

CPC**COOPERATIVE PATENT CLASSIFICATION****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

Guidance heading: Heating

H05B 1/00

Details of electric heating devices

- H05B 1/02 . Automatic switching arrangements specially adapted to apparatus; { **Control of heating devices** } (**control of temperature in general** [G05D 23/00](#); thermally-actuated switches [H01H 37/00](#))
- H05B 1/0202 .. { **Switches** }
- H05B 1/0205 ... { using a fusible material }
- H05B 1/0208 ... { actuated by the expansion or evaporation of a gas or liquid }
- H05B 1/0211 ... { using the expansion of an electric conductive liquid }
- H05B 1/0213 ... { using bimetallic elements }
- H05B 1/0216 ... { actuated by the expansion of a solid element, e.g. wire or rod }
- H05B 1/0219 ... { actuated by modification of the magnetic properties of a material }
- H05B 1/0222 ... { actuated by changing weight, level or centre of gravity }
- H05B 1/0225 ... { actuated by timers }
- H05B 1/0227 .. { **Applications** }
- H05B 1/023 ... { **Industrial applications** }
- H05B 1/0233 { for semiconductors manufacturing }
- H05B 1/0236 { for vehicles }
- H05B 1/0238 { For seats }
- H05B 1/0241 { For photocopiers }
- H05B 1/0244 { Heating of fluids ([H05B 1/0247](#) takes precedence) }
- H05B 1/0247 { For chemical processes }
- H05B 1/025 { For medical applications }
- H05B 1/0252 ... { **Domestic applications** }
- H05B 1/0255 { **Irons** }
- H05B 1/0258 { For cooking }
- H05B 1/0261 { of food }
- H05B 1/0263 { **Ovens** }
- H05B 1/0266 { **Cooktops** }
- H05B 1/0269 { For heating of fluids }

H05B 1/0272	....	{ For heating of fabrics }
H05B 1/0275	....	{ Heating of spaces, e.g. rooms, wardrobes }
H05B 1/0277	.....	{ Electric radiators }
H05B 1/028	.....	{ Airconditioning }
H05B 1/0283	.....	{ For heating of fluids, e.g. water heaters }
H05B 1/0286	.....	{ Heat storages }
H05B 1/0288	...	{ for non specified applications }
H05B 1/0291	....	{ Tubular elements }
H05B 1/0294	....	{ Planar elements }
H05B 1/0297	...	{ Heating of fluids for non specified applications }

H05B 3/00**Ohmic-resistance heating**

H05B 3/0004	.	{ Devices wherein the heating current flows through the material to be heated (electrical diagrams H05B 3/0019 ; details H05B 3/023 , H05B 3/03 ; for granular, powdered or fluid material H05B 3/60)}
H05B 3/0009	..	{ the material to be heated being in motion }
H05B 3/0014	.	{ Devices wherein the heating current flows through particular resistances }
H05B 3/0019	.	{ Electrical diagrams }
H05B 3/0023	..	{ Electrical diagrams for heating by passing the current directly across the material to be heated }
H05B 3/0028	..	{ electrical diagrams for heating by particular resistances }
H05B 3/0033	.	{ Heating devices using lamps (devices for radiation therapy A61N)}
H05B 3/0038	..	{ for industrial applications }
H05B 3/0042	...	{ used in motor vehicles }
H05B 3/0047	...	{ for semi-conductors manufacture }
H05B 3/0052	...	{ for fluid treatments }
H05B 3/0057	...	{ for plastic handling and treatment (including molds B29C)}
H05B 3/0061	...	{ for metal treatment }
H05B 3/0066	...	{ for photocopying }
H05B 3/0071	..	{ for domestic applications }
H05B 3/0076	...	{ for cooking, e.g. in ovens (lamps specially adapted for non-metallic cooking plates H05B 3/742 , H05B 3/744)}
H05B 3/008	...	{ for heating of inner spaces }
H05B 3/0085	..	{ for medical applications }
H05B 3/009	..	{ related to general description of heaters without specification of field of application }
H05B 3/0095	.	{ Heating devices in the form of rollers (heated by induction H05B 6/145)}
H05B 3/02	.	Details
H05B 3/023	..	{ the current passing through the material to be heated }
H05B 3/026	..	{ the current passing through particular resistances }

