H05B ELECTRIC HEATING; ELECTRIC LIGHTING NOT OTHERWISE PROVIDED FOR

**Note**
In this subclass, the following special cases occur:

a. 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 Note I(c) after the title of section H) there are places in H05B which cover the same technical subjects;

b. In the two cases referred to in Note (a) above, 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;

c. 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 aspect is covered by subclasses of class F21, 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 subclasses of class F21;

d. As regards heating, not only the electric elements and circuitry designs, as such, are covered by subclass H05B, 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 Note II after the title of section H.

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

**Heating**

1/00 Details of electric heating devices
1/02 . Automatic switching arrangements specially adapted to apparatus [: Control of heating devices] (thermally-actuated switches H01H 37/00)
1/0202 . . . (Switches)
1/0205 . . . [using a fusible material]
1/0208 . . . [actuated by the expansion or evaporation of a gas or liquid]
1/0211 . . . [using the expansion of an electric conductive liquid]
1/0213 . . . [using bimetallic elements]
1/0216 . . . [actuated by the expansion of a solid element, e.g. wire or rod]
1/0219 . . . [actuated by modification of the magnetic properties of a material]
1/0222 . . . [actuated by changing weight, level or centre of gravity]
1/0225 . . . [actuated by timers]
1/0227 . . . [Applications]
1/023 . . . [Industrial applications]
1/0233 . . . [for semiconductors manufacturing]
1/0236 . . . [for vehicles]
1/0238 . . . [For seats]
1/0241 . . . [For photocopierson]
1/0244 . . . [Heating of fluids (H05B 1/0247 takes precedence)]
3/0004 . [Devices wherein the heating current flows through the material to be heated (Circuit arrangements for heating by passing the current directly across the material to be heated H05B 3/0023; granular, powdered or fluid material H05B 3/60)]

**WARNING**

Group H05B 3/0004 is incomplete pending reclassification of documents from group H05B 3/023.

Groups H05B 3/0004 and H05B 3/023 should be considered in order to perform a complete search.

3/0009 . . [the material to be heated being in motion]

**WARNING**

Group H05B 3/0009 is incomplete pending reclassification of documents from group H05B 3/023.

Groups H05B 3/0023 and H05B 3/0009 should be considered in order to perform a complete search.

3/0014 . . [Devices wherein the heating current flows through particular resistances]

3/0019 . . [Circuit arrangements]

3/0023 . . [for heating by passing the current directly across the material to be heated]

3/0033 . . [Heating devices using lamps]

3/0038 . . [for industrial applications]

3/0042 . . . [used in motor vehicles]

3/0047 . . . [for semiconductor manufacture]

**WARNING**

Group H05B 3/0047 is incomplete pending reclassification of documents from group H05B 3/143.

Groups H05B 3/0047 and H05B 3/143 should be considered in order to perform a complete search.

3/0052 . . . [for fluid treatments]

3/0057 . . . [for plastic handling and treatment (including molds B29C)]

3/0061 . . . [for metal treatment]

3/0066 . . . [for photocopying]

3/0071 . . . [for domestic applications]

3/0076 . . . [for cooking, e.g. in ovens (lamps specially adapted for non-metallic cooking plates H05B 3/742, H05B 3/744)]

3/008 . . . [for heating of inner spaces]

3/0085 . . . [for medical applications]

3/009 . . . [heating devices not specially adapted for a particular application]

3/0095 . . . [Heating devices in the form of rollers (heated by induction H05B 6/145)]

3/02 . . Details

3/023 . . . [the current passing through the material to be heated]

**WARNING**

Group H05B 3/023 is no longer used for the classification of documents as of August 1, 2018. The content of this group is being reclassified into groups H05B 3/0004 and H05B 3/0009.

Groups H05B 3/023, H05B 3/0004, and H05B 3/0009 should be considered in order to perform a complete search.

3/03 . . . Electrodes

3/04 . . . Waterproof or air-tight seals for heaters

3/06 . . . having electric connections specially adapted for high temperatures

3/10 . . . Heater elements characterised by the composition or nature of the materials or by the arrangement of the conductor (compositions per se see the relevant subclasses)

3/12 . . . characterised by the composition or nature of the conductive material

3/14 . . . the material being non-metallic

3/141 . . . . . [Conductive ceramics, e.g. metal oxides, metal carbides, barium titanate, ferrites, zirconia, vitrous compounds]

3/143 . . . . . . (applied to semiconductors, e.g. wafers heating (H05B 3/0047 takes precedence))

**WARNING**

Group H05B 3/143 is impacted by reclassification into group H05B 3/0047.

Groups H05B 3/143 and H05B 3/0047 should be considered in order to perform a complete search.

