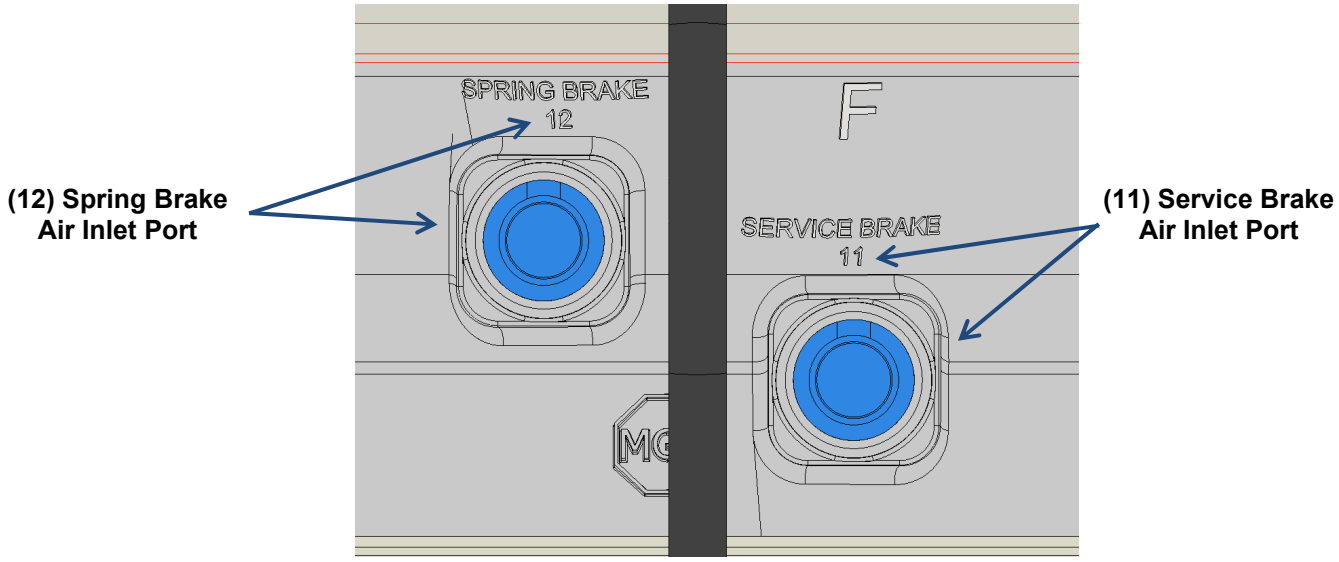


**FIGURE 12**

- Use high quality non-hardening sealing compound for NPT fittings. No sealing compound is required for metric fittings with O-rings. Ensure the O-rings are present and not damaged on metric fittings. Tighten fittings to the appropriate torque as specified in Table 4 below.

| Table 4: Air Inlet Fitting Installation Torque Specifications | |
|---|---|
| **Fitting** | **Installation Torque** |
| **3/8-18 NPTF** | **25-30 ft-lbs [34-41 Nm]** |
| **M16x1.5-6H** | **13-15 ft-lbs [18-20 Nm]** |
| **M22x1.5-6H** | **27-33 ft-lbs [37-45 Nm]** |

- Using vehicle system air, apply 90-100 psi [6.2 – 6.9 BAR] pressure to test for air leaks at air inlet fittings and clamp bands with soapy water or leak detection solution. Never use oil as a leak check solution.

- Exhaust air pressure from service brake chamber and with air pressure still applied to parking brake chamber uncage the parking spring.

**Integrated Caging Bolt (MJ / LT Models):**

- Manually tighten the integrated caging bolt clockwise until it is seated against the head insert and torqued to 50-60 ft-lbs [68-81 Nm]. This will ensure the parking brake will have full stroke capability and the release bolt O-ring is seated to seal out contaminants.

***WARNING* – Do not use an impact wrench.**

**Removable Caging Bolt (TR Models):**

- Remove release-bolt assembly from the actuator and replace these parts in the actuator storage pocket. Tighten the release bolt assembly into the storage pocket to 10 ft-lbs [14 Nm] torque. Properly replace the Weather Seal end cap into the head.

