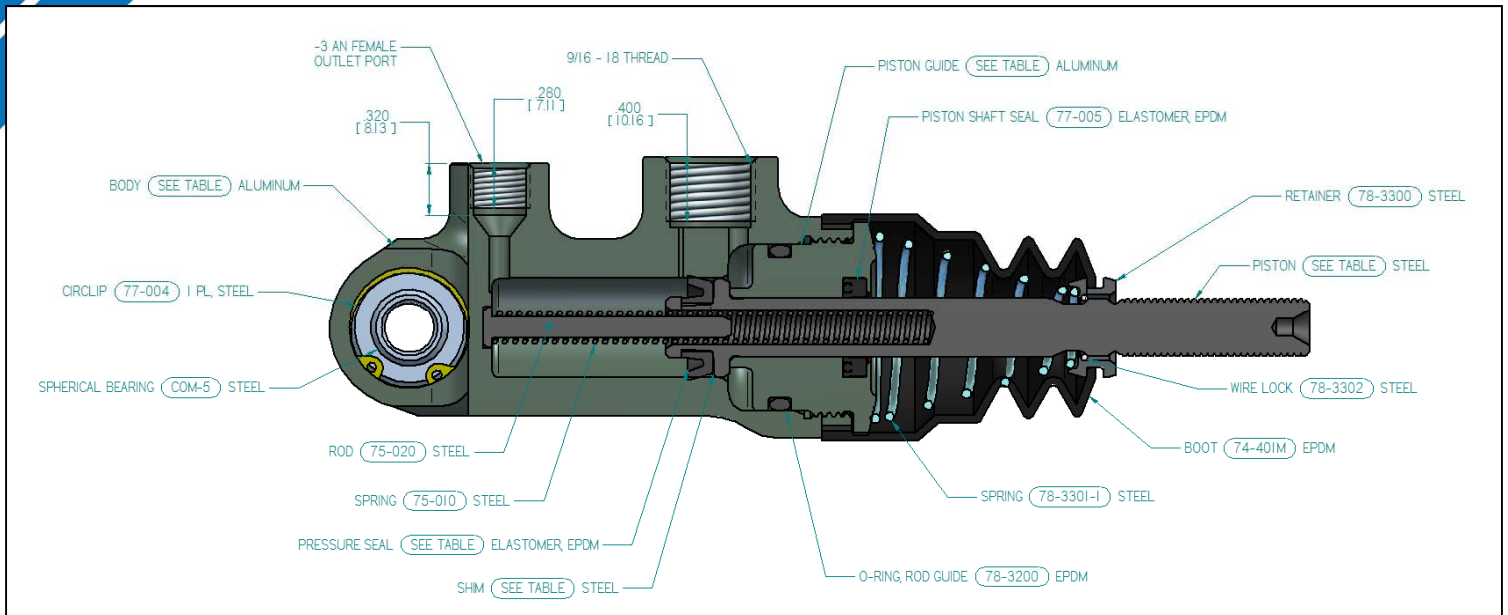


# TILTON 78 SERIES MASTER CYLINDER REBUILD INSTRUCTIONS



## DISASSEMBLY:

- 1.) In a vice with aluminum soft jaws, firmly clamp the parallel flat sides of the master cylinder Body around the Spherical Bearing.
- 2.) Remove any fittings or plugs from the ports.
- 3.) Remove the Rubber Boot (74-401M) by pulling it off of the Piston Guide and Piston Push Rod.
- 4.) Compress the conical Compression Spring (78-3301-1) and Spring Retainer (78-3300) to expose the Wire Lock Ring (78-3302).
- 5.) Expand the Wire Lock Ring and remove from the Piston Push Rod.
- 6.) Remove the Spring Retainer and Spring.
- 7.) Using a 1.25" deep socket, loosen the Piston Guide (78-31X) (hex shape, right hand threads).



**[NOTE: Piston Guides are made in incremental lengths and used specifically to set the cutoff port travel. Keep components from each master cylinder as a matched set. Cutoff port travel .030-.050" and documented on the label decal on bottom of units.]**

- 8.) Completely unscrew the Piston Guide from the Body. Be careful near the last thread, as an internal spring will push the assembly apart.
- 9.) Remove Body from vice and using snap ring pliers remove the internal Snap Ring (77-004) and press out Spherical Bearing (COM-5).
- 10.) Using a right angle pick, remove the main Pressure Seal (7X-31X) from the Piston (Take care not to damage or lose the thin shim washer behind main pressure seal).

11.) Using the same pick or similar tool remove the 77-005 Piston Guide Seal (77-005) and larger O-ring (78-3200) from the Piston Guide. Do not scratch seal glands when removing.

