U.S.C.G. Merchant Marine Exam

UFIV – Chief Engineer

Q694 Motor Plants

(Sample Examination)

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

1. You are assigned to a fishing industry factory ship fitted with main propulsion diesel engines of the type shown in the illustration. If the engine's crankshaft is turning at 900 rpm, what will be the rotational speed of the two camshafts? Illustration MO-0122

   A. 450 rpm
   B. 900 rpm
   C. 1800 rpm
   D. Not enough information is given to determine camshaft rpm

   Correct answer: B

2. You are assigned to a fishing factory ship 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

3. You are assigned as an engineer on a fishing industry factory ship using main propulsion engines of the type shown in the illustration. Assuming that the piston is properly positioned, what statement represents the procedure for inspection of the compression rings while in place inside the engine? Illustration MO-0122

   A. The inspection takes place by removing the appropriate oil pan cover and viewing through the resulting opening.
   B. The inspection takes place by removing the appropriate cylinder head valve cover and viewing through the resulting opening.
   C. The inspection takes place by removing the appropriate air box handhole cover and viewing through the resulting opening.
   D. It is not possible to inspect the compression rings while in place inside the engine.

   Correct answer: C

4. You are assigned as an engineer on an uninspected fishing trawler using main propulsion engines of the type shown in the illustration. What statement represents the procedure for inspection of the lower cylinder liner bore while in place inside the engine? Illustration MO-0122

   A. With the particular piston positioned at TDC and the corresponding oil pan handhole cover removed, inspect the lower liner bore through the crankcase opening.
   B. With the particular piston positioned at BDC and the corresponding oil pan handhole cover removed, inspect the lower liner bore through the crankcase opening.
   C. With the particular piston positioned at BDC and the corresponding air box handhole cover removed, inspect the lower liner bore through the crankcase opening.
   D. With the particular piston positioned at TDC and the corresponding air box handhole cover removed, inspect the lower liner bore through the crankcase opening.

   Correct answer: A

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

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

   Correct answer: A

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

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

   Correct answer: A

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

   A. The level should be well above the "full" mark on the side of the dipstick marked with engine IDLE and oil HOT.
   B. The actual level is unimportant as long as it is visible on the dipstick when the engine is running.
   C. The level should be below the "add" mark on the side of the dipstick marked with engine IDLE and oil HOT.
   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. When checking the cylinder jacket water cooling expansion tank level on a main propulsion diesel engine on your fishing factory ship while underway, what should be the expansion tank level?

   A. The actual level is unimportant as long as it is visible in the sight glass when the engine is at operating temperature.
   B. The level should be out of sight high in the sight glass when the engine is at operating temperature.
   C. The level should be in the lower part of the sight glass when the engine is at operating temperature.
   D. The level should be in the upper part of the sight glass when the engine is at operating temperature.

   Correct answer: D

9. Prior to starting a diesel generator set engine fitted on your fishery research 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 the between the ADD and FULL marks on the dipstick
   B. When the oil level rises to a level well above the FULL mark on the dipstick
   C. When the oil level rises to the FULL mark on the dipstick
   D. When the oil level rises to the ADD mark on the dipstick

   Correct answer: C

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

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

    Correct answer: A

11. The uninspected fishing trawler 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-0005

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

    Correct answer: A

12. The fishing industry line 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-0122

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

    Correct answer: A

13. The uninspected fishing trawler 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-0013

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

    Correct answer: D

14. The mollusc dredger to which you are assigned is fitted with generator set drive engines as shown in the illustration. What statement is true in terms of the combustion chamber design? Illustration MO-0006

    A. The engine uses turbulence chambers with a hemispherical fire-deck.
    B. The engine uses an open type combustion chamber with a flat fire-deck.
    C. The engine uses pre-combustion chambers with a flat fire-deck.
    D. The engine uses an open type combustion chamber with a hemispherical fire-deck.

    Correct answer: B

15. The main propulsion diesel engines fitted on your fishing industry factory ship are started with compressed air using the system illustrated. What would be the FIRST consequence of having the start solenoid valve energized open by depressing the start button? Illustration MO-0200

    A. The upper cranking air motor drive pinion is engaged to the engine flywheel.
    B. The upper cranking air motor drive pinion is disengaged from the engine flywheel.
    C. The lower cranking air motor drive pinion is engaged to the engine flywheel.
    D. The lower cranking air motor drive pinion is disengaged from the engine flywheel.

    Correct answer: C

16. The various auxiliary diesel engines fitted on your uninspected fishing trawler 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. Air cranking motor
    B. Gasoline engine cranking motor
    C. Hydraulic cranking motor
    D. Electric cranking motor

    Correct answer: A

17. The deck winch drive engine onboard your fishing seiner uses a lubricating oil filtration scheme as shown in the illustration. What type of filtration system is illustrated? Illustration MO-0182

    A. Shunt filtration
    B. Sump filtration
    C. Full-flow filtration
    D. Bypass filtration

    Correct answer: D

18. The diesel generator engines onboard your mollusc dredger use a lubricating oil filtration scheme as shown in the illustration. What type of filtration system is illustrated? Illustration MO-0181

    A. Bypass filtration
    B. Sump filtration
    C. Shunt filtration
    D. Full-flow filtration

    Correct answer: D

19. The fishery research 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 running 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 shut down 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 running and when the day tank is located above the engine.

    Correct answer: C

20. The fishing industry seiner to which you are assigned has an engine as shown in the illustration. What statement concerning air box and exhaust manifold pressure is true, if the engine is running at rated speed? Illustration MO-0224

    A. There is no predictable, consistent relationship between the exhaust manifold and air box pressures.
    B. The exhaust manifold pressure will be equal to the air box pressure.
    C. The exhaust manifold pressure will be lower than the air box pressure.
    D. The exhaust manifold pressure will be higher than the air box pressure.

    Correct answer: C

21. The freshwater cooling systems serving the main engines of the fishery research vessel to which you are assigned are arranged as shown in the illustration. What statement best describes the arrangement of the freshwater keel cooler shown in the system diagram? Illustration MO-0138

    A. The keel cooler is mounted on the outside of the hull below the water line
    B. The keel cooler is mounted on the inside of the hull above 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

    Correct answer: A

22. The diesel generators on the fishing industry seiner 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 non-positive displacement type, and the actual displacement is directly proportional to engine speed.
    C. The scavenging blower is a positive displacement type, and the actual displacement is not 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.

    Correct answer: A

23. The mollusc dredger 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, single-reduction type of gear
    C. The reduction gear is a single-input, single-reduction type of gear
    D. The reduction gear is a double-input, double-reduction type of gear

    Correct answer: C

24. The mollusc dredger to which you are assigned has a pneumatic propulsion control system as shown in the illustration. What statement is true concerning transfer of control? Illustration MO-0168

    A. The transfer valve at the engine room control station is used to transfer control of propulsion from the engine room control station to the pilot house pneumatic master control station or vice versa.
    B. The transfer valve at the pilot house pneumatic master control station is used to transfer control of propulsion from the pilot house master control station to the engine room control station or vice versa.
    C. The transfer valve at the pilot house pneumatic master control station is used to transfer control of propulsion from the pilot house master control station to the mechanical slave remote control station or vice versa.
    D. The transfer valve at the pneumatic remote control station is used to transfer control of propulsion from the pneumatic remote control station to the mechanical slave remote control station or vice versa.

    Correct answer: A

25. The fishing industry factory ship to which you are assigned has a pneumatic propulsion control system as shown in the illustration. Which control valve is responsible for bypassing the inflation delay orifice to insure rapid and positive reversals and to protect the clutches from excessive slip? Illustration MO-0167

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

    Correct answer: D

26. The main engines on your fishing industry factory ship 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 downward. The power cylinder tail rod moves upward.
    C. The servo piston rod moves upward. The power cylinder tail rod moves downward.
    D. The servo piston rod moves upward. The power cylinder tail rod moves upward.

    Correct answer: C

27. The main engines on your uninspected fishing trawler are equipped with over speed trip devices as shown in the illustration. What statement concerning the operation of the over speed trip is true? Illustration MO-0171

    A. The over speed 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.
    B. The over speed 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.
    C. The over speed trip senses oil pressure proportional to engine speed and shuts the engine down at a pre-determined, specified maximum speed setting.
    D. The over speed trip senses centrifugal force proportional to engine speed and shuts the engine down at a pre-determined, specified maximum speed setting.

    Correct answer: D

28. The deck winch on your fishing industry seiner 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 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 speed limit (maximum governed speed)
    Engine load limit (maximum fuel delivery)

    Correct answer: C

29. The diesel generators on your uninspected fishing trawler are fitted with speed control governors of the type shown in the illustration. If an adjustment is made to item #2, what will change? Illustration MO-0160

    A. The maximum high-speed setting
    B. The speed droop setting
    C. The governed speed setting
    D. The minimum low speed setting

    Correct answer: C

30. The purpose of try-cocks used on an auxiliary boiler is to _____.

    A. provide an alternate means of determining the water level, if the gage glass fails
    B. provide a means of adding chemical feed to the boiler water
    C. provide a means for blowing down the gage glass
    D. act as a steam sentinel valve, if any of the fusible plugs should melt

    Correct answer: A

31. The tube sheets installed in a fire-tube auxiliary boiler are normally connected by _____.

    A. girder stays
    B. fire-tubes and stay-tubes
    C. external boiler plating
    D. separate crown sheets

    Correct answer: B

32. Which of the listed sequence of events occurs when an automatic auxiliary boiler is prepurged?

    A. The damper on the inlet side of the furnace is moved to the open position for a given number of seconds and then moved to the closed position.
    B. The damper on the inlet side of the furnace is moved to the open position for a given number of seconds and then moved to the low fire position.
    C. The damper is moved to the closed position for a given number of seconds and then moved to the low fire position.
    D. The damper in the uptakes is moved to the wide-open position for a given number of seconds and then moved to the low firing rate position.

    Correct answer: B

33. When checking the valve stem to rocker arm clearances on an auxiliary diesel engine onboard your fishery research vessel, which of the following statements concerning intake and exhaust clearances when taken cold is correct?

    A. When taken cold, a properly adjusted exhaust valve clearance would definitely be greater than the intake valve clearance.
    B. When taken cold, a properly adjusted exhaust valve clearance could be less than or greater than the intake valve clearance.
    C. When taken cold, a properly adjusted exhaust valve clearance would definitely be equal to the intake valve clearance.
    D. When taken cold, a properly adjusted exhaust valve clearance would definitely be less than the intake valve clearance.

    Correct answer: A

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

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

    Correct answer: B

35. The main propulsion diesel engines used to power the fishing vessel 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 starting air pressure supplied to the air-starting motors should be increased.
    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 oil in the in-line lubricator should be replaced with oil of lower viscosity than specified.

    Correct answer: B

36. The diesel generator sets on your mollusc dredger use a starting system similar to the one shown in the illustration. While the engine is running, the starting battery bank terminal voltage and specific gravity gradually fall off and the ammeter indicates a discharging battery bank, eventually resulting in a dead battery bank. Which of the following failures would most likely result in this condition? Illustration MO-0202

    A. A closed oil pressure switch
    B. An open voltage regulator/alternator field circuit
    C. An open circuited starter solenoid coil
    D. An open circuited start switch

    Correct answer: B

37. The main engines on your fishery research vessel utilize a starting system similar to that shown in the illustration. The air supply pressure and engine room ambient temperatures are both within the normal range. Upon attempted start-up, the engine turns very slowly, and the flow rate of air from the air starting motor exhaust is very low. Which of the listed conditions would most likely be the cause of the failure to start? Illustration MO-0203

    A. The in-line lubricator siphon tube is severely restricted.
    B. The in-line strainer basket element is severely restricted.
    C. The fuel injection system piping is air-bound.
    D. The air-starting motor vanes are stuck in their slots.

    Correct answer: B

38. A diesel generator set on your fishing industry factory ship 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. 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).
    C. 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).
    D. The drain plug (B) is removed to drain the sludge from the strainer sump, but the engine must be stopped to perform this operation.

    Correct answer: B

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

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

    Correct answer: A

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

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

    Correct answer: A

41. When interpreting the engine lube oil supply header pressures for the main engines on your fishing trawler, what statement is true assuming that the lube oil pump is engine-driven?

    A. As the lube oil temperature increases, the supply header pressure tends to decrease, and as the engine rpm increases, the supply header pressure tends to decrease.
    B. As the lube oil temperature increases, the supply header pressure tends to decrease, and as the engine rpm increases, the supply header pressure tends to increase.
    C. As the lube oil temperature increases, the supply header pressure tends to increase, and as the engine rpm increases, the supply header pressure tends to increase.
    D. As the lube oil temperature increases, the supply header pressure tends to increase, and as the engine rpm increases, the supply header pressure tends to decrease.

    Correct answer: B

42. The main engines on the fishing factory ship 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 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.
    B. 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.
    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 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.

    Correct answer: B

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

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

    Correct answer: D

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

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

    Correct answer: A

45. The mollusc dredger 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

46. On diesel engines used on a fishing industry factory ship, which type of injection system is most likely to use sophisticated electronic controls for timing and metering?

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

    Correct answer: D

47. The fishery research 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 closed type and features pressure-time metering.
    B. The injector is of the open 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 port and helix metering.

    Correct answer: C

48. The main propulsion diesel engines on the fishery research vessel to which you are assigned are fitted with mechanically operated and controlled unit injectors. When are the sintered metal supply and return injector filters typically replaced?

    A. Whenever the fuel system secondary filter elements are replaced
    B. Whenever the coalescing fuel filters are drained of sludge and moisture
    C. Whenever the unit injectors are removed for reconditioning
    D. Whenever the fuel system primary suction strainer is cleaned

    Correct answer: C

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

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

    Correct answer: D

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

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

    Correct answer: C

51. In order to determine the restriction across a dry-type air filter on one of the diesel engines on your fishing trawler, the engine should be operating at rated speed and load. What instrument would give the most accurate measurement of air filter element restriction?

    A. A mercury manometer
    B. A water manometer
    C. A bourdon tube vacuum gauge
    D. A bourdon tube compound gauge

    Correct answer: B

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

    Correct answer: B

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

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

    Correct answer: D

54. Your fishing factory ship 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 inside of the tubes of the RW/FW heat exchanger
    B. The outside of the tubes of the lube oil cooler
    C. The inside of the tubes of the lube oil cooler
    D. The outside of the tubes of the RW/FW heat exchanger

    Correct answer: A

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

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

    Correct answer: C

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

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

    Correct answer: B

57. The turbochargers on the main propulsion engines on the fishing factory ship 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. Why is it essential that this debris be removed prior to placing the engine back into operation?

    A. The debris will eventually become difficult to remove from the trap box
    B. The debris may eventually cause the screen to become severely restricted
    C. The debris may eventually break into smaller pieces allowing turbine foreign object damage
    D. The debris will cause the turbine casing to become statically imbalanced

    Correct answer: C

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

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

    Correct answer: D

59. You are inspecting the blower of a Roots-blown, two-stroke cycle main propulsion engine on the fishing vessel to which you are assigned and discover the presence of aluminum dust on the rotors and on the air duct surfaces. What would most likely be the direct cause of this?

    A. Worn blower rotor shaft bearings
    B. Restricted scavenging air intake ports
    C. Worn blower rotor shaft seals
    D. Restricted blower air intake filter

    Correct answer: A

60. The lubricating oil system supporting the main propulsion reduction gear on the fishing trawler 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 left intact to ensure proper protection from galvanic corrosion
    B. Any accumulated scale build-up on sacrificial zinc anodes should be scraped off until the zinc anodes are shiny
    C. Any sacrificial zinc anodes with accumulated scale build-up should be replaced regardless of the degree of deterioration
    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: B

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

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

    Correct answer: B

62. The pneumatic propulsion control system used on your fishing factory ship 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 and metal parts such as the valve discs and seats should all be cleaned with non-flammable solvent.
    B. 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.
    C. 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.
    D. Rubber parts such as the diaphragm and metal parts such as the valve discs and seats should all be washed with soap and water.

    Correct answer: C

63. The fishing vessel to which you are assigned is fitted with a totally pneumatic propulsion control system as shown in the illustration. If the astern clutch fails to engage from all control locations, but the ahead clutch properly engages from all control locations, which of the following system faults best accounts for these symptoms? Illustration MO-0168

    A. The astern clutch engagement pilot air tubing has separated from the clutch actuator 4-way control valve at the clutch control panel.
    B. The control lever at the pneumatic remote control station has a blocked astern clutch engagement pilot port.
    C. The control lever at the engine room control station has a blocked astern clutch engagement pilot port.
    D. The ahead clutch engagement pilot air tubing has separated from the clutch actuator 4-way control valve at the clutch control panel.

