

U.S.C.G. Merchant Marine Exam

OSV-Assistant Engineer

Q654 Electrical-Electronics-Control Engineering

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions

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

If choice B is selected set score to 1.

2. Which of the following statements concerning analog and digital devices is correct?
- (A) There are no basic differences between the two systems.
 - (B) Analog devices are superior in accuracy compared to digital devices.
 - (C) Operations in a digital device are performed simultaneously.
 - (D) The variables in digital systems are fixed quantities, and the variables in analog systems are continuous quantities.

If choice D is selected set score to 1.

3. When a resistor is used as a shunt and is connected in parallel with a meter movement coil, what capability does this provide?
- (A) a measurement of circuit resistance
 - (B) an extended meter range
 - (C) an increased accuracy of approximately 1.5 percent
 - (D) this is never done

If choice B is selected set score to 1.

4. In general, what type of starter would be used to connect polyphase induction motors to full line voltage at the instant of start-up?
- (A) across-the-line starters
 - (B) compensator starters
 - (C) primary-resistor starters
 - (D) autotransformer starters

If choice A is selected set score to 1.

5. Which of the following activities occurs during the charging process of a lead-acid storage battery?

- (A) Hydrogen gas is absorbed.
- (B) The specific gravity of the acid increases.
- (C) Oxygen gas is absorbed.
- (D) Both plates change chemically to lead sulfate.

If choice B is selected set score to 1.

6. The individual 12 volt lead-acid batteries, when connected as shown in the illustration, as a battery bank would produce how many volts? Illustration EL-0070

- (A) 12 volts
- (B) 24 volts
- (C) 36 volts
- (D) 48 volts

If choice A is selected set score to 1.

7. How are operational amplifiers, used primarily in analog circuits, characterized?

- (A) low input impedance, low gain and high output impedance
- (B) high input impedance, high gain and high output impedance
- (C) low input impedance, high gain and low output impedance
- (D) high input impedance, high gain and low output impedance

If choice D is selected set score to 1.

8. If the voltage and the current developed in an AC circuit reach their peak values at the same time (with a phase angle difference of zero), what is the power factor considered to be?

- (A) lagging
- (B) infinity
- (C) leading
- (D) unity (1.0)

If choice D is selected set score to 1.

9. Referring to the illustration pertaining to a steering system hydraulic power unit motor controller, what statement is true concerning a response to a motor overload condition as visualized by the indicator lamps? Illustration EL-0119

- (A) Run indicator lamp is **ON**
Overload indicator lamp is **ON**
- (B) Run indicator lamp is **OFF**
Overload indicator lamp is **ON**
- (C) Run indicator lamp is **ON**
Overload indicator lamp is **OFF**
- (D) Run indicator lamp is **OFF**
Overload indicator lamp is **OFF**

If choice A is selected set score to 1.

10. 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) Temperature sensors inserted in the stator slots for measuring stator winding temperature.
- (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) Current transformers are the most reliable means of monitoring generator temperatures.

If choice A is selected set score to 1.

11. A salinity indicator system such as that used to measure the salt content of potable water systems and boiler feed and condensate systems uses what technology?

- (A) a salinity cell that senses the pH of water
- (B) a salinity cell that senses the brine density of water
- (C) a salinity cell that senses the electrical conductivity of water
- (D) a salinity cell that senses the optical refraction of water

If choice C is selected set score to 1.

12. Of the listed factors that influence the amount of RMS voltage induced in the windings of an AC generator operating at a constant 60 Hz frequency, which factor is variable during generator operation?

- (A) number of armature coil turns in series per winding
- (B) strength of the rotating magnetic field
- (C) rotational speed at which the magnetic field passes across the stator winding
- (D) number of field coil turns in series per winding

If choice B is selected set score to 1.

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

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

If choice B is selected set score to 1.

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

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

If choice C is selected set score to 1.

15. What practice could potentially damage a multimeter?

- (A) placing the test leads in series with the load of a circuit to measure current while in the voltmeter mode
- (B) placing the test leads across a voltage source to measure voltage while in the resistance mode
- (C) placing the test leads across a de-energized and isolated resistance to measure resistance while in the voltmeter mode
- (D) placing the test leads across a de-energized and isolated resistance to measure resistance while in the ammeter mode

If choice B is selected set score to 1.

16. Which statement is TRUE concerning electric propulsion drives?

- (A) The propeller speed and direction of rotation are easily controllable.
- (B) Lower transmission losses compared to other types of propulsion drives.
- (C) Inability to be utilized as a source of ships service power.
- (D) Lack of flexibility of arrangement between the prime mover and motor.

If choice A is selected set score to 1.

- 17.** 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

If choice C is selected set score to 1.

- 18.** After prior isolation and lock-out/tag-out procedures are performed, which electrical device requires discharging any stored electrical energy before any work may safely begin?
- (A) potential transformer
 - (B) capacitor
 - (C) resistor bank
 - (D) choke coil

If choice B is selected set score to 1.

- 19.** Which of the following statements correctly applies to bipolar junction transistors?
- (A) The emitter separates the base and collector.
 - (B) The three terminals are called the emitter, base, and collector.
 - (C) The collector separates the emitter and base.
 - (D) LED and LCD are the two basic types of transistors.

If choice B is selected set score to 1.

- 20.** What is a purpose of the automatic bus transfer device shown in the illustration? Illustration EL-0014
- (A) Provide power to the 450 VAC main bus from the 450 VAC emergency bus in the emergency mode.
 - (B) Provide power to the 450 VAC emergency bus from the 450 VAC main bus in the emergency mode.
 - (C) Provide power to the 450 VAC emergency bus from the emergency generator in the emergency mode.
 - (D) Provide power to the 450 VAC main bus from the emergency generator in the emergency mode.

If choice C is selected set score to 1.

21. Referring to the illustration what is the position of the three circuit breakers labeled in figure "A", "B", and "C" respectively? Illustration EL-0033

- (A) Circuit breaker in figure "A" is in the **OFF** position. Circuit breaker in figure "B" is in the **TRIPPED** position. Circuit breaker in figure "C" is in the **ON** position.
- (B) Circuit breaker in figure "A" is in the **ON** position. Circuit breaker in figure "B" is in the **TRIPPED** position. Circuit breaker in figure "C" is in the **OFF** position.
- (C)
Circuit breaker in figure "A" is in the **ON** position. Circuit breaker in figure "B" is in the **OFF** position. Circuit breaker in figure "C" is in the **TRIPPED** position.
- (D) Circuit breaker in figure "A" is in the **OFF** position. Circuit breaker in figure "B" is in the **ON** position. Circuit breaker in figure "C" is in the **TRIPPED** position.

If choice D is selected set score to 1.

22. Which of the conditions listed will indicate the need to clean the insulation on the windings of an electric motor?

- (A) Excessive vibration at normal speed.
- (B) Sparking at the brushes.
- (C) Higher than normal operating temperature.
- (D) High megger readings.

If choice C is selected set score to 1.

23. 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 periods of vibration
- (B) extended operation at normal loads
- (C) extended periods of operation at low ambient temperature
- (D) extended periods of operation at low load

If choice A is selected set score to 1.