3/145 . . . . . [Carbon only, e.g. carbon black, graphite]

3/146 . . . . . [Conductive polymers, e.g. polyethylene, thermoplastics]

3/148 . . . . . [Silicon, e.g. silicon carbide, magnesium silicide, heating transistors or diodes]

3/16 . . the conductor being mounted on an insulating base

3/18 . . the conductor being embedded in an insulating material

3/20 . . Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater (H05B 3/62, H05B 3/68, H05B 3/78, H05B 3/84 take precedence)

3/22 . . non-flexible

3/24 . . heating conductor being self-supporting

3/26 . . heating conductor mounted on insulating base {for transparent areas H05B 3/84, H05B 3/86}

3/262 . . . . [the insulating base being an insulated metal plate]

3/265 . . . . [the insulating base being an inorganic material, e.g. ceramic (H05B 3/262 takes precedence)]
Heating

3/267 . . . . [the insulating base being an organic material, e.g. plastic (H05B 3/262 takes precedence)]

3/28 . . . . heating conductor embedded in insulating material

3/283 . . . . [the insulating material being an inorganic material, e.g. ceramic]

3/286 . . . . [the insulating material being an organic material, e.g. plastic]

3/30 . . . . on or between metallic plates

3/32 . . . . heating conductor mounted on insulators on a metallic frame

3/34 . . flexible, e.g. heating nets or webs

3/342 . . . . [heaters used in textiles]

3/345 . . . . [knitted fabrics]

3/347 . . . . [woven fabrics]

3/36 . . . . heating conductor embedded in insulating material

3/38 . . . . Powder conductors

3/40 . . Heating elements having the shape of rods or tubes (H05B 3/62, H05B 3/68, H05B 3/78 take precedence)

3/42 . . non-flexible

3/44 . . . . heating conductor arranged within rods or tubes of insulating material

3/46 . . . . heating conductor mounted on insulating base

3/48 . . . . heating conductor embedded in insulating material

3/50 . . . . heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins

3/52 . . . . Apparatus or processes for filling or compressing insulating material in tubes

3/54 . . flexible

3/56 . . . . Heating cables

3/565 . . . . [flat cables]

3/58 . . . . Heating hoses; Heating collars

3/60 . . Heating arrangements wherein the heating current flows through granular powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating (H05B 3/38 takes precedence)

3/62 . . Heating elements specially adapted for furnaces (H05B 3/60 takes precedence; arrangements of such elements in furnaces F27, e.g. F27D 11/00)

3/64 . . . . using ribbon, rod, or wire heater

3/66 . . . . Supports or mountings for heaters on or in the wall or roof

3/68 . . Heating arrangements specially adapted for cooking plates or analogous hot-plates

3/681 . . . . [Plates having mobile parts coming into contact with the bottom of the kettles, pans, or the like]

3/683 . . . . [Plates having their feeding circuit closed as the kettles, pans or the like are put on (H05B 3/74 takes precedence)]

3/685 . . . . [Plates having magnetic means attracting the kettles, pans, or the like]

3/686 . . . . [Heat-storage plates]

3/688 . . . . [Fabrication of the plates (for single-step processes see the appropriate subclass, e.g. in B23C, sub-section metallurgy)]

NOTE

Group H05B 3/76 takes precedence over groups H05B 3/70, H05B 3/72, H05B 3/74.

3/70 . . . Plates of cast metal

3/72 . . . Plates of sheet metal

3/74 . . Non-metallic plates, e.g. vitreoceramic, ceramic or glassceramic hobs, also including power or control circuits

3/742 . . . . [Plates having both lamps and resistive heating elements]

3/744 . . . . [Lamps as heat source, i.e. heating elements with protective gas envelope, e.g. halogen lamps]

3/746 . . . . [Protection, e.g. overheat cutoff, hot plate indicator]

3/748 . . . . [Resistive heating elements, i.e. heating elements exposed to the air, e.g. coil wire heater (H05B 3/742 takes precedence)]

3/76 . . . Plates with spirally-wound heating tubes

3/78 . . . Heating arrangements specially adapted for immersion heating

3/80 . . . Portable immersion heaters

3/82 . . . Fixedly-mounted immersion heaters

3/84 . . . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields

3/845 . . . . [specially adapted for reflecting surfaces, e.g. bathroom - or rearview mirrors]

3/86 . . . . the heating conductors being embedded in the transparent or reflecting material (H05B 3/845 takes precedence)

6/00 Heating by electric, magnetic, or electromagnetic fields (radiation therapy using microwaves A61N 5/02)

6/02 . . Induction heating

6/04 . . Sources of current

6/06 . . Control, e.g. of temperature, of power

6/062 . . . . [for cooking plates or the like]

6/065 . . . . [using coordinated control of multiple induction coils]

6/067 . . . . [for melting furnaces]

6/08 . . using compensating or balancing arrangements

6/10 . . Induction heating apparatus, other than furnaces, for specific applications

6/101 . . . . [for local heating of metal pieces]

6/102 . . . . [the metal pieces being rotated while induction heated]

6/103 . . . . [multiple metal pieces successively being moved close to the inductor]

6/104 . . . . [metal pieces being elongated like wires or bands]

6/105 . . . . [using a susceptor]

6/106 . . . . [in the form of fillings]

6/107 . . . . [for continuous movement of material]

6/108 . . . . [for heating a fluid]

6/109 . . . . [using magnets rotating with respect to a susceptor]

6/12 . . . Cooking devices
Heat induction cooking plates or the like and devices to be used in combination with them.

