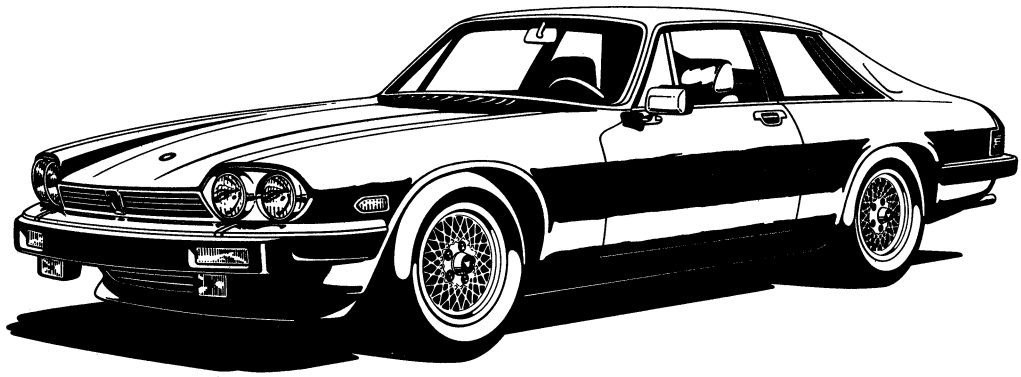
JAGUAR

XJ-S
MODEL YEAR
UPDATE
1989

JAGUAR

XJ-S



1989

Publication number S-60

CONTENTS

INTRODUCTION

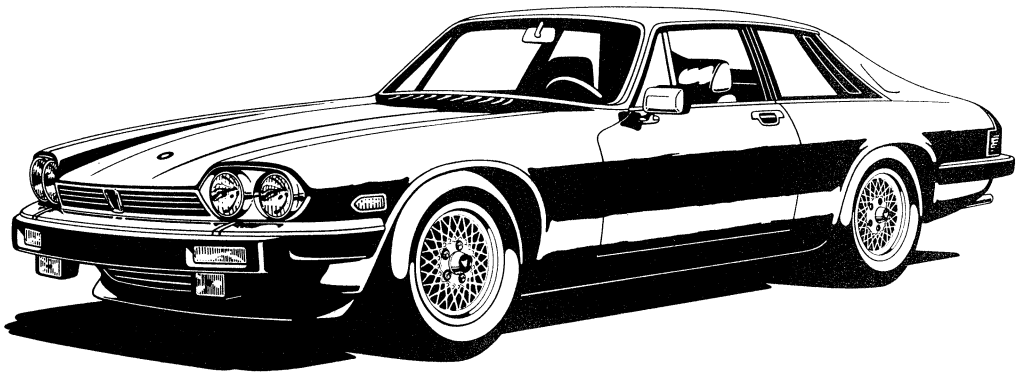
The 1989 XJ-S incorporates improvements for handling, safety, performance, appearance, convenience and comfort. Several changes introduced during the previous year are also described in this publication.

1989 MY IMPROVEMENTS	VIN 148782–ON
TRUNK VENTILATION	VIN 142987–ON
SPEED SENSING	VIN 144263–ON
BRAKE LINING MATERIAL	VIN 144578–ON
BATTERY	VIN 145730–ON

WIRING COLOR CODE

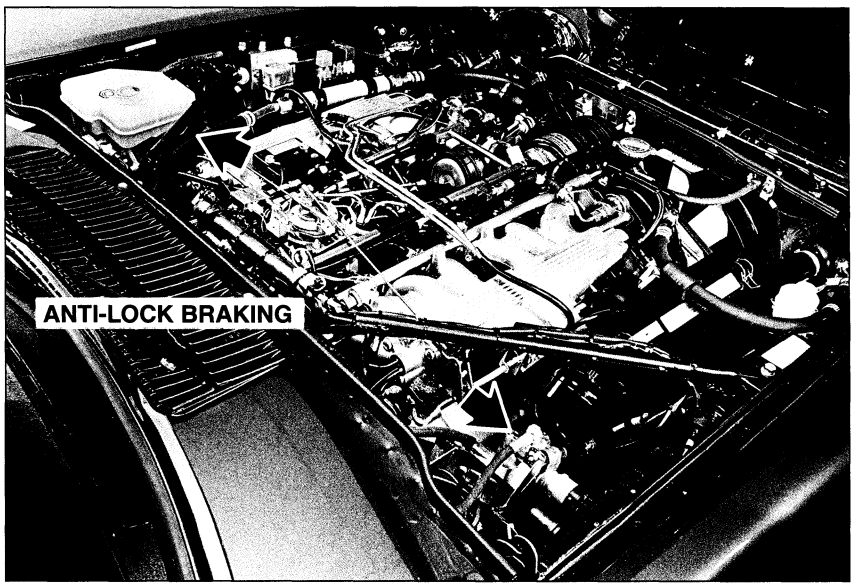
N	Brown	Y	Yellow
B	Black	O	Orange
W	White	S	Slate
K	Pink	L	Light
G	Green	U	Blue
R	Red	P	Purple

When a wire has two or more color code letters, the first letter indicates the main color and the subsequent letter(s) indicate the tracer color(s).



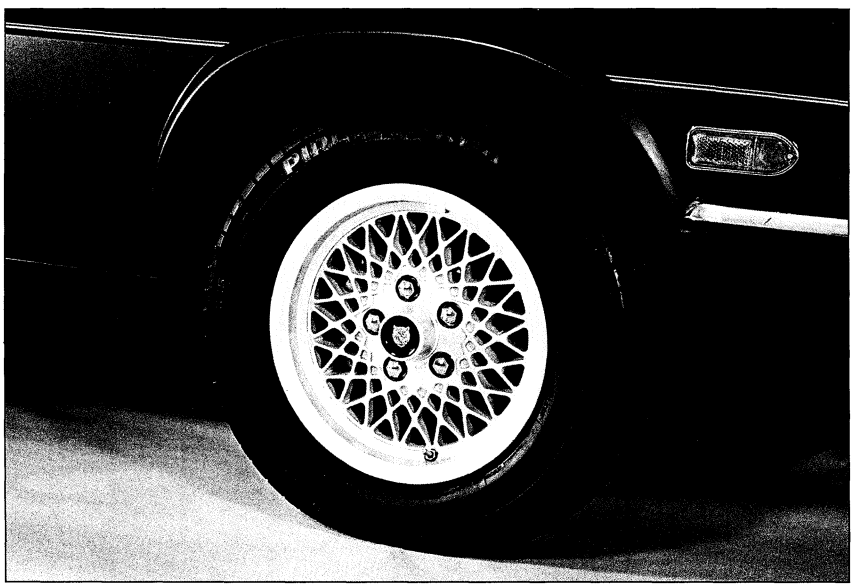
ANTI-LOCK BRAKING SYSTEM

A new braking system incorporating normal operation, power boost, and anti-lock braking is used on the 1989 XJ-S. This system provides increased efficiency and greater reserves of braking power under all conditions.



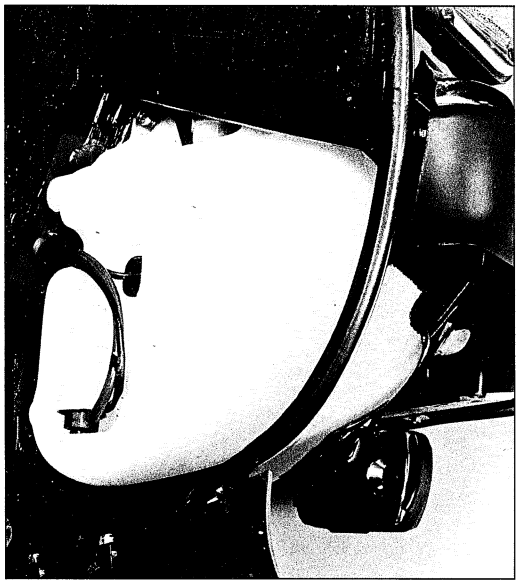
WHEELS AND TIRES

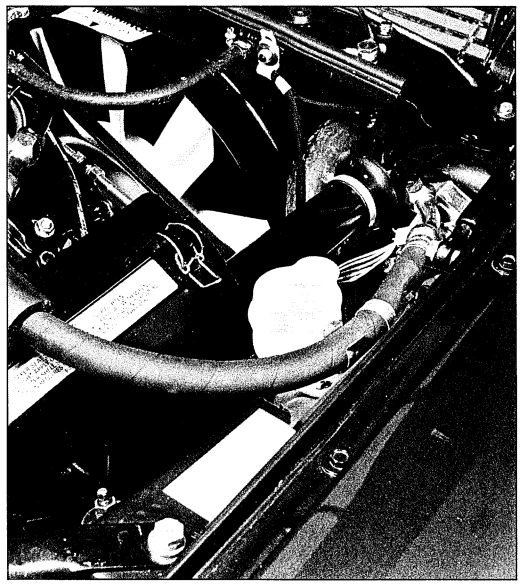
High performance Pirelli P600 tires are mounted on sports alloy wheels. Tire size is 235/60 VR15; rim size is 6 1/2 x 15. A new steering rack is used to produce a reduced turning circle.



WINDSHIELD WASHER RESERVOIR

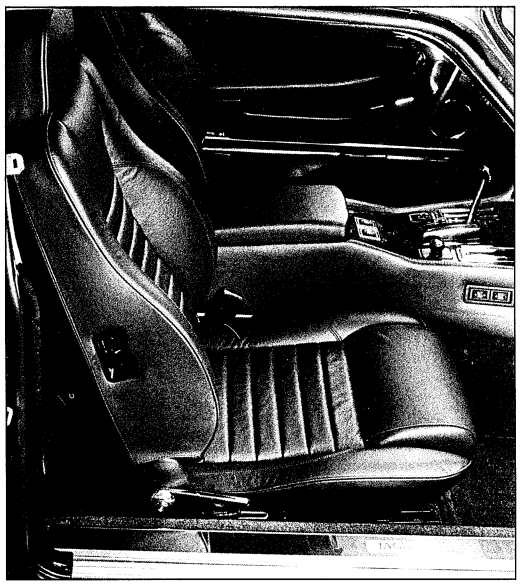
The washer reservoir has been relocated behind the right headlight. The filler is remotely located on the right inner fender. A low fluid level warning light is also incorporated.

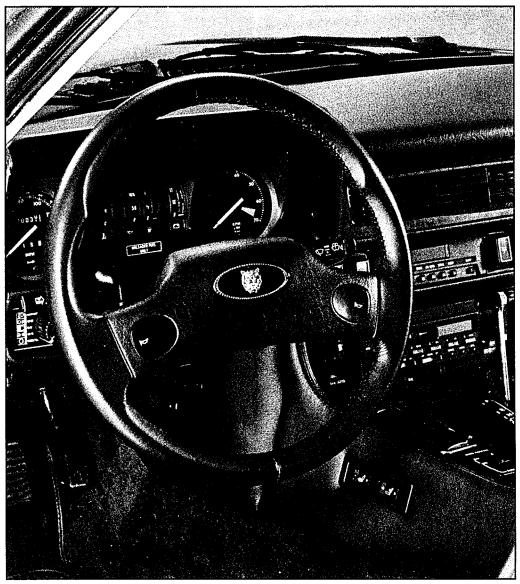




SEATS AND STEERING WHEEL

Leather trimmed sports seats and steering wheel are new on the 1989 XJ-S. The seats incorporate power lumbar supports and heaters. The steering wheel incorporates two horn buttons.

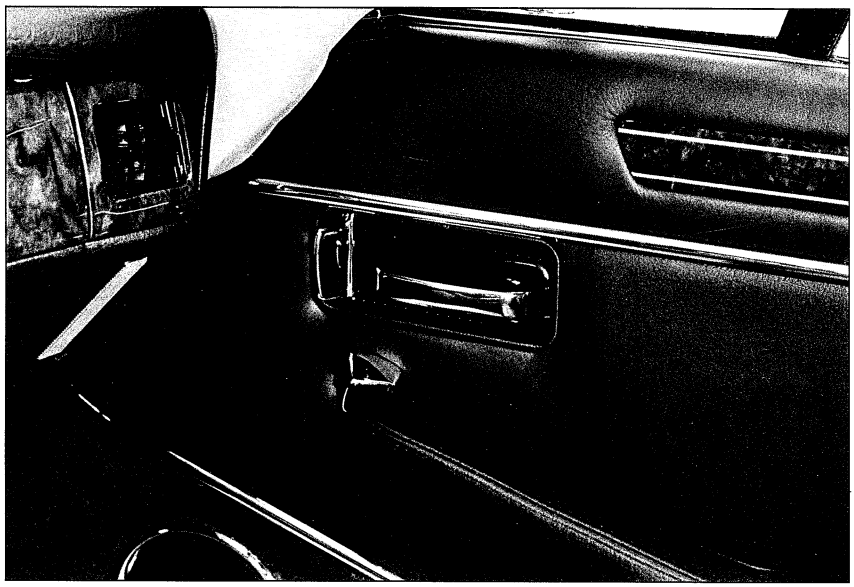




FEATURES

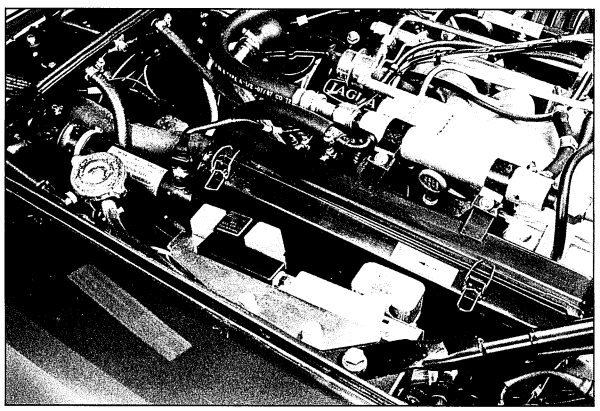
DOOR LOCKS

Motorized central locking operates the door and trunk locks. An electronic control unit controls the system.



