Marsh Brothers Aviation

INSTALLATION INSTRUCTIONS

DATE: March 18, 2022

PRODUCT: Aircraft Models Per Approved Model List (AML)

SUBJECT: Brake Master Cylinder Seal Kit Installation

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RELEASED BY: 24/03/2022

AVIO dg

TRANSPORT CANADA
DESIGN APPROVAL ORGANIZATION
NO.: 17-C-01

APPROVED

By: API
Appr'l Date: 06 Jun 2022
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REVISION HISTORY TABLE

REVISION	REVISION DATE	BY
N/C	December 4, 2020	E. Muenz
A	March 18, 2022	E. Muenz

INTRODUCTION

The purpose of these installation instructions is to provide all necessary information required to install a replacement seal kit in a brake master cylinder. The seal kit repairs a leaking brake master cylinder and provides preventative maintenance with a longer lasting lip seal.

APPLICABILITY

These installation instructions are applicable to the following brake master cylinders and seal kits:

BRAKE MASTER CYLINDER P/N	SEAL KIT P/N
96-380034-25	M-03-1001-1
96-380034-23	M-03-1001-3
90-380001-23	M-03-1000-1
90-380001-29	M-03-1000-3
90-380001-33	

Aircraft applicability per Approved Model List (AML).

MATERIALS

1. Parts Required:

PART NUMBER	DESCRIPTION
M-03-1000-1 / -3	Seal Kit, Brake Master Cylinder, Beech
M-03-1001-1 / -3	Seal Kit, Brake Master Cylinder, Beech
n/a (Included with above kits)	Installation tool kit

2. Tools Required:

   (a) Installation tool kit (supplied with seal kit)
   (b) Standard aviation tools and consumables.

REFERENCES

1. AC43.13-2B – Acceptable Methods, Techniques, and Practices – Aircraft Alterations.
2. Refer to the applicable aircraft maintenance manual (AMM).

INSTRUCTIONS

A. BRAKE MASTER CYLINDER REMOVAL PROCEDURE

NOTE

PREPARE THE AIRCRAFT FOR MAINTENANCE AND PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE AIRCRAFT MAINTENANCE MANUAL PROCEDURES AND STANDARD PRACTICES.

NOTE

FOLLOW ANY MANUFACTURER OR AMM INSTRUCTIONS / PROCEDURES FOR DISSASSEMBLY AND REASSEBLY OF THE BRAKE MASTER CYLINDER AS REQUIRED AND AS APPLICABLE.

1. Remove the brake master cylinder from the aircraft.
2. Disassemble the brake master cylinder to gain access to the piston and seals.

