2000 TUNING MANUAL

MRD
MANITOU RACING DEVELOPMENT

MANITOU

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CHAPTER 1: INTRODUCTION TO THE MRD TUNING MANUAL

1. INTRODUCTION
Thank you for choosing a Manitou suspension fork. Manitou suspension forks have been designed to give you better performance with less hassles. But to take best advantage of suspension, you will need to tune your fork and shock to your own particular riding style and body weight. By reading this MRD Tuning Manual, you will gain the necessary knowledge to do this and have your fork working like the ones the best pros in the world ride.

2. WHAT IS MRD?
MRD stands for Manitou Racing Development and is the division of Manitou responsible for tuning Manitou forks and developing products for use by the world's top pro race teams. This includes former National and World Cup champ John Tomac, World Cup race winner Filip Meirhaeghe, World Cup race winner Gerwin Peters, World Cup race winner Bas Van Dooren, Olympic Gold Medallist Bart Brentjens and 1999 World Champion Margarita Fullana.

MRD is the brainchild of Jose Gonzalez, Manitou Race Team and R & D manager, former Kawasaki Team Green assistant manager and inventor of TPC damping technology. Gonzalez's concept for MRD was formed by his early years at Kawasaki and his involvement in motorcycling. Gonzalez felt that simply putting professional racers on stock product for 12 or more national and international races every season wasn't going to cut it. Not only did course conditions vary as the race schedule worked its way across the globe, but each rider also wanted a different set up for his or her weight and riding style. Gonzalez also knew that racing is one of the best test beds for new product testing and development and wanted to use this group of high-profile racers to improve Manitou products in general.

MRD has seen many successes over the years, with wins in the highest levels of professional racing, but perhaps more importantly, the biggest successes MRD have seen have occurred with each and every Manitou fork that rolls off the assembly line today. Features such as TPC and Microlube were developed and validated on the race circuit before they were deemed fit to be on any production fork. Needless to say, MRD has been Manitou's most successful program ever.

If you want to see MRD research and development in action, stop by our race team trailer at each and every World Cup and National event. Not only will you get to see the behind the scenes action of high-profile racing, but for a nominal charge you can have your fork serviced by a MRD technician. Proceeds benefit IMBA (International Mountain Biking Association).

3. THE BIBLE OFSUSPENSION TUNING
Information included in this manual is the result of many years spent working with top racers and is written by MRD techs who's job it is to ensure that Manitou riders are riding perfectly-tuned suspension forks and shocks. If in reading this manual, you find that the information seems overly complicated, don't become frustrated. The MRD technicians who wrote this manual have extensive experience with suspension and only through much time and effort have learned the intricacies of suspension technology. With time, you will find that the manual will become easier to understand and soon you will be able to both understand and execute changes to your suspension. Our best recommendation is to keep at it. It's only through experience that you will be able to tune your suspension properly.

CHAPTER 2: MANITOU TECHNOLOGY

1. BEFORE YOU BEGIN
Some thoughts on 2000 forks before we begin. For 2000, the travel for all forks is 76 millimeters or more (Magnum forks are 76 millimeters, SX and MARS forks are 80 millimeters and X-Verts and the SXLT 100 are millimeters of travel or more). In addition, there have been some other major changes to Manitou forks for 2000.
- TPC has been moved from the left to the right side
- Springs have been moved from the right to the left side
- Disc brake spacing increased to 74 millimeters (from 68 millimeters in 1999)

Before you delve into the actually tuning of your fork, we recommend taking a few rides and getting accustomed to your new suspension fork. You may actually find that the stock set up is perfect for you and no tuning is necessary. In addition, your fork also needs to be broken in before any tuning takes place.

Make sure you follow the details in this tuning manual rather than just flipping through the pages and trying to find the section that pertains to you. For example, if you skip the section on starting a logbook (to track changes you have made to

the fork and the conditions you ride in), it will cost you time later as you try to jog your memory to remember previous settings. Also, because one aspect of suspension tuning can relate to many more, by missing one juicy moment of this manual, you may be making changes that are actually counterproductive.

In addition, reading the entire MRD Tuning Manual in sequence will make suspension tuning much easier. The MRD manual has been designed to make it as readable and simple to understand as possible. Thus, the first portion of this book is dedicated to explaining the different aspects of the suspension technology, the second to tuning your suspension fork and shock, the third to the parts needed to make changes, and finally, the maintenance schedule to keep your fork working perfectly.

2. TPC DAMPING TECHNOLOGYEXPLAINED

TPC stands for Twin Piston Chamber and is a damping system that consists of four main components: the compression assembly, the rebound assembly, the inner leg and the fork fluid **(see Figure 1)**. The standard TPC piston uses velocity respondent valves and independent adjustment and tuning of compression and rebound damping circuits. The TPC damping system is contained in the right leg in 2000 forks (left leg in 1999 and earlier model TPC forks) and is a low-pressure system so there's very little possibility for leaks (all TPC systems carry a 2-year leak-proof guarantee). It's also one of the lightest hydraulic damping systems on the market because oil and springs are only needed in one leg each.

HOWTPC WORKS

The theory behind TPC is oil displacement. For those unfamiliar with oil displacement as it relates to damping, simply visualize a bucket filled with water. When a brick is lowered slowly into the bucket, the water is displaced and the water level in the bucket rises.

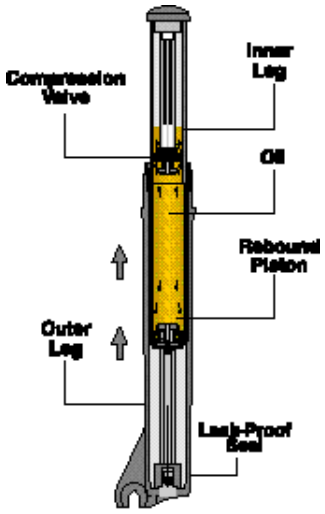


Figure 1: TPC DAMPING

TPC works on the same principle. As the lower (or rebound) shaft enters the inner leg (as the fork is compressed), it pushes fork fluid up through the compression valve (which is static) resulting in displacement much like the brick being introduced in the bucket. The compression piston controls or dampes this oil flow, allowing the fork to control the reaction to bumps. As the shaft returns to its original position, the fluid moves likewise through the rebound piston to provide damping. Each circuit, compression and rebound, has a blow by valve to allow the oil to bypass the compression valving when the fork is rebounding, or vice-versa (the rebound valving when the fork is compressing).

A benefit of TPC is that the damping is velocity respondent. When the flow of oil is slow, the fork has very little compression damping over small bumps, permitting it to be very plush. Conversely, on large bumps, when more oil is pushed through the compression piston at a higher speed, there is more compression damping.

3. TPC PLUS

TPC Plus is based on the standard TPC damper, except taken to the next level. TPC Plus is housed in the right leg like the other TPC systems, but uses a position-activated damping compression piston in addition to the static compression piston **(see Figure 2)**.

With TPC Plus, the two compression pistons are the static piston and the position-activated piston. The static piston is located above the position-activated piston. As the fork compresses initially, the position-activated piston (or lower piston) moves, compressing the spring located between it and the upper piston. During the phase that lower piston is moving, it does not provide compression damping. Rather the static piston above it provides compression damping to the fork. The static piston provides 100 percent of the fork's initial damping. But as the fork compresses further, the lower piston reaches a stop and begins to assist the upper piston by adding a 50 percent increase in compression damping.
The result of all this is a super-active ride initially (because you only have a small amount of compression damping provided by the static piston), but with controlled brake dive and bottoming (because once the fork compresses further and the position-activated piston stops, it provides additional compression damping).

4. HOWTPC PLUS WORKS

In the standard TPC system, as the fork compresses, oil is displaced and flows through a static compression piston to provide damping. But with TPC Plus, there are actually two compression pistons, one static like in standard TPC, and one that is able to move (a position activated piston). While this complicates things for explanation purposes, this sophisticated damping system provides many performance benefits to a long-travel suspension fork (that's why it's used in X-Vert forks only).

Think back to the description of the brick and the bucket. As the brick is lowered into the bucket, the water is displaced and rises. With TPC Plus, as the oil is displaced by the fork compressing, the lower piston (or position activated piston) begins to move upward toward the static compression piston. During this stage, there is very little compression damping because the lower position-activated piston provides no damping as it moves and the upper piston provides only minimal compression damping (because it's set up this way). As the fluid continues to be displaced, the lower position-activated piston reaches a point where it stops and begins to provide additional compression damping.

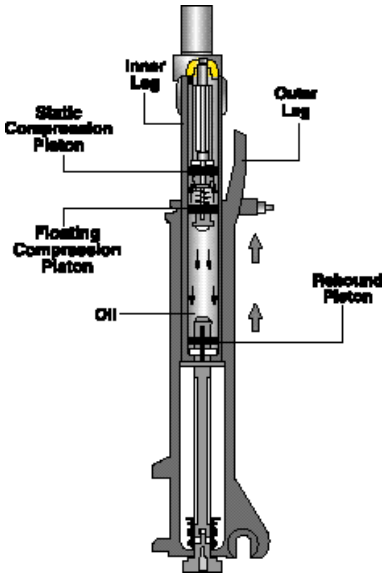


Figure 2: TPC + DAMPING

On the bike, the system allows for a dual personality of the fork. In the initial portion of the travel (when the floating piston is moving), the compression damping feels very light and the fork is very sensitive to small bumps (think "plush"). As the fork compresses further into the travel, the floating piston provides increased damping so that you do not blow through the fork travel and bottom harshly. In addition, the secondary piston also helps to eliminate brake dive, which is a quality most forks with plush initial travel suffer from.

A Stupid Question You Should Ask: What's Position Activated Damping?

There's plenty of hype surrounding position-activated damping currently, but if you quizzed most of those talking about it, you'd find few actually understand just what it is and how it can benefit a suspension system. An example of a position-activated damping system is TPC Plus, explained in the section above. A position activated damping system is any system where the damping changes depending on the position of the suspension in the stroke. In the case of TPC Plus, it's not until the fork compresses into the stroke 40-percent that the Plus part of the TPC Plus (the position-activated piston) actually takes effect. The benefit TPC Plus'position activated system is that your fork can be plush initially yet resist bottoming. Without position activated damping, it would be difficult, if not impossible, to create this kind of damping character.

5. TPC SPORT EXPLAINED

TPC Sport is very similar to standard TPC. The four main components are the compression assembly, the rebound assembly, the inner leg and the fork fluid. The theory behind the function of TPC Sport is oil displacement. As the fork is compressed, the lower (rebound) assembly moves up through the stanchion tube and fork fluid flows through the compression valve. This provides compression damping. As the fork extends, the oil flows back through the rebound piston, providing rebound damping. The difference between the two designs is that TPC Sport uses simple orifices to monitor oil flow through the piston where TPC has shim stacks to control oil flow. TPC damping is also speed sensative.

6. MICROLUBE

All 2000 Manitou forks come standard with the Microlube lubrication system. Located at the back of the fork is a small fitting that is the heart of the Microlube system. This is where you inject grease into the fork.

The major benefits of the Microlube system are that it is lightweight and effective. Only a small quantity of grease is needed to properly lubricate the fork, and the fitting for injecting grease puts it just where it needs to be. Other lubrication systems, like open bath for instance, can be very effective, but are intrinsically very heavy because of the quantity of oil needed to function properly.
Another benefit is that the lubricant (Prep M) for Microlube is designed specifically for lubricating. Using open bath forks as an example again, an open bath fork requires the use of the damping oil in the fork for lubrication purposes. The major deficit of this is breakdown of oil. Because the same oil used for lubrication is also used for damping, the oil in the fork will contaminate and break down more quickly, affecting the damping performance of the fork.

MRD Prep M Grease and Grease Gun

Prep M Grease for Microlube	85-3810
Grease Gun Head	85-3812

7. MARS

MARS stands for Manitou Air Response System and is the combination of air and a MCU spring that is used in every 2000 MARS suspension fork. The typical MARS spring system consists of an MCU, a compression rod, a negative spring and an air spring actuated by a piston **(see Figure 3)**. The MCU is located below the compression rod and can be switched with stiffer or softer MCU to accommodate different rider styles and terrain. The air spring is adjustable via a Schraeder valve located on top of the left leg. The negative spring is available in one rate only, but is designed to be preloaded automatically as the positive air spring pressure is increased (in other words, you don't need to do anything to tune it)

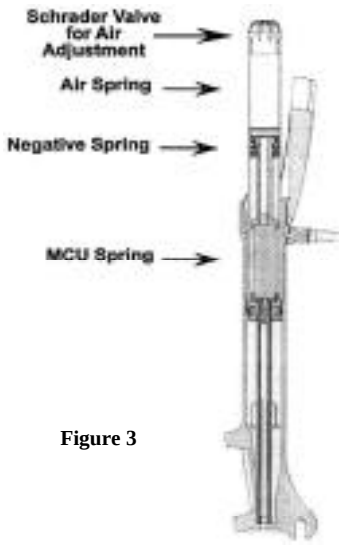


Figure 3

The MARS system is both lightweight and produces a progressive spring curve because of the use of two spring materials (MCU and air). The spring system in action functions like this: When the fork compresses, the MCU compresses first. This is because the MCU has a very low breakaway threshold (it moves with just one pound of pressure applied) and thus provides initial suppleness with the fork. The negative spring also helps provide initial suppleness because it helps actuate the air spring (Anegative spring works to pull the fork together, where a positive spring is keeping the fork extended). In the middle portion of the travel, the fork transitions from the MCU to the air spring. Near the end of the fork's travel, it transitions back onto the MCU to provide resistance to bottoming.

