

# GROUP 3

## ENGINE FUEL AND EXHAUST SYSTEMS

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### SECTION 3-A

## SPECIFICATIONS AND GENERAL DESCRIPTION

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### SERVICE BULLETIN REFERENCE

Bulletin No.	Page No.	SUBJECT

### 3-1 SPECIFICATIONS

#### a. General Specifications

Items	Series 40-50	Series 70
Gasoline Tank Capacity (gal.)...	←19 Minimum→	
Gasoline Gauge—Make and Type	←AC Electric→	
Fuel and Vacuum Pump		
Make and Type.....	AC-DG	AC-DH
Drive.....	←From Camshaft→	
Fuel Pump Pressure, Pounds		
At Pump Outlet Port.....	←4 ½ to 5 ½→	
At Carburetor.....	←4 to 5→	
Fuel Filter—Make.....	←Moraine→	
Location.....	←At Carburetor Inlet→	
Carburetor—Make.....	←Carter or Stromberg→	
Type.....	←Downdraft→	
Barrels.....	2	4
Air Cleaner—Make.....	AC	AC
Type.....	←Heavy Duty Oil Bath→	
Sump Capacity, Oil Grade Used	←1 Pint S.A.E. 50→	

Items	Series 40-50	Series 70
Intake Manifold—Type.....	←Dual→	
Heat Source.....	←Exhaust Gas→	
Heat Control.....	←Valve and Thermostat→	
Thermostat Wind-Up @ 70° F, Valve Closed.....	←¼ Turn→	
Muffler—Type.....	←Straight Thru Resonance→	

#### b. Carter Carburetor and Choke Calibrations

**IMPORTANT:** *Calibrations are governed by the CODE NUMBER on attached code tag and not by the model number cast on main body below the fuel inlet. Carburetors of same model number but different code numbers are not interchangeable.*

Items	Series 40-50	Series 70
Model Designation	WCD	WCFB
Number of Barrels	2	4
Large Venturi Diameter	1 1/16"	1 1/16"
Code Number, for Following Calibrations	882 SA	894 SA
		<b>Primary</b>
Float Setting, Cover to Float	5/32"	1/4"
Float Needle Seat, Drill Size	#42	#42
Low Speed Jet, Drill Size	#62	#69
By-Pass		← 1.5 mm (059") →
Economizer	#54	← 1.25 mm (.049") →
Idle Air Bleed, Drill Size	#38	#43
Idle Discharge Port	.030" x .103"	.030" x .156"
Lower Idle Port, Drill Size	#52	#55
Idle Adjust. Screw, Average Setting		← One Turn Open →
Metering Rod or Main Metering Jet, Production	120-158	120-165
High Altitude	120-158	120-165
Metering Rod, Production	75-685	75-846
High Altitude	75-703	75-829

NOTE: Use high altitude rods above 3500 feet.

Pump Intake, Drill Size	#32	#32	—
Pump Check Needle Seat, Drill Size	#50	#50	—
Pump Relief, Drill Size	#55	#55	—
Pump Discharge Jet, Drill Size	#74	#74	—
Vacuum Spark Control Port	.040"	.040"	—
Choke Coil Housing Number	170U73S	170AC238S	—
Choke Thermostat Setting	1 Pt. Rich	At Index	—
Choke Suction Hole, Drill Size	#42	#42	—
F. I. Cam to Boss Clear., Choke Closed	.020"	.020"	—
F. I. Setting, Valve to Barrel Wall	.012"	.020"	—
Choke Valve Opening With Unloader		← 3/16" at U. Edge of Valve →	

**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 and not by the model number. Carburetors of same model but different code numbers are not interchangeable.

Items	Series 40-50	Series 70
Model Designation	AAUVB-267	4 AUV-267
Number of Barrels	2	4
Size	1 1/8"	1 1/8"
Primary Venturi Diameter	1 1/32"	1 1/32"
Code Number, for Following Calibrations	7-90 A	7-92
		<b>Primary</b>
Float Setting, Above Ends of Gauge	5/64"	—
Float Setting, Horn Gasket to Float	—	3/64"
Float Needle Valve Seat	.101"	.101"
Idle Tube Feed Hole	#58	#66
Idle Air Bleeder	#55	#70
Location	Main Body	← Idle Tube →
Sec. Air Bleeder	#42	#39
Location	T.B.	T.B.
Idle Discharge Holes, Upper	#60	#65
Idle Discharge Holes, Lower	#55	#54
Idle Needle Valve, Average Opening	1 1/2 Turns	1 1/8 Turns
Main Metering Jet, Production	.047"	.049"
High Altitude	.044"	.045"

NOTE: Use H. Alt. Jets for 3500-9000 feet; Use .002" smaller jets above 9000 feet.

