Understanding Electrical Diagrams

RV 01.20.2022

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4. Begin viewing the web pages. Refer to your printed test to find the correct answers. The questions track the web pages.

5. As you find the answers, circle them on your printed copy.

6. At the end of each section, you'll enter the quiz which is the same as your printed test. Refer to your circled answers when actually answering the quiz on the web.

7. Upon passing, you will proceed to the next section. If you failed to pass, you will be moved back to the beginning of that section for more review.

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Quiz 1

1. Which of the following is NOT part of the basic circuit?
- Load
- Source of power
- Conductors
- Fuse
- Switch

2. Which of the following is NOT a type of electrical wiring diagram?
- A. Stick
- B. Line
- C. Pictorial
- D. Schematic
- E. Only A and D are types of electrical wiring diagrams

3. A ladder diagram is also known as a _____.
- Stick
- Line
- Pictorial
- Schematic

4. To determine the relative physical position of the electrical components of a system, one would use a _____ diagram.
- stick
- line
- schematic
- ladder

5. Electricity can be understood by comparing it to a closed loop hydraulic system. In this model, amps are similar to _____.
- water pressure in PSIG
- water flow in GPM
- resistance to flow in head loss
- pipes

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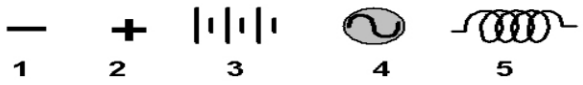
Quiz 2

1. A battery generates _____.
- direct current
- alternating current
- pulse current
- reversed Sine Wave current

2. A portable generator makes _____.
- direct current
- alternating current
- pulse current
- reversed Sine Wave current

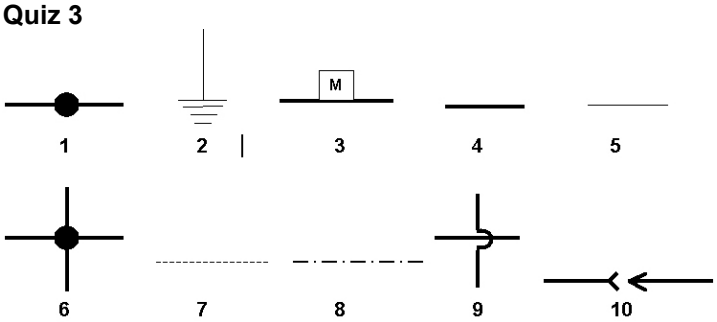


3. Which of the above symbols is used for electricity generated by a battery?
- 1
- 2
- 3
- 4
- 5

4. Which of the above symbols is used for electricity generated by a mechanical device?
- 1
- 2
- 3
- 4
- 5

5. At the power generation station, a/n _____ transformer is used.
- isolation
- step-up
- step-down

Quiz 3



1. Which of the above is the symbol for Field Line Voltage?
- 2
- 4
- 6
- **8**
- 10

2. Which of the above is the symbol for Field Low Voltage?
- 1
- 3
- 4
- 5
- 7

3. Which of the above is the symbol for Factory Low Voltage?
- 1
- 3
- 5
- 7
- 9

4. Which of the above is the symbol for Factory Line Voltage?
- 1
- 2
- 4
- 6
- 9

5. Which of the above is the symbol for Marked or Flagged Line?
- 3
- 4
- 5
- 7
- 10

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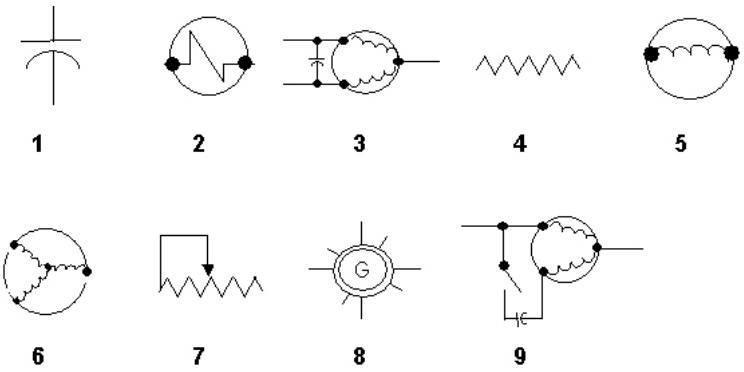
Quiz 4



