

GROUP 3

ENGINE FUEL AND EXHAUST SYSTEMS

SECTIONS IN GROUP 3

Section	Subject	Page	Section	Subject	Page
3-A	Specifications and General Description	3-1	3-D	Fuel and Vacuum Pump	3-15
3-B	Fuel System Trouble Diagnosis	3-7	3-E	Carter 2-Barrel Carburetor and Climatic Control	3-21
3-C	Adjustments and Replacements—Except in Pump and Carburetor Assemblies	3-10	3-F	Carter 4-Barrel Carburetor	3-34
			3-G	Stromberg 2-Barrel Carburetor and Automatic Choke	3-44
			3-H	Stromberg 4-Barrel Carburetor	3-57

NOTE: This Group covers Series 50-70 only. For Series 40 see Group 3 in the 1952 Buick Shop Manual.

SECTION 3-A

SPECIFICATIONS AND GENERAL DESCRIPTION

CONTENTS OF SECTION 3-A

Paragraph	Subject	Page	Paragraph	Subject	Page
3-1	Specifications, V-8 Fuel and Exhaust Systems	3-1	3-2	Description of V-8 Fuel System	3-3
			3-3	Description of V-8 Intake and Exhaust Systems	3-4

SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

3-1 SPECIFICATIONS, V-8 FUEL AND EXHAUST SYSTEMS

a. General Specifications

Items	Series 50	Series 70
Gasoline, Grade Required	← Premium →	→
Gasoline Tank Capacity (gal.)	← 19 Minimum →	→
Gasoline Gauge, Make and Type	← AC Electric →	→
Fuel and Vacuum Pump—Make and Type	← AC, DJ →	→
Drive	← Eccentric on Camshaft Sprocket →	→
Fuel Pump Pressure—		
At Pump Outlet, pounds	← 4 1/2 to 5 1/2 →	→
At Carburetor Inlet, pounds	← 4 to 5 →	→
Fuel Filter, Make and Location	← Moraine, at Carb. Inlet →	→
Carburetor, Make	← Carter or Stromberg →	→

Items	Series 50	Series 70
Type	← Downdraft →	→
Barrels	2	4
Air Cleaner, Make and Type	← AC, H.D. Oil Bath →	→
Sump Capacity, Oil Used	← 1 Pint, SAE 50 →	→
Intake Manifold Heat Control	← Valve and Thermostat →	→
Heat Source	← Exhaust Gas →	→
Thermostat Wind-Up @ 70 Deg. F., Valve Closed	← 3/8 Turn →	→

b. Carter Carburetor and Choke Calibrations

IMPORTANT: Calibrations are governed by the CODE number on the attached code tag.

Items	Series 50	1st Type	Series 70	2nd Type	
Model Designation	WCD	WCFB		WCFB	
Number of Barrels	2	4		4	
Large Venturi Diameter	1 3/16"	1 1/16"		1 1/16"	
Code Number, for Following Calibrations	WCD 2017S	996 S		2053 S	
		Primary	Secondary	Primary	Secondary
Float Setting, Cover to Float	15/64"	3/32"	3/16"	3/32"	3/16"
Float Needle Seat, Drill Size	No. 38	No. 42	No. 42	No. 42	No. 42
Low Speed Jet, Drill Size	No. 69	No. 69	No. 69	No. 69	No. 69
By-Pass		1.5 mm (.059")		1.45 mm (.057")	
Economizer	1.25 mm	No. 56	No. 56	No. 57	No. 57
Idle Air Bleed, Drill Size	No. 47	No. 44	No. 44	No. 44	No. 44
Idle Discharge Port	.115" x .030"	.110" x .030"	.103" x .030"	.110" x .030"	.103" x .030"
Lower Idle Port, Drill Size	No. 52	No. 55	No. 55	No. 55	.045"
Idle Adjust Screw, Average		One Turn Open			
Metering Jet					
Production	120-165	120-166	120-186	120-159	120-186
Lean	120-165	120-166	120-186	120-159	120-186
High Altitude	120-165	120-166	120-143	120-159	120-183
Metering Rod, Production	75-888	75-877	—	75-903	—
Lean	75-924	75-926	—	75-929	—
High Altitude	75-925	75-927	—	75-930	—

NOTE: Use High Altitude Rods Above 3500 Feet.

