# 2005 Minute Service Manual

**Rev NC**

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## Contact Information


**Answer Products Customer Service Department**
**28209 Ave. Stanford**
**Valencia, CA 91355**

**Toll Free:** (800) 423-0273
**Direct:** (661) 257-4411
**FAX:** (661) 775-1798
**E-mail:** warranty@answerproducts.com
tech@answerproducts.com
**Web site:** www.answerproducts.com

# INTRODUCTION

This manual is intended to guide the user through basic service of Manitou Minute front forks. Service is supported by the identification of common parts and assemblies that have been assembled into Service Kits. The purpose of this manual will be to describe conditions that may drive the need for service and to provide installation instructions for the kits.

Due to the time-consuming nature of suspension fork service, at this time our primary focus is to offer service kits that minimize the amount of downtime and labor involved.

**Important information is highlighted in this manual by the following notations:**

**WARNING**
**Failure to follow WARNING instructions could result in severe injury or death to the person inspecting or repairing the suspension fork or the user.**

**CAUTION**
**A CAUTION a caution indicates special precautions that must be taken to avoid damage to the product.**

**NOTE**
A NOTE provides key information to make procedures easier or clearer

**GENERAL WARNING: Suspension forks by design contain gases and fluids under extreme pressure and warnings contained in this manual must be observed to reduce the possibility of injury or possible death. Following these instructions can help you reduce the risk of being injured. Any questions in regards to the information in this manual should be directed to Answer Products Customer Service at (661) 257-4411.**

**WARNING: The Minute uses compressed air to provide fluid pressure in the damping system and spring resistance in Air models. BOTH systems must be relieved of pressure prior to servicing these systems. Failure to relieve air pressure could result in injury or possible death.**

**CAUTION:** The Minute suspension fork uses precision machined aluminum and other soft alloy components. Using correct tools for assembly is essential to prevent damage.

# FRONT SUSPENSION TERMINOLOGY

**Air Cap –** Top cap that threads into top of air/spring leg (this is the left leg of the fork as you are seated on the seat). Forks may be controlled with an air/spring or a coil spring. The air cap contains the Schrader Valve, which is used to control the spring rate or SAG of air forks.

**Air Spring –** A mechanism that is used to control the SAG of an air fork.

**Arch –** A support that connects the two outer lower legs of the casting so as to keep them moving in unison.

**Black Nitrate Leg Coating** – New coating for steel stanchion legs that reduces stiction.

**Boss –** The word used to describe an outer casting that has brake posts for V-brakes or cantilever brakes.

**Bottom Out Bumper –** A rubber or elastomer device that absorbs the shock that occurs when a suspension is compression to its limit.

**Bushings** – A cylindrical sleeve between a fork stanchion tube (inner leg) and a fork outer casting (slider), which facilitates the sliding movement between these two parts.

**Coil Spring Air Assist** – A new feature for 2005 that utilizes a full length coil spring and allows you to increase the spring rate of the fork by adding air as a booster to that coil spring.

**Coil Spring** – A coiled piece of metal that acts as a spring to help suspend a fork.

**Compression** – The phase of the suspension operation in which the wheel travels up, or travels closer to the frame. The suspension forks reaction to a bump in the trail.

**Compression Damping** – Restriction of the rate that the suspension compresses under load.

**Convertible Travel** – A system used to alter the travel of a suspension fork. It requires moving a travel clip on the compression rod to a different position. This operation is accomplished by disassembling the fork and physically moving the travel clip on the compression rod.

**Crown Steerer Assembly** – the stanchion legs (inner legs), the fork crown, and the steer tube pressed together as one assembly. This assembly is then finished by adding all of the fork internals and then outer casting (slider).

**Damping** – A function that modifies the rate of suspension compression or rebound.

**Detent** – An indentation that causes a rotating adjuster to stop at fixed increments.

**Drop Out** – The end of an outer casting (slider) where the wheel attaches.

**Dust Boot** – Usually a piece of rubber in the shape of a cylinder with baffles to allow it to compress as the fork compresses through its travel. Its function is to help keep dirt and water from getting into the inner legs of the fork.

**FFD** – Fluid Flow Damping. A Manitou patented low cost oil damping system. The compression damping is non-adjustable and the rebound damping may be non-adjustable or adjustable damping.

**Fork Crown** – The component that joins the stanchion tubes (inner legs) to the steer tube of the fork.

# FRONT SUSPENSION TERMINOLOGY (CONT.)

**Hydraulic Fork Oil** – Oil used in suspension designs to provide damping. It has special characteristics that determine how it reacts when exposed to compressed air, how it changes viscosity when its temperature changes, and how it moves through valves.

**Hydraulic Lock Out** – a condition caused when the mixture of air and damping oil is out of balance. It is caused when there is too little air space in a chamber, not allowing the fork to compress through its travel.

**Infinite Travel System (IT)** – A handle-bar mounted air travel adjust system that allows the rider to change the fork travel (and ride height) without a spring rate change. The travel can be changed from full compression to full rebound and at any place in between.

**Lock Out** – a special function that restricts the compression of the fork from moving. It is generally controlled by an external knob that is activated when a rider does not want the fork to move, thus eliminating extra energy needed to overcome the bobbing forces of the fork.

**MCU** – (Micro-Cellular Urethane) Special urethane that is filled with tiny air cells that act like springs when the elastomer is compressed.

**Micro Lube** – Lubrication system that is operated by injecting small quantities of grease directly into ports that are inserted into outer casting legs. This enables the lubrication of the fork without having to disassemble it.

**No Boss** - The word used to describe an outer casting that has no brake posts for V-brakes or cantilever brakes. This casting is to be used for disk brakes only.

**Oil Damping** – A system that uses the resistance to oil flow through holes in a valve to provide a means to alter the rate of suspension compression or rebound.

**Oil Level** – The level of damping oil needed for the optimal damping performance of a suspension. It is measured as the air space distance between the top of the stanchion leg (inner leg) and the height of the oil inside of the leg. The fork must be completely extended in order to get an accurate measurement.

**O-Ring** – A soft, flexible neoprene or Buna rubber ring with a round cross-section, which is used for sealing and retention.

**Oil Weight** – A description of the relative viscosity of oil, such as hydraulic oil. Oil with low weight numbers (5wt or 7wt) flows through the valving with less resistance than higher weight numbers (10or 15 wt).

**One Point Five Standard** - 1.5 inch interface standard for frame head tubes, headset, cups, stem, and steer tubes which allows for the lightest weight and strongest design in 170mm single crown forks. This design greatly improves the control and steering precision of the fork. It is used predominately on forks with longer travel and the intended use is for more hardcore, extreme riding.

**Outer Casting** – (see Slider)

**Preload** – A condition of compressing a spring or elastomer before the operating loads are put on the suspension, so that it provides a stiffer spring rate.

# FRONT SUSPENSION TERMINOLOGY (CONT.)

**Piston** – In front suspension, the part of the damper that slides back and forth inside of the damping leg that houses the valves. It can also refer to the air piston in the air/spring assembly that slides back and forth compressing the air, thus causing a change in the spring rate of the suspension.

**Porosity** – The condition or property of having pores in a material that will allow gas or liquid to pass through it.

**Platform Plus Damping** – A new damping system found on 2005 Rear shocks (featured on Metel and Radium's). This system will establish a pedaling efficiency platform similar to SPV, but is done through unique valving that is not adjustable (helps in bump control).

**Rapid Travel II, Wind Down** – Systems that are used to control the travel of suspension forks. Also known as RTII, and WD. RTII is used for the specific purposes of controlling the travel in two conditions: climbing and descending. WD is an incremental travel adjustment between to set limits and does not affect the spring rate of the fork as severely as RTII.

**Quad Ring seal** – New seal that replaces standard o-rings in designs that require more efficient air and oil sealing methods.

**Rebound** – The phase of the suspension operation in which the wheel returns to its original position on the ground after compression.

**Rebound Damping** – Restriction of the rate that the suspension rebounds when the compression load is relived.

**Remote Lock out system** – A handle-bar lever actuated system that controls the lock out function on front and rear suspension products.

**Reverse Arch Technology** – Also known as RA. It is a system that is designed to move the arch of a fork to the backside of a fork, rather than the conventional front position. It was designed to provide greater rotational torque strength to an outer casting (slider), without adding additional weight to the fork.

**Sag** – The amount a suspension fork compresses at rest with a normal load (rider's weight).

**Schrader Valve** – Valve used to introduce air into a chamber.

**Seal** – A part, usually neoprene rubber or Buna, that keeps contaminants out and/or working fluids in.

**Semi Bath** – A lubrication system that uses a lubricating oil to keep the bushing surface and stanchion legs (inner legs) as friction free as possible during movement of the stanchion legs.