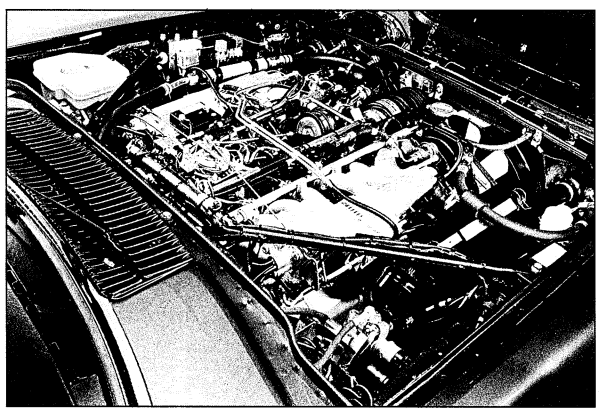
WIRING HARNESS AND FUSES

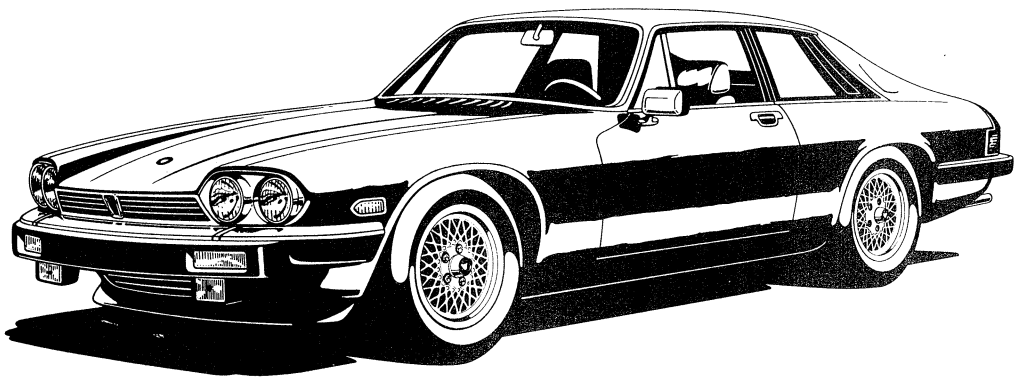
The wiring harness has been revised to incorporate the new 1989 features. Fuse locations and functions have been revised and an additional two-fuse panel has been added for anti-lock braking.



EFI AND EMISSIONS CONTROL

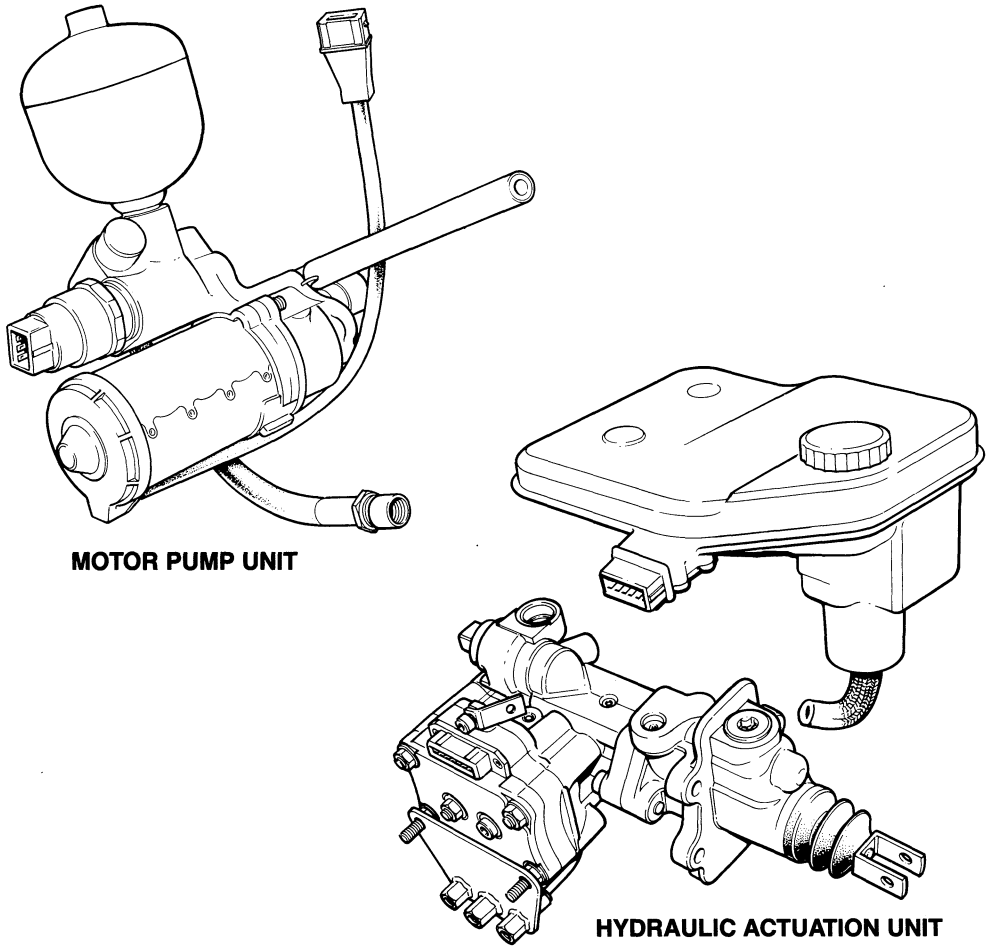
Changes have been made to improve cold starting and warm-up.





ANTI-LOCK BRAKING SYSTEM

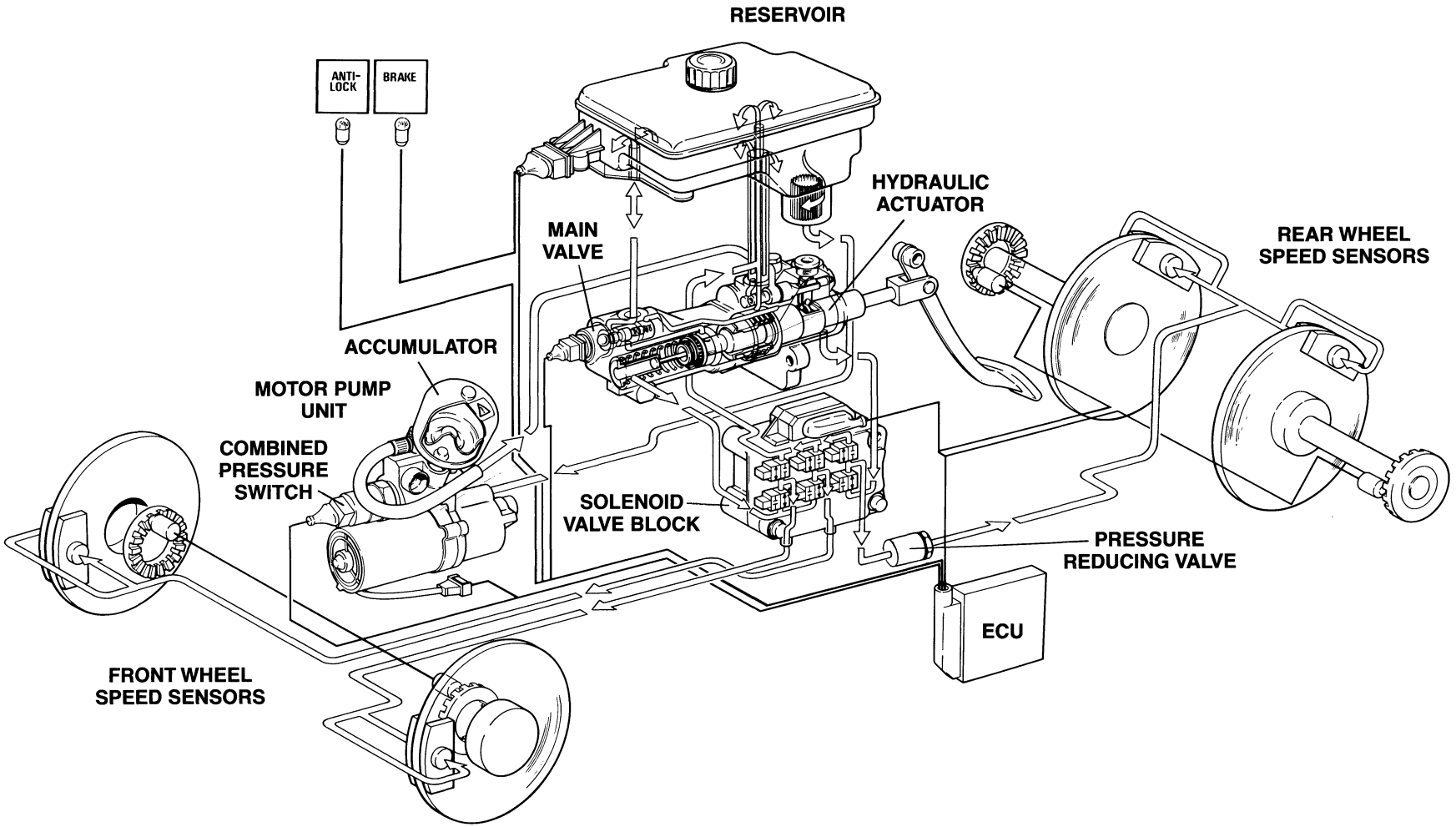
The new XJ-S brake system combines normal system operation, power boost, and anti-lock braking. The previous vacuum servo has been eliminated completely and replaced with an independent electrically driven motor pump unit. Besides providing the obvious benefit of anti-lock braking, this new system provides a greater number of successive fully assisted stops. Also, hydraulic system recharge time is faster.



MOTOR PUMP UNIT

HYDRAULIC ACTUATION UNIT

A common operating fluid, DOT 4 BRAKE FLUID, is used for both power boost and brake application.


RESERVOIR
ANTI-LOCK
BRAKE
HYDRAULIC ACTUATOR
MAIN VALVE
REAR WHEEL SPEED SENSORS
ACCUMULATOR
MOTOR PUMP UNIT
COMBINED PRESSURE SWITCH
SOLENOID VALVE BLOCK
PRESSURE REDUCING VALVE
ECU
FRONT WHEEL SPEED SENSORS

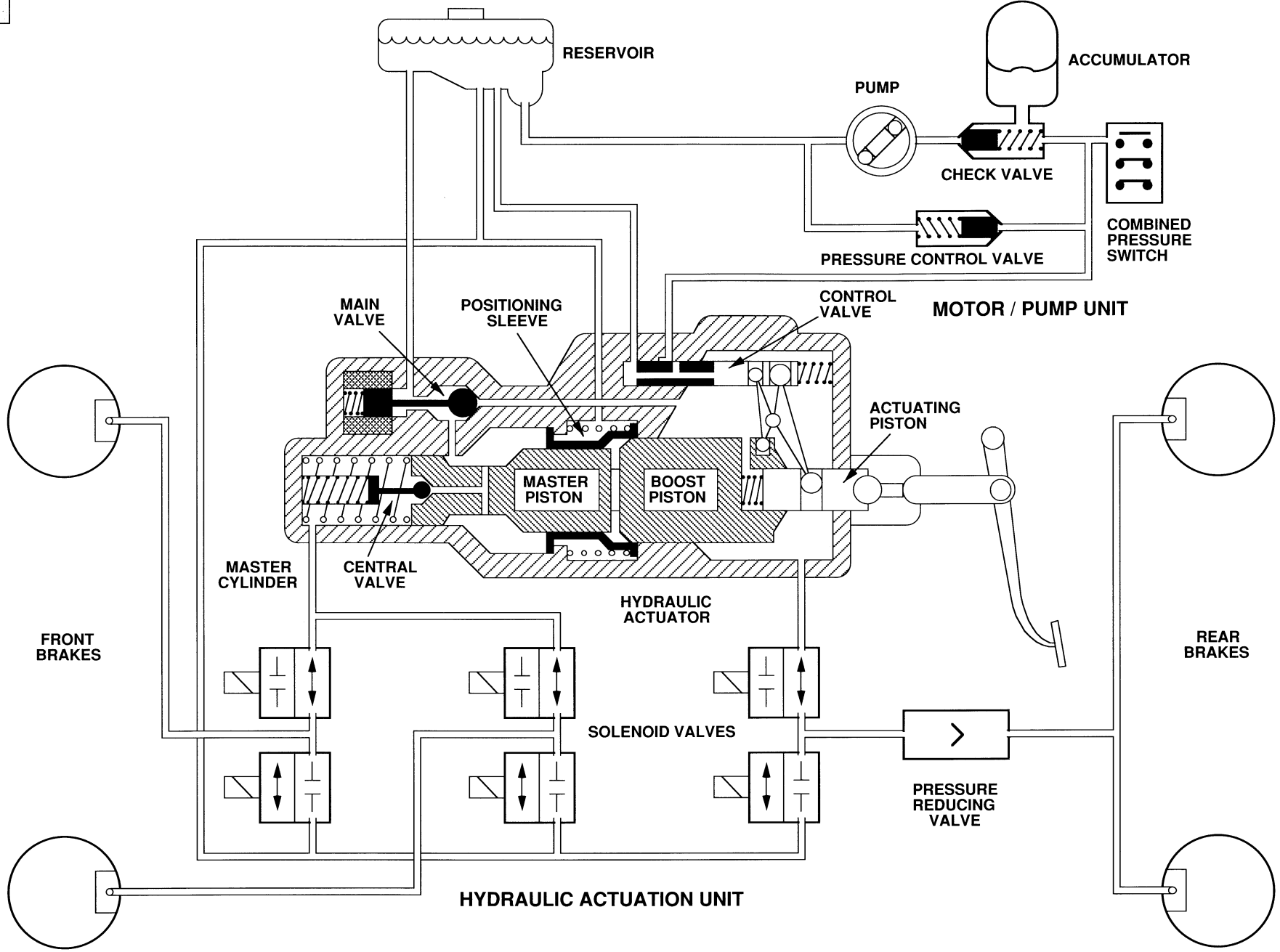
ANTI-LOCK BRAKING

In the XJ-S system, three hydraulic circuits are used—one to each front wheel and one to the rear wheels. Depending on the mode of operation, the circuits operate differently:

Normal Operation The two front hydraulic circuits operate conventionally via the master cylinder assisted by the hydraulic booster. The rear hydraulic circuit is operated continuously by the controlled pressure in the booster via the pressure reducing valve. Simply stated, during normal operation, the front hydraulic circuits are "static" and the rear circuit "dynamic."

Anti-Lock Operation When anti-lock control is required, the front hydraulic circuits also become "dynamic" as boost pressure replaces master cylinder pressure via the main valve. The four wheel speed sensors input to the ECU, which processes the information and modulates the three sets of solenoid valves in the valve block to control the pressure in the three circuits and prevent wheel lock. Because both rear wheels share a common circuit, a tendency for one wheel to lock will result in control of both wheels according to the need of the "locking" wheel.

The state of the anti-lock system is continuously monitored by the ECU. If a failure is identified, it switches off the ABS system and lights the warning. Full boosted braking to all wheels is maintained if the ECU switches off the ABS system. If a failure of the hydraulic boost portion of the system occurs, the brake system will function on the *front wheels only,* without boost pressure.


