U.S.C.G. Merchant Marine Exam

MODU – Chief Engineer

Q750 General Subjects

(Sample Examination)

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

1. A hydraulic flow control circuit is shown in the illustration and is known as a _____. Illustration GS-0107

   A. bleed-in circuit
   B. bleed-off circuit
   C. metered-in circuit
   D. metered-out circuit

   Correct answer: B

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

   A. clean water inlet line
   B. oily bilge water inlet line
   C. waste oil outlet line
   D. processed water outlet line

   Correct answer: B

3. In the illustration shown, the notation 1/8"R indicates a one-eighth inch _____. Illustration GS-0016

   A. recess on one end of the tool
   B. rough finish on both ends of the tool
   C. 45° Chamfer on both ends of the tool
   D. radius on one end of the tool

   Correct answer: D

4. In the pump shown in the illustration, what is the distance from the bottom of the inlet to the bottom end of the motor shaft? Illustration GS-0011

   A. 45 1/4 inches
   B. 45 5/16 inches
   C. 53 5/8 inches
   D. 57 5/8 inches

   Correct answer: D

5. A water line ruptures under pressure and floods the engine room causing $30,000(USD) damage to the machinery. By law, this must be reported to the _____.

   A. owner or his agent
   B. insurance underwriter
   C. engine manufacturer
   D. U.S. Coast Guard

   Correct answer: D

6. A dented race in an antifriction bearing could be caused by _____.

   A. dirt in the bearing
   B. abrasives in the lubricant
   C. vibration while the bearing is not in operation
   D. water in the bearing

   Correct answer: C

7. Which of the following statements describes the characteristics of precision manufactured roller bearings?

   A. Their lubrication is complicated and requires constant attention.
   B. They have a relatively high-power loss due to friction.
   C. They are well adapted to variable speed operation.
   D. They are not capable of maintaining alignment over long periods of time.

   Correct answer: C

8. Which of the following statements is true concerning the application for an isochronous governor?

   A. An isochronous governor is ideally suited for a ship's geared propulsion drive driving through a fixed pitch propeller.
   B. An isochronous governor is ideally suited for a pump drive associated with maintaining a constant pump discharge pressure.
   C. An isochronous governor is ideally suited for a ship's direct-reversible propulsion drive driving through a fixed pitch propeller.
   D. An isochronous governor is ideally suited for a ship's service alternator drive associated with maintaining a constant system frequency.

   Correct answer: D

9. As it pertains to a "constant-tension" mooring winch, what statement is true?

   A. A constant-tension mooring winch is set to automatically render, but not recover, mooring line using the prime mover when the mooring line tension varies above a certain preset tension.
   B. A constant-tension mooring winch is set to automatically recover, but not render, mooring line using the prime mover when the mooring line tension varies below a certain preset tension.
   C. A constant-tension mooring winch is set to automatically render, but not recover, mooring line using the brake when the mooring line tension varies above certain preset tension.
   D. A constant-tension mooring winch is set to automatically render and recover mooring line using the prime mover when the mooring line tension varies outside of narrow preset adjustable tension limits.

   Correct answer: D

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

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

    Correct answer: B

11. When normal operating pressure is applied to the hydraulic oil in a high-pressure system, the oil _____.

    A. floc point will increase
    B. viscosity will decrease
    C. volume will increase
    D. viscosity will increase

    Correct answer: D

12. A hydraulic system gear pump being fed from a reservoir frequently indicates signs of excessive pitting after two months of service. Which of the following would most likely contribute to this condition?

    A. A vacuum condition has developed in the reservoir.
    B. Abnormal pressurization is occurring in the reservoir.
    C. A partial restriction in the return line has developed.
    D. Operating oil temperature is determined to be below normal.

    Correct answer: A

13. If oil under pressure is supplied to the area noted as "N" on the vane in the illustration _____. Illustration GS-0116

    A. "O" will rotate clockwise as oil is returned from the area between "M" and "I"
    B. "O" will be hydraulically locked in place even though oil is returned to the main pump from the area between "M" and "I"
    C. "O" will rotate counter-clockwise as oil is returned from the area between "M" and "I"
    D. "Q" will rotate counter-clockwise as oil is returned from the area between "M" and "I"

    Correct answer: C

14. As chief engineer, to prevent the motorization of an alternator what safety device would you have checked quarterly?

    A. The high load alarm point for the alternator
    B. The high frequency alarm for the alternator
    C. The reverse power relay
    D. The overcurrent relay

    Correct answer: C

15. As shown in the illustrated diagnostic setup for locating a shorted field coil of a ten-pole salient pole alternator, if 240 VAC/60 Hz is applied across the brushes, what would be the voltage drop across field coil No.4 if that field coil had shorted turns and the other field coils were free of shorts? Illustration EL-0202

    A. 17 VAC
    B. 24 VAC
    C. 25 VAC
    D. 32 VAC

    Correct answer: A

16. Using the catalog selection chart shown in Illustration EL-0180, determine the correct catalog number for a motor starter that meets the following criteria:

NEMA	Open enclosure
3-pole	Rated at 45 continuous amperes
Vertically mounted	Electronic overload relay-Ground fault feature set;
Reversing starter	Operating coil rated at 24 VAC/60 Hz

A. AE19GNVB5G045
B. AN19AN0A5E005
C. AN59GNVT5G045
D. CN16GNVT5G045

Correct answer: C

17. The motor starts when the start button in the illustration is pushed, but stops when the button is released. What is most likely the trouble? Illustration EL-0007

A. an open auxiliary "M" contact
B. a corroded contact on the disconnect switch (DS) at 'L3'
C. an open "M" contactor coil
D. an open in the stop button contact

Correct answer: A

18. Which of the following is a disadvantage of electric drive propulsion systems?

A. Propulsion motors are required along with electrical power generation machinery.
B. The propeller speed and direction of rotation are easily controllable.
C. Main propulsion power may also be directed to ships electrical service distribution.
D. Location of electric power generation machinery is flexible.

Correct answer: A

19. Why is it necessary to perform periodic testing of correctly rated and properly installed circuit breakers?

A. to insure they will continue to provide the original degree of protection
B. to insure they do not exceed their interrupting capacity
C. to insure they can trip faster as they increase in age
D. to insure they will be able to withstand at least 125% of applied voltage

Correct answer: A

20. To check the three-line fuses protecting a three-phase motor using a multimeter set up as a voltmeter, what should be done FIRST?

A. make sure the motor is operating at full load to guard against a false reading
B. place the starter in the "stop" position
C. place the leads across the "hot" ends of the fuses
D. place the leads across the bottom ends of the fuses

Correct answer: B

21. Which of the following actions can be carried out in order to prevent thermal runaway in a transistor?

    A. Increase the potential difference between the emitter and the base.
    B. Increase the current through the collector-base junction.
    C. Shift the "Q" point to increase collector current.
    D. Install a heat sink.

    Correct answer: D

22. When troubleshooting a printed circuit board, one technique that can be used is swapping the suspected damaged board with a new board. If a board extraction system is not available, what technique should be used to remove the suspected damaged board that is plugged into its edge card connector horizontally?

    A. Grasp the board with your thumbs and fingers placed on top of and under the board and remove it rapidly with one continuous motion.
    B. Handle the board at the corner edges and apply pressure while you rock it up and down gently while pulling.
    C. Handle the board at the corner edges and apply pressure while you rock it back and forth left to right gently while pulling.
    D. Grasp the board with your thumbs and fingers on top of and under the board and rock it up and down gently while pulling.

    Correct answer: C

23. Why should an electrical worker determine the nominal voltage of a circuit first before making contact with the circuit?

    A. So the worker can select the proper PPE and voltage tester to use before contact with the circuit is made
    B. So the worker can select the proper PPE to use before contact with the circuit is made
    C. So the worker can select the proper voltage tester to use before contact with the circuit is made
    D. As long as the circuit is properly tagged/locked out, no determination of the nominal voltage is necessary

    Correct answer: A

24. When a high voltage system insulation test value is suspect or recorded during an annual survey, a polarization index test is performed. What is the polarization index?

    A. The polarization index is the ratio of the insulation resistance taken at one minute to the insulation resistance taken at ten minutes.
    B. The polarization index is the ratio of the insulation resistance taken at ten minutes to the insulation resistance taken at one minute.
    C. The polarization index is the insulation resistance taken at ten minutes.
    D. The polarization index is the ratio of the insulation resistance taken at thirty minutes to the insulation resistance taken at one minute.

    Correct answer: B

25. If a mechanical mouse of a computer workstation is operating erratically, what maintenance should be performed?

    A. Compressed air should be directed onto the underside of the mouse.
    B. Remove the plastic surround on the underside of the mouse, and after removing the ball, mechanically clean the two wheels.
    C. Solvent should be sprayed onto the underside of the mouse.
    D. Remove the plastic surround on the underside of the mouse, and after removing the ball, mechanically clean the limit switches.

    Correct answer: B

26. As shown in the illustrated adaptive digital steering control system functional block diagram and listed system interface signals table, what would the rudder order signal output voltage to the rudder servo amplifier be for a rudder order of 15 degrees right rudder, assuming left rudder signals are negative and right order signals are positive in polarity? Illustration EL-0191

    A. -1.33 VDC
    B. -3.75 VDC
    C. +3.75 VDC
    D. +5.0 VDC

    Correct answer: C

27. If item "1" in the illustrated oily-water separator indicates an abnormally deep vacuum, which of the following conditions is the most probable cause? Illustration GS-0153

    A. Coalescer beds are severely fouled
    B. Process water inlet valve, item "5", is open
    C. Suction line inlet strainer is obstructed
    D. No problem exists as a high vacuum should be maintained in the chamber whose vacuum is to be measured

    Correct answer: C

28. Coast Guard regulations concerning marine sanitation devices may be found in _____.

    A. 33 CFR Section 159
    B. 33 CFR Section 153
    C. 33 CFR Section 155
    D. 33 CFR Section 156

    Correct answer: A

29. In a closed-loop process control system, what is meant by the proportional mode of control?

    A. It is a control mode that produces a control action that is proportional to the gain.
    B. It is a control mode that produces a control action that is proportional to the accumulation of error over time.
    C. It is a control mode that produces a control action that is proportional to the error.
    D. It is a control mode that produces a control action that is proportional to the rate at which the error is changing.

    Correct answer: C

30. In a closed-loop process control system, what term is used to describe the action of measuring the difference between the actual result and the desired result and using that difference to drive the actual result toward the desired result?

    A. Deadband
    B. Feedback
    C. Gain
    D. Instability

    Correct answer: B

31. When tuning a proportional-integral-derivative (PID) controller/loop, one should know/understand the influence of each action component on the loop. Which description of a component is correct?

