U.S.C.G. Merchant Marine Exam

Assistant Engineer, Limited

Q613 General Subjects

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions.

1. Referring to the illustrated dual duct multiple zone HVAC system, how is the space temperature directly controlled? Illustration GS-RA-43

- (A) The space air temperature is controlled by automatically proportioning the cold and hot air streams at the mixing unit.
- (B) The space air temperature is controlled by automatically controlling the chilled water flow through the cooling coil.
- (C) The space air temperature is controlled by automatically controlling the steam flow through the reheat coil.
- (D) The space air temperature is controlled by automatically controlling the steam flow through the preheat coil.

If choice A is selected set score to 1.

2. In accordance with 33 CFR Subchapter O (Pollution), which discharge of oil or oily mixture to sea is permissible?

- (A) When the discharge is necessary for the purpose of securing the safety of a ship or saving life at sea.
- (B) When the oil content of the effluent without dilution is less than 100 parts per million.
- (C) When the oil or oily mixture originates from tanker cargo pump room bilges.
- (D) When the oil or oily mixture is mixed with tanker cargo residues.

If choice A is selected set score to 1.

3. Suppose the illustrated self-contained, internal-pilot, piston-operated temperature control valve is part of the temperature control system for a steam-heated heavy fuel oil service heater for a steam boiler. If there was an increase in demand for fuel by the boiler, what statement correctly represents how the valve would initially respond? Illustration GS-0045

- (A) The fuel oil heater fuel outlet temperature would increase, causing the remote bulb pressure to increase and the control diaphragm to flex downward and through lever action, further close the pilot valve.
- (B) The fuel oil heater fuel outlet temperature would decrease, causing the remote bulb pressure to decrease and the control diaphragm to flex upward and through lever action, further open the pilot valve.
- (C) The fuel oil heater fuel outlet temperature would decrease, causing the remote bulb pressure to decrease and the control diaphragm to flex downward and through lever action, further close the pilot valve.
- (D) The fuel oil heater fuel outlet temperature would increase, causing the remote bulb pressure to increase and the control diaphragm to flex upward and through lever action, further open the pilot valve.

If choice B is selected set score to 1.

4. If a centrifugal pump were continually operated with the discharge valve closed, the _____.

- o (A) motor controller overload would open
- · (B) pump would eventually overheat
- o (C) relief valve would continuously cycle open
- o (D) motor would overheat

If choice B is selected set score to 1.

5. The flame screens installed on sewage system tank vents prevent explosions by _____.

- o (A) allowing the escape of flammable vapors
- · (B) dissipating the heat of a flame
- o (C) absorbing any flammable vapors in the vicinity
- o (D) preventing flammable vapors from entering the tank

If choice B is selected set score to 1.

6. Capacity control of a centrifugal refrigeration compressor can be accomplished by what means?

- o (A) varying the position of the hot gas bypass valve
- o (B) varying the speed of the compressor
- o (C) varying the position of the suction inlet damper vanes
- · (D) all of the above

If choice D is selected set score to 1.

7. If a heat exchanger is designed to condense refrigerant vapor using central cooling fresh water as a condensing medium, what statement is true?

- o (A) The refrigerant vapor loses latent heat; the central cooling fresh water loses latent heat.
- · (B) The refrigerant vapor loses latent heat, the central cooling fresh water gains sensible heat.
- o (C) The refrigerant vapor loses sensible heat, the central cooling fresh water gains latent heat.
- o (D) The refrigerant vapor gains latent heat, the central cooling fresh water loses sensible heat.

If choice B is selected set score to 1.

8. Which statement is true concerning alkaline reserve as it applies to a lubricating oil?

- o (A) Alkaline reserve represents the ability of an oil to maintain the oil in an alkaline condition.
- o (B) Alkaline reserve represents the ability of an oil to neutralize bases as they are formed.
- o (C) Alkaline reserve represents the ability of an oil to maintain the oil in an acidic condition.
- · (D) Alkaline reserve represents the ability of an oil to neutralize acids as they are formed.

If choice D is selected set score to 1.

9. The term "oil foaming" in refrigeration practice, is used to describe what event?

- (A) release of miscible refrigerant from the lubricant in the crankcase
- (B) release of dissolved lubricant from the refrigerant in the crankcase
- (C) sudden evaporation of entrapped moisture from the crankcase lubricant
- (D) sudden evaporation of entrapped air from the refrigerant liquid

If choice A is selected set score to 1.

10. In examining a baseline vibration signature and the historical record of periodic vibration analyses, what must be considered for the evaluation of rotating machinery?

- (A) Minimum vibration limits and the change in vibration levels over time.
- (B) Maximum vibration limits and the change in vibration levels over time.
- (C) Change in vibration levels over time, with no regard to maximum vibration limits.
- (D) Maximum vibration limits only, with no regard for the change in vibration levels over time.

If choice B is selected set score to 1.

11. As shown in figure "B" of the illustrated self-contained recovery unit connection diagrams, what is the recovery method supported by the connection scheme? Illustration GS-RA-33

- (A) direct vapor recovery
- (B) direct liquid recovery
- (C) liquid recovery/push-pull
- (D) vapor recovery/push-pull

If choice A is selected set score to 1.

12. What statement is true concerning the keel arrangements of a double bottomed ship?

- (A) A ship with a "duct keel" has a single continuous transverse girder positioned along the centerline and perpendicular to the flat plate keel, and a ship with an "I-section keel" has two continuous transverse girders spaced apart and positioned on either side of the centerline and perpendicular to the flat plate keel.
- (B) A ship with an "I-section keel" has a single continuous transverse girder positioned along the centerline and perpendicular to the flat plate keel, and a ship with a "duct keel" has two continuous transverse girders spaced apart and positioned on either side of the centerline and perpendicular to the flat plate keel.
- (C) A ship with a "duct keel" has a single continuous longitudinal girder positioned along the centerline and perpendicular to the flat plate keel, and a ship with an "I-section keel" has two continuous longitudinal girders spaced apart and positioned on either side of the centerline and perpendicular to the flat plate keel.
- (D) A ship with an "I-section keel" has a single continuous longitudinal girder positioned along the centerline and perpendicular to the flat plate keel, and a ship with a "duct keel" has two continuous longitudinal girders spaced apart and positioned on either side of the centerline and perpendicular to the flat plate keel.

If choice D is selected set score to 1.

13. A 'centerline' depicted in a drawing or blueprint is represented by which of the figures shown in the illustration? Illustration GS-0031

o (A) A
· (B) E
o (C) C
o (D) D

If choice B is selected set score to 1.

14. The line labeled "G", as shown in the illustration, would be identified as the _____. Illustration GS-0175

· (A) waste oil outlet line
o (B) processed water outlet line
o (C) clean water inlet line
o (D) oily bilge water inlet line

If choice A is selected set score to 1.

15. In the unit illustrated, the feed water temperature is required to be increased to 165°F or greater and must exist at this temperature when leaving _____. Illustration GS-0053

o (A) HX1
o (B) FC1
o (C) HX4
· (D) HX5

If choice D is selected set score to 1.

16. Reheating a hardened component to a temperature lower than the hardening temperature and then cooling it is known as _____.

o (A) case hardening
o (B) low temperature hardening
o (C) annealing
· (D) tempering

If choice D is selected set score to 1.

17. Which term represents the ability of a speed control governor to maintain prime mover speed without hunting?

o (A) Dead band
· (B) Stability
o (C) Promptness
o (D) Sensitivity

If choice B is selected set score to 1.

18. What statement is true concerning heat transfer rates by the heat transfer mode of natural convection?

- (A) Heat transfer rates are directly proportional to the difference in fluid densities which, in turn, is directly proportional to the temperature gradient.
- (B) Heat transfer rates are inversely proportional to the difference in fluid densities which, in turn, is directly proportional to the temperature gradient.
- (C) Heat transfer rates are directly proportional to the difference in fluid densities which, in turn, is inversely proportional to the temperature gradient.
- (D) Heat transfer rates are inversely proportional to the difference in fluid densities which, in turn, is inversely proportional to the temperature gradient.

If choice A is selected set score to 1.

19. If immediate action is required to ensure the safety of the ship, its machinery, and crew, who has the responsibility to take this action?

- (A) Only the chief engineer can take such action.
- (B) Only the chief or first assistant engineer can take such action.
- (C) Only the chief, first assistant or second assistant engineer can take such action.
- (D) The officer in charge of the engineering watch must take immediate action.

If choice D is selected set score to 1.

20. As shown in figure "A" of the illustrated block diagram of a central operating system configured for direct digital control, what does the output system block "DIGITAL CONTACT" represent? Illustration EL-0095

- (A) It receives analog outputs from the analog device sensors and conditions these as analog signals for CPU processing.
- (B) It receives digital outputs from the binary device sensors and converts these to analog signals for CPU processing.
- (C) It receives analog outputs from the analog device sensors and converts these to digital signals for CPU processing.
- (D) It receives digital outputs from the binary device sensors and conditions these as digital signals for CPU processing.

If choice D is selected set score to 1.

21. In a dry-type direct expansion refrigeration evaporator, what is true concerning the evaporator coils?

- (A) the coils are surrounded on the outside by refrigerant
- (B) the coils are surrounded on the outside by air
- (C) the coils are coated on the inside with insulation
- (D) the coils are covered on the outside with insulation

If choice B is selected set score to 1.

