

99 X-VERT SERVICE MANUAL

P/N 85-3667



MANITOU

ANSWER PRODUCTS, INC

28209 AVENUE STANFORD, VALENCIA, CA 91355

(805) 257-4411

www.answerproducts.com

□ TABLE OF CONTENTS

Consumer Safety & Warranty Information 1
Installation Instructions 2
Spare Parts List 3
Exploded View 4
Maintenance & Disassembly. 6
Inspection 8
Re-assemble 8
Inner Fork Leg, Crown, & Brake Arch 9
Adjusting the Ride Qualities 10
Trouble Shooting 11

ANSWER PRECISION SUSPENSION

CONGRATULATIONS FOR CHOOSING THE LATEST STATE OF THE ART MOUNTAIN BIKE SUSPENSION FORK AVAILABLE. THE 1999 X-VERT FORK MODELS HAVE STATE OF THE ART MCU/SPRING COMPRESSION SYSTEMS. THE X-VERT SERIES ALL USE THE NEW TWIN PISTON CARTRIDGE SYSTEM (TPC) THAT SURPASS ALL OTHER TYPES OF OIL DAMPED SYSTEM IN PERFORMANCE AND DURABILITY.

Your 99 X-VERT Fork is fully assembled and ready to be installed onto your bicycle and comes equipped with a 1 1/8" threadless steer tube. 99 X-VERT's are available with the V-Brake cable hangerless arch and have an optional attachable cable hanger kit P/N 85-3800, which is available through your dealer.

CONSUMER SAFETY INFORMATION

IMPORTANT: The 99 X-VERT Fork is a off road fork and as such, does come with the reflectors for on road use installed. Reflector bracket kit P/N 85-3674 is available through your dealer. Have your dealer or mechanic install the kit to meet the Consumer Product Safety Commission's (C.P.S.C.) Requirements for Bicycles if the fork is going to be used on public roads at any time. If you have questions regarding C.P.S.C. Standards contact your dealer.

1. Never remove or have the steer tube or stanchions (inner legs) removed from the crown. The steer tube and stanchions are press fit assembled at the factory. Pressing them out will permanently damage the crown, steer tube, and stanchions beyond repair and render them unsafe for any continued use.
2. Never attempt to threas a threadless steer tube. Machining threads will weaken the steer tube and cause unsafe condition. The only safe thing to do is obtain the proper crown/steerer from your dealer.
3. Any other alterations or modifications to your fork should be considered unsafe. Contact Answer products Technical Support prior to modifying your fork in any way for safety information.
4. Do not use any Manitou Fork if any part appears to be be broken, bent, cracked, or damaged. Contact your dealer or Answer Products Technical Support, (800) 670-7446, if you have any questions concerning the integrity, condition, or safe operation of your fork.
5. Answer Products recommends that you periodically inspect your fork for wear and damage. Inspect the Crown, Inner Legs, and Outer Leg Dropout and Break Arch areas for cracks or damage. Befor every ride check to ensure that the proper preload exists and that the positive rebound stop is in order to ensure that the fork can not over extend.

WARRANTY INFORMATION

Any Answer Products fork found by the factory to be defective in materials and/or workmanship within one year from the date of purchase will be repaired or replaced at the option of the manufacturer, free of charge, when received at the factory, freight prepaid. This warranty does not cover breakage, bending, or damage that may result from crashes or falls. This warranty does not cover any fork that has been modified, subject to misuse or whose serial number has been altered, defaced or removed. This warranty does not cover paint damage. Any modifications made by the user will render the warranty null and void. This warranty is expressly in lieu of all other warranties, and any implied are limited in duration to the same duration as the expressed warranty herein. Answer Products shall not be liable for any incidental or consequential damages.

If for any reason warranty work is necessary, return the fork to the place of purchase. In the USA, dealers should call Answer Products for a return authorization number (RA#). At that time instructions for repair, return, or replacement shall be given. Customers in countries other than USA should contact their dealer or local distributor.

INSTALLATION INSTRUCTIONS

Figures 1,2, &3

Insure that the proper steer tube has been delivered on your fork. The steer tube may need to be cut to length to fit your bicycle head tube. If you are not familiar with this procedure or do not have the proper tools to cut the steer tube it is recommended that you seek a dealer with a qualified bicycle mechanic to perform installation.

WARNING: The steer tube and stanchions (inner legs) are a one time precision press fit at the factory and cannot be removed from the crown. Replacement of the entire crown/steerer assembly must be done to change steer tube lengths or diameters. Removing and replacing the steer tube or stanchions will result in an unsafe condition and should never be done.

1. Remove old forks from bicycle.
2. Measure and cut the steer tube to fit your bicycle head tube.
3. Remove crown race from old forks and press onto 99 X-VERT Steer until seated on crown.
4. Clean and grease headset bearing and races of bicycle.
5. Install lower bearings on fork crown race.
6. Install steer tube into head tube frame.
7. Install upper bearing, spacers, and stem.
8. Install stem cap, adjust and tighten headset per manufacturer's instructions.
9. Install handlebars to desired height. Torque stem handlebar pinch screw and stem clamping system to manufacturer's instructions.
10. Install cantilever breaks and adjust to pre manufacturers instructions.
11. Adjust fork wheel quick release to clear the 0.275" (7MM) thick secondary catch dropout. The quick release must be tightened after it is adequate thread engagement (4 or more threads with the release adjusted to bicycle per manufacturers specifications.
12. Install brake cable per manufacturers instructions.

