Carbureted HONDAS

The Basic and the Not-So-Basic

Part Two

As promised, we're back with Part Two *of our trip through the passages, ports and cavities of Honda carburetors. If you're just joining us, please turn back to your August, 1999,* Import Service *for* Part One. Part Two *includes information on the main fuel-metering circuit, power-enrichment circuit, accelerator pump circuit, CVCC auxiliary circuit, idle speed adjustments and heated intake air systems.*

Main Fuel-Metering Circuit

Main-metering circuit problems usually cause hesitation and low-power complaints. I've seen problems from dirt at the bottom of an emulsion tube, a loose boost venturi (they are removable on Honda carbs) and some quirks with vacuum hoses.

Hose 11 to the EGR may collapse if soaked with oil and crankcase fumes. This opens the EGR valve sooner and wider, flowing more recirculated exhaust than necessary for the driving conditions.

The high-altitude compensator (**Photo 1** on the next page) may also fail. Of the three hoses at the compensator, two are air-bleeds and one is a fresh-air source. This helps lean the mixture at high elevation, but all three passages should be closed at sea level.

The float bowl vent is located on the top, driver's side of Honda carbs. It's the big cadmium-plated diaphragm in **Photo 2**, with three Phillips screws and a single vacuum hose. The small black vacuum hose is numbered either 8 or 22. Hose 14 connects to the power valve.

Accidentally swapping the vacuum hoses for the bowl vent (vacuum all the time when running due to a check valve, even under wide-open throttle) and the power valve (vacuum only at idle or modest throttle) closes the bowl vent under heavy throttle and the power valve at all times. This keeps any fuel from passing through the main fuel jets. The result is a lean hesitation or bog on acceleration.

The bowl vent diaphragm should hold vacuum, and the rubber stopper should pull away from the vent passage when you apply vacuum (**Photos 3** and **4**). With the engine idling, a failed bowl vent can produce a stream of bubbles visible in the sight-glass. Fuel is drawn into the engine through the idle circuit and main circuit as the throttle opens farther.

Additional air is needed to equalize the low pressure on the fuel in the bowl. If the bowl vent stays closed, the only source available is through the secondary main fuel jet. The backward-moving bubbles follow the boost nozzle and air bleed, down into the emulsion tube and out the main jet to vent the bowl. The only way to stop the reversed vacuum is to depress the throttle far enough to open the secondaries.

Check the metal tube in the boost nozzle. On 1984-87 Civics I've seen this tube work its way out, which blocks off fuel as it reaches the choke side of

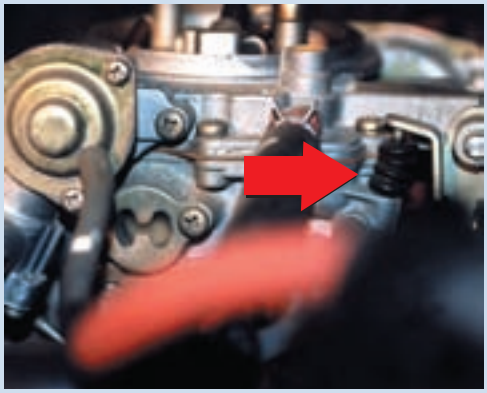
In the background above the tip of my thumb is the High Altitude Compensator (arrow). The hoses to this component are labeled A, B and C. Its purpose is to allow an additional air bleed for the idle and main circuits at high altitude, relying the rest of the time on fixed air bleeds in the carb top. If you suspect a lean condition caused by a faulty High Altitude Compensator, clamping off the vacuum hoses to the compensator should make a difference (the engine should run better). The control hose for the EGR is below the accelerator pump bellows. When this hose (usually numbered 11) gets mushy, it makes the EGR valve aggressive, causing a jerky sensation on a modest acceleration from a stop. Because of age, just about all carbureted Hondas are candidates for vacuum hose problems, so they all deserve an inspection.

the boost nozzle. So check for a loose boost nozzle. The nozzles are removable, but normally should not wiggle or appear loose.

