R. WALDIG

1978

Service Highlights

COSMO
RX-4
RX-3SP

mazda

FORWARD

The main service points on COSMO, RX-4 and RX-3SP that differ between 1977 and 1978 models are fully explained in this book as a guide for service personal of the Mazda family until the 1978 workshop manual will be supplied to you after several months.

During that period, it is requested to refer to the other service points, safety notice and general service instructions in service shown in the 1977 workshop manual.

As all informations in this book are the best available at the time of printing, all alternations related to modifications will be notified by Service Informations.

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

Toyo Kogyo Co.,Ltd.
HIROSHIMA, JAPAN

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MAZDA ROTARY ENGINE;
LICENSE NSU-WANKEL
3031-10-77G LE-FU

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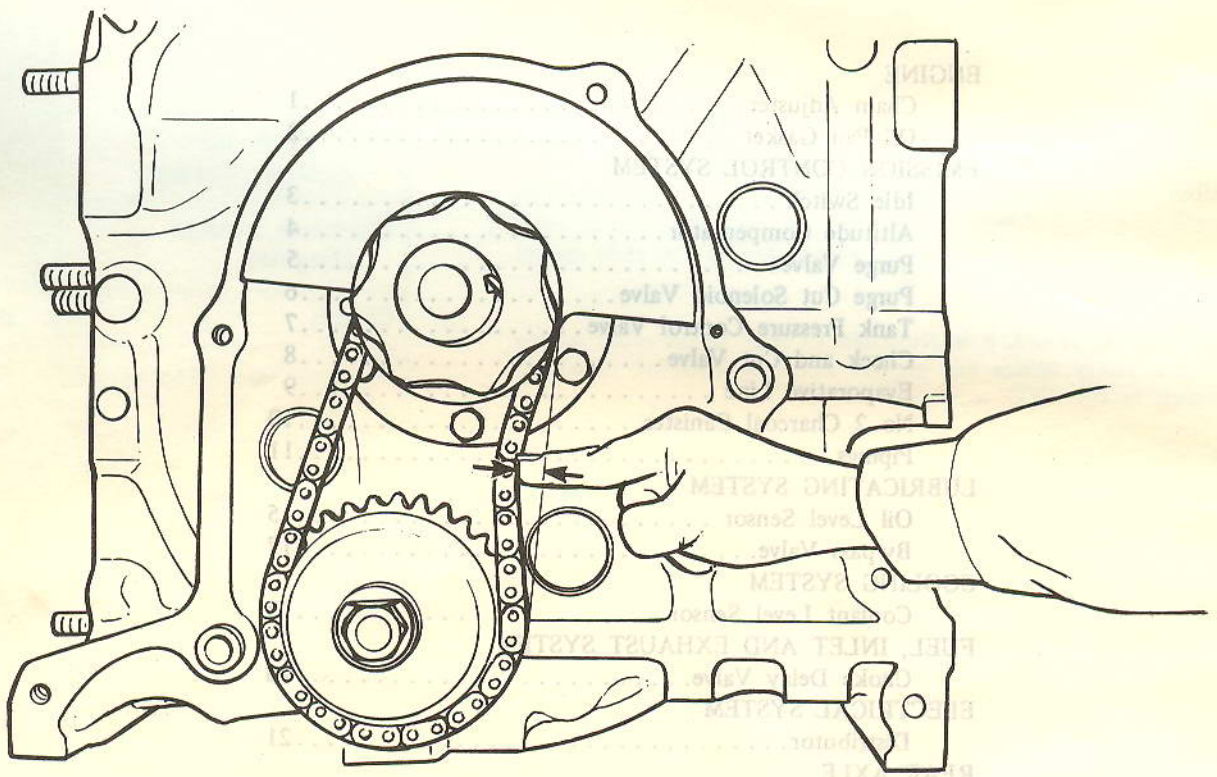
CHAIN ADJUSTER

RX-4

The chain adjuster and its attaching stud bolts of the oil pump drive chain have been abolished.



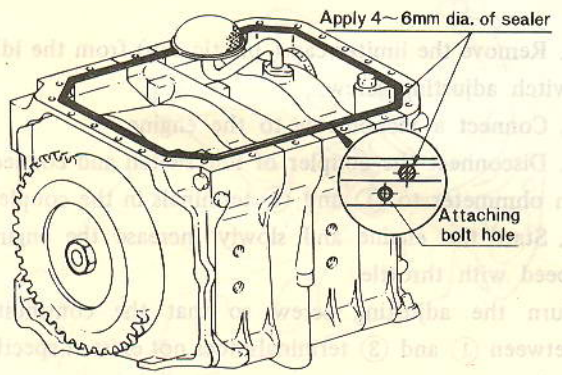
INSPECTION

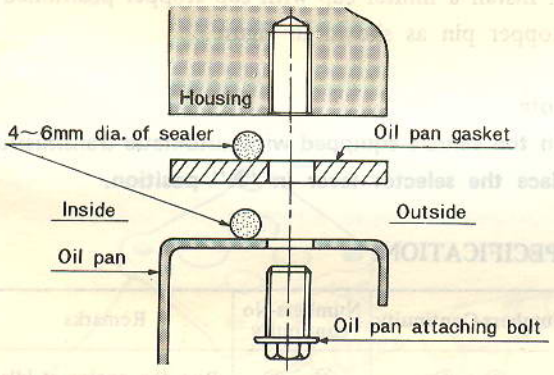
1. Remove the oil pan.
2. Remove the eccentric shaft pulley and front cover.
3. Check the slack of the oil pump drive chain by pressing with a finger.
If the slack exceeds 13 mm (0.51 in), replace the drive chain with a new one.

OIL PAN GASKET

COSMO, RX-4, RX-3 SP

When installing the oil pan to the engine, both the gasket and the sealer must be used whether the engine is ON THE CAR or OFF THE CAR to prevent the oil leakage.





REMOVAL AND INSTRATION

1. Remove the oil pan attaching bolts and remove the oil pan with a suitable drift.
2. Clean the mounting surfaces of oil pan and housings.
3. Apply the 4 ~ 6 mm (0.16 ~ 0.24 in) diameter continuous bead of sealer to mounting surface of oil pan and place the gasket on it.
The both ends of the bead should be overlapped.
4. Apply the sealer onto the gasket as instructed in above.
5. Install the oil pan and gasket assembly in position.
6. Install the oil pan attaching bolts and tighten the bolts little by little in turn until the torque becomes 0.7 ~ 1.0 m-kg (5 ~ 7 ft-lb) evenly.
7. Fill the oil in the engine.
8. Operate the engine and check to see the oil is not leaking from the joining faces of the oil pan.

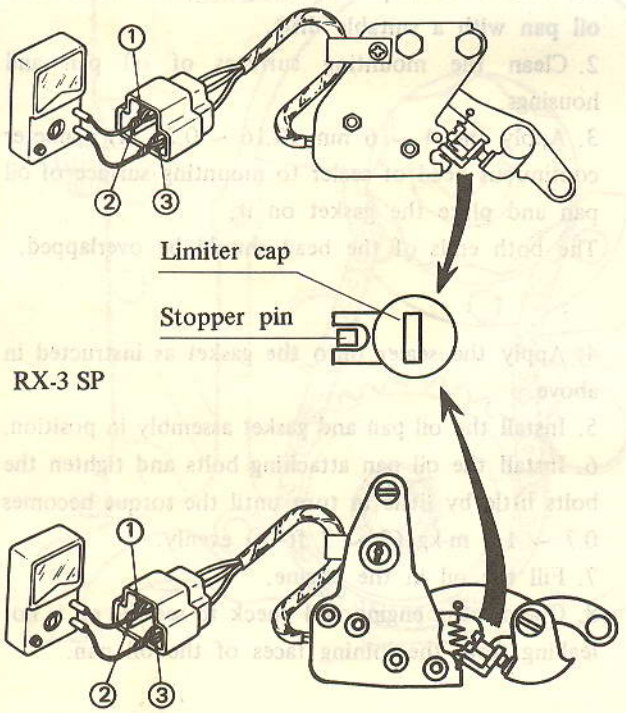
Sealer part number: 8527 77 739

IDLE SWITCH

COSMO, RX-4, RX-3 SP

The limiter cap (plastic cap) has been newly adopted on the idle switch adjusting screw.

COSMO, RX-4



RX-3 SP

ADJUSTMENT

1. Remove the limiter cap (plastic cap) from the idle switch adjusting screw.
2. Connect a tachometer to the engine.
3. Disconnect the coupler of idle switch and connect an ohmmeter to ① and ③ terminals in the coupler.
4. Start the engine and slowly increase the engine speed with throttle.
Turn the adjusting screw so that the continuity between ① and ③ terminals does not exist at specification.
5. Install a limiter cap with cap stopper positioned at stopper pin as shown in figure.

Note:
On the vehicle equipped with automatic transmission, place the selector lever in "N" position.