Anti-Percolator Bleed Hole	No. 60	—	—	No. 70	No. 70
Pump Stroke @ Full Throttle	15/32"	5/16"	—	5/16"	—
Pump Discharge Jet, Drill Size	No. 70	No. 74	—	No. 74	—
Vacuum Spark Control Port	No. 46 (.081")	.040"	—	No. 46 (.081")	—
Choke Coil Housing Number	170 U 73 S	170 AC 238 S	—	170 AC 238 S	—
Choke Thermostat Setting		At Index			
Choke Suction Hole, Drill Size	No. 42	No. 42	—	No. 42	—
F. I. Cam to Boss Clear., Choke Closed	.020"	.020"	—	.020"	—
F. I. Setting, Valve to Barrel Wall	.012"	.020"	—	.020"	—
Unloader Opening at Choke Valve Edge	3/16"	3/16"	—	3/16"	—

c. Stromberg Carburetor and Choke Calibrations

IMPORTANT: Calibrations are governed by the CODE number stamped on air horn directly above the fuel level sight plug.

Items	Series 50	Series 70	
Model Designation	AAVB-267	4 AUV-267	
Number of Barrels	2	4	
Size	1 1/4"	1 1/8"	
Primary Venturi Diameter	1 1/8"	1 1/2"	
Code Number, for Following Calibrations	7-95A	7-94B	
Float Setting, Above Ends of Gauge	5/64"	—	
		Primary	Secondary
Float Setting, Horn Gasket to Float	—	3/64"	1/2"
Float Needle Valve Seat	.101"	.101"	.076"
Idle Tube Feed Hole	No. 66	No. 66	No. 70
Idle Air Bleeder	No. 53	No. 70	No. 70
Location	Main Body	Idle Tube	
Sec. Air Bleeder	No. 42	No. 39	No. 42
Location	Throttle Body	Throttle Body	
Idle Discharge Holes, Upper	No. 53	No. 65	No. 56
Idle Discharge Holes, Lower	No. 60	No. 54	No. 63
Idle Needle Valve Aver. Open Turns	1 1/4	1 1/8	—
Main Metering Jet, Production	#P-24673 (.049")	#P-19442 (.048")	#P-24773 (.057")
High Altitude	#P-24673 (.047")	#P-19442 (.046")	#P-24773 (.054")

NOTE: Use High Altitude Jets Above 3500 Feet.

Main Discharge Jet	32-28	28-32	28-32
High Speed Bleeder	No. 70	No. 70	No. 70
Power By-Pass Jet	#386398	No. 70	—
Power By-Pass Restriction in Main Body	No. 60	—	—
Pump Discharge Jet	No. 70	No. 68	—
Pump Rod Location in Throttle Lever	Lower Hole	Up. Hole	—
Vacuum Spark Control Port	No. 46 (.081")	No. 46 (.081")	—
Choke Thermostat Setting		At Index Mark	
Thermostat Cover Ident. Number	23	23	—
Drill for Setting Choke Valve and Piston	No. 29	No. 29	—
Drill Size for Setting F. I. Cam	No. 41	No. 41	—
Drill Size for Checking Start Aid Lever	No. 53	No. 53	—
Drill Size for Checking Choke Unloader	No. 29	No. 2	—

	Series 50	Series 70
Opening of Pri. Throttle Valve When Sec. Valves Start to open.....	—	.125"-.180"
Clear. Between Inside Edge of Aux. Throttle Valve and Barrel.....	—	.015"
Lock-Out Slide Clear. to Aux. Throttle Valve Shaft Lever—Choke Closed.....	—	.025"-.060"
Choke Open.....	—	$\frac{3}{64}$ "- $\frac{5}{64}$ "

3-2 DESCRIPTION OF V-8 FUEL SYSTEM

a. Gasoline Tank, Feed Pipe, and Filter

The gasoline tank is attached by two strap type supports to the body under the trunk compartment, where it is seated against strips of anti-squeak material. Two internal baffles spot-welded to the upper half at centerline of tank at the support seats act as struts to maintain the shape of tank and prevent flexing due to weight of gasoline and pull of the supporting straps.