6/1218 . . . . {with arrangements using lights for heating zone state indication}

6/1227 . . . . {for wok pans and wok pans supports for induction cooking plates}

6/1236 . . . . {adapted to induce current in a coil to supply power to a device and electrical heating devices powered in this way}

6/1245 . . . . {with special coil arrangements}

6/1254 . . . . {using conductive pieces to direct the induced magnetic field}

6/1263 . . . . {using coil cooling arrangements}

6/1272 . . . . {with more than one coil or coil segment per heating zone}

6/1281 . . . . {with flat coils}

6/129 . . . . {induction ovens}

6/14 . . . . Tools, e.g. nozzles, rollers, calenders

6/145 . . . . {Heated rollers}

6/16 . . . . Furnaces having endless cores (H05B 6/34 takes precedence)

6/18 . . . . having melting basin

6/20 . . . . having melting channel only

6/22 . . . . Furnaces without an endless core (H05B 6/34 takes precedence)

6/24 . . . . Crucible furnaces (H05B 6/30 takes precedence)

6/26 . . . . using vacuum or particular gas atmosphere

6/28 . . . . Protective systems

6/30 . . . . Arrangements for remelting or zone melting

6/32 . . . . Arrangements for simultaneous levitation and heating

6/34 . . . . Arrangements for circulation of melts

6/36 . . . . Coil arrangements

6/362 . . . . {with flat coil conductors}

6/365 . . . . {using supplementary conductive or ferromagnetic pieces}

6/367 . . . . {for melting furnaces}

6/38 . . . . specially adapted for fitting into hollow spaces of workpieces

6/40 . . . . Establishing desired heat distribution, e.g. to heat particular parts of workpieces

6/405 . . . . {for heating gear-wheels}

6/42 . . . . Cooling of coils

6/44 . . . . having more than one coil or coil segment

6/46 . . . . Dielectric heating (H05B 6/64 takes precedence)

6/48 . . . . Circuits

6/50 . . . . for monitoring or control

6/52 . . . . Feed lines

6/54 . . . . Electrodes

6/56 . . . . Rolling electrodes

6/58 . . . . "sewing machine" type

6/60 . . . . Arrangements for continuous movement of material

6/62 . . . . Apparatus for specific applications

6/64 . . . . Heating using microwaves (containers, packaging elements or packages specially adapted to be heated by microwaves H05D 81/3446)

6/6402 . . . . {Aspects relating to the microwave cavity}

6/6405 . . . . {Self-cleaning cavity}

6/6408 . . . . {Supports or covers specially adapted for use in microwave heating apparatus}
Heating by electric discharge (plasma torches H05B 1/26)

7/005 . . . {Electrical diagrams}
7/02 . . . Details
7/06 . . . Electrodes
7/07 . . . designed to melt in use
7/08 . . . non-consumable
7/085 . . . mainly consisting of carbon
7/09 . . . Self-baking electrodes, e.g. Söderberg type electrodes
7/10 . . . Mountings, supports, terminals or arrangements for feeding or guiding electrodes
7/101 . . . Mountings, supports or terminals at head of electrode, i.e. at the end remote from the arc
7/102 . . . specially adapted for consumable electrodes
7/103 . . . Mountings, supports or terminals with jaws (H05B 7/101 takes precedence)

7/05 . . . comprising more than two jaws equally spaced along circumference, e.g. ring holders
7/107 . . . specially adapted for self-baking electrodes
7/109 . . . Feeding arrangements (H05B 7/107 takes precedence; where the electrode movement is part of a closed loop for automatic control of power H05B 7/148)
7/11 . . . Arrangements for conducting current to the electrode terminals
7/12 . . . Arrangements for cooling, sealing or protecting electrodes
7/14 . . . Arrangements or methods for connecting successive electrode sections
7/144 . . . Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes
7/148 . . . Automatic control of power (electrode feeding arrangements H05B 7/109; automatic feeding of electrodes for spot or seam welding or cutting B23K 9/12; disposition of electrodes in or on furnaces F27D 11/10; control of position in general G05D 3/00; regulating electric characteristics of arcs in general G05F 1/02; regulating electric power in general G05F 1/66)
7/152 . . . by electromechanical means for positioning of electrodes
7/156 . . . by hydraulic or pneumatic means for positioning of electrodes
7/16 . . . Heating by glow discharge
7/18 . . . Heating by arc discharge
7/185 . . . {Heating gases for arc discharge (gas-filled discharge tubes H01J 37/32) }
7/20 . . . Direct heating by arc discharge, i.e. where at least one end of the arc directly acts on the material to be heated, including additional resistance heating by arc current flowing through the material to be heated
7/22 . . . Indirect heating by arc discharge
7/225 . . . {by arc image}

11/00 Heating by combined application of processes covered by two or more of groups H05B 3/00 - H05B 7/00 (H05B 7/20 takes precedence)

Lighting

31/00 Electric arc lamps (regulating electric characteristics of arcs G05F 1/02)
31/0003 . . . {the arc being outside, in the open}
31/0006 . . . {with superimposed electrodes}
31/0009 . . . {with parallel or oblique disposition of the electrodes; Special form of the electrodes}
31/0012 . . . {with a plurality of electrode pairs}
31/0015 . . . {with spare electrodes}
31/0018 . . . {in a closed vessel}
31/0021 . . . {Construction, in particular closure, of the vessel}
31/0024 . . . {Outlet valves}
31/0027 . . . {with special gasfilling}
31/003 . . . {of a special type}
31/0033 . . . {with glowrod and candle}
31/0036 . . . {for projection, copying or stage lighting}
31/0039 . . . {Projectors, the construction of which depends upon the presence of the arc}
31/0042 . . . {Mounting; Connecting}
Root: Lighting

33/00 Electroluminescent light sources

33/02 . Details
33/04 . . Sealing arrangements {, e.g. against humidity}
33/06 . . Electrode terminals
33/08 . . Circuit arrangements for operating electroluminescent light sources (for operating light emitting diodes H05B 45/00)

**WARNING**

Group H05B 33/08 is impacted by reclassification into group H05B 45/00.