24. The transformer diagram shown in figure "B" of the illustration represents what type of transformer? Illustration EL-0082

- (A) open delta transformer
- (B) step-down transformer with dual voltage secondary
- (C) Scott-connected transformer
- (D) autotransformer

If choice B is selected set score to 1.

25. The multiplier prefix "giga" (G) such as used in "gigabytes" represents what multiplication factor?

- (A) thousand (10 to the 3rd power)
- (B) million (10 to the 6th power)
- (C) billion (10 to the 9th power)
- (D) trillion (10 to the 12th power)

If choice C is selected set score to 1.

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

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

If choice C is selected set score to 1.

27. Referring to the containership one-line distribution diagram shown in the illustration, what is the purpose of the transformers providing power to the refrigerated container feeder bus? Illustration EL-0014

- (A) Prevent any unintentional grounds in the main distribution system from affecting the refrigerated container distribution system.
- (B) Step up the voltage from the main bus to the voltage required for the refrigerated container feeder bus.
- (C) Step down the voltage from the main bus to the voltage required for the refrigerated container feeder bus.
- (D) Prevent any unintentional grounds in the refrigerated container distribution system from affecting the main distribution system.

If choice D is selected set score to 1.

28. The propulsion motor most often utilized in an AC drive system operating in the moderate to high power range is of what type?

- (A) wound rotor induction type
- (B) squirrel-cage induction type
- (C) synchronous type with wound field
- (D) split-phase induction type

If choice C is selected set score to 1.

29. What equipment for modern SCR rectified DC propulsion drive systems is usually included in the package?

- (A) propulsion generators which produce DC power that is converted to AC power for the propulsion motor
- (B) propulsion generators which produce AC power that is converted to DC power for the shunt-wound DC propulsion motor
- (C) propulsion generators which produce AC power that is directly delivered to the synchronous AC propulsion motor
- (D) propulsion generators which produce DC power that is directly delivered to the series-wound DC propulsion motor

If choice B is selected set score to 1.

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

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

If choice C is selected set score to 1.

31. Occasionally a synchronous motor is configured without an external shaft to drive a load. In this case, the sole purpose of the synchronous motor is improving overall power factor of an electrical distribution system. What is the name of the synchronous motor so constructed?

- (A) Synchronous compensator
- (B) Motor-generator
- (C) Synchronous converter
- (D) Synchronous condenser

If choice D is selected set score to 1.

32. A signal derived from an amplifier output and returned to the amplifier input is called what type of signal?

- (A) monitoring signal
- (B) feedback signal
- (C) reverse signal
- (D) inverse signal

If choice B is selected set score to 1.

33. What is the name of the part of the shipboard electrical system used to control the distribution of power to the branch circuits?

- (A) disconnect links
- (B) main switchboard
- (C) governor relay box
- (D) bridge control panel

If choice B is selected set score to 1.

34. As shown in the illustration, what is responsible for maintaining the "UV" relay energized when the master switch handle is moved away from the "off" position? Illustration EL-0102

- (A) normally open "UV" contacts
- (B) "MS 2" contacts
- (C) "MS 1" contacts
- (D) normally closed "OL" contacts

If choice A is selected set score to 1.

35. As shown in the illustration, how are the rotor windings of the motor configured? Illustration EL-0102

- (A) wye
- (B) delta
- (C) series-parallel
- (D) open delta

If choice A is selected set score to 1.

36. Which of the illustrated motors has an open, drip-proof (ODP) motor enclosure? Illustration EL-0001

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

If choice C is selected set score to 1.

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

If choice C is selected set score to 1.

38. What is the best method of determining the state of charge of a lead-acid storage battery?

- (A) ampere-hour capacity of the battery
- (B) total cell voltages
- (C) testing of the individual cell voltages
- (D) specific gravity of the electrolyte

If choice D is selected set score to 1.

39. Which of the pictured motors within the split-phase family of single-phase induction motors represents a split-phase, resistive start, induction run motor? Illustration EL-0146

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

If choice C is selected set score to 1.

40. If a digital multimeter set up to measure AC volts reads slightly above "zero" when its leads are disconnected, what is this a result of?

- (A) capacitors inside the meter storing charges
- (B) "ghost" voltages due to electromagnetic energy in the air
- (C) definite miscalibration of the meter
- (D) a poor ground for the meter case

If choice B is selected set score to 1.

41. As shown in figure "A" of the illustration, the actual rudder angle repeat back signal originates at what device and is delivered to what other device? Illustration EL-0097

- (A) originates at the amplifier and delivered to the control potentiometer
- (B) originates at the power unit and delivered to the amplifier
- (C) originates at the power unit and delivered to the control potentiometer
- (D) originates at the amplifier and delivered to the power unit

If choice B is selected set score to 1.

42. To keep emergency lead-acid batteries in a full state of charge for emergency use, what is normally done?

- (A) Batteries are kept charged by performing an equalizing charge daily.
- (B) Batteries are kept charged by maintaining a continuous trickle charge.
- (C) Batteries are kept charged by maintaining the maximum charging rate.
- (D) Batteries are kept charged by cycling through discharge and charge cycles daily.

If choice B is selected set score to 1.

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

If choice C is selected set score to 1.

44. As shown in the illustrated wound-rotor induction motor, what statement is true concerning motor lead connections? Illustration EL-0148

- (A) The "M1, M2, and M3" motor leads are directly connected to the rotor windings and the "T1, T2, and T3" motor leads are connected to the stator windings via slip rings and brushes.
- (B) The "T1, T2, and T3" motor leads are connected to the rotor windings via slip rings and brushes and the "M1, M2, and M3" motor leads are directly connected to the stator windings.
- (C) The "M1, M2, and M3" motor leads are connected to the rotor windings via slip rings and brushes and the "T1, T2, and T3" motor leads are directly connected to the stator windings.
- (D) The "T1, T2, and T3" motor leads are directly connected to the rotor windings and the "M1, M2, and M3" motor leads are connected to the stator windings via slip rings and brushes.

If choice C is selected set score to 1.

45. If the cooling water system is isolated for repairs, but it is still desirable to run the alternator pictured in figure "A" of the illustration, what must be done? Illustration EL-0037

- (A) The emergency air inlet panel and air outlet doors must remain closed, which requires the alternator to be run only at reduced loads.
- (B) The emergency air inlet panel and air outlet doors must be opened and only then can the alternator be run, but at reduced load.
- (C) The alternator may not be run without cooling water under any circumstances.
- (D) The emergency air inlet panel and air outlet doors must be opened, but in doing so allows the alternator to be run at rated load.

If choice B is selected set score to 1.

46. In which of the situations listed will a megohmmeter give the most accurate readings?

- (A) While the machine is in operation.
- (B) Immediately prior to restarting the machine.
- (C) While the machine is discharging static electricity.
- (D) When the machine has been shut down and grounded for a period of 15 minutes.

If choice D is selected set score to 1.

47. When you are making a high potential test (megger) on the motor coils of repaired electrical machinery to ground, what would a low resistance reading indicate?

- (A) a high slot discharge factor
- (B) bad insulation
- (C) high insulation power factor
- (D) good insulation

If choice B is selected set score to 1.

