U.S.C.G. Merchant Marine Exam

OSV – Chief Engineer

Q680 Motor Plants

(Sample Examination)

Choose the best answer to the following Multiple-Choice Questions:

1. You are assigned to an OSV fitted with main propulsion diesel engines operating on the cycle represented in the polar timing diagram shown in the illustration. What combustion cycle event has a duration of 103o? Illustration MO-0206

   A. Compression
   B. Power
   C. Intake
   D. Exhaust

   Correct answer: B

2. You are assigned to an OSV fitted with main propulsion diesel engines operating on the cycle represented in the polar timing diagram shown in the illustration. In consideration of the direction of rotation, what combustion cycle event occurs from point "A" to point "D"? Illustration MO-0084

   A. Exhaust
   B. Compression
   C. Power
   D. Intake

   Correct answer: D

3. You are assigned as an engineer on an anchor handling vessel using main propulsion engines of the type shown in the illustration. Fortunately, with engines of this type, it is possible to inspect the compression rings while in place inside the engine. What would be the indication of properly functioning rings? Illustration MO-0224

   A. The rings should be free to move within their grooves, and their faces should be blackened with carbon.
   B. The rings should be free to move within their grooves, and their faces should have vertical brown streaks.
   C. The rings should NOT be free to move within their grooves and their faces should be bright and shiny.
   D. The rings should be free to move within their grooves and their faces should be bright and shiny.

   Correct answer: D

4. You are analyzing the data used for trend analysis for a two-stroke main propulsion diesel engine on your general purpose supply vessel. 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?

   A. Leaking crankcase handhold cover
   B. Burned cylinder exhaust valve
   C. Worn piston compression rings
   D. Dribbling injector needle valve

   Correct answer: C

5. You are in the process of setting up a system for collecting engine data for trend analysis for the main propulsion engines on your offshore supply vessel. In terms of the conditions under which readings are to be taken and recorded, what statement is true?

   A. Data should be collected under conditions of load and speed as variable as possible.
   B. Data should be collected with no particular concern for conditions of load and speed.
   C. Data should be collected under conditions of load and speed that are similar, if not constant.
   D. Data should be collected under random conditions of load and speed.

   Correct answer: C

6. You are about to perform valve stem to rocker arm clearance adjustments on an auxiliary diesel engine onboard your offshore supply vessel. Which of the following statements concerning hot and cold clearances is true?

   A. When comparing hot and cold valve clearances, the hot and cold valve clearances for a given valve application will always be identical.
   B. When comparing hot and cold valve clearances, it is not possible to predict the hot and cold clearances relative to one another for a given valve application.
   C. When comparing hot and cold valve clearances, the hot clearance will always be less than the cold clearance for a given valve application.
   D. When comparing hot and cold valve clearances, the hot clearance will always be greater than the cold clearance for a given valve application.

   Correct answer: C

7. You are about to check the valve lash adjustment on #1 cylinder's intake and exhaust valves of an auxiliary diesel engine fitted on the anchor-handling supply vessel to which you are assigned. You want to adjust the valve lash on both valves without having to reposition the crankshaft between adjustments. What should be the position of #1 piston to insure both the intake and exhaust valves are both in a position to facilitate valve adjustment?

   A. The crankshaft should be barred in the direction of rotation with #1 piston at BDC having just completed a power stroke.
   B. The crankshaft should be barred in the direction of rotation with #1 piston at TDC having just completed an exhaust stroke.
   C. The crankshaft should be barred in the direction of rotation with #1 piston at BDC having just completed an intake stroke.
   D. The crankshaft should be barred in the direction of rotation with #1 piston at TDC having just completed a compression stroke.

   Correct answer: D

8. An engine that emits black smoke through the stack may indicate a misfiring cylinder. Assume that the auxiliary diesel engines on your oil platform supply vessel have a fuel injection system that permits the injectors to be disabled for troubleshooting purposes by loosening the high-pressure fuel injection line fitting at the injector nozzle while the engine is running and noting the response of the engine in terms emission of black smoke. Which of the following statements is true?

   A. After disabling the injector of a given cylinder, if the engine previously producing black smoke continues to produce equally dense black smoke, this indicates that the cylinder associated with the disabled injector is misfiring.
   B. After disabling the injector of a given cylinder, if the engine previously producing black smoke now produces even denser black smoke, this indicates that the cylinder associated with the disabled injector is misfiring.
   C. After disabling the injector of a given cylinder, if the engine previously producing a clear exhaust now produces black smoke, this indicates that the cylinder associated with the disabled injector is misfiring.
   D. After disabling the injector of a given cylinder, if the engine previously producing black smoke now produces a clear stack, this indicates that the cylinder associated with the disabled injector is misfiring.

   Correct answer: D

9. An engine that runs rough may indicate a misfiring cylinder. Assume that the auxiliary diesel engines on your OSV have a fuel injection system that permits the injectors to be disabled for troubleshooting purposes by loosening the high-pressure fuel injection line fitting at the injector nozzle while the engine is running and noting the engine response. Which of the following statements is true?

   A. After disabling the injector of a given cylinder, if the previously rough-running engine continues to run equally roughly with no change, this indicates that the cylinder associated with the disabled injector is misfiring.
   B. After disabling the injector of a given cylinder, if the previously smooth-running engine runs rough with considerable change, this indicates that the cylinder associated with the disabled injector is misfiring.
   C. After disabling the injector of a given cylinder, if the previously rough-running engine runs even rougher with considerable change, this indicates that the cylinder associated with the disabled injector is misfiring.
   D. After disabling the injector of a given cylinder, if the previously rough-running engine now runs smoothly, this indicates that the cylinder associated with the disabled injector is misfiring.

   Correct answer: A

10. The main engines on your OSV utilize a starting system with two air-start motors similar to that shown in the illustration. Upon pushing the start button, the solenoid air valve energizes open, but the air start relay valve fails to receive pilot air, and thus the starter motors and engine fail to rotate. Which of the listed conditions would most likely be the cause of the failure to start? Illustration MO-0200

    A. The lower pinion fails to engage, which in turn does not allow the upper pinion to engage. Because engagement of both pinions is required to supply air to the air-start motors, the engine does not start.
    B. The lower pinion fails to retract, which in turn does not allow the upper pinion to retract. Because retraction of both pinions is required to supply air to the air-start motors, the engine does not start.
    C. The upper pinion fails to engage, which in turn does not allow the lower pinion to engage. Because engagement of both pinions is required to supply air to the air-start motors, the engine does not start.
    D. The upper pinion fails to retract, which in turn does not allow the lower pinion to retract. Because retraction of both pinions is required to supply air to the air-start motors, the engine does not start.
    Correct answer: A

11. The tank-type full-flow lubricating oil filter is situated on the discharge side of the engine-driven lube oil pump on the main engines on your anchor-handling supply boat. Assuming oil pressure readings are observed at constant engine rpm and lube oil temperature, what is the indication of gradually clogging filter elements as long as the bypass relief valve remains closed?

    A. The filter inlet pressure gradually drops, while the filter outlet pressure gradually rises.
    B. The filter inlet pressure gradually rises, while the filter outlet pressure gradually drops.
    C. The filter inlet AND outlet pressures BOTH gradually rise.
    D. The filter inlet AND outlet pressures BOTH gradually drop.

    Correct answer: B

12. The lube oil quality management system used on your general purpose supply vessel requires on board testing of lubricating oil to include testing for viscosity at the same temperature consistently. In terms of viscosity test results, what statement is true?

    A. An unusual drop in viscosity indicates excessive oxidation of the lubricating oil OR excessive dilution of the lubricating oil with diesel fuel oil OR BOTH.
    B. An unusual rise in viscosity indicates excessive oxidation of the lubricating oil OR excessive dilution of the lubricating oil with diesel fuel oil OR BOTH.
    C. An unusual drop in viscosity indicates excessive dilution of the lubricating oil with diesel fuel oil and an unusual rise in viscosity indicates excessive oxidation of the lubricating oil.
    D. An unusual drop in viscosity indicates excessive oxidation of the lubricating oil and an unusual rise in viscosity indicates excessive dilution of the lubricating oil with diesel fuel oil.

    Correct answer: C

13. Concerning the diesel fuels used for the auxiliary and main propulsion diesel engines on-board the offshore supply vessel to which you are assigned, what fuel property is directly a measure of the ignition quality of the fuel?

    A. Cetane rating
    B. Density
    C. Heating value
    D. Viscosity

    Correct answer: A

14. In terms of the diesel fuels burned in auxiliary and main propulsion diesel engines on general purpose offshore supply vessels, which of the listed fuel properties would be most critical to consider when transferring and forwarding fuel in extremely low ambient temperature conditions?

    A. Pour point
    B. Heating value
    C. Flash point
    D. Ash content

    Correct answer: A

15. The manufacturer of the diesel generator set drive engines used aboard your anchor-handling supply vessel recommends that no more than a 2 psig pressure drop across a fuel primary metal-edge suction strainer be allowed before recommended servicing. Assuming that the strainer inlet pressure is 4 psig, what would be the minimum allowable outlet pressure before recommended servicing?

    A. 2" Hg
    B. 2 psig
    C. 6 psig
    D. 6" Hg

    Correct answer: B

16. A deck winch drive engine fuel system on board your offshore supply vessel is prone to becoming air bound, and you suspect a fuel system piping leak. Assuming that the diesel fuel tank is beneath the engine, that the fuel booster pump is engine driven, and that the fuel injection pump is a high-pressure multi-plunger pump, where in the system would the leak most likely exist?

    A. In the booster pump discharge line between the booster pump outlet and the fuel injection pump inlet.
    B. In the fuel injection pump return line between the fuel injection pump return outlet and the fuel oil day tank (or booster pump suction as appropriate).
    C. In the booster pump suction line between the day tank suction line and the booster pump inlet.
    D. In the fuel injection pump high pressure fuel lines between the fuel injection pump high pressure outlets to the fuel injector nozzle inlets.

    Correct answer: C

17. You suspect that a diesel generator set on your general purpose offshore supply vessel has a defective unit injector because the engine, although warm, is running roughly. The two-stroke engine is fitted with mechanically operated unit injectors. When you push and hold down the #3 cylinder injector follower, there is no real change, as the engine continues to run roughly as before. What does this indicate?

    A. The #3 cylinder unit injector is functioning properly. One of the other cylinder unit injectors must be faulty.
    B. The #3 cylinder unit injector is faulty. You have successfully isolated the faulty unit injector.
    C. Either the #1 or #2 cylinder unit injector is faulty. The #4, #5 and #6 cylinder unit injectors are functioning properly.
    D. Either the #4, #5, or #6 cylinder unit injector is faulty. The #1 and #2 cylinder unit injectors are functioning properly.

    Correct answer: B

18. You suspect that a diesel generator set on your anchor-handling supply vessel has a misfiring cylinder because the engine, although warm, is running roughly. The six-cylinder engine is fitted with a multi-plunger in-line high pressure fuel injection pump with hydraulically operated injector nozzles. When you slacken the high-pressure fuel line fitting at #5 fuel injector nozzle, the engine continues to run roughly as before with no real change. Upon re-tightening the high-pressure fuel line fitting, the engine begins and continues to run smoothly. What does this indicate?

    A. #5 cylinder was and continues to be firing properly. #1, #2, #3, or #4 cylinder is misfiring. # 6 cylinder is firing properly.
    B. #5 cylinder was and continues to be misfiring. You have successfully located the misfiring cylinder.
    C. #5 cylinder was and continues to be firing properly. #6 cylinder is misfiring. #1, #2, #3, and #4 cylinders are all firing properly.
    D. #5 cylinder had been misfiring. You have successfully purged the air from the #5 cylinder high pressure fuel line, and the engine is no longer misfiring.

    Correct answer: D

19. The turbocharged, four-stroke, main propulsion diesel engines on your offshore supply vessel are protected with dry-type air intake filters. The engines are fitted with dial-type restriction indicators measuring the pressure in the air duct between the air intake filter and the turbocharger blower inlet. Under what conditions should the air intake filters be evaluated using the restriction indicators?

    A. The engine should be running at rated RPM with no load (propulsion clutch disengaged).
    B. The engine should be running at idle RPM with minimal load (propulsion clutch engaged).
    C. The engine should be running at idle RPM with no load (propulsion clutch disengaged).
    D. The engine should be running at rated RPM with full load (propulsion clutch engaged).

    Correct answer: D

20. The diesel engines on your anchor-handling supply vessel are all protected with dry-type air filters. When changing filter elements what visual indication would cause you to suspect that the engine has been contaminated with dust as the result of improperly sealing of the filter element gasket?

    A. The "dirty" side of the air filter housing is coated with dust
    B. The "clean" side of the air filter element is clean and free of dust
    C. The "dirty" side of the air filter element is coated with dust
    D. The "clean" side of the air filter element is streaked with dust

    Correct answer: D

21. A diesel engine on your platform supply vessel has a restricted exhaust silencer/muffler resulting in high exhaust back pressure. With an appreciable load on the engine, what would be the condition of the exhaust gases exiting the stack?

    A. White smoke
    B. Gray to black smoke
    C. Bluish tinge smoke
    D. Clear, with no smoke

    Correct answer: B

22. A main propulsion diesel engine on your anchor-handling supply vessel produces gray to black smoke under virtually all load conditions as observed at the stack. The heavier the load on the engine, the darker the smoke becomes. What condition would most likely account for this?

    A. Leaking exhaust manifold cooling water jackets
    B. Excessively restricted exhaust silencer/muffler
    C. Excessively worn exhaust valve guides
    D. Leaking exhaust piping expansion joints

    Correct answer: B

23. The freshwater cooling systems serving the main engines on your general-purpose supply vessel are arranged as shown in the illustration. If coolant drain valves are inadvertently opened during engine operation, what combination set of symptoms would most likely result? Illustration MO-0138

    A. High level in the jacket water expansion tank. High freshwater outlet temperature from the engine. High freshwater pump(s) discharge pressure.
    B. Low level in the jacket water expansion tank. High freshwater outlet temperature from the engine. High freshwater pump(s) discharge pressure.
    C. Low level in the jacket water expansion tank. Low freshwater outlet temperature from the engine. Low freshwater pump(s) discharge pressure.
    D. Low level in the jacket water expansion tank. High freshwater outlet temperature from the engine. Low freshwater pump(s) discharge pressure.

