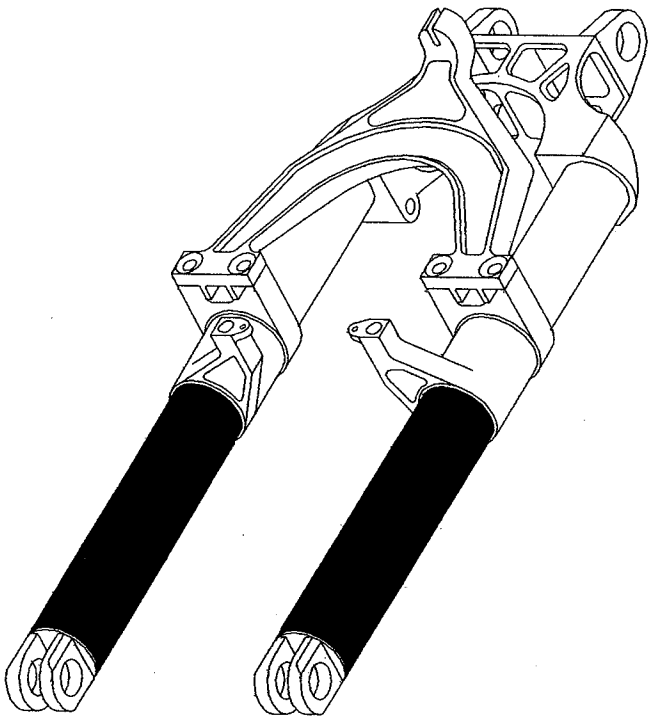
ANSWER

MANITOU

PRECISION SUSPENSION FORKS

OWNERS MANUAL



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ANSWER MANITOU REAR SUSPENSION SYSTEM

CONGRATULATIONS FOR CHOOSING A MOUNTAIN BIKE WITH THE BEST REAR SUSPENSION AVAILABLE. THE MANITOU REAR SUSPENSION SYSTEM IS A HIGHLY SOPHISTICATED YET SIMPLE SYSTEM THAT WILL PROVIDE EXCELLENT MAINTENANCE FREE PERFORMANCE.

The Manitou Rear Suspension System consists of specially drawn anodize outer legs pressed fit assembled into heat treated 6061 Aluminum components. The Easton Aluminum taper drawn hard anodized aluminum inner legs have a proprietary Teflon coating to eliminate stiction. Suspension spring rate and damping are provided by the same polymer elastomers that are being used in the Manitou 3 front fork. The top loading elastomer stack is easy to remove and tune by changing elastomers. Preload adjustment is located at the top of the fork in the rear crown cut outs. The 94 Manitou rear fork also features a second stage elastomer that adds progressiveness to the last 1/2" of travel. Standard travel is 2" (50.8MM) with an easy change over to long travel 2 1/2" (63.5 MM). Four standard rear fork sizes are available to provide an integrated suspension system matched to your bicycle. Rear fork sizes are shown in figure 1.

Available spare parts for the Manitou Rear Suspension System are listed in table 1. An exploded view of the rear suspension and swingarm pivots appears in figure 2. All spare parts are available through approved Manitou your OEM dealer.

