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Kevin Wright
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who laboriously scanned, post-processed, Distilled, and organized the original 1979 (1978 printing) RX-7 Product Information manual provided by Michael K. DeVantier.

The Table of Contents is hotlinked to the appropriate chapters, for easy navigation.

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 manuals 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:
See http://www.dfw-rx7.com/mailman/listinfo/sa22c
See http://www.dfw-rx7.com for information on the DFW-RX7 email list.

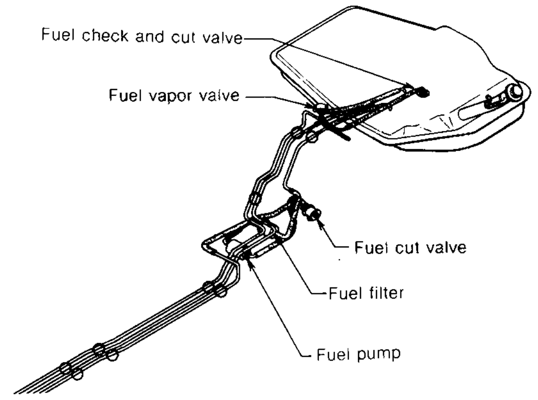
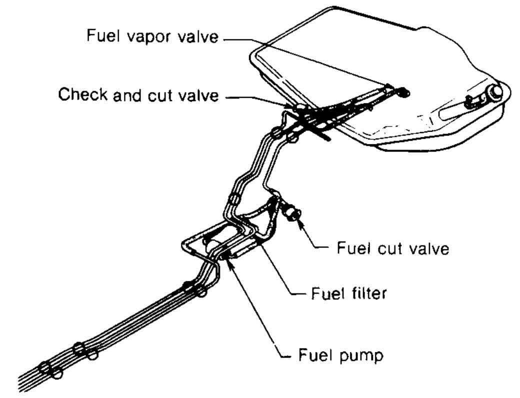
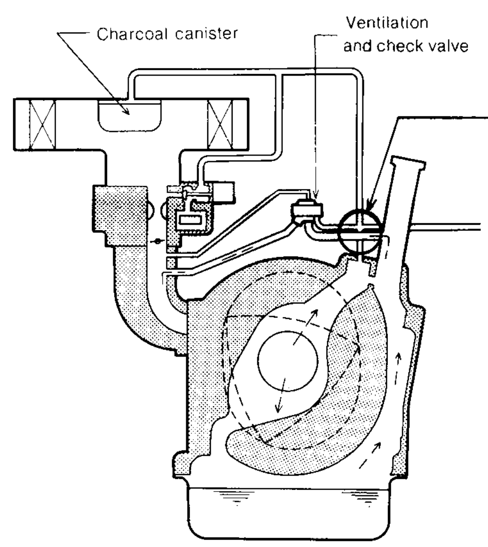
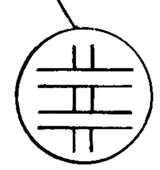
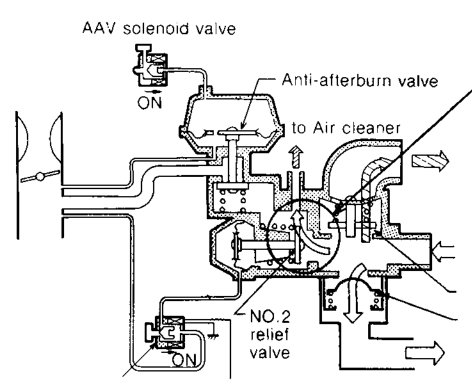
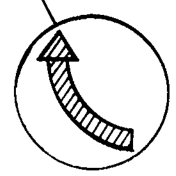
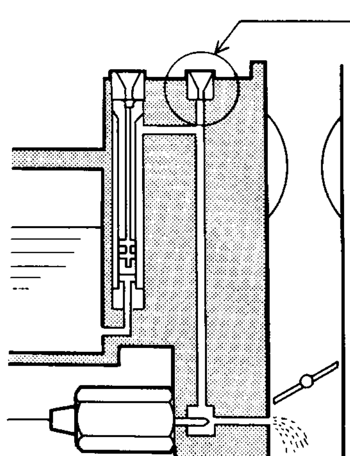
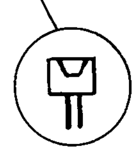
1979

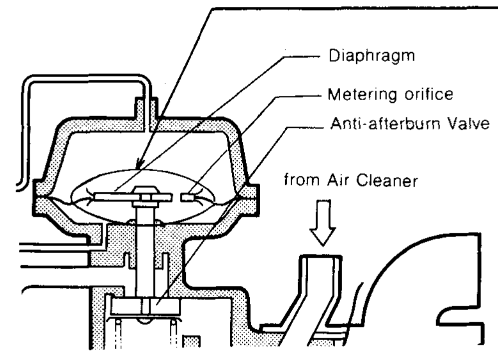
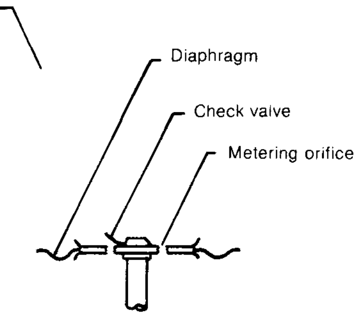
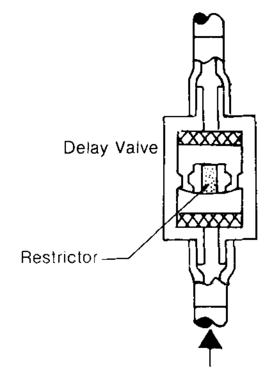
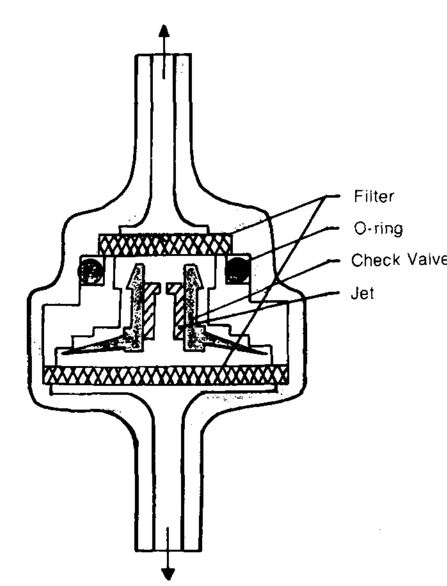
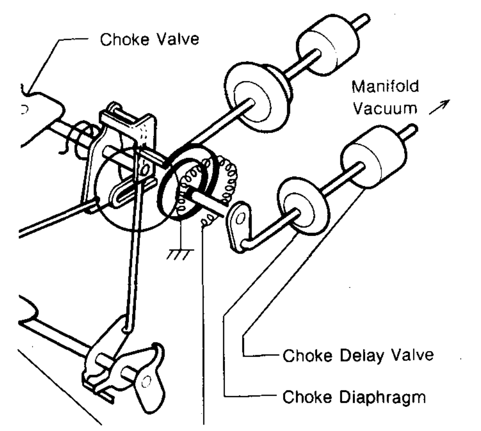
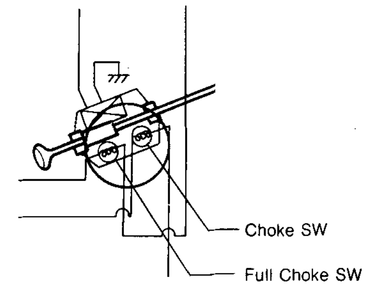
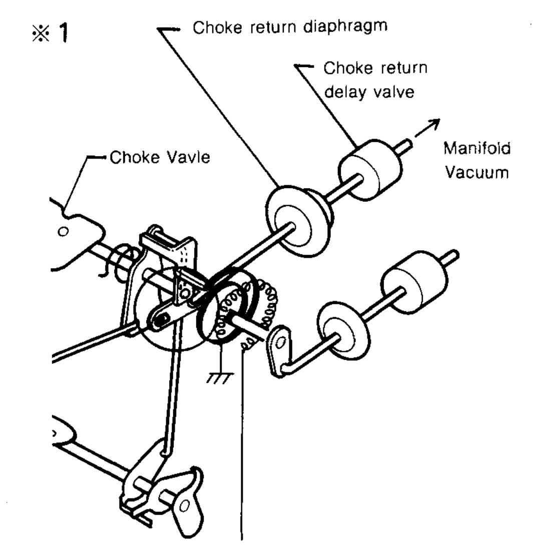
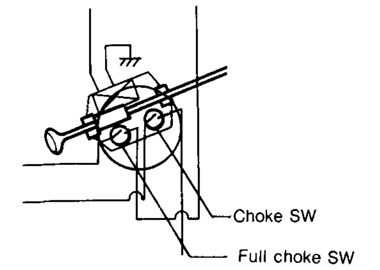
Product Information

RX-7

mazda

ERRATA FOR 1979 RX-7 PRODUCT INFORMATION

PAGE	ITEM	CORRECTIONS	
		WRONG	CORRECT
1—4	TENSION BOLT	These two bolts are not interchangeable.	The tension bolt for RX-7 can be used in the older year model engines, but do not install the tension bolt from older year model engine to RX-7.
1—7	OIL COOLER BY-PASS VALVE	The oil cooler by-pass valve - 60° C(140° F), - - - - - - - - - - - - - - - - - 70° C(158° F).	The oil cooler by-pass valve - 70° C(158° F), - - - - - - - - - - - - - - - - - 60° C(140° F).
1—11	FUEL INTAKE SYSTEM		
1—18	CARBURETOR	Metering oil tube (Federal, Canadian spec. only)	Metering oil tube.
2—4 2—5	CRANKCASE EMISSION CONTROL SYSTEM EVAPORATIVE EMISSION CONTROL SYSTEM		
2—9 2—10	AIR INJECTION AND THERMAL REACTOR SYSTEM		 Relief air flow
2—11	FUEL ENRICHMENT SYSTEM		 Blind plug

PAGE	ITEM	CORRECTIONS	
		WRONG	CORRECT
2—9 2—10 2—16	DECELERATION CONTROL SYSTEM		
2—18	DECELERATION CONTROL SYSTEM		 Note: Jet controls air flow, and Check valve operater as a one way valve.
2—23 2—27	AUTOMATIC CHOKE RELEASE SYSTEM COLD ENRICHMENT SYSTEM (※1: Same drawing as the above item except names.)	 	※1  

FOREWORD

This book has been prepared for service personnel of Mazda authorized distributors and their dealers.

This book consists of the following three sections.

1. **ENGINE**
   In this section, the service points on '79 RX-7 that differ from those on '78 RX-3 SP are explained.
2. **EMISSION CONTROL SYSTEM**
   Basic construction and operation of system are fully described.
3. **CHASSIS · BODY**
   Features and main service points of chassis and body are explained in this section.

All information, illustrations and specifications contained in this book were the best available at the time of printing this book.

Toyo Kogyo reserves the right to make changes in designs and specifications without previous notice.

Toyo Kogyo Co.,Ltd.

SECTION INDEX

PRINTED IN JAPAN FEB. '78
MAZDA ROTARY ENGINE:
LICENSE NSU — WANKEL

3033-10-78B LE-FUC

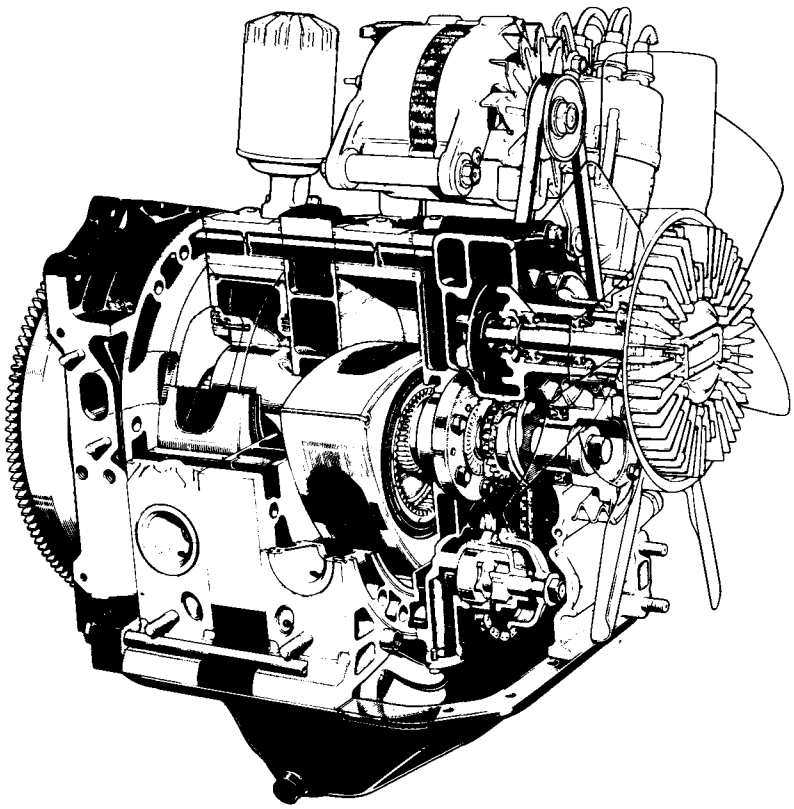
ENGINE

1

ENGINE OUTLINE

The engine on the Mazda RX-7 is a 12A type rotary engine.
The engine component parts are basically the same as those for the 1978 model RX-3 SP, but have improvements in endurance and performance incorporated.
The main engine component parts modified for the RX-7 are:

- **Side housings**
- **Rotor housing**
- **Tension bolt**
- **Inner oil seal (Rotor)**

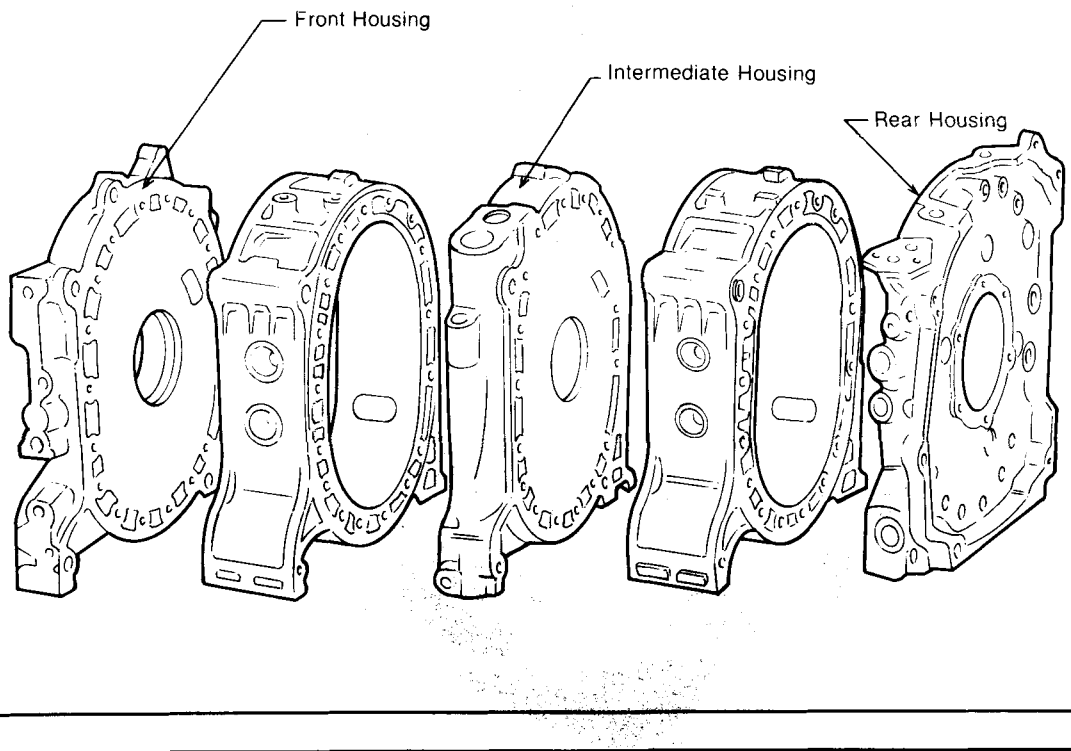


- Main Specifications of Engine

Type	12A
Displacement	573cc × 2rotors
Compression ratio	9.4 : 1
Max. horsepower	100 HP/6000 rpm, SAE Net
Max. torque	105 lb - ft/4000 rpm, SAE Net

SIDE HOUSINGS

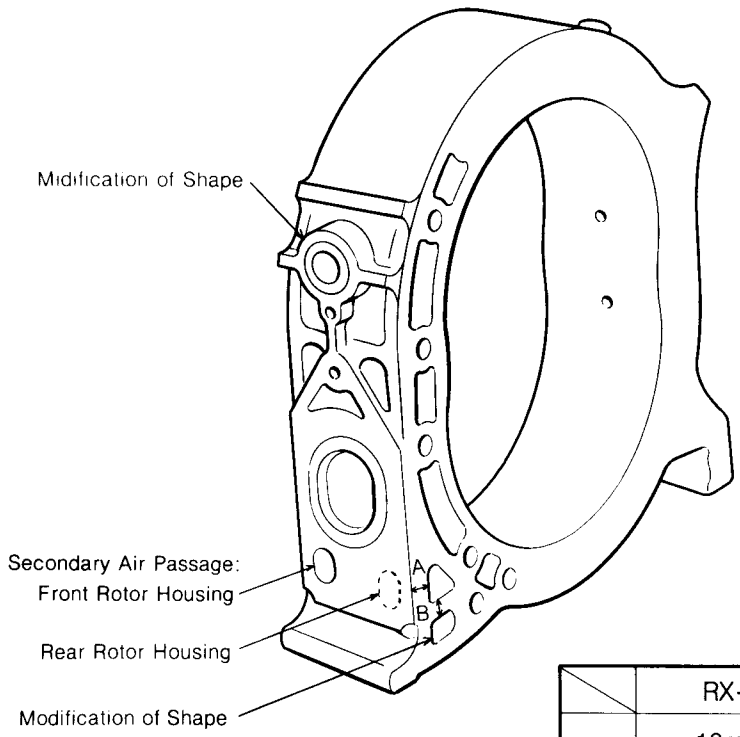
As a measure for less oil consumption, the rotor-sliding surfaces of all side housings are newly gas-nitrided for an increase in hardness.
Refacing of all these housings is possible.
The intake ports of the front and rear housings are different in shape from those of the housings for the 1978 model RX-3 SP.
None of the side housings are interchangeable with those for the 1978 model RX-3 SP.
The EGR passage on the intermediate housing is abolished for the California-specification model only.



MEMO:

ROTOR HOUSINGS

The rotor housings for the RX-7 are somewhat different than housing for the 1978 RX-3 SP. The modifications listed below have incorporated.
The trochoidal surface of this housing is plated with chromium as in the past.
The rotor housing for the RX-7 is not interchangeable with that for the 1978 model RX-3 SP.
The front rotor housing and rear rotor housing for the RX-7 are not interchangeable with each other, because of the difference in their secondary air passages.



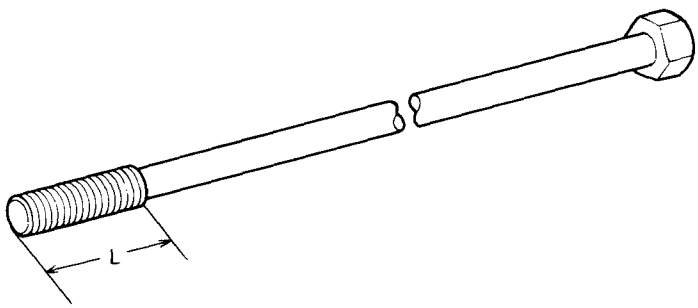
	RX-7	RX-3 SP
A	13mm (0.512in)	9mm (0.354in)
B	9mm (0.354in)	7mm (0.275in)

MEMO:

TENSION BOLT · INNER OIL SEAL (ROTOR)

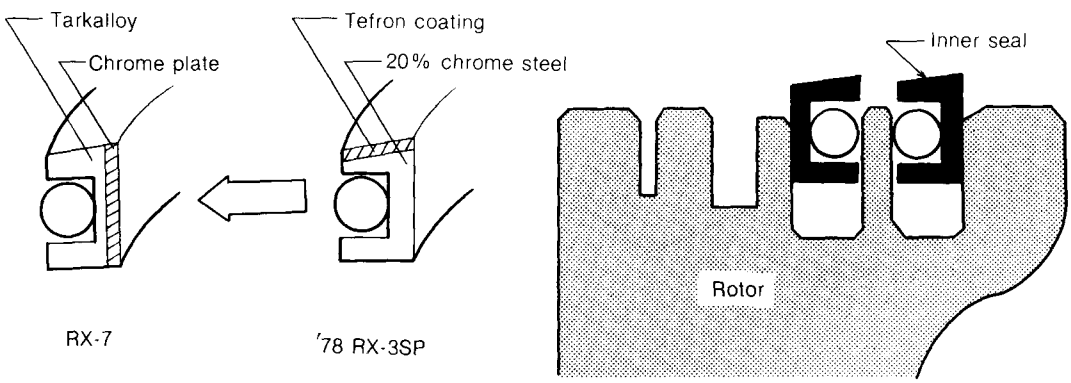
TENSION BOLT

The threaded part (L) of the tension bolt for the RX-7 has been lengthened to 55mm (2.16 in.) from 28mm (1.10 in.) (the length of the threaded part of the tension bolt for the 1978 model RX-3 SP). These two bolts are not interchangeable.



INNER OIL SEAL

The inner oil seal for the 1978 model RX-3 SP was treated with teflon while the seal for the RX-7 is plated with chromium. There is no interchangeability between these two seals.

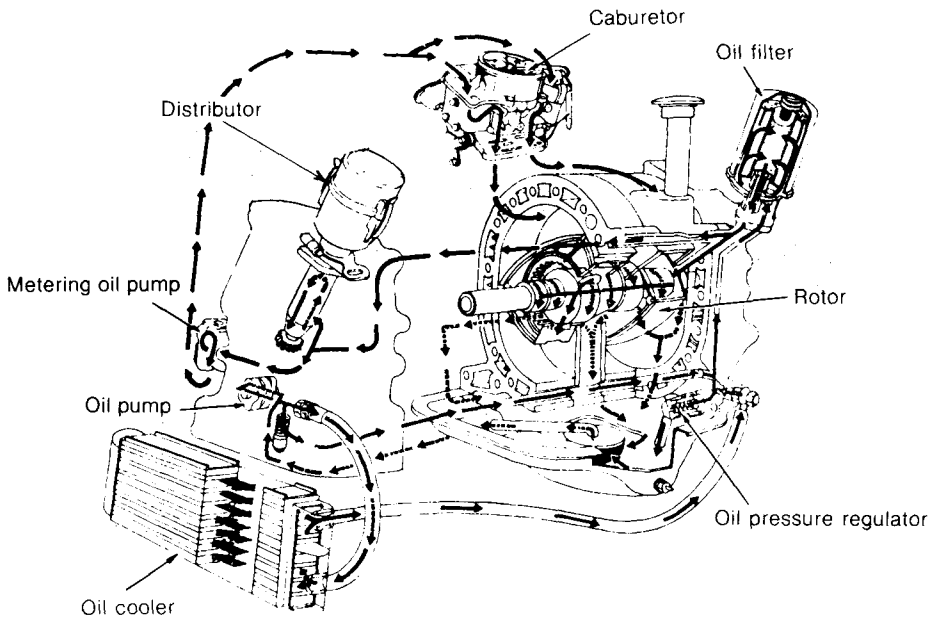


MEMO:

OUTLINE OF LUBRICATING SYSTEM

The lubricating system of the RX-7 is basically the same as the system of the 1978 model RX-3 SP, with the exception of some differences in shape of the oil pan, oil strainer, oil cooler, etc.
The engine oil capacity is approximately 5.2 liters (5.5 US quarts).
The main parts for the RX-7 which are different from those for the 1978 model RX-3 SP are:

- **Oil pan**
- **Oil cooler**
- **Metering oil pump rod**

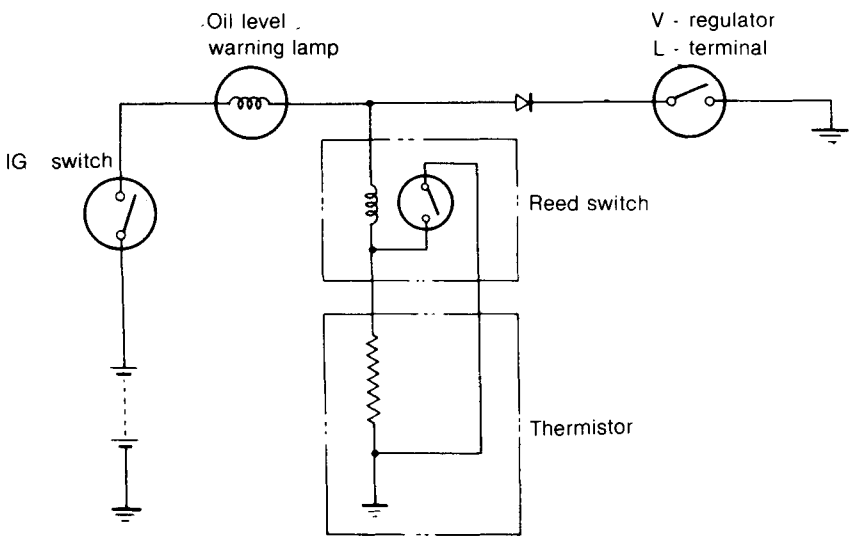


MEMO:

OIL PAN

The oil pan is fitted with an oil level sensor that lights a warning lamp on the instrument panel to give warning to the driver in case the engine oil level in the oil pan falls below a certain level. The oil level sensor of the 1978 model RX-3 SP was fitted on the oil pan with the sensor and reed switch combined as one piece. In the oil level sensor of the RX-7, on the other hand, the sensor is fitted on the oil pan and the reed switch is mounted on the oil hose near the front housing. Owing to difference in shape, the oil pans for the RX-7 and for the 1978 model RX-3 SP are not interchangeable.