**Spring Rate** – The rate at which the resistance of a spring increases as it is compressed.

**SPV** – (Stable Platform Valve) new damping system that allows the rider to set the pedaling platform that he desires to pedal most efficiently in all situations. It is dependent on the pressure that the SPV valve experiences from the movement of the wheel vs. the terrain and the platform that is set by pressure introduced to other side of the SPV valve through changes of air pressure working on the damping oil.

**SPV Evolve** – The latest version of SPV damping technology that has increased its performance with modifications to the original design.

# FRONT SUSPENSION TERMINOLOGY (CONT.)

**Slider/Outer Casting** – The tube (outer casting leg) of the suspension fork that0. remains fixed to the wheel. It slides up and down on the stanchion leg (inner leg).

**Stanchion Clamps** - (Double-Triple Clamps) the portions of the fork crown that clamp around the stanchion legs above and below the head tube of the bicycle frame on specific long travel applications.

**Stanchion Legs** – The suspension tube (inner leg) fixed to the fork crown. It remains stationary during the operation of the suspension.

**Steer Tube** – The long cylindrical tube that extends from the top of the fork crown. Its function is to be inserted into the bicycle head tube and attach the suspension to the bicycle frame.

**Thru Axle** – (Hex-lock) A device used for mounting a thru axle hub to special outer legs that are not made for standard quick release hubs. Manitou's Hex-lock (thru axle) system is a special patented system utilizing a hex shaped end that increases the stiffness of the fork and reduces slippage in the joint between the axle clamps and the axle.

**Top Out Bumper** – A rubber, coil spring, or elastomer device that absorbs the shock that occurs when the load is taken off a suspension so that it is allowed to rebound to its limits

**TPC** – (Twin Piston Chamber) a patented damping system that has independent pistons for rebound and compression. The system utilizes a mixture of air and oil in the damping leg of the fork to enhance the damping performance.

**TPC+** - A variation of TPC that has added a floating piston to the compression damper to enhance the performance of the compression damping under the load of bigger hits.

**Travel** – The amount that a wheel moves between the most compressed and the most extended states of the suspension

**Viscosity** – A description of how a liquid flows. Liquids with higher viscosity are thicker flow less easily or quickly than liquids with low viscosity. This has an affect on the damping speeds of rebound and compression.

**Volume Control** – A new system designed to work with SPV as a control of the compression ramp up rate of the fork. It has a range of adjustments from linear to very progressive.

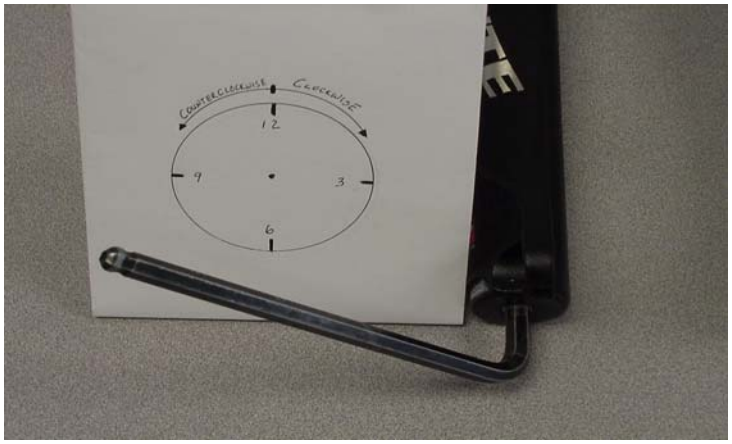
**Wiper Seal** – A rubber material that is used as a seal to keep dirt and water out of the outer casting legs. It is not designed to keep air pressure or extreme oil pressure in. Manitou has the new Evil Genius wiper seals.

# 2005 Minute Forks Disassembly and Rebuild Instructions

## Disassembly Instructions

### Removal of Outer Casting

1. On forks with Rapid Travel Adjust or Wind Down, be sure to set travel to its longest setting. For **Rapid Travel**, rotate knob on bottom right of fork leg clockwise towards the front of the fork and then push down on the fork to release its travel into the longest mode. For **Wind Down,** rotate adjuster on top left of fork crown counterclockwise until it stops. This will relieve spring tension on the fork. More complete instructions for servicing Travel Adjust systems may be found in the "Travel Adjust "section.
2. Turn the fork upside down and remove the fixing screws that attach the Rebound Adjuster Knob (Blue) and/or the Rapid Travel 1, (Red) Travel Adjust knob. Set both knobs and screws aside.
3. (**Note**: there will be three small pieces under the Red knob – wave washer, detent spring, and a plastic detent plate.)
   **USE:** 2mm Allen wrench to unscrew fixing screws.
4. Remove the 11mm Compression Rod bolt from the bottom of the left leg (From the rider's perspective).
   **USE:** 11mm socket, nut driver, or open-end wrench.
5. Insert 8mm Allen wrench into the end of the Rebound Damper Shaft on the bottom of the right leg. Turn the wrench in a ***Clock Wise*** direction in order to loosen the damper shaft in the casting (See Figure below). You are turning the Damper Shaft in a way that causes it to disappear into the casting leg.




   **USE:** 8mm Allen wrench
6. Working with the "Semi Bath" lubrication system:
   A. Position the bottom of the fork legs over a drain pan that is on the ground. Pull the casting downward towards the pan, allowing the Semi Bath oil in the casting to drip into the pan. Pull the casting completely off of the inner legs and wipe any excess oil off of inner legs and inside of casting.
      **USE:** Drainage pan and extra rags

## Removal of SPV Compression Damping Assembly

**WARNING This fork uses compressed air as part of the SPV damping system and must be relieved of pressure prior to servicing. Failure to relieve air pressure could result in injury or possible death.**

1. Remove Schrader valve dust cap from Red Hex Shaped Top Cap on the top right of the crown. Release all air pressure from the Schrader valve.




2. Remove SPV Volume Control Cap (Red Hex Shaped Top Cap) from top right of the crown with a 24mm Socket. Turn fork upside down over drainage pan to empty Damping oil from the inner leg. Stroke the Damper shaft on the bottom of the inner leg 3-5 times to purge the leg of oil that is caught below the oil piston.

   **USE:** 24mm Socket, Valve core removal tool or small object that can be used to depress valve stem

## Removal of SPV Rebound Damping Assembly

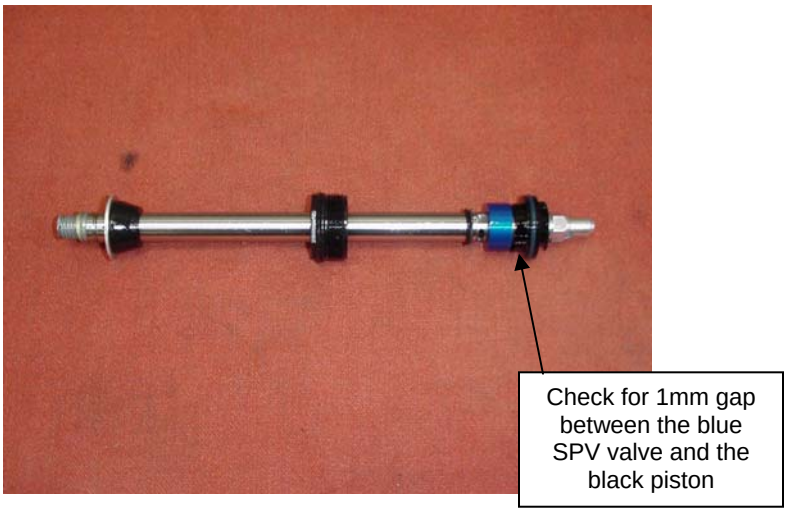
3. Unscrew Damper end cap from the bottom of the right leg and then pull the SPV
4. Damping assembly out of inner leg.



5. To check the function of the SPV valve:
   Visually inspect the gap between the SPV valve and the bottom of the damping piston. It should have approximately 1mm of space. The valve should also spring back to its open rested position after compressing it with your fingers.

