

Flyin' Miata

Hub Stands 35-70050

Congratulations on your new Flyin' Miata hub stands! These tools will make setting up your suspension much easier.

First, assemble the stands as shown. You can snug the toe bar, but don't tighten it - it will be adjusted later.

To install, simply remove the wheel and bolt the hub stand in to place. Be sure that the hub plate sits flush. If it interferes with something (e.g., the hardware for two-piece rotors or a bolt holding the rotor on), use washers (or something) to space the hub plate out enough to eliminate the interference. Evenly space each stud, so that the plate is still parallel to the rotor.

Once the hub stands have been installed and are supporting the car's weight, the toe bars need to be adjusted. Refer to Appendix A for more information and the proper procedure.

If you are going to be cornerweighting, you can do without the plates if your scales have a reasonably smooth surface. If you're not, make sure a plate is under each stand when you lower the car.

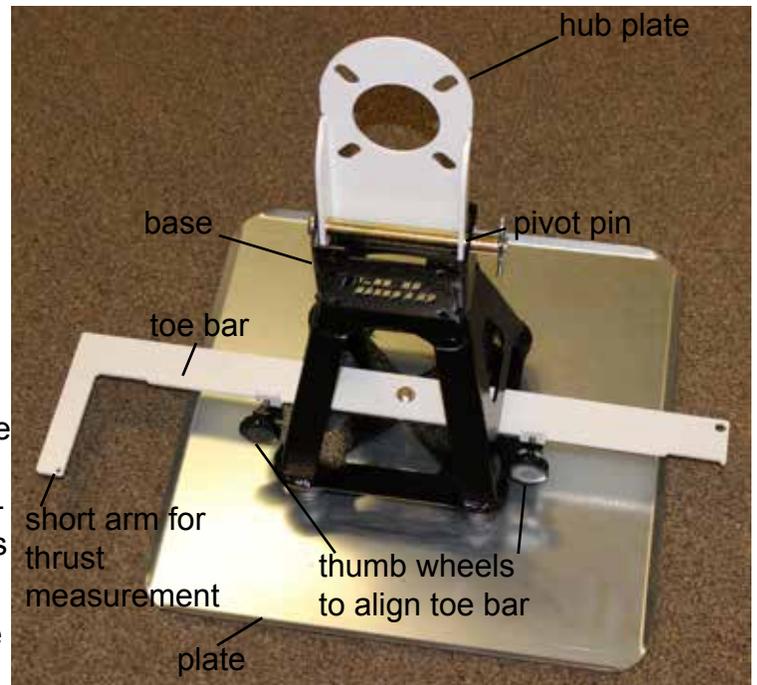
When installing the stands and after, be aware that the car can roll around on the stands. In other words, don't use these on a hill!

The design of the stands has changed, but they still function the same. The current design has an arm coming off of the toe bar to assist in setting the thrust angle.

How to align your car with our hub stands

These instructions are Miata-specific. If you are working on some other car, the methods of adjustment (or even the possible adjustments) will vary. Our suggested alignment is on the last page.

Alignment on the Miata is set using the two alignment cams on each lower control arm. By rotating the cam, you can move the control arm in and out. You will need some sort of angle measuring device to check caster and camber, such as our digital angle gauge or a smartphone with an appropriate app. Bubble gauges can be used, but are difficult to use accurately.



Front

On the front, start with the caster. Turn the steering wheel 3/4 of a revolution off center in one direction. Check the vertical angle of the hub plate (as if you were checking the camber), then turn the steering wheel 3/4 off center in the other direction. Check the angle again. The sum of the two angles is your caster angle. Caster is adjusted with the rear cam on the control arm. By moving the arm further out, you will increase the caster. Adjust it to your desired value.



Once you have the caster set, it's time to do the camber. This is done with the wheels straight. Use the forward cam to adjust the camber. Moving the arm further out will increase the amount of negative camber. Check the caster occasionally, as the two adjustments will affect each other somewhat.

With the camber and caster set, it's time to set the toe. This is adjusted with the tie rods coming from the steering rack. Get your steering wheel centered, then measure the toe with a pair of tape measures - hook one end on the toe bar on one side of the car, then measure the distance to the other. The difference in measurements is your amount of toe. If the front measurement is smaller than the rear, you have positive toe or toe-in. Shorten or lengthen the tie rods equally to adjust the toe.

Rear

There is no caster measurement for the rear wheels, so start with camber. On 1990-05 Miatas, you'll have to adjust both of the alignment cams to set the camber, turning them both the same direction. On 2006-13 models, camber is adjusted with the rear cam.