    Correct answer: D

24. The freshwater cooling systems serving the main engines on your anchor-handling supply boat are arranged as shown in the illustration. If the fresh water thermostatic control valve fails in the position where 100% of the flow from flange "A" is permanently ported to flange "C" and flange "B" is permanently blocked, while starting and warming the engine with no load, what would be the resulting warm up time period? Illustration MO-0137

    A. With no load, the engine would require a relatively normal time frame to warm up.
    B. With no load, the engine would require a much shorter than normal time frame to warm up.
    C. With no load, it is not possible to describe the time frame required to warm up the engine.
    D. With no load, the engine would require a much longer than normal time frame to warm up.

    Correct answer: D

25. A Roots-blown, two-stroke cycle main propulsion engine on the platform supply vessel to which you are assigned is emitting excessive, bluish-tinged smoke from the stack. Further investigation reveals excessive lube oil consumption. What condition would most likely account for this?

    A. Restricted blower air intake filter
    B. Worn blower rotor shaft seals
    C. Leaking fuel injector needle valve
    D. Restricted scavenging air intake ports

    Correct answer: B

26. A turbocharged, two-stroke cycle main propulsion diesel engine on your OSV is emitting gray to black smoke excessively from the stack. Upon comparing the measured air box pressure against a reference engine which is producing a clear stack, the measured air box pressure is determined to be too high. Which of the following conditions would most likely be the cause for the relatively high air box pressure?

    A. Turbocharger blower air intake filter is excessively restricted
    B. Turbocharger over-running clutch failure
    C. Airside aluminum fins on after coolers are excessively restricted
    D. Scavenging air intake ports are excessively restricted with carbon deposits

    Correct answer: D

27. The offshore supply vessel to which you are assigned is fitted with reversing reduction gears equipped with airflex pneumatic tire-type friction clutches. With the bridge in control of the main engines, you hear unusual screeching noises coming from the clutches, but only when transitioning from one direction to the other. Given the situation of changing direction from ahead to astern as an example, what is the most likely cause?

    A. The EOT handle is being left in neutral and then in astern idle for too long a period of time.
    B. The EOT handle is being left in neutral and then in astern idle for too short a period of time.
    C. The EOT handle is being left in ahead idle and then in neutral for too long a period of time.
    D. The EOT handle is being left in ahead idle and then in neutral for too short a period of time.

    Correct answer: B

28. The OSV to which you are assigned is fitted with hydraulic clutches similar to that shown in the illustration. If the time required for the clutch to disengage is unacceptably long, which of the following conditions would most likely be responsible for this? Illustration MO-0089

    A. Fluid clutch sump level maintained at too high a level
    B. Solid contaminants are present in the hydraulic fluid
    C. Clutch operating fluid is maintained at too high a temperature
    D. Clutch operating fluid is maintained at too low a temperature

    Correct answer: B

29. The OSV to which you are assigned is fitted with a totally pneumatic propulsion control system as shown in the illustration. All propulsion controls function properly from all locations with the exception of the pneumatic remote control station. Here the propulsion engine will run only at idle and neither propulsion clutch will engage regardless of the throttle lever control position. Which of the following system faults best accounts for these symptoms? Illustration MO-0168

    A. The local/remote transfer valve at the engine room control station has a blocked remote port.
    B. The pilot house/remote transfer valve at the pilot house pneumatic master control station has a blocked remote port.
    C. The throttle lever control at the pneumatic remote control station has a blocked speed signal pilot air port.
    D. The attendance valve at the pilot house pneumatic master control station has a blocked outlet port.

    Correct answer: B

30. The anchor-handling supply boat to which you are assigned is fitted with a totally pneumatic propulsion control system as shown in the illustration. If the astern clutch fails to engage from the engine room control station, but engages properly from all remote control stations, which of the following system faults best accounts for these symptoms? Illustration MO-0168

    A. The clutch actuator 4-way control valve at the clutch control panel has a restricted astern clutch quick exhaust port opening.
    B. The astern clutch engagement pilot air tubing has separated from the clutch actuator 4-way control valve at the clutch control panel.
    C. The local/remote transfer valve at the engine room control station has a blocked local port.
    D. The control lever at the engine room control station has a blocked astern clutch engagement pilot port.

    Correct answer: D

31. A main engine on your general purpose supply vessel has experienced a low coolant water level alarm even though the water level in the expansion tank is normal. Assuming that the float activated switch is designed to open at low coolant level to activate the alarm, which of the following would account for this?

    A. The float level switch contacts are welded closed, not permitting the contacts to open.
    B. The float is binding in the float chamber, not permitting the float to drop.
    C. The float switch wire connections are loose at the terminals, not permitting continuity through the switch.
    D. It is not possible for a low coolant level alarm to occur when the water level is normal.

    Correct answer: C

32. The rated speed of the main propulsion diesel engines on your offshore supply vessel is 900 rpm. The installed centrifugal overspeed trip device similar to the one shown in the illustration is designed to shut down the engine at 110% of rated speed. Upon testing the overspeed trip device, you determine that the actual shutdown occurs at 945 rpm. Which of the following would account for this? Illustration MO-0101

    A. The compression spring (item #12) was excessively compressed when the overspeed trip was last set.
    B. The throw-out weight (item #10) link bolt (item #15 & #16) is binding within the spring guide (item #11) drilling.
    C. The jam nut (item #14) was not properly tightened against the adjusting nut (items #13) when the overspeed trip was last set.
    D. The throw-out weight (item #10) pivot bolt (not labeled) is binding within the counterweight (item 1 through 9) drilling.

    Correct answer: C

33. You are preparing to change the oil of the speed control governor on one of the main propulsion diesel engines on your OSV. What statement is true concerning the draining and flushing procedures?

    A. The governor oil should be drained while the oil is hot, and the governor should be flushed with the heaviest grade of the same type of oil.
    B. The governor oil should be drained while the oil is cold, and the governor should be flushed with the heaviest grade of the same type of oil.
    C. The governor oil should be drained while the oil is cold, and the governor should be flushed with the lightest grade of the same type of oil.
    D. The governor oil should be drained while the oil is hot, and the governor should be flushed with the lightest grade of the same type of oil.

    Correct answer: D

34. The diesel generator on service on your anchor-handling supply vessel is undergoing cyclic, rhythmic variations in speed at steady load. When the governor output shaft is disconnected from the fuel control linkage and the linkage is blocked manually, these variations in engine speed stop. What would be an appropriate corrective action?

    A. Tighten the bolts securing the governor base to the engine
    B. Replace the fuel injector nozzle of the misfiring cylinder
    C. Replace the governor drive gears
    D. Make an adjustment at the compensating needle valve

    Correct answer: D

35. When cleaning burner atomizers associated with an oil-fired auxiliary boiler fitted on your offshore supply boat, which of the following metals would be recommended to use in fabricating a tool for the purposes of carbon removal?

    A. Chromoly steel
    B. Copper
    C. Tungsten
    D. Titanium

    Correct answer: B

36. Your general purpose supply vessel is fitted with a coil-type, water-tube, forced-circulation auxiliary boiler. What statement best represents the conditions associated with coil water-sides inspection and cleaning?

    A. Coil water-sides are very difficult to inspect AND chemical cleaning with a suitable acid is the only practical and efficient method of scale removal.
    B. Coil water-sides are relatively easy to inspect AND chemical cleaning with a suitable acid is the only practical and efficient method of scale removal.
    C. Coil water-sides are very difficult to inspect AND mechanical cleaning with water jet or wire brush is a practical and efficient method of scale removal.
    D. Coil water-sides are relatively easy to inspect AND mechanical cleaning with water jet or wire brush is a practical and efficient method of scale removal.

    Correct answer: A

37. Your oil platform supply vessel is fitted with a two-pass, fire-tube, oil-fired auxiliary boiler. What is the most practical way of determining if the outside surface of the boiler tubes is excessively scaled with hard scale deposits?

    A. Performing a visual inspection
    B. Monitoring the circulating pump pressures
    C. Measuring the outside diameter of the tubes
    D. Monitoring the feed pump pressures

    Correct answer: C

38. While on deck, you are observing the stack of an oil-fired auxiliary boiler installed on your general purpose supply vessel. The gases exiting the stack are a dense white smoke. Eliminating water vapor as a possible cause of the white smoke, what would be the correlating flame color as observed through an observation window peephole?

    A. Yellow flame
    B. Dull or dazzling white flame
    C. Yellowish orange or golden yellow flame
    D. Reddish flame

    Correct answer: B

39. Due to environmental and safety concerns, the towing winch drive diesel engine cooling water system is treated with propylene glycol for protection against freezing. According to the illustration, what would be the limit of protection if 40 pints of propylene glycol are used in treating a cooling water system with a volumetric capacity of 10 gallons? Illustration MO-0209

    A. 10oF
    B. -6oF
    C. -30oF
    D. -53oF

    Correct answer: C

40. In a closed, recirculating freshwater cooling system used for the main engines on your oil platform supply vessel, what function would chemical treatment with molybdate primarily perform?

    A. Freezing point depression
    B. Boiling point elevation
    C. Corrosion inhibition
    D. Biological growth inhibition

    Correct answer: C

41. After a main diesel engine on your oil platform construction support vessel has experienced a safety shutdown due to excessive crankcase pressure, why is it important to wait 2 hours before opening the crankcase to investigate the cause of the trip?

    A. Opening the crankcase before 2 hours has elapsed may result in the engine spontaneously restarting.
    B. Opening the crankcase before 2 hours has elapsed may result in excessively rapid cooling.
    C. Opening the crankcase before 2 hours has elapsed may result in a crankcase explosion.
    D. Opening the crankcase before 2 hours has elapsed may result in crankshaft rotation.

    Correct answer: C

42. After performing repairs on the fuel injection system or governor of a main propulsion diesel engine on your offshore platform supply vessel, what precaution should be taken prior to starting the engine?

    A. Provisions should be made to shut off the engine's starting air supply to stop the engine in case there is an overspeed on start-up.
    B. Provisions should be made to shut off the engine's lubricating oil supply to stop the engine in case there is an overspeed on start-up.
    C. Provisions should be made to shut off the engine's inlet air and/or fuel supply to stop the engine in case there is an overspeed on start-up.
    D. Provisions should be made to shut off the engine's control electrical power supply to stop the engine in case there is an overspeed on start-up.

    Correct answer: C

43. While underway in open waters on your platform supply vessel, the low clutch air pressure alarm sounds and the faint odor of burning rubber is detected. What is the appropriate response?

    A. Investigate the cause of low clutch air pressure, then reduce the engine load and speed if necessary.
    B. Investigate the cause of low clutch air pressure, then bring the throttle and clutch control to the stop position if necessary.
    C. Reduce the load and speed on the engine, then investigate the cause of low clutch air pressure.
    D. Bring the throttle and clutch control to the stop position, then investigate the cause of low clutch air pressure.

    Correct answer: D

44. When rolling over a main engine on your anchor handling vessel prior to starting with the cylinder test valves open to expel any fluids accumulated within the cylinders, a rather large amount of water is discharged. What is the appropriate response?

    A. Start the engine, but run the engine with the cylinder test valves cracked slightly open.
    B. Start the engine, but maintain the jacket water expansion tank level higher than normal.
    C. Do not allow the engine to be started until the cause of the water discharge has been determined and corrected.
    D. Start the engine, but monitor all fluid levels very closely, especially that of the jacket water.

    Correct answer: C

45. You are assigned to an anchor handling vessel fitted with main propulsion diesel engines operating on the cycle represented in the polar timing diagram shown in the illustration. What combustion cycle event has a duration of 103o? Illustration MO-0206

    A. Exhaust
    B. Compression
    C. Intake
    D. Power

    Correct answer: D

46. The main propulsion diesel engines fitted on your anchor handling vessel are equipped with engine crankcase oil level dipsticks marked on both sides of the dipstick. What is the significance of the markings?

    A. The add and full marks on one side correspond to the side to be used when the engine is STOPPED and the engine oil is COLD. On the other side, the marks correspond to side to be used when the engine is running at IDLE RPM and the engine oil is HOT.
    B. The add and full marks on one side correspond to the side to be used when the engine is STOPPED and the engine oil is HOT. On the other side, the marks correspond to side to be used when the engine is running at IDLE RPM and the engine oil is COLD.
    C. The add and full marks on one side correspond to the side to be used when the engine is running at IDLE RPM and the engine oil is COLD. On the other side, the marks correspond to side to be used when the engine is running at MAXIMUM RPM and the engine oil is HOT.
    D. The add and full marks on both sides correspond to one another and are identically placed. Either side can be used accurately no matter what is the running status of the engine and what is the temperature of the oil.

    Correct answer: A

47. When starting a deck winch drive engine in preparation for cargo handling operations, what parameter must be checked FIRST upon start-up to avoid immediate engine damage?

    A. Engine lubricating oil supply header pressure
    B. Fuel oil supply header pressure
    C. Deck winch gear oil pump discharge pressure
    D. Cylinder jacket water pump discharge pressure

    Correct answer: A

48. The main propulsion diesel engines fitted on your OSV are started with vane-type air-starting motors. What statement concerning air-start motor lubricator maintenance is true? (Assume a metal bowl fitted with a tubular sight glass.)

    A. The lubricator reservoir bowl should be re-filled with clean oil when it is estimated that the bowl is completely empty.
    B. The lubricator reservoir bowl should be re-filled with clean oil when the level is no longer visible in the glass.
    C. The lubricator reservoir bowl should be re-filled with clean oil when it becomes approximately half full as shown in the glass.
    D. The lubricator reservoir bowl should be re-filled with clean oil as soon as the level drops to the very upper part of the glass.

    Correct answer: C

49. The main diesel engines on the OSV to which you are assigned are fitted with a basket type lube oil strainer, which must be periodically cleaned. The engine manufacturer recommends using a petroleum-based solvent for cleaning. Which of the following would typically be acceptable?

    A. A high flash point solvent such as kerosene or diesel fuel
    B. An aromatic solvent such as benzene or toluene
    C. A chlorinated solvent such as perchloroethylene or trichloroethylene
    D. A low flash point solvent such as gasoline

    Correct answer: A

50. The main propulsion diesel engines on your offshore supply vessel are fitted with mechanically operated and controlled unit injectors. In order for the engine to run properly, the injectors must be properly timed relative to the camshaft and properly synchronized relative to the other injectors. In terms of timing and synchronization, what statement is true?

    A. Injector timing is achieved by adjusting the cam follower heights of the injectors to the proper setting, and injector synchronization is also achieved by adjusting the cam follower heights of the injectors to the proper setting.
    B. Injector timing is achieved by adjusting the control racks of the injectors to the proper setting, but injector synchronization is achieved by adjusting the cam follower heights of the injectors to the proper setting.
    C. Injector timing is achieved by adjusting the control racks of the injectors to the proper setting, and injector synchronization is also achieved by adjusting the control racks of the injectors to the proper setting.
    D. Injector timing is achieved by adjusting the cam follower heights of the injectors to the proper setting, but injector synchronization is achieved by adjusting the control racks of the injectors to the proper setting.