If the valve is not responsive or all the time closed, it is bad and the assembly needs to be replaced

**USE:** 24mm Open-end wrench or 8-10" Adjustable wrench




## Removal of Spring and Compression Rod Assembly

1. **For Minute 2 & 3 forks (Air/spring systems as the spring)**: Remove all of the air pressure from the Schrader valve on top of the crown on the left side (Black top cap), by depressing the Schrader valve. Be sure to hold fork with the top of the crown facing upwards. (**Note**: When the air is released, this is a mixture of the oil and air inside the leg).
2. If you have not removed the Outer casting, refer to the above section on Removal of Outer Casting, then proceed to next step.
3. Unscrew the end cap on the bottom of the inner leg and remove compression rod assembly. This will consist of a compression rod, bottom and top out bumpers, the end cap, and should be followed by a coil spring and then another rod (air push rod). This spring is the one that would be changed if the fork's SAG needed to be changed beyond the capabilities of the air pressure.
4. **For Minute 1 forks (Coil Springs only):** Remove the adjuster knob from the top of the Wind Down adjuster assembly on the top of the crown on the left side of the fork, by unscrewing the 2mm Allen head screw. Use a 20mm socket and unscrew the remainder of the assembly from the crown. The spring will be attached to the bottom of the assembly, when you pull it form the inner leg.
5. Pull the spring from the assembly and it can be substituted with a different rated spring if necessary.
6. The compression rod assembly on a Coil fork may be removed in the same
7. procedure as described above in the removal of an air spring.
    a. **USE:** 24mm Open-end wrench or 8-10" Adjustable wrench, 2mm Allen wrench, 24mm socket
8. **For more specific details on Wind Down, Rapid Travel II, refer to "Travel Adjust" section of this manual.**

# Air Piston Removal and Installation

1. There are now two ways to remove the air piston from the inner leg.
2. An Air Piston Removal tool has been developed that will enable you to remove the piston without having to take the fork apart. (P/N: 85-8062**)**. Without this new tool, you will need to follow the procedures in the following section**.**

## Disassembly:

**WARNING This fork uses compressed air to provide spring resistance and must be relieved of pressure prior to servicing. Failure to relieve air pressure could result in injury or possible death.**

1. Remove air dust cap covering the Schrader valves.
    a. Depress Schrader valve to release air pressure.
    b. Remove air cap on top of Left leg with 20mm socket.
2. Remove rebound adjuster knob using a 2mm hex wrench.
3. From the right leg dropout, use 8mm hex wrench to turn the damper shaft clockwise until it can be pushed into the casting.
4. Remove 11mm hex bolt (Compression Rod bolt) from bottom of Left leg.
5. Remove crown/steer/inner leg assembly from the outer leg casting over a drain pan, because Semi Bath oil will leak out of bottom of casting once you pull the inner legs from the outer casting legs.
6. Be sure to drain all Semi Bath oil out of casting before re-assembly of fork.
7. Remove left leg end cap and compression rod assembly from inner left leg. Then remove spring and Air piston rod.
8. Use a long narrow rod approximately 18”/458mm long and no greater than ¼”/7mm in diameter and insert it into the left inner leg from the bottom of the leg. Be sure to direct the rod through the center of the negative spring assembly that is about halfway up the inner leg. Once the rod has contacted the air piston, use a rubber mallet and tap the piston out through the top of the inner leg.
   (**Caution:** Do not allow rod used for pushing piston out to contact the inside wall of inner leg during procedure, the surface of the leg could get damaged)

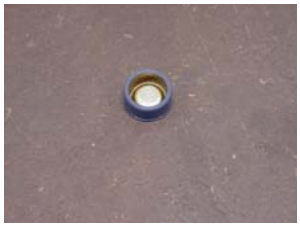
## Assembly:

1. Apply a small amount of Prep M grease (Motorex) onto the threads at the top of the left inner leg with your finger.
2. Apply a small amount of Prep M grease (Motorex) around the outside diameter of the new air piston.
3. Insert the air piston (metal side up) into the inner leg through the threaded area at the top of the inner leg. Use your fingers to push the piston past the threads into the leg.
4. Re-install the air push rod, positive spring (that has been well greased), and compression rod assembly
5. Pour about 3cc of a 40wt or greater automotive oil into the top of the piston (allowing it to slightly overflow the top of the piston) and then install the air cap assembly. Tighten the air cap assembly 30-50in/lbs.
6. Fully extend the damper shaft and slide the rubber bumper against the inner leg end cap. Insert the crown/steer assembly into the outer legs to the upper bushing. Holding the fork horizontal, inject 16cc of 5-40wt Semi bath oil into the hole at the bottom of each outer leg (Figure 2). A syringe works well for this procedure.

7. Push the outer legs past the lower bushing and reinstall the 4mm bolt and tighten 8mm damper fitting in a **counterclockwise direction**. Tighten the 8mm damper fitting to 10-30inlbs and the 4mm bolt to 20inlbs.

   ***Use a shock pump (p/n 85-4069) to fill the air system to the recommended levels as outlined in the “Minute Fastener and Torque Values”.

Air Piston is inserted into inner leg with metal side facing up



Make sure to apply a thin layer of grease to inner threads and outside of piston before installation.

Pour 3 cc of oil into top of piston

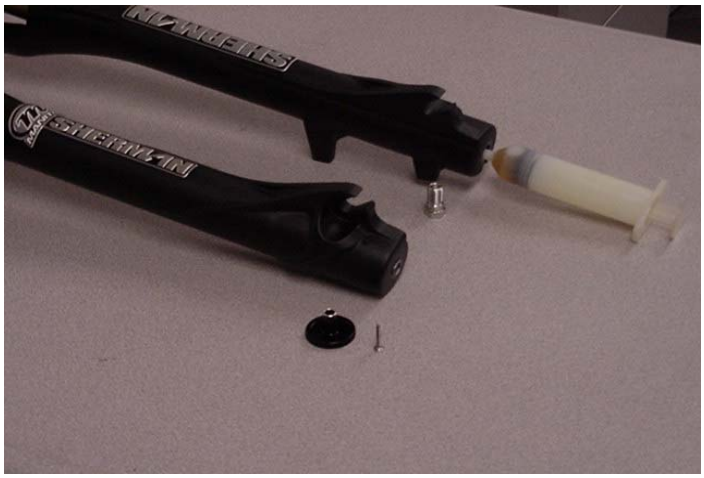


Tapping Piston out with long rod



Injecting Semi Bath Oil into casting

Put 16cc's of oil into each leg



## Bushing Removal & Installation

Please refer to section on Bushing Removal & Installation.

# Assembly Instructions

**Reassembly of Crown Steer/Leg Assembly**

**For Air Forks (Minute 2 & Minute 3)**

**WARNING All top caps for Damper and Spring systems must be properly tightened prior to use. Failure to do so could result in injury or possible death.**

1. Grease the outside of the air piston and then apply a thin film of grease to the threads at the top of the inner leg. It is recommended to use Prep M grease (P/N: 85-0031). Push the piston into the top of the left inner leg with the metallic side of the piston facing you, using your thumb. Push the piston past the threads and then pour approximately 3-4cc's of a 20-50wt oil (P/N: 85-0022) into the top of the piston. This oil needs to be checked about every 6-8 weeks of riding time. It will dissipate over time and then you may experience some air leakage and increased stiction in the fork movement.
2. Install the air cap and tighten it to value given on fork schematic.
3. Turn crown/steer/leg assembly over, so that the bottoms of the inner legs are facing you. In the same leg that you just installed the air piston and air cap into; insert the air push rod (longer end in first), then the positive spring (this is your ride kit spring) onto the short end of

the push rod, then install the compression rod assembly, and tighten end cap into leg. Tighten to torque values that are listed on fork schematic.

4. Now, install SPV damping assembly into bottom of other inner leg. Be sure to check the function of the SPV valve and apply a thin layer of Prep M grease onto o-ring that is around the piston at top of assembly. Install the assembly and tighten end cap to specified torque value.
5. Turn Crown/steer/leg assembly right side up, so that the crown of the assembly is facing you. Extend the SPV damping assembly all the way out and then pour damping oil (P/N: 85-0023) into the right inner leg. Fill leg about ¼ full. Take a rag and cover the top of the right inner leg and then stroke the SPV damping assembly up and down about 5 times. This will insure that oil gets below the piston and not create an air space. Extend the damping assembly all the way out and then fill the inner leg to the specified oil level.
6. Insert the Volume control assembly into the top of the right inner leg and tighten it to specified torque value. Be sure that you unscrew the red 16mm Hex shaped Volume control nut all of the way counterclockwise after you tighten the entire assembly into the inner leg.
7. The crown/steer/leg assembly is now complete.
8. **Use:** 8-10" adjustable wrench, Manitou Volume Control Adjuster (P/N: 85-3007), 24mm socket, metric ruler.

