

U.S.C.G. Merchant Marine Exam

DDE-1000/4000 HP

Q634 General Subjects

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions

1. When a megohmmeter is used to test insulation, what condition causes the gradual rise of the pointer reading as a result of continued cranking?
- (A) the dielectric-absorption effect of the insulation
 - (B) good conductor resistance
 - (C) the inductive reactance of the windings
 - (D) the leakage of current along the surface of dirty insulation

If choice A is selected set score to 1.

2. Over pressurization of an air compressor intercooler is prevented by which of the following?
- (A) First-stage unloader.
 - (B) Intercooler relief valve.
 - (C) Last-stage unloader.
 - (D) After cooler relief valve.

If choice B is selected set score to 1.

3. In a refrigeration system, the pressure within the power element of a thermostatic expansion valve depends directly upon what factor?
- (A) compressor suction pressure
 - (B) temperature in the box
 - (C) temperature of the evaporator coil outlet
 - (D) heat transferred from the saturated liquid in the evaporator

If choice C is selected set score to 1.

4. 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.

5. As shown in figure "B" of the typical ground fault relay shown in the illustration, what statement concerning the leakage current setting adjustment is true? Illustration EL-0223
- (A) Setting the leakage current for too high a value may increase the likelihood of nuisance trips and setting the leakage current for too low a value may result in incidental damage due to a ground fault.
 - (B) Setting the leakage current for too low a value may increase the likelihood of nuisance trips and setting the leakage current for too high a value may result in incidental damage due to a ground fault.
 - (C) Setting the leakage current for too high or too low a value may increase the likelihood of nuisance trips.
 - (D) Setting the leakage current for too high or too low a value may result in incidental damage due to a ground fault.

If choice B is selected set score to 1.

6. As the electrolyte level in the cells of a lead-acid battery evaporates over time, what will tend to happen to the specific gravity of the electrolyte in the cells as the level drops due to evaporation?
- (A) Although the specific gravity will change due to evaporation, there is no predictable tendency either way.
 - (B) The specific gravity of the electrolyte will decrease as only the sulfuric acid will evaporate from the electrolyte solution.
 - (C) The specific gravity of the electrolyte will remain unchanged as both the water and sulfuric acid will evaporate from the electrolyte solution.
 - (D) The specific gravity of the electrolyte will increase as only the water will evaporate from the electrolyte solution.

If choice D is selected set score to 1.

7. Referring to the illustration what is the position of the three circuit breakers labeled in figure "A", "B", and "C" respectively? Illustration EL-0033
- (A) Circuit breaker in figure "A" is in the **OFF** position. Circuit breaker in figure "B" is in the **TRIPPED** position. Circuit breaker in figure "C" is in the **ON** position.
 - (B) Circuit breaker in figure "A" is in the **ON** position. Circuit breaker in figure "B" is in the **TRIPPED** position. Circuit breaker in figure "C" is in the **OFF** position.
 - (C) Circuit breaker in figure "A" is in the **ON** position. Circuit breaker in figure "B" is in the **OFF** position. Circuit breaker in figure "C" is in the **TRIPPED** position.
 - (D) Circuit breaker in figure "A" is in the **OFF** position. Circuit breaker in figure "B" is in the **ON** position. Circuit breaker in figure "C" is in the **TRIPPED** position.

If choice D is selected set score to 1.

8. What statement is true concerning the term "isochronous" as it applies to prime mover speed control governors?
- (A) Isochronous governors are able to maintain constant prime mover load regardless of speed by employing temporary speed droop.
 - (B) Isochronous governors are able to maintain constant prime mover load regardless of speed by employing permanent speed droop.
 - (C) Isochronous governors are able to maintain constant prime mover speed regardless of load by employing temporary speed droop.
 - (D) Isochronous governors are able to maintain constant prime mover speed regardless of load by employing permanent speed droop.

If choice C is selected set score to 1.

9. Which of the illustrated motors has an open motor enclosure? Illustration EL-0001
- (A) A
 - (B) B
 - (C) C
 - (D) D

If choice B is selected set score to 1.

10. What is the wet bulb temperature of air if the dry bulb temperature of the air is 90 degrees and the relative humidity is 65%? Illustration GS-RA-22
- (A) 62 degrees F
 - (B) 63 degrees F
 - (C) 77 degrees F
 - (D) 80 degrees F

If choice D is selected set score to 1.

11. For an analog electronic transmission system for instrumentation purposes, if an electronic level indicator has a calibrated scale of 0 to 1800 mm, what would be the actual measured liquid level of the tank if the transmitted signal current is 12 mA, assuming the industry standard of 4 to 20 mA is used for instrument current?
- (A) 800 mm
 - (B) 900 mm
 - (C) 1000 mm
 - (D) 1080 mm

If choice B is selected set score to 1.

12. What is the ampere-hour rating of a lead-acid battery that can deliver 20 amperes continuously for 10 hours?

- (A) 20
- (B) 40
- (C) 200
- (D) 400

If choice C is selected set score to 1.

13. Which of the valves listed is NOT considered to be a hydraulic system directional control valve?

- (A) Counterbalance valve
- (B) Two-position valve
- (C) Three-position valve
- (D) Detented-position valve

If choice A is selected set score to 1.

14. Which of the following illustrations represents the proper method of circuit grounding for a low level analog signal cable? Illustration EL-0124

- (A) A
- (B) B
- (C) C
- (D) D

If choice A is selected set score to 1.

15. A vessel is in compliance with federal regulations regarding the discharge of sewage by _____.

- (A) pumping the sewage ashore to an approved container
- (B) holding all sewage onboard
- (C) treating sewage in an approved system
- (D) all of the above

If choice D is selected set score to 1.

16. In the presence of an open flame or hot surfaces, chlorinated fluorocarbon refrigerants decompose and form what chemical substance?

- (A) phosgene gas
- (B) carbon monoxide
- (C) water vapor
- (D) petroleum crystals

If choice A is selected set score to 1.

17. To prevent motor overload during start-up of a hermetically sealed centrifugal refrigeration system, what is true concerning the compressor suction gas variable inlet guide vanes?

- (A) opened until the motor is connected across the line at full voltage and current drawn is up to full load current
- (B) opened until the motor is connected across the line at full voltage and current drawn is below full load current
- (C) closed until the motor is connected across the line at full voltage and current drawn is up to full load current
- (D) closed until the motor is connected across the line at full voltage and current drawn is below full load current

If choice D is selected set score to 1.

18. 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?