    Correct answer: A

64. The main diesel propulsion engines on your uninspected fishing industry vessel are protected with a mechanical over speed 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 over speed trip, the engine must be stopped AND the locknut must be retightened after each adjustment.
    B. To adjust the over speed trip, the engine must be stopped AND the locknut must be retightened only after the final adjustment.
    C. To adjust the over speed trip, the engine must be running AND the locknut must be retightened after each adjustment.
    D. To adjust the over speed trip, the engine must be running AND the locknut must be retightened only after the final adjustment.

    Correct answer: A

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

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

    Correct answer: B

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

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

    Correct answer: D

67. Using the oil chart provided in the illustration for guidance, what would be the recommended straight weight petroleum oil to use in a main engine speed control governor on your fishery research vessel, if the governor is to remain in the acceptable operating range and the governor oil operating temperature may drop as low as 40oF? Illustration MO-0161

    A. SAE 10
    B. SAE 20
    C. SAE 30
    D. SAE 40

    Correct answer: A

68. A main engine speed control governor for one of your uninspected fishing industry vessel's main propulsion engines hunts, surges, or is sluggish to respond to load changes. Which of the following governor oil conditions would be the greatest single source of governor troubles?

    A. Foamy oil (air entrainment)
    B. Wrong type of oil (composition)
    C. Dirty oil (solid contaminants)
    D. Wrong grade of oil (viscosity)

    Correct answer: C

69. 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 engine should be started by means of jumper cables connected to another battery without any particular concern regarding the electrolyte being frozen.
    B. 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.
    C. The battery electrolyte should be allowed to thaw, and then the battery should be recharged 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.

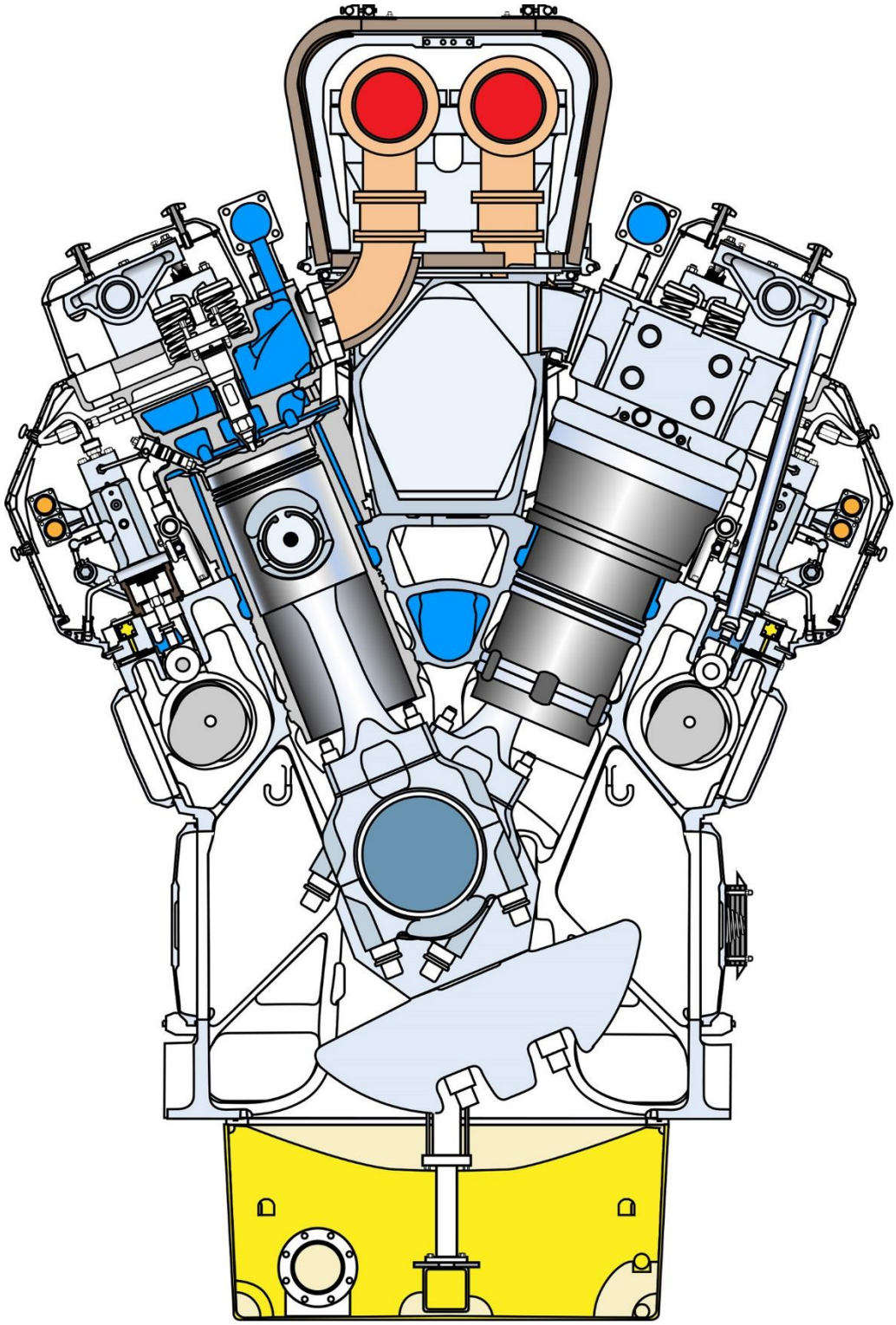
    Correct answer: C

70. While warming up the main engines on your uninspected fishing trawler 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?

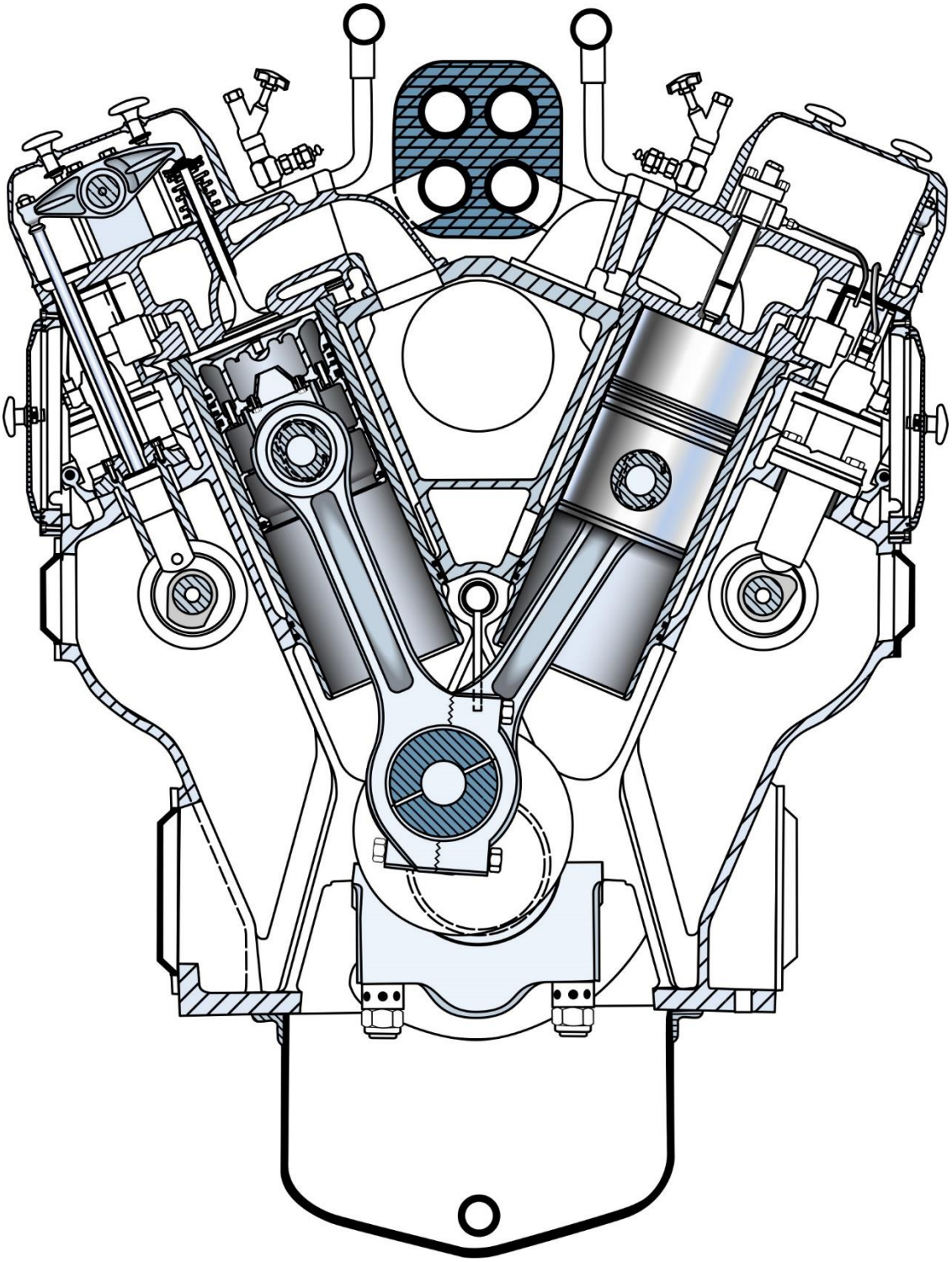
    A. Immediately add make-up oil or service lube oil coolers, strainers, and filters, as appropriate.
    B. Immediately shutdown the engine, then investigate the cause for the low-pressure alarm.
    C. Monitor closely oil pressures, temperatures, and levels while continuing to run the engine.
    D.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

