

TESTING THE TESTERS: C/D DEMOLISHES THE EPA'S MILEAGE CLAIMS

**CAR  and DRIVER**

DECEMBER 1975 • ONE DOLLAR

**PORSCHE'S INCREDIBLE  
TURBO CARRERA**

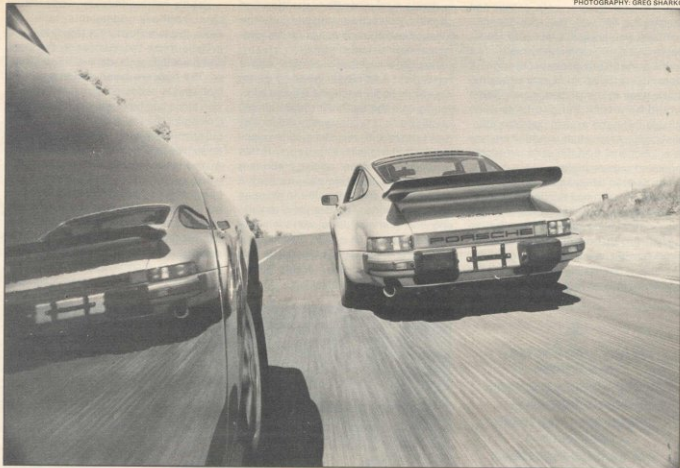
Plus the New-for-'76 912E Four

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# Porsche Power

BY STEPHAN WILKINSON

It comes in all sizes, from a gentle 86 horsepower to a turbocharged 234.

• Don't ask me why I had two at once, but in a day when I barely could afford one, I owned a pair of Porsches—two refrigerator-white 1956 Speedsters. One was a Carrera, a 1500 that was rumored (weren't they all?) to be "an ex-factory car." It was the GT model, which supposedly meant it had an aluminum hood and doors. The way I guarded that rare metal with constant warnings to passengers to close their door *very* gently and nightmares of sidewalk leaners crushing it like so much Reynolds wrap, you'd have thought it was Kryptonite.

Cams were the big deal in those days. Jaguars, Ferraris and Maseratis had two. So did Astons and Alfas, but nobody else of note had more than one. The Carrera had four. I was the only kid on my block who was able to say I had a quadruple-overhead-cam engine. It wasn't true, because all there was under the Speedster's little bustle was two horizontally opposed dohc banks—a VW

that got heads—but that little sucker added up to four, and nobody was going to convince me otherwise. It didn't matter that my Carrera went down the road crabwise, the unfortunate effect of the previous owner having slow-rolled it over a guard rail. I was still the only guy around with four cams.

Twenty years separate those old Speedsters (the other one was a 1600 Normal, little more than an arrogant Volkswagen) from their 1976 equivalents—the brand-new Turbo Carrera and the gently resurrected, VW-engined 912E. Yet the similarities between the '56 and '76 cars are far greater than the two-decade gap might suggest. My little Carrera was simply a street car with a 550 Spyder engine; the 1976 Turbo Carrera is just as straightforward a mating of race-car motor with civilized amenities. And just as the whole Speedster concept was an attempt to produce a People's Porsche, the 912E with its

four-cylinder VW engine hiding meekly under a 911's hemline is today's version of my old 60-horsepower 1600, a car that couldn't cover a Karmann Ghia.

The guiding principles still work as well as they ever did. The Turbo Carrera is a Panzer among Porsches, a street racer that will guarantee you a place at the top of the pecking order in a way that not even a Ferrari or a Lamborghini can, while the 912E is a domesticated quasi-Porsche perfect for the driver who can afford only half a loaf of sheer performance but wants a full helping of quality, prestige and operating economy.

The Turbo Carrera is a surprisingly modest car—almost too much so. There is little blatant visual drama beyond the classic Porsche shape, the now-familiar whale-tail spoiler and the compound curves of its wildly flared flanks. In fact, the squat, low-profile tires and diminutive size of the whole car make it look from some angles like a huge Dinky toy.

