

## SECTION H — ELECTRICITY

### H01 BASIC ELECTRIC ELEMENTS

**H01H ELECTRIC SWITCHES; RELAYS; SELECTORS; EMERGENCY PROTECTIVE DEVICES** (contact cables H01B 7/10; electrolytic self-interrupters H01G 9/18; emergency protective circuit arrangements H02H; switching by electronic means without contact-making H03K 17/00)

#### Note(s)

- This subclass covers (in groups H01H 69/00-H01H 87/00) devices for the protection of electric lines or electric machines or apparatus in the event of undesired change from normal electric working conditions, the electrical condition serving directly as the input to the device.
- This subclass does not cover bases, casings, or covers accommodating two or more switching devices or for accommodating a switching device as well as another electric component, e.g. bus-bar, line connector. Those bases, casings or covers are covered by group H02B 1/26.
- In this subclass, the following terms or expressions are used with the meanings indicated:
  - "relay" means a switching device having contacts which are operated from electric inputs which supply, directly or indirectly, all the mechanical energy necessary to cause both the closure and the opening of the contacts;
  - "driving mechanism" refers to the means by which an operating force applied to the switch is transmitted to the moving contact or contacts;
  - "operating" is used in a broader sense than "actuating" which is reserved for those parts not touched by hand to effect switching;
  - "acting" or "action" means a self-induced movements of parts at one stage of the switching. These connotations apply to all parts of the verbs "to operate"; "to actuate", and "to act", and to words derived therefrom, e.g. to "actuation".
- In this subclass, details are classified as follows:
  - details of an unspecified type of switching device, or disclosed as applicable to two or more kinds of switching devices designated by the terms or expressions "switches", "relays", "selector switches", and "emergency protective devices", are classified in groups H01H 1/00-H01H 9/00;
  - details of an unspecified type of switch, or disclosed as applicable to two or more types of switches as defined by groups H01H 13/00-H01H 43/00 and subgroups H01H 35/02, H01H 35/06, H01H 35/14, H01H 35/18, H01H 35/24, and H01H 35/42, all hereinafter called basic types, are classified in groups H01H 1/00-H01H 9/00;
  - details of an unspecified type of relay, or disclosed as applicable to two or more types of relays as defined by groups H01H 51/00-H01H 61/00, hereinafter called basic types, are classified in group H01H 45/00;
  - details of an unspecified protective device, or applicable to two or more types of protective devices as defined by groups H01H 73/00-H01H 83/00, hereinafter called basic types, are classified in group H01H 71/00.
  - However, details only described with reference to, or clearly only applicable to, switching devices of a single basic type, are classified in the group appropriate to switching devices of that basic type, e.g. H01H 19/02, H01H 75/04;
  - mechanical structural details of control members of switches or of keyboards such as keys, push-buttons, levers or other mechanisms for transferring the force to the activated elements are classified in this subclass, even when they are used for controlling electronic switches.

However, mechanical details directly producing electronic effects are classified in group H03K 17/94.

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##### ELECTRIC SWITCHES

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## H01H

### RELAYS

Electromagnetic; dynamo-electric; magnetostrictive.....	51/00, 53/00, 55/00
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### Electric switches

#### **1/00**   **Contacts** (liquid contacts H01H 29/04)

- 1/02   • characterised by the material thereof
- 1/021 • • Composite material **[2006.01]**

#### **Note(s) [2006.01]**

1. In this group, the following expression is used with the meaning indicated:
  - "composite material" is a material made of two or more different materials, e.g. coated material, layered materials or carbon fibres in a copper base or matrix.
2. Subject matter classifiable in more than one of groups H01H 1/023-H01H 1/029 should be classified in all relevant groups.

- 1/023 • • • having a noble metal as the basic material **[2006.01]**
- 1/0233 • • • • and containing carbides **[2006.01]**
- 1/0237 • • • • and containing oxides **[2006.01]**
- 1/025 • • • having copper as the basic material **[2006.01]**
- 1/027 • • • containing carbon particles or fibres **[2006.01]**
- 1/029 • • • comprising conducting material dispersed in an elastic support or binding material **[2006.01]**
- 1/04   • • Co-operating contacts of different material
- 1/06   • characterised by the shape or structure of the contact-making surface, e.g. grooved
- 1/08   • • wetted with mercury
- 1/10   • • Laminated contacts with divided contact surface
- 1/12   • characterised by the manner in which co-operating contacts engage
- 1/14   • • by abutting
- 1/16   • • • by rolling; by wrapping; Roller or ball contacts
- 1/18   • • • with subsequent sliding
- 1/20   • • • Bridging contacts

- 1/22   • • • with rigid pivoted member carrying the moving contact
- 1/24   • • • with resilient mounting
- 1/26   • • • • with spring blade support
- 1/28   • • • • • Assembly of three or more contact-supporting spring blades
- 1/30   • • • • within supporting guides
- 1/32   • • • Self-aligning contacts
- 1/34   • • • with provision for adjusting position of contact relative to its co-operating contact
- 1/36   • • by sliding
- 1/38   • • • Plug-and-socket contacts
- 1/40   • • • Contact mounted so that its contact-making surface is flush with adjoining insulation
- 1/42   • • • Knife-and-clip contacts
- 1/44   • • • with resilient mounting
- 1/46   • • • self-aligning contacts
- 1/48   • • • with provision for adjusting position of contact relative to its co-operating contact
- 1/50   • Means for increasing contact pressure, preventing vibration of contacts, holding contacts together after engagement, or biasing contacts to the open position
- 1/52   • • Contacts adapted to act as latches
- 1/54   • • by magnetic force
- 1/56   • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing
- 1/58   • Electric connections to or between contacts; Terminals
- 1/60   • Auxiliary means structurally associated with the switch for cleaning or lubricating contact-making surfaces (cleaning by normal sliding of contacts H01H 1/18, H01H 1/36)
- 1/62   • Heating or cooling of contacts
- 1/64   • Protective enclosures, baffle plates, or screens for contacts