    Correct answer: B

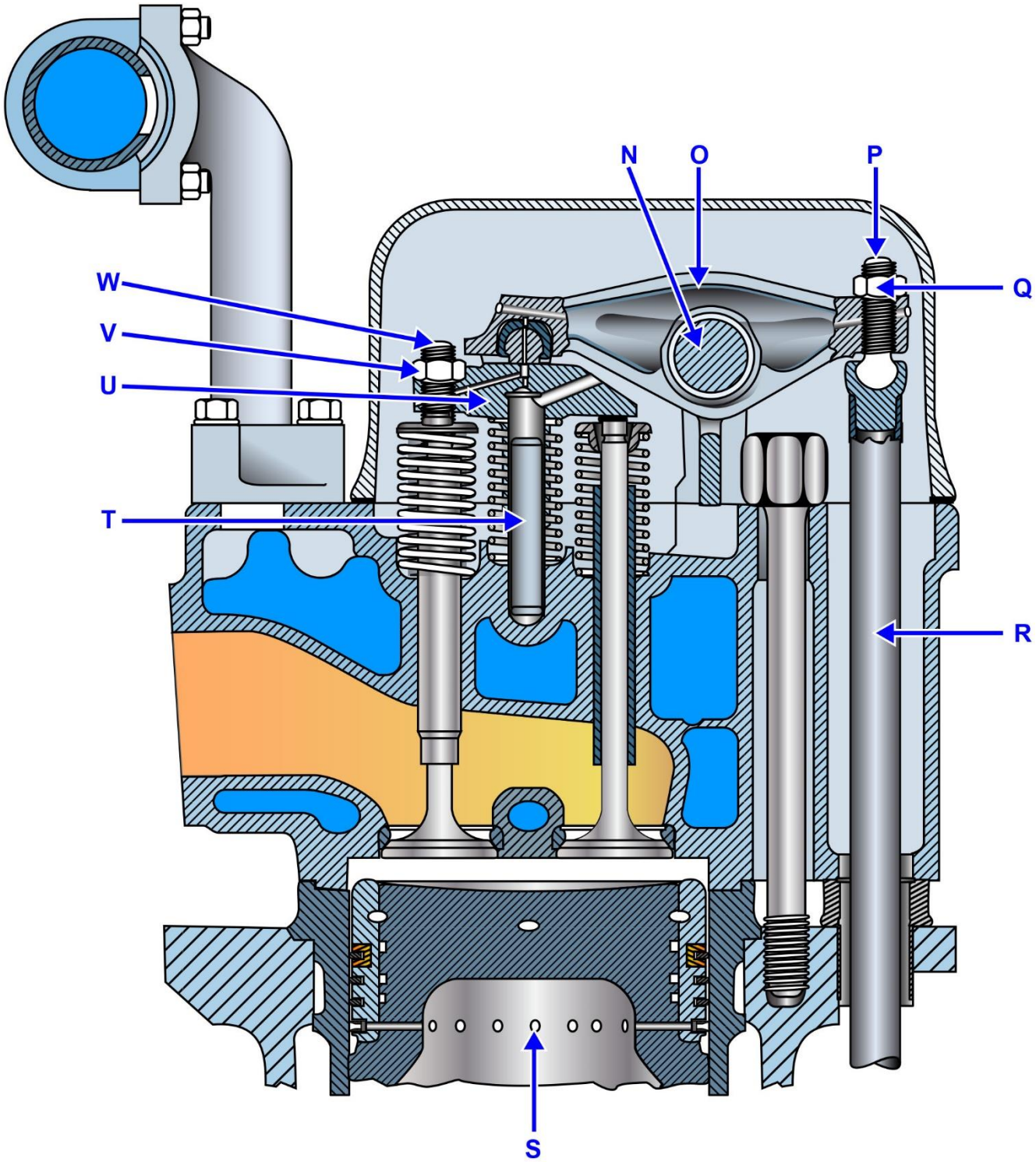
MO-0005



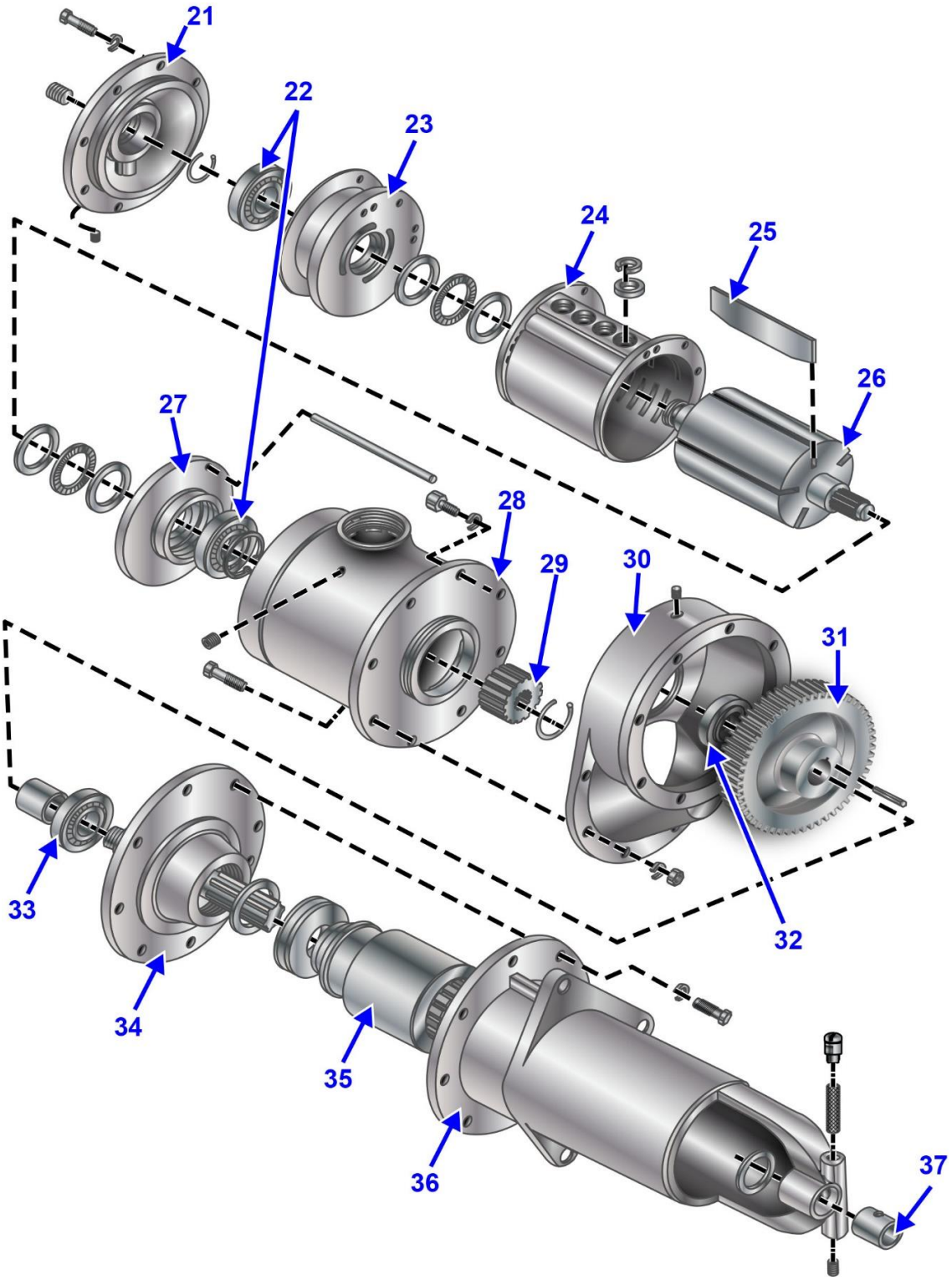
MO-0006



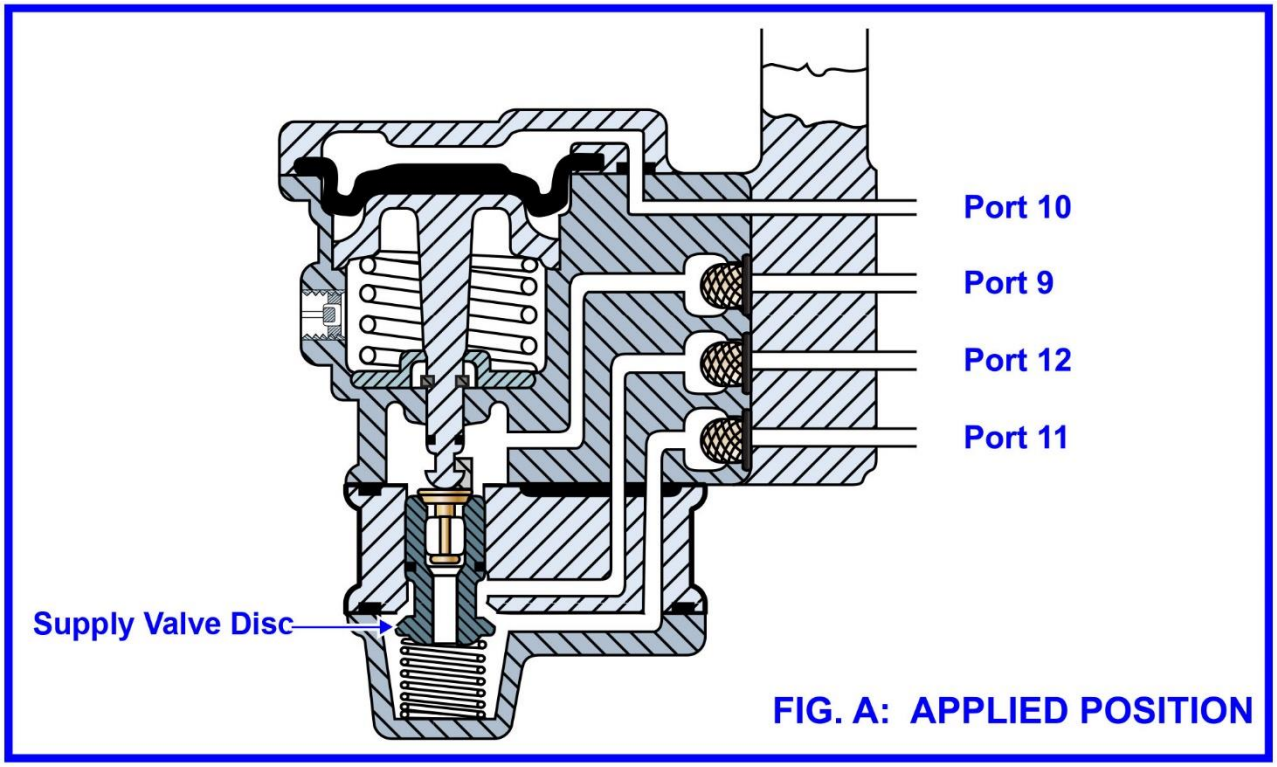
MO-0013

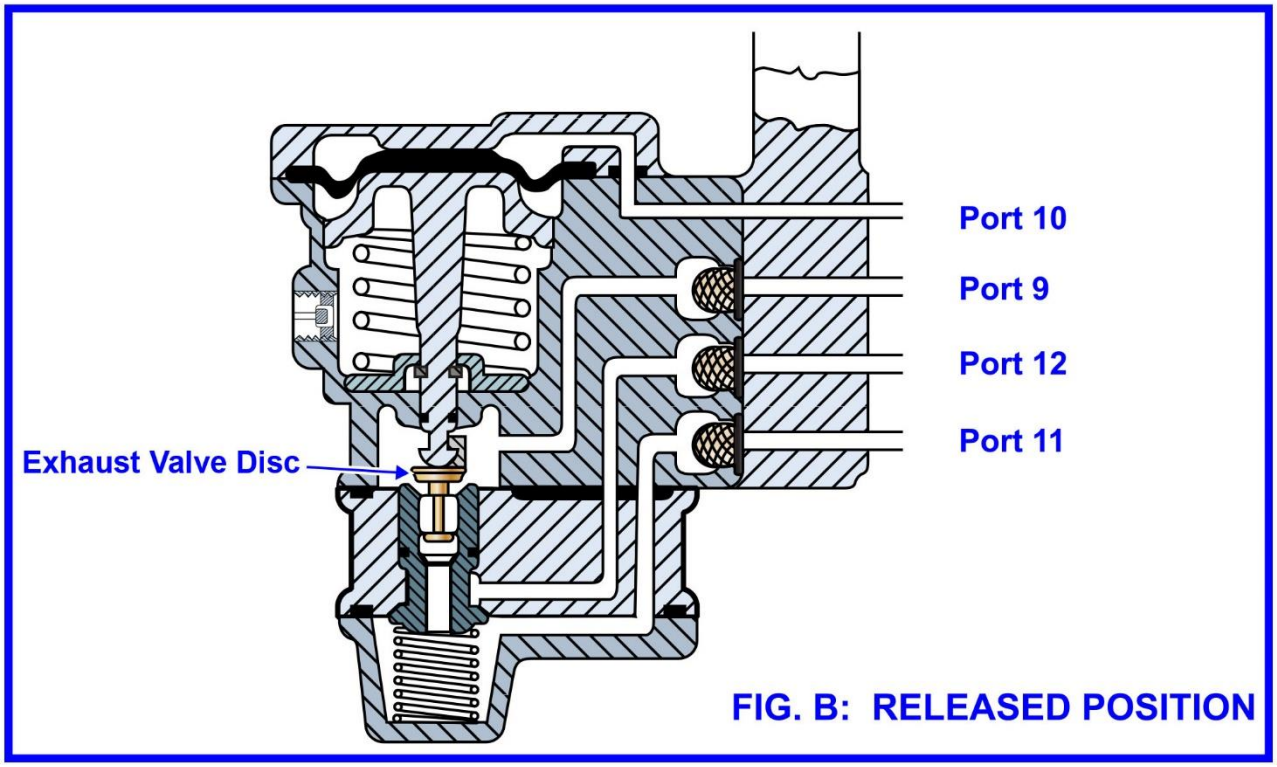


MO-0044

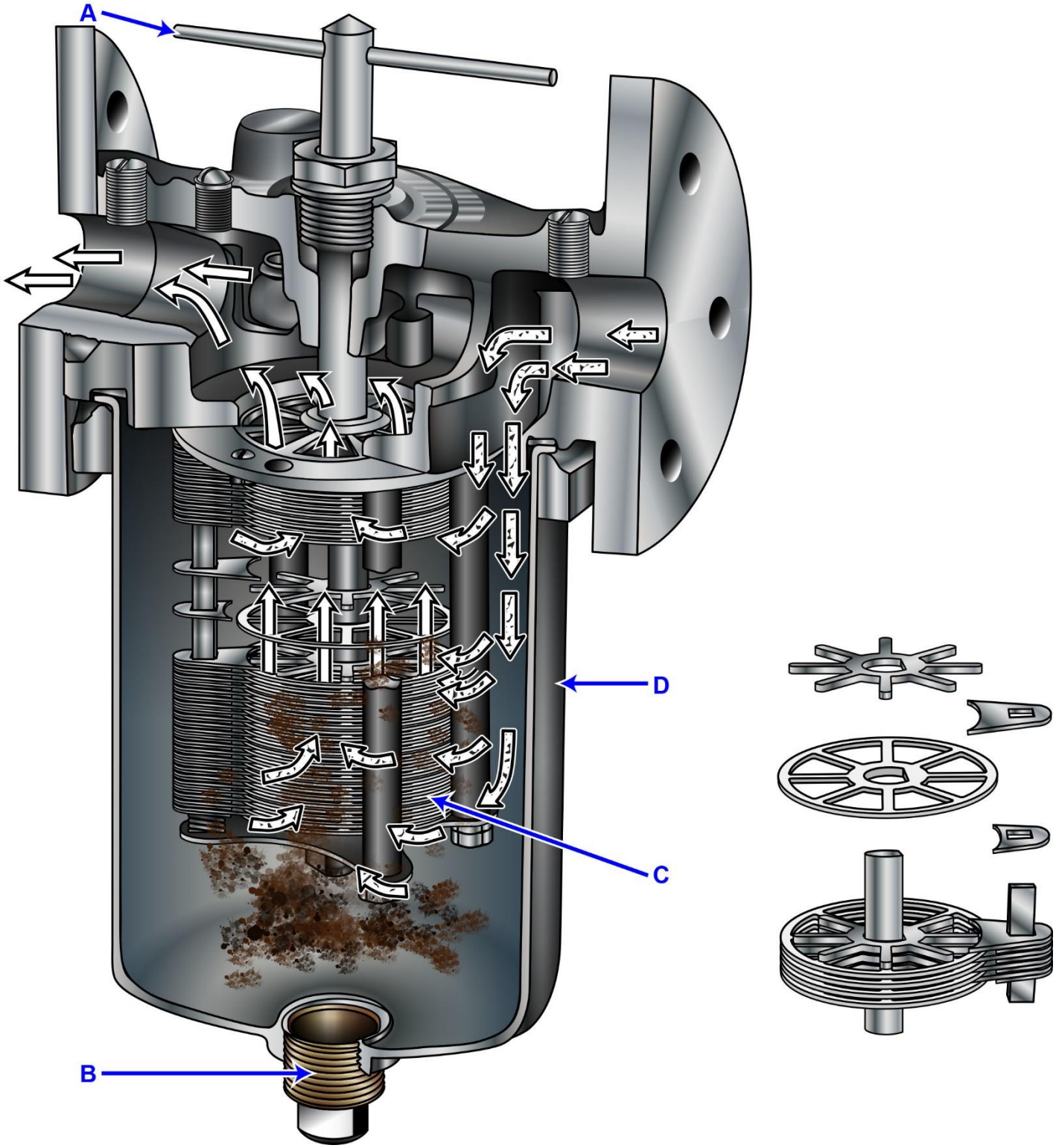


MO-0052

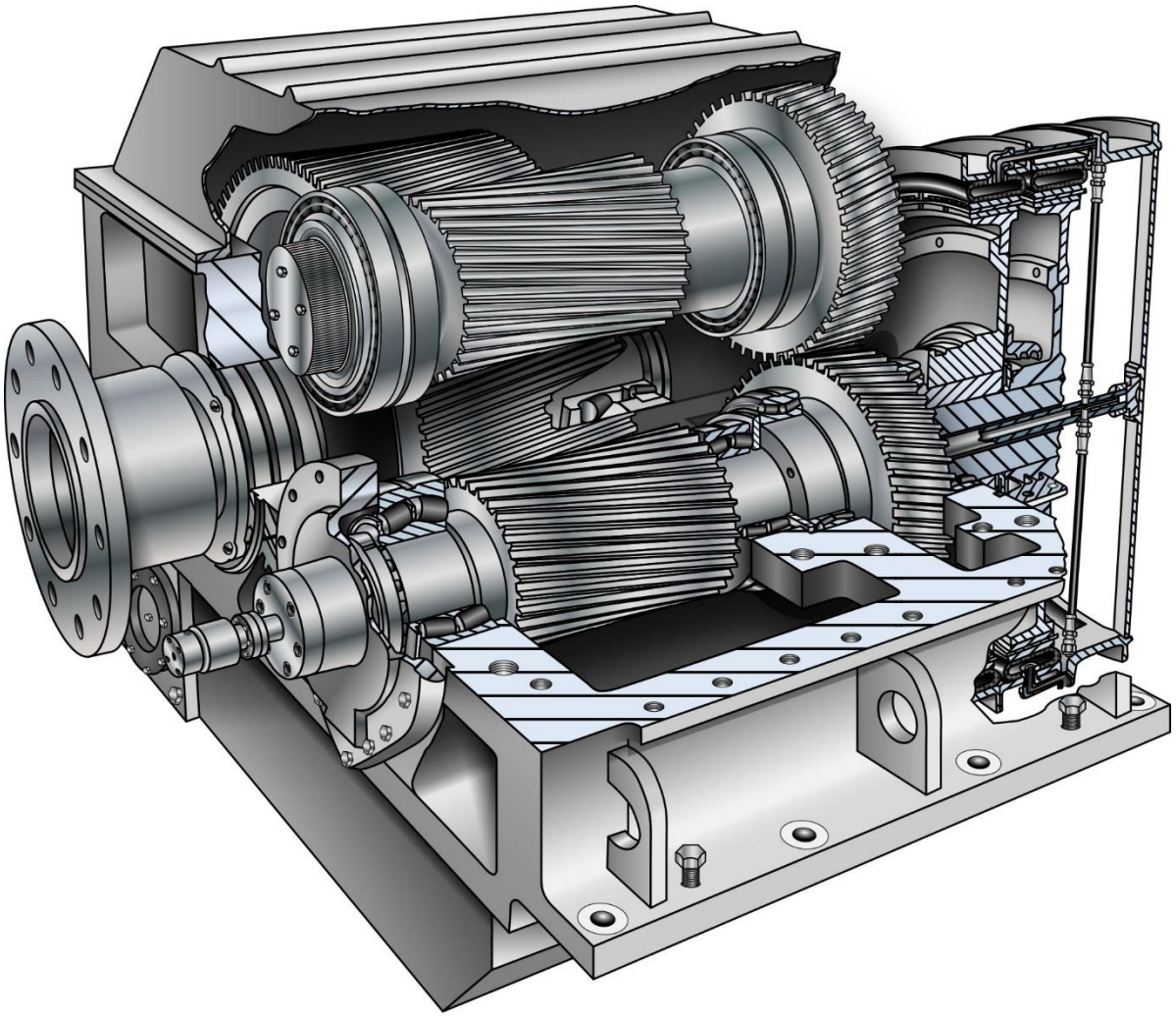




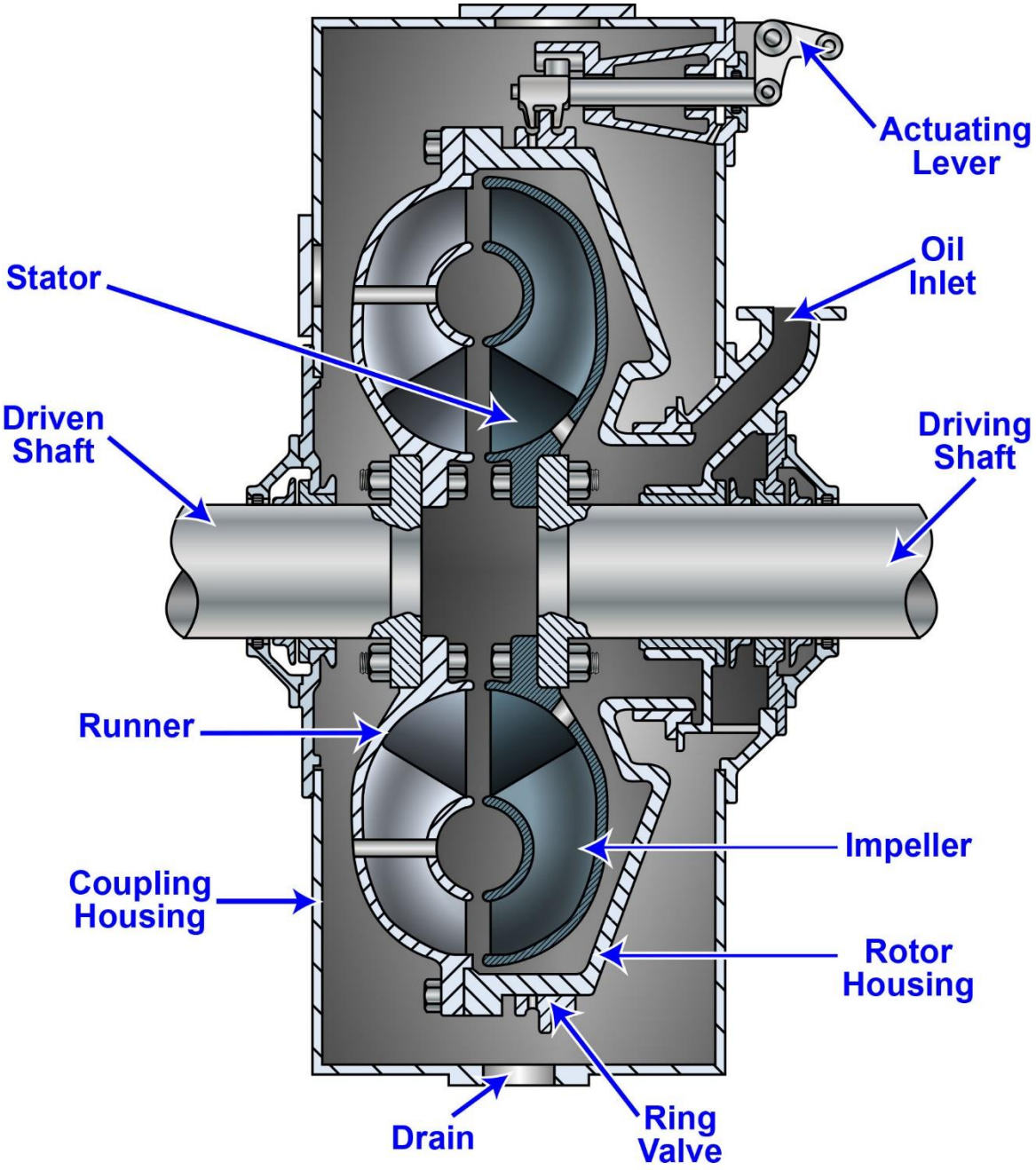
MO-0057



