

U.S.C.G. Merchant Marine Exam

DDE – Unlimited HP

Q625 Electrical – Electronic – Control Engineering

(Sample Examination)

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

1. In a series circuit, what is the applied voltage (or sum of the applied voltages) equal to?
- A. the total current divided by the total resistance
 - B. the sum of the individual currents multiplied by the number of resistors
 - C. the total resistance divided by the total current
 - D. the sum of the individual voltage drops

Correct answer: D

2. As shown in figure "A" of the illustration, with the switch closed what statement is true if "R1" and "R2" have unequal resistance values? Illustration EL-0019
- A. The voltage drop across "R1" will not be equal to the voltage drop across "R2".
 - B. The current flow through "R1" will equal the current flow through "R2".
 - C. The current flow through "R1" will differ from the current flow through "R2".
 - D. The energy dissipated in "R1" will be the same as the energy dissipated in "R2".

Correct answer: C

3. In the illustration, 1, 2, 3 and 4 are 12-volt batteries. What will be the nominal voltage as read by a voltmeter across the output of the battery bank? Illustration EL-0107
- A. 6 volts
 - B. 12 volts
 - C. 24 volts
 - D. 48 volts

Correct answer: C

4. As shown in figure "6" of the illustration, what does the symbol represent as used in electrical drawings? Illustration EL-0026
- A. normally closed contact held open mechanically by an interlock
 - B. maintaining type push button with an electrical interlock
 - C. maintaining type push button with a mechanical interlock
 - D. limit switch with one set of normally open contacts

Correct answer: C

5. What type of electrical diagram for the electrical distribution system is shown in the illustration? Illustration EL-0014
- A. The diagram is a ladder or line diagram (schematic).
 - B. The diagram is a wiring diagram.
 - C. The diagram is a one-line diagram.
 - D. The diagram is an isometric diagram.

Correct answer: C

6. As shown in the illustrated devices and symbols, which of the symbols shown in the illustration represents a standard normally closed relay contact? Illustration EL-0005
- A. E
 - B. F
 - C. I
 - D. K

Correct answer: B

7. What statement is true concerning the electrical diagrams for the motor controller shown in the illustration? Illustration EL-0007
- A. Figure "A" is a wiring diagram and figure "B" is a ladder or line diagram (schematic).
 - B. Figure "A" is a ladder or line diagram (schematic) and figure "B" is a wiring diagram.
 - C. Figure "A" is a one-line diagram and figure "B" is a ladder or line diagram (schematic).
 - D. Figure "A" is a pictorial drawing and figure "B" is a wiring diagram.

Correct answer: A

8. Which figure shown in the illustration represents the schematic symbol shown in figure "2"? Illustration EL-0034
- A. figure "A"
 - B. figure "B"
 - C. figure "C"
 - D. figure "D"

Correct answer: B

9. What is an ammeter used to measure?
- A. voltage
 - B. continuity
 - C. resistance
 - D. current

Correct answer: D

10. When configuring a digital multimeter as an ohmmeter, what will MOST likely be displayed on the screen when the test leads are shorted together?
- A. A reading of "OL" ohms will be displayed.
 - B. A reading of residual test lead and internal resistance will be displayed (typically .2 to .5 ohms).
 - C. A reading of 0 ohms will be displayed.
 - D. B or C could be correct depending upon the digital multimeter.

Correct answer: D

- 11.** When a battery-operated megohmmeter (insulation tester) is used to perform a dielectric absorption test, the resistance is measured and recorded from each conductor to ground each minute for 10 consecutive minutes. What condition accounts for a gradual rise in resistance each successive minute?
- A. The insulation is cracked and otherwise deteriorated.
 - B. The insulation is in good condition.
 - C. The insulation is contaminated with moisture.
 - D. The insulation has direct continuity with ground.

Correct answer: B

- 12.** When troubleshooting a lead-acid storage battery, what is the best method for detecting a weak or dead cell?
- A. visually inspecting the electrolyte levels of each cell
 - B. comparing the specific gravity of the electrolyte in each cell
 - C. taking an open circuit voltage test of individual cells
 - D. taking each cell's temperature with a calibrated mercury thermometer

Correct answer: B

- 13.** 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. The specific gravity of the electrolyte will increase as only the water will evaporate from the electrolyte solution.
 - B. Although the specific gravity will change due to evaporation, there is no predictable tendency either way.
 - C. The specific gravity of the electrolyte will decrease as only the sulfuric acid will evaporate from the electrolyte solution.
 - D. The specific gravity of the electrolyte will remain unchanged as both the water and sulfuric acid will evaporate from the electrolyte solution.

Correct answer: A

- 14.** As shown in the illustrated diagnostic setup for locating a shorted field coil of a ten-pole synchronous motor, if 240 VAC/60 Hz is applied across the brushes, what would be the individual voltage drops measured across each field coil assuming that none of the field coils are shorted? Illustration EL-0202
- A. 6 VAC
 - B. 12 VAC
 - C. 24 VAC
 - D. 48 VAC

Correct answer: C

- 15.** Grounds occurring in electrical machinery as a result of insulation failure may result from deterioration over time and excessive heat. What could be another contributing cause?
- A. extended operation at normal loads
 - B. extended periods of operation at low ambient temperature
 - C. extended periods of operation at low load
 - D. extended periods of vibration

Correct answer: D

- 16.** The motor of the illustrated motor controller fails to start on an attempted startup. You ensure the motor has not tripped out on overload, and you check the disconnect switch closed. With the start button depressed, a voltmeter reading between 3 and 4, as in figure "A" shown in the illustration, indicates line voltage. After re-opening the disconnect switch and verifying the circuit de-energized, what should be your next step in the troubleshooting process? Illustration EL-0007
- A. after depressing, check the resistance across the normally open start button contacts (across 2 and 3)
 - B. without depressing, check the resistance across the normally closed stop button contacts (across 1 and 2)
 - C. check the resistance across the contactor coil "M" (across 3 and 5)
 - D. check the resistance across the normally closed overload relay contacts (across 4 and 5)

Correct answer: D

- 17.** What can be the cause of excessive heat or burning contacts in an operating motor controller?
- A. burned out operating coil
 - B. high ambient temperature
 - C. low motor starting torque
 - D. dirty or pitted contacts

Correct answer: D

- 18.** How can the loss of residual magnetism in an alternator with a brushless excitation system be corrected?
- A. running the rotor in the opposite direction for 5 minutes
 - B. using a storage battery or battery charger to "flash" the field
 - C. running the generator at normal speed with the field rheostat fully counterclockwise
 - D. allowing the generator to run at 10% of normal speed for 5 minutes

Correct answer: B

- 19.** Suppose an ungrounded 3-phase distribution system is fitted with a lamp-type ground detecting circuit with 3 lamps. If an accidental ground is displayed continuously, what is the indication on the switchboard of a single grounded conductor?
- A. One lamp would be extremely bright and the others would be extremely dim or go out
 - B. One lamp would be extremely dim or go out and the others would be extremely bright
 - C. All three lamps would be extremely dim or go out
 - D. All three lamps would be extremely bright

Correct answer: B

- 20.** Which of the procedures or conditions listed could result in damaging a transistor beyond repair?
- A. Applying silicone grease between the heat sink and the transistor mounting.
 - B. Providing incorrect polarity to the collector circuit.
 - C. Installing a transistor whose current rating exceeds the design circuit current.
 - D. Providing insufficient voltage to the input circuit.

Correct answer: B

21. What is the nominal open-circuit cell voltage of one lead-acid storage battery cell?

- A. 1.2 volts
- B. 2 volts
- C. 6 volts
- D. 12 volts

Correct answer: B

22. What is the most reliable and preferred method for determining the state of charge of a wet cell NiCad battery while it is being charged?

- A. Measuring the battery voltage with a digital voltmeter.
- B. Measuring the temperature corrected specific gravity of each cell with a hydrometer and thermometer.
- C. Measuring the battery voltage with a solenoid type voltage tester.
- D. Measuring the specific gravity of each cell with a hydrometer.

Correct answer: A

23. Which statement is true concerning a split-phase induction motor?

- A. The motor will run as a generator with the proper wiring.
- B. Motor rotation can be reversed by reversing the leads on the starting winding.
- C. Motor rotation can be reversed without changing the windings or leads.
- D. Motor speed can be readily adjusted from zero to full speed.

Correct answer: B

24. How is the difference between the synchronous speed of a three-phase induction motor and its operating speed correctly expressed?

- A. a decimal fraction of full load speed
- B. a percentage of full load speed
- C. deviation
- D. slip

Correct answer: D

25. What type of AC motor would use a rheostat in the rotor circuit to vary the speed of the motor?

- A. regenerative braking motor
- B. squirrel-cage induction motor
- C. synchronous motor
- D. wound-rotor induction motor

Correct answer: D

26. What is the characteristic of a wound-rotor induction motor, with a high resistance inserted in series with the rotor winding at startup?

- A. relatively high starting torque and high stator current
- B. relatively low starting torque and high stator current
- C. relatively low starting torque and low stator current
- D. relatively high starting torque and low stator current

Correct answer: D

- 27.** Assuming that a three-phase synchronous motor is separately excited, what statement is true concerning power supplies?
- A. The rotor winding via slip rings and brushes is connected to a three-phase AC power source, and the stator winding is directly connected to a single-phase AC power source.
 - B. The rotor windings via slip rings and brushes are connected to a three-phase AC power source, and the stator winding is directly connected to a DC power source.
 - C. The rotor winding via slip rings and brushes is connected to a single-phase AC power source, and the stator winding is directly connected to a three-phase AC power source.
 - D. The rotor winding via slip rings and brushes is connected to a DC power source, and the stator windings are directly connected to a three-phase AC power source.

Correct answer: D

- 28.** From the instant of start-up, through the acceleration period, and until the motor reaches rated speed, when is the counter EMF produced in the windings of a DC motor "zero"?
- A. armature is not yet turning
 - B. motor is almost up to rated speed
 - C. armature has just begun to turn
 - D. motor is at rated speed

Correct answer: A

- 29.** Which of the following statements represents the main difference between an electromagnetic relay and an electromagnetic contactor as used in motor control and power circuits?
- A. A relay is series connected and a contactor is parallel connected.
 - B. Contactor contacts can handle heavier loads than relay contacts.
 - C. Contactor contacts are made from silver and relay contacts are made from copper.
 - D. Contactors control current and relays control voltage.

Correct answer: B

- 30.** What is the function of the movable cams in a master-switch winch motor drum controller?
- A. limit the amount of load put on the motor
 - B. insulate the operating handle
 - C. regulate the speed of the motor
 - D. maintain resistance contacts in clean condition

Correct answer: C

- 31.** Which of the following pictures represents a magnetic reversing or two-speed motor starter? Illustration EL-0179
- A. A
 - B. B
 - C. C
 - D. D

Correct answer: D

32. Which of the following statements about a three-phase wye connected alternator is correct?

- A. The line current is 1.73 times the phase current.
- B. The phase current is 1.73 times the line current.
- C. The line voltage is 1.73 times the phase voltage.
- D. The phase voltage is 1.73 times the line voltage.

Correct answer: C

33. Which pair of safety disconnect switches shown in the illustration represents the exterior and interior views of a double-throw switch? Illustration EL-0176

- A. A and B
- B. B and D
- C. C and D
- D. A and C

Correct answer: B

34. A thermal-magnetic molded case circuit breaker for a 300 kW alternator is rated at 500 amperes at full continuous load. Which of the following conditions will MOST likely trip the breaker?

- A. Sustained current draw of 450 amperes indefinitely.
- B. Sustained current draw of 500 amperes for 3 hours.
- C. Momentary current draw of 1000 amperes for 3 seconds.
- D. Instantaneous current draw of 10,000 amperes for .03 seconds.

Correct answer: D

35. What is the basic similarity between a circuit breaker and a fuse?

- A. a circuit breaker and a fuse have no similarities
- B. after a short or overload condition, both have to be replaced before the circuit can be re-energized
- C. after a short or overload condition, both should open to de-energize the circuit
- D. after a short or overload condition, both must be reset to re-energize the circuit

Correct answer: C

36. What is the purpose of a three-phase lighting power transformer bank of a shipboard distribution system?

- A. increase source voltage temporarily for striking an arc in fluorescent lighting fixtures
- B. transform electrical energy directly into light energy
- C. stabilize the arc in fluorescent lighting fixtures
- D. decrease generating system voltage to a lower voltage suitable for lighting fixtures

Correct answer: D

37. Which of the following statements is true concerning step-down transformer operation?

- A. The kVA consumed by the primary side is lower than the kVA produced by the secondary side.
- B. The current drawn by the primary side is greater than the current delivered from the secondary side.
- C. The voltage supplied to the primary side is lower than the voltage produced by the secondary side.
- D. The voltage supplied to the primary side is greater than the voltage produced by the secondary side.

Correct answer: D

38. How are the line losses in a distribution circuit kept to a minimum?

- A. using higher current and lower voltage
- B. using higher voltage and lower current
- C. adding rubber insulation conductors to the circuit
- D. increasing the number of thermal relays in the circuit

Correct answer: B

39. In the diagram of the switchboard shown in the illustration, if one of the turbines should fail due to a throttle trip, what will happen? Illustration EL-0003

- A. The device labeled 'Exciter' will drive the alternator.
- B. The operator must open all the devices labeled 'Generator Circuit Breaker' to reduce the load on the remaining turbo-alternator.
- C. The device labeled 'Generator Circuit Breaker' for that alternator should automatically open because of the reverse power relay.
- D. The emergency generator should automatically start and be placed online to supply emergency load centers.

Correct answer: C

40. In the illustration of the one-line distribution system diagram, if at sea the 450 VAC section of the main switchboard experiences a complete loss of power, what statement is true concerning the operation of the emergency diesel-generator? Illustration EL-0014

- A. It will automatically start but the automatic bus transfer device must be manually shifted to "Emergency Power" to supply the 450 VAC section of the emergency bus.
- B. It will automatically start and automatically supply power to the 450 VAC section of the main bus through the automatic bus transfer device.
- C. It will automatically start and automatically supply power to the 450 VAC section of the emergency bus through the automatic bus transfer device.
- D. It must be manually started but once running will automatically supply power to the 450 VAC section of the emergency bus through the automatic bus transfer device.