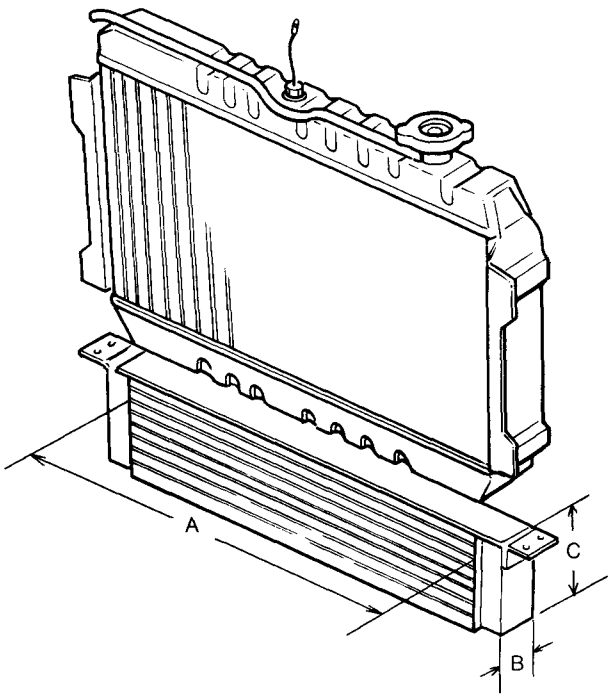
The oil pan capacity of the RX-7 is approximately 4.2 liters (4.4 US quarts).



MEMO:

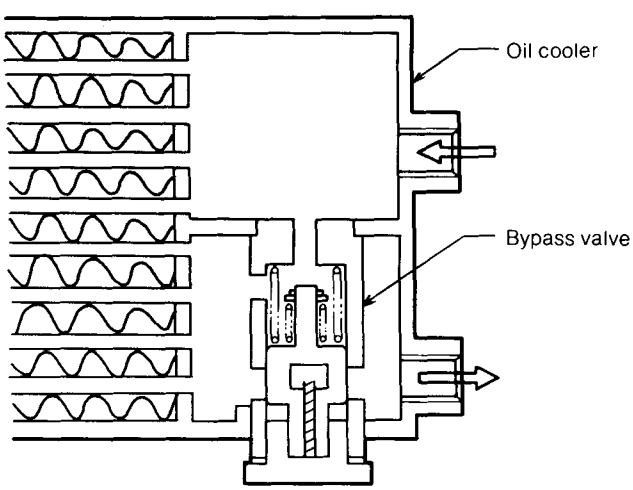
OIL COOLER

The oil cooler capacity for the RX-7 is larger than that for the 1978 model RX-3 SP, as shown below.



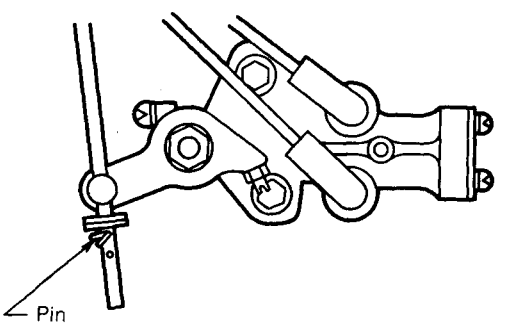
	RX-7	RX-3 SP
A	500mm (19.69in)	455mm (17.92in)
B	50mm (1.97in)	←
C	115mm (4.53in)	←

The oil cooler bypass valve of the 1978 model RX-3 SP began to operate when the oil temperature reached ~~60~~ 70 C ° C (140° F), while this valve of the RX-7 operates at ~~70~~ 60 C ° C (158° F).



METERING OIL PUMP ROD

The metering oil pump connecting rod of the RX-7 and that of the 1978 model RX-3 SP are different in length and shape.
Usually, this rod is connected with the pump through the upper one of the two holes made on the pump.

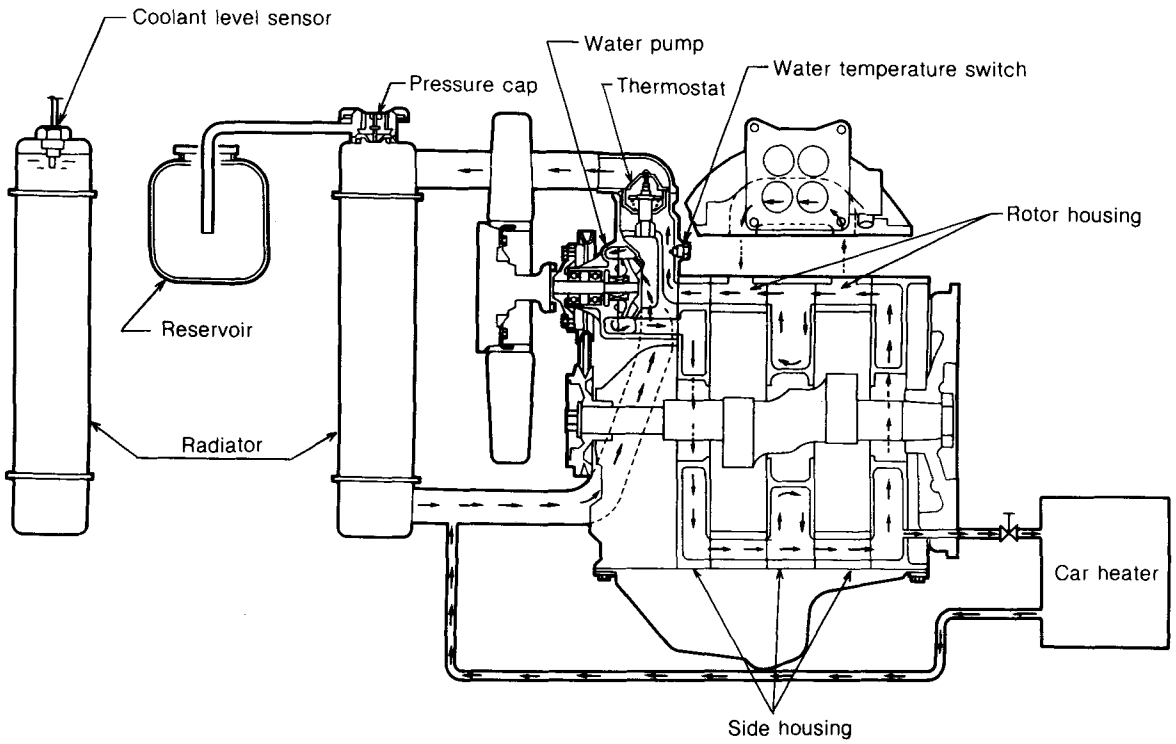


MEMO:

OUTLINE OF COOLING SYSTEM

With the exception of a few parts, such as the radiator and coolant reservoir, the cooling system of the RX-7 is the same as that of the 1978 RX-3 SP.
The main parts of the cooling system modified for the RX-7 are:

- **Radiator**
- **Coolant reservoir**



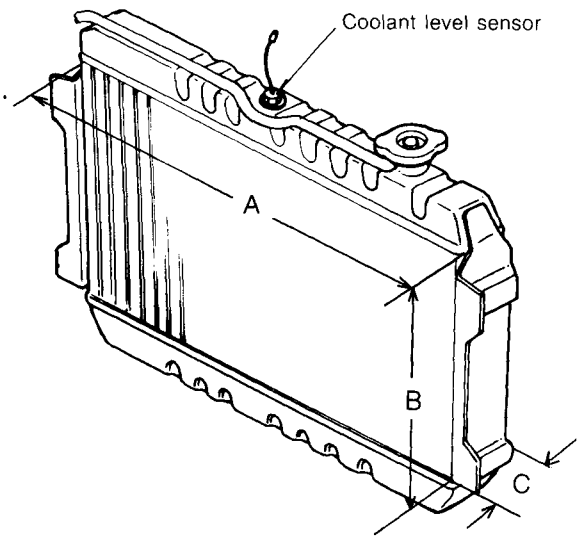
- Coolant capacity in cooling system

	RX-7, RX-3 SP
with heater	9.5 ℓ (10.0 U.S. quarts)
without heater	8.5 ℓ (8.9 U.S. quarts)

MEMO:

RADIATOR · COOLANT RESERVOIR

The radiator is fitted with a coolant level sensor that lights a warning lamp on the instrument panel to warn driver should the coolant in the system fall short of the prescribed level.

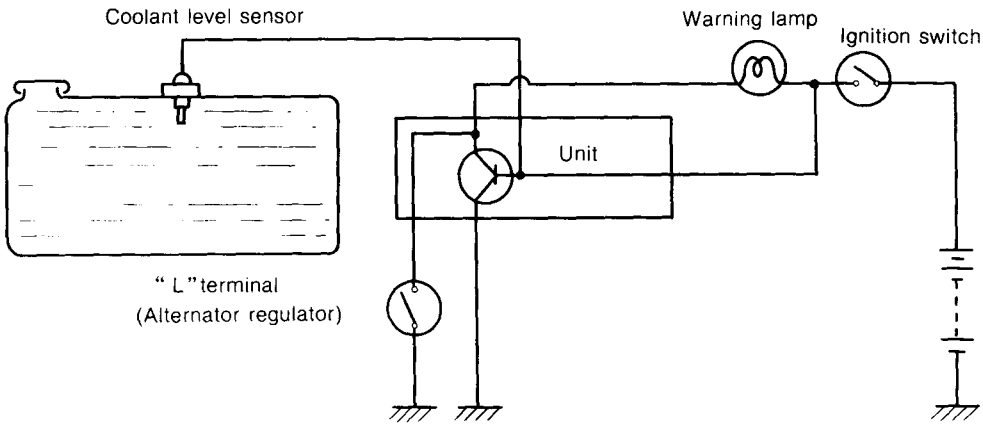


Size of Radiator:

	RX-7		RX-3 SP	
	M/T	A/T	M/T	A/T
A	550mm (21.65in)	←	←	←
B	290mm (11.42in)	←	←	←
C	32mm (1.26in)	49mm (1.93in)	←	←

Coolant Reservoir:

RX-7	RX-3 SP
1.6 ℓ (1.7 U.S. quarts)	1.2 ℓ (1.3 U.S. quarts)



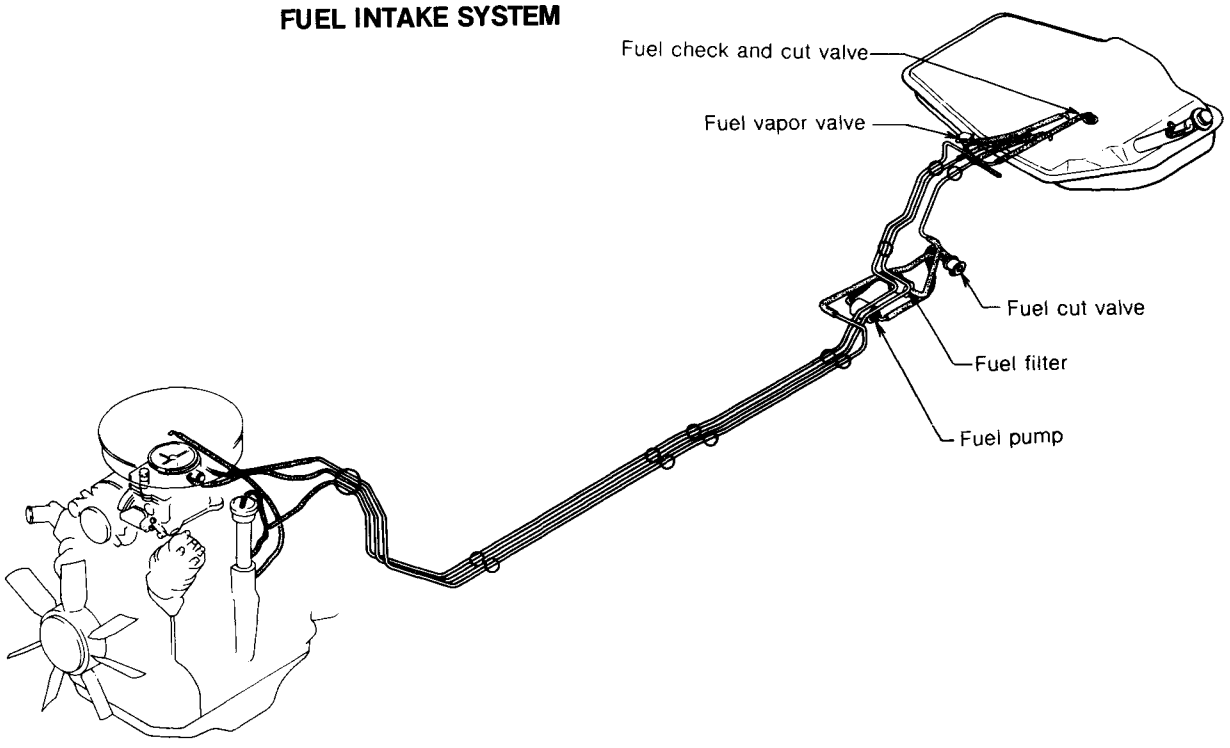
MEMO:

OUTLINE OF FUEL SYSTEM

The main changes in fuel system for the RX-7 are on the following two:

- **Carburetor**
- **Fuel tank**

FUEL INTAKE SYSTEM

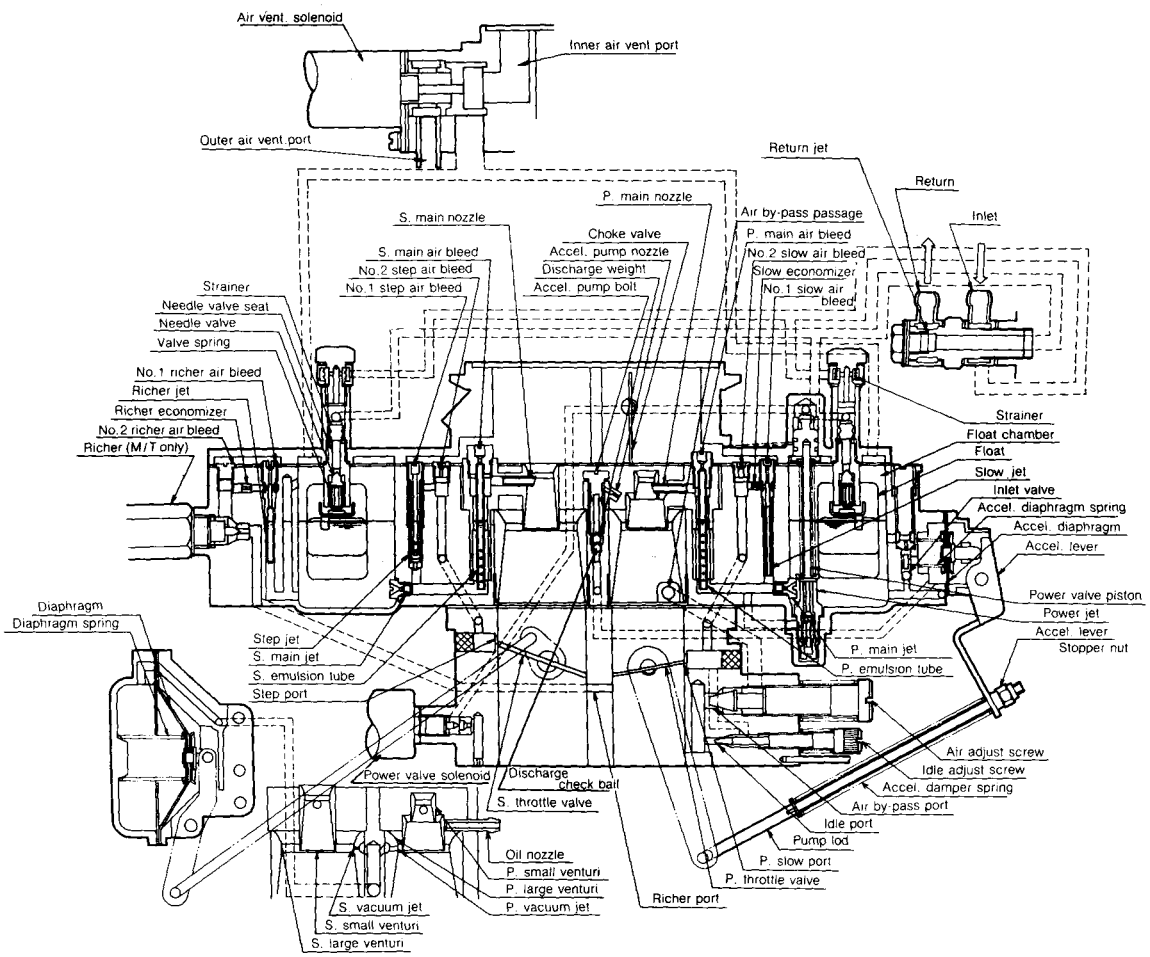


MEMO:

CARBURETOR

The carburetor for the RX-7 is of Nikki make, the same as that for the 1978 model RX-3 SP, but the former differs from the letter in the following:

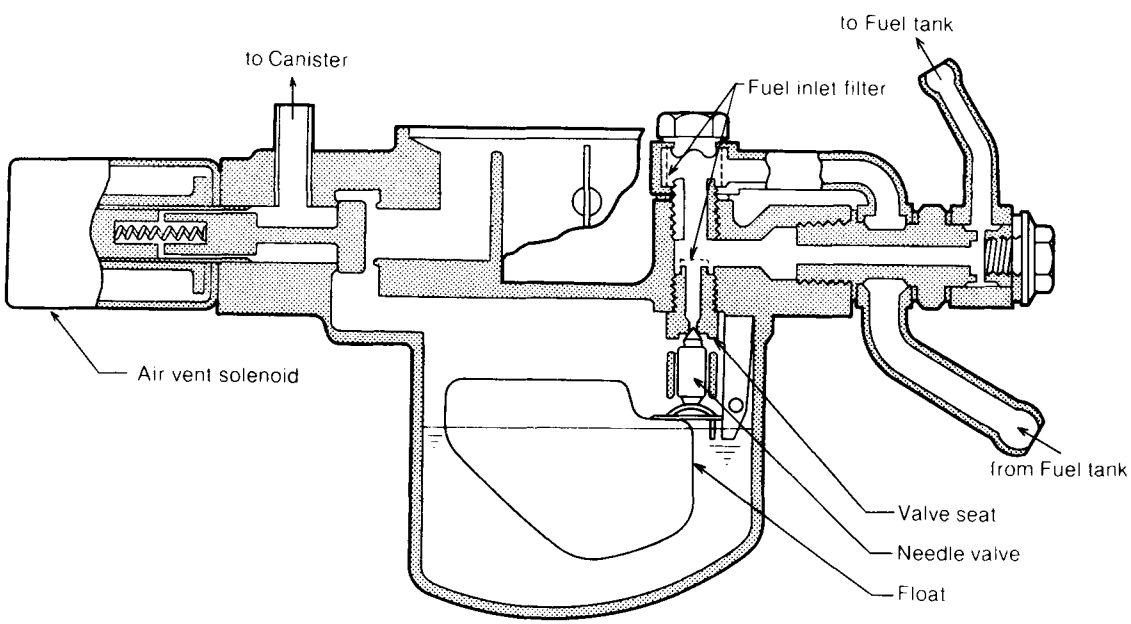
- Fuel inlet and return passages
- Float and air horn gasket
- Richer jet
- Safety throttle return system
- Spacer (Insulator)
- Automatic choke half release system
- Power valve
- Dash pot
- Hot start assist system



MEMO:

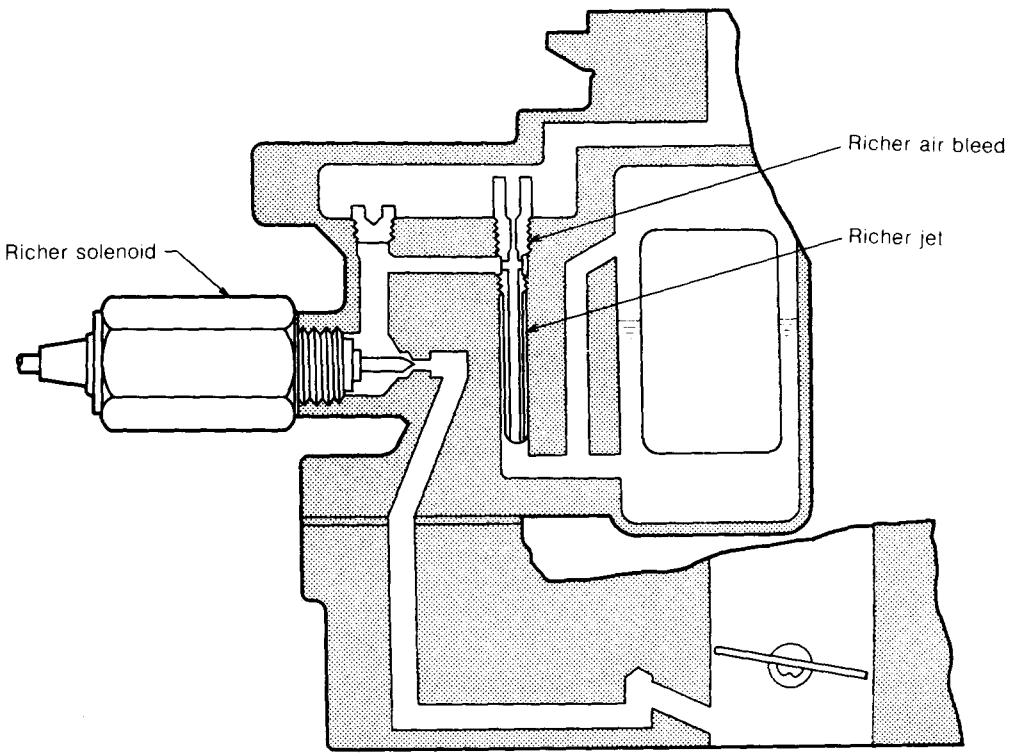
FUEL INLET AND RETURN PASSAGE
FLOAT AND AIR HORN GASKET

The shapes of the following are changed as shown in the sketches.



MEMO:

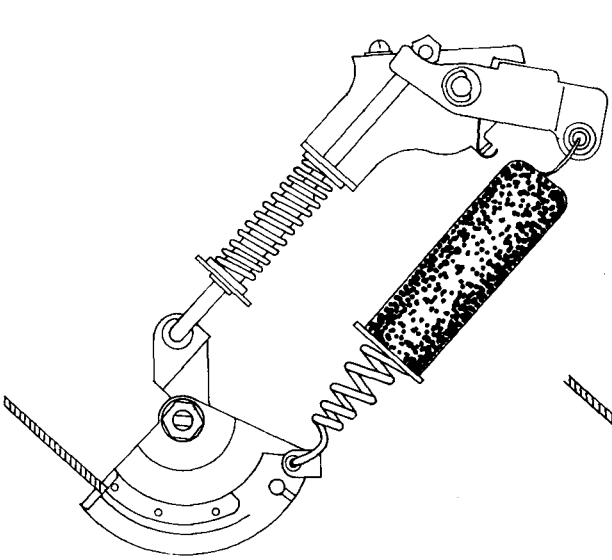
RICHER AIR BLEED



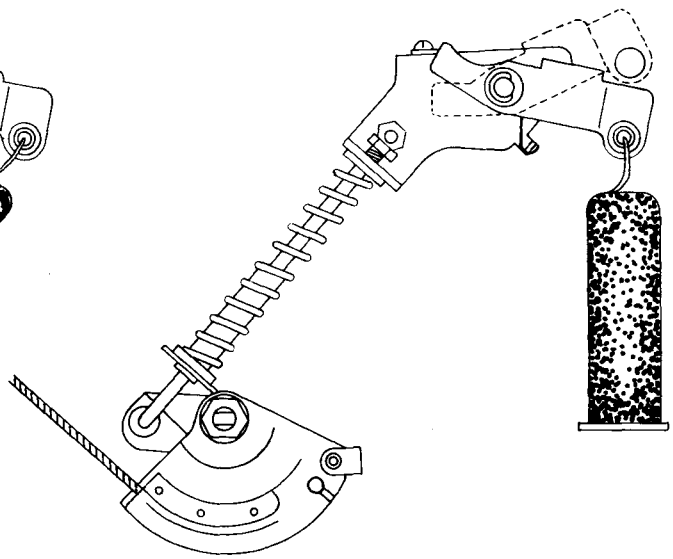
MEMO:

SAFETY THROTTLE RETURN SYSTEM

The 1978 model RX-3 SP was fitted with two throttle return springs while the RX-7 adopts the following system.



