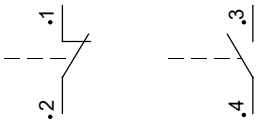
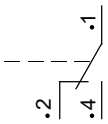
L.3.2.2 Function number

L.3.2.2.1 Function numbers 1 and 2 are allocated to break-contact elements and functions 3 and 4 to make-contact elements (break-contact element, make-contact element as defined in IEC 60050-441).



The terminals of change-over contact elements are marked by the function numbers 1, 2 and 4.

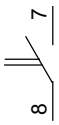


L.3.2.2.2 Auxiliary contact elements with special functions, such as time-delayed auxiliary contact elements, are identified by the function numbers 5 and 6, 7 and 8 for break-contact elements and make-contact elements respectively.

EXAMPLES

Break-contact delayed on closing

Make-contact delayed on closing



The terminals of change-over contact elements with special functions are marked by the function numbers 5, 6 and 8.

EXAMPLE

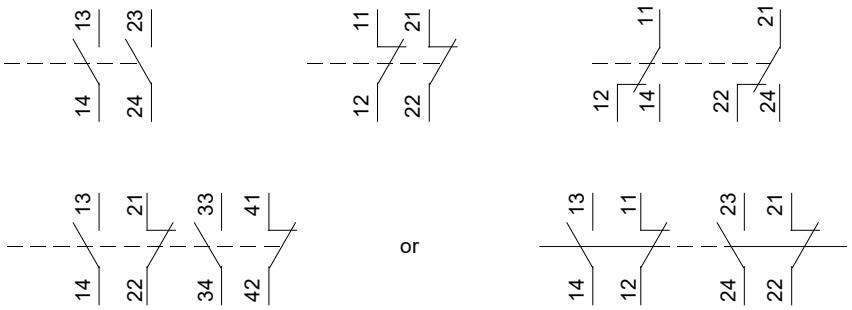
Change-over contact delayed in both directions

L.3.2.3 Sequence number

Terminals belonging to the same contact elements are marked with the same sequence numbers.

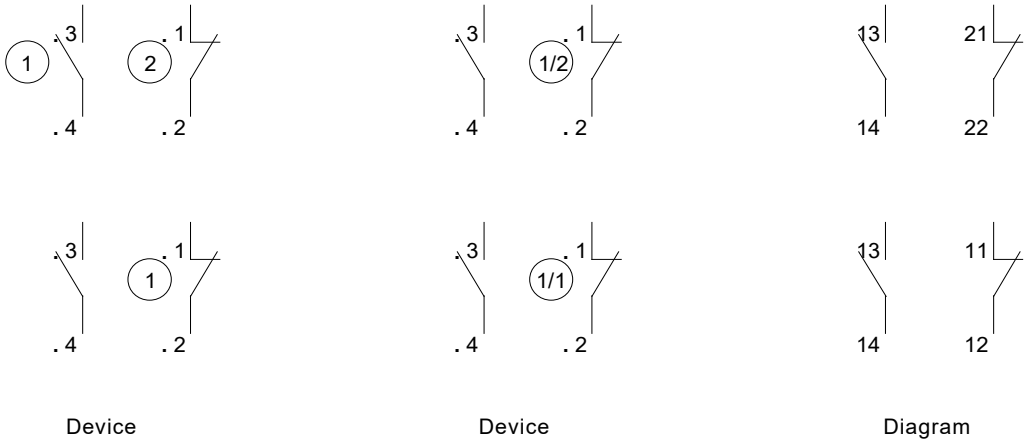
All contact elements having the same function shall have different sequence numbers.

EXAMPLES



L.3.2.2.2 The sequence number may be omitted from the terminals only if additional information provided by the manufacturer or the user clearly gives such a number.

EXAMPLES

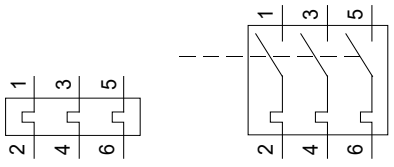


NOTE The dots shown in the examples of L.3.2 are merely used to show the relationship and do not need to be used in practice.

L.4 Terminal marking of overload protection devices

The terminals of the main circuits of an overload protection device are identified in the same manner as the terminals of main switching elements.

