

U.S.C.G. Merchant Marine Exam

Chief Engineer, Limited

Q604 Electrical-Electronic-Control Engineering

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions.

1. What problem with a printed circuit board may resolve itself once a board is removed from its edge card connector and then reinstalled?
- (A) Leaking components
 - (B) Corroded pin connectors
 - (C) Open traces or broken connections
 - (D) Discolored or darkened components

If choice B is selected set score to 1.

2. To conduct an in-circuit test of a transistor, what meter or tester should be used?
- (A) wattmeter
 - (B) voltmeter or transistor tester
 - (C) impedance meter
 - (D) ohmmeter or transistor tester

If choice B is selected set score to 1.

3. In order to definitively determine whether or not fuse "1", shown in the illustration is blown using an on-line testing technique, across what points would you connect the voltmeter leads? Illustration EL-0062
- (A) from the top of fuse "1" and the top of either fuse "2" or fuse "3"
 - (B) from the bottom of fuse "1" and the bottom of either fuse "2" or fuse "3"
 - (C) from the top of fuse "1" and the bottom of either fuse "2" or fuse "3"
 - (D) from the bottom of fuse "1" and the top of either fuse "2" or fuse "3"

If choice D is selected set score to 1.

4. What statement is TRUE concerning the Azipod propulsion system?
- (A) It is an electric drive system in which the motor drives a controllable-pitch propeller (CPP).
 - (B) It is an electric drive system where the propulsion motor is installed in a submerged housing capable of swiveling.
 - (C) It is an electric drive system that incorporates a DC motor.
 - (D) It is an electric drive system using water jets.

If choice B is selected set score to 1.

5. When the operating handle of a molded-case circuit breaker is in the mid-position, what does this indicate?
- (A) the circuit breaker is switched off
 - (B) the circuit breaker is switched on
 - (C) the circuit breaker has been reset
 - (D) the circuit breaker has tripped

If choice D is selected set score to 1.

6. In addition to improper brush pressure or seating, what can result in excessive sparking at the brushes of a DC propulsion motor?
- (A) improper positioning of brush rigging outside the neutral plane
 - (B) reversed main field polarity with respect to the armature
 - (C) operating at continuously varying loads such as during maneuvering
 - (D) reversed armature polarity with respect to the field

If choice A is selected set score to 1.

7. What computer network device maintenance procedure is recommended to be increased in frequency when the equipment is located in areas of high vibration?
- (A) Periodically cleaning or replacing equipment enclosure air filters.
 - (B) Periodically testing network connections with network analyzers.
 - (C) Periodically blowing out equipment enclosures with compressed air.
 - (D) Periodically checking the connections between devices and components.

If choice D is selected set score to 1.

8. What would be the resistance tolerance of a carbon resistor which is color-coded as red, violet, brown, and silver in bands 1 thru 4 respectfully as shown in figure "A" of the illustration? Illustration EL-0103

- (A) 1%
- (B) 5%
- (C) 10%
- (D) 20%

If choice C is selected set score to 1.

9. Refer to the two-generator, two-motor, DC diesel-electric drive propulsion system simplified schematic shown in the illustration. Which of the following conditions would cause the propulsion shaft to only rotate in the ahead direction? Illustration EL-0141
- (A) A failure of the main propulsion diesel-generators engines to reverse direction of rotation.
 - (B) A failure of the field rheostats to reverse polarity to the motor field windings.
 - (C) A failure of the controlled rectifier to reverse polarity to the generator field windings.
 - (D) A failure of the non-controlled rectifier to reverse polarity to the motor field windings.

If choice C is selected set score to 1.

10. What is meant by the term 'dielectric'?

- (A) good conductor
- (B) current flow
- (C) semiconductor material
- (D) electrical insulator

If choice D is selected set score to 1.

11. How is the speed of the propeller shaft directly coupled to an AC synchronous propulsion motor changed when powered by a variable frequency alternator in an AC turboelectric drive system?

- (A) varying the field strength of the motor
- (B) varying the field strength of the generator
- (C) varying the number of motor poles
- (D) varying the turbine speed

If choice D is selected set score to 1.

12. What may cause magnetic controller contacts to become welded together during operation?

- (A) an open coil
- (B) excessive magnetic gap
- (C) low contact pressure
- (D) excessive ambient temperature

If choice C is selected set score to 1.

13. As shown in the illustrated block diagram for a distributed automation system, what statement is true concerning the area networks? Illustration EL-0096

- (A) The LAN is a single non-redundant network and the partitioned CAN is a dual redundant network, with both networks being interconnected.
- (B) The LAN is a dual redundant network and the partitioned CAN is also a dual redundant network, with no interconnectivity between the two networks.
- (C) The LAN is a dual redundant network and the partitioned CAN is also a dual redundant network, with both networks being interconnected.
- (D) The LAN is a single non-redundant network and the partitioned CAN is a dual redundant network, with no interconnectivity between the two networks.

If choice C is selected set score to 1.

14. Under what circumstance would a hand-held portable phase sequence indicator be used should the main switchboard mounted fixed phase sequence indicator be inoperative?

- (A) preparing to make the shore power connection
- (B) installing a new synchroscope
- (C) replacing a defective solenoid
- (D) paralleling alternators

If choice A is selected set score to 1.

15. Which of the following statements is true concerning the operation of modern marine electric drive DC propulsion motors?

- (A) The source and load converters respond to a small reference voltage increasing the frequency applied to the motor until it reaches the desired speed.
- (B) The cycloconverter is used to increase the voltage applied to the motor until it reaches the desired speed.
- (C) The rotor follows the frequency and phase sequence rotation of voltage applied to the motor until it reaches the desired speed.
- (D) The silicon controlled rectifiers in the power converter are used to control the voltage and current applied to the motor armature.

If choice D is selected set score to 1.

16. As shown in the illustration, what mechanism will disconnect the motor from the line in case of a sustained motor overload? Illustration EL-0080

- (A) transformer secondary fuses FU6 and FU7
- (B) disconnect switch fuses FU1, FU2, and FU3
- (C) transformer primary fuses FU4 and FU5
- (D) overload relay heaters and overload relay NC contacts (OL)

If choice D is selected set score to 1.

17. Why are motor controllers seldom troubled by grounds?

- (A) shock mounts on controller panels greatly reduce vibration
- (B) cabinet heaters always keep internal components dry
- (C) special insulation is used on wire for vital circuits
- (D) contactors and relays are mounted on non-conducting panels

If choice D is selected set score to 1.

18. Using the trouble analysis chart and faults table provided in the illustration, if the gyrocompass was malfunctioning, but no fault codes are present on the display unit, what is most likely the problem if the DC/DC converter LED status indicator is functioning properly, but the CPU LED status indicator is not blinking? Illustration EL-0195

- (A) The DC/DC converter is malfunctioning.
- (B) The AC/DC power supply is malfunctioning.
- (C) The CPU assembly is malfunctioning.
- (D) Ship's power is not available.

If choice C is selected set score to 1.

19. Why are external shunts sometimes used with ammeters?

- (A) to increase meter sensitivity
- (B) to permit shunts with larger resistances to be utilized
- (C) to prevent damage to the meter movement from heat generated by the internal shunt
- (D) to reduce reactive power factor error

If choice C is selected set score to 1.

20. The turns ratio of the step-down transformer with dual voltage secondary shown in figure "B" of the illustration is two to one (total). If 220 volts were applied to terminals "H1" and "H2", what would be measured across "X3" and "X4"? Illustration EL-0082

- (A) 55 volts
- (B) 110 volts
- (C) 440 volts
- (D) 880 volts

If choice A is selected set score to 1.

21. On a vessel with turbo-electric drive, which of the following conditions would indicate that the propulsion motor had dropped out of synchronization with the propulsion generator?

- (A) Tripped main motor interlocks
- (B) Closed contact in the field circuits
- (C) Overheated cross-tie busses
- (D) Excessive vibration of the vessel

If choice D is selected set score to 1.

22. On a digital numerical display readout, what would be the minimum number of LED segments required to form and display any digit 0 through 9?

- (A) 6
- (B) 7
- (C) 8
- (D) 9

If choice B is selected set score to 1.

23. (3.1.10.1.6-4) What do the devices labeled "L" in Panel 2 of the illustrated switchboard represent?
Illustration EL-0003

- (A) power available lights indicating that the generator is producing a voltage
- (B) load lights indicating that the generator breaker is closed and the generator is supplying power to the main bus
- (C) emergency lighting for the switchboard to enable the meters to be read in case of power failure
- (D) synchronizing lights used as a backup to the synchroscope for paralleling purposes

If choice D is selected set score to 1.

24. Which of the following describes the action when the handle is moved to the "start" position of a drum-type motor controller used with a compound wound DC motor?

- (A) Full line voltage is supplied to the shunt field, series field, and armature.
- (B) Reduced voltage is supplied to the shunt field, series field, and armature.
- (C) Full line voltage is supplied to the shunt field, and reduced voltage is supplied to the series field and the armature.
- (D) Full line voltage is supplied to the shunt and series fields, and reduced voltage is supplied to the armature.

If choice C is selected set score to 1.

25. Concerning the method for the reversal of rotation of a DC propulsion motor, what statement is true?

- (A) The only possible method of reversal of rotation direction is by reversing the polarity of the armature by reversing the armature current direction. No other method is possible.
- (B) The only method of reversal of rotation direction is by reversing the polarity of the field by reversing the field current direction AND by reversing the polarity of the armature by reversing the armature current direction SIMULTANEOUSLY.
- (C) The only possible method of reversal of rotation direction is by reversing the polarity of the field by reversing the field current direction. No other method is possible.
- (D) The methods of reversal of rotation direction are by EITHER reversing the polarity of the field by reversing the field current direction OR by reversing the polarity of the armature by reversing the armature current direction.

If choice D is selected set score to 1.

26. Referring to the illustration of a twin-screw diesel-electric AC propulsion drive system, what is the purpose of the shaft position signal? Illustration EL-0168

- (A) The shaft position signal senses shaft vibration due to shaft bearing wear or propeller blade damage and provides data for the predictive maintenance system.
- (B) The shaft position signal is used when in the shaft-synchronizing mode to momentarily accelerate or decelerate the shafts to align the propeller blades of the two shafts to reduce vibration.
- (C) The shaft position signal is used when changing the direction of rotation of the shaft and is used to determine the exact instant reversal of rotation takes place after reversing torque direction.
- (D) The shaft position signal detects axial movement of the shaft due to thrust bearing wear and provides data for the predictive maintenance system.

If choice B is selected set score to 1.

27. What would be the total current in figure "A" of the circuit illustrated if the value of capacitor C_1 was 100 microfarads, capacitor C_2 was 200 microfarads and the power supply was 240 volts at 60 Hz? Illustration EL-0038

- (A) 27 amps
- (B) 37 amps
- (C) 47 amps
- (D) 57 amps

If choice A is selected set score to 1.

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

If choice B is selected set score to 1.

29. As shown in figures "A", "B", and "C" of the illustration, what is the purpose of the regenerating mode when transitioning from ahead to astern operation with a fixed-pitch propeller as driven by an AC synchronous propulsion motor? Illustration EL-0162

- (A) It allows the shaft to use inertia to very gradually slow down to a stop before reversing direction.
- (B) It allows the shaft to instantly reverse directions with virtually no slow down period.
- (C) It allows regenerative braking to slow down the shaft to a stop before reversing direction.
- (D) It allows regenerative acceleration to accelerate the shaft after the reversal of direction has taken place.

If choice C is selected set score to 1.

30. What is the name of a TCP/IP application run from the command prompt that sends datagrams once every second in the hope of an echo response from another machine (network device) being addressed to test network connectivity and to verify that TCP/IP is running?

- (A) TRACERT
- (B) FTP
- (C) IPCONFIG
- (D) PING

If choice D is selected set score to 1.