Correct answer: C

41. When placed in a magnetic field, which of the materials listed has the highest permeability?

- A. Glass
- B. Iron
- C. Bakelite
- D. Aluminum

Correct answer: B

42. Which of the substances listed can be used to shield sensitive equipment from static magnetic fields?

- A. Mica
- B. Glass
- C. Bakelite
- D. Iron

Correct answer: D

43. What does the symbol in figure "1" shown in the illustration represent? Illustration EL-0065

- A. junction field effect transistor
- B. silicon controller rectifier
- C. PNP bipolar junction transistor
- D. NPN bipolar junction transistor

Correct answer: C

44. What is the name of the component labeled CR1 as shown in section "D" of the regulated DC power supply illustrated? Illustration EL-0085

- A. rectifier diode
- B. tunnel diode
- C. diac
- D. zener diode

Correct answer: D

45. The component labeled "CR1" in the circuit shown in the illustration serves what functional purpose? Illustration EL-0085

- A. it varies its anode/cathode polarity depending on "RL" current
- B. it acts as a low capacitive reactance to smooth ripple
- C. it establishes a constant reference voltage for the base of "Q1"
- D. it rectifies the varying voltage from the collector of "Q1"

Correct answer: C

46. A voltage amplifier has a calculated voltage gain of 5. Which statement is true concerning input and output voltages?

- A. If the input changes 5 volts, the output changes 10 volts.
- B. If the input changes 10 volts, the output changes 5 volts.
- C. If the input changes 2 volts, the output changes 10 volts.
- D. If the input changes 10 volts, the output changes 2 volts.

Correct answer: C

47. Referring to figure "3" of the illustration, what type of logic gate is symbolized? Illustration EL-0035

- A. OR gate
- B. AND gate
- C. NOR gate
- D. XOR gate

Correct answer: B

- 48.** Ships requiring extremely rapid maneuvering response using propeller shaft speed and direction as the sole means of controlling propeller thrust are most likely to use what type of drive system?
- A. Diesel-electric drive
 - B. Steam turbine geared drive
 - C. Direct or geared diesel drive
 - D. Gas turbine geared drive

Correct answer: A

- 49.** An electric propulsion drive system in which the propulsion generator supplies power to both the propulsion motor and ship service loads is referred to as what type of system?
- A. a multi-purpose system
 - B. a composite system
 - C. a dedicated system
 - D. an integrated system

Correct answer: D

- 50.** While standing an "at sea watch" onboard an AC diesel-electric drive ship with a synchronous propulsion motor with the ability to vary the field excitation strength and still remain in synchronism. Ideally what would be the character of the power factor associated with the main power distribution system including all motors?
- A. lagging
 - B. zero
 - C. leading
 - D. unity

Correct answer: D

- 51.** What type of motor is generally used in DC propulsion drive systems?
- A. shunt-wound or separately excited
 - B. permanent magnet
 - C. differentially compounded
 - D. series-wound

Correct answer: A

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

Correct answer: B

- 53.** In order for a live-line tester to be used to test and prove dead a high voltage circuit, what must be done to verify the ability of the tester to detect a voltage?
- A. The live-line tester should be checked by connecting to a known high voltage source only after testing the circuit to be worked upon.
 - B. The live-line tester should be checked by connecting to a known high voltage source before and after the circuit to be worked upon is tested.
 - C. The live-line tester should be checked by connecting to a known high voltage source only before testing the circuit to be worked upon.
 - D. The live-line tester need not be checked prior to testing the circuit to be worked upon as long as it has not been declared inoperative.

Correct answer: B

- 54.** Assuming the vessel has an engine control room, where is an engineers' assistance needed alarm required to produce an audible signal-
- A. The engineers' accommodation spaces
 - B. The engine room/machinery space
 - C. The crew's and officers' mess
 - D. The wheelhouse/navigational bridge

Correct answer: A

- 55.** To facilitate communication between the wheelhouse and the steering gear room in a steering emergency where no external source of power is required, what means of two-way communication would be provided?
- A. Ship-service telephone system
 - B. Sound-powered telephone system
 - C. Emergency loudspeaker system
 - D. Two-way portable radios

Correct answer: B

- 56.** Modern ships use multiple computers arranged in a client/server network to perform various shipboard functions. What type of computer network would most likely be used aboard ship?
- A. Wireless local area network
 - B. Wired local area network
 - C. Wireless wide area network
 - D. Wired wide area network

Correct answer: B

- 57.** As shown in the illustrated block diagram for a distributed automation system, what statement is true concerning the units labeled "ROS" which are remote operating system workstations? Illustration EL-0096
- A. The ROS located in the ship's office is designated as the master ROS.
 - B. The ROS located in the wheelhouse is designated as the master ROS.
 - C. Operator access to control functions among the various ROS locations are all identical.
 - D. Operator access to control functions among the various ROS locations differ depending system configuration and need.

Correct answer: D

58. Referring to the illustration pertaining to the semi-automatic navigation light panel circuit, if the buzzer sounds and the masthead indicator light comes on, what statement is true concerning acknowledging and responding to the alarm while minimizing the danger to navigation? Illustration EL-0108

- A. The buzzer is immediately silenced by turning the masthead transfer switch in the line section off. The masthead light can only be illuminated by replacing the burned-out bulb.
- B. The buzzer is immediately silenced by turning the masthead transfer switch in the line section to the secondary lamp position. The masthead light will then immediately illuminate.
- C. The buzzer is immediately silenced by turning the master switch in the master section off. The masthead light can only be illuminated by replacing the burned-out bulb.
- D. The buzzer cannot be silenced and the masthead light cannot be illuminated until the burned-out masthead lamp is replaced.

Correct answer: B

59. While monitoring an impressed current cathodic hull protection system, which of the following measurements should remain constant in a properly operating electronically regulated system?

- A. Total anode current
- B. Reference electrode voltage
- C. Individual anode currents
- D. Control amplifier output voltage

Correct answer: B

60. When power is restored after a complete power failure, how will the steering gear pump motor which was on-line respond?

- A. It will restart automatically
- B. It will have to be restarted manually
- C. It will have to be reset manually
- D. It will trip its overload relays

Correct answer: A

61. Referring to the sound-powered telephone circuit shown in the illustration, what statement is true? Illustration EL-0093

- A. The sound-powered telephone circuitry consists of common-talk and common-ringing circuits.
- B. The sound-powered telephone circuitry consists of selective-talk and selective-ringing circuits.
- C. The sound-powered telephone circuitry consists of a common-talk circuit and a selective-ringing circuit.
- D. The sound-powered telephone circuitry consists of a selective-talk circuit and a common-ringing circuit.

Correct answer: C

62. What would be the indication of a grounded switch or cable as measured by a megohmmeter?

- A. infinity
- B. "zero"
- C. being unsteady in the high range
- D. being unsteady in the low range

Correct answer: B

- 63.** When testing insulation resistance of electric equipment and machinery, ideally when should the insulation resistance be tested for the lowest normal insulation values?
- A. every time the brush rigging is adjusted
 - B. every 30 days whether the machine is in use or not
 - C. immediately after starting up the machine
 - D. immediately after shutting down the machine

Correct answer: D

- 64.** When regreasing the electric motor bearing as shown in figure "B" of the illustration, what practice should be avoided? Illustration EL-0218
- A. Only partially filling the bearing cavity with new grease.
 - B. Completely filling the bearing cavity with new grease.
 - C. Flushing out the old grease while running the motor with no load.
 - D. Flushing out the old grease with an approved solvent.

Correct answer: B

- 65.** What should you be aware of when checking the specific gravity of the battery electrolyte with a hydrometer?
- A. the battery is fully charged when the float sinks deepest into the electrolyte
 - B. the battery is discharged when the float is highest in the electrolyte
 - C. a hydrometer reading is accurate if taken immediately after water is added to the cell
 - D. depending on the temperature it may be necessary to correct for temperature

Correct answer: D

- 66.** Suppose it is desired to connect a dual voltage three-phase squirrel-cage induction motor for low volts, but it is undetermined whether the nine-lead motor is internally configured for wye or delta configuration. Using an ohmmeter, the motor itself with leads disconnected, and the illustration as a guide, what statement is true? Illustration EL-0134
- A. If leads "7", "8", and "9" have continuity across each other, the motor is "wye" configured. Without continuity, the motor is "delta" configured.
 - B. If leads "7", "8", and "9" have continuity across each other, the motor is "delta" configured. Without continuity, the motor is "wye" configured.
 - C. If leads "4", "5", and "6" have continuity across each other, the motor is "wye" configured. Without continuity, the motor is "delta" configured.
 - D. If leads "4", "5", and "6" have continuity across each other, the motor is "delta" configured. Without continuity, the motor is "wye" configured.

Correct answer: A

- 67.** Which of the following methods should be used to dress the face of silver-plated contacts?
- A. Sanding with 400 grit sandpaper
 - B. Filing with a mill file
 - C. Burnishing with a burnishing tool
 - D. Knurling with a knurling tool

Correct answer: A

- 68.** Under unusual circumstances, it may be required to operate a ship's service generator above its rated kVA. What supplemental casualty control action will be required?
- A. While maintaining the rated system voltage, lower the operating frequency to at least 5% below the rated system frequency.
 - B. Increase the cooling water flow, while maintaining air temperatures below the dew point for increased cooling effect.
 - C. Increase the cooling water flow, while maintaining air temperatures above the dew point to avoid any condensation.
 - D. While maintaining the rated system frequency, lower the operating voltage to at least 5% below the rated system voltage.

Correct answer: C

- 69.** After prior isolation and lock-out/tag-out procedures are performed, it is still possible that stored electrical energy within the circuit can pose an electrical shock hazard. Which electrical device requires discharging any stored electrical energy before any work may safely begin?
- A. potential transformer
 - B. choke coil
 - C. resistor bank
 - D. capacitor

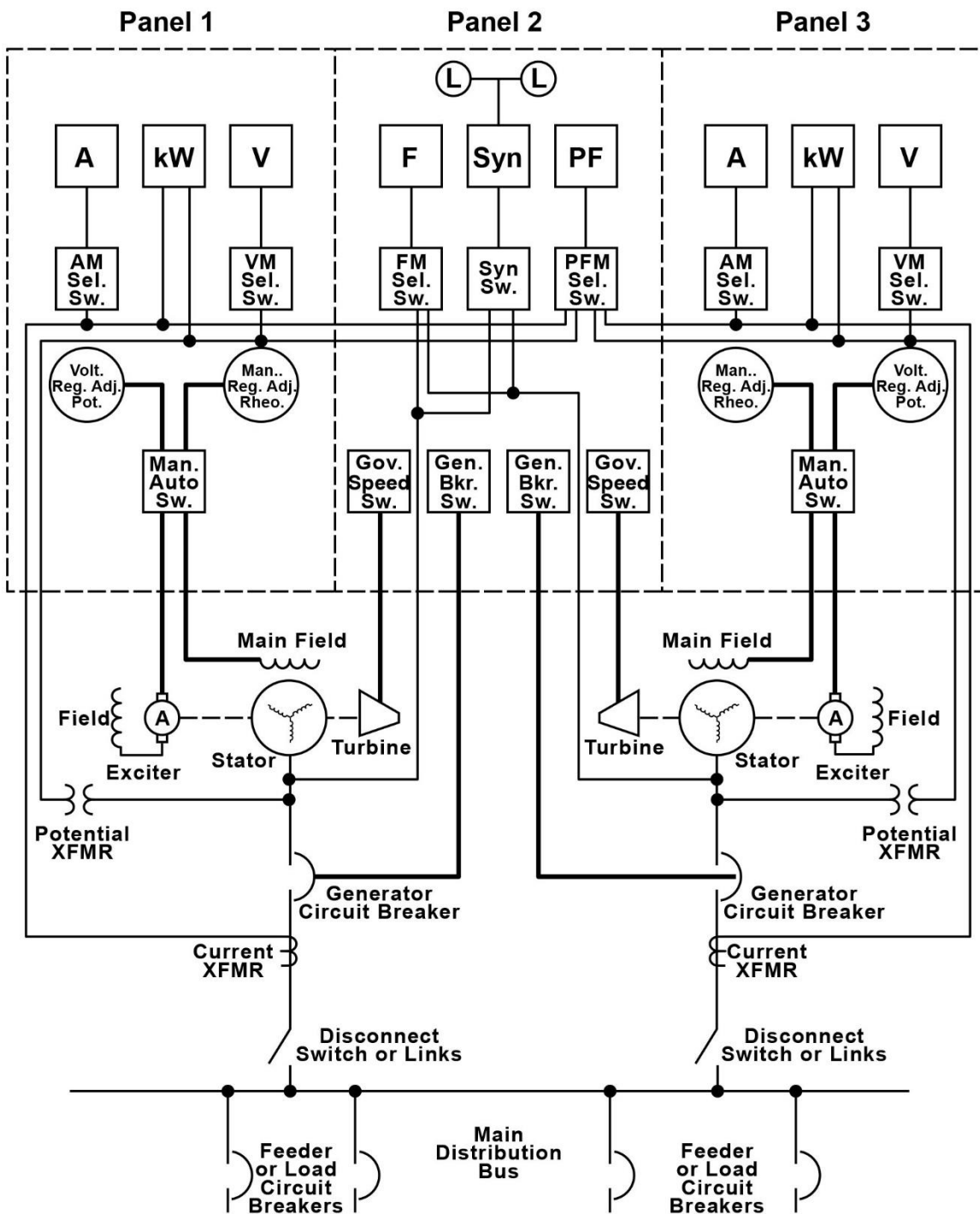
Correct answer: D

- 70.** Which of the following devices would be forbidden to use as a primary means of electrical isolation?
- A. fused disconnect switch
 - B. start/stop push button station
 - C. circuit breaker
 - D. non-fused disconnect switch