- 1/66 • • Contacts sealed in an evacuated or gas-filled envelope, e.g. magnetic dry-reed contacts
- 3/00 Mechanisms for operating contacts** (thermal actuating or release means H01H 37/02)
- 3/02 • Operating parts, i.e. for operating driving mechanism by a mechanical force external to the switch
- 3/04 • • Levers (tumblers H01H 23/14)
- 3/06 • • • Means for securing to shaft of driving mechanism
- 3/08 • • Turn knobs
- 3/10 • • • Means for securing to shaft of driving mechanism
- 3/12 • • Push-buttons
- 3/14 • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 3/16 • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. for a door switch, a limit switch, a floor-levelling switch of a lift
- 3/18 • • • the movement in one direction being intentionally by hand, e.g. for setting automatically cancelled trafficators
- 3/20 • • wherein an auxiliary movement thereof, or of an attachment thereto, is necessary before the main movement is possible or effective, e.g. for unlatching, for coupling
- 3/22 • Power arrangements internal to the switch for operating the driving mechanism
- 3/24 • • using pneumatic or hydraulic actuator
- 3/26 • • using dynamo-electric motor (for storing energy in a spring motor H01H 3/30)
- 3/28 • • using electromagnet (for storing energy in a spring motor H01H 3/30; for operating relays H01H 45/00)
- 3/30 • • using spring motor
- 3/32 • Driving mechanisms, i.e. for transmitting driving force to the contacts (snap-action arrangements H01H 5/00; introducing a predetermined time delay H01H 7/00)
- 3/34 • • using ratchet
- 3/36 • • using belt, chain, or cord
- 3/38 • • using spring or other flexible shaft coupling
- 3/40 • • using friction, toothed, or screw-and-nut gearing
- 3/42 • • using cam or eccentric
- 3/44 • • using Geneva movement
- 3/46 • • using rod or lever linkage, e.g. toggle
- 3/48 • • using lost-motion device
- 3/50 • • with indexing or locating means, e.g. indexing by ball and spring
- 3/52 • • with means to ensure stopping at intermediate operative positions
- 3/54 • Mechanisms for coupling or uncoupling operating parts, driving mechanisms, or contacts
- 3/56 • • using electromagnetic clutch
- 3/58 • • using friction, toothed, or other mechanical clutch
- 3/60 • Mechanical arrangements for preventing or damping vibration or shock
- 3/62 • Lubricating means structurally associated with the switch (for lubricating contact-making surfaces H01H 1/60)
- 5/00 Snap-action arrangements, i.e. in which during a single opening operation or a single closing operation energy is first stored and then released to produce or assist the contact movement**
- 5/02 • Energy stored by the attraction or repulsion of magnetic parts
- 5/04 • Energy stored by deformation of elastic members (by deformation of bimetallic element in thermally-actuated switches H01H 37/54)
- 5/06 • • by compression or extension of coil springs
- 5/08 • • • one end of spring transmitting movement to the contact member when the other end is moved by the operating part
- 5/10 • • • one end of spring being fixedly connected to the stationary or movable part of the switch, and the other end reacting with a movable or stationary rigid member respectively through pins, cams, toothed, or other shaped surfaces
- 5/12 • • • having two or more snap-action motions in succession
- 5/14 • • by twisting of torsion members
- 5/16 • • • with auxiliary means for temporarily holding parts until torsion member is sufficiently strained
- 5/18 • • by flexing of blade springs
- 5/20 • • • single blade moved across dead-centre position
- 5/22 • • • blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg
- 5/24 • • • • having three legs
- 5/26 • • • having two or more snap-action motions in succession
- 5/28 • • • two separate blade springs forming a toggle
- 5/30 • • by buckling of disc springs
- 7/00 Devices for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts** (time or time-programme switches H01H 43/00)
- 7/02 • with fluid timing means
- 7/03 • • with dash-pots
- 7/04 • • with flies, i.e. fan governors
- 7/06 • with thermal timing means
- 7/08 • with timing by mechanical speed-control devices
- 7/10 • • by escapement
- 7/12 • • • mechanical
- 7/14 • • • electromagnetic
- 7/16 • Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 9/56)
- 9/00 Details of switching devices, not covered by groups H01H 1/00-H01H 7/00**
- 9/02 • Bases, casings, or covers (accommodating more than one switch or a switch and another electrical component H02B 1/26)
- 9/04 • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
- 9/06 • • Casing of switch constituted by a handle serving a purpose other than the actuation of the switch, e.g. by the handle of a vacuum cleaner
- 9/08 • Arrangements to facilitate replacement of switch, e.g. cartridge housing
- 9/10 • Adaptation for built-in fuses (mounting switch and fuse separately on, or in, common support H02B 1/18)

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- 9/12 • Means for earthing parts of switch not normally conductively connected to the contacts
- 9/14 • Adaptation for built-in safety spark gaps
- 9/16 • Indicators for switching condition, e.g. "on" or "off"
- 9/18 • Distinguishing marks on switches, e.g. for indicating switch location in the dark; Adaptation of switches to receive distinguishing marks
- 9/20 • Interlocking, locking, or latching mechanisms
- 9/22 • • for interlocking between casing, cover, or protective shutter and mechanism for operating contacts
- 9/24 • • for interlocking two or more parts of the mechanism for operating contacts
- 9/26 • • for interlocking two or more switches (by a detachable member H01H 9/28)
- 9/28 • • for locking switch parts by a key or equivalent removable member (switches operated by a key H01H 27/00; locking by removable part of two-part coupling device H01R)
- 9/30 • Means for extinguishing or preventing arc between current-carrying parts
- 9/32 • • Insulating body insertable between contacts
- 9/34 • • Stationary parts for restricting or subdividing the arc, e.g. barrier plate
- 9/36 • • • Metal parts
- 9/38 • • Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing-horns H01H 9/46)
- 9/40 • • Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc
- 9/42 • • Impedances connected with contacts
- 9/44 • • using blow-out magnet
- 9/46 • • using arcing horns (using blow-out magnet H01H 9/44)
- 9/48 • Means for preventing discharge to non-current-carrying parts, e.g. using corona ring
- 9/50 • Means for detecting the presence of an arc or discharge
- 9/52 • Cooling of switch parts (cooling of contacts H01H 1/62)
- 9/54 • Circuit arrangements not adapted to a particular application of the switching device and for which no provision exists elsewhere
- 9/56 • • for ensuring operation of the switch at a predetermined point in the ac cycle
- 11/00 Apparatus or processes specially adapted for the manufacture of electric switches** (processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards, H01H 13/88) **[1, 2006.01]**
- 11/02 • for mercury switches
- 11/04 • of switch contacts
- 11/06 • • Fixing of contacts to carrier
- 13/00 Switches having rectilinearly-movable operating part or parts adapted for pushing or pulling in one direction only, e.g. push-button switch** (wherein the operating part is flexible H01H 17/00)
- 13/02 • Details **[1, 2006.01]**
- 13/04 • • Cases; Covers
- 13/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
- 13/08 • • • Casing of switch constituted by a handle serving a purpose other than the actuation of the switch
- 13/10 • • Bases; Stationary contacts mounted thereon
- 13/12 • • Movable parts; Contacts mounted thereon
- 13/14 • • • Operating parts, e.g. push-button
- 13/16 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 13/18 • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 13/20 • • • Driving mechanisms
- 13/22 • • • • acting with snap action (depending upon deformation of elastic members H01H 13/26)
- 13/24 • • • • with means for introducing a predetermined time delay
- 13/26 • • Snap-action arrangements depending upon deformation of elastic members
- 13/28 • • • using compression or extension of coil springs
- 13/30 • • • • one end of spring transmitting movement to the contact member when the other end is moved by the operating part
- 13/32 • • • • one end of spring being fixedly connected to the stationary or movable part of the switch and the other end reacting with a movable or stationary rigid member respectively through pins, cams, toothed, or other shaped surfaces
- 13/34 • • • • having two or more snap-action motions in succession
- 13/36 • • • using flexing of blade springs
- 13/38 • • • • Single blade moved across dead-centre position
- 13/40 • • • • Blade spring with at least one snap-acting leg and at least one separate contact-carrying or contact-actuating leg
- 13/42 • • • • • having three legs
- 13/44 • • • • having two or more snap-action motions in succession
- 13/46 • • • • two separate blade springs forming a toggle
- 13/48 • • • using buckling of disc springs
- 13/50 • having a single operating member
- 13/52 • • the contact returning to its original state immediately upon removal of operating force, e.g. bell push switch
- 13/54 • • the contact returning to its original state a predetermined time interval after removal of operating force, e.g. for staircase lighting
- 13/56 • • the contact returning to its original state upon the next application of operating force
- 13/58 • • • with contact-driving member rotated step-wise in one direction
- 13/60 • • • with contact-driving member moved alternately in opposite directions
- 13/62 • • the contact returning to its original state upon manual release of a latch (latch released by second push-button H01H 13/68)
- 13/64 • • wherein the switch has more than two electrically distinguishable positions, e.g. multi-position push-button switches
- 13/66 • • • the operating member having only two positions

