

I am going to attempt to share my experience with adjusting the ride height of the Safari Panther RV on the Magnum chassis. It is straight forward and anyone with some mechanical know-how should be able to do it with some precautions.

Things you will potentially need in addition to normal mechanics tools:

1. A powerful jack
2. Jack stands
3. A VERY deep 7/8ths socket! You can purchase specialty sockets at SnapOn or other places, or make you own.
4. 1/2" impact drive, or at least a wrench
5. a stiff wire brush. I used the small stainless style.
6. A welder, or the means to get something welded. (IF you make your own socket)
7. You may need a 9/16th X 18 Die, or a Thread chaser/Nu-thread restoring file: http://www.atgstores.com/tap-die-sets/century-drill-amp-tool-9294-nu-thread-restoring-file_g1513867.html



Since I am attempting to add to an existing document for the do-it-your-selfer, I am going to insert the instructions here. This document appears to have been done at PMW (Pioneer Metal Works) <http://www.pioneermetalworks.com/> . These are the folks to go to for many slick engineered products including the airbag system Part #10-600. They sell them through Henderson's RV <http://www.hendersonslineup.com/>, and Brazel's RV. <https://www.brazelsrv.com/>

The beginning of PMW's document. I will add comments to this to help clarify the process. I'll make it red to make it obvious. I have made no textual changes to the original document, other than add some in red.

Ride Height Adjustment

Why is Ride Height adjustment important?

The reason is that the Velvet-Ride Torsalastic suspension is like a leaf or coil spring suspension. There is a tube on each corner and you need to consider each one being a spring.

So, why is ride height important? When the suspension was designed it was designed to be set at a certain ride height per the manufacturer. If this ride height is not correct, the problems could be ill handling; suspension and frame in a bind. It could also cause a harsh or rough ride if the ride height is too low.

Let's take a look at some of the other suspensions and how you would adjust ride-height. On a leaf spring or coil spring coaches you would first determine what the ride-height is and what it should be. To do this you need to know what the manufacturer specifications are for your particular suspension. Any adjustments that may need to be made are very limited and usually requires rebuilding or replacement. For an air-ride coach the height adjustment can be made by adjusting the air-ride control valves that are put into the system. Now, we will get into the Velvet-Ride. When these were new, designed and developed they had shims build in so the ride-height could be adjusted. Remember that Velvet-Ride is a Torsalastic spring, which means that it can over time or with load changes settle or sag. With the design of the Velvet-Ride and with the shims that were installed at each shackle, you can remove shims to adjust ride height. With Velvet-Ride when you remove shims you raise the ride-height, not lower it as one would think.

Some may find, like I did, that you can no longer adjust it up to specs. In this case, you have two options.

1. Replace the torsion bars. I have found one place that makes replacement bars. <http://www.sulastic.com/>

The dimensions of these "tubes" are NOT the total length, but just the square portion of the bar. The width of the square tube is what determines whether it is 4" or 5".

2. Add an airbag retrofit system from one of the three places listed above.

"When dealing with ride heights the #1 thing to do is weigh your coach. You need to weigh each corner and then figure out how to shift your load or how to adjust each corner."

How to determine what the Ride-Height should be on a Safari Motor Home with Velvet-Ride.

First thing weigh the coach and write down the weights for each wheel. This should be done with the coach in its normal loaded condition for traveling. If you find differences between left and right sides of the coach, see if you can change the load inside the coach to better balance the coach if possible. If you can't shift the weight, then you will need to remove shims on each corner to get the ride-height equal. To do this move the coach to a level flat surface.

Second, find the center of the wheel and mark it with a felt-tip pen or use a piece of tape (see

photo # 1).

