
Q630 - Motor Plants

1. You are analyzing the data used for trend analysis for a two-stroke main propulsion diesel engine on your river push boat. Although the engine has yet to experience a safety shutdown on high crankcase pressure, over time the crankcase pressure (which normally runs in a vacuum) has gradually become less negative. Which of the following failures would most likely be responsible for this condition?

- Burned cylinder exhaust valve
- Dribbling injector needle valve
- **Worn piston compression rings**
- Leaking crankcase handhole cover

Note:
Gradual reduction in crankcase vacuum, which is normally a vacuum, is most likely caused by worn piston compression rings, which increase combustion gas leakage into the crankcase over time.

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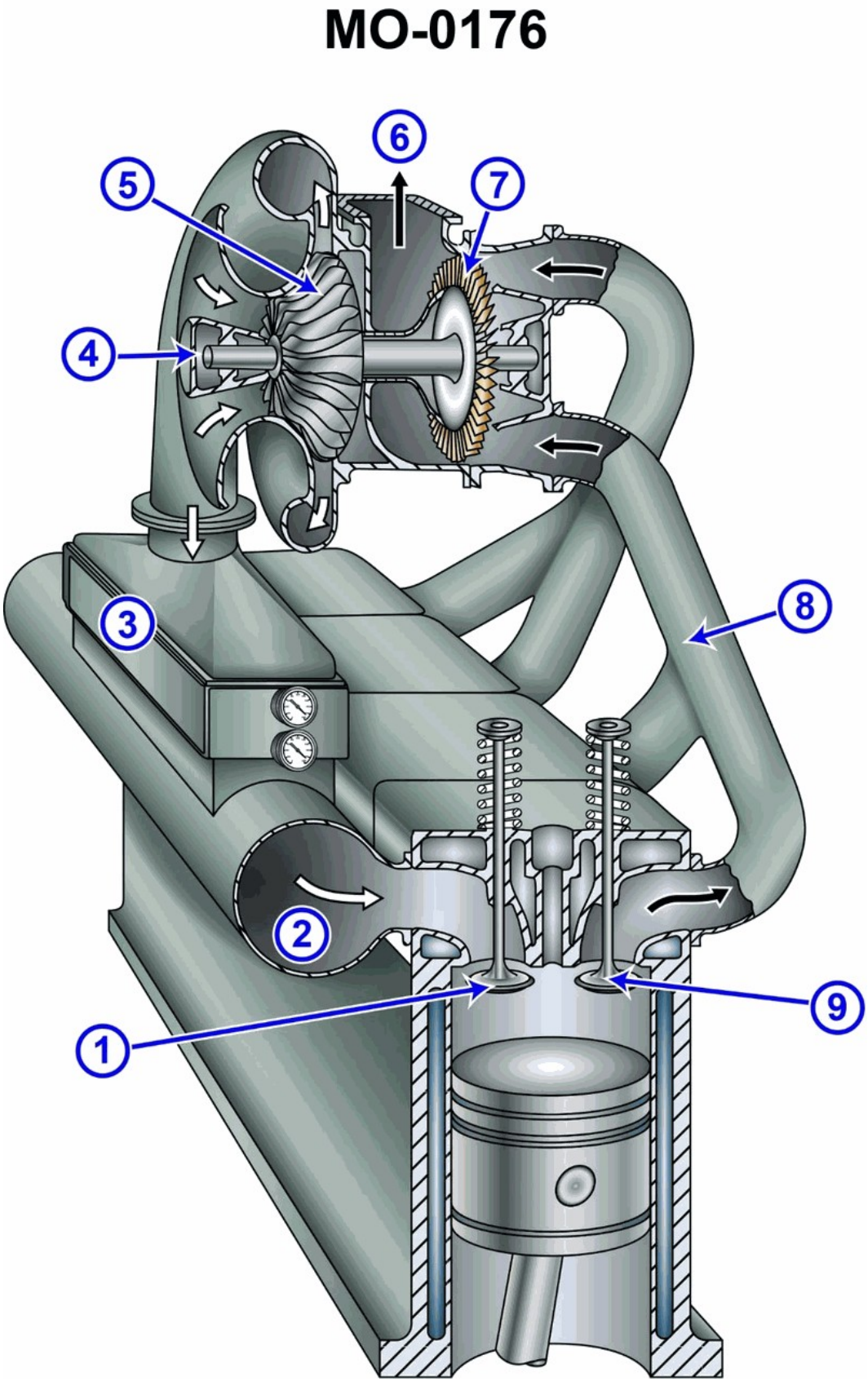
2. The anchor handling supply vessel to which you are assigned has diesel generator engines fitted with intake and exhaust systems as shown in the illustration. What type of turbo-charging configuration is used



- Boost-controlled turbocharging
- Constant pressure turbocharging

- 2-stage turbocharging
- **Pulse turbocharging**

Note:
The illustration depicts individual exhaust runners directly feeding the turbine, characteristic of pulse turbocharging. This configuration preserves exhaust pulses for turbine energy, differentiating it from constant pressure systems which use a common manifold to smooth pulses, and two-stage systems which utilize multiple turbochargers. Boost control refers to pressure regulation, not the exhaust manifold layout.