22. Expansion tanks when used in a ship's low temperature hot water heating system may be of the open or closed type. In a closed type system, what would be the normal temperature range of the water?

- o (A) 180°F to 200°F
- · (B) 220°F to 240°F
- o (C) 260°F to 280°F
- o (D) 320°F to 360°F

If choice B is selected set score to 1.

23. When making welding repairs to a ship's structural member, why is it important to avoid weld faults?

- o (A) The poor quality weld can lead to points of stress relief, which in addition to a weak joint, may form the starting points for cracks.
- o (B) The poor quality weld can lead to points of stress concentration, which in addition to a weak joint, may cause plate distortion.
- · (C) The poor quality weld can lead to points of stress concentration, which in addition to a weak joint, may form the starting points for cracks.
- o (D) The poor quality weld can lead to points of stress relief, which in addition to a weak joint, may cause plate distortion.

If choice C is selected set score to 1.

24. The pressure of an operating hydraulic system, as indicated by a pressure gauge, is a result of the fluid flow overcoming _____.

- o (A) the load applied to the system
- o (B) resistance of the internal components
- o (C) internal resistance to flow
- · (D) all of the above

If choice D is selected set score to 1.

25. Which of the following guidelines is considered to reflect good design practices for shipboard steam heating systems?

- · (A) Provide a dirt pocket and strainer ahead of the steam trap on a unit heater return.
- o (B) Provide all units with a dirt trap and gate valve in the supply and a check valve on the return.
- o (C) Wherever possible install vertical runs for condensate piping.
- o (D) Provide orifice-type bypasses for all traps and automatic valves.

If choice A is selected set score to 1.

26. Concerning transverse fixed tunnel thrusters, what statement is true?

- o (A) Transverse fixed tunnel thrusters are oriented fore-to-aft, usually located at the stern of a vessel, and used for docking, undocking, and low-speed maneuvering.
- o (B) Transverse fixed tunnel thrusters are oriented athwartships, usually located at the bow of a vessel, and used to supplement main propulsion for higher sustained speeds.
- · (C) Transverse fixed tunnel thrusters are oriented athwartships, usually located at the bow of a vessel, and used for docking, undocking, and low-speed maneuvering.
- o (D) Transverse fixed tunnel thrusters are oriented fore-to-aft, usually located at the stern of a vessel, and used to supplement main propulsion for higher sustained speeds.

If choice C is selected set score to 1.

27. For a shell-and-tube heat exchanger, which tube pitch pattern would feature "see-through" lanes and would most easily allow external mechanical cleaning of the tubes?

- o (A) Rotated triangular tube pitch
- · (B) Square tube pitch
- o (C) Triangular tube pitch
- o (D) Rotated square tube pitch

If choice B is selected set score to 1.

28. Line "K" shown in the illustration is the _____. Illustration MO-0110

- o (A) brine eductor inlet
- o (B) feed water inlet
- o (C) brine eductor suction
- · (D) distillate pump suction

If choice D is selected set score to 1.

29. Which of the following bilge pumping applications would most likely use a non-automated centrifugal pump under manual supervision?

- o (A) Shaft alley bilges
- o (B) Machinery space bilges
- o (C) Engine room bilges
- · (D) Dry cargo-hold bilges

If choice D is selected set score to 1.

30. What is another name for the "collision" bulkhead?

- · (A) Forepeak bulkhead
- o (B) Forward engine room bulkhead
- o (C) After engine room bulkhead
- o (D) After peak bulkhead

If choice A is selected set score to 1.

31. Which of the following compressors would be used for a dead ship start-up of a ship's service diesel-generator on a motor ship?

- o (A) Ship's service air compressor
- o (B) Starting air compressor
- o (C) Topping air compressor
- · (D) Emergency air compressor

If choice D is selected set score to 1.

32. To convert a vane type hydraulic pump to a hydraulic motor, which of the following would have to be done?

- · (A) Provide small springs between the vanes and the base of the vane slots.
- o (B) Provide one additional slot and vane.
- o (C) Double the casing thickness.
- o (D) Install an enlarged control ring around the rotor.

If choice A is selected set score to 1.

33. If an oil-in-water content monitor uses a lamp emitting light in the visible spectra in conjunction with a reference photocell and a sampling photocell, what is the operating principle upon which this oil-in-water content monitor works?

- o (A) The monitor works on the fluorescence principle where the greater the oil content, the less the amount of ultraviolet light detected by the sampling photoelectric cell as compared to the reference photoelectric cell.
- · (B) The monitor works on the absorption/scattering principle where the greater the oil content, the less the amount of visible light detected by the sampling photoelectric cell as compared to the reference photoelectric cell.
- o (C) The monitor works on the fluorescence principle where the greater the oil content, the greater the amount of ultraviolet light detected by the sampling photoelectric cell as compared to the reference photoelectric cell.
- o (D) The monitor works on the absorption/scattering principle where the greater the oil content, the greater the amount of visible light detected by the sampling photoelectric cell as compared to the reference photoelectric cell.

If choice B is selected set score to 1.

34. In a forced-feed lubrication system, what statement is true concerning lube oil reservoir/sump residence time?

- o (A) The lower the oil level, the longer the residence time, and the cooler the oil will be as delivered by the pump.
- · (B) The lower the oil level, the shorter the residence time, and the hotter the oil will be as delivered by the pump.
- o (C) The lower the oil level, the longer the residence time, and the hotter the oil will be as delivered by the pump.
- o (D) The lower the oil level, the shorter the residence time, and the cooler the oil will be as delivered by the pump.

If choice B is selected set score to 1.

35. In a vapor compression type refrigeration cycle, the refrigerant temperature decreases the most when passing through which system component?

- o (A) evaporator
- o (B) compressor
- · (C) expansion valve
- o (D) condenser receiver

If choice C is selected set score to 1.

36. A spur gear pump should be operated with the discharge valves _____.

- o (A) slightly opened
- o (B) halfway opened
- o (C) throttled
- · (D) fully opened

If choice D is selected set score to 1.

37. Which of the drill sets listed would commonly be referred to as a 'Jobbers Set'?

- o (A) A set of numbered size drills from 1 to 60.
- · (B) A set of fractional size drills from 1/16'' to 1/2''.
- o (C) A set of fractional size drills from 1/2'' to 2''.
- o (D) A set of lettered size drills from A to Z.

If choice B is selected set score to 1.

38. What type of pump is shown in the illustration? Illustration GS-0144

- o (A) Deep well centrifugal pump
- o (B) Simplex reciprocating pump
- · (C) Triple screw rotary pump
- o (D) Double screw rotary pump

If choice C is selected set score to 1.

39. What is the primary purpose of the lead-lag arrangement of the two potable water pumps supporting a typical potable water system?

- · (A) Enabling the lead pump to cycle on and off during periods of relatively low demand and the lag pump to assist the lead pump only when the demand is high.
- o (B) Enabling the lead pump to pump against a shut-off head during periods of relatively low demand and the lag pump to recirculate when the demand is high.
- o (C) Enabling the lag pump to cycle on and off during periods of relatively low demand and the lead pump to assist the lag pump only when the demand is high.
- o (D) Enabling both potable water pumps to cycle on and off together in response to system demand changes.

If choice A is selected set score to 1.

40. Which of the following fresh water generators has an operating principle that evaporates preheated sea water by causing it to undergo a pressure drop into a vacuum?

- o (A) Submerged tube unit
- · (B) Flash type unit
- o (C) Titanium plate unit
- o (D) Reverse osmosis unit

If choice B is selected set score to 1.

41. Suppose the illustrated pneumatically operated diaphragm actuated control valve is used to control the fuel oil outlet temperature of a steam-heated heavy fuel oil heater by controlling the steam flow. What would be the result if there was a complete loss of pilot air being delivered to the valve actuator? Illustration GS-0051

- o (A) The valve would fail in the fully closed position, most likely resulting in a low fuel oil temperature alarm condition.
- o (B) The valve would fail in the exact position just before the loss of pilot air. The fuel temperature will fluctuate with changes in fuel demand.
- · (C) The valve would fail in the fully open position, most likely resulting in a high fuel oil temperature alarm condition.
- o (D) It is not possible to predict how the valve would respond to a loss of pilot air.

If choice C is selected set score to 1.

42. The safety heads of most large reciprocating compressors used in refrigeration systems are held in place by what means?

- o (A) tack welding on the sides
- · (B) heavy coil springs
- o (C) discharge pressure in the relief valve return line
- o (D) large Teflon gaskets

If choice B is selected set score to 1.

43. Which of the following types of diesel engine lubricating oil filtration schemes must be equipped with a bypass relief valve to insure that the engine bearings are not starved of oil if the filter element should become severely restricted or blocked?

- o (A) Batch filter
- o (B) Shunt filter
- · (C) Full flow filter
- o (D) Bypass filter

If choice C is selected set score to 1.

44. An arrow stamped on the valve body of a water regulating valve indicates which of the following?

- o (A) closed position
- · (B) direction of the flow
- o (C) open position
- o (D) direction of the plunger slide

If choice B is selected set score to 1.