FIGURE 1: ANSWER MANITOU REAR SUSPENSION

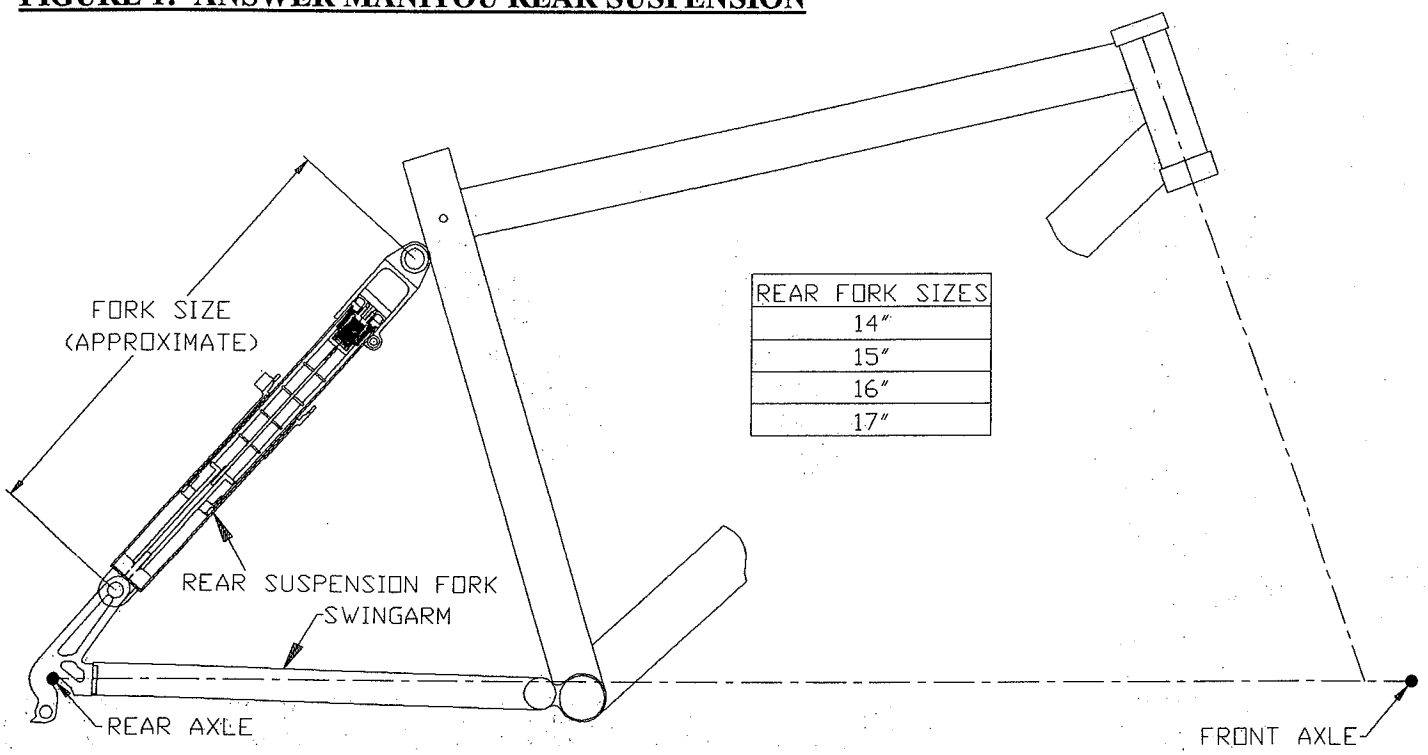


FIGURE 2: 94 REAR SUSPENSION SCHEMATIC

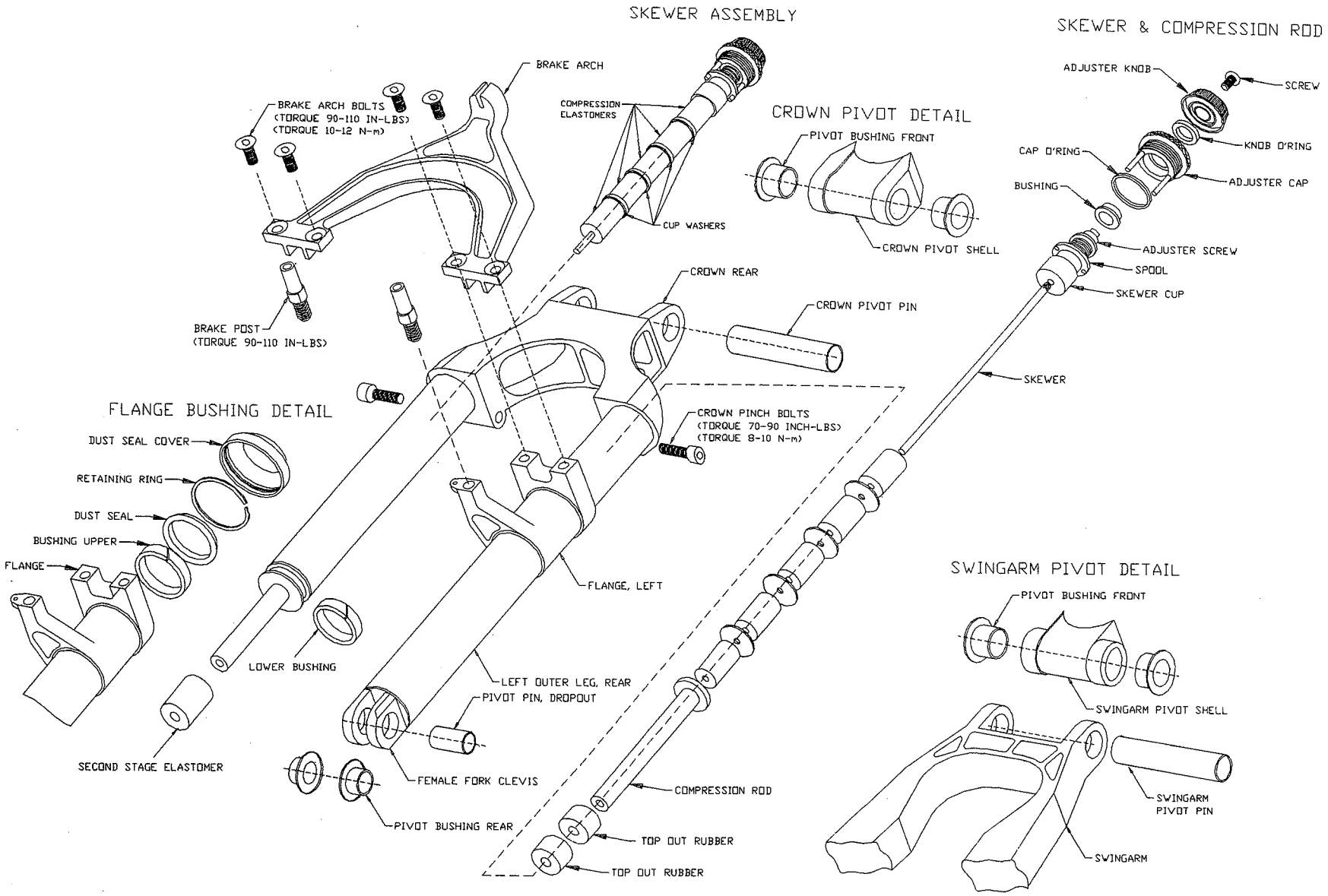
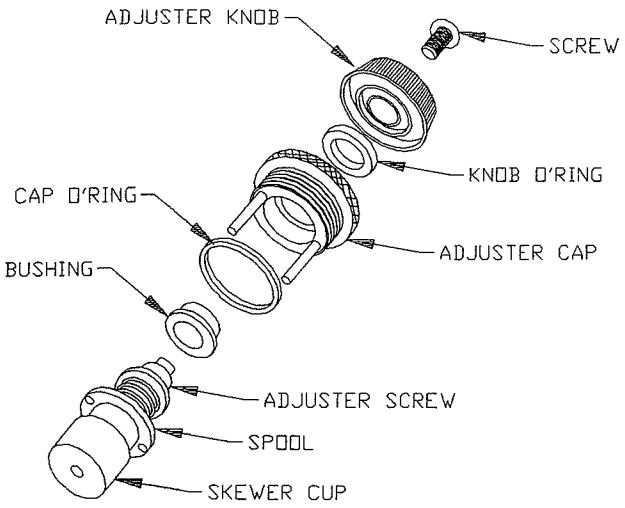