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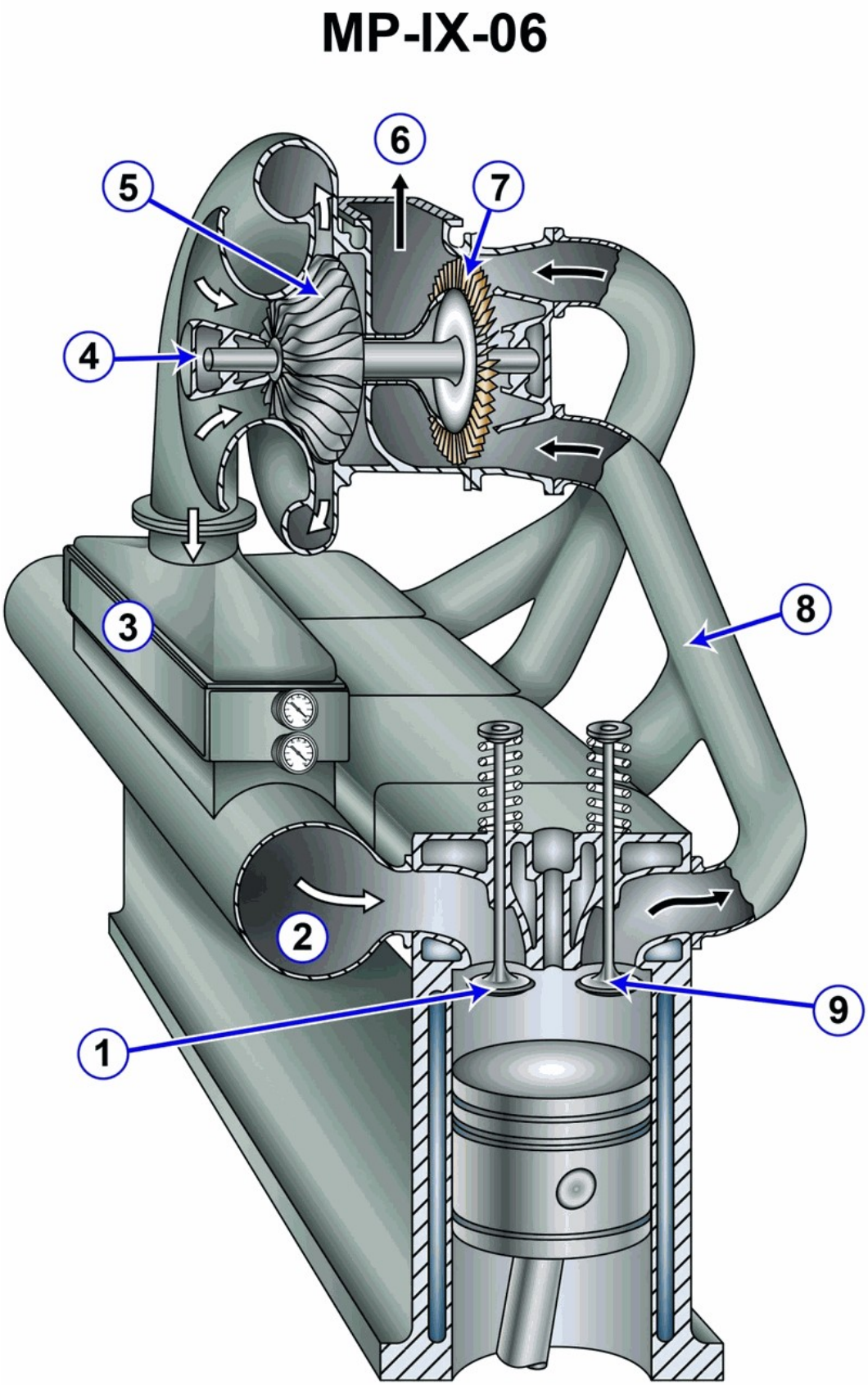
3. The river push boat to which you are assigned has diesel generators fitted with intake and exhaust systems as shown in the illustration. What does the component labeled "3" represent



- Wet muffler
- **Charge air cooler**
- Charge air manifold

- Exhaust manifold

Note:
The component labeled '3' is a charge air cooler, positioned in the intake path after the turbocharger compressor to cool the compressed air and increase its density before it enters the engine cylinders.