RESERVOIR
ACCUMULATOR
PUMP
CHECK VALVE
COMBINED PRESSURE SWITCH
PRESSURE CONTROL VALVE
MOTOR / PUMP UNIT
MAIN VALVE
POSITIONING SLEEVE
CONTROL VALVE
ACTUATING PISTON
MASTER PISTON
BOOST PISTON
MASTER CYLINDER
CENTRAL VALVE
HYDRAULIC ACTUATOR
FRONT BRAKES
REAR BRAKES
SOLENOID VALVES
PRESSURE REDUCING VALVE
HYDRAULIC ACTUATION UNIT

HYDRAULIC ACTUATION UNIT

The hydraulic actuation unit contains the reservoir and the components used for pressure application, boost application, and anti-lock valving.

Actuating Piston The actuating piston transmits the motion from the brake pedal to the control valve and the boost piston.

Control Valve The control valve opens and closes the high pressure line from the accumulator to the actuator hydraulic booster.

Hydraulic Booster The boost piston is independent from the actuating piston and applies boost pressure on the master cylinder piston. Boost pressure is used to directly operate the rear brakes.

Master Cylinder The master cylinder operates the front brakes only.

Main Valve The solenoid-activated main valve is opened under anti-lock conditions to apply boost pressure directly to the master cylinder and the front brake circuits.

Central Valve The central valve opens under anti-lock conditions to allow boost pressure to be applied directly to the front brakes.

Positioning Sleeve The positioning sleeve is used during anti-lock operation to prevent brake pedal pulsations.

Solenoid Valves The six solenoid valves direct hydraulic pressure and hydraulic return in the three brake circuits during anti-lock conditions. During normal operation, the valves are at rest, allowing conventional application.

MOTOR PUMP UNIT

The motor pump unit supplies the system operating hydraulic pressure.

Pump The pump is driven by an electric motor and is switched on and off to maintain a range of operating pressure.

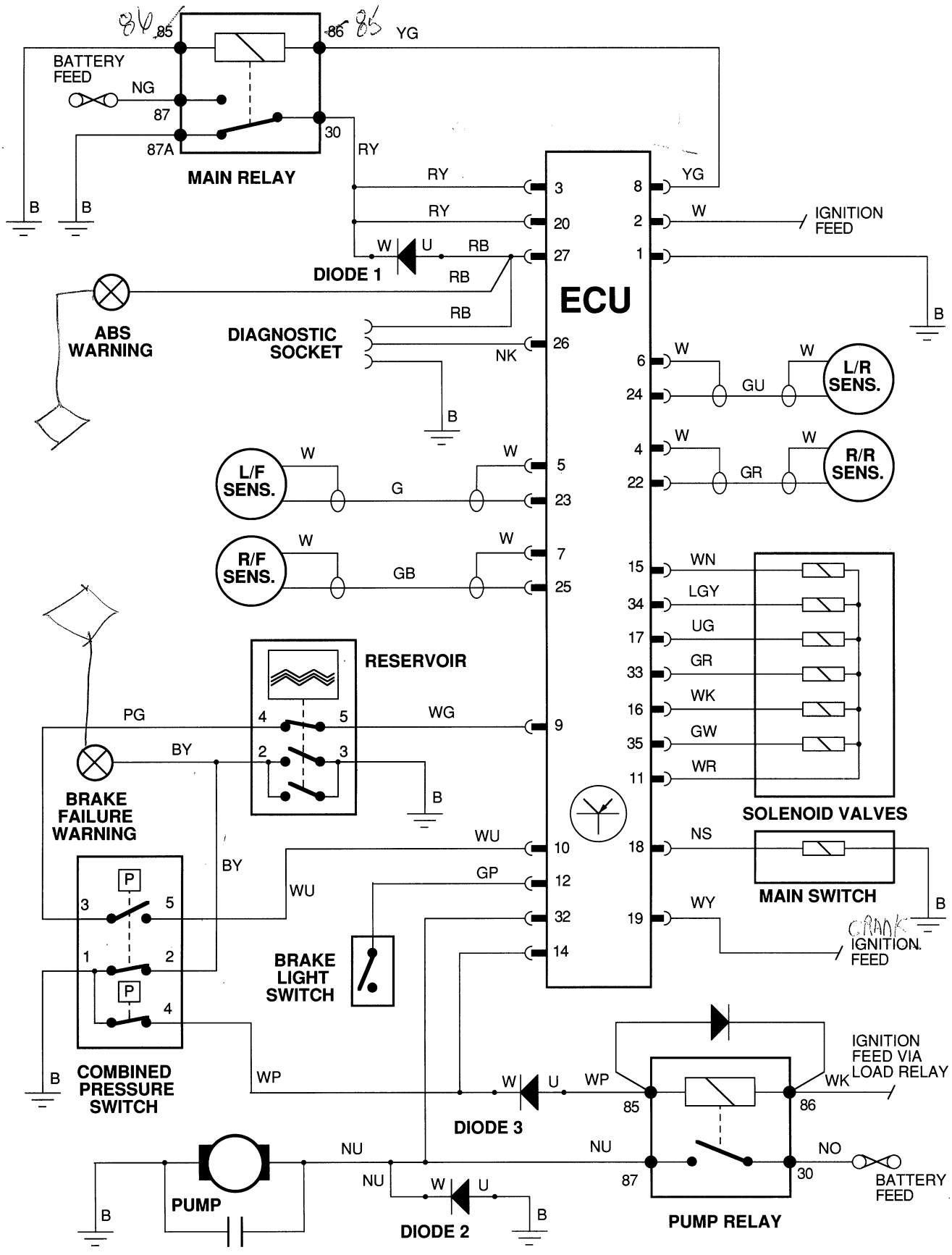
Accumulator The accumulator stores the pump pressure and provides reserve for normal, anti-lock, and pump failure operations. A check valve prevents pressure loss.

Pressure Control Valve The pressure control valve limits the maximum system pressure.

Combined Pressure Switch Two sets of contacts in the pressure operated switch signal the ECU for activation of warnings and anti-lock shut down. The other contacts switch the pump on and off.

PRESSURE REDUCING VALVE

Since the rear brakes operate directly off boost pressure, a pressure limiting device is necessary. The pressure reducing valve is located in the rear brake circuit and limits the pressure applied to the rear brakes.



PROVISIONAL WIRING DIAGRAM

REFER TO PAGE 1 FOR WIRING COLOR CODE

ELECTRICAL CIRCUIT

The ABS electrical circuit is protected by two 30-amp fuses, which receive direct battery feeds. The system is switched on by the ignition switch via the ECU.

Electronic Control Unit The ECU processes information from the wheel speed sensors and the various switches for system operation, control, and warnings.

Main Relay The main relay provides the power for system operation. The control circuit is switched by the ECU from an ignition ON signal.

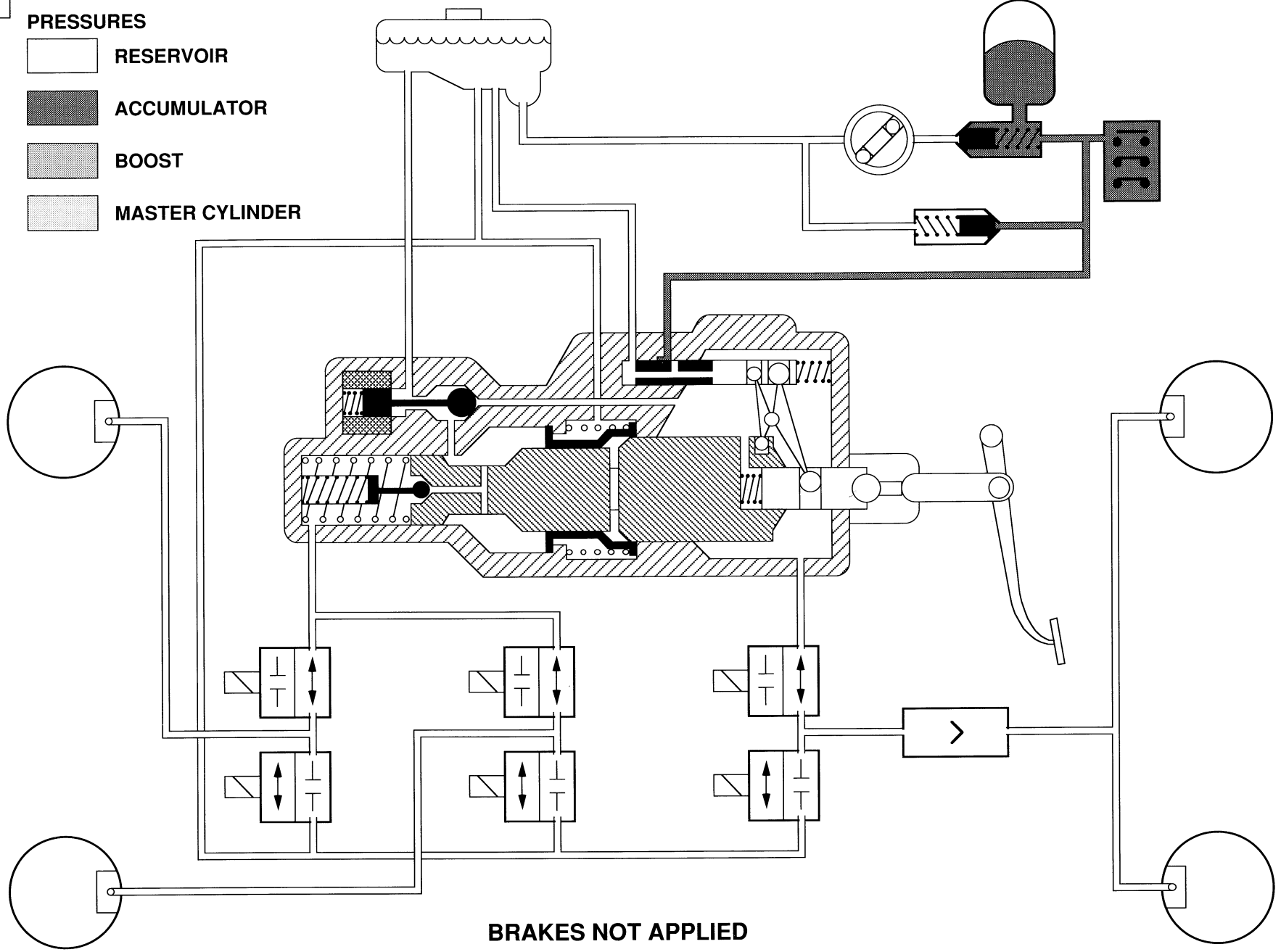
Pump Relay The pump relay provides remote pump switching. The control circuit is ignition fed (via the load relay) and is switched by the pump contacts in the combined pressure switch.

Reservoir The reservoir contains three fluid level operated reed switches. Two "normally open" switches light the BRAKE FAILURE warning if the level drops too low. The third "normally closed" switch signals the ECU if the level drops below a minimum level for full ABS operation. In this case, the ECU switches off the front wheel ABS and lights the ABS warning.

Combined Pressure Switch The combined pressure switch contains three pressure-operated switches. The two "normally closed" switches open when normal operating pressure is reached, switching off the pump and the BRAKE FAILURE warning. The third "normally open" switch closes if the system pressure falls too low and signals the ECU, which lights the ABS warning.

Main Switch The main switch activates the main valve on signal from the ECU.

Diagnostic Socket The diagnostic socket is provided for conducting system self tests.



BRAKES NOT APPLIED

SYSTEM OPERATION: BRAKES NOT APPLIED

Control Valve
The control valve is open to the reservoir and closed to accumulator pressure from the motor pump unit.

Pump
The pump is switched on or off as determined by system pressure.

Accumulator
The accumulator stores boost pressure for use as soon as the brakes are applied.

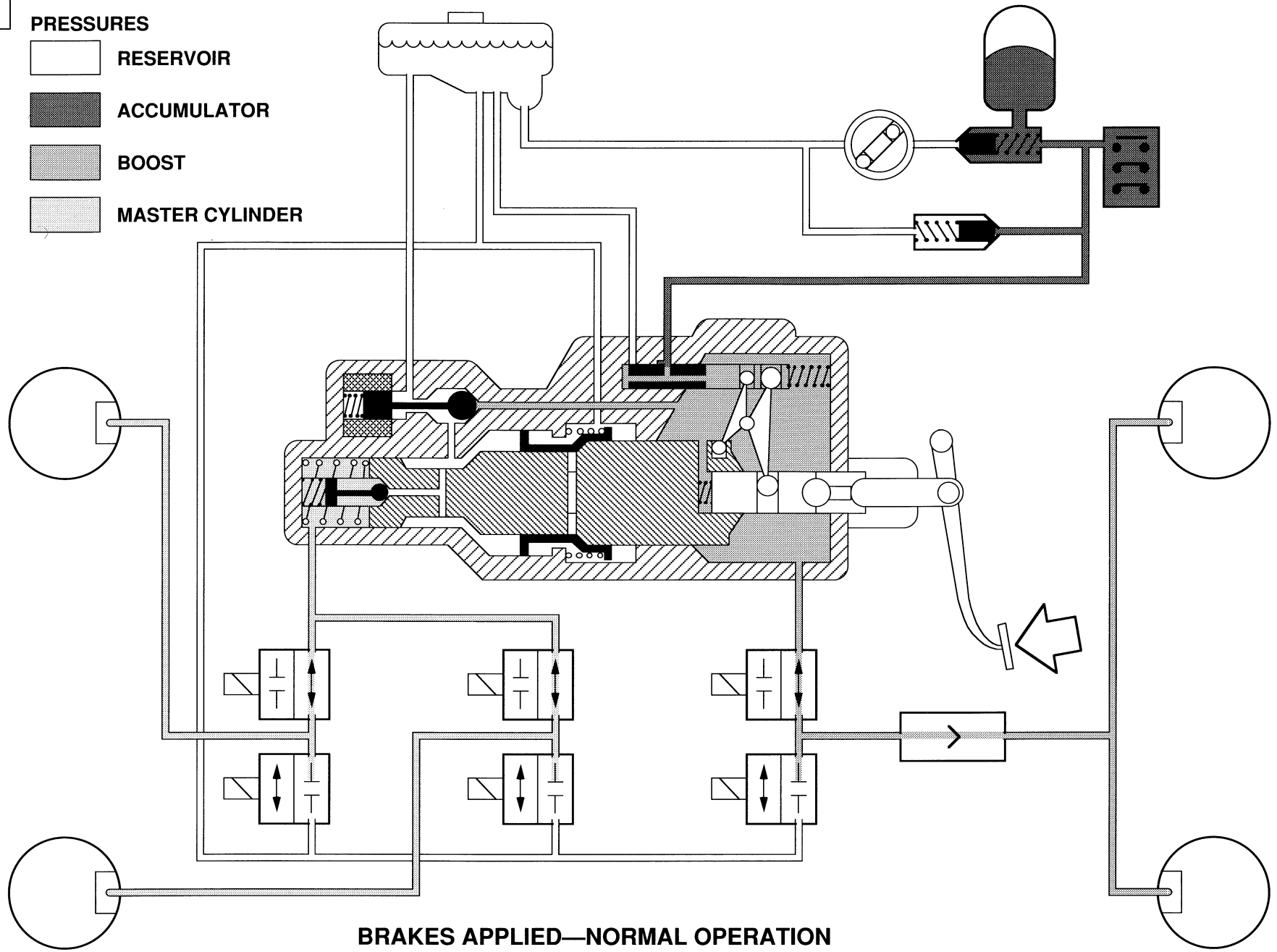
Boost Piston
The boost piston is retracted.

