

CPC**COOPERATIVE PATENT CLASSIFICATION****H****ELECTRICITY****NOTE**

These notes cover the basic principles and general instructions for use of section H.

Section H covers :

basic electric elements, which cover all electric units and the general mechanical structure of apparatus and circuits, including the assembly of various basic elements into what are called printed circuits and also cover to a certain extent the manufacture of these elements (when not covered elsewhere);

generation of electricity, which covers the generation, conversion, and distribution of electricity together with the controlling of the corresponding gear;

applied electricity, which covers :

general utilisation techniques, viz. those of electric heating and electric lighting circuits;

some special utilisation techniques, either electric or electronic in the strict sense, which are not covered by other sections of the Classification, including :

- electric light sources, including lasers;
- electric X-ray technique;
- electric plasma technique and the generation and acceleration of electrically charged particles or neutrons;

basic electronic circuits and their control;

radio or electric communication technique, including electromechanical transducers in general;

the use of a specified material for the manufacture of the article or element described. In this connection, paragraphs 56 to 58 of the Guide should be referred to.

In this section, the following general rules apply :

subject to the exceptions stated in I (c) above, any electric aspect or part peculiar to a particular operation, process, apparatus, object, or article classified in one of the sections of the Classification other than section H is always classified in the subclass for that operation, process, apparatus, object, or article, or where common characteristics concerning technical subjects of similar nature have been brought out at class level, it is classified, in conjunction with the operation, process, apparatus, object, or article in a subclass which covers entirely the general electrical applications for the technical subject in question;

such electrical applications, either general or particular, include the therapeutic processes and apparatus, in class [A61](#) ;

the electric processes and apparatus used in various laboratory or industrial operations, in classes [B01](#) , [B03](#) , and subclass [B23K](#) ;

the electricity supply, electric propulsion and electric lighting of vehicles in general and of particular vehicles, in the "Transporting" subsection of section B;

the electric ignition systems of internal-combustion engines, in subclass [F02P](#) , and of combustion apparatus in general, in subclass [F23Q](#) ;

the whole electrical part of section G, i.e. measuring devices including apparatus for measuring electric variables, checking, signalling, and calculating. Electricity in that section is generally dealt with as a means and not as an end in itself;

all electrical applications, both general and particular, presuppose that the "basic electricity" aspect appears in section H (see 1 (a) above) as regards the electric "basic elements" which they comprise. This rule is also valid for applied electricity, referred to under 1 (c) above, which appears in section H itself.

In this section, the following special cases occur :

among the general applications covered by sections other than section H, it is worth noting that electric heating in general is covered by subclasses [F24D](#) or [F24H](#) or class [F27](#) , and that electric lighting in general is partly covered by class [F21](#) , since in section H (see 1 (c) above) there are places in [H05B](#) which cover the same technical subjects;

in the above two cases, the subclasses of section F, which deal with the respective subjects, essentially cover in the first place the whole mechanical aspect of the apparatus or devices, whereas the electrical aspect, as such, is covered by subclass [H05B](#) ;

in the case of lighting, this mechanical aspect should be taken to cover the material arrangement of the various electric elements, i.e. their geometrical, or physical, position in relation to one another; this is covered by subclass [F21V](#) , the elements themselves and the primary circuits remaining in section H. The same applies to electric light sources, when combined with light sources of a different kind. These are covered by subclass [H05B](#) , whereas the physical arrangement which their combination constitutes is covered by the various subclasses of class [F21](#) ;

as regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass H 05 B, but also the electric aspects of their arrangement, where these concern cases of general application; electric furnaces being considered as such. The physical disposition of the electric elements in furnaces is covered by section F. If a comparison is made with electric welding circuits which are covered by subclass [B23K](#) in connection with welding, it can be seen that electric heating is not covered by the general rule stated in 2 above.

H01 BASIC ELECTRIC ELEMENTS

NOTE

Processes involving only a single technical art, e.g. drying, coating, for which provision exists elsewhere are classified in the relevant class for that art.

H01B CABLES; CONDUCTORS; INSULATORS; SELECTION OF MATERIALS FOR THEIR CONDUCTIVE, INSULATING OR DIELECTRIC PROPERTIES (selection for magnetic properties [H01F 1/00](#); waveguides [H01P](#) ; installations of cables or lines [H02G](#) ; { printed circuits [H05K](#) })

NOTE

Group [H01B 12/00](#) takes precedence over groups [H01B 5/00](#) to [H01B 11/00](#).

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[H01B 7/17](#) to [H01B 7/295](#) covered by [H01B 7/18](#) to [H01B 7/28D](#),
[H01B 7/34](#) to [H01B 7/34B3](#)

H01C RESISTORS

NOTE

In this subclass, the term "adjustable" means mechanically adjustable.

Variable resistors, the value of which is changed non-mechanically, e.g. by voltage or temperature, are classified in group [H01C 7/00](#).

H01F MAGNETS; INDUCTANCES; TRANSFORMERS; SELECTION OF MATERIALS FOR THEIR MAGNETIC PROPERTIES (ceramics based on ferrites [C04B 35/26](#); alloys [C22C](#) ; { construction of loading coils [H01B](#) }; thermomagnetic devices [H01L 37/00](#); loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#))

NOTE

In this subclass, inductances and transformers are regarded as being "for power supply" if they are intended for this purpose even in systems operating at frequencies above 60 cycles/sec.

H01G CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES OR LIGHT-SENSITIVE DEVICES, OF THE ELECTROLYTIC TYPE (selection of specified materials as dielectric [H01B 3/00](#); {

ceramics [C04B](#) })

H01H

ELECTRIC SWITCHES; RELAYS; SELECTORS; EMERGENCY PROTECTIVE DEVICES (contact cables [H01B 7/10](#); overvoltage protection

resistors, resistive arresters [H01C 7/12](#), [H01C 8/04](#); electrolytic self-interrupters [H01G 9/18](#); switching devices of the waveguide type [H01P](#) ; devices for interrupted current collection [H01R 39/00](#); overvoltage arresters using spark gaps [H01T 4/00](#); emergency protective circuit arrangements [H02H](#) ; switching by electronic means without contact-making [H03K 17/00](#))

NOTE

Attention is drawn to the Notes following the titles of class [B81](#) an subclass [B81B](#) relating to "micro-structural devices" and micro-structural systems"

This subclass covers (in groups [H01H 69/00](#) to [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 accomodating two or more switching devices or for accomodating 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 movement 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](#) to [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](#) to [H01H 43/00](#) and sub-groups [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](#) to [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](#) to [H01H 61/00](#), hereinafter called basic types are classified in [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](#) to [H01H 83/00](#), hereinafter called basic types, are classified in [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](#).

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

[H01H 33/575](#) covered by [H01H 33/56](#)

[H01H 33/825](#) " [H01H 33/82](#)

[H01H 33/835](#) " [H01H 33/83](#)

[H01H 33/867](#) " [H01H 33/86](#)

[H01H 33/873](#) " [H01H 33/86](#)

[H01H 33/915](#) " [H01H 33/91](#)

[H01H 33/985](#) " [H01H 33/98](#)

[H01H 33/99](#) " [H01H 33/98](#)

H01J

ELECTRIC DISCHARGE TUBES OR DISCHARGE LAMPS (spark-gaps [H01T](#) ; arc lamps with consumable electrodes [H05B](#) ; particle accelerators [H05H](#))

NOTE

This subclass covers only devices for producing, influencing, or using a flow of electrons or ions, e.g. for controlling, indicating, or switching of electric current, counting electric pulses, producing light or other electromagnetic oscillations, such as X-rays, or for separating or analysing radiation or particles, and having a closed or substantially closed casing containing a chosen gas, vapour, or vacuum, upon the pressure and nature of which the characteristics of the device depend. Light sources using a combination (other than covered by group [H01J 61/96](#) of this subclass) of discharge and other kinds of light generation are dealt with in [H05B 35/00](#).

