U.S.C.G. Merchant Marine Exam

OSV - Assistant Engineer

Q650 Motor Plants

(Sample Examination)

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Illustrations: 33

Choose the best answer to the following Multiple Choice Questions:

1. In all diesel engines, including those used in offshore oil spill response vessels, at what point in the combustion cycle does ignition actually begin?

- (A) At the beginning of the compression event.
- (B) Near the completion of the scavenging event.
- (C) Near the completion of the compression event.
- (D) Near the completion of the expansion (power) event.

If choice C is selected set score to 1.

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

If choice A is selected set score to 1.

3. 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) Intake
- (C) Power
- (D) Compression

If choice C is selected set score to 1.

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.

If choice A is selected set score to 1.

5. The offshore oil spill response 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-0227

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

If choice B is selected set score to 1.

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

If choice C is selected set score to 1.

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

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

If choice C is selected set score to 1.

8. Prior to starting a main propulsion diesel engine fitted on your multi-purpose offshore supply vessel, it has been determined that the transfer of make-up oil is required. At what checked level should you stop adding make-up oil?

- (A) When the oil level rises to a level well above the FULL mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD.
- (B) When the oil level rises to the ADD mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD.
- (C) When the oil level rises to the between the ADD and FULL marks on the side of the dipstick marked ENGINE STOPPED and OIL COLD.
- (D) When the oil level rises to the FULL mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD.

If choice D is selected set score to 1.

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 FULL mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD.
- (D) When the oil level drops below the ADD mark on the side of the dipstick marked ENGINE STOPPED and OIL COLD.

If choice D is selected set score to 1.

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

If choice D is selected set score to 1.

11. 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 a pushrod operated overhead valve engine with wet cylinder liners.
- (B) This is an overhead cam engine with wet cylinder liners.
- (C) This is a pushrod operated overhead valve engine with dry cylinder liners.
- (D) This is an overhead cam engine with dry cylinder liners.

If choice C is selected set score to 1.

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

If choice D is selected set score to 1.

13. 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) Deck winch gear oil pump discharge pressure.
- (C) Cylinder jacket water pump discharge pressure.
- (D) Fuel oil supply header pressure.

If choice A is selected set score to 1.

14. 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 below the ADD mark on the dipstick.
- (D) The level should be well above the FULL mark on the dipstick.

If choice B is selected set score to 1.

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

If choice A is selected set score to 1.

16. The various auxiliary diesel engines fitted on your offshore oil spill response vessel may employ a variety of different starting systems. What type of starting system is shown in the illustration? Illustration MO-0049

- (A) Pneumatic power operated system.
- (B) Hydraulic power operated system.
- (C) Electric power operated system.
- (D) Gas engine power operated system.

If choice B is selected set score to 1.

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 starting air pressure supplied to the air-starting motors should be increased.
- (C) The in-line lubricator oil injection metering needle valve should be further closed.
- (D) The in-line lubricator oil injection metering needle valve should be further opened.

If choice D is selected set score to 1.

18. 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 it becomes approximately half full as shown in the glass.
- (C) The lubricator reservoir bowl should be re-filled with clean oil when the level is no longer visible 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.

If choice B is selected set score to 1.

19. A diesel generator set on your offshore supply boat 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 pressure drop becomes unacceptably high. When you rotate the cleaning handle you notice that it is extremely difficult to rotate. What should be done? Illustration MO-0057

- (A) The cleaning handle (A) should be forced to rotate, even if it requires an extender handle to produce greater rotating torque.
- (B) After stopping the engine, the drain plug (B) should be removed to drain the accumulated sludge from the strainer sump.
- (C) After stopping the engine, the strainer element should be withdrawn and soaked in solvent to break up the heavy deposits on the disk stack (C).
- (D) No special consideration need be taken as long as the cleaning handle (A) rotates, even if it rotates with great difficulty.

If choice C is selected set score to 1.

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

If choice B is selected set score to 1.

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) Cetane rating
- (B) Heating value
- (C) Viscosity
- (D) Density

If choice A is selected set score to 1.

22. 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 shutdown 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 running and when the day tank is located above 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 below the engine.
- (D) They prevent backflow of fuel from the engine to the day tank when the engine is shutdown and when the day tank is located below the engine.

If choice D is selected set score to 1.

23. 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) A coalescing type filter.
- (B) A strainer.
- (C) An absorption type filter.
- (D) An adsorption type filter.

If choice A is selected set score to 1.

24. What maintenance practice represents the best protection against moisture carryover to the fuel injection system of the main engines on board your general purpose supply vessel?

- (A) Periodically opening, then reclosing, the drain valve on coalescing type diesel oil filters.
- (B) Periodically opening, then reclosing, the vent valve on coalescing type diesel oil filters.
- (C) Closing the diesel oil day tank vents, particularly when the relative humidity is high.
- (D) Frequently replacing fuel injection pump and injector nozzle inlet fuel filters.

If choice A is selected set score to 1.

25. 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) Perchlorethylene or trichlorethylene.
- (B) Kerosene or diesel fuel.
- (C) White mineral spirits.
- (D) Benzene or toluene.

If choice B is selected set score to 1.

26. The oil spill response vessel to which you are assigned has diesel generators fitted with multi-plunger pumps with the metering principle as shown in the illustration. What statement is true concerning this injection pump type? Illustration MO-0145

- (A) As the load changes, the beginning of injection is variable, and the ending of injection is constant.
- (B) As the load changes, the beginning of injection is variable, and the ending of injection is variable.
- (C) As the load changes, the beginning of injection is constant, and the ending of injection is variable.
- (D) As the load changes, the beginning of injection is constant, and the ending of injection is constant.

If choice C is selected set score to 1.

27. 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

If choice B is selected set score to 1.

28. The offshore supply vessel to which you are assigned has diesel generators fitted with a fuel injection system that have a complete absence of high pressure fuel lines. Which figure of the illustration represents the most likely type of fuel injection pump used? Illustration MO-0149

- (A) 1
- (B) 2
- (C) 3
- (D) 4

If choice C is selected set score to 1.

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

If choice C is selected set score to 1.

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 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.
- (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 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.

If choice A is selected set score to 1.

31. The generator drive diesel engines on your supply boat are fitted with a multi-plunger injection pump with high pressure fuel lines leading to each hydraulically operated injector. If the engine is allowed to run out of fuel, it may become necessary to purge the high pressure fuel lines of air. How is this accomplished?

- (A) Slackening each high pressure fuel line fitting at the fuel injector while stroking the manually operated priming pump and allowing air to escape, then retightening when bubbly fuel is observed.
- (B) Slackening each high pressure fuel line fitting at the fuel injector while cranking over the engine with the starter and allowing air to escape, then retightening when a solid stream of fuel is observed.
- (C) Slackening each high pressure fuel line fitting at the fuel injector while cranking over the engine with the starter and allowing air to escape, then retightening when air bubbly fuel is observed.
- (D) Slackening each high pressure fuel line fitting at the fuel injector while stroking the manually operated priming pump and allowing air to escape, then retightening when a solid stream of fuel is observed.

If choice B is selected set score to 1.

32. 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 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.
- (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 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.

If choice B is selected set score to 1.

33. 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 both cylinder banks, and the right side turbocharger discharges charge air to both cylinder banks.
- (B) It is not possible to determine the turbocharger charge air discharge arrangements in this particular drawing.
- (C) 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.
- (D) 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.

If choice D is selected set score to 1.

34. 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) Exhaust receiver.
- (B) Air box.
- (C) Exhaust discharge to stack.
- (D) Air intake.

If choice D is selected set score to 1.

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

If choice A is selected set score to 1.

36. 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) Multi-tube filter element.
- (B) Panel-type filter element.
- (C) Wire-mesh filter element.
- (D) Spiral-rotor filter element.

If choice C is selected set score to 1.

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) Pulse turbo-charging.
- (B) Boost-controlled turbo-charging.
- (C) 2-stage turbo-charging.
- (D) Constant pressure turbo-charging.

If choice A is selected set score to 1.

38. 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) Baking off carbon with heat lamps.
- (B) Treating with carbon penetrating solvent.
- (C) Sand blasting with diamond dust.
- (D) Treating with carbon tetrachloride solvent.

If choice B is selected set score to 1.

39. 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) Summer operations with prolonged idling on station.
- (B) Summer operations with lengthy ship escort transit times.
- (C) Winter operations with prolonged idling on station.
- (D) Winter operations with lengthy ship escort transit times.

If choice C is selected set score to 1.

40. The fresh water cooling system self-contained, internally-sensing thermostatic temperature control valves fitted on the main engines of your anchor-handling supply vessel are configured as shown in the illustration. If the valve sleeve (item #4) as controlled by the thermostatic sensing element (item #7) is in the position as shown in the drawing, what statement is true? Illustration MO-0079

- (A) As shown, the actual engine fresh water outlet temperature must be at the temperature set point of the valve, thus sending a portion of the water flow through the fresh water cooler and the remainder in bypass of the cooler.
- (B) As shown, the actual engine fresh water outlet temperature must be above the temperature set point of the valve, thus sending 100% of the water flow through the fresh water cooler.
- (C) As shown, it is not possible to determine what the relationship is between the actual engine fresh water outlet temperature and the temperature set point of the valve, and as such it is not possible to determine the flow pattern.
- (D) As shown, the actual engine fresh water outlet temperature must be below the temperature set point of the valve, thus diverting 100% of the water flow in bypass of the fresh water cooler.

If choice D is selected set score to 1.

41. The fresh water cooling systems serving the main engines of the platform supply vessel to which you are assigned are arranged as shown in the illustration. What statement best describes the arrangement of the fresh water keel cooler shown in the system diagram? Illustration MO-0138

- (A) The keel cooler is mounted on the inside of the hull above the water line.
- (B) The keel cooler is mounted on the outside of the hull below the water line.
- (C) The keel cooler is mounted on the inside of the hull below the water line.
- (D) The keel cooler is mounted on the outside of the hull above the water line.

If choice B is selected set score to 1.

42. 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

If choice B is selected set score to 1.

43. The raw water boxes of the fresh water 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%

If choice B is selected set score to 1.

44. The diesel generators on the platform supply vessel to which you are assigned are fitted with a charge air system as shown in the illustration. What statement is true concerning this type of charge air system? Illustration MO-0134

- (A) The scavenging blower is a positive displacement type, and the actual displacement is directly proportional to engine speed.
- (B) The scavenging blower is a positive displacement type, and the actual displacement is not directly proportional to engine speed.
- (C) The scavenging blower is a non-positive displacement type, and the actual displacement is directly proportional to engine speed.
- (D) The scavenging blower is a non-positive displacement type, and the actual displacement is not directly proportional to engine speed.

If choice A is selected set score to 1.

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

If choice B is selected set score to 1.

46. The two-stroke cycle main propulsion engines on the platform supply vessel to which you are assigned are fitted with turbochargers for scavenging purposes. Assume that you are checking the air box drains in an installation that is valved with external drain piping to a drains tank. When you open the air box drain valves, no drainage occurs when in fact there is an accumulation of oil and moisture on the floor of the air boxes. What should you do?

- (A) Blow through the drain openings with compressed air to clear the drains.
- (B) Increase the air box pressure to blow the air box drain openings clear.
- (C) Mechanically poke through the drain openings with a rod to clear the drains.
- (D) Increase the crankcase pressure to blow the air box drain openings clear.

If choice C is selected set score to 1.

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

If choice C is selected set score to 1.

48. The oil spill response vessel to which you are assigned is fitted with reduction gears as shown in the illustration. What statement is true concerning this type of reduction gear? Illustration MO-0085

- (A) The reduction gear is a single-input, double-reduction type of gear.
- (B) The reduction gear is a double-input, double-reduction type of gear.
- (C) The reduction gear is a double-input, single-reduction type of gear.
- (D) The reduction gear is a single-input, single-reduction type of gear.

If choice D is selected set score to 1.

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 non-reversing engine.
- (D) This type of reduction gear is used with a controllable pitch propeller and a reversing engine.

If choice A is selected set score to 1.

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

If choice A is selected set score to 1.

51. 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.

If choice A is selected set score to 1.

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

If choice D is selected set score to 1.

53. The anchor handling vessel to which you are assigned has a pneumatic propulsion control system as shown in the illustration. Which control valve is responsible for by-passing the inflation delay orifice to insure rapid and positive reversals and to protect the clutches from excessive slip? Illustration MO-0167

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

If choice A is selected set score to 1.

54. The pneumatic propulsion control system used on your oil platform supply vessel 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 method for lubrication upon reassembly? Illustration MO-0052

- (A) O-rings should be lubricated with a silicone-based grease.
- (B) O-rings should be lubricated with penetrating oil.
- (C) O-rings should be lubricated with desiccant powder.
- (D) O-rings should not be lubricated by any means.

If choice A is selected set score to 1.

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 downward.
- (B) The servo piston rod moves upward.
  The power cylinder tail rod moves downward.
- (C) The servo piston rod moves downward.
  The power cylinder tail rod moves upward.
- (D) The servo piston rod moves upward.
  The power cylinder tail rod moves upward.

If choice B is selected set score to 1.

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

If choice B is selected set score to 1.

57. The main diesel engines on your general purpose supply vessel are protected with an array of devices designed to provide an alarm or possible shutdown for various unsafe conditions. During the maintenance procedure for adjusting the alarm and/or trip point setting for such a device, which of the following devices would have a time delay associated with it?

- (A) Engine low lube oil pressure trip/alarm device.
- (B) Engine overspeed trip/alarm device.
- (C) Engine coolant high temperature alarm device.
- (D) Engine crankcase high pressure trip/alarm device.

If choice A is selected set score to 1.

58. 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 only after the final adjustment.
- (B) To adjust the overspeed trip, the engine must be stopped AND the locknut must be retightened after each 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 running AND the locknut must be retightened after each adjustment.

If choice B is selected set score to 1.

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 load limit (maximum fuel delivery)
  Engine speed limit (maximum governed speed)
- (C) Engine idle speed (minimum governed speed)
  Engine speed limit (maximum governed speed)
- (D) Engine idle speed (minimum governed speed)
  Engine load limit (maximum fuel delivery)

If choice C is selected set score to 1.

60. The thermal fluid heating oil system on your offshore supply vessel is configured similarly to that shown in the illustration. What system component performs expansion and deaeration functions? Illustration MO-0198

- (A) 1
- (B) 2
- (C) 4
- (D) 5

If choice D is selected set score to 1.

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

If choice C is selected set score to 1.

62. If the water level as indicated by the gauge glass of an auxiliary boiler is in question, it should be blown down. Which of the following statements represents the proper procedure for performing a gauge glass blowdown?

- (A) The gauge glass should be blown down twice; first with the upper cut-out valve open and then with the lower cut-out valve open.
- (B) The gauge glass should be blown down twice; first with the lower cut-out valve open and then with the upper cut-out valve open.
- (C) The gauge glass should be blown down once with the lower cut-out valve open.
- (D) The gauge glass should be blown down once with both the upper cut-out and lower cut-out valves open simultaneously.

If choice B is selected set score to 1.

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 tricocks 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 tricock situated above the water level, when opened some of the escaping steam will condense to water.
- (B) On a tricock situated above the water level, when opened all of the escaping steam will condense to water.
- (C) On a tricock situated below the water level, when opened some of the escaping water will flash to steam.
- (D) On a tricock situated below the water level, when opened all of the escaping water will flash to steam.

If choice C is selected set score to 1.

64. The auxiliary oil-fired water-tube steam boiler on your platform supply vessel is equipped with a water column similar to that shown in the illustration. Assuming that the water level is at the normal operating water level (NOWL) of the boiler, what would be the result of alternately opening and reclosing each of the water column tricocks? Illustration MO-0093

- (A) Water should issue from each of the uppermost, middle, and lowermost tricocks.
- (B) Steam should issue from the uppermost tricock, and water should issue from lowermost tricock. Either steam or water could issue from the middle tricock.
- (C) Steam should issue from the uppermost tricock, and water should issue from both the middle and lowermost tricocks.
- (D) Steam should issue from both the uppermost and middle tricocks, and water should issue from the lowermost tricock.

If choice B is selected set score to 1.

65. For corrosion to take place within the closed, recirculating cooling water system of a marine diesel engine, an electro-chemical cell must exist where the cooling water is electrically conductive. Which of the following factors has the greatest influence on electrical conductivity?

- (A) The amount of dissolved oxygen in the water.
- (B) The temperature of the water.
- (C) The amount of dissolved solids in the water.
- (D) The pH of the water.

If choice C is selected set score to 1.

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

If choice A is selected set score to 1.

67. You suspect that the diesel-generator in service on your oil spill response vessel has a low coolant level. Assuming that the cooling water system is pressurized and has no sight glass associated with the expansion tank, which of the following represents the proper procedure for checking the coolant level?

- (A) Allow the engine to continue to run, but with the load removed.
  With a rag, very rapidly remove the pressure cap to relieve the system pressure.
  With the cap removed, check the coolant level.
- (B) Shut down the engine.
  With a rag, very rapidly remove the pressure cap to relieve the system pressure.
  With the cap removed, check the coolant level.
- (C) Allow the engine to continue to run with a normal load.
  With a rag, very slowly remove the pressure cap to relieve the system pressure.
  With the cap removed, check the coolant level.
- (D) Shut down the engine, and allow the engine to cool.
  With a rag, very slowly remove the pressure cap to relieve the system pressure
  With the cap removed, check the coolant level.

If choice D is selected set score to 1.

68. 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 excessively rapid cooling.
- (D) Opening the crankcase before 2 hours has elapsed may result in the engine spontaneously restarting.

If choice B is selected set score to 1.

69. 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 fresh water 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) Shut down the engine immediately.
- (B) Add makeup water to the expansion tank.
- (C) Reduce the load and speed on the engine.
- (D) Drain water from the expansion tank.

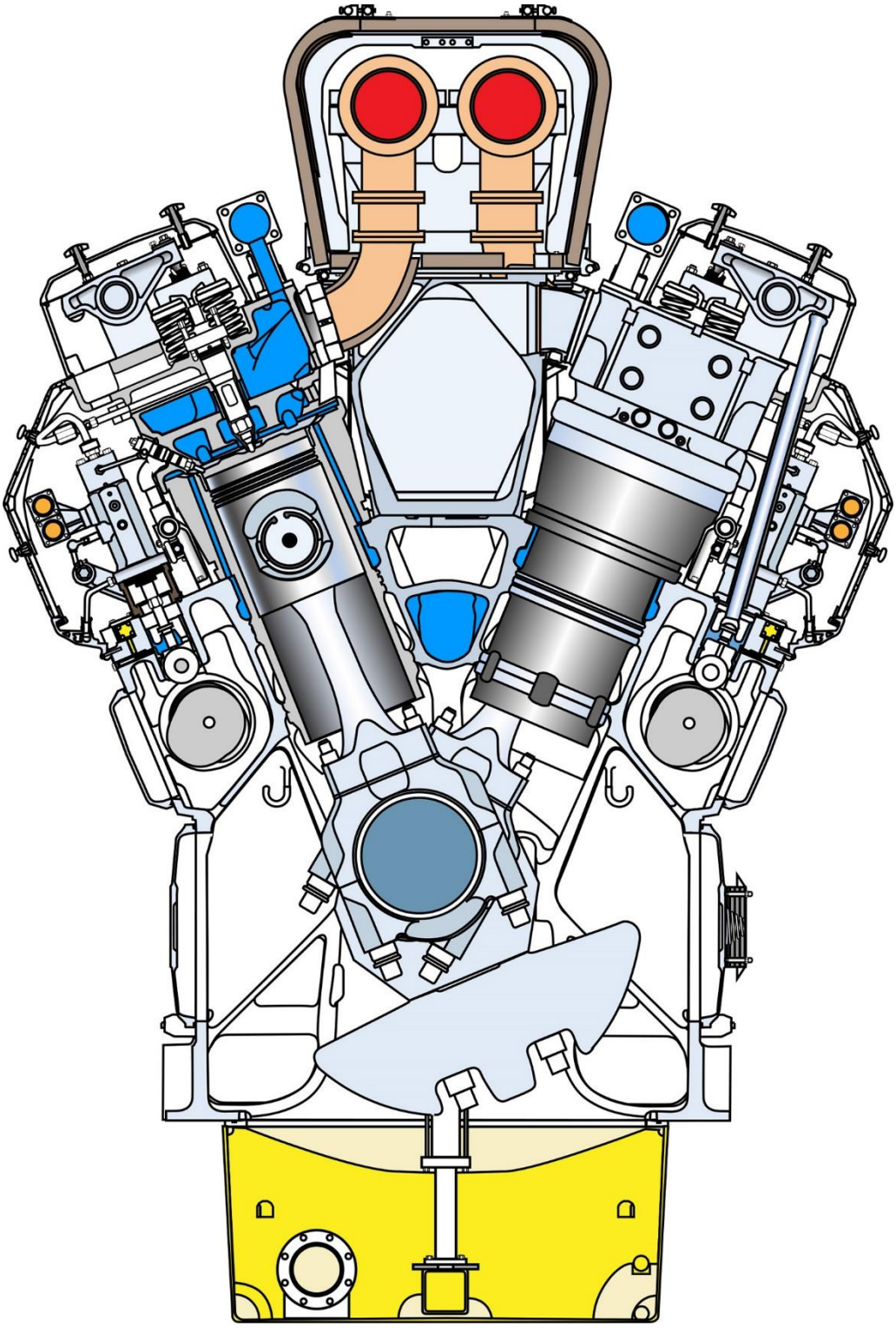
If choice C is selected set score to 1.