  ***IMPORTANT* – Operating units equipped with an external breather tube without the weather seal end cap securely in place will void the MGM Brakes Warranty.**

- Exhaust air pressure from parking chamber.

***WARNING* - After installation of any S-Cam / Drum brake actuator, the push-rod stroke must be checked to ensure correct foundation brake adjustment. Always follow the foundation brake or vehicle manufacturer recommended practices for brake adjustment.**

***WARNING* - After installation of any Disc brake actuator, the caliper running clearance must be checked to ensure correct foundation brake adjustment. Always follow the caliper or vehicle manufacturer recommended practices for brake adjustment.**

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## SECTION 5: S-Cam / Drum Actuator Piston Rod Measurement and Adjustment

***WARNING* - Always block wheels to prevent vehicle rollaway when performing any brake inspection or maintenance.**

***WARNING* - Improper installation of the new actuator could result in malfunctioning brakes or premature failure of the braking system.**

- Ensure the service and parking brake chambers are fully released. The push-rod must be fully retracted to the zero position. Reference Section 3 for parking chamber caging instructions. Ensure the service brakes are fully released prior to push-rod measurement.

  ***IMPORTANT* - Checking that the yoke pin is loose within the yoke will verify that the actuator and slack adjuster holes are properly aligned.**

- Measure and record the “X” and / or “Y” dimensions as shown in Figure 13.

  “X” Dimension - The dimension from bottom of actuator to end of push-rod.

  “Y” Dimension - The dimension from bottom of actuator to center line of yoke pin.

**Shown in Figure 13: Push-Rod Measurement**

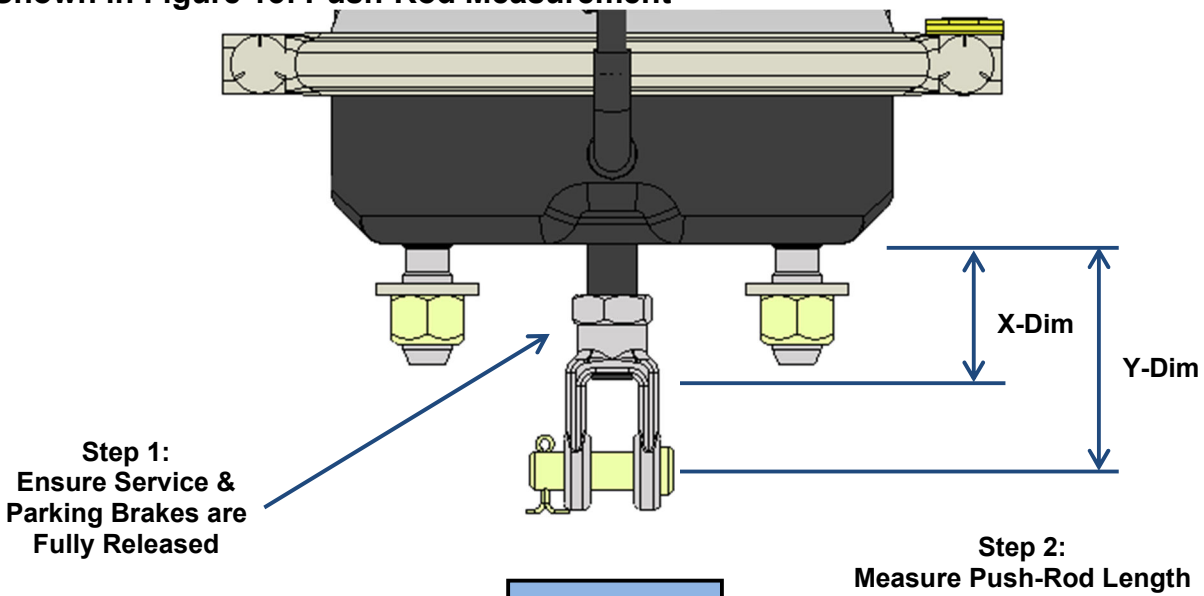


**FIGURE 13**

***NOTE* - If for some reason the spring chamber parking spring cannot be caged and fully released, then the "X" and "Y" dimensions will need to be measured from another actuator of the exact type from the same vehicle provided it is retracted to its zero-stroke position (brake fully released) and was operating correctly.**