    A. Proportional - component in which there is a linear relationship between output and input
    B. Derivative - component in which the input is proportional to the rate of change of the output
    C. Integral - component in which the input is proportional to the output
    D. Proportional - component in which there is a linear relationship between setpoint and input

    Correct answer: A

32. In general, the thermal bulb for a thermal expansion valve used in a reciprocating air conditioning system is usually charged with what substance?

    A. the same refrigerant as the system
    B. mercuric sulfate
    C. bees wax
    D. distilled water

    Correct answer: A

33. The introduction of outside air to the air conditioning system is 90°F with a relative humidity of 60%. The air has been conditioned to 70°F with a relative humidity of 80%. Using the psychrometric chart, shown in the illustration, determine the quantity of moisture removed from one pound of the conditioned air. Illustration RA-0022

    A. 20 grains
    B. 30 grains
    C. 40 grains
    D. 50 grains

    Correct answer: C

34. The compressor used in a water-cooled air conditioning system is short-cycling and as a consequence a safety shutdown alarm occurs at each shutdown, and a manual reset is required to restart. A service check determines that the suction pressure remains above the normal cut-in point during cycling and that the discharge pressure rapidly builds up to the cut-out point while running and gradually falls to the cut-in point during the off cycle. What is likely the cause?

    A. loosely fitted compressor drive belt
    B. back seated discharge service valve
    C. front seated liquid line service valve
    D. reduction in condenser water flow (scaled condenser)

    Correct answer: D

35. Why can CFC or HCFC refrigerants leaking into a confined space or in limited surroundings cause suffocation?

    A. Refrigerants obnoxious odor prevents breathing.
    B. Refrigerants lighter than air will rise.
    C. Refrigerants are heavier than air and displace oxygen.
    D. Refrigerants contain an acidic substance.

    Correct answer: C

36. If the discharge reed valves used in a refrigeration compressor are leaking badly, what statement is true?

    A. the low side pressure will indicate below normal
    B. the high-pressure cutout setting should be lowered
    C. the reed valves should be replaced
    D. the reed valves should be reground and relapped

    Correct answer: C

37. Which of the listed statements describes the reason why oil foaming occurs when starting a refrigeration compressor?

    A. If the oil level is not initially high, this condition is the result of agitation created by the movement of the mechanical components.
    B. This phenomenon is inherent only in hermetically sealed units and is always provisional.
    C. This will occur only if crankcase heaters are used.
    D. This condition is the result of the sudden low-pressure created in the crankcase at start up causing the release of refrigerant absorbed within the oil.

    Correct answer: D

38. A refrigeration compressor used in a multi-box refrigeration system, is designed with six of its eight cylinders able to be controlled for variable load conditions. If all of the reefer boxes are currently feeding, what percentage of the total number of compressor cylinders will be loaded after start up?

    A. 100%
    B. 50%
    C. 25%
    D. 0%

    Correct answer: A

39. An obstructed expansion valve may be indicated by an incompletely cooled evaporator and what other symptom?

    A. a decrease in the amount of frosting across the drier
    B. frosting at the evaporator inlet
    C. a higher-than-normal discharge pressure
    D. frosting at the suction side of the compressor

    Correct answer: B

40. With regards to shipboard refrigeration systems, after July 1, 1992, what action became illegal?

    A. working on a refrigeration system without permission of the Officer in Charge Marine Inspection
    B. intentionally venting class I or II refrigerants to the atmosphere
    C. producing a class I refrigerant
    D. mixing R-12 and R-22

    Correct answer: B

41. When opening or closing compressor service and line isolation valves on a typical refrigeration system that is fitted with packed valves, what must you do?

    A. you should turn valves slowly to avoid thermal stresses due to low temperatures
    B. you must first remove the stem seal cap
    C. you should replace the gasket each time the valve position is changed
    D. you should never loosen or tighten the packing gland

    Correct answer: B

42. Attitudes, biases, and prejudices towards certain groups (nationalities, races, religions, and sexes) can pose formidable challenges to communication. This is because an individual is judged by group association rather than by getting to know the individual and recognizing individual differences. What is the tendency called?

    A. Stereotyping
    B. Stereographing
    C. Monotyping
    D. Individualizing

    Correct answer: A

43. When it comes to motivating employees, it is important to distinguish between intrinsic and extrinsic motivation. What statement best represents the difference?

    A. Intrinsic motivation is derived from doing the job itself (such as enjoyment), where extrinsic motivation is derived from the consequences of doing the job (such as pay).
    B. Intrinsic motivation is derived from the consequences of doing the job (such as pay), where extrinsic motivation is derived from the fear of the consequences of not doing the job (such as getting fired).
    C. Intrinsic motivation is derived from doing the job itself (such as enjoyment), where extrinsic motivation is derived from the fear of the consequences of not doing the job (such as getting fired).
    D. Intrinsic motivation is derived from the consequences of doing the job (such as pay), where extrinsic motivation is derived from doing the job itself (such as enjoyment).

    Correct answer: A

44. What leadership style tends to extrinsically motivate employees on a contingent reward system where the focus is on outcomes?

    A. Transactional leadership
    B. Developmental leadership
    C. Transformational leadership
    D. Adaptive leadership

    Correct answer: A

45. During the "forming" stage of group development, members are trying to determine the task of the group and their role expectations of one another. As a manager, what should be done to help facilitate the "forming" process?

    A. The group should have a designated leader to provide structure and guidance.
    B. The group members should be widely differing in background regardless of the degree of complexity of the task.
    C. The group members should be similar in background regardless of the degree of complexity of the task.
    D. The group should not have a designated leader to promote equality.

    Correct answer: A

46. As a manager, which of the following conflict management styles is considered the most appropriate for resolving conflict and is considered both an assertive and a cooperative approach?

    A. Forcing
    B. Avoiding
    C. Collaborating
    D. Accommodating

    Correct answer: C

47. As a manager conducting a meeting, what action should you take when an attendee exhibits disruptive or inappropriate behavior?

    A. Aggressively confront the offending trainee.
    B. Immediately expel the offending attendee from the meeting.
    C. Ignore the disruptive or inappropriate behavior.
    D. With respect, respond in a way appropriate to the behavior.

    Correct answer: D

48. In planning for a fire and emergency drill, to ensure drill success within the context of a comprehensive fire and emergency training program, what should be planned for?

    A. The fire drill should be a simulated outbreak in a low fire risk area and for each fire drill the location should remain the same.
    B. The fire drill should be a simulated outbreak in a high fire risk area and for each fire drill the location should remain the same.
    C. The fire drill should be a simulated outbreak in a high fire risk area and for each fire drill the location should be changed.
    D. The fire drill should be a simulated outbreak in a low fire risk area and for each fire drill the location should be changed.

    Correct answer: C

49. Which of the following comprehensive computerized maintenance system database modules would contain technical data such as machinery serial numbers?

    A. Requisitions management module
    B. Planned maintenance management module
    C. Equipment management module
    D. Inventory management module

    Correct answer: C

50. Which of the following types of maintenance would be considered a reactive approach to maintenance as opposed to proactive?

    A. Planned maintenance
    B. Corrective maintenance
    C. Predictive maintenance
    D. Condition-based maintenance

    Correct answer: B

51. Which of the following would be a positive outcome associated with performing a trend analysis of data acquired from lube oil testing, vibration sensors, performance data sensors, and thermographic sensors?

    I) Avoidance of catastrophic failures
    II) Determining the need of when to perform corrective maintenance
    III) Improving the overall effectiveness of the engineering plant

    A. I only
    B. II only
    C. I and II only
    D. I, II, and III

    Correct answer: D

52. As a management level engineering officer, you are apt to be the primary investigator investigating the root cause of the failure of a piece of machinery. In collecting the necessary data for the root cause analysis, what should be your FIRST priority?

    A. Consulting with other technical experts, suppliers, and manufacturers
    B. Interviewing any directly involved watchstanding or maintenance personnel
    C. Reviewing the historical watchkeeping and maintenance records
    D. Collecting and preserving the physical evidence of the failure

    Correct answer: D

53. When using a thermal imager for the purpose of conducting a thermographic analysis of equipment, what form of energy produces the thermal signature radiating from the object surface?

    A. Ultraviolet energy
    B. X-ray energy
    C. Infrared energy
    D. Visible light energy

    Correct answer: C

54. A self-propelled mobile offshore drilling unit is required to have its emergency storage batteries tested in accordance with 46 CFR regulations applicable to tests, drills, and inspections for MODU operations. What is the test criteria?

    A. The emergency batteries are to be tested once each month and furnish power to the actual connected loads for a period of not less than 2 continuous hours.
    B. The emergency batteries are to be tested once each 6 months and furnish power to the actual connected loads for a period of not less than 2 continuous hours.
    C. The emergency batteries are to be tested once each 6 months and furnish power to the actual connected loads for a period of not less than 18 continuous hours.
    D. The emergency batteries are to be tested once each 6 months and furnish power to the actual connected loads for a period of not less than 6 continuous hours.

    Correct answer: B

55. In accordance with 33 CFR Subchapter O (Pollution), how long must the Oil Record Book be maintained on board those vessels for which the regulations apply?

    A. 1 year at a minimum
    B. 2 years at a minimum
    C. 3 years at a minimum
    D. 4 years at a minimum

    Correct answer: C

56. One of the means of alternative dispute resolution regarding a collective bargaining agreement is arbitration. What is the role of the arbitrator?

    A. The arbitrator facilitates settlement by negotiation by working with both sides to reach common ground.
    B. The arbitrator appoints a factfinder from each side to investigate the dispute and report back to the principals.
    C. The arbitrator conducts independent fact-finding and renders a decision based on the results of that investigation.
    D. The arbitrator makes a binding decision based on the evidence and the arguments presented by both sides.

    Correct answer: D

57. If there is any doubt that a newly employed engine department crew member is sufficiently familiar with the engine room equipment, operating and maintenance procedures needed for the proper performance of his or her duties, what should be done?

    A. The employee should be allowed to perform his or her duties without supervision in the hopes that he or she will eventually become familiar enough to be competent.
    B. The employee should be immediately terminated, and arrangements made for a relief to be sent out whenever practical.
    C. The employee should be provided a period of close supervision until there is no longer any doubt that he or she is familiar enough to be competent.
    D. The employee should be demoted and required to function at the lowest level for the entire duration of his or her assignment.

    Correct answer: C

58. In consultation with the other ship's management level officers, you are planning a required fire emergency drill. In addition to selecting a scenario as functionally realistic as possible (such as a high fire risk area) what follow-up activity would best maximize the training effectiveness for future applicability to an actual fire emergency?

