U.S.C.G. Merchant Marine Exam

OSV – Assistant Engineer

Q650 Motor Plants

(Sample Examination)

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

1. What statement concerning fuel cetane rating and the ignition delay period is true as it applies to offshore anchor handling vessel main propulsion diesel engines?

   A. The ignition delay period is the lag in time between when fuel injection is initiated and when fuel injection actually begins, and the higher the cetane rating of the fuel the longer the ignition delay period.
   B. The ignition delay period is the lag in time between when fuel injection actually begins and when combustion actually begins, and the higher the cetane rating of the fuel the longer the ignition delay period.
   C. The ignition delay period is the lag in time between when fuel injection actually begins and when combustion actually begins, and the higher the cetane rating of the fuel the shorter the ignition delay period.
   D. The ignition delay period is the lag in time between when fuel injection is initiated and when fuel injection actually begins, and the higher the cetane rating of the fuel the shorter the ignition delay period.

   Correct answer: C

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

   Correct answer: B

3. 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? Illustration MO-0224

   A. 180 degrees
   B. 360 degrees
   C. 720 degrees
   D. Not enough information is given to determine crankshaft degrees of revolution.

   Correct answer: B

4. You are assigned to an offshore supply vessel fitted with main propulsion diesel engines of the type shown in the illustration. If the engine's crankshaft is turning at 720 rpm, what will be the rotational speed of the two camshafts? Illustration MO-0005

   A. 360 rpm
   B. 720 rpm
   C. 1440 rpm
   D. Not enough information is given to determine camshaft rpm

   Correct answer: A

5. The anchor handling vessel 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? Illustration MO-0069

   A. This is a double-acting, two-stroke cycle, crosshead piston type engine.
   B. This is a single-acting, two-stroke cycle, crosshead piston type engine.
   C. This is a double-acting, four-stroke cycle, opposed piston type engine.
   D. This is a single-acting, two-stroke cycle, opposed piston type engine.

   Correct answer: D

6. The multi-purpose offshore supply vessel to which you are assigned is fitted with main propulsion diesel engines of the type shown in the illustration. In terms of valve operating gear, cylinder liner type, and connecting rod type, what statement is true? Illustration MO-0192

   A. This is an overhead cam engine, with jacketed cylinder liners and marine-type connecting rods.
   B. This is a pushrod operated overhead valve engine, with wet cylinder liners and conventional connecting rods.
   C. This is an overhead cam engine, with wet cylinder liners and conventional connecting rods.
   D. This is a pushrod operated overhead valve engine, with jacketed cylinder liners and articulated connecting rods.

   Correct answer: B

7. When checking the crankcase oil level on a main propulsion engine on your offshore oil spill response vessel while underway, what should be the oil level as indicated on the dipstick?

   A. The level should be below the ADD mark on the side of the dipstick marked with engine IDLE and oil HOT.
   B. The level should be well above the FULL mark on the side of the dipstick marked with engine IDLE and oil HOT.
   C. The actual level is unimportant as long as it is visible on the dipstick when the engine is running.
   D. The level should be between the FULL and ADD marks on the side of the dipstick marked with engine IDLE and oil HOT.

   Correct answer: D

8. Before shutting down the main propulsion engines on an offshore supply vessel, ideally what should be accomplished FIRST?

   A. The engine should be operated with the load removed from the engine for several minutes, then shut down.
   B. The engine should be operated at rated load for several minutes, then shut down.
   C. The engine should be shut down immediately with no delay period, regardless of the engine load.
   D. The engine should be operated at a steady, but substantial load for several minutes, then shut down.

   Correct answer: A

9. Prior to starting the main propulsion diesel engines fitted on your platform supply vessel, the crankcase oil level must be checked. At what checked level would you be required to add make-up oil?

   A. When the oil level drops to where it is no longer visible on the side of the dipstick marked ENGINE STOPPED and OIL COLD
   B. When the oil level drops to between the ADD and FULL marks on the side of the dipstick marked ENGINE STOPPED and OIL COLD
   C. When the oil level drops below the ADD mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD
   D. When the oil level drops below the FULL mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD

   Correct answer: C

10. The platform supply vessel to which you are assigned is fitted with auxiliary diesel engines of the type shown in the illustration. In terms of valve operating gear and cylinder liner type, what statement is true? Illustration MO-0165

    A. This is an overhead cam engine with dry cylinder liners
    B. This is an overhead cam engine with wet cylinder liners
    C. This is a pushrod operated overhead valve engine with wet cylinder liners
    D. This is a pushrod operated overhead valve engine with dry cylinder liners

    Correct answer: D

11. 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? Illustration MO-0163

    A. This is a four-stroke cycle, 60o V-type engine
    B. This is a two-stroke cycle, 90o V-type engine
    C. This is a two-stroke cycle, 60o V-type engine
    D. This is a four-stroke cycle, 90o V-type engine

    Correct answer: C

12. The offshore oil spill response vessel to which you are assigned is fitted with auxiliary engines as partly shown in the illustration. What statement is true concerning the valve guide and valve seat arrangements? Illustration MO-0163

    A. The valve guides are replaceable inserts, and the valve seats are integral (non-replaceable)
    B. The valve guides and the valve seats are both replaceable inserts
    C. The valve guides and the valve seats are both integral (non-replaceable)
    D. The valve guides are integral (non-replaceable), and the valve seats are replaceable inserts

    Correct answer: B

13. When checking the crankcase oil level on an off-line diesel generator set engine on your offshore oil spill response vessel, what should be the oil level as indicated on the dipstick?

    A. The actual level is unimportant as long as it is visible on the dipstick.
    B. The level should be between the FULL and ADD marks on the dipstick.
    C. The level should be well above the FULL mark on the dipstick.
    D. The level should be below the ADD mark on the dipstick.

    Correct answer: B

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

    Correct answer: C

15. The main propulsion diesel engines fitted on your multi-purpose offshore supply vessel are started with compressed air using the system illustrated. What is the starting method used with this system? Illustration MO-0199

    A. Direct air admission with cam actuated air start valves
    B. Direct air admission with air start distributor
    C. Air cranking motor(s)
    D. Hydraulic cranking motor(s) with air over hydraulics

    Correct answer: C

16. The various auxiliary diesel engines fitted on your anchor handling vessel may employ a variety of different cranking methods for engine starting. What type of cranking method is shown in the illustration? Illustration MO-0044

    A. Hydraulic cranking motor
    B. Air cranking motor
    C. Gasoline engine cranking motor
    D. Electric cranking motor

    Correct answer: B

17. The main propulsion diesel engines used to power the offshore supply boat to which you are assigned are started with vane-type air-starting motors designed to operate at 250 psig. The in-line lubricator should provide 3 drops of oil per cranking minute, as long as the in-line lubricator oil viscosity is as specified. If the start air pressure is within the normal range and the oil viscosity is correct, but the oil injection rate is only 1 drop per minute, what should be done?

    A. The oil in the in-line lubricator should be replaced with oil of lower viscosity than specified.
    B. The in-line lubricator oil injection metering needle valve should be further opened.
    C. The in-line lubricator oil injection metering needle valve should be further closed.
    D. The starting air pressure supplied to the air-starting motors should be increased.

    Correct answer: B

18. Various diesel engines onboard your offshore supply vessel are started by means of either vane-type or air-turbine air-starting motors. At a minimum, in the absence of automatic drain valves, how often should moisture separators be drained of moisture while the vessel is underway?

    A. Hourly
    B. Daily
    C. Weekly
    D. Monthly

    Correct answer: B

19. A diesel generator set on your anchor-handling supply vessel has a simplex lube oil strainer of the type shown in the illustration, situated on the discharge side of the lube oil pump. At a specified engine rpm and lube oil temperature, you notice that the inlet pressure is increasing, and the outlet pressure is decreasing, resulting in an unacceptable pressure drop. What should be done? Illustration MO-0057

    A. While the engine is running, the drain plug (B) should be carefully loosened to drain the sludge from the strainer sump.
    B. The drain plug (B) is removed to drain the sludge from the strainer sump, but the engine must be stopped to perform this operation.
    C. While the engine is running, the cleaning handle (A) should be rotated one or more full turns to remove the accumulated dirt from the disk stack (C).
    D. While the engine is running, the cleaning handle (A) should be rotated one-half turn to remove the accumulated dirt from the disk stack (C).

    Correct answer: C

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

    Correct answer: C

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

    Correct answer: C

22. The platform supply vessel to which you are assigned has a main engine fuel system as shown in the illustration. When the filter and water separator as shown in the day tank fill line are combined into one unit, what is this called? Illustration MO-0152

    A. An adsorption type filter
    B. An absorption type filter
    C. A coalescing type filter
    D. A strainer

    Correct answer: C

23. The offshore supply vessel to which you are assigned has a main engine fuel system as shown in the illustration. Besides preventing the attached fuel oil pump and the hand priming fuel oil pump from discharging through the other, what other purpose do the anti-flood check valves serve? Illustration MO-0152

    A. They prevent backflow of fuel from the engine to the day tank when the engine is shut down and when the day tank is located above the engine.
    B. They prevent backflow of fuel from the engine to the day tank when the engine is shut down and when the day tank is located below the engine.
    C. They prevent backflow of fuel from the engine to the day tank when the engine is running and when the day tank is located above the engine.
    D. They prevent backflow of fuel from the engine to the day tank when the engine is running and when the day tank is located below the engine.

    Correct answer: B

24. The main diesel engines on the OSV to which you are assigned are fitted with a metal-edge duplex suction fuel strainer, where the elements must be periodically cleaned. The engine manufacturer recommends using a petroleum-based solvent for cleaning. Which of the following would typically be acceptable?

    A. Kerosene or diesel fuel
    B. Benzene or toluene
    C. Perchloroethylene or trichlorethylene
    D. White mineral spirits

    Correct answer: A

25. The main engines on the anchor-handling supply boat to which you are assigned are fitted with duplex secondary spin-on fuel filters. Concerning the selector handle, what statement is true?

    A. The selector handle is placed in the "BOTH" position when the engine is running at high load or rpm to accommodate higher fuel delivery requirements. When the engine is running at low load or rpm, the selector handle is placed in either the "1" or "2" position.
    B. The selector handle is placed in the "BOTH" position when the engine is running at low load or rpm. When the engine is running at high load or rpm, the selector handle is placed in either the "1" or "2" position depending upon which filter element is clean.
    C. The selector handle is normally placed in the "BOTH" position regardless of the load or rpm on the engine in order to be able to double the fuel handling throughput at any load or rpm and allow the engine speed to be changed without worrying about the selector handle position.
    D. The selector handle is placed in either position the "1" or "2" position regardless of the load or rpm on the engine. The selector handle is temporarily placed in the "BOTH" position only when transitioning from a restricted filter element over to a clean filter element.

    Correct answer: D

26. The anchor handling supply vessel to which you are assigned has diesel generators fitted with fuel injectors with the operating principle as shown in the illustration. In figure "B" which plunger rotation position corresponds to the engine running under no load at idle RPM? Illustration MO-0144

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

    Correct answer: B

27. On diesel engines used on a multi-purpose supply vessel, which type of injection system is most likely to use sophisticated electronic controls for timing and metering?

    A. Distributor type pump
    B. In-line multi-plunger pump
    C. Unit injector type pump
    D. Rotary plunger type pump

    Correct answer: C

28. The platform construction support 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 begins? Illustration MO-0144

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

    Correct answer: B

29. The offshore supply vessel to which you are assigned has diesel generators fitted with fuel injectors of the type shown in figure "2" of the illustration. What statement is true concerning this type of injector? Illustration MO-0150

    A. The injector is of the open type and features pressure-time metering.
    B. The injector is of the closed type and features pressure-time metering.
    C. The injector is of the open type and features port and helix metering.
    D. The injector is of the closed type and features port and helix metering.

    Correct answer: D

30. The drilling platform supply vessel to which you are assigned has diesel generators fitted with unit injectors of the type shown in the illustration. What statement is true concerning the operation of unit injectors of this type? Illustration MO-0143

    A. Pressurization of the fuel is accomplished by the mechanically operated rocker arm, and the timing and metering of the fuel is accomplished by the electronically controlled solenoid.
    B. Pressurization of the fuel is accomplished by the electronically controlled solenoid, and the timing and metering of the fuel is accomplished by the mechanically operated rocker arm.
    C. Pressurization and metering of the fuel is accomplished by the mechanically operated rocker arm, and the timing of the fuel is accomplished by the electronically controlled solenoid.
    D. Pressurization and timing of the fuel is accomplished by the mechanically operated rocker arm, and the metering of the fuel is accomplished by the electronically controlled solenoid.

    Correct answer: A

31. 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, but injector synchronization is achieved by adjusting the control racks of the injectors to the proper setting.
    B. 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.
    C. 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.
    D. 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.

    Correct answer: A

32. The main propulsion diesel engines on your anchor-handling supply vessel are fitted with conventional hydraulically operated injector nozzles of the orifice type. When testing an injector by performing a pop-test on an injector test stand, you observe no leakage prior to reaching the popping pressure, the pressure holds at just below the popping pressure, the actual popping pressure is within specification, but the spray pattern is distorted. What maintenance is required?

    A. The injector spindle and nozzle holder bore must be reconditioned or replaced.
    B. The injector spring compression must be readjusted or a broken spring replaced.
    C. The injector needle valve and seat must be reconditioned or replaced.
    D. The injector nozzle tip orifices must be reconditioned by cleaning or the tip replaced.

    Correct answer: D

33. The oil platform construction support vessel to which you are assigned has main diesel engines fitted with intake and exhaust systems as shown in the illustration. If the main engine is running under a heavy load at maximum rpm, which pressure would ordinarily be negative? Illustration MO-0180

    A. Air intake
    B. Air box
    C. Exhaust receiver
    D. Exhaust discharge to stack

    Correct answer: A

34. The offshore supply vessel to which you are assigned has main engines fitted with intake and exhaust systems as shown in the illustration. What statement is true concerning the turbocharger charge air discharge arrangements? Illustration MO-0177

    A. The left side turbocharger discharges charge air to the left cylinder bank, and the right side turbocharger discharges charge air to the right cylinder bank.
    B. The left side turbocharger discharges charge air to the right cylinder bank, and the right side turbocharger discharges charge air to the left cylinder bank.
    C. It is not possible to determine the turbocharger charge air discharge arrangements in this particular drawing.
    D. The left side turbocharger discharges charge air to both cylinder banks, and the right side turbocharger discharges charge air to both cylinder banks.

    Correct answer: B

35. In order to minimize the abrasive action of dust particles entering the combustion spaces of the diesel engines used on the offshore supply vessel to which you are assigned, each engine is protected with a heavy-duty air intake filter. Which one of the listed air intake filter elements is periodically cleaned as opposed to being periodically replaced with a new element?

    A. Panel-type filter element
    B. Spiral-rotor filter element
    C. Wire-mesh filter element
    D. Multi-tube filter element

    Correct answer: C

36. The diesel engines on your general-purpose supply vessel are all protected with dry-type air filters. The air filters should be inspected and replaced in accordance with manufacturer instructions. What is the generally accepted criteria that would dictate when filter replacement becomes necessary?

    A. The air filter element should be replaced when the pressure rise across the element decreases below the specified minimum.
    B. The air filter element should be replaced when the pressure drop across the element increases above the specified maximum.
    C. The air filter element should be replaced when the pressure rise across the element increases above the specified maximum.
    D. The air filter element should be replaced when the pressure drop across the element decreases below the specified minimum.

    Correct answer: B

37. 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? Illustration MO-0176

    A. Boost-controlled turbocharging
    B. Pulse turbocharging
    C. 2-stage turbocharging
    D. Constant pressure turbocharging

    Correct answer: B

38. Assuming the use of ultra-low sulfur content diesel fuel, what combination of conditions associated with OSV engine room operations would require the most frequent draining of exhaust systems of condensation?

    A. Winter operations with prolonged idling on station
    B. Winter operations with lengthy ship escort transit times
    C. Summer operations with lengthy ship escort transit times
    D. Summer operations with prolonged idling on station

    Correct answer: A

39. Wire brushing and scraping can be used to remove hard carbon deposits from exhaust system surfaces. When cleaning exhaust systems associated with the diesel engines on the supply boat to which you are assigned, what technique can effectively be used in conjunction with mechanical cleaning to loosen and soften up these hard carbon deposits?

    A. Treating with carbon penetrating solvent
    B. Baking off carbon with heat lamps
    C. Sand blasting with diamond dust
    D. Treating with carbon tetrachloride solvent

    Correct answer: A

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

    Correct answer: A

41. The freshwater cooling systems serving the main engines of your offshore supply vessel are of the type shown in the illustration. What statement accurately describes the characteristics of the freshwater cooling circuit? Illustration MO-0137

    A. The freshwater circuit is a pressurized system using a stationary/marine type 3-way thermostatic control valve for temperature control.
    B. The freshwater circuit is a vented system using a stationary/marine type 3-way thermostatic control valve for temperature control.
    C. The freshwater circuit is a pressurized system using an automotive type 2-way thermostatic control valve for temperature control.
    D. The freshwater circuit is a vented system using an automotive type 2-way thermostatic control valve for temperature control.

    Correct answer: B

42. Your platform supply vessel is fitted with cooling water systems serving the main propulsion diesel engines as shown in the illustration. Which heat exchanger/cooler application and aspect would most likely require periodic mechanical cleaning with a specially designed brush? Illustration MO-0137

    A. The outside of the tubes of the lube oil cooler
    B. The inside of the tubes of the RW/FW heat exchanger
    C. The outside of the tubes of the RW/FW heat exchanger
    D. The inside of the tubes of the lube oil cooler

    Correct answer: B

43. You are replacing an automotive type cooling water thermostat on one of the diesel generator sets on your anchor-handling supply vessel. The markings on the original thermostat indicate that it was set to begin opening at 180oF. Which of the following thermostats marked for Celsius would be a replacement that comes closest to the value at which opening begins as compared to the original thermostat?

    A. 70oC
    B. 80oC
    C. 90oC
    D. 100oC

    Correct answer: B

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

    Correct answer: B

45. The winch drive engine on the anchor handling supply vessel to which you are assigned is fitted with a Roots-type blower as shown in the illustration. What statement is true concerning this blower? Illustration MO-0082

    A. Rotor "1" turns clockwise, and rotor "2" turns counter-clockwise.
    Area "3" is the discharge passage, and area "4" is the suction passage.
    B. Rotor "1" turns clockwise, and rotor "2" turns counter-clockwise.
    Area "3" is the suction passage, and area "4" is the discharge passage.
    C. Rotor "1" turns counter-clockwise, and rotor "2" turns clockwise.
    Area "3" is the discharge passage, and area "4" is the suction passage.
    D. Rotor "1" turns counter-clockwise, and rotor "2" turns clockwise.
    Area "3" is the suction passage, and area "4" is the discharge passage.

    Correct answer: C

46. The two-stroke cycle main propulsion engines on the supply boat to which you are assigned are fitted with Roots-type blowers for scavenging purposes. Upon inspection of the air boxes, what condition would indicate a need to replace the Roots-type blower immediately?

    A. Aluminum dust residue
    B. Oil accumulations
    C. Water accumulations
    D. Iron dust residue

    Correct answer: A

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

    Correct answer: B

48. You are assigned to an anchor handling supply vessel with a propulsion system as shown in figure "B" of the illustration. What type of propulsion system is illustrated? Illustration MO-0215

    A. Schottel-azimuthing drive (z-drive)
    B. Conventional fixed pitch propeller
    C. Controllable pitch propeller
    D. Voith-Schneider drive

    Correct answer: A

49. 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 fixed pitch propeller and a 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 controllable pitch propeller and a non-reversing engine.

