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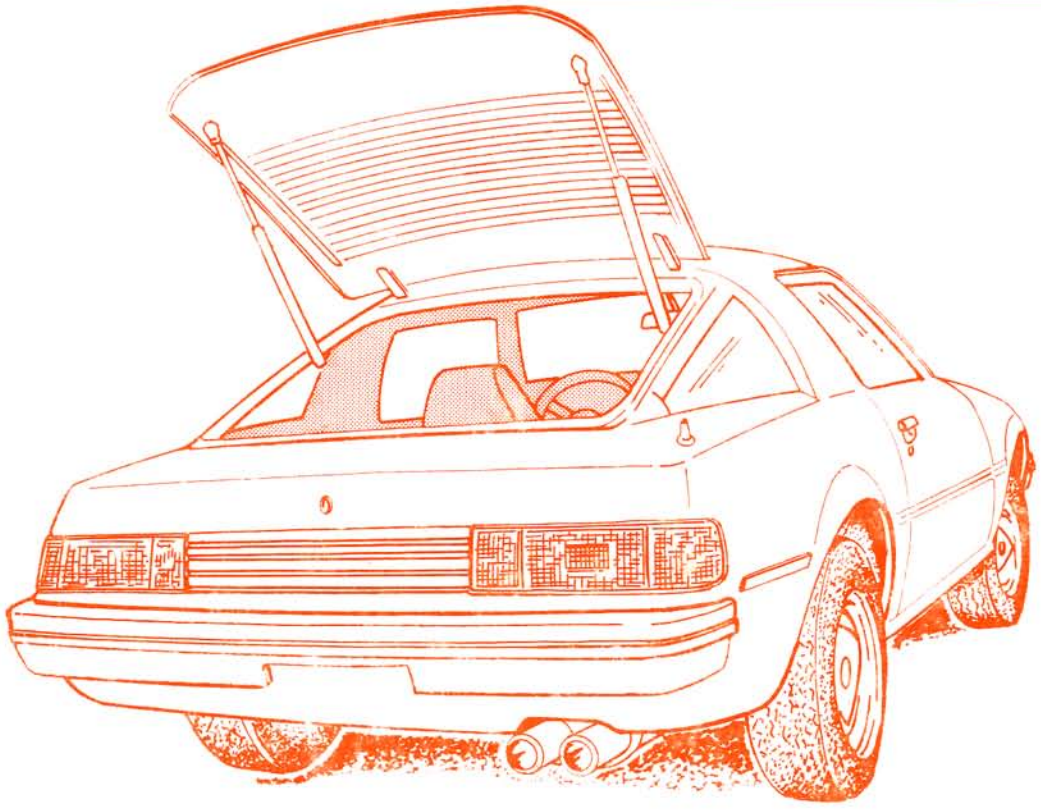
This version is provided as a service for owners of first generation Mazda RX-7s who are having a devil of a time locating the factory service manuals and dealer mechanic's materials for a reasonable price.
If you really want to send me money, email me and I'll tell you where to send it, but it's not necessary. Consider this payback for all the good advice and information gleaned from the various RX-7 email lists!

Subscribe to the Early Mazda Rotaries email list:
Send an email with "subscribe" (without the quotes) to list-request@sa22c.org
See http://www.dfw-rx7.com for information on the DFW-RX7 email list.

07/26/05

Mazda RX-7 626

1981 TRAINING MANUAL



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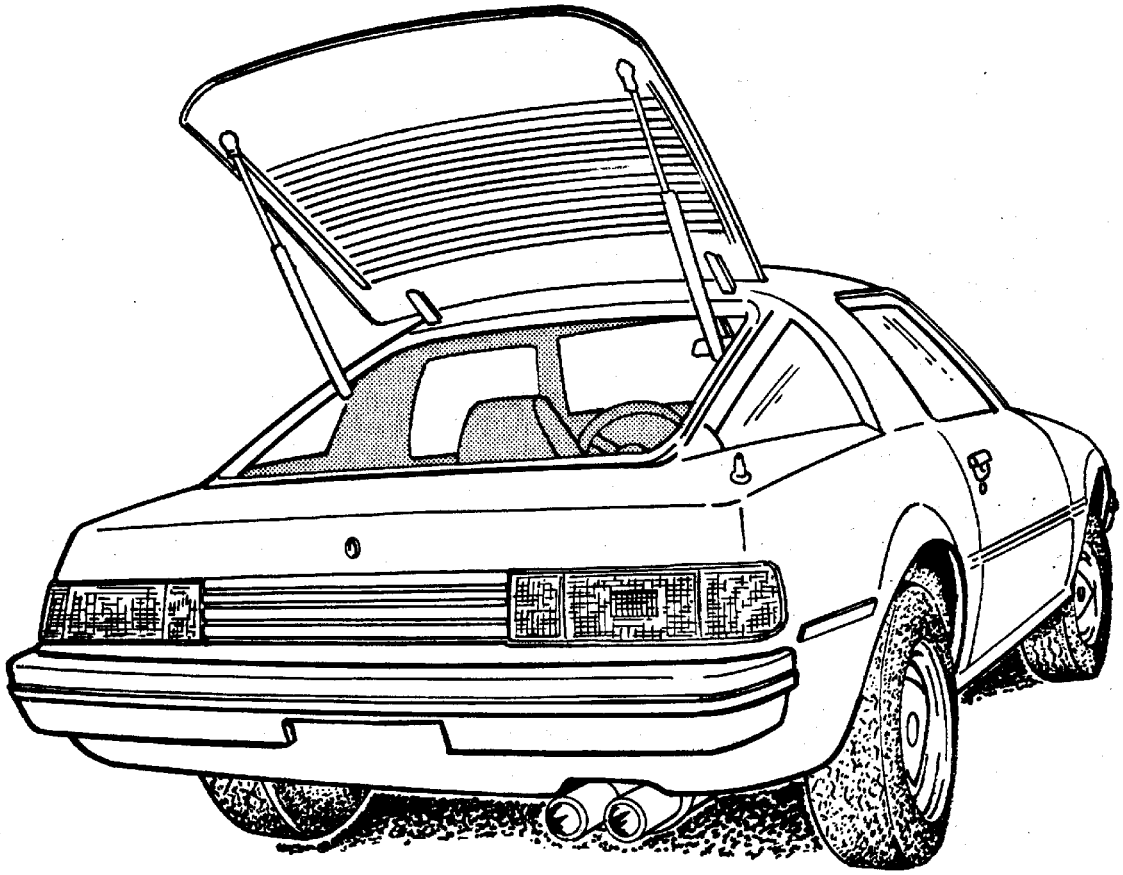
Mazda RX-7 626

1981 TRAINING MANUAL



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INDEX

General

MAJOR CHANGES FOR 1981

GLC

- All new styling and front wheel drive design
- New low resistance 1500 cc engine
- 4/5 speed manual or automatic transaxle
- Rack and pinion steering
- Tilt steering wheel
- Sunroof (manual)
- Self-adjusting rear brakes

GLC Wagon

- New low resistance 1500 cc engine

NOTE: The GLC Wagon is still equipped with rear wheel drive and its styling is the same as the 1980 model. The emission control system is updated and very similar to the front wheel drive GLC.

626

- New front and rear end styling
- New instrument panel and center console styling
- Power steering
- Power windows
- Child-proof power door locks (Sedan only)
- Power sliding sunroof
- Tilt steering wheel
- Cruise control
- Illuminated ignition key cylinder
- Illuminated door key cylinder
- Head lamp cleaner (Canada)
- Self-adjusting rear brakes

RX-7

- New front and rear end styling
- New GSL model added with many special features
- Restyled interior and upgraded upholstery
- Adoption of catalyst system and fuel economy improvement
- Power windows
- Remote control side mirrors
- Rear window wiper and washer
- Oil pressure gauge
- Cruise control
- Limited slip differential
- Rear disc brakes
- Self-adjusting rear brakes

B2000

- Exterior and interior styling is unchanged; California emissions system is slightly changed.

GENERAL — VIN

17-Digit VIN Code

Purpose

FMVSS Number 115 requires that all 1981 vehicles use a 17-digit VIN code. This number provides a more detailed description of each vehicle for identification purposes.

Code Breakdown

A.	B.	C.	D.		E.		F.	G.	H.	I.	J.
J	M	1	B	D	2	3	1	7	B	O	500001

Meaning	Remarks
A. Origin	J = Japan
B. Manufacturer	M = Mazda
C. Type	1 = Passenger car, 2 = Truck
D. Model	BD = GLC, GB = 626, FB = RX-7, UC = B2000
E. Body Style	21 = 2-dr Sedan, 22 = 4-dr Sedan, 23 = 3-dr Hatchback
F. Modification	Usually 1
G. Check Digit	For official use only
H. Year	A = 1980, B = 1981, C = 1982
I. Assembly Plant	Usually O
J. Serial Number	Beginning with 500001 (6 digits)

Example

JM1BD2317BO500001 is a 1981 Mazda GLC 3-door Hatchback

Warranty

All Vehicle Identification Numbers and letters must be correct on the new Warranty Claim Form or the claim will be rejected.

TEMPORARY SPARE TIRE

Purpose

- A new space saving lightweight spare tire is now equipped on some 1981 models. This tire is for emergency use only.

Model Application

- The chart below indicates which models are equipped with the temporary spare tire.

Model / Country	GLC	GLC Wagon	626	RX-7	B2000
U.S.A.	Yes	No	Yes	Yes	No
Canada	No	No	Yes	Yes	No

P.D.I. PROCEDURE

P.D.I. Sheet

On the following page is the P.D.I. Sheet for 1981 models. This form must be filled out while performing the P.D.I.

Changes in P.D.I. Procedure

The following adjustments are no longer necessary when performing the P.D.I. on 1981 models:

- Ignition Timing Adjustment
- Idle Mixture Adjustment (CO)
- Idle Speed Adjustment (RPM)

NOTE: The above adjustments are still required on the 626 model in Canada.

mazda 1981 PRE-DELIVERY INSPECTION SHEET (FOR U.S.A.)

The pre-delivery inspection should be done within 3 days before this vehicle is delivered to your customer.
Check and adjust each item as necessary.

Owner's Name	Dealer Name & Code No.	Stock No.	Delivery Date	
Street Address	Street Address	Chassis No.	Key Numbers Ign.	
City, State, Zip	City, State, Zip & Phone No.	Engine No.	Color	Transmission ☐std. ☐auto

EXTERIOR

- ☐ Inspect glass, exterior bright metal and paint for damage or rust.
- ☐ Tighten wheel bolts to specification.
- ☐ Adjust tire pressures to specification.
- ☐ Install wheel rings. (If equipped)
- ☐ Inspect all weather strips for damage and detachment.
- ☐ Install outside mirror.

UNDER HOOD—ENGINE OFF

- ☐ Inspect fuel, coolant and hydraulic lines, fittings, connections and components for leaks.
- ☐ Check engine oil level.
- ☐ Check oil level in steering gearbox.
- ☐ Check power steering fluid level (only for 626)
- ☐ Check brake and clutch master cylinder fluid level.
- ☐ Check windshield washer reservoir fluid level.
- ☐ Check radiator coolant level and specific gravity.
- ☐ Check tightness of water hose clamps.
- ☐ Check battery terminals, electrolyte level and specific gravity.
- ☐ Check manual transaxle oil level. (only for GLC hatchback)
- ☐ Check drive belt tensions.
- ☐ Clean spark plugs.
- ☐ Inspect carburetor linkage, choke control and wide open throttle position.
- ☐ Check sub-zero starting aid fluid level. (If equipped)
- ☐ Check throttle sensor. (Set to 1100 ± 50rpm) (only for RX-7)
- ☐ Check accelerator switch. (only for GLC)

INTERIOR

- ☐ Check front seat controls for operation. (sliding and reclining)
- ☐ Check seat belts and warning system.
- ☐ Check operation of parking brake.
- ☐ Check operation of ignition switch and steering lock.
- ☐ Check operation of inhibitor switch. (A/T only)
- ☐ Check operation of all lights and retractable headlight mechanism. (only for RX-7) (Including warning and indicator lights)
- ☐ Check operation of horn, windshield wipers and washers.
- ☐ Inspect operation and fit of windows.
- ☐ Install fuse for accessory and check presence of spare fuse.
- ☐ Check operation of cigarette lighter and clock. (If equipped)
- ☐ Check operation of radio and antenna. (If equipped)
- ☐ Inspect upholstery and interior finish.
- ☐ Check heater, defroster and air conditioner for proper air flow when various modes are selected. (If equipped)
- ☐ Install rubber stopper for room mirror. (only for RX-7)
- ☐ Check operation of sliding sunroof. (only for GLC hatchback and 626)

UNDER HOOD—ENGINE RUNNING AT OPERATING TEMPERATURE

- ☐ Check operation of throttle opener for air conditioner. (if equipped)
- ☐ Check automatic transmission fluid level.
- ☐ Check automatic transaxle fluid level. (only for GLC hatchback)
- ☐ Check carburetor float level.
- ☐ Check operation of E.G.R. valve. (only for GLC, 626 and B2000)

ON HOIST

- ☐ Check manual transmission oil level.
- ☐ Check rear axle oil level.
- ☐ Inspect underside fuel, coolant and hydraulic lines, fittings, connections and components for leaks.
- ☐ Check tires for cuts and bruises.
- ☐ Inspect steering linkage, suspension, exhaust system and all underside hardware for damage.

ROAD TEST

- ☐ Check brake operation.
- ☐ Check clutch operation.
- ☐ Check steering control.
- ☐ Check operation of meters and gauges.
- ☐ Check for squeaks, rattles or unusual noise.
- ☐ Check engine general performance.
- ☐ Check emergency locking retractors.
- ☐ Check cruise control system. (only for 626 and RX-7)

AFTER ROAD TEST

- ☐ Remove seat and floor mat protective covers.
- ☐ Check for necessary owner information materials, tools and spare tire in vehicle.

THIS VEHICLE HAS BEEN THOROUGHLY INSPECTED WITH THIS CHECK LIST.

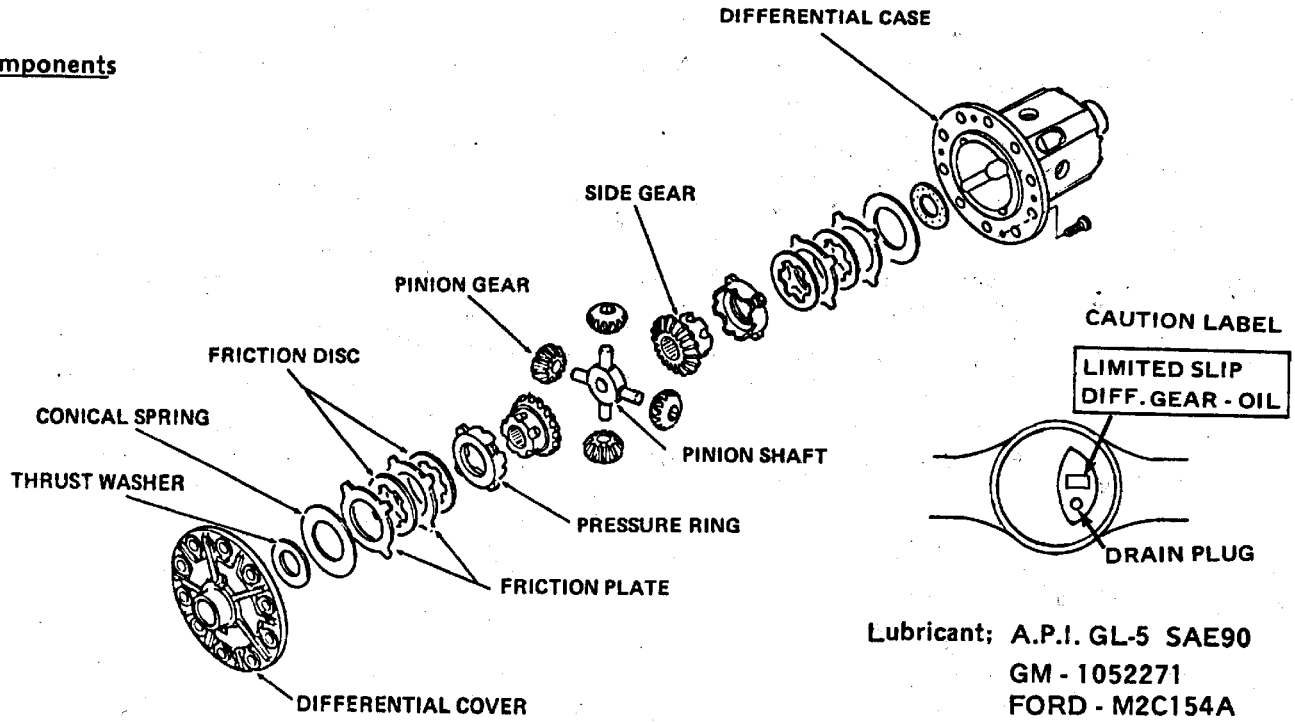
Signature of Technician	Date	Signature of Service Manager	Date	Repair Order Number	Date

RX-7

Description

The GSL model uses a limited slip differential which has multiple discs and plates to control differential operation.

Components



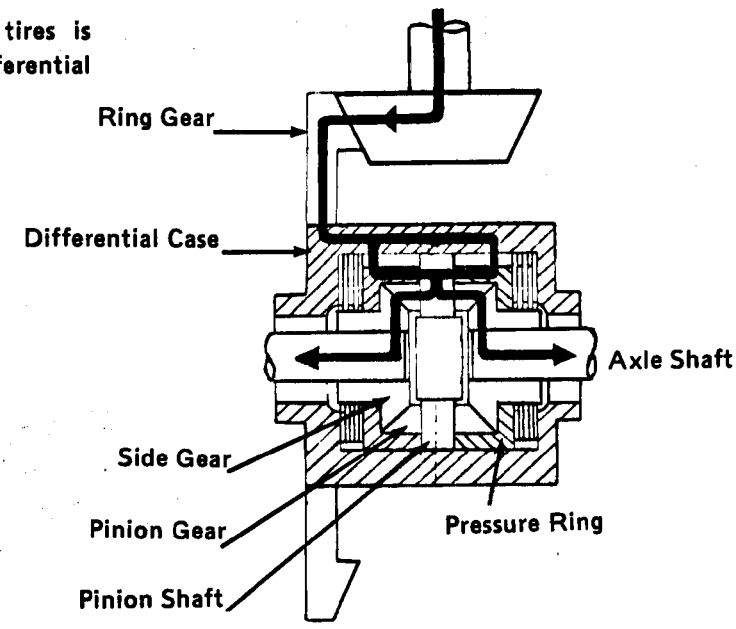
Lubricant; A.P.I. GL-5 SAE90
GM - 1052271
FORD - M2C154A

Oil Capacity; 1.6 liters

- **Differential Case:** Transfers the driving torque from the ring gear to the pressure ring.
- **Pressure Ring:** Transfers the driving torque from the differential case to the pinion shafts through 4 notches and keys.
- **Pinion Shaft:** Divides the driving torque from the pressure rings to side gears.
- **Pinion Gears:** Transfers the driving torque from the pinion shaft to the side gears.
- **Friction Discs:** Metal discs keyed to the side gear. Used to control differential slipping action.
- **Friction Plates:** Metal plates keyed to the differential case used to control differential slipping action.
- **Conical Springs:** Springs used to pre-load the friction plates and friction discs.
- **Thrust Washers:** Thrust washers are used to set the backlash between side gears and pinion gears.

Power Flow — Equal Load

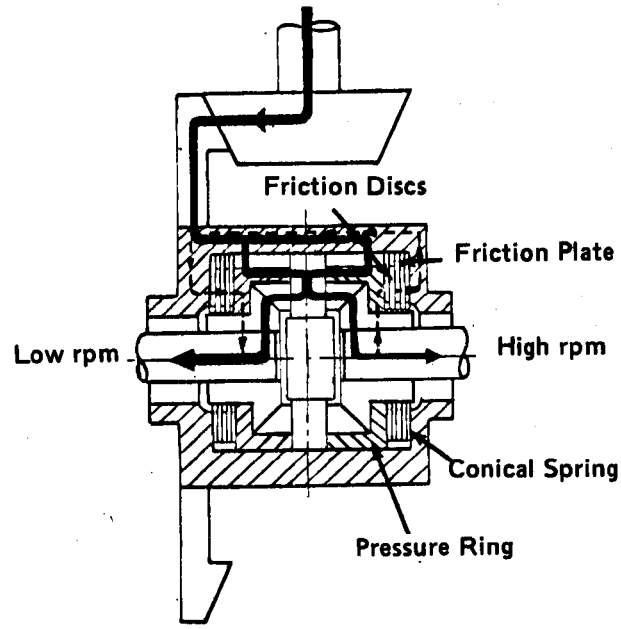
- Power flow with equal load on the tires is basically the same as a conventional differential assembly.



Power Flow — Unequal Load

- When unequal load occurs at the rear wheels, conventional differentials tend to lose traction on one side and waste energy as a result of high RPM wheel spin.
- The limited slip differential transfers the torque from the side losing traction (high RPM) through friction discs and plates to the other side (low RPM) which still has traction. This action prevents a high RPM wheel spin and loss of driving torque.

Note: Vehicles equipped with limited slip should not be operated in gear with either one or both driving wheels off the ground on jacks. With one wheel still touching the ground, the vehicle can move resulting in injury.