12.) Discard of the following parts:

- 77-004 Snap Ring (1)
- COM-5 Spherical Bearing (1)
- 7X-31X Pressure Seal (1)
- 77-005 Piston Guide Seal (1)
- 75-010 Internal Compression Spring (1)
- 75-020 Rod, Spring Guide (1)
- 75-06X Shim Washer
- 78-3200 O-ring (1)
- 78-3302 Wire lock ring (1)

#### CLEANING / PREPARATION

- Be careful not to scratch remaining parts, clean in aqueous parts washer or equivalent. It is ok to use shop air to dry and blow off components.

1) Inspect the 3 small holes in the head of the Piston Push Rod for debris. Use a small pick or drill bit to clear the holes if necessary.

2) Inspect the deep hole in the center of the Piston Push Rod.

3) Wipe any remaining residue from all features of the Piston Push Rod.

4) If necessary, clean any oil from the master cylinder Body. Use NEW Simple Green or Alcohol because any grit in the cleaning solution may plug the very tiny holes in the Master Cylinder Body.

5) Remove any residue from the bore that receives the Spherical Bearing and Snap Ring.

#### ASSEMBLING THE MASTER CYLINDER:

1) Apply a small drop of sleeve retainer (Loctite 609 or equivalent) to the OD of the Spherical Bearing 180° away from the lubrication hole.

3) Press in the Spherical Bearing until seated against the shoulder and install the Snap Ring.

4) Lightly apply rubber grease to the head and seal groove of the Piston Push Rod.

5) Place the thin Shim on the head of the Piston followed by the Pressure Seal. Make sure the ID of the Pressure Seal is fully seated in the small diameter area of the Piston. You may need to work the ID edge of the seal down with your fingernail.

6) Check that the thin Shim is centered on its register on the Piston.

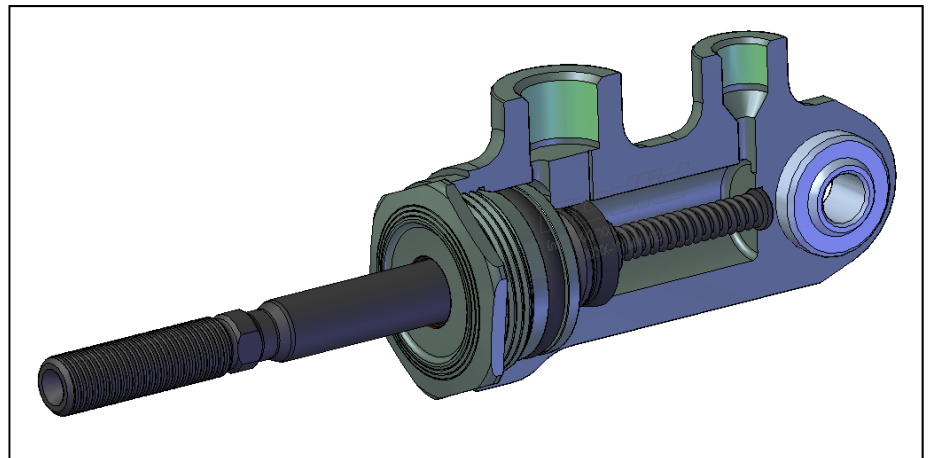
7) Install the 77-005 Seal into the Piston Guide by folding the seal into a kidney shape and inserting into the bore. The seal is a loaded U cup and should be positioned so that the U shape is open towards the inside of the bore with the o-ring. (Note, o-ring comes preinstalled into the U cup seal to energize the sealing lips.) Rubber grease will help the installation. Make sure it is fully seated and that the o-ring did not move out of position.

8) Install the outer O-ring onto the Piston Guide.

9) Slide the Piston Guide onto the piston push rod until the tip is at the 77-005 seal. Thread the Piston Guide and Seal onto the Piston Push Rod so that the Seal lip does not get damaged. Once past the threaded section, push the Piston Guide down onto the Push Rod shaft.

10) Insert the Rod and Spring into the drilled counterbore in the Piston Push Rod, leaving it hanging part way out.

11) Lightly apply rubber grease to the Pressure Seal and Piston Guide O-ring. Gently insert the Piston into the Body. As you do so, make sure the Spring and Rod are registered by the counter bore at the bottom of the Body bore.



12) Hand tighten the Piston Guide into the Body. If the Piston Guide will not thread down, check the alignment of the Spring and Rod in the counterbore of the Body.