You'd expect louvers, vents, gauges and toggles for \$26,000, but your doorman will think you bought a 911 with fender flares and a 180-mph speedometer. Not even a manifold-pressure gauge. A boost indicator would fit right where the clock goes in the present panel, and it would be a trick thing to have even though the turbo system operates automatically. After all, it wouldn't be any less functional than the car's electrically operated outside mirror.

We used to talk grandly of "getting on the cam," which was supposed to make it obvious that your engine had a peaky, high-performance torque curve. But the age of the turbo will change all that. From now on, you'll be "building boost." When you get the Turbo Carrera off the line and put your foot down hard, nothing

surprising happens. The car accelerates almost lethargically, just like any 2800-pound, 3.0-liter, low-compression machine should. But when the rpms reach about 3000, an incredible slingshot suddenly launches the car. No production machine ever got on a cam as spectacularly as a turbocharged Porsche Carrera when its blower has spun up enough to poke its power through the intake ports.

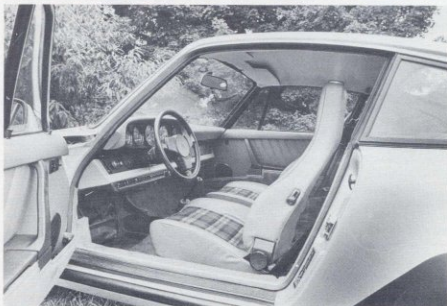
er during maximum-effort takeoffs when chassis/powertrain torque binds the linkage bushings and hangs up the lever momentarily between gears. Though a five-speed gearbox with a lower first and closer-spaced gears would marginally decrease ET and allow you to spin the fat Pirelli CN36s almost at will (which is probably why the factory didn't provide it), the car is quite happy hustling along with four gears. It has mountains of torque, so the Turbo is a tremendously tractable car—as easy a high-performance machine to drive as any in the world. The interior is remarkably free of engine noise, with the turbo-charger serving as a solid little energy- and sound-absorber; the steering is light at all speeds; and the pressure on the big clutch is not obtrusive.

Yet it's not a particularly *comfortable* car. Like those original four-cam Carreras, this is a Spyder for the street, not a "let's throw the Vuittons in the boot and dash to Biarritz, darling" grand tourer. The tires are harsh and suspension taut, and a series of prominent expansion strips can have you dodging around looking for the low spots. There's a considerable amount of wind and road noise, which is true of the 912E as well. A nice place to visit, but you wouldn't want to live there. Not that Porsche hasn't tried to furnish it grandly; the Turbo Carrera comes standard with a full leather interior, air conditioning, AM/FM, carpeting with "turbo" spelled out on the package deck behind the front seats—better there than in foot-high script on the sides of the car—and an automatic

“  
The Turbo Carrera  
is a Panzer  
among Porsches, a street  
racer that will  
guarantee you a place  
at the top  
of the pecking order.  
”



Turbo's fenders are even wider than the normal Carrera's, as are tires and track.



The only Turbo option is a sunroof; everything from air to leather comes standard.

This artificial aspiration is good for 13.5-second quarter-mile times and 103 mph through the trap, which are production-car figures you haven't seen much of since the late 1960s. You won't get any help from the Turbo Carrera's four-speed gearbox, though, for first is high enough to take you all the way to 51 mph; third and fourth are *both* overdrive ratios. If you can't keep the tires spinning, the revs at 3000 or 4000 off the line and the blower pumped up, the car will bog down long enough to add at least a second to your elapsed time. And if you're ever going to lose your grace under pressure, you'll do it with a Porsche's gearbox. What seems a precise transmission even under brisk road driving becomes a recalcitrant graunch-

heater-control thermostat that retains the manual between-the-seats heat lever of the 911/912 but moves it electrically, as ponderously and mysteriously as one of those nonsense boxes where the hand comes out of the trap door and shuts off the switch. In fact, the only option available is a sunroof.