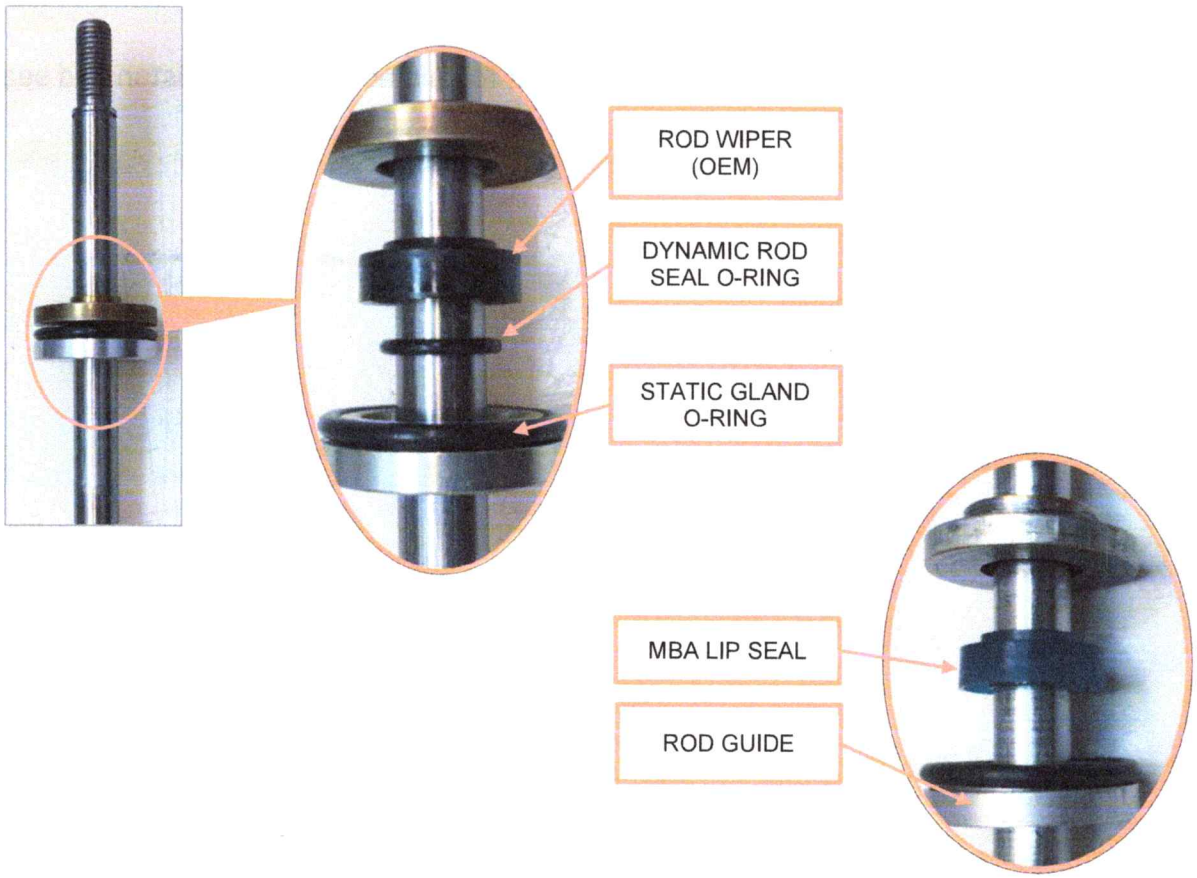
B. SEAL KIT INSTALLATION PROCEDURE

PREAMBLE

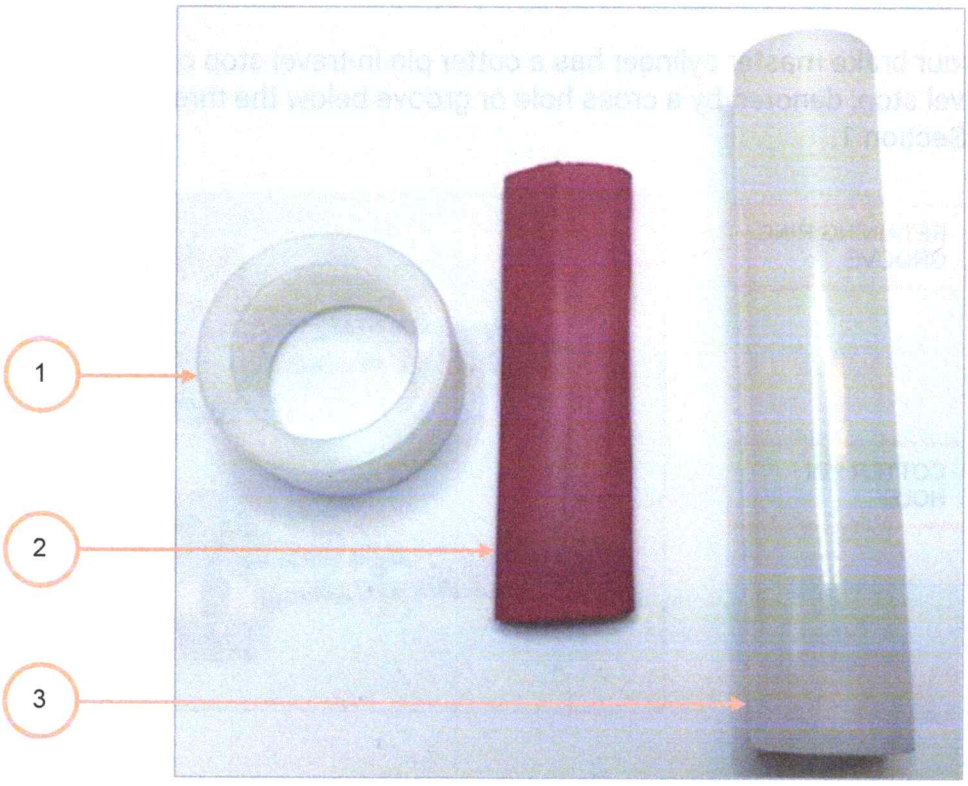
The following provides a general overview of terminology used in this document, and a method of selection with installation process to follow.

LIP SEAL – Inner and outer seal lips provide static and dynamic sealing function. Damage to either of these lips will likely cause the seal to leak.

The MB Aviation designed Lip Seal replaces both the OEM Rod Wiper and the Piston Rod dynamic O-ring.