Preload Adjustment

To adjust the friction disc pre-load:

- Measure the thickness of the conical springs at X NOT Y.
- Then measure dimension "a" (without conical springs installed).
- Add dimension "a" to the thickness of the conical springs; $(a + x_1 + x_2)$.
- Subtract the above result from dimension "A" to obtain the clearance:

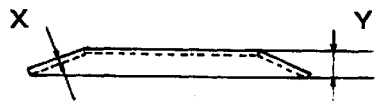
  Standard (A): 84.0 mm (3.307 in.)

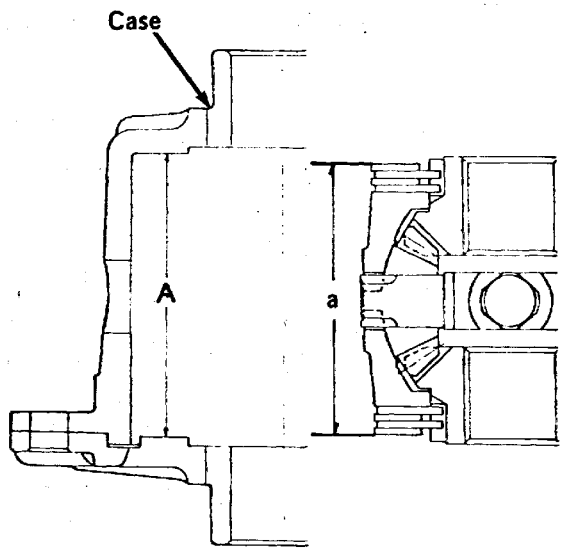
  $A - (a + x_1 + x_2)$ = actual clearance
- The standard clearance is:

  0∿ 0.20 mm (0∿ 0.08 in.)
  Limit: 1.0 mm (0.04 in.)
- If clearance is beyond limits, an oversize friction disc is available.
  Thickness of oversize disc:

  2.10 ± 0.02 mm
  (0.083 ± 0.0008 in.)

Thickness of Conical Spring





Pinion Gear to Side Gear Backlash

To adjust the backlash between the pinions and side gears:

- Measure the width of "b" with the thrust washers in place.
- Subtract measurement "b" from Dimension "B" to obtain the actual clearance.

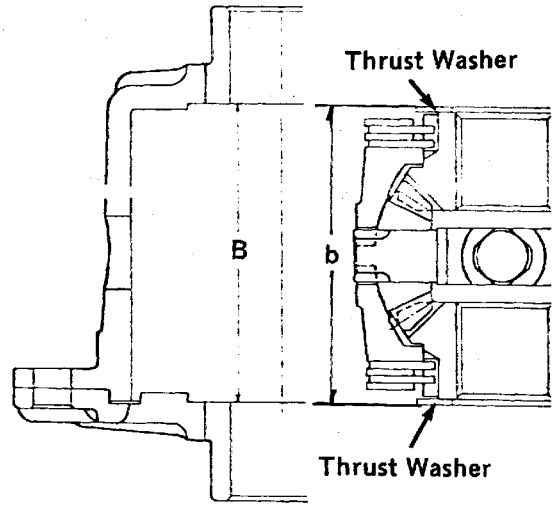
  Standard (B): 88.20 mm (3.472 in.)

  B — b = Clearance
- The clearance should be:

  Standard: 0.16∿ 0.42 mm (0.063∿ 0.0165 in)
  Limit: 0.8 mm (0.031 in)
- If clearance is beyond limits, oversize thrust washers are available:

  Thickness of oversize thrust washer:

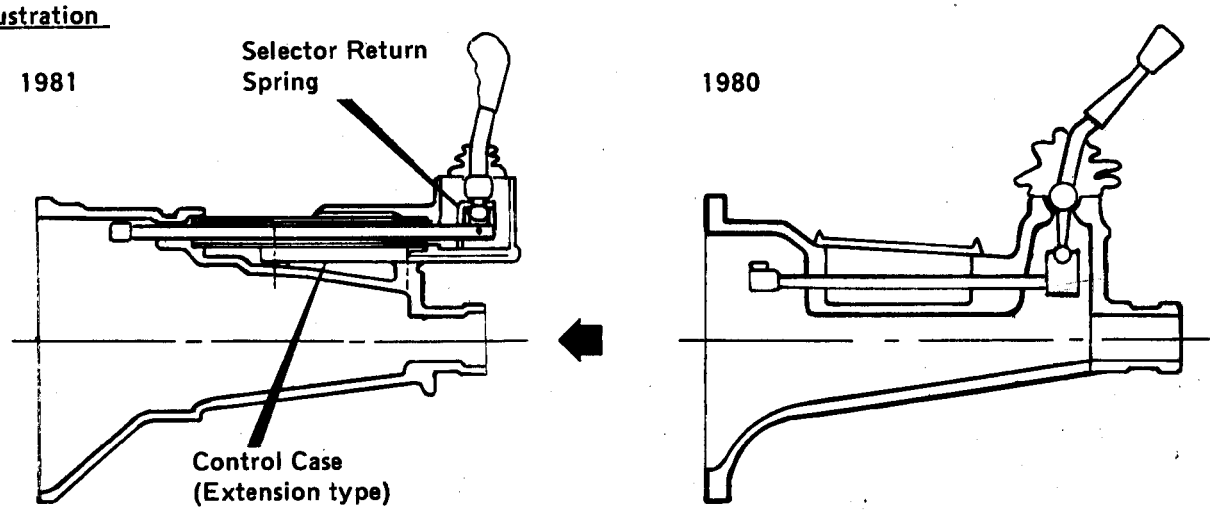
  1.80 ± 0.03 mm
  (0.071 ± 0.001 in.)



Transmission Modification

The extension housing and gear shift linkage has been changed from previous models as shown below.

Illustration



Parts Changed

- Extension housing
- Shift lever shortened from 245mm to 189mm
- Selector return spring in 1-2 shift rod end replaced by a spring at the gear shift lever.

Clutch

The clutch spring pressure has been increased from 380 to 445 kg.

Gear Lubricant

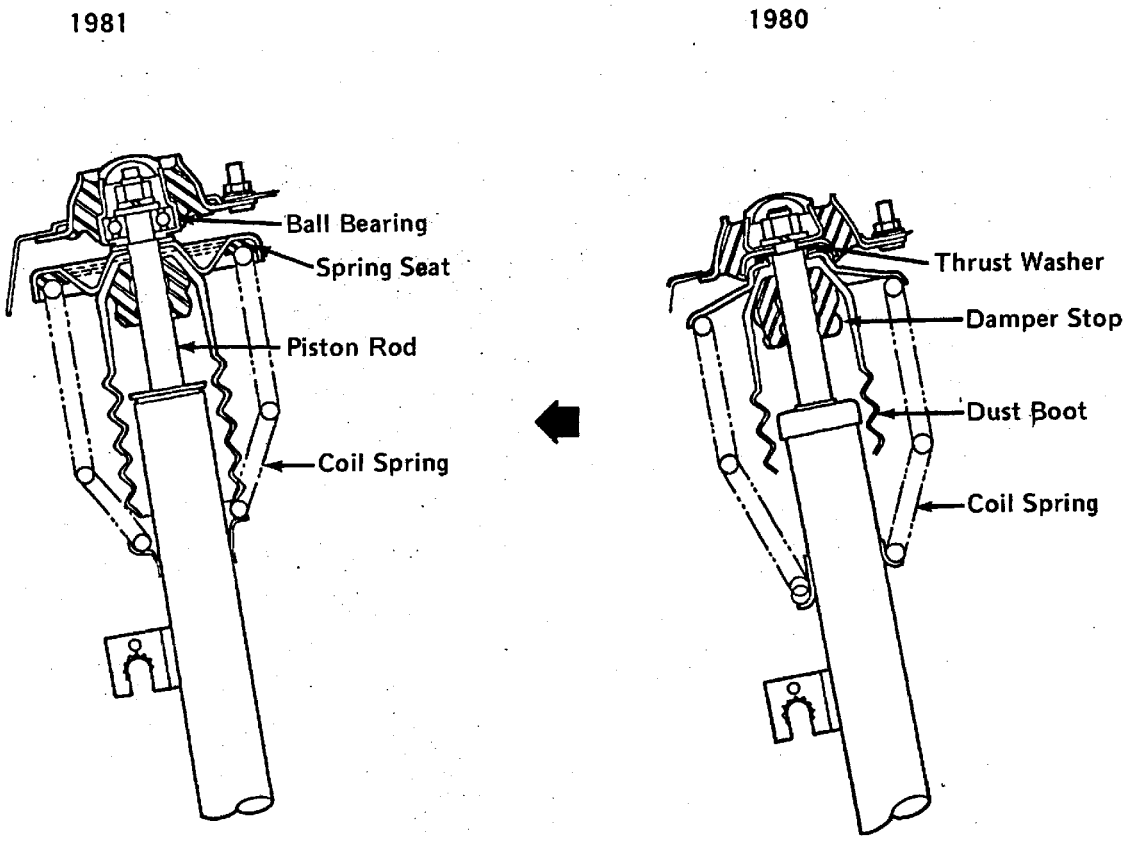
The gear lubricant for the manual transmission has been changed from 90 weight to 75W80 for improved cold weather operation.

Changes

- The front shocks have been modified to minimize road noise through the front suspension.
- A new ball bearing , rubber spring seat and spring have been added.
- These parts are not interchangeable with the old style shocks.

Illustration

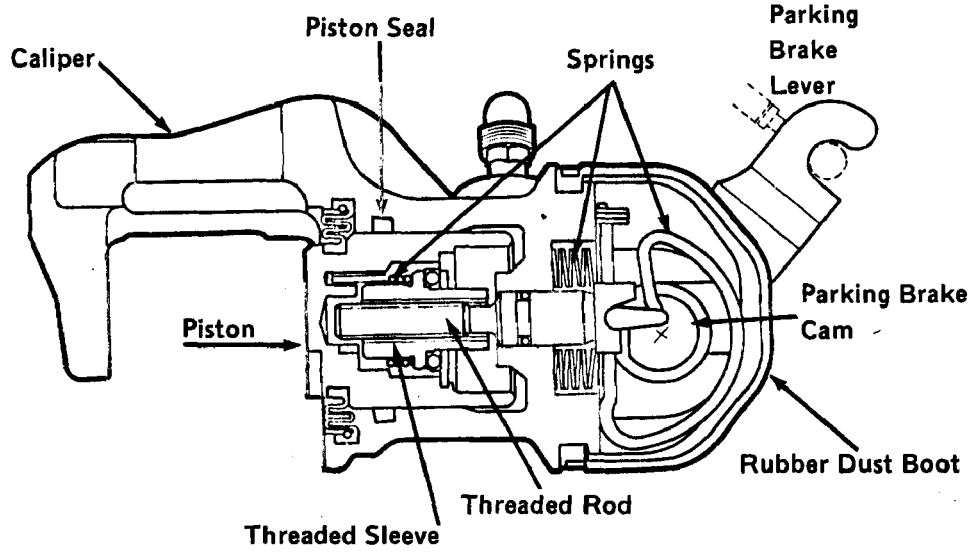
FRONT SHOCK ABSORBER MODIFICATIONS



Description

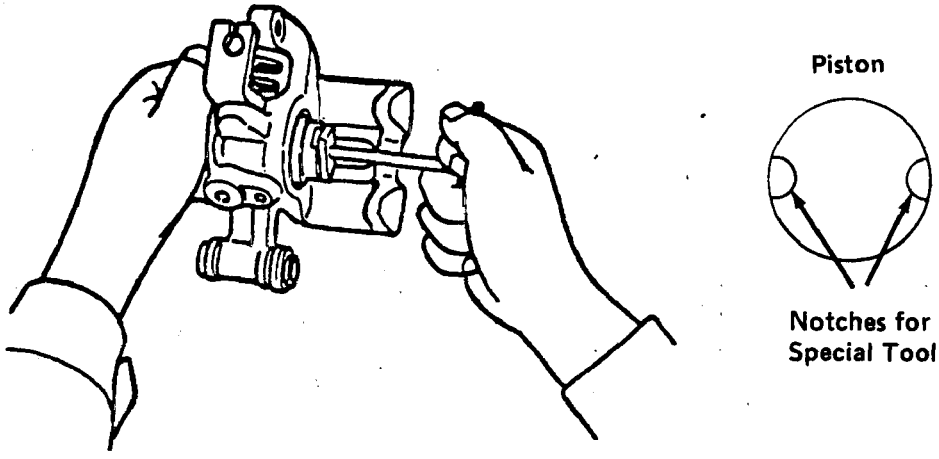
- The GSL model is equipped with self-adjusting rear disc brakes.
- The parking brake is applied by a lever operated cam which pushes a threaded rod and sleeve against the caliper piston. The caliper piston pushes on the brake pads to hold the disc while parked.
- As the brake pads wear, the parking brake is self-adjusted as the brakes are applied and released.
- The threaded rod and sleeve are both spring loaded. As the brake pads wear and the piston moves outward, the spring tension forces the threaded sleeve to rotate on the rod. This rotation will automatically adjust the rod to the proper length.

Illustration



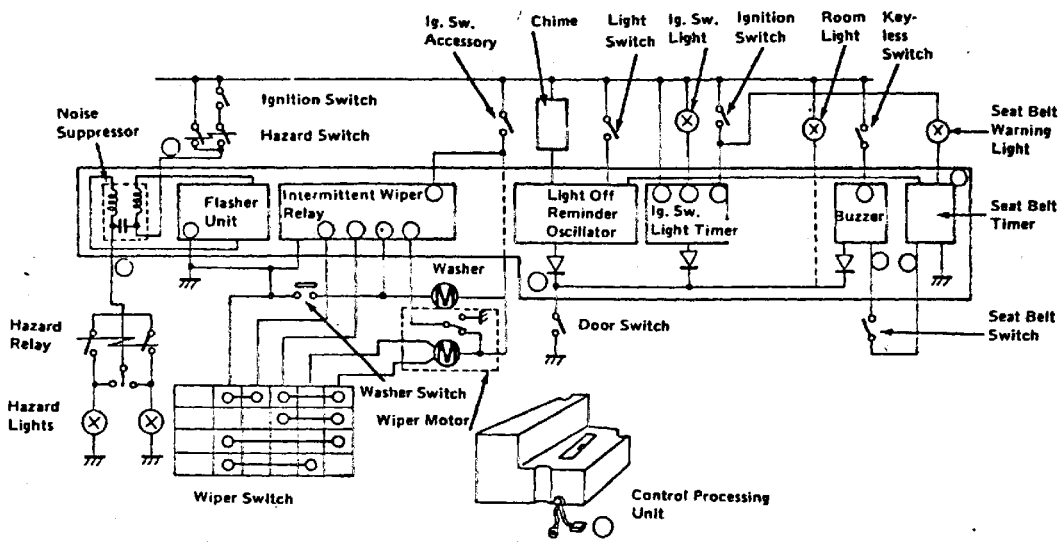
Pad Replacement

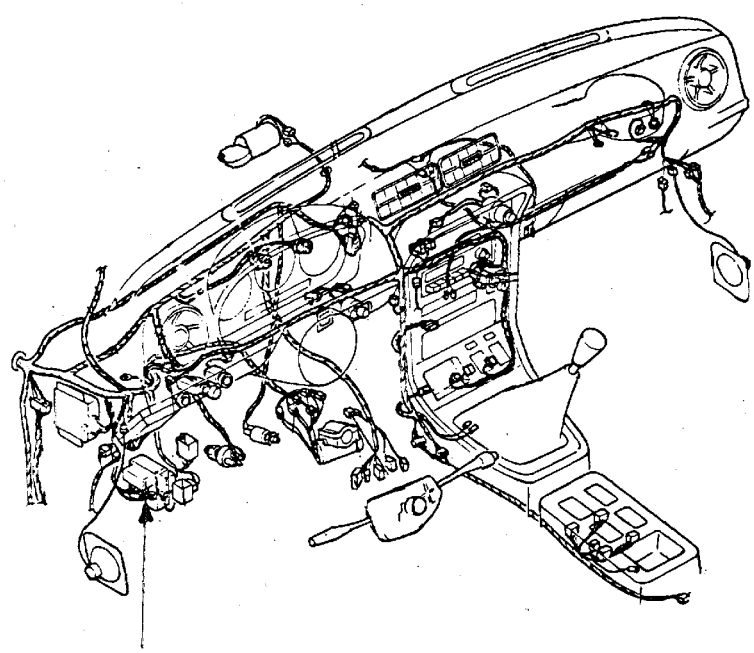
- Due to the self-adjusting action of the parking brake mechanism, the threaded rod and sleeve must be returned back to their original position.
- Using the special tool as shown in the illustration below, rotate the piston (sleeve) back in until it stops.
- Replace the pads and then apply the brakes several times to adjust the parking brake.



Note: The piston (sleeve) must be returned to its original position or the replacement brake pads will not fit into the caliper.

The CPU controls the operation of the flashers, wipers, chime, key light and seat belt warning buzzer all in a single unit. It is located under the dash board on the driver's side.





CONTROL PROCESSING UNIT

SOUND SYSTEM

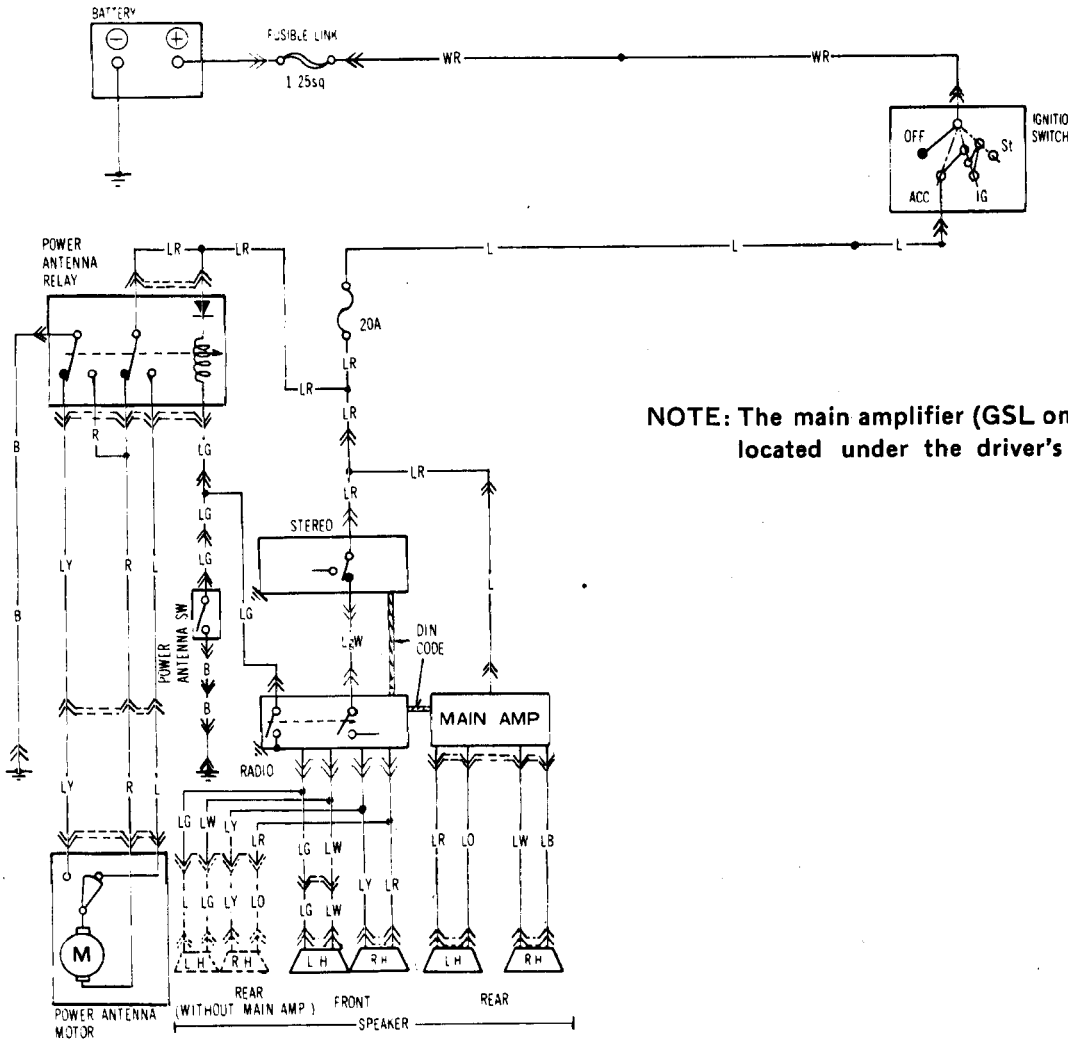
Power Antenna

The power antenna is now automatically controlled by the radio "ON—OFF" switch. The antenna switch on the center console has been discontinued.