- 13/68 • having two operating members, one for opening and one for closing the same set of contacts (single operating member protruding from different sides of switch casing for alternate pushing upon opposite ends H01H 15/22)
- 13/70 • having a plurality of operating members associated with different sets of contacts, e.g. keyboard (mounting together a plurality of independent switches H02B)
- 13/702 • • with contacts carried by or formed from layers in a multilayer structure, e.g. membrane switches [7]
- 13/703 • • • characterised by spacers between contact carrying layers [2006.01]
- 13/704 • • • characterised by the layers, e.g. by their material or structure (H01H 13/703 takes precedence) [2006.01]
- 13/705 • • • characterised by construction, mounting or arrangement of operating parts, e.g. push-buttons or keys [7]
- 13/7057 • • • • characterised by the arrangement of operating parts in relation to each other, e.g. pre-assembled groups of keys [2006.01]
- 13/7065 • • • • characterised by the mechanism between keys and layered keyboards [2006.01]
- 13/7073 • • • • • characterised by springs, e.g. Euler springs [2006.01]
- 13/708 • • • in which all fixed and movable contacts are carried by insulating members (H01H 13/705 takes precedence) [7]
- 13/712 • • • • all of the insulating members being substantially flat [7]
- 13/715 • • • in which each contact set includes a contact which is not secured to or part of a supporting layer, e.g. a snap dome (H01H 13/705 takes precedence) [7]
- 13/718 • • • in which some or all of the movable contacts are formed in a single conductive plate, e.g. formed by punching sheet metal (H01H 13/705 takes precedence) [7]
- 13/72 • • wherein the switch has means for limiting the number of operating members that can concurrently be in the actuated position
- 13/74 • • • each contact set returning to its original state only upon actuation of another of the operating members
- 13/76 • • wherein some or all of the operating members actuate different combinations of the contact sets, e.g. ten operating members actuating different combinations of four contact sets
- 13/78 • • characterised by the contacts or the contact sites [2006.01]
- 13/785 • • • characterised by the material of the contacts, e.g. conductive polymers [2006.01]
- 13/79 • • • characterised by the form of the contacts, e.g. interspersed fingers or helical networks [2006.01]
- 13/80 • • • characterised by the manner of cooperation of the contacts, e.g. with both contacts movable or with bounceless contacts [2006.01]
- 13/803 • • • characterised by the switching function thereof, e.g. normally closed contacts or consecutive operation of contacts [2006.01]
- 13/807 • • • characterised by the spatial arrangement of the contact sites, e.g. superimposed sites [2006.01]
- 13/81 • • characterised by electrical connections to external devices [2006.01]
- 13/82 • • characterised by contact space venting means [2006.01]
- 13/83 • • characterised by legends, e.g. Braille, liquid crystal displays, light emitting or optical elements [2006.01]
- 13/84 • • characterised by ergonomic functions, e.g. for miniature keyboards; characterised by operational sensory functions, e.g. sound feedback (legends H01H 13/83) [2006.01]
- 13/85 • • • characterised by tactile feedback features [2006.01]
- 13/86 • • characterised by the casing, e.g. sealed casings or casings reducible in size [2006.01]
- 13/88 • • Processes specially adapted for manufacture of rectilinearly movable switches having a plurality of operating members associated with different sets of contacts, e.g. keyboards [2006.01]
- 15/00 Switches having rectilinearly-movable operating part or parts adapted for actuation in opposite directions, e.g. slide switch**
- 15/02 • Details
- 15/04 • • Stationary parts; Contacts mounted thereon
- 15/06 • • Movable parts; Contacts mounted thereon
- 15/08 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing
- 15/10 • • • Operating parts
- 15/12 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 15/14 • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 15/16 • • • Driving mechanisms
- 15/18 • • • • acting with snap action
- 15/20 • • • • with means for introducing a predetermined time delay
- 15/22 • having a single operating part protruding from different sides of switch casing for alternate actuation from opposite ends
- 15/24 • having a single operating part only protruding from one side of the switch casing for alternate pushing and pulling
- 17/00 Switches having flexible operating part adapted only for pulling, e.g. cord, chain**
- 17/02 • Details
- 17/04 • • Stationary parts (guides H01H 17/14)
- 17/06 • • Movable parts (guides H01H 17/14)
- 17/08 • • • Operating part, e.g. cord
- 17/10 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 17/12 • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 17/14 • • Guiding means for flexible operating part
- 17/16 • having a single flexible operating part adapted for pulling at one end only
- 17/18 • • secured to a part of the switch driving mechanism that has only angular movement
- 17/20 • • • the contact returning to its original state immediately upon removal of operating force
- 17/22 • • • the contact returning to its original state upon the next application of operating force

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- 17/24 • • secured to a part of the switch driving mechanism that has both angular and rectilinear motion
- 17/26 • having two flexible operating parts; having a single operating part adapted for pulling at both ends
- 17/28 • • secured to a part or parts of the switch driving mechanism having only rectilinear motion
- 17/30 • • secured to a part or parts of the switch driving mechanism having only angular motion
- 19/00 Switches operated by an operating part which is rotatable about a longitudinal axis thereof and which is acted upon directly by a solid body external to the switch, e.g. by a hand [1, 2006.01]**
- 19/02 • Details
- 19/03 • • Means for limiting the angle of rotation of the operating part [2006.01]
- 19/04 • • Cases; Covers
- 19/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
- 19/08 • • Bases; Stationary contacts mounted thereon
- 19/10 • • Movable parts; Contacts mounted thereon
- 19/11 • • • with indexing means [2006.01]
- 19/12 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing
- 19/14 • • • Operating parts, e.g. turn knob
- 19/16 • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 19/18 • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 19/20 • • • Driving mechanisms allowing angular displacement of the operating part to be effective in either direction
- 19/22 • • • • incorporating lost motion
- 19/24 • • • • acting with snap action
- 19/26 • • • • with means for introducing a predetermined time delay
- 19/28 • • • Driving mechanisms allowing angular displacement of the operating part to be effective or possible in only one direction
- 19/30 • • • • incorporating lost motion
- 19/32 • • • • acting with snap action
- 19/34 • • • • with means for introducing a predetermined time delay
- 19/36 • the operating part having only two operative positions, e.g. relatively displaced by 180°
- 19/38 • • Change-over switches
- 19/40 • • • having only axial contact pressure
- 19/42 • • providing more than two electrically-different conditions, e.g. for closing either or both of two circuits
- 19/44 • • • having only axial contact pressure
- 19/46 • the operating part having three operative positions, e.g. off/star/delta
- 19/48 • • having only axial contact pressure
- 19/50 • the operating part having four operative positions, e.g. off/two-in-series/one-only/two-in-parallel
- 19/52 • • having only axial contact pressure
- 19/54 • the operating part having at least five or an unspecified number of operative positions
- 19/56 • • Angularly-movable actuating part carrying contacts, e.g. drum switch
- 19/58 • • • having only axial contact pressure, e.g. disc switch, wafer switch
- 19/60 • • Angularly-movable actuating part carrying no contacts
- 19/62 • • • Contacts actuated by radial cams
- 19/63 • • • Contacts actuated by axial cams [2]
- 19/635 • • • Contacts actuated by rectilinearly-movable member linked to operating part, e.g. by pin and slot [2006.01]
- 19/64 • Encased switches adapted for ganged operation when assembled in a line with identical switches, e.g. stacked switches
- 21/00 Switches operated by an operating part in the form of a pivotable member acted upon directly by a solid body, e.g. by a hand (tumbler or rocker switches H01H 23/00; switches having an operating part movable angularly in more than one plane H01H 25/04) [1, 2006.01]**
- 21/02 • Details
- 21/04 • • Cases; Covers
- 21/06 • • • interlocked with operating mechanism
- 21/08 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
- 21/10 • • • Casing of switch constituted by a handle serving a purpose other than the actuation of the switch
- 21/12 • • Bases; Stationary contacts mounted thereon
- 21/14 • • Means for increasing contact pressure
- 21/16 • • Adaptation for built-in fuse
- 21/18 • • Movable parts; Contacts mounted thereon
- 21/20 • • • Contact arrangements for providing make-before-break operation, e.g. for on-load tap-changing
- 21/22 • • • Operating parts, e.g. handle
- 21/24 • • • • biased to return to original position upon removal of operating force
- 21/26 • • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 21/28 • • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 21/30 • • • • not biased to return to original position upon removal of operating force
- 21/32 • • • • • adapted for operation by a part of the human body other than the hand, e.g. by foot
- 21/34 • • • • • adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 21/36 • • • Driving mechanisms
- 21/38 • • • • incorporating lost motion
- 21/40 • • • • having snap action
- 21/42 • • • • • produced by compression or extension of coil spring
- 21/44 • • • • • produced by flexing blade springs
- 21/46 • • • • • with two or more snap-action motions in succession