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

If choice C is selected set score to 1.

32. What statement is true concerning read only memory (ROM)?

- (A) ROM is non-volatile memory and the contents of ROM are lost when the power is removed.
- (B) ROM is non-volatile memory and the contents of ROM are not lost when the power is removed.
- (C) ROM is volatile memory and the contents of ROM are not lost when the power is removed.
- (D) ROM is volatile memory and the contents of ROM are lost when the power is removed.

If choice B is selected set score to 1.

33. As shown in the illustration, what type of motor is controlled as depicted in both figure "A" and in figure "B"? Illustration EL-0144

- (A) three-phase wound rotor induction motor
- (B) single-phase wound rotor induction motor
- (C) three-phase synchronous motor
- (D) three-phase squirrel cage induction motor

If choice A is selected set score to 1.

34. In viewing the liquid crystal display for the illustrated depth sounder data display unit, what should be done if the graphic display of the ocean bottom is no longer visible on the screen? Illustration EL-0186

- (A) Increase the range adjustment.
- (B) Decrease the range adjustment.
- (C) Decrease the gain adjustment.
- (D) Increase the gain adjustment.

If choice A is selected set score to 1.

35. What would be the indication of a burned-out LED?

- (A) excessive illumination
- (B) no illumination
- (C) excessive output
- (D) a slight glow in the crystal

If choice B is selected set score to 1.

36. 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 minimize the magnitude of the ground fault current
- (C) To completely eliminate ground fault current
- (D) To maximize the magnitude of the ground fault current

If choice B is selected set score to 1.

37. Without the benefit of a specially designed enclosure window for thermo graphic analysis, what must be done to obtain accurate, but safe readings using infrared thermo graphic techniques?

- (A) The infrared camera recording is taken after waiting a suitable period of time after de-energizing and isolating in accordance with safety procedures.
- (B) The infrared camera recording is taken before de-energizing and isolating in accordance with safety procedures.
- (C) The infrared camera recording is taken immediately after de-energizing and isolating in accordance with safety procedures.
- (D) The infrared camera recording is taken while energized with the enclosure door open in accordance with safety procedures.

If choice C is selected set score to 1.

38. Which of the following statements is true concerning the cleaning of electrical contacts?

- (A) Magnetic brushes should be used to remove metallic dust.
- (B) The contact surfaces should be greased to increase contact resistance.
- (C) Compressed air should be used to blow out metallic dust.
- (D) Delicate parts should be cleaned with a brush and an approved safety solvent.

If choice D is selected set score to 1.

39. Which of the listed temperature measuring devices installed on a large turbo-electric alternating current propulsion generator would be the most reliable for monitoring generator temperatures to avoid premature winding insulation failure?

- (A) Current transformers are the most reliable means of monitoring generator temperatures.
- (B) Temperature sensors measuring the temperature of the cooling air associated with the generator air cooler.
- (C) Temperature sensors measuring the temperature of the cooling water associated with the generator air cooler.
- (D) Temperature sensors inserted in the stator slots for measuring stator winding temperature.

If choice D is selected set score to 1.

40. When measuring DC current flow using an analog or digital multimeter set up as a milliammeter, how is the meter connected?

- (A) in series with the power source and load
- (B) insuring correct polarity
- (C) in parallel with the power source and load
- (D) using the lowest range possible to prevent instrument damage

If choice A is selected set score to 1.

41. Power conversion for use in DC propulsion drive motors is accomplished by what type of converter?

- (A) pulse width modulated converters
- (B) silicon controlled rectifier converters
- (C) load commutated converters
- (D) cycloconverters

If choice B is selected set score to 1.

42. Which of the following procedures should be used to maintain a large electric motor during periods of inactivity?

- (A) A thin layer of air-drying varnish should be applied on the windings.
- (B) Space heaters should be used to prevent condensation of moisture.
- (C) Spraying a solvent periodically to remove carbon dust.
- (D) Compressed air should be blown over areas where dust is deposited.

If choice B is selected set score to 1.

43. (3.1.10.1.4-6) As shown in the illustration, which of the lighting fixtures represents an incandescent bulb? Illustration EL-0122

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

If choice B is selected set score to 1.

44. What should be done when performing maintenance of circuit breaker contacts?

- (A) inspect for wear and misalignment of main contacts
- (B) use a metallic oxide abrasive cloth to dress contacts
- (C) smooth roughened contact surfaces with a file
- (D) apply a thin film of oil on contact surfaces

If choice A is selected set score to 1.

45. (3.1.14.1-11) As shown in the illustration, what is the magnetic phase differential in degrees between the reference signal magnetic axis and the control signal magnetic axis of the illustrated diagram for a two-phase induction servomotor for an automatic radio direction finder? Illustration EL-0196

- (A) 45
- (B) 90
- (C) 135
- (D) 180

If choice B is selected set score to 1.

46. While troubleshooting a circuit in an engine room central control console, a resistor is suspected of being faulty. Which of the following precautions must be observed if an analog or digital multimeter set up as an ohmmeter is to be used to check its value?

- (A) The resistor's circuit must be de-energized and at least one end of the resistor isolated by disconnecting.
- (B) The correct polarity must be observed because reverse bias will damage the component.
- (C) The meter leads must not be twisted so as to cancel out the individual magnetic fields.
- (D) The meter case must be grounded prior to attaching the leads.

If choice A is selected set score to 1.

47. When a low input voltage is delivered to a transformer which then produces a high output voltage, what is the proper name for the transformer type?

- (A) step-down transformer
- (B) secondary transformer
- (C) step-up transformer
- (D) primary transformer

If choice C is selected set score to 1.

48. When troubleshooting a printed circuit board, one technique that can be used is component substitution. Upon what basis would a suspected defective component be substituted with a known good component?

- (A) Component substitution is not recommended as a troubleshooting technique.
- (B) Methodical substitution of components starting at one end of the board and working towards the opposite end.
- (C) Random substitution of components in no particular pattern.
- (D) Visual inspection of components or the use of live signal tracing with test instruments.

If choice D is selected set score to 1.

49. (3.1.8.1.1-7) As shown in the illustration of a cycloconverter for an AC synchronous propulsion motor, what statement is true concerning the operating motor frequency? Illustration EL-0157

- (A) The operating motor frequency is generally limited to less than one-third of mains line frequency.
- (B) The operating motor frequency is generally limited to three times the mains line frequency.
- (C) The operating motor frequency is generally not limited regardless of the mains line frequency.
- (D) The operating motor frequency is generally limited to that equal to the mains line frequency.

If choice A is selected set score to 1.

50. Which of the listed conditions describes the effect on intrinsic semiconductor operation as a result of a temperature increase?

- (A) Inductive reactance will decrease
- (B) Resistivity will increase
- (C) Capacitive reactance will decrease
- (D) Conductivity will increase

If choice D is selected set score to 1.

51. If a digital multimeter is setup as shown in figures "A" and "B" of the illustration, what is the status of the silicon diode if the display reads 4.7 ohms when configured as in figure "A" and reads 490 ohms when configured as in figure "B"? Illustration EL-0211

- (A) the diode is intermittently open
- (B) the diode is shorted
- (C) the diode is functioning properly
- (D) the diode is open

If choice C is selected set score to 1.

52. A carbon resistor has the following color bands; band 1 is yellow, band 2 is violet, band 3 is yellow, and band 4 is silver. What is the value of the resistor in ohms, as well as the tolerance? Illustration EL-0103

- (A) 74 ohms + or - 5%
- (B) 4,700 ohms + or - 10%
- (C) 74,000 ohms + or - 5%
- (D) 470,000 ohms + or - 10%

If choice D is selected set score to 1.

53. As shown in the illustrated echo sounding display unit and control panel and pertinent operating characteristic tables, what situation would require increasing the unit gain? Illustration EL-0186

- (A) transitioning from a stone/rock seabed to a sand seabed
- (B) transitioning from a soft mud seabed to a mud/sand seabed
- (C) transitioning from a sand/mud seabed to a sand seabed
- (D) transitioning from a sand seabed to a stone/rock seabed

If choice A is selected set score to 1.

54. As shown in the illustration of a DC diesel-electric propulsion drive system, what would be the set up contactor configurations if #1 M/E is to be secured, so that only #2 M/E diesel-generator is set up to supply both propulsion motors? Illustration EL-0141

- (A) contactors G2 and S1 pulled in; contactors G1 and S2 dropped out
- (B) contactors G2 and S1 dropped out; contactors G1 and S2 pulled in
- (C) contactors G2 and S2 dropped out; contactors G1 and S1 pulled in
- (D) contactors G2 and S2 pulled in; contactors G1 and S1 dropped out

If choice A is selected set score to 1.

55. Why are large cable sizes often formed as individual conductors comprised of several smaller strands?

- (A) reduce the overall weight of the wire run
- (B) obtain the flexibility required for easy handling and reduces skin effect losses
- (C) reduce the resistance to current flow for a given wire size
- (D) reduce the number of supports needed for a horizontal overhead run

If choice B is selected set score to 1.

56. In a diesel-electric plant, raising the generator's field excitation current will have what effect on the DC propulsion motor speed?

- (A) increase in speed
- (B) effect generator speed only
- (C) effect main motor speed if done in conjunction with higher generator engine speeds
- (D) decrease in speed

If choice A is selected set score to 1.

57. (3.1.10.3.2-1) In the illustration what is the component labeled "C"? Illustration EL-0033

- (A) trip bar
- (B) connection terminal
- (C) moving contact
- (D) fixed contact

If choice D is selected set score to 1.

- 58.** On an older two-generator, two-motor DC diesel-electric drive system as shown in the illustration, if both the A1 and A2 contactors are dropped out, both the S1 and S2 contactors are dropped out, and both the G1 and G2 contactors are pulled in, what is the configuration of the plant? Illustration EL-0141
- (A) The gas turbine generator provides power to the main propulsion motors, and the auxiliary diesel-generator provides power to the bow thruster motor as needed.
 - (B) The main propulsion generators provide power to the main propulsion motors, and the gas turbine generator provides power to the bow thruster motor as needed.
 - (C) The gas turbine generator provides power to the main propulsion motors and provides power to the bow thruster motor as needed.
 - (D) The main propulsion generators provide power to the main propulsion motors, and the auxiliary diesel-generator provides power to the bow thruster motor as needed.

If choice B is selected set score to 1.

- 59.** When completing repairs on a high voltage circuit where portable grounding straps were used for increased operator safety and confidence, what is the proper procedure for disconnecting these grounding straps?
- (A) Disconnect the phase connections to common first, and then disconnect the common connection to hull ground.
 - (B) The common to hull ground connection and the phase connections to common can all be disconnected in any sequence.
 - (C) The common to hull ground and the phase connections to common should all be disconnected simultaneously.
 - (D) Disconnect the common connection to hull ground first, and then disconnect the phase connections to common.

If choice A is selected set score to 1.

- 60.** As shown in figure "A" of the illustration, under what conditions will the thyristor conduct? Illustration EL-0154
- (A) when the anode is more positive than the cathode and when the gate is briefly pulsed with a voltage more positive than the cathode
 - (B) when the anode is more negative than the cathode and when the gate is briefly pulsed with a voltage more positive than the cathode
 - (C) when the anode is more positive than the cathode and when the gate is briefly pulsed with a voltage more negative than the cathode
 - (D) when the anode is more negative than the cathode and when the gate is briefly pulsed with a voltage more negative than the cathode

If choice A is selected set score to 1.

61. Which of the following expresses the relationship of the AC input frequency and DC ripple output frequency in a full wave rectifier?

- (A) The output ripple frequency is the same as input frequency.
- (B) The output ripple frequency is four times the input frequency.
- (C) The output ripple frequency is one-half the input frequency.
- (D) The output ripple frequency is twice the input frequency.

If choice D is selected set score to 1.