Vacuum hose number 7 is on the firewall side of the engine, near the base of the carb. This is the open-throttle input to the carb computer. The carb computer uses hose 7 along with the vehicle speed sensor to determine when to cut voltage to the idle-cut solenoid during decel. If the vehicle speed is over 20 mph when the driver takes his foot off the throttle, the carb computer cuts voltage to the slow-cut solenoid to prevent backfiring and fuel waste. If hose 7 collapses, gets porous or cracks, the computer never gets the open-throttle vacuum signal. If this happens, the vehicle may accelerate fine to 20 mph and then fall on its face. Check hose 7 if you find these symptoms.

Power-Enrichment Circuit

Power valves on oval-top carbs have a removable diaphragm cover on the bottom of the main fuel bowl connected to hose 14. Vacuum to the diaphragm holds the valve closed. Without vacuum, the power valve opens, supplementing fuel to the main metering circuit. On a cold engine *only* (below 65 degrees F), hose 14 should not provide vacuum to the power valve. This hose is controlled by the air temp switch in the air cleaner snorkel.



At the right is the black bellows for the accelerator pump to keep dirt out of the linkage. If allowed to build up, dirt can lock the pump rod in the carb and prevent an accelerator pump shot. If the bellows is wet with fuel, the accelerator pump diaphragm leaks.

The bowl vent port is on the left side of the diaphragm (upper arrow). Directly below it is the rubber stopper that covers the bowl vent when no vacuum is applied (lower arrow).

Remove the bowl vent from the carb (remove the two screws holding it to the carb top, not the three on the diaphragm itself), then apply vacuum to the small port. Three inches of vacuum should move the diaphragm. The diaphragm may also hold vacuum but not move the plunger. If the stopper doesn't move, check for a ruptured diaphragm. If vacuum at this port goes to zero under heavy throttle, the check valve in the vacuum hose may have failed. When this occurs, the engine will lose power above 30 mph.

Frequently on these carbs, the power valve diaphragm ruptures and leaks fuel into hose 14. Liquid fuel is then sucked into the engine. This problem will soak number 3 and 4 spark plugs (the vacuum source is on that side of the intake manifold). The car will run fine when cold. If there is fuel in hose 14 when you remove it from the power valve, replace the power valve diaphragm.

Round-top carbs have a spring-piston power valve in the top of the carb. Vacuum from hose 14 holds the piston up. This hose connects to the carb top right next to the accelerator pump pivot in **Photo 5** (arrow). Look for an appreciable difference in tailpipe CO and O_2 readings at 2500 rpm with and without vacuum applied to this port.

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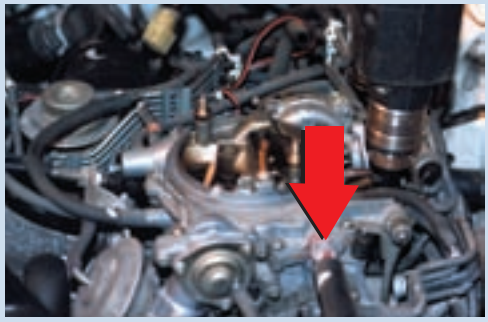

The hose closest to the accelerator pump arm (arrow) is the vacuum supply for the power valve. This should have vacuum on a warm engine. Cruise CO should be considerably more with the hose off than on. Straight down from the drill are two ported vacuum hoses: 4 and 7. Use care when drilling the throttle body over the idle passage to avoid damaging either hose. On this model, hose 7 is the ECU's input, much like a TPS signals an open throttle. Hose 7 may be cut or collapsed, if the car bogs at about 20 mph when accelerating from a stop. The carburetor would normally go into a coasting fuel-cut mode with the idle solenoid turned off. These hoses commonly deteriorate and become brittle, or soak with fuel.

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After the engine warms up and the choke linkage is off, Frequency Solenoid Valve C should start to click. This 1989 model gets about 5 volts at 40-70Hz at idle warm (depending on which accessories are on). Earlier models operated the solenoid on 12 volts, but you should also be able to read Hz on these too (they call it "Frequency Solenoid Valve C," don't they?). Auto-trans-equipped 1986-1989 models should maintain a 750-800 rpm value if all carb controls are operating and adjustments are correct.

Accelerator Pump Circuit

The accelerator pump linkage includes a rod from the top of the carb on the left rear to the diaphragm in the base of the carb below it. Sediment can fill in the diaphragm area, or the rod may rust in place and squelch the pump shot. I've also seen the top rear of the carb wet with fuel after a diaphragm ruptures. This allows fuel to travel up the tube and around the bellows. When the throttle is snapped, the accelerator pump arm should rotate and press the rod. A stream of fuel should squirt down the carb primary throat.