Groups H05B 33/08 and H05B 45/00 should be considered in order to perform a complete search.

33/10 . Apparatus or processes specially adapted to the manufacture of electroluminescent light sources
33/12 . Light sources with substantially two-dimensional radiating surfaces
33/14 . . characterised by the chemical or physical composition or the arrangement of the electroluminescent material {, or by the simultaneous addition of the electroluminescent material in or onto the light source}

**NOTE**

When classifying in this group, the chemical composition of the electroluminescent material is also classified in the appropriate subgroup of C09K 11/00

33/145 . . [Arrangements of the electroluminescent material]
33/18 . . characterised by the nature or concentration of the activator
33/20 . . characterised by the chemical or physical composition or the arrangement of the material in which the electroluminescent material is embedded
33/22 . . characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers
33/24 . . . of metallic reflective layers (H05B 33/26 takes precedence)
33/26 . . characterised by the composition or arrangement of the conductive material used as an electrode
33/28 . . . of translucent electrodes

**35/00 Electric light sources using a combination of different types of light generation**

39/00 Circuit arrangements or apparatus for operating incandescent light sources

39/02 . Switching on, e.g. with predetermined rate of increase of lighting current
39/04 . Controlling
39/041 . . [the light-intensity of the source (H05B 39/08 takes precedence)]
39/042 . . . [by measuring the incident light]
39/044 . . . [continuously (H05B 39/042 takes precedence)]
39/045 . . . [with high-frequency bridge converters (H05B 39/048 takes precedence)]
39/047 . . . [with pulse width modulation from a DC power source]
39/048 . . . [with reverse phase control]
41/00  Circuit arrangements or apparatus for igniting or operating discharge lamps

41/02  . Details
41/04  . Starting switches
41/04 . . [using semiconductor devices]
41/04 . . . [for lamp provided with pre-heating electrodes]
41/04 . . . . . (using controlled semiconductor devices)
41/04 . . . . . . [using electromagnetic relays]
41/06  . thermal only
41/08 . . heated by glow discharge
41/10 . . magnetic only
41/12  . . combined thermal and magnetic
41/14  . Circuit arrangements
41/16  . . in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac, (or with network frequencies)
41/18  . . . having a starting switch
41/19  . . . . for lamps having an auxiliary starting electrode
41/20  . . . having no starting switch
41/22  . . . . . for lamps having an auxiliary starting electrode
41/23  . . . . . . for lamps not having an auxiliary starting electrode
41/23 . . . . . . . for high-pressure lamps
41/23 . . . . . . . . . [provided with pre-heating electrodes]
41/23 . . . . . . . . . . to eliminate stroboscopic effects, e.g. feeding two lamps with different phases
41/24 . . . in which the lamp is fed by high frequency ac, {or with separate oscillator frequency} (H05B 41/26 takes precedence)
41/24 . . . . . . . for a plurality of lamps
41/26  . . . . . in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc
41/28  . . . . . . . . . . . using static converters

41/2806 . . . . . [with semiconductor devices and specially adapted for lamps without electrodes in the vessel, e.g. surface discharge lamps, electrodeless discharge lamps]
41/2813 . . . . . [Arrangements for protecting lamps or circuits against abnormal operating conditions]
41/282 . . . . . with semiconductor devices ([H05B 41/2806], H05B 41/288, H05B 41/295 take precedence)
41/2821 . . . . . [by means of a single-switch converter or a parallel push-pull converter in the final stage (H05B 41/285 takes precedence)]
41/2822 . . . . . [using specially adapted components in the load circuit, e.g. feedback transformers, piezo-electric transformers, using specially adapted load circuit configurations]
41/2824 . . . . . [using control circuits for the switching element (H05B 41/2822 takes precedence)]
41/2825 . . . . . [by means of a bridge converter in the final stage (H05B 41/285 takes precedence)]
41/2827 . . . . . [using specially adapted components in the load circuit, e.g. feedback transformers, piezo-electric transformers; using specially adapted load circuit configurations]
41/2828 . . . . . [using control circuits for the switching elements (H05B 41/2827 takes precedence)]
41/285  . . . Arrangements for protecting lamps or circuits against abnormal operating conditions
41/2851 . . . . . [for protecting the circuit against abnormal operating conditions]
41/2853 . . . . . . [against abnormal power supply conditions]
41/2855 . . . . . . [against abnormal lamp operating conditions]
41/2856 . . . . . . [against internal abnormal circuit conditions]
41/2858 . . . . . . . [for protecting the lamp against abnormal operating conditions]
41/288 . . . . . with semiconductor devices and specially adapted for lamps without preheating electrodes, e.g. for high-intensity discharge lamps, high-pressure mercury or sodium lamps or low-pressure sodium lamps (H05B 41/2806 takes precedence)
41/2881 . . . . . [Load circuits; Control thereof]
41/2882 . . . . . [the control resulting from an action on the static converter]
41/2883 . . . . . {the controlled element being a DC/AC converter in the final stage, e.g. by harmonic mode starting}
41/2885 . . . . . [Static converters especially adapted therefor; Control thereof (H05B 41/2882 takes precedence)]
41/2886 . . . . . {comprising a controllable preconditioner, e.g. a booster}
41/2887 . . . . . {characterised by a controllable bridge in the final stage}
Lighting

