HITACHI 4-BARREL

Mazda RX7

DESCRIPTION

Carburetor is of 4-barrel, 2-stage design. Primary stage includes idle system, slow speed circuit, accelerator pump system and main metering system. In addition, on vehicles so equipped (Federal), fluid from sub-zero starting device and oil from metering oil pump is admitted into primary stage. Secondary stage contains secondary vacuum diaphragm operating system, stepping circuit, and main metering system. Choking is accomplished through a semi-automatic choke.

Manual transmission vehicles are equipped with an electric idle switch, coasting richer valve, and a dashpot with dashpot delay valve. California vehicles are equipped with a choke return diaphragm, choke return delay valve, and choke delay valve. Vehicles with automatic transmissions, as well as California manual transmissions, are equipped with an accelerator sensor.

ADJUSTMENTS

HOT (SLOW) IDLE RPM

See appropriate Tune-Up article in TUNE-UP section.

IDLE MIXTURE

See appropriate Tune-Up article in TUNE-UP section.

COLD (FAST) IDLE RPM

See appropriate Tune-Up article in TUNE-UP section.

FLOAT LEVEL ADJUSTMENT

Before assembling air horn to main body, adjust float level. Invert air horn on stand and allow float to drop by its own weight. Measure clearance between float and air horn gasket. See *Fig. 1*. Clearance should be .61-.65" (15.5-16.5 mm). If not within specifications, bend float seat lip as necessary.

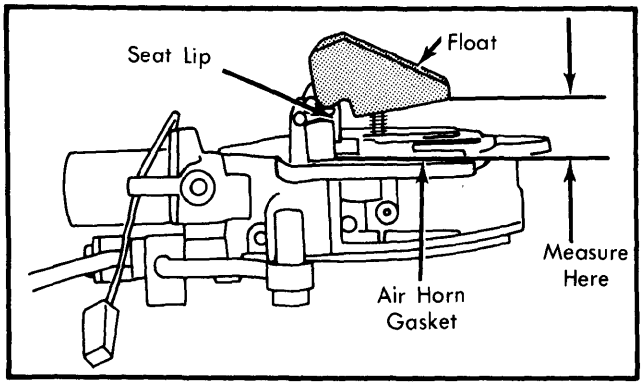

Fig. 1 Adjusting Float Level

FLOAT DROP ADJUSTMENT

Turn air horn over to its normal position and allow float to lower by its own weight. Measure distance between bottom of float and air horn gasket. See *Fig. 2*. Distance should be 1.98-2.03" (50.5-51.5 mm). If not, bend float stopper to obtain proper distance.

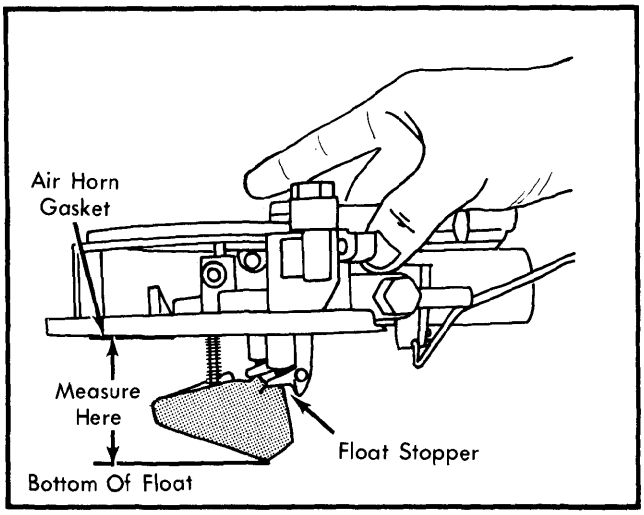

Fig. 2 Adjusting Float Drop

CHOKE LINKAGE ADJUSTMENT (FAST IDLE OPENING ANGLE)

Close choke valve fully and measure clearance between primary throttle valve and wall of throttle bore. Set clearance to .051-.059" (1.3-1.5 mm) by bending fast idle rod. See *Fig. 3*.

