

**1st TESTS** MAZDA RX-7 SE: *High Output Hummer*  
AUDI 4000 QUATTRO: *Affordable Supercar*

# MOTOR TREND

300ZX vs. 280ZX:  
*How Much Better?*

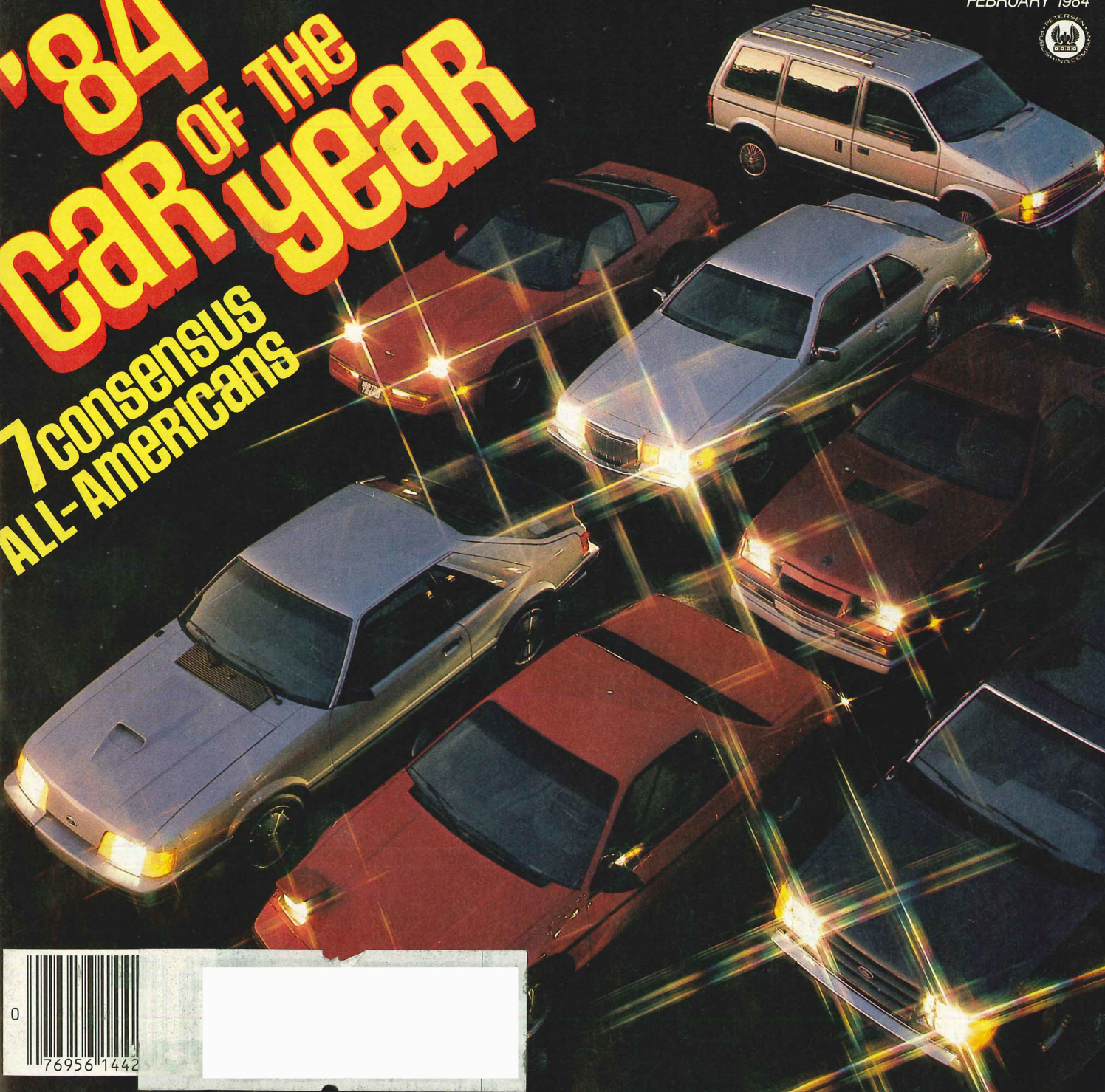
LOTUS ESPRIT TURBO:  
*Can This Be Love?*