41/2888 . . . . . . . [the bridge being commutated at low frequency, e.g. 1kHz]
41/292 . . . . . . . Arrangements for protecting lamps or circuits against abnormal operating conditions
41/2921 . . . . . . . {for protecting the circuit against abnormal operating conditions}
41/2923 . . . . . . . [against abnormal power supply conditions]
41/2925 . . . . . . . [against abnormal lamp operating conditions]
41/2926 . . . . . . . [against internal abnormal circuit conditions]
41/2928 . . . . . . . {for protecting the lamp against abnormal operating conditions}
41/295 . . . . . . . with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps
41/298 . . . . . . . Arrangements for protecting lamps or circuits against abnormal operating conditions
41/2981 . . . . . . . {for protecting the circuit against abnormal operating conditions}
41/2983 . . . . . . . [against abnormal power supply conditions]
41/2985 . . . . . . . [against abnormal lamp operating conditions]
41/2986 . . . . . . . [against internal abnormal circuit conditions]
41/2988 . . . . . . . {for protecting the lamp against abnormal operating conditions}
41/30 . . . . . . . in which the lamp is fed by pulses, e.g. flash lamp
41/32 . . . . . . . for single flash operation
41/325 . . . . . . . {by measuring the incident light}
41/34 . . . . . . . to provide a sequence of flashes
41/36 . . . . . . . Controlling
41/38 . . . . . . . Controlling the intensity of light
41/382 . . . . . . . [during the transitional start-up phase]
41/384 . . . . . . . {in case of hot-restriking}
41/386 . . . . . . . {for speeding-up the lighting-up}
41/388 . . . . . . . {for a transition from glow to arc}
41/39 . . . . . . . continuously
41/391 . . . . . . . using saturable magnetic devices
41/392 . . . . . . . using semiconductor devices, e.g. thyristor
41/3921 . . . . . . . {with possibility of light intensity variations}
41/3922 . . . . . . . {and measurement of the incident light}
41/3924 . . . . . . . {by phase control, e.g. using a triac (H05B 41/3922 takes precedence)}
41/3925 . . . . . . . {by frequency variation (H05B 41/3922 takes precedence)}
41/3927 . . . . . . . {by pulse width modulation (H05B 41/3922 takes precedence)}
41/3928 . . . . . . . {for high-pressure lamps, e.g. high-pressure discharge lamps, high-pressure mercury or sodium lamps}
41/40 . . . . . . . discontinuously
41/42 . . . . . . . . . in two steps only
41/44 . . . . . . . for providing special optical effects, e.g. progressive motion of light
41/46 . . . . . . . Circuits providing for substitution in case of failure of the lamp

45/00 Circuit arrangements for operating light emitting diodes [LED]

NOTE
In this group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its subgroups, which is considered to represent information of interest for search, may also be classified in each of those subgroups.

WARNING
Group H05B 45/00 is incomplete pending reclassification of documents from group H05B 33/08.
Group H05B 45/00 is also impacted by reclassification into groups H05B 45/30, H05B 45/397, Groups H05B 33/08, H05B 45/00, and H05B 45/30-H05B 45/397 should be considered in order to perform a complete search.

45/10 . . . Controlling the intensity of the light

WARNING
Group H05B 45/10 is impacted by reclassification into groups H05B 45/12 and H05B 45/18.
Groups H05B 45/10, H05B 45/12, and H05B 45/18 should be considered in order to perform a complete search.

45/12 . . . using optical feedback

WARNING
Group H05B 45/12 is incomplete pending reclassification of documents from group H05B 45/10.
Groups H05B 45/10 and H05B 45/12 should be considered in order to perform a complete search.

45/14 . . . . . . . using electrical feedback from LEDs or from LED modules

45/18 . . . using temperature feedback

WARNING
Group H05B 45/18 is incomplete pending reclassification of documents from group H05B 45/10.
Groups H05B 45/10 and H05B 45/18 should be considered in order to perform a complete search.

45/20 . . . Controlling the colour of the light

WARNING
Group H05B 45/20 is impacted by reclassification into group H05B 45/28.
Groups H05B 45/20 and H05B 45/28 should be considered in order to perform a complete search.

45/22 . . . . . . . using optical feedback

45/24 . . . . . . . using electrical feedback from LEDs or from LED modules
Lighting

H05B

45/28 . . using temperature feedback

**WARNING**

Group H05B 45/28 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/20 and H05B 45/28 should be considered in order to perform a complete search.

45/30 . . Driver circuits

**WARNING**

Group H05B 45/30 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/30 should be considered in order to perform a complete search.

45/305 . . Frequency-control circuits

**WARNING**

Group H05B 45/305 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/305 should be considered in order to perform a complete search.

