



Modern Automotive Technology Chapter 11

Engine Fundamentals

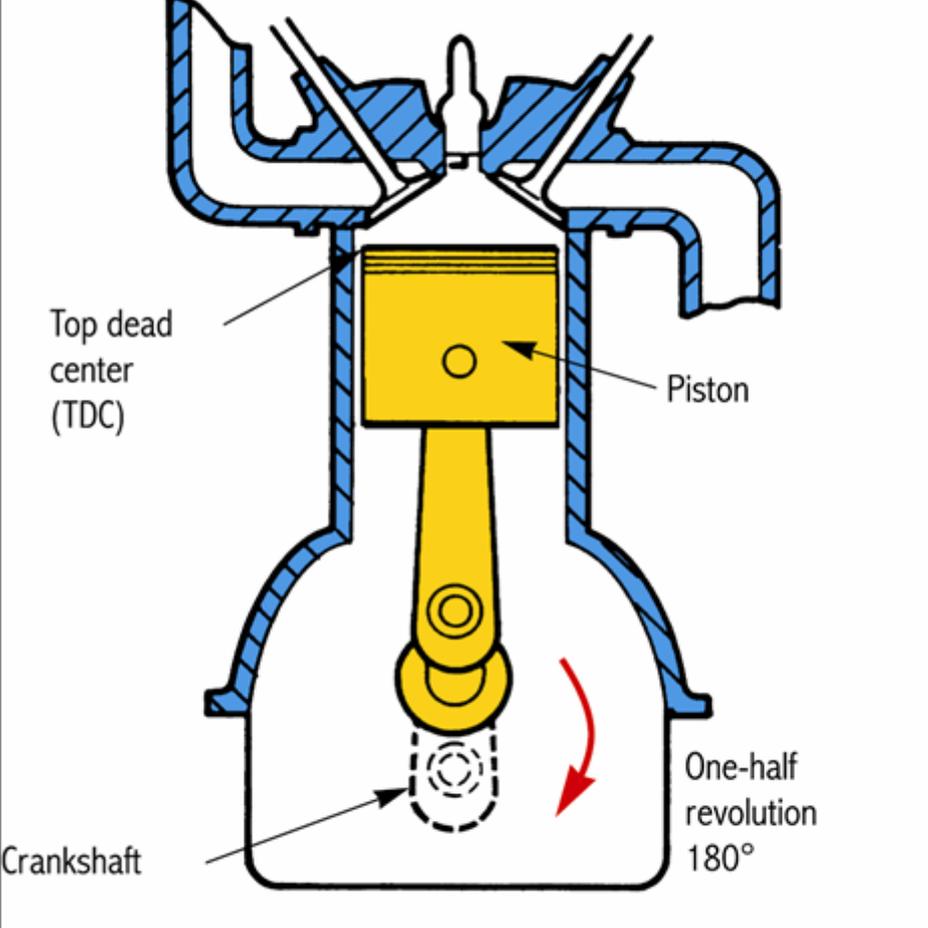
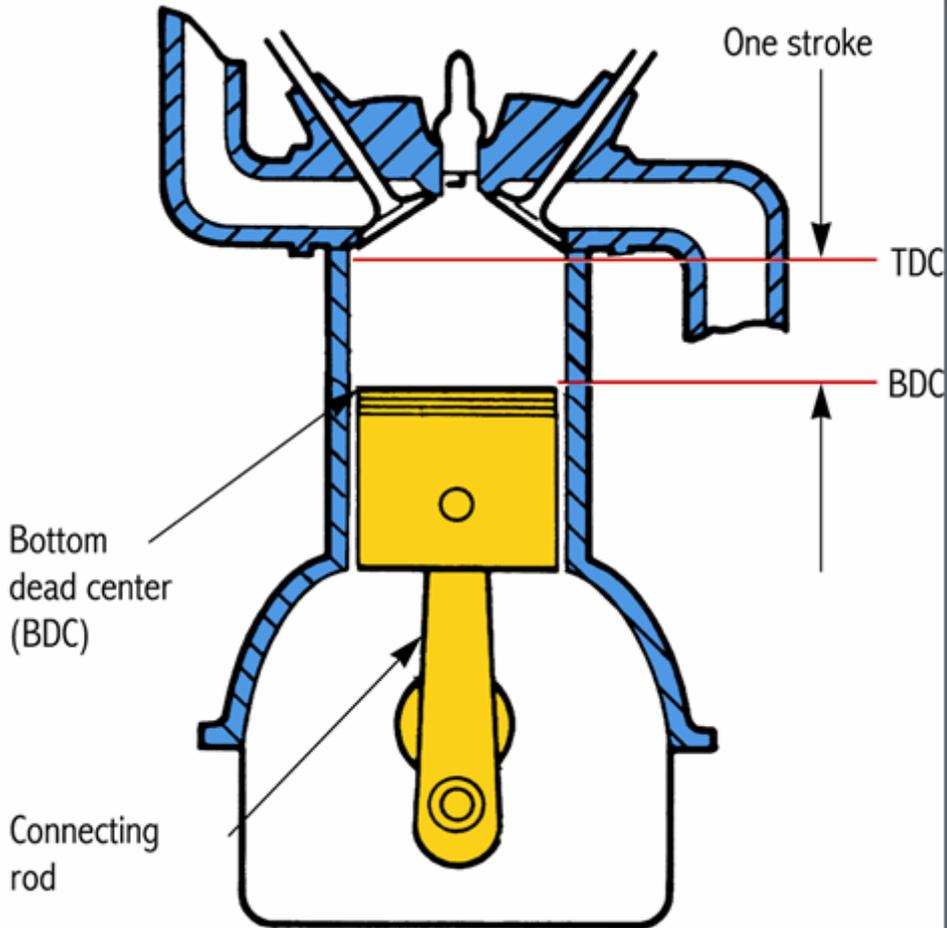
Learning Objectives

- Identify the major parts of a typical automotive engine.
- Describe the four-stroke cycle. Define common engine terms.
- Explain the basic function of the major parts of an automotive engine.
- Cite and demonstrate safe working practices related to engines.
- Correctly answer ASE certification test questions that require knowledge of the basic operation of piston engines.

