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south

2004 SERVICE MANUAL

South Super
South Elite
South Comp

answerproducts incorporated

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Table of Contents

Description	Page
Introduction	3
Glossary of Terms	4
Disassembly Instructions	6
Assembly Instructions	7
Troubleshooting Chart	9
South Schematic and Torque Specifications	10
South Service Kit Chart	11

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INTRODUCTION

This manual is intended to guide the user through basic service of Manitou South 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 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 can contain preloaded springs, 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: Suspension forks uses preloaded spring(s) to provide compression spring resistance. This system must be relieved of preload prior to servicing. Failure to relieve air pressure could result in injury or possible death.

CAUTION: Suspension forks use precision machined aluminum and other soft alloy components. Using correct tools for assembly is essential to prevent damage.

GLOSSARY OF TERMS

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

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 – 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.

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).

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.

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

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.

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

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.

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

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).

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

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

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

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.

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

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

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.

2004 South Forks Disassembly and Rebuild Instructions

Disassembly Instructions

Removal of Outer Casting

1. From the left leg dropout (Left when sitting on the bike), use a 4mm hex wrench to remove the compression rod screw.
2. South Comp and Elite: From the right leg dropout, use a 6mm hex wrench to turn the compression rod **clockwise** until it can be pushed into the casting. If you cannot unscrew the compression rod see step 5 below.
3. South Super: From the right leg dropout, use a 8mm hex wrench to turn the compression rod **clockwise** until it can be pushed into the casting. If you cannot
4. Remove crown/steer/inner leg assembly from the outer leg casting.

Bushing Removal & Installation

Please refer to section on Bushing Removal & Installation.

Removal of Spring and Compression Rod Assembly

WARNING This fork uses a preloaded coil spring provide spring resistance. The spring must be relieved of its preload prior to servicing. Failure to do so could result in injury or possible death.

1. Turn spring preload adjuster knob counter clockwise until it stops. Remove 2mm hex screw on spring preload adjuster knob and remove knob on the top left side of the fork.
2. Remove preload adjuster using 18mm socket.
3. Compress fork and remove the spring preload, MCU, and spring assy.
4. South Comp and Elite: Remove top leg cap on right hand side using 27mm socket. If you could not remove the right side compression rod externally, reach down inside the inner leg with a 6mm hex, the top of the compression rod has a recessed 6mm hex that a hex wrench will fit into. The comp rod can be unscrewed counterclockwise at this point. Remove crown/steer/inner leg assembly from the outer leg casting.
5. Remove rubber bumper and clip on compression rods.
6. Turn crown/steer upside down to allow the comp rods to fall out of the inner legs.

Removal of Compression Damping Assembly - South Super

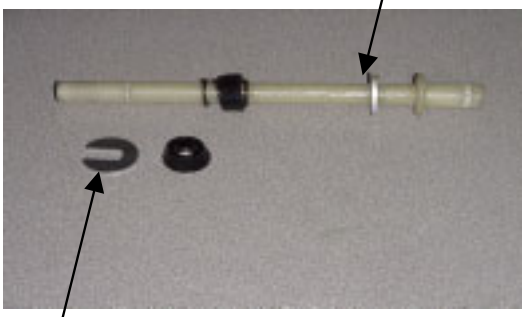
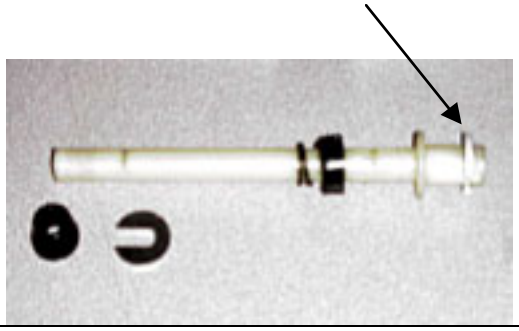
1. Remove the 2mm fixing screw on top of the damper knob on top right side of the fork.
2. Remove 2 balls and springs from inside the top cap.
3. Unscrew the compression damping assembly using a 24mm socket. Pour old oil out of the top of the fork, then compress fork upside down over oil drain pan 3-5 times to get oil out from under rebound piston and discard appropriately.