〔NORMAL CONDITION〕

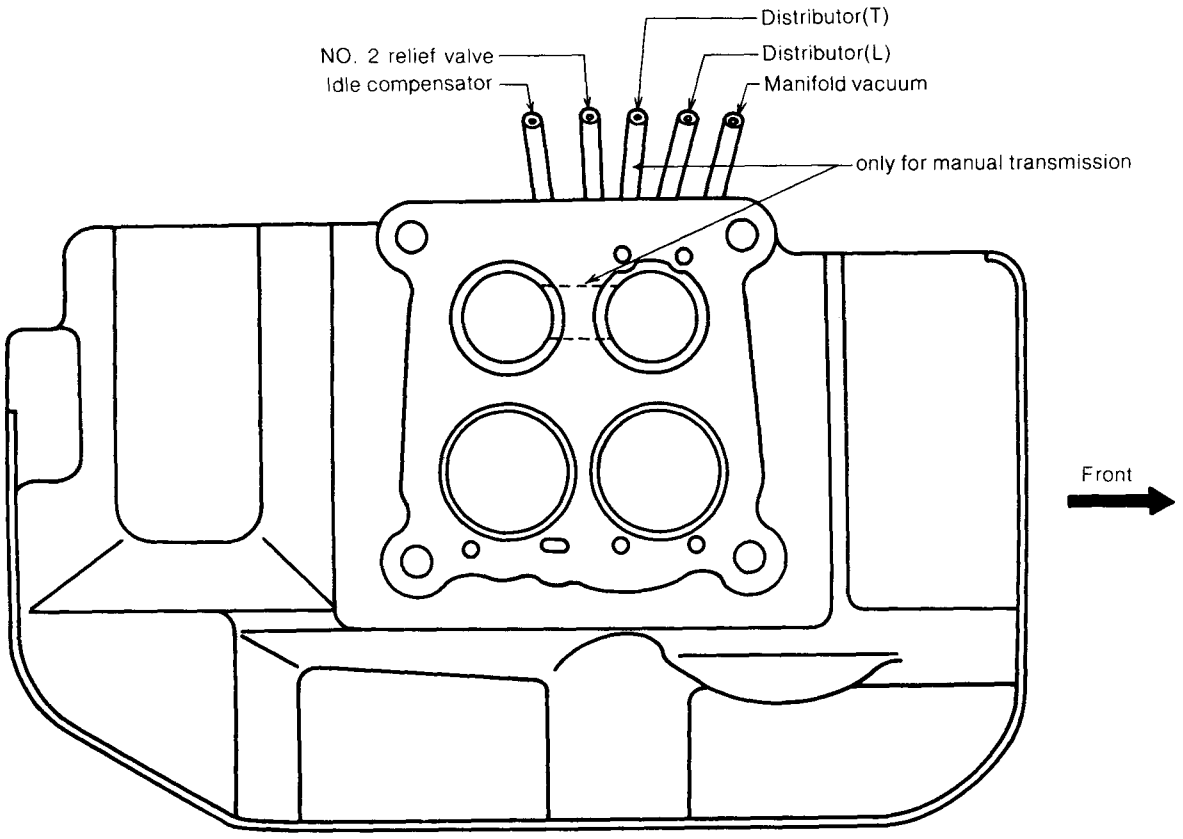


〔WHEN SPRING IS BROKEN〕

MEMO:

SPACER (INSULATOR)

The spacer, which has a shape illustrated below, also serves as a heat insulator to reduce radiant heat from the thermal reactor.



MEMO:

CARBURETOR

AUTOMATIC CHOKE HALF-RELEASE SYSTEM

Only the RX-7 for California is newly equipped with this system in addition to the usual full-release system, for there is a fear of the engine stalling when the choke has fully been returned. See Page 2-23~2-24 of EMISSION CONTROL SYSTEM.

POWER VALVE

The valve-operating timing on the RX-7 is changed as a measure for better fuel economy. See Page 2-11~2-13 of EMISSION CONTROL SYSTEM.

DASH POT (FOR RX-7 WITH MANUAL TRANSMISSION ONLY)

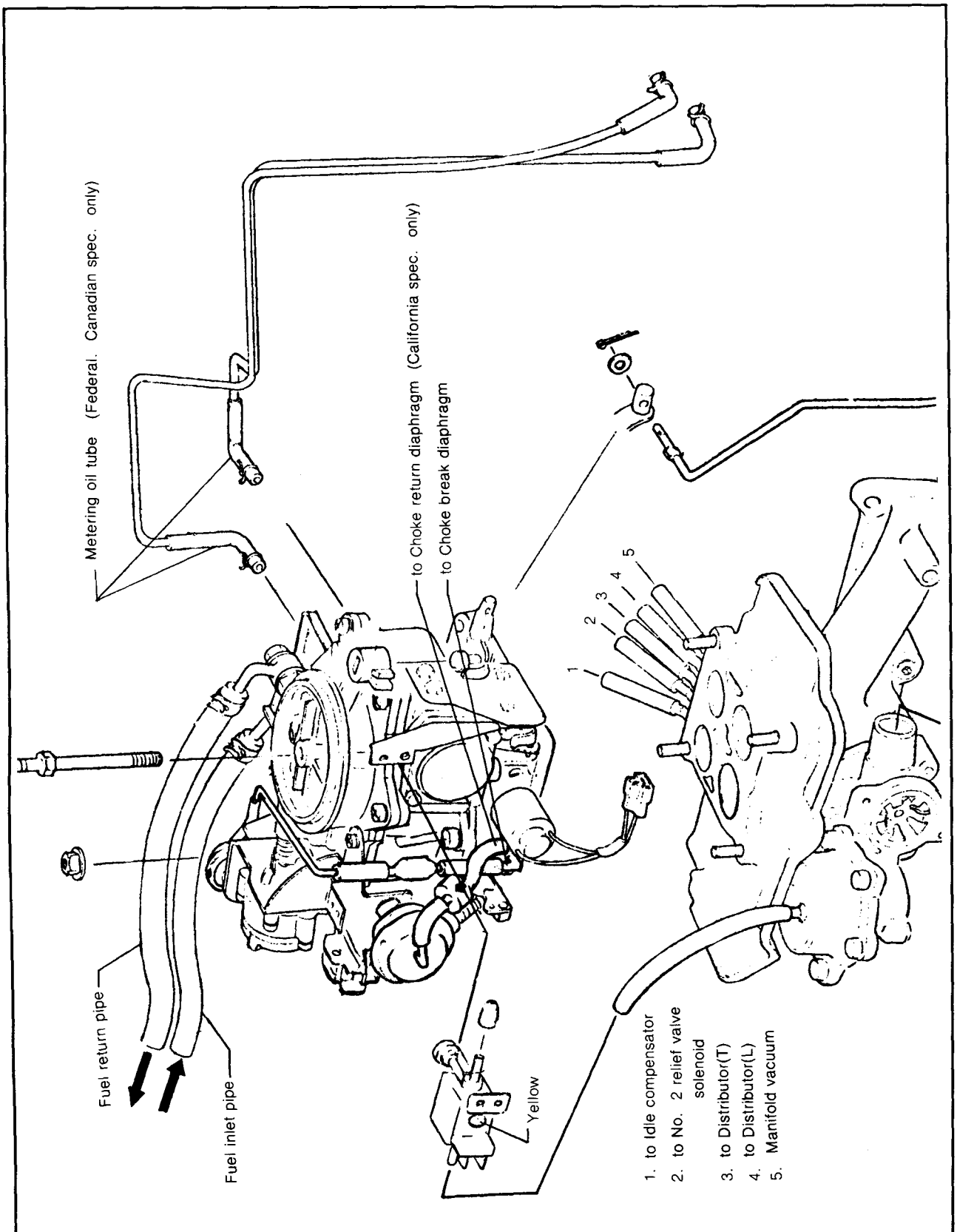
A dash pot is newly fitted on the RX-7 to prevent vibrations of the car that may occur at the initial stage of deceleration. See Page 2-17 of EMISSION CONTROL SYSTEM.

HOT START ASSIST SYSTEM

The RX-7 is newly equipped with this system to make starting of the warm engine easier. See Page 2-25 of EMISSION CONTROL SYSTEM.

MEMO:

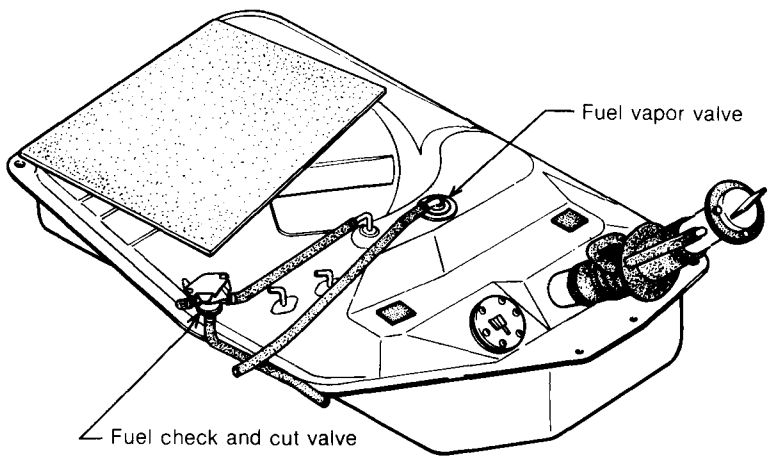
CARBURETOR


Metering oil tube (Federal, Canadian spec. only)
to Choke return diaphragm (California spec. only)
to Choke break diaphragm
1
2
3
4
5
Fuel return pipe
Fuel inlet pipe
Yellow
1. to Idle compensator
2. to No. 2 relief valve solenoid
3. to Distributor(T)
4. to Distributor(L)
5. Manifold vacuum

FUEL TANK

The fuel tank capacity of the RX-7 is 55 liters (14.5 U.S. gallons).
An air space (fuel expansion space) equivalent to about 6 liters (1.6 U.S. gallons) of fuel is provided on the top of the fuel tank.
The fuel tank is newly fitted with a fuel vapor valve on it to prevent poor engine operation during abrupt turning and hard braking.

FUEL TANK



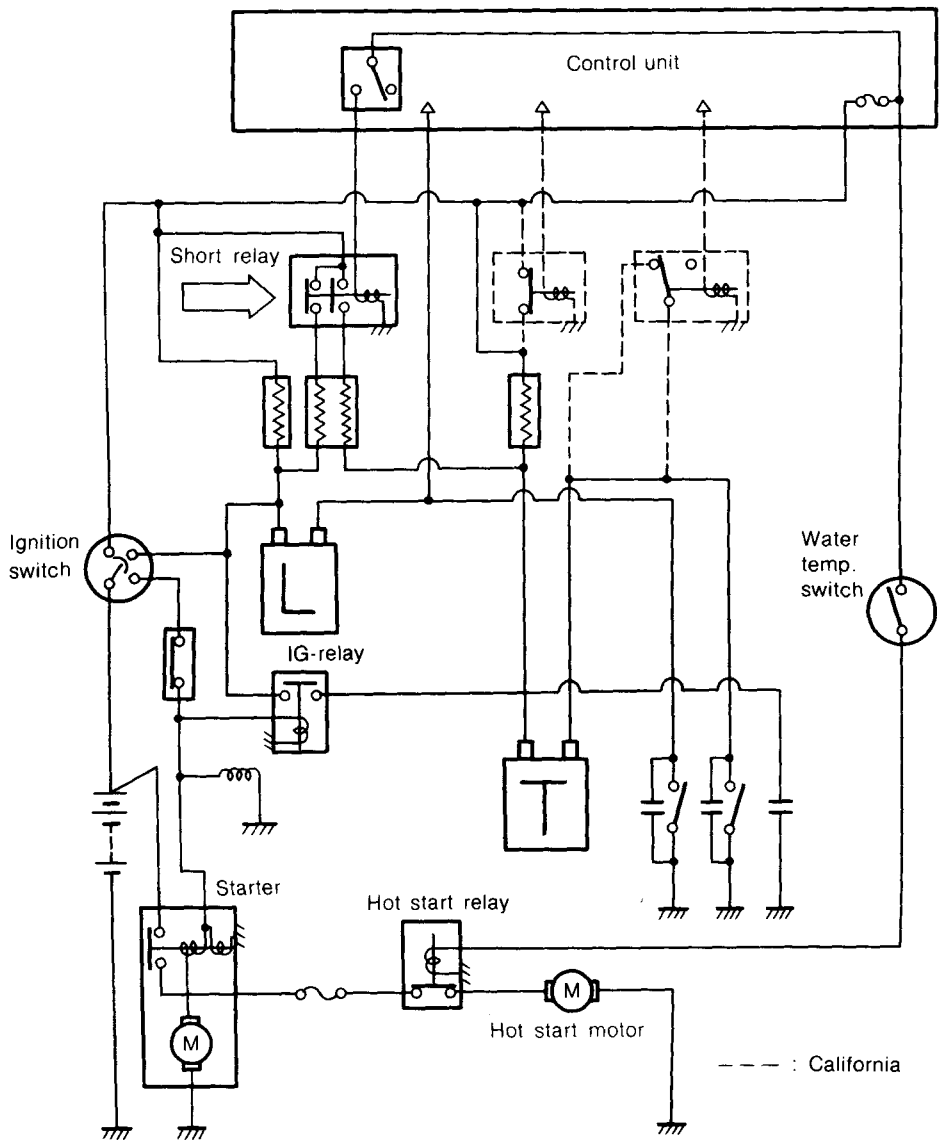
MEMO:

OUTLINE OF ENGINE ELECTRICAL SYSTEM

The engine electrical system for RX-7 is nearly the same as that on the 1978 model RX-3 SP, with the exception of the following:

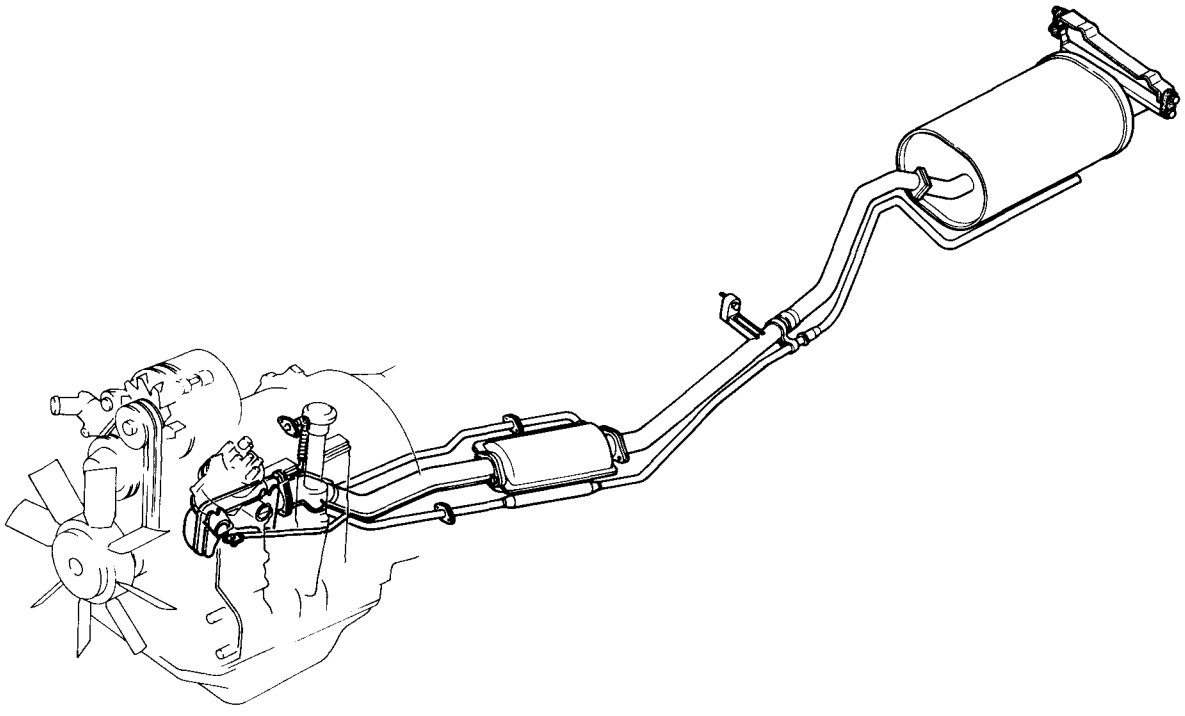
- **Addition of a resistance short circuit to the trailing ignition coil.**

In the RX-7 for Federal and Canada, both leading and trailing spark plugs ignite at all times when the engine is running.
The RX-7 for California, however, controls the ignition timing of each spark plug according to the running conditions.
Page 2-14~2-15 of EMISSION CONTROL SYSTEM.

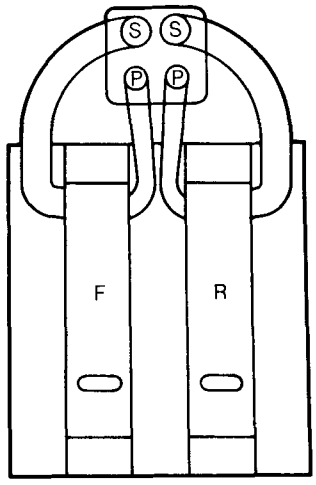


OUTLINE OF INTAKE & EXHAUST SYSTEM

The exhaust system of the RX-7 is as shown in the following figure.



The passages to induce air-fuel mixture into the engine are as follows:

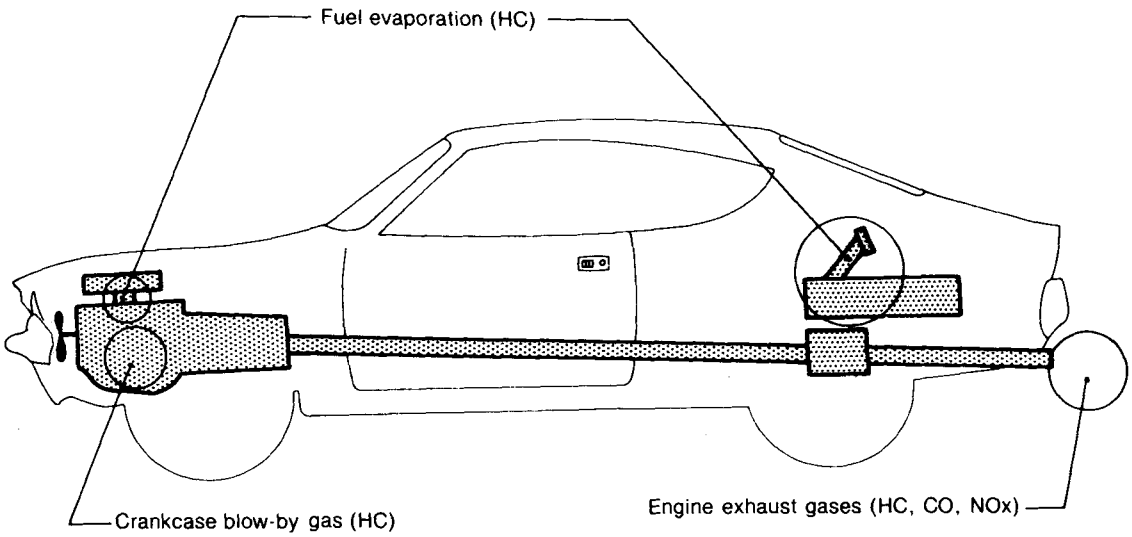


MEMO:

EMISSION CONTROL SYSTEM

INTRODUCTION

Automotive emissions that contribute to air pollution originate from three sources; engine crankcase, fuel system and engine exhaust.
The emissions are formed as crankcase blow-by gas, fuel vapor and engine exhaust gases.
Specific pollutants contained in these emissions are hydrocarbons **(HC)**, carbon monoxide **(CO)** and oxides of nitrogen **(NOx)**.
HC and CO, which consist of unburned fuel, are contained in crankcase blow-by, fuel evaporation and exhaust gases. NOx is found basicaly in the exhaust gases.



To comply with the requirements of Government Regulations, the following systems which control all three sources of emissions have been developed:

- **CRANKCASE EMISSION CONTROL SYSTEM**
  This system channels blow-by gas (HC) into the combustion chamber for burning to prevent to being it emitted into the atmosphere.

MEMO:

- **EVAPORATIVE EMISSION CONTROL SYSTEM**

  When the engine is not operating, this system traps evaporated gas (HC) from the carburetor and fuel tank and channels it to burn when the engine starts to operate.

- **EXHAUST EMISSION CONTROL SYSTEM**

  This system reduces the HC, CO and NOx emissions contained in the engine exhaust gases. The exhaust emission control system consists of the sub-systems indicated in the table below. These sub-systems function differently depending on vehicle type (California, Federal and Canadian specifications) and kind of transmission (manual transmission or automatic trasmission). This matter will be described later.

Sub-Systems	California		Federal & Canada	
	M/T	A/T	M/T	A/T
Air injection and thermal reactor system	O	O	O	O
Ignition control system	O	O	×	×
Deceleration control system	O	O	O	O
Fuel enrichment system	O	O	O	O
Kick-down control system	×	O	×	O

× ..... No O ..... Yes

MEMO:

• **OTHER SYSTEMS**

In order to maintain the engine performance and driveability, the following systems are equipped.

Other Systems	California		Federal & Canada	
	M/T	A/T	M/T	A/T
Idle compensator	○	○	○	○
Altitude compensator	○	○	○	○
Intake air temperature control system	○	○	○	○
Automatic choke release system	○	○	○	○
Hot start assist system	○	○	○	○
Throttle opener system (Vehicle equipped with air conditioner)	○	○	○	○
Sub-zero starting assist system	×	×	○	○

Please note that the function of the automatic choke release system differs between California vehicle and Federal & Canada vehicle.

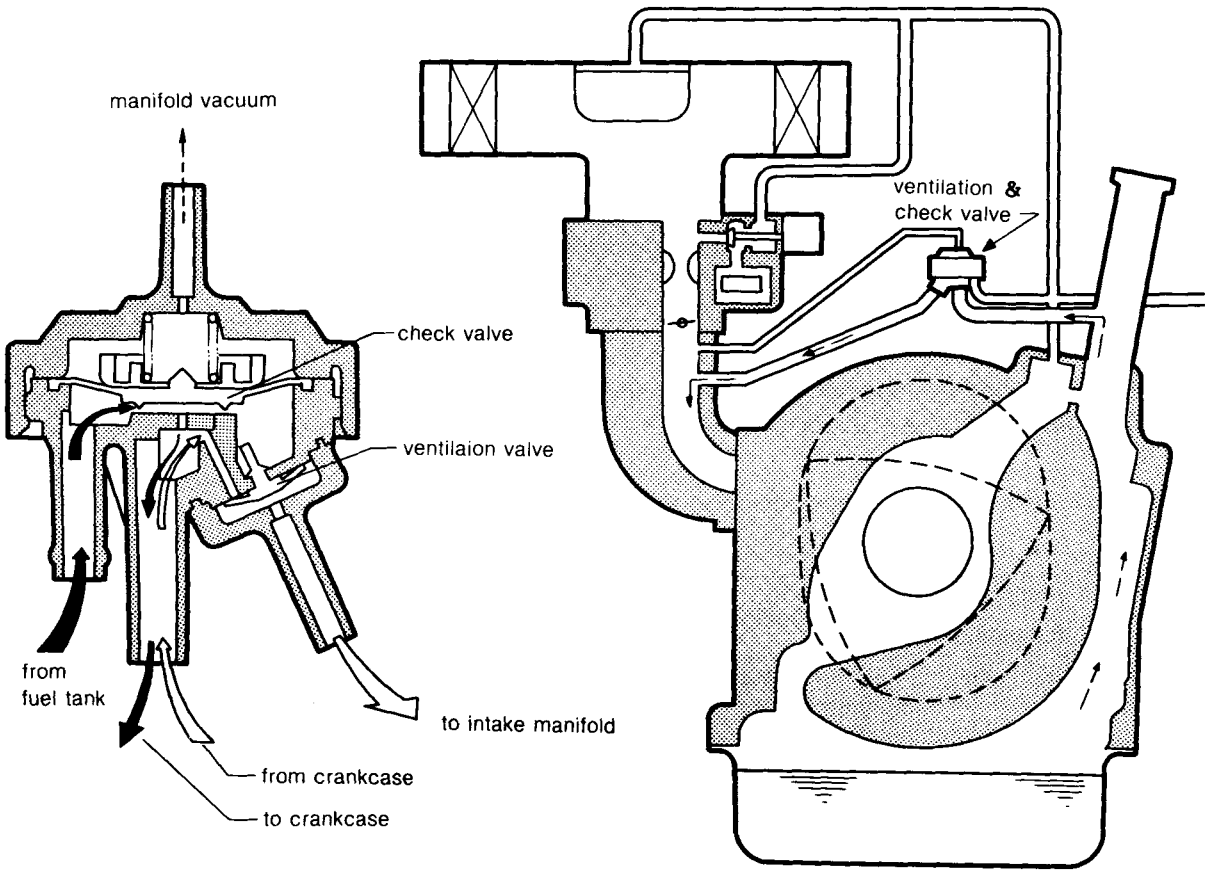
Exhaust emission standards established for the RX-7(1979) are as listed below.

Pollutants (Grams/mile)	California	Federal	Canada
HC	0.41	1.5	2.0
CO	9	15	25
NOx	1.5	2.0	3.1

MEMO:

CRANKCASE EMISSION CONTROL SYSTEM

This system is the sealed type and recirculates blow-by gas in crankcase when the engine is operating and evaporated fuel from the fuel system into the combustion chamber for burning. While the engine is not operating the ventilation valve is closed, and therefore blow-by gas in the crankcase, and evaporated fuel inducted from the fuel system are held in the crankcase.
When the engine is in operation, the flow of blow-by gas and evaporated fuel fed to the combustion chamber is controlled by the orifice in the passage.



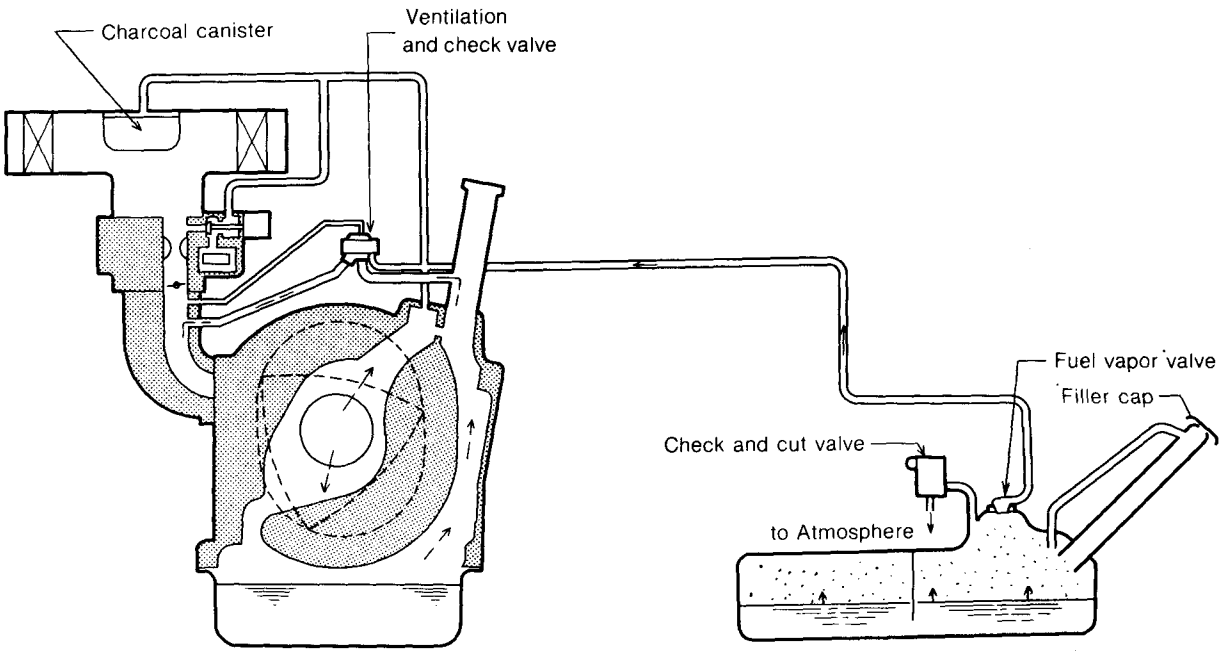
fuel vapor flow when the engine is not running.

fuel vapor, blow-by gas and purge air flow when the engine is running.