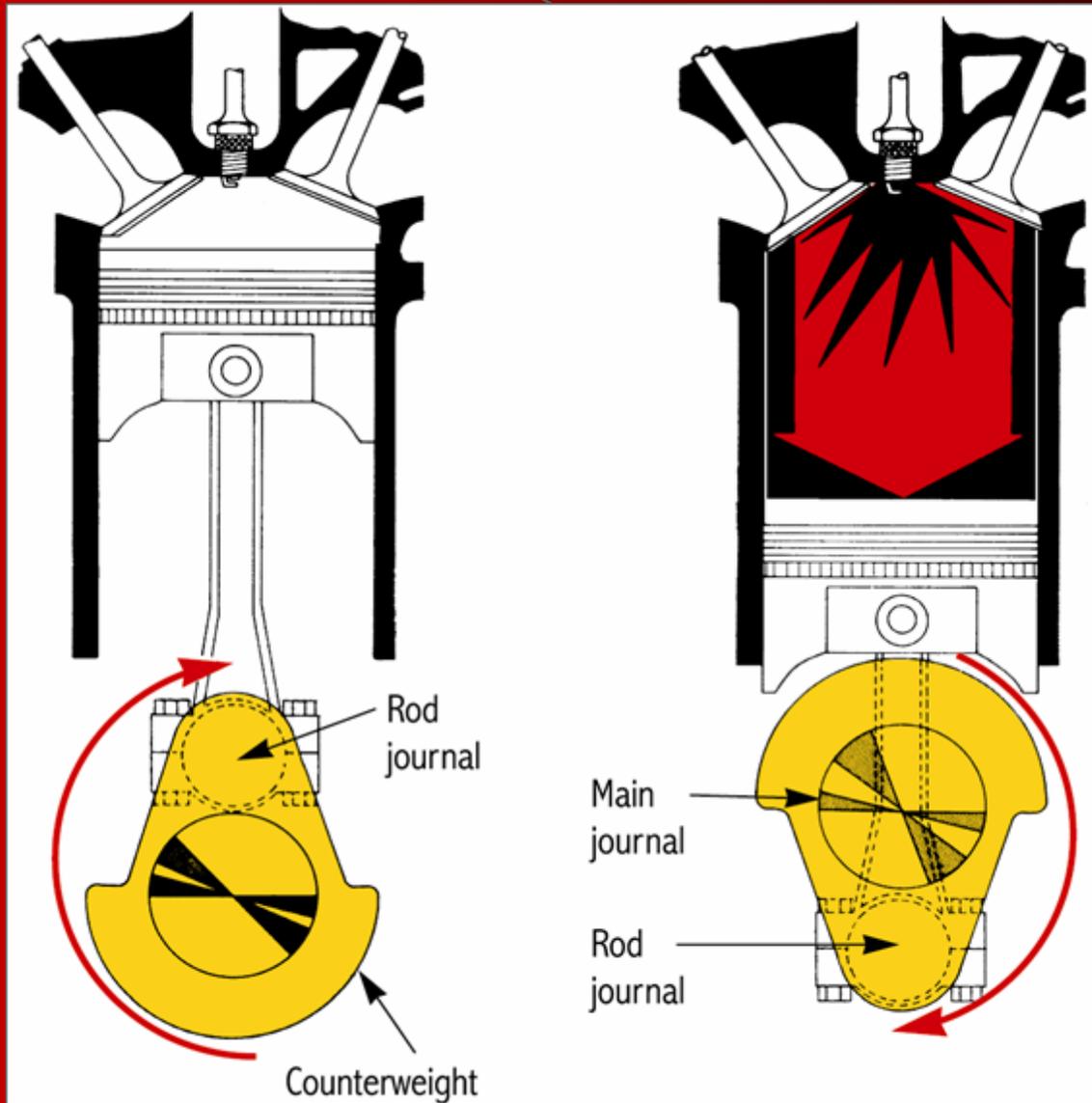
Engine Fundamentals

1. The *piston stroke* is the distance of up and down movement from TDC to BDC
2. The *crankshaft* harnesses the force produced by the downward thrust of the pistons.
3. The *exhaust stroke* removes the burned gases from the engine and readies the cylinder for a fresh charge of air and fuel.