- 21/48 • • • • incorporating a ratchet mechanism
- 21/50 • • • • with indexing or latching means, e.g. indexing by ball and spring; with means to ensure stopping at intermediate operative positions
- 21/52 • • • • with means for introducing a predetermined time delay
- 21/54 • Lever switches with blade-type contact co-operating with one or two spring-clip contacts, e.g. knife switch, sectionalisers
- 21/56 • • making contact in one position only
- 21/58 • • Change-over switches without stable intermediate position
- 21/60 • • Change-over switches with stable intermediate position
- 21/86 • Switches with abutting contact carried by operating part, e.g. telegraph tapping key
- 21/88 • • with intermediate position of rest
- 23/00 Tumbler or rocker switches, i.e. switches characterised by being operated by rocking an operating member in the form of a rocker button**
- Note(s) [2006.01]**
- In this group, the term "rocking" is defined as pivotal motion in one plane about an axis parallel to the switch faceplate and located substantially centrally between the ends of the rocker button.
- 23/02 • Details
- 23/04 • • Cases; Covers
- 23/06 • • • Dustproof, splashproof, drip-proof, waterproof, or flameproof casings
- 23/08 • • Bases; Stationary contacts mounted thereon
- 23/10 • • Adaptation for built-in fuse
- 23/12 • • Movable parts; Contacts mounted thereon
- 23/14 • • • Tumblers
- 23/16 • • • Driving mechanisms
- 23/18 • • • • incorporating lost motion
- 23/20 • • • • having snap action
- 23/22 • • • • with means for introducing a predetermined time delay
- 23/24 • with two operating positions
- 23/26 • • one of which positions is unstable
- 23/28 • with three operating positions
- 23/30 • • with stable centre position and one or both end positions unstable
- 25/00 Switches with compound movement of handle or other operating part**
- 25/04 • Operating part movable angularly in more than one plane, e.g. joystick
- 25/06 • Operating part movable both angularly and rectilinearly, the rectilinear movement being along the axis of angular movement
- 27/00 Switches operated by a removable member, e.g. key, plug or plate; Switches operated by setting members according to a single predetermined combination out of several possible settings (combined with plug-and-socket connectors H01R 13/70; with current-carrying plug H01R 31/08)**
- 27/04 • Insulating plug or plate inserted between normally-closed contacts
- 27/06 • Key inserted and then turned to effect operation of the switch
- 27/08 • • wherein the key cannot be removed until the switch is returned to its original position
- 27/10 • Switch operated by setting members according to a single predetermined combination out of several possible settings
- 29/00 Switches having at least one liquid contact (solid contacts wetted or soaked with mercury H01H 1/08)**
- 29/02 • Details
- 29/04 • • Contacts; Containers for liquid contacts
- 29/06 • • • Liquid contacts characterised by the material thereof
- 29/08 • • Means for introducing a predetermined time delay
- 29/10 • • • by constricting the flow of the contact liquid
- 29/12 • • Operating mechanisms adapted for operation by a part of the human body other than the hand, e.g. by foot
- 29/14 • • Operating mechanisms adapted for actuation at a limit or other predetermined position in the path of a body, the relative movement of switch and body being primarily for a purpose other than the actuation of the switch, e.g. door switch, limit switch, floor-levelling switch of a lift
- 29/16 • operated by dipping solid contact into stationary contact liquid
- 29/18 • with level of surface of contact liquid displaced by non-electrical contact-making plunger
- 29/20 • operated by tilting contact-liquid container
- 29/22 • • wherein contact is made and broken between liquid and solid
- 29/24 • • wherein contact is made and broken between liquid and liquid
- 29/26 • with level of surface of contact liquid displaced by centrifugal action
- 29/28 • with level of surface of contact liquid displaced by fluid pressure
- 29/30 • with level of surface of contact liquid displaced by expansion or evaporation thereof
- 29/32 • with contact made by a liquid jet, e.g. earthing switch with contact made by jet of water
- 31/00 Air-break switches for high tension without arc-extinguishing or arc-preventing means (in combination with high tension or heavy-current switches with arc-extinguishing or arc-preventing means H01H 33/00) [3]**
- 31/02 • Details
- 31/04 • • Interlocking mechanisms
- 31/06 • • • for interlocking between casing, cover, or protective shutter and mechanism for operating contacts
- 31/08 • • • for interlocking two or more parts of the mechanism for operating contacts
- 31/10 • • • for interlocking two or more switches
- 31/12 • • Adaptation for built-in fuse
- 31/14 • with bridging contact that is not electrically connected to either line contact in open position of switch
- 31/16 • • with angularly-movable bridging contact or contact-carrying member
- 31/18 • • • actuated through the movement of one or more insulators
- 31/20 • • • • at least one insulator being rotatable about its own geometrical axis
- 31/22 • • • wherein the contact or contacts are rectilinearly movable with respect to the carrying member
- 31/24 • • with rectilinearly-movable bridging contact
- 31/26 • with movable contact that remains electrically connected to one line in open position of switch

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- 31/28 • • with angularly-movable contact
- 31/30 • • • actuated-through the movement of one or more insulators
- 31/32 • • with rectilinearly-movable contact
- 31/34 • with movable contact adapted to engage an overhead transmission line, e.g. for branching
- 31/36 • • Contact moved by pantograph
- 33/00 High-tension or heavy-current switches with arc-extinguishing or arc-preventing means**
- 33/02 • Details
- 33/04 • • Means for extinguishing or preventing arc between current-carrying parts
- 33/06 • • • Insulating body insertable between contacts
- 33/08 • • • Stationary parts for restricting or subdividing the arc, e.g. barrier plate
- 33/10 • • • • Metal parts
- 33/12 • • • Auxiliary contacts on to which the arc is transferred from the main contacts (using arcing horns H01H 33/20)
- 33/14 • • • Multiple main contacts for the purpose of dividing the current through, or potential drop along, the arc
- 33/16 • • • Impedances connected with contacts
- 33/18 • • • using blow-out magnet
- 33/20 • • • using arcing horns (using blow-out magnet H01H 33/18)
- 33/22 • • • Selection of fluids for arc-extinguishing
- 33/24 • • Means for preventing discharge to non-current-carrying parts, e.g. using corona ring
- 33/26 • • Means for detecting the presence of an arc or other discharge
- 33/28 • • Power arrangements internal to the switch for operating the driving mechanism
- 33/30 • • • using fluid actuator
- 33/32 • • • • pneumatic
- 33/34 • • • • hydraulic
- 33/36 • • • using dynamo-electric motor
- 33/38 • • • using electromagnet
- 33/40 • • • using spring motor
- 33/42 • • Driving mechanisms
- 33/44 • • Devices for ensuring operation of the switch at a predetermined point in the ac cycle (circuit arrangements H01H 33/59)
- 33/46 • • Interlocking mechanisms
- 33/48 • • • for interlocking between casing or cover and mechanism for operating contacts
- 33/50 • • • for interlocking two or more parts of the mechanism for operating contacts
- 33/52 • • • for interlocking two or more switches
- 33/53 • • Cases (for switchgear H02B 1/26); Reservoirs, tanks, piping or valves, for arc-extinguishing fluid; Accessories therefor, e.g. safety arrangements, pressure relief devices **[3]**
- 33/55 • • • Oil reservoirs or tanks; Lowering means therefor (associated with withdrawal mechanism for isolation of switch H02B 11/08)
- 33/56 • • • Gas reservoirs
- 33/57 • • • Recuperation of liquid or gas
- 33/575 • • • Pressure relief devices for normal or emergency use **[3]**
- 33/58 • • • Silencers for suppressing noise of switch operation **[3]**
- 33/59 • • • Circuit arrangements not adapted to a particular application of the switch and not otherwise provided for, e.g. for ensuring operation of the switch at a predetermined point in the ac cycle
- 33/60 • Switches wherein the means for extinguishing or preventing the arc do not include separate means for obtaining or increasing flow of arc-extinguishing fluid
- 33/64 • • wherein the break is in gas (vacuum switches H01H 33/66)
- 33/65 • • • wherein the break is in air at atmospheric pressure, e.g. in open air **[2009.01]**
- 33/66 • • Vacuum switches
- 33/662 • • • Housings or protective screens **[7]**
- 33/664 • • • Contacts; Arc-extinguishing means, e.g. arcing rings **[7]**
- 33/666 • • • Operating arrangements **[7]**
- 33/668 • • • Means for obtaining or monitoring the vacuum **[7]**
- 33/68 • • Liquid-break switches, e.g. oil-break
- 33/70 • Switches with separate means for directing, obtaining, or increasing flow of arc-extinguishing fluid
- 33/72 • • having stationary parts for directing the flow of arc-extinguishing fluid, e.g. arc-extinguishing chamber
- 33/73 • • • wherein the break is in air at atmospheric pressure, e.g. in open air
- 33/74 • • • wherein the break is in gas (in air at atmospheric pressure H01H 33/73)
- 33/75 • • • Liquid-break switches, e.g. oil-break
- 33/76 • • wherein arc-extinguishing gas is evolved from stationary parts; Selection of material therefor
- 33/77 • • • wherein the break is in air at atmospheric pressure
- 33/78 • • • wherein the break is in gas (in air at atmospheric pressure H01H 33/77)
- 33/80 • • flow of arc-extinguishing fluid from a pressure source being controlled by a valve
- 33/82 • • • the fluid being air or gas
- 33/825 • • • • with closed circuit of air or gas (H01H 33/835 takes precedence) **[3]**
- 33/83 • • • • wherein the contacts are opened by the flow of air or gas
- 33/835 • • • • • with closed circuit of air or gas **[3]**
- 33/84 • • • the fluid being liquid, e.g. oil
- 33/85 • • • • wherein the contacts are opened by the flow of liquid
- 33/86 • • the flow of arc-extinguishing fluid under pressure from the contact space being controlled by a valve
- 33/867 • • • the fluid being air or gas **[3]**
- 33/873 • • • • with closed circuit of air or gas **[3]**
- 33/88 • • the flow of arc-extinguishing fluid being produced or increased by movement of pistons or other pressure-producing parts
- 33/90 • • • this movement being effected by, or in conjunction with, the contact-operating mechanism
- 33/91 • • • • the arc-extinguishing fluid being air or gas
- 33/915 • • • • • with closed circuit of air or gas **[3]**
- 33/92 • • • • the arc-extinguishing fluid being liquid, e.g. oil
- 33/94 • • • this movement being effected solely due to the pressure caused by the arc itself or by an auxiliary arc
- 33/95 • • • • the arc-extinguishing fluid being air or gas