Note: All 98 X-VERT Forks except X-VERT TI Forks are equipped with a secondary catch dropout.

Note: The 98 X-VERT except X-VERT TI comes equipped with a hangerless arch. Brake cable hangers that attach to the arch are available through your dealer. See Figure 2

WARNING: When installing wheel or any new tire check the minimum tire clearance. Measure from the highest point on the tire to the bottom of the crown. The minimum clearance allowed for 100MM travel fork models is 4.055"(103.0MM), for 115MM travel fork models is 4.645" (115.0MM) and for 160MM travel fork models is 6.417" (163.0MM). Any less clearance can result in accident resulting in serious injury or death. Figure 3

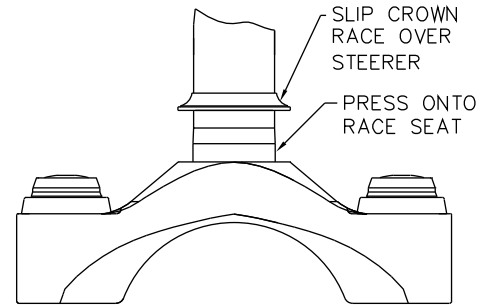


FIGURE 1: RACE INSTALLATION

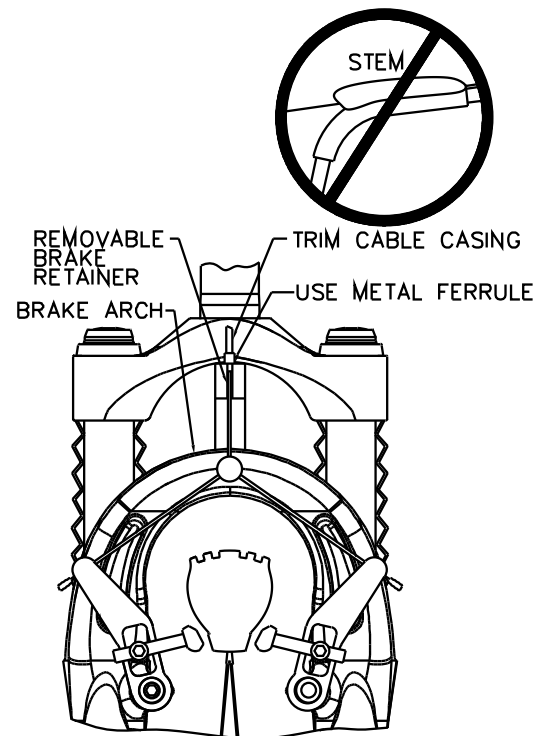


FIGURE 1: BRAKE CABLE ROUTING

SPARE PARTS: Table 1

Spare parts can be ordered through your local dealer. If you have any problems that you cannot resolve with your dealer, you may call Answer Products Technical / Warranty Service Department at (805) 257-4411, 8:00 AM to 5:00 PM, Pacific Standard, Monday through Friday. In addition helpful information can be found on the Answer Products Web Site, <http://www.answerproducts.com>. Include on the site is downloadable manuals and e-mail to technical support.

DESCRIPTION	P	ART #
99 X-VERT TI STEM/CLAMP KIT	85-3735	
99 X-VERT R STEM/CLAMP KIT	85-3736	
99 SOFT KIT SX E, SX, SX R & X-VERT E	85-3751	
99 MEDIUM KIT SX E, SX, SX R & X-VERT E	85-3752	
99 FIRM KIT SX E, SX, SX R & X-X-VERT E	85-3753	
99 ADJUSTER KIT SPYDER R, SX, X-VERT E	85-3754	
99 SX R, SX TI, SX C, X-VERT COMPRESSION DAMPING KIT	85-3805	
99 X-VERT T & X-VERT R LOWER SHAFT ASSEMBLY	85-3808	
99 X-VERTE & X-VERT T LOWER SHAFT ASSEMBLY	85-3809	
MANITOU PREP M GREASE, 6 OZ.	85-3810	
MICRO L GREASE GUN HEAD	85-3812	
99 X-VERT T COMPRESSION DAMPING ASSEMBLY	85-3816	
99 X-VERT R & X-VERT TI COMP DAMPING ASSEMBLY	85-3817	
99 X-VERT TI LOWER SHAFT ASSEMBLY	85-3819	
99 X-VERT BUSHING SEAL KIT	85-3828	
99 X-VERT C BUSHING SEAL KIT	85-3829	
98/99 SOFT RIDE KIT X-VERT, X-VERT R & X-VERT T	85-3871	
98/99 MEDIUM RIDE KIT X-VERT, X-VERT R & X-VERT T	85-3872	
98/99 FIRM RIDE KIT X-VERT, X-VERT R & X-VERT T	85-3873	
98/99 BUSHING REMOVAL TOOL	85-3892	
MICRO-LUBE DEMO KIT	85-3910	
99 X-VERT OUTER ASSEMBLY BRIGHT RED NO STICKERS	85-4007	
99 X-VERT OUTER ASSEMBLY BLACK NO STICKERS	85-4009	
99 X-VERT CARBON OUTER ASSEMBLY	85-4014	
99 X-VERT RED STICKER KIT	85-4034	
99 X-VERT MANGO STICKER KIT	85-4035	
99 X-VERT T MANGO STICKER KIT	85-4036	
99 X-VERT T BLUE STICKER KIT	85-4037	
99 X-VERT R MANGO STICKER KIT	85-4038	
99 X-VERT R BLACK STICKER KIT	85-4039	
99 X-VERT CARBON STICKER KIT	85-4040	
99 X-VERT E YELLOW STICKER KIT	85-4041	
99 X-VERT E BLACK STICKER KIT	85-4042	
99 X-VERT E CROWN/STEER/LEG KIT	85-4051	
99 X-VERT CROWN/STEER/LEG KIT	85-4052	
99 X-VERT T TRIPLE CROWN/STEER KIT	85-4053	
99 X-VERT R TRIPLE CROWN/STEER KIT	85-4054	
99 X-VERT C TRIPLE CROWN/STEER KIT	85-4055	
99 X-VERT C BOOT KIT	85-4056	
99 X-VERT C BUSHING SEAL KIT	85-4057	
99 X-VERT CLAMP SHIM KIT	85-4058	

