

INTRODUCTION

How to Use This Manual -

This manual is divided into 14 sections. The first page of each secion is marked with a black tab that lines up with one of the thumb index tabs on this page and the back cover. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

- 1. A table of contents, or an exploded view index showing:
 - Parts disassembly sequence.
 - Bolt torques and thread sizes.
 - Page references to descriptions in text.
- 2. Disassembly/assembly procedures and tools.
- 3. Inspection.
- 4. Testing/troubleshooting.
- 5. Repair.
- 6. Adjustments.

Special Information -

AWARNING Indicates **a strong** possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION: Indicates a possibility of personal injury or equipment damage if instructions are not followed.

NOTE: Gives helpful information.

ION: Detailed descriptions of standard workshop procedures, safety principles and service operations are not included,,,, Please note that this manual does contain warnings and cautions against some specific service methods which could cause **PER**-**SONAL** INJURY,. or could damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA, might be done, or of the possible hazardous consequences of each conceivable way, nor -could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *must satisfy himself thorough/y* that neither personal safety nor vehicle safety will be jeopardized.

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 First Edition 7/90 1450 pages
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Chassis and Paint Codes

U.S. Model



SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS).Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

AWARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Label Locations





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Lift and Support Points

- Lift

CAUTION:

- If ground clearance is inadequate to clear the shop lift, either:
 - install rubber spacers on the coil springs to raise the car. Use the floor jack procedures to raise the car (see page I-7).
 - o r
 - Remove the chin spoiler.
 - o r
 - If you need even more clearance, install the rubber spacers and remove the chin spoiler.
- Follow the lift manufacturer's instructions.
- Use rubber pad adapters on the lift to avoid damaging the car.

Spacer Installation

- 1. Place the rubber contact pads as shown.
- 2. Raise the lift a few inches and rock the car to be sure it is firmly supported.
- 3. Raise the lift to full height and inspect lift points for solid support.
- 4. Install rubber spacers on the coil springs.

CAUTION: Remove the rubber spacers after lowering the car. Do not drive the car with rubber spacers installed between the spring.



I - 6

Floor Jack

CAUTION: Place a rubber pad between the lift platform and the center support point to avoid damaging the car. The lift platform must contact the support point only: it must not come in contact with any other part of the car.

- 1. Set the parking brake and block the wheels that are not being lifted.
- 2. When lifting the rear of the car, put the gearshift lever in reverse (Automatic in PARK).
- 3. Raise the car high enough to insert the safety stands.
- 4. Adjust and place the safety stands as shown on page I-8 so the car will be approximately level, then lower the car onto them.

AWARNING

- Always use safety stands when working on or under any vehicle that is supported by only a jack.
- Never attempt to use a bumper jack for lifting or supporting the car.





Lift and Support Points (cont'd)

- Safety Stands

CAUTION: Place a rubber pad between the safety stand platforms and the car's front and rear support points to avoic damaging the car. The safety stand platforms must contact the car's support points only; they must not come in contact the car's support points on t



Towing





If the car needs to be towed, call a professional towing service. Never tow the car behind another car with just a rope or chain. It is very dangerous.

There are three widely used methods of towing a car:

Flat-bed Equipment – The operator loads the car on the back of a truck. This is the only recommended way of towing the NSX.

Wheel Lift Equipment — The tow truck driver uses two pivoting arms which go under the tires (front or rear) and lift them off the ground. The other two wheels remain on the ground. This towing method is not recommended. Because of the NSX's low ground clearance, the body can be damaged going over large bumps or up inclines.-'

Bling-type Equipment — The tow truck uses metal chains with hooks on the ends. These hooks go around parts of the frame or suspension and the cables lift that end of the car off the ground. Damage to the car's suspension and body is almost certain if this method of towing is attempted.

If the NSX cannot be towed by flat-bed, it should be towed with the rear wheels off the ground. If, due to damage, the car must be towed with the rear wheels on the ground, do the following:

- Release the parking brake.
- Shift the 5-speed transmission to Neutral.
- If the car has an automatic transmission, start the engine. Shift the transmission to Drive, then into Neutral, then shut off the engine.
- It is best to tow the car no farther than 50 miles, and keep the speed below 35 mph.

NOTICE:

- Improper towing preparation will damage the transmission. Follow the above procedure exactly. The car must be towed on a flat bed if the engine will not start or the transmission will not shift.
- Trying to lift or tow the car by the bumpers will cause serious damage. The bumpers are not designed to support the car's weight.



Service Precautions



Handling of tires

- The tires on NSX should not be rotated. The fr ont wheels are 15" in.'diameter and the rear wheels are 16" in. so they cannot be rotated front-to-rear. .The original-equipment tires on NSX have a unidirectional tread pattern, so they cannot be rotated side-to-side.
- The folding spare tire can not be repaired or removed



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General Information - SRS

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

AWARNING

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- Improper maintenance, including incorrect removal and installtion of the SRS, can lead to personal injury caused by unintentional activation of a airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

Component Locations





The SRS is a safety device which, when used in conjunction with the seat belt, is designed to protect the driver by operating only when the car receives a frontal impact exceeding a certain set limit.

The system is composed of left and right dash sensors, the SRS control unit (including the cowl sensor), the cable reel and airbag assembly.



OPERATION:

As shown in the diagram below, the left and right dash sensors are connected in parallel. The parallel set of sensors are connected in series by the airbag inflator circuit and the car battery. In addition, a backup power unit is connected in parallel with the car battery. The backup power unit and the cowl sensor are located inside the SRS control unit.

The SRS operational sequence is as follows:

- (1) The cowl sensor activates, and one or both dash sensors activate.
- (2) Electrical energy is supplied to the airbag inflator by the battery, or the backup power unit if the battery voltage is too low.
- (3) Airbag deployment.

At least the cowl and one dash sensor must be activated simultaneously for at least 0.002 seconds in order for the airbag to be deployed.



Self-diagnosis system

A self-diagnosis circuit is built into the SRS control unit; when the ignition switch is turned ON, the SRS light comes on and goes out after about 6 seconds if the system is operating normally. If the light does not come on, or does not go out after 6 seconds, or if it comes on while driving, this indicates an abnormality in the system. It must be inspected and repaired as soon as possible.

Warning/Caution Labels





A: CABLE REEL CAUTION A

CAUTION:	SRS
BEFORE INSTA	LLING CABLE REEL
CENTER THE	e front wheels.
ALIGN THE	MARKS.
READ SERV	ICE MANUAL.
C READ CERT	

B: CABLE REEL CAUTION B

CAUTION: SRS NO SERVICEABLE PARTS INSIDE; DO NOT DISASSEMBLE OR TAMPER.

C: STEERING WHEEL WARNING

WARNING SRS BEFORE INSTALLING STEERING WHEEL: • CENTER THE FRONT WHEELS. • ALIGN THE MARKS. (CABLE REEL)

READ SERVICE MANUAL.

D: BULKHEAD WARNING

WARNING SRS THIS VEHICLE IS EQUIPPED WITH A DRIVER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM. (SRS) ALL SRS ELECTRICAL WIRING AND CONNECTORS ARE COLORED YELLOW. DO NOT USE ELECTRICAL TEST EQUIPMENT ON THESE CIRCUITS. TAMPERING WITH OR DISCON-NECTING THE SRS WIRING COULD RESULT IN ACCIDENTAL FIRING OF THE INFLATOR OR MAKE THE SYSTEM INOPERATIVE, WHICH MAY RESULT IN SERIOUS INJURY.



E: MODULE WARNING

WARNING SRS
TO PREVENT ACCIDENTAL DEPLOYMENT AND POSSIBLE
INJURY:
ALWAYS INSTALL THE PROTECTIVE SHORT CONNEC-
TOR ON THE INFLATOR CONNECTOR WHEN THE
HARNESS IS DISCONNECTED.
UNDER NO CIRCUMSTANCES SHOULD DIAGNOSIS BE
PERFORMED USING ELECTRICAL TEST EQUIPMENT OR
PROBING DEVICES.
NO SERVICEABLE PARTS INSIDE. DO NOT DISASSEMBLE
OR TAMPER.
STORE THE REMOVED AIRBAG ASSEMBLY WITH THE
PAD SURFACE UP.
FOR SPECIAL HANDLING OR STORAGE REFER TO THE
ACURA SERVICE MANUAL.

DISPOSE OF THE ENTIRE UNIT AS DIRECTED.

F: DRIVER INFORMATION

SRS ALWAYS WEAR YOUR SEAT BELT

- THIS CAR IS EQUIPPED WITH A DRIVER AIRBAG AS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS)
- IT IS DESIGNED TO SUPPLEMENT THE SEAT BELT.
 BEFORE DRIVING READ LABEL INSIDE THE GLOVE BOX.

G: SRS UNIT CAUTION



CAUTION SRS	
NO SERVICEABLE PARTS INSIDE.	
DO NOT DISASSEMBLE OR TAMPER.	
DO NOT DROP.	
STORE IN A CLEAN, DRY AREA.	

H: STEERING COLUMN CAUTION

CAUTION SRS

TO AVOID DAMAGING THE SRS CABLE OR REEL, WHICH COULD MAKE THE SYSTEM INOPERATIVE, REMOVE THE STEERING WHEEL BEFORE REMOVING THE STEERING SHAFT CONNECTOR BOLT.

I: POCKET INFORMATION

DRIVER'S AIRBAG INFORMATION SPECTRA SUPPLEMENTAL RESTRAINT SYSTEM (SRS) CAN PROVIDE ADDITIONAL PROTECTION FOR THE DRIVER IN A FRONTAL COLLISION. A FUNCTIONAL DESCRIPTION OF THE SRS IS IN YOUR OWNER'S MANUAL.

- THE SYSTEM MUST BE INSPECTED TEN YEARS AFTER DATE OF MANUFACTURE, AS NOTED ON THE CERTIFICATION PLATE.
- ANY REPAIR, INSPECTION OR NEARBY ACCESSORY INSTALLTION SHOULD BE DONE BY AN ACURA DEALER.
- IF YOUR SRS INDICATOR: LIGHTS WHILE DRIVING OR FLASHES; FAILS TO LIGHT OR STAYS ON AFTER THE IGNITION IS FIRST TURNED ON: SEE YOUR AUTHORIZED ACURA DEALER.

J: STEERING WHEEL WARNING

WARNING SRS TO PREVENT ACCIDENTAL DEPLOYMENT AND POSSIBLE INJURY: ALWAYS INSTALL THE PROTECTIVE SHORT CONNEC-TOR ON THE INFLATOR CONNECTOR WHEN THE HARNESS IS DISCONNECTED.

K: LABEL AIRBAG

L: INFLATOR LABEL

DANGER CONTAINS SODIUM AZIDE AND POTASSIUM NITRATE. CONTENTS ARE EXTREMELY FLAMMABLE. DO NOT DISMANTLE OR INCINERATE. DO NOT PROBE WITH ELECTRICAL DEVICES.

M: INFLATOR COVER LABEL

DANGER
EXPLOSIVE/FLAMMABLE SRS
CONTACT WITH ACID, WATER, OR HEAVYMETALS
SUCH AS COPPER, LEAD, OR MERCURY, MAY PRODUCE
HARMFUL AND IRRITATING GASES OR EXPLOSIVE COM-
POUNDS. STORAGE TEMPERATURES MUST NOT EX-
CEED 200°F. FOR PROPER HANDLING, STORAGE, AND
DISPOSAL PROCEDURES REFER TO THE ACURA SERVICE
MANUAL, SRS SUPPLEMENT.
POISON
CONTAINS POISONOUS SODIUM AZIDE AND
POTASSIUM NITRATE.
FIRST AID:
IF CONTENTS ARE SWALLOWED, INDUCE VOMITING.
FOR EYE CONTACT, FLUSH EYES WITH WATER FOR 15
MINUTES. IF GASES (FROM ACID OR WATER CONTACT)
AIR INHALED, SEEK FRESH AIR. IN EVERY CASE, GET
PROMPT MEDICAL ATTENTION.
KEEP OUT OF REACH OF CHILDREN.

Wiring Locations



1-16

Precautions/Procedures

General Precautions -

- 1. Carefully inspect any SRS part before installing. Do not install any part that shows signs of being dropped or improperly handled, such as dents, cracks or deformation:
 - Airbag assy.
 - Dash sensors.
 - Cable reel.
 - SRS unit.



- Use only the digital multimeter (KS-AHM-32-003) to check the system. If using an analog circuit tester, it may cause an accidental deployment and possible injury.
- 3. Do not install used SRS parts from another car. When repairing, use only new SRS parts.
- 4. Except when performing electrical inspections, always disconnect both the negative cable and positive cable at the battery before begining work.
- 5. Replacement of the lighting and wiper combination switches and cruise control switch can be done without removing the steering wheel:
 - Lighting and wiper combination switch replacement, see section 23.
 - Cruise control switch replacement, see section 23.

Airbag Assembly

Do not try to disassemble the airbag assembly. There are not separately serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.



AIRBÁG MODULE

For temporary storage of the airbag assembly during service, please observe the following precautions:

1. Store the removed airbag assembly with the pad surface up.



AWARNING If the airbag is improperly stored face down, accidental deployment could propel the unit with enough' force to cause serious injury.

 Store the removed airbag assembly on a secure flat surface away from any high heat source (exceeding 1 00°C/21 2°F) and free of any oil, grease, detergent or water.

CAUTION: Improper handling or storage can internally damage the **airbag** assembly, making it inoperative.

If you suspect the airbag assembly has been damaged, install a new unit and refer to the Deployment/Disposal Procedures for scrapping of the damaged airbag.

Precautions/Procedures

Steering -

1. Steering Wheel and Cable Reel Alignment:

NOTE: To avoid misalignment of the steering wheel or airbag on reassembly, make sure the wheels are turned straight ahead before removing the steering wheel.



Rotate the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until:

- The yellow gear tooth lines up with the mark on the cover.
- The arrow on the cable reel label points straight up.



2. Steering Column Removal:

CAUTION:

- Before removing the steering column, first disconnect the connector between the cable reel and the main SRS harness.
- If the steering column is going to be removed without dismounting the steering wheel, lock the steering by turning the ignition key to O-LOCK position or remove the key from the ignition so that the steering wheel will not turn round.



3. Steering wheel:

Do not replace the original steering wheel with any other design, since it will make it impossible to properly install the airbag (Only use genuine HONDA replacement parts).

4. After reassembly confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie rods, not by removing and repositioning the steering wheel.



Sensor inspection

1. After any degree of frontal body damage, inspect both dash sensors.

Replace a sensor if there are any signs of deuts, cracks or deformation.



2. Be sure the sensors are installed securely.



CAUTION: Take extra care when painting or doing body work on any part of the dashboard lower panel. Avoid direct exposure of the sensors or wiring to heat guns, welding or spraying equipment.

A WARNING

- Disconnect both the negative and positive battery cables.
- Install the short connector before performing work on the dashboard lower panel or the SRS sensors.

Wiring

1. Never attempt to modify, splice or repair SRS wiring.

NOTE: SRS wiring can be identified by special yellow outer protective covering.



2. Be sure to install the harness wires so that they are not pinched or interfering with other car parts.



3. Make sure all SRS ground locations are clean and grounds are securely fastened for optimum metalto-metal contact. Poor grounding can cause intermittent problems that are difficult to diagnose.

(cont'd)

Precautions/Procedures

Wiring (cont'd) -

4. installing Short Connector:

AWARNING To avoid accidental deployment and possible injury always install the protective short connector on the inflator connector when the harness is disconnected.

- (1) Disconnect both the negative cable and positive cable from battery.
- ② Remove maintenance lid A below the airbag, then remove the red short connector.
- (3) Disconnect the connector between the airbag and cable reel.
- (4) Connect the short connector to the airbag side of the connector.
- (5) Reconnect both the positive cable and negative cable to battery.



5. Removing the connectors at the fuse box:

CAUTION: Avoid breaking the double-locked connectors on the fuse box.

The connectors are double-locked; to remove them, first lift the connector lid with a thin screwdriver, then press the connector tab down and pull the connector out.

To reinstall a connector, push it into position until it clicks, then close the connector lid.





Special Tools

Individual tool lists are located at the front of each section.

specs

Specifications

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Standards and Service Limits

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Compression	200 rpm and Nominal wide open throttle Minimum kPa (kg/cm², psi) Maximum variation	1,373 (14.0, 199) 981 (10.0, 142) 196 (2, 28)	
Cylinder head	Warpage Height	150.95-1 51.05 (5.9429-5.9468)	0.05 (0.002)
Camshaft	End play Oil clearance Runout Cam lobe Height M/T IN Primary Mid Secondary EX Primary Mid Secondary A/T IN Primary Mid Secondary EX Primary Mid Secondary	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.5 (0.02) 0.15 (0.006) 0.03 (0.0012)
Valve	Valve clearance IN EX EX Valve stem 0.D. IN EX Stem-to-guide clearance IN EX EX EX	0.15-0. 19 (0.006-0.007) 0.17-0.21 (0.007-0.008) 5.475-5.485 (0.2156-0.2159) 5.45-5.46 (0.2146-0.21591 0.025-0.055 (0.001-0.002) 0.05-0.08 10.002-0.0031	5.445 (0.2144) 5.42 (0.2134) 0.008 (0.003) 0.11 (0.04)
Valve seat	Width IN EX Stem installed height IN EX	0.80-1 .00 (0.031-0.039) 1.25-1.55 (0.049-0.061) 41.55-42.35 (1.6358-1.6673) 41.55-42.35 (1.6358-1.6673)	1.5 (0.059) 2.0 (0.079) 42.435 (1.6707) 42.435 (1.6707)
Valve spring	Free length M/T IN Outer Inner EX A/TIN EX	43.23 (1.7020) * 1 43.24 (1.7024) *2 39.79 (1.5665) *1 39.82 (1.5667)*2 46.00 (1.8110) *1 45.98 (1.8102) "2 44.59 (1.7555) *1 44.60 (1.7559) *2 47.40 (1.8661) *1 47.43 (1.8673) *2	t 42.40 (1.6693) 1 39.02 (1.5362) 1 45.12 (1.7763) 3 43.73 (1.72171 4 6.69 (1.8303)
Valve guide	I.D. IN and EX Installed height IN and EX	5.51-5.53 (0.2169-0.2177) 13.75-14.25 (0.5413-1.5610)	5.53 (1.5610) 14.50 (0.5709)
Rocker arm	Arm-to-shaft Primary and Secondary IN and EX clearance Mid IN and EX	0.025-0.052 (0.001 O-0.0020) 0.024-0.053 (0.0009-0.0021)	0.008 (0.003) 0.008 (0.003)

Cylinder Head/Valve Train - Sections 6 -

*1: NIPPON HATSUJO made, *2: CHUO HATSUJO made. M/T: Manual Transmission A/T: Automatic Transmission



Unit of length: mm (in)

Engine Block - Section 7 -

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Wapage of deck surface Bore diameter Bore taper Reboring limit		0.07 (0.003) max. 90.00-90.02 (3.5433-3.5441) 	0.10 (0.004) 90.07 (3.5461) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. (at 17 mm (0.67 in) from bottom of skirt Clearance in cylinder Groove width (for ring)	A B Top Second Oil	89.986-90.004 (3.5427-3.5434) 89.976-89.994 (3.5424-3.5431) 1.22-1 .23 (0.0480-0.0484) 1.22-1 .23 (0.0480-0.0484) 2.805-2.820 (0.1104-0. 1110)	89.97 (3.5421) 89.96 (3.5417) 0.0825 (0.0032) 1.25 (0.0492) 1.25 (0.0492) 2.84 (0.11181
Connecting rod	End play installed on crankshaft		0.15-0.30 (0.006-0.012)	0.40 (0.018)
Piston ring	Ring-to-groove clearance	Top Second	0.030-0.055 (0.001-0.002) 0.030-0.055 (0.001-0.002)	0.13 (0.005) 0.13 (0.005)
	Ring end gap	Top Second Oil	0.25-0.40 (0.010-0.016) 0.35-0.50 (0.014-0.020) 0.20-0.70 (0.008-0.028)	0.60 (0.024) 0.75 (0.03) 0.80 (0.03)
Crankshaft	Main journal diameter Taper/out-of-round, main journal Rod journal diameter Taper/out-of-round, rod journal End play Runout		63.976-64.000 (2.5187-2.5197) 0.005 (0.0002) max. 49.976-50.000 (1 .9676-1 .9685) 0.004 (0.0002) max. 0.01 o-o.35 (0.004-0.014) 0.015 (0.0006) max.	0.01 (0.0004) 0.006 (0.0002) 0.45 (0.018) 0.03 (0.0012)
Bearings	Main bearina-to-iournal oil clearance Rod bearing-to-journal oil clearance		0.024-0.048 (0.0009-0.0019) 0.04-0.06 (0.0016-0.0024)	0.05 (0.002) 0.06 (0.0036,





Standards and Service Limits

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Cpacity ℓ (US qt, Imp qt)	6.3 (6.7, 5.5) for engine overhaul 5.0 (5.3, 4.4) for oil-change, including filter	
Oil pump	Displacement l (US gal, Imp gal)/min@rpm	68 (18.0, 15.0) @6,000	
	Inner-to-outer rotor radial clearance Pump body-to-outer rotor radial clearance Pump body-to-outer rotor side clearance	0.02-o. 18 (0.00080.0070) 0.1 o-o. 19 (0.0040-0.0075) 0.02-0.07 (0.001-0.003)	0.2 (0.008) 0.2 (0.008) 0.12 (0.005)
Relief valve	Pressure setting 80°C (176°F) at idle kPa (kg/cm ² , psi) at 3,000 rpm	69 (0.7, 10) min. 343 (3.5, 50) min.	

Cooling – Section 10 –

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt. Imp qt) (including engine, heater, cooling) line and expansion tank) expansion tank capacity 2.1 ℓ (2.2 US qt. 1.8 Imp qt)	M/T: 16.0 (17.0, 14.1) for overhaul 12.0 (12.7, 10.6) for coolant change A/T: 16.5 (17.4, 14.5) for overhaul 12.0 (12.7, 10.6) for coolant change
Expansion tank cap	Opening pressure kPa (kg/cm ² , psi)	93-1 23 (0.95-1 .25, 14-18)
Thermostat	Start to open °C (°F) Fully open °C (°F) Valve lift at fully open	76-80 (1 69-I 76) 90 (194) 10 (0.39) min.
Water pump	Displacement ℓ (US gal, Imp_gal)/min @rpm	150 (39.6, 33.0) @6,000
Cooling fan	Thermoswitch "ON" temperature (LOW) ^o C (^o F) Thermoswitch "OFF" temoerature (LOW) ^o C (^o F) Thermoswitch "ON" temperature (HIGH) ^o C (^o F) Thermoswitch "OFF" temperature (HIGH) ^o C (^o F)	84 ± 1.2 (183 ± 2) Subtract 6 ± 2 (11 ± 3) from the actual "ON" tempera- ture (LOW) 90 ± 1.2 (194 ± 2) Subtract 6 ± 2 (11 ± 3) from the actual "ON" tempera- ture (HIGH)

M/T: Manual Transmission A/T: Automatic Transmission

specs

Unit of length: mm (in)

| - Fuel and Emission - Section 11

MEASUREMENT		STANDARD (NEW)	
Fuel pump	Delivery pressure kPa (kg/cm ² , psi) Displacement cc (US oz, Imp oz)/minimum in 10 seconds Relief valve opening pressure kPa (kg/cm ² , psi)	343 (3.5, 50) 333 (11.3, 9.4) 490-637 (5.0-6.5, 71-92) @ 12 ∨	
Pressure regurator	Pressure kPa (kg/cm ² , psi)	323-363 (3.30-3.70, 47-53)	
Fuel tank	Capacity ℓ (US gal, Imp_gal)	70 (18.5, 15.4)	
Engine	Fast idle rpm	I,IOO-1,900	
-	Idle speed rpm (with headlight and cooling fan off)	M/T 800±50 A/T 750±50 fin gear)	
	ldle CO % min.	0.1%	

- Clutch - Section 12

- Clutch - Section 12						
	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT		
Clutch pedal	Pedal height Stroke Pedal play Disengagement height	to floor to floor	186.4 (7.32) 130-I 35 (5.12-5.32) 9-15 (0.35-0.59) 92 (3.62) min.			
Pressure plate	Disc surface runout		0.03 (0.001) max.	0.15 (0.006)		
1st clutch disc	Thickness Rivet head depth		8.3-9.0 (0.33-0.35) 1.1 (0.04) min.	5.9 (0.23) 0.5 (0.02)		
2nd clutch disc	Thickness Rivet head depth		7.6-8.3 (0.30-0.33) 1.1 (0.04) min.	5.4 (0.21) 0 . 5 (0.02)		
Mid plate	Disc surface runout		0.05 10.002)	0.15 (0.006)		
Flywheel	Clutch surface runout		0.05 (0.002)	0.15 (0.006)		



Standards and Service Limits

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.8 (3.0, 2.5) for overhaul 2.7 (2.9, 2.4) for oil change	
Mainshaft	Diameter of ball bearing contact area (transmission housing side) Diameter of needle bearing contact area Diameter of ball bearing contact area (clutch housing side) Runout End play	30.984-31 .000 (1.2198-1.2205) 42.984-43.000 (1 .692-1 .693) 32.002-32.018 (1.260-1.261) 0.02 (0.001) min. 0.14-0.21 (0.006-0.008)	30.93 (1.2177) 42.93 (1.690) 31.95 (1.258) 0.05 (0.002) Adjust with a shim.
Mainshaft 3rd gear	I.D. End play Thickness	49.009-49.025 (1.9295-I .9301) 0.06-0.23 (0.002-0.009) 35.92-35.97 (1.414-1.416)	49.08 (1.9323) 0.3 (0.012) 35.80 (1.409)
Mainshaft 4th gear	I.D. End play Thickness	49.009-49.025 (1.9295-1 .9301) 0.06-0.21 (0.002-0.009) 35.92-35.97 (1 .414-1 .416)	49.08 (1.9323) 0.3 (0.012) 35.80 (1.409)
Mainshaft 5th gear	I.D. End play Thickness	47.009-47.025 (1.8507-1.8513) 0.06-0.21 (0.002-0.009) 34.92-34.97 (1.375-1.377)	47.08 (1.8535) 0.3 (0.012) 34.80 (1.370)
Spacer collar (Mainshaft)	I.D. , O.D. 4th gear side 5th gear side L e n g t h 4th gear side 5th gear side 5th gear side	36.002-36.012 (1 .417-1 .418) 42.989-43.000 (1.692-1.693) 41.989-42.000 (1 .653-1 .654) 29.53-29.58 (1.163-1.165) 28.53-28.58 (1.123-1.125)	36.06 (1.420) 42.94 (1.691) 41.94 (1.652) 29.51 (1.162) 28.51 (1.122)
Countershaft	Diameter of needle bearing contact area (clutch housing side) Diameter of needle and ball bearing contact area (transmission housing side) Runout	43.974-43.990 (1.731-1.732) 33.984-34.000 (1.338-1 .339) 0.02 (0.001) min.	43.92 (1.729) 33.93 (1.336) 0.05 (0.002)
Countershaft 1 st gear	I.D. End play (when tightened by the specified torque)	60.510-60.529 (2.382-2.383) 0.04-o. 10 (0.002-0.004)	60.58 (2.385) Adjust with a washer.
Countershaft 2nd gear	I.D. End play (when tightened by the specified torque)	57.010-57.029 (2.244-2.245) 0.04-o. 10 (0.002-0.004)	57.08 (2.247) Adjust with a collar.
Countershaft reverse gear	Diameter of needle bearing contact area	54.487-54.500 (2.145-2.146)	54.43 (2.143)
Spacer collar (Countershaft)	I.D. O.D.	43.046-43.056 (1.6947-1.6951) 51.087-52.000 (2.01 I-2.047)	43.10 (1.697) 51.03 (2.009)
Reverse idler gear shaft	I.D.	21.987-22.000 (0.8656-0.8661)	21.93 (0.8634)
Reverse driven gear and reverse drive	I.D.	28.007-28.020 (1.1026-I. 1031)	28.07 11.1051)



Unit of length: mm (in)

F- Manual Transmission - Section 13 -

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Oil pump	Driven gear boss-to-transmission housing clearance Driven gear thickness Inner-to-outer rotor radial clearance Pump body-to-outer rotor radial clearance Pump body-to-outer rotor side clearance	0.3-0.8 (0.01-0.03) 17.0-17.1 (0.669-0.673) 0.14 (0.006) 0.1-0.2 (0.004-0.008) 0.03-0.10 (0.001-0.004)	0.9 (0.04) 16.9 (0.665) 0.20 (0.008) 0.22 (0.009) 0.15 (0.006)
Svncro ring	Ring-to-gear clearance (ring pushed against gear)	0.85-1. 10 (0.034-0.043)	0.4 (0.016)
Shift fork	Finger thickness 1st/2nd shift fork 3rd/4th shift fork 5th shift fork Reverse shift fork Finger-to-syncro sleeve clearance	8.9-9.0 (0.350-0.354) 7.4-7.5 (0.29-0.30) 6.4-6.5 (0.25-0.26) 6.4-6.5 (0.25-0.26) 0-45-0.65 (0.018-0.026)	 1 .o (0.039)
Reverse shift arm	Arm-to-Bthlreverse shift piece clearance Groove width Arm-to-reverse shift fork clearance Diameter (at the contact point with the reverse shift fork)	0.05-0.30 (0.002-0.012) 7.05-7.20 (0.278-0.283) 0.05-0.35 (0.002-0.014) 12.8-13.0 (0.504-0.512)	0.5 (0.02) - 0.5 (0.02)
Shift arm	Arm-to-shift piece clearance Diameter (at the contact point with the shift piece)	0.05-0.25 (0.002-0.0101 12.9-13.0 (0.508-0.512)	0.5 (0.02) ~-
Interlock	Interlock-to-select arm clearance Diameter (at the contact point with the select arm)	0.03-o. 15 (0.001-0.006) 11.95-I 2.00 (0.470-0.472)	-
Shift piece	Shift piece-to-shift forks and 5th/reverse shift piece clearance Diameter (at the contact point with the shift forks and 5th/reverse shift piece)	0.2-0.5 (0.008-0.020) 11.9-12.0 (0.460-0.472)	0.6 (0.024)

Standards and Service Limits

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)	7.0 (7.4, 6.2) for overhaul 2.9 (3.1, 2.6) for fluid change	
Hydraulic	Line pressure at 2,000 rpm D or 1	834-883 (8.5-9.0, 121-I 28)	785 (8.0, 114)
pressure kPa	1st clutch pressure at 2,000 rpm D or 1		
(Kg/clii , pai)	2nd clutch pressure at 2,000 rpm D	490 (5.0, 71) throttle fully closed	441 (4.5, 64) throttle fully closed
	pressure rpm 3rd clutch at 2,000 D	883 (9 0 129)	785 (8 0 114)
	4th clutch pressure at 2,000 rpm D	1.5/8 opened	1.5/8 opened
	1st hold cpmessureat 2,000pm 1	834-883 (8.5-9.0, 121-128)	785 (8.0, 114)
	2nd clutporhessuraet 2,000rpm 2		
	3rd clutpehessuzzet 2,000rpm 3		
	4th clutch pressure at 2,000 rpm R		
	Throttle p&essur∛hrottle fully closed Throttle fully _{open}	O-I 5 (O-0.1 5, O-2) 590-657 (6.1-6.7, 87-95)	-
Stall speed rpm	Check with car on level ground	1,950-2,250	
Clutch	Clutch initial clearance 1 st-hold	0.7-0.9 (0.028-0.035)	
	1st	O-65-0.85 (0.026-0.033)	-
	2nd, 3rd, 4th Clutch return spring free length	0.075-0.95 (0.030-0.037)	-
	futch return spring nee length	<i>A</i> 1 <i>A</i> (1.630)	39 4 (1 551)
	2nd, 3rd, 4th	33.0 (1.299)	31.0 (1.220)
	Clutch disc thickness Ist-hold, Ist, 2nd, 3rd	1.88-2.00 (0.074-0.079)	Until grooves wone out.
	4th	2.28-2.40 (0.090-0.094)	Until grooves wone out.
	Clutch plate thickness 1 St-hold, 1 st 2nd 3rd 4th	1.95-2.05 (0.077-0.081) 2 25-2 35 (0.089-0.093)	Discoloration
	Clutch end plate thickness" Mark 1	2.05-2.10 (0.081-0.083)	Ť
	Mark 2	2.15-2.20 (0.085-0.087)	
	Mark 3	2.25-2.30 (0.089-0.091)	
	Mark 4	2.35-2.40 (0.093-0.094)	
	Mark 5	2.45-2.50 (0.096-0.098)	
	Mark o Mark 7	2.55-2.00 (0.100-0.102)	
	Mark 8	2.05-2.10 (0.104-0.100)	*
	Mark 8 Mark 9	2.85-2.90 (0.112-0. 114)	Discoloration
Valve body	Stator shaft needle bearing contact I.D.		
	(torque converter side)	28.000-28.021 (1.102-1.103)	Wear of damage
	Stator shaft needle bearing contact I.D.		
	foil pump side)	31.000-31.013 (1.220-1.221)	
	Oil pump chaft O.D.	13 980-13 990 (0.552-0.553)	wear of damage
	Oil pump gear side clearance	0.03-0.05 (0.001-0.002)	0.07 (0.003)
	Oil pump gear-to-body clearance Drive	0.210-0.265 (0.008-0.010)
	Driven	0.070-0.125 (0.003-0.005)	-
Regurator valve body	Sealing ring contact I.D.	37.000-37.025 (1 .457-1 .458)	37.05 (1.459)

Automatic Transmission -Section 14 -

* Clutch end plate diameter: 1st 116 mm Ist-hold, 2nd, 3rd and 4th 120 mm



Unit of length: mm (i

- Automatic Transmission (cont'd) - Section 14 -

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
2nd accumura- tor body	Sealing ring contact I.D.	35.000-35.025 (1.378-1.379)	35.05 (1.380)
Shifting device	Reverse shift fork finger thickness	5.90-6.00 (0.232-0.236)	5.40 (0.213)
and parking	Parking brake racher pawl		Wear or other defect
brake control	Parking brake gear	-	Wear or other defect
Servo body	Shift fork shaft bore I.D. A	14.000-14.005 (0.5512-0.5513)	-
	В		
	6 Shift fork shaft valve here I D	14.011-14.015 (0.5516-0.5518) 27.000 27.020 /1 /67.1 /69)	-
T		37.000-37.033 (1.437-1.430)	37.045 (1.4459)
Iransmission	Diameter of needle bearing contact area	22 080 22 002 (0 944-0 945)	Maan on domono
	On mainshaft 4th gear collar	23.900-23.993 (0.944-0.943)	wear or damage
	On mainshaft 1st gear collar	32 975-32 991 (1 298-1 299)	
	On countershaft (right side)	41.005-41.015 (1.614-1.615)	
	On countershaft 3rd gear collar	43.975-43.991 (1.731-1.732)	
	On countershaft 4th gear	34.975-34.991 (1.377-1.378)	
	On countershaft reverse gear collar	36.975-36.991 (1.4557-1.4567)	
	On countershaft 1st gear collar	33.975-33.991 (1.3376-1.3382)	
	On secondaryshaft 2nd gear	36.975-36.991 (1.455/-1.456/)	
	On reverse idler gear shaft Beverse idler shaft helder I D	13.990-14.000 (0.5507-0.5512)	
	Inside diameter	14.410-14.434 (0.5070-0.5085)	wear or damage
	Mainshaft 1st gear	38 000-38 016 (1 496-1 497)	Wear or damage
	Mainshaft 4th gear	40.000-40.016 (1.5748-1.5754)	
	Countershaft 1 st gear	40.000-40.016 (1.5748-1.5754)	Ī
	Countershaft reverse gear	43.000-43.016 (1.693-1.694)	
	Countershaft 4th gear	41.000-41.016 (1.614-1.615)	
	Countershaft 2nd gear	Involuted spline	
	Countershaft 3rd gear	52.000-52.019 (2.0472-2.0480)	
	Secondary shaft 2nd gear	43.000-43.016 (1.693-1 .694) 18.007-18.020 (0.7089-0.7094)	Wear or damage
	Mainshaft 1st gear collar length	35.00-35.05 (1.358-1 380)	
	Mainshaft 1st gear collar flange thickness	2.95-3. 10 (0.116-0. 122)	Wear or damage
	Countershaft reverse gear collar length	16.00-l 6.05 (0.630-0.632)	
	Countershaft reverse gear collar flange		
	thickness	2.95-3.05 (0.116-0. 120)	Wear or damage
	Diameter of countershaft one-way clutch		
	contact area Diameter of parking gear one-way clutch	88.869-88.895 (3.499-3.410)	wear or damage
	contact area	72.212-72.225 (2.8429-2.8435)	Wear or damage
	Mainshaft feed pipe O.D. Mainshaft feed pipe O.D.	11.47-1 1.48 (0.4310-0.4320) 5.07-5.08 (0.2350-0.2354)	11.45 (U.451) 5.05 (0.2242)
	Mainshaft sealing ring 37 mm thickness	1.980-I 995 (0.078-0.079)	1 80 (0.2343)
	Mainshaft bushing I.D.	6.018-6.030 (0.2369-0.2374)	6.045 (0.238)
	······································	11.500-I 1.518 (0.4528-0.4535)	11.53 (0.454)
	Countershaft feed pipe O.D.	11.47-11.48 (0.4516-0.4520)	11.45 (0.451)
	Countershaft feed pipe O.D.	7.97-7.98 (0.3138-0.3142)	7.95 (0.313)
	Countershaft bushing I.D.	8.000-8.015 (0.315-0.316)	8.03 (0.316)
	Secondary shaft sealing ring 25 mm thickness	1.500-1 1.518 (0.4528-0.4535)	11.53 (0.454)
	Mainshaftsealing ring groove width	2 025-2 060 /0 080-0 081	1.00 (0.071)
	Secondary shaft sealing ring groove width	2.025-2.060 (0.080-0.081)	2.08 (0.082)

Standards and Service Limits

|- Automatic Transmission (cont'd) - Section 14 -

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission (cont'd)	Selector hub O.D. Thrust washer thickness		55.67-55.70 (2.192-Z. 193)	Wear or damage
(cont u)	Mainshaft 4th gear right side		4.45-4.55 (0.175-O. 179)	Wear or damage
	Mainshaft 4th gear left side		3.45-3.55 (0.136-0. 140)	Wear or damage
	Mainshaft 1st gear right side		1.45-1.50 (0.057-0.059)	1.40 (0.055)
	Mainshaft 1st gear left side		2.43-2.50 (0.096-0.098)	Wear or damage
	Countershaft 3rd gear collar length	1	35.425-35.440 (1.3947-1.3952)	~
		2	35,440-35,455 (1.3952-1.3959)	-
		3	35.455-35.470 (1.3959-1.3965)	-
		4	35.470-35.485 (1.3965-1.3970)	→
		5	35.485-35.500 (1.3970-I .3976)	-
		6	35.500-35.515 (1.3976-1.3982)	-
	Countershaft spacer length		17.90-1 7.95 (0.705-0.707)	-
	Cotter thickness	1	1.975-2.000 (0.078-0.079)	•
		2	2.000-2.025 (0.078-0.080)	
		3	2.025-2.050 (0.080-0.081)	
		4	2.050-2.075 (0.081-0.082)	-
		5	2.075-Z. 100 (0.082-0.083)	~
		6	2.100-Z. 125 (0.083-0.084)	-
		/	2.125-Z. 150 (0.084-0.085)	-
		8	2.150-Z. 175 (0.085-0.086)	•••
		9	2.175 - 2.200 (0.086 - 0.087)	
		10	2.200-2.225 (0.087-0.088)	
		11	2.225-2.250 (0.066-0.069)	_
		12	2.250-2.275 10.089-0.090)	-
		14	2 300-2 325 (0.091-0.092)	
		15	2 325-2 350 (0 092-0 093)	_
		16	2.350-2.375 (0.093-0.094)	
	Cotter retainer thickness	1	3.00-3.03 (0.118-0, 119)	
		2	3.03-3.06 (0.119-0, 120)	
		3	3.06-3.09 (0.120-0, 122)	
		4	3.09-3.12 (0.122-0.123)	_
	Countershaft reverse gear thrust washer		· · · · ·	
	thickness		1.45-1.50 (0.057-0.059)	1.40 (0.055)
	Countershaft 1st gear spacer length		62.50-62.55 (2.461-2.463)	TRA I
	Countershaft 1st gear right side		3.43-3.50 (0.135-0. 138)	Wear or damage
	Secondary shaft 2nd gear		4.45-4.55 (0.175-O. 179)	Wear or damage
	Secondary shaft spacer length		33.00-33.05 (1,299-1,301)	
	End play			
	Mainshaft 4th gear		0.10-0.22 (0.004-0.009)	_
	Mainshaft 1st gear		0.08-0.33 (0.003-0.013)	_
	Countershaft 3rd gear		o-0.03 (O-0.001)	Adjust with a 3rd gear
	Countershaft 2nd gear		o-0.05 (O-0.002)	collar or a cotter
	Countershaft 4th gear		0.05-o. 16 (0.002-0.006)	Adjust with a cotter retainer
	Countershaft reverse gear		0.10-0.25 (0.004-0.010)	-
	Countershaft 1st gear		0.10-0.31 (0.004-0.012)	-
	Secondary shaft 2nd gear		0.01-0.11 (0.0004-0.0043)	
	Reverse idler gear		0.05-o. 18 (0.002-0.007)	-



Unit of length: mm (in)

<mark>| –</mark> Automatic Transmission (cont'd) – Section 14 –

		STANDARD (NEW)			
	MEASUREMENT	Wire Dia.	0.D.	Free Length	No. of Coils
Spring	Idle shaft spring A	0.7 (0.028)	5.7 (0.224)	14.6 (0.575)	7.0
	Servo detent spring	1 .o (0.039)	7.6 (0.299)	14.8 (0.583)	5.5
	Regulator valve spring A	1.58 x 2.0	14.7 (0.579)	88.6 (3.488)	20.9
		(0.062 × 0.079)			
	Regulator valve spring B	1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	14.7
	Stator reaction spring	6.0 (0.236)	38.4 (1.512)	30.3 (1.193)	2.0
	Torque converter check valve spring	1.1 (0.043)	8.4 (0.331)	41.8 (1.646)	15.7
	Relief valve spring	1.1 (0.043)	8.4 (0.331)	44.4 (1.748)	19.5
	Cooler relief valve spring	1.2 (0.0471	8.4 (0.331)	35.7 (1.406)	16.5
	Oneway relief valve spring	0.9 (0.035)	6.4 (0.252)	25.1 (0.988)	11.9
	LSD relief valve spring	0.8 (0.031)	8.4 (0.331)	37.3 (1.469)	12.1
	2nd orifice control valve spring	0.8 (0.031)	8.1 (0.319)	47.9 (1.886)	16.0
	3rd orifice control valve spring	0.9 (0.035)	8.6 (0.339)	48.3 (1.902)	16.6
	4th exhaust valve spring	0.6 (0.024)	7.6 (0.299)	24.4 (0.961)	7.9
	Throttle valve spring A/B/C/D	0.9 (0.035)	7.1 (0.280)	29.0 (1.1421	12.6
	1-2 shift valve spring	0.9 (0.035)	8.6 (0.339)	40.4 (1.591)	14.5
	2-3 shift valve spring	0.8 (0.031)	7.0 (0.276)	43.7 (1.720)	21.2
	1 st-hold accumulator spring	3.4 (0.134)	24.3 (0.957)	64.7 (2.547)	6.7
	1 st accumulator spring	2.3 (0.091)	20.0 (0.787)	104.6 (4.118)	14.8
	4th accumulator spring	3.0 (0.118)	18.0 (0.709)	84.5 (3.327)	12.8
	2nd accumulator spring	3.3 (0.130)	20.2 (0.795)	78.0 (3.071)	11.8
	3rd accumulator spring	3.2 (0.126)	19.0 (0.748)	88.6 (3.488)	14.3
	Lock-up shift valve spring	1.0(0.039)	8.6 (0.339)	51.3 (2.020)	19.8
	Lock-up timing B spring	0.8 (0.031)	5.6 (0.220)	27.8 (1.094)	16.4
	Lock-up control valve spring A/B/C	0.8 (0.031)	6.6 (0.260)	38.3 (1.508)	25.0
	Servo control valve spring	1 .o (0.039)	8.1 (0.319)	53.5 (2.106)	20.8
	Modulator valve spring A/B	1.4 (0.055)	9.4 (0.370)	33.0 (1.299)	10.5
	CPC valve spring A/B/C	1 .0 (0.039)	6.8 10.268)	32.1 (1.264)	15.6
	4-3 kick down valve spring	0.9 (0.035)	6.6 (0.260)	30.7 il.2091	12.9
	3-2 kick down valve spring	1.0 (0.039)	6.1 (0.240)	27.1 (1.067)	13.4
	2nd exhaust valve spring	1 .o (0.039)	6.1 (0.240)	27.1 (1.067)	13.4

- Differential - Section 15 -----

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Differential carrier	Preset Torque N·m (kg-cm, Ib-ft)	0.6-1 .4 (6-14, 0.43-1 .01)	0.3 (3, 0.3)
Taper roller bearing	Preload N·m (kg-cm, lb-ft) MIT Reused A/T New Reused	2.0-3.0 (20-30, 1.45-2.17) 3.3-4.5 (33-45, 0.73-0.99) 3.0-4.2 (30-42, 0.66-0.93)	Adjust with a shim Adjust with a shim Adjust with a shim
Clutch disc	Thickness	1.68-1.80 (0.061-0.071)	0.25 (0.01)
Clutch plate	Thickness	2.55-2.65 (0.100-0.10	4) —
Distance between final driven gear and 112mm shim		41.7-41.9 (1.64-1.65)	

M/T: Manual Transmission A/T: Automatic Transmission

Т

Standards and Service Limits

|- Steering - Section 17 -

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Play Starting force MIS N (kg. lb) P/S engine stopped P/S engine running		5.0 (0.2) max. 20 (2, 4) min. wheels off the ground 118 (12, 26) min. 41 (4.2, 9.3) min. } wheels on the ground
Gearbox	Angle of rack guide screw loosened from locked position ⁰ Pinion starting preload N·m (kg-cm, lb-ft)	MIS P/S M/S M/S P/S	15° 20° ⁺ 5° 0.69-I .67 (7-17, 0.51-I .23) 0.15-0.25 (1.5-2.5, 0.11-o. 18) (without rack) 2.94 (30, 2.17)

M/S: Manual Steering P/S: Power Steering

r- Suspension - Section 18 -MEASUREMENT STANDARD (NEW) SERVICE LIMIT $\begin{array}{c} -0^{\circ} 20' \pm 30' \\ -0^{\circ} 20' \pm 10' \\ -1^{\circ} 30' \pm 30' \\ -1^{\circ} 30' \pm 10' \end{array}$ Camber º / Wheel Front at inspection alignment at adjustment Rear at inspection at adjustment Caster º ' +8° 00' ±45' +8° 00' ±15' Front at inspection at adjustment out 3.5 ±1 Total toe Front Rear In 6.0 ±1 Front wheel turning angle Inward wheel 33° 06' ±2° 26° 34' Outward wheel Side slip Front Out 6.0 ± 1 Rear In 9.0 ±1 O-O.7 (O-0.028) O-O.7 (O-0.028) Wheel Rim runout Axial -Radial -(0.002) Wheel bearing End Play Front 0 0.05 Rear 0 0.05 (0.002)

- Brakes -	Section 19			
	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200 N (20 kg, 44 lb)		To be locked when pulled 1 O-I 4notches	-
Foot brake pedal	Pedal height (with floor mat removed)	M/T A/T	218 (8.58) 218 (8.58)	1
Master cylinder	Piston-to-oushrod clearance		I-0.4 (O-0.01 6)	Ĩ
Disc brake	Disc thickness	Front Rear	28.0 (1.10) 21 .O (0.83)	26.0 (1.02) 19.0 (0.75)
	Disc runout	Front Rear	-	0.10 (0.004) 0.10 (0.004)
	Disc parallelism Pad thickness	Front and rear Front Bear	 11.0 (0.43) 9.5 (0.37)	0.015 (0.0006) 1.6 (0.06) 1.6 (0.06)

M/T: Manual Transmission A/T: Automatic Transmission



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Unit of length: mm (in)

Air Conditioner – Section 22 –

	MEASUREMENT	I STANDARD (NEW)
Air conditioner system	Lubricant capacity Conde cc (US 0Z, Imp 0Z) Evapo Line o Reserv	er 10 (0.34, 0.28) tor 10 (0.34, 0.28) hose 10 (0.34, 0.28) ir 20 (0.88, 0.56)
Compressor	Lubricant capacity cc (US oz, Imp oz) Stator coil resistance at 20°C (68°F) Pulley-to-pressure plate clearance	60-100 (2.03-3.38, 1.96-2.82) 3.4-3.8 0.35-0.65 (0.014-0.026)
Comoressor belt	Deflection with 98 N (10 kg, 22 lb) between the pulleys	1 0-I 2 (0.39-0.47) with used belt 5.5-7.5 (0.22-0.30) with new belt

- Electrical – Section 23

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Ignition coil	Rated voltage V Primary winding resistance Ω	12 1.0±10%		
Sprak Plug	Туре Gap	See Section 23 1.0-I. 1 (0.039-0.043)		
Ignition timing	At idling ⁰ BTDC	15°±2° (Red) BTDC		
Battery	Lighting capacity (5-hour ratio) V-AH MIT A K Starting capacity (5-second ratio) V M/T at ~ 15°C (5°F), 300 A draw A/T	12-52 12-55 9.2 min. 9.4 min./8.8 min.		
Alternator belt	Deflection with 98 N (IO kg, 22 lb-ft) between oullevs	12-14 (0.47-0.55) with used belt 7-9 (0.28-0.35) with new belt		
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Alternator	Output 13.5 V at hot A $@6,000$ rpm Coil resistance (rotor) Ω Slip ring O.D. Brush length Brush spring tension g (oz)	110 2.7-3.1 14.2-14.4 10.5 300-360 (10.6-I 2.7)	102 	
Starting motor	Type/Output kW Mica depth Commutator runout Commutator O.D. Brush length Brush sorina tension N (kɑ, lb)	Reduction/I .6 0.5-0.8 (0.020-0.031) o-0.02 (0-0.001) 29.9-30.0 (1.177-1.181) 15.0-I 5.5 (0.590-0.610) 18.1-23.9 (1.85-2.44, 4.1-5.4)	- 0.2 (0.008) 0.05 (0.002) 29.0 (1.142) 10.0 (0.394) -	

M/T: Manual Transmission A/T: Automatic Transmission

Design Specification

	ITEM		METRIC	ENGLISH	NOTES
Dimentions	Overall Length Overall Width Overall Height Wheelbase Track F/R Ground Clearance Seating Capacity		4,425 mm 1,810 mm 1,175 mm 2,530 mm 1,510/1,530 mm 135 mm	174.0 in 71.3 in 48.3 in 99.6 in 59.4/60.2 in 5.3 in	
Weight (USA)	Gross Vehicle Weight Rating (GVWR)		1,610 kg	3,550 lb	
Weight (CANADA)	Gross Vehicle Weight Rating (GVWR)		1,610 kg	3,550 lb	
ENGINE	Type Cylinder Arrangement Bore and Stroke Displacement Compression Ratio Valve Train Lubrication System Fuel Required		Water cooled, 4-stro gasoline 90° V6-cylind 90.0 x 78.0 mm 2,977 cm ³ (cc) 10 Belt driven, double (Forced and Premium UNLEAD with 91 Pump ((96 R.O.N.	ke DOHC with VTEC engine er, transverse 3.54 x 3.07 in 181.6 cu in .2 41 overhead camshafts I wet sump ED grade gasoline Octane Number) or higher	
STARTER	Type/Makes Normal Output Nominal Voltage Hour Rating Direction of Rotation Weight		Gear reduction/NIPPON DENS0 1.6 kW 1 2 v 30 seconds Counterclockwise as viewed from gear end 4.6 kg 1 10 lb		
CLUTCH	Clutch Clutch Lining Area	М/Т А/Т М/Т	Double plates dry, Torque c 587.6 cm ²	diaphragm spring onverter 22.7 sq in	
TRANSMISSION	Transmission Primary Reduction	м/т А/Т	Synchronized 5-speed forward 1 reverse Electronically controlled 4-speed automatic; 1 reverse Direct 1 : 1		
	Туре		Manual	Automatic	
	Gear Ratio	1st 2nd 3rd 4th 5th Reverse	3.071 1.727 1.230 0.967 0.771 3.186	2.611 1.551 1.025 0.684 1.909	
	Final Reduction	Gear type Gear ratio	Single he 4.062	lical gear 4.428	


		ITEM	METRIC	ENGLISH	NOTES
AIR CONDITIONER	Cooling Capacity — Conditions: Compressor RPM Outside Air Temperature Outside Air Humidity Condenser Air Temperature Condenser Air Velocity Blower Capacity		4,000 Kcal/h 1,80 27 °C 50 35 °C 4.5 m/sec 420 m ³ /h	at 12 V	
	Compressor	Type/Makes No. of Cylinder Capacity Max. Speed Lubricant Capacity	Swash-plate typ 155.3 cc/rev 7,600 80 cc	e/NIPPON DENS0 10 94.7 cu in/rev 0 rpm 2.7 US oz	
	Condenser	Туре	Corruaate	ed fin type	
	Evaporator	Type Air Temperature	Corrugate 19.5 °C	ed fin type 67 °F	
	Blower	Type Motor Input Speed Control Max. Capacity	Siroc 178 V Infinity 460 m ³ /h	cofan V/12 V variable 16.247 cu ft/h	at 13.5 V
	Temp. control		Air-mi	x type	
	Comp. clutch	Type Power Consumption	Dry, single pla 40 W	ate, V-belt drive //12 V	
	Refrigerant	Type Quantity	R 9505.8 g	12 77,9 ⁺ 1.8 ⁰ lb	
STEERING System	Type Overall Ratio	МІТ А/Т М/Т	Rack an Electric, power assi 20.8 (18.2-20.8)	d pinion sted, rack and pinion (Manual variable)	
	Turns, Lock-to-Lo Steering Wheel D	A/T ock Dia.	18.6 (Powe 3. 368 mm	er steering) 24 │ 14.5 in	
SUSPENSION	Type, Front		Independent double pliance pivot, coil s	wishbone with com- pring with stabilizer	
	Shock Absorber,	Front and Rear	coil spring w Telescopic, hydrauli	vith stabilizer c nitroaen gas-filled	

M/T: Manual Transmission A/T: Automatic Transmission

(cont'd)

Design Specification

|- (Cont'd) --

(oont a)						
	ITEM	METRIC	ENGLISH	NOTES		
WHEEL ALIGNMENT	Camber Front Rear Caster	- 0° - 1° 8	- 0° 20' - 1° 30' 8°			
	loe Front Rear	Out 3.5 mm In 8.0 mm	Out 0.14 in In 0.24 in			
BRAKE SYSTEM	Type, Front and Rear Pad and Lining Surface Area: Front/Rear Parking Brake Kind and Type	Power assisted ventilate 58.0/38.8 cm ² Mechanical expandi brak	d self-adjusting ed disc 8.99/6.01 s q i n ing, rear two wheel kes			
TIRE	Size	Front: 205150 ZR 15 165/80 D 15 (Fo	Rear: 225150 ZR 16 olding spare tire)			
ELECTRICAL	Battery Starter Alternator Fuses In The Fuse Box In The Relay Box In The Relay Box In The Main Fuse Box Headlights, High, Low Front Turn Signal Lights Front Position Light Rear Turn Signal Lights Stop/Tail Lights Tail Lights Side Marker Lights Foot Back-up Lights License Plate Lights Gauge Lights Indicater Lights Glove Box and Fuse Lights Dome Lights Trunk Lights Door Courtesy Lights Footlight Illumination and Pilot Lights Day Time Running Lights	MIT: 12 V- A/T: 12 V- 12 V-1 12 V- 12 V- 7.5 A, 10 7.5 A, 10 A, 15 A, 20 7.5 A, 10 A	52AH/5HR 55AH/5HR 55AH/5HR 1.6 kW 110 A 0 A, 15 A 0 A, 30 A, 40 A, 50 A 0 A, 30 A, 40 A, 120A W, 5 5 W 32 CP -5 w 45 CP 212 CP -2 CP -3 4 W 3.4 w -5	(SAE 1156) (SAE 3652) (SAE 3497) (SAE 2057) (SAE 194) (SAE 168) (SAE 1156)		
	Day Time Running Lights	12 V-3	32 CP	Canada model only		

Body Specifications





Maintenance





For the details of lubrication points and types of lubricants to be applied, refer to the Illustrated Index and various work procedures (such as Assembly/Reassembly, Replacement, Overhaul, Installation, etc.) contained in each section.

u	o . LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: SG SAE viscosity: 10 W-30 recommended Fuel Efficient Oil: Identified by the words, "Energy Conserving II" SAE Viscosity: See chart below.
2	Transmission Manual Automatic	API Service Grade: SF or SG SAE Viscosity: See chart below. Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON [®] II type automatic transmission fluid
3	Brake Line (including anti-lock brake system)	Brake fluid DOT3 or DOT4
4	Clutch Line ,	Brake fluid DOT3 or DOT4
5 6	Shift lever pivots (Manual) Release fork (Manual)	Silicone grease with molybdenum disulfide
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	Steering gearbox (Manual) Steering boots Steering column bushings Steering ball joints select lever (Automatic) Pedal linkage Intermediate shaft Brake master cylinder pushrod Trunk hinges Door hinges upper and lower Door opening detents Fuel filler lid Front hood hinges and latch Clutch master cylinder pushrod Tilt Tilt lever Parking brake cable end Throttle cable end Shift cable end Rear hatch latch	Multi-purpose grease
26	Caliper Piston seal, Dust seal, Caliper pin, Piston	Silicone grease
Rec AP Fu Ide	ommended Engine Oil I Service Grade: SG el Efficient Oil: entified by the words, "Energy Conserving II"	Recommended Manual Transmission Oil API Service Grade: SF or SG
	$\begin{array}{c} \hline 10W-30 \\ \hline 5W-30 \\ \hline -20 \\ \hline 0 \\ \hline -30 \\ \hline -20 \\ \hline 0 \\ \hline -30 \\ \hline -20 \\ \hline 0 \\ \hline -30 \\ \hline -20 \\ \hline 0 \\ $	30 20W 40 10W 30 10W 40 -20 0 20 40 60 80 100°F -30 -20 -10 0 10 20 30 40°C transmission oil viscosity for ambient temperature ranges





MAINTENANCE ITEM			MAINTENANCE INTERVALS														
Service at the interval listed x 1,000 miles (or km) or	x 1,000 miles	7.5 1		7.5	15	22.5	30	37.5	4 5	52.5	60	67.5	75	82.5	90		SEC
after that number of months,	x 1,000 km	12	24	36	48	60	72	84	96	108	120	132	144	NOTES	&		
whichever comes first.	months	6	12	18	24	30	36	4 2	48	54	60	66	72		PAGE		
Emission Related								1		•				<u> </u>			
Air cleaner element					R	Γ				1	I		R		11 11.		
Idle speed						1								Manual: 800 + 50 rpm	11-11;		
									I					Automatic: 750 \pm 50 rpm (in gear)	11-84		
Idle CO			L						ł					Check with CO meter	1 1-12		
EGR system									1						11-128		
Evaporative emission contr	ol system	İ											_		1 1-135		
Ignition timing									1					15 ± 2° (Red) BTDC	23-91		
Positive crankcase ventilat	ion valve								1					If clicking sound is heard as you pinch the PCV hose between the PCV valve and in- take manifold, valve is OK.	11-134		
Valve clearance (cold)			1		1		1		I		1		I	Intake: 0.15-0.19 mm (0.0060.007 in) Exhaust: 0.17-0.21 mm (0.007-0.008 in)	6-54		
Fuel filter and hoses									R					The rubber fuel hoses need periodic replacement since they are subject to cracks and deterioration during a long period of use.	11-4, 97		
Fuel line connections	-				I *1				1				1	Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or deformed parts.	11-4		
Spark plugs									R					NGK: PFR6G-11 ND: PK20PR-L11 Gap: 1.1 mm (0.043 in)	23-96		
3 Engine oil		R	R	R	R	R	R	R	R	R	R	R	R	5.0 ℓ (5.3 US qt, 4.4 Imp qt) with filter change	8-4		
Engine oil filter		R	R	R	R	R	R	R	R	R	R	R	R		8-5		
Alternator drive belt					1.5				I				-	12-14 mm (0.47-0.55 in) @ 98 N (10 kg, 22 lb) tension	23-110		
Cooling system hoses and	connections				I								1		10-2, 3		
Radiator coolant							R				R⁺³			Cooling system capacity Manual: 12.0 (12.7 US qt, 10.6 Imp qt) Automatic: 11200 ((12.7 USsqt, 10.6 Imp qt) Check specific gravity for freezing point	10-5		
Manual transmission oil					R				R				R	2.7 ℓ (2.9 US qt. 2.4 Imp qt)	13-3		
Automatic transmission flui	d				R				R				R	2.9 ℓ (3.1 US gt, 2.6 Imp gt)	14-94		

R = Replace C = Clean I = Inspect After inspection, clean, adjust, repair or replace if necessary.

Check oil and coolant level at each fuel stop.
 Under severe driving conditions, service these items more often.

4

4

*1 For cars sold in Carifornia, this service is recommended only; other areas, it is required.

² Tension adjustment only.

^{*3} Thereafter, replace every 2 years or 30,000 miles (48,000 km), whichever comes first.

Maintenance Schedule



R = Replace C = Clean I = Inspect After inspection, clean, adjust, repair or replace it necessary.

					:91	e seo	e zervi	чт							Severe Driving Conditions
זי 18-1 פי	Check tightness of bolts.	Т		I		I		I		I		I		s	flod pnitnuom noisnaqsu2
1E-71						T		Π				1			🗆 Power steering system
0E-L l I Z-7 l	Check rack grease and steering linkage. Check the boot for damage or leaking grease.			.								-		-reets, sbne	Steering operation, tie rod ing gearbox and boots
9-8 l						1		-		-		Ι			Front wheel alignment
													(bəte	sləfi noizzim∃-n	oV) noiznaqzu2 bne_pninaat2_
29-6i	Bleed high pressure fluid					Я								ah pressure	Anti-lock brake system high hose
₱₱-61 EP-61 It-61	Function test Wheel sensor signal confirmation Anti-lock brake system light circuit	ł				I				I				noiterae	Anti-lock brake system op
69-6 L 79-6 L	Use only DOT3 or 4 fluid. Check that brake fluid level is between the upper and lower marks On the reservoir.	Я				Я				Я				lock prake	Brake fluid (including Anti- system fluid)
P - 6	Fully engaged 1 0 to 1 4 clicks	1													Parkin <u>g brake</u>
19-26	Check for leaks, damage, interference or twisting.	I		I		I				Ι		ļ		luding Anti- (səqiq bre	Brake boss and lines system boss e lock brake system poss
81-61 0Z-6	ni 87.0) mm 91 siscs 19 mm (0.75 in) Pads ^{1,6} mm ^{3,1} sbag							Ι	¢					sped pue	🗖 Rear brake discs, calipers
01-61	Min. thickness: 26 mm (1.02 in)			Ŧ		1		-		1		-		oers.	I ront brake discs and calit
1 <u>017</u> 8	(ni 80.0) mm 8. r :ss	hickne	1. I	iΜ	I I	I	I	I I	I	1	I	I	I		i ront brake pads
														q)	Brakes (Non-Emission Relate
7-6	Check condition and tightness	1		1		I		1		1		1			Exhaust pipe and muffler
11-122	Check condition and tightness					1								play	catalytic converter heat s
11-01		1													dwud 1916W
6-23		Я													Tlad poimiT
		·	1	L										(F	Engine (Non-Emission Related
1		27	99	09	P4	48	45	98	0 E	54	81	15	9	months	WINCHEVER COMES TIFSL
PAGE	AD LES	144	ZEL	150	801	96	78	ZL	09	48	36	54	15	ա _հ 000, ۲ X	after that number of months,
Sec	23TON	06	82.5	97	G.7ð	09	52.5	945	37.5	OE	22.5	91	ð.T	eəlim 000,1 X	Service at the interval listed
			•	•	s	IAVA:	E INTE	NANC	INI/	W.		•		EM	TI 3 3 3 3 3 3 3 3 3 3

Inspect the power steering system every 7,500 miles (12,000 km) or 6 month under condi-tion 8, C, or E.

Inspect front and rear brake discs and calipers, and rear brake pads every 7,500 miles (12,000 km) or 6 months under condition A, B, D, or E.

- Replace engine oil and oil filter every 3,750 miles (6,000 km) or 3 months under condition A

- Clean the air cleaner element every 7,500 miles (12,000 km) or 6 months and replace every

30,000 miles (48,000 km) of 24 months under condition B of E.

Items with an for for the chart will need service more often, if you drive in some service more often, if you

The conditions are:

A. Repeated short distance driving.

B. Dusty conditions.

C. Severe cold weather.

D. Areas with road salt or other corrosive materials.

Speor Appnw Jo Uguon .3



Construction and Function

Outline	5-2
Variable Valve Timing and Lift	
Electronic Control System (VTEC)	5-4
Cylinder Head	5-9
Lubrication System	5-11
Exhaust System	5-13
Cooling	5-14



Outline

Description

This engine is a 2,977 cc DOHC mid-ship unit having 6 cylinders of 90° -V configuration; it is water cooled and equipped with a center plug type pent roof combustion chamber. It is specified for unleaded fuel and uses a PGM-FI (Multipoint injection) system. This engine incorporates a new mechanism called Honda Variable Valve Timing and Lift Electronic Control System (VTEC). This mechanism, the world's first, allows the timing and lift of the intake and exhaust valves to be changed simultaneously. The engine also includes a new electronically controlled intake manifold system that can change the volume of the intake chamber.





This engine has the following new features.

- VTEC; High output and a broad power band is achieved through control of low-speed and high-speed valve operation by the PGM-FI ECU. (Two knock sensors are used to detect octane level of the fuel.)
- Titanium connecting rods; Accommodate high rotation speed and high output. Titanium material of light weight and high strength is used for the connecting rods. (Strength is at the same level as iron.) (Weight is about 30% lighter than iron.)
- New mechanism to the intake system; Increased low and middle speed torque and higher output can both be achieved by switching the chamber volume of the intake manifold according to engine speed. This is electronically controlled.
- Cooling system for the mid-ship engine:
 - Radiator located in front compartment (An aluminum alloy radiator and pipes made of aluminum alloy)
 - Engine room cooling fan
 - Expansion tank
- The cylinder block is highly rigid with deep water jackets.
- In order to achieve lighter weight. magnesium is used for the following parts:
 - . Cylinder head cover
 - . Intake manifold cover
 - . Intake manifold chamber

Major Specifications

Туре	Water-cooled V6-90° Cross Flow		
Displacement	2,977 cm ³ (181.6 cu.in)		
Bore x Stroke	90 x 78 mm (3.54 x 3.07 in)		
Compression Ratio	10.2		
Cam, Valve Mechanism	DOHC (4-camshafts), VTEC		
Valve Train	Belt Driven		
Fuel Supply System	PGM-FI (Multi-Point Injection)		

Variable Valve Timing and Lift Electronic Control System (VTEC)

Outline

The engine is equipped with multiple cam lobes per cylinder, providing one valve timing and lift profile at low speed and a different profile at high speed. Switch-over from one profile to the other is controlled electronially, and is selected by monitoring current engine speed and load.



CAM LOBES FOR LOW RPM
 CAM LOBES FOR HIGH RPM
 PRIMARY ROCKER ARM
 MID ROCKER ARM
 SECONDARY ROCKER ARM
 LOST MOTION ASSEMBLY
 INTAKE VALVE
 EXHAUST VALVE



In general, it would be ideal if the high rpm performance of a racing engine and the low rpm performance of a standard passenger car engine could be combined in a single engine. This would result in a maximum performance engine with a wide power band. Two of the major differences between racing engines and standard engines are the timing of the in-take/exhaust valves and the degree of valve lift. Racing engines have longer intake/exhaust timing and a higher valve lift than standard engines. The Honda Variable Valve Timing and Lift Electronic Control System takes this into account. When valve actuation is adjusted for low rpm timing and lift, low rpm torque is better than in a standard engine. When valve actuation is then adjusted for high rpm timing and lift, output improves to the level that a racing engine can offer. Until now, few variable valve timing systems have been commercialized. In those that have, only the time that both valves are open (intake/exhaust overlap) could be changed. Honda's system is the first in the world in which both the valve timing and the degree of valve lift can be changed as needed, making it the most advanced valve train mechanism available.

Comparison of Valve Lift of Racing Engines vs. Mass Produced Engines

	Racing Engine	Variable Timing & Lift Engine	Standard Engine
Valve Timing (exhaust/intake) Valve Lift	*TDC *BDC *BDC Exhaust Intake	Exhaust Intake	Exhaust Intake
Max. Power	0	0	
Low rpm Torque		0	0
idling Stability		0	0

*TDC = Top Dead Center *BDC = Bottom Dead Center 0 = Optimum Characteristic

The engine is equipped with two valve timing and lift settings which change according to driving conditions.



Variable Valve Timing and Lift Electronic Control System (VTEC)

Mechanism

At Low rpm:

As shown, the primary and secondary rocker arms located on both sides are not connected to the mid rocker arm but are driven separately by cam lobes A and B at different timing and lift. Although the mid rocker arm is following the center cam lobe with the lost-motion assembly, it has no effect on the opening and closing of the valves in the low rpm range.

At Low rpm:



At High rpm:

When driving at high rpm, the built-in piston moves in the direction shown by the arrow in the figure below. As a result, the primary, secondary, and mid rocker arms are linked by 2 hydraulic pistons (like a skewer) and the 3 rocker arms move as a single unit. In this state, all the rocker arms are driven by cam lobe C opening and closing the valves at the valve timing and lift set for high operation.

At High rpm:





Control System

The control system for this mechanism, as shown below, constantly monitors the changes in engine status such as load, rpm and vehicle speed. This information is transmitted to the Control Unit.

Valve Timing Change ConditionsEngine RPM:5,800-6,000 rpmVehicle Speed:5 km/h (3 MPH) or fasterWater Temperature:60°C (140°F) or higher

Control System



(cont'd)

Variable Valve Timing and Lift Electronic Control System (VTEC)

- Control System

Lost Motion Mechanism

The mid rocker arm is always driven by the high-speed cam lobe, even at low speeds. At low speeds, the lost motion mechanism keeps the mid rocker arm in contact with the high-speed cam lobe. At high speeds, the lost motion mechanism acts as part of the valve spring load.



LOST MOTION ASSEMBLY

Hydraulic Pressure Control Mechanism Spool valve/hydraulic pressure switch

The solenoid valve, in response to a signal from the PGM-FI ECU, closes the oil passage to the rocker arm at low speed. This cuts oil pressure to the hydraulic pistons in the rocker arms so the arms operate independently. At high speed, the ECU opens the solenoid valve. The increased oil pressure causes the hydraulic pistons to lock the primary, secondary, and mid rocker arms together.

The oil pressure switch serves as a sensor to determine if the switch-over has taken place in response to the ECU signal.



Cylinder Head



Camshaft

The camshaft is a cast piece. By improving dimensional accuracy, it became possible to achieve minimum space between cams, thus allowing a more compact cylinder head. Each camshaft is supported on four bearing journals with forced lubrication. On the right end of each camshaft is a driven pulley. The exhaust and intake cycles require a total of 36 cam lobes to open and close the valves.



Valves

The valves are opened and closed by rocker arms driven by the camshaft. The rocker arm lever ratio is set to the optimum value, keeping cam lift to the minimum while increasing valve lift, thus improving intake/exhaust efficiency.

Valve specifications

Unit: mm(in)

ITEM	VALVE	INTAKE	EXHAUST
HEAD DIAMETER		35 (1.38)	30 (1.18)
SHAFT DIAMETER		5.5 (0.22)	5.5 (0.22)
OVERALL LENGTH		112. 45 (4. 43)	111. 55 (4.39)
VALVE LIFT	МІТ	A: 8.7 B: 10.2" C: 8.3	A: 7.7 8: 9.0* c: 7. 4
	A/T	A: 9.0 B: 9.5" c: 8. 6	A: 7.7 B: 9.0" c: 7. 4

* Indicates high-speed valves







Oil Passage

The lubrication system is a full filtration circulation type. The oil pump is directly linked to the crankshaft; oil to the oil pump is pulled through the oil strainer, after which pressure is regulated by the pump relief valve. It is then filtered through the oil filter and pumped to the cylinder block and cylinder head. A baffle plate is provided inside the oil pan; the baffle plate helps minimize the changes in oil level produced inside the pan while driving will affect the amount of oil going to the pump.



Exhaust System

- Dual Exhaust System



Features

- A compact dual exhaust system is used to provide low back pressure.
- Sound tuning has been optimized to give a sporty exhaust sound note suitable to this type of car. This is done by a collection chamber in Exhaust Pipe B.







- Radiator

The radiator, made of aluminum alloy, is mounted in the front of the vehicle to gain maximum cooling efficiency from air passage. It is a corrugated-fin type, double row alminum core radiator with electric cooling fan. Since the tubes are in a line, the volume of the cooling water in the radiator is reduced for less weight. The upper and lower tanks are made of resinous material for reduced weight and increased corrosion protection.

The engine compartment cooling fan is mounted on the right side. It operates in conjunction with the radiator's electric cooling fan in high mode.

The expansion tank is used to separate air out of the coolant circulating through the system.

Radiator Specifications

	Radiator	46,000				
		Height (mm)	340			
	Core size	Width (mm)	688.1			
		Thickness (mm)	32			
	Fin	2.5				





RESINOUS LOWER TANK

OVERFLOW TUBE TANK CAP (PRESSURE TYPE) EXPANSION TANK

Engine Removal/Installation



Ref. No.	Tool Number	Description	Q'ty	Page Reference
1 2	07MAC-SL00100 07941-6920003	Ball Joint Remover Ball Joint Remover	1	5-24 5-24
	TIMAC-SLOUTOU 07941-6920003	a Joint Remover Ball Joint Remover		5-24



A WARNING

- Make sure jacks and safety stands are placed proper ly and hoist brackets are attached to the correct positions on the engine (See Section 1).
- Make sure the car will not roll off stands and fail while you are working under it.

CAUTION:

- Use front and rear fender covers to avoid damaging painted surfaces.
- Unspecified items are common for the M/T cars, A/T cars, and the AIC equipped cars.
- Unplug the wiring connectors carefully while holding the coupler and the connector portion to avoid damage.
- Mark all wiring and hoses to avoid mis-connection. Also, be sure that they do not contact other wiring or hoses or interference with other parts.
- If the ground clearance should be retained, use a scissors jack and install the rubber spacers to the coil springs (page I-6).
- Put rubber pads under the jacking points when using jacks or safety stands to avoid damaging body (page I-7, I-81.
- 1. Move the seat bottoms and backs as far forward as they will go.
- 2. Disconnect the battery negative terminal first, then the positive terminal.

3. Remove the expansion tank cap to speed draining.

A WARNING Use care when removing the expansion tank cap to avoid scalding by hot coolant or steam.

- 4. Raise the hoist to full height.
- 5. Drain the coolant (See Section 10),
 - Loosen the drain plug from the radiator lower tank.
 - Remove two drain bolts from the water pipes Reinstall the drain bolts with new washers.
 - Loosen the front and rear engine drain bolts to drain coolant from cylinder heads. Connect rubber hoses to the drain bolts for easy operation.
- 6. Drain transmission oil/fluid. Use a 3/8" drive socket wrench to remove the drain plug. Reinstall the drain plug using a new washer.
- 7. Drain the engine oil. Reinstall the drain plug using a new washer.
- 8. Lower the hoist.
- 9. Remove the rear hatch (See Section 20).
- 10. Remove the engine cover (See Section 20).
- 11. Remove the rear hatch scoop (See Section 20).
- 12. Remove the strut bar.







- 15. Remove the intake manifold plate and the top cover.
- 16. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle bracket and accelerator linkage.

NOTE:

- Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.
- Adjust the throttle cable when installing (See Section 1 1).



17. Relieve fuel pressure by slowly loosening the service bolt on the fuel filter about one turn (See Section 11).

A WARNING Do not smoke while working on the fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

CAUTION:

- Before disconnecting any fuel line, the fuel pressure should be relieved as described above.
- Place a shop towel over the fuel filter to Prevent pressurized fuel from spraying over the engine.

- 18. Remove the fuel feed pipe.
- 19. Remove the fuel return hose from the pressure control valve.



20. Disconnect two hoses, then remove the expansion tank.







27. Disconnect the three connectors, then remove the emission control box. Fix it to the intake manifold.
Do not disconnect the vacuum hoses.



CONNÉCTORS

- 28. Move the trunk carpet and disconnect the anti-lock brake right sensor connector. Push the wire and connector through the body hole into the engine compartment.
- 29. Remove the front engine mounting bolt (page 5-28).



- 30. Raise hoist to full height.
- 31. Remove the clutch slave cylinder from the transmission case (M/T, See Section 12)
 - Do not disconnect the clutch hose.
- 32. Remove the lower cover, then remove the shift cable and select cable with cable bracket (M/T, See Section 13).
- 33. Remove the cover, then remove the shift cable (A/T See Section 14).

NOTE:

- Take care not to bend the cable when removing it. Always replace a kinked cable with a new one.
- Adjust the cables when installing.
- 34. Remove the engine under guard and the center rod assembly.

A/T:



Engine Removal/Installation

(cont'd)

35. Remove the rear beam rod assembly.

36. Remove the front beam. Remove the A/C compressor, then reinstall the front beam and retorque the two nuts to the front beam.

NOTE:

- Do not remove the compressor hoses.
- Hang the A/C compressor with wire or rope as shown. Do not let it hang from hoses.
- 37. Remove the left and right parking brake cables.
- 38. Remove the stabilizer links and separate the damper and the suspension lower control arms.

- 39. Remove the rear brake hoses. Plug the brake pipes with rubber caps.
- 40. Remove the anti-lock brake sensor wire clamps.
- 41. Remove the ball joints from the suspension lower control arms (use ball joint remover 07MAC-SL00100), and the toe control arms (use ball joint remover 07941-6920003).

CAUTION: Make sure that the reference marks on the control arm are aligned.





- 42. Remove the oxygen sensor connectors.
- 43. Remove the front exhaust pipe A and catalytic converter.
- 44. Remove the self-locking nuts, then separate the catalytic converter and exhaust silencer.

CAUTION:

- Do not use air wrench or hammer to remove exhaust pipes or catalytic converters if the oxygen sensors are not to be removed.
- Do not use air wrench for tightening self-locking nuts on exhaust pipes or catalytic converters if the oxygen sensors are not to be removed.

NOTE: Use new gaskets and self-locking nuts reassembling. when

- 45. Remove the half shaft heat cover
- 46. Remove the driveshafts.

NOTE:

- Coat all precision finished surfaces with clean engine oil or grease.
- Tie plastic bags over the driveshaft ends.





10 x 1.25 mm 55 N-m (5.5 kg-m, 40 lb-ft)

5-25

Engine Removal/Installation

(cont'd)

- 47. Loosen the rear beam side bracket mounting bolts one or two turns, then remove the mounting bolts except the four bolts shown.
- 48. Lower hoist, attach a chain hoist to the engine.
- 49. Install the front engine mounting bolt, torque the nut temporarily.
- 50. Remove the side engine mount and bolts, then push the side engine mounting bracket into the support bracket of the body.
- 51 . Remove the transmission mounting bolt.





- 52. Remove the four mounting bolts from the rear beam side bracket.
- 53. Lower the engine, suspension and beam assembly a few inches with the chain hoist.
- 54. Check that wires and hoses are completely removed from the engine assembly.
- 55. Slowly lower the engine assembly on to a truck.
- 56. Remove the chain hoist from the engine.
- 57. Raise the body with the hoist. Roll the engine assembly from under the body.



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Engine Removal/Installation

(cont'd)





61. Install the engine in the reverse order of removal:

NOTE:

- Align the bolt holes of the beam brackets and body with screwdriver (page 5-27).
- Temporarily torque the two front beam nuts and front engine mounting bolt when installing the A/C compressor.
- Combine the front beam and the rear beam rod assembly, then torque the four mounting bolts.
- Check that the set ring on the end of each driveshaft clicks into place.

CAUTION: Use new set ring on installation.

5 - 2 8



After the engine is in place:

• Torque the engine mounting bolts in sequence shown below.

CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration and reduce bushing life; check that the bushings are not twisted or offset.

- Bleed air from the cooling system (See Section 10)
- Bleed air from the brake lines (See Section 19)
- Adjust the throttle cable tension.
- Check the clutch pedal free play.
- Adjust the clutch guide assemblies when disassembling clutch (See Section 12).

- Check that the transmission shifts into gear smoothly (M/T See Section 13, A/T See Section 14).
- Adjust the alternator belt (See Section 23).
- Adjust the A/C belt (See Section 22).
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Inspect for fuel leakage:
 - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.


Engine Removal/Installation

- (cont'd)







Cylinder Head/Valve Train

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Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
10346678	07HAH-PJ701 OA 07LAJ-PT301OA 07MAA-PR70110 07MAA-PR70120 07MAJ-PR70100 07MAJ-PR70200 07757-PJ1010A 07742-0010100	Valve Guide Reamer, 5.5 mm Test Harness Tappet Adjuster Tappet Locknut Wrench Test Harness VTEC Plug Valve Spring Compressor Attachment Valve Guide Driver, 5.5 mm	1 1 1 1 1 1 1	6-45 6-11 6-55 6-55 6-1 1 6-52, 53 6-40 6-44, 45

Cylinder Head/Valve Train



Illustrated Index

CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (100°F) before removing it.

- NOTE:
- Use new O-rings and gaskets when reassembling.
- Replace rubber seals, if damaged or deteriorated.
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head, cover and rubber seals to prevent the rubber seal from failing off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage,
- When installing the new crankshaft: @tighten hte crankshaft pulley bolt to 280 N·m (28 kg-m, 203 lb-ft), 2 loosen it bolt, 3 retighten it to 250 N·m (25 kg-m, 181 lb-ft).



Cylinder Head/Valve Train

Illustrated Index (cont'd) -

NOTE:

- Use new O-rings and gaskets when reassembling.
- Replace rubber seals, if damaged or deteriorated.