- H05B 3/03 .. Electrodes ([electrothermic treatment of ores C22B 4/00](#))
- H05B 3/04 .. Waterproof or air-tight seals for heaters
- H05B 3/06 .. Heater elements structurally combined with coupling elements or holders
- H05B 3/08 ... having electric connections specially adapted for high temperatures

- H05B 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](#))
- H05B 3/12 .. characterised by the composition or nature of the conductive material { [electric conductive compositions characterised by PTC or NTC resistance, per se H01C 7/02, H01C 7/04](#) }
- H05B 3/14 ... the material being non-metallic {([non-metallic, non-adjustable resistors H01C 7/022, H01C 7/042](#))}
- H05B 3/141 { [Conductive ceramics, e.g. metal oxides, metal carbides, barium titanate, ferrites, zirconia, vitrous compounds](#) }
- H05B 3/143 { [applied to semi conductors, e.g. wafers heating \(apparatus for thermal treatment of semiconductor or solid-state devices or of parts thereof H01L 21/00S2H \)](#) }
- H05B 3/145 { [Carbon only, e.g. carbon black, graphite](#) }
- H05B 3/146 { [Conductive polymers, e.g. polyethylene, thermoplastics](#) }
- H05B 3/148 { [Silicon, e.g. silicon carbide, magnesium silicide, heating transistors or diodes](#) }

- H05B 3/16 .. the conductor being mounted on an insulating base
- H05B 3/18 .. the conductor being embedded in an insulating material

- H05B 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](#))
- H05B 3/22 .. non-flexible
- H05B 3/24 ... heating conductor being self-supporting
- H05B 3/26 ... heating conductor mounted on insulating base {([for transparent areas H05B 3/84, H05B 3/86](#))}
- H05B 3/262 { [the insulating base being an insulated metal plate](#) }
- H05B 3/265 { [the insulating base being an inorganic material, e.g. ceramic \(\[H05B 3/262 takes precedence\]\(#\) \)](#) }
- H05B 3/267 { [the insulating base being an organic material, e.g. plastic \(\[H05B 3/262 takes precedence\]\(#\) \)](#) }
- H05B 3/28 ... heating conductor embedded in insulating material
- H05B 3/283 { [the insulating material being an inorganic material, e.g. ceramic](#) }
- H05B 3/286 { [the insulating material being an organic material, e.g. plastic](#) }
- H05B 3/30 on or between metallic plates
- H05B 3/32 ... heating conductor mounted on insulators on a metallic frame
- H05B 3/34 .. flexible, e.g. heating nets or webs
- H05B 3/342 ... { [heaters used in textiles \(\[making textile fabrics D04H\]\(#\) \)](#) }
- H05B 3/345 { [knitted fabrics](#) }
- H05B 3/347 { [woven fabrics](#) }
- H05B 3/36 ... heating conductor embedded in insulating material
- H05B 3/38 powder conductors

- H05B 3/40 . Heating elements having the shape of rods or tubes ([H05B 3/62](#), [H05B 3/68](#), [H05B 3/78](#) take precedence)
- H05B 3/42 . . non-flexible
- H05B 3/44 . . . heating conductor arranged within rods or tubes of insulating material
- H05B 3/46 . . . heating conductor mounted on insulating base
- H05B 3/48 . . . heating conductor embedded in insulating material
- H05B 3/50 heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins
- H05B 3/52 Apparatus or processes for filling or compressing insulating material in tubes
- H05B 3/54 . . flexible
- H05B 3/56 . . . Heating cables
- H05B 3/565 { flat cables }
- H05B 3/58 . . . Heating hoses; Heating collars
- H05B 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)
- H05B 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](#))
- H05B 3/64 . . using ribbon, rod, or wire heater
- H05B 3/66 . . Supports or mountings for heaters on or in the wall or roof
- H05B 3/68 . Heating arrangements specially adapted for cooking plates or analogous hot-plates
- H05B 3/681 . . { Plates having mobile parts coming into contact with the bottom of the kettles, pans, or the like }
- H05B 3/683 . . { Plates having their feeding circuit closed as the kettles, pans or the like are put on ([H05B 3/74](#) takes precedence) }
- H05B 3/685 . . { Plates having magnetic means attracting the kettles, pans, or the like }
- H05B 3/686 . . { Heat-storage plates }
- H05B 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](#).

