MARA PRO PIGGYBACK 250 HOUR COMPLETE SERVICE GUIDE

MANITOU

MANITOU

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WARRANTY

For full warranty information please visit
hayesbicycle.com/warranty

INTRODUCTION

This manual is intended to provide the information necessary for the 250 hour full service of the Manitou Mara Pro PiggyBack shock. We highly recommend installation and service be performed by a qualified mechanic. These instructions can be downloaded from the Hayes Performance Systems website at www.manitoumtb.com

⚠ WARNING ⚠

We highly recommend that service be performed by a certified bicycle mechanic. Failure to follow instructions presented in this manual could lead to serious injury or death. Any questions about the servicing of this shock or the manual itself should be directed to Hayes Customer Support at:

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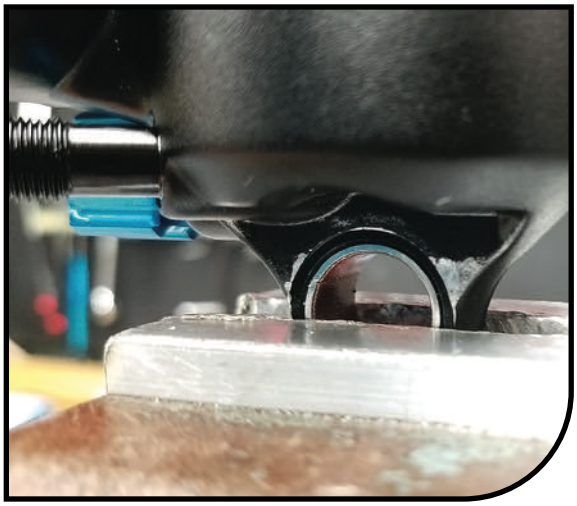
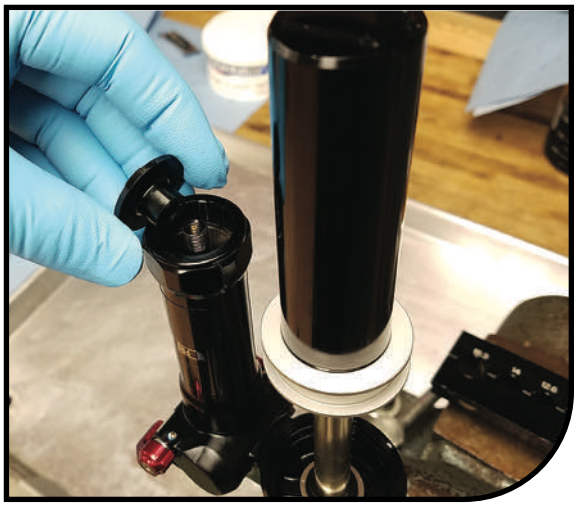
SHOCK TEARDOWN

Air Can removal and service is outlined in the 50 hour service guide. This guide assumes those steps have been completed

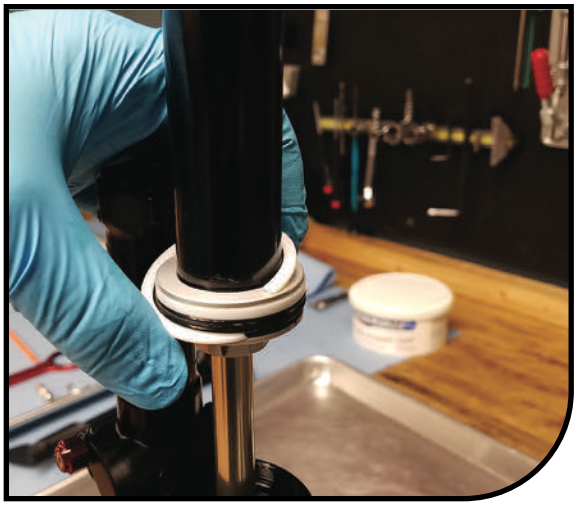
1 Clamp upper eyelet of shock in vise. If Trunnion shock, clamp on trunion mounts. (Use soft jaws to not damage the shock)



2 Remove the Piggyback Reservoir cap by unthreading it counter-clockwise.

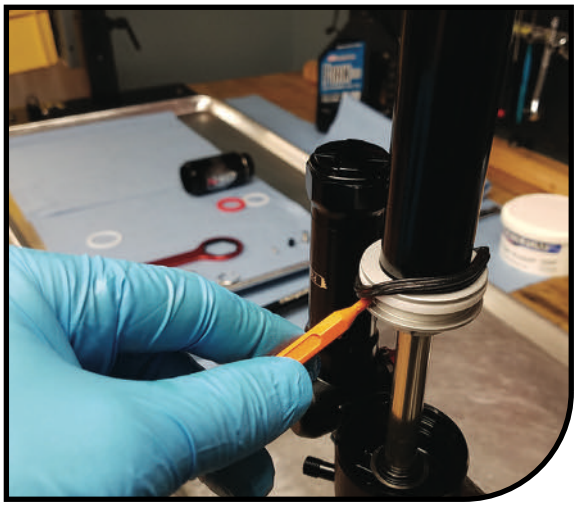


3 Remove split ring from the main air piston.

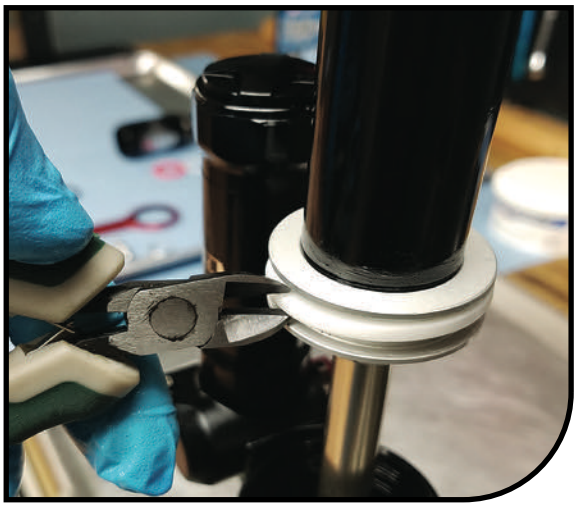


SHOCK TEARDOWN

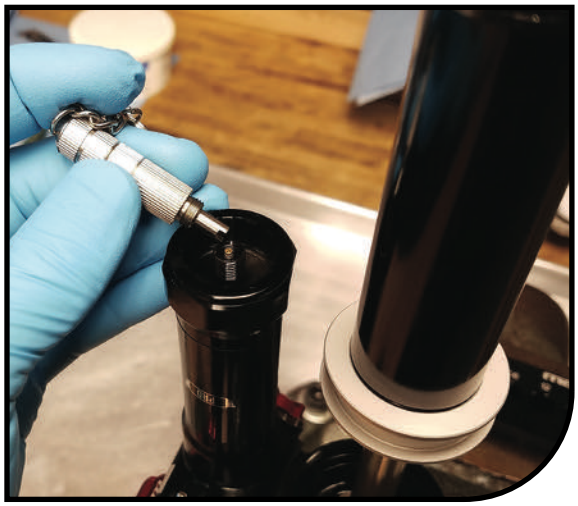
4 With a plastic pick remove quad-ring seal.



5 A small side-cutter can be used to first partially cut the large piston ring, then break it to remove. Be careful not to damage the groove. Only remove and replace glide ring if wear is present. Ring must be sized appropriately after installation.



6 Thread on shock pump, using the pump's pressure release button, release all air. Then depress Schrader valve with a small tool a few times to ensure all air is released. Remove the valve core.

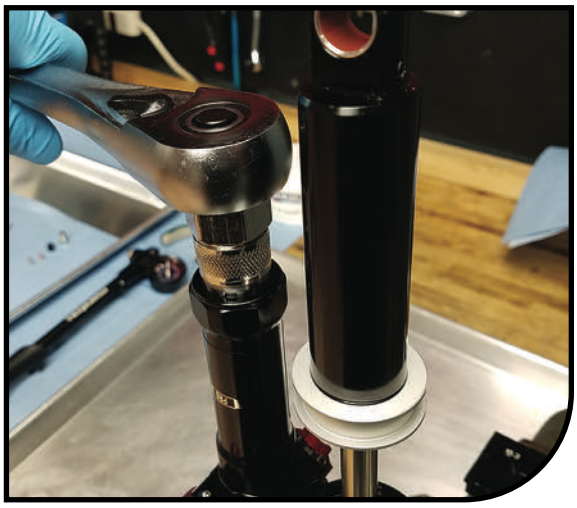


SHOCK TEARDOWN

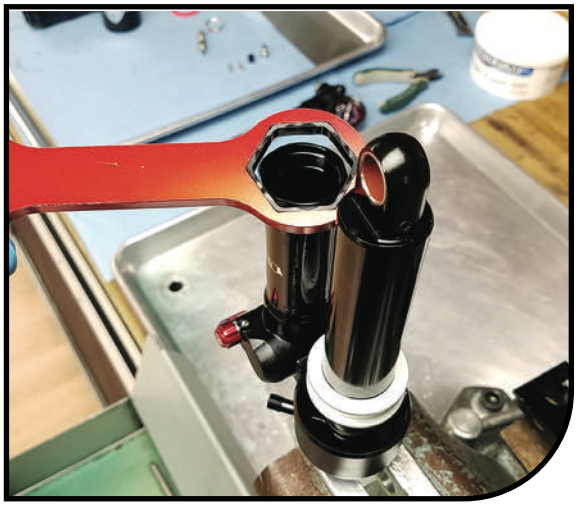
CAUTION

Do not proceed to the next step without completely depressurizing reservoir.