**WARNING All leg caps for Damper and Spring systems must be properly tightened prior to use. Failure to do so could result in injury or possible death.**

**For Coil spring Forks (Minute 1):**

1. Turn the crown/steer/leg assembly over so that the bottoms of the inner legs are facing you. Install the compression rod assembly into the bottom of the left inner leg (the leg that was the left side of the fork when you are sitting on the bicycle) and tighten the end cap to specified torque value.
2. **Refer to step 4 above, for installation of SPV damping assembly.**
3. **Refer to step 5 & 6 above, for completing the installation of the components of the damper leg.**
4. **Refer to Wind Down assembly service instructions for reassembly of Wind Down assembly.**
5. The crown/steer/leg assembly is now complete.

## Installation of Outer Casting

**For Minute 1:**

**When installing the outer Leg Casting to the Crown Steer Assy, Drop Out bolts and Damper Shafts must be properly tightened prior to use. Failure to do so could result in injury or possible death.**

1. Turn completed crown/steer/leg assembly upside down, so that the compression rod and SPV damper shaft are facing you. You will see a bottom out bumper on the SPV damper shaft; slide this bumper down towards the end cap that is threaded into the inner leg. This will help in keeping the shaft extended as you install the outer casting. You could also insert air into the damper leg through the Schrader valve on top of the right leg. This extra pressure will help to keep the shaft from moving.

2. Extend the rebound damper out from end cap as far as it will go and then slide bottom out bumper towards the end cap as far as it will go. The bumper will help to hold the damper shaft in place as you are inserting the inner legs into the casting.
3. Press inner legs into casting about half way and then inject Semi Bath oil (5/40wt. synthetic oil, P/N: 85-0022) into outer casting, holding fork at 45 degree angle to the ground with bottom of fork in the air (drop outs up). Inject **16cc's** of oil into each outer leg. It is recommended to use a syringe to inject oil.
4. Press inner leg assembly into outer leg casting until damper shaft contacts casting. Adjuster hex shaft should protrude slightly from casting.
5. Use an 8mm hex wrench to turn the damper shaft **counterclockwise**, threading it into the casting. Tighten per the Minute Schematic and Torque Specification Table.
6. Install rebound adjuster knob if applicable. Knob should turn uninhibited until the indicator is stopped by the casting. If not, remove knob and reinstall on hex shaft in 1/6 turn increments until full travel is reached.
7. Install the compression rod screw and tighten per the Minute Schematic and Torque Specification Table.
8. Now follow steps 2 – 5 from the Wind Down Travel Adjust assembly instructions.

**For Minute 2 Forks:**

Follow steps 1-7 from Minute 1 Outer casting installation instructions, above.

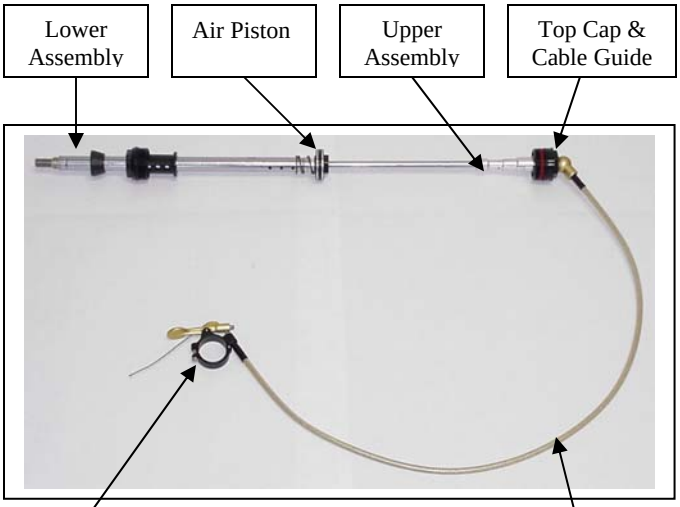
**For Minute 3 Forks:** Follow steps from InfiniteTravel service (assembly) instructions.

**Use:** 8mm Allen wrench, 2mm Allen wrench, 11mm Nut Driver or open end wrench,
Syringe for Semi Bath Oil, Air pump

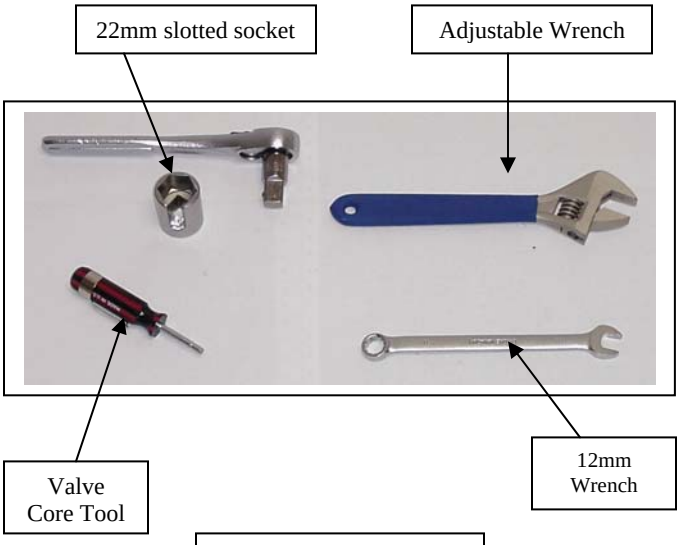
# Infinite Travel System
# (IT)

## IT System Disassembly Instructions

1. Remove front wheel and brake set from fork.
2. **Important:** you must remove all of the air from the left leg of the fork before disassembling the IT System. There may also be a discharge of a white substance when you depress the Schrader valve core (this is similar to the discharge when you depress the valve core on any of the Manitou Air or SPV forks).
3. On the bottom of the left leg (leg that has the Disk Brakes mounts on it), there is a Schrader valve protruding from it. Unscrew the valve cap and follow either of these two methods for releasing all of the air from the system.
    A. Depress the valve core and let all of the air out. Now depress the IT lever on the bike's handlebar and release it. Once again, depress valve core in the Schrader valve to release any air in the leg. Do this a couple of times, until all of the air is released.
    B. If you have a helper, have them hold the IT lever on the handlebar down as you depress the valve core. This will let all of the air out at one time.
4. Now that all of the air is released, unscrew the 12mm nut that is threaded onto the Schrader valve. It is recommended to either turn the fork upside down or hold it right side up over a drain pan to catch the Semi Bath lubrication oil that will come out of the bottom of the casting as you start the procedure of removing the casting. (see Fig 1)
5. Move over to the bottom of the right leg and unscrew the 2mm Allen screw from the middle of the rebound adjuster knob. Pull the knob away from the bottom of the casting leg exposing a recessed 8mm hex.
6. Use an 8mm Allen Wrench and turn it in a clockwise direction in order to unscrew the rebound damper shaft from the casting.
7. You can now remove the casting, exposing the fork's inner legs. Be aware that there may be some of the Semi Bath oil in the casting after you remove it.
8. Use an Adjustable Wrench and unscrew the black end cap that is threaded into the bottom of the left inner leg.
9. Pull the lower IT assembly from the inner leg. There may be a very little amount of oil that comes out of the inner leg as you remove the lower IT assembly. This is the lubricating oil used to allow the air piston on the lower shaft assembly to move freely.




**IT System Components**




**Service Tools Needed**

## Disassembly Instructions continued

10. Now it is time to remove the IT upper assembly. Release the IT control wire from the control lever by unscrewing the fixing screw on the lever that holds the cable tight. Use a 2mm Allen Wrench to unscrew this screw and then pull the cable out of the lever. (Go to Fig 2 for next step)
11. To remove the upper IT assembly, use a slotted 22mm 6 point socket (P/N: 83-2503), a 22mm Open End wrench, or an adjustable wrench.
    **(Note: Be aware of the IT control Wire spinning around when unscrewing the top cap)**
12. Pull the upper assembly out of the inner leg.



Figure 1

## Troubleshooting Tips

1. Here is a guide to help pinpoint fork travel issues.

** If the fork starts to lose travel from an extended position to a shorter position by itself, the damage is most likely centered on the Quad ring around the outside of the piston.

**If the fork extends from a shorter travel to a longer travel by itself, the failure can be involving the smaller Quad ring that is located under the piston on the inside diameter of it where the shaft of the upper assembly intersects the lower assembly and piston. The shaft is sealed against leakage at this point to define the two different chambers.

A. Always check two things when you have the system apart.

***Use a straight edge and lay it next to the inner shaft that is attached to the top cap of the upper assembly to insure that that shaft is not bowed at any point. We found that on assembly of these pieces, the shaft is pressed into the top cap and if it is over pressed, the shaft will bow. This means that at where the bow is in the travel of the shaft, it will cause the Quad ring that it is passing through, to distort. Thus air transfers from one chamber to the other and the fork will extend by itself. If this is the case, you will need a new top assembly and an O-ring kit. (Refer to Figure 3)
***Make sure that the valve core in the Schrader valve is tight and does not stick open or closed. If this is faulty, replace this valve core with a new one. Any bicycle tube valve core will work, as well as any valve cores that we currently use on any of our other products.