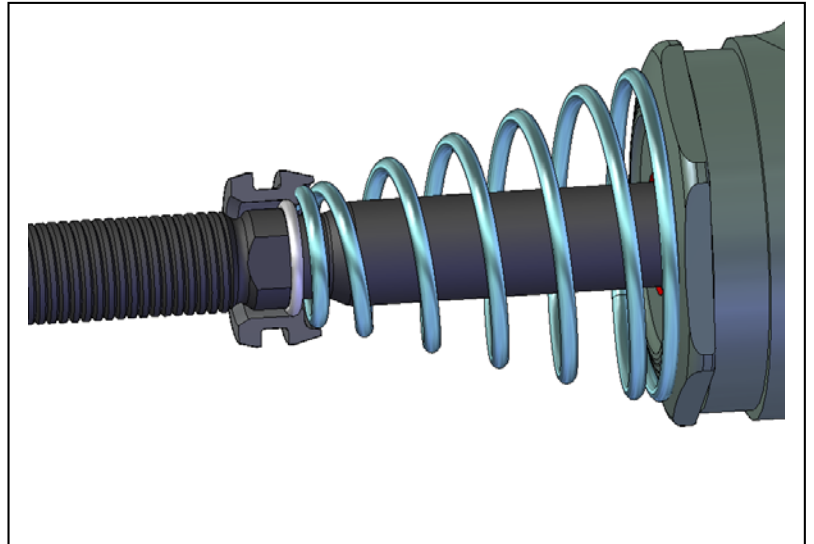
13) Torque the Piston Guide to 20 ft-lbf.

14) Confirm that the Piston Push Rod moves in and out freely.

15) Apply rubber grease to the Piston Push Rod shaft. (Boot will cover and retain this grease.)

16) Install the Conical Compression Spring and Spring Retainer (note direction) onto the Push Rod.

17) Expand the Wire Lock Ring and install over the Piston Push Rod shaft. Compress the Spring and Retainer down past the second groove and wrench flats on the Piston Push Rod shaft. Squeeze the Wire Lock Ring into a closed circle shape and compress/guide it into the counterbore ID of the Spring Retainer. The Wire Lock Ring should register against the taper of the groove past the wrench flats.



18) Install the Rubber Boot onto the shaft and over the Spring and Spring Retainer. Stretch the large end of the Boot over the hex of the Piston Rod Guide. Stretch the ID of the Boot and register it into the groove on the Spring Retainer.

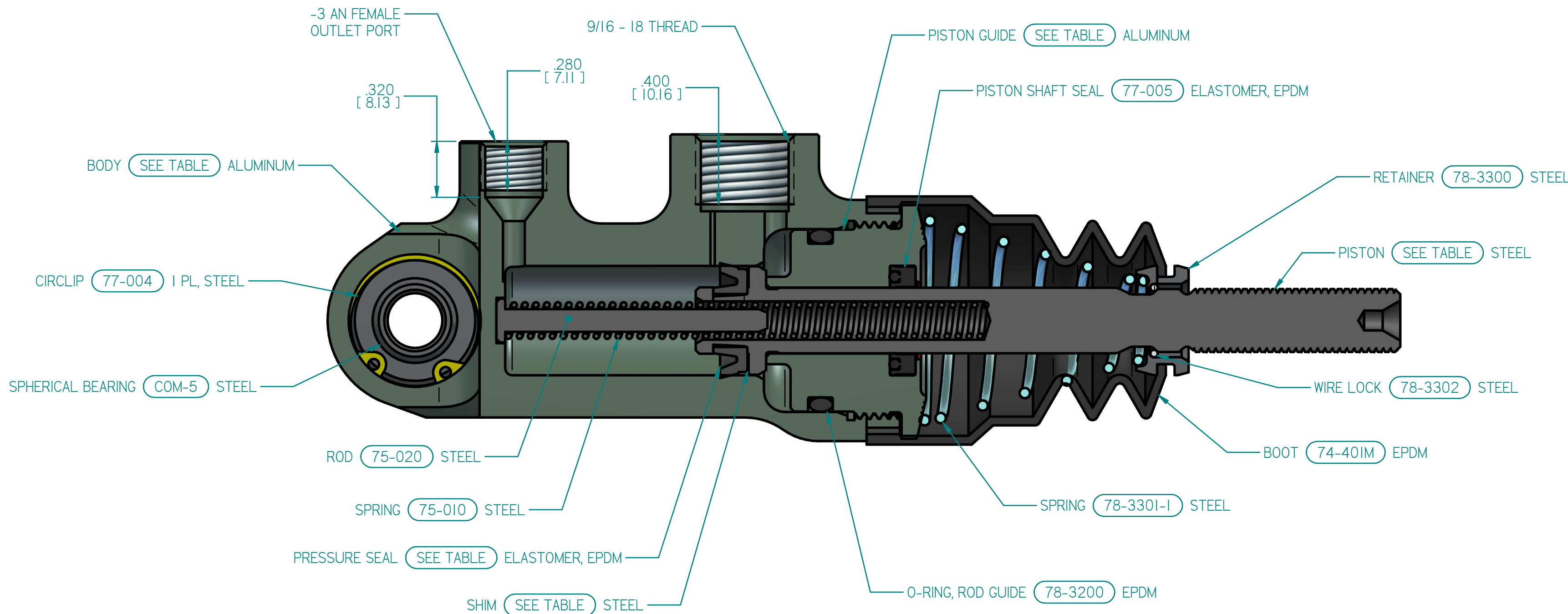
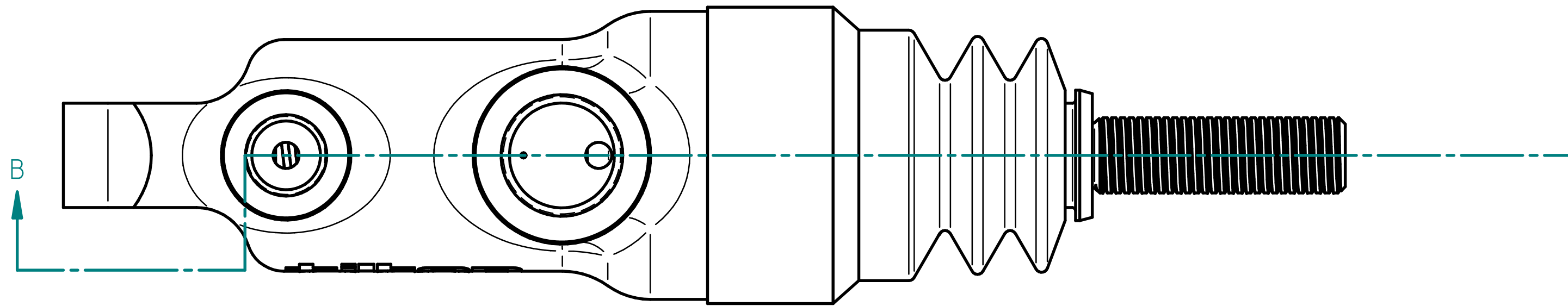
19) Confirm that the Piston Push Rod compresses and extends.