70. 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?

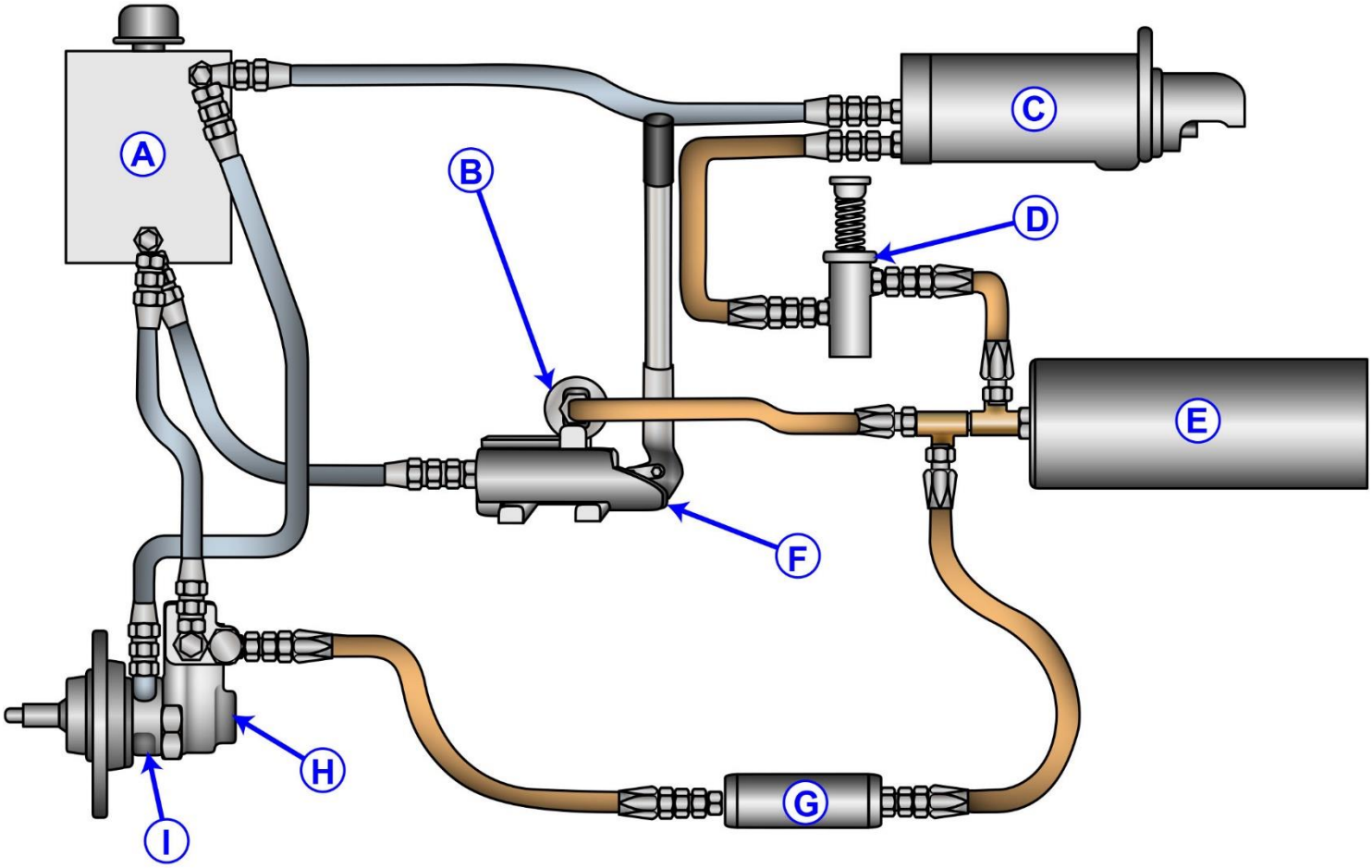
- (A) Investigate the cause of low clutch air pressure, then reduce the engine load and speed if necessary.
- (B) Investigate the cause of low clutch air pressure, then bring the throttle and clutch control to the stop position if necessary.
- (C) Bring the throttle and clutch control to the stop position,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

If choice C is selected set score to 1.

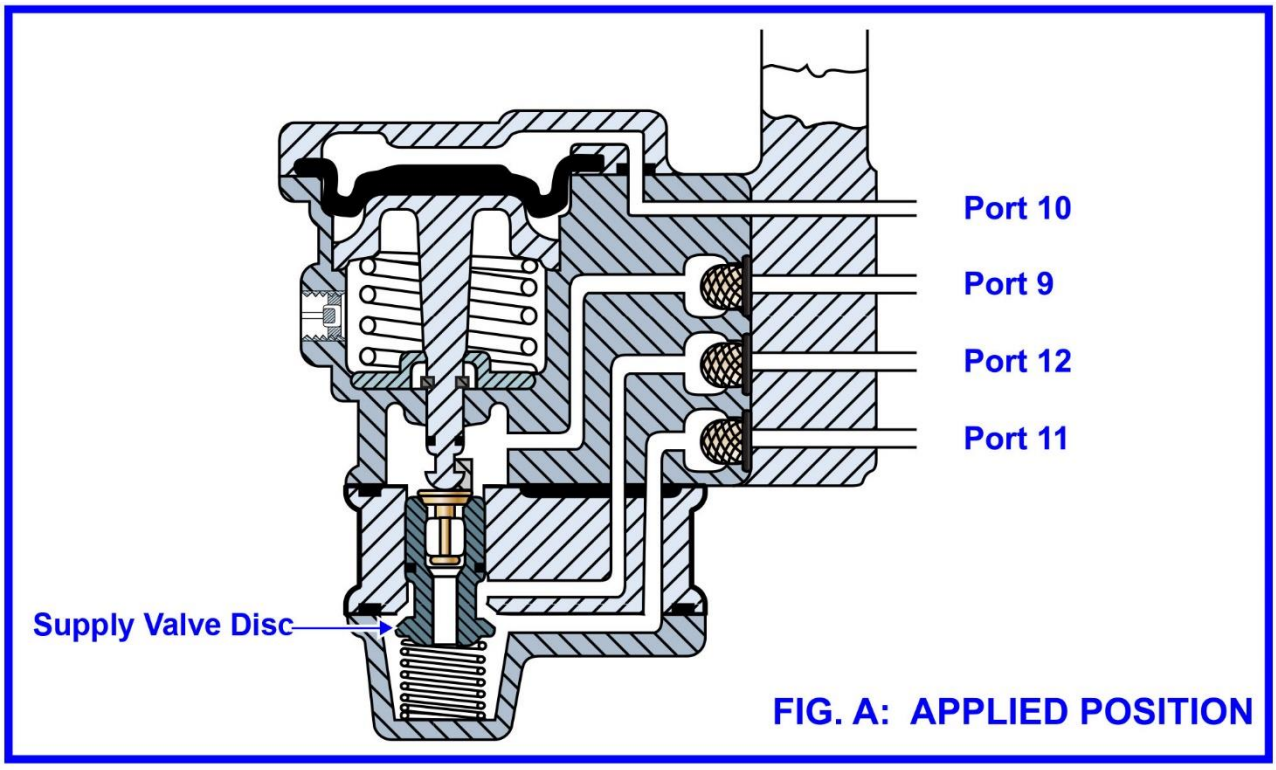
MO-0005

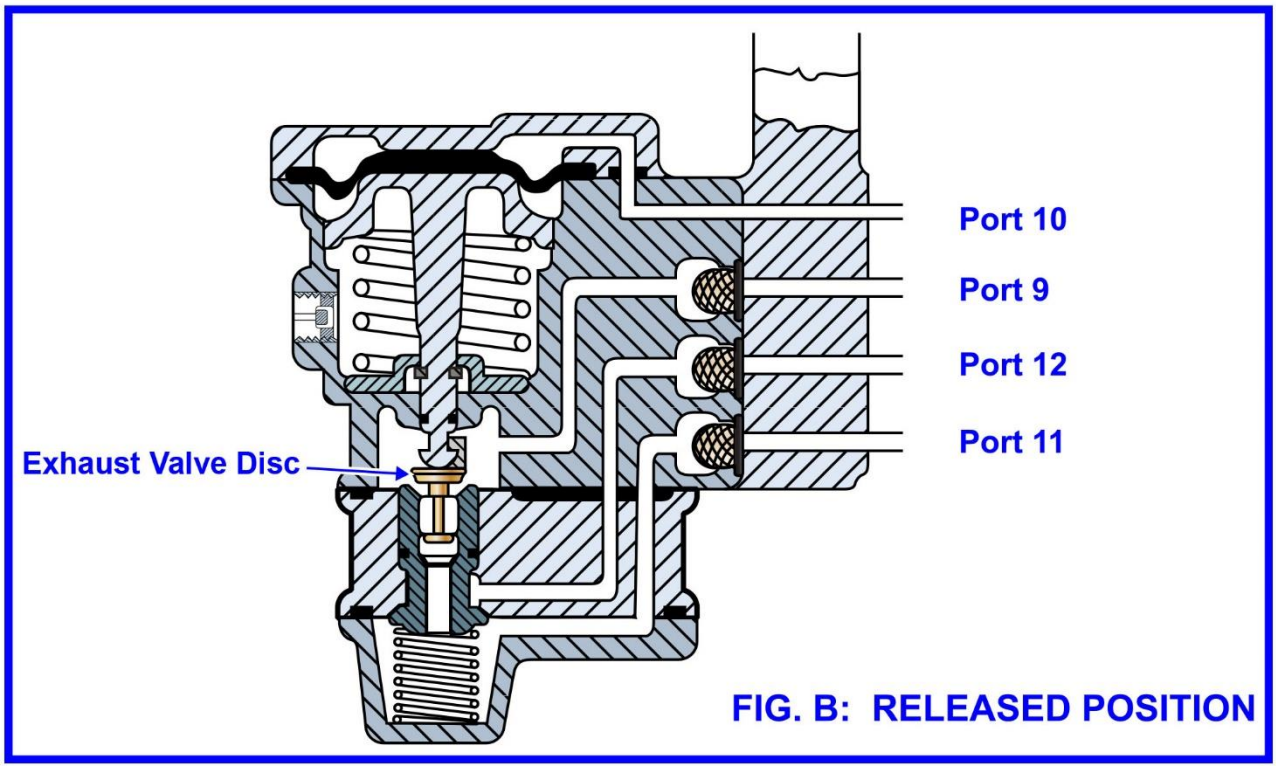


MO-0049



MO-0052





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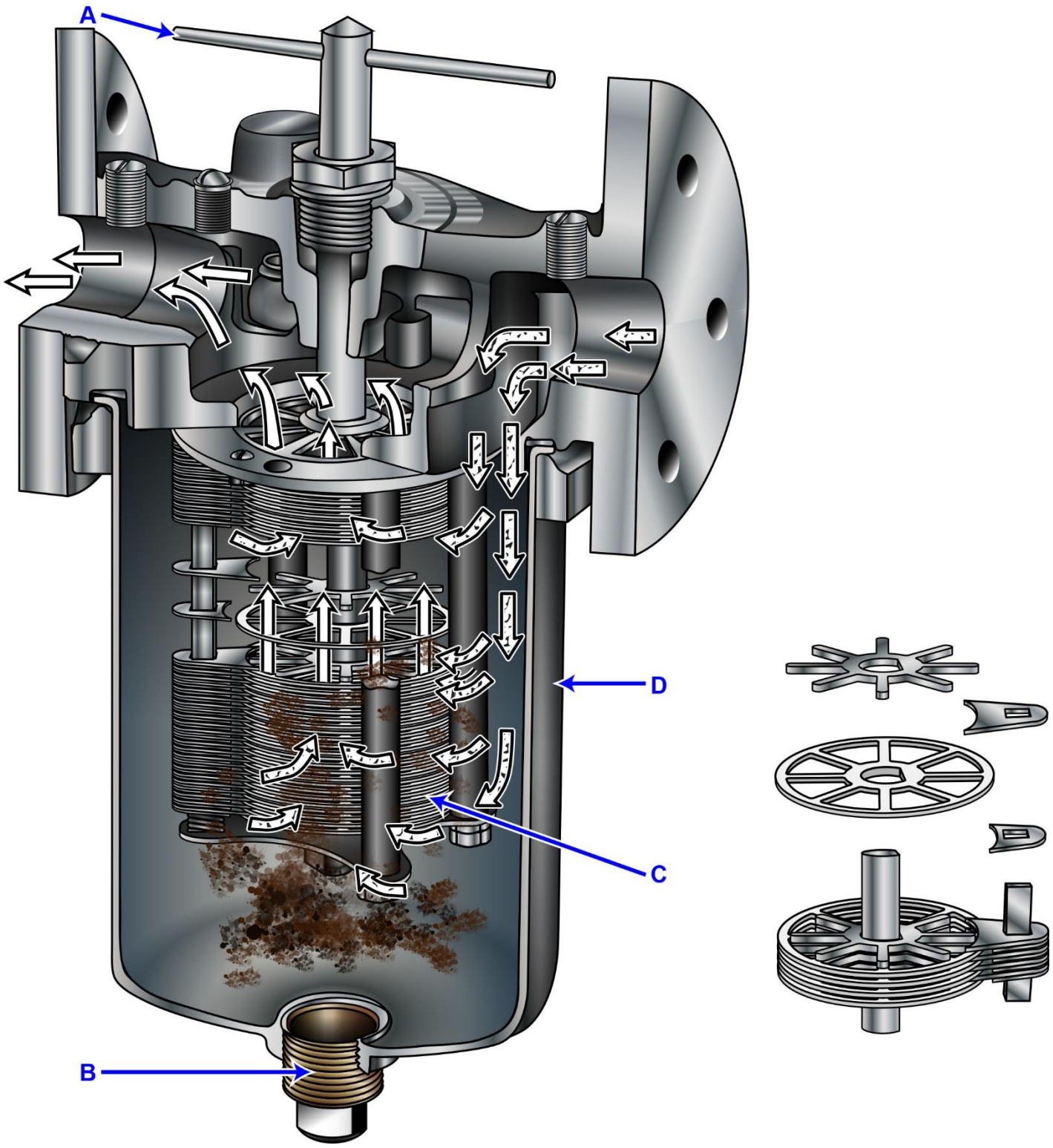

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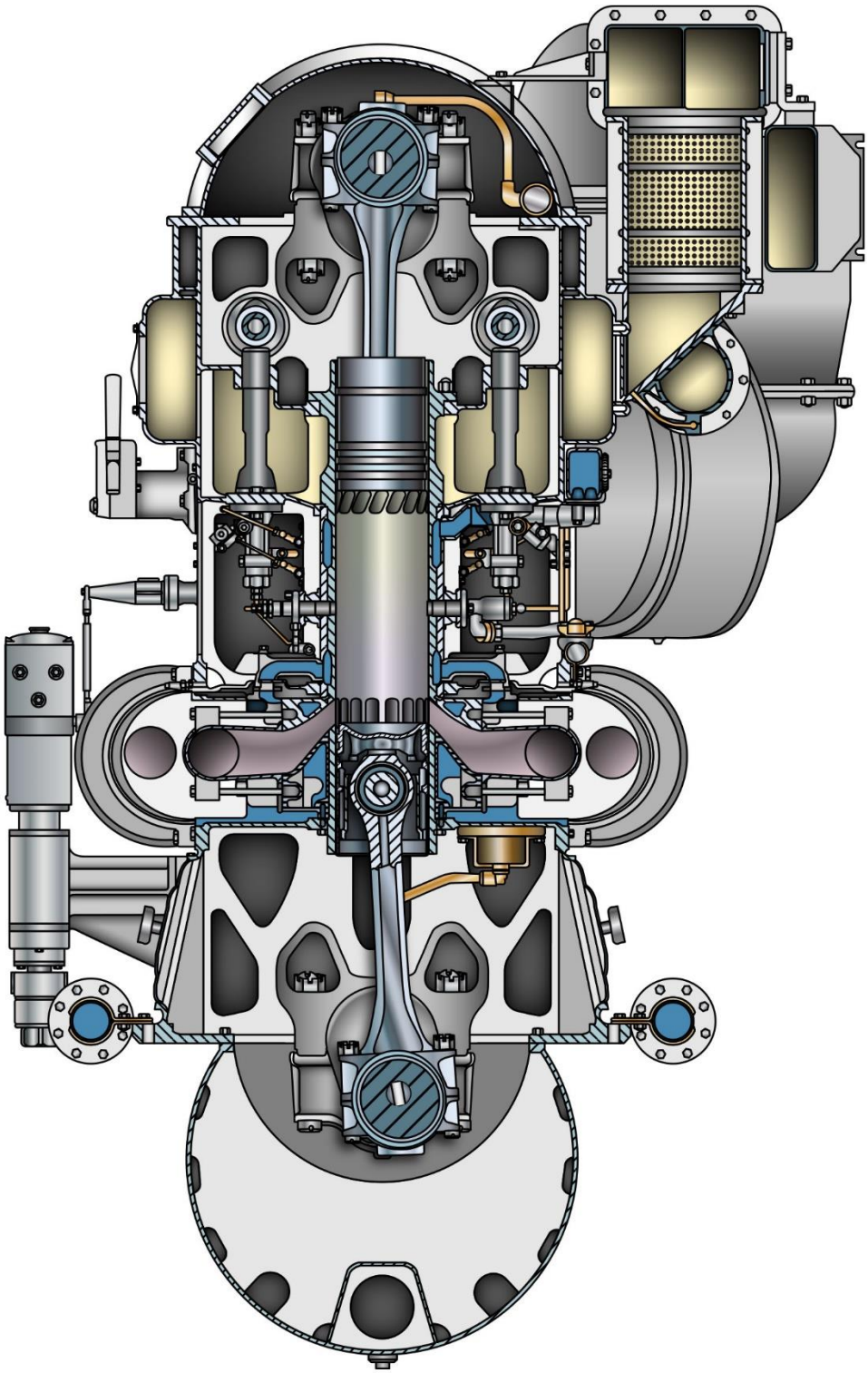