    Correct answer: D

51. The diesel generator set drive engines on your offshore supply boat are protected with heavy-duty oil bath air cleaners. The oil within these air cleaners should be periodically replaced in accordance with manufacturer recommendations. What statement best describes when it would be appropriate to deviate from the recommended frequency?

    A. Replace the oil less frequently when the engine is exposed to dusty conditions (such as arc welding in the engine room), and replace the oil more frequently when the oil is unusually dirty or when it thickens.
    B. Replace the oil more frequently when the engine is exposed to dusty conditions (such as arc welding in the engine room), and replace the oil more frequently when the oil is unusually dirty or when it thickens.
    C. Replace the oil less frequently when the engine is exposed to dusty conditions (such as arc welding in the engine room), and replace the oil less frequently when the oil is unusually dirty or when it thickens.
    D. Replace the oil more frequently when the engine is exposed to dusty conditions (such as arc welding in the engine room), and replace the oil less frequently when the oil is unusually dirty or when it thickens.

    Correct answer: B

52. Water-jacketed exhaust manifolds as used on anchor-handling supply vessel main engines require periodic inspection of the jackets and scale removal as necessary. What would be the impact of a failure to remove scale deposits on a timely basis?

    A. Excessive scale deposits would increase heat transfer and raise the temperature of the inside wall of the exhaust manifold.
    B. Excessive scale deposits would increase heat transfer and lower the temperature of the inside wall of the exhaust manifold.
    C. Excessive scale deposits would decrease heat transfer and raise the temperature of the inside wall of the exhaust manifold.
    D. Excessive scale deposits would decrease heat transfer and lower the temperature of the inside wall of the exhaust manifold.

    Correct answer: C

53. The raw water boxes of the freshwater coolers serving the main propulsion diesel engines on your offshore supply vessel are fitted with sacrificial zinc anodes. Upon inspection, at what percentage of deterioration should the zinc anodes be replaced?

    A. 25%
    B. 50%
    C. 75%
    D. 100%

    Correct answer: B

54. The turbochargers on the main propulsion engines on the OSV to which you are assigned are fitted with an exhaust inlet screen to protect the turbocharger turbine. Upon inspection, pieces of broken piston rings or exhaust valves are found in the foreign object trap box. Besides removing this debris, with respect to the screen what should be done?

    A. The screen should be magnafluxed to check for damage not visible to the naked eye.
    B. The screen should be placed in a press to remove any indentations from impingement.
    C. The screen should be replaced only when damage is obvious to the naked eye.
    D. The screen should be replaced without conducting any further checking or investigation.

    Correct answer: A

55. The lubricating oil system supporting the main propulsion reduction gear on your offshore supply vessel is fitted with a lube oil strainer as shown in the illustration. How often should the handle "A" be rotated for cleaning purposes? Illustration MO-0057

    A. Once per watch while underway
    B. Once per month
    C. Once every six months
    D. Once per year

    Correct answer: A

56. The pneumatic propulsion control system used on your offshore supply vessel is configured as shown in the illustration. In terms of clutch air system maintenance, what statement best represents operational requirements? Illustration MO-0168

    A. Whereas the dryness of clutch air is critical, the pressure and cleanliness of the clutch air are of secondary concern.
    B. Whereas the cleanliness of clutch air is critical, the dryness and pressure are clutch air are of secondary concern.
    C. Whereas the clutch air pressure is critical, the dryness and cleanliness of the clutch air are of secondary concern.
    D. The pressure, dryness, and cleanliness of clutch air are all critical to successful pneumatic propulsion control operations.

    Correct answer: D

57. The main engines on your supply boat are protected with a low crankcase oil level detector protective device designed to provide an alarm when the main sump oil level drops below a certain level. It is malfunctioning, and upon investigation you determine from the technical manual that the oil level detector is a sealed unit. What statement best represents the best strategy to remedy this situation?

    A. The oil level detector seals must be broken before adjustments can be made, as long as new seals are established before placing the unit back into operation.
    B. The oil level detector is adjusted just as if it was an unsealed unit, but the seals must be re-established before placing the unit back into operation.
    C. The oil level detector is adjusted just as if it was an unsealed unit, without regard to any seals associated with the unit.
    D. The oil level detector must be replaced with a new detector if it is found to be defective, since field adjustments are not possible on this type of unit.

    Correct answer: D

58. Which of the following statements describes pertinent criteria for performing a surface blow for the purposes of removing excess chemicals and/or salinity as indicated by boiler water testing on an auxiliary steam boiler as fitted on your OSV?

    A. The surface blow would be performed when the boiler is secured AND the level would be maintained normal during the duration of the blow.
    B. The surface blow would be performed when the boiler is steaming AND the level would be maintained normal during the duration of the blow.
    C. The surface blow would be performed when the boiler is secured AND the level would be maintained above normal during the duration of the blow.
    D. The surface blow would be performed when the boiler is steaming AND the level would be maintained above normal during the duration of the blow.

    Correct answer: D

59. Diesel engine closed, recirculating cooling water systems are particularly prone to cavitation corrosion/erosion. Which of the listed cooling system/engine components has surfaces in contact with the coolant that are most susceptible to this type of corrosion and erosion?

    A. Wet-type cylinder liners
    B. Engine exhaust cooling water jackets
    C. Cylinder cooling water jackets
    D. Cylinder head cooling water passages

    Correct answer: A

60. For diesel engines, such as those used for main propulsion and auxiliary power on offshore supply vessels, while running at speed, how is the ignition of fuel within the cylinder achieved?

    A. Ignition is achieved by the heat of compression created by compressing the air/fuel mixture within the cylinder into a relatively small volume.
    B. Ignition is achieved by a high voltage electric spark induced across the gap of a specially designed spark plug.
    C. Ignition is achieved by intense heat by passing electric current through the element of a specially designed glow plug.
    D. Ignition is achieved by the heat of compression created by compressing intake/charge air within the cylinder into a relatively small volume.

    Correct answer: D

61. The platform supply vessel to which you are assigned has main engines fitted with open type combustion chambers featuring direct injection. Of the listed figures below found in the illustration, which figure represents the most likely type of injector nozzle type? Illustration MO-0148

    A. 1
    B. 2
    C. 3
    D. 4

    Correct answer: A

62. The multi-purpose supply vessel to which you are assigned has main engines fitted with injectors similar to those shown in the illustration. What statement is true concerning the operating principle of this type of injector? Illustration MO-0151

    A. The fuel pressure within the annulus is a needle valve opening force, the compression load on the spring is a needle valve closing force.
    B. The fuel pressure within the annulus and the compression load on the spring are both needle valve opening forces.
    C. The fuel pressure within the annulus is a needle valve closing force, the compression load on the spring is a needle valve opening force.
    D. The fuel pressure within the annulus and the compression load on the spring are both needle valve closing forces.

    Correct answer: A

63. The offshore supply vessel to which you are assigned has diesel generators fitted with injectors with the operating principle as shown in the illustration. What statement is true concerning the metering principle used in this system? Illustration MO-0146

    A. The amount of fuel injected is dependent upon the pressure of the inlet fuel to the injector and the length of time the orifice is open during metering.
    B. The amount of fuel injected is dependent upon the distance of plunger travel.
    C. The amount of fuel injected depends upon the injector pre-load torque setting.
    D. The amount of fuel injected is dependent upon the cylinder compression pressure and the cylinder compression temperature.

    Correct answer: A

64. The multi-purpose supply vessel to which you are assigned has a deck winch drive engine fitted with fuel injectors with the operating principle as shown in the illustration. In figure "A" which plunger travel position corresponds to when fuel injection ends? Illustration MO-0144

    A. 1
    B. 2
    C. 3
    D. 4

    Correct answer: C

65. The freshwater cooling systems serving the main engines on your supply boat are arranged as shown in the illustration. What statement best describes the functioning of the fresh water thermostatic control valve shown in the system diagram? Illustration MO-0138

    A. The fresh water thermostatic control valve controls the engine freshwater inlet temperature and is set up as a 3-way mixing valve.
    B. The fresh water thermostatic control valve controls the engine freshwater outlet temperature and is set up as a 3-way mixing valve.
    C. The fresh water thermostatic control valve controls the engine freshwater inlet temperature and is set up as a 3-way diverting valve.
    D. The fresh water thermostatic control valve controls the engine freshwater outlet temperature and is set up as a 3-way diverting valve.

    Correct answer: D

66. The auxiliary engines on the offshore supply vessel to which you are assigned are fitted with Roots-blowers as shown in the illustration. What statement is true concerning the timing gears as shown in figure "A"? Illustration MO-0135

    A. The timing gears are straight cut and ensure that the blower is properly timed to the engine's crankshaft.
    B. The timing gears are helically cut and ensure that the blower is properly timed to the engine's crankshaft.
    C. The timing gears are straight cut and ensure that the blower rotor lobes are properly spaced apart with a close tolerance.
    D. The timing gears are helically cut and ensure that the blower rotor lobes are properly spaced apart with a close tolerance.

    Correct answer: D

67. The multi-purpose supply vessel to which you are assigned is fitted with main propulsion reduction gears as shown in the illustration. What statement is true concerning this type of reduction gear? Illustration MO-0142

    A. This type of reduction gear is used with a fixed pitch propeller and a non-reversing engine.
    B. This type of reduction gear is used with a controllable pitch propeller and a non-reversing engine.
    C. This type of reduction gear is used with a controllable pitch propeller and a reversing engine.
    D. This type of reduction gear is used with a fixed pitch propeller and a reversing engine.

    Correct answer: A

68. The offshore supply vessel to which you are assigned has a pneumatic propulsion control system as shown in the illustration. Which valve is responsible for processing a clutch inflation pressure at speed signal pilot pressure during periods of clutch slip maneuvering at low engine rpm? Illustration MO-0167

    A. H5 governor limit relay air valve
    B. C2 speed-slip relay valve
    C. H5 boost relay air valve
    D. H5 inflation air relay valve

    Correct answer: B

69. The oil platform supply vessel to which you are assigned has a pneumatic propulsion control system as shown in the illustration. When the mechanical slave remote control station is being used to control propulsion, what is the direct result of positioning the control lever in the ahead direction? Illustration MO-0168

    A. Movement of the mechanical slave remote control station lever directly shifts the clutch actuator 4-way control valve to the ahead direction by the action of a chain or cable.
    B. Movement of the mechanical slave remote control station lever directly shifts the pneumatic remote control station lever control valve spool by the action of a chain or cable which results in pneumatic shifting of the clutch actuator 4-way control valve to the ahead direction.
    C. Movement of the mechanical slave remote control station lever directly shifts the pilot house pneumatic master control station lever control valve spool by the action of a chain or cable which results in pneumatic shifting of the clutch actuator 4-way control valve to the ahead direction.
    D. Movement of the mechanical slave remote control station lever directly shifts the engine room control station lever control valve spool by the action of a chain or cable which results in pneumatic shifting of the clutch actuator 4-way control valve to the ahead direction.

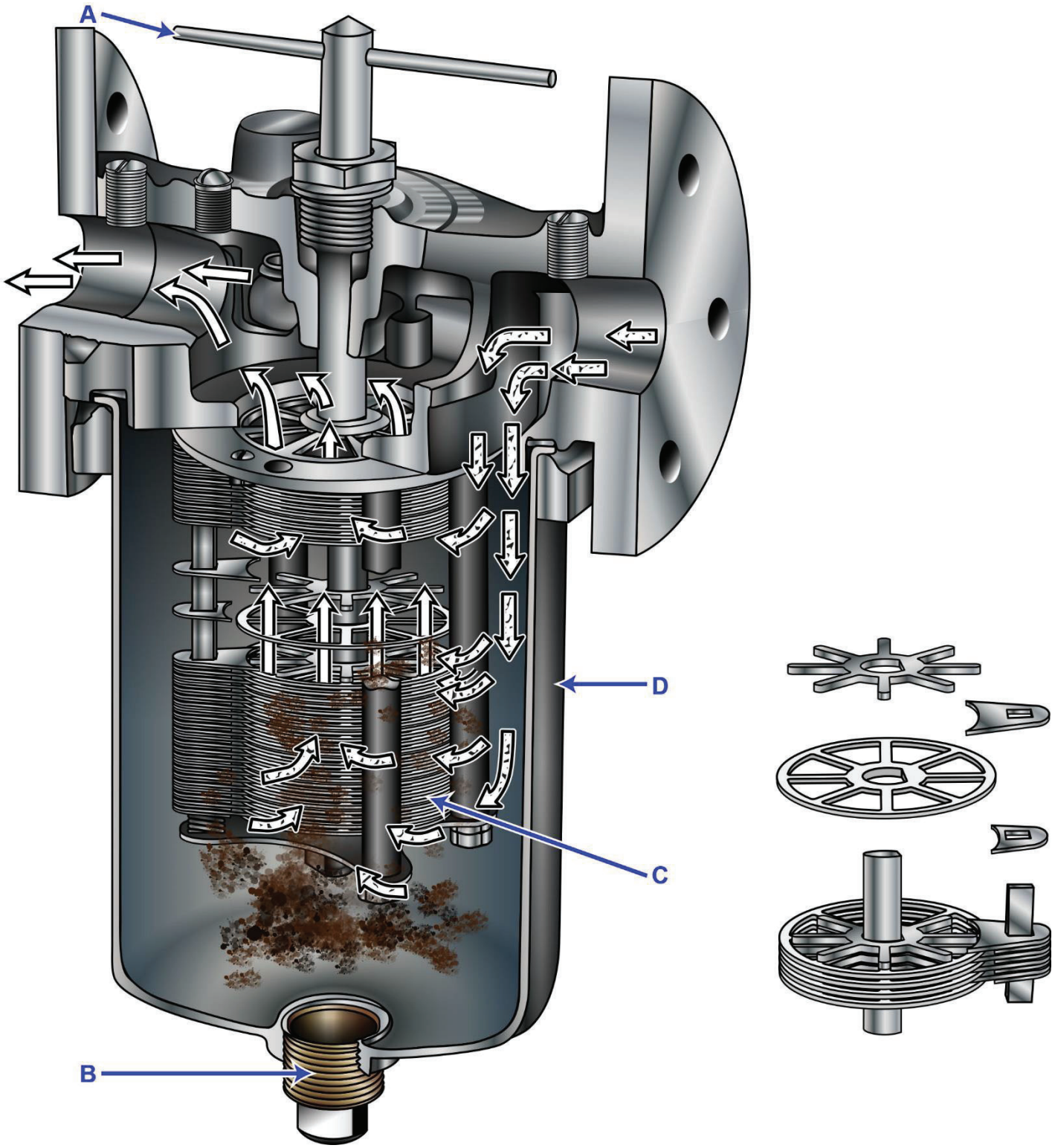
    Correct answer: C

70. The main engines on your anchor handling supply vessel are equipped with manual shutdown levers as shown in the illustration. What statement concerning manual shutdown is true? Illustration MO-0171

