

# The American Motors Pacer

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# 1 History

In the 1970s, American Motors was a struggling company. Its management decided to take a risk and try something all-new. In Project Amigo, The First Wide Small Car was conceived with no legacy, featuring a body style not seen before, using the latest technology, and exceeding upcoming safety regulations. Yet, it was made for a future that did not happen, commercially successful for a short time only – not long enough to save AMC.

AMC experimented with various designs, as concept drawings show, among them mid-engine concepts, front-wheel drive, and more usual body widths. However, at an early stage the wide body with standard drive train was chosen, providing a much more spacious and comfortable interior than those of the competition while not scaring customers away with the unfamiliar front wheel drive. But comfort was not the only reason: New safety regulations were planned, which demanded strong protection against front, rear, and side impacts, as well as roll-over security. The Pacer was to meet all these requirements. For active safety, it got rack & pinion steering, independent front suspension (double wishbone), and a huge glass area for good visibility in all directions. For a quiet ride, the engine was to be mounted in a subframe, isolated from the body with rubber bushings, and the Pacer would get the smoothest combustion engine ever, a Wankel rotary engine.

That engine was to be bought from General Motors initially. On February 7, 1973, AMC licensed the building of rotary engines with 80-200 hp from Curtiss-Wright (themselves licensees of NSU-Wankel, Germany), for \$1.5 million. They had planned to replace the GM engine by their own design some time later. In 1973, AMC executives still believed "that the rotary engine will play an important role as a power plant for cars and trucks of the future" (Roy Chapin). Suddenly in 1974 GM dropped the project. Rotary engines weren't known to be extremely fuel-efficient by then, and the oil crisis made efficiency an important feature. Due to high combustion chamber temperatures, they emitted a lot of NOx, too much for the new anti-pollution laws, and GM neither managed to solve the problem technically nor politically by getting an exemption from the law for a period of time.

NSU's RO80, an advanced if not futuristic concept by a rather small independent, was a disaster. Failing rotor seals made the engines break frequently, and many were destroyed because the drivers were not used to the quietness even at high RPMs and revved them to death. These problems ruined the image of the car, then the company. Citroen built a few prototypes, at first on AMI basis, followed by the GS Birotor, a few dozens of which were sold officially. In the end the plans to present the new Citroen CX with rotary engine were abandoned, and the French helped themselves by updating existing piston engines. The only car manufacturer still risking the Wankel engine was Mazda, and their RX-7 was no best-seller, either. Mazda did get their rotaries clean and durable, though, leaving the rather high fuel consumption as only drawback.

AMC had quite a problem, now that the new compact car was ready, and they were not able to start all over again. So they made some changes in the body design to shoehorn the tried-and-true inline 6 that powered all AMC vehicles from Gremlin to Jeep Wagoneer into the Pacer's engine compartment, a tight fit. For some novelty, it got electronic ignition.

Low center of gravity and wide stance ensure excellent handling, only harmed by the heavy engine



Figure 1: Pacer X, 1975

that spoils the weight balance and makes the Pacer much more stolid than it would have been with the light Wankel. The body style was revolutionary. Richard Teague, Vice President of Styling, gave it a down-sloping hood, tunneled headlights, and huge glass areas. The dashboard was put as far to the front as possible ("cab forward") for a maximum of passenger space. The rear side windows curve around the back where a big rear door allows good trunk accessibility. Doors like portals provide easy entry. For benefit of back seat passengers, the passenger door is 10 cm longer than the driver's door.

The Pacer came with front bench seat, 3.8l six cylinder engine and three-speed column shift as standard. The list of options was loong (see specifications). The D/L packages added convenience features. An optional performance package, consisting of stiffer springs, front anti-sway bar, floor shift and rally package (tacho and gauges for oil pressure, water temperature and battery charge) was offered. The X package gave the car a sporty look and feel. The Pacer was a vertical take-off. In the first year of production 145,528 were sold, 72,158 were X-models.

Customers did not like the Pacer's lack of power. The sixes were optimized for low emissions and good mileage. The tiny carburetor didn't allow enough flow. The heavy weight of the car, caused by engine, drivetrain, huge glass areas, and built-in safety, added to the problem. Net weight of a 1975 Pacer X was no less than 1500 kilograms. A Mercedes W123 of 1976 weighed more than 100 kg less, but was a big, "heavy" four-door sedan with large trunk.

From 1976 on the 4.2 was offered with a bigger carb which pushed the power up to 120 hp along with whopping 300 Nm of torque at 1800 rpm. Fuel consumption was too high on all engines when compared to the 4-cylinder competition from Germany and Japan and reached from 12 to 17l/100km (20-14 mpg). That wasn't caused by the weight only, but also by loads of devices intended to reduce emissions.

Second year's sales were still good, but not as good as the year before: 117,244 Pacers were sold. 1977 a new line was added: the Pacer Wagon. It looked more conventional, a fact that should help it find customers who disliked the mars explorer look of the Coupe. 1975's numbers couldn't be



Figure 2: Pacer D/L, 1976

reached anyway, only 20,265 Coupes and 37,999 Wagons were delivered, and that was really bad as the Pacer would have needed to sell near the first year levels for five years just for AMC to break even on the initial tooling costs.