The filler is soldered into its opening in the upper half of tank and the inner end is supported by the left baffle. An internal passage and a groove in the upper end of filler, where the cap seats, provide a protected air vent for the tank. See figure 3-10.

The feed pipe connects to the gasoline gauge tank unit at top of tank and is supported on the right side of car frame by clips. The front end of feed pipe is connected to the fuel pump by a rubber hose which provides the flexibility required by movement of the engine on its rubber mountings.

A Moraine gasoline filter is located at the gasoline inlet of the carburetor for the purpose of removing any dirt and water which may be present in the gasoline. The filter contains a porous bronze filtering disk and is provided with a plug for draining out the accumulated dirt and water.

b. Fuel Pump, Carburetor, and Automatic Choke

The combination fuel and vacuum pump is mounted on the right side of the timing chain cover and is actuated by a hardened, chrome-plated, stamped steel eccentric mounted on front side of the camshaft sprocket. The fuel section is mounted above the vacuum section, has extra large valves, and has a built-in air dome with diaphragm to dampen out pulsations in the fuel stream. The pump construction and operation is described in Section 3-D.

Engines of all series are equipped in production with either a Carter or a Stromberg down-

draft type carburetor. *Both makes are considered standard and it is not intended that these units be interchanged to provide "optional" equipment.*

Series 50 engines use a 2-barrel carburetor and *Series 70* engines use a 4-barrel carburetor. All carburetor assemblies include automatic choke mechanism and an accelerator vacuum switch. A thick fibre gasket is used between the carburetor and the intake manifold to insulate the carburetor from the heat of the manifold.

The Carter carburetors are described in Section 3-E (2-barrel) and Section 3-F (4-barrel). The Stromberg carburetors are described in Section 3-G (2-barrel) and Section 3-H (4-barrel). The accelerator vacuum switches are described in Section 10-E.

c. Air Cleaner and Intake Silencer

All series engines are equipped with heavy duty oil bath air cleaners combined with intake silencers. The air cleaner removes abrasive dust and dirt from the air before it enters the engine through the carburetor. The intake silencer reduces to a very low level the roaring noise made by the air as it is drawn through the intake system. The cleaner and silencer also functions as a flame arrester in event of "back-fire" through the intake system.

The *Series 50* air cleaner and silencer is mounted on top of the carburetor. Air enters the cleaner first and then passes through the silencer.

The *Series 70* inverted elbow type air cleaner and silencer is mounted lengthwise on top of the engine. Air enters the silencer first and then passes through the air cleaner located directly above the carburetor. See figure 3-1.

The air cleaner consists of an oil reservoir and a cleaner element containing a filtering mesh which nests down into the reservoir above the oil level. The reservoir is filled with S.A.E. 50 engine oil to a predetermined level.

Incoming air passes downward through the passage between the oil reservoir and cleaner element, impinges on the surface of the oil and