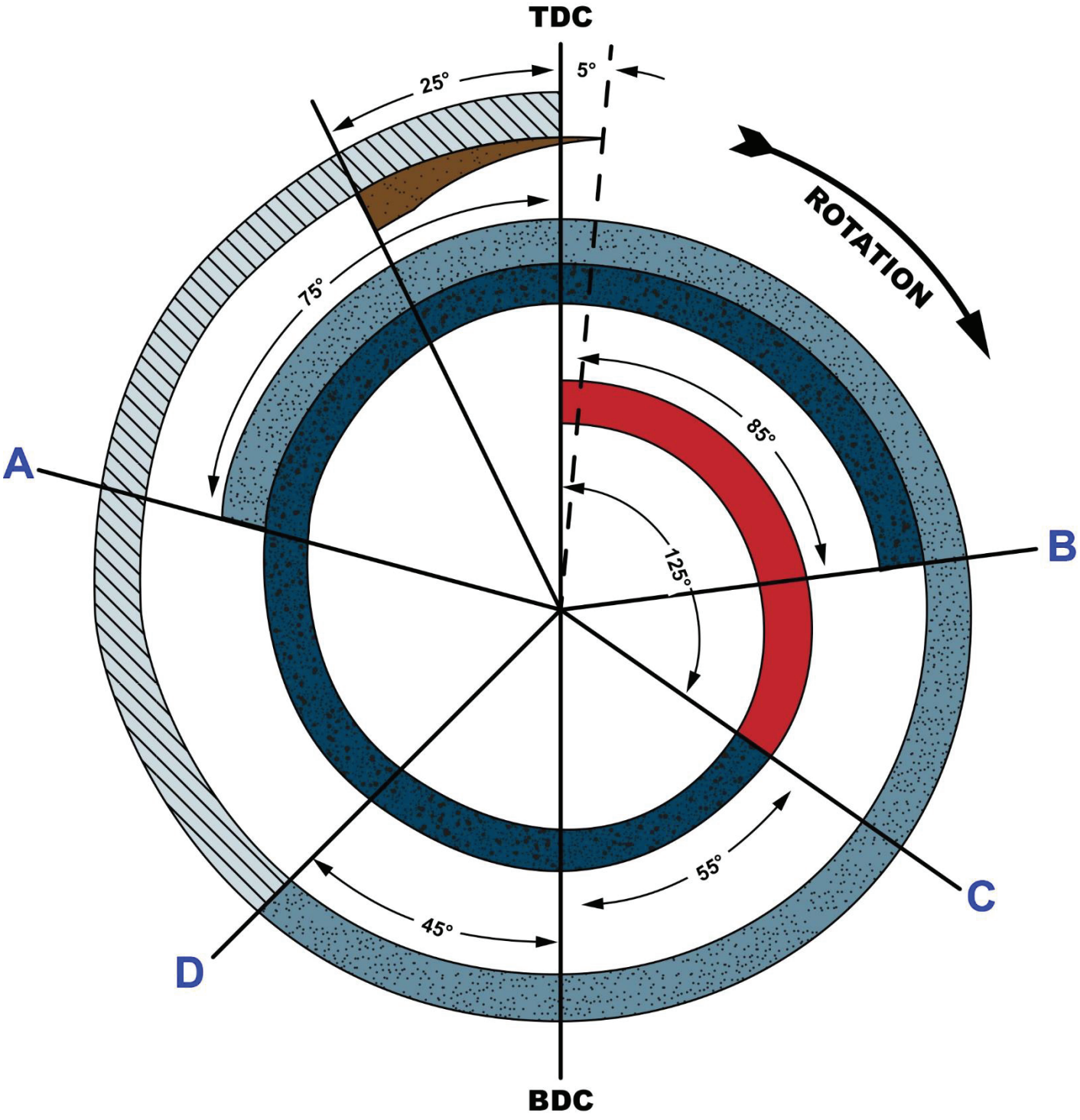
    A. The manual shutdown lever is operated by means of the over speed trip reset lever and uses the over speed trip mechanism to accomplish engine shutdown.
    B. The manual shutdown lever is operated by means of the emergency trip reset lever and uses the governor fuel control linkage.
    C. The manual shutdown lever is operated by means of a remote pull cable and uses the governor fuel control linkage to accomplish engine shutdown.
    D. The manual shutdown lever is operated by means of a remote pull cable and uses the over speed trip mechanism to accomplish engine shutdown.