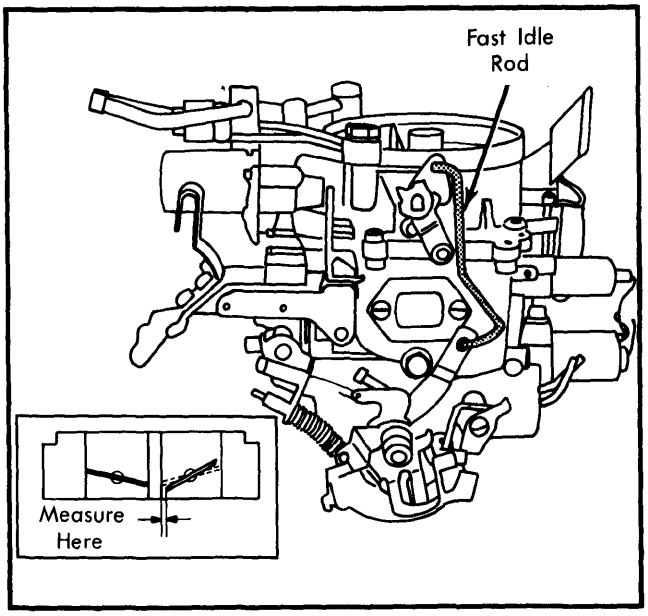

Fig. 3 Adjusting Choke Linkage Fast Idle Opening Angle

CHOKE VALVE OPENING ANGLE ADJUSTMENT

Disconnect vacuum sensing tube from vacuum diaphragm. Pull choke lever link out fully and hold in place. Apply approximately 19.7 in. Hg vacuum. Check clearance between choke valve and inward wall of choke bore. See *Fig. 4*. Measure temperature around bi-metal cover and compare clearance with chart in *Fig. 5*. If not to specifications, adjust by turning adjusting nut on end of vacuum diaphragm shaft at bi-metal housing.

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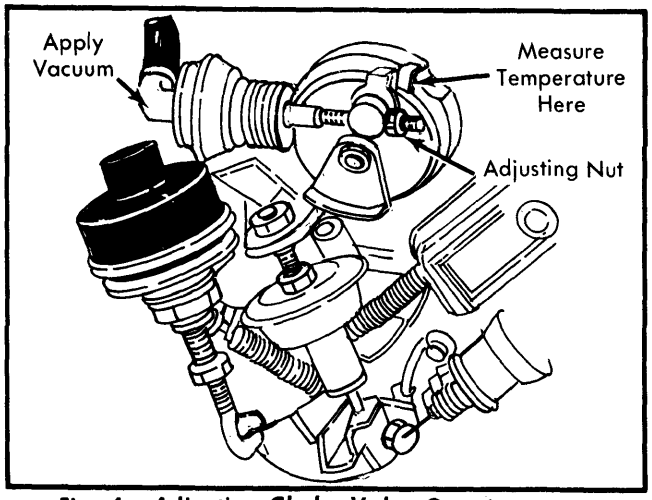


Fig. 4 Adjusting Choke Valve Opening Angle

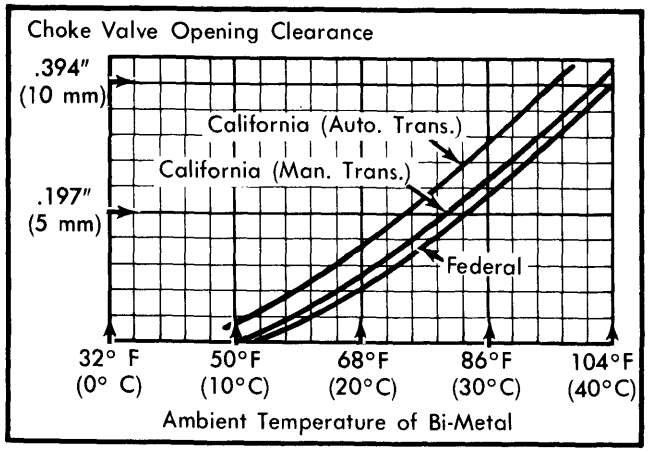


Fig. 5 Determining Choke Valve Opening Clearance Based on Bi-Metal Ambient Temperature

CHECKING NO. 2 CHOKE DIAPHRAGM OPERATION (FEDERAL ONLY)

1) Disconnect No. 2 choke diaphragm connecting link and install small spring scale. Slowly pull spring scale. Diaphragm shaft should begin to move with a pulling force of 1.2-1.8 oz.