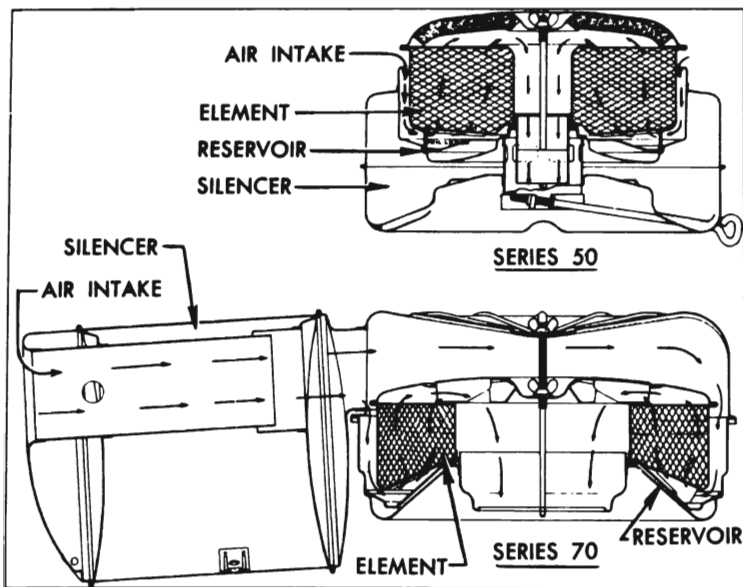


Figure 3-1—Air Cleaner and Silencer Assemblies—Series 50 and 70

turns upward into the cleaner element. The air carries oil into the element to coat the finely divided filtering mesh. The air thus exposed to a large oil wetted surface to which the dirt and impurities adhere. The cleaned air then passes through the silencer and into the carburetor. See figure 3-1.

When the throttle is closed, any excess oil on the filtering mesh drips back into the reservoir carrying the collected dirt with it. This dirt then settles to the bottom of the reservoir.

d. Carburetor Throttle Control Linkage

The carburetor throttle control linkage is designed to provide positive control of the throttle valves through their entire range without being affected by movement of the engine on its rubber mountings. The linkage also serves to operate the accelerator vacuum switch when cranking the engine.

The accelerator pedal is connected by two rods and a bell crank type lever to an equalizer shaft mounted horizontally on the engine to rear of the carburetor. Movement of the pedal rotates the equalizer shaft, which actuates the throttle shaft in the carburetor through a connecting rod. The throttle return spring is connect to a lever on the equalizer shaft and to a bracket anchored on the engine. See figure 3-9.

On cars equipped with *Dynaflow Drive*, a dash pot is mounted in position to be actuated by a lever on the equalizer shaft as the throttle is closed. The dash pot cushions the closing of throttle valves to prevent sudden shut off which might cause the engine to stall when the accelerator pedal is suddenly released. The dash pot

is an atmospheric type in which a diaphragm and calibrated by-pass controls the closing of the throttle valves. It is sealed at assembly and is serviced as a unit only.

3-3 DESCRIPTION OF V-8 INTAKE AND EXHAUST SYSTEMS

a. Intake Manifold and Heat Control

A low-restriction, dual (2 section) intake manifold is bolted to the inner edges of both cylinder heads, where it connects with all inlet ports. The end branches of each section run at 90 degrees to the connecting middle branch, thereby forming a T-junction at the dividing point which assures a uniform division and distribution of fuel to all cylinder inlets. Each manifold section feeds four cylinders—two in each bank. See figure 3-2.

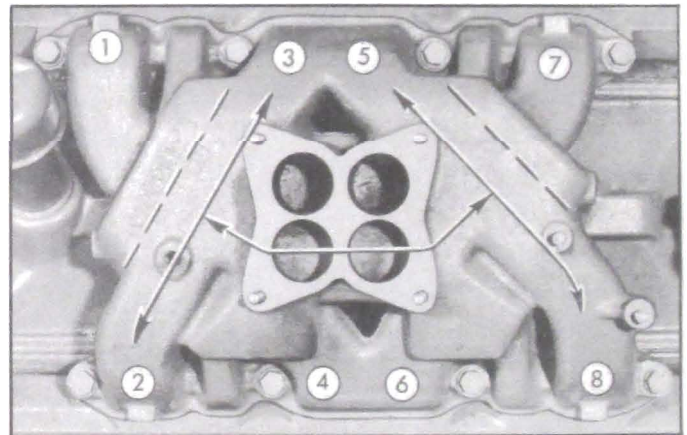


Figure 3-2—Intake Manifold Distribution

The *Series 50* 2-barrel carburetor feeds one barrel into each section of its 2-port manifold. The *Series 70* 4-barrel carburetor feeds one primary and one secondary barrel into each section of its 4-port manifold.