    A. Debrief the entire crew after the drill to critique what went right and what went wrong.
    B. Write up a critique of the fire drill and distribute to shore side management.
    C. Hold a post-drill conference among the management officers to discuss the drill.
    D. Document the fire drill training as required to authenticate proof of training.

    Correct answer: A

59. Vessel special surveys are conducted how often in the life of a vessel?

    A. Every 5 years after the anniversary date of construction or last special survey
    B. Every 5 years after the anniversary date of construction always
    C. Every 2 1/2 years after the anniversary date of construction or last special survey
    D. Annually on the anniversary date of the last survey

    Correct answer: A

60. What statement is true concerning the checks to be undertaken in the "checks prior to transfer" section of the bunkering safety checklist where the transfer is from barge-to-ship?

    A. These are checks to be performed jointly by the person in charge (PIC) of the ship's role of the bunkering operation and the USCG marine inspector.
    B. These are checks to be performed jointly by the persons in charge (PICs) of both the barge's and ship's roles of the bunkering operation.
    C. These are checks to be performed solely by the person in charge (PIC) of the barge's role of the bunkering operation.
    D. These are checks to be performed solely by the person in charge (PIC) of the ship's role of the bunkering operation.

    Correct answer: B

61. The coil temperature measured at the expansion valve sensing bulb of an operating system is 10°F. The low side pressure with the compressor running as shown on the gauge illustrated indicates 15 psig. What adjustments or changes, if any, should be made to the system? Illustration RA-0016

    A. The evaporator coils need to be steam cleaned or high-pressure washed.
    B. The filter drier needs to be changed to increase the suction pressure.
    C. The expansion valve should not be adjusted, as the degree of superheat is within the accepted range.
    D. The liquid line strainer is obviously fouled and needs to be cleaned.

    Correct answer: C

62. Constant superheat is maintained at the evaporator coil outlet of a refrigeration system or unit by the action of what device?

    A. low-pressure cutout switch
    B. solenoid valve
    C. king valve
    D. thermal expansion valve

    Correct answer: D

63. When observing the candidate's performance while conducting an assessment, what is the appropriate response from the assessor when a safety condition is being violated?

    A. The assessor should ask leading questions in an attempt to correct the unsafe condition.
    B. The assessor should offer unsolicited assistance in order to correct the unsafe condition.
    C. The assessment must be terminated whenever safety conditions are being violated.
    D. For the purposes of assessment, the safety condition violation should be ignored.

    Correct answer: C

64. As shown in the illustration, what is the purpose of the main contacts of contactor "1S"? Illustration EL-0012

    A. The "1S" contactor connects the autotransformer in wye configuration during the starting/acceleration period.
    B. The "1S" contactor connects the autotransformer in wye configuration during the run period.
    C. The "1S" contactor connects the autotransformer to the line during the starting/acceleration period.
    D. The "1S" contactor connects the autotransformer in delta configuration during the starting/acceleration period.

    Correct answer: A

65. What is one major advantage of a diesel-electric propulsion plant?

    A. less maintenance
    B. low cost and weight
    C. lower fuel consumption
    D. excellent maneuverability

    Correct answer: D

66. If the inputs to the diagram shown in figure "2" of the illustration were A=0 and B=0, what logic levels would be indicated at points "C", "D", "E", and "F" respectively? Illustration EL-0089

    A. C=0, D=0, E=1, and F=1
    B. C=1, D=0, E=0, and F=1
    C. C=1, D=0, E=1, and F=0
    D. C=1, D=1, E=0, and F=1

    Correct answer: D

67. As shown in figure "B" of the illustrated block diagram of the signal processing flow path, the block "TRANSDUCER" represents a sensing and transmitting device designed to sense and measure a physical parameter and convert it into a proportional force or signal of what type? Illustration EL-0095

    A. electro-mechanical force
    B. analog electrical signal
    C. digital electrical signal
    D. pneumatic signal

    Correct answer: B

68. Some shipboard high voltage systems have the neutral point of the generators bonded to the ship's hull with a neutral grounding resistor. What is the purpose of this resistor?

    A. To prevent nuisance ground fault trips
    B. To maximize the magnitude of the ground fault current
    C. To minimize the magnitude of the ground fault current
    D. To completely eliminate ground fault current

    Correct answer: C

69. For troubleshooting purposes, the key indicator to the safety and general condition of high voltage circuitry is insulation resistance. For a 6.6 kV high voltage system, what would be the recommended minimum insulation resistance value?

    A. 1 megohm
    B. 5.6 megohms
    C. 6.6 megohms
    D. 7.6 megohms

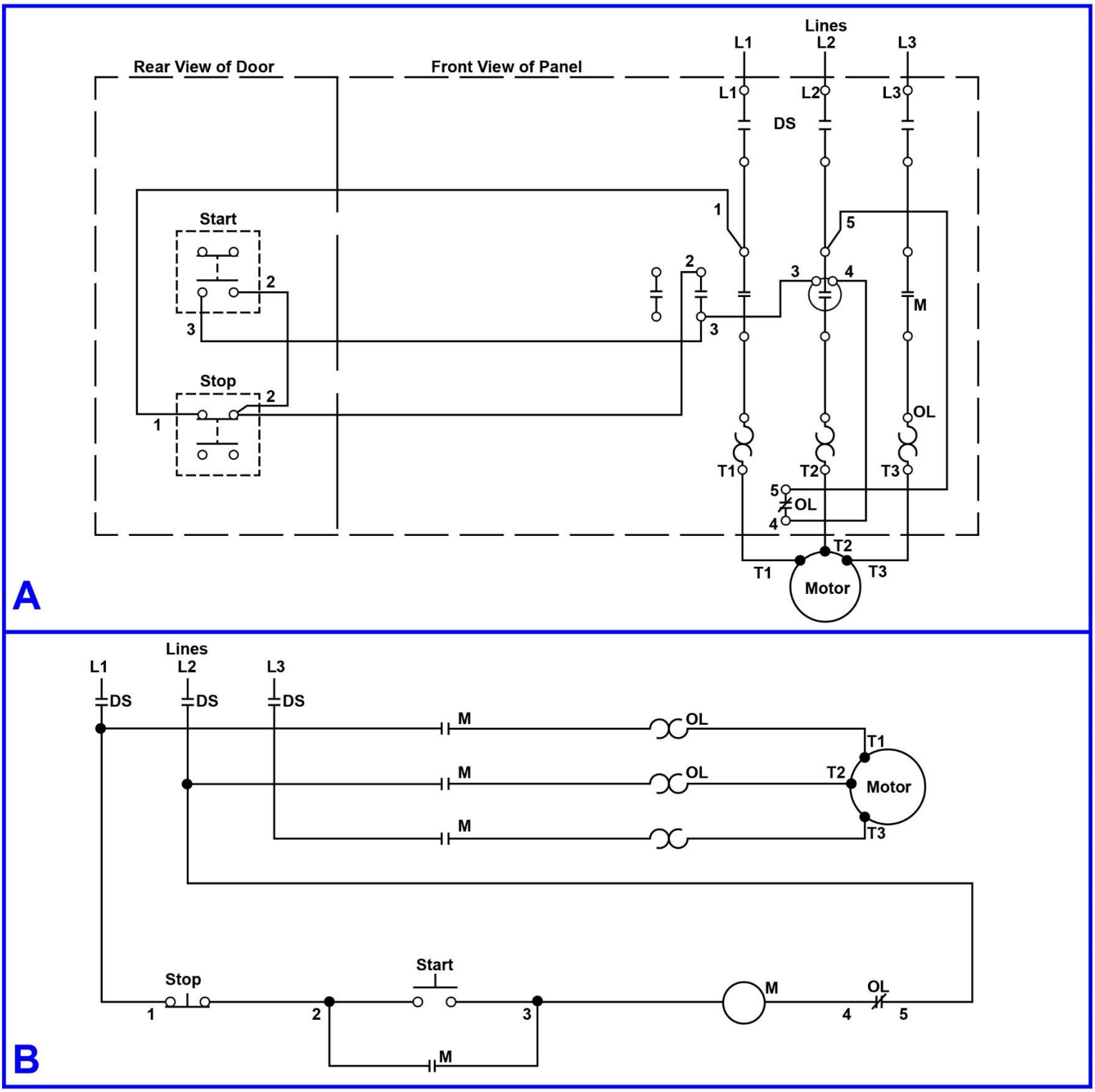
    Correct answer: D

70. What type of local area network physical topology features point-to-point interconnection between all communicating devices and is the least vulnerable to a break in communication?

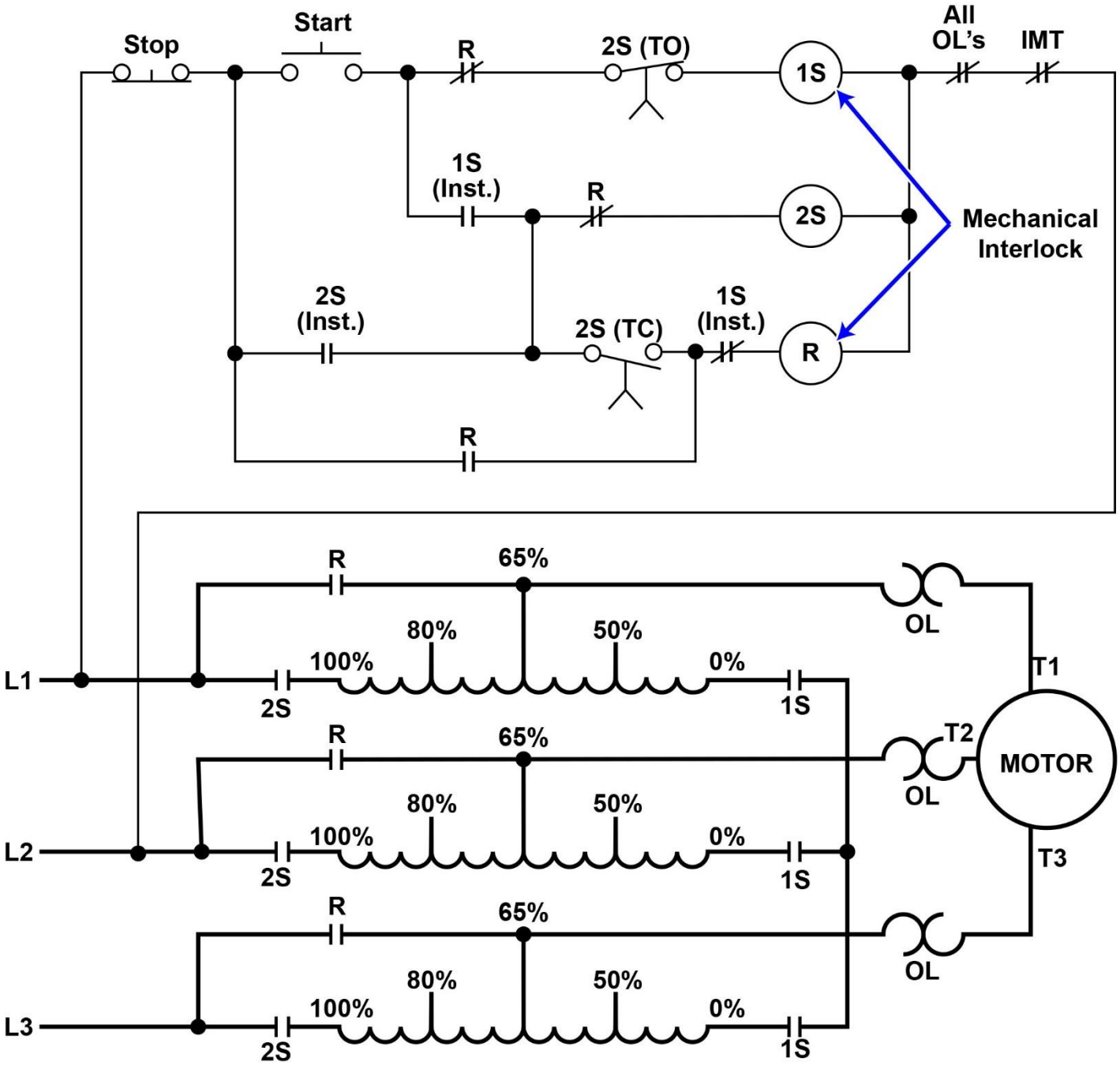
    A. Mesh
    B. Bus
    C. Ring
    D. Star