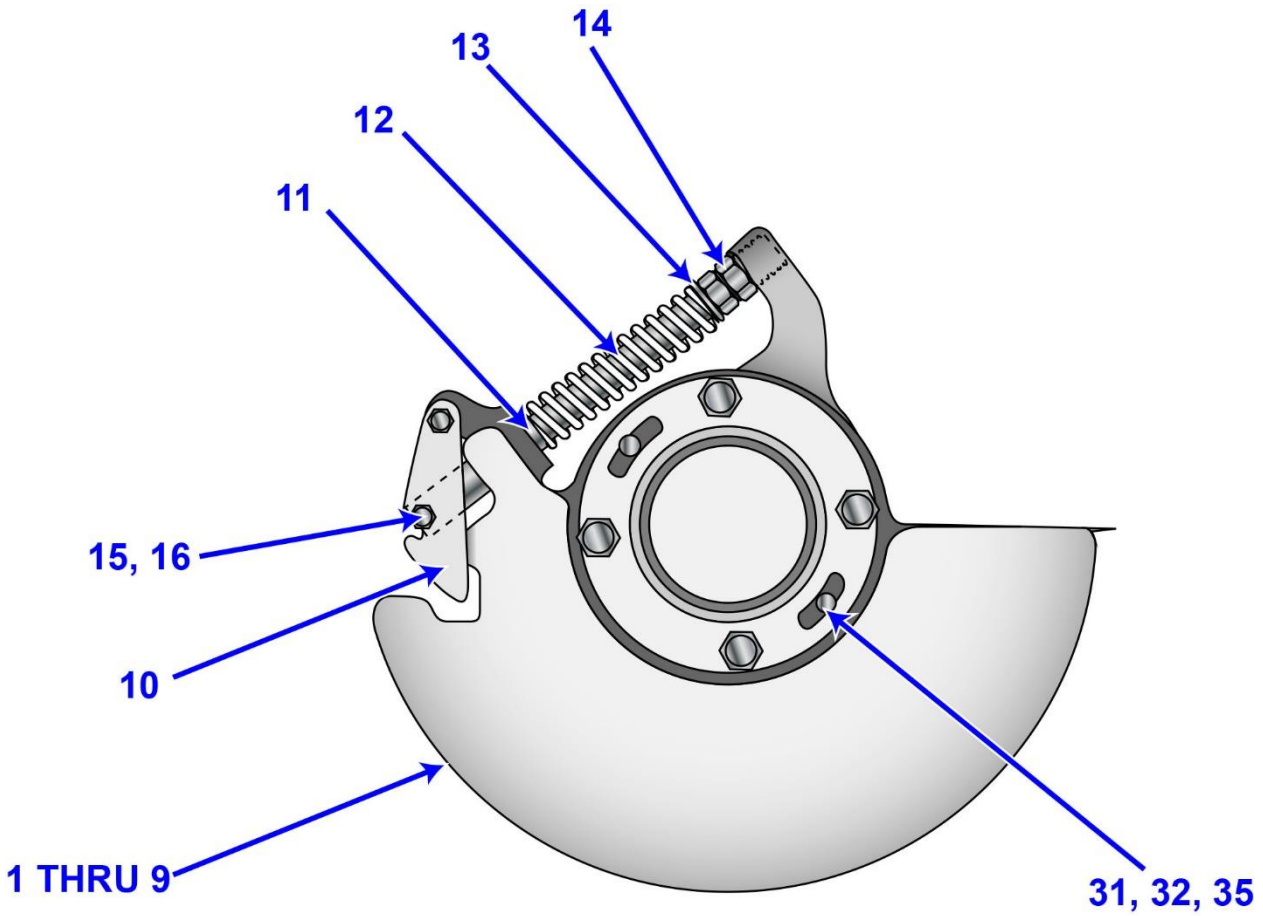
MO-0085



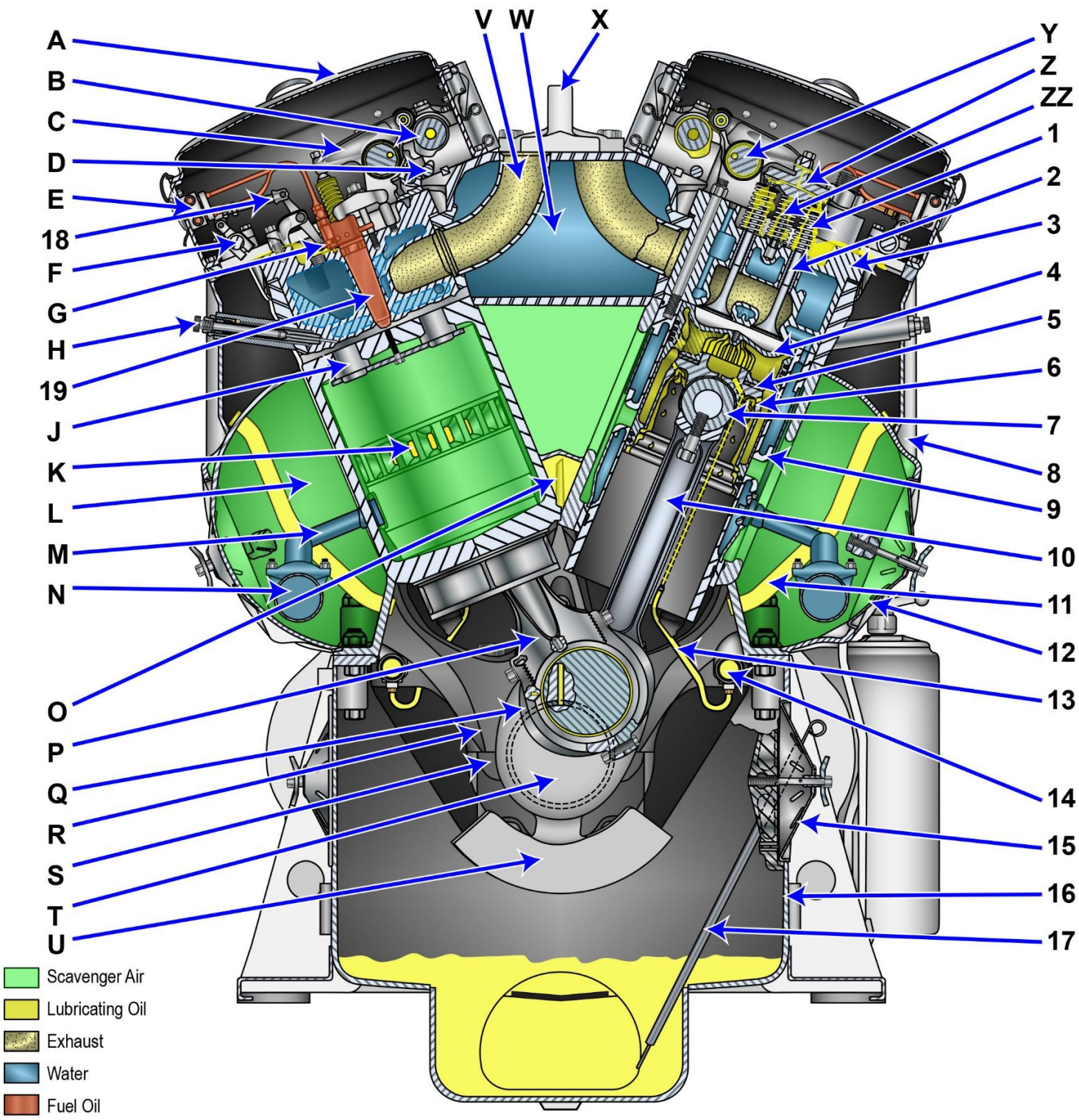
MO-0089



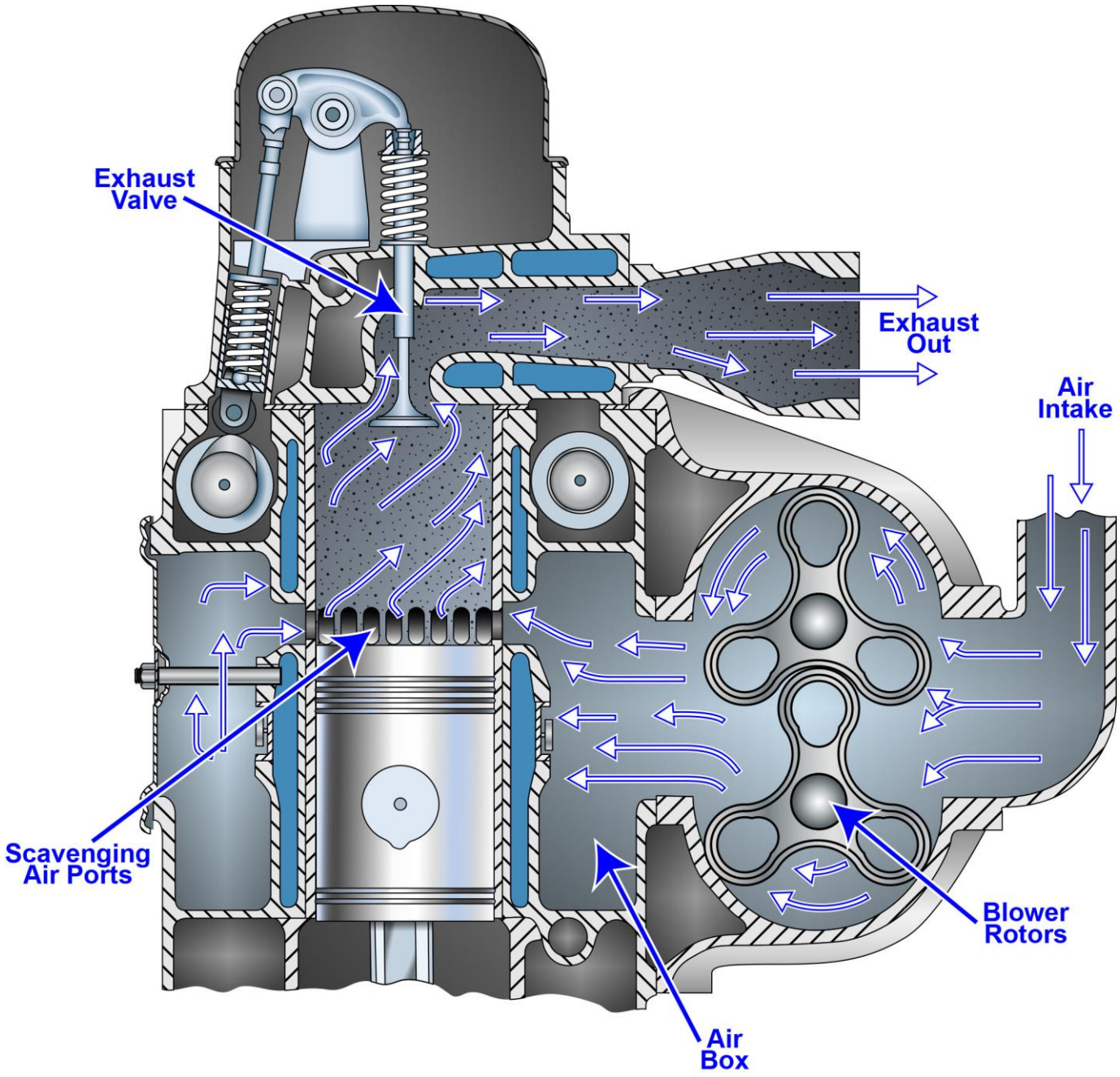
MO-0101



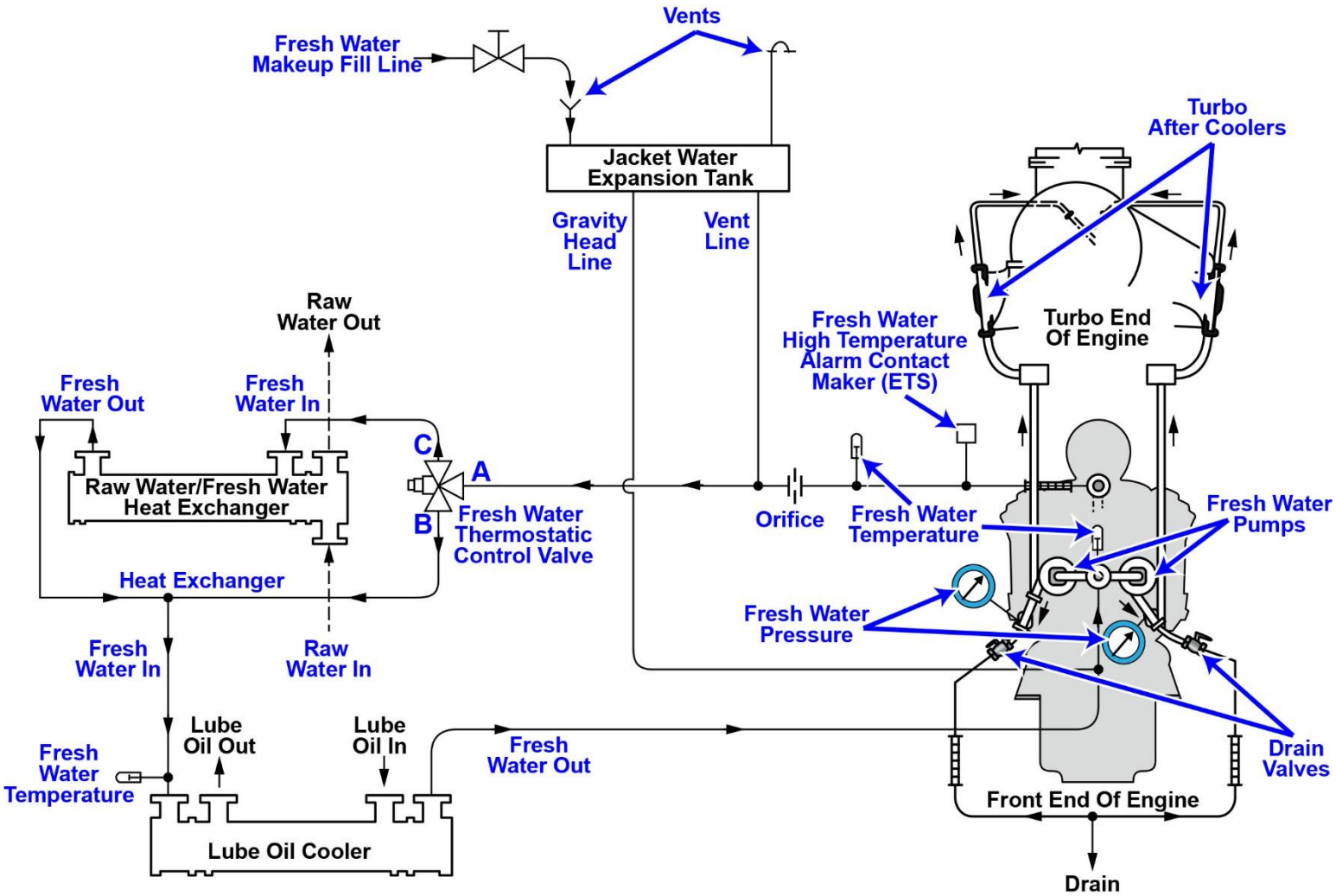
MO-0122



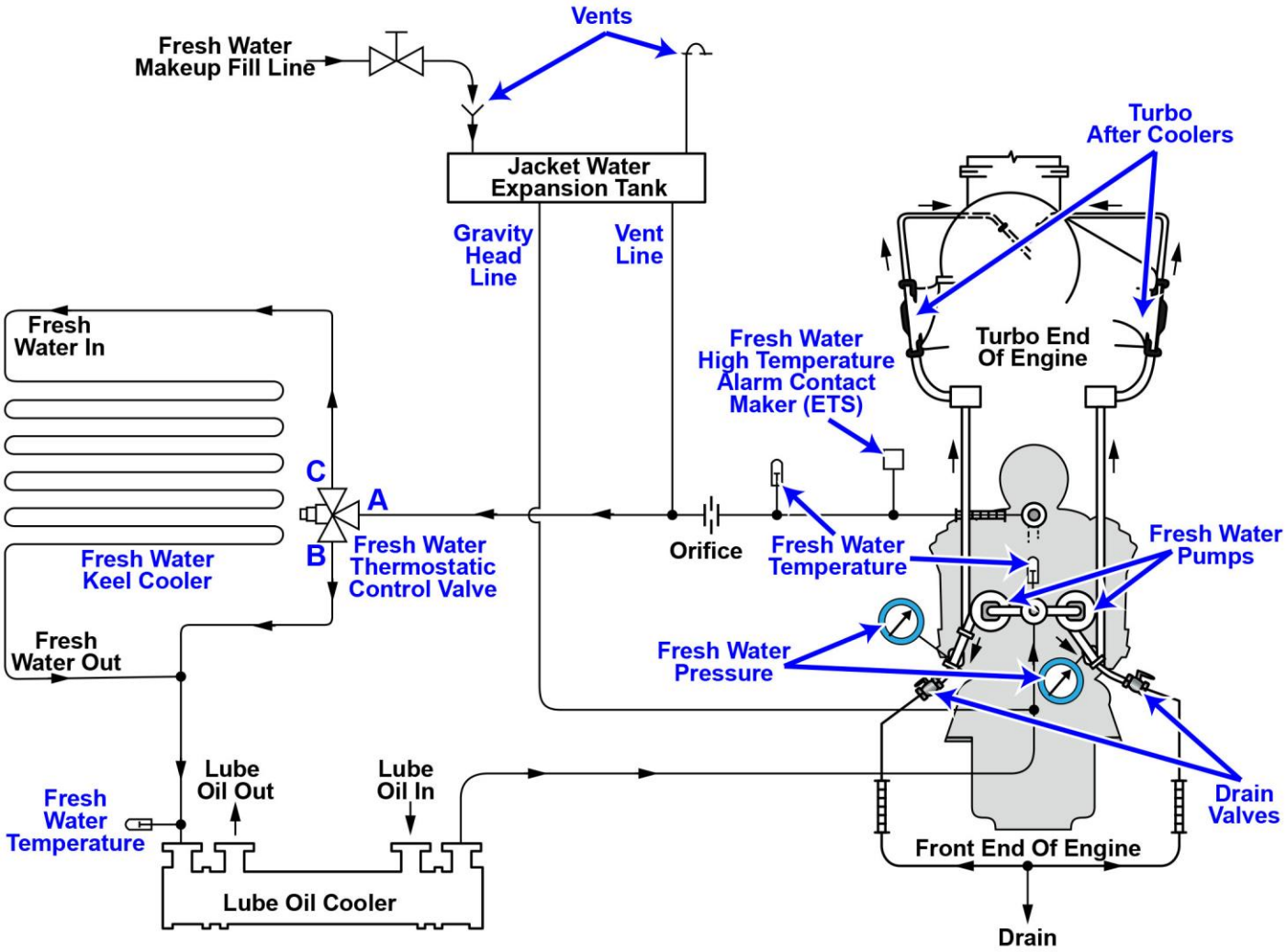
MO-0134



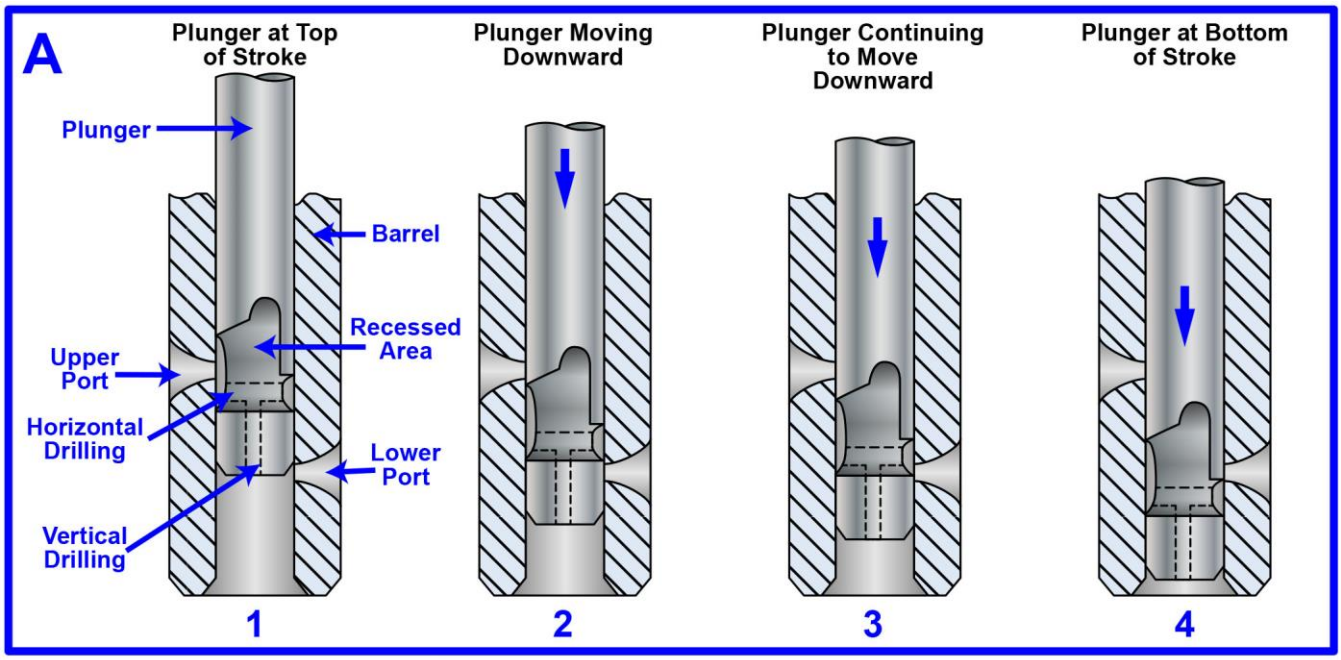
MO-0137
EMD Engine Fresh Water Cooling System with Heat Exchanger



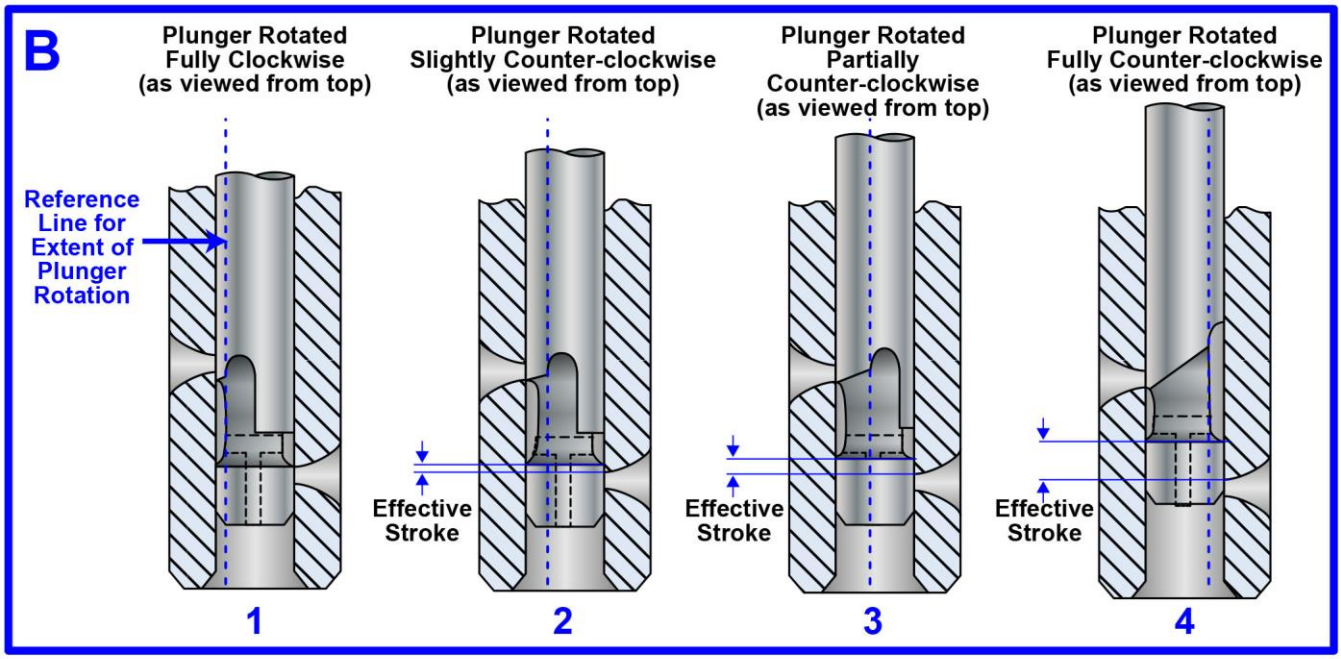