- Mark the "X" dimension location on the push-rod of the new actuator. Measure from the mounting surface of the new actuator.
- Thread the jam nut past the mark on the push-rod and align the bottom edge of the nut with the mark.
- Use a sharp hack-saw to cut the push-rod to the marked length.
- After cutting the rod, thread jam nut off the push-rod to clean up the thread.
- Thread the jam nut back onto the push-rod followed by the yoke. The yoke from the removed unit may be reused provided the yoke pin hole is not worn. Adjust yoke to the same "Y" dimension as measured from the removed unit.

  ***IMPORTANT* – Ensure final push-rod set up dimension and orientation meet the vehicle manufacturer's recommendations for installation with the mating slack adjuster.**

- Orient the yoke to the proper alignment position. Tighten the locknut against the yoke and torque to 25-50 ft-lbs [34-68 Nm].

## SECTION 6: S-Cam / Drum Actuator Service Chamber Rebuild and Parking Spring Brake Chamber (Piggyback) Replacement

***WARNING*** **- Replace any damaged or failed brake actuator with an approved replacement brake actuator of the same size, and type as originally installed on the vehicle.**

***WARNING*** **– MGM Brakes does not recommend mounting MGM parking spring brake chambers to other manufacturer's NPC housings. Use of other manufacturer's parts may alter performance of the completed actuator assembly. Use only genuine MGM Brakes replacement parts when servicing MGM Brake actuators.**

***IMPORTANT*****– Disc actuator service chambers are not serviceable due to potential damage to the sealing boot. Section 6 procedure only applies to S-Cam Drum actuator configurations.**

Reference this section for service chamber component replacement including the diaphragm and return spring as well as replacement of the parking spring brake chamber. The parking spring brake chamber is also known as a "single" or "piggyback" assembly.

### 6.1 Service Chamber Disassembly

- The removal and installation of the service chamber pressure cap or parking spring brake chamber (piggyback) without removal of the complete brake actuator can be made easier by "locking off" the service chamber push-rod. Use locking pliers to retain the push-rod to prevent the rod from retracting when the pressure cap or parking spring brake chamber (piggyback) is removed.

- Ensure the parking spring brake chamber (piggyback) is properly caged prior to removal.

  ***IMPORTANT*** **- Reference Section 3 for MGM Brake actuator removal and proper caging instructions.**

- Drain all air pressure from the service and spring chambers of the actuator.

- Mark each air-line with air-inlet port designations and remove the air lines from the air-inlet ports if the parking spring brake chamber (piggyback) is being replaced.

- If equipped, disconnect the external breather tube and elbow from the service non-pressure chamber (NPC) housing.

- Using a 9/16-inch wrench, remove the clamp nuts from the service clamp ring. Then, while holding the pressure cap or parking spring brake chamber (piggyback) securely in place, remove the clamp ring to allow removal of the pressure cap or parking spring brake chamber (piggyback) from the service chamber. This operation can be made easier with two people.

***WARNING* – Use caution when removing the service chamber clamp band. The service chamber includes a return spring capable of outputting up to 65 lbs [0.29 kN].**

## 6.2 Service Chamber Assembly

***IMPORTANT* - At this time inspect all parts in the service chamber including the diaphragm and return spring. Replace any parts which are damaged or worn. Use only genuine MGM Brakes replacement parts.**

- Verify that the non-pressure chamber (NPC) housing includes a 0.5 inch [12.7 mm] hole for the parking spring brake chamber (piggyback) breather tube elbow if required. A hole may need to be drilled if the existing actuator did not include a breather tube prior to service. This hole must be in the correct location to mate up with tube upon installation. Reference Figure 11 for proper breather tube orientation after vehicle installation. An existing drain hole may be enlarged if in the correct location. Ensure the hole is properly deburred and the housing is cleaned of debris after drilling.

- Make sure the new parking spring brake chamber (piggyback) is fully caged as outlined in Section 3.

- Install new return spring and push-rod components as required. The cotter pin and yoke pin will need to be removed and reinstalled from the s-cam drum slack adjuster if the push-rod or return spring components are serviced.