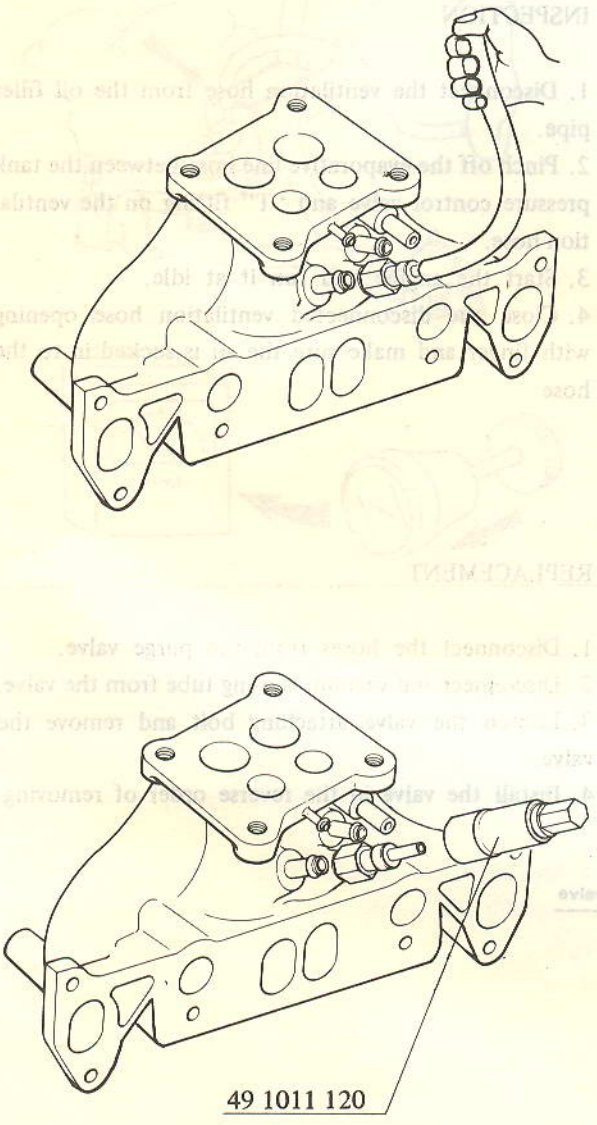
SPECIFICATION:

Numbers-Continuity	Numbers-No continuity	Remarks
① – ③	① – ②	Run the engine at idle.
① – ②	① – ③	On the manual transmission, increase the engine speed up to 1,000 ± 50 rpm with throttle.
① – ②	① – ③	On the automatic transmission, increase the engine speed up to 1,200 ± 50 rpm with throttle in "N" range.

ALTITUDE COMPENSATOR

COSMO, RX-4, RX-3 SP

The altitude compensator has been newly adopted on the inlet manifold.



INSPECTION

1. Disconnect the altitude compensator hose from the hose fitting on the carburetor.
2. Start the engine and run it at idle.
On the vehicle equipped with automatic transmission, place the selector lever to "N" or "P" position.
3. Close the altitude compensator hose opening with finger and check to see the engine speed drops as shown in the table.
The engine speed varies according to the altitude.

Altitude	Drops of idle speed
0 ~ 1,000 m (0 ~ 3,280 ft)	10 ~ 100 rpm
1,000 ~ 2,000 m (3,280 ~ 6,560 ft)	50 ~ 200 rpm
More than 2,000 m (6,500 ft)	More than 100 rpm

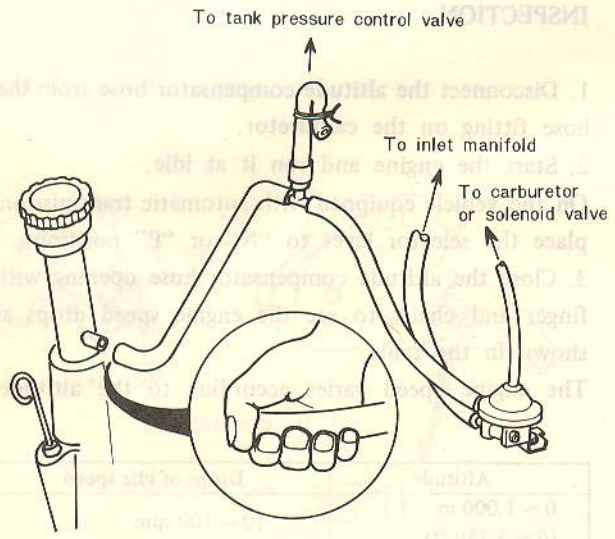
REPLACEMENT

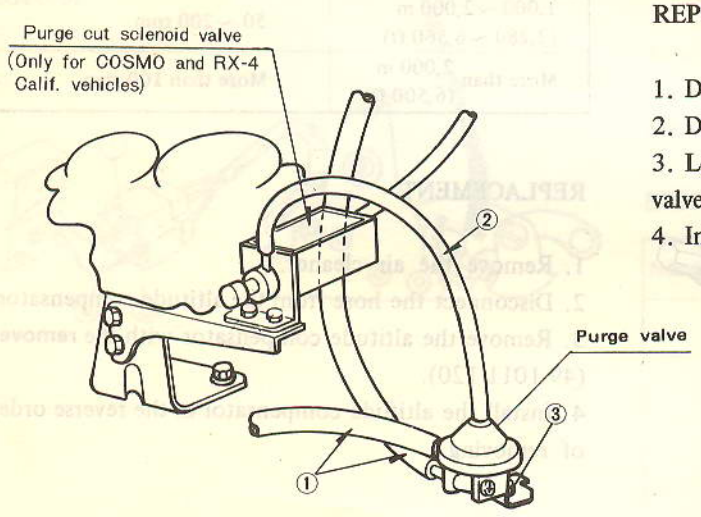
1. Remove the air cleaner.
2. Disconnect the hose from the altitude compensator.
3. Remove the altitude compensator with the **remover** (49 1011 120).
4. Install the altitude compensator in the reverse order of removing.

PURGE VALVE

COSMO, RX-4, RX-3 SP

The purge valve has been newly adopted on the crankcase and evaporative emission control system.





1. Hose
2. Vacuum sensing tube
3. Attaching bolt

INSPECTION

1. Disconnect the ventilation hose from the oil filler pipe.
2. Pinch off the evaporative line hose between the tank pressure control valve and "T" fitting on the ventilation hose.
3. Start the engine and run it at idle.
4. Close the disconnected ventilation hose opening with finger and make sure the air is sucked in to the hose.

REPLACEMENT

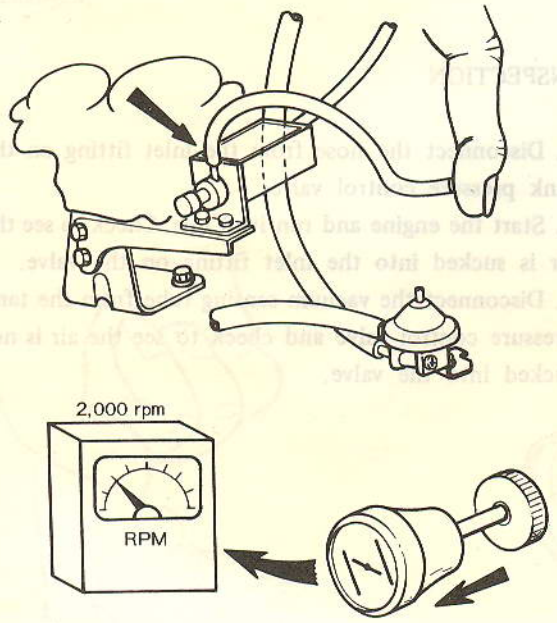
1. Disconnect the hoses from the purge valve.
2. Disconnect the vacuum sensing tube from the valve.
3. Loosen the valve attaching bolt and remove the valve.
4. Install the valve in the reverse order of removing.

PURGE CUT SOLENOID VALVE

COSMO, RX-4

California

The purge cut solenoid valve has been newly adopted.



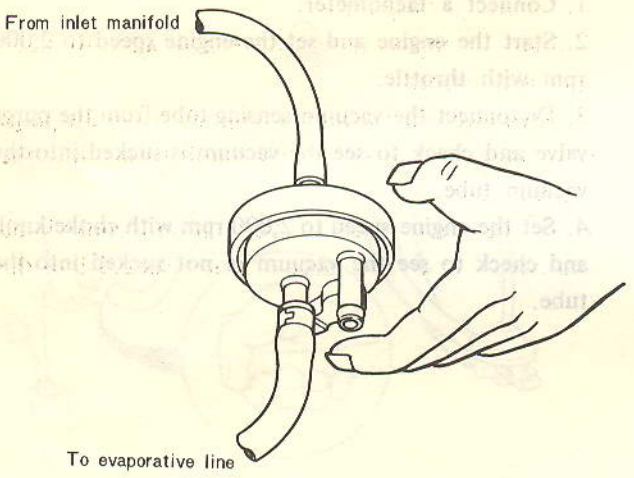
INSPECTION

1. Connect a tachometer.
2. Start the engine and set the engine speed to 2,000 rpm with throttle.
3. Disconnect the vacuum sensing tube from the purge valve and check to see the vacuum is sucked into the vacuum tube.
4. Set the engine speed to 2,000 rpm with choke knob and check to see the vacuum is not sucked into the tube.

