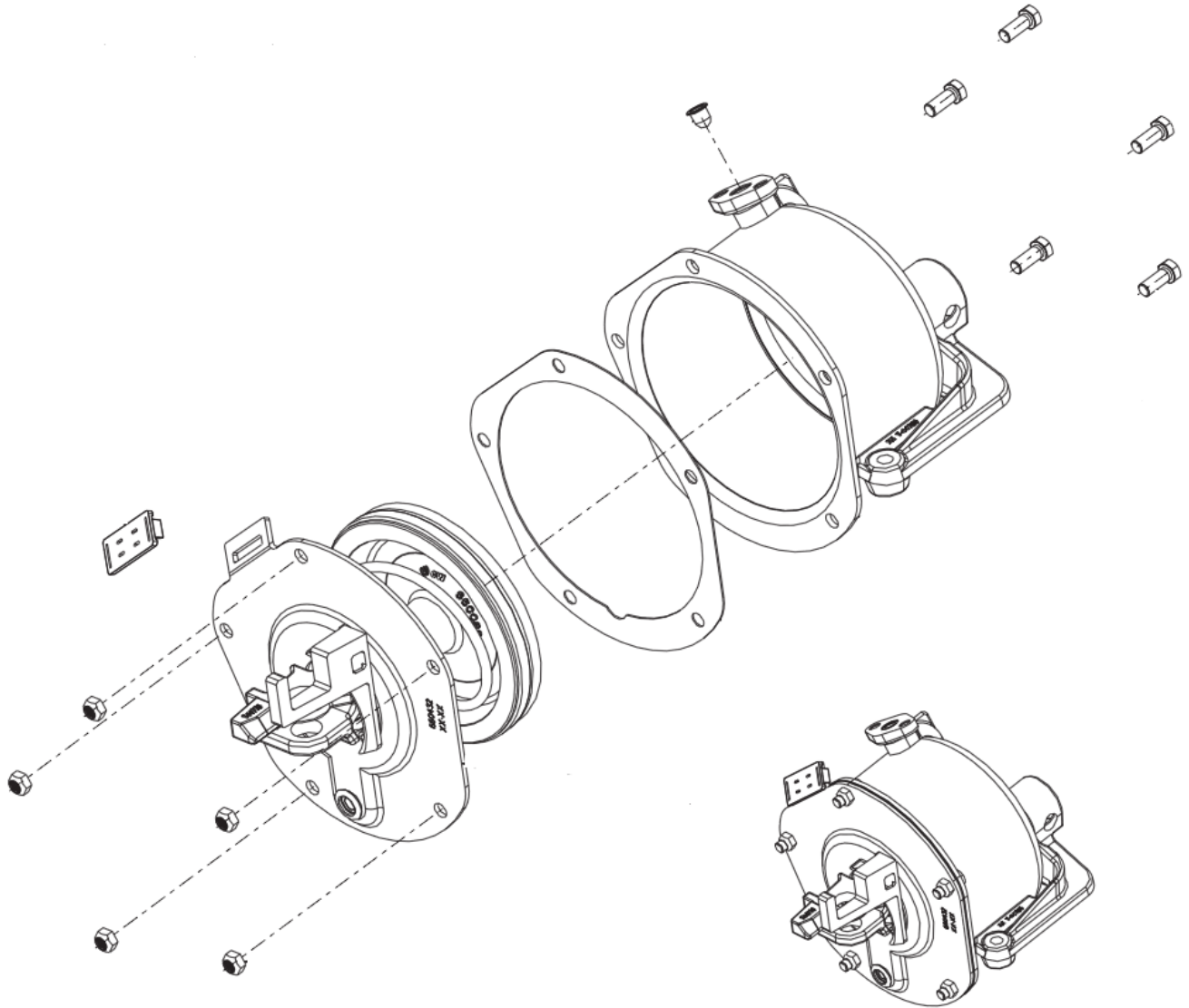


TM-22584

TMX[®] CYLINDER MAINTENANCE MANUAL

Rev. A



Cardwell Westinghouse
A **Wabtec** company

TM-22584**TMX[®] Cylinder Maintenance Manual**

1.0 Scope:

- 1.1 To provide information on the proper disassembly, inspection, and rebuild processes for a TMX[®] brake cylinder.