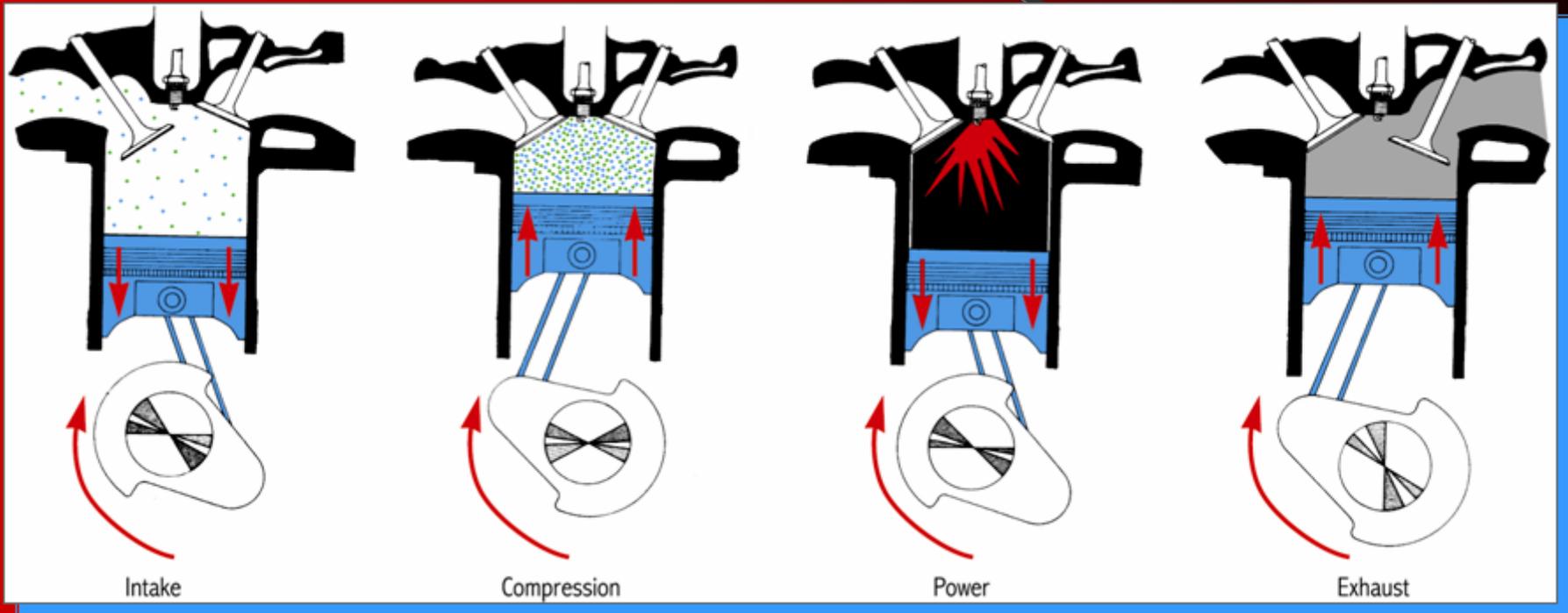
Piston Stroke



Crankshaft



Engine Fundamentals

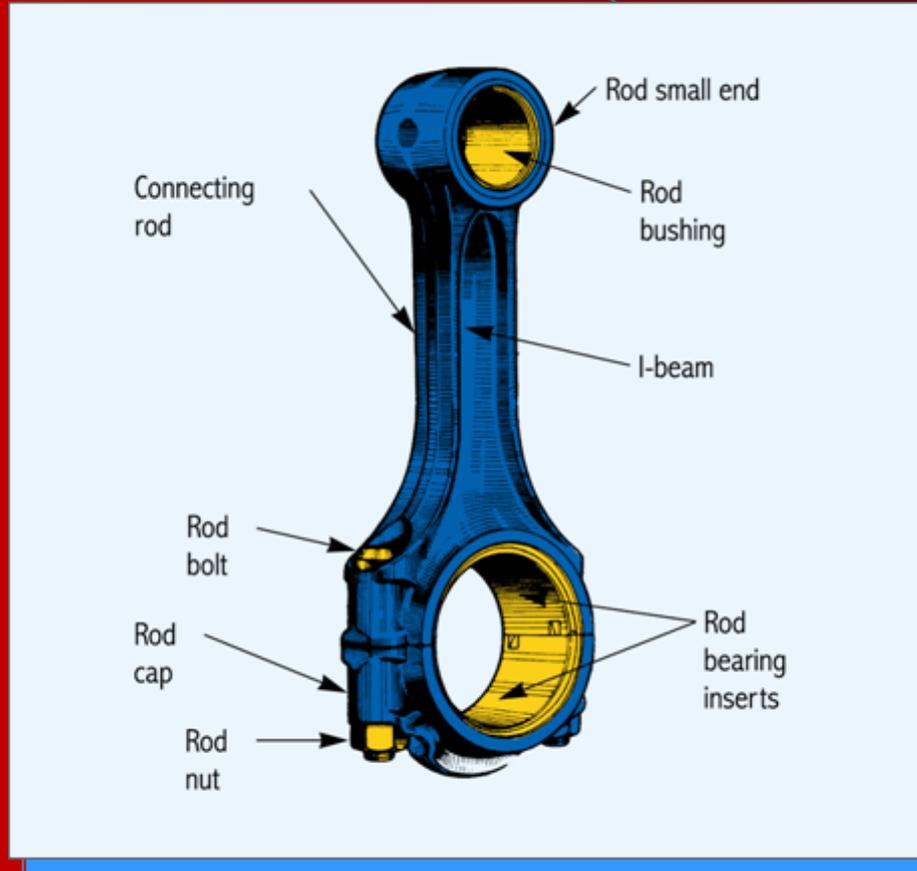


Four-Stroke Cycle

Engine Fundamentals

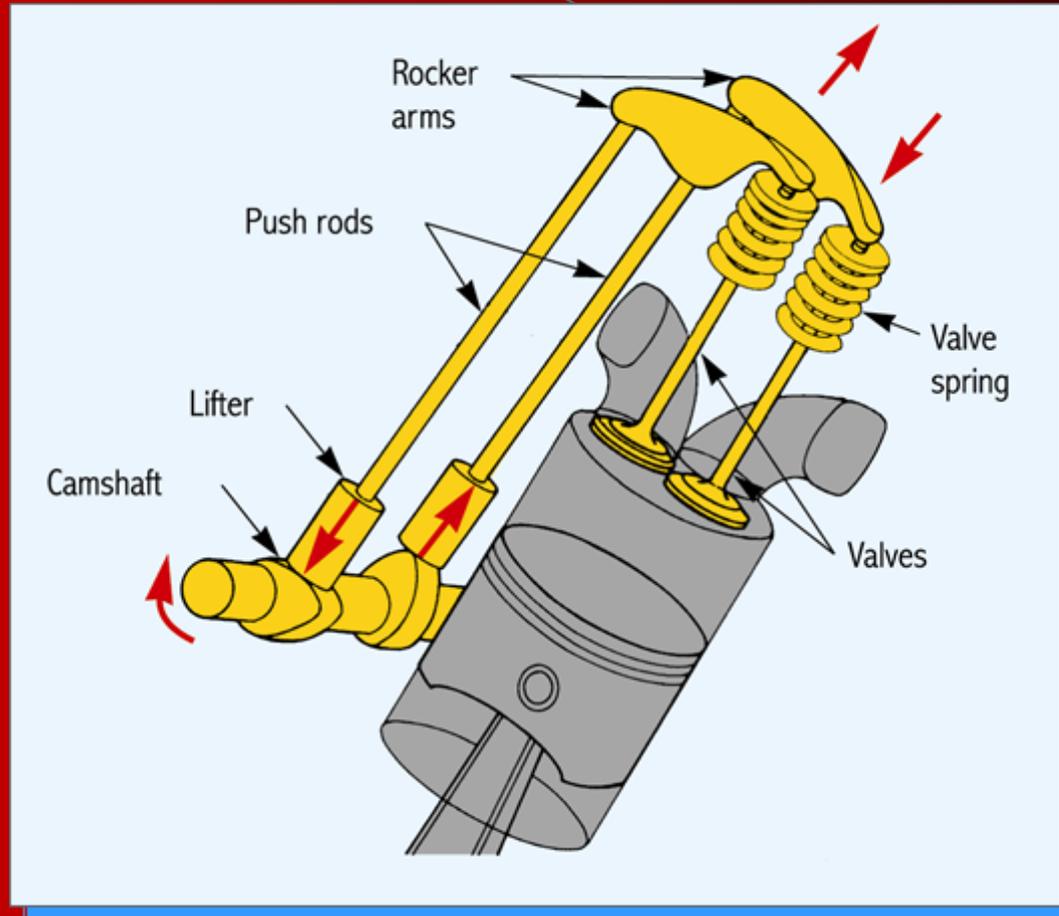
4. The *valve lifter* usually rides on the cam lobes and transfers motion to the rest of the valve train.
5. The *connecting rod* fastens the piston to the crankshaft.
6. *The flywheel* is mounted on the rear of the crankshaft.