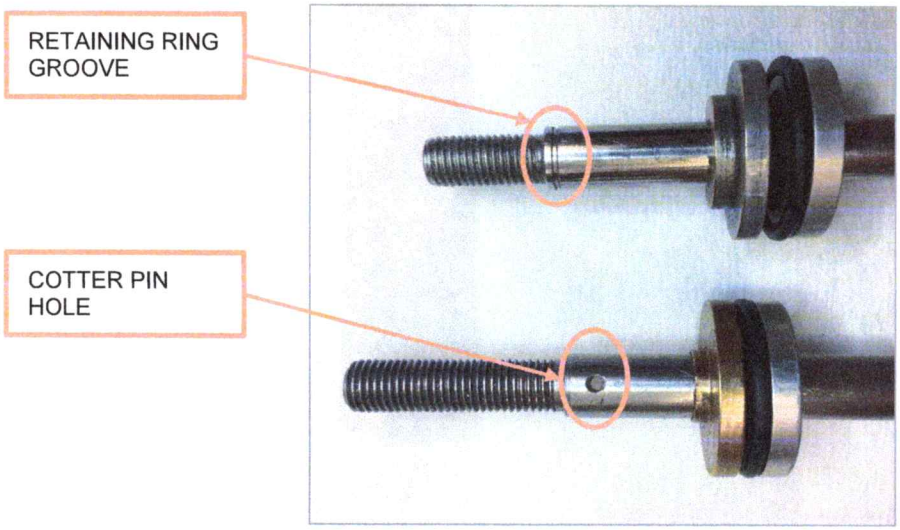
Installation tool kit – Ground support equipment/tooling only. Used to avoid damage to the lip seal during installation.



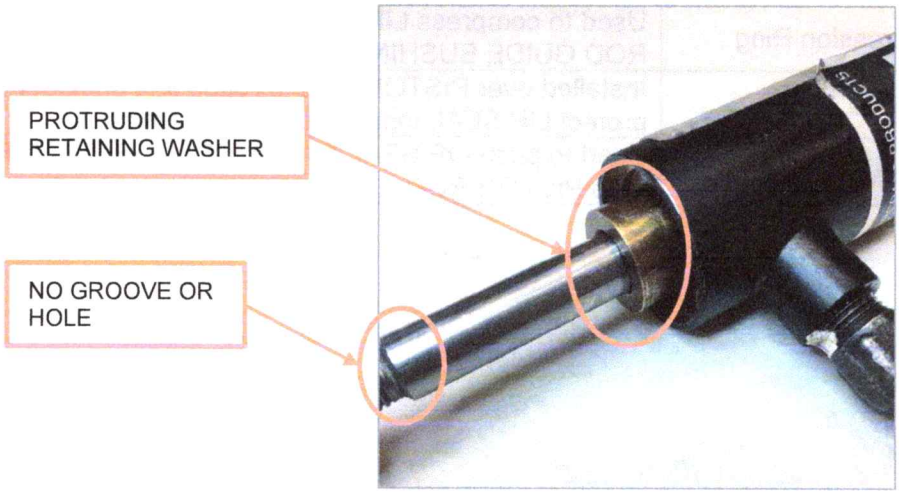
Item	Description	Function/Use
1	Seal Compression Ring	Used to compress LIP SEAL outer lip into PISTON ROD GUIDE BUSHING.
2	Thread Sleeve	Installed over PISTON ROD threads and shoulder to protect LIP SEAL inner lip during assembly.
3	Push Tube	Used to push LIP SEAL through COMPRESSION RING onto PISTON ROD.

BEFORE PROCEEDING WITH THE INSTALLATION STEPS, DETERMINE WHICH TYPE OF BRAKE MASTER CYLINDER YOU ARE WORKING ON AND PROCEED AS FOLLOWS:

If your brake master cylinder has a cotter pin in-travel stop or an external retaining ring in-travel stop, denoted by a cross hole or groove below the threads respectively, then proceed to Section 1.



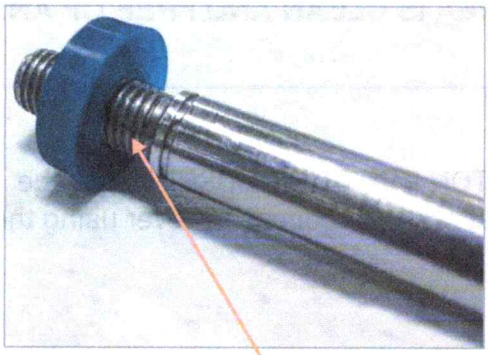
Alternatively, if your brake master cylinder does not have a cotter pin hole or a retaining ring groove, and has a protruding retaining washer as shown below, proceed to Section 2.