48. If the supply voltage is 220 volts 60 Hz, what is the operating voltage of the motor controller control circuit illustrated in figure "A" of the illustration? Illustration EL-0011

- (A) 110 volts DC
- (B) 110 volts AC
- (C) 220 volts DC
- (D) 220 volts AC

If choice D is selected set score to 1.

49. When paralleling two alternators the synchronizing lamps grow dim and are totally darkened as the synchroscope pointer approaches the 0° position. What does this indicate?

- (A) the alternator voltages are 180° apart
- (B) the incoming alternator is in synchronism with the bus
- (C) the incoming alternator is running too fast
- (D) the synchroscope pointer is defective or broken

If choice B is selected set score to 1.

50. By what common means is the speed of the AC propulsion motor on a diesel-electric propulsion ship controlled?

- (A) by decreasing the motor voltage
- (B) by varying the input frequency of the voltage to the motor
- (C) by increasing the current to the motor
- (D) by increasing the motor voltage

If choice B is selected set score to 1.

51. For the purpose of calculating apparent power, which of the following procedures should be used to determine the total load current of a three-phase, delta wound, and AC generator?

- (A) Divide the total amperage in all phases by three.
- (B) Divide the total amperage in all phases by the square root of three.
- (C) Multiply the amperage in one phase by the square root of three.
- (D) Multiply the amperage in one phase by three.

If choice C is selected set score to 1.

52. Referring to figure "1" of the illustration, what type of logic gate is symbolized? Illustration EL-0035

- (A) NOR gate
- (B) XOR gate
- (C) AND gate
- (D) OR gate

If choice D is selected set score to 1.

53. What will be the impact of reduced voltage applied to a motor during the starting period?

- (A) increase the starting current and decrease the acceleration time
- (B) decrease the starting current and decrease the acceleration time
- (C) increase the starting current and increase the acceleration time
- (D) decrease the starting current and increase the acceleration time

If choice D is selected set score to 1.

54. Which of the pictured solid state semiconductor devices is a light-emitting diode? Illustration EL-0068

- (A) 1
- (B) 2
- (C) 4
- (D) 7

If choice D is selected set score to 1.

55. Assuming that the 3-phase power source has a phase sequence of A-B-C and that the motor is connected as shown in figure "A", if the motor has a clockwise (CW) rotation, what statement is true concerning the motors connected as shown in the other figures? Illustration EL-0156

- (A) Motors "B", "C", and "D" would all have a clockwise (CW) rotation.
- (B) Motors "B", "C", and "D" would all have a counter-clockwise (CCW) rotation.
- (C) Motors "B" and "D" would have a clockwise (CW) rotation and motor "C" would have a counter-clockwise (CCW) rotation.
- (D) Motors "B" and "D" would have a counter-clockwise (CCW) rotation and motor "C" would have a clockwise (CW) rotation.

If choice D is selected set score to 1.

56. Before working on an electric cargo winch master switch or controller, what should be done?

- (A) heat the switch box to remove any moisture
- (B) open the circuit breaker in the power supply and tag-out
- (C) drain condensate from the box
- (D) spray the gasket surface with a solvent

If choice B is selected set score to 1.

57. 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) Increase the cooling water flow, while maintaining air temperatures below the dew point for increased cooling effect.
- (B) While maintaining the rated system voltage, lower the operating frequency to at least 5% below the rated system frequency.
- (C) While maintaining the rated system frequency, lower the operating voltage to at least 5% below the rated system voltage.
- (D) Increase the cooling water flow, while maintaining air temperatures above the dew point to avoid any condensation.

If choice D is selected set score to 1.

58. With all other factors considered equal (such as voltage, conducting path through the body and the duration of contact), contact with an energized electrical system conductor of which system type would produce the most damaging effect?

- (A) DC systems
- (B) 60 Hz AC systems
- (C) 10 kHz AC systems
- (D) All the above systems would be equally as damaging

If choice B is selected set score to 1.

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

- (A) Sustained current draw of 450 amperes for 2 hours.
- (B) Sustained current draw of 500 amperes for 10 minutes.
- (C) Momentary current draw of 1000 amperes for 3 seconds.
- (D) Instantaneous current draw of 5,000 amperes.

If choice D is selected set score to 1.

60. How are fuses usually rated?

- (A) watts only
- (B) amps only
- (C) volts and amps only
- (D) volts, amps, and interrupting capacity

If choice D is selected set score to 1.

61. As shown in the illustrated plots of uncorrected and temperature corrected insulation resistance readings for a particular piece of equipment, at what point in time should the equipment have been refurbished or replaced? Illustration EL-0120

- (A) 2006
- (B) 2008
- (C) 2010
- (D) no refurbishment or replacement was necessary through 2011

If choice D is selected set score to 1.

62. How can the direction of rotation of a DC motor be reversed?

- (A) wiring the field and armature in series
- (B) reversing the field or armature connections
- (C) reversing both the field and the armature connections
- (D) wiring the field and armature in parallel

If choice B is selected set score to 1.

63. What is the functional name of an electrical device which prevents simultaneous energizing of loads thereby preventing damage or injury?

- (A) monitoring device
- (B) electrical interlock device
- (C) modulating device
- (D) mechanical limit device

If choice B is selected set score to 1.

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

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

If choice A is selected set score to 1.

65. What is the approximate discharge voltage produced by one cell of a wet type nickel-cadmium battery at 75% of charge?

- (A) 1.2 volts
- (B) 1.5 volts
- (C) 2.2 volts
- (D) 6.0 volts

If choice A is selected set score to 1.

66. Which of the methods listed below is used to provide the rotational torque to cause an AC generator to turn?

- (A) Residual magnetism remaining in the field.
- (B) Starting of the prime mover.
- (C) Providing current to the field from an external source.
- (D) Residual magnetism remaining in the armature.

If choice B is selected set score to 1.

67. As shown in figure "A" of the illustration, with the switch closed what statement is true if " R_1 " and " R_2 " have unequal resistance values? Illustration EL-0019

- (A) The energy dissipated in " R_1 " will be the same as the energy dissipated in " R_2 ".
- (B) The voltage drop across " R_1 " will not be equal to the voltage drop across " R_2 ".
- (C) The current flow through " R_1 " will equal the current flow through " R_2 ".
- (D) The current flow through " R_1 " will differ from the current flow through " R_2 ".

If choice D is selected set score to 1.

68. To properly use a clamp-on-type ammeter to check current flow, what must be done FIRST?

- (A) de-energize the circuit to allow connection of the instrument in series
- (B) short the test leads and calibrate the instrument to zero
- (C) connect the voltage test leads to the appropriate terminals
- (D) hook the jaws of the instrument around the insulated single conductor

If choice D is selected set score to 1.