62. In process control terminology, continuously variable values which change without distinct increments, such as temperature, pressure, or level are correctly referred to as what type of values?

- (A) binary values
- (B) bumpless values
- (C) digital values
- (D) analog values

If choice D is selected set score to 1.

63. In testing a hand cranked megger prior to use, what statement is true?

- (A) With the test leads shorted or open, the pointer should go to infinite ohms.
- (B) With the test leads shorted or open, the pointer should go to zero ohms.
- (C) With the test leads shorted, the pointer should go to zero ohms, and with the tests leads open, the pointer should go to infinite ohms.
- (D) With the test leads shorted, the pointer should go to infinite ohms, and with the tests leads open, the pointer should go to zero ohms.

If choice C is selected set score to 1.

64. In a logic circuit, how does a NOT gate function?

- (A) it does not alter the input logic condition
- (B) it serves to amplify a given signal level
- (C) it serves to attenuate a given signal level
- (D) it reverses the input logic condition

If choice D is selected set score to 1.

65. Which of the following devices represents primary storage, where the processor is able to directly read instructions and data and directly return results of its computation in fetch/execute cycles?

- (A) Various optical disks
- (B) Random access memory
- (C) Hard disk drive
- (D) Magnetic tape drive

If choice B is selected set score to 1.

- 66.** In addition to high voltage circuit grounding with ground-connecting switching devices, for additional operator safety and confidence, portable grounding straps may be used. What is the proper procedure for connecting these portable grounding straps?
- (A) The common to hull ground connection and the phase connections to common should all be made simultaneously.
 - (B) The common to hull ground connection and the phase connections to common can be made in any sequence.
 - (C) Connect the common connection to hull ground first, and then connect the phase connections to common.
 - (D) Connect the phase connections to common first, and then connect the common connection to hull ground.

If choice C is selected set score to 1.

- 67.** When completing repairs on a high voltage circuit where portable grounding straps were used for increased operator safety and confidence, what is the proper procedure for disconnecting these grounding straps?
- (A) The common to hull ground connection and the phase connections to common can all be disconnected in any sequence.
 - (B) Disconnect the phase connections to common first, and then disconnect the common connection to hull ground.
 - (C) The common to hull ground and the phase connections to common should all be disconnected simultaneously.
 - (D) Disconnect the common connection to hull ground first, and then disconnect the phase connections to common.

If choice B is selected set score to 1.

- 68.** If a digital multimeter is setup as shown in figures "A" and "B" to test a silicon diode, what is the status of the diode if the screen displays 0.70 V when configured as in figure "A" and displays OL V when configured as in figure "B"? Illustration EL-0212
- (A) diode is open
 - (B) diode is intermittently open
 - (C) diode is shorted
 - (D) diode is operating properly

If choice D is selected set score to 1.

- 69.** What damage may occur to the components of a winch master control switch, if the cover gasket becomes deteriorated?
- (A) Rapid corrosion of switch components.
 - (B) Contamination of lube oil.
 - (C) Sparking at the winch motor brushes.
 - (D) Overheating of the winch motor.

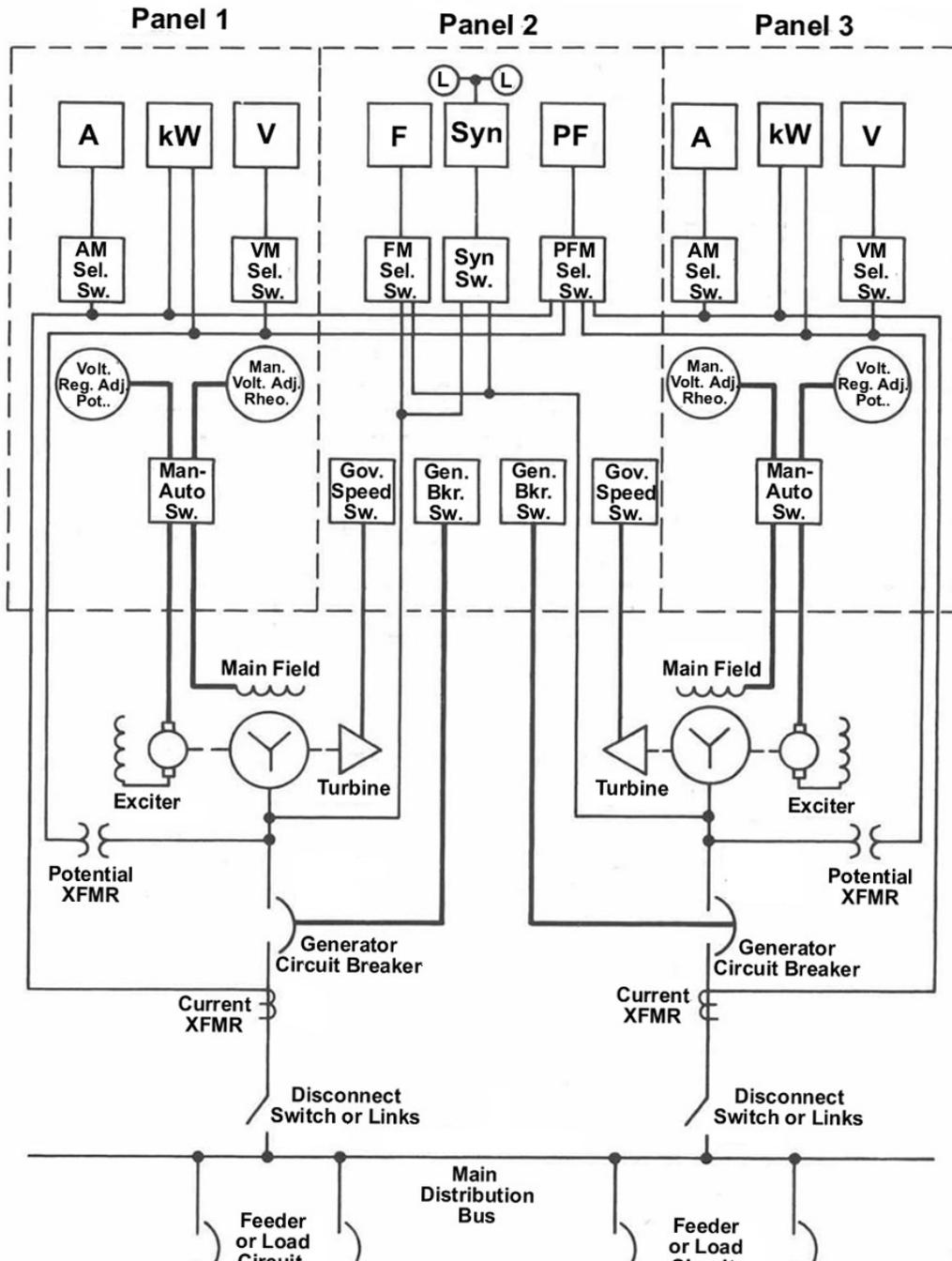
If choice A is selected set score to 1.

70. How is the direction of rotation of the main propulsion motor in a modern AC propulsion drive system reversed?

- (A) changing the direction of current flow in the motor's field winding
- (B) power directional relays
- (C) reversing the direction of current flow in the armature
- (D) electronically changing the phase sequence of the voltages generated by the power converter

If choice D is selected set score to 1.

EL-0003



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EL-0033



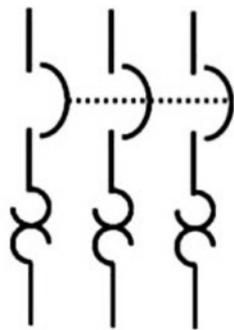
A



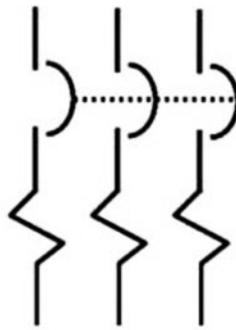
B



C



1



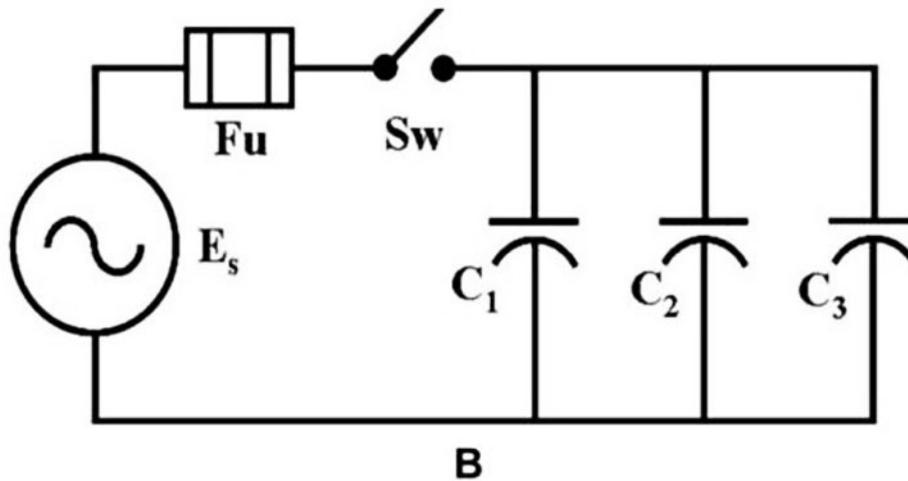
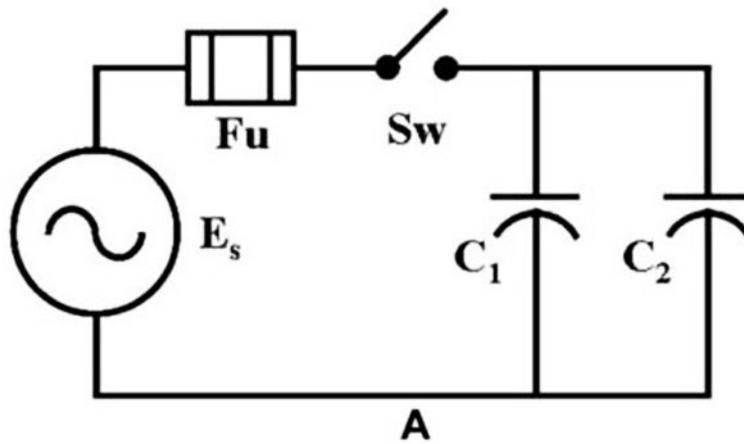
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3

