



Adjustments Overview

Introduction

The FormulaSPEED2.0 race car is designed to be a spec race car, with no adjustments or changes that would cause an increase in the cost of competing. That does not mean that nothing can be adjusted or changed. The FormulaSPEED2.0 does offer many of the same adjustments that you would find in FIA F2, GP3, Formula 3, Star Mazda, Indy Lights, and most other junior open wheel classes. This is what is adjustable on the FS2.0:

- Front dampers - rebound & compression
- Rear dampers - rebound & compression
- Adjustable front anti roll bar
- Adjustable rear anti roll bar
- Front spring pre-load
- Rear spring pre-load
- Ride height
- Rake
- Camber
- Toe
- Caster
- Front wing flap angle
- Rear upper wing element angle
- Rear lower wing element angle
- Tire Pressures
- Brake Bias (cockpit adjustable)

Dampers: Ohlins TTX-36

The TTX dampers are double adjustable with the external adjustments controlling what amounts to a piston bleed (through the outer tube). There is one compression and one rebound adjuster.

The TTX Owners manual:

http://formulaspeed.us/owners/documentation/ttx36_owners_manual.pdf

Dyno sheets for FS2.0 TTX-36 Dampers

- [Rear Shock Compression Dyno Sheet](#)
- [Rear Shock Rebound Dyno Sheet](#)
- [Front Shock Compression Dyno Sheet](#)
- [Front Shock Rebound Dyno Sheet](#)

ARB: Anti Roll Bars (Sway bars) are essentially springs connected between the left and right side of the car. Their job is to resist rolling of the suspension. Both bars were run on a ARB dyno and the ratings can be found at My.FormulaSPEED.us. Both front and rear bars are adjustable, and baseline settings can be found in the baseline setup sheet.

Springs: The FS2.0 has spec 5 inch springs: Front 400lb - Rears 600lbs. The preload is adjustable. Suggested installed height is 4.750" in the front, and 4.833" in the rear.

Tires: The tires for the FS2.0 are spec Goodyear parts D2526 front and D2527 rear. They are cross-ply construction, and the sizes are 22.0x9.0x13 and 20.0x7.0x13. The compound is R475. The proper procedure for "breaking in" a race tire consists of running a lap or 2 of warm up, a few miles as hard as possible, and then letting the tire cool. Recommended hot pressures for these tires are 19psi. These

specific tires we chosen for the FS2.0 as they are fast, easy to drive, forgiving, relatively inexpensive, and long lasting. Proper break-in will increase longevity of your racing tires.

Aero Package: The FS2.0 has a fixed main plane with adjustable winglets at the front, and multi-tier adjustable wings at the rear. Recommendations are provided in the baseline setup sheet. Keep in mind that changing rake will change your wing angles, and that ride height can change the effectiveness of the front main plane. The FS2.0 has a unique front wing arrangement. The wing is fairly small which decreases drag and it is mounted further forward from the front axle centerline than what is found on most junior formula cars increasing effectiveness. The rear wing features two adjustable elements, allowing for a wide range of adjustability. The FS2.0 features a large flat floor design, sans rear undertray diffuser. This is one of the reasons that the car is extremely stable, and less prone to pitch sensitivity.

Motion Ratios: Motion ratio is a way of referring to the leverage the spring has when installed in a particular suspension geometry. Motion ratio affects both spring and shock rates, as well as the effectiveness of the anti-roll bar. The motion ratio for the front is 0.697 which is an average motion ratio over one inch of compression from setup shock length. Rear motion ratio is 0.624 which is an average motion ratio over one inch of compression from setup shock length

Data Acquisition:

With the base system you are able to monitor these car functions after each session: Oil pressure, Oil temperature, H2O temperature, RPM, Speed, Gear, Shift lights, Alarms, Lap times, ECU information, Track map & Throttle blade angle.

Series Permitted Data Options:

Steering sensor kit

Brake pressure MSI 0-2000psi pressure transducer, 1/8" NPT (permitted to run 2 to monitor bias)

Wide Angle SmartyCam sync'd with EVO4 data stream imprinted on video

Proximity speed sensor to allow for AiM Gear Calculation to be displayed on dash

Data system details, and manuals are posted on My.FormulaSPEED.us

Suggested Reading:

Here are some books that go into detail on the art of adjusting your car, and understanding data acquisition.

Basics:

Making Sense of Squiggly Lines by Christopher Brown

Carroll Smith's Engineer in Your Pocket by Carroll Smith

Tune to Win: The art and science of race car development and tuning by Carroll Smith

Inside Racing Technology: Discussions of Racing Technical Topics by Paul Haney and Jeff Braun

More Advanced:

Race Car Vehicle Dynamics by William and Douglas Milliken

Competition Car Suspension: A Practical Handbook by Allan Staniforth

Engineer to Win by Carroll Smith