



CHEVROLET MOTOR DIVISION
General Motors Corporation
Chevrolet Service Department



Chevrolet Dealer Service Technical Bulletin

67-T-43

Number:

VI_m

Section:

June 15, 1967

Date:

Attn: Service Manager

Subject: QUADRA-JET MALFUNCTIONS
1965, 1966 AND 1967 ENGINES
WITH QUADRA-JET CARBURETORS

To: ALL CHEVROLET DEALERS

Quadra-jet carburetors are sensitive to starting procedures and, therefore, the correct starting method must be followed at all times. In addition, choke mechanism hang-up and mis-adjustments which result in stalling, hesitation, hard starts and/or long cranking periods have been encountered. The reasons for, and corrections of, the above difficulties are outlined in this bulletin.

During the current model year, several important modifications have been incorporated in production to correct conditions that have been encountered in service. These revisions include - teflon coated secondary throttle shafts, a revised float needle and seat, inclusion of a secondary air flow baffle on units with 396 and 427 cu. in. engines, and a higher temperature choke coil.

Before any repair is attempted, the problem must be thoroughly analyzed and the owner's driving habits considered. In cases of hard starting, review with the owner the starting procedure outlined in the owner's manual.

As with the other complex parts of the automobile, successful diagnosis and servicing of the Quadra-jet requires knowledge of the carburetor, and a step-by-step process. This bulletin provides a procedure to accomplish this end, and if the technician diligently follows it, a customer complaint can be quickly brought to a successful conclusion.

Page 2 outlines the most frequent complaints and their corrections. This is followed by a diagnosis guide with an itemized discussion of proper carburetor service.

Chevrolet Motor Division
General Motors Corporation

c: Dealer List
Chevrolet List

Important That All Service Personnel Read—Please Initial

Service Manager		Shop Foreman		Service Salesman			Service Technicians						

The following checks should be made prior to major carburetor repair.

1. Remove the air cleaner stud and install a new design stud (Part No. 3921975). Excessive tightening of the early shouldered stud could distort the air horn and cause the air valve to stick and interfere with choke closing. This results in a hesitation or stumble on acceleration or possibly a long cranking time.
2. If screws 8 and 9, shown in Figure 39R, page 6M-20 of the Chassis Overhaul Manual, are not installed on carburetor air horn, they should be added. With a 10-32 tap, thread the existing holes in the bowl casting and install two 7029912 screws. Screws were not used at these locations until approximately 2-15-67. Torque all screws to 35-40 in.-lbs.
3. Some Quadra-jet carburetors may experience difficulty with cold starts due to failure of the choke to close when the throttle is depressed according to the instructions in the owner's guide.

Careful inspection of the carburetor when the engine is cold (prior to starting) may reveal that the fast idle cam is sticking on its shaft preventing the choke blade from closing fully when the throttle is opened.

If inspection shows the above to be the case, the fast idle cam should be replaced, using the service parts shown in the chart below.

<u>Engine</u>	<u>"327"</u>	<u>"350"</u>	<u>"396"</u>	<u>"427"</u>
Automatic Transmission	7033859	7033859	7031259	7031259
Manual Transmission	7033814	7033814	7031259	7031259

Effective in late March production, the hole size and bearing length in the cam were revised to correct this situation.

4. On 327 cu. in. engines --- an additional possible cause for failure of the choke to close may be found in the thermostat/choke coil rod. Typically, if sticking exists in this area, the choke will release and close if only light rearward finger pressure is applied to the choke coil rod where it comes out of the thermostat cover.

Cars with this condition can be fixed in the field by deburring the thermostat guide bar and the coil rod. On higher mileage cars, where road dirt and salt have accumulated in the engine compartment, the upper end of the choke coil rod where it attaches to the choke lever, as well as all other areas of the choke linkage should also be checked for evidence of binding and sticking.

In production, steps were taken to provide deburred thermostats on 4-3-67, by adding a spiral tumbling operation to the processing.

5. 396 and 427 Cu. In. Engines - A stumble or sag, after cold start and during warm up, may be corrected by adding a baffle (Part No. 7035494) on the carburetor air horn. This baffle is attached to screws 3 and 4 shown on page 6M-20 of the Chassis Overhaul Manual, Figure 39R. Position the baffle to the front of the carburetor secondaries, near the air cleaner mounting stud.
6. It is extremely important that proper starting procedures be used. Cranking a cold engine in temperatures above 0° with the throttle open only enough to crack the primaries will not seriously affect cranking time. However, it has been found that owners may very easily hold the throttle open too far and unknowingly open the secondaries. This seriously affects the cranking time to "first fire", especially in cold weather. Acquaint the owner with the proper starting method and explain the effect of any deviation.