Main Discharge Jet	#32-28	28-32	28-32
High Speed Bleeder	#70	#70	#70
Power By-Pass Jet	#54	#56	—
Pump Discharge Jet	#68	#68	—
Pump Rod Location in Throttle Lever	Mid. Hole	Up. Hole	—
Vacuum Spark Control Port	#58	#58	—
Choke Thermostat Setting		← At Index Mark →	
Thermostat Cover Ident. Number	23	23	—
Drill for Setting Choke Valve and Piston	#29	#29	—
Drill Size for Setting F. I. Cam	#26	#26	—
Drill Size for Checking Start Aid Lever	#53	#53	—
Drill Size for Checking Choke Unloader	#29	#2	—
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	—	3/64"-.5/64"	—

## 3-2 DESCRIPTION OF FUEL SYSTEM

### a. Gasoline Tank and Feed Pipes

The gasoline tank is made of two halves ribbon-welded together at the joining flanges. 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 pipe and a groove in the upper end of filler, where the cap seats, provide a protected air vent for the tank. See figure 3-12.

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. The rear feed pipe, which is connected to the gasoline gauge tank unit is supported by clips on the body. The rear feed pipe and the front feed pipe, which is connected to the fuel pump, are joined by a rubber hose which provides the flexibility required by movement of the engine on its rubber mountings. Flared type fittings are used at all other feed pipe connections.

### b. Fuel Pump and Gasoline Filter

The combination fuel and vacuum pump is mounted on the right side of crankcase at the front end and is driven directly from the engine camshaft. The construction and operation of the pump assembly is described in Section 3-D.

A Moraine gasoline filter is located at the gasoline inlet of the carburetor for the purpose of removing any dirt and water which may pass the filter contained in the fuel pump. The filter contains a porous bronze filtering disk and is provided with a plug for draining out the accumulated dirt and water. See figure 3-5.

### c. Carburetor and Automatic Choke Assembly

Engines of all series are equipped in production with either a Carter or a Stromberg downdraft type carburetor. *Both makes are considered standard and it is not intended that these units be interchanged to provide "optional" equipment.*

*Series 40-50* engines use a dual or 2-barrel carburetor and *Series 70* engines use a 4-barrel carburetor. All carburetor assemblies include

automatic choke mechanism and an accelerator vacuum switch.

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.

A thick fibre gasket is used between the carburetor and the intake manifold to insulate the carburetor from the heat of the manifold.

### d. 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.

On *Series 40-50*, the air cleaner and silencer is mounted crosswise of engine, with the silencer supported by a bracket on the rocker arm cover. On *Series 70*, the air cleaner and silencer is mounted lengthwise of engine, with air cleaner supported on intake manifold.

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

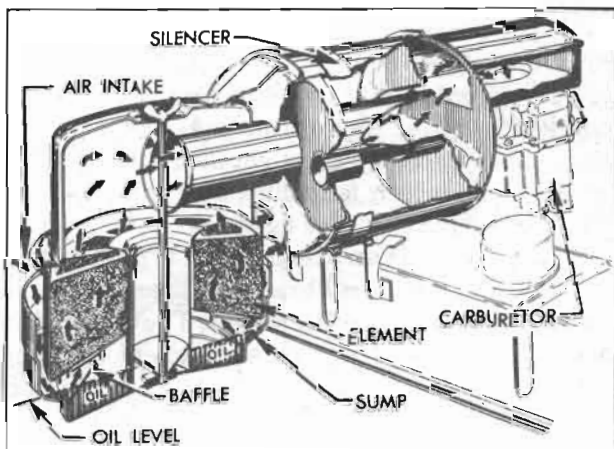


Figure 3-1—Air Cleaner and Silencer—Series 40-50

Incoming air passes downward through the passage between the oil sump and cleaner element, impinges on the surface of the oil and turns upward into the cleaner element. The air

carries oil into the element to coat the finely divided filtering mesh. The air is 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 sump carrying the collected dirt with it. This dirt then settles to the bottom of the sump.

#### e. 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 in its rubber mountings. The linkage also serves to operate the accelerator vacuum switch when cranking the engine.