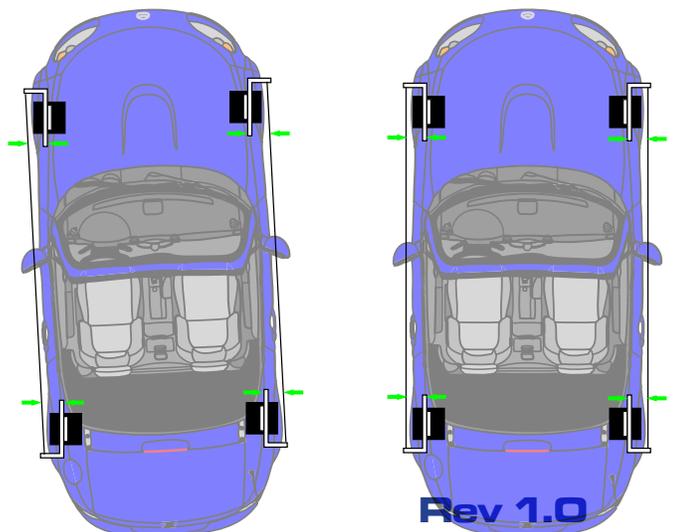
Once the camber is set, turn your attention to the toe. This is easily set on the 2006-13 cars using the forward cam. On a 1990-05, you will have to again use both alignment cams. This time, you can adjust them in opposite directions - by making the same adjustment on both cams in opposite directions, you will make a minimal change to the camber. On 1990-05, you'll want to double-check the camber.

Thrust angle

Thrust angle refers to the angle of the wheels relative to the chassis. If the thrust angle is off, the car will not run straight down the road. It's primarily set with the rear wheels. Start by making sure that the steering wheel is straight.

With our latest design, the thrust angle is much easier to measure. First, find a string and tie it to the small hole in the short arm on one of the toe bars. Then run it to the same place on the other hub stand, on that same side (as shown). Do this for both sides. Measure the distance from the string to the other side of the same toe bar for both sides of the same end of the car (as shown with the green arrows). This measurement should be the same - if it's not, adjust the toe on both sides by equal (but opposite) amounts until it is. The front-rear comparison is irrelevant, only the side-to-side matters. The picture on the left shows a bad thrust angle, the right shows a correct thrust angle. Double-check the toe once the thrust is set.

When you're done, tighten all the alignment cams good and tight. Mazda gives a torque setting, but they can slip unless you crank them down as hard as you can. Don't use a 4' breaker bar, but do get them as tight as you can by hand with your normal wrenches. If you suspect the cams may be slipping, mark their positions before you put the wheels on.



FM alignment specs - These are what we recommend for most Miatas, other cars or unique setups may use different numbers.

Front:

Caster: 5.0°

Camber: 1.0° negative

Toe-in: 1/16" total (1/32" per side)

Rear:

Camber: 1.5° negative

Toe-in: 1/16" total (1/32" per side)

Conversions: 1/16" toe = 0.15° = 9 arcminutes

Appendix A: Adjusting the toe bars

The Hub Stands have been designed so that the toe bars can be adjusted, as they need to be calibrated before each use. Keep in mind that the action of tightening the bars back down can actually move the bar slightly, so care must be taken here.

To properly adjust them, you'll need a handheld laser device. Pen-style laser pointers probably won't work, since most of them are round and you need something with a flat edge on it - in addition to being inaccurate. Larger units will work too, but the smaller ones are easier to handle. Try to find something like one of the two to the right.

First, jack up the car and install a pair of Hub Stands on one axle (or both axles, if you have two pairs).

Next, position the flat edge of the laser directly onto the hat of the rotor (the same surface that the wheel is bolted to), and shoot the beam down onto the toe bar as shown. (Note: there's not a lot of room to work with here so be sure your laser is as flat as possible on the surface.)

Use a tape measure as shown in the picture to record where the beam "hits". Do the same thing for the opposite end of the Toe Bar, using the other side of the hub surface. The idea is to adjust the Toe Bar such that you come up with the same reading on the tape measure on both sides. **VERY IMPORTANT:** As mentioned earlier, these laser units are NOT manufactured to a high tolerance. You will see that they do not shoot a beam straight, relative to the laser's body. **THIS MEANS YOU MUST USE THE SAME FLAT SIDE OF THE LASER TO PUT AGAINST THE HUB SURFACE WHEN CHECKING BOTH SIDES!!!** Mark it with a sharpie if you have to, and use the same side every time. Experiment with this and you will very likely see what's going on. The actual measurement isn't that important (e.g., the beam doesn't have to be X" from the edge), what's important is that it's the same on both sides.

Do this for both sides of all Hub Stands, and your toe bars have been adjusted. Old designs have two bolts that hold the bars in place, new designs have one bolt to hold it down and two thumb screws to properly align it. You can now proceed with the alignment.