1. Which of the above symbols represents an indicator light?
- 4
- 5
- 6
- 7
- 8

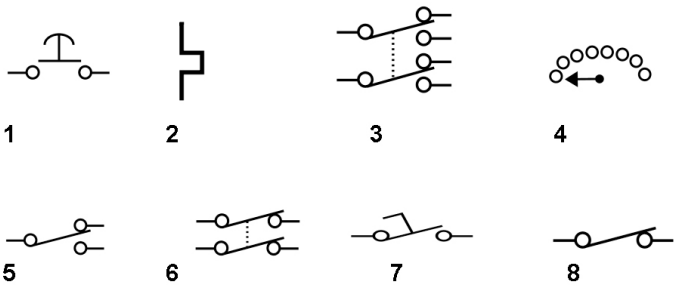
2. Which of the above symbols represents a resistance heater?
- 1
- 2
- 3
- 4
- 5

3. Which of the above symbols represents an adjustable rheostat?
- 2
- 4
- 6
- 7
- 9

4. Which of the above symbols represents a shaded pole motor?
- 1
- 2
- 3
- 4
- 5

5. Which of the above symbols represents a capacitor start motor?
- 5
- 6
- 7
- 8
- 9

Quiz 5



1. Which of the above symbols represents a start-stop button?
- 1
- 4
- 6
- 7
- 8

2. Which of the above symbols represents a single pole, double throw switch?
- 1
- 3
- 5
- 7
- 8

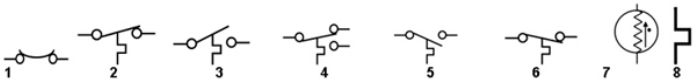
3. Which of the above symbols represents a double pole, single throw switch?
- 2
- 4
- 6
- 7
- 8

4. Which of the above symbols represents a double pole, double throw switch?
- 1
- 2
- 3
- 4
- 5

5. Which of the above symbols represents a single pole, single throw switch?
- 4
- 5
- 6
- 7
- 8

Quiz 6

1. Bi-metal _____.
- consists of 2 metals with different expansion rates welded together
- is used to sense temperature changes
- can be wound in a spiral
- all of the answers provided
- none of the answers provided



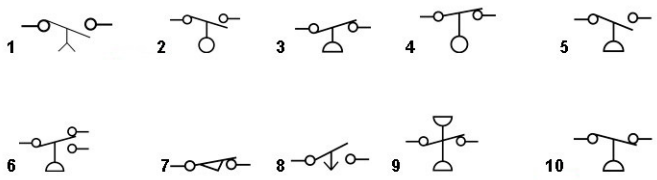
2. Which of the above symbols is the commonly shared symbol for all temperature-controlled devices?
- 4
- 5
- 6
- 7
- 8