    Correct answer: A

EL-0007



EL-0012



EL-0089

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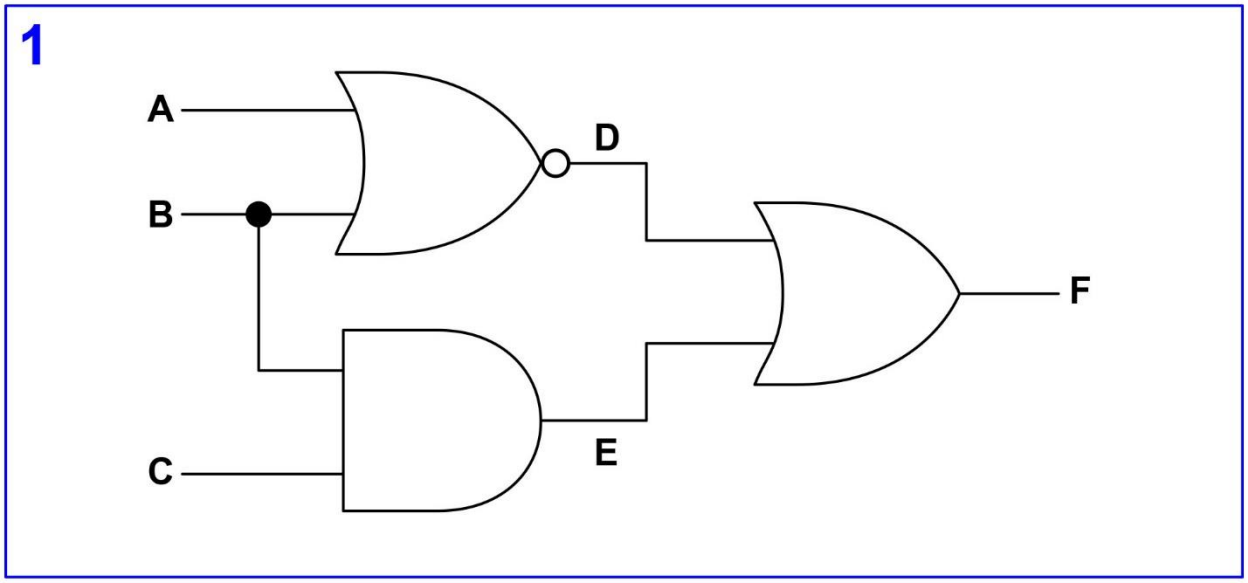

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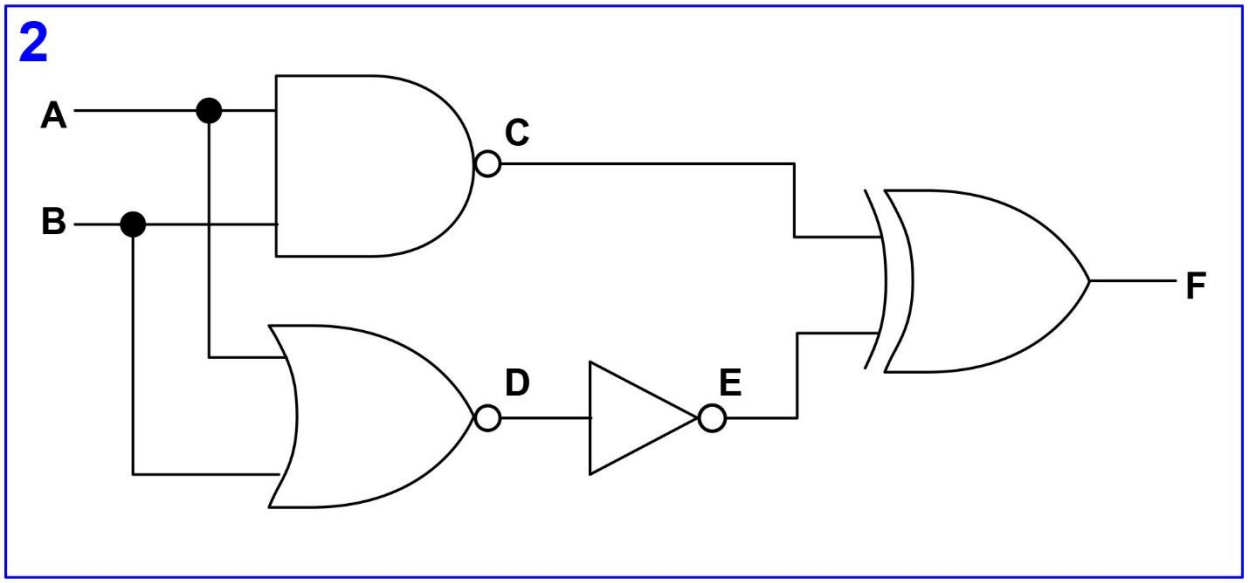
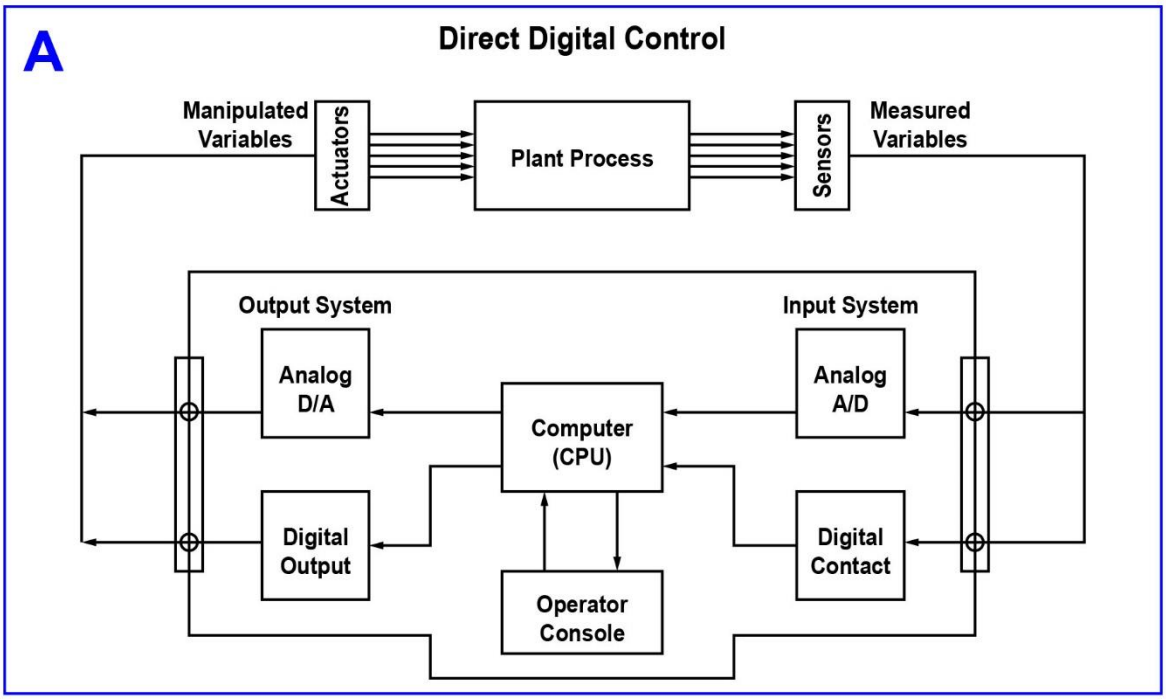
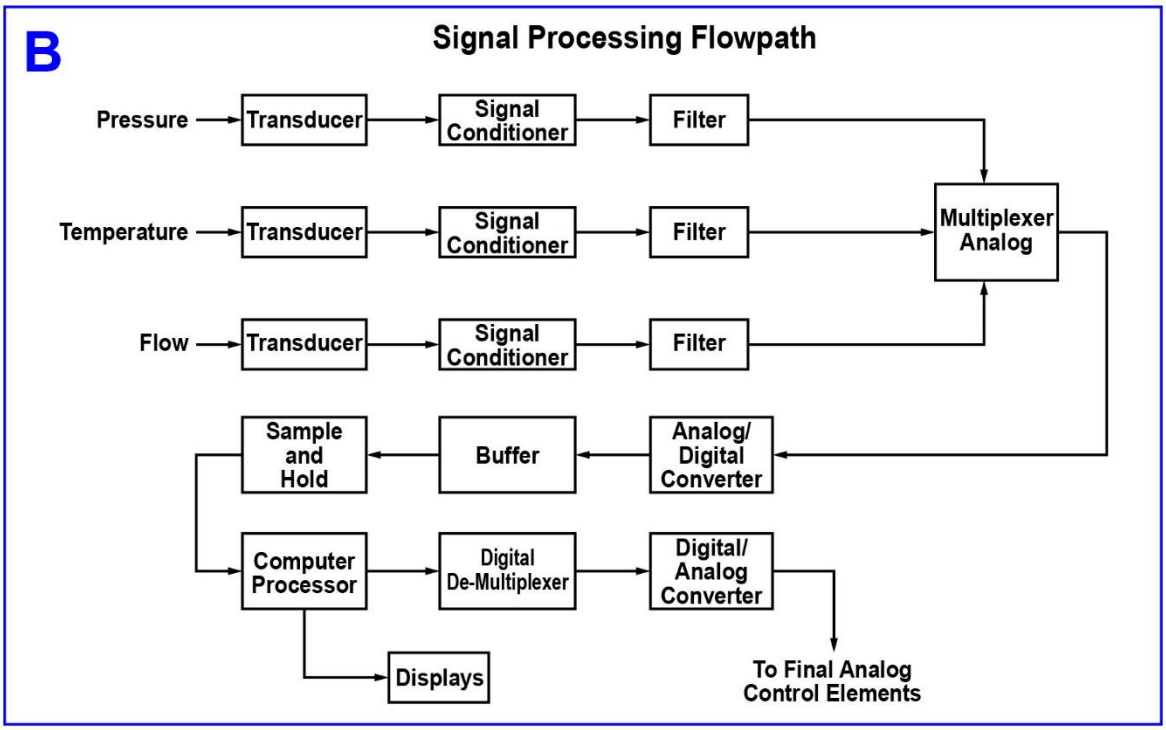