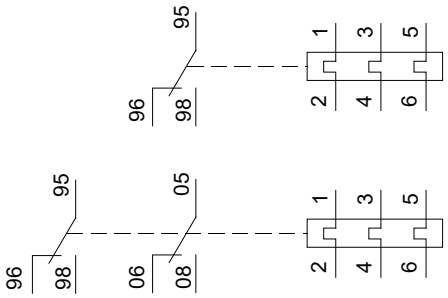
EXAMPLES



The terminals of an auxiliary contact element of an overload protection device are identified in the same manner as the terminals of a special contact element (see L.3.2.2.2) but with the sequence number 9.

If a second sequence number is required, it should be the number 0.

EXAMPLES

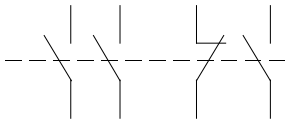


L.5 Distinctive number

A device with a fixed number of make-contact elements and break-contact elements may be allocated a two-figure distinctive number.

The first figure indicates the number of make-contact elements and the second figure the number of break-contact elements.

Distinctive number 31



L.6 Marking of terminals for external associated electronic circuit components, contacts and complete devices

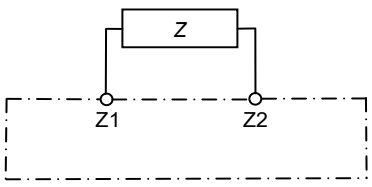
L.6.1 Marking of terminals for external associated electronic circuit components and contacts

L.6.1.1 General

Terminals for external associated electronic circuit components and contacts shall be marked in the following alphanumerical manner.

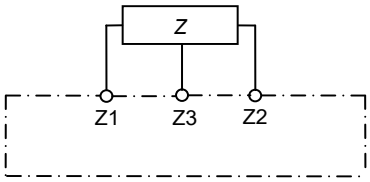
L.6.1.2 Marking of terminals for external associated impedances

L.6.1.2.1 The two terminals for an external associated impedance Z shall be marked Z1 and Z2.



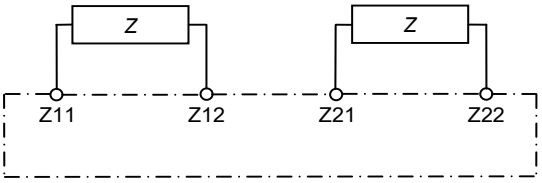
EXAMPLE

L.6.1.2.2 For an impedance Z with tappings, the terminals for the tappings shall be marked in sequential order Z3, Z4, etc.



EXAMPLE

L.6.1.2.3 In case of more than one impedance, the terminals shall be marked by using the letter Z and two-figure numbers, the first figure being a sequence number.

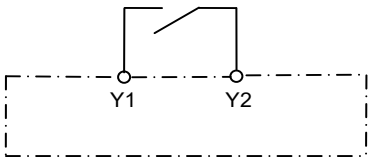


EXAMPLE

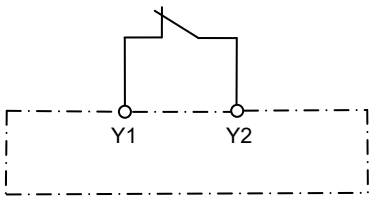
L.6.1.2.4 For particular application to a control system associated with thermistors for built-in thermal protection of rotating electrical machines, the rules for terminal marking T1, T2, ... or 1T1, 2T2, ... and 2T1, 2T2, ... are given in IEC 60947-8.

L.6.1.3 Marking of terminals for external associated contacts

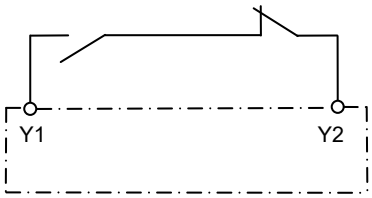
L.6.1.3.1 The two terminals for an external associated make or break contact or a group of contacts shall be marked Y1 and Y2.