MARS is a very sophisticated system that provides a performance advantage by taking advantage of the two spring materials very different characters. In addition, because both the air and MCU spring system can be adjusted, there's a wide range in adjustment.

Note: Air forks tend to feel stiff initially because of the high initial breakaway threshold associated with air springs. The high threshold is usually created because heavy seals are required to retain the air in the spring chamber. Negative springs assist the movement of the fork.

Manitou Technology Explained:

Why TPC?
There are many reasons why we use TPC-based damping systems in each and every 2000 Manitou suspension fork (except in the Magnum). For starters, the design of TPC allows for independent compression and rebound control (not in magnum, Magnum R and SX). When you turn one of the TPC adjuster knobs (rebound on the bottom of the right side leg, compression at the top), you are able to tune each damping circuit independently. TPC also employs a large volume of oil. By using a large quantity of oil, we were able to eliminate the possibility of having any heat-related problems or problems with air mixing with the oil (which tends to cause variations in damping). TPC damping systems by nature are also extremely reliable because there's never more than a few PSI of pressure on the seals (even under full compression!). All of these factors combine to make TPC the most effective, reliable, and tunable damping systems in the world.

Why Air?
At Manitou, our logic has always been to produce the lightest, highest-performance bicycle suspension in the world. Air is certainly a good way to lighten up a fork, but until this year we felt that performance disadvantages associated with using an air spring outweighed the loss in overall fork weight. But with the new Manitou Air Response System, we feel that we've found a way to have both the weight and performance with an air spring. In the end, the result is some of the lightest, highest-performance forks in the world.

Why Not Open Bath?
Open-bath forks offer good performance, and using oil to lubricate a fork is certainly advantageous, but the major deficits of the open-bath system are weight and breakdown of oil. Let's start with weight issue. The oil in itself can be very heavy. For example, a typical open bath fork uses over 6 fl. ounces of oil compared in each leg. A TPC fork uses a total of 6 ounces of fluid for both lubrication and damping. Needless to say, open bath forks with coil springs and oil in both legs have trouble hitting the 3-1/2 pound mark. Breakdown of oil is also a problem with open bath forks. Because the same oil that is used for lubrication is also used for damping, the oil in the fork will contaminate and break down quickly, affecting the performance of the fork.

Why Microlube?
Ease of lubrication is one of the main reasons Microlube was developed. In a nutshell, we wanted a user to be able to quickly lubricate their fork without disassembly. With grease fittings, this desire became a reality. A rider could simply inject grease or oil into exactly the right location in the fork with a minimal amount of hassle. But there's another benefit of using grease fittings. On our high-speed assembly line for forks, Microlube allow us to lubricate the forks after assembly of the stanchion and slider tubes. This means more consistency and proper lubrication with each and every fork that comes off the line.

Why MCU and Coil Springs?
A coil spring with MCUs is a truly magnificent spring combination. The two spring mediums working together provide a truly progressive spring rate, with both suppleness on small bumps and protection from bottoming on big hits. The combination of an MCU and coil spring is also lighter than a single progressively-wound coil spring would be, it provides added options when it comes to dialing in the springs, and it's less expensive for the consumer to alter the fork's spring rate after he purchases the fork.

CHAPTER 3: UNDERSTANDING SPRINGS

1. THE PURPOSE OFSPRINGS AND PRELOAD

A suspension fork or rear shock uses springs primarily to support the rider's weight and bicycle, as well as isolate both from impacts encountered while riding over rocks, holes, jumps and other obstacles. Generally speaking, you want to use a spring with a rate just stiff enough to prevent bottoming on all but the biggest bumps. Any stiffer than this and you will not get full use of your suspension because your suspension will be too stiff. Similarly, a spring rate that is too soft will have the suspension riding too deep into the travel and bottoming constantly. Keep in mind that it isn't just the springs that keep the fork or shock from bottoming: compression damping also assists the spring in keeping the suspension from over compressing too quickly

2. SPRING RATE DEFINED

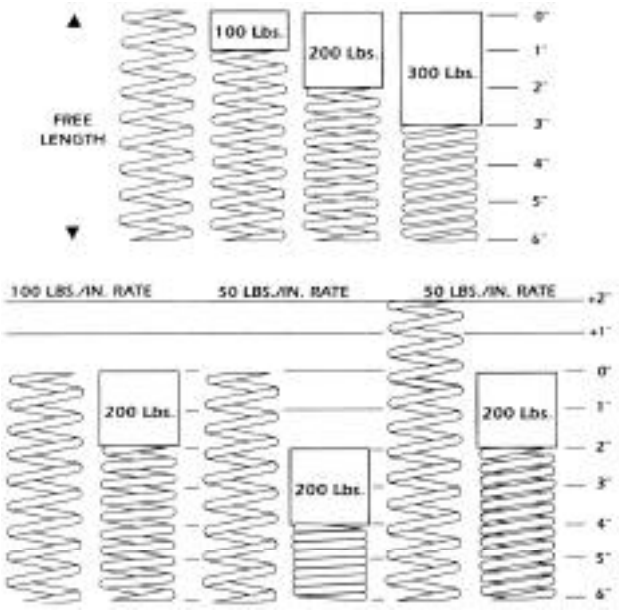
Spring rate is a measure of the spring's stiffness or softness and is rated by the amount of force (weight) necessary to compress the spring a given distance; it's most often expressed in pounds per inch or kilograms per centimeter **(see Figure 4)**. A coil spring's rate is determined by its wire diameter, the number of coils, and the coil diameter. An MCU's spring rate is determined by its SP2 durometer hardness and density of the mixture. An air spring rate is simply determined by the pressure within a given area.

3. PRELOAD EXPLAINED

Preload is a term that is often misunderstood. Defined, preload is the amount you initially compress a spring in order to control the point at which it begins to

move. Preloading springs is useful because it enables larger riders to raise the threshold that the fork begins to compress.

Note: On a coil spring, preload increases the amount of force required to begin moving the spring. IT DOES NOT ALTER OVERALL SPRING RATE! In other words, regardless of how much a fork's been preloaded, it still takes the same amount of force to continue to compress the spring once it's moving (Many people think that if you preload the spring, you are actually altering the fork's spring rate).



Fork spring compression is dependent on the weight placed on them, the length, and the progressivity on the spring

Figure 4

One of the benefits of an air spring system is that you can easily change the spring rate with an air pump (part number . This saves the cost of having to buy multiple springs for different riding conditions, and eliminates the need for preload adjustment on a fork, but you still have to purchase the high-pressure pump of course.

Preloading coil and MCU springs is not the end-all to spring woes, and in actuality is only a quick fix. If it becomes necessary to increase preload to a near maximum adjustment, the fork springs are too soft for you and need to be changed. Preloading MCU or coil springs too much not only restricts travel (by the amount your preload the springs), but tends to make the fork feel harsh and make rebound damping more difficult to control.

CHAPTER 4: DAMPING

1. DAMPING: WHAT ITIS & WHYIT'S IMPORTANT

Damping is the act of absorbing shock by changing the energy of motion into heat and then dissipating it. If damping systems didn't exist, a fork would behave like a pogo stick, resulting in very poor control of your bike. The purpose of a damping system (such as that contained in a suspension fork) is to limit both the rate at which a spring is compressed (compression damping) and the resulting rate of return (rebound damping). Piston and shim stack damping, like that used in TPC damping systems, is speed-sensitive. That means the resistance to movement increases with speed and force. (When talking about speed in reference to damping, it is the speed of fork movement being referred to, not the speed of the bike). As fluid tries to flow through a TPC piston and shim stack, it encounters more resistance if it tries to flow faster, due to added speed and force. Damping adjusters like on the TPC system allow you to alter how easily the fluid flows, thus helping to control the speed at which the fork both compresses and returns.

2. THE BENEFITS OFCOMPRESSION DAMPING

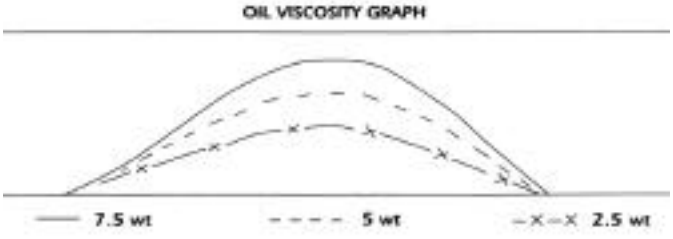
Compression damping usually permits the use of lighter-rate fork springs than would be possible in non-damped forks. That's because compression damping affects the down stroke or compression phase of suspension movement, sharing the workload with the spring(s) as speed and force increase (thus, the term "speed-sensitive"). The use of compression damping results in a wider range of optimum performance, as it's possible to maintain a plush, supple ride over small hits and still resist hard bottoming on hard landings. (thanks to the speed sensitivity of the compression damping).

3. THE BENEFITS OFREBOUND DAMPING

When a spring (coil or MCU) is compressed, it wants to return to its decompressed state; in other words, it wants to rebound. If it's allowed to rebound completely freely, the resulting suspension action would result in a very pogo stick like ride, with the fork returning very quickly and erratically. Rebound damping slows and controls the extension stroke to keep the front wheel on the ground at all times.

4. ABOUT HYDRAULIC DAMPING INTERNALS

All 2000 Manitou forks feature either a TPC (Twin Piston Chamber), TPC Plus or TPC Sport Damping System, that can easily be serviced and tuned by a competent owner or qualified technician. Damping can be dialed in with any TPC damping system by either changing fluid viscosity or, in the case of TPC and TPC Plus the amount and sizes of the shims. The only way to change the damping character of TPC Sport is to change the fork oil weight. This is because TPC Sport is orifice damping only, i.e. no shim stacks. The stock fork fluid in all 2000 Manitou forks is Maxima 5-weight, and we recommend using Maxima fork fluids for all suspension fork tuning purposed. (A note on our reason for using 5-weight suspension fluid: Higher viscosity oils, like 10 and 15 weight, fade more because they are more affected by operating and ambient temperatures.) The accompanying chart **(see Figure 5)** shows how different fluid weights affect damping, though the graphs have been exaggerated to make the differences more visual.



The heavier the fork oil weight, the more damping it will provide. 5-weight Maxima oil is stock in Manitou TPC and TPC Sport forks, but this oil viscosity can be increased or decreased in weight for differing riding conditions and styles

Figure 5

A Stupid Question You Should Ask: What's a Shim?

A shim is a small, thin washer that bends when oil is forced over it (as the oil passes through a valve). In the suspension world, shim are also known as deflection disks. Because thinner shims bend easier than thicker shims, the thicker the shim the more damping that is created (because the thicker shim won't bend out of the way of the oil as easy as a thin one.) In addition, more shims stacked on top of each other will be harder to bend away to let the oil pass, creating more damping. That's one way to achieve a thicker shim: simple stack the same thickness and diameter shims on top of each other. Smaller diameter shims are stiffer as they have less working or bending area. The result of all three options is more possibilities when you tune your suspension fork.

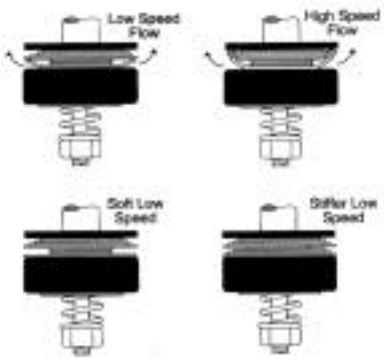


Figure 6

Maxima Fork Oils

85-3814	Maxima Suspension Fluid 5-WT8oz
85-3820	Maxima Suspension Fluid 7.5-WT-8oz
85-3822	Maxima Suspension Fluid 10-WT-8oz

TPC or TPC Plus shim stacks **(see Figure 6)** meter fluid flow through the damping piston. Changing the number of shims, their thickness and diameter will alter damping character as will changing the oil weight. You can't change the diameter of the shim closest to the piston though, as this is fixed and based on the piston's ports and its diameter. Changing a large-diameter shim has more effect than changing a small-diameter shim. Shims are available through your Manitou authorized dealer.

