RS SPYDER MEETS 962

The Magazine About Porsche

excellence 11

Perfect Turbo

THE BRILLIANT WERKS K1

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KING OF THE CONES
AUTOCROSS 911 SC

DUAL-PURPOSE
356 SPEEDSTER

The windows are down. Outside, the scenery is blurred. The noise from the back of this 911 is no song. It's not the pretty music of a GT3, with harmonic highs and throaty tips. It's not the song of horsepower. No, it's the sound of torque, tearing through the atmosphere's canvas, echoing off the trees.

Few 911s, and even fewer turbocharged 911s, offer a soundtrack as scintillating or a powerband as electric. The turbo six's thrust is epic, its wave of torque endless, always accessible. Second gear straightens your spine in the carbon-fiber seat shell. It's the kind of brutal acceleration that heightens all of your senses. Gear to gear, turbo lag is minimal as the 3.6 six breathes deeply and shoves the K1 forward.

But there appears to be more to this modified 997 Turbo than a great motor. Leaving the first section of *Excellence*'s South Test Loop and heading into its most challenging set of turns — turns riddled with bumps, elevation changes, and varied surfaces that separate merely good suspension setups from brilliant ones — first impressions are good. So good, in fact, that the K1 may be the best modern Porsche we've driven here in years. If so, that would put a heavy 997 Turbo ahead of the 997 GT3 and RS, two 911s that are handling specialists if nothing else. But a Turbo can't be that fun, can it? *Can it?*

We've made it no secret that we aren't in love with Porsche's latest Turbo. It's not that we don't want to be, it's just that we were expecting greatness in the follow-up to the superb 996 Turbo. If you define automotive excellence by the spec sheet, the 997 Turbo's got greatness: 480 bhp, up to 505 lb-ft of torque, variable-geometry turbos, smarter all-wheel-drive, electronically adjustable dampers, and a less-intrusive PSM electronic stability control system.

If you're reading this magazine, however, you probably know true driver's cars can't be summed up by mere numbers. That the latest 505-horse Corvette Z06 is a surprisingly good car with stunning on-track performance — but that a 245-horse Cayman 2.7 might be more fun on a tight, tricky backroad. That the way a truly great car's steering and chassis respond to your inputs is the key to driver involvement. And that's where the 997 Turbo fell down.

We were prepared to look beyond its busy, nearly blingy, exterior. There was no denying its interior was a vast improvement, nor was there any doubt about its stupefying speed on Watkins Glen International's road course. But, on track, it seemed soft. *Way* too soft. Even with its Porsche Active Suspension Management set to the firmer Sport setting, the Turbo dove hard under braking, rolled too much in turns, and transferred too much weight to the rear end under acceleration. It felt like a heavy car on too-soft suspension. And, while Porsche had clearly decided to put oversteer back on the menu, the unsettled chassis' muted feedback hardly made it accessible, intuitive, or fun to exploit.

When a 997 Turbo finally showed up at 42 Digital Drive for a week, it worked better on the road than the launch cars did on the track. But its chassis just didn't feel as sorted as Turbos past. Of course, the 997 Turbo still provided one thing 911 Turbos always have: sonic straightline speed. Even here, though, something was amiss. Its Variable Turbine Geometry was claimed to virtually eliminate lag, but we weren't so sure. The new car did exhibit less lag than the outgoing, 450-bhp 996 Turbo S — but 2001's 415-bhp 996 Turbo felt less laggy than either. The 415-bhp car offered less ultimate thrust, but more than made up for that with fast-building boost out of turns.

On our test loop, the difference was obvious: the less powerful car launched harder out of every turn while the later cars made you wait for boost, often until just before the braking point for the next bend.

Dynamically, the 997T seemed like a break from Turbos past. Its allure and value within its targeted segment, which we'll term "performance luxury," was clear. But we felt the magic balance between everyday usability and backroad point-to-point ability achieved in the 996 Turbo had been lost. For the first time in memory, the Turbo felt more like a boulevard cruiser than a backroad burner. Maybe that's why the first 997 Turbo we really liked was the softer Cabriolet, as the car seemed to gel better.