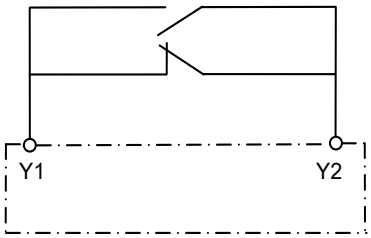
EXAMPLE 1



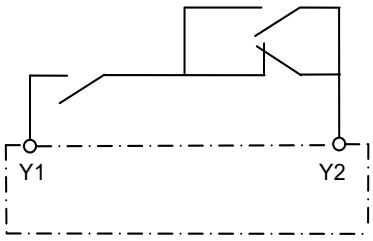
EXAMPLE 2



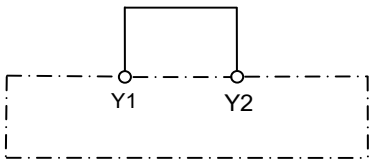
EXAMPLE 3



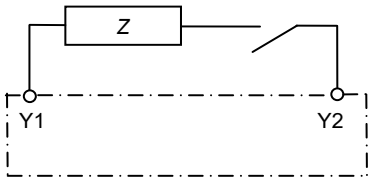
EXAMPLE 4



EXAMPLE 5

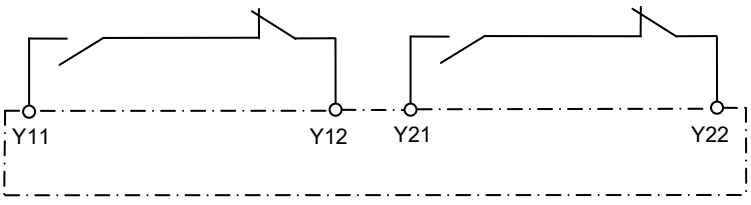


A bridge between two terminals is considered as a permanently closed contact and the corresponding terminals shall be marked Y1 and Y2.



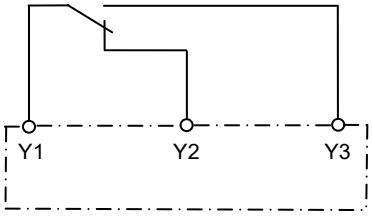
For an external circuit comprising an association of impedance(s) and contact(s), the corresponding terminals shall be marked Y1 and Y2.

L.6.1.3.2 In the case of more than one contact or one group of contact, the terminals shall be marked by using the letter Y and two-figure numbers, the first figure being a sequence number.

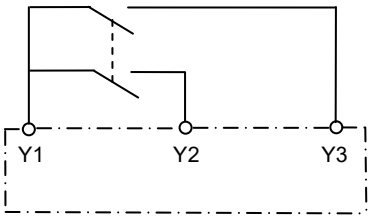


EXAMPLE

L.6.1.3.3 The three terminals necessary for connection of several contacts which operates simultaneously (e.g. forming a change-over contact) shall be marked Y1, Y2 and Y3, Y1 being the common.



EXAMPLE 1



EXAMPLE 2

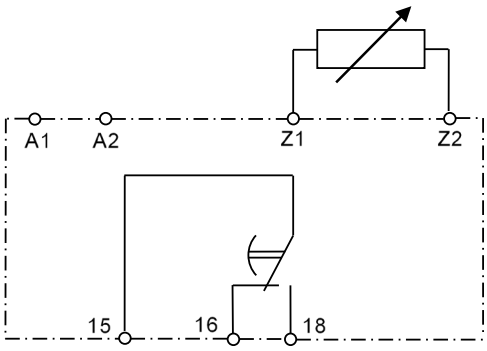
L.6.2 Marking of terminals for external complete devices

To illustrate the association with the general rules, four examples of the terminal marking of a complete device are given hereafter.

EXAMPLE 1

Switching device having:

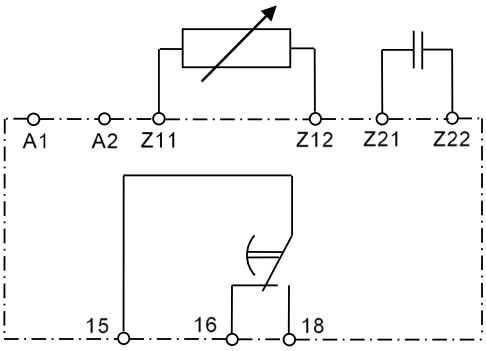
– two control supply terminals A1 and A2,
– two terminals Z1 and Z2, for an external associated variable resistor, and
– three terminals 15, 16 and 18, for an internal delayed change-over contact.