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

If choice B is selected set score to 1.

19. The device shown in the illustration is commonly known as a/an _____. Illustration GS-0071

- (A) soft-packing seal
- (B) quad seal
- (C) mechanical seal
- (D) spring seal

If choice C is selected set score to 1.

20. With an increase in temperature, the volume of hydraulic fluid _____.

- (A) increases
- (B) contracts
- (C) remains constant if pressure decreases
- (D) remains the same

If choice A is selected set score to 1.

21. Which of the following statements describes the functions of a reservoir used in a hydraulic system?

- (A) Separate air from the oil
- (B) Trap foreign matter
- (C) Dissipate heat
- (D) All of the above

If choice D is selected set score to 1.

22. Which of the devices listed is used to maintain a snug interface between the rotating and stationary seal members shown in the illustration? Illustration GS-0071

- (A) spring
- (B) notch and keyway
- (C) seal retaining ring
- (D) bellows

If choice A is selected set score to 1.

23. What must be done, at a minimum, before a system can legally be opened up for repairs while adhering to the prohibition against the venting of halogenated fluorocarbon refrigerants to the atmosphere?

- (A) destruction of the refrigerant
- (B) recovery of the refrigerant
- (C) reclamation of the refrigerant
- (D) recycling of the refrigerant

If choice B is selected set score to 1.

24. In a series circuit, which value will remain unchanged at all places in the circuit?

- (A) Inductance
- (B) Voltage
- (C) Current
- (D) Resistance

If choice C is selected set score to 1.

25. A split-phase induction squirrel-cage motor will not start and come up to speed, even though the rated voltage, rated frequency, and rated load are applied. Which of the following troubles would be suspected?

- (A) a shorted rotor bar
- (B) a shorted centrifugal switch
- (C) a shorted thermal protector
- (D) an open run or start winding

If choice D is selected set score to 1.

26. Which of the procedures or conditions listed could result in damaging a transistor beyond repair?

- (A) Installing a transistor whose current rating exceeds the design circuit current.
- (B) Applying silicone grease between the heat sink and the transistor mounting.
- (C) Providing insufficient voltage to the input circuit.
- (D) Providing incorrect polarity to the collector circuit.

If choice D is selected set score to 1.

27. In the illustrated refrigeration system, what is the proper name for the component labeled "A"?
Illustration GS-RA-12

- (A) accumulator
- (B) compressor
- (C) condenser
- (D) filter drier

If choice B is selected set score to 1.

28. Which of the following statements is true concerning the gauge labeled "A" of the illustrated gauge manifold set? Illustration GS-RA-01

- (A) The gauge labeled "A" is a compound gauge and is usually color-coded blue.
- (B) The gauge labeled "A" is a compound gauge and is usually color-coded red.
- (C) The gauge labeled "A" is a standard pressure gauge and is usually color-coded blue.
- (D) The gauge labeled "A" is a standard pressure gauge and is usually color-coded red.

If choice A is selected set score to 1.

29. In an air conditioning system, moisture is removed from the air by what means?

- (A) separators
- (B) ducted traps
- (C) filters
- (D) cooling coils

If choice D is selected set score to 1.

- 30.** 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 "ANALOG D/A" represent? Illustration EL-0095
- (A) It receives analog outputs from the CPU and converts these to digital signals for transmission to the digital actuators.
 - (B) It receives analog outputs from the CPU and conditions these to analog signals for transmission to the analog actuators.
 - (C) It receives digital outputs from the CPU and converts these to analog signals for transmission to the analog actuators.
 - (D) It receives digital outputs from the CPU and conditions these to digital signals for transmission to the digital actuators.

If choice C is selected set score to 1.

- 31.** What is used to prevent contamination of a potable water system supplying a plumbing fixture such as a galley sink from a backup of sewage sanitary drains?
- (A) Check valves in the potable water supply lines delivering water to the galley sink.
 - (B) Location of the potable water spigots above the rim of the galley sink.
 - (C) A "P" trap in the drain line draining sewage waste from the galley sink.
 - (D) Location of the potable water spigots below the rim of the galley sink.

If choice B is selected set score to 1.

- 32.** Which statement is true concerning the total power consumed in a parallel circuit?
- (A) The total power is always less than the power consumed by the smallest load.
 - (B) The total power is equal to the sum of the powers consumed by each individual load.
 - (C) The total power is never more than the power consumed by the largest load.
 - (D) The total power is the sum of the powers consumed by each load (resistor) divided by the number of loads.

If choice B is selected set score to 1.

- 33.** Ships requiring rapid maneuvering response with a degree of propeller shaft control are most likely to use what type of drive system?
- (A) Gas turbine geared drive
 - (B) Steam turbine geared drive
 - (C) Direct or geared diesel drive
 - (D) Diesel-electric drive

If choice D is selected set score to 1.

34. When shore power is being connected to a ship in dry-dock, what must be ensured, assuming that the ship's generators are rated at 450 VAC, 60 Hz with a total capacity of 5000 kW?

- (A) shore power must be capable of delivering a total of 5000 kW
- (B) exactly 60 Hz must be supplied from shore, as no tolerance is permitted
- (C) shore power phase sequence must agree with that of the ship
- (D) exactly 450 volts must be supplied from shore, as no tolerance is permitted

If choice C is selected set score to 1.

35. Which of the listed numeric values represents the smallest size drill?

- (A) 0
- (B) 1
- (C) 60
- (D) 80

If choice D is selected set score to 1.

36. Which of the listed statements is correct when using a digital multimeter set up as an ohmmeter?

- (A) With the test leads shorted together, a reading of "OL" ohms will be displayed.
- (B) With the test leads apart insulated from each other, a reading of "zero" ohms will be displayed.
- (C) It is usually not possible for a digital multimeter to be set up as an ohmmeter.
- (D) With the test leads shorted together, a reading of "zero" ohms will be displayed.

If choice D is selected set score to 1.

37. Both the direction of flow and fluid flow rate of a variable displacement radial piston pump are determined by the relative positions of the _____.

- (A) pump shaft and central valve
- (B) floating ring and cylinder body
- (C) floating ring and pump shaft
- (D) pump shaft and horizontal ports

If choice B is selected set score to 1.

38. What is the color-coding for a storage container of R-134a refrigerant?

- (A) green
- (B) purple
- (C) light blue
- (D) grey

If choice C is selected set score to 1.

39. Due to the operating characteristics of the system, time lag fuses (or dual-element fuses) are necessary for use in what types of circuits?