    Correct answer: A

50. 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

51. The lubricating oil system supporting the main propulsion reduction gear on the platform supply vessel to which you are assigned is fitted with a sea water cooled 4-pass shell and tube lube oil cooler. The water box sacrificial zinc anodes must be inspected periodically. Which of the following listed actions correctly states maintenance criteria pertaining to scale build-up on the zincs?

    A. Any sacrificial zinc anodes with accumulated scale build-up should be replaced regardless of the degree of deterioration.
    B. Any accumulated scale build-up on sacrificial zinc anodes should be left intact to ensure proper protection from galvanic corrosion.
    C. Any accumulated scale build-up on sacrificial zinc anodes should be scraped off until the zinc anodes are shiny.
    D. There is no need to check for scale build-up on the sacrificial zinc anodes as this phenomenon is not physically possible.

    Correct answer: C

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

    Correct answer: D

53. 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 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.
    B. 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.
    C. 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.
    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: A

54. The pneumatic propulsion control system used on your OSV uses a diaphragm-operated relay valve as shown in the illustration. Periodically, the valve is to be disassembled for cleaning and inspection. What statement best describes the proper technique? Illustration MO-0052

    A. Rubber parts such as the diaphragm should be cleaned with non-flammable solvent, and metal parts such as the valve discs and seats should be washed with soap and water.
    B. Rubber parts such as the diaphragm should be washed with soap and water, and metal parts such as the valve discs and seats should be cleaned with non-flammable solvent.
    C. Rubber parts such as the diaphragm and metal parts such as the valve discs and seats should all be washed with soap and water.
    D. Rubber parts such as the diaphragm and metal parts such as the valve discs and seats should all be cleaned with non-flammable solvent.

    Correct answer: B

55. The main engines on your oil platform supply vessel are fitted with speed control governors of the type shown in the illustration. If the shutdown solenoid is de-energized during normal operation, which of the following scenarios depicts the response on a safety shutdown where the shutdown plunger rod moves downward unseating the ball check valve when the shutdown solenoid energizes? Illustration MO-0170

    A. The servo piston rod moves downward.
    The power cylinder tail rod moves upward.
    B. The servo piston rod moves upward.
    The power cylinder tail rod moves downward.
    C. The servo piston rod moves upward.
    The power cylinder tail rod moves upward.
    D. The servo piston rod moves downward.
    The power cylinder tail rod moves downward.

    Correct answer: B

56. The main engines on your multi-purpose supply vessel are equipped with overspeed trip devices as shown in the illustration. What statement concerning the operation of the overspeed trip is true? Illustration MO-0171

    A. The overspeed trip senses centrifugal force proportional to engine speed and limits the engine speed to the rated speed, while allowing the engine to continue to run at the rated speed.
    B. The overspeed trip senses centrifugal force proportional to engine speed and shuts the engine down at a pre-determined, specified maximum speed setting.
    C. The overspeed trip senses oil pressure proportional to engine speed and limits the engine speed to the rated speed, while allowing the engine to continue to run at the rated speed.
    D. The overspeed trip senses oil pressure proportional to engine speed and shuts the engine down at a pre-determined, specified maximum speed setting.

    Correct answer: B

57. The main diesel propulsion engines on your offshore supply vessel are protected with a mechanical overspeed trip mechanism similar to that shown in the illustration. Upon testing the trip setting, you discover that it is necessary to make an adjustment. Assuming that several adjustments may be necessary before the final setting is accurately achieved, what statement concerning adjustment is true? Illustration MO-0101

    A. To adjust the overspeed trip, the engine must be running AND the locknut must be retightened after each adjustment.
    B. To adjust the overspeed trip, the engine must be running AND the locknut must be retightened only after the final adjustment.
    C. To adjust the overspeed trip, the engine must be stopped AND the locknut must be retightened only after the final adjustment.
    D. To adjust the overspeed trip, the engine must be stopped AND the locknut must be retightened after each adjustment.

    Correct answer: D

58. 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 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.
    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 is adjusted just as if it was an unsealed unit, but the seals must be re-established before placing the unit back into operation.

    Correct answer: B

59. The deck winch on your oil platform construction support vessel is fitted with a speed control governor of the type shown in the illustration. In addition to variable governed speed setting, what other group of settings is built into this particular governor? Illustration MO-0157

    A. Engine idle speed (minimum governed speed)
       Engine speed limit (maximum governed speed)
       Engine load limit (maximum fuel delivery)
    B. Engine idle speed (minimum governed speed)
       Engine speed limit (maximum governed speed)
    C. Engine idle speed (minimum governed speed)
       Engine load limit (maximum fuel delivery)
    D. Engine load limit (maximum fuel delivery)
       Engine speed limit (maximum governed speed)

    Correct answer: B

60. The heating plant on your anchor handling supply vessel is of the type shown in the illustration. What statement is true concerning the system pumps? Illustration MO-0194

    A. The circulating pump runs continuously, and the feed pump runs intermittently.
    B. The circulating and feed pumps both run intermittently.
    C. The circulating pump runs intermittently, and the feed pump runs continuously.
    D. The circulating and feed pumps both run continuously.

    Correct answer: A

61. The steam generating plant on your oil spill response vessel is of the forced-circulation type. Which figure of the illustration represents a steam generator or boiler of this type? Illustration MO-0197

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

    Correct answer: C

62. The water-tube natural-circulation steam boiler on your general-purpose supply vessel is equipped with soot blowers for maintaining heat transfer efficiency. Which of the following statements best describes the conditions that must be met before tubes can be safely blown using the soot blowers?

    A. The boiler draft must be decreased AND the boiler fires must be secured before tubes can be safely blown.
    B. The boiler draft must be increased AND the boiler fires must be lit before tubes can be safely blown.
    C. The boiler draft must be decreased AND the boiler fires must be lit before tubes can be safely blown.
    D. The boiler draft must be increased AND the boiler fires must be secured before tubes can be safely blown.

    Correct answer: B

63. The auxiliary oil-fired water-tube steam boiler on your anchor-handling supply vessel is equipped with a water column similar to that shown in the illustration. If the gauge glass becomes disabled or there is uncertainty associated with the gauge glass reading, the tri-cocks can be used to determine the boiler water level. What statement best describes the challenge associated with trying to differentiate between steam and water? Illustration MO-0093

    A. On a tri-cock situated below the water level, when opened all of the escaping water will flash to steam.
    B. On a tri-cock situated above the water level, when opened all of the escaping steam will condense to water.
    C. On a tri-cock situated above the water level, when opened some of the escaping steam will condense to water.
    D. On a tri-cock situated below the water level, when opened some of the escaping water will flash to steam.

    Correct answer: D

64. Which of the following conditions best describes the reason for performing a bottom blow on an auxiliary steam boiler as fitted on your offshore supply vessel?

    A. Priming and carryover
    B. Sludge removal
    C. High water
    D. Excess chemicals and/or salinity

    Correct answer: B

65. Due to the questionable mineral content of fresh water taken on from shore as a source of make-up water for diesel engine closed, recirculating cooling water systems, besides chemical treatment and coolant testing, what is the best line of defense in minimizing cooling system problems?

    A. Increasing the frequency of draining, flushing, and re-filling the system
    B. Maintaining a tight system and promptly repairing leaks
    C. Maintaining cooling water temperatures at lower than normal values
    D. Maintaining cooling water temperatures at higher than normal values

    Correct answer: B

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

    Correct answer: D

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

    Correct answer: B

68. You are attempting to start a deck winch drive engine fitted with an electric cranking motor where the battery electrolyte is frozen. What should be done to facilitate starting?

    A. The battery electrolyte should be allowed to thaw, and then the battery should be recharged as necessary before attempting to start the engine.
    B. The engine should be started by means of jumper cables connected to another battery without any particular concern regarding the electrolyte being frozen.
    C. The battery electrolyte should be allowed to thaw, and then the battery electrolyte should be diluted with distilled water as necessary before attempting to start the engine.
    D. The battery electrolyte should be thawed by means of a battery charger, and then the battery should be recharged as necessary before attempting to start the engine.

    Correct answer: A

69. While warming up the main engines on your offshore utility vessel while tied up at your own pier, one of the main engines suddenly sounds the low lube oil pressure alarm. What is the appropriate initial response?

    A. Immediately add make-up oil or service lube oil coolers, strainers, and filters, as appropriate.
    B. Immediately shutdown the engine, then investigate the cause for the low-pressure alarm.
    C. Monitor closely oil pressures, temperatures, and levels while continuing to run the engine.
    D. Reduce the load and speed on the engine and continue to monitor the oil pressure.

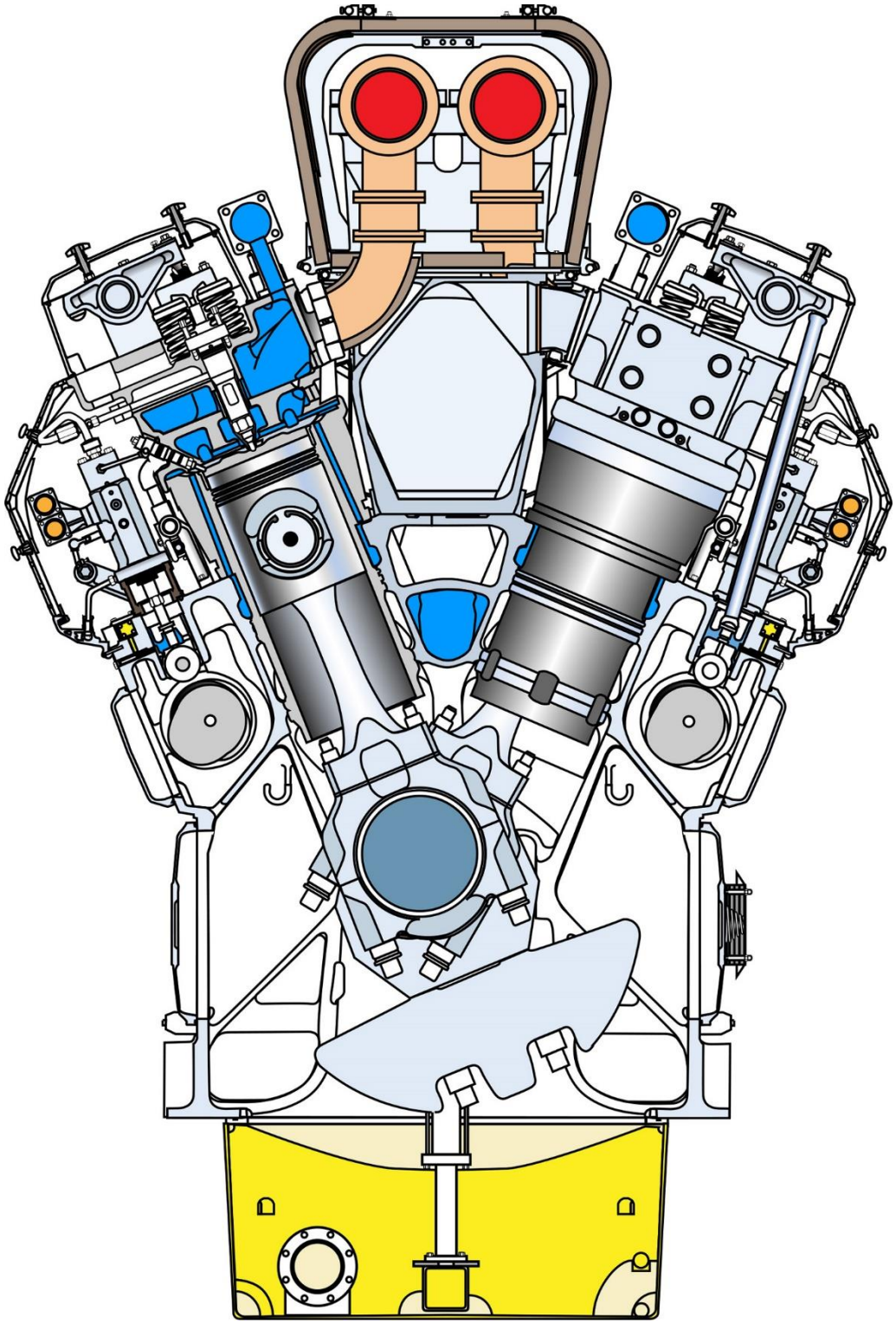
    Correct answer: B

70. While proceeding in open waters to an offshore drilling platform, one of the main engines on your offshore supply vessel overheats. The high jacket water temperature alarm sounds, the freshwater thermometers indicate out of range (high), and the expansion tank level sight glass indicates out of range (high) with vapor bubbles forming and escaping through the vent. What is the appropriate initial response?

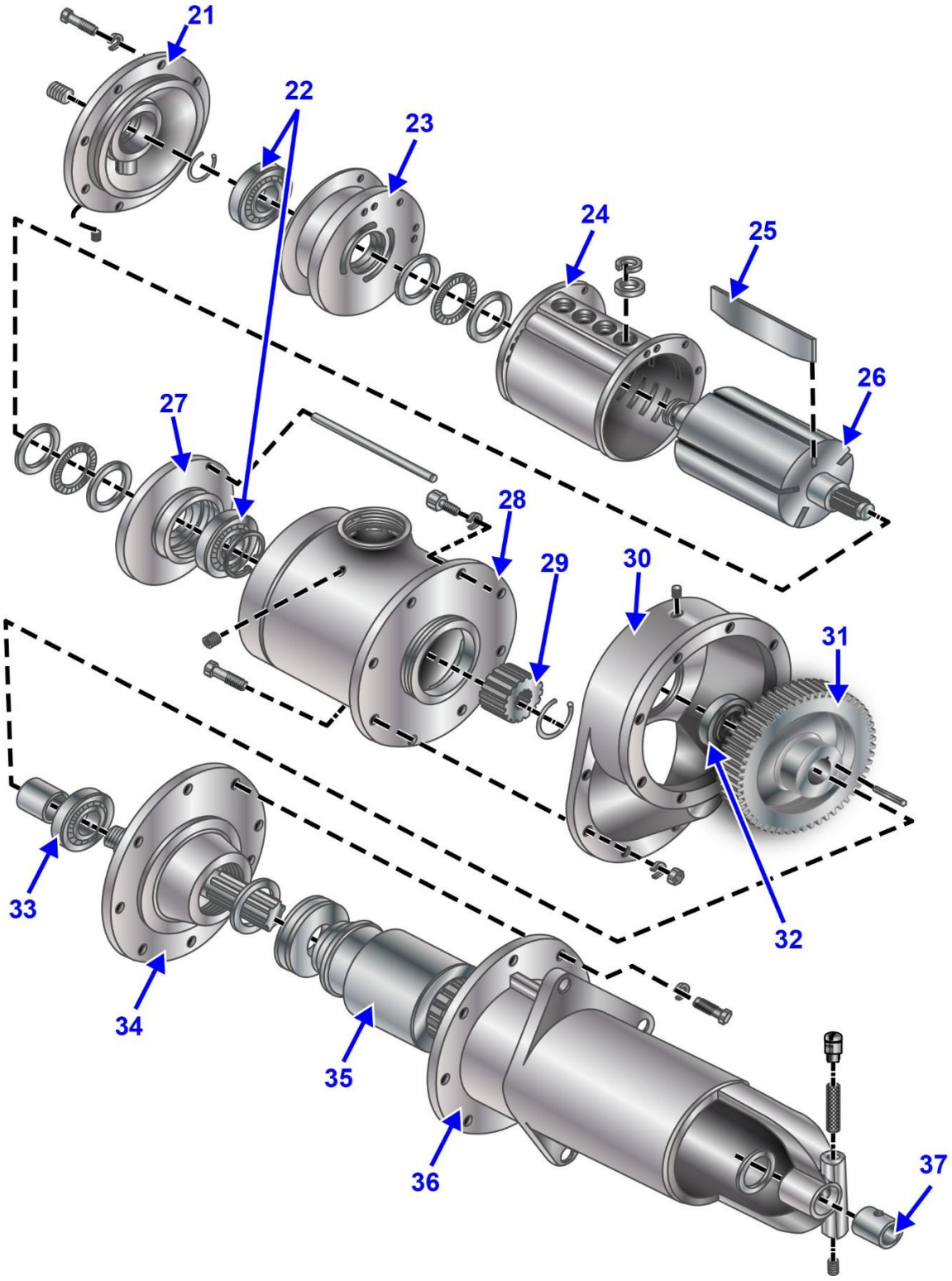
    A. Reduce the load and speed on the engine.
    B. Shut down the engine immediately.
    C. Drain water from the expansion tank.
    D. Add makeup water to the expansion tank.

    Correct answer: A

MO-0005



MO-0044



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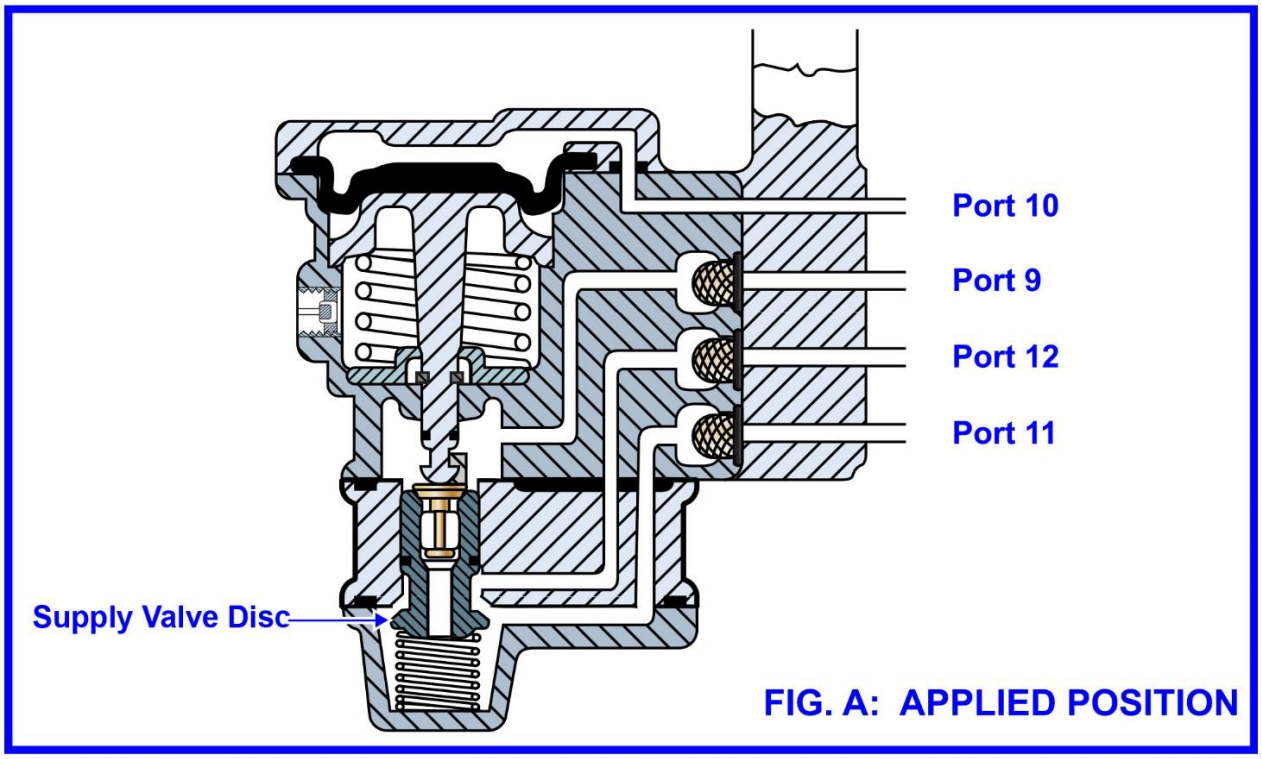


