PUTTING SPEED TO THE TEST

JUNE 2008 – VOLUME 20, NO. 06

SPORT COMPACT CAR

Greatest SUSPENSION TEST EVER!

8 of the best brands from around the world—which is worth your money?

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THE RAWEST ROTARY
WHAT DOES AN 1800LB MAZDA FEEL LIKE?

MEDIA PUBLICATION

THE ULTIMATE SUSPENSION TEST

Which set-up is worth your money?

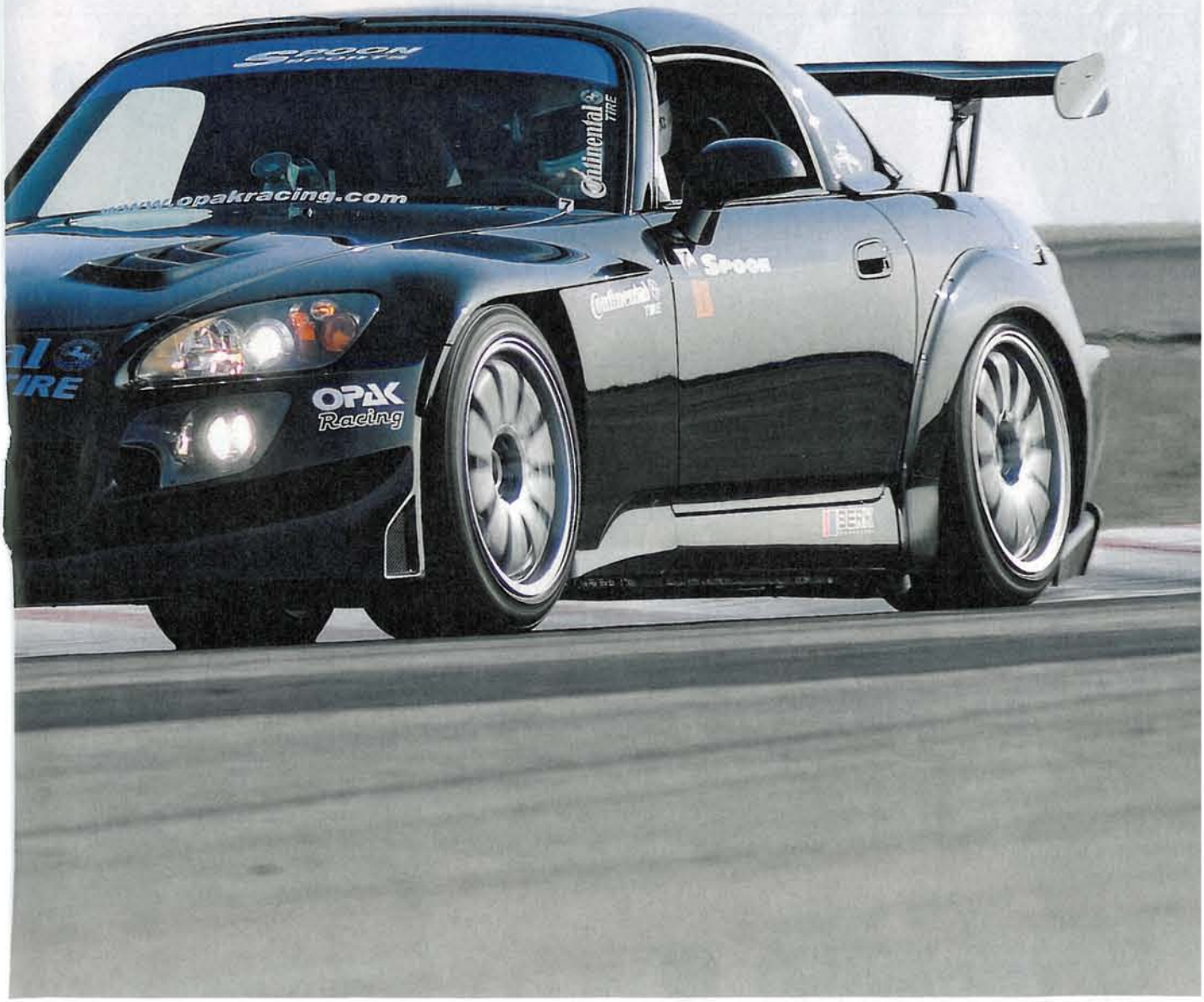
by *SCC*

PHOTOGRAPHY BY STEVE DEMMITT AND STAFF

Suspension is a true black art. To know what kind of improvement a turbo kit or exhaust makes, take it to the dyno. A couple of pulls and a graph later, and you'll see how much power your paycheck just bought. But suspension systems, even stock ones, are far more mysterious to most people.

So we've decided to make ourselves the medium through which eight of the most popular suspension tuners—Buddy Club, J's Racing, JIC, KW, Moton, Ohlins, Spoon Sports and TEIN—can channel their wares. Trust us, if you don't see your favorite brand here, it's not because the list of invitees was too short, they just couldn't make it out.

Using the Honda S2000 as our base, we've lined up a stock second-generation S2000 and Honda has loaned us a fresh factory hot-rod S2000 CR. And if you don't own a S2000, don't worry, the information here still applies. Spring rate choice, MSRPs, shock valving philosophy—all these concepts apply universally.



Because this test is designed to be a suspension test and not a project car test, we've set a few ground rules. No forced induction, ECU tuning, aftermarket limited-slip differentials, shorter final drives, or roll cages.

Because this is designed to be a suspension test and not a project car test, we've set a few ground rules. No forced induction, ECU tuning, aftermarket limited-slip differentials, shorter final drives, or roll cages. And no widebody kits or fenders. Even though the cars will run through Buttonwillow's infamous 'time attack' configuration #13CW, each tuner must come with a set-up that can be recommended and sold to the average buyer. This means street cars, not stripped-out track machines.

Leveling the playing field is the choice of spec rubber, the Continental ContiSportContact 3 maximum-grip summer tire. We could have allowed racing slicks, but the 280 treadwear-rated CSC3 is more indicative of a sticky real-world tire, one where consumers balance overall grip with longevity and civility. By choosing a true street tire, we also forced each company to pick suspension kits with acceptable spring rates—and thus shock valving—for a street car.

Since the racetrack isn't the only place you'll be driving, we decided to carry out a few other tests as well. With all the data gathered and presented here, it should be possible to figure out each tuner's style and judge what combination of stiffness, speed, price and feel fits your needs best.

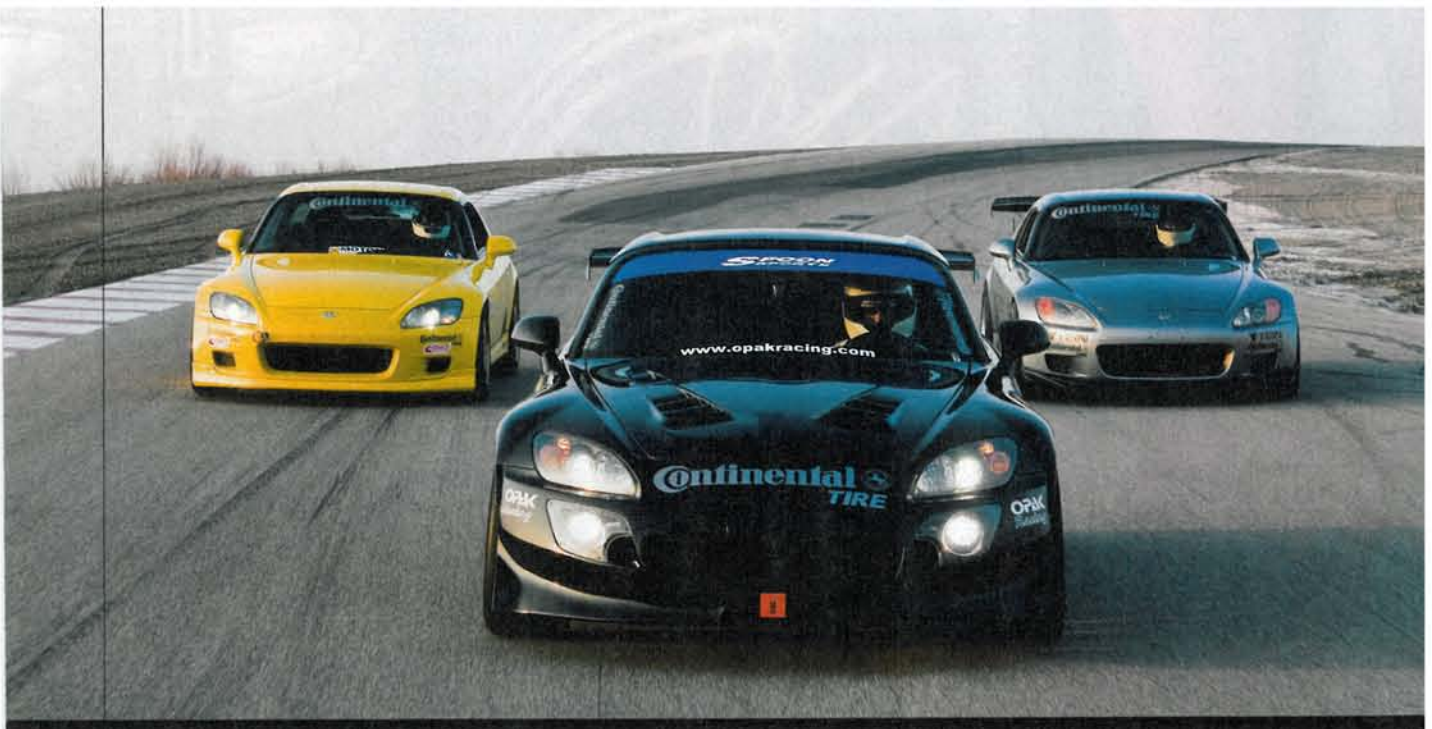
Shock Dyno

As one of the requirements of our comparison, we had every company submit one off-the-shelf kit for independent testing on a shock dyno. While understanding and correlating handling and ride quality to a shock dyno plot requires a trained eye and a lot of experience, most *SCC* readers should at least be able to compare damping curves and ranges. Each chart is plotted on the same linear scale, with damping forces and speed values omitted for confidentiality reasons.

In the case of the S2000, understanding the car and reading the dyno plots can tell many things. The car's near-50/50 weight distribution means that, ideally, the front and rear spring rates are about the same. The only difference might be on account of the shorter rear suspension stroke. The front and rear damping profiles for each car should be fairly similar, any difference would be down to how each company wants the car to handle in terms of front and rear grip, as reflected by the compression and rebound settings.

For the S2000, even Honda's engineers decided to use a fairly linear damping curve, meaning that damping force increases in proportion with damper piston speed. Many race and sport applications use this type of profile for consistent suspension response over the entire range of piston speeds.

The sacrifice with a linear profile is the greater damping force at high speed, which contributes to a harsher ride. Many



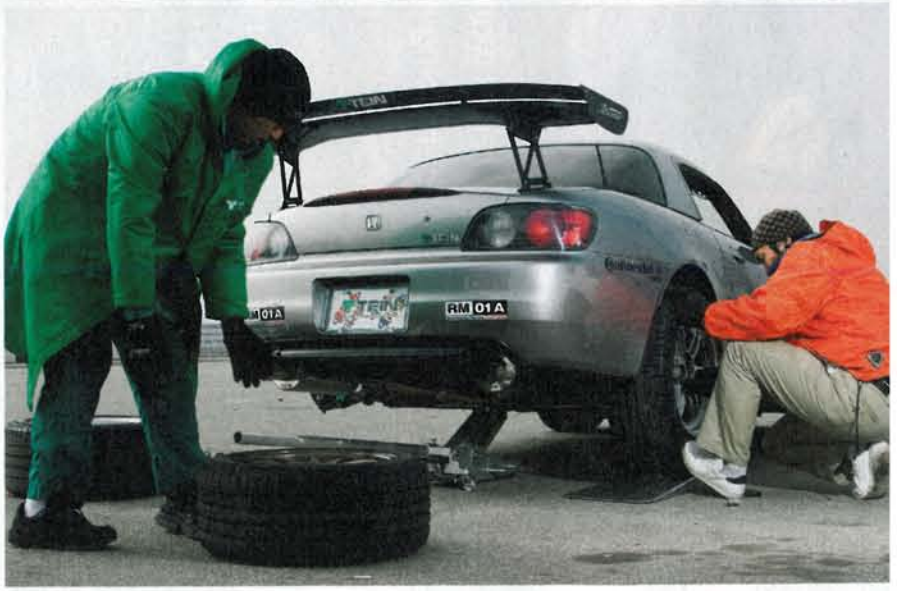
The point where the damping curve rolls over is called the knee-over point. Some dampers will have more than one, but the knee-over point can influence ride quality, handling, and sometimes track predictability.

street cars use a digressive damping profile where, at low piston speeds (which govern body roll and pitch), damping force increases at a steeper angle. At mid-speeds—like driving over a pothole, speed bumps or FIA curbing—a digressive profile will decrease (similar to the Ohlins front damper profile). Damping forces decrease proportionally, allowing the suspension to soak up larger bumps and dips.