7 Use a freewheel removal tool (example: Park Tool FR-1) to remove the Reservoir End Cap.



8 Remove reservoir.
- Short Wide Reservoir use air can wrench 142-37512-K046
- Short / Long reservoirs use air can wrench 142-37512-K033 or 30mm wrench.

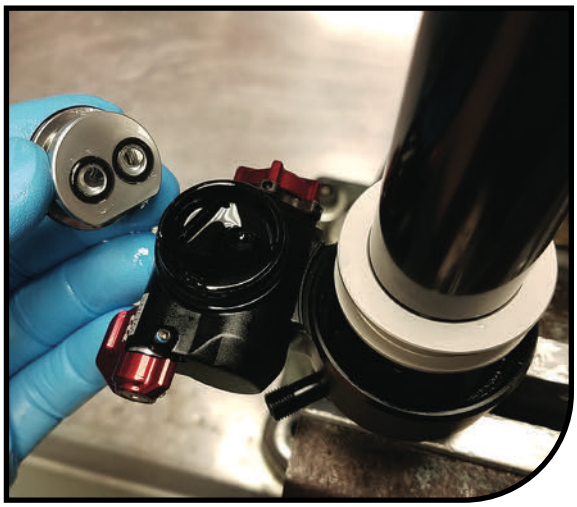


SHOCK TEARDOWN

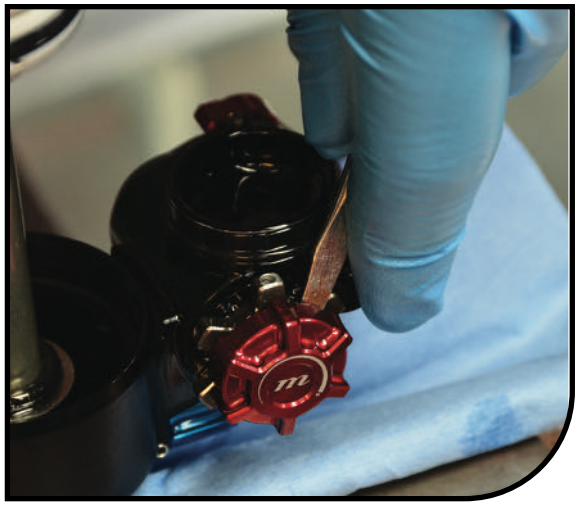
9 The rubber internal floating piston (IFP) will be inside the reservoir. Remove the piston towards the hex end of the reservoir, note orientation and set aside. Removing the IFP in the other direction may damage the seals on the threads. (IFP is replaced during a full service.)

Note: Short and wide reservoir uses AL IFP
Short and Long reservoirs (Mara DH) use SKF IFP

10 The shock's lock-out piston will be visible at this point, carefully remove this assembly and set aside on a lint-free rag. Be sure to account for the rubber face seal which may still be in the top cap when assembly is removed.

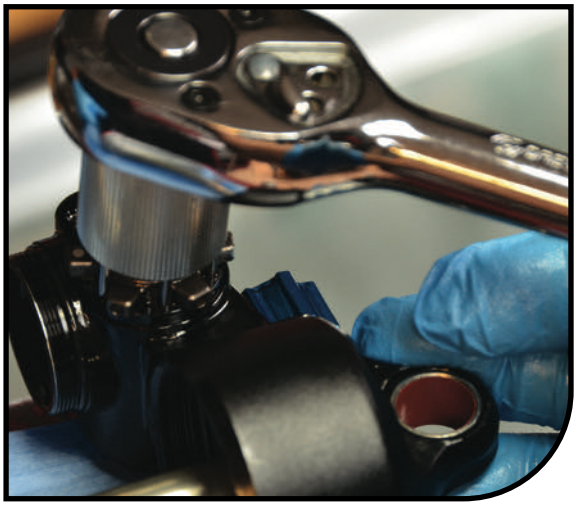


11 Using a small flathead screw driver, gently pry up to remove the red LSC knob. Be careful when removing this knob, underneath are two detent balls and springs. Pull these out and set aside, remove the O-ring used to retain the LSC knob.



SHOCK TEARDOWN

12 Rotate the HSC so the points of the star pattern expose the spanner holes in the adjuster housing underneath. Using the Compression Assembly Pin Spanner (PN 142-37512-K031), engage the pins past the HSC adjuster into the holes in the adjuster housing. Turn counter-clockwise to unthread and remove compression adjuster assembly.

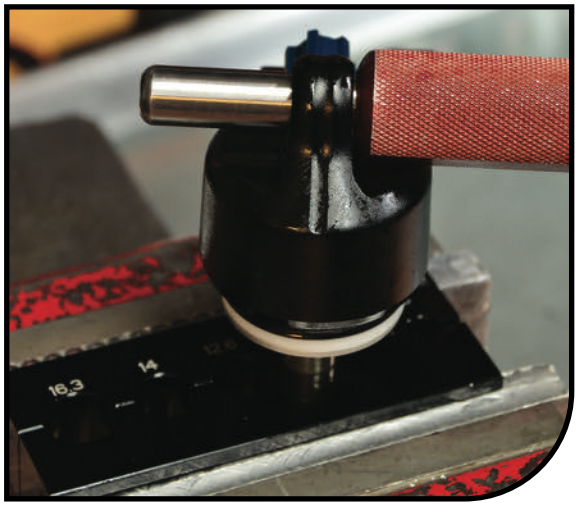


13 Hold the bottom eyelet in a vise, and place a drip pan under the shock. Using a 21mm wrench, remove the air piston from the damper body.

14 Remove shock from vise and pour oil into catch pan. Cycle shock to allow oil to drain.

SHOCK TEARDOWN

15 Place the main shock shaft into the 12mm Manitou clamp block. Using an eyelet tool such as a pin wrench or an adjustable wrench accross the flat turn the top cap counter clockwise to release the top cap from the main shock shaft.



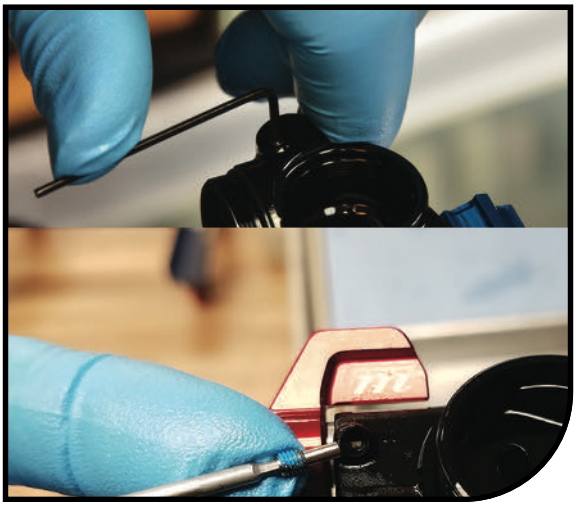
16 Remove top cap, any travel spacers, washer and or ring.

Note: see page 38 for travel spacer orientation. If full service is not neccesary, only changing the stroke / travel skip to page 27 for re-assembly.