    Correct answer: D

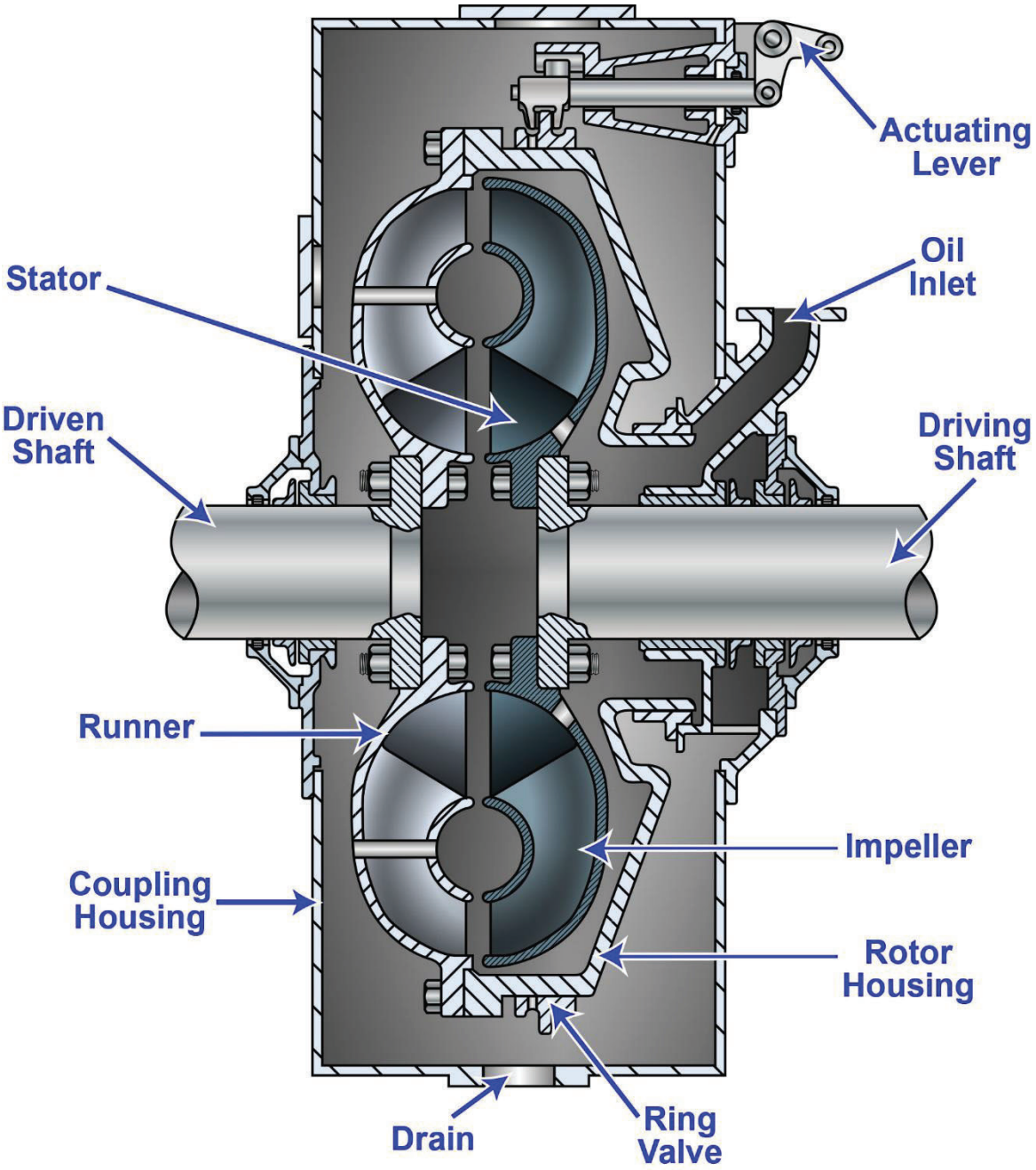
MO-0057



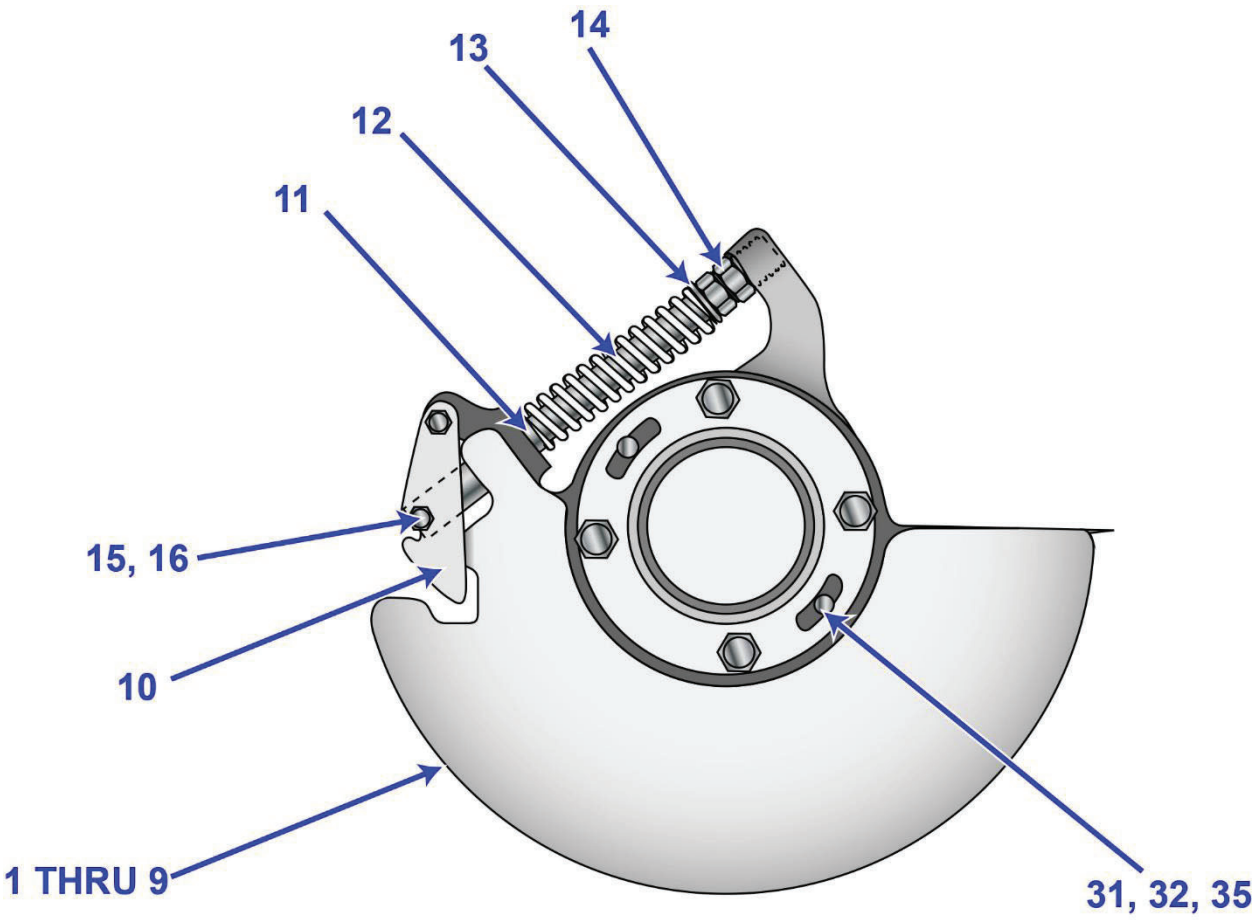
MO-0084



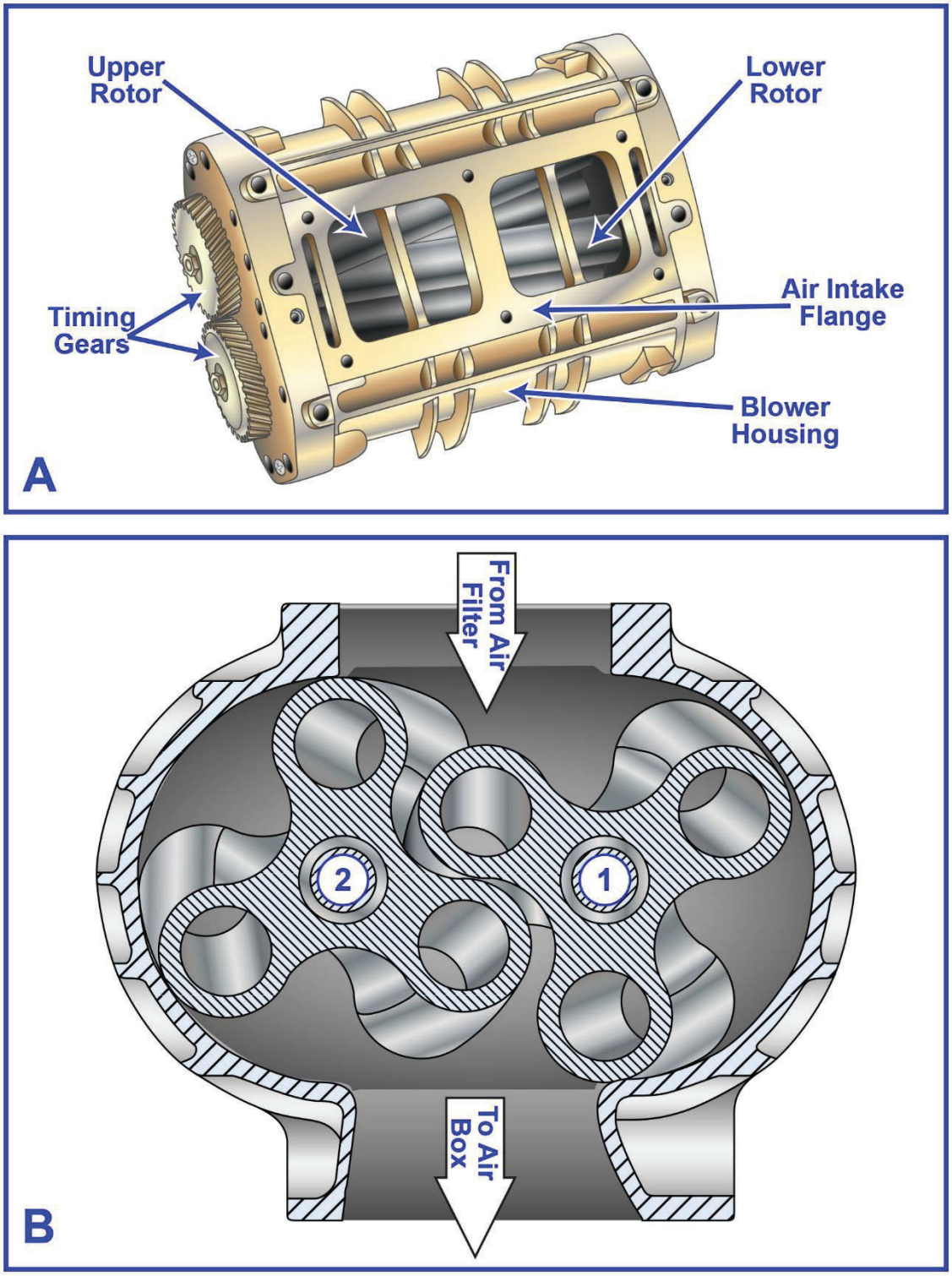
MO-0089



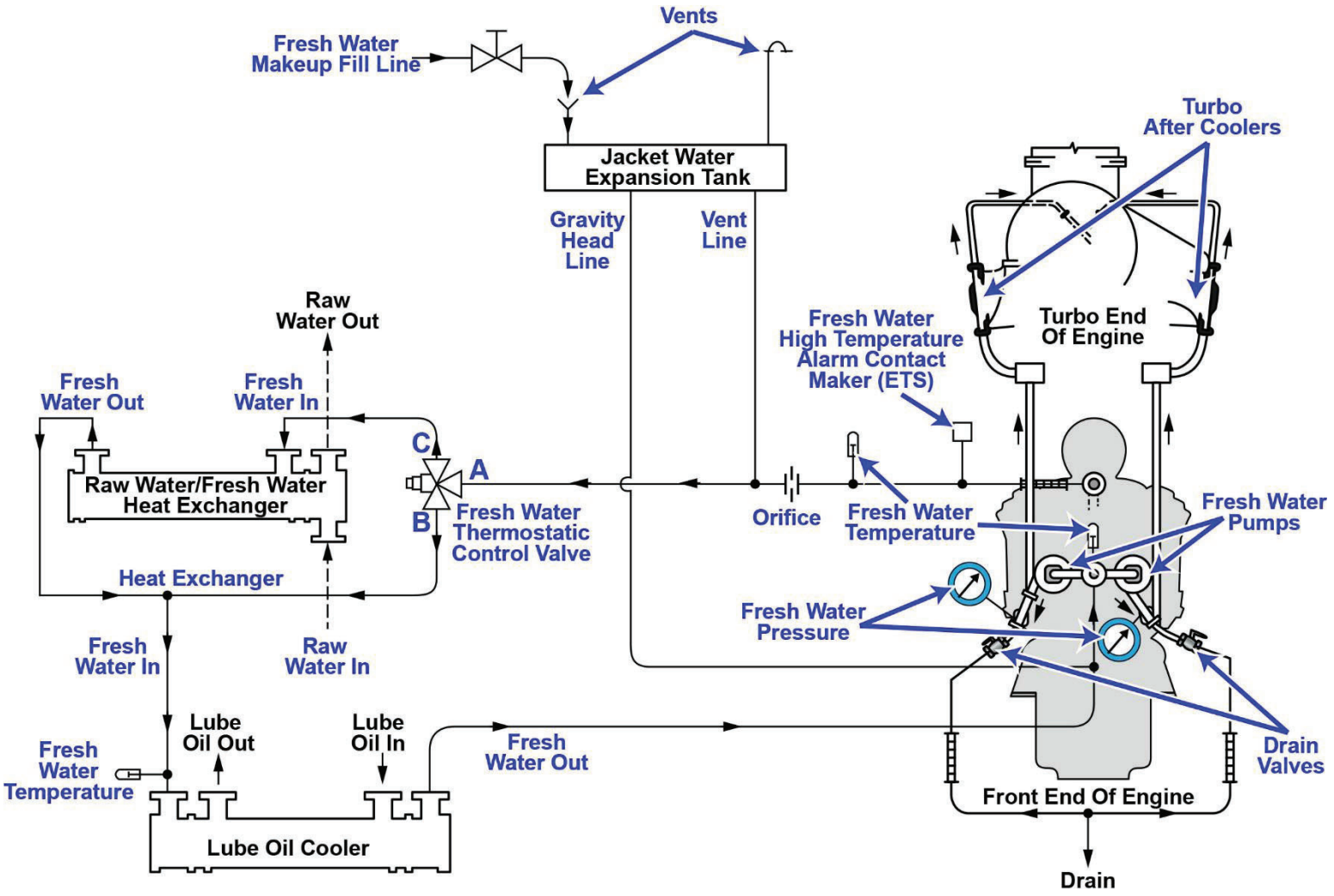
MO-0101



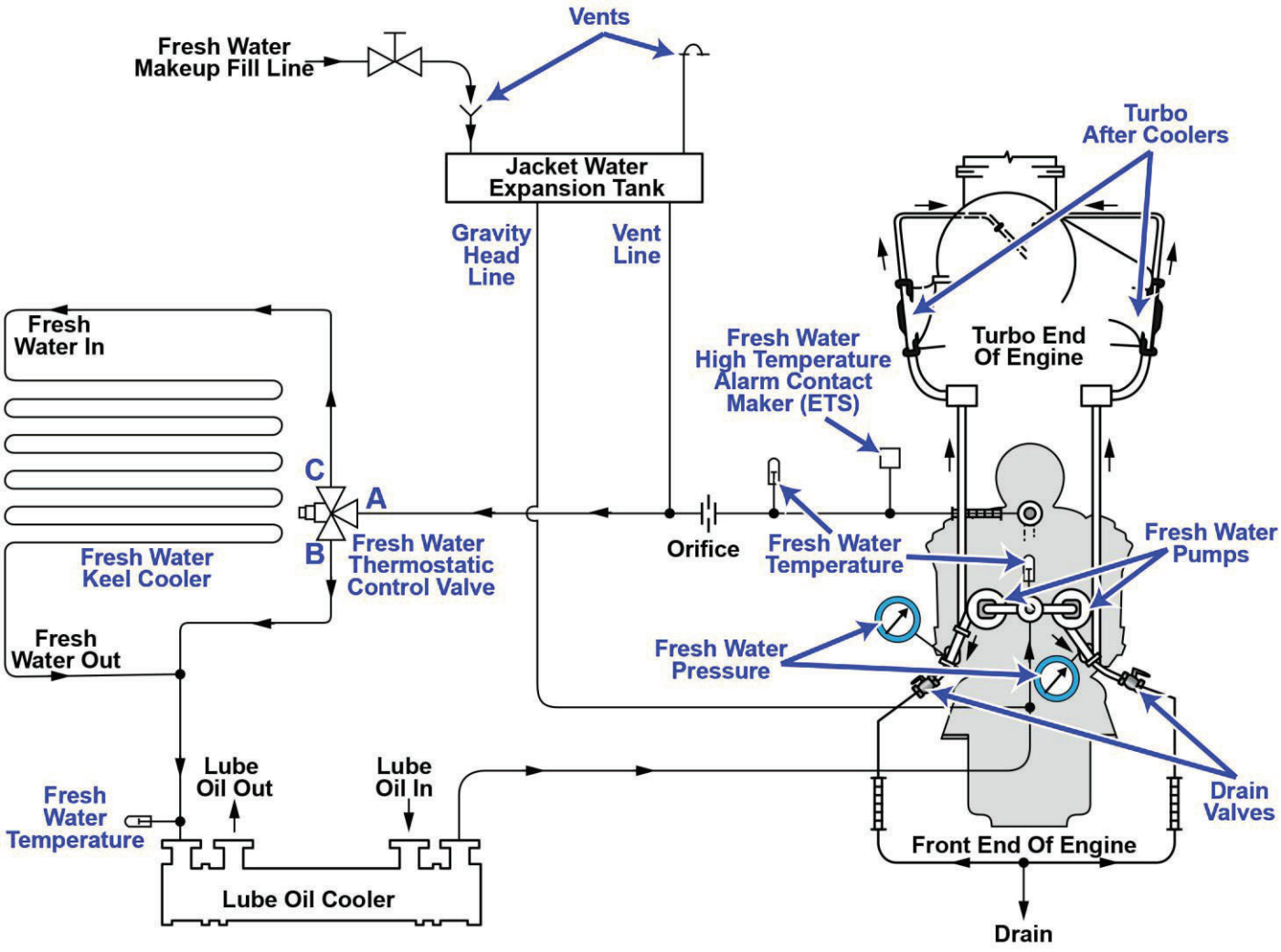
MO-0135



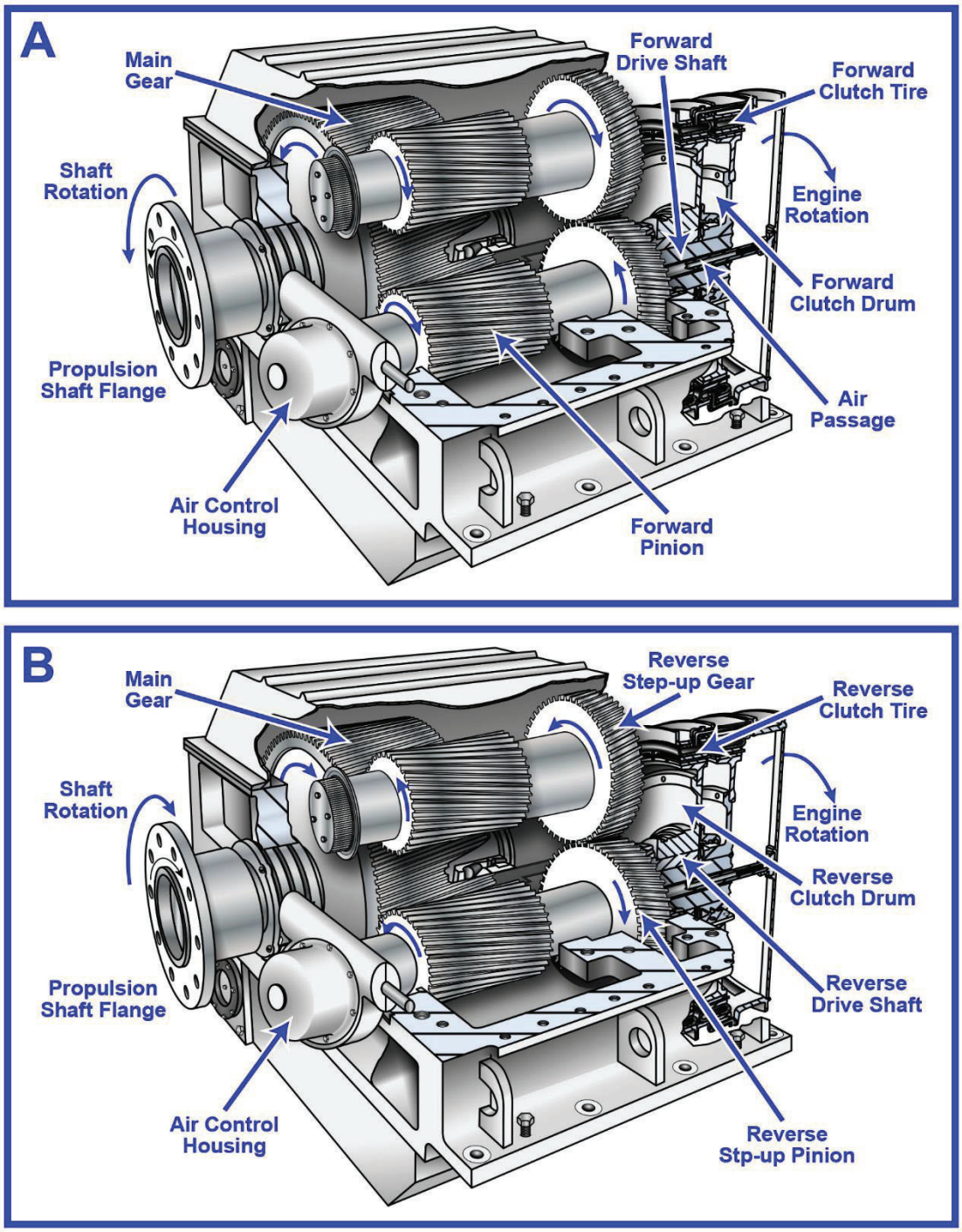
MO-0137
EMD Engine Fresh Water Cooling System with Heat Exchanger