The point where the damping curve rolls over is called the knee-over point. Some dampers will have more than one, but the knee-over point can influence ride quality, handling, and sometimes track predictability. There isn't a correct or best damping profile, it's up to driver preference and chassis/design goals. Having a knee-over point at lower piston speeds means that mid- and high-speed damping forces decrease, while only high-speed damping (like small cracks in the road or landing from a jump) is affected with a knee-over point that occurs at mid-to-high piston speeds.

We plotted each damper's front and rear profile, as well as the range of adjustment. Some have independent adjustment for compression and rebound, while others have one adjustment knob that changes both compression and rebound damping simultaneously. Some manufacturers have a single adjustment that adjusts rebound damping forces only, which many feel has more impact on ride quality.

Different suspensions will vary in damping force adjustment ranges. A narrow range isn't necessarily bad, as it gives a better resolution since the kit was designed with a specific spring rate in mind. More motorsport-oriented kits (like Moton) don't come with pre-selected spring rates and a wide range of adjustment is intentional, so damping force can be matched to the chosen spring rate.



Scales/car weight

Prior to any performance tests, we threw each vehicle (with a full tank of pump gas) onto the corner scales to get total weight and weight distribution. Some cars came prepped and completely corner-balanced for the driver's weight, trunk contents removed and a gas tank two-thirds full, while others were just set by ride height and spring preload.

The KW car turned out the heaviest, at 2829 pounds. Meanwhile, the race-like Spoon Sports car registered 2685 pounds (with the help of composite bodywork and lightweight aerodynamic aids). A net spread, then, of 154 pounds. Average weight came in at 2758 pounds with a median weight of 2757 and one standard deviation of 49 pounds, meaning 68 percent of the cars fell between 2700 and 2800 pounds.

Engine dyno

To ensure all cars were operating with similar power-to-weight ratios, we ran them on the Dynojet at 7s Only Racing, (located conveniently at Buttonwillow racetrack). In order to compensate for the difference in power, torque and power delivery between the 2.0 and 2.2-liter S2000s, we allowed for some mild bolt-on tuning, with headers, exhaust, and intakes. Our curveball constraint was that each car had to keep the stock ECU, since we know how tricky it is to make more power with the stock tune and high-flow parts. The dyno was also our way of ensuring that everyone had the stock final drive, as each car was dynoed in fourth gear.

We took the best pass from three back-to-back runs as the published horsepower and torque number. Ironically, differences in power were more apparent between the F20 and F22C engines than individual cars, even though Honda states the same peak power in the two engines. The overall difference was 24 wheel-hp, with the 2.2-liter engines making an average of 213 hp, while the older 2.0-liter engines averaged 198 wheel-hp.

All power and torque curves shared similar profiles (with the tell-tale VTEC dip), except for the Spoon car, which had a power delivery that was almost perfectly linear all the way to 7800rpm, 100rpm past the rest of the AP2s. Spoon's car also had a 7mph wheel-speed difference from the rest of the AP2s, even though it made about the same peak power.

On-track behavior/lap time

Buttonwillow Raceway's clockwise configuration #13CW course involves elevation changes, sweepers and tight esses. It's also home to the Super Lap Battle finals and a good balance between a power track and an autocross track. This would also ensure easy comparison to the times set by some dedicated time attack cars. Senior Editor Andy Hope put on his game face to test all 10 cars. Each would be prepared, handed over, and driven as fast as it could go. All entrants were given five consecutive laps, with no changes or adjustments made in between.

The Honda S2000 showed a definite improvement with aerodynamic aids and larger tires, with the top four spots going to cars with rear wings—the two fitted with 255-width front tires did exceptionally well. The top-spot Spoon Sports machine (which was more racecar than street car) came with monoblock brakes, solid engine mounts and some modifications not allowed by our rules, including wider fenders and other body work. Its almost three-second advantage over second place is impressive, but it really can't be compared with the others on equal ground.

Ride quality

Along with frequent contributor Mike Kojima, Editor Joey Leh carried out an OEM-style ride quality evaluation.

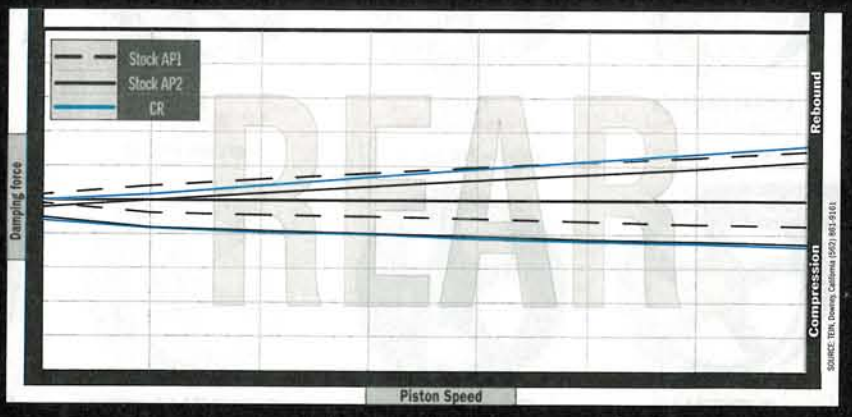
Leh and Kojima were looking for comfort, suspension noise, driving stability and the ability to soak up bumps and undulations. All impressions were carried out on the same route from Buttonwillow Raceway, which included a freeway drive, a steep driveway ingress/egress and a circle around downtown Buttonwillow's war-zone–like city streets. Tuners were allowed to make adjustments before handing the car over for testing, but none were made during the drive route. Because there is no real standard for what is 'comfortable', each assessment is for a comfort level relative to the stock AP2-chassis S2000.

Damping quality

Using all his experience as a suspension engineer and club racer, we let Kojima loose on Buttonwillow Raceway's West Loop for some on-track impressions of damping feel. Each S2000 was given two laps under Kojima's lead foot and judged on damping feel, style and behavior. As difficult as it was, Kojima had to leave out his impressions of braking ability, acceleration and balance. Because this was a suspension test only, Kojima had to focus solely on that aspect of each car.

S2000/S2000 CR

Stock Honda S2000 AP1, AP2 & CR damping curves



Ride quality

Designed to be a true sports car, the Honda S2000 is hardly the most comfortable ride in the world. While it's not quite as harsh over bumps as say, a Speed World Challenge car, the S2000 is nowhere near as comfortable as a stock Scion tC, Honda Civic or Acura RSX. But for the hardcore *SCC* reader, the S2000 might as well be a Lexus—there's always a little more comfort that can be traded for speed. Both were quite stable and comfortable on the freeway, but surprisingly stiff over rough roads (for factory cars). As expected of OEM systems, both suspensions exhibited zero noise from the top mounts, dampers and springs. Compared to the stock AP2, the CR was harsher over sharp bumps and picked up more of the smaller road imperfections. The CR also possessed more control over softer bumps, with less pitching and jiggling of the body. Both stock S2000s were tested using ContiSportContact 3 tires in the factory sizes.

On-track behavior/lap time

Stock S2000s are a blast on the track—really tossable. So much so that most publications criticize them for being loose or even dangerous. But with a little practice, most people learn to love them. However, compared to the company in our test, the stock S2000 feels sloppy.

It took Hope two laps to realize that the frustratingly pathetic acceleration was the result of having the traction control enabled.

Then, on the unrestricted laps, the stock brake pads withered, much like Hope's passion for stock S2000s.

On Hope's out lap in the CR, the steering felt twitchy. The steering rack was tugging at the wheel with every imperfection in the road surface, almost like something was coming loose. But come the hot laps, it was awesome. The car was easy to rotate. A simple lift of the throttle would pitch the rear end around, but it wasn't scary. The amazing steering response made it easy to catch. It really settled down in the high-speed sections (seven and eight). Aerodynamically, the rear seemed to be doing more than the front. We're sure the slight high-speed understeer would be welcome in wheel-to-wheel club racing. Overall, the car felt great through every corner, just what we'd expect from one of Honda's factory-tuned track cars.

Damping quality

The S2000 shows good body structure, with the stock second-generation car feeling better than all of its predecessors, and the CR edition possessing a noticeably stiffer chassis again, perhaps the stiffest in this entire competition. The S2000 also feels quite soft for the track, with a lot of pitching and rolling. More low- and mid-speed damping could help its floaty nature. The CR model is surprisingly aggressive and good for a factory car. There is some harshness and overdamping (which can cause tire shock) making it tricky to get the power down on exit, but the overall balance is good. Surprisingly, all the tuned S2000s felt better than the stock AP2 and all the entrants displayed good behavior on track, with faster lap times than stock. Each aftermarket S2000 was also fully capable of being tuned to the driver's particular preference or style.

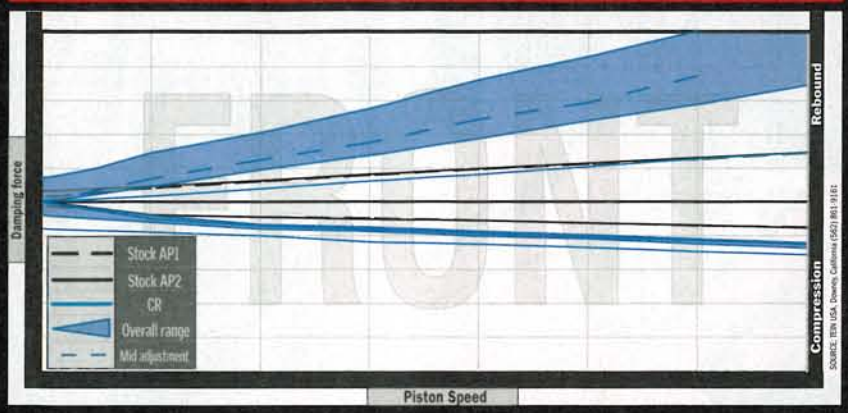
BEST LAP (STOCK): 2:12.461 | **BEST LAP (CR): 2:06.585**

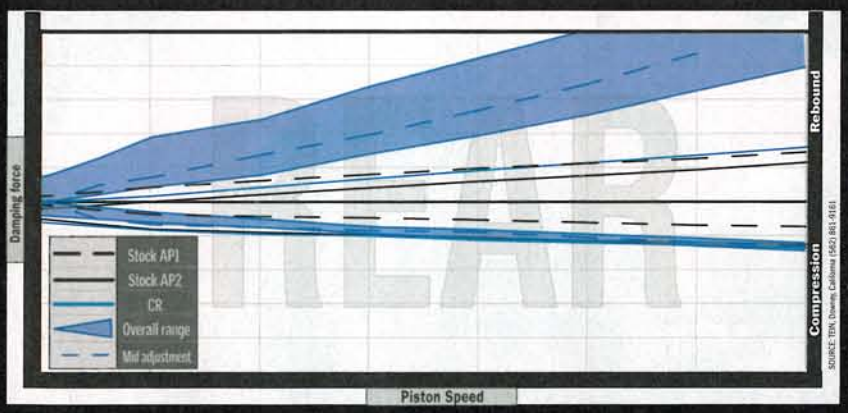
MODIFICATIONS
Peak Power (AP2): 213whp @ 7700rpm
Peak Torque (AP2): 141lb-ft @ 6300rpm
Weight (AP2): 2759 lbs (50.3/49.7)
Peak Power (CR): 211whp @ 7700rpm
Peak Torque (CR): 147lb-ft @ 6300rpm
Weight (CR): 2800 lbs (48.5/51.5)
Model Year: 2007 (AP2), 2008 (CR)
Engine Code: F22C
Engine Modifications: Stock
Chassis: Front subframe brace, rear body brace (CR)
Suspension (other) (AP1, AP2, CR): front anti-rollbar (mm): (26.5, 26.5, 28.6), rear anti-rollbar (mm): (27.2, 25.4, 26.5)
Brakes: Stock
Wheels (AP1, AP2, CR): front: (16x6.5, 17x7, 17x7), rear: (16x7.5, 17x8.5, 17x8.5)
Tires (AP1, AP2, CR): Continental ContiSportContact 3: front: (205/55/16, 215/45/17, 215/45/17), rear: (225/50/16, 245/40/17, 255/40/17)
Body: Front lip, rear wing, hardtop (CR)
Interior: Stock (soft top removed from CR)