In this subclass, groups [H01J 1/00](#) to [H01J 7/00](#) relate only to:
 details of an unspecified kind of discharge tube or lamp, or

details mentioned in a specification as applicable to two or more kinds of tubes or lamps as defined by groups [H01J 11/00](#), [H01J 13/00](#), [H01J 15/00](#), [H01J 17/00](#), [H01J 21/00](#), [H01J 25/00](#), [H01J 27/00](#), [H01J 31/00](#), [H01J 33/00](#), [H01J 35/00](#), [H01J 37/00](#), [H01J 40/00](#), [H01J 41/00](#), [H01J 47/00](#), [H01J 49/00](#), [H01J 61/00](#), [H01J 63/00](#) or [H01J 65/00](#), hereinafter called basic kinds. A detail

only described with reference to, or clearly only applicable to, tubes or lamps of a single basic kind is classified in the detail group appropriate to tubes or lamps of that basic kind, e.g. [H01J 17/04](#).

In this subclass, the following term is used with the meaning indicated:

- "lamp" includes tubes emitting ultra-violet or infra-red light.

Attention is drawn to the definition of the expression "spark gaps" given in the Note following the title of subclass [H01T](#) .

Apparatus or processes specially adapted for the manufacture of electric discharge tubes, discharge lamps, or parts thereof are classified in group [H01J 9/00](#).

H01K

ELECTRIC INCANDESCENT LAMPS (details or apparatus or processes for manufacture applicable to both discharge devices and incandescent lamps [H01J](#) ; light sources using a combination of incandescent and other types of light generation [H01J 61/96](#), [H05B 35/00](#); circuits therefor [H05B](#))

NOTE

In this subclass, the following term is used with the meaning indicated:

- "lamp" includes tubes emitting ultra-violet or infra-red light.

H01L

SEMICONDUCTOR DEVICES; ELECTRIC SOLID STATE DEVICES NOT OTHERWISE PROVIDED FOR (use of semiconductor devices for measuring [G01](#) ; resistors in general [H01C](#) ; magnets, inductors { in general }, transformers [H01F](#) ; capacitors in general [H01G](#) ; electrolytic devices [H01G 9/00](#); batteries, accumulators [H01M](#) ; waveguides, resonators or lines of the waveguide type [H01P](#) ; line connectors, current collectors [H01R](#) ; stimulated emission devices [H01S](#) ; electromechanical resonators [H03H](#) ; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#) ; electric light sources in general [H05B](#) ; printed circuits, hybrid circuits, casings or constructional details of electric apparatus, manufacture of assemblages of electrical components [H05K](#) ; use of semiconductor devices in circuits having a particular application, see the subclass for the application)

NOTE

This subclass covers electric solid state devices which are not provided for in any other subclass and details thereof. This includes:

- semiconductor devices adapted for rectifying, amplifying, oscillating or switching;
- semiconductor devices sensitive to radiation;
- electric solid state devices using thermoelectric,

superconductive, piezo-electric, electrostrictive, magnetostrictive, galvano-magnetic or bulk negative resistance effects and integrated circuit devices. Also covered by this subclass are photo-resistors, magnetic field dependent resistors, field effect resistors, capacitors with potential-jump barrier, resistors with potential-jump barrier or surface barrier, incoherent light emitting diodes, electromechanical solid state transducers and thin-film or thick-film circuits. Furthermore, it provides for processes and apparatus adapted for the manufacture or treatment of such devices, except where such processes relate to single step processes for which provision exists elsewhere.

In this subclass:

The expression "solid state body" refers to the body of material within which, or at the surface of which, the physical effects characteristic of the device occur. In thermoelectric devices it includes all materials in the current path.

Regions in or on the body of the device (other than the solid state body itself), which exert an influence on the solid state body electrically, are considered to be "electrodes" whether or not an external electrical connection is made thereto. { Electrodes are often referred to as "contacts" in the literature. } An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region, (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions only those portions which exert an influence on the solid state body by virtue of their shape, size or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads.

The word "device" refers to an electric circuit element; where an electric circuit element is one of a plurality or elements formed in or on a common substrate it is referred to as a "component".

A "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electro-forming, before it is ready for use but which does not require the addition of further structural units.

The word "parts" includes all structural units which are included in a complete device.

A "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation".

"Integrated circuit" is a device where all components, e.g. diodes, resistors, are built up on a common substrate and form the device including interconnections between the components.

"Integration processes" are processes for the manufacture of at least two different components where the process is especially adapted to their integration, e.g. to take advantage of it or to reduce their manufacturing cost.

Example: in a CMOS process, the same ion implant dopes the p-MOS gate and the n-MNOS source and drain.

Consequently, a process for the manufacture of a component per se is not considered as an integration process, even though that component will be part of an integrated circuit.

"Assembly" of a device is the building up of the device from its component constructional units and includes the provision of fillings in containers.

When referring to the periodic table of the elements, either the new IUPAC notation, i.e. numbering system from 1 to 18, or the previous IUPAC form may be used to indicate an element group, e.g. group IV elements according to the previous IUPAC form correspond to group 14 elements according to the new notation

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups

[H01L 21/301](#) covered by [H01L 21/30](#)
[H01L 21/328](#) covered by [H01L 29/66075](#) [H01L 21/329](#) covered by [H01L 29/66083](#)
[H01L 21/33](#) covered by [H01L 29/66227](#) [H01L 21/331](#) covered by [H01L 29/66234](#)
[H01L 21/332](#) covered by [H01L 29/66363](#) [H01L 21/334](#) covered by [H01L 29/66075](#)
[H01L 21/335](#) covered by [H01L 29/66409](#) [H01L 21/336](#) covered by [H01L 29/66477](#)
[H01L 21/337](#) covered by [H01L 29/66893](#) [H01L 21/338](#) covered by [H01L 29/66848](#)
[H01L 21/339](#) covered by [H01L 29/66946](#) [H01L 21/58](#) covered by [H01L 24/80](#)
[H01L 21/8239](#) covered by [H01L 27/105M](#) [H01L 21/60](#) covered by [H01L 24/80](#)
[H01L 21/66](#) covered by [H01L 22/34](#) [H01L 21/603](#) covered by [H01L 24/80](#)
[H01L 21/607](#) covered by [H01L 24/80](#)
[H01L 21/8242](#) covered by [H01L 27/10844](#)
[H01L 21/8244](#) covered by [H01L 27/11](#) [H01L 21/8246](#) covered by [H01L 27/112](#)
[H01L 21/8247](#) covered by [H01L 27/11517](#) [H01L 21/98](#) covered by [H01L 25/50](#)
[H01L 29/38](#) covered by [H01L 29/04](#) to [H01L 29/36D](#)
[H01L 29/96](#) covered by [H01L 29/68](#) to [H01L 29/945](#) [H01L 51/30](#) covered by [H01L 51/0032](#)
[H01L 51/40](#) covered by [H01L 51/00A](#)
[H01L 51/46](#) covered by [H01L 51/0032](#)
[H01L 51/48](#) covered by [H01L 51/00A](#)
[H01L 51/54](#) covered by [H01L 51/0032](#)

Groups [H01L 23/562](#) to [H01L 23/576](#) do not correspond to former or current IPC groups. Concordance CPC : IPC for these groups is as follows: -
[H01L 23/562](#) - [H01L 23/564](#) : [H01L 23/00](#) - [H01L 23/57](#) : [H01L 23/58](#)