FEBRUARY 1984



# '84 CAR OF THE YEAR

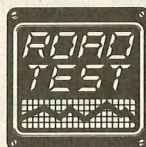
7 consensus  
ALL-AMERICANS



More power, more torque, more fun to drive



# Mazda RX-7 GSL-SE



Toyo Kogyo, better known as Mazda in this country, doesn't have a whole bunch of cards in its corporate hand. It's a small company, selling around 150,000 units a year, duking it out with giants, both domestic and imports. As a result, it doesn't have all that big a margin for error. One mistake and it could end up as dead here as Fiat. That nearly happened in the late '60s, when the rotary was branded as a gas hog with a taste for self-destruction. Normally, this small and vulnerable circumstance would lead a company to be as conservative as a Swiss banker and deal in products designed to appeal to the lowest common denominator or worse. Other Japanese car makers, we won't mention names, have fallen victim to this kind of Pabulum-think and their products reflect it in a total lack of personality. Fortunately for us car enthusiasts, Mazda can't be accused of that sin.

Take any of Mazda's three offerings and you'll find an unmistakable, clearly defined entity in residence. The GLC, while showing signs of age, is still fun to drive, efficiently packaged, and still available for un-

by Tony Assenza

PHOTOGRAPHY BY MARC SPROULE  
AND PAUL MARTINEZ

der \$5000. The 626 was our 1983 Import Car of the Year. Enough said. And then there's the RX-7, which, since its introduction in '78, has been one of the most affordable sports cars—we're talking *real* sports cars here—on the market, a car that has more than its fair share of fun to drive qualities and an engaging, amiable personality. And for '84, the RX-7's personality is further enhanced by the long-awaited addition, as optional equipment, of the firm's 13B rotary engine.

The last time we tested an RX-7 was in the June '83 issue when we put it up against the Supra, the Mitsubishi Starion and the turbocharged version of the 280ZX. In that test we said "... its modest horsepower and skimpy low-end torque limited its abilities." In the handling tests, however, the car remained "the most controlled and composed." We're happy to report that the horsepower situation has improved immensely and the handling is not only as good as the '83 GSL but better. In

fact, on the skidpad, the GSL-SE, as the car with the 13B engine is designated, came in with the third highest lateral acceleration number we've ever recorded for a street car. Grable got it around the skidpad at a blistering .87 g, behind only a Camaro L-69 at .88 and the neck-strainer Corvette at .89 g. That's pretty grippy company, outdoing cars like the Lotus Esprit Turbo, Ferrari 308GTSi, and Porsche 928S. Particularly on tires (Pirelli P6s) that don't deliver quite as much stick as the Goodyear Eagle GTs, NCTs, and Pirelli P7s common to those supercars.

In straight-line acceleration, the 13B powers the car to 60 mph in 7.96 sec and covers the quarter mile in 16.06 sec at 85.1 mph. The results are revealing when compared to the 12A RX-7, which took 9.50 sec to 60 mph. These are substantial gains that would have beat the Starion in all categories except straight-line acceleration in the Samurai shootout mentioned earlier.

The 13B motor responsible for the added adrenaline is a product of the continuing R&D effort that Kenichi Yamamoto, Mister Rotary and senior managing director of TKK, and his staff have been conducting on the rotary engine. In a very real sense,

the 13B is an interim motor, bridging the gap between the present 12A and the yet-to-be-seen mechanically supercharged version that will make its appearance in the all-new RX-7 sometime in the next three years.

Rated at 135 hp at 6000 rpm and 133 lb-ft of torque at 2750 rpm, the 13B displaces 1308 cc. Comparing it to the 12A, which displaces 1146 cc and produces 100 hp at 6000 and 105 lb-ft at 4000, it's clear where Yamamoto and crew concentrated their efforts. Long known for being a peaky motor, the 12A never had much bottom-end grunt, a quality Mazda frankly acknowledged and something many felt to be simply the nature of the beast. Mazda's method for putting a bulge in the torque curve, and getting it low on the rev band, was upping the displacement, adding a third intake port, swapping carburetors for fuel injection, and tuning the induction system.