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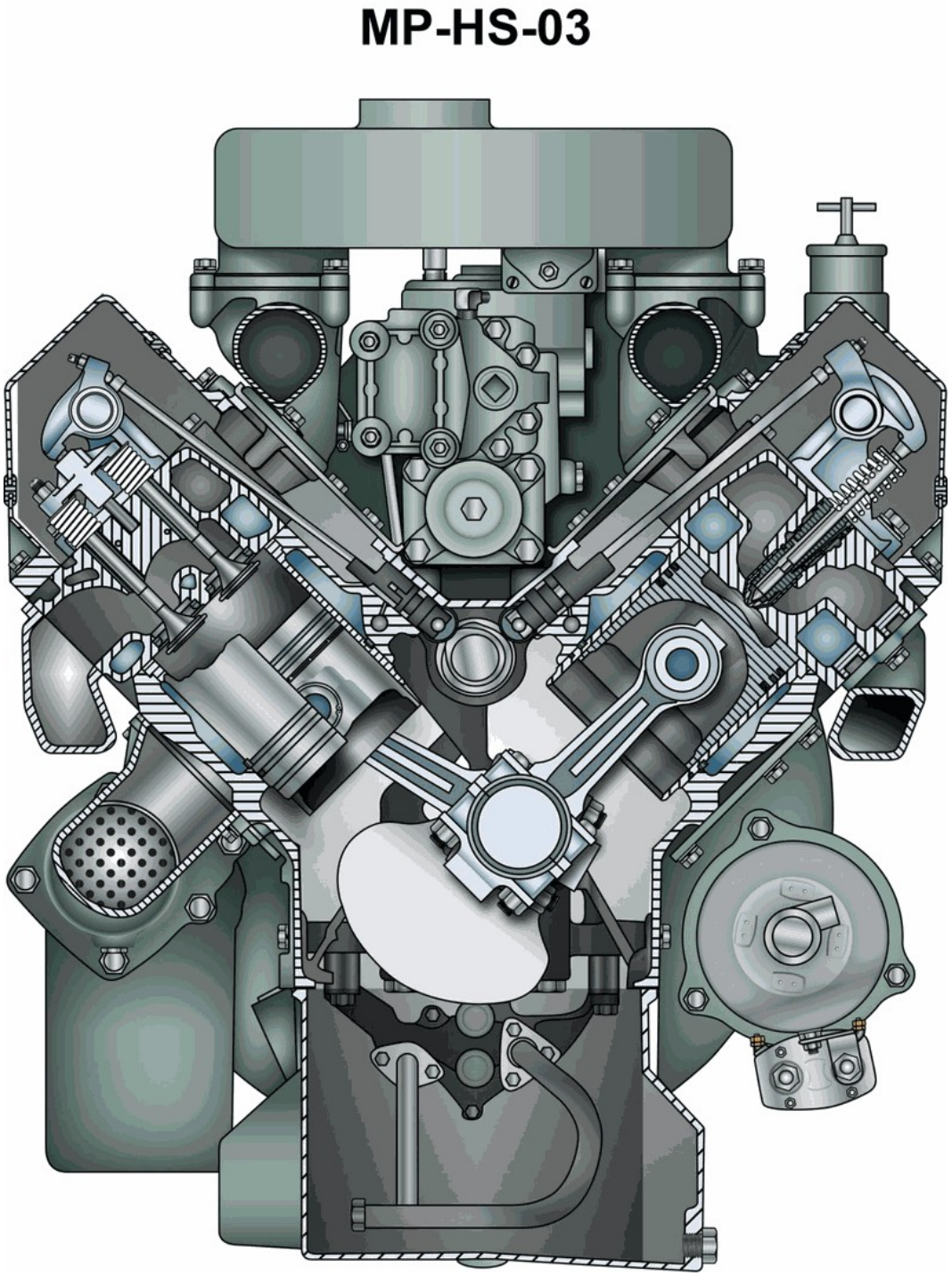
4. The anchor handling vessel to which you are assigned is fitted with generator drive engines of the type shown in the illustration. In terms of operating cycle and cylinder configuration, what statement is true



- This is a two-stroke cycle, 90° V-type engine
- This is a four-stroke cycle, 90° V-type engine
- This is a four-stroke cycle, 60° V-type engine
- **This is a two-stroke cycle, 60° V-type engine**

Note:
The engine is a two-stroke cycle with a 60 V-type configuration, as evidenced by the scavenge ports in the cylinder liner and the narrow angle between the cylinder banks.