Apparently, we're not alone in feeling the Turbo coupe could use a little "hardening." Champion Motorsports, a subsidiary of Pompano Beach, Florida mega-dealer Champion Porsche, says it's already modified more than 100 997 Turbos to varying degrees for its customers. It also sells its line of wheels, engine parts, suspension bits, and bodywork through other Porsche dealers and aftermarket companies.

The K1 follows Champion Motorsport's 997 Carrera S-based F77, but introduces a new brand: Werks 1. Why? Head of Champion Motorsports Naveen Maraj says that other Porsche dealers, some of them Champion Motorsports' top sellers in Florida, didn't love the idea of selling parts branded with the name of another dealer. Hence, Werks. The name might look very German to an American, but it will be obviously American to a German — as the plural of "Werk" (German for factory) is Werke, not Werks. As for K1, K stands for "Kompressor" and 1 refers to the car's status as the first in Werks' turbo line.

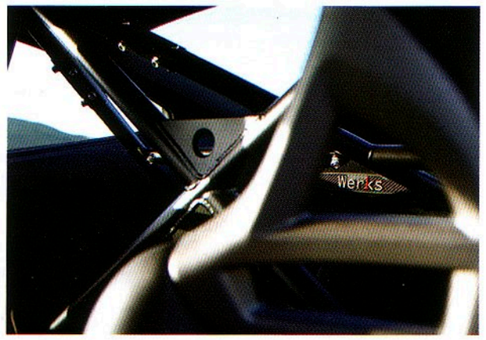
The car so impressed Michelin that the tire-maker asked to put the K1 on its show stand next to a GT3 RS and RS Spyder at the 2007 Specialty Equipment Manufacturer's Association convention in Las Vegas, a big compliment because 2006's display (Veyron, Caparo, Carrera GT, Enzo, and more...) was going to be a hard act to follow. Wearing Champion's trademark Man from Chile Grey paint, which looks like high-gloss putty in person, the K1 caught our eye, too. Sitting low on flat-black magnesium 19s and trimmed with minimalist carbon-fiber aero bits, it looked purposeful in a way we didn't think a 997 Turbo could. We called Champion, and it offered to send the K1 to our offices in Novato for a full evaluation after the SEMA show.

Turns out it looks even better in person. Man from Chile may not translate in photos, but it's arresting in person. The stock Turbo's fussy front bumper, fish-like foglamps, straked side vents, and busy rear bumper all remain, but the color and ride-height drop bring the subtler curves of the front fenders, roofline, and generous rear flares forward. The flat-faced, flat-black magnesium wheels highlight the huge PCCB brakes and look better with Man from Chile than the F77's black wheels with polished lips did. Look at the K1 and you're struck by how little Champion has changed. The stock tailpipes remain, but a flat-black finish mutes them. Ditto for the mirrors.

Despite a claimed 40-percent weight reduction, the internal volume of this carbon-fiber airbox is 30 percent greater than the factory unit for improved turbo efficiency at higher boost.

Visually, the K1 is all about reductions, not additions — a rarity in aftermarket 911s.

"The color is very calming, and the new Turbo really needs that because it's so busy," says racer, restorer, and designer Bruce Canepa, who is obviously taken by the K1 when we run into him in the paddock at Infineon Raceway. After the paintwork and the stance, just five pieces alter the K1's visuals: a front spoiler lip, rear wing upper element, and a rear diffuser in naked carbon-fiber plus two thin black "swooshes," one each ahead of the intercooler exhaust vent on either side of the rear bumper. The satin swooshes are said to help hot air escape the intercoolers by preventing outside air from *entering* the vents at high speed, a problem Champion says it discovered during wind-tunnel testing at A2 in North Carolina — a wind tunnel favored by NASCAR teams.



Black-out sidemarkers work well with the rest of the K1's visual treatment. Euro RS seats and half-cage are great on track, but probably a step too far for regular street work...

The testing at A2 would determine the final form of all the aero pieces, the design of which necessitated the purchase of a digitizing arm, a major investment. Engineer Edrick Cosme says the K1 as it sits would not have been possible without the arm. While it would help him to render parts with complex curves, its biggest benefit was the ability to measure the Turbo precisely, from its crankshaft's centerline outward. The measurements would help Werks create aftermarket parts that fit like factory parts. As the arm fed dimensions into his computer, Cosme says he was impressed by the symmetry and tolerances Porsche has achieved in its mass-produced cars.

