

## SECTION H — ELECTRICITY

### H01 BASIC ELECTRIC ELEMENTS

#### H01C RESISTORS

##### Note(s)

- In this subclass, the following term is used with the meaning indicated:
  - "adjustable" means mechanically adjustable.
- Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group H01C 7/00.

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##### **1/00 Details**

- 1/01 • Mounting; Supporting [2]
- 1/012 • • the base extending along, and imparting rigidity or reinforcement to, the resistive element (H01C 1/016 takes precedence; the resistive element being formed in two or more coils or loops as a spiral, helical, or toroidal winding H01C 3/18, H01C 3/20; the resistive element being formed as one or more layers or coatings on a base H01C 7/00) [2]
- 1/014 • • the resistor being suspended between, and being supported by, two supporting sections (H01C 1/016 takes precedence) [2]
- 1/016 • • with compensation for resistor expansion or contraction [2]
- 1/02 • Housing; Enclosing; Embedding; Filling the housing or enclosure [2]
- 1/022 • • the housing or enclosure being openable or separable from the resistive element [2]
- 1/024 • • the housing or enclosure being hermetically sealed (H01C 1/028, H01C 1/032, H01C 1/034 take precedence) [2]
- 1/026 • • • with gaseous or vacuum spacing between the resistive element and the housing or casing [2]
- 1/028 • • the resistive element being embedded in insulation with outer enclosing sheath [2]
- 1/03 • • • with powdered insulation [2]
- 1/032 • • plural layers surrounding the resistive element (H01C 1/028 takes precedence) [2]
- 1/034 • • the housing or enclosure being formed as coating or mould without outer sheath (H01C 1/032 takes precedence) [2]
- 1/036 • • • on wound resistive element [2]
- 1/04 • Arrangements of distinguishing marks, e.g. colour coding
- 1/06 • Electrostatic or electromagnetic shielding arrangements
- 1/08 • Cooling, heating, or ventilating arrangements

- 1/082 • • using forced fluid flow [2]
- 1/084 • • using self-cooling, e.g. fins, heat sinks [2]
- 1/12 • Arrangements of current collectors
- 1/125 • • of fluid contacts [2]
- 1/14 • Terminals or tapping points specially adapted for resistors; Arrangements of terminals or tapping points on resistors
- 1/142 • • the terminals or tapping points being coated on the resistive element [2]
- 1/144 • • the terminals or tapping points being welded or soldered [2]
- 1/146 • • the resistive element surrounding the terminal [2]
- 1/148 • • the terminals embracing or surrounding the resistive element (H01C 1/142 takes precedence) [2]
- 1/16 • Resistor networks not otherwise provided for
- 3/00 Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven, or formed as grids**
- 3/02 • arranged or constructed for reducing self-induction, capacitance, or variation with frequency
- 3/04 • Iron-filament ballast resistors; Other resistors having variable temperature coefficient
- 3/06 • Flexible or folding resistors, whereby such a resistor can be looped or collapsed upon itself [2]
- 3/08 • Dimension or characteristic of resistive element changing gradually or in discrete steps from one terminal to another [2]
- 3/10 • the resistive element having zig-zag or sinusoidal configuration [2]
- 3/12 • • lying in one plane [2]
- 3/14 • the resistive element being formed in two or more coils or loops continuously wound as a spiral, helical, or toroidal winding (H01C 3/02-H01C 3/12 take precedence) [2]
- 3/16 • • including two or more distinct wound elements, or two or more winding patterns [2]

## H01C

- 3/18 • • wound on a flat or ribbon base (H01C 3/16 takes precedence) [2]
- 3/20 • • wound on cylindrical or prismatic base (H01C 3/16 takes precedence) [2]

**7/00 Non-adjustable resistors formed as one or more layers or coatings; Non-adjustable resistors made from powdered conducting material or powdered semi-conducting material with or without insulating material** (consisting of loose powdered or granular material H01C 8/00; resistors with a potential-jump barrier or surface barrier, e.g. field effect resistors, H01L 29/00; semiconductor devices sensitive to electromagnetic or corpuscular radiation, e.g. photoresistors, H01L 31/00; magnetic field controlled resistors H01L 43/08; bulk negative resistance effect devices H01L 47/00) [2]

- 7/02 • having positive temperature coefficient
- 7/04 • having negative temperature coefficient
- 7/06 • including means to minimise changes in resistance with changes in temperature
- 7/10 • voltage responsive, i.e. varistors [6]
- 7/102 • • Varistor boundary, e.g. surface layers (H01C 7/12 takes precedence) [6]
- 7/105 • • Varistor cores (H01C 7/12 takes precedence) [6]
- 7/108 • • • Metal oxide [6]
- 7/112 • • • • ZnO type [6]
- 7/115 • • • • Titanium dioxide- or titanate type [6]
- 7/118 • • • Carbide, e.g. SiC type [6]
- 7/12 • • Overvoltage protection resistors; Arresters [3]
- 7/13 • current-responsive [2]

### Note(s)

Groups H01C 7/02-H01C 7/13 take precedence over groups H01C 7/18-H01C 7/22.

