

INTRODUCTION

As the entry-level Acura, the Integra embodies all the virtues that have established Acura as one of the leading luxury import brands in the U.S. market. It features superb road manners and excellent handling, an advanced powertrain, an aerodynamic exterior shape and a comfortable, ergonomic cockpit designed to make driving enjoyable and safe. The Integra, like all Acura automobiles, is dedicated to the proposition that driving is its own reward.

CONCEPTS AND GOALS

The Integra Sports Coupe and Sports Sedan were designed to achieve:

- Spirited engine performance, with excellent acceleration, sporty, free-revving response and top-level smoothness and flexibility.
- Crisp, precise handling with excellent driver feedback and steering response.
- Distinctive, aerodynamic styling with high efficiency and low wind noise.
- A rigid structure for accurate handling response, long-term durability, excellent corrosion protection and optimum occupant safety.
- An intimate, highly ergonomic driving environment.

OVERVIEW

The third-generation Acura Integra (introduced in 1994) features a number of technological innovations that enhance performance and handling and provide high levels of safety, durability, efficiency, comfort and ride quality. The Integra is available as a Sports Coupe or Sports Sedan. For 2000 the Sports Coupe and Sports Sedan come in three trim levels — LS, GS and GS-R. The ultra-high performance Integra Type R Sports Coupe also returns for 2000, and is discussed in detail in its own section.

The Integra has evolved and matured in its three generations. The Integra offers a comprehensive list of standard luxury, comfort and safety features. It features a standard driver's and front passenger's air bag Supplemental Restraint System (SRS) in all models. Additionally, features such as an AM/FM/CD six-speaker audio system, a power moon roof, windows, door mirrors and locks, Antilock Braking System (ABS) and a lumbar/height/tilt adjustment for the driver's seat are all standard equipment.

INTRODUCTION (continued)

For 2000, Integra models receive further refinements and enhancements. Key new features for the Integra include:

- 100,000-mile tune-up intervals;
- Compliance with strict TLEV emission standards;
- Available 4-speed automatic transmissions with improved, smoother shift quality;
- A standard vehicle immobilizer anti-theft system;
- An On-board Vapor Recovery System—one year earlier than required by regulation.

Key performance features of the Integra include:

- 140-hp, 1.8-liter, 16-valve, DOHC, 4-cylinder engine (LS and GS);
- 170-hp, 1.8-liter, 16-valve, DOHC, VTEC 4-cylinder engine (GS-R);
- 5-speed manual or an optional electronically controlled, 4-speed automatic transmission with the sophisticated Grade Logic Control System (LS and GS);
- Close-ratio 5-speed manual transmission (GS-R);
- Four-wheel independent double-wishbone suspension;
- Four-wheel disc brakes;
- Variable power-assisted steering with rotary-valve steering gear.

Key safety features of the Integra include:

- Standard driver's and front passenger's air bag Supplemental Restraint System (SRS) on all models;
- Standard Antilock Braking System (ABS);
- 3-point outboard seat belts;
- Projector beam headlights;
- Side-impact door-protection beams;
- Side-intrusion shoulder pads.

OVERVIEW

The Integra features two distinct engines. The LS and GS models offer an all-aluminum, 1.8-liter, 16-valve, DOHC, 4-cylinder engine with programmed fuel injection (PGM-FI). This powerplant produces 140 horsepower at 6300 rpm and 127 lb-ft of torque at 5200 rpm.

Designed to run on unleaded regular fuel (87 octane), this powerplant combines economy with energetic performance. When coupled with a standard five-speed manual transmission, it logs EPA fuel economy of 25/31 MPG city/highway. With an optional four-speed-automatic transmission, EPA highway mileage remains unchanged, while the city rating drops by just one MPG.

The GS-R model features a 1.8-liter engine equipped with the Variable Valve Timing and Lift Electronic Control (VTEC) system pioneered in the Acura NSX. It also features Programmed Fuel Injection (PGM-FI), a dual-stage intake system, a knock sensor, a crankshaft reinforcing bridge, oil jet piston cooling and a number of other innovations to improve reliability, durability and smoother operation. All this adds up to 170 horsepower at 7600 rpm and 128 lb-ft of torque at 6200 rpm. These impressive figures give it one of the highest specific outputs of any normally aspirated engine sold.