TOP CAP SERVICE

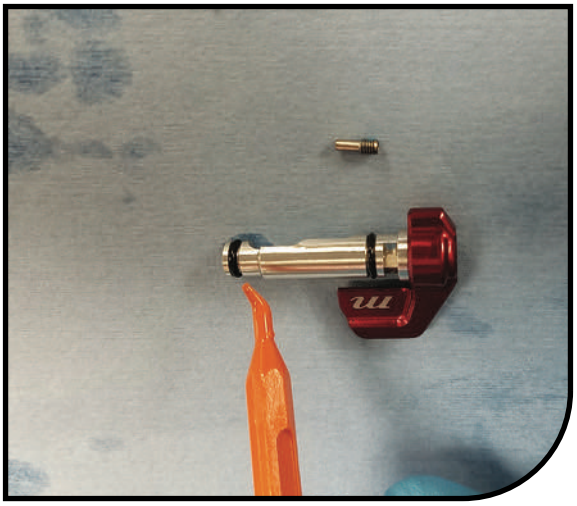
1 Remove the Lock-Out detents by using an M1.5 hex tool, and unthread the small set-screw on the end near the compression adjuster. Flip the shock over and tap, or use a small pointed tool to aid in removing the spring and ball. Next, remove the set-screw/retaining pin near the red Work/Party lever.

NOTE: Skip for Mara DH.

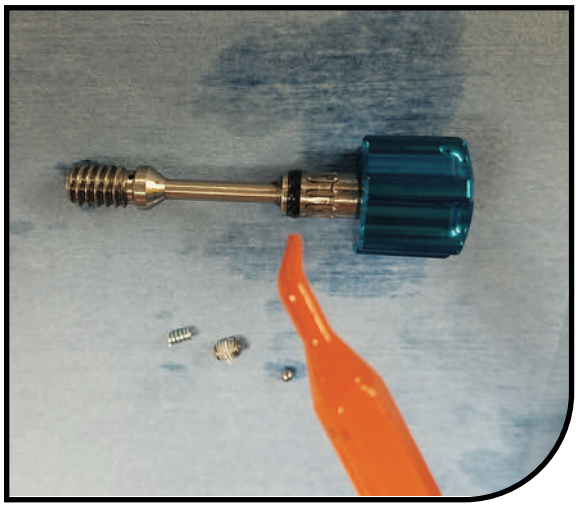


2 Remove the lockout lever assembly by gently sliding it out. Remove the two O-rings. Clean the spool with isopropyl alcohol. Install new O-rings (the Larger 101-600 close to the lever, and the smaller 101-500 near the end.)

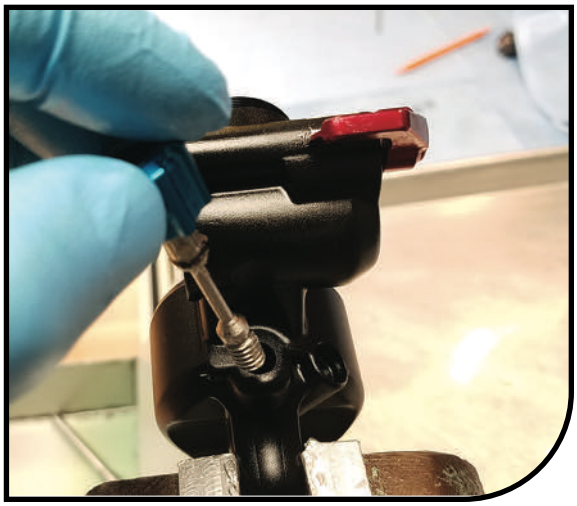
NOTE: Skip for Mara DH.



3 Remove the M1.5 set screw under the rebound adjustment knob. Remove the spring and detent ball. Remove the rebound adjuster by turning clock-wise (left-handed thread). Remove O-ring and clean the adjuster with isopropyl alcohol. Install a new O ring (101-450) and set aside. *Requires main shaft to be separated from top cap*



TOP CAP SERVICE

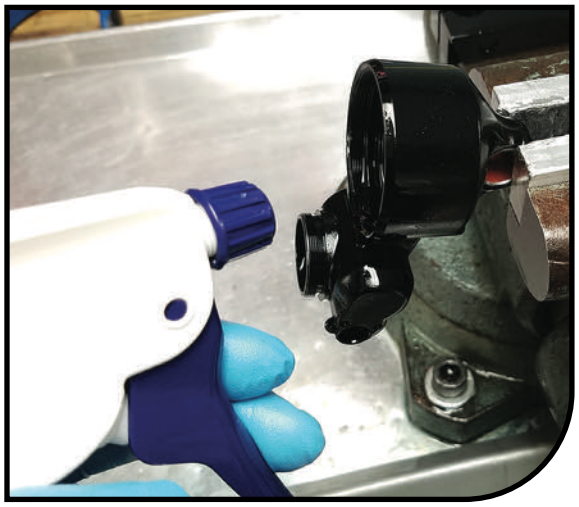


4 Remove main shaft O-ring, air can O-ring and reservoir O-ring from the top cap.

5 Remove valve stem with a 3mm hexwrench.

TOP CAP SERVICE

6 Thoroughly clean topcap, spraying isopropyl alcohol into all ports and passageways. Allow to air dry or blow out with clean compressed air.

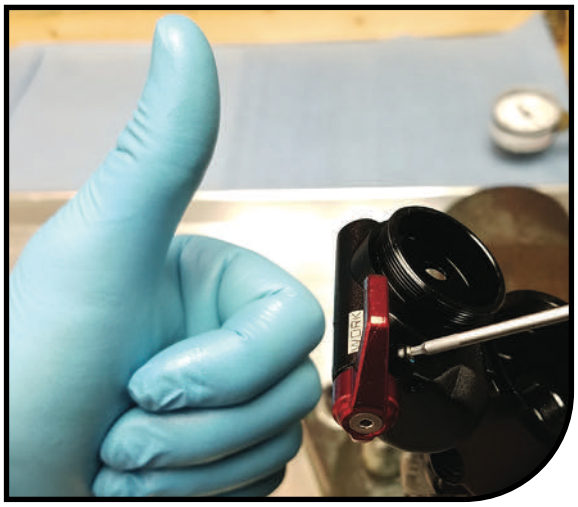


7 Replace O-Ring (101-550-100), apply small drop of blue Loctite to the valve stem threads. Reinstall valve stem into top cap torque to 2.3-2.7Nm (20-24 INlbs) Reinstall valve core.

8 Install reservoir O-ring (101-2600-150), main shaft O-ring (100-013) and air can O-ring (101-4100-200).

TOP CAP SERVICE

9 Grease O-rings, reinstall Work/Party assembly into the top cap. Install retention pin, check for full movement of the Work/Party lever by adjusting the depth of the retention pin. Such that the lever flips just past the word “WORK”.

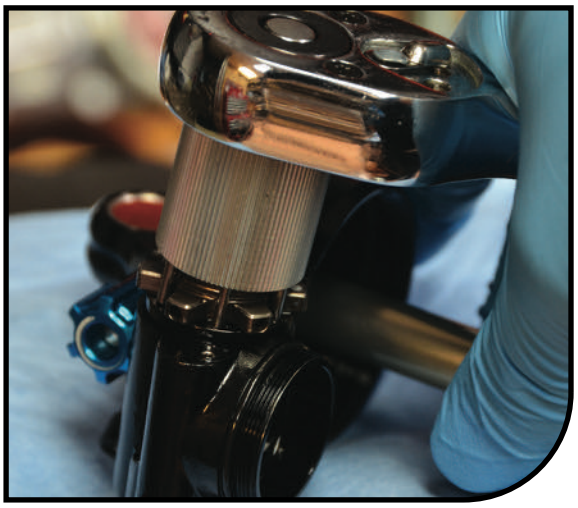


10 Apply a dab of grease to the O-ring, ramped surface and thread on the rebound adjuster. Insert into top cap, rotate counter-clockwise to engage the left handed thread. Turn until it lightly bottoms. Reinstall spring and detent ball.

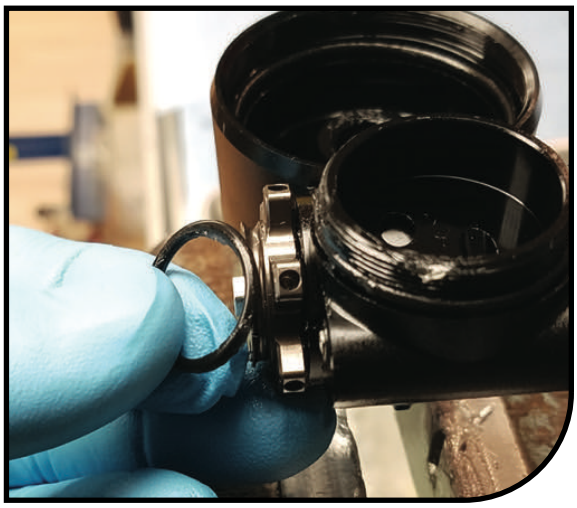
11 Replace the O-Ring (101-1600-0180) on the HSC Piston. Replace the O-Ring (100-018) on the compression cartridge body (above threads at the flange). Grease both O-Rings.