Six Speakers

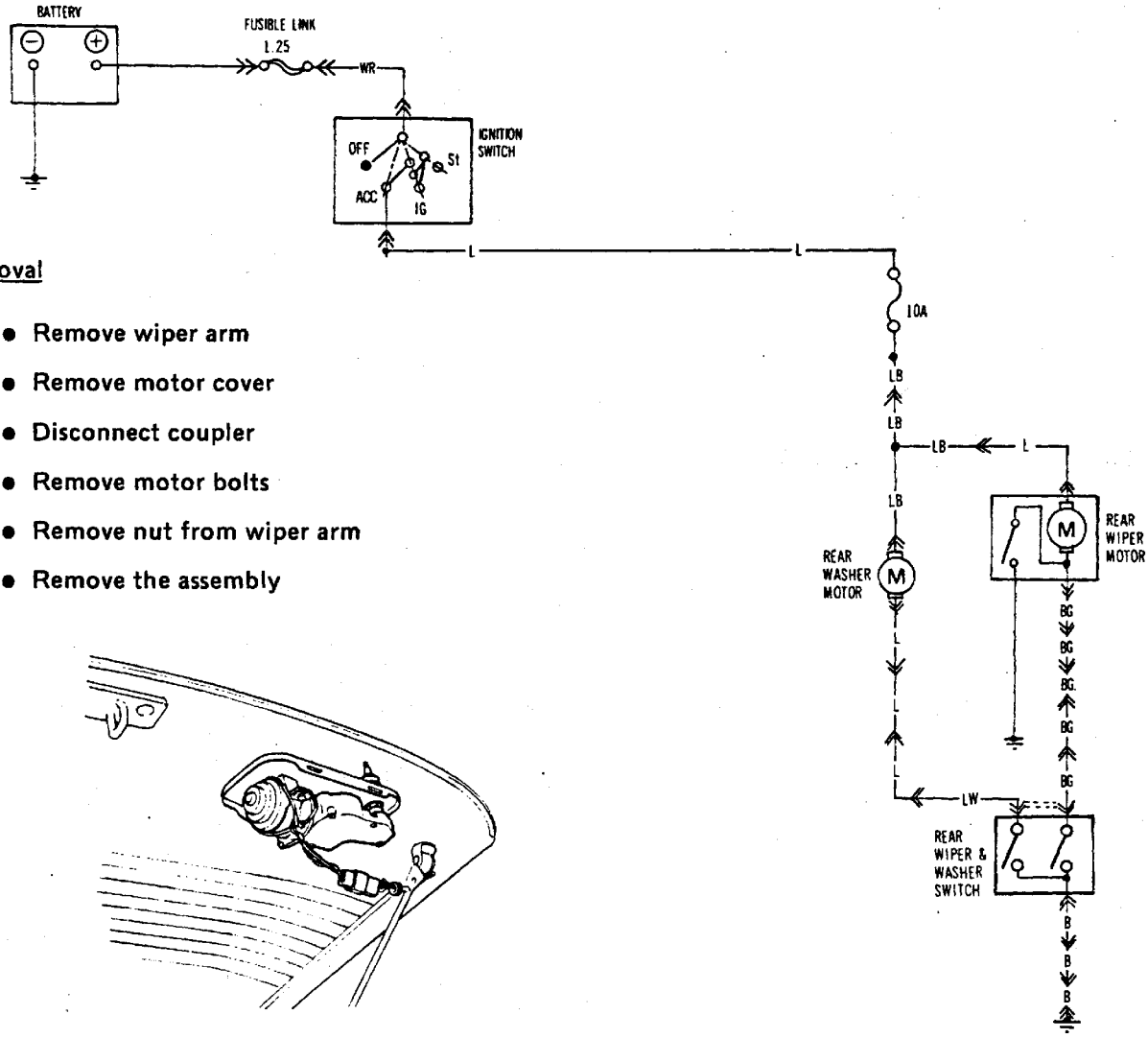
The GSL model uses a power amplifier and six speakers; four in the rear and two in the front. The rear speakers contain two speakers in each unit.

Illustration



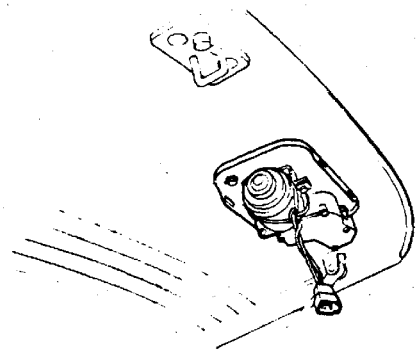
NOTE: The main amplifier (GSL only) is located under the driver's seat.

Schematic



Removal

- Remove wiper arm
- Remove motor cover
- Disconnect coupler
- Remove motor bolts
- Remove nut from wiper arm
- Remove the assembly



MISCELLANEOUS CHANGES

Fuel Tank Capacity

Increased from 55 to 63 liters (14.5 to 16.6 U.S. Gal.)

Bumpers

The front and rear bumpers are now urethane material which is impact-resistant and lighter in weight.

Storage Box

A storage box with two compartment doors has been added in the cargo area.

Headliner

The inner top ceiling is now an injection molded unit.

Fuel Door

A solenoid operated remote control fuel door opener is now provided. The control switch is located next to the choke knob.

Map Light

The GS and GSL models with a sunroof now have a map reading light incorporated into the dome light assembly.

Chime

A 626 style lights "ON" reminder chime is actuated if a door is opened with the lights on.

Stop Lamp Checker

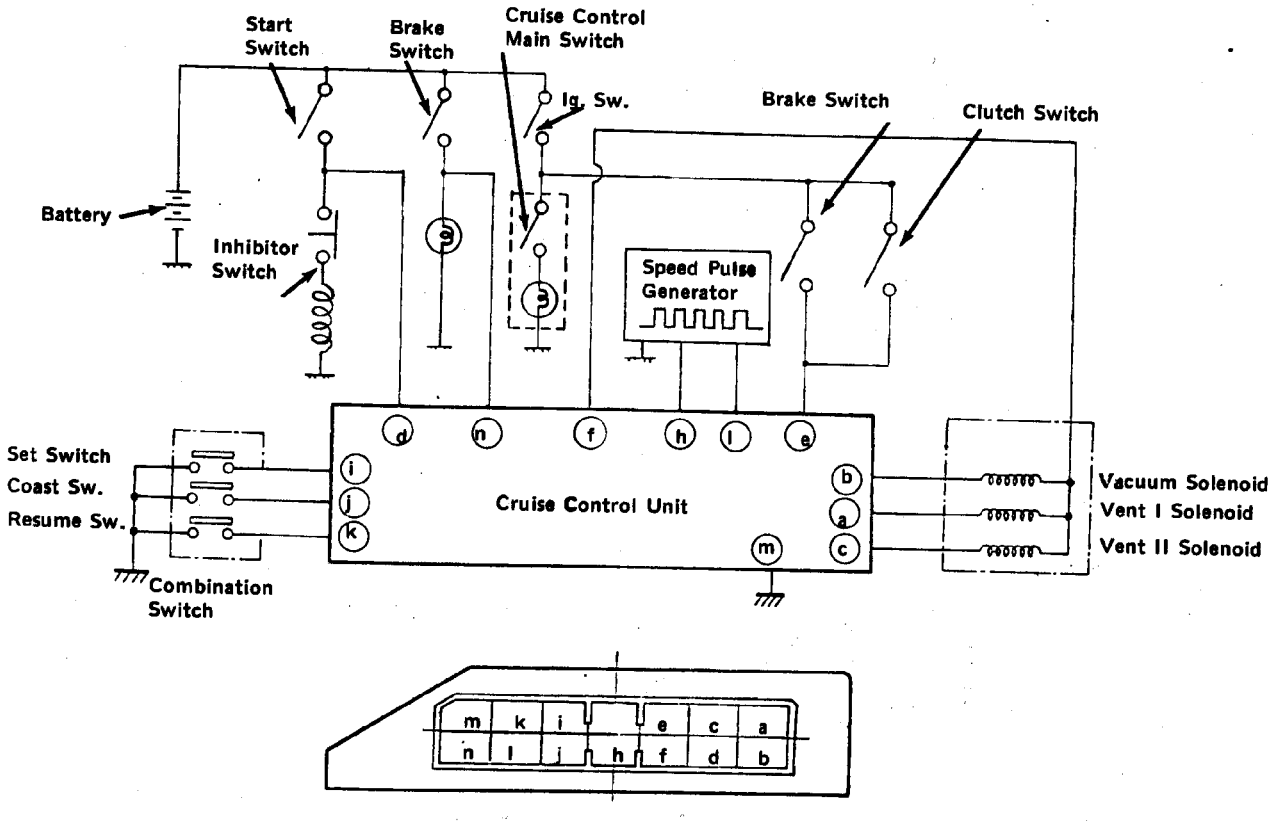
A 626 style stop light out warning light is now also on the RX-7. This light illuminates while braking if a stop light bulb is burned out.

626, RX-7

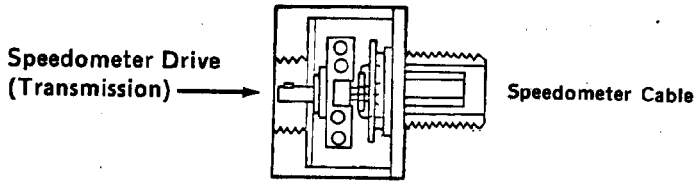
Principles

The cruise control system is electrically controlled and vacuum operated. A speed pulse generator is located on the speedometer drive and works with a control unit to apply or vent vacuum to the actuator that pulls the throttle cable. Safety switches on the brakes and clutch, if actuated immediately will cut operation of the system.

Schematic

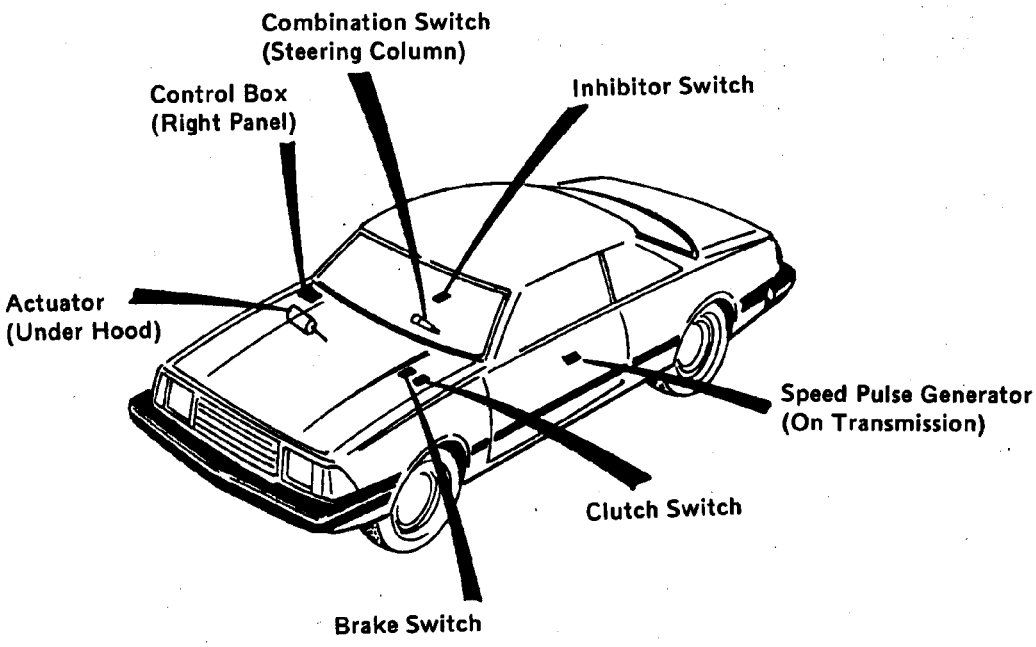


SPEED PULSE GENERATOR

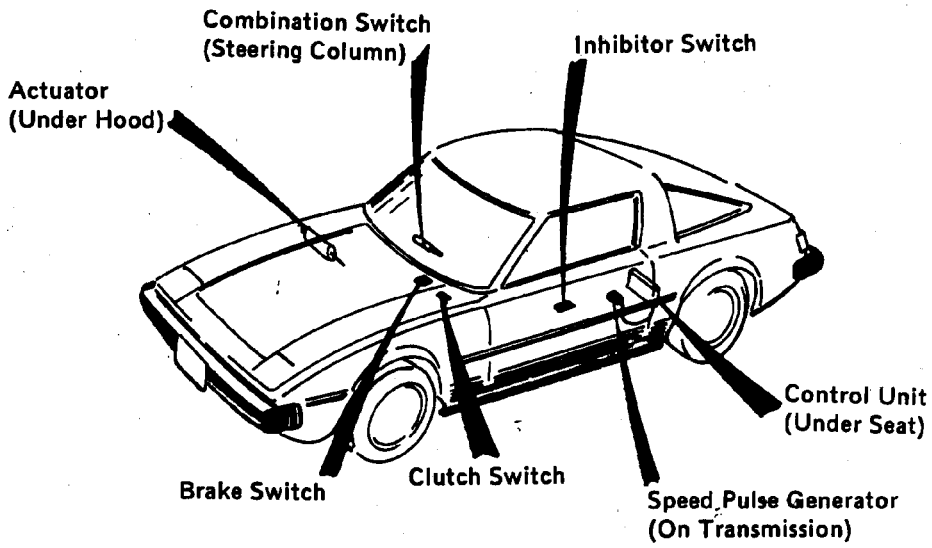


Component Location

626



RX-7

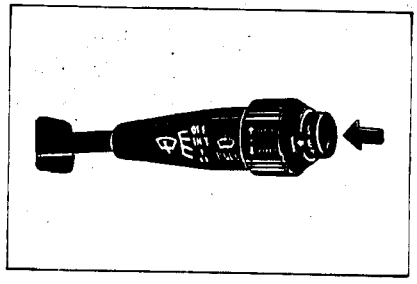


Adjustment

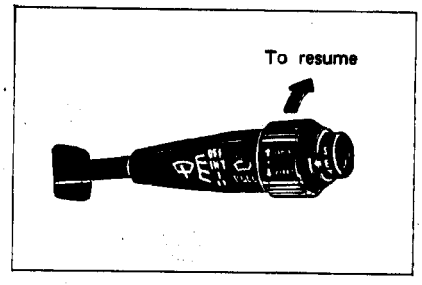
- Throttle cable end play at the actuator solenoid valve: within 3 mm

Operation

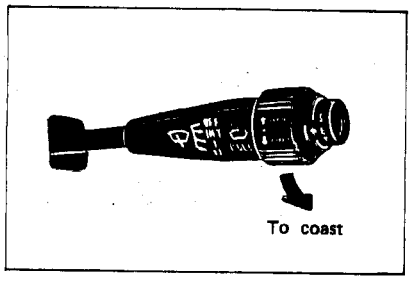
- Vehicle speed must be over 25 MPH to engage. Speed range is 25 - 88 MPH (40 - 140 KPH)
- Cruise control main switch on console must be in "ON" position.
- Push in SET button — vacuum is applied to actuator by vacuum solenoid. Vacuum will hold vehicle throttle at that speed.



- When climbing a grade — vacuum solenoid will increase vacuum.
- When going down a grade — Vent I solenoid will vent off enough vacuum to correct speed setting.
- If brakes or clutch is touched or A/T is placed in "N" or "P", Vent II will dump the vacuum and release the throttle.
- Twisting the combination switch to "RESUME" will reapply the vacuum through the vacuum solenoid to correct speed.



- To reduce the set speed, twist switch to "COAST" and the Vent I solenoid will reduce the vacuum.
- To increase the speed setting, push in SET button and vehicle will accelerate at a steady rate. Release the SET button when the desired speed is obtained.



Checking Procedure

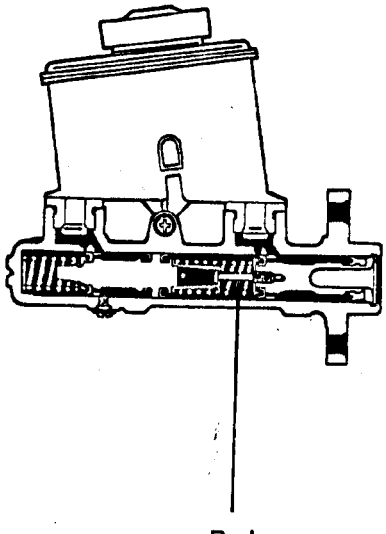
1. Raise rear wheels off the ground.
2. Turn cruise control master switch "ON" and "SET" speed above 25 mph.
3. Use a voltmeter to check voltage at Pins indicated (while connected and operating)
4. Ground voltmeter negative lead to M terminal.

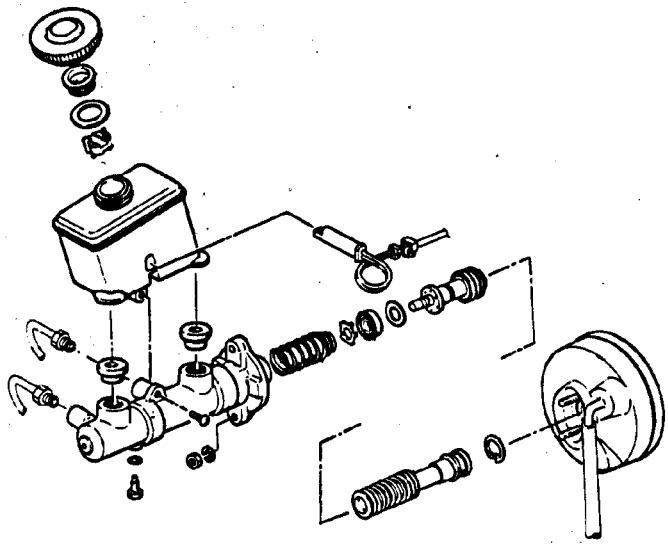
PIN	Voltage (Should Have)	Probable Cause (If Not)
f	12 Volts (+)	Fuse, Main Switch
l	12 Volts (+)	Control Unit
i	Approx. 8 Volts, push "SET" button = 0 Volts (Ground)	Control Unit, Combination Switch
j	Approx. 8 Volts, twist to "COAST" = 0 Volts (Ground)	Control Unit, Combination Switch
k	Approx. 8 Volts, twist to "RESUME" = 0 Volts (Ground)	Control Unit, Combination Switch
e	0 Volts (Ground), apply brake or clutch = 12 Volts	Stop Switch, Clutch Switch, Control Unit
n	0 Volts (Ground), apply parking brake = 12 Volts	Parking Brake Switch, Control Unit
d	12 Volts (+), shift to "N" or "P"	Inhibitor Switch, Control Unit
b	12 Volts, push "SET" button = 0 Volts for a moment then returns to 12 Volts	Combination Switch, Control Unit
a	12 Volts, twist to "COAST" = 0 Volts for a moment then returns to 12 Volts	Combination Switch, Control Unit
c	12 Volts, push in clutch = 0 Volts for a moment then returns to 12 Volts	Combination Switch, Control Unit
h	Turn engine "OFF", turn main switch "ON" turn ignition switch to "IGNITION" and rotate the rear wheels by hand. Voltmeter should fluctuate from 12 Volts to zero volts repeatedly.	12 Volts only 0 Volts only > Speed Pulse Generator

Brake Pedal Travel

The master cylinder internal action has been changed by the addition of a rod between the primary and secondary pistons. This modification decreases the stroke within the master cylinder by 0.5 to 1.0mm as the brakes are applied. As a result, the brake pedal travel is reduced by 2 to 5mm.

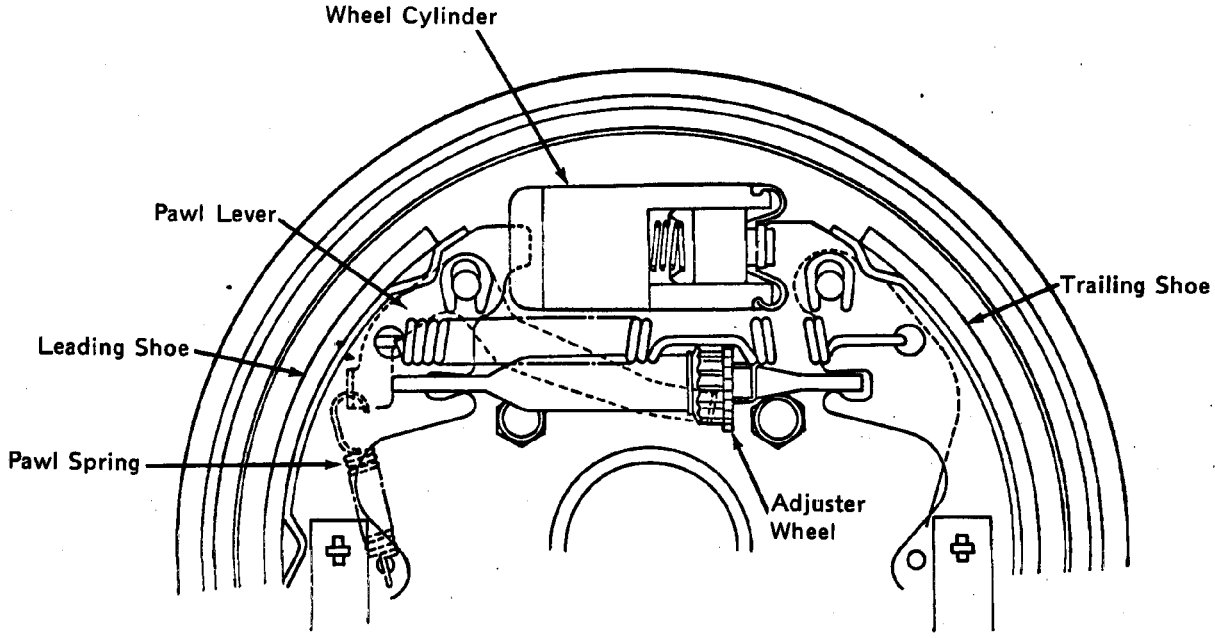
(For GLC)





Operation

- As the brake linings wear, the clearance between the brake shoes and the drum increases. The additional clearance causes the brake shoes to travel further to contact the drum.
- As the brakes are applied, a pawl lever is moved by spring tension, which will rotate the adjuster wheel one notch.
- When the adjuster wheel is rotated, it expands the brake shoes outward reducing the shoe to drum clearance.
- When the shoes are in proper adjustment, the pawl cannot move enough to further rotate the adjuster wheel.

