

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather hose. If the hose is smoky, check for a seized piston ring.

### Compression too low, hard starting or poor performance at low speed

- Valves
  - Incorrect valve clearance
  - Burned or bent valve
  - Incorrect valve timing
  - Weak valve spring
  - Uneven valve seating
  - Valve stuck open
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug
- Cylinder/piston problem.

### Compression too high

- Excessive carbon build-up on piston head or combustion chamber

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (page 9-3)

### Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn rocker arm and/or shaft
- Worn rocker arm and valve stem end
- Worn cam sprocket teeth or cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (page 9-3)

### Rough idle

- Low cylinder compression

## CYLINDER COMPRESSION

Warm up the engine to normal operating temperature. Stop the engine and remove the spark plug.

Install the compression gauge [1] into the spark plug hole.

Shift the transmission into neutral.

Open the throttle all the way and crank the engine with the starter motor or kickstarter until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.

### COMPRESSION PRESSURE:

**1,275 kPa (13.0 kgf/cm<sup>2</sup>, 185 psi) at 300 min<sup>-1</sup> (rpm)**

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

If compression is low, pour 3 – 5 cm<sup>3</sup> (0.1 – 0.2 oz) of engine oil into the cylinder through the spark plug hole and recheck the compression.

If the compression increases from the previous value, check the cylinder, piston and piston rings.

- Leaking cylinder head gasket
- Worn cylinder, piston or piston ring

If compression is the same as the previous value, check the valves for leakage.