MEMO:

EVAPORATIVE EMISSION CONTROL SYSTEM

This system prevents evaporated gas from being emitted into the atmosphere.
The gas evaporated in the fuel tank while the engine is not operating is maintained in the tank and evaporative line up to the time it reaches a certain pressure. However, when the pressure exceeds the limit, the check valve in the ventilation and check valve open to channel the gas into the crankcase, which is then trapped by the canister in the air cleaner.
The gas evaporated in the carburetor float chamber is trapped in the canister. The fuel trapped in this canister is sent to the combustion chamber for burning while the engine is in operation.

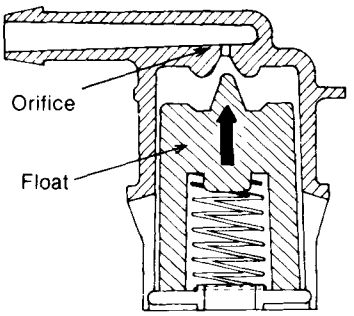


MEMO:

EVAPORATIVE EMISSION CONTROL SYSTEM

- **FUEL VAPOR VALVE**

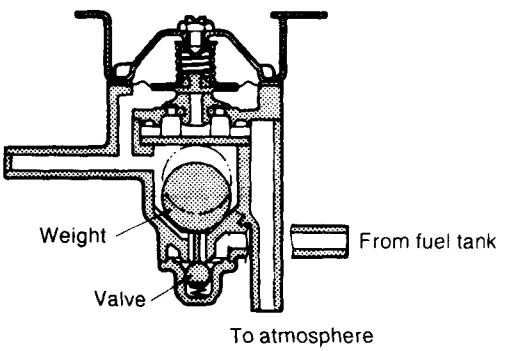
  When a sharp turn is made, this valve prevents fuel in the tank from being supplied, through the evaporation line into the engine, thereby preventing uneven engine operation.



- **CHECK AND CUT VALVE**

  This valve has three functions.

  1. When pressure in the tank becomes high, the valve releases the pressure to the atmosphere, thus preventing tank damage.
  2. When the negative pressure in the tank becomes high, the valve allows air to enter the tank to prevent tank collapsing and insufficient fuel supply by the fuel pump into the carburetor.
  3. When a vehicle is overturned, the valve prevents fire by preventing the fuel in the tank from flowing out.



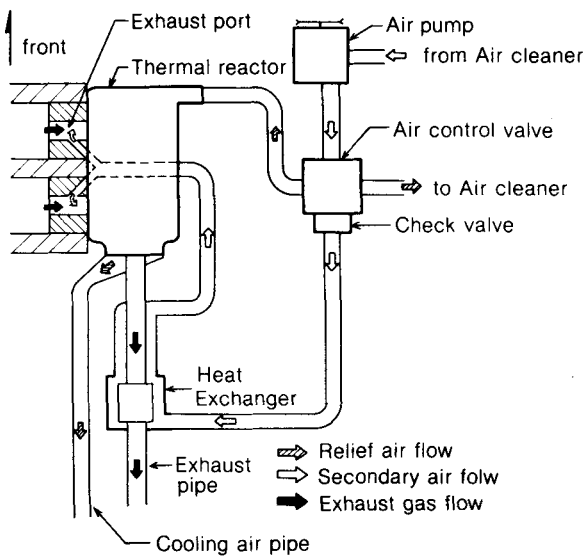
MEMO:

AIR INJECTION AND THERMAL REACTOR SYSTEM

This is a system for feeding fresh air (secondary air) into hot exhaust gas just discharged from the engine exhaust port to completely burn HC and CO contained in the exhaust gas. The secondary air to the exhaust port (thermal reactor) is fed by the air pump, and its flow is controlled by the air control valve according to engine speed and running condition (load applied).
The thermal reactor is a chamber to maintain the temperature of hot exhaust gas as high as possible to facilitate reaction between the exhaust gas and the secondary air.

SYSTEM OPERATION (SECONDARY AIR INJECIOTN)

Air taken from the clean side of the air cleaner is sent to the air control valve by the air pump. This air is controlled by the air control valve and is sent to the heat exchanger for preheating.
The preheated air is blown into the hot exhaust gas in the exhaust port of rotor housing. Thus, the unburned HC and CO in the exhaust gas is almost completely burned in the thermal reactor before the gas is emitted through the exhaust system.
The check valve prevents exhaust gas from backflowing into the air pump and damaging it.



MEMO:

AIR INJECTION AND THERMAL REACTOR SYSTEM

OPERATION OF AIR CONTROL VALVE (SECONDARY AIR CONTROL)

In the air control valve, there are three valves, i.e., No. 1 relief valve, No. 2 relief valve and anti-afterburn valve. No. 1 and No. 2 relief valves control the air from the air pump according to engine speed and load. (As to anti-afterburn valve, an explanation will be given on page 2-16.)

Principal functions of air control valve:

1. Control of secondary air flow to the exhaust port - When No. 2 valve is in operation
2. Control of thermal reactor cooling air - When No. 1 valve is in operation
3. Control of air sucked in during deceleration and also upon ignition switch off - Anti-afterburn valve operation

The operation of No. 1 relief valve is the same for all vehicles (California, Federal and Canada). There is a difference, however, in the operation of No. 2 relief valve between vehicles for California and ones for Federal and Canadian specification.

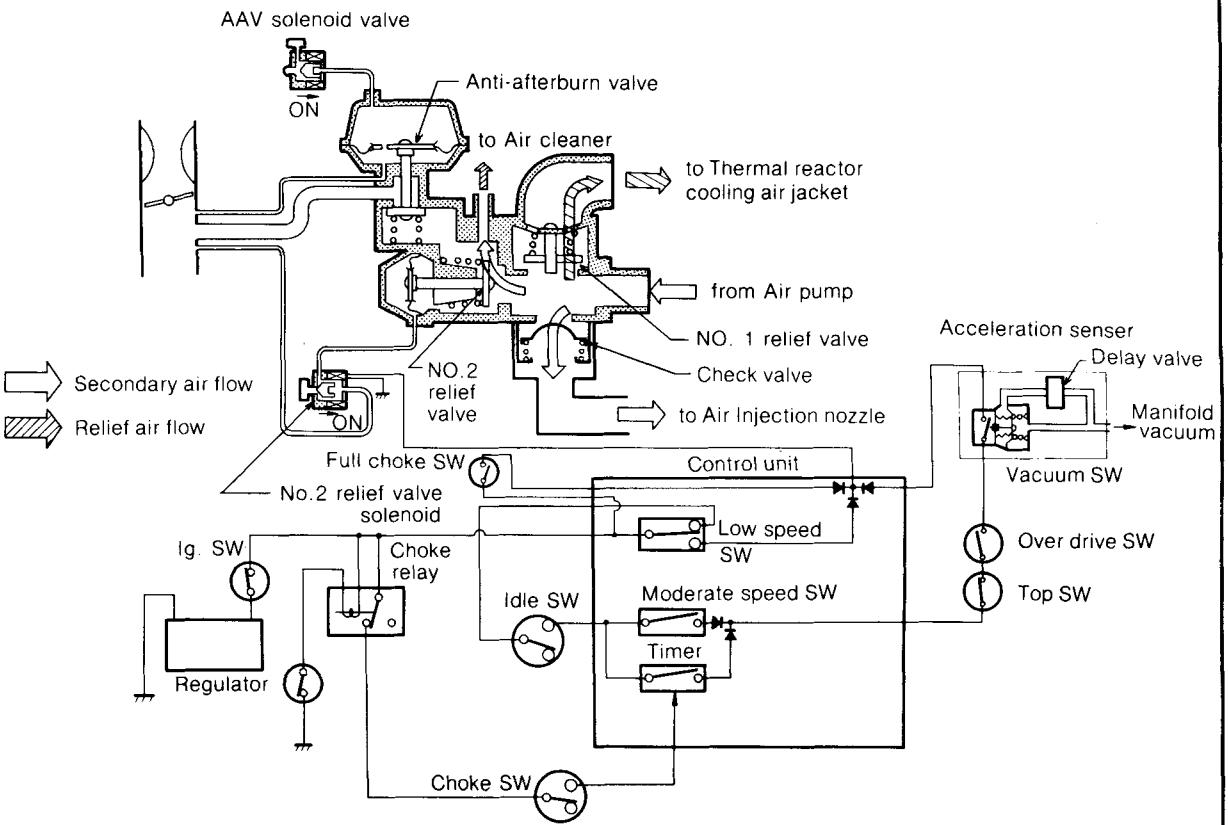
OPERATION OF NO. 1 RELIEF VALVE

The thermal reactor has to be kept at a very high temperature to burn unburned elements in the exhaust gas. But on the other hand, excessively high heat could be a cause of deteriorated durability. For this reason, the circumference of the thermal reactor is cooled by air through No. 1 relief valve when the air pressure in the system becomes higher than specified.

MEMO:

OPERATION OF NO. 2 RELIEF VALVE
- CALIFORNIA -

This valve is kept closed, ①when the engine speed is below 1,150 rpm, ②when the choke knob is fully pulled, ③when accelerating in any gear excepting 4th and 5th within 130 sec. after engine starting with choke used and ④when accelerating below 3,000 rpm after the 130 sec. in any gear excepting 4th and 5th. Under any other conditions than the above-mentioned, the valve opens and releases part of the air from the air pump into the air cleaner according to the load applied on the engine (intake manifold vacuum). This makes a balanced air-exhaust gas mixture required for reburning in the reactor.

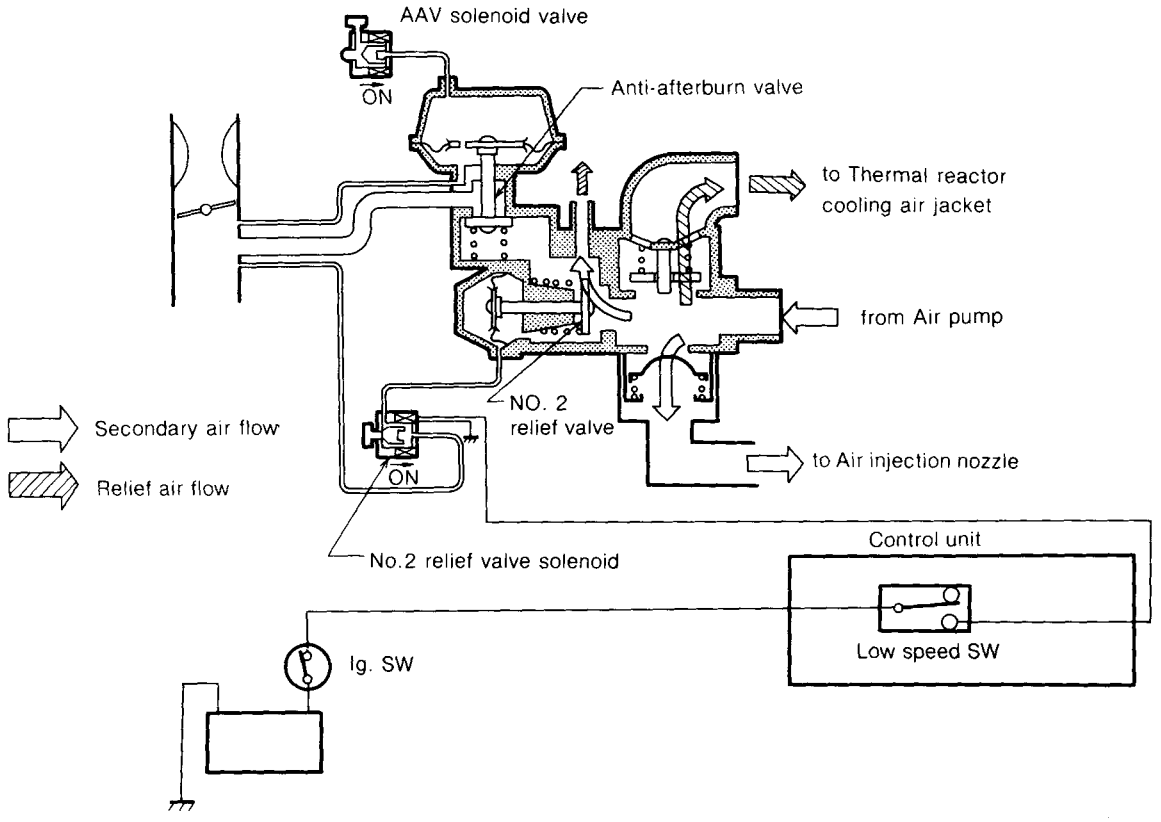


MEMO:

OPERATION OF NO. 2 RELIEF VALVE

- FEDERAL & CANADA -

This valve is closed while the engine speed is below 1,150 rpm, but when the engine speed rises over 1,150 rpm, the valve is opened according to the load applied on the engine (intake manifold vacuum) and releases air from the air pump into the air cleaner.



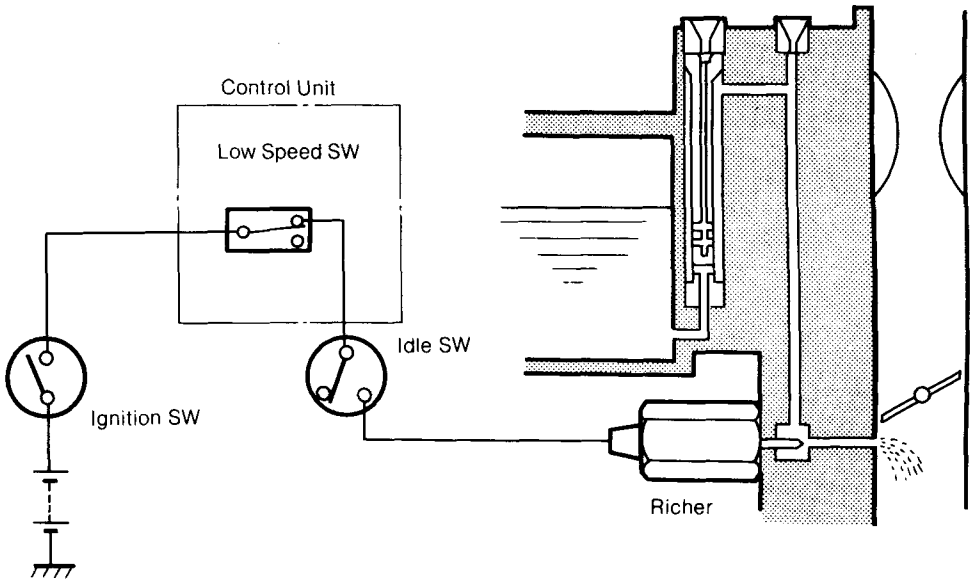
MEMO:

FUEL ENRICHMENT SYSTEM

This system consists of the following components:

	CALIFORNIA		FEDERAL · CANADA	
	M/T	A/T	M/T	A/T
Richer	○	×	○	×
Power valve solenoid	○	○	×	○

The richer supplies additional fuel to the intake manifold to prevent engine misfiring by maintaining a balanced air-fuel mixture during deceleration over 1,150 rpm.



MEMO:

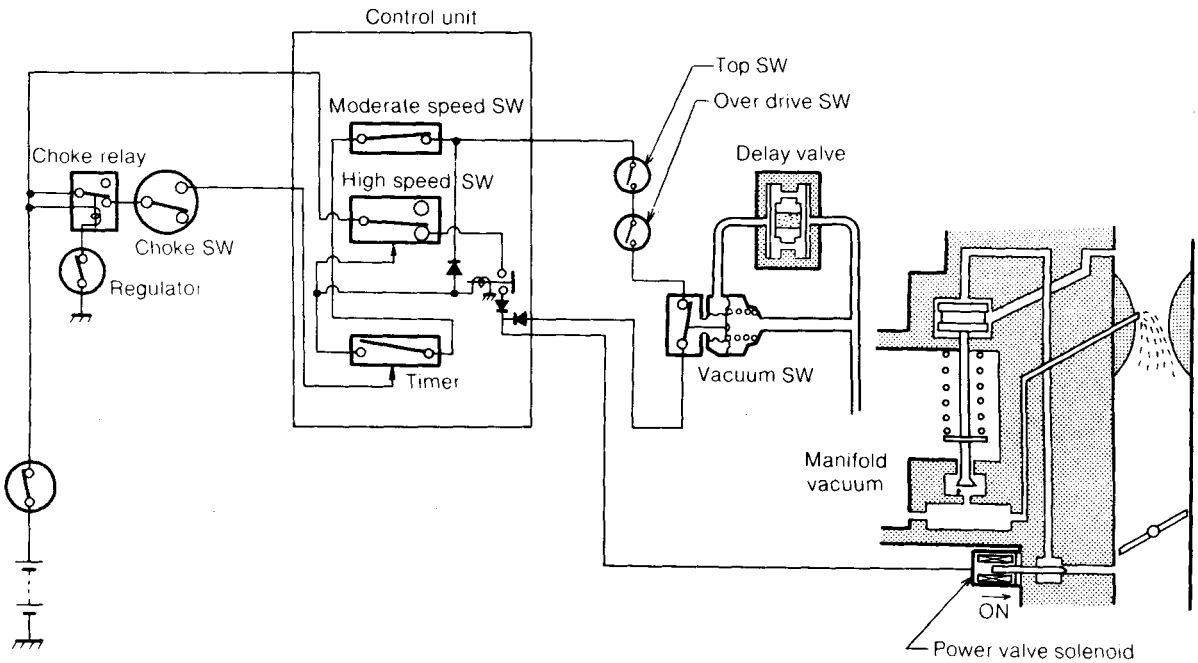
FUEL ENRICHMENT SYSTEM

The power valve solenoid for California vehicle differs function and operation from the one for Federal and Canada vehicles. The power valve solenoid itself is the same but there is a difference in the timing of solenoid opening and closing.

- CALIFORNIA -

Under the conditions as mentioned below, the power valve solenoid closes the vacuum passage to the power valve in order to have additional fuel supplied from the power valve to the intake manifold.

1. When accelerating in any gear other than 4th and 5th at the engine speed of 1150 ~ 3000 rpm (for controlling NOx formation).
2. When accelerating at over 4600 rpm, and when engine speed is 1150 ~ 4600 rpm within 130 sec. from engine starting with the choke used (for quickening reactor reaction in cold starting).

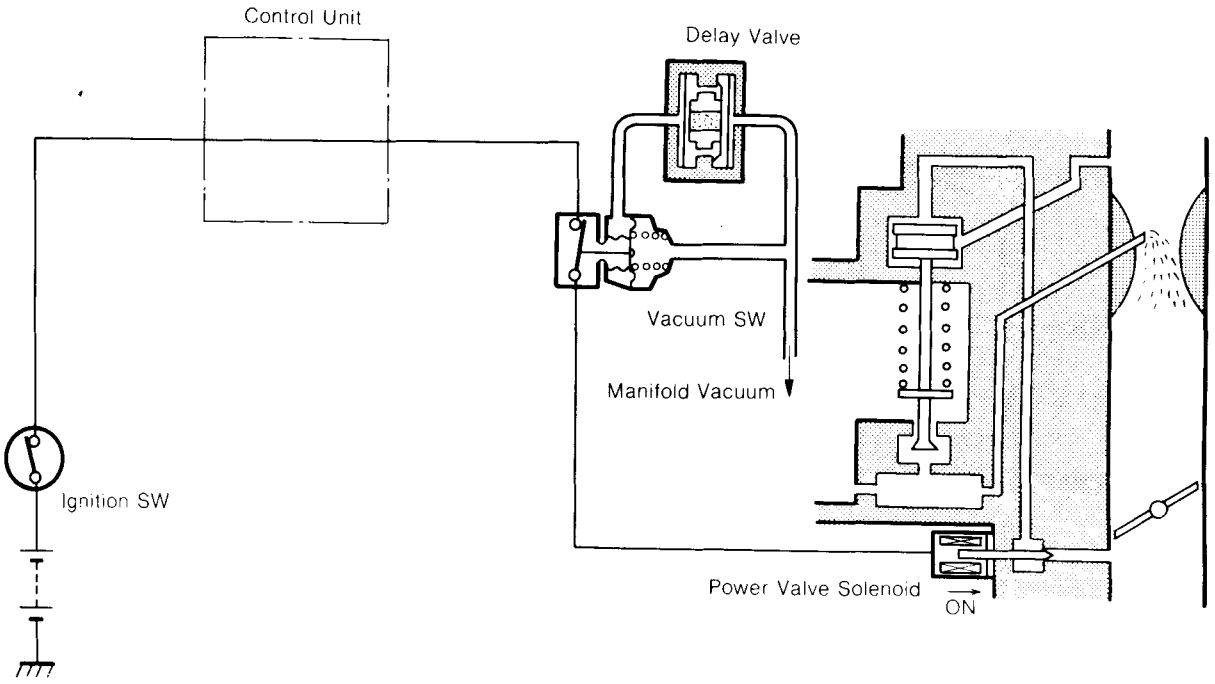


MEMO:

FUEL ENRICHMENT SYSTEM

- FEDERAL AND CANADA -

The power valve solenoid closes the vacuum passage leading to the power valve during acceleration so that additional fuel is supplied by the power valve, thus controlling NOx formation during acceleration to the minimum.



MEMO:

IGNITION CONTROL SYSTEM

As in previous rotary engine vehicles, the RX-7 is provided with two types of plugs; i.e., leading plugs and trailing plugs. For California vehicles, to which severe emission regulations apply, the ignition timing of these plugs is controlled. For Federal and Canadian vehicles, the leading and trailing plugs are always ignited while the engine is in operation.

		CALIFORNIA		FEDERAL CANADA	
		M/T	A/T	M/T	A/T
Dis. vacuum advance	(T)	○	×	○	×
	(L)	○	○	○	○
Dis. centrifugal advance		○	○	○	○
Ignition control		○	○	×	×

- LEADING SPARK PLUG CONTROL (CALIF.) -

- The leading spark plug is retarded when the engine speed is 1150~4600 rpm within 130 seconds from engine starting by using the choke. In this condition, the trailing plugs are not ignited except during deceleration.
- Retarded ignition timing on the leading plugs is obtained by using the trailing breaker point.
- In the above condition, the vacuum passage leading to the trailing distributor vacuum advance unit is colosed to prevent the trailing breaker point from advancing. ..... M/T only

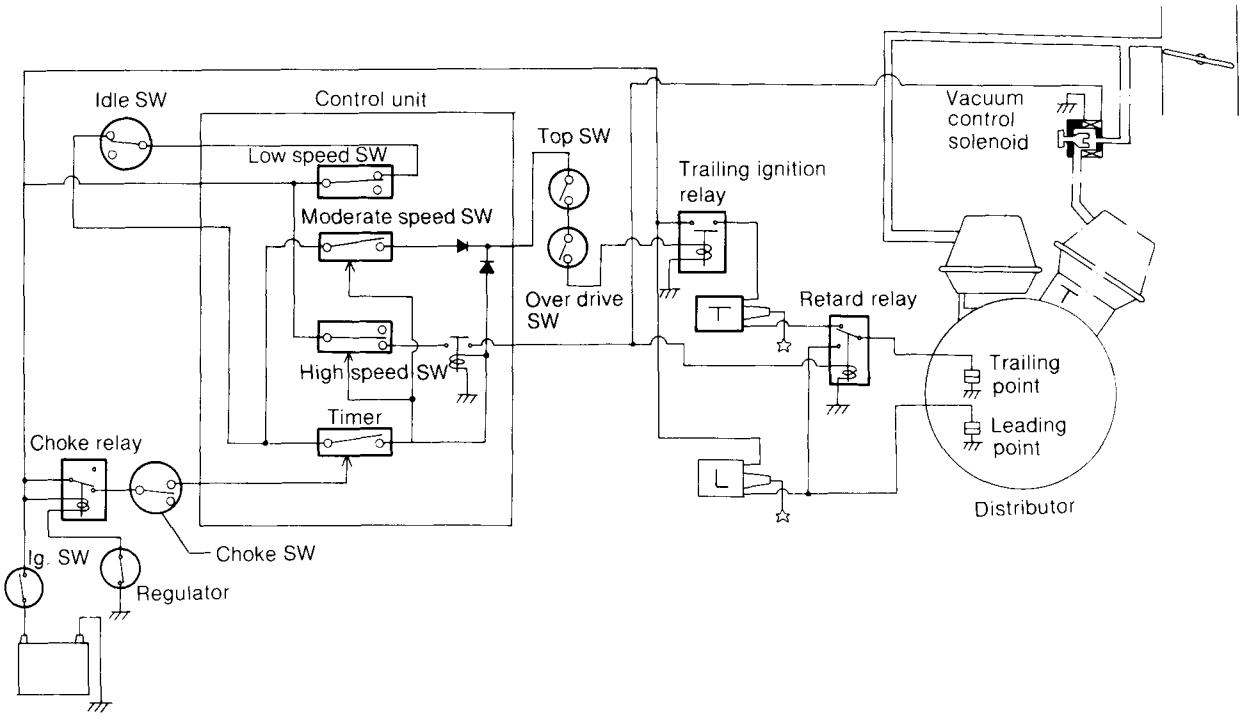
MEMO:

IGNITION CONTROL SYSTEM

- TRAILING SPARK PLUG CONTROL (CALIF.) -

The trailing spark plug is not ignited under the following condition:

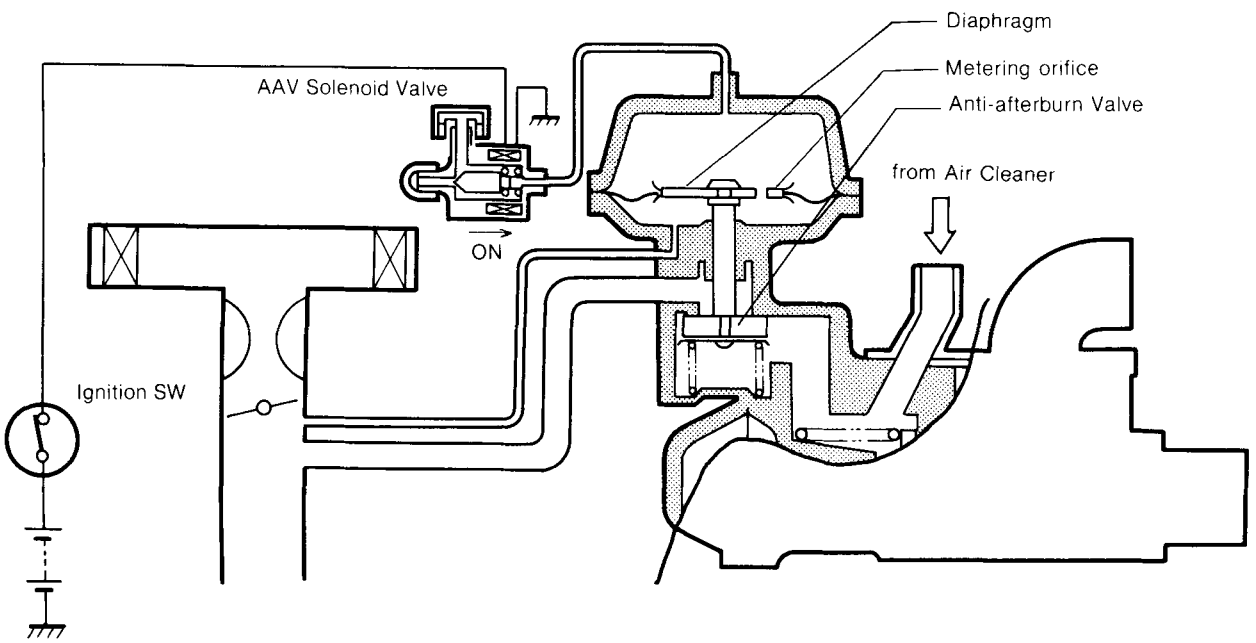
- The engine speed is over 1150 rpm within 130 seconds from engine starting by using the choke. (Except when decelerating and running at over 4600 rpm with 4th and 5th gear)
- The engine speed is 1150 ~ 3000 rpm after 130 seconds from engine starting by using the choke. (Except when decelerating and running in 4th or 5th gear)



MEMO:

DECELERATION CONTROL SYSTEM

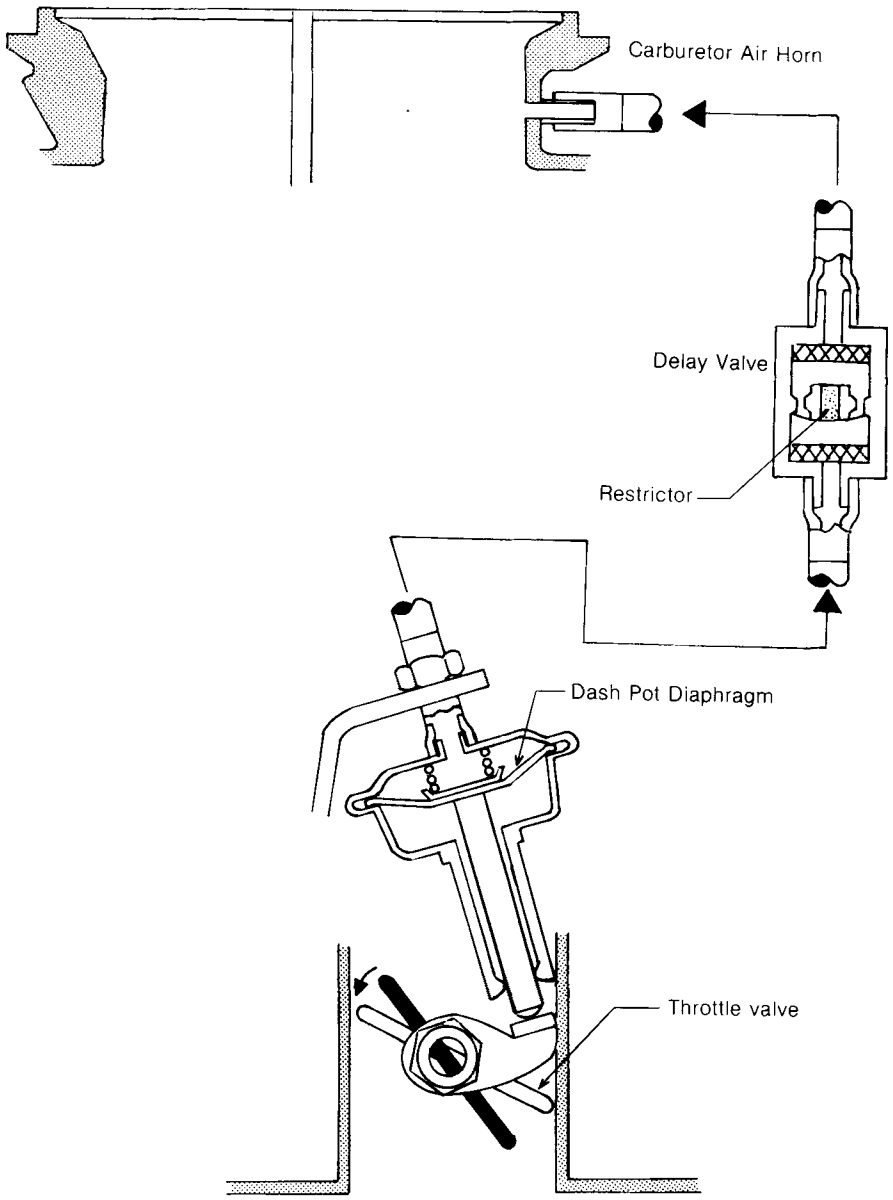
The **anti-afterburn valve** integrated in the air control valve allows additional air to flow into the intake manifold during deceleration to prevent afterburn. Also, this valve allows additional air to flow into the intake manifold to prevent the afterburn when the ignition switch is turned off.



MEMO:

DECELERATION CONTROL SYSTEM

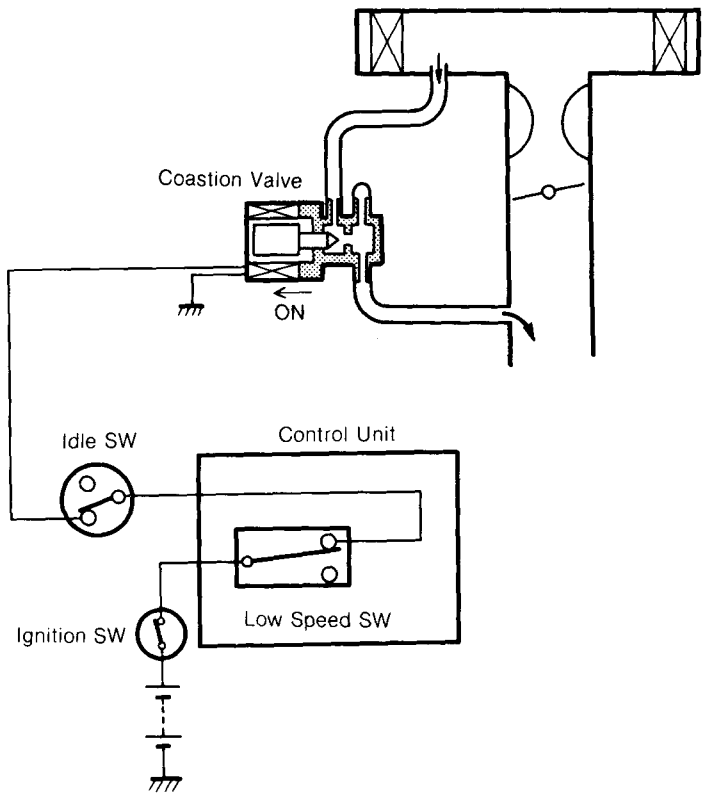
The **dash pot** slightly slows down the throttle valve return when releasing the accelerator pedal. By doing so, a balanced air-fuel mixture during deceleration is improved to prevent engine misfiring. The deceleration control system for automatic transmission vehicles is not equipped with the dash pot and coasting valve. But an anti-afterburn valve is used.



MEMO:

DECELERATION CONTROL SYSTEM

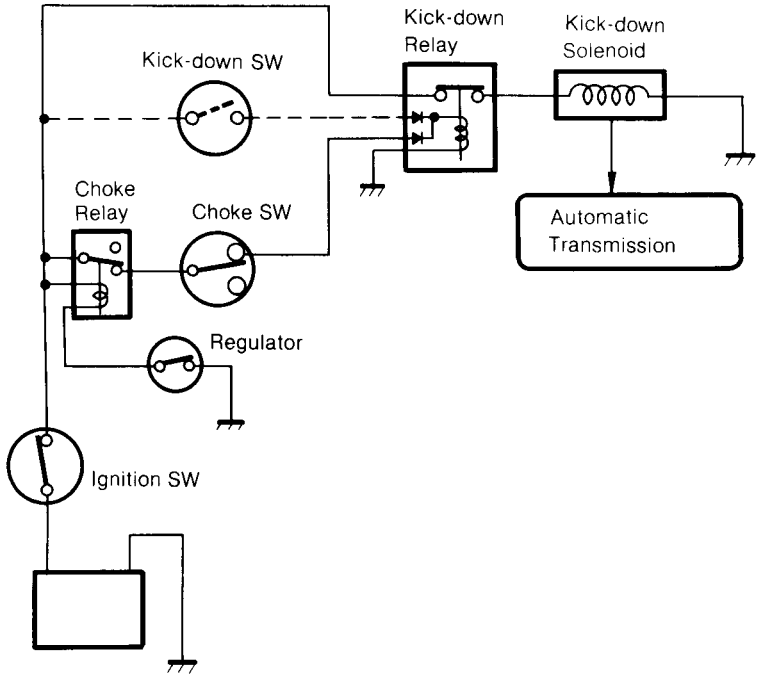
The **coasting valve** allows additional air to flow into the intake manifold to prevent engine misfiring during deceleration at engine speeds over 1150 rpm.



MEMO:

KICK-DOWN CONTROL SYSTEM

In order to quickly warm up the thermal reactor, when the choke knob is pulled the transmission is kicked down through the action of choke switch.

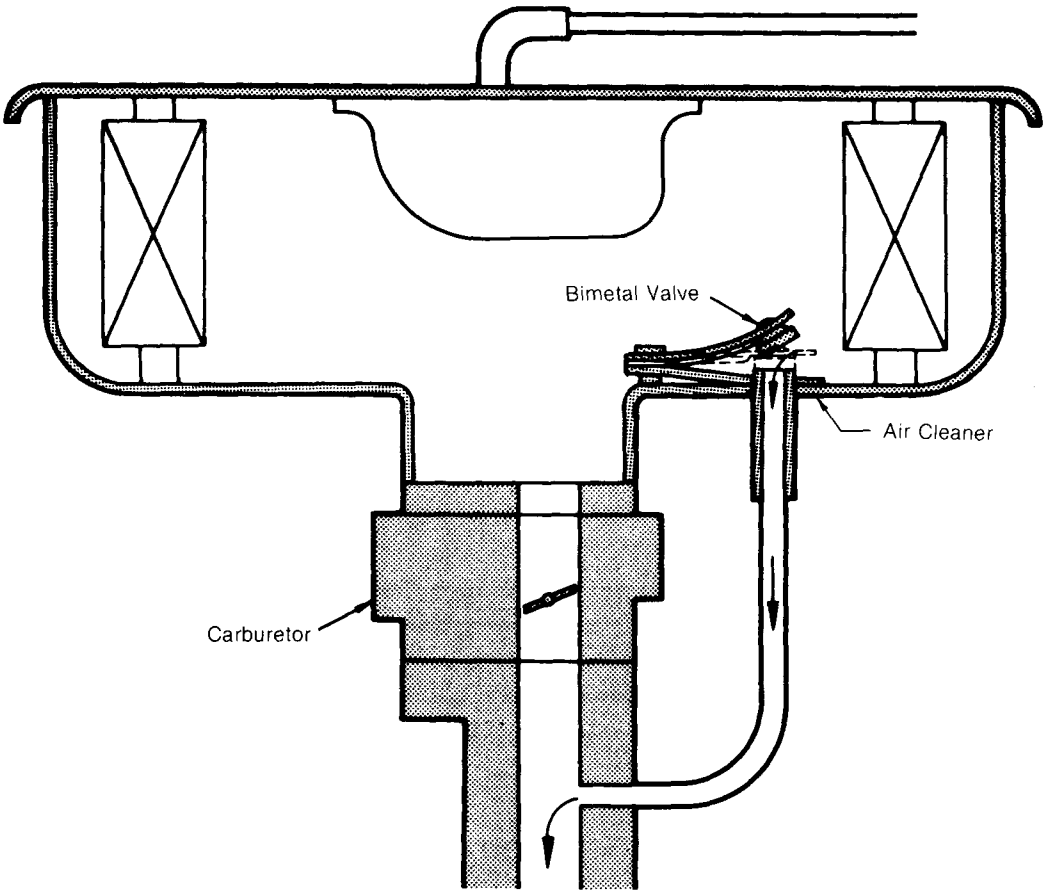


MEMO:

IDLE COMPENSATOR SYSTEM

Under extremely hot condition, the air-fuel mixture has a tendency to become a little richer, and as the result the idling is apt to be unstable. In this connection, an idle compensator is adopted to keep a balanced air-fuel mixture in idling.

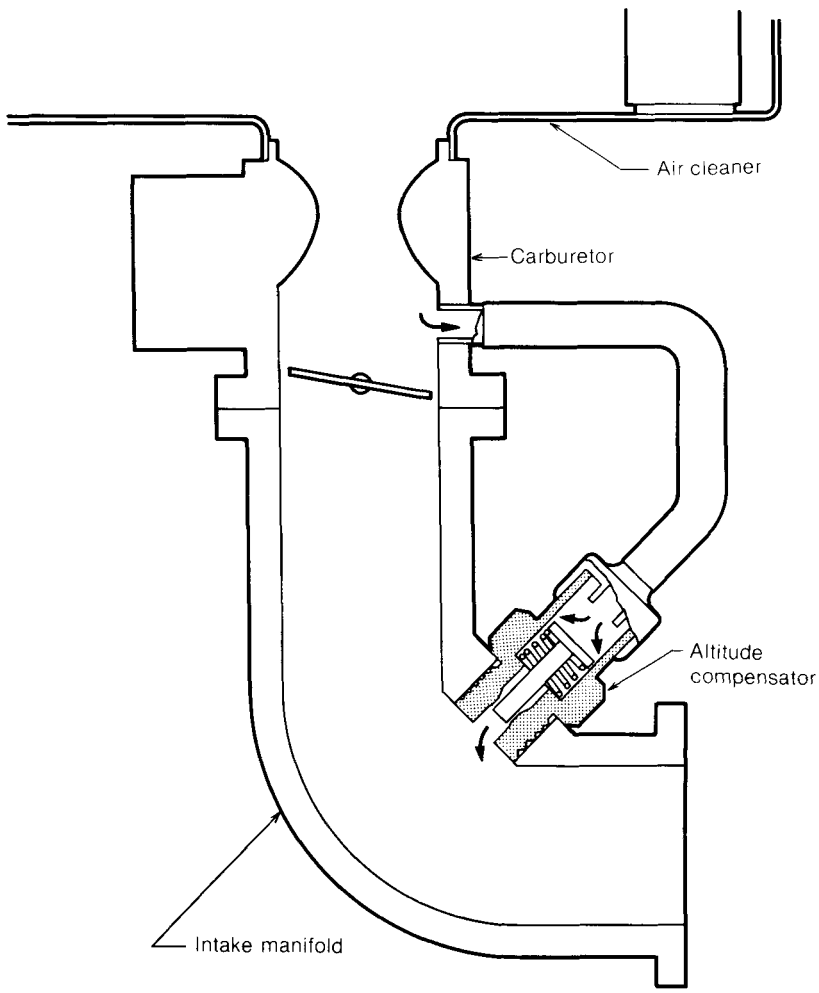
The bimetal valve opens the air passage. As a result, additional air from the air cleaner is drawn in the intake manifold and the rich mixture is corrected to an optimum air-fuel mixture for complete burning.



MEMO:

ALTITUDE COMPENSATOR

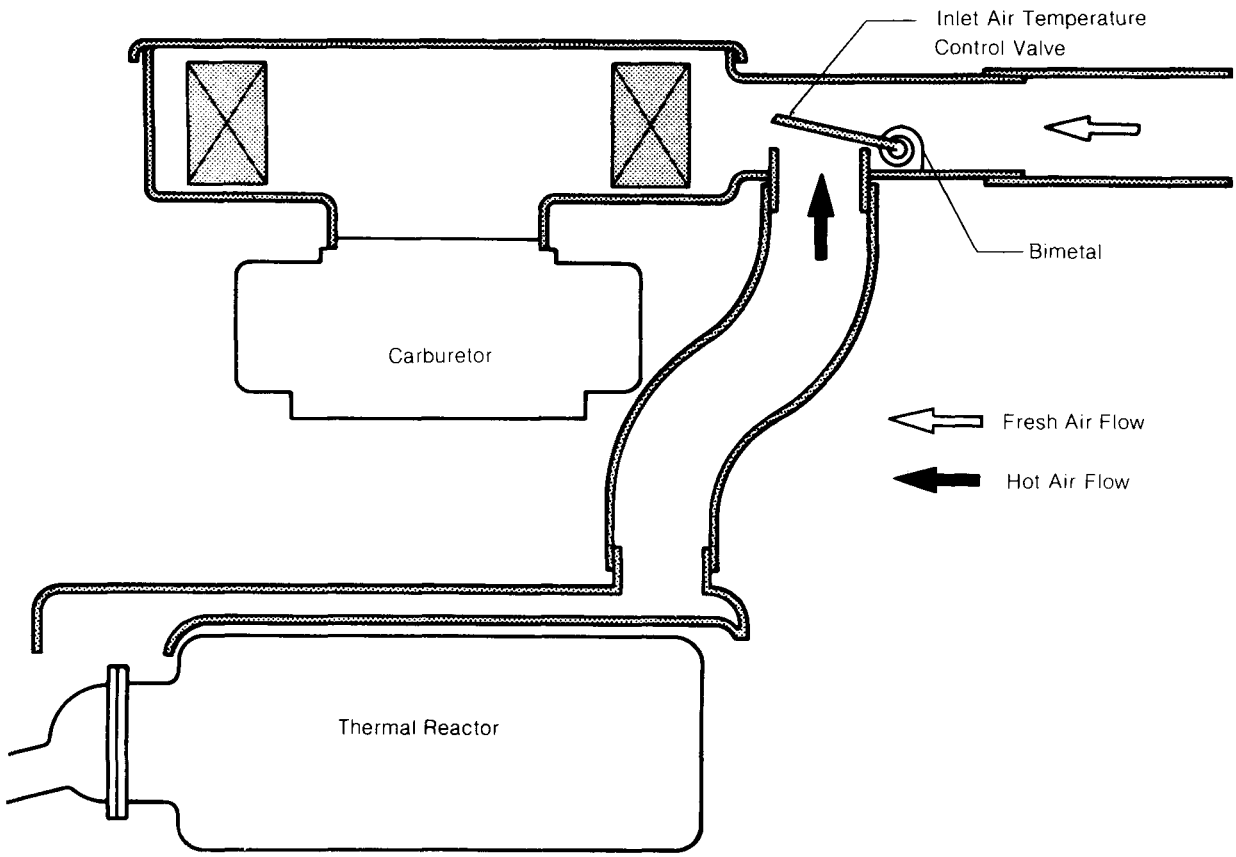
In high altitude area, the air-fuel mixture becomes too rich and as the result idling particularly has a tendency to become unstable.
To cope with this tendency, the altitude compensator optimizes the air-fuel mixture by supplying additional air mainly during idling when driving in high altitude area.



MEMO:

INTAKE AIR TEMPERATURE CONTROL SYSTEM

A bimetal valve provided at the inlet of the air cleaner opens and closes the intake passage for hot air. Until the intake air warms up after starting, the hot air passage opens to improve the drive ability and prevent icing. As the intake air temperature rises only the fresh air is sucked in.



MEMO:

AUTOMATIC CHOKE RELEASE SYSTEM

This system prevents the choke knob from being left unreturned and the resultant overheating of the thermal reactor.

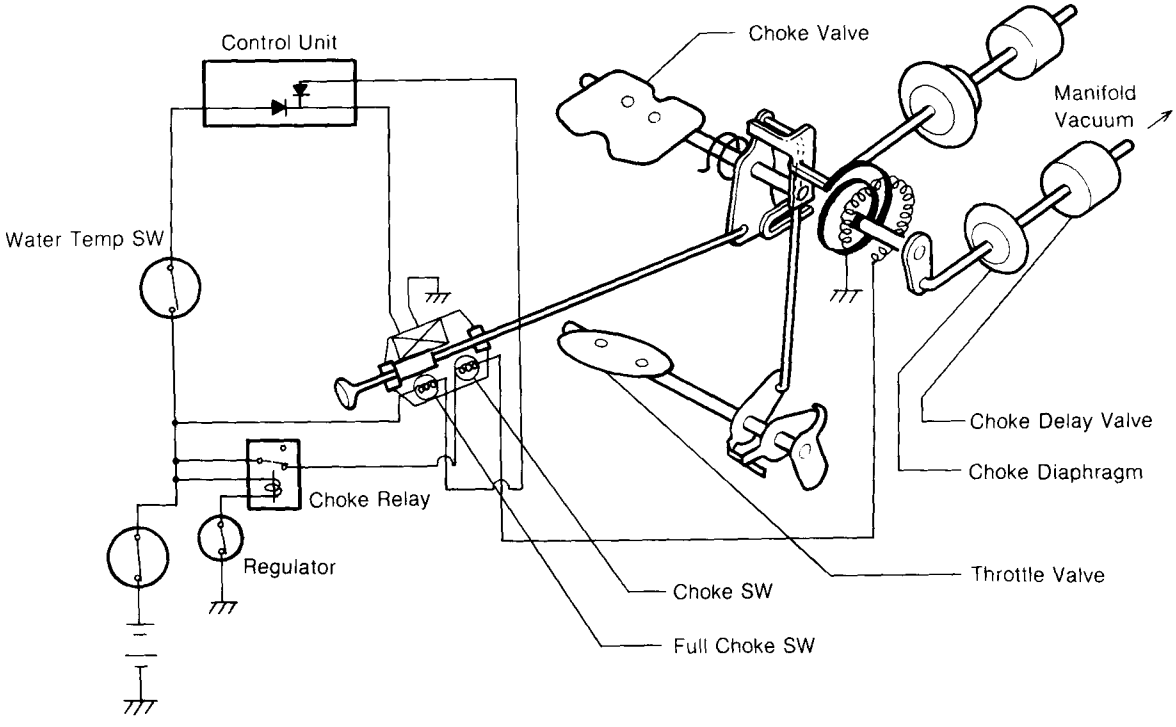
Operation:

The operation of this system for California vehicle differs from that of Federal and Canadian vehicles, please refer to the following descriptions:

- CALIFORNIA VEHICLE -

When the cold engine is started with the choke knob pulled, the knob is held in the pulled position for about one minute. Subsequently it returns halfway through the operation of the choke diaphragm and the choke return delay valve.

As the engine warms up sufficiently the electric current stops flowing to the magnet which holds the choke knob, to return the choke knob completely.



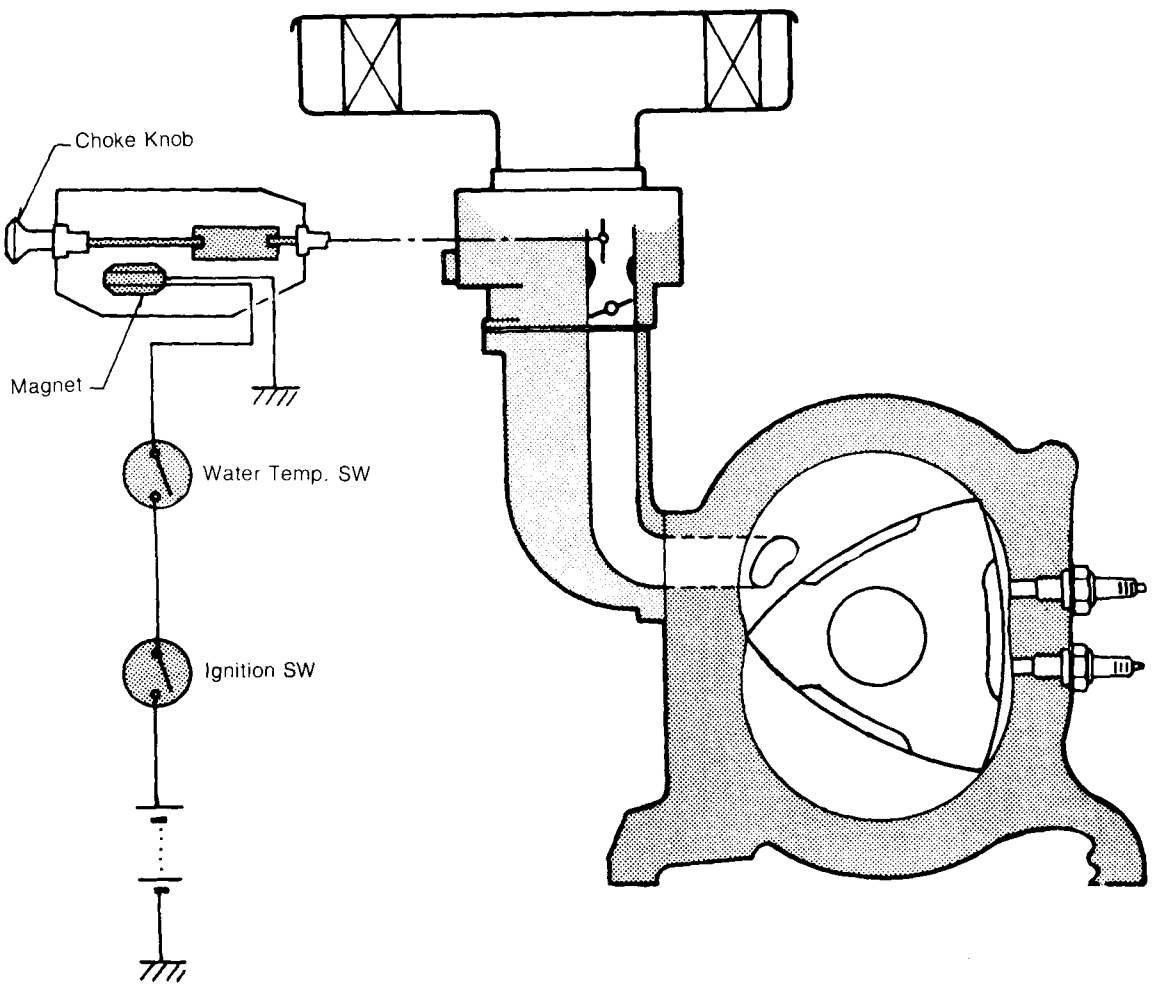
MEMO:

AUTOMATIC CHOKE RELEASE SYSTEM

- FEDERAL AND CANADA VEHICLE -

When the cold engine is started with the choke knob pulled, the choke knob is held at the pulled position through the action of the choke magnet.