69. In order to properly set up programmable motor protection, it is necessary to know the locked-rotor current of a motor. Given the chart of code letters for locked-rotor kVA/HP and the necessary instructions shown in the illustration, calculate the estimated locked-rotor current for the motor represented by the illustrated motor nameplate using a mid-range value for the code letter, assuming the motor is to run at 440 VAC. Illustration EL-0175

- (A) 34.7 amps
- (B) 43.7 amps
- (C) 60 amps
- (D) 75.6 amps

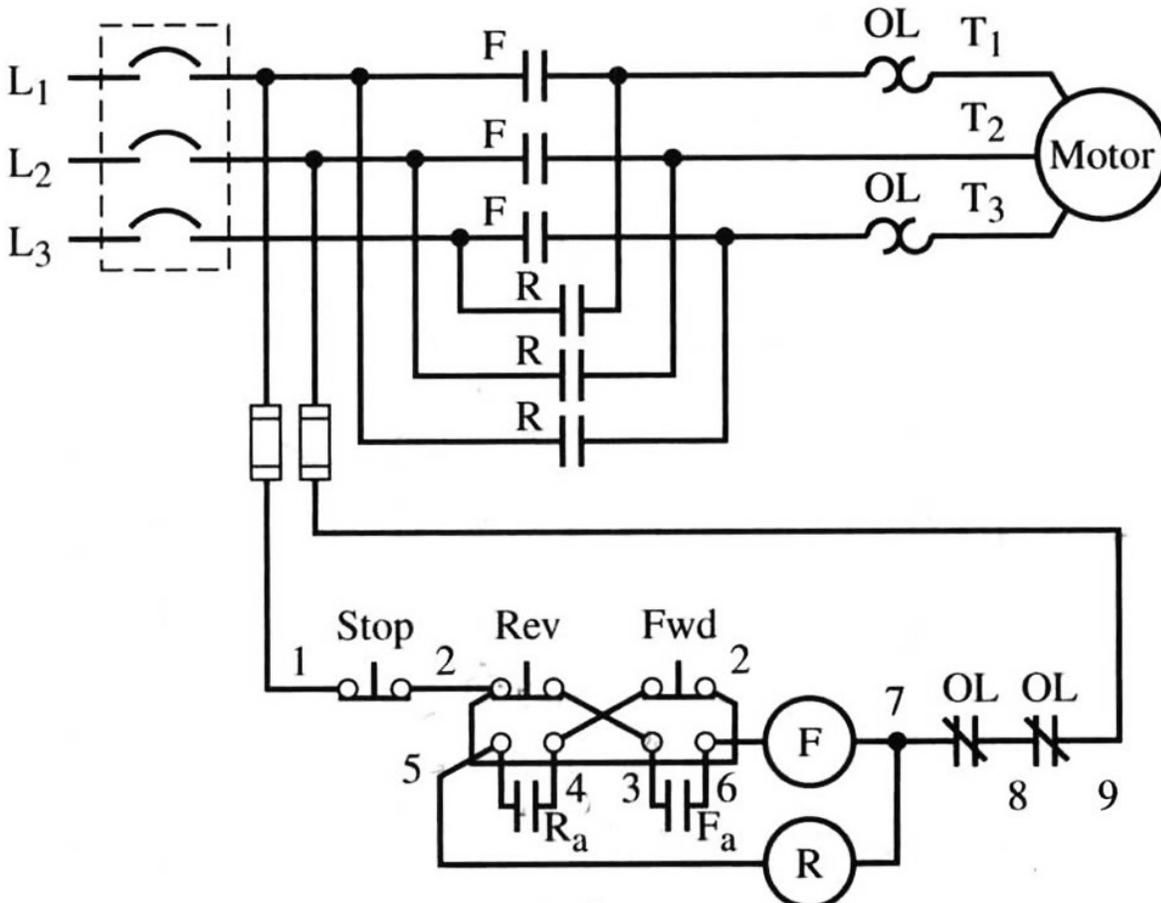
If choice B is selected set score to 1.

70. What is the primary means by which an electrical maintenance worker is protected from electrical hazards while performing work on an electrical circuit?

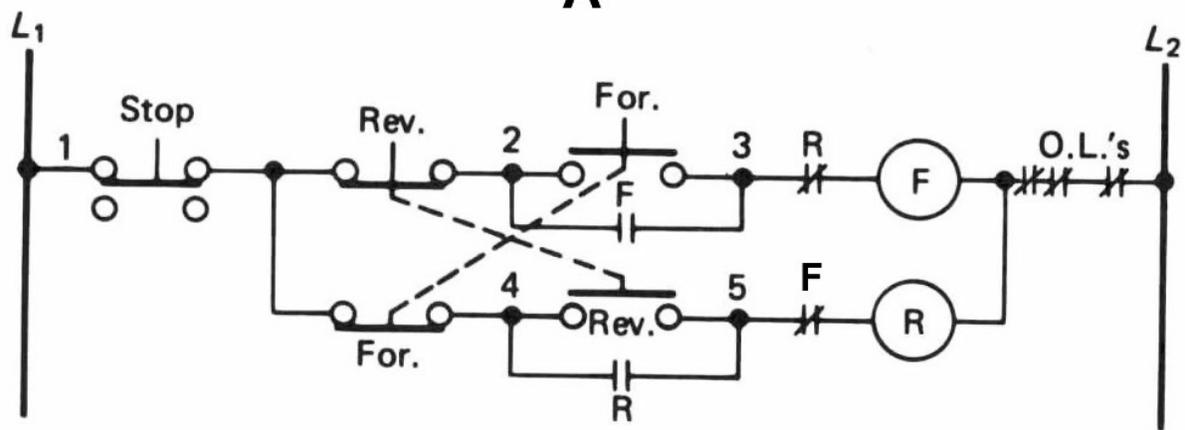
- (A) shutting down the necessary equipment
- (B) using the appropriate personal protective equipment
- (C) posting of safety warning signs
- (D) performing a lock-out/tag-out procedure

If choice D is selected set score to 1.