FIG. A: APPLIED POSITION

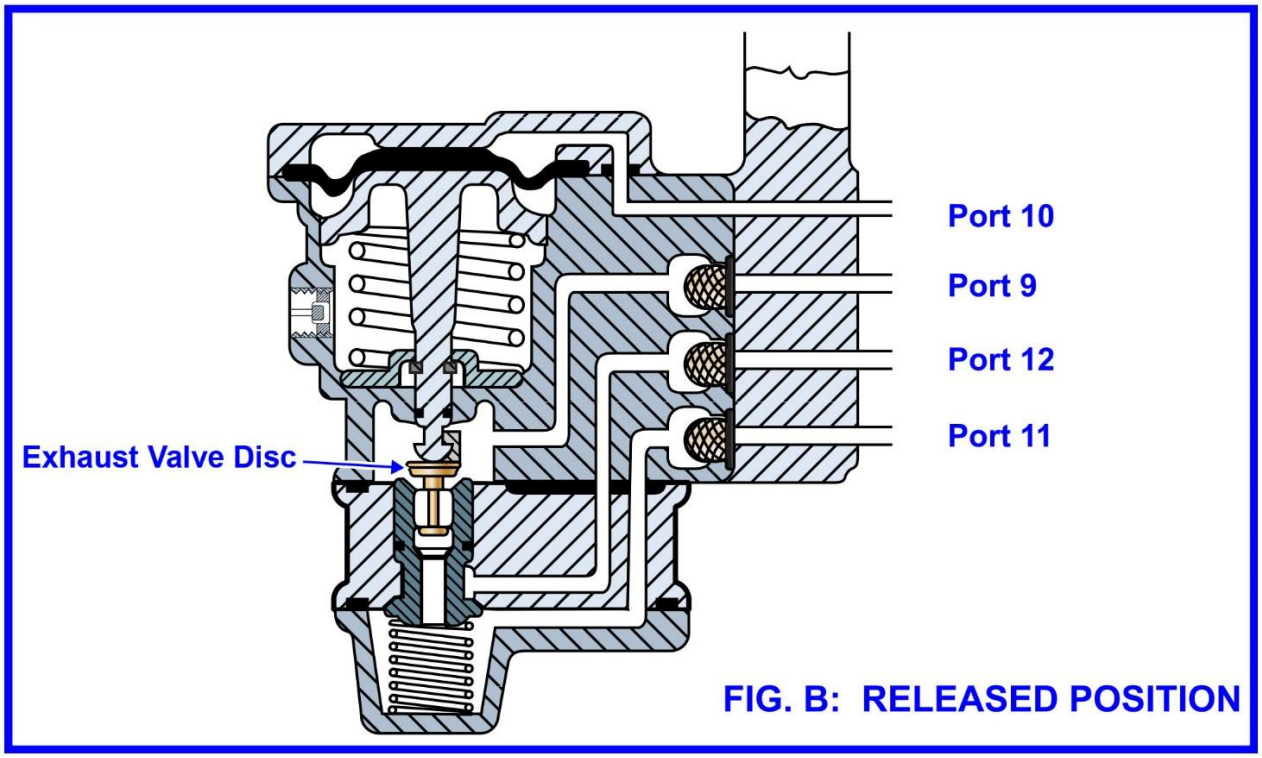
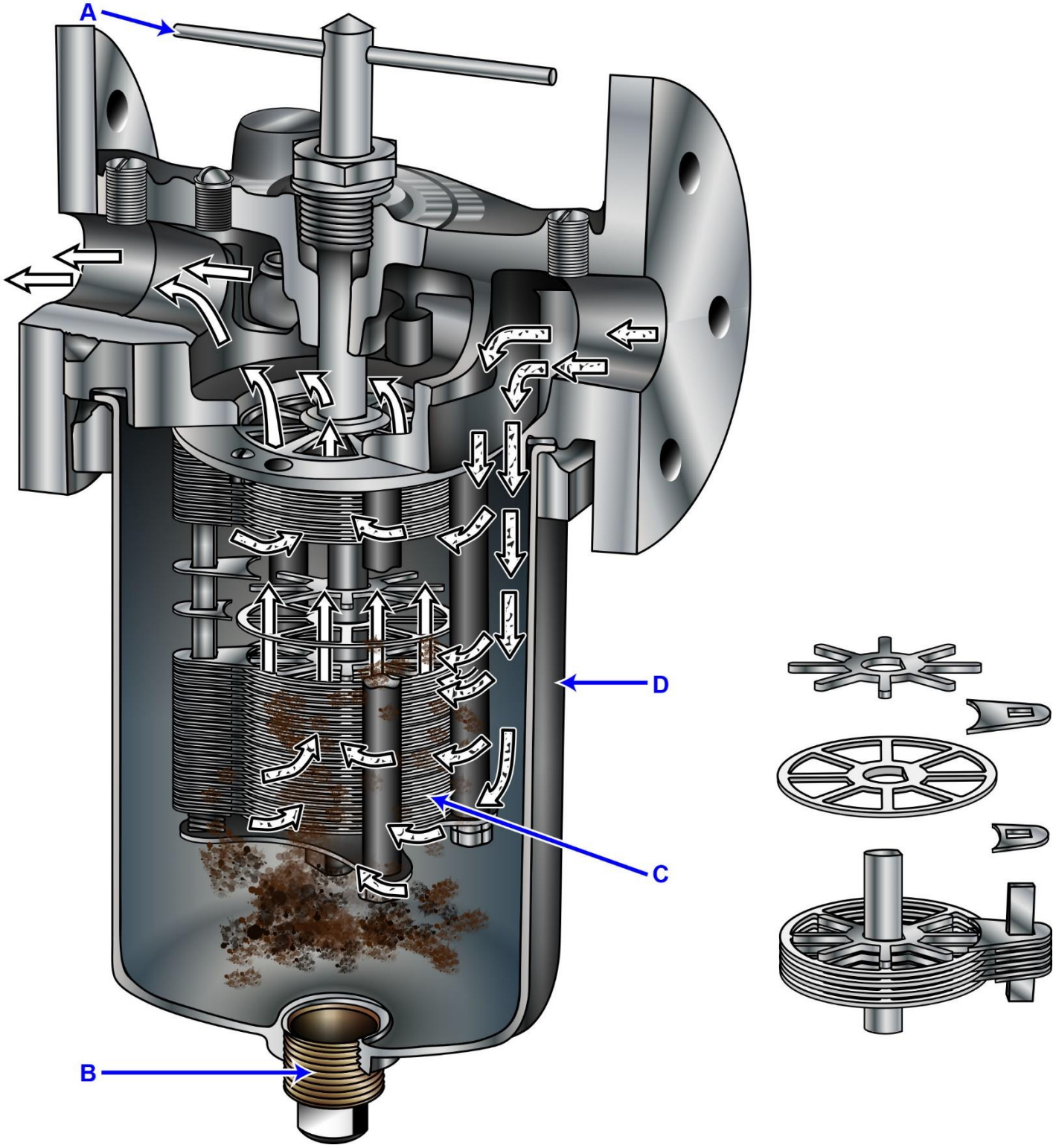


FIG. B: RELEASED POSITION

MO-0057



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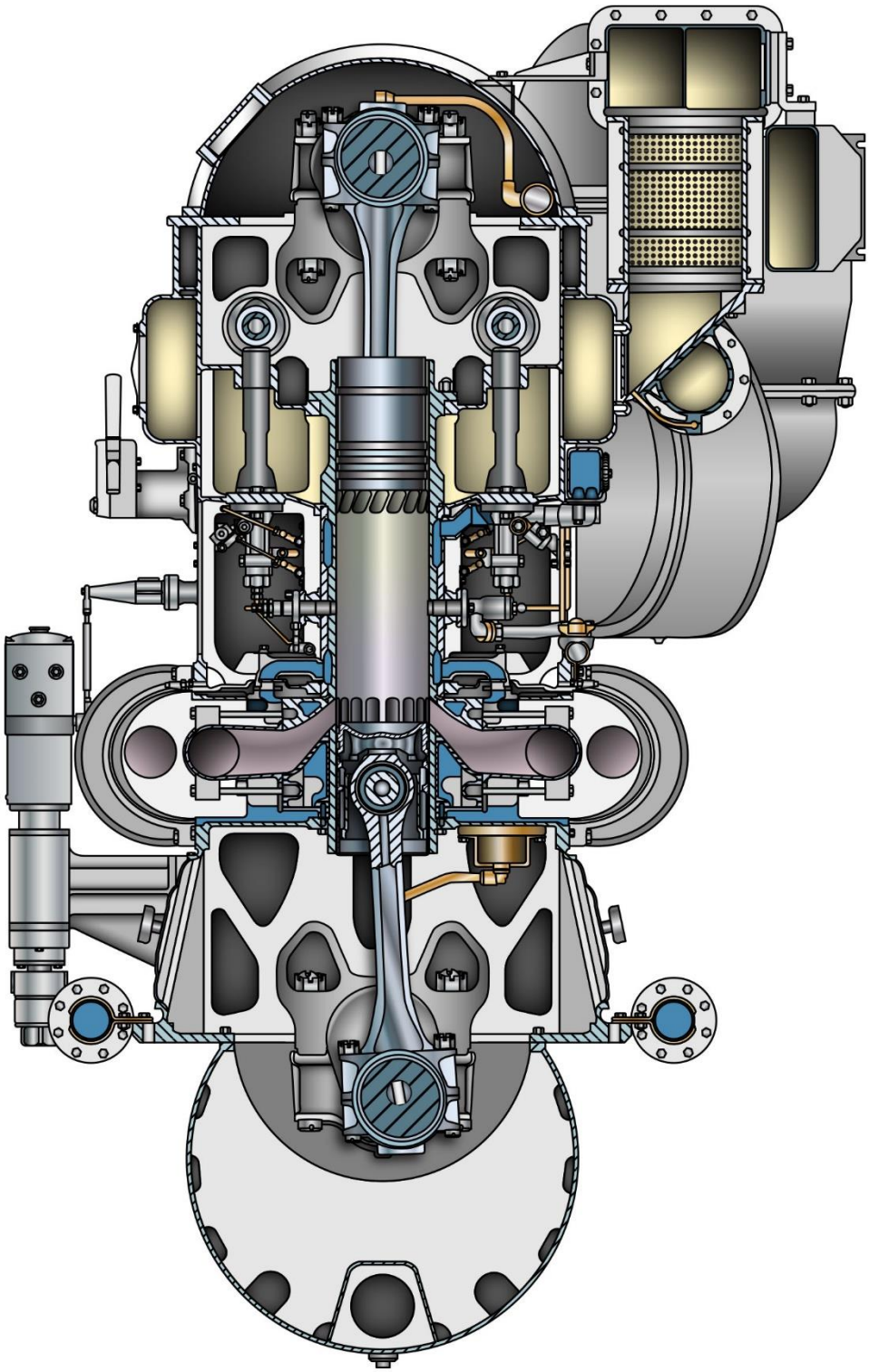

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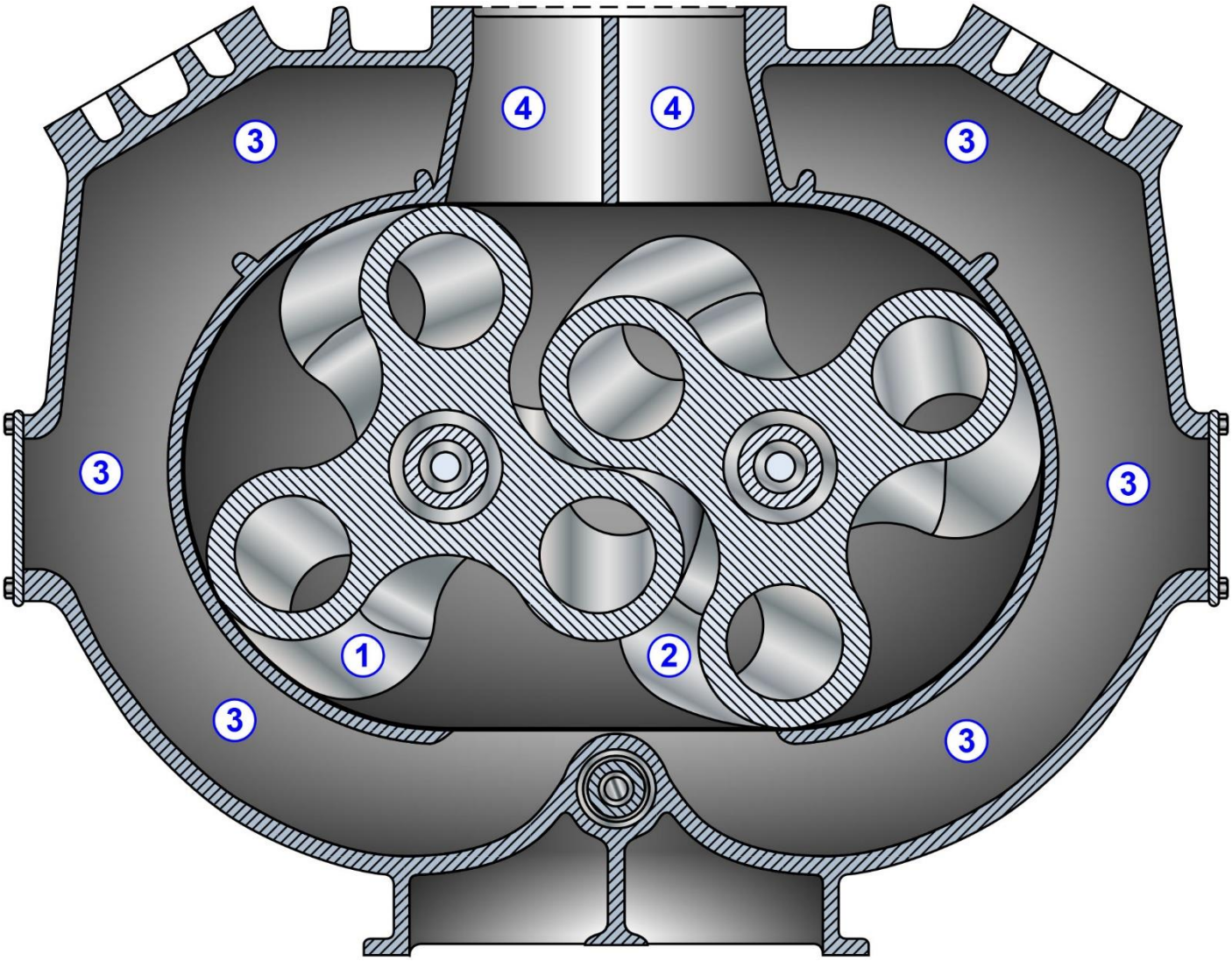

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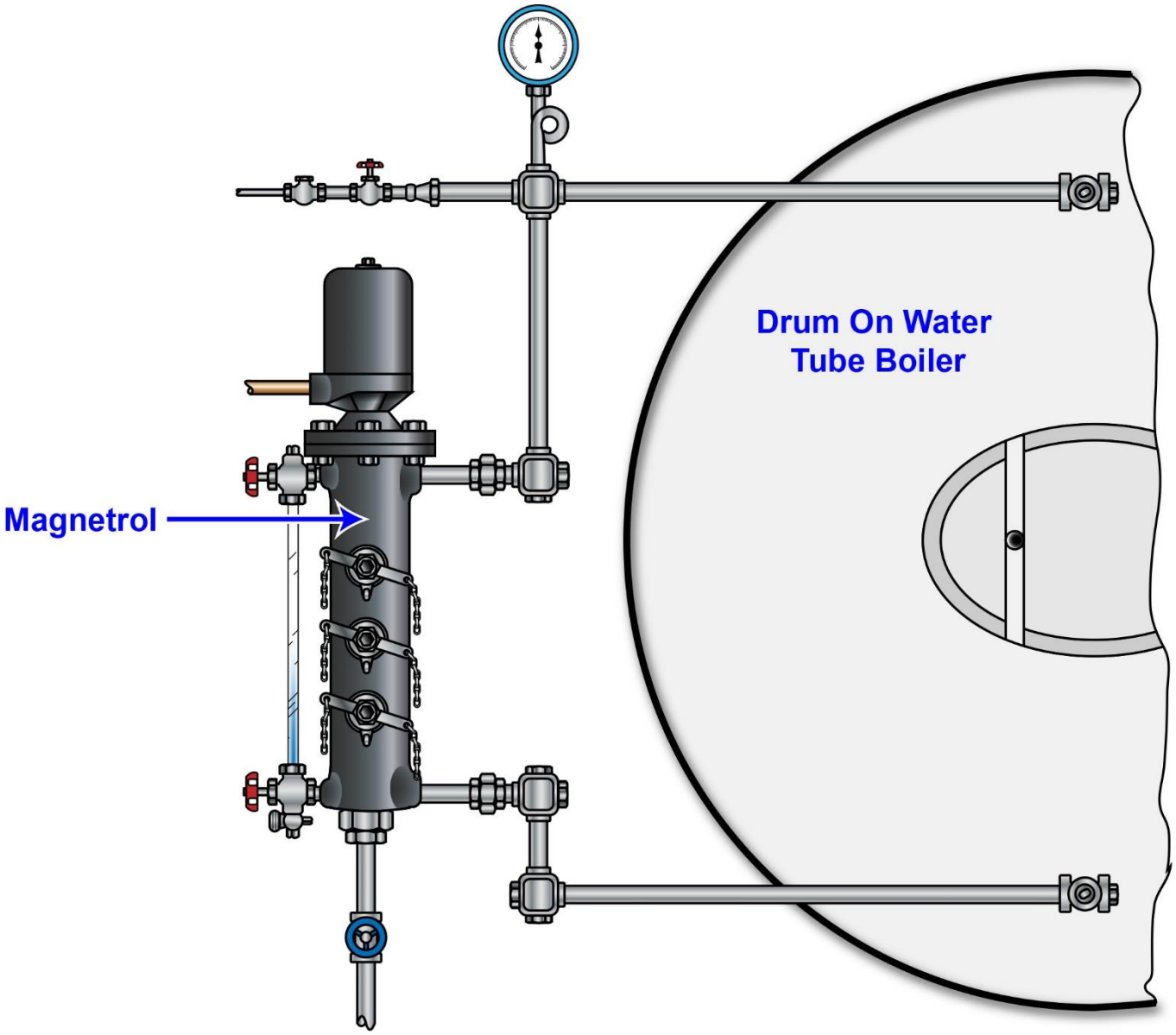
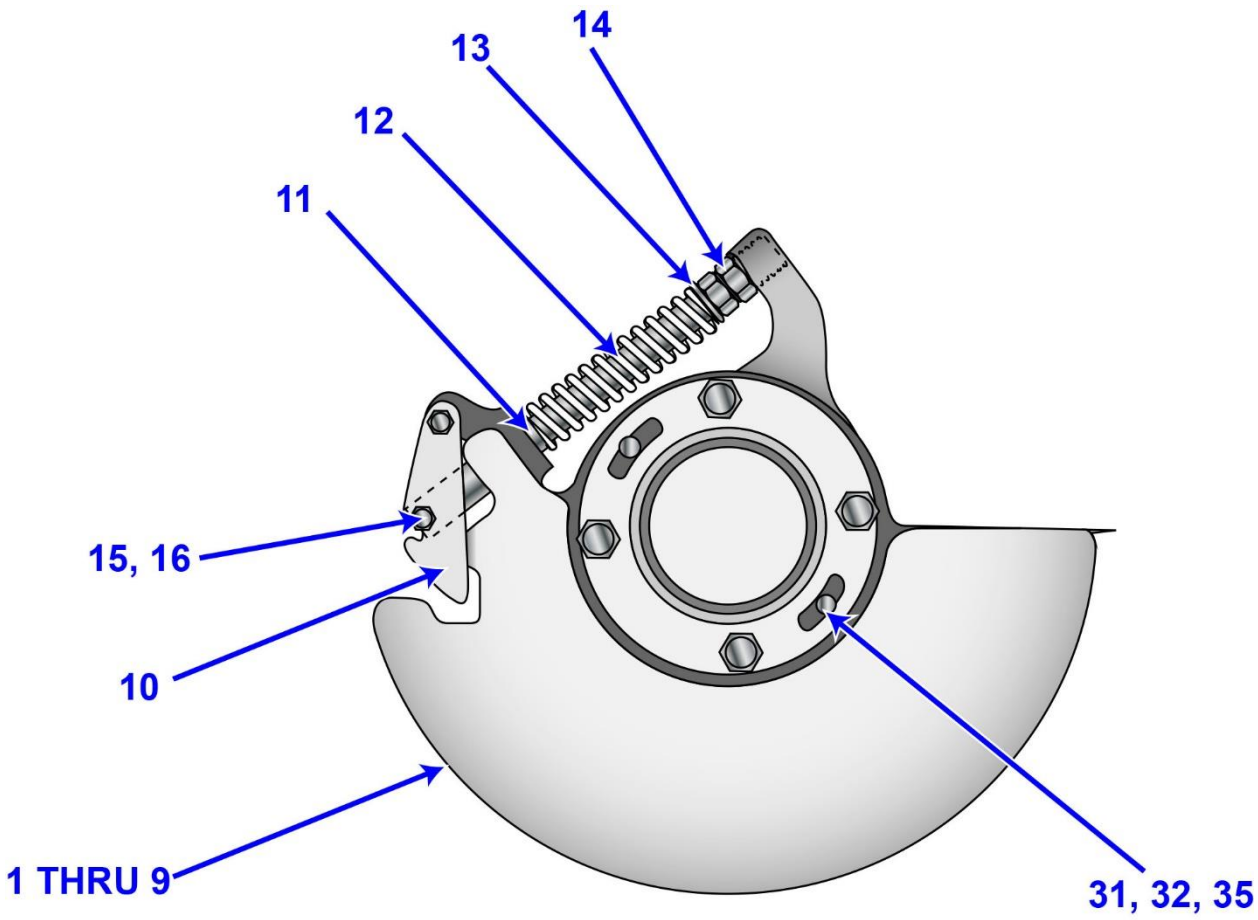


