## CPC
### COOPERATIVE PATENT CLASSIFICATION

#### H
**ELECTRICITY**  
*(NOTE omitted)*

#### H01
**BASIC ELECTRIC ELEMENTS**  
*(NOTE omitted)*

#### H01C
**RESISTORS**

### NOTES
1. In this subclass, the term "adjustable" means mechanically adjustable.
2. Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group [H01C 7/00](#).

### WARNING
In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

<table>
<thead>
<tr>
<th>1/00</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/01</td>
<td>Mounting; Supporting</td>
</tr>
<tr>
<td>1/012</td>
<td>the base extending along and imparting rigidity or reinforcement to the resistive element (<a href="#">H01C 1/016</a> takes precedence; the resistive element being formed in two or more coils or loops as a spiral, helical or toroidal winding <a href="#">H01C 3/18</a>, <a href="#">H01C 3/20</a>; the resistive element being formed as one or more layers or coatings on a base <a href="#">H01C 7/00</a>)</td>
</tr>
<tr>
<td>1/014</td>
<td>the resistor being suspended between and being supported by two supporting sections (<a href="#">H01C 1/016</a> takes precedence)</td>
</tr>
<tr>
<td>1/016</td>
<td>with compensation for resistor expansion or contraction</td>
</tr>
<tr>
<td>1/02</td>
<td>Housing; Enclosing; Embedding; Filling the housing or enclosure</td>
</tr>
<tr>
<td>1/022</td>
<td>the housing or enclosure being openable or separable from the resistive element</td>
</tr>
<tr>
<td>1/024</td>
<td>the housing or enclosure being hermetically sealed (<a href="#">H01C 1/028</a>, <a href="#">H01C 1/032</a>, <a href="#">H01C 1/034</a> take precedence)</td>
</tr>
<tr>
<td>1/026</td>
<td>with gaseous or vacuum spacing between the resistive element and the housing or casing</td>
</tr>
<tr>
<td>1/028</td>
<td>the resistive element being embedded in insulation with outer enclosing sheath</td>
</tr>
<tr>
<td>1/03</td>
<td>with powdered insulation</td>
</tr>
<tr>
<td>1/032</td>
<td>plural layers surrounding the resistive element (<a href="#">H01C 1/028</a> takes precedence)</td>
</tr>
<tr>
<td>1/034</td>
<td>the housing or enclosure being formed as coating or mould without outer sheath (<a href="#">H01C 1/032</a> takes precedence)</td>
</tr>
<tr>
<td>1/036</td>
<td>on wound resistive element</td>
</tr>
<tr>
<td>1/04</td>
<td>Arrangements of distinguishing marks, e.g. colour coding</td>
</tr>
<tr>
<td>1/06</td>
<td>Electrostatic or electromagnetic shielding arrangements</td>
</tr>
<tr>
<td>1/08</td>
<td>Cooling, heating or ventilating arrangements</td>
</tr>
<tr>
<td>1/082</td>
<td>using forced fluid flow</td>
</tr>
<tr>
<td>1/084</td>
<td>using self-cooling, e.g. fins, heat sinks</td>
</tr>
<tr>
<td>1/12</td>
<td>Arrangements of current collectors</td>
</tr>
<tr>
<td>1/125</td>
<td>of fluid contacts</td>
</tr>
<tr>
<td>1/14</td>
<td>Terminals or tapping points {or electrodes} specially adapted for resistors *(in general <a href="#">H01R</a>): Arrangements of terminals or tapping points {or electrodes} on resistors</td>
</tr>
<tr>
<td>1/1406</td>
<td>(Terminals or electrodes formed on resistive elements having positive temperature coefficient)</td>
</tr>
<tr>
<td>1/1413</td>
<td>(Terminals or electrodes formed on resistive elements having negative temperature coefficient)</td>
</tr>
<tr>
<td>1/142</td>
<td>the terminals or tapping points being coated on the resistive element</td>
</tr>
<tr>
<td>1/144</td>
<td>the terminals or tapping points being welded or soldered</td>
</tr>
<tr>
<td>1/146</td>
<td>the resistive element surrounding the terminal</td>
</tr>
<tr>
<td>1/148</td>
<td>the terminals embracing or surrounding the resistive element (<a href="#">H01C 1/142</a> takes precedence)</td>
</tr>
<tr>
<td>1/16</td>
<td>Resistor networks not otherwise provided for</td>
</tr>
</tbody>
</table>