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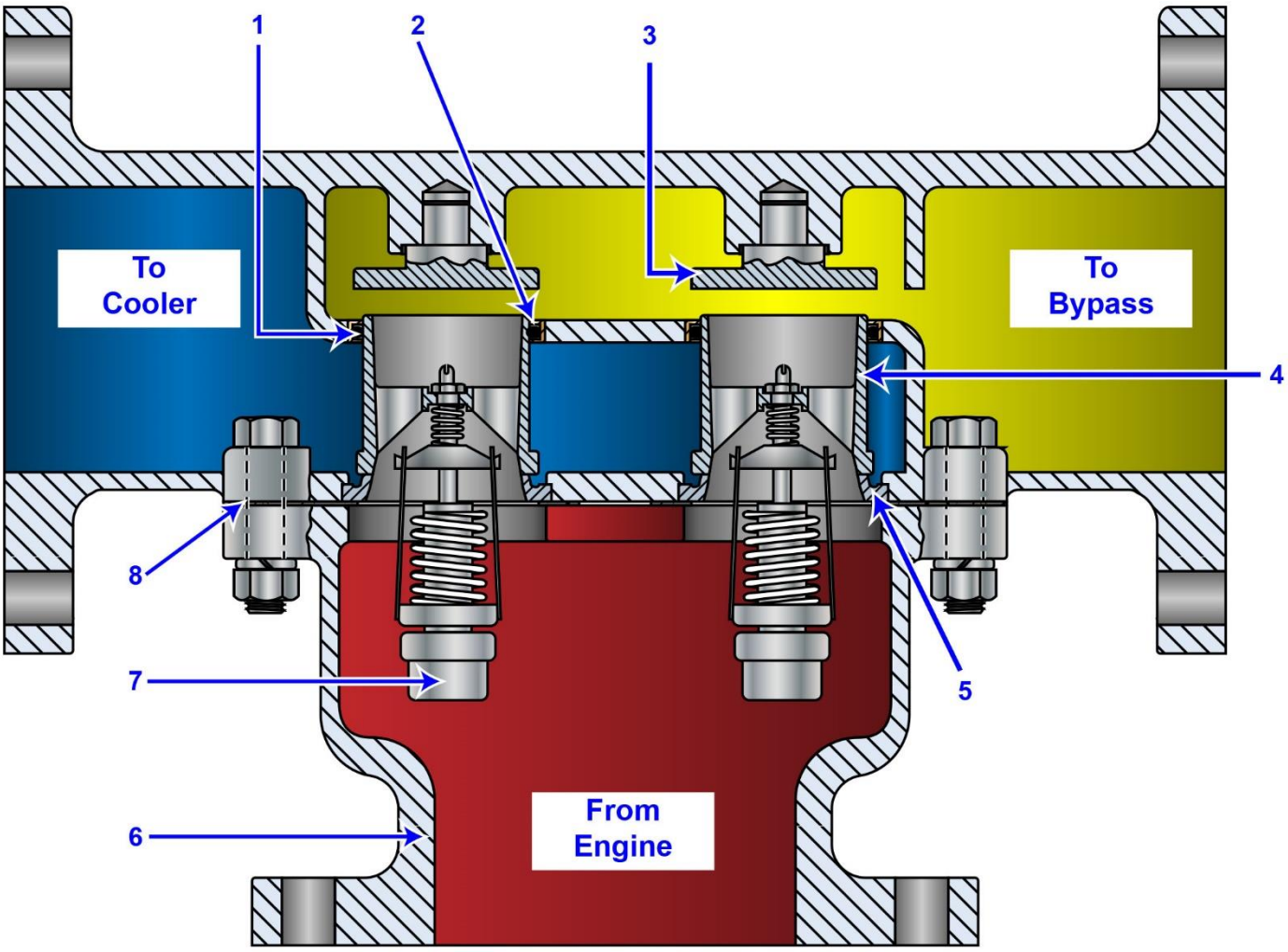

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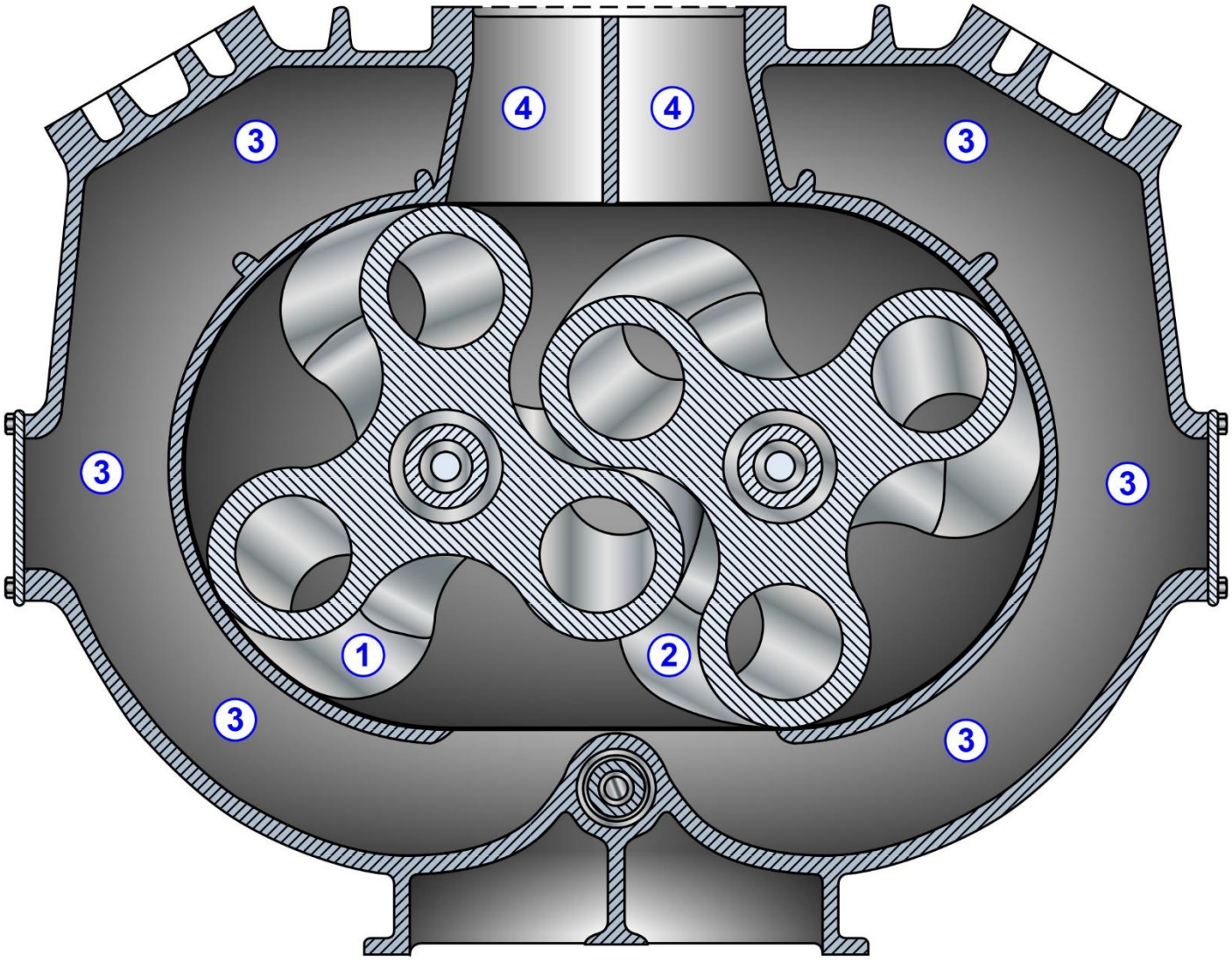

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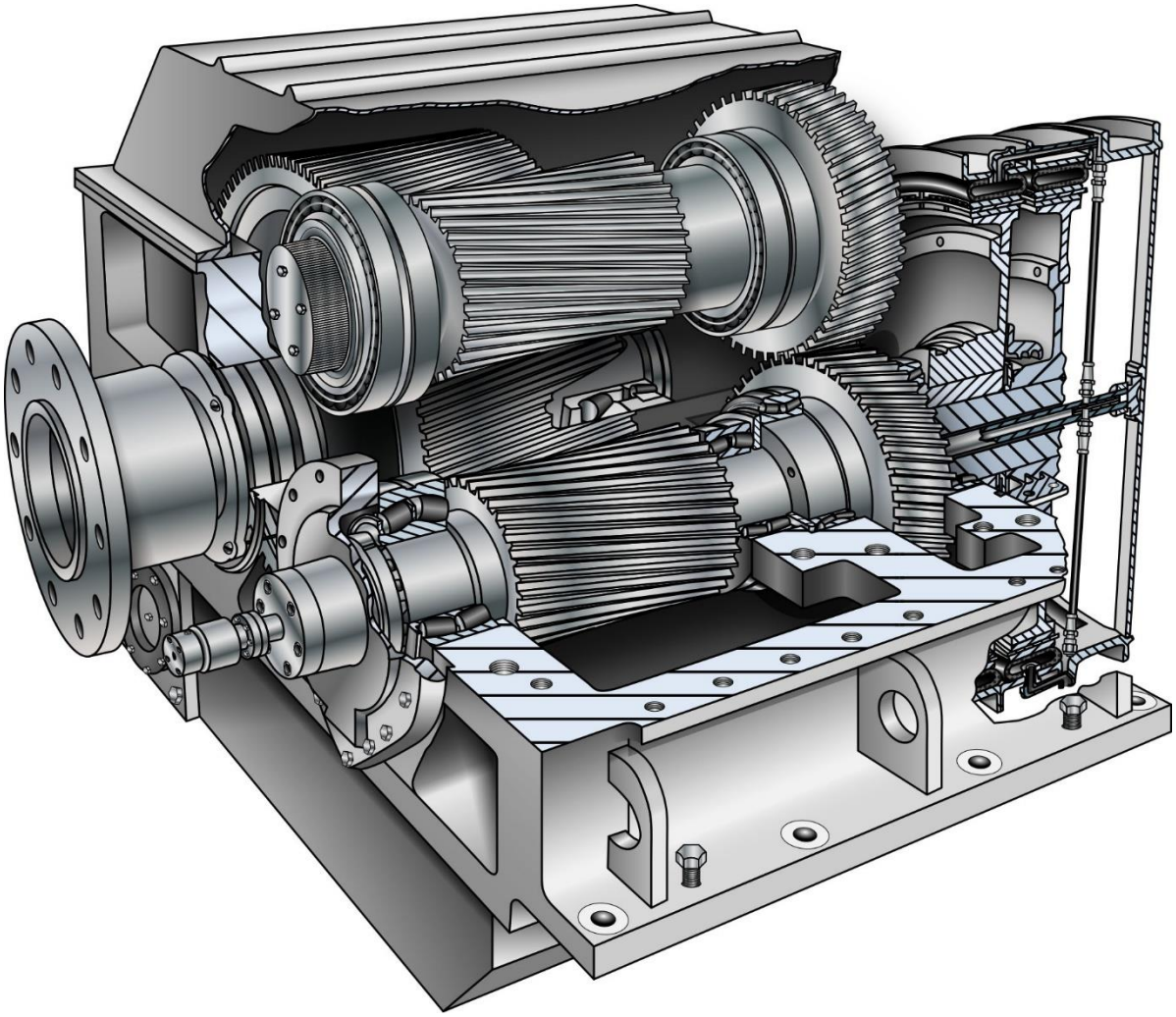

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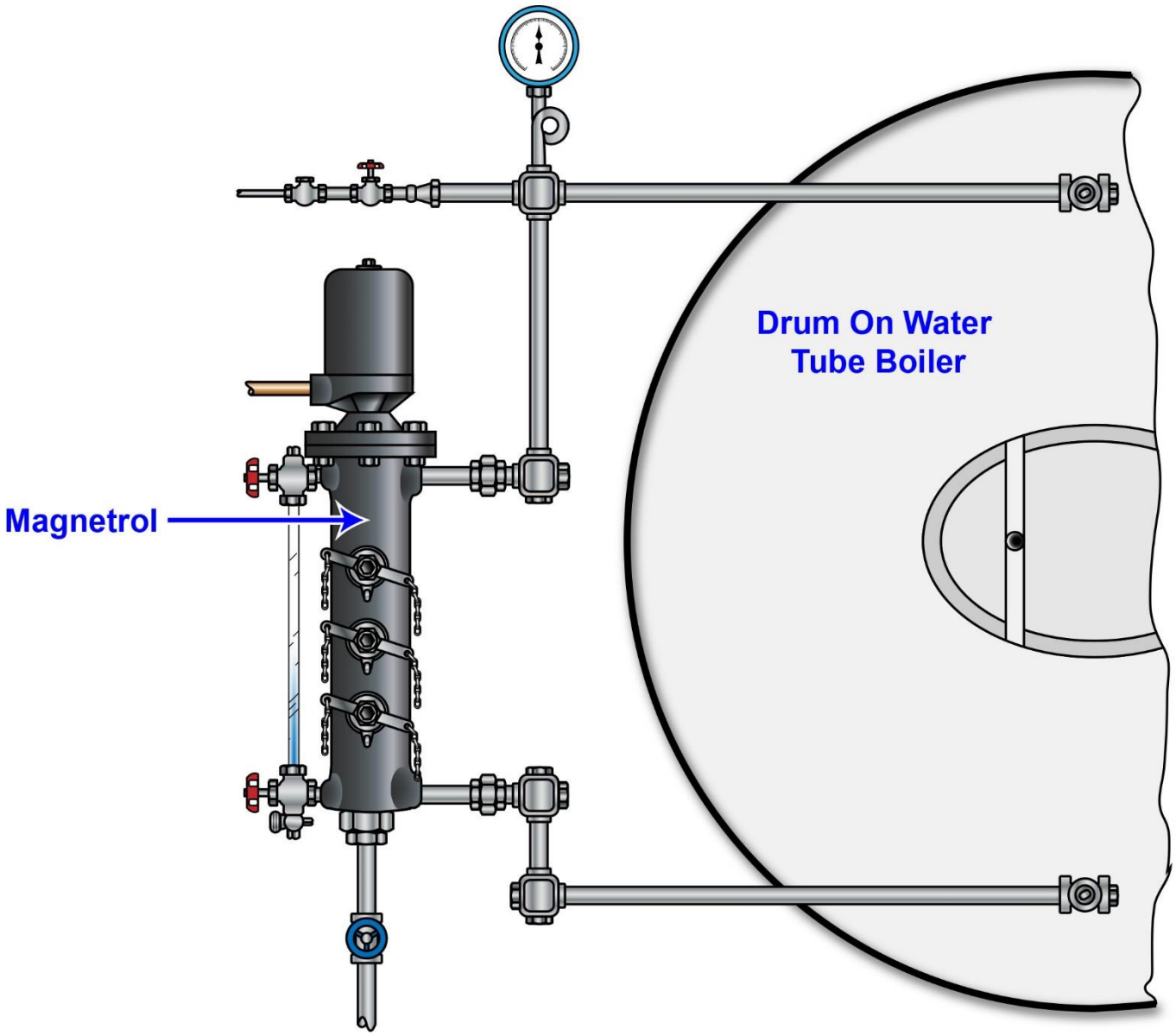
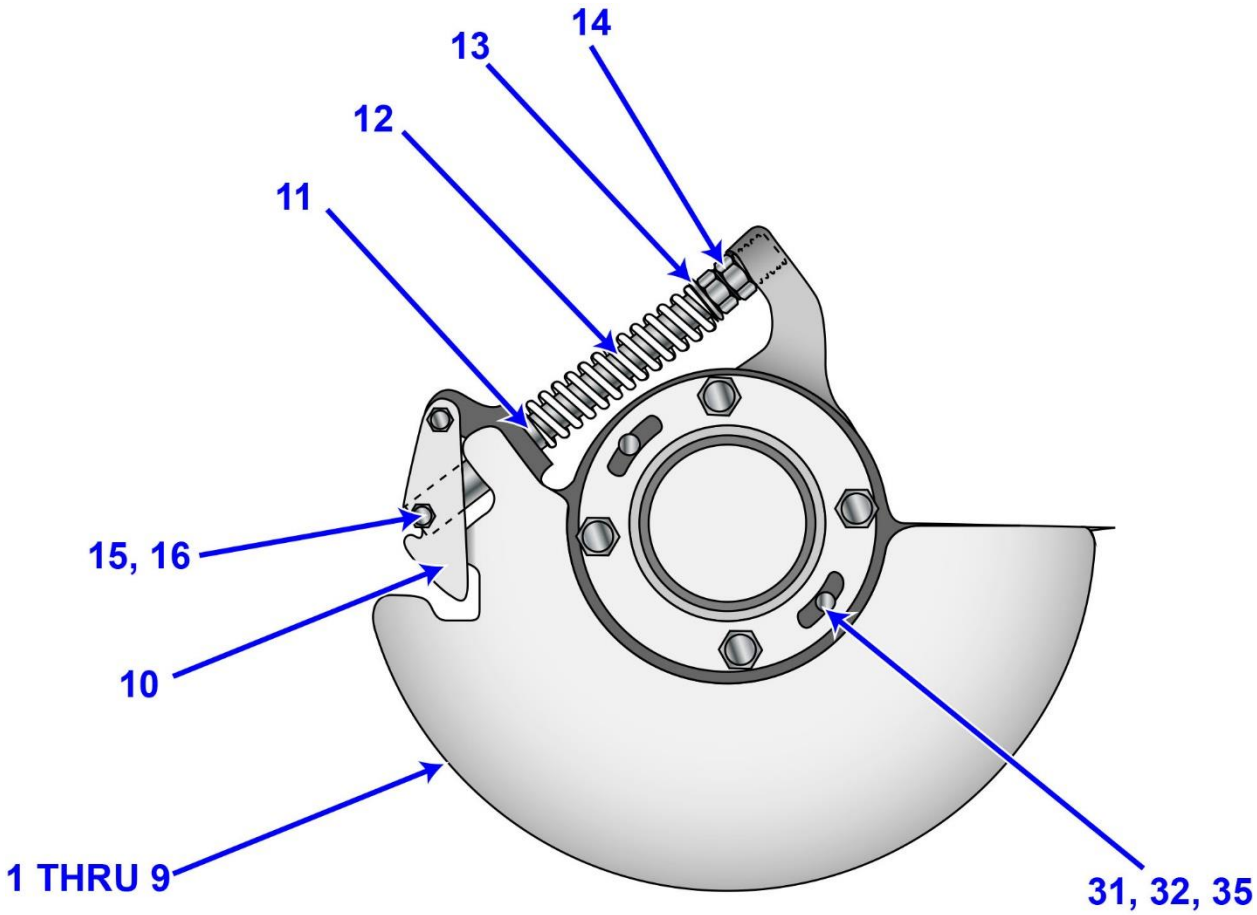


Adapted for testing purposes only from MAGNETROL, Installation, Maintenance, Operating Instructions for Models W126, W127, W251, W252, W291