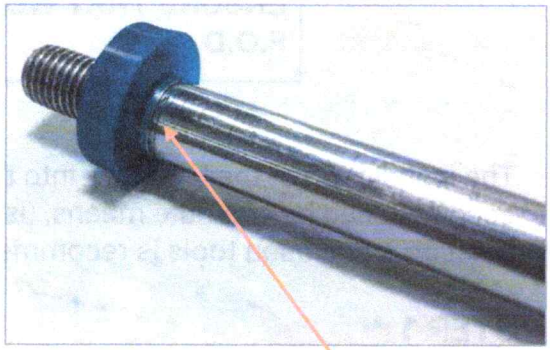
CAUTION

DAMAGE TO THE INNER AND/OR OUTER SEAL LIPS MAY CAUSE LEAKAGE. TAKE CARE DURING INSTALLATION TO PREVENT DAMAGE TO SEAL LIPS.

Attempting to install the Lip Seal over the unprotected piston rod threads and onto the piston rod may result in damage to the seal inner lips. Damage to the seal lips will result in leakage.



RISK OF DAMAGE TO SEAL INNER LIP FROM THREAD CRESTS



RISK OF DAMAGE TO SEAL INNER LIPS FROM PISTON ROD SHOULDER

Attempting to install the Lip Seal into the Rod Guide without the use of the seal compression ring will be difficult and could cause damage to the outer seal lips. This may eventually cause the seal to leak.

RISK OF DAMAGE TO SEAL OUTTER LIP FROM PISTON ROD GUIDE BUSHING.

SECTION 1 – INSTALLATION AND ASSEMBLY PROCESS FOR M-03-1000-1 AND M-03-1001-1/-3 SEAL KITS

CAUTION

SEAL ORIENTATION IS CRITICAL TO FUNCTION. ENSURE LIPS OF SEAL FACE THE PISTON HEAD.

CAUTION

ENSURE THAT WORK AREA IS CLEAN AND FREE OF ANY F.O.D

The installation of the LIP SEAL into the PISTON ROD GUIDE BUSHING may be accomplished by alternate means, using best shop practices, however using the MB Aviation installation tools is recommended.

STEP 1

(a) Install PISTON ROD GUIDE BUSHING onto piston rod, as shown in Figure 1.

(b) Insert COMPRESSION RING over piston rod and firmly seal it onto stepped end of PISTON ROD GUIDE BUSHING, as shown in Figure 2.

(c) Install LIP SEAL with THREAD SLEEVE inserted into LIP SEAL bore over threaded end of PISTON ROD. Ensure that THREAD SLEEVE fully covers threads and PISTON ROD shoulder, as shown in Figure 3.

(d) Apply a thin film of hydraulic fluid over piston rod.

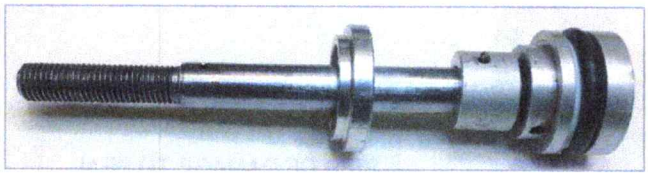


FIGURE 1 – Piston sub-assembly with PISTON ROD GUIDE BUSHING installed.

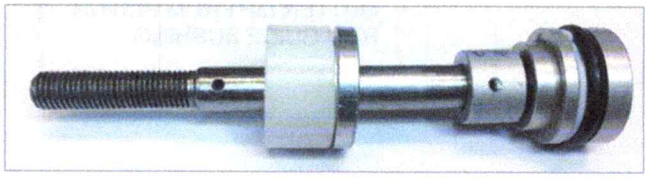


FIGURE 2 – COMPRESSION RING installed onto PISTON ROD GUIDE BUSHING.

CAUTION

ENSURE THAT SEAL LIPS FACE PISTON HEAD AS SHOWN.

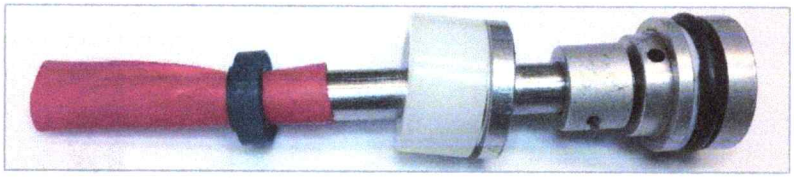


FIGURE 3 – THREAD SLEEVE with LIP SEAL installed over piston threads and shoulder.

STEP 2

Using the PUSH TUBE, push LIP SEL through COMPRESSION RING into and firmly seat seal into PISTON ROD GUIDE BUSHING.

FIGURE 4 – PUSH TUBE, used to push LIP SEAL onto piston rod and into compression ring into PISTON ROD GUIDE BUSHING.

STEP 3

Remove tooling from piston.