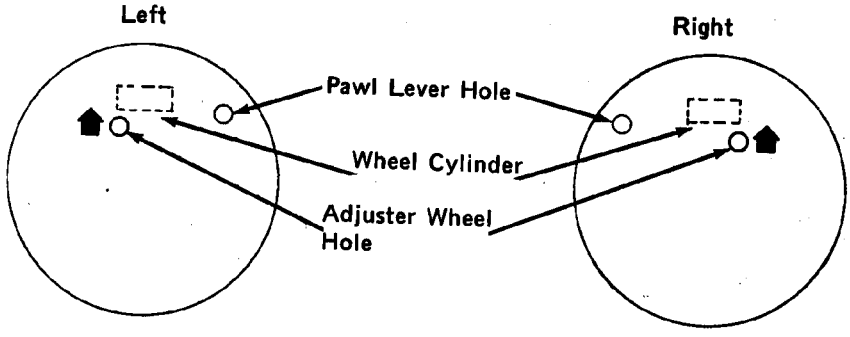


Note: The B2000 self-adjuster is moved by the parking brake linkage.

Adjustment

- When the brake linings are replaced, the shoes must be mechanically adjusted.
- The pawl lever MUST be disengaged prior to rotating the adjuster wheels with a screwdriver.
- Two rubber access hole plugs must be removed from the backing plate to adjust the shoes.

Backing Plates



- Push in the pawl lever to disengage it from the adjuster wheel and hold it in while performing the adjustment.
- While spinning the wheel, rotate the adjuster wheel in the direction of the arrow (upwards) to expand the shoes until they contact the drum.
- After the shoes have contacted the drum, back the adjuster wheel off three to four notches.

  Note: The RX-7 adjuster hole is located in a manner that makes it hard to adjust with a conventional screwdriver. Use an offset screwdriver to perform the adjustment.

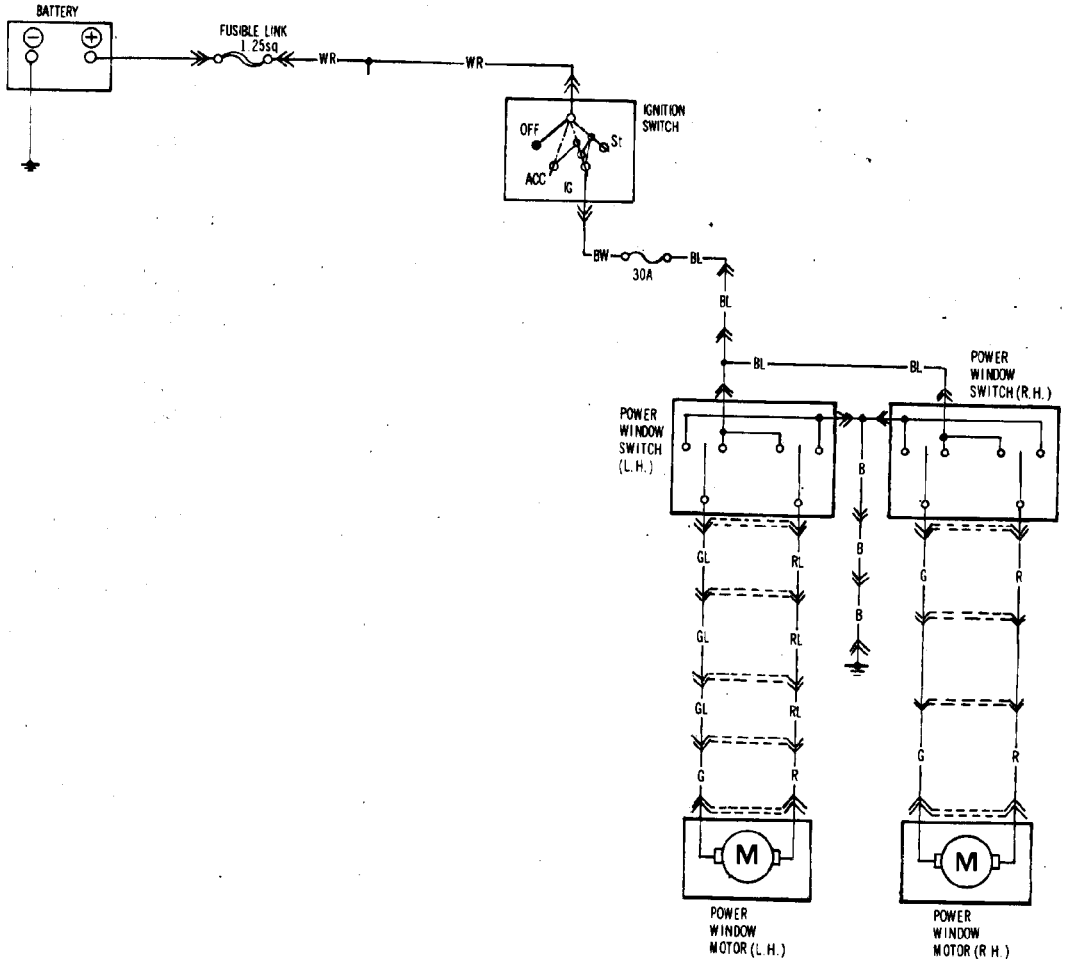
- After adjusting the shoes, release the pawl lever and check to see that it engages with the adjuster wheel. To check for engagement, lightly attempt to rotate the adjuster. The adjuster should not move when engaged with the pawl lever.

Operation

- The window switches are located in the center console.
- Motors are permanent magnet field core type units with two brushes.
- Motors turn both clockwise or counterclockwise depending on which way power is flowing through the circuit.
- Each motor contains a bimetal circuit breaker for circuit protection which will reset after one minute.
- Operating a switch both applies power and ground to the motor.

Schematic

(RX-7)



HEADLAMPS

GLC, 626, RX-7

Halogen Headlamp

- Longer life and better illumination
- Sealed beam type unit, bulb is not individually replaceable

Model	Bulb
GLC	65/55 Watt
626	65/55 Watt
RX-7	60/50 Watt

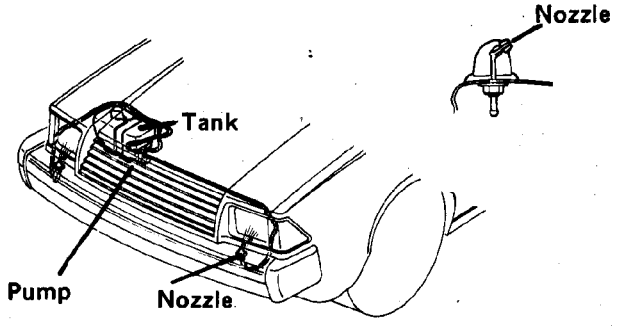
HEADLAMP CLEANER (CANADA)

626

Operation

- Nozzles are located on the grille
- Fluid tank and pump are located under the hood
- Fluid tank is the same as the window washer tank
- Capacity of washer tank has been increased to 6.8 liters
- Headlight cleaner switch is located on the center console

Illustration

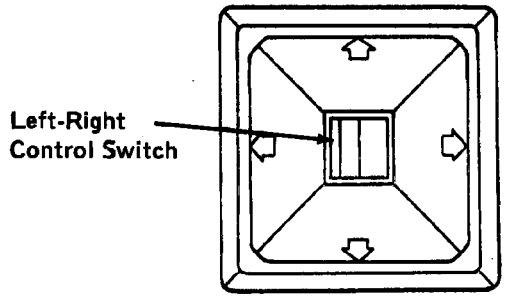


NOTE: To adjust nozzles, use a needle or pin. Spray should be to the center of the headlight.

POWER MIRRORS RX-7

Operation

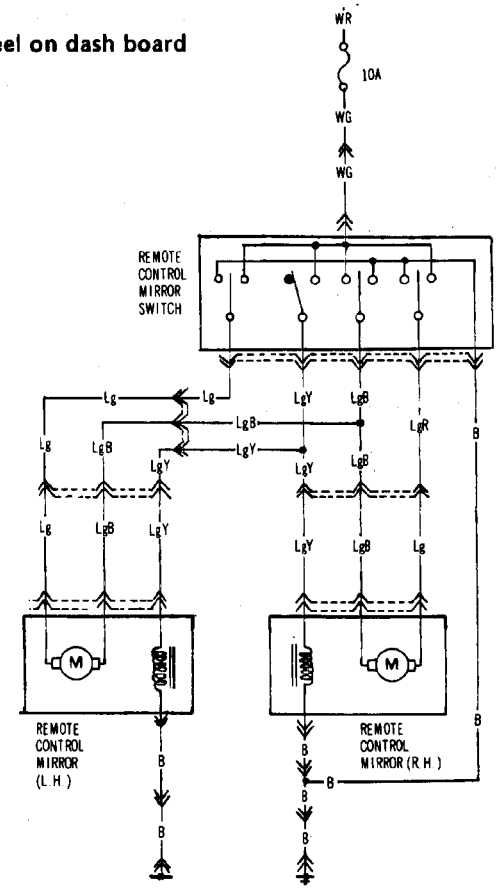
Remote Mirrors Switch



- One switch controls both side mirrors
- Selector switch in center for left or right
- Switch located to right of steering wheel on dash board

Schematic

(For RX-7)



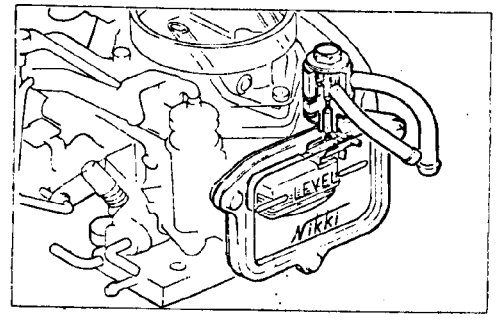
Note: 626 is quite simular to the RX-7 layout.

Engine Tune-up Procedure

ENGINE TUNE-UP PROCEDURE

1. Pre-Tune-up Preparation

- Check battery condition
- Apply parking brake
- Turn off all accessories
- Disconnect and plug the hot idle compensator
- Remove the fuel tank cap
- Hook up tachometer

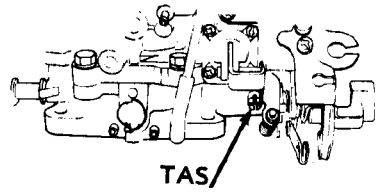


2. Warm Engine to Operating Temperature

- Choke valve fully open
- Correct float level

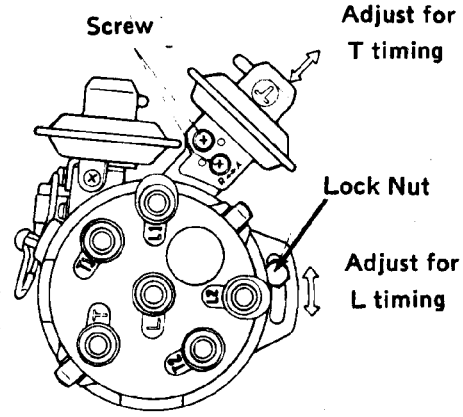
3. Idle Adjustment

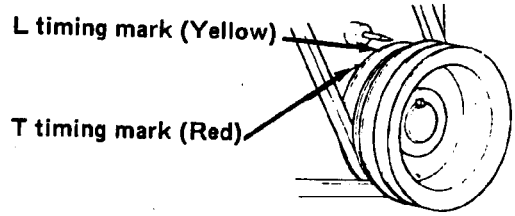
- Adjust idle speed to specifications by turning the throttle adjusting screw (TAS)
- Idle Speed:
  - —M/T 750 rpm
  - —A/T 750 rpm "Drive"



4. Ignition Timing

- Leading Timing 0°
  - — Connect timing light to leading high tension wire (black boot)
  - — Rotate distributor to align timing marks (Yellow — 0°)
  - — Check timing again after tightening distributor
- Trailing Timing 20° ATDC
  - — Connect timing light to trailing high tension wire (blue boot)
  - — Adjust by moving the trailing vacuum advance (Red —20°)
  - — Check timing again after tightening vacuum advance

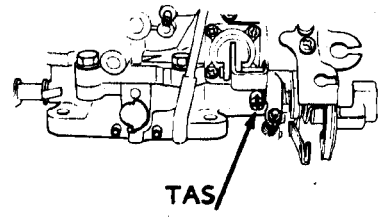




5. Idle Speed Re-Adjustment

- Run engine for 3 minutes at 2000 rpm in neutral
- Re-adjust idle speed by turning TAS
- Specification:

A/T in Drive	750 rpm
M/T	750 rpm

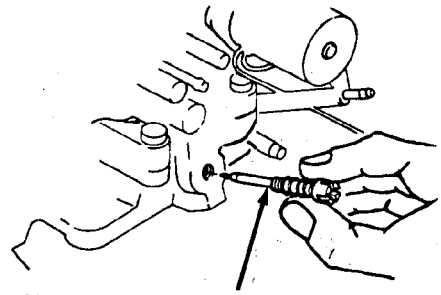


6. Idle Mixture Adjustment

- Unnecessary under normal maintenance
- Difficult to perform due to anti-tampering cap

IDLE MIXTURE ADJUSTMENT

1. ● Remove carburetor from engine
   ● Cut Off
   — Anti-tampering cap
   — Idle mixture screw and spring
   ● Install new idle mixture screw and spring
   ● Seat idle mixture screw lightly and back it off 3 turns



New Mixture Adjustment Screw & Spring

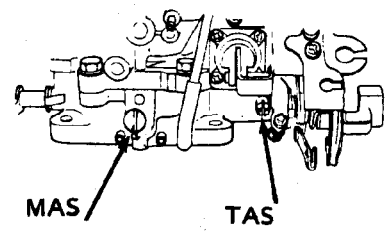
2. ● Reinstall carburetor on engine
   ● Run engine for 3 minutes at 2000 rpm
   ● Adjust idle speed by turning throttle adjustment screw (TAS) to:

A/T	870 rpm in Neutral
M/T	770 rpm

3. ● Turn the idle mixture adjustment screw (MAS) to find maximum engine speed

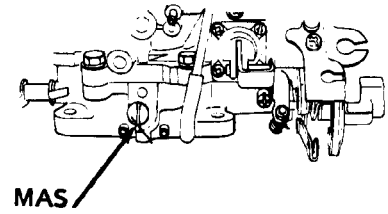
4. ● Re-adjust the idle speed by turning TAS

A/T	870 rpm in Neutral
M/T	770 rpm



5. • Re-set the idle speed by turning the mixture adjust screw (MAS) clockwise to:

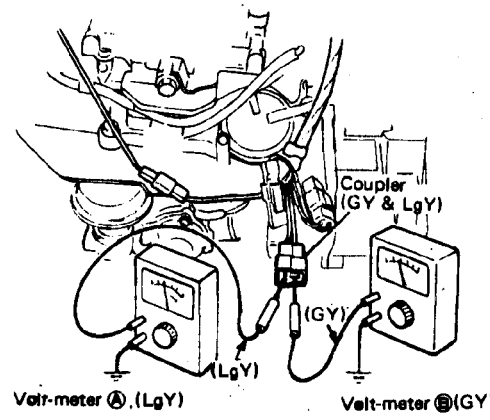
A/T	750 rpm in Drive
M/T	750 rpm in Neutral

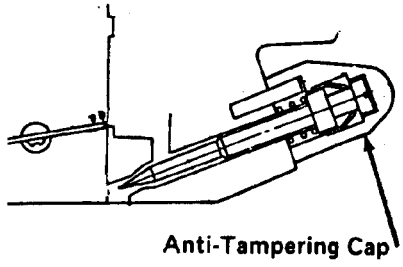


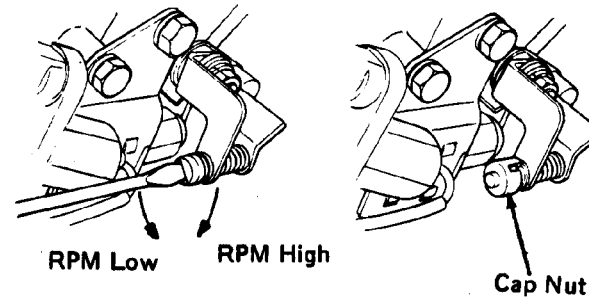
6. • Install and seat new anti-tampering cap
   • Reconnect hot idle compensator
   • Reinstall air cleaner and gas cap

7. Throttle Sensor Adjustment

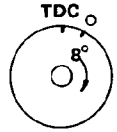
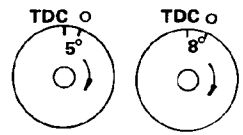
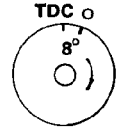
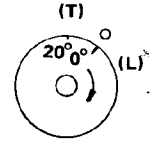
- Disconnect coupler (BY, GB)
- Connect voltmeters to each terminal in the coupler (GY and LgY)
- Accelerate engine speed to 3000 rpm
- Decelerate engine speed and observe meters
- Simultaneous current flow on both meters at 1100 ± 50 rpm.
- Adjustment:
  - — Remove cap from throttle sensor adjusting screw to adjust voltmeter "A" (LgY) side.
  - — Screw in — Advance current flow
  - — Screw out — Retard current flow
- Replace cap after adjustment







1981 ENGINE TUNE-UP SPECIFICATIONS

ENGINE SPECIFICATIONS	GLC	GLC (WAGON)	626	B2000	RX-7
ENGINE MODEL	E5	D5	MA	MA	12A
DISPLACEMENT	1490 cc (90.9 cid)	1490 cc (90.9 cid)	1970 cc (120.2 cid)	1970 cc (120.2 cid)	573 cc (35 cid) x 2
BORE X STROKE	77 x 80 mm	77 x 80 mm	80 x 98 mm	80 x 98 mm	—
NUMBER OF CYLINDERS	4 cylinders	4 cylinders	4 cylinders	4 cylinders	2 rotors
NOMINAL COMP. RATIO	9.0 to 1	9.0to 1	8.6 to 1	8.6 to 1	9.4 to 1
COMPRESSION PRES.	12 kg/cm^2 @ 300 rpm (171 lbs/in^2 @ 300 rpm)	12 kg/cm^2 @ 300 rpm (171 lbs/in^2 @ 300 rpm)	12 kg/cm^2 @ 250 rpm (171 lbs/in^2 @ 250 rpm)	12 kg/cm^2 @ 250 rpm (171 lbs/in^2 @ 250 rpm)	7 ∿ 9 kg/cm^2 @ 2500 rpm
LIMIT	9 kg/cm^2 @ 300 rpm (128 lbs/in^2 @ 300 rpm)	9 kg/cm^2 @ 300 rpm (128 lbs/in^2 @ 300 rpm)	9 kg/cm^2 @ 250 rpm (128 lbs/in^2 @ 250 rpm)	9 kg/cm^2 @ 250 rpm (128 lbs/in^2 @ 250 rpm)	6 kg/cm^2 @ 250 rpm (85 lbs/in^2 @ 250 rpm)
MAX. H.P. (SAE NET)	68 HP @ 5000 rpm	63 HP @ 5000 rpm	74 HP @ 4500 rpm	77 (CA.72) HP @ 4300 rpm	100HP @ 6000 rpm
MAX. TORQUE (SAE NET)	82 lbs/ft @ 3000 rpm	82 lbs/ft @ 3000 rpm	105 lbs/ft. @ 2500 rpm	109 (CA.105) lbs/ft@2400 rpm	105 lbs/ft @ 4000 rpm
ENGINE OIL CAP	3.0 ℓ (3.2 qts.)	3.0 ℓ (3.2 qts.)	3.9 ℓ (4.1 qts.)	3.9 ℓ (4.1 qts.)	Full cap 5.2 ℓ (
FIRING ORDER	1 – 3 – 4 – 2	1 – 3 – 4 – 2	1 – 3 – 4 – 2	1 – 3 – 4 – 2	
VALVE CLEARANCE					
VALVE SIDE Exhaust	0.30 mm (.012")	0.30 mm (.012")	0.30 mm (.012")	0.30 mm (.012")	——
VALVE SIDE Intake	0.25 mm (.010")	0.25 mm (.010")	0.30 mm (.012")	0.30 mm (.012")	
CAM SIDE Exhaust	0.23 mm (.009")	0.23 mm (.009")	0.22 mm (.009")	0.22 mm (.009")	
CAM SIDE Intake	0.18 mm (.007")	0.18 mm (.007")	0.22 mm (.009")	0.22 mm (.009")	
IGNITION PICK-UP COIL RESISTANCE (OHMS)	1050 ±10%	1050 ±10%	1050 ±10%	1050 ±10%	1050 ±10%
SPARK PLUGS (Recommended)	NGK: BPR–5ES BPR–6ES	NGK: BP–5ES BP–6ES BPR–5ES BPR–6ES	NGK: BP–5ES BP–6ES BPR-5ES BPR–6ES	NGK: BPR–6ES Autolite: AGR32	NGK: BR8EQ 14 BR7EQ 14 BR9EQ 14 ND: W22EDR14 W25EDR14 W27EDR14
SPARK PLUG GAP	0.80 ±.05 mm	0.80 ± .05 mm	0.80 ±0.5 mm	0.80 ±.05 mm	1.4 ±.05 mm
IGNITION TIMING	 8° BTDC Yellow Mark on Pulley	 8° BTDC White Mark on Pulley	U.S.A. Canada  5° BTDC 8° BTDC White Mark on Pulley	 8° BTDC White Mark on Pulley	 Leading: 0° Yellow Mark Trailing: 20° Red Mark
IDLE SPEED - A/T	750 rpm "D"	750 rpm "D"	650 rpm "D"	————————	750 rpm "D"
IDLE SPEED - M/T	850 rpm	800 rpm	650 rpm	650 rpm	750 rpm
IDLE MIXTURE - Fed. - Calif. - Can.	Refer to Workshop Manual	Refer to Workshop Manual	Refer to Workshop Manual	Refer to Workshop Manual	Refer to Workshop Manual

P.D.I. & Scheduled Maintenance

P.D.I. & Scheduled Maintenance

The following items have been eliminated or added when performing a P.D.I. or Scheduled Maintenance on 1981 models due to changes in emissions regulations and the introduction of new components.