Initial wind-tunnel testing occurred with just the front spoiler — which extends forward, using a proven downforce-generating arc — and rear spoiler. Once the rear diffuser was added, however, the pitch of the wing had to be reduced by 1.5°, as it was generating far too much downforce. At that point, a decision to engineer all three pieces together as a package was made, because getting them to work individually *and* together was proving to be an impossible task. In the end, Cosme says the package provided a 75-percent reduction in lift at the front end at 84 mph despite a big increase in downforce at the rear end, from roughly 20 pounds to 120 pounds.

The digitizing arm proved instrumental while designing the $4,600 wing blade's endplates, painted body color on the K1. They may be small, but the complexity of their curves *makes* the wing. More details abound. The complex front lip incorporates aluminum skidplates to prevent damage in anything but a full-frontal assault, such as when an owner drives into a curb. It pays to stay back, as the piece retails for $2,000. Just as precarious is the $3,500 rear diffuser, which hangs low and long off the rear. But the functional diffuser adds a distinctly ALMS flavor to this 997, which ties in well with its fat, semi-slick tires.

The tires, jutting out from the bodywork, indicate there's more to this Turbo's stance than lowering springs, wheels, and tires. There is. GT3 Cup pieces (front lower control arms plus rear upper and lower control arms and toe links) lengthen the K1's wheelbase and provide adjustable camber and caster. Werks' bump-steer kit, front upper strut-tower brace, and adjustable anti-roll bars (made by H&R and sized 26-mm front/24-mm rear) have been added, as well. The lowered ride height is facilitated via springs wound by H&R for Werks and designed to work with PASM.

The biggest gain in grip comes from the rolling stock. The Champion 19x9 and 19x12 MS61 forged-magnesium wheels, which are 4.0 and 6.4 pounds lighter than their factory counterparts, wear 235/35R19 and 305/35R19 Michelin Pilot Sport Cup tires. The massive brakes hiding behind the ten-spoke wheels are Porsche's PCCB ceramic-composite rotors. Their calipers were repainted metallic orange on this K1, but any color may be specified.

Inside, the interior is dominated by the Euro GT3 RS half-cage, powder-coated matte black, and a pair of carbon-fiber GT3 RS shell-bucket seats. The RS parts bin also contributed a grippy, Alcantara-wrapped steering wheel with a yellow centering stripe and a similar faux-suede shift knob. More of the suede-like stuff has been added to the dash trim strips and the center armrest. The final touches are a few plastic bits refinished in Man from Chile and a Werks firewall plaque to replace the one that once said "turbo."

The plaque sits ahead of an engine package that starts with an airbox rendered in carbon-fiber with twin intakes and twin ITG air filters. We rarely get excited about airboxes, but this one's a bit different. Thanks to its carbon-fiber construction and aluminum mounting bar, it's light. It is also beautifully made. Flip it over and the black bung for the mass air sensor is so well integrated you've got to touch it to know it's aluminum, not plastic. Flip the box over and you'll see two small metallic squares. They're super-fine filtration tape, borrowed from F1 to cover the twin drain holes.

Topside, the unit looks good enough to make popping the decklid of this 997 a visually rewarding endeavor, but Maraj and Cosme say function dictated its shape. They note that the airbox, alone, adds no power, but say it's required because simply raising boost pressure with a stock airbox moves the turbos out of their efficiency range. As their impellers spin faster, the turbos need more air than the factory airbox was designed to supply, so Werks increased airbox volume by approximately 30 percent. During dyno development, Werks kept the Turbo's decklid shut to better understand the way a stock, twin-inlet 997 Turbo airbox breathes through holes in the rear decklid. Simply enlarging the holes changed turbo-response characteristics, according to Maraj. The optimum configuration for the K1 airbox requires the decklid's holes to be enlarged slightly.

While the K1 retains the stock VTG turbos, a Werks' intercooler upgrade swaps the stock coolers — with their plastic endcaps — for new units with aluminum endcaps. The original rubber intercooler hoses are replaced with silicone hoses. A proprietary GIAC reflash for the Motronic engine management is responsible for turning up the boost as well as matching the airbox and intercooler to one of two Tubi-style cross-flow exhaust systems developed in conjunction with Werks. The street-legal setup uses 200-cell catalysts while the "race" setup deletes the cats. Both systems make the same power, but the latter is louder, weighs less, and reduces lag.