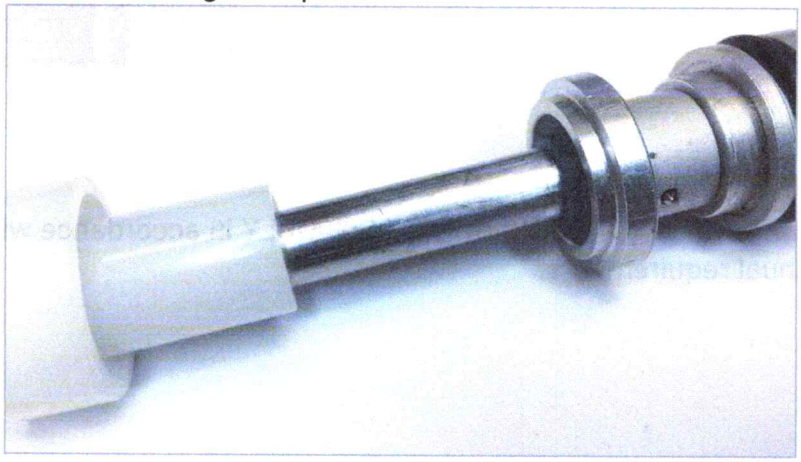
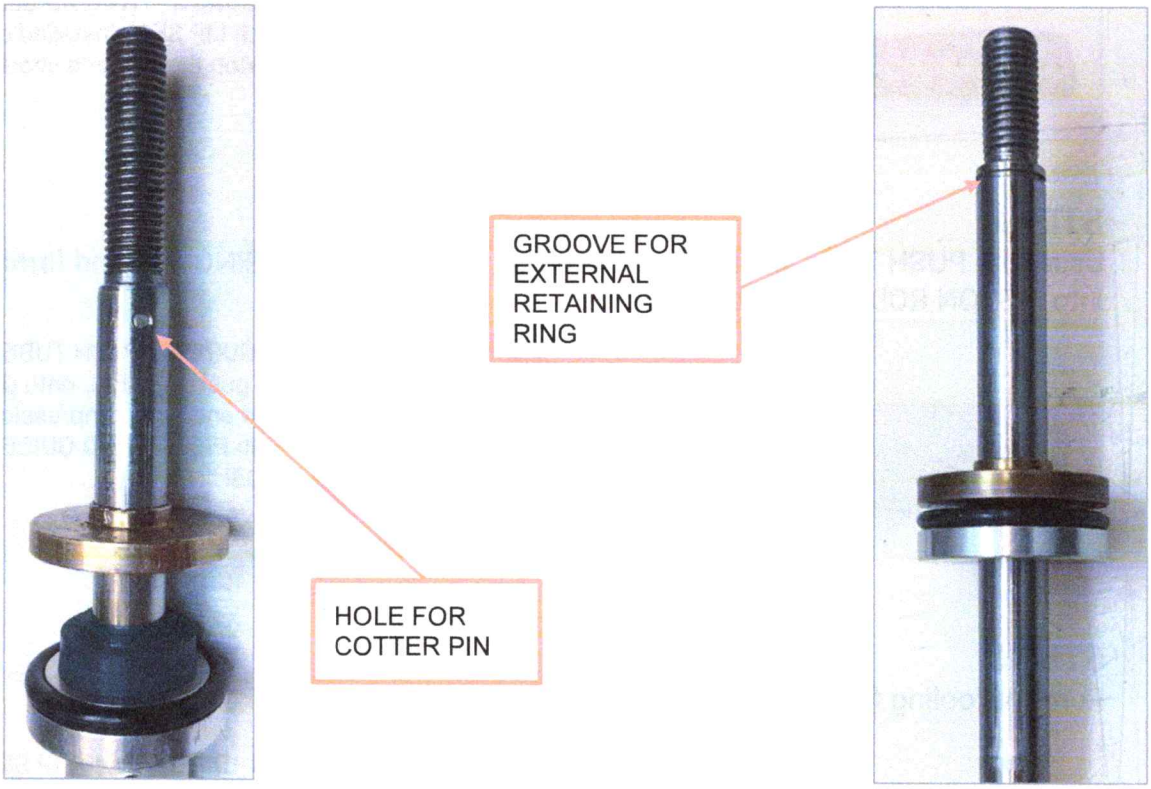


FIGURE 5 – Once LIP SEAL is fully inserted into PISTON ROD GUIDE BUSHING, remove all tooling.

STEP 5

Depending on the piston type, use either the MS24665-132 COTTER PIN or the MS16624-1037 EXTERNAL RETAINING RING and install on piston end. (Ref. Figure below).

