

WHEEL ALIGNMENT COURSE

Alignment & Suspension Adjustment Tips

Some of these tips include concepts and terminology more advanced than those presented in the HPA Wheel Alignment Fundamentals Course. To learn more about suspension concepts and tuning check out the HPA Suspension Tuning & Optimization Course.



UNDERSTEER

CORNER ENTRY

Initial Understeer can often be caused by insufficient front roll resistance. To increase roll resistance:

- Increase spring stiffness / damper compression resistance / anti-roll bar (ARB) stiffness

Initially points in and then washes out?

- Excessive front toe-in or toe-out (car feels "darty") » Decrease toe (adjust towards zero)
- Incorrect packer/bump stop (car hitting stops?) » Remove packers / Increase damper compression resistance
- Insufficient front roll resistance » Increase front roll stiffness (see above)

Car won't point in and gets progressively worse?

- Relatively narrow front track width » Increase front track width or reduce rear
- Excessive front tire pressure » Reduce cold front tire pressure
- Excessive front roll stiffness » Reduce front roll stiffness (see above)
- Insufficient front toe-in or toe-out » Increase toe
- Front roll centre too high or low » Decrease front ride height
- Excessive dynamic camber gain on outside tire » Increase static negative camber

MID CORNER

- Excessive front tire pressure » Reduce tire pressure
- Excessive relative front roll stiffness » Reduce front roll stiffness or increase rear roll stiffness
- Excessive front toe-in or toe-out » Reduce toe towards zero

CORNER EXIT

Slow Corners

- Often a result of excessive entry/mid corner understeer. Reduce understeer in the earlier corner phases and perhaps reduce entry speed in favor of earlier throttle application at corner exit.

Fast Corners

- Insufficient front load (rearward load transfer) » Increase damper compression resistance
- Relatively narrow track width » Increase relative front track width

OVERSTEER

CORNER ENTRY

- Excessively heavy trail breaking » Try braking earlier/harder in a straight line before corner entry
- Excessive rearward brake bias » Adjust bias bar/change brake pad compound/master cylinder
- Severe ride/roll rate imbalance front-rear » Measure roll stiffness (springs, roll bar, motion ratio, etc)
- Rear roll center too high » Lower rear ride height
- Limited rear droop travel » Inside rear wheel lifting, increase rear compression resistance

MID CORNER

- Entry understeer forces aggressive turn in » Find and fix understeer at corner entry
- Excessive rear tire pressure » Reduce cold rear tire pressure
- Excessive relative rear ride/roll resistance » Reduce rear springs/roll bar/droop resistance
- Rear suspension bottoming in roll » Reduce rear springs/roll bars/compression resistance

CORNER EXIT

Corner exit oversteer gets worse from the time power is applied

- Excessive ride or roll stiffness » Reduce rear springs/roll bars/compression resistance
- Excessive rear negative camber » Reduce static negative camber
- Excessive roll in rear » Increase rear springs/roll bars/compression resistance
- Toe little dynamic toe-in » Increase static toe-in

Car doesn't put power down on corner exit of smooth corners

- Excessive rear ride or roll resistance » Reduce rear springs/roll bars/compression resistance
- Excessive rear tire pressure » Reduce cold rear tire pressure
- Excessive rear low speed bump resistance » Reduce low speed rear damper bump resistance

Car doesn't put power down on corner exit of bumpy corners

- Any or all of the above for smooth corners » Reduce high speed rear damper bump resistance
- Excessive rear high speed bump resistance » Also called "jacking down" - Reduce rebound speed
- Excessive rear damper rebound speed