TANK PRESSURE CONTROL VALVE

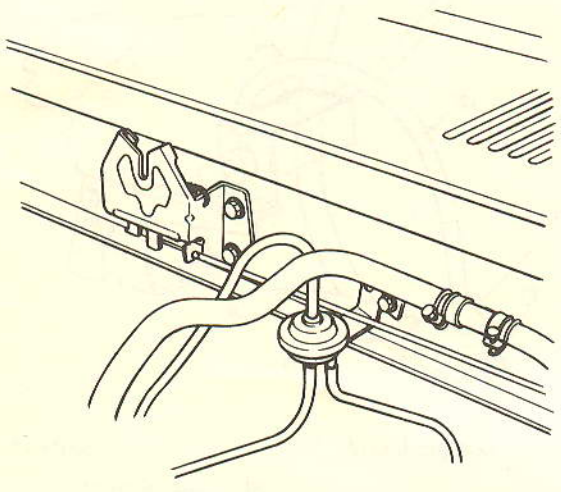
COSMO, RX-4, RX-3 SP

The tank pressure control valve has been newly adopted on the evaporative control system.



INSPECTION

1. Disconnect the hose from the inlet fitting on the tank pressure control valve.
2. Start the engine and run it at idle. Check to see the air is sucked into the inlet fitting on the valve.
3. Disconnect the vacuum sensing tube from the tank pressure control valve and check to see the air is not sucked into the valve.



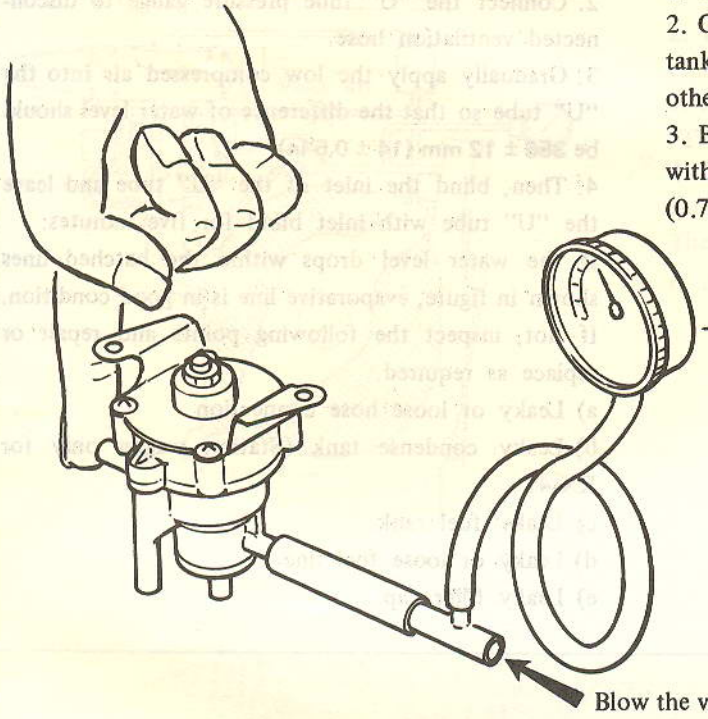
REPLACEMENT

1. Disconnect the hoses from the tank pressure control valve.
2. Disconnect the vacuum sensing tube from the valve.
3. Loosen the valve attaching bolt and remove the valve.
4. Install the valve in the reverse order of removing.

CHECK AND CUT VALVE

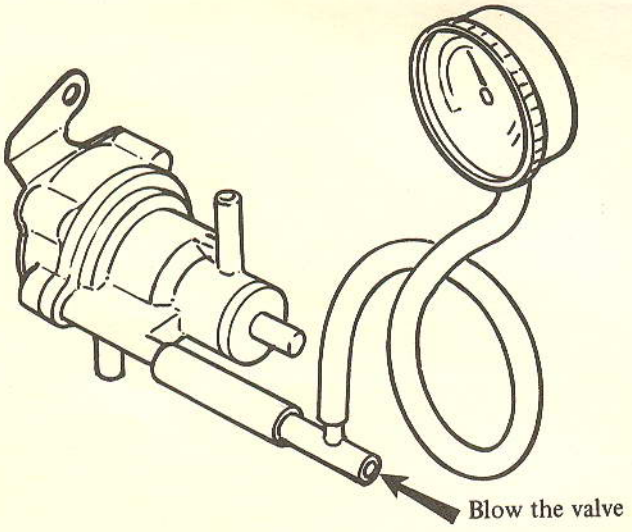
COSMO, RX-4, RX-3 SP

The operating pressure of the check and cut valve, and the shape have been changed.



INSPECTION

1. Remove the check and cut valve.
2. Connect a pressure gauge to the passage to the fuel tank or condense tank for station wagon and blind the other end by finger.
3. Blow through the valve. The valve should open with the pressure of more than 0.055 ~ 0.07 kg/cm² (0.78 ~ 1.0 lb/in²).



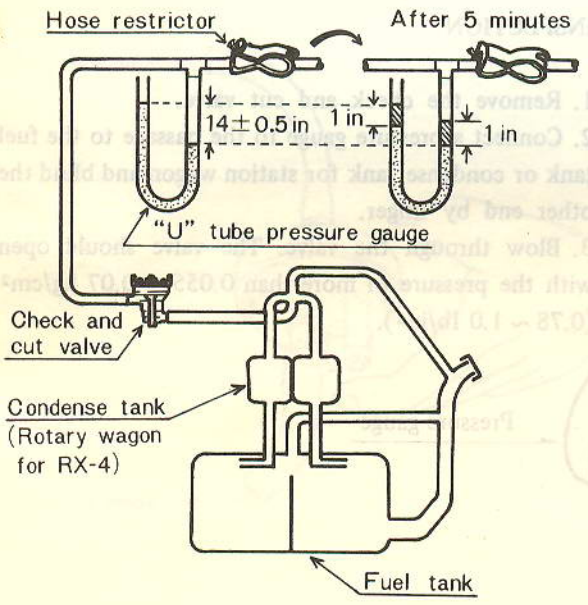
4. Remove the pressure gauge and connect it to the passage to atomosphere.
5. Blow through the valve and if the valve opens with the pressure of more than 0.01 ~ 0.05 kg/cm² (0.14 ~ 0.71 lb/in²), the valve is normal.

Note:
The test should be performed with the valve located horizontally. Otherwise the weight of the valve will move out of the position and cut the line.

EVAPORATIVE LINE

COSMO, RX-4

The inspecting procedure of the evaporative line has been changed.



INSPECTION

1. Disconnect the evaporative hose from the tank pressure control valve.
2. Connect the "U" tube pressure gauge to disconnected ventilation hose.
3. Gradually apply the low compressed air into the "U" tube so that the difference of water level should be **356 ± 12 mm (14 ± 0.5 in).**
4. Then, blind the inlet of the "U" tube and leave the "U" tube with inlet blind for five minutes.

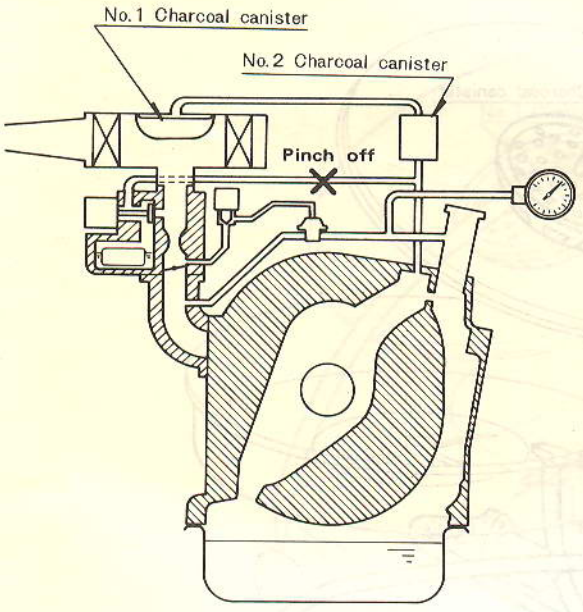
If the water level drops within the hatched lines shown in figure, evaporative line is in good condition. If not, inspect the following points and repair or replace as required.

a) Leaky or loose hose connection
b) Leaky condense tank (Station wagon only for RX-4)
c) Leaky fuel tank
d) Leaky or loose fuel line
e) Leaky filler cap

NO. 2 CHARCOAL CANISTER

RX-4 Rotary Wagon

The No. 2 charcoal canister has been newly adopted on the evaporative line.