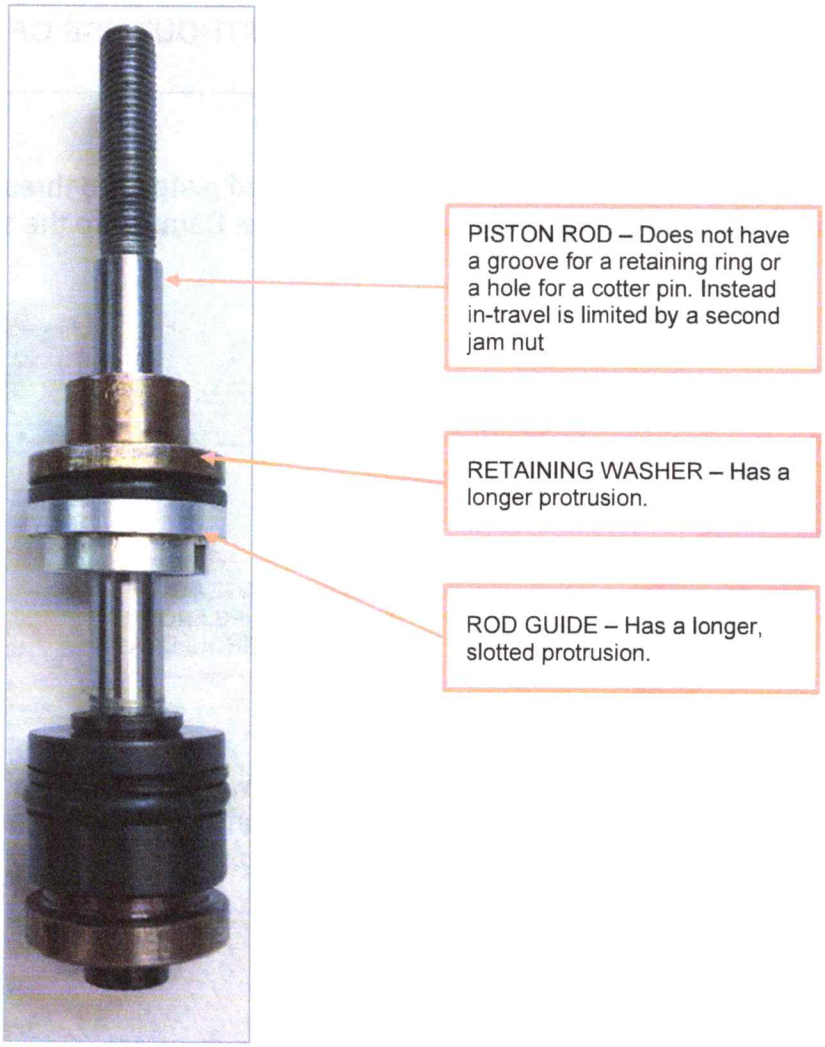


STEP 6

Complete re-assembly of BRAKE MASTER CYLINDER ASSEMBLY in accordance with aircraft maintenance manual requirements.

SECTION 2 – INSTALLATION AND ASSEMBLY PROCESS FOR M-03-1000-3 SEAL KITS

Although similar, there are some unique aspects associated with installation of the M-03-1000-3 kit.



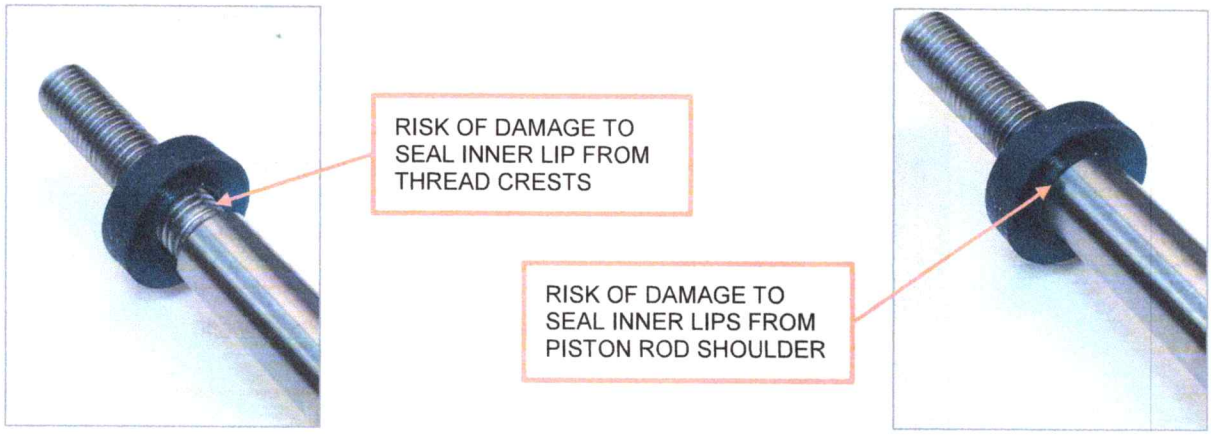
CAUTION

DAMAGE TO THE SEAL MAY OCCUR IF INSTALLED ONTO THE PISTON ROD WITHOUT THE USE OF INSTALLATION SLEEVE.