Groups [H01L 22/00](#) to [H01L 22/34](#) do not correspond to a former or current IPC group. Concordance CPC : IPC for these groups is as follows: -
[H01L 22/00](#) - [H01L 22/34](#) : [H01L 21/66](#)

Groups [H01L 24/00](#) to [H01L 24/98](#) do not correspond to former or current IPC groups. Concordance CPC : IPC for these groups is as follows: -
[H01L 24/00](#) - [H01L 24/98](#) : [H01L 23/00](#)

Group [H01L 25/50](#) does not correspond to a former or current IPC group. Concordance CPC : IPC for this group is as follows: - [H01L 25/50](#) : [H01L 21/98](#)

Groups [H01L 28/00](#) - [H01L 28/92](#) do not correspond to former or current IPC groups. Concordance CPC : IPC for these groups is as follows: -
[H01L 28/00](#) - [H01L 28/92](#) : [H01L 49/02](#)

H01M

PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL INTO ELECTRICAL ENERGY

(electrochemical processes or apparatus in general [C25](#) ; semiconductor or other solid state devices for converting light or heat into electrical energy [H01L](#) , e.g. [H01L 31/00](#), [H01L 35/00](#), [H01L 37/00](#))

NOTE

This subclass covers galvanic primary or secondary cells or batteries, fuel cells or batteries.

H01P**WAVEGUIDES; RESONATORS, LINES, OR OTHER DEVICES OF THE WAVEGUIDE TYPE** (operating at optical frequencies [G02B](#) ; aerials [H01Q](#) ;

{ modulating electromagnetic waves in transmission line, waveguide, cavity resonator or radiation field of aerial [H03C 7/02](#) }; networks comprising lumped impedance elements [H03H](#))

NOTE

In this subclass, the following expression is used with the meaning indicated :

- "waveguide type" as applied to transmission lines includes only high-frequency coaxial cables or Lecher lines, and as applied to resonators, delay lines, or other devices includes all devices having distributed inductance and capacitance.

H01Q

AERIALS (microwave radiators for near-field therapeutic treatment [A61N 5/04](#); apparatus for testing aerials or for measuring aerial characteristics [G01R](#) ; waveguides [H01P](#) ; radiators or aerials for microwave heating [H05B 6/72](#))

NOTE

This subclass covers:

- in addition to the primary active radiating elements,
a) secondary devices for absorbing or for modifying the direction or polarisation of waves radiated from aerials, and
b) combinations with auxiliary devices such as earthing switches, lead-in devices, and lightning protectors;
- both transmitting and receiving aerials

This subclass does not cover devices of the waveguide type, such as resonators or lines, not designed as radiating elements, which are covered by subclass [H01P](#) .

In this subclass, the following expression is used with the meaning indicated:

- "active radiating element" covers corresponding parts of a receiving aerial.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups : - [H01Q 5/01](#) covered by [H01Q 5/0003](#) to [H01Q 5/0096](#) - [H01Q 5/02](#) covered by [H01Q 5/0003](#) to [H01Q 5/0096](#)

H01R

LINE CONNECTORS; CURRENT COLLECTORS (switches, fuses [H01H](#) ;

coupling devices of the waveguide type [H01P 5/00](#); switching arrangements for the supply or distribution of electric power [H02B](#) ; installations of electric lines, cables or auxiliary apparatus [H02G](#) ; printed means for providing electric connections to or between printed circuits [H05K](#))

NOTE

This subclass covers:

- all kinds of contact-making disconnectible and non-disconnectible electric line connectors, coupling devices, lamp or similar holders or current collectors for all kinds of electric lines, cables or apparatus;
- non-printed means for electric connections to or between printed circuits.

This subclass does not cover mounting of connections in or specified apparatus. Such mounting is covered by the relevant subclass for such apparatus, e.g. mounting in junction or distribution boxes is covered by subclass [H02B](#) or [H02G](#) , high-temperature connections for heating elements is covered by group [H05B 3/08](#). Structural association of one part of a two-part coupling device with specific electric apparatus is classified with the apparatus e.g. association of cap with incandescent lamp is covered by subclass [H01K](#) .

In this subclass, a contact in a coupling device is only regarded as an additional earth contact if this contact is clearly designed for that purpose.

General details are classified in groups [H01R 4/00](#), [H01R 9/00](#), [H01R 11/00](#).

H01S

DEVICES USING STIMULATED EMISSION

NOTE

This subclass covers:

devices for the generation or amplification, by using stimulated emission, of coherent electromagnetic waves or other forms of wave energy;

such functions as modulating, demodulating, controlling, or stabilising such waves.

WARNING

The following IPC groups are not used in the CPC scheme.

Subject matter covered by these groups is classified in the following CPC groups:

- [H01S 3/098](#) covered by [H01S 3/08M](#), [H01S 3/11](#) and s.gr.

H01T

SPARK GAPS; OVERVOLTAGE ARRESTERS USING SPARK GAPS; SPARKING PLUGS; CORONA DEVICES; GENERATING IONS TO BE INTRODUCED INTO NON-ENCLOSED GASES (working of metal by the action of a high concentration of electric current [B23H](#) ; welding, e.g. arc welding, electron beam welding or electrolytic welding [B23K](#) ; gas-filled discharge tubes with solid cathode [H01J 17/00](#); electric arc lamps [H05B 31/00](#))

NOTE

In this subclass, the term "spark gaps" is used with the following meaning:

- enclosed or non-enclosed discharge device having cold electrodes and used exclusively to discharge a quantity of electrical energy in a small time duration.

H02**GENERATION; CONVERSION OR DISTRIBUTION OF ELECTRIC POWER****H02B**

BOARDS, SUBSTATIONS, OR SWITCHING ARRANGEMENTS FOR THE SUPPLY OR DISTRIBUTION OF ELECTRIC POWER (basic electric elements, their assembly, including the mounting in enclosures or on bases, or the mounting of covers thereon, see the subclasses for such elements, e.g. transformers [H01F](#) , switches, fuses [H01H](#) , line connectors [H01R](#) ; installation of lines, cables, or other conductors for supply or distribution [H02G](#))

NOTE

This subclass covers boards, switchyards, switchgear or their installation, or the association of switching devices with each other or with other devices, e.g. transformers, fuses, meters or distribution boards; such associations constitute substations or distribution points.

H02G

INSTALLATION OF ELECTRIC CABLES OR LINES, OR OF COMBINED OPTICAL AND ELECTRIC CABLES OR LINES (distribution points incorporating switches [H02B](#) ; guiding telephone cords [H04M 1/15](#); cable ducts or mountings for telephone or telegraph exchange installations [H04Q 1/06](#))

NOTE

1. This subclass covers installation of communication cables or lines, including those comprising a combination of optical and electrical conductors, or of lightning conductors as well as installation of power cables or lines.

2. This subclass does not cover installation of purely optical cables, which is covered by groups { [G02B 6/44C](#) }, [G02B 6/46](#).

3. In this subclass, the following expression is used with the meaning indicated:

- "electric cable" includes cables comprising optical conductors, e.g. fibres, in combination with electrical conductors.

[H02G 2200/00](#) whenever appropriate

H02H

EMERGENCY PROTECTIVE CIRCUIT ARRANGEMENTS (indicating or signalling undesired working conditions [G01R](#) , e.g. [G01R 31/00](#), [G08B](#) ; locating faults

along lines [G01R 31/08](#); emergency protective devices [H01H](#))

NOTE

This subclass covers only circuit arrangements for the automatic protection of electric lines or electric machines or apparatus in the event of an undesired change from normal working conditions

H02J

CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (for digital computers [G06F 1/18](#); circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus [H02M](#) ; interrelated control of several motors, control of a prime-mover/generator combination [H02P](#) ; control of high-frequency power [H03L](#) ; additional use of power line or power network for transmission of information [H04B](#))

NOTE

This subclass covers:

- ac or dc mains or distribution networks;
- circuit arrangements for battery supplies, including charging or control thereof, or co-ordinated supply from two or more sources of any kind;
- systems for supplying or distributing electric power by electromagnetic waves.