CHAPTER 5: PRE SET UP

1. Service

Servicing your fork is the first step that should be taken before any tuning is performed. The owner's manual you received with the fork provides detailed descriptions on how to accomplish this. Servicing your fork will also provide some familiarity with your fork, so that when you get to the tuning, you will feel comfortable taking the fork apart and making changes. Luckily, features like Microlube make servicing your fork easier than ever. If you did not receive an owner's manual or need a service manual contact your bicycle dealer, call Manitou at (661) 257-4411, or download from www.answerproducts.com. You will also find a copy of this and other model year MRD Tuning Manuals on the web as well

Basic Set-Up Tips

o If the suspension fork is new, break it in with at least one hour of riding before making any evaluations or changes.

o Check the compression and rebound settings before you begin (where applicable) to make sure the damping is not fully closed. Try a setting right in the middle (about 14 clicks out from all the way in) to break the fork in.

o Always keep a record of adjustment changes made and the performance differences that resulted. When proper settings are achieved for a particular course, terrain or conditions, they should be written down for future reference.

AStupid Question You Should Ask: What's a Push Test and Why Is It Important?

A front fork push test is something that every rider who picks up a bike loves to do. We're sure you've done it before too. But what are you looking for with a push test? A knowledgeable person performs a push test on a bike because through experience, he or she has learned how the fork should feel. But you should not use the push test as the end all to fork tuning or even fork feel. Manitou forks, for instance, are designed through extensive riding, not by push testing them. As a result, a Manitou might not feel plush or active during a push test, but then once you are on the bike will provide the kind of performance you will need for riding over aggressive terrain.

2. SUSPENSION SETUP101

With all the preceding information in mind, let's begin with the basics of suspension set up. First of all, remember that the Manitou's base damping and spring rates have been set by experienced test riders. The rider in mind, when the settings are determined, is a 150- to 170-pound Sport-to Expert-level rider with a bike using geometry typical of current mountain bikes and riding primarily dry terrain. We understand that these can be rather tight parameters, but that's what tuning and this tuning manual is for. Those who are heavier or more experienced than average may need stiffer springs; likewise, those who are lighter or less experienced may need softer springs. Be aware that changing spring rates often requires a change in rebound damping adjustment to compensate.

Note: don't be fooled by your own suspension. Sometimes you may think the fork is bottoming when it's not. The sensation may be due to an overly stiff spring rate or excessive damping. As a result, you will want to lighten up the compression damping and lighten the spring rate to make the fork feel plusher. Conversely, a harsh sensation may be due to a soft spring rate that is causing the suspension to ride too far into the firm portion of its travel.

A Stupid Question You Should Ask: What Breaks In When You Break a Fork In?

When we talk about breaking in a fork, we are talking solely about the initial riding period on a new fork. During the first few times you ride the fork, the moving parts, most notably the stanchion tubes as they go up and down as the fork compresses and rebounds, are becoming mated to each other. As this happens, you will notice the fork will become plusher, because as the fork parts mate to each other, they begin to require less force to begin and continue movement. Any Manitou fork should break in within the first few rides, but it may take longer depending on the length of your ride and the condition. It's also important to make sure the fork is properly lubricated (which it will be directly from the factory), as this ensures a quick and complete break in. See "Microlube First" below for details on lubricating your Manitou suspension fork.

3. GENERALSETUPAND TUNING TIPS

• If the suspension fork is new, break it in with at least one hour of riding before making any evaluations or changes. If your fork still feels sticky when you compress it (which is usually caused by tight bushings), you may want to ride it for a few more hours before you begin tuning.

• While you may want to turn the compression and rebound knobs completely one way and then the other to see the range of adjustment, you should make suspension changes in small increments once you start tuning.

• On full-suspension bicycles, the front and rear suspension must be balanced in order to provide the best-performing total package. Same brand front and rear components is not the key, nor necessary, for suspension harmony. Proper set up and suspension balance is the key to superior performance, so keep in mind that a front suspension change often requires a change to the rear and vice-versa.

• When evaluating suspension performance, the rider must ride as consistently as possible and recognize the effects of his input. That means riding the same terrain at the same speed over and over. While this may not be a bundle of fun, it certainly will produce more accurately tuned suspension in the long run. MRD tester riders use a 15-minute loop for testing. Our riders have to log hundred of laps in order to notice the slight changes in fork performance and set-up.

• Since riding conditions and terrain have such a big impact on your suspension, you shouldn't feel afraid to make changes to your suspension if the conditions warrant. Again, try to make small changes, but make changes nonetheless to see how the suspension is affected. As a general rule, if the terrain is smooth, you can both increase compression and rebound damping. If the terrain is rough, you may want to decrease rebound damping (to make the fork react faster to repetitive bumps) and decrease compression damping (to make the fork feel plusher over bumps.)

• Lubrication is one of the most important aspects to the performance of your Manitou suspension fork. While features like the Microlube system make it easier to lubricate your suspension fork, the coil springs and couplers also need to be lubricated to maximize performance. See lubricating your springs for more information on how to do this.

4. MICROLUBE FIRST

Before you get into tuning your fork, you'll want to Microlube your fork. All you need is a Microlube grease gun (part # 85-3812) and Manitou's Prep M (part # 85-3810) suspension fork grease. Once you have the two aforementioned components, the next step is to brush off any dirt from the grease ports then just put the tip of the grease gun into the small eye and squeeze a few times **(see Figure 7)**. After you've given the fork a few squirts, push down on the fork and see if you feel any stiction (notchiness as the fork compresses).If you do, continue injecting grease and checking for stiction until it is eliminated. Don't overdo it either. Some people think that if a little is good, a lot will be great. That's not true with Microlube. The proper amount of grease is when stiction is eliminated-no more, no less. Note: When your fork is new, you may not be able to eliminate all stiction by simply lubricating your fork. You will need to break it in completely before all stiction is removed.

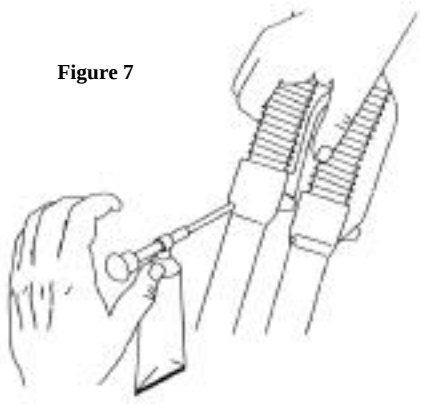


Figure 7

Something to remember with Microlube is that it does not mean the end to servicing your fork. Periodically, depending on the conditions you ride in, you'll have to disassemble the fork, clean it thoroughly, and then reassemble it. We recommend doing this every 100 hours of riding, but since keeping track of hours in the saddle can be difficult, try to pay attention to your fork and make sure you work service time into your maintenance schedule.

CHAPTER 6: SUSPENSION SAG

1. SETTING SAG

In order to ensure optimum performance of your Manitou fork, the springs must be the correct rate for the ride. The proper set up for you is determined by measuring the suspension sag. Suspension sag helps the tires to remain in contact with the ground under dynamic loading and should be done before you make any tuning adjustments.

Measuring Sag

For starters, it's a lot easier if you have a friend to help you measure sag. The only equipment needed is a tape measure, a pencil and a piece of paper. Here's how to do it:

A. Measure the distance from the front axle's centerline to the bottom of the upper crown when no one's sitting on the bike. (Remember the exact locations of the two points because you'll need to use them later.)
B. Write this distance down.
C. Have the rider sit on the bike. It's important to be in the normal riding position (weight centered) with your feet on the pedals; this is where having a helper comes in handy, but you can lean against a wall and try to remain as upright as possible.
D. Measure the distance between the same two points as in step one.
E. Subtract the second measurement from the first. The resulting measurement is the static sag or ride height.

SAG MEASUREMENTCHART

Fork Travel	Sag
70-80 millimeters	12-16 millimeters
100-105 millimeters	18-24 millimeters
125 millimeters	25-28 millimeters
160 millimeters	35-40 millimeters
180 millimeters	40-45 millimeters

Note: Some XC racers may prefer less sag, approximately 7-12 millimeters, to eliminate suspension movement during climbing.

MANITOU MCU SPRING COLORS

Green	Ultrasoft
Blue	Soft
Red	Medium
Yellow	Hard

MANITOU COILSPRING COLORS

Blue	Soft
Red	Medium
Yellow	Hard

*Titanium springs have color stripes on them.

You should be able to use between 0 and eight clicks (not turns) on the preload adjusters to achieve the correct sag **(see Figure 8)**. If more than eight clicks are required (indicating more preload is needed for correct sag), stiffer springs are needed. If it requires less than the 0 click setting (indicating less preload is needed for correct sag), softer springs are needed.

Should a spring change be necessary, Manitou forks allow doing so by simply changing one or more of the MCUs. Changing MCUs will make a noticeable difference in effective spring rate and will be much less expensive than changing the coil spring. When making spring changes, start by changing the MCU, but if you go up more than one rate on the MCU, you should consider changing to the next stiffest coil spring with the stock MCU or MCUs.

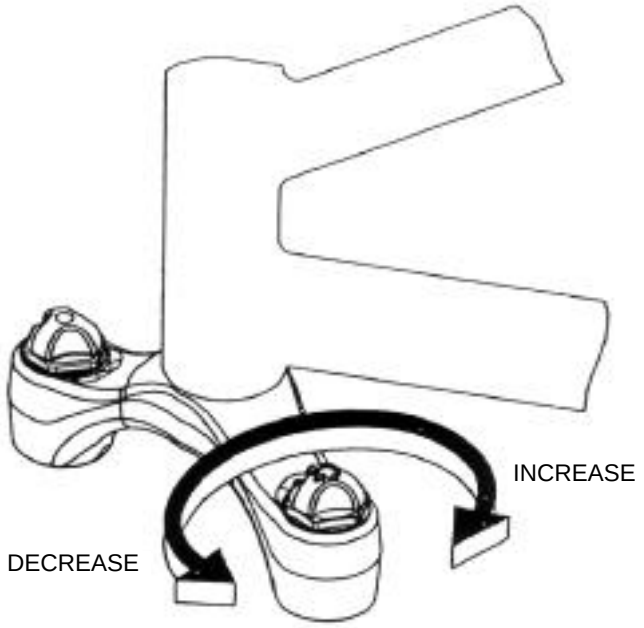


Figure 8

2000 Tuning Specifications

Magnum - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-140 lbs.	(1) 4 3/8 inch 100 pound coil	(1) 4-inch blue MCU	n/a	n/a
140-170 lbs	(1) 4 3/8 inch 125 pound coil	(1) 4-inch red MCU	n/a	n/a
170-190 lbs.	(1) 4 3/8 inch 125 pound coil	(1) 4-inch yellow MCU	n/a	n/a
190-210 lbs.	(1) 4 3/8 inch 150 pound coil	(1) 4-inch red MCU	n/a	n/a
210+lbs	(1) 4 3/8 inch 150 pound coil	(1) 4-inch yellow MCU	n/a	n/a

Magnum R - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-140 lbs.	(1) 4 3/8 inch 100 pound coil	(1) 4-inch blue MCU	n/a	n/a
140-170 lbs	(1) 4 3/8 inch 125 pound coil	(1) 4-inch red MCU	n/a	n/a
170-190 lbs.	(1) 4 3/8 inch 125 pound coil	(1) 4-inch yellow MCU	n/a	n/a
190-210 lbs.	(1) 4 3/8 inch 150 pound coil	(1) 4-inch red MCU	n/a	n/a
210+lbs	(1) 4 3/8 inch 150 pound coil	(1) 4-inch yellow MCU	n/a	n/a

SX - Standard Set Up

Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 3.5-inch 190 pound coil	(3) 2-inch blue and (1) 1-inch blue MCU	n/a	n/a
125-150 lbs.	(1) 3.5-inch 190 pound coil	(2) 2-inch blue, (1) 2-inch red and (1) 1-inch red MCU	n/a	n/a
150-170 lbs.	(1) 3.5-inch 190 pound coil	(3) 2-inch red and (1) 1-inch red MCU	n/a	n/a
170-190 lbs.	(1) 3.5-inch 190 pound coil	(2) 2-inch yellow, (1) 2-inch red and (1) 1-inch red MCU	n/a	n/a
190+lbs.	(1) 3.5-inch 190 pound coil	(3) 2-inch yellow and (1) 1-inch yellow MCU	n/a	n/a

SX 100mm - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 5.8-inch 80 pound coil	(1) 2-inch green or 2-inch blue MCU	n/a	n/a
125-150 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch green or 2-inch blue MCU	n/a	n/a
150-170 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch blue MCU	n/a	n/a
170-190 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch red or 2-inch yellow MCU	n/a	n/a
190+lbs.	(1) 5.8-inch 140 pound coil	(1) 2-inch red or 2-inch yellow MCU	n/a	n/a

SX R - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 5.8-inch 80 pound coil	(1) 2-inch green or 2-inch blue MCU	12-15 clicks from max.	12-15 clicks from max.
125-150 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch green or 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
150-170 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
170-190 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch red or 2-inch yellow MCU	10-12 clicks from max.	10-12 clicks from max.
190+lbs.	(1) 5.8-inch 140 pound coil	(1) 2-inch red or 2-inch yellow MCU	7-10 clicks from max.	7-10 clicks from max.