45. What should be done if localized scoring is discovered on a pump shaft sleeve during routine maintenance inspection?

- o (A) Reassemble the pump and set the governor to obtain a slower speed.
- o (B) Reassemble the pump and provide more water leak off for lubrication.
- o (C) Check for parallel alignment of the sleeve radial face to the sleeve bore.
- · (D) Correct the cause of scoring and install a new shaft sleeve.

If choice D is selected set score to 1.

46. To prevent the unnecessary loading of an air conditioning system while maintaining the designed dry bulb temperature and relative humidity in an air conditioning system, what should be done?

- o (A) operate the purge recovery unit continuously
- o (B) reduce the air reheating system load
- o (C) lower the compressor head pressure
- · (D) admit only enough fresh outside air to provide proper ventilation

If choice D is selected set score to 1.

47. What statement is true concerning thermal energy in transition?

- o (A) Thermal energy in transition is called heat which is the result of a temperature difference. The resulting heat flow may produce two possible outcomes. Sensible heat transfer results in a change of state of the substance. Latent heat transfer results in a change of temperature of the substance.
- · (B) Thermal energy in transition is called heat which is the result of a temperature difference. The resulting heat flow may produce two possible outcomes. Sensible heat transfer results in a change of temperature of the substance. Latent heat transfer results in a change of state of the substance.
- o (C) Thermal energy in transition is called heat which is the result of differences in state. The resulting heat flow may produce two possible outcomes. Sensible heat transfer results in a change of temperature of the substance. Latent heat transfer results in a change of state of the substance.
- o (D) Thermal energy in transition is called heat which is the result of differences in state. The resulting heat flow may produce two possible outcomes. Sensible heat transfer results in a change of state of the substance. Latent heat transfer results in a change of temperature of the substance.

If choice B is selected set score to 1.

48. Which of the following statements is true? Illustration GS-RA-12

- · (A) Valve "14" is the king solenoid, valve "28" is the chill box solenoid, and valve "36" is the freeze box solenoid.
- o (B) Valve "14" is the king solenoid, valves "28" and "36" are both freeze box solenoids.
- o (C) Valve "14" is the king solenoid, valve "36" is the chill box solenoid, and valve "28" is the freeze box solenoid.
- o (D) Valve "14" is the king solenoid, valves "28" and "36" are both chill box solenoids.

If choice A is selected set score to 1.

49. Mechanical shaft seals used on water service pumps require lubrication of the seal faces to minimize deposits of foreign matter on those surfaces. Which of the following pressures and lubricants are required?

- o (A) Water under negative pressure.
- · (B) Water under positive pressure.
- o (C) Oil under positive pressure.
- o (D) Oil under negative pressure.

If choice B is selected set score to 1.

50. If you attempt to tighten a leaking hydraulic fitting with pressure on the system, you will _____.

- o (A) dislodge any scale in the tubing, and it will damage the system
- o (B) cause the system to vibrate
- · (C) find that the pressure will prevent the components from being tightened
- o (D) be successful every time

If choice C is selected set score to 1.

51. After adding grease to a ball bearing with a hand-held grease gun, you should _____.

- o (A) close the bearing housing drain and add a little extra grease to compensate for air pockets in the bearing
- · (B) run the machine with the bearing housing drain plug open for a short while
- o (C) save the used grease for chemical analysis
- o (D) remove the grease fitting and leave open to allow excess grease to escape

If choice B is selected set score to 1.

52. If a main propulsion shafting arrangement is such that no strut or strut bearing is required, what is an alternative name given to the propeller shaft, which is the section of shafting that the propeller is attached to?

- o (A) Line shaft
- · (B) Tail shaft
- o (C) Thrust shaft
- o (D) Head shaft

If choice B is selected set score to 1.

53. An improperly maintained filter used in a hydraulic system can _____.

- o (A) rupture the pump discharge piping
- · (B) reduce or stop the output action of the actuator
- o (C) cause leaking of the flexible line connections
- o (D) all of the above

If choice B is selected set score to 1.

54. In order to facilitate separation of oil from an oily-water mixture in an oily-water separator, what statement is true concerning the flow pattern of the oily-water?

- o (A) Ideally the flow of the oily-water should be low in flow rate and high in turbulence.
- o (B) Ideally the flow of the oily-water should be high in flow rate and high in turbulence.
- · (C) Ideally the flow of the oily-water should be low in flow rate and low in turbulence.
- o (D) Ideally the flow of the oily-water should be high in flow rate and low in turbulence.

If choice C is selected set score to 1.

55. How would you prevent the rudder from moving while a repair is made on the steering system using the illustrated actuator? Illustration GS-0116

· (A) secure the valves in the supply and return lines
o (B) tighten the locking screws in item "S"
o (C) screw in the locking pin, item "J"
o (D) tighten the locking pins, item "H" at each position of item "I" to keep the rudder from swinging

If choice A is selected set score to 1.

56. Even though bilge keels do provide some improvement in longitudinal strength at the bilge radius, what is the primary purpose of the bilge keels?

o (A) Dampen the tendency the ship has to heave.
o (B) Dampen the tendency the ship has to yaw.
· (C) Dampen the tendency the ship has to roll.
o (D) Dampen the tendency the ship has to pitch.

If choice C is selected set score to 1.

57. When responding to a "right rudder" command from the amidships position, which parts of the steering gear system illustrated will be subjected to the highest pressure? Illustration GS-0137

o (A) "C" and "F"
· (B) "E" and "B"
o (C) "F" and "E"
o (D) "B" and "C"

If choice B is selected set score to 1.

58. Which of the illustrated devices would be the LEAST accurate for the purposes of weighing-in a refrigerant charge? Illustration GS-RA-45

o (A) A
o (B) B
· (C) C
o (D) D

If choice C is selected set score to 1.

59. As it pertains to the automatic electric brake of a horizontal electro-mechanical anchor windlass, what statement is true?

- o (A) The brake is electrically set and spring released, and the brake automatically releases when electric power is removed from the electric drive motor.
- · (B) The brake is spring set and electrically released, and the brake automatically sets when electric power is removed from the electric drive motor.
- o (C) The brake is spring set and electrically released, and the brake automatically releases when electric power is removed from the electric drive motor.
- o (D) The brake is electrically set and spring released, and the brake automatically sets when electric power is removed from the electric drive motor.

If choice B is selected set score to 1.

60. A flare-type tubing connector is used in the hydraulic hatch cover system and has developed a slight leak. To stop the leak you should _____.

- · (A) shut down the power unit and use two wrenches to avoid damaging the tubing when tightening
- o (B) replace both the tubing sections and the fitting
- o (C) keep the system in operation and tighten the flare nut
- o (D) stop the system and use only one wrench to tighten the flare nut

If choice A is selected set score to 1.

61. If a belt-driven reciprocating air compressor is operating at a lower than design displacement capacity (in cubic feet per minute), which of the following would be a cause?

- · (A) Insufficiently tensioned drive belts.
- o (B) Misalignment between the compressor and its driver.
- o (C) Improperly lubricated bearings.
- o (D) Excessively tensioned drive belts.

If choice A is selected set score to 1.

62. The lathe tools shown as figure "M" in the illustration are commonly known as _____.
Illustration GS-0090

- · (A) form tools
- o (B) curvature cutting tools
- o (C) parting tools
- o (D) universal turning tools

If choice A is selected set score to 1.

63. Which of the following propulsor types represents the proper terminology for electric propulsion where the drive motors are outside the ship's hull?

- o (A) Jet drive
- o (B) Azimuthing propulsor
- · (C) Azipod propulsor
- o (D) Cycloidal propeller

If choice C is selected set score to 1.

64. For the successful operation of a reverse osmosis fresh water generator, why is the high-pressure pump required to operate in the 750 to 1200 psig range for a discharge pressure?

- o (A) To overcome the pore size of the semi-permeable membrane.
- o (B) To successfully force the salt water through the chemical pre-treatment device.
- · (C) To overcome the osmotic pressure generated by the difference in solution concentrations.
- o (D) To successfully force the salt water through the pre-filter (or pre-filters).

If choice C is selected set score to 1.

65. To set the dividers to the proper radius, you should use a _____.

- o (A) micrometer
- o (B) calipers
- o (C) scribing circle
- · (D) steel rule

If choice D is selected set score to 1.

66. In a closed-loop process control system featuring negative feedback, what is the function of the error detector within the controller?

- o (A) The error detector computes the sum of the measured value of the controlled variable and the desired value (set point).
- o (B) The error detector computes the quotient of the measured value of the controlled variable and the desired value (set point).
- · (C) The error detector computes the difference between the measured value of the controlled variable and the desired value (set point).
- o (D) The error detector computes the product of the measured value of the controlled variable and the desired value (set point).

If choice C is selected set score to 1.

67. With regard to a ballast system associated with a dry cargo ship, what is the primary purpose of the forepeak and aft peak tanks?

- o (A) Adjusting the overall draft of the vessel.
- · (B) Adjusting the trim of the vessel.
- o (C) Correcting a list condition on the vessel.
- o (D) Correcting a condition of hogging or sagging of the vessel.

If choice B is selected set score to 1.