2.0 Warnings & Safety Procedures:

- 2.1 This manual is meant to be used as a guide and is not all inclusive. Be sure to exercise care and follow the proper safety protection procedures per your shops discretion. The TMX[®] brake cylinder is under a mechanical load and poses a safety hazard to those servicing the cylinder. Cardwell Westinghouse does not assume liability for injuries or damage caused while re-building a cylinder.

3.0 Maintenance Schedule:

- 3.1 At least once every 144 months, or more frequently if service conditions require, the TMX[®] brake cylinder should be removed from the brake rigging.
- 3.2 Using this manual combined with proper technique and fixtures the unit should be disassembled, cleaned, inspected, reassembled, and tested for proper operation.

4.0 Replacement Part Information:

- 4.1 **Important:** To ensure satisfactory operation and reliability of this device, only Cardwell Westinghouse replacement parts should be used in the maintenance of TMX[®] brake cylinder.
- 4.2 Please see drawing 662582 for the Cardwell Westinghouse TMX[®] brake cylinder rebuild kits.
- 4.3 For any parts not listed in this drawing that may need replacement please consult with Cardwell Westinghouse Engineering Department, to ensure the proper part is ordered.

5.0 Required Equipment:

- 5.1 Cleaning Solvent
 - 5.1.1 The solvent used for cleaning the metal parts of the TMX brake cylinder must be an aliphatic hydrocarbon solvent, such as Perkins Perchem-1028, that will dissolve oil or grease without abrasion.
- 5.2 Lubricant
 - 5.2.1 Brake cylinder lubricant should adhere to AAR specification M-914.
- 5.3 Sealant
 - 5.3.1 A thread locking sealant should be used, such as Loctite[®] Number 242.
- 5.4 Fixtures
 - 5.4.1 The TMX[®] brake cylinder components are under a mechanical load. A suitable holding fixture **MUST BE MADE** for the safe assembly & disassembly, to prevent damage and/or injury.

TM-22584**TMX ® Cylinder Maintenance Manual****6.0 Disassembly:**

- 6.1 **Important:** In the following procedures **DO NOT** use any sharp or hard metal tools to remove any components. Care should be exercised so that no damage is done to the metal parts.
- 6.2 Carefully loosen and remove the five ½” locking nuts from the ½” x 1-¼” hex head cap screws. The locking nuts and cap screws are to be scrapped.
- 6.3 Remove the piston and non-pressure head assembly from the cylinder body and place in the holding fixture from Section 5.4. The cylinder body is to be placed to the side for inspection and cleaning.
 - 6.3.1 **Important:** Be sure that the parts are securely held in the compressed position by the holding fixture.
- 6.4 Carefully loosen and remove the 5/8” x 1-¾” hex head cap screw and washer from the push rod.
- 6.5 **Important:** Slowly release the holding fixture to allow the return spring to extend to its relaxed position. Exercise care so that no parts are expelled from the assembly.
- 6.6 Remove and Scrap the following parts
 - 6.6.1 Cylinder Gasket
 - 6.6.2 Piston Packing Cup
 - 6.6.3 Guide Ring
- 6.7 Place the piston and return spring to the side for cleaning and inspection.
- 6.8 Carefully loosen and remove the three hex head socket cap screws from the dust boot retainer ring.
- 6.9 Remove and Scrap the following parts
 - 6.9.1 Dust Boot
 - 6.9.2 Dust Boot Retainer Ring
 - 6.9.3 Three Hex Head Socket Cap Screws
 - 6.9.4 Wear Sleeve
 - 6.9.5 Wasp Excluder
 - 6.9.6 Piston Travel Indicator
- 6.10 Place the non-pressure head and push rod to the side for inspection and cleaning.

7.0 Inspection and Cleaning:

- 7.1 **Important:** **DO NOT** use any tool or abrasive material that may scratch or otherwise damage any of the metal surfaces.
- 7.2 Wash all of the remaining parts in a bath of the cleaning solvent from Section 5.1
 - 7.2.1 The release spring may be wire brushed to assist in the removal of any dirt, rust, or scale.
 - 7.2.2 A dull wooden/rubber spatula type tool may be used to assist in removing any build-up of brake cylinder lubricant on the walls of the cylinder body.