This subclass does not cover:

- control of a single motor, generator or dynamo-electric converter, of the types covered by subclass [H01F](#) or [H02K](#) , which is covered by subclass [H02P](#) ;
- control of a single motor or generator, of the types covered by subclass [H02N](#) , which is covered by that subclass.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

[H02J 7/10](#) covered by [H02J 7/0072](#)

H02K

DYNAMO-ELECTRIC MACHINES (measuring instruments [G01](#) ; dynamo-electric relays [H01H 53/00](#); conversion of dc or ac input power into surge output power { [H03K 3/53](#) }; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#))

NOTE

This subclass covers structural adaptation of the machine for the purposes of its

control.

This subclass does not cover starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators or dynamo-electric converters, in general, which are covered by subclass [H02P](#).

H02M

APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF

(systems for regulating electric or magnetic variables in general, e.g. using transformers, reactors or choke coils, combination of such systems with static converters [G05F](#) ; { digital function or clock generators } for digital computers [G06F 1/00](#), { [G06F 1/025](#), [G06F 1/04](#) }; transformers [H01F](#) ; connection or control of one converter with regard to conjoint operation with a similar or other source of supply [H02J](#) ; dynamo-electric converters [H02K 47/00](#); controlling transformers, reactors or choke coils, control or regulation of electric motors, generators or dynamo-electric converters [H02P](#) ; pulse generators [H03K](#) ; { static converters specially adapted for igniting or operating discharge lamps [H05B 41/28](#) })

NOTE

This subclass covers only circuits or apparatus for the conversion of electric power, or arrangements for control or regulation of such circuits or apparatus. The electrotechnical elements employed are dealt within the appropriate subclasses, e.g. inductors, transformers [H01F](#), capacitors, electrolytic rectifiers [H01G](#), mercury rectifying or other discharge tubes [H01J](#), semiconductor devices [H01L](#), impedance networks or resonant circuit not primarily concerned with the transfer of electric power [H03H](#).

In this subclass, the following term is used with the meaning indicated:

- "conversion", in respect of an electric variable, e.g. voltage or current, means the change of one or more of the parameters of the variable, e.g. amplitude, frequency, phase, polarity.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

[H02M 9/00](#) covered by [H03K 3/53](#)
[H02M 9/02](#) covered by [H03K 3/53](#)
[H02M 9/04](#) covered by [H03K 3/53](#)
[H02M 9/06](#) covered by [H03K 3/53](#)

H02N

ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR

NOTE

This subclass covers:

- electrostatic generators, motors, clutches, or holding devices;
- other non-dynamo-electric generators or motors;
- holding or levitation devices using magnetic attraction or repulsion;
- arrangements for starting, regulating, braking, or otherwise controlling such machines unless in conjoint operation with a second machine.

Specific provision for generators, motors, or other means for converting between electric and other forms of energy also exists in other subclasses, e.g. in subclasses [H01L](#) , [H01M](#) , [H02K](#) , [H04R](#) .

H02P

CONTROL OR REGULATION OF ELECTRIC MOTORS, GENERATORS, OR DYNAMO-ELECTRIC CONVERTERS; CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS ({ specially adapted for electrically propelled vehicles [B60L](#) }; structure of the starter, brake, or other control devices, see the relevant subclasses, e.g. mechanical brake [F16D](#) , mechanical speed regulator [G05D](#) , variable resistor [H01C](#) , starter switch [H01H](#) ; systems for regulating electric or magnetic variables using transformers, reactors or choke coils [G05F](#) ; arrangements structurally associated with motors, generators, dynamo-electric converters, transformers, reactors or choke coils, see the relevant subclasses, e.g. [H01F](#) , [H02K](#) ; connection or control of one generator, transformer, reactor, choke coil, or dynamo-electric converter with regard to conjoint operation with similar or other source of supply [H02J](#) ; control or regulation of static converters [H02M](#))

NOTE

This subclass covers arrangements for starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators, dynamo-electric converters, clutches, brakes, gears, transformers, reactors or choke coils, of the types classified in the relevant subclasses, e.g. [H01F](#) , [H02K](#) .

This subclass does not cover similar arrangements for the apparatus of the types classified in subclass [H02N](#) , which arrangements are covered by that subclass.

In this subclass, the following terms or expressions are used with the meanings indicated:

- "control" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation;
- "regulation" means maintaining a variable at a desired value, or within a desired range of values, by comparison of the actual value with the desired value.

H02S

GENERATION OF ELECTRIC POWER BY CONVERSION OF INFRA-RED RADIATION, VISIBLE LIGHT OR ULTRAVIOLET LIGHT, e.g. USING PHOTOVOLTAIC [PV] MODULES (light sensitive inorganic

semiconductor devices [H01L 31/00](#); thermoelectric devices [H01L 35/00](#); pyroelectric devices [H01L 37/00](#); light sensitive organic semiconductor devices [H01L 51/00](#); obtaining electrical energy from radioactive sources [G21H 1/12](#); solar heat collectors [F24J 2/00](#))

WARNING

Subclass [H02S](#) corresponds to IPC2014.01. Concordance CPC : IPC for the groups is as follows: - [H02S 10/00](#) : [H01L 31/04](#) - [H02S 20/00](#) : [H01L 31/042](#) - [H02S 30/00](#) : [H01L 31/042](#) - [H02S 40/00](#) : [H01L 31/042](#) - [H02S 50/00](#) : [G01R 31/40](#) - [H02S 99/00](#) : [H02N 6/00](#)]

H03

BASIC ELECTRONIC CIRCUITRY

H03B

GENERATION OF OSCILLATIONS, DIRECTLY OR BY FREQUENCY-CHANGING, BY CIRCUITS EMPLOYING ACTIVE ELEMENTS WHICH OPERATE IN A NON-SWITCHING MANNER; GENERATION OF NOISE BY SUCH CIRCUITS (measuring, testing [G01R](#) ; generators adapted for electrophonic musical instruments [G10H](#) ; Speech synthesis [G10L](#) ; masers, lasers [H01S](#) ; dynamo-electric machines [H02K](#) ; power inverter circuits [H02M](#) ; by using pulse techniques [H03K](#) ; automatic control of generators [H03L](#) ; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified [H03L](#) ; generation of oscillations in plasma [H05H](#))

H03C

MODULATION (measuring, testing [G01R](#) ; masers, lasers [H01S](#) ; modulators specially adapted for use in the amplifiers [H03F 3/38](#); modulating pulses [H03K 7/00](#); so-called modulators capable only of a switching between predetermined states of amplitude, frequency or phase [H03K 17/00](#), [H04L](#) ; coding, decoding or code conversion, in general [H03M](#) ; synchronous modulators specially adapted for colour television [H04N 9/65](#))

NOTE

This subclass covers only modulation, keying, or interruption of sinusoidal oscillations or electromagnetic waves, the modulating signal having any desired waveform.