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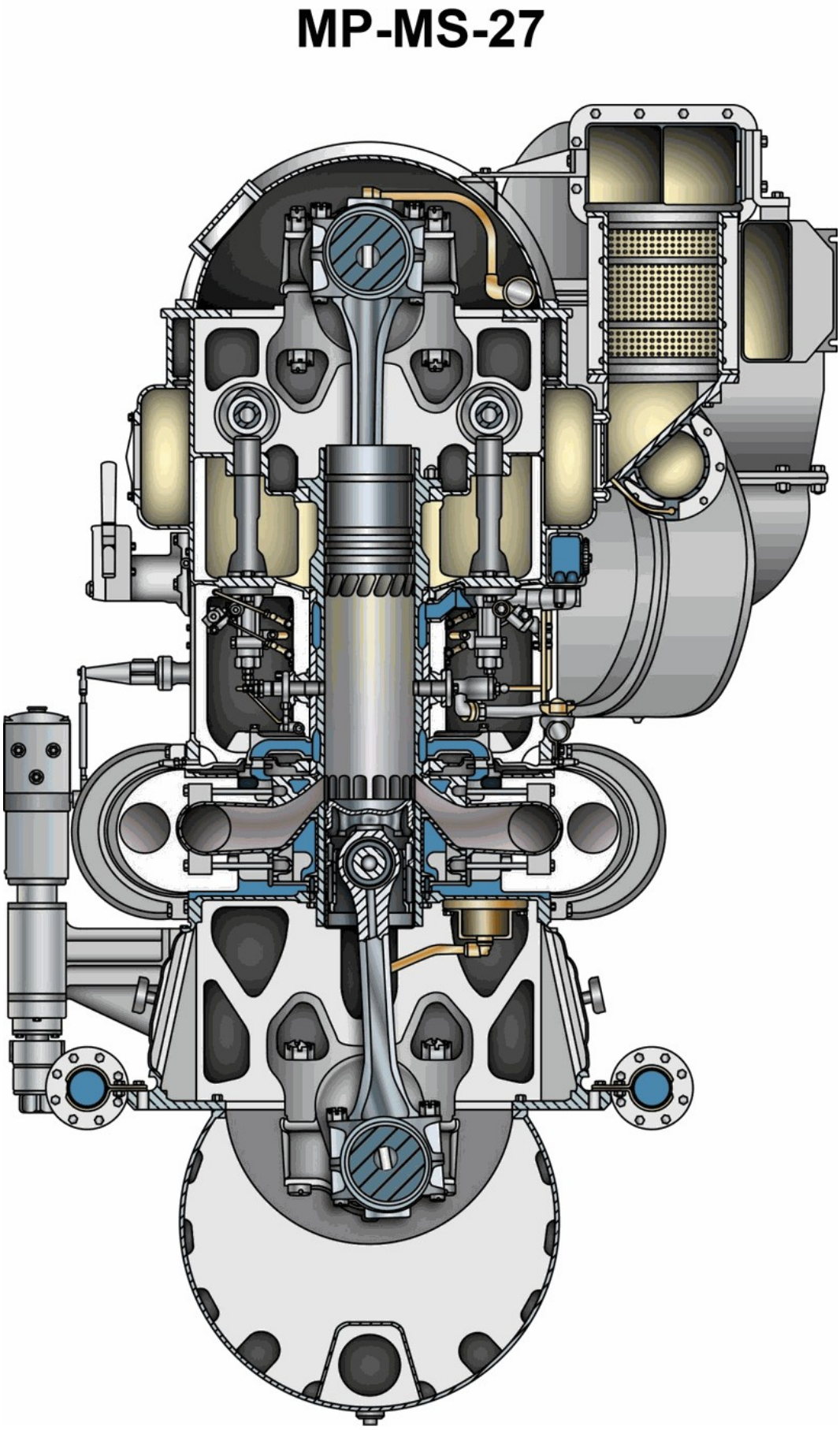
5. The fishing industry factory ship to which you are assigned has a main propulsion engine of the type shown in the illustration. In terms of piston action, operating cycle, and piston type, what statement is true concerning this engine type



- This is a double-acting, four-stroke cycle, opposed piston type engine.
- **This is a single-acting, two-stroke cycle, opposed piston type engine.**
- This is a double-acting, two-stroke cycle, crosshead piston type engine.
- This is a single-acting, two-stroke cycle, crosshead piston type engine.

Note:
The engine features two pistons within a single cylinder, combustion occurring between their crowns, and utilizes ports for intake and exhaust, indicating a single-acting, two-stroke cycle, opposed-piston design. This configuration distinguishes it from engines with cylinder heads, crosshead pistons, or double-acting mechanisms, and the presence of ports and a blower confirms the two-stroke cycle.

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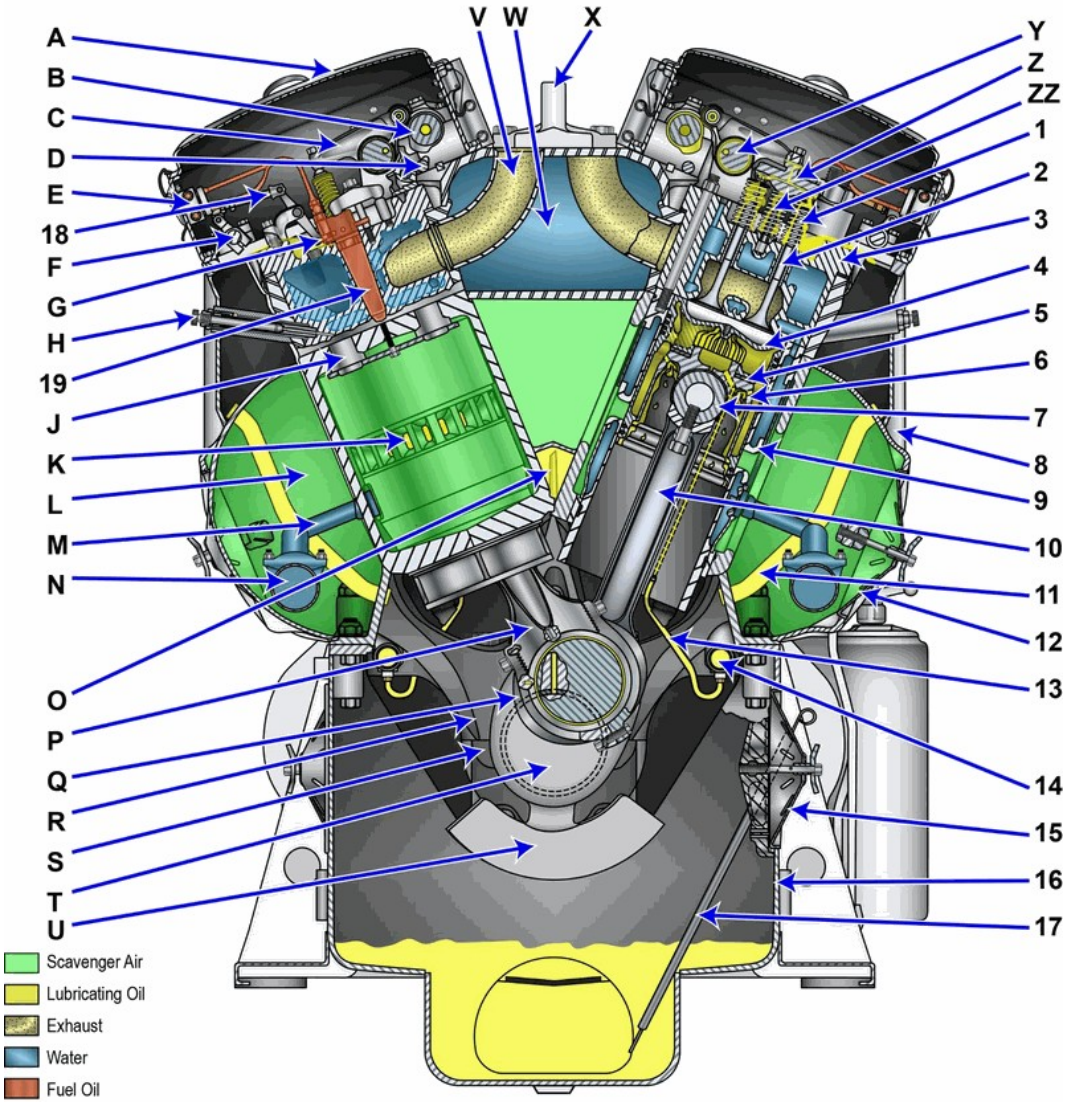
6. You are on a river towboat using main propulsion engines of the type shown in the illustration. What statement represents the procedure for inspection of the lower cylinder liner bore while in place inside the engine