Yet the Turbo's task is not simply to be "tractable" or "comfortable" but to move on down the road. Which it does. At an indicated 158 mph (another *C/D* tester saw 160 during one run at the Ohio Transportation Research Center track), the car seems as docile as any other car at half that speed. It exhibits none of the twitchiness and front-end lightness that afflicts 911s at high speeds or in crosswinds. The car has extremely effective spoilers at both ends,

and they help the tires maintain their vertical load at high speeds. The Turbo also carries several suspension changes adapted directly from the company's racers: The front-end geometry comes straight from the Turbo RSR (the winged coupes campaigned in Europe by the Martini team), and the Turbo's angled rear trailing arms are of a new cast-aluminum shape known around the factory as "the banana," with geometry adapted from the 2.8 RSR.

One of the problems inherent in the standard Porsche's rear-suspension design is something called "deflection steer," which means that due to flexing of the fabricated steel trailing arm as well as the rubber bushings where the trailing arm is attached to the chassis, the rear wheels don't stay exactly paral-

lel to the centerline of the car. You can imagine what this does to a Porsche's desire to follow a straight path. The Turbo's new trailing-arm design, however, has decreased considerably any tendency toward deflection steer, and the extremely wide track and fat tires doubtless help as well.

The Turbo Carrera has a surprising amount of low-speed understeer—more so than even the standard 911. This is to some extent a designed-in trait, for if the car were much closer to neutral at low speeds, its oversteering tendencies at high speeds would be unmanageable.

Porsche handling is a subject of much contention, for the car has long defined "excellent handling" for many enthusiasts. So to hint otherwise is considered sacrilege. The truth is that what many of



Back by popular demand—and marketing strategy—the 912 had gone away in 1970.



The 912E's full interior and 2+2 seating are a prime advantage over the 914.

The little four-cylinder 912E is your comfortable road car—comfortable where the Carrera is harsh, rational where the Carrera is excessive.

these people are talking about might better be called "apparent handling"—the supple, well-balanced way in which a Porsche eats up the bumps and ripples and camber changes of twisty back roads at brisk speeds, the precise steering and overall responsiveness of the car. Probe the depths of a Porsche's real handling, however—which can only be done on a large skidpad or road with plenty of room for spins and no threat of traffic—and you'll fish up the other side of the coin. And it's a coin that any Porsche owner ought to cash in at least once before pushing the car into a corner too fast. The difficulty (and fascination) of driving a Porsche truly hard is in trying to utilize handling that frequently and rapidly varies between the two extremes of insistent understeer and sudden oversteer. And to do so with a single corrective mode—power. Go into a corner too fast in a Porsche and you can't brake, back off or trust to the saving grace of understeer, because as soon as you lift, the rear end comes around in a classic illustration of what's called trailing-throttle oversteer. Porsches are sim-

(Text continued on page 74, specifications overleaf)



## The Turbo Carrera: Where All That Power Comes From

BY PATRICK BEDARD

It's not magic—just superior engineering.

• The Turbo Carrera's supercharging system is exactly what you'd expect of Porsche: complex, sophisticated and extremely effective. At low speeds, the only difference a driver would notice between the normally-aspirated 2.7-liter 911 and the 3.0-liter Turbo is a very slight lag in the Turbo's throttle response. From a standing start, the Turbo feels pretty much like any other 911, although you are aware of the long first gear ratio. Only difference is that the Turbo's power seems to double in the 500-rpm span between 2700 and 3200. This is accompanied by a hissing roar from the tailpipe as the volume of exhaust gases increases in proportion to the power. The traditional Porsche exhaust note is gone: Each cylinder's pulse is purged by the turbine and comes out an acoustic applesauce.