EXAMPLE 2

Switching device having:

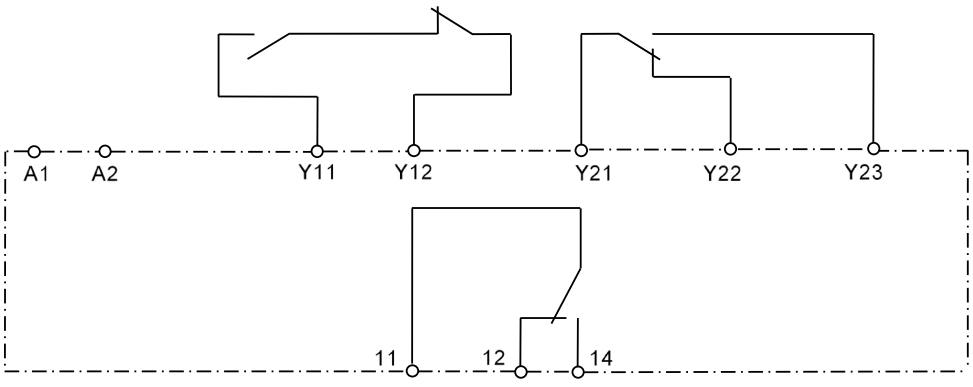
– two control supply terminals A1 and A2,
– four terminals for two external associated impedances (Z11 and Z12 for a variable resistor, and Z21 and Z22 for a capacitor), and
– three terminals 15, 16 and 18, for an internal delayed change-over contact.



EXAMPLE 3

Switching device having:

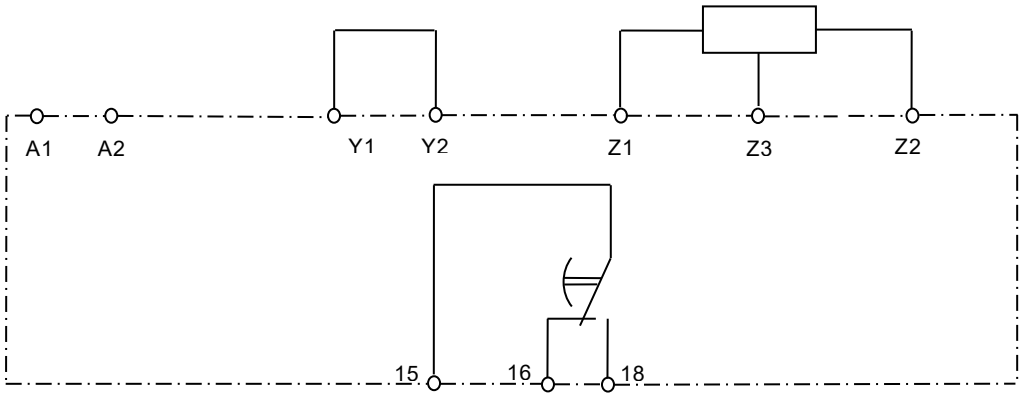
– two control supply terminals A1 and A2,
– two terminals Y11 and Y12, for an external associated group of contacts,
– three terminals Y21, Y22 and Y23, for an external associated change-over contact, and
– three terminals 11, 12 and 14, for an internal change-over contact.



EXAMPLE 4

Switching device having:

– two control supply terminals A1 and A2,
– two terminals Y1 and Y2, for an external bridge,
– three terminals Z1, Z3 and Z2, for an external associated resistor with a tapping, and
– three terminals 15, 16 and 18, for an internal delayed change-over contact.



Annex M
(normative)

Flammability test

M.1 Hot wire ignition test (HWI)

M.1.1 Test sample

Five samples of each material shall be tested.

The rectangular bar-shaped samples shall be 125 mm ± 5 mm long by 13 mm ± 0,5 mm wide and of uniform thickness stated by the material manufacturer. The test method applies to moulded or sheet materials in thicknesses ranging from 0,25 mm to 6,4 mm.