VARIABLE VALVE TIMING AND LIFT ELECTRONIC CONTROL (VTEC) SYSTEM

The Variable Valve Timing and Lift Electronic Control (VTEC) system, first pioneered in the Acura NSX, works similar performance magic in the Integra GS-R. As the performance of the NSX has already been amply demonstrated, VTEC is an innovative solution to an age-old automotive engineering problem. It elegantly solves the trade-off between tuning an engine for either high-end horsepower or low-end torque. With VTEC, engineers no longer have to compromise between the two. VTEC-equipped engines can have the best of both, especially when the system works in conjunction with the dual-stage intake manifold.

The VTEC system uses three cam lobes and three corresponding rocker arms for each pair of valves. The VTEC system operates on both the intake and exhaust valves. The two outer cam lobes have a profile that optimizes low-speed torque and response. The middle lobe has a high-lift, longer-duration profile that is designed to optimize high-end horsepower.

VARIABLE VALVE TIMING AND LIFT ELECTRONIC CONTROL (VTEC) SYSTEM (continued)

At low rpm, the middle rocker arm is idle. At a predetermined engine load and speed, the middle rocker arm is activated by means of a computer-controlled hydraulic piston, which locks all three rocker arms together. The middle rocker arm forces the two outer rocker arms to follow the higher lift and longer duration profile of the middle cam lobe, allowing the engine to draw and expel more air and consequently produce more power.

This simple, yet elegant, design has proven its effectiveness as well as its reliability in both the NSX and the previous generation Integra GS-R. The changeover point between low lift and high lift in the GS-R is 4400 rpm, for excellent midrange torque and to fully exploit the benefits of the dual-stage intake manifold. By carefully balancing the 4400 rpm VTEC changeover point and the 5800 rpm opening of the second intake runner of the dual-stage intake manifold, the GS-R has an almost flat torque curve from 2500 rpm to 7200 rpm. This makes the GS-R engine responsive under all operating conditions, especially when going from part-throttle, steady-state cruising to full throttle.

The GS-R engine utilizes the latest combustion technology to provide a combination of fuel efficiency and power. Because of the low surface-to-volume area of the chamber, minimal surface area is exposed to the heat of combustion and more heat is retained in the expanding gases, resulting in increased thermal efficiency. The “squish” area around the combustion chamber is also increased, yielding increased gas turbulence, faster flame propagation and even better efficiency.

Also, the fuel injectors point almost directly toward the center of the intake valves, helping to reduce fuel condensation on the intake port walls, improving drivability and engine response.

DUAL-STAGE INTAKE MANIFOLD

The dual-stage intake manifold on the GS-R engine features two intake runners for each cylinder, one longer than the other. When operating under 5800 rpm, only the longer of the two runners delivers air to the cylinder. Above 5800 rpm, a butterfly valve in the bore of the short runner opens to allow the passage of additional air to the cylinder. This has the desired effect of boosting midrange and high-end power output.

PISTONS AND CONNECTING RODS

In conjunction with a lightweight piston design, the GS-R engine also uses a sophisticated connecting rod design. Constructed of high-strength steel, this connecting rod is thinner and lighter than a conventional connecting rod, yet it's 26 percent stronger.

The combination of lightweight pistons and connecting rods helps to reduce reciprocating inertia and enhance throttle response significantly.

OIL JET PISTON COOLING

To help ensure long-term durability and reliability, the GS-R engine uses an oil jet cooling system. A jet of pressurized engine oil is directed to the underside of the piston to help dissipate the extreme heat generated during sustained high rpm operation. This technology has proven itself in Formula One and other top-level racing engines.

TUNE-UP INTERVAL INCREASED TO 100,000 MILES

The Integra's first scheduled tune-up is required at 100,000 miles; during that time only routine inspections and fluid changes are required. Long-wearing platinum-tipped spark plugs are the principal technical change for 2000 that makes this longevity possible. Careful design and engineering of the DOHC valvetrain allows both versions of the 1.8-liter in-line four engine to reliably maintain proper valve tappet clearances until the scheduled first tune-up.

