

ENGINE TUNE-UP

ALL SERIES

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DESCRIPTION AND OPERATION

TUNE-UP PURPOSE

The purpose of an engine tune-up is to restore power and performance that has been lost through wear, corrosion or deterioration of one or more parts or units. In the normal operation of an engine, these changes take place gradually at a number of points so that it is seldom advisable to attempt an improvement in performance by correction of one or two items only. Time will be saved and more lasting results will be obtained by following a definite and thorough procedure of analysis and correction of all items affecting power, performance, and exhaust emission.

Because of federal laws limiting exhaust emissions, it is even more important that the engine tune-up be done accurately, using the specifications listed on the tune-up sticker found in each engine compartment.

Economical, trouble-free operation can better be assured if a complete tune-up is performed each 12,000 miles, when using non leaded fuels and each 6,000 miles when using leaded fuels.

The parts or units which affect power and performance may be divided into three groups:

- (1) Units affecting compression
- (2) Units affecting ignition
- (3) Units affecting carburetion

The tune-up procedure should cover these groups in the order given. Correction of items in the carburetion group should not be attempted until all items affecting compression and ignition have been satisfactorily corrected.

Most of the service procedures for performing a tune-up are covered in the carburetor and electrical sections, therefore, the following provides an outline only.

MAINTENANCE AND ADJUSTMENTS

TUNE-UP PROCEDURES

To make sure hydrocarbon and carbon monoxide emissions will be within limits, it is very important that the adjustments be followed exactly as listed on the sticker found in each engine compartment.

The suggested procedure for engine tune-up is as follows:

1. Run engine until warm.
2. Remove all spark plugs.
3. Position throttle and choke valve in full open position.
4. Connect jumper wire between distributor terminal of coil and ground on engine to avoid high tension sparking while cranking engine.
5. Firmly insert compression gage in spark plug port.

6. Check compression of each cylinder. *Repeat* compression check and record highest reading obtained on each cylinder during the two pressure checks.

The recorded compression pressures are to be considered normal if the lowest reading cylinder is more than 70 percent of the highest reading cylinder. See the following chart.

Cylindr. No.	Pressure PSI
1	129
2	135
3	146
4	121
5	120
6	100
7	130
8	126

EXAMPLE: 70 percent of 146 (highest) is 102. Thus, cylinder number 6 is less than 70 percent of number 3. This condition accompanied by low speed missing, indicates an improperly seated valve or worn or broken piston ring.

7. If one or more cylinders read low, inject about a tablespoon of engine oil on top of pistons in low reading cylinders through spark plug port. Repeat compression check on these cylinders.

a. If compression improves considerably, rings are worn.

It should be pointed out, however, that continued slow- speed driving with leaded fuel can produce deposit build-up on exhaust valves and seats which can cause temporary valve leakage, engine miss and low compression readings.

Repeated hard accelerations or a few miles of free-way operation usually will remove these deposits, allowing normal engine operation and satisfactory cranking compression pressures, thereby eliminating unnecessary engine repair. Top engine cleaner can be used to remove the deposits also.

b. If compression does not improve, valves are sticking or seating poorly.

c. If two adjacent cylinders indicate low compression and injecting oil does not increase compression, the cause may be a head gasket leak between the cylinders. Engine coolant in cylinders could result from this defect.

8. Clean, inspect and test spark plugs; if necessary, replace spark plugs. Gap to .040" and install spark plugs.

9. Inspect and test battery and cables.

10. If battery is in good condition but cranking speed is low, test cranking motor circuit.

11. Adjust generator, A.I.R. Pump and power steering belts (also air conditioner belt if so equipped). If difficulty is experienced in keeping battery charged, check generator and regulator.

12. Inspect and test entire ignition system and make indicated corrections.

13. Inspect and test fuel pump.

14. Inspect gasoline filter.

15. Check operation of choke valve and fast idle cam.

16. Check operation of choke unloader.

17. Check throttle linkage adjustment.

18. Adjust carburetor idle speed and mixture (adjust mixture only when incidental to major overhaul of the carburetor).

19. Inspect all water hose connections and tighten clamps, if necessary.

20. Check transmission controlled vacuum spark advance system (if equipped).

21. Road test car for power and overall performance.

Compression Compression Pressure Limit Chart

This chart may be used when checking cylinder compression pressures. It has been calculated so that lowest reading number is 70 percent of the highest reading number.

EXAMPLE: After checking the compression pressures in all cylinders, it was found that the highest pressure obtained was 182 psi. The lowest pressure reading was 145 psi. By locating 182 in the maximum column, it is seen that the minimum allowable pressure is 127 psi. Since the lowest reading obtained was 145 psi, the car is within limits and the compression is considered satisfactory.

Maximum Pressure Pounds Sq. Inch	Minimum Pressure Pounds Sq. Inch	Maximum Pressure Pounds Sq. Inch	Minimum Pressure Pounds Sq. Inch
134	94	186	130
136	95	188	132
138	97	190	133
140	98	192	134
142	99	194	136
144	101	196	137
146	102	198	139
148	104	200	140
150	105	202	141
152	106	204	143
154	108	206	144
156	109	208	146
158	111	210	147
160	112	212	148
162	113	214	150
164	115	216	151
166	116	218	153
168	118	220	154
170	119	222	155
172	120	224	159
174	122	226	158
176	123	228	160
178	125	230	161
180	126	232	162
182	127	234	164
184	129	236	165
		238	167

SPECIFICATIONS

SPECIFICATIONS AND ADJUSTMENTS

Gasoline Tank Capacity (Approximately)

A Series (Except Wagon) 22 Gal.

A and B Series Wagon 22 Gal.

B-C-E Series (Except Wagon) 26 Gal.

Gasoline Gauge, Make and Type A.C., Electric

Fuel Pump, Make A.C.

Fuel Pump, Type and Location

All Mechanical, Left Front Engine

Fuel Pump Pressure - At Carb. Level

350 Engines 3 PSI Min.

455 Engines 4-1/2 PSI Min.

Fuel Pump Volume 1 Pt. in 30 Seconds or Less

Carburetor, Make and Type Rochester, Remote Choke Coil

Air Cleaner Element, Make and Material A.C., Oiled Paper Element

Air Cleaner Element, Type - Standard Duty

350-455 Engines in "A" Series Non G.S. A329C

All G.S. Engines A212CW

All 455 B-C-E Series A212CW

Air Cleaner Element, Type - Heavy Duty

350-455 Engines in "A" Series Non G.S. A368C