TABLE 1: MANITOU 94 REAR FORK SPARE PARTS LIST

REAR FORK ASSEMBLIES	
PART NAME	PART NO.
REAR FORK 14"	85-3340
REAR FORK 15"	85-3341
REAR FORK 16"	85-3342
REAR FORK 17"	85-3343
FS REAR FORK ASS RIGHT 14"	060727
FS REAR FORK ASS LEFT 14"	060731
FS REAR FORK ASS RIGHT 15"	060728
FS REAR FORK ASS LEFT 15"	060732
FS REAR FORK ASS RIGHT 16"	060729
FS REAR FORK ASS LEFT 16"	060733
FS REAR FORK ASS RIGHT 17"	060730
FS REAR FORK ASS LEFT 17"	060734
94 REAR FORK MANUAL	040484
PIN REMOVAL TOOL	71-0001

ADJUSTER ASSEMBLY, 060754



REAR FORK SPARE PARTS	
BRAKE ARCH	040408
BRAKE ARCH BOLTS, M6x1.0x16MM FSCS	040452
REAR CROWN	060063
CROWN BOLTS, M6x1.0x20 SHCS	040454
NNER LEG SHORT 14"	060735
INNER LEG LONG 15"	060736
NNER LEG SHORT 16"	060737
INNER LEG LONG 17"	060738
COMPRESSION ROD 14"	060749
COMPRESSION ROD 15"	060750
COMPRESSION ROD 16"	060751
COMPRESSION ROD 17"	060752
SKEWER ROD 14"	040627
SKEWER ROD 15"	040628
SKEWER ROD 16"	040625
SKEWER ROD 17"	040629
ADJUSTER ASSEMBLY	060754
OUTER LEG ASSEMBLY, LEFT	060758
OUTER LEG ASSEMBLY, RIGHT	060759
FORK BUSHING UPPER	040155
FORK BUSHING LOWER	040154
DUST SEAL	040166
DUST SEAL COVER	040647
BRAKE POST	040452

FRONT & REAR FORK ELASTOMERS	
1/2" REBOUND ELASTOMER, ORANGE	040612
1" SECOND STAGE ELASTOMER, ORANGE	040613
1" COMPRESSION ELASTOMER SOFT, BLUE	040616
1" COMPRESSION ELASTOMER MEDIUM, RED	040619
1" COMPRESSION ELASTOMER FIRM, YELLOW	040623
1/2" LONG TRAVEL ELASTOMER, BLUE	040624
CUP WASHER	040620

MAINTENANCE:

Your Manitou Rear Suspension is intended to be nearly maintenance free. The rear suspension forks may develop moisture and contamination internally under adverse conditions. Although this may not affect the performance of the suspension it is recommended that they be periodically disassembled, cleaned, checked, and regreased to insure long life. The swingarm pivots require no maintenance unless play is noticeable.

Before every ride you should:

1. Wipe the rear inner legs clean.
2. Visually inspect the rear suspension forks and swingarm for dents or damage.
3. Check rear crown bolt torque, 70-90 in-lb. (8-10 N-m) and check for inner fork leg slippage in the crown.
4. Verify that brake and shifting cables are working properly and that the rear brake outer cable is properly seated in the rear arch brake retainer.

NOTE: THE MANITOU SUSPENSION SHOULD NOT BE RIDDEN IF ANY PARTS ARE DAMAGED OR IF ANY COMPONENTS ARE OUT OF ADJUSTMENT. CONTACT YOUR LOCAL DEALER FOR REPLACEMENT PARTS OR SERVICE IF NECESSARY.

DISASSEMBLY INSTRUCTIONS

REAR SUSPENSION FORKS

The rear suspension forks can be disassembled without removing the cantilever brakes, brake arch, cables, or pivot pins. It is recommended that these components be left undisturbed to preserve the thread torquing and press fits.

Inner Leg Removal: Figures 3 &4

1. Elevate bike on stand by clamping on the seat post. DO NOT CLAMP ON ANY PART OF THE FRAME. CLAMPING ON THE THIN WALL FRAME TUBING WILL DAMAGE IT.
2. Slacken and detach rear brake cable.
3. Remove rear wheel.
4. Loosen rear crown pinch bolts.
5. Press inner legs down through crown taking care not to stretch cables.
6. Rotate crown down out of the way and rotate fork assembly up to gain access to the inside of the fork legs as shown in figure 3.
7. Unscrew and remove skewer adjuster assemblies.
8. Using the special 6MM allen wrench loosen the two compression rods.
9. Slide inner legs up gently until they stop.
10. Unsnap and slide up dust seal covers.
11. Using a small screwdriver or pick pry and remove retaining ring.
12. Using same pick gently pry up dush seal to remove it from flange. Do not damage sealing area.
13. Remove the two inner legs by pulling upward. A sharp pull at the end will remove the lower bushing from its race and free the inner leg.
14. Remove the lower bushing by hand if necessary for inspection.