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(cont'd)

Cylinder Head/Valve Train

Illustrated Index (cont'd) -

CAUTION:

To avoid damaging the cylinder head, wait until the coolant temperature drops below 38°C (1 00°F) before removing it.
 In handling a metal gasket, care should be taken not to fold it or damage the contact surface of the gasket.

NOTE: Use new O-rings and gaskets when reassembling.

Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.





Electrical Connections







- Troubleshooting -Self-diagnostic Procedures
 - 1. Connect the Service Check Connector terminals with a jumper wire as shown (the Service Check Connector is located under the dash on the passenger side of the car).



2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by a individual short blinks. Problem codes 10 through 59 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit.





2. Remove the CLOCK fuse (7.5 A) from the main relay box for 10 seconds to reset ECU.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



III. Final Procedure (this procedure must be done after any troubleshooting)

(cont'd)

Troubleshooting -Self-diagnostic Procedures (cont'd)

SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	11-26
1	FRONT OXYGEN SENSOR	11-30
2	REAR OXYGEN SENSOR	11-30
3	MANIFOLD ABSOLUTE PRESSURE (MAP SENSOR)	1 1-40
5		
4	CRANK ANGLE A	11-46
6	COOLANT TEMPERATURE (TW SENSOR)	11-48
7	THROTTLE ANGLE	11-50
9	No. 1 CYLINDER POSITION A (CYL SENSOR)	1 I-46
1 0	INTAKE AIR TEMPERATURE (TA SENSOR)	1 I-52
1 2	EXHAUST GAS RECIRCULATION SYSTEM (EGR)	11-128
1 3	ATMOSPHERIC PRESSURE (PA SENSOR)	i 11-54
1 4	ELECTRONIC AIR CONTROL (EACV)	11-70
1 5	IGNITION OUTPUT SIGNAL	11-56
16	FUEL INJECTOR	11-89
17	VEHICLE SPEED SENSOR	11-58
18	IGNITION TIMING ADJUSTMENT	11-60
21	FRONT SPOOL SOLENOID VALVE	6-15
22	FRONT VALVE TIMING OIL PRESSURE SWITCH	6-17
23	FRONT KNOCK SENSOR	11-62
30	A/T FI SIGNAL A	11-64
31	A/T FI SIGNAL B	11-64
35	TC STB SIGNAL	19-100
36	TCFC SIGNAL	19-102
41	FRONT OXYGEN SENSOR HEATER	11-32
42	REAR OXYGEN SENSOR HEATER	1-32
43	FRONT FUEL SUPPLY SYSTEM	1-36
44	REAR FUEL SUPPLY SYSTEM	11-36
45	FRONT FUEL METERING	11-38
46	REAR FUEL METERING	11-38
47	FUEL PUMP	11-99
	REAR SPOOL SOLENOID VALVE	6-15
52	REAR VALVE TIMING OIL PRESSURE SWITCH	6-17
53	REAR KNOCK SENSOR	11-62
54	CRANK ANGLE B	11-46
59	No. 1 CYLINDER POSITION B (CYL SENSOR)	1 I-46

 If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.

- The Check Engine light may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine light and D indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 and 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D indicator light. If it comes on, see page 14-52.
- The Check Engine light and TCS indicator light may come on simultaneously when the self-diagnosis indicator blinks 3, 5, 6, 13, 15, 16, 17, 35 and 36. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the TCS indicator light. If it comes on, see page 1 S-84.
- The Check Engine light does not come on when there is a malfunction in the A/T FI signal. However, when the two terminals of the service check connector are connected with a jumper wire and, the Check Engine light will indicate the codes.



If the inspection for a particular failure code requires the ECU test harness, remove the seat back panels. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



Troubleshooting - Self-diagnostic Procedures (cont'd) -

CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the ECU test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.













Troubleshooting Flowchart – Oil Pressure Switch (cont'd)









Illustrated Index -



NOTE:

- Turn the crankshaft so that the No. 1 piston is at TDC (page 6-25, 26)
- Replace rubber seals if damaged or deteriorated.
- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling of.
- After installation, fill the engine with oil up to the specified level, run the engine fbr more than 3 minutes, then check for oil leakage.
- When installing a new crankshaft; @tighten the crankshaft pulley bolt to 280N·m (28 kg-m, 203 lb-ft), ② loosen it, ③ retighten it to 250 N·m (25 kg-m, 181 lb-ft).



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Inspection

- 1. Remove the ignition coil covers and harness clamps.
- Disconnect the connectors, then remove the ignition coils.
 NOTE:
- 3. Remove the cylinder head covers.
- 4. Inspect the timing belt for cracks and oil soaking.

NOTE:

- Replace the belt if oil soaked.
- Remove any oil or solvent that gets on the belt.



Tension Adjustment -

CAUTION:

- Always adjust timing belt tension with the engine cold.
- Do not rotate the crankshaft when adjusting bolt is loose (the timing belt will skid over the teeth of the rear intake cam pulley).
- Never adjust the belt tension on any other occasion than when the belt is removed for belt or parts replacement.

NOTE:

- Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Inspect the timing belt before adjusting the belt tension.
- Always rotate the crankshaft clockwise. Rotating it counterclockwise may result in improper adjustment of the belt tension.
- 1. Install the timing belt with the No. 1 piston at TDC (page 6-25, 26).
- 2. Fix the crankshaft, remove the slack in the sequence of (a), (b), (c), and (d) by turning each cam pulley.
- Loosen the timing belt adjusting bolt 1 80° (the slack at (e) should be eliminated).
- Then, tighten the timing belt adjusting bolt.
- 4. Set the No. 1 piston at TDC (page 6-26)
- 5. Rotate the crankshaft clockwise g-teeth on camshaft pulley (The blue mark on crankshaft pulleys should be line up with the pointer on lower cover).
- 6. Loosen the timing belt adjusting bolt.
- Retighten the adjusting bolt torque to 43 N·m (4.3 kg-m, 31 lb-ft).







- Removal -





(cont'd)

-Removal (cont'd)-



- 14.' Remove the connector, the terminal' and the alternator.
- 15. Remove the side engine mount, then push into the side mounting bracket housing of the body (page 5-26).
- 16. Remove the transmission mount.
- 17. Remove the cylinder head covers.
- 18. Turn the crankshaft so that the No. 1 piston is at topdead-center (page 6-25, 26).
- 19. Install the attachment under the engine, then tilt the engine approximately 5° using a jack.



20. Remove the alternator bracket stiffener.



- 2 1. Remove the A/C adjusting pulley and belt.
- 22. Remove the dipstick pipe mounting bolt, then remove the front and rear timing belt middle covers.
- Remove the crankshaft pulley, then remove the timing belt lower cover.
- 24. Loosen the timing belt adjusting bolt 180° and release the belt tension.

NOTE: Push the tensioner to release tension from the belt, then retighten the adjusting, bolt.



25. Remove the timing belt from the pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in.) in diameter.



12.2



6-25

- Installation

CAUTION: Do not rotate the crankshaft or camshaft without installing the belt. The piston could hit a valve and damage may result. 1. install the timing belt in the reverse order of removal; Only keypoints are described here. 2. Remove all spark plugs. 3. Position the crankshaft and the cam pulleys as shown before installing the timing belt. (A) Set the crankshaft so that the No.1 piston is at top-dead-center (TDC). NOTE: Turn the crankshaft until its keyway is facing up. (B) Align the TDC mark on the front exhaust cam pulley and front intake cam pulley to the pointer on the front timing belt cover plate. C Align the TDC mark on the rear intake cam pulley to the pointer on the rear timing belt cover plate. (D) Advance the rear exhaust cam pulley to one half tooth from TDC. 4. Install the timing belt in the sequence shown. @Timing belt drive pulley (crankshaft) \rightarrow (2) Adjusting pulley \rightarrow (3) Front exhaust cam pulley \rightarrow (4) Front intake cam pulley \rightarrow @Water pump pulley \rightarrow 6 Rear intake cam pulley $\rightarrow (7)$ Rear exhaust cam pulley. POINTER ON REAR COVER PLATE **REAR-EXHAUST** CAM PULLEY



- 5. Tension the timing belt between the pulleys in the sequence A to E as shown above.
 - Refer to page 6-22 for timing belt tension adjustment.



-Installation (cont'd)-

6. Check the crankshaft pulley and the cam pulleys at TDC.





- 7. If the cam pulleys are not positioned at TDC, remove the timing belt and adjust the positioning following procedure, then reinstall the timing belt. NOTE:
 - Refer to page 6-23 for timing belt removal.
 - Bring the "UP" mark of the cam pulleys to the top, and align the TDC marks on the pulleys.
 - Align the holes on the camshaft holder pipes to the camshaft holes, insert 5.0 mm pin punches and fix them at TDC.
 - Remove the pin punches after the timing belt has been reinstalled.



NOTE:

- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

CRANK/CYL Sensor





Cylinder Heads

Removal -

NOTE: Engine removal is not required in this procedure.

CAUTION: To avoid damaging the cylinder heads, wait until the coolant temperature drops below $38^{\circ}C$ ($100^{\circ}F$) before loosening the retaining bolts.

NOTE:

- Inspect the timing belt before removing the cylinder heads.
- Turn the crankshaft so that the No. 1 piston is at top-dead-center (page 6-25, 261.
- Mark ail emission hoses before disconnecting them.
- 1. Disconnect the negative terminal from the battery.
- 2. Remove the expansion tank cap.

A WARNING Use care when removing the expansion tank cap to avoid scalding by coolant or steam.

- 3. Raise the car.
- 4. Remove the right rear wheel/tire.
- 5. Remove the engine under guard, then remove the front exhaust pipe A.
- 6. Remove the exhaust pipe A.

CAUTION: Do not use air wrench or hammer for removing the exhaust pipe A and the catalytic converter if the oxygen sensors are not to be removed.





- 7. Remove the under cover, then remove the water pipe drain bolts and drain the coolant.
- 8. Attach the hoses to front and rear engine drain bolts, then loosen the bolts and drain the coolant.
 - Bleed air from the cooling system when installing the cylinder heads (page 10-5).

CAUTION: Failure to comply with the bleeding procedure could cause imperfect bleeding, which may result in severe engine damage.

- 9. Remove the engine oil cooler base assembly (page 6-23).
- IO. Lower the car.
- 11. Remove the strut bar (Page 5-19).
- 12. Remove the intake manifold plate and top cover (page 5-21).
- 13. Remove the throttle cable by loosening the locknut, then slip the cable and nut off the throttle bracket and throttle link (page 5-21).

NOTE:

- Take care not to bend the cable when removing it. Always replace a kinked cable with new one.
- Adjust throttle cable when installing (See Section 11).



- 14. Relieve fuel pressure (See Section 11). A WARNING Do not smoke while working on fuel system; keep open flame or spark away from work area. Drain fuel only into an approved container.
- 15. Disconnect the fuel feed hose and the return hose (page 5-21).
- 16. Remove the ignition coil covers, the wire harness covers, the ignition coils and the connectors (page 6-23).
- 17. Remove the water hoses, then remove the expansion tank (page 5-21).
- 18. Remove the breather hose, and the air cleaner case (page 5-22).
- 19. Remove the brake booster hose, the charcoal canister hose and other hoses from the intake manifold and throttle body (page 5-22).
- 20. Remove the emission control box (page 5-23).
 - Do not disconnect emission hoses.
 - Disconnect the three connectors before removing.
- 21. Remove the connector, the terminal and the alternator.

22. Disconnect the engine wire harness connectors, then remove the harness clamps from the cylinder head and the intake manifold.

Front cylinder head:

- CRANK/CYL sensor connector
- A/C compressor magnetic clutch connector
- Oxygen sensor connector
- Ground cable terminal
- Ground terminal
- Three injector connectors (cylinders No.4, 5, and 6)
- TA sensor connector
- Igniter connector
- Condenser connector
- Oil pressure sensor connector (oil pressure gauge)
- Spool valve connector
- Oil pressure switch connector (VTEC)
- TW sensor connector (for emission)
- Temperature sender unit connector
- Pedal sensor connector (throttle body)
- TW sensor connector (for radiator fan)

- Rear cylinder head:
- Oil pressure switch connector (oil cooler base)
 Oxygen sensor connector
- Three injector connectors (cylinders No. 1, 2, and 3)
- EACV connector
- Knock sensor connector
- Step motor connector (throttle body)
- Throttle sensor connector
- Spool valve connector
- Oil pressure switch connector (VTEC)
- Igniter connector
- Ground terminal



- , -Removal (cont'd) -

INSECTOR CONNECTOR 23. Remove the EGR pipe and the intake manifold as-PCV HOSE (No.4 CYLINDER) sembly. Remove. TA SENSOR GROUND CABLE NOTE: Fill the cylinder head intake ports with clean shop towels to prevent foreign materials from getting into the cylinders. 8x 1.25 m m 22N·m (2.2 kg-m, 18 lb-ft) \cap EGR PIPE MOUNTING BOLT 8x 1.0 mm 12N·m (1.2 kg-m, 9 lb-ft) **GROUND** CABLE INJECTOR I l 8x 1.0 mm 12N·m (1.2 kg-m, 9 lb-ftl CONNECTOR (No.1 CYLINDER) INTAKE MANIFOLD GASKET Replace. EGR PIPE GASKET Replace.



- 24. Remove the side engine mount, then push it into the side mounting bracket housing of the body (page 5-26).
- 25. Remove the transmission mount.
- 26. Remove the alternator bracket stiffener (page 6-24).
- 27. Disconnect the knock sensor connectors, then remove the wire holder.



28. Remove the heater hose and the water hoses.



29. Remove the water passage. **O-RINGS** Replace. **CONNECTING** PIPE WATER PASSAGE 8 × 1.25 mm 22N·m (2.2 kg-m, 16 lb-ft) 30. Remove the cylinder head covers. 31. Turn the crankshaft so that the No. 1 piston is at topdead-center (page 6-25, 26). 32. Install the attachment under the engine, then tilt the engine approximately 5° using a jack (page 6-24) 33. Remove the alternator bracket. 9x 1.25 mm 22N·m (2.2 kg-m, 16 lb-ft) 10 × 1.25 mm 45N m (4.5 kg-m, 33 lb-ft) ALTERNATOR BRACKET 3 (cont'd)

Cylinder Head

- Removal (cont'd)

NOTE: Removal of the following items is not necessary if only the rear cylinder head is going to be removed.

- A/C adjusting pulley and A/C belt
- Timing belt lower cover
- Crankshaft pulley
- 34. Remove the A/C adjusting pulley and belt.
- 33. Remove the dipstick pipe mounting bolt, then remove the front and rear timing belt middle covers.
- 35. Remove the crankshaft pulley, then remove the timing belt lower cover.
- 36. Loosen the timing belt adjusting bolt 180° and release the belt tension.NOTE: Push the tensioner to release tension from

the belt, then retighten the adjusting bolt.



ADJUSTING BOLT Do not remove. Loosen it 1 80°.

37. Remove the timing belt from the pulleys.

CAUTION: Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in) in diameter.

CAUTION:" Do not crimp or bend the timing belt more than 90° or less than 25 mm (1 in) in diameter.



38. Remove the cam pulleys.



39. Remove the front and rear timing belt cover plates.





- 40. Loosen the valve locknuts, backed off the adjusting screw.
- 41. Remove the cam holder pipes, the cam holders and the camshafts.



42. Screw a 5 mm bolt into each rocker shaft orifice, then pull out the rocker shaft orifices.



- 43. Remove the spool valve assemblies.
- 44. Remove the sealing bolts.



- 45. Bundle the rocker arms with a rubber band to prevent them from separating.
- 46. Screw a 12 x 1.25 mm bolt into each rocker shaft. Remove the rocker arms while slowly pulling the rocker shafts out of the cylinder heads toward the transmission.



Cylinder Heads

- Removal (cont'd)

- 47. Disconnect the connectors and remove the engine wire harness.
- 48. Remove the cylinder head bolts, then remove the cylinder heads.
 CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE



NOTE: Separate the cylinder head from the block with a flat blade screwdriver as shown.



- 49. Remove the front and rear exhaust manifold covers, then remove the front and rear exhaust manifolds. CAUTION:
 - Remove the oxygen sensors before removing the exhaust manifolds.
 - Do not use air wrench or hammer for removing the exhaust manifolds if the oxygen sensors are not to be removed.

Sec. 1
Rocker Arms and Shafts

Locations

CAUTION: After installing the locker shaft orifice, try to turn the locker shaft to make sure that the orifice has been inserted in the hole of lockershaft correctly. If the orifice is in place, it should not turn.

NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (pages 6-I 3 and 141.
- Rocker arms must be installed in the same position if reused.
- Install the rocker arms after torquing the cylinder head bolts.

Prior to reinstalling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces.



Rocker Arms and Lost Motion Assemblies



6-36

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Rocker Arms and Shafts



- Clearance -

Measure both the intake rocker shafts and exhaust rocker shafts.

1. Measure diameter of shaft at first rocker location.



- Surface should be smooth.
- 2. Zero gauge to shaft diameter.

MICROMETER

CYLINDER BORE. GAUGE 3. Measure inside diameter of rocker arm and check for out-of-round condition.

Rocker Arm Radial Clearance: Service Limit: 0.08 mm (0.003 in.)



Camshafts

Inspection

NOTE:

- Do not rotate the camshaft during inspection.
- Remove the rocker arms and rocker shafts.
- 1. Put the camshafts, the cam holders the holder pipes on the cylinder head, and then tighten the bolts to the specified torque.

NOTE: Apply clean engine oil to 8 mm bolt threads. Specified torque:

- (1) (24) 8 mm × 1.25 mm bolts: 22N·m (2.2 kg-m, 16 lb-ft)
- (25) (28) 6 mm × 1.0 mm bolts: 10N·m (1.0 kg-m, 7 lb-ft)

CAM HOLDER BOLTS TORQUE SEQUENCE

FRONT:



- 2. Seat the camshaft by pushing it toward left end of cylinder head.
- Zero the dial indicator against the left end, then push 3. the camshaft back and forth, and read the end play. Camshaft End Play:

Standard (New): 0.05-0.15 mm (0.002-0.006 in.) 0.5 mm (0.02 in.)

Service limit:



- Remove the bolts, then remove the cam holders from 4. the cylinder head.
 - --- Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.

- Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place. - Insert plastigage strip across each journal.

5. Install the cam holders, and then tighten the bolts to the specified torque, as shown in the left column on this page.

Remove the cam holders and measure widest por-6. tion of plastigage on each journal. Camshaft Bearing Radial Clearance:

Standard (New):0.050-0.089 mm (0.002-0.004 in.1

Service Limit: 0.15 mm (0.006 in.)





- 7. If camshaft bearing radial clearance is out of tolerance:
 - And camshaft has already been replaced, you must replace the cylinder head.
 - If camshaft has not been replaced, first check total runout with the camshaft supported on Vblocks.

Camshaft Total Runout:

Standar	d (New):	0.015	mm	(0.0005	in)
Service	Limit:	0.030	mm	(0.0012	in)



- If the total runout of the camshaft is within tolerance, replace the cylinder head.
- If the total runout is out of tolerance, replace the camshaft and recheck. If the bearing clearance is still out of tolerance, replace the cylinder head.

8. Check cam lobe height wear.

Cam lobe height standard (New): M/T

	INTAKE	EXHAUST
PRIMARY	37.086 mm (1.4601 in)	36.559 mm (1.4393 in)
MID	38.037 mm (1.4975 in)	37.398 mm (1.4724 in)
SECONDARY	37.326 mm (1.4695 in)	36.741 mm (1.4465 in)

A/T

r		
	INTAKE	EXHAUST
PRIMARY	37.266 mm (1.4672 in)	36.559 mm ll.4393 in)
MID	37.655 mm (1.4825 in)	37.398 mm (1.4724 in)
SECONDARY	37.504 mm (1.4765 in)	36.741 mm (1.4465 in)



Check this area for wear.

Cam position P:Primary M:Mid S:Secondary



6-39

Valves and Valve Seals

- Replacement -

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NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



2. Install spring compressor. Compress spring and remove valve keeper.



3. Install the special tool as shown.



4. Remove the valve guide seal.





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Cylinder Heads Warpage-

NOTE: If camshaft bearing clearances (page 6-38) are not within specification, the head cannot be resurfaced. If camshaft bearing radial clearances are within specifications, check the head for warpage. n • If warpage is less than 0.05 mm (0.002 in.) cylinder head resurfacing is not required. • If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head. Maximum resurface limit is 0.2 mm (0.008 in.) based on a height of 151 mm (5.945 in). Intake Valve Dimensions PRECISION STRAIGHT EDGE A Standard (New): 34.9-35.1 mm (1.374-1.382 in) 110 8 Standard (New): 111.05-111.40 mm , 🕴 (4.372-4.388 in) C Standard (New): 5.475-5.485 mm (0.2158-0.2159 in) C Service Limit: 5.445 mm (0.2144 in) D Standard (New): 1.05-1.35 mm (0.041-0.053 in) D Service Limit: 0.85 mm (0.033 in) **Exhaust Valve Dimensions** A Standard (New): 29.9-30.1 mm (1.177-1.185 in) 8 Standard (New): 109.60-109.90 mm (4.315-4.327 in) C Standard (New): 5.45-5.46 mm Measure along edges, and 3 ways across center. (0.2146-0.2150 in) C Service Limit: 5.42 mm (0.2134 in) D Standard (New): 1.65-1.95 mm (0.065-0.077 in) **D Service Limit:** 1.45 mm (0.057 in) 11 Cylinder Head Height; > Service . Standard (New): 150.95 - 151.05 (5.943-5.947 in) Service Limit: 150.8 mm (5.937 in)

Valve Seats

Reconditioning -

1. Renew the valve seats in the cylinder head using a valve seat grinder.

NOTE: If guides are worn (page 6-43), replace them (page 6-44) before grinding the valve seats.



- 2. Carefully grind a 45° seat, removing only enough material to ensure a smooth and concentric seat.
- 3. Bevel the upper edge of the seat with the 30° stone and the lower edge of the seat with the 60° stone. Check width of seat and adjust accordingly.
- 4. Make one more very light pass with the 45° stone to remove any possible burrs caused by the other stones.

Valve seat Width: Standard: IN 0.80 – 1 .OO mm (0.031-0.039 in) EX 1.25-1.55 mm (0.049-0.061 in.) Service Limit: IN 1.5 mm (0.059 in) EX 2.0 mm (0.079 in)



5. After resurfacing the seat, inspect for even valve seating: Apply Prussian Blue compound to the valve face, and insert valve in original location in the head, then lift it and snap it closed against the seat several times.



- 6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 60° stone to move it down, then one more cut with the 45° stone to restore seat width.
 - If it is too low (closer to the valve edge), you must make a second cut with the 30° stone to move it up, then one more cut with the 45° stone to restore seat width.
 NOTE: The final cut should always be made with the 45° stone.
- Insert intake and exhaust valves in the head and measure valve stem installed height. Valve Stem Installed Height (IN and EX): Standard (New): 41.55-42.35 mm (1.6358-1.6673 in)

Service Limit: 42.435 mm (1.6707 in)



 If valve stem installed height is over the service limit, replace valve and recheck. If still over the service limit, replace cylinder head; the valve seat in the head is too deep.

Valves



. Valve Movement -

Measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).

Intake Valve Stem-to-Guide Clearance: Standard (New): 0.0125-0.0275 mm (0.0005-0.0011 in) Service Limit: 0.08 mm (0.003 in)

Exhaust Valve Stem-to-Guide Clearance: Standard (New): 0.025-0.04 mm (0.001-0.0016 in) Service Limit: 0.055 in (0.0022 in)

Valve extended 10 mm out from seat.



- If measurement exceeds the service limit, recheck using a new valve.
- If measurement is now within the service limit, reassemble using a new valve.
- If measurement still exceeds limit, recheck using alternate method below, then replace valve and guide, if necessary.

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit

Intake Valve Stem-to-Guide Clearance: Standard (New): 0.025-0.055 mm (0.001-0.002 in) Service Limit: 0.08 mm (0.003 in)

Exhaust Valve Stem-to-Guide Clearance: Standard (New): 0.05-0.08 mm (0.002-0.003 in) Service Limit: 0.11 mm (0.004 in)



Valve Guides

. Replacement

1. As illustrated, in the removal steps of this procedure use a commercially-available air-impact driver attachment which may need to be modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using Valve Guide Drivers and a conventional hammer. Tool numbers are at the end of this procedure.



- 2. Select the proper replacement guides and chill them in the freezer section of a refrigerator for about an hour.
- 3. Use a hot plate or oven to evenly heat the cylinder head to 1 50°C (300°F). Monitor the temperature with a cooking thermometer.



CAUTION:

- Do not use a torch; it may warp the head.
- Do not get the head hotter than 150°C (300°F); excessive heat may loosen the valve seats.
- To avoid burns, use heavy gloves when handling the heated cylinder head.

4. Use the driver and an air hammer working from the camshaft side to drive the guide about 2 mm towards the combustion chamber. This will knock off some of the carbon and make removal easier.





CAUTION:

- Always wear safety goggles or a face shield when using the air hammer.
- Hold the air hammer directly in line with the valve guide to prevent damaging the driver.
- 5. Turn the head over and drive the guide out toward the camshaft side of head.

If a valve guide still won't move, drill it out with a 5/16 inch bit, then try again.

CAUTION: Drill guides only in extreme cases: you could damage the cylinder head if the guide breaks.

6. Remove the new guide(s) from the refrigerator, one at a time, as you need them.



7. Slip a 6 mm steel washer and the correct driver attachment over the end of the driver (The washer will absorb some of the impact and extend the life of the driver).



8. Install the new guide(s) from the camshaft side of the head; drive each one in until the attachment bottoms on the head. If you have all twelve guides to do, you may have to reheat the head one or two more times.



NOTE: Valve guide replacement can be performed with this special tool.

Removal and Installation VALVE GUIDE DRIVER 07742-0010100 Valve Guide Installed Height: Intake: 13.75-14.25 mm (0.541-0.561 in) Exhaust: 13.75-14.25 mm (0.541-0.561 in)



--Valve Guide Reaming

NOTE: For new valve guides only.

- 1. Coat both reamer and valve guide with cutting oil.
- 2. Rotate the reamer clockwise the full length of the valve guide bore.
- 3. Continue to rotate the reamer clockwise while removing it from the bore.
- 4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
- Check clearance with a valve (page 6-43).
 Verify that the valve slides in the IN, EX valve guides without exerting pressure.





Valve Installation

- When installing valves in cylinder head, coat valve stems with oil before inserting into valve guides, and make sure valves move up and down smoothly.
- When valves and springs are in place, lightly tap the end of each valve stem two or three times to ensure proper seating of valve and valve keepers (use hammer handle bottom).



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HAMMER HANDLE BOTTOM

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Cylinder Heads



Install the cylinder heads in the reverse order of removal:

- Always use new head gaskets.
- Cylinder heads and engine block surface must be clean.
- Turn the crankshaft so that No. 1 piston is at TDC (page 6-26).
- 1. Install the front and rear exhaust manifolds to each cylinder head, then tighten the self-locking nuts in a criss-cross pattern in two or three steps, beginning with the inner nut.
 - Apply oil to the self-locking nut threads.
 - Always use new exhaust manifold gaskets. CAUTION:
 - Install the oxygen sensors after installing the exhaust manifolds.
 - Do not use air wrench for tightening the selflocking nuts if the oxygen sensors are not to be removed.

2. install the exhaust manifold covers.

Front:



Cylinder Heads

Installation (cont'd)-



空震

Rocker Arms

Camshafts



Installation

CAUTION: Valve locknuts should be loosened and adjusting screws backed off before installation.

- 1. After wiping down the cam and journals in cylinder head, lubricate both surfaces and install camshaft.
- 2. Turn the camshaft until its keyway is facing up. (No. 1 cylinder TDC).
- 3. install the camshaft seal with the open side (spring) facing in.

Lubricate cam lobes after reassembly.

4. Set a new O-ring and a dowel pin in the oil passage of the No.1 cam holder.



5. Set the camshaft seal as shown below.



Installation



Camshafts

- Installation (cont'd)

- Apply liquid gasket to the head mating surfaces of the No. 1 and the No. 4 cam holders.
 Apply liquid gasket to the shaded areas.
- 7. Place the cam holders.
 - NOTE:
 - "F" or "R" marks are stamped on the cam holders.
 - The arrows must be pointing to the timing belt side.
 - Set two dowel pins in each cam holder.

FRONT:



REAR:



- 8. Place the cam holder pipes.
- 9. Tighten each bolt two turns at a time in the sequence shown below to insure that the rockers do not bind on the valves.

NOTE: Apply clean engine oil to 8 mm bolt threads.

Specified torque: (1)-(24) 8 mm x 1.25 mm bolts: 22 N-m (2.2 kg-m, 16 lb-ft) (25)-(28) 6 mm x 1.0 mm bolts: 10 N-m (1.0 kg-m, 7 lb-ft)

CAM HOLDER BOLT TORQUE SEQUENCE

FRONT:









12 N-m (1.2 kg-m, 9 lb-ftl





- 12. Insert the dowel pins in the camshaft pulleys.
- 13. Install the cam pulleys then tighten the retaining bolts to the torque specified.

NOTE: To set the camshafts at TDC, algin the camshaft holes with the camholder pipe holes and insert 5.0 mm pin punches as shown.



10x 1.25 mm 70 N·m (7.0 kg-m, 51 lb-ft)

- 14. install the timing belt (page 6-25).
- 15. Adjust the valve clearance (6-54).
- 16. Inspect the rocker arms (pages 6-36, and 6-52 thru 6-541.
- 17. After installation, check that hoses and connectors are installed correctly.

NOTE:

- Prior to installing the cylinder head cover, apply a thin layer of liquid gasket to the mating surface of the cylinder head cover and rubber seals to prevent the rubber seal from falling off.
- After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

Rocker Arms



abnormality.



2. Remove the 10 mm sealing bolt and washer from the inspection hole and connect the special tool.



3. Apply specified air pressure to the rocker arm pistons after loosening the regulator valve on the VTEC inspection attachment

Specified Air Pressure: 245 **kPa** (2.5 **kg/cm²**, 36 psi) -490 **kPa** (5.0 **kg/cm²**, 71 **psi**) 4. Make sure that the primary and secondary rocker arms are mechanically connected by pistons and that the mid rocker arms do not move when pushed manually.



• If the mid rocker arms move independently of the primary and secondary rocker arms, replace the rocker arms as a set.

5. Remove the special tools.

- Check for smooth operation of the lost motion assembly. It is compressed slightly when the mid rocker arm is lightly pushed and compressed deeply when the mid rocker arm is strongly pushed.
 - Replace the lost motion assembly if it does not move smoothly.
 - After inspection, check that the ECU does not show an error code.

Valve Clearance

Adjustment –

NOTE:

- Valves should be adjusted cold when the cylinder head temperature is less than **38°C (100°F)**.
- Adjustment is the same for both intake and exhaust valves.
- Adjust valve clearance at TDC of each cylinder.
- 1. Remove the cylinder head covers.

FRONT:



REAR:



Rotate crankshaft and set No.1 piston at TDC.
 TDC mark (white paint) on the crank pulley should align with pointer on the timing lower cover, and TDC grooves on the camshaft pulleys should align with timing belt cover plates.





- 3. Manuallv inspect the rocker arms for independent operation (page 6-52).
- 4. Adjust valves on No.1 cylinder.
 - Adjusting screws are on primary and secondary rocker arms.

Intake: 0.15-0.19 mm (0.006-0.007 in) Exhaust: 0.17-0.21 mm (0.007-0.008 in)

5. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

INTAKE:



NOTE: Use a mirror to check if the special tool is positioned on the locknut correctly.



6. Tighten locknut **and check** clearance again. Repeat adjustment if necessary.

• (A)

INTAKE:



EXHAUST:



Valve Clearance

<Adjustment (cont'd)-

7. Rotate the crankshaft 120° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
 Repeat step 3 to step 6
 Number 4 piston at TDC:



Rotate the crankshaft 1 20° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
 Repeat step 3 to step 6.
 Number 2 piston at TDC:



Rotate the crankshaft 120° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.
 Repeat step 3 to step 6.



10, Rotate the crankshaft 1 20° clockwise (cam pulley turns 60°). Check that the front intake cam pulley is positioned as shown.

Repeat step 3 to step 6. Number 3 piston at TDC



11. Rotate the crankshaft 120° clockwise (cam pulley turns 60%). Check that the front intake cam pulley is positioned as shown. Repeat step 3 to step 6.

Number 6 piston at TDC:



Engine Block

7

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6 N.,



1.

Special Tools

Ref. No.	Tool Number	Description	Qʻty	Page Reference
1 2 3	07746-0010000 07924PD20003 07948SB00101	Driver Ring Gear Holder Driver Attachment	1 1	7-18 7-6 7-18
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Engine Block



Illustrated Index

Lubricate all internal parts with engine oil during reassembly.

NOTE:

- Apply liquid gasket to the mating surfaces of the left side cover and oil pump case before installing them.
- Use liquid gasket, part No. 08718-550000 OE.
- If the bottom of the oil pan is deformed, it should be repaired or the oil pan should be replaced with new one so as to retain a proper clearance between the screen and the bottom.



(cont'd)

Engine Block







Flywheel and Drive Plate

- Replacement -

Manual Transmission:

Remove the eight flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Automatic Transmission:

Remove the eight drive plate bolts, then separate the drive plate from the crankshaft flange. After installation, tighten the bolts in the sequence shown.



Connecting Rod and Crankshaft

- End Play -

Connecting Rod End Play: Standard (New): 0.15-0.30mm (0.006-0.012in) Service Limit: 0.40mm (0.016in)



if out-of-tolerance, install a new connecting rod.
if still out-of-tolerance, replace the crankshaft (pages 7-9, 10 and 7-1 8).

Push the crank firmly away from the dial indicator, and zero the dial against the end of the crank. Then pull the crank firmly back toward the indicator; dial reading should not exceed service limit.



Crankshaft End Play: Standard (New): 0.10-0.35 mm (0.004-0.014 in) Service Limit: 0.46 mm (0.018 in)

• if end play is excessive, inspct the thrust washers and thrust surface on the crankshaft. Replace parts as necessary.

NOTE: Thrust washer thickness is fixed and must not be changed either by grinding or shimming. Thrust washers are installed with grooved side facing outward.

Main Bearings

Rod Bearings

- Clearance



Clearance

- 1. To check main bearing clearance, remove the main caps and bearing halves.
- 2. Clean each main journal and bearing half with a clean shop rag.
- 3. Place one strip of plastigage across each main journal.

NOTE: If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crank and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time.

- Reinstall the bearings, caps and cap bridge, then torque the 9 mm bridge bolts to 40 N•m 14.0 kg-m, 29 lb-ft). Torque the 11 mm cap bolts to 66 N•m (6.6 kg-m, 48 lb-ft).
- 5. Torque the side bolts to 50 N·m (5.0 kg-m, 36 lbft).
- 6. Remove the bridge, caps and bearings, and measure the widest part of the plastigage.

Main Bearing Clearance: Standard (New): 0.024-0.048 mm (0.0009-0.0019 in) Service Limit: 0.05 mm (0.002 in)



If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crank, remove the upper half of the bearing, then install a new, complete bearing with the same color code (select the color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearings or the caps to adjust clearance.

If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again. NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

1. Remove the connecting rod cap and bearing half.

- 2. Clean the crankshaft rod journal and bearing half with a clean shop reg.
- 3. Place plastigage across the rod journal.
- Reinstall the bearing half and cap, and torque the nuts to 20 N·m (2.0 kg-m, 14 lb-ft), then turn 95° (page 7-I 9).

NOTE: Do not rorate the crank during inspection.

5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

Connecting Rod Bearing Clearance: Standard (New): 0.04-0.06 mm 10.0016-0.0024 in) Service Limit: 0.06 mm (0.0024 in)



6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select color as shown on next page), and recheck the clearance.

CAUTION: Do not file, shim, or scrape the bearing or the caps to adjust clearance.

7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crank and start over.

Main Bearings

Selection

Crank Bore Code Locations (Letters) Letters have been stamped on the end of the block as a code for the size of each of the 4 main journal bores. Use them, and the numbers stamped on the crank (codes for main journal size), to choose the correct bearings.



Rod Bearings

- Selection -

Rod Code Location (Numbers) Numbers have been stamped on the side of each connecting rod as a code for the size of the big end. Use them, and the letters stamped on the crank (codes for rod journal size), to choose the correct bearings.





Piston/Connecting Rod Assemblies and Crankshaft

Removal

1. Remove the L. side cover.



- 3. Remove the baffle plate.
- 4. Remove the oil pass pipe and joint.
- 5. Remove the oil pump.

6. If you can feel a ridge of metal or hard carbon around the top of any cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

CAUTION: If the ridge is not removed, it may damage the pistons as they are pushed out.



7. Remove the bearing cap bridge.



(cont'd)

Piston/Connecting Rod Assemblies and Crankshaft

- Removal (cont'd) -

• Remove the connecting rod caps after setting the crank pin at the BDC for each cylinder. Remove the piston assembly by pushing on the connecting rod.

CAUTION: Take care not to damage the crank pin or cylinder with the connecting rod.



- 8. Remove the bearing from the cap. Keep all caps/bearings in order.
- 9. Remove upper bearing halves from connecting rods and set aside with their respective caps.
- 10. Reinstall the cap on the rod after removing each piston/connecting rod assembly.
- 11. Mark piston/connecting rod assemblies with cylinder numbers to avoid mixup on reassembly.

NOTE: The existing number on the connecting rod does not indicate its position in the engine, it indicates the rod bore size.

12. Remove the bearing cap bolts and bearing cap side bolts, then remove the bearing caps.



 To help with removal of the caps install the bearing cap bolts in the bearing cap bridge bolt holes.



13. Lift the crankshaft out of engine, being careful not to damage journals.



14. Reinstall main caps and bearings on engine in proper order.



Crankshaft



- Inspection

- Clean the crankshaft oil passages with pipe cleaners or a suitable brush.
- Check the keyway and threads.

Alignment

- Measure runout on all main journals to make sure the crank is not bent.
- The difference between measurements on each journal must not be more than the service limit.

Crankshaft Total Indicated **Runout:** Standard (New): 0.015 mm (0.0005 in) min. Service limit: 0.03 mm (0.0012 in)



Out-of-Round and Taper

- Measure out-of-round at the middle of each rod and main journal in two places.
- The difference between measurements on each journal must not be more than the service limit.

Jouinal Out-of-Round: Standard (New): 0.004 mm (0.00016 in) min. Service Limit: 0.006 mm (0.00024 in)





- Measure taper at edges of each rod and main journal.
- The difference between measurements on each journal must not be more than the service limit.

Journal Taper: Standard (New): 0.005 mm (0.0002 in) min. Service Limit: 0.010 mm (0.0004 in)

Cylinder Block

with a feeler gauge:

0.0825 mm (0.00032 in)

wear.

Piston-to-Cylinder

2.

Piston-to-Block Clearance

1. Make a preliminary piston-to-block clearence check

If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive

To confirm the feeler gauge check, further measurement with a micrometer will be necessary.

Calculate difference between cylinder bore

Clearance:

diameter on page 7-I 3 and piston diameter.

Service Limit: 0.0825 mm (0.0032 in)

Service Limit: 0.0825 mm (0.0032 in)

Pistons

Inspection

1. Check the piston for distortion or cracks.

NOTE: If cylinder is bored, an oversized piston must be used.

2. Measure piston diameter at a point 17 mm (0.67 in.) from bottom of skirt.

NOTE: There are two standard-size pistons (A and B). The letter is stamped on the top of the piston. These letters are also stamped on the block as cylinder bore sizes.

Piston A Diameter Standard (New): 89.986-90.004 mm (3.5427-3.5434 in) 89.97 mm (3.5421 in) Service Limit: Piston 8 Diameter Standard (New): 89.976-89.994 mm (3.5424-3.5431 in) Service Limit: 89.96 mm (3.5417 in) 17 mm SKIRT DIAMETER 0.67 in Oversize Piston Diameter 0.25: 90.226-90.244 mm (3.5522-3.5530 in) 0.50: 90.476-90.494 mm (3.5620-3.5627 in)

Cylinder Block



Inspection

1. Measure wear and taper in directions X and Y at three levels in each cylinder as shown.



Service Limit: 90.07 mm (3.546 in)

Oversize

0.25: 90.25-90.27 mm (3.553-3.554 in) 0.50: 90.50-90.52 mm (3.563-3.564 in)

Bore Taper

- Limit: (Difference between first and third measurement) 0.05 mm (0.002 in)
- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (page 7-I 2) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

Reboring Limit: 0.50 mm (0.020 in)

Check the top of the block for warpage. 2. Measure along the edges and across the center as shown.



Engine Blcok Warpage: Standard (New): 0.07 mm (0.003 in) Service Limit: 0.10 mm (0.004 in)



Cylinder Block

Bore Honing

- 1. Measure cylinder bores as shown on page 7-I 3. If the block is be reused, hone the cylinders and remeasure the bores.
- 2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.

NOTE:

- Use only a rigid hone with 400 grit or finer stone such as Sunnen, Ammco, or equivalent.
- Do not use stones that are worn or broken.



3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil the cylinder walls immediately.

NOTE: Never use solvent, it will only redistribute the grit.

4. If scoring or scratches are still present in cylinder bores after honing to service limit, rebore the engine block.



- After honing, clean the cylinder thoroughly with soapy water.
- Only scored or scratched cylinder bores must be honed.

Piston/Connecting Rod Assemblies

Selection

Each rod is sorted into one of four tolerance ranges (from 0 to 0.024 mm, in 0.006 mm increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3 or 4) indicating that tolerance. You may find any combination of 1, 2, 3 or 4 in any engine.

Normal Bore Size: 53 mm (2.09 in)

NOTE:

- Reference numbers are for big end bore size and do NOT indicate the position of rod in engine.
- Inspect connecting rod for cracks and heat damage.



7-14
Piston Rings



End Gap

- 1. Using a piston, push a new ring into the cylinder bore 15-20 mm (0.6-0.8 in.) from the bottom.
- 2. Measure the piston ring end-gap with a feeler gauge:
 - If the gap is too small, check to see if you have the proper rings for your engine.
 - If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-13.
 If the bore is over limit, the engine block must be rebored.

Piston Ring End-Gap:

Top Ring Standard (New): 0.25-0.40 mm (0.010-0.016 in) Service Limit: 0.60 mm (0.024 in)

Second Ring Standard (New): 0.35-0.50 mm (0.014-0.020 in) Service Limit 0.75 mm (0.03 in)

Oil Ring

Standard (New): 0.2-0.7 mm (0.008-0.028 in) Service Limit: 0.8 mm (0.03 in)



Replacement

- 1. Using ring expander, remove old piston rings.
- 2. Clean all ring grooves thoroughly.

NOTE:

- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Compression ring grooves are 1.2 mm wide and oil ring groove is 2.8 mm wide.
- File down blade if necessary.

CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

NOTE: If piston is to be separated from connecting rod, do not install new rings yet.

3. Install new rings in proper sequence and position (page 7-I 6).

NOTE: Do not reuse old piston rings.



Piston Rings



Piston/Connecting Rod Assemblies



Installation



NOTE:

- Guide the piston carefully to prevent damage.
- Fit long rubber hoses (about 30 cm long) to connecting rod bolts to protect the crankshaft.
- Install the pistons after setting the crankshaft to BDC for each cylinder.



- 1. If the crankshaft is already installed:
 - Install the piston assemblies in No. 1 and No. 4 cylinders, No. 2 and No. 5 cylinders, and No. 3 and No. 6 cylinder.
 - Remove the connecting rod caps, then slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
 - Install the ring compressor, check that the bearing is securely in place; then position the piston in the cylinder and drive it in using the wooden handle of a hammer.
 - Stop after the ring compressor pops free and check the connecting rod-to-crank journal alignment before driving rod into place.
 - Install the rod caps with bearings, and torque the nuts to 20 N·m (2.0 kg-m, 14 lb-ft), then turn the nut 95 degrees (page 7-19).

- 2. If the crankshaft is not installed:
 - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder and drive it in using the wooden handle of a hammer.



NOTE: Maintain downward force on ring compressor to prevent rings from expanding before entering the cylinder bore.



Oil Seal



Crankshaft

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Crankshaft

Installation (cont'd)





6. Install the bearing cap bridge, and tighten 1 1 x 1.5 mm bolts to the specified torque diagonally outward from the center.

Torque 66 N·m (6.6 kg-m, 48 lb-ft)

7. Tighten cap side bolts (10 x 1.25 mm) to the specified torque.

Torque: 50 N·m (5.0 kg-m, 36 lb-ft)

- Coat the bolt thread and seat surface with engine oil.
- NOTE: The shorter side bolts are for the front side.



8. Apply liquid gasket to the block mating surface of the left side cover and oil pump case, and install them on the engine block.

NOTE: The seal surface on the block should be dry. Apply a light coat of oil to the crankshaft and to the lip of seal.

LEFT SIDE:







- NOTE:
- Use liquid gasket, Part No. 087 18- 550000 OE.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket by starting with an even band, centered between edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.





Engine Lubrication

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Oil Cooler, Oil Filter Base	8-10







f. No.	Tool Number	Description	Qʻty	Page Reference
(1) (2)	07GAD—PH70200 07912-6110001	Seal Driver Oil Filter Socket	1	8-8 8-5
	1		2	

Engine Lubrication



Illustrated Index



Oil Level

4

- Inspection

- 1. Check engine oil with the engine off and the car parked on level ground.
- 2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.
- 3. If the level has dropped close to the lower mark, add oil until it reaches the upper mark.

CAUTION: Insert the dipstick carefully to avoid bending it.



Engine Oil

- Replacement

- 1. Warm up the engine.
- 2. Drain the engine oil.



OIL PAN **DRÁIN** PLUG 45 **N•m (4.5 kg-m, 33 lb-ft)**

3. Reinstall the drain plug with a new washer, and refill with the recommended oil.

Requirement	API Service Grade: SG SAE viscosity: 10 W-30 recommended Fuel Efficient oil: Identified by the words, "Energy Conserving II"
Capacity	 5.0 ℓ (5.3 US qt, 4.4 Imp qt) for change, including filter. 6.3 ℓ (6.7 US qt, 5.5 Imp qt) for engine overhaul.
Change	Every 12,000 km (7,500 miles)

Engine Oil Viscosity for Outside Temperature Ranges.



NOTE: Oil filter should be replaced at each oil change.

Oil Filter

- Replacement

CAUTION: Loosen the oil filter carefully 'while the engine is hot, the hot oil may cause scalding.

1. Remove the oil filter with the special tool as shown.



- (22 N·m (2.2 kg-m, 16 lb-ft))
- 2. Inspect the threads and rubber seal on the new filter. Wipe off seat on oil filter base, then apply a light coat of oil to the rubber seal, and install filter.
- 3. After rubber seal is seated, tighten the oil filter by turning approximately one turn:

Torque: One turn (22 N·m (2.2 kg-m, 16 lb-ft)).



4. Start the engine and check the filter for oil leakage.

Oil Pressure



Test

If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

- 1. Remove the oil pressure sender and install an oil pressure gauge.
- 2. Start the engine and allow to reach operating temperature (fan comes on at least twice).
- 3. Pressure should be:

Engine Oil Pressure: At Idle: 69 kPa (0.7 kg/cm², 10 psi) minimum At 3,000 rpm: 343 kPa (3.5 kg/cm2, 50 psi) minimum

- If oil pressure is within specifications, replace oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect oil pump (page 8-7).



Oil Pump



Oil Pump





Oil Pump



- 17. Reassemble the oil pump, applying liquid threadlock to.the pump housing screws.
- 18. Check that the oil pump turns freely.
- 19. Apply a light coat of oil to the seal lip.
- 20. Install the two dowel pins end new O-ring on the cylinder block.
- 21. Apply liquid gasket to the cylinder block mating surface of the oil pump.

NOTE:

- Use liquid gasket, Part No. 08718-550000 OE.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.



- Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. Instead reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

OIL PUMP



- 22. Install the oil pump on the cylinder block.
- 23. Install the oil pass pipe and the joint.
- 24. Install the baffle plate.
- 25. Install the oil screen.

16 lb-ft) Replace.

surface.

9 lb-ft)

26. Install the oil pan and gasket.

NOTE:

- Use the new gasket.
- If the bottom of the oil pan is deformed, it should be repaired or the oil pan should be replaced with a new one so as to retain proper clearance between the screen and the bottom.

OIL PAN BOLTS and NUTS TORQUE SEQUENCE





Oil Cooler, Oil Filter Base

Illustrated Index _



Intake Manifold/Exhaust System

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Exhaust	Pipe	and	Muffler	 	9-4



Intake Manifold



Exhaust Manifold

Index



Illustrated

CAUTION:

- Remove the oxygen sensors before removing the exhaust manifolds.
- Do not use air wrench or hammer to remove or install the exhaust manifolds if the oxygen sensors are not to be removed.
- Install the oxygen sensors after installing the exhaust manifolds.



Exhaust Pipe and Muffler

Illustrated Index

CAUTION:

- Remove the oxygen sensors before removing the exhaust pipes.
- Do not use air wrench or hammer to disconnect or connect the exhaust manifolds and the exhaust pipes if the oxygen sensors are not to be removed.
- Install the oxygen sensors after installing the exhaust pipes.



Cooling

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Cooling

Illustrated Index

A WARNING System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.

Total Cooling System Capacity: Including expansion tank 2.1 ℓ (2.2 US qt. 1.8 Imp qt) 5 M/T: 18.0 ℓ (17.0 US qt. 14.1 Imp qt) 4 A/T: 16.5 ℓ (17.4 US qt. 14.5 Imp qt)

Radiator, Water Pipes and Hoses:

NOTE:

- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.



*



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10-3

Radiator







- Refilling and Bleeding

A WARNING Removing the expansion tank cap while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine and radiator cool down before removing the expansion tank cap.

CAUTION: When pouring coolant, be sure to shut the relay box lid and not let coolant spill on the electrical parts or the paint. If any coolant spills, rinse it off immediately.

NOTE:

- Perform this when the engine is cool.
- Before replacing the coolant, turn the ignition ON, slowly tune the climate control temperature knob to 90° and turn off the ignition. This will allow the coolant in the heater to drain out with the rest of the system.

- 1. Open the hood, the rear hatch and the engine cover.
- 2. Remove the cover protecting the water pipes and shift cables on the underside of the car.
- 3. Before removing the expansion tank cap, first loosen the cap to lower pressure.

CAUTION: Do not remove the expansion tank cap when engine is hot. The coolant is under pressure and may blow out and scald you. Open the cap slowly when the engine is cool.

- 4. Loosen the drain plug from the bottom of the radiator and drain the coolant.
- 5. Remove the two drain bolts from the water pipes and drain the coolant.



Radiator

Refilling and Bleeding (cont'd)

- 6. Install rubber hoses to drain bolts located at the front and rear of the engine under the cylinder bank and loosen the drain bolts to drain the coolant.
 - Bleeding can be done more quckly if all the bleed bolts, plug and cap are opened. When opening them, make sure the coolant level in the expansion tank has come down completely so that the coolant will not pour out of the bleed bolts, plug and cap.
- 7. When the coolant stops draining, tighten the radiator drain plug, water pipe drain bolts and engine drain bolts.
 - Be sure to replace the water pipe drain bolt washers with new ones.



- 8. Open all four bleeders.
 - 1) Loosen the radiator bleed plug.
 - 2) Remove the heater pipe bleed cap.
 - 3) Loosen the water pipe bleed bolt.
 - 4) Loosen the engine bleed bolt on the thermo cover.
- 9. Mix the recommended anti-freeze/coolant with an equal amount of water in a clean container.

NOTE:

- Use only HONDA-RECOMMENDED antifreeze/coolant.
- For best corrosion protection, the coolant concentrations must be maintained year-round at 50% MINIMUM. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.

CAUTION:

FRONT ENGINE DRAIN BOLT

30 N·m (3.0 kg-m, 22 lb-ft)

- Do not mix different brands of antifreeze/coolant.
- Do not use additional rust inhibitors or anti-rust products: they may not be compatible with the recommended coolant.

Radiator Coolant Refill Capacity: Including expansion tank 2.1 ℓ (2.2 US qt, 1.8 Imp qt)

Manual: 12.0 ℓ (12.7 US qt. 10.6 Imp qt) Automatic: 12.0 ℓ (12.7 US qt. 10.6 Imp qt)



- 10. Fill the expansion tank with coolant.
 - Tighten the bleeders in sequence: thermo cover bleed bolt, radiator bleed plug, heater pipe bleed cap and water pipe bleed bolt as coolant starts to run out in a steady stream without bubbles.
- 11, After tightening all the bleeding bolts, plug and cap, fill the expansion tank with coolant up to MAX line.
- 12. Reloosen the thermo cover bleed bolt to remove air again.
- 13. When bleeding is completed, retighten the thermo cover bleed bolt and fill the expansion tank up to 0.5 ℓ (0.53 US qt, 0.44 Imp qt) or 30 mm (1.2 in) over the MAX line.

- 14. Install the expansion tank cap and turn it 60 degrees (where the first lock tab of filler neck is engaged).
- 15. Start the engine and let it run until warmed up (until the thermostat opens and the radiator cooling fan runs).
- 16. Turn off the engine. Check the expansion tank and, if needed, add coolant to bring it up to the MAX line.
- 17. Tighten the expansion tank cap securely.
- 18. Reinstall the cover on the car's underside.



Expansion Tank

Cap Testing -

- 1. Remove the expansion tank cap, wet its seal with coolant, then install it on the pressure tester.
- Apply a pressure of 93-123 kPa (0.95-1.25 kg/cm², 14-18 psi).
- 3. Check for a drop in pressure.



Pressure Testing

i

- 1. Wait until the engine is cool, then carefully remove the expansion tank cap and fill the expansion tank with coolant to the top of the filler neck.
- 2. Attach the pressure tester to the radiator and apply a pressure of 93-123 kPa (0.95-I .25 kg/cm², 14-18 psi).
- 3. Inspect for coolant leaks and a drop in pressure.
- 4. Remove the tester and reinstall the expansion tank cap.

NOTE: Check for engine oil in coolant and/or coolant in engine oil.



Thermostat



Replacement

NOTE: Use new gaskets and O-rings when reassembling.



Testing

Replace thermostat if it is open at room temperature.

- To test a closed thermostat:
- 1. Suspend the thermostat in a container of water as shown.
- 2. Heat the water and check the temperature with a thermometer. Check the temperature at which the thermostat first opens and at full lift.

CAUTION: Do not let thermometer touch bottom of hot container.

3. Measure lift height of thermostat when fully open.



Water Pump

Illustrated Index



10-10





Fuel and Emission

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Special Tools



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Component Locations







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Vacuum

Connections





(cont'd)

System Description Vacuum Connections (cont'd)

Control Box







- FRONT OXYGEN (02) SENSOR
 REAR OXYGEN (02) SENSOR
 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
 ELECTRONIC AIR CONTROL VALVE (EACV)
 FAST IDLE VALVE
 AIR CLEANER
 FUEL INJECTOR
 PRESSURE REGULATOR
 FUEL FILTER
 FUEL PUMP

- **10** FUEL PUMP

- (1) FUEL TANK (2) **DASHPOT** DIAPHRAGM (3) **DASHPOT** CHECK VALVE

- (14) CHECK VALVE
 (15) AIR CHAMBER
 (16) CHAMBER VOLUME CONTROL SOLENOID VALVE
 (17) CHAMBER VOLUME CONTROL DIAPHRAGM
 (18) PCV VALVE

- () EGR VALVE () CONSTANT VACUUM CONTROL (CVC) VALVE () EGR CONTROL SOLENOID VALVE

- (2) CHARCOAL CANISTER
 (2) PURGE CUT-OFF SOLENOID VALVE
 (3) PURGE CONTROL DIAPHRAGM VALVE
 (5) TWO-WAY VALVE

System Description





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System Description



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(cont'd)

System Description



11-12





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System Description

Electrical Connections (cont'd)



II-14





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Troubleshooting

Troubleshooting Guide -

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system ②, etc.

PAGE	SYSTEM	PGM-Fi									
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	CRANK/CYL SENSOR	COOLANT TEMPERA- TURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERA- TURE SENSOR	ATMO- SPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	SPOOL SOLENOID VALVE
SYMPTOM		26	30, 32, 36	40	46	48	50	52	54	56	6-15
CHECK ENGINE LIGHT TURNS ON		·····································									
CHECK ENGINE LIGHT BLINKS		ç or 	-1- or -2- -41- or -42-	َ or - قِ	4 or 54 9 or 59 - 9 or - 59				- - - - -	- 15 -	- 21 - or - <u>51</u> -
ENGINE WON'T START		3			3					1	
DIFFICULT TO START ENGINE WHEN COLD		BU	• 	3	3	1		l	3		1
IRREGULAR IDLING	WHEN COLD ₽₽₽₽₽₽₽₽₽ ₽₽₽₽₽₽₽₽₽₽	BU				3					
	ROUGH IDLE	BU		3							
	WHEN WARM RPM TOO HIGH	BU									
	when warm RBM TOO	BU									
FREQUENT STALLING POOR PERFORM- ANCE	WHILE WARMING UP	BU				3					
	AFTER WARMING UP	BU							3		
	MISFIRE OR ROUGH RUNNING	BU			3						
	FAILS EMISSION	BU	3	2							
	⊨8§v£RF	BU		3			2				3

* If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.
 (BU) : When the Check Engine light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.



PGM-FI					IDLE C	ONTROL	FUEL SUPPLY					EMISSION	CONTROL	
VALVE TIMING OIL PRESSURE SWITCH	VEHICLE SPEED SENSOR	IGNITION TIMING ADJUSTER	KNOCK SENSOR	A/T FI SIGNAL A	A/T FI SIGNAL B	ELEC- TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	FUEL METERING	fuel Pump	OTHER FUEL SUPPLY	AIR INTAKE	EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
6-17	58	60	62	64	64	70	66	89	38	99	86	110	128	124
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Troubleshooting

-Self-diagnostic Procedures

- I. When the Check Engine light has been reported on, do the following:
 - 1. Connect the Service Check Connector terminals with a jumper wire as shown (the Service Check-Connector is located under the dash on the passenger side of the car).



2. Note the CODE: the Check Engine light indicates a failure code by blinking frequency. The Check Engine light can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by a individual short blinks. Problem codes 10 through 59 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit.





II. ECU Reset Procedure

- 1. Turn the ignition switch off.
- 2; Remove the CLOCK fuse (7.5 A) from the main relay box for 10 seconds to reset ECU.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.



- III. Final Procedure (this procedure must be done after any troubleshooting)
 - 1. Remove the Jumper Wire.

NOTE: If the Service Check Connector is jumped the Check Engine light will stay on.

- 2. Do the ECU Reset Procedure.
- 3. Set the radio preset stations and the clock setting.

(cont'd)

Troubleshooting

· Self-diagnostic Procedures (cont'd) -

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 If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.

- The Check Engine light may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine light and D indicator light may come on simultaneously when the self-diagnosis indicator blinks 6, 7 and 17. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the D indicator light. If it comes on, see page 14-52.
- The Check Engine light and TCS indicator light may come on simultaneously when the self-diagnosis indicator blinks 3, 5, 6, 13, 15, 16, 17, 35 and 36. Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the TCS indicator light. If it comes on, see page 19-84.
- The Check Engine light does not come on when there is a malfunction in the A/T FI signal. However, when the two terminals of the service check connector are connected with a jumper wire and, the Check Engine light will indicate the codes.



If the inspection for a particular failure code requires the ECU test harness, remove the seat back panels. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



Troubleshooting

- Self-diagnostic Procedures (cont'd)

CAUTION:

- Puncturing the insulation on a wire can cause poor or intermittent electrical connections.
- For testing at connectors other than the ECU test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment. For female connectors, just touch lightly with the tester probe and do not insert the probe.





-How to Read Flowcharts

A flowchart is designed to be used from start to final repair. It's like a map showing you the shortest distance. But beware: if yo u go off the "map" anywhere but a "stop" symbol, you can easily get lost.



Describes the conditions or situation to start a troubleshooting flowchart.

ACTION Asks you to do something; perform a test, set up a condition, etc.

____ł

DECISION Asks you about the result of an action, then sends you in the appropriate, troubleshooting direction.



The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests. In any event, if the Check Engine light on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting.
- Most of the troubleshooting flowcharts have you reset the ECU and try to duplicate the problem code. If the problem it s intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly a needlessly replaced ECU.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECUs), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the ECU test harness, check the test harness connections before proceeding.

PGM-FI Control System

. System Description-

INPUTS		ELECTRONIC CONTROL UNIT	 UTPUTS
CRANK/CYL Sensors MAP Sensor TW Sensor TA Sensor Throttle Angle Sensor Oxygen Sensors EGR Valve Lift Sensor Vehicle Speed Sensor Ignition Timing Adjuster Knock Sensers A/T FI Signals TCS Signals Starter Signal Alternator FR Signal Alternator FR Signal Air Conditioning Signal A/T Shift Position Signal M/T Neutral Switch Signal Battery Voltage (IGN. 1) Fuel Pump Terminal Voltage VTEC Oil Pressure Switch Signals	$\mathbf{\hat{\mathbf{A}}}$	Injector Timing and Duration Electronic Idle Control Other Control Functions Ignition Timing Control ECU Back-up Functions	Injectors Main Relay (Fuel Pump) Fuel Pump Relay Check Engine Light EACV A/C Compressor Clutch Relay Igniter Unit Purge Cut-Off Solenoid Valve EGR Control Solenoid Valve Chamber Volume Control Solenoid Valve Radiator Fan Relay Engine Compertment Fan Relay VTEC Spool Valves TCS Control Signals

Injector Timing and Duration

The ECU contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Electronic Air Control

Electronic Air Control Valve (EACV)

When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only) or the alternator is charging, the ECU controls current to the EACV to maintain correct idle speed.

Ignition Timing Control

- The ECU contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for coolant temperature.
- A Knock Control System is also used. When detonation is detected by the knock sensor, the ignition timing is retarded.

Other Control Functions

1. Starting Control

When the engine is started, the ECU provides a rich mixture.

- 2. Fuel Pump Control
 - When the ignition switch is initially turned on, the ECU supplies ground to the main relay which supplies current to the fuel pump for two seconds to pressurize the fuel system.
 - . When the engine is running, the ECU supplies ground to the main relay which supplies current to the fuel pump.
 - When the engine is not running and the ignition is on, the ECU cuts ground to the main relay which cuts current to the fuel pump.
 - Excellent engine performance is achieved through the use of VTEC (Variable Valve Timing and Lift Electronic Control System), intake manifold chamber control and discharge volume control of the fuel pump.
- 3. Fuel Cut-off Control
 - During deceleration with the throttle valve closed, current to the injectors is cut off to improve fuel economy at speeds over 1,500 rpm.
 - Fuel cut-off action also takes place when engine speed exceeds, 8,300 rpm regardless of the position of the throttle valve to protect the engine from over-revving.

11-24



4. A/C Compressor Clutch Relay

When the ECU receives a demand for cooling from the air conditioning system (compressor control unit), it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.

- 5. Purge Cut-off Solenoid Valve When the coolant temperature is below 70°C (158°F), the ECU supplies a ground to the purge cut-off solenoid valve which cuts vacuum to the purge control valve.
- 6. Chamber Volume Control Solenoid Valve (CVCSV)

When the engine rpm is below 4,800 rpm the CVCSV is activated by a signal from the ECU, intake air flows through a smaller chamber, then high torque is delivered. At speeds higher than 4,800 rpm, both solenoid valves are deactivated by the ECU, and intake air flows through the a larger chamber in order to increase airflow.

7. EGR Control Solenoid Valve (EGR CSV)

When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECU supplies ground to the EGRCSV which supplies regulated vacuum to the EGR valve.

- ECU Back-up Functions
- 1. Fail-Safe Function

When an abnormality occurs in a signal from a sensor, the ECU ignores that signal and assumes a pre-programmed value that allows the engine to continue to run.

2. Back-up Function

When an abnormality occurs in the ECU itself, the injectors are controlled by a back-up circuit independent of the system in order to permit minimal diving.

3. Self-diagnosis Function (Check Engine light)

When an abnormality occurs in a signal from a sensor, the ECU lights the Check Engine light and stores the failure code in erasable memory. When the ignition is initially turned on, the ECU supplies ground for the Check Engine light for two seconds.

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PGM-FI Control System











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Self-diagnosis Check Engine light indicates code 1: A problem in the Front Oxygen (O₂) Sensor circuit.

Self-diagnosis Check Engine light indicates code 2: A problem in the Rear Oxygen (O2) Sensor circuit.

The oxygen sensors, detects the oxygen content in the exhaust gas, and input the ECU. In operation, the ECU receives the signals from the sensors and varies the duration during which fuel is injected. The oxygen sensors are combined with a heaters, The heaters stabilize the sensors output. The oxygen sensors are installed in the exhaust manifolds.



II-30



II-31



















11-38





PG M- FI Control System



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PG M - FI Control System























-Troubleshooting Flowchart —— Throttle Angle Sensor —

The throttle angle sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle angle changes, the throttle angle sensor varies the voltage signal to the ECU.







-Troubleshooting

Flowchart — TA Sensor -



The TA sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.



II-52













II-56





PGM-FI Control System



11-58



- Troubleshooting Flowchart ----- ignition Timing Adjuster

Sufi-vingnosis Check Engine lights indicates code 18: A problem in the Ignition Timing Adjuster circuit.

The ignition timing adjuster allows the electronic ignition advance to be set to 15° BTDC at idle.



II-60







11-62





PGM-FI Control System







System Troubleshooting Guide -

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Check Engine light does not blink CODE 14, go to inspection described on page 11-70.

PAGE	SUB SYSTEM	IDLE ADJUST- ING SCREW	EACV	AIR CONDI- TIONING SIGNAL	ALTER- NATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL	M/T NEUTRAL SWITCH SIGNAL	M/T CLUTCH SWITCH SIGNAL	STARTER SWITCH SIGNAL	FAST IDLE VALVE	HOSES AND CONNEC- TIONS
SYMPTOM		86	70	72	74	76	78	80	a2	83	•
DIFFICULT TO START ENGINE WHEN COLD										1	
WHEN COLD FAST IDLE OUT OF SPEC (1,000-2,000 rpm)		3	2							1	
ROUGH IDLE			2								1
WHEN WARM RPM TOO HIGH		3	1							2	3
WHEN WARM RPM TOO LOW	Idle soeed is below specified rpm (no load)	2	1								
	I dle speed does not increase after initial start up.		1								
	On models with automatic transmis- sion, the idle speed drops in gear		2			1					
	ldle speeds drops when air conditioner in ON		2	1							
	ldle speed fluctuates with electrical load		2								1
FREQUENT STALLING	WHILE WARMING UP		1								
	AFTER WARMING UP	1		I		1	' II				
FAILS EMISSION TEST											1



System Description

The idle speed of the engine is controlled by the Electronic Air Control Valve (EACV). The valve changes the amount of air bypassing into the intake manifold in response to electric current sent from the ECU. When the EACV is activated, the valve opens to maintain the proper idle speed.



System Description (cont'd)

- 1. After the engine starts, the EACV opens for a certain time. The amount of air is increased to raise the idle speed about 150 -300 rpm.
- 2. When the coolant temperature is low, the EACV is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the coolant temperature.



- 1. When the idle speed is out of specification and the Check Engine warning light does not blink CODE 14, check the following items:
 - . Adjust the idle speed (page 1 I-84)
 - . Air conditioning signal (page 1 I-72)
 - . Alternator FR signal (page 1 I-74)
 - . A/T shift position signal (page 1 I-76)
 - . M/T neutral switch signal (page 1 I-78)
 - M/T clutch switch signal (page 1 I-80)
 - Starter switch signal (page 1 I-82)
 - . Fast idle valve (page 1 I-83)
 - . Hoses and connections
 - . EACV and its mounting O-rings
- 2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 11-84).
 - If the idle speed still cannot be adjusted to specification (and the Check Engine warning light does not blink CODE 14) after EACV replacement, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Idle Contro

- Troublesho

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14 Self-diagnosis check Engine light indicates code 14: A problem in the Electronic Air Control Valve, (EACV) circuit.

The EACV changes the amount of air bypassing the throttle body in response to a current signal from the ECU in order to maintain the proper idle speed.







(cont'd)















11-76

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11-77



11-78



Idle Control System

Troubleshooting Flowchart — Clutch Switch Signal

This signals the PGM-Fi ECU when the clutch is engaged.



1 I-80





Idle Control System





Fast Idle Valve -

Description

To prevent erratic running when the engine is warming up, it is necessary to raise the idle speed. The fast idle air bypass valve is controlled by a thermowax plunger. When the engine is cold, the engine coolant surrounding the thermowax contracts the plunger, allowing additional air to be bypassed into the intake manifold so that the engine idles faster. When the engine reaches operating temperature, the valve closes, reducing the amount of air bypassing into the manifold.



AR BYPASS VALVE

Inspection

NOTE: The fast idle valve is factory adjusted; it should not be disassembled.

- 1. Start the engine.
- 2. Remove the cover of the fast idle valve.
- 3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F) and idling.



• If not, replace the fast idle valve and retest.



- 4. Warm up the engine (cooling fan comes on).
- 5. Check that the valve is completely closed. If not, air suction can be felt in the valve seat area.
 - If any suction is felt, the valve is leaking. Replace the fast idle valve and recheck.

Idle Control System

- Idle Speed Setting

Inspection/Adjustment

- 1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
- 2. Connect a tachometer.
 - Connect a tachometer to loop of igniter unit secondary, or...



3. Disconnect the 2P connector from the EACV.



- 4. Start the engine with the accelerator pedal slightly depressed. Stabilize the rpm at 1000, then slowly release the pedal until the engine idles.
- 5. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

idle speed should be:

Manual	650 ± 50 rpm
Automatic	600 \pm 50 rpm (in gear)

Adjust the idle speed, if necessary, by turning the idle adjusting screw.





- 6. Turn the ignition switch OFF.
- 7. Reconnect the 2P connector on the EACV, then remove CLOCK fuse in the main relay box for 10 seconds to reset ECU.
- 8. Restart and idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	800 ± 50 rpm
Automatic	750 \pm 50 rpm (in gear)



System Troubleshooting Guide -

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with (1). Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system (2), etc.

PAGE	SUB SYSTEM	FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	fuel Filter	FUEL PUMP	MAIN RELAY	Fuel Pump Relay Fuel Pump Resistor	CONTAMI- NATED FUEL
SYMPTOM.		89	94	95	97	98	103	106	•
ENGINE WON'T S	START	3	3		3	1	2		3
DIFFICULT TO S When cold or	tart engine Hot								1
ROUGH IDLE		1	2						3
POOR PERFORMANCE	Misfire or Rough Running	1	2	3		3		3	3
	FAILS Emission T es t	2	3	1					
	LOSS OF POWER	. 3	3		1	3		3	2



System Description

The fuel supply system consists of a fuel tank, in-tank high pressure fuel pump, fuel pump relay, fuel pump resistor, main relay, fuel filter, pressure regulator, injectors and injector resistor.

This system delivers pressure regulated fuel to the injectors and cuts the fuel delivery when the engine is not running.

Fuel Pressure -

Relieving

Â WARNING

- Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area.
- Be sure to relieve fuel pressure while the engine is Off.

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt at top of the fuel filter.

- 1. Disconnect the battery negative cable from the battery negative terminal.
- 2. Remove fuel filler cap.
- 3. Use a box end wrench on the 6 mm service bolt al the fuel filter, while holding the special banjo bolt with another wrench.
- 4. Place a rag or shop towel over the 6 mm service bolt.
- 5. Slowly loosen the 6 mm service bolt one complete turn.



- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt, whenever the service bolt is loosened to relieve fuel pressure.
- Replace all washers whenever the bolts are removed to disassemble parts.

(cont'd)

- Fuel Pressure (cont'd)

Inspection

- 1. Relieve fuel pressure (page 1 I-87).
- 2. Remove the service bolt on the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
- 3. Start the engine. measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.
 - Pressure should be: 323-363 **kPa (**3.30-3.70 **kg/cm²**, 46-53 psi)
- 4. Reconnect vacuum hose to the pressure regulator.



- If the fuel pressure is not as specified, first check the fuel pump (page 1 I-99). If the pump is OK, check the following:
- If the pressure is higher than specified, inspect for:
 Pinched or clogged fuel return hose or piping.
 Faulty pressure regulator (page 1 I-95).
 - If the pressure is lower than specified, inspect for: . Clogged fuel filter.
 - . Pressure regulator failure (page 1 I-95).
 - . Leakage in the fuel line.



FUEL PIPE

O-RING

CUSHION RING

- INJECTOR.

INTAKE

MANIFOLD

- Fuel Injectors

Troubleshooting Flowchart



The injectors are the solenoid-actuated constant-stroke pintle type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected close to the intake valve. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open (i.e., the duration the current is supplied to the solenoid coil). The injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.



NO

NO k Engine light on and does

YES

ate CODE 16?

(To page 1 I-90)

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at this time (test drive may be necessary). Check for poor connections or loose wires at injectors, injector resistor and ECU.

Intermittent failure, system is OK

(cont'd)



II-90





- Fuel Injectors (cont'd)

Replacement

A WARNING Do not smoke during the work. Keep open flames away from your work area.

- 1. Relieve fuel pressure (page 1 I-87).
- 2. Remove the intake manifold covers.
- 3. Disconnect the connectors from the injectors.
- 4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

NOTE: Place a rag or shop towel over the hoses before disconnecting them.

- 5. Disconnect the fuel hose from the fuel pipe.
- 6. Loosen the retainer nuts on the fuel pipe and harness holder.
- 7. Disconnect the fuel pipe.
- 8. Remove the injectors from the intake manifold.



- 9. Slide new cushion rings onto the injectors.
- 10. Coat new O-rings with clean engine oil and put them on the injectors.
- 11. Insert the injectors into the fuel pipe first.
- 12. Coat new seal rings with clean engine oil and press them into the intake manifold.



13. install the injectors and fuel pipe assembly in the manifold.

CAUTION: To prevent damage to the O-ring, install the injectors in the fuel pipe first, then install them in the intake manifold.



14. Align the center line on the connector with the mark on the fuel pipe.

- 15. Install and tighten the retainer nuts.
- 16. Connect the fuel hose to the fuel pipe.
- 17. Connect the vacuum hose and fuel return hose to the pressure regulator..
- 18. Install the connectors on the injectors.
- 19. Install the intake manifold covers.
- 20. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.



- Injector Resistor

Description

The resistor lowers the current supplied to the injectors to prevent damage to the injector coils. This allows a faster response time of the injectors.



Testing

- 1. Disconnect the resistor connector.
- 2. Check for resistance between each of the resistor terminals (b, c, d, e, f and g) and the power terminal (a).





• Replace the resistor with a new one if any of the resistances are outside of the specification.



Pressure Regulator

Description

The fuel pressure regulator maintains a constant fuel pressure to the injectors. When the difference between the fuel pressure and manifold pressure exceeds 3.5 kg/cm^{*} (50 psi), the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

CLOSE



OPEN



Testing

Do not smoke during the test. Keep AWARNING open flames away from your work area. 1. Attach a pressure gauge to the service port of the fuel filter (page 1 I-88). Pressure should be: 323-363 kpa (3.30-3.70 kg/cm², 46-53 psi) (with the regulator vacuum hose disconnected) PRESSURE FUEL PRESSURE GAUGE REGULATOR 07406-0040001 2. Reconnect the vacuum hose to the pressure regulator.

(cont'd)

Pressure Regulator (cont'd)

- 3. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected again.
 - If the fuel pressure did not rise, check to see if it rises with the fuel return hose lightly pinched.
 - If the fuel pressure still does not rise, replace the pressure regulator.



Replacement

A WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

- 1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 1 I-87).
- 2. Disconnect the vacuum hose and fuel return hose.
- 3. Remove the two 6 mm retainer bolts.



NOTE:

• Replace the O-ring.

 When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.



-Fuel Filter

Replacement



Fuel Pump -

Description

Because of its compact impeller design, the fuel pump is installed inside the fuel tank, thereby saving space and simplifying the fuel line system.



The fuel pump is comprised of a DC motor, a circumference flow pump, a relief valve for protecting the fuel line systems, a check valve for retaining residual pressure, an inlet **port**, and a discharge port. The pump assembly consists of the impeller (driven by the motor), the pump casing (which forms the pumping chamber), and the pump cover.

OPERATION

- (1) When the engine is started, the main relay actuates the pump, and the motor turns together with the impeller. Differential pressure is generated by the numerous grooves around the impeller.
- (2) Fuel entering the inlet port flows inside the motor from the pumping chamber and is forced through the discharge port via the check valve. If fuel flow is obstructed at the discharge side of the fuel line, the relief valve will open to bypass the fuel to the inlet port and prevent excessive fuel pressure.
- (3) When the engine stops, the pump stops automatically. However, a check valve closes by spring action to retain the residual pressure in the line, helping the engine to restart more easily.







1 I-100





(cont'd)

11-101

-Fuel Pump (cont'd) -

Testing



- 1. With the ignition switch OFF, disconnect the main relay connector.
- 2. Connect a jumper wire between the BLK/YEL wire (5) and BLK/YEL wire (7).



- Relieve fuel pressure as described on page 1 I-87 3. then tighten the service bolt.
- Disconnect the fuel return hose from the regulator. 4.
- Turn the ignition switch' ON for 10 seconds and 5. measure the amount of fuel flow.

Amount should be: 333 cm³ (11.2 oz) min. in 10 seconds at 12 V PRESSURE REGULATOF If fuel flow is less than 333 cm³ (11.2 oz), or there is no fuel flow, check for: · Clogged fuel filter. . Clogged fuel line. Pressure regulator failure (page 1 I-95). .

Replacement

Do not smoke while working on fuel AWARNING

system. Keep open flames away from your work area.

- Remove the fuel tank (page 1 I-108). 1.
- 2. Disconnect the connector from the fuel pump.
- Remove the fuel pump mounting nuts. 3.
- 4. Remove the fuel pump from the fuel tank.



1 I-102



- Main Relay

Description

The main relay actually contains two individual relays. This relay is installed behind the passengers seat back panel.

One relay is energized whenever the ignition is on which supplies the battery voltage to the ECU, power to the injectors, and power for the second relay.

The second relay is energized for 2 seconds when the ignition is switched on, and when the engine is running which supplies power to the fuel pump.



Relay Testing

NOTE: If the car starts and continues to run, the main relay is OK.

- 1. Remove the main relay.
- 2. Attach the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.
 - If there is continuity, go on to step 3.
 - If there is no continuity, replace the relay and retest.



- 3. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.
 - If there is continuity, go on to step 4.
 - If there is no continuity, replace the relay and retest.
- 4. Attach the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.
 - If there is continuity, the relay is OK;
 If the fuel pump still does not work, go to Harness Testing in the next column.
 - If there is no continuity, replace the relay and retest. (cont'd)

11-103













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- Fuel Tank

Replacement

AWARNING

- Do not smoke while working on fuel system. Keep open flame away from work area.
- Make sure lifts are placed properly. (See page I-6.)
- 1. Raise the car.
- 2. Remove the drain bolt and drain the fuel into an approved container.
- 3. Remove the center rod (Section 5).
- 4. Disconnect the M/T shift cable and M/T clutch cable or A/T shift cable from the transmission (Section 14).
- 5. Disconnect the 6P connector from the fuel tank.
- 6. Disconnect the hoses.

CAUTION:

• When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them. 7. Place a jack, or other support, under the tank.

- 8. Remove the strap bolts and nuts, and let the straps fall free.
- 9. Remove the fuel tank.

NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount,



1 I-108



Air Intake System

System Troubleshooting Guide

NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.

PAGE	SUB SYSTEM	THROTTLE CABLE	THROTTLE BODY	DASHPOT SYSTEM	CHAMBER VOLUME CONTROL SYSTEM
SYMPTOM		113	114	117	119
WHEN COLD FAST IDLE O	OUT OF SPEC	3	2		1
WHEN WARM RPM TOO H	IIGH	2	1	3	
LOSS OF POWER			1		2



System Description

,

The system supplies air for all engine needs. It consists of the air cleaner, air intake pipe, throttle body, EACV, fast idle mechanism, and intake manifold. A resonator in the air intake pipe provides additional silencing as air is drawn into the system.



Air Intake System




- Throttle Cable

Inspection/Adjustment

- 1. Warm up the engine to normal operating temperature (cooling fan comes on).
- 2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
- 3. Check cable free play at the throttle linkage. Cable deflection should be IO- 12 mm (0.39-0.47 in.)



- 4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
- 5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

Installation

- 1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
- 2. Warm up the engine to normal operating temperature (the cooling fan comes on).



- 3. Hold the cable sheath, removing all slack from the cable.
- 4. Turn the adjusting nut until it is 3 mm away from the cable bracket.
- 5. Tighten the locknut. The cable deflection should now be IO- 12 mm. If not, see Inspection/ Adjustment.



Air Intake System

- Throttle Body -

Description

The throttle body is of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant which is fed from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the canister/purge port are located on the top of the throttle body. A dashpot is used to slow the throttle as it approaches the closed position.



Inspection

CAUTION: Do not adjust the throttle stop screw since it preset at the factory.

- 1. Start the engine and allow it to reach normal operating temperature (cooling fan comes on).
- 2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.



3. Allow the engine to idle and check that the gauge indicates no vacuum.

- 4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
 - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
- 5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
 - If there are any abnormalities in the above steps, check for:
 - Excessive wear or play in the throttle valve shaft.
 - Sticky or binding throttle lever at full close position.
 - Clearance between throttle stop screw and throttle lever at full close position.

If there is vacuum, check the throttle cable (page 1 I-I 13).







Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

(cont'd)

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Air Intake System



11-116



· Dashpot System ·



Description The dashpot is employed to slow the closing of the throttle valve during gear shifting or deceleration.



Air Intake System

Dashpot System

Testing

- 1. Check the vacuum line for leaks, blockage or a disconnected hose.
- 2. Disconnect the vacuum hose from the dashpot diaphragm, and connect a vacuum pump to the hose.



3. Apply vacuum and check the speed the vacuum goes out.

Vacuum should go out slowly.

• If the vacuum holds or goes out quickly, replace the dashpot check valve and retest.

4. Connect a vacuum pump to the dashpot diaphragm.



- 5. Apply vacuum and check that the rod pulls in and vacuum holds.
 - If the vacuum does not hold or the rod does not move, replace the dashpot diaphragm and retest.





Chamber Volume Control System

Description

.