SPECIFICATIONS		
Suspension brand	Honda	
Model name	S2000/S2000 CR	
Setup by	N/A	
Type	Steel body non-adjustable monotube w/remote reservoir in rear	
	Front	**Rear**
Spring rate AP1	249 lb/in (4.45 kg/mm)	306 lb/in (5.42 kg/mm)
AP2	266 lb/in (4.75 kg/mm)	273 lb/in (4.88 kg/mm)
CR	392 lb/in (7.00 kg/mm)	342 lb/in (6.22 kg/mm)
Piston rod diameter (mm)	12.5	12.5
Stroke length (mm)	111	122
Weight (each, lbs)	13.1	12.6
Camber (deg) AP1	0 deg 30'	-1 deg 30'
AP2	0 deg 30'	-1 deg 30'
CR	0 deg 30'	-1 deg 30'
Toe (mm) AP1	0.0	-6.0
AP2	0.0	-3.6
CR	0.0	-5.5
Caster (deg) (AP1, AP2, CR)	6.0	N/A

Buddy club
MOTOR SPORTS EQUIPMENT

Buddy Club Racing Spec vs. Stock Honda S2000 damping curves





Ride quality

Offering a more direct connection from the driver to the road, the Buddy Club S2000 was one of only two entrants with a full bucket seat. This helped with the ability to 'feel' and pick up all the car's characteristics. The Buddy Club Racing Spec damper system was easily as comfortable as stock on the freeway and over smooth city streets. But, while not as harsh as the CR, the suspension had problems maintaining a smooth ride over sharp bumps and ruts. With little padding in the racing seat, each thud was transferred to our backsides as well. We were very interested in fiddling

with the damping adjustments and seeing the range in feel on this suspension, but we didn't, because of the rules we set.

On-track behavior/lap time

Hope reportedly had a difficult time trying to control this car. The Buddy Club seat was mounted in a high, forward position which, combined with the factory non-adjustable steering column, made it hard for him to drive. The seat also had a noticeable amount of lateral play, which was surprising considering how solid the Buddy Club seat rails are in our Project Evo IX. It was challenging for Hope to place the car exactly where he wanted through the more complicated series of corners. Lateral-*g* telemetry shows some fairly sharp spikes in sections three and four. But, in the second half of the course where the turns smooth out and speeds come up, the car made up a lot of time.

Damping quality

The impact harshness of the this set-up over sharp bumps was better than the CR, but worse than the stock AP2. The car also exhibited an odd sensation of the wheels crashing noisily into large potholes. On track, the Racing Spec dampers displayed lots of hop and tire shock. The hopping reduced mid-corner grip and made it difficult to put the power down. The suspension felt like it was packing down in the rear and that it had too much damping dialed in for the spring rate. According to our own rules, we didn't make any adjustments, so we don't know if dialing down these Buddy Club shocks would improve matters.

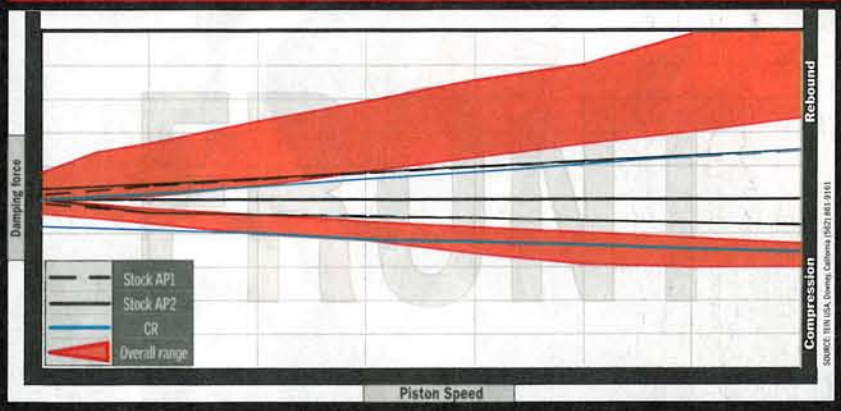
MSRP: $1680.00 | **BEST LAP: 2:08.324**

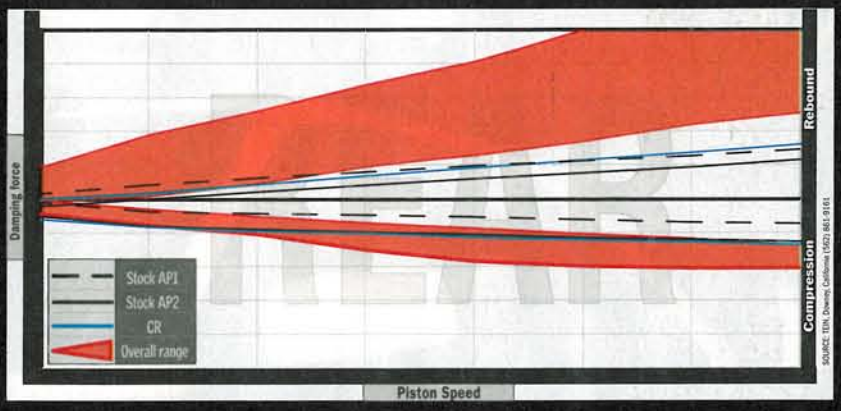
MODIFICATIONS
Peak Power: 196whp @ 8300rpm
Peak Torque: 134lb-ft @ 6600rpm
Weight: 2721 lbs (50.5/49.5)
Model Year: 2002 (AP1)
Engine Code: F20C
Engine Modifications: Buddy Club Racing Spec race header, Spec III exhaust
Chassis: Carbon fiber front tower bar
Suspension (other): Stock
Brakes: Stock
Wheels: Buddy Club P1 Racing QF, 17x8 +45mm (F), 17x9 +63mm (R)
Tires: Continental ContiSportContact 3, 225/45/17 (F), 255/40/17 (R)
Body: Stock
Interior: Buddy Club P-1 Limited Edition carbon fiber bucket seat

SPECIFICATIONS		
Suspension brand	Buddy Club	
Model name	Racing Spec Damper	
Setup by	Buddy Club	
Type	Monotube, 15-position combined compression and rebound damping adjustment. Independent spring and ride height adjustment, pillow ball upper mounts	
	Front	**Rear**
Spring rate	560 lb/inch (10kg/mm)	478 lb/inch (8kg/mm)
Piston rod diameter (mm)	15	15
Stroke length (mm)	121	89
Weight (each, lbs)	13.5	11.0
Manufacturer suggested settings		
Street (0 is softest)	8 clicks, 8/15	8 clicks, 8/15
Track (0 is softest)	8 clicks, 8/15	10 clicks, 10/15
Ride height (inches from wheel center to outer fender edge)	13.0	13.0
Camber (deg)	-2.0	-3.0
Toe (mm)	-0.5	0.0
Caster (deg)	Stock	N/A

Motorsport!!
J'S RACING
INTERNATIONAL RACING TEAM

J's Racing SSK-S1-SH vs. Stock Honda S2000 damping curves



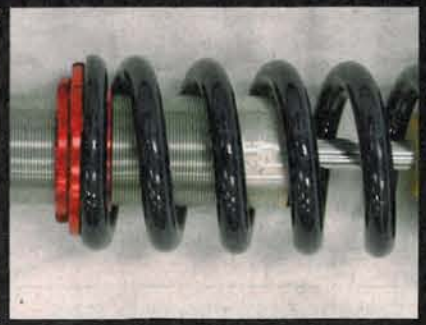


Ride quality

As one of the most noted JDM Honda tuners, J's Racing was the early front-runner to appear with the stiffest suspension, tuned for the pristine race tracks of Japan. Surprisingly, this suspension was smoother than the CR, with a freeway ride quality close to the stock AP2. There was some harshness when going over multiple small bumps and it was hitting the bumps noticeably harder than both stock S2000s when going over sharp imperfections. Still, the only suspension shipped from Japan came out feeling very un-JDM.

On-track behavior/lap time

Hello, can someone do some basic maintenance, please? Engineering Editor Chen found this donor car to represent J's Racing and personally set the car up the night before. The slipping clutch wasn't helping it get out of the corners and the fading brakes weren't helping it get into them. More than once, Hope had to trail-brake into turns because it wouldn't slow properly. This would invariably send the back end around. In the sweepers of sectors eight and nine, it wasn't any better. The lack of downforce, combined



with excessive body roll, made for some pretty flashy racing lines. The car was nearly a second off the pace of the CR, but we can't help but think it could have done better after a 60K-mile service.

Damping quality

This suspension was smoother riding than the CR and felt close to the stock AP2 on the street. There was some slight harshness over sharp bumps, but the J's Racing kit left Kojima thinking that this was how a good OEM calibration for a sports model should be. Trackside, the J's Racing kit was firm, with good body motion and platform control. The feel was decidedly more European than the other JDM suspensions, with a style reminiscent of KW, except with slightly less damping and firmness. The kit understeered slightly on turn-in (on the track) but had good balance and good exit traction. This was Kojima's favorite Japanese suspension.

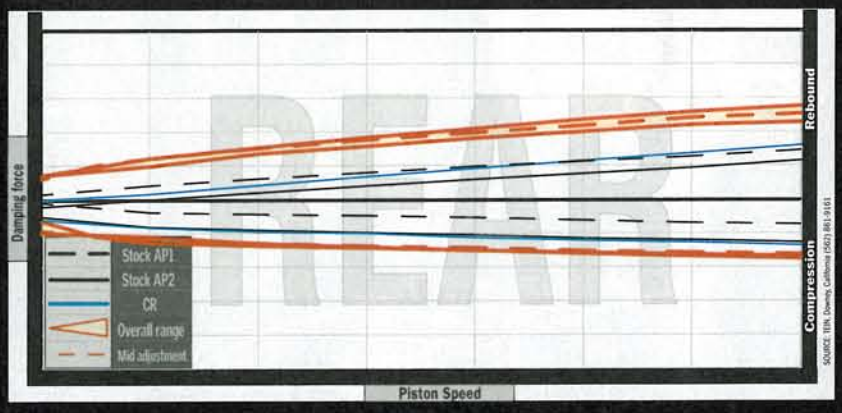
MODIFICATIONS
Peak Power: 217whp @ 7700rpm
Peak Torque: 148lb-ft @ 6300rpm
Weight: 2810 lbs (49.0/51.0)
Model Year: 2005 (AP2)
Engine Code: F22C
Engine Modifications: JPR filter
Chassis: Carbon fiber front tower bar
Suspension (other): Stock
Brakes: Stock
Wheels: Volk Racing CE28N, 17x8 +44mm (F), 17x9 +54mm (R)
Tires: Continental ContiSportContact 3, 225/45/17 (F), 255/40/17 (R)
Body: Front fenders, hard top
Interior: Stock

MSRP: $4487.14 | **BEST LAP: 2:07.304**

SPECIFICATIONS		
Suspension brand	J's Racing (manufactured by Showa)	
Model name	SSK-S1-SH	
Setup by	Jay Chen	
Type	Combined rebound and compression adjustment, aluminum monotube, adjustable spring and body length, stock upper mounts per Japanese racing regulations	
	Front	**Rear**
Spring rate	1002.4 lb/in (18 kg/mm)	1002.4 lb/in (18 kg/mm)
Piston rod diameter (mm)	14	14
Stroke length (mm)	71.8	71.8
Weight (each, lbs)	10.5	9.5
Jay Chen's settings		
Street (0 is softest)	4.5 turns, 4.5/7.5	3.5 turns, 3.5/7.5
Track (0 is softest)	4.5 turns, 4.5/7.5	3.5 turns, 3.5/7.5
Ride height (inches from wheel center to outer fender edge)	13.0	13.0
Camber (deg)	Stock?	Stock?
Toe (mm)	0?	In?
Caster (deg)	Stock	N/A

JIC magic

JIC Magic FLT-TAR vs. Stock Honda S2000 damping curves



Ride quality

We've always preached against the over-lowering of cars. And with a mean, low-down stance more related to show queens than track machines, we were skeptical about the JIC S2000. Until we drove it. Truly surprising, the JIC FLT-A2 coilovers displayed a smooth and controlled comfort level over the freeways, soft bumps and crater-strewn city streets of our test route. This set-up had a definite firmness over sharp bumps that could be felt in the backside, but the feeling was controlled and free from any worry-inducing 'crashing' into the bumps.