TRANSITIONAL LOW EMISSION VEHICLE (TLEV) EMISSIONS COMPLIANCE AND ON-BOARD VAPOR RECOVERY SYSTEM

Acura's advancing emission control technology is evidenced in the new Integra. A new catalytic converter design allows all models to comply with TLEV standards for tailpipe emissions. All 2000-model Integras also have an On-board Vapor Recovery System—one year earlier than required by regulation.

SURFACE-ORIENTED CRYSTAL BEARING MATERIAL

The use of a surface-oriented crystal bearing material was pioneered in Formula One racing and has been adapted for use in the GS-R VTEC engine. Unlike the surface of conventional bearing material, the crystal bearing surface has molecules oriented into a pyramid shape. This surface traps a layer of oil and holds it far better than conventional bearing surfaces, reducing friction and enhancing reliability.

FIVE-SPEED MANUAL TRANSMISSION

In order to maximize the performance and efficiency of each Integra model, two different 5-speed manual transmissions are utilized. The transmission used in the GS-R model features different ratios, bearing design, clutch, flywheel, second, third and fourth gear synchronizers and reverse idler gear than the transmission for the LS and GS engines. The differences were necessary to handle the higher output of the GS-R engine, to ensure durability and reliability and to maximize performance and fuel economy.

The main design goals of the GS-R transmission were to take advantage of the additional low- and midrange power and to enhance the GS-R engine's response without excessive rpm in freeway driving.

All manual-equipped Integra models feature a short-stroke shift linkage of exceptional rigidity. The system approaches the quality feel and short stroke of the Acura NSX shift linkage system.

Both manual transmissions feature a refined hydraulic clutch unit to provide progressive engagement and low clutch-pedal effort.

As in the past, all Integra models feature equal-length halfshafts, which virtually eliminate torque steer.

REVISED FOUR-SPEED AUTOMATIC TRANSMISSION

The optional, electronically controlled four-speed automatic transmission, available in 2000 LS and GS models, is a newly refined unit designed to offer a superb blend of sporty response and sophisticated manners. It features an ignition retard system to reduce shift-shock, a torque-load control shift sequence, a low-hold feature to enhance performance on driver demand, a large-capacity lock-up torque converter to reduce slippage and provide a more direct feel and the Grade Logic Control System to reduce unwanted shift hunting on up- and downhill grades.

Shifting is controlled by a new 16-bit microprocessor located in the Electronic Control Module (ECM). The new processor's greater capacity is put to use controlling a new linear shift solenoid, that in turn controls hydraulic pressure to the gear clutch packs. For optimal control of hydraulic pressure, the ECM monitors engine torque and controls transient-condition shifting. Since control is linear, the engagement is more progressive. The result is smoother shifting and power transmission over a greater variety of power and gear settings.

To help insure that the transmission always selects the appropriate ratio for the conditions, the Grade Logic Control System compares the actual driving condition with a map stored in the electronic control unit (ECU) memory. Based on the degree of variance between actual driving conditions and the map, the system either allows shifting or prevents it, in order to minimize frequent gear changes. In essence, the Grade Logic Control can estimate the grade of a hill by measuring throttle position, road speed, and rate of acceleration/deceleration to compare with the map in the ECU. The system holds the transmission in a lower gear for better uphill acceleration and also provides additional engine braking in downhill driving.

Grade Logic also uses brake pedal application as a control input. For example, Grade Logic will determine that the Integra is traveling downhill if it receives a closed throttle signal and a brake application signal. It then selects a shift map that will downshift and hold 3rd gear to allow the Integra to utilize engine braking.

Similarly, Grade Logic can use a rapid deceleration signal and closed throttle to determine that the car is entering a tight curve in the road. It then chooses a shift map that downshifts, then delays upshifting for more responsive acceleration.

OVERVIEW

The Integra continues in the enviable tradition of providing a fully independent, four-wheel double-wishbone suspension for a superb combination of sporty handling and excellent ride quality.

The objective was to provide the Integra driver with a vehicle that is responsive and comfortable in daily driving, yet with excellent cornering stability, good traction and stable behavior.

FRONT SUSPENSION

The components of the front suspension are an L-shaped lower control arm, an upper control arm, a coil-over shock absorber, a stabilizer bar and a performance rod. For the GS-R front suspension, the engineering team also specified the use of a shock tower bar and on all Integras, a stabilizer bar equipped with ball joints instead of rubber bushings. The tower bar ties together the tops of the front spring/damper assemblies. The performance rod is designed to act as an A-arm cross brace to enhance handling and precision and stiffen the front lower subframe. The tower bar and performance rod are designed to enhance rigidity and contribute to suspension precision.