45/31 . . Phase-control circuits

**WARNING**

Group H05B 45/31 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/31 should be considered in order to perform a complete search.

45/315 . . Reverse phase-control circuits

**WARNING**

Group H05B 45/315 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/315 should be considered in order to perform a complete search.

45/32 . . Pulse-control circuits

**WARNING**

Group H05B 45/32 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/32 should be considered in order to perform a complete search.

45/325 . . Pulse-width modulation [PWM]

**WARNING**

Group H05B 45/325 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/325 should be considered in order to perform a complete search.

45/327 . . Burst dimming

**WARNING**

Group H05B 45/327 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/327 should be considered in order to perform a complete search.

45/33 . . Pulse-amplitude modulation [PAM]

**WARNING**

Group H05B 45/33 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/33 should be considered in order to perform a complete search.

45/335 . . Pulse-frequency modulation [PFM]

**WARNING**

Group H05B 45/335 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/335 should be considered in order to perform a complete search.

45/34 . . Voltage stabilisation; Maintaining constant voltage

**WARNING**

Group H05B 45/34 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/34 should be considered in order to perform a complete search.

45/345 . . Current stabilisation; Maintaining constant current

**WARNING**

Group H05B 45/345 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/00 and H05B 45/345 should be considered in order to perform a complete search.
Lighting

45/347 . . Dynamic headroom control [DHC]

**WARNING**

Group H05B 45/347 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/347 should be considered in order to perform a complete search.

45/35 . . Balancing circuits

**WARNING**

Group H05B 45/35 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/35 should be considered in order to perform a complete search.

45/355 . . Power factor correction [PFC]; Reactive power compensation

**WARNING**

Group H05B 45/355 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/355 should be considered in order to perform a complete search.

45/357 . . specially adapted for retrofit LED light sources

**WARNING**

Group H05B 45/357 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/357 should be considered in order to perform a complete search.

45/3574 . . Emulating the electrical or functional characteristics of incandescent lamps

**WARNING**

Group H05B 45/3574 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/3574 should be considered in order to perform a complete search.

45/3575 . . by means of dummy loads or bleeder circuits, e.g. for dimmers

**WARNING**

Group H05B 45/3575 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/3575 should be considered in order to perform a complete search.

45/3577 . . . Emulating the dimming characteristics, brightness or colour temperature of incandescent lamps

**WARNING**

Group H05B 45/3577 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/3577 should be considered in order to perform a complete search.

45/3578 . . . Emulating the electrical or functional characteristics of discharge lamps

**WARNING**

Group H05B 45/3578 is incomplete pending reclassification of documents from group H05B 45/00.
Groups H05B 45/00 and H05B 45/3578 should be considered in order to perform a complete search.

45/358 . . Circuits for reducing harmonics, ripples or electromagnetic interferences [EMI]

**WARNING**

Group H05B 45/35 is incomplete pending reclassification of documents from group H05B 45/00.
Group H05B 45/37 is also impacted by reclassification into groups H05B 45/3725, H05B 45/375, H05B 45/38, H05B 45/382, H05B 45/385, H05B 45/39, and H05B 45/392.
All groups listed in this Warning should be considered in order to perform a complete search.

45/35725 . . Switched mode power supply [SMPS]

**WARNING**

Group H05B 45/3725 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.
Groups H05B 45/00, H05B 45/37, and H05B 45/3725 should be considered in order to perform a complete search.
45/375 . . . using buck topology

**WARNING**

Group H05B 45/375 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/375 should be considered in order to perform a complete search.

45/38 . . . using boost topology

**WARNING**

Group H05B 45/38 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/38 should be considered in order to perform a complete search.

45/382 . . . with galvanic isolation between input and output

**WARNING**

Group H05B 45/382 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/382 should be considered in order to perform a complete search.

45/385 . . . using flyback topology

**WARNING**

Group H05B 45/385 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/385 should be considered in order to perform a complete search.

45/39 . . . Circuits containing inverter bridges

**WARNING**

Group H05B 45/39 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/39 should be considered in order to perform a complete search.

45/392 . . . wherein the LEDs are placed as freewheeling diodes at the secondary side of an isolation transformer

**WARNING**

Group H05B 45/392 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/37.

Groups H05B 45/00, H05B 45/37, and H05B 45/392 should be considered in order to perform a complete search.

45/395 . . . Linear regulators

**WARNING**

Group H05B 45/395 is incomplete pending reclassification of documents from group H05B 45/00.

Groups H05B 45/395 is also impacted by reclassification into group H05B 45/397.

Groups H05B 45/00, H05B 45/395, and H05B 45/397 should be considered in order to perform a complete search.

45/397 . . . Current mirror circuits

**WARNING**

Group H05B 45/397 is incomplete pending reclassification of documents from groups H05B 45/00 and H05B 45/395.

Groups H05B 45/00, H05B 45/395, and H05B 45/397 should be considered in order to perform a complete search.

45/40 . . . Details of LED load circuits

**WARNING**

Group H05B 45/40 is impacted by reclassification into group H05B 45/42.

Groups H05B 45/40 and H05B 45/42 should be considered in order to perform a complete search.

45/42 . . . Antiparallel configurations

**WARNING**

Group H05B 45/42 is incomplete pending reclassification of documents from group H05B 45/40.