Correct answer: B



EL-0003



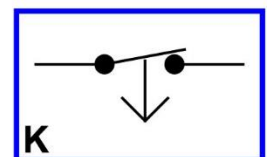
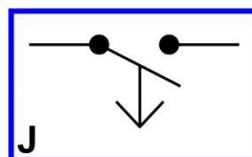
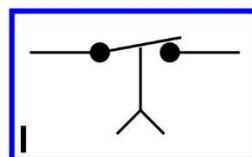
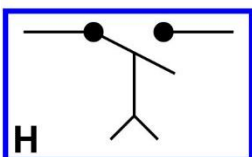
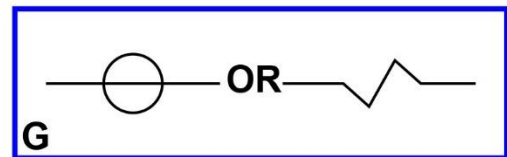
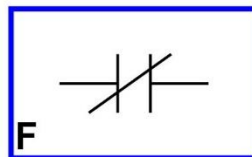
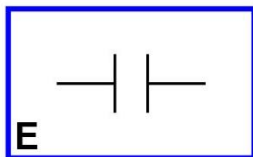
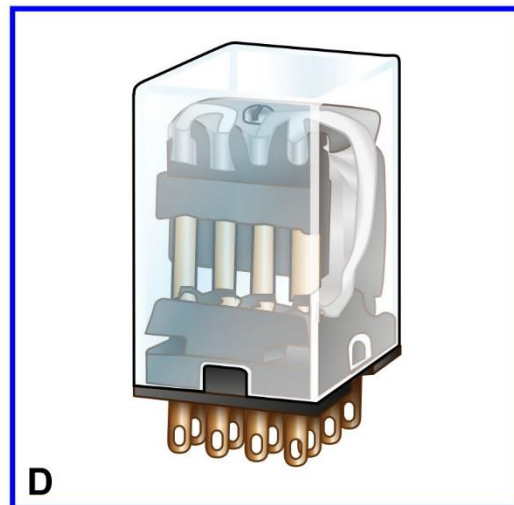
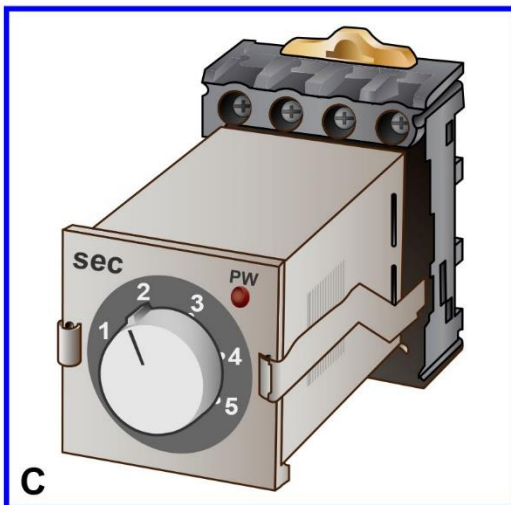
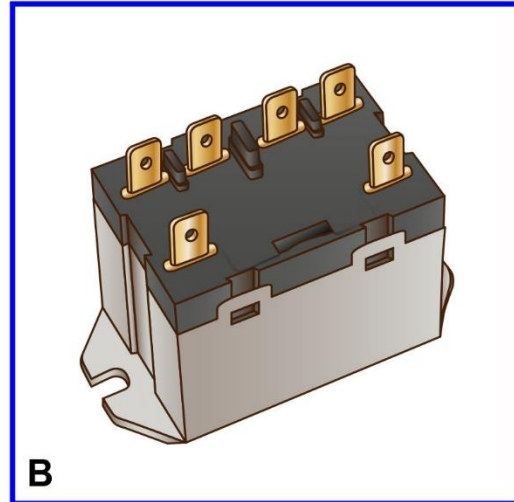
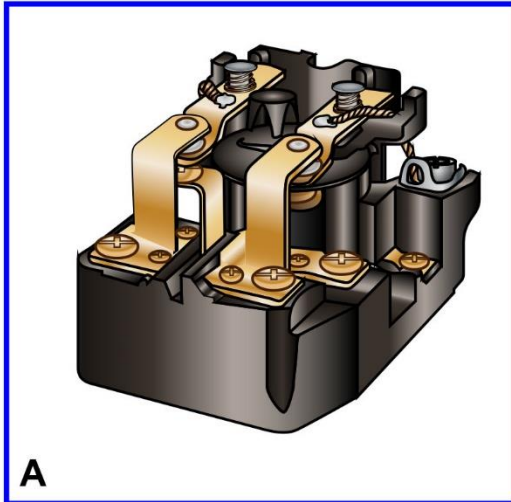
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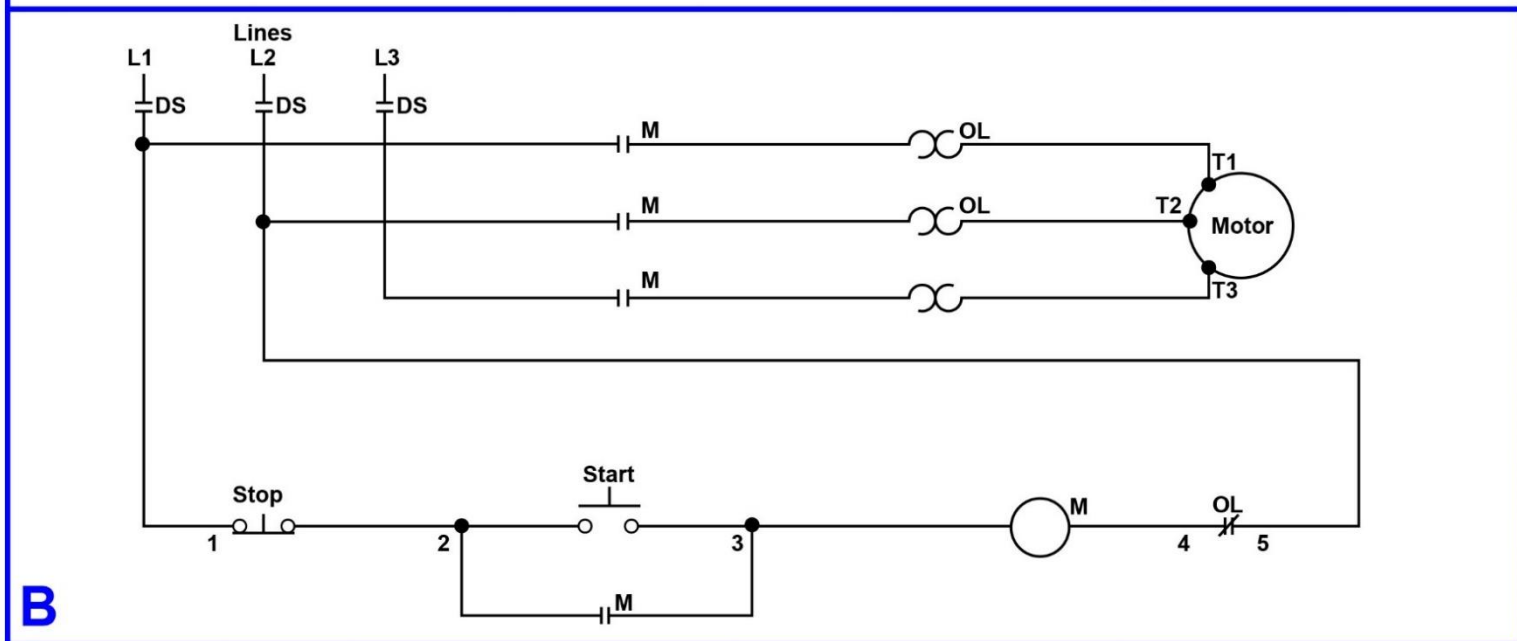
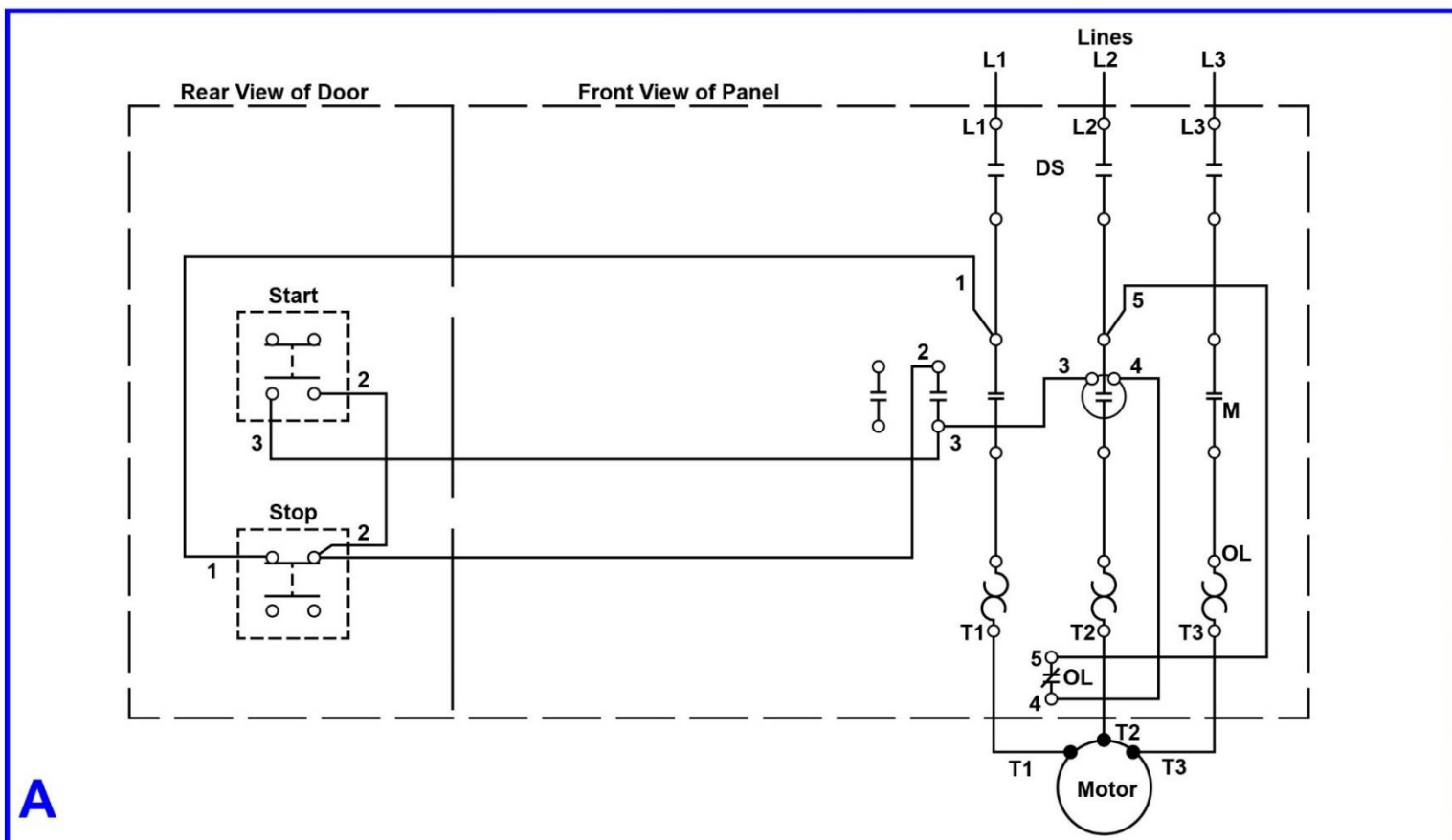
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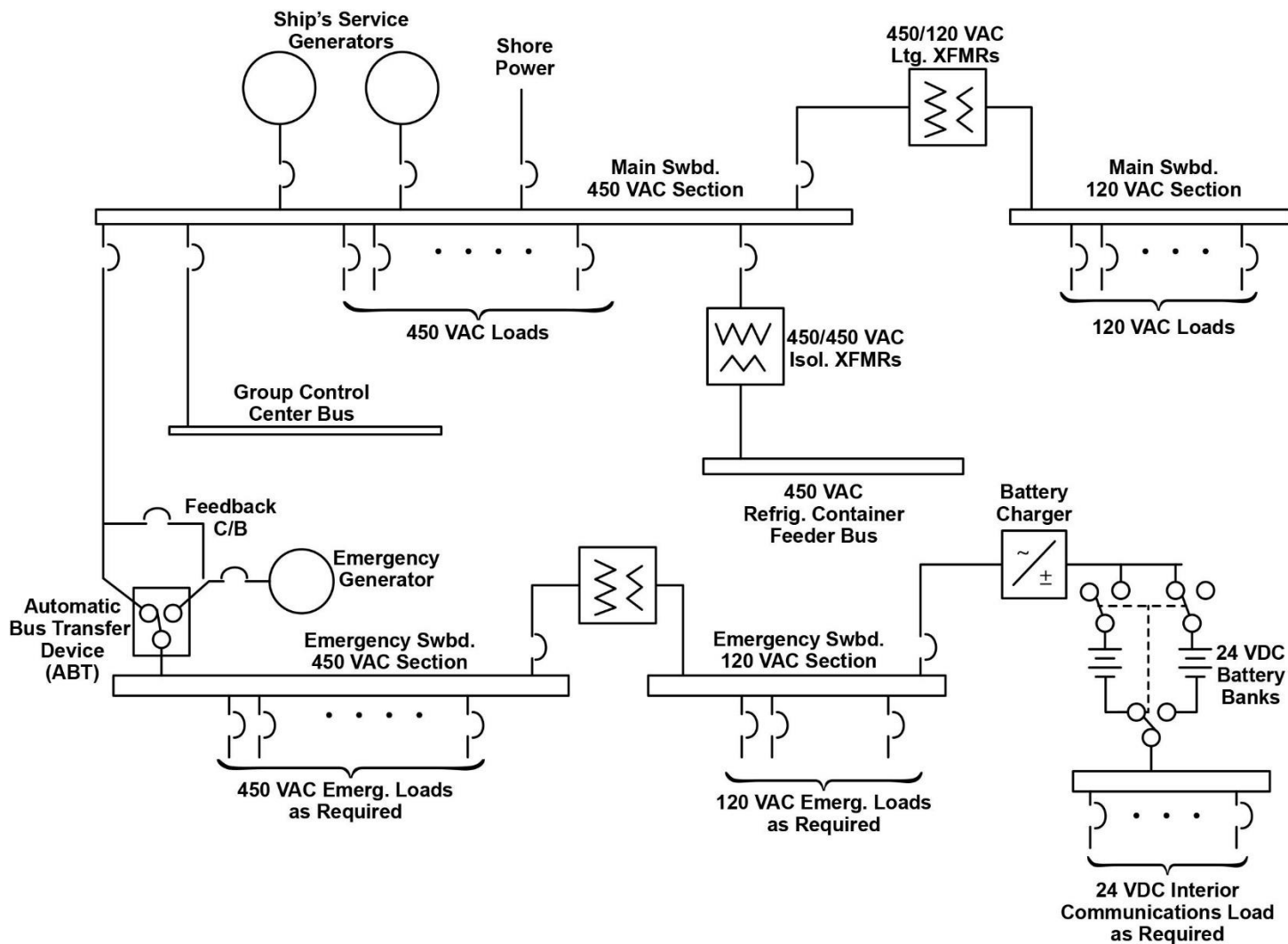
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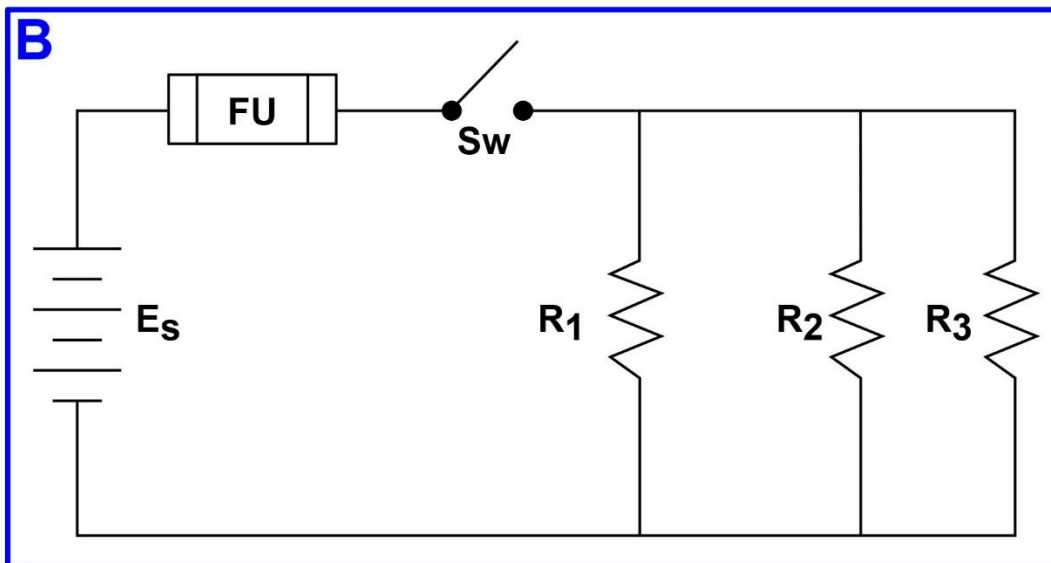
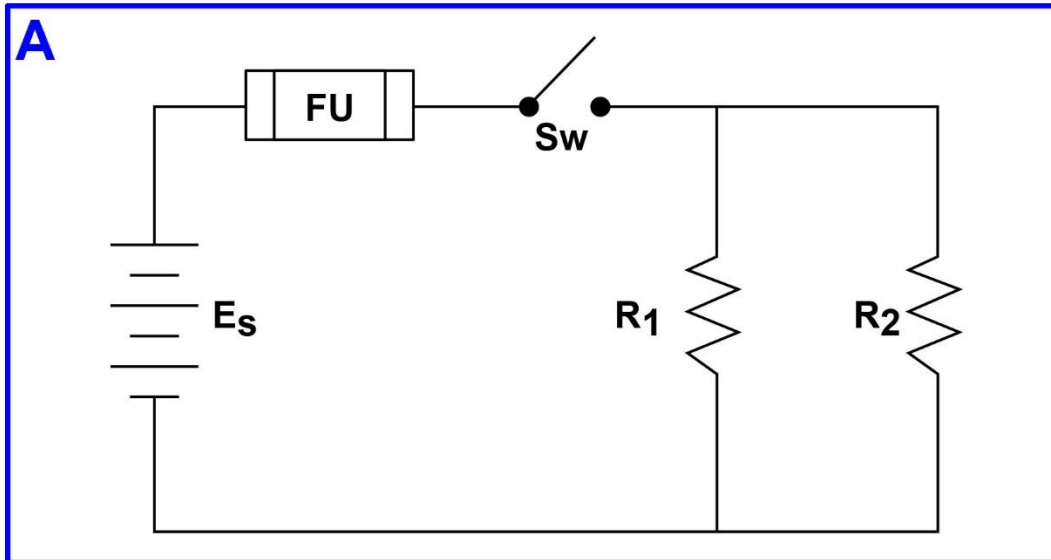
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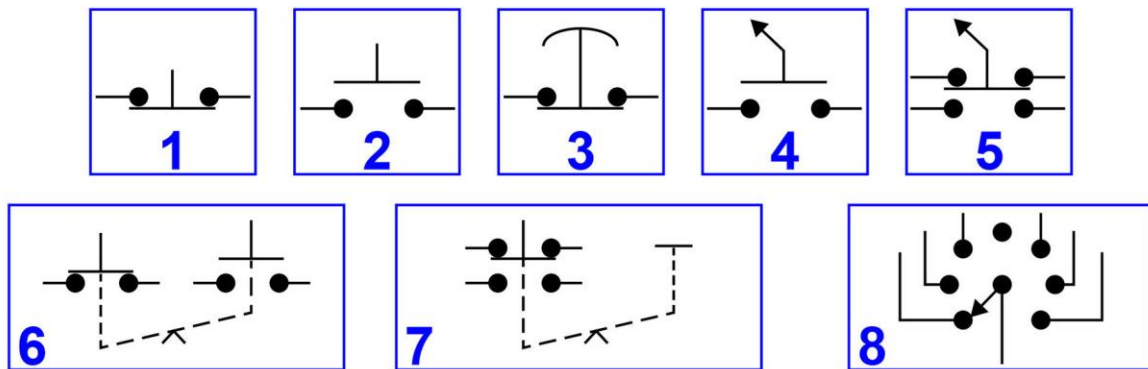
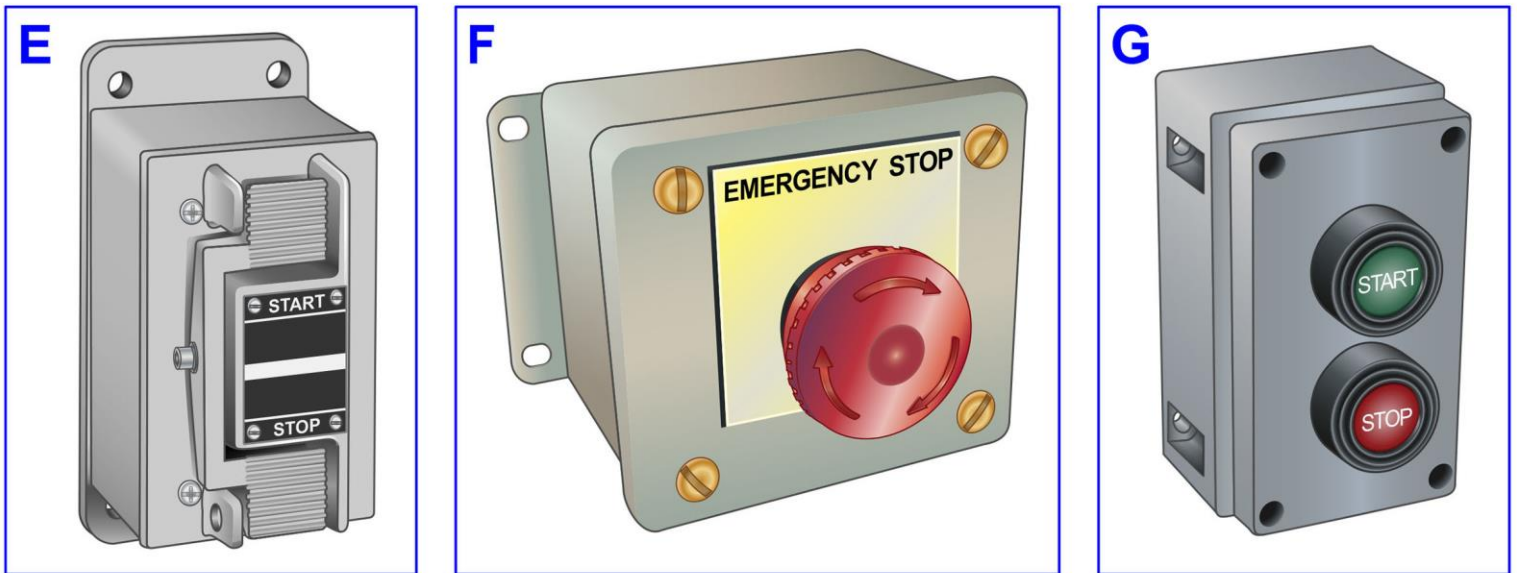
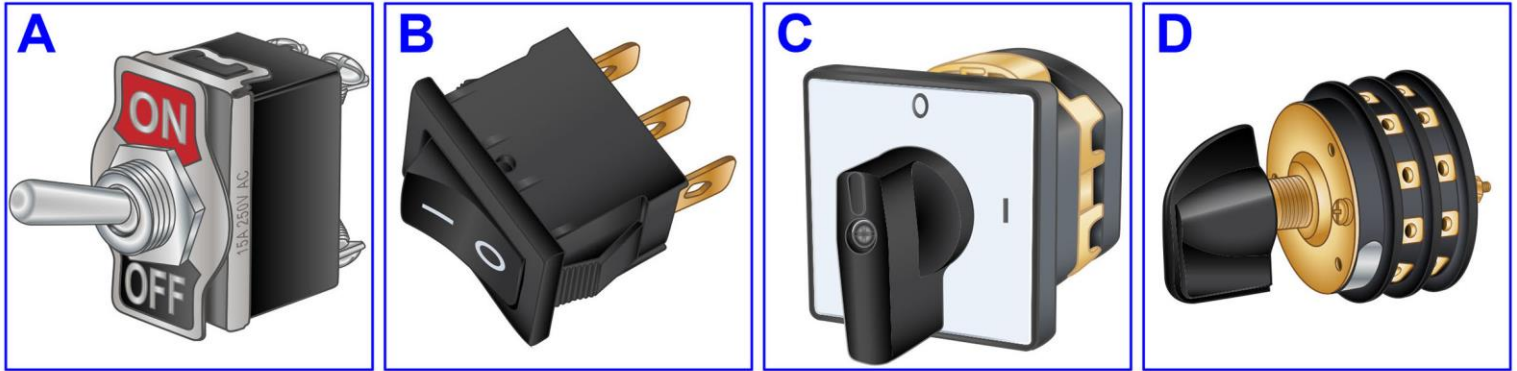
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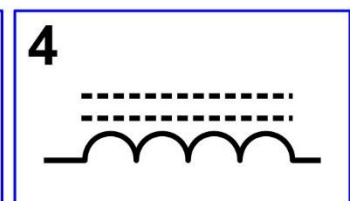
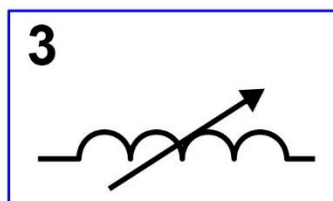
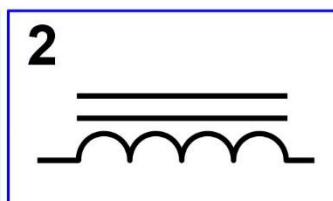
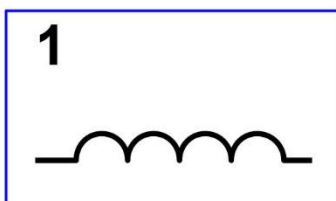
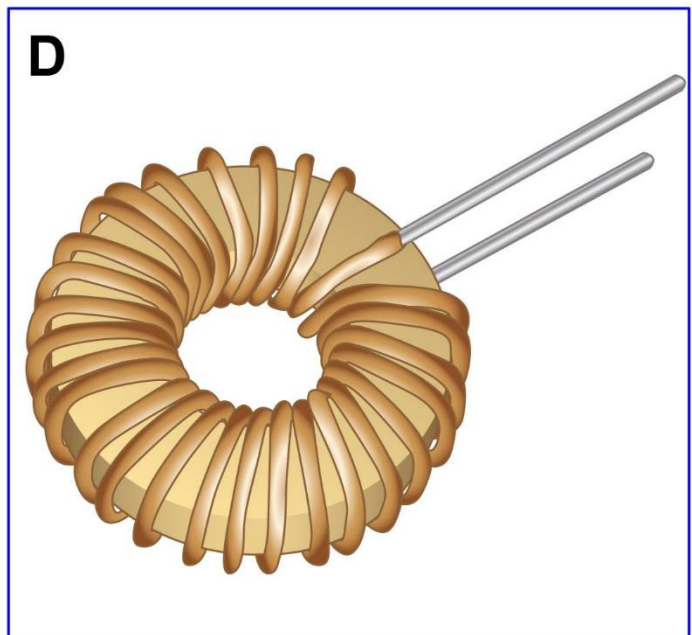
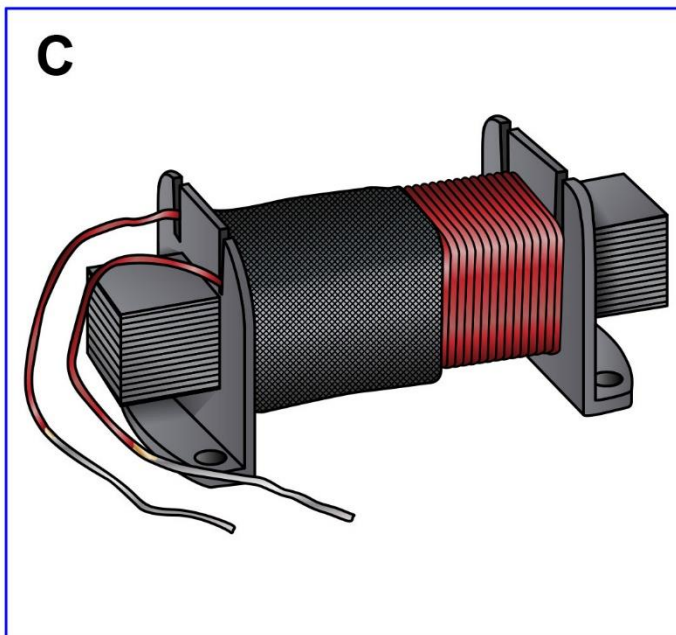
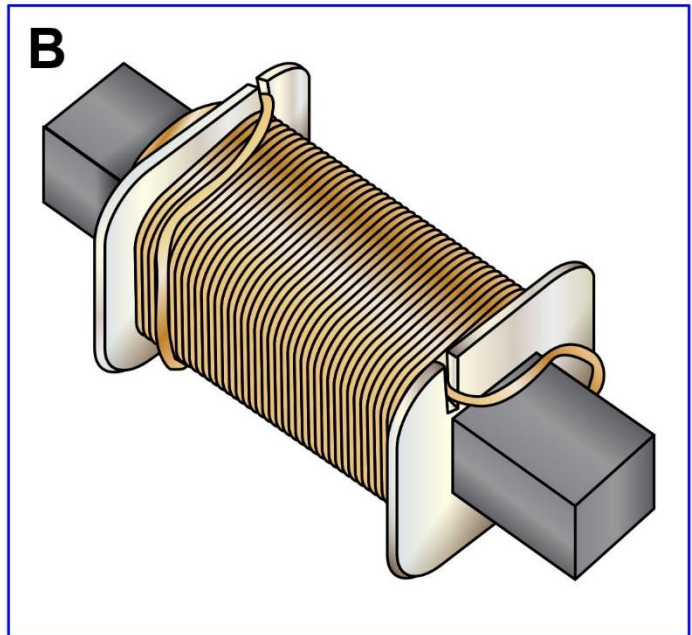
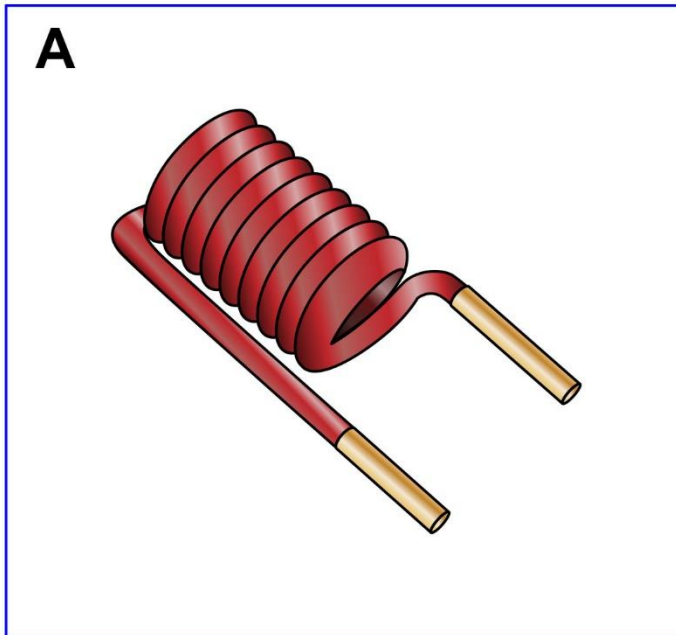