- (A) emergency lighting circuits
- (B) main lighting circuits
- (C) motor starting circuits
- (D) general alarm circuits

If choice C is selected set score to 1.

40. What is the name of the type of motor control circuit that will not permit automatic restarting after power is restored, following a power failure?

- (A) low voltage protection
- (B) overload lockout
- (C) reduced voltage restart
- (D) low voltage release

If choice A is selected set score to 1.

41. Hydraulically, servo-operated, automatic, change over valves, utilized in a two ram hydraulic steering gear, serve to _____.

- (A) allow an alternate main pump to start in the fully loaded condition thus developing immediate full torque
- (B) prevent both units from operating simultaneously which could result in doubling the flow of oil and pressure leading to over pressurization of the system
- (C) prevent either main pump from being hydraulically motored when idle by cross pressure flow
- (D) all of the above

If choice C is selected set score to 1.

42. Referring to the illustrated motor ship fresh water cooling system drawing, which cooling system has cooling water passing through passages within components that are continuously undergoing motion? Illustration MP-CW-06

- (A) The main engine jacket water cooling system.
- (B) The SSDG cooling water systems.
- (C) The main engine piston cooling water system.
- (D) The main engine injector cooling water system.

If choice C is selected set score to 1.

43. Assuming the vessel has an engine control room, where is an engineers' assistance-needed alarm required to produce an audible signal?

- (A) The crew's and officers' mess
- (B) The engineers' accommodation spaces
- (C) The wheelhouse/navigational bridge
- (D) The engine room/machinery space

If choice B is selected set score to 1.

44. What is the pressure and condition of the refrigerant entering the receiver of a refrigeration system?

- (A) superheated low-pressure vapor
- (B) superheated high-pressure vapor
- (C) sub cooled low-pressure liquid
- (D) sub cooled high-pressure liquid

If choice D is selected set score to 1.

45. One of the consequences in continuing to operate a centrifugal bilge pump with the discharge valve closed, is that the _____.

- (A) motor overload will open
- (B) relief valve will open
- (C) motor will overheat
- (D) pump will overheat

If choice D is selected set score to 1.

46. Referring to the illustration, note that the solenoid in line "C" is closed. The check valve in line "E" is open. The separator service pump is running. The check valve in line "G" is closed. Valve "B" is closed. Valve "D" is open. What is the operational status of the oily-water separator unit? Illustration GS-0175

- (A) The oily-water separator is in the bilge water separation processing mode with water discharging back to the bilge water holding tank with an oil content greater than 15 ppm.
- (B) The oily-water separator is in the bilge water separation processing mode with water discharging back to the bilge water holding tank with an oil content less than 15 ppm.
- (C) The oily-water separator is in the bilge water separation processing mode with water discharging overboard with an oil content less than 15 ppm.
- (D) The oily-water separator is in the bilge water separation processing mode with water discharging overboard with an oil content greater than 15 ppm.

If choice A is selected set score to 1.

47. As shown in the illustrated harmonic analysis diagram, which figure represents the fundamental (or first harmonic)? Illustration EL-0163

- (A) A
- (B) B
- (C) C
- (D) D

If choice B is selected set score to 1.

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

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

If choice D is selected set score to 1.

49. How often should the air receivers on a compressed air system be drained of moisture and emulsions?

- (A) Daily
- (B) Weekly
- (C) Monthly
- (D) Quarterly

If choice A is selected set score to 1.

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

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

If choice B is selected set score to 1.

EL-0001



A



B



C



D

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EL-0033



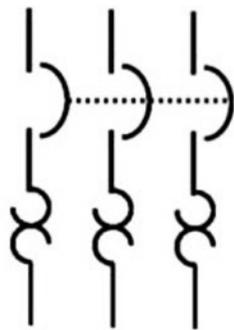
A



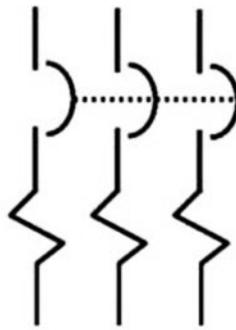
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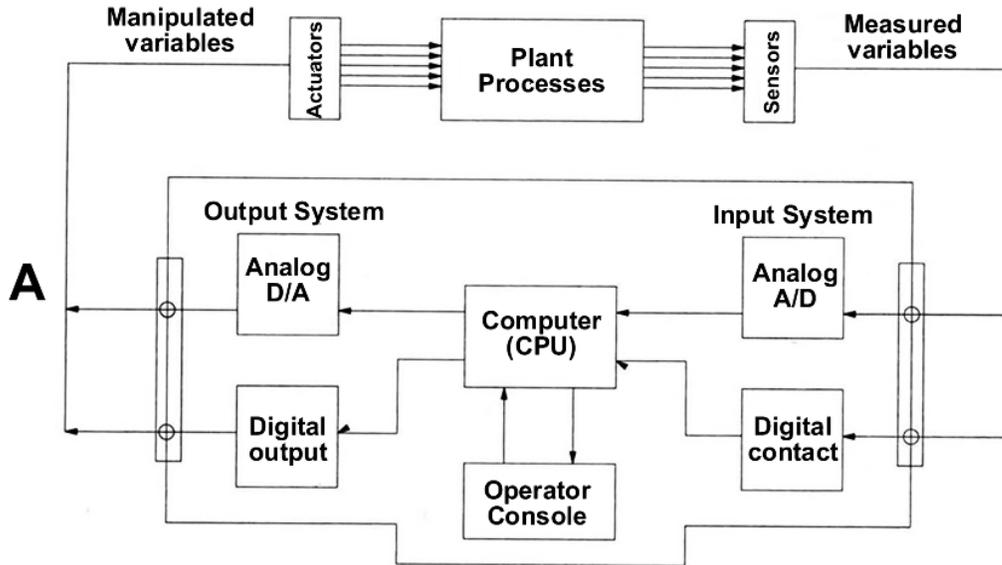