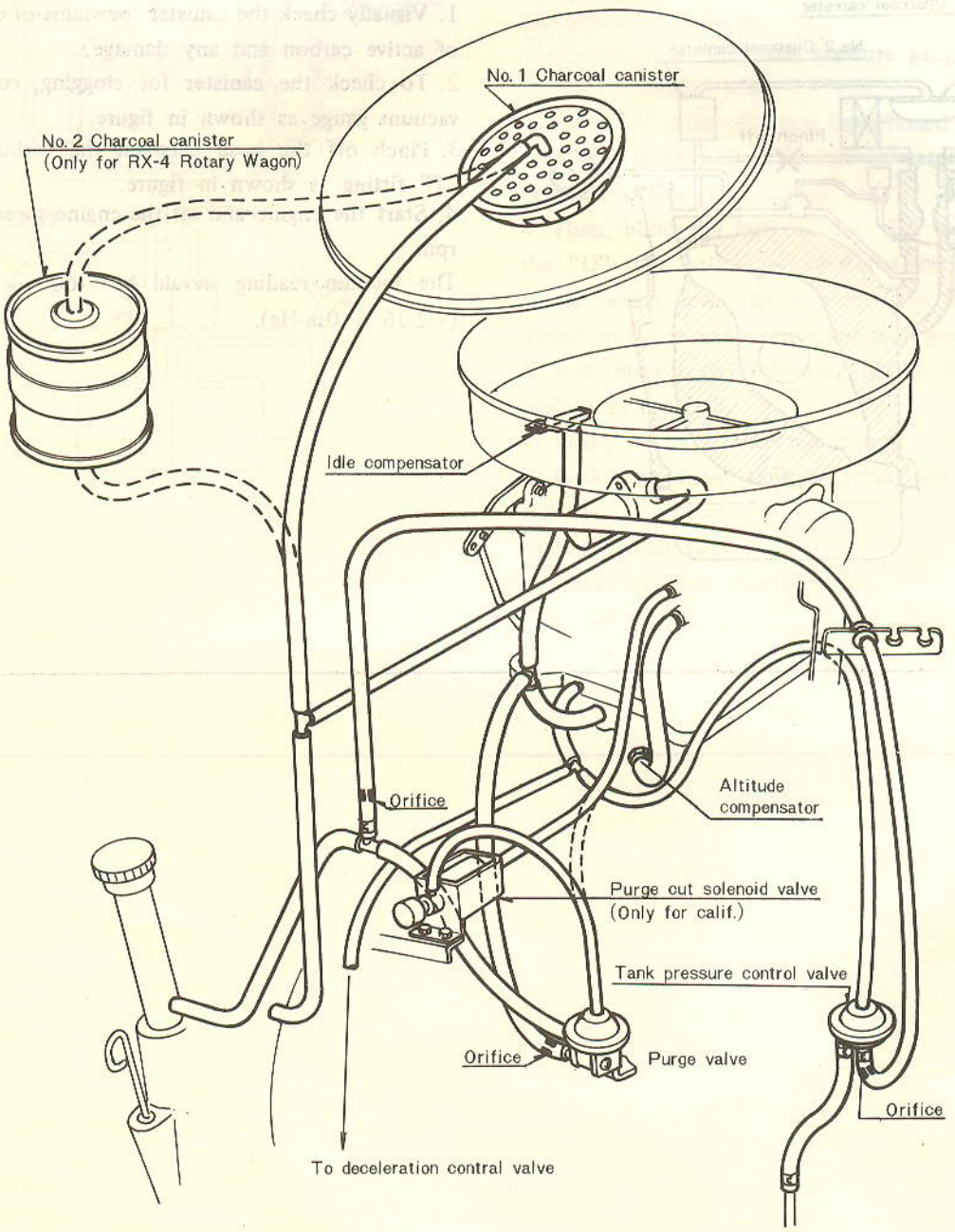
INSPECTION

1. Visually check the canister for stains of oil, leakage of active carbon and any damage.
2. To check the canister for clogging, connect the vacuum gauge as shown in figure.
3. Pinch off the hose between the carburetor and "T" fitting as shown in figure.
4. Start the engine and set the engine speed to 2,500 rpm.
The vacuum reading should be −60 ~ 0mm-Hg (−2.36 ~ 0in-Hg).

PIPINGS

COSMO, RX-4

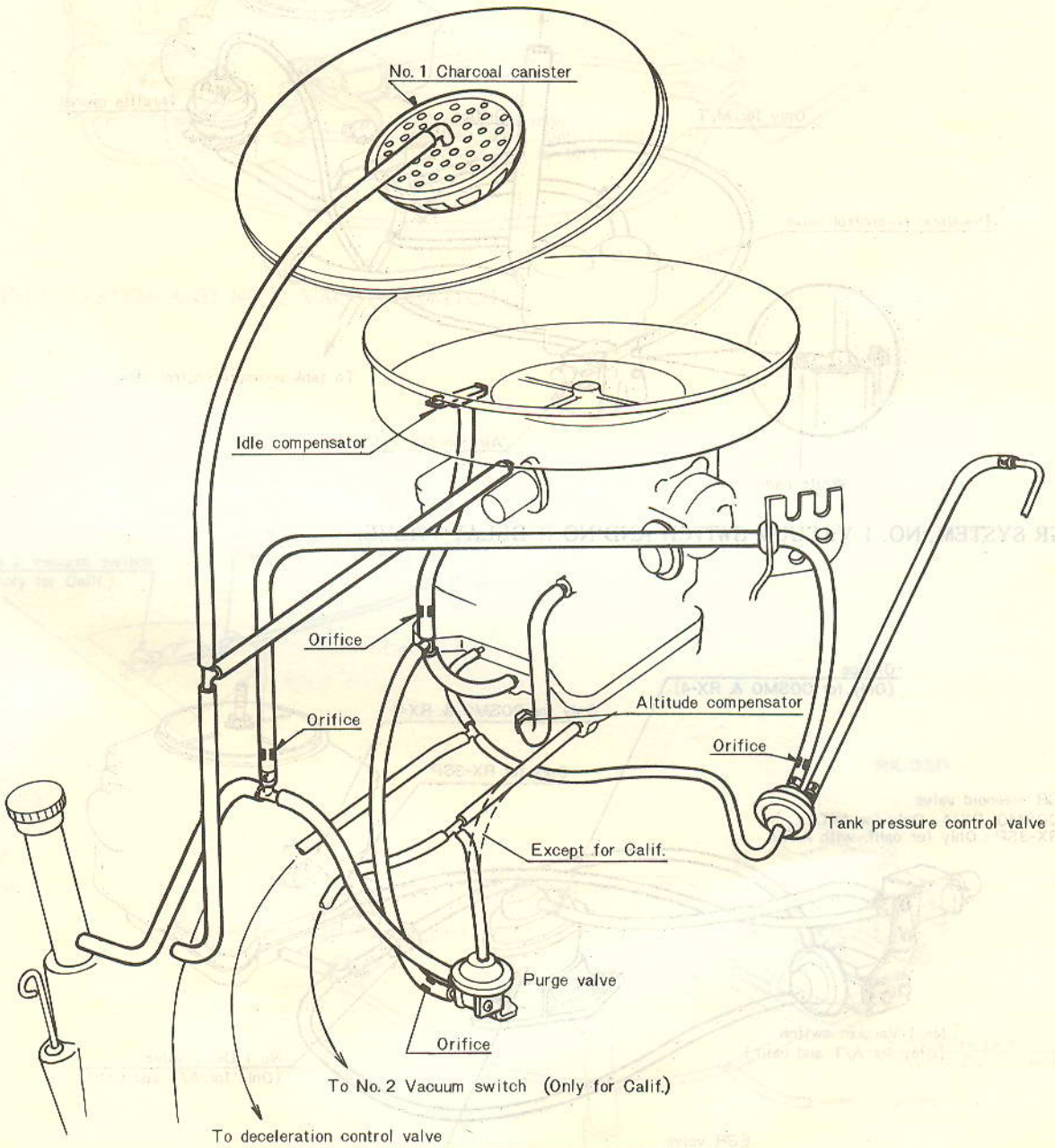
EVAPORATIVE, IDLE COMPENSATOR AND ALTITUDE COMPENSATOR SYSTEMS



PIPINGS

RX-3 SP

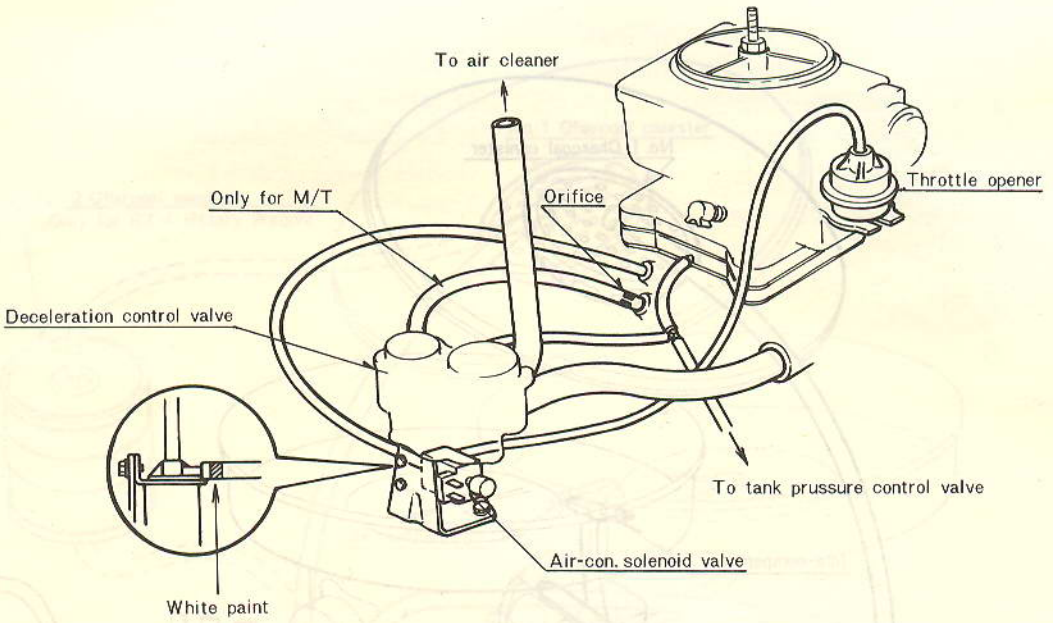
EVAPORATIVE, IDLE COMPENSATOR AND ALTITUDE COMPENSATOR SYSTEMS