MO-0138
EMD Engine Fresh Water Cooling System with Keel Cooler



MO-0142
Reversing Reduction Gear Operation



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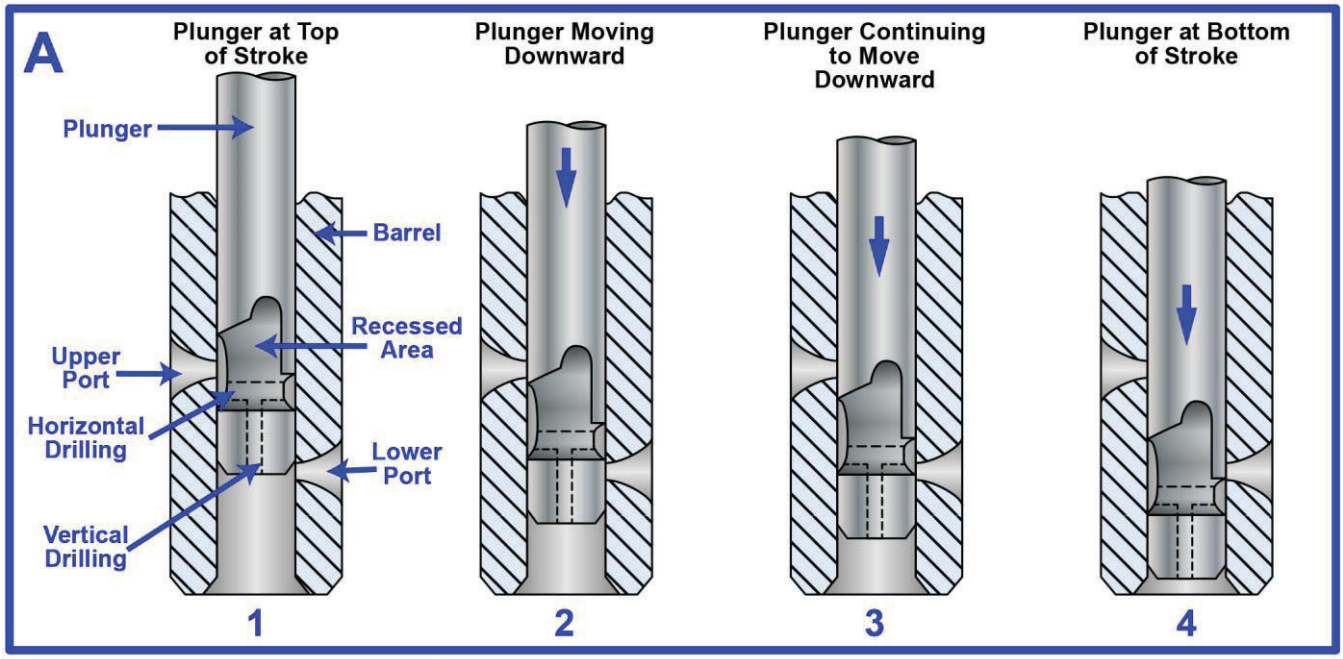
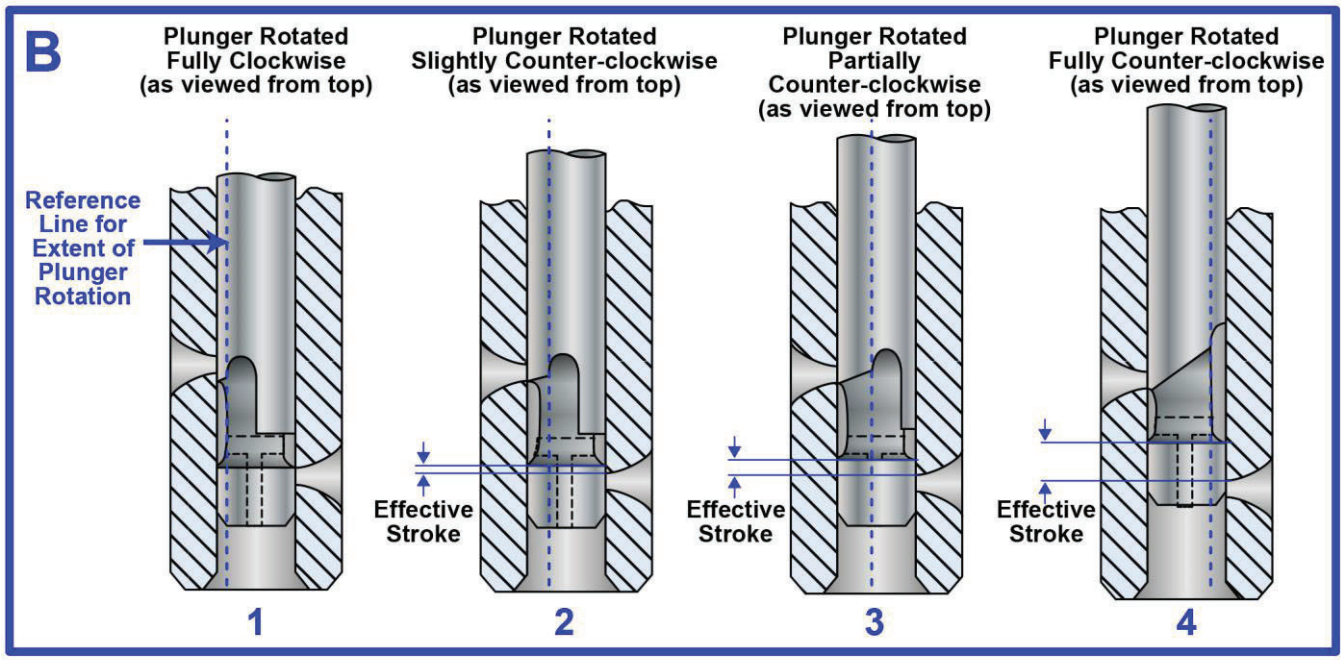
NAVEDTRA 14331

MO-0144

Detroit Diesel 71 Series Engine Unit Injector



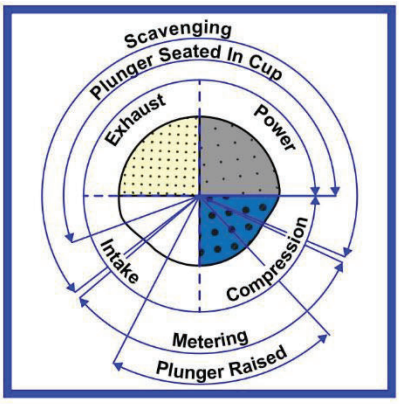
Injector Operation as a Function of Vertical Plunger Travel

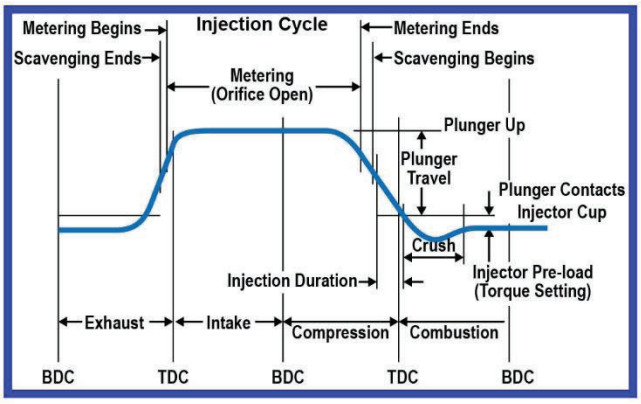


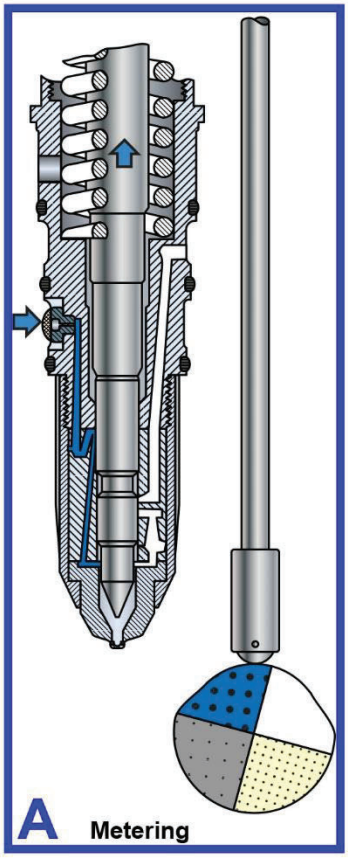
Injector Operation as a Function of Extent of Plunger Rotation