CVCC Auxiliary Circuit

The idle mixture passage is fixed, and there really isn't too much you can do to service this portion of the carburetor. Things can get screwed up when uninformed attempts are made to adjust idle speeds. Messing with the yellow painted screw that synchs the main linkage to the CVCC linkage can make the overall mixture way too rich or way too lean.

Before attempting to 'untamper' the CVCC linkage screw, verify all other circuits are normal. The results we're looking for are a clean tailpipe with reasonable power and driveability. It's something that's difficult to explain, but I can tell you that a lot of trial and error has taught me you'll only get this adjustment right if you have time and patience.

Start with the main idle mix screw about 2-3/4 to 3 turns out. If the mixture is still too lean, turn the screw to increase engine speed. This is not an easy adjustment to make correctly, so the smartest strategy is to leave the adjustment where the factory put it. The adjustment during production uses a flow bench, a tool I'd bet you won't find in many shops.

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I have seen a high idle, even though the choke was open and the secondaries were closed. No amount of linkage adjustment would change anything. What's left? Check the throttle cable for 10-12 mm freeplay between the bracket where the cable attaches to the carb and the loop that goes around the bell crank. Sometimes pushing the cable toward the carb will slow the idle. That's a good clue the cable is too tight. The set screw behind the choke housing preloads the boost venturi against the bowl side of the carb. If the boost venturi is loose, remove the choke housing and tighten this screw. There's an O-ring that seals the boost nozzle to the bowl side of the carb.

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To read the Hz signal from the carb ECU to the duty solenoid, probe the blue/red wire at the solenoid connector and ground the black lead. This 1989 had no solenoid response when the choke was on. When the engine slowed to warm idle, the solenoid immediately started clicking, and the meter showed a 23 Hz signal from the carb ECU.

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The primary venturi on the right side of the carburetor is a magnified mirror image of the auxiliary venturi. The 1/8-inch hole at 3 o'clock from the primary venturi is the idle passage. Right below is the brass accelerator-pump check valve.

A rubber O-ring is visible at the air bleed or bowl end of the primary venturi. This O-ring is twice as deep as in cross-section. It's the oddball O-ring in the overhaul kit, in case you've been wondering where that belongs. A common mistake is to substitute the idle cut O-ring during an overhaul (it's the same diameter, but doesn't have the extra depth). This will cause an extremely lean main circuit.

The large middle venturi is the secondary. The main jet for this venturi is located at about 6 o'clock in the fuel bowl, just opposite the sight glass. The primary and secondary main jets are at the correct installed depth.

If an oval-top equipped engine has a power problem, check the position of the primary jet. The primary jet has an electric solenoid with a rubber plunger that closes when the vehicle is off to prevent evaporative HC. The stopper may swell. More commonly, the pressed-in main jet may work its way out, blocking all primary fuel flow. Remove the solenoid, then use a hammer and drift to tap the primary jet back into position.

All the passages visible in this photo can be cleaned during a 'block and blow' on-the-car carb overhaul. The instructions included with Honda on-the-car carburetor overhaul kits specify an order for passage cleaning. Quite frankly, I've scrambled the sequence several times, reused the gaskets where possible and still got things clean. Watch for calcium or other mineral deposits in the bottom of the bowl. If there's a lot of junk in there, carb cleaner spray may not be enough to do the job.

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The piece of red tag wire shows the idle circuit path. The slow cut solenoid threads into the hole in the center of the carb where the bottom of the wire is visible. I've had success clearing out a stalling or lean idle by removing the slow-cut solenoid, shooting carb spray into this passage, then chasing it with shop air.

The vertical cast passage to the left of the idle circuit is the accelerator pump circuit. The brass bushing at the top left is where the accelerator pump rod goes, and the bellows covers the bushing. The brass port on the left is for EGR metering. At the bottom of the carburetor is the power valve jet, with its diaphragm removed. The black knob at the right is the idle speed screw.