- H05B 3/70 . . Plates of cast metal
- H05B 3/72 . . Plates of sheet metal
- H05B 3/74 . . Non-metallic plates, { e.g. vitroceraamic, ceramic or glassceramic hobs, also including power or control circuits }
- H05B 3/742 . . . { Plates having both lamps and resistive heating elements }
- H05B 3/744 . . . { Lamps as heat source, i.e. heating elements with protective gas envelope, e.g. halogen lamps }
- H05B 3/746 . . . { Protection, e.g. overheat cutoff, hot plate indicator }
- H05B 3/748 . . . { Resistive heating elements, i.e. heating elements exposed to the air, e.g. coil wire heater ([H05B 3/742](#) takes precedence) }

- H05B 3/76 . . Plates with spirally-wound heating tubes
- H05B 3/78 . Heating arrangements specially adapted for immersion heating
- H05B 3/80 . . Portable immersion heaters
- H05B 3/82 . . Fixedly-mounted immersion heaters
- H05B 3/84 . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields
- H05B 3/845 . . { specially adapted for reflecting surfaces, e.g. bathroom - or rearview mirrors }
- H05B 3/86 . . the heating conductors being embedded in the transparent or reflecting material
{ ([H05B 3/84C](#), [H05B 3/845](#), [H05B 3/84P](#) take precedence) }
- H05B 6/00** **Heating by electric, magnetic, or electromagnetic fields (for therapeutic purposes [A61N 5/00](#); joining of preformed parts by heating of plastics or substances in a plastic state [B29C 65/02](#))**
- H05B 6/02 . Induction heating
- H05B 6/04 . . Sources of current
- H05B 6/06 . . Control, e.g. of temperature, of power
- H05B 6/062 . . . { for cooking plates or the like }
- H05B 6/065 . . . { using coordinated control of multiple induction coils }
- H05B 6/067 . . . { for melting furnaces }
- H05B 6/08 . . . using compensating or balancing arrangements
- H05B 6/10 . . Induction heating apparatus, other than furnaces, for specific applications
- H05B 6/101 . . . { for local heating of metal pieces }
- H05B 6/102 . . . { the metal pieces being rotated while induction heated }
- H05B 6/103 . . . { multiple metal pieces successively being moved close to the inductor }
- H05B 6/104 N: metal pieces being elongated like wires or bands]
- H05B 6/105 . . . { using a susceptor }
- H05B 6/106 . . . { in the form of fillings }
- H05B 6/107 . . . { for continuous movement of material }
- H05B 6/108 . . . { for heating a fluid }
- H05B 6/109 . . . { using magnets rotating with respect to a susceptor }
- H05B 6/12 . . . Cooking devices
- H05B 6/1209 . . . { induction cooking plates or the like and devices to be used in combination with them }
- H05B 6/1218 { with arrangements using lights for heating zone state indication }
- H05B 6/1227 { for wok pans and wok pans supports for induction cooking plates }
- H05B 6/1236 { adapted to induce current in a coil to supply power to a device and electrical heating devices powered in this way }
- H05B 6/1245 { with special coil arrangements }
- H05B 6/1254 { using conductive pieces to direct the induced magnetic field }
- H05B 6/1263 { using coil cooling arrangements }
- H05B 6/1272 { with more than one coil or coil segment per heating zone }
- H05B 6/1281 { with flat coils }