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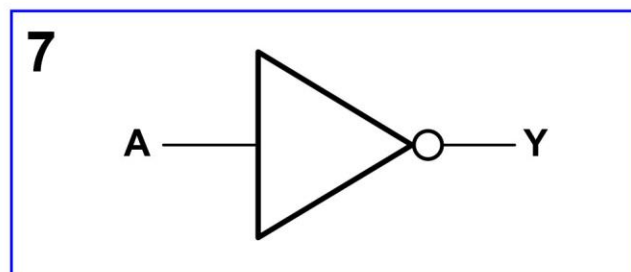
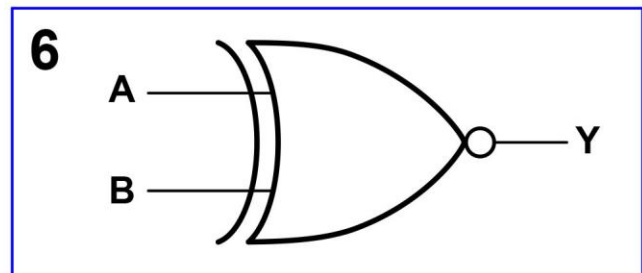
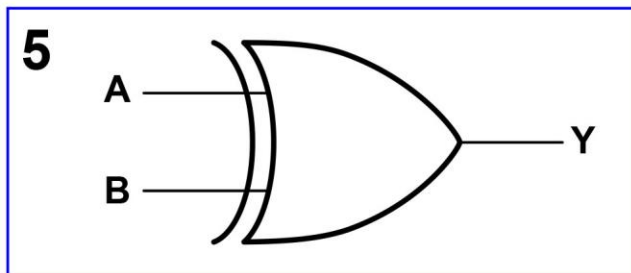
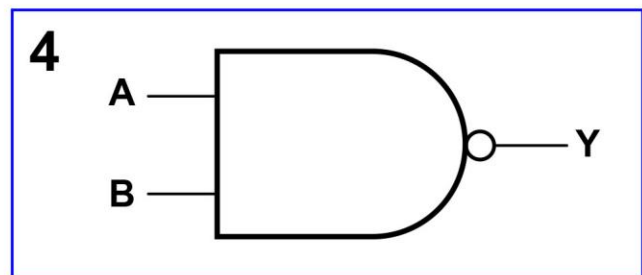
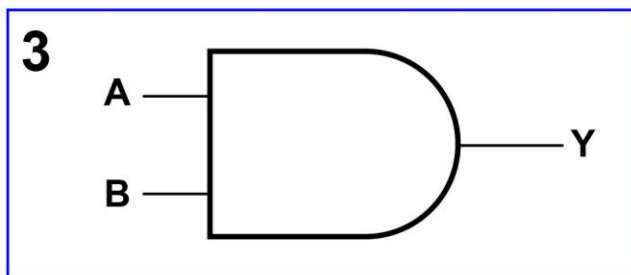
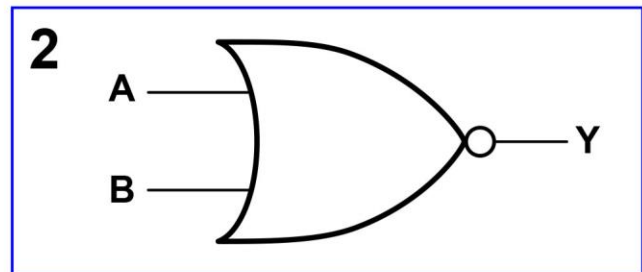
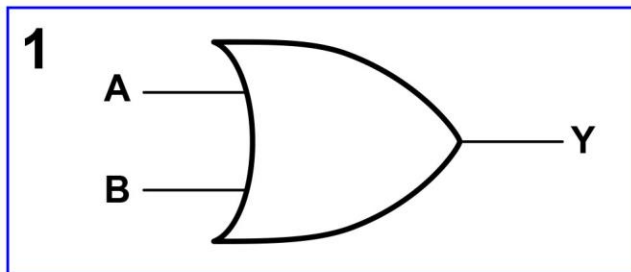
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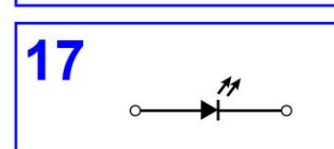
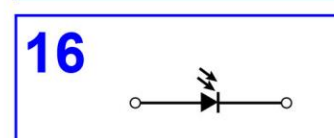
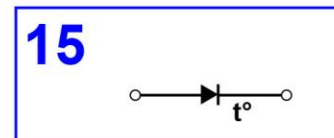
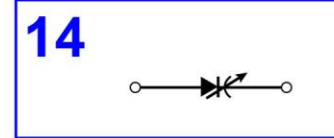
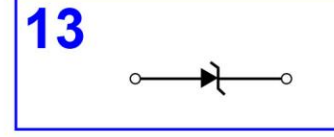
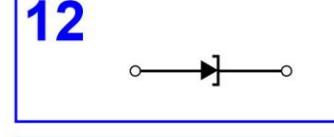
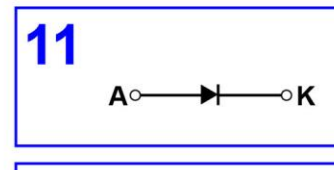
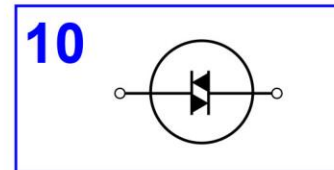
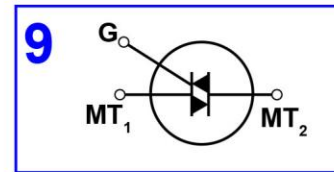
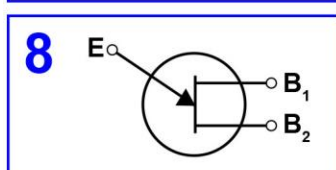
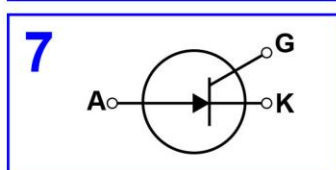
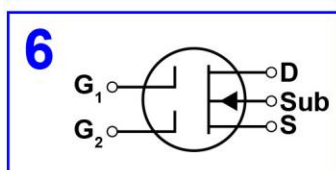
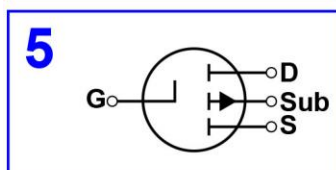
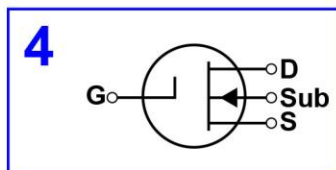
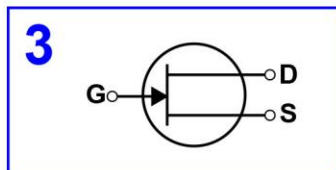
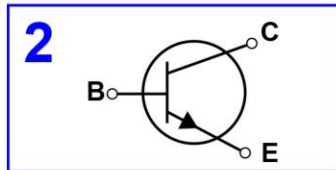
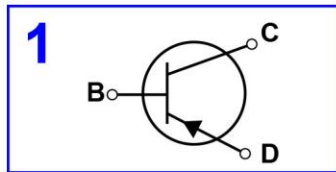
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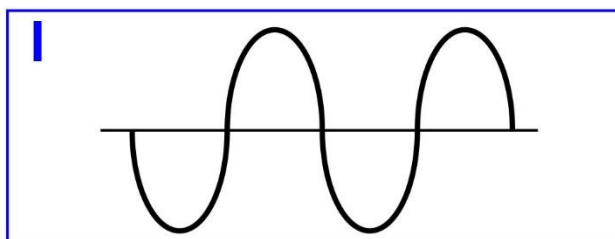
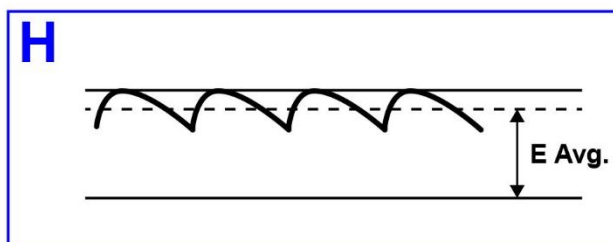
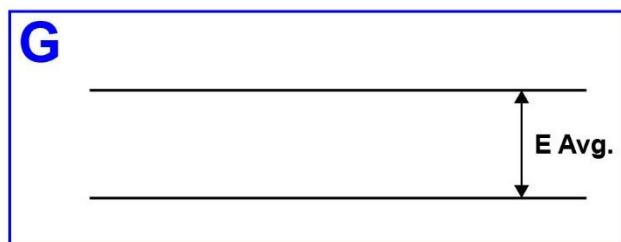
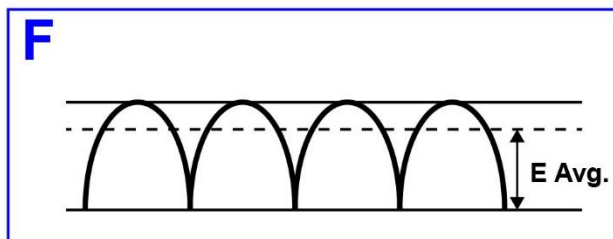
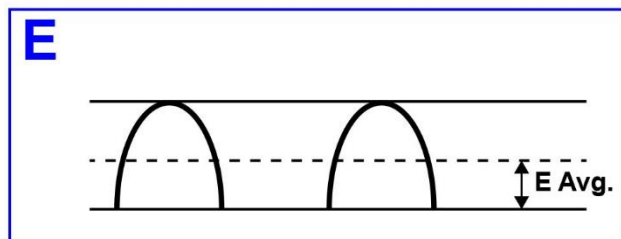
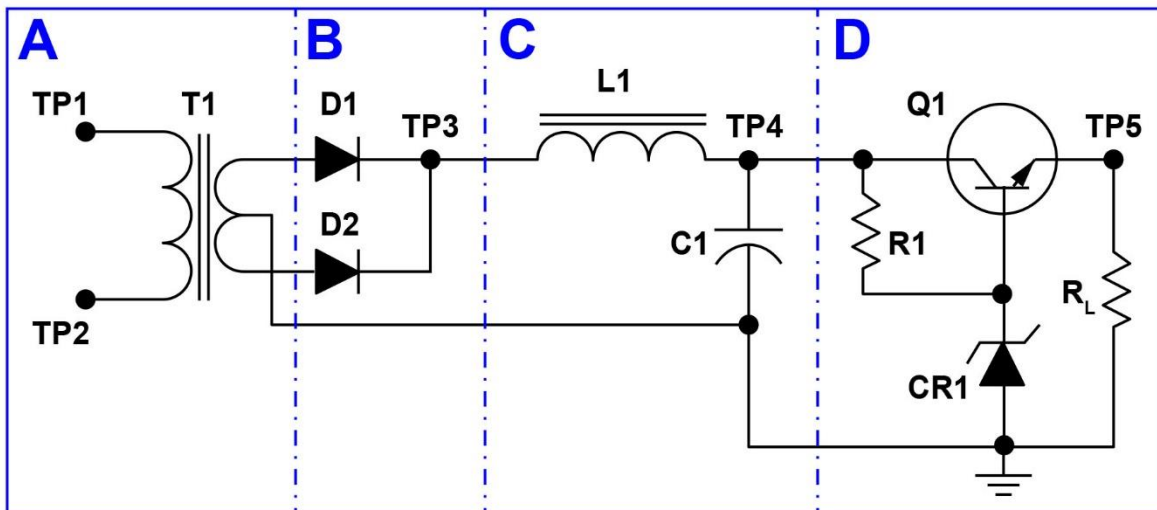
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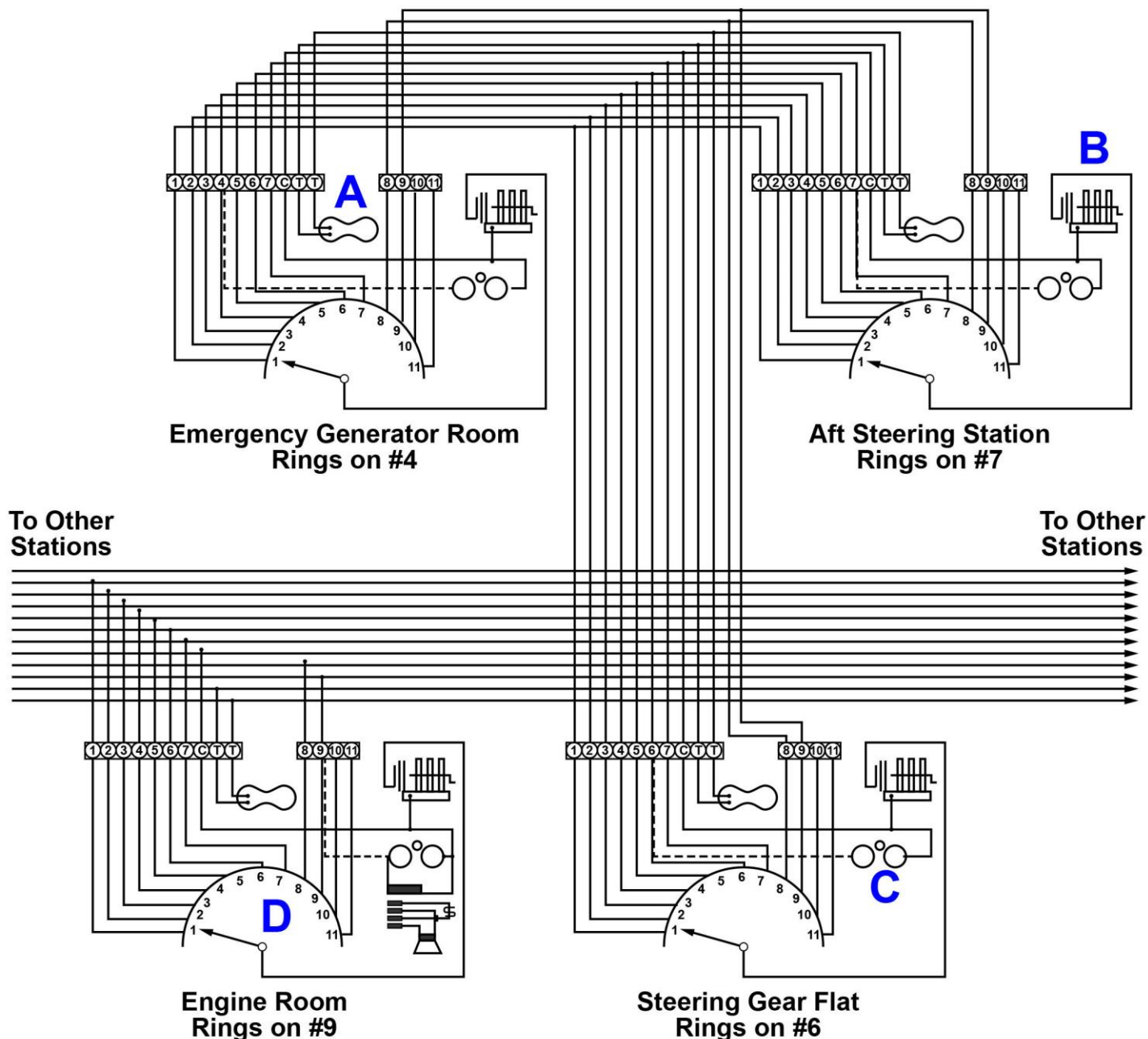