### 3/00
**Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven or formed as grids**

| 3/005 | Metallic glasses therefor |
| 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 |
| 3/08 | Dimension or characteristic of resistive element changing gradually or in discrete steps from one terminal to another |
| 3/10 | the resistive element having zig-zag or sinusoidal configuration |
| 3/12 | lying in one plane |
| 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) |
| 3/16 | including two or more distinct wound elements or two or more winding patterns |
| 3/18 | wound on a flat or ribbon base ([H01C 3/16](#) takes precedence) |
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); measuring deformation in a solid state using the change in resistance formed by printed-circuit technique G01B 7/20; insulating materials H01B 3/00; passive thin-film or thick-film semiconductor or solid state devices H01L 27/00; resistors without a potential-jump or surface barrier specially adapted for integrated circuits, details thereof, multistep manufacturing processes therefor H01L 28/20; resistors with a potential-jump barrier or surface barrier, e.g. field effect resistors H01L 29/00; semiconductor devices sensitive to electromagnetic radiation, e.g. photoresistors, H01L 31/00; devices using superconductivity H01L 39/00; devices using galvanomagnetic or similar magnetic effects, e.g. magnetic-field-controlled resistors, H01L 43/00; solid state devices for rectifying, amplifying, oscillating or switching without a potential-jump barrier or surface barrier H01L 45/00; bulk negative resistance effect devices H01L 47/00; (ohmic resistance heating H05B 3/00; printed circuits H05K)

7/001 . . . [Mass resistors]
7/003 . . . [Thin film resistors]
7/005 . . . [Polymer thick films]
7/006 . . . [Thin film resistors]
7/008 . . . [Thermistors (H01C 7/02 - H01C 7/06 take precedence)]
7/02 . . . having positive temperature coefficient {ceramics C04B]
7/021 . . . . [formed as one or more layers or coatings]
7/022 . . . . [mainly consisting of non-metallic substances (H01C 7/02) takes precedence]
7/023 . . . . [containing oxides or oxidic compounds, e.g. ferrites]
7/025 . . . . . [Perowskites, e.g. titanates]
7/026 . . . . . [Vanadium oxides or oxidic compounds, e.g. VOx]
7/027 . . . . [consisting of conducting or semi-conducting material dispersed in a non-conductive organic material]
7/028 . . . . [consisting of organic substances]
7/04 . . . having negative temperature coefficient {thermometers using resistive elements G01K 7/16}
7/041 . . . . [formed as one or more layers or coatings]
7/042 . . . . [mainly consisting of inorganic non-metallic substances (H01C 7/041) takes precedence]

NOTE
In groups H01C 7/043 - H01C 7/049, in the absence of an indication to the contrary, classification is made in the last appropriate place

7/043 . . . . . [Oxides or oxidic compounds]
7/044 . . . . . [Zinc or cadmium oxide]
7/045 . . . . . [Perowskites, e.g. titanates]
H01C

10/106 . . . [on resistive material dispersed in an elastic material (H01C 10/103 and H01C 10/12 take precedence; for electric switches H01H 1/029)]
10/12 . . . by changing surface pressure between resistive masses or resistive and conductive masses, e.g. pile type
10/14 . . . adjustable by auxiliary driving means
10/16 . . . including plural resistive elements
10/18 . . . including coarse and fine resistive elements
10/20 . . . Contact structure or movable resistive elements being ganged
10/22 . . . resistive element dimensions changing gradually in one direction, e.g. tapered resistive element (H01C 10/04 takes precedence)
10/23 . . . resistive element dimensions changing in a series of discrete, progressive steps
10/24 . . . the contact moving along turns of a helical resistive element, or vica versa
10/26 . . . resistive element moving (H01C 10/16, H01C 10/24 take precedence)