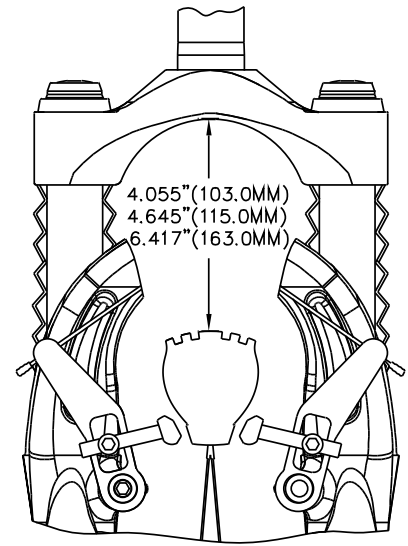


FIGURE 3: TIRE CLEARANCE

FIGURE 6: 99 X-VERT R SMALL, MEDIUM & LARGE FORK SCHEMATIC

BUSHING & SEAL DETAIL

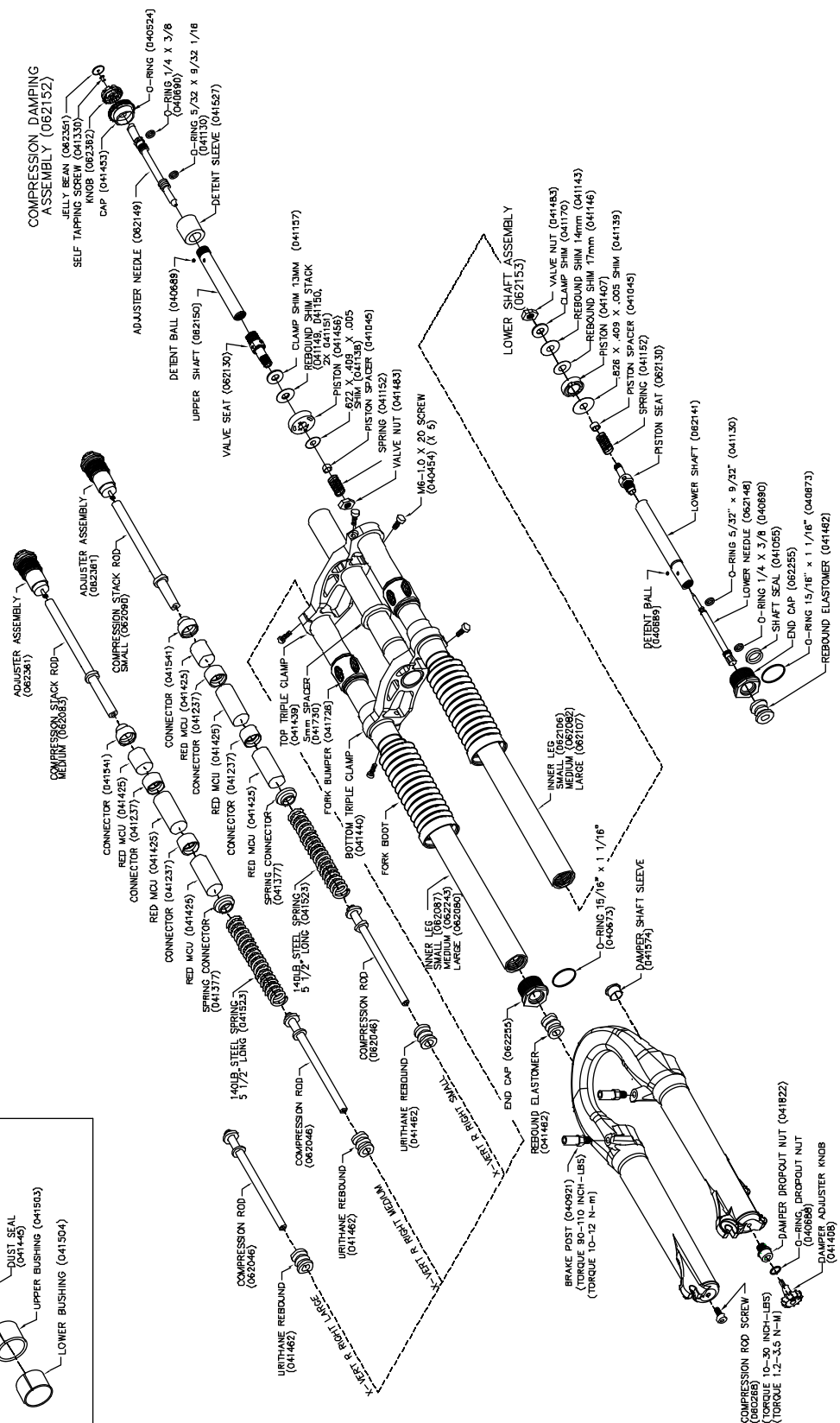
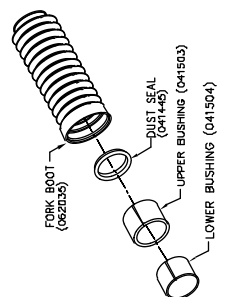
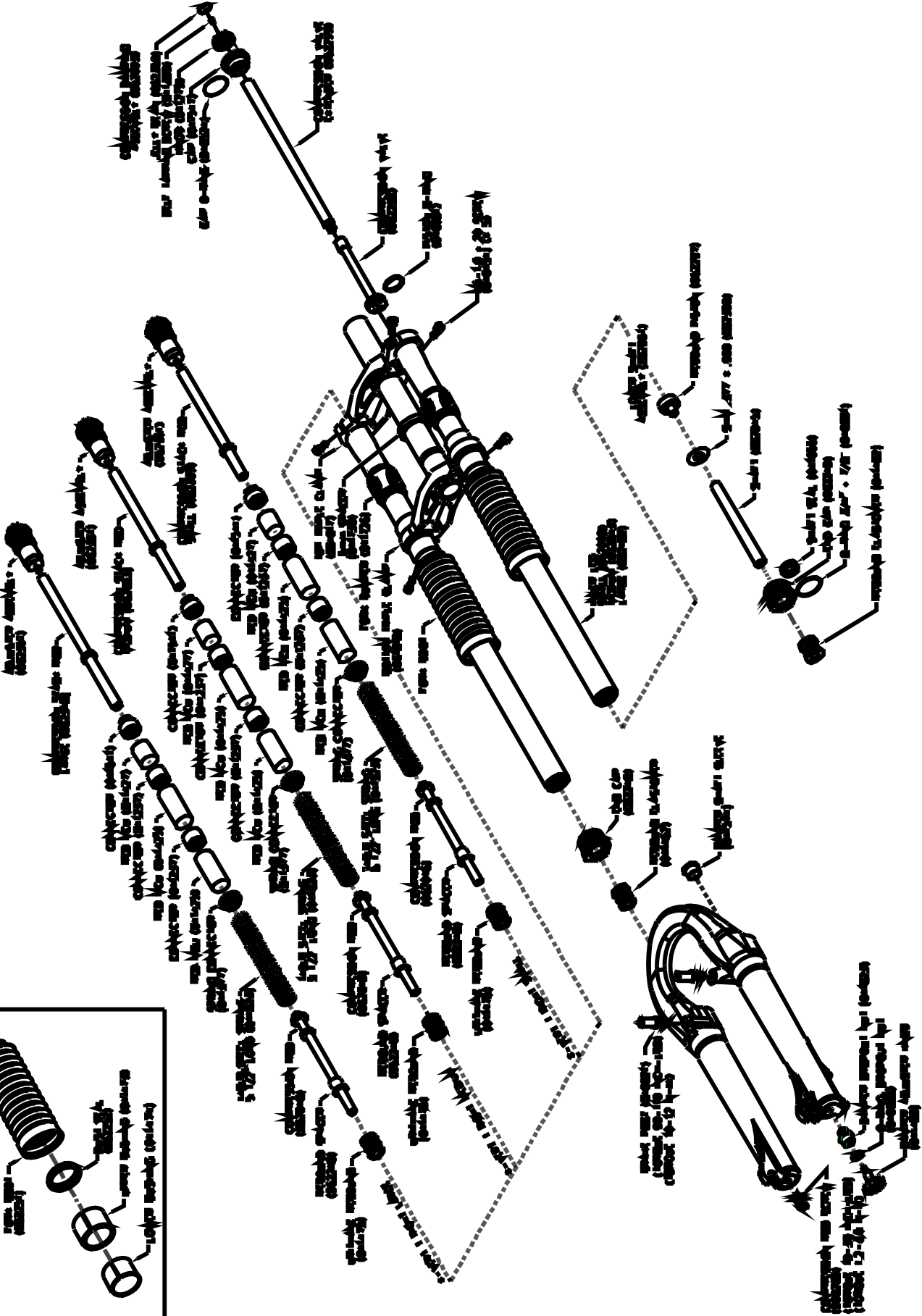
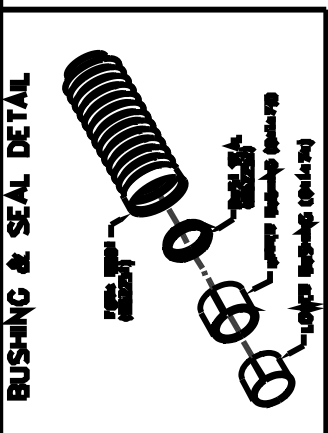


FIGURE 7: 99 X-VERT T SMALL, MEDIUM & LARGE FORK SCHEMATIC



MAINTENANCE

IMPORTANT: The 99 X-VERT should not be used if any parts appear to be or are damaged. Contact your local dealer or Answer Products for replacement parts.

IMPORTANT: Use of fork boots is required to keep your 99 X-VERT performing well and your warranty in effect. Use of this fork with the boots removed will shorten the life of the fork, reduce the performance and void the warranty.

Your 99 X-VERT Fork requires periodic maintenance, cleaning, and inspection. Moisture and contamination may build up inside the fork depending on the severity of riding conditions. To maintain top performance it is recommended that the fork be periodically disassembled, cleaned, dried and re-greased using the grease ports on the back of each leg. Figure 9

IMPORTANT: When filling the fork with grease through the grease ports it is important to note the grease is being forced between the upper and lower bushing. If the area is overfilled the force of the grease may force the upper bushing and dust seal out.