FIGURE 3: INNER LEG REMOVAL

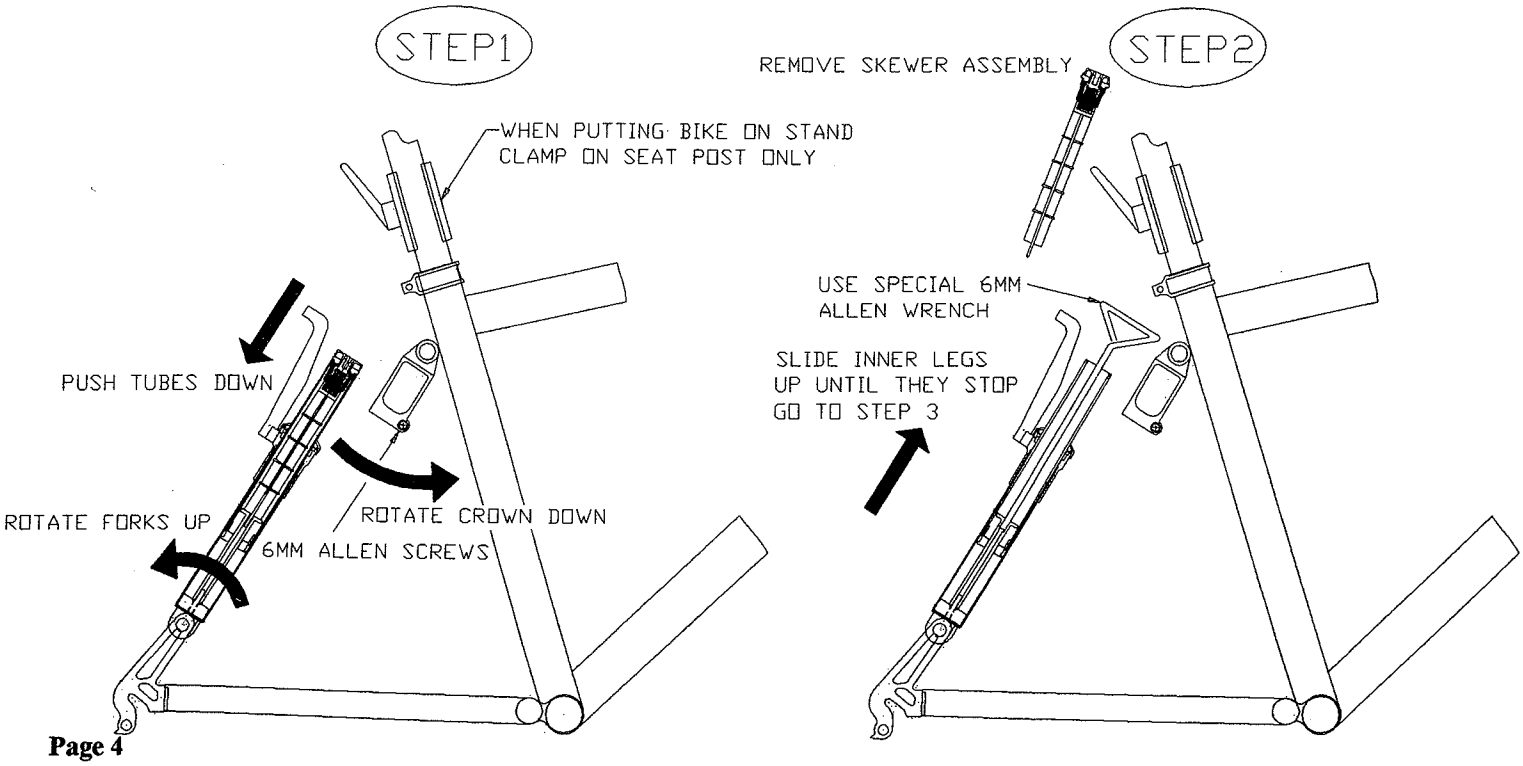
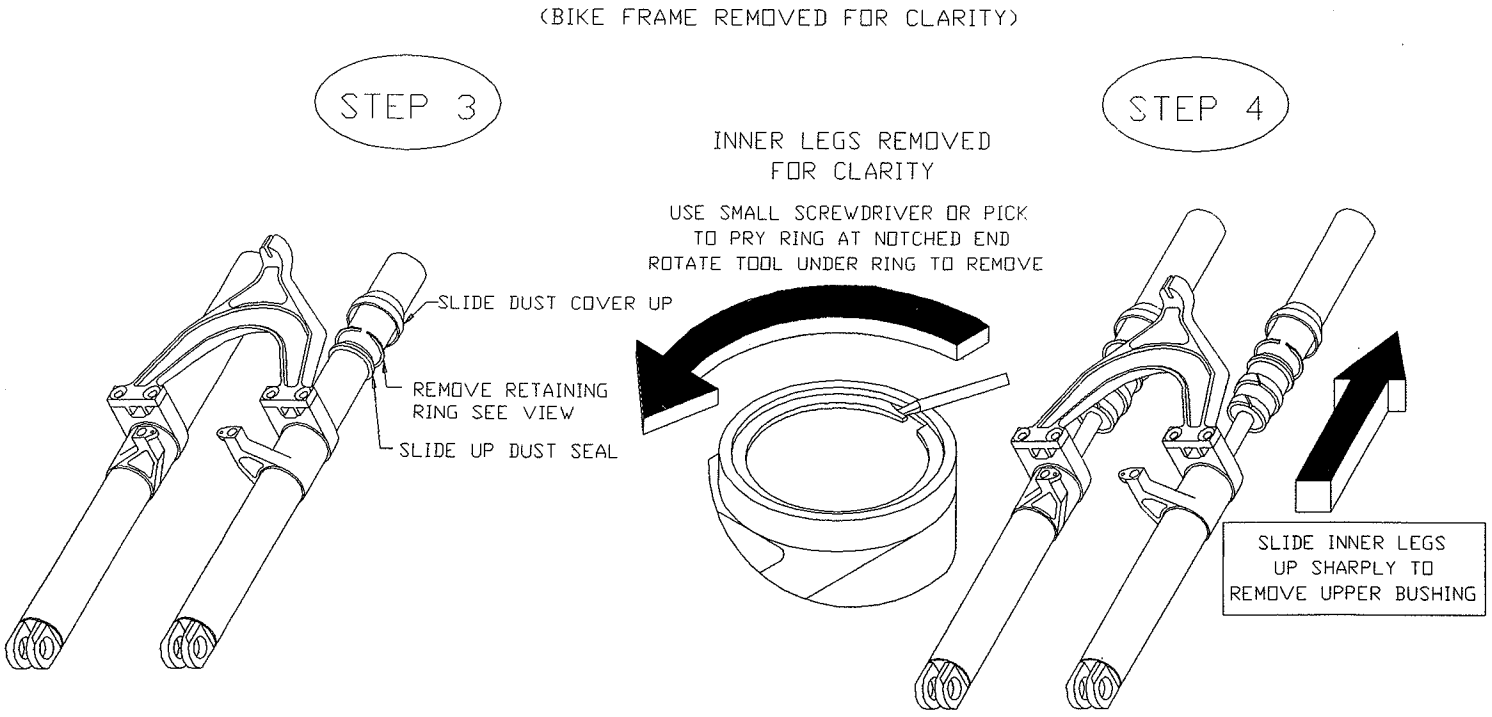