MO-0138
EMD Engine Fresh Water Cooling System with Keel Cooler



MO-0144
Detroit Diesel 71 Series Engine Unit Injector

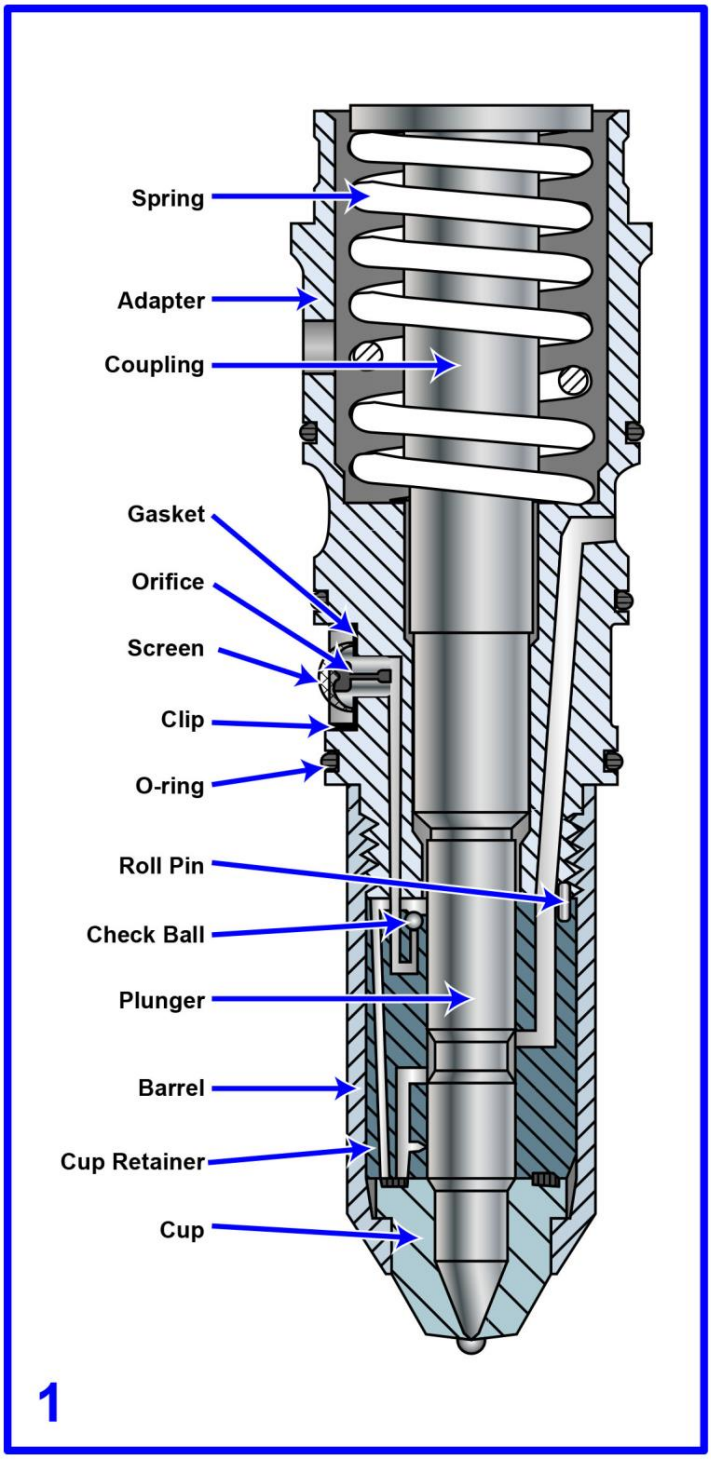


Injector Operation as a Function of Vertical Plunger Travel



Injector Operation as a Function of Extent of Plunger Rotation

MO-0150



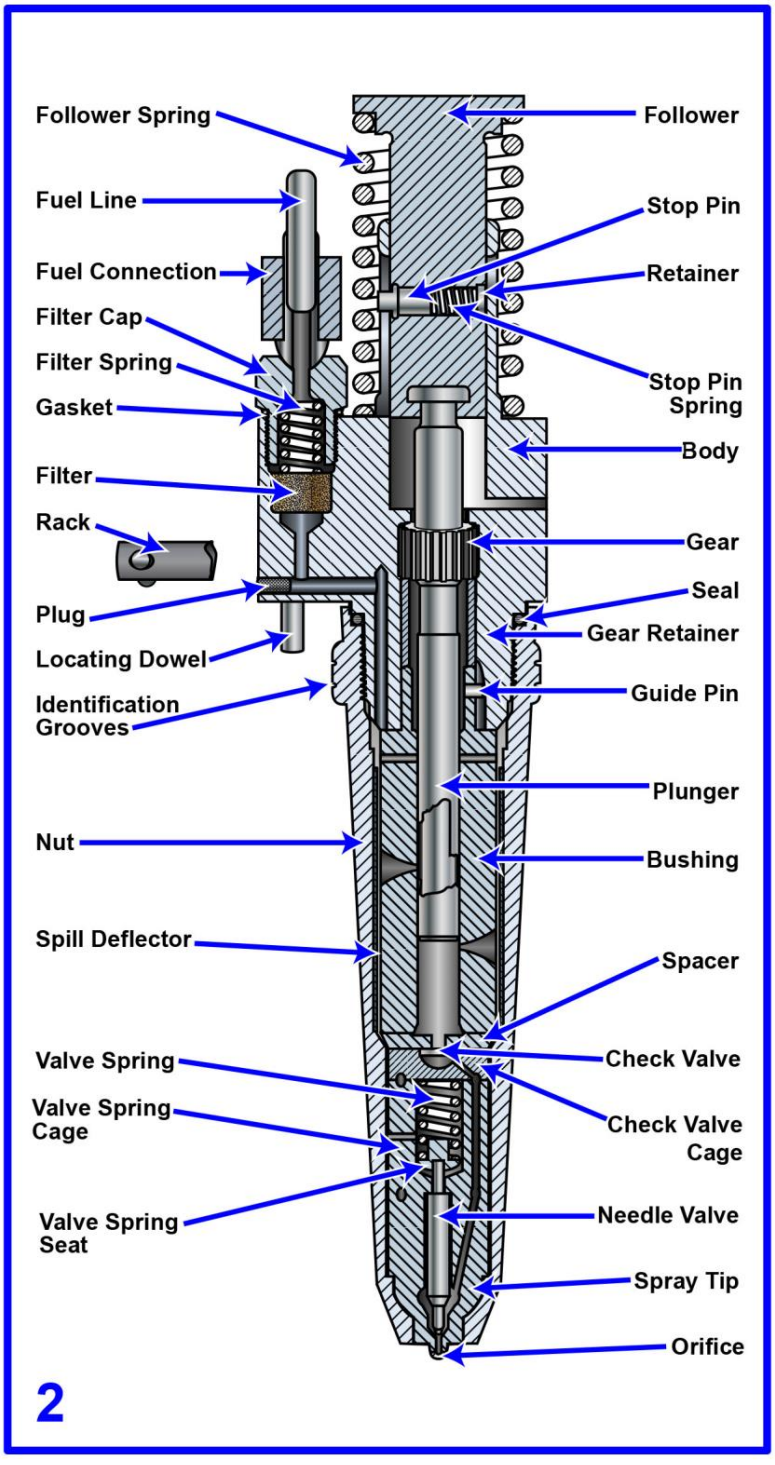
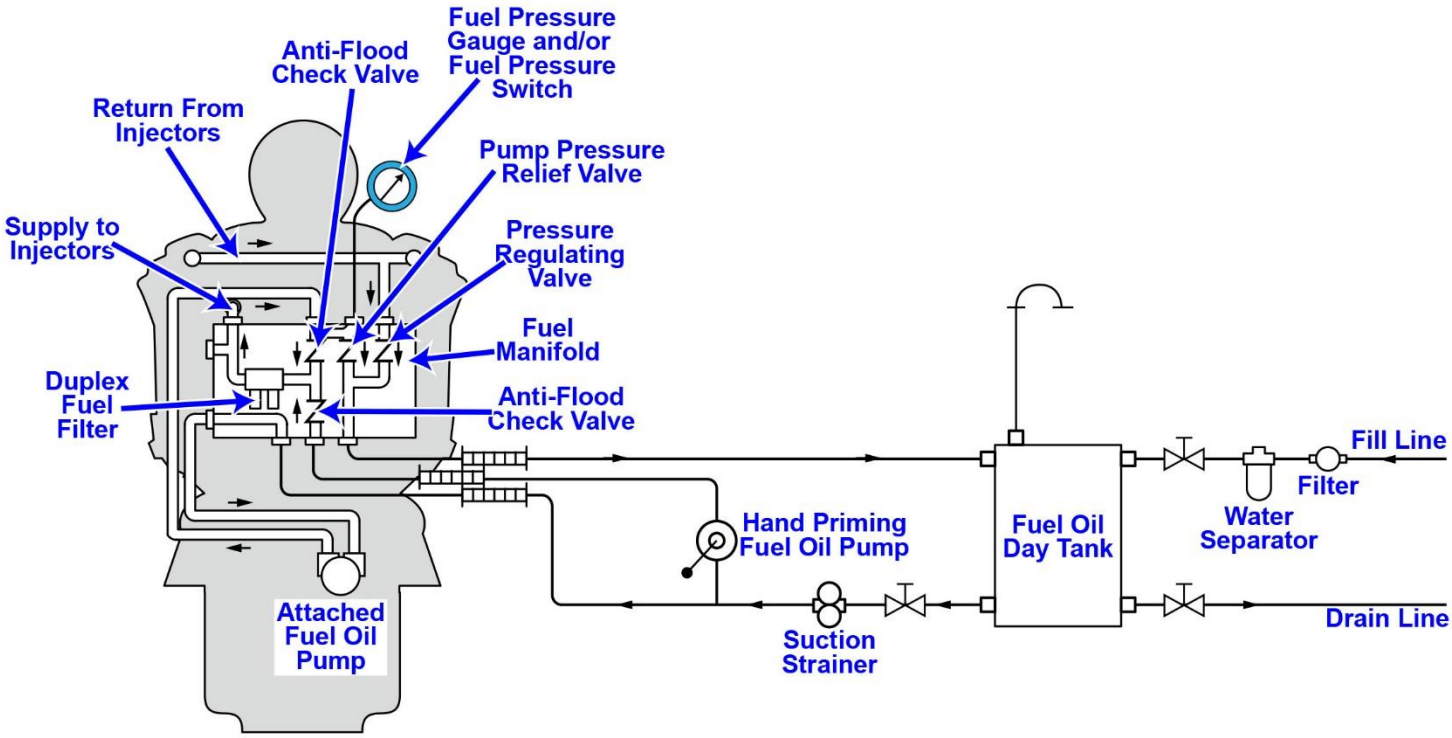