Under full boost, the Turbo has the feel of a much larger engine. In contrast to the peaky 911S engines of days gone by, the Turbo's torque curve is dead level in the 4000/5000 rpm range and then drops gradually to the 6700 redline. There is a fair amount of turbo lag, however. When you move the throttle from its cruise position to wide-open, the engine is effectively naturally aspirated for a fraction of a second before the turbine can accelerate to its full-boost speed of

90,000 rpm. The lag is probably the result of the very long intake and exhaust passages inevitable with an opposed engine in a tightly packaged space. The exhaust gases are routed forward from each cylinder head through heat exchangers for the heater, then collected together and piped back along the left side of the engine through the waste gate and into the turbocharger at the left rear corner. The intake charge passes through an equally tortuous path. From an air cleaner on top of the engine it goes through the metering valve for the K-Jetronic fuel-injection system, then down to the left rear corner through the compressor, and finally back up on top of the engine, through the throttle valve and into the intake manifold.

The long distances don't really hurt anything once the boost is built up, but the transitions definitely suffer. Once you open the throttle, it takes a fair amount of time before the extra intake charge you've just admitted can burn, pass through all of the exhaust system and add its energy to the turbine wheel. And once the compressor starts to spin up, it still has a very long column of intake air to pressurize before the cylinders feel the effect. That's what makes turbo lag.

(Continued on page 75)



### PORSCHE 912E

Importer: Porsche-Audi Division  
Volkswagen of America, Inc.  
Englewood Cliffs, NJ 07632

Vehicle type: rear-engine, rear-wheel-drive, 2 passenger coupe

Price as tested: \$11,615.00

(Manufacturer's suggested retail price, including all options listed below, dealer preparation and delivery charges, does not include state and local taxes, license or freight charges)

Options on test car: base Porsche 912E, \$10,845; forged alloy wheels, \$495; AM/FM stereo radio, \$200; dealer preparation, \$75

#### ENGINE

Type: flat-4, air-cooled, aluminum block and heads, cast iron cylinder liners, 3 main bearings  
Bore x stroke ..... 3.70x2.80 in, 94.0 x 71.1 mm  
Displacement ..... 120 cu in, 1971 cc  
Compression ratio ..... 7.6 to one  
Carburetion ..... Bosch L-Jetronic fuel injection  
Valve gear ..... pushrod-operated overhead valves, solid lifters  
Power (SAE net) ..... 86 bhp @ 4900 rpm  
Torque (SAE net) ..... 93 lbs-ft @ 4000 rpm  
Specific power output ..... 0.72 bhp/cu in, 43.6 bhp/liter  
Max. recommended engine speed ..... 5600 rpm

#### DRIVE TRAIN

Transmission ..... 5-speed, all-synchro  
Final drive ratio ..... 4.42 to one  
Gear Ratio Mph/1000 rpm Max. test speed  
I 3.18 5.2 29 mph (5600 rpm)  
II 1.83 9.0 51 mph (5600 rpm)  
III 1.26 13.2 74 mph (5600 rpm)  
IV 0.96 17.3 97 mph (5600 rpm)  
V 0.72 23.0 111 mph (4850 rpm)

#### DIMENSIONS AND CAPACITIES

Wheelbase ..... 89.4 in  
Track, F/R ..... 53.5/52.4 in  
Length ..... 168.9 in  
Width ..... 65.4 in  
Height ..... 52.8 in  
Ground clearance ..... 5.5 in  
Curb weight ..... 2455 lbs  
Weight distribution, F/R ..... 40.7/59.3 %  
Battery capacity ..... 12 volts, 44 amp/hr  
Fuel capacity ..... 21.1 gal  
Oil capacity ..... 3.7 qts

#### SUSPENSION

F: ..... ind, MacPherson strut, torsion bars, anti-sway bar  
R: ..... ind, semi-trailing arm, torsion bars

#### STEERING

Type ..... rack and pinion  
Turns lock-to-lock ..... 3.11  
Turning circle curb-to-curb ..... 34.0 ft