In order to enhance stability under braking in both a straight line and while cornering, the L-shaped lower control arm has been equipped with specially tuned compliance bushings. These bushings allow the lower control arm to impart a toe-out condition on the front wheels. Allowing the wheels to toe out while braking in a corner enhances stability and allows the vehicle to track more precisely.

The engineering team has tailored the suspension to take the full benefit of negative scrub geometry, especially when braking on a split-friction surface. Under this condition, the suspension tends to maintain greater directional stability by countering the forces that would normally tend to steer the vehicle in the direction of the side with the lower traction coefficient. By balancing these forces, the Integra tends to brake with maximum stability.

REAR SUSPENSION

The rear double-wishbone suspension components consist of upper and lower control arms, a trailing arm, a coil-over shock absorber and a stabilizer bar. All Integra models share the same rear suspension componentry and calibrations.

SUSPENSION TUNING

The engineering team designed the Integra suspension to deliver neutral handling characteristics and provide the driver with high-quality feedback and excellent traction. The spring/shock combination offers both a resilient ride and precise handling. Each shock absorber uses a 30 mm cylinder and is equipped with an exclusive progressive valve unit, which opens progressively in response to wheel loads. Most shock valves are designed to either open completely or close completely in response to vertical wheel loads. This system provides better ride quality along with excellent handling.

HIGH-RIGIDITY BRAKE CALIPERS AND ANTILOCK BRAKE SYSTEM (ABS)

All Integra models feature four-wheel disc brakes, with ventilated rotors at the front and solid rotors at the rear. For maximum rigidity of the braking system and to provide a short pedal stroke, the front brake calipers are large, stout units that have a higher resistance to flexing and “spread” under severe braking conditions.

The Integra uses a state-of-the-art ABS system to help the driver maintain steering control during hard braking. This lightweight system also functions with minimal pedal kickback during ABS operation.

TORQUE-SENSING ROTARY VALVE STEERING GEAR

The Integra features an innovative, power-assisted steering gear design that is lighter and more compact than conventional power steering systems. Instead of modulating power assistance to the steering rack in accordance with road speed, this system varies power assist by a combination of engine rpm and the amount of torque generated between the pavement and the tire. The advantage of this system is that it exercises more precise control over the amount of power assist provided. It also provides more linear steering with regard to lateral loads encountered while cornering.

WHEELS AND TIRES

All models feature 195/55R15 84V Michelin XGT-V4 all-season performance radial tires mounted on lightweight 6.0 JJx15 machine-finished aluminum-alloy wheels. The tires have been specifically developed to work in concert with the suspension calibrations, to provide excellent traction, stability, controllability and predictable handling behavior.

OVERVIEW

The goals for the Acura Integra structure were to provide a strong, rigid platform to ensure a long, durable service life, create a stable base for the suspension, provide carefully designed front and rear crumple zones to minimize cabin intrusion in a collision and ensure very tight tolerances to help provide the occupants with a quiet, vibration-free environment.

Another goal was to shift as much of the mass to the center of the vehicle as possible to enhance transient response and handling. Other considerations included the creation of a large greenhouse to maximize front and rear visibility, creating a large cabin that provides ample room while making the cabin intimate to enhance the feeling of a sports-oriented coupe and sedan.

AERODYNAMICS

The aerodynamic goal for the Integra was to achieve a balance of forces that include moderate downforce at the rear, low turbulence, minimal wind roar in crucial areas such as the windows, excellent flow-through ventilation and to provide optimum resistance to crosswinds while maintaining a low drag coefficient. This was achieved by extensive computer modeling, using the Cray supercomputer and wind-tunnel testing with scale models, mockups and prototype vehicle bodies. One important detail of the aerodynamic package is the one-piece, integral bumper assembly. This unit not only gives the Integra a clean, modern appearance, but its flowing, one-piece construction eliminates gaps between the bumper and the body that tend to produce turbulence and disrupt laminar airflow over the hood. The Integra has a drag coefficient of 0.33 and a lift coefficient of 0.10.