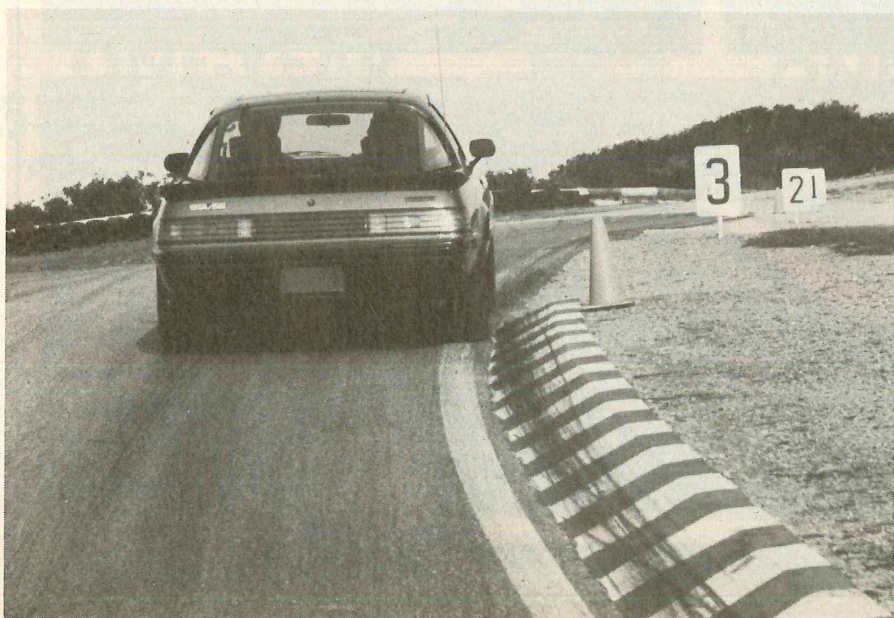
Although all these changes contributed to the output increase, the two most important seem to be the addition of the third port and the induction tuning. The six-port (two rotors, three ports each) induction is called 6PI. Obvious enough. The intake tuning is called Dynamic Effect Intake, or DEI in Mazda-speak. The added port is called the secondary power port and only comes into operation at high engine revs. At low revs this third port is closed. But as speed escalates and exhaust gas pressure increases, a rotating valve—operated by increased exhaust gas pressure—opens, allowing the engine to aspirate more air. It only works at the high end of the rev band, when the engine really needs the extra oxygen. If it worked all the time, gas velocities would remain low at low engine speeds, compounding the lack of bottom-end torque.

The operation of the DEI is a bit more

complex. The heart of the DEI system is a resonance chamber in the intake tract—Mazda calls it a surge tank—situated downstream from the air cleaner and air-flow meter at the beginning of the intake manifold proper. Inside the surge tank is a split plenum, one part fed air by the primary throttle valve and the other by the pair of secondary throttle valves. The two plenum chambers in turn feed air down the long intake runners to the engine's primary and secondary ports. So far, this is fairly straightforward. But it gets more intriguing in the surge tank once the rotors start whirring.

A walk through an intake and exhaust cycle reveals the system's relative complexity—and its solid logic. As the rotor passes by the intake port, a column of air is drawn into the chamber. Once the rotor passes through its arc and blocks the port, the moving column of air is brought to an abrupt halt. This creates high pressure, which bounces the air back up the intake runner, into the surge tank, and down the other intake runner, which then feeds the other rotor. Due to the timing of the two rotors, this high-pressure wave (traveling at the speed of sound) arrives at the other rotor just prior to its intake port being closed. The net effect is a ram charge to the rotor, which creates a more complete filling of the combustion chamber. This is supercharging of a sort using only the inertia inherent in the columns of moving air generated by any engine. This part of the DEI system is called Intake Inertia. But there's still another benefit of the system that Mazda calls Residual Gas Effect (hold the gastrointestinal jokes, please).

The Residual Gas Effect part of the cycle begins as exhaust gases are expelled through the exhaust port. According to Yamamoto-san and crew, not all the ex-



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## If you want one, better sign up quick; only 7500 RX-7s will be 13B-powered

haust gases are blown out through the exhaust port. Some, the residual gas, is still expanding and being blown up through one of the intake ports. Again by virtue of rotor timing, the inertia of this residual exhaust gas is used to send a high-pressure wave up the intake runner, into the surge tank, and back down the other rotor's intake runner just as the receiving rotor is about to close off its intake port. This, too, promotes more complete chamber filling and increases the engine's overall volumetric efficiency.