MO-0101



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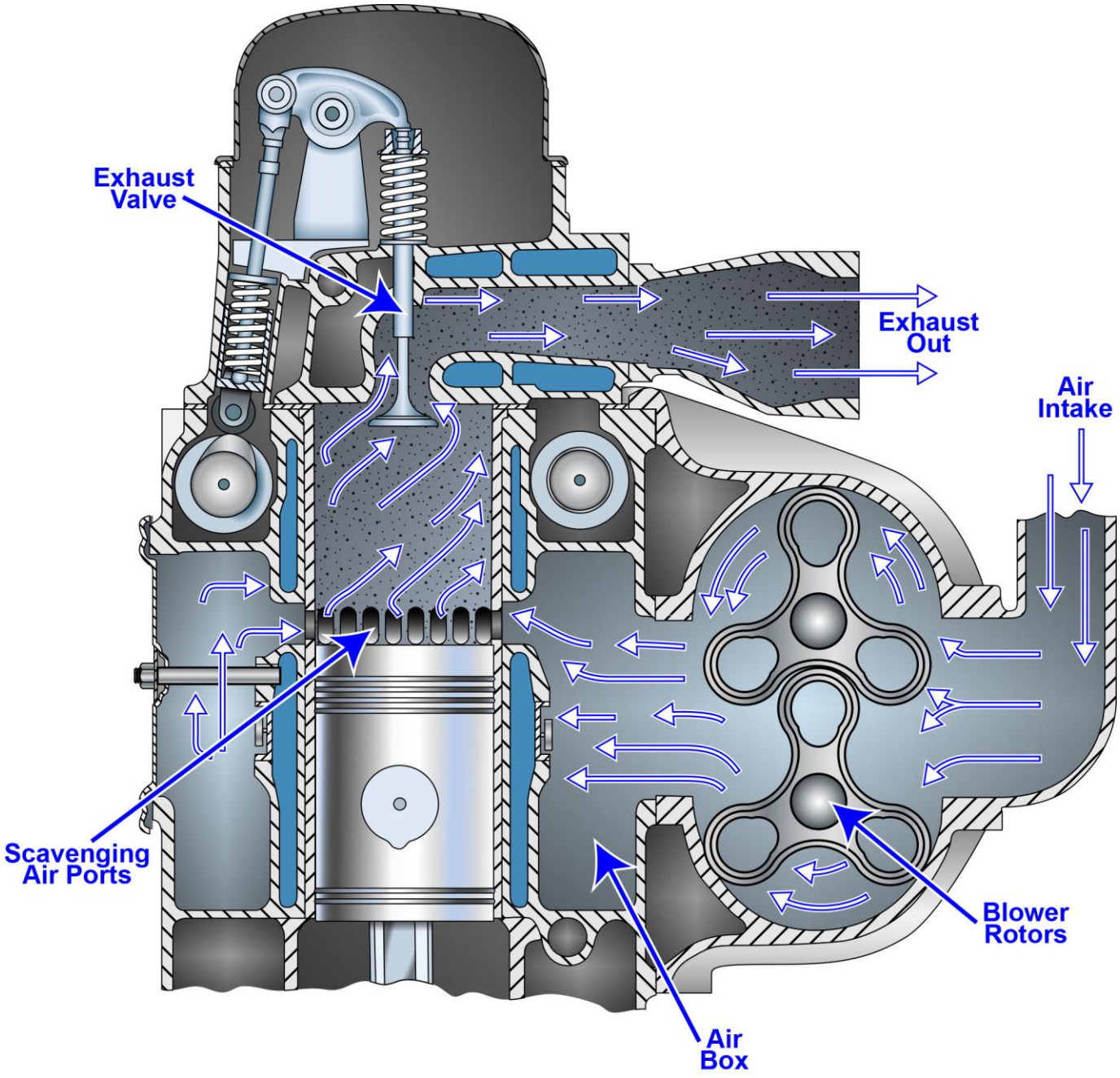
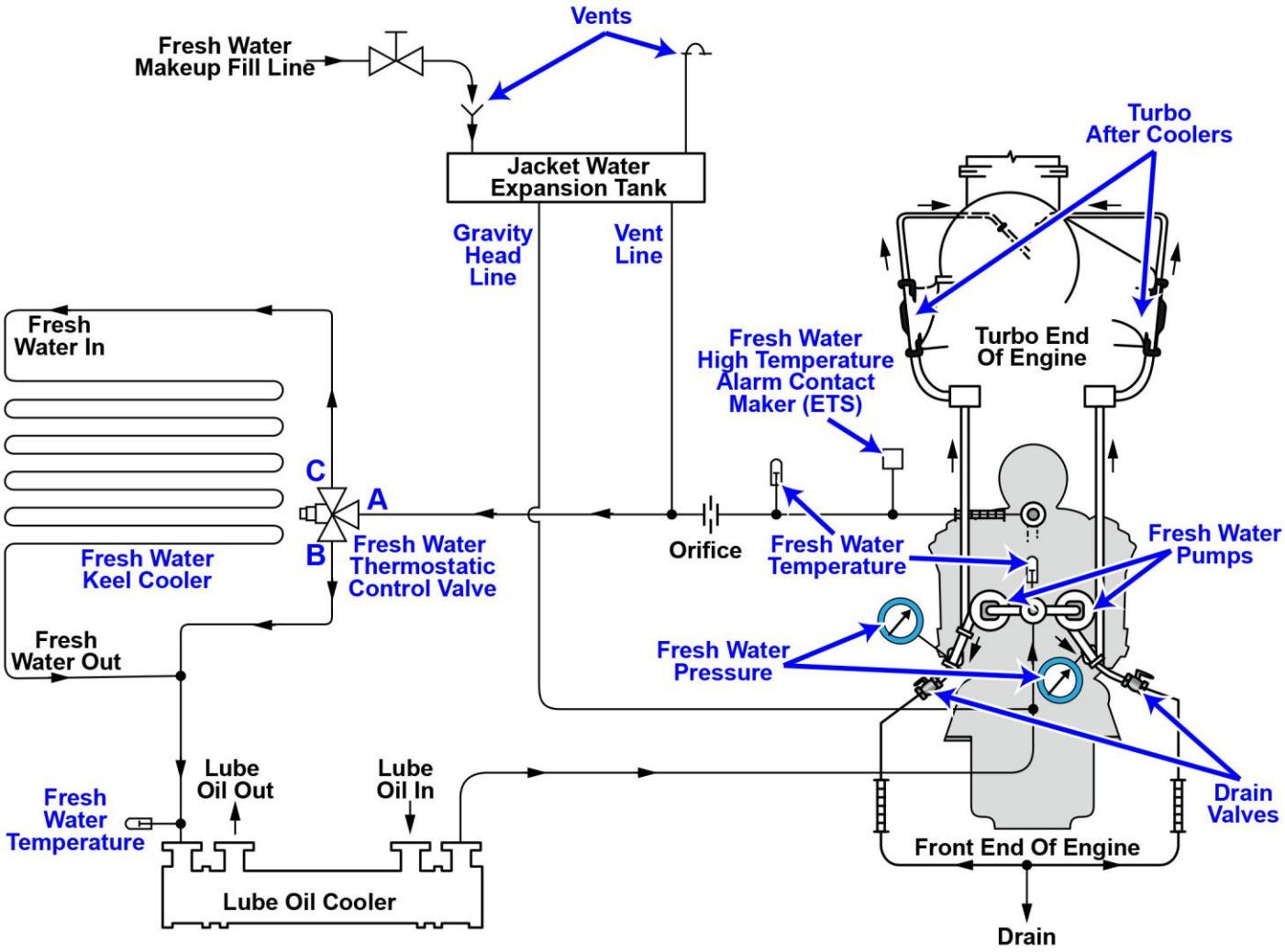
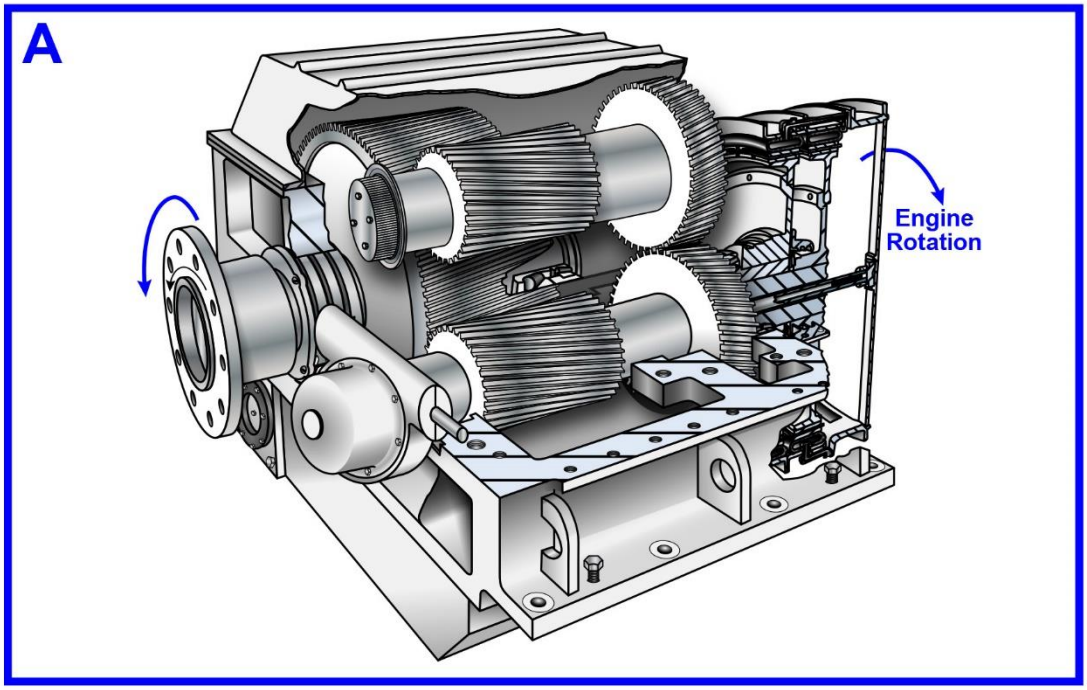
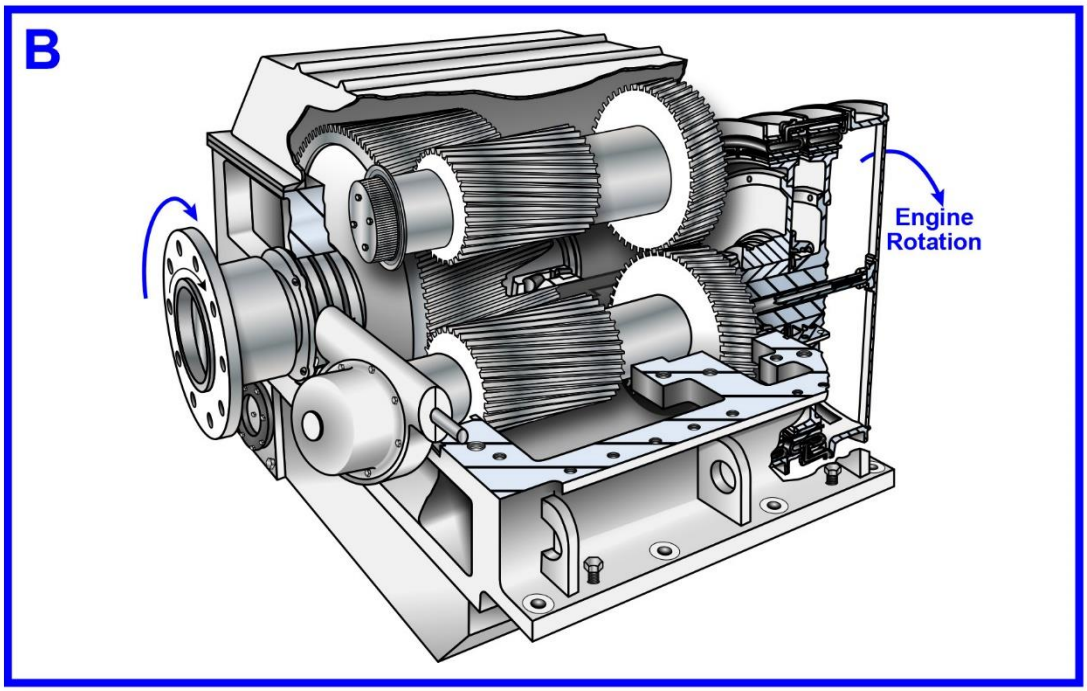


MO-0138
EMD Engine Fresh Water Cooling System with Keel Cooler

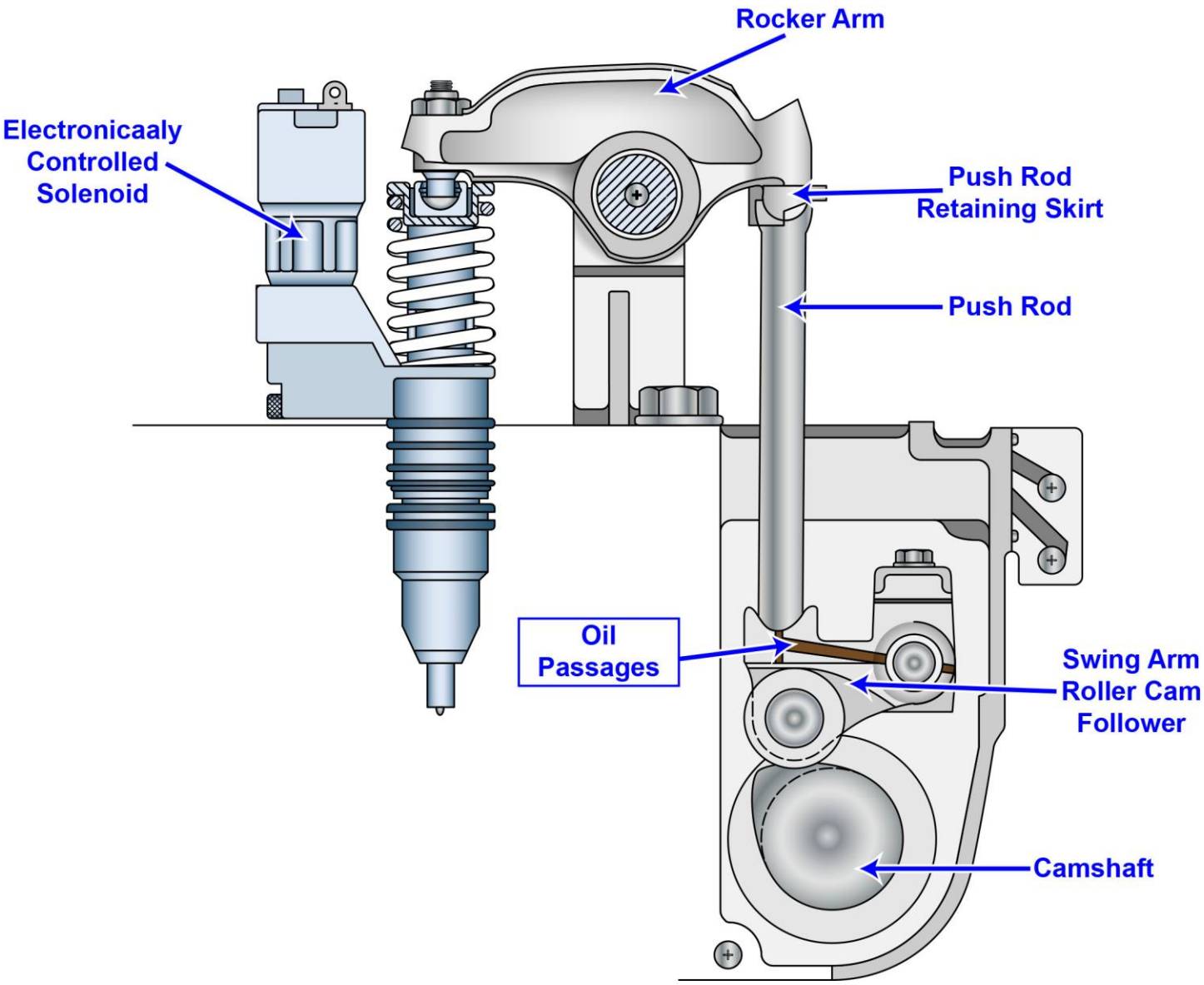


MO-0142
Reversing Reduction Gear Operation

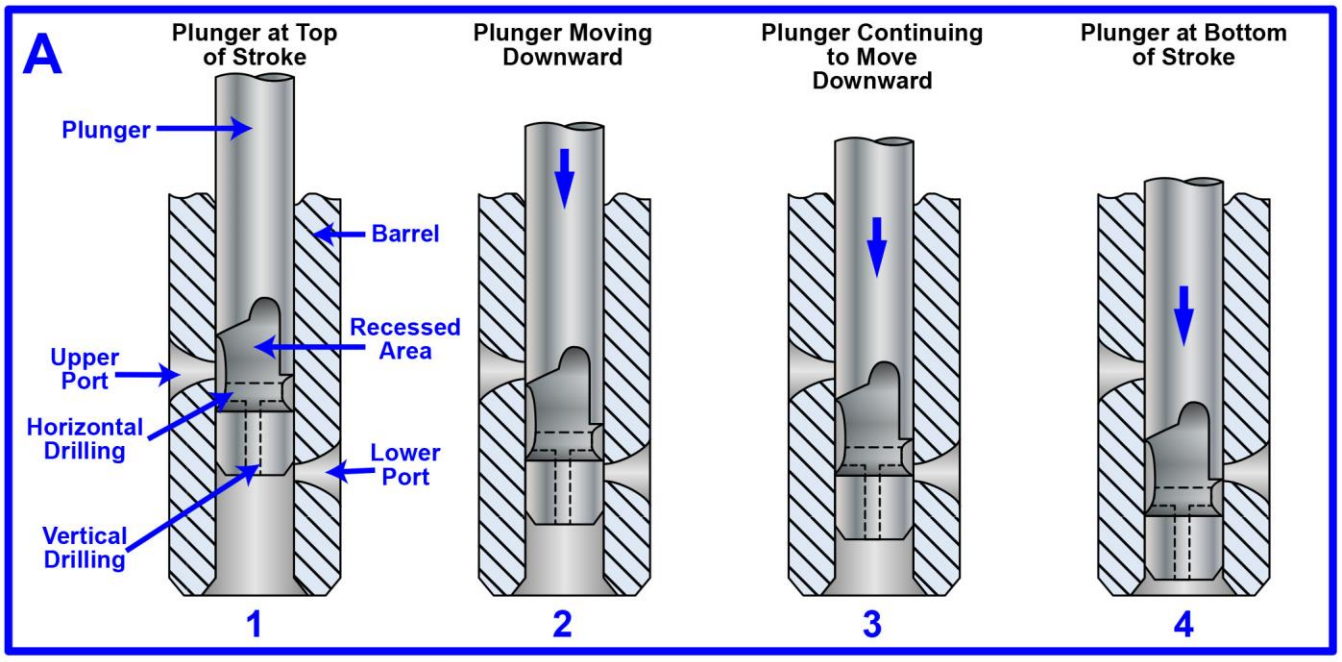




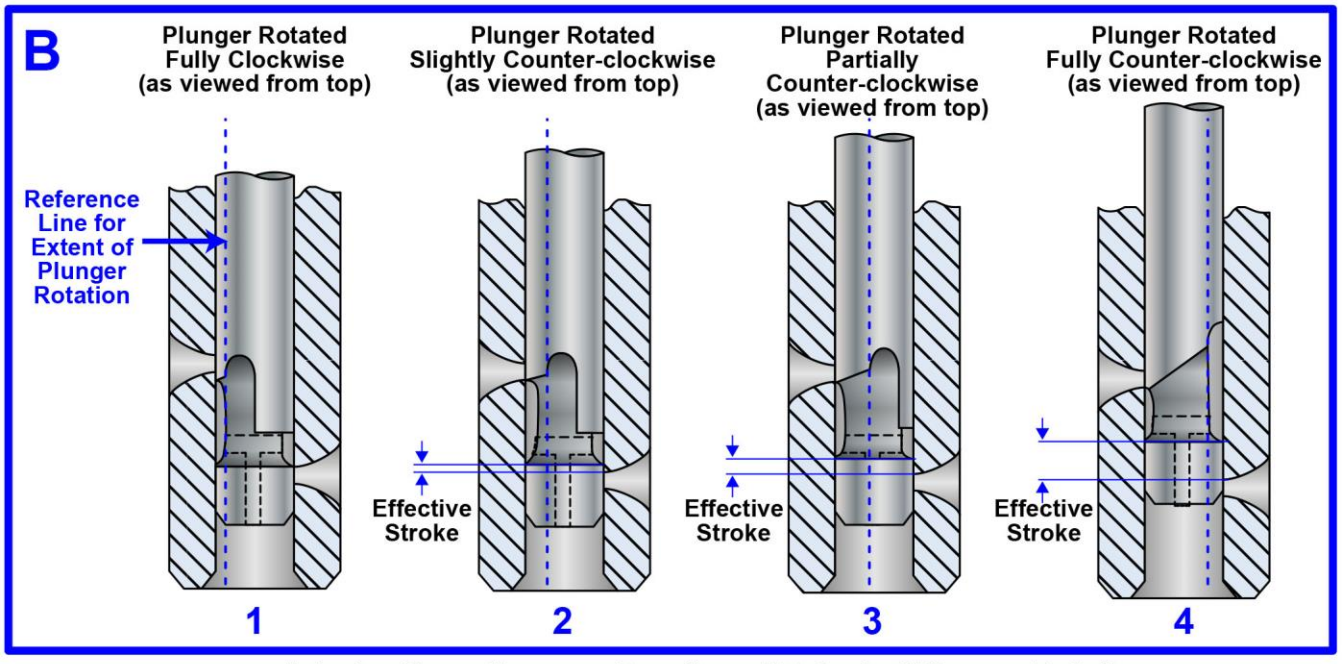
MO-0143
Detroit Diesel 60 Series Engine
Unit Injector Arrangements