3. Which of the above symbols represents a SPST temperature switch in the closed position?
- 1
- 2
- 3
- 4
- 5

4. Which of the above symbols represents a SPST temperature switch which closes on temperature rise?
- 1
- 2
- 3
- 4
- 5

5. Which of the above symbols represents a SPDT temperature switch?
- 1
- 2
- 3
- 4
- 5

Quiz 7



1. Which of the above symbols represents a N.C. open on pressure rise control?
- 1
- 2
- 3
- 4
- 5

2. Which of the above symbols represents a N.C. open on pressure decrease control?
- 6
- 7
- 8
- 9
- 10

3. Which of the above symbols represents a SPDT pressure switch?
- 6
- 7
- 8
- 9
- 10

4. Which of the above symbols represents a SPST pressure differential switch?
- 6
- 7
- 8
- 9
- 10

5. Which of the above symbols represents a Float switch – close on rise of fluid?
- 1
- 2
- 3
- 4
- 5

Quiz 8

1. A contactor uses a solenoid coil to initiate mechanical movement.
- True
- False

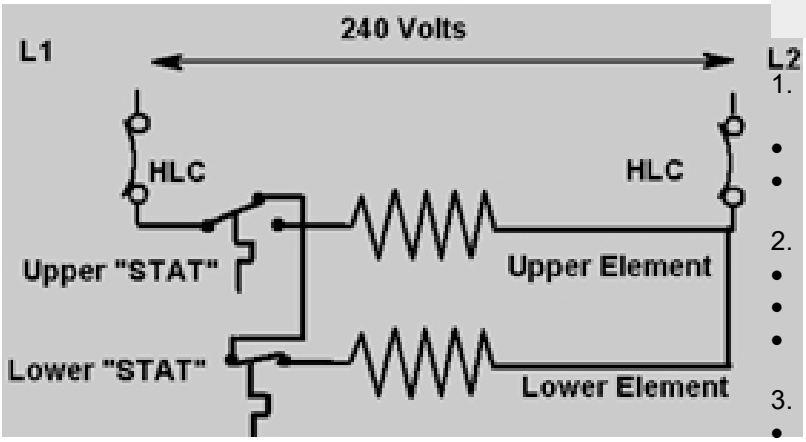
2. A contactor may have one or more sets of contacts.
- True
- False

3. The load carrying contacts in a contactor are normally _____.
- open
- closed

4. The voltage of the contactor coil is usually shown on the coil.
- True
- False

5. The control voltage of a coil could be _____.
- 24 volts
- 120 volts
- 240 volts
- any of the answers provided

Quiz 9



1. In a ladder diagram, the power legs form the _____ of the ladder.
- rails
- rungs
- hooks
- handles

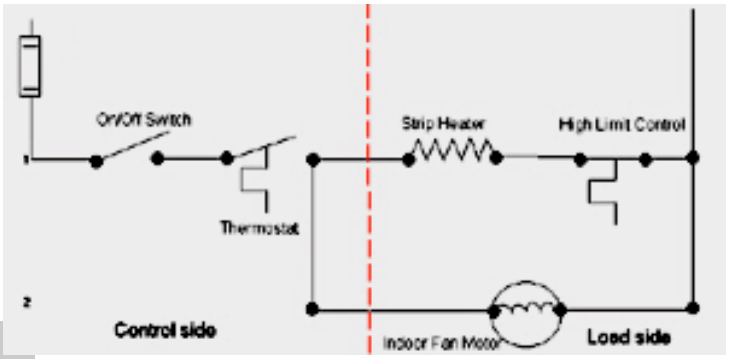
2. Usually Line 1 (or L1) is on the left-hand side of the diagram.
- True
- False

3. The HLC refers to _____.
- High Limit Control
- Hot Limit Control
- Higher Light Control
- Hot Liquid Control

4. On a water heater, the HLC operates as an over-temperature safety control.
- True
- False

5. The HLC also closes its contacts when the temperature is too hot.
- True
- False

Quiz 10



1. It is common to show a switch on the right side of the load.
- True
- False

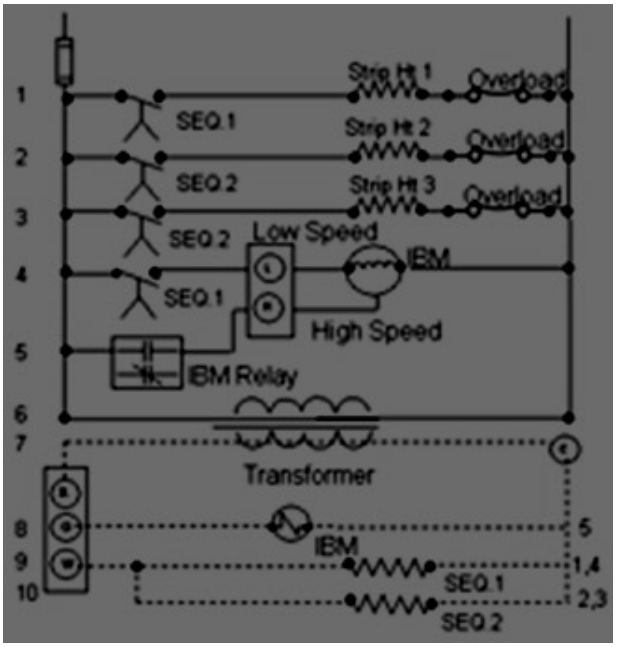
2. The On/Off switch is in _____ with the thermostat.
- series
- parallel
- series/parallel