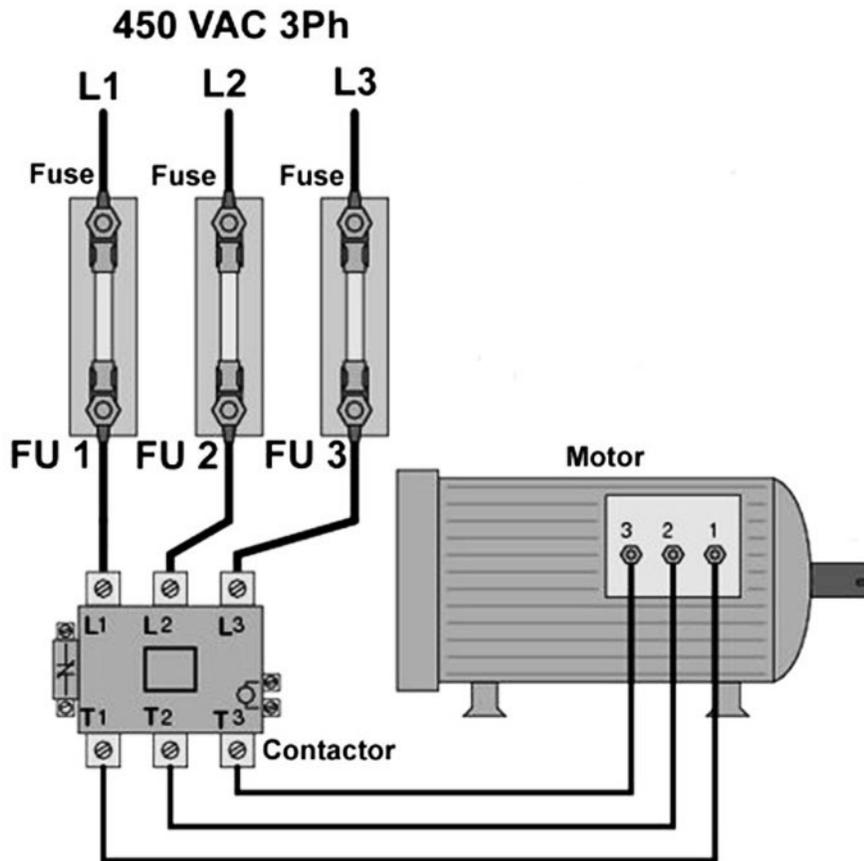
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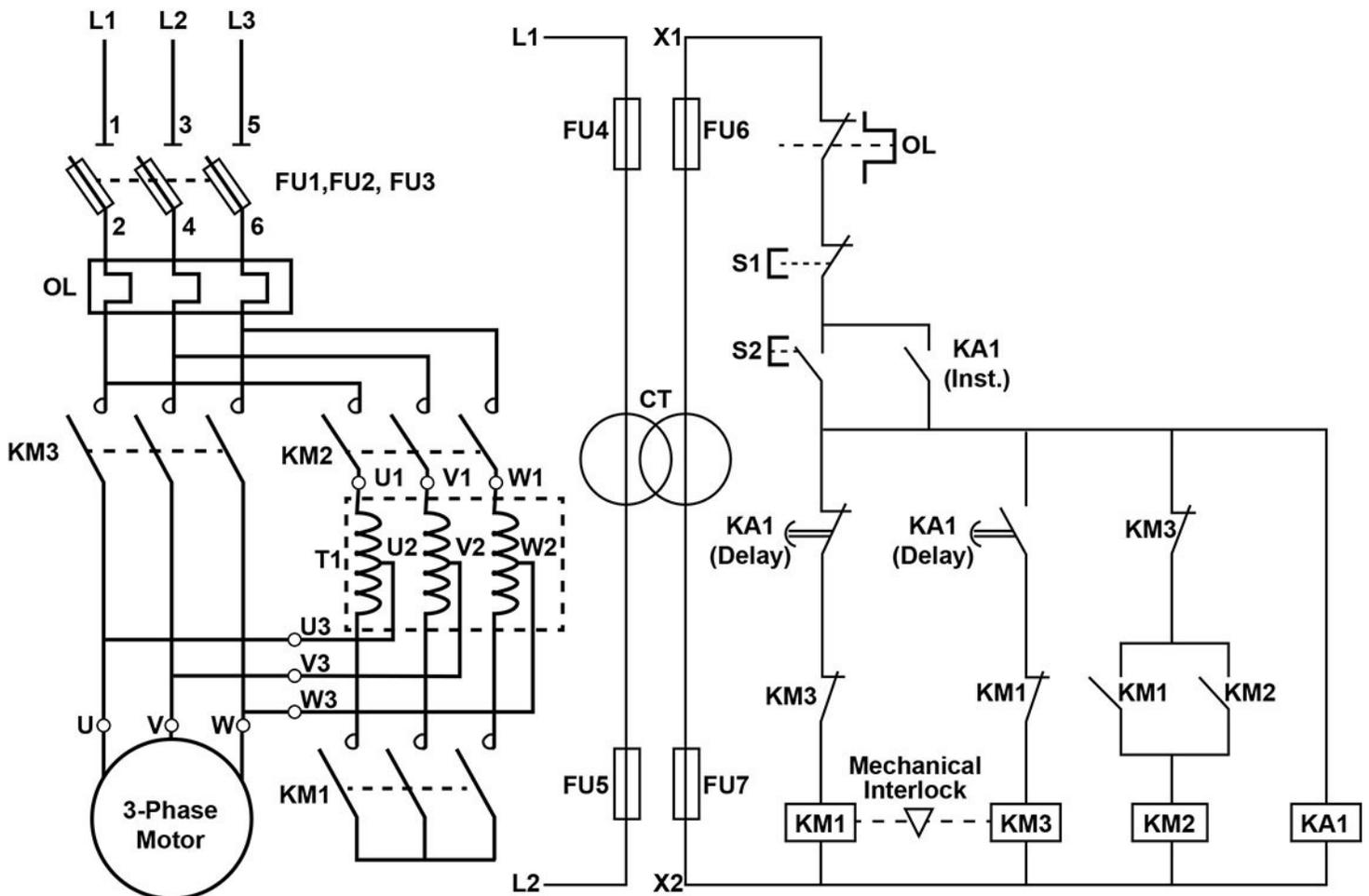
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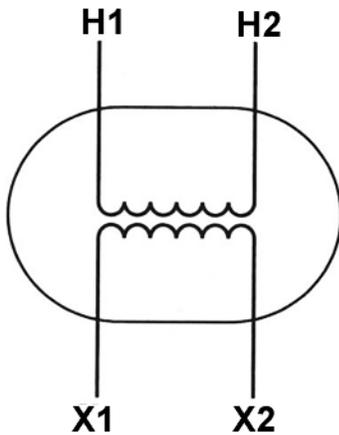


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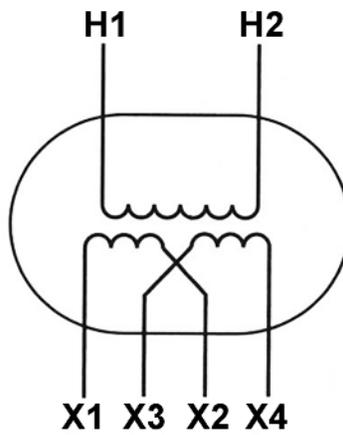
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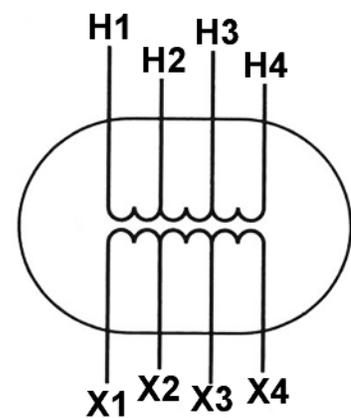
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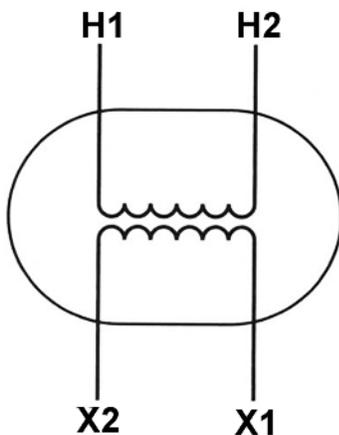
A



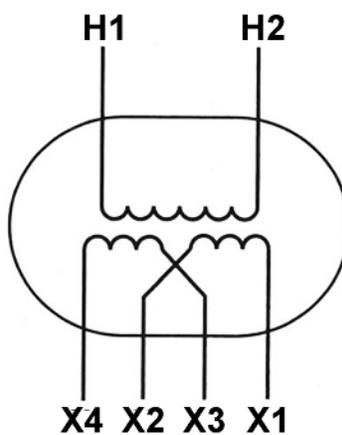
B



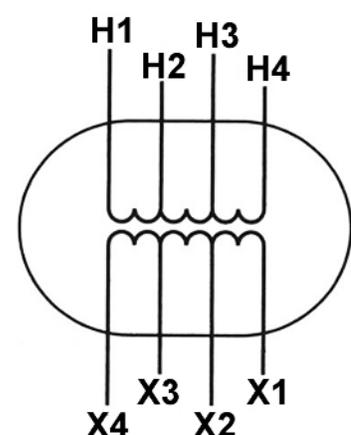
C



D



E

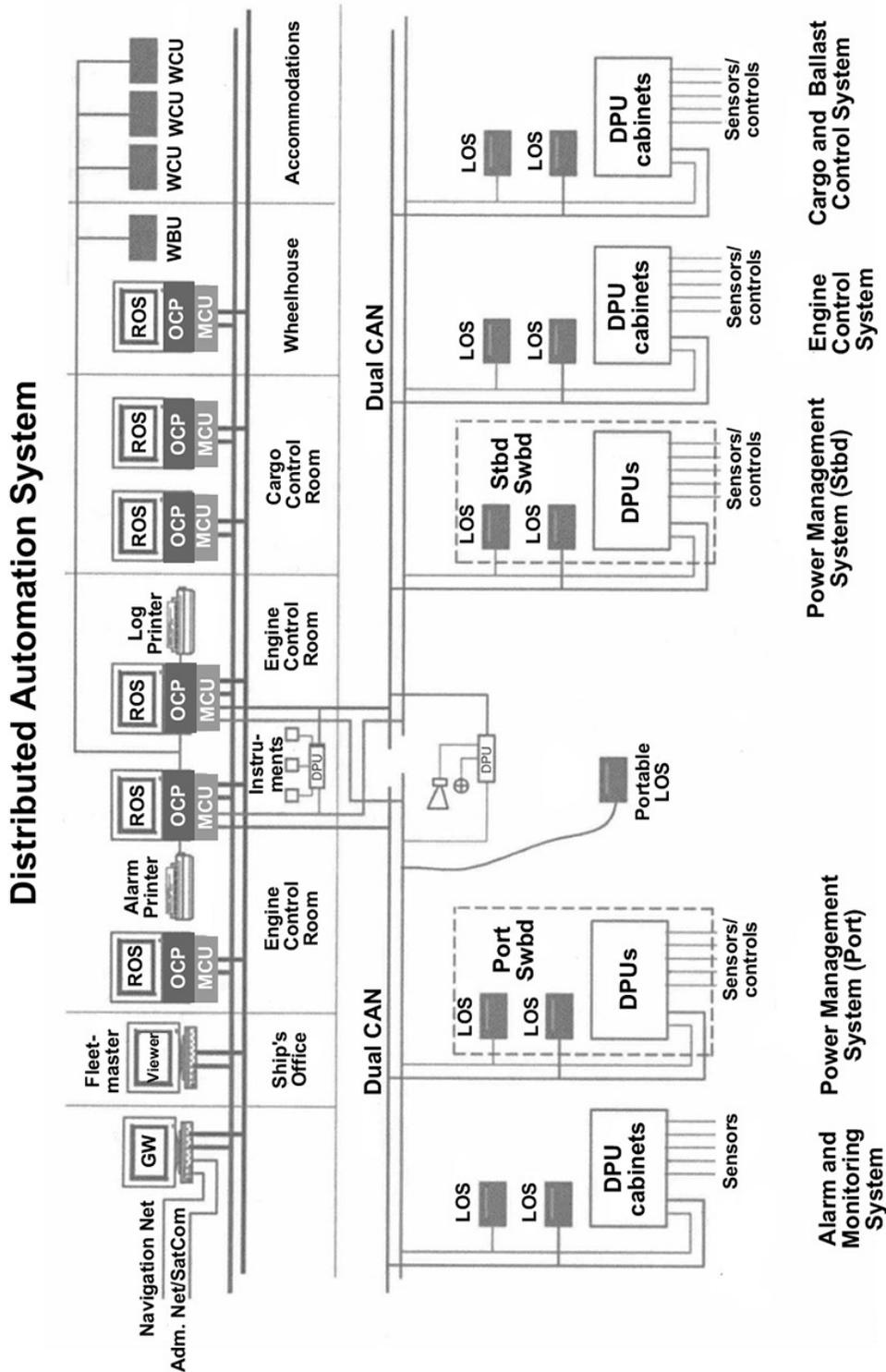


F

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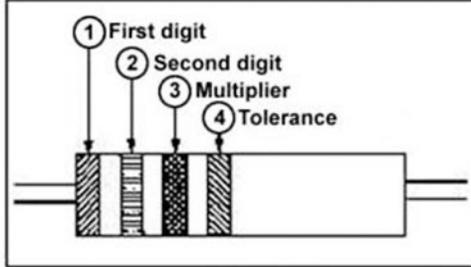
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EL-0103