Satisfactory power performance is achieved by closing and opening the chamber volume control valves. High torque at low RPM is achieved when the valves are closed, whereas high power at high RPM is achieved by when the valves are opened.









Air Intake System



 If the problem still exists after cleaning, disassemble the intake manifold and check the chamber volume control valve (page 1 I-I 23).

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System Troubleshooting Guide

NOTE: Across each row in the chart, the systems that could be sources of a symptom are ranked in the order they should be inspected starting with (1). Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next most likely system (2), etc.

PAGE	SUB SYSTEM	CATALYTIC CONVERTER	EGR SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
310171000		126	128	134	135
ROUGH IDLE				2	
IFREQUENT STALLING	AFTER WARM- ING UP		1		
ING UP POOR PERFORMANCE	FAILS EMISSION TEST	1	3		2
	LOSS OF POWER	1	2		



- System Description

The emission control system includes a three-way catalytic converter, exhaust gas recirculation (EGR) system, crankcase ventilation system and evaporative control system.

The emission control system is designed to meet federal and state emission standards.

Tailpipe Emission

Inspection

AWARNING Do not smoke during this procedure. Keep any open flame away from your work area.

- 1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
- 2. Connect a tachometer.
- 3. Check idle speed and adjust the idle speed, if necessary (page 1 I-84).
- 4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
- 5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.
 - CO meter should indicate 0.1 % maximum.

- Catalytic Converter-

Description

The d-way catalytic converter is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide (CO₂), dinitrogen (N₂) and water vapor





inspection

If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if any of the visible area is damaged or plugged.





14 4]²⁵





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- Exhaust Gas Recirculation System (cont'd)-









II-I 32



R

- Positive Crankcase Ventilation System

Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.



Inspection

1. Check the crankcase ventilation hoses and connections for leaks and clogging.



 At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold in lightly pinched with your fingers or pliers.



 If there is no clicking sound, check the PCV valve grommet for cracks or damage. If the grommet is OK, replace the PCV valve and recheck.



- Evaporative Emission Controls

Description

The evaporative *controls* are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

A. Charcoal Canister

A canister for the temporary storage of fuel vapor until the fuel vapor can be purged from the canister into the engine and burned.

B. Vapor Purge Control System

Canister purging is accomplished by drawing fresh air through the canister and into a port on the throttle body. The purging vacuum is controlled by the purge control diaphragm valve and the purge cut-off solenoid valve.



C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the two-way valve, the valve opens and regulates the flow of fuel vapor to the canister.

(cont'd)















2.4

1 I-140

Clutch

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Special Tools Ref.No. **Tool Number** Q'ty Page Reference Description 07LAB-PV00100 or 1 Ring Gear Holder 12-12 1 07924 - PD20003 07MAF-PR80100 2 3 4 5 Clutch Alignment Shaft 12-20 1 Attachment, 37 x 40 mm 07746-0010200 12-19 1 07749-0010000 Driver 12-l 9 1 07936-3710100 Handle 12-20 1 2 3 1 Watter and JANESS STATES STATES STATES 4 6



NOTE:

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked * are removed, the clutch hydraulic system must be bled.



NOTE:

The clutch is self-adjusting to compensate for wear.
Total clutch pedal free play is 9-1 5 mm (0.35-0.59 in).

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

- 1. Loosen locknut A, and back off the pedal switch until it no longer touches the clutch pedal.
- 2. Loosen locknut C, and turn the push rod in or out to get the specified stroke and height at the clutch pedal.
- 3. Tighten locknut C.

- 4. Thread in the clutch pedal switch A in until it contacts the clutch pedal.
- 5. Turn the switch in further 1/4 1/2 turn.
- 6. Tighten locknut A.
- 7. Loosen locknut B and pedal switch B.
- 8. Measure the clearance between the floor board and clutch pedal with the clutch pedal fully depressed.
- Release the clutch pedal 15-20 mm from the fully depressed position and hold it there.
 Adjust the position of pedal switch B so that the engine will start with the clutch pedal in this position.
- 10. Thread in pedal switch B in 1/4 1/2 turn further.
- 11. Tighten locknut B.





Clutch Master Cylinder

Removal

1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



- 2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.
- 3. Remove the clutch pipe and reservoir hose from the master cylinder.

CAUTION:

- Avoid spilling brake fluid on paint as it may damage the finish.
- Plug the end of the clutch pipe and reservoir hose with a shop towel to prevent fluid from flowing out of the clutch pipe and reservoir hose after disconnecting.



Installation

- 1. Install the clutch master cylinder in the reverse order of removal.
 - NOTE: Bleed the clutch hydraulic system (page 12-6).



Slave Cylinder

⊦• Removal

1. Disconnect the clutch pipe from the slave cylinder.

CAUTION:

- Avoid spilling brake fluid on the painted surfaces, as it may damage the finish.
- Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.
- 2. Remove the slave cylinder from the clutch housing.



Installation

1. Install the slave cylinder assembly on the clutch housing.



2. Bleed the clutch hydraulic system:

- Attach a hose to the bleeder screw and suspend the hose in a container of brake fluid.
- Make sure there is an adequate supply of fluid at the master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
- Refill the master cylinder fluid when done.
- Use only DOT 3 or 4 brake fluid.

Clutch Master Cylinder (CANADA)



Overhaul/Inspection



Clutch Master Cylinder (CANADA)

Removal/Installation

1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



- 2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.
- 3. Remove the clutch pipe and reservoir hose from the master cylinder.

CAUTION:

- Avoid spilling brake fluid on paint as it may damage the finish.
- Plug the end of the clutch pipe and reservoir hose with a shop towel prevent fluid from flowing out of the clutch pipe and reservoir hose after disconnecting.



4. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (page 1 2 - 1 1) .


Disassembly –

CAUTION: Avoid spilling brake fluid on paint as it may damage the finish.

1. Remove the dust seal from the master cylinder.



- 2. Pry the circlip off the master cylinder.
- 3. Carefully remove the piston by applying air pressure through the clutch line hose.

CAUTION:

- Hold a shop towel over the master cylinder, to stop the piston in case it comes out suddenly.
- Plug the end of the clutch hose port with a shop towel to prevent fluid from coming out.
- Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.



- Reassembly

CAUTION:

- Before assembling, make sure all parts are completely clean.
- Replace parts with new ones whenever specified to do so.
- Do not allow dust or water to enter the system.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the brake fluid which was drained out.
- Avoid spilling the brake fluid on painted surfaces, as it may damage the finish.
- 1. Assemble the piston noting the proper direction of the parts (page 1 2-7).



- 2. Slide the piston assembly into the master cylinder.
- 3. Install the circlip in the groove of the master cylinder.



Slave Cylinder (CANADA)

Overhaul/Inspection







Pressure Plate, Clutch Disc, Mid Plate

- Removal

1. Install the Ring Gear Holder.



- 2. To prevent warping, unscrew the pressure plate mounting bolts two turns at a time in a crisscross pattern, then remove the pressure plate and the 1 st clutch disc.
- 3. Remove the release bearing from the pressure plate.





4. Remove the mid plate and the 2nd clutch disc.



5. Remove the spring collar and damper washer from the flywheel.



Pressure Plate

Inspection –

or burning.

1.



Inspection

Release Bearing

1. Check the release bearing for excessive play by spinning it by hand.

CAUTION: Do not wash it in solvent.



2. Replace the release bearing with a' new one if there is excessive play.

3. Inspect for warpage using a straight edge and feeler gauge. Standard (New): 0.03 mm (0.0012 in.) min. Service Limit: 0.15 mm (0.0059 in.) Measure across the pressure plate at three points. STRAIGHT EDGE FEELER'GAUGE

NOTE: If replacement is required, always replace the

Inspect the pressure plate surface for wear, cracks,

2. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.

pressure plate, mid plate and flywheel as a set.

12-13

1st and 2nd Clutch Discs

Inspection

. . . .

- 1. inspect the lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked. 2. Measure the clutch disc thickness. Standard: 1st Clutch Disc: 8.3-9.0 mm (0.327-0.354 in.) 2nd Clutch Disc: 7.6-8.3 mm (0.299-0.327 in.) Service Limit: 1st Clutch Disc: 5.9 mm (0.232 in.) 2nd Clutch Disc: 5.4 mm (0.213 in.)
- 3. Measure the depth from the lining surface to the rivets, on both sides.

1st and 2nd Clutch Discs:Standard:1.1 m m 10.043 in.) min.ServiceLimit:0.5 m m 10.020 in.)





12-15

nd Plate Guide

Initialization

NOTE:

- If the pressure plate mounting bolts are unscrewed, the mid plate guide must be initialized.
- Initialize after tightening the pressure plate mount bolts.
- 1. Screw the 5 mm bolt into the back of the flywheel until it just touches the mid plate guide.
- 2. Screw the 5 mm bolt in 150-210" further.





Replacement

SCREW

MID PLATE GUIDE

NOTE: Make sure all parts are clean before installation.

1. Thread and tighten a 4 mm screw into mid plate guide.



PRING

WASHER

3. Remove the mid plate guide with the screw installed.



4. Thread and tighten a 4 mm screw into the new mid plate guide, then remove the mid plate guide from the guide collar.



Mid Plate Guide

- Replacement (cont'd)

5. Install the new mid plate guide with the screw installed.



6. Install the washer, spring and guide collar, then remove the screw.



 7. Initialize the mid plate guides after installing the clutch assembly. (See page 12-I 6).

Flywheel, Flywheel Bearing

Inspection

NOTE: If replacement is required, always replace the pressure plate, mid plate and flywheel as a set.

- 1. Inspect the ring gear teeth for wear or damage.
- 2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
- 3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

NOTE: The runout can be measured with engine installed.

Standard (New): 0.05 mm (0.0020 in.) max. Service Limit: 0.15 mm 10.0059 in.)



4. Turn the inner race of the flywheel bearing with your finger. The bearing should turn smoothly and quietly. Check that the bearing outer race fits tightly in the flywheel. Replace the bearing if the race does not turn smoothly, quietly, or fit tight in the flywheel.





-Replacement

1. Remove the flywheel mounting bolts and the flywheel.



3. Drive in the new bearing into the flywheel using the special tools.



- 4. Align the hole in the flywheel with the crankshaft dowel pin and install the flywheel. Install the bolts finger tight.
- 5. Install the special tool, then torque the flywheel bolts in a crisscross pattern, as shown.



Pressure Plate, Clutch Disc Mid Plate

Installation

NOTE:

- Install the pressure plate, clutch discs and mid plate is a set.
- Do not mix-up the 1 st and 2nd clutch discs. The 2nd clutch disc has a flat plate between the two friction surfaces. The 1st clutch disc has a spring plate between the two friction surfaces.



- 2. Install the ring gear holder.
- 3. Install the 2nd clutch disc.

NOTE: The index mark on the 2nd clutch disc should face away from the flywheel.



4. Install the mid plate.

NOTE: Align the mark on the flywheel with the mark on the mid plate.



5. Install the 1st clutch disc.

NOTE:

- The marks on the 1st and 2nd clutch discs should be 180° a part.
- The index mark on the 1st clutch disc should face away from the flywheel.









- 6.. Install the release bearing on the pressure plate.
- 7. Install the pressure plate.

NOTE:

- Align the mark on the mid plate with the mark on the pressure plate.
- After installed, make sure the release bearing no come off.

Align the marks.



6. Torque the bolts in a crisscross pattern as shown. Tighten them two turns at a time to prevent warping the diaphragm spring.

NOTE: Place the diaphragm spring fingers in the groove of the release bearing.



9. Remove the alignment tool and ring gear holder. 10. Initialize the mid plate guides (See Page 12-16).





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Special Tools

	Specia	I Tools ———				
	Ref. No.	Tool Number	Description		Q'ty	Page Reference
-	10346608	07GAJ-PG20110 07GAJ-PG20130 * 07736-A01000A 07746-0010400 07746-0010500 07746-0030100 07746-0030400 07749-0010000	Mainshaft Holder Mainshaft Base Adjustable Bearing Puller, 25-40 Attachment, 52 x 55 mm Attachment, 62 x 68 mm Driver 40 mm I.D. Attachment 35 mm I.D. Driver	0 mm	1 1 1 1 1 1 1	13-42 13-42 13-39 13-40 13-39 13-42 13-42 13-39
a sector de la companya de la compan La companya de la comp		1	2		3	
		(6		(6)	anna
			WHINNWHER			
		\bigcirc	8			
	* Must be used with commercially available 3/8 x 1.6 Slide Hammer					

Maintenance

- Transmission Oil -

NOTE: Check with the oil at operating temperature, engine OFF, and the car on level ground.

1. Remove the oil filler plug, then check the level and condition of the oil.



- 2. The oil level must be up to the fill hole. If it is below the hole, add oil until it runs out, then reinstall the oil filler plug.
- 3. If the oil is dirty, remove drain plug and drain transmission.
- 4. Reinstall the drain plug with a new washer, and refill to proper level.
- 5. Reinstall the oil filler plug with a new washer.

NOTE: The drain plug washer should be replaced at every oil change.

```
    Oil Capacity
    2.7 ℓ (2.9 U.S. qt.) after drain.
    2.8 ℓ (3.0 U.S. qt.) after overhaul.
```

Use only SAE1 OW-30 or 1 OW-40, that exceeds SE grade.



Back-up Light Switch, Neutral Switch



Replacement —

NOTE: To check the switch, see section 23.

- 1. Disconnect the connector, then remove the switch connector from the connector clamp.
- 2. Remove the switch.
- 3. Apply liquid gasket (P/N0871 8-550000 OE) to the switch threads, then install the switch.



Gearshift Mechanism



NOTE:

inspect rubber parts for wear or damage when disassembling.
Check that the new cotter pin is seated firmly.





Cable Adjustment



- 1. With the transmission in neutral, measure distance
 - (B): 157.5- 158.5 mm (6.20-6.24 in)



If distance (B) is out of spec, loosen the locknut and turn the adjuster as necessary.



3. Tighten the locknut.

NOTE: After adjustment, check operation of the gearshift lever.

Transmission Assembly

Removal -

ARNING Make sure lifts are placed properly, and hoist brackets are attached to correct position. (See page I-6).

CAUTION:

- Use fender covers to avoid damaging painted surfaces.
- Before removing the transmission, be sure to check and record the rear camber.
- 1. Check and record the rear camber. (See section 18.)
- Disconnect the battery negative (-), and positive (+) cables from the battery.
- Drain transmission oil. Reinstall the drain plug with a new washer.

- 4. Remove the strut bar.
- 5. Remove the air cleaner case.
- 6. Remove the connectors from the control box and remove the control box.

CAUTION: Do not remove the vacuum tubes from the control box.

- 7. Remove the wire harness holder, jumper connector and transmission ground cable.
- 8. Disconnect the switch connectors, then remove the back-up light switch and neutral switch.
- 9. Disconnect the starter motor cables, then remove the starter motor.
- 10. Remove the transmission housing bolts.



13-6

1 1. Remove the parking brake cable holders from the rear beam rod. 12. Remove the rear beam rod.

13. Remove the front exhaust pipe A.



- 14. Remove the parking brake cable holder and the Anti-lock Brake sensor wire clamp.
- 115. Loosen the ball joint nut, then separate the toe control arm from the knuckle using the special tool. (See Section 18.) 1 6. Remove the damper fork bolt.
- 17. Remove the ball joint nut using the special tool and separate the lower control arm from the knuckle. (See Section 18.)
- 1 8. Remove the right driveshaft from the intermediate shaft.



Transmission Assembly







* REAR TRANSMISSION MOUNTING BOLT TRANSMISSION JACK TRANSMISSION HOUSING MOUNTING BOLT TRANSMISSION HOUSING MOUNTING BOLT TRANSMISSION HOUSING MOUNTING BOLT TRANSMISSION HOUSING MOUNTING BOLT 1.40

Clean all parts thoroughly in solvent and dry with compressed air.

Lubricate all parts with oil before reassembly.

NOTE:

- This transmission uses no gaskets between the major housings; use P/N 08718-550000 OE sealant.
- Assemble the housings within 20 minutes after applying the sealant and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.
- Always clean the magnet 2 whenever the transmission housing is disassembled.



- (1) CLUTCH RELEASE HANGER
- 2 RELEASE HANGER SPRING
- ③ RELEASE BEARING GUIDE
- (4) 40 x 68 x 12.5 mm OIL SEAL Replace.
- (5) 10 x 20 mm DOWL PIN
- **(6)** CLUTCH HOUSING
- (7) SPEED SENSOR
- **8** SENSOR DUMMY COVER
- 9 O-RING
- Replace.

- (1) HOLDER PLATE
- (1) REVERSE SHIFT FORK ASSEMBLY
- Disassembly/Reassembly, page
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- (1) REVERSE IDLE GEAR SHAFT ASSEMBLY
 - Disassembly/Reassembly, page
 - 13-15

- () OIL GUIDE RING
- (4) 90 mm WASHER
- (b) BEARING OUTER RACE (b) DIFFERENTIAL ASSEMBLY
- See Section 15
- (1) OIL GUIDE PLATE
- W OIL GUIDE PLATE
- 18 44 x 72 x 23 mm NEEDLE BEARING
- () BEARING RETAINING PLATE
- **Ö** COUNTERSHAFT ASSEMBLY
- Index, page 13-29 (2) MAINSHAFT ASSEMBLY
- Index, page 13-23
- 22:75 mm SPRING WASHER
 32 x 46 x 7 mm OIL SEAL Replace.

- (A) TRANSMISSION MAGNET
- B SHIFT FORK ASSEMBLY
 Disassembly/Reassembly. page
- 13-22
- 1 OIL PUMP ASSEMBLY
 - Disassembly/Reassembly, page 13-37
- (7) CHANGE HOLDER ASSEMBLY
- Disassembly/Reassembly, page 13-19
- **BUPPER COVER**
- ③ SELECT LEVER ASSEMBLY
- Removel, page 13- 17
- Installation, page 13-43
- ()) REVERSE SHIFT ARM
- (i) 14 x 20 mm DOWEL PINS
- 🔞 14 x 20 mm DOWEL PIN





- (1) BEARING OUTER RACE (2) 75 mm THRUST SHIM
- Selection.
- CLAMP (3)
- **A BACK-UP LIGHT SWITCH** 25 N·m (2.5 kg-m, 18 lb-ft)
- 6 CLAMP
- 6 TRANSMISSION HANGER A
- TRANSMISSION HANGER B
- (8) STAY
- **WASHER**
- Replace.
- 10 OIL FILLER PLUG
- 45 N·m (4.5 kg-m, 33 lb-ft) (1) 42 x 63 x 12.5 mm OIL SEAL
- Replace.
- 12 WASHER
- Replace.
- (1) DRAIN PLUG
 - 40 N·m (4.0 kg-m, 29 lb-ft)

- (14) 36 mm SEALING BOLT
- 35 N•m (3.5 kg-m, 25 lb-ft)
- (15) STRAINER COVER
- (16) O-RING
- Replace.
- 1) STRAINER SET SPRING (B) OIL PUMP STRAINER
- 1 14 mm SEALING BOLT
- 33 N·m (3.3 kg-m, 24 lb-ft)
- (a) SPRING (L. 25 mm)
 (b) STEEL BALL (LARGE)
 (c) 16 mm SEALING BOLT

- 42 N·m (4.2 kg-m, 30 lb-ft)

- (2) SPRING (L. 24.2 mm) (2) 16 mm SEALING BOLTS
- 42 N·m (4.2 kg-m, 30 lb-ft) (b) SPRING (L. 30 mm)
- ③ STEEL BALL (SMALL)
- D SHIFT LEVER ASSEMBLY
- Removal, page 13-I 7
- Installation, page 1'3-43 **18 NEUTRAL SWITCH**
- 25 N·m (2.5 kg-m, 18 lb-ft)
- (9) TRANSMISSION HOUSING
- 3 OIL GUIDE PLATE
- (i) 82 mm THRUST SHIM
 - · Selection, page 13-41

Torque Value	Bolt Size
A-12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm
B- 24 N•m (2.4 kg-m, 17 lb-ft)	8 x 1.25 mm
C-26 N•m (2.6 kg-m, 19 lb-ft)	8 x 1.25 mm
D-45 N•m (4.5 kg-m, 33 lb-ft)	10 x 1.25 mm
E- 12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1 .0 mm SPECIAL BOLT
F- 15 N•m (1.5 kg-m, 11 lb-ft)	6 x 1 .0 mm SPECIAL BOLT
G-26 N•m (2.6 kg-m, 19 lb-ft)	8 x 1.25 mm SPECIAL BOLT

Transmission Housing

-Removal=



5. Expand the snap ring on the countershaft ball bearing and remove it from the groove using a pair of snap ring pliers.



- 6. Separate the clutch housing from the transmission housing.
- 7. Remove the thrust shim and oil guide plate from the transmission housing.



Reverse Shift Arm., Reverse Shift Fork



--Clearance Inspection -

1. Measure the clearance between the reverse shift arm and the 5th/reverse shift piece.

Standard: 0.05-0.30 mm (0.0020-0.0118 in) Service Limit: 0.5 mm (0.020 in)



2. If the clearance exceeds the service limit, measure the width of the groove in the reverse shift arm.

Standard: 7.05-7.20 mm (O-2776-0.2835 in.)

3. Measure the clearance between the reverse shift arm and reverse shift fork.

Standard: 0.05-0.35 mm (0.0020-0.0138 in.) Service Limit: 0.5 mm (0.020 in.)



4. If the clearance exceeds the service limit, measure the width of the reverse shift arm.

Standard: 12.8-13.0 mm (0.5039-0.512 in.)



If the width of the groove exceeds the standard, replace the reverse shift arm with a new one. If the width of the groove is within the standard, replace the 5th/reverse shift piece with a new one.



If the width exceeds the standard, replace the reverse shift arm with a new one. If the width is within the standard, replace the reverse shift fork with a new one.

(cont'd)

Reverse Shift Arm, Reverse Shift Fork

- Clearance Inspection (cont'd) -

5. Measure the clearance between the reverse shift fork and reverse synchro sleeve.

Standard: 0.45-0.65 mm (0.0177-0.0256 in.) Service Limit: 1 .0 mm (0.394 in.)



REVERSE SYNCHRO SLEEVE REVERSE SHIFT FORK

6. If the clearance exceeds the service limit, measure the thickness of the shift fork fingers.

Standard: 6.4-6.5 mm (0.2520-0.2559 in)



If the thickness exceeds the standard, replace the reverse shift fork with a new one. If the thickness is within the standard, replace the reverse synchro sleeve with a new one.

NOTE: The synchro sleeve and synchro hub should be replaced as a set.

Reverse Idler Gear Shaft Assembly

- Removal -
 - 1. Remove the reverse shift arm from the clutch housing.



- 2. Shift the reverse shift fork to the driven gear side.
- 3. Lift the mainshaft assembly and reverse idler gear shaft assembly, then remove the reverse shift fork assembly.





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4. Lift the reverse idler gear shaft, then remove the spring pin from the groove and remove the idler gear shaft assembly.



SHAFT ASSEMBLY

Reverse Shift Fork Assembly



Mainshaft, Countershaft, Differential Assemblies

- Removal -

1. Remove the change holder assembly from the clutch housing.



CHANGE HOLDER

2. Remove the mainshaft assembly and countershaft assembly with the shift fork from the clutch housing.

NOTE: Tape the mainshaft splines to protect them before removing the mainshaft and countershaft assemblies.



13-16

Shift Lever, Select Lever



Removal -

1. Remove the shift spring set plate and shift detent spring from the transmission housing.

Shift Spring Set plate



Remove the differential assembly from the clutch

3.

housing.



Shift Lever, Select Lever





Change Holder Assembly

-Disassembly/Reassembly

NOTE: Make sure the return springs are installed properly.

Prior to reassembling, clean all parts in solvent, dry them and apply lubricant to any contact surfaces.



Change Holder Assembly, Shift Fork



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Shift Fork Assembly

-Disassembly/Reassembly

NOTE:

- Be careful, not to lose the 5th shift fork steel ball.
- Install the spring pins, so their grooves are 1 80° apart.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces.

Disassembly: Remove with the 3 mm spring pin and 5 spring pin.

Reassembly: Install the 5 mm spring pin first, then install the 3 mm spring pin.



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Mainshaft Assembly



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NOTE: The 3rd/4th and 5th synchro hubs are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.


Mainshaft Assembly

-Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

1. Measure the clearance between 2nd and 3rd gears.

Standard: 0.06-0.23 mm (0.0024-0.0091 in) Service Limit: 0.3 mm (0.012 in)



2. If the clearance exceeds the service limit, measure the thickness of 3rd gear.

Standard: 36.92-35.97 mm (1.4142-1.4161 in) Service Limit: 35.80 mm 11.4094 in)



If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.

If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

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3. Measure the clearance between 4th gear and the spacer collar.

Standard: 0.06-0.21 mm (0.0024-0.0083 in) Service Limit: 0.3 mm (0.012 in)



4. If the clearance exceeds the service limit, measure distance (A) on the spacer collar.





 If distance (A) is more than the service limit, replace the spacer collar with a new one.
If distance (A) is within the service limit, measure the thickness of 4th gear.





If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one. If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.



BALL BEARING

BALL BEARING

Disassembly -

CAUTION: Remove the synchro hubs using a press and Measure the clearance between the spacer collar 6. steel blocks as shown. Use of a jaw-type puller can and 5th gear. damage the gear teeth. Standard: 0.06-0.21 mm Remove the ball bearing using a bearing puller as (0.0024-0.0083 in) 1. Service Limit: 0.3 mm (0.012 in) shown. Clutch housing side: 4th GEAR **5th GEAR** 7. If the clearance exceeds the service limit, measure distance B on the spacer collar. Standard: 28.53-28.58 mm (1.1252-1.1272 in) Service Limit: 28.51 mm (1.1224 in) Transmission housing side: 5th GEAR -B SIDE 8. If distance (\widehat{B}) is more than service limit, replace the spacer collar with a new one. If distance (B) is within the service limit, measure thickness of 5th gear. Standard: 34.92-34.97 mm (1.3748-1.3768 in) Service Limit: 34.80 mm (1.3700 in) If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one. If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

(cont'd)



Mainshaft Assembly

T Disassembly (cont'd) -

2. Support 5th gear on steel blocks as shown and press the shaft out of the 5th synchro hub.



3. In the same manner as above, support the 3rd gear on steel blocks and press the shaft out of the 3rd/4th synchro hub.



Inspection

1. Inspect the gear surface and bearing surface for wear or damage, then measure the mainshaft at points A, B and C.

Standard:			
A (Ball bearing surface): 32.002-32.018 mm			
(1.2599–1.2605 in)			
B (Needle bearing surface): 42.984-43.000 mm			
(1.6923–1.6929 in)			
C (Ball bearing surface): 30.984-31 .000 mm			
(1.2198–1.2205 in)			
Service limit:			
A:31.95 mm (1.2579 in)			
B:42.93 mm (1.6902 in)			
C:30.93 mm (1.2177 in)			



If any part of the mainshaft is less than the service limit, replace it with a new one.

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2. Inspect for runout.

Standard: 0.02 mm (0.0008 in.) min. Service Limit: 0.05 mm (0.0020 in.)

NOTE: Support the mainshaft at both ends as shown.

Rotate two complate revolutions.

If the runout exceeds the service limit, replace the mainshaft with a new one.

Reassembly

CAUTION:

- Press the 3rd/4th and 5th synchro hubs on the mainshaft without lubrication.
- When installing the 3rd/4th and 5th synchro hubs, support the shaft on steel blocks and install the synchro hubs using a press.
- install the 3rd/4th and 5th synchro hubs with a maximum pressure of 1.000 kg, and press the 3rd/4th and 5th synchro hubs with a pressure of 2.000 kg.
- The clutch housing ball bearing is installed when it's time to check the mainshaft clearances.
- 1. Support 2nd gear on steel blocks as shown, then install the 3rd/4th synchro hub using a press.



Mainshaft Assembly



13-28

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2



NOTE: The 3rd, 4th and 5th gears are installed with a press.

Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces ^{3.} The Зrd, 4th and 5th gears, should be installedِdَشithout lubrication using a press.



Countershaft Assembly

- Clearance Inspection ----

- 1. Measure the clearance between 2nd and 3rd gear. Standard: 0.04-0.10 mm (0.0016-0.0039 in.1
- 3. Measure the clearance between 1st and reverse gear.

Standard: 0.04-0.10 mm (0.0016-0.0039 in)



2. If the clearance exceeds the standard, select the appropriate spacer collar for the correct clearance from the chart below.

	PART NUMBER	THICKNESS
Α	23912-PR8-000	33.003_3.005 mm (1.2993-1.3012 in)
В	23913- PR8 -000	32.998-33.000 mm ´ (1.2991–1.2992 in)



4. If the clearance exceeds the standard, select the appropriate thrust washer for the correct clearance from the chart below.

	PART NUMBER	THICKNESS
Α	23921 PR8-000	1.42-1.44 mm (0.0559-0.0567 in)
В	23922-PR8-000	1.45 – 1.47 mm (0.0571-0.0579 in)
С	23923-PR8-000	1.48-1.50 mm (0.0583-0.0591 in)
D	23924-PR8-000	1.51–1.53 mm (0.0594–0.0602 in)
E	23925-PR8-000	1.54–1.56 mm (0.0606–0.0614 in)



-Disassembly -

CAUTION: Remove the gears using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

1. Raise the locknut tab from the groove of the shaft and remove the locknut and the spring washer.

NOTE: Locknut has left-hand threads.



2. Remove the ball bearing using a bearing puller as shown.

3. Remove the outer bearing race of the needle bearing, then remove the needle bearing using a bearing puller as shown.



4. Support 4th gear on steel blocks as shown and press the shaft out of 5th and 4th gears.





Countershaft Assembly





-Reassembly -

CAUTION:

- Press the 3rd, 4th and 5th gears on the countershaft without lubrication.
- When installing the 3rd. 4th and 5th gears, support the shaft on steel blocks and install the gears using a press.
- Install the 3rd, 4th and 5th gears with a maximum pressure of 1,000 kg, and press the 3rd. 4th and 5th gears with a pressure of 2,600 kg.
- 1. Support the countershaft on a steel block as shown and install 3rd gear using a press.



2. Install 4th gear using a press as shown.



3. Install 5th gear using a press as shown.



4. Install the needle bearing using a press as showr then install the bearing outer race.



(cont'c

Countershaft Assembly





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Synchro Sleeve, Synchro Hub

--Inspection -

- 1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, which indicates wear.
- 2. Install each hub in its mating sleeve and check for freedom of movement.

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.



HUB

--Installation

Each synchro sleeve has three sets of longer teeth (1 20 degrees apart) that must be matched with the three sets of deeper grooves in the hub when assembled.

NOTE: Installing the synchro sleeve with its longer teeth in the 1 st/2nd synchro hub slots will damage the spring ring.



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North North

Oil Pump

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Disassembly/Reassembly



Oil Pump

Clearance Inspection

1. Check the clearance between the transmission mating surface of the clutch housing and the oil pump gear.

Standard: 0.3-0.8 mm (0.012-0.032 in.) Service Limit: 0.9 mm (0.035 in.)



2. Check the axial clearance on the pump rotor.

Clutch Housing-to-Rotor Axial clearance Standard: 0.03-0.1 mm (0.0012-0.0039 in) Service Limit: 0.15 mm (0.0059 in)



3. Check the radial clearance on the pump rotor.

Inner Rotor-to-Outer Rotor Radial clearance Standard: 0.14 mm (0.0055 in) Service Limit: 0.2 mm (0.008 in)



4. Check the radial clearance between the clutch housing and the outer rotor.

Clutch housing-to-Rotor Radial Clearance Standard: 0.1-0.2 mm (0.0039-0.0079 in) Service Limit: 0.22 mm (0.0087 in)



Countershaft Bearing (Clutch Housing)





3. Position the oil guide plate and new needle bearing in the bore of the clutch housing.

NOTE: Position the needle bearing with the oil hole facing up.

4. Drive the needle bearing in using the special tools.





5. Install the bearing retaining plate and stake the bolt heads in the groove in the bearing retaining plate?!

12 N·m (1.2 kg-m, 8.7 lb-ft)



BEARING RETAINING PLATE

Mainshaft Oil Seal (Clutch Housing)

_I-Replacement —

1. Remove the release bearing guide.



2. Remove the oil seal.



OIL SEAL Replace. 3. Drive in a new oil seal from the transmission side using the special tools.





4. Install the release bearing guide.



Mainshaft Thrust Shim



-Adjustment -

- 1. Remove the thrust shim and oil guide plate from the transmission housing.
- 2. Install the mainshaft in the transmission housing.

NOTE: Do not install the clutch housing side ball bearing.

3. Measure distance (A) between the end of the transmission housing and mainshaft.

NOTE:

- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.



4. Set the mainshaft ball bearing in the clutch housing, and measure distance (B) or (C) between the surfaces of the clutch housing and the bearing inner race.

NOTE:

- Use a straight edge and feeler gauge.
- Measure at three locations and average the readings.
- Do not install the spring washer.



5. Select the proper shim on the basis of the following calculations.

NOTE: Do not use more than one shim.

(Basic Formula)

(A) + (B) = 0.99 mm = shim thickness (max.) (A) + (B) = 1.06 mm = shim thickness (min.)

 $\mathbf{A} = \mathbf{C} - 0.99 \text{ mm} = \text{shim thickness (max.)}$

 $\check{\mathbf{A}}$ = $\check{\mathbf{C}}$ - 1.06 mm = shim thickness (min.)

	PART NUMBER	THICKNESS
Α	23931-PR8-000	0.50 mm (0.0197 in)
в	23932-PR8-000	0.55 mm (0.0217 in)
С	23933-PR8-000	0.60 mm (0.0236 in)
D	23934-PR8-000	0.65 mm (0.0256 in)
Е	23935-PR8-000	0.70 mm (0.0276 in)
F	23936-PR8-000	0.75 mm (0.0295 in)
G	23937-PR8-000	0.80 mm (0.0315 in)
н	23938-PR8-000	0.85 mm (0.0335 in)
1	23939-PR8-000	0.90 mm (0.0354 in)
J	23940-PR8-000	0.95 mm (0.0374 in)
К	23941-PR8-000	1.00 mm (0.0394 in)
L	23942-PR8-000	1.05 mm (0.0413 in)
М	23943-PR8-000	1.10 mm (0.0433 in)
Ν	23944-PR8-000	1.15 mm (0.0453 in)

(cont'd)

Mainshaft Thrust Shim

-Adjustment (cont'd) -

NOTE: Clean all the parts thoroughly before installation

6. Install the oil guide plate and thrust shim into the transmission housing.



7. Install the ball bearing onto the mainshaft, then install the spring washer and mainshaft assembly into the clutch housing.



8. Install the transmission housing.

Housing Mount Bolts: 45 N·m (4.5 kg-m, 33 lb-ftl

9. Check the thrust clearance in the manner described below.

NOTE: Carry out the measurement at normal room temperature.

a. Slide the mainshaft base over the mainshaft.

- b. Attach the mainshaft holder to the mainshaft as follows:
 - Back-out the mainshaft holder bolt and loosen the two hex bolts.
 - Fit the holder over the mainshaft so its lip is towards the transmission.
 - Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



- c. Seat the mainshaft fully by tapping its end with a plastic hammer.
- d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.
- e. Zero a dial gauge on the end of the mainshaft.



f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the 'dial gauge is the amount of mainshaft end play.

CAUTION: Turning the shaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

g. Clearance is correct if reading is between 0.14-0.21 mm (0.0055-0.0083 in).
If not, recheck shim thickness, as necessary.

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Transmission



-Reassembly







2. Install the shift detent spring and spring set plate.



3. Install the oil seal, select arm and select lever in the clutch housing.



4. Install the (differential assembly in the clutch housing.



(cont'd)

Transmission

- Reassenbly (cont'd)

5. Install the spring washer, then insert the mainshaft and countershaft into the shift forks and install them as an assembly.

NOTE: Tape the mainshaft spline, before installation.



6. install the change holder assembly in the clutch housing.

NOTE: Plate the interlocker finger in the groove of the select arm.



7. Lift the mainshaft assembly, then install the reverse idle gear shaft assembly with the spring pin matching the groove of the clutch housing.



8. Shift the reverse shift fork to the driven gear side. Lift the mainshaft assembly and reverse idle gear shaft assembly, then install the reverse shift fork assembly.



late: +



9. Install the reverse shift arm.



10. Apply liquid gasket to the transmission mating surface of the clutch housing.

NOTE: This transmission uses no gasket between the major housings; use Honda Genuine liquid gasket (P/N OY740-99986). Assemble the housing within 20 minutes after applying the liquid gasket and allow it to cure at least 30 minutes after assembly before filling it with oil.



12. Place the transmission housing over the clutch housing, being careful to line up the shafts.

NOTE: Make sure the 3rd/4th shift fork shaft collar mates with the 3rd/4th shift fork shaft.

3RD/4TH SHIFT FORK SHAFT COLLAR









(cont'dl

10 miles

Transmission

- Reassembly (cont'd) -

b. Lower the transmission housing, then place the shift arm in the groove of the shift piece by turning the shift lever.



c. Check the operation of the shift lever.



13. Lower the transmission housing with the snap ring expanded and set the snap ring in the groove of the countershaft bearing.



14. Check that the snap ring is securely seated in the groove of the countershaft bearing.

Dimension A as installed: 1.60-8.15 mm (0.0630-0.3209 in)





15. Tighten the transmission housing attaching bolts in the numbered sequence shown below.

Torque: 45 N·m (4.5 kg-m, 33 lb-ft)



16. install the 36 mm sealing bolt.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740-99986) to the flange.

17. Install the steel balls, spring and sealing bolts.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740-99986) to the threads, but don't plug the hole with liquid gasket.

18. Install the upper cover.



19. Install the back-up light switch and neutral switch.

NOTE: Apply Honda Genuine liquid gasket (P/N 0Y740-99986) to the threads.

20. Install the speed sensor.



Transmission Assembly

Installation -

GREASE NOTE: Check that the two dowel pins are installed in the clutch housing. 1. Place the transmission on the transmission jack, and raise it to the engine level. 2. Set the release fork to the clutch housing. (See page, 13-9) 3. Install the 2 transmission housing mounting bolts and engine stiffener. 4. Install the 3 rear transmission mounting bolts. 5. Loosen the front engine mounting bolt, then install the 2 front engine mounting bolts to the transmission side. 6. Remove the transmission jack. TRANSMISSION HOUSING 7. Install the clutch housing cover. MOUNTING BOLTS **DOWEL PINS** 12 x 1.25 mm 65 N-m 16.5 kg-m, 47 lb-ft) ☆ FRONT ENGINE MOUNTING BOLT 10 x 1.25 mm 60 N•m (6.5 kg-m, 43 lb-ft) 8x 1.25 mm 22 N•m (2.2 kg-m, 16 lb-ft) 6x I.Omm 12 N·m (1.2 kg-m, 9 (b-ft) ☆ REAR TRANSMISSION' TRANSMISSIÓN MOUNTING BOLTS JACK 12 x 1.25 mm ☆10 x 1.25 mm 105 N·m 45 N•m (4.5 kg-m, 33 lb-ft) (10.5 kg-m, 76 lb-ft) TRANSMISSION HOUSING MOUNTING BOLT 12x 1.25 mm 65 N·m (6.5 kg-m, 47 lb-ft) 8. Install the slave cylinder. 9. Install the shift cable and select cable. CAUTION: Take care not to bend the cables. 10. Install the upper cover, change wire bracket and lower cover., 1 1. Install the upper control arm mounting bolt. 8 × 1.25 mm 22 N·m (2.2 kg-m, 16 lb-ft) COTTER PIN Replace. 1.0 mm 6 x 12 N·m (1.2 kg-m. lb-ft) 9 ☆ UPPER CONTROL ARM MOUNTING BOLT 10 x 1.25 mm 60 N·m (6.0 kg-m, 43 lb-ft) 6x 1.0 mm **☆8 x 1.25 mm** 26 N·m (2.6 kg-m, 19 lb-ft) 12 N·m (1.2 kg-m, 9 lb-ft)

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12. Install a new set ring on the end of the left driveshaft and intermediate shaft.

- 13. Install the left driveshaft.
- 14. Install the lower arm to the side beam.

CAUTION: Align the reference marks on the adjusting bolt, adjusting cam and lower control arm.

- 15. Install the damper fork bolt.
- 16. Install the ball joint nut to the toe control arm at the knuckle.

CAUTION: Make sure that the arrow marks on the toe control arm are aligned.

17. Install the ALB sensor wire clamp and parking brake cable holder.



- 18. Install the intermediate shaft and tighten the intermediate shaft mounting bolts to the intermediate shaft support base.
- 19. Install the intermediate shaft heat cover.



Transmission Assembly

Installation (cont'd)

20. Install the right driveshaft onto the intermediate shaft.

- 21. Install the castle nut on the lower control arm at the knuckle.
- 22. Install the damper fork bolt.
- 23. Install the castle nut on the toe control arm at the knuckle.

CAUTION: Make sure that the arrow marks on the toe control arm are aligned.

24. Install the Anti-lock brake sensor wire clamp and parking brake cable holder.





- 28. Install the transmission mount and 2 transmission housing mounting bolts.
- 29. Install the starter motor and connect the starter motor cables.
- 30. Install the transmission ground cable and jumper connector, and connect the back-up light switch, neutral switch and speed sensor connectors.
- 31. Install the control box and connect the control box connectors.
- 32. Install the air cleaner case.
- 33. Install the strut bar.
- 34. Refill the transmission with oil.
- 35. Connect the battery positive (+) and negative (-) cables to the battery.
- 36. Inspect the rear camber (See Section 18).
- 37. Check the clutch operation.
- 38. Shift the transmission and check for smooth operation.





Automatic Transmission

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NS-X includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special caution and tools and should therefore be done by an anthorized Acura dealer.

A WARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

- Special Tools				
Ref. No.	Tool Number	Description	Q'ty	Page Reference
1 0034601 6 0896	07HAC-PK4010A 07GAE-PG40200 07HAE-PL50100 07LAE-PX40100 07LAJ-PT3010A 07406-0020003 07406-0020201 07406-0070000 07736-A01000A* 07746-0010500	Housing Puller Clutch Spring Compressor Bolt Assembly Clutch Spring Compressor Attachment Clutch Spring Compressor Attachment ECU Test Harness A/T Oil Pressure Gauge Set A/T Oil Pressure Gauge A/T Low Pressure Gauge Adjustable Bearing Puller, 25-40 mm Attachment, 62 x 68 mm Attachment, 62 x 75 mm	1 1 1 1 1 1 1 (1) 1 1 1 1	14-107 14-131, 134 14-131, 134 14-131, 134 14-51 14-90 14-90 14-90 14-139 14-138 14-138
000	07749-0010000 07924-PJ40000 07947-6340500	Driver Mainshaft Holder Attachment	1	14-137, 138, 139 14-137, 138, 139 14-106, 146 14-138

* (8) must be used with commercially available 3/B x 16 thread Slide Hammer.



14-2



The automatic transmission is a combination of a 3-element torque converter and a triple-shaft electronically controlled automatic transmission which provides 4 speeds forward and 1 in reverse. The entire unit is positioned in line with the engine.

TORQUE CONVERTER, GEARS AND CLUTCHES

The torque converter consists of a pump, turbine and stator, assembled in a single unit.

They are connected to the engine crankshaft so they turn together as a unit as the engine turns.

Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft. The transmission has three parallel shafts, the mainshaft, the countershaft, and the secondary shaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the clutches for lst, and 4th, and gears for 3rd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).

The countershaft includes the clutches for Ist-Hold and 3rd, and gears for 2nd, 3rd, 4th, Reverse and 1st.

The secondary shaft includes the 2nd clutch and gears for 2nd and 3rd.

The 4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.

The gears on the mainshaft and secondary shaft are in constant mesh with those on the countershaft.

When certain combinations of gears in the transmission are engaged by clutches, power is transmitted from the mainshaft to the countershaft to provide 1, 2, 3, and D.

ELECTRONIC CONTROL

The electronic control system consists of an automatic transmission control unit, sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions. The A/T control unit is located on the insulator center bulkhead, behind the driver's seat.

HYDRAULIC CONTROL

The valve assembly includes the main valve body, secondary valve body, servo valve body, regulator valve body, lock-up valve body and the 2nd accumulator body.

They are bolted to the torque converter case as an assembly.

The main valve body contains the manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, relief valve, one-way relief valve and oil pump gears.

The secondary valve body contains the 3-2 kick-down valve, CPC (clutch pressure control) valve, 2nd orifice control valve, 3rd orifice control valve, modulator valve, 4th exhaust valve, servo control valve, 2nd exhaust valve and 4-3 kick-down valve.

The servo valve body contains the accumulator pistons and servo valve. The throttle valve body includes the throttle B valve which is bolted onto the servo valve body.

The regulator valve body contains the pressure regulator valve, lock-up control valve and cooler refief valve. Fluid from the regulator passes through the manual valve to the various control valves.

The lock-up valve body contains the lock-up timing B valve and lock-up shift valve. The 2nd accumulator body contains the accumulator pistons and LSD relief valve.

The torque converter check valve is located in the torque converter housing, under the main valve body.

The lst, lst-Hold, 3rd and 4th clutches receive oil from their respective feed pipes.

SHIFT CONTROL MECHANISM

Input from various sensors located throughout the car determines which shift control solenoid valve the A/T control unit will activate. Activating a shift control solenoid valve changes modulator pressure, causing a shift valve to move. This pressurizes a line to one of the clutches, engaging that clutch and its corresponding gear.

LOCK-UP MECHANISM

In 3 or D positon in 2nd, 3rd and 4th. pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held, against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, an electronic control unit optimizes the timing of the lock-up mechaism.

The lock-up valves control the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. When lock-up control solenoid valves A and B activate, modulator pressure changes. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the A/T control unit.

(cont'd)

Description

GEAR SELECTION The selector lever has seven positions: gear, 2nd gear and 1st gear.			
1	Position	Description	
		Rear wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.	
	R REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.	
	NEUTRAL	All clutches released.	
	_C D _I DRIVE	General driving; starts in low speed, shifts automatically, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop.	

The lock-up mechanism comes into operation in 2nd, 3rd and 4th.

Driving in 3rd gear; stays in 3rd gear, does not shift up and down. For climbing or downhill and light engine braking on high speed condition.

Driving in 2nd gear; stays in 2nd gear, does not shift up and down.

Driving in 1st gear, stays in 1st gear, does not shift up and down.

and N position through use of a slide-type, neutral-safety switch.

For engine braking or better traction starting off on loose or slippery surface.

POSITION INDICATOR

Starting is possible only in

A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.

For engine braking.

ATF COOLER

_c3₁ THIRD

1 FIRST

c² | SECOND

With this mid-engine type car, the radiator is mounted at the front of the car, so the ATF cooler is installed directly on the transmission housing.





Description

- Clutches (cont'd)

The Acura four speed automatic transmission uses hydraulically actuated clutches to engage or disengage the transmission gears. When clutch pressure is introduced into the clutch drum, the clutch piston is applied. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear.

Likewise, when clutch pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each other while disengaged. This allows the gear to spin independently of its shaft, transmitting no power.

[I st Clutch1

The first clutch engages/disengages first gear, and is located at the end of the mainshaft, just behind the end cover. The first clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[I st-Hold Clutch]

The first hold clutch engages/disengages low hold or 1 position, and is located at the end of the countershaft, just behind the end cover. The 1st hold clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

[2nd Clutch1

The second clutch engages/disengages second gear, and is located on the secondary shaft. The second clutch is supplied clutch pressure through the secondary shaft by a circuit connected to the 2nd accumulator body.

[3rd Clutch1

The third clutch engages/disengages third gear, and is located at the end of the countershaft, opposite the end cover The third clutch is supplied clutch pressure by its oil feed pipe within the countershaft.

[4th Clutch]

The fourth clutch engages/disengages fourth gear, as well as reverse gear, and is located at the center of the mainshaft. The fourth clutch is supplied clutch pressure by its oil feed pipe within the mainshaft.

[One-way Clutch1

The one-way clutch is positioned between the parking gear and first gear, with the parking gear splined to the countershaft. The first gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft first gear to the countershaft first gear.

The first clutch and gears remain engaged in the 1 st, 2nd, 3rd, and 4th gear ranges in the position. However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the D position. This is because the increased rotational speed of the gears on the countershaft over-ride the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch freewheels with the first clutch still engaged.



PARKING GEAR





Description

- Clutches (cont'd) -

Lock-up Clutch

1 . Operation (clutch on)

With the lock-up clutch on, the oil in the chamber between the converter cover and lock-up piston is discharged, and the converter oil exerts pressure through the piston against the converter cover. As a result, the converter turbine is locked on the converter cover firmly. The effect is to bypass the converter, thereby placing the car in direct drive.

Power flow



2. Operation (clutch off)

With the lock-up clutch off, the oil flows in the reverse of CLUTCH ON. As a result, the lock-up piston is moved away from the converter cover; that is, the torque converter lock-up is released.

Power flow

Engine

1

Drive plate

Torque converter cover

↓ Pump

Ţ

Turbine

Mainshaft




- Power Flow

RA	PART	TORQUE CON-	1ST GEAR 1ST HOLD	1ST GEAR 1ST CLUTCH	1ST GEAR ONE-WAY	2ND GEAR 2ND	3RD GEAR 3RD	4: GEAR	th CLUTCH	REVERSE GEAR	PARKING GEAR
	P	0	x	×	×	x	x	×	×	×	0
	R	0	×	×	×	×	×	×	0	0	×
	N	0	×	×	×	×	×	×	×	×	×
	1ST	0	×	0	0	×	×	×	×	×	×
D	2ND	0	×	0*	×	0	×	×	×	×	×
	3RD	0	×	0*	×	×	0	×	×	×	×
	4TH	0	×	0*	×	×	×	0	0	×	×
	3	0	×	0*	×	×	0	×	×	×	×
	2	0	×	0*	×	0	×	×	×	×	× ,
L	1	0	0	0	×	×	×	×	×	×	× -
MAINSHAFT REVERSE GEAR MAINSHAFT IST GEAR 1ST CLUTCH 1ST HOLD CLUTCH MAINSHAFT IST GEAR MAINSHAFT SHO GEAR MAINSHAFT SHO GEAR MAINSHAFT SHO GEAR											
CDNTERSHAFT 4TH GEAR 2ND CLUTCH SECONDARY SHAFT 2ND GEAR SECONDARY SHAFT 3RD GEAR											

FINAL DRIVEN GEAR

Power Flow (cont'd)

1 Position

At 1 position, hydraulic pressure is applied to the 1st clutch and to the 1st hold clutch.

The power flow when accelerating is as follows;

- 1. Hydraulic pressure is applied to the 1 st clutch on the mainshaft and power is transmitted via the 1 st clutch to the mainshaft 1st gear.
- 2. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch on the inside of the countershaft 1st gear. The one-way clutch is used to drive the countershaft.
- 3. Power is transmitted to the final drive gear and drives the final driven gear. Hydraulic pressure is applied to the 1st hold clutch but the countershaft is rotated by the one-way clutch.

The power flow when decelerating is as follows;

- 1. Rolling resistance from the road surface through the rear wheels to the final drive gear, then to the countershaft 1st gear via the lst-hold clutch which is applied during deceleration.
- 2. The one-way clutch becomes free at this time because of the countershaft rotates in reverse at the time of accelerating.
- 3. The counterforce conveyed to the countershaft 1st gear turns the mainshaft 1st gear. At this time, since hydraulic pressure is also applied to the 1 st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st speed gear.





- **2** Position is provided to drive only in 2nd speed.
- 1. Power from the mainshaft 3rd gear drives the countershaft 3rd gear. Since at this time there is no hydraulic pressure to the 3rd clutch. The countershaft 3rd gear turns freely and drives the secondary shaft 3rd gear.
- 2. The power is also transmitted to the secondary shaft 2nd gear because hydraulic pressure is applied to 2nd clutch.
- 3. The secondary shaft 2nd gear drives the countershaft 2nd gear. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE:

- At 2 position, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of the 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.
- Power flow in D position, 2nd speed is the same as 2 position.







In D position, the optimum gear is automatically selected from the gear ratios of 1 st, 2nd, 3rd and 4th speeds, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

- D Position, 1st speed
- 1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
- 2. Power is transmitted to the countershaft 1st gear, and drives the countershaft via the one-way clutch.
- 3. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE: In the D position, hydraulic pressure is not applied to the lst-hold clutch.



Power Flow (cont'd)

- D Position, 4th speed
- 1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
- 2. Power is transmitted through countershaft 4th gear to the countershaft.
- 3. Power is transmitted to the final drive gear and drives the final driven gear.

NOTE: At D position, 4th speed, hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of '1st gear, power from 1st gear is cut off at the one-way clutch.





Electronic Control System

Electronic Control System

The electronic control system consists of the A/T control unit, sensors, a linear solenoid and 4 solenoid valves. Shifting and lock-up are electronically controlled for comfortable driving under all conditions.

The A/T control unit is located on the insulator center bulkhead, behind the driver's seat.

Shift control

Shifting is related to engine torque through the linear solenoid used to operate throttle valve B which is controlled by the A/T control unit the control throttle pressure.

Getting a signal from each sensor, the A/T control unit detects the appropriate gear shifting and activates shift control solenoid valves A and/or B.

The combination of driving signals to shift control solenoid valves A and B is shown in the table below.

Shift control sol. valve Range (gear)	А	В
D (1st)	OFF	ON
(2nd)	ON	OFF
🔲 🔲 (3rd),🔲 (1st)	ON	OFF
(4th), (2nd)	OFF	OFF

Lock-up control

From sensor input signals, the A/T control unit detects whether to turn the lock-up ON or OFF and activates lock-up control solenoid valve A and/or B accordingly.

The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

Solenoid valv	e ,	в
Lock-up condition	×	נ
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	OFF
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up	ON	Duty operation
during deceleration	U N	off ↔0N

L

- Electronic Control System (cont'd)



14-16



Circuit Diagram and Terminal Location



- Hydraulic Control

The valve bodies include the main valve body, regulator valve body, lock-up valve body, secondary valve body, servo body, throttle valve body and 2nd accumulator body.

The oil pump is driven by splines on the left end of the torque converter which is attached to the engine. Oil flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, and the servo body, directing pressure to each of the clutches.



14-18



<image>

Throttle Valve B, Linear Solenoid

Throttle valve B converts changes in the throttle opening to changes in transmission hydraulic pressure, to determine transmission shift quality and lock-up operation. Throttle valve B also operates on accumulator back pressure, to make smooth changes from one gear to another.

The end of the valve contacts the linear solenoid which is controlled by the A/T control unit.

The throttle pedal load has been reduced by eliminating the cable.







Regulator Valve

The regulator valve maintains a constant hydraulic pressure sent from the oil pump to the hydraulic control system, while also furnishing oil to the lubricating system and torque converter.

Oil flows through B and B'. The oil which enters through B flows through the valve orifice to A pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the oil through B' from D thus changes. This operation is continued, thus maintaining the line pressure.

(ENGINE NOT RUNNING)

(ENGINE RUNNING)



To TORQUE CONVERTER

To RELIEF VALVE

Stator Reaction Hydraulic Pressure Control

Hydraulic pressure increase according to torque is performed by the regulator valve using stator torque reaction. The stator shaft is splined in the stator and its arm end contacts the regulator spring cap. When the car is accelerating or climbing (Torque Converter Range), stator torque reaction acts on the stator shaft and the stator arm pushes the regulator spring cap in this \rightarrow direction in proportion to the reaction. The spring compresses and the valve moves to increase the regulated control pressure or line pressure. Line pressure is maximum when the stator reaction is maximum.



- Hydraulic Control (cont'd)

Main Valve Body

The main valve body is located on the torque converter housing. The oil pump gear, torque converter check valve, manual valve, 1-2, 2-3, 3-4 shift valves, relief valve and one-way relief valve are all built into the main valve body. The primary function of this valve body is switching on and off oil passages and controlling the hydraulic pressure going to the hydraulic control system.





Oil Pump

The external tooth gear type oil pump consists of a housing together with the main valve body, a pump drive gear, a pump driven gear, and a pump shaft. The oil pump is installed on the torque converter housing. The pump's driving force is transmitted by the torque converter pump (directly connected to the engine) to the pump shaft. The gears are provided in the housing. The intake and exhaust lines and the torque converter line are provided in the housing.

One way Relief Valve

The one-way relief valve is used at times of high speed or high temperature to send relief oil to the oil cooler so that cooling of ATF will be effective.



Hydraulic Control (cont'd)

Secondary Valve Body

The secondary valve body is also mounted on the main valve body with the 3-2 kick down valve, CPC valve, 2nd orifice control valve, 3rd orifice control valve, modulator valve, 4th exhaust valve, 2nd exhaust valve, servo control valve and 4-3 kick down valve built in.

Primarily, it regulates shift valve operation timing and clutch pressure for shock reduction during shifting.



14-24



Modulator Valve

The modulator valve maintains line pressure from the regulator which is supplied to shift control solenoid valves A/B and lock-up control solenoid valves A/B, thus maintaining accurate shift and lock-up characteristics.



2nd Orifice Control Valve

For smooth shifting between the 2nd and 3rd gear, the open pressure on the 2nd gear side is relieved through a fixed orifice. The valve also moves to equalize pressure differences between the 2nd and 3rd gear.

2nd Exhaust Valve

The 2nd exhaust valve is installed to release 2nd clutch pressure quickly when shifting from the range at which hydraulic pressure is applied to the 2nd clutch to the N position.



Hydraulic Control (cont'd)

Servo Valve Body/2nd Accumulator Body

The servo valve body is mounted on the secondary valve body with the servo valve, 1 st accumulator piston, 3rd accumulator piston and 4th accumulator piston built in. The primary function of the servo valve body is forward and reverse switching and control.

The 2nd accumulator body is mounted on the torque converter housing with the 1 st-hold accumulator, 2nd accumulator and LSD relief valve built in.



LSD Relief Valve

When the resistance of oil flow inside the LSD becomes large, the LSD relief valve is opened, and oil is sent to the oil cooler and cooled.



14-26



Lock-up Valve Body

The lock-up valve body is mounted on the regulator valve body with the lock-up shift valve and lock-up timing B valve built in.

The capacity of the lock-up clutch is controlled by the lock-up valve body.



- Hydraulic Elow					
General of Hydraulic Pressure					
Oil Pump → Regulator V	alve → Line Pressure Torque Converter Pressure Lubrication Pressure				
Distribution of Hydrualic Pressure					
Manual Valve	→ to select Line Pressure				
• Throttle Valve B	→ Throttle B Pressure				
 I-2 Shift Valve 2-3 Shift Valve 3-4 Shift Valve 	→ Clutch Pressure				
● Line Pressure	→ { Servo Valve → { Throttle Valve				

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE		DESCRIPTION OF PRESSURE	
1	LINE		1ST CLUTCH	90	TORQUE CONVERTER	
2	LINE		1ST-HOLD CLUTCH	91	TORQUE CONVERTER	
3	LINE		1ST-HOLD CLUTCH	92	TORQUE CONVERTER	
3′	LINE		LINE	93	OIL COOLER	
3′′	LINE		2ND CLUTCH	94	TORQUE CONVERTER	
4	LINE	21	2ND CLUTCH	95	LUBRICATION	
4'	CLUTCH PRESSURE CONTROL	25	LINE	96	TORQUE CONVERTER	
5	CLUTCH PRESSURE CONTROL	30	3RD CLUTCH	97	TORQUE CONVERTER	
6	MODULATOR	31	3RD CLUTCH	99	SUCTION	
6A	MODULATOR (SHIFT SOL. V A)	40	4TH CLUTCH	X	BLEED	
6B	MODULATOR (SHIFT SOL. V B)	41	4TH CLUTCH			
6C	MODULATOR (L/C SOL. V A)		THROTTLE B			
6D	MODULATOR (L/C SOL. V B)		THROTTLE B			
9	LINE	57	THROTTLE B			

.



N position

As the engine turns, the oil pump also starts to operate. Automatic transmission fluid is drawn from (99) and discharged into (1). Then, ATF pressure is controlled by the regulator valve and becomes line pressure (1). The torque converter inlet pressure (1) enters (94) of torque converter through the orifice and discharges into (90). The torque converter check valve prevents the torque converter pressure from falling. Under this condition, the hydraulic pressure is not applied to the clutches.



- Hydraulic Flow (cont'd)

1 Position

The line pressure (1) becomes the line pressure (4), (18), (25) as it passes through the manual valve. Also, the line pressure (1) goes to the modulator valve through the filter and becomes the modulator pressure (6). The modulator pressure (6) is supplied to the I-2 shift valve and 2-3 shift valve.

The t-2 shift and 2-3 shift values are moved to the left side because the shift control solenoid value A is turned ON and B is OFF by the A/T control unit.

The line pressure (18) is supplied to the 3-4 shift valve, and it is moved to the left side. The line pressure (4) is the 1 st clutch pressure (IO), then the 1st clutch is engaged.

The line pressure (4) becomes the lst-hold clutch pressure (16) via the 1-2 shift valve, 2-3 shift valve, 3-4 shift valve and manual valve, then the lst-hold clutch is engaged.

NOTE: When used, "left" or "right" indicates direction on the flow chart.





2 Position

The line pressure (1) becomes the line pressure (4), (25) as it passes through the manual valve.

The line pressure (1) goes to the modulator valve and becomes the modulator pressure (6). The modulator pressure (6) is supplied to the I-2 shift valve and 3-4 shift valve. The I-2 shift and 3-4 shift valves are moved to the left side end the 2-3 shift valve is moved to the right side because the shift control solenoid valve A and B are turned OFF by the A/T control unit.

The line pressure (4) goes through the line (20) to the 2nd clutch, then the 2nd clutch is engaged.

The line pressure (4) also flows to the throttle valve and the line pressure (1) flows to the 1st clutch. However no power is transmitted by means of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



Hydraulic Flow (cont'd)

3 Position

Ĩ

The line pressure (1) becomes the modulator pressure (6) as it passes the modulator valve.

Also, the modulator pressure (6) is supplied to the 1-2 shift valve and 2-3 shift valve, and they are moved to the left side because the shift control solenoid A is turned ON and B is OFF by the A/T control unit.

The line pressure (4) becomes the clutch pressure control (5) and the 3rd clutch pressure (31).

Then it goes to the 3rd clutch. The 3rd clutch is engaged.

The line pressure (4) also flows to the throttle valve and line pressure (1) flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in 2nd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.





D Position

1. 1st speed

The flow of fluid through the torque converter is the same as in N position.

The line pressure (1) becomes the line pressure (4) and it becomes the 1st clutch pressure (IO).

The 1 st clutch pressure is applied to the 1 st clutch and 1 st accumulator, consequently the vehicle will move as the engine power is transmitted.

The line pressure (1) becomes the modulator pressure (6) by the modulator valve and travels to each shift valve. The 1-2 shift valve is moved to the right side because the shift control solenoid valve A is turned OFF and B is ON by the A/T control unit.

The line pressure (1) also flows to the throttle valve.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



- Hydraulic Flow (cont'd)

2. 2nd speed

The flow of fluid up to the 1-2 and 2-3 shift valves is the, same as in the 1st speed range. As the speed of the car reaches the prescribed value, the solenoid valve A is turned ON by means of the A/T control unit, As a result, the 1-2 shift valve is moved to the left side and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged. Fluid flows by way of:

-Line Pressure (4) \rightarrow CPC Valve – Clutch Control Pressure (4') \rightarrow I-2 Shift Valve Clutch Pressure Control (5) \rightarrow 2-3 Shift Valve – 2nd Clutch Pressure (21) \rightarrow Orifice – 2nd Clutch Pressure (20) \rightarrow 2nd Clutch The hydraulic pressure also flows to the 1 st clutch. However no power is transmitted by means of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the flow chart.





3. 3rd Speed

The flow of fluid up to the I-2, 2-3 and 3-4 shift valves is the same as in the 2nd speed. As the speed of the car reaches the prescribed value, the shift control solenoid valve B is turned OFF (Shift control solenoid valve A remains ON). The 2-3 shift valve is then moved to the left side, uncovering the oil port leading to the 3rd clutch. Since the 3-4 shift valve is moved to the right side to cover the oil port to the 4th clutch, the 3rd clutch is engaged. Fluid flows by way of:

-Line Pressure (4) \rightarrow CPC Valve – Clutch Pressure Control (4') \rightarrow I-2 Shift Valve – Clutch Pressure Control (5) \rightarrow 2-3 Shift Valve – Clutch Pressure Control (5) \rightarrow 3-4 Shift Valve – 3rd Clutch Pressure (31) \rightarrow 3rd Clutch The hydraulic pressure also flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in the 2nd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



- Hydraulic Flow (cont'd)

4. 4th Speed

The flow of fluid up to the I-2, 2-3 and 3-4 shift valves is the same as in the 3rd speed. When the speed of the car reaches the prescribed value, the shift control solenoid valve A is turned OFF (Shift control solenoid valve B remains OFF). As this takes place, the 3-4 shift valve is moved to the left side and uncovers the oil port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by way of:

-Line Pressure (4) \rightarrow CPC Valve – Clutch Pressure Control (4') \rightarrow I-2 Shift Valve – Clutch Pressure Control (5) \rightarrow 2-3 Shift Valve – Clutch Pressure Control (5) \rightarrow 3-4 Shift Valve – 4th Clutch Pressure (41) \rightarrow Manual Valve – 4th Clutch Pressure (40) \rightarrow 4th Clutch

The hydraulic pressure also flows to the 1st clutch. However no power is transmitted by means of the one-way clutch as in 2nd and 3rd speed.

NOTE: When used, "left" or "right" indicates direction on the flow chart.





R Position

The flow of fluid through the torque converter circuit is the same as in the \boxed{N} . The fluid (1) from the oil pump flows through the manual valve and becomes the line pressure (3). It then flows through the 1-2 shift valve to the servo valve (3), causing the shift fork shaft to be moved in to the reverse position.

Under this condition, the shift control solenoid valve A is turned ON and the valve B is turned OFF as in 3rd speed. As a result, the 1-2 shift value is also moved to the left side. The fluid (3)' will flow through the servo value and manual valve to the 4th clutch; power is transmitted through the 4th clutch.

Reverse Inhibitor Control When the R position is selected while the vehicle is moving forward at a speed over 6 MPH, the control unit outputs 1st signal (A: OFF, B: ON), the I-2 shift valve is moved to the right side. The line pressure (3) is intercepted by the 1-2 shift valve, consequently the power is not transmitted as the 4th clutch and servo valve are not operated.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



<mark>∣-</mark> Hydraulic Flow (cont'd)

Position The flow of fluid through the torque converter is the same in N position. The line pressure (1) is intercepted by the manual valve, and is not supplied to the clutches. The power is not transmitted.





Lock-up System

In L in 2nd, 3rd and 4th, pressurized fluid is drained from the back of the torque converter through an oil passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the control unit optimizes the timing of the lock-up system. Under certain conditions, the lock-up operation is applied during deceleration, in 3rd and 4th speed.

The lock-up shift valve body controls the range of lock-up according to lock-up control solenoid valves A and B, and throttle valve B. When lock-up control solenoid valves A and B activate, modulator pressure changes. Lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the A/T control unit.



Lock-up System (cont'd)

No Lock-up

Pressured fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Under this condition, the pressure on both ends of the lock-up shift valve are equal, and the shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the oil pump will flow through the left side of the lock-up clutch to the torque converter; i.e., the lock up clutch is in OFF condition.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



14-40



Partial Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: OFF The control unit switches the solenoid valve A to ON to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force, thus the lock-up shift valve is moved to the left side.

The torque converter pressure is spearated into two passages:

Torque Converter Inner Pressure: entered into right side-to engage lock-up clutch

Torque Converter Back Pressure: entered into left side-to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve whereas the position of the lock-up timing valve B is determined by the throttle B pressure, tension of the valve spring and pressure regulated by the modulator. Also the position of the lock-up control valve is determind by the throttle valve B pressure, back pressure of the lock-up control valve and torque converter pressure regulated by the check valve. In low speed range, the throttle B pressure working on the right side of the lock-up control valve is low, causing the valve to be moved to the right side. With the lock-up control valve is moved solution pressure is maintained in the left end of the lock-up control valve; in other words, the lock-up control valve is moved slightly to the left side. This slight movement of the lock-up control valve causes the back pressure to be lowered slightly, resulting in partial lock-up.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



Lock-up System (cont'd)

Half Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON

The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lockup control valve to lower.

Also the modulator pressure in the left cavity of the lock-up timing valve B is low. However the throttle B pressure is still low at this time, consequently the lock-up timing valve B is kept on the right side by the spring force. With the lock-up control solenoid valve B turned ON, the lock-up control valve is moved somewhat to the right side, causing the back pressure (F2) to lower. This allows a greater amount of the fluid (F1) to work on the lock-up clutch so as to engage the clutch. The back pressure (F2) which still exists prevents the clutch from engaging fully.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



14-42



Full Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: ON When the vehicle speed further increases, the throttle valve B pressure is increased in accordance with the throttle opening. The lock-up timing valve B overcomes the spring force and moves to the left side. Also this valve closes the oil port leading to the torque converter check valve.

Under this condition, the throttle B pressure working on the right end of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); i. e., the lock-up control valve is moved to the left side. As this happens, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



Lock-up System (cont'd)

Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty Operation (ON \leftrightarrow OFF) The A/T control unit switches the solenoid valve B to ON and OFF alternately at high speeds under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

NOTE: When used, "left" or "right" indicates direction on the flow chart.



14-44


– ATF Cooler —

The radiator is mounted at the front of the vehicle. The ATF cooler is installed directly on the transmission housing. The ATF is cooled by the engine coolant.







Circuit Diagram







Troubleshooting Procedures

When the A/T control unit senses an abnormality in the input or output systems, the D indicator light in the gauge assembly will blink. However, when the Service Check Connector (located to the lower right of the glove compartment) is connected with a jumper wire, the D indicator light will blink the problem code when the ignition switch is turned on.

When the D indicator light has been reported on, connect the two terminals of the Service Check Connector together. Then turn on the ignition switch and observe the D indicator light.



Problem codes 1 through 9 are indicated by individual short blinks, Problem codes 10 through 16 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code. After determining the problem code, refer to the electrical system Symptom-to-Component Chart on page 14-52.



Some PGM-FI problems will also make the D indicator light come on. After repairing the PGM-FI system, disconnect the CLOCK fuse (7.5 A) in the main relay box for more than 10 seconds to reset the A/T control unit memory.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removing the fuse so you can reset them.





Symptom-to-Component Chart

- Electrical System

Number of D indicator light blinks while Service Check Connector is jumped.	D indicator light	Possible Cause	Symptom	Refer to page
1	Blinks	 Disconnected lock-up control solenoid valve A connector Short or open in lock-up control solenoid valve A wire Faulty lock-up control solenoid valve A 	 Lock-up clutch does not engage. Lock-up clutch does not disengage. Unstable idle speed. 	14-54
2	Blinks	 Disconnected lock-up control solenoid valve B connector Short or open in lock-up control solenoid valve B wire Faulty lock-up control solenoid valve B 	Lock-up clutch does not engage.	14-55
3	Blinks or OFF	 Disconnected throttle angle sensor connector Short or open in throttle angle sensor wire Faulty throttle angle sensor 	 Lock-up clutch does not engage. 	14-56
4	Blinks	 Disconnected speed sensor connector Short of open in speed sensor wire Faulty speed sensor 	. Lock-up clutch does not engage.	14-57
5	Blinks	 Short in shift position console switch wire Faulty shift position console switch 	 Fails to shift other than 2nd ↔ 4th gears. Lock-up clutch does not engage. 	14-58
6	OFF	 Disconnected shift position console switch connector Open in shift position console switch wire Faulty shift position console switch 	 Fails to shift other than 2nd ↔ 4th gears. Lock-up clutch does not engage. Lock-up clutch engages and disengages alternately. 	14-60
7	Blinks	 Disconnected shift control solenoid valve A connector Short or open in shift control solenoid valve A wire Faulty shift control solenoid valve A 	 Fails to shift (between 1st ↔ 4th, 2nd ↔ 4th or 2nd ↔ 3rd gears only). Fails to shift (stuck in 4th gear) 	14-62
18	Blinks	 Disconnected shift control solenoid valve B connector Short or open in shift control solenoid valve B wire Faulty shift control solenoid valve B 	• Fails to shift (stuck in 1st or 4th gears).	14-63



Number of D indicator light blinks while Service Check Connector is jumped.	D indicator light	Possible Cause	Symptom	Refer to page
9	Blinks	 Disconnected NC speed sensor connector Short or open in the NC speed sensor wire Faulty NC speed sensor 	. Lock-up clutch does not engage.	14-64
10	Blinks	 Disconnected water temperature sensor connector Short or open in the water temperature sensor wire Faulty water temperature sensor 	. Lock-up clutch does not engage.	14-66
11	OFF	 Disconnected gauge assembly connector Short or open in tachometer wire Faulty tachometer 	. Lock-up clutch does not engage.	14-67
14	OFF	 Short or open in FAS wire Trouble in PGM-FI unit 	 Transmission jerks hard when shiftina. 	14-68
15	OFF	 Disconnected NM speed sensor connector Short of open in NM speed sensor wire Faulty NM speed sensor 	 Transmission jerks hard when shifting. 	14-70
16	Blinks	 Disconnected linear solenoid connector Short or open in linear solenoid wire Faulty linear solenoid 	 Transmission jerks hard when shifting Lock-up clutch does not engage. 	14-73

If the self-diagnosis D indicator light does not blink, perform an inspection according to the table listed below.

Symptom	Probable Cause	Ref. page
D indicator light does not come on for 2 seconds after ignition is first turned on.	-	14-74
D indicator light is on steady, not blinking whenever the ignition is on.	-	14-76
Lock-up clutch does not have duty operation (ON-OFF).	Check A/C signal	14-77
Lock-up clutch does not engage.	with A/C on	
Fails to shift from 2nd to 1st gear after releasing the brake pedal from a stop when in the D position.	Check brake light signal.	14-78

- If a customer describes the symptoms for codes 3,6, or 11, yet the D indicator light is not blinking, it will be necessary to recre ate the symptom by test driving, and then checking the D indicator light with the ignition still ON.
- If the D indicator light displays codes 1, 2, 3, 8, 11 or 16, check first the No. 9, 13 and 18 fuse before electrical troubleshooting If any of the fuses have blown, repair them and then recheck.
- If the D indicator light displays codes other than those listed above or stays lit continuously, the control unit is faulty.
- Sometimes the D indicator light and the Check Engine light may come on simultaneously. If so, check the PGM-FI system ac cording to the number of blinks on the PGM-FI ECU self-diagnosing indicator, then reset the memory by removing the CLOCk fuse in the main relay box for more than IO seconds. Drive the vehicle for several minutes at speed over 30 mph (50 Km/h) then recheck the lights.

NOTE: Disconnecting the CLOCK fuse also cancels the radio preset stations and the clock setting. Make note of the radio presets before removina the fuse so vou can reset them.

- Troubleshooting Flowchart













(cont'd)







(cont'd)



14-60

















(cont'd)











1 4-68





















(cont'd)

· Troubleshooting Flowchart (cont'd)







Lock-up Control Solenoid Valve A/B

Test

NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

Disconnect the connector from the lock-up control 1.



Replacement

Remove the mounting bolts and lock-up control sole-1. noid valve assembly.

NOTE: Be sure to remove or replace the lock-up COntrol colonoid values Δ and R as an assembly.



L

ı.



Linear Solenoid

Test Remove the linear solenoid connector. 1. 2. Measure the resistance between the A and B terminal. STANDARD: 4.65 - 5.35 Ω View from terminal side surface. Replace the linear solenoid if resistance is out of 3. specification. 4. Connect the A terminal of the linear solenoid connector to the battery. A clicking sound should be heard. Connect the B terminal of the linear solenoid connector to the battery. A clicking sound should be heard. 5. If not, check for continuity between the A/T control unit AI or D1 harness and body ground page 14-73. 6. Replace the linear solenoid assembly if there is continuity between the AI or D1 and body ground.

Replacement

NOTE: Select the appropriate shim when the linear solenoid is replaced.

- 1. Remove the linear solenoid and shim from the transmission housing.
- 2. Clean the mounting surface.
- 3. Measure the distance between the mounting surface of the linear solenoid and the throttle valve body.



Linear Solenoid

- Replacement (cont'd) -

4. Select a new shim from the chart below.

NOTE: Identification color is painted on the side of the shim.



LINEAR SOLENOID SHIM

NO	PART NUMBER	THICKNESS	COLOR
1	28252-PR9-000	1.2 mm (0.047 in)	BLACK
2	28253-PR9-000	1.4 mm (0.055 in)	BROWN
3	28254-PR9-000	1.6 mm (0.063 in)	RED
4	28255-PR9-000	1.8 mm (0.071 in)	PINK
5	28256-PR9-000	2.0 mm (0.079 in)	YELLOW
6	28257-PR9-000	2.2 mm (0.087 in)	GREEN
7	28258-PR9-000	2.4 mm (0.094 in)	BLUE
8	28259-PR9-000	2.6 mm (0.102 in)	SKY BLUE
9	28260-PR9-000	2.8 mm (0.110 in)	WHITE

5. Apply liquid gasket to both sides of the linear solenoid shim as shown. Use liquid gasket Part No. 08718-550000 OE.

CAUTION:

- Install the linear solenoid within 10 minute of applying the liquid gasket.
- After installation, wipe off any liquid gasket, that squeezed out from around the linear solenoid shlm.

NOTE:

- Check that the mounting surfaces are clean and dry before applying liquid gasket. Degrease if necessary.
- Apply the liquid gasket evenly.
- Do not install the parts if 10 minutes or more has passed since you first applied the liquid gasket. If 10 minutes has passed, reapply liquid gasket after removing the residue.
- Wait at least 30 minutes before filling with oil.



6. Install the linear solenoid and shim to the transmission housing.



\odot

A/T Speed Sensors



Symptom-to-Component Chart

Hydraulic System (cont'd) ———

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R, 2 and 3, but not in D or 1.	8, 29, 44, 48	С, М, О
Car moves in D, 2, 1, R but not in 3.	10, 31	C, L
Car moves in D, 3, 1, R but not in 2.	9, 30, 49	C, L
Car moves in D, 3, 2, 1, but not in R.	1, 11, 22, 34, 38, 39, 40	С, L, Q
Car moves in N.	1, 8, IO, 9,11, 46, 47	С, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears	6, 7, 16	С, L, u
No engine braking in 🖵 position.	12	C, D,L
Slips in 1st gear.	8, 29, 44, 48	C, Ν, Ο, υ
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	С
Flares on 1-2 upshift.	3, 15	É, L, V
Flares on 2-3 upshift.	3, 15, 24, 44	E, L, V
Flares on 3-4 upshift.	3, 15, 25, 44	E, L, V
No upshift, trans stays in 1st gear.	14, 19, 23	G, L
No downshift to 1st gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	14, 26	V
Harsh shift (up and down shifting).	2, 4, 15, 23, 24, 27, 47	A, E,H, I, L, V
Harsh shift (1 -2).	2, 9	C, D, V
Harsh shift (2–3).	2, 10, 23, 24	C, D, H, L, v
Harsh shift (3–4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27, 28	L, V, Q
Harsh kickdown shift (2 – 1).	48	0
Harsh downshift at closed throttle,	15	Е, Т
Harsh shift when manually shifting to 1.	33	L
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	К, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P or from R to N.	38, 39, 40, 45	L, Q
Noise from trans in all selector lever positions.	6, 17	К, L, Q
Noise from trans only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Trans will not shift into 4thearin D.	1, 21, 28, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q


	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Linear solenoid shim too thin.
3.	Linear solenoid shim too thick.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure requiator stuck.
8.	1 st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st hold clutch defective.
14.	Modulator valve stuck.
15.	Throttle B valve stuck.
16.	ATF strainer clogged.
17.	Torque converter defective.
18.	Torque converter check valve stuck.
19.	1-2 shift valve stuck.
20.	2-3 shift valve stuck.
21.	3-4 shift valve stuck.
22.	EAT D inhibitor valve stuck.
23.	Clutch pressure control valve stuck.
24.	2nd orifice control valve stuck.
25.	3rd orifice control valve stuck.
26.	3-2 kickdown valve stuck.
27.	3rd kickdown valve stuck.
28.	4th exhaust valve stuck.
29.	1 st accumulator defective.
30.	2nd clutch accumulator defective.
31.	3rd clutch accumulator defective.
32.	4th/reverse accumulator defective.
33.	1st hold clutch accumulator defective.
34.	Servo valve stuck.
35.	Lock-up clutch timing valve stuck.
36.	Lock-up clutch shift valve stuck.
37.	Lock-up clutch control valve stuck.
20	



	NOTES	
L.	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential clutch and planetary gear assembly. If both are OK and no cause for the contamination is found, replace the torque converter.	
М.	If the 1st clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the trnsmisison housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably worn.	
N.	Replace the mainshaft if the bushings for the 1st and 4th feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.	l
0.	A worn or damaged sprag clutch is mostly a result of shifting the trans in D while the wheels	

Symptom-to-Component Chart

- Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly.	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Car creeps in N.	RI, R2	
Car does not move in D.	R4	
Trans locks up in R.	R3, R12	
Excessive drag in trans.	R 6	R, K
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R 5	
Main seal pops out.	R 6	S
Various shifting problems.	R9, R I O	I
Harsh upshifts.	RI1	

	PROBABLE CAUSE DUE TO IMPROPER REPAIR
RI.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	Sprag clutch installed upside down.
R5.	Reverse hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
RIO.	Valves improperly installed.
RI 1.	Ball check valves not installed.
R12.	Shift fork bolt not installed.

	NOTES
В.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in en- gine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
Ε.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1-2 valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
Н.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
l.	If the orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
К.	Improper alignment of main valve body and torque convertor case may couse oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.

Stall Speed



. Test

CAUTION:

- To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.
- Do not shift the lever while raising the engine speed.
- Be sure to remove the pressure gauge before testing stall speed.
- 1. Engage the parking brake and block all four wheels.
- 2. Connect the tachometer, and start the engine.
- 3. After the engine has warmed up to normal operating temperature, shift into 2 position.
- 4. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
- 5. Allow 2 minutes for cooling, then repeat same test in 1, 3, D and R position.

NOTE: Stall speed test must be made only for checking the cause of trouble.