#### BRAKES

F: ..... 11.1-in solid disc  
R: ..... 11.4-in solid disc

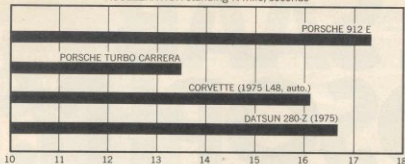
#### WHEELS AND TIRES

Wheel size ..... 5.5 x 14 in  
Wheel type ..... forged aluminum, 5-bolt  
Tire make and size ..... Uniroyal Rallye 240, 185HR-14  
Tire type ..... steel belted radial ply, tubelless  
Test inflation pressures, F/R ..... 29/34 psi

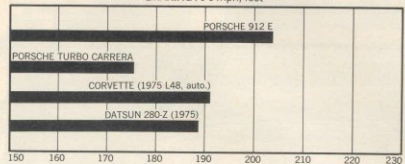
#### PERFORMANCE

Zero to	Seconds
30 mph	3.0
40 mph	4.6
50 mph	6.7
60 mph	9.7
70 mph	13.6
80 mph	20.2
Standing 1/4-mile	17.4 sec @ 76.4 mph
Top speed (observed)	111 mph
70-0 mph	20.4 sec (0.80 g)
Fuel economy, C/D mileage cycle	23.0 mpg, urban driving
	28.5 mpg, highway driving

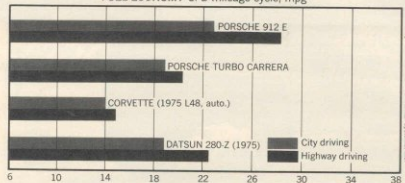
### ACCELERATION standing 1/4 mile, seconds



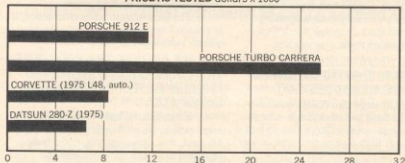
### BRAKING 70-0 mph, feet



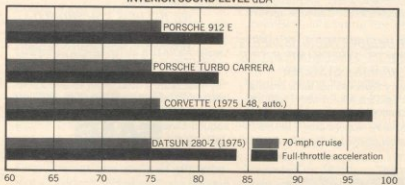
### FUEL ECONOMY C/D mileage cycle, mpg



### PRICE AS TESTED dollars x 1000



### INTERIOR SOUND LEVEL dBA



### PORSCHE TURBO CARRERA

Importer: Porsche-Audi Division  
Volkswagen of America, Inc.  
Englewood Cliffs, NJ 07632

Vehicle type: rear-engine, rear-wheel-drive, 2 passenger coupe

Price as tested: \$25,975.00

(Manufacturer's suggested retail price, including all options listed below, dealer preparation and delivery charges, does not include state and local taxes, license or freight charges)

Options on test car: base Porsche Turbo Carrera, \$25,850; dealer preparation, \$125

#### ENGINE

Type: flat-6 air-cooled, light alloy block and heads, 4 main bearings  
Bore x stroke ..... 3.74 x 2.77 in, 95.0 x 70.4 mm  
Displacement ..... 182.6 cu in, 2993cc  
Compression ratio ..... 6.5 to one  
Carburetion ..... Bosch CIS mechanical fuel injection  
Valve gear ..... chain-driven single overhead cam  
Power (SAE net) ..... 234 bhp @ 5500 rpm  
Torque (SAE net) ..... 246 lb-ft @ 4500 rpm  
Specific power output ..... 1.28 bhp/cu in, 78.2 bhp/liter  
Max. recommended engine speed ..... 6700 rpm

#### DRIVE TRAIN

Transmission ..... 4-speed, all-synchro  
Final drive ratio ..... 4.22 to one  
Gear Ratio Mph/1000 rpm Max. test speed  
I 2.25 7.6 51 mph (6700 rpm)<sup>1</sup>  
II 1.30 13.2 88 mph (6700 rpm)  
III 0.89 19.3 129 mph (6700 rpm)  
IV 0.66 26.0 156 mph (6000 rpm)