- 7/18 • comprising a plurality of layers stacked between terminals [2]
- 7/20 • the resistive layer or coating being tapered [2]
- 7/22 • Elongated resistive element being bent or curved, e.g. sinusoidal, helical [2]

**8/00 Non-adjustable resistors consisting of loose powdered or granular conducting, or powdered or granular semi-conducting material** [2]

- 8/02 • Coherers or like imperfect resistors for detecting electromagnetic waves [2]
- 8/04 • Overvoltage protection resistors; Arresters [2, 3]

**10/00 Adjustable resistors** [2]

- 10/02 • Liquid resistors [2]
- 10/04 • with specified mathematical relationship between movement of resistor actuating means and value of resistance, other than direct proportional relationship [2]
- 10/06 • adjustable by short-circuiting different amounts of the resistive element [2]
- 10/08 • • with intervening conducting structure between the resistive element and the short-circuiting means, e.g. taps [2]
- 10/10 • adjustable by mechanical pressure or force [2]
- 10/12 • • by changing surface pressure between resistive masses or resistive and conductive masses, e.g. pile type [2]
- 10/14 • adjustable by auxiliary driving means [2]
- 10/16 • including plural resistive elements [2]
- 10/18 • • including coarse and fine resistive elements [2]

- 10/20 • • Contact structure or movable resistive elements being ganged [2]
- 10/22 • resistive-element dimensions changing gradually in one direction, e.g. tapered resistive element (H01C 10/04 takes precedence) [2]
- 10/23 • resistive-element dimensions changing in a series of discrete, progressive steps [2]
- 10/24 • the contact moving along turns of a helical resistive element, or *vice versa* [2]
- 10/26 • resistive element moving (H01C 10/16, H01C 10/24 take precedence) [2]

### Note(s)

Groups H01C 10/02-H01C 10/26 take precedence over groups H01C 10/28-H01C 10/50.

- 10/28 • the contact rocking or rolling along resistive element or taps [2]
- 10/30 • the contact sliding along resistive element [2]
- 10/32 • • the contact moving in an arcuate path [2]
- 10/34 • • • the contact or the associated conducting structure riding on collector formed as a ring or portion thereof [2]
- 10/36 • • • structurally combined with switching arrangements [2]
- 10/38 • • the contact moving along a straight path [2]
- 10/40 • • • screw-operated [2]
- 10/42 • • • the contact bridging and sliding along resistive element and parallel conducting bar or collector [2]
- 10/44 • • • the contact bridging and sliding along resistive element and parallel conducting bar or collector (H01C 10/42 takes precedence) [2]
- 10/46 • Arrangements of fixed resistors with intervening connectors, e.g. taps (H01C 10/28, H01C 10/30 take precedence) [2]
- 10/48 • • including contact movable in an arcuate path [2]
- 10/50 • structurally combined with switching arrangement (H01C 10/36 takes precedence) [2]

**11/00 Non-adjustable liquid resistors** [2]

**13/00 Resistors not provided for elsewhere**

- 13/02 • Structural combinations of resistors [2]

**17/00 Apparatus or processes specially adapted for manufacturing resistors** (providing fillings for housings or enclosures H01C 1/02; reducing insulation surrounding a resistor to powder H01C 1/03; manufacture of thermally variable resistors H01C 7/02, H01C 7/04) [2]

- 17/02 • adapted for manufacturing resistors with envelope or housing (apparatus or processes for filling or compressing insulating material in heating element tubes H05B 3/52) [2]
- 17/04 • adapted for winding the resistive element [2]
- 17/06 • adapted for coating resistive material on a base [2]
- 17/065 • • by thick-film techniques, e.g. serigraphy [6]
- 17/07 • • by resistor foil bonding, e.g. cladding [6]
- 17/075 • • by thin-film techniques [6]
- 17/08 • • • by vapour deposition [2]
- 17/10 • • • by flame spraying [2]
- 17/12 • • • by sputtering [2]
- 17/14 • • • by chemical deposition [2]
- 17/16 • • • • using electric current [2]
- 17/18 • • • • without using electric current [2]
- 17/20 • • by pyrolytic processes [2]
- 17/22 • adapted for trimming [2]

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| 17/23    • • by opening or closing resistor tracks of<br>predetermined resistive values <b>[6]</b><br>17/232   • • Adjusting the temperature coefficient; Adjusting<br>value of resistance by adjusting temperature<br>coefficient <b>[6]</b><br>17/235   • • Initial adjustment of potentiometer parts for<br>calibration <b>[6]</b> | 17/24    • • by removing or adding resistive material<br>(H01C 17/23, H01C 17/232, H01C 17/235 take<br>precedence) <b>[2, 6]</b><br>17/242   • • • by laser <b>[6]</b><br>17/245   • • • by mechanical means, e.g. sand-blasting,<br>cutting, ultrasonic treatment <b>[6]</b><br>17/26    • • by converting resistive material <b>[2]</b><br>17/28    • adapted for applying terminals <b>[2]</b><br>17/30    • adapted for baking <b>[2]</b> |
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