TOP CAP SERVICE

12 Install the compression assembly into the top cap. Use the compression assembly Pin spanner tool (142-37512-K031) and torque to 5.7Nm (50 in-lb).



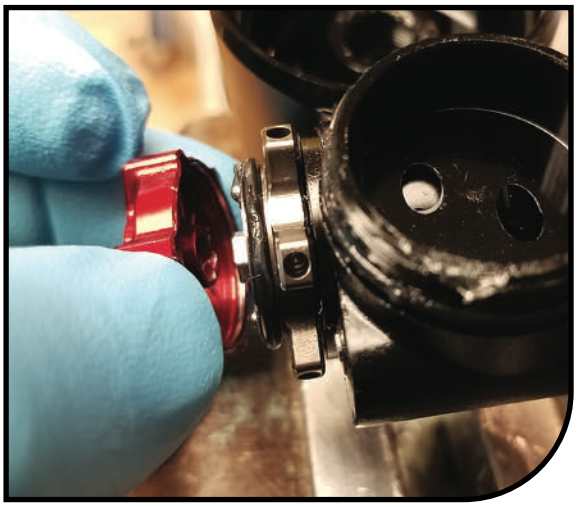
13 Lightly grease O-ring (PN 100-016) and install on the HSC compression adjuster.



14 Use this procedure to install detent and spring for lockout, rebound and LSC knob. Install detent spring using a tool and a dab of grease to help hold the spring in place. Repeat procedure with detent balls.

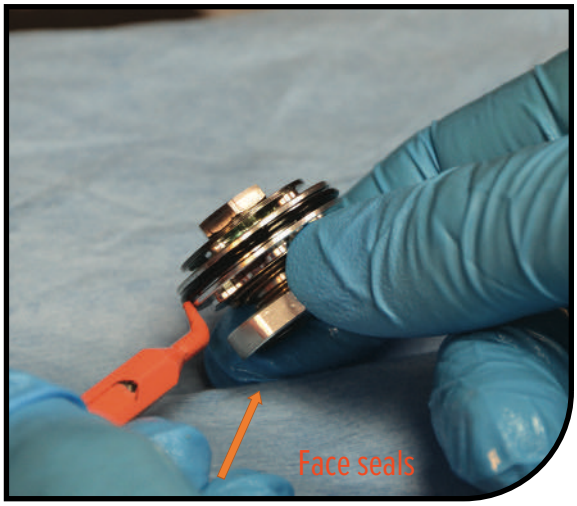
TOP CAP SERVICE

15 Reinstall LSC knob by pushing straight down to not disrupt the detent balls.

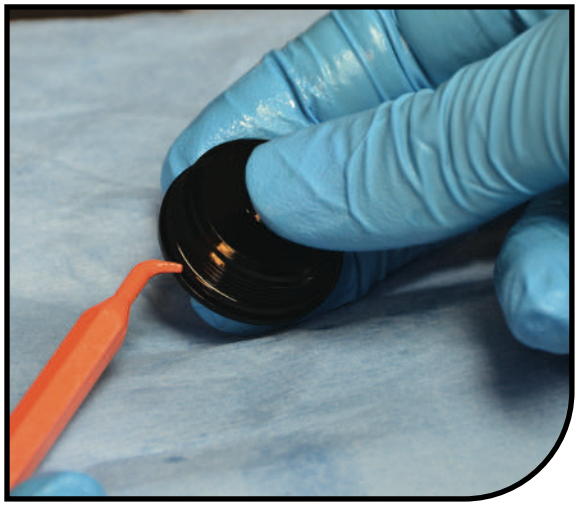


16 Remove the O-ring (101-2300-150) from the lock-out piston assembly. Remove face seals if still in place. Clean assembly with Isopropyl alcohol. Install new piston O-ring and new face seal(s). O-ring type face seals (2pc) (101-700-110) or figure 8 type seal (08-37751) depending on the seal gland available. Lockout will be installed at the time of oil fill.

Note: Use grease to hold face seals in place.



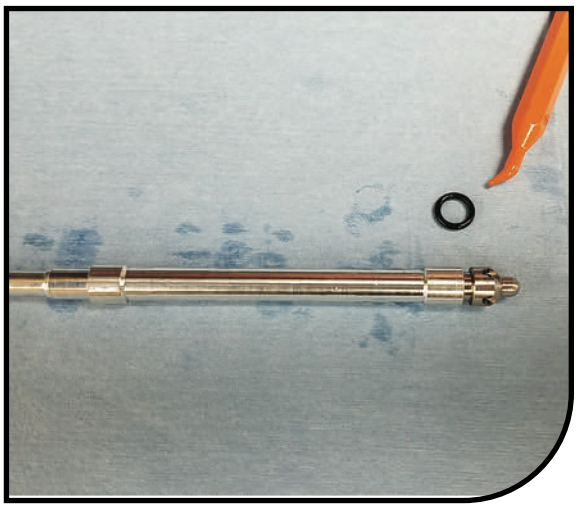
17 Remove O-ring (100-021) from the reservoir end cap. Clean end cap with Isopropyl alcohol. Install new O-ring and apply grease. Set aside on a clean, lint free rag until needed after the oil fill process.



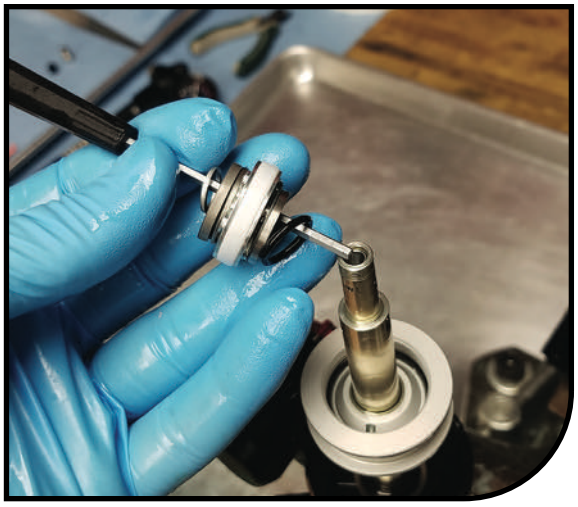
SHAFT SERVICE

1 Remove the rebound needle (inner piece with rounded head) from the main shaft by gentle pulling it up. Be aware of the spring and any shims that may be present at the bottom of the rebound needle.

2 Remove O-ring (101-600) from the rebound needle. Clean needle with Isopropyl alchohol. Replace the O-ring (101-600) on the rebound shaft. **DO NOT** grease this O-ring! Function and assembly is better without grease.

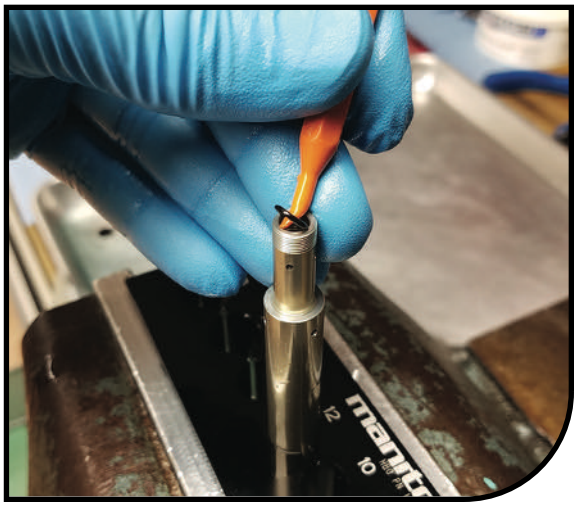


3 Clamp the main shaft in the 12mm Manitou Clamp Block (PN 172-31464) Remove the piston nut from the shaft with a 16mm socket wrench. Carefully slide the shims and piston onto a small tool like an O-ring pick or screw driver to preserve the sequence of components. Carefully set aside.



SHAFT SERVICE

4 Remove inner shaft O-ring.

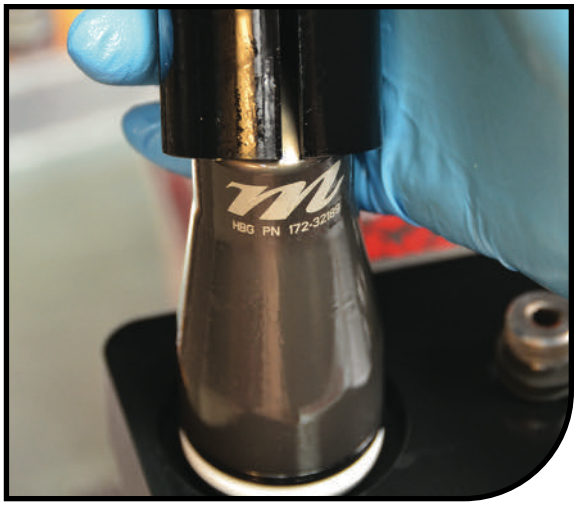


5 If the service warrants replacement of bushings within the air piston, use a ½-13 UNC bottoming tap and the Manitou clamp block to remove the bushings. (See Manitou Air Piston Bushing and Seal Tool instructions for information)

SHAFT AND AIR PISTON ASSEMBLY

1 Place the air piston into the first pocket of the service block. Grease the outside of the bullet tool and place it on top of the piston. Use the Air Piston Seal Pusher Tool (PN 172-32189-K001) to install the glide ring onto the air piston.