MARS, MARS 1, MARS C, MARS CL - Standard Set Up

Rider Weight	Air Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	90 psi +/-5psi	(1) 2-inch blue MCU	12-15 clicks from max.	12-15 clicks from max.
125-150 lbs.	100 psi +/- 5psi	(1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
150-170 lbs.	110 psi +/- 5psi	(1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
170-190 lbs.	125 psi +/- 5psi	(1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
190+lbs.	140 psi +/- 5 psi	(1) 2-inch red MCU	7-10 clicks from max.	7-10 clicks from max.

X-Vert and X-Vert Super - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 5.8-inch 80 pound coil	(1) 2-inch red MCU, (1) 2-inch blue MCU	12-15 clicks from max.	12-15 clicks from max.
125-150 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch red MCU, (1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
150-170 lbs.	(1) 5.8-inch 110 pound coil	(2) 2-inch red MCU	10-12 clicks from max.	10-12 clicks from max.
170-190 lbs.	(1) 5.8-inch 110 pound coil	(1) 2-inch red MCU, (1) 2-inch yellow MCU	10-12 clicks from max.	10-12 clicks from max.
190+lbs.	(1) 5.8-inch 140 pound coil	(1) 2-inch red MCU, (1) 2-inch yellow MCU	7-10 clicks from max.	7-10 clicks from max.

X-Vert DCX - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 5.8-inch 80 pound coil	(2) 2-inch red MCU, (1) 2-inch blue MCU	12-15 clicks from max.	12-15 clicks from max.
125-150 lbs.	(1) 5.8-inch 110 pound coil	(2) 2-inch red MCU, (1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
150-170 lbs.	(1) 5.8-inch 110 pound coil	(3) 2-inch red MCU	10-12 clicks from max.	10-12 clicks from max.
170-190 lbs.	(1) 5.8-inch 110 pound coil	(2) 2-inch red MCU, (1) 2-inch yellow MCU	10-12 clicks from max.	10-12 clicks from max.
190+lbs.	(1) 5.8-inch 140 pound coil	(2) 2-inch red MCU, (1) 2-inch yellow MCU	7-10 clicks from max.	7-10 clicks from max.

X-Vert Carbon - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(2) 8-inch 60 pound coil	(1) 2-inch blue MCU	22-28 clicks from max.	22-28 clicks from max.
125-150 lbs.	(1) 8-inch 80 pound coil & (1) 8-inch 60 pound coil	(1) 2-inch blue MCU	18-22 clicks from max.	18-22 clicks from max.
150-170 lbs.	(2) 8-inch 80 pound coil	(1) 2-inch red MCU	15-18 clicks from max.	15-18 clicks from max.
170-190 lbs.	(1) 8-inch 80 pound coil & (1) 8-inch 110 pound coil	(1) 2-inch red MCU	10-15 clicks from max.	10-15 clicks from max.
190+lbs.	(2) 8-inch 110 pound coil	(1) 2-inch yellow MCU	5-10 clicks from max.	5-10 clicks from max.

Millennium - Standard Set Up

Rider Weight	Coil Spring	MCU Spring	Compression Setting	Rebound Setting
100-125 lbs.	(1) 5.8-inch 80 pound coil	(1) 2-inch red MCU, (2) 2-inch blue MCU	12-15 clicks from max.	12-15 clicks from max.
125-150 lbs.	(1) 5.8-inch 80 pound coil	(2) 2-inch red MCU, (1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
150-170 lbs.	(1) 5.8-inch 110 pound coil	(2) 2-inch red MCU, (1) 2-inch blue MCU	10-12 clicks from max.	10-12 clicks from max.
170-190 lbs.	(1) 5.8-inch 110 pound coil	(3) 2-inch red MCU	10-12 clicks from max.	10-12 clicks from max.
190+lbs.	(1) 5.8-inch 110 pound coil	(2) 2-inch red MCU, (1) 2-inch yellow MCU	7-10 clicks from max.	7-10 clicks from max.

2000 Spring Kits

Description	Part #	Description	Part #
Magnum small	85-9124	X-Vert soft	85-9100
Magnum medium	85-9125	X-Vert medium	85-9178
Magnum firm	85-912	X-Vert firm	85-9099
Magnum R soft	85-9124	X-Vert Super soft	85-9100
Magnum R medium	85-9125	X-Vert Super medium	85-9178
Magnum R firm	85-9126	X-Vert Super firm	85-9099
SX soft	85-9127	X-Vert DC soft	85-9102
SX medium	85-9128	X-Vert DC medium	85-9179
SX firm	85-9129	X-Vert DC firm	85-9101
SX R soft	85-9127	X-Vert Carbon soft	85-9079
SX R medium	85-9128	X-Vert Carbon medium	85-9080
SX R firm	85-9129		

3. SWITCHING MCU AND COILSPRINGS
If you can't attain proper sag using the procedures explained in the previous section, changing either the MCU or the coil spring will be the solution **(see Figure 9)**. How to do this is explained is step-by-step instructions below.
A. Start by removing the preload adjuster by unscrewing the cap from the top of the crown/leg assembly. A 1 1/16th socket may be necessary. Remember: The

springs are housed only in one leg so remove the cap from the right side only on pre-2000 forks and left side only on 2000 forks (rider right).
B. With the adjuster assembly removed, the spring stack is now accessible.
C. Select the appropriate MCU or coil spring (refer to the spring chart on page 7 for recommended rates).
D. Apply a liberal amount of grease to the new coil spring or MCU and the spring couplers (what holds the springs together). We recommend any thick grease (not light greases like Prep M). Install the new spring stack with the coil spring on the bottom and the MCUs on the top.
E. Reinstall the preload adjuster assembly, taking care not to cross-thread the cap. It should thread in by hand and does not need to be tightened with a wrench (finger-snug is recommended).
F. With the new spring rate, it'll be necessary to ensure that the sag is set correctly, so run through that procedure again, making any adjustments required.

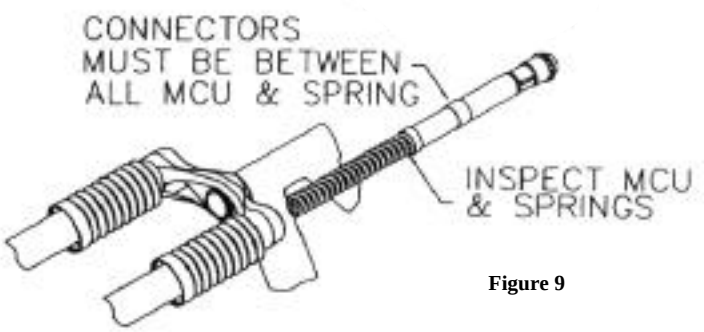


Figure 9

3. CHANGING AIR SPRING PRESSURE IN A MARS FORK
Altering the pressure in a MARS fork is really a no brainer. All you need is a high-pressure pump (e.g. part #85-4069), remove the air cap located on the top of the left leg, and then inflate the fork with the desired pressure. Be aware that sometimes air systems lose a small amount of pressure when the pump is removed, so you may want to check exactly how much your pump loses by reinstalling it on the fork after you have set and checked the pressure. Then you can slightly over inflate, accommodating for the pressure loss in the pump to ensure that your fork matches the recommended inflation rate.

4. REAR SUSPENSION: A BALANCED BIKE IS BEST
If you have a full-suspension bicycle, you should make sure that the front and rear suspension works in unison ("balanced"). It's not so important to have the same brand suspension, or even the same spring medium for that matter, with your suspension. The most important factors are quality, tunable components that are set up properly. With this said, after the fork's sag is set correctly, also check the rear suspension sag. You can check your rear suspension sag in much the same way as the front suspension. If you don't want to take the time to do this, see the Cheat Sheet to Full-Suspension Balance sidebar.

CHEAT SHEET TO FULL-SUSPENSION BALANCE
1. Hold the bike upright on level ground.
2. While standing next to the bike, pull on the front brake lever so the bike doesn't move.
3. Place your foot on the pedal closest to you and lower the pedal to bottom dead center.
4. Now push down on the pedal with your foot and note the attitude of the bike. Do it a few times. If the suspension is well balanced, the bike will maintain a level attitude as it compresses and rebounds.
5. Next, sit on the bike in your normal riding position. If either the front or rear end drops down excessively, you'll need to adjust the preload and/or change (or alter in the case of an air spring) the springs.

CHAPTER 7: GETTING DOWN TO BUSINESS

1. DAMPING ADJUSTMENTS: WHAT'S WHERE
On pre-2000 Manitou suspension forks with TPC damping, the damping adjusters are located only on the left-hand leg of the fork (as you look at the fork from the rider's position). On 2000 forks, the TPC damping system is located on the right hand side. On any model TPC fork, compression damping is adjusted with the knob on top of the fork and rebound adjustment is located at the bottom (underneath the leg) of the fork.

2. GETTING FAMILIAR WITH YOUR TPC FORK
After you set the sag, before you start making further changes to your fork, you must establish a baseline or point of reference for testing. The best way to do this is to lay out a test course to make comparisons as you tune the fork. The course shouldn't be too long (10-15 minutes per lap is fine). It should be rough and similar to the most demanding conditions you ride.

After coming up with a satisfactory test-course layout, ride a lap with the stock compression and rebound settings. Concentrate on all aspects of the bike: how the suspension performs, your body positioning, and how the bicycle handles. After one lap, try making some adjustments to the fork for comparison's sake. Start by turning the rebound damping adjuster knob (TPC and TPC Plus forks only. TPC Sport is non-adjustable) clockwise as you look from the bottom of the fork. all the way in (slowest return); write down the stock setting so you can return to it later.

Now ride the test course again, attempting to duplicate the effort and body positioning used on the first lap, and note how the fork acts. Concentrate on how the bike handles and what it does where. After finishing the lap, turn the rebound knob clockwise to the fully open position (quickest return) and ride another lap. After these three laps, you should have a good idea of how the bike handles at the extreme ends of fork rebound damping adjustment and how that compares to the original setting. The differences should be rather pronounced.

Generally speaking, cross-country riders prefer rebound damping on the slow side. That's because of XC rider's slower actual speed, the time between bumps tends to be longer. Also, with slower rebound settings the fork is not as active while climbing. Downhill riders, on the other hand, because of the high speeds resulting in shorter time between bumps, and, as a result, typically prefer quicker rebound.

Note: Do not try and race around your test course. You should ride at a comfortable speed that can be duplicated lap after lap. By riding at a comfortable speed you will also be able to focus more on the suspension.

DAMPING ADJUSTMENTS: Making mistakes and correcting them
When adjusting your suspension, make only one change at a time so you can keep track of what does what. Also keep a written record so you can return to your original settings if something goes wrong. Sometimes an adjustment will produce an undesirable effect so you'll want to return to the previous setting.

3. TUNING 2000 TPC AND TPC PLUS FORKS
Now that you have a basic understanding of the theory behind TPC, let's look at one of the greatest benefits of TPC, especially in terms of tuning. With a TPC fork, the compression and rebound damping can be tuned completely independent of each other. This can be done in a number of ways depending on the type of TPC damping your fork is equipped with (TPC or TPC Plus).

4. TPC AND TPC PLUS EXTERNALCOMPRESSION AND REBOUND DAMPING ADJUSTMENTS
For TPC and TPC Plus forks, a simple turn is all that's required to make external damping adjustments (due to the knobs at the top-compression-and bottom-rebound-of the right fork leg). The adjusters are preset at the factory so that when you receive your fork you will have a usable set-up, but you'll no doubt want to swirl those adjusters to get the exact setup you want.

Both the rebound and compression damping knobs turn clockwise to increase damping (think righty-tighty, lefty-loosy). Since the rebound adjuster is on the bottom of the fork leg, you will have to look at the fork and then turn the knob clockwise. **(See Figures 10 & 11)**.