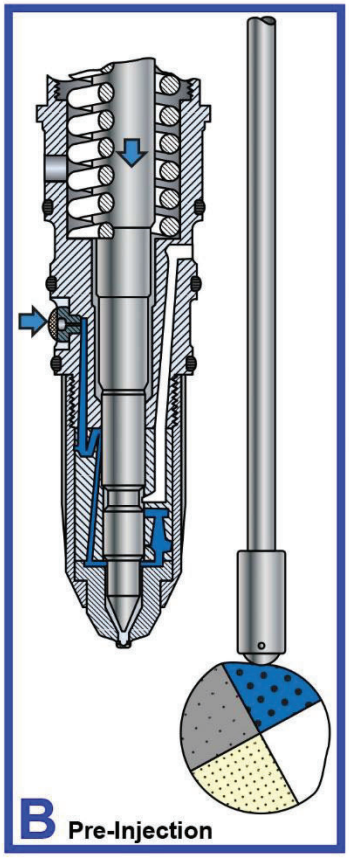
MO-0146

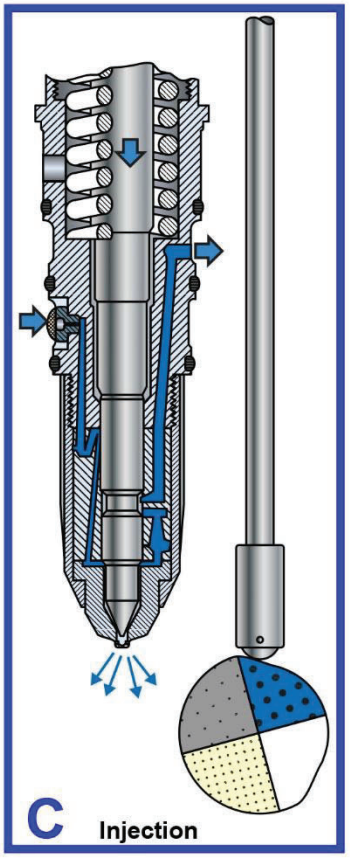
Cummins PT Injection System Injector

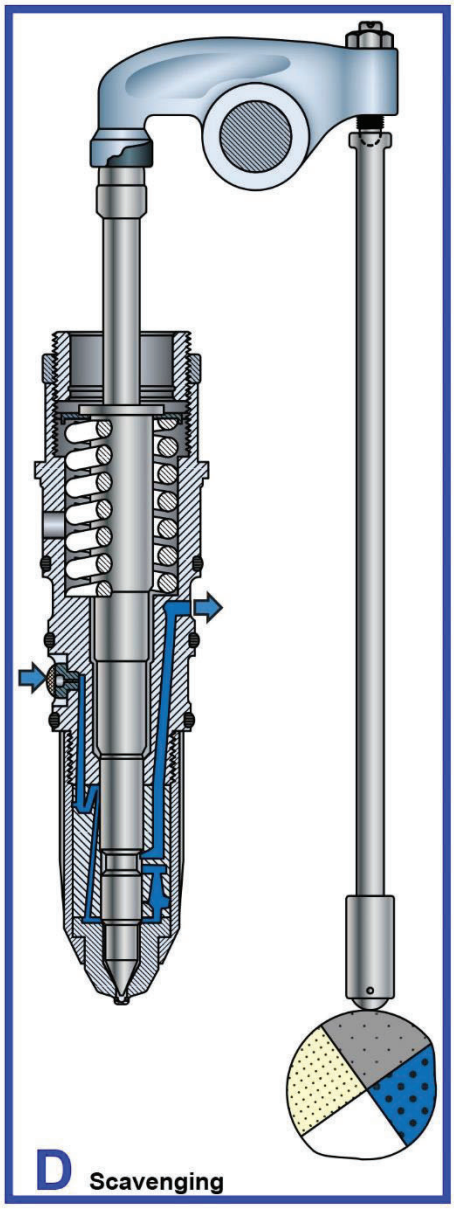




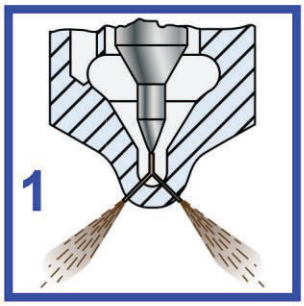


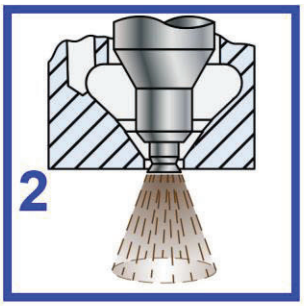


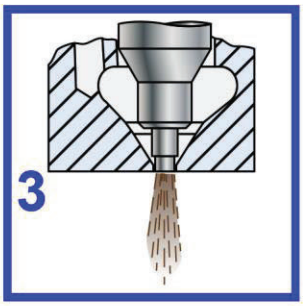


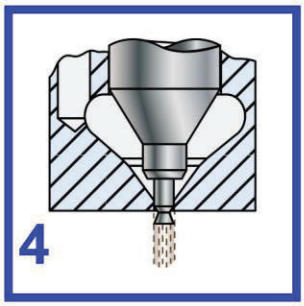


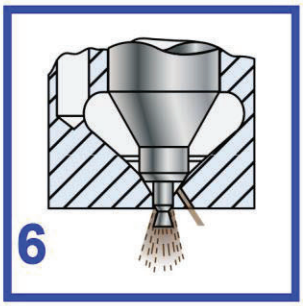
MO-0148

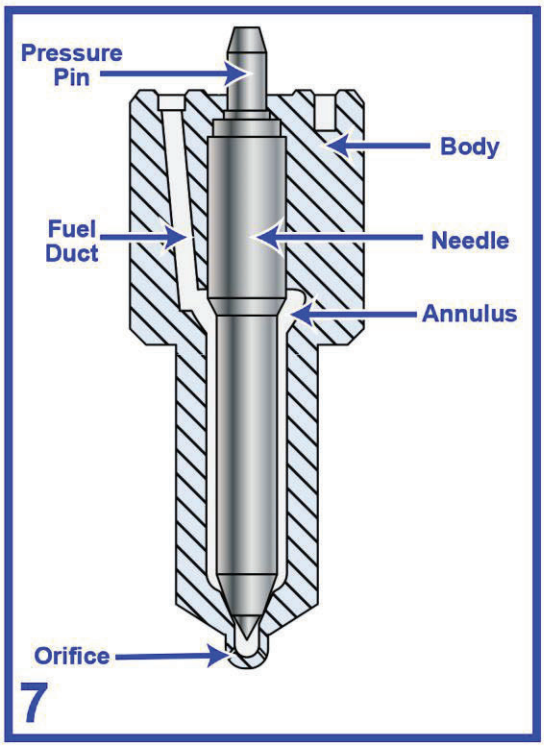


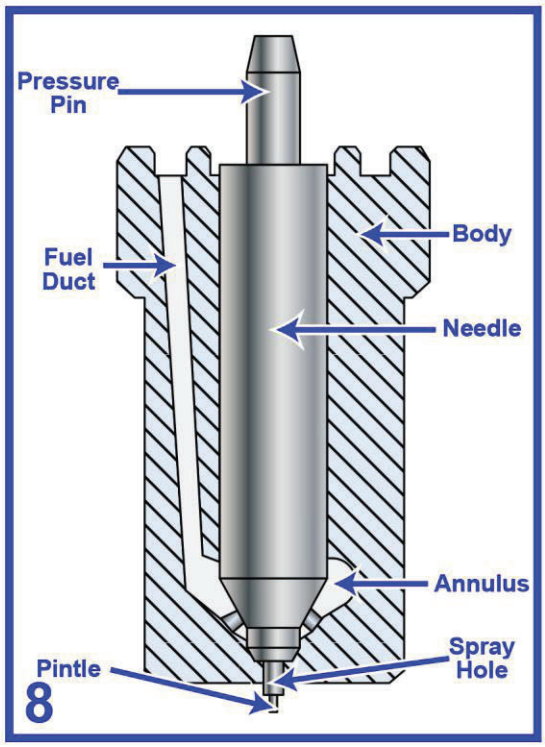




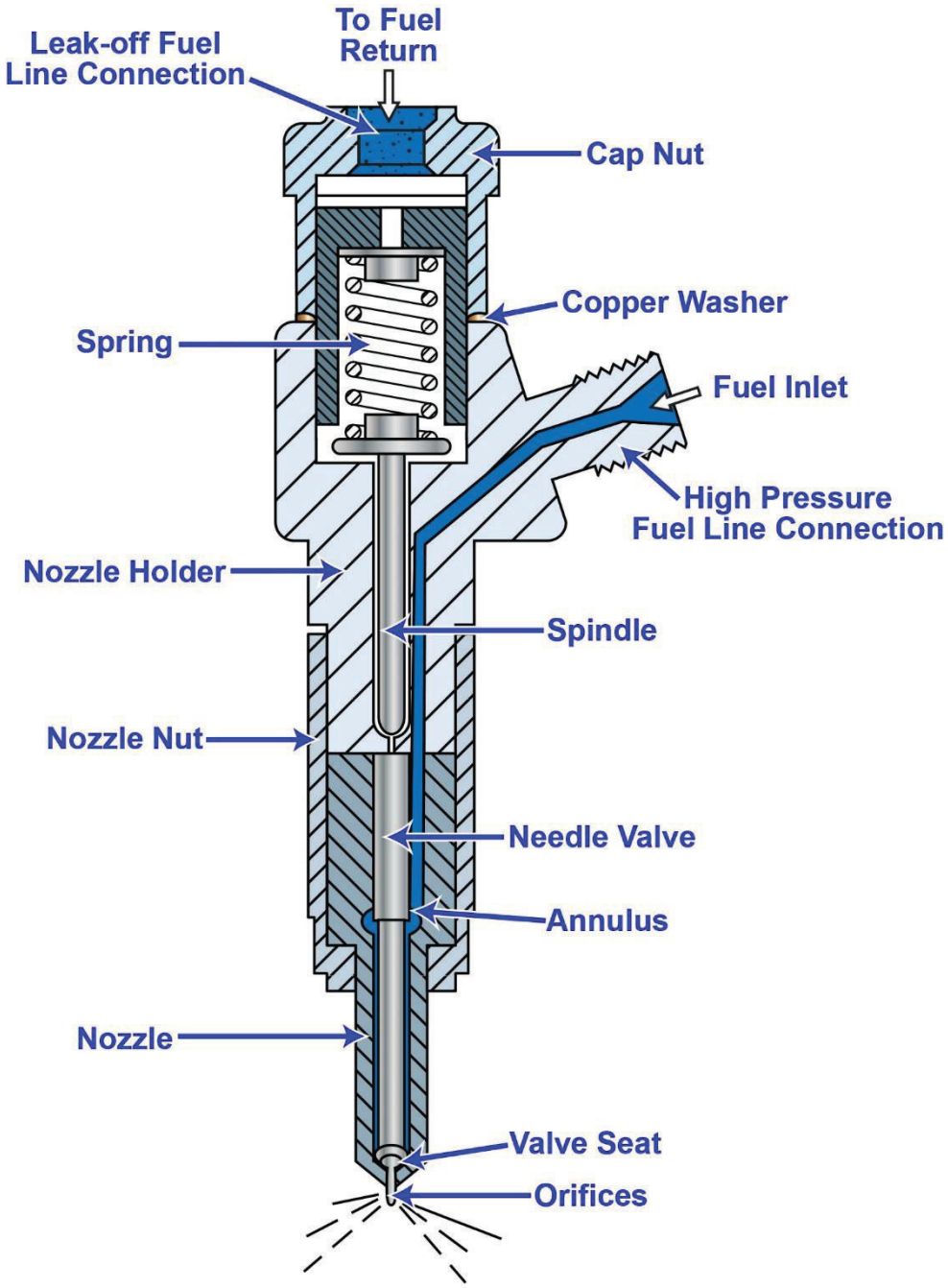






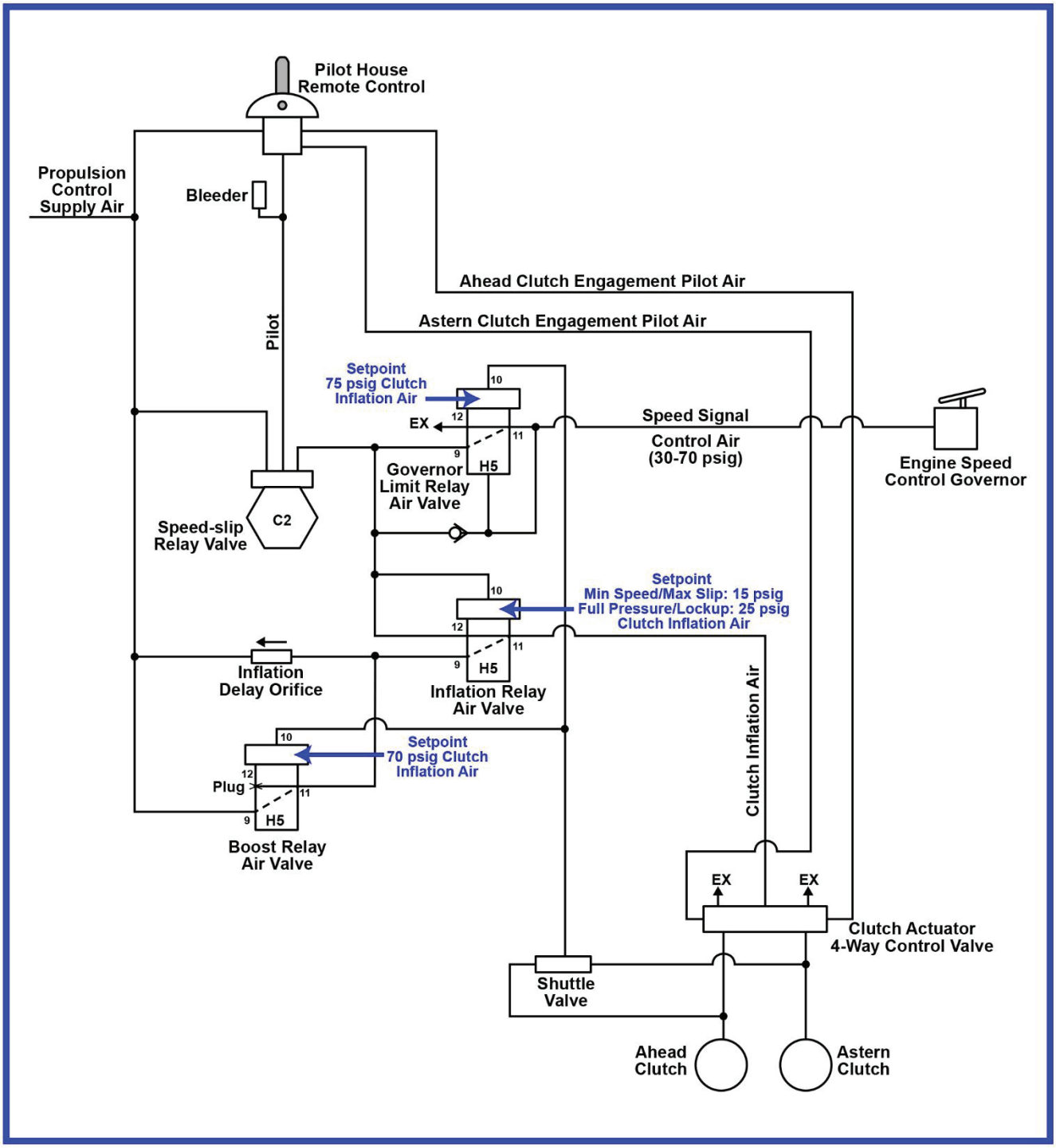


MO-0151



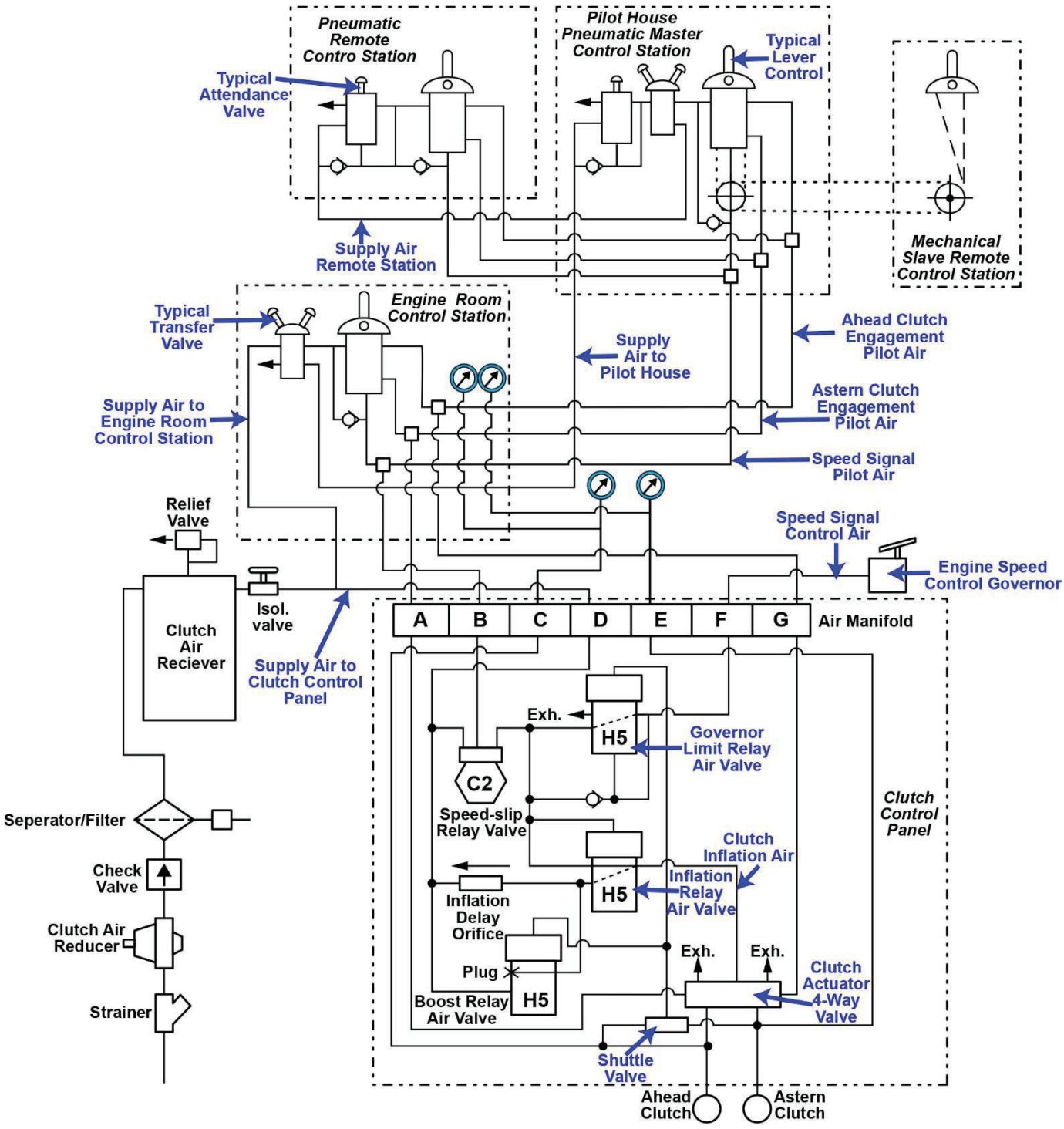
MO-0167