On-track behavior/lap time

Had we been using stopwatches, we would have questioned the timer's motor skills. The JIC car felt great. It was easy to control the slip angle through throttle steering and stay on the racing line. It inspired a lot of confidence. It just wasn't clocking the lap times it felt like it was. For whatever reason, it wouldn't pull the lateral-*g* numbers. The car lost time all the way from sections five through nine. The only obvious points where it needed to slow down more than the others to stay on the track were at the right-hander in section five and the high-speed transition approaching Magic

Mountain. It's purely speculation, but the clumsy 18-inch wheels may not have been the best choice for all-out track performance.

Damping quality

Although quite comfortable on the street, the JIC S2000 was sensitive to differences in road surface on the freeway and displayed a slight upshock harshness from too much compression damping. On the track, the JIC suspension again felt like it had too much damping for the spring and was packing down on bumps. The balance was toward late-turn oversteer, but tire shock made it hard to get the power down on exit. The JIC S2000's racing brake pads were rated by Kojima as the second-best brakes in the group, right behind the Spoon's mega-buck calipers.

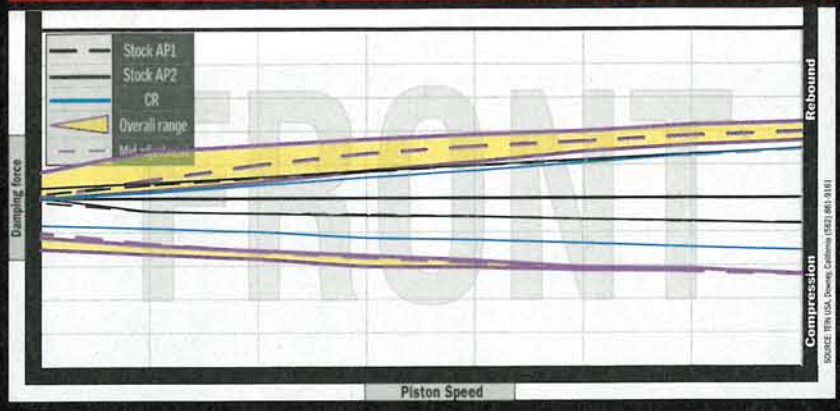
MSRP: $2070.00 | **BEST LAP: 2:08.546**

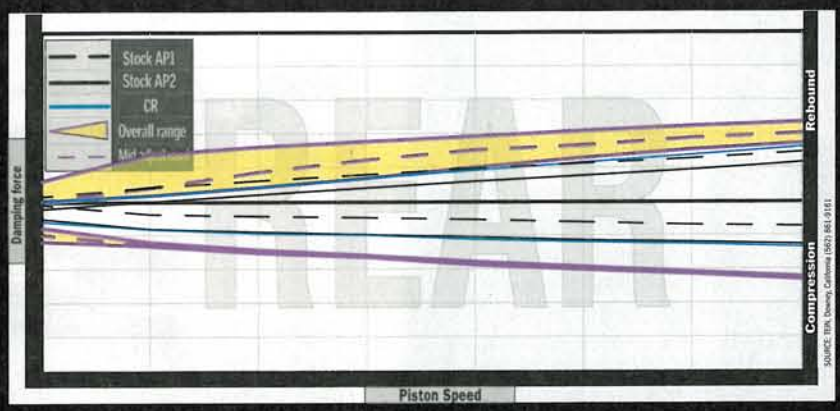
MODIFICATIONS
Peak Power: 195whp @ 8300rpm
Peak Torque: 132lb-ft @ 6600rpm
Weight: 2693 lbs (50.7/49.3)
Model Year: 2000 (AP1)
Engine Code: F20C
Engine Modifications: AEM intake, Berk Technology 50mm header and high-flow catalytic converter, JIC titanium exhaust, Clutchmasters stage three clutch and lightweight flywheel
Chassis: JIC Magic shock tower bar, X-brace, SCCH spherical bearing bushings for front control arms, Megan Racing anti-bumpsteer kit
Suspension (other): Stock
Brakes: Project Mu brake pads
Wheels: AME, 18x8 +50mm (F), 18x9 +50mm (R)
Tires: Continental ContiSportContact 3, 245/40/18 (F), 255/35/18 (R)
Body: Front lip spoiler
Interior: Stock

SPECIFICATIONS		
Suspension brand	JIC	
Model name	FLT-TAR	
Setup by	JIC	
Type	Monotube, 15-position combined compression and rebound damping adjustment, independent spring and height adjustment, pillow ball upper mounts	
	Front	**Rear**
Spring rate	672 lb/in (12 kg/mm)	560 lb/in (10 kg/mm)
Piston rod diameter (mm)	45	45
Stroke length (mm)	90	90
Weight (each, lbs)	10.6	9.2
Manufacturer suggested settings		
Street (15 is softest)	7-10 clicks, 7-10/15	10-15 clicks, 10-15/15
Track (15 is softest)	1-4 clicks, 1-4/15	5-7 clicks, 5-7/15
Ride height (inches from wheel center to outer fender edge)	12.75	12.5
Camber (deg)	-2 deg 30'	-2 deg 30'
Toe (mm)	0.0	0.0
Caster (deg)	Stock	N/A

KW suspensions

KW Clubsport vs. Stock Honda S2000 damping curves





Ride quality

In stark contrast to some of the other S2000s, the Robispec-tuned KW S2000 had a definite aversion to being over-lowered. Set up to avoid riding on its bumpstops, the high-riding (relative to this crowd) KW car had careful attention paid to its bumpsteer curves, suspension travel and alignment settings. The KW Clubsport dampers were easily more comfortable than both the stock S2000 and the CR. Compliance was also good, even over sharp bumps and the bombed-out streets of Buttonwillow. There was a small dead spot in the very center of the steering and a tendency to pull left or right across uneven pavement, both probably due to the alignment settings. Still, this car shined as one of the most capable dual-purpose street and track machines, as long as it's not slammed down tuner-kid–style. This was one of the few cars where Kojima didn't have to visit the bathroom on the way back to the hot pits. No, seriously.

On-track behavior/lap time

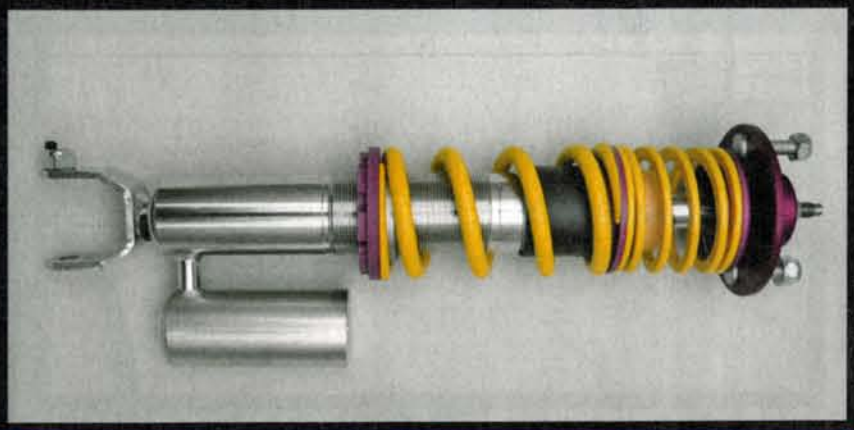
The KW S2000 hit every mark dead-on. The mechanical front grip provided by the wide front tires was obvious. While the others required a healthy bit of throttle lift at the apexes in order to pivot into oversteer, the KW car just needed the slightest choke to send its

nose right where the steering wheel was pointed. This allowed it to carry more speed through every corner. Other than that, it was perfectly neutral at high speed, stable under braking and tossable in the tight stuff. Credit the taller ride height or the obvious time spent on set-up, but this thing was dialed in.

Damping quality

KW's Clubsport set-up displayed a Euro-style ride, with a firm yet smooth quality. This was Kojima's pick as his favorite for a track-worthy, daily driver suspension. There was a tendency to wander a bit toward road undulations during the freeway section, due to the alignment settings. On the track, the KW S2000 showed exceptional traction on corner-exit, with good turn-in and solid mid-corner behavior. It proved again to be firm and well damped, with good platform control.

MODIFICATIONS
Peak Power: 214whp @ 7700rpm
Peak Torque: 153lb-ft @ 6300rpm
Weight: 2829 lbs (49.6/50.4)
Model Year: 2006 (AP2)
Engine Code: F22C
Engine Modifications: J's Racing air intake
Chassis: J's Racing fender brace
Suspension (other): J's Racing front tie-rod ends, rear toe links, Robispec 30mm solid front anti-rollbar, rear bar disabled
Brakes: Stock
Wheels: Enkei NT03+M, 17x9.5 +44mm (F), 17x9.5 +44mm (R)
Tires: Continental ContiSportContact 3, 255/40/17 (F), 255/40/17 (R)
Body: APR Performance GT-200 rear wing
Interior: Stock

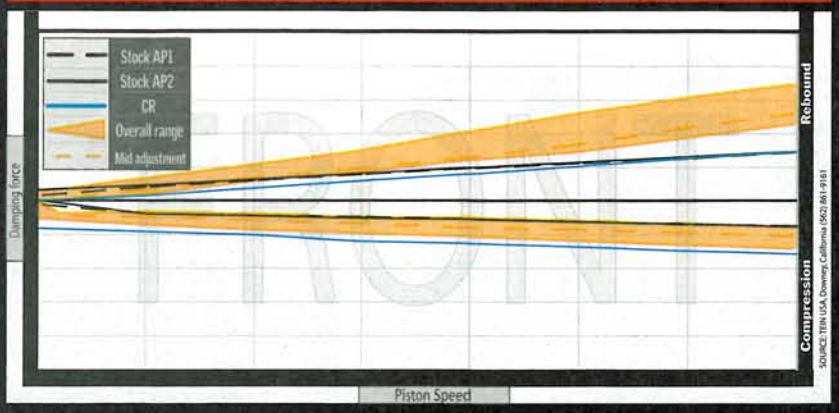


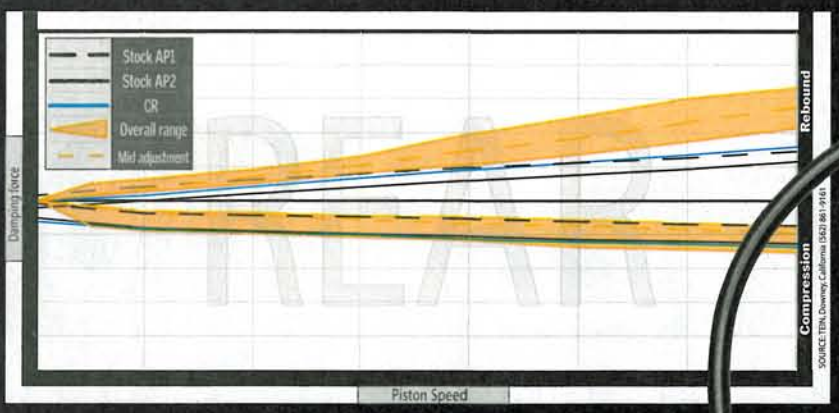
MSRP: $3095.00 | **BEST LAP: 2:05.501**

SPECIFICATIONS		
Suspension brand	KW Suspensions	
Model name	KW Clubsport	
Setup by	Robispec	
Type	Twin-tube, stainless steel housing, fixed body length, adjustable spring pre-load w/tender springs, remote reservoir (rear), independent 24-way rebound, 16-way low-speed compression damping, pillow ball upper mount	
	Front	Rear
Spring rate	540 lb/inch (9.6 kg/mm)	540 lb/inch (9.6 kg/mm)
Piston rod diameter (mm)	22	22
Stroke length (mm)	125	128
Weight (each, lbs)	11.4	10.2
Manufacturer suggested settings		
Street (0 is softest)	8 clicks, 8/15	8 clicks, 8/15
Track (0 is softest)	8 clicks, 8/15	10 clicks, 10/15
Ride height (inches from wheel center to outer fender edge)	13.13	13.13
Camber (deg)	-2.0	-2.3
Toe (mm)	0.0	0.0
Caster (deg)	Stock	N/A