B. On the lower assembly, inspect the Quad ring that is around the piston at the top of the lower assembly. You are looking to see if it is seated properly and not torn or twisted. Also inspect the piston to see if there are unusual wear marks on the piston on one side of the piston only.
If this is a wear spot, then this means that the hole in the bottom of the casting is slightly off center and the casting needs to be replaced with a new one. (Refer to Figure 4)



Figure 2




Figure 3



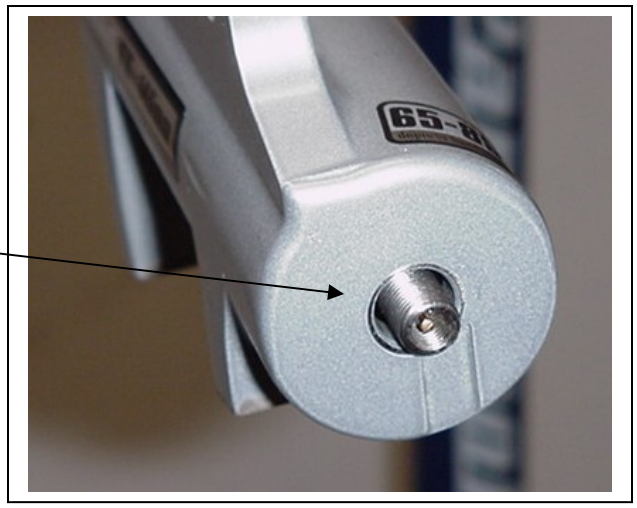
Figure 4

## Troubleshooting Tips continued

This condition causes the Lower shaft assembly to be side loaded inside of the inner leg and causes wearing of the piston that allows for a poor fit of the Quad ring and thus an air leak

C. The last item to be concerned with is the casting. When reassembling the fork, be sure to visually inspect the position of the bottom of the lower assembly as it begins to come through the bottom hole in the casting before you secure it with the 12mm nut.
If that shaft is not guiding itself straight through that lower hole without any assistance, you will eventually see the same issue as mentioned above. Once again it is a casting issue.

**(Note: Always replace all o-rings and seals provided in the IT O-ring kit, each time you take the system apart)**



## IT Control Wire Change

1. In order to change the inner control wire, start by following IT disassembly steps 2, 3, 10, 11, & 12.
2. Once you have the upper assembly out of the fork, use the adjustable wrench and the 12mm Open End wrench to unscrew the top cap from the shaft of the assembly. Refer to Figure 5 at the right.
3. As you unscrew the top cap, you will feel a little tension created by a spring that is under the cap. Separate the top cap from the shaft once you have completely unthreaded the two pieces.
4. Pull on the inner wire in order to remove the machined stopper with the cable end in it from the shaft.
5. You can now unhook the cable from the stopper and from the cable head end, pull the cable through the spring, the top cap, and the outer cable housing. Refer to Figure 6 at the right.
6. Reverse the above steps to replace the cable.
   **(Note: The inner cable can be replaced with a standard bicycle Derailleur cable)**
   **(It is recommended to replace the two O-rings on the stopper each time that it is removed from the shaft, in addition to the Black Buna O-ring that is on the shaft below the threads.)**
7. Tighten top cap on the shaft to 25inlbs (2.85Nm).
8. Put a small amount of Motorex grease on the end of the Upper Assembly shaft, and then insert the assembly into the fork inner leg.
9. As soon as contact is made with the hole in the top of the air piston/lower assembly, twist the upper assembly like screwing in a screw to guide the upper assembly shaft into the hole without damaging the Quad ring seal in the shaft of the lower assembly.
10. After reinserting the upper assembly into the fork but before screwing the top cap in, pour about 6-8cc's of 40wt. automotive oil into the fork leg through the top of the crown.



Figure 5

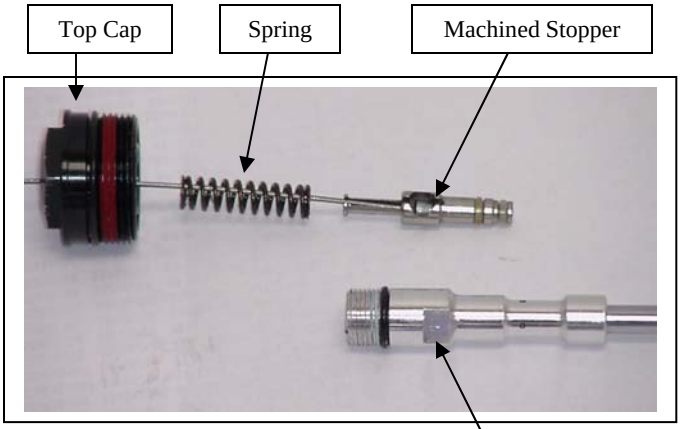



Figure 6

11. Feed the inner wire through the cable housing and secure one end of the of the housing into the gold cable guide, then feed the end of the inner wire through the hole in the black cable stop on the lever.
12. The inner wire now feeds through the hole in bottom of the lever, over the top of the lever and through the hole in the back of the lever.
13. Pull the inner wire until there is no slack in the cable. Be sure to set a 2mm gap between the front of the lever and the top of the cable stop to insure that you have not over tightened the cable before you tighten the 2mm Allen bolt on the front of the lever to cinch the inner wire. (Refer to Figure 7)
14. The last step is to cut the inner wire that is left hanging on the backside of the lever and then installing the cable end to prevent it from fraying.

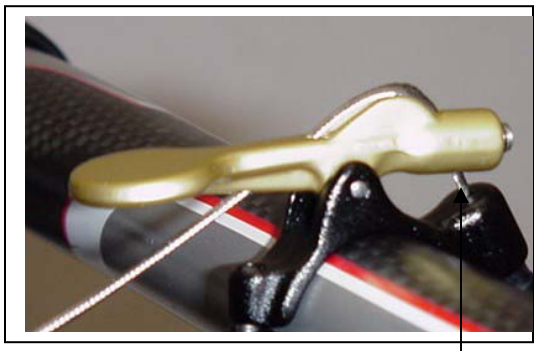



Figure 7

**Replacement of Piston Quad Rings**

1. In order to replace the Air piston Quad rings, you need a 12mm Open End wrench and an adjustable wrench.
2. Refer to Figure 8 for wrench placement. Hold the 12mm wrench in place on the flats that are on the piston seat and turn the piston with the adjustable wrench in a counter clockwise motion to unscrew the piston from the shaft.
3. Once the piston is off of the shaft, you will see a small Black Quad ring inside the top of the shaft that you just unscrewed the piston from. Use a small diameter object to remove the Quad ring from the shaft. Replace this Quad ring with a new one from your IT O-ring kit. Be sure that it is seated in the shaft and rests flat against the shelf inside of the shaft. (Refer to Figure 9)
4. Install the Air Piston back onto the shaft in the reverse of the way you removed it. Tighten the piston to 15inlbs (1.7Nm) onto the shaft.
5. To remove the large Quad ring on the outside of the piston, grasp the piston at the Quad ring like you would pinch someone with your thumb and pointer finger. Squeeze the Quad ring and you will see a section of the Quad ring move away from the piston. Use the same tool that you used to remove the small Quad ring from the shaft and pry the Quad ring off of the piston, being careful not to scar the surfaces of the piston.
6. Discard this Quad ring and replace it with a new one. Be careful not to twist it in the seat that it rests in.
7. You are now ready to reassemble the IT system.