In this subclass, circuits usable both as modulator and demodulator are classified in the group dealing with the type of modulator involved.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

[H03C 1/38](#) to [H03C 1/44](#) covered by [H03C 1/36](#)

H03D

DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER (masers, lasers [H01S](#) ; circuits capable of acting both as modulator and demodulator [H03C](#) ; details applicable to both modulators and

frequency-changers [H03C](#) ; demodulating pulses [H03K 9/00](#); transforming types of pulse modulation [H03K 11/00](#); coding, decoding or code conversion, in general [H03M](#) ; repeater stations [H04B 7/14](#); demodulators adapted for ac systems of digital information transmission [H04L 27/00](#); synchronous demodulators adapted for colour television [H04N 9/66](#))

NOTE

This subclass covers only:

- demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
- comparing phase or frequency of two mutually-independent oscillations.

H03F

AMPLIFIERS (measuring, testing [G01R](#) ; optical parametric amplifiers [G02F](#) ; circuit arrangement with secondary emission tubes [H01J 43/30](#); masers, lasers [H01S](#) ; control of amplification [H03G](#) ; coupling arrangements independent of the nature of the amplifiers, voltage dividers [H03H](#) ; amplifiers capable only of dealing with pulses [H03K](#) ; repeater circuits in transmission lines [H04B 3/36](#), [H04B 3/58](#); application of speech amplifiers in telephonic communication [H04M 1/60](#), [H04M 3/40](#))

NOTE

This subclass covers:

- linear amplification, there being linear relationship between the amplitudes of input and output, and the output having substantially the same waveform as the input;
- dielectric amplifiers, magnetic amplifiers, and parametric amplifiers when used as oscillators or frequency-changers;
- constructions of active elements of dielectric amplifiers and parametric amplifiers if no provision exists elsewhere.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[H03F 1/44](#) covered by [H03F 1/42](#)
[H03F 1/46](#) covered by [H03F 1/42](#)
[H03F 3/18](#) covered by [H03F 3/00](#)
[H03F 3/32](#) covered by [H03F 3/30](#)
[H03F 7/06](#) covered by [H03F 7/00](#)

H03G

CONTROL OF AMPLIFICATION (impedance networks, e.g. attenuators, [H03H](#) ; control of transmission in lines [H04B 3/04](#))

NOTE

This subclass covers:

- control of gain of amplifiers or frequency-changers,
- control of frequency range of amplifiers,
- limiting amplitude or rate of change of amplitude

Attention is drawn to the Note following the title of subclass [H03F](#) .

H03H

IMPEDANCE NETWORKS, e.g. RESONANT CIRCUITS; RESONATORS

(measuring, testing [G01R](#) ; arrangements for producing a reverberation or echo sound [G10K 15/08](#); impedance networks or resonators consisting of distributed impedances, e.g. of the waveguide type, [H01P](#) ; control of amplification, e.g. bandwidth control of amplifiers, [H03G](#) ; tuning resonant circuits, e.g. tuning coupled resonant circuits, [H03J](#) ; networks for modifying the frequency characteristics of communication systems [H04B](#))

NOTE

This subclass covers:

networks comprising lumped impedance elements;

networks comprising distributed impedance elements together with lumped impedance elements;

networks comprising electromechanical or electro-acoustic elements;

networks simulating reactances and comprising discharge tubes or semiconductor devices;

constructions of electromechanical resonators.

In this subclass, the following expression is used with the meaning indicated:
"passive elements" means resistors, capacitors, inductors, mutual inductors or diodes.

Attention is drawn to the Notes following the titles of class [B81](#) and subclass [B81B](#) relating to "micro-structural devices" and "micro-structural systems".

In this subclass, main groups with a higher number take precedence.

H03J

TUNING RESONANT CIRCUITS; SELECTING RESONANT CIRCUITS

(indicating arrangements for measuring [G01D](#) ; measuring, testing [G01R](#) ; remote-control in general [G05](#) , [G08](#) ; automatic control or stabilisation of generators [H03L](#))

NOTE

This subclass covers also the control of tuning, including the combined control of tuning and other functions, e.g. combinations of tuning control and volume control, combinations of control of local oscillator and of supplementary resonant circuits.

H03K

PULSE TECHNIQUE (measuring pulse characteristics [G01R](#) ; mechanical counters having an electrical input [G06M](#) ; information storage devices in general [G11](#) ; sample-and-hold arrangements in electric analogue stores [G11C 27/02](#); construction of switches involving contact making and breaking for generation of pulses, e.g. by using a moving magnet, [H01H](#) ; static conversion of electric power [H02M](#) ; generation of oscillations by circuits employing active elements which operate in a non-switching manner [H03B](#) ; modulating sinusoidal oscillations with pulses [H03C](#) , [H04L](#) ; discriminator circuits involving pulse counting [H03D](#) ; automatic control of generators [H03L](#) ; starting, synchronisation or stabilisation of generators where the type of generator is irrelevant or unspecified [H03L](#) ; coding, decoding or code conversion in general [H03M](#))

NOTE

This subclass covers:

- methods, circuits, devices, or apparatus using active elements operating in a discontinuous or switching manner for generating, counting, amplifying, shaping, modulating, demodulating, or otherwise manipulating signals;
- electronic switching not involving contact-making and braking;
- logic circuits handling electric pulses.

In this subclass, the following expression is used with the meaning indicated:

- "active element" exercises control over the conversion of input energy into an oscillation or a discontinuous flow of energy.

In this subclass, where the claims of a patent document are not limited to a specific circuit element, the document is classified at least according to the elements used in the described embodiment.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

[H03K 17/695](#) covered by [H03K 17/687](#)

H03L

AUTOMATIC CONTROL, STARTING, SYNCHRONISATION, OR STABILISATION OF GENERATORS OF ELECTRONIC OSCILLATIONS OR PULSES (of dynamo-electric generators [H02P](#))

NOTE

This subclass covers:

- automatic control circuits for generators of electronic oscillations or pulses;
- starting, synchronisation, or stabilisation circuits for generators where the type of generator is irrelevant or unspecified.

This subclass does not cover stabilisation or starting circuits specially adapted to only one specific type of generator, which are covered by subclasses [H03B](#) , [H03K](#) .

In this subclass, the following expression is used with the meaning indicated:

- "automatic control" covers only closed loop systems.

H03M

CODING; DECODING; CODE CONVERSION IN GENERAL (using fluidic means [F15C 4/00](#); optical analogue/digital converters [G02F 7/00](#); coding, decoding or code conversion, specially adapted for particular applications, see the relevant subclasses, e.g. [G01D](#) , [G01R](#) , [G06F](#) , [G06T](#) , [G09G](#) , [G10L](#) , [G11B](#) , [G11C](#) , [H04B](#) , [H04L](#) , [H04M](#) , [H04N](#) ; ciphering or deciphering for cryptography or other purposes involving the need for secrecy [G09C](#))

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[H03M 7/32](#) covered by [H03M 7/3004](#), [H03M 7/3048](#) [H03M 7/34](#) covered by [H03M 7/3004](#), [H03M 7/3051](#) [H03M 7/36](#) covered by [H03M 7/3004](#), [H03M 7/3044](#) [H03M 7/38](#) covered by [H03M 7/3004](#), [H03M 7/3046](#)

H04

ELECTRIC COMMUNICATION TECHNIQUE

NOTE

This class covers electrical communication systems with propagation paths employing light (optical communication), infra-red, ultrasonic, sonic, or infrasonic waves.