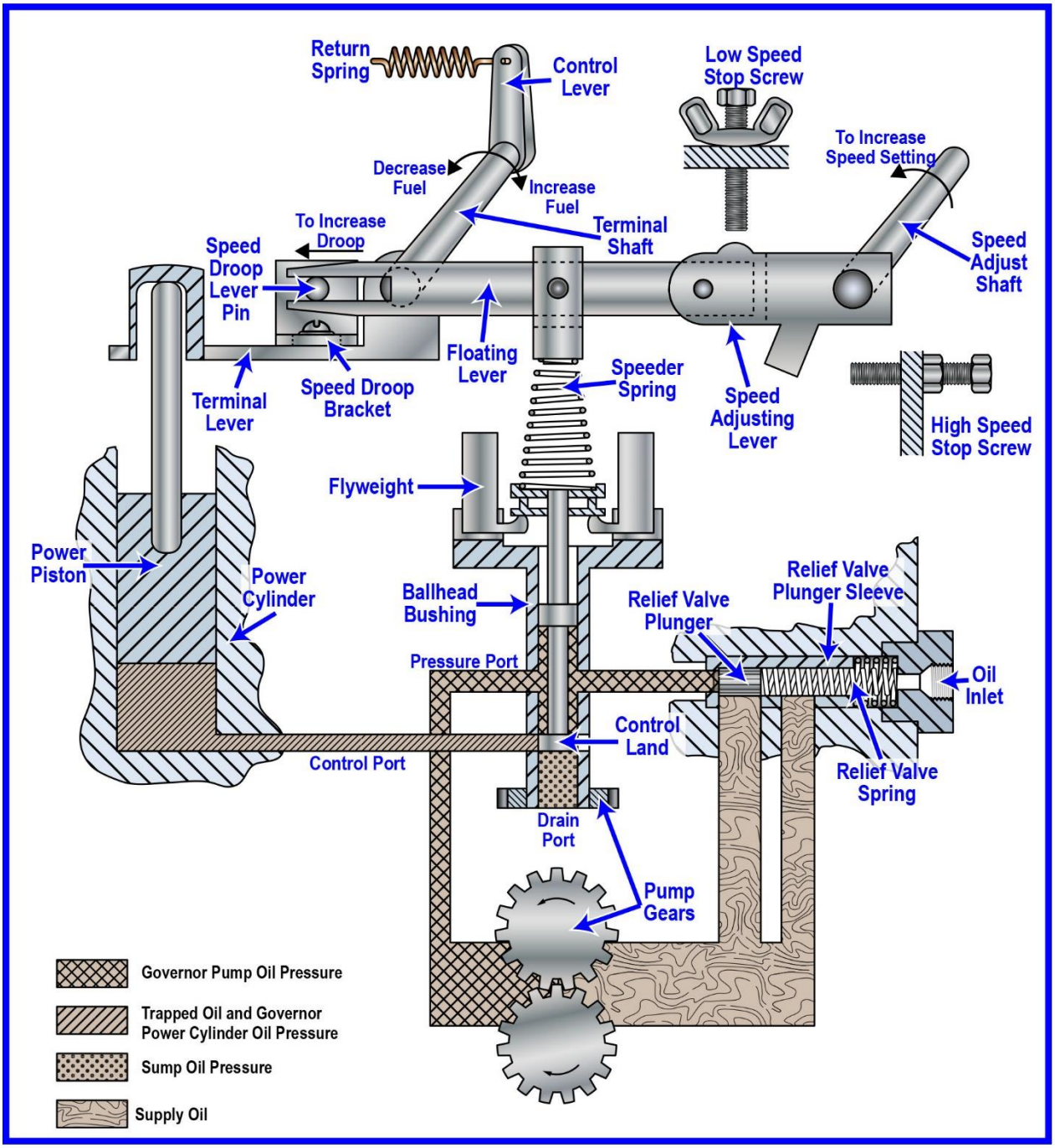
Figure 1: Adapted for testing purposes only from NORMAN, Diesel Technology: Fundamentals, Service, Repair