TROUBLE SHOOTING GUIDE

Attached is a complete trouble shooting guide developed for the Quadra-jet carburetor as used on the various Chevrolet engines. To use the guide, find the complaint item which most accurately describes the customer's problem. The numbers in the second column indicate the items and the order in which they should be checked. The third column indicates items which may have a bearing on a specific problem after the others have been checked out. The bottom half of the chart names the service adjustment or inspection item with numbers keyed to the upper chart and to the detailed items that follow in this bulletin. If the technician diligently follows the chart (checking the areas after each complaint in numerical order and then the additional items), a complaint can be quickly brought to a successful conclusion.

TROUBLE SHOOTING GUIDE

<u>COMPLAINT</u>	<u>CHECK THESE ITEMS IN ORDER LISTED</u>	<u>ADDITIONAL ITEMS THAT MAY AFFECT COMPLAINT</u>
Surge	12-3-25-15	13-16
Hard Start - Cold	7-5-10-9-6	3-4-8-13-14-18-24
Hard Start - Hot	23-3-1-8-5	7-13-18-21
Cold Operation Problems	7-9-10-27-5-6-4	3-8-13-21
Stalls After Cold Start	10-7-9-6-5-1	4-18-20
Stalls After Hot Start	1-2-23-3	18-20-21
Stalling - Other Times	1-10-9-13	7-20-21-24-25-26-27
Hesitation - Warm Up	4-27-26-5-6-10-15	7-11-12-13-14-18-21-22
Hesitation - Hot	4-27-26-15-14-19-11	12-21-22
Acceleration Flatness	14-19-15-22	3-16-17-25
Rough Idle	1-19-21-24	2-7-9-10-18-20-23
Economy	15-12-11-2	3-5-6-7-17-18-27
Flooding	3-2-18	8-21-23
Poor Top Speed or Power	17-19-14-12-15-1	3-16-22-25

SERVICE ADJUSTMENT AND INSPECTION ITEMS

1. Idle Mixture and Speed Adjust.
2. Float Level Adjustment
3. Check Float and Inlet Valve
4. Accelerator Pump Adjustment
5. Choke Coil Rod Adjustment
6. Choke Rod Adjustment
7. Inspection of Choke Linkage and Thermostat
8. Choke Unloader Adjustment
9. Fast Idle Adjustment
10. Vacuum Break Adjustment
11. Secondary Metering Rod Adjust.
12. Primary Metering Rod Inspection
13. Secondary Closing Adjustment
14. Air Valve Lock-Out Adjustment
15. Power Piston Operation - Vacuum Channel Inspection
16. Air Valve Dash Pot Adjustment
17. Throttle Valve Inspection
18. Inspect Gaskets
19. Air Valve Spring Adjustment
20. Idle Passage Inspection
21. Hot Idle Compensator Adjustment
22. Secondary Discharge Nozzles
23. Idle Vent Adjustment
24. Check Crankcase Ventilator Valve
25. Clean or Replace Fuel Filter
26. Manifold Heat Passage Inspection
27. Manifold Heat Valve Inoperative

1. IDLE MIXTURE AND SPEED ADJUSTMENT

Rough idle and stalling may be directly related to the idle mixture and idle speed adjustments. Look for loose, grooved or bent mixture needles. Set the idle speed and mixture following the procedure on page 6M-1 of the 1967 Chevrolet Chassis Service Manual. Specifications of idle speeds are listed on page 12 of Specifications in the Chassis Service Manual.

2. FLOAT LEVEL ADJUSTMENT

Flooding, stalling when hot, poor mileage and/or poor performance may be due to the float level adjustment. Locate the gaging point on the floats 1/16" from the toe of the float. This is a specification change from that noted in the Shop Manual. Following the procedure outlined on page 6M-19 of the Chassis Overhaul Manual, set floats to the following specifications.

Engine Size	Diaphragm Assist Type	Conventional Needle & Seat
396-427	9/32"	3/16"
327-350	9/32"	9/32"

3. CHECK THE FLOAT AND INLET VALVE

Flooding, poor mileage, rough idle, engine stalling, and hard starts when hot can be due to a leaking or defective float or inlet valve. Look for dirt between the float valve and seat. Look for leaking float valve or diaphragm, binding or distorted float, and proper air horn contact on float hinge pin.