MO-0122



- With the particular piston positioned at BDC and the corresponding oil pan hand hole cover removed, inspect the lower liner bore through the crankcase opening.
- With the particular piston positioned at BDC and the corresponding air box hand hole cover removed, inspect the lower liner bore through the crankcase opening.
- **With the particular piston positioned at TDC and the corresponding oil pan hand hole cover removed, inspect the lower liner bore through the crankcase opening.**
- With the particular piston positioned at TDC and the corresponding air box hand hole cover removed, inspect the lower liner bore through the crankcase opening.

Note:
The lower cylinder liner bore is inspected by positioning the piston at TDC, removing the oil pan hand hole cover, and observing through the crankcase opening to ensure proper condition.

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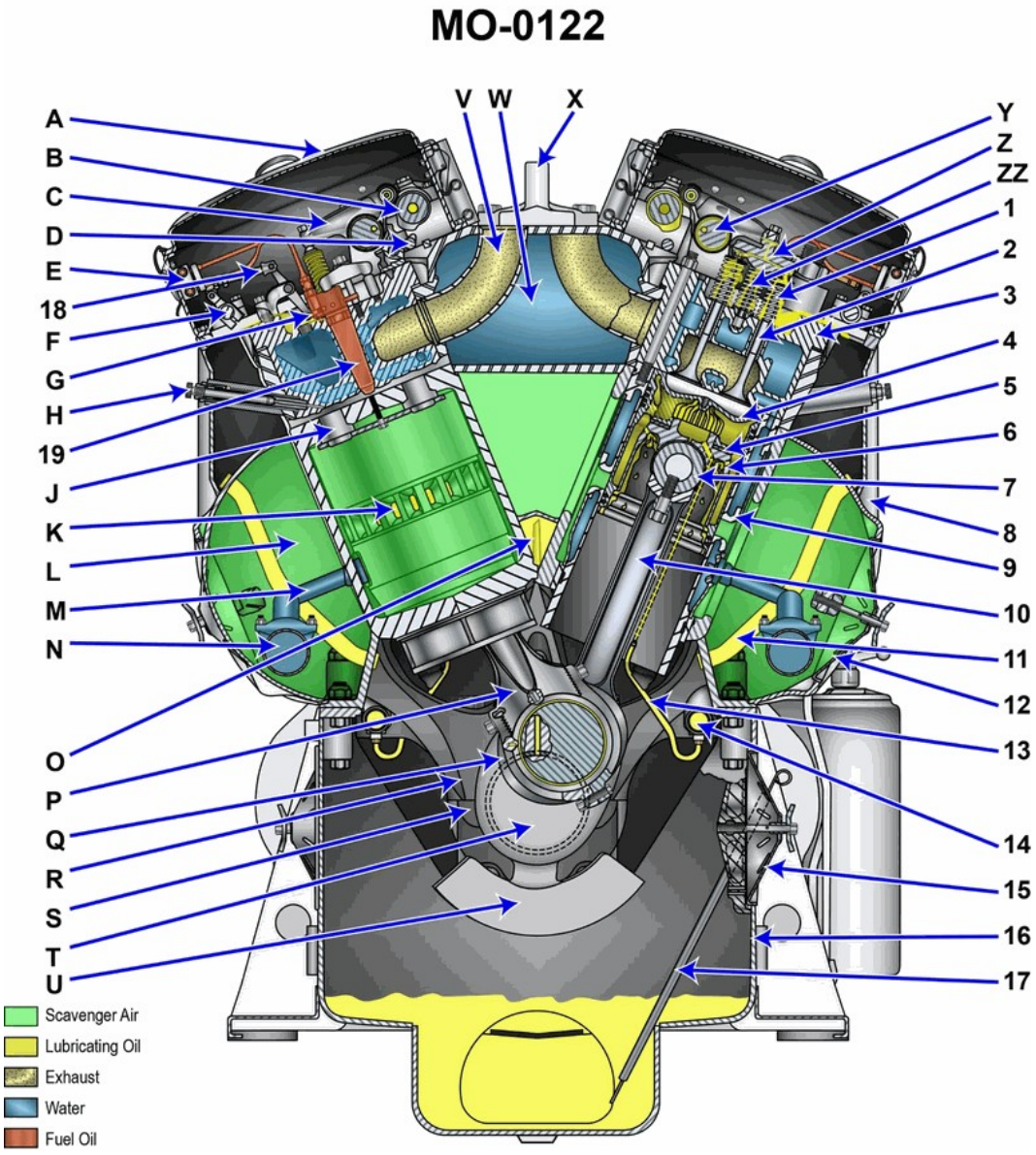
7. You are assigned to a platform supply vessel fitted with main propulsion diesel engines of the type shown in the illustration. If the engine's crankshaft is turning at 900 rpm, what will be the rotational speed of the two camshafts