MO-0101



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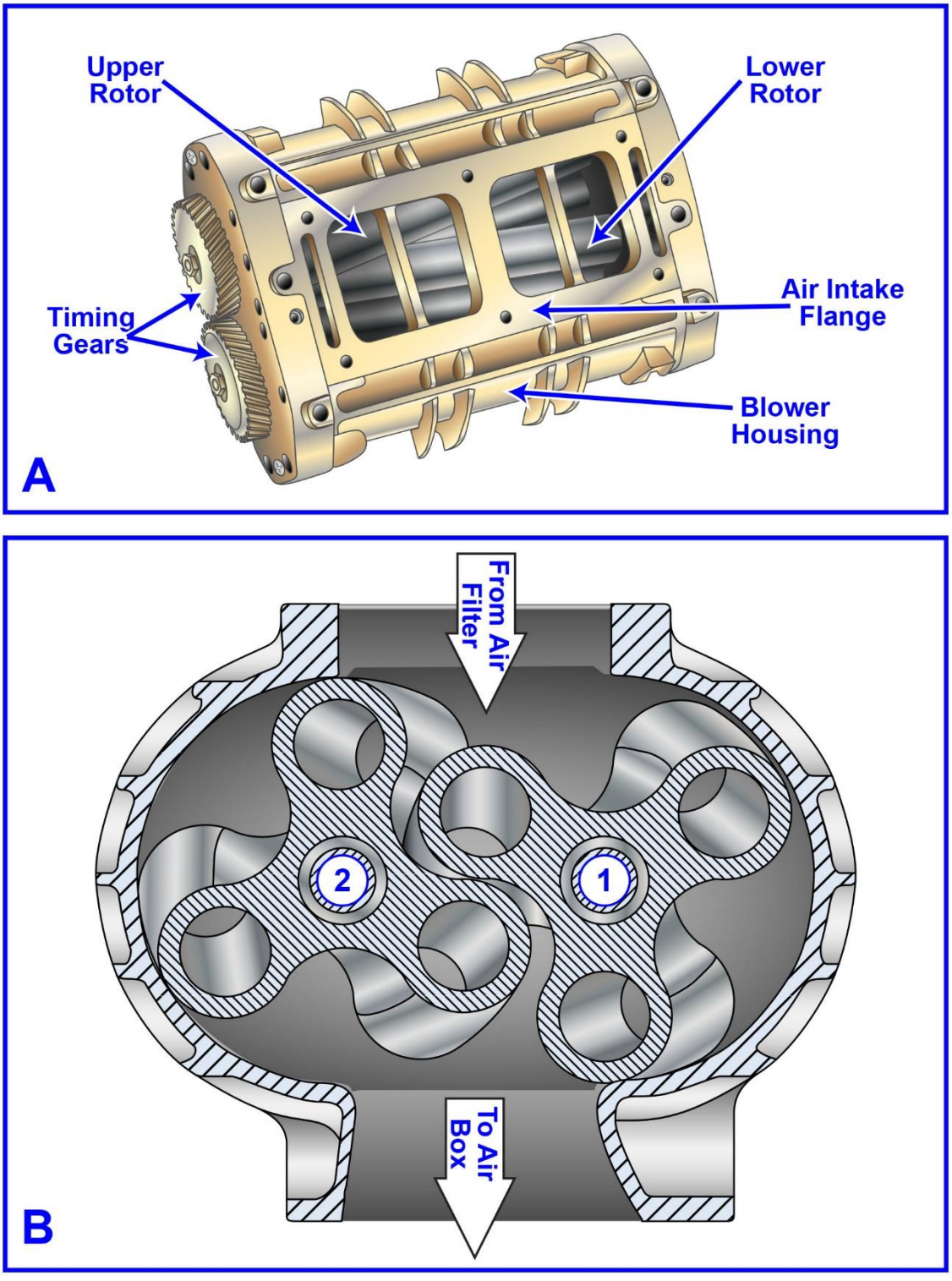
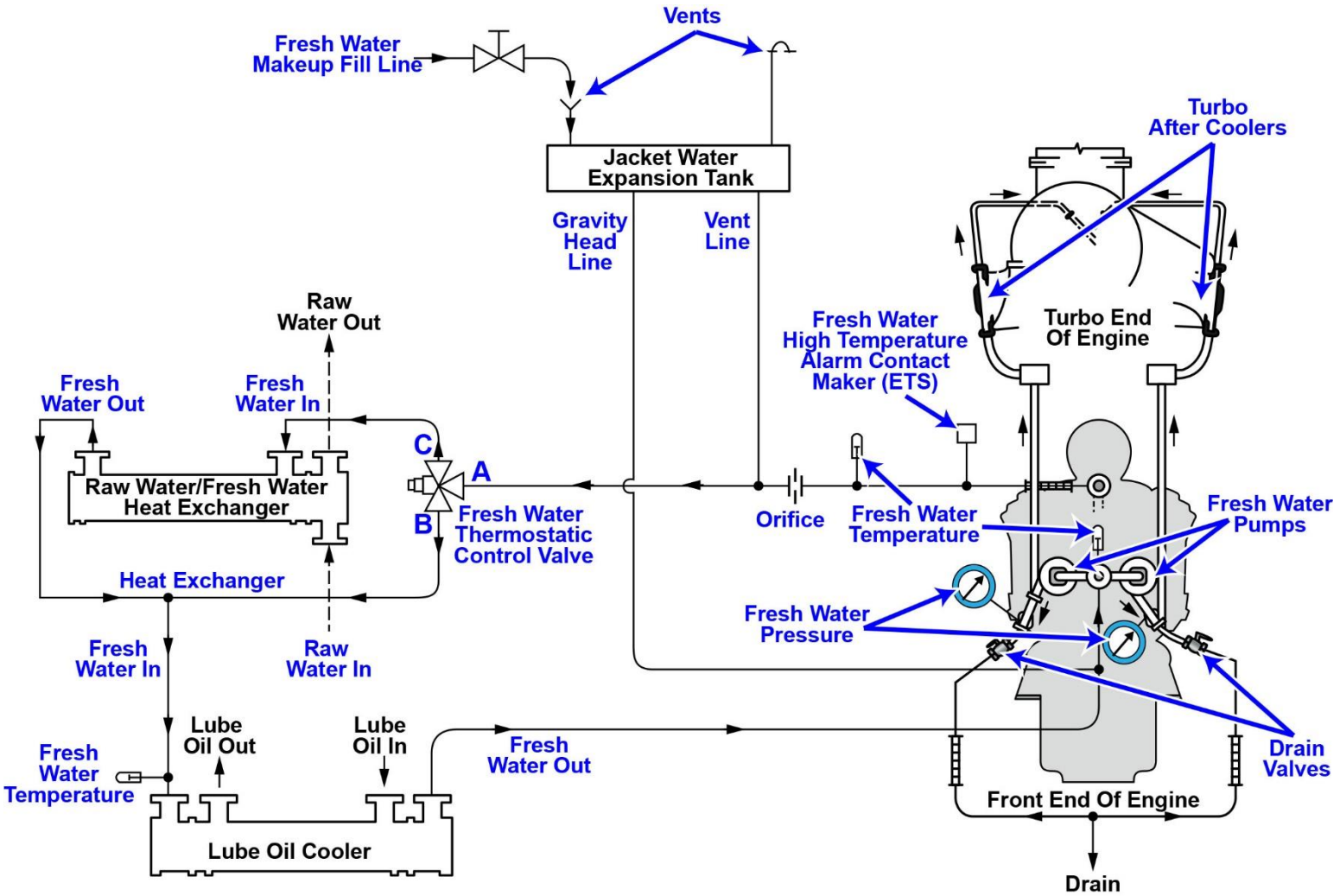
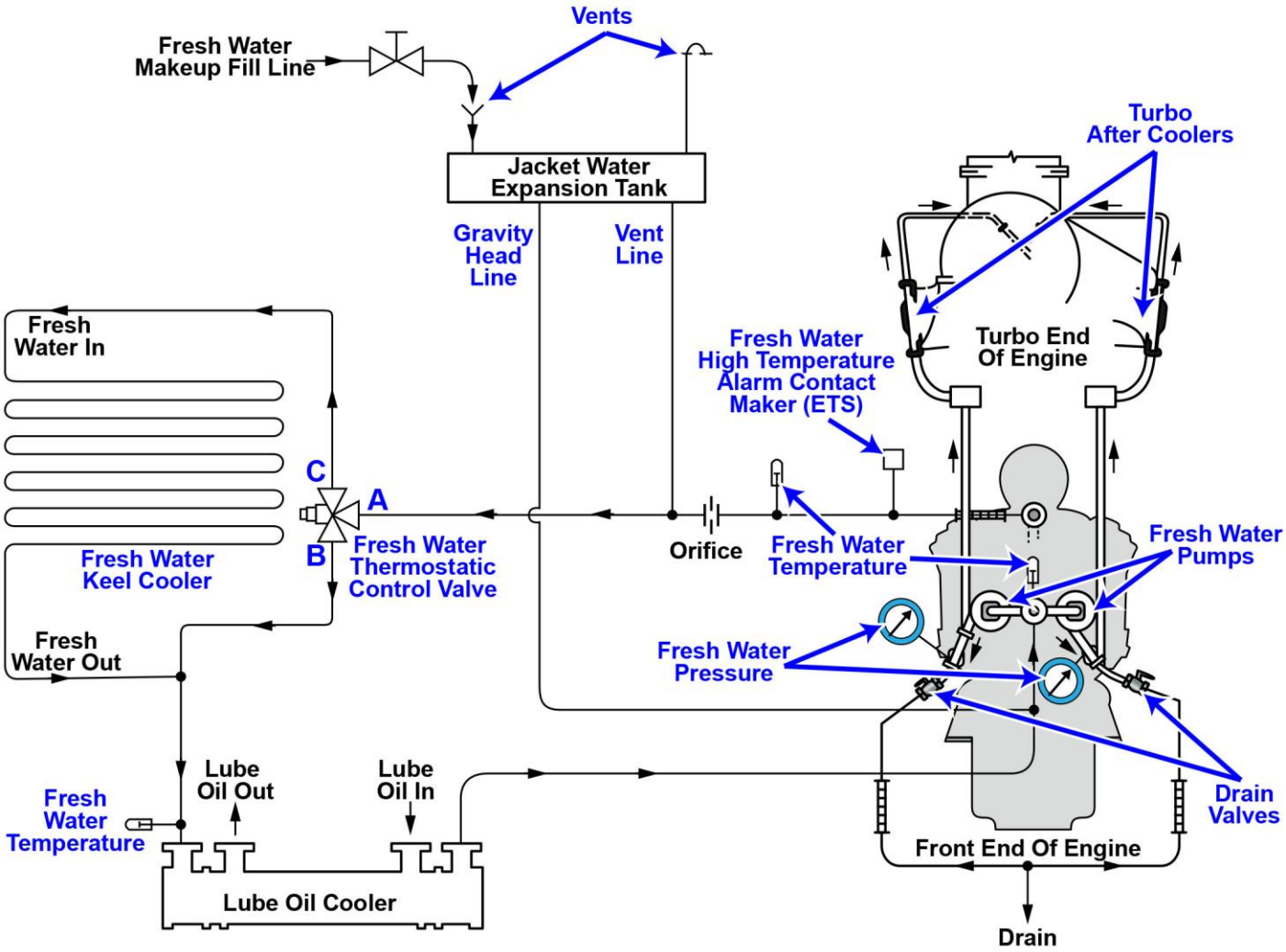


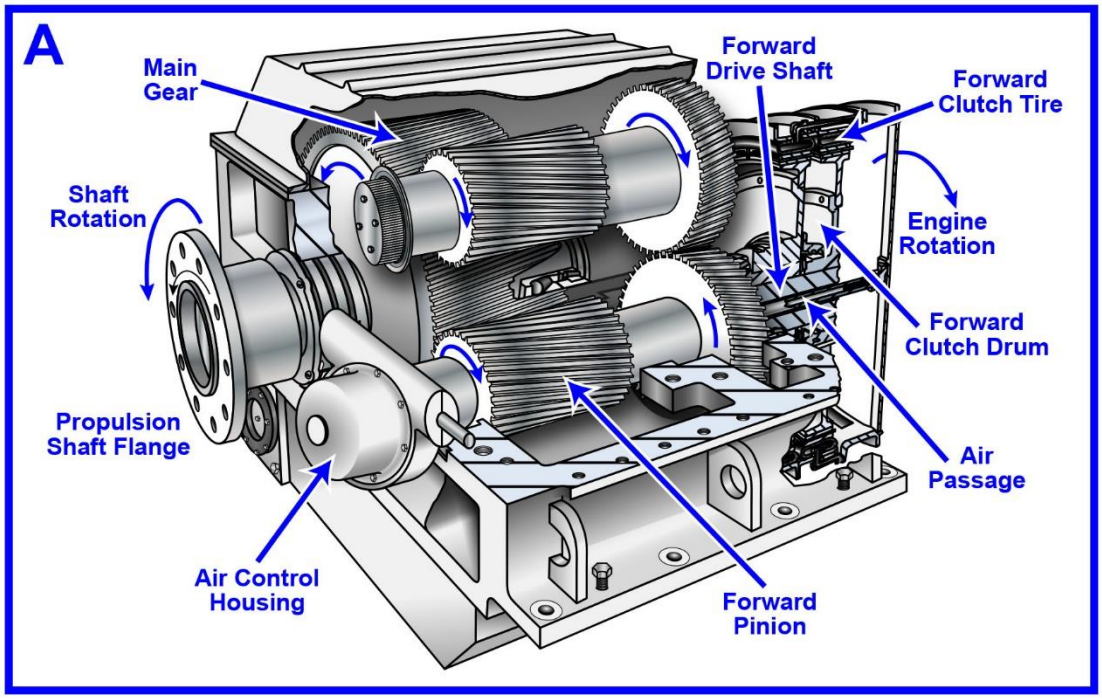
MO-0137
EMD Engine Fresh Water Cooling System with Heat Exchanger