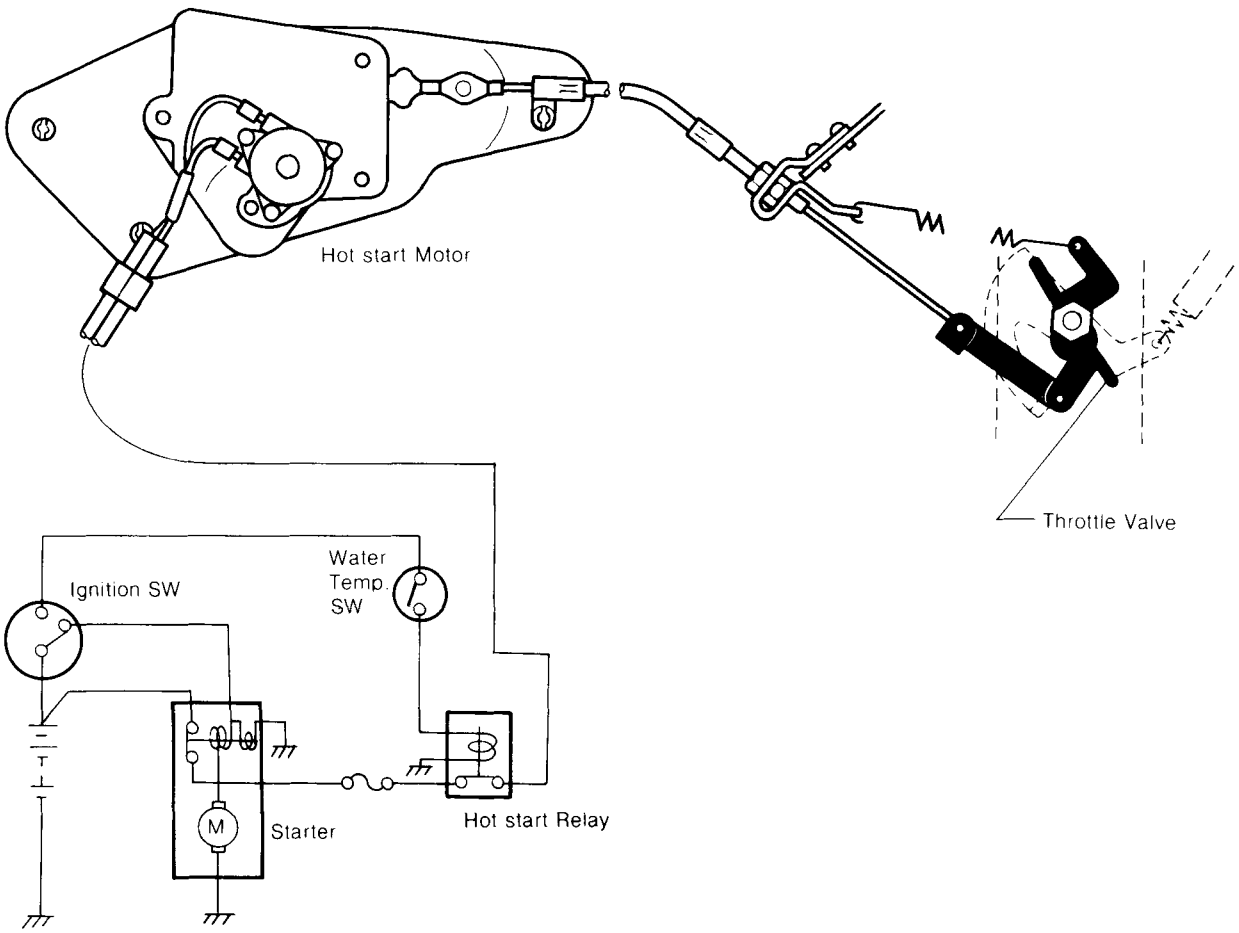
As the engine warms up, electric current stops flowing to the magnet and as the result the choke knob returns to its original position.



MEMO:

HOT START ASSIST SYSTEM

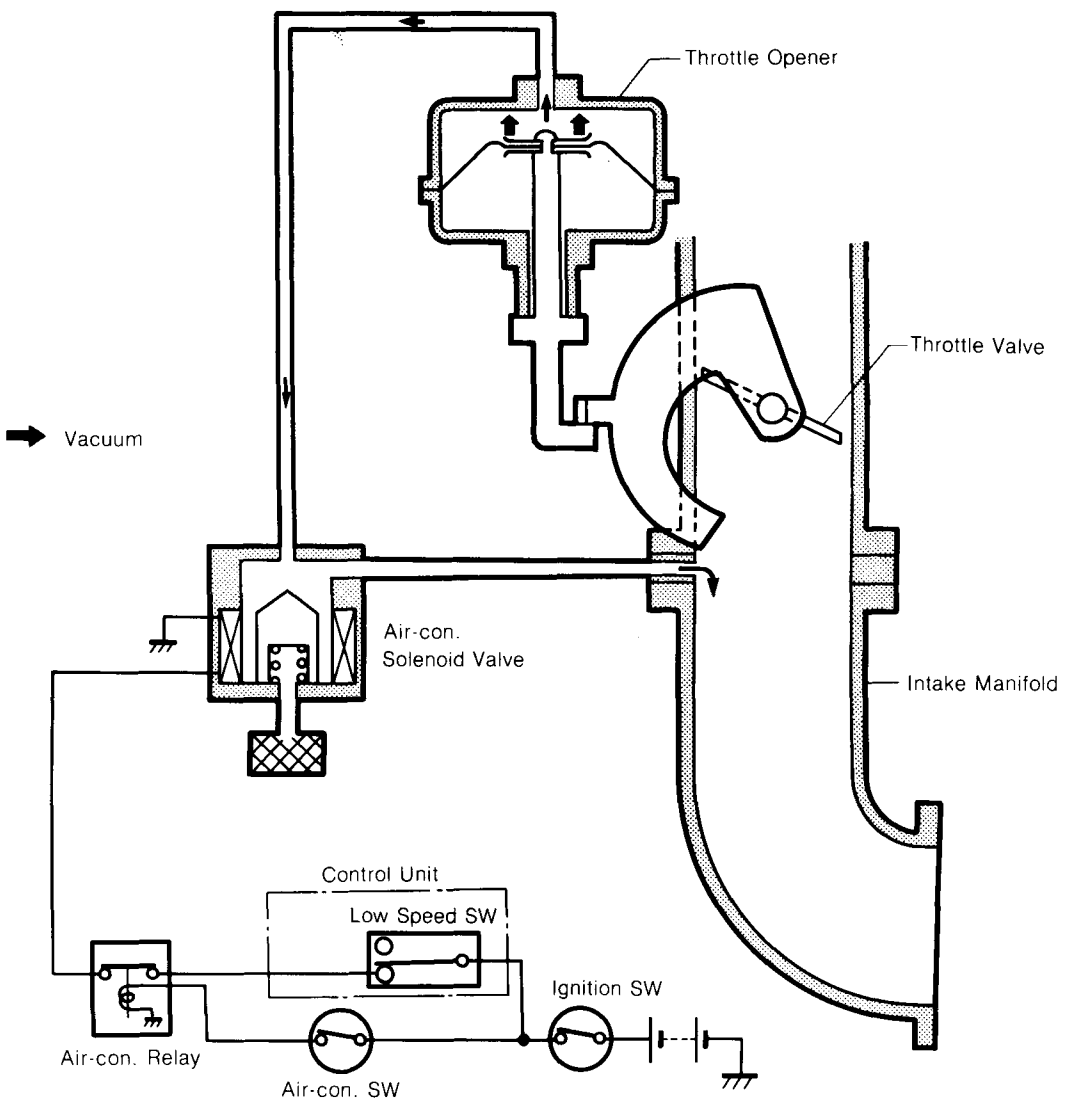
Hot starting can be easily done by cranking with the accelerator pedal fully depressed. This starting method, however, is not throughly known by customers. Therefore, the hot start assist system is newly added to give the same effect automatically. In hot starting with this system, a motor mounted on the left suspension tower pulls wire to force the throttle valve to open. After starting the engine, the wire is released and the throttle valve returns to the idling position. The condition of a hot engine is sensed by the water temperature switch.



MEMO:

THROTTLE OPENER SYSTEM

The throttle opener system serves to improve the air conditioner cooling efficiency at low speed and idling, and to obtain smooth idling.
That is, when the air conditioner switch is ON and the engine speed is below 1150 rpm, the primary throttle valve is opened slightly more than the normal idling position by operating the servo diaphragm.



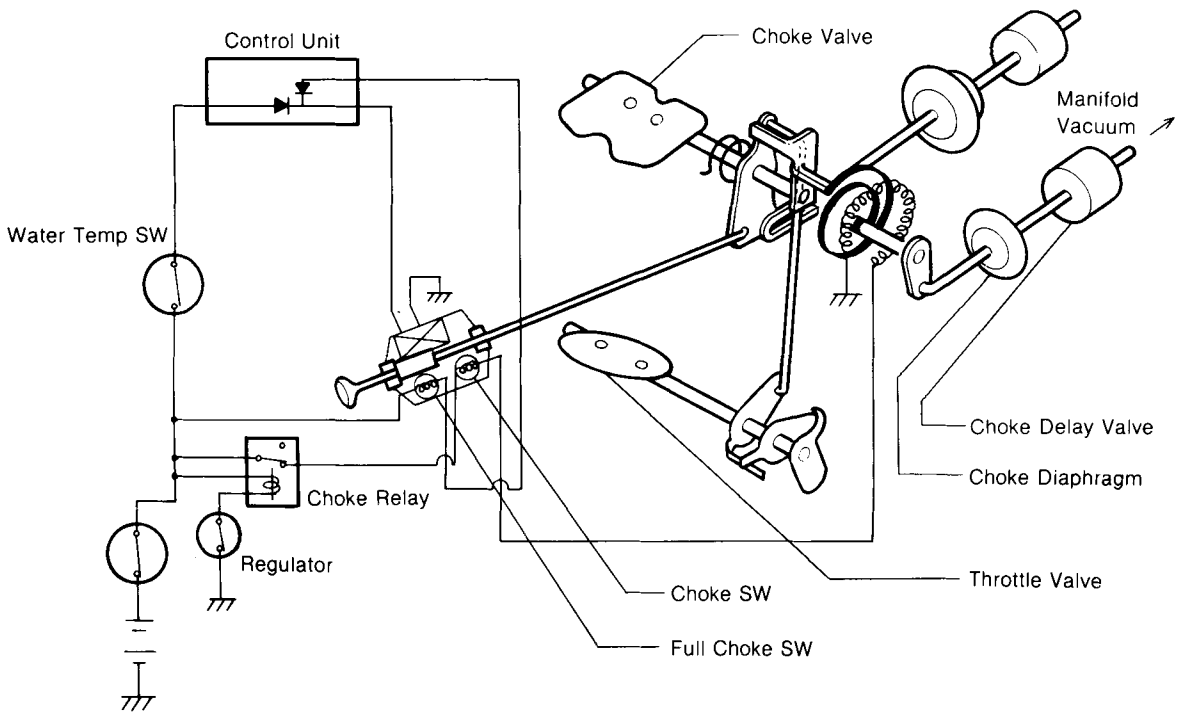
MEMO:

COLD ENRICHMENT SYSTEM

This system controls opening and closing of the choke valve at the time of engine starting with the use of the choke, to get correct air-fuel mixture.

While the engine is cranking, the choke valve is kept closed to enrich the air-fuel mixture for easy starting of the engine. As soon as the engine starts, the choke valve opens slightly to correct the mixture. The choke valve is opened (returns) by the vacuum diaphragm and the force of the bimetal spring.

The force of this bimetal spring is weakened by an electric current flowing through the choke switch to the carburetor heater when the choke control knob is pulled out.



MEMO:

COLD ENRICHMENT SYSTEM

OPERATION

- During engine cranking -

When the engine is cranking, the intake manifold vacuum is so low that the vacuum diaphragm does not operate. As the carburetor heater has not warmed up yet at this time, the force of the bimetal spring does not change, either. Accordingly, the choke valve is kept closed.

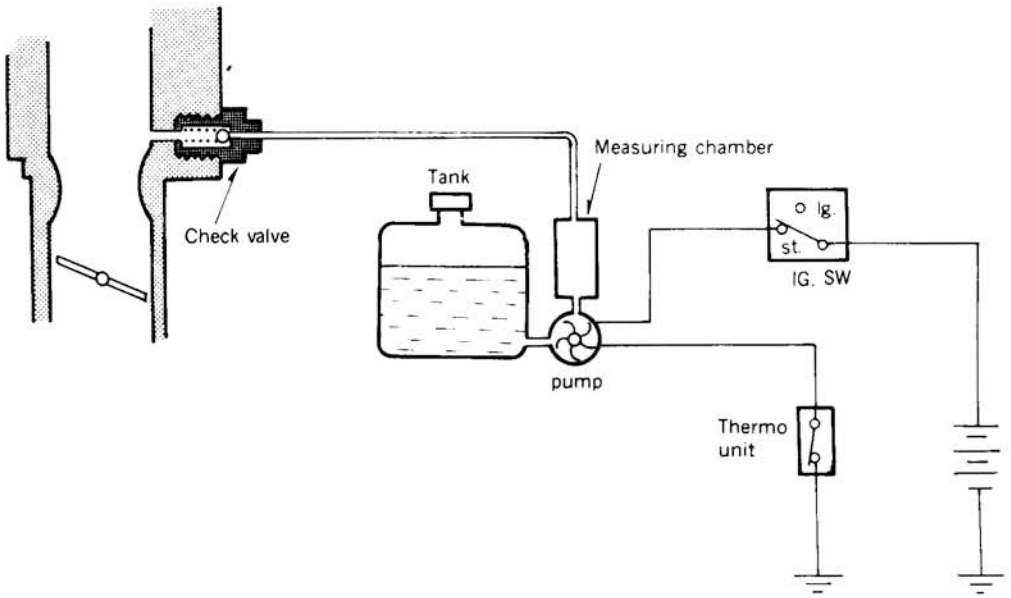
- After engine starting -

On engine starting, a high intake manifold vacuum (idle vacuum) is led to the vacuum diaphragm to open the choke valve slightly. With the lapse of time, the carburetor heater gets warmer and this weakens the force of the bimetal spring and opens the choke valve to get correct air-fuel mixture.

MEMO:

SUB-ZERO STARTING ASSIST SYSTEM

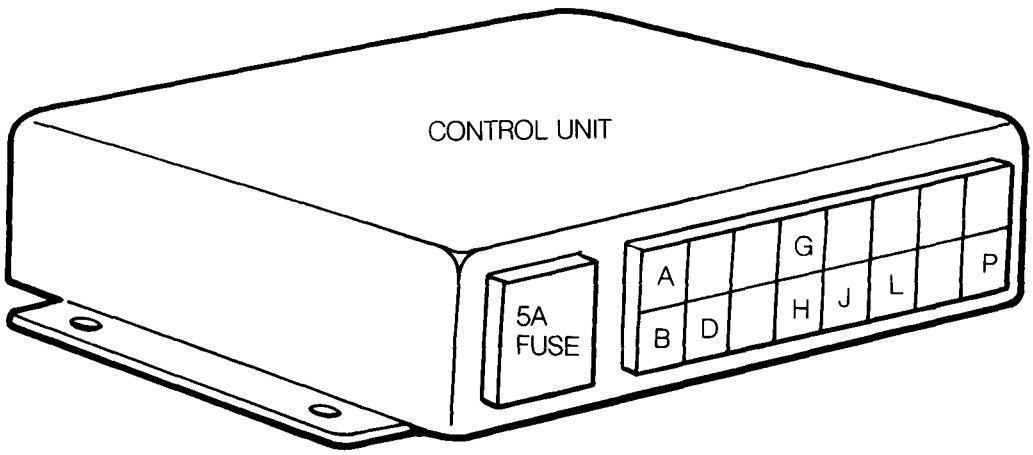
This system serves to facilitate the engine starting in the extremely cold condition.
When the ignition switch is turned on to START position, the assist fluid in the assist fluid tank is supplied into the engine to facilitate the engine starting by operation of the pump.



MEMO:

TERMINALS OF CONTROL UNIT

- FEDERAL AND CANADIAN SPECIFICATIONS -



Terminal	Description
A	Through Terminal **A**, the engine speed detected from the leading ignition coil is transmitted to each speed switch inside the control unit.
B	When the ignition switch is turned on, the battery power is sent through Terminal **B** into the control unit.
D	When the ignition switch is turned on, the battery power is sent to Terminal **D**. From Terminal **D**, the power is led in the following route. • Terminal **D** → Water temp. SW (ON↔OFF) - - - - - - - → Choke magnet → Vacuum SW (ON↔OFF) - - - - - - - - → Power valve solenoid A/T only

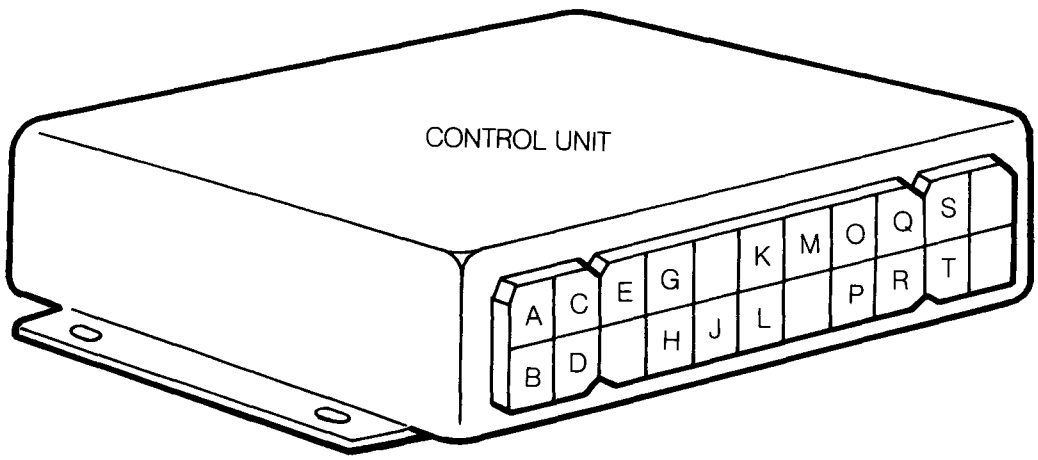
TERMINALS OF CONTROL UNIT

Terminal	Description
G	The battery power is sent to Terminal **G** when the engine speed is above 1,150 rpm. From Terminal **G**, the power is led in the following route. • Terminal **G** → Idle SW → Richer → Coasting valve (M/T only)
H	The battery power is sent to Terminal **H** when the engine speed is above 4,000 rpm. From Terminal **H**, the power is led to the short relay for ignition coil.
J	The battery power is sent to Terminal **J** when the engine speed is below 1,150 rpm. From Terminal **J**, the power is led to NO. 2 relief valve solenoid of the air control valve.
L	The battery power is sent to Terminal **L** when the engine speed is below 1,150 rpm. From Terminal **L**, the power is led to the air conditioner solenoid.
P	Terminal **P** is for earthing.

MEMO:

TERMINALS OF CONTROL UNIT

- CALIFORNIA SPECIFICATIONS -



Terminal	Description
A	Through Terminal **A**, the engine speed detected from the leading ignition coil is transmitted to each speed switch inside the control unit.
B	When the ignition switch is turned on, the battery power is sent through Terminal **B** into the control unit.
D	When the ignition switch is turned on, the battery power is sent to Terminal **D**. From Terminal **D**, the power is led in the following route.

TERMINALS OF CONTROL UNIT

Terminal	Description
D	• Terminal **D** → Full choke SW (ON↔OFF) → Terminal T → Terminal K → Choke magnet Terminal Q (ON↔OFF) → Water temp. SW
C	When the engine is started with the choke control knob pulled out, the battery power is led through Terminal **C** to the timer (130 seconds) inside the control unit.
E	When accelerating (excepting the acceleration in 4th and 5th gears) within the engine speed range of 1,150 ~ 3,000 rpm after 130 seconds from the time engine has been started with the use of the choke and when accelerating (excepting the acceleration in 4th and 5th gears) with the choke control knob pulled out, the battery power coming through the acceleration sensor is led through Terminals **E** and **M** to the power valve solenoid.
G	The battery power is sent to Terminal **G** when the engine speed is above 1,150 rpm. From Terminal **G**, the power is led in the following route. • Terminal **G** → Idle SW (ON↔OFF) → Richer / Coasting valve (M/T only)
H	The battery power is sent to Terminal **H** when the engine speed is above 4,000 rpm (when it is above 4,600 rpm in case of the choke being used). From Terminal **H**, the power is led to the short relay for ignition coil.

TERMINALS OF CONTROL UNIT

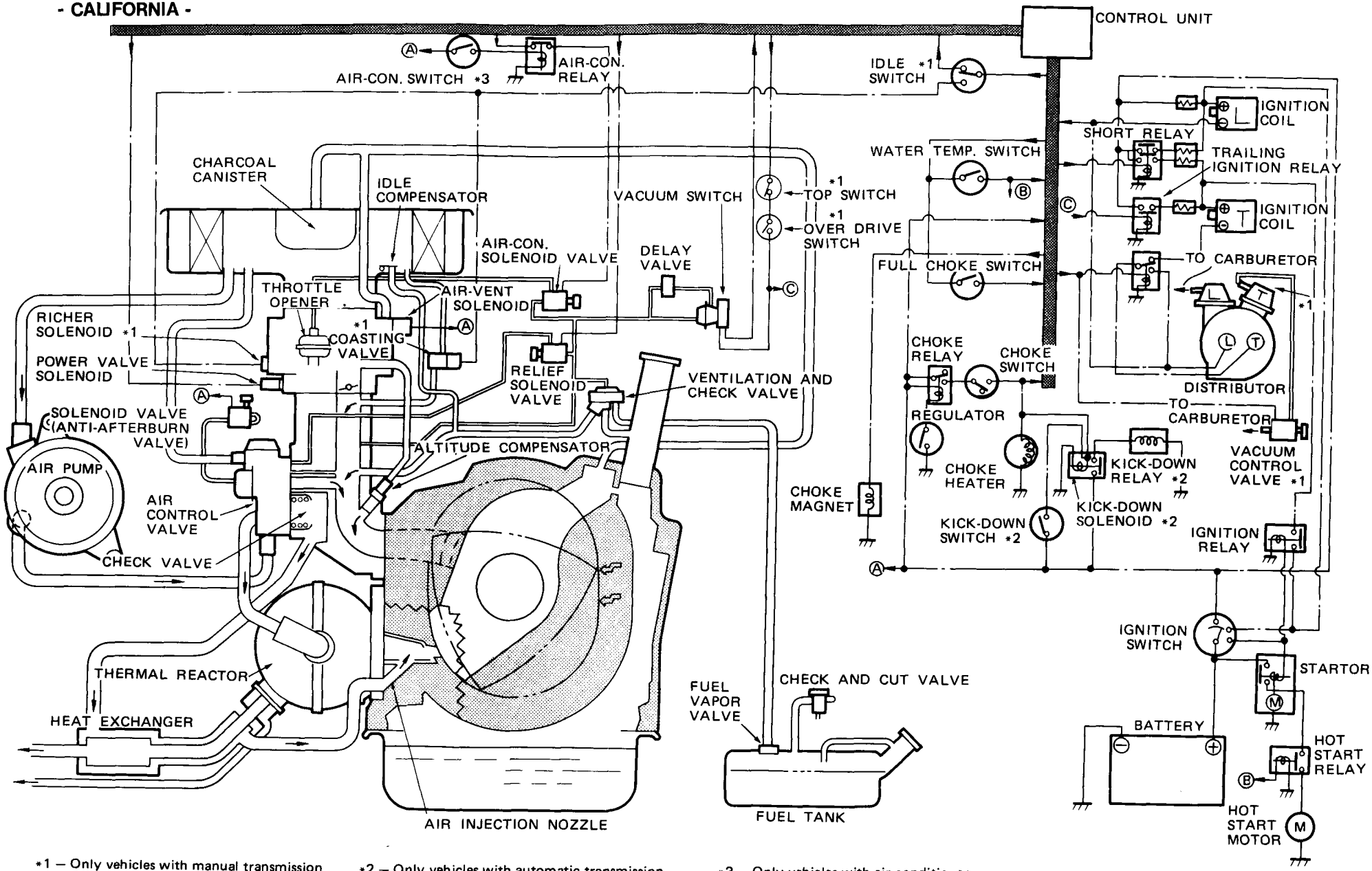
Terminal	Description
J	The battery power is sent to Terminal **J** in the following cases: • When the engine speed is below 1,150 rpm • When the car is accelerating (excepting the acceleration in 4th and 5th gears) within the engine speed range of 1,150 ~ 3,000 rpm after 130 seconds from the time engine has been started with the use of the choke • When the choke knob is fully pulled out • When the car is accelerating (excepting the acceleration in 4th and 5th gears) within 130 seconds after the engine has been started with the use of the choke From Terminal **J**, the battery power is led to the power valve solenoid.
K	The battery power is sent to Terminal **K** (1)when the choke knob is fully pulled out and (2)when the coolant temperature is below 140 F. From Terminal **K**, the battery power is led to the choke magnet.
L	From Terminal **M**, the battery power is led to the power valve solenoid. The battery power is sent to Terminal **L** when the engine speed is below 1,150 rpm. From Terminal **L**, the power is led to the three-way solenoid valve for air conditioner.
M	The battery power is sent to Terminal **M** in the following cases: • When the car is acceleration under the use of the choke (excepting the acceleration in 4th and 5th gears) • When the car is accelerating within 1,150 ~ 3,000 rpm without using the choke (excepting the acceleration in 4th and 5th gears) • When the engine speed is 1,150 ~ 4,600 rpm within 130 seconds after the engine has been started with the use of the choke
O	Through Terminal **O**, the battery power is led to the choke magnet when the coolant temperature is below 140 F.