H05B 6/129	.... { induction ovens }
H05B 6/14	... Tools, e.g. nozzles, rollers, calenders
H05B 6/145	.... { Heated rollers }
H05B 6/16	.. Furnaces having endless cores (H05B 6/34 takes precedence)
H05B 6/18	... having melting basin
H05B 6/20	... having melting channel only
H05B 6/22	.. Furnaces without an endless core (H05B 6/34 takes precedence)
H05B 6/24	... Crucible furnaces (H05B 6/30 takes precedence)
H05B 6/26	.... using vacuum or particular gas atmosphere
H05B 6/28	.... Protective systems
H05B 6/30	... Arrangements for remelting or zone melting
H05B 6/32	... Arrangements for simultaneous levitation and heating
H05B 6/34	.. Arrangements for circulation of melts
H05B 6/36	.. Coil arrangements
H05B 6/362	... { with flat coil conductors }
H05B 6/365	... { using supplementary conductive or ferromagnetic pieces }
H05B 6/367	... { for melting furnaces }
H05B 6/38	... specially adapted for fitting into hollow spaces of workpieces
H05B 6/40	... Establishing desired heat distribution, e.g. to heat particular parts of workpieces
H05B 6/405	.... { for heating gear-wheels }
H05B 6/42	... Cooling of coils
H05B 6/44	... having more than one coil or coil segment
H05B 6/46	. Dielectric heating (H05B 6/64 takes precedence)
H05B 6/48	.. Circuits
H05B 6/50	... for monitoring or control
H05B 6/52	.. Feed lines
H05B 6/54	.. Electrodes
H05B 6/56	... Rolling electrodes
H05B 6/58	... "sewing machine" type
H05B 6/60	.. Arrangements for continuous movement of material
H05B 6/62	.. Apparatus for specific applications
H05B 6/64	. Heating using microwaves { (containers, packaging elements or packages specially adapted to be heated by microwaves B65D 81/3446) }
H05B 6/6402	.. { Aspects relating to the microwave cavity }
H05B 6/6405	... { Self-cleaning cavity }
H05B 6/6408	.. { Supports or covers specially adapted for use in microwave heating apparatus }
H05B 6/6411	... { the supports being rotated }
H05B 6/6414	.. { Aspects relating to the door of the microwave heating apparatus }
H05B 6/6417	... { Door interlocks of the microwave heating apparatus and related circuits }
H05B 6/642	.. { Cooling of the microwave components and related air circulation systems (H05B 6/6473 takes precedence) }

H05B 6/6423	...	{ wherein the microwave oven air circulation system is also used as air extracting hood }
H05B 6/6426	..	{ Aspects relating to the exterior of the microwave heating apparatus, e.g. metal casing, power cord }
H05B 6/6429	...	{ Aspects relating to mounting assemblies of wall-mounted microwave ovens }
H05B 6/6432	..	{ Aspects relating to testing or detecting leakage in a microwave heating apparatus }
H05B 6/6435	..	{ Aspects relating to the user interface of the microwave heating apparatus }
H05B 6/6438	...	{ allowing the recording of a program of operation of the microwave heating apparatus }
H05B 6/6441	...	{ allowing the input of coded operation instructions, e.g. bar code reader }
H05B 6/6444	..	{ Aspects relating to lighting devices in the microwave cavity }
H05B 6/6447	..	{ Method of operation or details of the microwave heating apparatus related to the use of detectors or sensors }
H05B 6/645	...	{ using temperature sensors }
H05B 6/6452	....	{ the sensors being in contact with the heated product }
H05B 6/6455	....	{ the sensors being infra-red detectors }
H05B 6/6458	...	{ using humidity or vapor sensors }
H05B 6/6461	...	{ using fire or fume sensors }
H05B 6/6464	...	{ using weight sensors }
H05B 6/6467	...	{ using detectors with R.F. transmitters }
H05B 6/647	..	{ Aspects related to microwave heating combined with other heating techniques }
H05B 6/6473	...	{ combined with convection heating (H05B 6/6485 takes precedence)}
H05B 6/6476	....	{ the refrigerating air being used for convection }
H05B 6/6479	....	{ using steam }
H05B 6/6482	...	{ combined with radiant heating, e.g. infra-red heating }
H05B 6/6485	....	{ further combined with convection heating }
H05B 6/6488	...	{ combined with induction heating }
H05B 6/6491	...	{ combined with the use of susceptors (H05B 6/80 and subgroups takes precedence)}
H05B 6/6494	....	{ for cooking }
H05B 6/6497	.....	{ the susceptors being liquids }
H05B 6/66	..	Circuits
H05B 6/662	...	{ Aspects related to the boost transformer of the microwave heating apparatus }
H05B 6/664	...	{ Aspects related to the power supply of the microwave heating apparatus }
H05B 6/666	...	{ Safety circuits (emergency protective circuits in general H02H)}
H05B 6/668	...	{ Microwave heating devices connected to a telecommunication network }
H05B 6/68	...	for monitoring or control
H05B 6/681	....	{ Circuits comprising an inverter, a boost transformer and a magnetron }
H05B 6/682	.....	{ wherein the switching control is based on measurements of electrical values of the circuit }
H05B 6/683	.....	{ the measurements being made at the high voltage side of the circuit }
H05B 6/685	.....	{ the measurements being made at the low voltage side of the circuit }