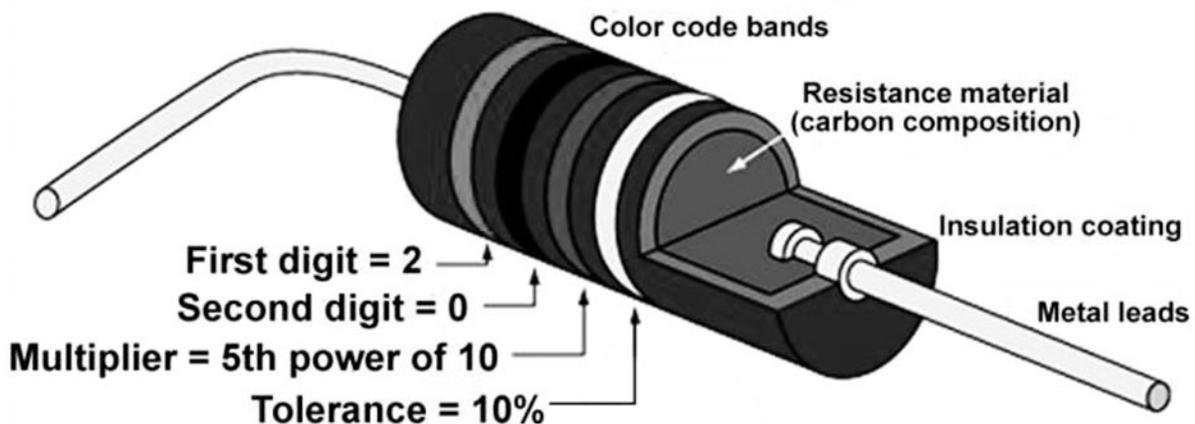


Color	1st Digit	2nd Digit	Multiplier	Tolerance (percent)
Black	0	0	1	
Brown	1	1	10	
Red	2	2	100	
Orange	3	3	1,000	
Yellow	4	4	10,000	
Green	5	5	100,000	
Blue	6	6	1,000,000	
Violet	7	7	10,000,000	
Gray	8	8	100,000,000	
White	9	9	1,000,000,000	
Gold			.1	5
Silver			.01	10
No color				20

Resistors for military use may have a fifth band to indicate reliability in terms of failure rate as follows:

No color: No test made
 Brown: 1.0 percent per 1000 hours
 Red: 0.1 percent per 1000 hours
 Orange: 0.01 percent per 1000 hours
 Yellow: 0.001 percent per 1000 hours