68. As an indication that an air compressor air intake filter needs to be replaced or cleaned, what statement is true?

- o (A) For a given air demand, the compressor would run for shorter periods and the air intake pressure as measured between the filter and the compressor inlet would be less negative than with a clean filter.
- o (B) For a given air demand, the compressor would run for shorter periods and the air intake pressure as measured between the filter and the compressor inlet would be more negative than with a clean filter.
- o (C) For a given air demand, the compressor would run for longer periods and the air intake pressure as measured between the filter and the compressor inlet would be less negative than with a clean filter.
- · (D) For a given air demand, the compressor would run for longer periods and the air intake pressure as measured between the filter and the compressor inlet would be more negative than with a clean filter.

If choice D is selected set score to 1.

69. The amount of HCFC-123 in a storage cylinder is measured by what means?

- o (A) saturation pressure
- o (B) volume
- · (C) weight
- o (D) saturation temperature

If choice C is selected set score to 1.

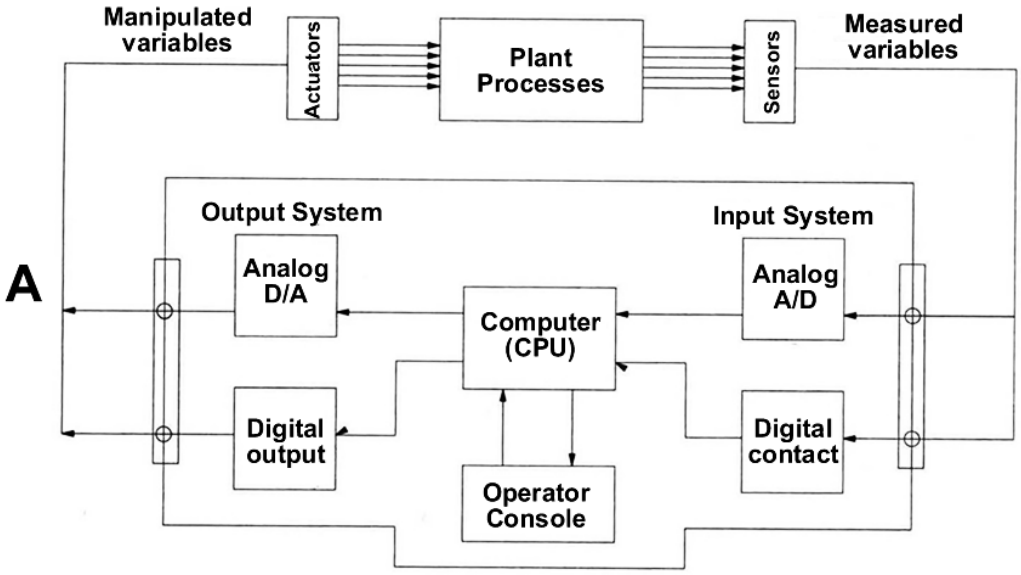
70. In a two-stage centrifugal air conditioning system, the liquid refrigerant passes through the condenser directly to what component?

- o (A) expansion valve
- · (B) economizer
- o (C) chiller
- o (D) evaporator

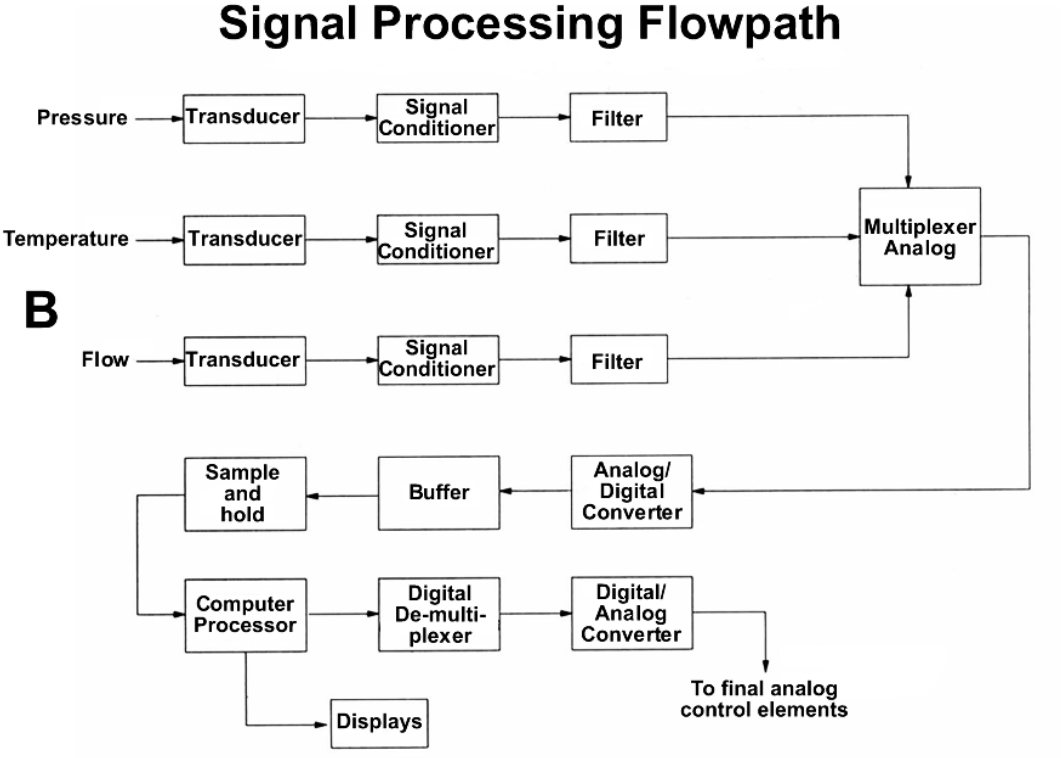
If choice B is selected set score to 1.