MO-0144
Detroit Diesel 71 Series Engine Unit Injector

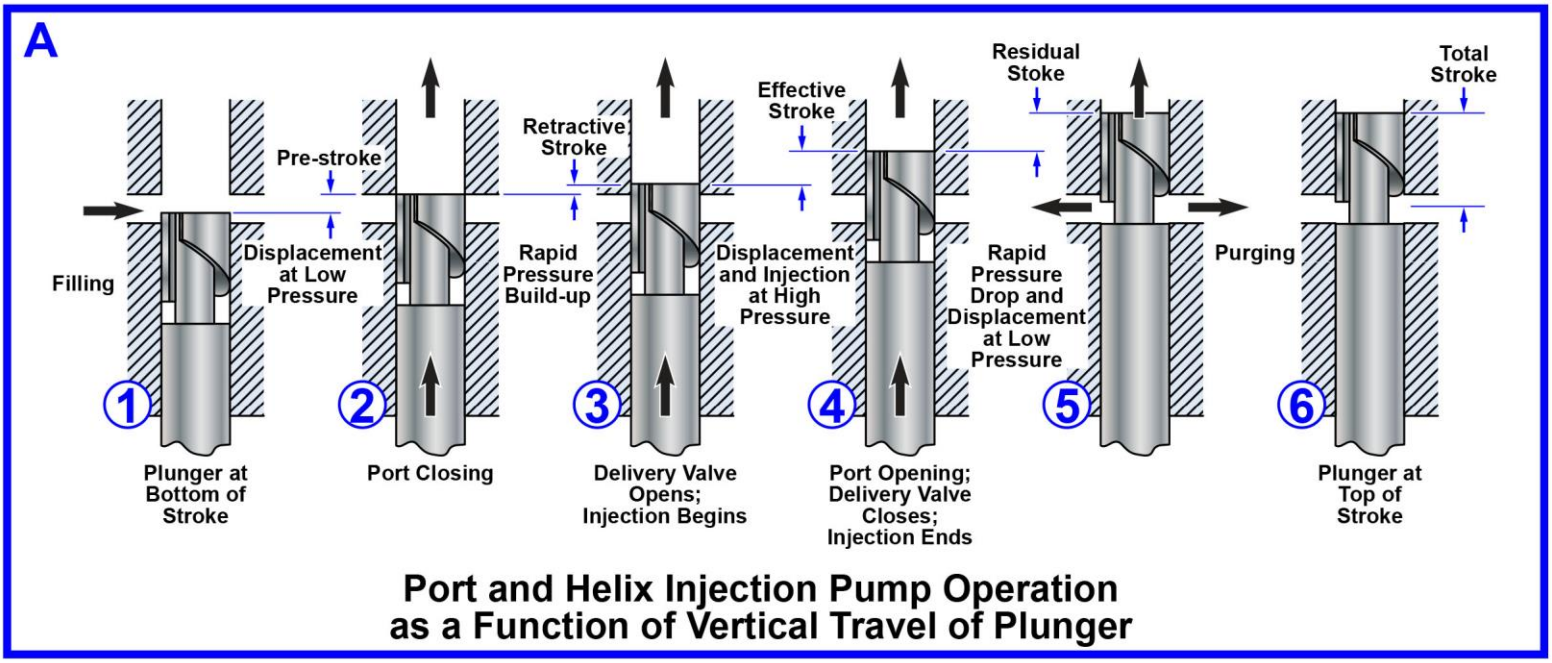


Injector Operation as a Function of Vertical Plunger Travel

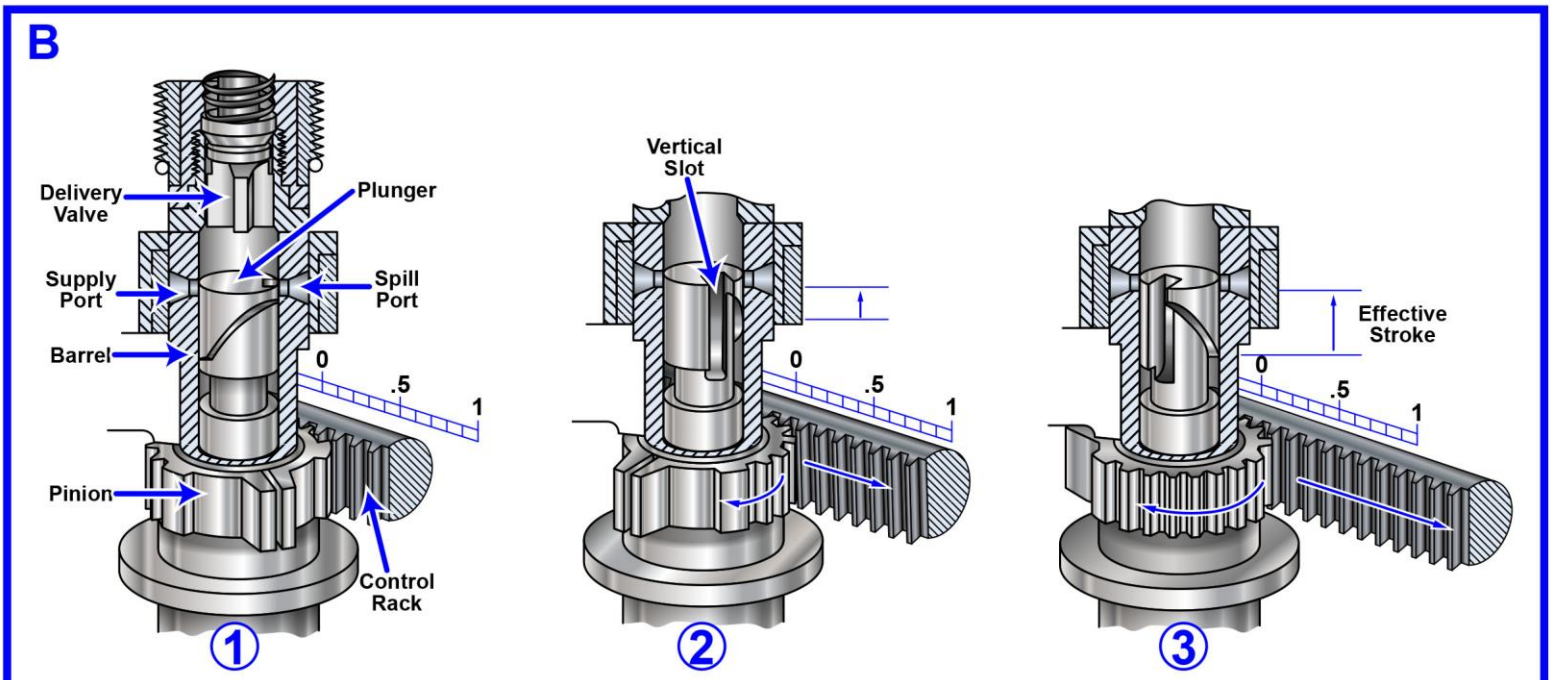


Injector Operation as a Function of Extent of Plunger Rotation

MO-0145
Plunger Type Fuel Injection Pump with Port and Helix Metering

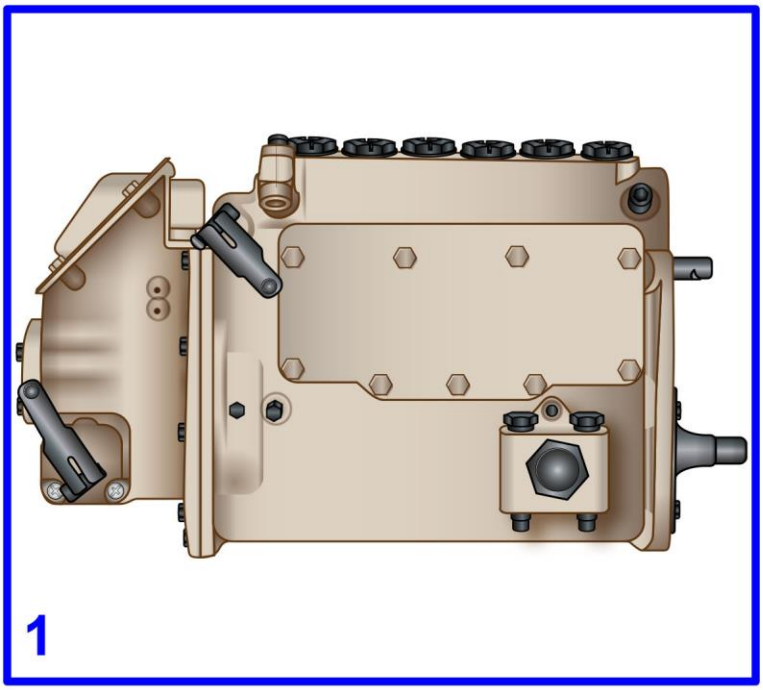


Port and Helix Injection Pump Operation as a Function of Vertical Travel of Plunger



Port and Helix Injection Pump Metering as a Function of Extent of Plunger Rotation

MO-0149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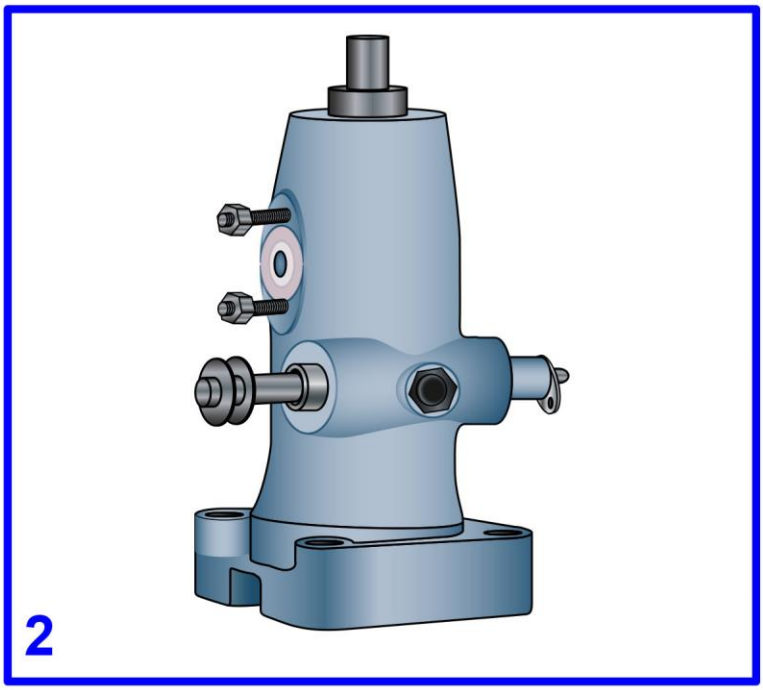
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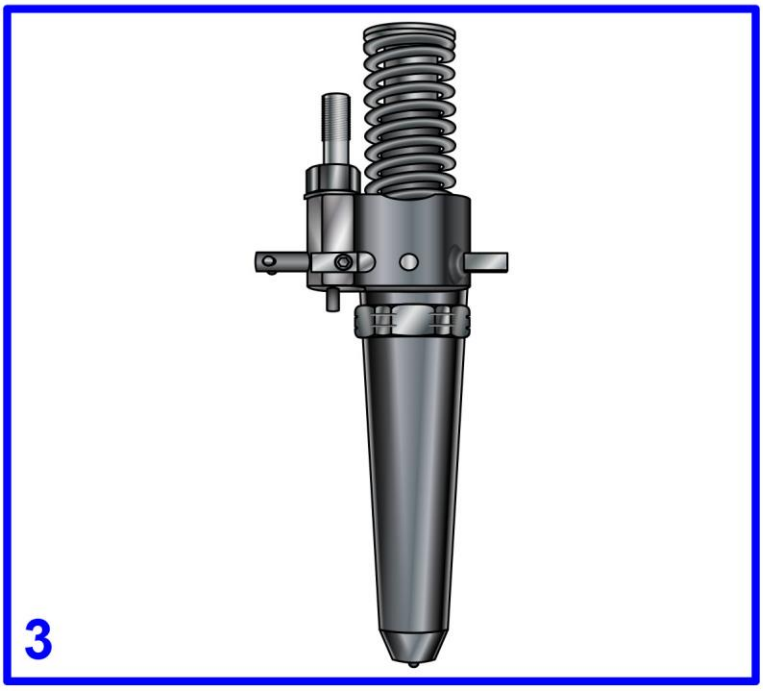
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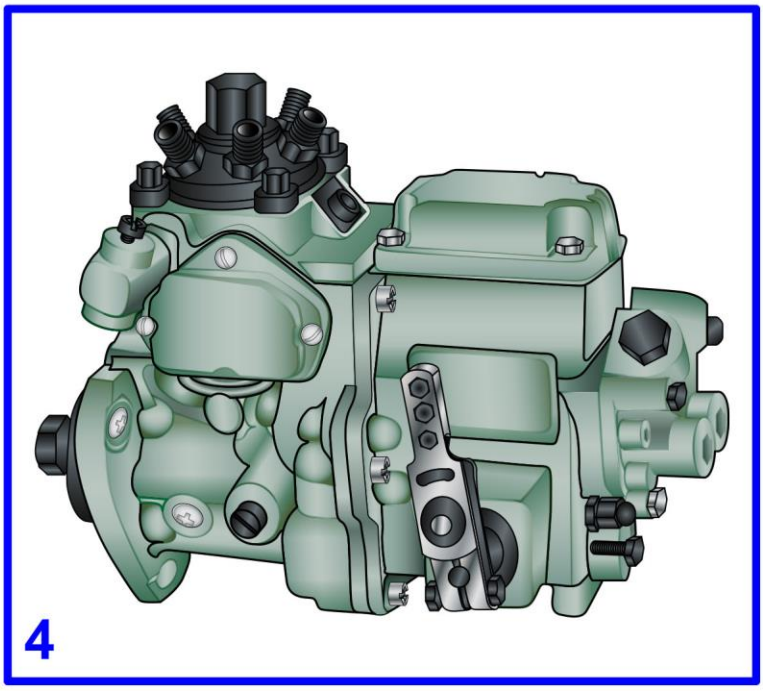
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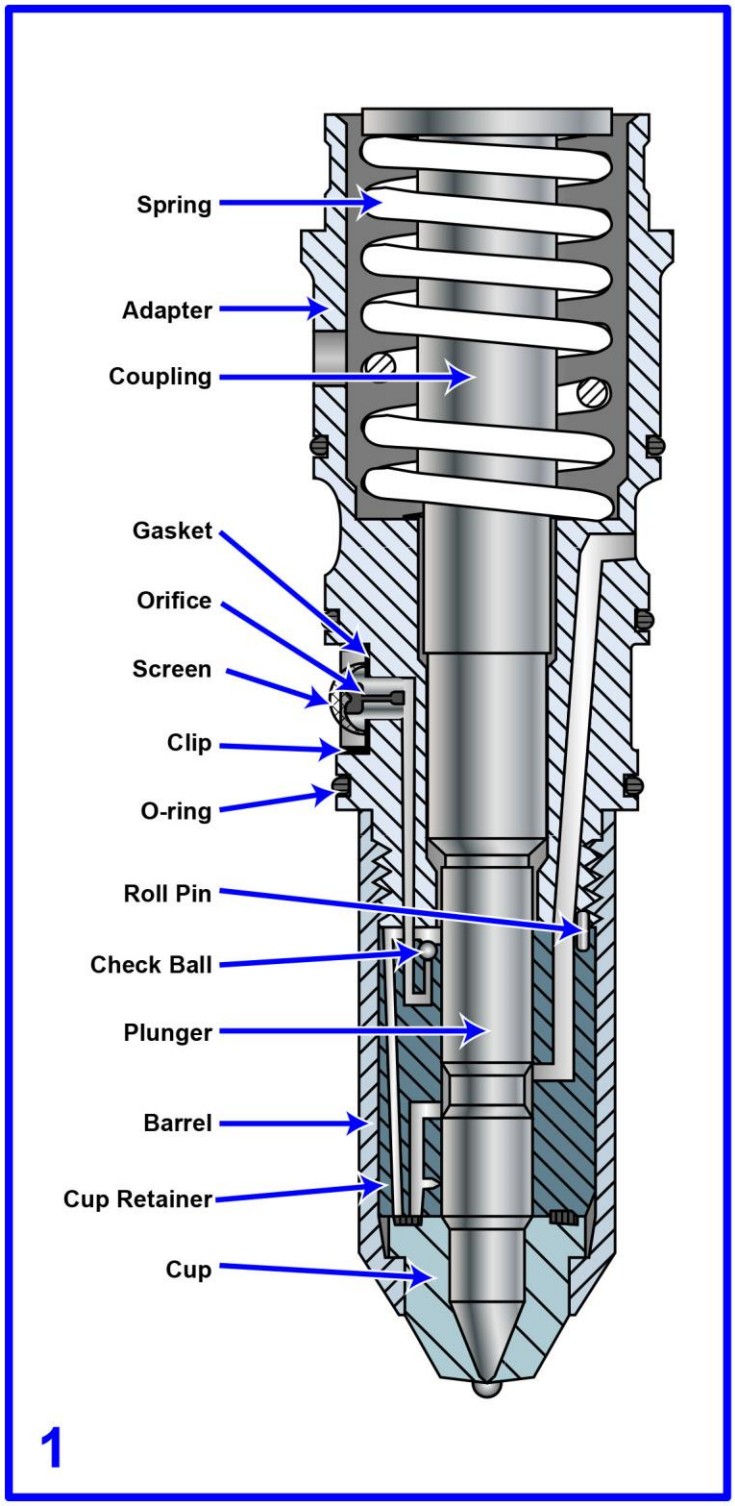