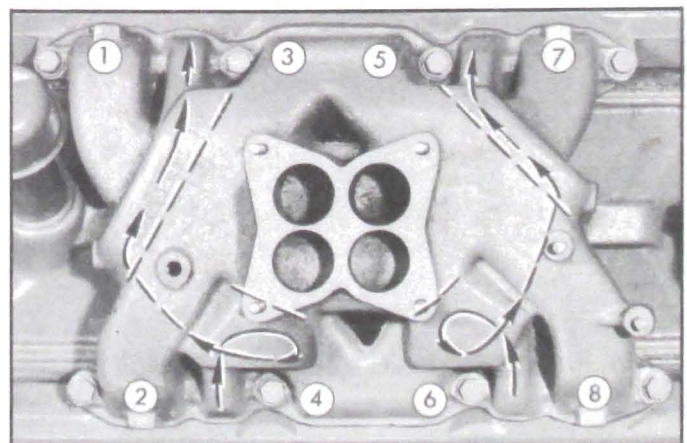


Figure 3-3—Intake Manifold Heat Chambers

The intake manifold is heated and hot spots are provided at the T-junction dividing points

by crossover chambers cast along the outer walls of each end branch. These chambers connect to the two middle exhaust passages in each cylinder head. See figure 3-3. Hot spots located at the dividing junctions aid in vaporizing the heavier particles of fuel which are swept against the outer walls due to their greater momentum. The heated intake manifold also aids in obtaining a uniform fuel distribution.

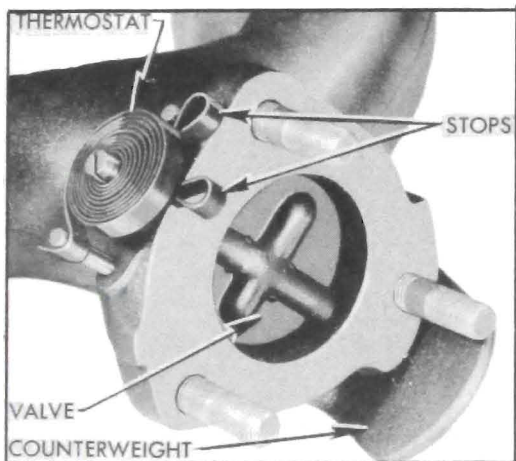


Figure 3-4—Manifold Valve

A heat control valve with a bi-metal thermostat is located in the left exhaust manifold. See figure 3-4. When the engine is cold and the thermostat closes the valve, the resulting back pressure in the manifold forces exhaust gas through the crossover chambers in intake

manifold to the right exhaust manifold. As the engine warms up and the thermostat releases the valve, the flow of hot gas through the crossover chamber is reduced. Restricted openings in the metal intake manifold gaskets further reduce the flow of gases through the manifold when the engine is warm and the heat valve is open.

b. Exhaust Manifolds, Pipes, and Muffler

Each cylinder exhausts through an individual port into a separate branch of the exhaust manifold, which is mounted on the outer side of each cylinder head. Use of individual exhaust ports instead of the customary "Siamese" type of porting permits valve timing that improves engine efficiency, minimizes exhaust valve burning, and effects more complete scavenging of exhaust gases from cylinders.

The left exhaust manifold contains the valve which controls the supply of heat to the intake manifold, as described above (subpar. a). The right exhaust manifold contains an alloy steel heating tube which is connected by an insulated pipe to the automatic choke thermostat housing. The heat tube is mounted horizontally inside the manifold with the entrance end opening into a heating chamber located on the outside of manifold.