At the time of our test, the K1 was fitted with the "race" exhaust. Interestingly, the bolt-on system doesn't cause the Check Engine light to illuminate. That's no small feat in a modern, OBD II-equipped Porsche that constantly monitors the catalysts via O2 sensors ahead of and behind each catalyst. A look under the K1 reveals a surprisingly simple solution to the deletion of the cats: a slender tube on each side splits off each exhaust pipe before the muffler. Most gases still head directly into the muffler, but *just* the right amount is diverted up this tubular dead end to yield the "right" readings from an oxygen sensor mounted at the top of each tube. Maraj and Cosme say the system's apparent simplicity is deceiving, rolling their eyes when recalling the long hours required to figure out just how long and how big the tubes had to be to create the desired readings.

So what's the payoff? "1,000 horsepower, or 530 at the wheels," quips Maraj, who doesn't like to estimate flywheel output based on chassis-dyno readings. Even so, he knows customers want numbers. Cosme estimates SAE flywheel horsepower is 598 at 6000 rpm on premium pump gas, with 611 lb-ft of torque at 3400 rpm. If accurate, the package adds nearly 120 bhp and just over 100 lb-ft of torque to a Sport Chrono-equipped factory 997 Turbo. Cosme says filling the K1 with 100-octane unleaded and switching its engine management over to the "Race" setting via a plug-in GIAC controller yields another 30-60 horses depending on fuel mixture, outside temperature, and other factors.

Out on the road, the K1 feels every bit as powerful as the pump-gas claims. Two tanks of 100-octane unleaded revealed a K1 that had noticeably stronger pull. That said, we never felt like we were wanting for power on pump gas; in either case, the K1 is nothing less than a rocketship. More importantly, it retains excellent flexibility. Porsche AG is rightly proud that the standard 997 Turbo makes its peak torque of 460 lb-ft all the way from 1950 rpm to 6000 rpm. While that's impressive, the K1's still-linear powerband is more exciting — with no sacrifice in driveability.

The GIAC engine management tuning deserves credit here. Around town, the engine is seamless. The twin-turbo flat six never stumbles, never misses. Floor the throttle in any gear, at any rpm, and the K1 pulls cleanly until the redline is reached or you're forced to back off. Critically, partial-throttle tuning is beautifully sorted, too. The GIAC software also eliminates Sport Chrono's time limit for the overboost function and raises the redline by 450 rpm, from 6750 to 7200 rpm. That last tweak and a lightweight flywheel-and-clutch package transform the 997 Turbo engine's character, simultaneously making it more lively on heel-and-toe shifts and more willing to play at high revs from corner to corner. It feels like a new engine and this, when combined with its prodigious output, has us rethinking our preference for naturally-aspirated 997s.

There's noticeably less turbo lag, too. While the airbox may account for part of the improvement, Maraj says the "race" exhaust is responsible for most of the reduction. He says the Tubi setup with cats reintroduces some of the lag felt in a stock 997 Turbo. As we didn't get a chance to test both systems, we can't comment.

The no-cat exhaust does sounds great, however. Better than a GT3's? Surprisingly for a turbo car, maybe. Windows up, the K1's sonic signature is loud, but not too loud. Windows down, a race-car soundtrack that will stand neck hairs on end is ever-present. But while you can roll the windows up and enjoy relative peace, those outside don't get that choice. This K1 can be heard several *blocks* away. Those who select the "race" system will have to ask themselves whether the reduction in lag is worth the

Interior is another restraint story, with only a few splashes of Man from Chile and Alcan-tara trim. The only carbon-fiber to be found, on the seats, is purely functional...

racket, lack of legality, and environmental impact of running a modern car without cats — especially one that returns 16 mpg in mixed use and 8 mpg when you're on it.

Running up Highway 101, heading for the South Test Loop, the RS seats are seriously grippy but surprisingly comfortable — so long as you've got a relatively narrow back. After the seats, the faux-suede wheel and shifter continue to move the experience towards Porsche's GT ethic. If anything's hair in the cake, it's the RS half cage. Every ripple, every compression of the suspension — no matter how small — causes the cage's bolt-together sections to creak and ping. Incessantly. The payoff is additional chassis rigidity you can feel, but the noise will be too much for most.