33/96	• • • the arc-extinguishing fluid being liquid, e.g. oil	37/12	• • Means for adjustment of "on" or "off" operating temperature
33/98	• • the flow of arc-extinguishing fluid being initiated by an auxiliary arc or a section of the arc, without any moving parts for producing or increasing the flow	37/14	• • • by anticipatory electric heater
33/985	• • • the fluid being air or gas [3]	37/16	• • • by varying the proportion of input heat received by the thermal element, e.g. by displacement of a shield
33/99	• • • the fluid being liquid [3]	37/18	• • • by varying bias on the thermal element due to a separate spring
<b>35/00</b>	<b>Switches operated by change of a physical condition</b> (operated by change of magnetic or electric field H01H 36/00; thermally-actuated switches H01H 37/00)	37/20	• • • by varying the position of the thermal element in relation to switch base or casing
	<b>Note(s)</b> A switching device is classified according to that physical condition which when changed acts as input to the device, e.g. external explosion causing pressure wave to act upon switch is classified in group H01H 35/24, an explosion produced within the switch in group H01H 37/00 if initiated by heat, in group H01H 39/00 if initiated electrically, and in group H01H 35/14 if initiated by an external blow.	37/22	• • • by adjustment of a member transmitting motion from the thermal element to contacts or latch
35/02	• Switches operated by change of position, inclination, or orientation of the switch itself in relation to gravitational field (tilting mercury container H01H 29/20; change of position due to change of liquid level H01H 35/18)	37/24	• • • by adjustment of position of the movable contact on its driving member
35/06	• Switches operated by change of speed (operated by change of fluid flow H01H 35/24)	37/26	• • • by adjustment of abutment for "off" position of the movable contact
35/10	• • Centrifugal switches (level of mercury displaced by centrifugal action H01H 29/26)	37/28	• • • by adjustment of the position of the fixed contact
35/12	• • operated by reversal of direction of movement	37/30	• • • by varying the position of the contact unit in relation to switch base or casing
35/14	• Switches operated by change of acceleration, e.g. by shock or vibration, inertia switch	37/32	• • Thermally-sensitive members
35/18	• Switches operated by change of liquid level or of liquid density, e.g. float switch (by magnet carried on a float H01H 36/02)	37/34	• • • Means for transmitting heat thereto, e.g. capsule remote from contact member
35/24	• Switches operated by change of fluid pressure, by fluid pressure waves, or by change of fluid flow (wherein the change of pressure is caused by change of temperature H01H 37/36)	37/36	• • • actuated due to expansion or contraction of a fluid with or without vaporisation (the fluid forming a contact of the switch H01H 29/04, H01H 29/30)
35/26	• • Details	37/38	• • • • with bellows
35/28	• • • Compensation for variation of ambient pressure or temperature	37/40	• • • • with diaphragm
35/30	• • • Means for transmitting pressure to pressure-responsive operating part, e.g. by capsule and capillary tube	37/42	• • • • with curled flexible tube, e.g. Bourdon tube
35/32	• • actuated by bellows	37/44	• • • • with piston and cylinder
35/34	• • actuated by diaphragm	37/46	• • • actuated due to expansion or contraction of a solid (deflection of a bimetallic element H01H 37/52)
35/36	• • actuated by curled flexible tube, e.g. Bourdon tube	37/48	• • • • with extensible rigid rods or tubes
35/38	• • actuated by piston and cylinder	37/50	• • • • with extensible wires under tension
35/40	• • actuated by devices allowing continual flow of fluid, e.g. vane	37/52	• • • actuated due to deflection of bimetallic element
35/42	• Switches operated by change of humidity	37/54	• • • • wherein the bimetallic element is inherently snap acting
<b>36/00</b>	<b>Switches actuated by change of magnetic field or of electric field, e.g. by change of relative position of magnet and switch, by shielding</b>	37/56	• • • • having spirally wound or helically wound bimetallic element
36/02	• actuated by movement of a float carrying a magnet	37/58	• • • actuated due to thermally controlled change of magnetic permeability
<b>37/00</b>	<b>Thermally-actuated switches</b>	37/60	• • • Means for producing snap action (inherent in bimetallic element H01H 37/54; caused by a magnet H01H 37/66)
37/02	• Details	37/62	• • • Means other than thermal means for introducing a predetermined time delay
37/04	• • Bases; Housings; Mountings	37/64	• • • Contacts
37/06	• • • to facilitate replacement, e.g. cartridge housing	37/66	• • • • Magnetic reinforcement of contact pressure; Magnet causing snap action
37/08	• • Indicators; Distinguishing marks	37/68	• • • • sealed in evacuated or gas-filled tube
37/10	• • Compensation for variation of ambient temperature or pressure	37/70	• • • • Resetting means
		37/72	• Switches in which the opening movement and the closing movement of a contact are effected respectively by heating and cooling or <u>vice versa</u>
		37/74	• Switches in which only the opening movement or only the closing movement of a contact is effected by heating or cooling
		37/76	• • Contact member actuated by melting of fusible material, actuated due to burning of combustible material or due to explosion of explosive material
		<b>39/00</b>	<b>Switching devices actuated by an explosion produced within the device and initiated by an electric current</b>