Note If bullet tool is not available see “50 hour air can and piston service guide” for alternative method of replacing the seals. If using this method the air piston will need to be installed on the main shaft. It is recommended this would be done after the full service is complete. Please skip to step 5 if using the alternative method

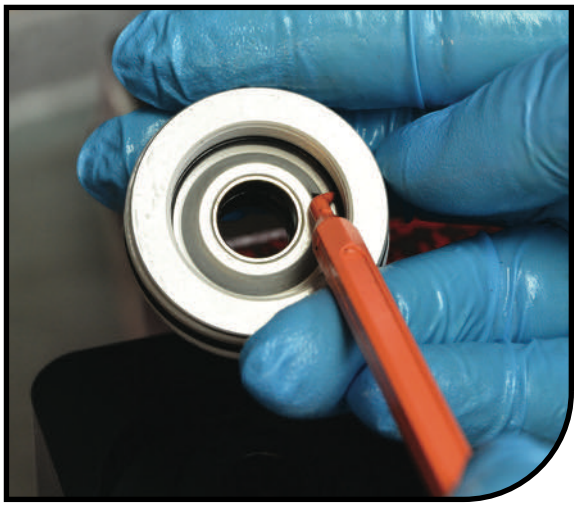


2 Grease new air piston quad seal (08-30017) and use the seal pusher to install onto the air piston.

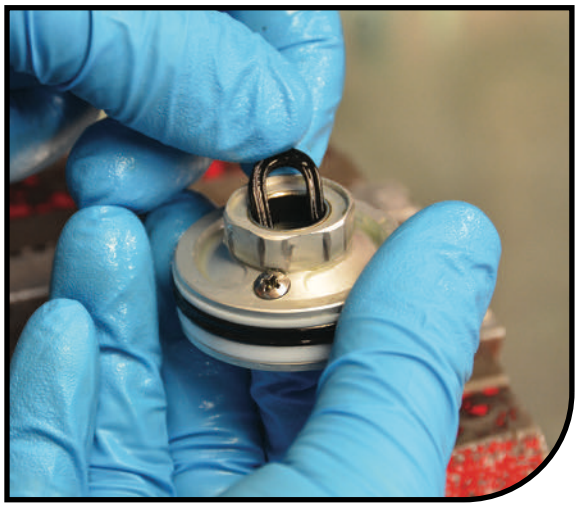
3 Install the Split Ring (08-30718) onto the air piston.

SHAFT AND AIR PISTON ASSEMBLY

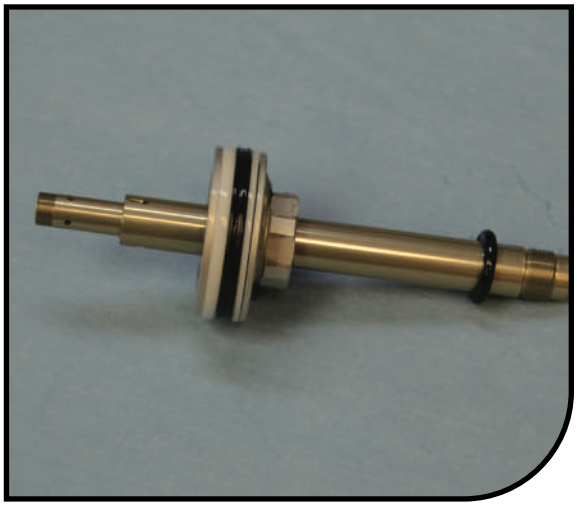
4 Replace the O-Ring (101-2600) in the bottom of the air piston.



5 Grease new shaft Quad Ring (110-112) and install into the air piston. Ensure it is not twisted. Note: Air Piston Service Tool can be used for this step. The peg on the end acts as a stop for installing the seals in the piston.

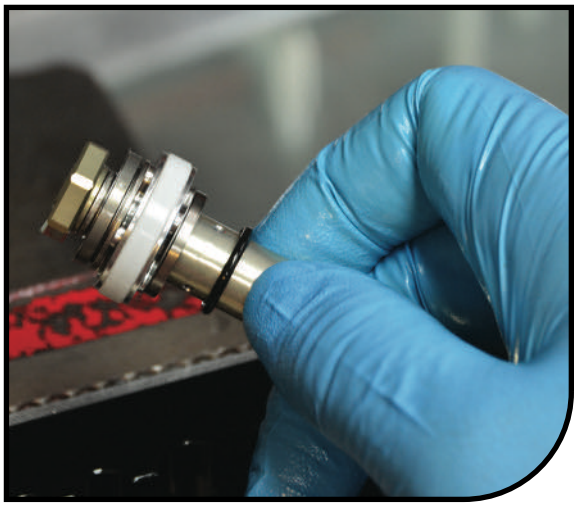


6 Grease the mainshaft. Using the shaft seal bullet tool (142-37512-K040), slide the air piston on at the damping-end of the shaft



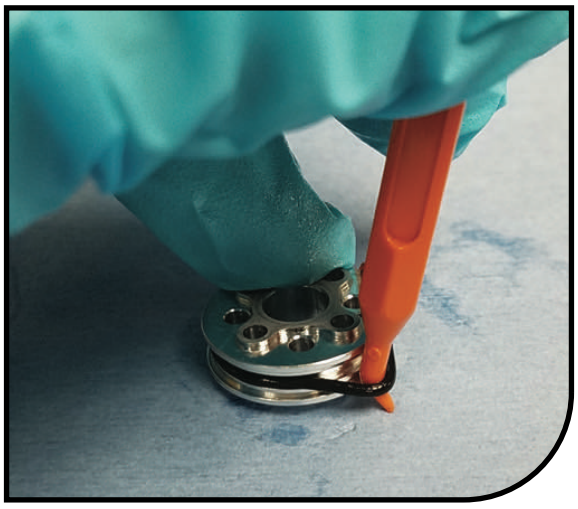
SHAFT AND AIR PISTON ASSEMBLY

7 Replace the top-out bumper O-ring (100-013) on the main shaft that will sit on the main piston.



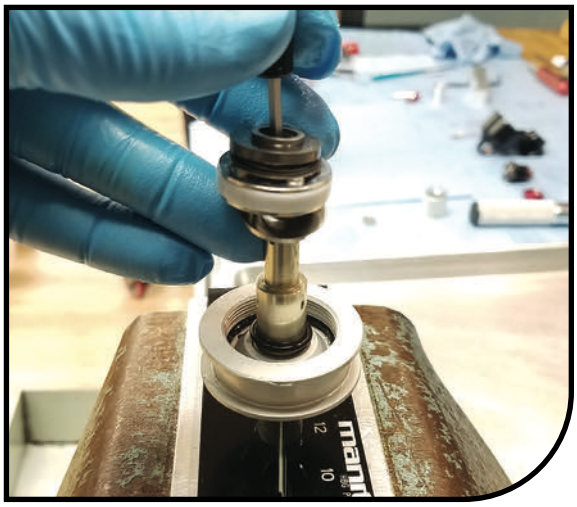
8 Reinstall shim stack below the piston by gently sliding the tool into the main shaft. Be careful to maintain the correct sequence of components. Remove the piston and stack above the piston for further disassembly.

9 Using an O-ring pick, remove the white piston ring, and the O-ring underneath. Install a new O-ring (PN 101-1810). Install a new piston glide ring (PN 129-30020).



SHAFT AND AIR PISTON ASSEMBLY

10 Reinstall the piston and top shim stack by gently sliding the tool into the main shaft. Be careful to maintain the correct sequence of components.