2) Continue pulling spring scale. When the diaphragm shaft is pulled out .12-.14" (3-3.6 mm), reading should be 1.9-2.9 oz.

3) Remove spring scale and reconnect diaphragm connecting link. Fully pull out and hold choke lever link. Apply more than 17.7 in. Hg vacuum to No. 2 choke diaphragm and push diaphragm shaft (plastic shaft) in with finger.

4) Measure clearance between upper end of choke plate and inward wall of choke bore. Clearance should be .07-.116" (1.78-2.94 mm). With vacuum still applied, pull out diaphragm and again measure clearance at choke plate. Clearance should be .04-.054" (1.02-1.8 mm).

CHECKING NO. 1 CHOKE DIAPHRAGM OPERATION

Remove air cleaner assembly. Start engine and run at idle speed. Disconnect vacuum sensing tube from choke diaphragm. Diaphragm shaft should move outward from diaphragm.

CHECKING CHOKE DELAY VALVE OPERATION

Warm engine to normal operating temperature. Stop engine and remove air cleaner assembly. Disconnect vacuum sensing tube from No. 1 choke diaphragm. Start engine and run at idle speed. Diaphragm shaft should move fully inward within 10-20 seconds after reconnecting vacuum sensing tube to choke diaphragm.

NOTE – *Automatic transmission must be in Neutral.*

CHECKING CHOKE RETURN DELAY VALVE OPERATION (CALIF. ONLY)

Warm up engine to normal operating temperature. Stop engine and remove air cleaner assembly. Disconnect vacuum sensing tube from choke return diaphragm. With automatic transmission in Neutral, start engine and run at idle speed. Reconnect vacuum sensing tube to choke return diaphragm. Diaphragm shaft should be fully pulled into diaphragm within 20-70 seconds.

CHECKING CHOKE RETURN SOLENOID VALVE (FEDERAL ONLY)

1) Disconnect vacuum sensing tubes from choke return diaphragm and solenoid valve. Blow through diaphragm hose. Air should pass through valve and escape at solenoid filter.

2) Disconnect coupler from solenoid valve and apply battery voltage to solenoid valve terminal. Blow through hose again. Air should escape at solenoid vacuum port.

CHECKING AUTOMATIC CHOKE RELEASE

1) With engine cold and ignition off, pull out fully on choke knob and release. Knob should return automatically and freely. Connect a tachometer to engine.

2) Start engine with choke knob pulled fully out. Knob should return halfway automatically within 48-72 seconds (20-70 seconds on Calif.) after starting. Set engine speed at 2000 RPM with choke knob. Let engine run and when temperature reaches range indicated in *Fig. 6,* choke knob should automatically return completely inward.

3) Stop engine and pull choke knob fully out with ignition switch on. Choke knob should be held in this position (should not return).

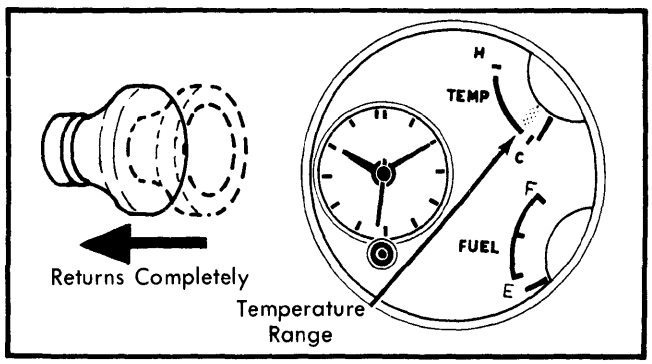


Fig. 6 Checking Automatic Choke Release

HITACHI 4-BARREL (Cont.)

HOT START ASSIST CABLE ADJUSTMENT

Remove lock spring of hot start assist cable from cable bracket. Slowly pull outer cable until hot start lever just touches stopper lever. Check clearance between cable bracket and lock nut on cable. See *Fig. 7*. Clearance should be .02-.08" (0.5-2.0 mm). If not within specifications, adjust by turning lock nut. Then install lock spring securely on cable.