Idle Speed Adjustments

On 1982-1985 Accords and 1980-1983 Civics, set base-idle speed with the black plastic knobbed screw on the right rear of the carb, under the choke. On A/C-equipped cars, a diaphragm receives vacuum when the A/C is turned on and boosts the idle speed another 100 rpm above 750. Manual transmission-equipped 1986-89 Accord models have a similar screw and use the same adjustment procedure.

The 1986-1989 Accords equipped with auto trans have a little more going on. These use a throttle controller (a dashpot on M/T cars) below the choke opener to control the idle speed. Vacuum hose 20 goes to Frequency Solenoid Valve C (FSVC), right behind and below the battery (refer to **Photo 6** on page 16). It has another hose number 20, which goes to a manifold vacuum source. Full vacuum on hose 20 at the throttle controller gives us base idle. A cold engine, electrical demands and other inputs tell the computer to control vacuum available to the throttle controller. This keeps idle speed at 750 rpm, but allows the throttle to close slowly after startup.

To set base idle, back off the Phillips screw to the throttle controller linkage on the passenger side of the carb. Adjust the throttle stop screw to 700 rpm. It's the same as the black knobbed screw on the M/T cars coming in from the firewall. Take the filter off the top of Frequency Solenoid valve C and cap the vent to ensure full vacuum to the throttle controller, then adjust the Phillips link screw to 750 RPM (the screwdriver tip is touching this screw in **Photo 7** also on page 16).

There is another screw on the driver's side of the carb, just like the one to the throttle controller. Have an assistant apply and hold the brakes and shift the transmission into Drive, then adjust this screw to get 750 rpm. The diaphragm that controls this is on the driver's side rear of the carb. The forward fitting should have hose 21 attached to it. This supplies vacuum when the trans is in Drive. Next, shift back into Park, turn the A/C on and adjust the thumbscrew on the back of the diaphragm just mentioned to get 750-850 rpm. It usually has a small black rubber cap over it. And you guessed it — the rear hose should have vacuum when the A/C is on.

The FSVC is a common failure item. The symptom is a warm idle speed of 2200 rpm or so. Remove both hoses numbered 20 from the FSVC and connect them together. If you now have a normal idle speed, the FSVC has probably failed. It needs 12 volts on the blue/red wire from the computer and ground on the black wire.

The base idle screw on Civics is attached to the dashpot diaphragm, which can be accessed from the front. The throttle stop screw looks just like the big plastic-tipped adjustment screw found on the other carbs. However, it has no knob, no screw slots — just a round screw head. I take this to mean 'since we've made it difficult for you to turn, don't mess with it.' Even so, some guys try to adjust something with it. Can't say what — headlight aim, perhaps?

M/T cars have an electric-load boost screw on the driver's side of the carb, just like the A/T Accord Drive position adjustment. It uses a hose 21, which has vacuum when the headlights, blower or cooling fans are on. If you have the base idle speed set to 750 rpm, turn on the headlights or blower or wait for the cooling fans to come on. The idle speed should increase by about 100 rpm over the base setting. With all electrical loads on, the idle speed may actually be less than 750 rpm. It's an on-or-off deal, not graduated. If the vehicle has A/C, adjust the thumbscrew on the diaphragm at the center of the carburetor on the firewall side with the A/C on.

Heated Intake Air Systems

We don't give much thought to carburetor icing when the weather is warm, but it's too important not to mention now. The '84 and '85 Accords are particularly susceptible to carb icing. If this system doesn't work properly, driveability will be affected, even on moderate days. The diaphragm in the air cleaner snorkel needs vacuum anytime the ambient air temp is below 100 degrees F.

Symptoms of carburetor icing include a gradual loss of power, stalling and flooding, especially on cooler, more humid days. Until the crankcase oil gets too gas-diluted to seal the rings for compression, the engine will start and run normally after a few minutes (after the ice in the venturis melts), but then the problem recurs in another five or ten minutes.

The hot air inlet tube must be working properly during the winter months. In severe winter weather, I've gone so far as to remove the fresh air tube at the radiator support. That way any air to the carb had to at least go through the radiator first. The bimetal strip in the air cleaner controls vacuum to the diaphragm and should block the bleed port at temperatures below 100 degrees F. and open to fresh air above that. I've 'tweaked' those bimetal doors and watched the door operation with a thermometer inside the air cleaner, just to make sure everything worked. Always check the operation of this system when doing any carburetor work. ■

—By Marlowe Peterson