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- 7.3 After the parts are cleaned they must be completely dried. Use a low-pressure jet of clean, dry air to blow the parts dry.
- 7.4 Inspect the return spring, if it is rusted, pitted, distorted, or has taken a permanent set it is to be scrapped and replaced with a NEW Cardwell Westinghouse part.
- 7.4.1 Please reference Section 8.5.1 for return spring specifications.
- 7.5 Inspect the piston and push rod. If it is cracked, cut, bent, broken, or damaged in any way, it is to be scrapped and replaced with a NEW Cardwell Westinghouse part.
- 7.6 Inspect the non-pressure head. If it is cracked, bent, broken, or damaged in any way, it is to be scrapped and replaced with a NEW Cardwell Westinghouse part.
- 7.6.1 If only the hand brake rest portion of the non-pressure head is damaged, it can be replaced with a new bracket and does not require an entirely new non-pressure head.
- 7.7 Inspect the cylinder body. If it is cracked, bent, broken, or gouged more than .050" anywhere on the inner cylinder body wall, it is to be scrapped and replaced with a NEW Cardwell Westinghouse part.
- 7.7.1 The inner brake cylinder walls must maintain the original surface finish. If the surface finish is marked but does not exceed the .050" Max, it can be returned to Cardwell Westinghouse for re-machining.

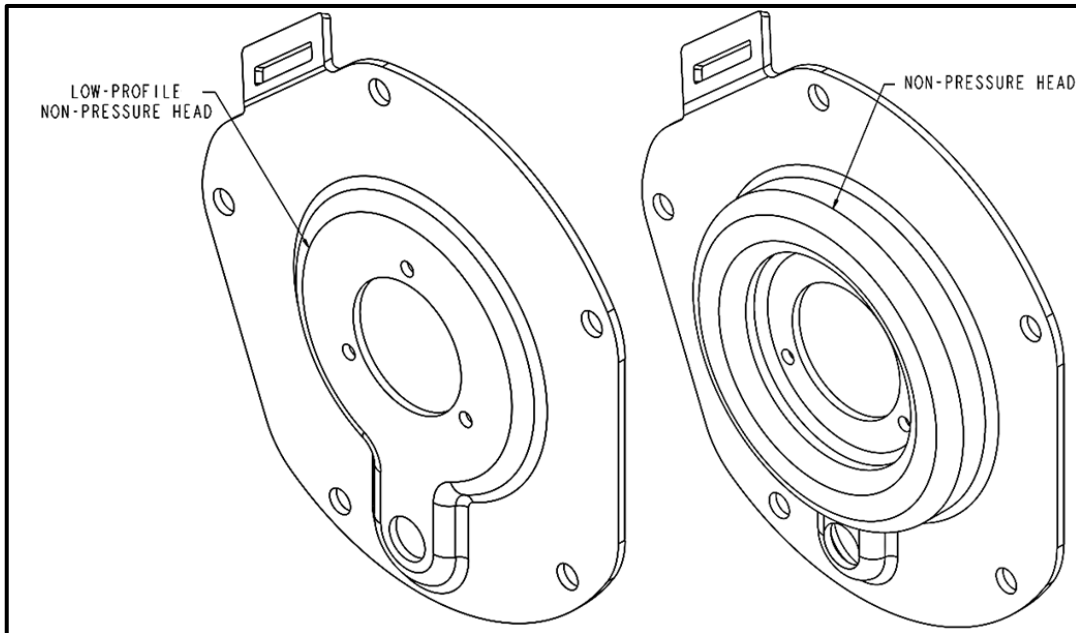
8.0 Assembly:

- 8.1 With the non-pressure head supported, install a new dust boot as shown in **FIGURE 1**.
- 8.2 Place the dust boot retainer over the dust boot and align the holes for assembly.
- 8.2.1 Using the three hex head socket cap screws secure the dust boot and dust boot retainer ring to the non-pressure head.
- 8.2.2 As shown in **FIGURE 1**, be sure to install the piston travel indicator on the non-pressure head under two of the hex head socket cap screws.
- 8.2.2.1 The screws are to be equally tightened to 13-20 ft-lbs. for steel piston travel indicators.
- 8.2.2.2 The screws are to be equally tightened to 5-7 ft-lbs. for plastic piston travel indicators.
- 8.3 Apply a light coating of brake cylinder lubricant from Section 5.2 to the inside lip of the dust boot that will contact the push rod.
- 8.4 Install the push rod through the dust boot sliding the push rod until the dust boot bottoms out.
- 8.4.1 **Important: DO NOT** permit any of the lubricant to get into the tapped hole in the end of the push rod.