Both exhaust manifolds discharge into one

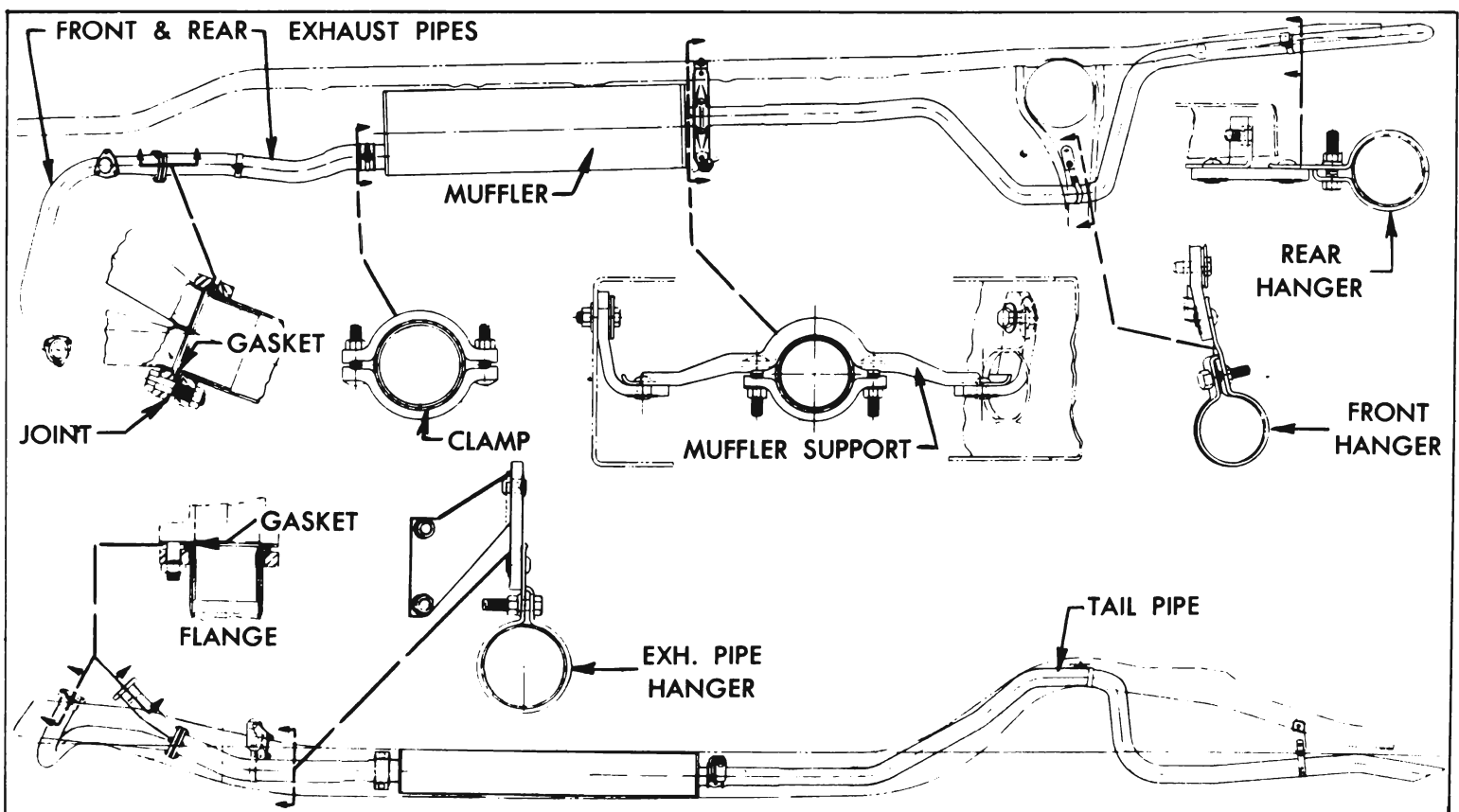


Figure 3-5—Exhaust Pipes, Muffler, and Mountings

front exhaust pipe. This pipe crosses under the front of engine from the left manifold to meet with the right manifold in a "Y" joint that provides a common, low-restriction connection with the rear exhaust pipe attached to the muffler on right side of the frame. See figure 3-5.

The muffler is an oval-shaped, dynamic flow type having very low back pressure. It is dou-

ble wrapped of heavy gauge sheet steel with a layer of asbestos placed between wrappings to aid in reduction of noise transfer and prevents any "oil-canning" effect. The muffler and exhaust pipes are supported by free hanging, rubber-fabric mountings which permit free movement but eliminate transfer of noise and vibration into the passenger compartment. See figure 3-5.