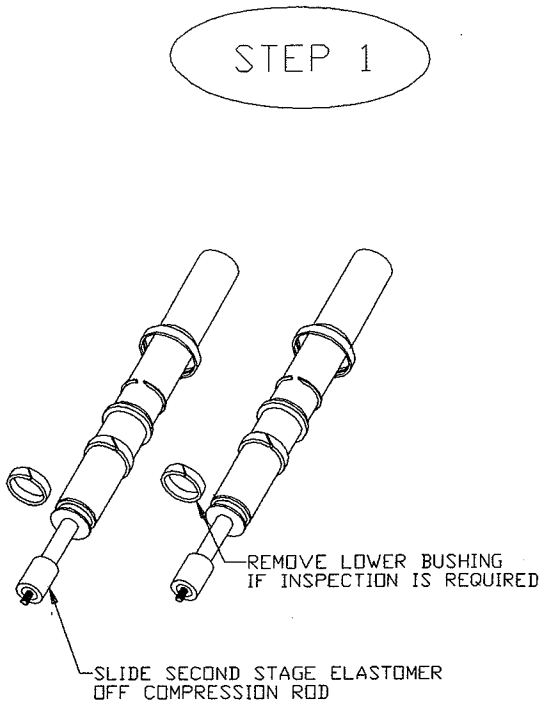
FIGURE 4: INNER LEG REMOVAL



Compression Rod Removal: Figure 5

1. Slide second stage elastomer off end of compression rod.
2. Tip inner leg upside down to remove compression rod.

FIGURE 5: COMPRESSION ROD



INSPECTION

1. Check dust seals and dust seal covers for tears or damage. Replace if needed.
2. Inspect the lower and upper bushings for excessive wear or damage. Checking the drag between the inner and outer leg with the lower bushing installed and then checking with the upper bushing in place in the flange is a good indication of ear. Drag should be very slight, enough to hold the weight of the inner leg but not more than is necessary to hold the weight of the outer leg. Replace if necessary.
3. Check all elastomers for splitting, cracks or other obvious damage. Replace if necessary.
4. Check skewer rod for straightness.
5. Check smooth action of the adjuster, clean and lube if necessary with chain lube.
6. Check the outer leg I.D. for deep gouges or dents. Replace if necessary.
7. Check the inner leg O.D. for deep gouges and other obvious damage. Minor wear resulting in the removal of the black dye is not detrimental to the hard anodized surface. Replace if needed.
8. Check compression rod for cracks or excessive wear.

Long Travel Conversion: Figure 6 Step 2

1. Remove one of the 1/2" long topout elastomers.
2. Add one cup washer and one 1/2" blue long travel compression elastomer to skewer stack.
3. Reassemble per reassembly instructions.