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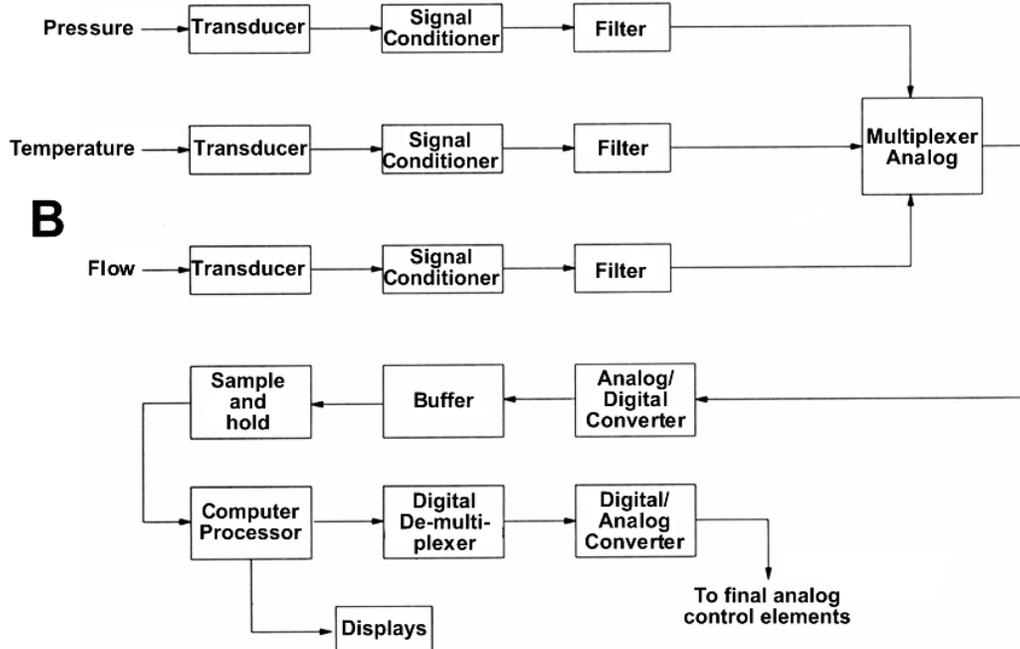
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EL-0095