NOTE

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
10/30 . . . the contact sliding along resistive element
10/301 . . . [consisting of a wire wound resistor]
10/303 . . . [the resistor being coated, e.g. lubricated, conductive plastic coated, i.e. hybrid potentiometer]
10/305 . . . [consisting of a thick film]
10/306 . . . [Polymer thick film, i.e. PTF]
10/308 . . . [consisting of a thin film]
10/32 . . . the contact moving in an arcuate path
10/34 . . . the contact or the associated conducting structure riding on collector formed as a ring or portion thereof
10/345 . . . [the collector and resistive track being situated in 2 parallel planes]
10/36 . . . structurally combined with switching arrangements
10/363 . . . [by axial movement of the spindle, e.g. pull-push switch (H01C 10/366 takes precedence)]
10/366 . . . [using an electromagnetic actuator]
10/38 . . . the contact moving along a straight path
10/40 . . . screw operated
10/42 . . . the contact bridging and sliding along resistive element and parallel conducting bar or collector
10/44 . . . the contact bridging and sliding along resistive element and parallel conducting bar or collector (H01C 10/42 takes precedence)
10/46 . . . Arrangements of fixed resistors with intervening connectors, e.g. taps (H01C 10/28, H01C 10/30 take precedence)
10/48 . . . including taps (H01C 10/28, H01C 10/30 take precedence)
10/50 . . . structurally combined with switching arrangements (H01C 10/36 takes precedence)

11/00 Non-adjustable liquid resistors

13/00 Resistors not provided for elsewhere

13/02 . . . Structural combinations of resistors (impedance networks per se H03H)

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)

17/003 . . . [using lithography, e.g. photolithography (lithographic compositions and processing in general G03F)]

17/006 . . . [adapted for manufacturing resistor chips]

17/02 . . . adapted for manufacturing resistors with envelope or housing

17/04 . . . adapted for winding the resistive element

17/06 . . . adapted for coating resistive material on a base

17/065 . . . by thick film techniques, e.g. serigraphy

17/06506 . . . [Precursor compositions therefor, e.g. pastes, inks, glass frits]

17/06513 . . . . . . [characterised by the resistive component]

17/0652 . . . . . . [containing carbon or carbides]

17/06526 . . . . . . [composed of metals]

17/06533 . . . . . . [composed of oxides]

17/0654 . . . . . . [Oxides of the platinum group]

17/06546 . . . . . . [Oxides of zinc or cadmium]

17/06553 . . . . . . [composed of a combination of metals and oxides]

17/0656 . . . . . . [composed of silicides (H01C 17/0652 takes precedence)]

17/06566 . . . . . . [composed of borides (H01C 17/0652 takes precedence)]

17/06573 . . . . . . [characterised by the permanent binder]

17/0658 . . . . . . [composed of inorganic material]

17/06586 . . . . . . [composed of organic material]

17/06593 . . . . . . [characterised by the temporary binder]

17/07 . . . by resistor foil bonding, e.g. cladding

17/075 . . . by thin film techniques ((H01C 17/20 takes precedence)

17/08 . . . by vapour deposition

17/10 . . . by flame spraying

17/12 . . . by sputtering

17/14 . . . by chemical deposition

17/16 . . . using electric current

17/18 . . . without using electric current

17/20 . . . by pyrolytic processes

17/22 . . . adapted for trimming

17/23 . . . by opening or closing resistor geometric tracks of predetermined resistive values, [e.g. snapistors]

17/232 . . . Adjusting the temperature coefficient; Adjusting value of resistance by adjusting temperature coefficient of resistance

17/235 . . . Initial adjustment of potentiometer parts for calibration

17/24 . . . by removing or adding resistive material (H01C 17/23, H01C 17/232, H01C 17/235 takes precedence)

17/2404 . . . [by charged particle impact, e.g. by electron or ion beam milling, sputtering, plasma etching]

17/2408 . . . [by pulsed voltage erosion, e.g. spark erosion]

17/2412 . . . [by electrolytic treatment, e.g. electroplating (for anodic oxidation H01C 17/262)]

17/2416 . . . [by chemical etching]
by laser \{(trimming by laser in general B23K 26/351)\}

by mechanical means, e.g. sand blasting, cutting, ultrasonic treatment

by converting resistive material

\{by electrolytic treatment, e.g. anodic oxydation\}

\{by chemical or thermal treatment, e.g. oxydation, reduction, annealing (etching H01C 17/2416)\}

\{by passage of voltage pulses or electric current\}

adapted for applying terminals

\{by thick film techniques\}

\{Precursor compositions therefor, e.g. pastes, inks, glass frits\}

\{applied to zinc or cadmium oxide resistors\}

\{applied to TiO$_2$ or titanate resistors\}

\{by thin film techniques\}

adapted for baking