- 450 rpm
- **900 rpm**
- 1800 rpm
- Not enough information is given to determine camshaft rpm.

Note:
In a two-stroke diesel engine, the camshaft rotates at the same speed as the crankshaft to ensure proper fuel injection and valve timing. Therefore, with a crankshaft speed of 900 rpm, the camshafts also rotate at 900 rpm.

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8. You are assigned to a fishery research vessel fitted with main propulsion diesel engines operating on the cycle represented in the polar timing diagram shown in the illustration. When do the intake valves open and close respectively

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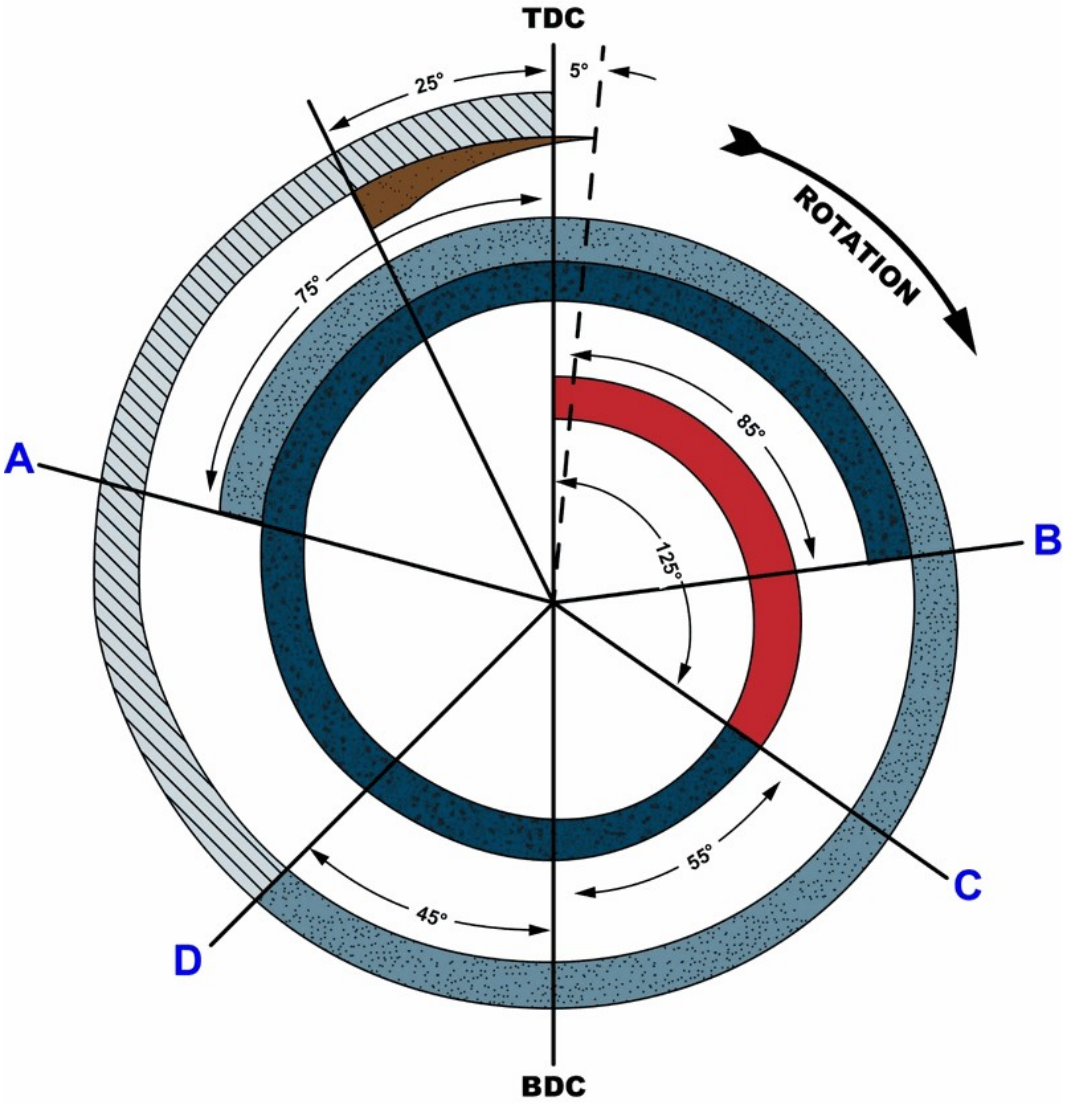