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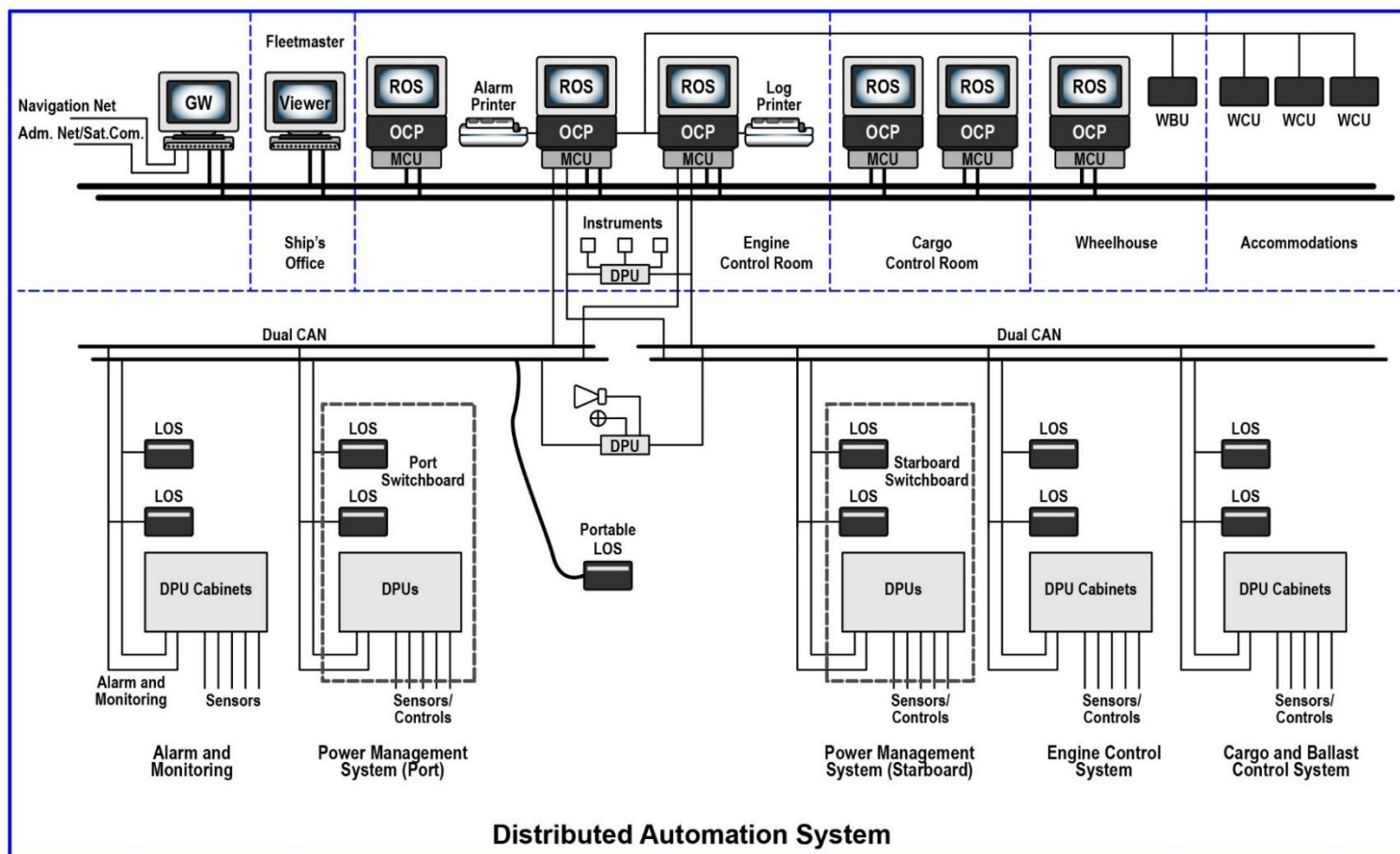


