

CPC COOPERATIVE PATENT CLASSIFICATION

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](#).

1/00	Details	1/142	. . the terminals or tapping points being coated on the resistive element
1/01	. Mounting; Supporting	1/144	. . the terminals or tapping points being welded or soldered
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)	1/146	. . the resistive element surrounding the terminal
1/014	. . the resistor being suspended between and being supported by two supporting sections (H01C 1/016 takes precedence)	1/148	. . the terminals embracing or surrounding the resistive element (H01C 1/142 takes precedence)
1/016	. . with compensation for resistor expansion or contraction	1/16	. Resistor networks not otherwise provided for
1/02	. Housing; Enclosing; Embedding; Filling the housing or enclosure	3/00	Non-adjustable metal resistors made of wire or ribbon, e.g. coiled, woven or formed as grids
1/022	. . the housing or enclosure being openable or separable from the resistive element	3/005	. {Metallic glasses therefor}
1/024	. . the housing or enclosure being hermetically sealed (H01C 1/028 , H01C 1/032 , H01C 1/034 take precedence)	3/02	. arranged or constructed for reducing self-induction, capacitance or variation with frequency
1/026	. . . with gaseous or vacuum spacing between the resistive element and the housing or casing	3/04	. Iron-filament ballast resistors; Other resistors having variable temperature coefficient
1/028	. . the resistive element being embedded in insulation with outer enclosing sheath	3/06	. Flexible or folding resistors, whereby such a resistor can be looped or collapsed upon itself
1/03	. . . with powdered insulation	3/08	. Dimension or characteristic of resistive element changing gradually or in discrete steps from one terminal to another
1/032	. . plural layers surrounding the resistive element (H01C 1/028 takes precedence)	3/10	. the resistive element having zig-zag or sinusoidal configuration
1/034	. . the housing or enclosure being formed as coating or mold without outer sheath (H01C 1/032 takes precedence)	3/12	. . Lying in one plane
1/036	. . . on wound resistive element	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)
1/04	. Arrangements of distinguishing marks, e.g. colour coding	3/16	. . including two or more distinct wound elements or two or more winding patterns
1/06	. Electrostatic or electromagnetic shielding arrangements	3/18	. . wound on a flat or ribbon base (H01C 3/16 takes precedence)
1/08	. Cooling, heating or ventilating arrangements	3/20	. . wound on cylindrical or prismatic base (H01C 3/16 takes precedence)
1/082	. . using forced fluid flow		
1/084	. . using self-cooling, e.g. fins, heat sinks		
1/12	. Arrangements of current collectors		
1/125	. . of fluid contacts		
1/14	. Terminals or tapping points {or electrodes} specially adapted for resistors (in general H01R); Arrangements of terminals or tapping points {or electrodes} on resistors		
1/1406	. . {Terminals or electrodes formed on resistive elements having positive temperature coefficient}		
1/1413	. . {Terminals or electrodes formed on resistive elements having negative temperature coefficient}		

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 ; {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 electro-magnetic or corpuscular 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 })	7/047	. . . . {Vanadium oxides or oxidic compounds, e.g. VO _x }
		7/048	. . . {Carbon or carbides}
		7/049	. . {mainly consisting of organic or organo-metal substances (H01C 7/041 takes precedence)}
		7/06	. including means to minimise changes in resistance with changes in temperature
		7/10	. voltage responsive, i.e. varistors
		7/1006	. . {Thick film varistors}
		7/1013	. . {Thin film varistors}
		7/102	. . Varistor boundary, e.g. surface layers (H01C 7/12 takes precedence)
		7/105	. . Varistor cores (H01C 7/12 takes precedence)
		7/108	. . . Metal oxide
		7/112	. . . . ZnO type
		7/115	. . . . Titanium dioxide- or titanate type
		7/118	. . . Carbide, e.g. SiC type
		7/12	. . Overvoltage protection resistors {(series resistors structurally associated with spark gaps H01T 1/16)}
		7/123	. . . {Arrangements for improving potential distribution}
		7/126	. . . {Means for protecting against excessive pressure or for disconnecting in case of failure}
		7/13	. current responsive
			NOTE
			Groups H01C 7/02 - H01C 7/13 take precedence over groups H01C 7/18 - H01C 7/22 .
7/001	. {Mass resistors}		
7/003	. {Thick film resistors}		
7/005	. . {Polymer thick films}		
7/006	. {Thin film resistors}		
7/008	. {Thermistors (H01C 7/02 - H01C 7/06 take precedence)}	7/18	. comprising a plurality of layers stacked between terminals
7/02	. having positive temperature coefficient {(ceramics C04B)}	7/20	. the resistive layer or coating being tapered
7/021	. . {formed as one or more layers or coatings}	7/22	. Elongated resistive element being bent or curved, e.g. sinusoidal, helical
7/022	. . {mainly consisting of non-metallic substances (H01C 7/021 takes precedence)}	8/00	Non-adjustable resistors consisting of loose powdered or granular conducting, or powdered or granular semi-conducting material
7/023	. . . {containing oxides or oxidic compounds, e.g. ferrites}	8/02	. Coherers or like imperfect resistors for detecting electromagnetic waves
7/025	. . . . {Perowskites, e.g. titanates}	8/04	. Overvoltage protection resistors; Arresters
7/026	. . . . {Vanadium oxides or oxidic compounds, e.g. VO _x }	10/00	Adjustable resistors
7/027	. . {consisting of conducting or semi-conducting material dispersed in a non-conductive organic material}	10/005	. {Surface mountable, e.g. chip trimmer potentiometer}
7/028	. . {consisting of organic substances}	10/02	. Liquid resistors
7/04	. having negative temperature coefficient {(thermometers using resistive elements G01K 7/16)}	10/025	. . {Electrochemical variable resistors (trimming resistors by electrolytic treatment H01C 17/2412 , H01C 17/262)}
7/041	. . {formed as one or more layers or coatings}	10/04	. with specified mathematical relationship between movement of resistor actuating means and value of resistance, other than direct proportional relationship
7/042	. . {mainly consisting of inorganic non-metallic substances (H01C 7/041 takes precedence)}	10/06	. adjustable by short-circuiting different amounts of the resistive element
	NOTE	10/08	. . with intervening conducting structure between the resistive element and the short-circuiting means, e.g. taps
	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	10/10	. adjustable by mechanical pressure of force
7/043	. . . . {Oxides or oxidic compounds}	10/103	. . {by using means responding to magnetic or electric fields, e.g. by addition of magnetisable or piezoelectric particles to the resistive material, or by an electromagnetic actuator}
7/044	. . . . {Zinc or cadmium oxide}		
7/045	. . . . {Perowskites, e.g. titanates}		
7/046	. . . . {Iron oxides or ferrites}		