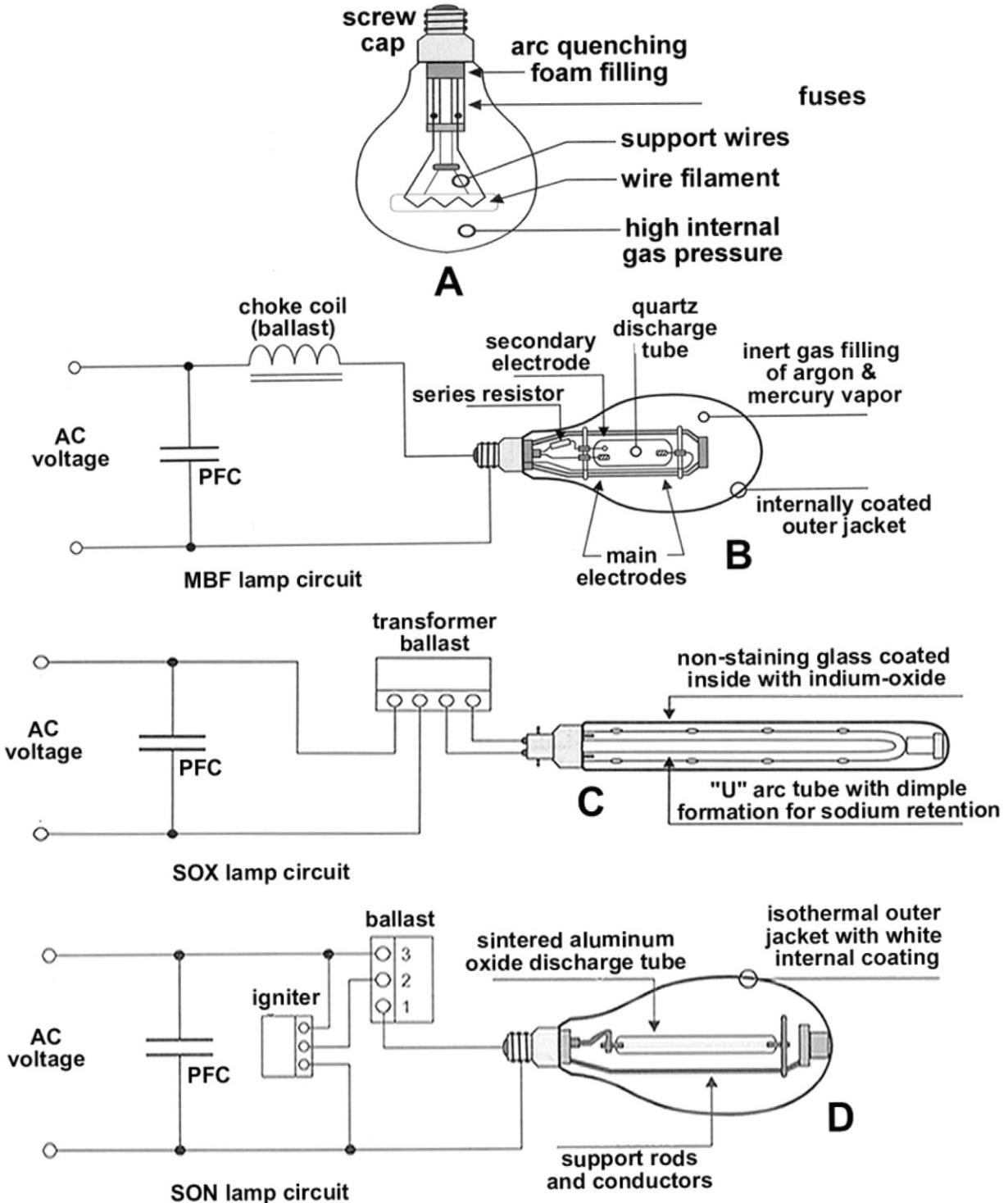
A



B

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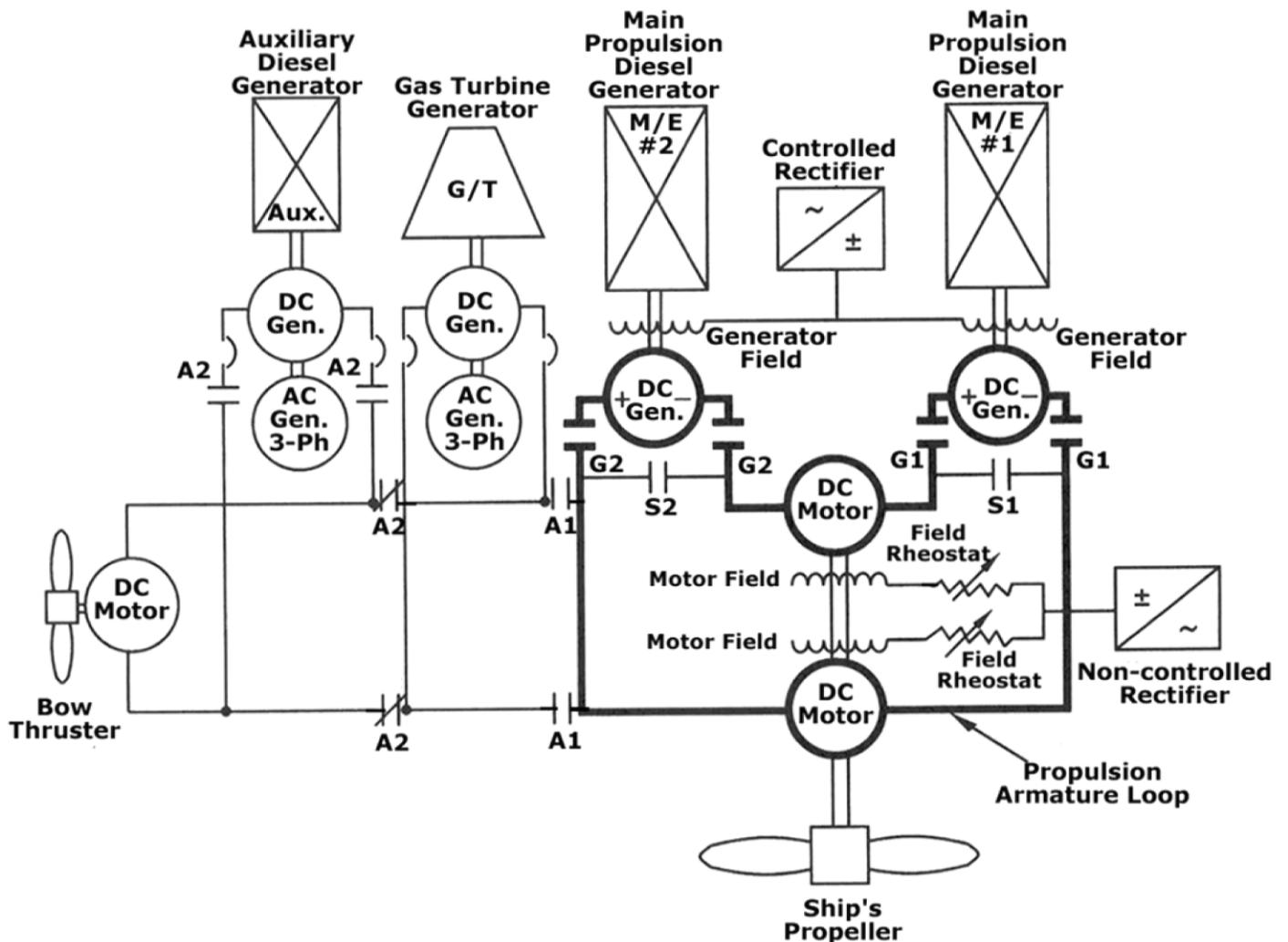
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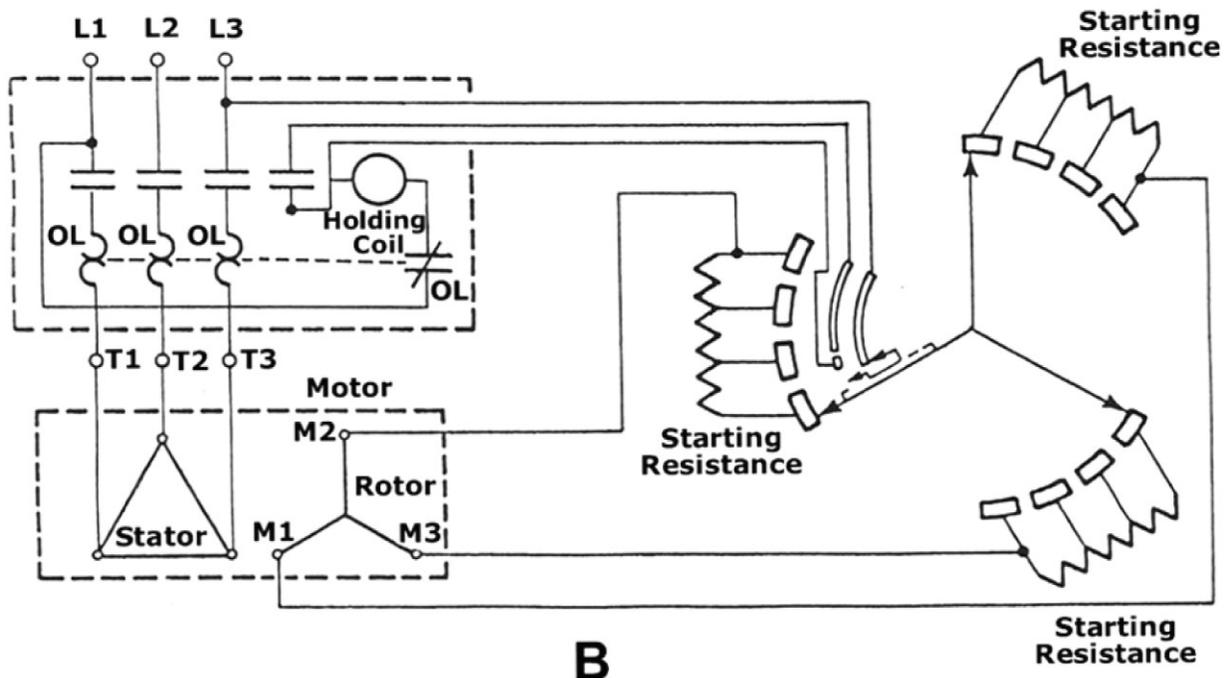
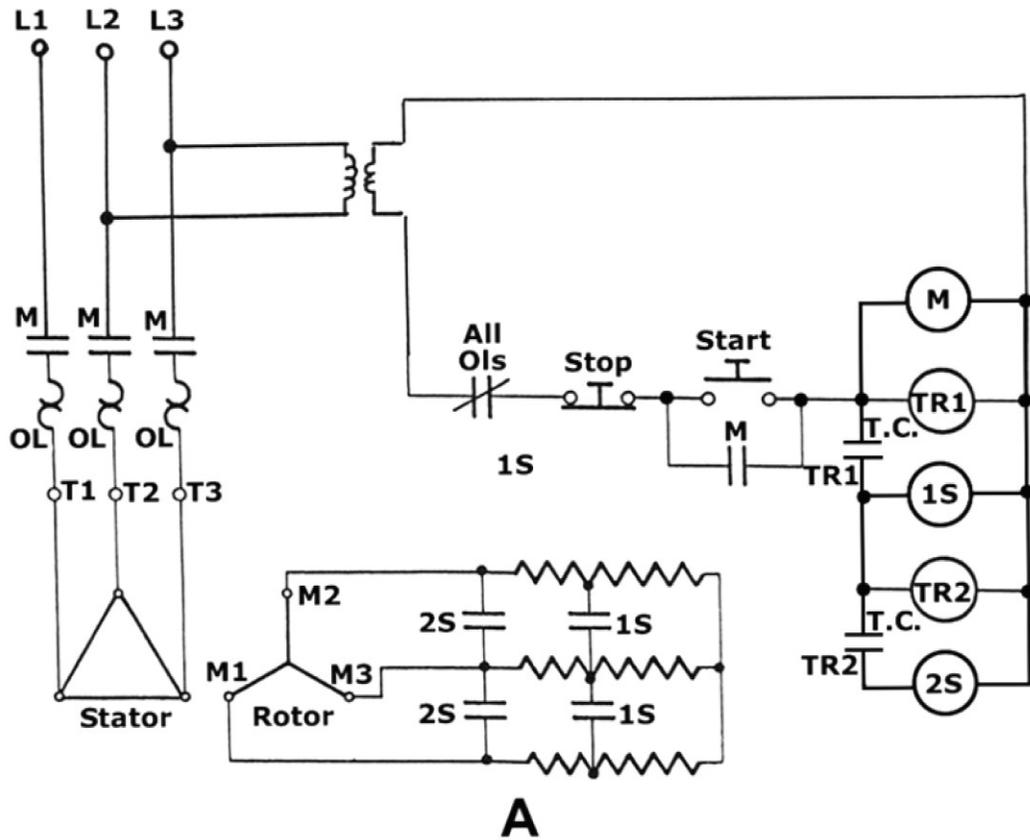
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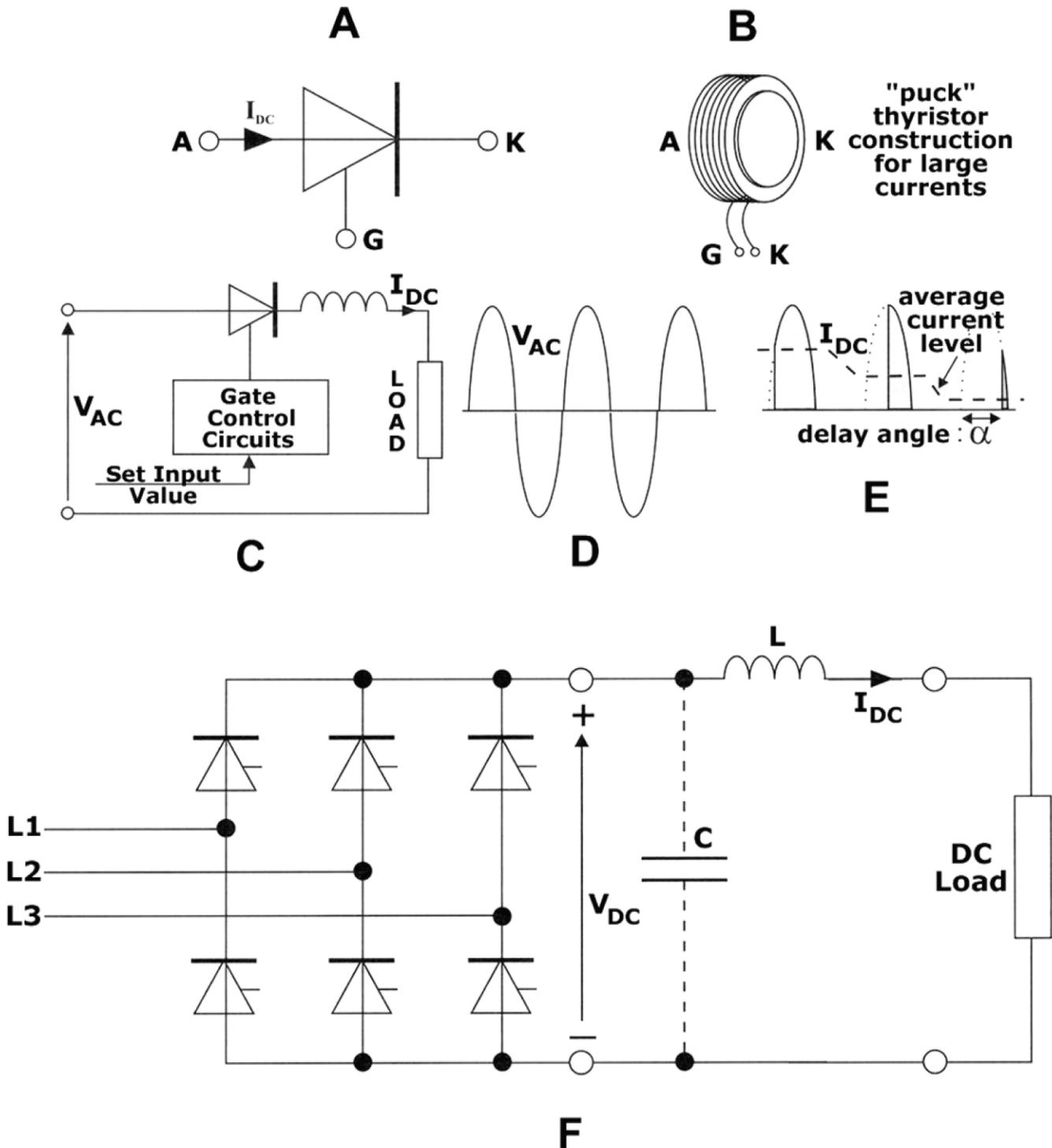
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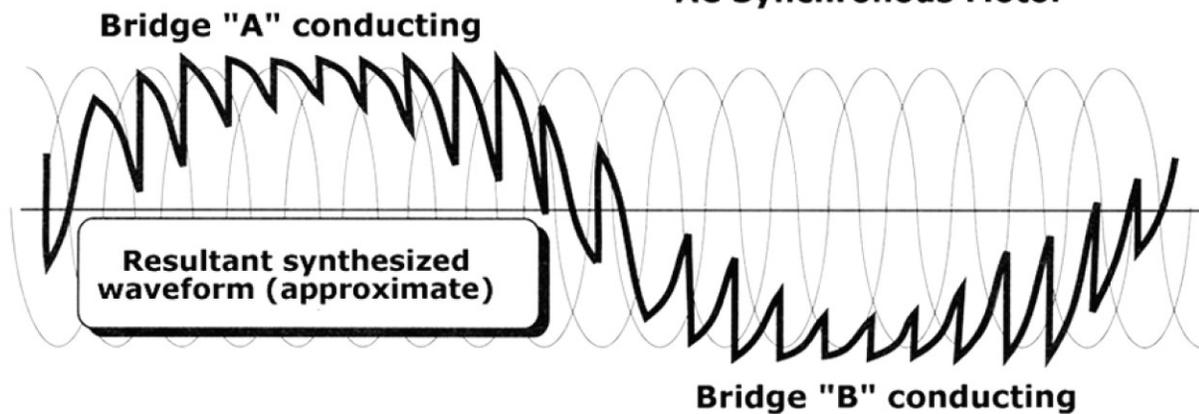
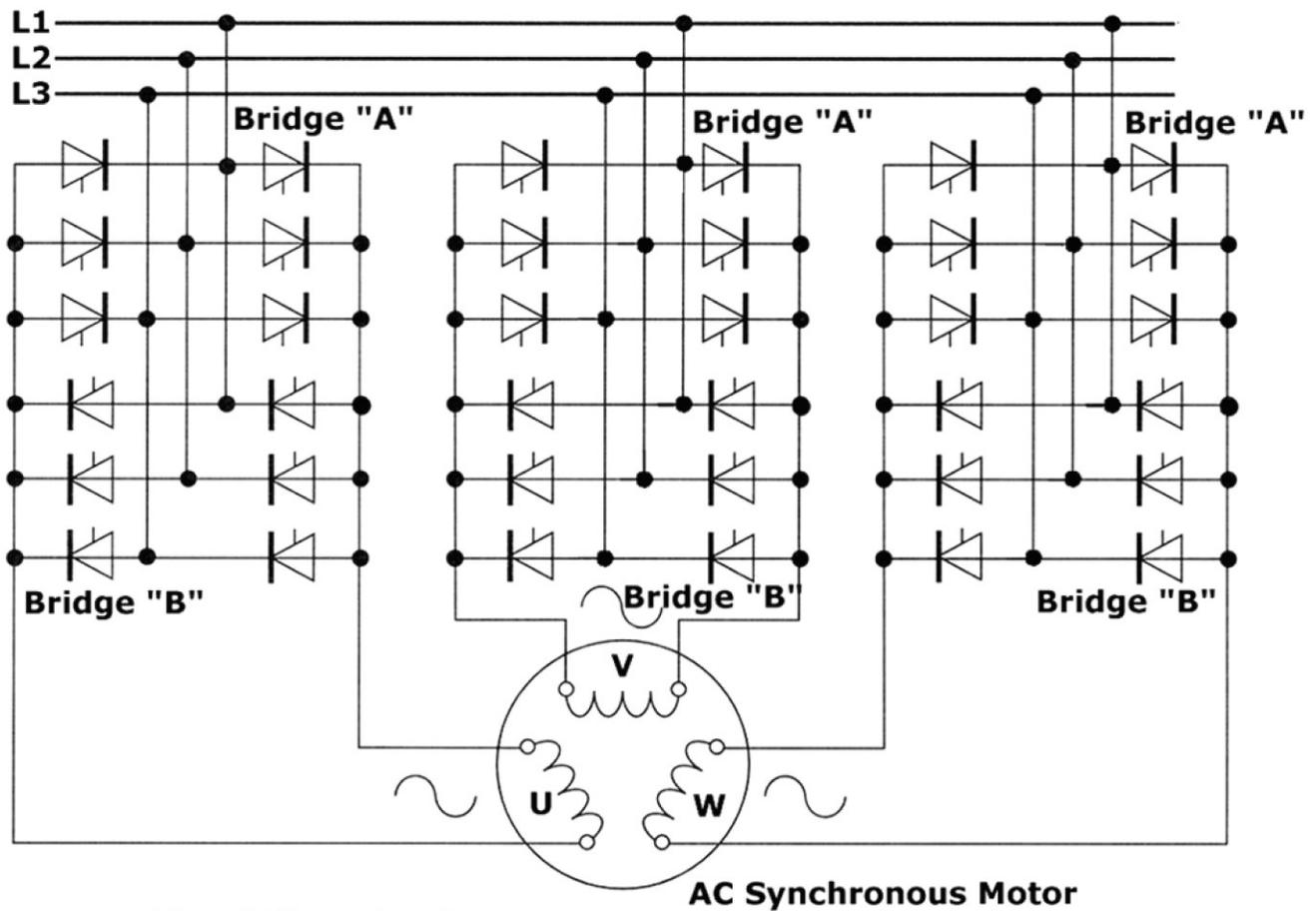
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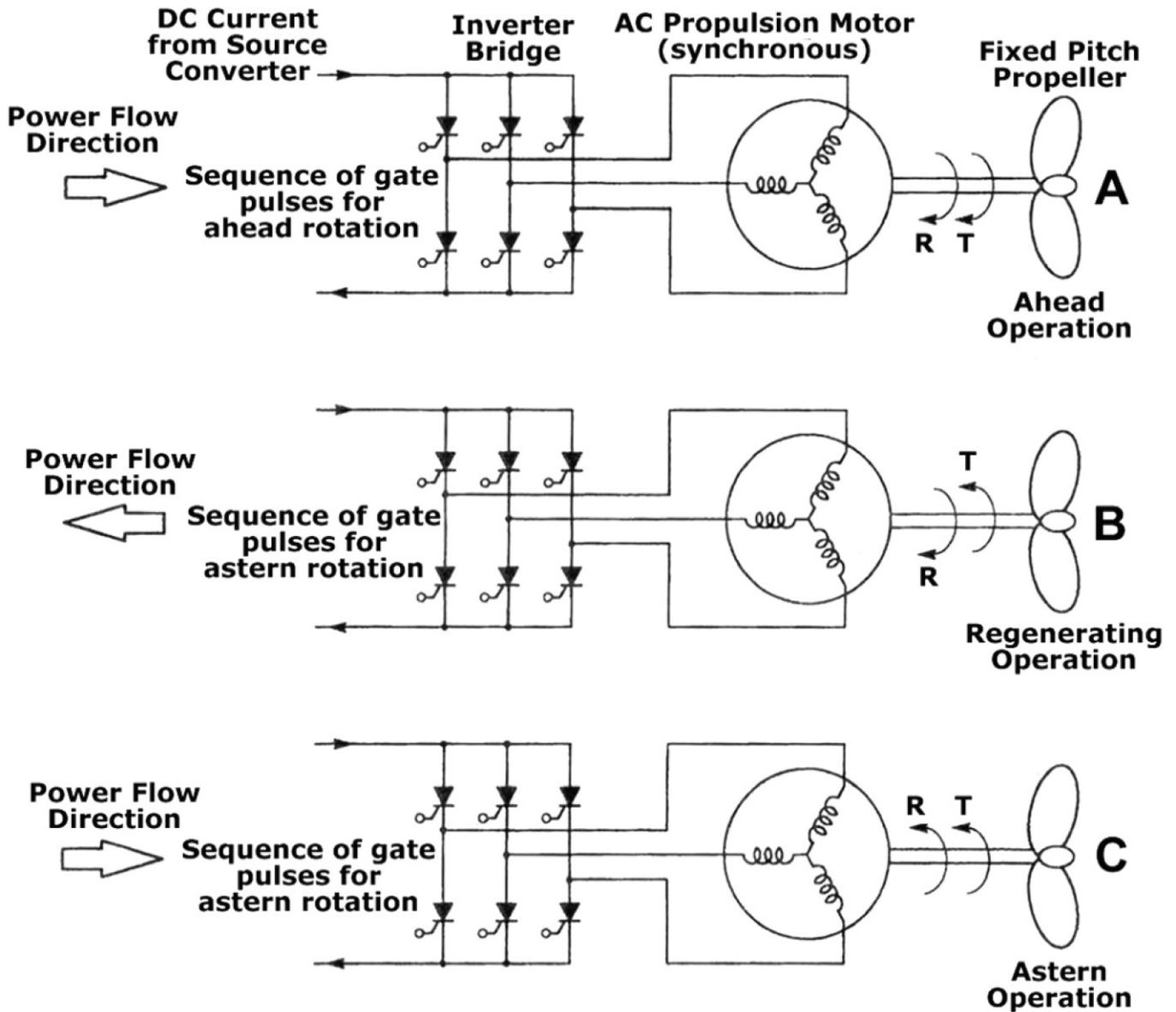
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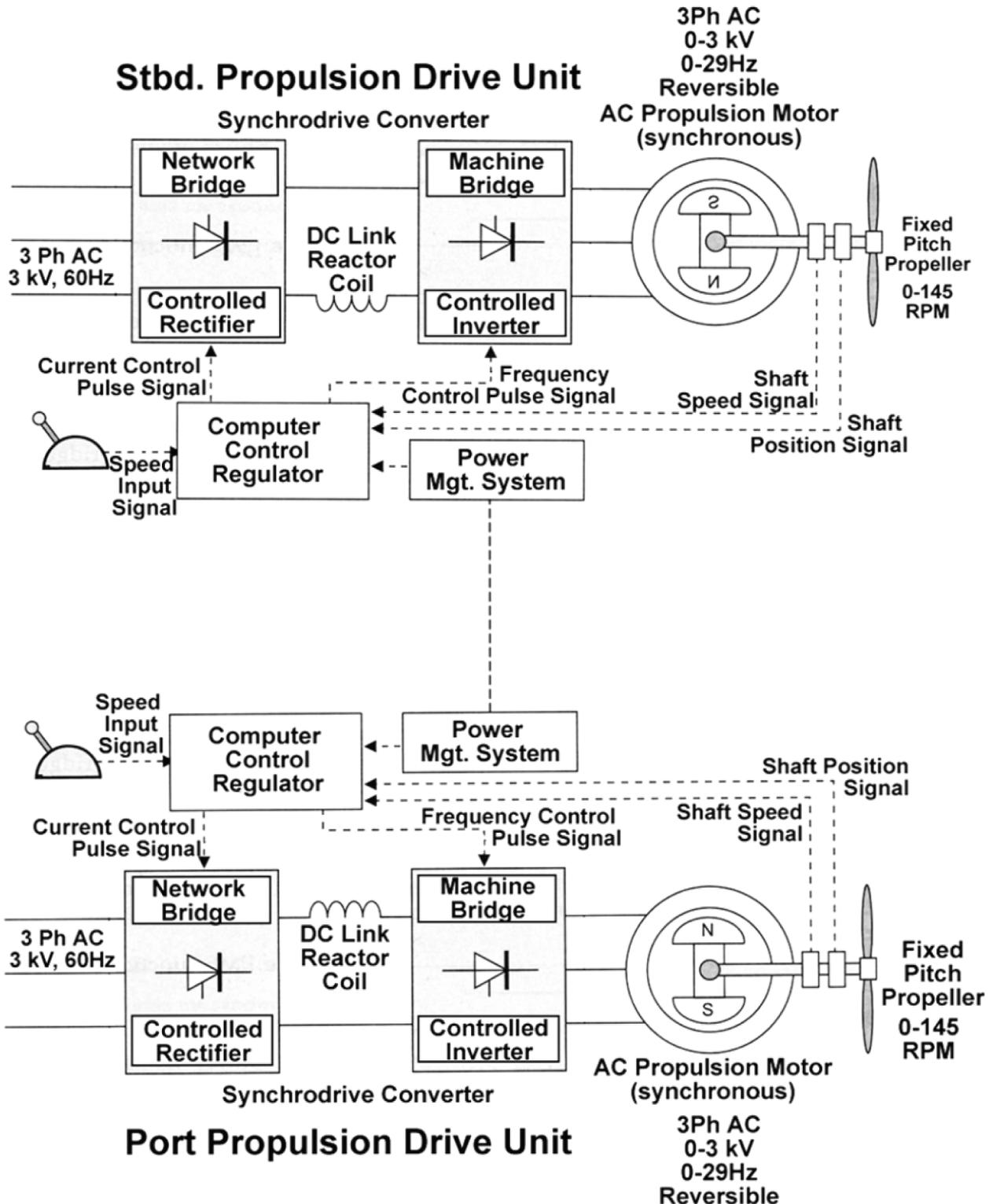
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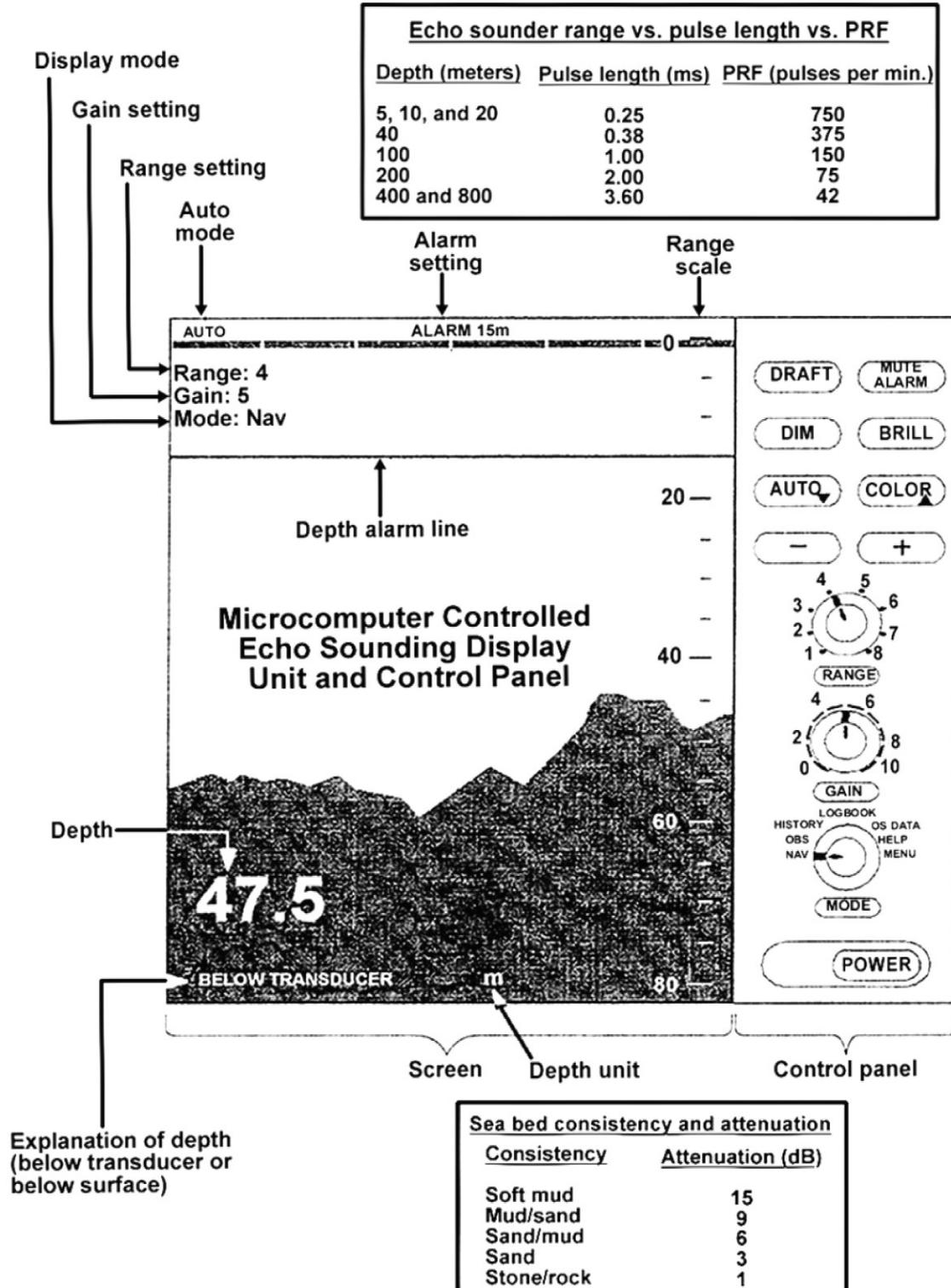
Where R = Direction of actual rotation
T = Direction of applied torque