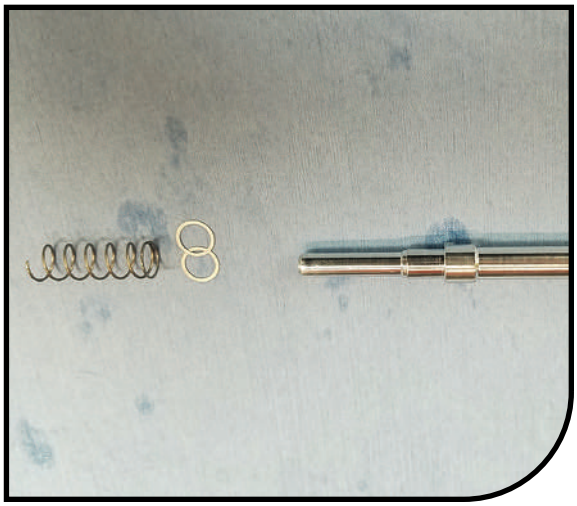


11 With a small drop of red Loctite, replace the main shock nut on the bottom of the main shaft. Torque to 5nm (45in-lb). *Excess Loctite can contaminate the assembly)

12 From the bottom of the main piston install a new inner shaft O-Ring. (PN 101-500-100)

SHAFT AND AIR PISTON ASSEMBLY

13 Orient flat side of the spring towards the upper end of the rebound needle against the two shims. The shock stroke dictates the bottom out position of the shock, only use the specified travel from the frame manufacture



14 Reinstall the rebound shaft into the main shaft.

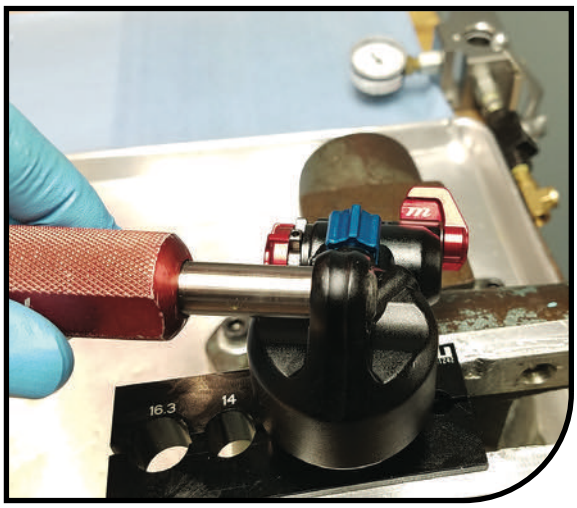
15 Replace the bottom out bumper O-Ring (101-1150-0300) above the air piston.

SHAFT AND AIR PISTON ASSEMBLY

16 Install the washer, and any needed travel spacers, and shims if present. The shock stroke dictates the bottom out position of the shock, only use the specified travel from the frame manufacture

If a travel / stroke change is desired please see page 38 at the end of this guide for spacers orientation.

17 Hold the main shaft in the vise using Manitou clamp block tool (172-31464). Thread the top cap onto the main shaft and torque to 11.3Nm (100in-lb)



AIR CAN SERVICE

1 Remove the negative chamber MCU and spacer(s). Carefully remove the dust wiper using an O-ring pick. Remove the quad-ring and piston ring. Clean and inspect air can for damage.

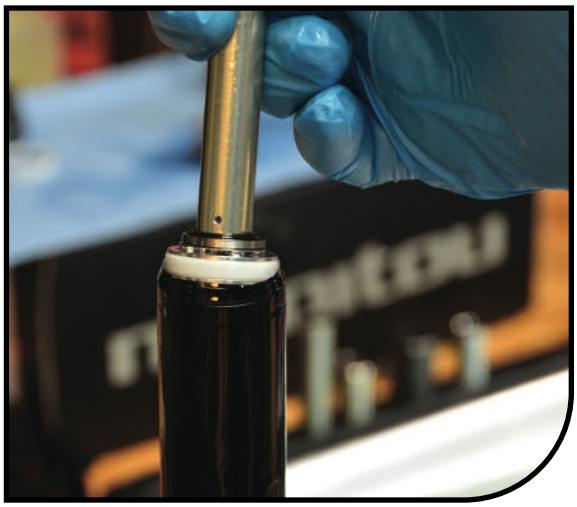
2 Remove the King Can outer sleeve. Remove the O-rings, remove white back-up ring from the middle groove (Mid-King Can volume setting), and volume spacer rings if used. Thoroughly clean the entire air can with Isopropyl alchohol

3 Optional use Air Can Negative Seal Service Tool (172-32193-K001) to ease seal installation. If not available refer to “50 hour Air Can and Piston Service Guide.” The flat surface of the tool will help direct the seals into the internal seal glands. Install the quad-ring first.

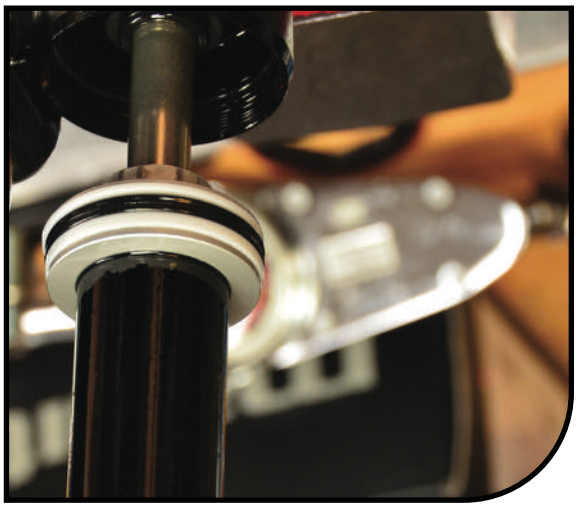
BLEED AND FILL

1 Clamp the shock damper tube in the vise on the eyelet. Fill the damper tube to the top with 3wt Maxima Synthetic damper fluid. (PN 141-34078-K016)*

2 Install the main shaft and piston into the shock damper tube. Add oil if needed to top-off the damper tube once the piston is installed.

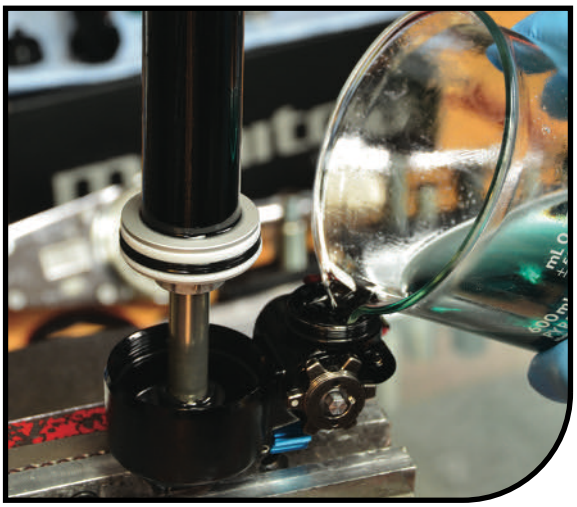


3 Thread air piston on to the damper tube. Torque the air piston to 26Nm (230in-lb).

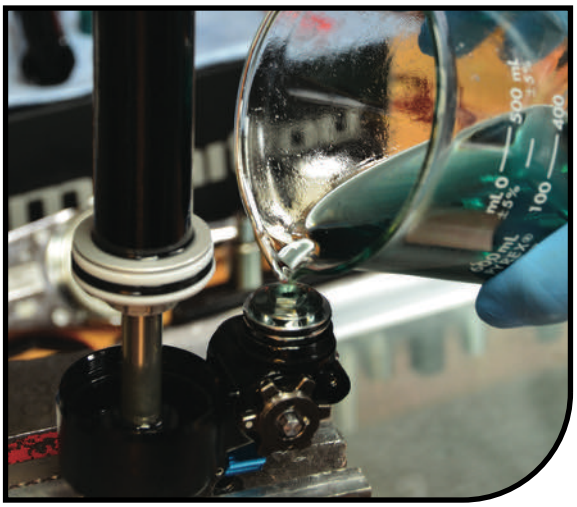


BLEED AND FILL

4 Flip the shock and clamp the eyelet (or clamp across the trunnion faces) into the vise. With the lockout assembly removed, fill the compression assembly with oil. Actuate the lockout lever 5-10x to work air out of the shock.



5 Place the lockout assembly into its location in the top cap. Be sure the face seals stay in place.

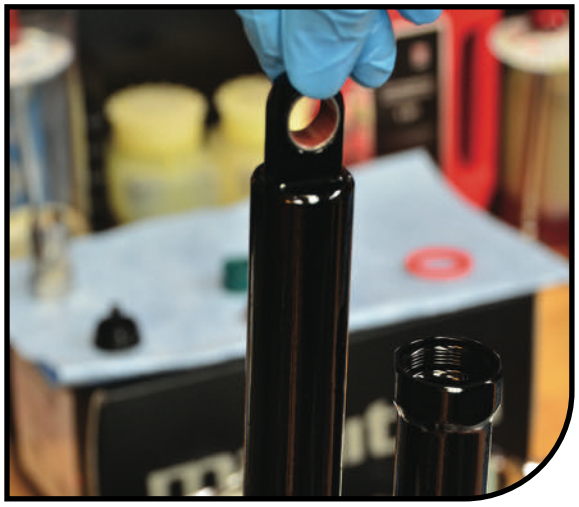


6 While pushing down firmly to engage the O-ring thread the reservoir onto the top cap and torque to 9Nm (80 in-lb). Fill the reservoir 2/3 full of oil.