EL-0095

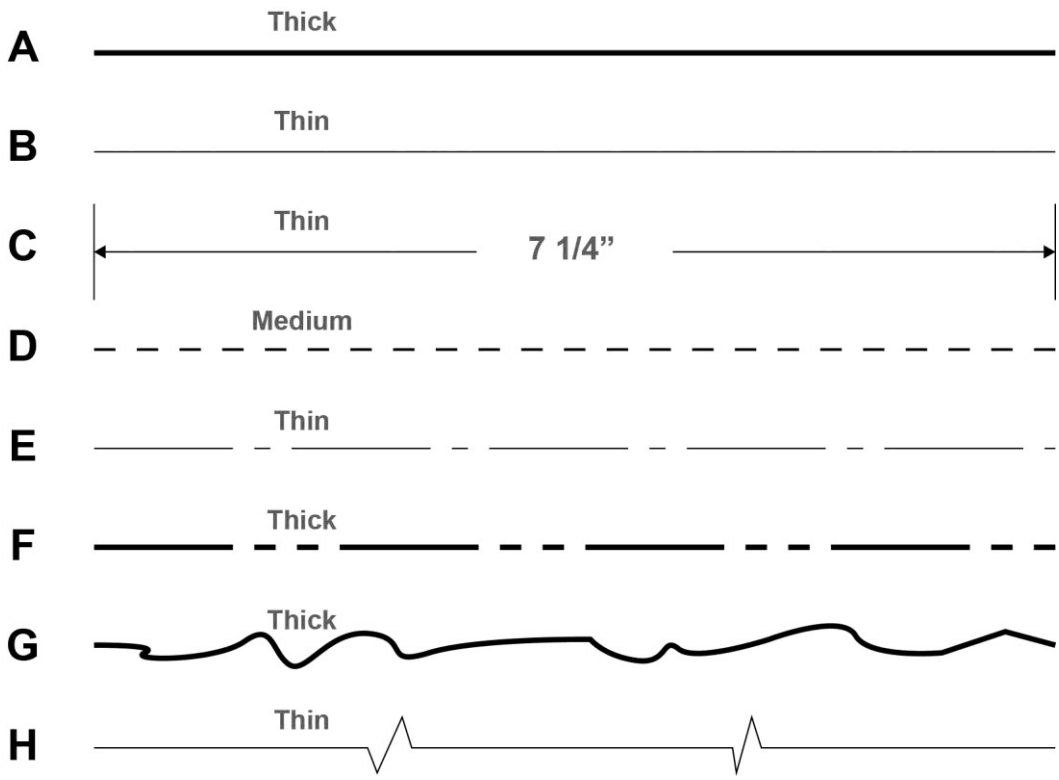
Direct Digital Control



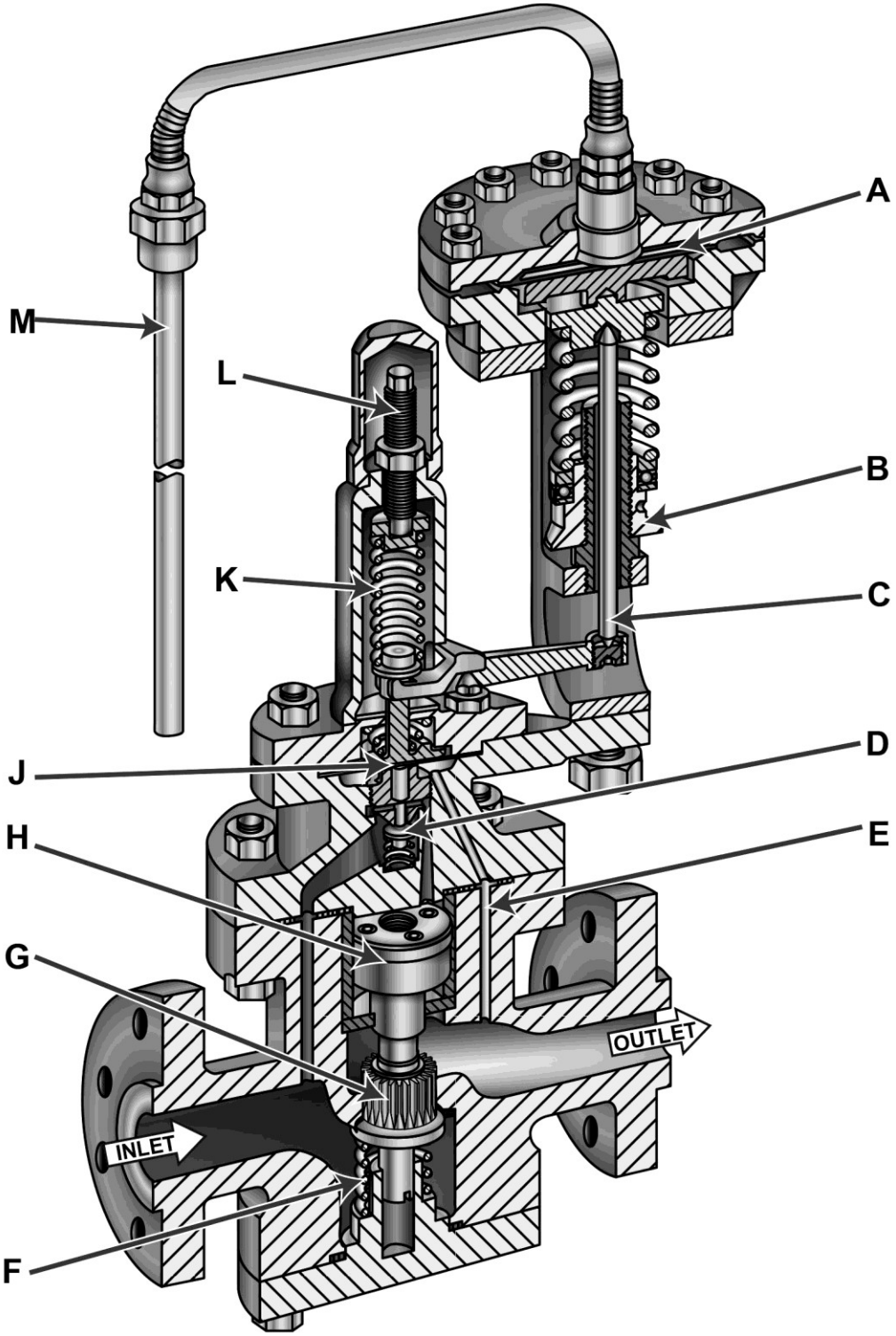
Signal Processing Flowpath



GS-0031



GS-0045