TERMINALS OF CONTROL UNIT

Terminal	Description
Q	The battery power is sent to Terminal **Q** when the engine speed is 1,150 ~ 4,600 rpm within 130 seconds after the engine has been started with the choke knob pulled out. From Terminal **Q**, the battery power is led to the retard relay and the vacuum control valve (three-way solenoid valve for T - dis. vacuum advance unit).
P	Terminal **P** is for earthing.
R	The battery power is sent to Terminal **R** when the engine speed is 1,150 ~ 3.000 rpm after the engine has been started with the use of the choke (with the exception of the cases where the car is decelerating and where the car is running in 4th and 5th gears) or when the engine speed is above 1,150 rpm within 130 seconds after the engine has been started with the use of the choke (with the exception of the cases where the car is decelerating and where the car is running in 4th and 5th gears). From Terminal **R**, the battery power is led in the following route. • Terminal **R** → Dis. relay → Vacuum SW (ON↔OFF) → Terminal **E**
S	The battery power is sent to Terminal **S** when the engine speed is above 1,150 rpm (excepting the case where the car is decelerating).
T	The battery power is sent to Terminal **T** when the choke control knob is fully pulled out.

MEMO:

- CALIFORNIA -



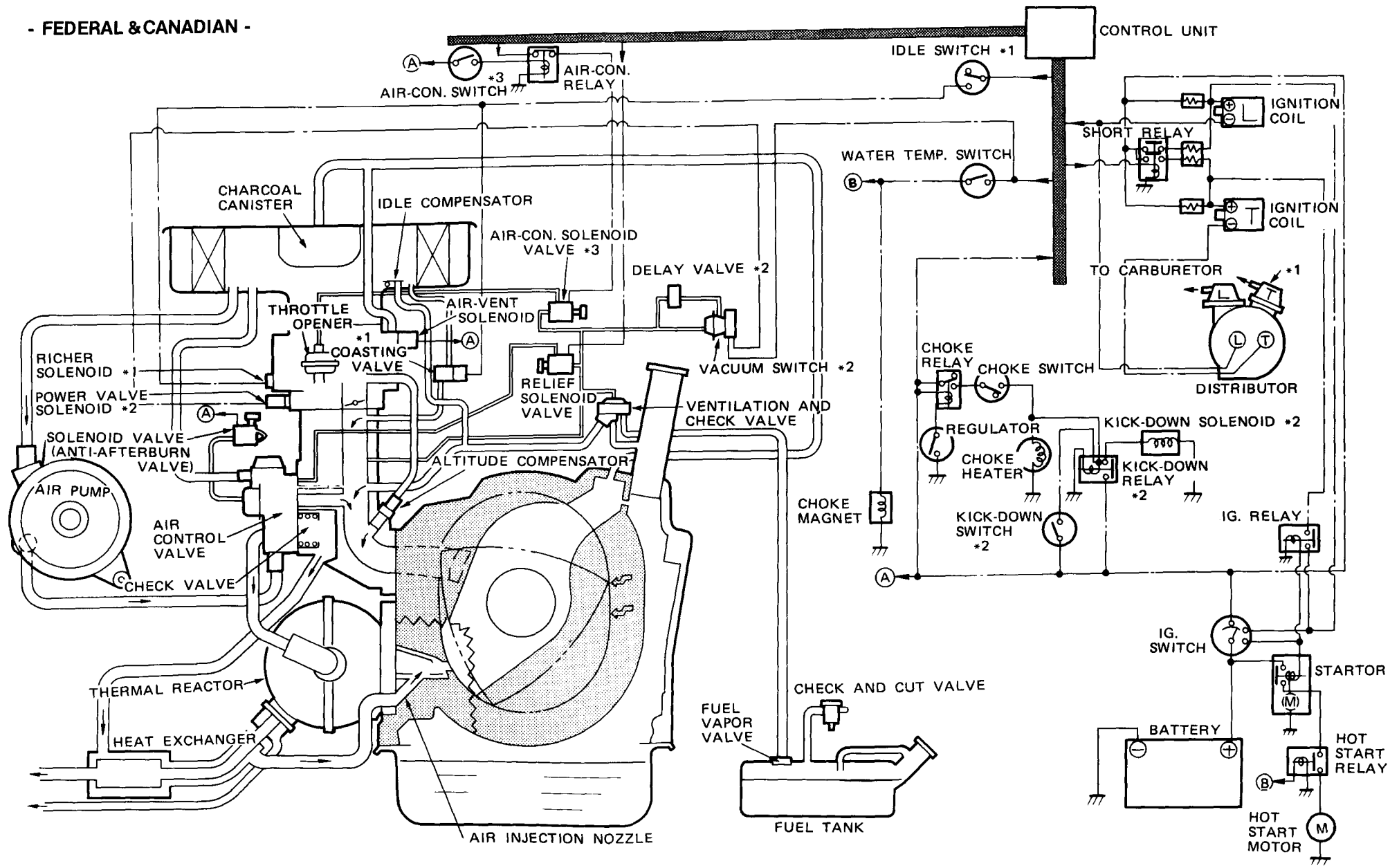
*1 — Only vehicles with manual transmission

*2 — Only vehicles with automatic transmission

*3 — Only vehicles with air conditioner

NOTE — The connection of hoses is simplified for easy understanding.

- FEDERAL & CANADIAN -



*1 — Only vehicles with manual transmission

*2 — Only vehicles with automatic transmission

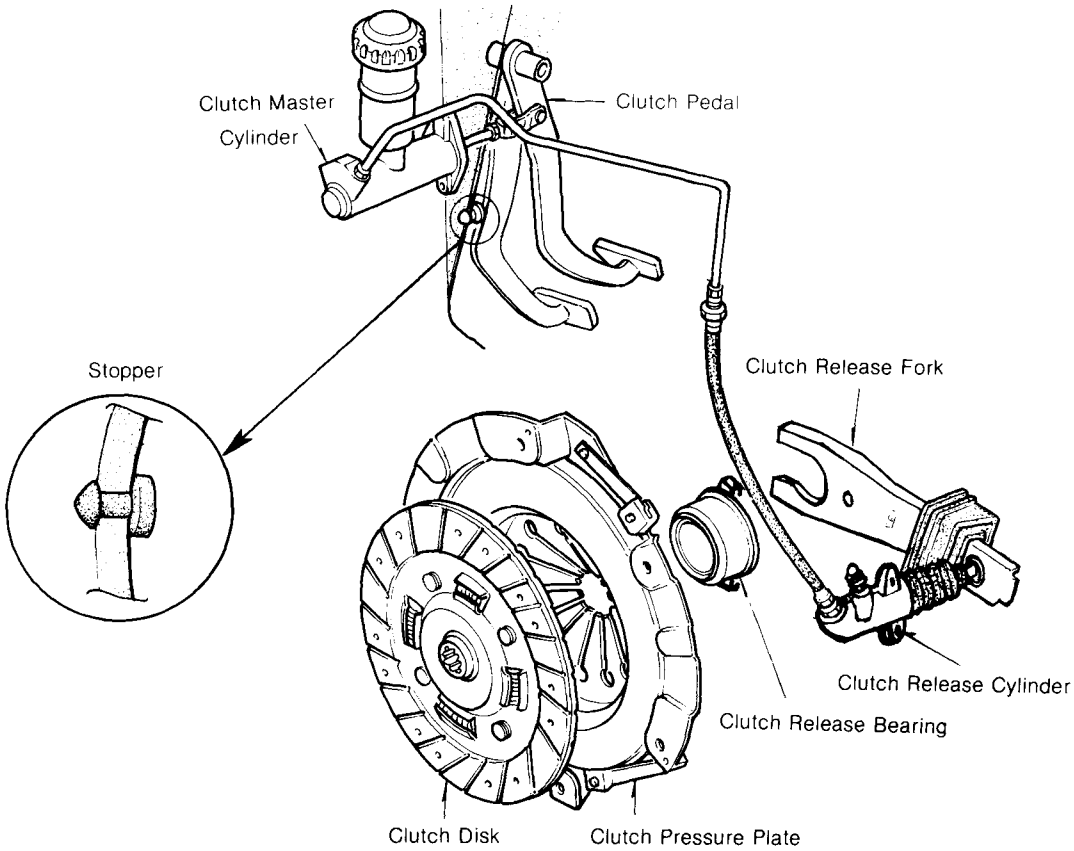
*3 — Only vehicles with air conditioner

NOTE — The connection of hoses is simplified for easy understanding.

CHASSIS · BODY

CLUTCH MECHANISM

The clutch is the common, single dry plate type. A diaphragm type clutch spring is used. A hydraulic actuating system is used, which is self adjusting.
The release bearing used in the RX-7 is self centering with the inner race rotating rather than the outer race, which increases release bearing life due to better lubrication.
A clutch pedal stopper is used to limit clutch actuation, which results in quicker shifts during hard acceleration or competition.



CLUTCH MECHANISM

(Specifications)

Pedal Stroke	Maximum	135mm (5.31in)
	Disconnection Point	100mm (3.94in)
Pedal Lever Ratio		6.2
Diameter of Clutch Facing		215mm × 150mm (8.46in × 5.91in)

MEMO:

TRANSMISSION

There are three types of transmission available; four speed manual, five speed manual, and three speed automatic transmissions.

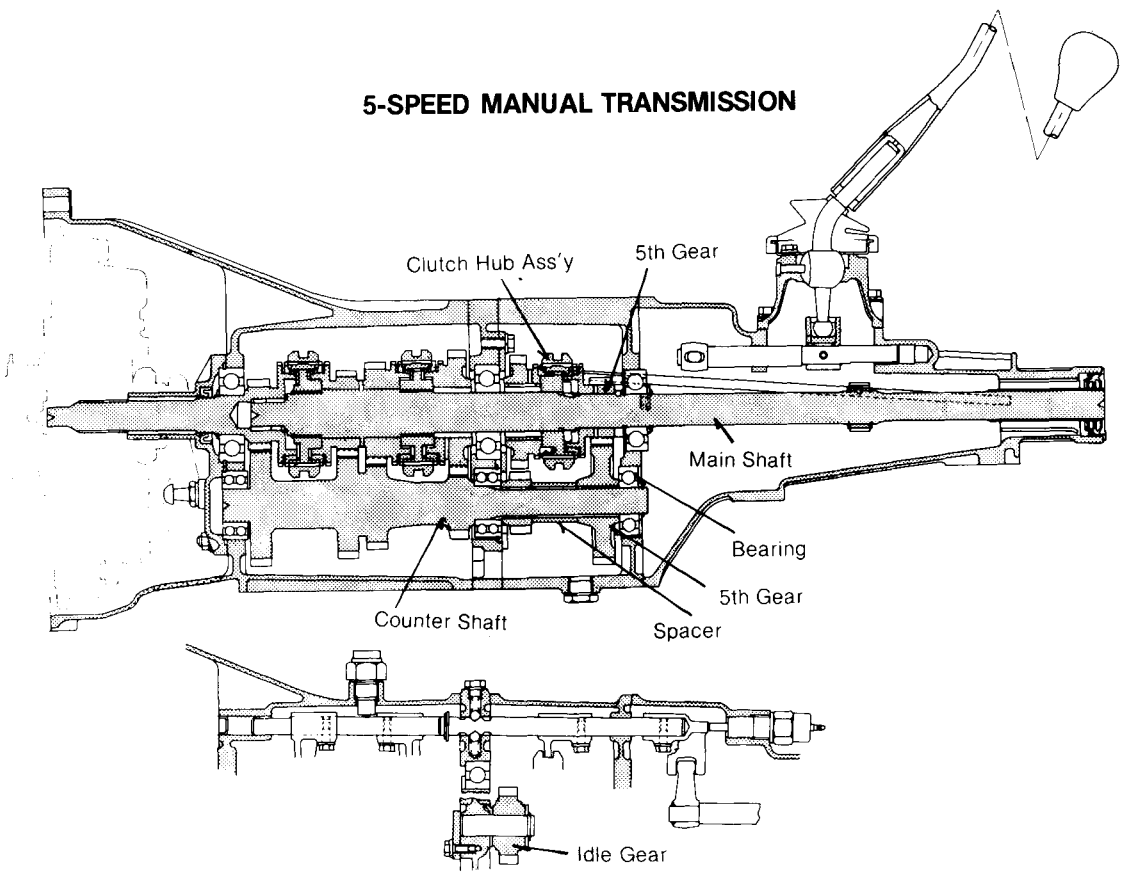
Model Grade	Manual	Automatic
S	4-speed	R3A (JATCO)
GS	5-speed	

The automatic transmission is the JATCO R3A, and similar in the construction to the RX-3.

Shift	Manual Transmission	Automatic Transmission
1st	3.674	2.458
2nd	2.217	1.458
3rd	1.432	1.000
4th	1.000	/
5th	0.825	/
Reverse	3.542	2.181

The four speed manual transmission is designed on the same basis as the five speed manual transmission.

5-SPEED MANUAL TRANSMISSION



MEMO:

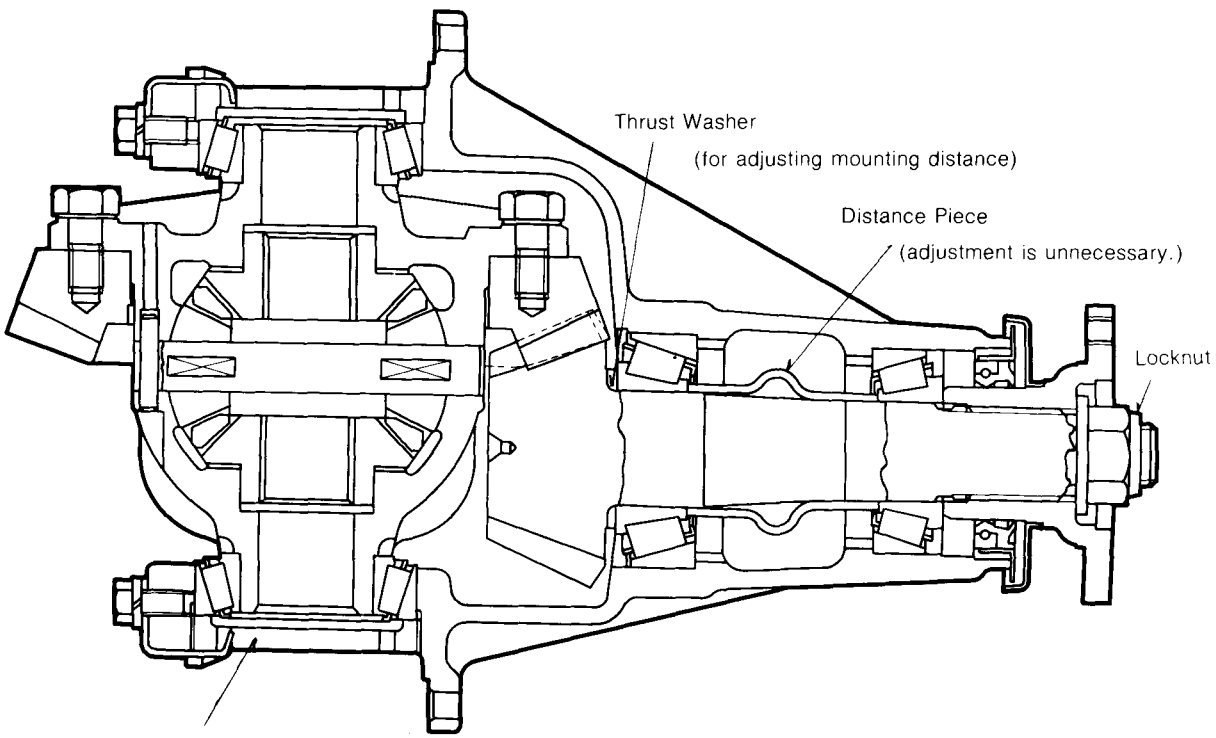
〔Propeller Shaft〕

A two piece propeller shaft is used, and the distance between the joints is short (968mm(38.11in.)).

〔Differential〕

The differential assembly uses a hypoid gear, with a final gear ratio of 3.909.

FINAL DRIVE GEARSET



MEMO:

FRONT & REAR SUSPENSION

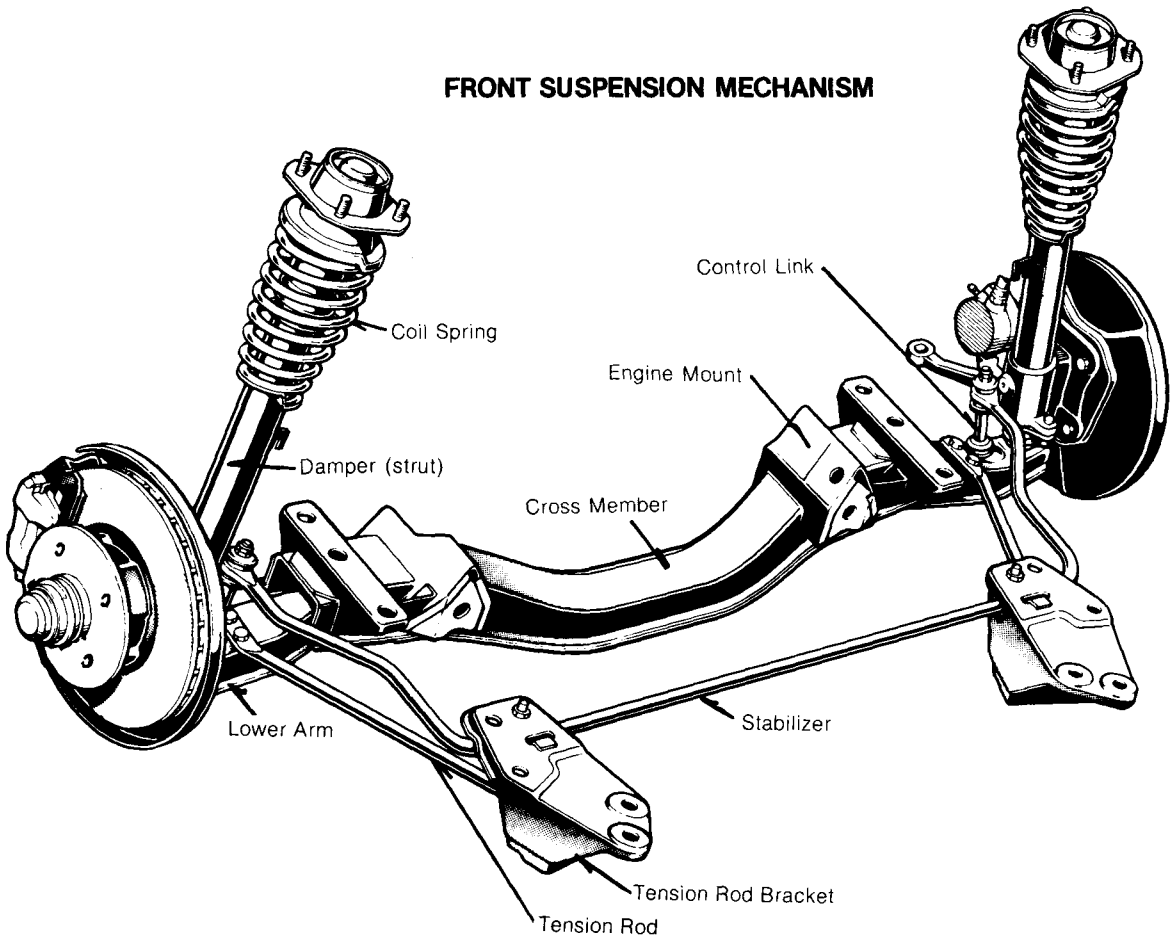
A lightweight and reliable strut type front suspension is used. The rear suspension uses coil springs located by four leading links and watts linkage. Both front and rear suspensions have been designed for excellent handling characteristics while maintaining a high degree of riding comfort.

〔Front Suspension〕

Front Wheel Alignment	
Camber	1° 10′
Caster	4° 03′
King Pin Inclination	10° 44′
Toe-in	0~6mm(0~0.24in.)

Front Coil Spring		
Diameter of Coil		12.2mm(0.48in)
Free Length:	Left	334.5±6mm(13.17±0.24in)
	Right	325±5.5mm(12.87±0.22in)
Spring Constant		2.16±0.15kg/mm (120.95±0.84lb/in)

FRONT SUSPENSION MECHANISM



MEMO:

FRONT & REAR SUSPENSION

〔Rear Suspension, Tire & Wheel〕

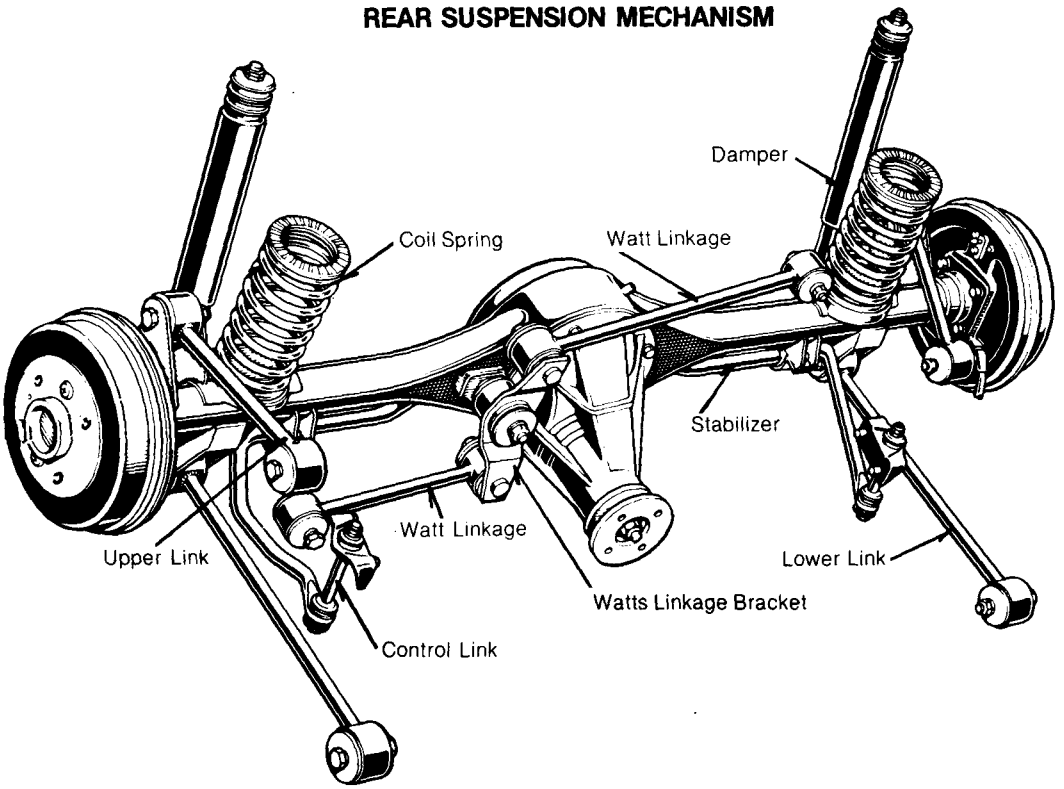
Rear Coil Spring	
Diameter of Coil	10.5mm(0.41in)
Free Length	329.5±5mm(12.97±0.2in)
Spring Constant	1.8±0.13kg/㎜(100.8±7.3lb/in)

Damper	
Damping Force: Compression	167±33kg/m/sec (9.35±1.9lb/in/sec)
Expanssion	243±40kg/m/sec (13.6±2.2lb/in/sec)

Model Grade	Tire	Wheel
S	165HR-13 Steel Radial	Steel 5-Jx13
GS	185/70HR-13 Steel Radial	Steel 5-Jx13
		As option, Alminum 5 1/2JJx13

Air Pressure
Front & Rear 1.8kg/cm² (26.0 lb/in²)

REAR SUSPENSION MECHANISM

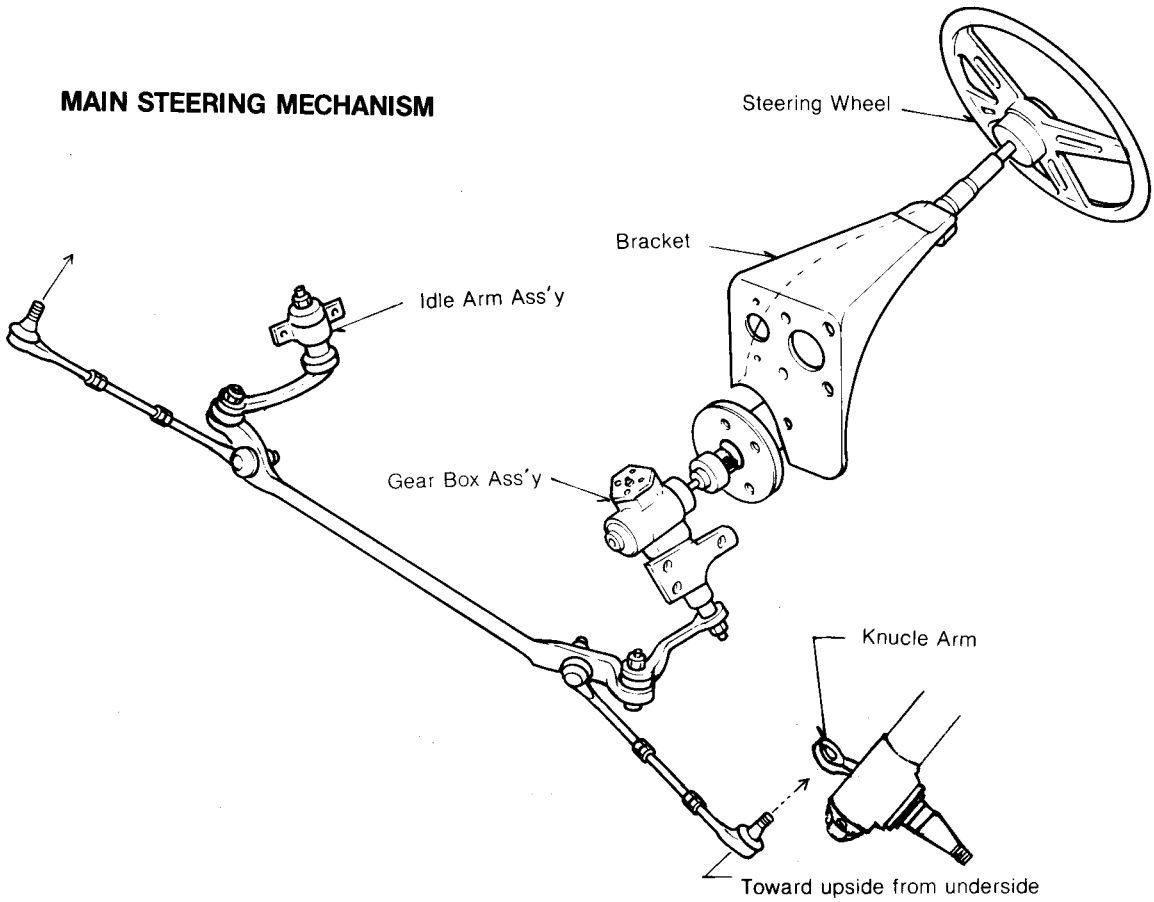


MEMO:

STEERING MECHANISM

The steering gear assembly is a recirculating ball-nut type which is reliable and light to operate.
The steering is sharp and displays neutral characteristics.
The steering shaft is of the collapsible type, with a variable ratio of 17 - 20 : 1.