Stall Speed RPM: Specification: 1,950-2,250 rpm

TROUBLE	PROBABLE CAUSE	
Stall rpm high in 2 position	Low fluid level or oil pump output Clogged oil strainer Pressure regulator valve stuck closed Slippage of 2nd clutch	
Stall rpm high in 1 position	. Slippage of 1st clutch or 1st hold clutch	
Stall rpm high in 3 position	. Slippage of 3rd clutch	
Stall rpm high in D position	. Slippage of 1 st clutch or 1 st gear one-way clutch	
Stall rpm high in R position	. Slippage of 4th clutch	
Stall rpm low in 2 position	Engine output low Torque converter one-way clutch slipping	

Pressure

Testing -

A WARNING

- While testing, be careful of the rotating rear wheels.
- Make sure lifts are placed properly.

CAUTION:

- Before testing, be sure the transmission fluid is filled to the proper level.
- Warm up the engine before testing.
- 1. Raise the car. (See page I-6.)
- 2. Warm up the engine, then stop the engine and connect a tachometer.
- Connect the oil pressure gauge to each inspection hole(s).
 18 N·m (1.8 kg-m, 12 lb-ft) .

CAUTION: Connect the oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.

A/T OIL PRESSURE GAUGE SET 07406-0020003 A/T OIL PRESSURE GAUGE REPLACEMENT HOSE 07406-0020201



- Line Pressure/Clutch Pressure
- Clutch Low/High Pressure
- Throttle B Pressure
- Install a new washer and the sealing bolt in the inspection hole and tighten to the specified torque. 18 N·m (1.8 kg-m, 12 lb-ft)

NOTE: Do not reuse old aluminum washers.

- Line Pressure/Clutch Pressure Measurement
- -1. Allow the rear wheels to rotate freely.
- -2. Run the engine at 2,000 rpm.
- -3. Shift the select lever as shown on the chart on the next page.
- -4. Measure each clutch pressure.

A WARNING While testing, be careful of the rotating rear wheels.





LINE PRESSURE/I **ST** CLUTCH PRESSURE INSPECTION HOLE IST-HOLD CLUTCH PRESSURE INSPECTION HOLE INSPECTION HOLE

3RD CLUTCH PRESSURE

DDECOUDE	SELECTOR	OVNETON	PROBABLE	FLUID P	RESSURE	
PRESSORE	i POSITION	SYMPTOM	CAUSE	Standard	Service Limit	
Line/I st Clutch	D or 1	No or low line/1st pressure	Torque converter, oil pump pressure regulator, torque conventeur check valve, oil poump, 1st Cluttedh	834-883 kPa (8.5–9.0 kg/cm², 121–128 psi)	785 kPa (8.0 kg/cm², 114 psi) }	
l <i>st</i> hold Clutch	1	No or low 1st hold pressure	ist Hold Clutch			
2nd Clutch	2	No or low 2nd pressure	2nd Clutch			
3rd Clutch	3	No or low 3rd pressure	3rd Clutch			
2nd Clutch	D	No <i>or</i> low 2nd pressure	2nd Clutch	490 kPa (5.0 kg/cm ² , 71 psi)	441 kPa (4.5 kg/cm², – 64 psi)	
3rd Clutch		No or low 3rd pressure	3rd Clutch	(throttle fully closed) 883 kPa (9.0 kg/cm ² ,	(throttle fully closed) 785 kPa (8.0 kg/cm²,	
4th Clutch		No or low 4th pressure	4th Clutch	(throttle more than 2/8 opened)	(throttle more than 2/8 opened)	
	R		Servo valve or 4th Clutch	834-883 kPa (β25[::-19_2,9) kg/cm*, psi)	785 kPa (8.0 kg/cm², 114 psi)	

(cont'd)

Pressure

- Testing (cont'd)

- Clutch Low/High Pressure Measurement
- -1. Allow the rear wheels to rotate freely.
- -2. Start the engine and let it idle.
- -3. Shift the select lever to D position.
- -4. Slowly press down the accelerator pedal to increase engine rpm until pressure is indicated on the oil pressure gauge. Then release the accelerator pedal, allowing the engine return to an idle, and measure the pressure reading.

A WARNING While testing, be careful of the rotating rear wheels.

-5. Repeat step -4 for each clutch pressure being inspected.

4TH CLUTCH PRESSURE

INSPECTION HOLE

-6. With the engine idling, press down the accelerator pedal approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the gauge, measure the highest pressure reading obtained.

 Λ WARNING. While testing, be careful of the rotating rear wheels.

-7. Repeat step -6 for each clutch pressure being inspected.



	SELECTOR	OVMETON	PROBABLE	FLUID PRESSURE	
PRESSURE	POSITION	STMPTOM	CAUSE	Standard	Service Limit
2nd Clutch	D	No or low 2nd pressure	2nd Clutch	490-883 kPa (5.0-9.0 kg/cm ² ,	441 kPa (4.5 kg/cm ² , 64 psi)
3rd Clutch		No or low 3rd pressure	3rd Clutch	71-128 psi) varies with throttle	released 785 kPa
4th Clutch		No or low 4th pressure	4th Clutch	oponing	(8.0 kg/cm ² , 114 Ps' with accelerator ped more than 2/8 opend



Throttle B Pressure Measurement

-1. Allow the rear wheels to rotate freely.

-2. Disconnect the linear solenoid connector.

-3. Shift the select lever to D position.

-4. Run the engine at 1,000 rpm.

-5. Measure full closed throttle B pressure.

-6. Connect battery voltage to the linear solenoid.

-7. Measure full opened throttle B pressure. A WARNING While testing, be careful of the rotating rear wheels.

LINEAR SOLENOID

CONNECTOR

LINEAR SOLENOID

THROTTLE B PRESSURE INSPECTIO N HOLE

LINEAR SOLENOID

DDESSUDE	SELECTOR	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
PRESSURE	POSITION	STIMPTOM		Standard	Service Limit
Throttle B	D	Pressure too high	Linear Solenoid	O-15 kPa (O-O. 15 kg/cm², O-2 psi)	O-15 kPa 10-O. 15 kg/cm², O-2 psi)
		No or low pressureFaulty throttle B5valve(68	598-657 kPa (6.1-6.7 kg/cm², 87-95 psi)	598-657 kPa (6.1 <i>—</i> 6.7 kg/cm², 87-95 psi)	

Fluid Level

- Checking/Changing

Checking

With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute).

The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add Honda Premium Formula Automatic Transmission Fluid or an equivalent DEXRON-II type automatic transmission fluid.

Changing

- 1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
- 2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

Automatic Transmission Fluid Capacity: 2.9 ℓ (3.1 US qt., 2.6 Imp. qt.) at change 7.0 ℓ (7.4 US qt., 6.2 Imp. qt.) after overhaul 6.3 ℓ (6.7 US qt., 5.5 Imp. qt.) after overhaul with new torque converter.





Transmission





- 11. Remove the parking brake cable holders from the rear beam rod.
- 12. Remove the rear beam rod.
- 13. Remove the front exhaust pipe A.
 - ☆: Corrosion resistant bolt/nut



- 14. Remove the parking brake cable holder and the anti-lock brake system sensor wire clamp.
- 15. Remove the castle nut and separate the control arm from the knuckle (See Section 18).
- 16. Remove the damper fork bolt.
- 17. Remove the castle nut and separate the lower control arm from the knuckle (See Section 18).
- 18. Remove the right driveshaft from the intermediate shaft.
 - ☆: Corrosion resistant bolt/nut



Transmission

- Removal (cont'd)-

- 19. Remove the intermediate shaft heat cover and the intermediate shaft mounting bolts.
- 20. Pry the intermediate shaft out of the differenctial, Pull and remove it.

NOTE:

- Coat all precision finished surfaces with clean engine oil or grease.
- Tie plastic bags over the driveshaft ends.



- 31. Remove the parking brake cable holder and the anti-lock brake system sensor wire clamp.
- 32. Make a reference mark on the flange of the adjusting bolt, adjusting cam and lower control arm.
- 33. Remove the castle nut and separate the control arm from the knuckle (See Section 18).
- 34. Remove the damper fork bolt.
- 35. Remove the bolts and lower arm from the side beam.
- 36. Pry the driveshaft out of the differential. Pull and remove it. NOTE:
 - Coat all precision finished surfaces with clean engine oil or grease.
 - Tie plastic bags over the driveshaft ends.





- 37. Remove the one bolt of the upper arm mounting bolts,
- 38. Remove the shift cable cover and shift cable holder.
- 39. Remove the shift cable from the control lever.
- 40. Remove the torque converter cover and then remove the drive plate bolts.



- 41. Attach a chain hoist to the transmission hangers.
- 42. Place a jack under the transmission and raise the transmission just enough to take weight off of the mounts.
- 43. Remove the front engine mounting bolts on the transmission side and retighten the bolt on the engine side. CAUTION: Loosen the front engine mounting bolt on the engine side, but do not remove it. After removing the two bolts on the transmission side, be sure to retighten the bolt on the engine side.
- 44. Remove the rear transmission mounting bolts.
- 45. Remove the transmission housing mounting bolts..
- 46. Pull the transmission away from the engine until it clears the dowel pins, then lower it on the transmission jack.



Illustrated Index

L. Side Cover -





$\widehat{1}$	L. SIDE COVER
ÕD	OWEL PIN
ૼ૽ૼૼૡ	ASKET Replace.
(Ă)S	EALING WASHER Replace.
(5)	O-RING Replace.
6	IST-HOLD CLUTCH FEED PIPE
Õ	O-RING Replace.
<u>(8)</u>	FEED PIPE FLANGE
Õ	SNAP RING
10	1ST CLUTCH FEED PIPE
Ū	O-RING Replace.
12	FEED PIPE FLANGE
13	SNAP RING
14	DISC SPRING Replace.
(15)	BALL BEARING
16	IS+-HOLD CLUTCH ASSEMBLY
Ð	O-RING Replace.
(18)	THRUST WASHER
(19)	THRUST NEEDLE BEARING
20	IST-HOLD CLUTCH HUB
ഇ	COUNTERSHAFT 1ST GEAR
(22)	ONE-WAY CLUTCH
23	NEEDLE BEARING
24)	COUNTERSHAFT IST GEAR COLLAR
25	
20	DISC SPRING REPIACE.
6	O BING Bankaga
@	
0	
8	
Ö	MAINSHAFT 1ST GEAR
š	THRUST WASHER
3 4	MAINSHAFT 1ST GEAR COLLAR
ă	PARKING BRAKE PAWL STOPPER

- 36 PARKING BRAKE PAWL Ì PARKING BRAKE PAWL SPRING PARKING BRAKE PAWL SHAFT **\$\$\$\$\$\$**\$**\$**\$**\$**\$**\$**\$**\$**\$**\$** LOCK WASHER Replace. PARKING BRAKE STOPPER ROLLER PIN PARKING BRAKE LEVER WASHER PARKING BRAKE SPRING ROLLER **COTTER PIN Replace.** SEALING WASHER Replace. 33333333333 3 DISC SPRING Replace. TRANSMISSION HANGER/CONNECTOR STAY SEALING WASHER Replace. BREATHER JOINT BREATHER CAP TRANSMISSION HANGER NC SPEED SENSOR O-RING Replace. ATF COOLER ATF COOLER FILTER/GASKET Replace. SPEED SENSOR COVER LINEAR SOLENOID SHIM 68886 O-RING Replace. LINEAR SOLENOID CONNECTOR STAY NM SPEED SENSOR O-RING Replace. 66 67 ATF LEVEL GAUGE ATF LEVEL GAUGE PIPE 68) O-RING Replace.
- RETAINER PLATE
- BALL BEARING

TORQUE SPECIFICATION

JO.	TORQUEVALUE	BOLT SIZE	REMARKS
Α	12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	
В	18 N·m (1 .8 kg-m, 13 lb-ft)	8 x 1.25 mm	OIL PRESSURE CHECK BOLT
С	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	24x 1.25 mm	COUNTERSHAFT LOCKNUT (Left-hand threads)
D	140→0→140 N·m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	23x 1.25 mm	MAINSHAFT LOCKNUT
Ε	140→0→140 N•m (14.0→0→14.0 kg-m, 101→0→101 lb-ft)	24x 1.25 mm	SECONDARY SHAFT LOCKNUT
F	14 N•m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt (Replace.)
G	50 N•m (5.0 kg-m, 36 lb-ft)	18 x 1.5 mm	DRAIN PLUG
Н	30 N•m (3.0 kg-m, 22 lb-ft)	8 x 1.25 mm	
	12 N·m (1 .2 kg-m, 9 lb-ft)	6x I.Omm	
J	30 N·m (3.0 kg-m, 22 lb-ft)	8 x 1.25 mm	ATF COOLER BOLT
Κ	12 N•m (1.2 kg-m, 9 lb-ft)	6x I.Omm	
L	10 N·m (1.0 kg-m, 7 lb-ft)	6 x 1.0 mm	LINEAR SOLENOID BOLT
М	12 N•m (1.2 kg-m, 9 lb-ft)	6 x 1.0 mm	

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Transmission Housing





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20	COUNTERSHAFT 2ND GEAR SPACER	6
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Se al	COUNTERSHAFT SRU GEAR	6
ଭ		6
w w	COUNTEDSHAFT 280 CEAR COLLAR	6
3	200 CLUTCH ASSEMBLY	6
8	O DING Daplaga	Č
8		G
	SPACER 31 mm	6
Ś		Ľ

2ND CLUTCH ASSEMBLY 8 O-RING Replace. THRUST WASHER 9) 0 11) THRUST NEEDLE BEARING SECONDARY SHAFT 2ND GEAR 2 NEEDLE BEARING 3) THRUST NEEDLE BEARING 4) SECONDARY SHAFT 5) 6) SEAL RING 35 mm DIFFERENTIAL OIL SEAL Replace. Ī) REVERSE IDLER GEAR SHAFT/HOLDER 8) **REVERSE IDLER GEAR SHAFT SPRING** STEEL BALL NEEDLE BEARING TRANSMISSION HOUSING 2) REVERSE IDLER GEAR 3) CONNECTOR STAY Â) SEALING WASHER Replace. 5 THRUST SHIM BEARING OUTER RACE 3 8) SNAP RING SECONDARY SHAFT BALL BEARING 9) COUNTERSHAFT BALL BEARING 0 MAINSHAFT BALL BEARING ก GASKET Replace. 3 DOWEL PIN 3) DIFFERENTIAL GEAR ASSEMBLY 4) BEARING OUTER RACE 5) THRUST SHIM ล DIFFERENTIAL OIL GUIDE RING 3 2ND CLUTCH FEED PIPE 8 IST-HOLD CLUTCH FEED PIPE 4TH CLUTCH FEED PIPE **1ST** CLUTCH FEED PIPE D

- **3RD** CLUTCH FEED PIPE 2
- TORQUE CONVERTER HOUSING 3)
- DIFFERENTIAL OIL SEAL Replace. Ā)

TORQUE SPECIFICATION

No.	TORQUE VALUE	BOLT SIZE	REMARKS
Α	55 N•m 15.5 kg-m, 40 lb-ft)	10 x 1.25 mm	
В	14 N·m (1.4 kg-m, 10 lb-ft)	6 x 1.0 mm	Special bolt (Replace.)
С	12 N•m (1.2 kg-m, 9 lb-ft)	6x I.Omm	
D	18 N•m (1.8 kg-m, 13 lb-ftl	8 x 1.25 mm	OIL PRESSURE CHECK BOLT

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Torque Converter Housing/Valve Body -





(1)	ATF STRAINER Replace or clean.	29	MAIN SEPARATOR PLATE
Ž	O-RING Replace.	30	TORQUE CONVERTER CHECK VALVE
Ğ	ACCUMULATOR COVER	3	TORQUE CONVERTER CHECK VALVE SPRING
(Ă)	LOCK WASHER Replace.	32	ATF LUBRICATION PIPE
(5)	SERVO DETENT BASE	33	2ND ACCUMULATOR BODY
Ğ	SERVO VALVE BODY	34)	LSD RELIEF VALVE SPRING
Õ	SERVO SEPARATOR PLATE	35	LSD RELIEF VALVE
(ð)	CHECK BALLS	36	CONTROL SHAFT
ŏ	SECONDARY VALVE BODY FILTER Replace.	37	CONTROL LEVER
õ	SECONDARY VALVE BODY	38	OIL SEAL Replace.
ñ	SECONDARY SEPARATOR PLATE	39	LOCK WASHER Replace.
(Ī2)	DOWEL PIN	40	CHANGE SHAFT
<u>(13</u>)	LOCK-UP VALVE BODY	(41)	CHANGE SHAFT CAP
14	LOCK-UP SEPARATOR PLATE	42	SHIFT CONTROL SOLENOID VALVE ASSEMBLY
15	DOWEL PIN	43	SHIFT CONTROL SOLENOID FILTER/GASKET Replace.
16	REGULATOR VALVE BODY	44)	LOCK-UP CONTROL SOLENOID VALVE ASSEMBLY
$\overline{0}$	O-RING Replace.	45	LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
18	STATOR SHAFT ASSEMBLY	46	SPEED SENSOR ASSEMBLY
(19)	STOPPER PIN	(47)	O-RING Replace.
20	MAIN VALVE BODY FILTER Replace.	48	SECONDARY SHAFT NEEDLE BEARING Replace.
21	CHECK BALLS	49	OIL GUIDE PLATE Replace.
22	MAIN VALVE BODY	60	COUNTERSHAFT NEEDLE BEARING Replace.
23	ONE-WAY RELIEF VALVE SPRING	6)	OIL GUIDE PLATE Replace.
24)	ONE-WAY RELIEF VALVE	62	MAINSHAFT BALL BEARING Replace.
25	OIL PUMP DRIVEN GEAR	(53)	MAINSHAFT OIL SEAL Replace.
26	OIL PUMP DRIVE GEAR	54	SEALING WASHER Replace.
2	OIL PUMP DRIVEN GEAR SHAFT	(55)	4TH OIL GUIDE PLATE/PIPE
28	DOWEL PIN	(56)	3RD OIL GUIDE PLATE

TORQUE SPECIFICATION

No.	TORQUE VALUE	BOLT SIZE	REMARKS
A B C D	1 2 №m (1.2 kg-m, 9 lb-ft) 18 №m (1.8 kg-m, 13 lb-ft) 14 №m (1.4 kg-m, 10 lb-ft) 30 №m (3.0 kg-m, 22 lb-ft)	6 x 1.0mm 8 x 1.25 mm 6 x 1.0 mm 8 x 1.25 mm	OIL PRESSURE CHECK BOLT Special bolt

L. Side Cover

Removal -

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Cut the lock tab and raise it, then remove the locknut of each shaft.
- Countershaft locknut has left-hand threads.
- 1. Remove the speed sensor cover, then reinstall three bolts around the driveshaft oil seal. CAUTION: Do not damage the driveshaft oil seal lip.
- 2. Slip the special tool onto the mainshaft and engage the parking brake pawl with the parking gear.
- 3. Remove the transmission L. Side Cover in the following numbered sequence. NOTE: Remove the special tool from the mainshaft after removing the locknuts.



CAUTION: Protect the lip of the driveshaft oil seal by reinstalling three bolts, after removing the speed sensor cover. DRIVERSHAFT OIL SEAL SPEED SENSOR COVER BOLT MAINSHAFT HOLDER 07924-PJ40000 NOTE: Using a chisel, cut the lock tab. Pry it up and then remove the locknut from each shaft. CHISEL LOCK TAB

Transmission Housing



– Removal -

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Steel ball in reverse idler gear shaft is under spring pressure, take care not to let it pop out.
- 1. Remove the transmission housing in the following numbered sequence. CAUTION: Set the special tool with **bolts** as shown.





Valve Body

Removal

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air. Blow out all passages.
- Accumulator covers are spring loaded; to prevent stripping the threads in the torque converter housing, press down on the accumulator covers while unscrewing the bolts in a crisscross pattern.
- 1. Remove the valve body in the following numbered sequence.

CAUTION: Do not use a magnet to remove the check balls: it may magnetize the balls.



Valve





VALVE BODY

ROLLER

SPRING

VALVE BODY

VALVE

CAP

NOTE: Coat all parts with ATF before assembly.

Install the valve, valve spring and cap in the valve 1. body and secure with the roller.

ROLLER

SPRING

VALVE

CAP

2. Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver then install the spring seat.



Set the spring in the valve and install it in the valve 3. body.

Install the spring with a screwdriver, then install the valve cap with the cutout aligned with the screwdriver.



Valve

Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. You may use this procedure to free the valves in the valve bodies.

- 1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
- 2. Carefully tap the valve body so the sticking valve drops out of its bore.

CAUTION: It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.

- 3. Inspect the valve for any scuff marks. Use the ATFsoaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
- 4. Roll up half a sheet of ATF-soaked paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

CAUTION: The valve body is aluminum and doesn't require much polishing to remove any burrs.



- 5. Remove the #600 paper and thoroughly wash the entire valve body in solvent, then dry with compressed air.
- 6. Coat the valve with ATF then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest.



7. Remove the valve and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

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Oil Pump

Inspection

1. Install the pump gears and shaft in the main valve body.



VALVE BODY

2. Install the oil pump shaft and measure the side clearance of the drive and driven gears.

Pump Gears Side (Radial) Clearance: Standard (New): Drive gear (diameter) 0.210-0.265 mm (0.0083-0.0104 in) Driven gear (radius) 0.035-0.063 mm (0.0014-0.0025 in)



DRIVE GEAR Inspect teeth for wear or damage. 3. Measure the thrust clearance of the driven gear-tovalve body.

Drive/Driven Gear thrust (Axial) Clearance: Standard (New): 0.03-0.05 mm (0.001-0.002 in.) Service Limit: 0.07 mm (0.0028 in.)



Main Valve Body

- Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-1 10.
- Coat all parts with ATF before reassembly.
- Adjust and select the manual valve detent spring when the manual valve or manual valve detent spring is replaced. See page 14-142.

CAUTION: Do not use a magnet to remove the check balls; it may magnetize the balls.







SPRING SPECIFICATIONS

Unit of length: mm lin

1	I			Ornt	or length: mm (ii)	
No	Spring	Standard (New)				
NO.		Wire Dia.	O.D.	Free Length	No. of Coils	
~~ 3 (4) (6) (6)	I-2 shift spring 2-3/3-4 shift spring Relief valve spring One-way relief valve 2-3/3-4 shift spring Torque converter check valve spring	 0.8 (0.035) 1.1 (0.031) 0.9 (0.043) 0.8 (0.035) 1.1 (0.031) (0.043) 	8.6 (0.339) 7.0 (0.276) 8.4 (0.331) 6.4 (0.252) 7.0 (0.276) 8.4 (0.331)	40.4 (1.591) 43.7 (1.720) 44.4 (1.748) 25.1 (0.988) 43.7 (1.720) 41.8 (1.646)	14.5 21.2 19.5 11.9 21.2 15.7	

Secondary Valve Body



4



SPRING SPECIFICATIONS

·		T=		Unit	of length: mm (i	
No	Spring	Standard (New)				
	opinig	Wire Dia.	0.0.	Free Length	No. of Coils	
60000	2nd exhaust valve spring CPC valve spring 2nd orifice control valve spring 3rd orifice control valve spring Modulator valve spring 4th exhaust valve spring Servo control valve spring 3-2 kick down valve spring 4-3 kick down valve spring	1.0 (0.039) 1.0 10.039) 0.8 (0.031) 0.9 (0.035) 1.4 (0.055) 0.8 (0.024) 1.0 (0.039) 1.0 (0.039) 0.9 (0.035)	8.8 (0.269) 8.1 (0.319) 8.6 (0.339) 9.4 (0.370) 7.6 (0.299) 8.1 (0.319) 6.1 (0.240) 6.6 (0.260)	27.1 (1.067) 32.1 (1.264) 47.9 (1.886) 48.3 (7.902) 33.0 (1.299) 24.4 (0.967) 53.5 (2.106) 27.1 (7.067) 30.7 (1.209)	73.4 15.6 16.0 16.6 70.5 7.9 20.8 73.4 72.9	

Servo Body/Inspection/Reassembly/dy

- Disassembly

NOTE:

and dry with compressed air. • Clean all parts thoroughly in solvent or carburetor cleaner,

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- Blow out all passages.
 Replace valve body as an assembly if any parts are worn or damaged.
 Replace valve body as an assembly if any fail to slide freely, see Valve Body Repair on page 14-110.
 Check all valves for free movement.
- Coat all parts with ATF before reassembly.
- Ronlace-the O-rings.





SPRING SPECIFICATIONS

				Unit	of length: mm (in)
Ne	Spring	Spring Standard (New)	d (New)		
NO.	Spring	Wire Dia.	O.D.	Free Length	No. of Coils
1034	Throttle valve B spring 3rd accumulator spring 4th accumulator spring 1 st accumulator spring	0.9 (0.035) 3.2 (0.126) 3.0 (0.118) 2.3 (0.091)	7.1 (0.280) 19.0 (0.748) 18.0 (0.709) 20.0 (0.787)	29.0 (1.142) 88.6 (3.488) 84.5 (3.327) 104.6 (4.118)	12.6 14.3 12.8 14.8

NOTE:

• After disassembly of the ATF strainer, check that it is in good condition, and the inlet opening is not clogged. Replace the strainer with a new one if it is clogged or damaged.

• The strainer can be reused if it is not clogged. Clean the inlet opening thoroughly with compressed air before reinstalling it.



Regulator Valve Body

Disassembly/Inspection/Reassembly -

NOTE:
Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
Blow out all passages.
Replace valve body as assembly if any parts are worn or damaged.
Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-110.
Hold the regulator spring cap in place while removing the lock bolt. Once the bolt is removed, release the spring cap slowly.
CAUTION: The regulator spring cap can pop out when the lock bolt is removed.
Reassembly is in the reverse order of disassembly.
NOTE:

- Coat all parts with ATF.
- Align the hole in the regulator cap with the hole in the valve body, press the spring cap into the body and tighter the lock bolt.



SPRING SPECIFICATIONS

Unit of length: mm (in

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
1 2	Stator reaction spring Regulator valve spring A	6.0 (0.236) 1.58 x 2.0 (0.062 x 0.079)	38.4 (1.512) 14.7 (0.579)	30.3 (1.193) 88.6 (3.488)	2.0 20.9
3 4 5	Regulator valve spring B Cooler relief valve spring L/C control spring	1.8 (0.071) 1.2 (0.047) 0.8 (0.031)	9.6 (0.378) 8.4 (0.331) 6.6 (0.260)	44.0 (1.732) 35.7 (1.406) 38.3 (1.5081	14.7 16.5 25.0

Lock-up Valve Body



- Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-1 IO.
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

Unit of length: mm (in)

		Standard (New)				
	No.	Spring	Wire Dia.	O.D.	Free Length	No. of Coils
	1	Lock-up shift valve spring Lock-up timing valve B spring	1 .o (0.039) 0.8 (0.031)	8.6 (0.339) 5.6 (0.220)	51.3 (2.0201 27.8 (1.094)	19.8 16.4

2nd Accumulator Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-110.
- Coat all parts with ATF before reassembly.



SPRING SPECIFICATIONS

Unit of length: mm (in)

Ne	Spring		Standard (New)				
NO.		Wire Dia.	O.D.	Free Length	No. of Coils		
1 2 3	LSD relief valve spring Ist-hold accumulator spring 2nd accumulator spring	0.8 (0.031) 3.4 (0.134) 3.3 (0.130)	8.4 (0.331) 24.3 (0.957) 20.2 (0.795)	37.3 (1.469) 64.7 (2.547) 78.0 (3.071)	12.1 6.7 11.8		

Mainshaft





• Lubricate all parts with ATF during reassembly.

Disassembly/Inspection/Reassembly

- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect thrust needle and needle bearings for galling and rough movement.



Countershaft




Inspection/Installation

NOTE: Lubricate all parts with ATF during assembly.

1. Assemble the parts below on the countershaft.



2. Hold the 2nd gear against the 3rd gear. Measure the clearance between the 3rd gear and thrust needle bearing with a feeler gauge.

NOTE: Take measurements in at least three places and take the average as the actual clearance.

STANDARD: 0-0.03 mm (0-0.001 in)





3RD GEAR COLLAR

Νo	Part Number	Length mm (in)
1	90413-PR9-000	35.425-35.440 (1.3947-I .3952)
2	90414-PR9-000	35.440-35.455 (1.3952-1.3959)
3	90415-PR9-000	35.455-35.470 (1.3959-1.3965)
4	90416-PR9-000	35.470-35.485 (1.3965-1.3970)
5	90417-PR9-000	35.485-35.500 (1.3970-I . 3976)
6	90418-PR9-000	35.500-35.515 (1 .3976-1 .3982)

Countershaft

Inspection/Installation (cont'd)

- 3. If the clearance is out of tolerance;
 - -1. Select and install a new 3rd gear collar and recheck the clearance.
 - -2. If the clearance is still out of tolerance, replace the two thrust needle bearings and recheck the clearance.

NOTE:

- If the clearance still exceeds the service limit even with *new* thrust needle bearings, check the 3rd gear, 2nd gear and 3rd gear collar for wear, and replace any worn parts.
- After replacing parts, make sure that the clearance is within tolerance.
- 4. Hold the 2nd gear against the 3rd gear. Measure the clearance between the 2nd gear spacer and cotters with a feeler gauge.

NOTE: Take measurements in at least three places, and take the average as the actual clearance.



5. If the clearance is out of tolerance, select and install a new cotters.

COTTER 31.5 mm

No	Part Number	Thickness mm (in)
1	90441 - PR9-00 0	1.975-2.000 (0.078-0.079)
2	90442-PR9-000	2.000-2.025 (0.079-0.080)
3	90443-PR9-000	2.025-2.050 (0.080-0.081)
4	90444-PR9-000	2.050-2.075 (0.081-0.082)
5	90445-PR9-000	2.075-2.100 (0.082-0.083)
6	90446-PR9-000	2.100-2.125 (0.083-0.084)
7	90447-PR9-000	2.125-2.150 (0.084-0.085)
8	90448-PR9-000	2.150-2.175 (0.085-0.086)
9	90449-PR9-000	2.175-2.200 (0.086-0.087)
10	90450-PR9-000	2.200-2.225 (0.087-0.088)
11	90451 -PR9-000	2.225-2.250 (0.088-0.089)
12	90452-PR9-000	2.250-2.275 (0.089-0.090)
13	90453-PR9-000	2.275-2.300 (0.090-0.091)
14	90454-PR9-000	2.300-2.325 (0.091-0.092)
15	90455-PR9-000	2.325-2.350 (0.092-0.093)
16	90456-PR9-000	2.350-2.375 (0.093-0.094)

NOTE: After replacing the **cotters**, make sure that the clearance is held within tolerance.

- 6. Remove the countershaft bearing from the transmission housing. See page 14-1 40.
- 7. Assemble the countershaft including bearing and all parts shown to on page 14-I 22.



8. Torque the countershaft locknut to 30 $N{\cdot}m$ (3.0 kg-m, 22 lb-ft).



9. Measure the clearance between 4th gear and reverse selector hub with a feeler gauge.

NOTE: Take measurements in at least three places, and take the average as the actual clearance.

STANDARD: 0.05-0.16 mm (0.002-0.006 in)





10. If the clearance is out of tolerance, select and install a new cotter retainer.



COTTER RETAINER

No.	Parts Number	Thickness
1	90432-PR9-000	3.00 — 3.03 mm (0.118 — 0.119 in)
2	90433-PR9-000	3.03 - 3.06 mm (0.119 - 0.120 in)
3	90434-PR9-000	3.06 3.09 mm (0.120 0.122 in)
4	90435-PR9-000	3.09 – 3.12 mm (0.122 – 0.123 in)

NOTE: After replacing the cotter retainer, make sure that the clearance is within tolerance.

One-Way Clutch/Parking Gear

Disassembly and Inspection

1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



SCREWDRIVER



Secondary Shaft





Clutch

Illustrated Index







(cont'd)

Clutch

Illustrated Index

2ND CLUTCH



.

4



- Disassembly

1. Remove the snap rings, then remove the clutch end plate, clutch discs and plates.



3. Install the special tools as shown. CLUTCH SPRING COMPRESSOR ATTACHMENT OTLAE -- PX40100 CLUTCH SFRING COMPRESSOR BOLT ASSEMBLY OTGAE -- PG40200

CAUTION: If either end of the compressor attachment is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged.



(cont'd)

Clutch



COMPRESSED AIR HOSE NOZZLE OSHA-Approved 30 psi type only.



- Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before assembly.
- 1. install a new O-ring on the clutch piston.
- 2. Be sure that the disc spring is securely staked. NOTE: For lst, 3rd and 4th clutches



3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

NOTE: Lubricate the piston O-ring with ATF before installing.

CAUTION: Do not pinch O-ring by installing the piston with force.



4. Install the return spring and spring retainer and position the circlip on the retainer.



Clutch



6. Compress the clutch return spring.





Remove the special tools.

14-1 34



9. install the disc spring.

NOTE:

- For 1st hold and 2nd clutches
- Install the disc spring in the right direction.



- 10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes.
- 11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.





Clutch

- Reassembly (cont'd)

13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Measure at three locations.

End Plate-to-Top Disc Clearance:

Clutch	Service Limit		
1st	0.65 – 0.85 mm (0.026 – 0.033 in)		
2nd	0.75 – 0.95 mm (0.030 – 0.037 in)		
3rd	0.75 – 0.95 mm (0.030 <u>–</u> 0.037 in)		
4th	0.75 – 0.95 mm (0.030 – 0.037 in)		
1st-Hold	0.70 – 0.90 mm (0.028 – 0.035 in)		



14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed but the clearance is still over the standard, replace the clutch discs and clutch plates.

2ND, 3RD, 4TH and 1ST HOLD CLUTCH

	No. mm (in)
22551 - PX4-003 22552-PX4-003 22553-PX4-003 22554-PX4-003 22555-PX4-003 22556-PX4-003 22556-PX4-003 22557-PX4-003 22558-PX4-003	1 2.1 (0.083) 2 2.2 (0.087) 3 2.3 (0.091) 4 2.4 (0.094) 5 2.5 (0.098) 6 2.6 (0.102) 7 2.7 (0.106) 8 2.8 (0.1 IO) 0 0.0111

1 ST CLUTCH

PART No.	PLATE No.	THICKNESS mm (in)
22631 - PR9-003	1	2.1 (0.083)
22632-PR9-003	2	2.2 (0.087)
22633-PR9-003	3	2.3 (0.091)
22634—PR9—003	4	2.4 (0.094)
22635-PR9-003	5	2.5 (0.098)
22636-PR9-003	6	2.6 (0.102)
22637-PR9-003	7	2.7 (0.106)
22638-PR9-003	8	2.8 (0.1 IO)
22639—PR9—003	9	2.9 (0.114)



1 st-Hold Clutch Bearing

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- Replacement -

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1. Remove the lst-hold clutch bearing using a bearing puller.



Torque Converter Housing Bearings Mainshaft Bearing

Replacement

1. Drive out the mainshaft bearing and oil seal using the special tools.



 Install the new oil seal flush with the housing using the special tools.



ATTACHMENT. 62 x 68 mm 07746-0010500

Countershaft Bearing

- Replacement

1. Remove the countershaft bearing using the special tool.



- 2. Replace the oil guide plate.
- Drive the new bearing into the housing using the spe-3. cial tools.



Secondary Shaft Bearing

.

2.

3.

Replacement -1. Remove the secondary shaft bearing using the special tool. Commercially Available 3/8 x 16 Thread Slide Hammer. **ADJUSTABLE** BEARING PULLER SECONDARY SHAFT (25-40 mm) 07736-A01000A NEEDLE BEARING Replace with new bearing if removed. Replace the oil guide plate. Drive the new bearing into the housing using the special tools. DRIVER 07749-0010000



Transmission Housing Bearings

Replacement

I. To remove the mainshaft, countershaft and secondary shaft bearings from the transmission housing, expand each snap ring with the snap ring pliers, then push the bearing out.

NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



2. Expand each snap ring with the snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.



Reverse Idler Gear





1. Install the reverse idler gear.

NOTE: install the reverse idler gear so that the large chamfer on the shaft bore faces the torque converter housing.



2. Set the spring in the reverse idler shaft. Push the spring in with the steel ball then install the needle bearing.

NOTE: The steel ball is under spring pressure. Take care not to let it pop out.



3. Install the reverse idler shaft holder into the transmission housing, then tighten the bolts.



Manual Valve Detent Spring



MANUAL VALVE DETENT SPRING

No.	Part Number	Length
1	24618-PR9-000	103.5 mm (4.07 in)
2	24619-PR9-000	104.0 mm (4.09 in)
3	24620-PR9-000	104.5 mm (4.11 in)



Parking Brake Stopper

- Inspection/Adjustment

- 1. Set the parking shift arm in the PARK position.
- 2. Measure the distance between the face of the parking pawl shaft and face of the parking shift arm roller pin as shown.

DISTANCE: 52.1-53.1 mm (2.051-2.091 in)



3. If the measurement is out of tolerance, select the appropriate parking brake stopper using the table below, and install it on the parking shift arm.

PARKING BRAKE STOPPER

No.	Part Number
1	24537-PA9-003
2	24538-PA9-003
3	24539-PA9-003





NOTE: Coat all parts with ATF.

1. Reassemble the valve bodies in the following numbered sequence.

CAUTION: To prevent stripping the threads, press down on the accumulator cover while installing the bolts.

TORQUE:

6 x 1 .0 mm: all bolts except (50): 12 N·m (1.2 kg-m, 9 lb-ft) 6 x 1 .0 mm: 50: 14 N·m (1.4 kg-m, 10 lb-ft)

NOTE: Install the oil pump driven gear with its chamfered side facing down.







3. Assemble the transmission in the following numbered sequence.

,

12 1





Install the special tool as shown, and shift to PARK



Install and torque the new locknuts. Tighten to specified torque, then loosen and retighten to specified

TORQUE: 140 \rightarrow 0 \rightarrow 140 N·m $(14.0 \rightarrow 0 \rightarrow 14.0 \text{ kg-m}, 101 \rightarrow 0 \rightarrow 101 \text{ lb-ft})$

NOTE: Countershaft locknut has left-hand threads.

9. Stake each locknut into its shaft, using a 3.5 mm





- 10. Install the feed pipes and ball bearing in the L. Side Cover, aligning the lugs of the 1st and lst-hold clutch feed pipes with the grooves of the L. side cover.
- 11. Install the snap ring.



12. Install the L. Side Cover.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)



13. Install the speed sensors, speed sensor cover and linear solenoid.

TORQUE: 12 N·m (1.2 kg-m, 9 lb-ft)















SET RING 6 x 1.0 mm 10 N·m (1.0 kg·m, 7 lb-ft) 8 x 1.25 mm 22 N·m (2.2 kg·m, 16 lb-ft)





Installation (cont'd)

- 27. Install the 3 transmission mounting bolts, and the 2 transmission housing mounting bolts.
- 28. Install the starter motor and tighten the starter motor mounting bolts.
- 29. Install the ATF cooler.
- 30. Connect the transmission ground cable, starter motor cable, solenoid valve wire connectors and speed sensor wire connectors.
- 31. Install the control box and connect the control box connectors.
- 32. Install the air cleaner case.
- 33. Install the strut bar. TORQUE: 39 №m (3.9 kg-m, 28 lb-ft)
- ☆ : Corrosion resistant bolt/nut

- 34. Refill the transmission with ATF.
- 35. Connect the battery positive (+) and negative (-) cable to the battery.
- 36. Inspect the rear camber (See Section 18).
- 37. Start the engine. Set the parking brake, and shift the transmission through all gears three times. Check for proper shift cable adjustment.
- 38. Check the ignition timing (See Section 23).
- 39. Let the engine each operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
- 40. Road test as described on page 14-88.



Shift Cable



Adjustment

- 1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting on pages 14-84 thru 14-87.
- 2. Stop the engine.
- 3. Raise the car. (See page I-6.)
- 4. Shift the selector lever to 1 position.
- 5. Remove the shift cable cover.
- 6. Remove the control lever pin and lock pin from the control lever.



7. Shift the control lever to 1 position.

NOTE: 1 position moves the control lever toward to the front of the car.



8. Check that the hole in the control lever is perfectly aligned with the hole in the shift cable.

CONTROL LEVER



Shift Cable

Removal/Installation -



Gearshift Selector



SRS wire harness is routed near the gearshift selector.

A WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be carefull not to damage the SRS wire harness when servicing the gearshift selector.



Shift Indicator Panel

Adjustment -

SRS wire harness is routed near the gearshift selector.

A WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be carefull not to damage the SRS wire harness when servicing the shift indicator panel.

- 1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel with the transmission in NEUTRAL.
- 2. If not aligned, remove the center console panel. (See section 20.)
- 3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.



HIFT INDICATOR

Differential

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Special Tools


Differential



Illustrated Index

NOTE: If the * mark parts are replaced, the bearing preload must be adjusted (page 15-12).



Preset Torque

-Inspection -

On-Car:

- 1. Lift up right rear wheel and place the safety stand. (Lift and Support Points, page I-6).
- 2. Block the other three wheels.
- 3. Measure preset torque clockwise using a torque wrench as shown.

Standard: 60-140 N·m (6-14 kg·m, 43-101 lb-ft) Service Limits: 30 N·m (3 kg-m, 22 lb-ft)

TORQUE WRENCH



4. If preset torque is less than the service limit, replace the clutch discs with new ones.

NOTE: Adjust the thrust shim whenever the clutch discs are replaced. (See page 15-8).

Assembly:

1. Place one special tool in a vise. Place the left side of the differential assembly on the special tool, then preset the differential with 3-5 rotations, both clockwise and counterclockwise.



Standard: 60-140 N·m (6-14 kg-m, 43-101 lb-ft) Service Limit: 30 N·m (3 kg-m, 22 lb-ft)



3. If preset torque is less than the service limit, replace the clutch discs with new ones.

NOTE: Adjust the thrust shim whenever the clutch discs are replaced. (See page 15-8).



Bearing



- Replacement

NOTE:

- The bearing and outer race should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.
- 1. Remove the bearings using standard bearing pullers.

BEARING PULLER

2. Install the bearings using a press as shown.

NOTE: Press the bearings squarely until they bottom against the case.

Transmission Housing Side:



Clutch Housing Side:





3

Differential

Disassembly

1. Hold the differential in a vise using a special tool, then remove the differential housing mounting bolts.



2. Remove the differential case, then install the special tools on the stopper plate as shown.



ár.

3. Compress the spring plate.



- 4. Remove the stopper clip.
- 5. Remove the special tools and then remove the stopper plate, spring plate and 60 mm washer.





6. Remove the 112 mm thrust shim, clutch discs, clutch plates and 102 mm washer.



7. Remove the carrier assembly, central gear, clutch plate and clutch disc.



8. Remove the ring gear by installing the differential housing mounting bolts into the threaded holes and tightening them.



Clutch Disc, Clutch Plate

- Replacement -

NOTE: The clutch disks and clutch plates should be replaced as a set.

- 1. Remove the clutch discs and clutch plates. (See page 15-6).
- 2. Soak the clutch discs for five minutes in transmission oil.
- 3. Install the clutch discs, clutch plates and a standard shim.

112 mm THRUST SHIM

		○Standard shim		
	PART NUMBER	THICKNESS		
Α	41261-PR8-000	1.2 mm (0.0472 in.)		
В	41262-PR8-000	1.4 mm (0.0551 in.)		
С	41263-PR8-000	1.6 mm (0.0630 in.)		
D	41264-PR8-000	1.8 mm (0.0709 in.)		
Е	41265-PR8-000	2.0 mm (0.0787 in.)		
F	41266-PR8-000	2.2 mm (0.0866 in.)		
G	41267-PR8-000	2.4 mm (0.0945 in.)		
Θ	41268-PR8-000	2.6 mm (0.1024 in.)		
I	41269-PR8-000	2.8 mm (0.1102 in.)		
J	41270-PR8-000	3.0 mm (0.1181 in.)		

<Reference>

Measure (A): 41.7-41.9 mm (1.6417-1.6496 in)



4. install the differential case.

NOTE: Tighten the bolts evenly in several steps, then torque them in a criss-cross pattern.

Torque: 40 N·m (4.0 kg-m, 29 lb-ft)

- 5. Make sure the preset torque is within the standard. (See page 15-4).
- 6. If preset torque is beyond the standard, replace the 112 mm thrust shim as necessary.

Differential









Oil Sea!

- Removal

- 1. Remove the differential assembly.
- 2. Remove the oil seal from the transmission housing.



3. Remove the oil seal from the clutch housing.



8. Hold the differential in a vise using a special tool, then install the differential housing mount bolts.

NOTE: Tighten the bolts two turns at a time, then torque them in a crisscross pattern.



DIFFERENTIAL INSPECTION TOOL 07MAJ -- PR90100

Bearing Outer Race

r Replacement (Clutch housing side) ٦

NOTE:

- The outer race and bearing should be replaced as a set.
- Inspect and adjust the bearing preload whenever the bearing is replaced.
- 1. Remove the outer race, 90 mm washer and oil guide ring.



2. Install the oil guide ring and 90 mm washer, then drive the outer race into the clutch housing.



Bearing Preload

Adjustment

NOTE: If any of the items listed below are replaced, the bearing preload must be adjusted.

- TRANSMISSION HOUSING
- CLUTCH HOUSING
- DIFFERENTIAL
- TAPER ROLLER BEARING and OUTER RACE
- 75 mm THRUST SHIM
- 90 mm WASHER
- OIL GUIDE RING
- 1. Remove the bearing outer race and 75 mm thrust shim from the transmission housing by prying up on the bearing outer race or by heating the housing to about 100°C (212°F).

CAUTION: Do not reuse the thrust shim if the outer race was pried out.

NOTE:

- Let the transmission cool to the room temperature if the outer race was removed by heating the case before adjusting the bearing preload.
- Do not heat the transmission housing in excess of 100°C (212°F).
- Replace the bearing with a new one whenever the outer race is replaced.
- Repeat on the clutch side.
- There is no shim on the clutch side.



15-12



2. First try a 1.97 mm thrust shim (J).

CAUTION: Do not use more than one shim to adjust the bearing preload.



- **TRANSMISSION HOUSING** 3. Select shim from the following table.
- 75 mm SHRUST SHIM

; }		OStandard shim
	PART NUMBER	THICKNESS
٩	41481-PR8-000	1.70 mm (0.0669 in.)
m	41482-PR8-000	1.73 mm (0.0681 in.)
ပ	41483-PR8-000	1.76 mm (0.0693 in.)
۵	41484-PR8-000	1.79 mm (0.0705 in.)
ш	41485-PR8-000	1.82 mm (0.0723 in.)
ш	41486-PR8-000	1.85 mm (0.0728 in.)
თ	41487-PR8-000	1.88 mm (0.0740 in.)
I	41488-PR8-000	1.91 mm (0.0752 in.)
-	41489-PR8-000	1.94 mm (0.0764 in.)
0	41490-PR8-000	1.97 mm (0.0776 in.)
У	41491-PR8-000	2.00 mm (0.0787 in.)
_	41492-PR8-000	2.03 mm (0.0799 in.)
Σ	41493-PR8-000	2.06 mm (0.0811 in.)
z	41494-PR8-000	2.09 mm (0.0823 in.)
0	41495-PR8-000	2.12 mm (0.0835 in.)
Р	41496-PR8-000	2.15 mm (0.0846 in.)
d	41497-PR8-000	2.18 mm (0.0858 in.)
щ	41498-PR8-000	2.21 mm (0.0870 in.)
S	41499-PR8-000	2.24 mm (0.0882 in.)
-	41500-PR8-000	2.27 mm (0.0894 in.)

After installing the shim, install the outer race in the transmission housing.

NOTE:

- Install the outer race squarely.
- Check that there is no clearance between the outer race, shim and transmission housing.
- Install the differential assembly in the clutch housing, then install the transmission housing.

NOTE: Do not install the mainshaft, countershaft and reverse idle gear shaft assembly.

Torque: 43 N·m (4.3 kg-m, 31 lb-ft)

- 6. Rotate the differential assembly in both directions to seat the bearings.
- Measure the starting torque of the differential assembly with the differential inspection tool and a torque wrench.

NOTE: Measure the bearing preload at normal room temperature in both directions.

Standard: 2.0-3.0 N·m (20-30 kg-cm, 17-26 lb-in)



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8. If the bearing preload is beyond the standard, select the shim that will give you the correct preload and recheck.

NOTE: Changing one of the shims to the next size will increase or decrease preload about 3–4 kg-cm (2.60-3.47 lb-in).

Oil Seal



Sec. 14

15-14

Driveshafts

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STANK SHE

Special Tools

1		1			
	Number	Tool Number	Description	Q'ty	Page Reference
	103	07GAF-SD40700 07GAF-SE00200 07GAD-BG40100	Hub Dis/Assembly Base Hub Driver Attachment	2 1	16-13, 14, 16 16-16 16-16
	(4) (5)	07GAD-FG40100 07JAD-SH30100 07MAC-SL00100	Oil Seal Driver Attachment	1	16-16 16-16
	6	07746-0010400 07746-0010000	Attachment, 52 x 55 mm	1	16-5 16-14 16-14 16
	8	07749-0010000	Ball Joint Remover	1	16-4
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		1	2 3		۲
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				e	
	E E				JOEB)
		6	6 ⑦		(8)
					C

Driveshafts





Spline Looseness Turn the driveshaft by hand and make sure the spline and joint are not excessively loose. If damage is found, replace the inboard joint.

Twisted or Cracked Make sure the driveshaft is not twisted or cracked. Replace if necessary.

> INBOARD JOINT



- 1. Raise the car and place safety stands in the proper locations (see section 1),
- 2. Remove the rear wheels.
- 3. Drain the transmission oil (see section 13).

NOTE: It is not necessary to drain the transmission oil when the right driveshaft is removed.

4. Raise the locking tab on the spindle nut and loosen it.

NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



5. Remove the banjo bolt and disconnect the brake hose, then remove the brake hose clamp from the knuckle.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish;

Wash spilled brake fluid off immediately with clean water.



Driveshafts

- Removal (cont'd)

6. Remove the speed sensor from the knuckle and rear lower arm, but do not disconnect it.

NOTE: Avoid twisting the wires when reinstalling the sensors.



- 7. Remove the cotter pin from the toe control arm castle nut and remove the nut.
- 8. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball. joint remover.
- 9. Position the special tool between the knuckle and control arm as shown, then separate the toe control arm.

CAUTION: Be careful not to damage the ball-joint boot.



10. Hold the stabilizer link with a wrench and remove the damper mounting nut.



*Corrosion resistant bolt/nut

11. Remove the stabilizer link from the stabilizer bar and knuckle.



16-4



- 12. Remove the cotter pin from the lower control arm ball joint castle nut and remove the nut.
- 13. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

NOTE: Use the ball joint remover (07MAC-SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

14. Position the special tool between the knuckle and lower control arm as shown, then separate the lower control arm.

CAUTION: Be careful not to damage the ball joint boot.



15. Pry the driveshaft assembly with a screwdriver as shown to force the set ring past the groove.



 Pull the inboard joint and remove the driveshaft and CV joint from of the differential case or intermediate shaft as an assembly.

CAUTION:

- Do not pull on the driveshaft, as the CV joint may come apart.
- Use care when prying out the assembly and pull it straight to avoid damaging the differential oil seal or intermediate shaft dust seal.



- 17. Remove the spindle nut.
- 18. Pull the knuckle outward and remove the driveshaft outboard joint from the rear wheel hub using a plastic hammer.



19. Installation is the reverse order of removal. After installing the driveshafts, adjust the wheel alignment (see section 18).

Driveshafts

-Disassembly

 To remove the boot band, pry up the locking tabs with screwdriver and raise the end of the band.
 NOTE: Carefully clamp the driveshaft in a vise with soft jaws.
 CAUTION: Take care not to damage the boots.



- 2. Remove both joints.
 - Outboard joint side only:
 - Remove the circlip from the outboard joint groove.
 - Remove the outboard joint and spring.



3. Remove the rollers from the spider.



4. Remove the set ring, then remove the spider with a bearing remover.

NOTE: Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.







Driveshafts

- Reassembly

Outboard joint side

NOTE: Wrap the splines with vinyl tape to prevent damage to the boot.

1. install the outboard boot to the driveshaft, then remove the vinyl tape.



- 2. Install the set ring into the driveshaft groove.
- 3. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
- 4. install the set ring into the driveshaft groove.



5. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:

- Reinstall the rollers in their original positions on the spider.
- Hold the driveshaft assembly with the rollers up, to prevent them from falling off.



6. Pack the joint with joint grease included in the new joint boot set.

Grease Quantity: 170-'I 80 g





joint onto the driveshaft.

7. Install the spring and cap, than fit the outboard

8. Fit the circlip into the outboard joint inner groove.

inboard joint side

NOTE: Wrap the splines with vinyl tape to prevent damage to the boot.

9. Install the inboard boot to the driveshaft, then remove the vinyl tape.



- IO. Install the set ring into the driveshaft groove.
- 11. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
- 12. Install the set ring into the driveshaft groove.





Driveshafts

- Reassembly (cont'd)

13. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:

- Reinstall the rollers in their original positions on the spider.
- Hold the drivashaft assembly with the rollers up, to prevent them from falling off.



14. Pack the joint with joint grease included in the new joint boot set.

Grease Quantity: 120-130 g



15. Fit the inboard joint onto the driveshaft.



16. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and extension.

NOTE: The ends of the boots seat in the grooves of the driveshaft and joint.





- 17. Install new boot bands on the boots and bend both sets of locking tabs.
- 18. Lightly tap on the doubled-over portions to reduce their height.



NOTE: Install the outboard joint in the knuckle before installing the driveshaft into the differential or intermediate shaft. Loosely install the spindle nut this time.



- 19. Install the new set rings in the driveshaft groove and intermediate shaft groove.
- 20. Install the inboard end of the driveshaft into differential or intermediate shaft.

CAUTION:

- Always use a new set ring whenever the driveshaft is being installed.
- Make sure the L. driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential.
- insert the R. driveshaft CV joint subaxle into the intermediate shaft until the intermediate shaft set ring locks in the groove in the R. driveshaft.





L. Driveshaft inboard end



R. Driveshaft inboard end (Intermediate shaft side)

Intermediate Shaft

-Replacement

- 1. Drain the oil from the transmission (see section 13).
- 2. Remove the right driveshaft assembly (page 16-3).
- 3. Remove the heat shield.

*Corrosion resistant bolt/nut



4. The bearing support assembly is a light press fit in the support base. To remove the bearing support assembly, remove the 8 x 1.25 mm flange bolts, with the support base still attached to the engine block. Tap the flanged section of the bearing support with a plastic hammer toward the wheel side, then remove the bearing support assembly from the support base.

CAUTION: To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential. NOTE: Mark the support base and bearing support during disassembly to ensure proper positioning during reassembly.

CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

*Corrosion resistant bolt/nut

SUPPORT BASE



5. Remove the support base from the engine block.



6. Installation is the reverse order of removal. Align the marks and install by tapping on the bearing support assembly shaft end.





CAUTION: The bearing support and support base are made of aluminum. Be careful not to damage them when servicing.

- 1. Remove the intermediate shaft outer seal from the bearing support.
- 3. Press the intermediate shaft out of the shaft bearing using the special tool.



Intermediate shaft







Intermediate shaft



16-16



facing out. EXTERNAL CIRCLIP Install the outer seal into the bearing support. 6. OUTER SEAL GREASE

5. Seat the external circlip in the groove of the intermediate shaft.

CAUTION: Install the circlip with the tapered end

Steering

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in each section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools and should therefore be done by an authorized Acura dealer.

AWARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS selectrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

ł

Special Tools



System Description



-Steering Column -

The NSX has a tilt/telescopic steering column. The tilt/telescopic mechanism makes it possible to adjust the steering wheel in fore and aft, and up and down directions.

Tilt Mechanism

There is a joint on the upper steering shaft, and the portion of the column between the steering wheel and this joint is adjustable up and down. When the tilt lever is operated, the lock gears are detached from the column gear to release the lock. The column moves upward or downward on two pivot bolts. When the tilt lever is returned to a fixed position after selecting the steering wheel height, the lock gear is engaged with the column gear to secure the column.



System Description

-Steering Column (cont'd)

Telescopic Mechanism

The upper steering shaft is divided into two shafts, connected by splines, making it possible for the shaft to telescope while transmitting the rotation of the steering wheel. When the telescopic lever is lowered, the lever pivot turns in a direction to loosen the stopper shim at the tip of the lever pivot, allowing the shaft to make telescope. The telescopic stroke is limited by the slot and stopper on the movable shaft. After selecting a steering wheel position and returning the telescopic lever to the fastening position, the stopper shim is pressed against the movable shaft the lever pivot to fasten the sliding part.





. Energy-absorbing Steering Column/Wheel

Both the steering column and steering wheel are designed to absorb impact energy during a collision.

Steering Wheel

The steering wheel absorbs the energy of a collision through the deformation of the spoke portion. Should the impact absorbing capacity of the column side decrease due to the deformation of the vehicle body during a collision, the steering wheel will help absorb the impact.

Steering Column

The steering column is fastened on the body through a U-shaped plate, and the lower part of the column is inserted into a lower holder. Due to this construction, the steering column will slide in its axial direction when a large impact is given in the axial direction of the column. Since the U-shaped plate is fastened to the body, the U-shaped plate is bent and deformed along the guide when the column slides in its axial direction. Through the deformation of the plate, the energy is absorbed and the column slides forward. When exposed to a greater impact, a shear pin will break and the energy is absorbed by the lower shaft.



Inspection

Steering Wheel Rotational Play — 1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels. 2. If the play exceeds the service limit, check all steering components. Service Limit: 5 cm (0.2 in)

- Steering Effort Check – (Manual Steering Only)

- 1. Raise the front wheels off the ground (see section 1).
- 2. Turn the steering wheel with a spring scale and check its reading.
- 3. If the reading exceeds the service limit, adjust the steering gearbox as shown on the next page. Service Limit: 20 N (2 kg, 4.4 lb)



-Power Assist Check With Car Parked (Electrical Power Steering Only)

Turn the steering wheel with a spring scale. Read the measurement when the front wheels or steering wheel start to move.

Operation Standard

Condition	Stationary Swing operation load		
Without power assist (engine off)	12 kg (26.46 lb) maximum		
With power assist (engine running)	4.2 kg (9.26 lb) maximum		





--Steering Gearbox Adjustment --

Manual Steering:

- 1. Loosen the rack guide screw locknut.
- 2. Tighten, loosen and retighten the rack guide screw two times to 5 N⋅m (0.5 kg-m, 3.6 lb-ft), then back it off 15°.



- 3. Tighten the locknut on the rack guide screw with the special tool.
- 4. Check for tight or loose steering through the complete turning travel.
- 5. Recheck steering effort.
- To calculate the indicated torque value, use the formula on page 17-26.
 - Actual: 66 N·m (6.8 kg-m, 49 lb-ft) Indicated: 52 N-m (5.2 kg-m, 38 lb-ft)



Electrical Power Steering:

- 1. Loosen the rack guide screw locknut.
- 2. Tighten, loosen and retighten the rack guide screw two times to $4 \text{ N} \cdot \text{m}$ (0.4 kg-m, 2.9 lb-ft), then back it off $20^{\circ} {}^{+5^{\circ}}_{0}$.



- 3. Tighten the locknut on the rack guide screw with the special tool.
- 4. Check for tight or loose steering through the complete turning travel.
- 5. Recheck steering assist.

To calculate the indicated torque value, use the formula on page 17-70.

Actual: 25 N-m (2.5 kg-m, 18 lb-ft) Indicated: 19 N·m (1.9 kg-m, 14 lg-ft)


Steering Wheel

-Removal -

Airbag Removal

AWARNING Store a removed **airbag** assembly with the pad **surfce** up, if the **airbag** is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

CAUTION:

- Before removing the steering wheel, aline the front wheels straight ahead.
- Do not install used SRS parts from another car. When repairing, use only new SRS parts.
- Carefully inspect the **airbag** assembly before installing. Do not install an **airbag** assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassemble or tamper with the airbag assembly.
- 1. Disconnect both the negative cable and positive cable from the battery.
- 2. Remove the maintenance lid form the steering wheel lower cover, then remove the short connector.
- 3. Disconnect the connector between the airbag and cable reel.
- 4. Connect the short connector to the airbag side of the connector.



5. Remove the two TORX[®] bolts using a TORX[®] T30 bit, then remove the airbag assembly.



CRUISE CONTROL SET/RESUME SWITCH



AIRBAG ASSEMBLY

(cont'd)



-Removal (cont'd)-

 Disconnect the connectors from the horn and cruise control set/resume switches remove the airbag connector from its dips.



- 8. Remove the steering wheel nut.
- 9. Remove the steering wheel by rocking it slightly from side-to-side as you pull steadily with both hands.



-Disassembly/Reassembly

A WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

NOTE: If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 23).

CAUTION:

- Carefully inspect the **airbag** assembly before installing. Do not install an **airbag** assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassemble or tamper with the airbag assembly.



Steering Wheel

-Installation

CAUTION:

- Before installing the steering wheel, align the front wheels straight ahead.
- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.
- Do not replace the original steering wheel with any other design, since it will make it impossible to properly install the **airbag.** (only use genuine HONDA replacement parts)
- After reassembly, confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary, do so only by adjustment of the tie rods, not by removing and repositioning the steering wheel.

AWARNING Confirm that the **airbag** assembly is securely attached to the steering wheel; otherwise, severe personal injury could result during later **airbag** deployment.

1. Before installing the steering wheel, center the cable reel.

Do this by first rotating the cable reel clockwise until it stops.

Then rotate it counterclockwise (approximately two turns) until:

- The yellow gear tooth lines up with the mark on the cover.
- --- The arrow on the cable reel label points straight up.





- Insert the cruise control set/resume 4-P connector and airbag connector to the steering wheel clips.
- 4. Connect the horn connector.







5. Install the airbag assembly with new TORX® bolts.



- 7. Disconnect the short connector from the airbag connector.
- 8. Connect the airbag 3-P connector and cable reel 3-P connector.
- 9. Attach the short connector to the lid, and install the lid on the steering wheel lower cover.

- 10. Connect the battery positive terminal and then connect the negative terminal.
- 1 1. After installing the airbag assembly, confirm proper system operation:
 - Turn the ignition to II: the instrument panel SRS warning light should come on for about 6 seconds and then go off.
 - Confirm operation of horn buttons.
 - Confirm operation of cruise control set/resume switch.
 - Turn the steering wheel counterclockwise and make sure the yellow gear tooth still lines up with the alignment mark.





Steering Column

-Removal -

- 1. Disconnect both the negative cable and positive cable from the battery.
- 2. Remove the airbag assembly and steering wheel from the column (page 17-8).
- 3. Remove the dashboard lower panel, knee bolster pad, and knee bolster.



4. Remove the column lower face. Disconnect the connector between the cable reel and the SRS main harness, then remove the connector holder.



5. Remove the column lower cover, and column upper cover. NOTE: Be careful not to damage the column covers.



6. Disconnect the TCS sensor.





- 7. Remove the combination switch assembly from the column shaft.
 - NOTE: The combination switch can be removed by disconnecting only the TCS connector.



8. Remove the steering joint cover.



9. Remove the steering joint bolts and washers from the joints.



10. Disconnect the ignition switch connectors and remove the column holder, then remove the column assembly by removing the attaching nuts.



Steering Column



NOTE:

- Check the telescopic mechanism, tilt mechanism, and steering joint bearings or steering shaft for movement and damage. Replace as an assembly if damaged or faulty.
- If either the steering column assembly or TCS sensor is removed, select the appropriate shim and adjust the distance between the steering shaft and TCS sensor. Refer to Section 19 for shim selection.

Attach a spring scale to the knob of the telescopic lever. Measure the force required to move the lever.

Preload: 70-90 N (7 -9 kg, 15-20 lbs)

If the force measured is not within the specification, **loos**en the locknut then the telescopic adjusting bolt until the correct force can be obtained.



17-14





- 1. Slip the lower end of the steering joint onto the pinion shaft.
- 2. Reposition the column assembly on the hanger bracket and loosely tighten with 8 mm nuts.



- 3. Tighten to the steering joint yoke bolts. NOTE:
 - Be sure that the lower bolt is securely in the groove in the steering gearbox pinion.
 - Be sure the pinion shaft and the steering column shaft are aligned; the joint should slip on freely. If not, reposition the steering rack to correct the misalignment.

STEERING JOINT

Slip the upper end of the steering joint onto the steering shaft (line up the bolt hole with the *groove* around the shaft) and loosely install the upper bolt.



4. Install the column holder and bolts.



- 5. Tighten the 8 mm nuts to the specified torque.
- 6. Install the steering joint cover with the clamps and clip.



Steering Column

- Installation (Cont'd)-

7. Install the combination switch assembly on the column shaft.



8. Reconnect TCS sensor.



9. Install the column upper cover, and column lower cover.

NOTE: Be careful not to damage the column covers.



- 10. Connect the harness from the cable reel to the SRS main harness below the pedal bracket, then attach the connector holder to the column lower face.
- 11. Install the column lower face.





- 12. Install the knee bolster and pad.
- 13. Connect the foot light harness and light-on warning chime to the driver under cover, then install the dashboard lower panel.



14. Install the steering wheel and SRS airbag assembly to the column. (17-10).





-Gearbox Removal/Installation NOTE: Before removing the steering gearbox, align the front wheels straight ahead. Disconnect the battery negative terminal and then disconnect the positive terminal. Remove the steering joint cover.



2. Remove the steering joint bolts, and move the joint toward the column.



- 3. Raise the car and place safety stands in the proper locations (see section 1).
- 4. Remove the front wheels.

- 5. Remove the cotter pin from the tie-rod ball joint nut and remove the nut.
- 6. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 7. Separate the tie-rod ball joint and knuckle using the special tool.

CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



- 8. Remove the folding spare tire and spare tire holdre plate.
- 9. Remove the battery.
- 10. Remove the spare tire holder.



-Gearbox Removal/Installation (Cont'd)

11. Remove the bolts and nuts of the gearbox and cross beam.



*Corrosion resistant bolt/nut

12. Remove the steering gearbox from the cross beam by removing the mounting bolts.



- 13. Installation is the reverse order of removal.
 - Install the gearbox assembly and spare tire holder plate frame.
 - Install the battery.
 - Install the spare tire holder plate and folding spare tire.
 - Install the steering joint.
- 14. Connect the battery positive terminal and then connect the negative terminal.
- 15. After confirm proper system operation:
 - Turn on the ignition to II: the instrument panel SRS warnig light should go on for about 6 seconds and then go off.
 - Confirm operation of horn buttons.
 - Confirm operation of cruise control set/resume switch.
 - Turn the steering wheel counterclockwise to make sure the yellow gear tooth still lines up with the alignment mark.



17-20



Illustrated Index-



- CAUTION:
- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Replace parts with damaged sliding surfaces.



Overhaul-

- 1. Carefully clamp the gearbox in a vise with soft jaws.
- 2. Remove the boot band.



- 3. Pull the boots away from the ends of the gearbox, and unbend the tie-rod lock washers.
- 4. Hold the rack with a wrench, and unscrew the tierods with another wrench.



 Before disassembly, install the special tool on the pinion shaft and check the preload. If the preload is out of the specification, adjust the rack guide (page 17-27). If the preload is still out of the specification, disassemble the gearbox and check each part.

NOTE: Slide the steering rack in the cylinder until the end of the projects rack 60 mm (2.34 in.) from the cylinder end. Inspection is made near this rack position.

5. Check the pinion preload with a spring scale. Preload 7-17 N (0.7-1.7 kg, 1.5-3.8 **b**)



6. Loosen the rack screw locknut, and remove the rack guide screw.





7. Remove the set screw locknut using the special tool.



- 8. Remove the set screw using the special tool.
 - Check the dust seal for damage and remove it if it must be replaced. Refer to page 17-25 for installation.



9. Move the rack toward the gearbox side (i.e. in the direction of the arrow) as far as it goes, and out *the* pinion assembly pull when the pinion gear contacts the cutout in the rack.

NOTE: The rack cannot be removed from the rackend side.



Arrow direction.

• Check the bearing movement while pulling the bearing outer race as shown.

NOTE: This type of the bearing has play. The play should not be excessive.





17-24



• Press the new bearing into the gearbox housing until it seats using the hydraulic press and special tool.

NOTE:

- Install the bearing with the wider side of the outer race toward the bottom of the gearbox.
- Hold the outer race with the tool securely.
 Do not allow dust and other foreign materials
- Do not allow dust and other foreign materials to enter the bearing.



P/S ADJUSTMENT GUIDE 07973-6920001

1 1. Inser the steering rack into the cylinder housing, being careful not to damage the steering rack sliding surface.



12. Install the steering pinion into the gearbox.

NOTE: Do not engage the steering pinion with the steering rack this time.



- 13. If the dust seal was removed, drive in the new dust seal until it bottoms on the step on the rack screw.
- 14. Grease the sealing lip of the dust seal.



-Overhaul (Cont'd)

- 15. Wrap the splined area of the steering pinion with vinyl tape and grease the surface of the tape.
- 16. Slide the set screw over the steering pinion, being careful not to damage the sealing lip of the dust seal, then remove the vinyl tape.



17. Tighten the pinion set screw to a torque wrench reading (indicated) of $5.7 \sim 7.1 \text{ N} \cdot \text{m}$ ($57 \sim 71 \text{ kg-cm}$, $49 \sim 62 \text{ in-lb}$).

NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 25 cm (10 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the torque value using the following formulas.



Indicated: 5.7-7.1 N·m (57-71 kg-cm, 49-62 in-lb) Actual: 8.0-10 N·m (80-100 kg-cm, 82-87 in-lb)



18. Turn the pinion right and left several times to make set it, then loosen the pinion set screw.

NOTE: Be sure that the pinion gear and rack gear are not engaged.



19. Install the special tool onto the pinion shaft. Attach a spring scale to the tool and pull the scale adjust the pinion set screw until the gauge reads $1.5 \sim 2.5$ N (0.15-0.25 kg, 0.33-0.55 lb).



PINION SCREW WRENCH 07MAA-SL0040A



20. Install the pinion set screw locknut, then hold the pinion set screw and tighten the locknut to a torque wrench reading [indicated) of $54 \sim 69$ N-m ($5.4 \sim 6.9$ kg-m, $39 \sim 50$ lb-ft).

NOTE: The above specification is the torque wrench reading (indicated) when the set screw is tightened using a torque wrench 50 cm (20 inches) long. If you tighten the set screw using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.

Actual: 70-90 N·m (7-9 kg-m, 50-65 lb-ft) indicated: 54-69 N·m (5.4-6.9 kg-m, 39-50 lb-ft)

Tool length (B): 15 cm (6 in)

50 mm, LOCKNUT WRENCH 07HAA-SL0030A PINION SCREW WRENCH 07MAA-SL0040A

21. Turn the pinion shaft slowly, then insert the rack and engage the rack and pinion gears.



- 22. The system is in neutral when the rack end projects 60 mm (2.34 in) from the cylinder end.
- 23. Install the rack guide, pressure plate, pressure spring and rack screw guide.



24. Tighten, loosen and retighten the rack guide screw two times to 5 N·m 10.5 kg-m, 3.6 lb-ft), then back it off 15°.



-Overhaul (Cont'd) -

25. Install the locknut on the rack guide screw, and tighten the locknut to a torque wrench reading (indicated) of $52 N \cdot m$ (5.2 kg-m, 38 lb-ft) while holding the rack guide screw with a wrench.

NOTE: The above specification is the torque wrench reading (indicated) when the locknut is tightened using a torque wrench 50 cm (20 in) long. If you tighten the locknut using a torque wrench of the different length, obtain the indicated torque value (torque wrench reading) using the formulas shown in the step 17.

Actual: 68 N^{·m} (6.8 kg-m, 49 lb-ft) Indicated: 52 N^{·m} (5.2 kg-m, 38 lb-ft) Tool length (B): 150 mm (6 in)



26. Screw each rack end into the rack while holding the lock washer so its tabs are in the slots in the rack end.

NOTE: Install the stopper washer with the chamfered side facing out.



27. Tighten the rack end securely, then bend the lock washer back against the flat on the flange as shown.



- 28. Install the boots on the rack end with the tube clamps.
 - NOTE:
 - Coat the rack end and inside of the boot with the grease.
 - Before installing the boot, be sure that the pressure inside of the boot is the atmospheric pressure.
 - Install the boot band with the rack in the straight ahead condition (i.e. right and left tie-rods are equal in length).





- 29. Install the new boot bands on the boot and bend both sets of locking tabs.
- 30. Lightly tap on the doubled portions to reduce their height.

NOTE: After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.



31. If the tie-rod ends were removed, install the tie-rods on the right and left rack ends and screw them in until the threaded section is 11 mm (0.43 in) in length.



- 32. Install the gearbox on the cross-beam (page 17-20).
- 33. Check the wheel alignment and adjust if necessary (Section 18).



System Description



-Electrical Power Steering (EPS)

Outline

The NSX uses an electric motor-driven power steering, which possesses the characteristics best suited for a mid engine automobile. This system is a power-assisted steering device, with a motor inside the steering gearbox driven by the control unit and power unit. Its distinctive features are described below:

- Minimized loss of engine horsepower are decreased, fuel consumption.
- A linear steering feel and the reduction of kick back.
- Since it requires no complicated hydraulic piping, etc., the system is compact and light in weight.



alaranı maaanbaar

-Major Components -

The Electrical Power Steering system is composed of the following major components:

- A steering gearbox that converts rotary operation of the steering wheel into transverse operation via a rack and pinion mechanism. Steering sensors and an actuating motor are incorporated.
- A control unit that computes the optimum amount of power assistance, taking into account steering torque, steering speed, and vehicle speed. Selfdiagnosis functions are included.
- A power unit that drives the motor according to the signals from the control unit. A current sensor is built in to give feedback information to the control unit. Two relays shut off the power if a problem in the system occurs.
- Two speed sensors, the speedometer and the automatic transmission sensor, send vehicle speed information to the control unit. Two sensors are used as a double-check.





-System Operation

Manual Steering Operation

Steering wheel input rotates the pinion of the gearbox through the universal joint. Due to the rack and pinion mechanism, the rotation of pinion is converted into a transverse motion at the rack, which steers the front wheels throught the tie-rods and knuckles the same as an ordinary rack and pinion system.

Assisting Operation

In addition to the manual steering operation, the steering sensor on the pinion shaft transmits a signal to the control unit when it receives a steering input. The control unit calculates an adequate motor control with addition of speed signals the two speed sensors, then transmits a control signal to the power unit. Based on the signal from the control unit, the power unit drives the motor inside the gearbox. The torque generated by the motor is transmitted to ball screw through gears and converted into an assisting thrust in the axial direction of rack. The assisting thrust acts in the steering direction and lessens the steering force required at the steering wheel.



System Description

*Function and Operation

Steering Sensor

The steering sensor consists of a torque sensor, an interface, and the rotation sensor.

Torque Sensor

The torque sensor converts steering torque input and its direction to voltage signals, in conjunction with the interface.

A torsional force caused by steering operation is converted to an axial movement of a slider core. A variable differential transformer is installed around the slider core. Within the tranceformer are three coils, primary coil on the inside, and two secondary coils, one for right turns and one for left turns.

Alternating current is passed through the primary coil when the system is energized. The amount of mutual induction from the primary coil to the secondary coils changes depending on the position of the slider coil.

The input shaft and the slider are one piece. Rotation of the shaft moves the slider in a circular direction. The pinion is turned via the torsion bar. The slider core is installed on the pinion shaft on grooves, and turns with the pinion shaft.

When there is little resistance, the input shaft tot-don bar, pinion shaft, and the slider core turn together to the same angle. The slider core does not move up/down.



When there is resistance on the input shaft (hard to steer situation), and the slider pin is turned at an angle by the steering wheel, the tortion bar is twisted due to the resistance. Accordingly, the pinion shaft turns at a smaller angle. The difference in the turning angles changes the position of the slider pin in the groove, forcing the slider core upward or downward, depending on the direction of the direction of the turn.





DWG No	Steering condition	Slider movement	Induction voltage on secondary coil	
Α	Steering to right (load steering)	Upward shift	Voltage on upper coil increases and that on the lower decreases	
В	Advancing straight ahead (no load steering)	Neutral	Voltage on upper and lower coils are equal	
С	Steering to left (load steering)	Downward shift	Voltage on lower coil increases and that on the upper decreases	



Rotation Sensor

The rotation sensor is housed inside the steering gearbox near the pinion. It converts the rotation speed and direction of steering into voltage signals. The rotation of the steering wheel is transmitted to the pinion, which drives the sensor by accelerating its speed through the three pieces of transmission the gears. Acting as a kind of direct current generator, the sensor generates direct current voltage proportionately with the rotational speed of the pinion. When the steering direction is reversed, the voltage is generated in the opposite direction. No power is generated when driving straight ahead without turning the steering wheel.

Interface Circuit

The interface circuit is housed inside the steering gearbox near the pinion. It rectifies and amplifies the signals from the torque sensor and the rotation sensor and transmits steering signals to the control unit. A phase compensating circuit is also built in, which changes the output signals in accordance with the drive signals input from the control unit.



System Description

Control Unit

The control unit receives input signals from the car's speed sensors, torque sensor and steering rotation sensor, and outputs control signals to the power unit. It performs a multitude of control works including a circuit which diagnoses troubles in each functional part of the system and the control unit itself. The control unit operates the system while the engine is in the process of starting, on receipt of voltage generated by the alternator. The system remains operational if the engine stalls with the ignition switch in ON position.

< Basic Control >

- (1) Travelling speeds are compiled into data, receiving input signals from the car's speed sensors.
- (2) The magnitude and direction of torque are compiled into data, receiving input signals from the torque sensor.
- (3) The rotational speed and direction of steering are compiled into data, receiving input signals from the steering rotation sensor.
- (4) Determination of motor torque data from the prescribed assisting force map, based on the car speed data, steering rotational speed data and the steering torque data.
- (5) Changeover of control modes and output of control signals to the power unit, based on data on car speed, direction of torque and rotational direction of steering.

Normal Control Mode:

The rotational direction of motor is determined afater changing over to the left/right steering mode in accordance with torque direction data. The mode is switched to the straight ahead mode when the output data is zero.

Return Control Mode:

According to torque direction data and steering rotational direction data, the mode is changed over to the return control mode to improve the steering return characteristic.

Damper Control Mode:

According to car speed data, torque value data and steering rotational speed data, the mode is changed over to the damper control mode to improve the convergence property of the steering.

16.20





Self-Diagnosis Function

The EPS control unit monitors the system inputs and outputs, and the driving current of the motor. If there is a problem in the system, the control unit turns the system off by actuating the relay in the power unit. Power assist stops and normal manual steering operation resumes. The control unit also turns the EPS indicator light on to alert the driver, and memorizes the problem in the form of a code. Connecting the terminals of the service check connector with a jumper wire enables the EPS indicator light to blink the problem code when the ignition switch is turned on.

Unloader Control

If the steering wheel is turned fully and held in the full-lock position, the steering torque reaches the maximum point, and an over-current flows to the motor and the power unit. The control unit detects this and reduces the current flow to the motor.

Average Moving Current Control

The electric current flow to the motor is estimated from the current values detected by the current sensor, and the average current is obtained at two second intervals. The motor driving current is suppressed when the average current value exceeds a predetermined marginal value. The control unit regurates the motor current during continuous loading to suppress any excessive temperature rise in the power unit and the motor.

Over-Voltage Control

If there is an excessive increase in power source voltage due to a poor 'battery condition, an alternator voltage regulator problem, etc., the motor assisting force increases, resulting in excessive control. To prevent this, the control unit signals to the power unit are corrected to ensure that adequate assisting force is generated.

17-37

System Description

Power Unit

The power unit consists of a driving circuit, current sensor, field effect transistor (FET) bridge circuit, and two relays. It receives control signals from the CPU and controls the driving current of the motor. The driving circuit controls the rotational direction and speed of the motor by driving the FET bridge circuit with a pulse width modulation (PWM) method on receipt of an input of driving signals from the control unit.

<Rotational Speed Control >

The PWM driving signal is a digital signal repeating the process of voltage ON/OFF at a constant frequency, which changes the ratio of ON time per one cycle of this signal. The ratio is called the duty ratio. When there is a change in duty ratio, the average voltage changes as smoothly as an analog type. The ratio of digital signal voltage (E) and the average voltage (V) is called the duty ratio (δ). Its relationship is expressed by V = E x δ . When the duty ratio is low, the rotational speed of motor is slow. As the duty ratio increases, the rotational speed increases to increase the torque.

(Motor rotational speed slow)

(Motor rotational speed fast)



<Rotational Direction Control > Normal Mode Control:

The table below shows the normal control mode to control the flow of current from the battery:

Steering condition	FET (1)	FET (2)	FET (3)	FET (4)	Motor operation
Steering to right	ON C	FF OF	F PW	M Op	erates in direction steering to the rrght
Straight ahead	OFF	OFF	OFF	OFF	Stops
Steering to left	OFF	ON PV	VM OI	F Op	erates in direction steering to the left

("PWM" in the table indicates PWM control based on torque sensor data).

Return Control Mode:

Return control mode improves the steering return characteristics. ("PWM" in the table denotes PWM control based on torque sensor data while "PWM-r" PWM control based on rotation sensor).



Damper Control Mode:

The damper mode control which improves the convergence of steering, is performed with damper mode signals from the control unit. In this mode, a short current circuit is formed on the motor side by turning off FET (1) and (2), and on FET (3) and (4), which suppresses the returning speed of the steering.

<Motor Driving Current Control >

A current sensor, power relay and fail-safe relay are built into the power unit. The current sensor detects motor driving current and transmits data to the control unit. If there is a problem in the system, a cut-off signal is sent from the control unit to relay, then the relay cuts off motor current to switch to manual steering operation.



Steering Gearbox

<Motor and Power Assist Mechanism >

A motor is housed inside the gearbox housing. It consists of a yoke with a permanent magnet fixed in it, a rotor with a field coil, and brushes which pass electricity to rotor commutators. The motor is on the rack shaft of the steering gearbox. The drive current from the power unit flows through the power relay and fail-safe relay to the brushes of the motor. The drive current flows to rotor commutators through brushes, exciting the field coil of the rotor and rotates the rotor with the magnetic action of the permanent magnet inside the yoke. The rotor rotates in the opposite direction when the direction of drive current is reversed.

The rotation torque of the motor is transmitted to the ball screw throught the helical gear. The rotation torque on the ball screw is converted into assist thrust in the direction of steering rack by the recirculating ball screw. The recirculating ball screw acts to reduce the steering thrust put into the steering rack through the joint to lessen the steering force required at the steering wheel.