Removal of Rebound Damping Assembly - South Super

1. Unscrew Damper end cap from the bottom of the right leg and then pull out the rebound damper.

Assembly Instructions

Setting Travel

Setting fork in short travel: 1. Follow Disassembly steps above. 2. Using pliers, pull thicker clip from top of rod and install it in slot just below flange. Reassemble assembly and fork as directed below.	Thicker Clip in slot below flange  Bottom out clip removed for clarity
Setting fork in longer travel: 1. Follow Disassembly steps above. 2. Using pliers, pull thicker clip from bottom of rod and install it in slot just above flange. 3. Reassemble assembly and fork as directed below.	Thicker Clip in slot above flange 

Assembly of Rebound Damping Assembly - South Super

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.

1. Install rebound damper into bottom of right leg and tighten per the South Schematic and Torque Specification Table. Slide the black rubber bottomout up the shaft until it contacts the damper cap. This will assist later during assembly of the outer leg casting to the damper shaft.

Assembly of Compression Damping Assembly - South Super

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. Fill right leg with **110-120mm (4.3 – 4.7in.)** of 5wt Motorex fork oil (Ref Answer Products PN 85-0023). Cover the opening at the top of the right leg of the crown/steer with a rag and cycle the fork six times. Recheck oil level and add/drain to meet the level requirement.

2. Put a little bit of Prep M grease (Ref Answer Products PN 85-0031) on the urethane or brown rubber o-ring found on the lower piston of the Lock out assembly.
3. Twist the Hex shaped aluminum shaft that sticks up from the top cap counter clockwise until it stops (the system is completely open to oil flow at this point).
4. Using a motion like screwing in a screw. Twist the assy. and apply a little pressure to insert the piston part of the mechanism past the threads at the top of the inner leg. Then push the assy. into the leg until the threads on the cap intersect the threads inside the inner leg, screw the cap. Tighten per the South Schematic and Torque Specification Table.
5. Once the cap is tightened, twist the Hex shaped shaft clockwise until it stops (this is the locked out position). Insert the springs into opposite holes in the top cap and then place the ball bearings on top of the springs (place a little dab of grease on spring to hold ball bearing in place).
6. Place the adjuster knob onto the hex shaped aluminum shaft and seat it onto the top cap and ball bearing. Position the adjuster cap so that the lever part of the cap is at the farthest point to the back of the crown.
7. Insert 2mm fixing screw and tighten to secure the knob. Twist the knob counter clockwise to activate the fork suspension. Compress the fork several times to circulate the oil through the system and then activate the Lock out system by moving the lever clockwise to its stopping point at the back of the crown. The fork should have approximately 5 mm of progressive travel before it locks out.

Note: This system is a combination of adjustable compression damping that becomes a lock out. It is fully active when the lever is facing all the way forward (counter clockwise) and locked out when the lever is facing all the way towards the back of the crown (clockwise).

Installation of Spring, Compression Rod Assembly, and Outer Leg Casting

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.

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

Note: Non dampened South forks (Comp and Elite) use two compression rods, one in each leg. Dampened south forks (Super) only use a compression rod in the left side.

1. Drop the compression rod(s) into the crown/steer assy. Make sure that the comp rod that accepts the 4mm screw is installed in the left leg.
2. Slide on the rubber bottomout bumper and clip onto the compression rod(s)
3. Remove rubber fork boots from the casting and slide them onto the inner legs of the crown/steer assy.
4. Lightly grease the bushings on the inside of the outer leg casting and on the lower portion of the inner legs below the boots using a thick grease such as Motorex Bike Grease 2000.
5. Grease spring heavily with Motorex Bike Grease 2000. Install the spring preload, MCU, and spring assy into the crown/steer assy.
6. Tighten preload adjuster using 18mm socket and tighten per the South Schematic and Torque Specification Table.
7. Insert 2mm hex screw into spring preload adjuster knob and install knob on the top left side of the fork.
8. Press inner leg assembly into outer leg casting until comp rod contacts casting.
9. From the left leg dropout, use a 4mm hex wrench to install the compression rod screw and tighten per the South Schematic and Torque Specification Table.