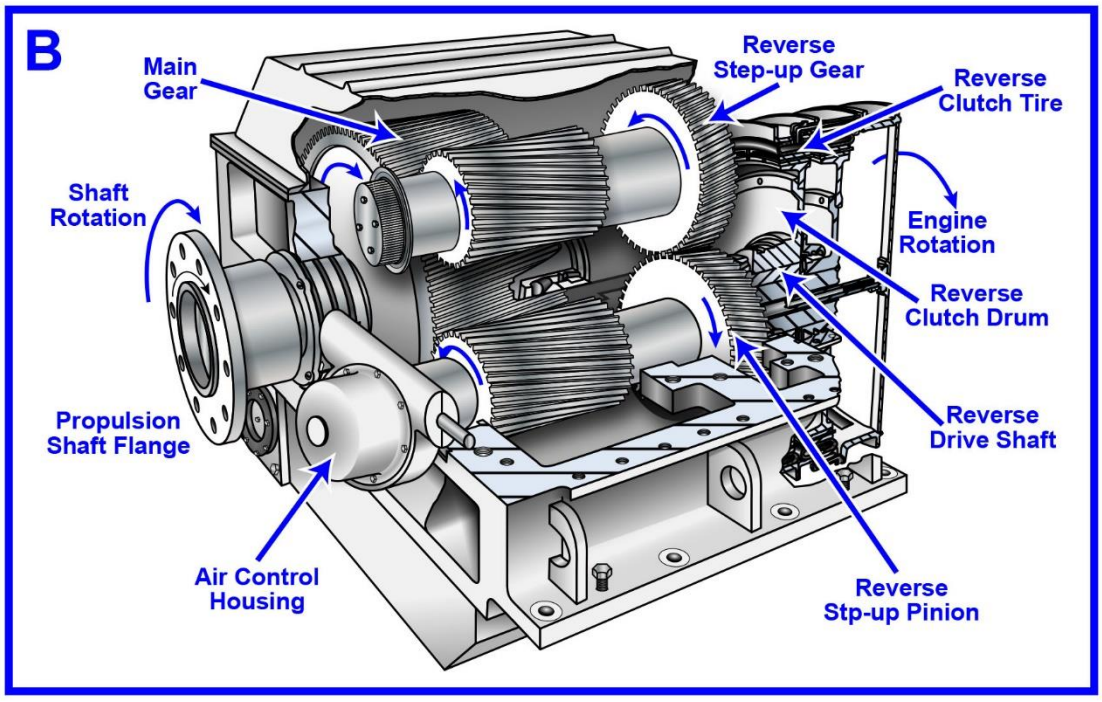


MO-0138
EMD Engine Fresh Water Cooling System with Keel Cooler

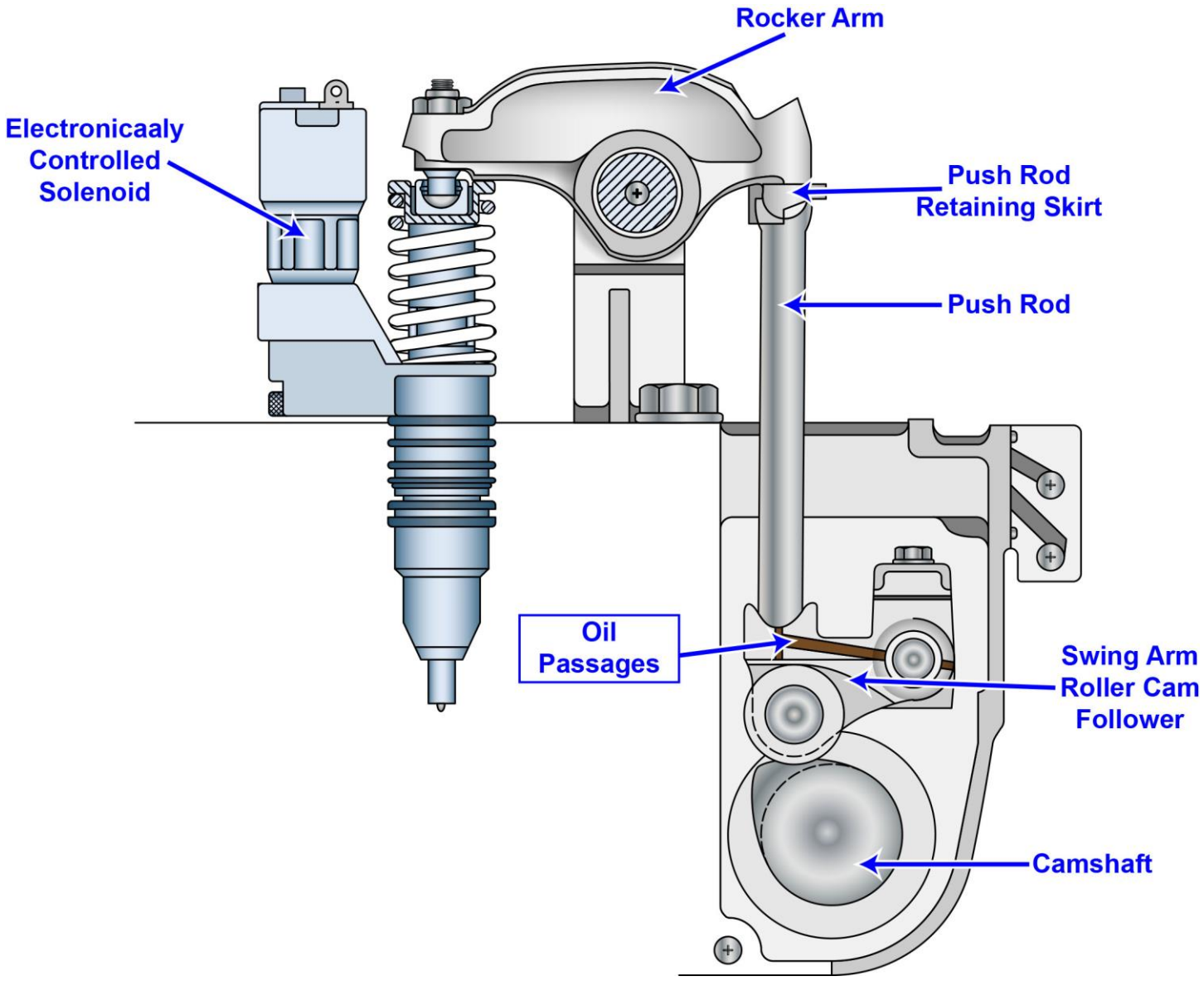


MO-0142
Reversing Reduction Gear Operation

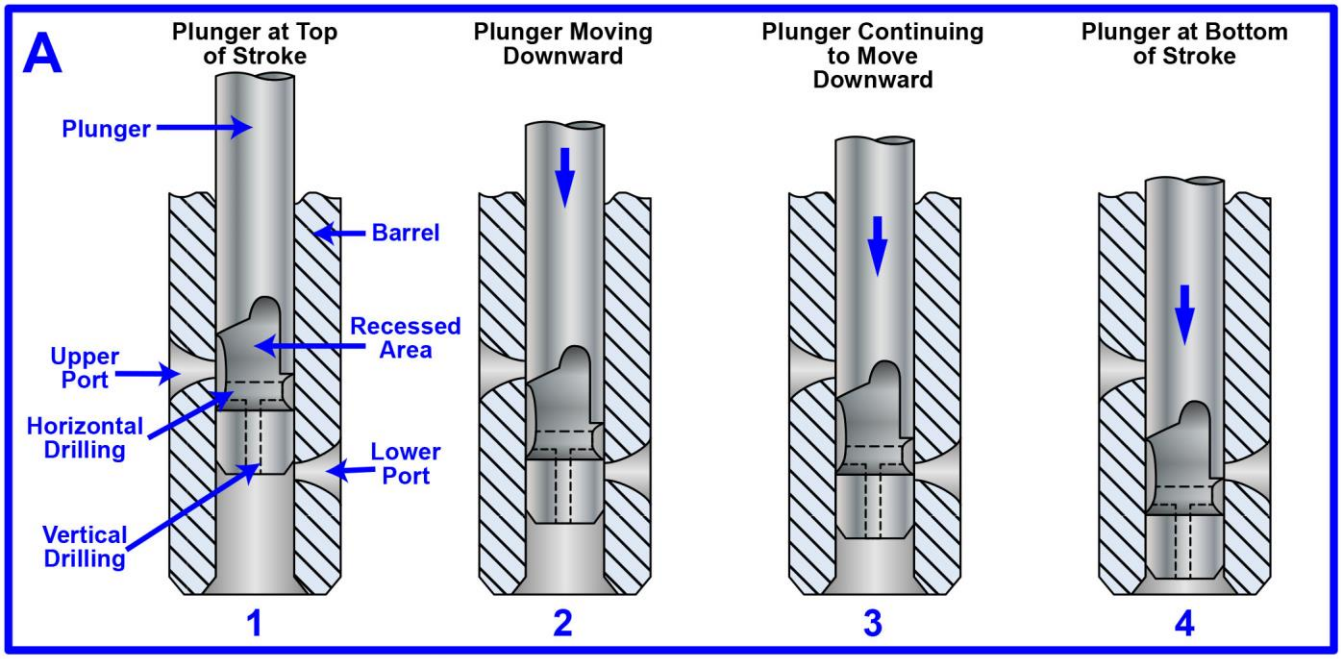




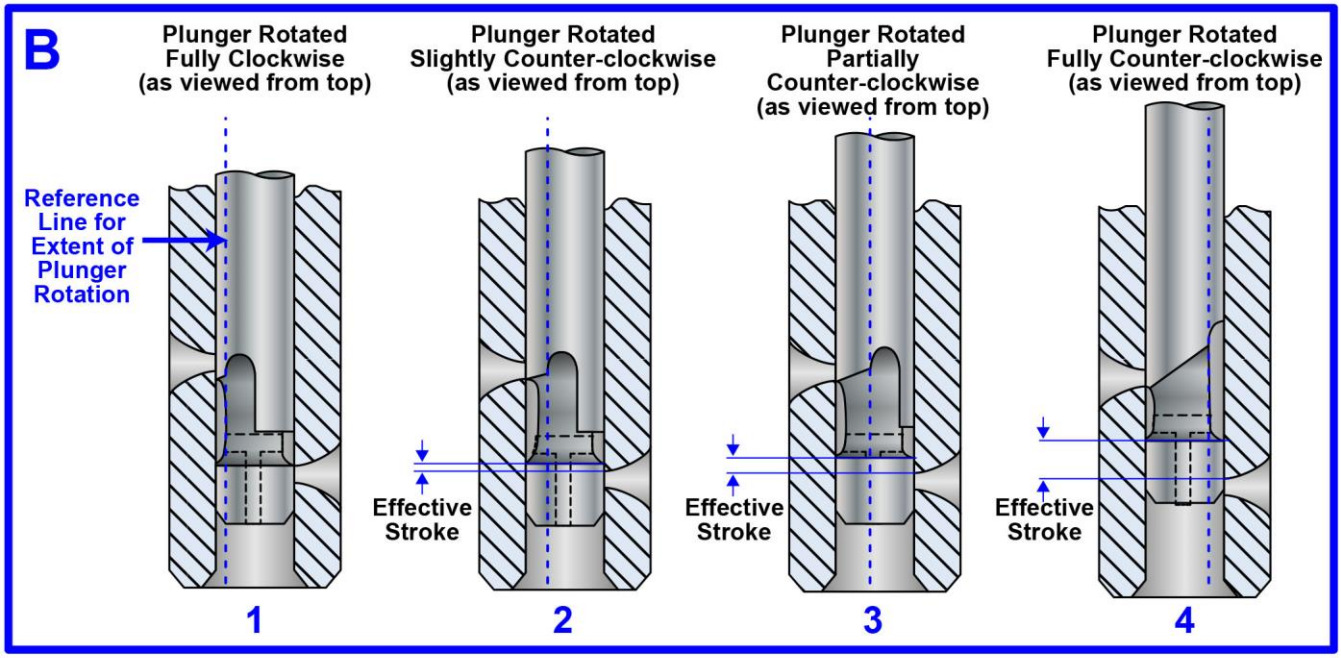
MO-0143
Detroit Diesel 60 Series Engine
Unit Injector Arrangements



MO-0144
Detroit Diesel 71 Series Engine Unit Injector

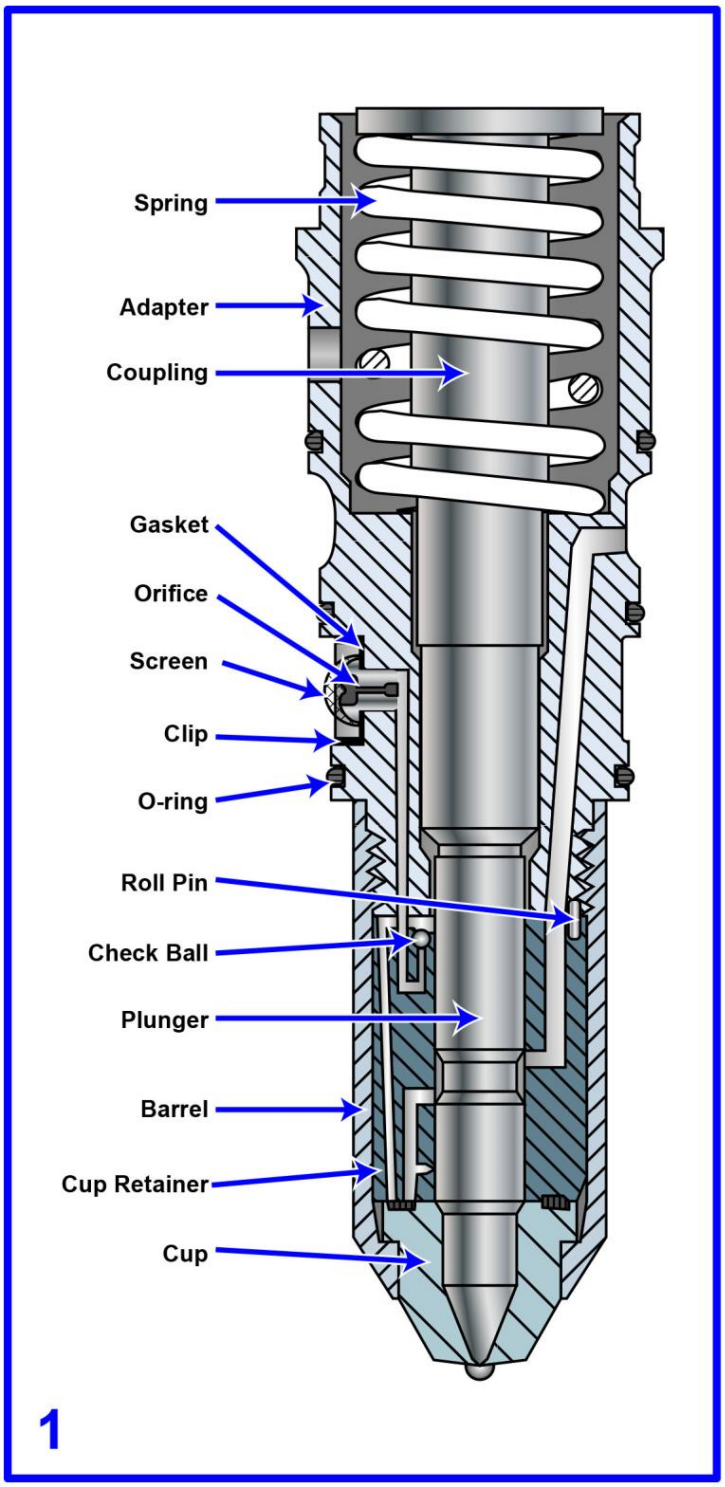


Injector Operation as a Function of Vertical Plunger Travel



Injector Operation as a Function of Extent of Plunger Rotation

MO-0150



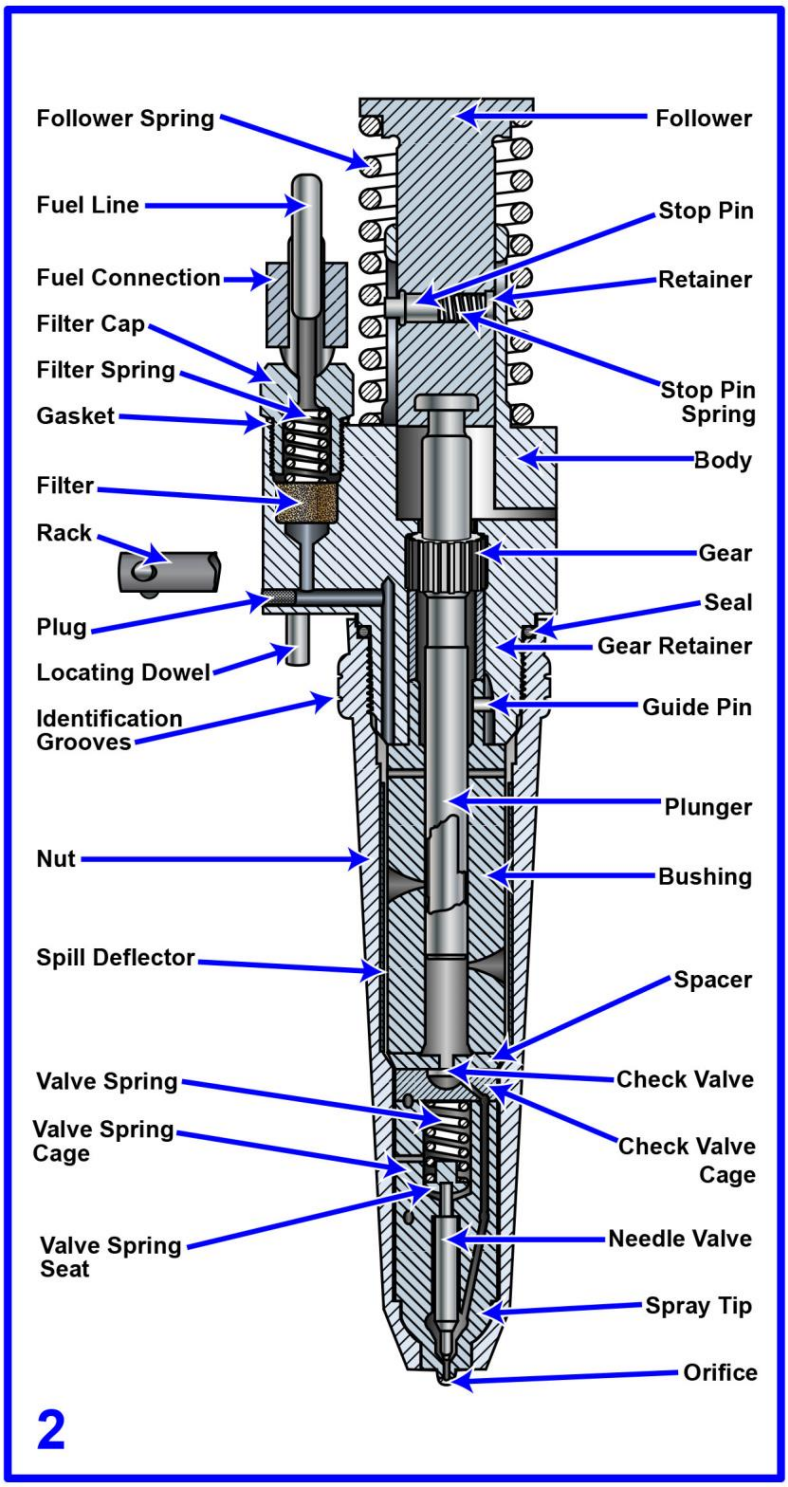
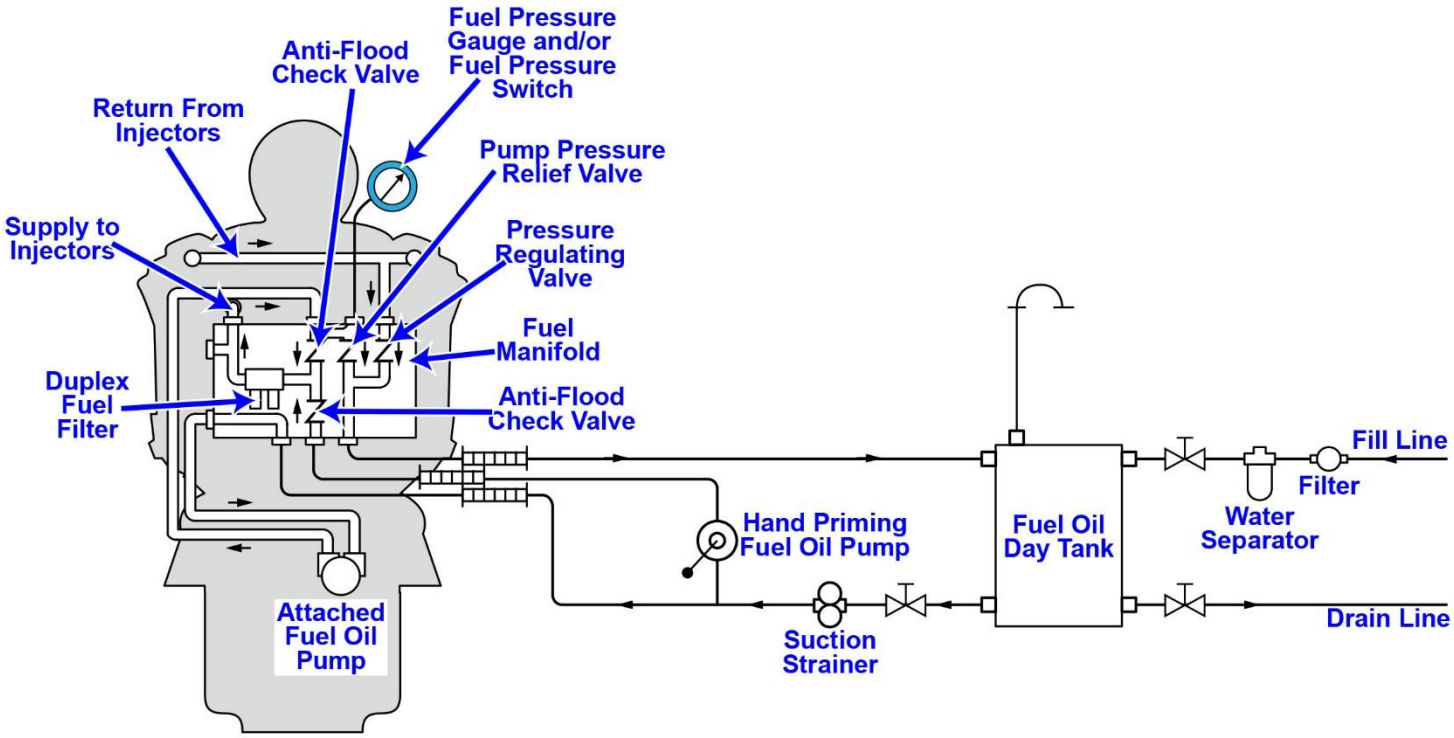