EL-0095





EL-0180
Catalog Number Selection Chart

Example Catalog Number

A N 1 9 A N 0 A 5E 005

Device Type
A = Starter
C = Contactor

Standard
E = IEC
N = NEMA

Device Assembly Configurations
70 = Multi-speed
1 = Non-reversing
5 = Reversing

OLR Type
5 = Contactor only-no overload relay
6 = Starter w/C306 bi-metalic OLR
9 = Starter w/C440 electronic overload

Contactor Frame Size*

Suffix	NEMA Size	Continuous Amperes
A =	00	9
B =	0	18
D =	1	27
G =	2	45
K =	3	90
N =	4	135
S =	5	270
T =	6	540
U =	7	810
V =	8	1215

NEMA Enclosures
N = Open

For Starters

Starter Mounting Options
0 = Horizontal
V = Vertical

For Contactors Only
2 = Two-pole
3 = Three-pole
4 = Four-pole
5 = Five pole

C440 OLR Designation (FVNR and FVR only)
5E = Standard feature set
SEL Reset, SEL Class (10A, 10, 20, 30)
5G = Ground fault feature set
SEL Reset, SEL Class (10, 20)

AC Coil Suffix

Suffix	Coil Volts and Hertz
A =	120/60 or 110/50
B =	240/60 or 220/50
C =	480/60 or 440/50
D =	600/60 or 550/50
E =	208/60
H =	277/60
J =	208-240/60 **
K =	240/50
L =	380-415/50
N =	550/50
T =	24/60, 24/50 ***
U =	24/50
V =	32/50
W =	48/60
Y =	48/50

C440 FLA Range (FVNR and FVR only)

NEMA Size 00
1P6 = 0.33 - 1.65A
005 = 1 - 5A
020 = 4 - 20A

NEMA Size 0
1P6 = 0.33 - 1.65A
005 = 1 - 5A
020 = 4 - 20A

NEMA Size 1
1P6 = 0.33 - 1.65A
005 = 1 - 5A
020 = 4 - 20A
045 = 9 - 45A

NEMA Size 2
005 = 1 - 5A
020 = 4 - 20A
045 = 9 - 45A

NEMA Size 3
100 = 20 - 100A ****

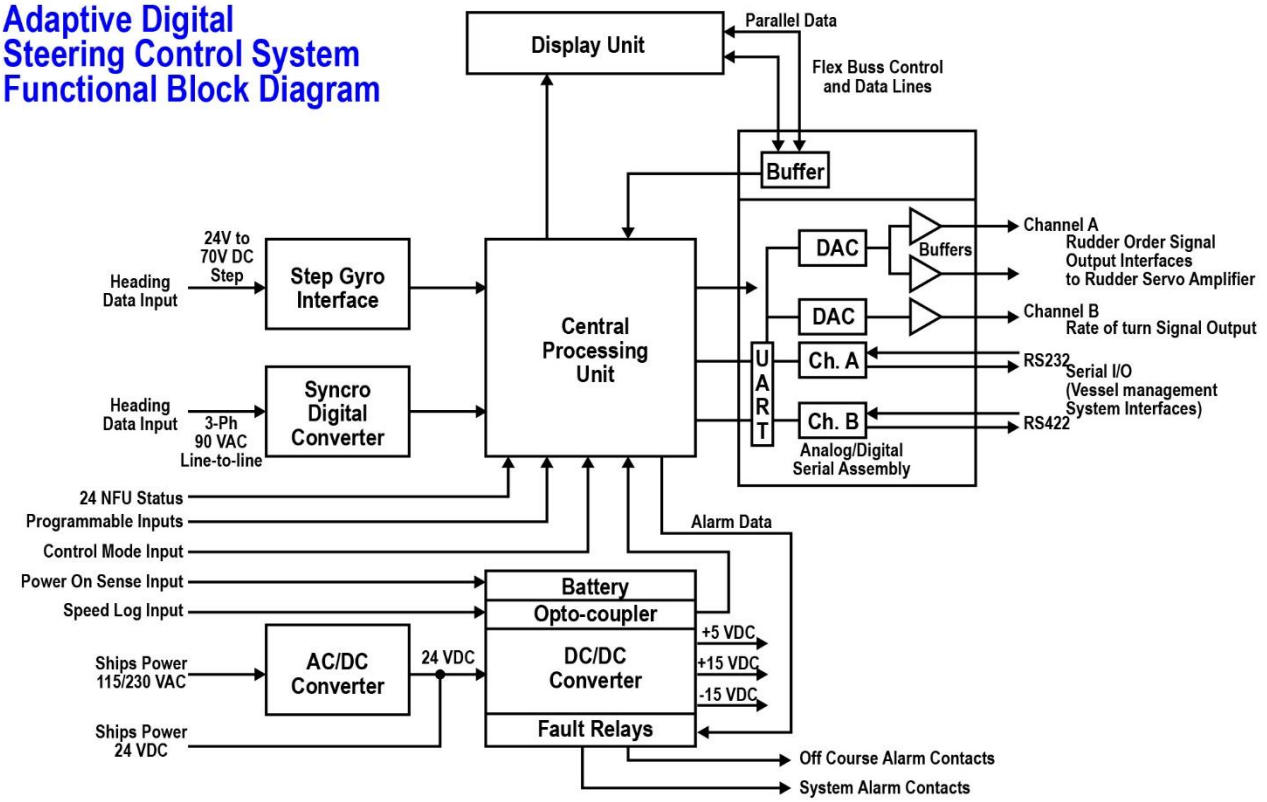
NEMA Size 4 **
300 = 60 - 300A ****

NEMA Size 5 **
300 = 60 - 300A ****

NOTES:
* For contactor only orders, add B to end of catalog number if NEMA size 00-2, 6.
** NEMA sizes 00 and 0 only.
*** NEMA sizes 00 and 0 only. Sizes 1-8 are 24/60 only.
**** NEMA sizes 4 and 5 require the use of CTs with 1 - 5A OL relay. Size 4 starters are not shipped as assembled units. Order CN15NN01 contactor 1 - 5A OL (C440A1A005SAX or C440A2A 005SAX) with 60 - 300A CTs (ZEB-XCT300).

EL-0191

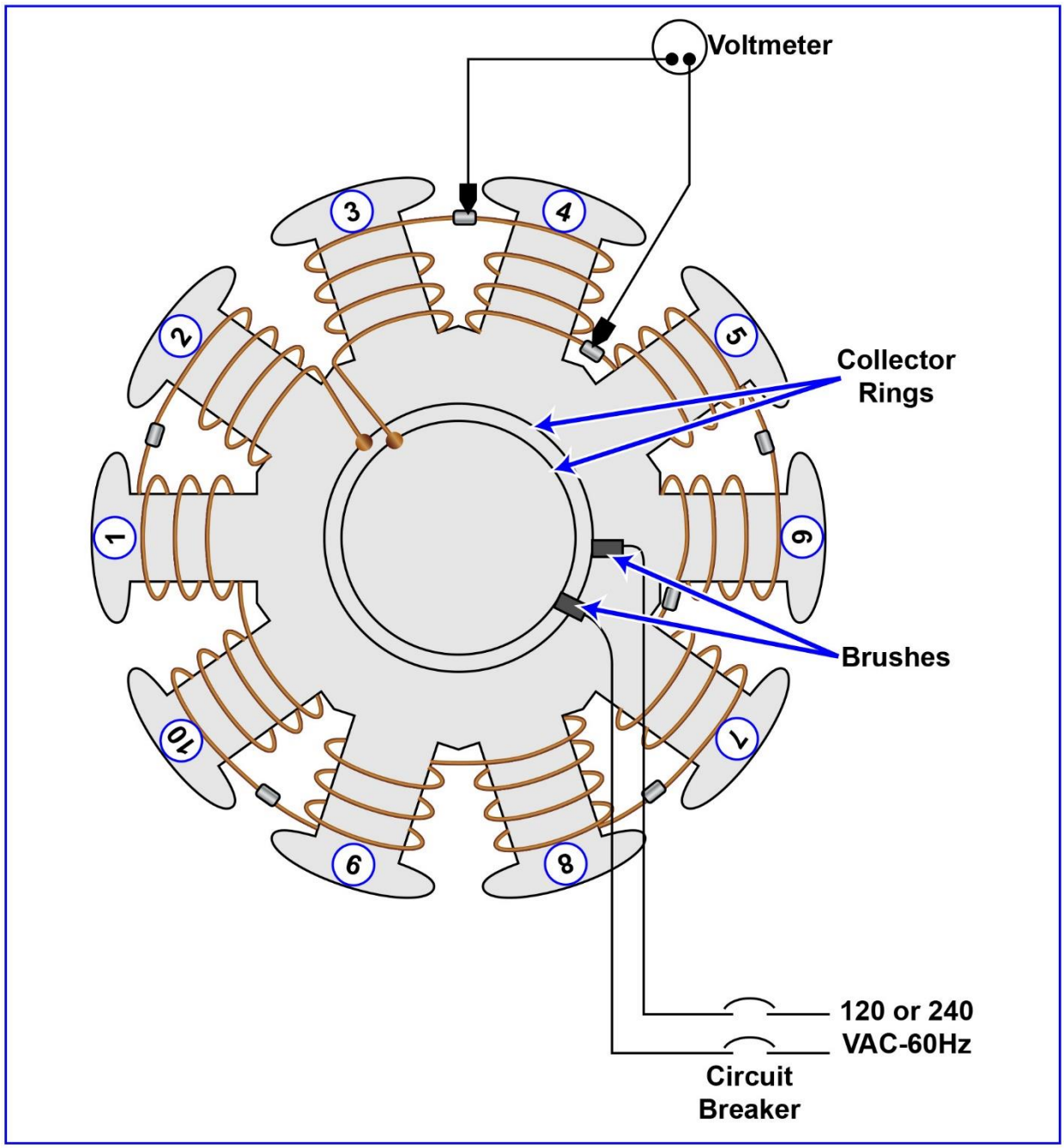
Adaptive Digital Steering Control System Functional Block Diagram