EL-0011



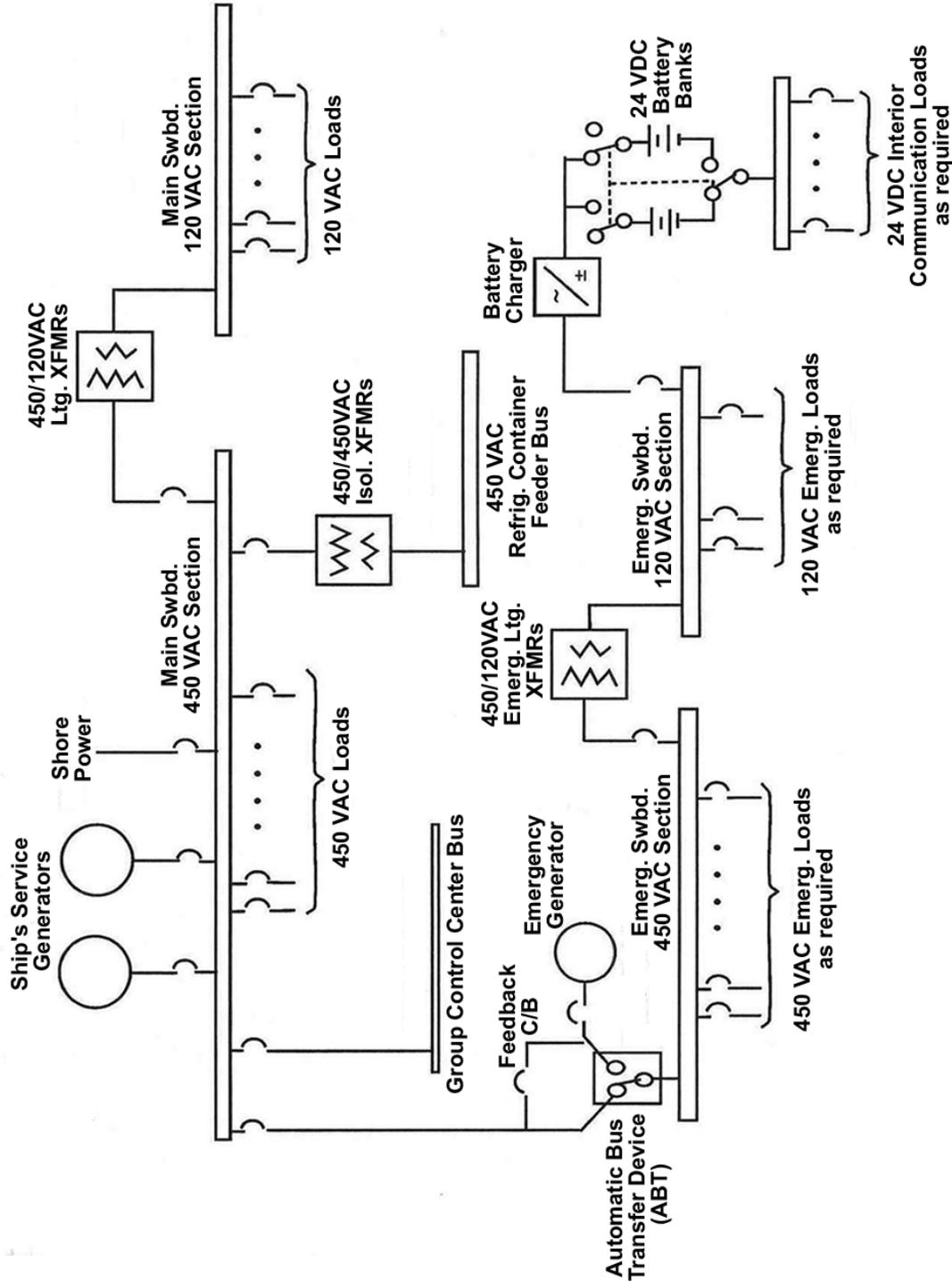
A



B

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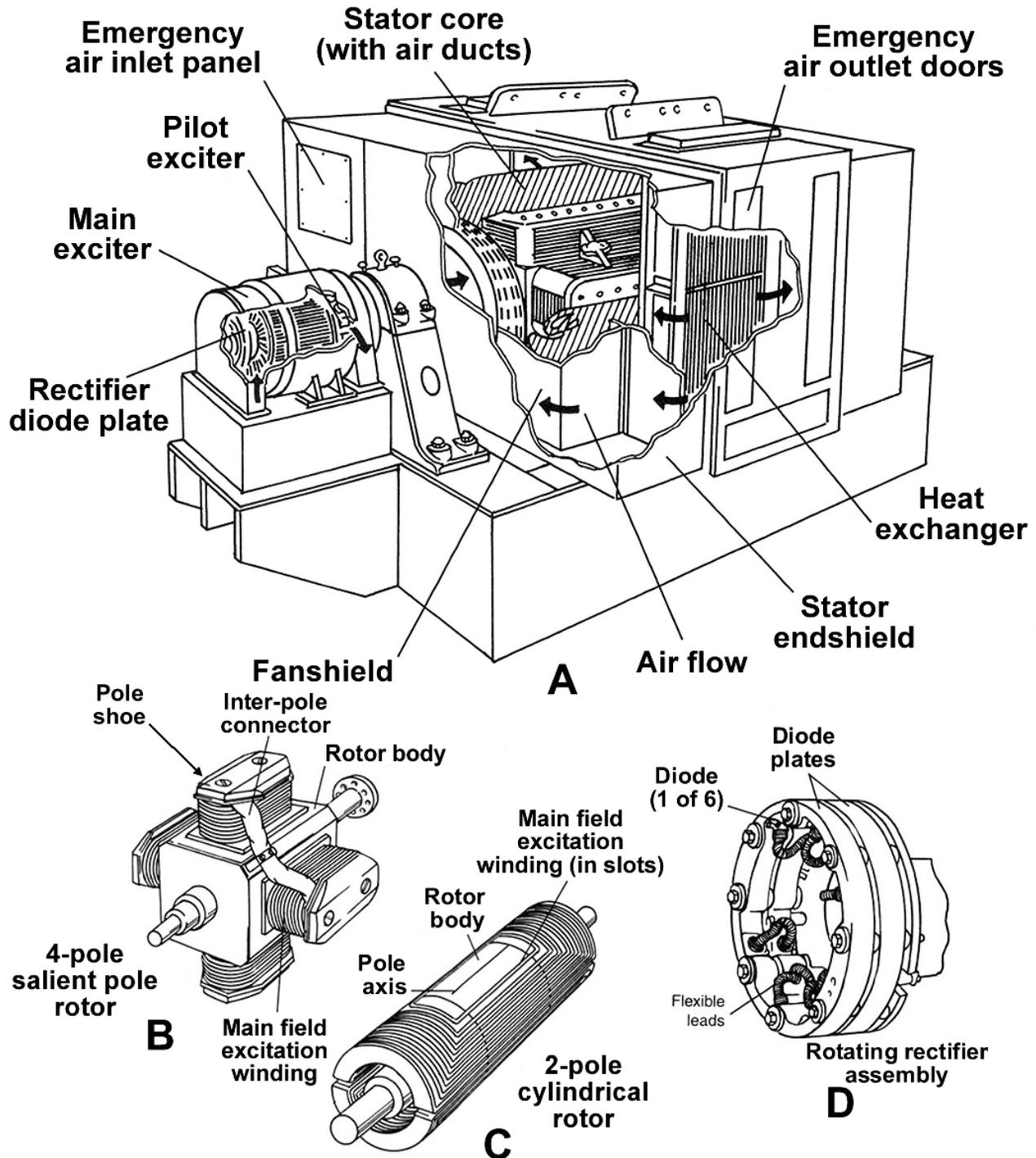
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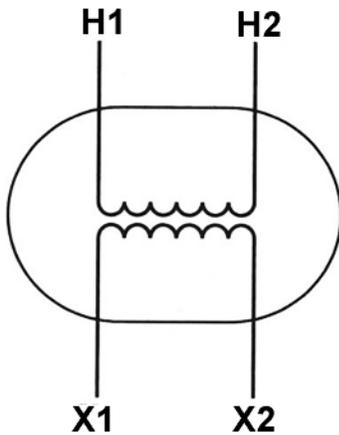
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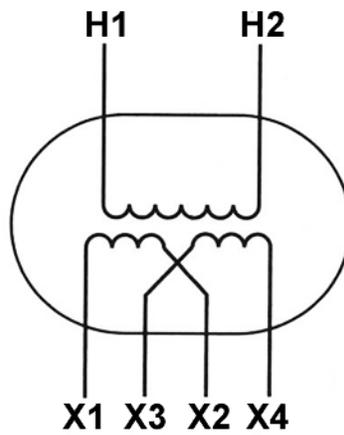