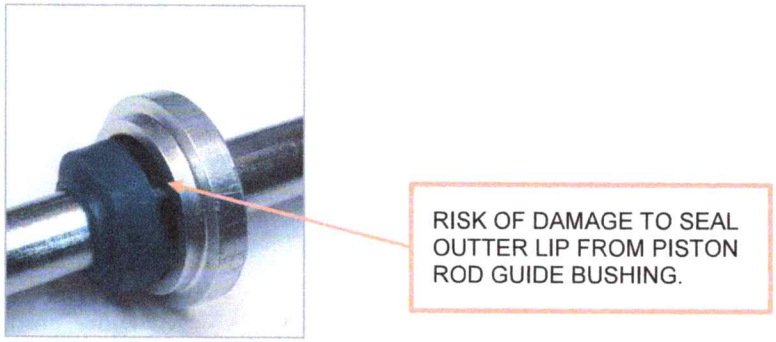
CAUTION

DAMAGE TO THE SEAL MAY OCCUR IF INSTALLED INTO THE PISTON GUIDE ROD BUSHING WITHOUT USE OF COMPRESSION RING.

Attempting to install the Lip Seal over the unprotected piston rod threads and onto the piston rod may result in damage to the seal inner lips. Damage to the seal lips will result in leakage.



Attempting to install the Lip Seal into the Rod Guide without the use of the seal compression ring will be difficult and could cause damage to the outer seal lips. This may eventually cause the seal to leak.



CAUTION

SEAL ORIENTATION IS CRITICAL TO FUNCTION. ENSURE LIPS OF SEAL FACE THE PISTON HEAD.

CAUTION

ENSURE THAT WORK AREA IS CLEAN AND FREE OF ANY DIRT OR DEBRIS.

STEP 1

(a) Install PISTON ROD GUIDE onto piston rod, as shown in Figure 1.

(b) Insert COMPRESSION RING over piston rod and firmly seal it onto stepped end of PISTON ROD GUIDE, as shown in Figure 2.

(c) Install LIP SEAL with THREAD SLEEVE inserted into LIP SEAL bore over threaded end of PISTON ROD. Ensure that THREAD SLEEVE fully covers threads and PISTON ROD shoulder, as shown in Figure 3.

(d) Apply a thin film of hydraulic fluid over piston rod.

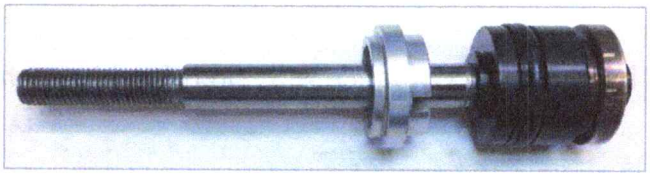


FIGURE 5a – Piston sub-assembly with PISTON GUIDE installed.

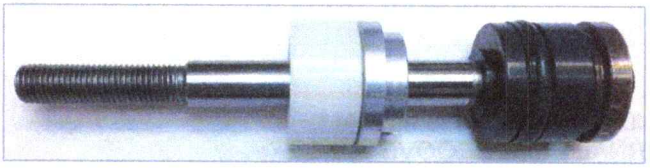


FIGURE 5b – COMPRESSION RING installed onto PISTON GUIDE.

CAUTION

ENSURE THAT SEAL LIPS FACE PISTON HEAD AS SHOWN.

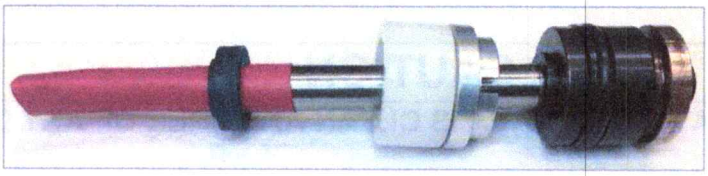


FIGURE 5c – THREAD SLEEVE covering threads and transition with seal in position.