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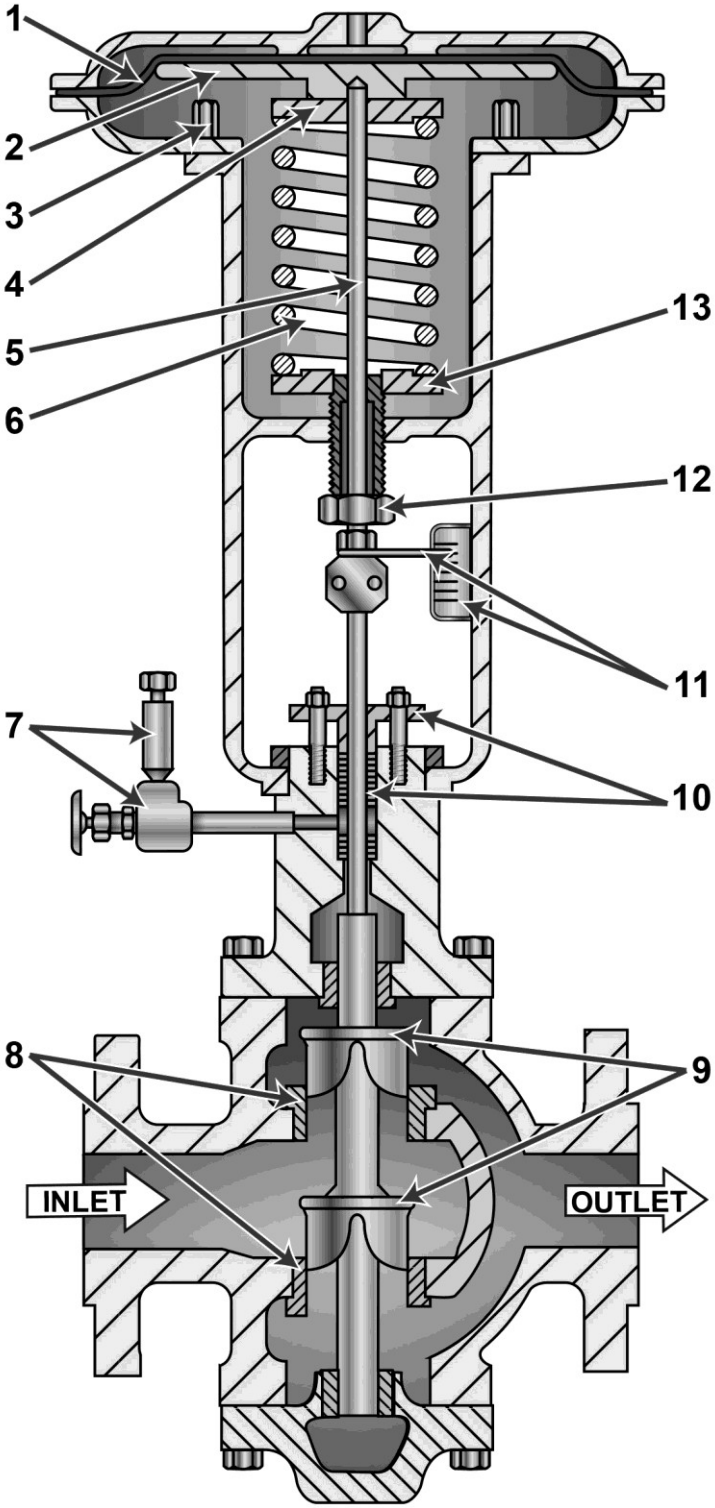
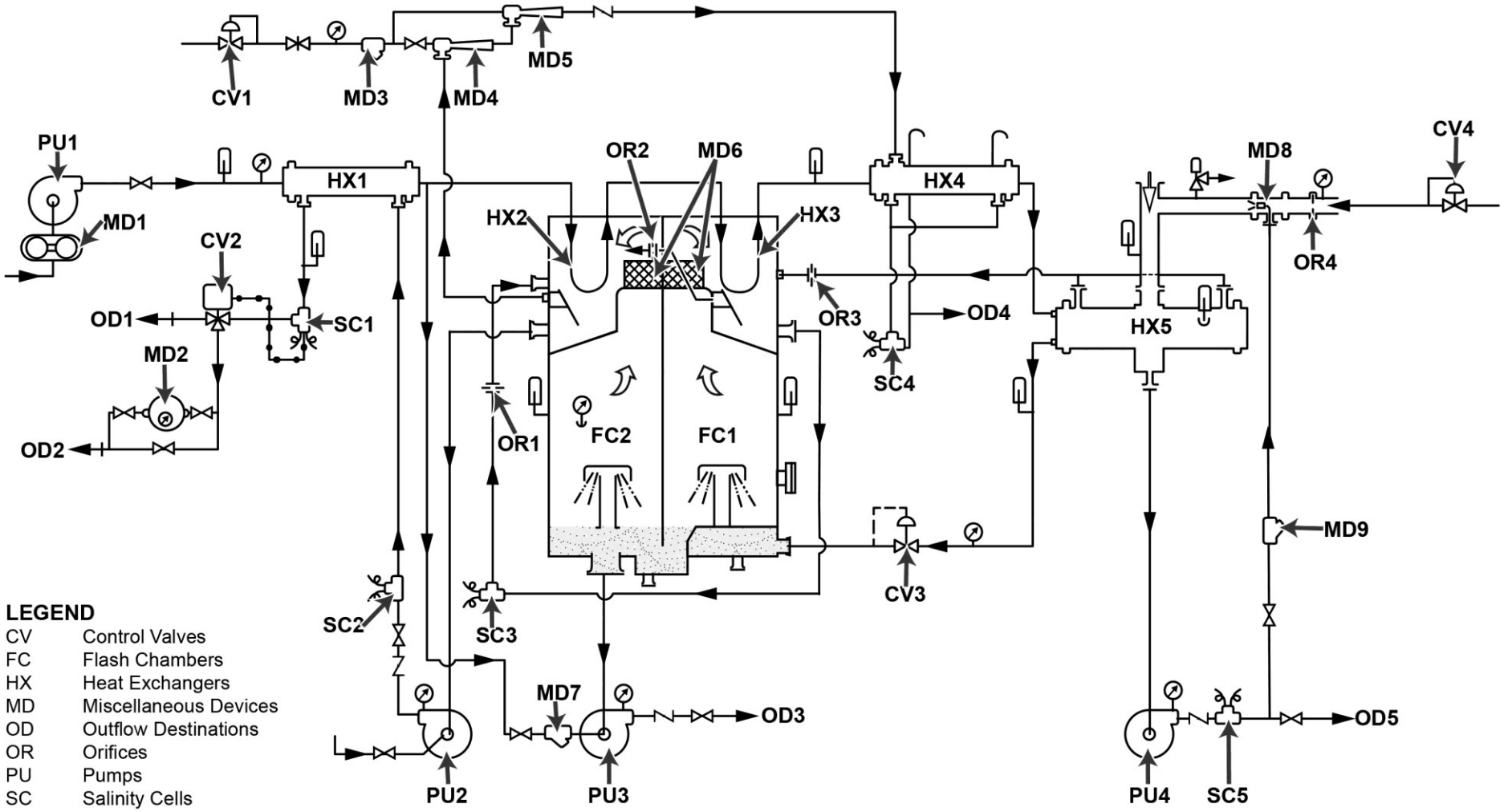
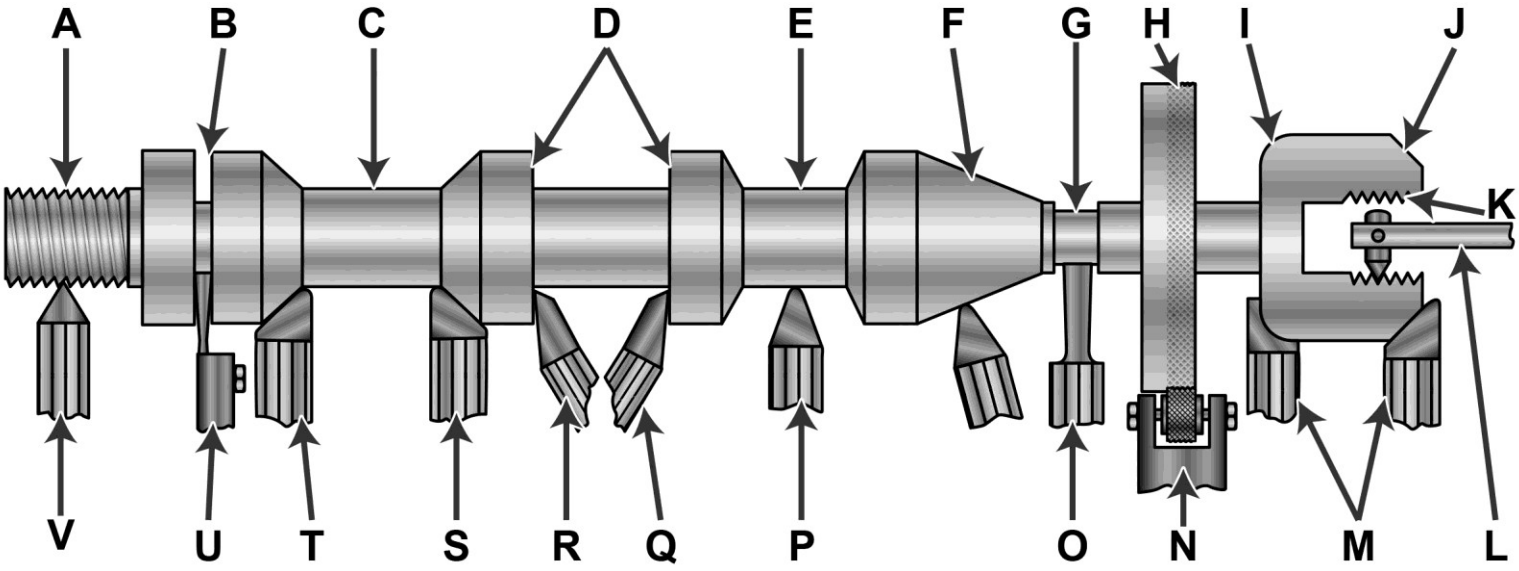
GS-0051