<Recirculating Ball Screw >

The recirculating ball screw is constructed so that balls roll between the screw shaft and the nut, and those coming out of the screw face enter the screw groove again through a tube for recirculation. The rotation torque on the shaft is converted into thrust in axial direction as the slope of the screw shaft presses against the nut throught balls. Since the torque conversion is made in this method through the screw shaft and balls, the friction is small, high transmission efficiency is obtained for both the forward and backward directions, and the steering feels identication the ordinary manual steering. Furthermore, sicnce the force from the backward direction (force pressing the steering rack) is converted into the rotation torque of the screw shaft, instantaneous kick-back from road surface will rapidly rotate the motor. In such a rapid rotation, the inertia of the motor increases, which acts to reduce the kick-back. Any great kick-back will be transmitted from the steering rack to the torque sensor on the pinion, which acts to twist the pinion shaft in the same direction as the input direction of kick-back. As a result, the motor operates the kick-back to reduce assist force.



Circuit Diagram



17-40

Wiring Locations





Troubleshooting

-Troubleshooting Precautions

- Always use the test harness to verify the resistance, voltage, current and other electrical characteristics for the EPS control unit, torque sensor, steering circuit sensor, power unit, and their connectors. The test probe must not make direct contact with the connector terminals.
- Make sure that the terminals are not bent or damaged in any way when a test harness is installed.
- A digital circuit tester must be used to perform the inspections.
- An analog circuit tester must be used only when this procedure is indicated in the specification figures.
- The EPS system connector should not be disconnected except when necessary.
- Inspect the connection condition and ground of each EPS system connector before peforming the troubleshooting procedures.

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-Troubleshooting Procedures

Under normal conditions, the EPS indicator light in the gauge assembly comes on when the ignition switch is turned to the ON position, then goes off after the engine is started. This indicates that the bulb and its circuits are operating correctly.



When the EPS control unit senses an abnormality in the system, the control unit memorizes the problem, the EPS indicator light blinks at equal intervals, and the power steering assist is turned off. When the EPS indicator light has been reported on, connect the two terminals of the service check connector with a jumper wire. Then turn on the ignition switch and observe the blinking frequency.


Problem Code Display -

When the service check connector terminals are connected with a jumper wire, the EPS control unit blinks the EPS indicator light to indicate the problem code. The problem codes are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code, then refer to the Troubleshooting Chart on page 17-51.



The control unit can memorize any number of simultaneous problems. The problem codes are repeated sequentially beginning with the lowest number.

The problem code is stored in the control unit memory even when the ignition switch is turned off. After repairing the EPS system, disconnect the CLOCK fuse in the relay box for more than 10 seconds to reset the EPS control unit memory.



-Test Harness Installation Test Harness C Test Harness A • Pull the carpet back from the passenger's side and re-• Remove the glove box and disconnect the EPS conmove the power unit cover. trol unit connector. Disconnect the connector and connect test harness C. Connect test harness A. **EPS CONTROL UNIT** POWER UNIT TEST HARNESS C 07MAZ-SL00300 TEST HARNESS A 07MAZ-SL00100 Power Unit Checker Test Harness B • Pull the floor carpet back from the passenger's side • Disconnect the torque sensor and steering speed senand remove the power unit cover. sor connectors and connect test harness B. Disconnect the connector and connect the power unit checker. • Remove the cigarette lighter and connect the power unit checker. TEST HARNESS B Connect to the 07MAZ-SL00200 cigarette lighter POWER UNIT CHECKER 07MAZ-SL00400 OUTPUT (VIS) AT THE REAL PROPERTY OF POWER UNIT STEERING 'GEARBOX'







(cont'd)





(cont'd)





-Troubleshooting Chart -

The EPS has been reported on:

Connect the service check connector with a jumper wire (see page 17-43). Turn on the ignition switch. Read the problem code and perform the troubleshooting according to the troubleshooting chart below.

							Related	l corni	oonent	s		
Page reference	Problem code	EPS Indicator light	System indicated	EPS control unit	Torque sensor	Steering wheel speed sensor	EPS power unit		Speed sensor signal	Wire hamess	No 2 (15 A) fuse	EPS motor
-	11	¢	Torque sensor (VT ₁ , VT ₂)	0	0					0		
17-52	12	0	Toraue sensor (VT ₃)	0	0					0		
17 02	13	¢	Torque sensor (VTA)	0	0					0		
	14	¢	Torque sensor (REF 2.5)	0	0					0		
17-54	21	¢	Steering wheel speed sensor	0		0				0		
17-56	22	ОЕ	PS power unit	0		0	0			0	_	0
17-59	31	0	Power supply (ECU, ignition input)	0				0		0	0	
17-60	33	0	Speed sensor signal. input	0					0	0		
17-62	23,34 41,42 43,44	0	PS control unit	0								

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(cont'd)









Problem code 3 1:

• EPS control unit related problem.



(cont'd)

-Flowcharts (cont'd)-

Problem code 33:

• Speed sensor related problem.

NOTE: Before performing the troubleshooting, check the related systems described below.

Is the speedometer operating	NO	Inspect the speed sensor and speedometer system.			
normally?	YES	Proceed the traublesheeting procedures described below			
Does the A/T warning indicator come	NO				
on?	YES	Perform the A/T troubleshooting (see section 14).			







Flowcharts (cont'd)-

Problem code 23, 34, 41, 42, 43 and 44:

EPS control unit related problem.

Check for poor connections or loose wires at the EPS control unit. If there is no abnormality, replace the EPS control unit.

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Component Location

Index-

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NOTE:

- If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 231.
- Before removing the gearbox, remove the ignition key to lock the steering shaft.
- After installing the gearbox, check the wheel alignment and adjust if necessary.



Power Steering



- 6. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 7. Separate the tie-rod ball joint and knuckle using the

CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant



10, Remove the spare tire holder.



Component Location

Index-



NOTE:

- If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (See section 23).
- Before removing the gearbox, remove the ignition key to lock the steering shaft.
- After installing the gearbox, check the wheel alignment and adjust if necessary.



Power Steering



- 11. Disconnect the connectors from the EPS wire harness.
- 12. Remove the ground cable by removing the EPS wire harness stay.



- 13. Remove the terminal guard and ground cable.
- 14. Remove the terminal nuts and the wires from the gearbox terminals.





16. Remove the radiator pipe bracket at the floor, and space the radiator pipe away from and gearbox.



Gearbox Removal/Installation (cont'd)

CAUTION: Before removing the gearbox, place a stand jack under the gearbox and front cross-beam to lightly support them. Lower the gearbox together with the cross-beam. 17. Remove the bolts and nuts of the gearbox and cross-beam. ☆ 10 mm NUTS ☆ 10 × 97 mm 60 N-m (6.0 kg-m, 43 lb-ft) FLANGE BOLT (Cross-beam bracket ☆ 10 × 97 m m to Front cross beam) FLANGE BOLT (Cross-beam bracket to front cross beam) ☆10 mm NUT ☆10 mm NUT 60N.m Å 10 × 97 mm 60N.m (6.0 kg-m, 43 lb-ft) (6.0 kg-m, FLANGE BOLTS 43 lb-ft) (Gearbox to Front cross beam) LEFT SIDE ☆10×84 m m FLANGE BOLT 60N.m (6.0 kg-m, 43 lb-ft) (Gearbox to Front cross beam) 10 × 68 mm FLANGE BOLT 60N.m (6.0 kg-m, 43 lb-ft) (Front cross beam to cross beam bracket) **RIGHT SIDED** ☆ 10 × 84 mm FLANGE BOLT 60N.m (6.0 kg-m, 43 lb-ft) (Gearbox to Front cross beam), ☆**`10 × 68** mm FLANGE BOLT 60N.m (6.0 kg-m. 43 lb-ft) (Front cross beam to cross beam bracket) A Corrosion resistant bolt/nut

18. Lower the gearbox and cross-beam with care so as not to interfere with the radiator pipe.

NOTE: The cross beam is attached to the cross beam bracket with knock pins. Remove the cross beam by lightly taping on it with a plastic hammer, then remove the gearbox.



19. When installing the cross beam to the cross beam bracket, be sure to align the holes in the cross beam with the knock pins on the cross beam bracket.



- 20. installation is the reverse order of removal.
 - Install the gearbox assembly and SST holder plate frame.
 - Install the battery.
 - Install the SST holder plate and folding spare tire.
 - Install the steering gearbox joint cover.

Connect the battery positive terminal and then connect the negative terminal.

NOTE: After installation, turn the ignition switch ON and check the Electrical Power Steering warning light for operation. Check and adjust the wheel alignment (Section 18).

- Turn on the ignition to II: the instrument panel SRS warning light should go on for about 6 seconds and then go off.
- Confirm operation of horn buttons.
- Confirm operation of cruise control set/resume switch.
- Turn the steering wheel counterclockwise and make sure the yellow gear tooth still lines up with the alignment mark.



Power Steering





-Inspection

- 1. Carefully clamp the gearbox in a vise with soft jaws.
- 2. Remove the boot bands.



- 3. Pull the boots away from the ends of the gearbox, unbend the tie-rod lock washers.
- 4. Hold the rack with a wrench, and unscrew the tierods with another wrench.



Preload Inspection:

NOTE: Slide the steering rack in the cylinder until the end of the rack projects 60 mm (2.34 in.) from the cylinder end. Inspection is made near this rack position.

Install the special tool on the pinion shaft and check the preload with a spring scale. If the preload is out of the specification, adjust the

rack guide.

Preload 30N (3 kg, 6.6 b)





Power Steering





- 7. install the boots on the rack end with the tube clamps. NOTE:
 - Coat the rack end and inside of the boot with the grease.
 - Before installing the boot, be sure that the pressure inside of the boot is the atmospheric pressure.
 - Install the boot band with the rack in the straight ahead condition (i.e. right and left tie-rods are equal in length).



 Install the new boot bands on the boot and bend both sets of locking tabs.
Lightly tap on the doubled portions to reduce their height.

NOTE: After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.



9. If the tie-rod ends were removed, install the tie-rods on the right and left rack ends and screw them in until the threaded section is 11 mm (0.43 in.) in length.



10. Install the gearbox and the cross-beam (17-66). Check the wheel alignment and adjust if necessary (Section 18).

Power Steering



Power Unit





Control- Unit

- Replacement -

- 1. Remove the dashboard lower panel and glove box and disconnect the light connector.
- GLOVE BOX
- 3. Disconnect the connectors from the control unit by removing the wire harness band.



4. Remove the power window control unit by pulling it toward you, then remove the control unit.

2. Remove the heater duct.





Installation is the reverse order of removal.

NOTE: Turn the ignition switch ON and check the EPS warning light for operation.

Suspension

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Special Tools

Ref. No.	Tool Number	Description	Q'ty Page Reference
1 2	07GAF—SD40100 07GAF—SD40200	Hub Dis/Assembly Pin Hub Assembly Driver Attachment	1 18-32, 33 1 18-18, 33
3 4	07GAF- SD40700	Hub Dis/Assembly Base	2 18-18, 32
() (07MAB-SL00100	Front Hub Holder	1 18-17, 19
(6)	07MAC-SL09100	Ball Joint Remover	1 18-21, 22, 23, 36
7	07MAG - SL00200	Bali Joint Boot Clip Guide	1 18-25
9	07965-SD90100	Hub Dis/Assembly Base	1 18-21, 35
10	07974-SA50800	Ball Joint Boot Clip Guide	1 18-38
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		M	
	(9)	®	
	9	10	
	9	®	
	(9)	®	

Component Location



Index -

A WARNING The front and rear dampers contain nitrogen gas and oil under pressure. The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.



Knuckle/Control Arms Removal, page 18-35

illustrated Index, page 18-34

· Ball Joint Boot Replacement, page 18-38
System Description

Suspension Composition

Outline

Double wishbone independent suspension has been selected for each of the four wheels. This eliminates damper friction along the steering axis and permits suspension geometry that takes full advantage of the performance potential of the wide, low aspect ratio tires. The double wishbone design also allows the use of aerodynamically-efficient and aesthetically pleasing low fender lines.

The knuckles and the suspension arms are manufactured from light-weight, high-strength aluminum alloys. This gives a notable reduction in unsprung weight which results in increased traction and improved ride. It also allows the individual suspension components to be designed in detail for maximum strength and rigidity.



To further increase suspension link rigidity and to obtain optimum knuckle geometry, the knuckles and ball joints are contained within the wheel profile. At each corner of the car, the individual suspension system is attached to the aluminum stressed skin chassis by a cast aluminum sub-frame. This design further reduces overall weight and ensures that suspension loads are fed into the chassis at the most efficient points and in the most efficient directions. A large front caster angle combined with small trail distance improves straight-line stability and response without causing heavy steering effort.





(Front Compliance Mechanism)

To avoid the usual compromise between ride quality and handling characteristics, a pivot-type "compliance mechanism" has been designed as an integral part of the front suspension. When one of the front wheels is subjected to a rearward movement by an uneven. road surface or by heavy braking, the load produced has two separate effects. As with any suspension system, the load acts in the vertical direction to compress the suspension spring and reduce the ride height. On the NSX the load also acts through both the upper and lower control arms to twist the compliance pivot. This allows the wheel to move rearward by a controlled amount, thus absorbing energy. The result is an outstanding ride quality with only minimal changes to track width and wheel geometry. In Corning, the compliance pivot does not come into play and the lateral suspension stiffness required for maximum roadholding and optimum control response is maintained.



(Rear Toe Control Arm)

Many conventional passenger-car independent rear suspension systems are subject to undesirable changes in toe-in angle with wheel movement. This results in instability both in Corning and in acceleration. In the NSX, the design and pivot locations of the rear toe control arm produce a slight controlled increase in toe-in during bump travel. As a result, the NSX is extremely stable under heavy cornering loads and over bumpy road surfaces.



Wheel Alignment

- Height

NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.

NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold a wheel with your hands and move it up and down and right and left to check for wobbling.)
- Check the height of each suspension (see below).

Standard value

	Tire size	Tire pressure psi (kpa)	Standard height mm (in) [empty car]
Front	205/50 ZR15	33 (230)	170-180 mm (6.7-7.1 in)
Rear	225/50 ZR16	40 (275)	213-223 mm (8.4-8.9 in)



Rear:

Front:

Ground clearance to the center of the lower control arm bolt



Ground clearance to the center of the toe control arm bolt



Height inspection:

- Before checking for the height, bounce the car up and down several times before measuring.
- Check the height with the car empty, parked on a level surface, with properly inflated tires (tread wear indicators must not be showing). If the height is out of specification, load or unload the car as necessary.



Front Wheel Alignment Adjusting Procedure

Adjustment

NOTE: NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.

The NSX suspension can be adjusted for camber, caster (front only), and toe. However, because each of them relates to the other, the camber changes when the toe is adjusted for example. Therefore, the total adjustment of the front/rear wheel alignment is required whenever either one of the clements (i.e. camber, caster, or the toe) is adjusted.

<Front wheel alignment adjusting procedure>





(cont'd)



Wheel Alignment

- Front Wheel Alignment Adjustment Procedure (cont'd)

NOTE:

- NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.
- The ride height is very important for setting the alignment. For every 10 mm of change in the front ride height, the camber will change approximately 10 minutes.
- The front alignment settings on the NSX are interactive.
 - A slight change in toe will dramatically change the camber.
- 1. Drive the car on the alignment rack.
- 2. Check the tire pressure and ride height as described on page 18-6.
- 3. Center the steering wheel.

Toe

- 1. Measure the length of the threaded section on the right and left rack ends.
 - Standard: 11 mm for shoulder Difference between right and left: 1 mm max.
- -2. If the measurement is out of the specification, loosen the locknut and adjust properly.

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LOCKNUT 44 **N·m** (4.4 kg-m, 32 lb-ft)



Camber

- 1. Loosen the locknut on the front lower control arm adjusting point and adjust the cam position so that the right and left gaduations on the adjusting cam are in contact.
- -2. Mark the arm in the position which aligns with the dial center of the adjusting cam.





Caster

 Loosen the pivot adjuster mounting nuts under the compliance pivot and adjust the cam position so that the right and left gaduations on the adjusting cam are in contact with the groove walls.



4. Measure and record the readings for the camber and toe according 'to the alignment equipment manufacture's instructions. 5. Adjust the camber and toe at the same time on one side of the car. Repeat for the other side of the car.

NOTE:

- One graduation on the camber adjusting cam equals approximately 10 minutes of camber change.
- One full turn of the tie rod equals approximately 8 mm.
- 6. Measure the caster according to the alignment equipment manufacture's instructions.
- 7. Adjust the caster.

NOTE: One graduation on the caster adjusting cam equals approximately 10 minutes of caster change.

- 8. Measure the readings for camber and toe.
- 9. Readjust the camber and toe to the specifications shown.

Front Specifications

Toe $-3.5 \text{ mm} \pm 1.0 \text{ mm}$ Camber -0 dagrees 20' \pm 30' Caster +8 degrees 00' \pm 45'

Wheel Alignment



Mar 2.



Rear Wheel Alignment Adjusting Procedure

<Rear wheel alignment adjusting procedure>





(cont'd)

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Wheel Alignment

Rear Wheel Alignment Adjusting Procedure (cont'd) -

NOTE:

- NSX four wheel alignment requires the use of equipment designed specifically for four wheel independent suspensions and capable of immediate feedback.
- 1. Drive the car on the alignment rack.
- 2. Check the tire pressure and ride height as described on page 18-6.
- 3. Center the steering wheel.

Toe

 I. Measure the length of the threaded section on the right and left toe control arms.

Standard: 40 mm Difference between right and left: 1 mm max.

-2. If the measurement is out of the specification, loosen the locknut and adjust properly.



Camber

- I. Loosen the locknut on the rear lower control arm adjusting point and adjust the cam position so that the right and left graduations on the adjusting cam are in contact.
- -2. Mark the arm in the position which aligns with the dial center of the adjusting cam.



- 4. Measure the readings for camber and toe according to the alignment equipment manufacture's instructions.
- 5. Adjust the camber and toe at the same time on one side of the car. Repeat for the other side of the car.

Rear Specifications

Toe \pm +6.0 mm \pm 1.0 mm Camber -1 degrees 30' \pm 30'



- Runout -

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Jack up the car and raise the wheels off the ground (Section 1). Place the dial gauge on each front and rear wheel rim,

turn the wheel slowly by hand, and check the front/rear wheel runout.

Front and Rear Wheel Axial Runout

Standard: O-O.7 mm (O-0.028 in)



Front and Rear Wheel Radial Runout

Standard: O-O.7 mm (O-0.028 in)



Turn the wheel slowly by hand and check for excessive axial and radial runout.

Bearing End Play

- Front Wheel End Play Standard: 0 mm (0 in) Service limit: 0.05 mm (0.002 in) max. Replace.
- Rear Wheel End Play Standard: 0 mm (0 in) Service limit: 0.05 mm (0.002 in) max. Replace.





Front Suspension

Torque Specifications

CAUTION:

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- Replace the self-locking nuts after removal.
- Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts.(It should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).
- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

☆ Corrosion resistant bolt/nut.





Hub Replacement

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removel.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.

CAUTION: Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.



Front Suspension

Hub Replacement

- I. Loosen the wheel nuts slightly.
- 2. Raise the front of car and support on safety stands in proper locations (See section 1).
- 3. Remove the wheel nuts and wheel.

NOTE: Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.



4. Remove the brake hose mounting bolts.



*Corrosion resistant bolt/nut

5. Remove the speed sensor from the knuckle and front lower control arm, but do not disconnect it.

NOTE: Be careful when installing the sensors to avoid twisting wires.



6. Remove the caliper bracket mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental **damago** to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage.



☆ Corrosion resistant bolt/nut



7. Remove the 6 mm brake disc retaining screws.

Screw two 8 x 12 mm bolts into the disc to push it away from the hub.

NOTE: Turn each bolt two turns at a time to prevent cocking the disc excessively.



8. Remove the hub unit from the knuckle.



*Corrosion resistant bolt/nut

Front Wheel Bearing Replacement:

- 1. Attach the special tool to the hub and tighten the nuts, then set the special tool in a vise and secure it.
- 2. Pry the spindle nut stake away from the spindle, then remove the spindle nut.



- 3. Remove the special tool.
- 4. Remove the pulser using a commercially available bearing puller.



Front Suspension



NOTE: Wash the bearing and hub thoroughly in high flash point solvent before reassembly.

NOTE: Replace the bearing with a new one after

Press a new wheel bearing into the hub using the special tools shown and a hydraulic press.



- 8. Install the pulser.

NOTE: Be sure the pulser engages with the pin on the spindle.





- 9. Attach the special tool to the hub and tighten the nuts, then set the special tool in a vise and secure it.
- 10. Tighten the new spindle nut to specified torque, then stake the spindle nut shoulder against the spindle.



11. Remove the special tool.

Knuckle/Control Arms/Compliance Pivot

Illustrated Index



NOTE: Replace the joint boot if any are damaged. The parts marked with an asterisk (*) have a retainer attaching the ball joints. Replace the retainer whenever the boot is replaced.

CAUTION: Do not remove the arms, knuckle, and compliance pivot by striking them with a hammer, and take care not to drop them.

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Removal

- 1. Remove the front wheel and bearing unit assembly (page 18-I 5).
- 2. Remove the splash guard from the knuckle.



- 4. Remove the cotter pin and the tie-rod ball joint nut.
- 5. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damage by the ball joint remover.
- 6. Break loose the tie-rod ball joint using the special tool, then lift the tie-rod out of the knuckle.

CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



NOTE: Use the ball joint remover (07MAC-SL00100) by adjusting it so that its upper section and lower section are parallel to each other.



Knuckle/Control Arms/Compliance Pivot

- Removal (cont'd)

- 10. Remove the cotter pin and the upper ball joint nut.
- 11. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 12. Break loose the upper ball joint using the special tool.

NOTE: Use the ball joint remover (07MAC-SL00100) by adjusting it so that its upper section and lower section are parallel to each other.

CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



KNUCKLE ASSEMBLY 14. Separate the lower control arm and damper by removing the damper mounting bolt.



*SELF-LOCKING NUT 12x 1.25 mm 85 N·m (8.5 kg-m, 62 lb-ft)

*Corrosion resistant bolt/nut



Ball Joint Boot Replacement

CAUTION: The upper control arm ball joint, lower control arm ball joint and knuckle upper ball joint are attached with the boot retainer to improve the sealing efficacy of the boot.

- 1. Remove the circlip and boot.
- 2. Remove the retainer.

NOTE: The knuckle lower ball joint dose not have a retainer.



CAUTION: Do not contaminate the boot installation section with grease.

- 4. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.
- 5. Insert the new retainer lightly into the ball joint pin.

NOTE: When installing the ball joint, press the retainer into the ball joint pin.



tamination and wipe them if necessary.

Damper Front



Wood block



Inspecton



• Damper Reassembly

- 1. Install the damper unit, damper spring, bump stop, bump stop plate, dust cover, dust cover end, dust cover plate, spring mounting rubber, damper bushings, and collar on the spring compressor.
- 2. Install the damper mounting base on the damper unit as shown.



- locking nut 10 mm.
- 5. Hold the damper shaft and tighten the 10 mm self-locking nut.



- Damper Installation

1. Reposition the damper on the frame with the welded nut of the. hose bracket facing outside as shown.



2. install the damper end on the lower arm and loosely tighten the mounting nut.

NOTE: The bolts and nuts should be tightened with the vehicle's weight on the damper.

- 3. Secure the damper mounting bolt using a new self-locking nut.
- 4. Secure the damper assembly to the frame with the new three self-locking nuts.
- 5. Install the caps in the top of the cowl.



☆ Corrosion resistant bolt/nut

2.1

6. Install the brake hose clamps with the two bolts.

Rear Suspension

Torque Specifications



CAUTION:

- Replace the self-locking nuts after removal.
- Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts. (It should require 1 **N**•m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt). The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

*Corrosion resistant bolt/nut



Rear Suspension

Hub Replacement

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheels.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.
- Before installing the wheel, clean the mating surfaces of the brake disc and inside of the wheel.

CAUTION: Use a rag at the point you are goint to pry, because aluminum alloy wheels can be easily damaged.





Hub Replacement

- 1. Remove the center cap, then pry the spindle nut lock tab away from the spindle and loosen the nut.
- 2. Raise the car and support it with safety stands (see Section 1),



6. Remove the banjo bolt and disconnect the brake hose, then remove the brake hose clamp from the knuckle.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish; Wash spilled brake fluid off immediately with clean



☆ Corrosion resistant bolt/nut

Rear Suspension





NOTE: Replace the bearing with a new one after removal.

3. Press a new wheel bearing into the hub using the special tools shown and a hydraulic press.







Knuckle/Control Arms

Illustrated Index -

Overall Suspension

NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- Torque specifications, see page 18-29.
- Align the white line on the stabilizer bar with the bushing end and install the stabilizer bar.

*Corrosion resistant bolt/nut



NOTE: Replace the joint boot if any are damaged. The parts marked with an asterisk (*) have a retainer attaching the ball joints. Replace the retainer whenever the boot is replaced.

CAUTION:

- Do not remove the arms and knuckle by striking them with a hammer, and take care not to drop them.
- Make sure that the reference marks on the toe control arm are aligned.



Removal



6. Hold the stabilizer link with the wrench and remove the damper mounting nut.





- 7. Remove the stabilizer link from the stabilizer bar and knuckle.
- ☆ Corrosion resistant bolt/nut



Knuckle/Control Arms

Removal (cont'd)

- 8. Remove the cotter pin from the castle nut of the lower control arm ball joint and remove the nut.
- 9. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 10. Position the special tool between the knuckle and lower control arm as shown, and separate the lower arm.

CAUTION: Be careful not to damage the ball joint boot.



*Corrosion resistant bolt/nut

- 11. Remove the cotter pin from the castle nut of the upper control arm ball joint and remove the nut.
- 12. Install the 12 mm hex nut on the ball joint. Be sure that the 12 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 13. Position the special tool between the knuckle and upper control arm as shown.
 - CAUTION: Be careful not to damage the ball joint boot.



14. Separate the knuckle from the upper control arm and driveshaft outboard joint.

NOTE: Do not remove the driveshafts from the differential case or intermediate shaft.



NOTE: Tie plastic bags over the driveshaft ends.

15. Remove the knuckle assembly from the lower control arm.







Knuckle/Control Arms



Damper Rear



Ι

Removal

- 1. Remove the rear wheel.
- 2. Remove the lower rear hatch glass garnish.



- 3. Remove the three self-locking nuts.
- 4. Remove the rear damper bar.



*Corrosion resistant bolt/nut

Hold.

Hold the stabilizer link with a wrench and remove

the damper mounting nut.

*DAMPER MOUNTING NUT

12 x 1.25 mm Replace.

5.

*Corrosion resistant bolt/nut

- 6. Remove the stabilizer link from the stabilizer bar and knuckle.
- 7. Remove the rear damper assembly.



Damper Rear



18-40

244 A


Damper Rear



18-42



Damper Disposal

- 5. Install the rear damper bar on the stud bolts of damper as shown.
- 6. Loosely tighten the new self-locking nuts.



🚳 🕸 Corrosion resistant bolt/nut

- 7. Secure the damper mounting nut and stabilizer link nut.
- 8. Secure the damper assembly to the frame with the self-locking nuts.
- 9. Install the rear hatch glass garnish.



A WARNING The dampers contain nitrogen gas and oil under pressure.

The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.

Place the damper on a level surface with its rod extended and drill a hole of 2-3 mm (0.078-0.118 in) diameter in the body to release the gas. Front Damper

•



Rear Damper



A WARNING Always wear eye protection to avoid getting metal shavings in your eyes when the gas damper pressure is relieved.

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools, and should therefore be done by an authorized Acura dealer.

AWARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.

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Special Tools





A WARNING The accumlator contains high-pressure nitrogen gas, do not puncture, expose to flame or attempt to disassemble the accumlator or it may explode; severe personal injury may result.



Pedal Height



Parking Brake

Adjustment

Remove the console mat, the four screws and the console box.



NOTE: After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brakes before adjusting the brake pedal.

AWARNING Block the front wheels before jacking up the each side of the car.

- Raise the rear wheels off the ground.
- Make sure the lever of the rear brake caliper contacts the brake caliper pin.
- Pull the parking brake lever up one notch. 4.
- Tighten the adjusting nut until the rear wheels drag. 5. slightly when turned.
- 6. Release the parking lever and check that the rear wheels do not drag when turned. Readjust if necessary.
- 7. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 10 to 14 clicks.



tion, brake drag may occur.

Front Brakes

Index/Inspection





Front Brake Pads

- Inspection/Replacement

AWARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.
- 1. Loosen the front wheel lug nuts slightly, then raise each side of the car and support on safety stands (page 1-6 through 8). Remove the front wheels.
- 2. If the brake pad thickness is less than service limit at step 5, replace the front pads as a set.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.



3. Remove the two brake hose bracket bolts. Remove the two caliper bolts and move the caliper out of the way.

CAUTION: Support the caliper with a piece of wire so that it does not hang from the brake hose.



- 4. Remove the pad shims, pad retainers and pads.
- 5. Using a vernier caliper, measure the thickness of each brake pad lining.

Brake Pad Thickness: Standard: 11 mm (0.43 in) Service Limit: 1.6 mm (0.06 in)



NOTE: Measurement does not include pad backing thickness.



- 6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
- 7. Install the pad retainers.

A WARNING When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.



- 8. Apply Molykote M77 to both sides of the inner shims A and the back of the pads. Wipe excess grease off the shims.
- 9. Install the brake pads.

NOTE:

- Install the inner pad with its wear indicator facing upward.
- Apply Molykote M77 to the shims (page 19-5). Wipe excess grease off the shims.
- 10. Install the brake pad shims correctly.



- 11. Push in the pistons so that the caliper will fit over the pads.
- 12. Set the caliper down into position, then install the brake hose bracket bolts and the caliper bolts. Tighten the bolts to the specified torque.



13. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Clean the mating surface of: the wheel and hub before installing the wheel.

A WARNING Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs or pads.

Front Caliper

Disassembly

CAUTION:

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Use only clean DOT 3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- 1. Remove the banjo bolt and disconnect the brake hose from the caliper.
- SEALING WASHERS
- 3. Remove the pad spring from the caliper body.



4. If necessary, apply compressed air to the caliper fluid inlet to get the pistons out. Place a shop rag or wooden block as shown to cushion the pistons when there are expelled.

Use low pressure air in short spurts. Remove the pistons from the caliper.

AWARNING

- Do not place your fingers in front of the piston.
- Do not use high air pressure; use an OSHAapproved 30 PSI nozzle.



5. Remove the piston boots and piston seals. CAUTION: Take care not to damage the cylinders.



2. Remove the caliper bolts, then remove the caliper.

Front Brake Disc



Reassembly

CAUTION:

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Use only clean DOT3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car; it may damage the paint, if brake fluid does contact the paint; wash it off immediately with water.
- 1. Clean the pistons and caliper bores with brake fluid and inspect for wear or damage.
- 2. Apply silicone grease to new piston seals, then install the piston seals in the cylinder grooves.
- 3. Apply silicone grease to new piston boots, then install the piston boots in the clyinder grooves.



4. Lubricate the caliper cylinders and pistons with brake fluid, then install the pistons in the cylinders with the dished end facing in.



AWARNING Always reinstall the brake pads in their original positions to prevent loss of braking efficiency.

6. Fill the brake reservoir up and bleed the brake system (page 19-10).

Run-Out Inspection

- 1. Raise each side of the car and support on safety stand (page 1-6 through 8). Remove the front wheels.
- 2. Remove the brake disc pads (page 19-6).
- 3. Inspect the disc surface for cracks, and rust. Clean the disc thoroughly and remove all rust.
- 4. Use suitable nuts (1 2 x 1.5 mm) and plain washers to hold the disc securely against the hub, then mount a dial indicator as shown.

Brake Disc Runout: Service Limit: 0.10 mm (0.004 in)

5. If the disc is beyond the service limit, refinish the rotor.



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

Front Brake Disc

Bleeding

Thickness and Parallelism -Inspection

- 1. Raise each side of the car and support on safety stands (page I-6 through 8), Remove the front wheels.
- 2. Remove the brake disc pads (page 19-6).
- 3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake disc thickness: Standard: 28 mm 11.10 in) Max. Refinishing Limit: 26 mm (1.02 in)

Brake Disc Parallelism: The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

4. If the disc is beyond the limits for thickness or parallelism, refinish the rotor.

CAUTION:

- Use only clean DOT3 or 4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each brake caliper. Add fluid as required. Use only clean DOT3 or 4 brake fluid.

BLEEDING SEQUENCE



- 1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
- 2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
- 3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.





Master Cylinder and Brake Booster

Index/Torque



Master Cylinder

Inspection



CAUTION:

- Be careful not to bend or damage the brake pipe when removing the master cylinder.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the master cylinder assembly. Replace the master cylinder assembly with a new part if necessary.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT3 or 4 Brake fluid.
- When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts.



Brake Booster

Tests

Functional Test

- 1. With the engine stopped, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, the master cylinder, brake line or a brake caliper is faulty.
- 2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is working. If the pedal height does not vary, the booster or check valve is faulty.

Leak Test

1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.

CAUTION: Do not try to disassemble the booster. Replace the booster assembly with a new one.

2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

Check Valve Test

- 1. Disconnect the brake booster vacuum hose at the booster.
- 2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working correctly. Replace the check valve and retest.

CHECK VALVE

ş



Brake Booster





- 2. Without disturbing the adjusting bolt's position, install the special tool upside down on the booster.
- 3. Install the master cylinder nuts and tighten to the specified torque.
- 4. Connect the booster in-line with a vacuum gauge (O-30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.
- 5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.



- 6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
- 7. Tighten the star locknut securely. Remove the special tool and install a new master cylinder rod seal in the booster.

STAR LOCKNUT 22 **N•m**



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance is 0 mm.

8. Adjust the pushrod length as shown if necessary.



9. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

Standard Pedal Height From Floor: Manual Transmission: 218 mm (8.58 in) Automatic Transmission: 218 mm (8.58 in) (with floor mat removed) The pedal should have 1-5 mm free play.

10. Adjust the brake light switch (page 19-4).

Rear Brakes

Torque/Inspection



19-16

Rear Brake Pads

Inspection/Replacement



AWARNING

- Never use an air hose or dry brush to clean brake assemblies.
- Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.
- 1. Loosen the rear wheel lug nuts slightly, then raise each side of the car and support on safety stands (page 1-6 through 8). Remove the rear wheels.
- 2. Remove the caliper shield.



3. Remove the lock pin and clevis pin. Remove the cable clip and disconnect the cable from the arm.



4. Remove the two caliper mounting bolts and the caliper from the bracket.

CAUTION:

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.
- Support the caliper with a piece of wire so that it does not hang from the brake hose.

CALIPER MOUNTING BOLTS



If lining thickness is less than service limit at step 6, replace the rear pads as a set.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.



Rear Brake Pads



NOTE: Measurement does not include pad backing thickness.

- 7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
- 8. Make sure that the pad retainers are installed in the correct positions.



9. Install the new brake pads and pad shims on caliper bracket.

AWARNING

t

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- A contaminated brake discs or pads reduces stopping ability. Keep grease off the discs and pads.

NOTE:

- Apply a Molykote 77 to the shims (page 1 Q-1 6). Wipe excess grease off the shims.
- Install the inner pad with its wear indicator facing upward.
- Make sure that the pad spring is installed onto the caliper body.



10. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning back the piston back.

CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

11. Install the brake caliper.





12. Install and tighten the two caliper mounting bolts.



- 50 N·m (5.0 kg-m, 36 lb-ft)
- 13. Insert the cable through the arm and connect the cable to the lever with the clevis pin and lock pin. Install the cable clip securely.



14. Install the caliper shieled.



Rear Brake Disc

Run-Out Inspection

- 1. Raise each side of the car and, support on safety stands (page I-6 through 8). Remove the rear wheels.
- 2. Remove the brake pads (page 19-I 7).
- 3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.
- 4. Use suitable nuts (1 2 x 1.5 mm) and plain washers to hold the disc securely against the hub, then mount a dial indicator as shown.

Brake Disc Runout: Service Limit: 0.10 mm (0.004 in)

Max. Refinishing Limit: 19 mm '(0.75 in)

5. If the disc is beyond the service limit, refinish the rotor.



NOTE: A new disc should be refinished if its runout is greater than 0.1 mm (0.004 in).

Thickness and Parallelism -Inspection

- Raise both sides of the car and support on safety stands (page I-6 through 8). Remove the rear wheels.
- 2. Move the caliper and pads out of the way as described on the preceding page.
- 3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in) in from the outer edge of the disc.



Brake Disc Thickness: Standard: 21 mm (0.83 in) Max. Refinishing Limit: 19 mm (0.75 in)

Brake Disc Parallelism: The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in).

4. If the disc is beyond the limits for thickness or parallelism, refinish the rotor.

Rear Caliper

Disassembly

CAUTION:

- Make sure all parts are clean before reassembly.
- Use only new replacement parts.
- Use only DOT3 or 4 clean brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Do not mix different brands of brake fluid.
- Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish. Wash spilled brake fluid off immediately with clean water.
- 1. Remove the caliper shield (page 19-17).
- 2. Disconnect the parking cable (page 19-I 7).
- 3. Remove the banjo bolt and two sealing washers.
- 4. Remove the two caliper mounting bolts and caliper body from the bracket.



CALIPER MOUNTING BOLTS

- 5. Remove the pad spring from the caliper.
- 6. Remove the piston and piston boot while rotating the piston.

CAUTION: Avoid damaging the piston and piston boot.





7. Remove the circlip, washer, adjusting spring A, and the adjusting nut from the piston.



8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



9. Adjust the special tool as shown. Approximately 95 mm (3.74 in) BRAKE SPRING COMPRESSOR 07HAE-SG00100 10. Install the special tool between the caliper body and spring guide as shown. 11. Compress the adjusting spring B by turning the shaft of the special tool, then remove the retaining ring with snap ring pliers. **RETAINING RING** SNAP RING PLIERS 07914-SA50001 BRAKE SPRING COMPRESSOR 07HAE-SG00100

(cont'd)

Rear Caliper

Disassembly (cont'd)

- 12. Remove the adjusting bolt.
- 13. Remove the spring cover, adjusting spring B, spacer, bearing A and cup from the adjusting bolt.



14. Remove the sleeve piston, and remove the pin from the cam.

15. Remove the return spring, parking nut, lock washer, lever, cam and cam boot.



PIN CARING O-RING SLEEVE PISTON

19-22



Reassembly

CAUTION:

- Make sure all parts are clean before ressembly.
- Use only new replacement parts.
- Use only clean DOT3 or 4 brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Do not mix different brands of brake fluid.
- Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish.
 Wash spilled brake fluid off immediately with clean water.
- 1. Pack all cavities of the needle bearing with a commercially available assembly lube
- 2. Coat the new cam boot with a commercially available assembly lube and install in the caliper.
- 3. Install the cam with threaded end facing up.

CAUTION:

- Avoid damaging the cam boot since it must be installed before the cam.
- When installing the cam, do not allow the cam boot lips to turn outside in.

- 4. Install the lever, lock washer and parking nut, then tighten the parking nut.
- 5. Install the return spring.





- 6. Install the pin in the cam.
- 7. Install a new O-ring on the sleeve piston.
- 8. Install the sleeve piston so the hole in the bottom of the piston is aligned with the pin in the cam, and two pins on the piston are aligned with the holes in the caliper.



Rear Caliper

Reassembly (cont'd)

- 9. Install a new cup with its groove facing the bearing A side on the adjusting bolt.
- 10. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, and install in the caliper cylinder.

NOTE: Install the bearing A with its open end facing the spacer.



- 12. Install the special tool as shown.
- 13. Compress the spring until it bottoms out.
- 14. Check that the flared end of the spring cover is below the retaining ring groove.
- 15. Install the retaining ring then remove the brake spring compressor.

NOTE: Check that the retaining ring is seated in the groove properly.



19-24



17. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.



18. Coat the outside of the piston with silicone grease, and install it on the adjusting bolt while rotating it clockwise.

CAUTION: Avoid damaging the piston boot.

- 19. Install the brake pad retainers and brake pads.
- 20. Install the pad spring on the caliper.
- 21. Install the caliper on the caliper bracket and tighten the caliper mounting bolts.
- 22. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.
- 23. Connect the parking brake cable to the arm on the caliper.
- 24. Fill the brake reservoir up and bleed the brake system (page 19-I 0).
- 25. Operate the brake pedal several times, then adjust the parking brake lever.

NOTE: Before adjustments, make sure the parking brake arm on the caliper touches the pin.

26. Install the caliper shield and tighten the bolts.



Brake Hoses/Pipes



5

- 1. Inspect the brake hoses for damage, leaks, interference or twisting.
- 2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
- 3. Check for leaks at hose and line joints or connections, and retighten if necessary. CAUTION: Replace the brake hose clip whenever the brake hose is serviced.



Parking Brake



ALB Description

Features/Construction/Operation

General

In a conventional brake system, if the brake pedal is depressed excessively, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverabily of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.

The Anti-Lock Brake system modulates the pressure of the brake fluid applied to each caliper, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to excessive braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.

4 Channel Anti-Lock Brake system Features

- Increased braking stability can be achieved regardless of changing driving conditions.
- The maneuverability of the vehicle is improved as the system prevents the front wheels from locking.
- When the anti-lock brake system goes into action, kick-back is felt on the brake pedal.
- The anti-lock brake system is equipped with a self-diagnosis function. When an abnormality is detected, the system indicator light comes on.
- The location of the system's trouble can be diagnosed from the frequency of the system indicator light display blinks. • This system has individual control of the front and rear wheels.
- Braking force is controlled on each of the four wheels independently, resulting in optimum braking efects on the four wheels.

The system has a fail-safe function that allows normal braking if there's a problem with the anti-lock brake system. • DIFFERENCES BETWEEN THE 3 CHANNEL AND 4 CHANNEL ANTI-LOCK BRAKE SYSTEM

Items	3 Channel	4 Channel
Gear Pulser	Front: 50 Rear: 50	Front: 47 Rear: 50
Control Unit	12 and 18 pins	18 and 20 pins
Modulator Solenoid Unit	4 Pistons 3 Solenoid Valves	4 Pistons 4 Solenoid Valves
Service Check Connector	No	Yes
System Control Methord	Front wheels controlled independently. Rear wheels controlled commonly	Four wheels controlled independently.
Rear Brakes are provided with PCV function (Prooortionina Control Valve)	Yes	Νο

Construction

In addition to the conventional braking system, the anti-lock brake system is composed of: gear pulsers attached to the rotating part of individual wheels; speed sensors, which generate pulse signals in correspondence to the revolution of the gear pulsers; control unit, which controls the working of the anti-lock brake system by performing calculations based on the signals from the individual speed sensors and the individual switches; modulator unit, which adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the control unit; an accumulator, in which high-pressure brake fluid is stored; a pressure switch, which detects the pressure in the accumulator and transmits signals to the control unit; a power unit, which supplies the high-pressure working fluid to the accumulator by means of a pump; a motor relay for driving the power unit; a fail-safe relay, which cuts off the solenoid valve ground circuit when the fail-safe device is at work; and, an anti-lock brake system indicator light.



Master Cylinder

1. Construction

A tandem master cylinder is adopted for the master cylinder in order to improve safety of the braking system. In addition, a center valve method is introduced so as to match the anti-lock brake system operation. The master cylinder has one reservoir tank which is connected to the cylinder sections by two small holes. It has two pistons-primary and secondary, which are criss-cross connected with the calipers so that the fluid pressure works separately on each system (front right wheel & rear left wheel, and front left wheel & rear right wheel). A stop bolt for controlling movement of the primary piston is provided at the side of the master cylinder body. A reed switch for detecting the brake fluid volume is also provided on the cap of the reservoir tank.

2. Operation

When the brake pedal is depressed, the secondary piston is pushed through the brake booster and the center valve B is closed so that the fluid pressure is generated on the secondary side. At the same time, the primary piston is pushed by the secondary fluid pressure and the center valve A is closed so that braking fluid pressure is generated both on the primary and secondary sides.

When the brake pedal is released, the primary and secondary pistons are returned to the original position by the brake fluid pressure and piston spring.



(cont'd)

ALB Description

-Features/Construction/Operation (cont'd) -

3. Responses when fluid is leaking

(1) In case of leaking from the primary system

Since the fluid pressure on the primary side does not rise, the primary piston is pushed by the fluid pressure of the secondary piston and the tension of the piston spring until the end hits on the cylinder; the braking is performed by the fluid pressure on the secondary side.



(2) In case of leaking from the secondary system The secondary piston does not produce fluid pressure, keeps moving ahead, hits on the end surface of the primary piston so that the primary piston is pushed under the same condition as an ordinary rod; the **Draking** is performed by the fluid pressure on the primary side.





Speed Sensor

The speed sensor is a contactless type and it detects the rotating speeds of a wheel. It is composed of a permanent magnet and coil. When the gear pulsers attached to the rotating parts of each wheel (rear wheel: outboard joint of the driveshaft, front: hub bearing unit) turn, the magnetic flux around the coil in the speed sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are inputted into the control unit and the control unit identifies the wheel speeds.

PERMANENT MAGNET OUTPUT

GEAR^t PULSER





(cont'd)

ALB Description

Features/Construction/Operation (cont'd)

Control Unit

The control unit consists of a main function section, which controls the operation of anti-lock brake system, and subfunction, which controls the pump motor and "self-diagnosis."

1. Main Function

The main function section of the control unit performs calculations on the basis of the signals from each speed sensor and controls the operation of the anti-lock brake system by putting into action the solenoid valves in the modulator unit for each front and rear brake.

2. Sub-Function

The sub-function section gives driving signals to the pump motor and also gives "self-diagnosis" signals, necessary for backing up the anti-lock brake system.



Self-Diagnostic Function

Since the anti-lock brake system modulates the braking pressure when a wheel is about to lock, regardless of the driver's intention, the system operation and the braking power will be impaired if there is a malfunction in the system. To prevent this possibility, at speeds above 10 km/h (6 mph), the self diagnosis function, monitors the main system functions. When an abnormality is detected, the anti-lock brake system indicator light goes on.

There is also a check mode of the self-diagnosis system itself: when the ignition switch is first turned on, the anti-lock brake system indicator light comes on and stays on for a few seconds after the engine starts, to signify that the selfdiagnosis system is functional.

Fail-Safe Function

If an abnormality is detected, the control unit turns off the fail-safe relays and motor relay. In this condition the anti-lock brake system is prevented from functioning, yet the basic brake system continues to operate normally.

The Anti-lock Brake System Indicator Light Comes On

- 1. When the fluid pressure pump runs more than 120 seconds.
- 2. When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
- 3. When the rear wheel(s) is (are) locked more than a specified time.
- 4. When the wheel rotation signal is not transmitted due to faulty wire or sensor.
- 5. When the operation time of the solenoid valve(s) exceeds a predetermined valve and the control unit finds an open in the solenoid circuit.

6. When the output signals from both main functions in the control unit are not transmitted to the solenoid valve(s).



Modulator Unit Modulators and solenoid valves for each wheel are integrated in the modulator unit. The modulators for front and rear brakes are of independent construction. The solenoid valve features quick response (5 ms or less). The inlet and outlet valves are integrated in the solenoid valve unit.



Accumulator

The accumulator is a pneumatic type which accumulates high-pressure brake fluid fed from the pump incorporated in the power unit. When the anti-lock brake system operates, the accumulator feeds high-pressure brake fluid to the modulator valve via the inlet side of the solenoid valve.



(cont'd)
ALB Description

Features/Construction/Operation (cont'd) -

Pressure Switch

The pressure switch monitors the pressure accumulation (pressure from the pump) in the accumulator and is turned off when the pressure becomes lower than a prescribed level. When the pressure switch is turned off, the switching signal is sent to the control unit. Upon receiving the signal, the control unit activates the pump motor relay to operate the motor. If the pressure doesn't reach the prescribed value, the system indicator light is turned on.

Operation

When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outwards. When the free end of the Bourdon tube moves more than the prescribed amount, the micro-switch is activated by the force of the spring attached to the sensing lever. When the pressure in the accumulator decreases due to anti-lock brake system operations. the Bourdon tube moves in the direction opposite to the one described above, and the micro-switch is eventually turned off. Upon receiving this signal, the control unit activates the motor relay to operate the motor.



Power Unit

The power unit is composed of a motor and a plunger-type pump. This unit transmits the revolution of the motor to the plunger by way of an eccentric bearing and supplies high-pressure brake fluid to the accumulator by the effect of the reciprocating movement of the plunger.

When the pressure in the accumulator drops below the prescribed pressure level, the pressure switch gives an OFFsignal. The control unit turns the motor relay ON to start the operation of the pump, upon the reception of this signal and a signal from the wheel sensor that the vehicle is running at a speed greater than 10 km/h. When the pressure in the accumulator attains the prescribed pressure, the control unit turns the motor relay OFF approximately three seconds after the unit receives an ON-signal from the pressure switch. By this, the high-pressure in the accmulator is maintained. The control unit turns the pump off and lights the system indicator light if the accumulator pressure does not reach the prescribed level after the pump has run continuously for 120 seconds.





Operation

1. Ordinary Braking Function

In ordinary brake operations, the cut-off out valve in the modulator is open to transmit the hydraulic pressure from the master cylinder to the brake calipers via the chamber A and the chamber B. The chamber C is connected to the reservoir through the outlet valve which is normally open. It is also connected to the hydraulic pressure source (pump, accumulator, pressure switch, etc.) via the inlet valve which is normally closed. The chamber D serves as an air chamber. Under these conditions, the pressures of the chambers C and D are maintained at about the atmospheric pressure, permitting regular braking operations.



(cont'd)

ALB Description

Features/Construction/Operation (cont'd) -

If brake inputs (force excerted on brake pedal) are excessively large and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the outlet valve and opening the inlet valve. As a result, the high pressure is directed into chamber C, the piston is pushed upward, causing ths slide piston to move upward and the cut-off valve to close.

As the cut-off valve closes, the flow from the master cylinder to the caliper is interrupted, the volume of chamber B, which is connected to the caliper, increases, and the fluid pressusre in the caliper declines.

When both of the two valves, inlet and outlet, are closed (when only the outlet valve is activated) the pressure in the caliper is maintained constant.

When the possibility of wheel locking ceases, it is necessary to restore the pressure in the caliper. The solenoid valve is therefore turned off (outlet valve: open, inlet valve closed).

Process	Caliper Pressure	Outlet Valve		Inlet Valve	
		Electric Power	Hydraulic Circuit	Electric Power	Hydraulic Circuit
Caliper pressure declining	Down	O N	Close	ON	Open
Caliper pressure constant	——Hold-	ON	Close	OFF	Close
Caliper pressure increasing	Up	OFF	Open	OFF	Close

Slide Piston Function

When the car is used on rough roads where the tires sometimes lose adhesion, the anti-lock brake system may function excessively, causing an excessively large volume of brake fluid to flow into the chamber C. As this occurs, the piston is moved excessively, resulting in an abnormal loss of pressure in the chamber B. In order to overcome this problem, the slide piston is kept in the proper position by the spring force to avoid a negative pressure in the chamber B.



Kickback

When anti-lock brake system is functioning, the piston moves upward, the volume of chamber B increases, and the fluid pressure on the caliper side is reduced. At the same time, the volume of chamber A is reduced and the brake fluid is returned to the master cylinder. When the brake fluid is pushed back to the master cylinder, the driver can feel the functioning of the anti-lock brake system because the brake pedal is kicked back.



Circuit Diagram







Wiring/Connector Location



ALB Checker



- Function Test

NOTE:

- The ALB checker is designed to confirm proper operation of the anti-lock brake system by simulating each system function and operating condition. Before using the checker, confirm that the anti-lock brake system indicator light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off one second after the engine is started.
- The checker should be used through modes, I-5, to confirm proper operation of the system, in any one of the following situations:
 - After replacing any anti-lock brake system component.
 - After replacing or bleeding the system fluid (0 mode not necessary).
 - After any body or suspension repair that may have affected the sensors or their wiring.
- The procedure for modes I-5 are on this page and 19-42, mode 0 (wheel sensor signal) is on page 19-43.
- Use the following models of the ALB checkers: 07HAJ-SG00100 (US) 07HAJ-SG00200 (CANADA)

AWARNING **Disconnect** the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover located under the glove box and connect the 6-P inspection connector to the ALB checker.



NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

- 2. Start the engine and release the parking brake.
- 3. Operate the ALB checker as follows,
 (1) Turn the Mode Selector switch to "1".
 (2) Push the Start Test switch:
 - The test in progress light should come ON.
 - In one or two more seconds, all four monitor lights should come on (If not the checker is faulty).
 - The anti-lock brake system indicator light should not come ON (If it comes on the checker harness to the 6-P connector connection is faulty).

NOTE: When test in progress indicator light ON, don't turn the Mode Selector switch.



(cont'd)

ALB Checker

- Function Test (cont'd)

- 4. Turn the Mode Selector switch further to "2".
- 5. Depress the brake pedal firmly and push the Start Test switch

The anti-lock brake system indicator light should not go on while the Test in Progress light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 19-44.

NOTE: The operation sequence simulated by Modes 2, 3, 4 and 5:



6. Turn the Mode Selector switch to 3, 4 and 5. Perform step 5 for each of the test mode positions.

Mode 1:

Sends the simulated driving signal 0 km/h (0 mph) \rightarrow 180 km/h (112.5 mph) \rightarrow 0 km/h (0 mph) of each wheel to the control unit to check the control unit self diagnosis circuit. There should be NO kickback.

Mode 2:

Sends the driving signal of each wheel, then sends the lock signal of the rear left wheel to the control unit. There should be kickback.

Mode 3:

Sends the driving signal of each wheel, then sends the lock signal of the rear right wheel to the control unit. There should be kickback.

Mode 4:

Sends the driving signal of each wheel, then sends the lock signal of the front left wheel to the control unit. There should be kickback.

Mode 5:

Sends the driving signal of each wheel, then sends the lock signal of the front right wheel to the control unit. There should be kickback.

NOTE: If little or no kickback is felt from the brake pedal in modes 2-5, repeat the function test of modes I-5 several times before beginning to troubleshoot other parts of the system.

Mode 6:

Not used on this model.

Inspection points:

- 1. The anti-lock brake system indicator light goes ON in mode 1.
 - Check the wiring. If it is in good condition, the control unit is faulty.
 If anti-lock brake system indicator light goes on
 - 120 seconds later but the power unit stops, refer to page 19-47.
- 2. There are no kickback in modes 2 through 5.
 - Faulty pressure switch (remains ON)
 - . Shorted wires
 - . Faulty or disconnected power unit connector
 - . Faulty power unit relay
- Weak kickback in modes 2 through 5.
 Bleed high pressure circuits.
- 4. Power unit stops in mode 1 but it does not stop and there are no kickback in modes 2 through 5.
 - . Brake fluid leakage
 - . Bleed power unit
 - . Clogged power unit outlet
 - . Clogged or deteriorated power unit hose



· Wheel Sensor Signal Confirmation

NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

1. Disconnect the 6-P inspection connector from the connector cover located under the glove box and connect the 6-P inspection connector to the ALB checker.





- 2. Raise the car so that all four wheels are off the ground and support on safety stands (see page 1-6 through 8).
- 3. Turn the ignition switch ON.
- 4. Turn the Mode Selector switch to "0".



5. With the transmission in neutral, rotate each wheel briskly (one revolution per second) by hand, and confirm that its respective monitor light on the checker blinks as the wheels rotates.

NOTE:

- Rotating a wheel too slowly will produce only a weak blink of its monitor light that may be difficult to see.
- In bright sunlight, the monitor light may be difficult to see. Perform tests in a shaded area.
- In some instances, it may not be possible to spin the rear wheels fast enough to get a monitor indication, if necessary, start the engine and slowly accelerate and decelerate the rear wheels. The monitor lights should blink indicating a good wheel sensor signal.

If any monitor light fails to blink, check the suspected sensor, its air gap and its wiring/connectors.

Anti-lock Brake System Indicator -Light

Temporary Driving Conditions:

1. The anti-lock brake system indicator light will come on and the control unit memorizes the problem under certain conditions.

NOTE: Problem codes explained on pages 19-46.

- The tire(s) adhesion is lost due to excessive cornering speed.
 Problem codes: 5, 5-4, 5-8.
- The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.

Problem code: 4-1, 4-2, 4-4, 4-8.

- When the parking brake is applied for more than 30 seconds while the vehicle is being driven. Problem code: 2.
- The vehicle is driven on extremely rough road.

The anti-lock brake system is OK, if the anti-lock brake system indicator light: goes off after the engine is restarted.





- 2. If you receive a customer's report that the anti-lock brake system indicator light sometimes comes on, check the system using the ALB checker to confirm whether there is any trouble in the system. See page 19-41.
- 3. The anti-lock brake system indicator light will come on and the control unit will store a problem code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be jump-started. After the battery is sufficiently recharged, the antilock system indicator light will work normally after the engine is stopped and restarted.

However, after recharging the battery, the problem code must be cleared from the control unit's memory by disconnecting the ALB 2.3 (No. 32) fuse for at least 3 seconds.

Anti-lock Brake System Indicator Light Circuit:

CAUTION: Use only the digital multimeter to check the system.

- The indicator light, does not go on when the ignition switch is turned on. Check the following items. If they are OK, check the control unit connectors. If not loose or disconnected, install a new control unit and recheck:
 - Blown anti-lock brake system indicator light bulb.
 - Open circuit in YEL wire between No. 5 (10 A) fuse and gauge assembly.
 - Open circuit in BLU/WHT wire between gauge assembly and control unit.
 - Loose component grounding of the control unit to the body.
 - The anti-lock brake system indicator light remains ON or after the engine is started, however the antilock brake system indicator light does not blink any code or sub-code. Check the following items:
 - Loose or poor connection of the wire harness at the control unit.
 - Faulty ALB 2.3 (No. 32) fuse.
 - Open circuit in WHT/BLK wire between ALB 2.3 (No. 32) fuse and control unit.
 - Open circuit in YEL/BLK wire between fuse No. 4 (15 A) and fail safe relay(s).
 - Open or short circuit in the YEL/GRN wire between fail safe relay(s).
 - Short circuit in BLU/WHT wire between gauge assembly and control unit.
 - Open circuit in WHT/BLU wire between alternator and control unit.

If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.



Comes on and remains on while running:

- 1. Stop the engine.
- 2. Turn the ignition switch on and make sure that the anti-lock brake system indicator light comes on.
- 3. Restart the engine and check the anti-lock brake system indicator light.
 - There is no problem in the anti-lock brake system, if the anti-lock brake system indicator light goes off.
 Go to step 4, if the anti-lock brake system indicator light remains on.
- 4. Stop the engine.
- 5. Disconnect the service check connector from the connector cover located under the glove box.
- Connect the two terminals of the service check connector with a jumper wire.
- 6. Turn the ignition switch on, but do not start the engine.
- 7. Record the blinking frequency of the anti-lock brake system indicator lgiht. The blinking frequency indicates the problem code.

A WARNING Before starting the engine, disconnect the jumper wire from the service check connector, or else the Check Engine light will stay on when the engine running.



NOTE:

- The control unit can indicate three problem codes (one, two or three problems).
- If the anti-lock brake system indicator light does not light, see Troubleshooting of anti-lock brake system indicator Light Circuit page 19-44.
- If you miscount the blinking frequency, turn the ignition switch off, then turn on to blink the anti-lock brake system indicator light again.
- After the repair is completed, disconnect the ALB 2.3 (No. 32) fuse for at least 3 seconds to erase the control unit's memory. Then turn the ignition key on again and recheck.
- The memory is erased if the connector is disconnected from the control unit or the control unit is removed from the body.



Symptom-to-System Chart -

PROBLEM CODE		PROBLEMATIC	AFFECTED					OTHER	
AIN ODE	SUB CODE	COMPONENT/ SYSTEM	FRONT RIGHT	FRONT LEFT	REAR RIGHT	R E A R LEFT	See page	COMPONENT	!See page
0		Hydraulic Controlled Components					19-47	 ALB fuse Motor relay Pressure Switch Accumulator Modulator 	19-71
2	ļ	Parking brake switch-related problem			 		19-50 BRA		
@		Pulser(s)	0				19-71		
	٢			0					
	٢				0				
	٢			 	<u> </u>	\bigcirc			_
	0	- Speed sensor	0				- 19-51		
	\bigcirc			0					
	() () () () () () () () () () () () () (\cap			
	÷	-			\cap	$\overline{0}$			
(ئ	5) Greed sensor(s)			$\overline{\bigcirc}$		19-52	- Modulator		
	۲		4	 		0			
		, fail -safe relay	<u> </u>		, <u> </u>		19-53 (Function Test)	Front or rear fail-safe relay	+
						'		Front fail-safe relay	
	\ \$4		-			-		Rear fail-safe relay	
	Û	4					-		
	related Solenoid problem		+0_			19-57	Rear fail-safe relay		
		(Open or short)				0		Front fail-safe relay ALB 1.4 (No. 40) Fuse	



- Flowcharts









NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 minutes for air bubbles to disappear and level to stabilize.

(cont'd)























Problem Code 7-1 and 7-2 Front Solenoid Related Problem

CAUTION: Use only the digital multimeter to check the system.













Hydraulic System

Hydraulic Connections

CAUTION: Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.



-'Relieving Accumulator/Line Pressure-

A WARNING Use the Bleeder T-Wrench before disassembling the parts shaded in the illustration.

- 1. Drain the brake fluid from the master cylinder and modulator reservoir thoroughly.
- 2. Remove the red cap from the bleeder on the top of the power unit.
- 3. Install the special tool on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into reservoir Turn the special tool out one complete turn to drain the brake fluid thoroughly.
- 4. Retighten the bleeder screw and discard the fluid.
- 5. Reinstall the red cap.



Modulator/Solenoid Unit



Index/Torque

CAUTION:

- Do not damage the brake pipes when removing the spare tire and modulator/solenoid unit.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- ☆ : CORROSION RESISTANT BOLT





Modulator/Solenoid Unit

Solenoid Leak Test

- Disconnect the 6-P inspection connector (PNK) 1. from the connector cover located under the glove box and connect the inspection connector to the ALB checker. ANTI-LOCK BRAKE SYSTEM INDICATOR LIGHT CONNECTOR COVER 6-P INSPECTION ALB CHECKER 07HAJ-SG00100 (US) CONNECTOR 07HAJ-SG00200 (Canada) CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models.,
 - 2. Remove the modulator reservoir filter, then fill the modulator reservoir to the MAX level.

NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

3. Bleed high pressure fluid from the maintenance bleeder with the special tool. BLEEDER T-WRENCH



- 4. Start the engine and release the parking brake.
- 5. Turn the Mode Selector to 1 and press the Start Test button.
- 6. While the ALB pump is running, place your finger over the top of the solenoid return tube in the modulator reservoir.



- If you can feel back fluid coming from the return tube, one of the solenoids is leaking. Go to Solenoid Flushing.
- If you can feel brake fluid coming from the return tube, one of the solenoids is leaking. Go to step 7.
- If you can't feel brake fluid coming from the return tube, the solenoids are OK. Reinstall the modulator reservoir filter and refill the reservoir to the MAX level.
- 7. Bleed high-pressure fluid from the maintenance bleeder with the special tool, then run through modes 3 and 6 with the ALB checker. Repeat this three or four times.
- 8. Repeat steps 5 and 6.
 - If the solenoid leakage has stopped, reinstall the modulator reservoir filter and refill the reservoir to the MAX level.
 - If one of the solenoids is still leaking, replace the modulator/solenoid unit.

-Solenoid Flushing -



- 1. Remove the ALB pump relay from the main relay box. (Location: page 19-40)
- 2. install the auxiliary window switch (07KAZ-001000A) into the two motor relay cavities in the relay box.



- 3. Disconnect the four modulator solenoid connectors.
- 4. Bleed any high-pressure fluid from the maintenance bleeder with the Bleeder T-Wrench, then retighten the bleeder.



5. Connect the RED terminal from one solenoid to the battery positive (+) terminal with a remote starter switch. Connect the BLK terminal from the same solenoid to the battery negative (-) terminal with a jumper lead as shown.



- 6. Press the auxiliary switch to run the pump. After the pump has run for about five seconds, press and release the remote starter switch three or four times to open and close the solenoid. Continue running the pump for about 30 seconds, then release the auxiliary switch and open and close the solenoid another three or four times.
- 7. Repeat steps 4-6 for the other two solenoids.
- 8. Reconnect the solenoids and the pump relay.
- 9. Connect the ALB Checker and turn the Mode Selector to "1". Start the engine and release the parking brake. Push the Start Test button on' the ALB Checker.
- IO. While the ALB pump is running, place your finger over the top of the solenoid return tube in the modulator resorvoir and check for leaks.
 - If a solenoid is still leaking, replace the modulator/solenoid unit.

Power Unit

Torque/Inspection

CAUTION:

- Do not attempt to disassemble the power unit except for those components shown in this illustration.
- Do not spill brake fluid on the car; it may damage the paint: if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.



Accumulator/Pressure Switch

Index/Torque



- CAUTION:
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Before disassembling the accumulator unit, Bleed the high pressure brake fluid out from the system using the Bleeder T-Wrench. (page 19-62)
- ☆ : CURRENT CORROSION PROTECTION BOLT

- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only clean DOT 3 or 4 brake fluid.

NOTE: Replace the O-ring with a new one before rassembly.

A WARNING The accumulator contains high pressure nitrogen gas, do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



Accumulator/Pressure Switch

Accumulator/Pressure – Switch Removal

- I. Drain the high pressure brake fluid from the power unit (see page 19-62).
- 2. Remove three 6 mm flange bolts, then remove the accumulator from the pressure switch joint.

6x I.Omm 10 N•m II .O kg-m, 7 Ib-ft)



- Accumulator Disposal -

A WARNING The accumulator contains high pressure nitrogen gas, do not puncture, expose to flame, or attempt to disassemble the accumulator or it may explode: severe personal injury may result.

- 1. Secure the accumulator in a vise so that the relief plug points straight up.
- 2. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
- 3. Remove the plug completely and dispose of the accumulator unit.



Bleeding



-Air Bleeding with ALB Checker-

1. Disconnect the 6-P inspection connecotor (PNK) from the connector cover located under the glove box and connect the inspection connector to the ALB checker.



or 07H AJ - SG00200 (Canada)

CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

2. Fill the modulator reservoir to the MAX level.

NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

3. Bleed high pressure fluid from the maintenance bleeder with the special tool.



4. Start the engine and release the parking brake.

NOTE: Depress the brake pedal firmly while test in progress light in ON.

- 5. There should be at least two strong kickbacks. If not, repeat steps 2 through 5, as necessary.
- 6. Fill the modulator reservoir up to the MAX level.



- 7. Install the reservoir cap.
- 8. Check the anti-lock brake system function in all modes by using the AL8 checker.
Electronic Components





Fail-Safe Relays/Motor Relay ——— Inspection

- 1. Check for continuity between terminals (3) and (4). There should be no continuity.
- 2. Connect a 12 V battery across terminals ① and ②. There should be continuity between terminals ③ and ④.



Pulsers/Sensors

-Inspection —

- 1. Check the pulser for chipped or damaged teeth.
- 2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

(A) - (B) = Standard: 0.4 - 1 .0 mm (0.016-0.039 in.)

NOTE: If the gap exceeds 1 .0 mm (0.039 in.), the probability is a distorted knuckle which should be replaced.



Pulsers/Sensors



TCS (Traction Control System)

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Component Location Index



System Description

- Outline

Role of System

The NSX traction control is a variable system designed to enhance traction during acceleration and cornering. It does so by determining the optimum amount of wheel spin for any given driving situation, then suppressing surplus engine power accordingly.

Construction and Function

The TCS control unit gets signals about the vehicle's speed, direction, and road conditions from sensors at the wheels and the steering column. Based on these signals, the control unit will determine the optimum amount of wheel spin. Because the system is variable, the control unit may determine, depending on the driving conditions, that some wheel spin is beneficial (thus enhancing straight-line acceleration), or that no wheel spin is beneficial (thus enhancing cornering). For any given driving situation, the control unit will determine the amount of wheel spin best suited to the driver's needs and, if necessary, will then signal the throttle actuator and PGM-FI control unit to reduce engine power.

The system is automatically "ready" whenever the engine is started, but can be manually canceled with the TCS switch. However, once activated, the system cannot be canceled until it is once again in the ready state.



Components:

- Wheel sensors. The TCS "shares" the wheel sensors with the Anti-lock brake system. The wheel sensors transmit wheel speed signals to the TCS through the Anti-lock brake system control unit.
- Steering angle sensor. The steering angle sensor signals the TCS control unit about the amount of steering angle.
- Throttle actuator. The throttle actuator gets signals from the TCS control unit and closes the throttle valve accordingly.
 TCS control unit. The control unit gets driving condition signals from the sensors and, if necessary, signals the throttle actuator to close the throttle valve and engine control unit (PGM-FI control unit).

- Construction and Function

TCS Control unit

Acceleration Control:

The TCS control unit gets signals from the wheel sensors about the rotational speed of each wheel. Traction control is activated when the rotational speed of the driving wheels differs from the rotational speed of the driven wheels (i.e., vehicle speed).

Handling Control:

Based on signals about driving wheel and driven wheel rotational speeds, the control unit calculates the car's "yaw" rate (i.e., the turn rate of the car's body). Based on signals from the steering angle sensor, the control unit also calculates the yaw rate expected by the driver. If the difference between actual and expected yaw rates is substantial-that is, if the direction of the car's body will exceed the driver's expected line -the control unit signals the throttle actuator, which closes the throttle valve, thus reducing engine power and maintaining the expected line.

Rough Road Control:

Based on signals from the wheel sensors, the control unit detects a rough road based on frequency of wheel rotational vibration. The control unit then signals the throttle actuator to relax engine power, thus improving acceleration efficiency.

Grip Control:

Based on signals about wheel speed and yaw rate, the control unit determines the efficiency of the grip of the tires on the road and signals the throttle actuator to relax engine power if necessary, thus improving grip.



Fail-Safe Function:

If the control unit detects an abnormality, it shuts the traction control system off and causes the TCS system indicator light to come on. However if the abnormality is detected while the TCS is activated, the control first establishes the appropriate wheel spin velocity, then shuts the system down, thus preventing excessive wheel spin.

Self-Diagnosis Function:

If the control unit detects an abnormality, it records a "problem code" which can be used to diagnose the problem. The failure code is shown at the TCS system indicator light when the Service Check connector terminals are connected with a jumper wire.

Steering Angle Detection

Steering angle is detected by the steering angle sensor, located on the steering column. The sensor uses two magnetoresistor elements to determine steering angle and direction of rotation. When the driver turns the steering wheel, a magnet in the steering shaft generates waves in the "MR" elements. These waves are amplified and converted into signals which the control unit can interpret as angle and direction of turn.







Vehicle Speed Detection

Wheel rotation speed is detected by the wheel sensors, located at each wheel. The signals are sent to the control unit, which compares each wheel's speed and determines whether traction control is required.







Circuit Diagram





TCS Indicator Light

Temporary Driving Conditions:

- 1. The TCS indicator light will come on and the control unit memorizes the problem code under certain temporary conditions:
 - The spare tire is installed, or a tire of the improper size is installed.
 - The tire pressures are not correct.
- 2. If the TCS indicator light does not come back on after correcting the tire or tire pressure problem. The TCS system is OK.

NOTE: Remove the ALB 2.3 (20A) fuse for at least 3 seconds to clear the problem code from the TCS control unit memory.

TCS Problem Code Indication:

- 1. Stop the engine.
- 2. Turn the ignition switch on and confirm that the TCS indicator light comes on.
- 3. Turn the ignition switch off.
- 4. Connect the two terminals of the Service Check Connector with a jumper wire.
- 5. Turn the ignition switch on, but do not start the engine.
- 6. Record the blinking frequency of the TCS indicator light. The blinking frequency indicates the problem code. Long blinks indicate the main code; short blinks indicate the sub-code.
- 7. Refer to the Troubleshooting Guide (page 19-84) for repair information.







NOTE:

- The TCS control unit has three memory registers. When a problem occurs, the control unit stores the problem code in the first memory register. If another problem occurs, or the same problem occurs again, the control unit moves the first problem code to the next memory register and stores the second problem code in the first register. If there's a third problem occurrence, the two existing problem codes are moved up one register and the third problem code is stored in the first register. If problems continue to occur, the oldest problem code is moved out of the last register and lost, and the most recent problem code is stored in the first register.
- The TCS indicator light will not come on again after the engine starts unless another problem occurrence is detected. However, there will still be a problem code stored in the control unit's memory.
- After the repair is completed, disconnect the jumper wire from the Service Check connector and remove the ALB 2.3 fuse (20A) from the main relay box for at least 3 seconds to erase the control unit's memory.
- The control unit's memory is erased if the connector is disconnected from the control unit, or if the control unit is removed from the car.

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Troubleshooting Guide

		Related components															
Problem Code	System Indicated	TCS (15A) FUSE	ALB 2.3 (20 A) FUSE	No. 5 (10 A) FUSE	Parking brake switch	Charging Svstem	Fail-safe relay	I Throttle bodv	Throttle actuator	Pedal angle sensor	Throttle angle sensor	Steering angle sensor	PGM-FI ECU	ALB control unit	A/T control unit	Wire harness	TCS control unit
_	The TCS indicator light, TCS OFF indicator light, TCS activation and TCS switch indicator light do not come on for two seconds when the ignition switch is first turned on.		0	0				_								0	0
	The TCS OFF indicator light and the TCS activation light do not go off two seconds after the ignition switch is turned on.															0	0
-	The TCS indicator light does not go off after the engine starts.					-							0			0	0
	The TCS OFF indicator light does not go off after the engine starts.					C										0	0
tays on	TCS control unit or battery voltage too low																0
1-2	TCS conrol unit												1				0
2	Parking brake signal				0								_			0	0
2-1	Steering angle sensor											Ö				0	0
3-1	PGM-FI ECU				_					<u> </u>		[0			0	0
3-2	NeP Signal (engine speed signal)						_						0	ter to	0-	0	0
3-3	Abnormal TQOUT signal										_		0			0	0
3-4	Abnormal VREF (reference voltage) signal					_					_		0		6	Ò	0
3-5	bnormal PA sensor signal											_	0			0	0
3-6	Abnormal θ ACP (throttle drum angle sensor)								_	0			0		t	0	0
3-7	Abnormal θ TH (throttle angle sensor)				_					_	0		0	_	0	0	0
4-1	Wheel sensor R. Front													Ó		0	0
4-2	Wheel sensor L. Front		ĺ					[Ĺ		[_			0		0	0
4-4	Wheel sensor R. Rear		ĺ				L							0		O	0
4-8	Wheel sensor L. Rear		ĺ											0		O	0
4-9	Ali wheel sensor													0		0	0
5-1	Abnormal fail-safe relay, throttle actuator or throttle body	0	[0	0	0	Ĺ						С	0
6-I	A/T control unit						L								6	C	0



- Troubleshooting Flowchart -

The TCS indicator light, TCS OFF indicator light, TCS activation light and the TCS switch indicator light do not come on for two seconds when the ignition switch is first turned on (no bulb check). NOTE: The TCS indicator light stays on until the engine starts.

Turn the ig nition switch ON. Do the other indicator lights (ALB, YES Check Engine, SAS, etc.) come on? NO (To page 19-86) Turn the ignition switch OFF. Check the No. 5 (10A) fuse in the dash fuse box. DASH FUSE BOX NO Is it normal? Replace the fuse and recheck. YES Repair open in the YEL wire between the dash fuse and gauge assembly.

(cont'd)







Troubleshooting Flowchart (cont'd)

The TCS OFF indicator light and the TCS activation light do not go off two seconds after the ignition switch is turned on.





The TCS indicator light does not go off after the engine starts:

NOTE:

- When the engine starts, a TCS system check is performed. The TCS indicator light will go off if the system is normal.
 If the back-up power supply is less than 8V to the TCS control unit (No. 35 terminal), the system check is stopped
- and TCS indicator light comes on.



(cont'd)







(cont'd)







(cont'd)

-- Troubleshooting Flowchart (cont'd)

Problem codes 1-2 or the TCS indicator light stays on: TCS Control Unit.

NOTE:

- If the TCS indicator light indicates problem code 1-2, replace the TCS control unit.
- If the TCS indicator light stays on, check for a short to body ground in the YEL/BLK wire between the control unit and the TCS indicator light. If the wire is OK, replace the TCS control unit.



Problem code 2: Parking brake signal

NOTE:

- Before proceeding to the troubleshooting procedure, be sure to perform a running test and check whether the TCS indicator light comes on or not. If the TCS indicator light does not come on, the system is working properly. If the TCS indicator light comes on, make sure the parking brake lever is released.
- When both of the front wheels are running at 10 km/h (6.2 mph) or over and the parking brake is applied for more than 30 seconds continuously, the TCS control unit will cause the TCS indicator light to come on.
 When the parking brake switch is turned OFF, the input signal to the TCS control unit becomes high. When the parking switch is turned ON, the input signal to the TCS control unit becomes low. Also, when the wire between the No.5 (10 A) fuse and the TCS control unit is disconnected or cut, the input signal becomes low.



~ Troubleshooting Flowchart (cont'd)

Problem code 2-1: Steering angle sensor system.

NOTE: The TCS control unit performs the s-chagr nosis for the steering angle sensor when the average speed of the front two wheels exceeds 16 km/hr. The TCS hdicator light comes on if the yaw rate is generated and the steering angle signal that corresponds to this yaw rate is not input when the steering wheel is turned while there is no input from the STOP (brake light signal) and PARK (Parking brake signal).



LT GRN/BLK

WIRE (LGE1)





(cont'd)



















Trouble shooting Flowchart (cont'd)



Problem code 3-2: Engine speed signal (NEP).












(cont'd)







(cont'd)















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Troubleshooting - Troubleshooting Flowchart-(cont'd) -

Problem code 4-9: All wheel sensors.

NOTE: The TCS indicator light comes on when the vehicle is stopped and engine is running and signals from all four wheels are disconnected for more than three seconds.







Troubleshooting Flowchart (cont'd)

Problem code 5-I : Fail-safe relay system and the throttle actuator system.













Troubleshooting Troubleshooting Flowchart (cont'd) (From page 19-124) **RED/BLK (FSR)** 20-P CONNECTOR 6 8 3 4 5 7 9 121314 1516 7||8|| 9 Ω **4-P CONNECTOR** Turn the ignition switch OFF. Disconnect the 4-P connector from the fail-safe relay. View from terminal side Check for continuity between the No. 2 terminal of the 20-P connector for the TCS control unit and No. 3 of the 4-P connector for the fail-safe relay. Repair open in the RED/BLK wire NO between the TCS control unit and Is there continuity? fail-safe relay. YES Check for continuity between the No. 2 (RED/BLK) terminal of the 20-P connector and body ground. YES Repair short in the RED/ BRK wire Is there continuity? to the body ground. NO Check for poor connections or loose wires. Substitute a known-good TCS control unit and recheck.





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Traction Control System Function Method

NOTE: Perform these procedures after the user reports these difficulties and the diagnosis is determined.





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Electronic Components





Electronic Compornents

Steering Angle Sensor Replacement

Removal:

1. Remove the steering column covers.



- 2. Disconnect the 5-P connector from the steering angle sensor.
- 3. Remove the steering angle sensor mounting bolts, then remove the steering angle sensor.

NOTE: Take care not to drop the adjusting shim used between the steering angle sensor and sensor mounting bracket.

CAUTION: Handle with care not to damage or drop the steering angle sensor as it is sensitive.



Installation:

1. Install the steering angle sensor by tightening 2 bolts and make sure the adjusting shim is installed properly.

CAUTION: Do not apply any grease or oil to the adjusting shim.



- 2. Connect the 5-P connector to the steering angle sensor.
- 3. Install the steering column covers.
- Perform the steering angle sensor system check (See page 19-96). If there is an abnormalty, check the troubleshooting flowchart (see page 19-96).

NOTE:

- There is no need to select (replace) the shim when the steering angle sensor is replaced. Use the original shim.
- Selection (Replacement) of the adjusting shim (for adjusting the air gap) is required only when the steering column assembly (without the sensor) is replaced.



Selection of the adjusting shim for the steering angle sensor air gap adjustment.

NOTE:

- The adjustment of the air gap between the steering shaft and the steering angle sensor should be carried out in order to obtain adequate sensor output.
- The adjusting shim reference number is stamped on the steering column. Adequate air gap can be kept by selecting the adjusting shim with the reference number

Reference Number	Shim (P/N): (Thickness)
1	Not used: (0 mm)
2	A: (0.1 mm)
3	B: (0.2 mm)
4	A + B: (0.3 mm)
5	C: (0.4 mm)
6	A+C: (0.5 mm)
7	B+C: (0.6 mm)
8	D: (0.7 mm)

Adjusting Shim

Parts Number	Thickness	Color
A: 53395-SL0-A01	l 0.1 mm	Yellow
8: 53396-SL0-A01	0.2 mm	Black
C: 53397-SL0-A01	0.4 mm	Green
D: 53398-SL0-A0 1	0.7 mm	White

Reference Number Locations

Selection of The Adjusting Shim



Body

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)



A WARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS electrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash and dashboard lower panel. Do not use electrical test equipment on these circuits.





Construction

- Features

- Mid-engine car with ground-hugging, full-forward canopy design.
- The lower body is AH-PO for greater resistance to corrosion and collision damage.
- Outer panels, (except the roof) are constructed of individual panels to allow more convenient and economical repairs.
- In considerations of rigidity, surface smoothness and simultaneous body painting, the rear spoiler is made of SMC.
- 1. Straight-line front side-frame for excellent absorption of front impact energy.
- 2. Extruded-molded side sills with high strength and rigidity.
- 3. Lower part of center pillar is designed as flare-type and united solidly to main frame, thus greatly improving rigidity.
- 4. All main-frame parts are joined smoothly, providing high impact strength and improving body rigidity.
- 5. Large cross-section rear frame to protect fuel tank in the event of rear impact.
- 6. Rear fenders are detachable to make minor collision repairs easier.