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

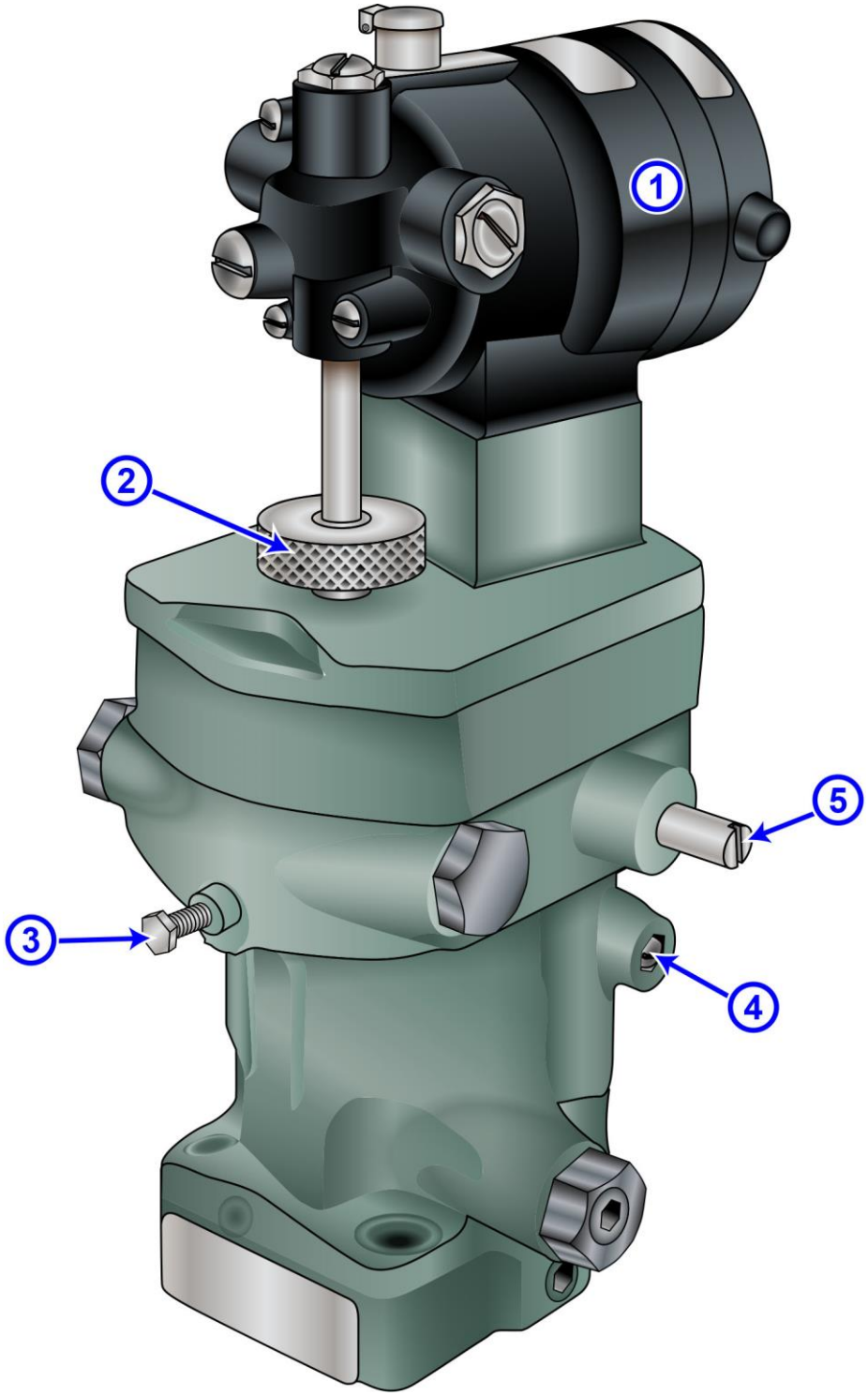
MO-0152



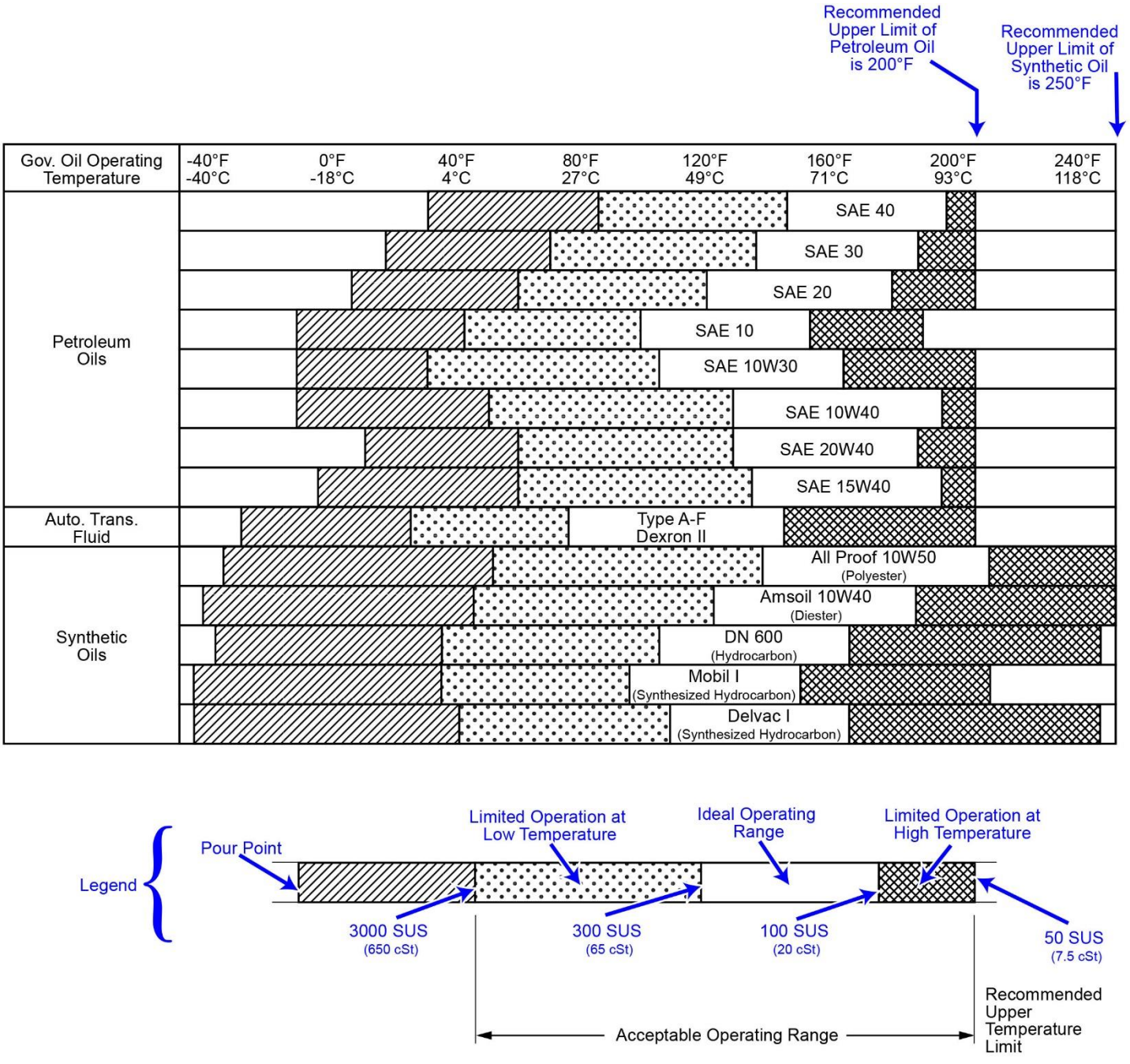
MO-0157
Woodward Type SG Governor



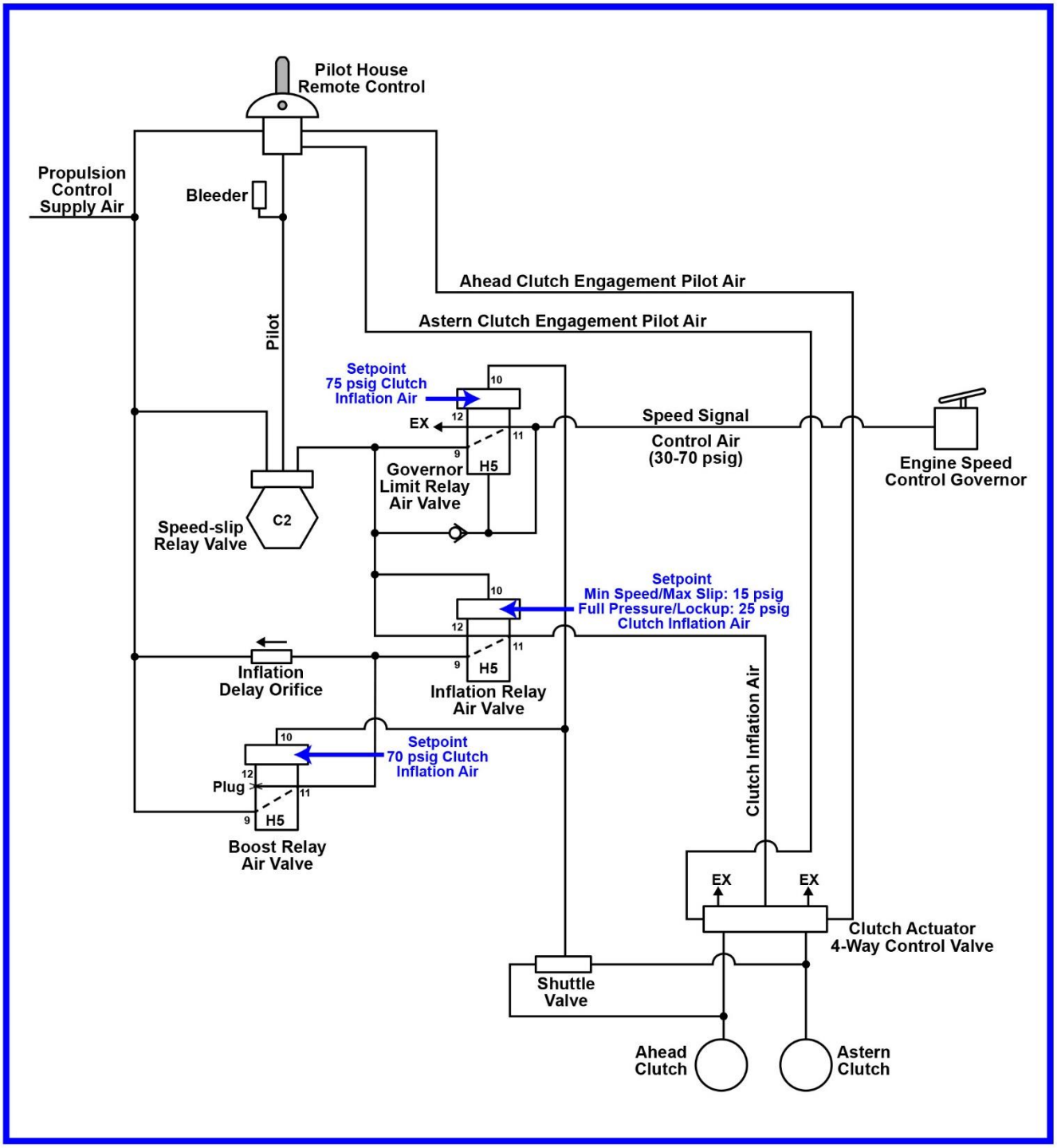
MO-0160
Woodward Type PSG Governor



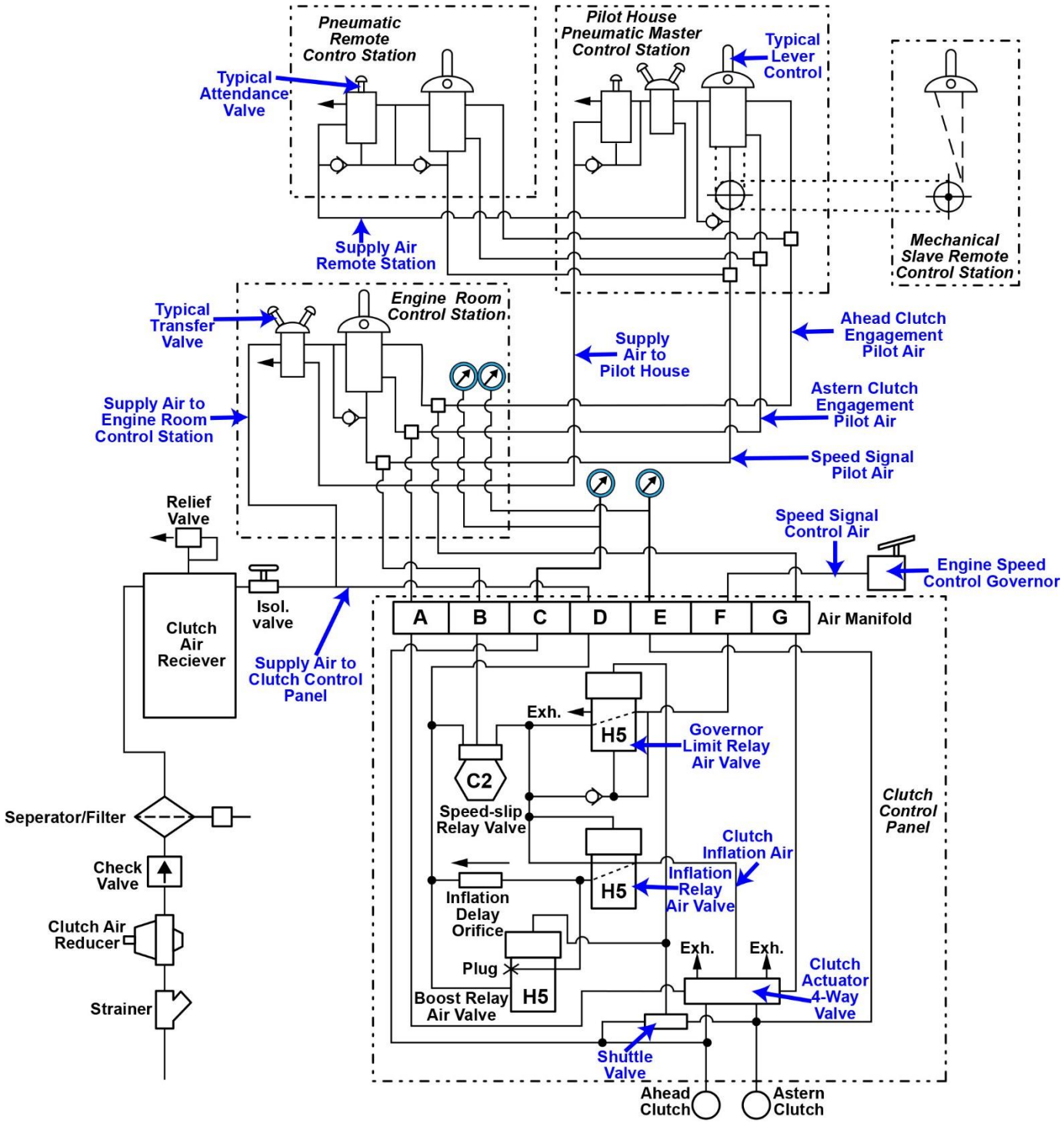
MO-0161
Oil Chart



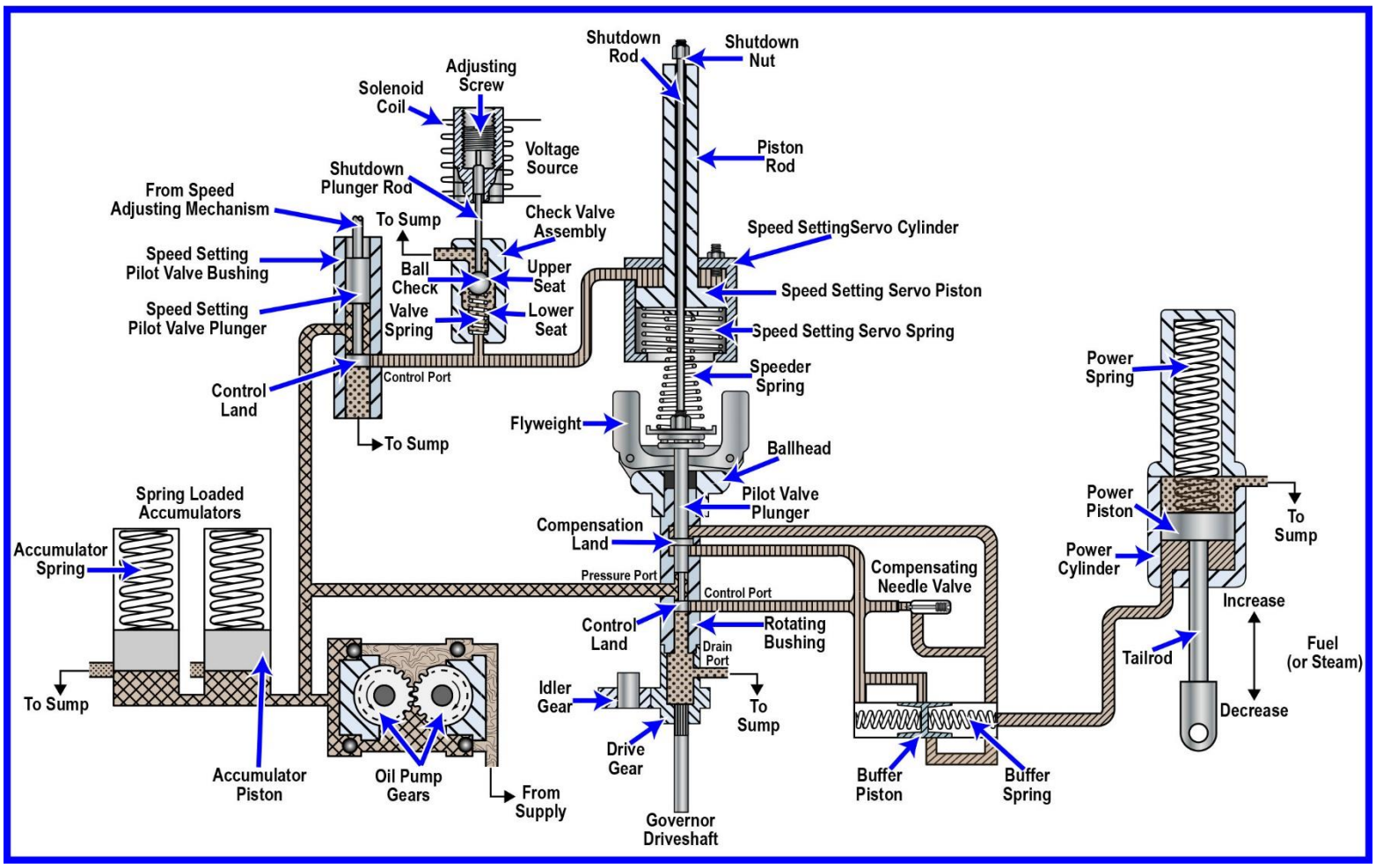
MO-0167
Pneumatic Propulsion Control System with Single Lever Pilot House Control



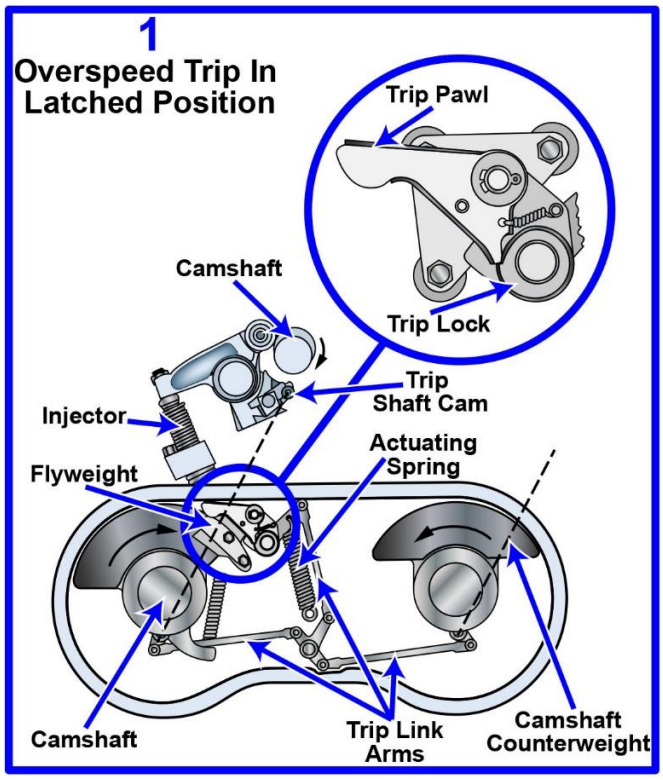
MO-0168
Pneumatic Propulsion Control System

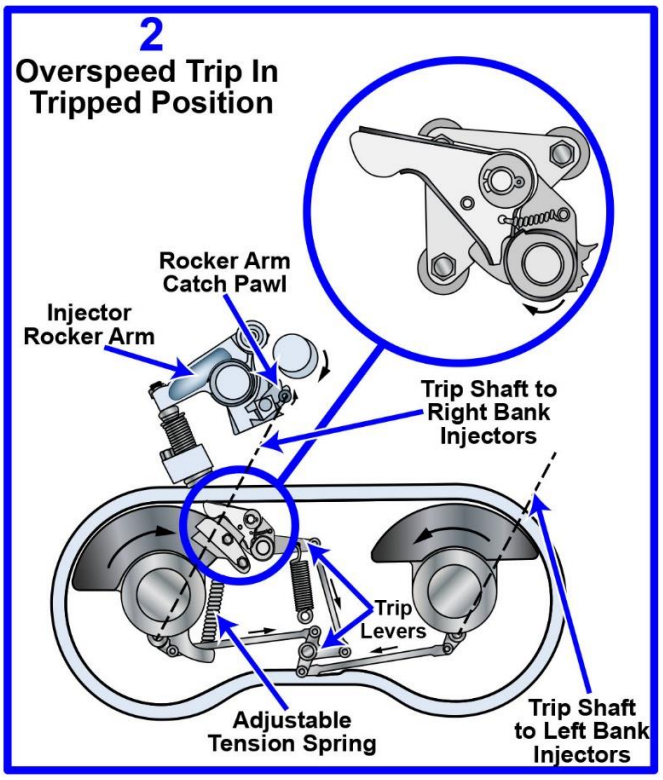


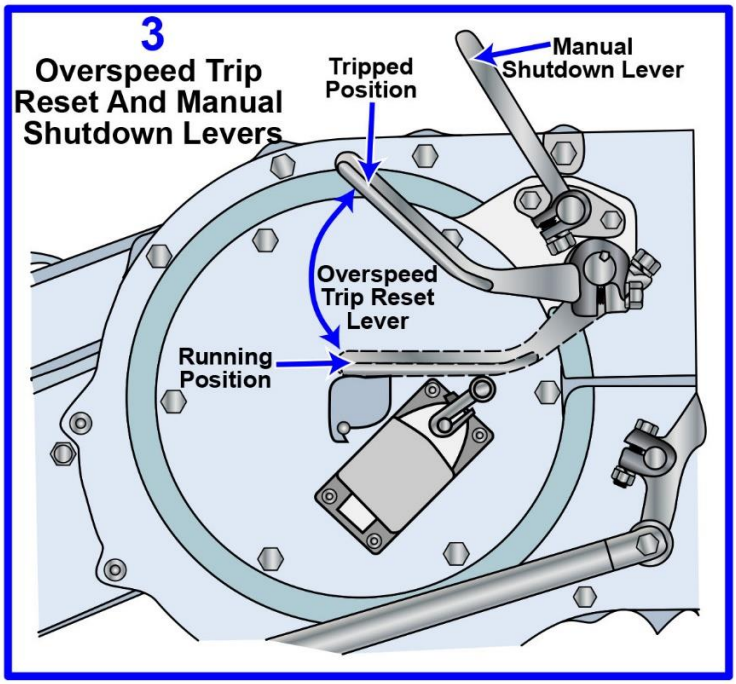
MO-0170
Woodward PG Governor with Shutdown Solenoid Assembly