Engine Fundamentals



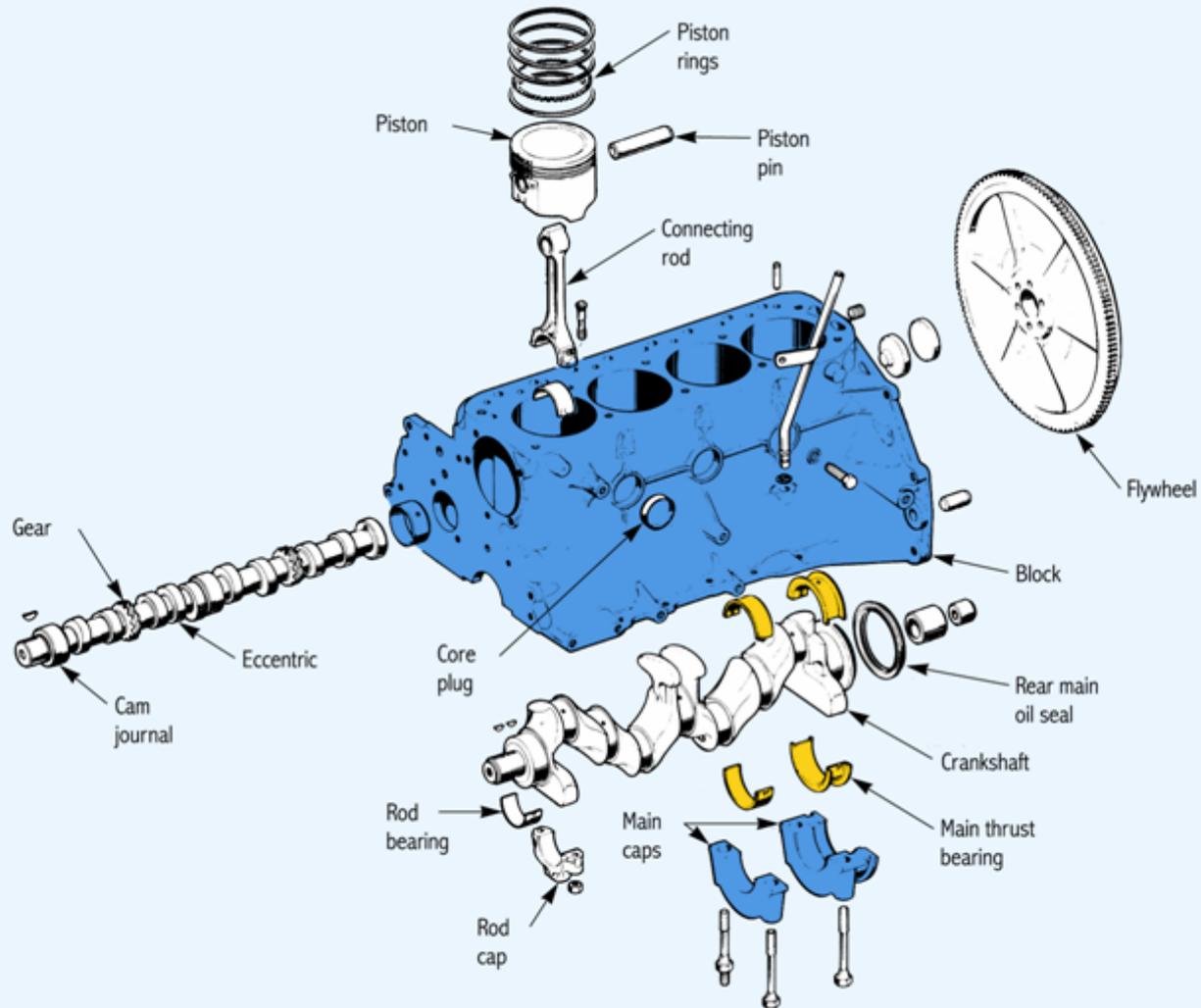
Connecting Rod

Engine Fundamentals



Valve Train

Engine Fundamentals



Engine Fundamentals

7. The *engine block* forms the main body of the engine.
8. The *compression stroke* squeezes the air-fuel mixture to prepare it for combustion.

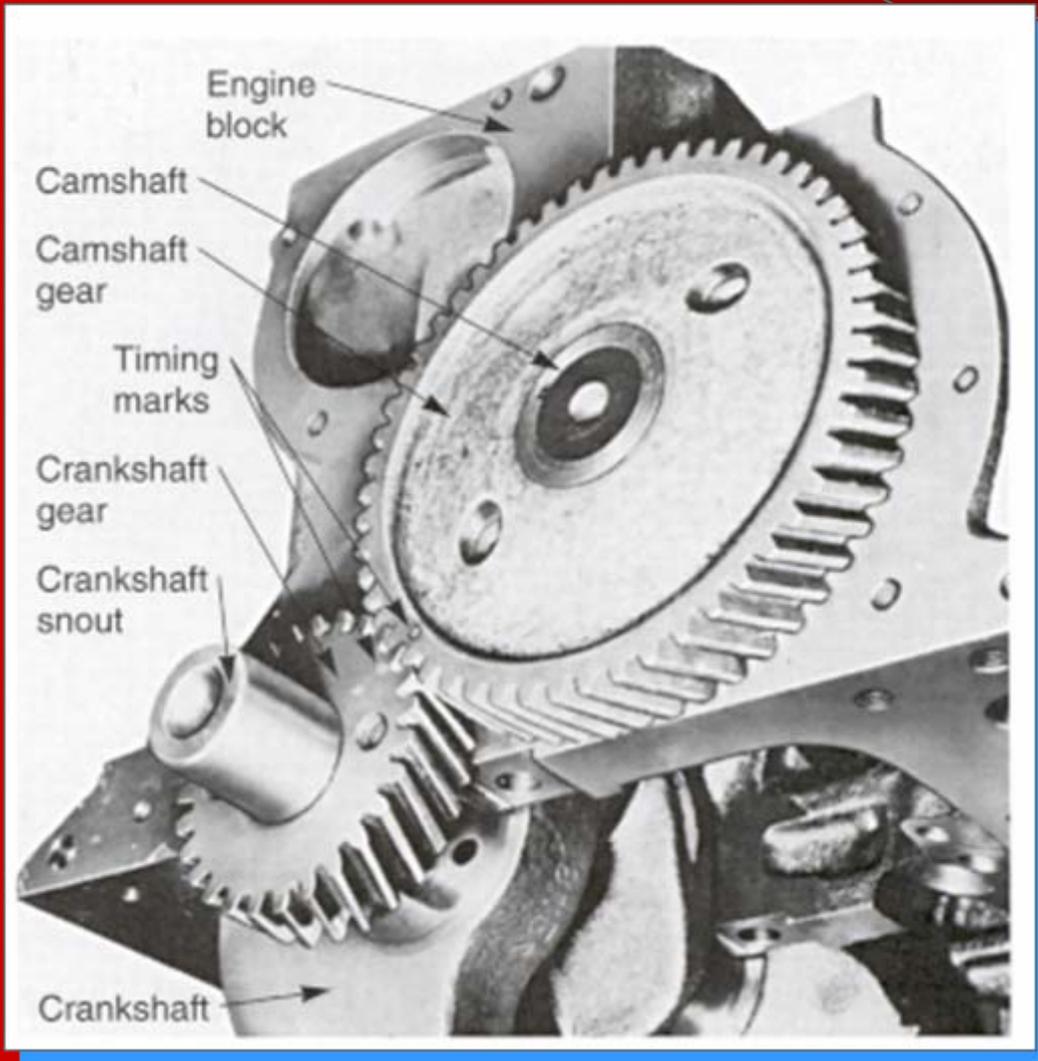
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9. The *intake stroke* draws fuel and air into the engine.
10. The *power stroke* burns the air-fuel mixture and pushes the piston down with tremendous force.