- Composition REAR HATCH TRUNK LID (#6000) HOOD (**#6000**) ROOF PANEL (#6000) SIDE 'SILL (#6000) REAR FENDER (#6000) DOOR PANEL (#6000) / Body Composites (#5000) FRONT FENDER (#6000)

Types of aluminum alloys for pressings:

Alloy	Part	Material properties	
Non-heat-treated alloys #5000, Aluminum-Magnesium (AIMg)	Body composites (HA51 82P0)	Good corrosion resistance, Weldability and mallability.	
Heat-treated #6000, Aluminum-Magnesium-Silicone	Exterior surface skin (HAZ6083P—T4) Roof panel (HAZ6083P—T4) Side sills (HACF60—T5)	Excellent mallability and corrosion resistance (HAZ6083—T4) is particularly resis- tant to corrosion.	

Types and Materials of Exterior Resin Parts



NO.	Part Name	Material	Replacement
1	Headlight lid	HAS-214F 6Nylon PPO alloy	See Section 23
2	Front bumper	BFO-1 Polyester	Page 20-47
3	Front and rear skirts	HRB denatured polypropylene	Pages 20-48, 50
4	Door mirror	ABS acrylic dash styrene	Page 20-19
5	Side sill panel	HAS-214B 6nylon PPO alloy	Page 20-59
6	Trunk lid spoiler	SMC non- saturated polyester	Page 20-55
7	Rear bumper	BFO-1 Polyester	Page 20-49
(8)	Fuel filler lid	HAS-2148 6nylon PPO alloy	Page 20-57



Disassembly _

NOTE: Lower the window fully.

1. Carefully pry out the trim plate with a fiat tip screwdriver as shown.

NOTE: To prevent damage to the trim plate, wrap the end of the screwdriver with a shop towel.



2 Remove the trim plate by pulling it backward and remove the inside door handle screws.



3. Disconnect the connector and the handle cable, then remove the inside door handle by pulling it forward.





20-6





Disassembly (cont'd) -

9. Remove the 3 mounting screws, then remove the front sash panel.



- IO. Remove the outer molding mounting screw and detach the crips, then remove the outer molding (page 20-I 1).
- 1, Remove the 2 mounting bolts and locknut, then remove the front sash.

NOTE:

- Hold the adjusting bolt with a hex wrench when removing the locknut.
- Scribe a line around the locknut to show the original adjustment.



12. Remove the mounting bolt and locknut. Remove the rear sash, then disconnect the latch rod.

NOTE:

- Hold the adjusting bolt with a hex wrench when removing the locknut.
- Scribe a line around the locknut to show the original adjustment.



- \bigstar : CORROSION RESISTANT BOLT/NUT
- 13. To replace the outside door handle, remove the 5 screws from the rear sash.





14. Remove the 2 locknuts, then remove the rear glass guide.

NOTE:

- Hold the adjusting bolt with a hex wrench when removing the locknuts.
- Scribe a line around the locknuts to show the original adjustment.



- ☆ : CORROSION RESISTANT BOLT/NUT
- 15. Before removing the latch assembly and lock cylinder, raise the window fully by connecting a 12
 V battery to the regulator motor (See Section 23).
- 16. Remove the retainer by sliding it forward. Pry the lock rod out its joint using a flat tip screwdriver, then carefully remove the lock cylinder.



17. Disconnect the rod and remove the inside crank. Remove the cable and harness clips. Remove the mounting screws, then remove the latch assembly through the hole in the door.

NOTE: Take care not to bend the lock rod.



18. Lower the window and remove the mounting nuts, then remove the stopper plates.

NOTE:

- Lower the window by connecting a 12 V battery to the regulator motor (See Section 23).
- Scribe a line around the mounting nuts to show the original adjustment.



- Disassembly (cont'd) —

19. Carefully lower the window until you can see its mounting bolts, then remove the bolts. Pull the glass out through the window slot.

NOTE:

- Lower the window by connecting a 12 V battery to the regulator motor (See Section 23).
- Scribe a line around the mounting bolts to show the original adjustment.



20. Remove the 2 locknuts, then remove the front glass guide.

NOTE:

- Hold the adjusting bolt with a hex wrench when removing the locknuts.
- Scribe a line around the locknuts to show the original adjustment.



21. Remove the 4 regulator mounting bolts and looser the 3 motor bolts, then take out the regulator assembly through the window slot.

NOTE:

- Scribe a line around the mounting bolts to show the original adjustment.
- Take care not to bend the cable.



- ☆ : CORROSION RESISTANT BOLT
- 22. Remove the mounting bolts, then remove the inside stabilizers from the door panel.

NOTE: Scribe a line around the mounting bolts tc₃ show the original adjustment.





– Door Molding Removal -

NOTE: Lower the window fully.

- 1. Remove: (See pages 20-6, 7) ● Trim plate ● Inside door handle ● Door panel
- 2. Pry the clips out using a flat tip screwdriver, then pull up the moldings.
- 3. Set the clips on to the molding, 'then install the molding in the reverse order removal.

inner molding:



Outer molding:

NOTE:

- Remove the front sash panel (page 20-8) 'and molding mounting screw.
- Starting at the front and sliding the molding forward.



- Removal -

- 1. Lower the window fully.
- 2. Remove the seat (page 20-38).
- 3. Disconnect the door harness connectors.
- 4. Remove the door assembly by removing the hinge bolts, detent rod pin and pulling out the wire harness.

CAUTION: Place a shop towel and rubber pad on the jack to prevent damage to the door.

NOTE: Let an assistant hold the ubur.



NOTE: Adjust the door position (page 20-I 8).

L

 $\ensuremath{\bigstar}$: Corrosion resistant bolt



- 2. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and door upper weatherstrip when the glass is closed. Adjust the position of the door glass as necessary (pages 20-I 3 to 17).
- 3. Attach the wire harness correctly on the door.



NOTE: Make sure the wires are not pinched.

4. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.



NOTE: Do not fill up with adhesive.

20-12

1







(5)







3.7



- 13. After the clearances have been adjusted properly, reinstall the weatherstrip.
- 14. Reinstall the door trim.
- 15. With the door and glass closed fully, check that the weatherstrip is not pinched by the door glass.
- Section: (1) (2)



Section: (3) - (4)



Section: (5)



16. With the door and glass closed fully, check for water leaks.

NOTE: Do not use high pressure water.



- 17. install the control switch panel in the door panel.
- 18. Install the door harness.
- 19. Attach the plastic cover, and install the door panel.
- 20. Check for air leaks.



Door Mirror



- Removal -

NOTE: Raise the window fully.

- 1. Remove the door panel and carefully remove the plastic cover (pages 20-6, 7).
- 2. Disconnect the power mirror connector.
- 3. Remove the 2 mounting nuts from the hole in the door while holding the mirror.

NOTE: Do not drop the mounting nuts inside the door.



- 4. Install the door mirror in the reverse order of removal.
- 5. With the door closed fully, check for water and air leaks.

NOTE: Do not use high pressure water.

☆: CORROSION RESISTANT NUT

- Mirror Glass Replacement

1. insert a screwdriver in the mirror through the service hole, and loosen the actuator retaining screw.



2. Pull the actuator and glass out from the mirror housing.



3. Install the actuator and glass in the reverse order of removal.

Side Window Molding/Weatherstrip



20-20



Windshield, Rear Window Glass, Rear Hatch Glass

Index ⁻

(): Quantity of part used.



Windshield

Removal

CAUTION:

- Wear gloves to remove and install the glass.
- Use covers to avoid damaging the interior.
- 1. To remove the windshield, first remove the:
 - Seats (page 20-38).
 - Rearview mirror (page 20-41).
 - Sun visor.
 - Front pillar retainer (page 20-20).
 - Front wiper and air scoop (See Section 23).
 - Front pillar trim and headliner (page 20-37).
- 2. Peel off the upper molding.
- 3. Apply protective tape along the edge of the dashboard and body next to the glass as shown.



4. Using an awl, make a hole thrugh the windshield adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



5. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire windshield.

CAUTION:

- Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.
- Take care not to damage the vehicle identification number plate.



6. Cut the lower spacers and upper fastener away from the body with a knife; they are cemented in place.

NOTE: Replace the rubber spacers with new ones whenever the windshield has been removed.

20-22



Installation



1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire windshield flange.

NOTE:

- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before painting.
- 2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



4. Glue the lower spacers and defrost panel seals in place as shown.



5. Set the windshield upright on the spacers, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



Windshield

 Glue the rubber dam to the inside face of the windshield as shown to contain the adhesive during installation.

NOTE: Be careful not to touch the glass where adhesive will be applied.



7. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the windshield is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

: Apply glass primer here.



8. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.
- 9. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



10. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



20-24



11. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.

NOTE:

- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.
- Mask off the dashboard before painting the flange.

: Apply body primer here.



12. Glue the upper fastener to the body as shown.



13. Use suction cups to hold the glass over the opening, align it with the marks made in step 5 and set it down on the adhesive. Lightly push on the glass until its edge it fully seated on the adhesive all the way around.

NOTE: Do not close or open the doors until the adhesive is dry.



Windshield

- Installation (cont'd) -

15. Let-the adhesive dry for at least 1 hour, then spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with urethane windshield adhesive.

NOTE:

- Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.
- Keep the glass dry within the first 1 hour after installation.
- Check that the ends of the molding are set under the air scoop.
- 16. Reassemble all removed parts.

Rear Window

- Removal –

CAUTION:

- Wear gloves to remove and install the glass.
- 1. To remove the rear glass, first remove:
 - Seats (page 20-38).
 - Rear pillar trim panel (page 20-37).
 - Rear upper trim panel (page 20-37).
 - Rear hatch glass assembly (page 20-53).
- 2. Remove the weatherstrip.
- 3. Disconnect the rear defogger sub-harness and ground cable/antenna lead, then remove the grommets.





4. Use a knife to cut through the glass adhesive from inside the car, all the way around.

CAUTION: Take care not to scratch or score the rear window molding and body.



5. Remove the rear window from the body. If necessary, replace the sub-harness and ground cable/antenna lead.

NOTE: Be careful not to damage the wire harness.



Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

NOTE:

- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before applying primer.
- 2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



Rear Window

- Installation (cont'd) -

4. Set the glass upright on the body, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

ALIGNMENT MARKS



5. Glue the rubber dams to the inside face of the glass as shown to contain the adhesive during installation.

NOTE: Be careful not to touch the glass where adhesive will be applied.



6. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

: Apply glass primer here





7. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

NOTE:

- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

: Apply body primer here





8. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE: Clean the plate with a sponge and alcohol before mixing.

- 9. Follow the instructions that came with the adhesive.
- 10. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



11. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



12. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not close or open the doors until the adhesive is dry.



13. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and, let the glass dry, then seal with sealant.

NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

- 14. Connect the rear defogger sub-harness and ground cable/antenna lead, then install the grommets.
- 15. Reinstall all remaining removed parts.

Rear Window Molding

Replacement -

- 1. Remove the rear window and wire harness. (page 20-26).
- 2. Place the glass on its surface as shown.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.

3. With a helper holding the glass, carefully cut off the upper and lower moldings.



4. Scrape all traces of old adhesive from the chamfered edges of the glass.

NOTE: Be sure to scrape all traces of old adhesive thoroughly.



5. Clean the glass surface with alcohol where the new moldings are to be installed.

NOTE: Make sure the surface is kept free of water, oil and grease.

6. With a brush, apply a light coat of glass primer around the edge of the glass.

NOTE: Scrape off excess glass primer with a putty knife after installing the new moldings.



7. Degrease the inner surfaces of the new moldings thoroughly, then apply a light coat of glass primer to the surfaces.

NOTE:

- Apply glass primer around the entire groove of the new molding.
- Do not apply glass primer to the outer surface.



8. Run a bead of adhesive in the molding grooves.



20-30



9. Press the moldings into position around the entire edge of the glass.

NOTE: Check that the moldings are not wrinkled or lifted away at the corners.



10. Scrape or wipe the excess adhesive off with a putty knife or gauge.

NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface, upper seal, lower fastener or glass.

11. After the adhesive is dry, install the rear defogger sub-harness and ground cable/antenna lead in the upper molding.



Rear Hatch Glass

Removal

CAUTION:

- Use covers to avoid damaging the body.
- Wear gloves to remove and install the glass.
- Do not damage the defroster grid lines.
- Take care not scratch or score the window molding.
- 1. Remove the rear hatch from the body (page 20-53).
- 2. Using an awl, make a hole through the glass adhesive from the inside, at the top of the glass. Push piano wire through the hole and wrap each end around a piece of wood.
- 3. Apply the protective tape along the edge of the rear hatch frame as shown.
- 4. With a helper holding the glass, pull the wire back and forth in a sawing motion and carefully cut through the adhesive along the top and the sides of the glass.

CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the frame.

PROTECTIVE

COVER

PIANO WIRE

GLASS

Installation

NOTE:

- Do not scrape down to the painted surface of the hatch frame; damaged paint will interfere with proper bonding.
- Mask off surrounding suufaces before painting.
- 1. Use a putty knife to scrape off all traces of old adhesive and dams, then clean the rear hatch frame and glass (new) surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



REAR HATCH

FRAME



2. Install the rear hatch frame and adjust it fit to the rear window weather strip and engine cover seal.

NOTE: Do not install the support struts.



Glue the outer and inner rubber dams to the inside 3. face of the glass as shown to contain the adhesive durina installation.

NOTE:

- Glue the rubber dams aligning the center of the glueing surface with the printed dots.
- Be careful not to touch the glass where adhesive will be applied.
- Mask off surrounding surfaces before applying primer.



4 Place the glass gently on the rear hatch frame, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

NOTE: Put several spacers between glass and rear hatch air scoop to prevent glass from sliding down.



5. With a brush, apply a light coat of glass primer of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:

- Do not apply body primer to the glass, and do not get body and glass primer brush mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.



(cont'd)

Rear Hatch Glass

- Installation (cont'd)-

- 6. With a brush, apply a light coat of body primer to the original adhesive remaining around the rear hatch frame.
 - NOTE:
 - Make sure the surface is kept free of water, oil and grease.
 - Do not apply glass primer to the body, and be careful not to mix up glass and body primer brush.
 - Never touch the primed surfaces with your hands.



7. Thoroughly mix the adhesive and hardener together on a glass or metal plate.

NOTE:

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that came with the adhesive.
- 8. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



9. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.



10. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not open or close the doors until the adhesive is dry.



Rear Hatch Glass Molding



Replacement

- 1. Remove the rear hatch (page 20-53).
- 2. Place the glass on its surface as shown.
 - CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.
- 3. With a helper holding the glass, carefully cut off the molding.





4. Turn the glass over, then cut the outer side rubber portion (3) of the molding.



(cont'd)

11. Scrape or wipe the excess adhesive off with a putty knife or gauze.

NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface or glass.

12. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

- 13. Remove the spacers.
- 14. Install the support struts.

Rear Hatch Glass Molding

Replacement (cont'd) -

5. Scrape all traces of old molding from the chamfered edges of the glass.

NOTE: Be sure to scrape all traces of old molding thoroughly.



6. Clean the glass surface with alcohol where new molding is to be installed.

NOTE: Make sure the surface is kept free of water, oil and grease.

7. With a brush, apply a light coat of glass primer around the edge of the glass.



NOTE: Scrape off excess glass primer with a putty knife after installing the new molding.

8. Degrease the inner surfaces of the new molding thoroughly, then apply a light coat of glass primer to the surfaces.

NOTE:

- Apply glass primer around the entire groove of the new molding.
- Do not apply glass primer to the outer surface.



9. Run a bead of adhesive in the groove of the molding.



10. Press the molding into position around the entire edge of the glass.

NOTE: Check that the molding is not wrinkled or lifted away at the corners.



11. Scrape or wipe the excess adhesive off with a putty knife or gauge.

NOTE: Use a soft shop towel dampened with alcohol to remove adhesive from a painted surface, upper seal, lower fastener or glass.

(Glass Surface)



Inside: Outside: Surface to be wiped clean.

Headliner/Interior Trim



I • Replacement



Seats

Replacement

NOTE:

SEAT ASSEMBLY SEAT MOUNT • Before removing the seat, move the seat until you COVER CAP can see its mounting bolts and seat mount cover caps. Take care not to scratch the interior trim, dashboard . and center armrest. * On reassembly, replace the anchor bolt and use li-* SEAT MOUNTING quid thread lock. BOLTS 10 x 1.25 mm 40 N•m (4.0 kg-m, 29 lb-ft) 1. Pry out the seat mount cover caps. Remove the seat mounting bolts, then remove the 2. seat and disconnect the connector. SEAT BELT 3. Pry out the lower anchor bolt cap and remove the seat belt rower and nor bolt. * LOWER ANCHOR BOLT 7/16-20 UNF 32 N·m (3.2 kg-m. 23 lb-ft) Ø ☆ SEAT MOUNTING BOLTS [▲] 10 x 1.25 mm 40 N·m (4,0 kg-m, 29 lb-ft) LOWER ANCHOR BOLT CAP LOWER ANCHOR mining In **☆** : CORROSION RESISTANT BOLT NOTE: Grease the moving surface of the slide INNER SLIDE gears. BOX GEAR OUTER SLIDE BOX GEAR **POWER SEAT** SWITCH POWER SLIDE CABLE Disconnect the connectors. NOTE: Take care not to bend the cable.

20-38
Seat Belts



Replacement



Seat Belts

Inspection

Retractor Inspection

- 1. With the retractor installed, check that the belt can be pulled out freely.
- Make sure that the belt does not lock when the retractor is tilted over slowly to 15° from the mounted position. The belt should lock when the retractor is tilted over 40°.

CAUTION: Do not attempt to disassemble the retractor. ***** : Mounted Position



3. Replace the belt with a new one if there is any abnormality.

On the Car Belt Inspection

- 1. Check that the belt is not twisted or caught on anything.
- 2. After installing an anchor, check for free movement on its retaining bolt. If necessary, remove the bolt and check that the washers and other parts are not damaged or installed improperly.
- 3. Check the belts for fouling, damage or discoloration. Clean with a shop towel if fouled.

CAUTION: Use only soap and water to clean.

- 4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
- 5. Make sure that the belt will retract automatically when released.
- 6. Replace the belt with a new one if there is any abnormality.

- Child Seat Anchor Plate

Attachment point for a child restraint system which uses a top tether. The tether bracket and bolt are available at your Acura dealer. The tether attachment point is located on the panel behind the passenger's seat-back.

- 1. Adjust the passenger seat fully forward to make room behind the seat-back.
- 2. Using the dimensions shown, measure and mark the location of the attachment point on the interior panel.
- 3. Use a razor blade or sharp knife to carefully cut a 1 inch diameter circle at the point you marked. Cut through one layer at a time. You will need to remove two layers to reach the tether attachment.
- Install the tether bracket and bolt and tighten to: 16 lb-ft (22 N·m)

Make sure to route the tether through the space between the headrest and seat.



NOTE:

- Do not remove the toothed washer from the child seat anchor plate. Use the child seat anchor plate with the toothed washer attached to it.
- When installing a child seat, follow the instructions of the manufacturer of the child seat.
- Additional anchor plates are available.

AWARNING Do not use the anchor plate for any other purpose, because it is designed exclusively for installation of a child seat.



Rearview Mirror



- Replacement

- 1. Carefully remove the cover with a flat tip screwdriver.
- 2. Loosen the lock bolt, then slide the mirror stay fron the lug.



3. Remove the lock bolt, then remove the toothed lock washer and hold spring from the mirror stay.



Carpet





Dashboard/Center Armrest



Dashboard - Component Removal/Installation (cont'd) — SRS wire harnesses are routed near the steering column. A WARNING All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits. CAUTION: Be careful not to damage the SRS wire harnesses when servicing the steering column. Driver's Side: NOTE: Take care not to scratch or score the dashboard and steering column. Disassemble in numbered sequence. SWITCH/DASH (1) RETRACTOR R. DASH L. DASH BRIGHTNESS SENSOR SENSOR R 3 CABLE REEL and MAIN HARNESS SRS UNIT 7 INSTRUMENT Ø $^{(1)}$ TCS SWITCH **(8) DASHBOARD** STAY 6 KNEE BOLSTER (2) DASHBOARD LOWER PANEL /Driver's side) 6 (4) KNEE BOLSTER PAD oppor INSTRUMENT PANEL CLIP a KN-IEE BOLSTER 3

20-44

(Standard



- Replacem<u>ent</u>



SRS wire harnesses are routed near the dashboard and steering column.

A WARNING All SRS wire harnesses and connectors are colored Yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the dashboard and steering column.



- 1. To remove the dashboard, first remove the: ● Seats (page 20-38).
 - Dashboard lower. panel (driver's side)
 - Knee bolster and pad (page 20-44).
 - Dashboard stay (page 20-44).
 - Center armrest (page 20-43).
 - Clock, center air vent and console panel (page 20-43).
 - Heater control unit and stereo cassette/radio (page 20-43).
 - Dashboard lower panel (passenger's side).
 - Glove box lid and glove box (page 20-43).

A WARNING To avoid accidental deployment and possible injury always install the protective short connector on the inflator connector when the harness is disconnected.



2. Lower the steering column (See Section 17).

NOTE: To prevent damage to the steering column, wrap with a shop towel.



- 3. Remove the instrument panel.
- 4. Remove the gauge assembly.



5. Remove the attaching screws, then remove the side air vents from each side of the dashboard.



Dashboard



Front Bumper



Replacement

- 1. Loosen the mounting screw, then pull the right and left front turn signal lights out and disconnect the connectors.
- 2. Remove the skirt covers, then remove the 3 bumper mounting bolts on each side, and lower skirt mounting bolt.
- 3. Lower the inner fender, then remove the 2 bumper mounting nuts and the skirt mounting bolts from inside the front fender on each side.
- 4. Lift and remove the bumper assembly.

NOTE:

- Disconnect the washer hose, horn connecters, and ambient sensor connector.
- An assistant is helpful when removing the front bumper.
- Take care not to scratch the bumper.



Front Bumper

Disassembly -.



Rear Bumper







Hood





Hood



Rear Hatch/Engine Cover



Trunk Lid



Trunk Lid Spoiler/Trunk Trim Panel



Opener Cables

- Replacement

- 1. Remove the opener and latch, then disconnect the opener cables.
- 2. Remove the fuel lid latch.
- 3. 'Remove the opener cables by removing the clips as shown.

NOTE:

- Before pulling out the opener cables, tie a string to the cable so you can pull it back in later.
- Take care not to bend the cable.
- After installing, check that the cables are routed and connected properly.
- If necessary, adjust the cable by changing the position of the cable housing.



Opener/Latch



- Replacement

Rear Hatch Opener/Latch:



Opener/Latch



Side Air Scoop/Side Sill Panel/Side Step Panel





Front Sub-Frame/Battery, Spare Tire Holder



Rear Sub-Frame





Frame Repair Chart



Automatic Climate Control

.

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SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The NSX includes a driver's side Airbag, located in the steering wheel hub, as part of a Supplemental Restraint System (SRS). Information necessary to safely service the SRS is included in this Service Manual. Items marked * in this section include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special cautions and tools and should therefore be done by an authorized Acura dealer.



AWARNING

- To avoid rendering the SRS inoperative, which can lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized Acura dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the Airbag.
- All SRS selectrical wiring harnesses are covered with yellow outer insulation and related components are located in the steering column, center console, dash, and dashboard lower panel. Do not use electrical test equipment on these circuits.



Special Tools

f. No.	Tool Number	Description	Qʻty	Page Reference
1	07LAJ-PT301OA	ECU Test Harness	1	22-57, 58
		e all		
	Contraction of the second s	a vegetille		
	(1)			



Illustrated Index

Heater-Evaporator Door Position



















Description





- Tripple Pressure Switch -

Construction

The tripple pressure switch consists of pressure switch A (Hi-Low pressure switch) and pressure switch B (middle pressure switch).

• Hi-Low pressure switch

If the refrigerant pressure becomes too high (due to blockage) or too low (due to leakagae), the tripple pressure switch sends a signal to the cooling fan control unit to prevent the compressor from operating.



Description





Circuit Diagram



22-I 0





Troubleshouting

- Self -diagnosis Circuit Check

The Automatic Climate Control System has a built-in self-diagnosis feature. To run it, turn the ignition switch ON and turn the FAN switch to AUTO position. Wait for at least one minute on each TEMP display 18°C (64°F), 32°C (90°F). Then, push both the AUTO and OFF buttons on the control unit at the same time. Any problems in circuits "A" through "I" listed below will be indicated by the respective indicator coming on.

The climate control unit does not memorize which self-diagnosis indicator lights comes on. If you turn the ignition switch OFF, the indicator light memory will be lost.



	INDICATOR	COMPONENT WITH PROBLEM	POSSIBLE CAUSE	Refer to PAGE
Α	MODE	IN-CAR TEMPERATURE SENSOR	Open or short circuit	22-1 6
В	€ €	AMBIANT TEMPERATURE SENSOR	Open or short circuit	22-1 8
С	Ŷ	SUNLIGHT SENSOR	Open or short circuit	22-20
D	Ø	COOLANT TEMPERATURE SENSOR	Open or short circuit	22-22
E	ŝ	EVAPORATOR TEMPERATURE SENSOR	Open or short circuit	22-24
F	A/C	AIR MIX CONTROL MOTOR	Open or short circuit Air mix door stuck	22-26
G	ON (A/C)	MODE CONTROL MOTOR	Open position signal circuit Mode door stuck	22-30
н	OFF (A/C)	RECIRCULATION CONTROL MOTOR	Open position signal circuit	22-32
I	LED on defroster button	VENT DOOR CONTROL MOTOR	Open or short circuit Vent door stuck	22-34

е


- Function Selection and Operation Check

This check will quickly and automatically select and operate all functions of the climate control system, in the combinations and sequence shown below. It may help clarify a problem, or identify one that didn't shown up when you ran the self-diagnosis circuit check.

Turn the FAN switch to AUTO, then push in both the MODE and AUTO buttons and hold them in while you start the engine. The control unit will then automatically run the check in eight steps one step every 5 seconds.

To stop at one of those steps, push the MODE button; to continue, push it again for each step after that. Pushing the OFF button or turning the ignition OFF, will turn off the check.

Check the temperature, volume, and source of this air flow, and compare it to what the chart shows it should be.



Symptom-to-Components Chart

Use this chart if the self-diagnosis checks don't identify any cause for the symptom.

Across each row in the chart, the potential sources of a symptom are ranked in the order they should be inspected in, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the component is OK, try component (2), etc.

PAGE SYSTEM		POWER CIRCUITS T 0 CLIMATE CONTROL UNIT	IN-CAR TEMPERA- TURE SENSOR	ambient tempera- TURE sensor	SUNLIGHT	COOLANT EMPERA- 1 TURE SENSOR	EVAPORA- OR TEM- PERATURE SENSOR	AIR MIX CONTROL MOTOR	MODE CONTROL MOTOR	RECIRCLA TION CON TROL MOTOR	- VENT DOOR CONTROL MOTOR	BLOWER MOTOR	SLOWER SPEED CONTROLS	A/C system	a/C CON- denser fan	A/C CON- PRESSOR
		22-38	23-16	22-18	22-20	22-22	22-24	22-26	22-30	22-32	22-34	22-40	22-46	22-50	22-52	22-56
Climate control system does not work at all.		1														
No air from blower.		1				2						3				
No cold air from blower.			1	2			3									
No hot air from blower.			2					1								
Actual temperature is differ- ent from set temperature.		2	3	Q												
Blower motor does not run.												1				
Blower motor speed does not change.						2	3						١			
Compressor clutch does not engage. and the con- denser fan does not run	If coolant tem- perature is abo- ve 130°C;															
	If coolant tem- perature is be- low 130°C;													1		
Condenser fan does notrun, out the compressor runs normally.															1	
Compressor clutch does not engage. but the condenser fan runs normally.				2			3									1

*Cool down coolant, and recheck.





7

8

MODE 4

Base

9 RECIRC. 🕀

10 FRESH 🕀

Power Transistor

Recirc. Position

Signal

19 Vent Motor I OPEN⊕

20 MODE 1

27

∠8

29

30

IG2

IG2

+ B

17

18

L

Coolant tempera-

Ambient Temper-

ture Sensor

ature Sensor

ature Sensor

In-car Temper-

7

ø

9

10

- In-car Temperature Sensor

Self-diagnosis indicator lilght A comes on: Indicates a problem in the in-car temperature sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The in-car temperature sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the temperature inside the car increases.









- Sunlight Sensor

Self-diagnosis indicator light C comes on: Indicates a problem in the sunlight sensor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The sunlight sensor is a light sensitive, variable resistance diode. The resistance of the diode increases as the intensity of the light increases.













Air Mix Control Motor

Self-diagnosis indicator light F comes on: Indicates a problem in the air mix control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The air mix control motor regulates the mixture to cold/hot air according to output from the control unit.











- Mode Control Motor

Self-diagnosis indicator light G comes on: indicates a problem in the mode control motor circuit. Use a digital multimeter (KS-AHM-32-003) to check it.

The mode control motor controls the outlet air direction and volume adcording to output from the control unit.









Recirculation Control Motor

Self-diagnosis indicator light H comes on: Indicates a problem in the recirculation control motor circuit. Use a digital multimeter (KS-AHM32-003) to check it.

The recirculation control motor regulates the fresh/recirc door according to output from the control unit.







- Vent Door Control Motor

Self-diagnosis indicator light I comes on: Indicates a problem in the vent door control motor circuit. Use a digital multimeter (KS-AHM32-03) to check it.

The vent door control motor regulates the vent door according to output from the control unit.













First, check for blown No.33 (7.5A) and No.4 (15A) fuses.





From page 22-38 Check for continuity between: No.25 (BLK) and body ground. No.24 (BLK) and body ground. Is there continuity? YES Substitute a known-good control unit and recheck. if symptom/indication goes away, replace the original control unit.



- Blower Motor -

First, check for blown No.28(30A) and No.4(15A) fuse



SUB RELAY





(cont'd)







(cont'd)














A/C System

First, check for blown fuses: No. 4 (15 A), No. 36 (10 A), No. 37 (10 A), No. 21 (10 A).





-Condenser Fan

First, check for blown fuses: No. 4 (15 A), No.36 (10 A), No. 37 (10 A).











A/C Compressor

irst, check for blown fuses: No. 21 (IO A), No. 4 (15 A).







(cont'd)







22-60





Blower





-Replacement

- Remove the spare tire (refer to Owner's manual).
 Remove the spare tire holder.
 - $rac{1}{2}$ Corrosion resistant bolt



3. Disconnect the battery cables, loosen the hold-down bracket nuts, and remove the hold-down bracket. Then, remove the battery.



- 4. Remove the sub relay box A and the water drair duct. Disconnect the connectors from the blower motor, power transistor and recirculation contro motor.
 - ☆ CORROSION RESISTANT BOLT



- 5. Remove the blower mounting bolts, then remove the blower.
 - $\texttt{\texttt{$\bigstar$}}$ Corrosion resistant bolt



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Recirculation Control Motor

- Replacement

- 1. Remove the blower (previous page).
- 2. Remove the recirculation control motor cover from the blower (3 screws).



3. Remove the recirculation control motor (1 connector and 3 screws).



 Install the recirculation control motor in the reverse order of removal. Apply battery voltage (page 22-89) and watch the door movement. Make sure that the recirculation door moves smooth-

ly without binding.

Make sure the motor doesn't pull the door too far.



- 1. Always disconnect the negative cable from the battery whenever replacing air conditioner parts.
- 2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
- 3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
- 4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
- 5. When discharging the system, use a refrigerant recovery system; don't release refrigerant into the atmosphare.
- 6. And refrigerant oil after replacing the following parts:

Condenser	10 cc (1/3 fl oz)
Evaporator	10 cc (1/3 fl oz)
Line or hose	20 ((2/3 fl oz)
Receiver	. 10 cc (1/3 fl oz)
Compressor	On compressor rep
	process from 90

... On compressor replacement, subtract the volume of oil drained from the removed compressor from 80 cc (2 2/3 fl oz), and drain the calculated volume of oil from the new compressor: 80 cc (2 2/3 fl oz) – Volume of oil from removed compressor = Volume to drain from new compressor.



6

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Receiver line and suction line to heater

(7) Compressor hose mounting

(8) Compressor mounting

(9) Compressor bracket

assembly...... 22 N·m (2.2 kg-m, 16 lb-ft)

bolts...... 22 N·m (2.2 kg-m, 16 lb-ft)

boltsa...... 25 N·m (2.5 kg-m, 18 lb-ft)

mounting bolts...... 50 N°m (4.5 kg-m, 36 lb-ft)

Idler pulley center nut 45 N·m (4.5 kg-m, 32.5 lb-ft)

☆ 6 mm bolt 10 N•m (1.0 kg-m, 7.2 lb-ft)

Don't overtighten fittings; you could damage them. Leaks are caused by faulty O-rings, overtightening won't stop them. ☆ CORROSION RESISTANT BOLT

- ① Suction hose and discharge hose
- (both side)..., 23 N°m (2.3 kg-m, 17 lb-ft) ③ Condenser line A
- (both side)...... 23 N·m (2.3 kg-m, 17 lb-ft) (4) Condenser line C to left side

AWARNING

When handling refrigerant (R-12):

- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
 - Do not rub your eyes or skin.
 - Splash large quantities of cool water in your eyes or on your skin.
 - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).
- Do not handle or discharge refrigerant in an enclosed area near an open flame; it may ignite and produce a poisonous gas.
- The ozone is fragile layer surrounding the earth which acts as a shield against the sun's ultraviolet radiation. Chlorine from chemicals called chlorofluorocarbons (CFCs) destroy the ozone in the stratosphere. Automotive air conditioning systems currently use chlorofluorocarbons as the refrigerant. Auto air conditioning service equipment has been developed to minimize the release of CFCs to the atmosphere. All service procedures should be performed using this equipment and the manufactuer's instructions.

Heater-Evaporator Unit

- Replacement -

SRS wire harness is routed near the heater.

AWARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the heater.

- 1. Remove the blower (page 22-63).
- 2. When the engine is cool, drain the coolant from the <u>radiator</u> (Section 10).

AWARNING

- Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.
- Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes, even after the engine is turned off.

CAUTION: Radiator coolant will damage paint. Quickly rinse any spilled coolant off painted surfaces.

- 3. Disconnect the heater hoses at the heater. Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.
- 4. Disconnect the heater valve cable from the heater valve.



- 5. Remove all refrigerant from the A/C system with a refrigerant recovery system. (page 22-93).
- Disconnect the receiver line and the suction line from the evaporator.
 Cap the open fittings immediately to keep moisture out of the system.



- SUCTION PIPE
- 7. Remove the dashboard (Section 20).
- 8. Remove the heater duct.
- Remove the mounting bolts(4) and disconnect the connectors from control units and evaporator temperature sensor connector from the control unit bracket, then remove the control unit bracket.



10. Remove the enclosure woofer.



- 11. Disconnect the connectors from all the actuators and sensors attached to the heater-evaporator.
- 12. Remove the mounting bolts(2-under the dash) and nuts(2-under the hood), then remove the heaterevaporator through the passenger door.



- 13. Install in the reverse order of removal, and:
 - Apply sealant to the A/C line grommets.
 - Do not interchange the inlet and outlet heater hoses. Make sure that the hose clamps are tight.
- 14 Fill the radiator and reservoir tank with the proper coolant mixture. Bleed the air from the cooling system (Section IO).
 - CAUTION: Follow the sequence described in the air bleed procedure. If you don't, you may leave air in the system which could damage the engine.

- 15. If necessary, adjust the heater valve cable:
 - Set the air mix control motor at COLD position (page 22-90).
 - Connect the end of the cable to the heater valve arm.
 - Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the other end move the arm on the air mix motor. Then snap the clamp down over the cable housing.





- 16. Turn the blower on and make sure that there is no air leakage.
- 17. Charge the system (page 22-93~95) and test Performance (page 22-96).

Coolant Temperature Sensor



Evaporator Temperature

Vent Door Control Motor

- Replacement -

1. Remove the mounting screws, then remove the vent door control motor.



2 Install the vent door control motor in the reverse order of removal. Then apply battery voltage (page 22-90) and watch the door move.

- Make sure that the vent door moves smoothly without binding.
- Make sure the motor doesn't pull the vent door too far.

Mode Control Motor



- Replacement
 - 1. Remove the mounting screws, then remove $th_{^{1}}\ mode\ control\ motor.$



- 2. install the mode control motor in the reverse order of removal. Then apply battery voltage (page 22-91) and watch the doors move.
 - Make sure that the HEAT and DEF doors moves smoothly without binding.
 - Make sure the motor doesn't pull the HEAT and DEF doors too far.

Air Mix Control Motor

- Replacement

1. Disconnect the heater valve cable from the air mix control motor.



2. Remove the air mix control motor (3 screws, 1 connector).



3. Install the air mix control motor in the reverse order of removal. Then apply battery voltage (page 22-90) and watch the door move.

Make sure that the air mix door moves smoothly without binding.

Make sure the motor doesn't pull the air mix door too far.

- 4. If necessary, to adjust the heater valve cable;
 Set the air mix control motor at COLD position (page 22-90).
 - Hold the end of the cable housing against the stop on the cable. Then snap the clamp down over the housing.
 - After adjusting the cable, make sure that the air mix control motor still moves smoothly without binding.



Heater-Evaporator Unit

-Disassembly/Reassembly

- 1. Remove the heater core cover, remove the pipe clamp, then pull out the heater core.
- 2. Remove the lower half of the housing, then remove the evaporater.
- 3. Remove the expansion valve if necessary.



4. Assemble the heater-evaporator unit in the reverse order of disassembly. Hold the expansion valve capillary tube down against the suction line, and wrap it with tape to hold it there.

Heater-Evaporator Unit



"HEAT" Door Adjustment -Reposition gear 2 so this mark lines up with the mark Loosen this screw in gear 2. 1 GEAR 2

Condenser



- Description

Dual condensers are mounted behind the right and left side of the front bumper as shown. The cooling efficiency of paralleldual condensers is as good as or better than a single condenser mounted in front of radiator.



Condenser Assembly

Replacement

- 1. Disconnect the battery negative terminal.
- 2. Use a refrigerant recovery system to discharge the refrigerant (page 22-93).
- Disconnect the discharge line and the condenser lines from the condenser.
 Cap the open fittings immediately to keep moisture and dirt out of system.







4. Disconnect the connector from the condenser fan motor, remove the mounting bolts(2) and nut, then remove the condenser.

☆: CORROSION RESISTANT BOLT

(Right Condenser)



- ☆ MOUNTING BOLTS 10 N·m (1.0 kg-m, 7.21 lb-ft)
- (Left Condenser)
- LEFT CONDENSER * MOUNTING BOLTS 10 N'm (1.0 kg-m, 7.2 lb-ft]
 - 5. Install the condenser in the reverse order of removal;
 - Replace O-rings with new ones each fitting.
 - Charge the system (page 22-93~95) and test its performance (page 22-96).



Disassembly/Reassembly —

Remove the bolts and nuts (4). Then separate the condenser duct from the shroud, and remove the condenser.
 Remove the fan mounting screws (3), then remove the fan from the shroud.



Compressor

Description

This compressor is a Nippondenso piston type. A revolving inclined disc drives the surrounding 10 reciprocating, pistons. As the inclined disc revolved, it pushes the pistons, protected by a ceramic shoe,





-Replacement

- 1. If the compressor still works, run the engine at idle for a few minutes with the A/C on, then shut the engine off and disconnect the negative cable from the battery.
- 2. Use a refrigerant recovery system to discharge the refrigerant from the system (page 22-93).
- 3. Disconnect the compressor connector.



- 4. Raise the car on a hoist. Make sure it's properly supported (Section 1).
- 5. Remove the front beam (Section 5).
- 6. Disconnect the suction and discharge hoses from the compressor. Cap the open fittings immediately to keep moisture and dirt out of the system.



7. Loosen the idler pulley center nut and adjusting bolt, then remove the belt from compressor.



Compressor

- Replacement (cont'd)

9. If necessary, remove the compressor bracket (4 bolts, plus 1 from the idler pully bracket).



10. If necessary remove the idler pulley (2 more bolts).



• Check the idler pulley bearing for play and drag. Replace it with a new one if it's noisy or has excessive play or drag.



- 11. Install in the reverse order of removal. If you're installing a new compressor, drain all the refrigerant oil out of the old compressor and measure its volume. Subtract the volume of old oil from 80 CC (2 1/3 floz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- 12. Adjust the compressor belt (page 22-79). After adjusting the belt, tighten the pully center nut. Then tighten the adjusting bolt securely.
- 13. Charge the system (page 22-93 \sim 95).
- 14. Test system performance (page 22-96).

- Compressor Belt Adjustment

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

NOTE: Check for belt damage. If necessary, replace the belt.

Belt tension	[mm/10 kg]]
New belt	Used belt	
7-9	12-14	



Compressor

Clutch Inspection

1. Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.



2. Check resistance of the field coil:

Field Coil Resistance: 3.6f0.2 ohm at 20°C (68°F)

If resistance is not within specifications, replace the coil.



3. Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required, following the procedure on the next page.

CLEARANCE: 0.5 ± 0.15 (0.020 \pm 0.006 in)

NOTE: The shims are available in three sizes: 0.1 mm, 0.2 mm and 0.5 mm of thickness.









Compressor

Clutch Overhaul (cont'd) 4. Remove snap ring A and the field coil.



- 5. Install parts in the reverse order of removal, and:
 - Install the field coil with the wire side facing UP (see above).
 - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
 - Check the pulley bearings for excessive play.
 - Make sure the circlip fits in its groove properly.
 - Apply locking agent to the threads on the center bolt.
 - Make sure that the pulley turns smoothly, after it's reassembled.

- 2. Clean off the mating surface.
- 3. Apply compressor oil to the O-ring.
- 4. Install and tighten the relief valve.
- 5. Charge the system and check for leaks, then push the cap into the valve.



22-83

Component Removal/Replacement

- Climate Control Unit

SRS wire harness is routed near the console.

A WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the console.

1. Carefully pry the clock out of the dash and disconnect it.

CAUTION: Be careful not to damage the center console panel and the dashboard.

- 2. Remove the center dash vent (2 screws).
- 3. Remove the 2 screws from the top of the console panel.

4. Remove the ashtray (lift up on the door to pop it out), then remove the 2 screws behind it.



- 5. Remove the console storage box (lift out the bottom panel and remove 4 screws).
- 6. Remove the screw from the end of the console panel.





22-84


7. Pull the parking brake handle all the way up, iift the panel and disconnect the 2 connectors from it, then carefully lift the panel off past the shift lever. Remove the center console panel.



Remove the screws (4), then pull out the control 8. unit, disconnect its connectors and remove it from the dashboard.



The in-car temperature sensor assembly includes a small fan (aspirator fan) to draw air past the sensor.

SRS wire harness is routed near the console.

AWARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuit.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the console.

- 1. Remove the center console panel as described in step 1 - 7 in the first column (Climate Control Unit).
- 2. Remove the mounting screws (2) and remove the in-car temperature sensor from the under side of the console panel. Be careful not to damage the console panel.









Component Tests

In-car Temperature Sensor -

Compare the resistance reading between No. 1 and No. 2 terminals of the in-car temperature sensor with specifications shown in the following graph: It should be within specification.



CAUTION: The sensor uses a thermistor which can be damaged if high current is **applied** to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



Ambient Temperature Sensor

Compare the resistance reading between terminals of the ambient temperature sensor with specifications shown in the following graph: It should be within specification.



CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



Component Tests



CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, use a circuit tester that puts out a measuring current of 1 mA or less.



Evaporator Temperature Sensor

Compare the resistance reading between terminals of the evaporator temperature sensor with specification shown in the following graph: It should be within specification.



CAUTION: The sensor uses a thermistor which can be damaged if high current is applied to it during testing. Therefore, **use** a circuit tester that puts out a measuring current of 1 mA or less.





- Sunlight Sensor

Measure the voltage between the terminals with the sensor out of direct sunlight.

- With the connector connected (probe the back of it): $1.4\pm0.2~V$
- With the connector disconnected: 0.1 ~ 0.2 V



- Recirculation Control Motor

1. Connect battery power to No. 1 terminal of the recirculation control motor, and connect to the No. 2 terminal to ground.

The motor should run. If it doesn't, reverse the connections; the motor should then run.



2. Check for continuity between the terminals of the recirculation control motor according to this table.



Component Tests

Air Mix Control Motor

• Connect battery power to the No. 1 terminal of the air mix control motor, and connect to the No. 2 terminal to ground; the air mix control motor should run, and stop at HOT.

If it doesn't, reverse the connections: then the motor should run, and stop at COLD.

Apply 5 V between the No. 3 terminal and the No.
 5 terminal, then measure the voltage between the No.
 3 terminal and the No. 4 terminal. The reading should be;

4.7 \pm 0.7 V at HOT position.

0.3 ±0.7 V at COLD pcosition.

· Vent Door Control Motor

1. Connect battery power to the No. 1 terminal of the vent door control motor, and connect to the No. 2 terminal to ground; the vent door control motor should run, and stop at CLOSE.

If it doesn't, reverse the connections; then the motor should run, and stop at OPEN.

 Apply 5 V between the No. 3 terminal and the No. 5 terminal, then measure the voltage between the No. 4 and the No. 5 terminals. The reading should be;

 4.7 ± 0.7 V at OPEN position.

 0.3 ± 0.7 V at CLOSE positon.







- Mode Control Motor -

1. Connect battery power to the No. 1 terminal of the mode control motor, and connect to the No. 2 terminal to ground. The motor should run, and stop at VENT.

If it doesn't reverse the connectinos; the motor should run, and stop at DEF.



2. Plug the connector back in to the motor. Then operate the MODE switch on the control panel, and in each mode probe the back of the connector to check for continuity between terminals according to the table.



LED symbol	3	4	5	6	7
ډر−	0				0
5.	0		0		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0			0	
( کر 🛎	0	0			
¥#	0		0	0	

#### - Aspirator Fan -

Connect battery power to the BRN/YEL terminal of the connector, and connect the BLK terminal to ground. The fan should run.



# **Component Tests**

Relay -

minals.

connected.

# **Control Unit Adjustment** There should be continuity between the A and B termi-The calibration switch can raise or lower the set tempernals when the battery is connected to the C and D terature by $\pm 3^{\circ}F$ (1.5°C) in relation to the digitallydisplayed temperature. There should be no continuity when the battery is dis-Calibration switch [±3°F (±1.53°C)] (+) 1 Ш







# A/C System Service

#### Discharge



- Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.
- Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.
- 1. Connect a Refrigerant Recovery System to the A/C system.
- Operate the Refrigerant Recovery System according to the manufacturer's instractions.
   IMPORTANT: Do not vent refrigerant to the atmosphere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (R-12) may damage the earth's ozone layer. Always use UL-listed, refrigerant recovery/recycling

equipment to extract the refrigerant before you open an A/C system to make repairs. Follow the equipment manufacturer's instructions.

Refrigerant Recovery/Recycling System.



- 1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced).
- 2. Attach an Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.

NOTE: If low pressure does not reach more than 700 mm hg (27 in-Hg) in 15 minutes, there is probably a leak in the system. Partially charge the system and check for leaks (see Leak Test).



### A/C System Service

#### Leak Test

#### **A** WARNING When handling refrigerant (R-12):

- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
  - Do not rub your eyes or skin.
  - Splash large quantities of cool water in your eyes or on your skin.
  - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- Keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.
- Work in well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.

IMPORTANT: Do not vent refrigerant to the atmosphere. The chlorofluorocarbons (CFCs) used in conventional refrigerant (R-12) may damage the earth's ozone layer. Always use UL listed, refrigerant recovery/recycling equipment to extract the refrigerant before you open an A/C system to make repairs.

Follow the equipment manufacturer's instructions.

- 1. Attach an Air Conditioning Service Station as shown.
- 2. Open high pressure valve to charge the system to about 100 kPa (14 psi), then close the supply valve.
- 3. Check the system for leaks using a leak detector.
- If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), discharge the system according to the Discharge Procedure on page 22-93.
- 5. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-93).



### Charging Procedures

Refrigerant capacity: 900-950 g (32-34 oz)

AwaRNING Always wear eye protection when charging the system.

CAUTION: Do not overcharge the system; the compressor will be damaged.

Attach an Air Conditioning Service Station as shown. Follow the equipment manufacturer's instructions.



### **Performance Test**

The performance test will help determine if the air conditioning system is operating within specifications.

- 1. Connect the hoses as shown.
- 2. Insert a thermometer in the vent outlet. Determine the relative humidity and air temperature by calling the local weather information line.
- 3. Test conditions:
  - Avoid direct sunlight.
  - Open engine cover.
    - Open front doors.
    - Set the temperature control dial to max cold and push the VENT and fresh air buttons.
    - Turn the fan switch to MAX.
    - Run the engine at 1,500 RPM.
    - No driver or passengers in vehicle.
- '4. After running the air conditioning for 10 minutes under the above conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.
- 5. To complete the charts:
  - Mark the delivery temperature along the vertical line.
  - Mark the intake temperature fair temperature) along the bottom line.
  - Draw a line straight up from the air temperature to the humidity.
  - Mark a point one line above and one line below the humidity level. (10% above and 10% below the humidity level)
  - From each point, draw a horizontal line across to the delivery temperature.
  - The delivery temperature should fall between the two lines.
  - Complete the low side pressure test and high side pressure test in the same way.







### **Pressure Test**

NOTE: Performance Test on page 22-96.

TECT. RESUULTS	RELATED_SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually	Air in system	Evacuate system: then recharge Evacuation: page 22-93 Recharging: page 22-95
	No bubbles in sight glass when CON- denser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	Reduced or no air flow through CON- denser.	<ul> <li>Clogged condenser or radiater fins</li> <li>Condenser or radiator fan not</li> </ul>	<ul><li>Clean</li><li>Check voltage and fan rpm</li></ul>
		working properly	
	Line to condenser is excessively hot	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot	insufficient refrigerant in system	<ul><li>Check for leak</li><li>Charge system</li></ul>
	High and low pressures are balanced soon after stopping compressor	<ul> <li>Faulty compressor discharge or inlet valve</li> <li>Faulty compressor seal</li> </ul>	Replace compressor
	Outlet of expansion valve is not frosted, low pressure gauge indi- cates vacuum	Faulty expansion valve	Replace
Suction (low) pressure abnormally	Excessive bubbles in sight glass; condenser is not hot	Insufficient refrigerant	Check for leaks. Charge as required.
low	Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum	<ul> <li>Frozen expansion valve</li> <li>Faulty expansion valve</li> </ul>	Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	<ul> <li>Expansion valve open too long</li> <li>Loose expansion valve</li> </ul>	Repair or Replace.
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	<ul> <li>Faulty gasket</li> <li>Faulty high pressure valve</li> <li>Foreign particle stuck in high pressure vlave</li> </ul>	Replace compressor
Suction and discharge pressures abnormally high	Reduced air flow through condenser	<ul> <li>Clogged condenser or radiator fins</li> <li>Condenser or radiator fan not working properly</li> </ul>	<ul> <li>Clean condenser and radiator</li> <li>Check voltage and fan rpm</li> </ul>
	No bubbles in sight glass when CON- denser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
Suction and discharge pressure	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pres- sure hose parts	Repair or Replace
abnormally low	Temperature around expansion valve is too low compared with that around receiver-dryer	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Tighten bolt(s) or replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

# Electrical

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# Special Tools

Ref. No.	Tool Number	Discription	Qʻty	Page Reference
1	07JAA-001 000B	Antenna Nut Wrench	1	23-236
2	07MAZ-SL00500	SRS Test Harness-A	1	23-329
3	07LAZ-SL40200	SRS Test Harness B	1	23-33 1
4	07LAZ-SL40300	SRS Test Harness C	1	23-334
6	07LAZ-SL40400	SRS Test Harness D	1	23-33 1
6	07HAZ-SG00500	Deployment Tool	1	23-340
$\bigcirc$	KS-AHM-32-003	Digital Multimeter	1	23-78

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# **Troubleshooting**



Before Troubleshooting

- Check the main fuse and the fuse box.
- Check the battery for damage, 'state of charge, and clean and tight connections.
- Check the alternator belt tension.

#### CAUTION:

- Do not quick-charge a battery unless the battery ground cable has been disconnected, or you will damage the alternator diodes.
- Do not attempt to crank the engine with the battery ground cable connected incompletely or you will severely damage the wiring.

While You're Working

- Make sure connectors are clean, and have no loose pins or receptacles.
- Make sure multiple pin connectors are packed with grease (except watertight connectors).

Since new type connectors are used, connection and disconnection of them should be done paying attention to the following precautions.

- Because all the connectors except terminal of 1-P are equipped with push-down type locks, unlock them first before disconnecting the connectors.
- On the connectors installed on the bracket a pull type lock is equipped between the bracket and the connector.

Some connectors of this type can not' be disconnected unless they are removed from their brackets. When disconnecting, check their shapes.

• On the bracket mounted connector with dual locks, remove the connector from the bracket before disconnecting.



• Push the locking tab to disconnect.



(cont'd)

# Troubleshooting

### -Troubleshooting Precautions (cont'd)-

• Pull the locking tab to remove the connector from the bracket.



• When disconnecting locks, first press in the connector tightly (to provide clearance to the locking device), then operate the tab fully and remove the connector in the designated manner.



- When disconnecting a connector, pull it off from the mating connector by holding on both connectors.
- Never try to disconnect connectors by pulling on their wires.



 Place the plastic cover over the mating connector after reconnecting. Also check that the cover is not distorted.



• Before connecting connectors, check to see that the terminals are in place and not bent or distorted.



 Check for loose retainer and rubber seals. The illustration shows examples of terminal and seal abnormality.



• Example of waterproof connector:





• For the connector which uses insulation grease, clean the connector then apply grease if the grease is insufficient or contaminated.



- Insert the connector tightly and make sure it is securely locked.
- Check all the wire harnesses are connected.
- There are two types of locking tab: one that you have to push and the other you should not touch when connecting the connector. Check the shape of the locking tab before connecting.
- The locking tab having a taper end should not be touched when connecting.



• The locking tab with an angle end should be pushed when connecting.



- Insert connectors fully until they will no longer go.
- The connectors must be aligned and engaged securely.
- Do not use wire harnesses with a loose wire or connector.



 Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover faces down.



• Secure wires and wire harness to the frame with their respective wire bands at the designated locations.

Position the wiring in the bands so that only the insulated surfaces contact the wires or harnesses.

• Remove with care not to damage the lock.



# Troubleshooting

### **Froubleshooting** Precautions (cont'd)



After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.

Keep wire harnesses away from the exhaust pipes and other hot parts.



• Always keep a safe distance between wire harnesses and any heated parts.



- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



• Route harnesses so they are not pulled taut or slackened excessively.



• Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



• Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.





• Seat grommets in their grooves properly.



- Do not damage the insulation when connecting a wire.
- Do not use wires or harnesses with a broken insulation.

Repair by wrapping with protective tape or replace with new ones if necessary.



 After installing parts, make sure that wire harnesses are not pinched.



- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interfering with adjacent or surrounding parts in all steering positions.

• When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



• Always insert the probe of the tester from the wire harness side (except waterproof connector).



• Make sure to use the probe with a tapered tip.





• Do not drop parts.



# Troubleshooting

### - Five-Step Troubleshooting

1. Verify The Complaint

Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. Analyze The Schematic

Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. Isolate The Problem By Testing The Circuit Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

#### 4. Fix The Problem

Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

5. Make Sure The Circuit Works

Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on that fuse. Make sure no new problems turn up and the original problem does not recur.



# How to Use This Section



Male

Female

					-
BATTERY	GRO	UND	FUSE	COIL. SOLENOID	CIGARETTE LIGHTER
or ⊕	Ground terminal	Component ground	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		HW
RESISTOR	VARIABLE RESISTOR	THERMISTOR	IGNITION SWITCH	BULB	HEATER
				¢	
MOTOR	PUMP	RCUIT BREAKEF	HORN	DIODE	SPEAKER, BUZZER
		¢	- <b>(E</b> )-		
ANTE	NNA	TRANSISTOR (Tr)	-Wire Col	or Codes —	
Mast RELAY (In n Normal open relay	Window	CONDENSER	The following wire colors in WHT YEL BLK BLU GRN RED ORN	abbreviations are the circuit schematic White . Yellow . Black . Blue Green . Red Orange Pink	used to identify s.
SWITCH (In r	normal condition)	.UMINOUS DIODE (LEC	GRY 9UP LT BLU	Borwn Gray Purple Light Blue	
Normal open switch	CONNECTOR	REED SWITCH	LT GRN Wire insulato another color	Light Green or has one color of stripe. The second co	one color with lor is the stripe.

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### **Relay and Control Unit Locations**



23-10





# Relay and Control Unit Locations











# Relay and Control Unit Locations

23-14



How to Identify Connectors:

Identifying numbers have been assigned to all connectors. The number is preceded by the letter "C" for connectors, "G" for ground terminals or "T" for non-ground terminals.

Location Harness	Engine Compartment	Front compartment	Dashboard	Others (Floor, Door, Trunk, Roof, Side)
Starter Cable	T1 and T3	T2 and (+)		
Battery Ground Wire		⊖ G1		
Engine Ground Wire A	T5 G2			
Engine Ground Wire B	T6 G2			
EPS Ground Wire		T7 G4		
Engine Wire Harness	Cl01 thru Cl61 T101 and T103 G101 thru G103			
Knock Sensor Sub Harness	CI71 thru CI73			
Front Compartment Wire Harness		C201 thru C222 C225 thru C250 C301 thru C321 T201 thru T208 G201 and G202 G301 and G302		
Right Retractor Sub Harness		C281 thru C283		
Left Retractor Sub Harness		C381 thru C383		
Floor Wire Harness			C401 thru C471 G401 and G402	C472 thru C508 G403 thru G405
Side Wire Harness				C521 thru C545
Rear Wire Harness				C551 thru C564 G551
Trunk Wire Harness				C581 and C582
Trunk Sub Wire Harness				C591 and C592
Driver's Door Wire Harness				C601 thru C615
Passenger's Door Wire Harness				C651 thru C660
SRS Main Wire Harness				C701 thru C706 G701
Roof Wire				C751 and C752
Fuel Tank Wires				C771 thru C773
Driver's Power Seat Wire Harness				C781 thru C786
Passenger's Power Seat Wire Harness				C791 thru C795
Hatch Wires				C801 thru C803 G801
Rear Window Deffoger Wire				C811 and C812
Main Fuse Box	c921			
Dash Fuse Box			C901 thru C907 C910 thru C913	
Main Relay Box		C934 thru C941		

#### starter Cable

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
T1 T2		Left side of engine compartment Right side of front compartment	To Main fuse box	
ТЗ		area Right side of engine compartment	To Main relay box To Starter motor	
Ð		Battery	To Battery positive terminal	

#### Battery Ground Wire

G1	Middle of front compartment area	To Body ground, via battery ground wire	
Θ	Battery	To Battery negative terminal	

#### **Engine Ground Wire A**

Т5	Middle of engine compartment	To Transmission housing	
G2	Left side of engine compartment	To Body ground, via engine ground wire A	

#### Engine Ground Wire B

Т6	Right front corner of engine compartment	To Front head cover	
G3	Right front corner of engine compartment	To Body ground, via engine ground wire B	

#### EPS Ground Wire

77	Center front compartment ander area	To EPS Gearbox	
G4	Center front compartment ander area	To Body ground, via EPS ground wire	





Engine Wire Harness

Connector or <b>Ferminal N</b> umber	Number of pins	Location	Where the Wires Go	Remark
C101	14	Left side of engine com-		
		partment	To Side wire harness (C530)	A/T
C101	6	Left side of engine com-		
		partment	To Side wire harness (C530)	M/T
C102	2	Left side of engine com-		
		partment	To Side wire harness (C531)	
C103	1	Engine compartment	To Starter solenoid	
C104	2	Engine compartment	To Engine oil pressure sensor	
C105	1	Engine compartment	To Radio noise condenser	
C106	2	Engine	To Front oil pressure switch B	
C107	2	Engine compartment	To Front spool solenoid valve	
C108	2	Engine	To Coolant temperature sensor (TW)	
C109	1	Engine compartment	To Coolant temperature gauge sender	
CI10	2	Engine compartment	To Back-up light switch	M/T
CI11	3	Engine compartment	To NM speed pulser	A/T
C112	2	Engine compartment	To Lock-up control solenoid valve	A/T
C113	3	Engine compartment	To Neutral switch	M/T
C114	2	Engine compartment	To Shift control solenoid valve	A/T
C115	3	Engine compartment	To Linear solenoid valve	A/T
C116	3	Engine compartment	To Accel pedal sensor	
C117	2	Engine compartment	To Radiator coolant temperature sensor (TW)	
CI18	8	Engine compartment	To Jumper connector	
CI19	3	Engine compartment	To Speed sensor	
C120	2	Engine compartment	To NC speed pulser	A/T
C121	2	Engine compartment	To Rear spool solenoid valve	
C122	2	Engine	To Rear engine oil pressure switch B	
C123	8	Engine	To Igniter	Rear
C124	2	Engine	To No.1 Ignition coil	
C125	2	Engine	To No.2 Ignition coll	
C126	2	Engine	To No.3 Ignition coil	
C127	2	Engine	I o No.4 Ignition coil	
C128	2	Engine		
C129	2	Engine	IO NO.6 Ignition coll	
T101		Left side of engine		
		compartment	To Main fuse box	
G103		Engine compartment	To Engine ground via engine wire harness	



Connector or <b>erminal</b> Number	Number of pins	Location	Where the Wires Go	Remark
C130	3	Left side of engine compartment	To Throttle angle sensor	
C131	6	Left side of engine com-	-	
		partment	To Throttle motor	
C132	3	Left side of engine compartment	To Knock sensor sub harness (C 171)	
C133	2	Middle of engine	To EACV	
C134	2	Middle of engine	To No.1 Fuel injector	
C135	2	Middle of engine	To No.2 Fuel injector	
C136	2	Middle of engine	To No.3 Fuel injector	
C137	2	Middle of engine	To No.4 Fuel injector	
C138	2	Middle of engine	To No.5 Fuel injector	
C139	2	Middle of engine	To No.6 Fuel injector	
C140	2	Middle of engine	To intake air temperature sensor	
C141	3	Middle of engine	To EGR valve lift sensor	
C142	4	Middle of engine	To Voltage regulator	
C143	6	Middle of engine	To igniter	Front
C144	4	Right corner of front engine	To Front oxygen sensor	
C145	1	Right corner of front engine	To A/C compresor clutch	
C146	8	Middle of engine	To CRANK/CYL sensor	
C147	4	Right side of engine com-		
		partment	To Engine compartment fan relay	
C148	4	Right corner rear engine com-		
		partment	To Rear oxygen sensor	
C149	8	Right side of engine com-		
	_	partment	To Engine compartment fan resister	
C150	2	Right side of engine com-		
		partment	To Engine compartment fan	
C151	2	Right side of engine com-		
		partment	To ignition Ne service connector	
C152	2	Right front engine compartment	To Fuel pump resister	
C153	20	Right bulkhead	To Junction connector	
C154	26	Middle of behind middle of		
		bulkhead	To PGM-Fi ECU	
C155	16	Middle of behind middle of		
		bulkhead	To PGM-FI ECU	
C156	12	Middle of behind middle of		
		bulkhead	To PGM-Fi ECU	
C157	22	Middle of behind middle of		
		bulkhead	To PGM-Fi ECU	
C158	16	Behind right side of bulkhead	To Floor wire harness (C476)	
C159	8	Behind right side of bulkhead	To Floor wire harness (C475)	
C160	18	Behind right side of bulkhead	To Floor wire harness (C477)	
CI61	20	Behind right side of bulkhead	To Floor wire harness (C478)	
T102	l	Middle of engine compartmen	t To Alternator	
T103		Engine rear cylinder head		
		cover	To Oil pressure switch	
G101		Right middle of engine	IO Engine ground, via engine wire harness	
G102		Right side of engine com-	To Date mound of contraction to t	
		partment	IO BODY ground, via engine wire harness	

Engine Wire Harness (Cont'd)

Knock Sensor Sub Harness

ſ	C171	3	Middle of engine	To Engine wire harness (C132)	
	CI72	2	Middle of engine	To Front knock sensor	
	C173	2	Middle of engine	To Rear knock sensor	



Connector or <b>Ferminal Number</b>	Number of pins	Location	Where the Wires Go	Remark
C201	2	Right front corner of front		
		compartment area	To R. Front side marker	
C202	2	Behind Right front bumper	To R. Condenser fan motor	
C203	2	Behind Right front bumper	To R. Front position light	
C204	2	Behind Right front bumper	To.R. Front turn signal light	
C205	2	Behind Right front bumper	To. R. Horn	
C206	2	Front end of front compart-		
		ment area	To Radiator fan motor	
C207	3	Front end of front compart-		
		ment area	To Radiator fan resister	
C208	14	Right side of front compart-		
		ment area	To R. Retractor sub harness (C281)	
C209	6	Behind Right headlight	To R. Retractor relay	
C210	6	Behind Right headlight	To L. Retractor relay	
c211	4	Sub relay box B	To Power amplifier relay	
c212	4	Sub relay box B	To Anti-lock brake Front fail-safe relay	
C213	4	Sub relay box B	To Washer motor relay	
C214	4	Sub relay box <b>B</b>	To Anti-lock brake Rear fail-safe relay	
c215	5	Sub relay box B	To Intermittent wiper relay	
C216	4	Sub relay box B	To Windshield wiper high relay	
C217	4	Sub relay box B	To Windshield wiper low relay	
C218	6	Behind spare tire	To Recirculation control motor	
c219	2	Behind spare tire	To Blower motor	
C220	3	Behind spare tire	To Power transistor	
c221	2	Right front compartment		
		area	To R. Front anti-lock brake speed sensor	
c222	5	Under air scoop	To Windshild wiper <b>motor</b>	
G201		Right side of front compart-	To Body ground, via front compartment wire	
		ment area	harness	
G202		Right side of front compart-	To Body ground, via front compartment wire	
		ment area	harness	

#### Front Compartment Wire Herness




(cont'd)

Connector or ' <b>erminal</b> Number	Number of pins	Location	Where the Wires Go	Remark
C225	4	Sub relay box A	To Junction connector	
C226	4	Sub relay box A	To Radiator fan low relay	
C227	4	Sub relay box A	To A/C compressor clutch relay	
C228	4	Sub relay box A	To Radiator fan high relay	
c229	4	Sub relay box A	To Horn relay	
C230	4	Sub relay box A	To Condenser fan relay	
C231	4	Sub relay box A	To L. Retractor cut relay	
C232	4	Sub relay box A	To Blower high relay	
C233	4	Sub relay box A	To R. Retractor cut relay	
C234	4	Sub relay box A	To Blower relay	
C235	4	Rear under front compart-		
		ment area	To EPS <b>Tach</b> generator	EPS
C236	6	Rear under front compart-		
		ment area	To EPS Torque sensor	EPS
C237	20	Behind right kick panel	To Jaunction connector	
C238	14	Right front floor	To Power unit	EPS
C239	6	Right under dash	To Anti-lock brake inspection connector	
C240	20	Right under dash	To Anti-lock brake control unit	
C241	18	Right under dash	To Anti-lock brake control unit	
C242	18	Right under dash	To EPS control unit	
C243	12	Right under dash	To EPS control unit	
C244	20	Behind right kick panel	To Floor wire harness (C468)	
C245	1 8	Behind right kick panel	To Floor wire harness (C469)	
C246	16	Behind right kick panel	To Floor wire harness (C470)	
C247	14	Behind right kick panel	To Floor wire harness (C466)	
C248	12	Behind right kick panel	To Floor wire harness (C465)	
C249	10	Behind right kick panel	To Floor wire harness (C464)	
C250	7	Behind right kick panel	To Floor wire harness (C467)	
T201		Batterv	To Battery negative terminal	EPS
T202		Rear under front compart-		_
		ment area	To Gearbox	EPS
T203		Rear under front compart-		_
		ment area	To Gearbox	EPS
T204		Rear under front compart-		, i i i i i i i i i i i i i i i i i i i
-		ment area	To Gearbox	EPS
T205		Right front floor	To Power unit	EPS
T206		Right front floor	To Power unit	EPS
T207		Right front floor	To Power unit	EPS
T208		Right front floor	To Power unit	EPS

### Front Compartment Wire Harness (Cont'd)





(cont'd)

Connector and ` <b>erminal</b> Number	Number of pins	Location	Where the Wires Go	Remark
C301	2	Left front compartment area	To L. Front side marker	
C302	2	Left behind front bumper	To L. Condenser fan motor	
C303	2	Left behind front bumper	To L. Front position light	
c 304	2	Left behind front bumper	To L. Front turn signal light	
C305	2	Left behind front bumper	To L. Horn	
C306	2	Behind middle of front		
		bumper	To Front washer motor	
C307	2	Behind middle of front		
		bumper	To Ambient sensor	
C308	2	Middle of front compartment		
		area	To Hood switch	
C309	3	Left front compartment area	To Anti-lock brake left front solenoid	
C310	3	Left front compartment area	To Anti-lock brake left rear solenoid	
c311	2	Lefr f ront compartment area	To Anti-lock brake motor	
C312	3	Left front compartment area	To Anti-lock brake right front solenoid	
c313	3	Left front compartment area	To Anti-lock brake right rear solenoid	
c314	14	Left front compartment area	To Retractor sub harness (C381)	
c315	4	Left front compartment area	To Auto cruise actuator	
C316	2	Left front compartment area	To Security horn	
c317	2	Left front compartment area	To Anti-lock brake pressure switch	
C318	4	Left front compartment area	To <b>A/C</b> pressure switch	
c319	1	Left rear front compartment		
		area	To Brake fluid level switch (+)	
C320	1	Left rear front compartment		
		area	To Brake fluid level switch (-)	
C321	2	Left rear front compartment		
		area	To L. Front anti-lock brake speed sensor	
G301		Left front compartment area	To Body ground, via front compartment	
			harness	
G302		Left front compartment area	To Body ground, via front compartment	
			harness	

Front Comoartment Wire Harness (Cont'd)

1



Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C281	14	Right front compartment area	To Front compartment wire harness (C208)	
C282	6	Behind Right headlight	To Right headlight	
C283	6	Right front compartment area	To Right retractor motor	

### Right Retractor Sub Harness

#### Left Retractor Sub Harness

C381	14	Left front compartment area	To Front compartment wire harness (C314)
C382 C383	6 6	Behind Left headlight Left front compartment	To Left headlight
		area	To Left retractor motor





RIGHT RETRACTOR SUB HARNESS

LEFT RETRACTOR SUB HARNESS



Floor Wire Harness

Connector or F <b>erminal</b> Number	Number of pins	Location	Where the Wires Go	Remark
C401	16	Behind left kick panel	To Integrated control unit	
C402	12	Behind left kick panel	To Dash fuse box (C904)	
C403	14	Behind left kick panel	To Dash fuse box (C901)	
C404	16	Behind left kick panel	To Dash fuse box (C902)	
C405	5	Behind left kick panel	To Dash fuse box (C905)	
C406	16	Behind left kick panel	To Dash fuse box (C903)	
C407	20	Behind left kick panel	To Side wire harness (C523)	
C408	2	Behind left kick panel	To Side wire harness (C524)	
C409	18	Behind left kick panel	To Driver's door wire harness (C601)	
C410	14	Behind left kick panel	To Driver's door wire harness (C602)	
c411	10	Behind instrument kick panel	To Retractor switch/Dashlight brightness controller	
C412	30	Behind gauge	To Gauge assembly	
c413	2	Left under dash	To Foot light	
c414	2	Left under dash	To Chime (lights-on warning)	
c415	6	Left under dash	To Turn signal/Hazard relay	
C416	16	Left under dash	To Combination switch (lighting & turn)	
c417	20	Behind gauge	To Junction connector	
C418	14	Under middle of dash	To Automatic climate control unit	
c419	30	Under middle of dash	To Automatic climate control unit	
C420	16	Under middle of dash	To Stereo radio/cassette player	
C421	2	Under middle of dash		
C422	4	Under center console	To Cigarette lighter relay	
C423	2	Under center console	To Shift position console light	A/T
C424	2	Under center console	To Shift position console switch	A/T
C425	12	Under center console	To Shift position console switch	AK
C426	3	Under center console	To Shift lock solenoid	A/T
C427	4	Under middle of dash	To In car temperature sensor	A/C
C428	3	Under middle of dash	To Cigarette lighter	
c429	4	Under right dash	To SRS main wire harness (C701)	
C430	2	Under right dash	To Glove box light	
c431	2	Behind glove box	To Trunk opener main switch	
C432	7	Right under dash	To Function contol motor	A/C
c433	6	Under middle of dash	To Air mix motor	A/C
c434	2	Under middle of dash	To Evaporator temperature sensor	A/C
c435	6	Under middle of dash	To Ventilation control motor	AIC
C436	5	Behind instrument panel	To TCS off switch	
c437	30	Behind gauges	To Gauge assembly	
G401		Behind left kick panel	To Body ground, via floor wire harness	
G404		Middle of floor	To Body ground, via floor wire harness	
0404				



(cont'd)

### Floor Wire Harness (cont'd)

NOTE: See page 23-31 for illustrations of C439 thru C446 connector locations.

Connector or F <b>erminal</b> Number	Number of <i>pins</i>	Location	Where the Wires Go	Remark
c/30	, 3	left under dash	To Clutch switch (cruise control)	M/T
C433	2	Left under dash	To Clutch interlock switch	M/T
C440 c441	2	Left under dash	To Water temperature sensor	
C442	4	Left under dash	To Brake light switch	110
C442	4	Left under dash	To Cruise control main switch	
C443	1.8	Left under dash	To Combination switch (windshield winer	
6444	10		and hazard)	
c445	8	Left under dash	To Ignition key switch/key interlock solenoid	
C446	7	Left under dash	To Ignition switch	
c447	20	Behind center dash	To Junction connector	
C448	2	Behind center dash	To Sunlight sensor	A/C
c449	4	Center under dash	To Clock	
C450	20	Behind right dash	To Junction connector	
c451	18	Behind right dash	To Junction connector	
C452	8	Right under dash	To Keyless door lock contol unit	OPTION
c453	6	Right under dash	To Foot well bass speaker	
c454	2	Right under dash	To Foot well bass speaker	
c455	4	Center under dash	To Starter cut relay	
C456	4	Right under dash	To Daytime running light control unit	CANADA
c457	8	Right under dash	To Daytime running light control unit	CANADA
C458	2	Right under dash	To Service check connector	
c459	2	Right under dash		
C460	16	Right under dash	To Security control unit	
C461	22	Right under dash	To Security control unit	
C462	18	Right under dash	To Power door lock control unit	
C463	14	Right under dash	To Cruise control unit	
C464	10	Behind right kick panel	To Front compartment wire harness (C 249)	
C465	12	Behind right kick panel	To Front compartment wire harness (C 248)	
C486	14	Behind right kick panel	To Front compartment wire harness (C 24 7)	
C467	7	Behind right kick panel	To Front compartment wire harness (C 2 5 0)	
C468	20	Behind right kick panel	To Front compartment wire harness (C 244)	
C469	18	Behind right kick panel	To Front compartment wire harness (C245)	
C470	16	Behind right kick panel	To Front compartment wire harness (C 246)	
c471	4	Behind right kick panel	To Junction connector	
C472	14	Behind right kick panel	To Passenger's door wire harness (C651)	
c473	10	Behind right kick panel	To Passenger's door wire harness (C652)	
c474	4	Under passenger's seat	To Passenger's power seat wire harness (C781)	
G402		Behind right kick panel	To Body ground, via floor wire harness	



(cont'd)

Floor Wire Harness (cont'd)

Connector or Ferminal Number	Number of pins	Location	Where the Wires Go	Remark
c475	8	Right rear bulkhead	To Engine wire harness (C 159)	
C476	16	Right rear bulkhead	To Engine wire harness (CI 58)	
c477	18	Right rear bulkhead	To Engine wire harness (C160)	
C478	20	Right rear bulkhead	To Engine wire harness (CI 61)	
c479	20	Right rear bulkhead	To Junction connector	
C480	8	Right rear bulkhead	To PGM-FI ECU	
C481	4	Right rear bulkhead	To PGM-FI main relay	
C482	8	Right rear bulkhead	To PGM-FI main relay	
C483	12	Right rear bulkhead	To Cooling fan control unit	
C484	2	Center bulkhead	To Rear speaker	
C485	2	Center floor	To Parking brake switch	
C486	4	Center floor	To C487 connector	
C486	4	Center floor	To Car telephone system	OPTION
C487	4	Center floor	To C486 connector	
C487	4	Center floor	To Car telephone system	OPTION
C488	18	Left rear bulkhead	To Retractable headlight control unit	
C489	6	Left rear bulkhead	To Fuel tank wires (C771)	
C490	8	Left rear bulkhead	To Interlock control unit	A/T
c491	4	Left rear bulkhead	To Fuel pump relay	
c492	10	Left rear bulkhead	To TCS control unit	
c493	12	Left rear bulkhead	To TCS control unit	
c494	20	Left rear bulkhead	To TCS control unit	
c495	22	Left rear bulkhead	To A/T control unit	
C496	26	Left rear bulkhead	To A/T control unit	
c497	7	Left rear bulkhead	To Dashlight brigtness control unit	
C498	4	Left rear bulkhead	To TCS fail-safe relay	
c499	12	Left rear bulkhead	To Side wire harness (C528)	
C500	20	Left rear bulkhead	To Side wire harness (C527)	
C501		Center floor	To Stereo radio/cassette player	
C 502		Left rear bulkhead	To Side wire harness (C540)	
C503		Center floor	To Stereo radio/cassette player	
C 504		Right rear bulkhead	To Hatch wires(C802)	
C505		Center floor	To Compact disc system	OPTION
C 506		Left rear bulkhead	To Side wire harness	OPTION
C507		Center floor	To Car telephone system	OPTION
C508		Left rear bulkhead	To Side wire harness	OPTION
G403		l eft rear bulkhead	To Body ground via floor wire barness	
G405		Left rear bulkhead	To Body ground via TCS control unit	
0400				



Side	Wire	Harness

Connector or <b>Ferminal N</b> umber	Number of pins	Location	Where the Wires Go	Remark
C521	20	Behind left kick panel	To Dash fuse box (C906)	
C522	2	Behind left kick panel	To Dash fuse box (C907)	
C523	20	Behind left kick panel	To Floor wire harness (C407)	
C524	2	Behind left kick panel	To Floor wire harness (C408)	
C525	6	Under driver's seat	To Driver's power seat wire harness (C791)	
C526	2	Left rear bulkhead	To Roof wire harness (C751)	
C527	20	Left rear bulkhead	To Floor wire harness (C500)	
C528	12	Left rear bulkhead	To Floor wire harness (C499)	
c529		Left rear window	To Rear defogger wire (C811)	
C530	14	Left front engine compartment	To Engine wire harness (C 101)	A/T
C530	6	Left front engine compartment	To Engine wire harness (CI 01)	M/T
c531	2	Left front engine compartment	To Engine wire harness (C102)	
C532	6	Left front engine compartment	To Emission control box	
c533	3	Left front engine compartment	To Emission control box	
c534	3	Left front engine compartment	To Emission control box	
c535	2	Center engine compartment	To Engine hood switch	
C536	2	Center engine compartment	To Trunk wire harness (C581)	
c537	2	Left engine compartment	To L. Rear anti-lock brake speed sensor	
C538	4	Left trunk area	To Car telephone system	OPTIC )N
c539	20	Left trunk area	To Rear wire harness (C551)	
C540		Left rear bulkhead	To Floor wire harness (C502)	
c541		Left trunk area	To Power antenna motor	

MAIN FUSE BOX C523 C530 / C531 C533 /C532 C534 C535 C525 C529 C524 Π C521 C540 C522 -C536 C539 C527
C528 C526 C538 C537 **Č**541 SIDE WIRE HARNESS

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
c551	20	Left quarter panel area	To Side wire harness (C539)	
C552	3	Left trunk area	To Trunk light	
c553	4	Left trunk area	To Power antenna motor	
c554	2	Left trunk area	To Trunk opener solenoid	
c555	8	Left trunk area	To L. Taillight assembly	
C556	2	Left trunk area	To L. Rear turn signal light	
c557	3	Center trunk area	To Trunk latch switch	
C558	4	Center trunk area	To License plate lights	
c559	2	Center trunk area	To Security trunk key cylinder switch	
C 560	8	Right trunk area	To R. Taillight assembly	
C561	2	Right trunk area	To R. Rear turn signal light	
C562	2	Right quarter panel area	To R. Rear anti-lock brake speed sensor	
C563	2	Right trunk area	To R. Rear side marker	
C564	2	Left trunk area	To L. Rear side marker	_
G551		Left quarter panel area	To Body ground, via rear wire harness	







### Trunk Wire Harness

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
<b>C58</b> 1	2	Left front trunk area	To Side wire harness <b>(C536</b> )	
C582	2	Above center trunk <b>area</b>	To Trunk sub wire harness <b>(C591</b> )	

### Trunk Sub Wire Harness

,

c591	2	Above center trunk area	To Trunk wire harness (C582)	
c592	2	Above center trunk area	To High mount brake light	



# Connector and Wire Harness Routing

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C601	18	Behind left kick panel	To Floor wire harness (C409)	
C602	14	Behind left kick panel	To Floor wire harness (C410)	
C603	3	Left door	To Left power door mirror	
C604	12	Left door	To Driver's power window switch	
C605	10	Left door	To Power door mirror switch	
C606	6	Left door	To Power window control unit	
C607	4	Left door	To Power window control unit	
C608	3	Left door	To Driver's door lock switch	
C609	5	Left door	To Left front speaker	
C610	2	Left door	To Trunk opener switch	
C611	3	Left door	To Driver's door courtesy light	
C612	8	Left door	<b>To</b> Driver's door key cylinder switch and door lock motor	
C613	4	Left door	To Driver's door power window motor	
C614	5	Left door	To Security indicator	
C615	2	Left door	To Driver's door switch	

### Driver's Door Wire Harness

### Passanger's Door Wire Harness

accounger of Boon		655	
C651	14	Behind right kick panel	To Floor wire harness (C472)
C652	10	Behind right kick panel	To Floor wire harness (C473)
C653	3	Right door	To Right power door mirror
C654	8	Right door	To Passenger's power window switch
C655	3	Right door	To Passenger's door lock switch
C656	5	Right door	To Right front speaker
C657	3	Right door	To Passenger's door courtesy light
C658	8	Right door	To Passenger's door key cylinder switch and door lock motor
C659	2	Right door	To Passenger's door power window motor
C602	2	Right door	To Passenger's door switch

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Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C701	2	Behind left kick panel	To Dash fuse box (C908)	
C702	4	Right under dash	To Floor wire harness (C429)	
C703	18	Center under dash	To SRS control unit	
C704	6	Left under dash	To Cable reel	
C705	2	Left under dash	To Left dash sensor	
C706	2	Right under dash	To Right dash sensor	
G701		Center floor	To Body ground, via floor wire harness	

### SRS Main Wire Harness

#### Fuel Tank Wires

c771	6	Left rear bulkhead	To Floor wire harness (C489)	
C772	3	Fuel tank area	To Fuel gauge sending unit	
c773	2	Fuel tank area	To Fuel pump	

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# Connector and Wire Harness Routing

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
C781	6	Under driver's seat	To Side wire harness (C525)	
C782	5	Left driver's seat	To Power seat sliding switch	
C783	5	Left driver's seat	To Power seat reclining switch	
C784	2	Right driver's seat back	To Power seat reclining motor	
C785	2	Under driver's seat	To Power seat sliding motor	
C786	2	Right driver's seat	To Belt switch	

#### Driver's Power Seat Wire Harness

### Passenger's Power Seat Wire Harness

<b>c791</b>	4	Under passenger's seat	To Floor wire harness <b>(C474)</b>	
c792	5	Right passenger's seat	To Power seat sliding switch	
c793	5	Right passenger's seat	To Power seat reclining switch	
c794	2	Left passenger's seat back	To Power seat reclining motor	
c795	2	Under passenger's seat	To Power seat sliding motor	





# Connector and Wire Harness Routing

**Roof Wire** 

Connector or Terminal Number	Number of pins	Location	Where the Wires Go	Remark
c751 C752	2	Left front engine compartment Roof area	To Side wire harness <b>(C526)</b> To Dome light	

### Rear Window Defogger Wire

### Hatch Wires

C801	1	Rear window area	To Rear window defogger (-)	I
C802	1	<b>Rigfit</b> rear bulkhead	To Floor wire harness ( <b>C504</b> )	
C803	1	Rear window area	To Rear window glass antenna	
G801		Right engine compartment	To Body ground, via hatch wires	



## **Fuses**



### r-Main Relay Box –

NOTE: Main relay box is located in the front compartment, right side.