H04B

TRANSMISSION (transmission systems for measured values, control or similar signals [G08C](#) ; coding, decoding, code conversion, in general [H03M](#) ; broadcast communication [H04H](#) ; multiplex systems [H04J](#) ; secret communication [H04K](#) ; transmission of digital information [H04L](#))

NOTE

This subclass covers the transmission of information-carrying signals, the transmission being independent of the nature of the information, and includes monitoring and testing arrangements and the suppression and limitation of noise and interference.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[H04B 10/04](#) covered by [H04B 10/50](#) [H04B 10/06](#) covered by [H04B 10/60](#) [H04B 10/08](#) covered by [H04B 10/07](#) [H04B 10/10](#) covered by [H04B 10/11](#) [H04B 10/13](#) covered by [H04B 10/2581](#) [H04B 10/26](#) covered by [H04B 10/24B](#) [H04B 10/28](#) covered by [H04B 10/43](#)

H04H

BROADCAST COMMUNICATION (multiplex communication [H04J](#) ; pictorial communication aspects of broadcast systems [H04N](#))

NOTE

1. In this subclass, the following terms or expressions are used with the meaning indicated:
 - "broadcast" is simultaneous distribution of identical signals to plural receiving stations. The term "broadcast" does not include distribution to receiving stations which is controlled by requests or responses from the receiving stations;
 - "broadcast information" covers all kinds of information distributed by broadcast systems;
 - "broadcast-related information" is information required by services provided via broadcast systems, other than broadcast information;
 - "broadcast time" is a time when particular broadcast information exists and is available;
 - "broadcast channel" is a channel via which broadcast information is distributed, e.g. carrier waves, time slots, cables or wireless broadcast service areas;
 - "broadcast space" is either a set of broadcast channels in which particular broadcast information exists and is available or a geographical area determined by the set of broadcast channels;
 - "broadcast space-time" is space-time determined by broadcast space and broadcast time in which particular broadcast information exists and is available;
 - "broadcast system" is a system which consists of transmitter, transponder and receiver for broadcast;
 - "broadcast-related system" is a system which is directly affected by generation, broadcast, reception or use of broadcast information;
 - "broadcast service" is a service directly provided by a broadcast system, i.e. distribution service of broadcast information;
 - "broadcast-related service" is a service provided by broadcast-related systems;
 - "A with a direct linkage to B" means that A directly affects B or that A is directly affected by B.
2. In this subclass, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups, which is considered to represent information of interest for search, may also be classified in each of those groups.

H04J

MULTIPLEX COMMUNICATION (transmission in general [H04B](#) ; peculiar to transmission of digital information [H04L 5/00](#); systems for the simultaneous or sequential transmission of more than one television signal [H04N 7/08](#); in exchanges [H04Q 11/00](#); stereophonic systems [H04S](#))

NOTE

This subclass covers

- circuits or apparatus for combining or dividing signals for the purpose of transmitting them simultaneously or sequentially over the same transmission path;
- monitoring arrangements therefor.

H04K**SECRET COMMUNICATION; JAMMING OF COMMUNICATION****NOTE**

In this subclass, the following expression is used with the meaning indicated:

- "secret communication" includes secret line and radiation transmission systems, i.e. those in which apparatus at the transmitting station modifies the signal in such a way that the information cannot be intelligibly received without corresponding modifying apparatus at the receiving station.

H04L

TRANSMISSION OF DIGITAL INFORMATION, e.g. TELEGRAPHIC COMMUNICATION (typewriters [B41J](#) ; order telegraphs, fire or police telegraphs [G08B](#) ; visual telegraphy [G08B](#) , [G08C](#) ; teleautographic systems [G08C](#) ; ciphering or deciphering apparatus per se [G09C](#) ; coding, decoding or code conversion, in general [H03M](#) ; arrangements common to telegraphic and telephonic communication [H04M](#) ; selecting [H04Q](#))

NOTE

This subclass covers transmission of signals having been supplied in digital form and includes data transmission, telegraphic communication and methods or arrangements for monitoring.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

H04L 12/20	covered by H04L 29/00
H04L 25/04	" H04L 25/03
H04L 25/17	" H03H
H04L 25/18	" H04L 25/02G1C
H04L 25/28	" H04L 25/02G1A
H04L 25/30	" H04L 25/061
H04L 25/32	" H04L 25/49
H04L 25/34	" H04L 25/4917
H04L 25/36	" H04L 25/02A
H04L 25/48	" H04L 25/49
H04L 25/50	" H04L 25/02A
H04L 25/52	" H04L 25/20
H04L 25/54	" H04L 25/20
H04L 25/56	" H04L 25/202
H04L 25/58	" H04L 25/20

[H04L 25/60](#) " [H04L 25/207](#)
[H04L 25/62](#) " [H04L 25/205](#)
[H04L 25/64](#) " [H04L 25/245](#)
[H04L 25/66](#) " [H04L 25/247](#)

H04M

TELEPHONIC COMMUNICATION (counting mechanisms [G06M](#) ; circuits for controlling other apparatus via a telephone cable and not involving telephone switching apparatus [G08](#) ; reels or other take-up devices for cords [H02G 11/00](#); multiplex transmission between switching centres [H04J](#) ; selecting arrangements [H04Q](#) ; loudspeakers, microphones, gramophone pick-ups or like electromechanical transducers [H04R](#))

NOTE

This subclass covers :

- telephonic communication systems combined with other electrical systems;
- testing arrangements peculiar to telephonic communication systems.

In this subclass, the following terms or expressions are used with the meanings indicated :

- "subscriber" is a general term for terminal equipment, e.g. telephone for public use;
- "substation" means a subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
- "satellite" is a type of exchange the operation of which depends upon control signals received from a supervisory exchange;
- "switching centres" includes exchanges and satellites.

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups are classified in the following CPC groups :

[H04M 1/677](#) covered by [H04M 1/677](#)
[H04M 7/02](#) covered by [H04Q 3/00](#)
[H04M 7/04](#) covered by [H04Q 3/00](#)
[H04M 7/10](#) covered by [H04Q 3/00](#)

H04N

PICTORIAL COMMUNICATION, e.g. TELEVISION (measuring, testing [G01](#) ; systems for autographic writing, e.g. writing telegraphy, which involve following an outline { [G08C 21/00](#) }; information storage based on relative movement between record carrier and transducer [G11B](#) ; coding, decoding or code conversion, in general [H03M](#) ; broadcast distribution or the recording of use made thereof [H04H](#))

NOTE

1. This subclass covers:

{ generation, recording or } transmission of pictures or their transient or permanent reproduction either locally or remotely { and the corresponding electronic image capture and reproduction process employing image representative electric signals, } by methods or arrangements { involving at least one of } the following steps:

step (a): the { electronic acquisition or } scanning of a picture { or scene }, i.e. resolving the whole picture-containing area into individual picture-elements and the derivation of picture-representative electric signals related thereto, simultaneously or in sequence { , e.g. by reading an electronic solid-state image sensor [SSIS] pickup device (e.g. CCD or CMOS image sensor) as electronic image sensor converting optical image information into said electrical signals;]

step (b): the reproduction of the whole picture-containing area { or scene } by the reproduction of individual picture-elements into which the picture is resolved by means of picture representative electric signals derived therefrom, simultaneously or in sequence [N: by converting an electric image signal into light e.g. with an electronic spatial light modulator;

concerning cameras or projectors:

video cameras or TV cameras, e.g. in studios, CCTV cameras, surveillance cameras, camcorders; constructional or mechanical details related to such cameras even when not peculiar to the presence of an electronic image sensor [EIS] e.g. housings;

arrangements or methods for image capture using an EIS or image projection using an electronic spatial light modulator [ESLM], i.e.