- H05B 6/686 { Circuits comprising a signal generator and power amplifier, e.g. using solid state oscillators }
- H05B 6/687 { for cooking }
- H05B 6/688 { for thawing }
- H05B 6/70 . . Feed lines
- H05B 6/701 . . . { using microwave applicators }
- H05B 6/702 . . . { using coaxial cables }
- H05B 6/704 . . . { using microwave polarisers }
- H05B 6/705 . . . { using microwave tuning }
- H05B 6/707 . . . { using waveguides }
- H05B 6/708 { in particular slotted waveguides }
- H05B 6/72 . . Radiators or aerials
- H05B 6/725 . . . { Rotatable antennas }
- H05B 6/74 . . Mode transformers or mode stirrers
- H05B 6/745 . . . { Rotatable stirrers }
- H05B 6/76 . . Prevention of microwave leakage, e.g. door sealings
- H05B 6/763 . . . { Microwave radiation seals for doors }
- H05B 6/766 . . . { Microwave radiation screens for windows }
- H05B 6/78 . . Arrangements for continuous movement of material
- H05B 6/782 . . . { wherein the material moved is food }
- H05B 6/784 . . . { wherein the material is moved using a tubular transport line, e.g. screw transport systems }
- H05B 6/786 . . . { wherein the material is moved using mechanical vibrations of plates }
- H05B 6/788 . . . { wherein an elongated material is moved by applying a mechanical tension to it }
- H05B 6/80 . . Apparatus for specific applications (stoves or ranges [F24C 7/02](#))
- H05B 6/802 . . . { for heating fluids (methods of heating fluids in conventional microwave ovens [H05B 6/66M](#)) }
- H05B 6/804 { Water heaters, water boilers }
- H05B 6/806 . . . { for laboratory use }
- H05B 6/808 . . . { Microwave heating adapted for vending machines }

H05B 7/00 **Heating by electric discharge** (electron beam or ion beam tubes for localised treatment of objects [H01J 37/30](#); plasma torches [H05H 1/26](#))

- H05B 7/005 . { Electrical diagrams }
- H05B 7/02 . Details
- H05B 7/06 . . Electrodes
- H05B 7/07 . . . designed to melt in use
- H05B 7/08 . . . non-consumable
- H05B 7/085 mainly consisting of carbon
- H05B 7/09 Self-baking electrodes e.g. Söderberg type electrodes
- H05B 7/10 . . Mountings, supports, terminals or arrangements for feeding or guiding electrodes

- H05B 7/101 . . . { Mountings, supports or terminals at head of electrode, i.e. at the end remote from the arc }
- H05B 7/102 specially adapted for consumable electrodes
- H05B 7/103 . . . Mountings, supports or terminals with jaws ([H05B 7/101](#) takes precedence)
- H05B 7/105 comprising more than two jaws equally spaced along circumference, e.g. ring holders
- H05B 7/107 . . . specially adapted for self-baking electrodes
- H05B 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](#))
- H05B 7/11 . . Arrangements for conducting current to the electrode terminals (non-insulated conductors or conductive bodies in general [H01B 5/00](#); insulated conductors or cables in general [H01B 7/00](#))
- H05B 7/12 . . Arrangements for cooling, sealing or protecting electrodes
- H05B 7/14 . . Arrangements or methods for connecting successive electrode sections
- H05B 7/144 . . Power supplies specially adapted for heating by electric discharge; Automatic control of power, e.g. by positioning of electrodes (circuit arrangements for supplying electric power in general [H02J](#))
- H05B 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](#))
- H05B 7/152 by electromechanical means for positioning of electrodes
- H05B 7/156 by hydraulic or pneumatic means for positioning of electrodes
- H05B 7/16 . Heating by glow discharge
- H05B 7/18 . Heating by arc discharge
- H05B 7/185 . . { Heating gases for arc discharge (gas-filled discharge tubes [H01J 37/32](#)) }
- H05B 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
- H05B 7/22 . . Indirect heating by arc discharge
- H05B 7/225 . . . { by arc image (heating by means of lamps [H05B 3/0033](#)) }
- H05B 11/00 Heating by combined application of processes covered by two or more of groups [H05B 3/00](#) to [H05B 7/00](#) ([H05B 7/20](#) takes precedence)**

