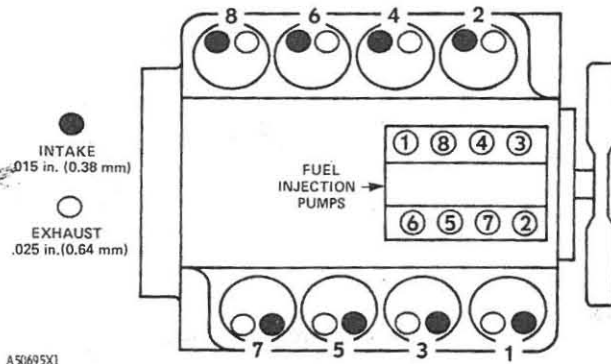


ENGINE DESIGN



CYLINDER, VALVE AND INJECTION PUMP LOCATION

Bore	4.5 in. (114.3 mm)
Stroke	5.0 in. (127.0 mm)
Number of Cylinders	8
Cylinder Arrangement	90°V
Firing Order (Injection Sequence)	1, 2, 7, 3, 4, 5, 6, 8
Direction of Rotation (As Seen From Flywheel End)	Counterclockwise

MISFIRING AND RUNNING ROUGH

Probable Cause(s)

1. Air in Fuel System

2. Valve Adjustment Not Correct

3. Fuel Injection Timing Not Correct

4. Automatic Timing Advance Does Not Operate Correctly

5. Bad Fuel Nozzle(s)

6. Valve Leakage; Wear or Damage to Pistons and/or Piston Rings; Wear or Damage to Cylinder Walls

7. Cylinder Head Gasket Leakage

8. Engine Camshaft timing Not Correct

9. Fuel Leakage from Fuel Injection Line Nut

10. Fuel Has a High "Cloud Point"

TOO MUCH EXHAUST SMOKE

BLACK OR GRAY

Engine Runs Smoothly

Probable Cause(s)

1. Engine Used at an Altitude higher than 2500 ft. (762 m)
2. Engine Used in a Lug Condition
3. Dirty Air Cleaner
4. Air Inlet Piping Damage or Restriction
5. Exhaust System Restriction
6. Fuel Injection Timing Not Correct
7. Fuel Setting Is Not Correct
8. Low Quality Fuel
9. Valve Adjustment Not Correct or Valve Leakage
10. Bad Fuel Nozzle(s)

Engine Runs Rough

Probable Cause(s)

11. Misfiring Cylinder(s)
12. Fuel Injection Timing Not Correct
13. Automatic Timing Advance Does Not Operate Correctly
14. Air in Fuel system

TOO MUCH EXHAUST SMOKE

Probable Cause(s)

White Smoke

Blue Smoke

1. Cold Outside Temperatures

2. Long Idle Periods

3. Low Quality Fuel

4. Air in Fuel System

5. Fuel Injection Timing Not Correct

6. Automatic Timing Advance Does Not Operate Correctly

7. Valve Adjustment Not Correct

8. Bad Fuel Nozzles(s)

9. Misfiring Cylinder(s)

10. Oil Level in Engine Too High

11. Damage to Positive Crankcase Ventilator Valve or Valve Assembled Wrong

12. Worn Valve Guides

13. Worn Piston Rings and/or Cylinder Walls

14. Wear or Damage to Pistons

DIFFICULT STARTING

Engine Crankshaft
Turns Freely

Exhaust Smoke Can Be
Seen While Starting

Exhaust Smoke Can Not
Be Seen While Starting

Probable Cause(s)

Probable Cause(s)

- 1. Cold Outside Temperatures
- 2. Air in Fuel System
- 3. Low Quality Fuel
- 4. Low Fuel Pressure
- 5. Fuel Injection Timing Not Correct
- 6. Valve Adjustment Not Correct
- 7. Bad Fuel Nozzle(s)
- 8. Low Compression

- 9. No Fuel in Tank(s)
- 10. No Fuel From Fuel Injection Pump
- 11. Exhaust System Not Open