As engine speed increases, the time the intake ports remain open naturally gets shorter and shorter, to where the swapping of these high-pressure columns of air no longer becomes effective. At this point, when the engine literally doesn't have time to catch its breath, the secondary power port comes into play, activated by the higher exhaust pressures created by high engine speed.

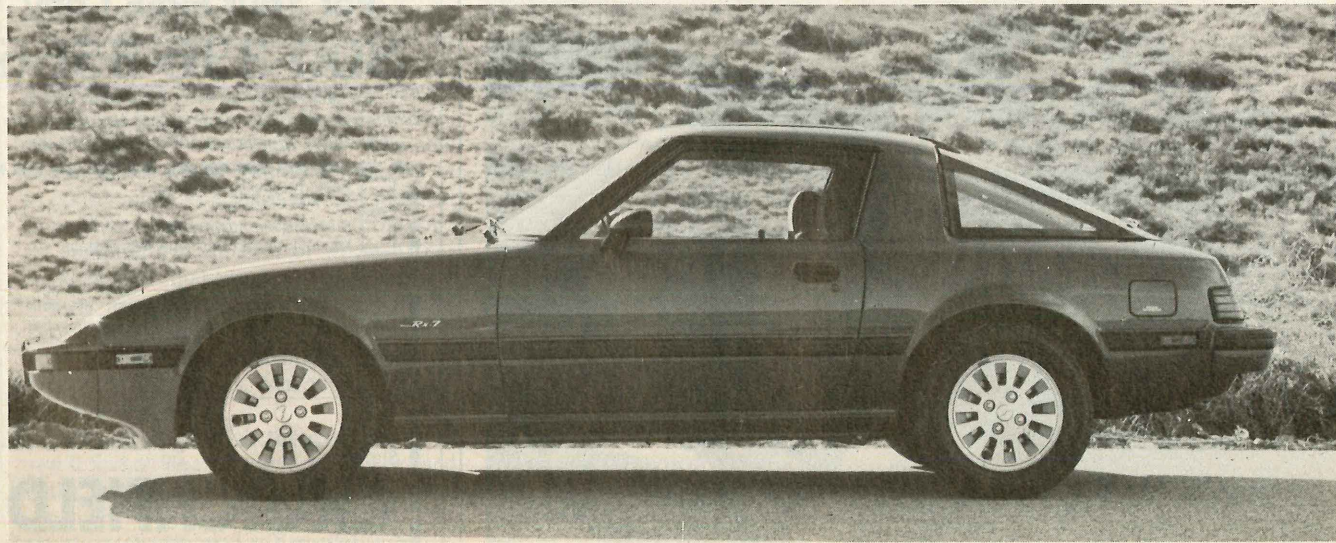
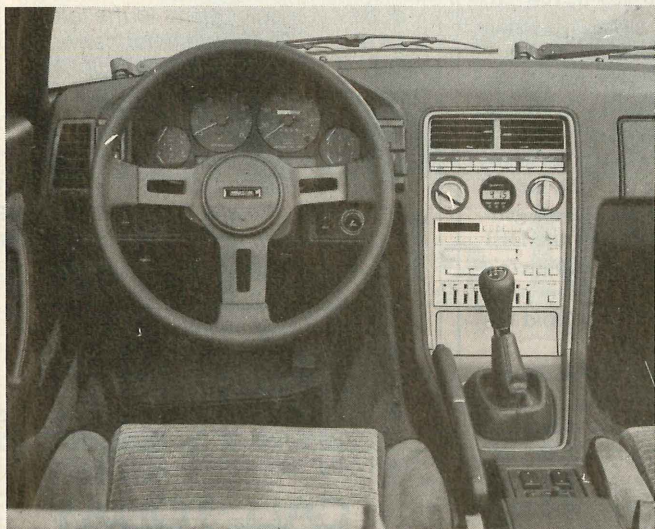
It's a pretty tidy arrangement, elegant in

its simplicity, and requires no moving parts to speak of. The results in our performance numbers bear proof of DEI's effectiveness.