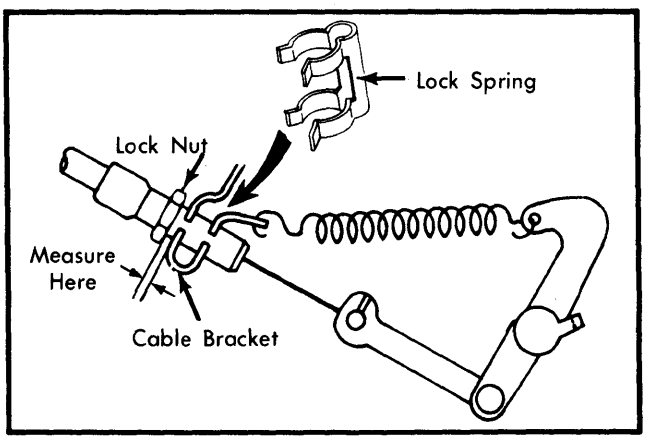


Fig. 7 Adjusting Hot Start Assist Cable

THROTTLE OPENER ADJUSTMENT (A/C MODELS ONLY)

Turn off all accessories. Disconnect vacuum tube at idle compensator (in air cleaner). Plug end of tube. Connect tachometer to engine and warm engine to normal operating temperature. Turn off air conditioner switch. Disconnect coupler from air conditioning solenoid valve. Connect battery power to one terminal and ground to second terminal. Check to see that throttle opener operates and engine speed increases to 1150-1250 RPM in Neutral. If engine speed is not within specification, turn adjusting nut. See *Fig. 8*.

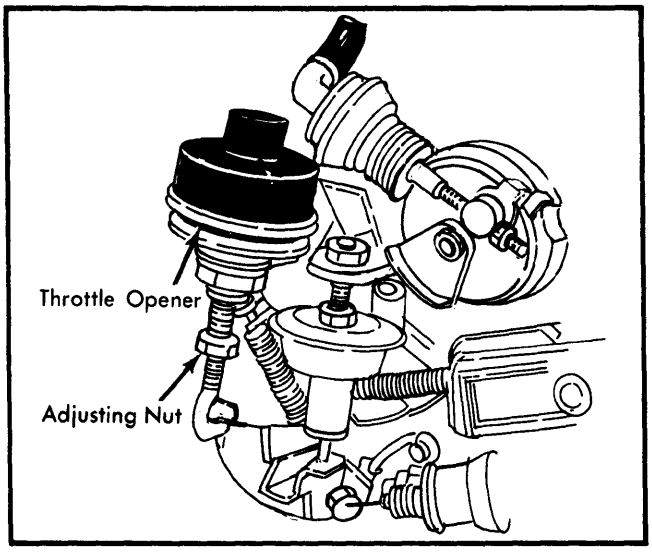


Fig. 8 Adjusting Throttle Opener (A/C Models Only)

CHECKING IDLE COMPENSATOR

Check that valve (located in air cleaner) is in closed position when bi-metal temperature is lower than operating temperature. Opening temperature should be 141-157°F (61-69°C). To check, suck air into tube. If excessive leakage occurs, replace idle compensator as an assembly. When bi-metal is more than approximately 159°F (69°C), check to see that the valve is in the open position. If not, replace idle compensator assembly.

CHECKING ALTITUDE COMPENSATOR

Disconnect altitude compensator hose from carburetor hose fitting. Start engine and run at specified idle speed. On vehicles equipped with automatic transmission, place selector lever in "N" or "P" position. Close altitude compensator hose opening with finger and check to see the engine speed drops as shown in *Fig. 9*. Engine speed varies according to altitude.

Altitude	Drops in Idle Speed
0-3280 feet (0-1000 meters)	10-100 RPM
3280-6560 feet (1000-2000 meters)	50-200 RPM
More Than 6560 feet (More than 2000 meters)	More Than 100 RPM

Fig. 9 Checking Altitude Compensator

ACCELERATOR CABLE ADJUSTMENT

Check accelerator pedal position. Pedal should be 1.5-1.9" (37-47 mm) lower than brake pedal. See *Fig. 10*. If necessary, adjust nut "A" to obtain correct position. Check cable free play