10/106	<ul style="list-style-type: none"> • {on resistive material dispersed in an elastic material (H01C 10/103 and H01C 10/12 take precedence; for electric switches H01H 1/029)} 	13/00	Resistors not provided for elsewhere
10/12	<ul style="list-style-type: none"> • by changing surface pressure between resistive masses or resistive and conductive masses, e.g. pile type 	13/02	<ul style="list-style-type: none"> • Structural combinations of resistors (impedance networks per se H03H)
10/14	<ul style="list-style-type: none"> • adjustable by auxiliary driving means 	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)
10/16	<ul style="list-style-type: none"> • including plural resistive elements 	17/003	<ul style="list-style-type: none"> • {using lithography, e.g. photolithography (lithographic compositions and processing in general G03F)}
10/18	<ul style="list-style-type: none"> • including coarse and fine resistive elements 	17/006	<ul style="list-style-type: none"> • {adapted for manufacturing resistor chips}
10/20	<ul style="list-style-type: none"> • Contact structure or movable resistive elements being ganged 	17/02	<ul style="list-style-type: none"> • adapted for manufacturing resistors with envelope or housing
10/22	<ul style="list-style-type: none"> • resistive element dimensions changing gradually in one direction, e.g. tapered resistive element (H01C 10/04 takes precedence) 	17/04	<ul style="list-style-type: none"> • adapted for winding the resistive element
10/23	<ul style="list-style-type: none"> • resistive element dimensions changing in a series of discrete, progressive steps 	17/06	<ul style="list-style-type: none"> • adapted for coating resistive material on a base
10/24	<ul style="list-style-type: none"> • the contact moving along turns of a helical resistive element, or vice versa 	17/065	<ul style="list-style-type: none"> • by thick film techniques, e.g. serigraphy
10/26	<ul style="list-style-type: none"> • resistive element moving (H01C 10/16, H01C 10/24 take precedence) 	17/06506	<ul style="list-style-type: none"> • {Precursor compositions therefor, e.g. pastes, inks, glass frits}
	NOTE	17/06513	<ul style="list-style-type: none"> • {characterised by the resistive component}
	Groups H01C 10/02 - H01C 10/26 take precedence over groups H01C 10/28 - H01C 10/50 .	17/0652	<ul style="list-style-type: none"> • {containing carbon or carbides}
10/28	<ul style="list-style-type: none"> • the contact rocking or rolling along resistive element or taps 	17/06526	<ul style="list-style-type: none"> • {composed of metals}
10/30	<ul style="list-style-type: none"> • the contact sliding along resistive element 	17/06533	<ul style="list-style-type: none"> • {composed of oxides}
10/301	<ul style="list-style-type: none"> • {consisting of a wire wound resistor} 	17/0654	<ul style="list-style-type: none"> • {Oxides of the platinum group}
10/303	<ul style="list-style-type: none"> • {the resistor being coated, e.g. lubricated, conductive plastic coated, i.e. hybrid potentiometer} 	17/06546	<ul style="list-style-type: none"> • {Oxides of zinc or cadmium}
10/305	<ul style="list-style-type: none"> • {consisting of a thick film} 	17/06553	<ul style="list-style-type: none"> • {composed of a combination of metals and oxides}
10/306	<ul style="list-style-type: none"> • {Polymer thick film, i.e. PTF} 	17/0656	<ul style="list-style-type: none"> • {composed of silicides (H01C 17/0652 takes precedence)}
10/308	<ul style="list-style-type: none"> • {consisting of a thin film} 	17/06566	<ul style="list-style-type: none"> • {composed of borides (H01C 17/0652 takes precedence)}
10/32	<ul style="list-style-type: none"> • the contact moving in an arcuate path 	17/06573	<ul style="list-style-type: none"> • {characterised by the permanent binder}
10/34	<ul style="list-style-type: none"> • the contact or the associated conducting structure riding on collector formed as a ring or portion thereof 	17/0658	<ul style="list-style-type: none"> • {composed of inorganic material}