Besides the major improvement in horsepower, the GSL-SE gets better stoppers in the form of bigger discs front and rear. The disc diameters are now 9.84 in. at the front and 10.1 in. at the rear versus the 8.94 and 9.29 in., respectively, of the previous GSL model. The master cylinder has also been enlarged from 13/14 in. to 7/8 in. This change, coupled with the standard Pirelli P6 tires, improves 60-0 braking performance from 142 ft (our most recent test, June '83) to 135 ft, again putting it within shouting distance of the Vette, Porsche 928S, and the other high-zoot big-buck sports cars. As good as that number appears on paper, however, not all is wonderful in the braking department. At the very limit of the performance envelope, and here we're talking situations like the top of the corkscrew at Laguna when you've come in a touch too hot and hit the binders

for all you're worth, the rear axle begins to hop up and down at around 3 cycles per sec. Welcome to the realities of a live rear axle that could use more positive location. That's when you start wishing for those 6-link setups—or a really good IRS.

The other major item of improvement is the variable-assist power steering that's offered as a \$300 option. At speed, it doesn't seem to add or detract anything from the RX-7's traditionally excellent steering feel or response. It just makes parking lot and driveway maneuvers less of a chore. Speaking of options, other than the power steering and leather seats, we have nothing further to say. Everything from sunroof, AM/FM/cassette stereo, A/C, 8-way adjustable seats, power remote rearview mirrors, etc. comes as standard equipment for the \$15,095 pricetag. That's roughly \$2000 above the price of the comparably equipped GSL. Given the performance increase and how much closer the car now comes to going head to head with pricier

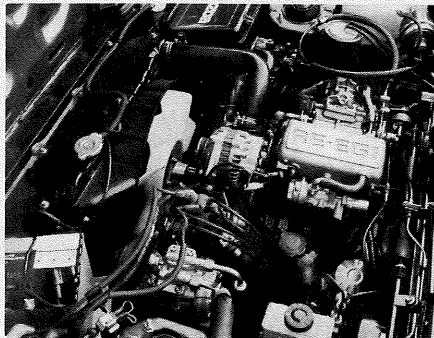


## Mazda RX-7 GSL-SE

competition, this latest version of the RX-7 is still one of the best sports car bargains going.

Visually the GSL-SE differs very little from the other RX-7s sharing the showroom floor. The only clues are the GSL-SE designation at the rear, brake cooling slits under the nose, alloy wheels, and the Pirelli P6s, unique to the SE. Some might feel that the 13B and the increased performance deserve more visual flash. But what does that matter, really? Unless you're Barbra Streisand, what you have should only matter to you. Right? If you want one, you'd better sign up quick because only 15% of Mazda's total RX-7 allotment are going to be SE versions. That means about 7500 cars. Will demand outstrip supply? Did Attila the Hun display anti-social behavior? Will some dealers try to extort a premium from eager enthusiasts? Does Hugh Hefner have it easy getting dates? It's all part of life's rich pageant. Yamamoto giveth and the local dealer taketh away.

Be that as it may, dealer greed and your cashflow notwithstanding, the RX-7 is and always has been a good buy. Unlike other makers of sports cars, Mazda has never compromised on the purpose of a sports car, never diluted performance or content, and, to its everlasting credit, never tried to turn it into a luxu-GT, personal luxury



2+2, or any other permutation designed to seduce a sometimes gullible market for the sake of expanded sales. The RX-7 remains a true sports car—agile, elemental, willing to please. It's still eager for the next apex, ready to hang its tail out for your amusement, yet cooperative enough to let you haul it back in plenty of time. The creature comforts and the sophistication common to all the Japanese GTs are there, to be sure. The good stereo, air conditioning, power windows are all as they should be for any modern car. Yet the fundamental elements that separate the real sports cars from pretenders, intangibles like the feel of the wheel in your hands and the exhaust note as you slice through a midnight canyon are as much a part of this car as the high lateral g's and quarter-mile time. Driving one seriously could be risky business. You have to be good. You could get emotionally involved.