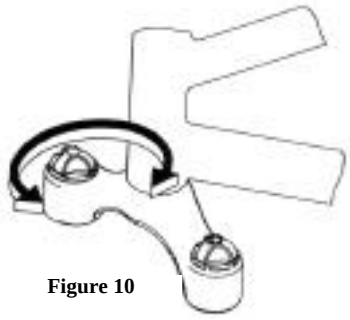


Figure 10

Besides the external adjustments, changes to TPC or TPC Plus can also be made internally. Like TPC Sport, the easiest method to altering the feel of the fork is to change the fork oil. But with more sophisticated systems like TPC and TPC Plus, this isn't recommended. If a different damping character is desired, it's better to change the shim stack in the damping pistons. The reason to doing this over just changing the fork oil is that by

changing the shim stacks in your fork, you can tune the rebound and compression damping independently. Refer to page 7 "2000 Tuning Specifications". This section identifies what tuning and adjustments can be made by diving into the internals of the fork. We recommend experimenting and exhausting external tuning adjustments before you attempt procedures that require disassembly or replacement of fork components (like shim stack changes).

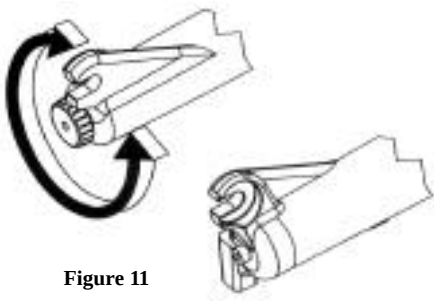


Figure 11

5. INTERNALTPC AND TPC PLUS TUNING

Changing the valve shim stacks in a TPC or TPC Plus fork (refer to Fork Schematics, Chapter 11) is the ultimate method of tuning your fork. However, determining the correct combination of shims can be time consuming and a tedious process that would take weeks to explain and longer to learn. Feel confident that the standard valving in your TPC fork has been tested and developed during many months on the racing circuit, but should you wish to customize your fork's valve shim stacks, keep the following hints in mind:

1. Make only small changes—a little bit goes a long way.
2. Always keep notes on what you've tried and how it worked.
3. Do not change the diameter of the shim closest to the piston. This shim must always cover the entire port.
4. Changing the larger diameter shim(s) will have greater effect on damping characteristics.
5. More shims and/or thicker shims will increase damping.
6. Fewer shims and/or thinner shims will decrease damping.

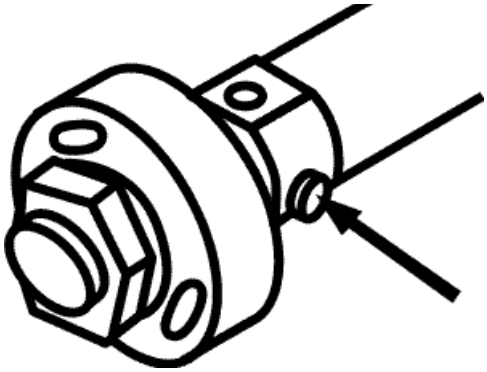
Manitou sells shim stack kits that will help you make changes to your suspension fork. Following are instructions on how to remove both the compression and rebound damping assemblies from the fork so that you can access the shim stacks. Once you have these assemblies outside of the fork, it's intuitive as to how to disassemble the assembly to access the shim. From there, you just need to be careful to reassemble the shim stacks and entire damping assembly correctly. Contact your authorized Manitou dealer to order any Manitou kits or call (661)257-4411.

2000 Damping Kits

Magnum R Rebound	85-9106
Magnum R Compression	85-9107
SX Rebound	85-9110
SX Compression	85-9111
SXR Rebound	85-9114
SXR Compression	85-9113
Mars & MARS C Rebound	85-4061
Mars & MARS C Compression	85-9113
Mars 1 Rebound	85-9114
Mars 1 Compression	85-9113
Mars CLRebound	85-4061
Mars CLCompression	85-4062
X-Vert Rebound	85-9082
X-Vert Compression	85-9085
X-Vert Super Rebound	85-9084
X-Vert Super Compression	85-9085
X-Vert DC Rebound	85-9083
X-Vert DC Compression	85-9086
X-Vert Carbon Rebound	85-9074
X-Vert Carbon Compression	85-9075

6. ADJUSTING COMPRESSION DAMPING WITH AN MRD ANTI BOB (see Figure 12)

Many people think that if you put the adjuster knob in the halfway position, it will increase compression damping. This is not the case. The MRD Anti Bob is simply an on-off switch for your fork, changing the fork from the on position to the off position. But this doesn't mean that the compression damping can not be altered once the MRD Anti Bob has been installed. On the lower piston of the lockout assembly is a small setscrew, which can be screwed in or out to increase or decrease compression damping respectively. Just do not over do it: a half turn makes a lot of difference, so make small and incremental changes to the setscrew.



internal damping adjustment using set screw. Turn clockwise to increase compression damping. Turn counterclockwise to decrease compression damping. Standard setting is 4.5 turns out from fully closed.

Figure 12

7. TUNING TPC SPORT

TPC (or Twin Piston Chamber damping) is one of the hottest developments in suspension technology and its more-moderately-priced brother, TPC Sport, is equally revolutionary. Like TPC, TPC Sport uses separate pistons for rebound and compression, no leak seals and large oil volume to eliminate heat-related problems. It is not adjustable externally, but that doesn't mean you can't vary the feel of the fork; changing the fork oil weight in your TPC Sport-equipped fork will significantly alter the damping character of the fork. (See "Changing Fork Fluid" below for instructions on how to do this and see the chapter on "Damping" on page 5 for recommended oil weights.) The standard fork fluid for Manitou forks is 5-weight Maxima.

One thing to remember when changing fork fluid from stock is that the increased or decreased oil weight will affect both compression and rebound damping equally. This means that while you may be slowing rebound down by say, adding heavier fork oil, you also may be adding compression damping to the point of the fork feeling harsh. The best thing to do is to experiment with different oil weights until you find that perfect setting for you.

Note: Since TPC Sport uses orifices (or holes) in the compression and rebound pistons to meter the flow of oil (and thus create damping), changing the orifice sizing may seem an obvious method to tuning TPC Sport. While doing this will produce significant changes in the damping of the fork, it is not recommended. Changing the size of the damping ports risks damaging the pistons, will void the warranty on the fork and will most likely compromise the performance of the fork as well.

CHAPTER 8: DAMPING ASSEMBLIES

1. REMOVING THE REBOUND DAMPING ASSEMBLY

To remove the rebound damping assembly, the fork must be disassembled first (please refer to "Manitou Disassembly Procedure" later in this manual). With the fork upside-down, reinstall the damper dropout nut (the bolt that holds the lowers to the uppers) and stroke the shaft 3-4 times. This pushes the fork fluid to the compression side of the leg so that you can remove the rebound assembly without having to change the oil.

The rebound damping assembly can now be removed with a 15/16- inch wrench. Be careful when removing the assembly as a small amount of fork fluid may remain on top of the piston. In addition, ensure that no contaminants enter the now-exposed fluid. To reinstall the assembly, torque the end cap as specified in the owner's manual. Turn the fork right side up and stroke the rebound shaft a few times to transfer fluid back down to the bottom of the leg. Remove the damper dropout nut and follow the steps outlined in Manitou Reassembly Procedure to put the fork back together.

2. REMOVING THE COMPRESSION DAMPING ASSEMBLY
If it sounded like removing the rebound damping assembly was easy, removing the compression damping is as easy as chewing gum and skipping rope (well, maybe a little easier). No disassembly is needed to remove the compression rod. Just unscrew it from the right hand leg (left hand side in pre-2000 forks) and pull it out. Do be careful when you pull the compression assembly past the threads as you can damage the O'ring on the damping piston.

3. MRD ANTI BOB INSTALLATION
The MRD Anti Bob is solid as a standard feature on all 2000 MARS CLforks and as an upgrade for other TPC Plus, TPC and TPC Sport equipped forks. Once installed in the fork, the Anti Bob can be turned from the on and off position by simply turning the knob on top of right fork leg clockwise or counterclockwise. The Anti-Bob is a hydraulic system which has a safety blow off to allow the fork to move through its travel should you hit a large bump or other obstacle while the Anti Bob is in the "on" position.

To install the Anti Bob to your fork, remove the compression assembly from the right side by unthreading it counterclockwise. Lightly grease the O-rings and threads on the MRD Anti Bob. With the Anti Bob in the off position, install it into the right side leg (Be careful as you do this to avoid damaging the lower rubber O-ring. The fit should be tight, so SLOWLY twist the Anti Bob as you SLOWLY lower it in the leg. If at the end of installation, it does not function properly, remove the Anti Bob and check the O-ring for tearing. Once the Anti Bob assembly is firmly in place, flip it to on, and while holding the front brake, compress the fork. It should only move a very small amount and then should feel firm. Remember that the Anti Bob has a safety blow off which allows the fork to move under extreme bump forces (when on), so if you push it very hard, you will see more than a few millimeters of movement. If you think you've done everything right and the lockout is still not functioning properly, remove the compression assembly and recheck the oil height.

Note: The MRD Anti Bob shaft locates the compression piston higher in the chamber than a normal TPC compression rod, so oil must be added for proper function of the lockout. Proper oil height can be measured with a simple dipstick, which you can put down into the fork leg. The proper oil height, measured from the top of the left leg and extending down into the leg, is between 3.75 inches (95mm) and 4.25 inches (108mm). Use Maxima SAE 5-weight oil only. **Warning: DO NOTOVERFILLTHE FORK WITH OIL. OVERFILLING THE FORK COULD CAUSE DAMAGE TO THE FORK AND POSSIBLY INJURE THE RIDER.**

3. CHECKING THE OILLEVEL
Having the correct oil level is critical to keep your TPC fork working at its best. To measure the oil level, you only need a measuring tape. Begin by unscrewing the compression valve assembly at the top of the left fork leg. Leave the spring stack (rider's right side) installed as it should not be removed to check oil height.

Once the assembly is completely unthreaded from the inner leg, pull the assembly about halfway out. You should be able to feel when the piston is no longer in the fork fluid. When this happens, slowly lower the assembly to where it again contacts the oil (felt by the increased resistance of the piston in the oil), and measure the distance from the top of the crown to the top O-ring (located under the knob above the cap threads). This distance should be approximately two inches.

4. CHANGING FORK FLUID
Though all suspension forks demand fluid changes, a TPC fork needs fluid changes far less frequently because the TPC design doesn't break fluid down quickly due to its greater oil volume (and also the fact that we aren't trying to use the damping fluid for lubrication). We recommend changing fluid just once a year for heavy users and only every other year for sport and recreational users. The first step in changing the fluid is to remove the compression damping assembly. Next, pour the old fluid out of the top of the leg into a clear container in order to inspect the fluid. Dark or cloudy fluid is normal and not an indication of a problem. If metal flakes or other contaminants are present, disassemble the entire left leg following the procedures outlined in Manitou Disassembly and Reassembly. Clean all parts off with a suitable cleaning solution, wipe clean and then reassemble if no damaged parts are found. Fill the leg with the recommended amount of fluid (Manitous are filled at the factory with 5-weight Maxima) and set the oil level according to the previous section "Checking Oil Level." Reinstall the compression damping assembly.

CHAPTER 9: TROUBLESHOOTING TIPS

1. IDENTIFYING PROBLEMS
Following are symptoms that will help you identify a suspension problem. Remember that some problems might be due to more than one cause and that it is easier to pinpoint the cause by looking for more than one symptom. While riding, pay attention to how the suspension feels and what that feel might be attributed to.