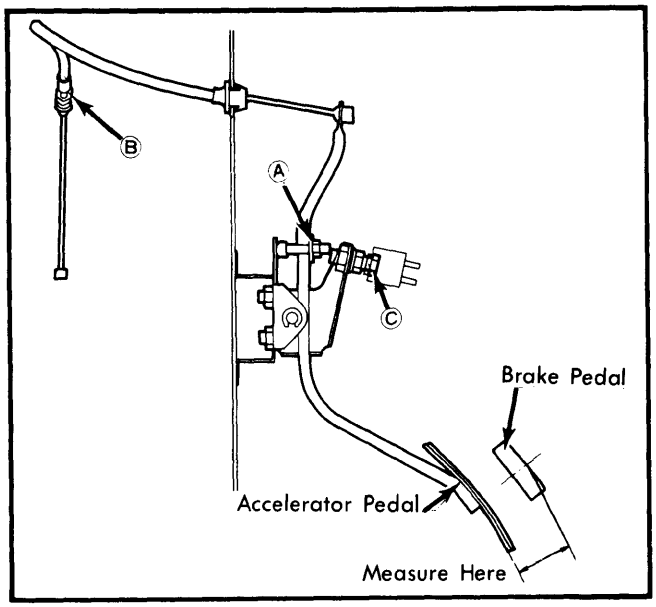


Fig. 10 Adjusting Accelerator Cable And Pedal Height

HITACHI 4-BARREL (Cont.)

at carburetor for .04-.12" (1-3 mm). To adjust cable free play, adjust nut "B". Depress accelerator all the way to the floor and check that throttle valves are wide open. If necessary, adjust stopper bolt "C".

DASHPOT ADJUSTMENT (MAN. TRANS. ONLY)

1) Remove air cleaner and check all sensing tubes for damage or mislocation. Be sure dashpot does not keep throttle lever from returning to idle stop. Quickly operate throttle lever fully and make sure dashpot extends quickly.

2) Release throttle lever and make sure lever returns slowly to idle position after it has touched dashpot rod. Connect a tachometer to engine and warm to normal operating temperature. Be sure engine operates at specified idle speed.

3) Operate throttle lever until it is away from dashpot rod. Slowly decrease engine speed. The throttle lever should contact the dashpot rod when engine speed is 3500-3900 RPM. If not, loosen lock nut and rotate dashpot diaphragm to obtain specified engine speed. Tighten lock nut.

OVERHAUL

NOTE – *Disassembly and assembly procedures will vary somewhat from vehicle to vehicle, depending upon sales area (Federal or California) and type of transmission. Therefore, some carburetors may not have all parts referred to in the following procedures.*

1) Remove carburetor from vehicle and begin disassembly with semi-automatic choke housing and air horn. Remove choke return delay valve (Calif. only) and choke delay valve. Remove heater lead and choke return solenoid (Federal only).

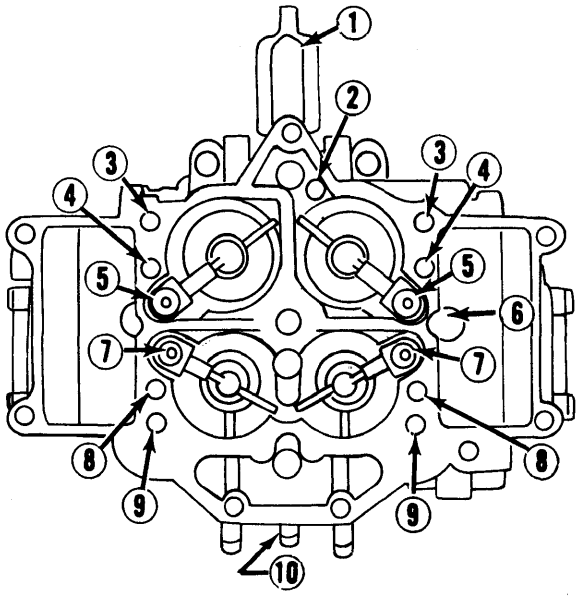
2) Remove throttle opener and bracket assembly. Remove dashpot diaphragm (Man. Trans. only). Remove throttle return spring, sub-return spring and semi-automatic choke housing. From air horn, remove "E" clip, choke lever, choke return diaphragm and bracket, hot start assist lever spring, fast idle rod and bracket. Remove No. 2 choke diaphragm (Federal only).

3) Remove air horn assembly from main body. Disconnect float pin, and remove float, needle valve, spring and retainer. From main body, remove accelerator pump rod, secondary throttle valve rod, idle switch return spring and idle switch (Man. Trans. only), and main body attaching screws.