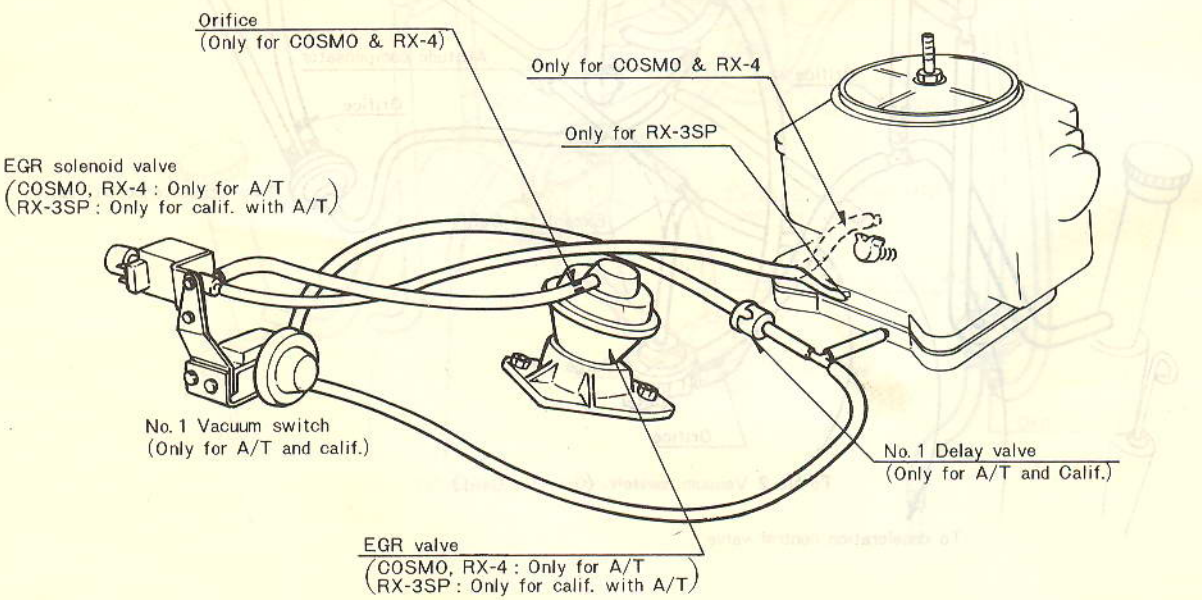
PIPINGS

COSMO, RX-4, RX-3 SP

DECELERATION CONTROL VALVE AND THROTTLE OPENER FOR AIR CONDITIONER



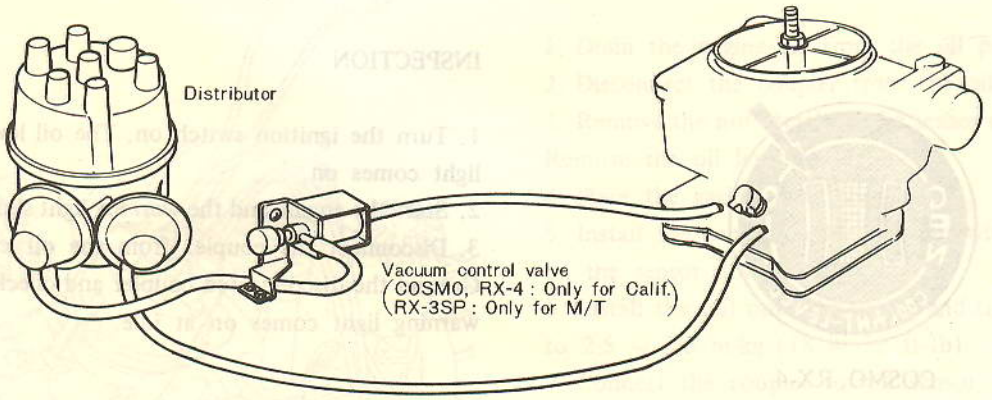
EGR SYSTEM, NO. 1 VACUUM SWITCH AND NO. 1 DELAY VALVE.



PIPINGS

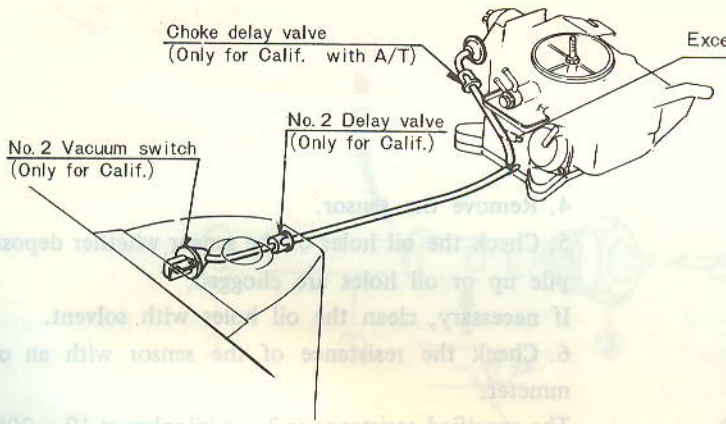
COSMO, RX-4, RX-3 SP

IGNITION SYSTEM

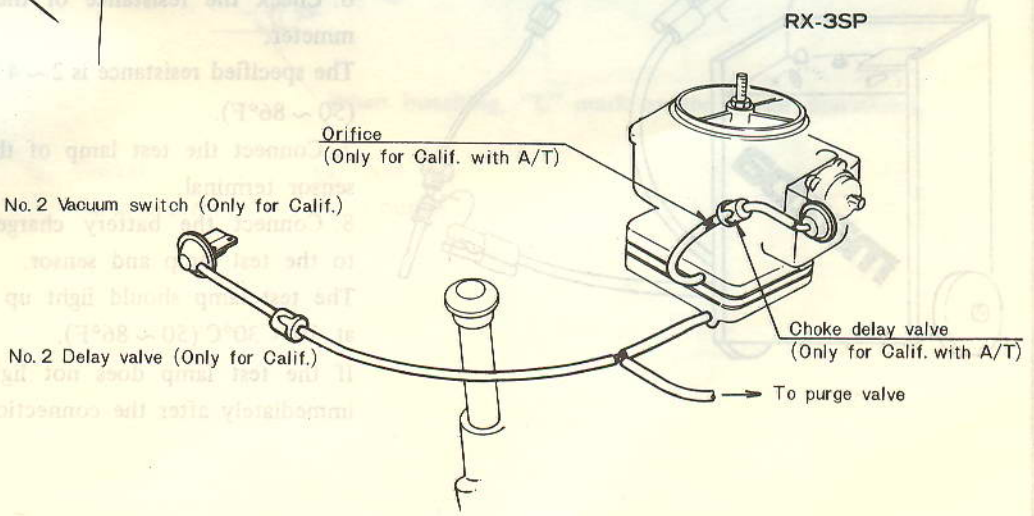


CHOKE SYSTEM AND NO. 2 VACUUM SWITCH

COSMO, RX-4



RX-3SP



OIL LEVEL SENSOR

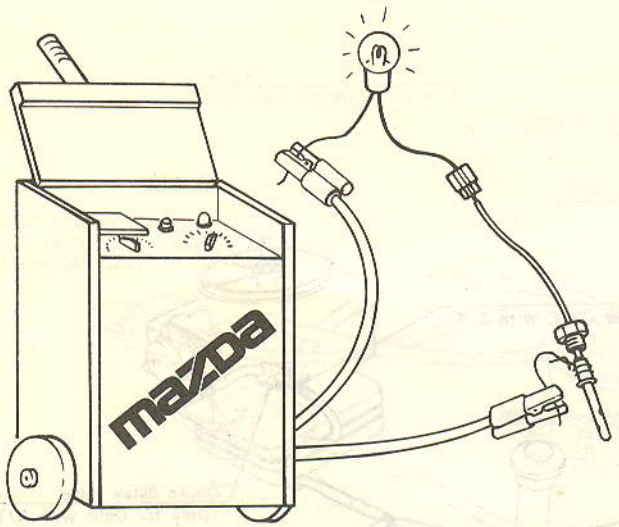
COSMO, RX-4, RX-3 SP

The oil level sensor of the lubricating system has been changed from the float type to the thermistor type.