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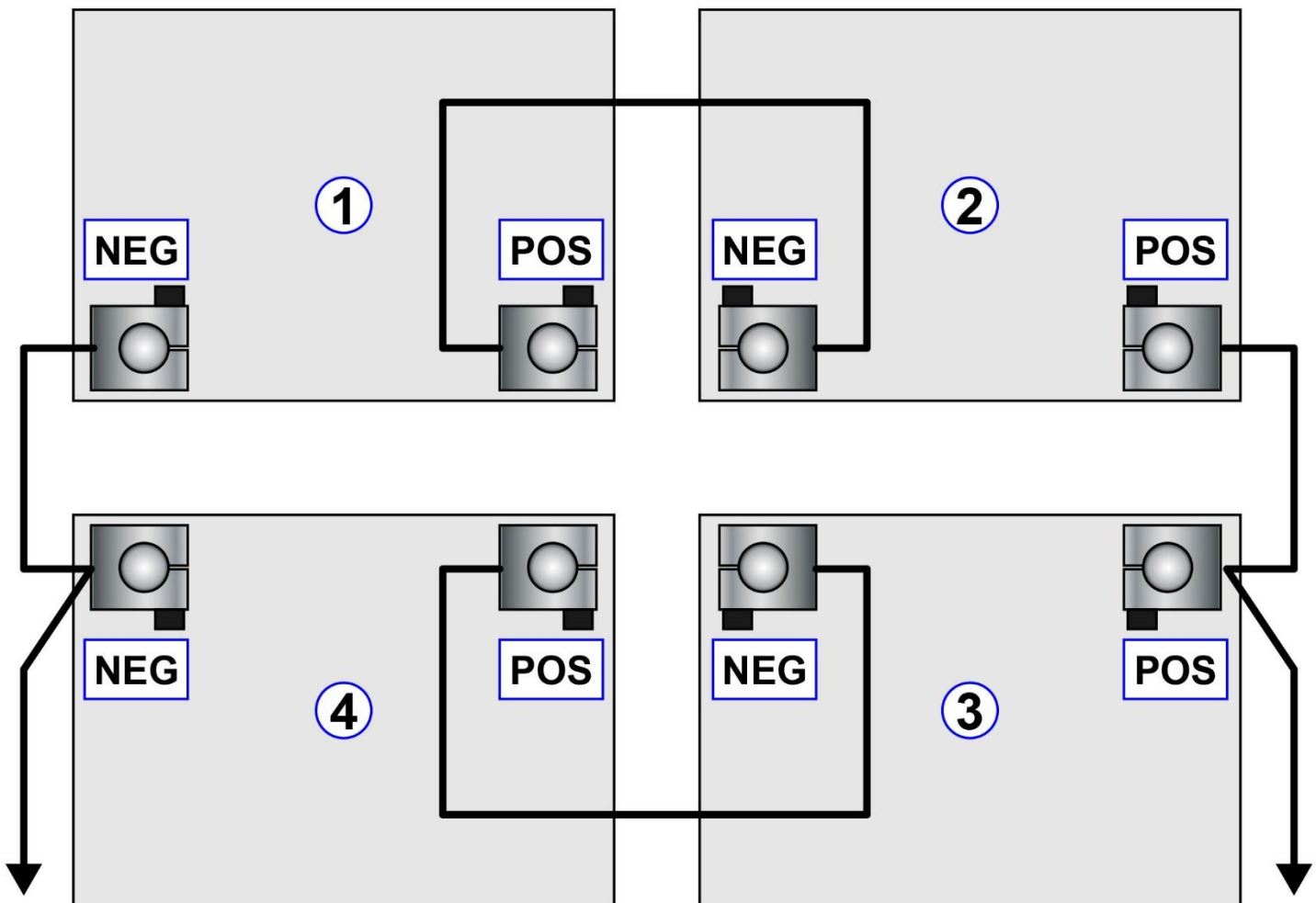
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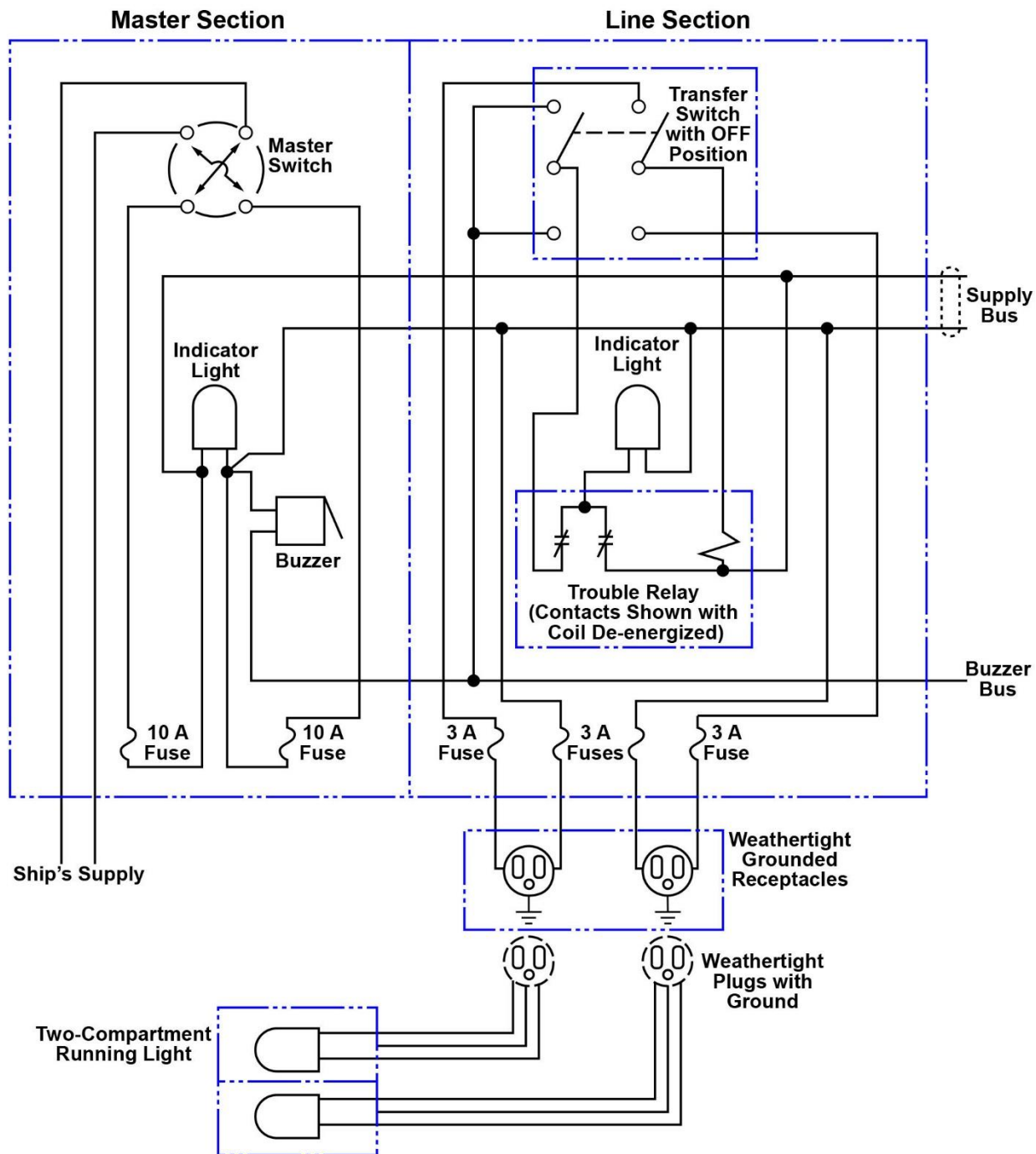
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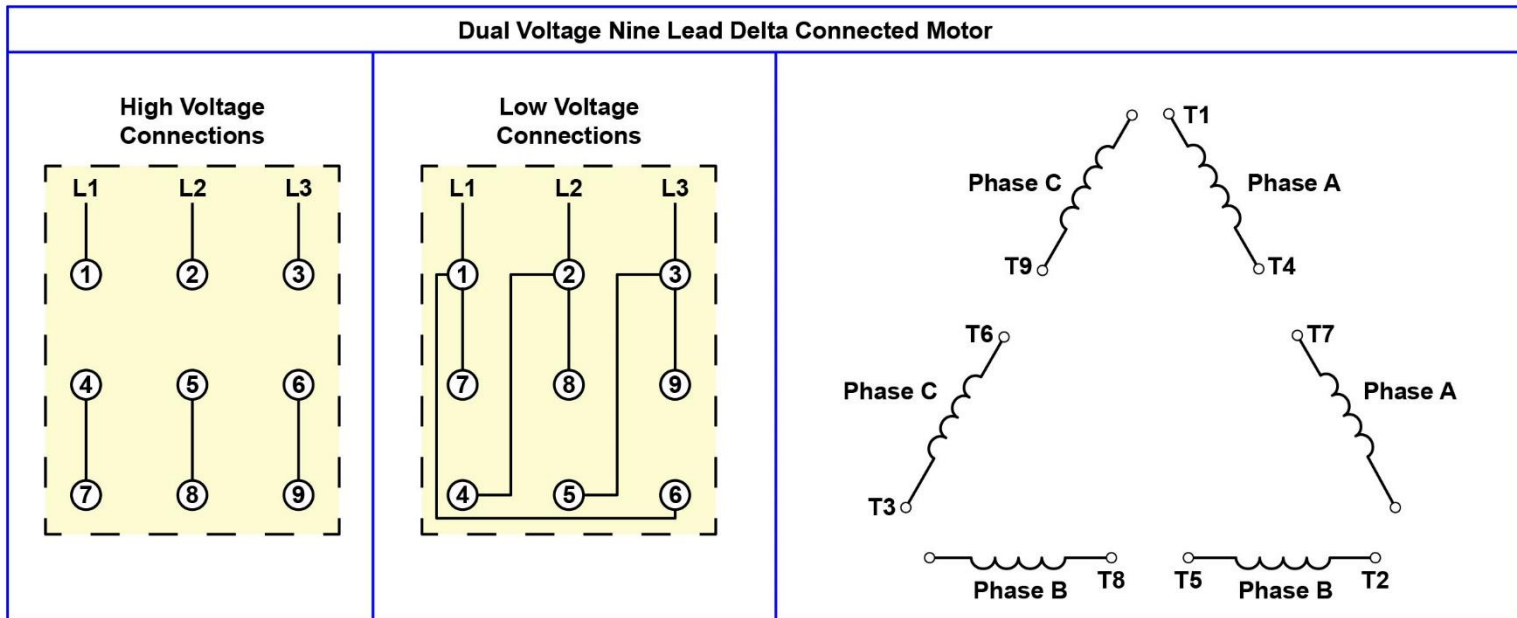