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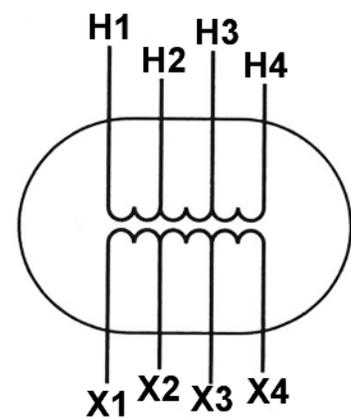
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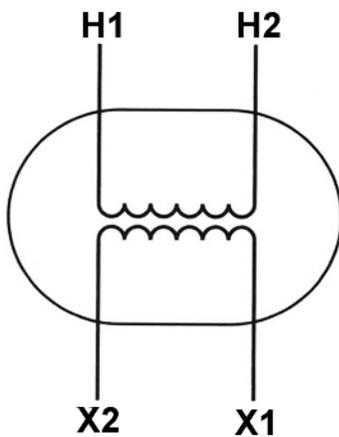
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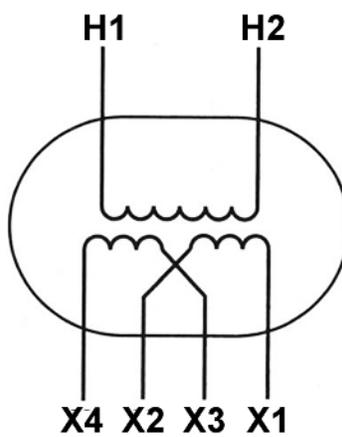
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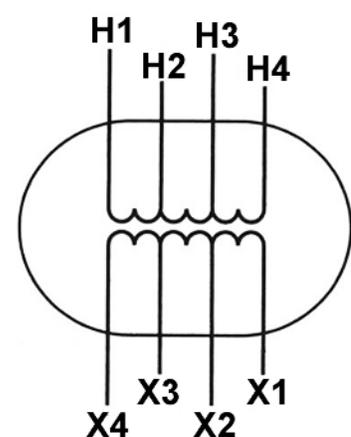
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D