Groups H05B 45/40 and H05B 45/42 should be considered in order to perform a complete search.

45/44 . . . with an active control inside an LED matrix

45/46 . . . having LEDs disposed in parallel lines

45/48 . . . having LEDs organised in strings and incorporating parallel shunting devices

45/50 . . . responsive to malfunctions of LEDs; responsive to LED life; Protective circuits

**WARNING**

Group H05B 45/50 is impacted by reclassification into groups H05B 45/52, H05B 45/54, and H05B 45/56.

All groups listed in this Warning should be considered in order to perform a complete search.

45/52 . . . in a parallel array of LEDs

**WARNING**

Group H05B 45/52 is incomplete pending reclassification of documents from group H05B 45/50.

Groups H05B 45/50 and H05B 45/52 should be considered in order to perform a complete search.
Lighting

45/54 . . in a series array of LEDs

**WARNING**

Group H05B 45/54 is incomplete pending reclassification of documents from group H05B 45/50.

Groups H05B 45/50 and H05B 45/54 should be considered in order to perform a complete search.

45/56 . . involving measures to prevent abnormal temperature of the LEDs

**WARNING**

Group H05B 45/56 is incomplete pending reclassification of documents from group H05B 45/50.

Groups H05B 45/50 and H05B 45/56 should be considered in order to perform a complete search.

45/58 . . involving end of life detection of LEDs

45/60 . . [Circuit arrangements for operating light emitting diodes (LEDs) comprising organic materials, e.g. polymer LEDs (PLED) or organic LEDs (OLED)]

46/00 Circuit arrangements for light sources using a charge of combustible material

47/00 Circuit arrangements for operating light sources in general, i.e. where the type of the light source is not relevant

**NOTE**

In this group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its subgroups, which is considered to represent information of interest for search, may also be classified in each of those subgroups.

**WARNING**

Group H05B 47/00 is impacted by reclassification into groups H05B 47/10 - H05B 47/29.

Groups H05B 47/00 and H05B 47/10 - H05B 47/29 should be considered in order to perform a complete search.

47/10 . . Controlling the light source

**WARNING**

Group H05B 47/10 is incomplete pending reclassification of documents from group H05B 47/00.

Group H05B 47/10 is also impacted by reclassification into groups H05B 47/165 and H05B 47/17.

All groups listed in this Warning should be considered in order to perform a complete search.

47/105 . . in response to determined parameters

**WARNING**

Group H05B 47/105 is incomplete pending reclassification of documents from group H05B 47/00.

Group H05B 47/105 is also impacted by reclassification into groups H05B 47/115, H05B 47/125, H05B 47/13, H05B 47/135, and H05B 47/14.

All groups listed in this Warning should be considered in order to perform a complete search.

47/11 . . by determining the brightness or colour temperature of ambient light

**WARNING**

Group H05B 47/11 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/11 should be considered in order to perform a complete search.

47/115 . . by determining the presence or movement of objects or living beings

**WARNING**

Group H05B 47/115 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/105.

Groups H05B 47/00, H05B 47/105, and H05B 47/115 should be considered in order to perform a complete search.

47/12 . . by detecting audible sound

**WARNING**

Group H05B 47/12 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/12 should be considered in order to perform a complete search.

47/125 . . . by using cameras

**WARNING**

Group H05B 47/125 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/105.

Groups H05B 47/00, H05B 47/105, and H05B 47/125 should be considered in order to perform a complete search.

47/13 . . . by using passive infrared detectors

**WARNING**

Group H05B 47/13 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/105.

Groups H05B 47/00, H05B 47/105, and H05B 47/13 should be considered in order to perform a complete search.
by determining the type of light source being controlled (electrical parameters of light source being controlled H05B 47/14)

**WARNING**

Group H05B 47/135 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/105.

Groups H05B 47/00, H05B 47/105, and H05B 47/135 should be considered in order to perform a complete search.

47/14 

by determining electrical parameters of the light source

**WARNING**

Group H05B 47/14 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/105.

Groups H05B 47/00, H05B 47/105, and H05B 47/14 should be considered in order to perform a complete search.

47/155 

Coordinated control of two or more light sources

**WARNING**

Group H05B 47/155 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/155 should be considered in order to perform a complete search.

47/16 

by timing means

**WARNING**

Group H05B 47/16 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/16 should be considered in order to perform a complete search.

47/165 

following a pre-assigned programmed sequence; Logic control [LC]

**WARNING**

Group H05B 47/165 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/10.

Groups H05B 47/00, H05B 47/10, and H05B 47/165 should be considered in order to perform a complete search.

47/17 

Operational modes, e.g. switching from manual to automatic mode or prohibiting specific operations

**WARNING**

Group H05B 47/17 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/10.

Groups H05B 47/00, H05B 47/10, and H05B 47/17 should be considered in order to perform a complete search.

47/175 

by remote control

**WARNING**

Group H05B 47/175 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/175 should be considered in order to perform a complete search.

47/18 

via data-bus transmission

**WARNING**

Group H05B 47/18 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/18 should be considered in order to perform a complete search.

47/185 

via power line carrier transmission

**WARNING**

Group H05B 47/185 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/185 should be considered in order to perform a complete search.