BLEED AND FILL

7 Set the Lockout to Party Mode. Slowly compress the damper body about 1/2 way or until bubbles stop coming up in the reservoir. Compressing slowly helps reduce atomization of the bubbles, allowing them to rise out more quickly. Fully extend the damper body.

Note: At this step, minimal stroking will help prevent excess aeration of the oil.

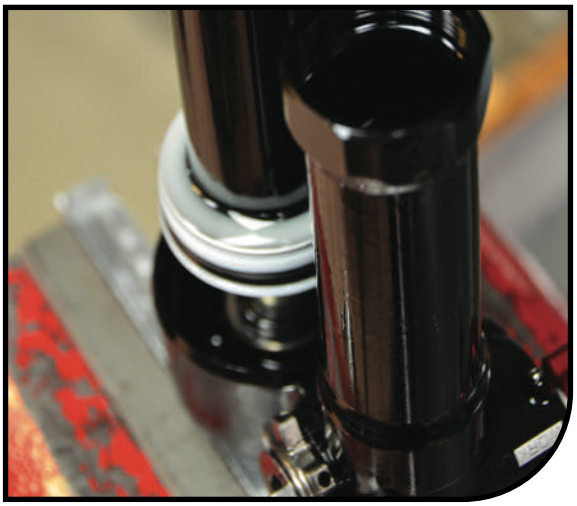


8 Angle the shock in the vise so the bleed screw is pointing slightly downwards. This sets the flow path from the body to the high point. Flip the Lockout Lever to Work Mode. This will create a strong resistance to oil flow going to the reservoir. Crack open the bleed screw at the damper eyelet. Slowly compress the damper body, noting the air coming out the bleed screw. At bottom-out or when oil begins to show, stop the compression and close the bleed screw. Slowly extend the shock.

9 Always ensuring the reservoir is about 2/3 full to prevent air ingestion, repeat step 8 until no air expels from the bleed port. With bleed screw closed and shock in Work mode, the damper should be difficult to compress, with no gap or soft feel at the very beginning of stroke. It may require 5 to 8 cycles to complete this step.

BLEED AND FILL

10 Set the lockout switch to Party Mode. Compress the damper body and note any bubbles rising up in the reservoir. Repeat as needed. Close the LSC adjuster, open the HSC adjuster and repeat. This will expel any air trapped under the HSC shim stack. Repeat steps 8-9 as needed if there is any suspicion of air remaining in the system. With Work Mode engaged, the damper should be very firm.



11 Fully extend the damper body. Fill the reservoir completely full with damper oil.

12 **A** For SHORT/LONG reservoirs (Mara DH): Rigid IFP has a removable bleed screw. Remove this screw before installing into damper body. Once rigid IFP is set to correct height (height measured to the outside skirt), reinstall bleed screw.

B The large cup side of the SKF IFP will be facing up (towards the gas charge side). Use 1 edge, and "scoop" the shallow face of the piston into the oil, allowing the small air pocket to clear before submersing. Stop when the leading edge of the IFP is engaged on the primary inner diameter of the reservoir below the threads. (See IFP height table found on page 37, SKF IFP depth is measured from the center of the IFP

BLEED AND FILL

13 Ensure damper is fully extended, by pressing lightly on the IFP while pulling up on the damper body. Completely remove the bleed screw.

NOTE: Steps 13-15 are not neccesary for AL IFP

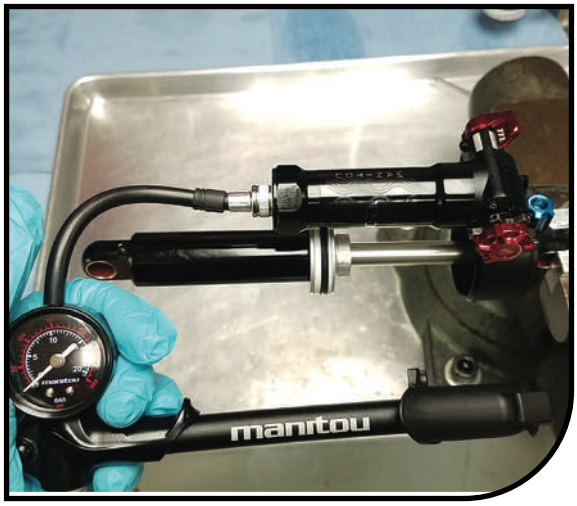
14 Use a finger to press the IFP down to the specified depth per shock and reservoir size published in Table 2 “IFP Depth.”

15 Reinstall the bleed screw while applying a light pressure to the IFP, preventing air entering into the bleed port.

BLEED AND FILL

16 Thread on the reservoir end cap and torque to 5.6Nm (50 in-lb) with the freewheel removal tool (example: Park Tool FR-1).

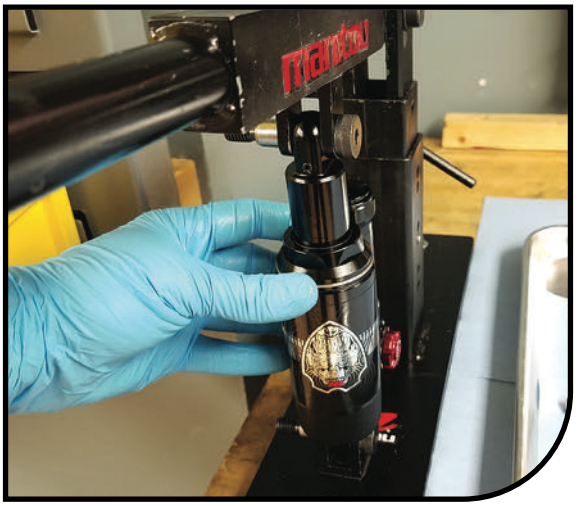
17 Pressurize the shock IFP to 300psi, test function in a hand dyno.



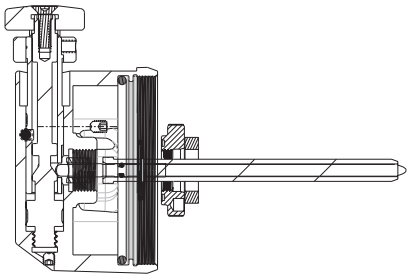
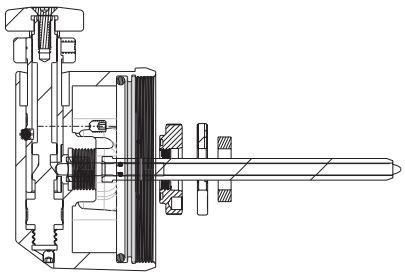
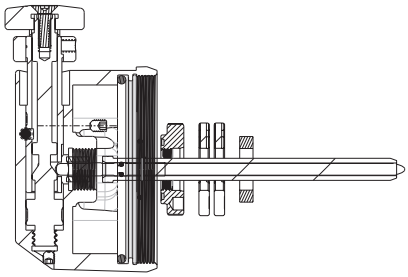
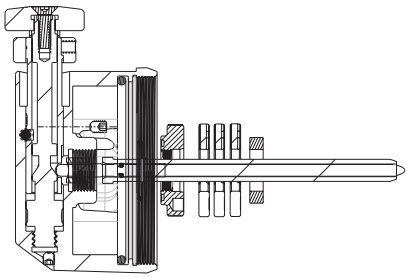
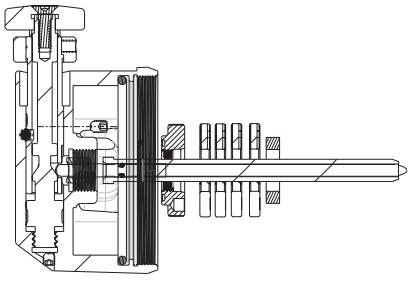
18 Clean the air can, replace negative spacers, apply grease and install the air can while easing the air piston back-up rings into the air can. Place the shock in a bike or on a hand dyno, compress the shock and thread on the air can to a torque of 10.7Nm (95in-lb).

(Refer to the 50 hour air can service guide for air can installation and service)

Note: If compressing by hand it may be necessary to release the gas charge to ease the process.