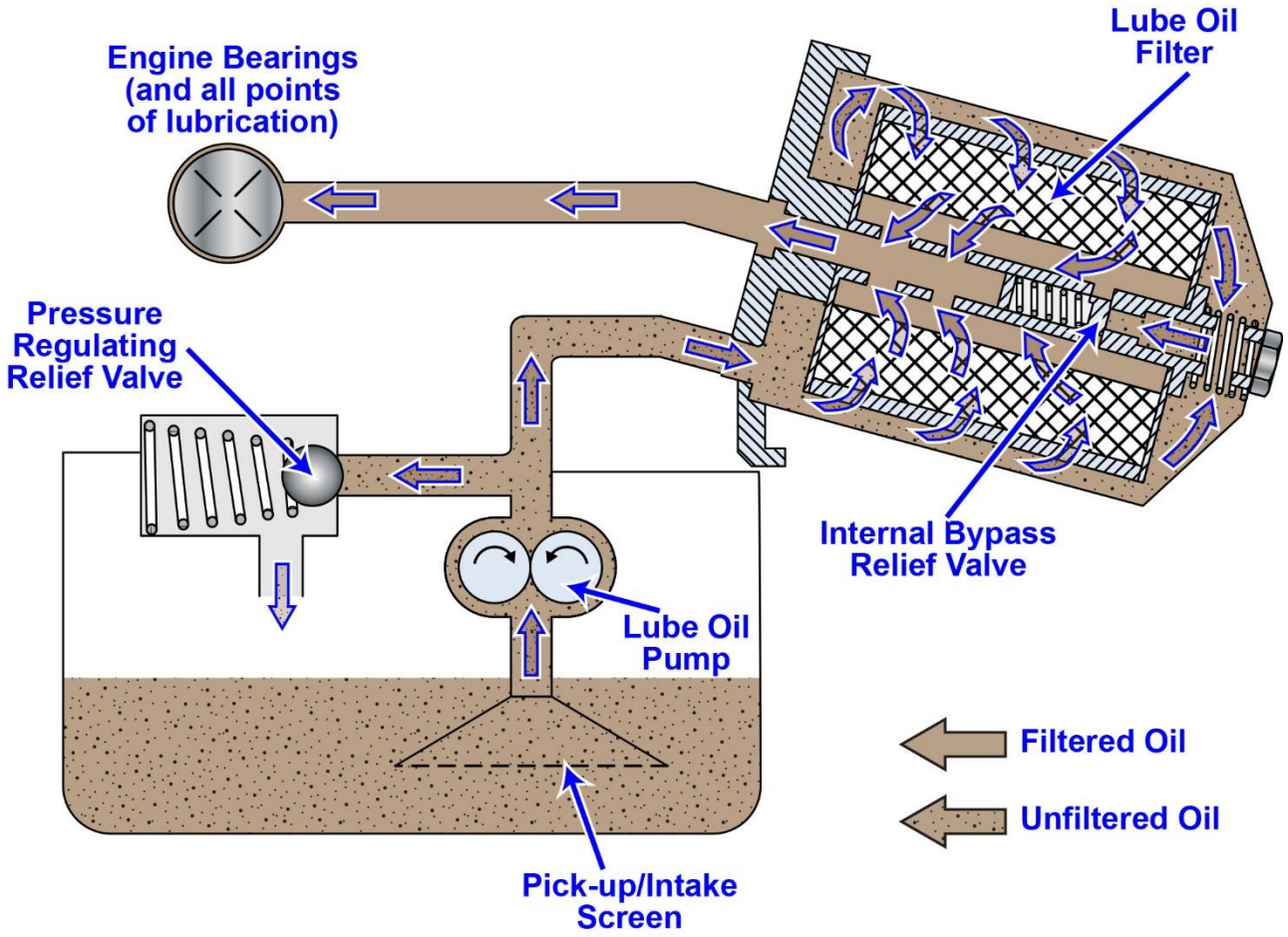
MO-0171
EMD 645 Overspeed and Manual Trips



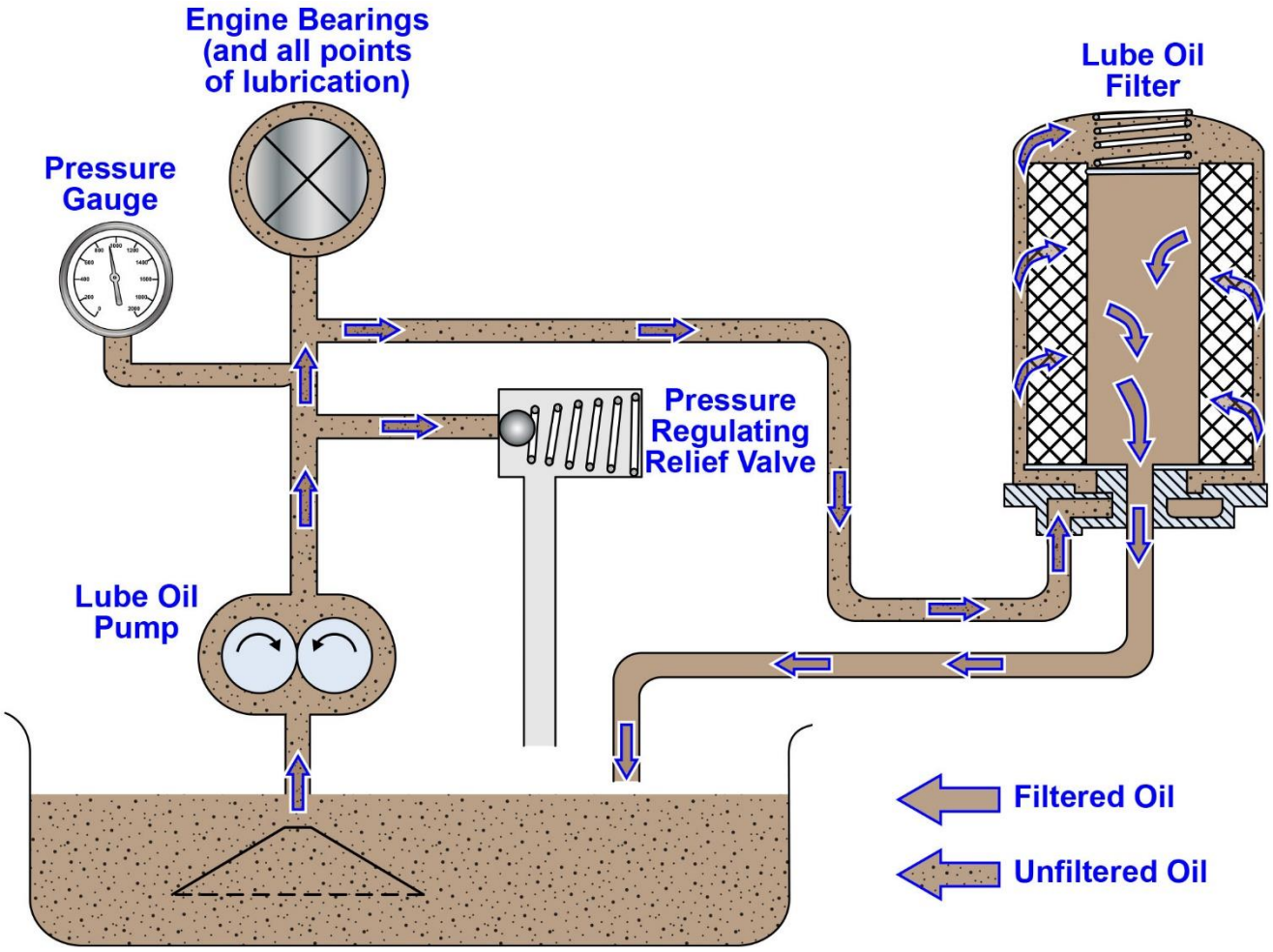




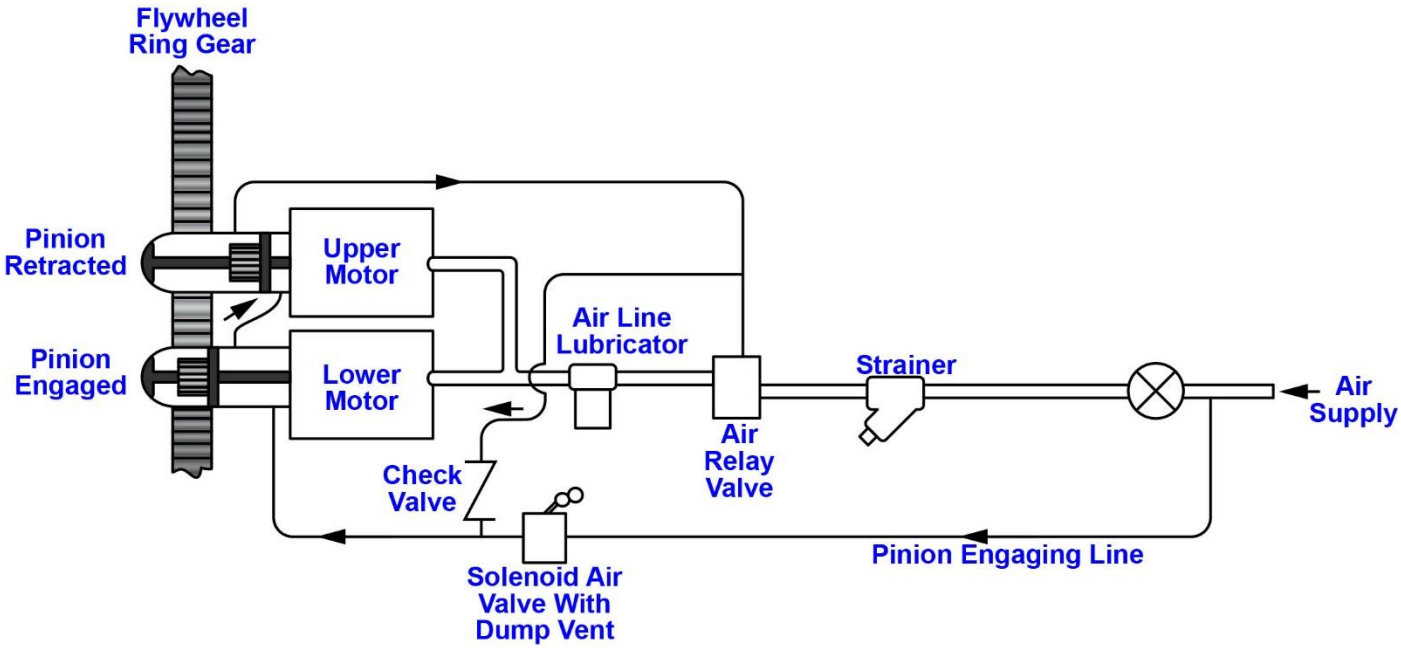
MO-0181
Simplified Lube Oil Filtration System



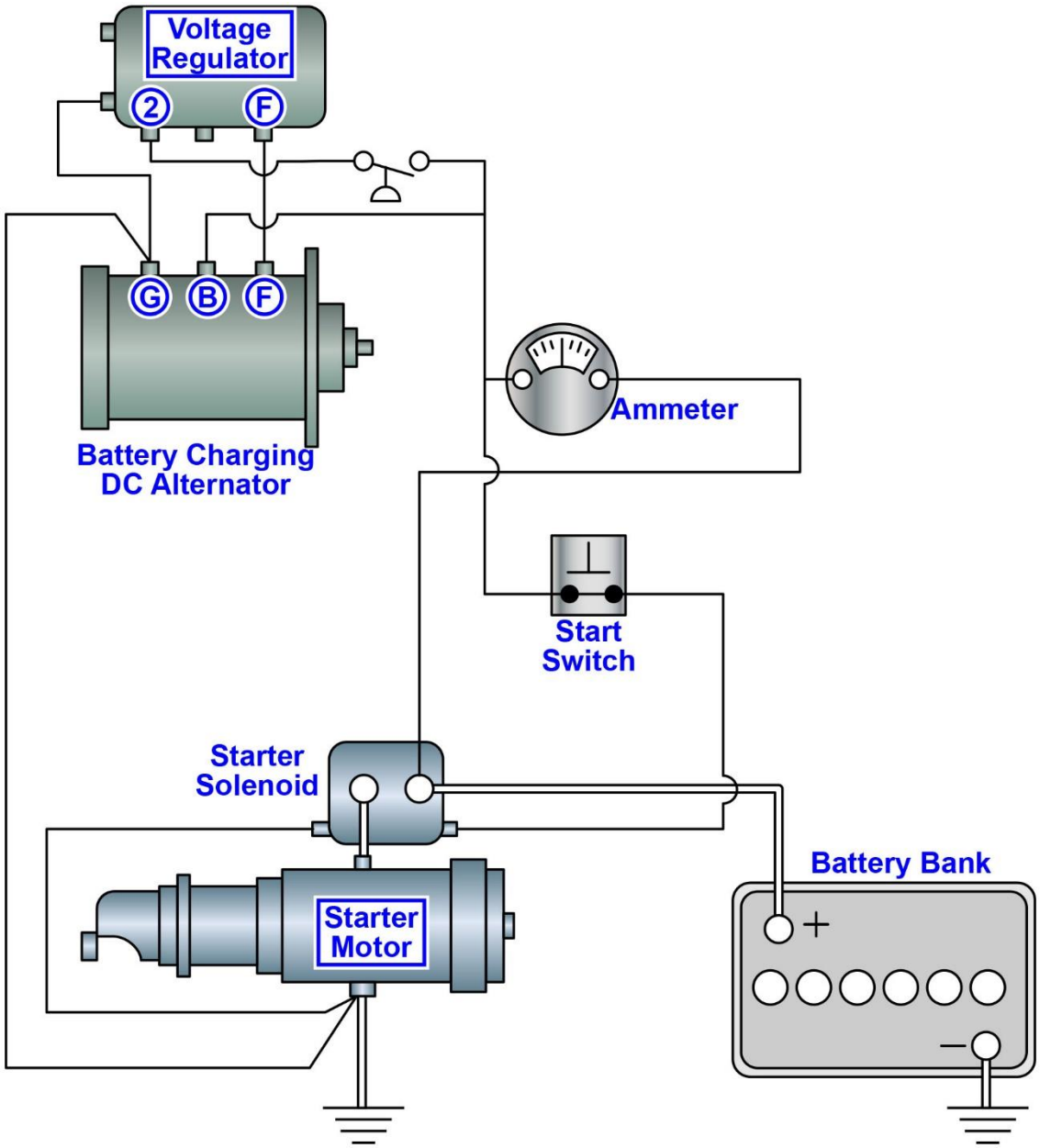
MO-0182
Simplified Lube Oil Filtration System



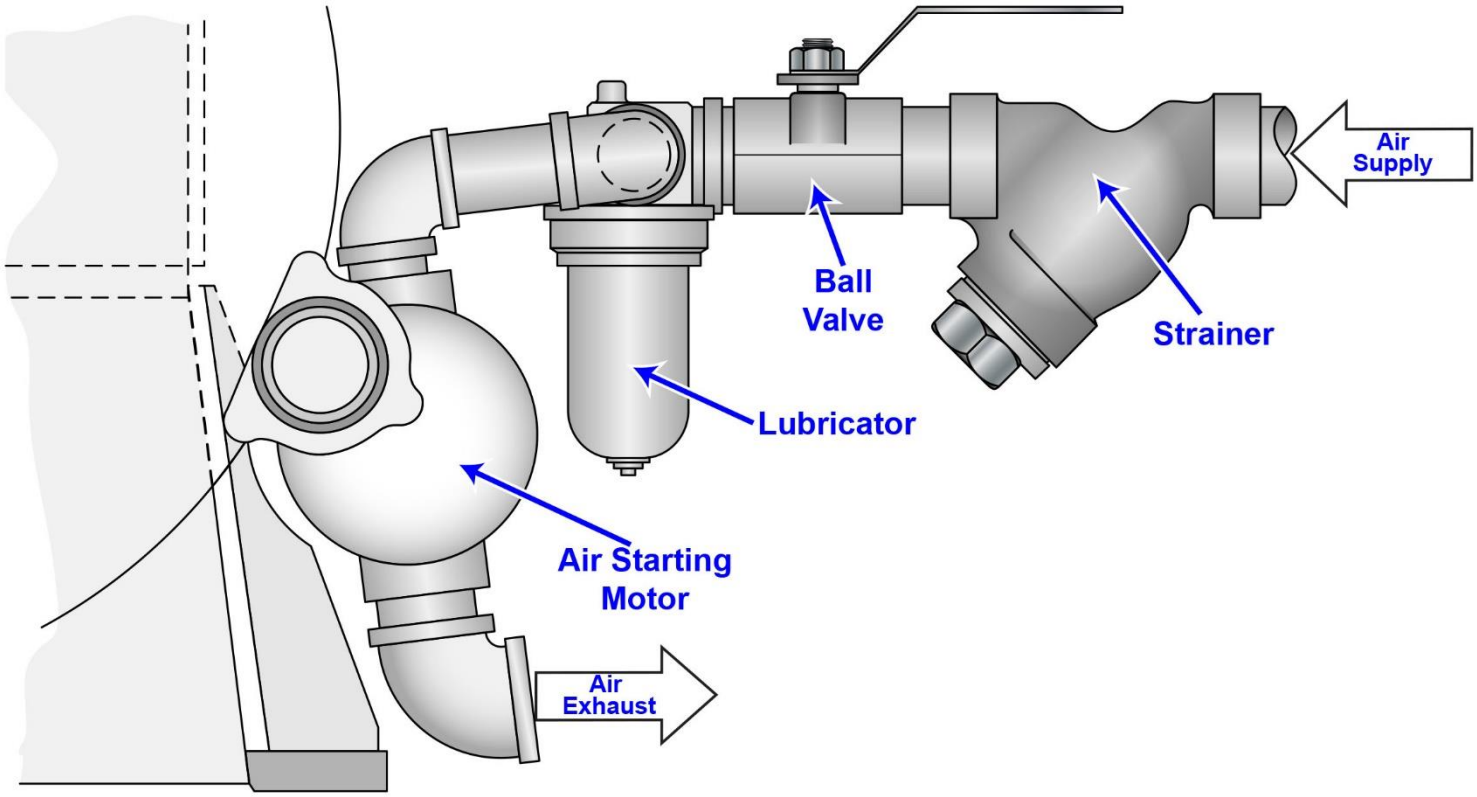
MO-0200
EMD Air Start System Piping at Engine



MO-0202
Simplified Electric Starting System



MO-0203
Simplified Air Starting System



MO-0224