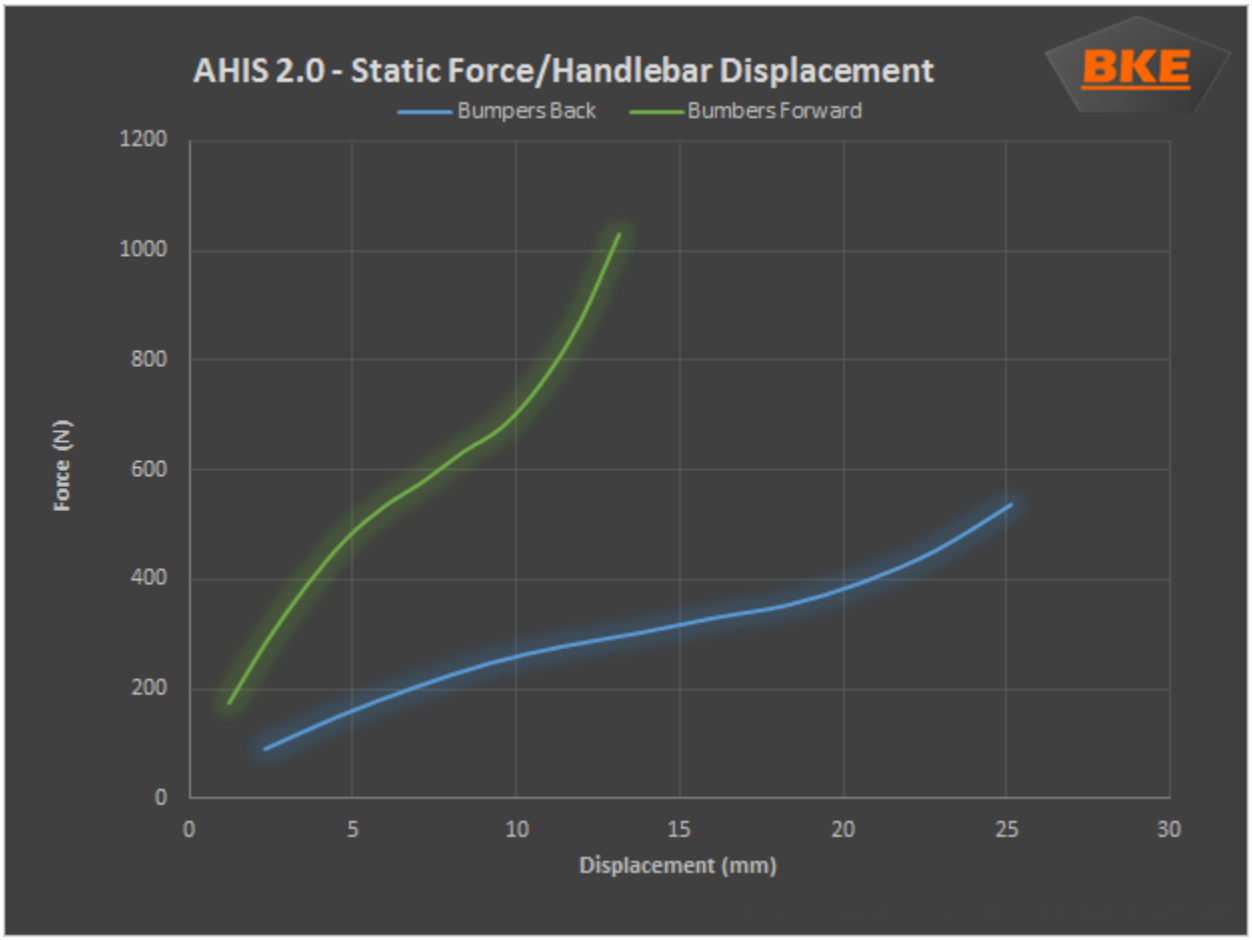
AHIS – How Does it Work?

AHIS is literally suspension for your handlebars; it works like the shock on the rear of your motorcycle. When your motorcycle hits a bump, the front of the bike comes up and the force gets transmitted to your hands and arms. The front forks can only do so much to absorb the impact. AHIS helps absorb some of this energy reducing the force on your body.

Two things can happen when your motorcycle experiences a sharp impact due to rough terrain or landing off a jump. Either the suspension will bottom out or it will compress to the point where the suspension becomes stiffer, transmitting more of the impact force to you, the rider. AHIS absorbs some of this energy so you don't have to. In fact, the bumpers can absorb 12Nm (9ftlbs) of energy and 1690N (360lbs) of peak dynamic force. See the graph below to see how much static force AHIS absorbs.