## **Fuses**





## Power Distribution

Circuit Ic

Identification –





(cont'd)

**23-51**.

#### Power Distribution

Circuit Identification (cont'd)





### Distribution Power **Circuit Identification (cont'd)**





## **Power Distribution**







## **Ground** Distribution

Circuit Identification

NOTE: See page 23-17 for illustrated ground locations.



# Ground Distribution

Circuit Identification (cont'd) -


NOTE: See page 23-19 and 21 for illustrated ground locatons.





: Engine wire harness : Floor wire harness

(cont'd)

# Ground Distribution

### Circuit Identification (cont'd) -

NOTE: See page 23-23 for illustrated ground locations.



Engine : Engine

: Engine wire harness : Front compartment wire harness



NOTE: See page 23-27 for illustrated ground locations.





: Front compartment wire harness

(cont'd)

## Ground Distribution

Circuit Identification (cont'd) -



- +

NOTE: See page 23-31 for illustrated ground locations.



: Floor wire harness J: Driver's door wire harness

(cont'd)

# Ground Distribution

Circuit Identification (cont'd) -

NOTE: See page 23-33 for illustrated ground locations.



NOTE: See page 23-31 thru 33 for illustrated ground locations.



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# **Ground** Distribution

## Circuit Indentification (cont'd) -

NOTE: See page 23-38, 43 and 46 for illustrated ground locations.





# Battery

#### -Test

#### **A** WARNING

- Batterv fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes. Wear protective clothing and a face shield.
  - If electrolyte gets on your skin or clothes, rinse it off with water immediately.
  - If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.
- A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.
- Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions and charge the battery at a proper rate.

If you're using a computerized battery tester, follow the test procedure provided with it. If you don't have a computerized tester, follow this conventional test produre:

To get accurate results, the temperature of the electrolyte must be between 21 °C (70°F) and 38°C (100°F).







# Dash Fuse Box

#### **Removal/Installation**

#### CAUTION;

- Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.
- Always keep the short connector on the airbag connector when the harness is disconnected.

#### Removal:

- 1. Disconnect both the negative cable and positive cable from the battery.
- 2. Remove the maintenance lid A below the airbag, then remove the short connector.



- 3. Disconnect the connector between the airbag and cable reel.
- 4. Connect the short connector to the airbag side of the connector.





- 5. Remove the door sill molding.
- 6. Remove the kick panel trim pieces, as necessary.
- 7. Remove the fuse box mounting bolts.
- 8. Disconnect the fuse box connectors.

NOTE: The SRS main harness connector is double locked. To remove it, first lift the connector lid with a thin screwdriver, then press the connector tab down and pull the connector out.

9. Take out the fuse box.





Installation:

1. Install the dash fuse box.



2. Connect the connectors to the dash fuse box.

NOTE: To reinstall the SRS main harness connector, push it into position until it clicks, then close the connector lid.

- 3. Install the kick panel trim pieces.
- 4. Disconnect the short connector from the airbag.



- 5. Connect the airbag 2-P connector and cable reel 2-P connector.
- 6. Attach the short connector to the lid A and attach to the steering wheel.
- 7. Connect both the negative cable and positive cable to the battery.
- 8. After installing the dash fuse box, confirm that all systems work properly.

# **Ignition Switch**

#### Test

- 1. Remove the dashboard lower panel. (See page 23-1 28)
- 2. Disconnect the 7-P connector from the floor wire harness.
- 3. Check for continuity between the terminals in each switch position according to the table.

Terminal	WHT/	WHT/	BLU/	WHT	BLK/	WHT	BLK/	
Position	(ACC)	(BAT-B)	(IG2-B)	(BAT-A)	(IG1)	(IG2-A)	(ST)	
0								
I	0	Ŷ						
I	0		-0	0		-0		
- 11				¢.			0	



### **Electrical Switch Replacement** -

- 1. Remove the dashboard lower panel. (See page 23-I 28)
- 2. Disconnect the 7-P connector from the floor wire harness.
- 3. Insert the key and turn it to "0".
- 4. Remove the 2 screws and replace the switch.







### Steering Lock Replacement

SRS wire harness is routed near the steering lock assembly.

**A** WARNING All SRS wire harnesses and connectors are colored yellow. Do not electrical test equipment on these circuit.

CAUTION: Be careful not to damage the SRS wire harness when servicing the steering lock.



- 1. Remove the dashboard lower and center panels.
- 2. Remove the steering column covers.
- 3. Remove the knee bolster and dash lower frame.
- 4. Disconnect the 7-P and 6-P connectors.



- 4. Remove the column holder mount bolts.
- 5. Remove the mounting nuts.



- 6. Lower the steering column assy.
- 7. Center punch each of the shear bolts and drill their heads off with a 3/16 in. drill bit.

CAUTION: Do not damage the switch body when removing the shear bolt head.

8. Remove the shear bolts from the switch body.



# **Ignition Switch**

### Steering Lock Replacement (cont'd)

9. Insert the key and turn it to "1".

NOTE: The illustration shows A/T.



10. Push the lock pin and pull out the steering lock assembly.

- 11. Turn the key to the "1", push the pin and insert the steering lock assembly into the steering column until the clicks into place.
- 12. Loosely tighten the new shear bolt.

NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.

- 13. Insert the ignition key and check for proper operation of the steering wheel lock and that ignition key turns freely.
- 14. Tighten the shear bolts until the hex heads twist off.





- Component Location Index



### Description

Starter interlock System (M/T only):

The starter interlock system prevents the engine from starting unless the clutch pedal is fully depressed.

The clutch interlock switch turns on at the position where the clutch disengages: 15-20 mm (0.59-0.79 in) from fully depressed position.

NOTE: Full stroke of clutch pedal is 135-145 mm (5.3-5.7 in) from fully released position.



7 - Circuit Diagram IGNITION SWITCH MAIN RELAY BOX BATTERY BAT-A ST NO.29(50A) Ŧ WHT/RED-- WHT -BLK/WHT BLK/WHT BLK/WHT JUMP Start Terminal MAIN FUSE BOX ٩I 44 lb STARTER CUT RELAY BLK/BLU **BLK/GRN** вК CLUTCH INTERLOCK SWITCH I (M/T) DASH FUSE BOX NO.7(7.5A) (ြ SHIFT POSITION CONSOLE SWITCH (A/T) BLK/GRN BLK<u>7</u>YEL BLK/WHT BLK/WHT В S • PGM-FI stat RELAY ● PGM FIECU 'GAUGE ASSEMBLY SECURITY CONTROL UNIT 100 COL M SOLENOID 8 STARTER

### - Starter Test -

NOTE: The air temperature must be between 15 and  $38^{\circ}$ C (59 and  $100^{\circ}$ F) before testing.

**Recommended Procedure:** 

Use a starter system tester. Connect and operate the equipment in accordance with manufacturer's instrucions. Test and trobleshoot as described.

Alternate Procedure:

- Use the following equipment:
  - Ammeter, O-400A
  - Voltmeter, 0-20V (accurate within 0.1 volt) - Tachometer, 0-1200 rpm
- Hook up voltmeter and ammeter as shown.



1. Disconnect the No. 13 (30A) fuse from the main fuse box.



2. Check the starter engagement:

Press the clutch pedal all the way (M/T only), and turn the ignition switch to "Start." The starter should crank the engine.

NOTE: On cars equipped with manual transmission, the engine will not crank unless the clutch pedal is fully depressed.

• If the starter still does not crank the engine, check the battery, battery positive cable, ground and the wire connections for looseness or corrosion.

• Test again.

If the starter still does not crank the engine, bypass the ignition switch circuit as follows: Unplug the connector (BLK/WHT wire) from the starter. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.





- If the starter still does not crank the engine, remove the starter and diagnose its internal problems.
- If the starter cranks the engine, check for an open in the BLK/WHT wire circuit between the starter and ignition switch, and connectors. Check the ignition switch.
  - On cars with automatic transmission, check the shift position console switch (neutral safety switch) and connector.
  - On cars with manual transmission, check the starter relay, clutch interlock switch and connectors.

NOTE: Check the No. 29 (50A) fuse and the starter cut relay, and investigate the security alarm system.

3. Check for wear or damage: The starter should crank the engine smoothly and steadily.

If the starter engages, but cranks the engine erratically, remove the starter motor. Inspect the starter, drive gear and flywheel ring gear for damage. Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

4. Check cranking voltage and current draw: Voltage should be no less than 8.5 volts. Current should be no more than 350 amperes.

If voltage is too low, or current draw too high, check for:

- Battery fully charged.
- Open circuit in starter armature commutator segments.
- Starter armature dragging.
- Shorted armature winding.
- Excessive drag in engine.

- 5. Check cranking rpm: Engine speed during cranking should be above 100 rpm.
  - Loose battery or starter terminals.
  - Excessively worn starter brushes.
  - Open circuit in commutator segments.
  - Dirty or damaged helical spline or drive gear.
  - Defective drive gear overrunning clutch.
- 6. Check the starter disengagement:
  - Press the clutch pedal all the way (M/T only), turn the ignition switch to "Start" and release to "Run." The starter drive gear should disengage from the flywheel ring gear.

If the drive gear hangs up on the flywheel ring gear, check for:

- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirt or damaged overuning clutch.

### Starter Cut Relay Test

- 1. Remove the glove box (See section 20).
- Disconnect the 4-P connector from the starter cut relay. (Wire colors of 4-P connector: BLK/GRN, BLK/WHT, BLK/BLU and BLK/WHT)
- There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.



## - Clutch Interlock Switch Test (M/T) ר

- 1. Remove the dashboard lower panel and knee bolster, then disconnect the 2-P connector from the switch.
- 2. Check for continuity between the terminals according to the table.

Terminal Clutch Pedal	А	В
RELEASED		
PUSHED	0	O



3. If necessary, replace the switch or adjust the switch position (see section 12).





#### Starter Overhaul







#### - Starter Brush Inspection

Measure the brush length. If not within the service limit, replace the armature housing and brush holder assembly.

Brush Length

Standard (New): 15.0 – 15.5 mm (0.59-0.61 in) Service Limit : 10.0 mm (0.39 in)



NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sand paper, with the grit side up, over the commutator, and smoothly rotate the armature. The contact surface of the brushes will be sanded to same contour as the commutator.

### · Armature Inspection and Test -

1. Inspect the armature for wear or damage due to contact with the field coil magnets.



2. A dirty or burnt commutator surface may be resurfaced with emery cloth or a lathe within the following specifications.

**Commutator Diameter** 

Standard (New): 29.9-30.0 mm (1.177-1.181 in) Service Limit : 29.0 mm (1.14 in)



Commutator Runout

Standard (New): O-0.02 mm (O-0.0008 in) Service Limit : 0.04 mm (0.0016 in)



- 3. If the commutator runout and diameter are within 'limits, check the commutator for damage or for carbon dust or brass chips between the segments.
- If surface is dirty, recondition it with a #500 or #600 sandpaper. Then, check mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth.



Commutator Mica Depth

Standard (New): 0.5-0.8 mm (0.019-0.031 in) Service Limit : 0.2 mm (0.008 in)



5. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace the armature.



6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace the armature.

7. With an ohmmeter, check that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If continuity exists, replace the armature.





### . Overrunning Clutch Inspection _____

Move the overrunning clutch along the shaft.

If it doesn't move freely, or if the clutch slips when the armature is rotated while holding the drive gear, replace the clutch assembly.



If the gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.

NOTE: Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

#### . Starter Reassembly -

Reassemble the starter in the reverse order of disassembly.

1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder, and release the spring to hold it there.



2. Install the armature in the housing. Next pry back each brush spring again and push the brush down until it seats against the commutator, then release the spring against the end of the brush.



3. Install the end cover on the brush holder.



# Ignition system





#### ignition Timing Control:

The programmed ignition (PGM-IG) employed in this engine provides optimum control of ignition timing by determining the optimum timing using a microcomputer in response to engine speed and vacuum pressure in the intake manifold, which are transmitted by signals from CRANK/CYL sensor, throttle angle sensor, coolant temperature sensor and MAP sensor. This system, not dependent on a governor or vacuum diaphragm, is capable of setting lead angles with complicated characteristics which cannot be provided by conventional governors.



#### Basic Control

Determination of ignition timing/current duration:

The control unit has stored within it the optimum basic ignition timing for operating conditions based upon engine speed and intake manifold pressure. With compensation by signals from sensors, the system determines optimum timing for ambient conditions and sends voltage pulses to the igniter unit.

Compensation of ignition timing:

Compensation Item	Related Sensor and Information	Description		
lding	CRANK/CYL sensor MAP sensor	Ignition timing is controlled to the target speed with compensation according to the idling speed.		
Compensation at warm-up	Coolant temperature sensor	Lag angle is adjusted in accordance with the warming up conditions to bring about a good balance between operating performance and exhaust gas level.		
Coolant temperature compensation	Coolant temperature sensor	Compensation for lead angle at low coolant temperature and lag angle at high coolant temperature.		

**Control at Start** 

Ignition timing is fixed at BTDC 15° for cranking. The cranking is detected by the CYL sensor (cranking revolution) and starter signal.

# Ignition System

#### Circuit Diagram

**NOTE:** Several different wires have the same color. They have been given a number suffix to distinguish them (for example  $WHT^1$  and  $WHT^2$  are not the same).





#### - Ignition Timing Inspection and Setting

- 1. Start the engine and allow it to warm up (cooling fan comes on).
- 2. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the timing belt cover.



TIMING LIGHT

3. Inspect ignition timing at idle.

Ignition Timing: 15° ± 2° BTDC (RED)

- Manual Trasmission [at BOO ± 50 min⁻¹ (rpm) in neutral]
- Automatic Transmission [at 750 ± 50 min- 1 (rpm) in gear]



- Adjust ignition timing, if necessary, by turning the adjusting screw on the ignition timing adjuster in control box.
- 5. Remove the control box cover.

 Remove the 2 screws from the control box then disconnect the 3-P connector from the ignition timing adjuster.



- 7. Remove the ignition timing adjuster from the control box.
- 8. Drill the 2 rivets off with a 3/16 in. drill bit, then separate the stay cover from the adjuster.

CAUTION: Do not damage the adjuster when removing the rivets.

• Re-connect the adjuster to the car, start the engine, and turn the adjusting screw counterclockwise to retard the timing, or clockwise to advance it, as necessary.



9. After adjusting, reinstall the stay cover to the ignition timing adjuster with new rivets, then reinstall the adjuster to the control box.

# Ignition System

#### - Idle Speed Inspection -

- 1. Start the engine and allow it to warm up (cooling fan comes on).
- 2. Connect a tachometer to the tachometer connector.



#### - Igniter Unit Replacement

- 1. Disconnect the 8-P and 6-P connectors from the igniter unit.
- 2. Remove the 2 mounting bolts from the igniter unit.
- 3. Pry or slide the igniter unit pull out of the front side.

CAUTION: Be careful not to damage the vacuum hose when removing igniter unit.





### - Igniter Unit Input Test

Disconnect the 8-P connector from the igniter unit. Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the igniter unit NOTE:

- See section 11 when self-diagnostic indicator blinks.
- Perfrom an input test on the igniter unit after finishing the fundamental tests for the ignition system and fuel emission system.
- The tachometer should operated nomally.



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obrtained)	
1	BLK ¹	Under all conditions.	Check for continuity to ground	• Poor ground (G403).	
2	BLK ²		There should be continuity.	• An open in the wire.	
3	WHT'	Ignition switch "ON".	Check for voltage to ground:	• Blown NO 13 (30 A) fuse.	
4	WHT/GRN ¹		There should be battery voltage.	<ul> <li>Faulty ignition coll.</li> <li>An open in the wire.</li> </ul>	
5	WHT/BLK ¹				
6	WHT/BLU ¹				
7	WHT/YEL ¹	-			
8	WHT/RED				

# Ignition System

### Ignition coil/plug Removal

#### CAUTION:

Ignition coils and plugs can become very hot in use, do not touch them: handle the ignition coils and plugs carefully.

- 1. Remove the ignition coil covers.
- Disconnect the 2-P connectors from the ignition coils.
- 3. Remove the ignition coils.
- 4. Remove the plugs.

#### NOTE:

Different ignition coils and ignition coil covers are used for the front side and rear side. Be sure to use **corrent** ones when mounting them.


#### - Ignition Coil Test

1. With the Ignition switch OFF, remove the ignition coil.

 Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specification.
 NOTE: Resistance will vary with the coil temperature; specification is at 25°C (77°F)

Primary Winding Resistance (between the A and B terminals): 0.9-1.1 ohms

• If primary winding resistance is OK, substitute a known-good ignition coil and check the system operation.

If the system is normal, replace the orginal ignition coil.



# Ignition System



# --+











### Charging System

#### - Alternator and Regulator Test

- 1. First make sure you have a good battery, and that the alternator belt is tight and in good condition. Also make sure the connections at the alternator and main fuses are good. Next, check the No. 2 (15 A) fuse in the dash fuse box and the No. 18 (20 A) fuse in the main fuse box. (if blown, the charge system light will come on even if the system's working properly.)
- Disconnect the 4-P connector from the alternator. With the ignition switch on, there should be battery voltage between the IG (BLK/YEL) terminal and body ground, and between the S (YEL/BLU) terminal and body ground.



- If there is no voltage, check for:
  - Blown No. 2 (15 A) fuse in the dash fuse box or No. 18 (20 A) fuse in the main fuse box.
  - -- An open in the BLK/YEL wire between the dash fuse box and the voltage regulator, or the YEL/BLU wire between the main fuse box and the voltage regulator.
- If there is battery voltage, go to step 3.



3. Following the illustrations instructions, connect the SUN VAT-40 (or equivalent) and turn the test selector switch to the "STARTING (No. 1)" position.



Positive tester cable, voltmeter positive lead: Attach the positive tester cable and the voltmeter positive lead to the jump start terminal at the main fuse box.



Negative tester cable, voltmeter negative lead: Attach the negative tester cable and the voltmeter negative lead to the top of throttle body.



Inductive pick-up: Attach the inductive pick-up to the B terminal at the alternator.



### **Charging System** Alternator and Regulator Test (cont'd)

- 4. Start the engine. Turn off all accessories, move the selector switch to the "CHARGING (No. 2)" position.
- Raise engine speed to 2,000 rpm and hold (make sure cooling fans are off).
   Apply a "load" with the carbon pile, so the voltage drops to no less than 12 volts.
   Check the maximum amperage reading and compare with the chart below.



- If amperage is "NORMAL" the system is OK: Proceed to the Charge System Light Test (see page 23-103).
- If amperage is "ABNORMAL" go to step 6.

 Stop the engine. Perform full field test: Insert the full field tester lead into the full field access hole at the back of the alternator.



- 7. Move the test selector switch to the "STARTING (No. I)" position.
- 8. Start the engine. Raise engine speed to 2,000 rpm and hold (make sure cooling fans are off).
- 9. Switch the field selector to the "A (Ground)" position momentarily and check amperage reading.

NOTE: As an alternative, use a screwdriver and an ammeter to full field the alternator.

screwdriver

CAUTION: The voltage will rise quickly when the alternator is full fielded. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.

- If the amperage is within specification, replace the regulator.
- If the amperage is not within specification, replace the alternator.

#### - Charge System Light Test

NOTE: Before testing, check the wire harness connection, alternator belt tension, No. 2 (15 A) fuse in the dash fuse box and No. 18 (20 A) fuse in the main fuse box.

1. Turn the ignition switch on. The charge system light should come on.

If it does not come on, disconnect the alternator connector and short the pin of the L(WHT/BLU) terminal to ground.



- If the light still does not come on, check for:
  Bad bulb.
  - An open in the WHT/BLU wire between the light and voltage regulator.
  - An open in the BLK/YEL wire between the light and the dash fuse box, or the dash fuse box and the ignition switch.
- If the light comes on, check the alternator and regulator (see page 23-100).
- Start the engine and let it idle. The charge system light should go off.
  If it stays on this time, check the YEL/BLU wire between the main fuse box and the alternator.
  If the fuse and wire are OK, check the alternator and regulator (see page 23-100).
  If the system is charging, proceed as follows.

(cont'd)

### Charging System

#### - Charging System Light Test (cont'd) -

- 3. Remove the door sill molding and cowl lining pieces.
- Remove the 26-P connector from the integrated control unit on the dash fuse box.
   With the engine running, the charge system light should go off.

**NOTE:** Don't disconnect all of the connectors from the dash fuse box.



- If the light goes off, there is a short in the integrated control unit.
- If the light does not go off, there is a short to ground in the WHT/BLU wire between the light and the control unit.

 Remove the glove box (See section 20) and disconnect the 20-P connector from the ALB control unit. With the engine running, the charge system light should go off.



- If the light goes off, there is a short in the ALB control unit.
- If the light does not go out, there is a short to ground in the WHT/BLU wire between the light and the ALB control unit.

#### A/T:

6. Disconnect the 18-P connector from the EPS control unit. With the engine running, the charge light should go off.



- If the light goes off, there is a short in the EPS control unit.
- If the light does not go off, there is a short to ground in the WHT/BLU wire between the charge system light and the EPS control unit.

#### **Alternator Replacement**

- 1. Disconnect the ground wire from the battery negative (-) post.
- 2. Disconnect the 4-P connector from the alternator.
- 3. Remove the terminal nut and the BLK wire from the B terminal.



### Charging System





10 mm BOX WRENCH

PULLEY

#### - Alternator Overhaul

NOTE: It is only necessary to separate the pulley, drive end housing and rotor when the front bearing needs replacement.

To remove the pulley and rotor, use 10 mm and 22 mm box wrenches to loosen the pulley locknut. Use an impact wrench to remove the nut if necessary.



# Charging System

Rectifier Test

NOTE:

- The diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of eight diodes (4 pairs), each diode must be tested for continuity in both directions; a total of 16 checks.
- Use an ohmeter capable of checking diodes.
- Check for continuity in each direction, between the B and P (of each diode pair) terminals, and between the E (ground) and P (of each diode pair) terminals. All diodes should have continuity in only one direction.



2. If any of the 8 diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

#### Alternator Brush Inspection

- 1. Remove the end cover, then take out the brush holder by removing its 2 screws.
- 2. Measure length of the brushes with a vernier caliper.
  - Alternator Brush Length: Standard : 10.5 mm (0.41 in) Service Limit: 1.5 mm (0.06 in)



If the brushes are not inside the service limit, replace the brushe holder assembly.





# Charging System

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# Cooling Fan Control





# **Cooling Fan Control**

#### - Circuit Diagram

'NOTE Several different wires have the same color. They have-been given a number suffix to distinguish them (for example WHT' and WHT² are not the same).





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#### - Discription

Fan control system:

The cooling fan system is comprised of radiator fan, condenser fan (left, right), engine compartment fan, radiator fan low relay radiator fan high relay, condenser fan relay, engine room fan relay, radiator fan resistor, coolant temperature sensor, A/C pressure switch, cooling fan control unit, climate control unit and PGM-FI ECU.

The fan control unit controls the operation of the radiator fan and condenser fan.

It uses inputs from the coolant temperature sensor and A/C pressure switch (A and B) on the A/C system to determine when the fans should run and at what speed.

Additionally the temperature switch shuts down the A/C system if the coolant temperature exceeds  $130^{\circ}C(266^{\circ}F)$ . If the pressure in the A/C system is higher than normal, pressure switch A closes and the fans will run at high speed only. See the A/C section for description and specification of that funciton.

Function	ON	OFF		
Operating Condition	- ON			
At low speed	84°C (183°F)	78°C (172°F)		
At high speed	90°C (194°F)	84°C (183°F)		
A/C cut	1 30°C(266°F)	128°C (262°F)		

Fans operating condiiton:

Operating condition	At low speed	At high speed		
Fans				
Radiator fan motor	ON	ON		
Engine compartment fan motor	OFF	ON		

### Troubleshooting —

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected	No. 51 (10A) fuse (in the main reldy box)	Blown No. 24 (10A) fuse (in the main fuse box)	Blown No. 4 (15A) fuse (in the dash fuse box)	Relay	Resistor	Coolant temerature sensor	Radiator fan motor	Engine compartment fan motor	Condenser fan motors	* A/C and PGM-FI systems	Faulty fan control unit	Faulty A/C pressure switch	Poor ground	Open circuit in wires or loose or disconnected terminals
Only one fan operates (with engine and A/C ON).	1	2		<u> </u>	(	- 1	-4 3	4	5	<b></b> (	ا _{مع} یر ا			WHT ² , WHT/BLU ² , WHT ³ , WHT/BLU ³ , WHT/GRN ¹ , WHT/ GRN ² , or WHT/BLU ¹
Fans Under all do not conditions.			1			2	-			_	3		G403	YEL/BLK, BLU/WHT or LT GRN
rotate. At low speed	1			3	2	4	-			_	5		G302 or G 4 0 3	YEL/BLK, WHT ² , WHT/BLU ² , RED, GRN/BLK, BLUNVHT or LT GRN
At high speed.	1	4		2	-	3	-				5		∃ 102, G20 <b>:</b> or G403	YEL/BLK, WHT/BLU ² BLU/RED, WHT/GRN ⁴ WHT/BLU ¹ , BLU/WH ⁴ or LT GRN
Compressor cluch does not engage as necessary.					[	_ ,				1	3	2	G302 or G403	GRY/BLK, BLU/BLK, BRN/BLK, BLU/WHT or LT GRN

* Refer to section 22 for A/C pressure inspection of the A/C system

# **Cooling Fan Control**



23-I 18



#### Radiator Fan Motor Test -

- 1. Disconnect the 2-P connector from the radiator fan motor.
- 2. Test motor operation by connecting battery positive to the A terminal, and negative to the B termianal.
- 3. If the motor fails to run smoothly, replace it.



#### Condenser Fan Motor Test

- 1. Disconnect the 2-P connector from the radiator fan motor.
- 2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
- 3. If the motor fails to run smoothly, replace it.



NOTE: The illustration shows right condenser.

# **Cooling Fan Control**



### _{I'} Relay Test -

A-TYPE:

There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.





### Cooling Fan Control

#### Coolant Temperature Sensor Test

NOTE: Bleed air of the cooling system after installing the coolant temperature sensor (see section 10).

CAUTION: Failure to comply with the bleeding procedure could cause imperfect bleeding, which may result in severe engine damage.

- 1. Remove the coolant temperature sensor from the thermostat housing.
- 2. Suspend the coolant temperature sensor in a container of coolant as shown.

COOLANT TEMPERATURE SENSOR

COOLANT

- 3. Heat the coolant and check coolant temperature with a thermometer (see table below).
- 4. Measure the resistance between the A and B terminals according to the table.

Temperature	84°	90°	108°	110°
	(183°F)	(194°F)	(226°F)	(230°F)
Resistance	1.047	0.872	0.519-	0.489 <i>-</i>
(KΩ)	1.255	1.024	0.573	0.541

5. If unable to obtain the above readings, replace the temperature switch.

THERMOMETER

## Gauge Assembly









4

# Gauge Assembly





# Gauge Assembly

#### - Removal -

#### CAUTION:

- All SRS electrical wiring harnesses are covered with yellow outer insulaton.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.
- After installation of the gauge assembly, recheck the operation of the SRS Indicator light.



SRS MAIN. WIRE HARNESS

1. Remove the dashboard lower panel and disconnect the two connectors from the floor wire harness.



2. Remove the 2 screws, then remove the dashboard center panel from the dashboard.



- 3. Disconnect the TCS switch and the retractor switch connectors.
- 4. Remove the 6 screws, then remove the instrument panel from the dashboard.





5. Remove the 2 screws, then remove the tilt cover from the steering column.



6. Remove the 8 screws, then remove the steering column upper and lower covers.

7. Disconnect the 30-P connectors from both sides from the gauge assembly.



8. Use a protective cloth on the combination switch to prevent scratching the gauge assembly. Remove the 4 screws, then take out the gauge assembly as shown.



COLUMN UPPER COVER



### Gauge Assembly



23-I 30
# Speedo/Tripmeter/Odometer

### Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected											
Symptom	Blown No. 5 (10A)fuse (in the dash fuse box)	Speedometer	Odometer	Tripmeter	Printed circuit panel A	Printed circuit panel B	Speed sensor input test	Speed sensor is not in stalled correctly	Undone joint connector	Poor ground	Open circuit in wires or loose or disconnected terminals
Speedomter operates, but deflection error is great.					2			1			
Odometer and tripmeter operate, but speedometer does not operate.		1			2						_
Speedometer and tripmeter operate, but odometer does not operate.			2		4	3			1		
Speedometer and odometer operate, but tripmeter does not operate.				1	2						_
Speedometer operates, but odometer and tripmeter do not operate.					1						_
Speedometer, odometer and tripmeter do not operate.	1				3		2			G401 G402	YEL



View from the back of the gauge assembly.

# Gauge Assembly

### Disassembly -

#### NOTE:

- Handle the terminals and printed circuit panels carefully to avoid damaging them.
- If replacement is required, replace the speedometer, tripmeter and printed circuit panel A as a unit.
- If replacement is required, replace the tachometer, odo meter and printed circuit panel B as a unit.





### -Replacement -

- 1. Disconnect the 3-P connector from the speed sensor.
- 2. Remove the mounting bolts and the speed sensor, then take out the speed sensor assembly.



3. Install in the reverse order of removal. NOTE: Be careful not to lose the joint shaft, because it is a tiny part.

# **Fuel Gauge**

### - Gauge Test

NOTE:

- Refer to page 23- 126 for wiring description of the fuel gauge system circuit.
- Check the No.5 (IO A) fuse in the dash fuse box before testing.
- Remove the maintenance access cover.
- 2. Disconnect the 3-P connector from the fuel gauge sending unit.



- 3. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the C (BLK) terminal, then turn the ignition switch ON. There should be between 5 and BV.
  - If the voltage is as specified, go to step 4.
  - If the voltage is not as specified, check for:
     An open in the YEL, YEL/WHT or BLK wire.
     Poor ground (G403)
- 4. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and C (BLK) terminals.

Turn the ignition switch ON. Check that the pointer of the fuel gauge starts moving toward "F" mark.

CAUTION: Turn the ignition switch OFF before the pinter reaches "F" mark on the gauge dial. Failure to turn the ignition switch OFF before the pointer reaches the "F" mark may cause damage to the fuel gauge.

NOTE: The fuel gauge is a bobbin (cross coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

- If the pointer of the fuel gauge does not swing at all, replace the gauge.
- Inspect the fuel gauge sending unit if the gauge is OK.



### -Sending Unit Test-



4, Measure the resistance between the A and B terminals at E (EMPTY), 'I/2 (HALF FULL) and F (FULL) by moving the float.

Float Positio	on	E	112	F
Resistance	(Ω)	105-I 10	25.5-39.5	2 - 5



E	1/2	F
25.0mm	144mm	275mm
(0.98in)	(5.67in)	(10.8in)

5. If unable to obtain the above readings, replace the fuel gauge sending unit.

# **Coolant Temperature Gauge**

#### -Gauge Test -

#### NOTE:

- Refer to page 23-I 24 for wiring description of the coolant temperature gauge circuit.
- Check the No. 5 (IO A) fuse in the dash fuse box before testing.
- Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature gauge sender and ground it with a jumper wire.



2. Turn the ignition switch ON. Check that the pointer of the coolant temperature gauge starts moving toward "H" mark.

CAUTION: Turn the ignition switch OFF before the pointer reaches "H" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

• If the pointer of the gauge does not swing at all, check for:

- An open in the YEL or YEL/GRN wire.

Repalce the coolant temperature gauge if the fuse and wiring are normal.

• Inspect the gauge sender if the gauge is OK.

### Sending Unit Test

- 1. Disconnect the YEL/GRN wire from the sender.
- 2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



- 3. Check the temperature of the coolant.
- 4. Run the engine and measure the change in resistance with the enigne at operating temperature (Cooling fan comes on).

Temperature	56°C (133°F) [''C'' mark1	85°C (185°F)– 100°C (212°F)	
Resistance (Ω)	142	49-32	

5. If obtained readings are substantially different from specifications above, replace the gauge sender.

# Oil pressure gauge

### -Gauge Test -

#### NOTE:

- Refer to page 23-124 for wiring description of the coolant temperature gauge circuit.
- Check the No.5 (IO A) fuse in the dash fuse box before testing.
- 1. Make sure the ignition switch is OFF, then disconnect the 2-P connector from the oil pressure sending unit and ground it with a jumper wire.



2. Turn the ignition switch ON. Check that the pointer of the oil pressure gauge starts moving toward "8" mark.

CAUTION: Turn the ignition switch OFF before the pointer reaches "8" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

- If the pointer of the gauge does not swing at all, check for:
  - An open in the YEL or BLU/WHT wire.

Replace the oil pressure gauge if the fuse and wiring are normal.

- Inspect the engine oil pressure if the gauge is OK.
- 3. Chcek the oil pressure of the engine (See section 8),
  - Replace the oil pressure sending unit if the engine oil pressure is OK.

# Oil pressure Warning System



### - Oil Pressure Switch Test

- 1. Raise the car and place safety stands in the proper locations (See section 1).
- 2. Remove the right rear tire.
- 3. Remove the YEL/RED wire from the oil pressure switch.

There should be continuity between the positive terminal and the engine (ground) with the engine stopped. There should be no continuity when the engine runs.





4. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level is correct (see section 8).

# Brake Warning System

# -Parking Brake Switch Test -

- 1. Remove the center console and disconnect the connector from the switch.
- 2. There should be continuity between the positive terminal and body ground with the brake lever up. There should be no continuity with the brake lever down.



#### NOTE: CANADA only If the parking brake switch is OK but the brake warning system does not function, perform input test for daytime running light control unit (see page 23-176)

### -Brake Fluid Level Switch Test-

- 1. Remove the reservoir cap. Check that the float moves up and down freely. Replace the reservoir cap assembly if the float does not move freely.
- Check for continuity between the terminals with the float up and down.
   There should be continuity with the float and no continuity with the float up.
   Replace the reservoir cap assembly if necessary.



## Seat Belt Reminder System

### - Seat Belt Switch Test -



- Indicator Light Test

System

Low Fuel Indicator

NOTE: Refer to page 23-I 26 for wiring description of the low fuel indicator circuit.

1. Park car on level ground.

A WARNING Do not smoke while working on fuel stystem. Keep open flame away from work area. Drain fuel only into an approved container.

- 2. Drain fuel tank into an approved container. Then install the drain bolt with a new washer.
- 3. Add less than 11  $\ell$  (2.4 U.S.Gal, 2.9 Imp. Gal) of fuel and turn the ignition switch on. The low fuel Indicator light should come on within 4 minutes.
- Then add one more gallon of fuel [approx. 4ℓ(1.1 U.S. Gal, 0.9 Imp. Gal)] The light should go out within 4 minutes.
  - If the light did not come on in step 3, remove the maintanace access cover and disconnect the 3-P connector from the fuel gauge sending unit. Connect the A (YEL/BLU) teminal to the C (BLK) terminal with a jumper wire.
    - If the light comes on, the problem is either the sending unit or its ground.
    - If the light does not come on, the problem is an open in the YEL/BLU wire to the gauge assembly, no power to the gauge or bad bulb.



1. Slide the driver's seat forward until the seat belt center anchor bolt is accessible, then disconnect the 2-P connector from the seat belt switch.

2. There should be continuity between the A and B terminals when the driver's seat belt is not buckled. There should be no continuity when the driver's seat belt is buckled.



View from wire side

# Interlock System



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### 23-141

# Interlock System

### -Control Unit Input Test -

Disconnect the 8-P connector from the control unit. Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, substitute the control unit with a known-good one. If the system is OK, replace the control unit.

NOTE: If the shift lock solenoid clicks when the ignition switch is ON and the brake pedal is pushed (the shift lever is in the P position), the shift lock system is electronically normal. If the shift lever cannot be shifted from P position, see page 23-1 56 and section 14.



Shift Lock System:

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)				
		Ignition switch ON. Brake pedal pushed.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 45 (20 A) fuse.</li> <li>Faulty brake light switch.</li> </ul>				
1	ORN/BLK	Ignition switch ON. Step on the brake pedal and the accelerator at the same time.	Check for voltage to ground: should not be battery voltage.	<ul> <li>Faulty throttle angle sensor.</li> <li>Faulty A/T control unit.</li> <li>An open in the wire.</li> </ul>				
2	GRY/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty shift position console switch.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>				
3	YEL/BLK	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10 A) fuse.</li> <li>Faulty shift lock solenoid.</li> <li>An open in the wire.</li> </ul>				

Key Interlock System:

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	GRN/WHT ²	Shift lever position in P.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty shift position console switch.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
3	WHT/RED	Ignition switch turned to ACC and the key pushed in.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 45 (20 A) fuse.</li> <li>Faulty steering lock assembly (key interlock solenoid).</li> <li>An open in the wire.</li> </ul>
4	BLK/RED	Ignition switch turned to ACC and the key pushed in.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 45 (20 A) fuse.</li> <li>Faulty steering lock assembly (key interlock solenoid).</li> <li>An open in the wire.</li> </ul>



### -Key Interlock Solenoid Test

- 1. Remove the dashboard lower panel and center panel.
- 2. Disconnect the 8-P connector from the floor wire harness.
- 3. Check for continuity between the terminal in each switch position according to the table.

<u>\</u>	Terminal	Α	в	с
Position				
Ignition	Key pushed in.	C	_0	Ŷ
switch ACC	Key released.		ο ·	• 4

- 4. Check that the key cannot be removed when the battery is connected to the A and C terminals.
  - If the key cannot be removed, the key interlock solenoid is OK.
  - If the key can be removed, replace the steering lock assembly (key interlock solenoid is not available separately).



View from wire side

# Interlock System

### Shift Lock Solenoid Test/Replacement

#### Test:

1. Remove the console, then disconnect the 3-P connector of the shift lock solenoid from the dashboard wire harness.

NOTE:

- Do not connect the battery terminals to wrong polarities because a diode is inside the solenoid.
- 2. Connect the battery positive to the A terminal and negative to the B terminal momentarily. Check the solenoid operation. If does not operate, replace it.

#### NOTE:

• When the shift lock solenoid is ON, check that there is clearance of  $2.5 \pm 0.5$  mm (0.098  $\pm$ 0.02 in) between the top of shift lock lever and lock pin groove (see clearance check on this page).

When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever. If not, adjust the position of shift lock solenoid.

View from wire side B(+) A(+)

#### **Replacement:**

- 1. Remove the E ring and the solenoid pin.
- 2. Remove the self-looking nuts and shift lock solenoid.



- Install the shift lock solenoid in the reverse order of removal and adjust the position of shift lock solenoid.
   When the shift lock solenoid is ON, check that
  - When the shift lock solehold is ON, check that there is a clearance of  $2.5 \pm 0.5$  mm (0.098  $\pm$ 0.02 in.) between the top of shift lock lever and the lock pin groove, then tighten the self-locking nuts.

NOTE: Use brand-new self-locking nuts.



• When the shift lock solenoid is OFF, make sure that the lock pin is blocked by the shift lock lever. NOTE: Test for the solenoid operation after assembling.







### . Description

#### Safety Indicator System:

LED's are used to indicate when the turnk lid or a door is not fully closed, or when a brake light is faulty. the LED's will remain ON for about 2 seconds after the ignition switch has been turned ON to show that the system circuit is functioning.

#### Brake Light Bulb Failure Indicator:

If all brake light bulbs are OK, the Indicator light stays off because the ORN/WHT wire is constantly being grounded by the two brake light failure sensors connected in series. With the brake light off, the ground is provided through the diode, the failure sensor relay coil and bulb filaments to ground. With the brake light on, all 4 relays, (2 in the left sensor, 2 in the right sensor) connected in series, supply ground. If any of the 4 bulbs is not working, the chain is broken and the ORN/WHT wire is not being grounded. The Indicator light comes on.



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### Indicator Input Test –

**A** WARNING All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the safety indicator system.

Remove the dashboard lower panel, center panel and instrument panel. Disconnect the B-connector (30-P) from the gauge assembly.

(See page 23-128)

Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the safety indicator.

A-CONNECTOR (Carries the SRS indicator signal)



**SRS MAIN WIRE HARNESS** 





No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, 402)</li> <li>An open in the wire.</li> </ul>
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 5 (10 A) fuse.</li><li>An open in the wire.</li></ul>
3	ORN/WHT	Brake pedal pushed.	Check for continuity to ground: should be continuity with the pedal pushed.	<ul> <li>Blown No. 45 (20 A) fuse.</li> <li>Faulty brake light switch.</li> <li>Blown brake light bulbs.</li> <li>Faulty brake light failure sensors.</li> <li>Poor ground (G501).</li> <li>An open in the ORN/WHT or GRN/WHT wire.</li> </ul>
4	BLU	Engine cover opened.	Check for continuity to ground: should be continuity.	<ul><li>Faulty engine cover switch.</li><li>An open in the wire.</li></ul>
5	GRN/BLK	Trunk lid openéd.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.34 (15 A) fuse.	<ul> <li>Faulty trunk latch switch.</li> <li>An open in the wire.</li> </ul>
8 F	RED/BLK and a RED	Lighting switch ON and dashlight bright- R ness control dial in full bright.	Check for voltage between ED/BLK (+) and RED (-) terminals: should be battery boltage.	<ul> <li>Faulty dashlight brightness control system.</li> <li>An open in the wire.</li> </ul>
	grn/Blu	Driver's door opened	Check for continuity to ground: should be continuity.	<ul><li>Faulty door switch.</li><li>An open in the wire.</li></ul>
7	GRN/RED	Passenger's door opened.	NOTE: Before testing, remove No. 34 (15 A) fuse.	
8	BLK/WHT	Dome light switch in MIDDLE position.	Connect to ground: Dome light should come on.	<ul> <li>Blown No. 34 (15 A) fuse.</li> <li>Faulty dome light.</li> <li>An open in the WHT/BLU or BLK/WHT wire.</li> </ul>
9	RED/YEL	Dissconnected the 14-P connector of retractor sub harness left or right.	* Connect the battery voltage to BLU/RED teminal (R. retractor) or BLU teminal (L. retractor), after about 4 seconds should be bat- tery voltage.	<ul> <li>Faulty retractable headlight control unit.</li> <li>Frozen, stuck, or improperly installed retractor likage.</li> </ul>

*: Terminal is floor wire harness side.

### - Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected	Blown No. 5 (10 A) fuse (in the dash fuse box)	Blown No. 34 (15 A) fuse (in the dash fuse box)	Safety indicator input	Safety indicator (diodes)	Blown bulb	Brake light failure sensor	Door switch	Trunk latch switch	Retractable headlight controll unit (See page 23-174)	Poor ground	Open circuit in wires or loose or disconnected terminals
No indicators operate.	1		2							G401 G402	YEL
Indicator panel illumination not lit with lighting switch ON.					1						<b>RED/BLK</b> or RED
Indicator lights fail to come on when ignition switch is turned to ON.			1								
Door warning lights not lit with doors opened.			2				1				GRN/BLU or GRN/RED
Trunk warning light not lit with trunk lid opened.		1	3					2			GRN/BLK
Brake Indicator light not lit with blown brake light bulb.			1								ORN/WHT
Brake Indicator light remains on with good brake light bulbs.			2			1				G501	or GRN
Dome light not on with door opened (When switch position is in MIDDLE).				1							BLK/WHT
Retractor     motor     Indicator     light       remains     on     with     good     retractor       motor.     1     1     1				2							
Retractor motor Indicator light not lit with faulty retractor motor (Stuck by foreign matter)			1						2		RED/YEL





### -Brake Light Failure Sensor Test -

- 1. First make sure the brake lights come on when the brake pedal is pressed.
  - If none of the brake lights come on, check the brake light circuit (See page 23-204).
  - If one of the brake lights does not come on, check whether the bulb is blown. If the bulb is OK, go to step 2.
  - If all the brake lights come on, go to step 2.
- 2. Open the trunk lid and remove the trim panel that covers the right taillight. Make sure the BRAKE LAMP of the safety indicator does not come on when the A(WHT/GRN) terminal of the 8-P connector is grounded and the ignition switch is turned OFF to ON.



View from wire side

- If the BRAKE LAMP comes on, check for an open in the A(WHT/GRN) wire between the safety indicator, the right failure sensor and whether the safety indicator circuit has a problem.
- If the <u>BRAKE LAMP</u> does not come on, go to step 3.
- 3. Make sure the <u>BRAKE LAMP</u> does not come on when the ignition switch is turned OFF to ON with the **B**(GRN) terminal of the 8-P connector grounded and the brake pedal pressed.
  - If the **BRAKE LAMP co**mes on, replace the right failure sensor.
  - If the BRAKE LAMP does not come on, go to step 4.

4. Remove the rear trim panel that covers the left taillight. Make sure the <u>BRAKE LAMP</u> does not come on when the ignition switch is turned OFF to ON with the A(GRN) terminal of the 8-P connector grounded and the brake pedal pressed.



- If the <u>BRAKE LAMP</u> comes on, there is an open in the A(GRN) wire between the left failure sensor and the right failure sensor.
- If the BRAKE LAMP does not come on, go to step 5.
- 5. Make sure the <u>BRAKE LAMP</u> does not come on when the ignition switch is turned OFF to ON with the B(BLK) terminal of the 8-P connector grounded and the brake pedal pressed.
  - If the BRAKE LAMP comes on, replace the left failure sensor.
  - If the BRAKE LAMP does not come on, check for an open in the B(BLK) wire between the left failure sensor and ground, and check whether the G501 terminal is poor.

# Shift Lever Position Indicator







# Shift Lever Position Indicator

### Indicator Input Test -

**AWARNING** All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when performing the Indicator input test.

Remove the gauge assembly from the dashboard and disconnect the 30-P connector from the gauge assembly. Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the main printed circuit panel, speedometer, tachometer and odo/tripmeter.





A-CONNECTOR 30-P CONNECTOR RED/BLK **GRN/YEL** YEL BLK RED LT GRN LT GRN/WHT łŧ ¥ YEL/BLU GRY/WHT GRN BRN/BLK LT BLU YEL/BLK View from wire side



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10 A) fuse.</li> <li>An open in the wire.</li> </ul>
	GRY/WH1	Shift lever position in P.	Check for continuity to ground:	Faulty shift position console switch
	LT BLU	Shift lever position in R.	should be continuity.	Poor ground (G401,G402).     An open in the wire
	GRN	Shift lever position in N.	-	
3	BRN/BLK	Shift lever position in 3.		
	GRN/YEL	Shift lever positon in 2.	Ť	
_	LT GRN/ WHT	Shift lever position in 1.		
4	GRN/BLU	Shift lever position in D.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty shift position console switch.</li> <li>Faulty A/T control system.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
5	RED/BLK and RED	Lighting switch ON and dashlight brightness con- trol dial on full bright.	Check for voltage between RED/BLK and RED terminals: should be battery voltage.	<ul> <li>Faulty dashlight brightness control system.</li> <li>An open in the wire.</li> </ul>
6	/EL/BLK	Ignition switch ON, shift lever positon in 2 or 3 and D switch ON.	Check for voltage to ground: should be about 5 V.	<ul> <li>Faulty D switch.</li> <li>Faulty shift position consle switch.</li> <li>Faulty A/T control system.</li> <li>An open in the wire.</li> </ul>
7	YEL/BLU	Ignition switch ON, shift lever position in 2 or 3 and D switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty D switch.</li> <li>Faulty shift position console switch.</li> <li>Faulty A/T control system.</li> <li>An open in the wire.</li> </ul>
8	LT GRN	Ignition switch ON.	Check for voltage to ground: should be about 5 V.	<ul> <li>Faulty PGM-FI ECU and A/T control unit.</li> <li>An open in the wire.</li> </ul>

# Shift Lever Position Indicator

### -Shift Position Console Switch Test -

#### CAUTION:

- All SRS electrical wiring harness& are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.
- 1. Remove the console, then disconnect the 12-P and 2-P connectors from the console switch.
- 2. Check for continuity between the terminals in each switch position according to the table.

#### NOTE:

- Move the lever back and forth without touching the push button at each switch position, and check for continuity within a range of free play of the shift lever.
- If there's no continuity within the range of free play, adjust the installation position of the console switch.

#### Shift Position Console Switch



Back-up Light Switch

Neutral Safety Switch

Terminal Position	8	1	2	3	4	5	6	7	11	9	10	13	14
1	0				_0								
2	0			-0		-0							
3	0		-0			-0							
D	0	_0				_0							
N	0											0	
R	0 —							-0		0 —	3		
Р	0_								_0			0 —	-0

#### Adjustment:

- 1. Shift to the "P" position, then loosen the bolts.
- Slide the switch in the direction of D position [within 2.0 mm (0.079 in)] so that there is continuity between No. 8 and No. 11 terminals (within the range of free play of the shift lever).
- 3. Recheck for continuity between each of the terminals.

NOTE:

- If adjustment is not possible, check for damage to the shift lever detent and/or bracket.
   If there is no damage, replace the console switch.
- The engine should start when the shift lever is in N position (within the range of free play).







# Integrated Control Unit

### -Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL' and YEL² are not the same).



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#### Description:

A multi-function control unit located on the left side kick panel integrates the functions of the entry light timer, key-on reminder, light-on reminder, seat belt reminder, oil pressure light, side marker light flasher, power window key-off timer and rear window defogger timer onto one circuit board, sharing common circuit functions.



# Integrated Control Unit

### - Input Test

#### CAUTION:

- All **SRS** electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

Remove the left side kick panel cover, and the dash relay holder from the bracket, to disconnect the 16-P connector from the integrated control unit.

Remove the integrated control unit from the dash fuse box.

Make the following input tests at the harness pins. If all tests prove OK, yet the system still falls to work, replace the control unit.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example  $YEL^1$  and  $YEL^2$  are not the same).



SRS MAIN WIRE HARNESS



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View from terminal side



#### Entry Light Timer System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)				
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401, G402).</li><li>An open in the wire.</li></ul>				
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>				
3	WHT/BLK	Under all conditions.	Connect to ground: Ignition key and foot lights should come on.	<ul> <li>Blown bulb or No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>				
4	GRN/BLU ²	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	<ul> <li>Faulty left door switch.</li> <li>An open in the wire.</li> </ul>				

#### Key-on Riminder System:

No. Terminal		Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>
3	GRN/BLU ²	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	<ul><li>Faulty left door switch.</li><li>An open in the wire.</li></ul>
4	BLU/GRN	Key inserted into the ignition switch.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty ignition key switch.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>

(cont'd)

# Integrated Control Unit

– In	- Input Test (cont'd)				
A7 A6 A6 A4 A3 A2 AI A7 A6 A6 A4 A3 A2 AI A14 A13 A12 AII A10 A9 A9 View from terminal side Lights-on Riminder System: WHT/BLU ² WHT/BLU ² ORN BLU/RED ORN BLU/RED ORN BLU/RED ORN BLU/RED ORN/BLU ² VIEW from terminal side BLU/VVFIT' PNK/BLU WHT/BLU ² ORN BLU/RED ORN/BLU ² VIEW from terminal side BLU/GRN View from wire side					
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>	
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (1 5A) fuse.</li> <li>An open in the wire.</li> </ul>	
3 i	gnitio A5	n switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50 A) fuse.</li> <li>An open in the wire.</li> </ul>	
4	GRN/BLU ²	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No. 34 (15A) fuse.	<ul><li>Faulty left door switch.</li><li>An open in the wire.</li></ul>	
5	A6	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 38 (15) fuse.</li> <li>Faulty lighting switch.</li> <li>An open in the wire.</li> <li>Faulty taillight relay.</li> </ul>	
6	ORN	Connect the A9 termi- nal to the ORN terminal.	Check chime operation: Chime should activate each time the battery is connected.	<ul><li>Faulty chime.</li><li>An open in the wire.</li></ul>	

Seat Belt Reminder System:

No. Terminal		Test condition	Test: desired result	Possible cause (if result is not obtained)
1	_A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 34 (15A) fuse.</li><li>An open in the wire.</li></ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50A) fuse.</li> <li>An open in the wire.</li> </ul>
4	BLU/YEL	Ignition switch ON.	Connect to ground: Seat belt warning light should come on.	<ul> <li>Blown No. 5 (10A) fuse.</li> <li>Blown bulb.</li> <li>An open in the wire.'</li> </ul>
5	A13	Driver's seat belt not buckled.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty seat belt switch.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>



Rea	A7 A14 r Window D	A6 A6 A4 A3 A2 AI A13 A12 A11 A10 A9 A 8 efogger Timer System: iew from terminal side	YEL/RED YEL ² BLU/WHT ¹ PN	U ² BLU/RED ORN GRN/RED WHT/GRN WHT/GRN WHT/BLK WHT/BLK View from wire side BLU/ ORN/BLK GRN ORN/WHT
No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50 A) fuse.</li> <li>An open in the wire.</li> </ul>
4	WHT/RED	Defogger switch pushed.	Check for continuity to ground: should be continuity as the switch is pushed.	<ul> <li>Faulty defogger switch.</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
5	A10	Ignition switch ON.	Connect to ground: Rear window defogger should work and the defogger switch indicator light should come on.	<ul> <li>Blown No. 4 (15 A) fuse.</li> <li>Faulty defogger relay.</li> <li>Blown bulb.</li> <li>An open in the wire.</li> </ul>

#### Oil Pressure Indicator System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401, G402).</li><li>An open in the wire.</li></ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 34 (15A) fuse.</li><li>An open in the wire.</li></ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50A) fuse.</li> <li>An open in the wire.</li> </ul>
4	WHT/BLU ²	Engine running.	Check for voltage to ground: should be battery voltage.	<ul><li>Faulty charging system.</li><li>An open in the wire.</li></ul>
	YEL/RED	Ignition switch OFF	Check for continuity to ground: should be continuity.	<ul><li>Faulty oil pressure switch.</li><li>An open in the wire.</li></ul>
5		Ignition switch ON.	Check light operation. If the light does not come on, attach the YEL/RED terminal to ground: Light should come on as the ignition switch is turned ON.	<ul> <li>Blown bulb.</li> <li>An open in the wire.</li> </ul>
		Start the engine.	Check for voltage to ground: should be battery voltage.	<ul> <li>Insufficient oil.</li> <li>Improper lubricaiton.</li> <li>Faulty oil pressure switch.</li> </ul>

# Integrated Control Unit

-Input Test (cont'd)				
A7 A8 A8 A4 A3 A2 AI A7 A8 A8 A4 A3 A2 AI A14 A13 A12 A11 A10 A9 A8 View from terminal side Side Marker Light Flasher System: WHT/BLU ² GRN/RED GRN/BLU ² VEL/RED VHT/BLU ² GRN/RED GRN/BLU ² VEL/RED VHT/BLU ² GRN/RED GRN/BLU ² VEL/RED VHT/BLU ² WHT/GRN VHT/BLK PNK/BLU BLU/YEL BLU/GRN View from wire side View from wire side				
No.	Terminal	Test condition	Test: desired result	Possible cause (If result is not obtained)
1	<b>A8</b>	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401, G402).</li><li>An open in the wire.</li></ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50 A) fuse.</li> <li>An open in the wire.</li> </ul>
4	A6	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 38 (15A) fuse.</li> <li>Faulty lighting switch.</li> <li>An open in the wire.</li> </ul>
5	AII	Ignition switch ON and turn signal switch in left position.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 46 (10A) fuse.</li> <li>Faulty turn signal system.</li> <li>An open in the wire.</li> </ul>
6	A3	Ignition switch ON and turn signal switch in right position.		
7 8	PNK/BLU r BLU/WHT י	Connect the A9 termi- al to the PNK/BLU (or BLU/WHT) termi- a I	Check marker light operation: left (or right) front side marker light should come on.	<ul> <li>Blown bulb.</li> <li>Poor ground (G301).</li> <li>An open in the wire.</li> </ul>

Power Window key-off Timer System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401, G402).</li><li>An open in the wire.</li></ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (1 5A) fuse.</li> <li>An open in the wire.</li> </ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50A) fuse.</li> <li>An open in the wire.</li> </ul>
4	GRN/BLU	Left door opened.	Check for continuity to ground: should be continuity.	<ul><li>Faulty door switch.</li><li>An open in the wire.</li></ul>
5	GRN/RED	Right door opened.	NOTE: Before testing, remove No. 38 (15A) fuse.	
6	A14	Connect the A9 termi- nal to the Al4 terminal.	Check window operation: Power windows should operate.	<ul> <li>Faulty power window relay.</li> <li>Poor ground (G201).</li> <li>An open in the wire.</li> </ul>

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View from terminal side



Wiper System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	A8	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	A9	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 34 (15A) fuse.</li> <li>An open in the wire.</li> </ul>
3	A5	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) or No. 29 (50 A) fuse.</li> <li>An open in the wire.</li> </ul>
4	BLU/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 26 (40A) fuse.</li> <li>Faulty intermittent relay.</li> <li>An open in the wire.</li> </ul>
5	YEL ²	Ignition switch ON. and wiper switch INT.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 6 (7.5A) fuse.</li> <li>Faulty wiper switch.</li> <li>An open in the wire.</li> </ul>
6	A4	ignition switch ON and washer switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 6 (7.5A) fuse.</li> <li>Faulty washer switch.</li> <li>An open in the wire.</li> </ul>
7	AI and A2	Intermittent dwell time control ring turned.	Check for resistance between the AI and A2 terminals: should vary from 0 to 25,000 ohms as the ring is turned.	<ul> <li>Faulty intermittent dwell time controller.</li> <li>An open in the wire.</li> </ul>
8	A7	Ignition switch ON, wiper switch OFF	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty wiper motor (automatic- stop circuit).</li> <li>An open in the wire.</li> </ul>

# Lights-on Reminder System

### -Description

NOTE: Refer to page 23-158 for wiring description of the lights-on reminder circuit, and page 23-162 for the input test of the circuit.

When the ignition key is turned to "0" position and removed, with the lights on, voltage is applied to the reminder circuit on the integrated control unit. When you open the driver's door, the circuit senses ground through the closed door switch.

With voltage at the "A6" terminal, ground at the "B2" terminal and no voltage at the "A5" terminal, the chime is activated to remind the driver to turn off the lights.

### -Chime Test

- 1. Remove the dashboad lower panel, then disconnect the 2-P connector from the foot light.
- 2. Disconnect the 2-P connector from the floor wire harness.
- 3. Test chime operation by connecting battery positive to the ORN terminal, and negative to the BLK terminal, and cycling the power on-off repeatedly.
- 4. If the chime fails to sound every time power is cycled, replace it.




## Key-on Reminder System

#### - Description -

NOTE: Refer to page 23-I 58 for wiring description of the key-on beeper circuit, and page 23-I 60 for input test of the beeper circuit.

When the ignition key is not removed, the key-on beeper in the integrated control unit senses ground through the closed ignition key switch. When you open the driver's door, the beeper circuit senses ground through the closed door switch. With ground at thee "AI 1" and "B2" terminals, the beeper sounds.

#### -Ignition Key Switch Test

- 1. Remove the dashboad lower panel and dashboard center panel.
- 2. If necessary, remove the knee bolster.

is removed.

- 3. Disconnect the 8-P connector from the floor wire harness.
- There should be continuity between the No. 8 and No. 7 terminal when the ignition key is inserted into the ignition key cylinder. There should be no continuity when the ignition key







### -Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for ex-ample BLU' and  $BLU^2$  are not the same).



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## Lighting System -Retractable Headlight Control Unit Input Test _____

Remove the bulkhead panels and disconnect the 18-P connector from the control unit. Make the following input tests at the harness pins.

#### NOTE:

- Recheck the connections between the 13-P connector and control unit. then replace the control unit if all input tests prove OK.
- Several different wires have the same color. They have been given a number suffix to distinguish them (for example RED/YEL¹ and RED/YEL⁴ are not the same).





No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK ¹	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401).</li><li>An open in the wire.</li></ul>
-	BLK ²			<ul><li>Poor ground (G403).</li><li>An open in the wire.</li></ul>
2	RED/GRN ²	Lighting switch OFF and retractor switch OFF.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 42 (15 A) and No. 43 (15 A) fuses.</li> <li>Faulty retractor switch or lighting switch.</li> <li>An open in the wire.</li> </ul>
3	WHT/GRN	Retractor switch OFF.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 42 (15 A) and No. 43 (15 A) fuses.</li> <li>Faulty retractor switch.</li> <li>An open in the wire.</li> </ul>
4	YEL/WHT	Retractor switch ON.	Check for voltage to ground: should be battery voltage.	<ul><li>Faulty retractor switch.</li><li>An open in the wire.</li></ul>
5	PNK/BLK	Lighting switch <i>'' • ''.</i> (headlights on)	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 43 (15 A) fuse.</li> <li>Faulty lighting switch.</li> <li>An open in the wire.</li> </ul>
6	RED/YEL ¹	Lighting switch " • ". (headlights on)	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty lighting relay or lighting switch.</li> <li>Blown No. 52 (20 A) fuse.</li> <li>An open in the wire.</li> </ul>
0	RED/GRN ¹			<ul> <li>Faulty lighting relay or lighting switch.</li> <li>Blown No. 49 (20 A) fuse.</li> <li>An open in the wire.</li> </ul>
7	LT GRN/ RED	Passing switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty lighting relay or dimmer relays.</li> <li>Blown No. 49 (20 A) and No. 52 (20 A) fuses.</li> <li>Faulty lighting switch.</li> <li>An open in the wire.</li> </ul>
R	BLU/RED t	Retractor motor sta- ionary.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 42 (15 A) fuse.</li> <li>Faulty R. retractor relay.</li> <li>An open in the wire.</li> </ul>
D	BLU'			<ul> <li>Blown No. 43 (15 A) fuse.</li> <li>Faulty L. retractor relay.</li> <li>An open in the wire.</li> </ul>
9	YEL	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty R. retractor cut relay.</li> <li>Poor ground (G202).</li> <li>An open in the wire.</li> </ul>
5	YEL/GRN			<ul> <li>Faulty L. retractor cut relay.</li> <li>Poor ground (G202).</li> <li>An open in the wire.</li> </ul>

## - Daytime Running Light Control Unit Input Test-

Remove the glove box lower panel and glove box. Disconnect the 8-P and 4-P connectors from the daytime running light control unit.

Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the control unit.



DAYTIME RUNNING LIGHT

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401)</li><li>An open in the wire.</li></ul>
2	PNK/WHT	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 44 (10A) fuse.</li><li>An open in the wire.</li></ul>
3	BLK/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 3 (7.5A) fuse.</li><li>An open in the wire.</li></ul>
4	PNK/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 43 (15A) fuse.</li> <li>Faulty lighting switch.</li> <li>An open in the wire.</li> </ul>
5	YEL/BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Blown daytime running light bulbs.</li> <li>Poor ground (G301).</li> <li>An open in the wire.</li> </ul>
6	GRN/RED	Ignition switch ON.	Connect to ground: Brake light bulb failure light should come on.	<ul> <li>Blown No. 5 (10 A) fuse.</li> <li>Blown bulb.</li> <li>An open in the wire.</li> </ul>
7	GRNNEL (	Parking brake switch N (parking brake lever up).	Check for continuity to ground: should be continuity.	<ul><li>Faulty parking brake switch.</li><li>An open in the wire.</li></ul>





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- 6. Remove the 4 screws from the lighting switch.
- 7. Disconnect the 1 O-P connector from the cancel unit, then remove the lighting switch.



8. If necessary, remove the cancel unit and cancel switch.



TURN SIGNAL

TURN SIGNAL CANCEL SWITCH

- Lighting Switch Light Bulb Replacement -
- 1. Remove the steering coloumn covers.
- 2. Remove the 2 screws.



- 3. Slide the lighting switch out of the housing as shown.
- 4. Remove the bulb from the lighting switch by turning the bulb  $45^{\circ}$ .











- 1. Remove the retractor switch.
- 2. Check for continuity between the terminals in each switch position according to the table.

Retractor Switch

#### Switch lights terminals: F and E



### Retractor Switch Light Bulb Replacement -

- 1. Remove the retractor switch.
- 2. Turn the socket  $45^{\circ}$  counterclockwise to remove it.



## Retractor Motor Replacement

#### CAUTION:

- Halogen headlights can become very hot in use: do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean headlights with the lights on.
- 1. Remove the No. 42 (15 A, R. Retractor motor) and No. 43 (15A, L. Retractor motor) fuses in the main relay box.



MAIN RELAY BOX

2. Turn the knob clockwise to raise the headlight.



3. Remove the 2 caps and 4 screws and cowl clips.



4. Slide the headlight garnish upward to remove it.

NOTE: Be careful not to damage the front bumper or the headlight garnish when upward to remove it.



HEADLIGHT GARNISH

PROTECTIVE TAPE

- 5. Disconnect the 6-P connector from the headlight unit.
- 6. Remove the 4 mounting bolts, then remove the unit.



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- 11. Install in the reverse order of the removal, and:
  - Make sure there is no interference between the wire harness and linkage.
  - Coat the joint with grease and make sure the linkage moves smoothly.

## -Adjustment

1. Remove the stopper caps.



- 2. Adjust the stopper bolt A and B.
- 3. Adjust the stopper bolt C fore or aft until the headlight garnish fits flush with the front fender when the headlights are closed.



## -Adjustment (cont'd)

4. Adjust the retractor motor fore or aft until the headlight garnish fits flush with the front fender when the headlight are closed.

NOTE: Be careful not to damage the headlight garnish.



## - Retractor Motor Test -

- 1. Remove the retractor motor.
- 2. Test motor operation by connecting battery positive wire to the A terminal and negative to the D terminal. The motor should run continuously.
- 3. If the motor fails to run smoothly, replace it.



4. Disconnect the power supply and check for continuity between the terminals according to the table while turning the knob clockwise, as shown above.

Terminal Position	B	C			Ē	F
At closed position	γ	٩	<b>Å Å</b>	<b>▲</b>		-0
At opened position	0-	9	<b>₹</b> ¥	₩	Ŷ	





## - Lighting Relay Test

- - $1. \quad \text{Remove the lighting relay from the main relay box.}$
  - 2. There should be continuity between the C and D terminals.
  - 3. There should be continuity between the A and B terminals when the battery is connected to C and D terminals.

There should be no continuity when the battery is disconnected.





## - Dimmer Relay Test -

- 1. Remove the dimmer relay from the main relay box.
- 2. There should be continuity between the F and E terminals and between the B and C terminals.
- There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.

There should be no continuity when the battery is disconnected.



-Retractor Relay Test

- 1. Remove the retractor relay (located in the right side of the front compartment area).
- 2. There should be continuity between the E and F terminals and between the B and C terminals.
- There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   There should be no continuity when the battery is

disconnected.

## - Retractor Cut/Taillight Relay Test -

- 1. Remove the retractor cut relay from sub relay box A.
- 2. There should be continuity between the C and D terminals.
- 3. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.





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# Headlights





The light first forms a basic pattern A after being interrupted by the interrupter plate and passed through the convex lense. The interrupter plate determines the form. The outer lense distributes the light into the pattern B.





# Headlights



## Headlight Replacement .





- Halogen headlights can become very hot in use: do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.
- 1. Remove the No. 42 (15 A, R. Retractor motor) and No. 43 (15A, L. Retractor motor) fuses in the main relay box.



MAIN RELAY BOX

2. Turn the knob clockwise to raise the headlight.



3. Remove the 2 caps and 4 screws and cowl clips.



4. Slide the headlight garnish upward to remove it.

NOTE: Be careful not to damage the front bumper or the headlight garnish when removing it.



- 5. Disconnect the 6-P connector from thee headlight unit.
- 6. Remove the 4 mounting bolts, then remove the unit.



7. After installing the unit, adjust the headlights to local requirements.

# Headlights

## Bulb Replacement -

#### CAUTION:

- Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.
- 1. Remove the cover cap.
- 2. Disconnect the 2-P connector, then remove the retaining spring and bulb.

NOTE: If necessary, remove the headlight garnish.



# Daytime Running Lights (CANADA)

## - Replacement -

1. Remove the bolt and pull out the daytime running light, then disconnect the 2-P connector.





2. If necessary, remove the bulb.

# Front Turn Signal/Front Position Lights

- Replacement
  - 1. Remove the screw and pull out the light assembly from the front bumper.



- 2. Disconnect the 2-P connectors from the bulb sockets.
- 3. Turn the bulb socket 45° counterclockwise to remove it from the housing.



# Front Side Marker Lights



- Replacement -
- 1. Carefully pry out the front side marker light from the front fender.

NOTE: Be carefully not to damage the front side marker light or the front fender when prying out the front side marker light.



- 2. Disconnect the 2-P connector from the front side marker light.
- 3. Turn the bulb socket 45° counterclockwise to remove it from the housing.



# Taillights



## Bulb Replacement -

- 1. Open the trunk lid and rear trim panel.
- Turn the socket 45° counterclockwise to remove it from the taillight housing.



- 1 : TURN SIGNAL LIGHT BULB (45CP)
- DRAKE LIGHT/TAILLIGHT
- (3)⁴ BULBS (43CP/3CP)
- (4) : TAILLIGHT BULB (3CP)
- (5) : BACK-UP LIGHT BULB (45Cp)
- Remove the bulbs from the socket.

# - +

# **Rear Side Marker Lights**

### Replacement -

1. Carefully pry out the rear side marker light from the rear fender.

NOTE: Be carefully not to damage the rear side marker light or the rear fender when prying out the rear side marker light.



- 2. Disconnect the 2-P connector from the rear side marker light.
- 3. Turn the bulb socket 45° counterclockwise to remove it from the rear side marker light.

## License Plate Lights

## Replacement

1. Remove the 8 screws and disconnect the 4-P connector.



2. Turn the bulb socket 45° counterclockwise to remove it from the housing.





# Glove Box Light

## Replacement/Test

- 1. Remove the glove box lower panel.
- 2. Remove the 8 screws then pull out the glove box.
- 3. Disconnect the 2-P connectors then remove the glove box.



4. Remove the 2 screws from the glove box light.



5. Theres should be continuity between the A terminal and B terminal with a bulb installed. There should be no continuity when the switch is pushed.





# Dome/Courtesy/Trunk Lights



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## Dome Light Test/Replacement -

- Turn the light switch OFF. 1.
- Pry off the lens. 2.
- Remove the 2 bolts and the housing. 3.
- Disconnect the 4-P connector from the housing. 4.





View from terminal side

ON

Ю

8

C'



5. Check for continuity between the terminals in each switch position according to the table.

Position	<u>Termin</u> al	A (A')	B (B')	с (С')		D	E	F	G
OFF DOOR		0			0	Ò			0
			0		•	0	0		0
0	ON			0	•	0			0
	ON					0		0	
SW1	OFF								
044 0	ON					0		0	
3W 2	OFF								

# **Dome/Courtesy/Trunk Lights**

## - Courtesy Light Test/Replacement -

NOTE: The bulb or lens alone can be replaced without having to remove the door trim panel.

- 1. Remove the door trim panel.
- 2. Remove the 2 screws and the retainer plate to remove the light from behind the door trim panel.
- 3. Make sure that the bulb is in good condition. Check for continuity between the terminals.

NOTE: Do not connect the tester probes in the wrong polarity because there is a diode inside the courtesy light.



#### - Door Switch Test

NOTE: Be careful not to damage the door trim panel when remove it.

- 1. Remove the door trim panel.
- 2. Disconnect the 2-P connector from the door switch.



- 3. There should be continuity between the A terminal and B terminal with the switch released [door opened).
- 4. There should be no continuity with the switch pushed (door closed).





# Trunk Light Test/Replacement — NOTE: The bulb or lens alone can be replaced without having to remove the trunk side trim panel. 1. Remove the trunk side trim panel. Disconnect the 3-P connector from the housing. 2. Remove the 2 screws and the retainer plate to re-3. move the light from the trunk side trim panel. Make sure that the bulb is in good condition. 4. Check for continuity between the terminals. NOTE: Do not connect the tester probes in the wrong polarity because there is a diode inside the trunk light. TRUNK SIDE PANEL RETAINER PLATE BULB (3.4W) HOUSING LENS From NO.34(15A)FUSE

(3.4W)

To GROUND(G501)

## Latch Switch Test/Replacement ----

- 1. Open the trunk lid and remove the trunk rear trim panel.
- $\mbox{2. Disconnect the $3$-P connector from the trunk latch. } \label{eq:2.1}$
- 3. There should be continuity between the A terminal and body ground. Theree should be continuity when the latch is open position.



- 4. If necessary, disconnect the lock rod from the latch, then remove the 2 bolts to pull out the latch from the trunk rear panel.
- 5. Disconnect the trunk opener cable from the latch.

# **Back-up Lights**

## - Component Location Index





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## Back-up Lights

Test

#### Automatic Transmission: Manual Transmission: NOTE: Check the No. 5 (10 A) fuse in the dash fuse box NOTE: Check the No. 5 (10 A) fuse in the dash fuse box before testing. before testing. Test the back-up light switch by shifting the select 1. Test the back-up light switch by placing the select lever to "R" and turning the ignition switch ON. 1. lever in reverse and turning the ignition switch to ON. 2. If the back-up lights do not go on, check the backup light bulbs in the taillight assembly. 2. If the back-up lights do not go on, check the backup light bulbs in the taillight assembly. If the fuse and bulbs are OK, remove the center con-3. sole, then disconnect the 12-P connector from the shift position console switch (back-up light switch). 3. If the fuse and bulbs are OK, disconnect the connector from the back-up light switch. CAUTION: Do not damage the yellow-covered SRS wiring. SWITCH 25 N·m (2.5 kg-m, 18 lb-ft) This washer must always be replaced for the switch to function properly and to prevent oil leaks. 1 2 3 4 5 6 7 8 9 101112 View from wire side CONSOLE SWITCH B(GRN/BLK) 4. Check for continuity between No. 9 and No. 10 ter-A(YEL) minals. Move the lever back and forth without touch-TRANSMISSION CASE ing the push button at the "R" position, and check for continuity within the range of free play of the shift lever. 4. Check for continuity between the A and B wires with the switch installed in the transmission case. There • If there is no continuity within the range of free should be continuity as the select lever engages "R". play, adjust the installation position of the con-• If there is no continuity, replace the switch. sole switch (see page 23-I 56). If there is continuity, but the back-up lights do not . • If there is continuity, but the back-up lights do not go on, inspect for: go on, inspect for: - Poor ground (G 501). - An open in the YEL or GRN/BLK wire. - An open in the YEL or GRN/BLK wire.
# **Brake Lights**







# **Brake Lights**





#### - High Mount Brake Light Test -

- 1. Open the trunk lid and engine cover.
- 2. Disconnect the 2-P connector from the trunk wire harness.

#### View from terminal side



- Connect voltmeter positive probe to the GRN/WHT terminal, negative probe to BLK terminal. When the brake pedal is pushed, check for voltage between GRN/WHT and BLK terminals. There should be voltage.
  - If there is no voltage, check for:
  - Blown No. 45 (20 A) fuse in the main relay box.
  - An open in th GRN/WHT or BLK wire.
  - Faulty brake light switch.
  - If there is battery voltage, go to step 4.
- Connect battery positive to GRN/WHT terminal, negative to BLK terminal. Check go on all the LEDs of the high mount brake

light.

- If the high mount brake light does not go on, check for an open in the wires in the trunk lid. If the wires in the trunk lid are OK, replace the high mount brake light.
- 5. If some of the high mount brake light LEDs do not go on, replace the high mount brake light assembly.

## **Brake Lights**



#### - Rear Spoiler Replacement

CAUTION: Be careful not to damage the high mount brake light, rear spoiler and trun lid.

- 1. Open the trunk lid.
- 2. Remove the 6 mounting nuts.



- Carefully pull out the spoiler assembly from the rear trunk lid.
- 4. Disconnect the 2-P connector from the trunk sub wire harness.



2-P CONNECTOR (trunk sub wire harness side)

## Side Marker/Turn Signal/Hazard Flasher System





## Side Marker/Turn Signal/Hazard Flasher System

# - +



## Side Marker/Turn Signal/Hazard Flasher System

#### -Description

To cope with dimentional requirements for the airbag components and to offer better operational feel, the turn signal lever and the cancel mechanism are separated mechanically, and connected electrically instead.

The system cancels the turn signals electrically, by means of a solenoid, when a turn is accomplished. To monitor the steering, a sensor mechanism which consists of cancel cams on the steering shaft and a switch, is used.





Around the steering shaft, a cam plate is installed. Beside it, a pair of switches (A and B) are installed.
 @When the steering is turned in direction of the arrow, switch A turns on first.
 Then switch B turns on.







By this pattern, steering rotation is monitored.

R. turn signal



L. turn signal



## Side Marker/Turn Signal/Hazard Flash System



### -Cancel Unit Input Test-

Remove the steering column covers. Disconnect the 10-P connector from the cancel unit. Make the following input tests at the 1 O-P connector terminals.

If all tests prove OK, but the turn signal lights fails to work, replace the cancel unit.

IO-P CONNE CTOR IO-P CONNE CTOR IO-P CONNE CTOR IO-P CONNE CTOR C3(ORN) C9(GRN/BLK) C5(PLUR) C3(ORN) C5(PLUR) View from wire side C10(BLK) C6(G RY) C3(ORN) C3(ORN) C3(ORN) C5(PLUR) C3(ORN) C5(PLUR) C3(ORN) C5(PLUR) C3(ORN) C5(PLUR) C3(ORN) C3(ORN) C5(PLUR) C5(PLUR) C3(ORN) C5(PLUR) C5(PLUR) C3(ORN) C5(PLUR) C5(PLUR) C3(ORN) C5(PLUR) C3(ORN) C5(PLUR) C5(PLUR) C3(ORN) C5(PLUR) C5(PLUR) C3(ORN) C5(PLUR) C

CANCEL UNIT

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	C10 (BLK)	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402)</li> <li>An open in the wire.</li> </ul>
2	CI (YEL)	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	<ul><li>Blown No. 5 (10A) fuse.</li><li>An open in the wire.</li></ul>
3	c5 (PUR)	Lighting switch (•)	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty lighting switch or taillight relay.</li> <li>An open in the wire.</li> </ul>
4	c 2 (BRN)	Turn signal switch (R.)	Check for continuity between the C2 and C6 terminals: should' be continuity.	<ul><li>Faulty turn signal switch.</li><li>An open in the wire.</li></ul>
	C6 (GRY)			
5	c2 (BRN)	Turn signal switch (L.)	Check for continuity between the C2 and C9 terminals: should be continuity.	<ul><li>Faulty turn signal switch.</li><li>An open in the wire.</li></ul>
	C9 (GRN/BLK)			
6	c 3 (ORN)	Under all conditions.	Check for continuity between the C3 and C4 terminals:	<ul> <li>Faulty turn signal switch solenoid.</li> <li>An open in the wire.</li> </ul>
	c4 (WHT)		should be continuity.	
7	c7 (BUL/YEL)	Connect the CI terminal to the C7 terminal then ignition switch ON.	R. turn signal lights should come on as the battery con- nected.	<ul> <li>Blown bulb.</li> <li>* Faulty turn signal/hazard relay.</li> <li>Poor ground (G301, G401, G403, G501)</li> <li>An open in the wire.</li> </ul>
	C8 (BLU/GRN)	Connect the CI terminal to the C8 terminal then ignition switch ON.	L. turn signal lights should come on as the battery con- nected.	<ul> <li>Blown bulb.</li> <li>* Faulty turn signal/hazard relay.</li> <li>Poor ground (G301, G401, G402, G501).</li> <li>An open in the wire.</li> </ul>

## Side Maker/Turn Signal/Hazard Flasher System

-Hazard Switch Removal





#### Hazard Switch Light Bulb Replacement -

- 1. Remove the steering column covers.
- 2. Remove the 3 screws.



3. Remove the 2 screws.



- 4. Side the hazard switch out of the housing as shown.
- 5. Remove the bulb from the hazard switch by turning the bulb  $45^{\circ}$ .



#### 'Hazard Switch Test

- 1. Remove the dashboard lower panel (see page 23-214).
- 2. Disconnect the 18-P connector from the floor wire harness.
- 3. Check for continuity between the terminals in each switch position according to the table.









## Dashlight Brightness Control

Lighting switch ON.

Adjusting dial rotated.



Attach to ground: dashlights

Check for resistance between

the RED/GRN and RED/WHT

terminals: should vary from 0

to 24,000 ohms as the dial is

rotated.

should come on full bright.

• An open in the RED/BLK or RED

wire.

• Faulty controller.

• An open in the wire.

3

4

RED

**RED/GRN** 

and

RED/WHT



#### Controller Removal —



## Dashlight Brightness Control

#### Controller Test

- 1. Remove the dashlight brightness controller from the instrument panel.
- 2. Measure resistance between A and **B** terminals while rotating the adjusting dial.

Resistance should vary from 0 to 24,000 ohms as the dial is rotated.

NOTE: Resistance will vary slightly with temperature.