- Position the diaphragm inside the pressure cap or parking spring brake chamber (piggyback) and then the assembly onto the non-pressure chamber (NPC) housing. Orient the assembly until all mating parts are aligned straight and the airlines are positioned to mate with the vehicle air supply lines. Replace the service clamp ring. Reference Figure 14.

**Shown in Figure 14: Service Chamber Component Installation**

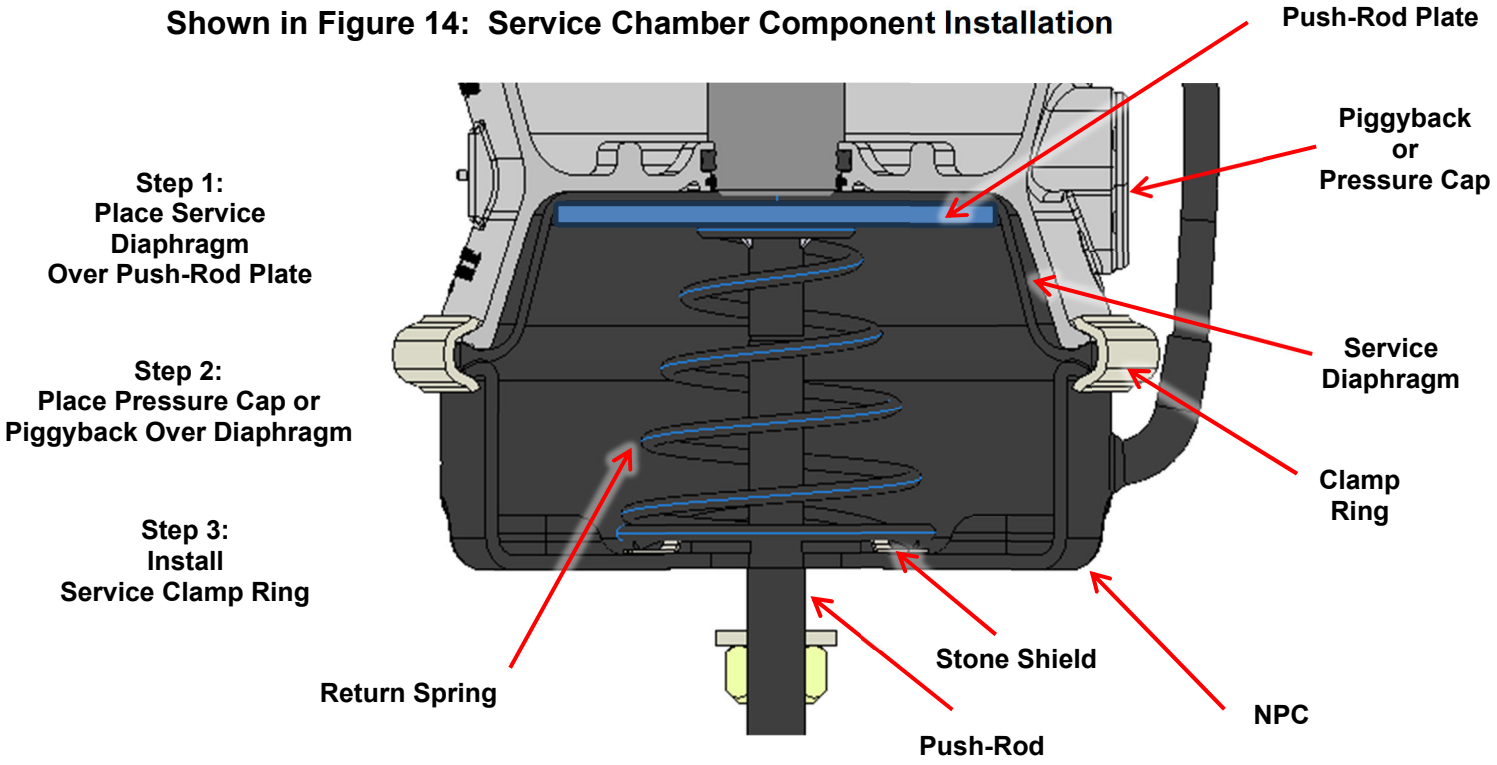


**FIGURE 14**

- Re-install the clamp bolts and nuts. Alternately tighten each nut in 5-10 ft-lbs [7-14 Nm] torque increments while constantly rechecking mating parts alignment. If re-alignment is required, loosen clamp nuts, and repeat the tightening process. Firmly tap around circumference of the clamp ring with a hammer to assure the full seating of the clamp and tighten the nuts to 30-35 ft-lbs [41-48 Nm] torque.