Guidance heading: Lighting

- H05B 31/00 Electric arc lamps (regulating electric characteristics of arcs [G05F 1/02](#); with non-consumable electrodes [H01J 61/00](#))**
- H05B 31/0003 . { the arc being outside, in the open }
- H05B 31/0006 . . { with superimposed electrodes }
- H05B 31/0009 . . { with parallel or oblique disposition of the electrodes; Special form of the electrodes }

H05B 31/0012	.. { with a plurality of electrode pairs }
H05B 31/0015	.. { with spare electrodes }
H05B 31/0018	. { in a closed vessel }
H05B 31/0021	.. { Construction, in particular closure, of the vessel }
H05B 31/0024	.. { Outlet valves }
H05B 31/0027	.. { with special gasfilling }
H05B 31/003	. { of a special type }
H05B 31/0033	.. { with glowrod and candle }
H05B 31/0036	.. { for projection, copying or stage lighting }
H05B 31/0039	.. { Projectors, the construction of which depends upon the presence of the arc }
H05B 31/0042	. { Mounting; Connecting }
H05B 31/0045	.. { of individual lamps; Associated impedances }
H05B 31/0048	.. { of plural lamps }
H05B 31/0051	.. { Bypassing circuit devices for arc lamps }
H05B 31/0054	.. { Short circuit devices for arc lamps }
H05B 31/0057	. { Accessories for arc lamps }
H05B 31/006	.. { Electromagnets or armatures; Arc blowing electromagnets }
H05B 31/0063	.. { Damping devices }
H05B 31/0066	.. { Saving arrangements; Ventilation devices }
H05B 31/0069	.. { Vessels; Closing of vessels }
H05B 31/0072	.. { Reflectors for arc lamps }
H05B 31/0075	.. { Incandescent mantles }
H05B 31/0078	.. { Devices for starting or extinguishing }
H05B 31/0081	. { Controlling of arc lamps }
H05B 31/0084	.. { with stirrups or levers }
H05B 31/0087	.. { with a thread or chain }
H05B 31/009	.. { with tightening devices }
H05B 31/0093	.. { with a threaded rod }
H05B 31/0096	.. { with hydraulic or pneumatic means }
H05B 31/02	. Details
H05B 31/04	.. Housings
H05B 31/06	.. Electrodes
H05B 31/065	... { for flame arc lamps }
H05B 31/08	... Carbon electrodes
H05B 31/10	.... Cored carbon electrodes
H05B 31/12	.... Beck-effect electrodes
H05B 31/14	... Metal electrodes
H05B 31/16	... Apparatus or processes specially adapted for manufacturing electrodes

- H05B 31/18 . . Mountings for electrodes; Electrode feeding devices
- H05B 31/20 . . . Mechanical arrangements for feeding electrodes {(for controlling arc lamps [H05B 31/0081](#))}
- H05B 31/22 . . . Electromagnetic arrangements for feeding electrodes {(using electromagnets [H05B 31/006](#))}
- H05B 31/24 . . Cooling arrangements
- H05B 31/26 . . Influencing the shape of arc discharge by gas blowing devices
- H05B 31/28 . . Influencing the shape of arc discharge by magnetic means {(using electromagnets [H05B 31/006](#))}
- H05B 31/30 . . Starting; Igniting {(devices therefor [H05B 31/0078](#))}
- H05B 31/305 . . . { Ignition devices }
- H05B 31/32 . . Switching-off
- H05B 31/34 . . Indicating consumption of electrodes

- H05B 31/36 . having two electrodes in line {(electrodes in the open [H05B 31/0006](#))}
- H05B 31/38 . . specially adapted for ac