(M)

## ROAD TEST DATA



## Mazda RX-7 GSL-SE

### ✓ SPECIFICATIONS

#### GENERAL

|                           |   |
|---------------------------|---|
| Vehicle mfr.              | Toyo Kogyo Co. Ltd.,<br>Hiroshima, Japan                                |
| Vehicle importer          | Mazda Motors of America<br>(Central), Inc., Rancho<br>Dominguez, Calif. |
| Body type                 | 2-pass., 2-door hatchback<br>coupe                                      |
| Drive system              | Front engine, rear drive  |
| Base price                | \$15,095  |
| Major options on test car | Power steering  |
| Price as tested           | \$15,395  |

#### ENGINE

|                       |  |
|-----------------------|--|
| Type                  | Wankel rotary<br>combustion, 2 rotors,<br>liquid cooled, aluminum<br>rotor housings, cast iron<br>end plates |
| Displacement          | 1308 cc (79.8 cu in.)  |
| Compression ratio     | 9.4:1  |
| Induction system      | EFI  |
| Crankshaft            | Forged, 2 main bearings  |
| Max. engine speed     | 7000 rpm   |
| Max. power (SAE net)  | 135 hp @ 6000 rpm  |
| Max. torque (SAE net) | 133 lb-ft @ 2750 rpm   |
| Emission control      | Catalytic converter  |
| Recommended fuel      | 87 RON unleaded  |

#### DRIVETRAIN

|                           |            |
|---------------------------|------------|
| Transmission              | 5-sp. man. |
| Transmission ratios (1st) | 3.62:1     |
| (2nd)                     | 2.18:1     |
| (3rd)                     | 1.42:1     |
| (4th)                     | 1.00:1     |
| (5th)                     | 0.75:1     |
| Axle ratio                | 4.07:1     |
| Final drive ratio         | 3.05:1     |

#### CAPACITIES

|                |                      |
|----------------|----------------------|
| Crankcase      | 5.7 L (6.1 qt)       |
| Cooling system | 8.9 L (9.5 qt)       |
| Fuel tank      | 62.8 L (16.6 gal)    |
| Luggage        | 662.5 L (23.4 cu ft) |

#### SUSPENSION

|       |   |
|-------|---|
| Front | MacPherson struts, coil<br>springs, anti-roll bar |
|-------|---|

|      |  |
|------|--|
| Rear | 4-link live axle and Watts<br>link, coil springs,<br>telescopic shocks,<br>anti-roll bar |
|------|--|

#### STEERING

|                     |                                     |
|---------------------|-------------------------------------|
| Type                | Recirculating ball, power<br>assist |
| Ratio               | 15.8:1                              |
| Turns, lock to lock | 3.4                                 |

#### BRAKES

|       |   |
|-------|---|
| Front | 8.9-in. internally<br>ventilated discs, power<br>assist |
| Rear  | 10.1-in. internally<br>ventilated discs                 |

#### WHEELS AND TIRES

|                   |                     |
|-------------------|---------------------|
| Wheel size        | 14 x 5.5 in.        |
| Wheel type        | Cast aluminum       |
| Tire size         | 205/60VR14          |
| Tire mfr. & model | Pirelli P6          |
| Tire construction | Steel-belted radial |

#### DIMENSIONS

|                                 |                                 |
|---------------------------------|---------------------------------|
| Curb weight                     | 1139 kg (2512 lb)               |
| Weight distribution<br>(%), f/r | 51/49                           |
| Wheelbase                       | 2496 mm (95.3 in.)              |
| Overall length                  | 4320 mm (170.1 in.)             |
| Overall width                   | 1668 mm (65.7 in.)              |
| Overall height                  | 1259 mm (49.6 in.)              |
| Track, f/r                      | 1419/1399 mm<br>(55.9/55.1 in.) |
| Min. ground clearance           | 144 mm (5.7 in.)                |

#### CALCULATED DATA

|                       |            |
|-----------------------|------------|
| Power-to-weight ratio | 18.8 lb/hp |
| Top speed             | 135 mph    |
| Drag coefficient      | 0.34       |

#### SKIDPAD

|                      |        |
|----------------------|--------|
| Lateral acceleration | 0.87 g |
|----------------------|--------|

#### FUEL ECONOMY (mpg)

|                       |       |
|-----------------------|-------|
| EPA rating, city/hwy. | 18/29 |
|-----------------------|-------|

### ✓ TEST RESULTS