4. CHECK THE ACCELERATING PUMP SYSTEM OPERATION

Hot engine hesitation, stalling after a cold start, and hard cold starts may be related to the operation of the accelerating pump system. Check for adequate discharge from pump jets. If doubtful, compare with pump discharge in a known good carburetor. Check for 11/32 inch setting with pump rod in inner hole if two holes are present. This is a revised specification. Adjust the pump setting according to the procedure on page 6M-20 of the Chassis Overhaul Manual.

If the pump discharge is still inadequate, look for worn or distorted pump plunger cup, for pump discharge check ball not seating, and for plugged pump discharge jets. Replace parts as required. Some cases of low speed tip-in hesitation have been traced to the pump return spring being caught on the lower part of the plunger. Check for this by carefully withdrawing the plunger from the well. If the spring comes out with the plunger, bend the top coil of the spring so that it will not catch on the plastic part of the plunger, or replace the spring. Diagrams and procedures for accelerating pump removal and repair are located on page 6M-15 and 6M-16 of the Chassis Overhaul Manual.

5. CHOKE COIL ROD ADJUSTMENT

Hard starting, hesitation and stalling may be due to improper choke coil rod adjustment. Make sure choke valve fits bore correctly when fully closed. Look for sticking choke valve or linkage. Check choke operating rod adjustment. Complete adjustment procedure is outlined on page 6M-3 of the Chassis Service Manual.

6. CHOKE ROD ADJUSTMENT

Accurate choke rod adjustment determines throttle opening during engine starting and warm up. If measurement is too small, cam follower may never reach highest (starting) step of cam and may drop off lowest step of cam too soon, causing engine stalling. Make sure choke valve and linkage are free with vacuum break lever held downward to close choke. Measurement between wall and choke valve lower edge should be .100 inch. Adjustment procedure is outlined on page 6M-21 of the Chassis Overhaul Manual.

7. INSPECTION OF CHOKE LINKAGE AND THERMOSTAT

Hard cold starts or cold engine stalling, as well as poor mileage and/or hesitation may be due to binding or improper operation of the choke and linkage. Check for choke valve not opening fully with engine at operating temperature or closing fully with engine cold. This can be caused by misadjusted choke operating rod, bent linkage, air valve lockout interference, binding thermostat coil, or sticking choke valve or shaft. Adjust the choke mechanism following the procedure on pages 6M-16 and 6M-21 of the Chassis Overhaul Manual and page 6M-3 of the Chassis Service Manual.

8. CHOKE UNLOADER ADJUSTMENT

Hard hot starts, flooding and cold operation problems may be a result of a maladjustment of the choke unloader. The choke unloader allows rapid starting of an engine even though an over rich or flooding condition exists. If necessary to use the unloader often, find the cause of flooding and correct. (Over-choking, high fuel level, idle vent not opening, etc.) Unloader setting should be made as outlined and illustrated on page 6M-21 of the Chassis Overhaul Manual, using the specifications on page 10 of the same.

9. FAST IDLE ADJUSTMENT

The fast idle adjustment may affect cold engine starting and engine stalling after a cold start. Since most engine stalling occurs when the choke is nearly open, the fast idle speed while on the low step is more critical than while on any other step. Make sure fast idle cam and linkage operate freely. With engine operating at normal temperature and transmission in "drive", position fast idle cam so that cam follower rests on high step of cam. Adjust fast idle screw in 3 turns after it contacts the cam follower. Complete adjustment procedure is outlined on page 6M-21 of the Chassis Overhaul Manual.

NOTE: DO NOT lubricate the fast idle cam with oil or grease, since this picks up dust and dirt which may cause binding.

10. VACUUM BREAK ADJUSTMENT

Engine stalling after a cold start, hard start when cold, and hesitation during warm up may be due to the adjustment of the vacuum break. The vacuum break adjustment determines how far engine vacuum will pull the choke valve open immediately after starting a cold engine. If measurement is too small, engine may run over rich or "load"; if measurement is too large, engine may stall. Complete procedure for vacuum break adjustment is outlined on page 6M-21 of the Chassis Overhaul Manual. Specifications are on page 10 of the above manual.

NOTE: Adjustment is to be made with the cam follower on the highest step of the fast idle cam.