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- 41/00 Switches providing a selected number of consecutive operations of the contacts by a single manual actuation of the operating part**
- 41/04 • Switches without means for setting or mechanically storing a multidigit number
  - 41/06 • • dial or slide operated
  - 41/08 • • keyboard operated
  - 41/10 • Switches with means for setting or mechanically storing a multidigit number
  - 41/12 • • dial or slide operated
  - 41/14 • • keyboard operated
- 43/00 Time or time-programme switches providing a choice of time-intervals for executing one or more switching actions and automatically terminating their operation after the programme is completed**
- 43/02 • Details
  - 43/04 • • Means for time setting
  - 43/06 • • • comprising separately adjustable parts for each programme step, e.g. with tappets
  - 43/08 • • • comprising an interchangeable programme part which is common for all programme steps, e.g. with a punched card
  - 43/10 • with timing of actuation of contacts due to a part rotating at substantially constant speed
  - 43/12 • • stopping automatically after a single cycle of operation
  - 43/14 • • • wherein repetition of operation necessitates resetting of time intervals
  - 43/16 • • stopping automatically after a predetermined plurality of cycles of operation
  - 43/24 • with timing of actuation of contacts due to a non-rotatably moving part
  - 43/26 • • the actuation being produced by a substance flowing due to gravity, e.g. sand, water
  - 43/28 • • the actuation being produced by a part, the speed of which is controlled by fluid-pressure means, e.g. by piston and cylinder
  - 43/30 • with timing of actuation of contacts due to thermal action
  - 43/32 • with timing of actuation of contacts due to electrolytic processes; with timing of actuation of contacts due to chemical processes
- 47/00 Details of relays** (electric circuit arrangements H01H 47/00; of electromagnetic relays H01H 50/00; details of electrically-operated selector switches H01H 63/00)
- 47/02 • for modifying the operation of the relay
  - 47/04 • • for holding armature in attracted position, e.g. when initial energising circuit is interrupted; for maintaining armature in attracted position, e.g. with reduced energising current
  - 47/06 • • • by changing number of serially-connected turns or winding
  - 47/08 • • • by changing number of parallel-connected turns or windings
  - 47/10 • • • by switching-in or -out impedance external to the relay winding
  - 47/12 • • for biasing the electromagnet
  - 47/14 • • for differential operation of the relay
  - 47/16 • • for conjoint, e.g. additive, operation of the relay
  - 47/18 • • for introducing delay in the operation of the relay (short-circuited conducting sleeves, bands, or discs H01H 50/46)
  - 47/20 • • for producing frequency-selective operation of the relay
  - 47/22 • for supplying energising current for relay coil
  - 47/24 • • having light-sensitive input
  - 47/26 • • having thermo-sensitive input
  - 47/28 • • Energising current supplied by discharge tube
  - 47/30 • • • by gas-filled discharge tube
  - 47/32 • • Energising current supplied by semiconductor device
  - 47/34 • • Energising current supplied by magnetic amplifier
  - 47/36 • • Relay coil or coils forming part of a bridge circuit
- 49/00 Apparatus or processes specially adapted to the manufacture of relays or parts thereof**
- 50/00 Details of electromagnetic relays** (electric circuit arrangements H01H 47/00; details of electrically-operated selector switches H01H 63/00)
- 50/02 • Bases; Casings; Covers (frames for mounting two or more relays or for mounting a relay and another electric component H02B 1/01, H04Q 1/08, H05K)
  - 50/04 • • Mounting complete relay or separate parts of relay on a base or inside a case
  - 50/06 • • having windows; Transparent cases or covers
  - 50/08 • Indicators; Distinguishing marks
  - 50/10 • Electromagnetic or electrostatic shielding (casings H01H 50/02)
  - 50/12 • Ventilating; Cooling; Heating (for operating electrothermal relays H01H 61/013)
  - 50/14 • Terminal arrangements
  - 50/16 • Magnetic circuit arrangements
  - 50/18 • • Movable parts of magnetic circuits, e.g. armature
  - 50/20 • • • movable inside coil and substantially lengthwise with respect to axis thereof; movable coaxially with respect to coil
  - 50/22 • • • • wherein the magnetic circuit is substantially closed
  - 50/24 • • • Parts rotatable or rockable outside coil
  - 50/26 • • • • Parts movable about a knife edge
  - 50/28 • • • • Parts movable due to bending of a blade spring or reed
  - 50/30 • • • Mechanical arrangements for preventing or damping vibration or shock, e.g. by balancing of armature
  - 50/32 • • • Latching movable parts mechanically
  - 50/34 • • • Means for adjusting limits of movement; Mechanical means for adjusting returning force
  - 50/36 • • Stationary parts of magnetic circuit, e.g. yoke

- 50/38 • • • Part of main magnetic circuit shaped to suppress arcing between the contacts of the relay
- 50/40 • • • Branched or multiple-limb main magnetic circuits
- 50/42 • • • Auxiliary magnetic circuits, e.g. for maintaining armature in, or returning armature to, position of rest, for damping or accelerating movement
- 50/44 • Magnetic coils or windings
- 50/46 • • Short-circuited conducting sleeves, bands, or discs
- 50/54 • Contact arrangements
- 50/56 • • Contact spring sets
- 50/58 • • • Driving arrangements structurally associated therewith; Mounting of driving arrangement on armature
- 50/60 • • moving contact being rigidly combined with movable part of magnetic circuit
- 50/62 • • Co-operating movable contacts operated by separate electrical actuating means
- 50/64 • Driving arrangements between movable part of magnetic circuit and contact (structurally associated with contact spring sets H01H 50/58)
  - 50/66 • • with lost motion
  - 50/68 • • with snap action
  - 50/70 • • operating contact momentarily during stroke of armature
  - 50/72 • • for mercury contact
  - 50/74 • • Mechanical means for producing a desired natural frequency of operation of the contacts, e.g. for self-interrupter
    - 50/76 • • • using reed or blade spring
    - 50/78 • • • using diaphragm; using stretched wire or ribbon vibrating sideways
    - 50/80 • • • using torsionally vibrating member, e.g. wire, strip
    - 50/82 • • • using spring-loaded pivoted inertia member
    - 50/84 • • • with means for adjustment of frequency or of make-to-break ratio
  - 50/86 • Means for introducing a predetermined time delay between the initiation of the switching operation and the opening or closing of the contacts (circuit arrangements for introducing delay H01H 47/18; short-circuited conducting sleeves, bands, or discs H01H 50/46)
  - 50/88 • • Mechanical means, e.g. dash-pot
  - 50/90 • • • the delay being effective in both directions of operation
  - 50/92 • • Thermal means (inherent in electrothermal relays H01H 61/00)
- 51/00 Electromagnetic relays** (relays using the dynamo-electric effect H01H 53/00)
  - 51/01 • Relays in which the armature is maintained in one position by a permanent magnet and freed by energisation of a coil producing an opposing magnetic field [3]
  - 51/02 • Non-polarised relays (H01H 51/01 takes precedence) [3]
  - 51/04 • • with single armature; with single set of ganged armatures
- 51/06 • • • Armature is movable between two limit positions of rest and is moved in one direction due to energisation of an electromagnet and after the electromagnet is de-energised is returned by energy stored during the movement in the first direction, e.g. by using a spring, by using a permanent magnet, by gravity
- 51/08 • • • • Contacts alternately opened and closed by successive cycles of energisation and de-energisation of the electromagnet, e.g. by use of a ratchet
- 51/10 • • • • Contacts retained open or closed by a mechanical latch which is controlled by an electromagnet
- 51/12 • • • Armature is movable between two limit positions of rest and is moved in both directions due to the energisation of one or the other of two electromagnets without the storage of energy to effect the return movement
  - 51/14 • • • • without intermediate neutral position of rest
  - 51/16 • • • • with intermediate neutral position of rest
  - 51/18 • • • Armature is rotatable through an unlimited number of revolutions
    - 51/20 • • with two or more independent armatures
- 51/22 • Polarised relays
  - 51/24 • • without intermediate neutral position of rest
  - 51/26 • • with intermediate neutral position of rest
  - 51/27 • Relays with armature having two stable magnetic states and operated by change from one state to the other
- 51/28 • Relays having both armature and contacts within a sealed casing outside which the operating coil is located, e.g. contact carried by a magnetic leaf spring or reed (H01H 51/27 takes precedence)
- 51/29 • Relays having armature, contacts, and operating coil within a sealed casing (H01H 51/27 takes precedence)
- 51/30 • specially adapted for actuation by ac
- 51/32 • • Frequency relays; Mechanically-tuned relays
- 51/34 • Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts
  - 51/36 • • wherein the make-to-break ratio is varied by hand setting or current strength
- 53/00 Relays using the dynamo-electric effect, i.e. relays in which contacts are opened or closed due to relative movement of current-carrying conductor and magnetic field caused by force of interaction between them**
  - 53/01 • Details
  - 53/015 • • Moving coils; Contact-driving arrangements associated therewith
  - 53/02 • Electrodynamical relays, i.e. relays in which the interaction is between two current-carrying conductors
  - 53/04 • • Ferrodynamical relays, i.e. relays in which the magnetic field is concentrated in ferromagnetic parts
  - 53/06 • Magnetodynamic relays, i.e. relays in which the magnetic field is produced by a permanent magnet
  - 53/08 • wherein a mercury contact constitutes the current-carrying conductor
  - 53/10 • Induction relays, i.e. relays in which the interaction is between a magnetic field and current induced thereby in a conductor
    - 53/12 • • Ferraris relays