A perfect example of this is riding over braking bumps. Usually the rider is braking hard into a turn with most of their weight pushing down on the bars. At the same time the front suspension is compressing, moving into the stiffer part of the stroke. And, you are hitting sharp bumps worn into the track. This is the perfect trifecta of arm pump and fatigue. The rapid braking deceleration is causing a huge amount of force in your arms as you counteract your own body weight. The suspension is compressed due to the forces for the rider and the bike and cannot provide as much compliance on top of the sharp edge bumps. In situations like this, AHIS really helps you out by absorbing the bumps that your suspension cannot.

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Handlebar and Steering Feel

Most systems engineer some flex or movement and trade off precise feel to give some compliance to reduce the vibrations or forces transmitted through the bars. Either the movement is minimized to keep good feel or they are soft enough to have some positive effect on impacts and vibration. These need to have a "mushy" feel by design. AHIS overcomes these problems in the following ways:

First, the system only allows movement fore and aft, there is no side to side movement or free rotational movement. When you turn the bars, the force is not being transmitted through some mushy rubber and you retain precise feel. Also, since there is no side-to-side movement, the bars do not have an independent feel, both bar ends move solidly together just like a rigidly mounted bar.

Second, the AHIS geometry prevents it from compressing when you put weight on the bars. Whenever you push the bars to turn the bike, AHIS will not compress maintaining precise steering feel. AHIS only compresses when the front of the bike comes up after it hits a bump. Often, after first installing AHIS, the rider will push on the bars and nothing happens. This is by design, it is a feature! If you want to see how AHIS works, grab the handguards and give them a twist forward, if you installed AHIS bumpers forward, or twist it back if you installed AHIS bumpers back. You will see and fell them compress as intended.

The third important feature, is that AHIS is only compliant when you apply weight down on the bars, not when you pull up on them. The majority of the time, your hands are pushing on the bars while riding, very seldom are you pulling up on the bars. This is why your hand grips always wear out on the side that face you, where you are pushing on them with your palm. When you do pull up on the bars, like when you want the front of the bike to lift up over a log or you want to pull a wheelie, AHIS feels like a solid bar, all of your pulling force gets sent directly to the front of the bike, it is not dampened by flex in the bars or backwards compliance in the isolator. The result is that you have a more precise feel when you need to get the front end up.

Other handlebar solutions take some getting used as they alter the feel of the bike. After trying AHIS for the first time, you will notice is that nothing feels different. There may be a reduction in vibration, but riding and turning the bike feels the same. What you will notice is that the sharp hits are smoothed out. You begin to have more confidence to hit the tack and trails a bit harder knowing that AHIS will soak up any unexpected hits and you will be able to keep control of the bike.

Vibration Reduction

There are a two ways to reduce vibration to your handlebars. The first way is to prevent the vibration from reaching the bars by de-coupling the bars from the motorcycle. The standard way of doing this is to provide something like rubber mounts. The idea is that the rubber absorbs some of the vibration and the vibration does not get transmitted to the bars. There are a couple problems with this. In order to get any positive effect, the rubber needs to be very soft since the mass you are trying to isolate (the handlebars and controls) is relatively small. The negative effects of soft rubbers are that the steering gets a very "mushy" feel and the bars clamps tend to twist when the bike is crashed or dropped. KTM/Husky tend to use very soft rubber bushings to provide the best vibration isolation, but have a clever design that limits the amount the bars will move, so that "mushy" feel is minimized. However, the

bars will still twist easily. Most of the Japanese bikes use stiffer bushings to reduce the mushy feel with the effect that they are not very good at isolating vibrations.

The second way is to tune out the vibration. This can done with weights and dampeners. Within a limited RPM range this can be very effective, but can be very difficult to tune correctly to get most effect. Simply adding weight can actually make things worse if not done correctly. Of course adding weight to your handlebars is certainly not desirable for our high-performance dirt bikes since this is one of the worst places you can add weight to your bike.

AHIS takes the first approach to reducing vibration. AHIS de-couples the bars from the bike through the polymer bumper and a composite bearing. The bearing is a high precision plastic part that inherently has some “give” to it for small force amplitudes and high frequencies (vibration). Although not the primary benefit of AHIS, most riders will immediately feel a reduction in vibration. As another side benefit, the composite bearing requires no lubrication (it won’t squeak) or maintenance.

Summary

AHIS works by adding a real suspension system to your handlebars. It limits movement to the direction that allows it to absorb the energy of vibration and hits without losing any steering feel. Because AHIS is a similar to the rear suspension of your motorcycle, it can absorb significant amounts of energy increasing its effectiveness and enabling you, the rider a better ride.