11. SECONDARY METERING ROD ADJUSTMENT

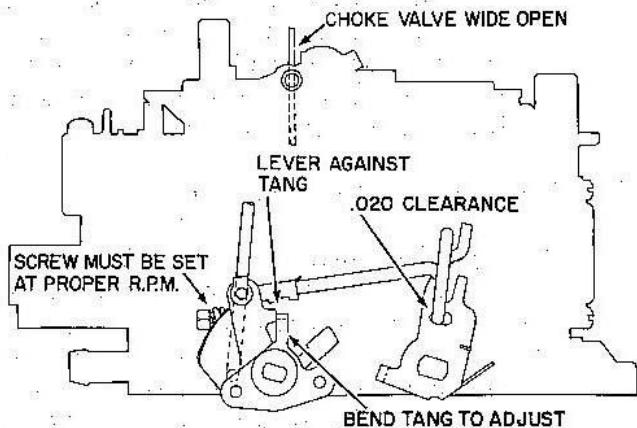
Poor mileage, hesitation when hot, and loss of power may be due to improper adjustment of the secondary metering rods. The secondary metering rod meters the secondary fuel flow in proportion to the air flow as determined by the air valve opening. If measurement is too small, the secondary mixture will be rich; if the measurement is too large, the mixture will be lean. Check secondary metering rod adjustment. With air valve closed, measure from top of casting surface behind air cleaner stud hole to top of metering rod (fig. 50R) on page 6M-22 of the Chassis Overhaul Manual. To adjust, bend secondary metering rod hanger with Tool J-22514 until rod height is 27/32 inches.

12. METERING ROD INSPECTION

Poor mileage, poor performance or hesitation can be a result of damaged metering rods. Look for bent, worn or incorrect metering rods. Look for loose, worn, plugged or incorrect jets.

13. SECONDARY CLOSING ADJUSTMENT

Rough or fast idle and hard cold start may be the result of an improper secondary throttle valve closing adjustment. The secondary closing adjustment insures proper closing of the secondary throttle valves. If the secondary valves should tend to stick open, the entire force of the primary valves and throttle linkage would be applied to close them. However, too little clearance could cause the primary valves to be held slightly open, resulting in too fast an idle even with the idle speed screw backed-out clear of the throttle lever. Adjust as shown.



SECONDARY CLOSING ADJUSTMENT

14. AIR VALVE LOCKOUT ADJUSTMENT

Hesitation or poor performance may be due to an improperly operating air valve. Make sure air valve closes fully; if it does not, look for sticking air valve or shaft. With choke valve wide open and with choke rod in mid-position in choke lever slot, lockout tang should barely clear air valve. Note: If thermostat coil does not lift choke rod enough, air valve will never unlock. If air valve unlocks too soon, hesitation or "sag" may result. Air valve adjustment procedure is outlined on page 6M-22 of the Chassis Overhaul Manual.

15. POWER PISTON OPERATION AND VACUUM CHANNEL INSPECTION

Poor mileage and low power may be due to operation of the power piston. The operation of the power piston may also affect hesitation. Check for sticking or inoperative power piston. Clean power piston and bore; replace parts as required. Check freedom of operation of power piston through bowl vent pipe with a pencil pressing lightly downward on metering rod bracket. The piston return spring will cause the piston to follow the pencil up and down movement if piston is free. Look for incorrect gaskets, plugged vacuum channel or for vacuum leaks. Install correct gaskets, clean channel and tighten screws securely. A diagram of the power piston and vacuum channel can be found on page 6M-15 of the Chassis Overhaul Manual.

16. AIR VALVE DASH POT ADJUSTMENT

Engine stalling may be due to improper dash pot adjustment. Make sure air valve moves freely in any position, but closes fully whenever released. A high vacuum in the diaphragm assembly prevents air valve from opening. On sudden acceleration, vacuum drops instantly, but restriction in diaphragm assembly controls rate of opening of air valve. This provides a smooth transition into secondary operation. Adjust the air valve dash pot following the procedure and illustration on page 6M-21 of the Chassis Overhaul Manual. Check for vacuum diaphragm not pulled-in with engine running. This can be caused by a leaky or ruptured diaphragm or a leaking or plugged vacuum head. Replace parts as required.

17. THROTTLE VALVE INSPECTION

Poor performance, rough idle, or engine stalling when hot may be due to a malfunction of the throttle valves. Look for throttle valves sticking open due to misalignment, damage, or carbon build-up. Clean parts thoroughly. Align valves if necessary. Check for full opening of all throttle valves by accelerator pedal. Gas pedal linkage affects throttle position. Adjust per Chassis Service Manual, page 6M-6.