Direct Digital Control



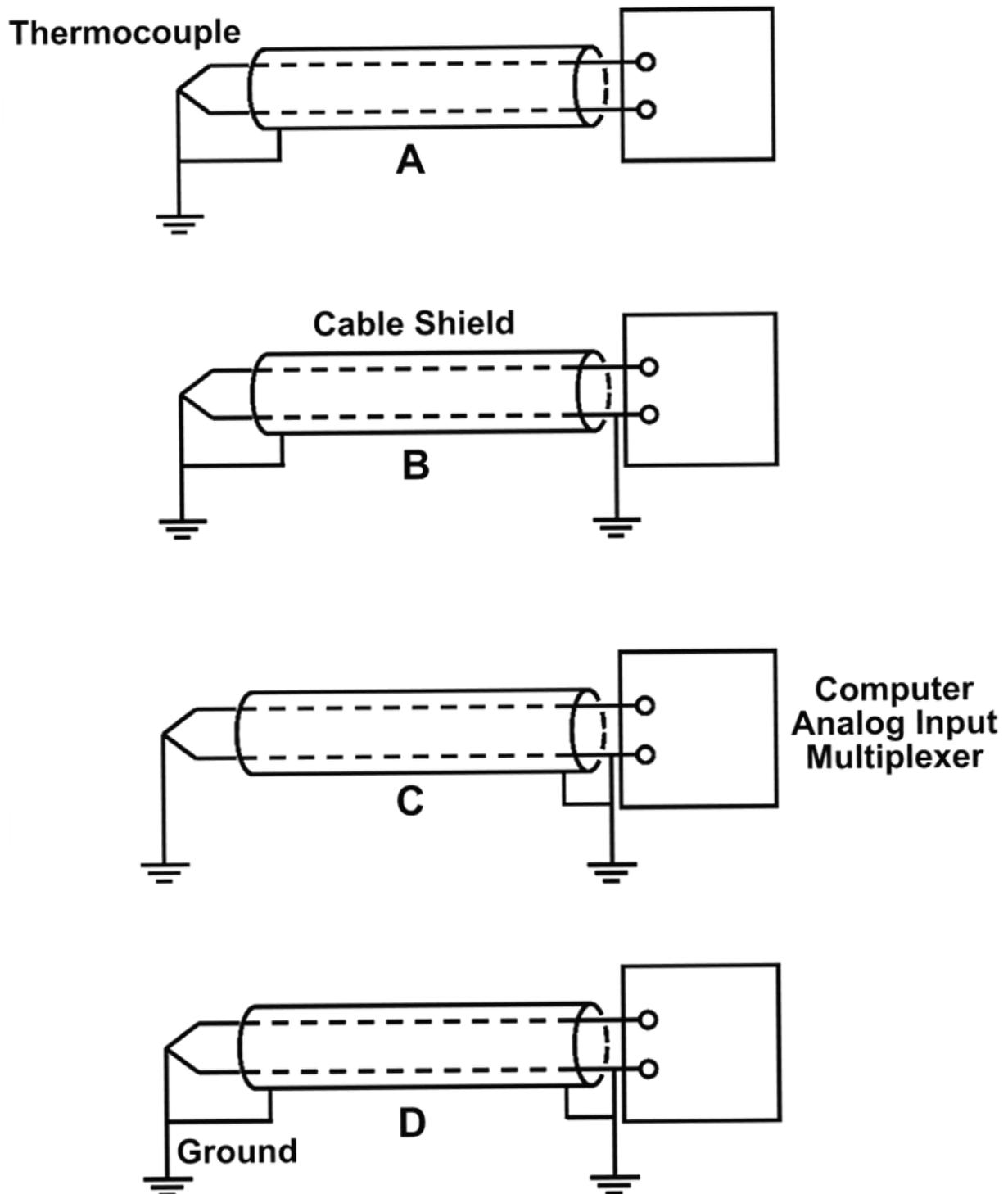
Signal Processing Flowpath



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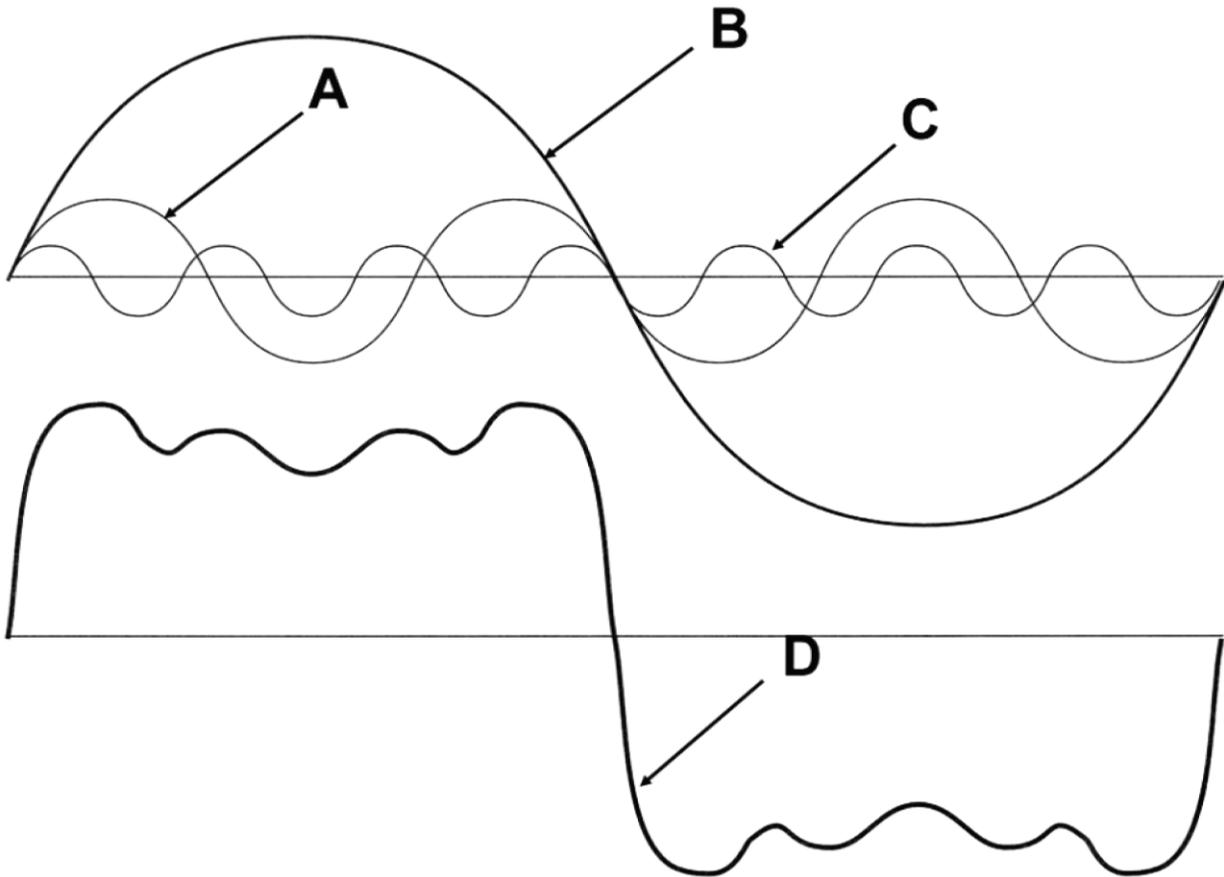
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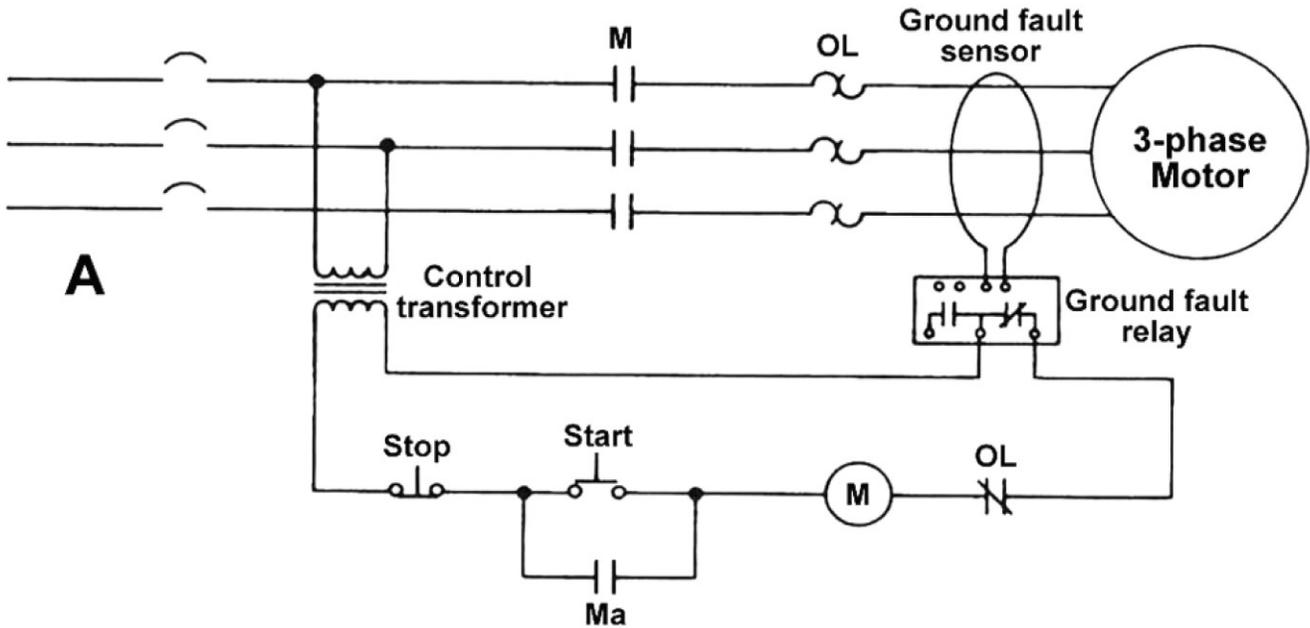
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EL-0163



EL-0223



B



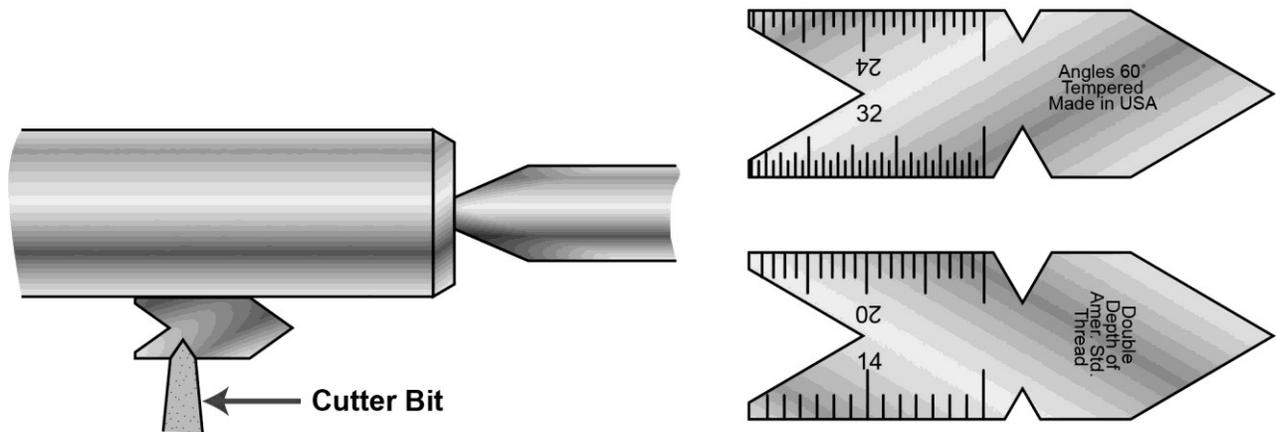
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GS-0072