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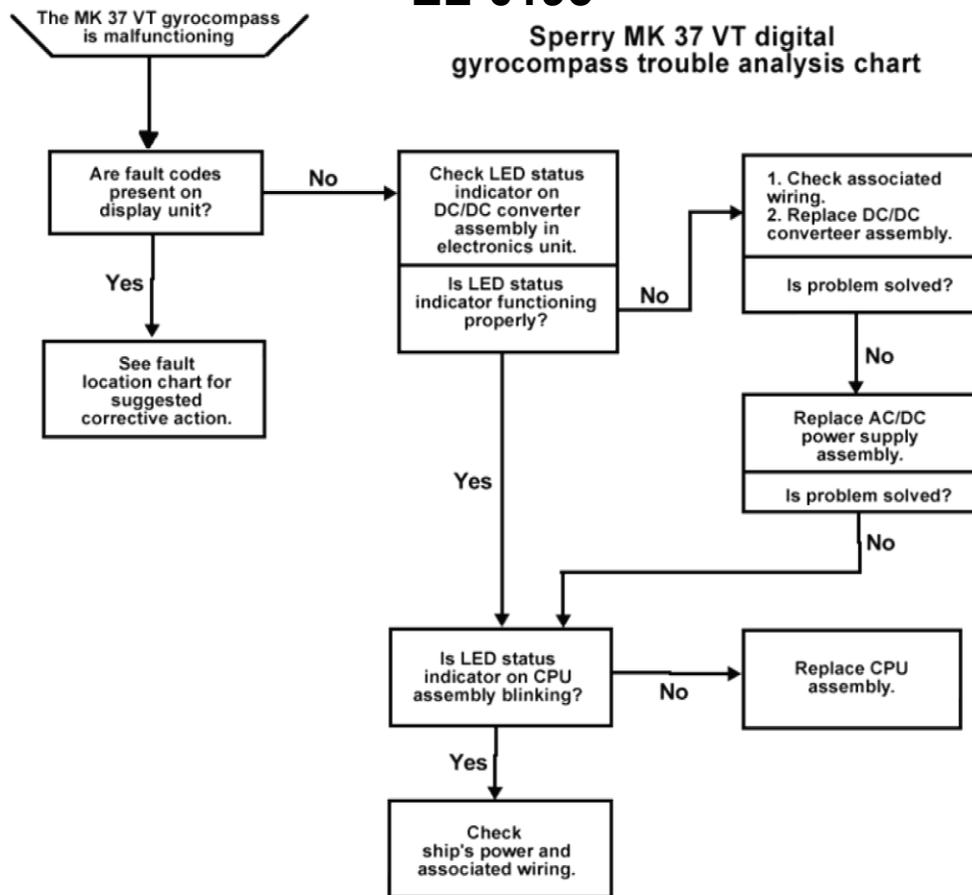