Positioning Sleeve
The positioning sleeve is at rest.

Master Cylinder
The master cylinder is at rest.

Main Valve
The main valve is switched off.

Equalized Hydraulic Pressure The hydraulic pressure is equalized throughout the system (except in the accumulator to control valve line).



BRAKES APPLIED—NORMAL OPERATION

SYSTEM OPERATION: BRAKES APPLIED—NORMAL OPERATION

Control Valve
As the driver applies force to the brake pedal, the actuating piston moves forward. The lever mechanism moves the control valve forward, opening the port from the accumulator and closing the return port to the reservoir. Boost pressure is applied to the boost piston and the rear brakes.

Boost Piston
The boost piston increases the pedal force acting on the master cylinder piston.

Main Valve
The main valve remains at rest, connecting the master cylinder to the reservoir.

Central Valve
As the master cylinder piston moves forward, the central valve closes and pressure is built up in the front brake circuits.

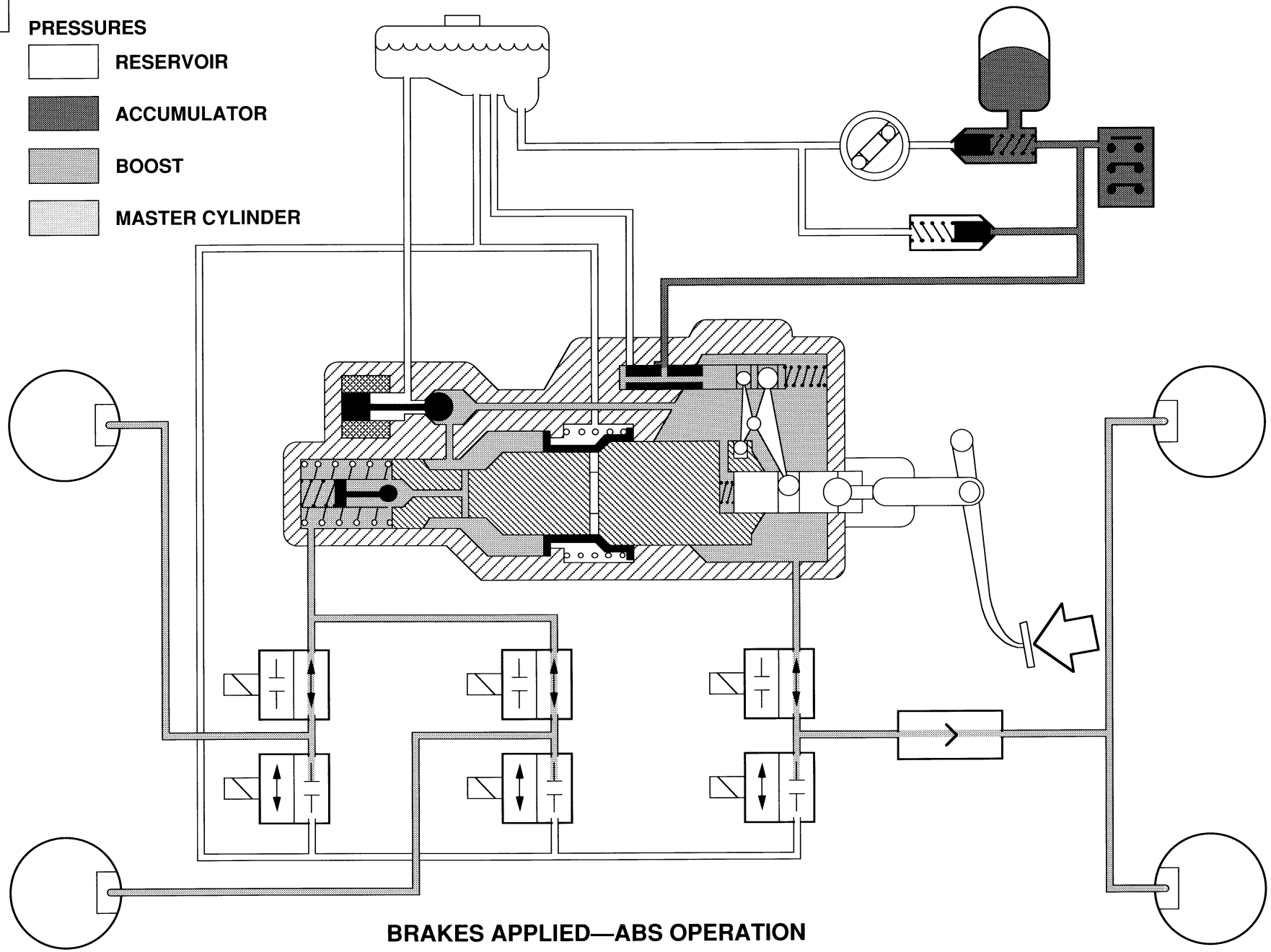
Positioning Sleeve
The positioning sleeve moves forward with the boost piston. The displaced fluid returns to the reservoir through the main valve, which is at rest.

Pressure Reducing Valve
Boost pressure is applied to the rear brakes through the pressure reducing valve.

Solenoid Valves
All solenoid valves are at rest, allowing pressure application and preventing return to the reservoir.

Boost Pressure Control As the boost pressure increases, it acts between the boost piston and the actuating piston, moving the actuating piston back, which moves the control valve to close the port from the accumulator. The control valve closes the accumulator pressure port when the pedal force and boost force acting on the actuating piston equalize. The return port to the reservoir remains closed. The resulting pressure in the booster is proportional to the pedal force; low pedal force = low pressure; high pedal force = high pressure.

"Dynamic," "Static" During normal operation, boost pressure is applied directly to the rear brake circuit, thus the description "dynamic." The front brake master cylinder is supplied with reservoir gravity pressure only, thus the description "static."



BRAKES APPLIED—ABS OPERATION

SYSTEM OPERATION: BRAKES APPLIED—ANTI-LOCK OPERATION

Main Valve
When the ECU senses the need for ABS control it activates the main switch, which moves the main valve, closing the reservoir feed line and applying boost pressure to the master cylinder circuit.

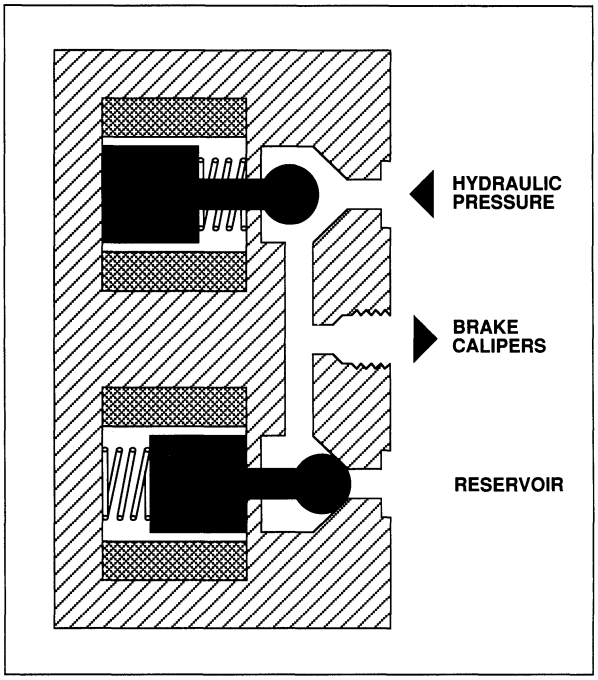
Central Valve
The central valve is held open by the pressure allowing boost pressure to be applied directly to the front brake circuits.

Positioning Sleeve
The positioning sleeve is gradually moved to its rest position by the boost pressure. This action pushes back the boost piston, the actuating piston, and the brake pedal, preventing ABS pulsations from being transmitted to the brake pedal.

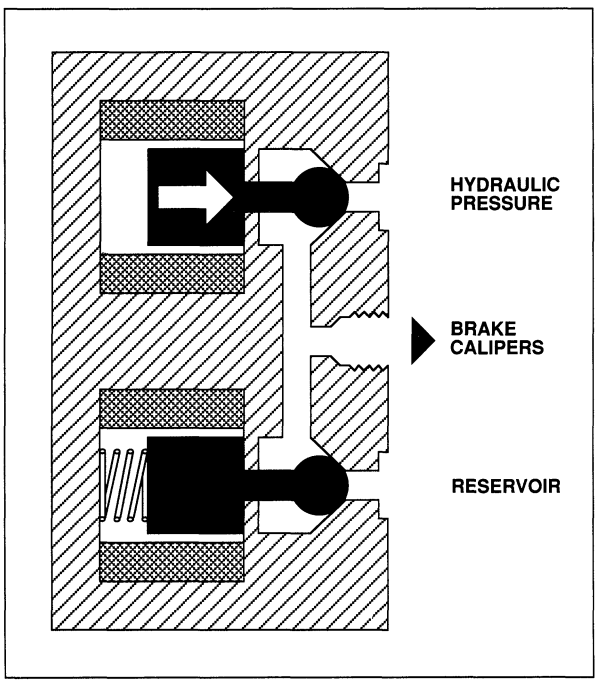
Solenoid Valves
The solenoid valves are modulated as necessary by the ECU to prevent wheel lock. Refer to pages 20–21 for solenoid valve operation.

"Dynamic," "Dynamic" During ABS operation both the front and rear brake circuits are "dynamic" as the front brakes are also operated directly by boost pressure.

SOLENOID VALVE OPERATION



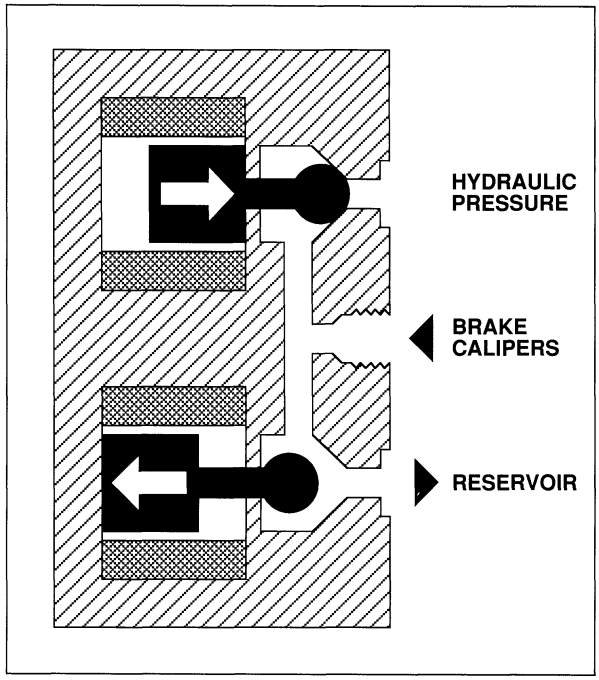
A pair of solenoid valves for one control circuit is shown. During normal braking operation, the solenoid valves are not controlled by the ECU and no current is applied. The inlet valve is open and the outlet valve is closed, porting hydraulic pressure to the brake caliper circuits. During ABS operation, the valves are modulated in three phases by the ECU as necessary to prevent wheel lock. The three phases are repeated up to six times per second until wheel lock is eliminated.



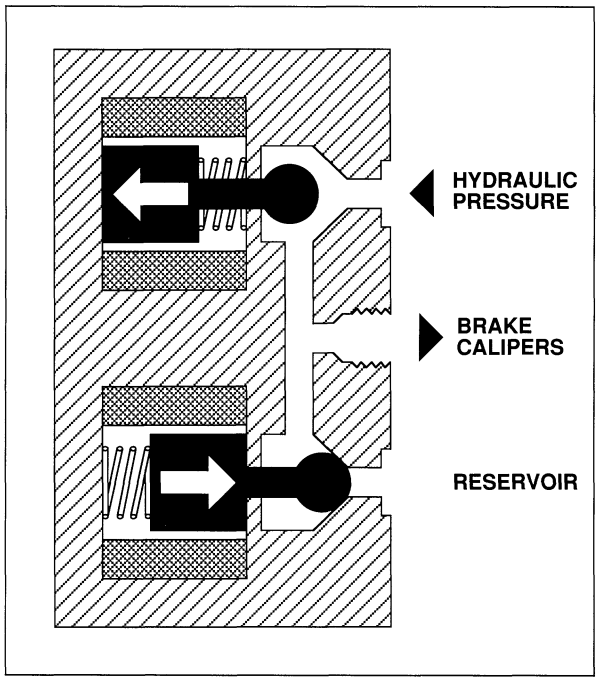
Phase One: Pressure Hold
To maintain brake pressure, the ECU activates the inlet valve, which closes and prevents additional hydraulic pressure application. The outlet valve remains closed, preventing return to the reservoir.

SOLENOID VALVE OPERATION

Phase Two: Pressure Reduce
If a wheel still has a tendency to lock with the pressure maintained, the ECU activates both valves, which prevents hydraulic pressure application and allows return to the reservoir—decreasing the pressure in the brake circuit.