MOTON
SUSPENSION TECHNOLOGY

Moton Club Sport vs. Stock Honda S2000 damping curves





Ride quality

Although all the first-generation AP1-chassis S2000s seemed to exhibit more flex or chassis fatigue than their AP2 counterparts, this particular Moton-equipped chassis seemed especially soft. There was a definite (and strange) difference in feel when turning and the car flexed more than any other S2000 when going up the driveway. In a straight line however, the Moton S2000 couldn't be touched. There was more noise than stock through the suspension, probably due to the pillowball mounts, but the Moton Clubsports virtually glided over road imperfections. Compliance over any road surface was nothing short of amazing. It should be noted that we found this supposedly straight and stock S2000, and offered it to the good people at Moton to represent their suspension. Chassis set-up was handled by Steve Mitchell of M-Workz who, despite his own objections, lowered the ride height to the owner's specifications.

ack behavior/lap time

ope brought the Moton-equipped car back he pits before even crossing the starting e. His first question to the owner was: "Is here any air in the left rear tire?" The owner louble-checked it, then we hunted around underneath to locate the problem. There was nothing obvious, but on the track something wasn't right. The only other car we've driven that felt this bad had a torn rear subframe and was toeing out under compression.

Hope took it back out to get the best numbers he could. It did well on left turns, carrying more exit speed out of the Bus Stop than the KW car. But the back end would wash out on right turns. While the adjustability of a racing suspension can create a set-up far worse than stock, the uneven windshield-to-hardtop gap and unusual overspray on the chassis' underside were indications that something far more serious was afflicting this poor yellow Honda.

Damping quality

The first noticeable aspect about this set-up was the chassis. The car displayed noticeable cowl and steering column shake on our street route, leading to the belief that there was some previous underlying damage. The Moton Clubsport dampers, however, provided a smooth and comfortable ride, masking some road bumps completely. Kojima noted that these were probably some of the best dampers in the pack, but were mated to the worst chassis of all. Out on the track, the suspension displayed excellent platform control but oversteered turning right and, when turning left, understeered on turn-in and oversteered on exit. This, combined with the even more apparent chassis flex when on track, reinforced our theory that the donor car had been damaged.

MSRP: $3995.00 | **BEST LAP: 2:10.933**

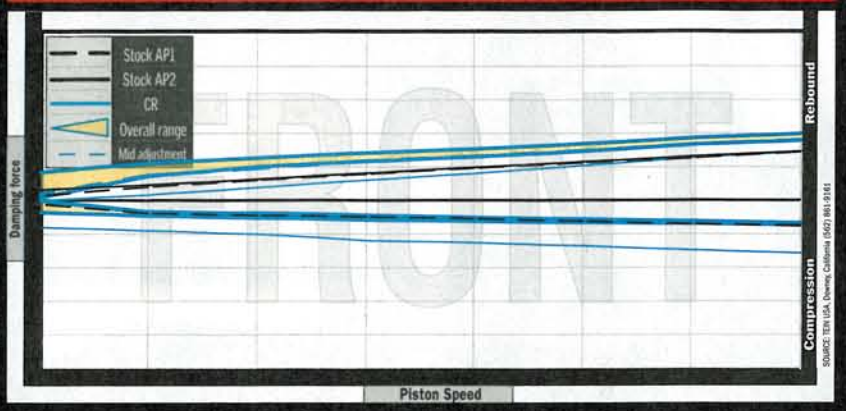
MODIFICATIONS
Peak Power: 197whp @ 8300rpm
Peak Torque: 129lb-ft @ 6600rpm
Weight: 2745 lbs (50.3/49.7)
Model Year: 2003 (AP1)
Engine Code: F20C
Engine Modifications: Stock
Chassis: Stock
Suspension (other): Eibach ERS Springs
Brakes: Stock
Wheels: Volk Racing CE28N, 17x8.5 +50mm (F), 17x8.5 +50mm (R)
Tires: Continental ContiSportContact 3, 245/45/17 (F), 245/45/17 (R)
Body: OEM hardtop
Interior: Soft top removed

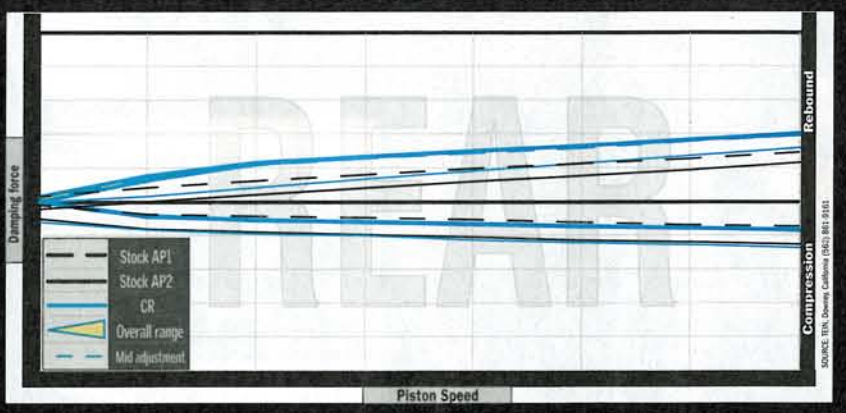
SPECIFICATIONS		
Suspension brand	Moton	
Model name	Club Sport	
Setup by	M-Workz	
Type	Independent six-way adjustable compression and rebound damping, monotube, remote reservoir, spring pre-load adjustable, pillow ball upper mounts	
	Front	**Rear**
Spring rate	650 lb/in (11.6 kg/mm)	600 lb/in (10.7 kg/mm)
Piston rod diameter (mm)	22	22
Stroke length (mm)	152.4	120.7
Weight (each, lbs)	11.5	10.0
Manufacturer suggested settings		
Street (0 is softest)	3/6 compression, 3/6 rebound	3/6 compression, 3/6 rebound
Track (0 is softest)	3/6 compression, 3/6 rebound	3/6 compression, 4/6 rebound
Ride height (inches from wheel center to outer fender edge)	12.5	13.1
Camber (deg)	-2.0	-2.0
Toe (mm)	0.0	-6.4
Caster (deg)	Stock	N/A

WORKS MOTORSPORTS

ÖHLINS ADVANCED SUSPENSION TECHNOLOGY

Works/Ohlins DFV vs. Stock Honda S2000 damping curves



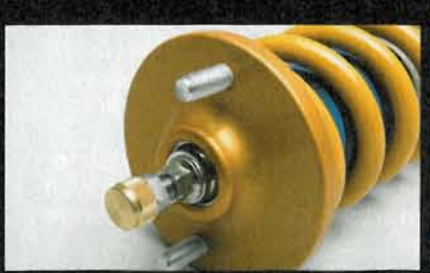


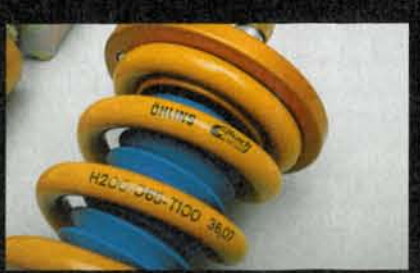
Ride quality

Firstly, the odd part about driving the Works-tuned Ohlins S2000 was that the steering wheel was crooked when driving straight. The Works crew later admitted to a late-night, last-minute tuning session. Steering effort was higher than for the others and the car wandered a bit through undulations on the freeway, leading us to believe that the alignment had probably been the last adjustment done. The suspension was smooth and controlled over bumps with an excellent ability to absorb sharp bumps and rough patches. Like the Moton suspension, the Ohlins car also transmitted more road noise into the cabin, due to the upper mounts. While firm in overall feel, the Ohlins Stage II dampers never bottomed out, crashed into bumps or displayed anything that made us cringe.

On-track behavior/lap time

The Works car ran nearly identical times to the J's Racing car in every section. Proper brakes gave it more control entering sections two, three and nine. But it lost a hair in sections six, seven and ten. A tendency to become unstable over bumps made it hard to place through consecutive corners. For example, the curbing that lines up the exit of the Bus Stop would get the car bouncing,





making it hard to initiate the turn with precision. Aside from the suspension, there was a serious driveline vibration. Despite these minor issues, the car still finished solidly within the tight pack of competitors.

Damping quality

The Ohlins Starge II suspension was, according to Works, designed to be neutral and predictable at all times, both on the track and the street. This was set up to be a dual-purpose suspension for time trials and daily driving, not a full-on race suspension. On the street, the Works-tuned system displayed a firm but well damped feel, with a slight low-speed body jiggle. When hitting bumps that were offset from the S2000's center, there was an odd difference in feel from the left and right sides. On the track, the set-up was firm, but with no tire shock. Finding grip in this car was easy, especially on corner exit. The overall balance was good and easy to drive.

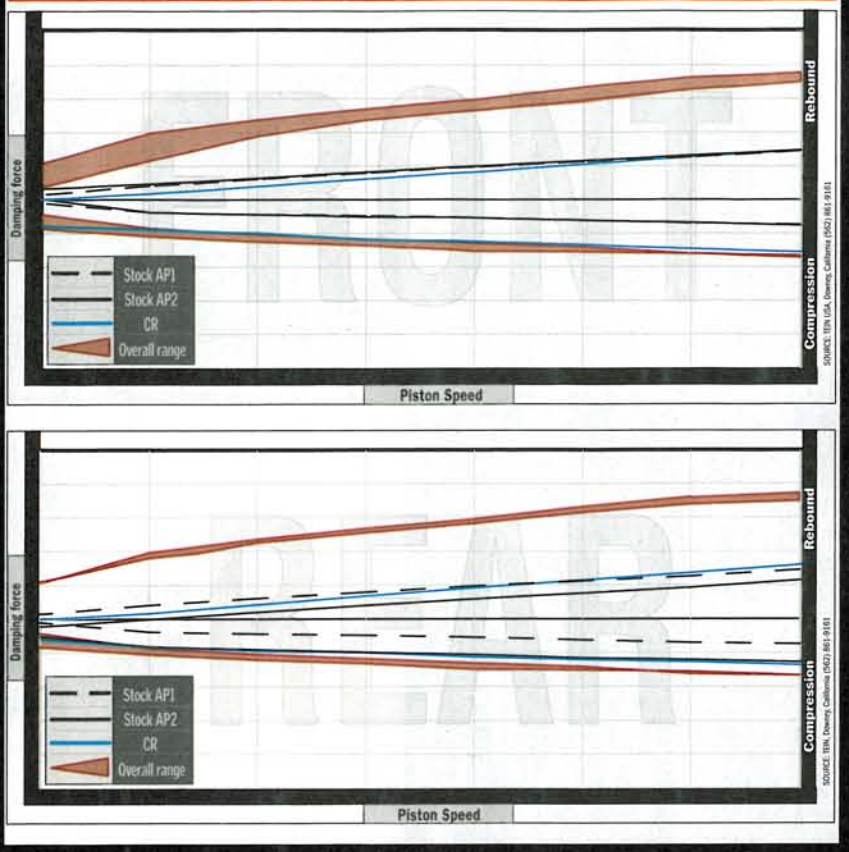
MSRP: $2795.00 | **BEST LAP: 2:07.285**

MODIFICATIONS
Peak Power: 205whp @ 7700rpm
Peak Torque: 133lb-ft @ 6600rpm
Weight: 2755 lbs (50.2/49.8)
Model Year: 2000 (AP1)
Engine Code: F20C
Engine Modifications: Stock
Chassis: Front tower bar, Works Croxx brace
Suspension (other): Stock
Brakes: Stock
Wheels: SSR Type C RS, 17x9 +55mm (F), 17x9 +55mm (R)
Tires: Continental ContiSportContact 3, 255/40/17 (F), 255/40/17 (R)
Body: OEM hardtop
Interior: Stock