P.D.I.

—Eliminated Items—

ITEM	APPLICABLE VEHICLE
1. Checking Idle Switch	RX-7
2. Checking Initial Ignition Timing	All Models (Except 626 in Canada)
3. Checking Idle Speed and Idle CO	All Models (Except 626 in Canada)

—New Items—

1. Checking Throttle Sensor	RX-7
2. Checking Accelerator Switch	GLC
3. Checking Manual Transaxle Oil Level	GLC
4. Checking Operation of Sliding Sunroof	GLC, 626
5. Checking Automatic Transaxle Fluid Level	GLC
6. Checking Cruise Control System	626, RX-7

Scheduled Maintenance

—Eliminated Items—

1. Seat Belt Warning System (Inspect)	GLC, 626, B2000, RX-7
2. Curb Idle Speed and Idle Mixture (Adjust)	B2000
3. Cold Start Enrichment System (Inspect)	B2000
4. Fuel Filter (Replace)	B2000
5. Fuel Line Connections (Inspect)	B2000
6. Air Cleaner Element (Clean)	B2000
7. Filler Cap, Evaporative Emission Control System, Fuel Tank and Vapor Lines (Inspect)	B2000
8. Ignition Timing (Adjust)	B2000
9. Servo Diaphragm (Inspect)	B2000

Note: Regarding items 2 — 9, those items were eliminated on 1980 GLC, 626 and RX-7 models.

—New Items—

1. Power Steering Fluid and Lines (Inspect)	626
2. Manual Transaxle Oil (Change and Inspect)	GLC
3. Automatic Transaxle Fluid Level (Inspect)	GLC

Maintenance Interval / Maintenance Item		Number of months or miles (km), whichever comes first								
	Months	–	7.5	15	22.5	30	37.5	45	52.5	60
	Miles	2,000	7,500	15,000	22,500	30,000	37,500	45,000	52,500	60,000
	(km)	(3,000)	(12,000)	(24,000)	(36,000)	(48,000)	(60,000)	(72,000)	(84,000)	(96,000)
ENGINE										
Engine Oil	*1	R	R	R	R	R	R	R	R	R
Oil Filter	*1			R		R		R		R
Drive Belts (Except Air Pump Drive Belt)						A				A
FUEL & INLET AIR CONTROL SYSTEM										
Air Cleaner Element	*2					R				R
IGNITION SYSTEM										
Spark Plugs						R				R
COOLING SYSTEM										
Engine Coolant						R				R
Cooling System				I		I		I		I
Engine Coolant Level Warning System		I				I				I
ELECTRICAL SYSTEM										
Battery Electrolyte Level and Specific Gravity			I	I	I	I	I	I	I	I
Engine Oil Level Warning System		I		I		I		I		I
Sub-zero Starting Assist System		Inspect the operation seasonally (sub-zero weather use only)								
CHASSIS AND BODY										
Brake Line Hoses and Connections				I		I		I		I
Clutch Fluid			I	I	I	I	I	I	I	I
Manual Transmission Oil		R	I	I	I	R	I	I	I	R
Automatic Transmission Fluid		I	I	I	I	I	I	I	I	I
Rear Axle Oil			R	I	I	R	I	I	I	R
Manual Steering Gear Oil				I		I		I		I
Steering Wheel Free Play			I	I		I		I		I
Brake Fluid	*3		I	I	I	R	I	I	I	R
Brake Pedal, Clutch Pedal and Parking Brake			I	I	I	I	I	I	I	I
Drum Brake				I		I		I		I
Disk Brake			I	I	I	I	I	I	I	I
Power Brake Unit and Hoses				I		I		I		I
Front Wheel Bearings						L				L
Steering Ball Joints, Idler Arm and Front Suspension Ball Joints						I				I
Bolts and Nuts on Chassis and Body			T	T		T		T		T
Exhaust System Heat Shields						I				I

(B) As for * marked items in this maintenance table, please pay attention to the following points.

*1 If the vehicle is operated under the following conditions, it is suggested that the engine oil and oil filter be changed more frequently.
- a) Driving in dusty condition
- b) Extended periods of idling or low speed operation
- c) Driving for a long time in cold remperature, or driving short distance only

*2 If the vehicle is operated in very dusty or sandy areas, inspect and replace more often than at the usual recommended intervals.

*3 At continuous hard driving, alp driving or similar when the brakes are used extensively the brake fluid should be changed annually.
Extremely humid climates warrant the same recommendation.

*4 Under sevère service conditions, inspect more frequently.

Emission Control System

EMISSION STANDARDS FOR 1981

This chart provides a comparison between 1980 and 1981 and the amount of emissions allowed.

MODEL			1981			1980		
			HC	CO	NOx	HC	CO	NOx
EXHAUST EMISSION	Passenger Car	Fed.	0.41	3.4	1.0	0.41	7.0	2.0
		Calif.	0.39	7.0	0.7	0.39	9.0	1.0
		Canada	2.0	25	3.1	←	←	←
	Truck	Fed.	1.7	18.0	2.3	←	←	←
		Calif.	0.39	9.0	1.0	0.39	9.0	1.5
		Canada	2.0	25	3.1	←	←	←
SHED*		Fed.	2			6		
		Calif.	2			←		

*Sealed Housing Evaporative Determination

EMISSION FAMILY FOR 1981

Due to changes in the emission control laws for 1981, the classification chart below indicates which vehicles are certified as Federal, California or Canadian models only.

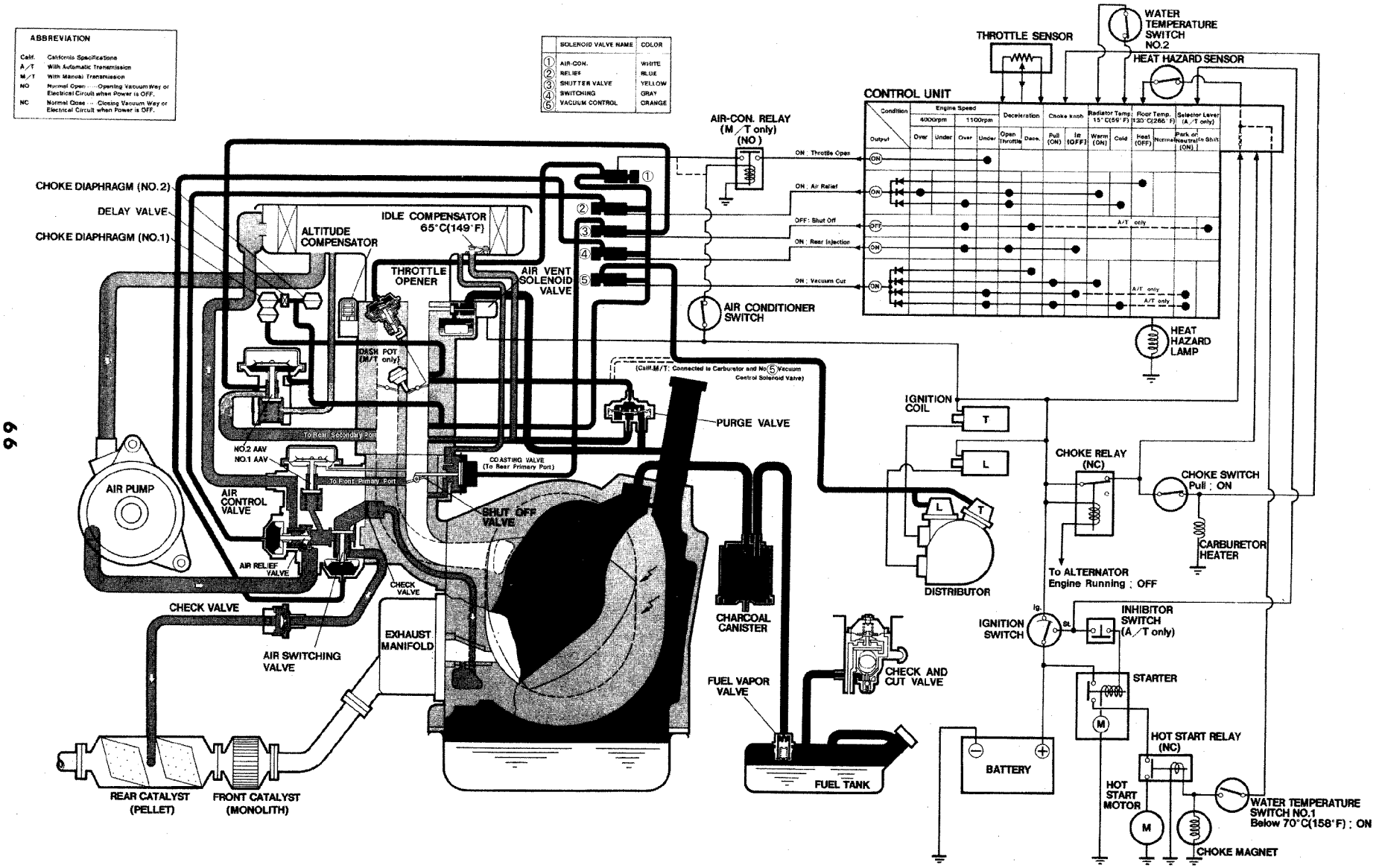
Area	Model	GLC	GLC(W)	626	B2000	RX-7
U.S.A.	Calif.					
	Fed.					
Canada				Same as 1980		

Note: As for 626, B2000 and RX-7 models, it is not allowable to move or sell the car to another area because the emissions system on each vehicle is different.

RX-7 Emission Control System

EMISSION CONTROL SYSTEM

RX-7



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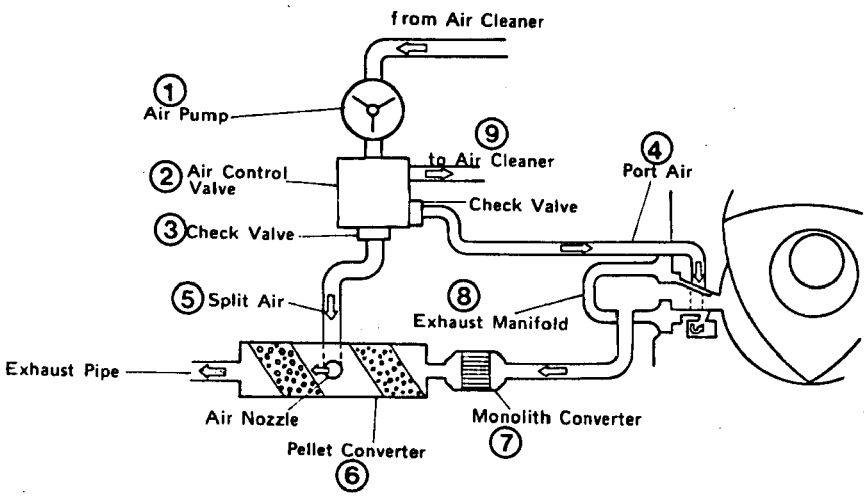
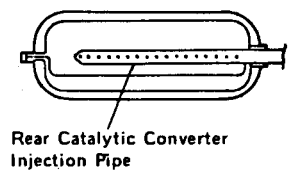
Changes from 1980 to 1981 Model in Emissions Devices

SYSTEM	DEVICE		COMMENTS
	'81 Model	'80 Model	
Secondary Air Injection	1. Air Pump	1. ←	
	2. Air Control Valve	2. Air Control Valve	Change configuration and operation
	3. Check Valve (port air)	3. ←	
	4. Check Valve (split air)	—	For air flow to catalyst
Catalytic Converter	1. Reaction Manifold (REM)	—	Previous models used a thermal reactor which was discontinued for '81
	2. Monolith Catalyst		
	3. 2-bed Pellet Catalyst		
	4. Overheat Light		Warns of catalyst overheating
EGR	—	1. California Models 2. EGR Valve 3. EGR Solenoid Valve 4. Acceleration Sensor	EGR is not needed on '81 model due to 3-way catalyst.
Deceleration Control System	1. No. 1 & No. 2 Anti-afterburn Valve	1. Anti-afterburn Valve	Added No. 2 Anti-afterburn Valve
	2. Coasting Valve	2. Coasting Valve M/T only	CV now combined with shutter valve on intake manifold.
	3. Shutter Valve	—	Combined with Coasting Valve
	—	4. Coasting Richer	Not used on '81 model
	5. Hydraulic Dash Pot (M/T only)	5. ← (M/T only)	
Fuel System	1. Idle Speed Adjustment Throttle Valve	1. Idle Speed Adjustment Air Bypass	Due to catalytic converter
	—	2. Power Valve	Not used on '81 model
	3. 2-stage Choke Diaphragm	3. 1-stage Choke Diaphragm	Choke pull back diaphragm discontinued for '81 model

Emission Control System (Cont'd)

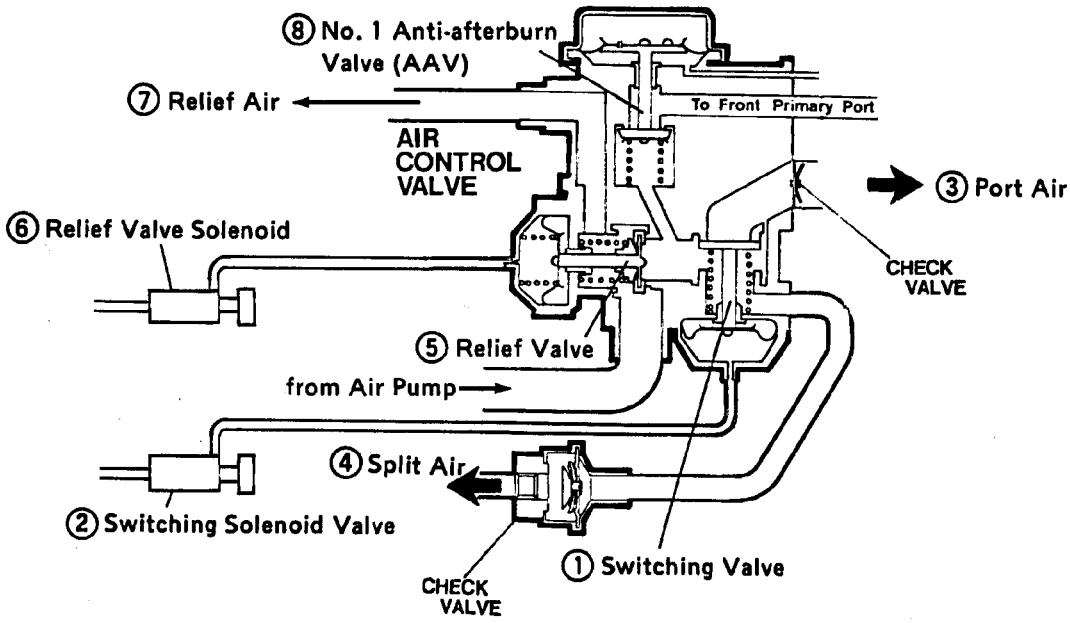
SYSTEM	DEVICE		COMMENTS
	'81 Model	'80 Model	
Fuel System (Cont'd)	4. Automatic Choke Release System	4. ←	No. 1 water thermo switch
Ignition Control System	1. Pointless HEI	1. ←	Igniters moved to distributor
	2. Timing: T: 20° ATDC L: 0° TDC	2. ←	
	3. Centrifugal Advance	3. Centrifugal Advance	Advance curve change slightly
	4. Vacuum Advance	4. ← (Trailing M/T only)	Both M/T & A/T now use L & T vacuum advance
	5. 4-electrode Spark Plug	5. 3-electrode Spark Plug	Will not interchange — '81 must use new type
	—	6. Trailing Relay	Both L & T plugs on '81 model operate at all RPMs
	—	7. Leading Retard Relay	LR relay discontinued on '81 model
Auxiliary Systems	1. Emission Control Unit • Low speed switch 1100 RPM • High speed switch 4000 RPM	1. Emission Control Unit • Low speed switch 1150 RPM • Medium speed switch 3000 RPM • High speed switch 4600 RPM	Still sensed off Y/G wire on leading ignition coil
	2. Choke Switch	2. ←	
	3. No. 1 Water Temp. Sw.	3. ←	Located on thermostat housing
	4. No. 2 Water Temp. Sw.	4. (Fed. only)	Located on radiator tank
	5. Throttle Sensor	5. Idle Switch (M/T only)	More precise indication of throttle position.
Evaporative System	1. Purge Valve	1. Vent and Check Valve	For fuel tank vapors and crankcase fumes
	2. Charcoal Canister (externally mounted)	2. Charcoal Canister (inside air cleaner)	
	3. Air Vent Valve	3. ←	
	4. Check & Cut Valve	4. ←	





Component	Function
1. Air Pump	• To supply secondary air into the exhaust system • Fresh air flows from the air cleaner through the pump to the air control valve
2. Air Control Valve (ACV)	• Directs air to one of three locations: Exhaust port, 2-bed catalyst or back to the air cleaner
3. Check Valves	• Prevents a backflow of hot exhaust into ACV or air pump • Located between ACV and exhaust port and between ACV and 2-bed catalyst
4. Port Air	• Air injected into exhaust port liner through a nozzle • Port air is controlled by the ACV
5. Split Air	• Air injected into 2-bed converter • Split air is controlled by ACV
6. Pellet Converter	• 2-bed pellet type catalytic converter • Split air injected between the 2 beds
7. Monolith Converter	• Honeycomb type catalytic converter • Air injected at exhaust port (port air)
8. Reaction Manifold (REM)	• Helps combust unburned HC and CO in exhaust system • Air injected at exhaust port (port air)
9. Relief Air	• Air is released back to the air cleaner from ACV at high RPM • Air also released if catalyst is overheating

Air Control Valve (ACV)

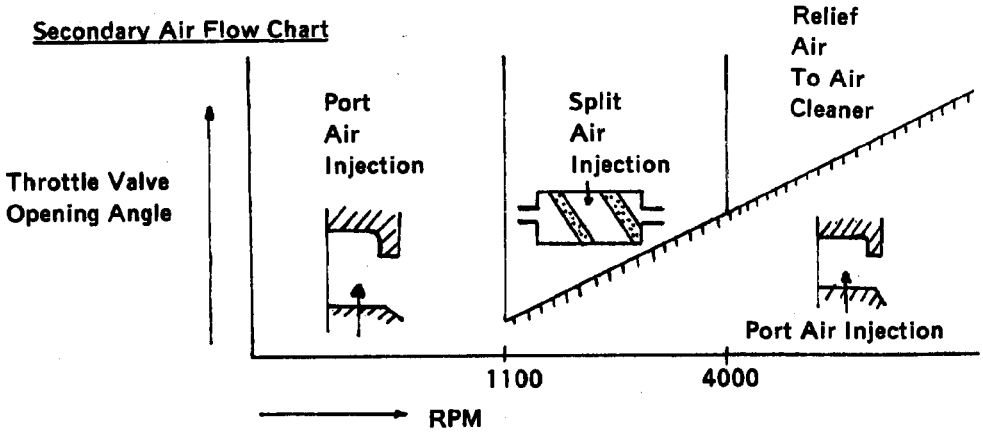


Component	Function
1. Switching Valve	• Controls air flow from ACV to port and split air injection • Vacuum actuated by a diaphragm inside ACV
2. Switching Solenoid Valve	• Controls switching valve by applying or removing vacuum signal. Valve has a grey color code dot. • Applies vacuum when power is removed.
3. Port Air	• Air injection flows to exhaust port at low RPM (engine warm) • Port air injection is cut above 1100 RPM (engine warm)
4. Split Air	• Air injection flows to 2-bed catalyst at medium speeds (engine warm) • Split air is cut at low speeds (below 1100 RPM) and at high RPM (engine warm)
5. Relief Valve	• Releases air from ACV back to the air cleaner at high RPM • No. 1 relief valve opens when air pressure from the air pump is high. • No. 2 relief valve opens when actuated by a diaphragm which is controlled by the relief valve solenoid.
6. Relief Valve Solenoid	• Applies vacuum to the relief valve in the ACV. Valve has a blue color code dot. • Applies vacuum when power is removed.
7. Relief Air	• Relief air flows from ACV back to the air cleaner at high RPM.
8. No. 1 Anti-afterburn Valve (AAV)	• Supplies air to the intake manifold during deceleration (rapid change in vacuum) • Only works for several seconds until vacuum on both sides of diaphragm is balanced.