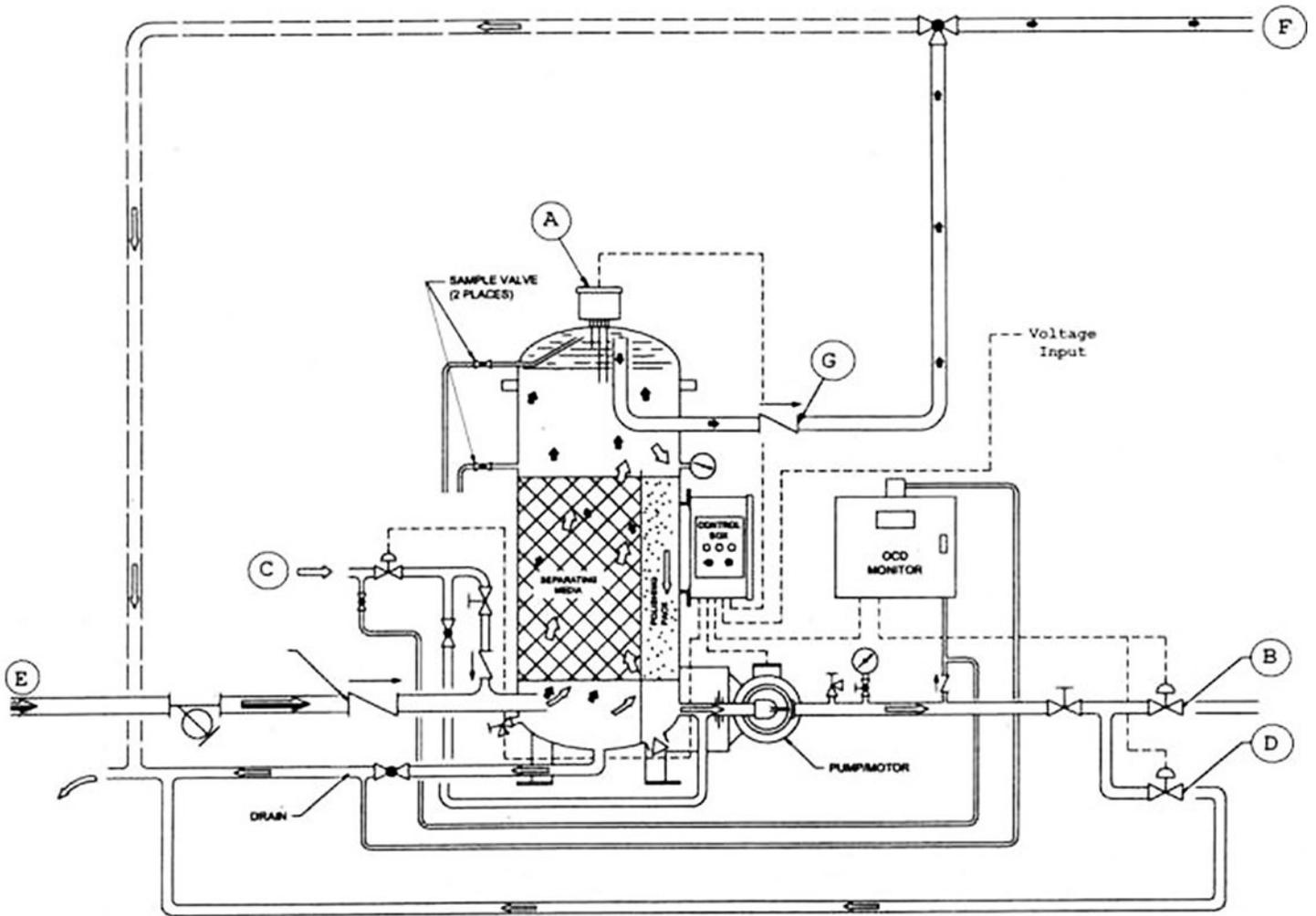


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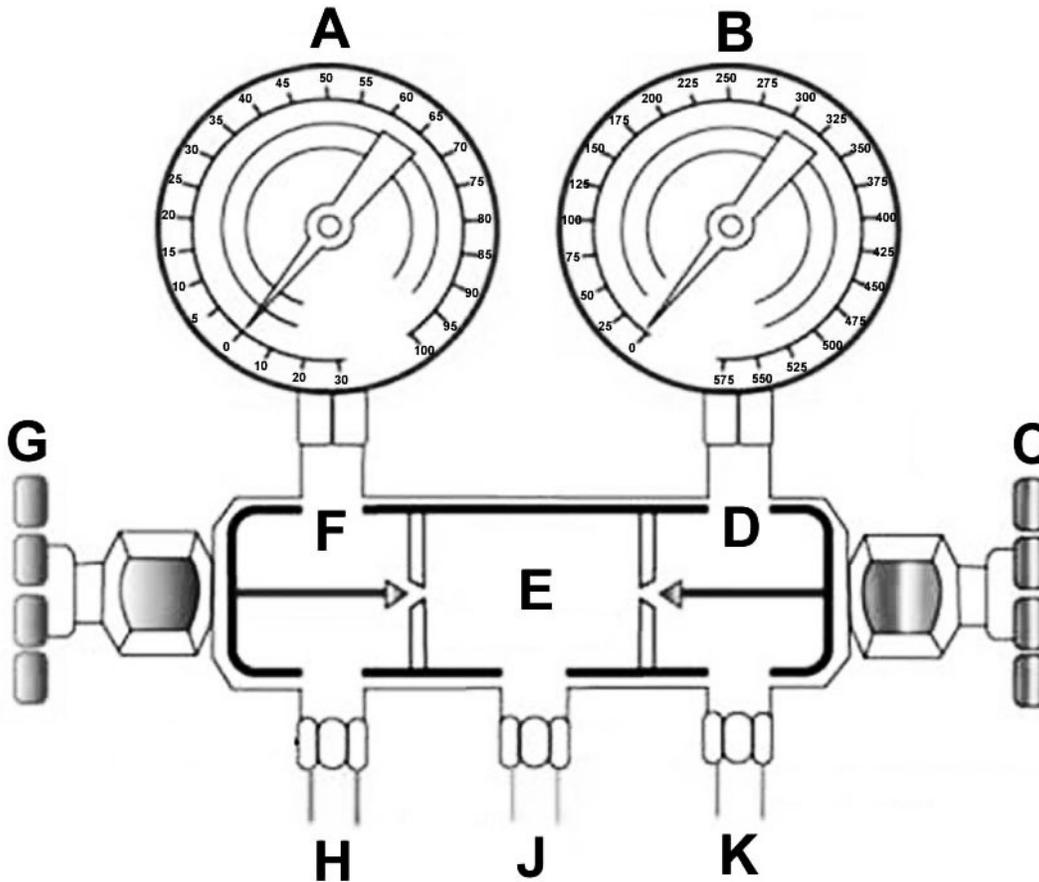