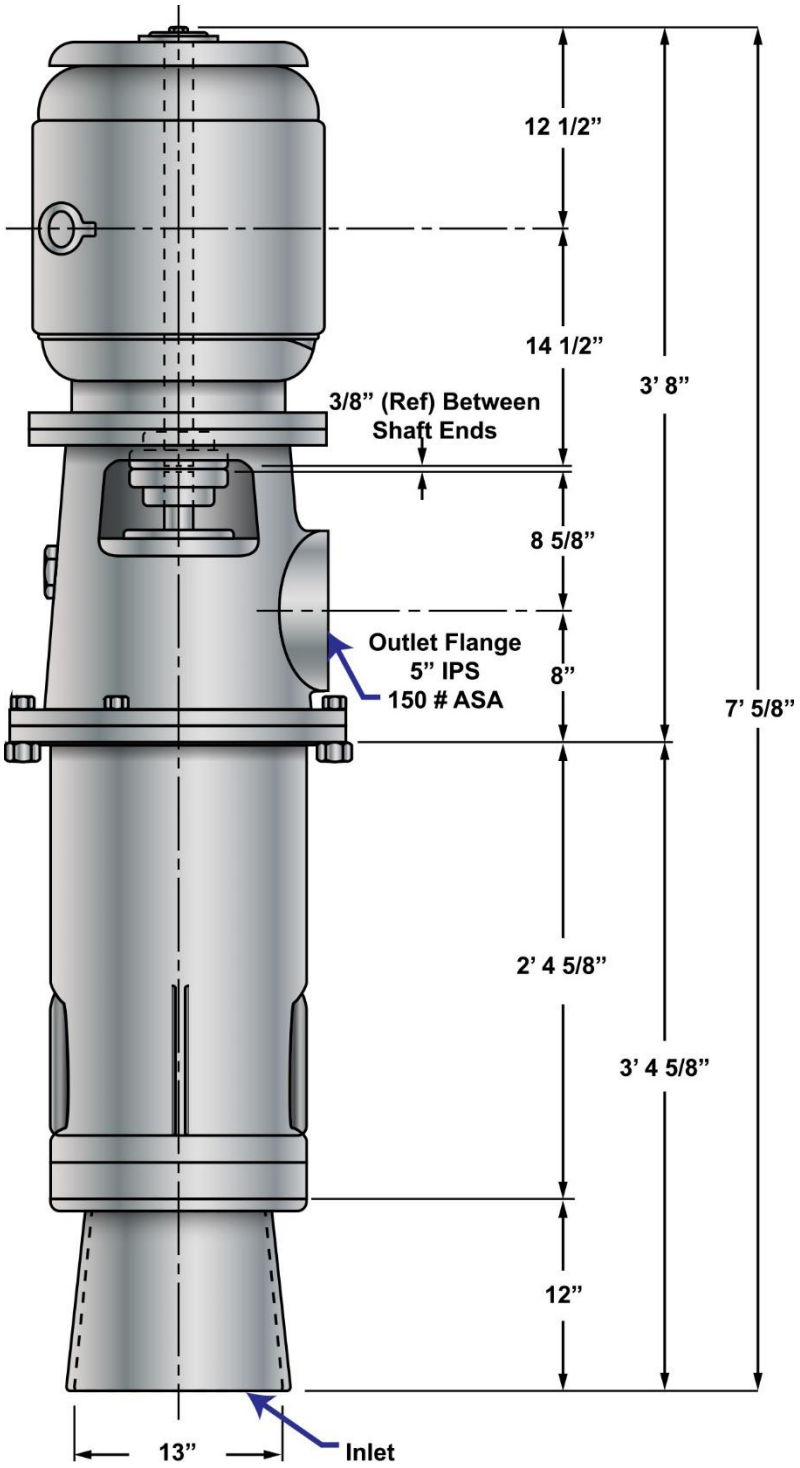
Adaptive Digital Steering System Interface Signals

Inputs	
Speed log input Pulsed Serial	 200 pulse nautical mile (PPNMI) format (contact closure) RS-232 (channel A or C) or RS-422 (channel B) communications in NMEA 0183 format, $VBW, $VHW
Navigator (vessel management system) input	Serial data for heading order, rate order, and cross track error information in RS-232 or RS-422 communication on channel A, B or C, in NMEA format $APB, $HSC, $HTR, $HTC or $XTE
Compass Step data Syncro	Positive or negative step data (24 or 70 V) 1X, 90X or 360X
Data Serial data	$HDT (on channels A, B or C)
Mode switch sense contact	External switched opened or closed to inform autopilot to change from Standby mode to an automatic mode
NFU sense contacts Power failure circuits	External contacts to indicate when the NFU Controller is active Closed contacts on external power switch to activate power failure alarm
Outputs	
Interface to external rudder Servo control amplifiers	Bipolar analogue voltage proportional to the rudder order. ± 11.25 V (maximum limit) equal to ± 45° or rudder
Rate of turn interface	Bipolar analogue voltage proportional to a turn rate indicator. ± 4.5 V (Max) equal to ± 90° turn/min. Resolution equal to 0.5°/min.

EL-0202



GS-0011



MOTOR CHARACTERISTICS

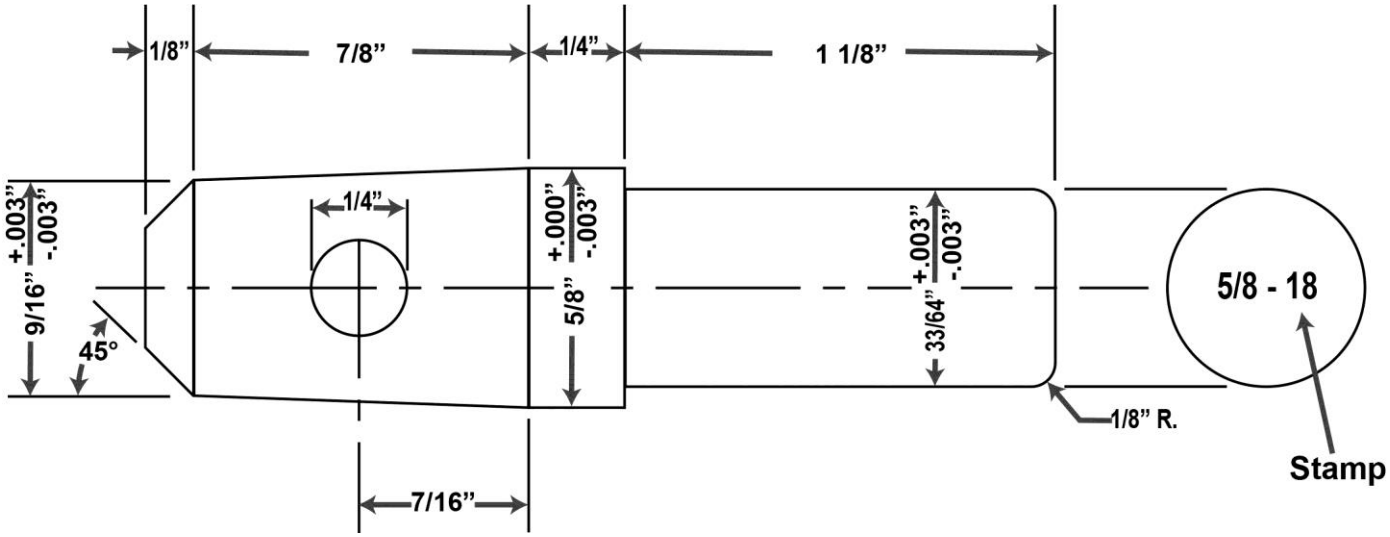
Motor (A. C.)	Electro Dynamic
Rating H. P.	25
Speed R. P. M. (SYN.)	1200
Frame	365 VY
Type	TN
Volts	440
Cycles	60
Phase	3

PUMP CHARACTERISTICS

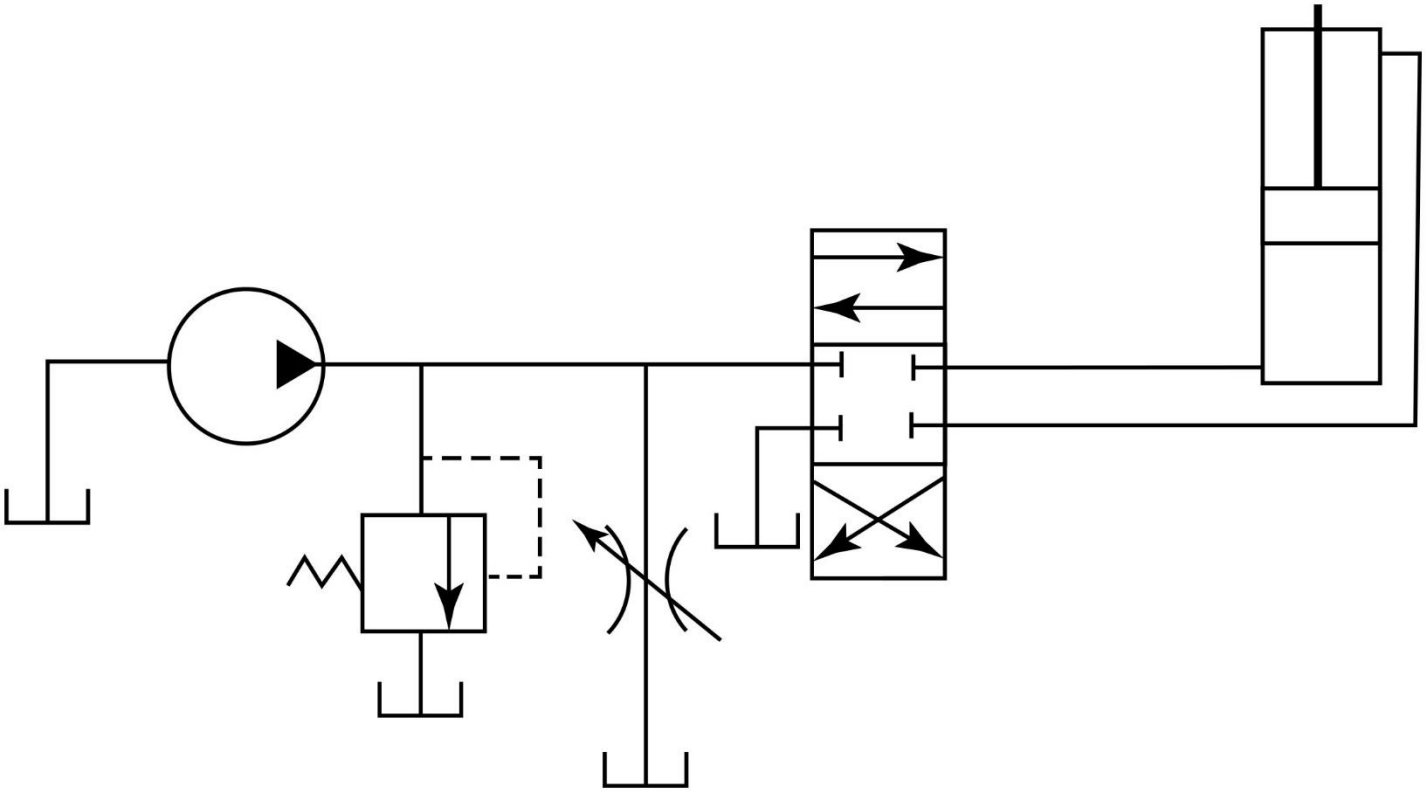
Capacity G. P. M.	400
Speed R. P. M.	1150
Suction Lift “HG	10
B, H, P. @ 1200 SSU-75° F	24.9
Oil viscosity Range, SSU	74-7000
Viscosity Normal SSU @ 140° F	155
Discharge Normal PSIG	55
Fluid Handled, Lube Oil	2190 TEP.
Navy Specification	MIL-L-17331
Oil Temperature Range ° F	40-180