E

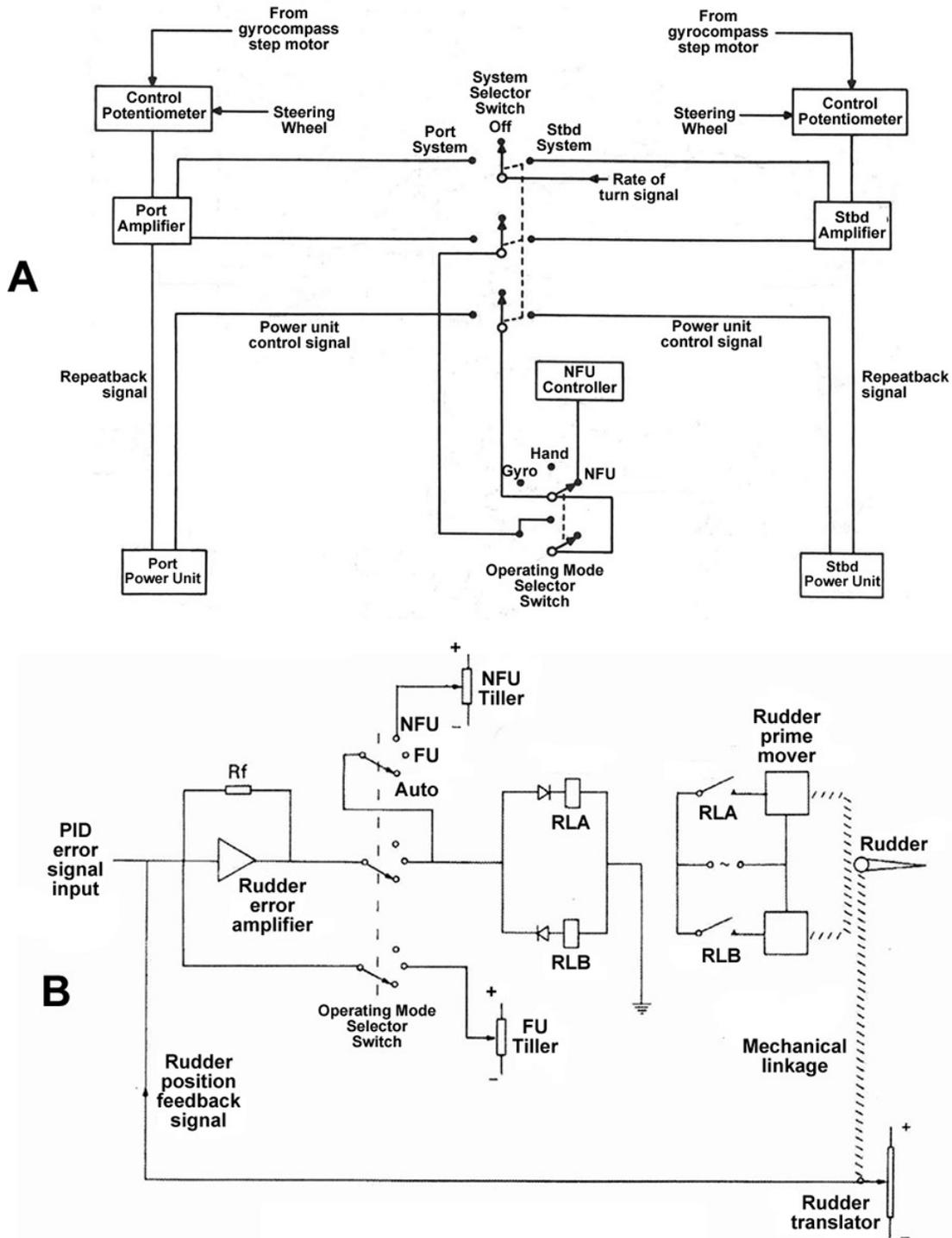


F

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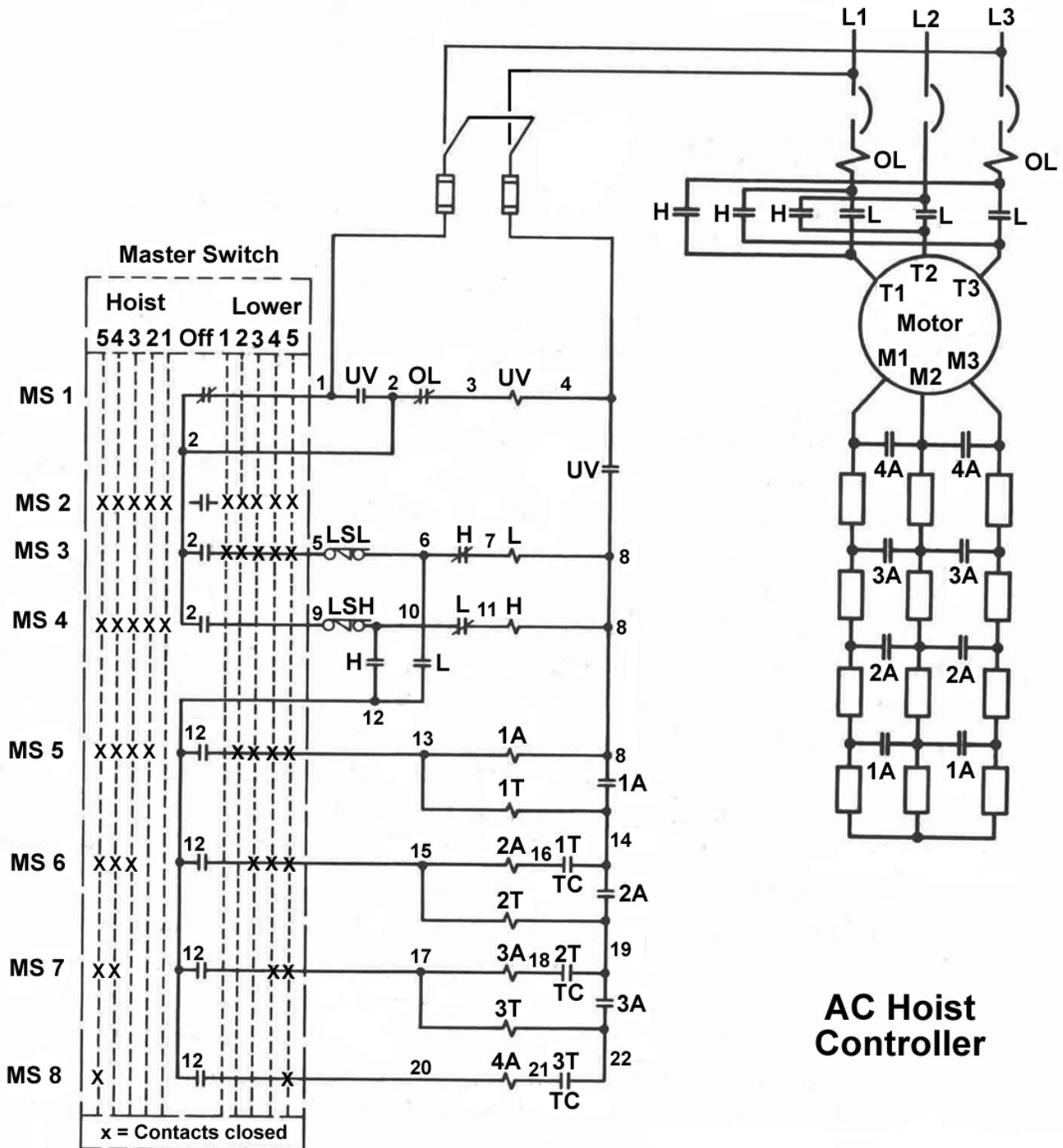
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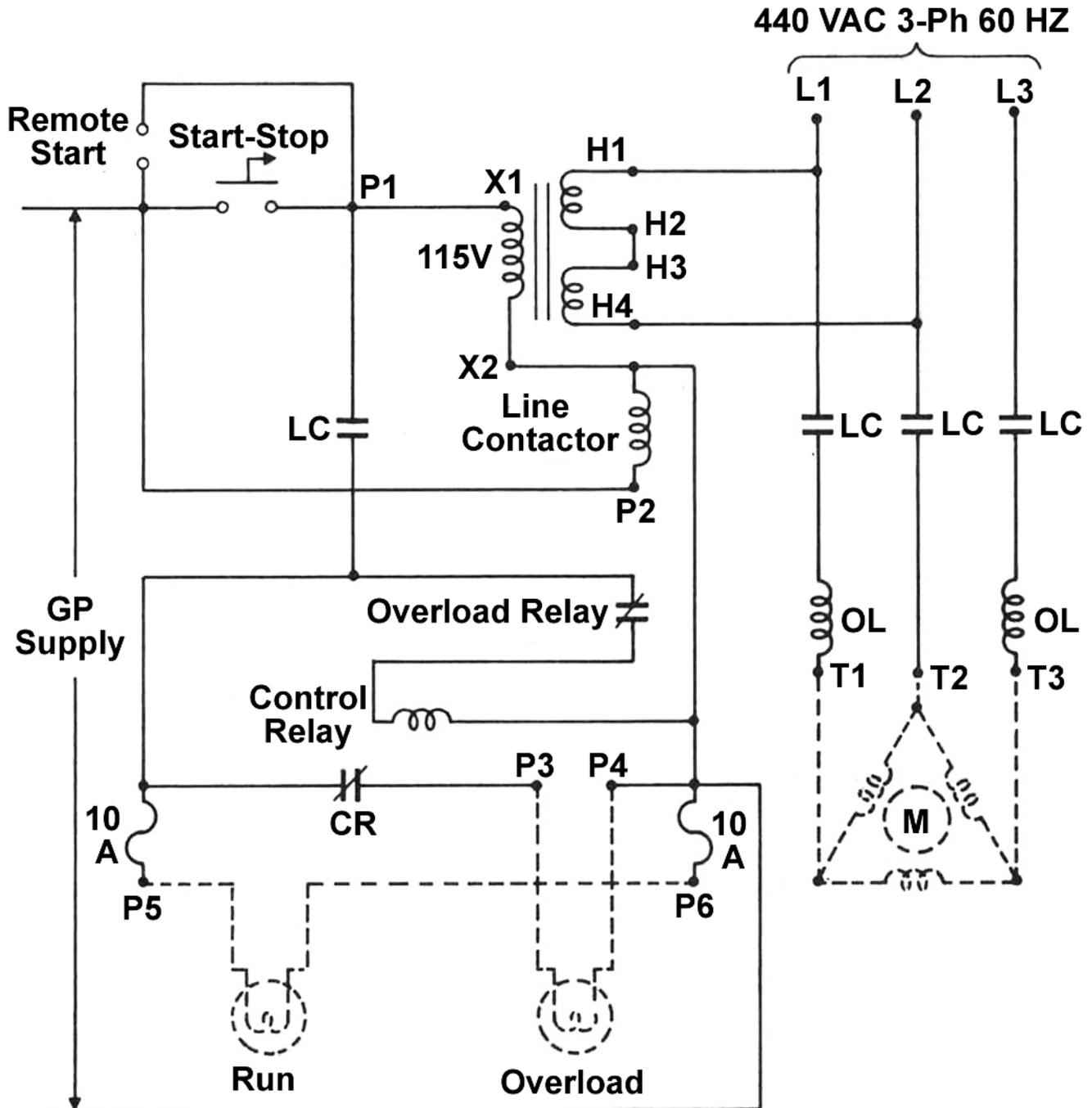
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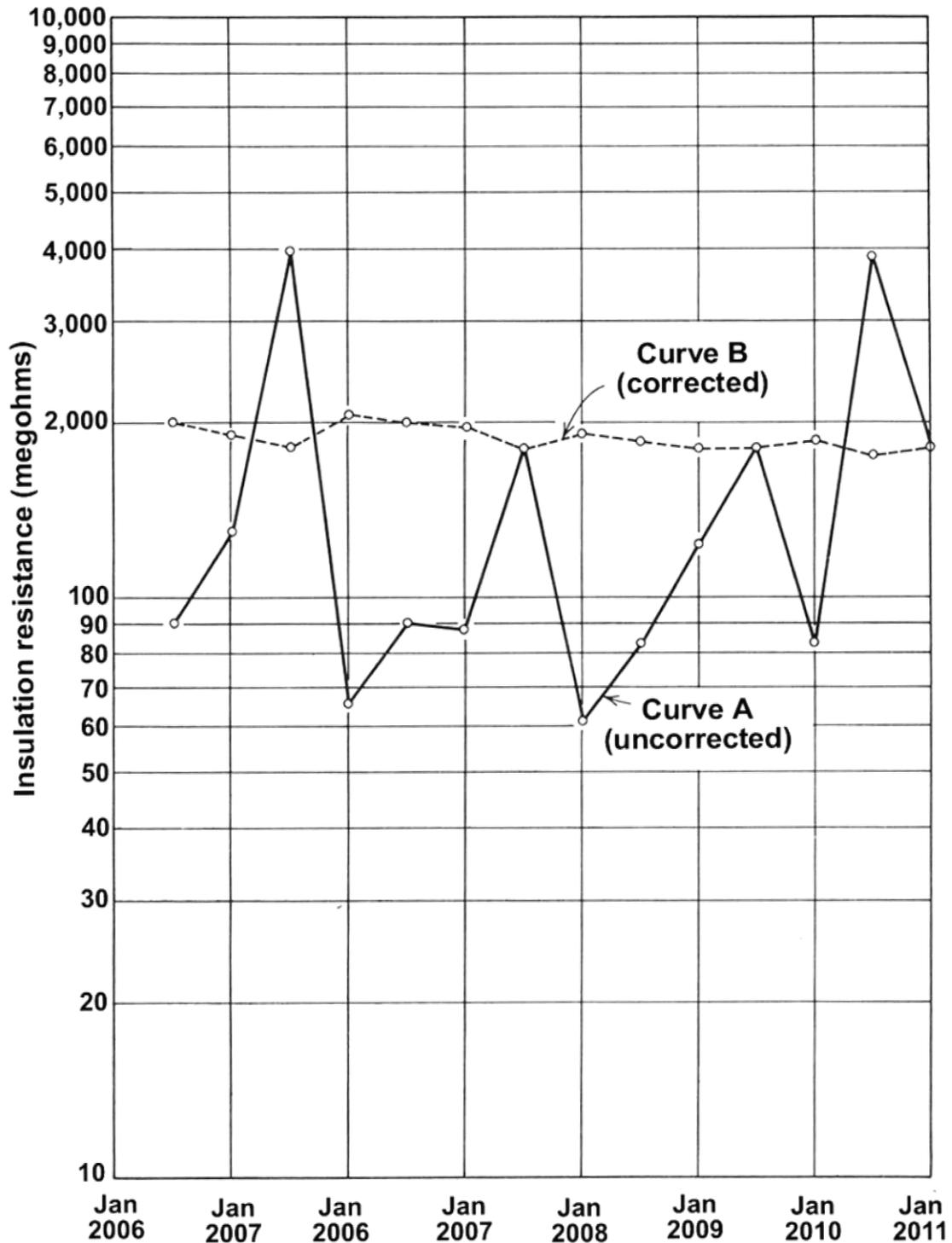
EL-0119