#### RETRACTOR SWITCH



Dashlight brightness controller



## Controller Light Bulb Replacement -

- 1. Remove the dashlight brightness controller.
- 2. Turn the socket **45°** counterclockwise to remove it.





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## Entry Light Timer System

Circuit Diagram







## Clock









## Cigarette Lighter



23-226



#### - Replacement -



- 6. Disconnect the thermo fuse case from the socket end.
- 7. Remove the ring nut and separate the cigarette lighter socket from the thermal protector.
- 8. When installing the cigarette lighter, align each lug on the face panel, illumination ring and cigarette lighter socket with the groove of the hole, then position the bulb case on the thermal protector between the stoppers of the center console panel.
- 9. Make sure that the ground wire, bulb socket and thermo fuse case are seated to the cigarette lighter assembly.



#### - Relay Test -

- 1. Remove the glove box (see section 20).
- 2. Disconnect the 4-P connector from the cigarette lighter relay. (Wire colors of 4-P conneclor: BLU/GRN, YEL/RED, BRN/YEL, BLK)
- There should be continuity between the A and B terminals when the battery is conencted to the C and D terminals.
   there should be no continuity when the battery is dis-





## Stereo Sound System





# Stereo Sound System

#### Unit Removal -

#### CAUTION:

- All SRS electrical wiring harnesses are covered with yellow outer insutation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.





1. Remove the clock.



2. Remove the 2 screws, then remove the center air vent.



3. Take out the ashtray. Remove the 2 screws under the ashtray.



4. Remove the 4 screws, then remove the center armrest.



**CENTER ARMREST** 



5. Remove the 3 screws and center console panel, then disconnect the 3-P connector and 4-P connector from the floor wire harness.



6. Remove the 4 screws, then disconnect the 14-P and 30-P connectors from the floor wire harness. Take out the climate control unit.



7. Remove the 4 screws, then disconnect the 16-P connector, mast antenna lead and window antenna lead. Take out the stereo radio/cassette player.



## Stereo Sound System



С



## - Power Antenna Motor Replacement

1. Open the trunk lid and remove the side trim panel.

2. Disconnect the 4-P connector and antenna lead from the motor, then remove the special nut and 3 mount-ing nuts to take out the motor.



#### - Front Speaker Replacement

- 1. Remove the door trim panel (see section 20).
- 2. Remove the door speaker assembly from the door panel by removing the 5 screws.



## Stereo Sound System



#### Foot Well Bass Speaker Replacement

- 1. Pull the right front floor carpet back.
- 2. Remove the foot well bass speaker cover.



3. Disconnect the 2-P and 6-P connectors, then remove the 2 bolts from the EPS power unit. Remove the foot well bass speaker assembly.



## Horns



### - Component Location Index _____

SRS wire harness is routed near the horns and related parts (SRS wire harness locations, page 23-323).

A WARNING All SRS wire harnesses and connections are colored yellow. Do not use electrical test equipment on these circuits.



#### Description

Security Alarm System:

The security alarm system is an anti-theft alarm system. If someone tries to open the trunk, hood or either door without the ignition key, the security control unit senses a signal from the sensors and activates relays to flash the headlights and sound the horn for about two minutes.

Horns




### - Horn Test

- 1. Disconnect the 2P connector from the horn.
- 2. Remove the right and left horns.



**RIGHT** HORN

Security Horn:



3. Test the horn by connecting battery voltage to the A and B terminals. The horn should sound.



4. If the horn fails to sound replace it.

## Horns

#### - Relay Test

- 1. Open the hood and remove the horn relay from sub relay box A.
- 2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.





#### Switch Test

A WARNING Store a removed airbag assembly with the pad surface up. If the airbag is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

#### CAUTION:

- Carefully inspect the **airbag** assembly before installing. Do not install an **airbag** assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassembly or tamper with the airbag assembly.
- Disconnect the battery negative terminal and then disconnect the positive terminal.
- 2. Make sure the wheels are aligned straight forward.
- 3. Remove the dashboard lower panel.
- 4. Remove the steering wheel maintenance lid A, and disconnect the cable reel harness and airbag assembly 2P connector. Connect the short connector (Red) to the airbag connector.



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5. Disconnect the cable reel harness and main harness's 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.



- 6. Check for countinuity between the No. 3 terminal and body ground with the horn switch pressed. There should be continuity.
  - If there is continuity, the horn switch is OK.
  - If there is no coutinuity, go to step 7.

7. Remove the TORX[®] bolts using TORX[®] T30 bit, then remove the airbag assembly.



8. Check for continuity between the horn positive terminal and the steering column shaft with the horn switch pressed.

There should be no continuity.



(cont'd)

## Horns



## Trunk Opener





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### 23-246





### Solenoid Test/Replacement

- 1. Open the trunk lid and remove the trunk side trim
- Disconnect the Z-P connector from the solenoid.
- Test the solenoid operation by connecting battery voltage to the A and B terminals momentarily.



4. If necessary, remove the 2 bolts, then disconect the trunk opener cable from the solenoid assembly.



### **Power Door Mirrors**







### **Power Door Mirrors**

#### Function Test

NOTE: Before testing, remove the left door trim panel, then disconnect all of the connectors from the door trim panel.



Mirror Test:

NOTE: Check the No. 4 (15A) fuse in the dash fuse box before testing.

One or both inoperative:

- 1. Check for voltage between the YEL/BLK¹ terminal and body ground with the ignition switch ON. There should be battery voltage.
  - If there is no voltage, check for an open in the YEL/BLK¹ wire.
  - If there is battery voltage, go to step 2.

2. Check for continuity between the BLK teminal and body ground.

There should be continuity.

- If there is no continuity, check for:
  - An open in the BLK wire.
  - Poor ground (G401).

Left inoperative:

Connect the YEL/BLK¹ terminal to the YEL/RED terminal and the YEL/WHT (or YEL/BLK²) terminal to the body ground with jumper wires.

The left mirror should tilt down (or swing left) when the ignitin switch is turned ON.

- If the mirror does not tilt down (or does not swing left), remove the left door trim panel and check for open in the YEL/WHT (or YEL/BLK²) wire between the left door mirror and switch. If the wire is OK, check the left door mirror.
- If the mirror neither tilts down nor swings left, repair the YEL/RED wire.
- If the mirror operates properly, check the mirror switch.

Right inoperative:

Connect the YEL/BLK¹ terminal to the BLU/GRN terminal and the YEL/WHT (or BLU/BLK) teminal to the body ground with jumper wires. The right mirror should tilt down (or swing left) when the

ignition switch is turned ON.

 If the mirror does not tilt down (or does not swing left), remove the right door trim panel and check for open in the YEL/WHT or BLU/BLK) wire between the right door mirror and the switch.
 If the wire is OK check the right door mirror.

If the wire is OK, check the right door mirror.

- If the mirror neither tilts down nor swings left, repair the BLU/GRN wire.
- If the mirror operates properly, check the mirror switch.



#### - Switch Removal

- 1. Remove the left door trim panel, then disconnect all of the connectors from the door trim panel (see section 20).
- 2. Remove the 3 screws, then remove the mirror switch from the armrest.



### Switch Test

- 1. Remove the power door mirror switch from the arm-rest.
- 2. Check for continuity between the terminal in each switch position according to the table.

Mirror Switch





## **Power Door Mirrors**

### Door Mirror Test

- 1. Remove the door trim panel and carefully remove the plastic cover (see section 20).
- 2. Disconnect the power mirror 3-P connector.
- 3. Test actuator operation:

TILT UP:	Connect battery positive to the
	No. 3 terminal and negative to the
	No. 2 terminal.
TILT DOWN:	Connect battery positive to the
	No. 2 terminal and negative to the
	No. 3 terminal.
SWING LEFT:	Connect battery positive to the
	No. 2 terminal and negative to the
	No. 1 terminal.
SWINC DICUT.	Connect bottom, positive to the No.

. .

- SWING RIGHT: Connect battery positive to the No. 1 terminal and negative to the No. 2 terminal.
- 4. If the mirror fails to operate properly, replace it.



### Door Mirror Replacement

- 1. Remove the door trim panel and carefully remove the plastic cover (see section 20).
- 2. Disconnect the power mirror 3-P connector.
- 3. Remove the 2 mounting nuts while holding the mirror.

DOOR MIRROR



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## Power Door Locks





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### Power Door Locks

#### Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example  $GRN/YEL^1$  and  $GRN/YEL^2$ ,  $BLU/RED^1$  and  $BLU/RED^2$  are not the same).



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### Troubleshooting

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NOTE: The numbers in the table show the troubleshooting sequence.

Item to be	inspected	Blown No. 35 (20A) fuse (in the main relay box)	Disconnected or obstructed door lock rod/linkage	L. Door lock knob switch (in the left door lock actuator)	lanition kev switch	L. VOOR SWITCH	L. Door lock actuator	R. Door lock actuator	- Door lock switch	R. Door lock switch	Control unit input	Poor ground	Open circuit in wires or loose or disconnected terminals
Symptom Power door lock system	doesn'	1							1	ŀ	2	G401	ORN
operate at all. Doors don't lock or	Both				-				-	-		G402 G401	
unlock with the left	doors								-	١	2	G402	
door lock switch.	Either door		1				:	2			3		WHT/RED, or YEL/RED
Doors don't lock or unlock with the right	Both doors							-		1	2		BLK/RED or BLK/WHT
door lock switch.	I - \$ & - ⁻ door		1				2	• <u>&gt;</u>	-	-	3		WHT/RED or YEL/RED
Doors don't lock or unlock with the left	Both door			1		-				-	2	G401 G402	BLU/WHT or BLU/RED
door lock knob. Either door			1				2	2			3		WHT/RED or YEL/RED
The door is not supposed to be locked, but it is locked. (When the ignition key is inserted and the door is opened.)					1	2					3	G401 G402	BLU/GRN or GRN/BLU

## Power Door Locks

## - Control Unit Input Test Remove the glove box, then disconnect the 18-P connector from the control unit. Make the following input tests at the harness pins. NOTE: • Recheck the connections between the 18-P connector and the control unit, then replace the control unit if all input tests prove OK. POWER DOOR LOCK CONTROL UNIT GRY/WHT BLU/WHT YEL/RED WHT/RED ORN BLU/RED / GRN/YEL¹ BLK/WHT BLK BLU/GRN BLK/RED **GRN/BLU** WHT/YEL GRN/RED **GRN/WHT** View from wire side



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)		
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, 402)</li> <li>An open in the wire.</li> </ul>		
2	ORN	Under all conditions.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 35 (20A) fuse.</li> <li>An open in the wire.</li> </ul>		
3	3RN/WHT	Left door lock switch in LOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty left door lock switch.</li> <li>Poor ground (G401, 402).</li> </ul>		
	WHT/YEL	Left door lock switch in UNLOCK.		• An open in the wire.		
4	3LK/WHT	Right door lock switch in LOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty right door lock switch.</li> <li>Poor ground (G401, 402).</li> </ul>		
_	BLK/RED	Right door lock switch in UNLOCK.	_	• An open in the wire.		
5	3LU/WHT	Left door lock knob in LOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty left door lock actuator.</li> <li>Poor ground (G401, 402).</li> </ul>		
•	BLU/RED ¹	Left door lock knob in UNLOCK.	*	<ul> <li>An open in the wire.</li> </ul>		
	3RY/WHT	Right door lock key cylinder switch in LOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty right door lock actuator.</li> <li>Poor ground (G402).</li> </ul>		
6	GRN/YEL ²	Right door lock key cylinder switch in UNLOCK.	*	An open in the wire.		
-	GRN/BLU	Left door opened.	Check for voltage to ground:	Faulty left or Right door switch.		
7	GRN/RED	Right door opened.	should be 1 V or less.	An open in the wire.		
8	BLU/GRN	Ignition key is inserted into the ignitin switch.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty ignition key switch.</li> <li>Poor ground (G401, 402).</li> <li>An open in the wire.</li> </ul>		
_	WHT/RED	Connect the ORN termi- nal to the WHT/RED ter- minal, and the YEL/RED terminal to the BLK ter- minal momentarily.	Check door lock operation: Left (or right) door should lock as the battery is connected momentarily.	<ul> <li>Faulty actuator.</li> <li>An open in the wire.</li> </ul>		
9	and YEL/RED	Connect the ORN ter- minall to the YEL/RED terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: Left (or right) door should un- lock as the battery is connect- ed momentarily.			

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

## Power Door Locks

### - Left Door Actuator Test

- 1. Remove the door trim panel.
- 2. Disconnect the 8-P connector of the actuator.
- 3. Test actuator operation:
  - LOCK: With battery positive connected to the No. 7 terminal, connect negative to the No. 8 terminal momentarily.
  - UNLOCK: With battery positive connected to the No. 8 terminal, connect negative to the No. 7 terminal momentarily.

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.



5. Check for continuity between the terminals in each switch position according to the table.

#### <KEY CYLINDER SWITCH>

Terminal Position \	1	2	3
UNLOCK	0	0	
NEUTRAL			
LOCK		0	-0

#### <DOOR LOCK KNOB SWITCH>

Terminasl Position	4	5	6
LOCK	0 —		-0
UNLOCK			



### - Right Door Actuator Test

- 1. Remove the door trim panel.
- 2. Disconnect the 4-P connector of the actuator.
- 3. Test actuator operation:
  - LOCK: With battery positive connected to the No. 7 terminal, connect negative to the No. 8 terminal momentarily.
  - UNLOCK: With battery positive connected to the No. 8 terminal, connect negative to the No. 7 terminal momentarily.

CAUTION: To prevent damage to the motor, apply battery voltage only momentarily.

5. Check for continuity between the terminals in each switch position according to the table.

#### <KEY CYLINDER SWITCH>

Terminal Position	1	2	3
UNLOCK	0	0	
NEUTRAL	·		
LOCK		0	0

#### <DOOR LOCK KNOB SWITCH>

Terminesl	4	F	
Position	4	Э	
LOCK	0		
UNLOCK	0	0	







## Power Door Locks

### Door Lock Switch Test

- 1. Remove the door grip assembly.
- 2. Disconnect the 3-P connector of the switch.
- 3. Check for continuity between the terminals in each switch position according to the tables.

Terminal			<u> </u>
Position \	I	2	3
UNLOCK		0	O
OFF			
LOCK	0	0	









### Description

Power Window Key-off Timer Operation:

The power windows can still be operated for about 10 minutes after the ignition switch is turned from the "II" to the "I" or "O" position as long as neither of the doors has been opened. this provides a convenience to parked occupants while offering a degree of security against unwanted or accidental window operation.

## **Power Windows**

#### -Circuit Diagram

NOTE: "DN" in the switch circuit denotes DOWN.



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### -Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected			in the main relav box							1			init)		es	
:Symptom	Blown No. 5 (10A) fuse (in the dash fuse box)	Blown No. 34 (15A) fuse	Blown No. 47 (20A) fuse	Blown No. 50 (20A) fuse	Power window relay	Control unit input	Driver's switch	Passenger's switch	Driver's motor	Pulser (in driver's motor)	Passenger's motor	Window regulator	Key-off timer circuit (in the integrated control u	Poor ground	Open ଜୀcଔt in wires or loc or dis∞ nnected termin⊐ls	
Both windows do not oprate.	1				2								3	G201	YEL	
Driver's window does not operate in any position.				1		4	2		3			5		G401 G402	WHTNEL	
Driver's window does not operate in AUTO.						3	1			2					RED/GRN or BLU	
Passenger's window does not operate.			1				2	3			4	5		G401 G402	BLU/BLK, BLUNEL, BLUIGRN, BLU/RED, or BLU/WHT	
Both windows do not oper- ate within minutes after the ignition switch is OFF.	1	2				3							4	G401 G402	WHT/BLU or GRN/RED	

### **Power Windows Control Unit Input Test**

NOTE: The control unit only controls the driver's door window.

Remove the driver's door trim panel and disconnect the 4-P and 6-P connectors from the control unit. Make sure the following input tests at the harness pins.

#### NOTE:

- To test the unit, keep the driver's switch connector connected with the door wire harness.
- Recheck the connections between the 4-P and 6-P connectors, and the control unit, then replace the control unit if all input tests prove OK.



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)		
1	BLK' Under all conditions.		Check for continuity to ground: should be continuity.	<ul><li>Poor ground (G401, 402).</li><li>An open in the wire.</li></ul>		
2	Ignition switch ON. WHTNEL		Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 50 (20A) fuse.</li> <li>Faulty power window relay.</li> <li>Faulty key-off timer system.</li> <li>Poor ground (G201).</li> <li>An open in the wire.</li> </ul>		
3	BLKNEL	Ignition switch ON and driver's switch UP.	Check for voltage to ground: should be battery voltage as the	<ul><li>Faulty driver's switch.</li><li>An open in the wire.</li></ul>		
4	BLK/GRN	Ignition switch ON and driver's switch DOWN.	- switch is turned.			
5	RED/GRN	Ignition switch ON and driver's switch DOWN (AUTO).				
6	BLU and BLK ² Connect the WHTNEL ter- minal to the RED/BLU ter- minal, and the BLK terminal to the REDNEL terminal.		Check for resistance between the BLU and BLK terminals: should indicate between 20-50 ohms as the motor runs.	<ul><li>Faulty pulser.</li><li>Faulty driver's motor.</li><li>An open in the wire.</li></ul>		

#### Driver's Switch Test



- 1. Remove the door trim panel. (see section 20)
- 2. Check for continuity between the terminals in each switch position according to the tables.



View from wire side

#### Driver's Switch

Terminal Position	2	5	1	12
UP	<u> </u>	0		
OFF				
DOWN		o	0	
DOWN (AUTO)		0		0

#### Passenger's Switch

	Terminal	4	11	9	10
Positio	n \	·			
	Main Switch			:	
	ON	<u> </u>	0	<u> </u>	<b></b> 0
UP	OFF	<u> </u>			
orr	ON		<u> </u>	-0	<b>_</b> 0
	OFF		<u> </u>		<b></b> 0
		<u> </u>			
DOWN	ON		<u> </u>		
	OFF	0			0

#### Switch Light

8		7
0	n	0
-		

### **Power Windows**



- 1. Remove the door trim panel (see section 20).
- 2. Check for continuity between the terminals in each switch position according to the table.



### Driver's Switch Replacement -

- 1. Remove the door trim panel (see section 20).
- 2. Remove the 4 screws, then remove the power window switch from the door panel.



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## **Power Windows**

### Driver's Motor Test

Motor Test:

- 1. Remove the door trim panel (see section 20).
- 2. Disconnect the 4-P connector from the driver's motor.
- Test motor operation by connecting battery voltage to the No. 1 and No. 2 terminals. Test the motor in each direction, by switching the leads from the battery.

CAUTION: When a motor stops running, disconnected battery terminal immediately.

4. If the motor does not run, replace it.



#### Pulser Test:

Using an analog ohmmeter, running the motor by connecting battery voltage to the No. 1 and No. 2 terminals, check for needle movement when connecting the test leads to the No. 3 and No. 4 terminals.

The analog ohmmeter needle should move back and forth alternately.



### Passenger's Motor Test

- 1. Remove the door trim panel (see section 20).
- 2. Disconnect the 2-P connector from the motor.
- Test motor operation by connecting battery voltalge to the No. 1 and No. 2 terminals. Test the motor in each direction, by switching the leads from the battery.

CAUTION: When a motor stops running, disconnected battery terminal immediately.

4. If the motor does not run, replace it.



View from wire side

### 23-268

# - +

### - Relay Test



- 1. Remove the power window relay in the main relay box.
- 2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.





## **Power Seats**





### -Circuit Diagram



### **Power Seats**

### -Seat Switch Test

CAUTION: Be careful not to damage the seats, the interior trim or the body.

- 1. Remove the 2 screws, then remove the power seat switch from the power seat.
- 2. Disconnect the 5-P connectors from the power seat each switch.
- 3. Check for continuity between the terminals in each switch position according to the table.

Position	Terminal	3	5	4	2	1
	FORWARD		<u> </u>	-0	0	-0
SLIDE	NEUTRAL	<u> </u>	-0		9	Ŷ
	BACKWARD	<u> </u>	-0	<u> </u>	Ŷ	
RECLINE	FORWARD	9	-0	6	Ŷ	
	NEUTRAL	0	<b>-</b> 0 '		<u> </u>	-0
	BACKWARD		<u> </u>	-0	<b>~</b>	-0



#### -Motor Test

CAUTION: Be careful not to damage the seats, the interior trim or the body.

- 1. Remove the power seat, then disconnect the 2-P connector from the sliding motor.
- 2. Remove the 2 screws then remove the power seat switch from the power seat.
- 3. Disconnect the 5-P connector from the reclining switch.



4. Test motor operation.

CAUTION: When the motor stops running, disconnect a battery terminal immediately.

FORWARD SLIDING:	Connect battery positive to the No. 6 terminal and negative to the No. 7 terminal.
BACKWARD	Connect bottom, maritim to the No.
SLIDING:	7 terminal and negative to the No. 6 terminal.
FORWARD	
RECLINE:	Connect battery positive to the No. 4 terminal and negative to the No. 1 terminal.
BACKWARD	
RECLINE:	Connect battery positive to the No. 1 terminal and negative to the No. 4 terminal.

NOTE: When a motor does not run, reverse the battery terminal connection. If the motor still does not run, the motor or the wire harness is defective.

## Rear Window Defogger





### -Circuit Diagram



## Rear Window Defogger

### -Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

item to be inspected	own indicator light bulb	own No 4 (15A) fuse the dash fuse box)	efogger timer circuit input the integrated control unit)	own No. 5 (1UA) tuse the dash fuse box)	own No. 11 (40A) tuse the main fuse box)	inction test	etogger relay	roken defogger wire	oor ground	pen i uit in wires loose or scon ted termina
Defogger operates, but indicator light does not go on.	1							-		YEL/BLK or YEL/WHT
Defogger does not operate and indicator light does not go on.		1	3	2					3401	YEL or YELIWHT
Defogger does not operate, but indicator light goes on.					1	2	3	4	3801	YEL/WHT, YEL/BLK, BLK/GRN
Operate time is too long or too short (Normal operation time is 25 minutes).			1							WHT/RED or BLK
### - Switch Removal

**A WARNING** All SRS wire harnesses and connectors are colored yellow. Do not use electrical test equipment on these circuits.

CAUTION: Be careful not to damage the SRS wire harnesses when servicing the rear window defogger system.

1. Remove the dashboard lower panel and disconnect the 2-P connectors from the floor wire harness.



2. Disconnect the 18-P connector from the floor wire harness.

CAUTION: Be careful not to damage SRS wire.





4. Remove the steering column lower cover and upper cover.



NOTE: Be careful not to damage steering column covers.

5. Remove the 4 screws, then remove the rear window defogger switch and wiper/washer switch assembly.



## Rear Window Defogger



- 1. Remove the defogger relay in the main fuse box.
- There should be continuity between the C and D ter-2. minals.
- 3. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is

disconnected.





### -Switch Test

- 1. Remove the dashboard lower panel.
- 2. If necessaly, remove the knee bolster.
- 3. Disconnect the 18-P connector from the floor wire harness.
- 4. Check for continuity between the terminals in each switch position according to the table.



View from wire side

Terminal Position	В	K	н		G	J		L
PUSHED	Ŷ	-0	~	6		~		
RELEASED			5	9	Ľ		అ	





# Wipers/Washers





#### -Description -

The system is equipped with an intermittent relay, a low relay and a high relay. The wiper operation of INT and LO position is controlled by the intermittent wiper circuit (incorporated in the integrated control unit).



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### -Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

							-		_	-								<b></b>		
Symptom	tem to be, nspected	ßlown No. 26 (40A) fuse lin the main relay box)	Blown No. 6 (7.5A) fuse iin the dash fuse box)	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	n ermittent wiper relay	Wiper low relay	Wiper high relay	Vyasher relay	Intermittent wiper circuit (in the integrated control unit)	Combined operation with wiper/ washer (in the integrated control unit)	Insufficient washer fluid in reservoir	Disconnected blocked washer hose or clogged outlet	Disconnected wiper linkages	Intermittant dwell time controller	Poor ground	Open circuit in wires or loose or disconnected terminals
Wipers do not	In all position s	1		4		2					-				<b>-</b>	•	3		G201	GRN/BLK
operate.	In INT			1		4			2	3			5	· · ·					G202	BLU/WHT
	In LO			1		4			2	3			5			1			G202	BLU/RED
	In HI			1		3					2								G401	BLU/GRN
	In MIST				1			┉			2								G401	YEL/RED
Blades do to park pos when wiper turned OFF	not returr) sition rs are			2		1			3	4										BLU/WHT
Erratic int cycle or wi not operate mittently.	ermittent pers do inter-							1	1				3					2	_	BLU/RED, BRN/RED or BRNNEL
Little or no fluid is pur	washer nped.		2				6	4				5			1	3			G201 G301	PINK or YEL/GRN
Wipers do operate si ously with	not multane- washer.								Ц.					1						BLU/RED

### - Intermittent Relay Test -

- 1. Remove the wiper intermittent relay from sub relay box B.
- 2. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
  - The should be continuity between the B and C terminals when the battery is disconnected.





### Wipers/Washers

### 

- 1. Remove the wiper high relay or the washer relay from sub relay box B.
- 2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be no continuity when the battery is disconnected.





- Remove the wiper low relay from sub relay box B. 1.
- 2. There should be no continuity between the A and B terminals when the battery is connected to the C and D terminals.

There should be continuity when the battery is disconnected.







### -Windshield Wiper Motor Test

- 1. Open the hood and remove the cap nuts and the wiper arms.

NOTE: Carefully remove the wiper arms so that they do not touch the hood.

2. Remove the windshield lower molding, hood seal and air scoop by prying off the trim clips and removing the screws.



- Disconnect the 5-P connector from the wiper motor assembly.
- 4. Test motor operation:

LOW SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Lo (BLU/RED) terminal. HIGH SPEED:Connect battery positive to the B (GRN/BLK) terminal and negative to

the Hi (BLU/GRN) terminal.

5. If the motor fails to run smoothly, replace it.





- 6. Reconnect the 5-P connector to the wiper motor assembly.
- Connect an analog voltmeter, between the As (BLU/WHT) and the E (BLK) terminals. Run the motor by turning the wiper switch is turned ON (Lo or Hi position).

Voltmeter should indicate 0 V-more than 4 V alternately.

# Wipers/Washers

### -Windshield Wiper Motor -Replacement

1. Open the hood and remove the cap nuts and the wiper arms.

NOTE: Carefully remove the wiper arms so that they do not touch the hood.

- 2. Remove the windshield lower molding, hood seal and air scoop by prying off the trim clips and removing the screws. (see page 23-285).
- Disconnect the 5-P connector from the wiper motor assembly, then remove the 2 mounting bolts and the wiper linkage assembly.



5-P CONNECTOR

 Remove the 3 mounting bolts and 1 nut from the wiper linkage assembly to remove the wiper motor assembly.

NUT



#### -Wiper/Washer Switch Replacement -

#### CAUTION:

- All SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.



**SRS** MAIN' WIRE HARNESS

1. Remove the dashboad lower panel and disconnect the 2-P connectors from the floor wire harness.



2. Disconnect the 18-P connector from the floor wire harness.

CAUTION: Be careful not to damage the SRS wires.



3. Remove the tilt cover.



4. Remove the steering column lower cover and upper cover.



- NOTE: Be careful not to damage the steering column covers.
- 5. Remove the 4 screws, then remove the hazard switch and wiper/washer switch assembly.



## Wipers/Washers



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#### - Washer Motor Test

- 1. Disconnect the 2-P connector from the washer motor and remove the front bumper.
- 2. Test the washer motor operation by connecting the battery positive to the ⊕ terminal and the negative to the ⊖ terminal.



- If the motor fails to run smoothly, replace it.
- If the motor runs smoothly but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.





#### Description

The cruise control system uses mechanically and electrically operated devices to maintain vehicle speed at a setting selected by the driver.

The cruise control unit receives command signals from the cruise control main switch and the cruise control set/resume switch. It receives information about operating conditions from the brake switch, PGM-FI ECU, speed sensor, the clutch switch (with manual transmission), or the shift lever position switch (with automatic transmission). The cruise control unit sends operational signals to the devices that regulate the throttle position. The throttle position maintains the selected vehicle speed. Essentially, the control unit compares the actual speed of the vehicle to the selected speed. Then, the control unit uses the result of that comparison to open or close the throttle.

The brake switch releases the system's control of the throttle at the instant the driver depresses the brake pedal. The switch sends an electronic signal to the control unit when the brake pedal is depressed; the control unit **responds by allowing the throttle to close.** The clutch switch (manual transmission) or the shift lever position switch (automatic transmission) sends a disengage signal input to the control unit that also allows the throttle to close.

#### **Operation:**

The cruise control system will set and automatically maintain any speed above 30 mph (45 kph). To set, make sure that the main switch is in the "ON" position. After reaching the desired speed, press the set switch. The cruise control unit will receive a set signal input and, in turn, will actuate the cruise control actuator. When the set switch is depressed and the cruise control system is on. the "cruise control" on indicator in the gauge assembly will light up. You can cancel the cruise control system by pushing the main switch to "OFF." This removes power to the control unit and erases the set speed from memory. If the system is disengaged temporarily by the brake switch, clutch switch, or gear selector switch and vehicle speed is still above 30 mph, press the resume switch. With the resume switch depressed and the set memory retained, the vehicle automatically returns to the previous set speed.

For gradual acceleation without depressing the accelerator pedal, push the resume switch down and hold it there until the desired speed is reached. This will send an acceleration signal input to the control unit. When the switch is released, the system will be reprogrammed for the new speed. To slow the vehicle down, depress the set switch. This will send a deceleration signal input to the control unit causing the vehicle to coast until the desired speed is reached. When the desired speed is reached, release the set switch. This will reprogram the system for the new speed.





The electrically operated actuator controls the throttle position the same as a vacuum operated actuator. The magnetic clutch is part of the safety system and controls acceleration or deceleration.



#### Acceleration

The motor actuates; then power is transmitted to the magnetic clutch by the transmission gear and the worm wheel. The magnetic clutch is rotated and magnetized. The magnetic clutch attracts the clutch plate, then power is transmitted to the output link by the gear directly connected to the clutch plate and the output gear. The output link rotates clockwise, then the actuator cable opens the throttle, and the car accelerates.

#### Deceleration

The motor rotates in the reverse direction of acceleration; then in the same way, the power is transmitted to the output link. The output link rotates counterclockwise, then the actuator cable closes the throttle, and the car decelerates.







#### Troubleshooting

#### NOTE:

- The numbers in the table show the troubleshooting sequence.
- Before troubleshooting. ____ Check the No. 5 (1 OA) fuse in the dash fuse box, and the No. 29 (50A), No. 45 (20A) fuses in the main relay box,
  - Check that the horns sound.
  - Check the tachomater for proper operation.

items to be inspected.	Main switch	SET/RESUME switch	Brake light switch/adjustment	Clutch switch/adjustment (M/T)	Shift lever position switch (A/T)	PGM-FI ECU (NE PULSE)	Dimming circuit in gauges	Actuator and cable deflection	Control unit	Poor ground	Open circuit in wires or loose or disconnected terminals
Cruise control can't be set.	2	3	4	5	5				1	G302 G401 G402	3LU/RED, LT GRN/RED, 3RN, YEL, LT GRN, GRY, 3RN, BLU, WHT, BLU/ORN yr YEL/RED
Cruise control can be set, but indicator light does not go on.							2		1	G401 G402	/EL or BLU/BLK
Cruise speed noticeably higher or lower than what was set.						1		2	3		
Excessive overshooting and/or undershooting when trying to set speed.						2		1	3		
Steady speed not held even on a flat road with cruise con- trol set.						1		2	3		
Car does not decelerate or ac- celerate accordingly when SET or RESUME button is pushed.		1							2		.T GRN/BLK .T GRN/RED
Set speed not cancelled when clutch pedal is pushed (M/T).				1					2		
Set speed not cancelled when shift lever is moved to N (A/T).					1				2		
Set speed not cancelled when brake pedal is pushed.			1						2		
Set speed not cancelled when main switch is pushed OFF.	1								2		
Set speed not resumed when RESUME button is pushed (with main switch on, but set speed temporarily cancelled).		1							2		

#### -Control Unit Input Test

#### CAUTION:

- ALL SRS electrical wiring harnesses are covered with yellow outer insulation.
- Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring.

Remove the glove box, then disconnect the 14-P connector from the control unit. Make the following tests at harness pins:

NOTE: Recheck the connections between the 14-P connector and the control unit, then replace the control unit if all input tests prove OK.



SRS MAIN WIRE HARNESS





No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
2	LT GRN	Ignition switch ON and main switch ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Blown No. 5 (10A) fuse.</li> <li>Faulty main switch.</li> <li>An open in the LT GRN or YEL wire.</li> </ul>
3	LT GRN/ BLK	RESUME button pushed.	Ground each terminal: Horns should sound as the switch is pushed	Blown No. 45 (20A) fuse.     Faulty SET/RESUME switch.     Eaulty cable real
4	<b>LT GRNI</b> RED	SET button pushed.	switch is pushed.	<ul> <li>An open in the WHT/GRN, BLUIRED, LT GRN/BLK or LT GRN/RED wire.</li> </ul>
5	BLU/ORN	M/T: Clutch pedal pushed. A/T: Shift lever in 2, 3 or D.	Check for continuity to ground: should be continuity.	<ul> <li>Faulty or misadjusted clutch switch (M/T).</li> <li>Faulty shift position console switch (A/T).</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>
6	GRN	Start the engine.	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty ignition system or PGM-FI ECU.</li> <li>An open in the wire.</li> </ul>
7	YEL/RED	Ignition switch ON and main switch ON. Raise the rear of the car rotate one wheel slowly.	Check for voltage between the LT GRN ⊕ and YEL/RED ⊖ terminals: should be 0-5-O-5 V repeatedly.	<ul><li>Faulty speed sensor.</li><li>An open in the wire.</li></ul>
8	GRY	Ignition switch ON, main switch ON and brake pedal pushed, then released.	Check for voltage to ground: should be 0 V with the pedal pushed and battery voltage with the pedal released.	<ul> <li>Faulty brake light switch.</li> <li>An open in the GRY or LT GRN wire.</li> </ul>
9	3RN/WHT	Brake pedal pushed, then relelased.	Check for voltage to ground: should be battery voltage with the pedal pushed, and 0 V with the pedal released.	<ul><li>Faulty brake light switch.</li><li>An open in the wire.</li></ul>
10	BLU/BLK	Ignition switch ON.	Attach to ground: Indicator light in the gauge assembly comes on.	<ul> <li>Blown bulb.</li> <li>Blown No. 5 (10A) fuse.</li> <li>Faulty dimming circuit in the gauge assembly.</li> <li>An open in the wire.</li> </ul>
	BRN	Connect the battery positive to the BRN terminal and negative to	Check the operation of the ac- tuator motor: should be able to hear motor.	<ul><li>Faulty actuator.</li><li>An open in the wire</li></ul>
12	BLU	the BLU terminal.		
13	WHT	Connect the battery positive to the BRN/ WHT terminal and nega- tive to ground.	Check the operation of the magnetic clutch: clutch should click and output link should be locked.	<ul> <li>Faulty actuator.</li> <li>An open in the wire.</li> <li>Poor ground (G302).</li> </ul>
		<b>J</b>		



CAUTION: Be careful not to damage the SRS wires.

- 6. Remove the 4 screws from the lighting switch.
- 7. Remove the lighting switch (main switch).



16-P CONNECTOR

### -Main Switch Test

- 1. Remove the dashboard lower panel and dashboard center panel.
- 2. If nesessary, remove the knee bolster.
- 3. Check for continuity between the terminals in each switch position according to the table.





### - SET/RESUME Switch Test

CAUTION: Disconnect both the negative and positive battery cables. Connect the short connector to the airbag assembly (see page 23-324).

1. Disconnect the cable reel harness and main harness 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.



2. Check for continuity between the terminals in each switch position according to the table.

۸ Terminal	3 I	2 I	1
Position	(BLU/RED	(LT GRN/RED)	(LT GRN/BLK)
SET (ON)	0	0	
RESUME (ON)	0		0

- If there is no continuity, check the cable reel.
- If OK, go to step 3.
- 3. Remove the switch cover from the SET/RESUME switch, then separate the SET/RESUME switch by removing the 2 screws.



4. Check for continuity between the terminals in each switch position according to the tables.

Terminal Position	A or A'	В	С	
SET (ON)	0		0	
RESUME (ON)	0	0		

• If there is no continuity, replace the switch.



### - Brake Light Switch Test

- 1. Disconnect the 4-P connector from the switch.
- 2. Check for continuity between the terminals according to the table.

Terminal Brake pedal	Α	В	с	D
RELEASED	0 —	_0		
PUSHED			0	0



3. If necessary, replace the switch or adjust pedal height (see section 12).

### Clutch Switch Test _

- 1. Disconnect the 3-P connector from the switch.
- 2. Check for continuity between the terminals according to the table.

Terminal Clutch pedal	В	С			
RELEASED	0	0			
PUSHED					



3. If necessary, replace the switch or adjust pedal height (see selection 12).



#### Shift Position Switch (for cruise control)

Terminal	5	8
Position		
1		
2	0	0
3	0	0
D	0	O
N		
R		
Р		

#### - Actuator Assembly Test

- 1. Disconnect 4-P connector from the actuator.
- 2. Check the output linkage moves smoothly.
- 3. Connect the battery positive to the D terminal and negative to the A terminal.
- 4. Check for a clinking sound from the magnetic clutch and that the output linkage is locked. You should be able to hear the motor.
- 5. If the output linkage is not locked, replace the actuator assembly.



6. Check the operation of the actuator motor in each output linkage position according to the table. You should be able to hear the motor.

Bat polar	tery ities	0	Output linkage position								
Ð	Û	FULL CLOSE	MIDDLE POSITION	FULL OPEN							
C Terminal	8 Terminal	The motor opreates	The motor operates	The motor stops							
B Terminal	C Terminal	The motor stops	The motor operates	The motor operates							





### Actuator Cable Adjustment

- 1. Check that the actuator cable operates smoothly with no binding or sticking.
- 2. Start the engine and warm it up to normal operating temperature (the cooling fan comes on twice).
- 3. Measure the amount of movement of the output linkage unit! the engine speed starts to increase. At first, the output linkage should be located at the full close position. Free play should be 11  $\pm$  1.5 mm (0.43  $\pm$  0.06 in.)



4. If the free play is not within specs, loosen the locknut and turn the adjusting nut as required.

NOTE: If necessary, check the throttle control system (Section 1 I), then recheck the output linkage free play.

5. Retighten the locknut and recheck the free play.

#### Component Location Index CAUTION: • All SRS electrical wiring harnesses are covered with yellow outer insulation. • Replace the entire affected SRS harness assembly if there is an open circuit or damage to the wiring. SRS MAIN WIRE HARNESS IGNITION **KEY SWITCH** IGNITION Test, page 23-318 HORN RELAY R. REAR SIDE MARKER LIGHT SWITCH Test, page 23-242 Replacement, page 23-193 Test, page 23-72 SUB RELAY **R. DOOR KEY CYLINDER** SWITCH BOX A Test, page 23-315 Replacement, section 20 BATTERY Test, page 23-68 **R. DOOR LOCK KNOB** and DOOR SWITCH SECURITY HORN Test, page 23-315 Test, page 23-241 and 198 L. HEADLIGHT SECURITY Replacement, page 23-189 CONTROL UNIT Input Test, S page 23-311 DIMMER RELAY Test, page 23-185 TAILLIGHT RELAY Test, page 23-186 MAIN RELAY BOX L. FRONT POSITION LIGHT Replacement, RETRACTOR RELAYS page 23-191 Test, page 23-186 LEFT (LOW) HORN Test, page 23-241 HOOD SWITCH **R. HEADLIGHT** Replacement. Test, page 23-317 page 23-1 89 LIGHTING/RELAY RIGHT (HIGH) HORN Test, page 23-185 Test, page 23-241 R. FRONT SIDE MARKER LIGHT **R. FRONT POSITION** Replacement, LIGHT page 23-191 Replacement, page 23-191



#### -Description

This system is activated automatically 15 seconds after everything has been closed and locked. The security alarm system indicator light located on the driver's side door trim panel will flash after the doors are properly locked. If any of the following conditions occur, the horns will sound, the headlights will pop up and flash, and the side marker lights, position lights and taillights will flash for about 2 minutes, or until the system is disarmed by unlocking either door from the outside **keylock** with the key.

- 1 Door is opened forcibly.
- ② Engine cover is opened.
- ③ Trunk lid is opened without using the key.
- ④ Hood is opened.

- (5) Battery terminal(s) are removed and reconnected.
- (6) Engine starter circuit and battery circuit are bypassed by breaking the ignition switch.
- ⑦ Hood/engine cover/trunk lid opener in the vehicle is operated.

Flowchart of the security alarm system operation:







#### Circuit Diagram

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL/GRN¹ and YEL/GRN² are not the same).







### - Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be	inspected	own No 8 (20A) fuse, in the main	own No. 5 (10A) fuse lituse box	own No. 45 (20A) in the main se	aulty indicator light (LED)	orn circuit	tarting system	/T: Shift position console switch /T: Clutch interlock switch	during svstem	oor key switch	nition key switch	runk key switch	runk latch switch	ood switch	ngine cover	toor switch	ontrol unit input	oor ground	
Symptom Security alarm can set (and indicator does not flash).	n't be light	1 1	<u>18</u>	_ <u></u> ⊞ <del>,</del> ⊒ 3	4	H	<u>c</u>	₹ ≥	.T_		d lo		1	H	Ш	L	C	G401 5402 or G404	YEL/BLU, YEL, WHT/GRN, GRN or BLU/GRN
Starting ststem is operated.	not	1					1	2									3	G401 G4O2 or 3404	BLK/WHT, BLK/GRN or BLK/YEL
Security alarm can be set, but alarm not ope- rated when the	Horn alarm			1		2											3		NHTIGRN, DRN/BLK, YEL/GRN ¹ or -T GRN/WHT
trunk, hood or either door is unlocked without the key.	Headlight alarm		-				1		1								2		_T GRN/RED, 3LU/RED ¹ or 3ED/YEL
	Both alarms			ŀ													1		
Alarm not cancelle the door keylock i locked with the ke	ed when is un- ey.									1							2	3401 3402 or <b>340</b> 4	GRN/YEL ¹ , GRN/YEL ² , GLU/RED ² or GLU/RED ³
Alarm not cancelle the key is inserted ignition switch.	ed when I the		1								2						3	_	YEL
Alarm not cancelled when the trunk lid is opened with the key.						<u>.</u>		İ		<b>-</b>		1	2				3	3501	3RN/WHT or WHT
Alarm not operated when the hood is opened.														1			2	3301	YEL/GRN ²
Alarm not operate the engine cover	d when is opened.														1		2	3401 3402	BLU
Alarm not operate the doors is open	ed when ed.															1	2	3401 3402	GRN/BLU or GRN/RED

### - Control Unit Input Test -

Remove the glove box to disconnect the 22-P connector and 16-P connector from the control unit. Make the following input tests at the harness pins.

#### NOTE:

 Recheck the connections between the 22-P connector and the control unit, the 16-P connector and the control unit, then replace the control unit if all input tests prove OK.



SECURITY CONTROL UNIT


No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
8	BLU/RED	Under all conditions.	Attach to ground: headlights should come on.	<ul><li>Faulty lighting relay.</li><li>Faulty lighting system.</li><li>An open in the wire.</li></ul>
9	RED/YEL	Under all conditions.	Connect to ground: Taillights should come on.	<ul><li>Faulty taillight relay.</li><li>Fautly taillight system.</li><li>An open in the wire.</li></ul>
10	LT GRN/ RED	Passing swich ON.	Check for voltage to ground: should be battery voltage.	<ul> <li>Faulty passig switch.</li> <li>Faulty dimmer relay.</li> <li>Faulty lighting relay.</li> <li>An open in the wire.</li> </ul>

Reconnect the 22-P and 16-P connectors to the control unit.

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)			
	YEL/GRN ²	Hood opened.	Check for voltage to ground: should be 1 V or less.	Faulty hood switch. Misadjusted hood switch.			
11		Hood closed.	Check for voltage to ground: should be 5 V or more.	<ul> <li>Poor ground (G301).</li> <li>An open in the wire.</li> </ul>			
		Ignition key is inserted into the ignition switch.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty ignition key switch.</li> <li>Poor ground (G401, G402).</li> </ul>			
1 2	BLU/GRN	Ignition key is removed from the ignition switch.	Check for voltage to ground: should be 5 V or more.	• An open in the wire.			
1 3	BLU	Engine cover opened.	Check for voltageto ground: should be 1 V or less.	<ul> <li>Faulty engine cover switch.</li> <li>Misadjusted engine cover switch.</li> </ul>			
13		Engine cover closed.	Check for voltage to ground: should be 5 V or more.	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>			
14	BLK/BRN or BLK/ LT GRN	Under all conditions.	Check for voltage to ground: should be 1 V or less.	<ul><li>Poor ground (G404).</li><li>An open in the wire.</li></ul>			
1 5	BRN/WHT	Trunk key in UNLOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty trunk key.</li> <li>Poor ground (G501).</li> <li>An open in the wire.</li> </ul>			
		Trunk lid opened.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty trunk latch switch.</li> <li>Misadjusted trunk latch switch.</li> </ul>			
16	WHT	Trunk lid closed.	Check for voltage to ground: should be 5 V or more.	<ul><li>Poor ground (G501).</li><li>An open in the wrie.</li></ul>			

(cont'd)

# Security Alarm System

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)			
17	GRN/BLU	Left door opened.	Check for voltage to ground: when the door is oppened,	<ul><li>Faulty right door switch.</li><li>An open in the wire.</li></ul>			
18	GRN/RED	Right door opened.	there should be 1 V or less, and when the door is closed, there should be 5 V or more.				
19	GRNNEL'	Left door key in UNLOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty left or right door key switch.</li> </ul>			
2	0 GRN/YE	Right door key in UNLOCK	-	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>			
21	GRN/WHT	Left door key in LOCK.	Check for voltage to ground: should be 1 V or less, as the	Faulty left or right door key switch.			
22	GRY/WHT	Right door key in LOCK.	door <b>keylock</b> is turned in LOCK	<ul> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>			
2	3 BLU/RE	Left door lock knob in D ² UNLOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty left door lock knob switch. (built in the actuator).</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>			
2 4	BLU/RED ³	Right door lock knob in UNLOCK.	Check for voltage to ground: should be 1 V or less.	<ul> <li>Faulty right door lock knob switch. (built in the actuator).</li> <li>Poor ground (G401, G402).</li> <li>An open in the wire.</li> </ul>			

# Control Unit Input Test (cont'd)





**Door Switch Test** 

NOTE: Be careful not to damage the door trim panel when remove it.

- 1. Remove the door trim panel (See section 20).
- 2. Disconnect the 2-P connector from the door switch.



DOOR SWITCH (microswitch type)

- 3. There should be continuity between the A terminal and B terminal with the door opened.
- 4. There should be no continuity with the switch pushed (door closed).



# Security Alarm System





### -Engine Cover Switch Test

1. Open the engine cover.

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- 2. Disconnect the 2-P connector from the engine cover switch.
- There should be continuity between the A and B terminals with the lever released (cover opened). There should be no continuity with the lever pushed down (cover closed).



- -Hood Switch Test ____
  - 1. Open the hood.
  - 2. Disconnect the 2-P connector from the hood switch.
  - 3. There should be continuity between the A and B terminals with the lever released (hood opened). There should be no continuity with the lever pushed down (hood closesd).



# Security Alarm System



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#### Description

The SRS is a safety device which, when used in conjunction with the seat belt, is designed to protect the driver by operating only when the car receives a frontal impact exceeding a certain set limit.

The system is composed of left and right dash sensors, the SRS unit (includes cowl sensor), the cable reel and airbag assembly.



#### **OPERATION:**

As shown in the diagram below, the left and right dash sensors are connected in parallel. The parallel sets of sensors are connected in series by the airbag inflator circuit and the car battery. In addition, a backup power unit is connected in parallel with the car battery. The backup power unit and the cowl sensor are located inside the SRS unit.

The SRS operational sequence is as follows:

- (1) Cowl sensor activates and one or both dash sensors activate.
- (2) Electrical energy is supplied to the airbag inflator by the battery, or the backup power unit if the battery voltage is too low.
- (3) Airbag deployment.

At least the cowl and one dash sensor must be activated simultaneously for at least 0.002 seconds in order for the airbag to be deployed.



#### Self-diagnosis system

A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON, the SRS warning light comes on and goes out after about 6 seconds if the system is operating normally. If the light does not light, or does not go out after 6 seconds, or if it comes on while dirving, this indicates an abnormality in the system. It must be inspected and repaired as soon as possible.

. Circuit Diagram







#### Troubleshooting

#### Self-diagnosis Function

The SRS unit includes a self-diagnosis function. If there is a failure in the sensors, SRS unit, inflator, or their circuits, the SRS light in the instrument panel goes ON.



As a system check the SRS light also comes on when the ignition is first turned to the II position. if the light goes off after approximately 6 seconds the system is OK.

If the SRS light remains on (or fails to come on the system check mode) one of the SRS components (or the wiring/connectors in-between) is faulty.

Troubleshooting precautions

- When attaching any of the test harnesses, push the connectors straight-in unit they are secure; do not bend the connector pins.
- Always use the test harness. Do not use test probes directly on component connector pins or wires; you may damage them or the control unit.
- Always keep the short connector on the airbag connector when the harness is disconnected.

#### SRS Indicator light troubleshooting

Possible conditions:

- 1. SRS light does not come on at ail see page 23-326.
- 2. SRS light stays on constantly see page 23-330.
- 3. SRS light comes on in combination with a failure of another electrical system (brake indicator, engine check light etc.). Check for damage/corrosion at the dash fuse box.

#### NOTE:

- Before starting the applicable troubleshooting, check the condition of ail SRS connectors and ground points.
- if the fault is not found after completing the applicable troubleshooting, substitute a known-good SRS unit and check whether the light indication goes away.

CAUTION: Disconnect both the negative and positive battery cables. Connect the short connector to the **airbag** assembly.



#### -Test Harness Attachment -



SRS test harness C

















(Cont'd)

### -Troubleshooting (cont'd) -

#### **SRS** Indicator Light Stays On Continuously

Connect test harness A to the SRS unit and check voltages (to ground) according to the chart below.

NOTE:

- Turn the Ignition switch ON.
- Voltages in the chart assume an original "battery voltage" of approximately 12V.
- A significantly discharged battery (less than 12V) will result in differeent and possibly false readings.
- Do not connect the short connector to the airbag connector when checking these voltages.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

Terminal No Failure mode	① SADH	④ VCC	(5) S V	<u>®</u> ССНК1	⑧ . Sadc	(1) BUC 1	(12) GND	(13) I D C	(4) M I
Normal	5.1 - 6 . 9	4.0-5.5	10.0-14.0	9.06-14.0	5.1-6.9	o- 2.0	O-2.0	10.0~ 14.0	9.0-14.0 <u>.</u>
A Cowl sensor open, or dash sensor short	0~2.0	4.0~5.5	10.0~14.0	9.0~14.0	02.0	0~ 2.0	0~2.0	4.0-9.0	9.0~14.0
9 Cowl sensor short, or dash sensor open.	10.0 ~ 14.0	4.0~5.5	10.0~14.0	9.0~ 14.0	10.0~ 14.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
C One dash sensor open	7.0~9.0	4.0~5.5	10.0~14.0	9.0~ 14.0	7.0 - 9.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
D Inflator or cable reel open.	10.0~14.0	4.0~5.5	10.0~14.0	9.0~14.0	0~2.0	0~2.0	0~2.0	4.0~9.0	9.0~14.0
E SRS fuse (No. 1) open.	5.1~6.9	0~1.0	0~2.0	9.0~14.0	5.1~6.9	0~6.9	0~2.0	4.0-9.0	9.0~14.0
F SRS indicator wire harness short. (open.)	5.1~6.9	4.0~5.5	10.0~14.0	9.0~14.0	5.1~6.9	0~2.0	0~2.0	0 (10.0~14.0)	9.0~14.0
G SRS unit ground and SRS unit mounting bolts (GND) open.	7.0-16.0	7.0~16.0	7.0~16:0	7.0-16.0	7.0 - 15.0	7.0-16.0	7.0~16.0	4.0~-9.0	7.0 16.0

- If output signal is not in accordance with the chart first check the contact condition of each connector and terminal of the SRS system.
- If contact condition is OK, substitute a known-good control unit and perform troubleshooting again.





Mode A: Cowl sensor open, or dash sensor short.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the **airbag** assembly (See page **23-324**).

- 1. Connect the SRS test harness B between the SRS unit and SRS main harness 18-P conector.
- Reconnect the battery cables then check the resistance between the left dash sensor terminals B 12 and B 16, and between the right dash sensor terminals B4 and B6.



(R) (L) 3.8-4.2 ΚΩ

- If resistance is more than 3.8 4.2 KΩ for either sensor, go to step 3.
- If resistance is less than 3.8-4.2 KΩ for either sensor, go to step 4.

3. Check to make sure there is no continuity between body ground and each terminal of both dash sensors.



- If there is no continuity the SRS unit is faulty. Substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.
- If there is continuity at any of the terminals, go to step 5.
- 4. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector. Check the resistance between the No. 1 terminal and No. 2 terminal.



(cont'd)

#### -Troubleshooting (cont'd) -

- If resistance is less than 3.8 4.2 KΩ the respective dash sensor is faulty, replace the dash sensor and recheck the voltages according to the chart on page 23-330.
- If resistance is more than 3.8-4.2 KΩ, replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.
- 5. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector. Check to make sure there is no continuity between the No. 1 terminal and body ground, and between the No. 2 terminal and body ground.

Mode B: Cowl sensor short, or dash sensor open. Mode C: One dash sensor open.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the **airbag** assembly.

1. Connect the SRS test harness B between the SRS unit and SRS main harness 18-P conector. Check the resistance between the left dash sensor terminals B 12 and B 16, and between the right dash sensor terminals B4 and B6.



- If resistance is more than 5 KΩ, go to step 2.
- If resistance is less than 5 Kg, the SRS unit is faulty, substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.



- If there is continuity, the dash sensor is faulty: replace and recheck the voltages according to the chart on page 23-330.
- If there is no continuity, replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

2. Connect the SRS test harness D between the dash sensor and SRS main harness 2-P connector. Check the resistance between the No. 1 terminal and No. 2 terminal.



- If resistance is more than 5 KΩ, the dash sensor is faulty: replace and recheck the voltages according to the chart on page 23-330.
- If resistance is less than 5 KΩ, the SRS main wire harness is faulty: replace the SRS main wire harness and recheck the voltages according to the chart on 'page 23-330.

Mode D: Airbag inflator or cable reel open.

- 1. Disconnect the battery negative terminal and then disconnect the positive terminal.
- 2. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector. Measure the resistance between the B 1 and the B7 terminal.



- If resistance is more than 0.2 K $\Omega$ , go to step 3.
- If resistance is less than 0.2 KΩ, the SRS unit is faulty, substitute a known good SRS unit and recheck the voltages according to the chart on page 23-330.
- 3. Disconnect the cable reel harness and main harness's 6-P connector, and connect the SRS test harness C only to the cable reel harness side 6-P connector.
- 4. Measure the resistance between the No. 4 terminal and the No. 5 terminal.

(cont'd)

- Troubleshooting (cont'd)-



- If resistance is more than 0.2 KΩ, go to step 5.
- If resistance is less than 0.2 KΩ, the SRS main harness is faulty: replace the SRS main harness and recheck the voltages according to the chart on page 23-330.
- Disconnect the airbag assembly and cable reel harness 3-P connector, and connect SRS test harness C to the airbag assembly harness's 3-P connector. Measure the resistance between terminals No. 7 and No. 8.



faulty: replace the **airbag** assembly and recheck the voltages according to the chart on page **23-330**.

Mode E: SRS No. 1 fuse open.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the **airbag** assembly (See page **23-324**).

- 1. Connect the SRS test harness B between the **SRS** unit and SRS main harness 18-P connector.
- 2. Reconnect the battery positive terminal and negative terminal.
- 3. Measure the voltage between the B 13 terminal and body ground with the ignition switch ON.



- If there is battery voltage, the SRS unit is faulty; replace and recheck the voltages according to the chart on page 23-330.
- If less than battery voltage, the main harness is faulty; replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

Mode F: SRS indicator wire harness open or short.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the **airbag** assembly (See page **23-324**).

- 1. Reconnect the battery positive terminal and negative terminal.
- 2. Disconnect the SRS main harness's 4-P connector from the floor wire harness.
- 3. Measure the voltage between the No. 1 terminal and body ground on the SRS main harness 4-P connector side, with the ignition switch ON.



• If voltage is more than 9 V, go to step 6.

4. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector. Check for continuity between the B1 1 terminal and body ground.



- If there is continuity, the SRS main harness is faulty: replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.
- If there is no continuity, go to step 5.

(cont'd)

### -Troubleshooting (cont'd) -

5. Check for continuity between the B11 terminal of the SRS test harness B and No. 1 terminal of the SRS main harness's 4-P connector.



- If there is continuity, the SRS unit is faulty; replace and recheck the voltages according to the chart on page 23-330.
- If there is no continuity, the SRS main harness is faulty; replace the SRS main wire harness and recheck the voltages according to the chart on page 23-330.

 Connect the SRS main harness's 4-P connector to the floor harness, then disconnect the floor harness's 30-P connector from the gauge assembly, and measure the voltage between the No. 9 terminal and body ground with ignition switch on.



- If voltage is less than 9 V, the floor wire harness is faulty; repair open or short in BLU wire of the floor wire harness and recheck the voltages according to the chart on page 23-330.
- If voltage is more than 9 V, the SRS indicater circuit is faulty (in the gauge assembly); replace the gauge assembly and recheck the voltages according to the chart on page 23-330.



Mode G: SRS unit ground and component ground open.

CAUTION: Disconnect the battery negative terminal and then disconnect the positive terminal. Connect the short connector to the **airbag** assembly. (See page **23-324**).

- 1. Connect the SRS test harness B between the SRS unit and SRS main harness's 18-P connector.
- 2. Check for continuity between the B5, B15 terminal and body ground.



 If there is no continuity, the SRS unit ground, the control unit component grounds or the main harness is faulty; check the ground (check wire and control unit mounting bolts.) and, if necessary, replace the main harness and recheck the voltages according to the chart on page 23-330.



### - Airbag Assembly Removal -

A WARNING Store a removed **airbag** assembly with the pad surface up, if the **airbag** is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

#### CAUTION:

- Do not install used SRS parts from another car. When repairing, use only new SRS parts.
- Carefully inspect the **airbag** assembly before installing. Do not install an **airbag** assembly that shows signs of being dropped or improperly **han**died, such as dents, cracks or deformation.
- Always keep the short connector on the **airbag** connector when the harness is disconnected.
- Do not disassemble or tamper with the **airbag** assembly.
- 1. Disconnect the battery negative terminal, then disconnect the positive terminal.
- 2. Remove the maintenance lid A below the airbag, then remove the short connector.

- 3. Disconnect the connector between the airbag and cable reel.
- 4. Connect the short connector to the airbag side of the connector.



5. Remove the 3 TORX[®] bolts using TORX[®] T30 bit, then remove the airbag assembly.







### Airbag Assembly Installation –

#### CAUTION:

- Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts.
- Be sure the battery cables are disconnected.
- 1. Place the airbag assembly on the steering wheel, and secure it with new TORX [®] bolts.



10 N·m (1.0 kg·m, 7 lb-ft) AIRBAG ASSEMBLY Replace.

2. Disconnect the short connector from the airbag connector.



- 3. Connect the airbag 3-P connector and cable reel 3-P connector.
- 4. Attach the short connector to lid A, then reinstall the lid on the steering wheel.
- 5. Connect the battery positive terminal and then connect the negative terminal.
- 6. After installing the airbag assembly, confirm proper system opration:
  - Turn on the ignition to II: the instrument panel SRS indicator light should go on for about 6 seconds and then go off.
  - Confirm operation of horn buttons.
  - a Confirm operation of cruise control set/resume switch.

### - Airbag Assembly Disposal

Before scrapping any **airbag** assembly (including one in a whole car to be scrapped) the **airbag** must be deployed. If the car is still within the warranty period, before deploying the **airbag**, the Acura District Service Manager must give approval and/or special instructions.

Only after the **airbag** is already deployed (as the result of vehicle collision, for example) can the normal scrapping procedure be done.

If the **airbag** appears intact (not deployed) it should be treated with extreme caution.

Follow the procedure, described below.

### Airbag Deployment: In-Car

NOTE: If an SRS car containing an intact airbag is to be entirely scrapped, the **airbag** should be deployed while still in the car.

It should not be considered a salvageable part and should never be installed in another car.

**WARNING** Confirm that the **airbag** assembly is securely attached to the steering wheel; otherwise. severe personal injury could result during **airbag** deployment.

- 1. Disconnect both the negative cable and positive cable from the battery.
- 2. Confirm that the special tool is functioning properly by following the check procedure on the label of the tool set box, or on page 23-341.
- 3. Remove the maintenance lid A, below the **airbag** assembly.

4. Disconnect the connector between the **airbag** and cable reel.



5. Cut off the **airbag** connector and connect the special tool alligator clips to the **airbag**. Place the special tool approximately thirty feet away from the **airbag**.



SHORT CONNECTOR

- +

- 6. Connect a 12 volt battery to the tool:
  - If the green light on the tool goes on, the airbag igniter circuit is defective and cannot be deployed. Go to Damaged Airbag Special Procedure.
  - If the red light on the tool goes on, the airbag is ready to be deployed.
- Push the tool's deployment switch. The airbag should deploy (deployment is both highly audibe and visible - a loud noise and rapid inflation of the bag, followed by slow deflation of the bag until it hangs loosely).
  - If audible/visible deployment happens and the green light on the tool goes on, continue with this procedure.
  - If deployment does not happen, yet the green light goes ON, the airbag igniter is defective and cannot be deployed.

Go to Damaged Airbag Special Procedure.

A WARNING During deployment, the **airbag** assembly can become hot enough to burn you. Wait thirty minutes after deployment before touching the assembly.

8. Dispose of the complete airbag assembly. No part of it can be reused.

#### Airbag Deployment: Out-of-car.

NOTE: If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed as follows:

**A** WARNING Position the **airbag** assembly face up, outdoors on flat ground at least thirty feed from any obstacles or people.



- 1. Confirm that the special tool is functioning properly by following the check procedure on this page or on the tool box label of the Tool Box.
- 2. Disconnect the short connector from the airbag harness.

Follow the remaining steps 5,6,7 and 8 of the in-car deployment procedure.

#### Damaged Airbag Special Procedure.

A WARNING If an **airbag** assembly cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

- 1. If installed in a car, follow the removal procedure on page 23-338.
- 2. In all cases, make sure a short connector is properly attached to the airbag assembly harness.
- 3. Package the airbag assembly using exactly the same packaging that a new replacement airbag assembly came in.
- Make the outside of th box "DAMAGED AIRBAG-NOT DEPLOYED" so it does not get confused with your parts stock.
   If applicable, also note on the box the VIN of the car from which it was removed.
- Contact your ACURA District Service Manager for the method and address to return it to ACURA for disposal.

#### **Deployment Tool: Check Procedure.**

- 1. Connect the yellow clips to both switch protector handles on the tool; connect the tool to a battery.
- 2. Push the operation switch: green means tool is OK; red means tool is faulty.
- 3. Disconnect the battery and the yellow clips.

### -Cable Reel Removal

**A** WARNING Store a removed **airbag** assembly with the pad surface up. If the **airbag** is improperly stored face down, accidental deployment could propel the unit with enough force to cause serious injury.

#### CAUTION:

- Carefully Inspect the **airbag** assembly before installing. Do not install an **airbag** assembly that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not disassemble or tamper with the airbag assembly.
- 1. Disconnect the battery negative terminal, then disconnect the positive terminal.
- 2. Make sure the wheels are aligned straight forward.
- 3. Remove the dashboard lower panel then disconnect the foot light connector and lights-on chime connector from the dashboard lower panel.

 Remove the steering wheel maintenance lid A, and disconnect the cable reel harness and airbag assembly 3-P connector. Connect the short connector to the airbag assembly.



5. Remove the upper and lower column covers.







- 6. Disconnect the connector between the cable reel and main harness.
- 7. Remove the airbag assembly from the steering wheel, then remove the steering wheel nut.



8. Disconnect the connectors from the horn and cruise control set/resume switches then remove the airbag connector from its clips.

- 9. Remove the steering wheel from the column.
- 10. Remove the cable reel and cancel sleeve.





#### -Cable Reel Installation

CAUTION:

- Before installing the steering wheel, the front wheels should be aligned straight forward.
- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.
- After reassembly, confirm that the wheels are still straight ahead and that steering wheel spoke angle is correct. If minor spoke angle adjustment is necessary do so only by adjustment of the tierods, not by removing and repositioning the steering wheel.
- 1. Align the cancel sleeve grooves with the cable reel projections.



2. Carefully install the cable reel and the cancel sleeve to the steering column shaft.



- 3. Install the steering column upper and lower covers.
- 4. Center the cable reel.
  - Do this by first rotating the cable reel clockwise until it stops.
  - Then rotate it counterclockwise (approximately two turns) until:
  - The yellow gear tooth lines up with the mark on the cover.
  - The arrow on the cable reel label points straight up.



- Install the steering wheel and insert the cruise control set/resume 4-P connector and airbag connector to the steering wheel clips.
- 6. Connect the horn connector.





- 7. Install the steering wheel nut.
- 8. Install the airbag assembly.



- 9. Connect the harness from the cable reel to the SRS main harness below the pedal bracket.
- 10. Connect the foot light harness and lights-on chime to the dashboard lower panel, then install the lower panel.

11. Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.

NOTE: Attach the short connector to lid A, then install the lid.

- 12. Connect the battery positive terminal, then connect the negative terminal.
- 13. After installing the cable reel, confirm proper system operation:
  - Turn on the ignition to II; the instrument panel SRS light should go on for about 6 seconds and then go off.
  - Confirm operation of horn buttons.
  - Confirm operation of the lighting and wiper switches.
  - Confirm operation of cruise control set/resume switch.
  - Rotate the steering wheel counterclockwise until the yellow gear tooth lines up with the slot on the cover.





### **Dash Sensors Removal**

#### CAUTION:

- Do not damage the sensor wiring.
- Do not install used SRS parts from another car, When repairing: use only new SRS parts.
- Carefully inspect the front sensors for signs of being dropped or improperly handled, such as dents, cracks or deformation.
- 1. Disconnect the battery negative terminal, then disconnect the positive terminal.
- 2. Remove the maintenance lid A below the airbag, then remove the short connector.



- 3. Disconnect the connector between the airbag and cable reel.
- 4. Connect the short connector to the airbag side of the connector.
- 5. Remove the dashboard lower panel.

6. Pull back the carpeting and disconnect the conritector between the dash sensor and SRS main harniess.



7. Remove the 2 dash sensor mounting bolts from the sensor bracket, then remove the dash sensor





### -Dash Sensors Installation

#### CAUTION:

- Be sure to install the harness wires so that they are not pinched or interfering with other car parts.
- Replace a sensor if there are any signs of dents, cracks or deformation.
- For the SRS to function properly, the right and left sensors must be installed on the proper sides.
- 1. Be sure the battery cables are disconnected.
- 2. install the sensor and sensor harness.

- 4. Connect the battery positive terminal, then connect the negative terminal.
- 5. After installing the dash sensor, confirm proper system operation.
  - Turn on the ignition to II: the instrument panel SRS indicator light should go on for about 6 seconds and then go off.



- Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.
  - NOTE: Reinstall the short connecter, then put the maintenance lid A back in position.

### - SRS Unit Assembly Removal

#### CAUTION:

- Always keep the short connector on the airbag connector when the harness is disconnected.
- Do not damage the pins of connectors.
- No serviceable parts inside.
- Do not disassemble or tamper.
- Store in a clean, dry area.
- Do not use any SRS unit which has been subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- 1. Disconnect the battery negative terminal, then disconnect the positive terminal.
- 2. Remove the maintenance lid A below the airbag, then remove the short connector.



5. Pull down the carpeting from the front console.



- 6. Disconnect the SRS unit connector, then unclip the SRS main harness from the holders.
- 7. Remove the SRS unit mounting bolts (4).
- 8. Pull out the SRS unit from the passenger's side.




## - SRS Unit Assembly Installation 4. CAUTION: Be sure to install the SRS wiring so that it is not pinched or interfering with other car parts. 1. Install the SRS unit. stall the lid. TORX [®] BOLTS 6 mm 10 N·m (1.0 kg-m, 7.2 lb-ft) Replace. AIRBAG -CONNECTOR TORX ® BOLTS 6 mm 10 N-m (1.0 kg-m, 7.2 lb-ft) Replace. SHORT CONNECTOR 2. Clip the SRS main harness into the harness holder, then connect it to the SRS unit. NOTE: To reinstall a connector, push it into posi-6. system tion until it clicks. 3. install the carpet.

I

 Disconnect the short connector from the airbag connector and connect the cable reel and airbag harness.

NOTE: Attach the short connector to lid A, then install the lid.



- 5. Connect the battery positive terminal, then connect the negative terminal.
- After installing the airbag assembly, confirm proper system operation:
  - Turn on the ignition to II: the instrument panel SRS indicator light should go on for about 6 seconds and then go off.

## 23-349

## Wiring Diagrams

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Automatic Transmission Control System	16
Battery	1
Blower Controls	20
Charging System	1
Cigarette Lighter	10
Clock	.9
Cooling Fan Control	2 2
Cruice Centrel	4
Deferrer Deer Window	10
Derogger, Rear Window	12
Electric Power Steering (EPS)	19
Fuel Injection System	14
Gauges	2
Heater Control	20
Horns	10
Ignition Switch	.1
Ignition System	1
Indicator	
Brake Warning	3
Kev-on Reminder	6
Lights-on Reminder	6
Low Fuel Indicator	3
Oil Pressure Warning	3
Safety Indicator	1
	4
Seal Dell nemina es.	5
Shift Level Positionandicator	5
	0
Interlock System	5
Lights, Exterior	_
Back-up Lights	9
Brake lights	4
Front Side Marker Lights	6
Daytime Running Lights	7
Hazard Lights	9
Headlights	7
License Plate Lights	8
Rear Side Marker Lights	8
Taillights	8
Turn Signal Lights	9
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Lights, Interior	
Ashtray Lights	10
Courtesy Lights	4
Dashlight Brightness Control	8
Dome Light	4
Entry Light Timer	6
Foot Light	6
Glove Box Light	8
Ignition Key Light	6
Trunk Light	4
Lighting System	
Locks, Power	11
Mirrors, Power	11
Opener, Trunk	1 1
Seat, Power	12
Security Alarm System	16
Starting System	1
Stereo Sound System	10
Supplemental Restraint System (SRS)	20
Side Marker/Turn Signal/Hazard	
Flasher System	9
Traction Control System (TCS)	18
Washer, Windshield	13
Windows, Power	12
Wipers, Windshield	13



























BAT No.9(120A) ACC WHT RED-ACC W H T - 1<u>6</u>2

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## Fuel-Nected System Connectors





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	·	*											
					1.1							•	
		C197	C152		C160			C40	)7		C473		2
	C106			1	() INI		I M BED3	1 1	GBN/WHT	11 BRN/YEL	1 WHT/BLK	6 LT GRN/WHT	BLK/YEL
	(1) GRN/WH14	CO RED/BCK	BIKAK			DIVE		ーち	BIK	12	2 WHT	7 PNK/BLK	2 BLK/WHT
	3 BLU	WHI/BLU	C IBLK/TEL					115	PLU	13 DI KANINT	3 VEL/BLK	9 BUIVELK	
		C139	C154 (ECILA)				C BLUKDER		WUT/RIK	14	A BUIDANHT	9 GBN/RED	C532
	C107					N/RED	BLO/RED	ᅱ┝ᢟ	WINDER	15 DAIL DAGUT	E OPN	() PED/CON	1 BLK/YEL
	() YEL	C RED/BLA	() MINT (DI L)	CO DED/DLU2	5 RE	D/BLU	GRN/WHT*	112	DED AVEUT	15 PNK/WHI	5 1044	I I NED/GRIN	BLK/YEI
	2	@  BLN/RED	C WHI/BLU	G RED/BLO	6 YE	L/RED	(19 YEL/WHT ²	112	RED/WHI	16 ORN/WHI	C480 (ECULE)		
	<b></b>	C129	C NED	US PNK	1 BLI	K/YEL	16 YEL/GRN	112	WHT	17 BRN/WHT			@ BED/BLU!
			(a) BLK/HED	17	(8) GR	IN/BLK	1 BLU	8	PNK/ORN	18 GRN/BLK			(G) GBN
	GRN/WHIT	C NEL	() OHN	(B) BLU/RED	9 BL	<u>K</u>	BLK/WHT	J D	YEL/BLU	19 YEL			0 0503
	(2) RED/WHI		(C) YEL	19				10	YEL/BLU	20 RED/BLK	O RILLIOLK		I I NED
	C113 (M/T)	C140	GRN/BLK	20 GRN	10161	000		7			CO/BLK		C533
	TO UT GRN	() GRN/WHT ²	I RED ²			GRN	I GRN						() GBN/WHT ²
	C LT GILL		BLU/RED	2 WHT/GRN	2 BR	IN/WHT	12 PNK	110	BLK/YEL		BLU/RED		() BRNI
			BLK1	3 BLK ²	3 PN	IK	13 BRN	1 12	WHT/BLK		() BLU/YEL		
	(3) HLK	C141	(1) RED ³	BLK ²	④ BL	.K/YEL	BLU/BLK	1					
	C118	() YELOWHT ²	BLK/BLU	YEL/BLK	S YE	EL/BLK	1 BLU	1 14		Lac Di Kanat			C534
		(2) WHT/GRN	BLU BLU	BRN/BLK	6 RE	D ²	1 RED/GRN	11-	RED/YEL	16 BLK/WHI	C481, C482		() WHT ²
	GRAVWH				1 BL	K/RED	17 WHT/GRN	12	BLK/WHI	17 GRN/RED	1 (1) YEL/BLU		CONIDARITI
	(2) BLU/RED	GRIMWIT	C155 (ECU-B)		I BL	.K ²	I WHT/YEL	1   3	ORN/WHT	18 GRN/BLK	2 BLK ²		
	3 TEL/WHIT	C142	1	ORN	(9) YE	EL/BLU	19 WHT/BLU	]   ⁴		19 BLU	3 YEL/BLK		6772
	C119	(1) WHT/RED	② BRN/WHT	1 WHT	1 RE	D/WHT	20 BLU/WHT	] [5	RED/GRN	20 GRN/BLU	BLK/WHT		
A 3 2 1		2 YEL/BLU	③ WHT/RED	1 BLU/GRN			· · · · · · · · · · · · · · · · · · ·	6	LT GRN/WHT	21 BRN/BLK	(5) BLK/YEL		
		3 WHT/BLU	WHT/YEL	BLU/YEL	C172		C173	_ 17	GRN/YEL	22 YEL/BLK	BLK/YEL		(2) BLK/RED
4 13 12 11 10 9	BLR/TEL	A BIK/YEI	5	( ORN/BLU'	1 (1) WI	HT ¹	1 ORN	8	) LT GRN	@ GRN	3 BLK/YEL		
			6 WHT/BLU	WHT/BLU ¹	2 -		2	9	RED/BLK	24 LT BLU	I GRN/BLK		
31	C121	C143	① LT GRN	(1) ORN/BLU ²	1			10	RED	25 GRY/WHT			
		O WHT/BLK	WHT/BLK	(16 WHT/BLU ²	C227		C228	- 1	GRN	26 YEL/BLU	C483		
8 7 6 - 5 4 3 2 1		WHT/GBN			1 YE	EL/BLK	1 YEL/BLK	10	YEL	27 WHT/BLU	1 GRN/BLK	7 BRN/BLK	
0 10 17 16 15 14 13 17 11 10	<u>ل</u> ے۔۔۔۔۔	() JANHT	C156 (ECU-C)		2 PN	NK/ORN	2 WHT/BLU	1 11:	3 BLK	28 YEL/GRN	2 YEL/BLK	8 BLK	
3 10 17 10 13 14 10 14 10	C122	C WHIT	10 YEL/BLK	(7) PNK	3 RE	D/BLU ²	3 BLU/RED	1 14	BLU/WHT	(3) BLU	③ BLU/BLK	9 BLU/RED	
·	CO GBN/WHT2	(a) WHITINED	2 YEL/RED	(8) GRN/YEL	4. RE	ED .	4 BLK		5 ORN/BLK	30 YEL/RED	4 ORN/BLU	10 GRY/BLK	
	O PLURIK	G WHITTEL	3 BILL/BLK	() BU							5	11 LT GRN	1
		6 WHI/BLO	(A) GRN	WHT/BED	C318			C4	25		6 BLU/WHT	12	
	C123	C144	(B) BED/GPM		1 BL	LK		<b>1</b>	GRN/BLU	7 LT BLU	]		
	(O WHT			() BERV	2 85	RN/BLK		12	BRN/BLK	8 BLK	C489	C491	
	O WHT/GBN	GUNUT	( Introduced		3 RE	ED/GRN			GRN/YEL	9 GRN/BLK	1 YEL/BLU	① YEL	
		2 WH1	C157 (FCU-D)		(4) BL	LK			LIT GBN/WHT	10 YEL	2 BLK	② BLK/YEL	
•	G HELT DI K	3 BLK	( JUNHTONE)	D MILT/CPM	1				RUUOPN	(D) CRYANHT	3 BLK	3 RED ²	
,	WHITBLK	(4) BLK/YEL		C PEDOMINT	C404				GRN	12	4 YEL/WHT	(A) BLK/RED	
	G WHI/BLO		( OPN	C MALT	1 I W	/HT/BLU	9 YEL/WHT	שך			5	1	
	BLK	G Topping 11			2 W	/HT/BLU	10 GRN/WHT	-] c₄	39	C458	6 BLK/BED	1 .	
	() WHI/YEL	() ORIV/BLO		CO RED/BLK	3 BF	RN/RED	(1) BLK/WHT	า เล	BLK	(D LBLK		3	
-	(8) WHI/RED	2 WHI/BLU	G DIKINCHED	( RED/BLO	4 G	RN/YEL	12	15	BLU/OBN	(2) GBN/WHT ²	C500		
	C120	3 WHI/BLO-	BLK/RED		5 YE	EL/GRN	13	16	PNK		1 LT BLU	11 BLU/GRN	
	C130	(4) ORN/BLU4		(B) BLU	6 YI	EL/RED	(1) YEL	- 13			2 BLU/WHT	12 WHT/GRN	
		(5) BLU/GRN	BRN	(19) YEL/WHT	171-		(B) YEL	1 24	68		3 WHT/BLU	13 RED/BLU1	
	C NEL MANTZ	6 BLU/YEL	(9) WHT/RED	W YEL/WHT	8 65	BN/YEL	16 YEL	10	RED/BLU	11 WHT/BLU	GRN	14 GRN/WHT	
		WHT	10	(1) GRN/WHT	╡└╧╜╩			- [3	WHT/YEL	12 BRN/WHT	S YEL/WHT2	15 YEL/WHT ¹	
	C132	ORN	BED/YEL	3 GRN/WHT2	C406			1	BRN	13 WHT/BLK	6 GRN/RED	16 WHT2	
					1 1	NK	10 BLK/YEL	7 6	WHT/YEL	14 GRN/WHT	(7) BRN	17 GBN/WHT2	
	(1) BRN/WHT	C148	0158		7 2 R	ED/BLK	(1) BLK/YEL	11	5 BLK/BLU	15 GRN/YEL	BED2	18 WHT/GBN	
	G WHT1	() GRN/WHT2	1 YEL	I WHT/BLK	3 8	ED/BLK	12 BLK/BED +	-11-	BLK	16 RED/YEL	9 GRN/VEI	19 IT CPN	
		2 RED/BLU	2 BRN	(1) GRN/YEL	1 1 10	ED/BLK	13 GBM/WHT	-115	7 PNK/BLU	17 BLU/ORN			
	C133	3 BLK/BLU	3 GRN/WHT	11 BRN/BLK		IV IV	14	-117	3 WHT/BLU	18 YEL		20 BLO/TEL	J
		BLK/YEL	YEL/WHT	I GRY		LF	14	-113	BLU	19 WHT/YEL	0521		
	O VEL/BLK		5 RED	13 BLK			10 DLK	니片	0 BLK/GBN	20 PNK/BLK		11 BED/BLK	
	C TEC/DEK	C149	YEL/RED	14 GRN		EL/BLK	10 BLK	ᅴᄔ	<u>.</u>		2 050/04/1	A DIKING	
	C124	1 RED/BLK	7 WHT/GRN	15 ORN	8 1	EL/BLK	17 TEL/BLK	~ 64	169		2 RED/BLU	BEIC/TEC	
		② RED/BLK	WHT/RED	(B) BLU	] [9][6	RN/BLU	18 YEL/BLK	Ξ L	1 BED/WHT	(1) BLU/RED			
	3 BRN	③ RED/BLK	1		-			1	2 YEL/WHT	11 GBN/BLK	TEL/BLK	14	
		4	C159		_			H	BUINNHT	12 OBN/BULL	GRN/WHT	15 GHN/BLU	<u> </u>
	C135	5 RED/BLK	1 BRN/WHT	5 RED	1			H	4 1811	13 CRNIANHT	GRN/YEL	16	
	( RED/BLK	RED/BLK	② RED/BLU ²	BLU/BLK	3			H		14 CBY	1171-	17 YEL/WHT	{
	@ BED'	7 RED/BLK	3 BLK	3 BLU				E	BRN/BLK	15 17 BUL	8 RED/BLU	18 WHT/BLU	
		(8) YEL/BLK	BLU/RED	8 YEL/BLK	1		:	H		16 OPN/0ED	9 RED/ORN	19	
	C136	*			_				2 PED (PL1)2	17 OPN/DLY	1101	1 20   BLK	
	① RED/BLK	C151	_					- 14	B/ RED/BLU*	17 URN/BLK	-		
	2 ORN	① GRN							9 IGRY/WHI	I IO YEL/RED	1		
	استعمر ومنتزز والمحي	2	-										

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example YEL/BLK¹ and YEL/BLK² are not the same).

O: Related to PGM-FI SYSTEM *: CANADA