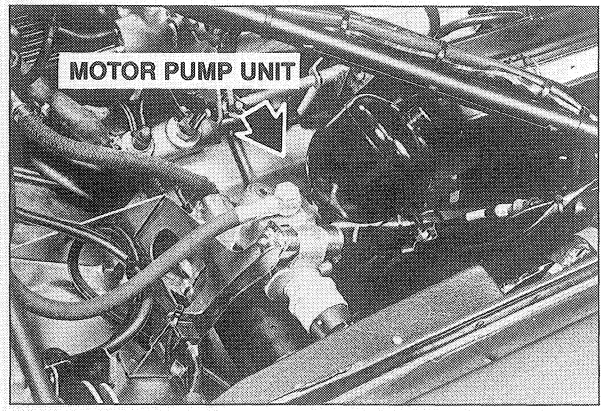


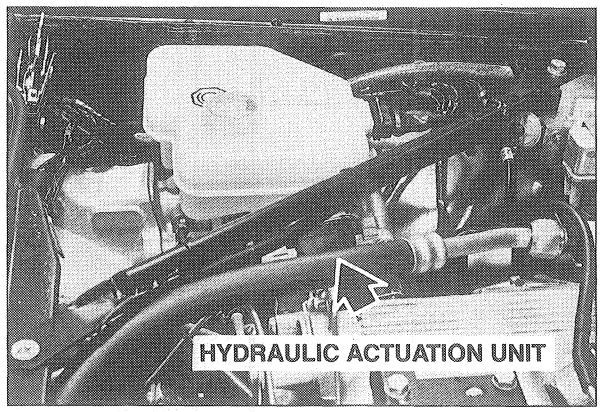
Phase Three: Pressure Increase
As the wheel accelerates, the ECU deactivates both valves, allowing hydraulic pressure to be applied to the brakes.



COMPONENT LOCATIONS

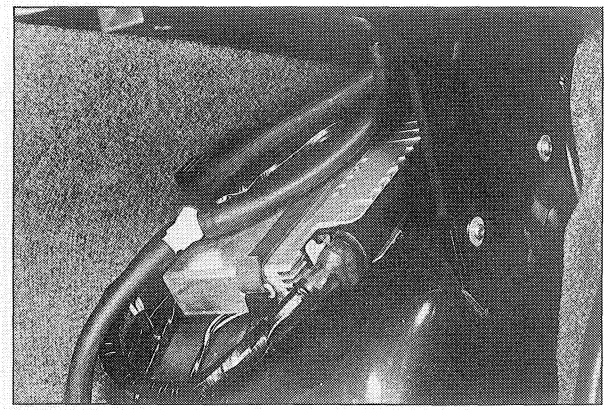
Motor Pump Unit; Hydraulic Actuation Unit





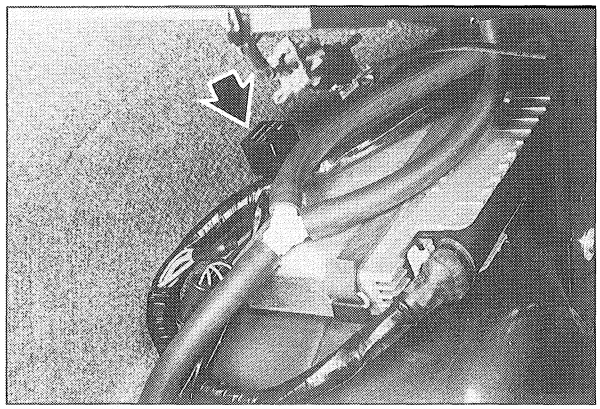
Location Engine compartment firewall, right and left sides.

Electronic Control Unit



Location Trunk, forward, left side.

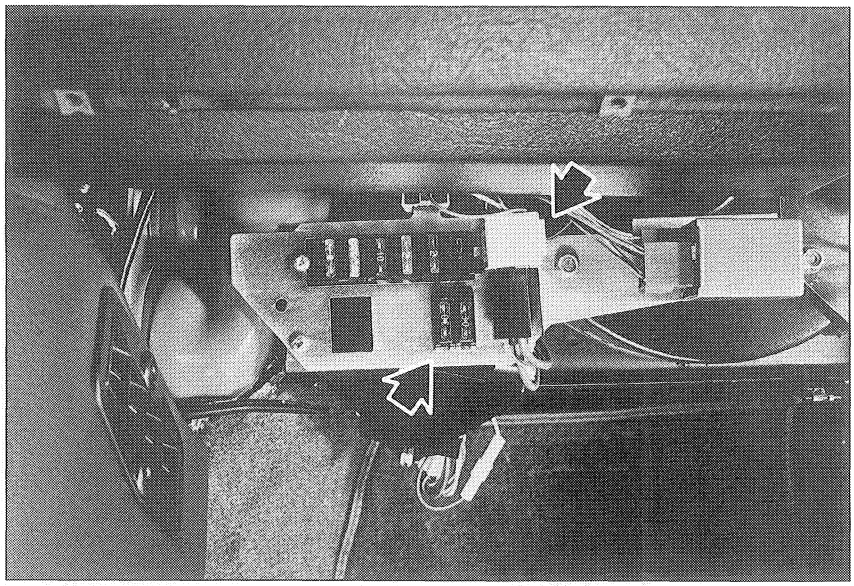
Main Relay



Location Beside ECU.

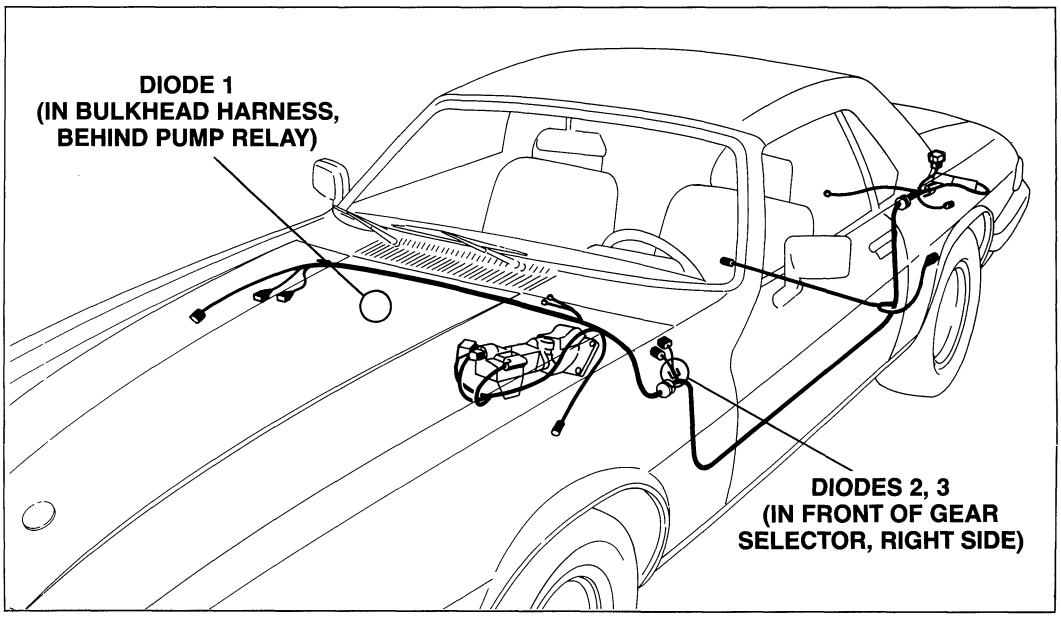
COMPONENT LOCATIONS

Pump Relay and Fuses



Location Right component panel.

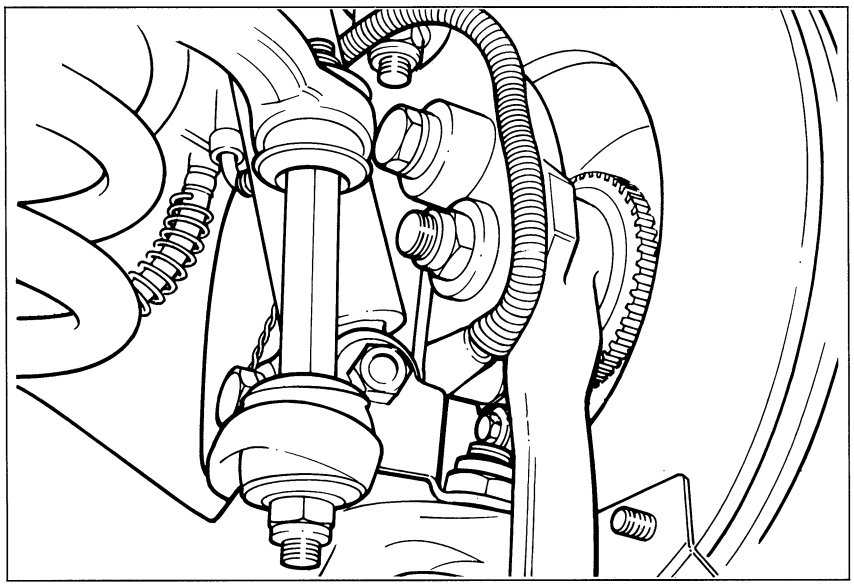
ABS Wiring Harness



Location Separate harness paralleling the rearward harness and the bulkhead harness on the right side.

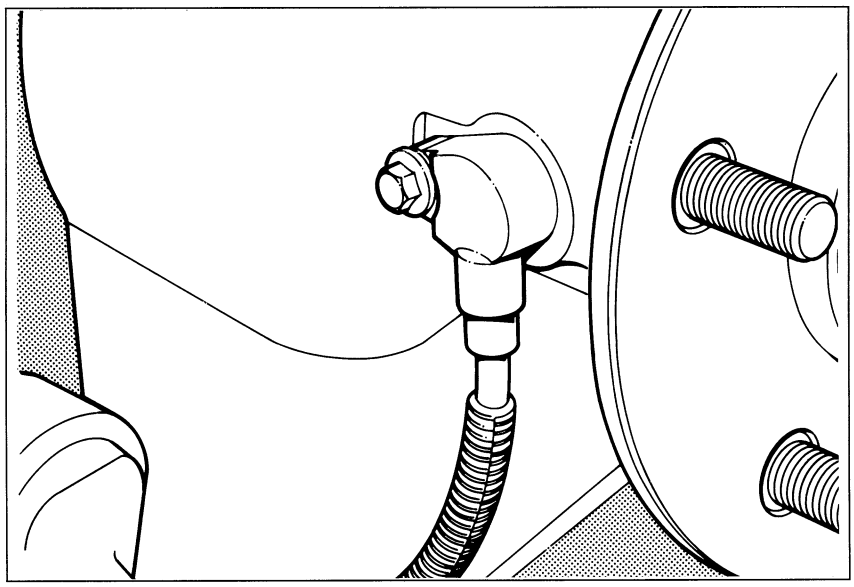
COMPONENT LOCATIONS

Front Wheel Speed Sensors



Location Front wheel hubs.

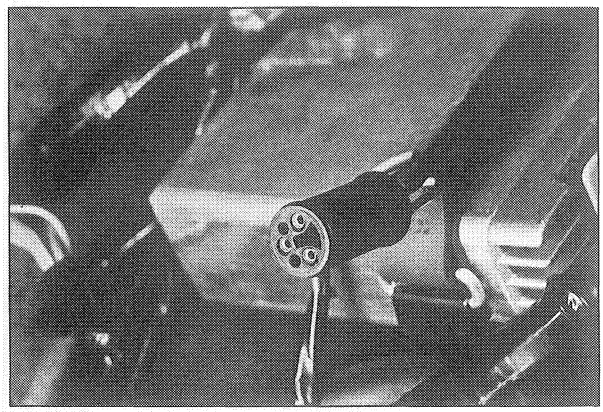
Rear Wheel Speed Sensors



Location Rear wheel hub carriers.

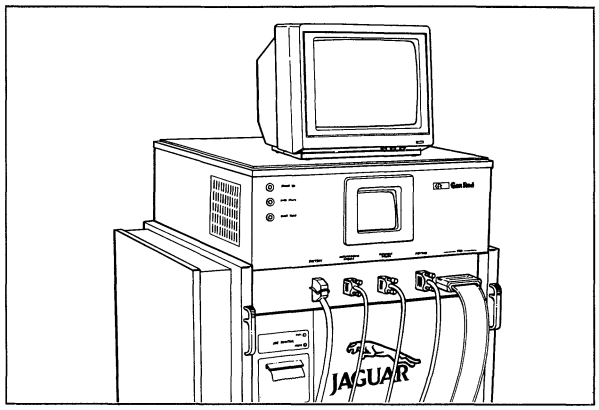
SYSTEM TESTING

System Self Tests



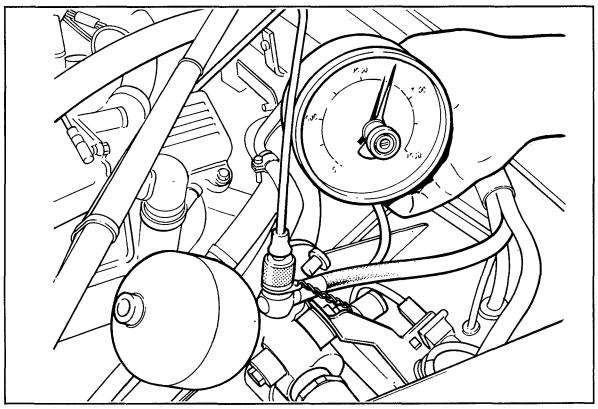
When a fault occurs, the ECU stores the information in its memory. Memory read out is provided via the ABS warning light. The diagnostic socket is used to perform the self tests.

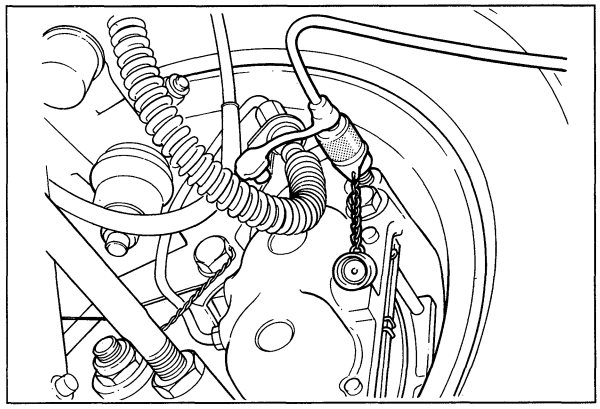
Electrical Testing



Electrical circuit testing will be incorporated into future editions of JDS software.