FIGURE 6: LONG TRAVEL CONVERSION

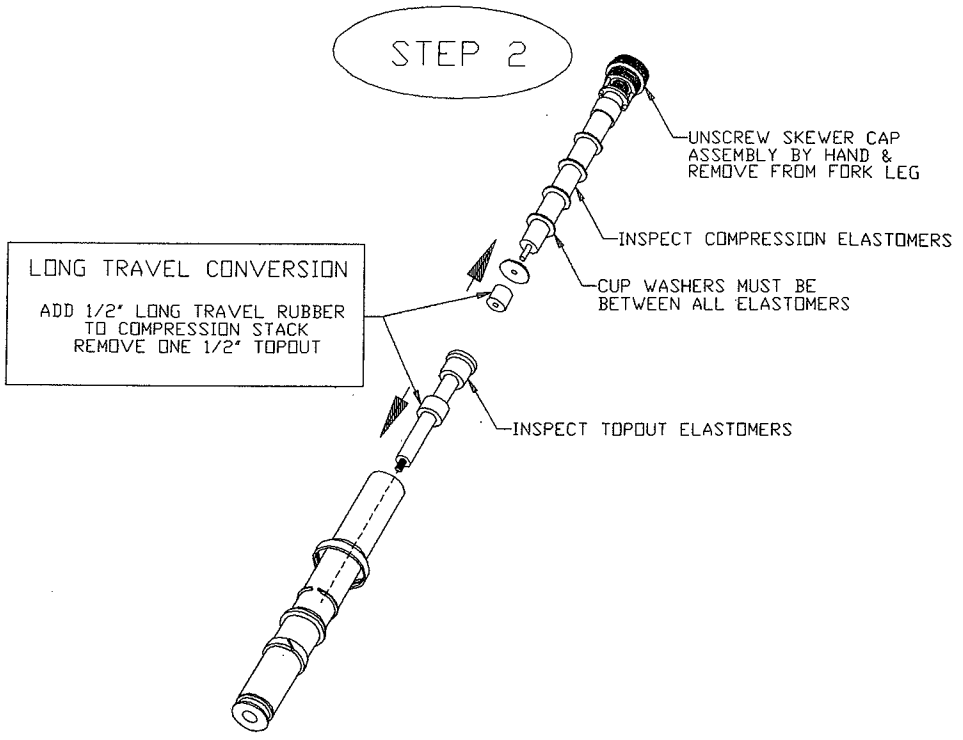
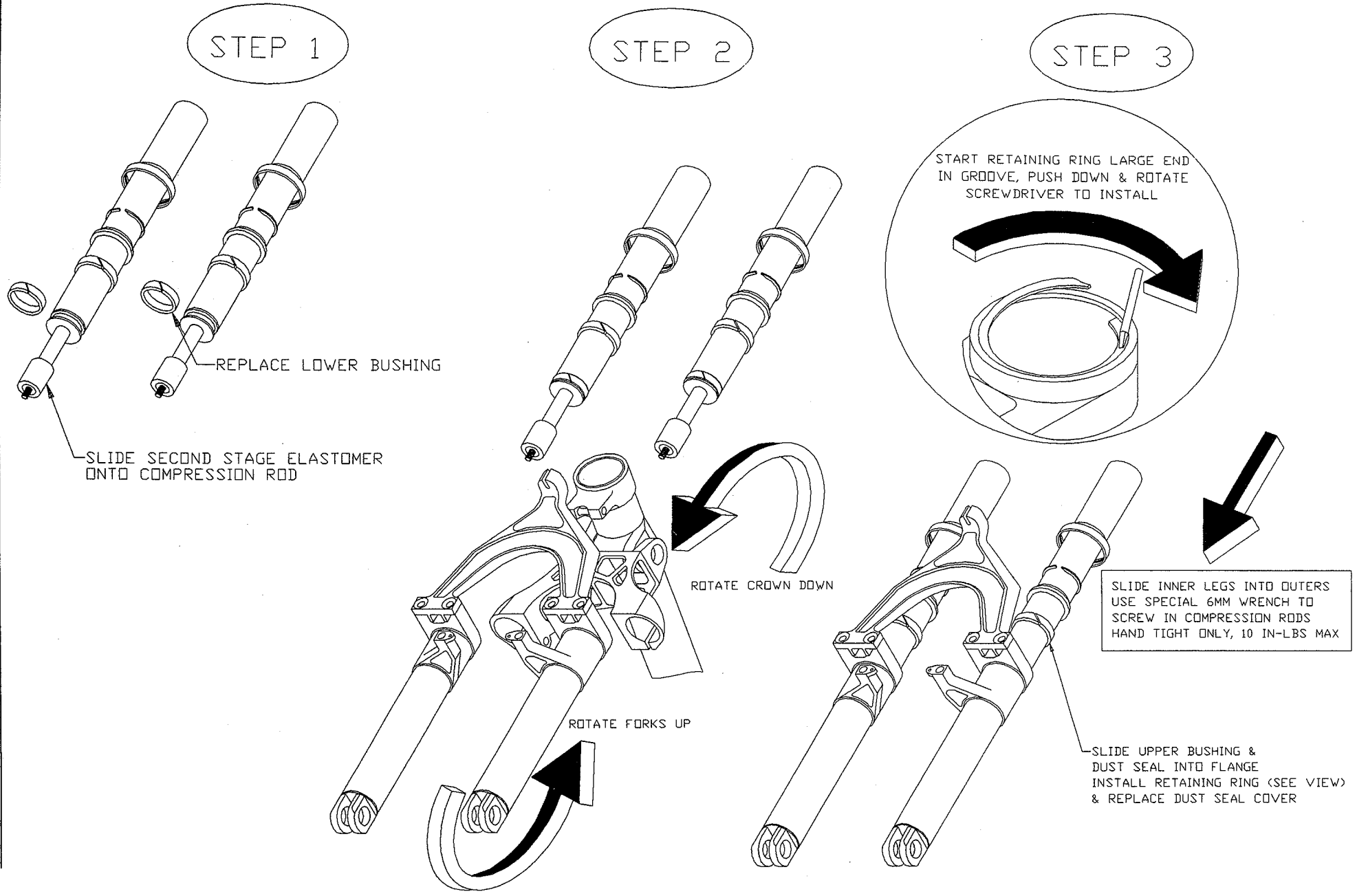


FIGURE 7: REAR FORK REASSEMBLY



REASSEMBLY

Compression Rods: Figure 7

1. Clean all parts thoroughly with solvent or clean rags and grease using a light weight lithium or molybdenum grease.
2. Clean and grease studded end of compression rod.
3. Slide on topout elastomers all the way to the top flange. Use one for long travel and two for long travel setting.
4. Drop compression rods into inner legs, studded end first. Shaking leg will help find hole in inner leg plug.
5. Slide on second stage elastomer onto compression rod until just past stud.