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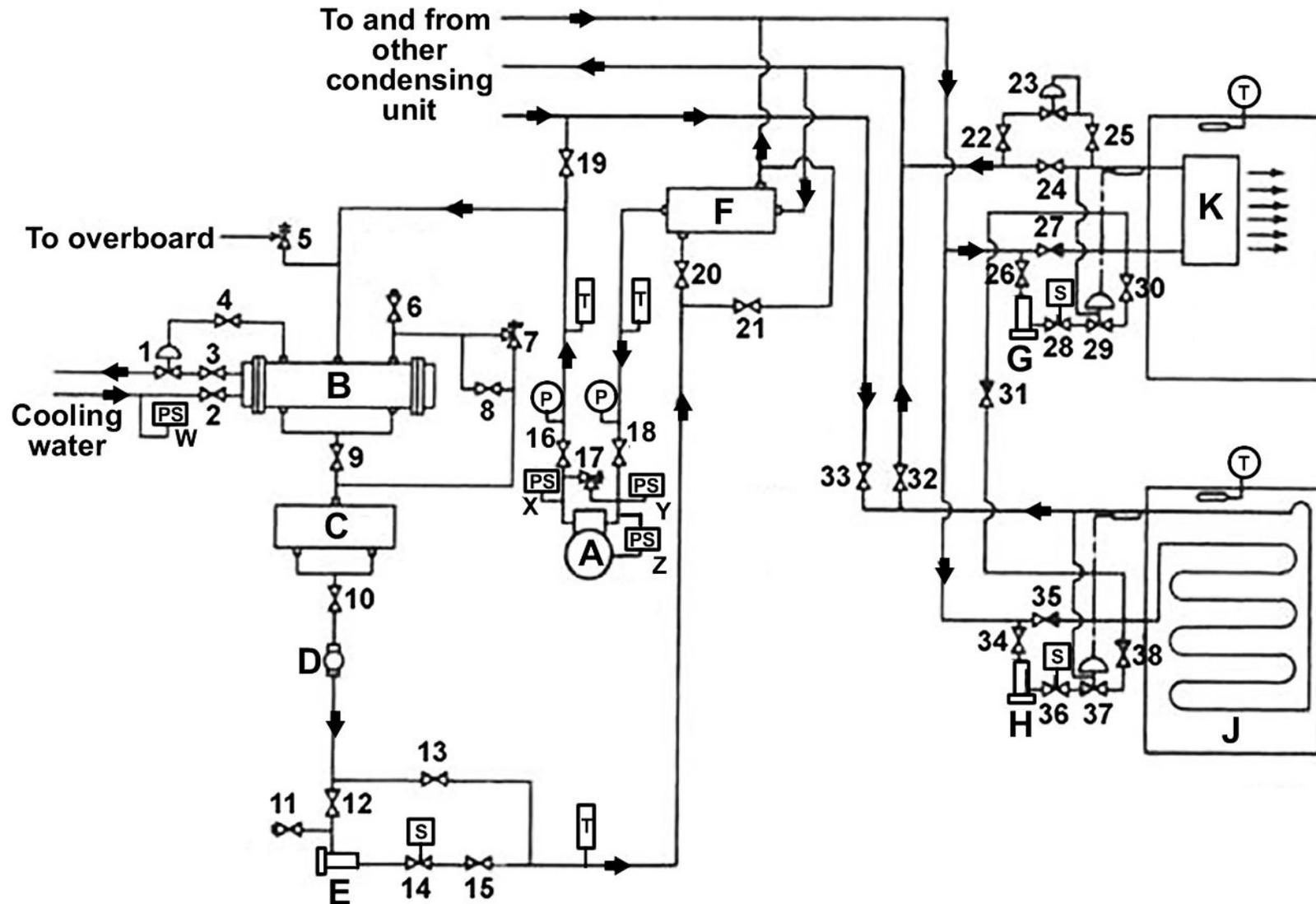
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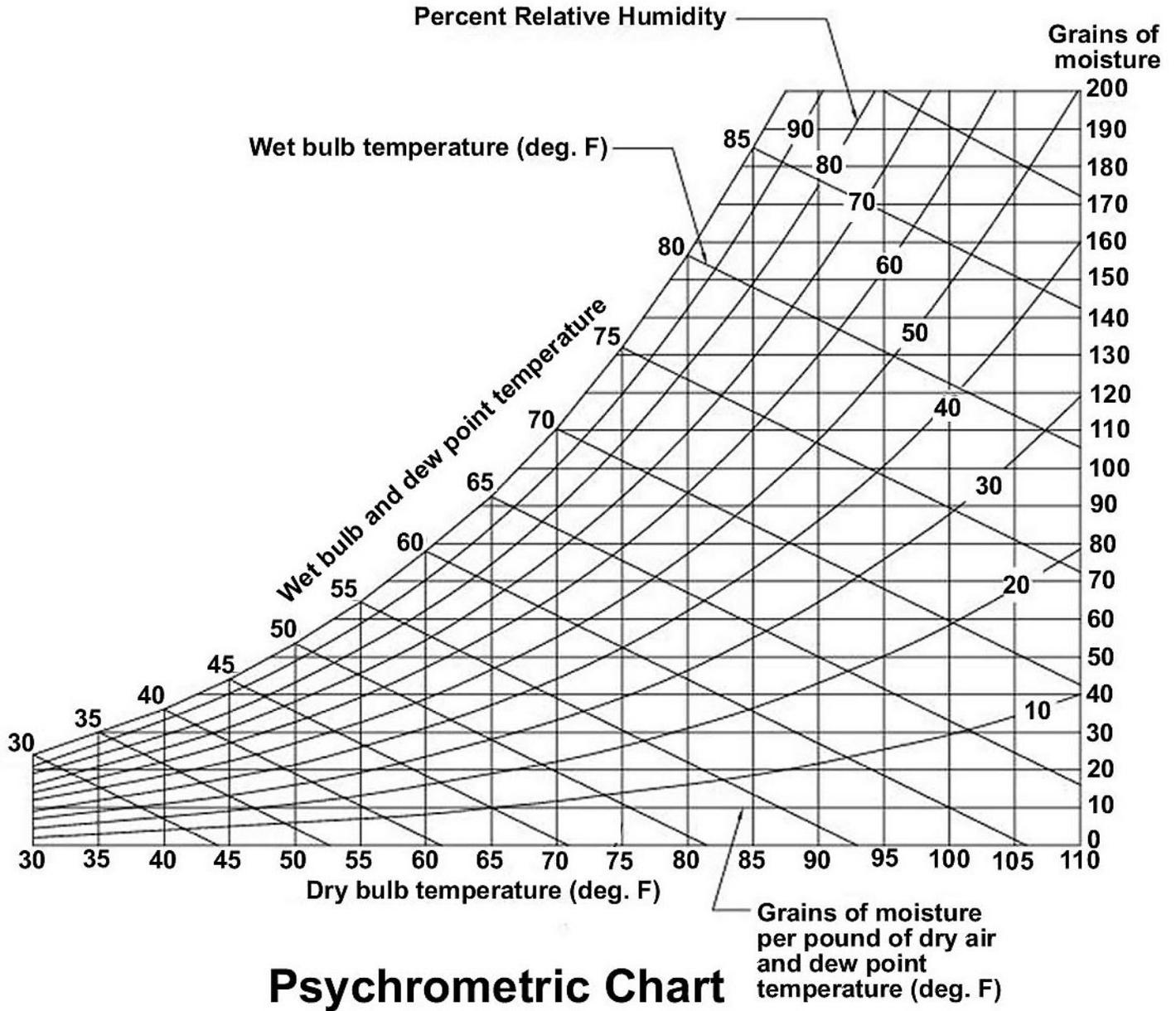