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8.5 Install the return spring as shown in **FIGURE 1** being sure that it is seated in the non-pressure head with the push rod through its center.

8.5.1 Please reference below figure and tables to ensure the appropriate spring and non-pressure head combination is used.



Cylinder Size	LP-NPH	NPH	Acceptable Springs
7"	X		TM-22504
7"		X	592143 or TM-22504
8"	X		TM-22504
8"		X	592143 or TM-22504
9.25"	X		TM-22504
9.25"		X	591872 or TM-22504
10"	X		TM-22504
10"		X	TM-22091 or TM-22504
11"	X		TM-22504
11"		X	591872 or TM-22504
12"	X		TM-22504
12"		X	591872 or TM-22504

Spring Part #	Wire Diameter (IN.)	Free Height (IN.)
592143	.283±.0020	12.5
591872	.363±.0024	10.56
TM-22091	.312±.0020	9.81
TM-22504	.283±.0020	10.94

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- 8.6 Place the piston on top of the spring, being sure it is seated properly on the spring.
- 8.6.1 Using the holding fixture from Section 5.4 carefully apply a load to the piston compressing the return spring until the push rod bottoms out on the inside of the piston.
- 8.7 Apply a coating of the sealant from Section 5.3 to the $\frac{5}{8}$ "x 1- $\frac{3}{4}$ " hex head cap screw.
- 8.8 With the jaw of the push rod constrained, install the washer on to the $\frac{5}{8}$ "x 1- $\frac{3}{4}$ " hex head cap screw; install both through the piston into the push rod.
- 8.8.1 The $\frac{5}{8}$ "x 1- $\frac{3}{4}$ " bolt is tightened to 90 –ft-lbs.
- 8.8.2 At this time the holding fixture can be slowly released, making sure everything is mechanically held.
- 8.9 Install the guide ring around the piston make sure it is completely seated in its groove on the piston.
- 8.9.1 Make sure the curved section of the guide ring is facing the top as shown in **FIGURE 1**.
- 8.10 Place a piece of string or zip tie across the head of the cylinder with a few inches extending past the piston to hold onto.
- 8.11 Install the packing cup by firmly pressing it, being sure it is completely seated on the piston and guide ring. Carefully remove the string or zip tie from Section 8.10.
- 8.11.1 The string ensures no air is trapped under the packing cup.
- 8.12 Apply a thorough coating of brake cylinder lubricant from Section 5.2 to the brake cylinder body walls and the skirt of the packing cup.
- 8.12.1 **Important: DO NOT** lubricate the top of the packing cup; it is to remain dry.
- 8.13 Install the cylinder gasket in place on the non-pressure head, being sure to align the bolt holes and semi-circle of the gasket with the wasp excluder hole of the non-pressure head.
- 8.14 Exercising care so that the skirt of the packing cup is not cut or bent over on itself, install the cylinder body over the packing cup, aligning the bolt holes on the body with the non-pressure head and gasket.
- 8.14.1 It is imperative that the wasp excluder hole in the non-pressure head is located at the bottom of the cylinder assembly and that the pushrod is oriented as shown in **FIGURE 1**.
- 8.15 Install a $\frac{1}{2}$ " x 1- $\frac{1}{4}$ " hex head cap screw through each of the five bolt holes, being sure each one passes through the cylinder body, gasket, and non-pressure head, in the orientation shown in **FIGURE 1**.
- 8.16 Install a $\frac{1}{2}$ " locking nut onto the exposed threads of the five $\frac{1}{2}$ " x 1- $\frac{1}{4}$ " hex head cap screws.
- 8.16.1 The bolts are to be equally tightened to 50 ft-lbs.
- 8.17 Snap the wasp excluder and wear sleeve in place as shown in **FIGURE 1**.