Edges shall be free from burrs, fins, etc. and the radius on the corners shall not exceed 1,3 mm.

M.1.2 Description of test apparatus

The sample shall be fastened in a fixture which provides two supporting posts positioned 70 mm apart to support the test specimen in a horizontal position, at a height of 60 mm above the bottom of the chamber, in the approximate centre of the test chamber (see Figure M.1).

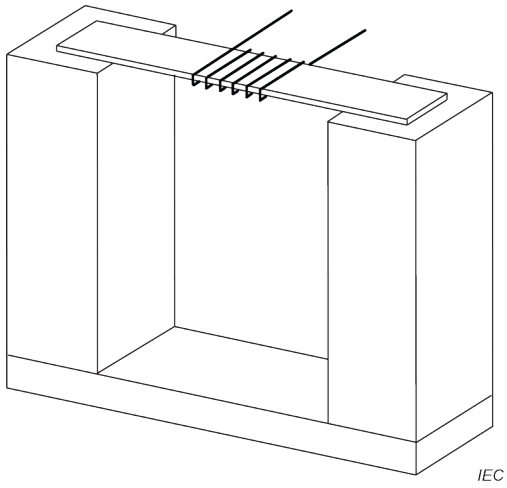


Figure M.1 – Test fixture for hot wire ignition test

A 250 mm ± 5 mm length of NiCr-wire (80 % nickel, 20 % chromium, iron free) approximately 0,5 mm diameter and having a cold resistance of approximately 5,28 Ω/m and a length-to-mass ratio of 580 m/kg shall be used. Prior to testing, the wire shall be connected in a straight length to a variable source of power which is adjusted to cause a power dissipation of 0,26 W/mm in the wire for a period of 8 s to 12 s.

After cooling, the wire shall be wrapped around a sample to form five complete turns spaced 6,35 mm ± 0,05 mm apart. A winding fixture shall be used, which will uniformly position the wire in the centre portion of the sample with a winding force of 5,4 N ± 0,02 N.

The ends of the wire shall be connected to the variable power source.

The supply circuit capacity shall be sufficient to maintain a continuous linear 48 Hz to 62 Hz power density of at least 0,31 W/mm over the length of the heater wire at or near unity power factor. The power density of the supply circuit at 60 A and 1,5 V shall be approximate 0,3 W/mm. It shall be possible to adjust the power level, smoothly and continuously and measure the power to within ±2 %.

M.1.3 Conditioning

Prior to testing, the test samples shall be maintained in a dry-as-moulded condition or alternatively, if this is not practical, the test samples shall be dried in an air-circulating oven at 70 °C ± 2 °C for 168 h and cooled over silica-gel or other desiccant for a minimum of 4 h. Immediately prior testing, the specimens shall be conditioned for at least 40 h at 23 °C ± 2 °C and 50 % ± 5 % relative humidity.

M.1.4 Test procedure

Start the test by energizing the circuit so that a current is passed through the heater wire yielding a linear power density of 0,26 W/mm over the whole length during the test.

Continue heating until the test specimen ignites. When ignition occurs, shut off power and record time to ignition. Ignition means an initiation of flaming produced by combustion in the gaseous phase which is accompanied by emission of light. Discontinue the test if ignition does not occur within 120 s. For specimens that melt through the wire without ignition, discontinue the test when the specimen is no longer in intimate contact with all five turns of the heater wire. The test shall be repeated on the remaining samples.

The thickness of each test sample and the time to ignition of each test sample or the time to melt through the wire of each test sample shall be recorded.

The test result for a given material within the tested thickness is the average time in seconds required for ignition.

M.2 Arc ignition test (AI)

M.2.1 Test sample

Five samples of each material shall be tested.

The rectangular bar-shaped samples shall be 125 mm ± 5 mm long by 13 mm ± 0,5 mm wide and of uniform thickness stated by the material manufacturer.

Edges shall be free from burrs, fins, etc. and the radius on the corners shall not exceed 1,3 mm.

M.2.2 Description of test apparatus

The test shall be made with a pair of test electrodes and a variable inductive impedance load connected in series to a source of 230 V AC, 50 Hz or 60 Hz (see Figure M.2).