

# MINICARS, INC.

#### ADVANCED SAFETY FEATURES

The Minicars RSV Eagle II is equipped with the most advanced occupant protection systems available. Front seat occupants are protected in 50 mph frontal and frontal oblique impact collisions by dual-chambered air cushion restraints. These restraints deploy in 25 milliseconds to completely restrain occupants without aid from lap belts or other types of active restraint systems.

Restraint systems for driver and front passenger protection are conceptually and functionally similar, though differing in appearance. Each restraint is comprised of an inflator and an air cushion containing two chambers one for the head and one for the torso. This design feature provides high speed protection by restraining the torso quickly and firmly and cushioning the head more softly and more slowly. Driver and passenger lower body trajectories are controlled by foam knee pads located under the driver and front passenger dash.

The RSV rear seat restraint, similar in configuration to the conventional 3-point harness, uses force limiters at each anchor location and lowstretch polyester webbing to protect occupants to over 40 miles per hour.



The RSV structure is designed to function in a complementary manner with restraints to minimize injury to RSV occupants as well as to occupants of other vehicles and to pedestrians. Resilient plastic covers the energy-absorbent, foam-filled steel structure which is designed to crush initially at low force levels in frontal impacts with the vulnerable sides of other cars. Side impact and rollover protection is afforded by well-padded door interiors, energy-absorbing side glazing, and special door construction and latches.





- A. Driver Restraint System B. Front Passenger Restraint System C. Rear Passenger Restraint D. Cutaway Showing Energy-
  - Absorbent Structure



## **STRUCTURES**

The structure, of sheet metal construction typical of unitized body production, has been configured to include closed volumes which are foam-filled for improved crash energy management. The gullwing doors have soft interior padding and rest against strong shut faces. High strength rollbars and roof struts form the upper structure. The front structural module prevents damage in barrier impacts below 10 mph and may be replaced at low cost after impacts at 20 mph or less. The lightweight, efficient structure resists compartment deformation, maximizes fuel economy and minimizes costs.

Exterior dimensions of the 2000-2100 lb. RSV are length 170 in., height 55 in., and width 70 in. Its front interior headroom is 37 in., legroom 40 in., and shoulder room 50 in. Rear interior dimensions are headroom 37 in., legroom 29 in. and shoulder room 46 in.

A. Unitized Structure B. Microcomputer C. Driver Display

**D.** Radar Components

#### ELECTRONICS

An electronic driver display, integrated with a microcomputer, presents standard dashboard data such as fuel level, speed, engine rpm, etc., in precise, easy-to-read, luminescent bars and/or numbers. Its flexible format feature enables



the driver to select either of two display modes — NORMAL and STATUS. Legends for these modes appear above and below the digital readout panel, respectively. A third EMERGENCY mode alerts the driver of equipment malfunction and impending emergency situations.

Information from the solid-state radar is interpreted by the microcomputer. This interface provides the most advanced and innovative driver aid and warning system available. A "smart" cruise control feature alerts the driver and slows the vehicle when the car ahead is being approached too quickly. The system will also provide an audible signal to warn of possible dangerous situations. It will automatically actuate the high performance braking system only if a serious collision is unavoidable.



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# **ACCOMMODATIONS & ACCESSORIES**

Other features...

- Economical and efficient stratified charge Honda Accord engine provides sprightly performance. It satisfies high fuel économy goals and all applicable emissions regulations through 1984.
- Outstanding all-around vision is provided 325° of totally unobstructed driver visibility.
- Approximately 13 cubic feet of luggage compartment space holds normal vacation luggage for a family of four.
- Front and rear comfort contour seats accommodate occupants ranging in size from the 5th percentile female to the 95th percentile male, and work in conjunction with restraints systems to minimize injury.

- A uniquely designed dashboard consisting of conveniently accessible operating controls, a luminescent flexible-format digital readout, a Citizens' Band radio/ AM-FM stero cassette combination, and heater/air conditioner controls.
- Gullwing doors provide easy ingress to and exit from the front and rear interior compartments.
- Four-wheel independent suspension and hydraulically assisted anti-skid disc brakes provide a 30% shorter stopping distance than is provided by any other car produced in the U.S.
- Lightweight wheels improve handling performance, and Advance Concept Tires (ATC) can run flat eliminating bulky spares and roadside tire changes.











Assisting in RSV development...The Budd Company, Systems Technology, Inc., Thiokol Corporation, RCA Laboratories, Monsanto Research Co., University of Utah, Stanford Research Institute, Sierracin/Sylmar and Man Factors, Inc.



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#### SAFETY PERFORMANCE TESTS

Extensive analysis of accident files has shown that a substantial portion of the societal cost of injury accidents occurs at velocity changes between 30-50 mph in frontal impacts and 15-30 mph in side impacts. To ensure minimal occupant injury over the full range of practical speeds and collision modes, Minicars, Inc. has conducted full-scale barrier and vehicle-to-vehicle crash tests using instrumented anthropometric dummies, restraints, and padding in appropriate structural configurations. The barrier tests involved frontal and frontal offset impacts ranging from 40-50 mph. Vehicle-to-vehicle tests included frontal aligned and offset tests (90 and 80 mph closing speeds, respectively), and front-to-side angular impact and aggressivity tests at closing velocities to 50 mph.

These tests reveal that the RSV structure and associated driver and passenger restraint protection systems more than satisfy the Government criteria for occupant survival at speeds representing about 75% of the societal costs of impacts in each accident mode. Low speed damageability and ride and handling tests have also been successfully conducted. The damageability tests indicate no damage at 10 mph and no damage past the replaceable nose module at 20 mph. Ride and handling tests ensure optimum supension, steering, and braking characteristics.









- A. Front-to-Side Impact B. Suspension Testing
- C. Brake Testing
- D. Frontal Impact



Under NHTSA sponsorship initiated in 1974, Minicars, Inc. has designed and developed the Research Safety Vehicle (RSV) Eagle II — a lightweight, safe, energy-efficient car which embodies state-of-the-art engineering design concepts and advanced styling. The RSV evolved from extensive analytical, developmental, integration and testing efforts to embrace S3E (safety, energy, environment, and economy) projections for the 1980s as well as to accommodate conventional full-scale automotive production technologies.

Uniquely designed occupant restraint systems, specially designed doors and latches, interior padding and energy-absorbing side glazing have been integrated into the RSV design to provide occupant protection in frontal, rollover and side impact collisions.

The Honda Accord CVCC four-cylinder stratified charge engine satisfies all applicable emissions regulations and provides good performance with high fuel economy — 31 mpg urban, 39 mpg highway, 34 mpg combined driving. Acceleration performance is 0-60 mph in 16 seconds.

### SAFETY, ENERGY, ENVIRONMENT AND ECONOMY