4) Remove secondary throttle attaching screws, cover, return spring, pin and clip, diaphragm, housing and gasket. Remove "E" clip, washer and shaft, accelerator pump lever, attaching screws, cover, diaphragm and return spring.

5) From main body, remove accelerator pump injection screw, nozzle, gasket, weight, outlet check valve, check valve seat, weight and inlet check valve. Remove retainer, blind plug and washer, primary main jet and secondary main jet.

6) Remove the following jets or air bleeds *(Fig. 11)*:



1. Coasting richer (Man. Trans. only)
2. Richer jet (Man. Trans. only)
3. Secondary No. 2 step air bleed
4. Secondary step jet
5. Secondary main air bleed
6. Power jet (Auto. Trans. & Calif. Man. Trans.)
7. Primary main air bleed
8. Primary slow jet
9. Primary No. 2 slow air bleed
10. Sub-zero starting assist fluid inlet (Federal only)

Fig. 11 Removing Jets and Air Bleeds Hitachi 4-Bbl. Carburetor

PRIMARY THROTTLE VALVE INITIAL OPENING ANGLE ADJUSTMENT

NOTE – *The following adjustment should be made when throttle body, throttle lock lever or lock lever adjusting screw have been replaced.*

Loosen lock nut and back off adjusting screw from lock lever. Close throttle valve completely and turn screw in gradually until it just touches throttle lock lever. Then turn adjusting screw "A" an additional 1/8 - 3/8 turn. Tighten lock nut. Throttle valve clearance should be .002" (.05 mm) and initial throttle opening angle should be 1°. See *Fig. 13.*

HITACHI 4-BARREL (Cont.)