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- 53/14 • Contacts actuated by an electric motor through fluid-pressure transmission, e.g. using a motor-driven pump
- 55/00 **Magnetostrictive relays**
- 57/00 **Electrostrictive relays; Piezo-electric relays**
- 59/00 **Electrostatic relays; Electro-adhesion relays**
- 61/00 **Electrothermal relays** (thermal switches not operated by electrical input, thermal switches with anticipating electrical input H01H 37/00; thermally-sensitive members H01H 37/32)
  - 61/01 • Details
  - 61/013 • • Heating arrangements for operating relays
  - 61/017 • • • Heating by glow discharge or arc in confined space
  - 61/02 • wherein the thermally-sensitive member is heated indirectly, e.g. resistively, inductively
  - 61/04 • wherein the thermally-sensitive member is only heated directly
  - 61/06 • Self-interrupters, i.e. with periodic or other repetitive opening and closing of contacts
  - 61/08 • • wherein the make-to-break ratio is varied by hand setting or current strength

### Selectors [3]

- 63/00 **Details of electrically-operated selector switches**
- 63/02 • Contacts; Wipers; Connections thereto
- 63/04 • • Contact-making or contact-breaking wipers; Position indicators therefor
- 63/06 • • Contact banks
- 63/08 • • • cylindrical
- 63/10 • • • plane
- 63/12 • • Multiplying connections to contact banks, e.g. using ribbon cables
- 63/14 • • • without soldering
- 63/16 • Driving arrangements for multi-position wipers
- 63/18 • • with step-by-step motion of wiper to a selector position
- 63/20 • • • using stepping magnet and ratchet
- 63/22 • • • using step-by-step electromagnetic drive without ratchet, e.g. self-interrupting driving magnet
- 63/24 • • with continuous motion of wiper until a selected position is reached
- 63/26 • • • with an individual clutch-drive from a shaft common to more than one selector switch
- 63/28 • • • with an individual motor for each selector switch
- 63/30 • • • • Pneumatic motor for moving wiper to selected position
- 63/32 • • • • Spring motor for moving wiper to selected position
- 63/33 • Constructional details of co-ordinate-type selector switches not having relays at cross-points
- 63/34 • Bases; Cases; Covers; Mountings (racks for mounting selectors with or without other exchange equipment H04Q 1/04); Mounting of fuses on selector switch
- 63/36 • Circuit arrangements for ensuring correct or desired operation and not adapted to a particular application of the selector switch
- 63/38 • • for multi-position wiper switches
- 63/40 • • for multi-position switches without wipers

- 63/42 • • • for co-ordinate-type selector switches not having relays at cross-points
- 65/00 **Apparatus or processes specially adapted to the manufacture of selector switches or parts thereof**
- 67/00 **Electrically-operated selector switches**
- 67/02 • Multi-position wiper switches
- 67/04 • • having wipers movable only in one direction for purpose of selection
- 67/06 • • • Rotary switches, i.e. having angularly movable wipers
- 67/08 • • • • with wiper selection
- 67/10 • • • • with coarse and fine positioning of wipers
- 67/12 • • • Linear-motion switches
- 67/14 • • having wipers movable in two mutually perpendicular directions for purpose of selection
- 67/16 • • • one motion being rotary and the other being parallel to the axis of rotation, e.g. Strowger or "up and around" switches
- 67/18 • • • one motion being rotary and the other being perpendicular to the axis of rotation, e.g. "round and in" switches
- 67/20 • • • both motions being linear
- 67/22 • Switches without multi-position wipers
- 67/24 • • Co-ordinate-type relay switches having an individual electromagnet at each cross-point
- 67/26 • • Co-ordinate-type selector switches not having relays at cross-points but involving mechanical movement, e.g. cross-bar switch, code-bar switch
- 67/30 • • Co-ordinate-type selector switches with field of co-ordinate coil acting directly upon magnetic leaf spring or reed-type contact member
- 67/32 • • having a multiplicity of interdependent armatures operated in succession by a single coil and each controlling one contact or set of contacts, e.g. counting relay

### Emergency protective devices

- 69/00 **Apparatus or processes for the manufacture of emergency protective devices**
- 69/01 • for calibrating or setting of devices to function under predetermined conditions
- 69/02 • Manufacture of fuses
- 71/00 **Details of the protective switches or relays covered by groups H01H 73/00-H01H 83/00**
- 71/02 • Housings; Casings; Bases; Mountings
- 71/04 • Means for indicating condition of the switching device
- 71/06 • Distinguishing marks, e.g. colour coding
- 71/08 • Terminals; Connections
- 71/10 • Operating or release mechanisms
- 71/12 • • Automatic release mechanisms with or without manual release
- 71/14 • • • Electrothermal mechanisms
- 71/16 • • • • with bimetal element
- 71/18 • • • • with expanding rod, strip, or wire
- 71/20 • • • • with fusible mass
- 71/22 • • • • with compensation for variation of ambient temperature
- 71/24 • • • Electromagnetic mechanisms
- 71/26 • • • • with windings acting in opposition
- 71/28 • • • • with windings acting in conjunction
- 71/30 • • • • having additional short-circuited winding

- 71/32 • • • • having permanently magnetised part
- 71/34 • • • • having two or more armatures controlled by a common winding
- 71/36 • • • • frequency selective
- 71/38 • • • • wherein the magnet coil also acts as arc blow-out device
- 71/40 • • • Combined electrothermal and electromagnetic mechanisms
- 71/42 • • • Induction-motor, induced-current, or electrodynamic release mechanisms
- 71/43 • • • • Electrodynamic release mechanisms
- 71/44 • • • having means for introducing a predetermined time delay (by short-circuited winding H01H 71/30; by additional armature H01H 71/34)
- 71/46 • • • having means for operating auxiliary contacts additional to the main contacts
- 71/48 • • • • with provision for short-circuiting the electrical input to the release mechanism after release of the switch, e.g. for protection of heating wire
- 71/50 • • Manual reset mechanisms
- 71/52 • • • actuated by lever
- 71/54 • • • actuated by tumbler
- 71/56 • • • actuated by rotatable knob or wheel
- 71/58 • • • actuated by push-button, pull-knob, or slide
- 71/60 • • • actuated by closure of switch casing
- 71/62 • • • with means for preventing resetting while abnormal condition persists, e.g. loose handle arrangement
- 71/64 • • • • incorporating toggle linkage
- 71/66 • • Power reset mechanisms
- 71/68 • • • actuated by electromagnet
- 71/70 • • • actuated by electric motor
- 71/72 • • • actuated automatically a limited number of times
- 71/74 • Means for adjusting the conditions under which the device will function to provide protection
- 73/00 Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of a hand reset mechanism**
- 73/02 • Details
- 73/04 • • Contacts
- 73/06 • • Housings; Casings; Bases; Mountings
- 73/08 • • • Plug-in housings
- 73/10 • • • Cartridge housings, e.g. screw-in housing
- 73/12 • • Means for indicating condition of the switch
- 73/14 • • • Indicating lamp structurally associated with the switch
- 73/16 • • Distinguishing marks, e.g. colour coding
- 73/18 • • Means for extinguishing or suppressing arc
- 73/20 • • Terminals; Connections
- 73/22 • having electrothermal release and no other automatic release (cartridge type H01H 73/62)
- 73/24 • • reset by lever
- 73/26 • • reset by tumbler
- 73/28 • • reset by rotatable knob or wheel
- 73/30 • • reset by push-button, pull-knob, or slide
- 73/32 • • reset by closure of switch casing
- 73/34 • • reset action requiring replacement or reconditioning of a fusible or explosive part
- 73/36 • having electromagnetic release and no other automatic release (cartridge type H01H 73/64)
- 73/38 • • reset by lever
- 73/40 • • reset by tumbler
- 73/42 • • reset by rotatable knob or wheel
- 73/44 • • reset by push-button, pull-knob, or slide
- 73/46 • • reset by closure of switch casing
- 73/48 • having both electrothermal and electromagnetic automatic release (cartridge type H01H 73/66)
- 73/50 • • reset by lever
- 73/52 • • reset by tumbler
- 73/54 • • reset by rotatable knob or wheel
- 73/56 • • reset by push-button, pull-knob, or slide
- 73/58 • • reset by closure of switch casing
- 73/60 • cartridge type, e.g. screw-in cartridge
- 73/62 • • having only electrothermal release
- 73/64 • • having only electromagnetic release
- 73/66 • • having combined electrothermal and electromagnetic release
- 75/00 Protective overload circuit-breaking switches in which excess current opens the contacts by automatic release of mechanical energy stored by previous operation of power reset mechanism**
- 75/02 • Details
- 75/04 • • Reset mechanisms for automatically reclosing a limited number of times (circuit arrangements H02H 3/06)
- 75/06 • • • effecting one reclosing action only
- 75/08 • having only electrothermal release
- 75/10 • having only electromagnetic release
- 75/12 • having combined electrothermal and electromagnetic release
- 77/00 Protective overload circuit-breaking switches operated by excess current and requiring separate action for resetting (H01H 73/00, H01H 75/00 take precedence)**
- 77/02 • in which the excess current itself provides the energy for opening the contacts, and having a separate reset mechanism
- 77/04 • • with electrothermal opening
- 77/06 • • with electromagnetic opening
- 77/08 • • • retained closed by permanent or remanent magnetism and opened by windings acting in opposition
- 77/10 • • with electrodynamic opening
- 79/00 Protective switches in which excess current causes the closing of contacts, e.g. for short-circuiting the apparatus to be protected**
- 81/00 Protective switches in which contacts are normally closed but are repeatedly opened and reclosed as long as a condition causing excess current persists, e.g. for current limiting**
- 81/02 • electrothermally-operated
- 81/04 • electromagnetically-operated
- 83/00 Protective switches, e.g. circuit-breaking switches, or protective relays operated by abnormal electrical conditions otherwise than solely by excess current**
- 83/02 • operated by earth fault currents (H01H 83/14 takes precedence)
- 83/04 • • with testing means for indicating the ability of the switch or relay to function properly
- 83/06 • operated by current falling below a predetermined value
- 83/08 • operated by reversal of dc