Symptom
Static sag excessive; front end too low entering turns; front end "knifes" (oversteers, turns in too easily)
Cause
Spring rate too soft; compression damping too soft; too much rebound damping
Solution
Check sag; increase compression damping; reduce rebound damping; increase spring rate

Symptom
Fork rarely bottoms; harsh feel; tall ride height despite soft spring and/or minimum preload; hard to turn into corners
Cause
Excessive compression damping
Solution
Reduce compression damping

Symptom
Fork feels too hard or stiff; tends to sit at the bottom of the travel
Cause
Too much rebound damping; spring rate too soft; too little compression damping; fork fluid weight too heavy; spring rate possibly soft
Solution
Check sag; reduce rebound damping; reduce compression damping; change fork fluid to 2.5 weight

Symptom
Fork feels too soft and bottoms
Cause
Spring rate too soft; compression damping too light; fork fluid weight too light; fork fluid worn out
Solution
Check sag; increase compression damping; increase spring rate; change fork fluid to 7.5 weight

Symptom
Fork extends too quickly; wheel springs up from ground after landing from jumps; difficult to maintain straight path in rocks; front end tries to climb berms or grooves while cornering; hard to turn into corners
Cause
Not enough rebound damping
Solution
Increase rebound damping

Symptom
Harsh feel, especially through successive rapid hits (braking bumps, etc.); bottoming after 3-4 successive large hits; failure to rebound after landing from jumps; too easy to turn into corners; fork bottoms despite correct compression damping & spring rate
Cause
Too much rebound damping
Solution
Reduce rebound damping

Symptom
Fork bottoms; "diving" feel while braking for turns; too easy to turn into corners; fork unstable
Cause
Not enough compression damping; spring rate too soft
Solution
Increase compression damping; check sag; increase spring rate

Symptom
Fork bottoms; needs more than maximum preload; front end too low on downhills
Cause
Soft compression damping setting; spring rate too soft; fork oil weight too low

Solution
Check sag; increase compression damping; change fork oil 7.5 weight

Symptom
Fork rarely/never bottoms; doesn't use full travel
Cause
Spring rate too stiff; compression damping too firm; fork oil weight too high
Solution
Check sag; decrease compression damping; reduce spring rate; change fork oil to 2.5 weight

Symptom
Static sag non/barely exists; fork feels stiff or harsh; hard to turn into corners; low-speed turning ability sluggish
Cause
Too much preload; spring rate too stiff
Solution
Check sag; reduce spring rate

2. TYPICALPROBLEMS AND SOLUTIONS
Here are some typical problems encountered by riders in various situations and what can be done to solve them, step by step—or at least help alleviate their severity until an authorized technician can be consulted. If you have one of these problems and wish to solve it, start with solution one. If that doesn't solve it completely, try solution two. Still not fixed? Go to solution three.

Front end searches or is nervous when descending hills
A. Increase spring preload
B. Increase compression damping
C. Use stiffer springs
D. Increase rebound damping

Front end "washes out" in turns (understeers, tends to push outward)
A. Increase rebound damping
B. Reduce preload
C. Reduce compression damping
D. Use softer springs

Front end "knifes" in turns (oversteers, tends to turn inward, dives)
A. Reduce rebound damping
B. Increase preload
C. Increase compression damping
D. Use stiffer springs

Fork doesn't respond to small bumps in turns
A. Reduce rebound damping
B. Reduce compression damping
C. Reduce preload
D. Use softer springs

Note: If you are out at the races, look for the Manitou Racing Development technical-support vehicles at many major events worldwide. Our technicians will try to answer any technical questions or solve equipment problems. We also offer emergency service to riders of all levels, not just our sponsored elite pros. Our goal is to ensure that our customers enjoy our forks to their fullest. For more information on where the MRD team will be throughout the year, check our website at www.answerproducts.com.

CHAPTER 10: SERVICE

1. SERVICE INTRODUCTION
Like any moving part, a Manitou suspension fork requires regular maintenance. If it doesn't receive such service, it will lose performance and wear quickly, negating all of the work put into dialing it in—not to mention the money it cost in the first place.

Riding in severe conditions such as mud and water make regular maintenance even more important. If you maintain your fork on a regular basis and Microlube it often, you won't have wasted your time and you won't waste your fork. Learn how to maintain your Manitou properly in this section.

Note: The fork boots and wiper seals that are standard equipment on all 2000 forks (except the MARS 1) greatly reduce the chance of contamination from outside elements. We recommend keeping the fork boots on at all times—even in good conditions—for extended service life and optimum performance.

When servicing the fork, take the time to inspect all parts for excessive wear or damage. Pay close attention to the bushings, which can be damaged by contamination in severe conditions. Replace any worn or damaged parts that are discovered. This will ensure optimum performance from the fork.

There are basically four aspects of a fork that will require attention: the stanchions (inner legs), the bushings in the outer legs, the spring stack and the damping fluid. Inspecting any of these parts requires disassembly of the fork. It isn't particularly difficult, but those uncomfortable with disassembling mechanical things should let a qualified technician do it.
One thing to remember is that the fork fluid needs changing regularly, just like the oil in a car's engine. Fresh fluid ensures quality, consistent damping, and it also acts as a lubricant for the piston and inner wall. When changing fork fluid, we recommend that you also replace the TPC chamber seals and replace any parts that are excessively worn or broken. Manitou offers rebuild kits for all forks that makes this both easy and convenient.

2. SERVICE SCHEDULE - Suggested Service ForManitou Forks

Normal Conditions
Short/Sporadic Rides:
Lube fork as needed with Prep M grease via Microlube lubrication ports.
Disassemble fork per owner's manual; clean and grease every 4-5 months.
Grease spring stack as needed.
Service TPC and TPC Sport by changing fork fluid every year.

Long/Frequent Rides:
Lube fork as needed with Prep M grease via Microlube lubrication ports.
Disassemble fork per owner's manual; clean and grease every 10-14 weeks.
Grease spring stack as needed.
Service TPC and TPC Sport by changing fork fluid every 6 months.

Severe Conditions (mud, rain, snow, extreme dust)
Short/Sporadic Rides
Lube fork as needed with Prep M grease via Microlube lubrication ports.
Disassemble fork per owner's manual; clean and grease every 6-8 weeks.
Grease spring stack as needed.
Service TPC and TPC Sport by changing fork fluid every year.

Long/Frequent Rides
Lube fork as needed with Prep M grease via Microlube lubrication ports
Disassemble fork per owner's manual; clean and grease every 4-6 weeks.
Grease spring stack as needed.
Service TPC and TPC Sport by changing fork fluid every 6 months.

3. MANITOU DISASSEMBLY PROCEDURE
All 1996 and later Manitou oil-damped forks use the same general disassembly/assembly methods. The fork doesn't have to be removed from the bicycle for general disassembly/assembly or cleaning, as the crown and inner legs can remain on the bike. Here's how to remove the outer legs and arch assembly on a 2000 fork. Remember that the TPC damping system has been switched from the left to the right side for 2000, so if you have a pre-2000 fork, look for the proper bolts on the opposite side of the fork.
A. Remove the lower compression rod screw from the left-leg dropout with a 4mm Allen wrench.
B. Pop out the damping adjuster knob from the right-leg dropout (a small screwdriver may be helpful for this). Then remove the retainer screw with an 8mm Allen wrench.
C. Pull down on the outer leg assembly (sliders) to separate them from the inner legs and the crown.
D. Remove the fork boots. (NOTE: Removing the dust seal every time the fork is disassembled is not recommended. The seal and bushings in each leg may be cleaned and regreased while in place.)

Inspection
A. Clean all parts thoroughly with non-flammable solvent.
B. Check the fork boots and felt wipers for excess wear, tears or other obvious damage.
C. Check the dust seals for tears or other damage; replace the seals if necessary.
D. Inspect both the lower and upper bushings for excessive wear or damage; replace them if necessary.
E. Check each outer leg/arch assembly for nicks or deep gouges on both the inner and outer surfaces; replace if necessary.
F. Check each inner leg for deep gouges and other obvious damage. Minor wear resulting in color change is not detrimental to the gold-anodized surface. If there's excessive wear or damage, replace the inner leg.
G. Check the inner legs at the bottom of the crown for cracks or flaking of the

anodizing. Replace the leg if a crack is discovered or if the gold anodizing is starting to flake.
H. Check the underside of the crown for cracks; replace if cracked.

4. MANITOU REASSEMBLY PROCEDURE
A. After thoroughly inspecting the fork and replacing parts where necessary, lightly grease the inner diameter of the top and bottom bushings.
B. Liberally grease the wiper.
C. Grease the compression rod lightly.

(**NOTE:** Before proceeding with the rest of the reassembly process, make sure that the black second-stage elastomer, the cup washer and the orange third-stage elastomer are installed on the compression rod, and that the detent ball and orange third-stage elastomer are installed
on the damper shaft.)

D. Slide the fork boots onto the inner legs; push them up until they are in position beneath the crown and lightly grease the inner leg.
E. Slide the outer leg/arch assembly onto the inner legs and fully compress the fork.
F. Install the compression-rod screw back into the left-leg dropout with a 4mm Allen wrench and the dropout nut into the right-leg dropout with an 8mm Allen wrench. Tighten to a torque reading between 10-30 inch-lb. (1.1-3.5 N-m). Beware: Over-torquing the dropout nut may damage the damper shaft.
G. Pop the damping adjuster knob back into the right-leg dropout. (An O-ring holds the knob in place.)
H. Slide the skirt of each fork boot onto the dust seals'corresponding groove. Be sure the skirt lip sits down into the corresponding groove.

5. GLOSSARY OFUSEFULTERMS

Compression damping: The act of controlling the compression of a fork by changing the energy of motion into heat and then dissipating it by way of an oil-based fluid.

Coil Spring: A wound spring made of metal.

Damping: The act of absorbing shock by changing the energy of motion into heat and then dissipating it by way of an oil-based fluid.

Elastomer: A urethane bumper which is used as a spring in a suspension fork.

MCU: A urethane bumper, like an elastomer, which is used as a spring; a special process forces air into the elastomer during construction allowing it to both compress and deform, providing limited damping in some uses.

Microlube: Manitou's lubrication system that allows you to inject grease in your fork without disassembly.

Preload: The initial loading of a spring via a dial adjuster.

Rebound damping: The act of controlling the extension of a fork by changing the energy of motion into heat and then dissipating it by way of an oil-based fluid.

Sag: The amount the suspension settles under normal rider weight.

Spring rate: A measure of the spring's stiffness or softness.

TPC: (Twin Piston Chamber): Manitou's revolutionary system of damping which uses two independent pistons for control of compression and rebound damping.

TPC Plus: TPC Plus is the next evolution in TPC damping technology and uses a position-activated damping piston that provides a super active ride initially, but has a secondary compression circuit to control brake dive and eliminate bottoming.

TPC Sport: A more affordable version of Manitou's TPC damping system which uses two separate pistons, one for compression and one for rebound, but uses orifice-style damping circuits rather than shim stacks like standard TPC.

MRD: Manitou Racing Development is the division of Manitou Performance Bicycle Components responsible for ensuring that Manitou-sponsored racers are riding the best suspension forks in the world.

6. USEFUL PART NUMBERS

2000 Forks

Description	P/N
Magnum Red	85-8990
Magnum Black	85-9041
Magnum R Blue	85-8991
Magnum R Fireball	85-9042
SX Red	85-9043
SX-R Black	85-8992
Mars Yellow	85-8994
Mars C Fireball	85-8995
Mars CLRed	85-8996
Mars 1 Yellow	85-9544
X-Vert Black	85-8997
X-Vert DC small blue	85-8998
X-Vert DC large blue	85-8999
X-Vert Super Red	85-9001
X-Vert Carbon small	85-8960
X-Vert Carbon Large	85-8988
Millennium	85-9038

2000 Spring Kits

Magnum small	85-9124
Magnum medium	85-9125
Magnum firm	85-9126
Magnum R soft	85-9124
Magnum R medium	85-9125
Magnum R firm	85-9126
SX soft	85-9127
SX medium	85-9128
SX firm	85-9129
SX R soft	85-9127
SX R medium	85-9128
SX R firm	85-9129
X-Vert soft	85-9100
X-Vert medium	85-9178
X-Vert firm	85-9099
X-Vert Super soft	85-9100
X-Vert Super medium	85-9178
X-Vert Super firm	85-9099
X-Vert DC soft	85-9102
X-Vert DC medium	85-9179
X-Vert DC firm	85-9101
X-Vert Carbon soft	85-9079
X-Vert Carbon medium	85-9080