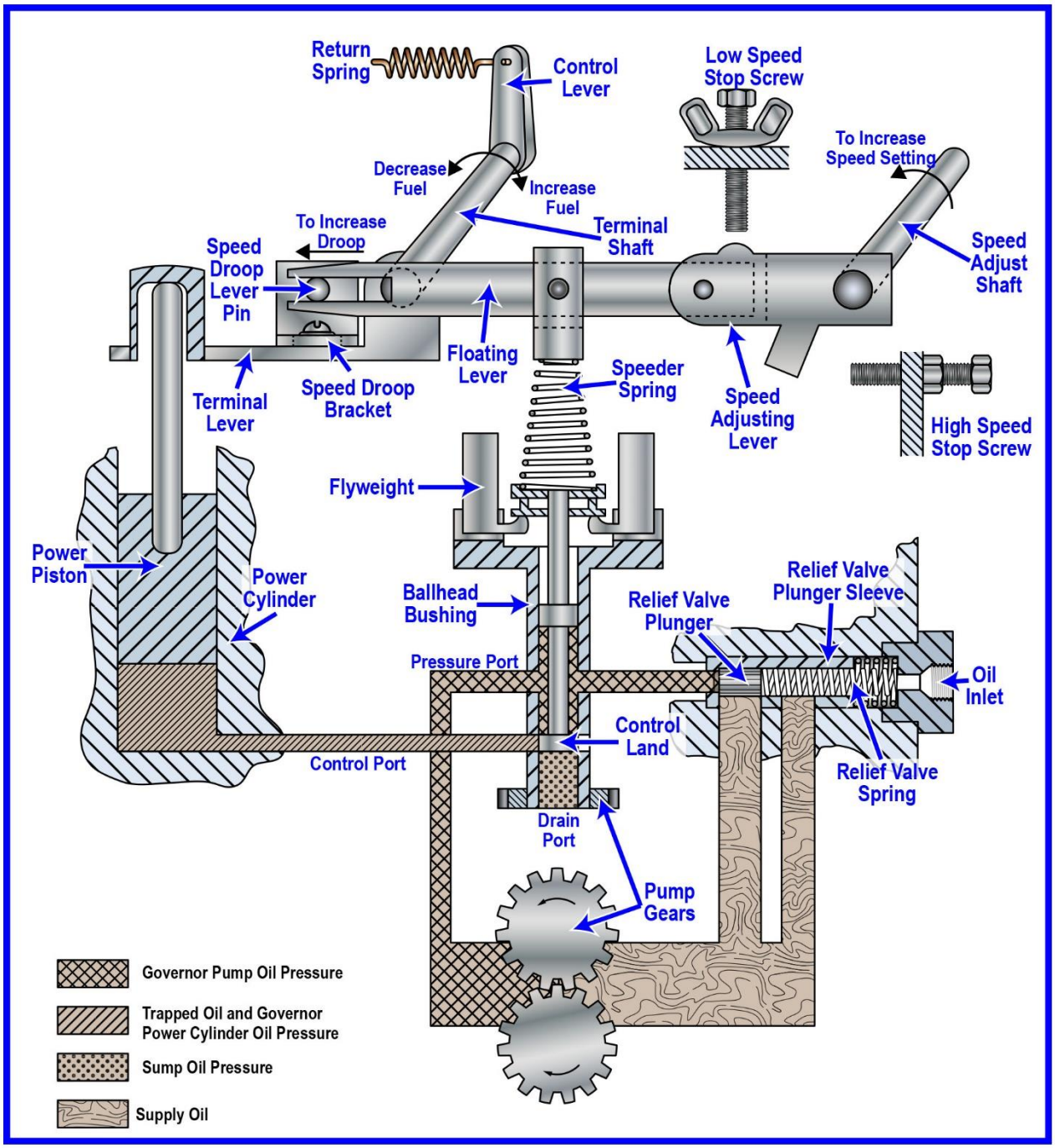
Figure 1: Adapted for testing purposes only from NORMAN, Diesel Technology: Fundamentals, Service, Repair

Figure 2: Adapted for testing purposes only from STINSON, Diesel Engineering Handbook, 12th Ed.

MO-0152



MO-0157
Woodward Type SG Governor



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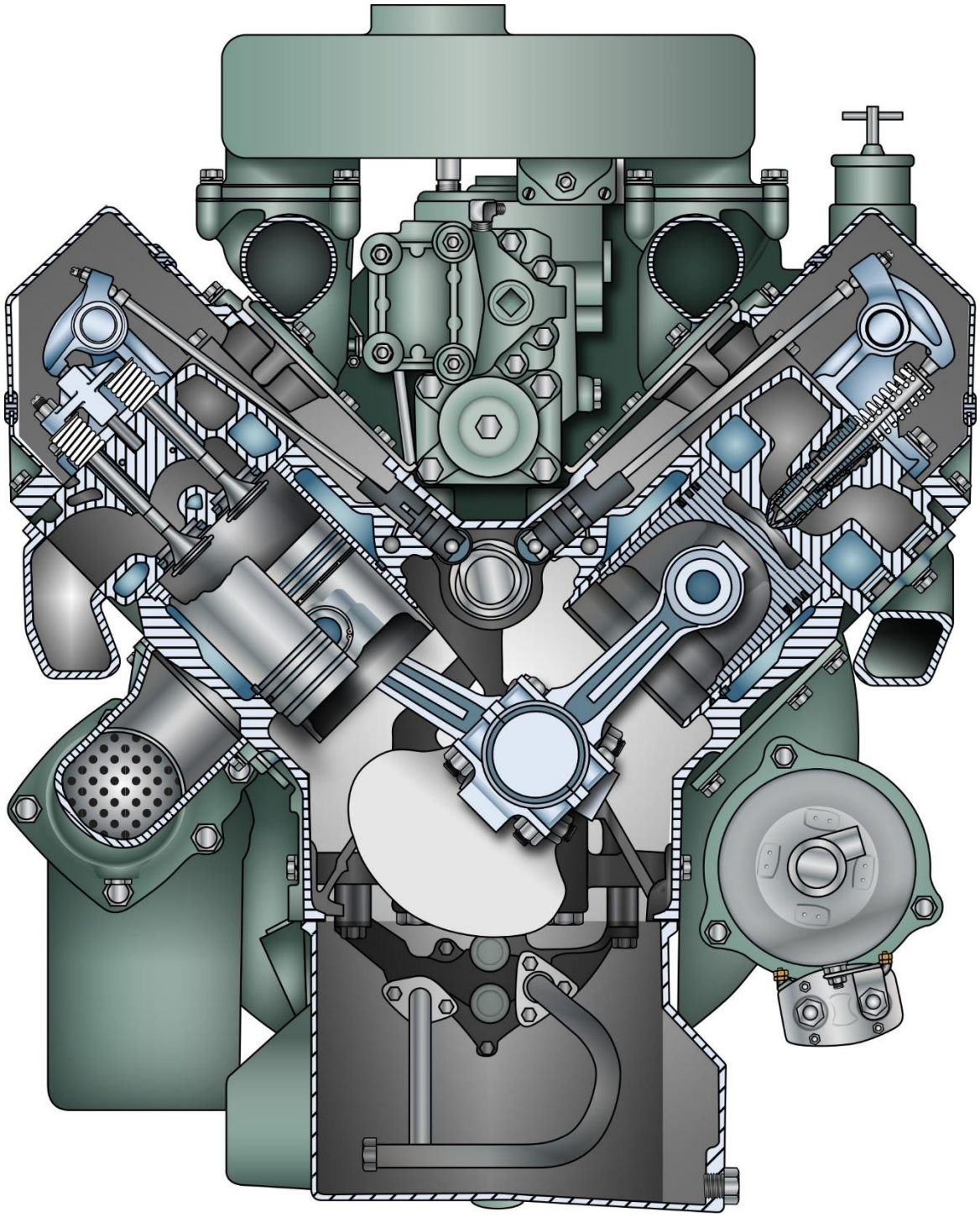

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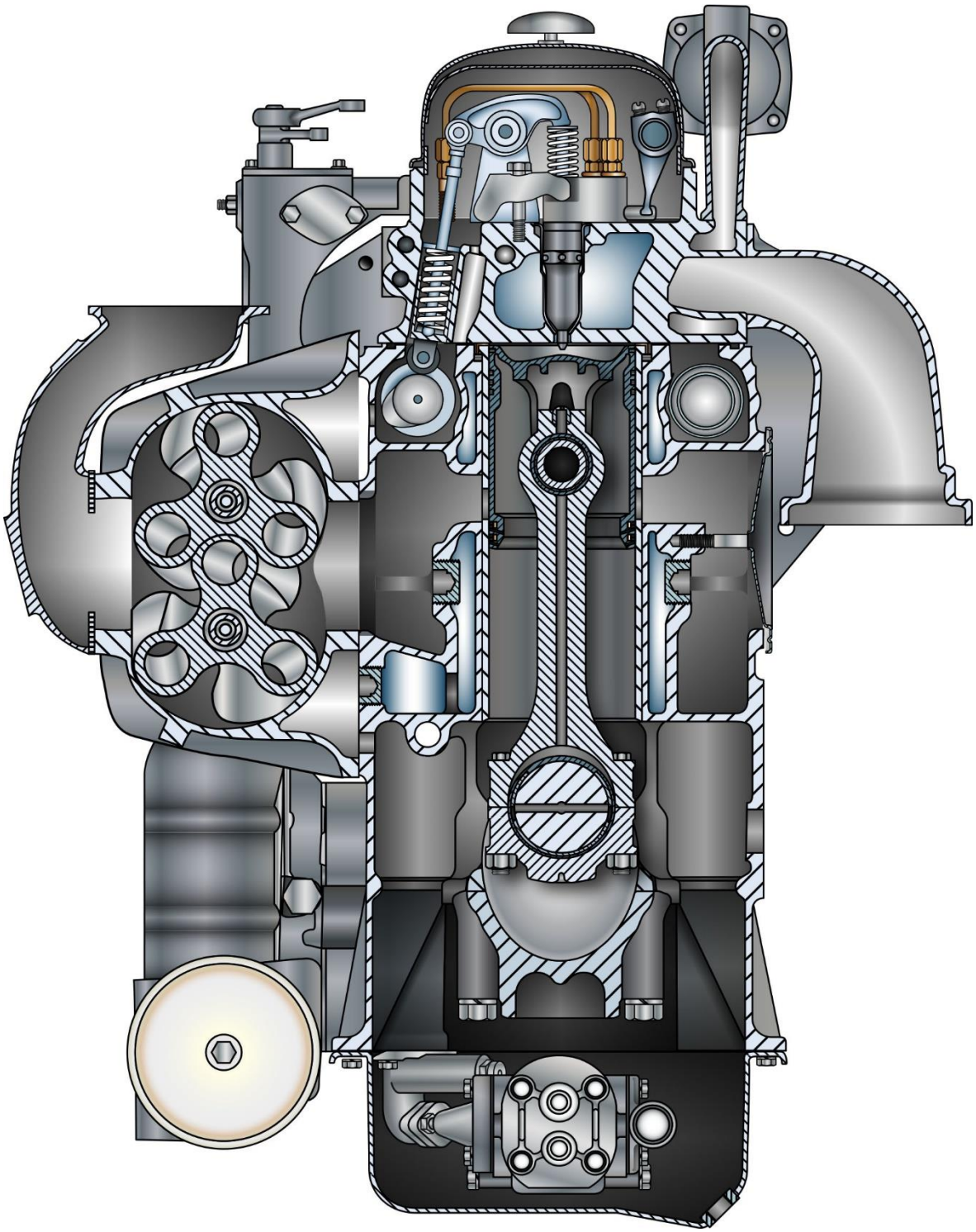
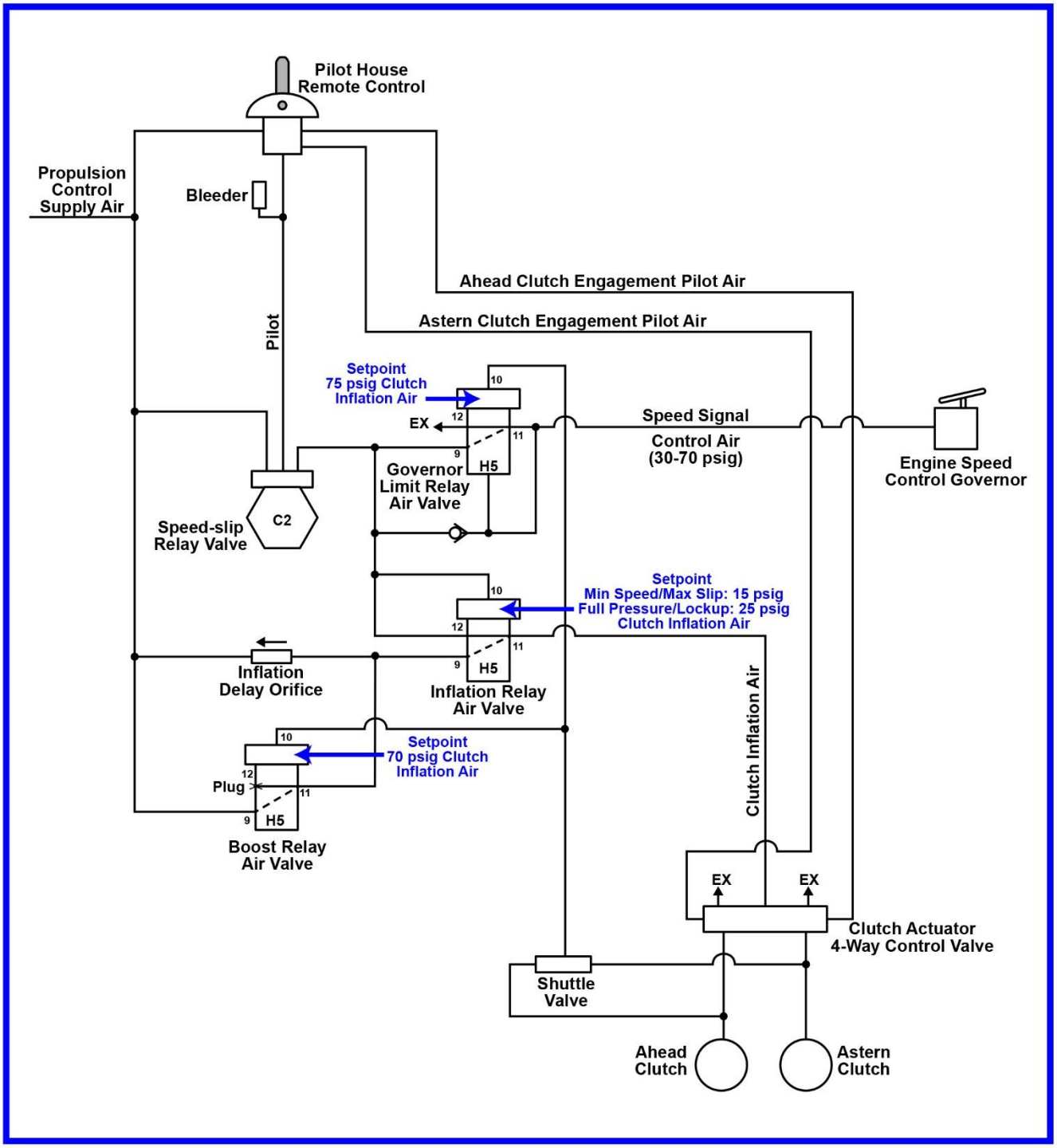
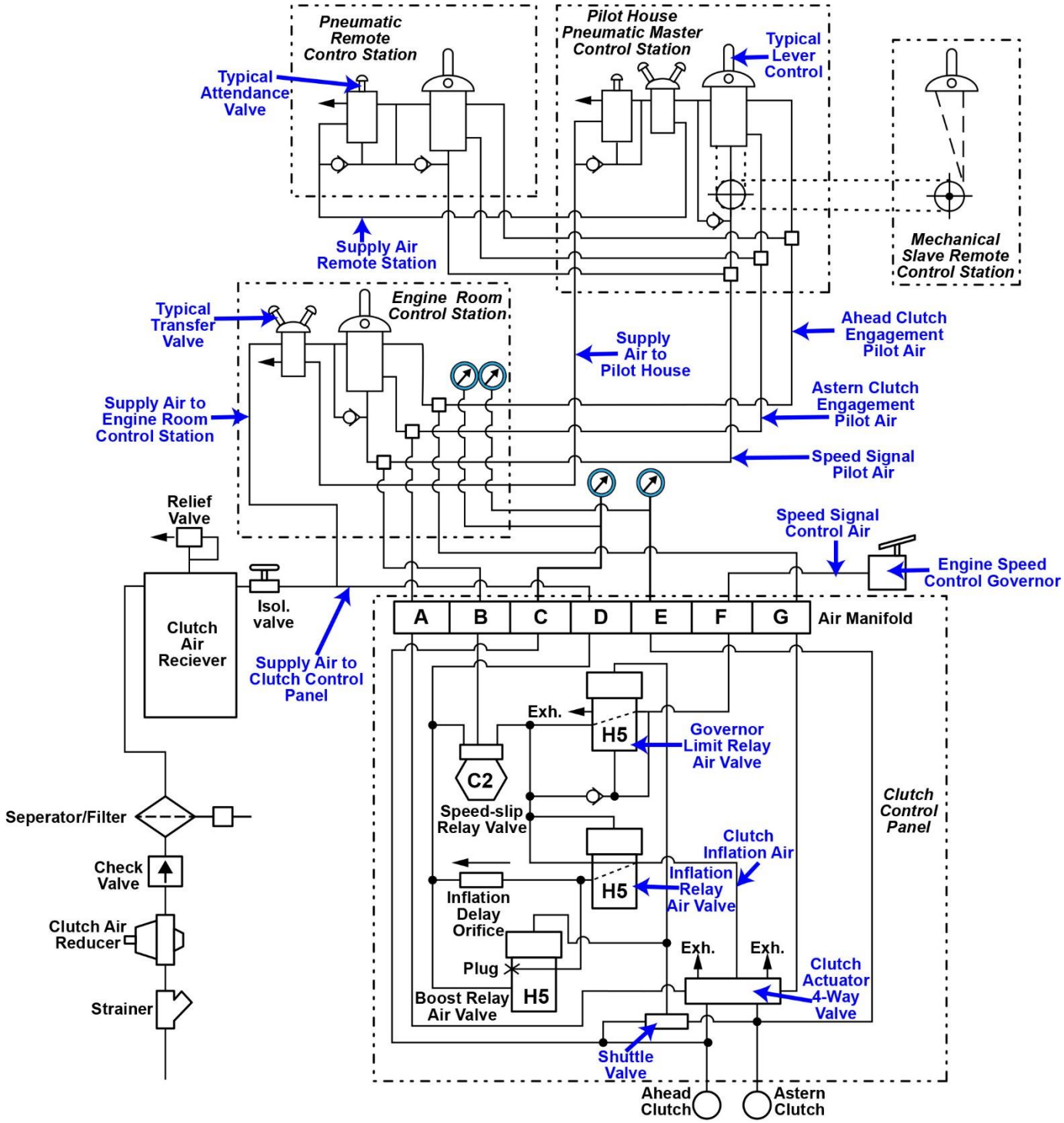