#### DIMENSIONS AND CAPACITIES

Wheelbase ..... 89.4 in  
Track, F/R ..... 56.4/59.1 in  
Length ..... 168.9 in  
Width ..... 69.9 in  
Height ..... 5.9 in  
Ground clearance ..... 52.0 in  
Curb weight ..... 2825 lbs  
Weight distribution, F/R ..... 36.5/63.5 %  
Battery capacity ..... 12 volts, 66 amp-hr  
Fuel capacity ..... 21.1 gal  
Oil capacity ..... 11.6 qts

#### SUSPENSION

F ..... ind. MacPherson strut, torsion bars, anti-sway bar  
R ..... ind. semi-trailing arm, torsion bars, anti-sway bar

#### STEERING

Type ..... rack and pinion  
Turns lock-to-lock ..... 3.1  
Turning circle curb-to-curb ..... 35.1 ft

#### BRAKES

F ..... 11.2-in. dia vented disc  
R ..... 11.4-in. dia vented disc

#### WHEELS AND TIRES

Wheel size ..... F: 7.0 x 15-in; R: 8.0 x 15-in  
Wheel type ..... forged aluminum alloy, 5-bolt  
Tire make and size ..... Pirelli Cinturato CN36, F: 185/70 VR-15  
R: 215/60 VR-15  
Tire type ..... steel belted radial, tube type  
Test inflation pressures, F/R ..... 28/33 psi

#### PERFORMANCE

Zero to	Seconds
30 mph	1.9
40 mph	2.7
50 mph	3.7
60 mph	4.9
70 mph	6.3
80 mph	7.9
90 mph	10.2
100 mph	12.9
Standing 1/4-mile	13.5 sec @ 102.6 mph
Top speed (observed)	156 mph
70-0 mph	17.6 ft (0.93 G)
Fuel economy, C/D mileage cycle	19.0 mpg, urban driving 20.5 mpg, highway driving

(Continued from page 45)

ply more stable under power than any other way.

On the track, the Turbo reveals itself as a rocket to be launched with extreme respect. The exhilaration of acceleration when the blower comes in is dangerously hypnotic, and there are corners of the car's performance envelope that are best left unexplored by any but the professionally skilled. Yet a race track is where this car is happiest, for it has such tremendous reserves of performance that nowhere else in this speed-limited land of ours will they ever be tapped.

The little four-cylinder Porsche 912E, on the other hand, is your prototypical road car. Leaping into and driving the 86-horsepower 912 after thundering around in the Turbo Carrera is not nearly so disappointing an experience as one might imagine. The 912 is comfortable where the Carrera is harsh, rational where the Carrera is excessive.

The 912E is the back-by-popular-demand reappearance of an honest little car that was introduced in 1966 and discontinued four years later: a 911-series body, chassis and interior mated to a docile 1.6-liter VW engine that could trace its own lineage all the way back to the mid-1950s. When the VolksPorsche 914 came along in 1970 with the same engine, the marketing men assumed that it would attract the attention of everybody who might otherwise have bought a 912. They missed the salient fact that the 914 is a two-seater of the starkest sort, and that the "full" Porsche accommodations of the 912 was one of its most attractive features. (Another reason for the early discontinuance of the 912 was that the car needed more power, and the old Porsche principle of overcarburetion to achieve that end was spikied by the onset of emissions regulations in the late 1960s. The 914 eventually got two liters and fuel injection, and that's what the 912E has today.)