**Note: Always change all Quad rings and o-rings when servicing the IT system**

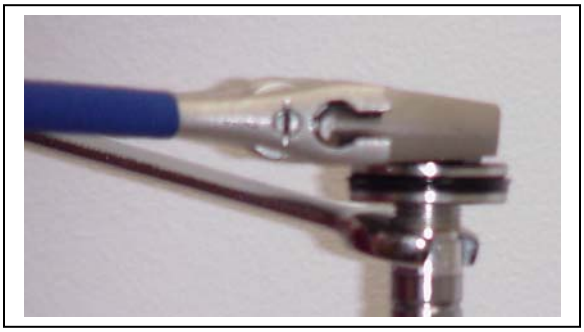


Figure 8

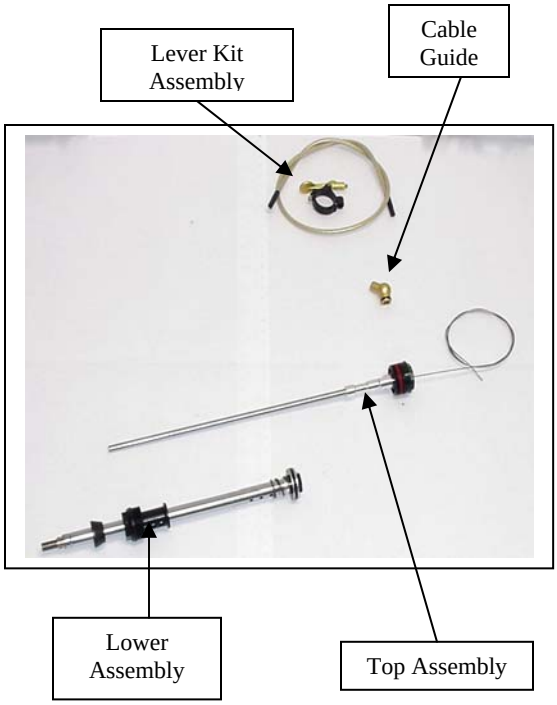


Figure 9

**Reassembly of the IT System**

1. It is recommended that when reassembling the IT system that you start by installing the lower assembly into the bottom of the inner leg first. Be sure to apply a small amount of Prep M grease to the Quad ring on the outside of the piston and onto the threads of the inner leg before inserting assembling into leg.
2. Twist shaft assembly as you insert piston past the threads of inner leg. Tighten end cap to 25-35inlbs (2.8-3.9Nm).
3. Refer to steps 8, 9, and 10 above in the "IT Control Wire Change" for installation of the top assembly.
4. Once this assembly is installed; the casting can be installed, Semi Bath oil added, and all fasteners secured.
5. When re-inflating the IT system, it is fastest if you have someone depress the control lever and hold it while you pump air into the system. This way the system equalizes immediately. If you do not have a second person to help, just add air to the system and then periodically depress the lever to equalize the pressure. This may have to be done a couple of times in order to reach the required air pressure.
6. It is recommended to initially set your fork up with an air pressure that is approximately 75% of your rider weight. Then you can fine tune your ride by adding or deleting air as you need.

**IT Service Kits**



# Travel Adjust Systems: Wind Down

**Wind Down Travel Adjust Service Instructions**

**Disassembly**

1. Turn travel adjust knob (clear plastic knob on top of the left side of the crown) in a counterclockwise direction until it stops. This insures that the fork is in its longest travel and reduces any spring preload on the fork.
2. Remove the 2mm Allen screw from the knob. Use a 28mm socket to unscrew the top cap assembly from the crown. (Refer to Figure 1)
3. Pull spring out of inner leg. If spring will not come out, you must take the outer casting off of inner legs (refer to Removal of Outer Casting instructions). Then remove the end cap from the bottom of the left leg and remove the Wind Down compression rod assembly and spring as a single unit through the bottom of the leg. You will find that on earlier production fork models, that there is a nylon washer at the top of the compression rod assembly that is holding the spring in place. Hold the spring in one hand and the compression rod assembly in your other hand and pull the apart from each other at a slight angle to each other. Once you have the two apart, remove the Allen bolt on top of the compression rod with a 4mm Allen wrench and remove the nylon washer (Fig 2). Re-install the bolt without the washer, it will not affect the operation of the Wind Down mechanism and insure that you will not have to take the whole fork apart in the future to change ride kit springs. (Note: the spring that you remove should have another spring (booster spring) intertwined within it)
   **Tools needed:** 28mm socket, 2mm Allen wrench, 8 or 10" Adjustable wrench, 11mm nut driver or open end wrench.

**Assembly**

1. If you had to remove the outer casting, reassemble the compression rod assembly and then follow instructions for Installation of Outer Casting.
2. Optional Ride Kits - If you need to adjust to overall ride characteristics either softer or firmer, purchase and/or install as follows (Kit Part Numbers can be found in the Service Part section of this manual):

   - Soft - Remove the Booster Spring
   - Firm - Purchase Firm Ride Kit and install the Booster Spring
   - Extra Firm - Purchase Extra Firm Ride Kit and install the Booster Spring

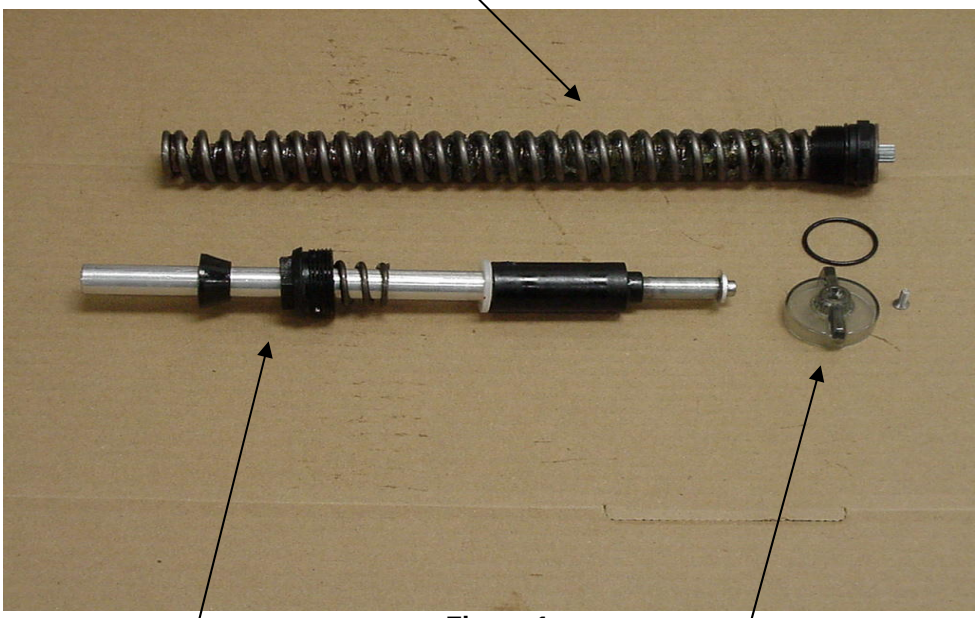
   1. To remove the booster spring from the main spring; grasp the flat end of the booster spring with a pair of needle nose pliers and twist it in a clockwise direction to unscrew it from the main spring.
   2. To install a booster spring into a main spring catch the flat end of the booster spring under the flat end of the main spring and twist it counterclockwise into the main spring. Make sure that the booster spring is threaded all of the way down into and contained by the main spring. Before inserting it back into the inner leg.

3. Generously grease the spring and insert it into the inner leg. The spring needs to seat onto the top of the compression rod.
4. Insert the wind down top cap assembly into the spring; the "D" shaped portion of the adjuster assembly must fit into the "D" shaped end of the main spring. Screw the assembly into the inner leg and tighten per the fastener torque guide at the end of this manual.

5. Install adjuster knob and 2mm hex screw. Turn the knob counterclockwise until it stops. This insures that the fork is in its longest travel position. If the travel indicator arrow on the crown is not lined up with the maximum travel point on the indicator dial, loosen the compression rod bolt on the bottom of the outer casting and continue to turn the knob counterclockwise until the indicator point to maximum travel. Retighten the compression bolt per the fastener torque guide at the end of this manual.