SPECIFICATIONS		
Suspension brand	Ohlins DFV	
Model name	Works Stage II/Ohlins DFV	
Setup by	Works	
Type	Aluminum monotube, 25-way rebound damping adjustable, adjustable height and spring pre-load, pillow ball upper mounts	
	Front	**Rear**
Spring rate	600 lb/in (10.7 kg/mm)	500 lb/in (8.9 kg/mm)
Piston rod diameter (mm)	14	14
Stroke length (mm)	120	100
Weight (each, lbs)	9.25	8.15
Manufacturer suggested settings		
Street (25 is softest)	10 clicks, 10/25	10 clicks, 10/25
Track (25 is softest)	7 clicks, 7/25	7 clicks, 7/25
Ride height (inches from wheel center to outer fender edge)	13.23	13.54
Camber (deg)	-2.8	-4.5
Toe (mm)	-1.0	-2.0
Caster (deg)	6.8	N/A

SPOON SPORTS

Spoon Sports vs. Stock Honda S2000 damping curves



Ride quality

As the racecar that snuck in as a street car, the Spoon Sports S2000 was the center of attention. The other competitors were drawn to this, which featured the only aftermarket brake calipers (which were allowed by us) and a full Spoon Sports widebody kit (which wasn't). Rumors also flew about a host of illegal mods, such as a shorter final drive, aftermarket LSD, flux capacitor and warp drive. Honestly, on the basis of this car's modification list, its lap times can't truly be considered apples-to-apples with the other entrants. While its tire sizes could fit under stock fenders, the entire package adds up to something that's the next logical step for a track car—beyond what we intended to test. But this was the only Spoon car we could find.

On the street and the freeway, the Spoon Sports S2000 shined at being uncomfortable. With a buzzing steering wheel (from the solid engine and transmission mounts) and a loud exhaust, the Super Taikyu clone exhibited extreme harshness on the street. It crashed and punished occupants over sharp bumps and virtually shook over the torn-up streets. Not helping matters was the virtually padding-free carbon/Kevlar Spoon Sports racing bucket seat. We crept over the driveway leading to the track, as the low ride height, lack of suspension compliance and large aftermarket bumper made it impossible to do anything else. Displaying a single-minded purpose, the Spoon Sports S2000 easily cleared all other entrants on the road course, securing its title as the most hardcore, borderline-streetable track car.

On-track behavior/lap time

It was our original intention to test each car as a blank slate without any company branding. The menacing Spoon Sports S2000 killed that idea. Even without the support team running around in yellow-and-blue jackets, the black monster was undeniably Spoon. Accusations of cheating spread through the paddock. From the low-slung race bucket to the roaring exhaust note, the experience was every bit as incredible as it sounded. The car felt about 300 pounds lighter in the front than any rival and the steering feel was impeccable,

even better than the CR. Oversteer is too primitive a word to describe being able to set any slip angle at will. No other car was as fast through the corners. It broke into triple digits exiting Cotton Corners. Then it carried that speed down every straight, hitting 111mph approaching Sunset.

Damping quality

With solid motor mounts and a low seating position, the Spoon Sports S2000 felt like a true racecar, including on the street. The rear end would kick up over large bumps and the front exhibited an up-shock harshness, though not as bad as the CR. Showing the most jiggly ride by far over the rough pavement of downtown Buttonwillow, the Spoon car also had a brutal ride over the track curbing. Kojima noted that the suspension would probably be better suited to a caged car with more body stiffness, as well as being matched to R-compound race rubber. Still, the Spoon S2000 featured responsive steering and a balance toward easily catchable oversteer. The dampers were capable of controlling the stiff springs, so exit traction and tire shock were OK—not horrible, but not great either. The Spoon monoblock brake calipers were praised as being the best in the pack and probably contributed quite a bit to its fastest lap time.

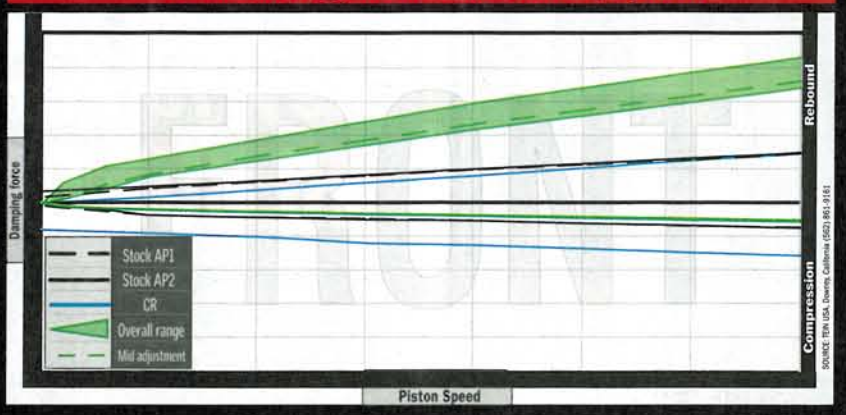
MODIFICATIONS
Peak Power: 219whp @ 7800rpm
Peak Torque: 144lb-ft @ 7500rpm
Weight: 2685 lbs (50.3/49.7)
Model Year: 2004 (AP2)
Engine Code: F22C
Engine Modifications: Spoon Sports air filter, carbon/Kevlar air duct, thermo-wrapped airbox, Venturi throttle body, 4-2-1 exhaust header, dual N1 70mm/60mm exhaust, engine mounts, engine mount rings, transmission mount, spark plugs, valve cover, baffled oil pan, oil catch can, thermostat, mini battery, Hondata heatshield gasket
Chassis: Spoon Sports weld-on gusset plate, tower bar, X-brace, rear brace, engine torque damper
Suspension (other): Spoon Sports offset ball joint, zero bumpsteer kit, differential mount set,driveshaft spacer kit, 27mm front/rear anti-roll bars
Brakes: Spoon Sports four-piston monoblock calipers
Wheels: Volk Racing CE28N, 17x9 +35mm (F), 17x9 +35mm (R)
Tires: Continental ContiSportContact 3, 255/40/17 (F), 255/40/17 (R)
Body: Spoon Sports, hood, front bumper, rear bumper, front fenders, hardtop, rear diffuser
Interior: Spoon Sports carbon fiber bucket seat, steering wheel

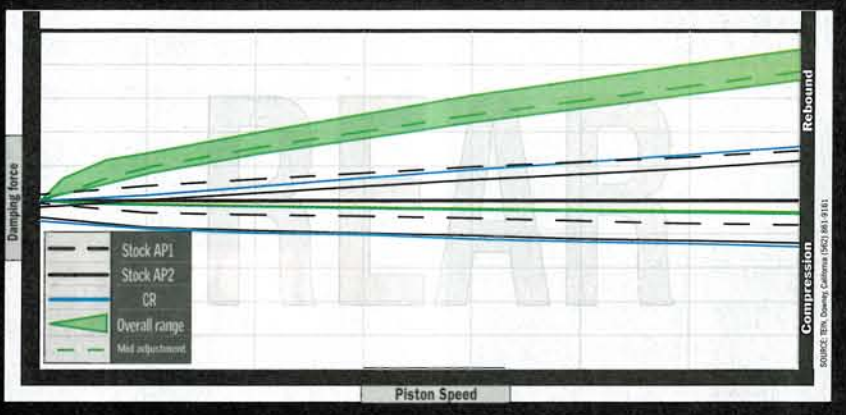
MSRP: $3076.50 | **BEST LAP: 2:02.932**

SPECIFICATIONS		
Suspension brand	Spoon Sports (manufactured by KYB)	
Model name	Full Spec Adjustable Damper Kit	
Setup by	Raceline Development	
Type	Chromoly steel with aluminum components. Four-position dampening adjustment, separate height and pre-load adjustment, stock upper mounts.	
	Front	**Rear**
Spring rate	784 lb/in (14 kg/mm)	672 lb/in (12 kg/mm)
Piston rod diameter (mm)	13	13
Stroke length (mm)	85	85
Weight (each, lbs)	10.95	9.65
Manufacturer suggested settings:		
Street (1 is softest)	4 clicks, 4/4	2 clicks, 2/4
Track (1 is softest)	4 clicks, 4/4	2 clicks, 2/4
Ride height (inches from wheel center to outer fender edge)	13.0	12.0
Camber (deg)	-3.5	-3.5
Toe (mm)	0.0	4.8
Caster (deg)	7.5 (L), 7.75 (R)	N/A

TEIN

TEIN Monoflex vs. Stock Honda S2000 damping curves





Ride quality

The TEIN MonoFlex suspension was a surprise for us, with suspension compliance and a comfortable ride that we weren't expecting from a JDM coilover equipped with such stiff springs and low ride height. It floated over sharp bumps and rough patches with ease, although the body could use more control and a faster steering response. Despite being in plain view, we refrained from hitting random buttons on the EDFC in-cockpit damping adjuster. Compared to older aftermarket suspensions we've driven (TEIN included) which were needlessly harsh and incorrectly damped, it's great to see the direction the industry is headed. Real performance is on many companies' minds now and the time that TEIN spent in US-based R&D shows in these dampers.

On-track behavior/lap time

To be fair to the guys from TEIN, they got hosed on the running order. The track was covered in a thick fog when we arrived in the morning. We pushed the schedule back by two hours, hoping it would burn off, but with precious minutes disappearing we had to get going. Both the TEIN car and the stock S2000 had to compete on a cold surface that may have had some dew left on it. Shortly

after, the sun hit, providing consistent air and track temps for the rest of the day. Still, the TEIN car's balance was near perfect. Positive steering feedback made hanging the tail out comfortable through Buttonhook and Cotton Corners. Mild aerodynamic push limited speeds through Talladega, but it was still within one mile an hour of the KW car there. As tempting as it was, the remote damping controller was left untouched to keep things fair. The TEIN S2000 came with a Back Yard Special seat bracket that dropped the stock driver's seat by 20mm, a noticeable difference that helped with driver comfort.

Damping quality

Possessing a soft and smooth ride, the TEIN Mono Flex system could have used more mid-speed damping, as it had a slight floating feel on the street. The need for more low- and mid-speed damping extended to the track, where it felt slow in the tightest transitions. The car also displayed a tendency to understeer, but was forgiving to drive. TEIN noted that this car was set up to be replicated by any consumer and designed to be used by drivers of all skill levels, thus the choice of a more conservative rear alignment. Still, this was probably the most receptive and easy car for the average or novice track driver to handle.