COSMO, RX-4

RX-3 SP

Test lamp: 3.4 W

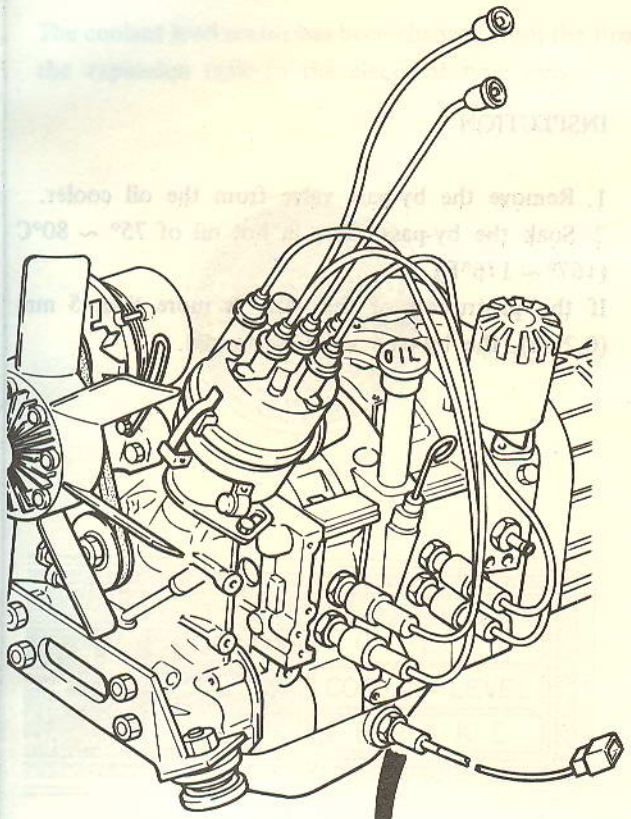


INSPECTION

1. Turn the ignition switch on. The oil level warning light comes on.
2. Start the engine and the warning light should go off.
3. Disconnect the coupler from the oil level sensor. Ground the disconnected coupler and check to see the warning light comes on at idle.
4. Remove the sensor.
5. Check the oil holes of the sensor whether deposits pile up or oil holes are chogged.
If necessary, clean the oil holes with solvent.
6. Check the resistance of the sensor with an ohmmeter.
The specified resistance is 2 ~ 4 kiloohm at 10 ~ 30°C (50 ~ 86°F).
7. Connect the test lamp of the 3.4 wattage to the sensor terminal.
8. Connect the battery charger or rectifier (14V) to the test lamp and sensor.
The test lamp should light up in 10 ~ 60 seconds at 10 ~ 30°C (50 ~ 86°F).
If the test lamp does not light up or it lights up immediately after the connection, replace the sensor.

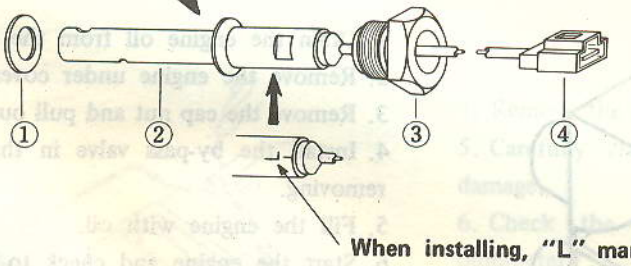
OIL LEVEL SENSOR

COSMO, RX-4, RX-3 SP



REPLACEMENT

1. Drain the engine oil from the oil pan.
2. Disconnect the coupler from the oil level sensor.
3. Remove the nut attaching the sensor to the oil pan. Remove the oil level sensor.
4. Place the gasket onto the sensor.
5. Install the sensor to the oil pan with "L" mark on the sensor downward.
6. Install the nut onto the sensor and tighten the nut to 2.5 ~ 3.0 m-kg (18 ~ 22 ft-lb).
7. Connect the coupler to the sensor.
8. Fill the engine with oil.
9. Start the engine and check to see the oil is not leaking from the joining faces of the sensor.



When installing, "L" mark on the sensor downward.

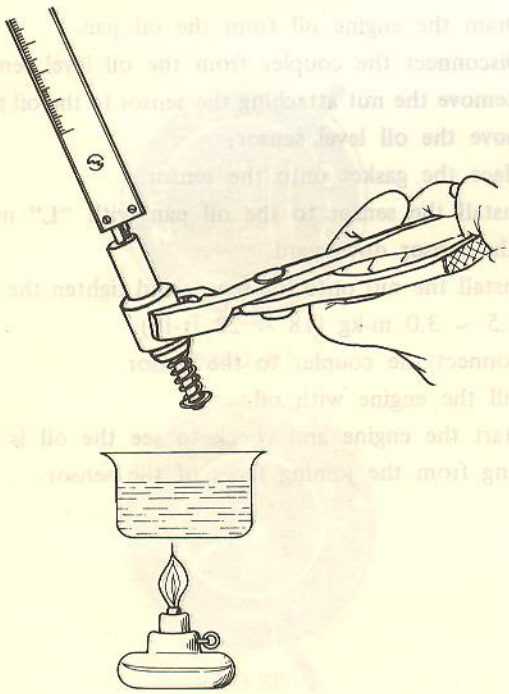
① Gasket
② Oil level sensor
③ Nut
④ Coupler

BY-PASS VALVE

COSMO, RX-4

California

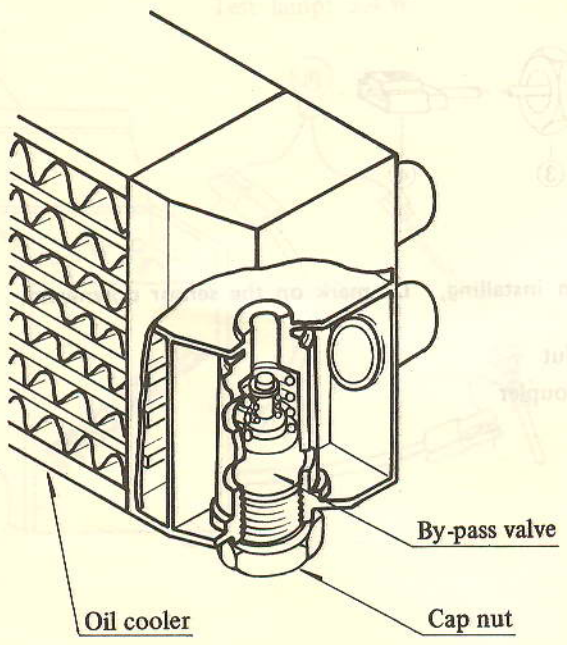
The by-pass valve of the oil cooler has been adopted.



INSPECTION

1. Remove the by-pass valve from the oil cooler.
2. Soak the by-pass valve in hot oil of 75° ~ 80°C (167° ~ 176°F).

If the protrusion of the valve is more than 5 mm (0.2 in), the by-pass valve is normal.



REPLACEMENT

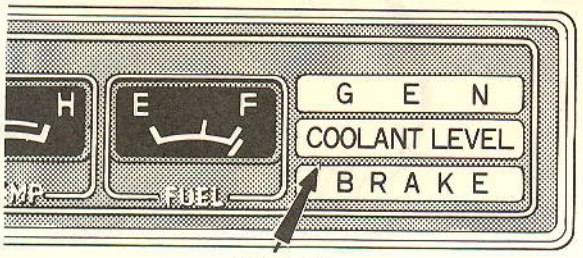
1. Drain the engine oil from the oil pan.
2. Remove the engine under cover.
3. Remove the cap nut and pull out the by-pass valve.
4. Install the by-pass valve in the reverse order of removing.
5. Fill the engine with oil.
6. Start the engine and check to see the oil is not leaking from the cap nut of the by-pass valve.

COOLANT LEVEL SENSOR

COSMO, RX-4, RX-3 SP

The coolant level sensor has been changed from the float type equipped on the expansion tank to the electrical type sensor equipped on the radiator.

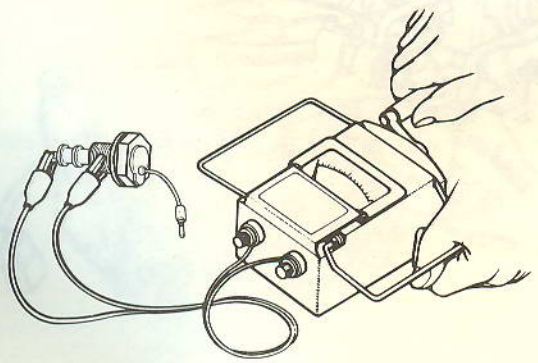
COSMO, RX-4



RX-3 SP

INSPECTION

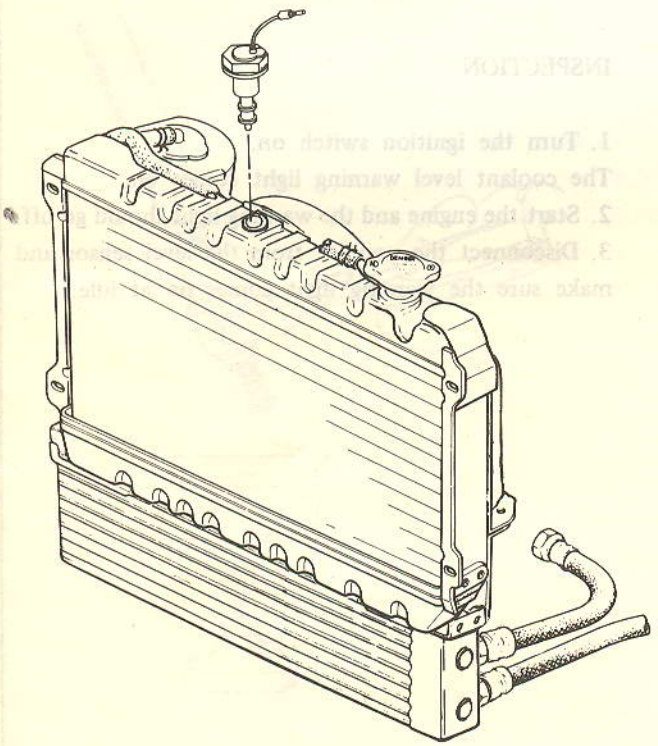
1. Turn the ignition switch on.
The coolant level warning light comes on.
2. Start the engine and the warning light should go off.
3. Disconnect the coupler from the level sensor and make sure the warning light comes on at idle.