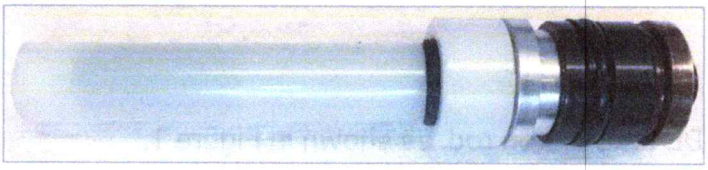


FIGURE 5d – PUSH TUBE, used to push LIP SEAL through compression ring into PISTON ROD GUIDE

STEP 2

Using the PUSH TUBE, push LIP SEAL through COMPRESSION RING into PISTON ROD GUIDE until firmly seated.

STEP 3

Remove tooling from piston.

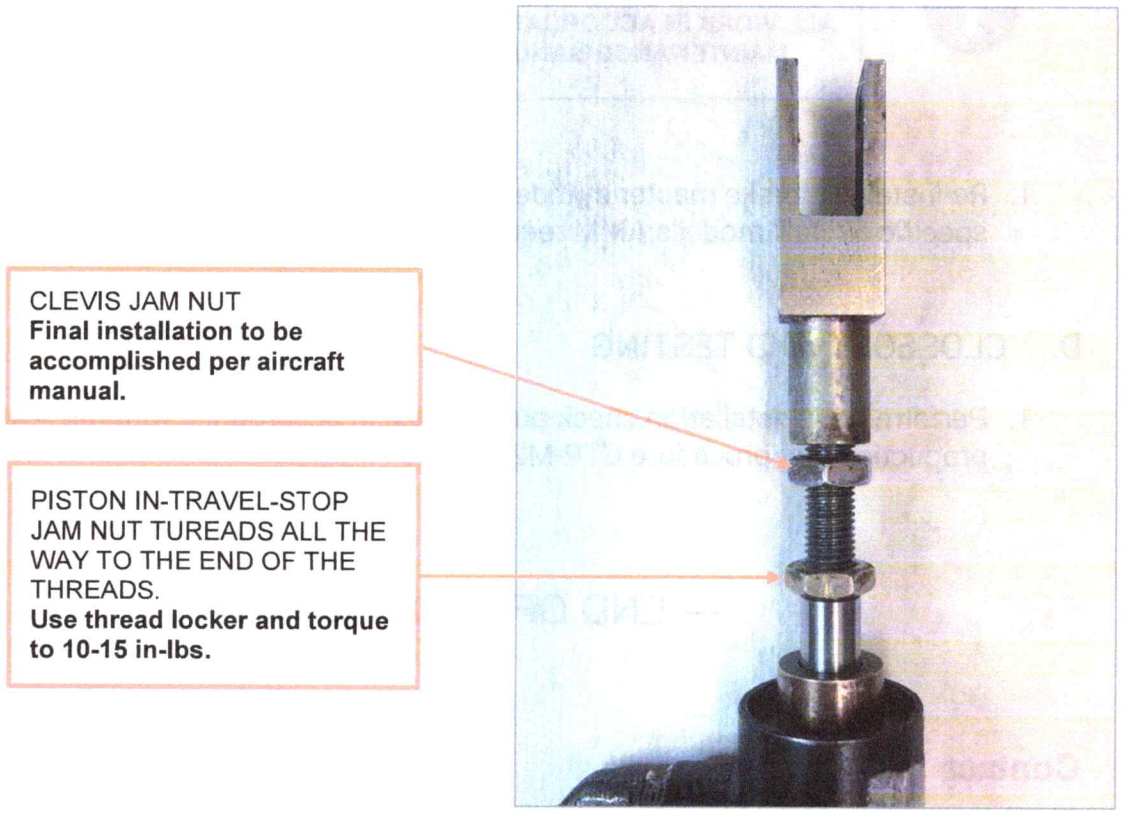
STEP 4

Install Retaining Washer O-ring and back-up in accordance with aircraft maintenance manual requirements.

FIGURE 6 – Retaining washer, with internal O-ring and back-up ring.

STEP 5

Complete re-assembly of BRAKE MASTER CYLINDER ASSEMBLY in accordance with aircraft maintenance manual requirements.



C. BRAKE MASTER CYLINDER RE-INSTALLATION PROCEDURE

NOTE

PREPARE THE AIRCRAFT FOR MAINTENANCE AND PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE AIRCRAFT MAINTENANCE MANUAL PROCEDURES AND STANDARD PRACTICES.

1. Re-install the brake master cylinder on the aircraft and adjust in accordance with the specific aircraft model's AMM requirements and procedures.

D. CLOSEOUT AND TESTING

1. Perform post installation check-out and test in accordance with MB Aviation production test procedure GTP-M20001-1.

— END OF PROCEDURE —

Contact

For additional information regarding the installation, servicing or other general inquiries contact Marsh Brothers Aviation:

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