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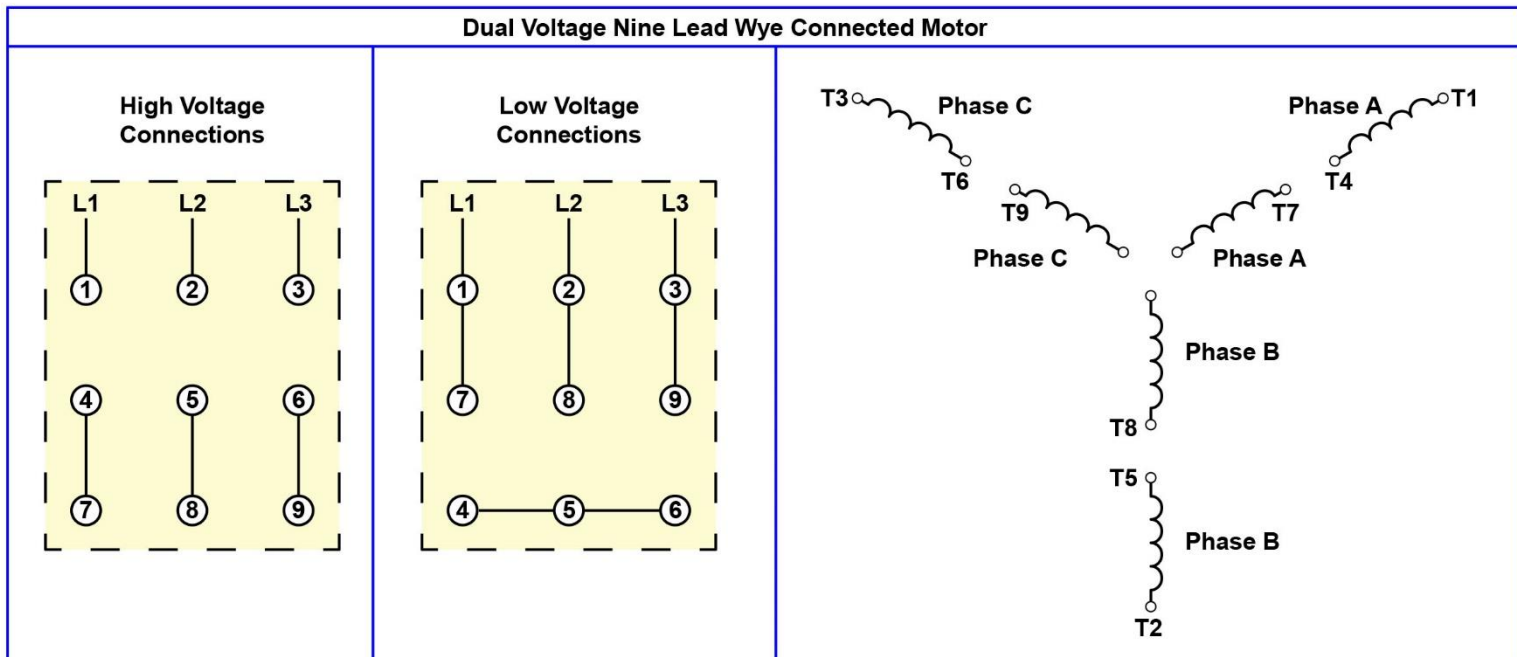


EL-0134

Dual Voltage Nine Lead Delta Connected Motor



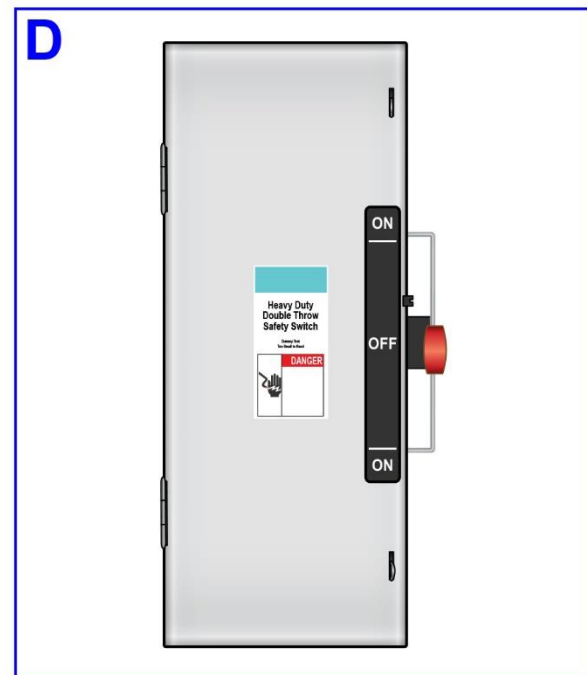
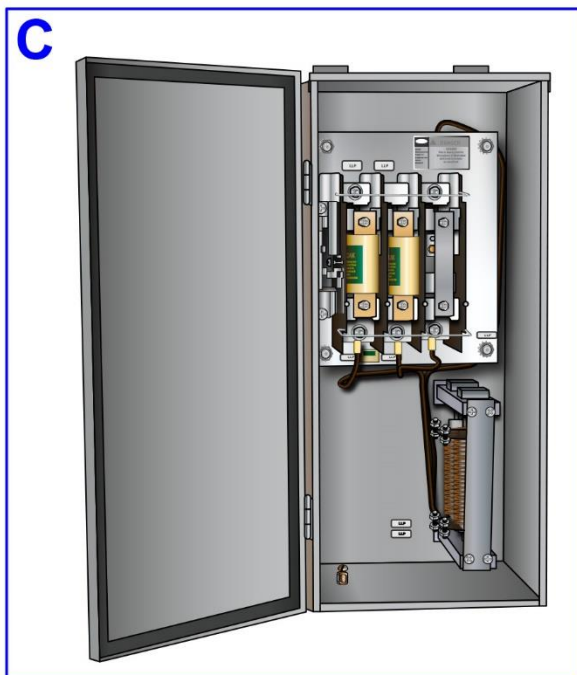
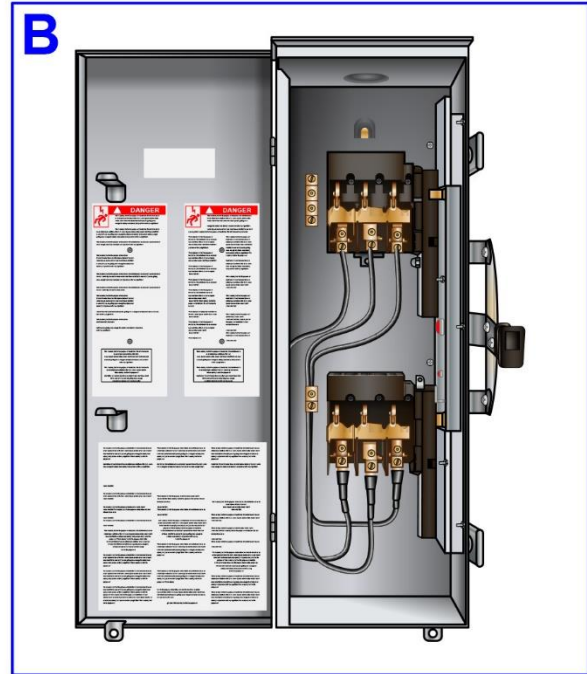
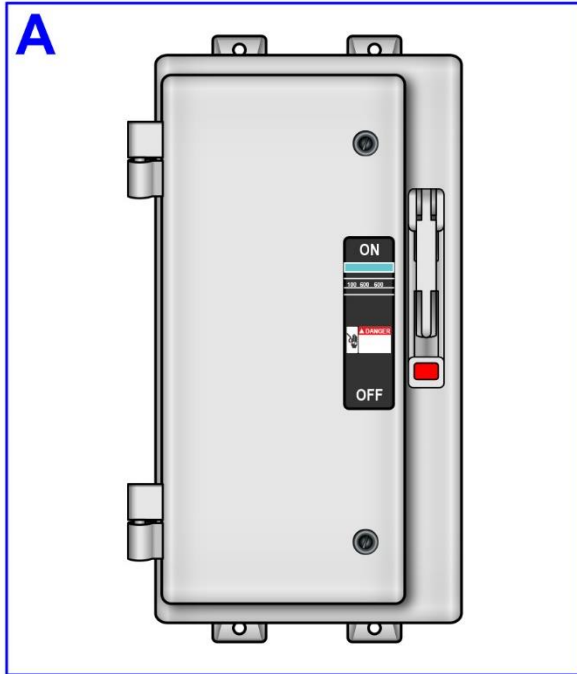
Dual Voltage Nine Lead Wye Connected Motor