4. Remove the coolant level sensor from the radiator.
5. Carefully check the sensor on cracks and any damage.
6. Check the sensor for open circuit with an ohmmeter.
7. Check the insulation resistance of the sensor. The insulation resistance is more than 1MΩ at 500 MV.

COOLANT LEVEL SENSOR

COSMO, RX-4, RX-3 SP



REPLACEMENT

1. Disconnect the coupler from the sensor.
2. Remove the sensor.

3. Install the sensor in the reverse order of removing. The tightening torque of sensor is 15 ~ 25 cm-kg (13 ~ 21.7 in-lb).
4. Warm up the engine to the normal operating temperature and check to see the coolant is not leaking from the joining faces of the sensor.

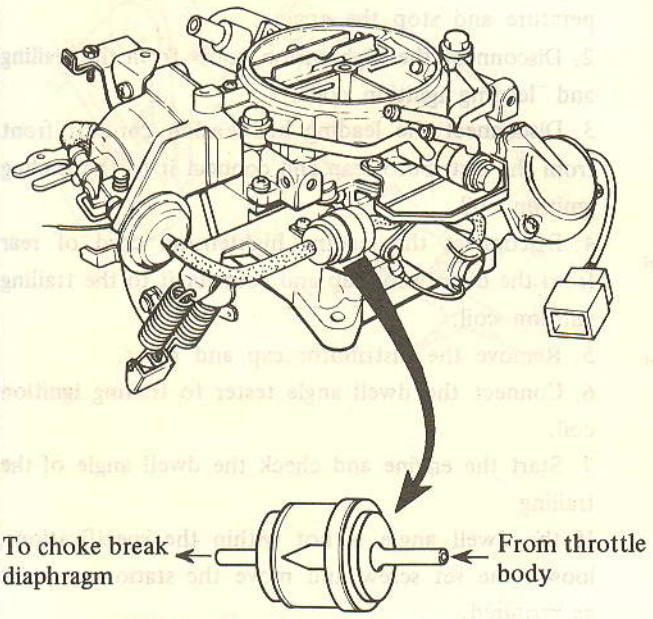
CHOKE DELAY VALVE

COSMO, RX-4, RX-3 SP

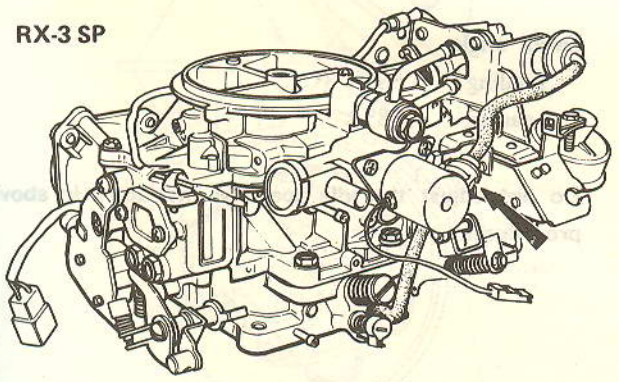
California with automatic transmission

The choke delay valve has been newly adopted on the choke break diaphragm of the carburetor.

COSMO, RX-4



RX-3 SP



INSPECTION

1. Warm up the engine to the normal operating temperature.
2. Stop the engine and remove the air cleaner assembly.
3. Disconnect the vacuum sensing tube from the choke break diaphragm.
4. Start the engine and run it at idle.

Make sure that the diaphragm shaft is fully pulled in to the diaphragm in 10 ~ 20 seconds after connecting the disconnected vacuum sensing tube to the diaphragm.

Note:

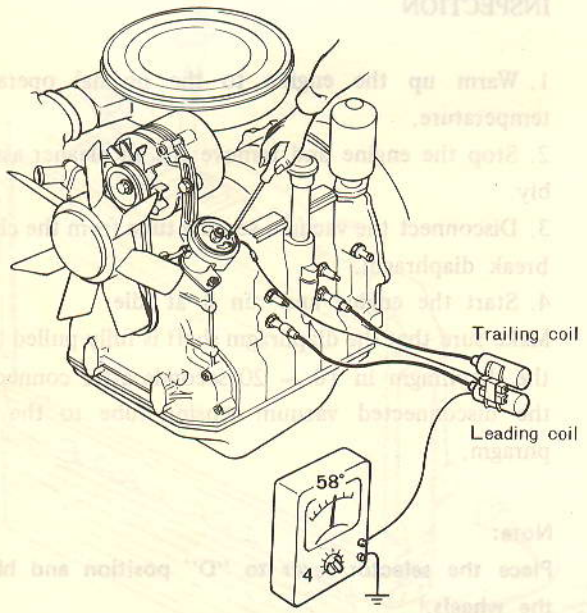
Place the selector lever to "D" position and block the wheels.

5

DISTRIBUTOR

COSMO, RX-4, RX-3 SP

The following method of dwell angle adjustment can be adopted as an alternative to the one in our '77 Workshop Manual.

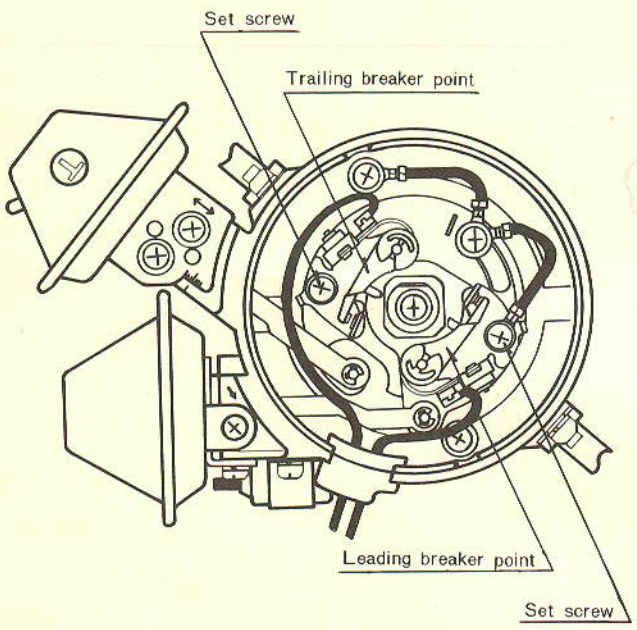


ADJUSTMENT

1. Warm up the engine to the normal operating temperature and stop the engine.
2. Disconnect the hightension cords from the trailing and leading ignition coils.
3. Disconnect the leading hightension cord of front from the distributor cap and connect it to the leading ignition coil.
4. Disconnect the leading hightension cord of rear from the distributor cap and connect it to the trailing ignition coil.
5. Remove the distributor cap and rotor.
6. Connect the dwell angle tester to trailing ignition coil.
7. Start the engine and check the dwell angle of the trailing.

If the dwell angle is not within the specifications, loosen the set screw and move the stationary point as required.

8. Check the dwell angle of the leading as instructed in Steps. 6 and 7.



Dwell angle

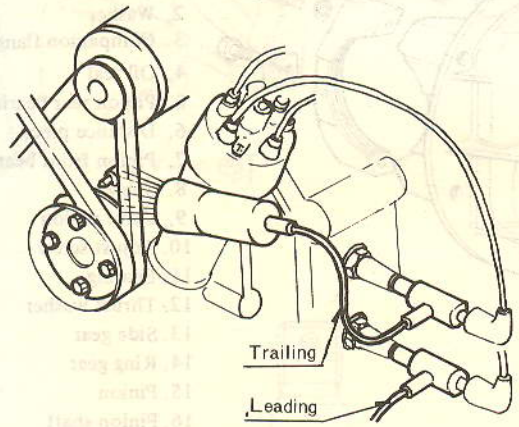
Trailing	58° ± 3°
Leading	58° ± 3°

Do not adjust the idle speed as instructed in above procedures.