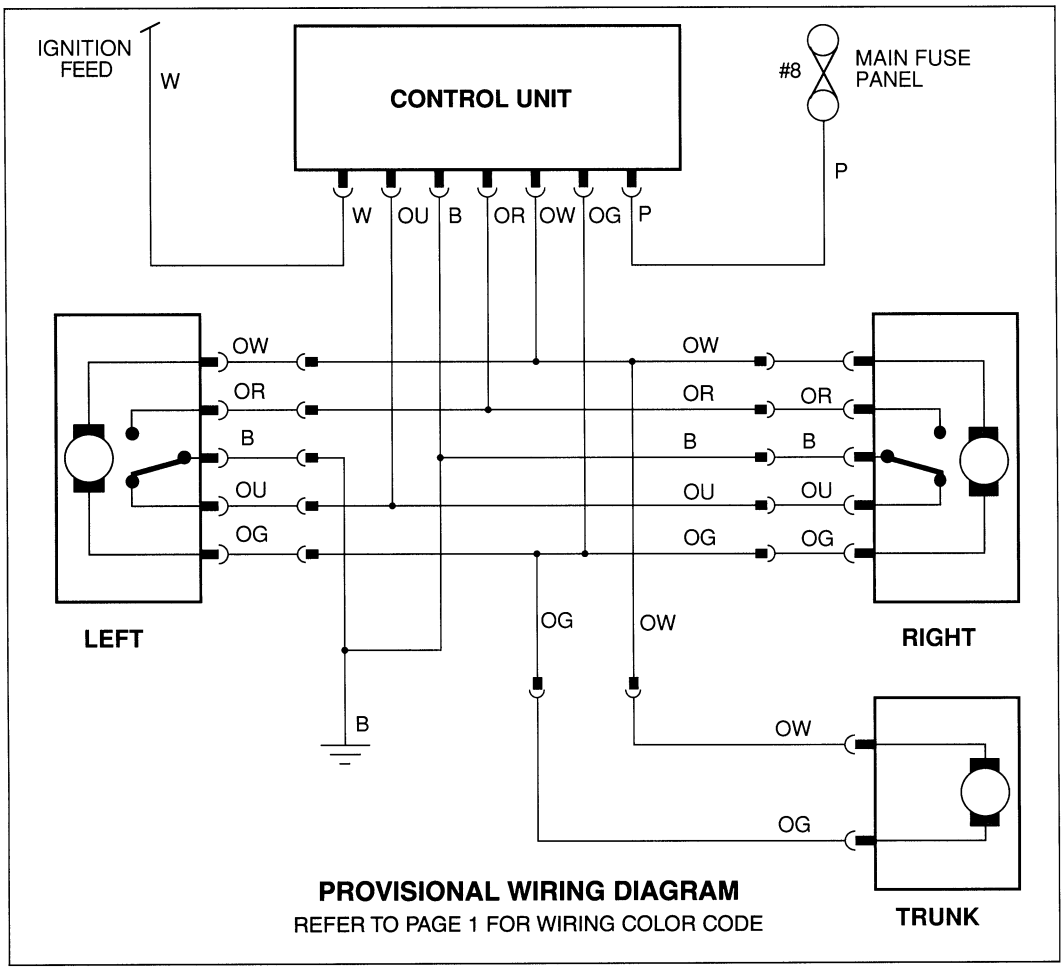
Hydraulic Pressure Testing





A Jaguar service tool set is used for testing the hydraulic pressures. The tool set includes pressure gauges and adaptors for connection to the pump, actuator, and brake calipers.

MOTORIZED DOOR LOCKS



PROVISIONAL WIRING DIAGRAM

REFER TO PAGE 1 FOR WIRING COLOR CODE

The motorized door lock system includes an actuator in each door and an actuator in the trunk lid. An electronic door lock control unit controls the system and contains an inertia switch to unlock the door locks in the event of a collision.

The control unit determines which locks to activate depending on the inputs received from the two door lock flaps. The *locking* of either door from the exterior key or the interior flap will lock both doors and the trunk simultaneously. The *unlocking* of either door from the exterior key or the interior flap will unlock both doors only or both doors and the trunk lock—*depending on the position of the trunk key lock.*

The trunk key lock has three positions:

Key turned fully clockwise The trunk lock operates with the door locks.

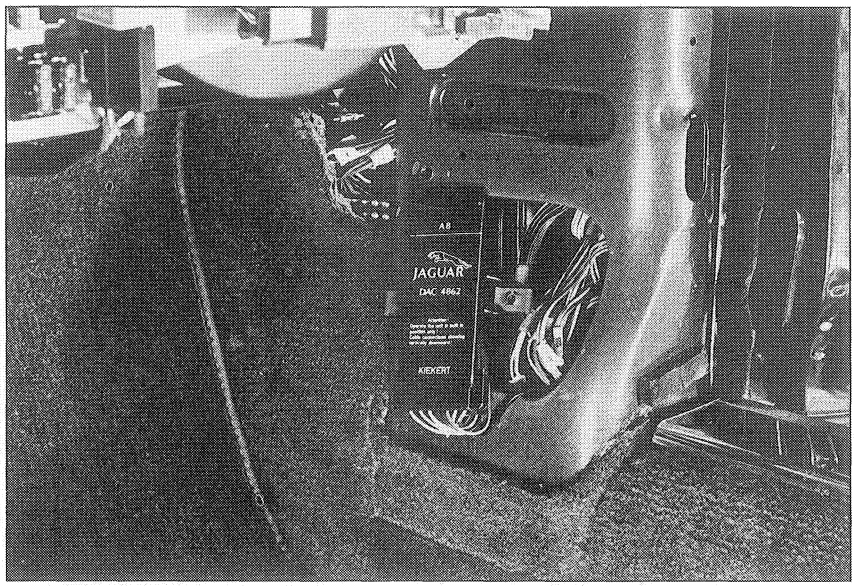
Key turned fully counter clockwise The trunk lock is permanently locked.

Key vertical The key cannot be removed. The trunk can be opened regardless of the door lock position. This allows the trunk to be opened with the doors centrally locked.

MOTORIZED DOOR LOCKS

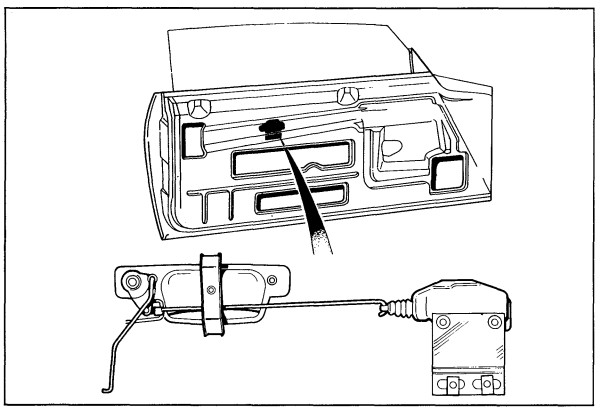
COMPONENT LOCATIONS

Door Lock Control Unit

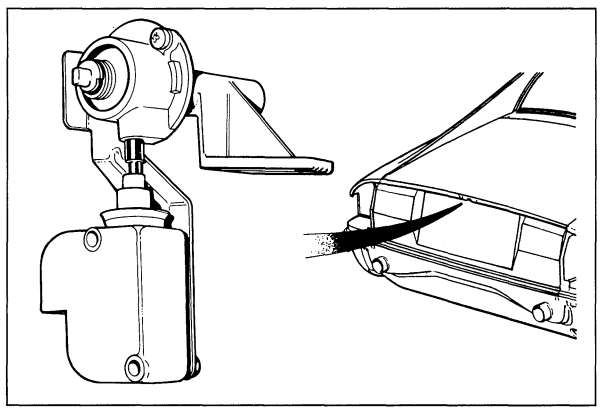


Location Right door "A" post.

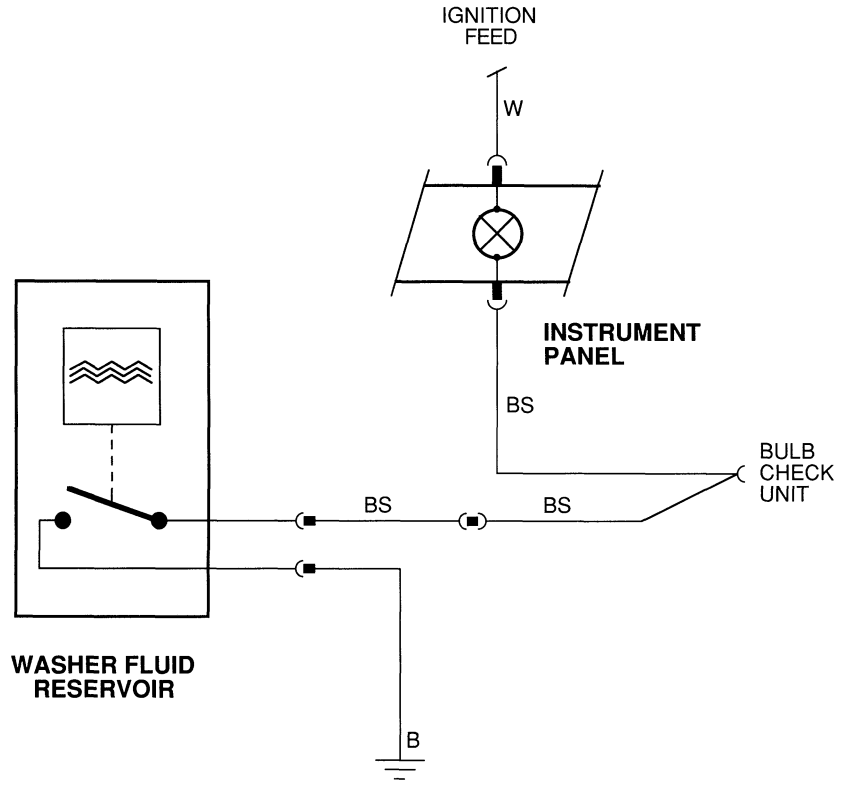
Door Lock Unit



Trunk Lock Unit



WASHER FLUID LEVEL WARNING

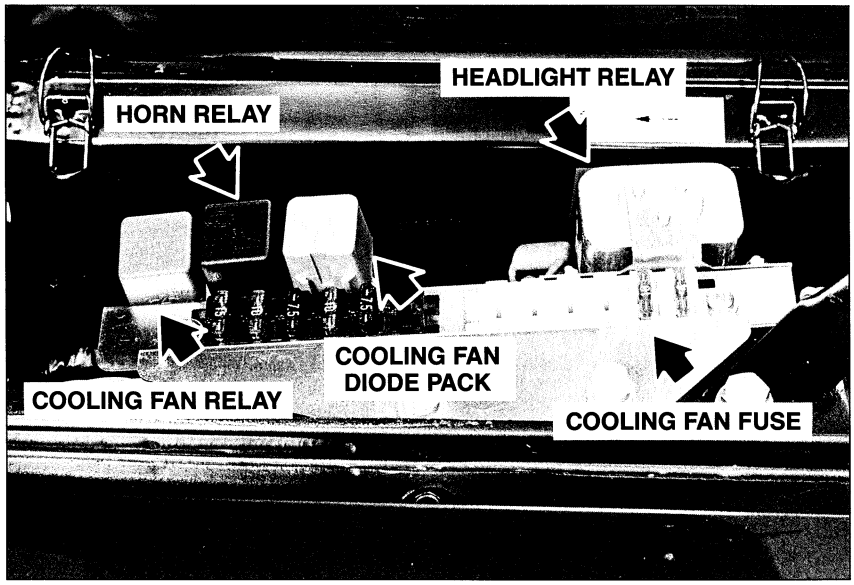


PROVISIONAL WIRING DIAGRAM

REFER TO PAGE 1 FOR WIRING COLOR CODE

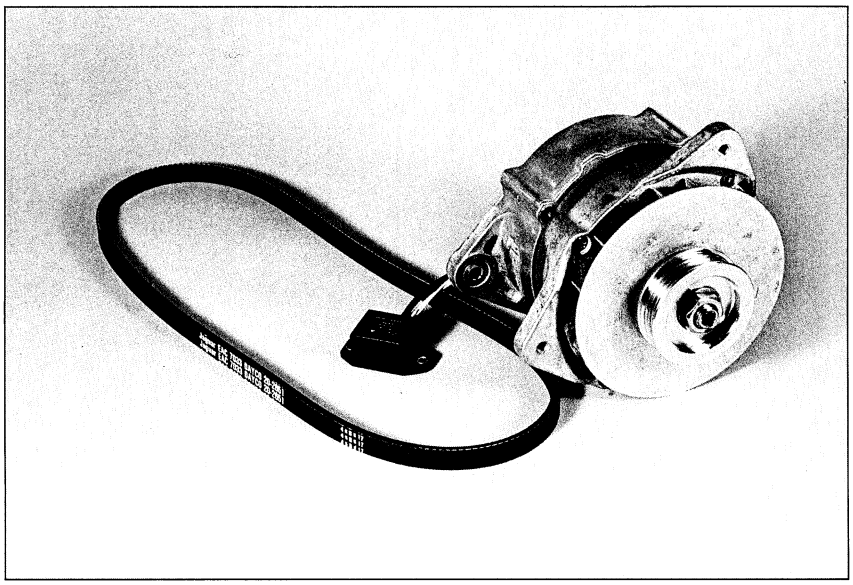
A low fluid warning has been added to the new washer fluid reservoir.

UNDER HOOD COMPONENT PANEL



An under hood component panel has been added to the left front inner fender to consolidate the components previously spread out along the fender.