2000 Damping Kits

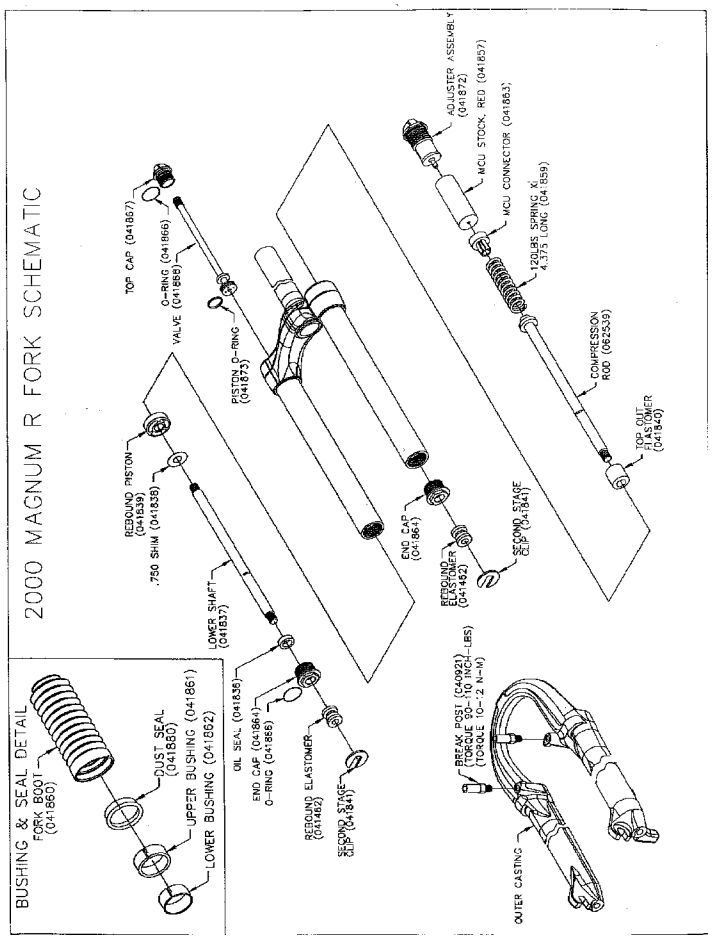
Magnum R Rebound	85-9106
Magnum R Compression	85-9107
SX Rebound	85-9110
SX Compression	85-9111
SXR Rebound	85-9114
SXR Compression	85-9113
Mars & MARS C Rebound	85-4061
Mars & MARS C Compression	85-9113
Mars 1 Rebound	85-9114
Mars 1 Compression	85-9113
Mars CLRebound	85-4061
Mars CLCompression	85-4062
X-Vert Rebound	85-9082
X-Vert Compression	85-9085
X-Vert Super Rebound	85-9084
X-Vert Super Compression	85-9085
X-Vert DC Rebound	85-9083
X-Vert DC Compression	85-9086
X-Vert Carbon Rebound	85-9074
X-Vert Carbon Compression	85-9075

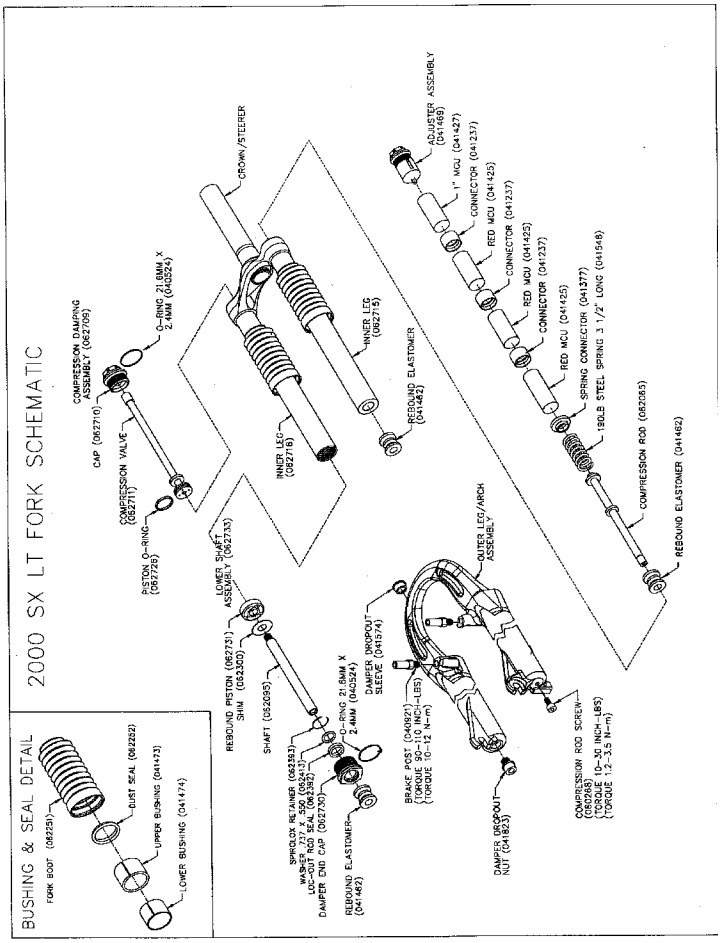
Maxima Fork Oils

Maxima Suspension Fluid 5-WT 8oz	85-3814
Maxima Suspension Fluid 7.5-WT-8oz	85-3820
Maxima Suspension Fluid 10-WT-8oz	85-3822