47/19 

via wireless transmission

**WARNING**

Group H05B 47/19 is incomplete pending reclassification of documents from group H05B 47/00.

Group H05B 47/19 is also impacted by reclassification into group H05B 47/195.

Groups H05B 47/00, H05B 47/19, and H05B 47/195 should be considered in order to perform a complete search.

47/195 

the transmission using visible or infrared light

**WARNING**

Group H05B 47/195 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/19.

Groups H05B 47/00, H05B 47/19, and H05B 47/195 should be considered in order to perform a complete search.
Responsive to malfunctions or to light source life; for protection

**WARNING**

Group H05B 47/20 is incomplete pending reclassification of documents from group H05B 47/00.

Group H05B 47/20 is also impacted by reclassification into groups H05B 47/24, H05B 47/25, H05B 47/26, and H05B 47/28.

All groups listed in this Warning should be considered in order to perform a complete search.

of two or more light sources connected in parallel

**WARNING**

Group H05B 47/21 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/21 should be considered in order to perform a complete search.

of two or more light sources connected in series

**WARNING**

Group H05B 47/23 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/23 should be considered in order to perform a complete search.

[C with communication between the lamps and a central unit]

**WARNING**

Group H05B 47/22 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/22 should be considered in order to perform a complete search.

Circuit arrangements for protecting against overvoltage

**WARNING**

Group H05B 47/24 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/20.

Groups H05B 47/00, H05B 47/20, and H05B 47/24 should be considered in order to perform a complete search.

Circuit arrangements for protecting against overcurrent

**WARNING**

Group H05B 47/25 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/20.

Groups H05B 47/00, H05B 47/20, and H05B 47/25 should be considered in order to perform a complete search.

Circuit arrangements for protecting against earth faults

**WARNING**

Group H05B 47/26 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/20.

Groups H05B 47/00, H05B 47/20, and H05B 47/26 should be considered in order to perform a complete search.

Circuit arrangements for protecting against abnormal temperature

**WARNING**

Group H05B 47/28 is incomplete pending reclassification of documents from groups H05B 47/00 and H05B 47/20.

Groups H05B 47/00, H05B 47/20, and H05B 47/28 should be considered in order to perform a complete search.

Circuits providing for substitution of the light source in case of its failure

**WARNING**

Group H05B 47/29 is incomplete pending reclassification of documents from group H05B 47/00.

Groups H05B 47/00 and H05B 47/29 should be considered in order to perform a complete search.

Aspects relating to Ohmic resistive heating covered by group H05B 3/00

- Heaters using a particular layout for the resistive material or resistive elements
- Heaters using serpentine layout
- Heaters using zigzag layout
- Heaters using multiple resistive elements or resistive zones isolated from each other
- Heaters using interdigitated electrodes
- Heaters using multiple electrically connected resistive elements or resistive zones
- Heaters with layout including a portion free of resistive material, e.g. communication window
- Heaters using conductive material in contact with opposing surfaces of the resistive element or resistive layer
- Heaters comprising a particular structure with multiple layers
- Heaters using laterally extending conductive material as connecting means
Heaters using non-flexible resistive rods or tubes not provided for in H05B 3/42

Heaters using resistive films or coatings

Heaters using resistive wires or cables not provided for in H05B 3/54

Heater wherein the heating element is interwoven with the textile

Heaters using particular connecting means

Manufacturing methods or apparatus for heaters

Heaters using heating elements comprising mosi2

Heaters using heating elements having a negative temperature coefficient

Heaters using heating elements having a positive temperature coefficient

Heaters specially adapted for heating liquids

Heaters specially adapted for heating gaseous material

Heaters of the type used for electrically heating the air blown in a vehicle compartment by the vehicle heating system

Heaters using beehive flow through structures

Electrical circuits used in resistive heating apparatus

Heaters using heating elements comprising short fibers of conductive material

Heaters specially adapted for garment heating

Heaters with zones of different power density

Microwave drying of wood, ink, food, ceramic, sintering of ceramic, clothes, hair

Aspects relating both to resistive heating and to induction heating, covered by H05B 3/00 and H05B 6/00

Stirring of melted material in melting furnaces

Heating plates made out of a matrix of heating elements that can define heating areas adapted to cookware randomly placed on the heating plate

Heating plates with overheat protection means

Heating plates with pan detection means

Cook-top or cookware capable of communicating with each other

Heating plates with temperature control means

Aspects relating to resistive heating, induction heating and heating using microwaves, covered by groups H05B 3/00, H05B 6/00

Heaters specially designed for de-icing or protection against icing

Heating of hydrocarbons

Heating means manufactured by using nanotechnology

Aspects relating both to resistive heating and to induction heating, covered by H05B 3/00 and H05B 6/00

Stirring of melted material in melting furnaces

Heating plates made out of a matrix of heating elements that can define heating areas adapted to cookware randomly placed on the heating plate

Heating plates with overheat protection means

Heating plates with pan detection means

Cook-top or cookware capable of communicating with each other

Heating plates with temperature control means

Aspects relating to resistive heating, induction heating and heating using microwaves, covered by groups H05B 3/00, H05B 6/00

Heaters specially designed for de-icing or protection against icing

Heating of hydrocarbons

Heating means manufactured by using nanotechnology