- The intake valves open at 45° after bottom dead center on the compression stroke. The intake valves close at 75° before top dead center on the exhaust.
- The intake valves open at top dead center at the beginning of the intake stroke. The intake valves close at bottom dead center at the end of the intake stroke.
- The intake valves open at bottom dead center at the end of the intake stroke. The intake valves close at top dead center at the beginning of the intake stroke.
- **The intake valves open at 75° before top dead center on the exhaust stroke. The intake valves close at 45° after bottom dead center on the compression stroke.**

Note:
The timing diagram indicates the intake valves open 75 before top dead center on the exhaust stroke and close 45 after bottom dead center on the compression stroke.

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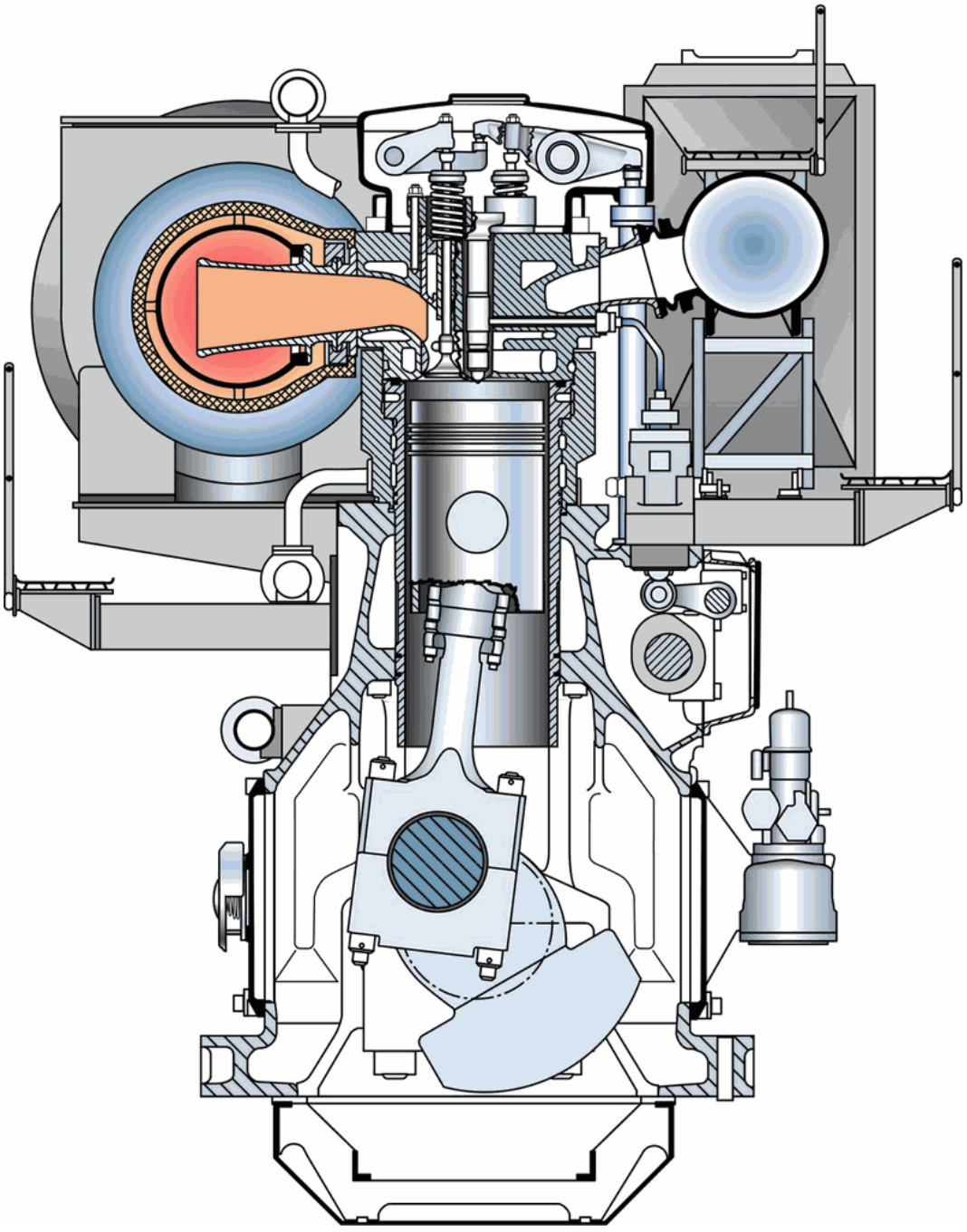
9. You are assigned to an offshore supply vessel fitted with main propulsion diesel engines of the type shown in the illustration. How many degrees of crankshaft revolution are required for all of the engine's cylinders to fire