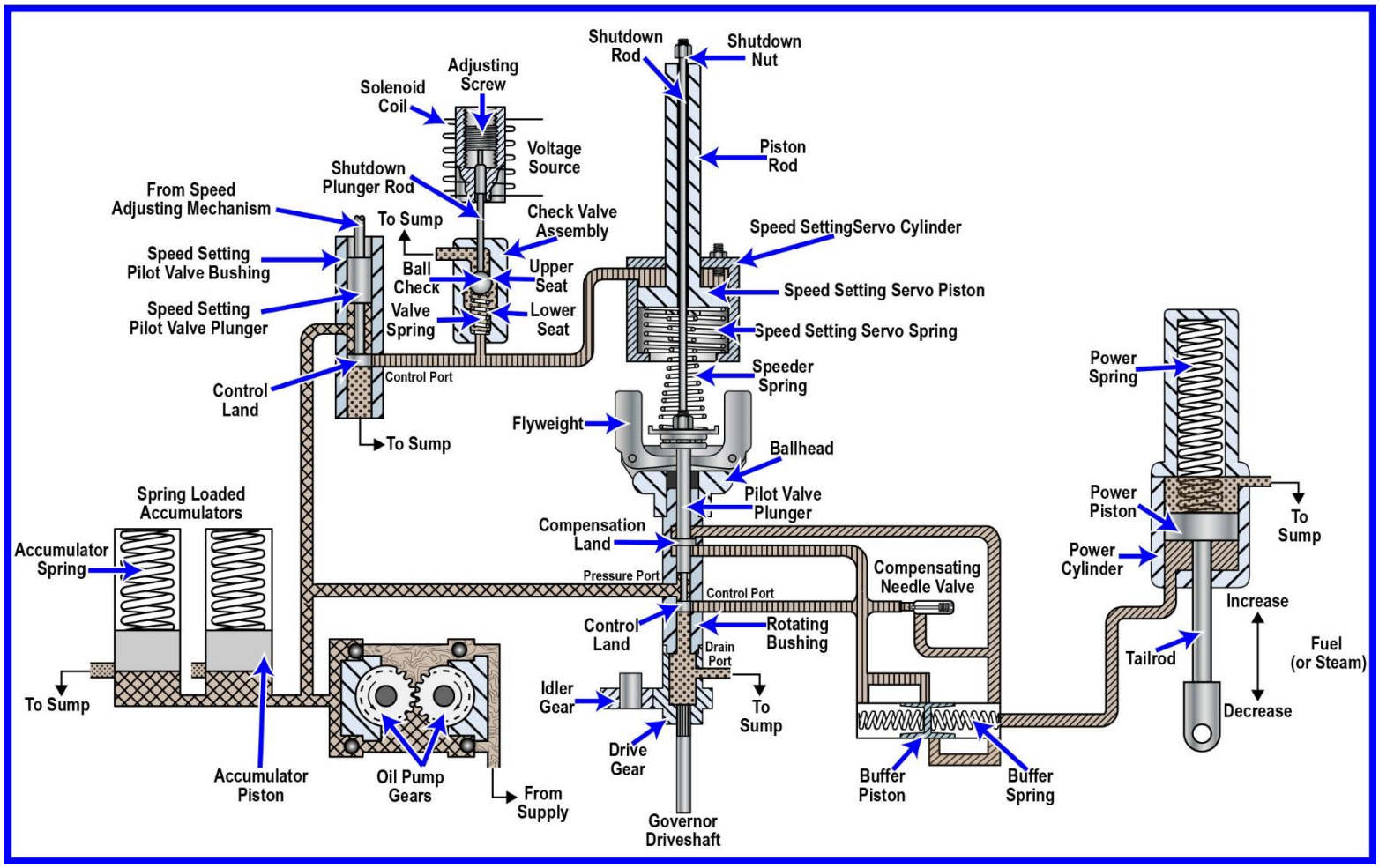
MO-0167
Pneumatic Propulsion Control System with Single Lever Pilot House Control



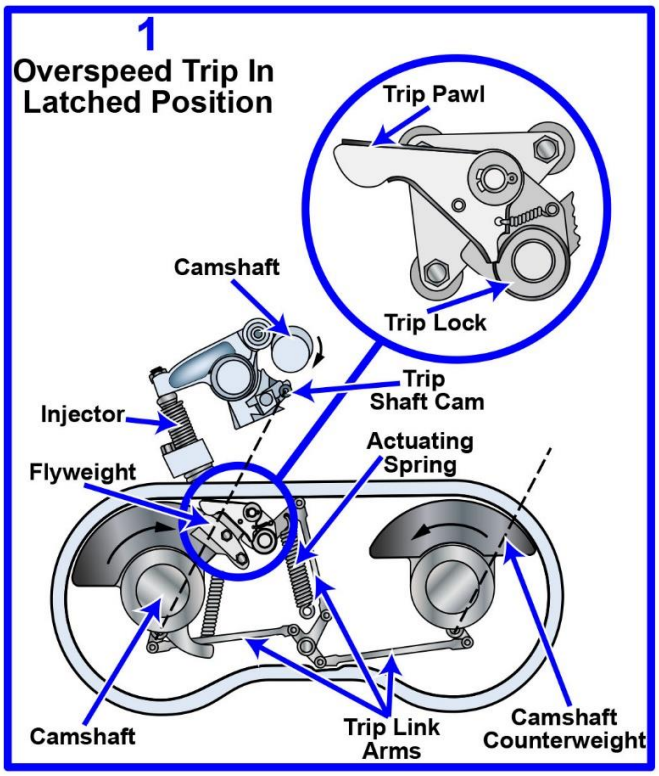
MO-0168
Pneumatic Propulsion Control System

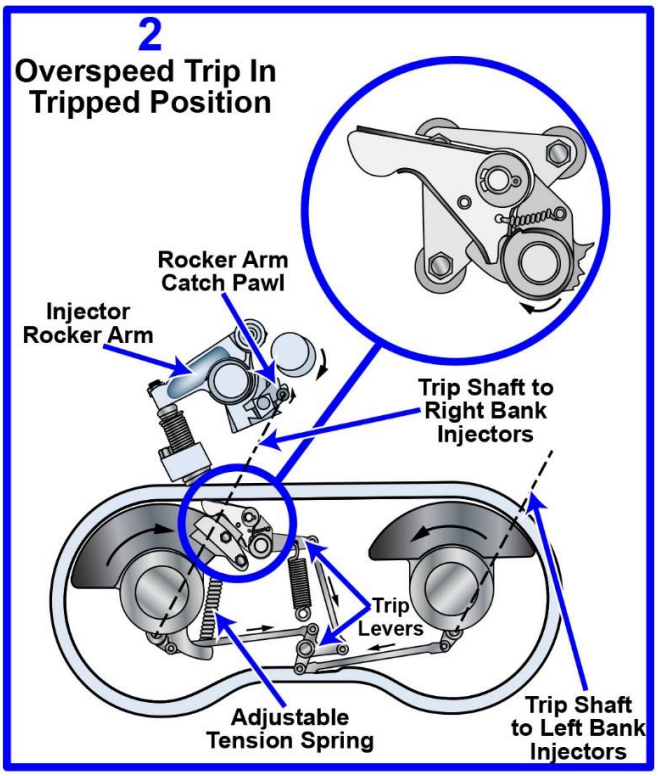


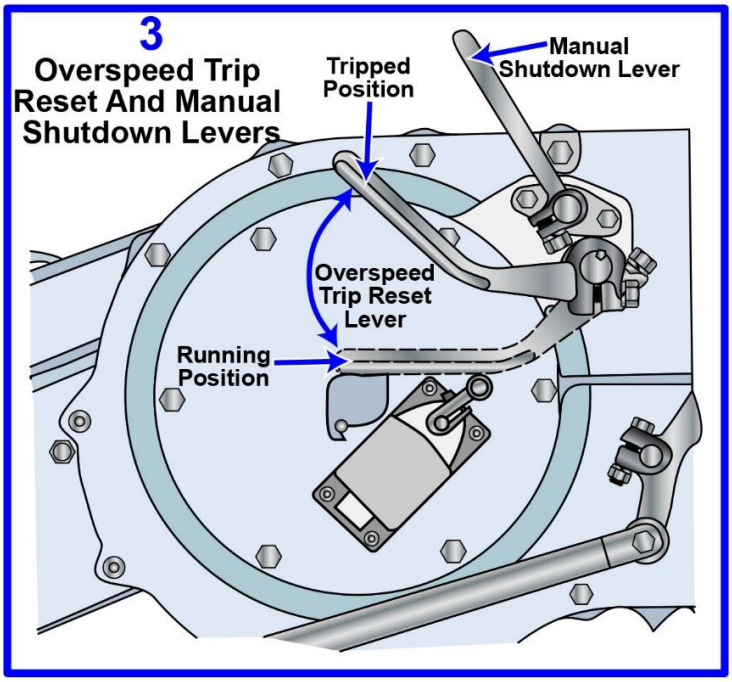
MO-0170
Woodward PG Governor with Shutdown Solenoid Assembly



MO-0171
EMD 645 Overspeed and Manual Trips







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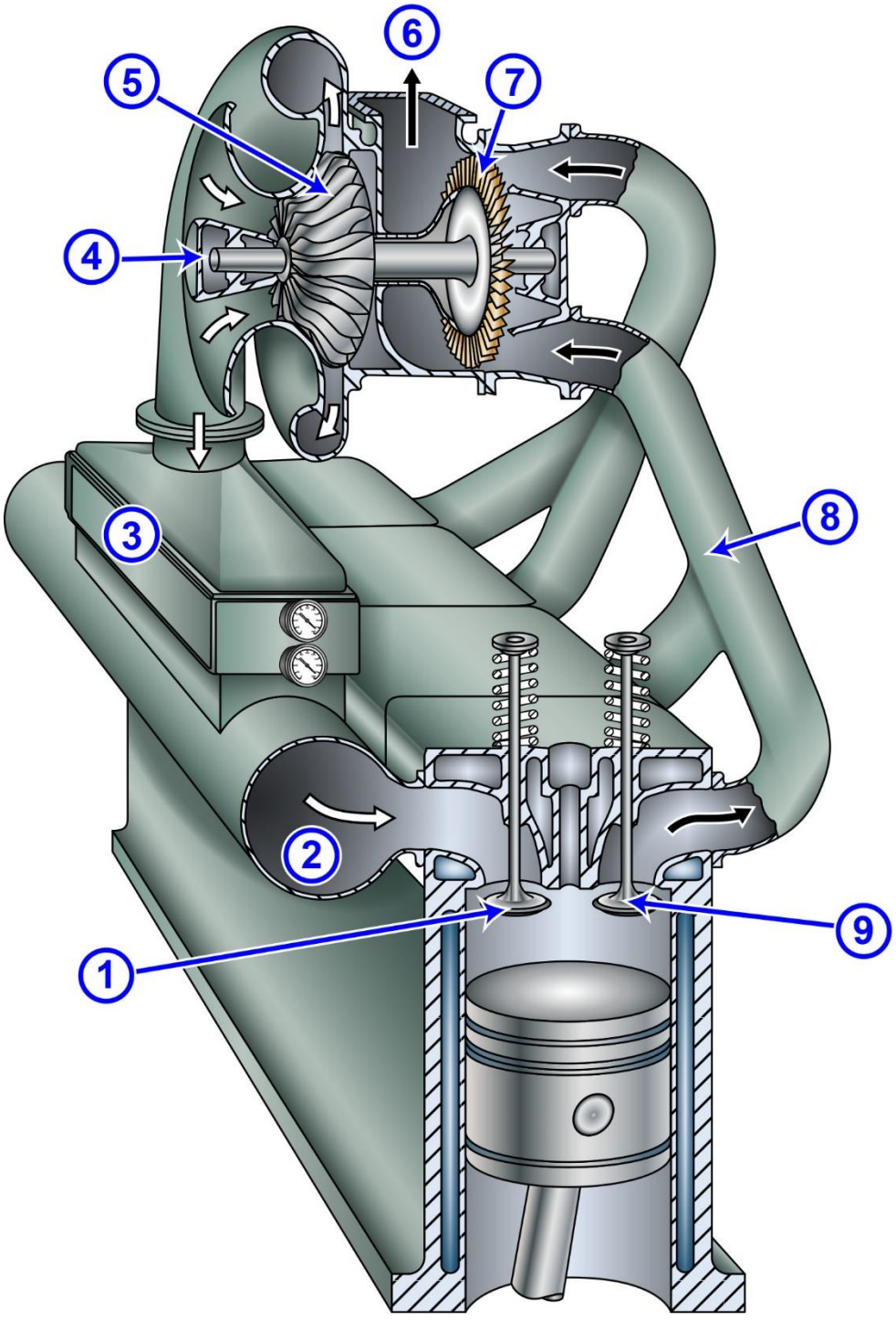

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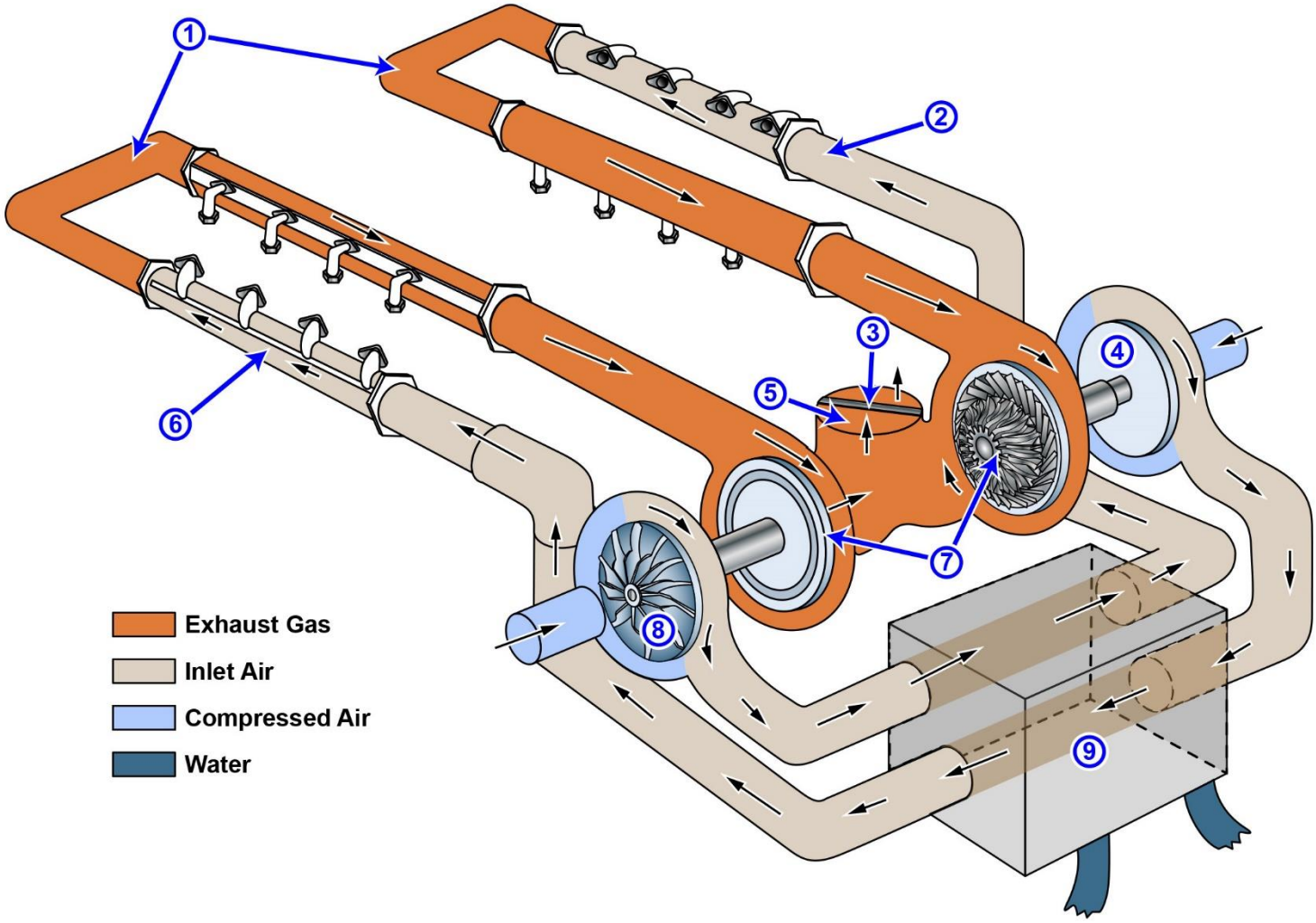
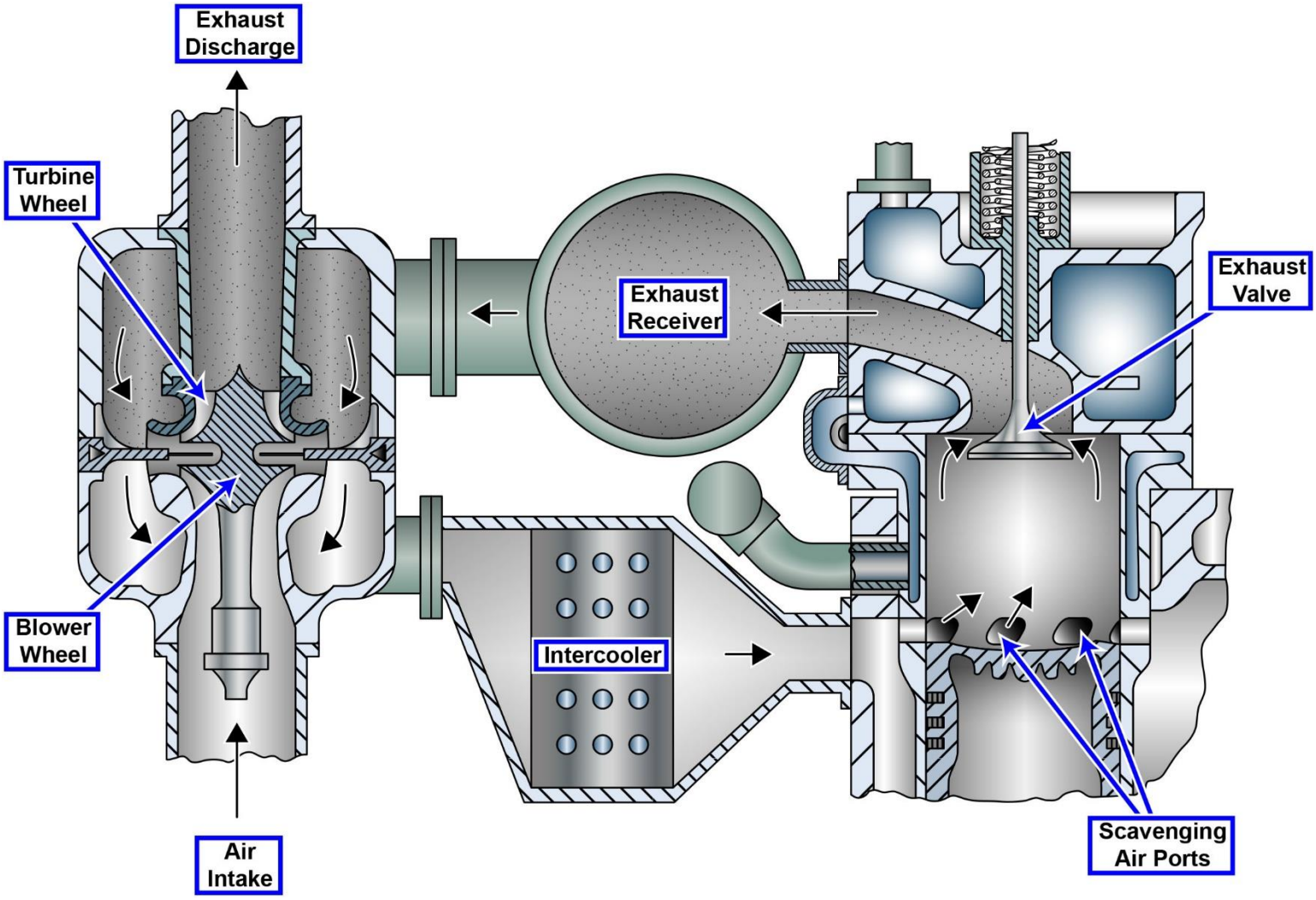
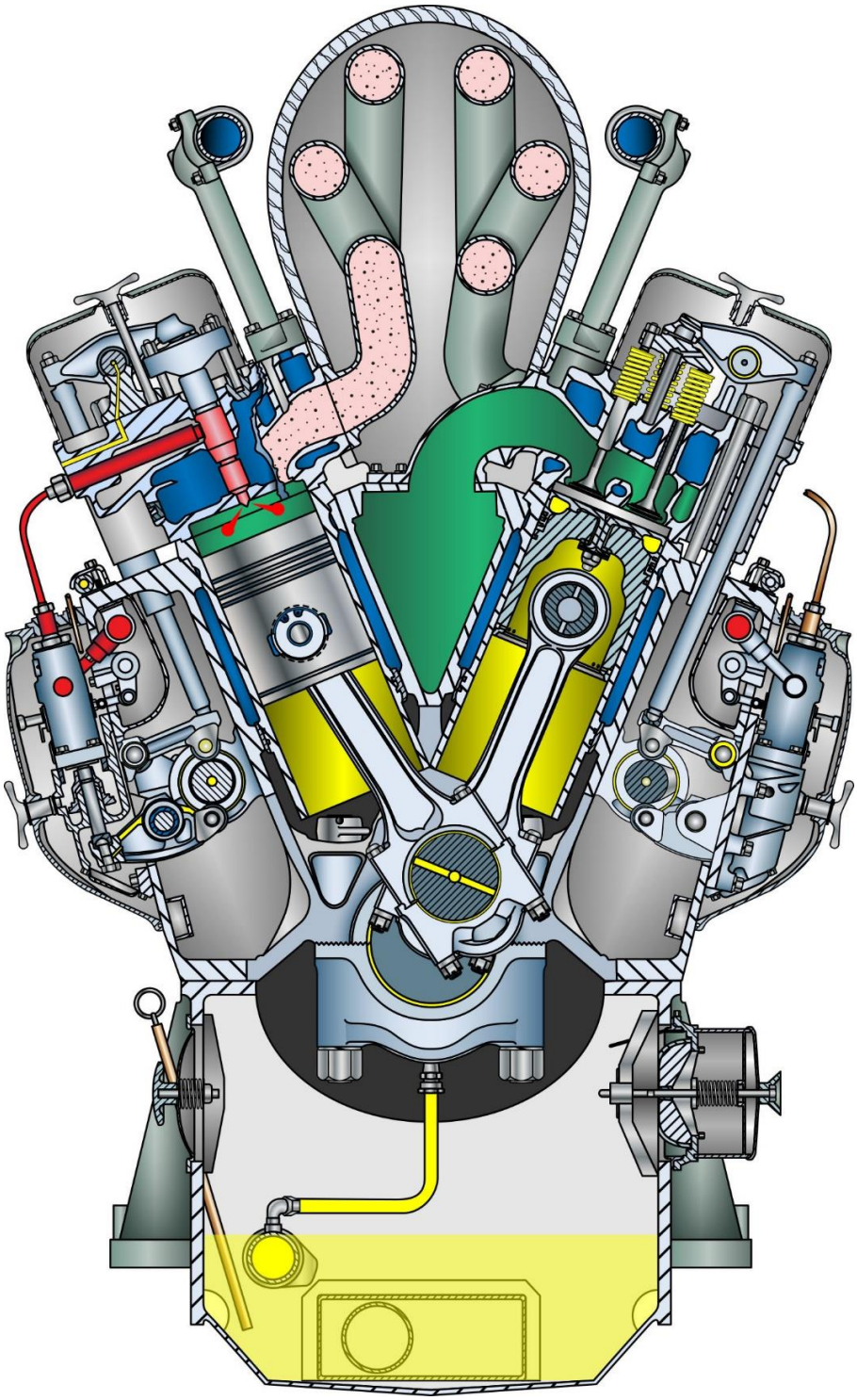