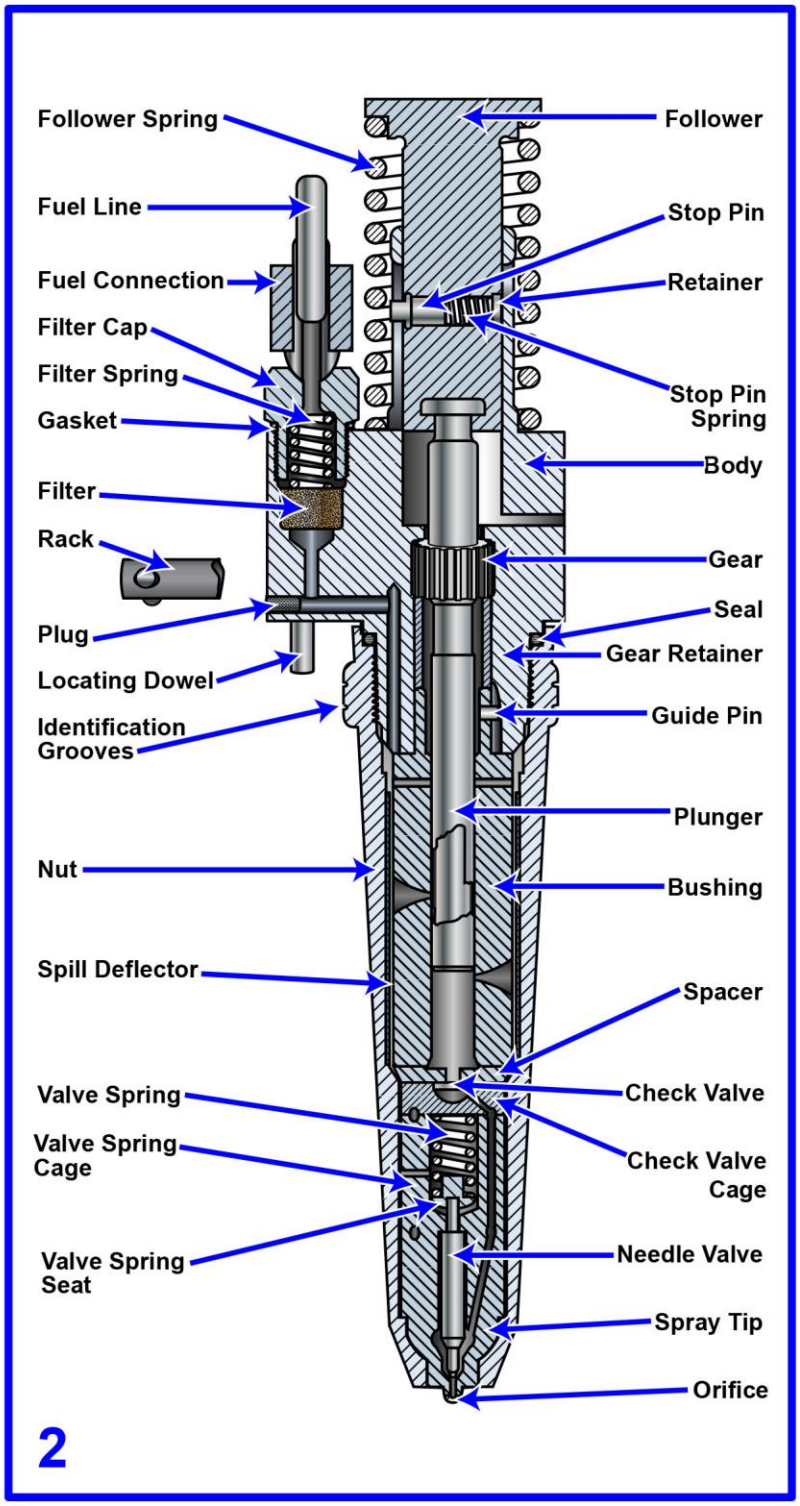
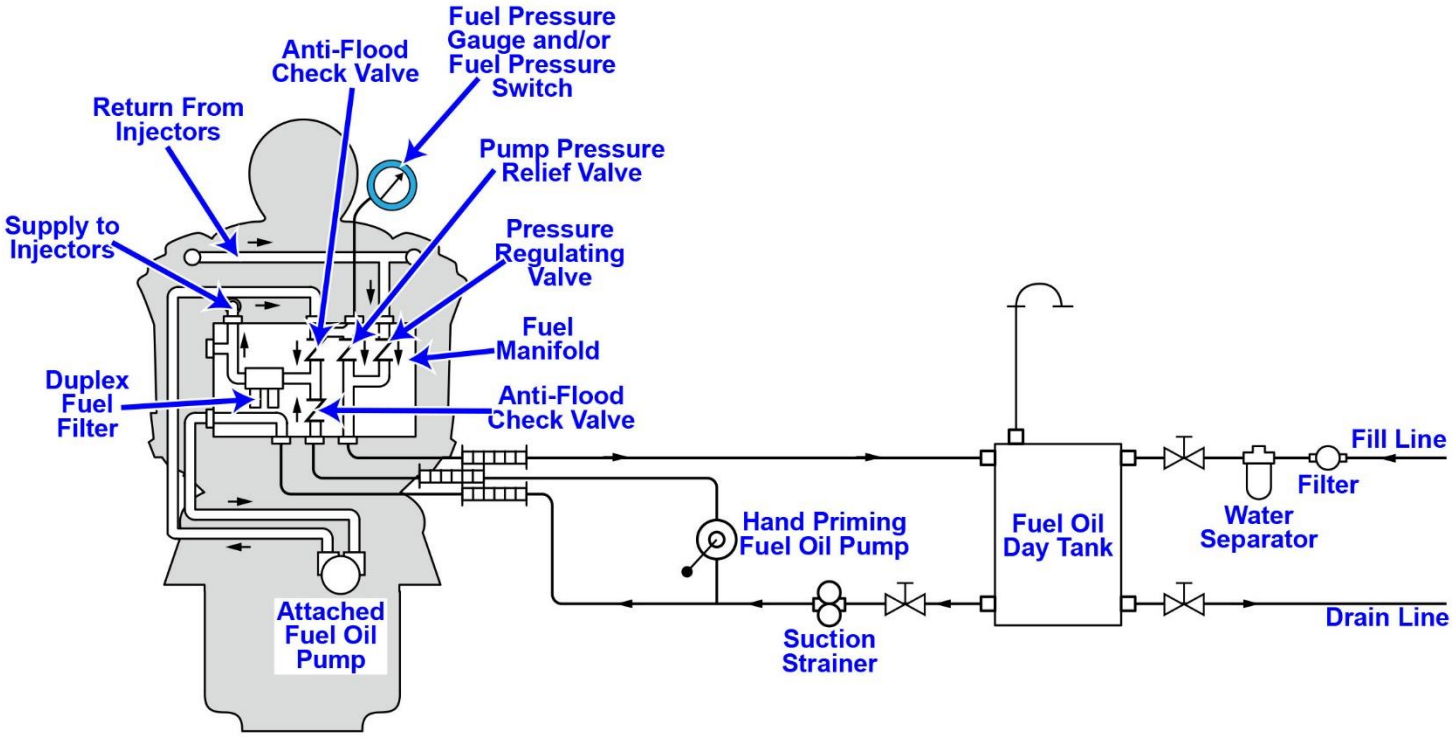


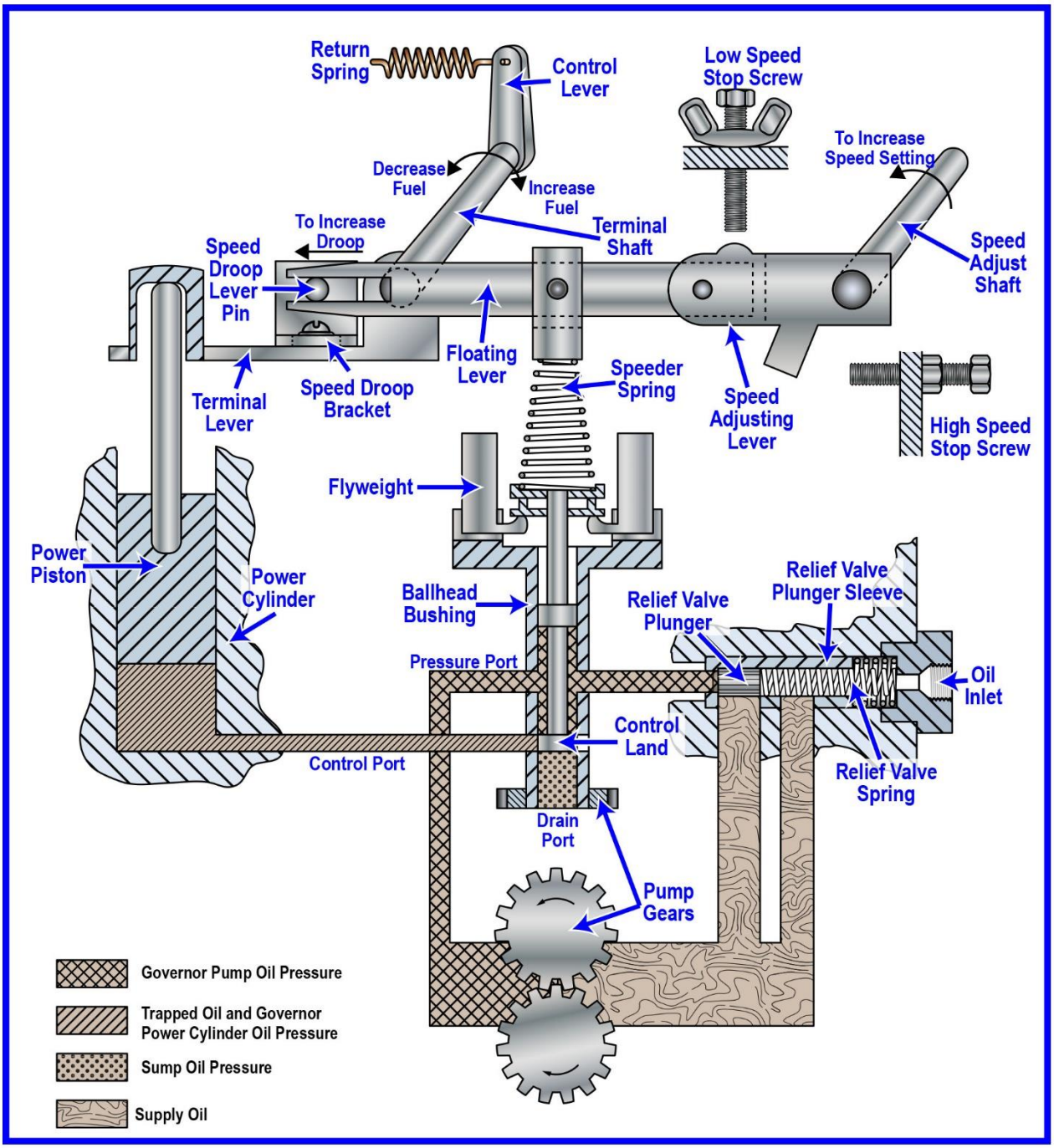
Figure 1: Adapted for testing purposes only from NORMAN, Diesel Technology: Fundamentals, Service, Repair

