

Diagnosing of Engine by Means of Vacuum Gauge and Combustion Tester

Information taken from Clymer Publications Datsun Sports Car and Service Manual, Eighth printing, December, 1978

In diagnosing the engine, the condition of each cylinder can be assumed by measuring its compression.

For employment of a vacuum gauge, connect it to the engine intake manifold and refer to Fig. 2.

The use of a master motor tester as showing in Fig. 2 is convenient.

When a combustion tester is used, install a special intake (pick-up) in the exhaust tube, and after the engine has been started, analyze by means of a special gauge, the combustion gas which flows through the connecting hose into the tester, and judge the combustion condition according to the mixture ratio of fuel and air. When measurement is to be made in rainy or cold weather, use an auxiliary condenser between the pick up and the meter; otherwise, the excessive moisture in the exhaust gas will damage the functioning of the meter if permitted to enter it.



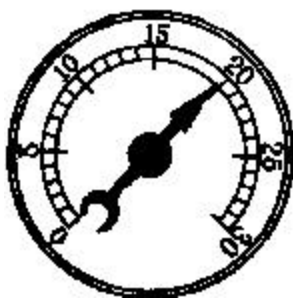
Fig. 2
**Motor master tester available
for 4, 6, and 8 cylinder engines**

When a tester is to be used, make adjustments according to the following table.

Conditions (Without load)	Suitable Weight Ratio of Mixture
Low Speed Running (600 r. p. m.)	70 ± 2%
High Speed Running (2, 000 r. p. m.)	+ 5 85 - 2

Engine Trouble Shooting

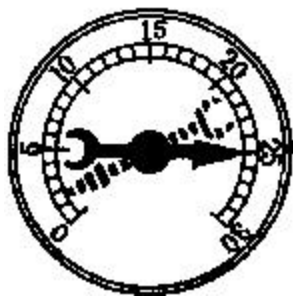
Fig. 3 is intended to be of assistance in the systematic analysis and isolation of symptoms of engine troubles so that the defective points may be accurately traced and economically repaired



(1)
Normal Condition
Settles between
18 ~ 20 in.



(4)
When above (3)
condition exists,
indicator will swing
to 0 in. if engine is
raced.



(2)
Normal condition
When indicator
fluctuates
between a range
of 0~25 in. as
engine is raced,
rings and valves
are in good
condition



(5)
When indicator
sometimes drops
by 4 in., or so,
valve sticking exists



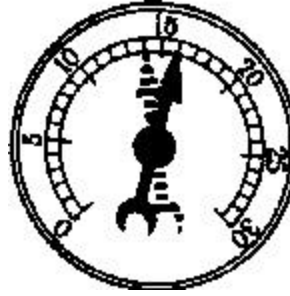
(3)
Even if indicator
settles, if reading
is low rings or oil
are in faulty
condition.



(6)
When indicator
drops by several
inches at certain
time, valves are
burnt.



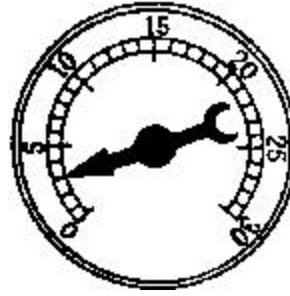
(7)
When indicator drops by about 2 in., valves leak.
(Faulty seating of valves.)



(12)
When indicator moves slowly between 14~16 in., it is because either electrode gaps of plugs are too narrow, or breaker point is defective.



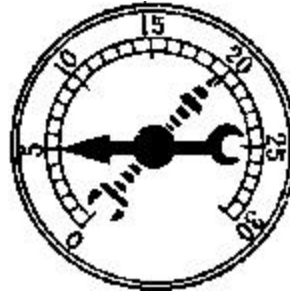
(8)
When indicator oscillates actively between 14 and 18 in., valve stem guide is worn out.



(13)
when indicator points to 5 in. or below, there is leakage at the intake-manifold or gasket of carburetor.
(Faulty clamping of gasket.)



(9)
When, with a slight speeding up, indicator moves between 10~22 in., and with increase of speed, the range becomes larger, valve springs are weak.



(14)
When indicator oscillates regularly between 5~19 in., there is leakage at the cylinder head gasket. (Faulty clamping of gasket.)



(10)
When indicator remains still between 8~15 in., it is because either valve timing is retarded or valve clearances are not correct.



(15)
When indicator first rises high, drops down to zero, and then returns to 16 in., muffler is clogged.



(11)
When indicator settles between 14~17 in., ignition timing is retarded



(16)
When indicator moves slowly between 13~17 in., carburetor is poorly adjusted.

Fig 3. Diagnosing engine by means of a vacuum gauge