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EL-0195

Sperry MK 37 VT digital gyrocompass trouble analysis chart



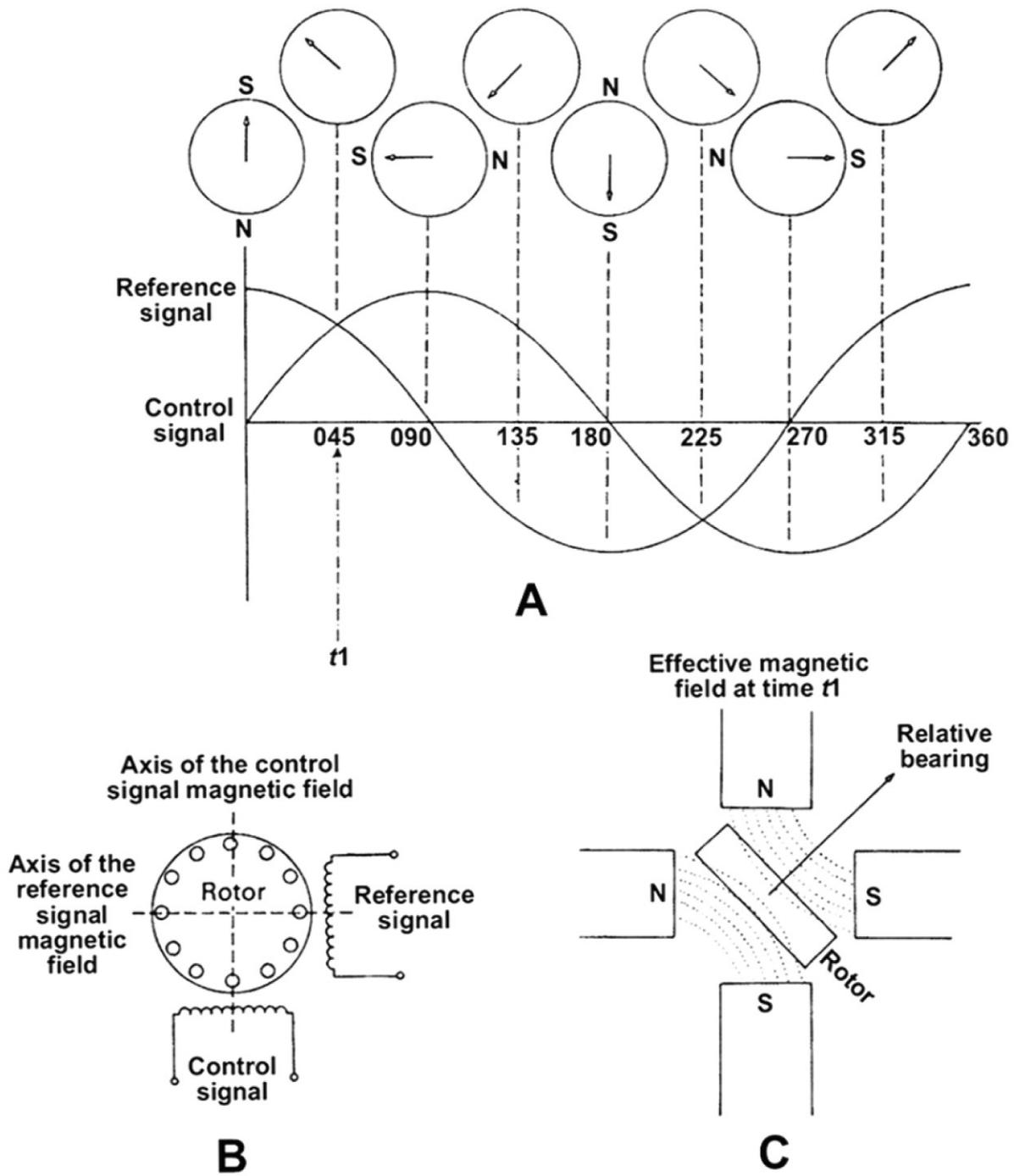
Partial list of Sperry MK 37 VT digital gyrocompass faults		
Symptom	Probable cause	Remedy
Course recorder leaves a blank page every 8-10 inches or has paper feed problems	Printer paper-release lever not in the middle, push-tractor position	Place level in the middle position for push-tractor installation
Repeater does not follow MK 37 VT heading	Repeater channel may not be on or not synchronized to the MK 37 VT heading	Check repeater switch on step driver assembly. Make sure repeater is synchronized to the MK VT gyrocompass
Speed value does not change	Speed selection may not be in Auto	Verify that speed menu selection is in Auto. Check for faults on serial channel
Latitude value does not change	Latitude selection may not be in Auto	Verify that latitude menu selection is in Auto. Check for faults on serial channel
Manual transfer (dual system) does not occur	Other system may not be powered, attached, or may have a critical fault. Manual transfer must be initiated from the primary compass only	Verify that other system is powered, attached, and does not have a critical fault
Unit makes buzzing sound for at least 15 min. after being switched on	If sound persists longer than 15 min., the AC/DC power supply assembly relay is bad	Replace the AC/DC power assembly

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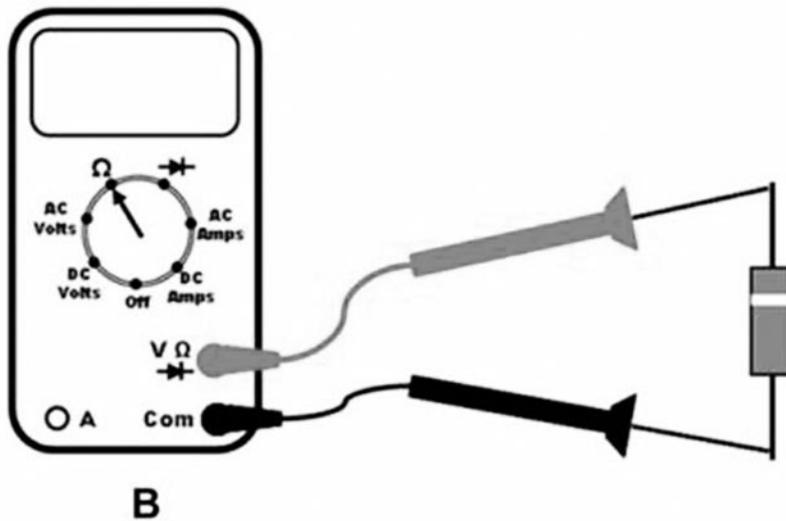
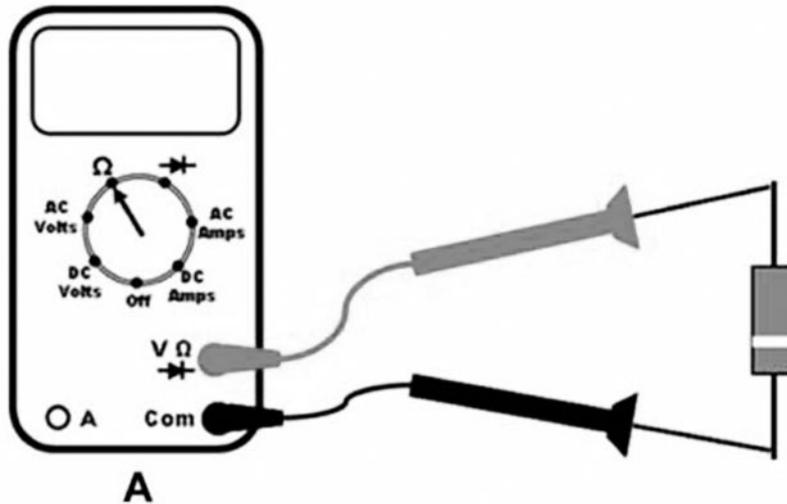
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EL-0212