Pneumatic Propulsion Control System with Single Lever Pilot House Control

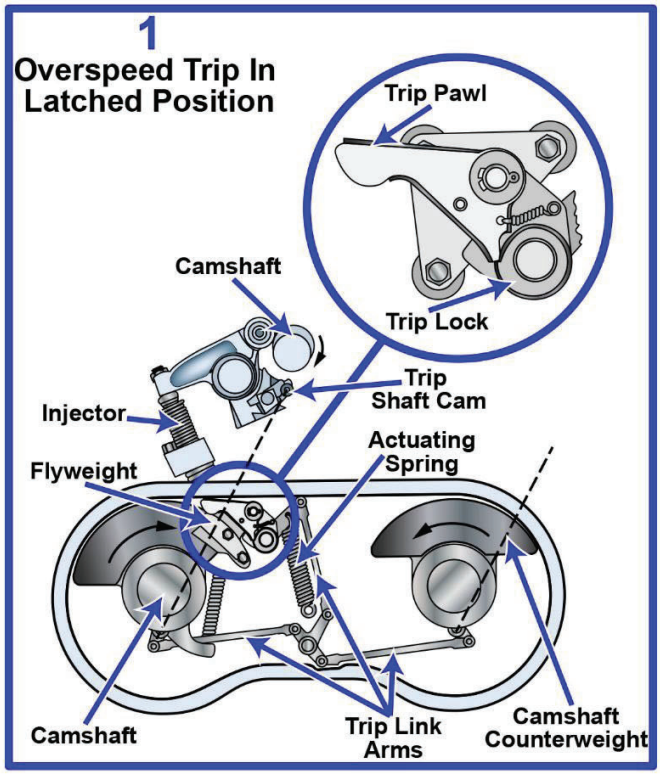


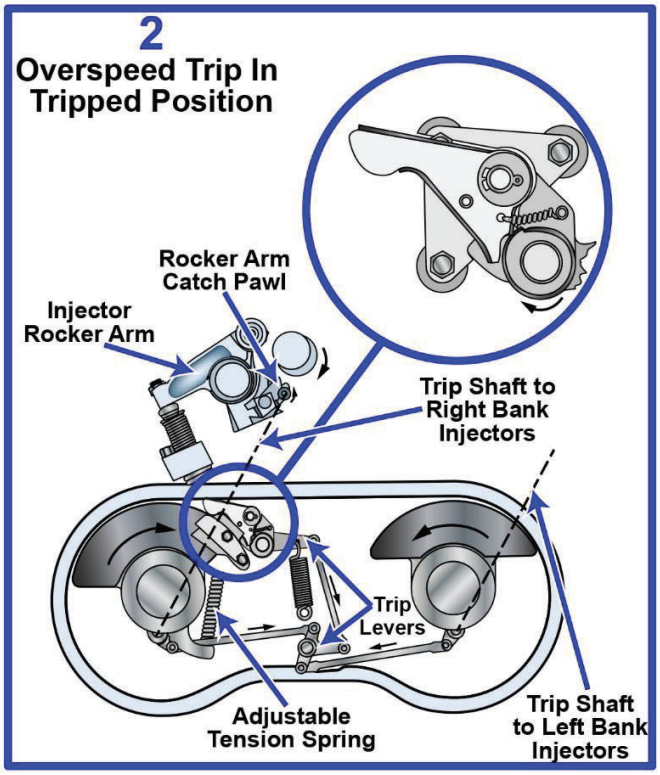
MO-0168

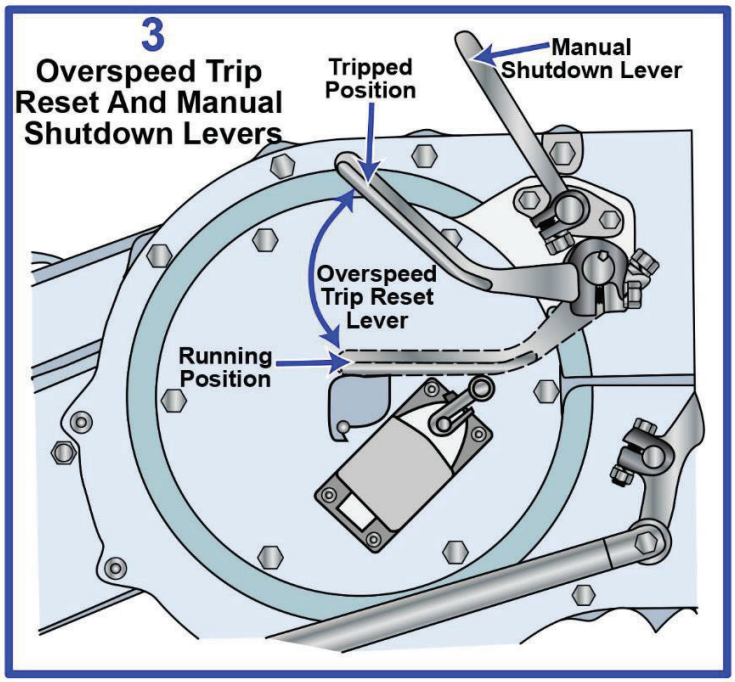
Pneumatic Propulsion Control System



MO-0171
EMD 645 Overspeed and Manual Trips

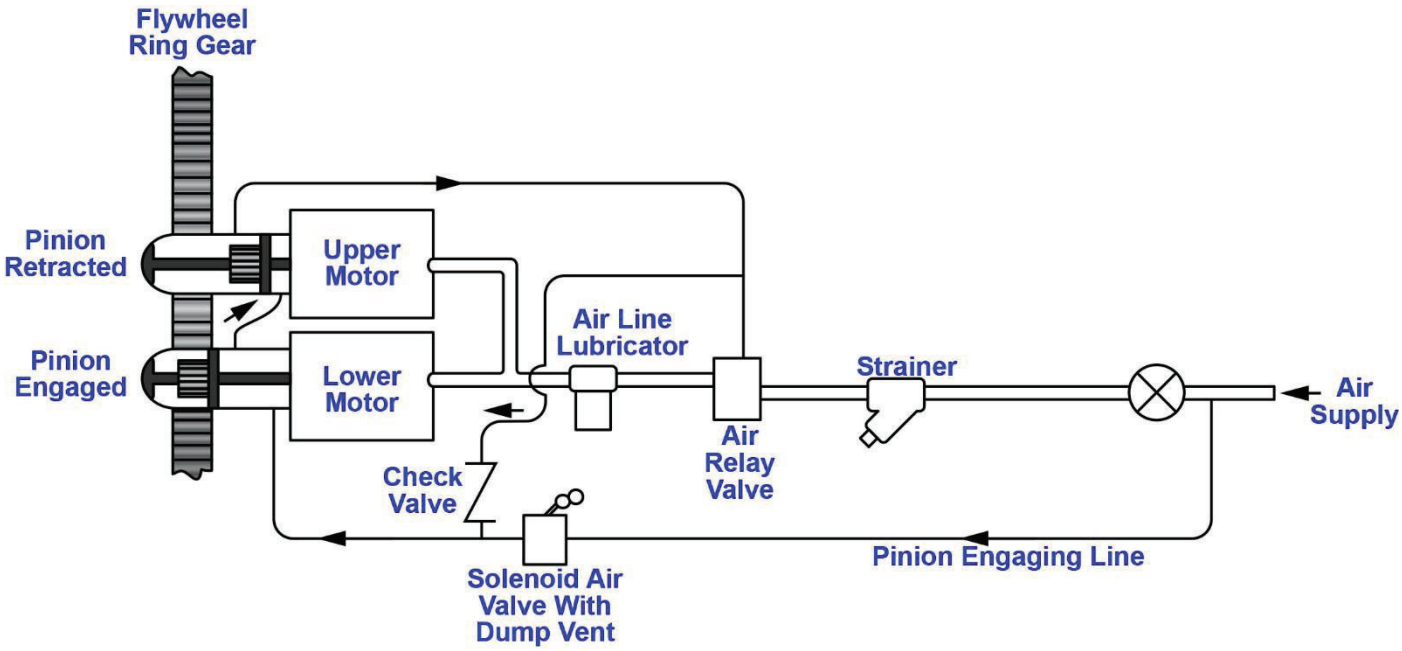




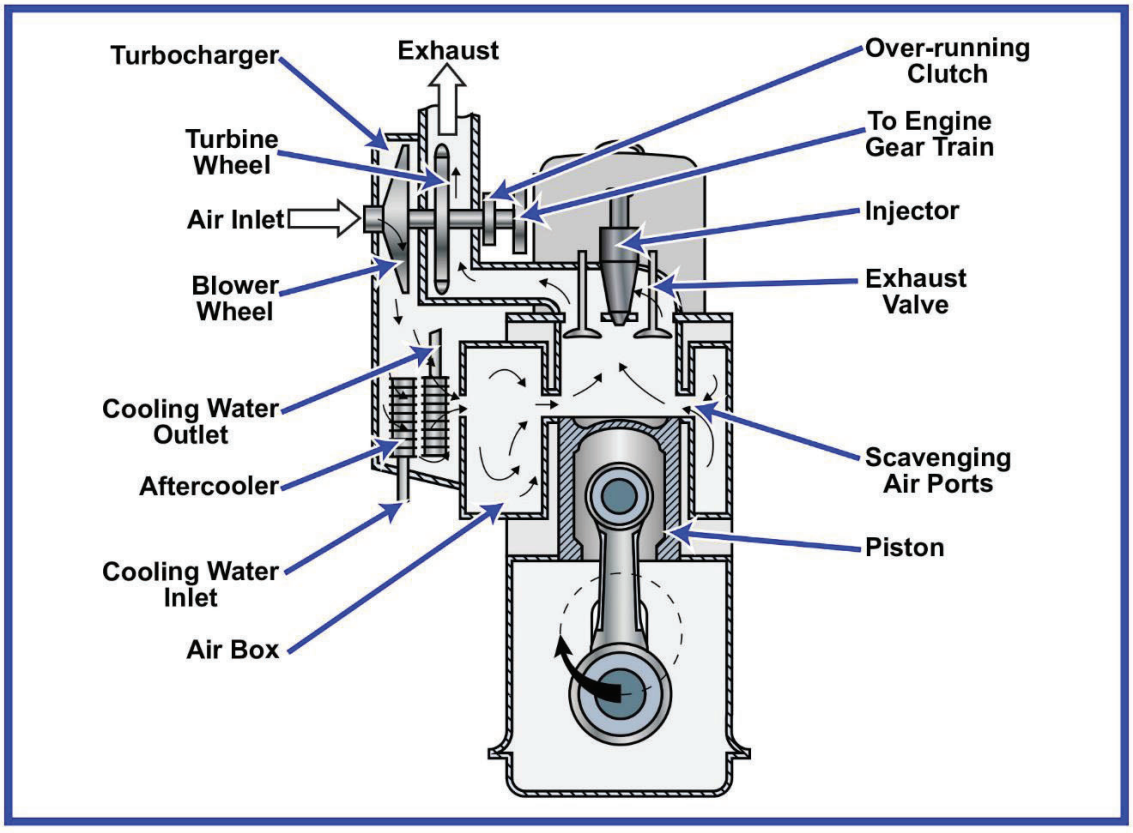


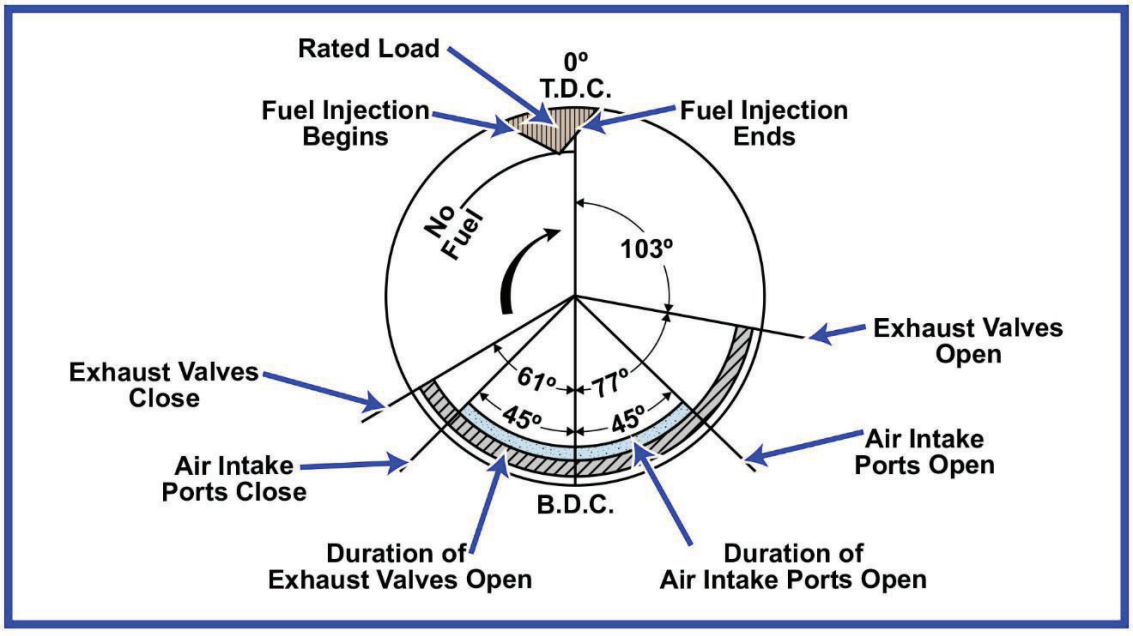
MO-0200

EMD Air Start System Piping at Engine



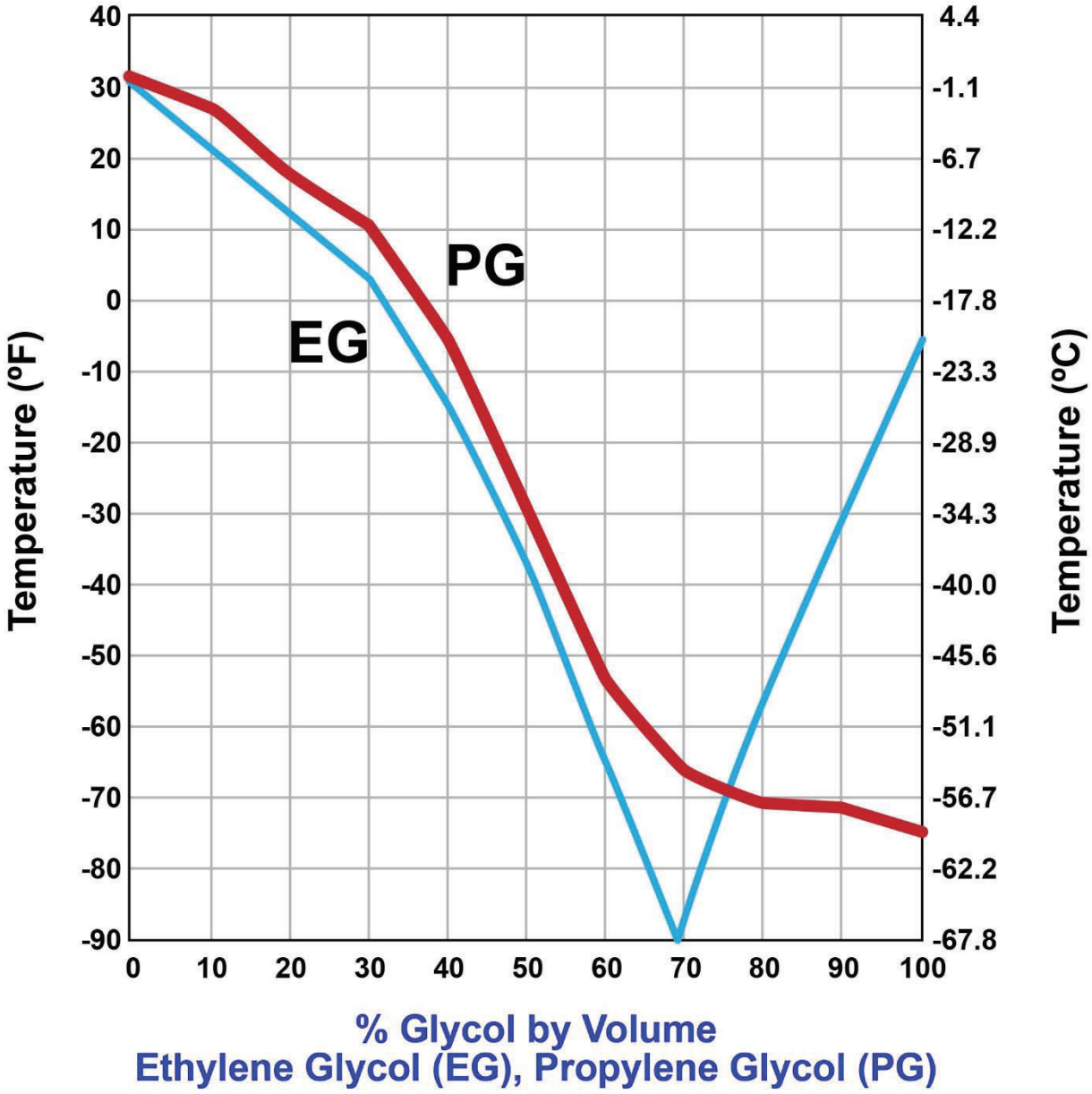
MO-0206
EMD 645 Engine Operating Cycle





MO-0209

Freezing Point of Coolant as a Function of Glycol Concentration



MO-0224