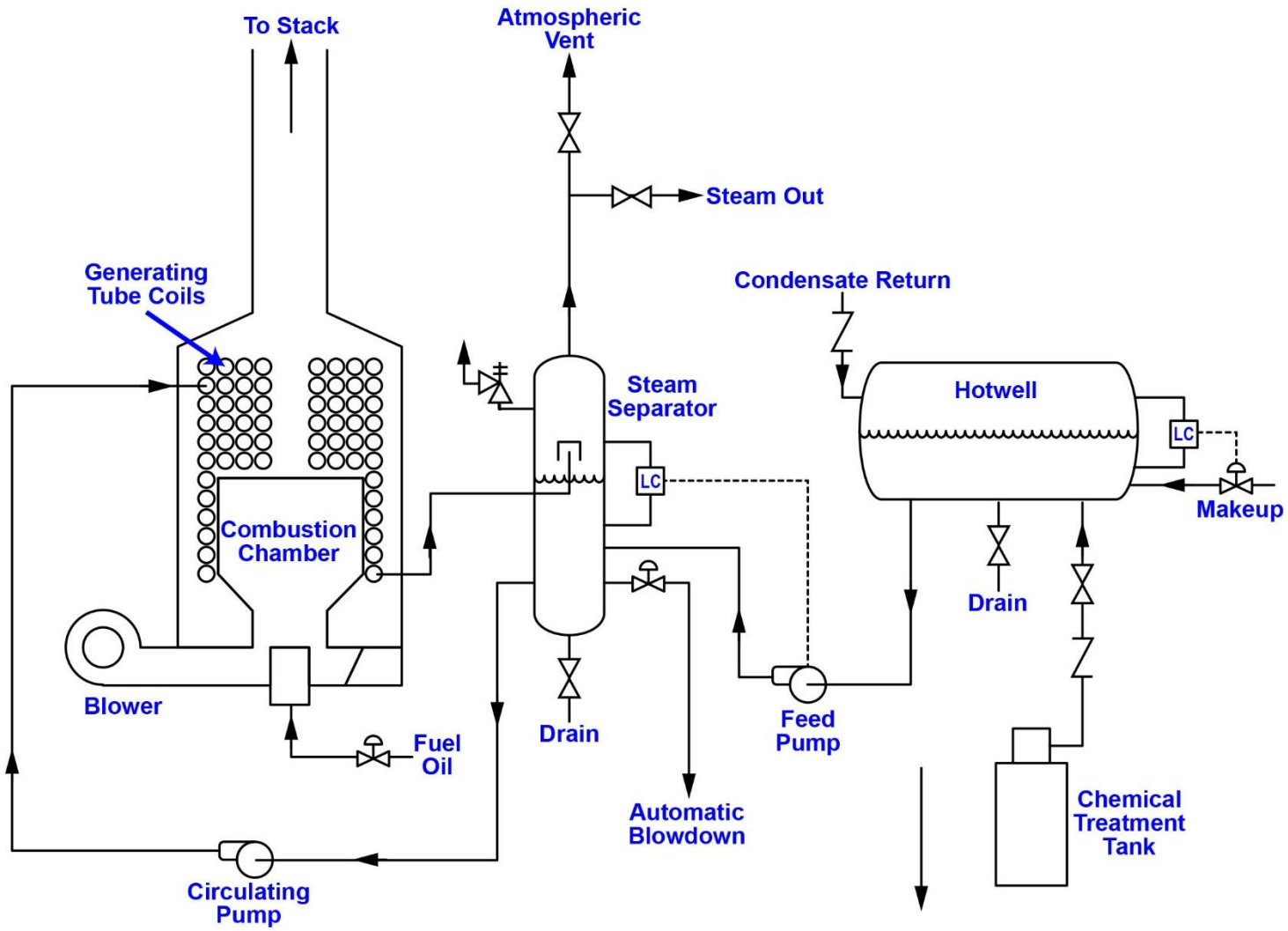
MO-0180



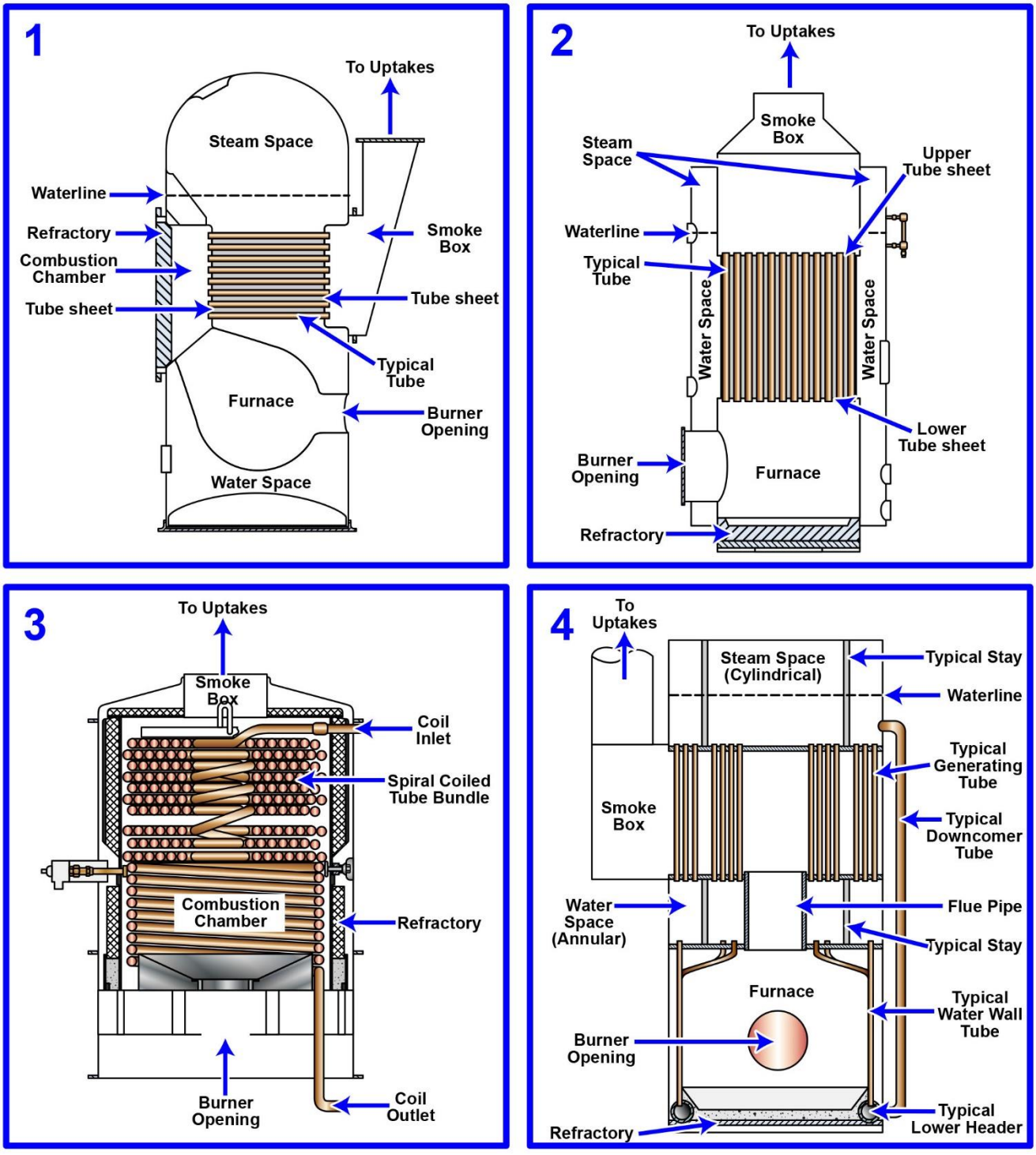
MO-0192
ALCO 251 Series Engine



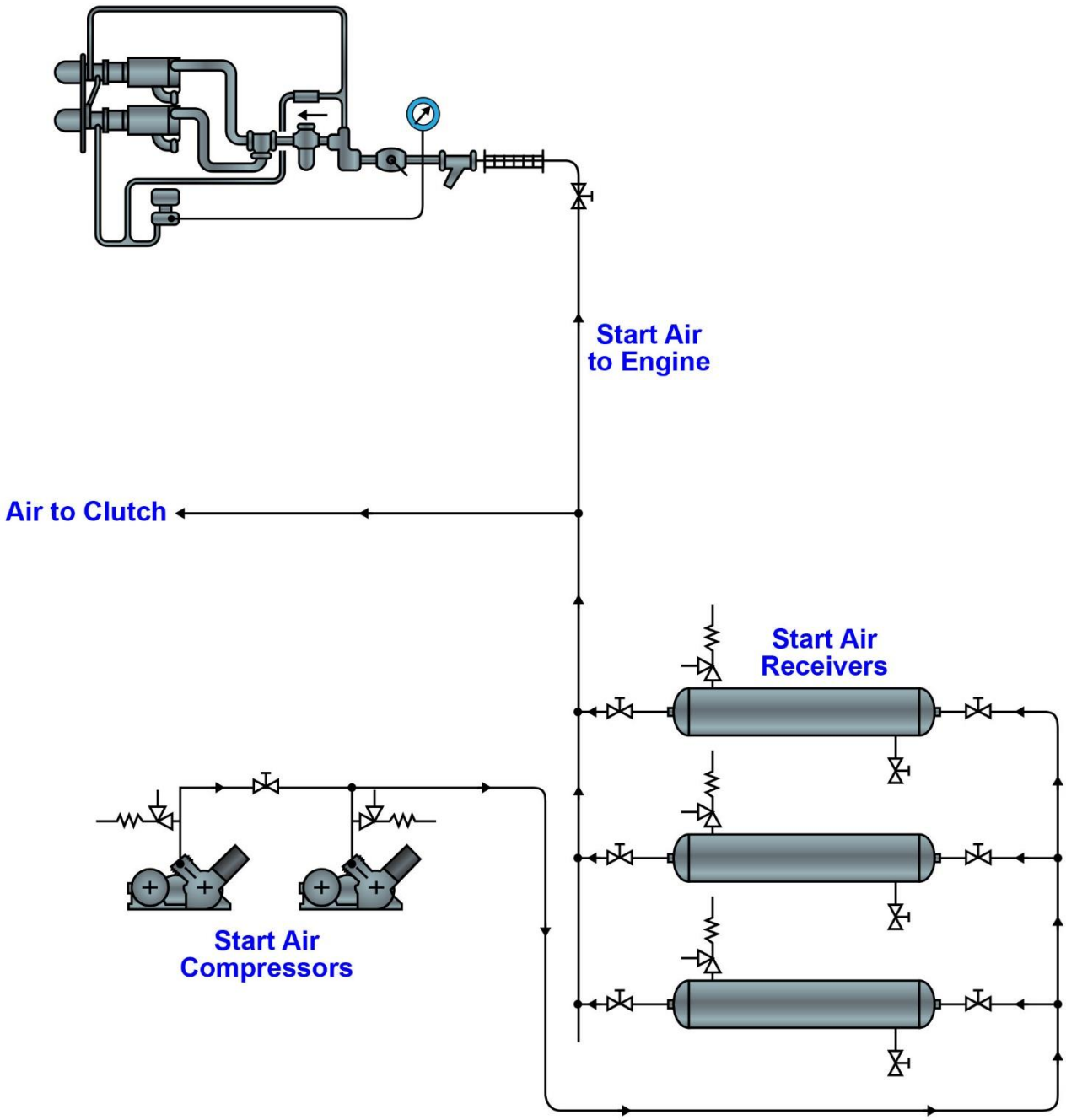
MO-0194
Coil Type Steam Generator



MO-0197



MO-0199
EMD Air Start System



MO-0215

Offshore Supply Vessel Drives

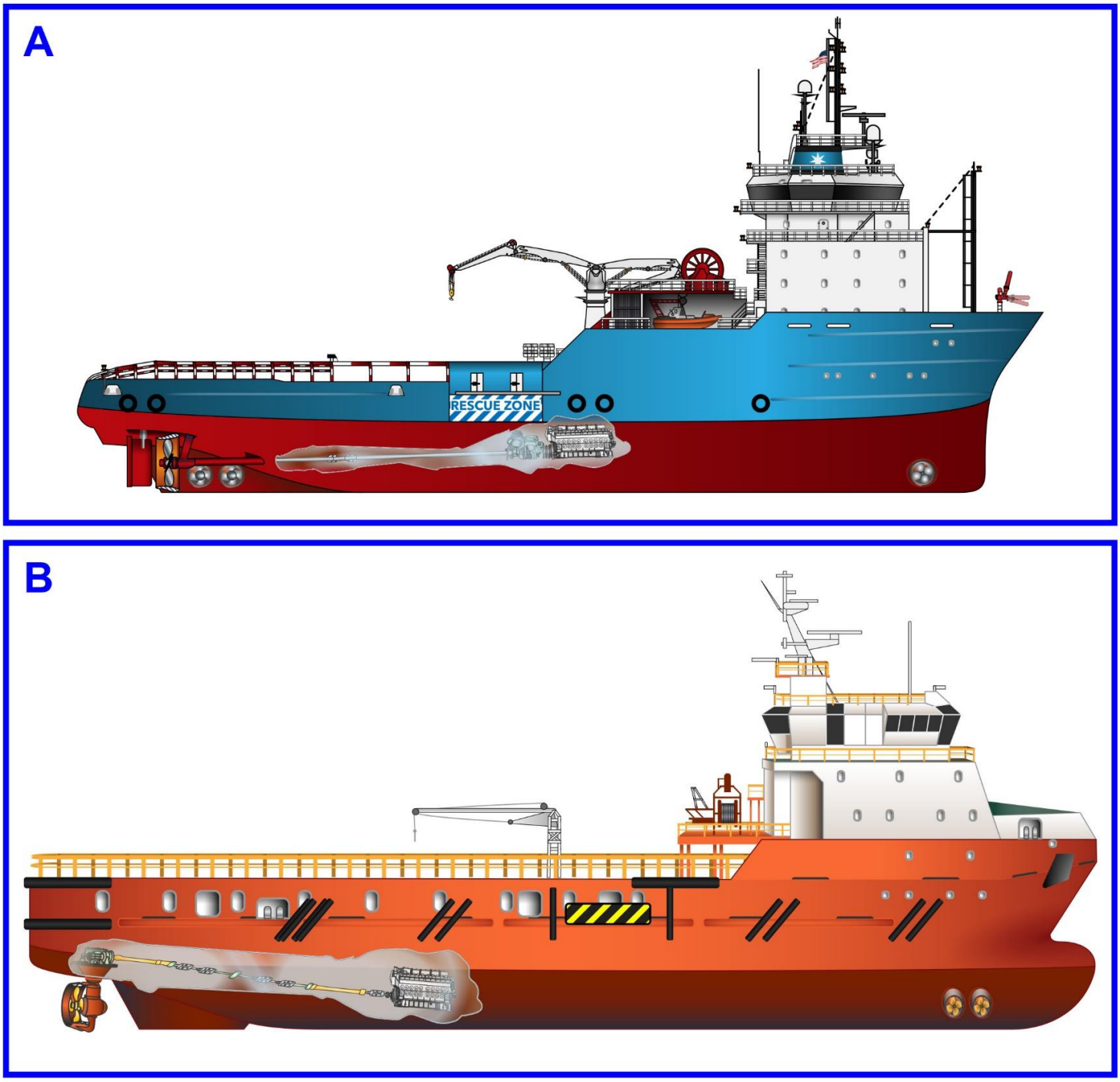


Fig. A: Adapted for testing purposes only from www.bst-tsb.gc.ca/eng/rapports-reports/marine/2011/m11n0047/m11n0047.html
Fig. B: Adapted for testing purposes only from www.pacificradiance.com/fleet-overview/ 4/24/2019

MO-0224