IMPORTANT: Before every ride you should:

1. Ensure that quick release skewers are properly adjusted and tight.
2. Wipe the inner legs clean, lubricate and check entire fork for any obvious damage.
3. Check headset adjustment.
4. Insure that the front brake cable is properly seated in the cable retainer & check brake adjustment.

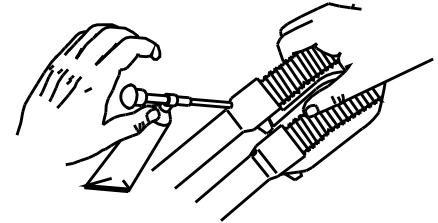


FIGURE 9: LUBRICATING THE BUSHINGS

IMPORTANT: Maintaining the proper oil level in your TPC is very important. Not enough oil will allow foaming and reduce the performance. Too much oil will restrict travel and may cause damage to the system and an unsafe riding situation. Finish reading this entire section prior to making any changes to the oil level.

To check the oil level remove only the compression damping assembly located in the top of the left leg. Leave the right side compression stack (adjuster, MCU, spring assembly) in place to keep the fork fully extended. Use a tape measure or "dip stick" to determine the oil level. It is recommended that you replace your oil at least once during the season, twice if it has been contaminated with dirt, mud, or other foreign substance. Use SAE 5WT Maxima fork oil or equivalent. Refer to Figure 10 for recommended oil level for specific fork models refer to table 2.

OIL LEVEL TABLE: 2

Fork Model	Minimum	Maximum	Recommended
X-VERT	3.5"(89MM)	4.5"(114MM)	3.0"(76MM)
X-VERT E	3.5"(89MM)	4.5"(114MM)	3.0"(76MM)
X-VERT T	8.0"(203MM)	10.0"(254MM)	9.0"(229MM)
X-VERT R	7.0"(178MM)	9.0"(228MM)	8.0"(203MM)
X-VERT TI	7.0"(178MM)	9.0"(228MM)	8.0"(203MM)

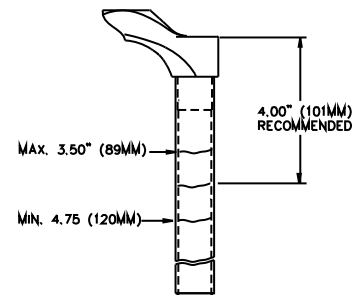


FIGURE 10: TPC OIL LEVEL

GENERAL DISASSEMBLY

NOTE: The Fork does not need to be removed from the bicycle for general disassembly-assembly or cleaning. It is also not necessary to disassemble the 98 Manitou Forks for compression Elastomer replacement. Elastomer replacement is accomplished by removing the adjuster assembly per Figure 12.

Removal of outer leg / arch assembly Figure 11:

1. Use a 4MM allen wrench to remove the M6 lower compression rod screw from the right leg dropout. Pop out the damping adjuster knob from the left dropout, X-VERT R & X-VERT TI. A small screwdriver may be helpful. Use a 8MM allen wrench to remove the dropout nut. Fully compress the fork to prevent the compression rod and damper shaft from turning while removing screws.

2. Pull outer leg assembly down to remove from the inner legs and crown.
3. Remove fork boots.
4. Bushing replacement will require the use of the bushing removal and installation tool available from Answer Products. It is recommended that the bushings be left installed unless they absolutely need replacement.

Note: It is not recommended to remove the dust seal every time the fork is disassembled. The seal and bushings may be cleaned and re-greased in place.

Compression Stack & Compression Rod Removal Figure 12:

1. Press the bottom clip off the compression rod.
2. Slide off the rebound elastomer from right leg compression rod.
3. Unscrew and remove the adjuster assembly by hand.
4. Turn fork upside down to remove the compression rod. If forks are installed on bicycle give the rod a quick upward thrust and catch it as it pops up above the crown.

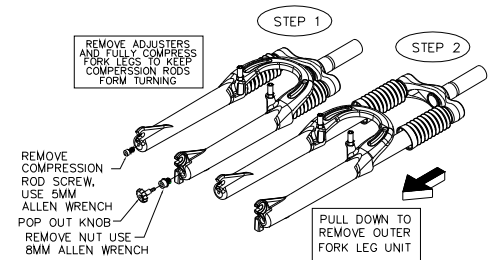


FIGURE 11: OUTER LEG REMOVAL

Lower Shaft Disassembly Figure 13:

Note: Lower Shaft disassembly is best done with the fork removed from the bicycle. Disassembly of the damping stack is not required unless you want to change or replace the shim stack.

1. Remove the left cap compression damping assembly from the top of the fork leg and pour the oil out of the top of the fork and discard appropriately. For complete disassembly continue.
2. Remove the plastic end cap and pull the lower shaft out of the inner leg.
3. Remove the clear plastic detent sleeve and capture the 1/8" dia. detent ball used on X-VERT and X-VERT R.
4. X-VERT TI adjuster needle may be unscrewed from the shaft.
5. For X-VERT, X-VERT R and X-VERT TI use 5MM allen wrench to remove piston seat. Keep note of the exact order of the shims and spacers.