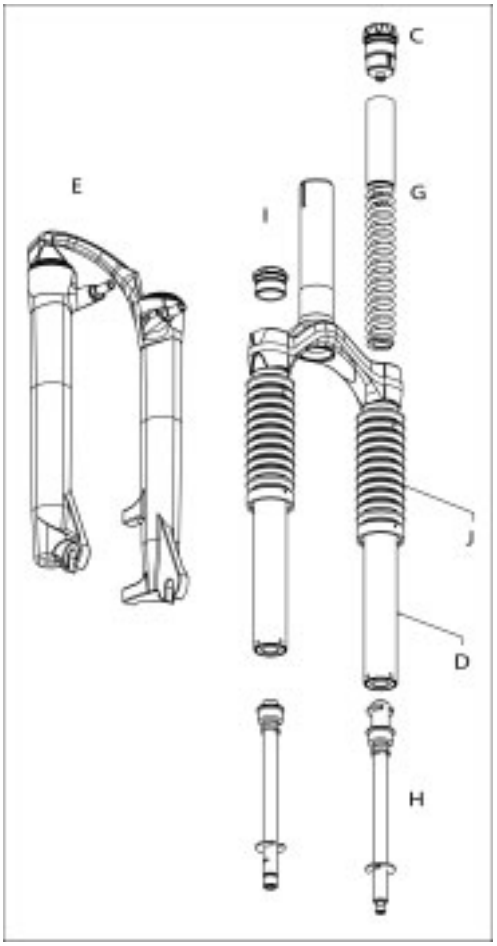
10. South Comp and Elite: From the right leg dropout, use a 6mm hex wrench to turn the compression rod **counterclockwise** until it screws into the casting. You may have to apply pressure from the top of the comp rod using a long 6mm hex to start screwing it in and tighten per the South Schematic and Torque Specification Table.
11. South Super: From the right leg dropout, use a 8mm hex wrench to turn the compression damper **counterclockwise** until it screws into the casting and tighten per the South Schematic and Torque Specification Table.
12. Slide fork boots down and snap over dust seal flange.
13. Lubricate the inner legs through the Microlube ports using Prep-M grease.

Troubleshooting Chart

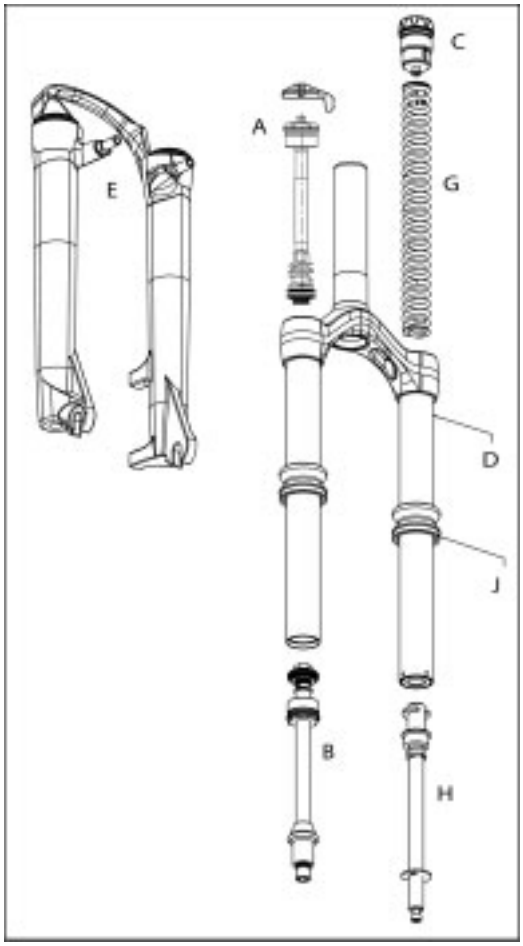
Symptom	Cause	Solution	Service Manual Page
Oil leaks from Wiper Seals	Seal not seated properly	Remove Casting from Inner Legs, reinstall or replace seals	
	Nicks or scratches on inner legs	Replace Crown/Steerer/Inner Leg Assembly	
	Wear	Remove Casting from Inner Legs, reinstall or replace seals	
Oil 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	
Lack of Travel	Tight Bushings	Replace outer leg	
	Hydraulic lock out	Replace Rebound Damping assembly	
	Damper oil volume	Check oil level, Replace Rebound Damping assembly if needed	
	Fork alignment	Visually inspect fork, call Answer Products Customer Service	
Fork Top out	Loss of Rebound Damping	Replace Rebound Damping assembly	
	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	Replace outer leg	
	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	