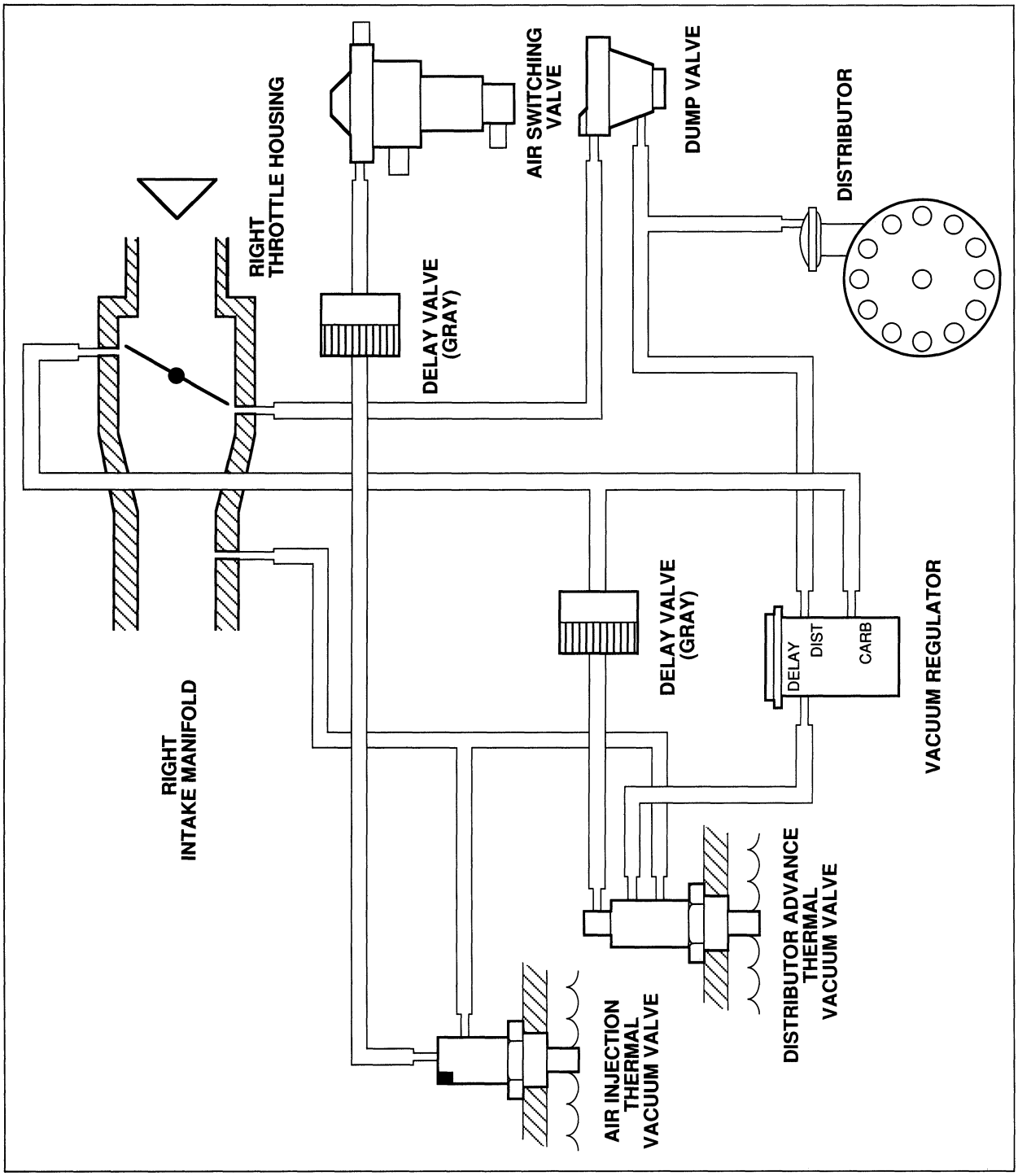
ELECTRICAL SYSTEM CHARGING



A new 115-amp alternator driven by a "multiple V" belt charges the electrical system. To protect against high electrical system transient voltages, an alternator dump module is installed.

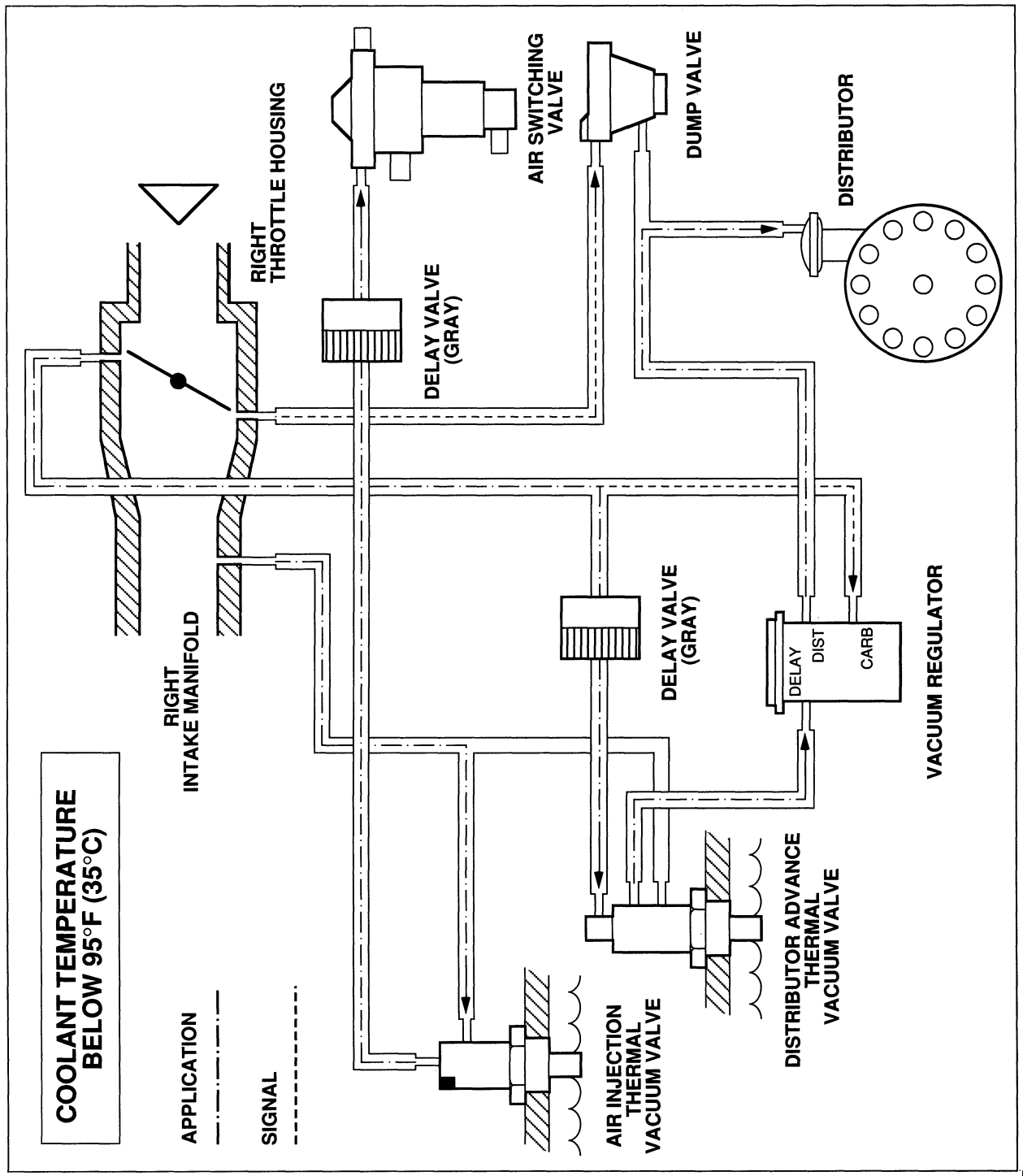
EFI AND EMISSIONS CONTROL

The 45-second timer circuit has been eliminated and replaced with a vacuum circuit. Control is provided by a thermal vacuum valve, which senses engine coolant temperature.



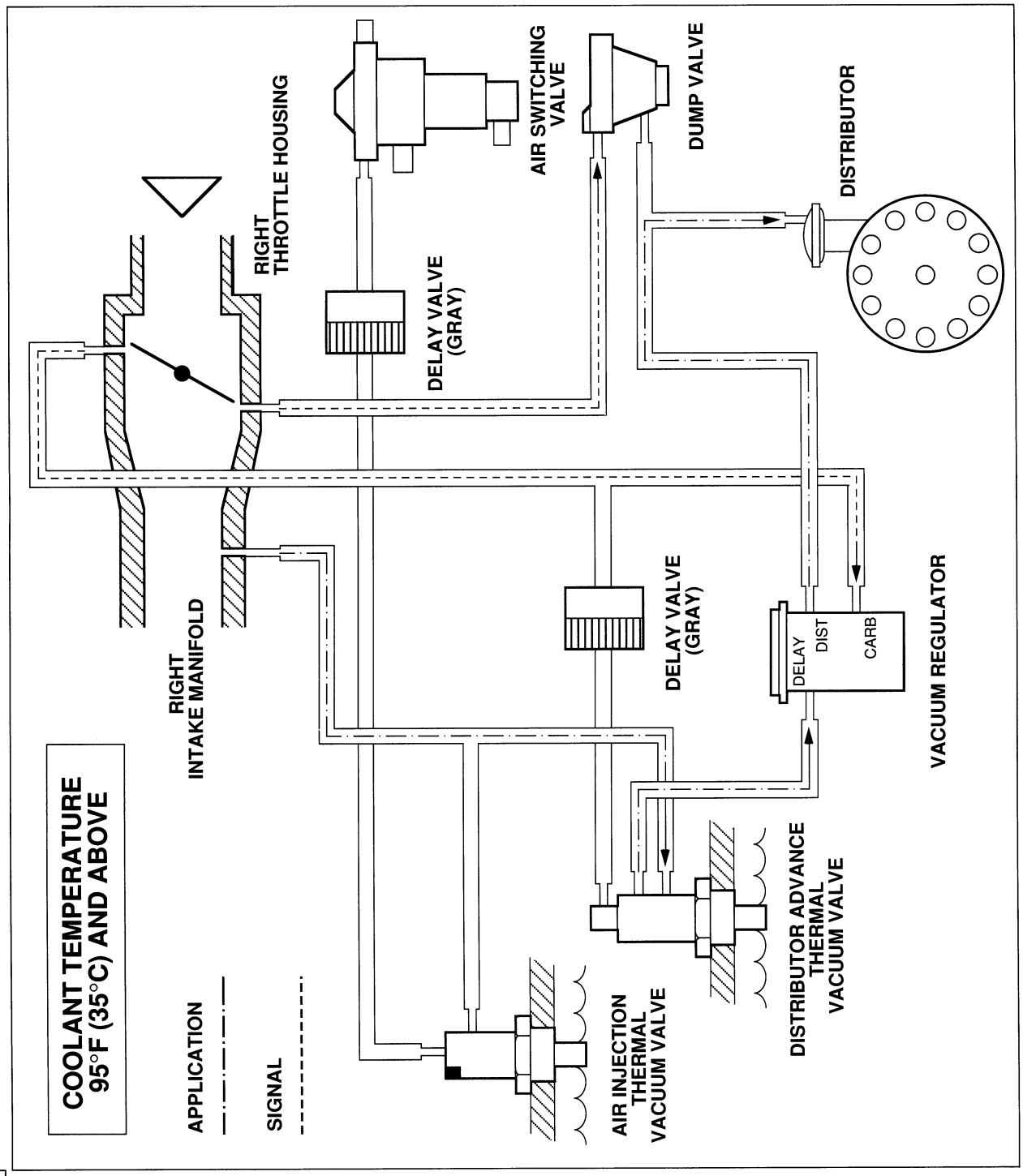
VACUUM OPERATION—ENGINE COLD

When the engine coolant temperature is below 95°F (35°C), the thermal vacuum valve connects the upper port with the middle port. Ignition vacuum advance is operated by throttle edge "ported" vacuum through the vacuum regulator. The delay valve prevents a sudden loss of vacuum, or a sudden increase in vacuum if the throttle valve is moved rapidly. The vacuum regulator will not allow vacuum to be applied to the distributor until the "CARB" port receives a vacuum signal.



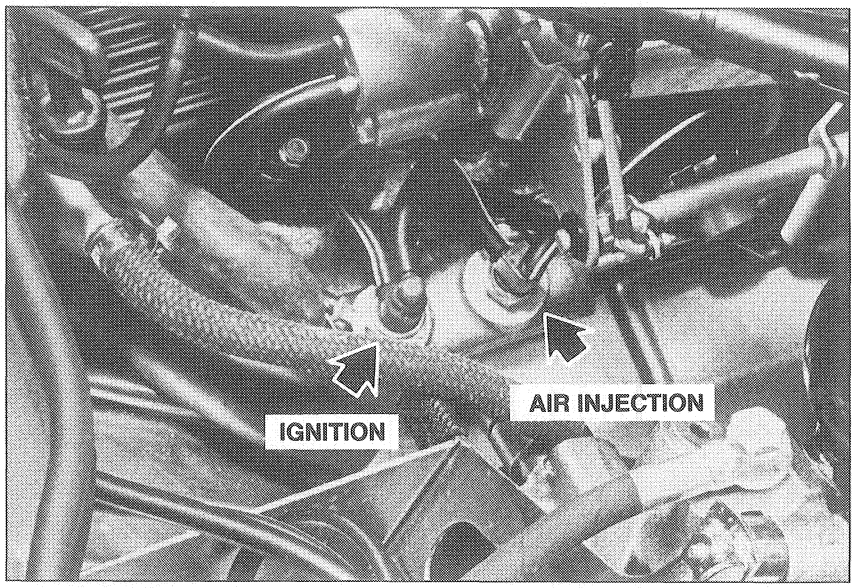
VACUUM OPERATION—ENGINE WARM

When the engine coolant temperature reaches 95°F (35°C), the thermal vacuum valve closes the upper port and connects the lower port to the middle port. Distributor vacuum advance is controlled in the normal manner through the vacuum regulator.



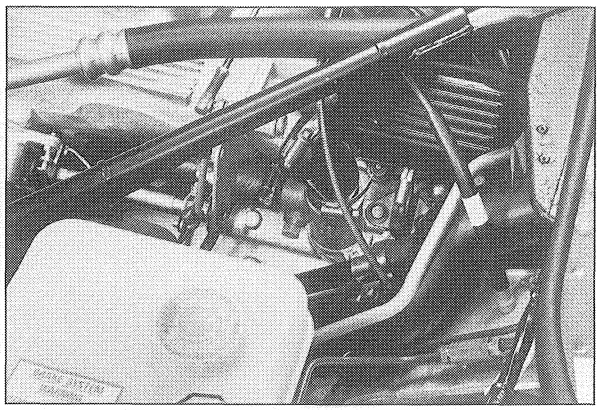
COMPONENTS

Thermal Vacuum Valves



Location Right rear of engine.

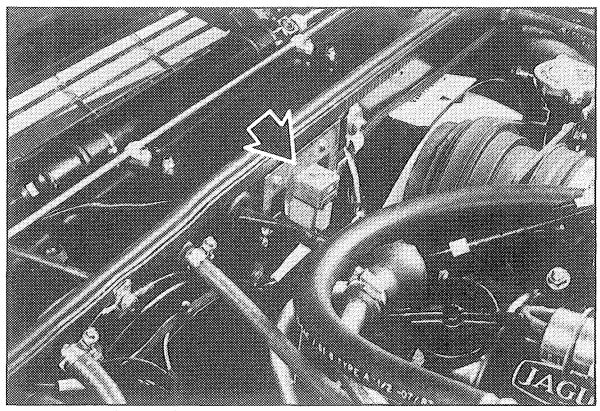
Extra Air Valve



Location Left rear of engine.