ANTICORROSION MEASURES

To enhance corrosion protection, virtually every panel of the Integra is constructed of double-sided galvanized steel. The only significant panel that does not use galvanized steel is the roof. After assembly, the body in white is treated to an electro-deposition process that bonds a rust-inhibiting primer coating to the metal. Electro-deposition draws this coating into minute crevices, helping to ensure a barrier against rust-producing moisture. A moisture-resistant wax is also injected into hidden body cavities, to help prevent corrosion that might otherwise form from condensation.

BODY RIGIDITY

Rigidity clearly has an impact on a number of critical areas. Any suspension, for instance, no matter how finely calibrated or advanced in design, will fail to perform properly if the body flexes and bends under loading. Rigidity also contributes significantly to crash protection and reduction of vibration and exterior noise and to the build quality perceived in areas like the small gaps between panels and openings.

INTEGRAL BUMPERS

The use of a one-piece integral front bumper accomplishes a number of objectives. In addition to providing a clean, modern and aerodynamic appearance, it reduces the number of components and the weight of the front facias, enhances the anticorrosion performance of the entire front end, resists minor dents and flying debris better and, in case of a minor collision, helps reduce damage that might otherwise be transmitted to the front fenders.

The choice of polypropylene for front and rear bumper material was made based on its properties of resilience to minor damage and because of the material's inherent recyclability. Due to the unique formulation of pigments and medium, the painted bumper resists the fading that was commonly associated with synthetic plastic bumpers. The front and rear bumpers of the Integra resist damage up to a 5-mph collision.

VISIBILITY

One of the design priorities of the body was to provide the driver with as much visibility as possible. As a result of extensive engineering, which was able to create thin but strong pillars, and a compact engine, which contributes to a low cowl, the Sports Coupe offers 298.9 degrees of visibility while the Sports Sedan offers 306.3 degrees of visibility.

PIN-GUIDE DOOR SASH

The Integra Sports Coupe uses a pin-guide sash system for the door glass. A pin, which is bonded to the rear inside edge of the door glass, slides in a channel designed into the window sash. The pin holds the window captive against the sash and forms a tight seal to enhance the rigidity of the glass and resist the negative air pressure that builds up at the side of the vehicle at high road speeds. The system also allows tighter tolerances between the glass and the moulding and contributes to better aerodynamics and reduced levels of wind noise.

OUTER-OPENING MOON ROOF

In order to maximize interior head room, the Integra features a moon roof that slides back and out of the roof surface. Unlike conventional sunroof configurations that slide into a receptacle in the roof, this unit takes up less head room. The glass moon roof also features a convenient sliding sunshade.

PROJECTOR BEAM HEADLIGHTS

A key element of the Integra styling is the signature separated four-headlight design. The individual lights have a near-flush look, improving styling and smoothing aerodynamic flow over the front bumper.

To enhance illumination and give the Integra a modern look, the engineers specified projector beam lamps for low-beam use. Compared to conventional units, these lamps reach 13 feet farther and illuminate an area 20 percent greater, while the high beams, which use improved halogen lamp technology, reach 125 feet farther and illuminate an area 2.5 times greater.

OVERVIEW

Since its original introduction, the Integra has always been a driver's car. Every element of the vehicle, from the engine to the design and location of major and minor function controls, has been tailored specifically to make the driving experience safe, efficient and enjoyable. The interior architecture, seats and controls, and the spatial relationship between the driver and the controls of the Integra, have all been tailored to keep driver and passengers comfortable, relaxed and keenly aware of the environment around the vehicle. For even greater comfort, the base of the driver seat is tilt/height adjustable. All Integra models feature a leather-wrapped steering wheel and shift knob as standard equipment, while GS and GS-R models come with a leather-trimmed interior.

INTERIOR

The cabin space has been designed to divide the cabin longitudinally, providing the driver and front-seat passenger with a distinct space separated by the center console. The interior space has been created like that of a sports car. It's simple, attractive, ergonomically designed and provides ease of operation. The dash sweeps around the driver and front passenger and the cabin provides exceptional space for comfort.