MAIN STEERING MECHANISM

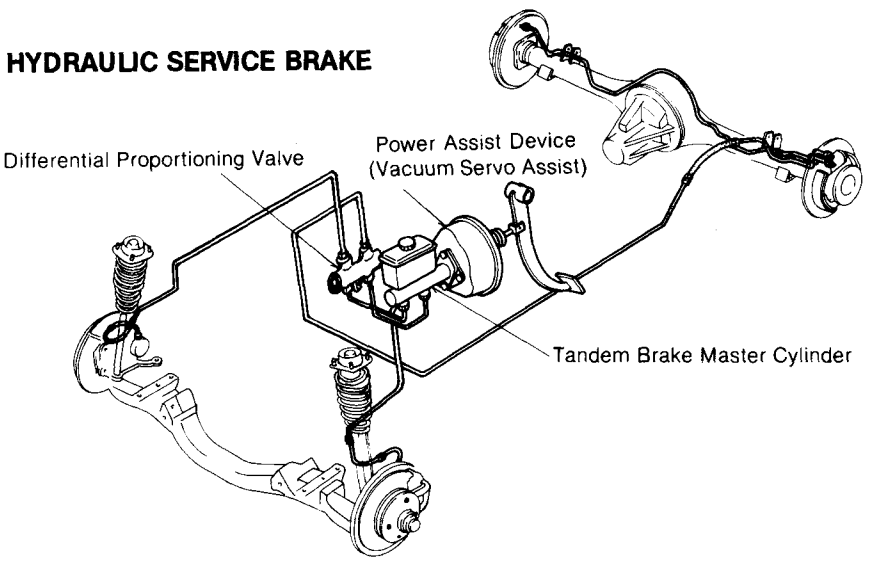


MEMO:

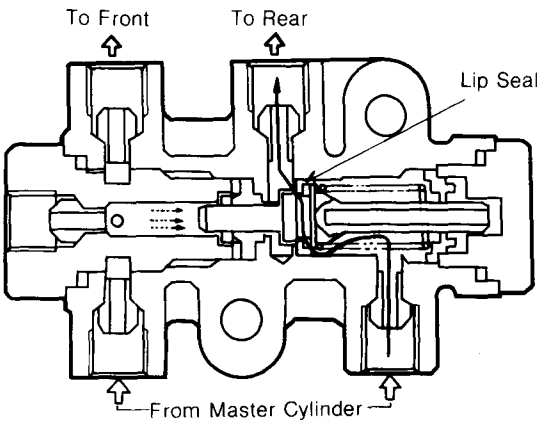
BRAKE SYSTEM

Hydraulic service brakes with a tandem master cylinder and vacuum servo assist are used. To insure stable and powerful braking, ventilated disc brakes are used on the front and finned drum brakes are used on the rear.
A brake fluid level warning system is used in the reservoir to insure fluid is sufficient, and a differential proportioning valve is used to insure proper braking force is applied to both front and rear brakes during severe stops.
A mechanical parking brake which operates on the rear drum brakes is actuated by a lever in the passenger compartment.

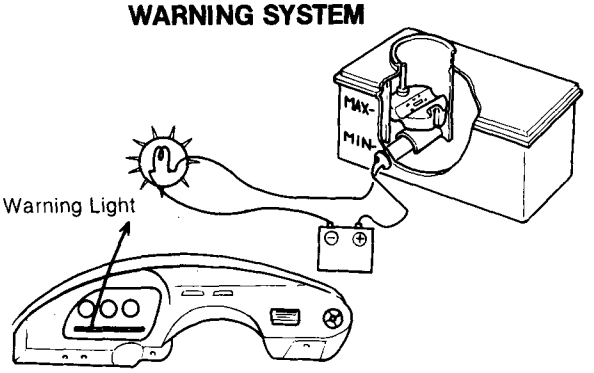
HYDRAULIC SERVICE BRAKE



DIFFERENTIAL PROPORTIONING VALVE



WARNING SYSTEM

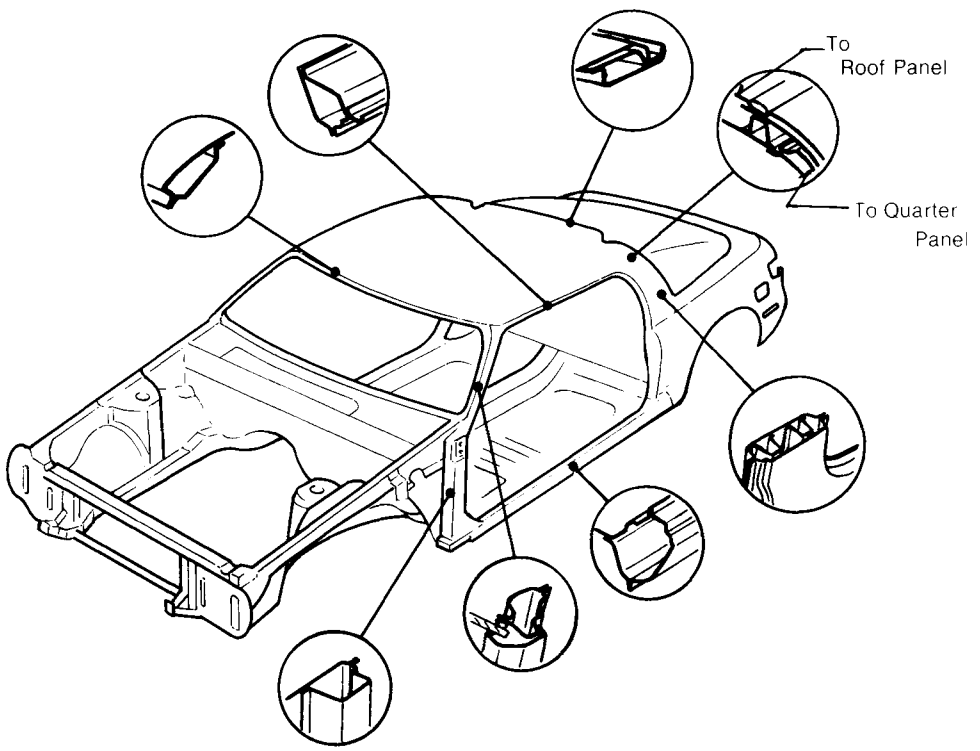


MEMO:

BODY STRUCTURE

The body is made both safe and lightweight by semi-monocoque construction, and a detachable top is available.
Especially, those measures for good aerodynamic characteristics, safety, rust-proofing, prevention of vibration and noise, etc. are incorporated in various sections.
A hook for tie-down & towing is provided at the front left and right sides and at the rear left side of the body. Since the hook provided at the rear right side is for tie-down only, do not use this hook for towing.

CUT SECTION OF MAIN PART



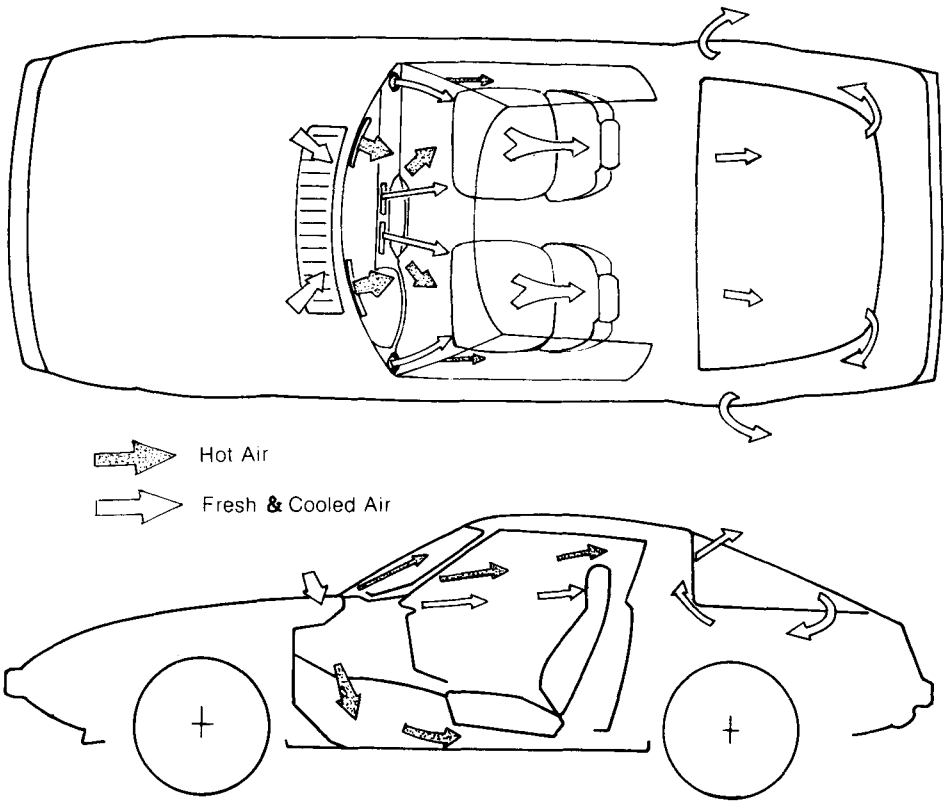
MEMO:

VENTILATION AND AIR CONDITIONING

A forced ventilation system using the blower motor is adopted.
Airvents are located in four section - two at the center and one at both ends of the instrument panel. There also is a vent operated by hand at the center of the left-hand air duct. Cool air outlets from the air conditioner are the same as the above.
Hot air outlets from the heater are located in four sections - two in the directions of the front passenger seats and two in the direction of the windshield. The same bi-level mechanism as that on the RX-4 and the Cosmo is used. When the defroster is in operation, hot air is also discharged from both sides of the front piller to defrost both side door glasses.

(Note)
Air conditioner made in the U.S. will be installed on the vehicle in the U.S.

VENTILATION OF HOT & FRESH AIR

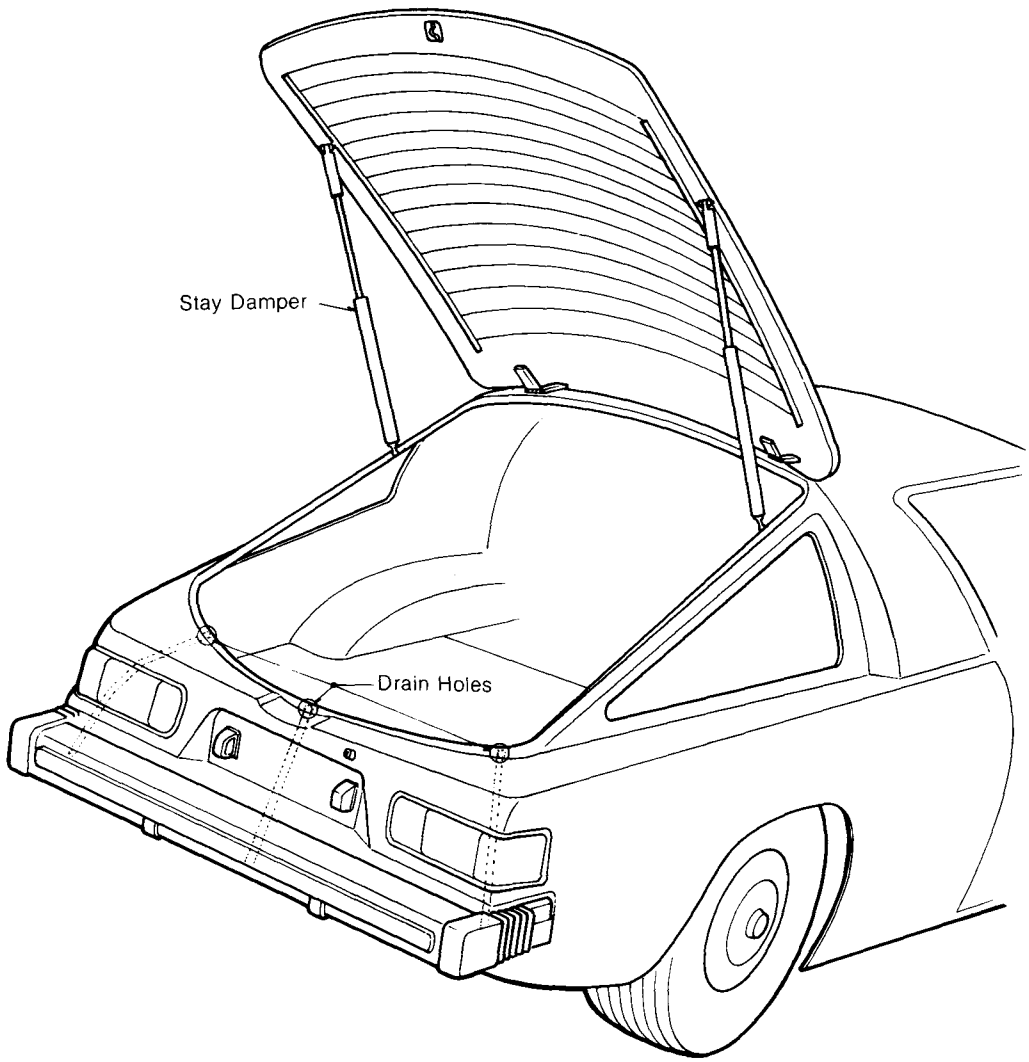


MEMO:

REAR GLASS HATCH

The rear hatch has tempered glass with a thickness of 6mm (0.24 in.) and an electric defroster is provided thereon.
From the standpoints of safety and operation feeling, a gas-oil filled stay damper is used.
The hatch includes a room lamp that turns on when it is not fully closed.

REAR HATCH

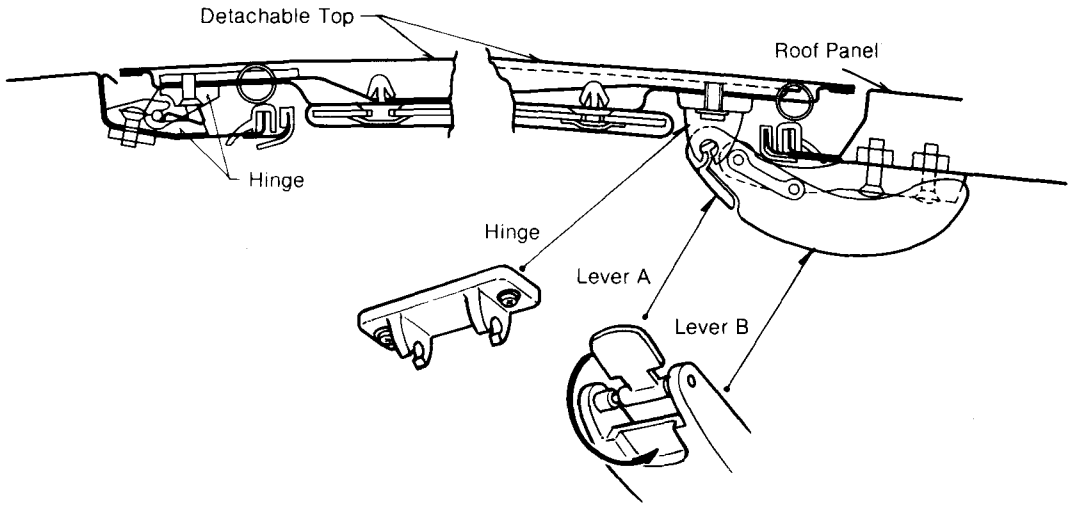


MEMO:

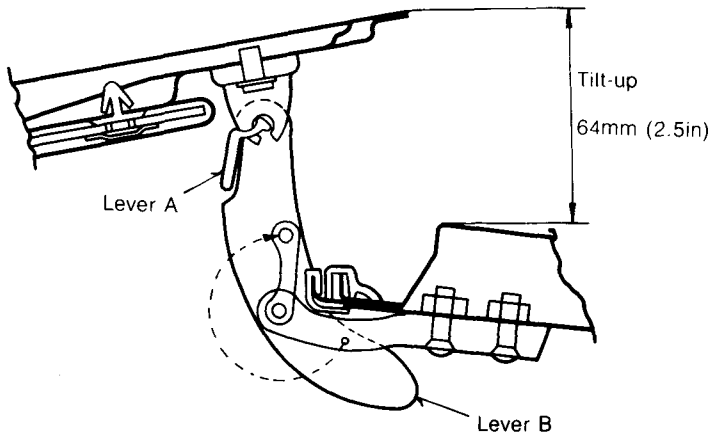
DETACHABLE TOP

This detachable top can be used in a stationary position, a tilt-up position, or may be removed.

DETACHABLE TOP MECHANISM



REMOVABLE TOP



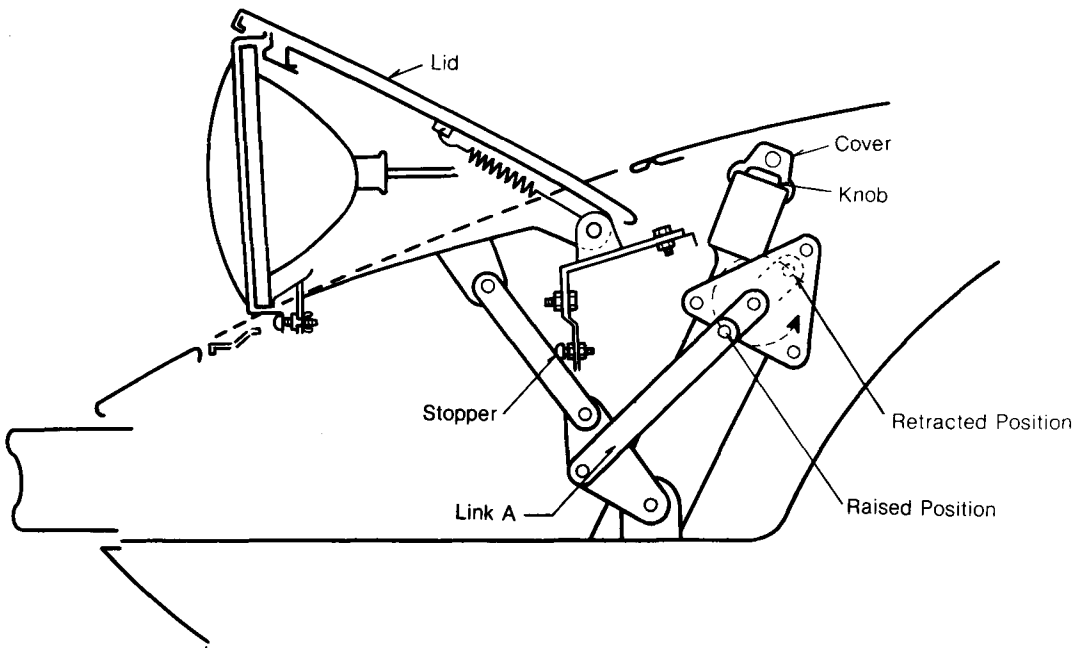
MEMO:

RETRACTABLE HEADLAMP

Retractable headlamps are provided to decrease the air resistance while driving.
When the light switch lever is put in the second stage, the headlamp will electrically come out and turn on simultaneously. When the light switch lever is returned to the first stage from the second stage, the headlamp will turn out and be retracted. (Other lighting operations such as side, tail and license lamps by the light switch lever, high and low beams and passing light by the combination control lever, are the same as the other models.)
A switch is independently provided to raise and lower the headlamps without turning them on for the purposes mentioned below:

1. Ready for passing light
2. For washing headlights
3. As occasion demands (to prevent the headlamp operating mechanism from freezing)

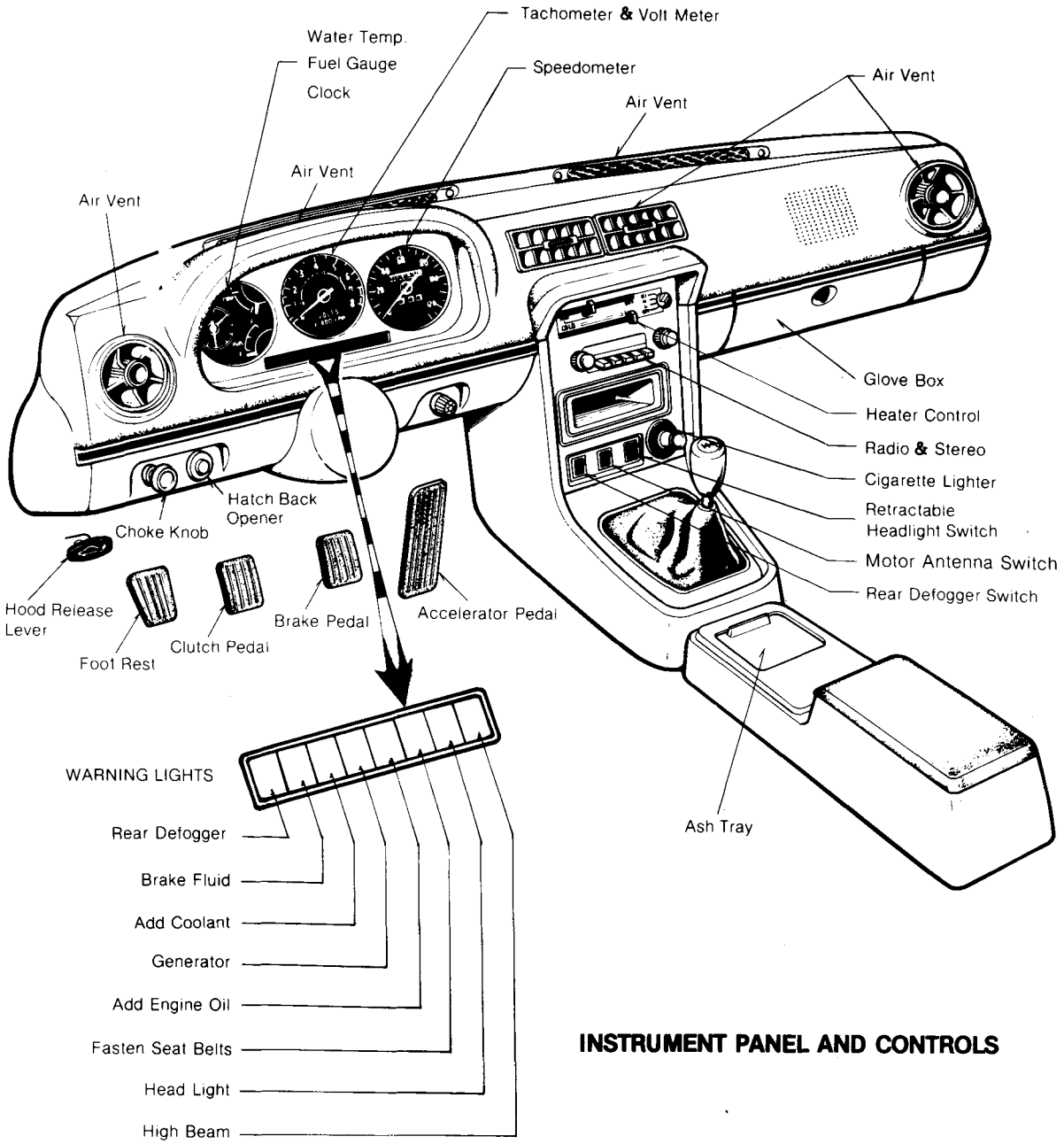
RETRACTABLE HEADLIGHT MECHANISM



MEMO:

INSTRUMENT PANEL AND CONTROLS

Those controls related to audio equipment are functionally arranged on the T-shape instrument panel having due consideration to vibration, noise prevention and serviceability.



INSTRUMENT PANEL AND CONTROLS

MEMO:

Toyo Kogyo Co., Ltd.

3033-10-78B LE-FUC