South : Fastener Torque and Setup Levels

South Comp & Elite



South Super



Model: South	
Description	**Torque Value**
Torque – Brake Post	90–110inlbs (10.2-12.4nm)
Leg Caps	25–35inlbs (2.8-4.0nm)
Torque - Comp Rod Screw	10-30inlbs (1.1-3.4nm)
Torque - Damper Screw (South Super)	10-30inlbs (1.1-3.4nm)
Adjuster caps:	
Torque	35-50inlbs (4.0-5.7nm)
Damping Oil - South Super	110 – 120mm (4.3 – 4.7”)

South Service Kits

		South		
Model		Comp	Elite	Super
Code		D-410	D-420	D-430
Travel (mm)		60 or 75	60 or 75	60 or 75
Comp Damp	**A**			85-5318
Rbnd Damp	**B**			85-5319
Pre Load Adj/Top Cap	**C**	85-4810		
Crn/Str/Leg	**D**			
	***Steel S/T (26")	85-5325		85-5335
	***Steel S/T (700C)			
	***Steel Threaded (26)	85-5329		85-5328
	***Steel Threaded (700c)			
Outer Leg Assy	**E**			
STD	Black (26")	85-5330		
STD	Black (700c)	85-5331		
STD	Silver (26")	85-5332		
STD	Silver (700c)	85-5333		
STD	Red (26")	85-5334		
STD	Red (700C)	85-4458		
STD	Cobalt	85-5337		
STD	Orange	85-5338		
STD	Yellow	85-5339		
STD	Candy Chrome	85-5340		
STD	Candy Red	85-5341		
STD	Candy Blue	85-5342		
No Boss	Black (26")	85-5343		
No Boss	Black (700c)	85-5344		
No Boss	Silver (26")	85-5345		
No Boss	Silver (700c)	85-5346		
No Boss	Red (26")	85-5347		
No Boss	Red (700C)	85-5348		
No Boss	White	85-5349		
No Boss	Cobalt	85-5350		
No Boss	Orange	85-5351		
No Boss	Yellow	85-5352		
No Boss	Candy Chrome	85-5353		
No Boss	Candy Red	85-5354		
No Boss	Candy Blue	85-5355		
Sticker Kit	**F - Silver**	85-5356		
	F - Black	85-5357		
Ride Kits	**G**			
	***Soft	85-5358		
	***Medium	85-5359		
	***Firm	85-5360		

South Service Kits (Cont.)

		South		
Model		Comp	Elite	Super
Code		D-410	D-420	D-430
Travel (mm)		60 or 75	60 or 75	60 or 75
Comp Rod/	**H**			
	60 or 75	85-5361		
Knob Kit	**I**	85-5362		
Boot Kit	**J**	85-5390		
Seal Kit	**K**	85-5391		
Bumper Kit	**K**	85-5363		
O-Ring Kit	**K**	85-5555		