Engine Fundamentals

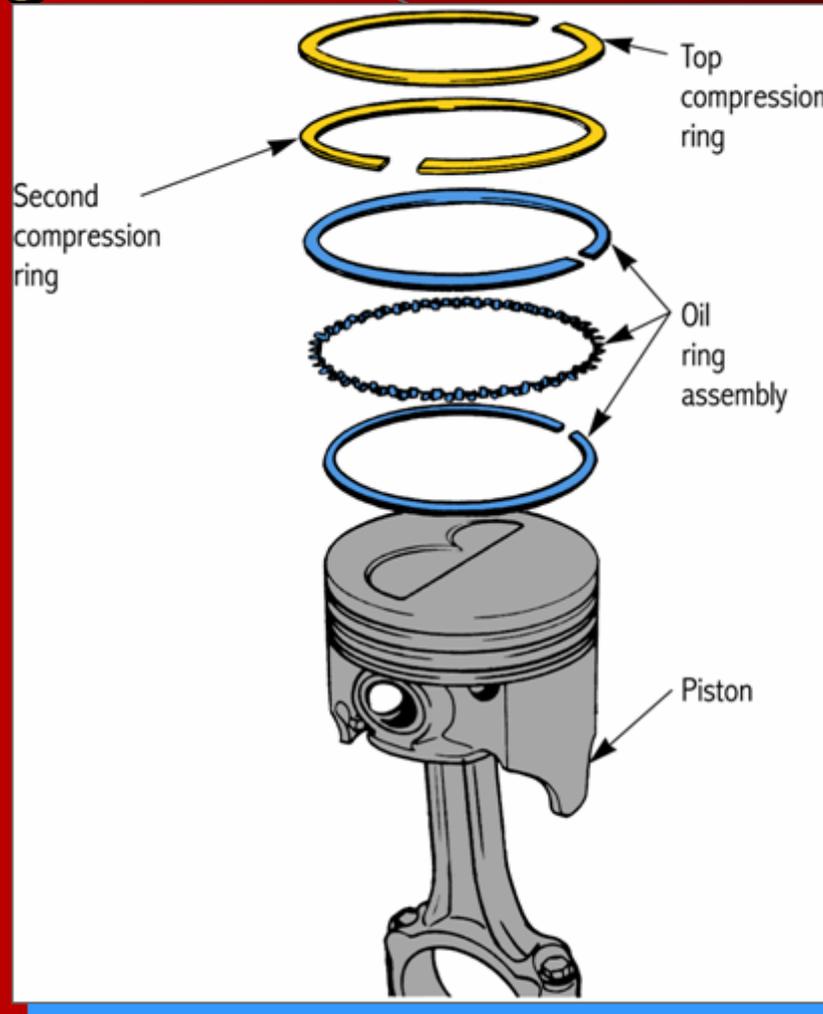
- Two timing gears are used to drive the camshaft
 - one on the crankshaft and one on the camshaft
- Cam gear is twice the size of the crank gear
 - provides a 2:1 reduction

Timing Gears



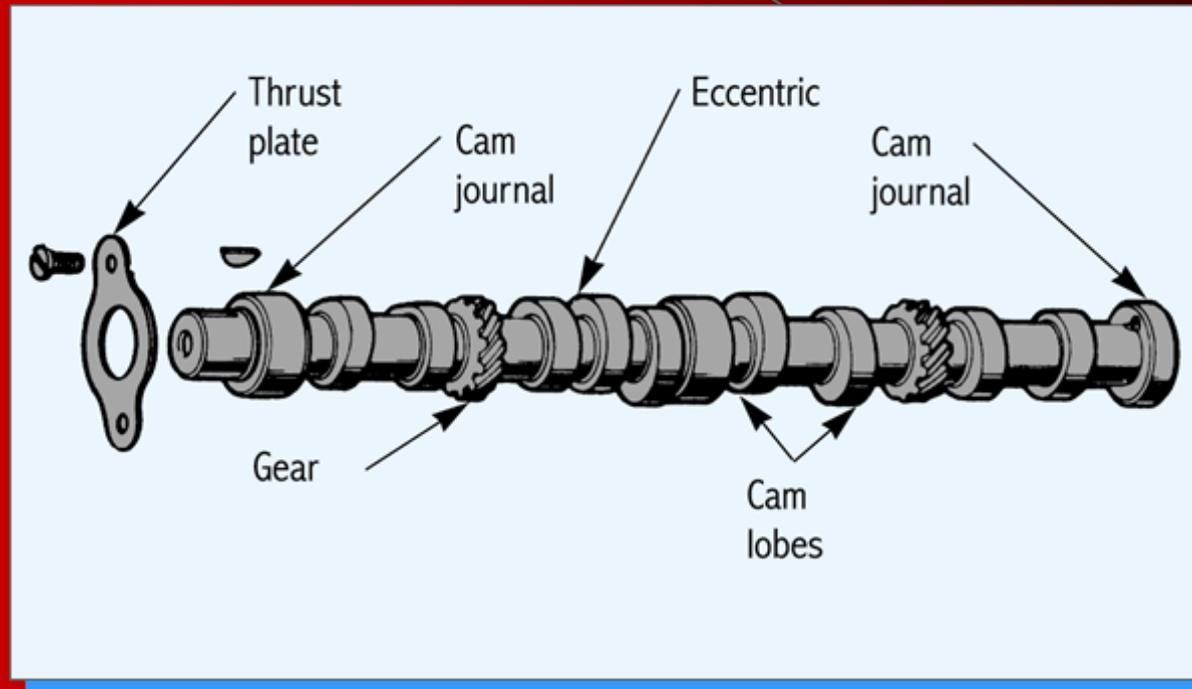
Timing marks show the technician how to install the gears properly