  ***IMPORTANT* - Remove the locking pliers from the service push-rod to return actuator to normal operating condition and released position.**

- Connect the external breather tube elbow to mating hole in the non-pressure chamber (NPC) housing. MGM Brakes offers a breather tube service kit if required.

- Follow Section 4 instructions to complete brake actuator installation.

## SECTION 7: S-Cam / Drum Actuator Adjustment Check

Maintaining proper brake adjustment is essential for safe and reliable operation of vehicles with air brakes. S-Cam Drum brake actuator stroke is more efficient within the first half of the stroke than near the end of the stroke. Long stroke actuators allow for additional safety factors in emergency situations. It is important to know the brake actuator size and stroke rating prior to measuring brake adjustment.

***WARNING* - Always block wheels to prevent vehicle rollaway when performing any brake inspection or maintenance.**

***IMPORTANT* – Always follow current CVSA guidelines for proper air brake system inspection and adjustment check procedures.**

Brake adjustment limits for s-cam drum actuators can be measured as follows:

- Ensure the brakes are cool and not hot from use.
- Release the parking brakes.
- Charge the vehicle air system to 90 – 100psi [6.2 – 6.9 BAR] and turn off the engine.
- Release service brakes and make note of the actuator push-rod position. Measure from the actuator to a known point on the push-rod.
- Fully apply the service brakes and measure to the same point on the push-rod.

  ***IMPORTANT* - Make note if the orange push-rod stroke alert indicator stripe is visible as this is an indication that the actuator is at or near the adjustment limit.**
- The difference in measurements is the brake stroke dimension.
- Reference the current CVSA Out of Service Criteria handbook for current brake adjustment limits.

## Section 8: Proper Disposal of Spring Brake Actuators

The brake actuator parking chamber includes a powerful high energy parking spring that outputs as much as 3200 lbs [14.2 kN] force. Refuse and scrap operations can crush and cut debris which could result in the parking spring becoming a projectile if disposed as an operational assembly. It is essential that all retired spring brake actuators be safely disarmed prior to disposal to prevent serious personal injury.

The actuator spring chamber must be disarmed by cutting at least two parking spring coils while the spring is retained in the actuator chamber assembly. A suitable disarming container and cutting tool is required to perform this operation.

***WARNING* - Parking actuators must have the parking spring caged prior to removal.**

***WARNING* – Properly disarm spring brake actuators prior to disposal to prevent personal injury.**

***WARNING* - Never attempt to remove the parking spring chamber head which contains the power spring.**

***WARNING* – Understand and observe all safety precautions and instructions for proper use of cutting tools.**

***WARNING* – Always wear appropriate personal protection equipment (PPE) when disarming spring brake actuators.**

***WARNING* – It is the user's responsibility to ensure the disarming container and tools are safe and suitable for the operation. The container MUST be strong enough to retain the actuator components and spring in the event that the actuator suddenly separates during the cutting operation. The container must have access holes to allow cutting of the actuator.**

***NOTE*: MGM Brakes does not manufacture or sell disarming boxes/containers.**

- Ensure the parking chamber is properly caged and remove the actuator from the vehicle following the instructions in Section 3.
- Place the actuator in the disarming container. Ensure the access door is completely closed and locked per the manufacturer's recommendations. Orient the actuator so the spring chamber head is accessible through the container access holes.
- Use a cutting torch to cut a hole through the actuator parking spring chamber head and parking spring. Ensure at least two spring coils are completely cut.
- Allow the actuator to cool prior to removal from the disarming container.
- Properly dispose of the actuator following local refuse and scrap regulations.

***WARNING*** **– It is the user's responsibility to ensure the actuator is completely disarmed and safe prior to disposal.**