FUEL IN CRANKCASE OIL

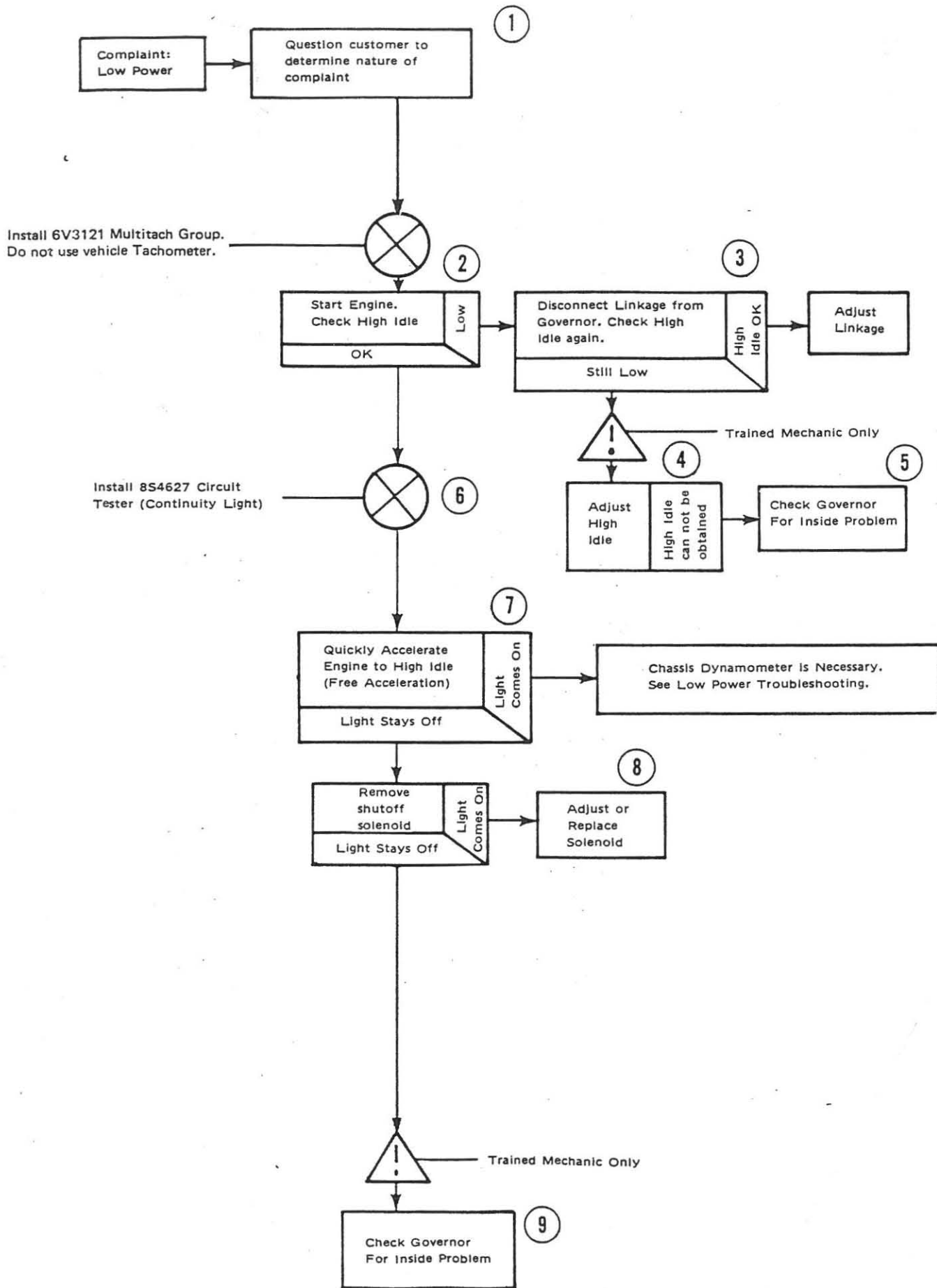
Probable Cause(s)

1. Bad Seals on Fuel Injection Pump
Camshaft and/or the Drain Line from the
Bottom of the Fuel Transfer Pump has
a Restriction

2. Loose Fuel Injection Nozzle Nut

3. Bad Fuel Nozzle(s)

PRIMARY ENGINE TEST
FOR LOW POWER



PROBLEM WITH VEHICLE OR VEHICLE OPERATION

Probable Cause(s)

1. Tachometer Error
2. Engine Operated at High Altitude
3. Brakes Do Not Completely Release
4. Vehicle Operated in Too High a Gear
5. Extra Engine Driven Equipment
6. Speedometer Error
7. Speeds Too High
8. Overload on Vehicle
9. High Moving Resistance
10. High Wind Resistance
11. Power Loss in Drive Gears
12. Wrong Gear Ratios
13. Chassis Dynamometer Error
14. Trailers That are Difficult to Pull
15. High Inlet Air Temperature

The problems in this chart are problems that do come about and are normally called "low power." These problems are not necessarily more common than engine problems, but they are possible problems which you need to read and check before an engine is disassembled.

Read all of the items but make sure the first four are checked completely before making any engine test.