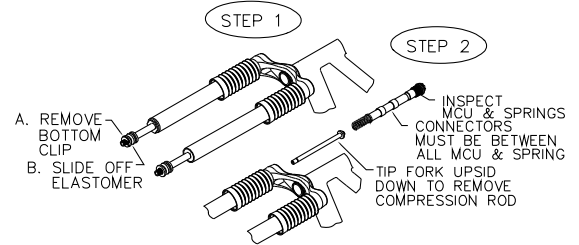


FIGURE 12: OUTER LEG REMOVAL

Compression Damping Disassembly Figure 14:

1. The compression damping assembly is almost identical to the lower shaft assembly.
2. Unscrew the compression damping adjuster all the way until it stops. The knob and the needle do not need to be removed. The shaft also does not need to be removed from the cap. The threads are bonded to prevent leaking.
- 3.
4. Remove either the valve nut or the piston seat following the instructions above for the lower shaft assembly.

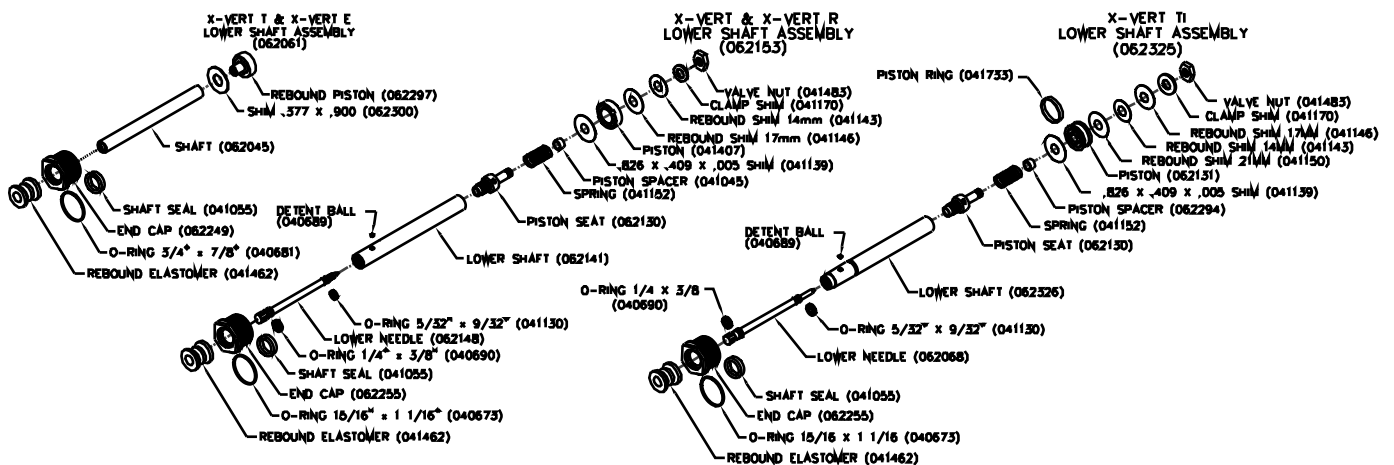


FIGURE 13: LOWER TPC SHAFT ASSEMBLY

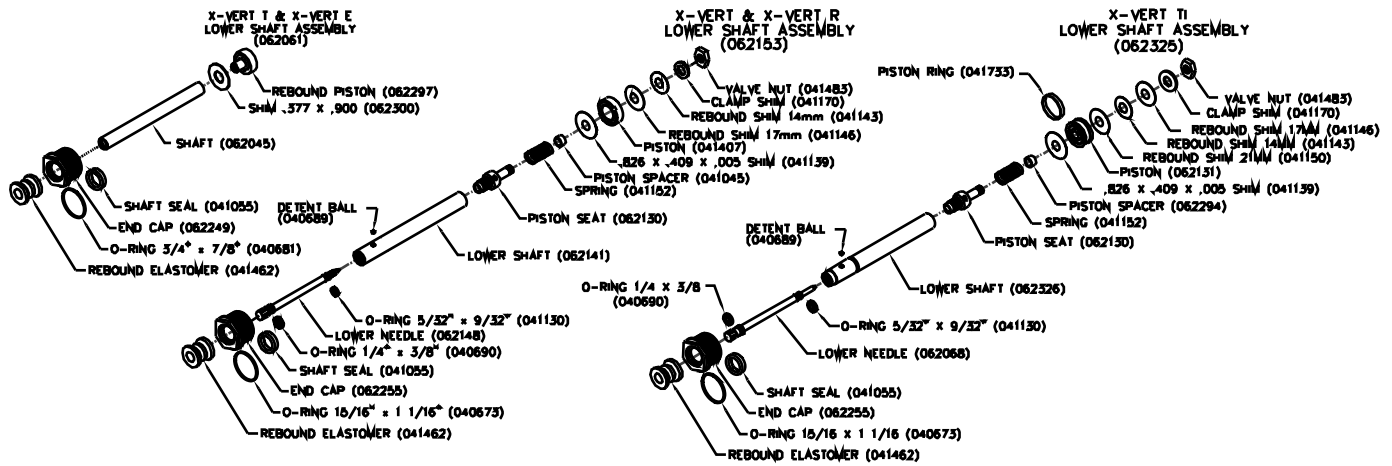


FIGURE 14: TPC COMPRESSION DAMPING ASSEMBLY

DAMPER INSPECTION

1. Check the shaft for scratches, wear, or other obvious damage.
2. Check the seal gland and end cap seal grooves for damage.
4. Check shims for permanent bends or damage.
5. Check all other parts for obvious damage, replace if necessary.
6. Replace all seals that have been removed.