The accelerator pedal is connected by a rod and ball joint to an accelerator lever on the lower end of a vertically mounted equalizer shaft. The equalizer shaft is supported at the lower end by a bracket attached to the dash and supported at upper end by a bracket attached to the intake manifold. A throttle operating lever on upper end of equalizer shaft is connected by a rod and ball joint to the throttle shaft lever on carburetor. The throttle return spring is connected to the throttle operating lever on equalizer shaft and to a boss on intake manifold. See figure 3-6.

On cars equipped with *Dynaflow Drive*, a dash pot is included in the throttle control linkage to prevent engine stalling when the accelerator pedal is suddenly released while driving. The dash pot cushions the closing of the throttle to prevent sudden shut off. The dash pot operating lever and adjusting screw are mounted on the lower end of accelerator equalizer shaft so that the adjusting screw contacts the plunger of dash pot, which is mounted on the equalizer shaft lower bracket. See figure 3-7.

The dash pot is an atmospheric type in which a diaphragm and calibrated by-pass controls the closing of the throttle valves. The dash pot is sealed at assembly and no adjustment or other service is required.

### 3-3 DESCRIPTION OF INTAKE AND EXHAUST SYSTEM

#### a. Intake and Exhaust Manifolds

The intake and exhaust manifolds are separate units jointed together by a valve body through which hot exhaust gasses may be di-

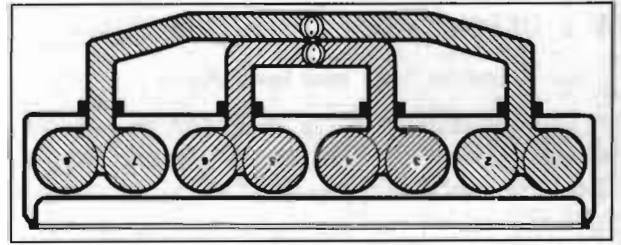


Figure 3-2—Fuel Distribution Through Intake Manifold—Series 40-50

rected into a heat jacket cast on the intake manifold to heat the area below the carburetor.

The intake manifold is of dual type, having two separate branches with the carburetor mounted at the middle of both branches. See figure 3-2. The left hand barrel (Ser. 40-50) or barrels (Ser. 70) of the carburetor feed into the outer branch of the manifold, which distributes fuel to cylinders No. 1, 2, 7, 8. The right hand barrel, or barrels, of carburetor feed into the inner branch of manifold, which distributes fuel to cylinders No. 3, 4, 5, 6.

The *Series 40-50* exhaust manifold is one piece and is bolted to the separate heat valve body which connects it to the intake manifold. The *Series 70* exhaust manifold is in three sections, and the heat valve body is cast integral with the center section.

#### b. Intake Manifold Heat Control

The amount of heat supplied to the intake manifold below the carburetor is regulated in accordance with operating requirements by means of the exhaust manifold valve. The valve is controlled by a bi-metal thermostat wound around the valve shaft so as to act as a spring to close the valve when engine is cold. The inner end of the thermostat engages a slot in valve shaft and the hooked outer end engages an anchor stud on the valve body.

When the engine is cold, the valve is held in closed position by the thermostat. Hot exhaust gasses strike the valve and are deflected upward into the heat jacket on intake manifold, where they pass around the intake passages and then pass downward to the exhaust pipe. See figure 3-3.

As the engine warms up, heat conducted to the thermostat through the valve shaft as well as by the increasing air temperature under the hood causes the thermostat to lose spring tension and allow the valve to move toward the open position, thereby reducing the amount of exhaust gas deflected into the heat jacket and consequently reducing the amount of heat to the

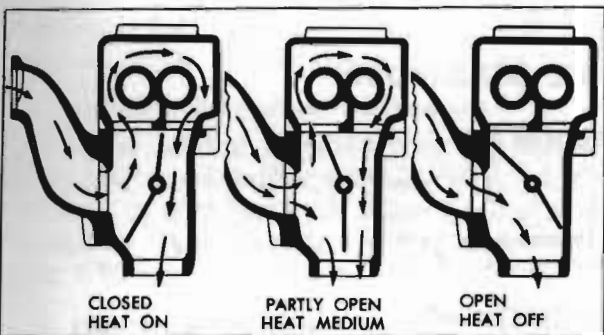


Figure 3-3—Exhaust Manifold Valve Operation—Sectional View

intake manifold. See figure 3-3.