(i) sensor read-out;

(ii) processing of electrical image signals from the EIS or provided to the ESLM for the generation of respective camera or projector control signals,

for controlling the EIS or its read-out for e.g. exposure, scene selection for auto focussing, or electronic image enhancement or processing of the image signals captured by the EIS, e.g. white balance, electronic motion blur correction, noise suppression [H04N 5/00](#),

for controlling the ESLM, e.g. control of the light source based on electronic image signal, light conditioning specially adapted for the ESLM, or

for controlling other camera functions, e.g. exposure, shaking by influencing optical parts of the camera (generation of control signals for focussing for optical elements [G02B 7/28](#); using such signals to control focus of particular apparatus, see the subclasses for the apparatus, e.g. [G03B](#) , [G03F](#) , [H04N](#));

electronic image data storage (data storage in general [G11B](#) , [G11C](#));

in-camera image processing e.g. correction of lens distortion, defect pixel correction, noise suppression, removal of motion blur, improving of the dynamic range of the image, in-projector image processing, electronic image data manipulation, e.g. during display or projection (image processing per se [G06T](#));

electronic viewfinders e.g. control of image pickup devices based on information indicated by the electronic viewfinder displaying an image signal generated by the EIS;

electrical or mechanical aspects of camera modules using electronic image sensors, as well as related constructional details as in webcams or mobile phones (see [H04M 1/0264](#) for mounting structure in mobile phones);

details of projectors peculiar to the use of an ESLM, e.g. dichroic or polarizing arrangements specially adapted for the ESLM (dichroic or polarizing arrangements in general [G02B](#), [G03B](#));

remote control of cameras or projectors peculiar to the EIS or the ESLM, e.g. affecting their operation, or based on a generated image signal;

adaptations peculiar to the use of a EIS or ESLM and/or the display, the transmission, recording or other use of electrical image data and related circuitry, e.g. mounting of EIS or ESLM, integrated cleaning system for the EIS, dust mapping, cooling of the EIS, controlling the operation of the EIS by external input signals;

systems or apparatus wherein the inventive contribution lies in the interaction between features covered in Notes 1 above, concerning cameras and projectors, when interacting with those covered in Note 1 of [G03B](#), e.g. switch-over between electronic motion-blur correction of electronic viewfinder during focussing and optical motion-blur correction of the lens during exposure, electronic motion blur correction of the electronic image sensor based on output signals of additional sensor, or interaction between mechanical shutter and electronic control of the charge accumulation period of the EIS;]

(in group [H04N 1/00](#)) systems for the transmission or the reproduction of arbitrarily composed pictures or patterns in which the local light variations composing a picture are not subject to variation with time, e.g. documents (both written and printed), maps, charts, photographs (other than cinematograph films);

circuits specially designed for dealing with pictorial communication signals, e.g. television signals, as distinct from merely signals of a particular frequency range.

2. This subclass does not cover:

circuits or other parts of systems which form the subject of other subclasses, which are covered by the corresponding subclasses, e.g. [H03C](#), [H03F](#), [H03J](#), [H04B](#), [H04H](#);

systems in which legible alphanumeric or like character forms are analysed according to step (a) of Note (1) to derive an electric signal from which the character is recognised by comparison with stored information, which are

covered by subclass [G06K](#) ;

systems for the direct photographic copying of an original picture in which an electric signal representative of the picture is derived according to the said step (a) of and employed to modify the operation of the system, e.g. to control exposure, which are covered by class [G03](#) ;

systems for the reproduction according to step (b) of Note (1) of pictures comprising alphanumeric or like character forms but involving the production of the equivalent of a signal which would be derived according to the abovementioned step (a), e.g. by cams, punched card or tape, coded control signal, or other means, which are covered by the subclass for the application, e.g. [G01D](#) , [G06T](#) , [H04L](#) ;

systems for the reproduction to the above-mentioned step (b) of pictures comprising alphanumeric or like character forms and involving the generation according to the abovementioned step (a) of picture-representative electric signals from a pre-arranged assembly of such characters, or records thereof, forming an integral part of the systems, which are covered by the subclass for the application, e.g. [B41B](#) , [G06K](#) , subject to those applications which are covered by this subclass;

printing, duplication or marking methods, or materials or processes therefor, which are covered by the relevant subclasses, e.g. [B41C](#) , [B41M](#) , [G03C](#) , [G03F](#) , [G03G](#) ;

[N: apparatus or methods for taking photographs using light sensitive film for image capture, apparatus/methods for printing, for projecting or viewing images using film stock, photographic film or slides by optical means, e.g. mounting of optical elements, flashes, and their related controls, e.g. exposure, focus, (opto-)mechanical motion blur (anti-shake), cooling, beam shaping;

aspects of apparatus or methods for taking photographs using an electronic image sensor [EIS] for image capture, insofar as they correspond to those of said apparatus methods for taking photographs using light sensitive film, i.e. insofar as not peculiar to the presence of the EIS, e.g. mounting of optical elements or flashes not peculiar to the presence of the EIS, and their related controls insofar as they are not peculiar to the presence or use of the EIS, e.g. exposure, focus, (opto-)mechanical motion blur (anti-shake);

aspects of apparatus or methods for projecting or viewing images using an electronic spatial light modulator [ESLM], insofar as they correspond to those of said apparatus/ methods for projecting or viewing images using film stock, photographic film or slides, i.e. insofar as not peculiar to the presence of the ESLM, e.g. mounting of optical elements not peculiar to the presence of the ESLM, and their related controls not peculiar to the presence of the ESLM, e.g. cooling, beam shaping, optical keystone correction;

(opto-)mechanical image enhancement in printers or projectors, e.g. keystone correction;

optical viewfinders;

remote control of cameras and projectors insofar not peculiar to the EIS or ESLM, e.g. not affecting their operation, or being based on a generated image signal;

optical aspects of camera modules using electronic image sensors and related constructional details (optical elements or arrangements associated with solid state imager structures [H01L 27/14625](#));

constructional aspects of projectors, e.g. cooling, beam shaping, light integrating means not peculiar to the ESLM;]

3. In this subclass, the following expression is used with the meaning indicated: "television systems" means those systems for the { electronic generation }, transmission and reproduction of arbitrarily composed pictures in which the local light variations composing a picture may change with time, e.g. natural "live" scenes, { electronic } recordings of such scenes such as cinematograph films].

4. In this subclass, as in subclass [G03B](#) , the following terms are used with the meaning indicated:

"camera": a device capturing image information represented by light patterns reflected or emitted from objects, and exposing a light sensitive film or a main electronic image sensor during a timed exposure, usually through a photographic lens, and producing an image on a light sensitive film or an electrical image information signal respectively;

"projector": a device displaying image information by projection of light patterns, usually through an optical lens, wherein the light patterns are generated by illuminating an image, e.g. film or slide, or by converting an electric image signal into an optical signal using an electronic spatial light modulator;

"electronic image sensor [EIS]": optoelectronic transducer, converting optical image information into an electrical signal susceptible of being processed, stored, transmitted or displayed;

"additional sensor": a sensor, other than the main electronic image sensor, used for controlling a camera;

"electronic spatial light modulator [ESLM]": optoelectronic transducer converting electric signals representing image information into optical image information.]

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups :

- [H04N 5/31](#) covered by [G01S 7/52](#), [G01S 15/89](#) - [H04N 5/761](#) covered by [H04N 5/782](#) - [H04N 5/7613](#) covered by [H04N 5/782](#) - [H04N 5/7617](#) covered by [H04N 5/782](#) - [H04N 5/922](#) covered by [H04N 5/92](#) - [H04N 5/924](#) covered by [H04N 5/92](#) - [H04N 7/40](#) covered by [H04N 7/38](#) - [H04N 7/42](#) covered by [H04B 14/06](#) - [H04N 7/44](#) covered by [H04B 14/06](#) - [H04N 9/815](#) covered by [H04N 9/81](#) - [H04N 11/24](#) covered by [H04N 11/002](#) - [H04N 15/00](#) covered by [H04N 13/00](#)

H04Q

SELECTING (switches, relays, selectors [H01H](#) ; electronic switches [H03K 17/00](#))

NOTE

This subclass covers:

- methods, circuits, or apparatus for establishing selectively a connection between a desired number of stations (normally two), or between a main station and a desired number of substations (normally one) for the purpose of transferring information via this connection after it has been established;
- selective calling arrangements over connections already established.