FORK INSPECTION

1. Check the fork boots for obvious damage.
2. Check the dust seal for tears, wear, or damage. Replace if needed.
3. Inspect the lower and upper bushing for damage to the Teflon coating. Replace using the bushing removal and replacement kits if necessary.
4. Check all MCU & springs for obvious damage. Replace if necessary.
5. Check the preload adjuster and connectors. Replace if damaged.
6. Check the outer leg/arch assembly for nicks or deep gouges on outside and inside. Replace if damaged.
7. Check the inner leg for deep gouges and other damage. Minor wear resulting in color change is not detrimental to the gold anodized surface. Replace if wear is excessive or damaged.
8. Check inner legs at the bottom of the crown for cracks or for flaking anodize. Replace crown steer leg assembly if cracked or if gold anodize is beginning to flake.
9. Check the underside of the crown for cracks. Replace if cracked.

RE-ASSEMBLE

Lower Shaft Figure 15:

1. Install all o-rings and seals removed.
2. Grease all seals lightly with seal grease.
3. Apply small amount of blue Loctite to piston seat threads.
4. Assemble shim stack and spacers in exact order that they were removed. For X-Vert E & X-Vert T thread on valve nut and torque 30 IN-LB (3.5N-m) max. For X-Vert, X-Vert R and X-Vert TI hand tighten piston seat. Be sure large blow off washer will slide over piston spacer and compress the small spring. Clamp shaft in soft jaws or collet and line up slots in clamp ring with hole in piston seat using 1/8" or smaller pin. Use a 5MM Allen wrench and tighten piston seat by turning Allen wrench and pin at same time. Torque 30 IN-LB (3.5 N-m) max.
5. X-Vert, X-Vert R and X-Vert TI install lower needle gently into shaft, thread until it stops then back off one turn for initial adjustment.
6. Slide shaft assembly through the plastic end cap, place detent ball in place and slide on 2nd STG Elastomer.
7. Insert into left leg and thread in end cap. Torque 30 IN-LB (3.5N-m) max.
8. Add approximately 100 CC of 5 WT Maxima or equivalent oil. Do not over fill. Check oil level, see Figure 8.

Compression Damping Assembly Figure 16:

1. Reassemble compression damping stack following the instructions above for the lower shaft assembly.
2. Install compression damping assembly into the left leg. The oil level should cover the compression valve when the assembly is installed.

Compression Rod & Boots Figure 15:

1. Clean all parts thoroughly.
2. Grease compression rod lightly. Be sure rebound Elastomer is installed on compression rod.
3. Drop compression rod down into inner legs. Shake inner leg to get rod through inner leg plug.
4. Slide on rebound elastomer.
5. Slide Boots onto inner leg.

Outer Leg Assembly Figure 16:

1. Slide outer leg/arch assembly onto inner legs and fully compress.
2. Install and torque 5MM compression rod screw and dropout nut to 10-30 inch-lb. (1.1-3.5 N-m). Over torquing the dropout nut may damage the damper shaft.
3. Pop in damper adjuster knob. O-ring holds knob in place (X-VERT, X-VERT R and X-VERT TI).
4. Slide skirt of fork boots onto the outer leg groove. Be sure the lip snaps into the groove.
5. Clean adjuster cap threads thoroughly. Clean threads on inside of inner leg.
6. Assemble MCU's, springs, and connectors with thick grease.
7. Install adjuster assembly into inner leg just hand tight.

INNER FORK LEGS & CROWN

The inner fork legs and steer tube are press fit into the crown and may never be removed. Removing them will make the fork unsafe to use. If you see any slippage contact Answer Technical Staff immediately (800) 670-7446.

BRAKE ARCH

NOTE: The 99 X-VERT outer leg/arch is a one piece assembly. If the unit is damaged it must be replaced. Using the fork with damage is unsafe and could cause serious injury. Contact Answer Products if you suspect that your brake outer leg/arch is damaged.

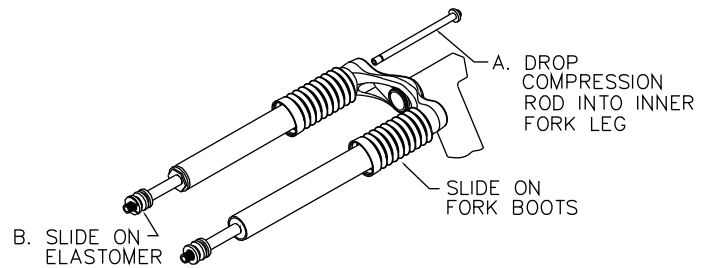


FIGURE 15: COMPRESSION ROD & BOOT

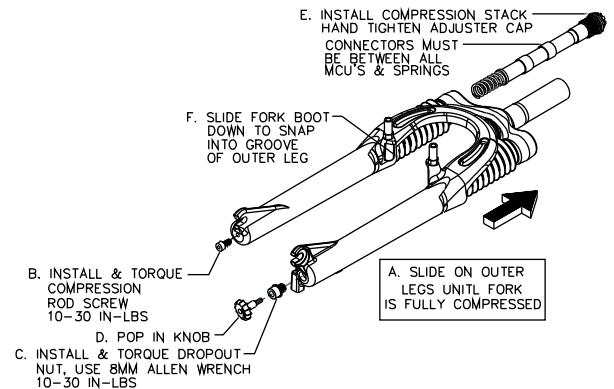


FIGURE 16: OUTER LEG ASSEMBLY

ADJUSTING RIDE QUALITIES

99 X-VERT TPC forks offer a wide adjustment range to suit individual riding preference and rider weight by simply changing the MicroCellular Urethane (MCU's). Fine tune adjustments can be made using the preload adjusters located on top of the fork crown.