3. The fan motor is in _____ with the thermostat.
- series
- parallel
- series/parallel

4. The fan motor is in _____ with the strip heater.
- series
- parallel
- series/parallel

5. The High Limit Control is in _____ with the strip heater.
- series
- parallel
- series/parallel

Quiz 11



1. The transformer in the above diagram is used to convert _____.
- 120 volts to 24 volts
- 24 volts to 120 volts
- 240 volts to 120 volts
- 120 volts to 240 volts
- line voltage to control voltage

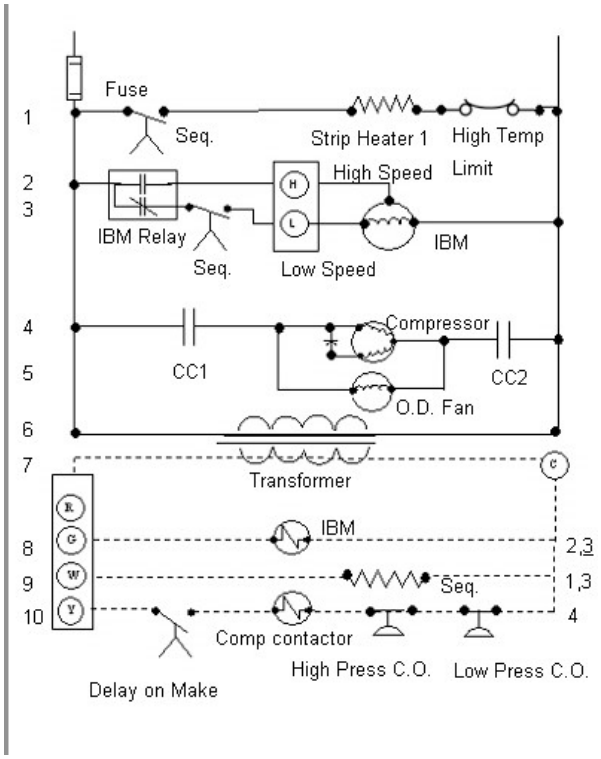
2. The high voltage section is shown at the _____ of the diagram.
- bottom half
- middle section
- top half

3. The low voltage section is shown at the _____ of the diagram.
- bottom half
- middle section
- top half

4. The dividing line between the high and low voltage is the _____.
- voltage regulator
- transformer
- battery
- power generator

5. The No.1 sequencer controls _____.
- A. heat strip No.1
- B. low speed fan
- C. high speed fan
- D. both A and B
- E. none of the answers provided

Quiz 12



1. The contacts for No.1 sequencer are placed in series with the low speed fan.
- True
- False

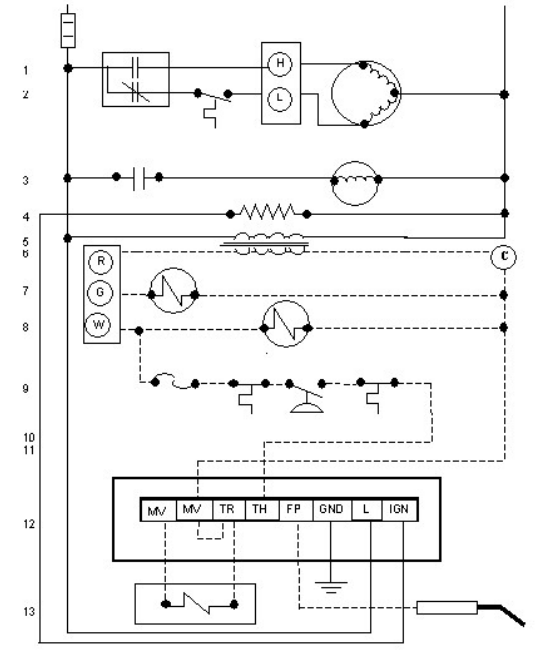
2. The contacts for No.1 sequencer are placed in series with the N.C. contacts on the IBM relay.
- True
- False