DISTRIBUTOR

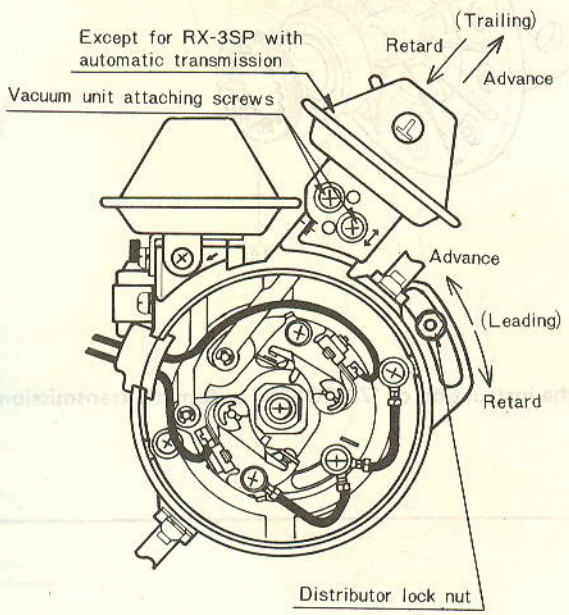
COSMO, RX-4, RX-3 SP

The adjusting method of the ignition timing has been changed.



IGNITION TIMING ADJUSTMENT

1. Warm up the engine to the normal operating temperature.
2. Connect a tachometer.
3. Connect a timing light to hightension cord of the leading spark plug on the front.
4. Start the engine and run it at idle speed.
On the vehicle equipped with automatic transmission, place the selector lever to "D" position and block the wheels.
5. Aim the timing light at the timing indicator pin.



6. If the leading timing is not correct, loosen the distributor lock nut and rotate the distributor housing until the correct leading timing is obtained.
7. Tighten the distributor lock nut, and recheck the leading timing.
8. Connect a timing light to hightension cord of the trailing spark plug on the front.
9. Check the trailing timing.
10. If the trailing timing is not correct, loosen the vacuum unit attaching screws of trailing and move the vacuum unit until the correct trailing timing is obtained.
11. Tighten the vacuum unit attaching screws and recheck the trailing timing.

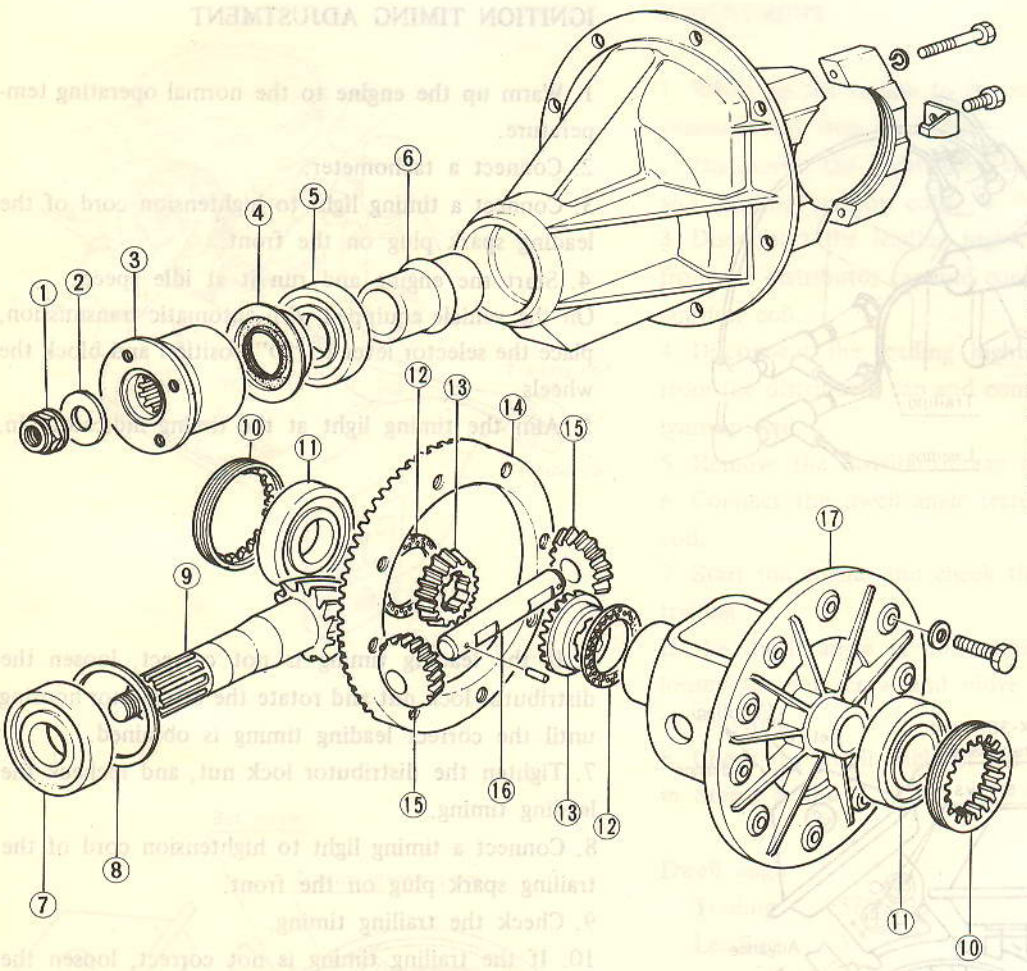
Ignition timing:

COSMO, RX-4
Leading: 5 ± 1° ATDC at 750 ± 25rpm
Trailing: 25 ± 2° ATDC at 750 ± 25rpm
RX-3SP
Leading: 0 ± 1° TDC at 750 ± 25rpm
Trailing: 20 ± 2° ATDC at 750 ± 25rpm

9

DIFFERENTIAL (Automatic transmission only)	COSMO

COMPONENT PARTS

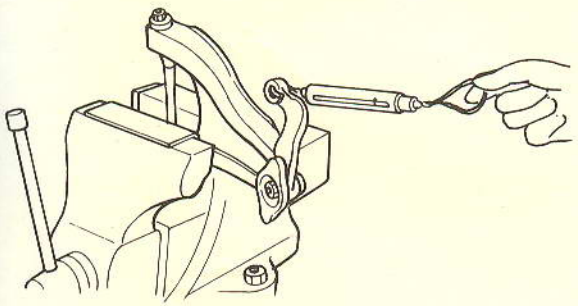


1. Nut
2. Washer
3. Companion flange
4. Oil seal
5. Pinion rear bearing
6. Distance piece
7. Pinion front bearing
8. Spacer
9. Drive pinion
10. Adjust screw
11. Bearing
12. Thrust washer
13. Side gear
14. Ring gear
15. Pinion
16. Pinion shaft
17. Gear case

Please refer to the '77 workshop manual RX-3 SP because the instruction of '78 COSMO automatic transmission vehicle is very same as '77 RX-3 SP.

SUSPENSION ARM BALL JOINT

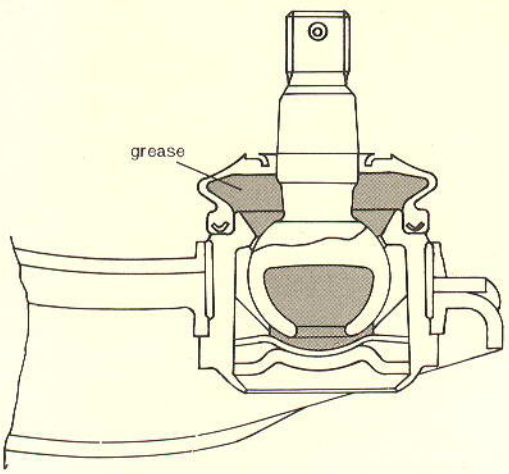
COSMO. RX-4. RX-3 SP



Checking Ball Joint:

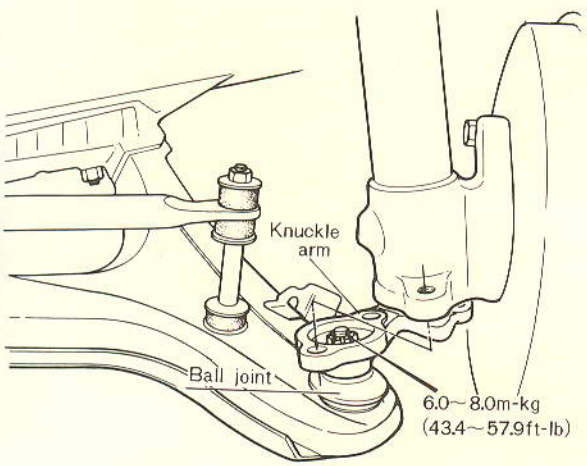
Check the revolving torque of the ball joint, hook the spring scale on the knuckle arm and pull the scale until the knuckle arm starts to turn. The reading should be as follows.

COSMO. RX-4	**2 ~ 4 kg (4.4 ~ 8.8 lb)**
RX-3 SP	**2.1 ~ 4.2 kg (4.6 ~ 9.2 lb)**



Lubricating Ball Joint:

The suspension ball joints are filled with molybdenum disulfied lithium grease and are completed sealed which require no lubrication service.



Installing Suspension Arm Assembly:

Installing suspension arm in the reverse order of removing.

The tightening torque of nut attaching the ball joint to the knuckle arm is **6.0 ~ 8.0 m-kg (43 ~ 58 ft-lb).**

In case of RX-3 SP, the shape of lower arm is different from COSMO. RX-4, but same instruction in service.

Toyo Kogyo Co.,Ltd.

3031-10-77G LE-FU