18. INSPECT GASKETS

Flooding, poor mileage, hesitation, hard start and stalling could be due to leaking gaskets. Look for leaking gaskets. Replace any hard or brittle gaskets. Tighten all screws securely, making sure air horn screws are tightened in the proper sequence. Torque air horn screws to 35-40 in.-lb. (avoid over tightening which may cut the air horn gasket.) Tighten carburetor hold-down bolts to 10-15 lb.-ft. Tighten intake manifold bolts to 25-35 lb.-ft. Any gaskets still leaking after torquing must be replaced.

Note: If screws 8 and 9 are not installed on carburetor, they should be added. With a 10-32 tap, thread the existing holes in the bowl casting and install two 7029912 screws. Screws were not used at these locations from 1967 start up until approximately 2-15-67.

See Figure 39R, page 6M-20 of the Chassis Overhaul Manual.

19. AIR VALVE SPRING ADJUSTMENT

Poor top speed performance or power may be due to the air valve adjustment. Make sure air valve is perfectly free in all positions, for proper closing tension. Although the large secondary throttle valves are opened each time the primary throttle valves are opened fully, the secondary air valves are held closed until engine speed is high enough to "take" this added mixture. Too little spring wind-up will allow the air valve to open too soon, resulting in a hesitation or "sag"; too much spring wind-up will cause the air valve to open too late and too little, resulting in loss of power or a "feel" somewhat like a two-barrel carburetor. Air valve adjustment is covered on page 6M-23 of the Chassis Overhaul Manual.

20. IDLE PASSAGE INSPECTION

Rough idle or stalling may be due to plugged idle passages. Look for plugged idle restrictions or air bleeds. Removing idle needles and blowing in holes with an air hose will often clear passages.

21. HOT IDLE COMPENSATOR ADJUSTMENT

Rough idle or hot engine stalling may be due to improper operation of the hot idle compensator. Make sure hot idle compensator valve is closed by pressing finger on inlet passage to valve. If idle speed drops, valve is open and a correction must be made (unless carburetor is hot). When carburetor is extremely hot, valve should be open to prevent rich engine stall. The hot idle compensator valve is pictured on page 6M-15.

22. SECOND DISCHARGE NOZZLES

Flatness on acceleration and/or hesitation may be due to plugged secondary discharge nozzles. Inspect secondary discharge nozzles for dirt and/or plugged condition. A diagram of the secondary discharge nozzle system can be found on page 6M-15 of the Chassis Overhaul Manual in the Power System diagram.

23. IDLE VENT ADJUSTMENT

Hard hot start, stalling after hot start, flooding and rough idle may be due to the adjustment of the idle vent. Since this is a balanced carburetor (no full-time vents outside of air cleaner), it is important that excess vapors be vented outside during hot idle or after hot shut-down. However, an idle vent open while driving would upset the balanced condition. Look for damaged valve or lifter wire. Replace parts as necessary. The procedure and specification for adjustment of the idle vent is located on page 6M-21 of the Chassis Overhaul Manual.

24. CHECK THE CRANKCASE VENTILATOR VALVE

Rough idle or stalling after a hot start can be caused by a dirty or plugged PCV valve. Check crankcase ventilator valve for proper function. Engine speed should increase at least 50 rpm when the valve is disconnected from the hose leading to the carburetor. A change of less than 50 rpm indicates a plugged valve that should be replaced. Procedure is outlined on pages 6-6 and 6-8 of the Chassis Service Manual.

25. CLEAN OR REPLACE THE FUEL FILTER

After qualifying the fuel pump and fuel lines for proper delivery rate, inspect the carburetor fuel filter for a possible plugged condition. If the late type paper filter is present, the system is designed to "blow off", and bypass enough fuel to permit speeds of 60-75 mph at W.O.T. Complete procedure is outlined on page 6M-5 of the Chassis Service Manual.

26. INTAKE MANIFOLD HEAT PASSAGE INSPECTION

Poor mileage or hesitation during warm up may be due to a plugged heat passage in the intake manifold. Look for intake manifold passage and holes plugged with carbon, causing loss of heat to throttle body. Clean out passage and holes in manifold.

27. MANIFOLD HEAT VALVE INOPERATIVE

Cold start and hesitation problems as well as stalling and poor mileage may be due to a sticking manifold heat valve. Check the exhaust heat valve for free operation and lubricate as needed using GM Manifold Heat Control Solvent.