Illustration scale: 1” = 1’

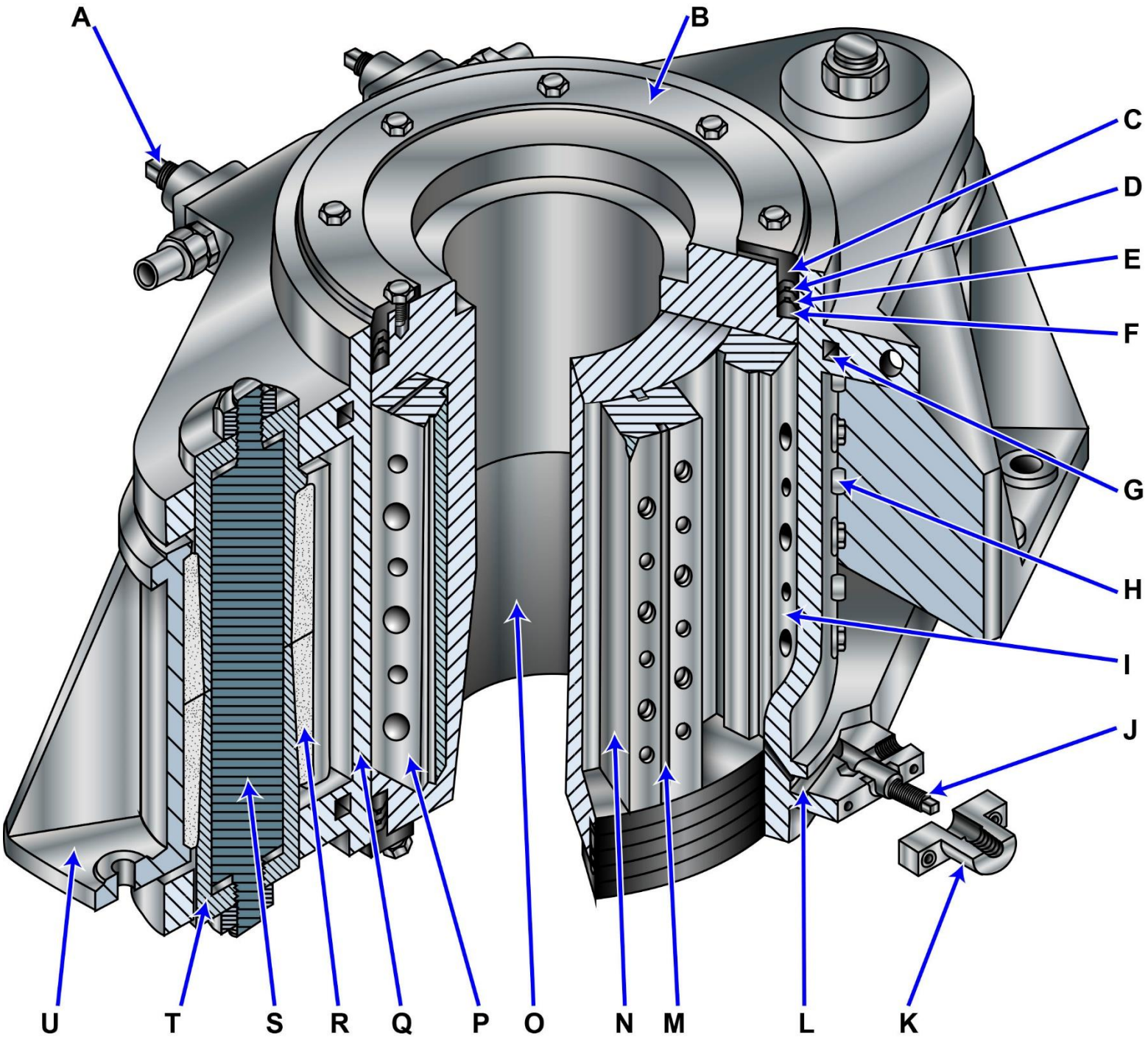
GS-0016



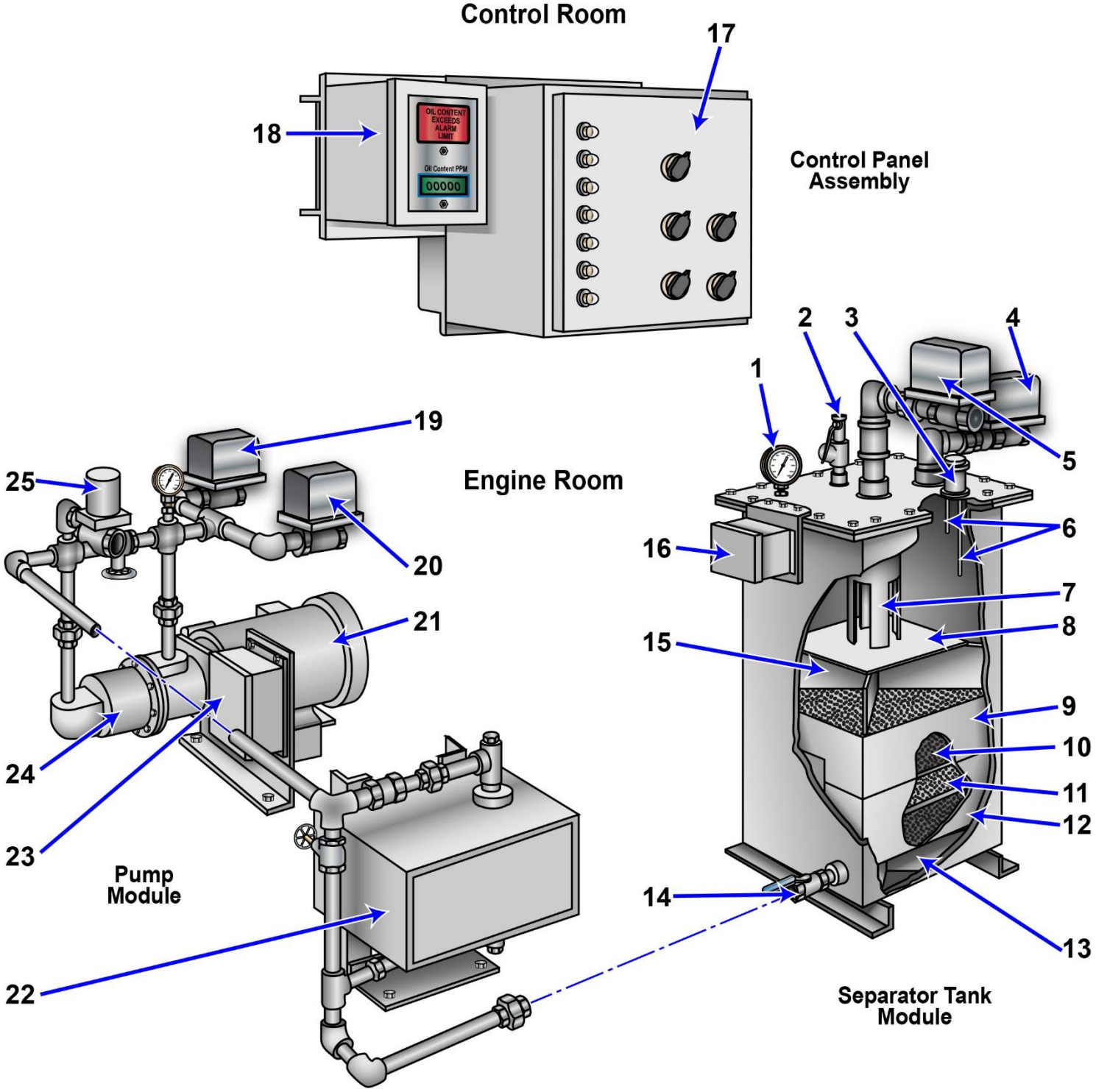
GS-0107



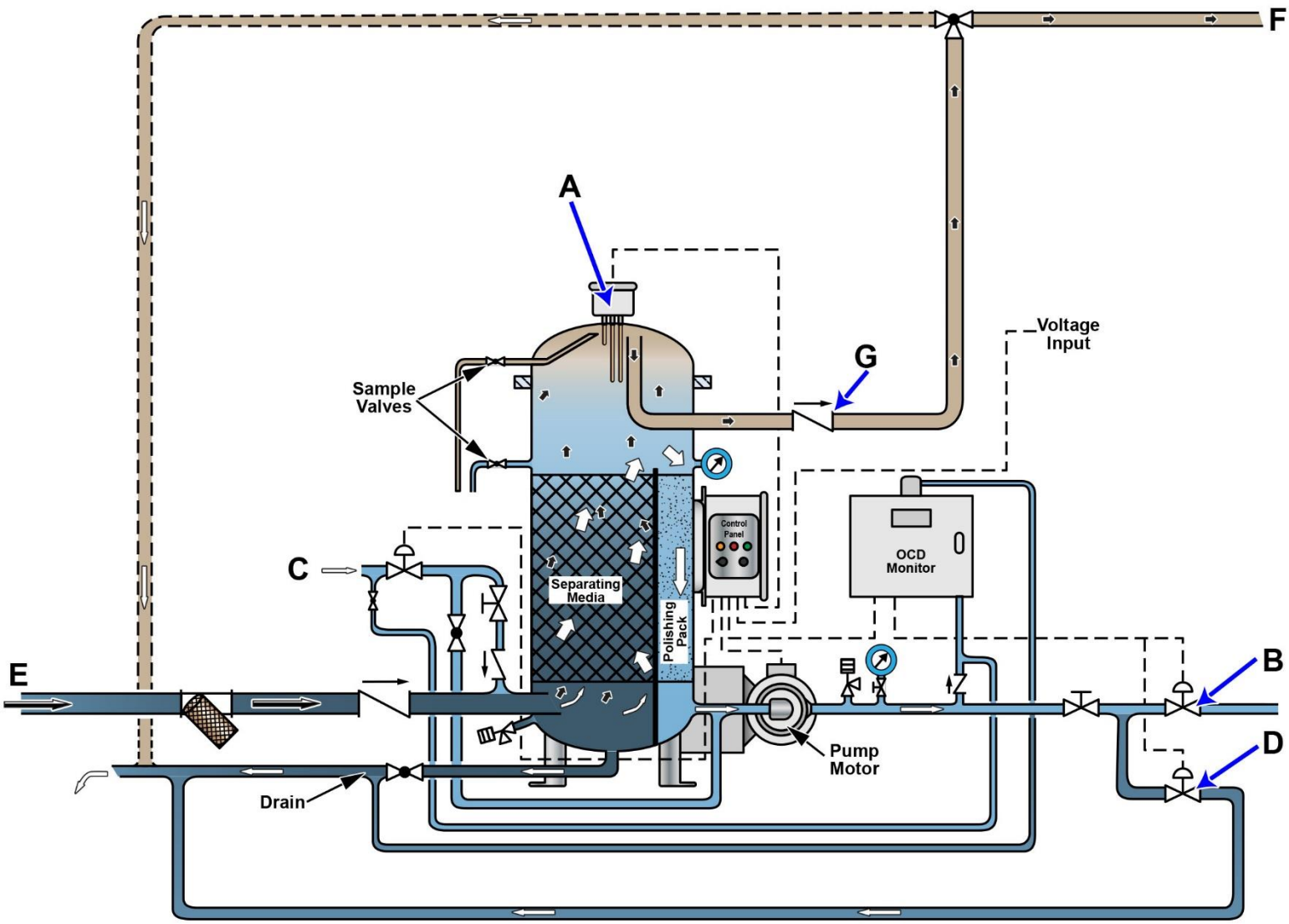