Air Control Valve Troubleshooting

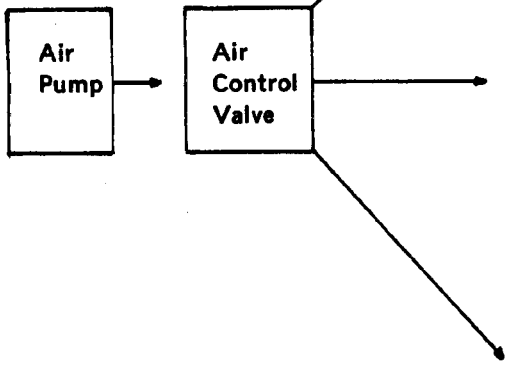
Internal Component	Symptom / Problem	Rough Idle or Stall	Hard Starting When Cold	Afterburn	High CO at Idle	Overheat Light On
No. 1 Anti-afterburn Valve (AAV)	Stuck Open or Leaking	●	●			
	Inoperative or Stuck Closed			●		
No. 1 Relief Valve	Relief All the Time				●	
	No Relief					
No. 2 Relief Valve	Relief All the Time			●	●	
	No Relief					●
Switching Valve	Stuck in Port Position					●
	Stuck in Split Position				●	

NOTE: The air control valve is difficult to test as most of its passages are internal and cannot be checked. Use the symptoms chart above to determine if the ACV is working correctly. The ACV is not repairable and must be replaced as a unit.



Secondary Air Flow Chart

The flow of air pump air varies under the following conditions:



Port Air Injection (To Exhaust Port)

- When throttle valve opening angle is small (throttle sensor) depending upon RPM.
- At idle (up to 1100 RPM)
- During deceleration
- Up to 4000 RPM when choke is "ON" and coolant temperature is above 15° C (60° F)
- Relief solenoid valve is "OFF"
- Switching solenoid is "OFF"

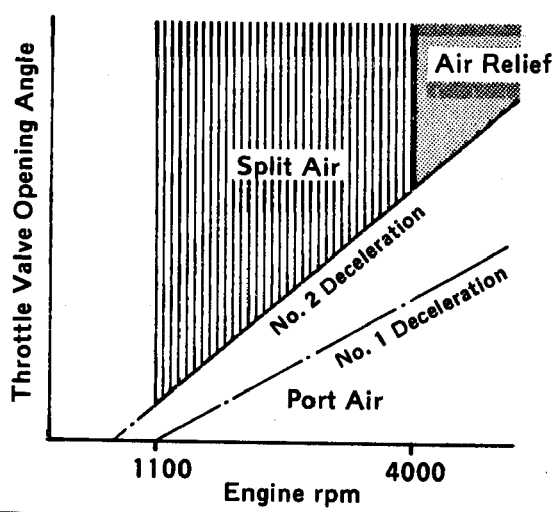
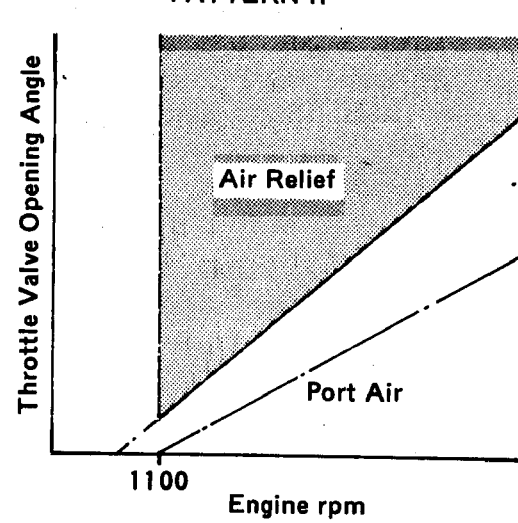
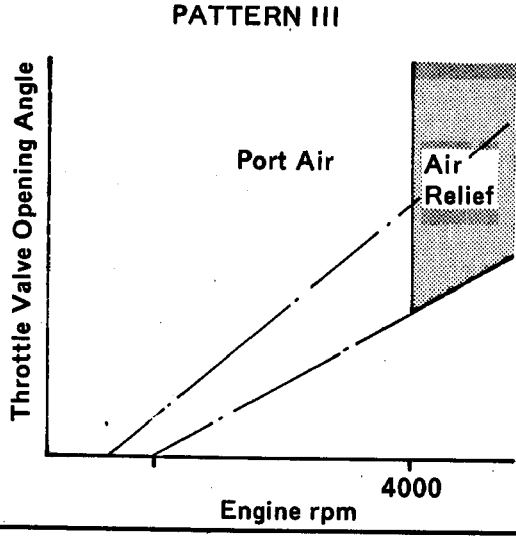
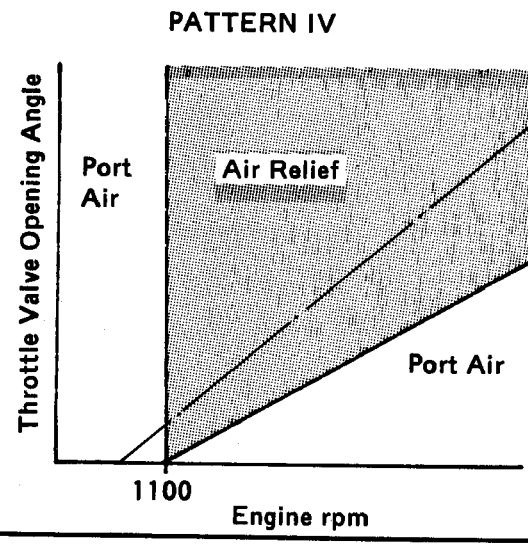
Split Air Injection (To 2-bed Catalyst)

- Between 1100 RPM and 4000 RPM when choke is "OFF"
- Relief solenoid valve is "OFF"
- Switching solenoid valve is "ON"

Relief Air (To Air Cleaner)

- At high RPM when air pump pressure is high
- Above 4000 RPM when choke is "OFF" and coolant temperature is above 15° C (60° F)
- Above 1100 RPM when coolant temperature is below 15° C (60° F)
- Relief solenoid valve is "ON"

SECONDARY AIR CONTROL FLOW CHART

	No. 2 Water Temp. Sw. is "ON" — Above 15° C	No. 2 Water Temp. Sw. is "OFF" — Below 15° C
Choke Switch is "OFF" — Choke Returned	PATTERN I 	PATTERN II 
Choke Switch is "ON" — Choke Pulled	PATTERN III 	PATTERN IV 

Port Air: The secondary air is injected into the exhaust port.
(Relief solenoid valve is "OFF", Switching solenoid valve is "OFF")

Split Air: The secondary air is injected into the catalyst.
(Relief solenoid valve is "OFF", Switching solenoid valve is "ON")

Air Relief: The secondary air is released to the air cleaner.
(Relief solenoid valve is "ON")

THROTTLE SENSOR

Purpose

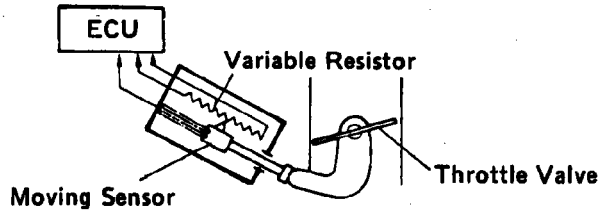
The throttle sensor has replaced the idle switch on the carburetor. The throttle sensor accurately senses the opening angle of the throttle valve. This angle, when compared to engine RPM by the E.C.U. is used to detect load and deceleration conditions. As an example, high RPM with a small throttle opening would indicate a deceleration condition.

Deceleration Control

Depending upon the throttle opening angle and RPM, the E.C.U. will either turn "ON" or turn "OFF" the coasting, shutter, vacuum advance control, relief and switching valve solenoids. When the choke knob is pulled (ON), the throttle opening angle that switches the air injection from air relief to port air injection, is less than when the choke is "OFF".

Operation

The throttle sensor is a variable resistor that works alot like a fuel tank level sensor and float. As the throttle valve moves, it changes the resistance to the E.C.U.

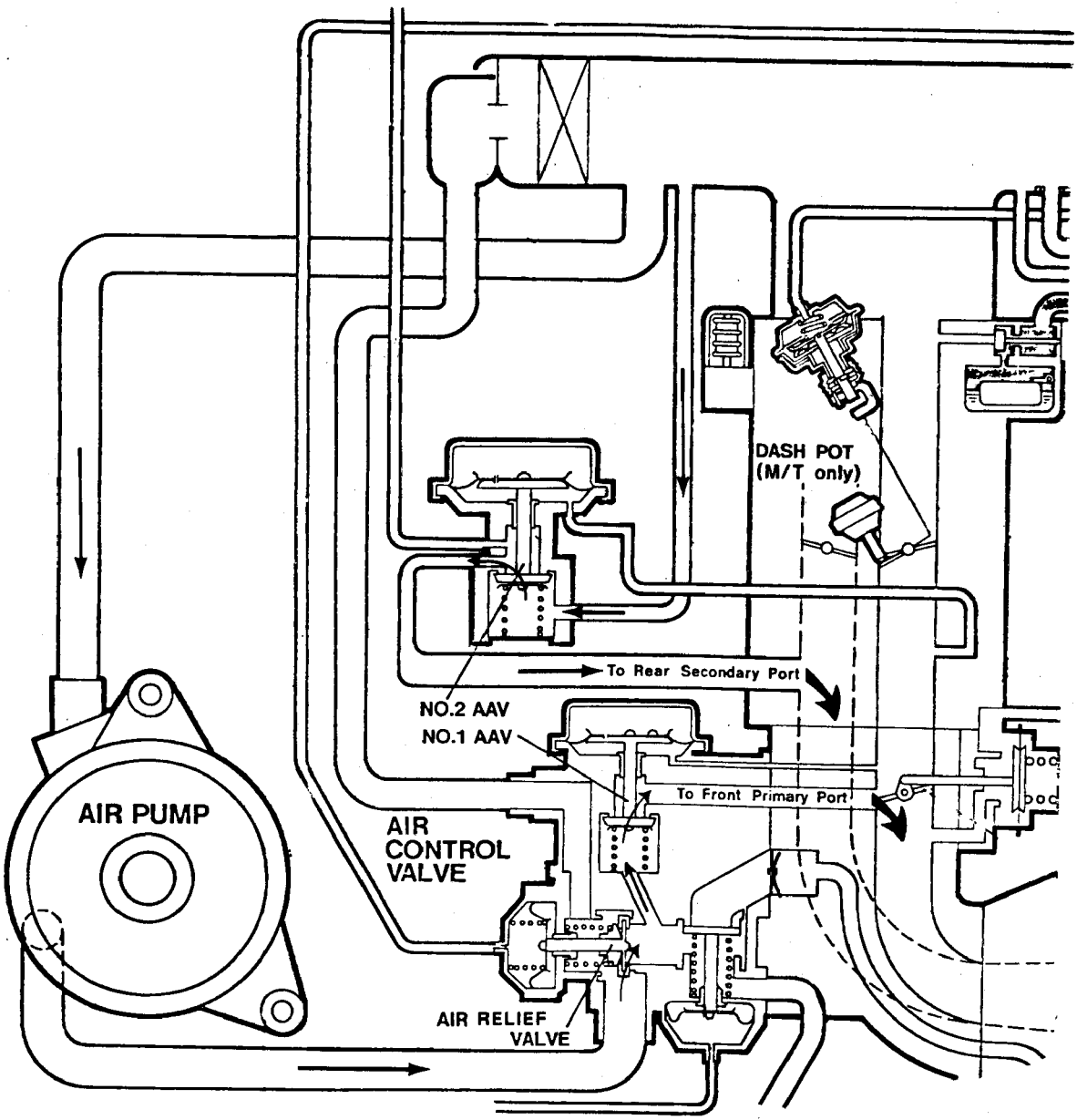


NOTE: Do not apply battery voltage (+) directly to the sensor with a jumper lead. Doing so will damage the sensor.

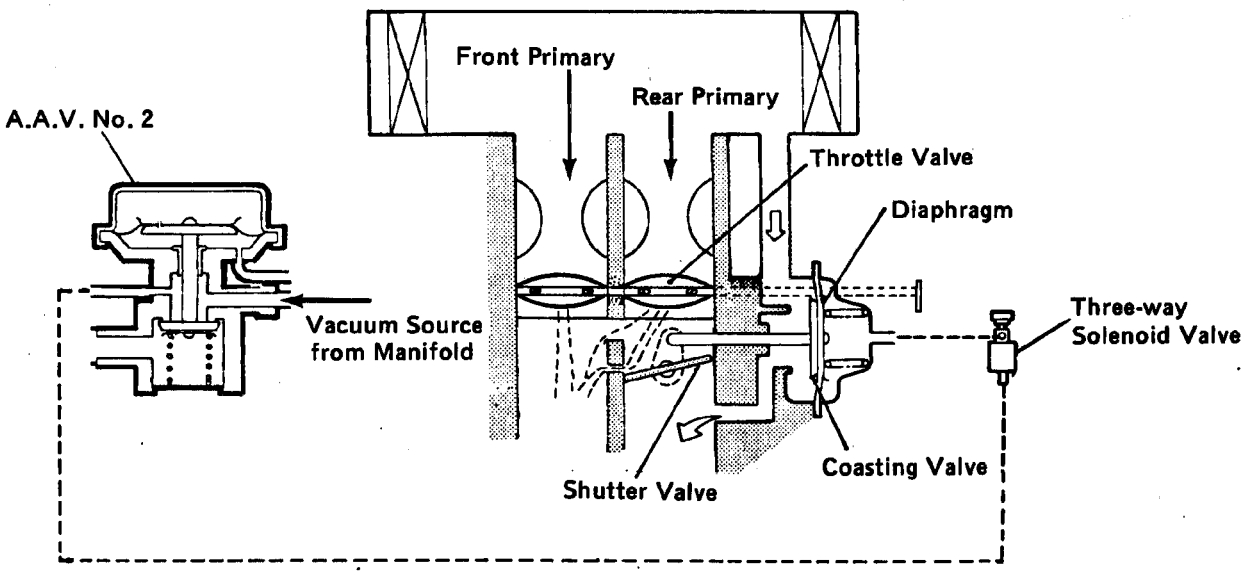
RX-7 Anti-Afterburn Valves

The No. 1 anti-afterburn valve is part of the air control valve. It opens for 1 to 2 seconds on deceleration dumping secondary air from the air control valve to the front primary port.

The No. 2 anti-afterburn valve also opens on deceleration, drawing air from air cleaner to enter the rear secondary port. This valve also only operates momentarily during initial deceleration.



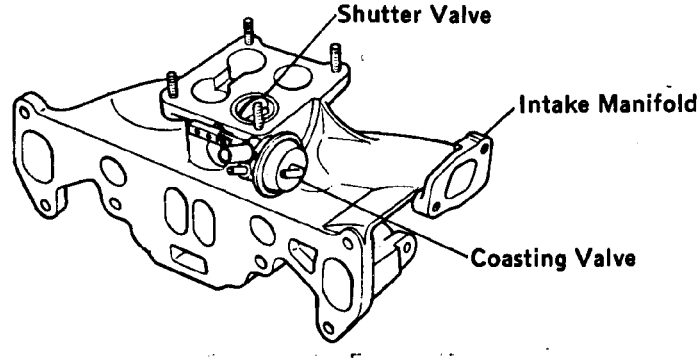
COASTING VALVE WITH SHUTTER VALVE



The source of vacuum to the coasting valve is through a solenoid valve which opens over 1100 RPM on deceleration and is drawn from A.A.V. No. 2. A.A.V. No. 2 opens first during deceleration, then closes allowing vacuum to reach the coasting valve.

The purpose of the coasting valve is to reduce excessive vacuum in the rear combustion chamber during deceleration. The coasting valve is combined with a shutter valve whose purpose is to prevent the fuel-air mixture from entering the rear combustion chamber during deceleration.

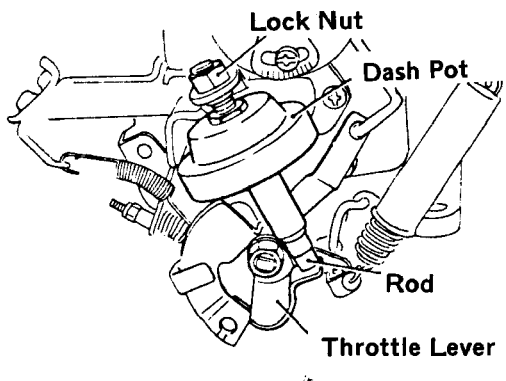
There are ports above the shutter valve which allows the flow of fuel to be redirected to the front primary port while the shutter valve is closed. During deceleration, only the front rotor chamber is operating.

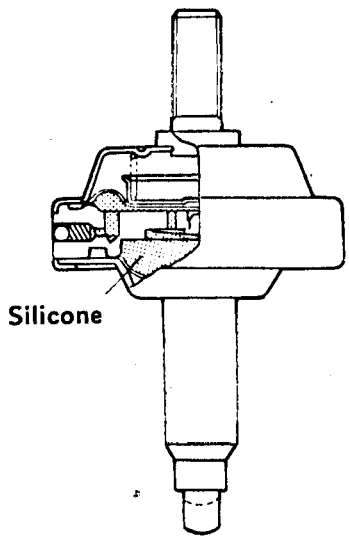


DASH POT (M/T Only)

Operation

The dash pot rod extends as the throttle rod moves away from it on acceleration. When the throttle is released, the dash pot rod returns in slowly which prevents high vacuum during deceleration.





Adjustment

Slowly increase engine speed while watching the dash pot rod, it should lose contact with the throttle lever at 3700 ± 200 RPM. If not within specifications, loosen the locknut and rotate the dash pot to adjust.

Troubleshooting

Problem \ Symptom		Vibration During Deceleration	No Engine Braking	Fast Idle During Deceleration	Afterburn	Engine Stalls on Sudden Stop
Misadjusted	Too High		●	●		
	Too Low	●			●	●
Return	Too Slow		●	●		
	Too Early	●			●	●

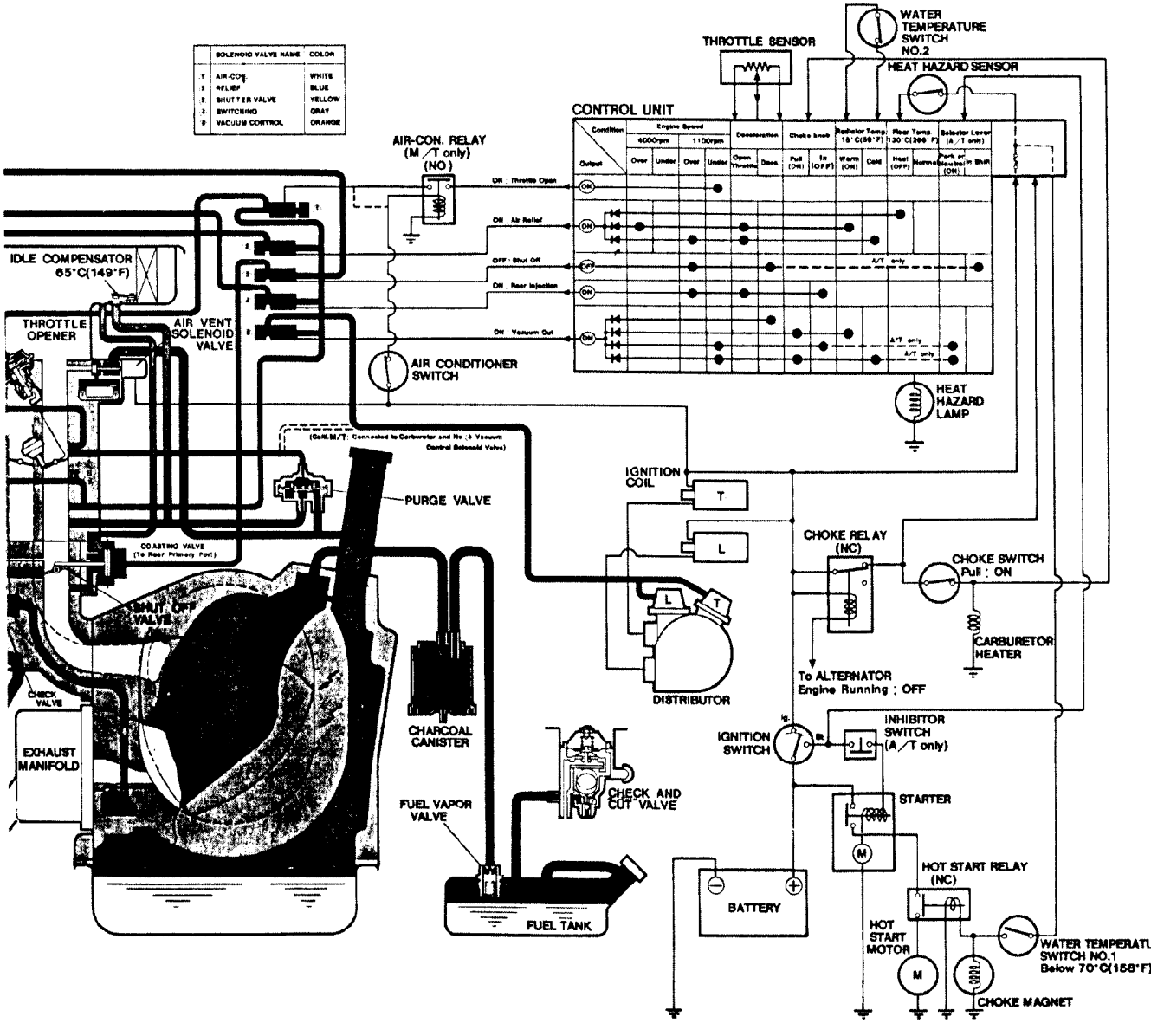
The advance will not operate (manifold vacuum will not be applied) under the following conditions:

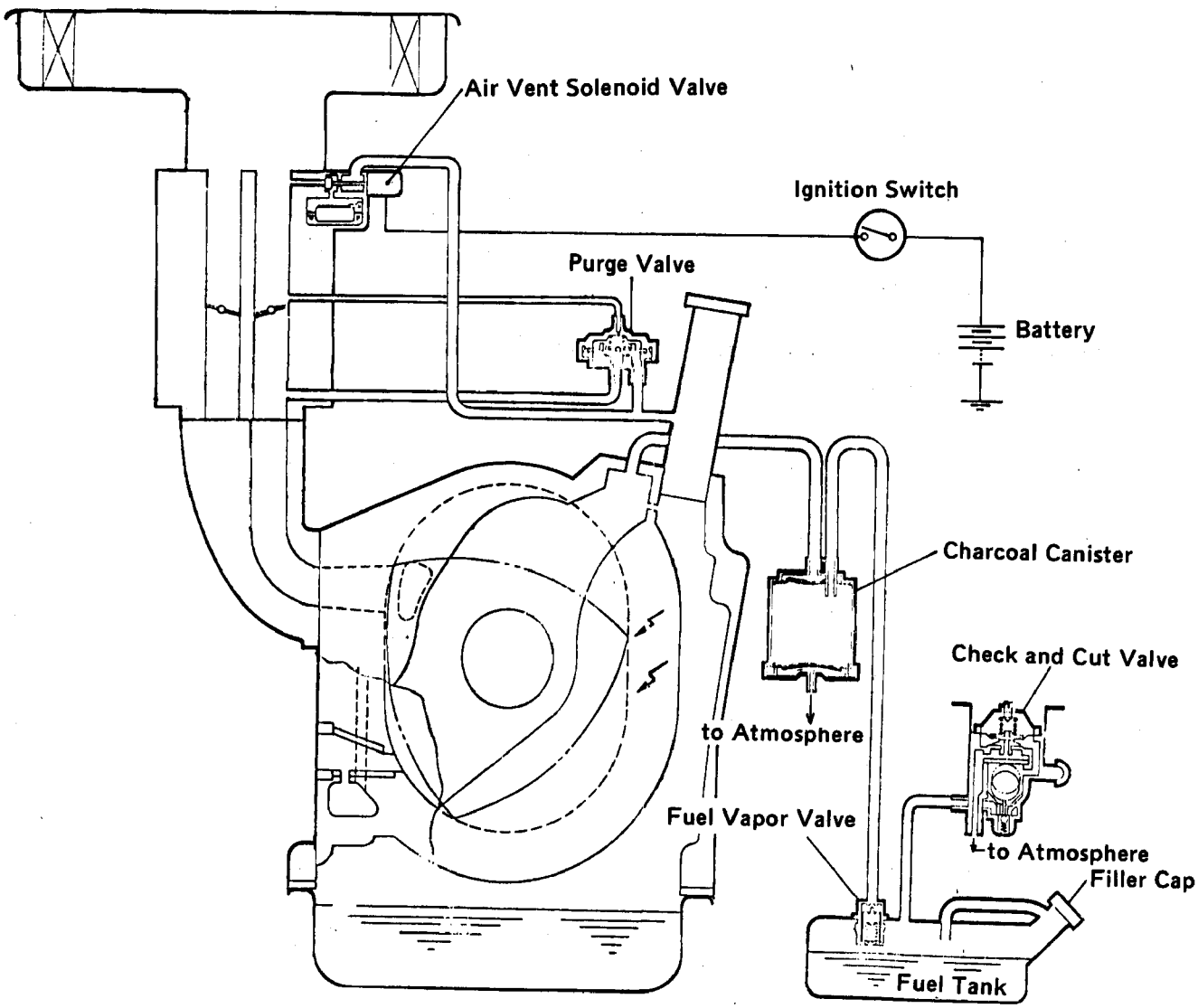
a — At idle in "P" or "N" (A/T) and when choke is on or when choke is pulled below 15° C.

b — When choke is pulled over 15° C.

c — Anytime while decelerating.

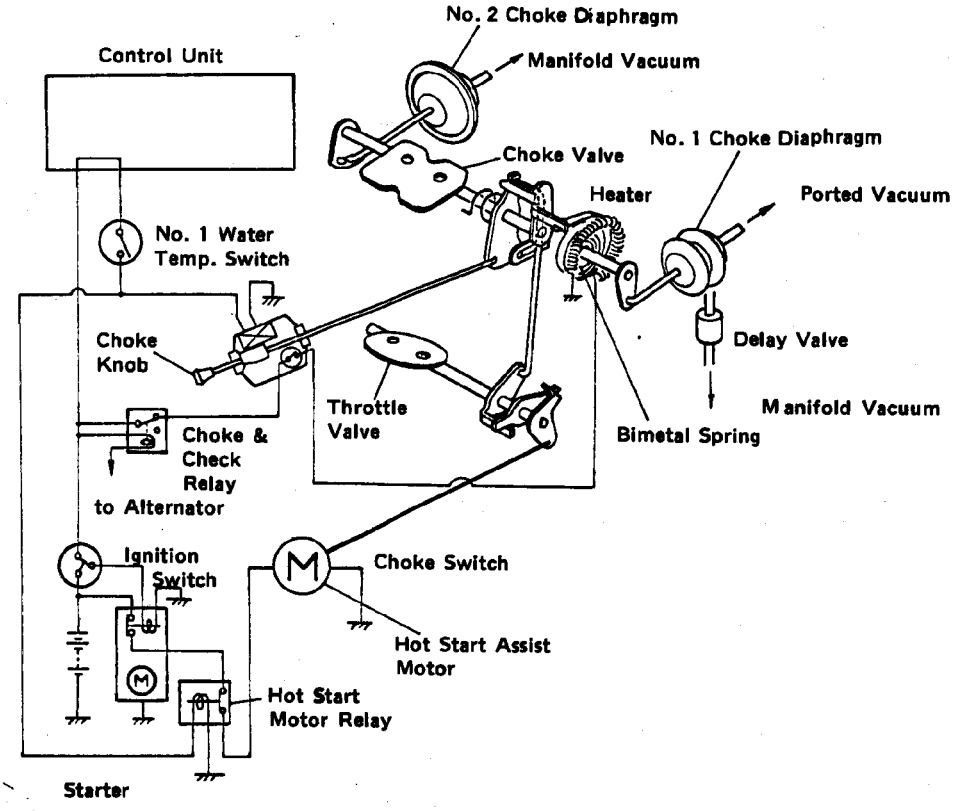
Note: On California manual transmission models, the vacuum line is connected direct to ported vacuum. Vacuum is cut at idle throttle position (idle and during deceleration).





HC fumes from the fuel tank are vented through a fuel vapor valve (allowing vapor, not liquid) to be absorbed by the charcoal canister. Excessive pressure or vacuum in the fuel tank is released by the check and cut valve to the atmosphere. The check and cut valve has a rollover feature to prevent fuel loss if the vehicle is overturned. HC from the float chamber of the carburetor is vented through the air vent solenoid valve to the crankcase and then to the charcoal canister when the engine is not running. The carburetor is vented to the air cleaner when the engine is running.

The purge valve is opened by ported vacuum. It draws the HC fumes from the canister and crankcase to the intake manifold.



Choke Operation

1. With the choke lever fully pulled out and the engine cold, the choke magnet holds the lever in the extended position and the choke valve is closed.

2. As the engine is started, the No. 2 choke diaphragm pulls the choke valve open slightly by manifold vacuum to allow the engine to run.

3. After a few seconds, the choke delay valve allows the No. 1 choke diaphragm to pull the choke open a little more which changes the RPM.

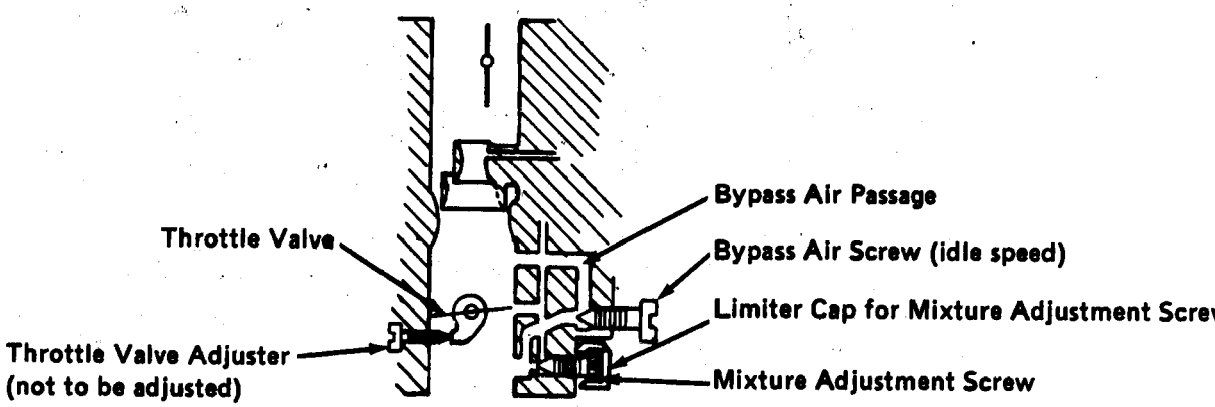
4. As current flows through the bimetal heater, the choke valve will begin to open.

5. The other diaphragm on the No. 1 choke diaphragm is actuated by ported vacuum to prevent overchoking when the throttle is opened, while the choke is still closed.

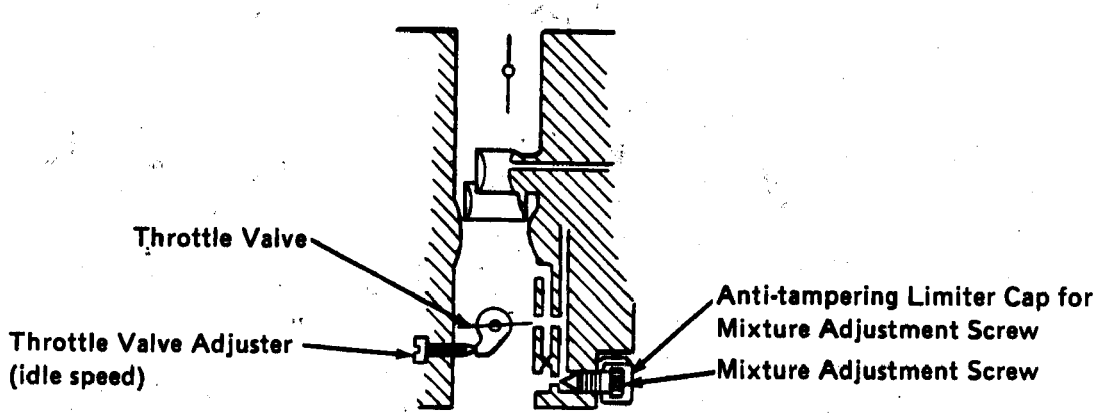
6. After several minutes of warm-up as the engine reaches normal operating temperature, the choke magnet will fully release the choke lever which will completely open the choke valve.

Carburetor Adjustment — Changes from 1980 to 1981

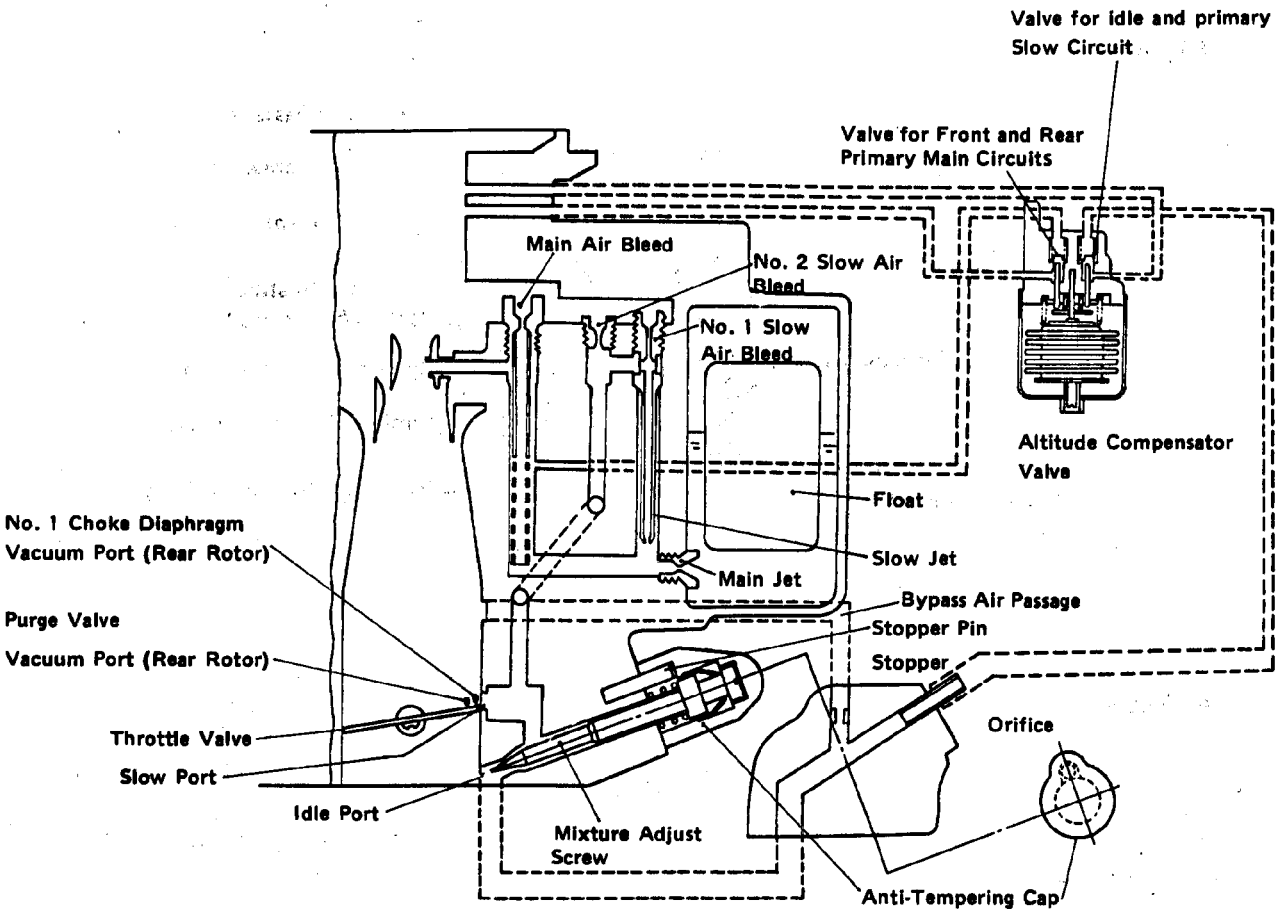
'80 Model

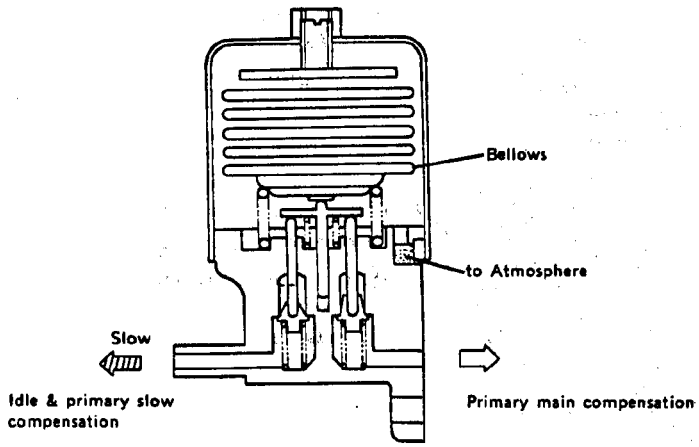


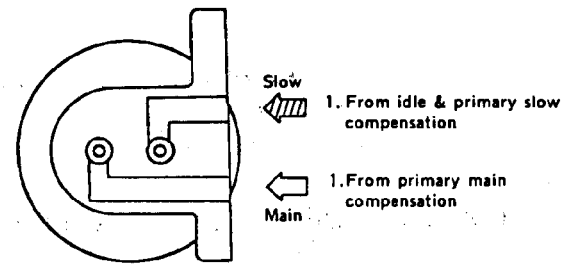
'81 Model

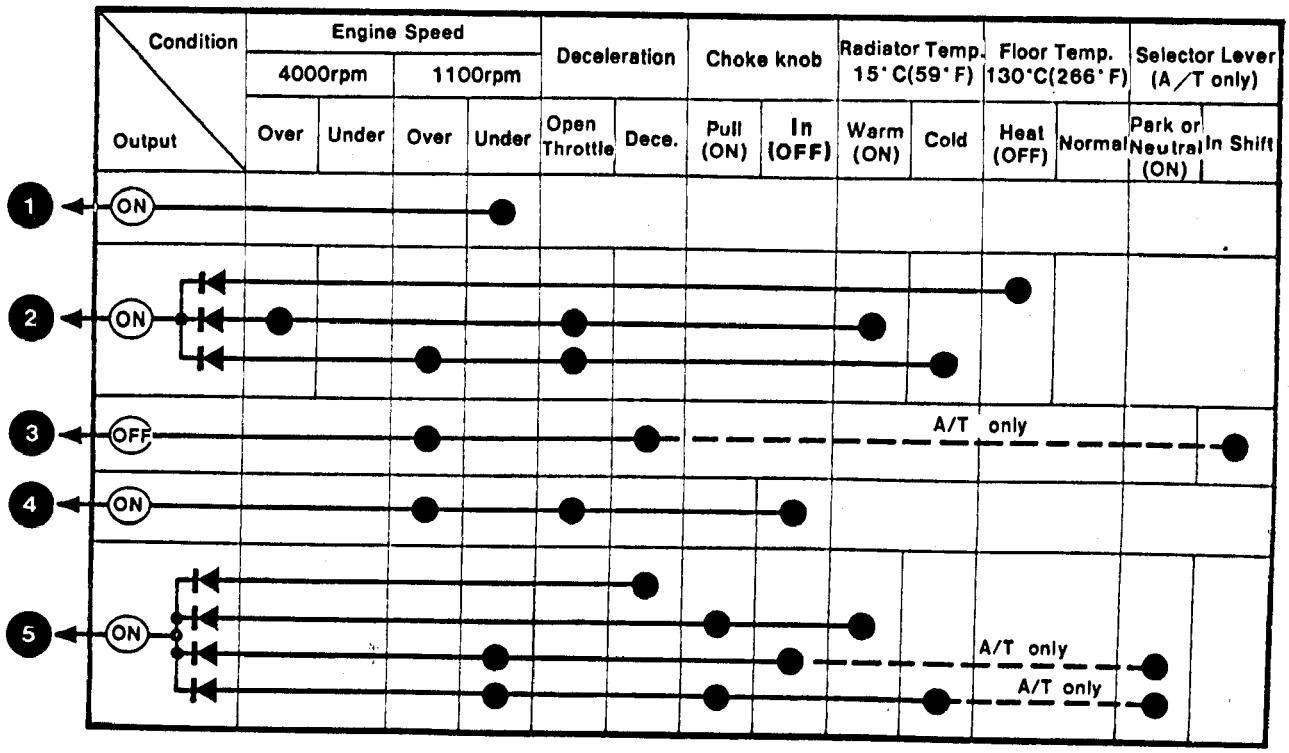


NOTE: Only idle speed is to be adjusted on the 1981 model.


Valve for idle and primary Slow Circuit
Valve for Front and Rear Primary Main Circuits
Main Air Bleed
No. 2 Slow Air Bleed
No. 1 Slow Air Bleed
Altitude Compensator Valve
Float
Slow Jet
Main Jet
No. 1 Choke Diaphragm Vacuum Port (Rear Rotor)
Purge Valve Vacuum Port (Rear Rotor)
Bypass Air Passage
Stopper Pin
Stopper
Orifice
Throttle Valve
Slow Port
Idle Port
Mixture Adjust Screw
Anti-Tempering Cap


Bellows
to Atmosphere
Slow
Idle & primary slow compensation
Primary main compensation

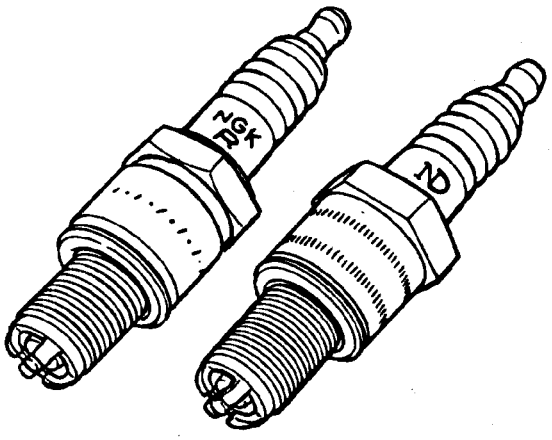

Slow
1. From idle & primary slow compensation
Main
1. From primary main compensation



	SOLENOID VALVE FOR	WHAT SHOULD HAPPEN	COLOR
1.	A/C (THROTTLE OPENER)	ON: Throttle Opener works OFF: Throttle Opener does not work	White
2.	AIR RELIEF VALVE	ON: Air relieves to Air Cleaner OFF: Air injection	Blue
3.	COASTING/SHUT OFF VALVE	ON: Valve does not work OFF: Valve works	Yellow
4.	AIR SWITCHING VALVE	ON: Split air (Rear) OFF: Port air (Front)	Gray
5.	VACUUM ADVANCE	ON: Vacuum cut OFF: Vacuum to Distributor	Orange

The 1981 RX-7 is equipped with a new style 4-electrode spark plug which is positioned closer (6mm to 3mm) to the combustion chamber. The old style 3-electrode spark plugs will not fit into the new rotor housings.