MSRP: $1710.00 | **BEST LAP: 2:06.079**

MODIFICATIONS
Peak Power: 204whp @ 8300rpm
Peak Torque: 136lb-ft @ 6500rpm
Weight: 2786 lbs (49.2/50.8)
Model Year: 2000 (AP1)
Engine Code: F20C
Engine Modifications: Fujitsubo RM01A cat-back exhaust (dual exit), J's Racing Intake, header, Okada Projects Plasma Direct
Chassis: Front tower bar, Spoon Sports front cross-beam bar (four-point), rear cross-beam bar (two-point.)
Suspension (other): J's Racing roll center adjuster, T1R rear bumpsteer kit
Brakes: StopTech rotors, Ferodo DS2500 pads, StopTech SS Lines, Motul RBF600 brake fluid
Wheels: Enkei RPF1, 17x9 +45mm (F), 17x9 +45mm (R)
Tires: Continental ContiSportContact 3, 235/40/17 (F), 255/40/17 (R)
Body: Veilside front lip spoiler, J's Racing rear wing (set at flat angle), OEM hardtop
Interior: Back Yard Special driver's-side low-position seat bracket

SPECIFICATIONS		
Suspension brand	TEIN	
Model name	MonoFlex	
Setup by	TEIN	
Type	Steel body monotube, 16-way combined compression and rebound adjustment, independent height and spring pre-load adjustment, pillow ball upper mounts	
	Front	**Rear**
Spring rate	671 lb/in (12 kg/mm)	559 lb/in (10kg/mm)
Piston rod diameter (mm)	14	14
Stroke length (mm)	75	96
Weight (each, lbs)	11.8	10.15
Manufacturer suggested settings		
Street (16 is softest)	12 clicks, 12/16	14 clicks, 14/16
Track (16 is softest)	8 clicks, 8/16	10 clicks, 10/16
Ride height (inches from wheel center to outer fender edge)	13.1 (0.3 inches lower than recommended because BW is a higher-speed course)	12.9 (0.3 inches lower than recommended because BW is a higher-speed course)
Camber (deg)	-2.0	-2.7
Toe (mm)	-1.0	-3.5
Caster (deg)	Stock	N/A

Sector 11: Sunset	Sector time (sec.)	Entry speed (mph)	Exit speed (mph)
TEIN	5.765	72.7	74.5
J's Racing	5.849	74.8	74.9
Spoon Sports	5.871	74.7	77.5
S2000 CR	5.898	73.7	76.2
Works/Ohlins	5.927	71.5	74.8
Moton	5.931	68.5	72.3
KW Suspension	5.951	70.6	77.0
JIC	5.978	72.0	74.9
Buddy Club	5.996	73.4	73.9
Stock S2000	5.999	71.3	73.0

Sector 11: Sunset

The only thing notable about this simple 90-degree corner is the dip at the apex. Other than that, there's nothing special—just one last chance to screw up an otherwise perfect lap.

Sector 12: Finish	Sector time (sec.)
Spoon Sports	3.936
KW Suspension	3.999
JIC	4.044
S2000 CR	4.047
Works/Ohlins	4.061
TEIN	4.073
Buddy Club	4.088
J's Racing	4.094
Moton	4.120
Stock S2000	4.177

Sector 10: Esses	Sector time (sec.)	Avg. speed (mph)	Peak speed (mph)
Spoon Sports	13.998	94.2	111.4
TEIN	14.175	92.8	110.7
J's Racing	14.314	92.1	109.5
S2000 CR	14.321	92.1	108.6
KW Suspension	14.436	91.2	108.7
Buddy Club	14.438	91.4	109.4
JIC	14.592	90.4	108.6
Works/Ohlins	14.594	90.4	108.8
Stock S2000	14.651	89.9	106.0
Moton	14.804	89.1	107.6

Sector 10: The Esses

This series of corners opens up from one turn to the next. Without adequate suspension travel and high-speed damping, the curbs are big enough to bounce a car off the track. But for this group, it was a hammer-down, full-throttle affair.

Sector 9: Sweeper	Sector time (sec.)	Average lateral *g*	Exit speed (mph)
Spoon Sports	11.132	0.87	69.6
KW Suspension	11.469	0.81	67.8
S2000 CR	11.631	0.80	69.4
TEIN	11.684	0.81	69.9
Buddy Club	11.706	0.78	68.4
Works/Ohlins	11.734	0.78	66.5
JIC	11.868	0.77	65.9
J's Racing	11.898	0.76	68.4
Moton	12.125	0.74	65.6
Stock S2000	12.661	0.68	67.4

Sector 9: The Sweeper

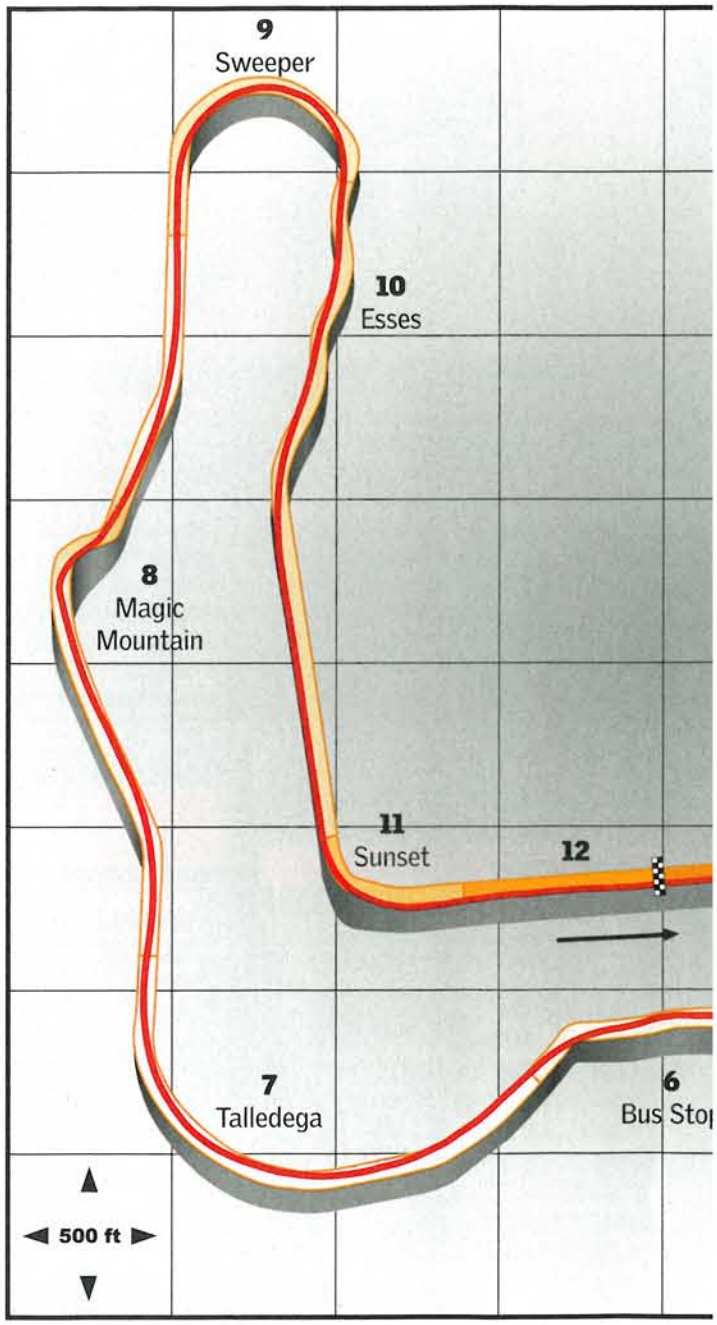
This is a long, sweeping turn. What makes it complicated is that the end pinches, then leads into a long section of full-throttle acceleration. Carrying speed through the corner is just as important as sticking the exit just right. Trail-braking in scrubs speed while maximizing lateral *g*s. At about two-thirds of the way through, the slip angle needs to increase to get on the throttle and hook it out. Bushings that minimize camber and toe deflection make controlling these slides much easier.

Sector 8: Magic Mountain	Sector time (sec.)	Max speed (mph)	Peak lateral *g*
Spoon Sports	17.291	107.2	1.23
KW Suspension	17.710	105.3	1.10
S2000 CR	17.821	103.8	1.11
TEIN	17.884	103.6	1.13
Buddy Club	18.135	100.5	1.08
Works/Ohlins	18.287	105.4	1.17
J's Racing	18.306	101.1	1.05
JIC	18.399	102.4	1.08
Moton	18.643	99.8	1.03
Stock S2000	18.838	98.7	1.01

Sector 8: Magic Mountain

One of the highlights of Buttonwillow Raceway, Magic Mountain is the largest elevation change. The approach involves a triple-digit transition that lines the car up for the braking zone. Braking into the incline compresses the suspension and creates massive grip. However, the ground drops away at the apex. Insufficient rebound damping here will spring you right off the top.

Sector 7: Talledega	Sector time (sec.)	Average lateral *g*	Average speed (mph)	Exit speed (mph)
Spoon Sports	11.694	0.90	93.5	101.3
TEIN	11.826	0.87	91.0	97.2
S2000 CR	12.007	0.85	90.0	96.9
J's racing	12.153	0.83	89.5	95.0
KW Suspension	12.181	0.84	90.0	97.8
Works/Ohlins	12.206	0.84	89.3	96.5
Buddy Club	12.433	0.82	88.0	93.7
JIC	12.438	0.81	88.0	93.5
Stock S2000	12.612	0.77	85.4	92.9
Moton	12.772	0.76	85.5	90.2



Sector 7: Talledega

The constant-radius, slight-camber sweeper highlights overall high-speed balance and a car's neutrality. Balancing front and rear downforce has a huge effect on how a car feels as aero grip makes a big contribution. Cars with a large rear wing only and staggered tire sizing will begin to push through the turn, limiting their cornering speed. Aerodynamic drag also becomes relevant in this Sector. The suspension should not be totally discounted through the long corner, though. The wrong combination of spring rate and rebound valving can cause the dampers to pack down. If this packing results in the shocks bottoming out, things can go bad really fast.

Sectors 12 & 1: Front straight

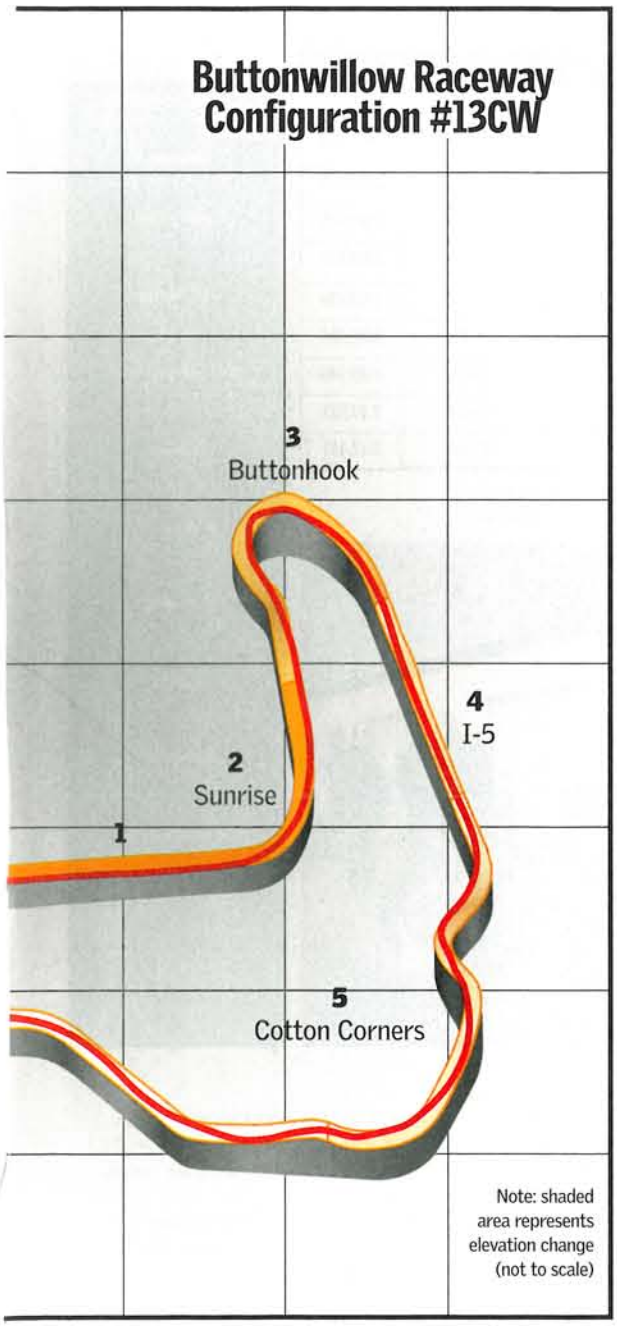
Coming off Sunset's 90-degree left, the front straight is a full-throttle run into the braking zone for Sunrise. The front suspension is loaded with heavy, straight-line braking all the way down to the turn-in point.