SEATING

The front seats feature fore/aft and seat back rake adjustment, in addition to a driver's seat lumbar adjustment for proper back support. To accommodate an even wider variety of operator preferences, the driver's seat is tilt/height adjustable so that the seat base can be tilted fore or aft and the overall seat position raised or lowered. The deeply bolstered seat has three different densities of foam in its construction to provide proper anatomical support for the driver's comfort, even after many hours behind the wheel. Upholstery material has been chosen for its appearance, durability and grip, a benefit in cornering situations.

The rear seats are designed to keep the occupants at a comfortable position with regard to back rake and angle of the bottom cushion. The rear seats in the Sports Coupe are equipped with two 3-point seat belts, while the Sports Sedan has two 3-point seat belts and a center lap belt.

INSTRUMENT PANEL

In order to enhance readability and allow the driver to absorb vital information quickly, the Integra features analog instrumentation. The large, white-on-black instruments are recessed in a binnacle that blocks out glare.

The instrument panel includes a speedometer, tachometer and gauges for fuel content and engine temperature. Indicator lights are also provided for oil pressure, battery-charging condition, high beams, brake status, SRS diagnostic check, door-ajar indicator, seat belt indicator, check engine, ABS status check and low-fuel indicator. The panel also features a maintenance reminder, which tells the driver when scheduled maintenance is due.

AIR CONDITIONING

All Integra models feature a compact and efficient air conditioning system as standard equipment. This system is equipped with an aluminum condenser core to enhance corrosion resistance, and the system is charged with environmentally friendlier, non-CFC R134a refrigerant.

AUDIO SYSTEM

The Integra features an AM/FM/CD audio system with six speakers designed to provide a high level of fidelity and acoustic clarity. All models feature a pair of 1.3-inch tweeters and 6-inch coaxial front speakers mounted in the front doors. The Sports Coupes have a pair of 6-inch rear speakers, while the Sports Sedans have a pair of 6x9-inch rear speakers. Sports sedans feature a printed in-glass antenna, while coupes featured a power mast-type antenna.

ENVIRONMENTAL MEASURES

In an effort to address environmental concerns, the Integra features a number of components that are recycled or can be recycled at the end of the vehicle's service life. The bumpers, for instance, are made of recyclable material and can be recycled if damaged. All of the plastic components that can be recycled are labeled as such and can be reconstituted into usable products when the vehicle is dismantled.

SECURITY/IMMOBILIZER SYSTEM

To enhance the Integra's theft resistance, a special electronically coded key prevents the car from being started, even if a mechanical duplicate of the proper key shape is used. A transponder built into the key signals the immobilizer control unit that the key is genuine. If the car is hot-wired, or an unauthorized key is used, it simply will not start. This system is a substantial deterrent to theft.

NEW REAR CHILD SEAT TETHER ANCHORS

To allow a child seat to be securely positioned in any of the outboard back seat positions, seat tether anchors are standard in the Integra.

CRUMPLE ZONES

As mentioned earlier, the Integra provides a high degree of structural rigidity to enhance crash protection. At the front and rear, the Integra has been designed with deformable crumple zones. These are designed to deform in a controlled manner, absorb the impact energy and help prevent deformation of the passenger compartment.

SIDE-IMPACT PROTECTION

To help minimize injury to occupants in a side-impact collision, the Integra features door intrusion beams as well as energy-absorbing pads in the doors.

On the Sports Sedan, there is a polypropylene pad located at hip level and an extended styrene pad located at shoulder level for both front and rear doors. The Sports Coupe, due to its different structural architecture, requires only a polypropylene pad. These pads substantially reduce the energy transmitted to the occupants in the event of a collision.

DUAL AIR BAG SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Integra is equipped with a driver and front passenger air bag Supplemental Restraint System (SRS). The driver's air bag is located in the steering wheel hub, while the passenger's air bag is located on top of the dash. Both air bags are triggered simultaneously by means of three impact sensors located in the passenger compartment. To ensure maximum reliability, the sensors use gold-plated electrical connectors. As in all Acura automobiles, the front passenger air bag is designed to deploy upward along the windshield and then back toward the occupant. This provides a large cushion to help protect the front passenger.

THREE-POINT SEAT BELTS

The dual front air bags are designed to work in conjunction with the 3-point front seat belts. For easy access, the front buckles are attached to the driver's and front passenger's seats. The front seat belts on the Sports Sedan feature height adjusters on the B-pillars for comfort.