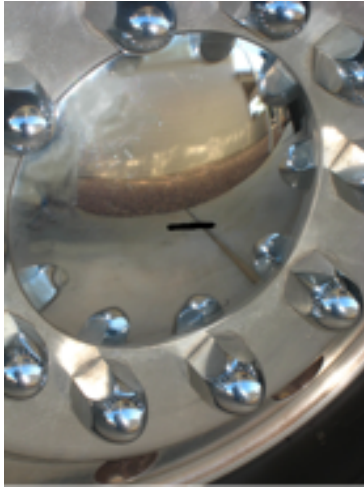


Photo #1

This is a generic means to make sure each coach is accurate. You can get this figured out, and then translate it from the ground. They didn't do this I presume since different tire sizes would produce different results. So my advise is, do as above, then find what "YOUR" coach is from the ground. Much quicker and easier.

Pioneer Metal Works, Inc ~~~ 512 "F" Street SE ~~~ Quincy, WA 98848 ~~~ 509-787-4425
~~~ [www.pioneermetalworks.com](http://www.pioneermetalworks.com)

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Now measure from the felt-tip mark or tape mark to the bottom of the beltline molding on the coach (*See Photo # 2*).



Photo #2

This dimension should be 25"  $\pm$  1/4" (see photo # 3).



Photo #3

Do this at each wheel and write down the measurement that you have for each wheel. This will determine where and if you need to take out shims. For each shim that you take out you raise the coach one-quarter of an inch. IMPORTANT: On the front and rear of each wheel there are a stack of shims. Always remove the same amount of shims in front of and in the rear of that particular wheel assembly. Remember that the shims have to be equal in front and back of the wheel, so if someone has already taken out shims and did not take out equal amounts then you must do so before you can get an accurate ride-height measurement on that wheel. Continue to remove shims at each corner until you have your ride height where it should be.

**EMPHASIS: Front and back!!!** There are shims in front and back of the axle, so we are talking about 8 bolts not 4 per wheel.

**Example:** *The left front wheel could have four shims at each shackle. The right front wheel could have eight shims at each shackle. This is acceptable. The main thing that we want to do is get the beltline level all the way around the coach.* **Another Example:** If on one particular corner you have removed all the shims and cannot get the ride-height you need. What should you do? Solutions for this are 2: One: Replace the velvet-ride tube if it is available. Two: Add an available after-market air-ride assist spring package available from PMW.

#### **Warnings and Tips when removing shims**

- 1) Put jack stands underneath the frame for safety purpose.
- 2) The four bolts used to hold the stack of shims together are extra long and are threaded all the way up and they have tall nuts on the end. **It is very important to use penetrating oil liberally so the threads won't gall.** When you loosen the nuts don't remove them, just get the nuts loose enough so that you can remove the shims. Remove all the shims and count how many you have. Remember that each shim represents one-quarter of an inch. Determine how many shims you will need to replace and remove the unneeded shims to a different area. Now, take a wire brush and lots of penetrating oil and brush the threads on the bolts really good, this will make tightening of the nuts much easier. Now you can reassemble the shackle and shims. When this is done to all four corners, recheck the ride-height you may have to go through the process again and add or remove more shims until you reach the desired ride-height.
- 3) Torque the bolts that hold the shim pack together (9/16-18) to 115 ft. lbs.
- 4) **It is NOT recommended that you use an impact wrench, it is too easy to ruin a bolt or get a nut seized on the bolt to where you cannot get it off.**
- 5) There are times when you are down to just one or two shims and now a deep socket isn't long enough to tighten the nut on the bolt...what to do? You get a 7/8" socket 1" drive and use a piece of 1" square tube as an extension and then find something that fits the end of the 1" tube. Such as, a 3/4" drive ratchet or a 1" end-wrench or whatever you can find that will fit the end of the square tube inside or outside, this is a cheap way to make an extra; extra deep 7/8" socket.

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This is the end of the original document, back to black. ;)

My findings are this. Most of the above advice is sound, however, I take issue with a couple of things.