10/345	<ul style="list-style-type: none"> • {the collector and resistive track being situated in 2 parallel planes} 	17/06586	<ul style="list-style-type: none"> • {composed of organic material}
10/36	<ul style="list-style-type: none"> • structurally combined with switching arrangements 	17/06593	<ul style="list-style-type: none"> • {characterised by the temporary binder}
10/363	<ul style="list-style-type: none"> • {by axial movement of the spindle, e.g. pull-push switch (H01C 10/366 takes precedence)} 	17/07	<ul style="list-style-type: none"> • by resistor foil bonding, e.g. cladding
10/366	<ul style="list-style-type: none"> • {using an electromagnetic actuator} 	17/075	<ul style="list-style-type: none"> • by thin film techniques (H01C 17/20 takes precedence)}
10/38	<ul style="list-style-type: none"> • the contact moving along a straight path 	17/08	<ul style="list-style-type: none"> • by vapour deposition
10/40	<ul style="list-style-type: none"> • screw operated 	17/10	<ul style="list-style-type: none"> • by flame spraying
10/42	<ul style="list-style-type: none"> • the contact bridging and sliding along resistive element and parallel conducting bar or collector 	17/12	<ul style="list-style-type: none"> • by sputtering
10/44	<ul style="list-style-type: none"> • the contact bridging and sliding along resistive element and parallel conducting bar or collector (H01C 10/42 takes precedence) 	17/14	<ul style="list-style-type: none"> • by chemical deposition
10/46	<ul style="list-style-type: none"> • Arrangements of fixed resistors with intervening connectors, e.g. taps (H01C 10/28, H01C 10/30 take precedence) 	17/16	<ul style="list-style-type: none"> • using electric current
10/48	<ul style="list-style-type: none"> • including contact movable in an arcuate path 	17/18	<ul style="list-style-type: none"> • without using electric current
10/50	<ul style="list-style-type: none"> • structurally combined with switching arrangements (H01C 10/36 takes precedence) 	17/20	<ul style="list-style-type: none"> • by pyrolytic processes
11/00	Non-adjustable liquid resistors	17/22	<ul style="list-style-type: none"> • adapted for trimming
		17/23	<ul style="list-style-type: none"> • by opening or closing resistor geometric tracks of predetermined resistive values, {e.g. snapistors}
		17/232	<ul style="list-style-type: none"> • Adjusting the temperature coefficient; Adjusting value of resistance by adjusting temperature coefficient of resistance
		17/235	<ul style="list-style-type: none"> • Initial adjustment of potentiometer parts for calibration
		17/24	<ul style="list-style-type: none"> • by removing or adding resistive material (H01C 17/23, H01C 17/232, H01C 17/235 take precedence)
		17/2404	<ul style="list-style-type: none"> • {by charged particle impact, e.g. by electron or ion beam milling, sputtering, plasma etching}
		17/2408	<ul style="list-style-type: none"> • {by pulsed voltage erosion, e.g. spark erosion}
		17/2412	<ul style="list-style-type: none"> • {by electrolytic treatment, e.g. electroplating (for anodic oxydation H01C 17/262)}
		17/2416	<ul style="list-style-type: none"> • {by chemical etching}

- 17/242 . . . by laser {(trimming by laser in general
[B23K 26/351](#))}
- 17/245 . . . by mechanical means, e.g. sand blasting,
cutting, ultrasonic treatment
- 17/26 . . by converting resistive material
- 17/262 . . . {by electrolytic treatment, e.g. anodic
oxydation}
- 17/265 . . . {by chemical or thermal treatment, e.g.
oxydation, reduction, annealing ([etching
H01C 17/2416](#))}
- 17/267 {by passage of voltage pulses or electric
current}
- 17/28 . . adapted for applying terminals
- 17/281 . . {by thick film techniques}
- 17/283 . . . {Precursor compositions therefor, e.g. pastes,
inks, glass frits}
- 17/285 {applied to zinc or cadmium oxide resistors}
- 17/286 {applied to TiO₂ or titanate resistors}
- 17/288 . . {by thin film techniques}
- 17/30 . . adapted for baking