MP-MS-04

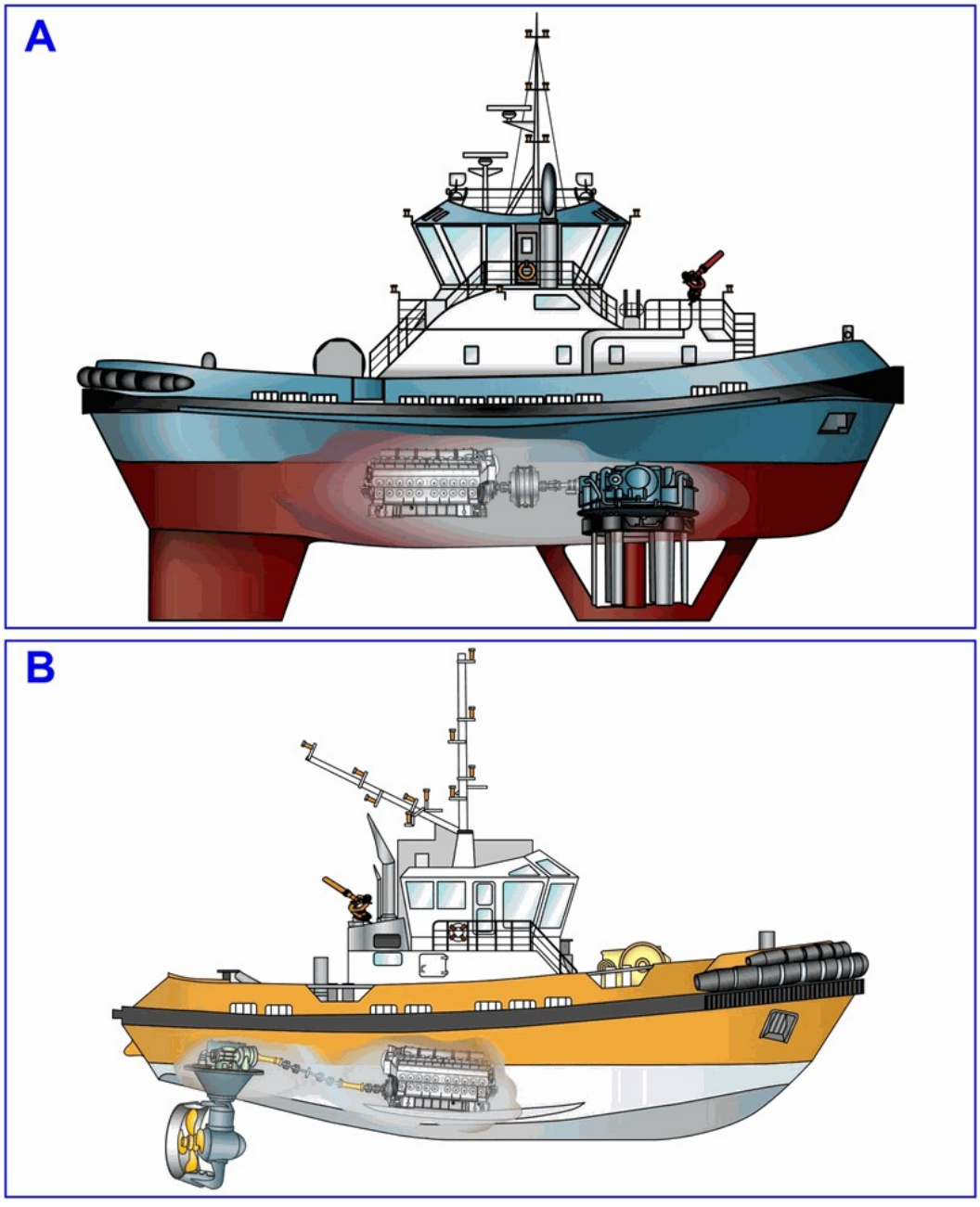


- 180 degrees
- **360 degrees**
- 720 degrees
- Not enough information is given to determine crankshaft degrees of revolution.

Note:
The engine is a two-stroke diesel, meaning each cylinder fires once per crankshaft revolution. Therefore, all cylinders complete a firing sequence every 360 degrees of crankshaft rotation.

10. You are assigned to a tractor tug with a drive system as shown in figure "A" of the illustration. What type of propulsion drive system is illustrated

MP-DS-09



- Azimuthing propeller drive (z-drive)
- Controllable pitch propeller drive
- Conventional fixed-propeller drive
- **Cycloidal propeller drive**

Note:
The illustration depicts a cycloidal propeller drive, characterized by a horizontal disc with vertical blades. This design allows for thrust in any direction without hull rotation, distinguishing it from azimuthing, controllable-pitch, or conventional fixed-propeller drives, which utilize a single propeller on a shaft or a steerable pod with a horizontal propeller.