Lack of power was suspected to be the culprit. Solution: The 5.0 V8 was transplanted to the Pacer, which made a different hood necessary. While being at it, the Pacer got the famous Mercedes look that was so hip at the time. Whether that helped improve the Pacer's looks is a matter of taste. It didn't help improve sales. 1978 numbers: 7,411 Coupes, 13,820 Wagons. 2,514 Pacers were ordered with V8 engine.

No changes were made for 1979, only the Limited-package was added. It consisted of leather interior, power windows, power locks, cruise control and "various buttons that pushed other buttons" as someone put it. And of a hood ornament to make the fake Mercedes look complete. 2,863 Coupes, 7,352 Wagons, 1,014 V8s.



Figure 3: Pacer dashboard

The Pacers that got delivered in 1980 had already been produced the year before. 405 Coupes, and 1,341 Wagons. A bitter end of a great concept. The Pacer was conceived for a future that did not come. The new safety regulations were much less drastic than planned, thanks to heavy lobbying by the automotive industry. Too late for the Pacer, which did not get much lighter even with the roll-bar removed from the design. The competition weighed a good deal less, making them more sporty and fuel-efficient, and safety was not a strong sales criterion yet, very much unlike today. The heavy engines used in the Pacer not only impaired its handling, but they put more load on the front suspension than intended, which caused the rack & pinion steering to fail frequently in the Pacers built in 1975. This taint of undependability, paired with the inefficient engines, made the customers, who at first welcomed the concept, turn away from the Pacer. A torquey 4 cylinder engine or even a diesel might have helped, but neither was in sight, and AMC had no means to do

anything against the failure of Project Amigo at this point.

Until a few years ago, the Pacer stuck in the Automotive Freak Show, scoring high in "Worst Car Ever" lists and books with titles like "Lemon!" or "Automotive Atrocities – the Cars We Love to Hate", often accompanied by the AMC Gremlin, so much that one gets almost disappointed when it misses from such a compilation. However, times are a-changing. Today, cars from the 1970s are dated technology, and many are gone for good. Lately, the Pacer is seen differently: as a design icon of its time, and as what it could have been.

It's not only Wayne and Garth, it's MTV where Pacers shine, in videos of the Bare Naked Ladies, flash in the pan Jimmy Ray, or Eminem. Pacers look stunningly good these days. A Pacer at a car show always draws a crowd, and not many cars have this talent.



Figure 4: Pacer Wagon, 1978

## 2 Specifications

### 2.1 Engines and Transmission

Engines				
<i>Construction</i>	inline ohv six cylinder engine, hydraulic lifters, 7 main bearings, electronic ignition			V8 ohv engine
<i>Displacement</i>	3,81	4,21	4,21	5,01
<i>Carburetors</i>	Carter YF 1V		Carter 2BBD	
<i>Compression Ratio</i>	8,0:1			8,4:1
<i>Power (hpRPM)</i>	90 - 4300	95 - 4300	120 - 4300	125 - 3600
<i>Torque (Nm-RPM)</i>		250 - 1800	288 - 1800	300 - 2400
<i>mileage</i>	9-18l/100 km (14-20 MPG), depending on options and driving style			

Randall AMC in Mesa, AZ produced a Monster-Pacer in limited numbers which had no rear side windows and the AMC 401 engine.

**Transmission** Alternatives:

- 3-speed manual transmission, column shift, optional with overdrive
- optional 3-speed floor shift (no OD)
- optional 3-speed automatic transmission with torque converter (Chrysler 904)
- 1977-80: optional 4-speed manual trans

**Differential** limited slip differential as an option

**Front Suspension** independent suspension, coil spring/shock combination, subframe isolated with rubber bushings, anti-sway bar (optional), rack & pinion steering (optional powered), drum brakes, optional vented discs and powered.

**Rear Axle** solid axle, semi-elliptic leaf springs, telescopic shock absorbers, drum brakes

## 2.2 Measurements and Weights (Coupe)

**Wheel Base** 254 cm

**Length** 436 cm

**Width** 196 cm

**Height** 124 cm

**Net Weight** 1400-1500 kg

**Load** 400 kg

**Trunk Volume** 840 l (rear bench down)

**Tank Volume** 82 l

**Cornering Circle** 11,3 m

## 2.3 Options

**Options** Power steering. Manual or power front disc brakes. AM, AM/FM radio, entertainment system with 8-track tape player. Hidden compartment. Bucket seats. Individual reclining seats (D/L only). Air conditioning system. Tinted glass, all windows. Rear window defogger. Rear window washer and wiper. Roof rack. Cruise command speed control (automatic transmission only). Adjust-O-Tilt steering column (auto/column shift only). Visibility group. Deluxe electric windshield wipers with intermittent action. Light group. Door vent windows. Sports steering wheel. Wheel discs. Styled road wheels (X or D/L). Aluminium styled wheels (X or D/L). Slot-styled wheels (X only). Extra quiet insulation. Protection group. Bumper

nerfing strips. Handling package: heavy-duty springs, shocks and front sway bar. Front sway bar. Vinyl roof. Two-tone paint. White-wall tires.

**Packages** X package, D/L package, Decor package, Performance package, Limited package

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