



Fig. 23-8. Typical vacuum gauge readings.
(Datsun)

15 to 22 in. is marked in color. This is the normal range. Check manufacturers' specifications for exact readings.

The problems which follow (typical) are numbered 1 through 16. These numbers correspond to numbers in Fig. 23-8. Read the numbered problem description and then study the gauge reading of the same number.

1. **NORMAL READING:** Needle between 15 and 22 in. and holding steady.
2. **NORMAL READING DURING RAPID ACCELERATION AND DECELERATION:** When engine is rapidly accelerated (dotted needle) needle will drop to a low (not to 0) reading. When throttle is suddenly released, the needle will snap back up to a higher than normal figure.
3. **NORMAL FOR HIGH LIFT CAM WITH LARGE OVERLAP:** Needle will register as low as 15 in. but will be relatively steady. Some oscillation is normal.
4. **WORN RINGS OR DILUTED OIL:** When engine is accelerated (dotted needle) needle drops to 0 in. Upon deceleration, needle runs slightly above 22 in.
5. **STICKING VALVE OR VALVES:** When the needle (dotted) remains steady at a normal vacuum but occasionally flicks (sharp, fast movement) down and back about 4 in., one or more valves may be sticking.

6. **BURNED OR WARPED VALVES:** A regular, evenly spaced downscale flicking of the needle indicates one or more burned or warped valves. Insufficient tappet clearance will also cause this action.
7. **POOR VALVE SEATING:** A small but regular downscale flicking can mean one or more valves are not seating.
8. **WORN VALVE GUIDES:** When the needle oscillates (swings back and forth), over about a 4 in. range at idle speed, the valve guides could be worn. As engine speed is increased, needle will become steady if guides are responsible.
9. **WEAK VALVE SPRINGS:** When the needle oscillation becomes more violent as engine rpm is increased, weak valve springs are indicated. The reading at idle could be relatively steady.
10. **LATE VALVE TIMING:** A steady but low reading could be caused by late valve timing.
11. **IGNITION TIMING RETARDING:** Retarded ignition timing will produce a steady but somewhat low reading.
12. **INSUFFICIENT SPARK PLUG GAP OR DEFECTIVE BREAKER POINTS:** When plugs are gapped too close, or when the distributor points are defective, a regular, small pulsation of the needle can occur.
13. **INTAKE LEAK:** A low, steady reading, can be caused by an intake manifold or carburetor mounting flange gasket leak.
14. **BLOWN HEAD GASKET:** A regular drop of fair magnitude can be caused by a blown head gasket or warped head to block surface.
15. **CLOGGED EXHAUST SYSTEM:** When the engine is first started and is idled, the reading may be normal but as the engine rpm is increased, the back pressure caused by a clogged muffler, kinked tail pipe, etc., will cause the needle to slowly drop to 0. The needle then may rise slowly. Excessive exhaust clogging will cause the needle to drop to a low point even if the engine is only idled.
16. **IMPROPER CARBURETOR ADJUSTMENT:** If the carburetor idle mixture is poorly adjusted, the needle will move slowly back and forth. By adjusting the idle mixture needle valves, the rolling needle motion will stop.