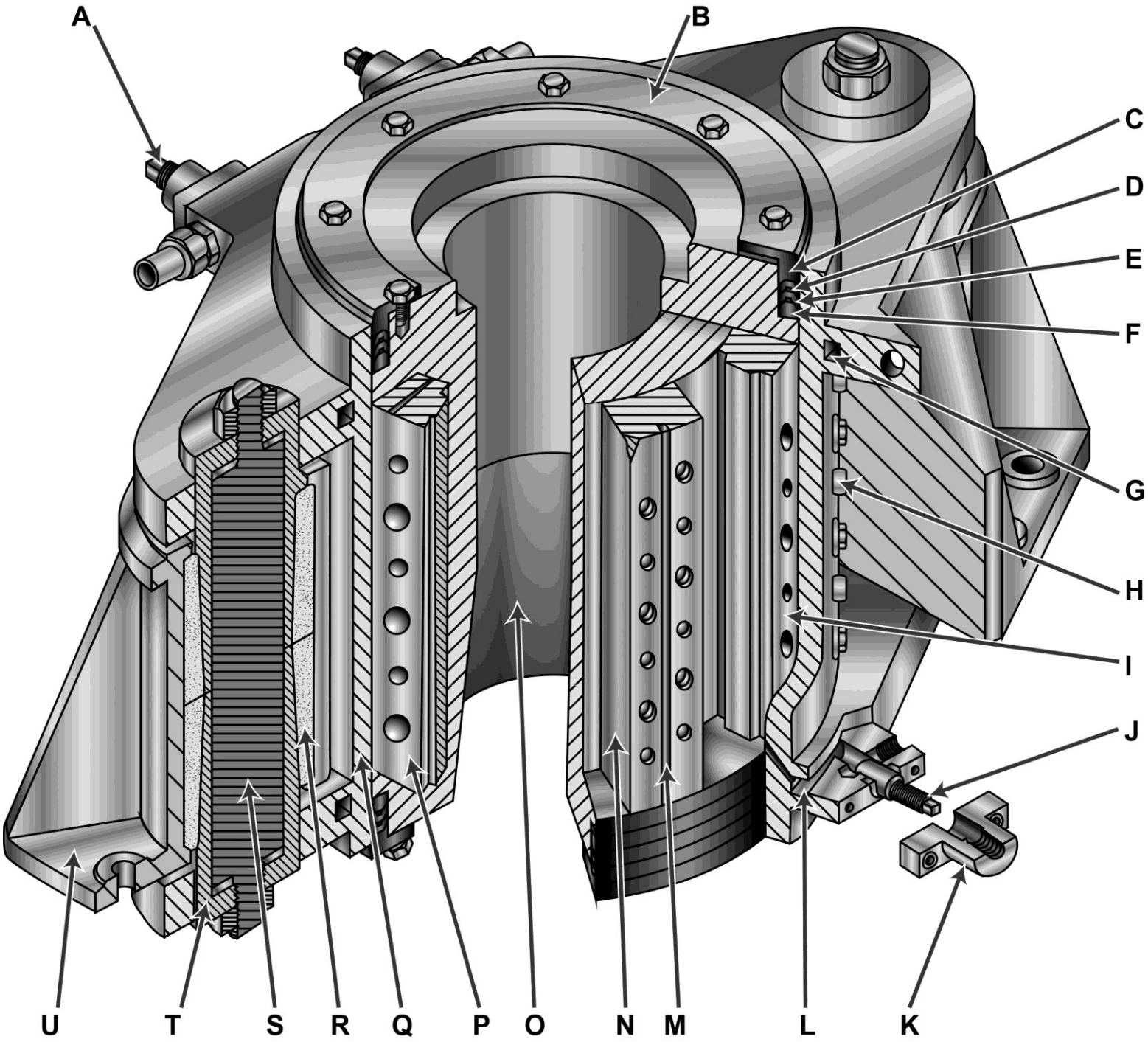
GS-0053



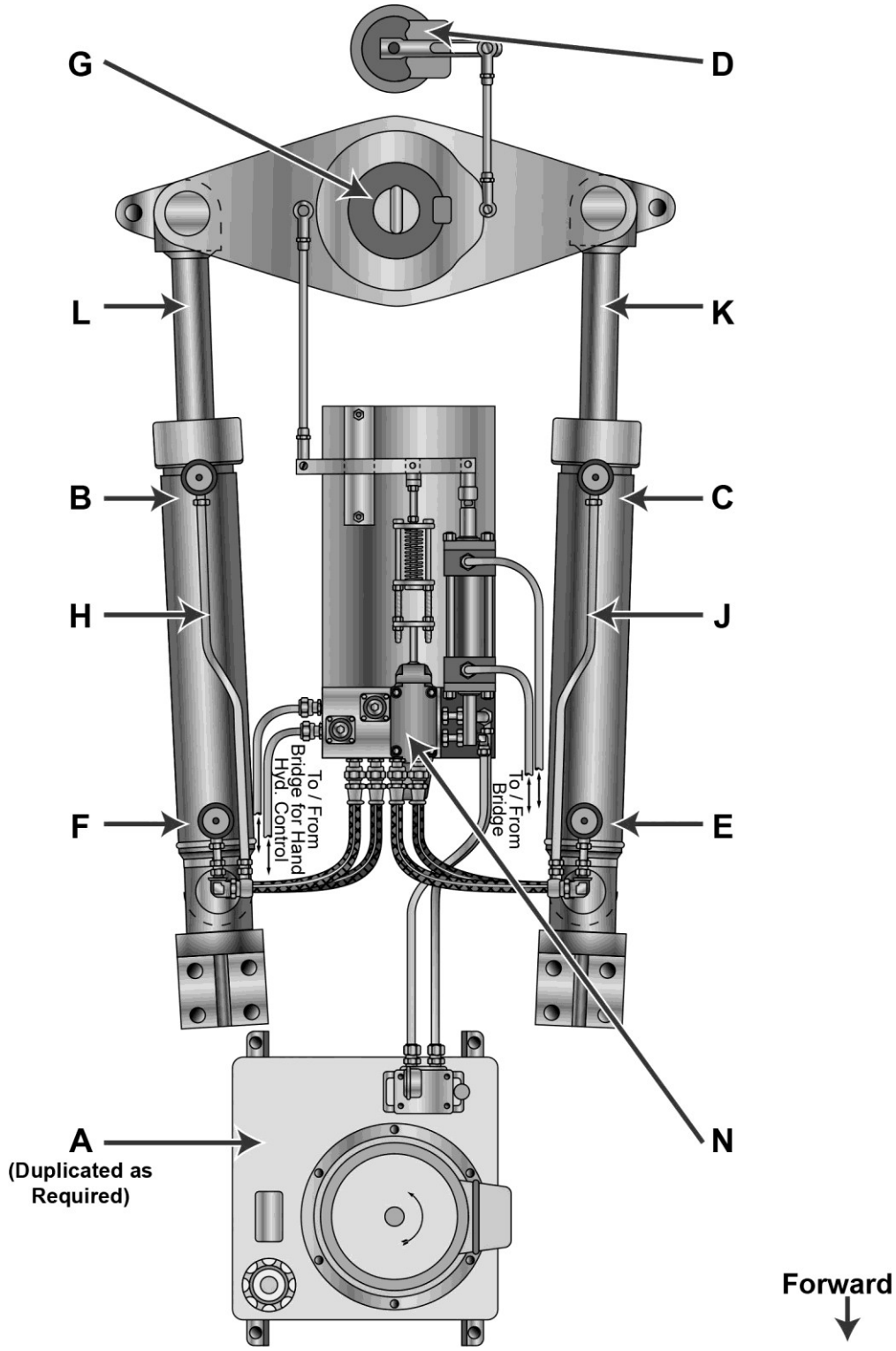
GS-0090



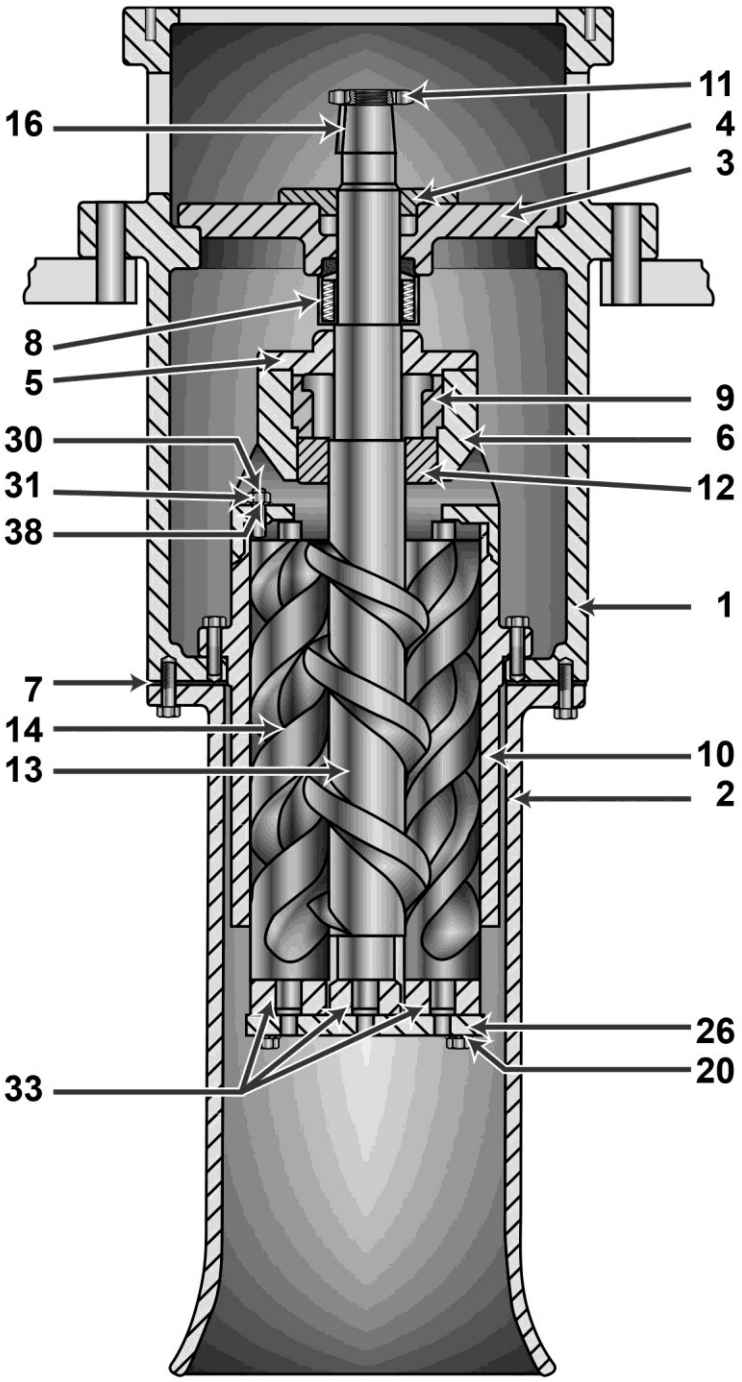
GS-0116



GS-0137

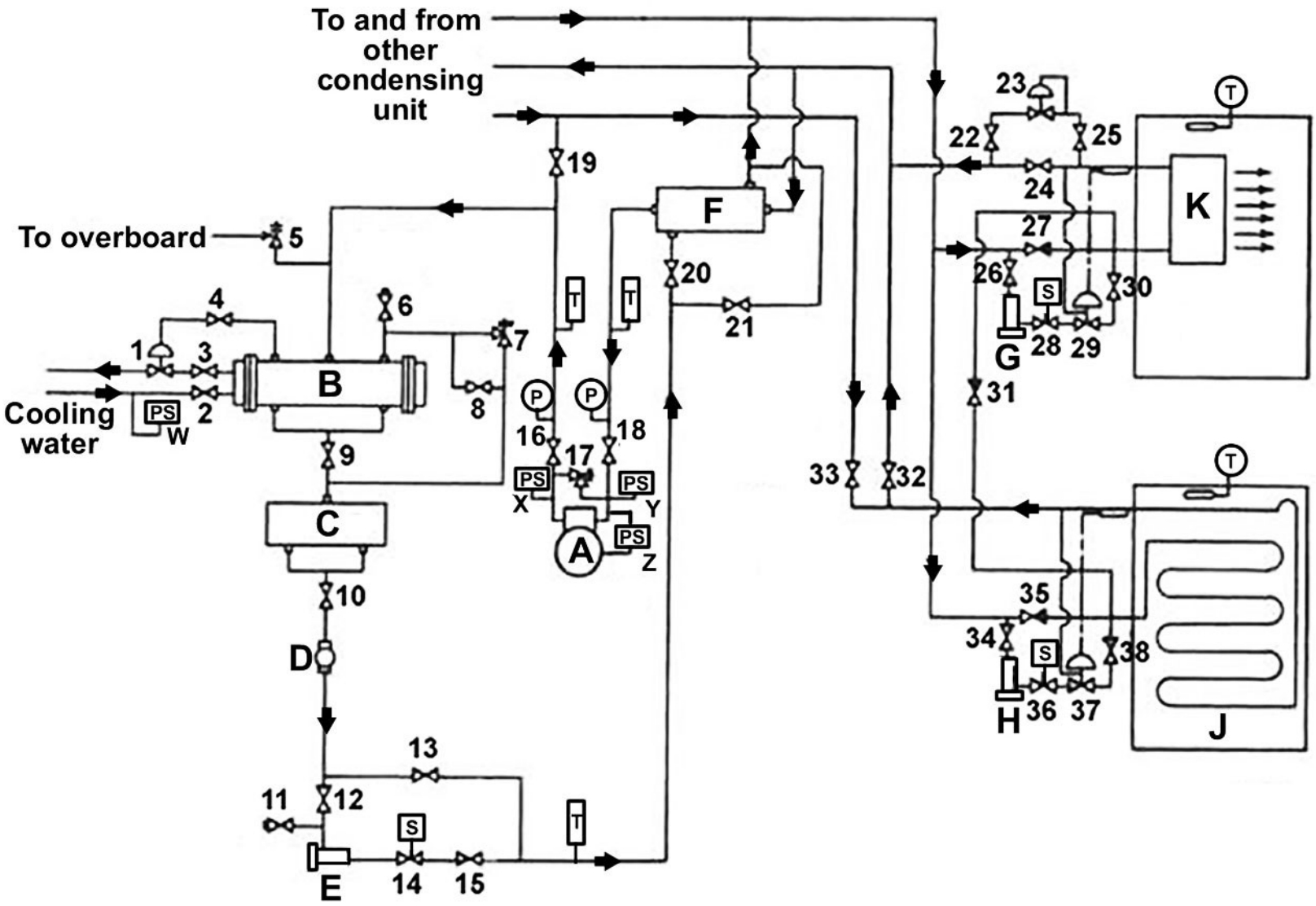


GS-0144



PC NO.	NAME	Material
1	Pump Case	Cast Steel
2	Inlet Bell	Cast Steel
3	Seal Housing	Cast Steel
4	Packing Gland	Gun Metal
5	Bearing Retainer	Bearing Bronze
6	Balance Rotor Housing	Bearing Bronze
7	Gasket	Plant Fiber
8	Mechanical Seal for 2, 3, 8" Dia. Shaft	Steel & Syn. Rubber
9	Spacer	Bearing Bronze
10	Rotor Housing	Bearing Bronze
11	Check Nut	Steel
12	Balance Piston	Steel
13	Power Rotor	Steel
14	Idler Rotor	Steel
15	Socket Head Set Screw 1/4 – 20 x 7/16" long	Steel
16	Key	Steel
17	Bolt 3/8" - 16 x 1" long	Steel
18	Bolt 3/8" - 16 x 1 1/4" long	Steel
19	External Tooth Lockwasher	Steel
20	External Tooth Lockwasher	Steel
21	Bolt 1/4" – 13 x 1 1/4" Long	Steel
22	Socket Head Pipe Plug – 1/8" Size	Brass
23	Inlet Bell	Cast Steel
24	Bolt 1/2" – 13 x 1 /2" Long	Steel
25	Spacer	Steel Pipe
26	Thrust Plate	Steel
27	Gasket	Plant Fiber
28	Oil Balance Tube	Steel
29	O Ring	Syn. Rubber