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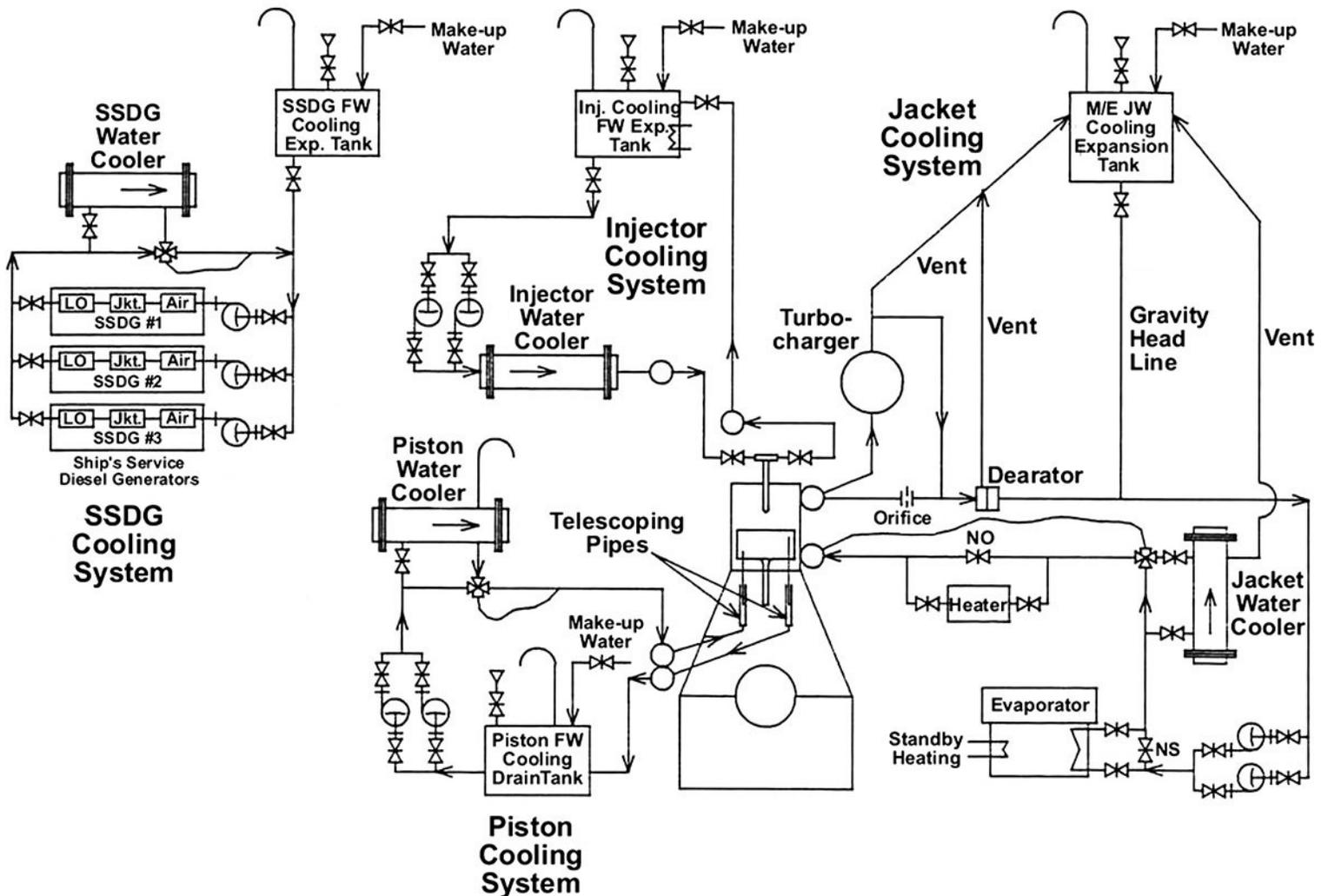


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MP-CW-06

Fresh Water Cooling Systems



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