20) Apply new sticker decal and label as desired. Sticker has clear cover flap that can be applied over the users written notes once flap backing is peeled off. (Sticker decal may be trimmed to fit as desired)

PARENT PART NUMBER	BODY P/N	PISTON GUIDE P/N	SHIM P/N	PISTON P/N	PRESSURE SEAL P/N
78-625	78-110	78-314	75-060	77-210	75-310
78-700	78-111	78-314	75-061	77-211	79-311
78-750	78-112	78-313	75-062	77-212	75-312
78-812	78-113	78-314	75-063	77-213	75-313
78-875	78-114	78-313	75-064	77-214	75-314
78-937	78-115	78-315	75-065	77-215	75-315
78-1000	78-116	78-313	75-066	77-216	75-316

ZONE	CHK'D	DATE	REV	ECN	CHANGE OR ADDITION

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SECTION B-B

NOTES:

1. DIMENSIONS AND TOLERANCES PER ASME Y14.5 - 2009
2. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES [MM].
3. MASS = 201 GRAMS, .443 LBM (78-625).

TILTON ENGINEERING, INC.		FAX 805/688-2745	
25 EASY STREET, P.O. BOX 1787, BUELLTON, CA 93427 805/688-2353			
TITLE: <b>78 SERIES M/C PRODUCTION ASSEMBLY DRAWING</b>			
ALL BORE SIZES			
DRAWN BY <b>LUND</b>	CHKD <b>WAHL</b>	SCALE <b>2 : 1</b>	SIZE <b>DWG</b>
P/N <b>SEE TABLE</b>	DATE <b>3/15/2016</b>	SHEET <b>1 OF 2</b>	REV <b>C</b>

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ZONE	CHK'D	DATE	REV	ECN	CHANGE OR ADDITION
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D

C

B

A

-3 AN FEMALE  
OUTLET PORT

.375  
[9.52]  
SPHERICAL BEARING WIDTH

Ø .142  
[36.07]

-4 AN MALE INLET PORT  
TILTON 77-015 FITTING AND  
CRUSH WASHER KIT SHOWN  
OPTIONAL, SOLD SEPARATELY

2.57  
[65.17]

Ø .312  
[7.94] THRU  
SPHERICAL BEARING

3/8 x 24 THREAD

1.755  
[44.58]

**tilton**  
PIN: XX-XXX XXXX D004mm  
S/N MMYY-XXXX

1.17  
[29.73]

.50

5.64  
[143.15] AT REST  
1.06 [26.9] MAX STROKE

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ALL BORE SIZES					
DRAWN BY	LUND	CHKD	WAHL	SCALE	2 : 1
P/N	SEE TABLE	DATE	3/15/2016	SHEET	2 OF 2
SIZE	C	DWG	6320	REV	C

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