## H01H

- 83/10 • operated by excess voltage, e.g. for lightning protection
- 83/12 • operated by voltage falling below a predetermined value, e.g. for no-volt protection
- 83/14 • operated by unbalance of two or more currents or voltages, e.g. for differential protection
- 83/16 • operated by abnormal ratio of voltage and current, e.g. distance relay
- 83/18 • operated by abnormal product of, or abnormal phase angle between, voltage and current, e.g. directional relay
- 83/20 • operated by excess current as well as by some other abnormal electrical condition
- 83/22 • • the other condition being unbalance of two or more currents or voltages
  
- 85/00 Protective devices in which the current flows through a part of fusible material and this current is interrupted by displacement of the fusible material when this current becomes excessive** (switches actuated by melting of fusible material H01H 37/76; disposition or arrangement of fuses on boards H02B 1/18)
- 85/02 • Details
- 85/04 • • Fuses, i.e. expendable parts of the protective device, e.g. cartridges
- 85/041 • • • characterised by the type [5]
- 85/042 • • • • General constructions or structure of high voltage fuses, i.e. above 1,000 V [5]
- 85/044 • • • • General constructions or structure of low voltage fuses, i.e. below 1,000 V, or of fuses where the applicable voltage is not specified (H01H 85/046-H01H 85/048 take precedence) [5]
- 85/0445 • • • • • fast or slow type (H01H 85/045-H01H 85/048 take precedence) [5]
- 85/045 • • • • • cartridge type [5]
- 85/046 • • • • • Fuses formed as printed circuits [5]
- 85/047 • • • • • Vacuum fuses [5]
- 85/048 • • • • • Fuse resistors [5]
- 85/05 • • • Component parts thereof [5]
- 85/055 • • • • Fusible members [5]
- 85/06 • • • • • characterised by the fusible material (H01H 85/11 takes precedence) [5]
- 85/08 • • • • • characterised by the shape or form of the fusible member [5]
- 85/10 • • • • • with constriction for localised fusing (H01H 85/11 takes precedence) [5]
- 85/11 • • • • • with applied local area of a metal which, on melting, forms a eutectic with the main material of the fusible member, i.e. M-effect devices [5]
- 85/12 • • • • • Two or more separate fusible members in parallel [5]
- 85/143 • • • • Electrical contacts; Fastening fusible members to such contacts [5]
- 85/147 • • • • • Parallel-side contacts [5]
- 85/15 • • • • • Screw-in contacts [5]
- 85/153 • • • • • Knife-blade-end contacts [5]
- 85/157 • • • • • Ferrule-end contacts [5]
- 85/165 • • • • Casings [5]
- 85/17 • • • • • characterised by the casing material [5]
- 85/175 • • • • • characterised by the casing shape or form [5]
- 85/18 • • • • Casing fillings, e.g. powder
- 85/20 • • Bases for supporting the fuse; Separate parts thereof
  
- 85/22 • • Intermediate or auxiliary parts for carrying, holding, or retaining fuse, co-operating with base or fixed holder, and removable therefrom for renewing the fuse
- 85/24 • • Means for preventing insertion of incorrect fuse
- 85/25 • • Safety arrangements preventing or inhibiting contact with live parts, including operation of isolation on removal of cover [5]
- 85/26 • • Magazine arrangements
- 85/28 • • • effecting automatic replacement
- 85/30 • • Means for indicating condition of fuse structurally associated with the fuse
- 85/32 • • • Indicating lamp structurally associated with the protective device
- 85/34 • • Distinguishing marks, e.g. colour coding
- 85/36 • • Means for applying mechanical tension to fusible member
- 85/38 • • Means for extinguishing or suppressing arc (by powder filling H01H 85/18; by mechanical tension applied to fusible member H01H 85/36)
- 85/40 • • • using an arc-extinguishing liquid (characterised by the composition of the liquid H01H 33/22)
- 85/42 • • • using an arc-extinguishing gas (characterised by the composition of the gas H01H 33/22)
- 85/43 • • Means for exhausting or absorbing gases liberated by fusing arc, or for ventilating excess pressure generated by heating [5]
- 85/44 • • Structural association with spark-gap arrester
- 85/46 • • Circuit arrangements not adapted to a particular application of the protective device
- 85/47 • • Means for cooling [5]
- 85/48 • Protective devices wherein the fuse is carried or held directly by the base
- 85/50 • • the fuse having contacts at opposite ends for co-operation with the base
- 85/52 • • the fuse being adapted for screwing into the base
- 85/54 • Protective devices wherein the fuse is carried, held, or retained by an intermediate or auxiliary part removable from the base, or used as sectionalisers
- 85/56 • • the intermediate or auxiliary part having side contacts for plugging into the base, e.g. bridge-carrier type
- 85/58 • • • with intermediate auxiliary part and base shaped to interfit and thereby enclose the fuse
- 85/60 • • the intermediate or auxiliary part having contacts at opposite ends for co-operation with the base
- 85/62 • • the intermediate or auxiliary part being adapted for screwing into the base
  
- 87/00 Protective devices in which a current flowing through a liquid or solid is interrupted by the evaporation of the liquid or by the melting and evaporation of the solid when the current becomes excessive, the circuit continuity being reestablished on cooling [3]**

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- 89/00 Combinations of two or more different basic types of electric switches, relays, selectors and emergency protective devices, not covered by any single one of the other main groups of this subclass [2006.01]**
- 89/02 • Combination of a key operated switch with a manually operated switch, e.g. ignition and lighting switches [2006.01]
- 89/04 • Combination of a thermally actuated switch with a manually operated switch [2006.01]

89/06 • Combination of a manual reset circuit with a contactor, i.e. the same circuit controlled by both a protective and a remote control device **[2006.01]**

89/08 • • with both devices using the same contact pair **[2006.01]**

89/10 • • • with each device controlling one of the two co-operating contacts **[2006.01]**