TRAVEL CHANGE AND AIR VOLUME CHART

# OF SPACERS	TRAVEL	DEPICTION
0		
1		
2		
3		
4		

TRAVEL CHANGE AND AIR VOLUME CHART

Mara Pro PB E		Stock air volume configuration		
Size	2.5 Travel Spacers 142-37512-K042	Neg Bands 142-37512-K039	Pos Sleeve High Volume Spacer 142-37512-k064	Pos Bands 142-37512-K039
190x37.5	3	2	3	1
190x40	2	2	3	1
190x42.5	1	2	3	0
190x45	0	2	2	2
210x47.5	3	2	4	1
210x50	2	2	3	2
210.52.5	1	2	3	0
210x55	0	2	2	2
230x57.5	3	1	4	1
230x60	2	1	3	2
230x62.5	1	1	3	0
230x65	0	1	2	2
250x67.5	3	2	4	1
250x70	2	2	3	2
250x72.5	1	2	3	0
250x75	0	2	2	2

TRAVEL CHANGE AND AIR VOLUME CHART

Mara Pro PB T		Stock air volume configuration		
Size	2.5 Travel Spacers 142-37512-K042	Neg Bands 142-37512-K039	Pos Sleeve High Volume Spacer 142-37512-k064	Pos Bands 142-37512-K039
165x37.5	3	2	3	1
165x40	2	2	3	1
165x40.5	1	2	3	0
165x45	0	2	2	2
185.47.5	3	2	4	1
185x50	2	2	3	2
185x52.5	1	2	3	0
185x55	0	2	2	2
205x57.5	3	1	4	1
205x60	2	1	3	2
205x62.5	1	1	3	0
205x65	0	1	2	2
225x67.5	3	2	4	1
225x70	2	2	3	2
225x72.5	1	2	3	0
225x75	0	2	2	2

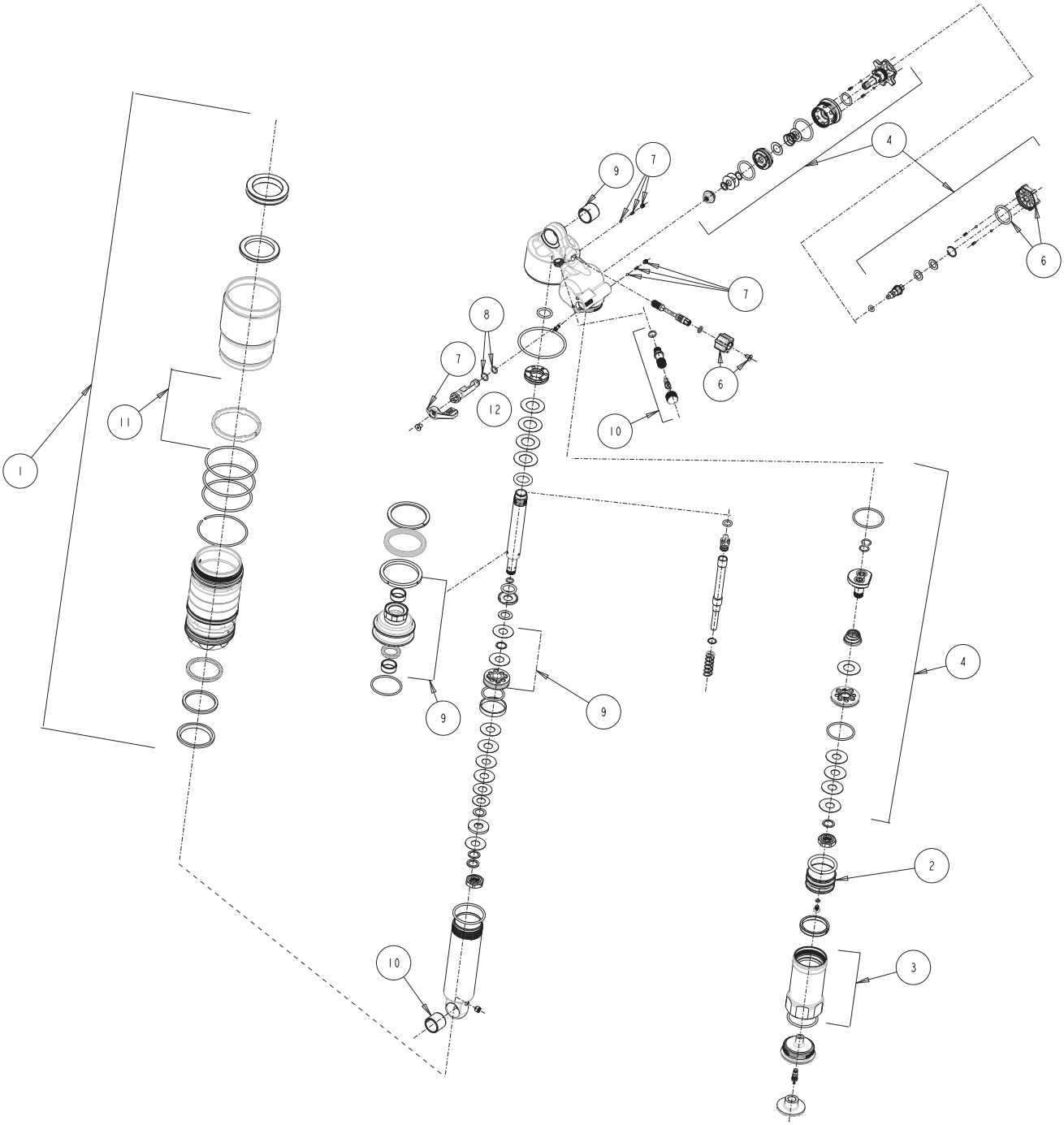
TORQUE SPECS

TORQUE SPECS		
COMPRESSION ASSEMBLY	NOMINAL	TOLERANCE
PISTON INTO CARTRIDGE	50 in-lb	±3
NUT ONTO LSC SHAFT	35 in-lb	±3
CARTRIDGE INTO TOPCAP	50 in-lb	±5
LOCKOUT ASSEMBLY		
BOLT IN LOCKOUT BODY	50 in-lb	±3
RESERVOIR		
RESERVOIR INTO TOPCAP	80 in-lb	±10
SCHRADER INSERT INTO RESERVOIR	50 in-lb	±3
MAIN SHAFT		
SHAFT INTO TOPCAP	100 in-lb	±10
NUT TO SHAFT	45 in-lb	±3
DAMPER BODY		
DAMPER BODY TO AIR PISTON	230 in-lb	±10
BLEED SCREW INTO DAMPER BODY	12 in-lb	±2
TOP CAP		
KNOB SCREWS	5 in-lb	±1
AIR CAN TO TOPCAP	95 in-lb	±5
SCHRADER VALVE CORE	3 in-lb	±1

IFP GUIDE

Mara Pro PB Gen 2 IFP Table * Denotes standard configuration			
	IFP Depth (MM)		
Stroke length	Short and Wide (AL IFP)	Short (SKF IFP)	Long (SKF IFP)
37.5-45mm	*22.5	40	N/A
47.5-55mm	*23.5	40	N/A
57.5-65mm	*24.5	44	50
67.5-75mm	25.5	*44	50

MARA PIGGYBACK VIEW PB EXPLODED VIEW & PARTS



MARA PIGGYBACK PB EXPLODED VIEW & PARTS

ITEM #	PART DESCRIPTION	KIT NUMBER
1	King Can Balance Groove Gen 2. 40/45, 50/55, 60/65, 70/75	142-37512-K050 142-37512-K051 142-37512-K052 142-37512-K053
2	IFP KIT ALL MARA SHOCKS	142-37512-K025
3	Short Wide Reservoir AL IFP (Stock on Gen 2)	142-37512-K045
4	COMP ADJUST KIT ALL MARA PIGGYBACK	142-37512-K027
5	LOCKOUT ADJUST KIT ALL MARA PIGGYBACK	142-37512-K028
6	KNOB KIT ALL MARA PIGGYBACK	142-37512-K029
7	DETENT KIT ALL MARA PIGGYBACK	142-37512-K030
8	SEAL KIT GEN 2 MANITOU SHOCKS	142-37512-K063
9	SHOCK BUSHINGS KIT	142-37512-K035
10	AIR VALVE KIT	142-31535-K026
11	MARA KING CAN VOLUME SPACERS	142-37512-K039
12	SHOCK TRAVEL SPACERS	142-37512-K042
13	SHORT RESERIOR KIT (STANDARD ON DH)	142-37512-K026
14	KING CAN HIGH VOLUME BAND SPACER	142-37512-K064

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