To say the 912E is "satisfactory" is not praise as faint as it might at first sound. The little VW-engined car is satisfactory in so many ways that it all adds up to... well, certainly not a bargain but at least a grand alternative to a number of other cars that offer certain qualities at the expense of others. The 912E gets the job done: It accelerates briskly, goes fast, brakes well, eats gas as sparingly as any econobox, offers excellent quality and a comfortable interior, and above all gives you a satisfying feeling of being so

sensible. It's the kind of car that produces warm fantasies of an ordered world full of 912s, everybody decreed to drive these chugging little gumdrops, bustling about with great dispatch and economy and... rationality.

Remember, though, there's a big difference between being excited and being satisfied, and there's little exciting about the 912E. After all, half the excitement of a full-size Porsche is the sheer power. (If you still want that kick but can't afford the Turbo—of which Porsche only plans to import 400 in any case—there's still the standard six-cylinder 911S for 1976, though the Turbo has superseded the naturally aspirated Carrera model.)

On the skidpad, the 912 is a lot less comfortable to drive than the Turbo. It has considerably less roll stiffness, so the inside front wheel gets well off the ground as the body leans. (Unfortunately, Porsches don't have a dead pedal for a driver to brace against during hard cornering and braking—a surprising omission in so driver-oriented a car—and a few laps on the skidpad in either the Turbo or the 912E leave you feeling slightly clubfooted from trying to pretzel your left foot firmly onto the sloping sidewall or around the clutch pedal and onto the floorboard.)

Braking is one of the car's most mannerly maneuvers. The 912E stops straight and almost level—there's hardly any nose dip at all—and the front/rear proportioning is perfect. This is not so much an engineering feat as an inevitable result of the car's rearward weight bias, which tends to distribute the load evenly on all four wheels with forward weight transfer under braking.

In a world with no lack of \$40,000 and \$60,000 exoticals of the most extreme sort, the Turbo Carrera shows what practical design, constant refinement and assiduous development can accomplish. It has only six cylinders, the basic design is a good 12 years old, the headlights don't retract and your neighbors will never know it, but the Turbo Carrera is truly today's boss car. Drive it and there isn't *anybody* who's going to get there before you in a store-bought automobile.

And at the other end of the Porsche performance spectrum, there's the 912E—a car so sensible yet enjoyable that you begin to wonder whether Turbo Carreras are necessary at all. ●

(Continued from page 46)

Porsche engineers have taken some elaborate steps to compensate, however. First, they've chosen a turbocharger with a tight exhaust scroll (the tighter the scroll, the higher the turbine speed with any given exhaust flow). This allows compressor speed to build rapidly. Then to prevent overboosting, they've provided a waste gate to bypass exhaust around the turbine when the desired intake manifold pressure—in this case 11.4 psi—is reached. So the system reaches full boost by about 3000 rpm, which results in the commendably flat torque curve.

Porsche engineers have also made an elaborate attempt to maintain high compressor speed in those situations where the driver momentarily lifts off the throttle and then gets back on the power again. To do this, another bypass valve has been incorporated in the system between the compressor outlet and the throttle valve. When the throttle is closed, the bypass valve opens to recirculate compressor outlet pressure back around to the compressor inlet. This allows the compressor turbine to operate in what approaches a no-load situation; therefore turbine speed decays slowly. A conventional system would have the compressor coast down against the full restriction of the closed throttle, and speed would be rapidly lost.

All of this elaborate machinery operates automatically, and even the worst possibilities have been anticipated. Waste gates are notoriously unreliable; they are inclined to stick closed and overboost the engine. The Turbo Carrera has a pressure switch in the intake manifold that shuts off the fuel if the boost exceeds 16 psi, so the engine is not likely to blow itself up. And there is an ignition interrupter set for the redline to keep the driver from getting carried away. About the only way to sabotage the works is a tank of low-octane gasoline, which could result in detonation and piston failure. Porsche specifies a minimum of 96 octane.

Naturally, any powerplant this complicated will have its service problems. The car we tested had a bad case of the low-speed jerks, which has so far defied diagnosis. It's apparently not typical, because we had previously driven another car that behaved perfectly.

And believe us, when a Turbo Carrera is right, it's really right.