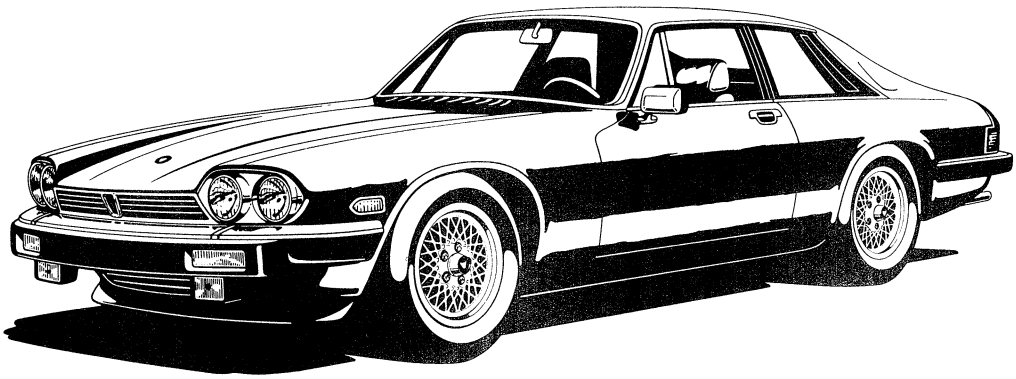
Description The revised extra air valve provides increased air flow for starting and warm-up.

Idle Relay



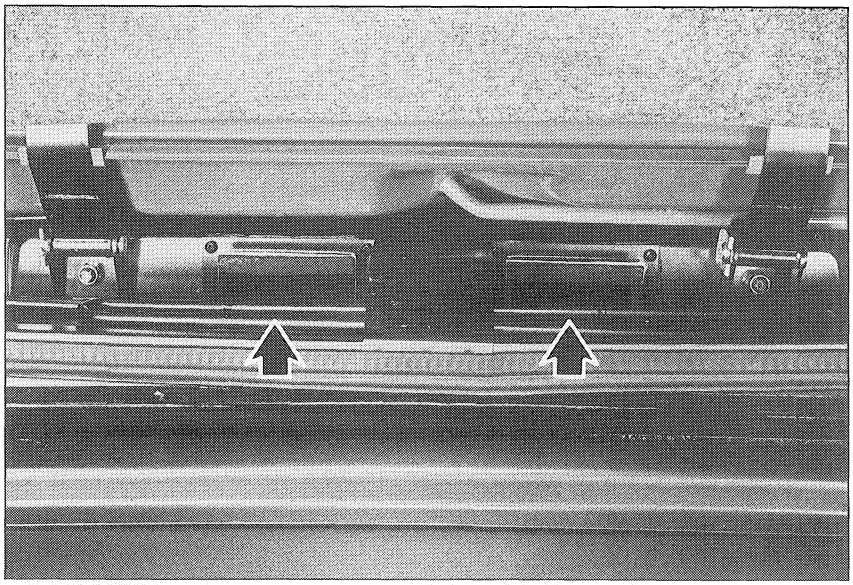
Location Radiator support.

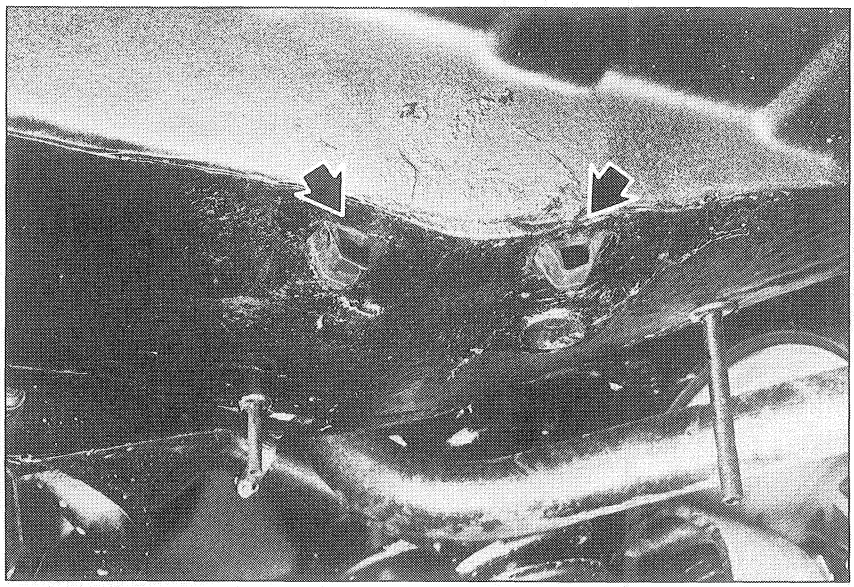
Description During air conditioning compressor operation, the supplementary air valve is activated from the compressor relay, allowing increased idle air flow to the right intake manifold. When Neutral or Park is selected, the idle relay switches off the supplementary air valve.



TRUNK VENTILATION

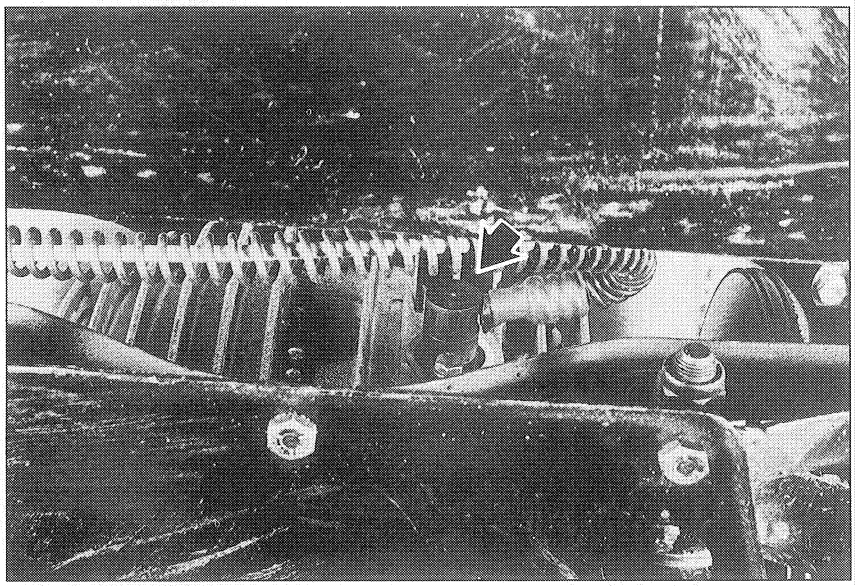
To provide additional trunk ventilation, two vents have been installed above the rear parcel shelf. These vents increase air flow from the passenger compartment to the trunk. Trunk air extraction is increased by the installation of two additional vented grommets in the floor. These modifications were introduced at VIN 142987.





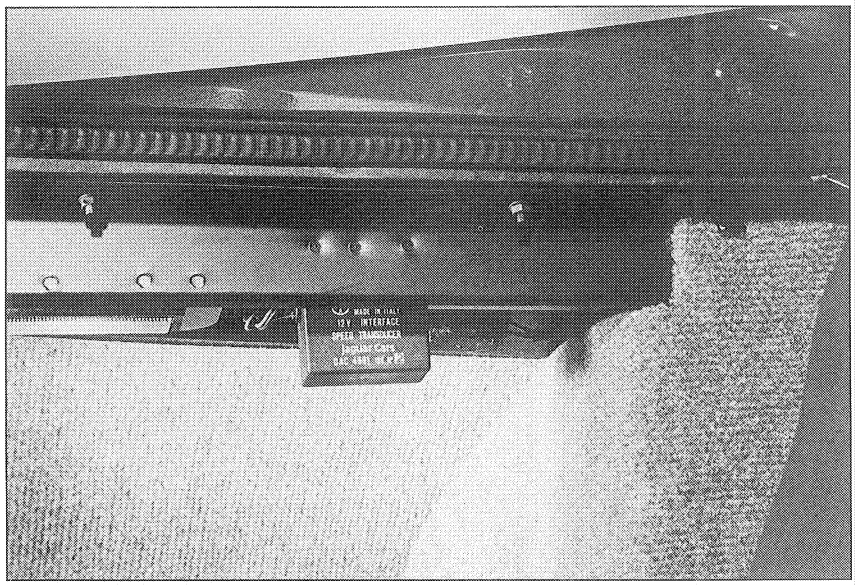
A revised speed sensing circuit was introduced at VIN 144263. A new speed sensing transducer is mounted on the final drive housing and uses the ring gear as a reluctor. The previous service interval counter has been replaced by a speed interface unit. The speed sensing circuit supplies road speed input to the speedometer, cruise control, and the trip computer.

Speed Transducer



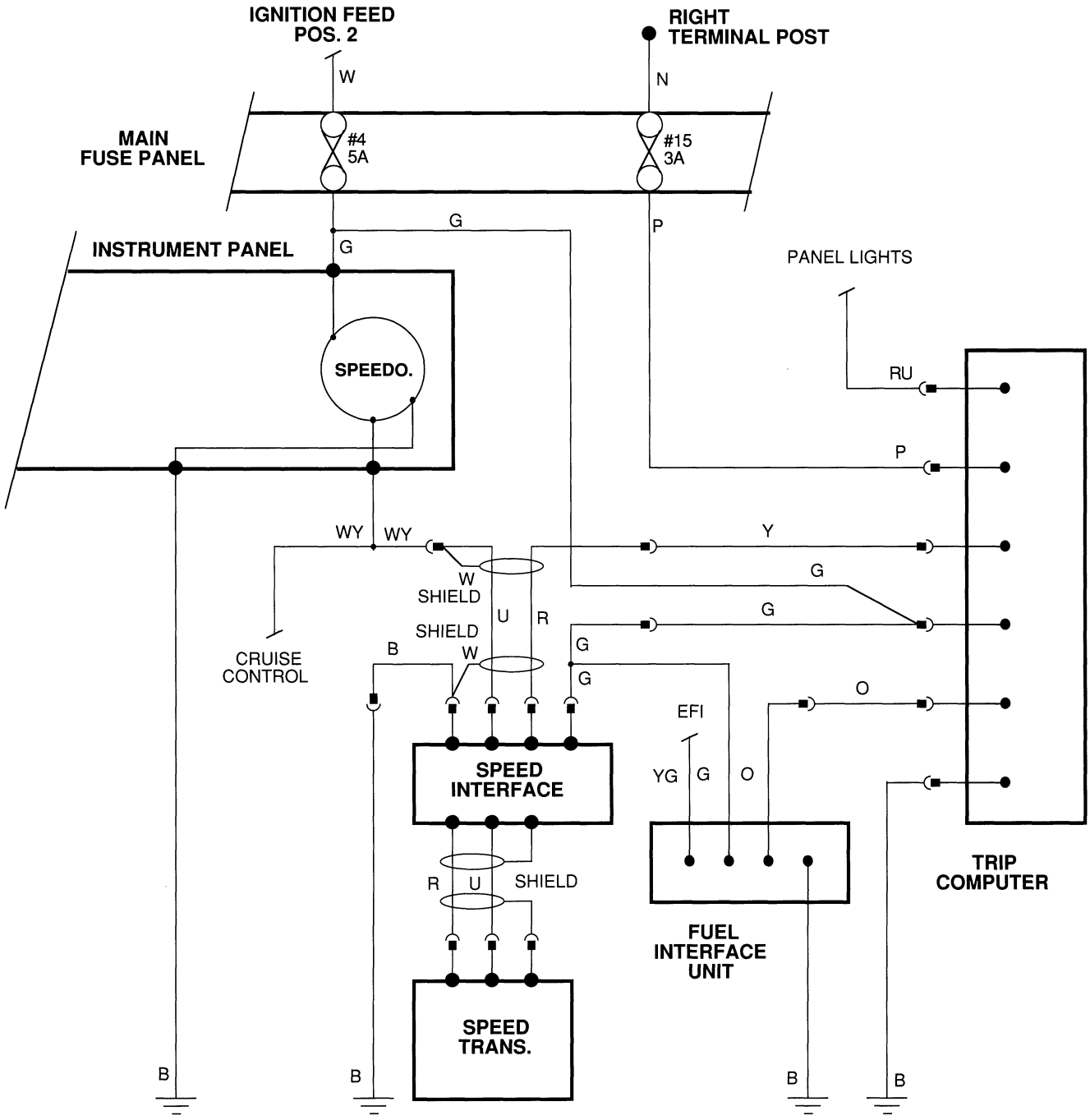
Location Final drive.

Speed Interface



Location Trunk, left side.

SPEED SENSING



PROVISIONAL WIRING DIAGRAM

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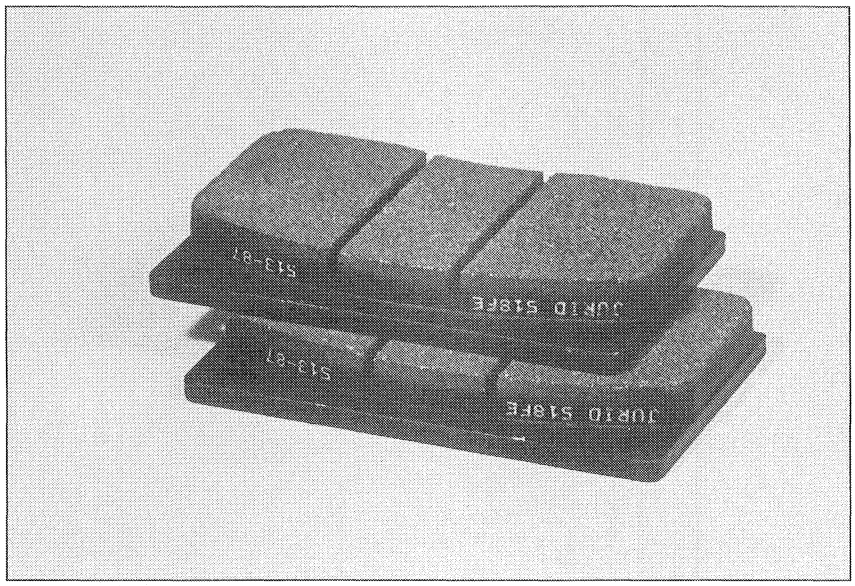
Brake Lining
The brake pad lining material was changed to improve performance and wear characteristics. This was introduced at VIN 144578. The new pads can be identified by the word Jurid 518.



Battery
A new 70 Amp Hour battery was introduced at VIN 145730. This battery has a different mounting arrangement than the previous battery and is not interchangeable. The electrolyte level should be maintained at 6mm above the plates.

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