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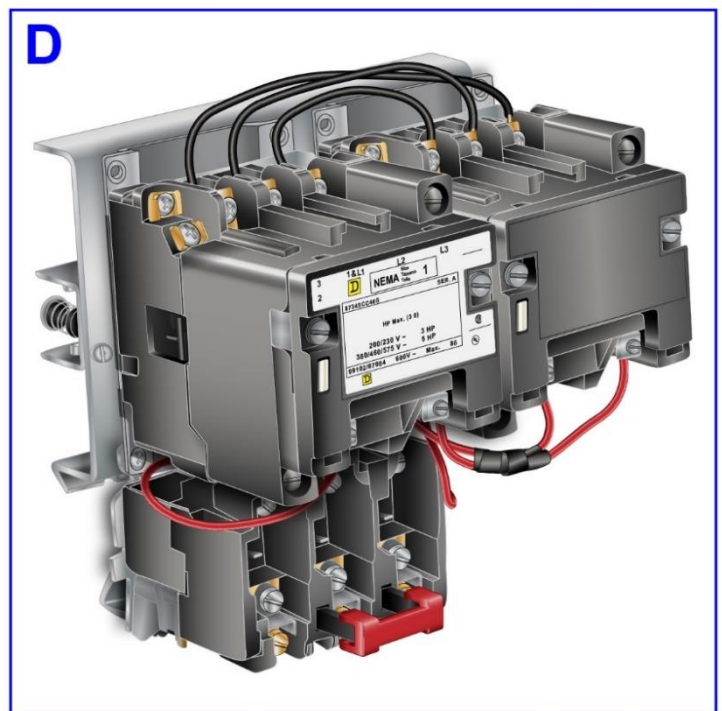
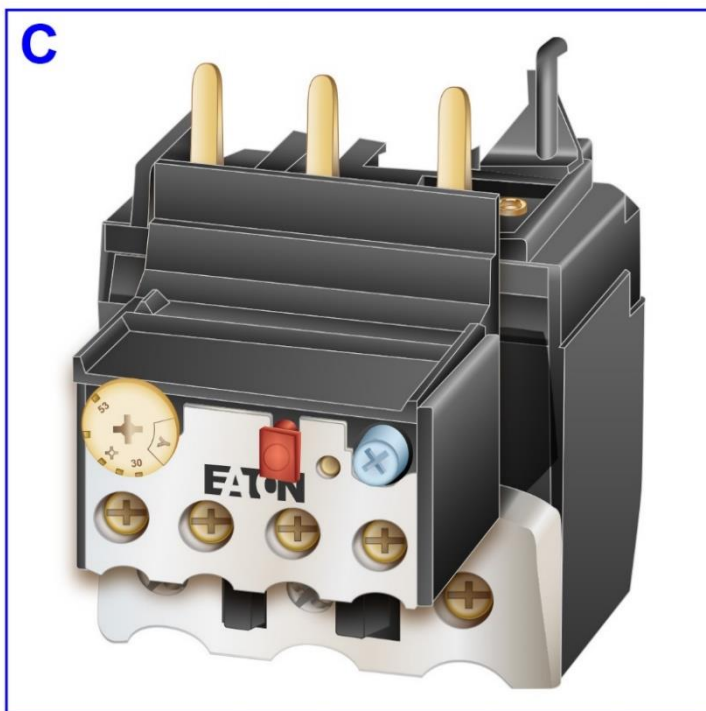
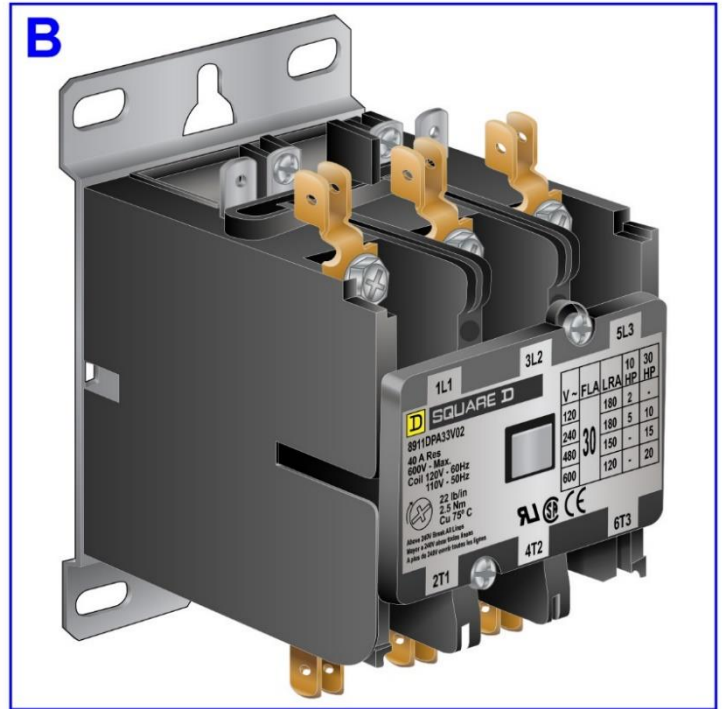
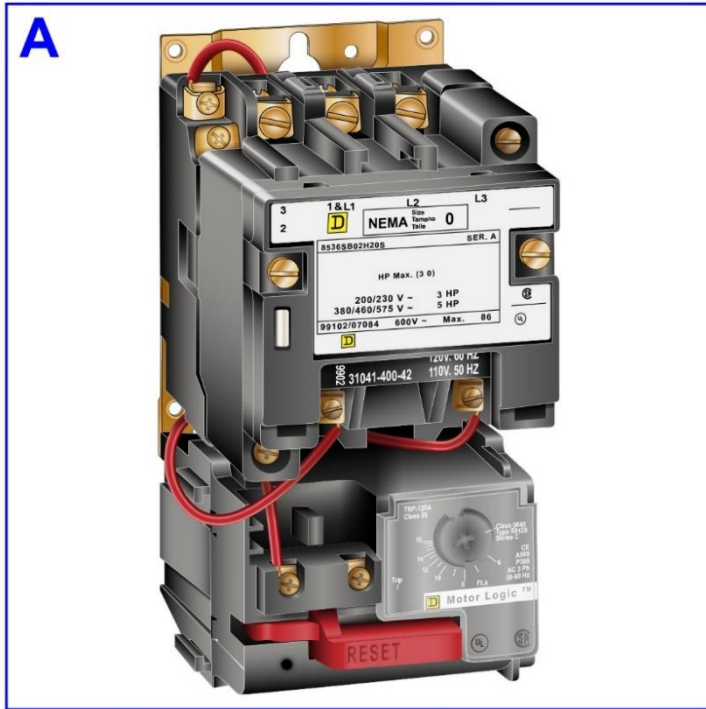
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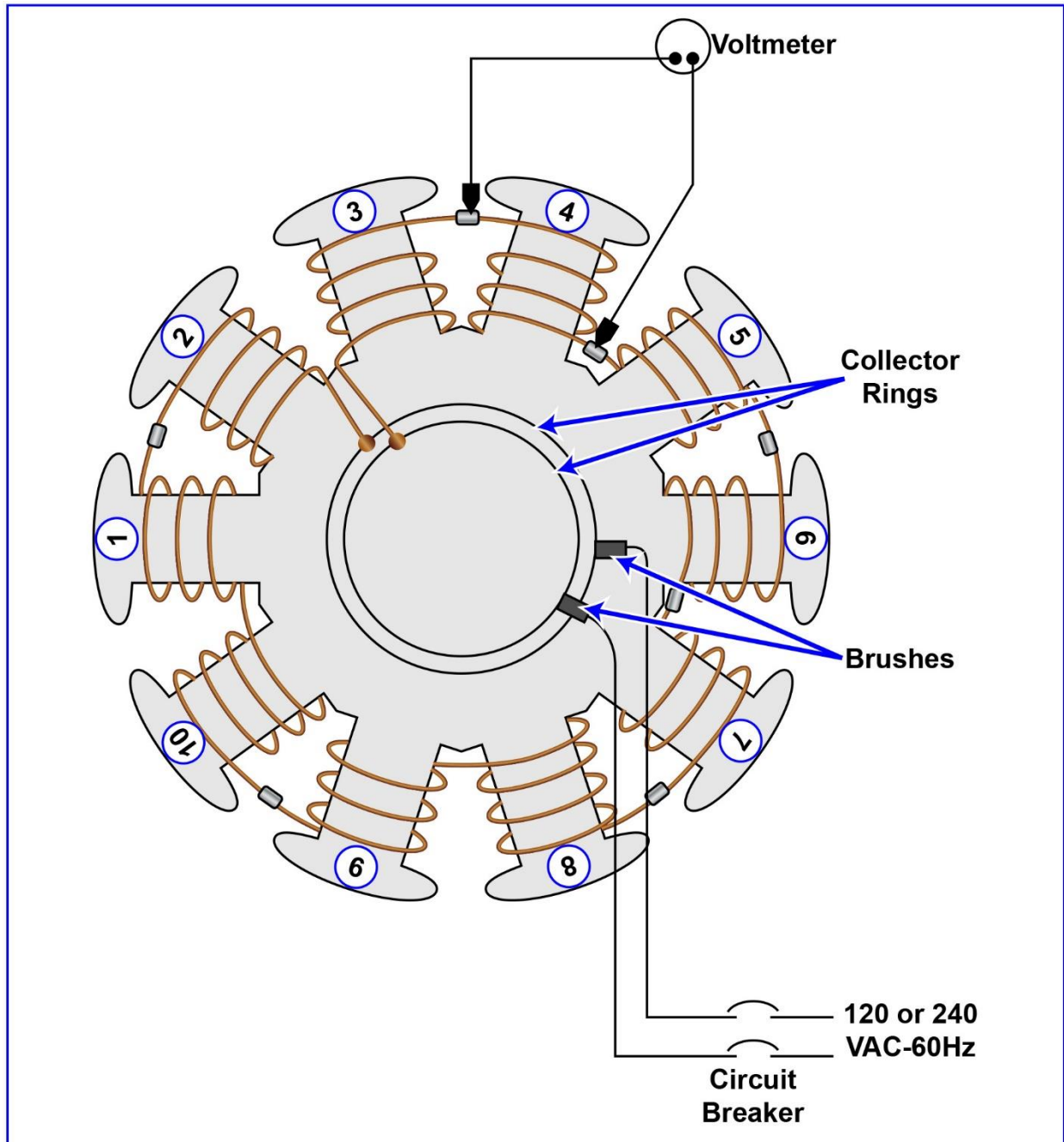
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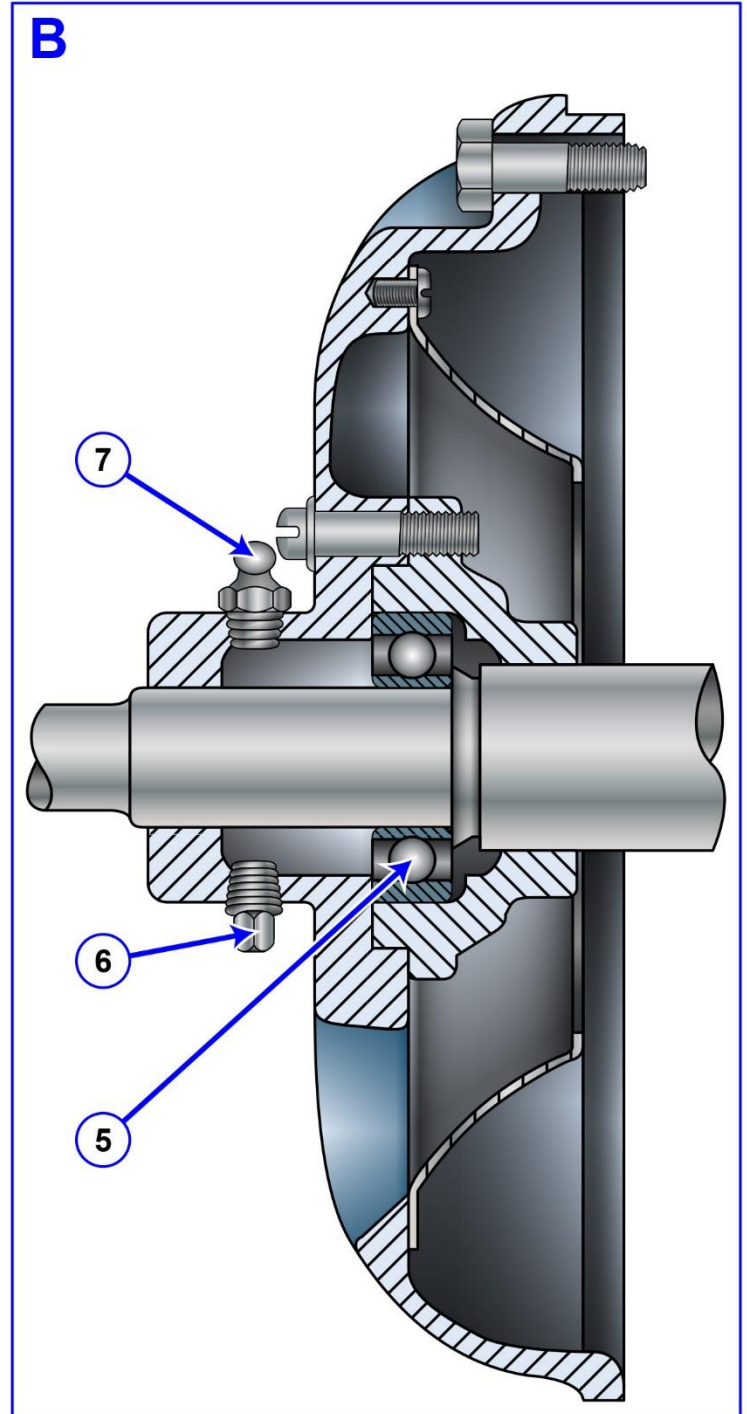
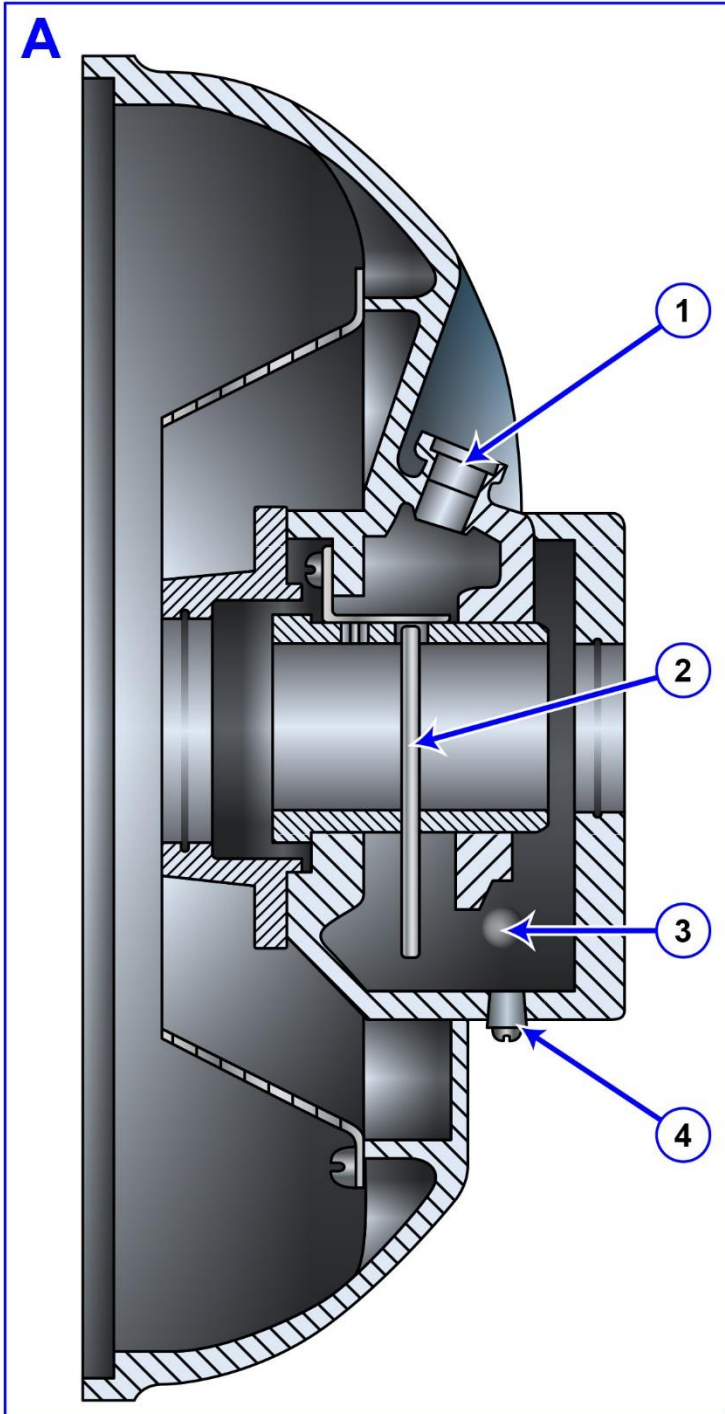
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