**Wind Down Travel Adjust Assembly**

Top Cap Assembly & Spring

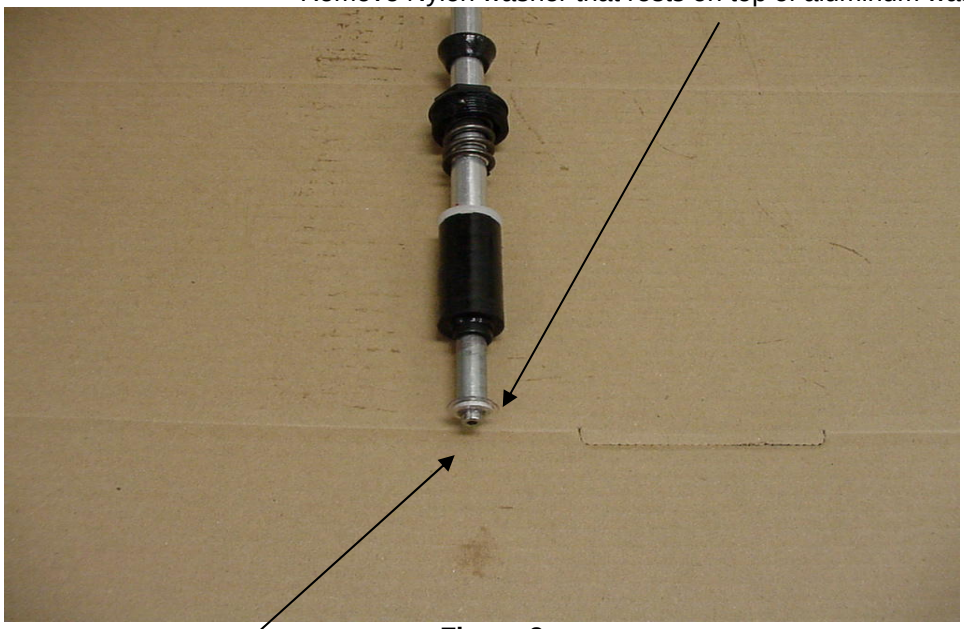


Travel adjust assembly & End Cap

Adjuster knob O-ring, knob, & 2mm screw

**Figure 1**

Remove Nylon washer that rests on top of aluminum washer



4mm recessed Allen bolt

**Figure 2**

# Bushing Removal & Installation

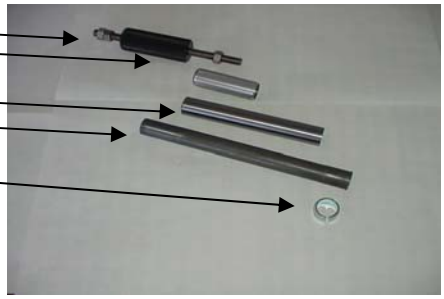
## Bushing Removal

(Note: use appropriate removal ring that corresponds to the leg diameter of the fork being repaired)

| **Leg Diameter** | **Answer Kit #** |
|---|---|
| 25.4mm (1”) | 85-5191 |
| 28.6mm (11/8”) | 85-5189 |
| 30mm | 85-5194 |
| 32mm | 85-5192 |

Bushing Removal Tool Components

A. Slide Hammer
B. Threaded Handle
C. Slide
D. Threaded Shaft
E. Removal Ring



Bushing Removal Tool Assembly



## Bushing Removal (CONT.)

***Bushing Removal Instructions***

A. Install 25.4mm Removal ring on the shiny, smaller diameter threaded shaft. Be sure to install the ring with the tapered, chamfered end first, followed by the long slide tube. This tapered end leads the tool through the bushing.

B. Start the procedure by removing the Dust/Wiper seal with a screwdriver, prying it out.

C. Insert Removal tool past the upper bushing and then stop. It is important to pull one bushing out at a time. Push the slide on the threaded shaft down towards the removal ring. Hold the casting with one hand and the slide hammer with your other hand. Now move the slide hammer in a motion away from the casting and repeat this action until the bushing comes out.

D. For all other leg diameters: use the larger diameter (dark colored) threaded shaft and repeat steps A-C.

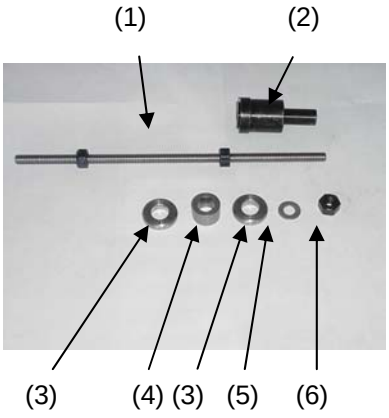


## Bushing Installation

(Note: Sizer kits listed in above chart contain the sizers needed for each specific leg diameter.)

**Bushing Installation Tool Components**

1. Installation Mandrel
2. Threaded Rod w/nuts
3. Sizer rings
4. Spacer
5. Washer
6. Nut



# Bushing Installation (CONT.)

***Bushing Installation Tool Assembly***
With weighted handle



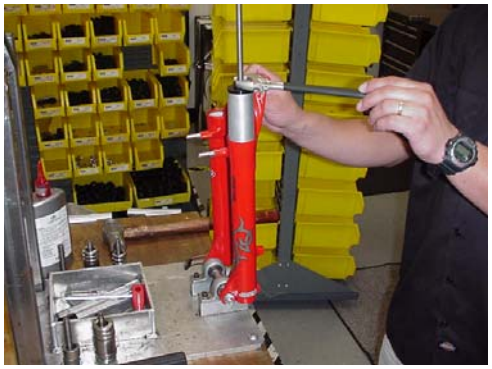
When selecting sizer rings to install bushings, choose the two rings that are in the middle of the size run to start with.

1. Assemble installation tool as shown in picture above. Each leg diameter kit has all of the needed pieces to remove and install bushings for forks with serviceable bushings. Some of the kits come with gauges to tell you how far to drive in the lower bushings. Upper bushings are driven in as far as the stop in the top of the casting will allow. The general rule of thumb is that the lower bushings must not be driven any deeper than 5" into a casting leg. If they do go deeper, call Customer Service at Answer Products – 800-423-0273 for a new outer casting.



2. Always assemble Mandrel with the larger diameter sizer ring being placed on the mandrel first, then the spacer, the next largest sizer ring, followed by the washer and the nut to hold it in place. Be sure to lock the nut above the Mandrel and below the Mandrel against each other.

3. Replace the lower bushing (bushing with a thicker wall diameter) first. Place a small amount of Prep M grease onto the sizer rings to help the rings come through the bushings when pulling them out. Slide bushing onto Mandrel until it stops. Apply a bead of Red Loctite all the way around the outside of the bushing. Hold casting on top of bench with a rag under the end of the legs and insert installation tool with bushing into casting leg.



## Bushing Installation (CONT.)

4. Slide weighted handle onto end of threaded rod and tap rod into casting with rubber Mallet until proper depth is achieved. If using depth gage, slide gage onto rod before installing weighted handle and let it settle on of Mandrel. Tap rod until appropriate line on gage is even with top of casting leg.

5. Remove weighted handle and gage (if applicable).

6. For sizing of the lower bushing:

7. Use slotted top cap from sizer kit and set it into the top of the casting leg, straddling the threaded rod. Spin the extra nut with washer down to the top cap and using a wrench, socket, or speeder wrench, tighten the nut in a clockwise direction. This will cause the Mandrel to be pulled through the bushing, thus sizing it. Keep turning the nut until the tool is all the way through the bushing and can be pulled out of the leg.

8. To install top bushings, repeat steps B-E. Note that the top bushing gets inserted until it stops against the step inside of the casting. The extra sleeve that comes with the sizer kit is used to space the top cap off of the casting, so that there is enough room to pull the sizers out of the casting without bottoming on the cap.

9. If you find that the bushings are too tight after installing them, use the sizer Mandrel that does not have a stop on it to hold the bushing while installing it into the casting. This is available in the 25.4mm leg kit (85-5191) to go back in and resize the bushings.