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

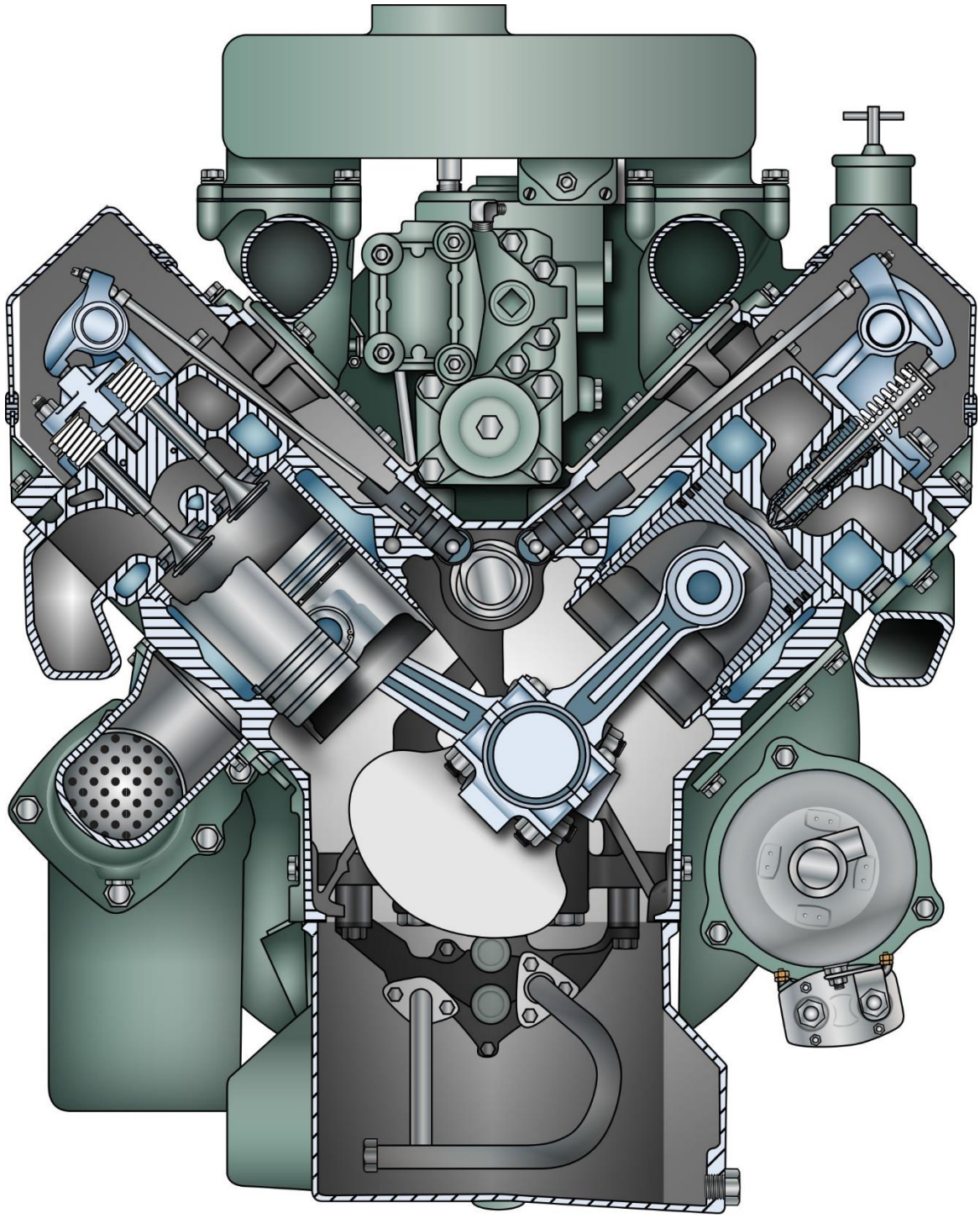
MO-0152



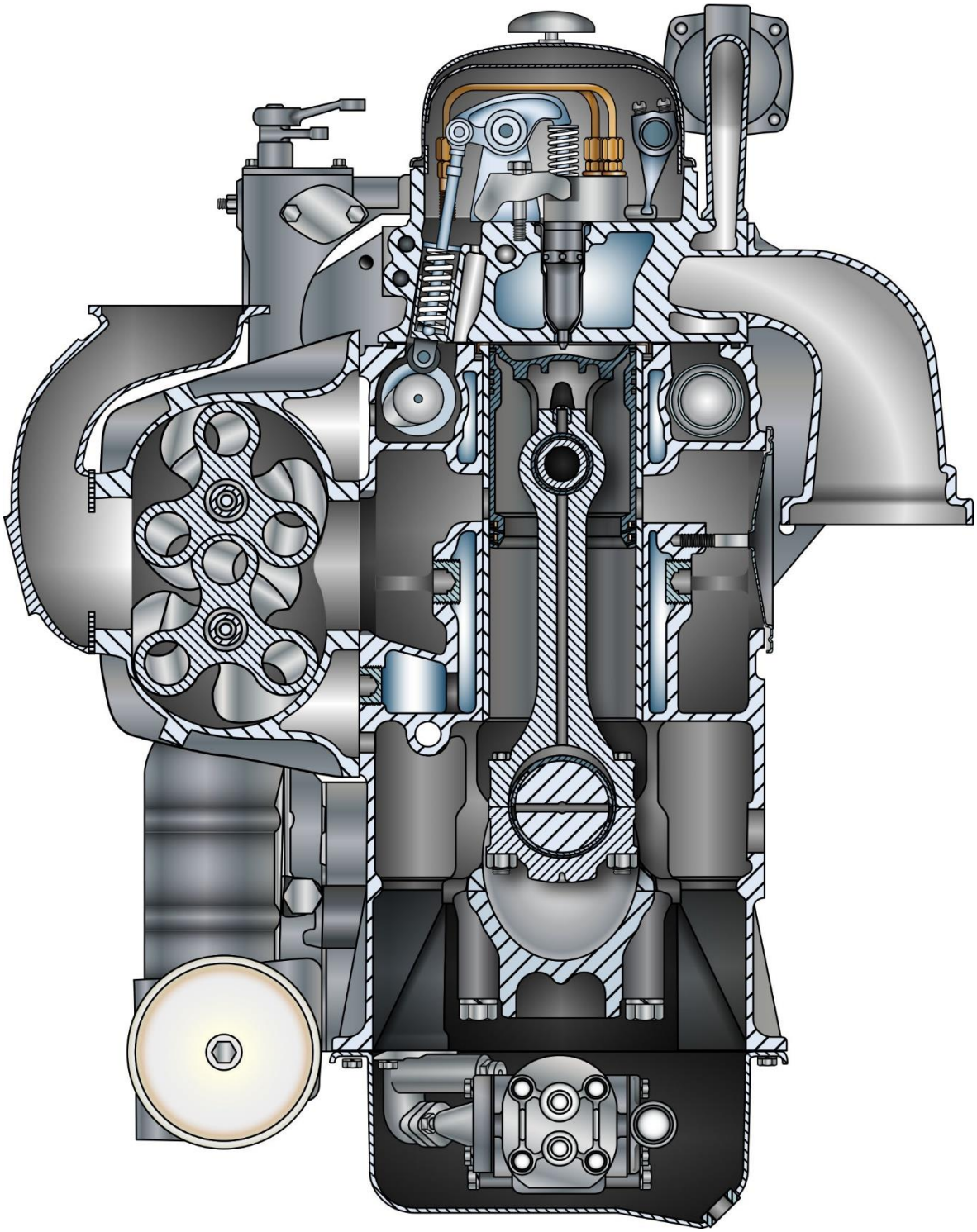
MO-0157
Woodward Type SG Governor



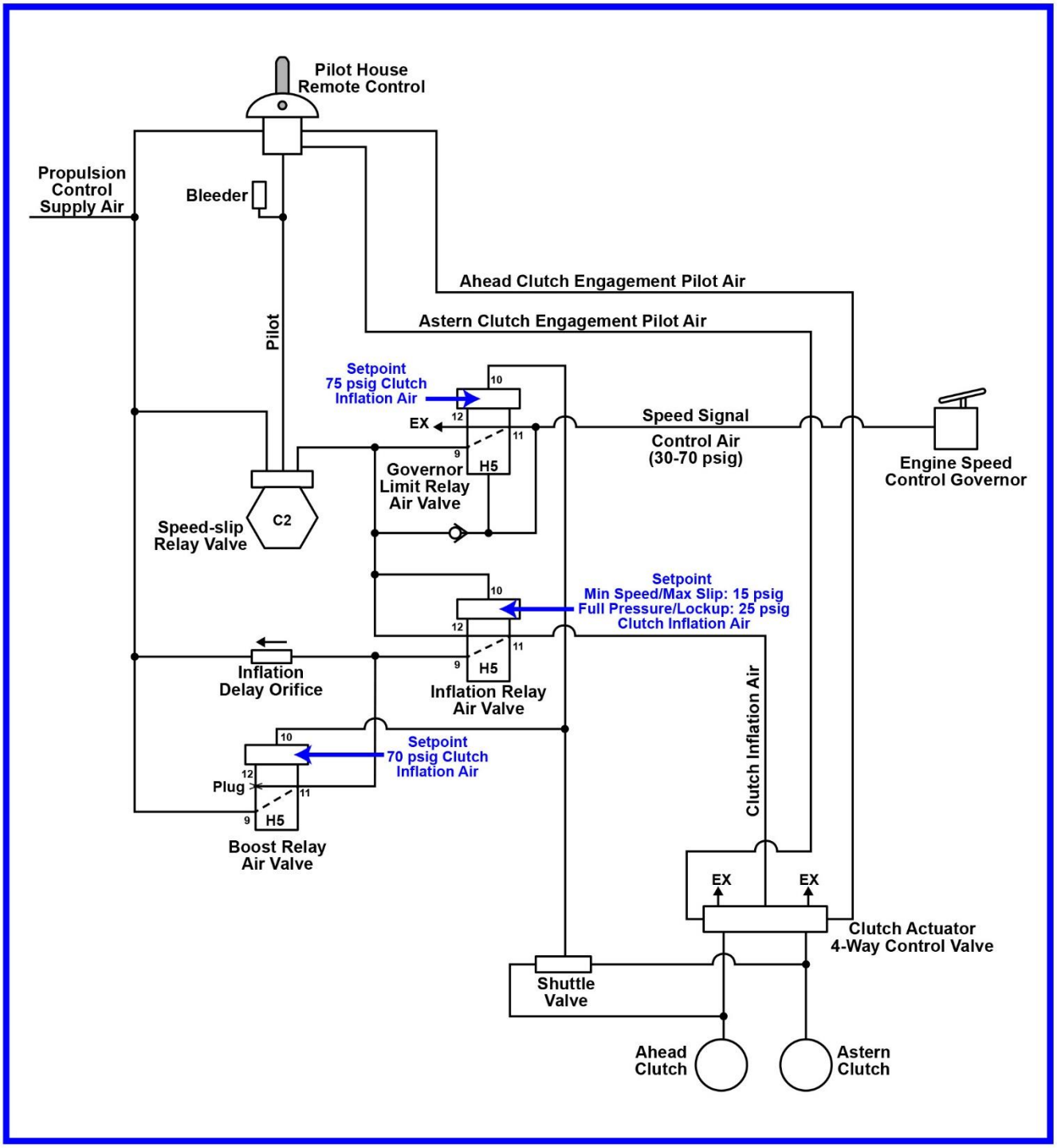
MO-0163



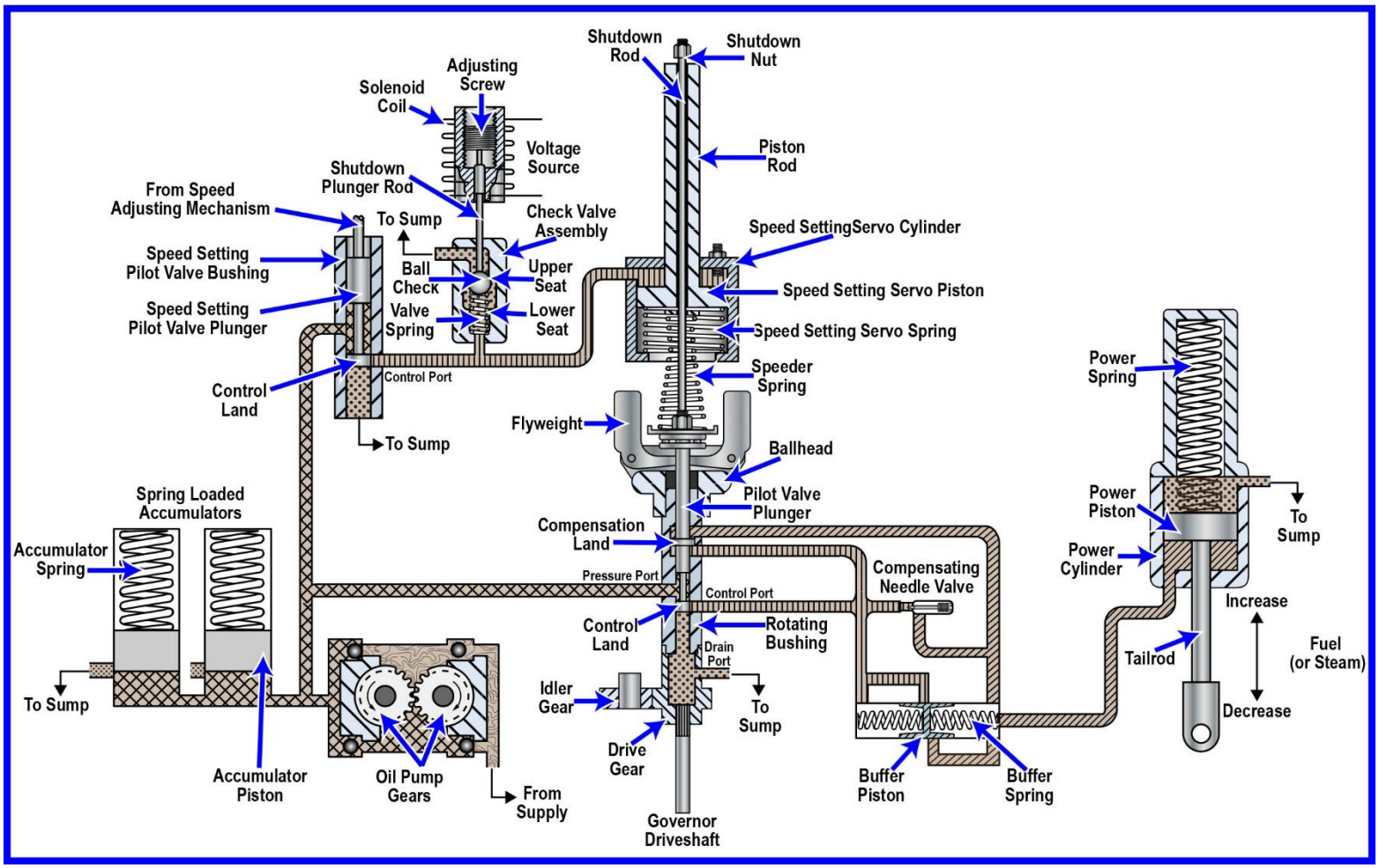
MO-0165



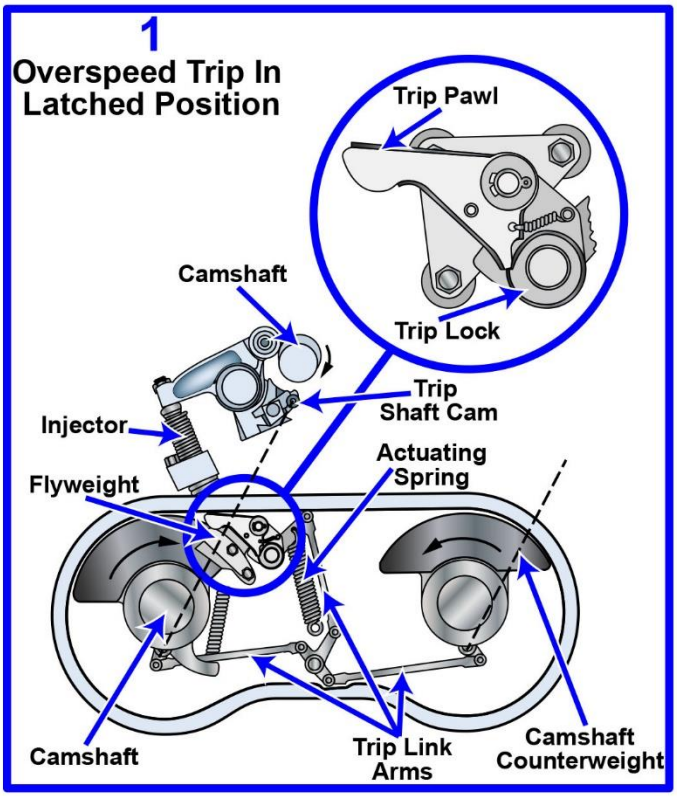
MO-0167
Pneumatic Propulsion Control System with Single Lever Pilot House Control

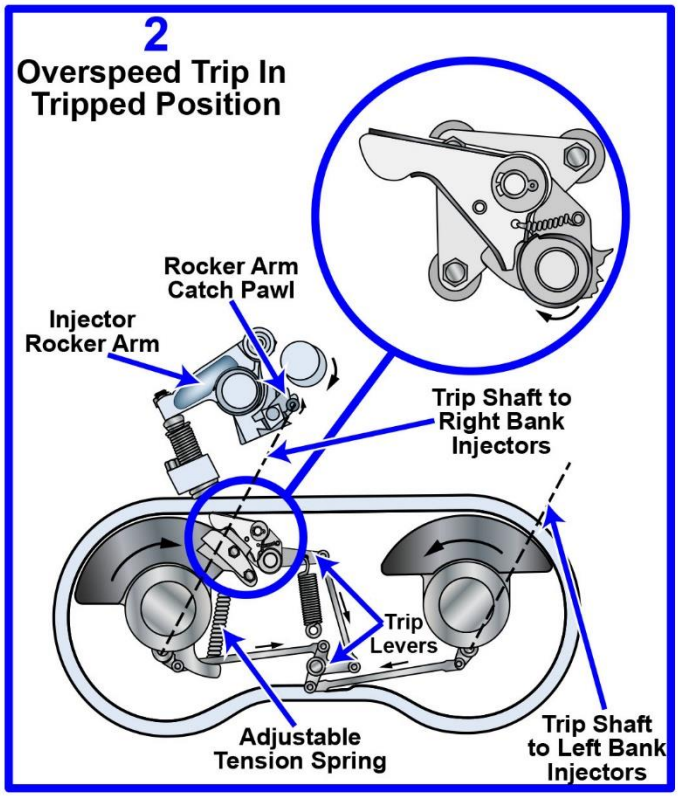


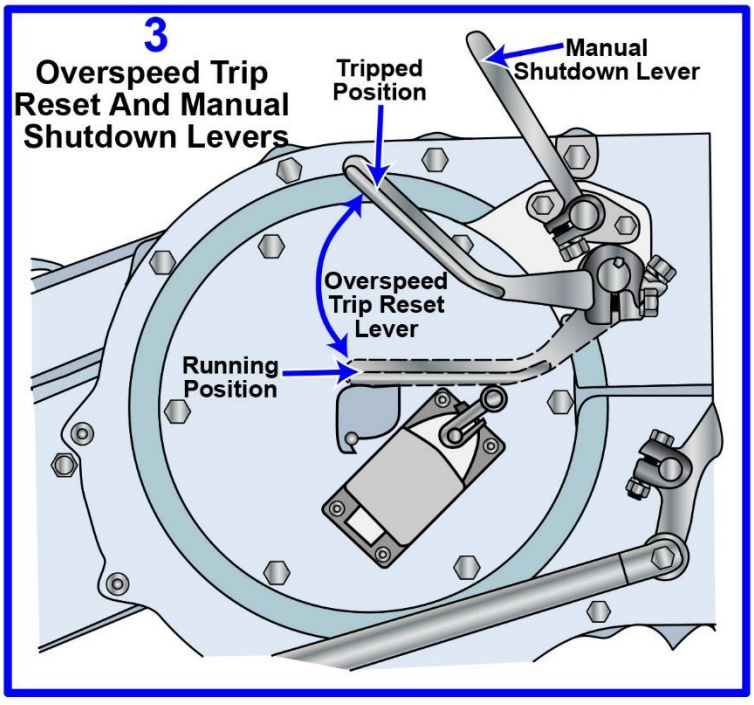
MO-0170
Woodward PG Governor with Shutdown Solenoid Assembly



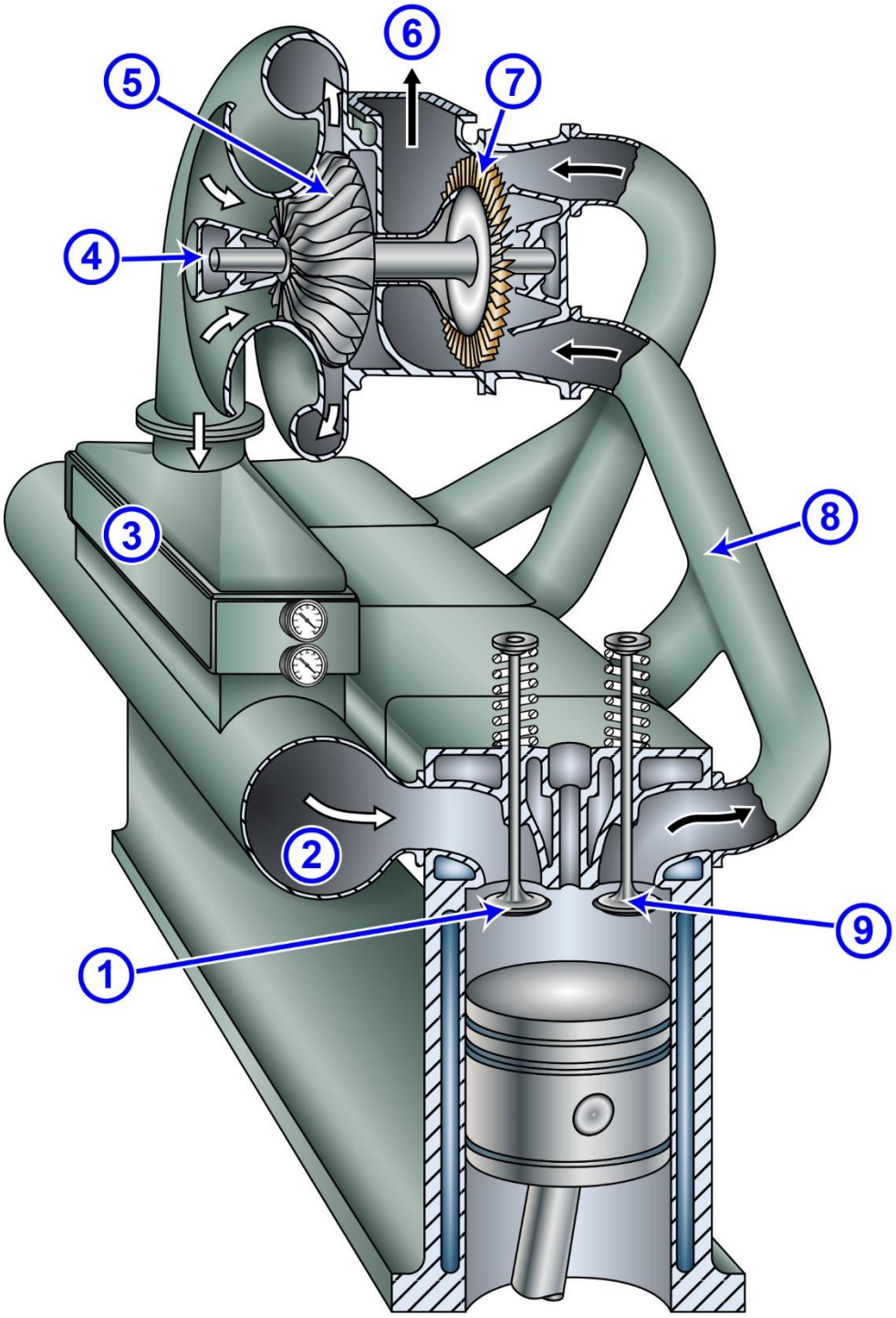
MO-0171
EMD 645 Overspeed and Manual Trips