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9.0 Testing:

9.1 It is recommended by Cardwell Westinghouse that all reconditioned cylinders be tested per AAR MSRP-[E] S-4004 Section 3.0.

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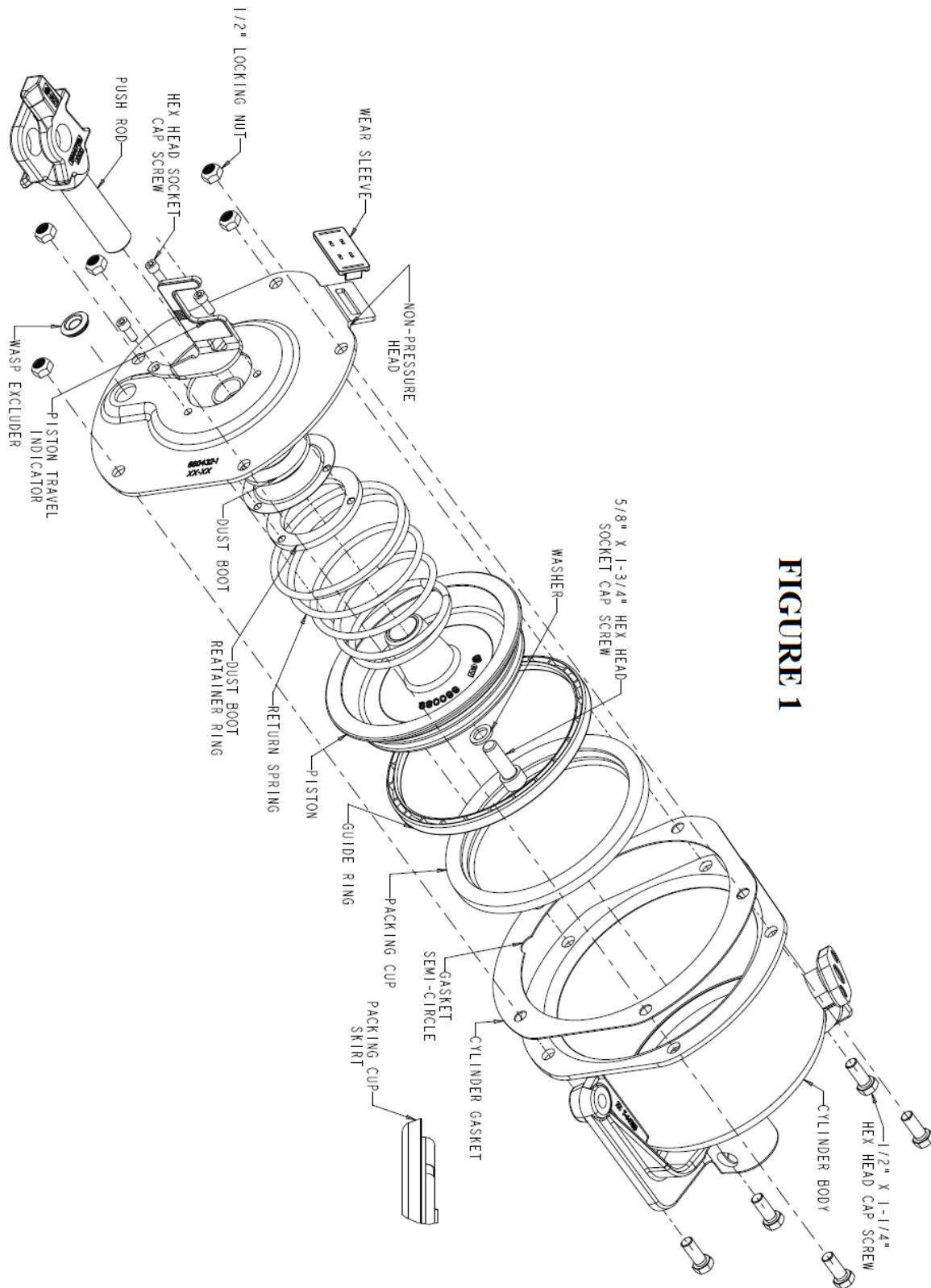


FIGURE 1