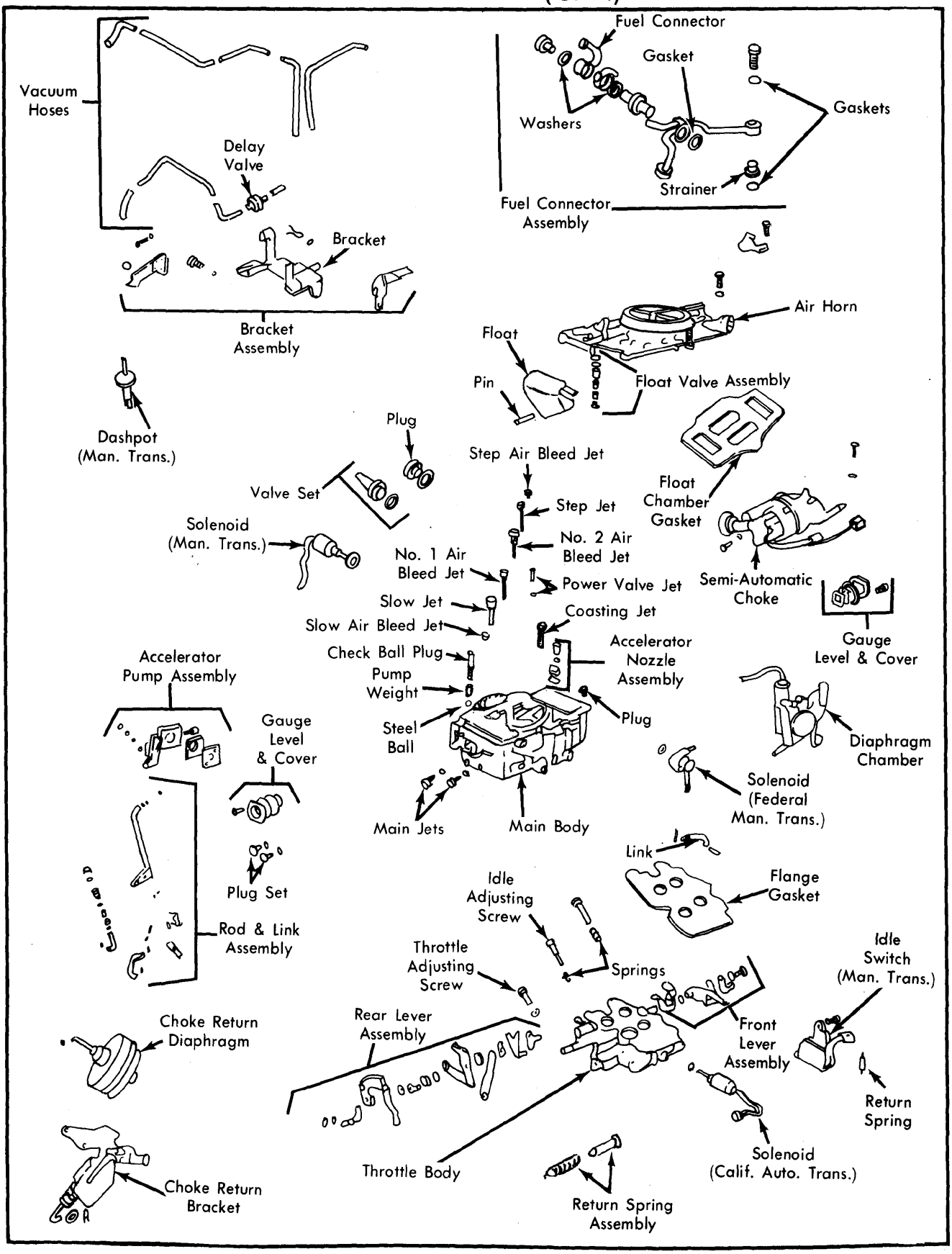


Fig. 12 Exploded View of Hitachi 4-Bbl. Carburetor (Mazda RX7)

HITACHI 4-BARREL (Cont.)

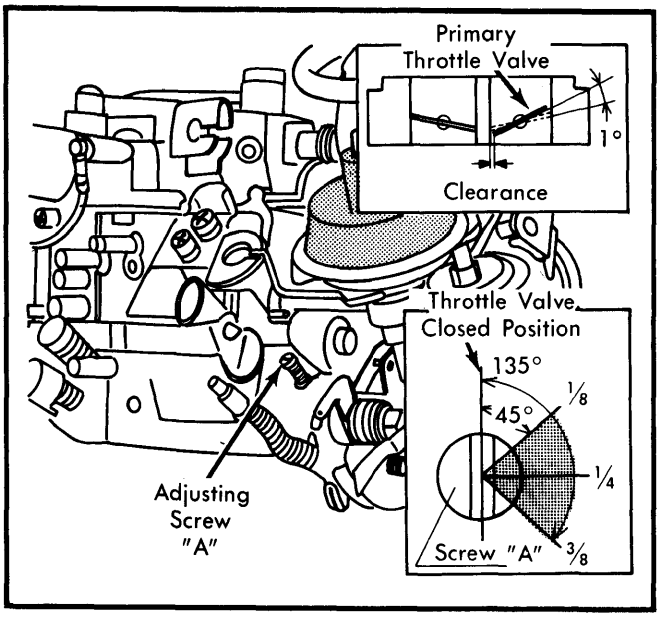


Fig. 13 Adjusting Primary Throttle Valve Initial Opening Angle

INSPECTION

Wash all parts in clean solvent, blow fuel passages with compressed air and remove dirt. Never use wire for cleaning jets. Inspect air horn, main body and throttle body for cracks or breakage. Inspect choke shaft and throttle shaft for wear, linkage and connecting rods for bends, and return springs for damage. Inspect for damage. Inspect float, needle valve and seat and strainer. Check air vent solenoid valve, richer solenoid valve (Man. Trans.), power valve solenoid (Auto. Trans. & Calif. Man. Trans.) for proper operation.

REASSEMBLY

To assemble, reverse disassembly procedure. Discard all old gaskets, using new ones. Clean and inspect all parts. Prevent primary and secondary system parts from becoming mixed. When installing bi-metal spring housing, fit choke shaft lever to bi-metal spring by closing choke valve and pulling vacuum diaphragm shaft.

CARBURETOR ADJUSTMENT SPECIFICATIONS

Application	Idle Speed (Engine RPM)		Float Level Setting In. (mm)	Float Drop Setting In. (mm)	Choke Linkage (Off Car) In. (mm)	Accelerator Cable Free Play	Choke Valve Opening In. (mm)
	Hot	Fast					
RX-7	750±25	①	.61-.65 (15.5-16.5)	1.8-2.2 (46-56)	.051-.059 (1.3-1.5)	.04-.12 (1-3)	②

① — Manufacturer does not supply fast idle speed. See Choke Linkage (Fast Idle Opening Angle).
② — Varies with ambient temperature. See *Fig. 5*.