10. To resize bushings, Choose the next larger size rings and repeat the above process.

11. When satisfied with the results, reinstall Dust/wiper seals and then reassemble fork

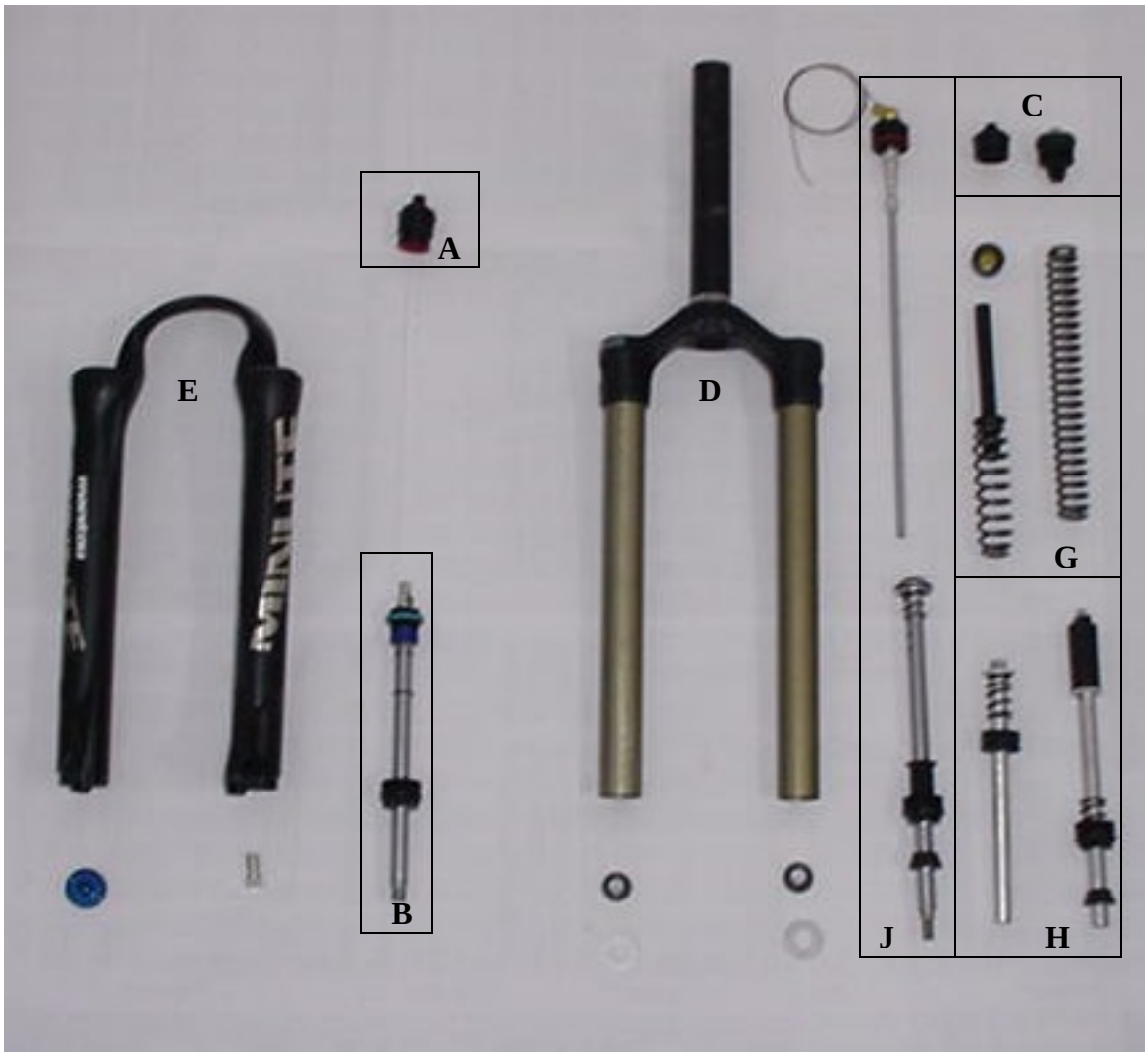
# TROUBLESHOOTING

| Symptom | Cause | Solution | Service Manual Page |
|---|---|---|---|
| Air Loss | Schrader Valve leaks | Tighten Valve core, replace bad parts as needed. | |
| | Air Cap O-ring leaks | Make sure O-ring is seated properly, replace parts as needed. | |
| | Air Piston leaks | Check oil volume on top of piston, replace parts as needed. | |
| | Air Top Cap leaks | Check O-ring, tighten cap to proper Torque, replace parts as needed. | |
| Oil leaks from Wiper Seals | Seal not seated properly | Remove Casting from Inner Legs, reinstall or replace seals | |
| | Nicks or scratches on inner legs | Replace Crown/Steerer/Inner Leg Assembly | |
| | Too much Semi Bath oil | Follow instructions for removal and installation of Outer Casting | |
| | Wear | Remove Casting from Inner Legs, reinstall or replace seals | |
| Oil leaks from bottom of Casting | Rebound damper shaft leaks | Replace Rebound Damping assembly | |
| | Rebound damper shaft O-ring damaged | Replace O-ring on threaded end of Rebound Damping assembly | |
| | Compression Rod Bolt leaks | Check O-ring on bolt to see if it is damaged and then reinstall | |
| Lack of Travel | Tight Bushings | Resize bushings or replace with new ones if damaged | |
| | Hydraulic lock out | Replace Rebound Damping assembly | |
| | Semi Bath oil volume | Follow instructions for removal and installation of Outer Casting | |
| | Damper oil volume | Check oil level, Replace Rebound Damping assembly if needed | |
| | Fork alignment | Visually inspect fork, call Answer Products Customer Service | |
| Loss of SPV damping | SPV valve not functioning | Inspect for damage, check valve gap, replace assembly if needed | |
| | Damper oil volume | Check oil level, refer to "Oil leaks from bottom of Casting" | |
| | Rebound knob does not turn | Replace Rebound Damping Assembly | |
| | Loss of SPV air pressure | Refer to "Air Loss- Schrader valve leaks and Air Cap O-ring Leaks" | |

## TROUBLESHOOTING (CONT.)

| Symptom | Cause | Solution | Service Manual Page |
|---|---|---|---|
| Fork Top out | Loss of Rebound Damping | Replace Rebound Damping assembly | |
| | SPV Valve not functioning | Refer to " Loss of SPV Damping - SPV valve not functioning" | |
| | Top out spring damaged | Inspect and replace Top out spring if needed. | |
| | Damping oil volume not correct | Check oil level, Replace Rebound Damping assembly if needed | |
| Fork Bottom out | Too much SAG | Refer to SAG Set up in Tuning section of Owners Manual | |
| | Bottom out Bumper damaged | Inspect and replace Bottom out Bumper if needed | |
| | Damping oil volume not correct | Check oil level, Replace Rebound Damping assembly if needed | |
| Play in Fork | Loose bushings | Resize bushings or replace with new ones if damaged | |
| | Loose Compression Rod bolt | Tighten bolt to specified torque | |
| | Loose Rebound damping shaft | Tighten Shaft to specified torque | |
| | Loose press fit tolerances | Call Answer Products Customer Service | |

# Minute: Fastener Torque and Setup Levels




| Model: Minute | |
|---|---|
| **Description** | **Torque Values** |
| Torque – Brake Post | 90–110inlbs (10.2-12.4nm) |
| Bushing Depth Left Lower | 4.25 – 4.50in (108-113mm) |
| Bushing Depth Right Lower | 4.25 – 4.50 (108-113mm) |
| Leg Caps - Not Cross-Threaded | 25–35inlbs (2.8-4.0nm) |
| Torque – Damper Screw | 10-30inlb (1.1-3.4nm) |
| Torque - Comp Rod Screw | 10-30inlb (1.1-3.4nm) |
| Adjuster caps & Top Caps | |
| Torque | 35-50inlbs (4.0-5.7nm) |
| Semi Bath Oil Volume | 16cc per leg |
| Damping oil Level (100-130mm Travel) | 3.9in, 75mm, 120cc |
| SPV air pressure | 40-100psi |
| | |

# Minute Service Kits

| Model | | One | Two | | Three |
|---|---|---|---|---|---|
| Travel (mm) | | 100-130 | 100 | 130 | 130 IT |
| SPV Volume Control Assy | A | 85-5871 | | | |
| SPV RbndComp Damp Assy | B | 85-5872 | | | |
| Pre Load Adj/Top Cap | C | 85-5950 | | | |
| Air Cap | C | | 85-5873 | | |
| Crn/Str/Leg | D | 85-5874 | 85-5875 | 85-5951 | 83-2493 |
| Outer Leg Assy | E | | | | |
| STD | Matte Black, Integrated | 85-5953 | | | |
| STD | Matte Black | 85-5876 | | | |
| STD | Matte Grey | 85-5877 | | | |
| No Boss | Matte Black, Integrated | 85-5952 | | | |
| No Boss | Matte Black | 85-5878 | | | |
| No Boss | Matte Grey | 85-5952 | | | |
| No Boss | Gloss Silver | 85-5879 | | | |
| Sticker Kit | F - Silver | 85-5861 | | | |
| | F - Black | 85-5862 | | | |
| Ride Kits | G | | | | |
| | ***WD Booster | 85-5954 | | | |
| | ***X-Soft | | | | |
| | ***Soft | 85-4494 | 85-5883 | 85-5882 | |
| | ***Medium | | 85-5886 | 85-5885 | |
| | ***Firm | 85-5881 | 85-5888 | 85-5887 | |
| | ***X-Firm | 85-5884 | | | |
| Comp Rod/ | H | 85-5892 | 85-5889 | 85-5890 | 85-5891 |
| Air Push Rods | | | 85-5955 | 85-5956 | |
| IT Bottom Assy | | | | | 83-2442 |
| IT Top Assy | | | | | 83-2440 |
| IT Cable Guide | | | | | 83-2318 |
| IT Handlebar Assy | | | | | 83-2319 |
| Knob Kit | I | 85-5893 | | | |
| Seal Kit | K | 85-5281 | | | |
| Air Piston Kit | G | | 85-5266 | | |
| Bumper Kit | K | 85-5894 | | | |
| O-Ring Kit | K | 85-5895 | | | 83-2443 |
| Bushing Kit | E | 85-5321 | | | |
| *****Lock Out | A | 85-5896 | | | |