Any frustrations with the cage fade to insignificance once we're on the loop with windows down and Sport selected. The K1 feels great out here. Its lowered, stiffened suspension keeps body motions in check over mid-corner bumps while its all-wheel-drive system and sticky, R-compound rubber put its considerable power down very effectively indeed. The K1 may wear the same Michelins GT3s and GT3 RSs do, but the way it uses them feels very different. Part of that's due to the fact you're feeding roughly twice as much torque through them, part of it is the extra weight driving their soft-compound rubber into the pavement, and part of it is the K1's very different and, in our view, superior suspension tuning. The result is a 997 that sticks to and processes the most challenging sections of the loop in a way no other has.

The way it keys into pavement, feeding you clear signals as to what's happening at all four corners, inspires the confidence to carry silly speeds through faster sweepers. Though the K1 feels like it's pounding the road into submission, its controls are still delicate, intimate even. Steering inputs through the suede-like steering wheel are easily measured, then perfectly translated to the front tires. Its weighting feels just right, its accuracy unerring. The K1 offers brutal speed but rewards a light touch; it's a heavyweight ready to flow down the road with not just pace, but grace.

The PCCB ceramic-composite brakes never fade, despite the K1's considerable bulk — even on the slowest sections that demand continuous hard braking without giving the rotors a chance to catch their breath and cool off. These same sections have caused some of Porsche's very best brakes — like steel 996 GT3 brakes — to fade, forcing us to slow down.

More than anything else, though, what impresses us about the K1 is how its suspension has utterly transformed the Turbo, leaving it a completely usable car in the city but making it an absolutely brilliant one on the loop. We still have reservations about suspension systems built around stock dampers and lowering springs, but this is one that works. But Champion also wanted us to try a KW coil-over setup on the K1. This would give us a rare chance to try PASM against proper coil-overs — in this case set up for fast times at the Nürburgring by a noted German tuner — back to back. After how shockingly good the H&R setup proved to be on the loop, we were excited at the prospect of trying the K1 with a well-sorted set of coil-overs.

Too bad it didn't work out so well. If the lowering springs showed us things don't always turn out the way you expect them to, the coil-overs drove that point home. A 997 that offered a completely acceptable ride on the street with fantastic handling on the loop's toughest sections became an uncompromising track car with marginal (at best) ride quality on the street. Worse, mid-corner bumps threatened to unhinge the K1 and cause a loss of mechanical grip — throwing its body skyward instead of merely compressing its suspension.

Body control, however, was iron-fisted. While the K1 would hop, it didn't keep on bouncing. Leaving the rebound alone and dialing the compression back helped, but it was clear that quite a bit of sorting would be required to make this setup work on the road. Champion decided to switch the K1 back to the PASM/H&R setup for the balance of our test. We were glad it did. While we're still skeptical of lowering springs without matching shocks in general, the setup in this particular 997 indicates H&R has this application nailed. We still have concerns regarding the longevity of PASM shocks with these springs, as they weren't designed to work at this ride height. When we bring this matter up with Maraj, he says Champion has installed the H&R springs in over 100 of its customers' 997 Turbos, many of them daily drivers, with no problems so far. Would we take the risk? Given the goodness of this setup, we probably would...

The final test of this suspension setup, and the K1 in general, would come during an on-track session at Infineon Raceway, where we're surprised to find the K1 feels just as good on track as it did on the South Test Loop. With PASM's Sport setting selected, the car feels beautifully balanced and clearly communicates what each of its four tires are up to. In tight turns and under braking, you can feel its heft working against you, but the K1's limitless power, all-wheel-drive, R-compound grip, and surprisingly sharp handling add up to a very, *very* fast track-day toy. Crucially, it's also a fun, chuckable car.

While better lap times might be achieved on carefully sorted coil-overs, the PASM/H&R setup works well on track. The stock Turbo's on-track gyrations are, if not completely eliminated, significantly reduced. So, instead of managing the car's weight as it pitches forward under braking and then rolls over as you turn in, you're left to manage grip as you do in the best, most intuitive 911s. Around Infineon, the K1 feels better resolved than any factory 997 I've driven here, GT3 included. With roughly 50 percent more horsepower, 100 percent more torque, and the ability to deploy it, I suspect it's faster than a GT3, too.