GS-0116



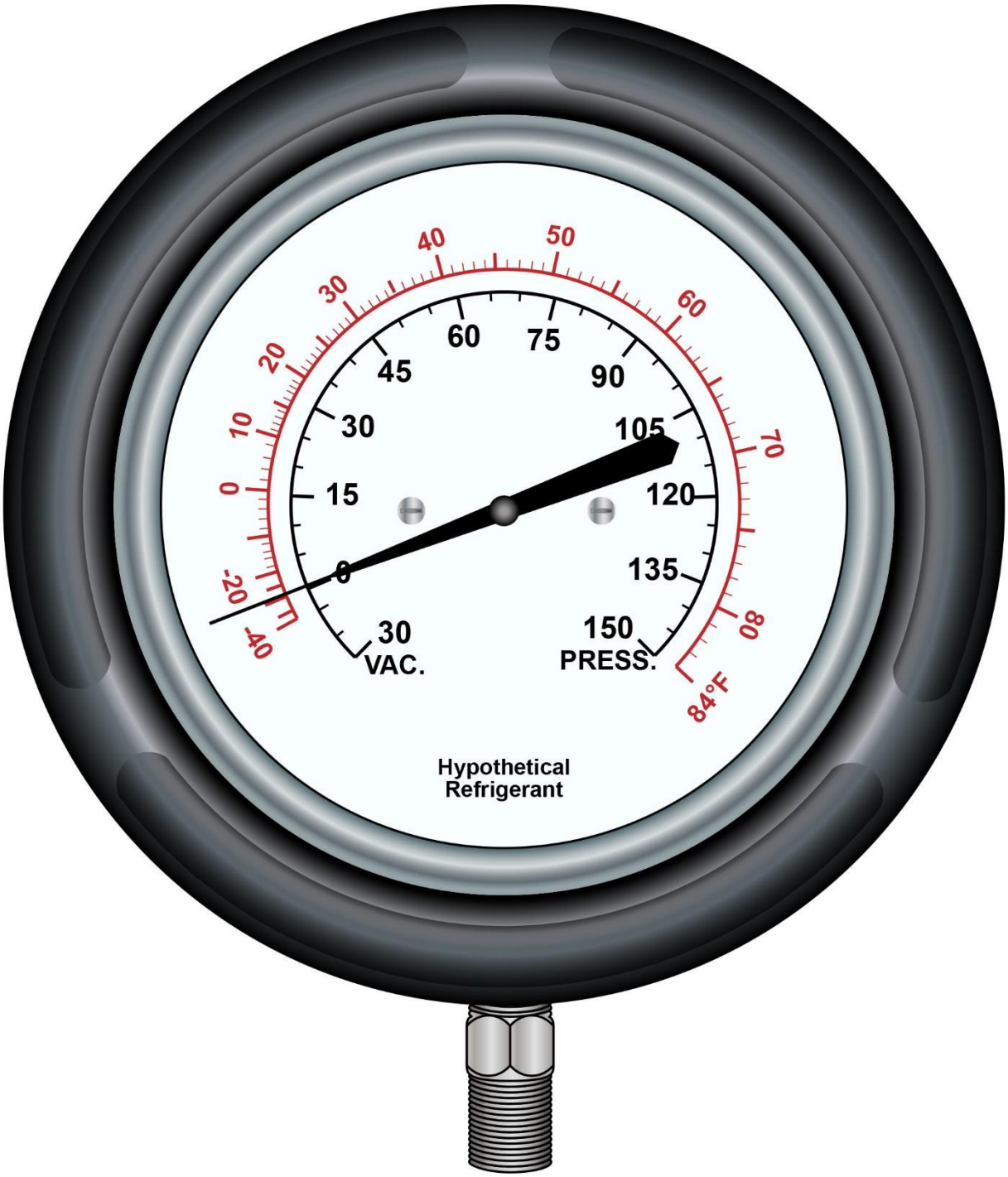
GS-0153



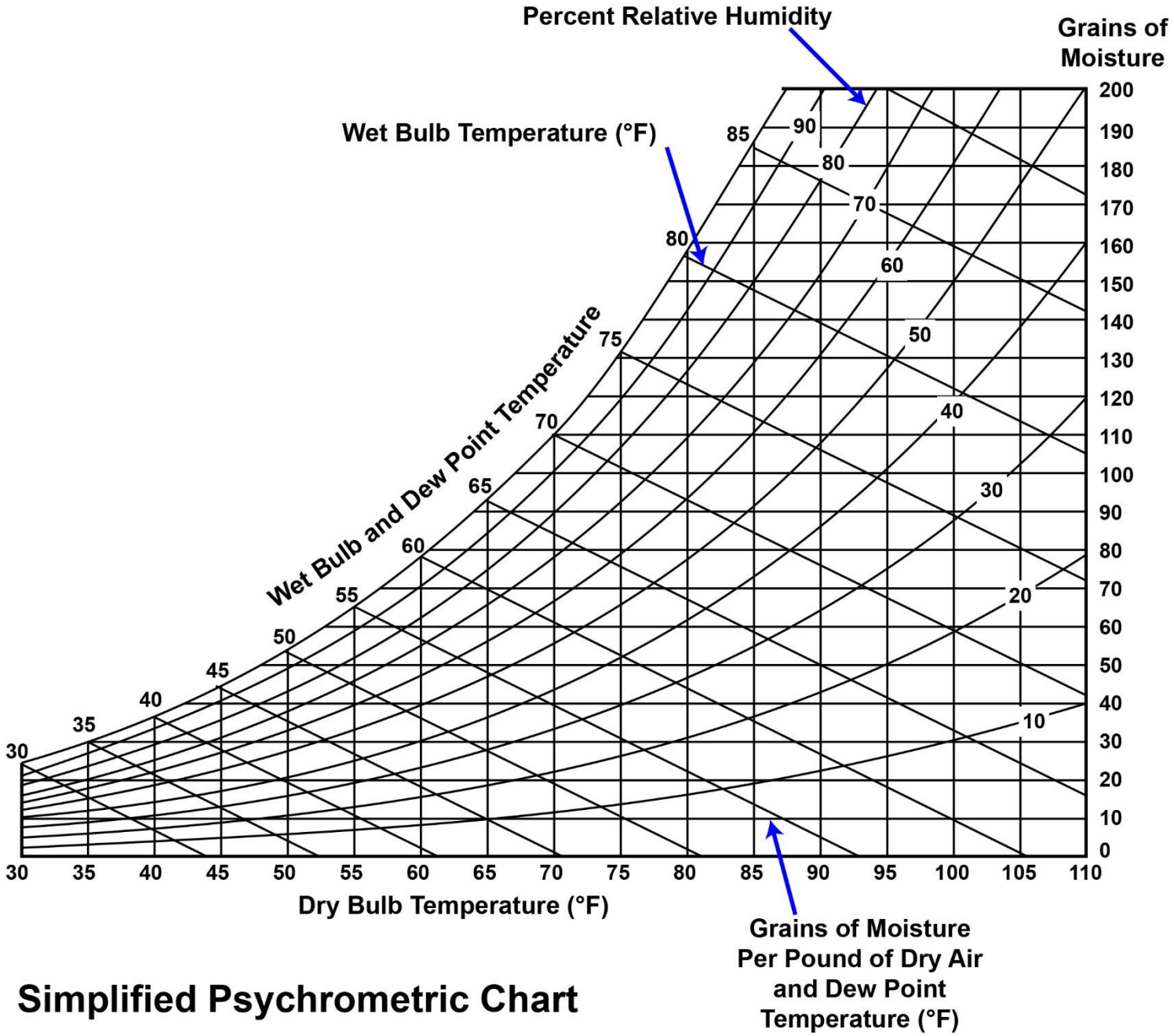
GS-0175



RA-0016



RA-0022



Simplified Psychrometric Chart