In either case, the connection may be made by means of electric conductors or electromagnetic waves.

In this subclass, the following terms or expressions are used with the meanings indicated:

- "subscriber" is a general term for terminal equipment, e.g. telephone for public use;
- "substation" means a subscriber or monitoring equipment which may connect a single subscriber to a line without choice as to subscriber;
- "satellite" is a kind of exchange the operation of which depends upon control signals received from a supervisory exchange;
- "switching centres" includes exchanges and satellites.

H04R

LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; DEAF-AID SETS; PUBLIC ADDRESS SYSTEMS (generating mechanical vibrations in general [B06B](#) ; transducers for measuring particular variables [G01](#) ; transducers in clocks [G04](#) ; producing sounds with frequency not determined by supply frequency [G10K](#) ; transducers in recording or reproducing heads [G11B](#) ; transducers in motors [H02](#))

NOTE

This subclass covers:

loudspeakers, microphones, { acoustic } transducers { therefor } producing acoustic waves or variations of electric current or voltage, or gramophone pick-ups;

arrangements actuated by variations of electric current or voltage for cutting grooves in records;

circuits for the above-mentioned { loudspeakers, microphones, acoustic transducers, gramophone pick-ups or } arrangements;

monitoring or testing { of the above-mentioned loudspeakers, microphones, acoustic transducers, gramophone pick-ups or arrangements }

H04S

STEREOPHONIC SYSTEMS (information storage on discs or tapes [G11B](#) ; broadcast systems for the distribution of stereophonic information [H04H 20/88](#); multiplex systems in general [H04J](#))

NOTE

In this subclass, the following term is used with the meaning indicated:
 - "stereophonic systems" covers quadraphonic or similar systems

H04T**INDEXING SCHEME RELATING TO STANDARDS FOR ELECTRIC COMMUNICATION TECHNIQUE (CLASS [H04](#))****NOTE**

This scheme constitutes an non-associated internal scheme for indexing exclusively documents issued by standardisation bodies (herein called standards) for electric communication technique (H04).

As standardisation bodies organize their documents in different ways, the present scheme is subdivided into main groups related to a particular CPC range to allow different indexing approaches.

Scheme index:

Wireless communication standards [H04T 2001/00](#) - [T04T 1/999](#)
 Standards related to data switching
 networks in general [H04T 2012/00](#) - [T04T 12/99](#)
 Internet standards [H04T 2029/00](#) - [T04T 29/99](#)

H04W

WIRELESS COMMUNICATIONS NETWORKS (radio transmission systems [H04B 7/00](#); transmission systems using electromagnetic waves other than radio waves, e.g. light, infrared [H04B 10/00](#); communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones [H04M 1/72](#); broadcast communication [H04H](#))

NOTE

This subclass covers:

communication networks for selectively establishing one or a plurality of wireless communication links between a desired number of users or between users and network equipment, for the purpose of transferring information via these wireless communication links;

networks deploying an infrastructure for mobility management of wireless users connected thereto, e.g. cellular networks, WLAN [Wireless Local Area Network], wireless access networks, e.g. WLL [Wireless Local Loop] or self-organising wireless communication networks, e.g. ad hoc networks;

planning or deployment specially adapted for the above-mentioned wireless networks;

services or facilities specially adapted for the above-mentioned wireless networks;

arrangements or techniques specially adapted for the operation of the

above-mentioned wireless networks.

This subclass does not cover:

communication systems using wireless extensions, i.e. wireless links without selective communication, e.g. cordless telephones, which are covered by group [H04M 1/72](#);

broadcast communication, which is covered by subclass [H04H](#) .

In this subclass, at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05B ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR (apparatus for special application, see the relevant places, e.g. [A47J](#) , [C21](#) , [C22](#) , [C23](#) , [F21](#) , [F24](#) , [F27](#))

NOTE

Attention is drawn to the Note (paragraph III) following the contents of Section of Section H

H05C ELECTRIC CIRCUITS OR APPARATUS SPECIALLY DESIGNED FOR USE IN EQUIPMENT FOR KILLING, STUNNING, OR GUIDING LIVING BEINGS (stationary means for catching or killing insects by electric means [A01M 1/22](#); apparatus for the destruction of noxious animals, other than insects, by electricity [A01M 19/00](#); electric traps for animals [A01M 23/38](#); scaring devices for animals [A01M 29/00](#); slaughtering or stunning by electric current [A22B 3/06](#))

H05F STATIC ELECTRICITY; NATURALLY-OCCURRING ELECTRICITY (electrostatic machines [H02N](#) ; uses of electricity in performing operations, e.g. precipitation, see the relevant subclasses for the operations)

NOTE

This subclass covers methods or arrangements for preventing the formation of electrostatic charges on bodies or for carrying-off these charges after their formation.

This subclass does not cover specific applications of the above-mentioned methods or arrangements, e.g. during the manufacture of artificial fibres or films, which are covered by the relevant subclasses.

H05G

X-RAY TECHNIQUE (apparatus for radiation diagnosis [A61B 6/00](#); X-ray therapy [A61N](#) ; testing by X-rays [G01N](#) ; apparatus for X-ray photography [G03B](#) ; filters, conversion screens, microscopes [G21K](#) ; X-ray tubes [H01J 35/00](#); TV systems having X-ray input [H04N 5/321](#))

WARNING

The following IPC group is not used in the CPC scheme. [H05G 1/61](#) covered by [H05G 1/60](#)

H05H

PLASMA TECHNIQUE (fusion reactors [G21B](#) ; ion-beam tubes [H01J 27/00](#); magnetohydrodynamic generators [H02K 44/08](#); producing X-rays involving plasma generation [H05G 2/00](#)); **PRODUCTION OF ACCELERATED ELECTRICALLY-CHARGED PARTICLES OR OF NEUTRONS** (obtaining neutrons from radioactive sources [G21](#) , e.g. [G21B](#) , [G21C](#) , [G21G](#)); **PRODUCTION OR ACCELERATION OF NEUTRAL MOLECULAR OR ATOMIC BEAMS** (atomic clocks [G04F 5/14](#); devices using stimulated emission [H01S](#) ; frequency regulation by comparison with a reference frequency determined by energy levels of molecules, atoms, or subatomic particles [H03L 7/26](#))

H05K

PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for [G12B](#) ; thin-film or thick-film circuits [H01L 27/01](#), [H01L 27/13](#); non-printed means for electric connections to or between printed circuits, { electric connections or line connectors, apparatus or processes for manufacturing, assembling, maintaining or repairing such connections or connectors } [H01R](#) ; casings for, or constructional details of, particular types of apparatus, see the relevant subclasses; processes involving only a single technical art, e.g. heating, spraying, for which provision exists elsewhere, see the relevant classes)

NOTE

This subclass covers:

- combinations of a radio or television receiver with apparatus having a different main function;- printed circuits structurally associated with non-printed electric components;
- { printed connectors (non printed connectors [H01R](#)) }

In this subclass, the following expression is used with the meaning indicated:

- "printed circuits" covers all kinds of mechanical constructions of circuits that consist of an insulating base or support carrying the conductor and are combined structurally with the conductor throughout their length, especially in a two-dimensional plane, the conductors of which are secured to the base in a non-dismountable manner, and also covers the processes or apparatus for manufacturing such constructions, e.g. forming the circuit by mechanical or

chemical treatment of a conductive foil, paste, or film on an insulating support.