NOTE: Since 98 model forks use a compression stack in the right leg only, MCU's and Springs used in previous Manitou forks are NOT interchangeable with later versions of X-VERT model Forks.

Compression Spring Fine Tuning: Figure 17

Fine tuning adjustments to the spring rate are made by rotating The adjuster knobs located on top of the crown. Note All 99 X-VERT fork models use compression spring systems in both right and left legs. Both right and left knobs on top of the crown adjust preload. The right knob for those models is used to adjust preload. Rotating the knobs clockwise will firm the ride, adding preload to the compression stack. Rotating the knobs counter clockwise will soften the ride. Four full revolutions will take the adjuster from full soft to the extreme firm setting.

Compression Damping Fine Tuning: Figure 18

To adjust the X-VERT, X-VERT R and X-VERT TI simply rotate the compression damping knob located on top of the left leg and crown. Rotating the knob clockwise will increase the damping, rotating the knob counter clockwise will reduce the damping. Excessive damping will give you a harsh ride over sharp bumps like rocky sections, but will feel good in large hits like G-outs. Insufficient compression damping will bottom out in the large hit G-outs and bob a little while climbing but feel plush on the sharp hits. A correctly adjusted fork will perform good in all conditions. The X-VERT E nad X-VERT T uses TPC Sport for compression damping and is not adjustable.

Rebound Damping Fine Tuning: Figure 19

To adjust the X-VERT, X-VERT R and X-VERT TI simply rotate the rebound damping knob located on bottom of the left leg. Rotating the knob clockwise will increase the damping, rotating the knob counter clockwise will reduce the damping. Excessive rebound damping will give you a harsh ride over repetitive bumps (like braking bumps) because the fork will pack up. Insufficient rebound damping will make the fork over active, top out and slap back when landing from a jump. We suggest that you try adjusting your fork on the very active side, minimum rebound. Then try it over a variety of terrain and tune in more rebound from there. The X-VERT E and X-VERT T uses TPC Sport for Rebound damping and is not adjustable

For additional tuning tips we recommend that you obtain a copy of the MRD tuning Manual P/N 85-3485 and check out the MRD Race Tuning kits available at your dealer

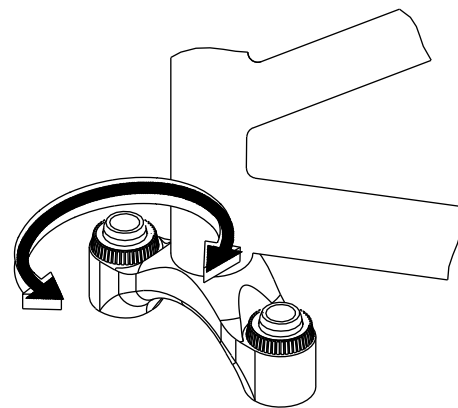


FIGURE 17: PRELOAD

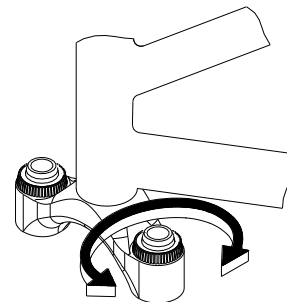


FIGURE 18: COMPRESSION DAMPING

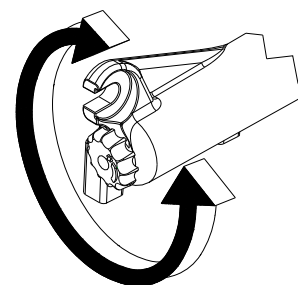


FIGURE 19: REBOUND DAMPING

TROUBLE SHOOTING

Fork seems to "top out" or has a slight clunking feel when front wheel comes off the ground:

Excessive preload or insufficient rebound damping will result in a "top out" . Select MCU's that better fit your weight and riding style, having the preload adjuster set mid to low range, and increase the rebound damping to eliminate "top out".

The fork feels less active and is not getting the travel it used to when it was new:

Chances are that the fork is developing stiction. Cleaning and applying light oil to the stanchions will help.

Outer legs feel loose on inner legs and bushings, a knock or rock can be felt when pushed from side to side:

A very small knock is normal with the new 99 harder bushings. If the knock is excessive or you can feel the fork rocking then the bushings should be removed and replaced. To do this you must have the Answer Products Bushing Removal and Replacement Tool Kit.

A small amount of oil seems to be leaking from top of the left leg at the adjuster cap:

If the 99 X-VERT us store upside down for a period of time a small amount of oil may leak through the adjuster cap / knob assembly. The cap area is not subjected to damping pressure. A small leak in that area will not affect the performance of the fork or cause any type of damage. We recommend that you store your Manitou right side up. If this condition causes you some problems please contact your Answer Products dealer or call our warranty tech department for prompt service.

CYCLE COMPUTER INSTALLATION INSTRUCTIONS:

Follow the instructions in your owners manual with the following exceptions:

WARNING: DO NOT DRILL A HOLE IN THE DROPOUT. THIS MAY WEAKEN THE DROPOUT, WILL VOID THE WARRANTY, AND MAY CAUSE AN UNSAFE CONDITION WITH RISK OF INJURY. DO NOT USE THE TEMPLATE PROVIDED IN THE 95 OR 96 SERVICE MANUAL.