Sector 1: Front Straight	Sector time (sec.)	Peak speed (mph)	Entry speed (mph)
Spoon Sports	7.555	106.4	94.0
KW Suspension	7.716	106.2	93.1
TEIN	7.813	105.3	93.1
S2000 CR	7.757	107.1	92.0
Works/Ohlins	7.793	109.9	91.4
J's Racing	7.648	105.8	90.7
Buddy Club	7.804	104.9	91.3
JIC	7.891	109.9	90.8
Moton	8.015	103.4	89.3
Stock S2000	8.237	103.3	91.2

Sector 2: Sunrise

Called Sunrise because it's located at the east end of the front straight, it's a 90-degree left with a short burst of throttle before braking for Buttonhook. The inside suspension must soak up the torn-out sections of curbing at the apex, with limited steering kickback or change in traction. At track out, to maximize exit speed, the car will drift onto the mild outer curbing and deal with yet another bump, even with the suspension fully loaded.

Sector 2: Sunrise	Sector time (sec.)	Average speed (mph)	Average lateral *g*
KW Suspension	5.501	69.5	0.82
Spoon Sports	5.503	70.5	0.84
S2000 CR	5.604	68.5	0.79
TEIN	5.654	68.1	0.82
Works/Ohlins	5.716	67.3	0.77
J's Racing	5.729	67.0	0.78
JIC	5.761	67.0	0.76
Stock S2000	5.831	65.6	0.74
Moton	5.863	66.4	0.74
Buddy Club	5.867	66.8	0.73



Sector 3: Buttonhook

Buttonhook is a throwaway corner with multiple lines, none being particularly fast. The quickest way through it is to threshold-brake straight to the apex, then turn in while the front tires are still loaded. This pitches the back end around into a slight oversteer condition through the increasing-radius exit. The initial, sharp, high-camber turn-in will spike well in excess of 1*g*, as well as max out outside compression and inside droop travel. The quicker the suspension can recover from this massive transfer of weight, the more throttle can be applied at the exit without spinning.

Sector 3: Buttonhook	Sector time (sec.)	Exit speed (mph)	Peak lateral *g*
Spoon Sports	12.987	79.5	1.34
KW Suspension	13.104	78.6	1.36
Works/Ohlins	13.193	76.4	1.34
JIC	13.266	76.7	1.32
J's racing	13.335	78.2	1.33
S2000 CR	13.457	77.3	1.24
Buddy Club	13.483	75.4	1.27
TEIN	13.523	76.8	1.33
Moton	13.622	74.7	1.21
Stock S2000	14.124	76.6	1.07

Sector 4: I-5

Called I-5 since it runs closest to (and parallel to) Interstate 5 on the far side of the track. Higher speed on I-5 comes from better exit speed though Buttonhook.

Sector 4: I-5	Sector time (sec.)	Peak speed (mph)
Spoon Sports	4.247	93.4
TEIN	4.325	92.0
KW Suspension	4.350	91.3
JIC	4.360	92.1
Works/Ohlins	4.370	91.0
J's Racing	4.380	90.7
Moton	4.438	90.0
Buddy Club	4.460	89.5
S2000 CR	4.473	88.7
Stock S2000	4.492	88.8

Sector 5: Cotton Corners

This tricky series of turns is complicated by a steep man-made hill that crests at the second right-hand apex. The amount of traction available varies greatly from one transition to the next as the suspension loads and unloads through the elevation changes.

Sector 5: Cotton Corners	Sector time (sec.)	Exit speed (mph)	Peak lateral *g*
Spoon Sports	15.055	79.2	1.39
TEIN	15.375	78.6	1.32
KW Suspension	15.495	78.3	1.39
Works/Ohlins	15.508	77.7	1.31
J's Racing	15.538	77.6	1.18
S2000 CR	15.562	76.2	1.21
Buddy Club	15.787	78.6	1.37
JIC	15.787	77.2	1.17
Moton	16.140	75.4	1.28
Stock S2000	16.276	77.3	1.13

Sector 6: Bus Stop

The track's high-speed portion begins with the Bus Stop. Kissing the relatively tall curbing through this sector really opens up the corners. A suspension's ability to soak up high-speed impacts while maintaining traction will contribute to higher average sector speeds. The exit of Bus Stop is critical as it leads onto the fastest part of the track. At these speeds, aero grip and balance start becoming a factor.

Sector 6: Bus Stop	Sector time (sec.)	Average speed (mph)	Exit speed (mph)
KW Suspension	13.670	85.0	78.4
Spoon Sports	13.683	85.1	80.4
Works/Ohlins	13.988	83.3	76.0
S2000 CR	14.007	83.4	79.1
TEIN	14.072	83.1	81.0
J's Racing	14.166	82.4	79.3
Buddy Club	14.217	81.8	78.2
JIC	14.254	81.7	79.2
Moton	14.559	79.9	79.2
Stock S2000	14.655	79.8	76.0

Sector	1	2	3	4	5	6	7	8	9	10	11	12	Total
Spoon Sports	7.555	5.503	12.987	4.247	15.055	13.683	11.694	17.291	11.132	13.998	5.871	3.936	**2:02.932**
KW Suspension	7.716	5.501	13.104	4.350	15.495	13.670	12.181	17.710	11.469	14.436	5.951	3.999	**2:05.501**
TEIN	7.813	5.654	13.523	4.325	15.375	14.072	11.826	17.884	11.684	14.175	5.765	4.073	**2:06.079**
S2000 CR	7.757	5.604	13.457	4.473	15.562	14.007	12.007	17.821	11.631	14.321	5.898	4.047	**2:06.585**
Works/Ohlins	7.793	5.716	13.193	4.370	15.508	13.988	12.206	18.287	11.734	14.594	5.927	4.061	**2:07.285**
J's Racing	7.648	5.729	13.335	4.380	15.538	14.166	12.153	18.306	11.898	14.314	5.849	4.094	**2:07.304**
Buddy Club	7.804	5.867	13.483	4.460	15.787	14.217	12.433	18.135	11.706	14.438	5.996	4.088	**2:08.324**
JIC	7.891	5.761	13.266	4.360	15.787	14.254	12.438	18.399	11.868	14.592	5.978	4.044	**2:08.546**
Moton	8.015	5.863	13.622	4.438	16.140	14.559	12.772	18.643	12.125	14.804	5.931	4.120	**2:10.933**
Stock S2000	8.237	5.831	14.124	4.492	16.276	14.655	12.612	18.838	12.661	14.651	5.999	4.177	**2:12.461**

Lap	1	2	3	4	5	Total	Average time (sec.)	Fastest
Spoon Sports	2:03.613	2:02.932	2:03.286	2:03.542	2:03.312	10:16.685	2:03.337	**2:02.932**
KW Suspension	2:07.285	2:05.572	2:05.67	2:06.396	2:05.501	10:30.424	2:06.085	**2:05.501**
TEIN	2:09.461	2:08.717	2:07.070	2:06.961	2:06.079	10:38.288	2:07.658	**2:06.079**
S2000 CR	2:06.784	2:06.821	2:16.585	2:07.671	2:07.523	10:45.384	2:09.077	**2:06.585**
Works/Ohlins	2:08.99	2:08.37	2:07.285	2:07.755	2:08.108	10:40.508	2:08.102	**2:07.285**
J's Racing	2:09.619	2:07.372	2:27.469	2:07.304	2:09.602	10:61.366	2:12.273	**2:07.304**
Buddy Club	2:08.324	2:09.216	2:08.539	2:08.69	2:09.024	10:43.793	2:08.759	**2:08.324**
JIC	2:11.378	2:09.016	2:08.546	2:09.037	2:10.211	10:48.188	2:09.638	**2:08.546**
Moton	2:11.419	2:10.933	2:11.611	2:11.075	2:11.603	10:56.641	2:11.328	**2:10.933**
Stock S2000	2:14.377	2:12.773	2:12.461	2:12.731	2:23.458	11:25.800	2:15.160	**2:12.461**

Lap notes: No aberrant variations in lap time were due to spins or off-track excursions. The J's Racing car had to stop to re-attach the GPS antenna on lap three and the stock S2000 and CR needed cool-down laps for the brakes.

SOURCES

Continental Tires
www.conti-online.com

Honda
automobiles.honda.com

Buddy Club
(909) 923-9188
www.buddyclub.us

JIC Magic
(562) 803-6122
www.jic-magic.com

KW Suspension
(888) 713-5566
www.kw-suspension.com

Moton
(770) 886-8777
www.motonsuspension.com

M-Workz
(310) 713-8386
www.m-workz.net

Works
(415) 226-2500
www.worksmitsu.com

Ohlins
(828) 692-4525
www.ohlins.com

Robispec
(760) 912-4337
www.robispec.com

Spoon Sports
www.spoonsports.us

Opak Racing
(650) 952-1900
www.opakracing.com

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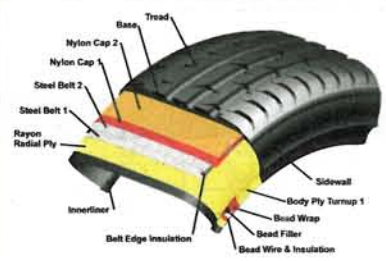
www.tein.com



Continental ContiSportContact 3

Without a spec tire, this test would have become a slick-tire free-for-all. After a comprehensive search, we decided on Continental Tire's flagship ContiSportContact 3 (CSC3) maximum-grip summer tire. The CSC series has long been a favorite of Euro OEMs (like BMW and Porsche), on account of its superb wet and dry capabilities, predictability, stability, comfort, and wear characteristics.

The latest-generation CSC3 is an evolution of the original CSC 1 and 2. They all adhere to the same philosophy and goal: provide a competent summer sport tire that does not falter in the wet, while still maintaining wear, noise, rolling resistance and steering characteristics that the everyday consumer and enthusiast alike can appreciate.

For the purposes of this shoot-out, the CSC3 is a tire that best represents the wide range of rubber that goes on to S2000s, from the budget-minded student to track-only owners. Using a non-R-compound tire also allowed us to dictate that each tuner use street and weekend track-oriented suspensions, instead of high-spring-rate race suspensions. Another advantage is the large selection of sizes available for performance applications, starting from 17 inches up to 21.

Continental came through by providing sets to each of our entrants, as well as sending engineers and staff to support the event, and provide input on tire pressures under our test and track conditions. While our track-whore driver and senior editor, Andy Hope, was initially skeptical of the non-R-comp item, he came away impressed with the track capability and consistency of this street tire. Over five sizzling hot laps, they maintained consistent grip on the 60-degree day—with no signs of scaling or chunking, even on the shoulders.

To watch videos from this test, visit www.sportcompactcarweb.com

Conclusion

After the dust cleared and the tires cooled at the end of our testing day, we gathered up the Continental tire engineers and the suspension tuners. The final pep talk was simple and short: there would be no winner. The methodology we created was comprehensive and thorough, but there were too many criteria to declare an outright victor.

Despite all entrants utilizing a spring rate stiffer than stock, each suspension was more comfortable than the stock AP2-chassis S2000. MSRPs fluctuated wildly, from Buddy Club's $1680 to J's Racing's hefty imported $4487. Lap times were spread wide open as well, with nearly 10 astounding seconds separating the stock S2000 from the Spoon Sports car. For the kiddie tuners who are reading this, yes, the shocks and springs even ranged in color from green to purple to nurple.

If you're enough of a cheap bastard, you're probably going to pick the lowest-priced suspension regardless of performance. And if you only care about lap times, then you'll pore over each spec box and try to figure out which mods are the most trackworthy. But taking into account all the information presented here and formulating a realistic balance toward what exactly is expected out of your car (S2000 or otherwise), then you'll arrive at your final decision easily. From there, only the downward spiral of personalized suspension tuning lies ahead. Finding out which damping settings are best, what alignment settings work for a particular track, what ride height and tire combo you want... we've all been there and done that. That's where the real fun begins. ■

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