

## Drawing rules in electrical engineering

a) Tick the right answers. There may be more than one correct answer.

1) In technical drawings standardized .... are used.

- |                                  |                                  |
|----------------------------------|----------------------------------|
| <input type="checkbox"/> numbers | <input type="checkbox"/> letters |
| <input type="checkbox"/> fonts   | <input type="checkbox"/> formats |
| <input type="checkbox"/> lines   | <input type="checkbox"/> texts   |

2) The main reading direction of technical drawings is

- |   |   |
|---|---|
| <input type="checkbox"/> bottom up and from the right to the left | <input type="checkbox"/> top down and from the left to the right  |
| <input type="checkbox"/> top down and from the right to the left  | <input type="checkbox"/> bottom up and from the left to the right |
| <input type="checkbox"/> bottom up                                | <input type="checkbox"/> top down                                 |

3) Each block in a technical drawing can be defined by

- |  |  |
|--|--|
| <input type="checkbox"/> a symbol for the material   | <input type="checkbox"/> an alphanumeric combination |
| <input type="checkbox"/> diagonal and vertical lines | <input type="checkbox"/> a digit for the column      |
| <input type="checkbox"/> a letter for the line       | <input type="checkbox"/> two letters                 |

4) Mirrored drawing is allowed if it does not change the

- |   |   |
|---|---|
| <input type="checkbox"/> size of the drawing          | <input type="checkbox"/> meaning of the drawing         |
| <input type="checkbox"/> perspective of the drawing   | <input type="checkbox"/> readability of the drawing     |
| <input type="checkbox"/> functionality of the drawing | <input type="checkbox"/> properties of the drawn object |

5) Continuous lines [Volllinien] are used to highlight

- |  |   |
|--|---|
| <input type="checkbox"/> unknown units                 | <input type="checkbox"/> otherwise unreadable numbers |
| <input type="checkbox"/> codes of electrical equipment | <input type="checkbox"/> special electric circuits    |
| <input type="checkbox"/> switches                      | <input type="checkbox"/> spatial relations            |

6) The position of a wiring symbol is primarily

- |  |  |
|--|--|
| <input type="checkbox"/> horizontal                    | <input type="checkbox"/> diagonal                      |
| <input type="checkbox"/> vertical                      | <input type="checkbox"/> either horizontal or diagonal |
| <input type="checkbox"/> either vertical or horizontal | <input type="checkbox"/> up to the draughtsman         |

b) Match the correct items.

1. All connection lines must be
2. Cases and housings have to be shown as
3. Relays, switches, contactors, couplings and brakes are shown as
4. Broken connection lines must be
5. The size of symbols and units is
6. Semiconductor switches are shown in
7. Functional units and groups and physical units must be
8. There are several ways of

a. presenting one symbol.
b. recognizable.
c. framed with a dot-and-dashed line.
d. circles or rectangles with a continuous line.
e. their initial state.
f. shown in the drawing.
g. "not operated", otherwise they have to be marked as "operated".
h. not standardized.

Draw the described symbols according to DIN EN 61082. You may use your handbook for help.

Description of the symbol	Symbol	Description of the symbol	Symbol
a melting fuse		a generator	
a miniature circuit breaker		an AC/DC converter (two ways of drawing)	
a normally closed NC contact with delayed opening		resistance with variability in general (outside driven)	
the appropriate contactor relay with delayed opening		resistance with adjustability (outside driven) continuously	
a normally open NO contact with delayed opening		resistance with adjustability (outside driven) stepwise	
the appropriate contactor relay with delayed opening		resistance with variability by its changing length $\Delta l$ *) *) resistance strain gauge	
a motor protection switch, three pole with two breaking mechanisms <ul style="list-style-type: none"> <li>• thermal breaking</li> <li>• electromagnetic breaking</li> </ul>		resistances ( inside driven / influenced by its physical property, non-linear) NTC / PTC / VDR / Hall-Effect	
a limit switch		a voltage meter	
a proximity switch			