Inner Leg Installation: Figure 7

7. Install and thoroughly grease lower bushing.
8. Grease I.D. of outer legs and upper bushing seat.
9. Slide inner legs into outer legs. A gentle tap may be necessary to force lower bushing past flange area.
10. Use special 6MM allen wrench to screw compression rod into clevis. Tighten hand tight only 10 in-lb. max.
11. Fully extend inner legs and put liberal amount of grease on. of inner leg just above flange.
12. Slide on upper bushing and dust seal and press them down into flange rotating as they pass by the grease to lubricate them.
13. Use a blunt tool like a medium size screwdriver to press dust seal and bushing past the retaining ring groove.
14. Install retaining ring by starting wide end in flange groove and pushing down with same blunt tool and rotating to snap ring into place (see view in figure 7). Install ring so the end gap is on opposite side as brake arch. This will leave ring in best position to be removed next time.
15. Snap on dust seal cover and wipe excess grease from inner leg O.D.

Skewer Adjuster Installation & Rear Crown Torquing:

1. Remove compression elastomers and clean skewer thoroughly.
2. Install compression elastomers and cup washers onto skewer. Dipping the end of the skewer into the grease between every elastomer is a good way to grease them.

NOTE: BE SURE THAT A CUP WASHER IS BETWEEN EVERY ELASTOMER

3. Clean threads on the O.D. of cap and the I.D. of inner leg. Lightly grease the threads in the inner leg.
4. Back off the preload adjuster to the full soft setting.
5. Install skewer assemblies taking care to be sure that skewer rod is started in the compression rod hole. Lightly hand tighten.
6. Reset preload.
7. Align inner legs and rear crown holes.
8. With twisting motion slide inner legs into rear crown. Rotating rear crown up and down on its pivot will help inner legs slide through. Inner leg cap should be just above the outside edge of the crown.
9. Tighten & torque 6MM crown bolts to 70-90 in-lb. (8-10 N-m)
10. Replace rear wheel, rear brake cable and adjust rear brake.

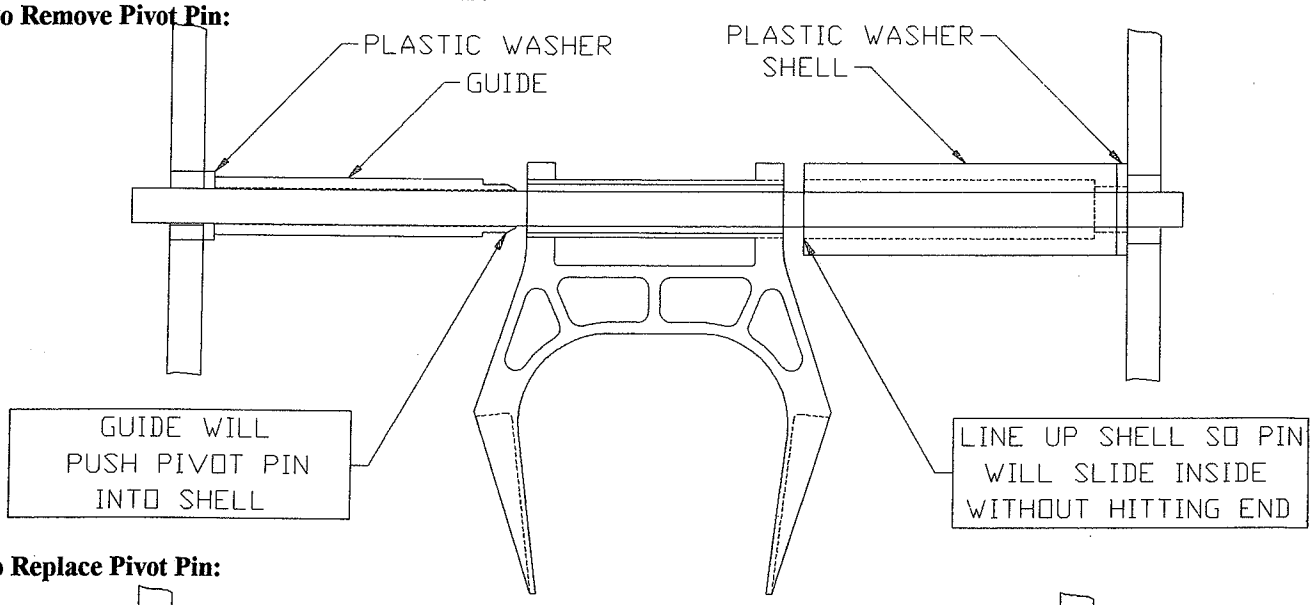
SWINGARM AND PIVOT PIN REMOVAL figure 8

Normal maintenance and use do not require the removal of the pivot pins and swingarm. It is recommended that the pins are not removed unless necessary for the replacement of damaged parts. The pivot pins are press fit into the rear crown, swingarm H-section, rear dropouts, and are a tight fit in the pivot bushings. The bushings are press fit into the pivot shells and fork clevis.