MRD Prep M Grease and Grease Gun

Prep M Grease for Microlube	85-3810
Grease Gun Head	85-3812


2000 MAGNUM R FORK SCHEMATIC
BUSHING & SEAL DETAIL
FORK BOOT (041860)
DUST SEAL (041880)
UPPER BUSHING (041861)
LOWER BUSHING (041862)
TOP CAP (041867)
O-RING (041866)
VALVE (041868)
PISTON O-RING (041875)
REBOUND PISTON (041839)
.750 SHIM (041838)
LOWER SHAFT (041837)
OIL SEAL (041836)
END CAP (041864)
O-RING (041856)
REBOUND ELASTOMER (041462)
SECOND STAGE CUP (041841)
BREAK POST (040921) (TORQUE 90-110 INCH-LBS) (TORQUE 10-12 N-M)
OUTER CASTING
END CAP (041861)
REBOUND ELASTOMER (041462)
SECOND STAGE CUP (041841)
TOP OUTER ELASTOMER (041840)
COMPRESSION ROD (062539)
120LBS SPRING KI 4.375 LONG (041859)
MCU CONNECTOR (041863)
MCU STOCK, RED (041857)
ADJUSTER ASSEMBLY (041872)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CAP (062710)
COMPRESSION VALVE (062711)
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INNER LEG (062715)
INNER LEG (062716)
REBOUND ELASTOMER (041462)
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SHAFT (062095)
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BRAKE POST (040921) (TORQUE 90-110 INCH-LBS) (TORQUE 10-12 N-m)
OUTER LEG/ARCH ASSEMBLY
DAMPER DROPOUT NUT (041823)
COMPRESSION ROD SCREW (060268) (TORQUE 10-30 INCH-LBS) (TORQUE 1.2-3.5 N-m)
ADJUSTER ASSEMBLY (041469)
1" MCU (041427)
CONNECTOR (041237)
RED MCU (041425)
CONNECTOR (041237)
RED MCU (041425)
CONNECTOR (041237)
RED MCU (041425)
SPRING CONNECTOR (041377)
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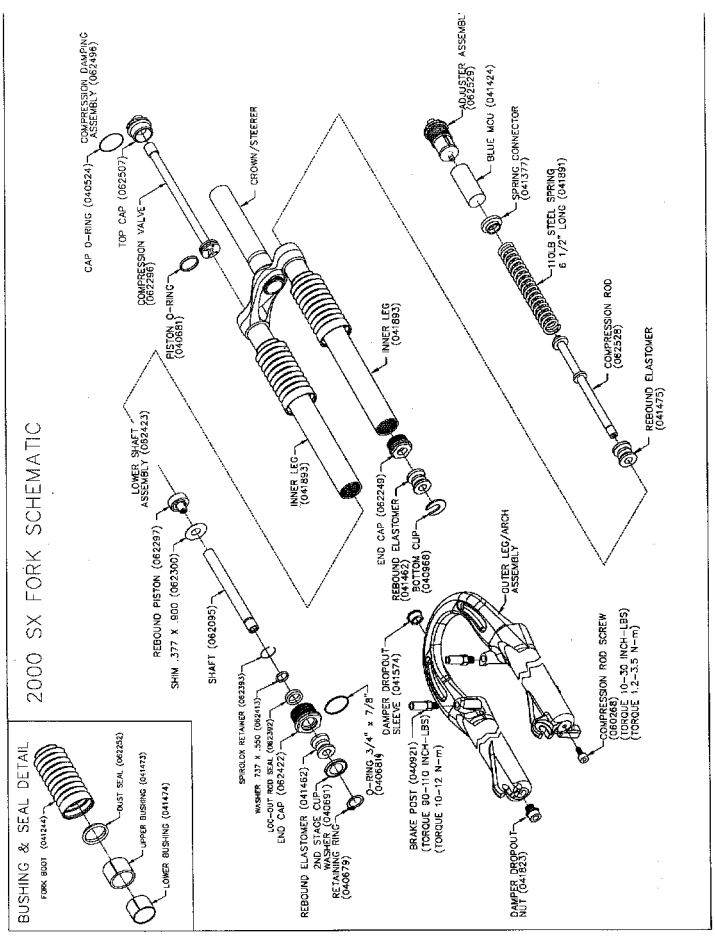
COMPRESSION ROD (062283)
REBOUND ELASTOMER (041462)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COMPRESSION DAMPING ASSEMBLY (062496)
TOP CAP (062507)
COMPRESSION VALVE (062296)
PISTON O-RING (040681)
CROWN/STEERER
LOWER SHAFT ASSEMBLY (062423)
REBOUND PISTON (062297) SHIM .377 X 800 (062300)
SHAFT (062095)
SPIROLOX RETAINER (062393) WASHER .737 X .500 (062402) LOC-OUT ROD SEAL (062422) END CAP (062422)
REBOUND ELASTOMER (041462) 2ND STAGE CUP (040891) RETAINING RING (040679)
O-RING 3/4" x 7/8" (040684)
INNER LEG (041893)
INNER LEG (041893)
END CAP (062248)
REBOUND ELASTOMER (041462) BOTTOM CUP (040968)
DAMPER DROPOUT SLEEVE (041574)
BRAKE POST (040921) (TORQUE 90-110 INCH-LBS) (TORQUE 10-12 N-m)
OUTER LEG/ARCH ASSEMBLY
DAMPER DROPOUT NUT (041823)
COMPRESSION ROD SCREW (060268) (TORQUE 10-30 INCH-LBS) (TORQUE 1.2-3.5 N-m)
ADJUSTER ASSEMBLY (062505)
BLUE MCU (041424)
SPRING CONNECTOR (041377)
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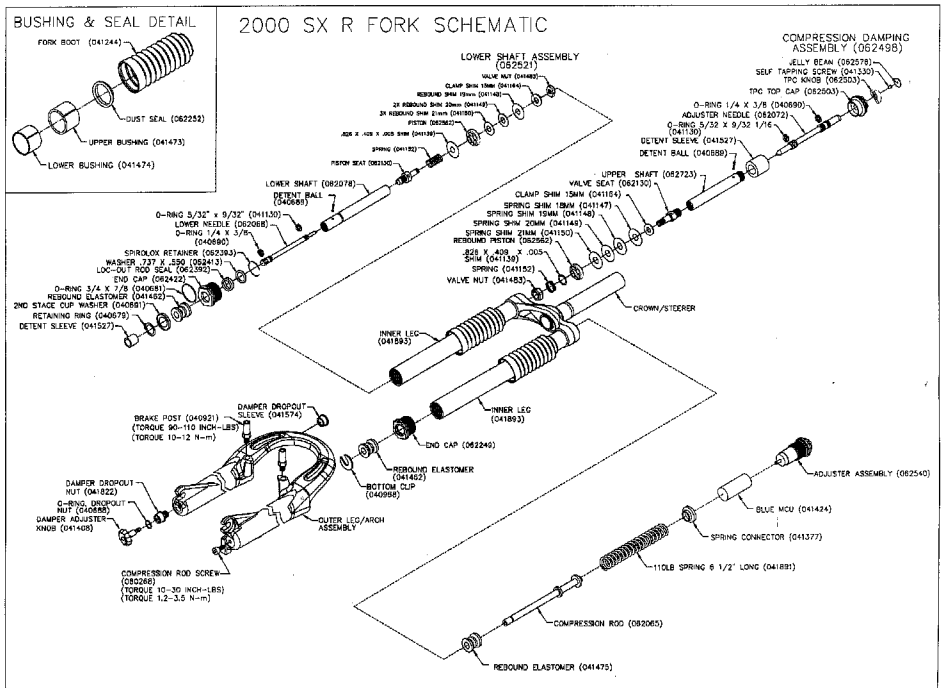
COMPRESSION ROD (062228)
REBOUND ELASTOMER (041475)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LOWER BUSHING (041474)
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LOWER SHAFT ASSEMBLY (082521)
COMPRESSION DAMPING ASSEMBLY (062498)
JELLY BEAN (062578)
SELF TAPPING SCREW (041330)
TPC KNOB (062503)
TPC TOP CAP (062503)
O-RING 1/4 X 3/8 (040690)
ADJUSTER NEEDLE (062072)
O-RING, 5/32 X 9/32 X 1/16 (041130)
DETENT SLEEVE (041527)
DETENT BALL (040888)
UPPER SHAFT (082723)
VALVE SEAT (062130)
CLAMP SHIM 15MM (041164)
SPRING SHIM 18MM (041147)
SPRING SHIM 15MM (041148)
SPRING SHIM 20MM (041149)
SPRING SHIM 21MM (041150)
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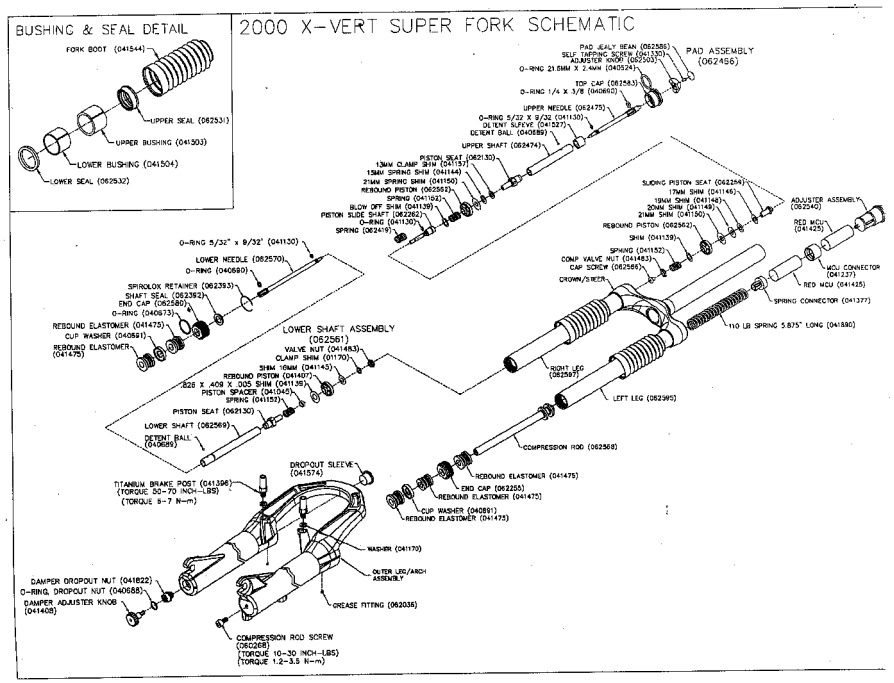
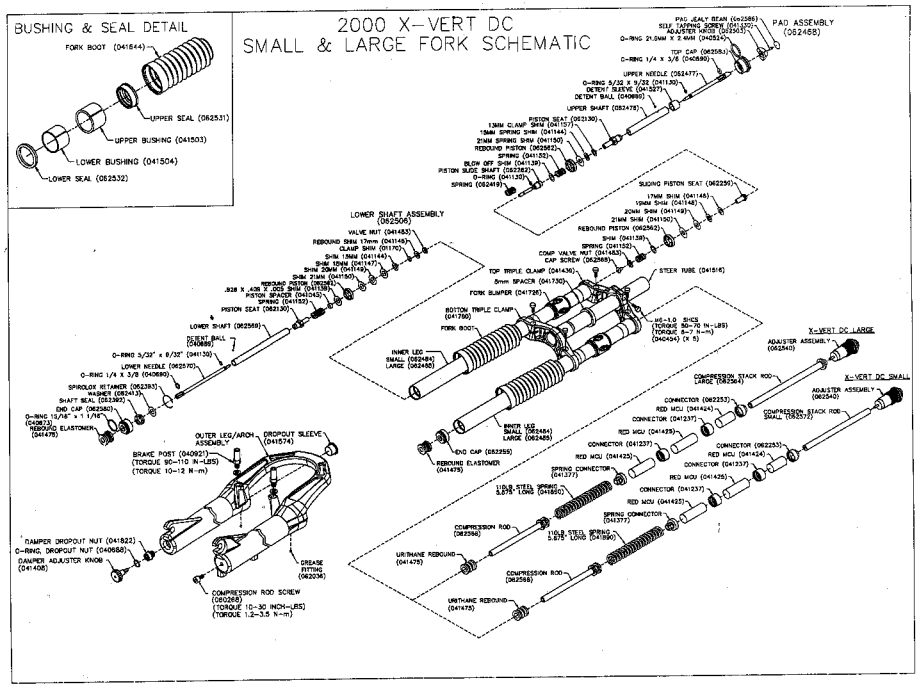
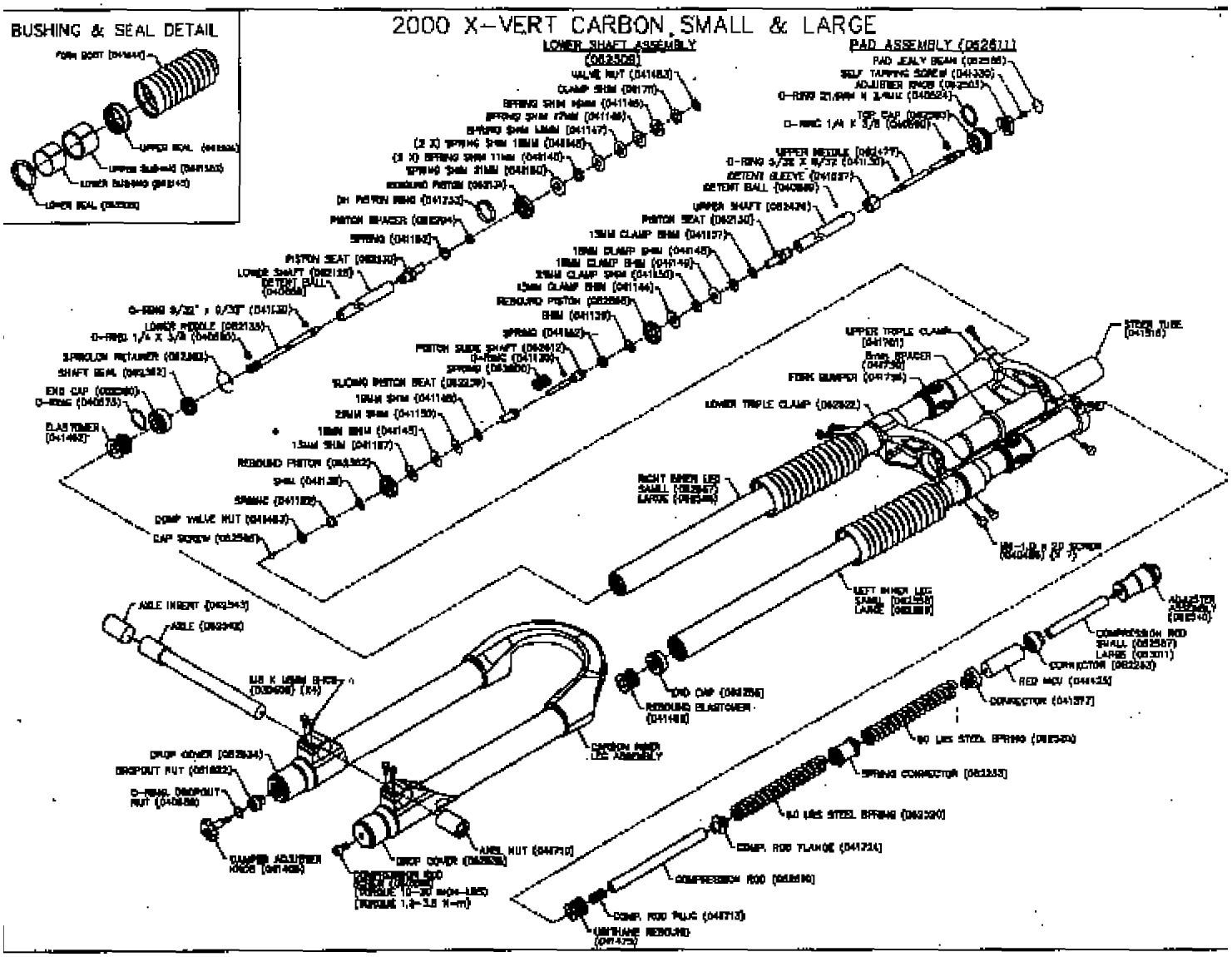
SPRING (041152)
VALVE NUT (041483)
CROWN/STEERER
INNER LEG (041893)
LOWER SHAFT (082078)
DETENT BALL (040888)
O-RING 5/32" x 9/32" (041130)
LOWER NEEDLE (062088)
O-RING 1/4 X 3/8 (040690)
SPIROLOX RETAINER (052393)
WASHER .737 X .890 (052413)
LOC-OUT ROD SEAL (062392)
END CAP (062422)
O-RING 3/4 X 7/8 (040681)
REBOUND ELASTOMER (041462)
2ND STAGE CUP WASHER (040881)
RETAINING RING (040679)
DETENT SLEEVE (041527)
DAMPER DROPOUT SLEEVE (041574)
BRAKE POST (040921) (TORQUE 90-110 INCH-LBS) (TORQUE 10-12 N-m)
END CAP (062240)
REBOUND ELASTOMER (041462)
BOTTOM CLIP (040998)
DAMPER DROPOUT NUT (041822)
O-RING, DROPOUT NUT (040688)
DAMPER ADJUSTER KNOB (041408)
OUTER LEG/ARCH ASSEMBLY
COMPRESSION ROD SCREW (080268) (TORQUE 10-30 INCH-LBS) (TORQUE 1.2-3.5 N-m)
ADJUSTER ASSEMBLY (062540)
BLUE MCU (041424)
SPRING CONNECTOR (041377)
110LB SPRING 6 1/2" LONG (041891)
COMPRESSION ROD (082065)
REBOUND ELASTOMER (041475)


BUSHING & SEAL DETAIL
FORK BOOT (041544)
UPPER SEAL (062531)
UPPER BUSHING (041503)
LOWER BUSHING (041504)
LOWER SEAL (062532)
2000 X-VERT SUPER FORK SCHEMATIC
PAD ASSEMBLY (062486)
TOP CAP (062583)
UPPER NEEDLE (062475)
UPPER SHAFT (062474)
PISTON SEAT (062130)
REBOUND PISTON (062562)
SLIDING PISTON SEAT (062294)
ADJUSTER ASSEMBLY (062540)
RED MCU (041425)
MCU CONNECTOR (041237)
RED MCU (041415)
SPRING CONNECTOR (041377)
110 LB SPRING 5.875" LONG (041890)
LEFT LEG (062395)
RIGHT LEG (062567)
COMPRESSION ROD (062568)
REBOUND ELASTOMER (041475)
END CAP (062255)
CUP WASHER (040891)
LOWER SHAFT ASSEMBLY (062561)
LOWER NEEDLE (062570)
LOWER SHAFT (062569)
PISTON SEAT (062130)
DROPOUT SLEEVE (041574)
TITANIUM BRAKE POST (041396)
WASHER (041170)
OUTER LEG/ARCH ASSEMBLY
GREASE FITTING (062036)
COMPRESSION ROD SCREW (062268)
DAMPER DROPOUT NUT (041822)
DAMPER ADJUSTER KNOB (041408)


BUSHING & SEAL DETAIL
FORK BOOT (041644)
UPPER SEAL (062531)
UPPER BUSHING (041503)
LOWER BUSHING (041504)
LOWER SEAL (062532)
2000 X-VERT DC
SMALL & LARGE FORK SCHEMATIC
PAD ASSEMBLY (062486)
TOP CAP (062583)
UPPER NEEDLE (062477)
UPPER SHAFT (062478)
PISTON SEAT (062130)
REBOUND PISTON (062562)
SLIDING PISTON SEAT (062294)
LOWER SHAFT ASSEMBLY (062506)
TOP TRIPLE CLAMP (041436)
STEER TUBE (041516)
FORK BUMPER (041728)
BOTTOM TRIPLE CLAMP (041760)
FORK BOOTS
INNER LEG SMALL (062484) LARGE (062485)
X-VERT DC LARGE
X-VERT DC SMALL
ADJUSTER ASSEMBLY (062540)
COMPRESSION STACK ROD LARGE (062564)
COMPRESSION STACK ROD SMALL (062572)
CONNECTOR (062253)
RED MCU (041424)
CONNECTOR (041237)
RED MCU (041425)
SPRING CONNECTOR (041377)
115LB STEEL SPRING 5.875" LONG (041890)
COMPRESSION ROD (062568)
URETHANE REBOUND (041475)
END CAP (062255)
REBOUND ELASTOMER (041475)
OUTER LEG/ARCH ASSEMBLY
DROPOUT SLEEVE (041574)
BRAKE POST (040927)
GREASE FITTING (062036)
COMPRESSION ROD SCREW (062268)
DAMPER DROPOUT NUT (041822)
DAMPER ADJUSTER KNOB (041408)



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