3. The contacts for No.1 sequencer are placed parallel with the high speed fan.
- True
- False

4. On the wiring diagram the compressor motor as shown in the diagram is a _____.
- shade pole
- capacitor start
- PSC
- 3-phase motor

5. On the wiring diagram, the compressor contactor coil is in series with the _____ thermostat terminal.
- R
- G
- W
- Y

Quiz 13



1. Which of the following is NOT a major type of ignition system for gas furnaces?
- Standing Pilot
- Spontaneous Ignition
- Proven Spark Ignition
- Hot Surface Ignition

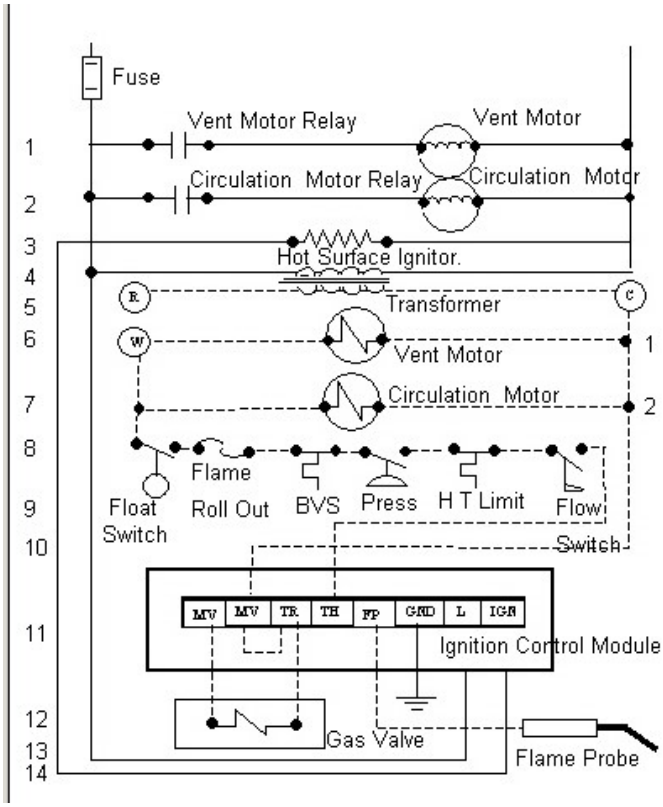
2. The Ignition Control Module is powered from the _____ 24-volt thermostat terminal.
- R
- G
- W

3. The gas valve is a _____.
- resistance heater
- solenoid
- shaded pole motor
- PSC motor
- heat strip

4. A flame sensor is placed in the _____.
- indoor air stream
- outdoor flue exhaust
- burner flame
- ductwork supplying warm air to the conditioned space

5. The Hot Surface Igniter is a _____.
- resistance heater
- solenoid
- shaded pole motor
- PSC motor
- heat strip

Quiz 14



1. A circulation pump has been added to the system. The pump contacts close _____ the vent motor contacts close.
- before
- at the same time as
- after

2. A safety device has been added to make sure that an adequate level of water is present in the boiler prior to ignition. This safety device is a _____ switch.
- float
- pressure
- aqua stat
- high limit
- flow

3. A safety device has been added to make sure that an adequate flow of water is present in the boiler prior to ignition. This safety device is a _____ switch.
- float
- pressure
- aqua stat
- high limit
- flow

4. If the circulation motor malfunctions, will the ignition sequence operation be completed?
- Yes
- No

5. If the vent motor malfunctions, will the ignition sequence operation be completed?
- Yes
- No

Quiz 15

1. All manufacturers must use the same symbols and methods of construction in making wire diagrams and schematics.
- True
- False

2. A line under a locator on the right-hand side indicates a/n _____.
- N.O. contact
- N.C. contact
- 24-volt control
- time delay control

3. A bracket over a locator on the right-hand side indicates a/n _____.
- N.O. contact
- SPST switch
- SPDT switch
- DPST switch

4. Standard practice for wire diagram construction requires that each component be identified with a label.
- True
- False

5. A Legend identifies the symbols that are used in a wire diagram.
- True
- False