Engine Fundamentals



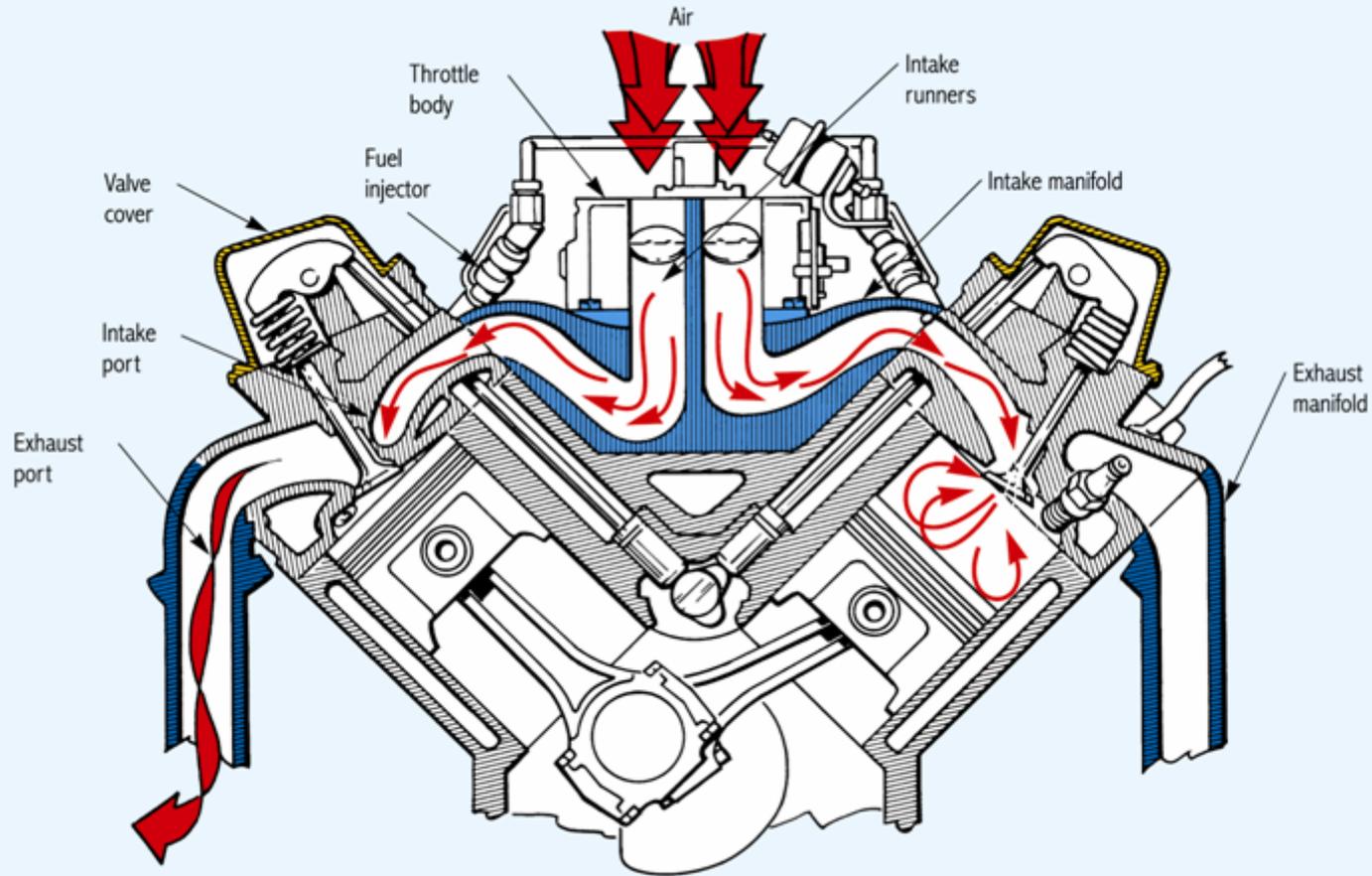
Piston Rings

Engine Fundamentals

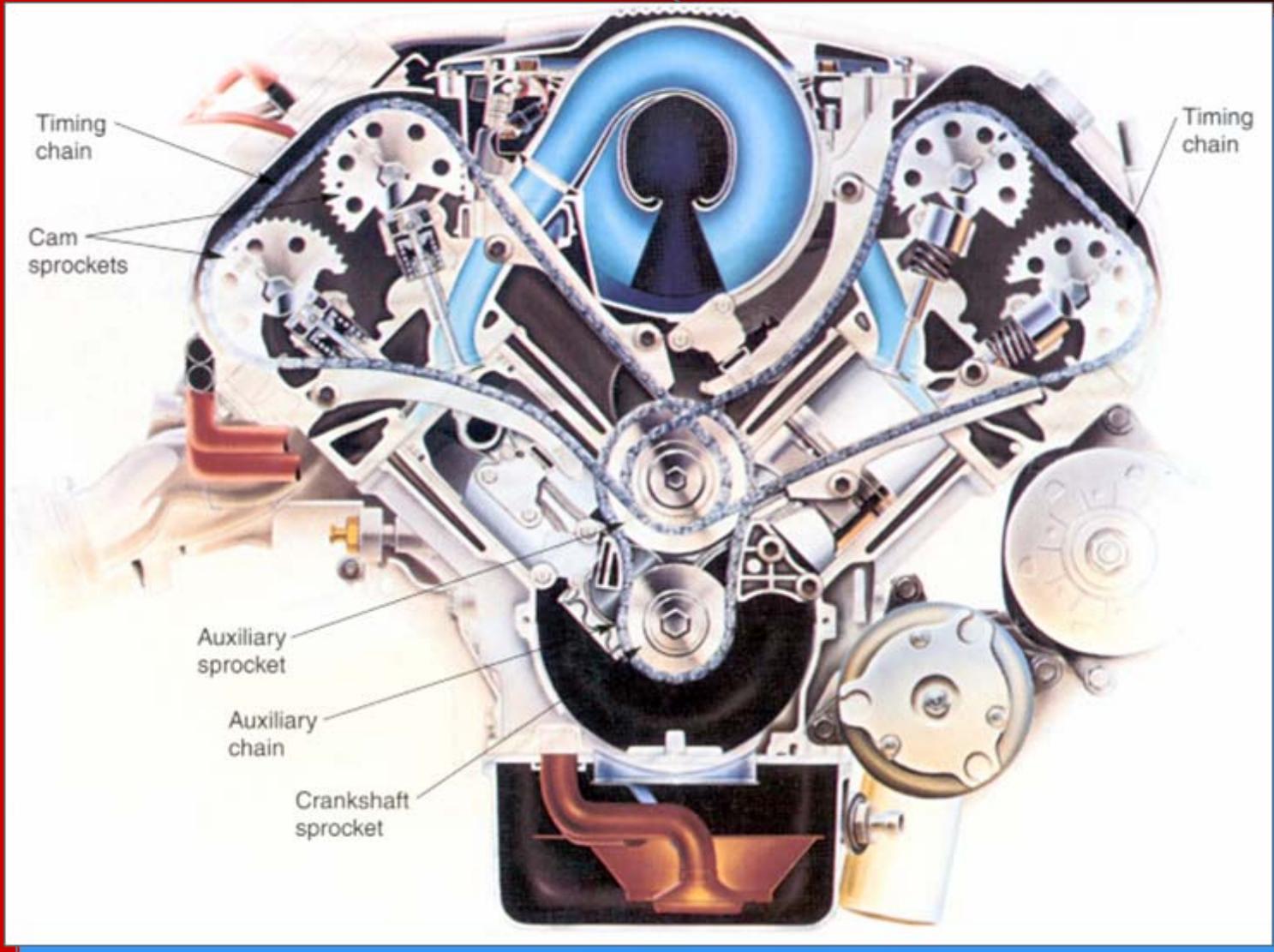


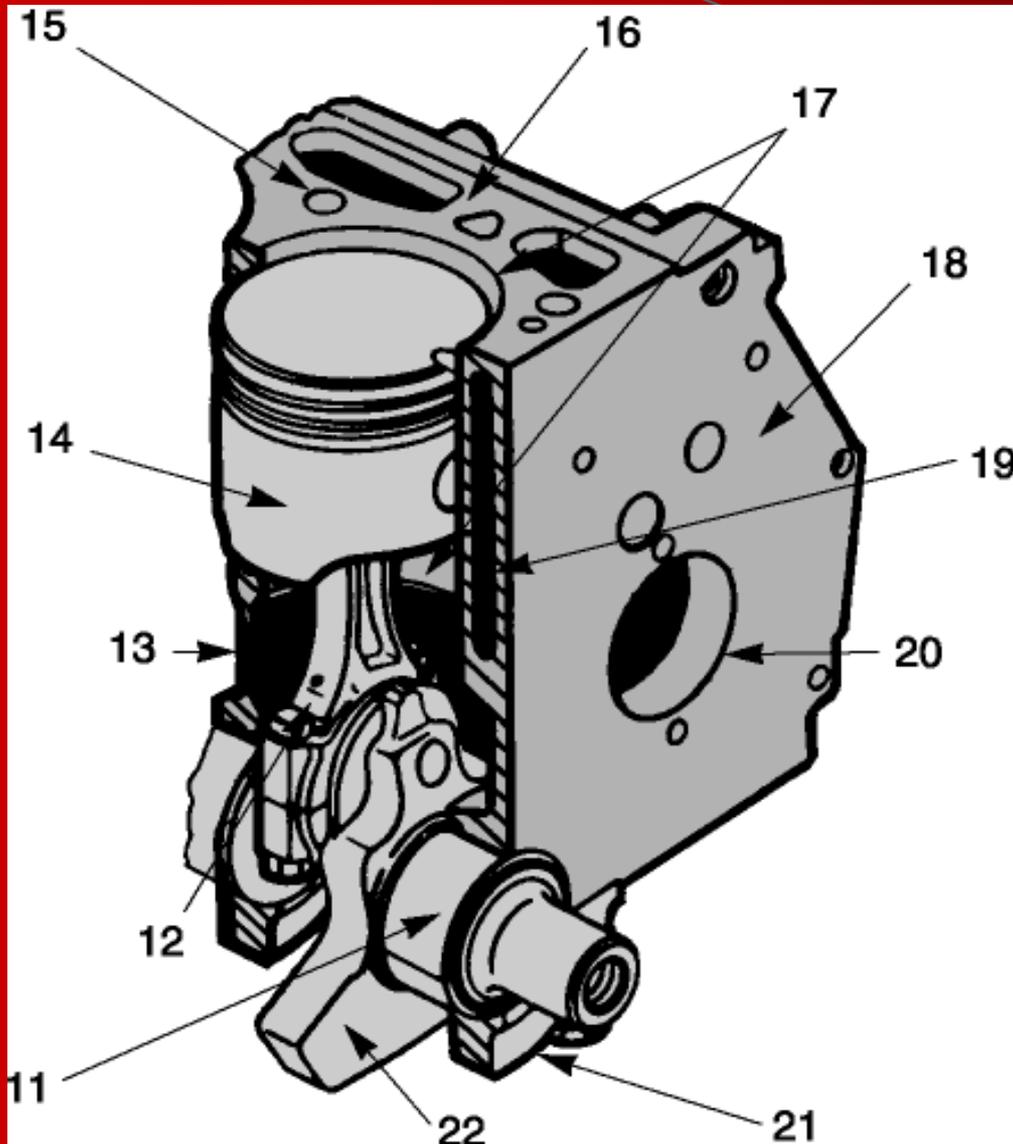
Camshaft

Engine Manifolds



DOHC Timing Chain





- 11. Main bearing
- 12. Connecting rod
- 13. Crankcase
- 14. Piston assembly
- 15. Head bolt hole
- 16. Deck
- 17. Cylinder
- 18. Cylinder block
- 19. Water jacket
- 20. Camshaft bore
- 21. Main cap
- 22. Crankshaft

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