30	Stud 5/8" – 11" x 3 1/4" Long	Steel
31	Nut 5/8" – 11" THDS.	Steel
32	Bolt 1/2" – 13 x 4 1/2" Long	Steel
33	Thrust Shoe	Bearing Bronze
34	Lacing Wire 1/16" Dia. x 16 ft. Lg. (Cut to Suit)	Monel
35	Pkg. Ring for 2 3/8" Dia. Shaft 1/4" SQ	Symbol 430
36	Bolt 3/8" – 16" x 1 3/4" Long	Steel
37	Stud 3/4" – 10 x 3" Long	Steel
38	External Tooth Lockwasher	Steel
39	Spring Pin 3/32" x 3/8" Long	Steel
40	Name Plate (Serial)	Brass Sheet
41	Name Plate (Caution)	Brass Sheet
42	Name Plate (Rotation)	Brass Sheet

GS-RA-12



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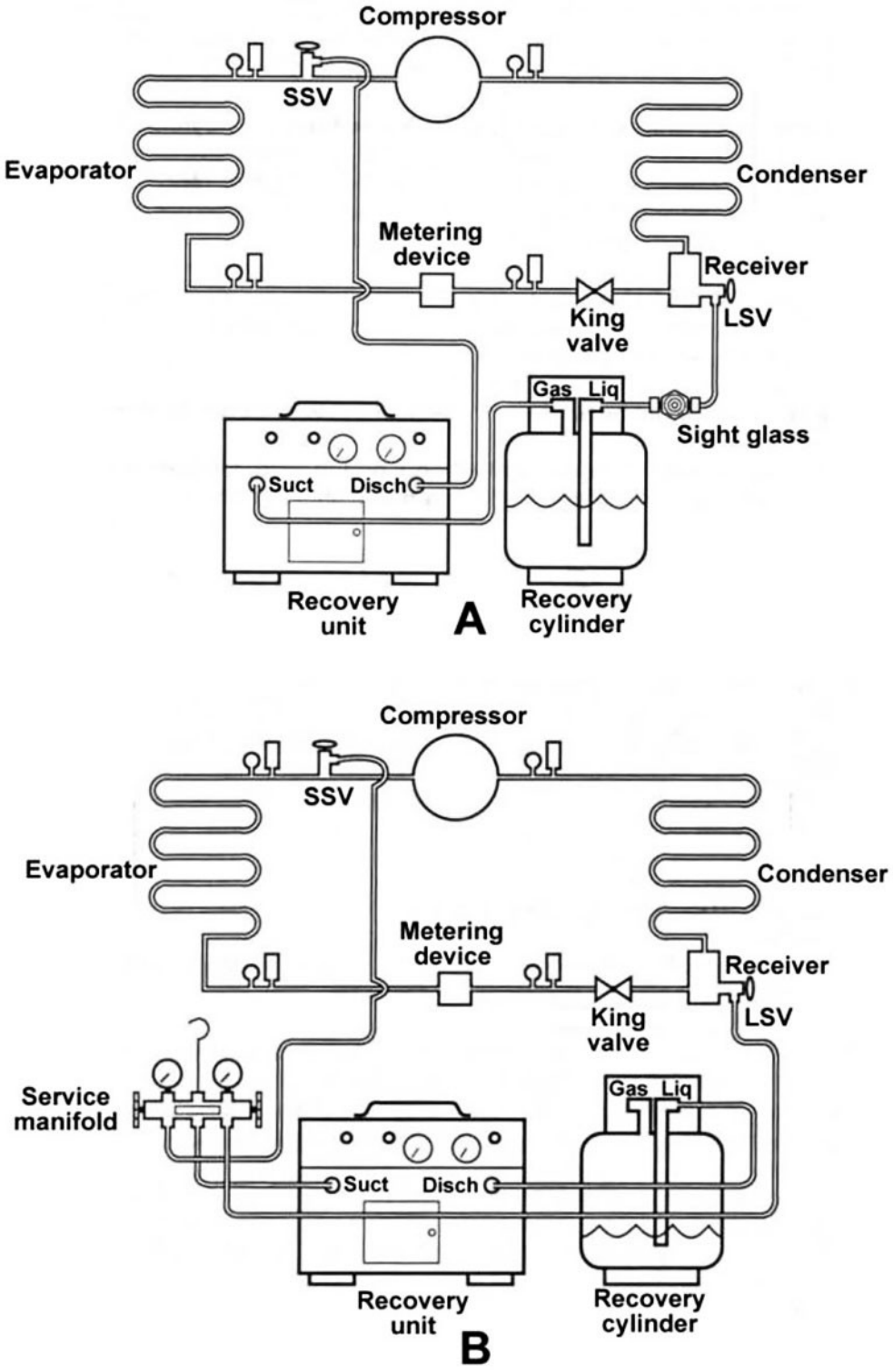
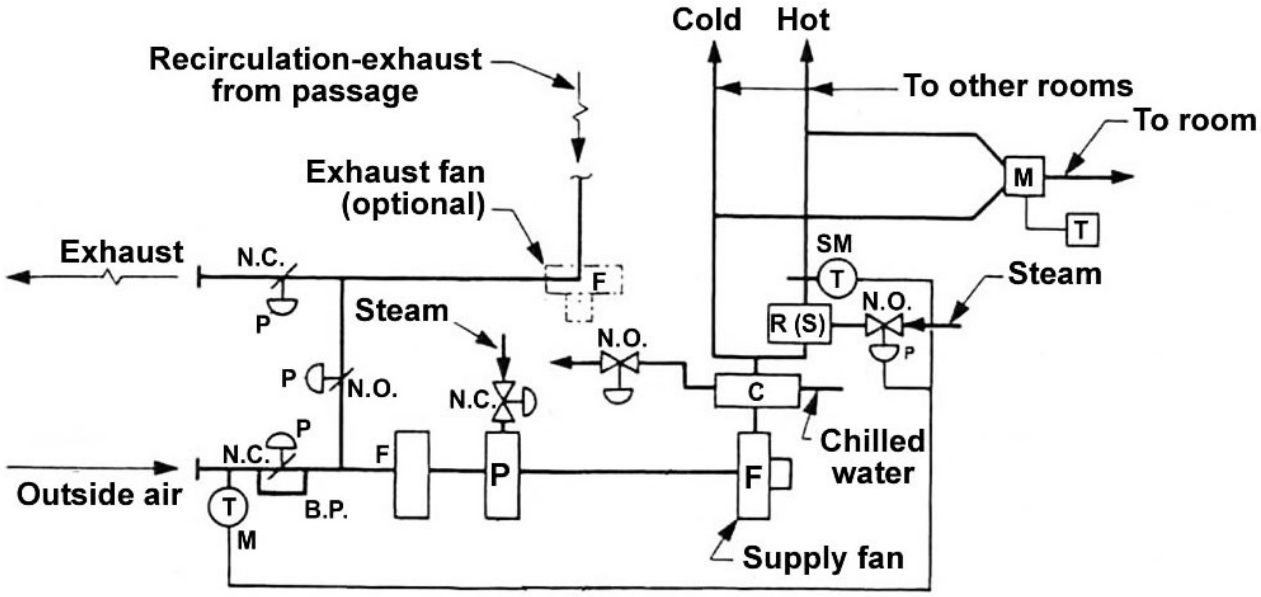
GS-RA-33



GS-RA-43



Legend

H Humidistat

F Fan

F Filter

C Cooling coil

P Preheater (steam)

R Reheater (W=water, S=steam)

T Duct thermostat

N.O. Normally open (valve or damper)

N.C. Normally closed (valve or damper)

T Room thermostat

M Dual duct air mixing unit

Pneumatic damper & motor

M Master

SM Sub-master

P Positive positioning relay

Pneumatic control valve

D Diverting relay

B.P. Minimum outside air bypass

GS-RA-45

A

B

C

D

MO-0110