1. Clean the bolts, sure, but I am a fan of using a torque wrench. If you use common sense, you will not gall the threads. You will thank me later. 4 of my bolts in the rear had the threads flattened. There is NO way I was going to get past this without replacing the bolts, or chasing the threads. Fortunately for me, all 4 were on the outside which allowed easy removal. IF they are on the inside you will have to innovate. Some have just cut the bolt, and removed it. Then replace that bolt by putting it in upside down. Those bolts can NOT be removed without removing the shackles, or cutting the bolt. However, I used to have (many years ago) a thread chaser. [http://www.atgstores.com/tap-die-sets/century-drill-amp-tool-9294-nu-thread-restoring-file\\_g1513867.html](http://www.atgstores.com/tap-die-sets/century-drill-amp-tool-9294-nu-thread-restoring-file_g1513867.html). Slim from SafariCoachs@yahoogroups.com suggested another solution. Buy a cheap Die and split it in half then assemble it around the bolt. Use a hose clamp to hold it together then then clean up the threads. In theory it sounds good, but not sure logistically how that would work. You may be able to get an open end wrench around it, but it would be tough going! I don't think you want to brute force the nuts past the bad spot. You will either gall the threads or simply twist the bolt off. Also, you will want to remove the nut (one at a time, not all at once) and raise it up to clean and check the threads that are hidden by the lower plate.



This was in BAD shape. But as you can see below, the die cleaned it right up. These are hardened bolts. It is not easy work! Use oil liberally, or even a die can gall the threads.





I used the impact wrench for this job too. Lots of oil and it will get hot! I chased the threads all the way up and that solved my problem.

I am going to post some photos to help clarify. They used a 1" socket and a tube. Seems more expensive and clunky than my solution. Go down to your local auto shop, or hardware shop and buy two 7/8th sockets. Cut the the back end off of one. Then simply weld the two together! Boom, DONE!!! Now you can go over 4-5" of thread easily. I think I paid \$3-5 bucks each. A specialty socket will probably cost close to \$30.





The store I went to, had a 1/2" drive and a 3/8" drive only. No problem. I cut the end off of the 3/8"th inch one. That is the reason the one is a little shorter. Still plenty for what I needed.



If you don't have a chop saw, a simple handheld metal cutter will work. I think you will

wear out with a hack saw. It needs to be fairly straight too.

Then weld it together.



Use a vice or something to hold it tight and presto. Doesn't have to be too pretty. Done!



Here is the reason you can't use a regular box wrench. It is up in a slot.



I used a 22 ton air-over-hydraulic jack, but you can use whatever works for you. I got this a couple of years ago from Harbor Freight. Pretty cheap solution.



Here is the stack before removal. Notice the loose bolts holding the leveler? Really poor work. Makes me furious. This coach has been loose and rocking since it was new!! They used bolts that were 1/2" too long and the nut tightened up on the unthreaded portion of the bolt. So the nut was tight, but the levers were loose!





Check yours just in case. If they are, be sure to use only hardened bolts! The one on the right was the correct size for reference.





Now carefully loosen all four bolts. Taking care (if you are using an impact wrench) to not **remove** them all at once. This may be where you want to only use a ratchet, so you can control it. Depending on the weight on your axle it may be under a load. You could be seriously injured at this point. Use CAUTION!



I used a drift pin and a hammer to knock out the first couple. You can raise or lower the axle to change the tension/spacing at this point.



All removed with tension. This is a good place to clean those threads carefully. Mine were fairly clean, but you can see some corrosion.



Carefully tighten all four corners together. If you do one side, you can bind it, ruining threads etc. The other alternative is to lower the axle and it will close up the spacing.



The required plates removed.



Now torque them to 115 foot ponds.

Disclaimer: I make no warranties or promises. It worked for me. It should work for you, just understand the dangers and risks associated with working with thousands of tons of weight. Now go have fun. Just remember, this is behind the axle. Now go to the front

side of the axle and do it again.