The exhaust manifold valve is offset or longer on the lower side of the shaft. This allows exhaust gas pressure to force the valve open when the engine is accelerated or operated with wide open throttle, thus reducing the heat to the intake manifold.

The valve is prevented from fluttering by a counterweight on the shaft. An anti-rattle spring is provided to prevent the valve from fluttering and rattling against the valve body in the open and closed position.

c. Exhaust Pipes, Muffler, and Tail Pipe

The muffler is a "straight through" type with resonance chambers which absorb and dampen out the exhaust sound waves. A slip joint at one end allows for expansion and contraction due to temperature changes.

The word "Front" is stamped on one end of the outer shell of muffler to indicate the end to place toward front of car during installation. The drain hole in outer shell should always be located at the bottom.

The exhaust pipe is connected to the exhaust manifold by a bolted flange and a gasket. The exhaust pipe and tail pipe connect to the muffler through slip joints provided with clamps. All exhaust system parts are flexibly mounted to allow for engine movement and for expansion and contraction due to temperature changes. All supports have fabric straps which provide the required flexibility and also serve to insulate exhaust system vibration from the chassis. See figure 3-4.

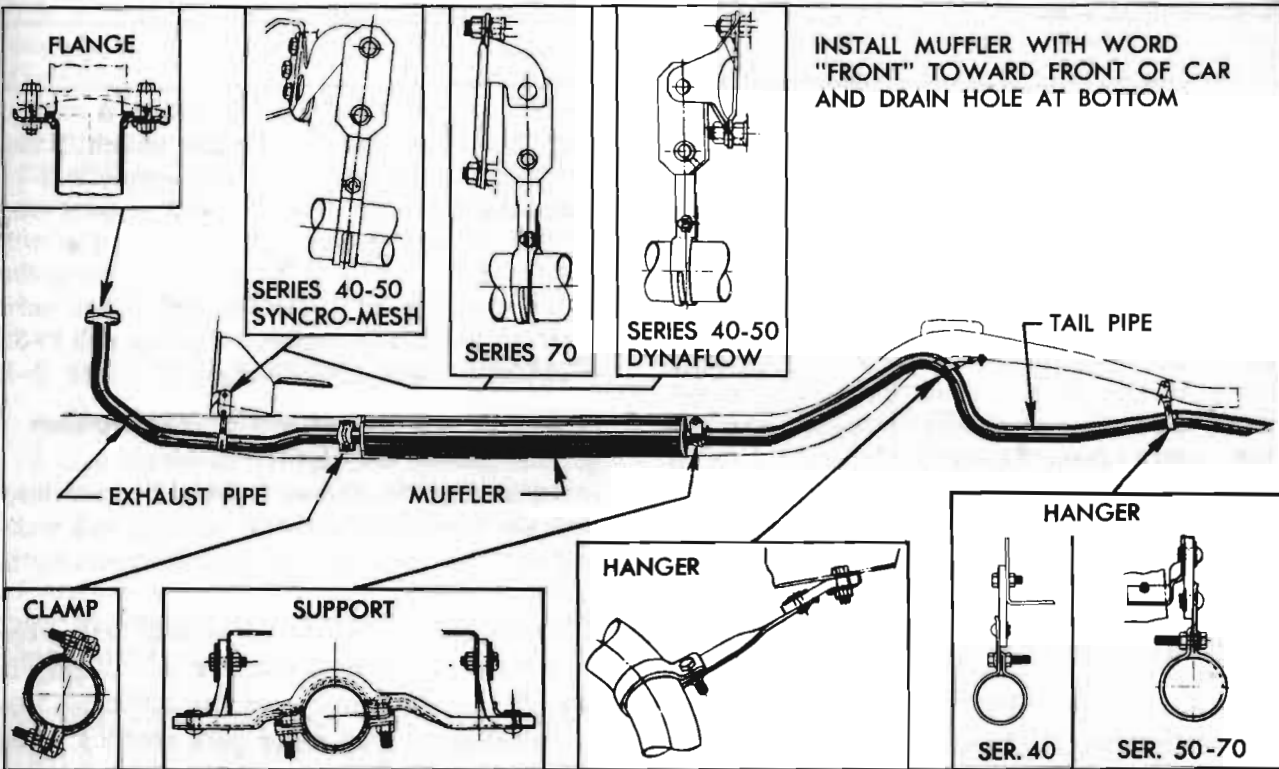


Figure 3-4—Exhaust System and Mountings—All Series