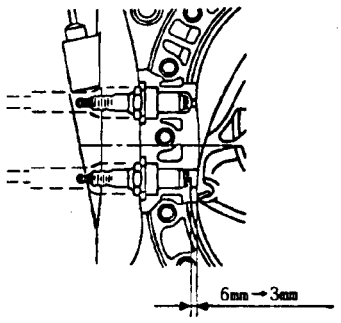
4 Electrodes



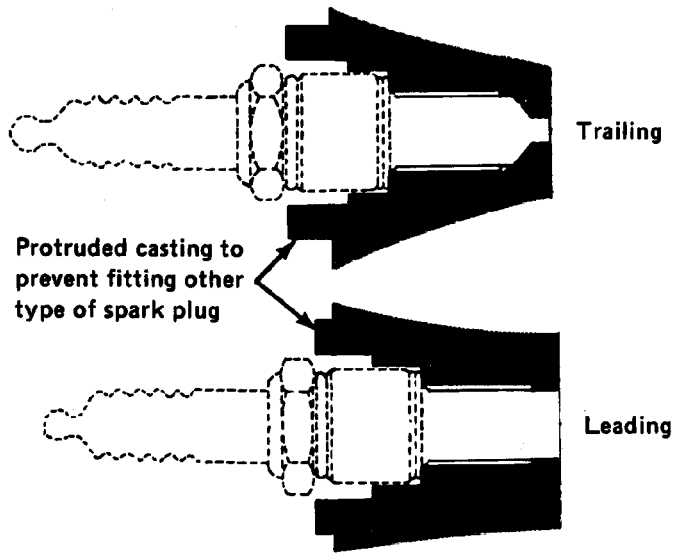
Spark Plug Type

NGK	BR7EQ14	Gap: 1.4 mm *Standard Heat Range
	BR8EQ14*	
	BR9EQ14	
ND	W22EDR14	
	W25EDR14*	
	W27EDR14	

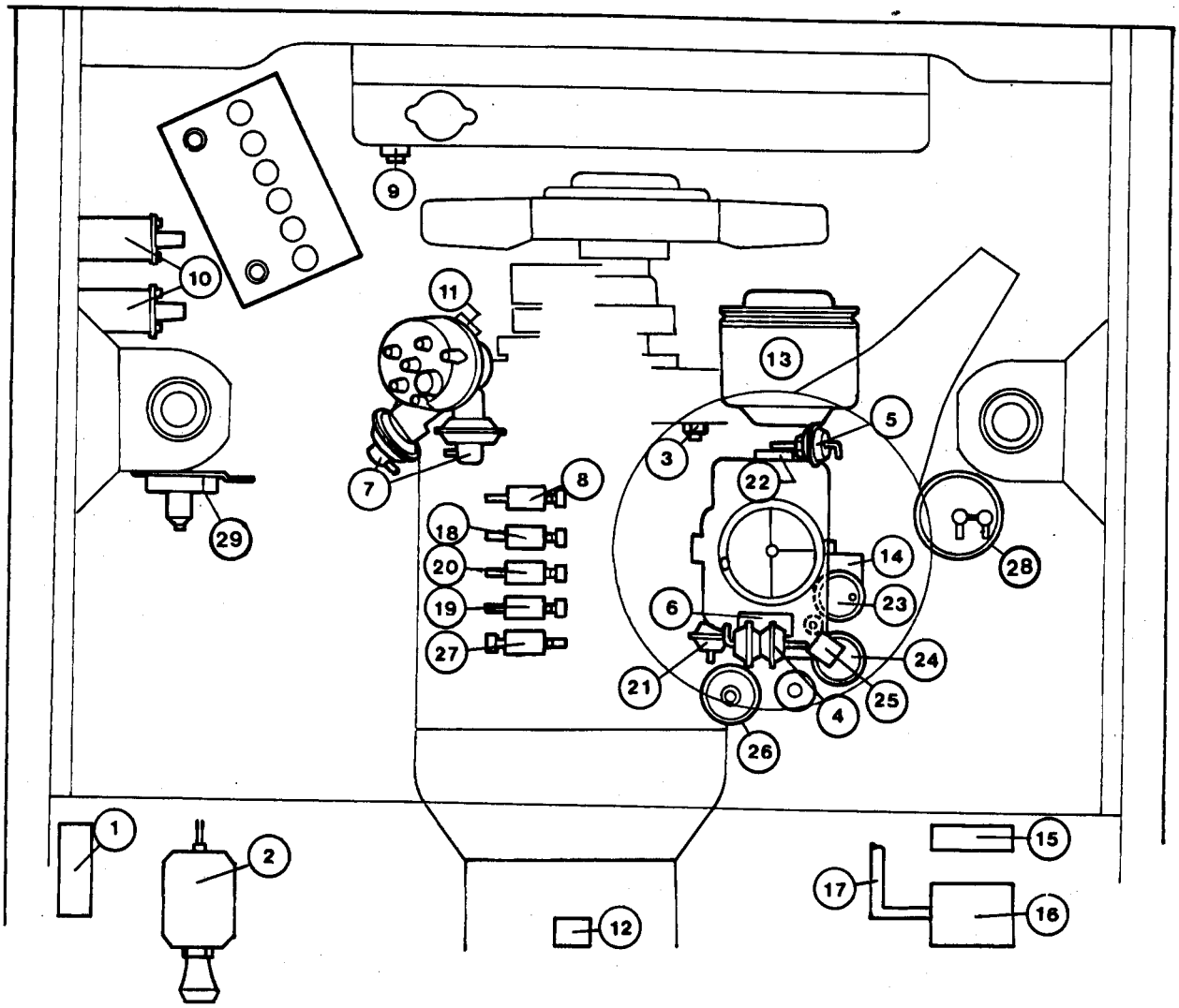
Combustion Chamber



Rotor Housing



Emission Components Location and Components Explanation



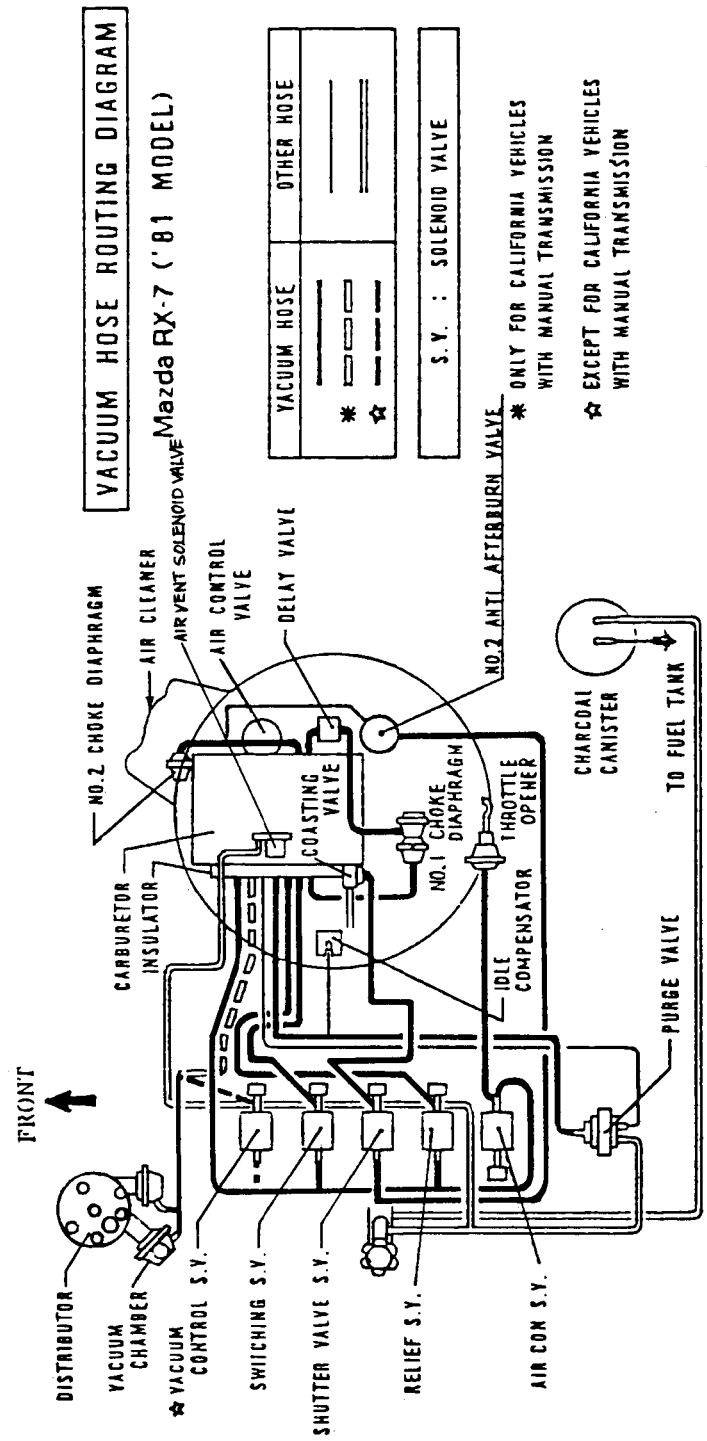
1. Emission Control Unit
2. Choke Switch
3. Water Temp. Switch (No. 1)
4. Choke Diaphragm (No. 1)
5. Choke Diaphragm (No. 2)
6. Choke Bimetal Heater
7. Vacuum Advance Diaphragm
8. Vacuum Control Solenoid Valve
9. Water Temp. Switch (No. 2)
10. Ignition Coils L & T
11. Igniters L & T
12. Inhibitor Switch (A/T)
13. Air Pump
14. Air Control Valve
15. Monolith Converter
16. 2-bed Converter
17. Split Air Injection
18. Switching Solenoid Valve
19. Relief Solenoid Valve
20. Shutter Solenoid Valve
21. Coasting/Shutter Valve
22. Throttle Sensor
23. Anti-afterburn Valve No. 1
24. Anti-afterburn Valve No. 2
25. HAC Valve
26. Throttle Opener
27. A/C Solenoid Valve
28. Canister
29. Hot Start Motor

Component	Description	Comments
1. Emission Control Unit	• Senses: Throttle Opening Radiator Temperature Choke Condition Floor Temperature Distributor Signal • Supplies signals to each solenoid valve	• Controls: Throttle Opener Air Control Valve Coasting Valve Distributor Vacuum Heat Hazard Lamp
2. Choke Switch	• Applies power to choke heater • Controls secondary air injection and distributor vacuum advance through control unit	• Pull knob: ON
3. Water Temperature Switch (No. 1)	• Holds choke on below 70°C • Operates hot start motor above 70°C	• On the water pump body • Below 70°C (158°F): ON
4. Choke Diaphragm (No. 1)	• Pulls choke valve partially open after delay valve opens or when accelerating (ported vacuum)	• 2 diaphragms, connected to choke bimetal
5. Choke Diaphragm (No. 2)	• Forces the choke valve to open a little after engine is started	• 1 diaphragm, connected to choke valve
6. Choke Bimetal Heater	• Gradually opens the choke valve after engine is started	• ON: after engine is started with choke • OFF: when choke returns to off position
7. Vacuum Advance Diaphragm	• Calif. M/T: Connected to ported vacuum • except Calif. M/T: Controlled by solenoid valve	
8. Vacuum Control Solenoid Valve	• Cut vacuum to distributor on deceleration, etc.	• Except Calif. M/T • Orange color

Component	Description	Comments
9. Water Temperature Switch (No. 2)	• Relieves secondary air back to air cleaner	• On bottom of radiator • Over 15°C (59°F): ON
10. Ignition Coil	• Both coils operate at all engine speeds	
11. Igniter	• Mounted on distributor	
12. Inhibitor Switch (A/T)	• Located on transmission • Detects P or N position	
13. Air Pump	• Supplies secondary air	• Do not oil
14. Air Control Valve	• Consists of 3 valves: Air Relief Valve Air Switching Valve No. 1 AAV	• Installed on intake manifold
15. Monolith Converter	• Reduces HC, CO and NOx	• Front Catalyst
16. 2-Bed Converter	• Further reduces HC, CO and NOx	• Rear catalyst • Pellet type
17. Split Air Injection	• Secondary air is injected between 2-beds • Above 1100 rpm with open throttle and choke off	
18. Switching Solenoid Valve	• Switches the secondary air to exhaust port or rear catalyst (2-bed converter)	• Gray color
19. Relief Solenoid Valve	• Relieves secondary air when unnecessary	• Blue color
20. Shutter Solenoid Valve	• Operates coasting valve during deceleration above 1100 rpm • Operates the shutter valve at the same time	• Yellow color

Component	Description	Comments
21. Coasting Valve	• Supplies fresh air into the rear primary port when decelerating to prevent excessive vacuum	
Shutter Valve	• Shuts off the rear primary port during deceleration	
22. Throttle Sensor	• Detects the throttle opening angle	
23. Anti-Afterburn Valve (No. 1)	• Supplies fresh air into the front port during deceleration	• Included in air control valve • Vacuum operated
24. Anti-Afterburn Valve (No. 2)	• Supplies fresh air into the rear port during deceleration	• Vacuum operated
25. HAC Valve	• Leans the mixture at high altitude	• Adds air to carburetor air bleeds
26. Throttle Opener	• Pulls the throttle valve partially open when A/C switch is turned on	• Compensates for load of compressor
27. A/C Solenoid Valve	• Applies vacuum to the throttle opener when A/C switch is turned on	• White color

Vacuum Hose Routing Diagram


VACUUM HOSE ROUTING DIAGRAM
Mazda RX-7 ('81 MODEL)
VACUUM HOSE
OTHER HOSE
S.V. : SOLENOID VALVE
* ONLY FOR CALIFORNIA VEHICLES WITH MANUAL TRANSMISSION
☆ EXCEPT FOR CALIFORNIA VEHICLES WITH MANUAL TRANSMISSION
FRONT
DISTRIBUTOR
VACUUM CHAMBER
☆ VACUUM CONTROL S.V.
SWITCHING S.V.
SHUTTER VALVE S.V.
RELIEF S.V.
AIR CON S.V.
CARBURETOR INSULATOR
NO.2 CHOKE DIAPHRAGM
AIR CLEANER
AIR VENT SOLENOID VALVE
AIR CONTROL VALVE
DELAY VALVE
COASTING VALVE
NO.1 CHOKE DIAPHRAGM
THROTTLE OPENER
IDLE COMPENSATOR
NO.2 ANTI AFTERBURN VALVE
CHARCOAL CANISTER
TO FUEL TANK
PURGE VALVE

Emission Checking Procedure

COLD START TEST PROCEDURE (under 70° C)

Step	What to Do	What Should Happen	Comments
1.	Turn ignition key "ON"	Dash warning lights "ON"	Bulbs working
2.	Pull choke knob to full choke position	Choke knob remains pulled out	• Choke magnet working • No. 1 water temperature switch is closed.
3.	Start engine on full choke and note the RPM	• Dash warning lights "OFF" • RPM changes slightly just after engine starts • RPM changes again slightly after a few seconds	• Alternator/Choke relay is working • No. 2 choke diaphragm working • No. 1 choke diaphragm and delay valve working
4.	Set engine speed at 2000 RPM and watch choke valve	• Choke is pulled open further	• Ported vacuum to No. 1 diaphragm working
5.	Feel the bimetal cover with fingers	• Should feel warm or hot	• Choke and check relay working • Bimetal heater working
6.	Check vacuum signal to vacuum advance diaphragms (except Calif. M/T)	• Vacuum is cut with choke "ON" with coolant above 15° C (60° F)	• Vacuum control solenoid valve working • No. 2 water temperature switch is closed • Choke switch working
7.	Check air flow from relief valve back to the air cleaner	• No air flow at idle • Air flows above 1100 RPM with choke "ON" if coolant is below 15° C (60° F)	• Relief valve solenoid working • Low speed switch in ECU working • No. 2 water temperature switch is "OFF"
		• Air flow above 4000 RPM with choke "ON" if coolant is above 15° C (60° F)	• High speed switch in ECU working • No. 2 water temperature switch is "ON" (closed)
8.	Check the switching solenoid valve with a test light	• No power at any RPM with choke "ON"	• No split air injection • Switching solenoid has a grey color code dot.
9.	As temperature gauge reaches operating temperature, watch the choke knob	• Choke should fully release	• No. 1 temperature switch working (70° C) • Choke magnet released • Choke valve vertical

HOT START TEST PROCEDURE (over 70° C)

Step	What to Do	What Should Happen	Comments
1.	Start the engine (without using accelerator pedal)	• Engine revs slightly as it starts	• Hot start assist motor working • Fuse link on starter motor has continuity • No. 1 water temperature switch is open (above 70° C) • Choke and hot air door should be fully open
2.	Run the engine at idle and check the ignition timing	• Trailing — 20° ATDC (Yellow) • Leading — 0° TDC (Red)	• Set leading first by rotating distributor • Set trailing last by moving "T" vacuum advance unit
3.	Check vacuum advance operation or check power to vacuum control solenoid valve (except Calif. M/T)	• Vacuum present above idle • No power to solenoid valve at idle	• Vacuum control valve is open • No. 2 water temperature switch is "ON" (closed)
4.	Turn A/C "ON" and note idle speed Increase engine speed to 2000 RPM with A/C "ON"	• Idle speed remains correct • Throttle opener releases	• Throttle opener working • A/C solenoid valve working (white dot) • Low speed switch in ECU working
5.	Check air flow from relief valve back to the air cleaner —OR— Check power to relief solenoid valve with a test light	• No air flow at idle • Air flows above 4000 RPM • No power at idle • Power "ON" above 4000 RPM	• Relief valve not leaking • Relief valve solenoid working (blue dot) • Relief valve working Note: Some air will flow during acceleration from 1100 to 4000 RPM • High speed switch in ECU is working
6.	Check vacuum signal from switching solenoid valve —OR— Check power to switching solenoid valve with a test light	• No vacuum signal above 1100 RPM • Power "ON" above 1100 RPM	• Switching solenoid valve working • Switches from port air to split air • Switching solenoid valve has grey color code dot
7.	Check air flow into coasting valve hose —OR— Check power to shutter valve solenoid with a test light	• No air flow at idle • Air drawn in during deceleration above 1100 RPM • Shutter valve rod actuates during deceleration	• Coasting valve closed • Coasting valve working • Throttle sensor working • Shutter solenoid valve working (yellow dot)
8.	Increase engine speed slowly and observe dash pot Release throttle rapidly while observing dash pot rod	• Dash pot rod extends as throttle lever releases it • Dash pot rod slows throttle closing below 3700 ± 200 RPM	• M/T only • Dash pot not sticking • Rod loses contact at 3700 ± 200 RPM • Dash pot working
9.	To check throttle sensor, disconnect coupler (BY, GB). Connect test lights to the LgY and GY terminals. Rapidly decelerate the engine RPM from 3000 RPM	• Both test lights should come "ON" simultaneously at 1100 ± 50 RPM Note: Test lights must be less than 3 Watts	• If not correct, adjust the throttle sensor screw until both light at the same time

Specification

ENGINE

Idle speed	
Man. trans.	750rpm in neutral
Auto. trans.	750rpm in "D" range
Ignition timing (at idle in neutral)	
Trailing	20° ATDC
Leading	0° TDC (with distributor vacuum line connected)
Oil capacity	
Oil pan	4.2 liters (4.4 US qts., 3.7 Imp. qts.)

COOLING SYSTEM

Coolant capacity	
With heater	9.5 liters (10.0 US qts., 8.4 Imp. qts.)
Without heater	8.5 liters (9.0 US qts., 7.5 Imp. qts.)

FUEL SYSTEM

Fuel tank capacity	63 liters (16.6 US gals.)

ELECTRICAL SYSTEM

Spark plug gap (initial)	1.4mm ± 0.05mm (0.055in ± 0.002in)

TRANSMISSION

Gear ratio				
Man. trans.				
5-speed	1st:	3.674	2nd:	2.217
	3rd:	1.432	4th:	1.000
	5th:	0.825	Rev:	3.542
Auto. trans.	1st:	2.458	2nd:	1.458
	3rd:	1.000	Rev:	2.181

Oil capacity	
Man. trans.	
(5-speed)	1.7 liters (1.8 US qts., 1.5 Imp. qts.)
Auto. trans.	6.2 liters (6.6 US qts., 5.5 Imp. qts.)

REAR AXLE

Final gear ratio	3.909
Oil capacity	1.2 liters (1.3 US qts., 1.1 Imp. qts.)
* Limited Slip Diff.:	1.6 liters

STEERING

Gear ratio (variable)	17.0 -- 20.0 to 1
Steering wheel free play	5 -- 20mm(0.2 — 0.8in)
Min. turning radius	4.8m (15ft - 9in)

BRAKE

Foot brake	
Type A	Hydraulic, front disc and, rear leading and trailing type drum brake with booster
Type B	Hydraulic, disc brake with booster
Parking brake	Mechanical, internal expanding on rear wheels

SUSPENSION

Front	Independent, strut type
Rear	Rigid axle with 4-link/coil springs and Watt linkage

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