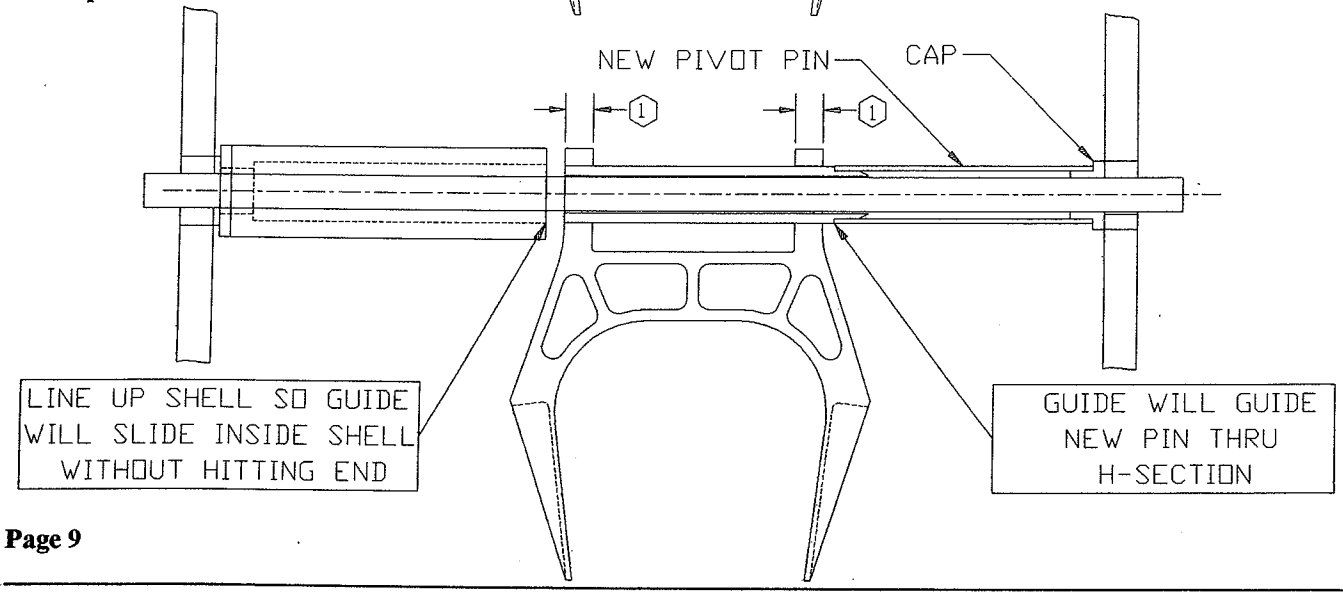
1. Follow the steps in rear suspension fork disassembly to separate the inner legs from the rear crown.
2. Remove chain, chain rings, cables, and rear derailleur as required.
3. Use pin removal tool available from your local dealer to press the 0.624" (15.85 MM) dia. swingarm pivot pin completely out of the H-section.
4. Remove the swingarm fork assembly.
5. Use the same tool to press the 0.498" (12.65MM) dia. dropout pivot pins completely out of the fork clevis. Removing the brake arch will allow the removal of each fork leg separately.
6. Inspect the pins and bushings for wear and damage. Replace if necessary.
7. New bushings may need trimming or sanding on the outside flange surfaces to properly fit crown and H-section. Do not alter the inside or outside diameter of the bushings.
8. Reassemble reversing the order of these steps taking care not to damage the pins or bushings during the press fit assembly.
9. Apply green locktite #609 or equivallent to h-section and pivot pin in area code 1. Do not apply to bushings.

FIGURE 8: PIN REMOVAL TOOL

To Remove Pivot Pin:



To Replace Pivot Pin:



ADJUSTING RIDE QUALITIES

The Manitou suspension system offers full adjust ability for the front and rear suspension. Tuning the front suspension is described in the Manitou 3 Front Fork Manual. The rear suspension, like the front, has been tuned to achieve 2" (51MM) of fork travel and has a softer ride that better absorbs large bumps while staying extremely active on the smaller ones. Fine tune adjustments can be made using the preload adjusters located in the rear crown cut outs. Each production frame set comes with an all red compression stack suitable for a moderate to aggressive rider of 155-180 lb. (70.5-82.0 Kg). A ride kit has been include that consists of a pair of softer (blue) elastomers and a pair of firmer (yellow) elastomers to allow tuning for your riding style and preference. Soft and firm rides kits that consist of an entire set of soft or firm elastomers are available at your Manitou dealer.

Fine Tuning:

Fine tuning adjustments can be made by rotating the preload adjuster knobs. Rotating the knob clockwise will firm the ride while rotating the knobs counterclockwise will soften the ride. Five complete revolutions of the adjuster knobs will take the adjustment from full soft to full firm. It is not necessary to have the adjusters set exactly the same. Having them turned at approximately the same number of revolutions will sufficiently balance the damping forces.

Coarse Tuning: Table 2

The 94 suspension system is tuned to provide more travel and a softer ride than previous Manitou suspension. Normal riding should result in 1 3/4" (44.5MM)t o 1 7/8" (47.5MM) of travel. Large hits should use the full 2" (51MM) of travel. An excessively soft damping stack will rely too heavily on the second stage elastomer. A mushy feel with frequent noticeable bottoming will occur. An excessively firm setting will not use full travel. If your forks are too soft or too firm and need coarse tuning remove the skewer assembly, replace the some or all of the elastomers and ride test. Disassembly of the fork is not required. In addition to the replacement elastomers provided with the rear fork, an expanded soft ride or firm ride kit is available through your Manitou dealer. The soft ride kit is a complete set of blue compression elastomers and the firm ride kit is a complete set of yellow elastomers. Each set contains twelve 21/32' dia. elastomers. Any combination of colors can be used to obtain the ride that suits your preference, although it is not recommended to use only one soft elastomer like blue in stack of firm elastomers like yellow. The soft elastomer will be overpowered by the firm ones

TABLE 2: ELASTOMER KITS

TABLE 2: ELASTOMER RIDE KITS			
COLOR	STIFFNESS	RIDE KIT	PART NUMBER
BLUE	SOFT	SOFT RIDE KIT	85-3503
BLUE	SOFT	STOCK	040616
RED	MEDIUM		040619
YELLOW	FIRM		040623
YELLOW	FIRM	FIRM RIDE KIT	85-3504

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