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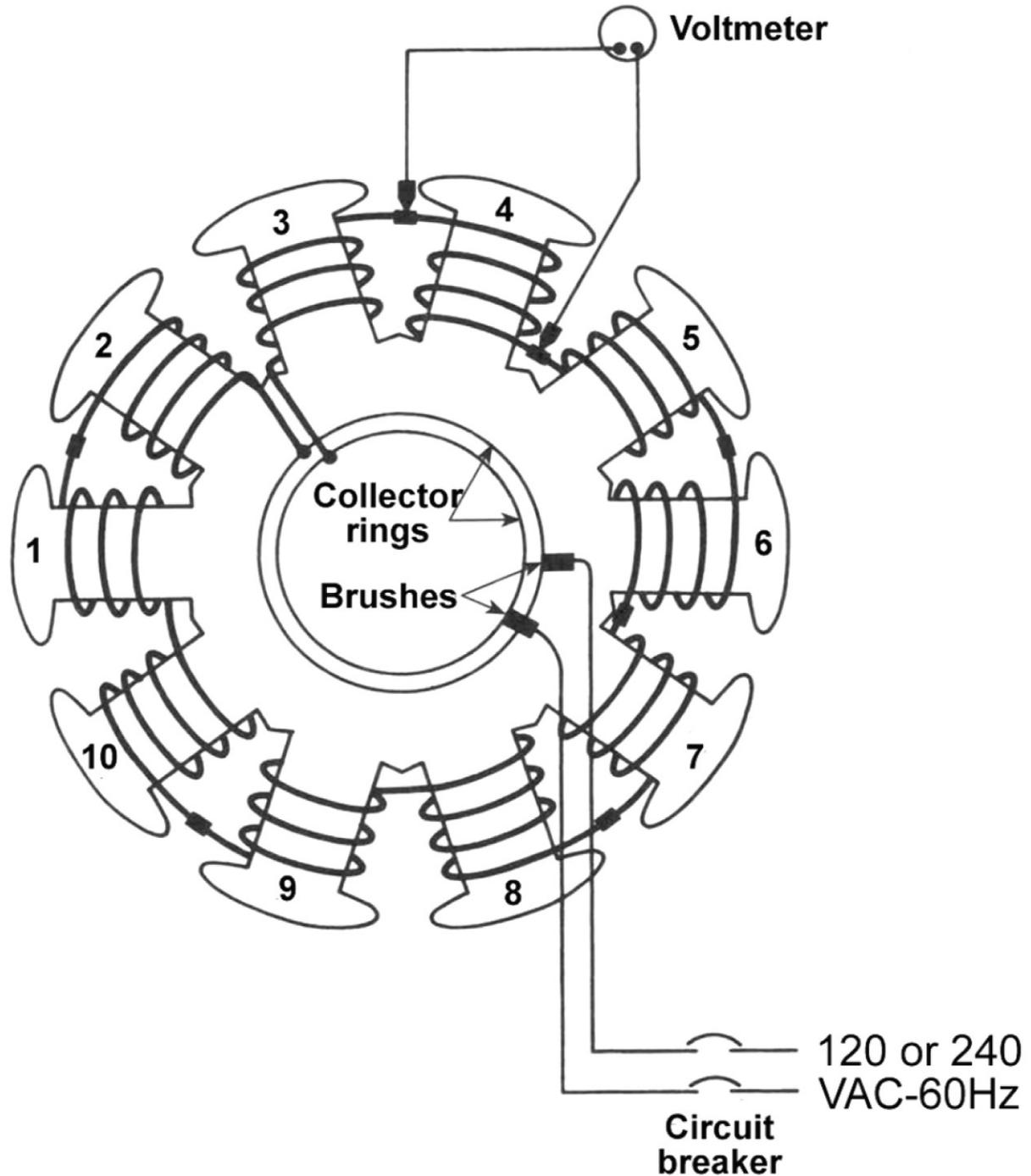
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