Few sports cars attain the K1's level of cohesiveness. Even fewer products of the aftermarket do. Its balance of power, braking, grip, and — critically, unexpectedly — handling finesse is inspiring. Between its razor-sharp turn-in, sharpened motor, lightened flywheel, chunky GT3 shifter, and

strong PCCB brakes, the K1 offers a sublime driving experience. For sweetness, it ranks right up there with the base 997 Carrera coupe and 997 Carrera S X51 — but it adds a performance envelope a step beyond Porsche's own GT3 and GT3 RS.

It's a pity Porsche doesn't offer an option package on the 997 Turbo that would introduce a bit of the K1's sharpened flavor. But we know there's a reason every Turbo isn't like this one. The K1 is not for everyone — or many, for that matter. For starters, 99 percent of buyers would find the RS half-cage's incessant noise unacceptable. The RS seats are narrow and restrict access to the back of the cabin. And few will have the patience to prevent the carbon-fiber bits hanging precariously at the extreme ends of this car from touching down.

To avoid fouling them on Northern California roads, it takes a willingness to park back from curbs, angle into every driveway carefully, and avoid some streets entirely. And, unlike the factory plastic front spoiler, the penalty for failure with these pieces carries a price with a comma in it. We were able to keep the front lip's visible surfaces scratch-free, but it touched down a couple of times around town, mainly in intersections with subtle depressions. Fortunately, the aluminum skidplates did their job, preventing visible damage and preserving the carbon-fiber's integrity.

As for the trailing rear diffuser, the piece never touched down at high speed on rougher sections of the loop as we had feared it might, but we finally caught it while angling into a gas-station driveway where pavement and cement met and heat had caused the black stuff to buckle ever so slightly. A nasty cracking sound resulted, as did a 0.25-inch chip in what was once a perfect piece. Werks says it's looking into the addition of aluminum spears along the lower edges of the diffuser strakes, but it may also want to consider adding kevlar threads into the carbon-fiber weave to prevent the diffuser strakes from breaking up in the event of a bigger hit.

The K1's perfect dynamics come with more compromises. When it comes down to picking which version of the Werks/Tubi exhaust to go with, choosing between lag and legality isn't fun. Also, a couple of more minor niggles popped up over 1,100 miles, both of them with the airbox. First, the glue used to keep the rubber seals in place at the top of each intake and on the decklid wasn't up to the task. Werks says it will fix that, but one thing it won't be able to fix is the fact that the right-hand intake cover must be removed to add motor oil, as it blocks the factory oil-filler neck. Even then, you'll want to have a funnel handy.

Finally, there's the price. Replicating this K1 exactly would cost about $220,000 including the price of a new 997 Turbo with PCCBs. The $20,000-25,000 color change to Man from Chile is part of that figure, so the balance of the mods and the labor to install them works out approximately $65,000. With a lightweight flywheel and clutch package, the K1 engine program works out to about $20,000 of that, while the suspension accounts for another $7,500-8,500. The wheels with tires add another $12,500. Thus, some will find it hard to justify building a full-boat K1 — especially in light of the new 997 GT2, which carries an MSRP under $200,000 and a limited-production pedigree.

Then again, GT2 allocations are so thin that even major Porsche dealers will be lucky to get more than two or three cars. The K1 is probably more powerful than the GT2, as well. So we suspect the K1, or parts of it, will appeal to existing 997 Turbo owners who want more involvement without having to trade their cars in. And the suspension upgrades and engine program do transform the 997 Turbo. Had the 997 Turbo driven like this at its Watkins Glen press introduction, or on our test loop, we would have been raving about it much as we did with the 996 Turbo back in 2000.

The K1's goodness has caught us off guard. The aftermarket has always offered more power, bigger brakes, lowered suspension, altered looks, and anything else an individual might want. But rarely does it produce such a cohesive whole. And it really should have a hard time of providing a 911 that's better on our test loop than the ones from Weissach. But, in this case, it has. The most shocking thing about the K1 is it's a 997 Turbo I find more desirable than a 997 GT3 or GT3 RS. But then perhaps that's not so shocking when I realize it's the most thrilling, most satisfying modern Porsche I've driven on road and track since the Carrera GT...