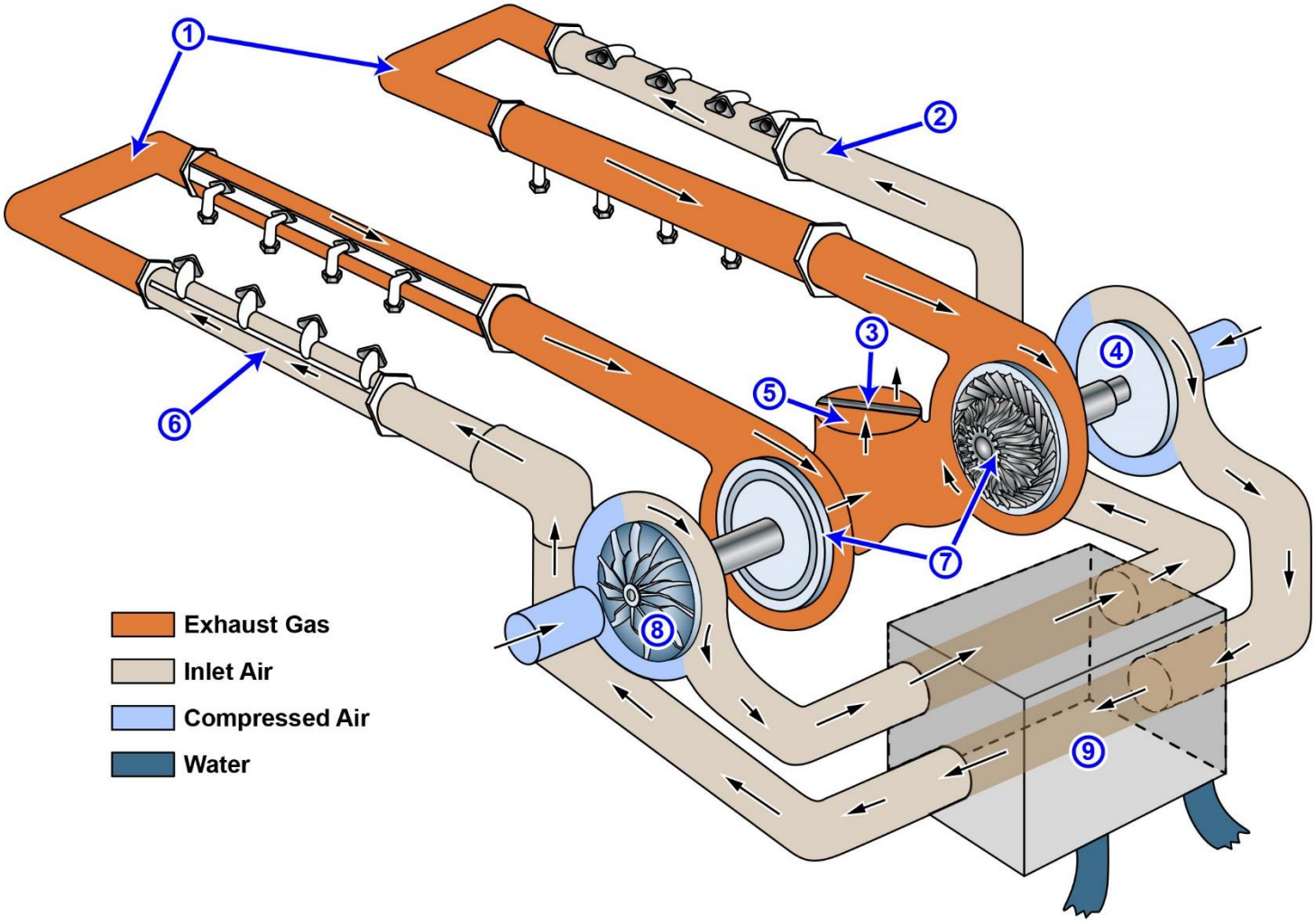




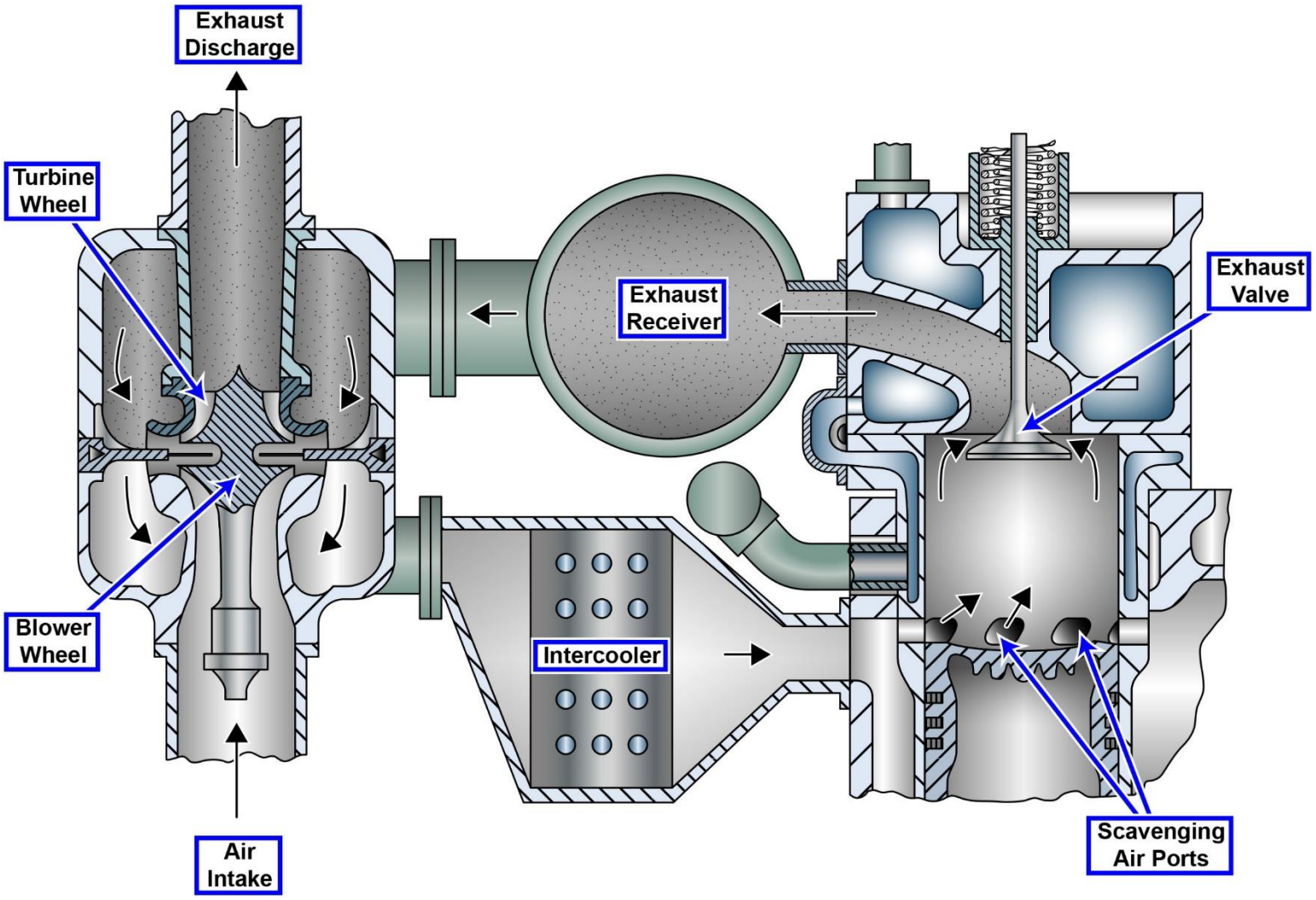
MO-0176



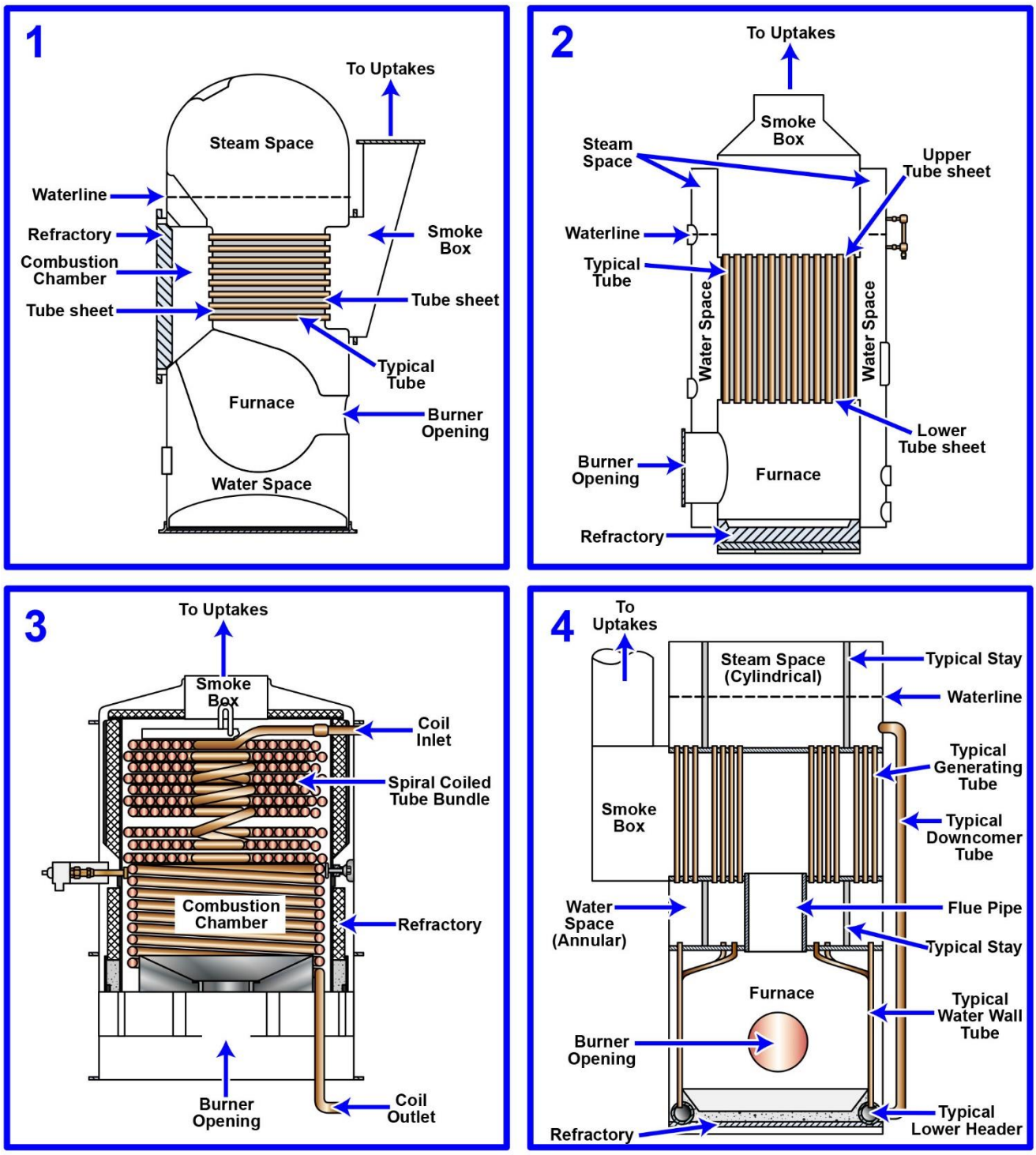
MO-0177



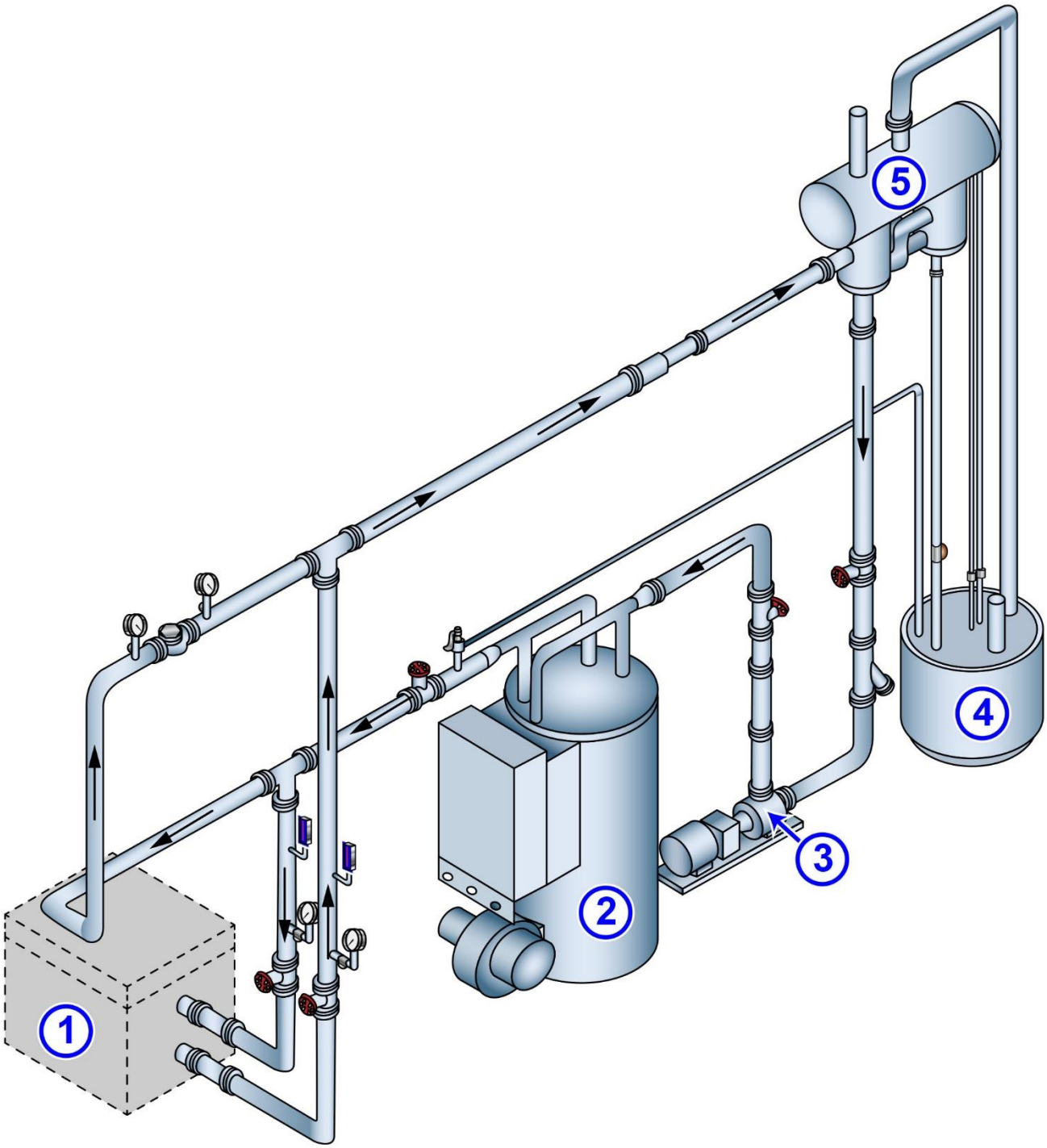
MO-0180



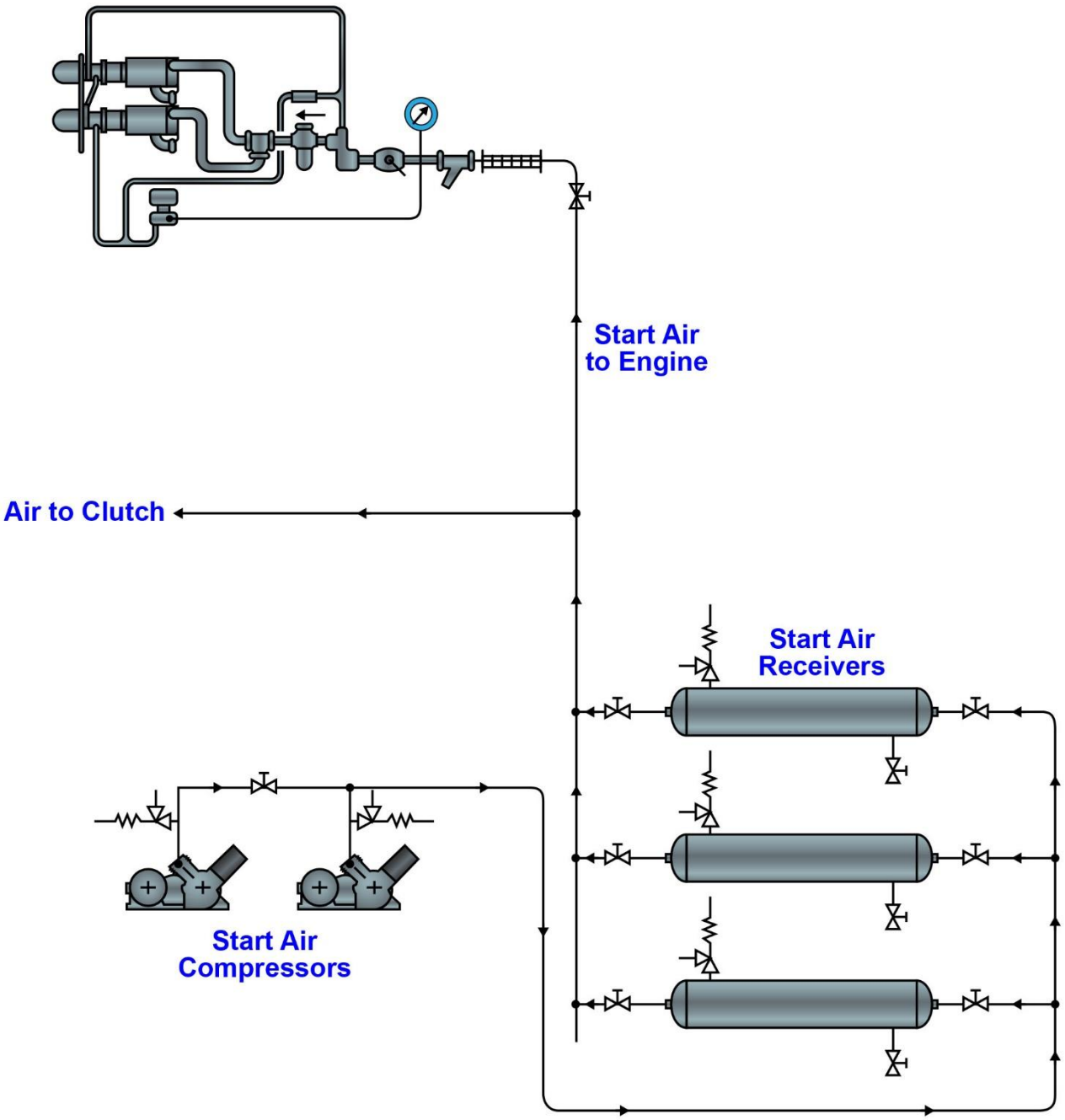
MO-0197



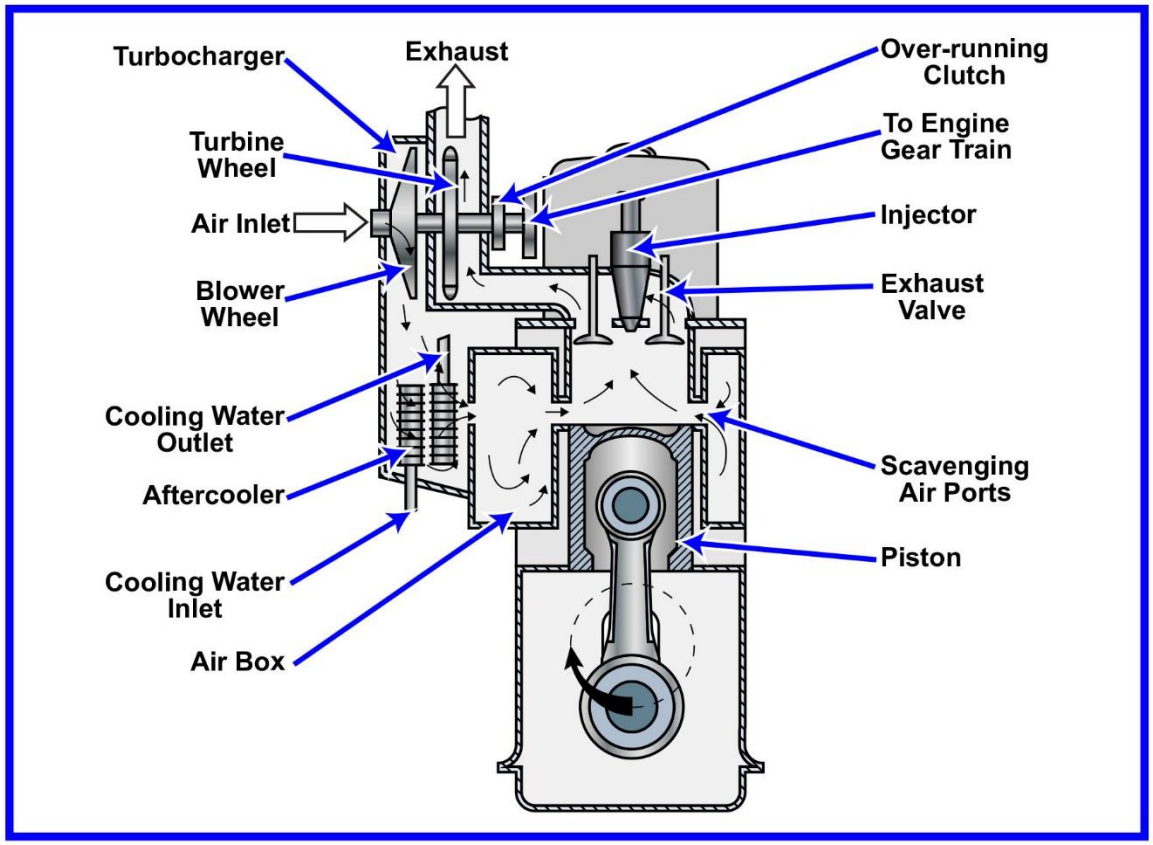
MO-0198
Thermal Fluid Heating Oil System

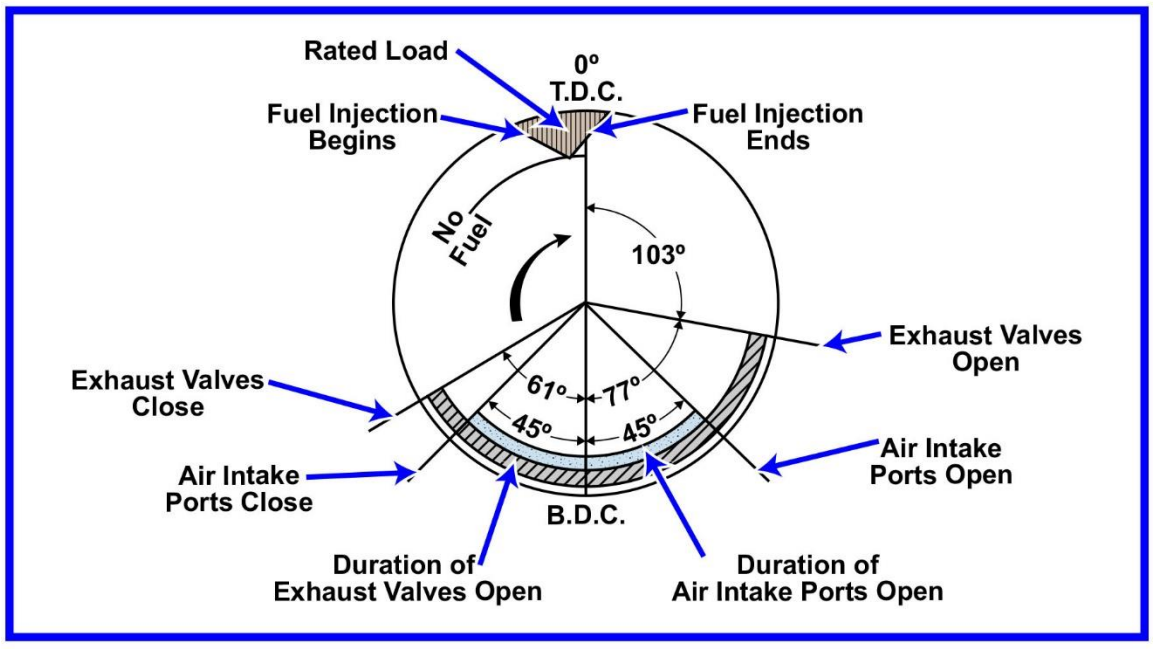


MO-0199
EMD Air Start System



MO-0206
EMD 645 Engine Operating Cycle





MO-0227