- H05B 31/40 . having two electrodes at an angle {(electrodes in the open [H05B 31/0009](#))}
- H05B 31/42 . . specially adapted for ac

- H05B 31/44 . having two parallel electrodes {(electrodes in the open [H05B 31/0009](#))}
- H05B 31/46 . . specially adapted for ac

- H05B 31/48 . having more than two electrodes {(electrodes in the open [H05B 31/0012](#))}
- H05B 31/50 . . specially adapted for ac
- H05B 31/52 . . . electrodes energised from different phases of the supply

H05B 33/00 **Electroluminescent light sources** (discharge lamps [H01J 61/00](#) to [H01J 65/00](#); semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission [H01L 27/15](#), [H01L 33/00](#); organic light emitting devices [H01L 27/32](#), [H01L 51/50](#); lasers [H01S 3/00](#), [H01S 5/00](#); compositions per se, see the relevant subclasses; { luminescent scales or hands [G01D 13/20](#), [G01D 13/28](#); luminescent dials [G09F 13/20](#); conductive layers on isolated substrate [H01B 1/00](#); solid state image amplifiers [H01L 31/14](#); electronic gates with electroluminescent elements [H03K 17/78](#); pulse generation with electroluminescent elements [H03K 3/00](#) }

- H05B 33/02 . Details
- H05B 33/04 . . Sealing arrangements, { e.g. against humidity }
- H05B 33/06 . . Electrode terminals
- H05B 33/08 . . Circuit arrangements not adapted to a particular application
- H05B 33/0803 . . . { for light emitting diodes (LEDs) comprising only inorganic semi-conductor materials }
- H05B 33/0806 . . . { Structural details of the circuit }

WARNING

This group and its subgroups are not complete pending reorganisation; see also groups [H05B 33/0833](#), [H05B 33/0875](#) and respective

subgroups

H05B 33/0809	.....	{ in the conversion stage }
H05B 33/0812	.....	{ with a controlled linear regulator }
H05B 33/0815	.....	{ with a controlled switching regulator }
H05B 33/0818	.....	{ wherein HF AC or pulses are generated in the final stage }
H05B 33/0821	.....	{ in the load stage }
H05B 33/0824	.....	{ with an active control inside the LED load configuration }
H05B 33/0827	.....	{ organized essentially in parallel configuration }
H05B 33/083	.....	N: organized essentially in string configuration with shunting switches]
H05B 33/0833	....	{ with control of the intensity of light emitted by the LEDs }

WARNING

This group and its subgroups are no longer used for classification of new documents as from January 1st, 2010. The backlog is being continuously reclassified to the groups [H05B 33/0806](#), [H05B 33/0842](#), [H05B 33/0884](#) and subgroups

H05B 33/0836	.....	{ by means of a linear regulator }
H05B 33/0839	.....	{ by means of a switching converter }
H05B 33/0842	....	{ with control (H05B 33/0884 takes precedence) }

WARNING

This group and its subgroups are not complete pending reorganisation; see also groups [H05B 33/0833](#), [H05B 33/0875](#) and respective subgroups

H05B 33/0845	.....	{ of the light intensity (H05B 33/0857 takes precedence) }
H05B 33/0848	.....	{ involving load characteristic sensing means }
H05B 33/0851	.....	{ with permanent feedback from the light source }
H05B 33/0854	.....	{ involving load external environment sensing means }
H05B 33/0857	.....	{ of the color point of the light }
H05B 33/086	.....	{ involving set point control means }
H05B 33/0863	.....	{ by user interfaces }
H05B 33/0866	.....	{ involving load characteristic sensing means }
H05B 33/0869	.....	{ optical sensing means }
H05B 33/0872	.....	{ involving load external environment sensing means }
H05B 33/0875	....	{ with detection of abnormal operating conditions }

WARNING

This group and its subgroups are no longer used for classification as from January 1st, 2010. The backlog is being continuously reclassified to the groups [H05B 33/0806](#), [H05B 33/0842](#), [H05B 33/0884](#) and subgroups

H05B 33/0878	.....	{ of the circuit arrangement }
H05B 33/0881	.....	{ of the LEDs }
H05B 33/0884	....	{ with monitoring or protection }

WARNING

This group and its subgroups are not complete pending reorganisation; see also groups [H05B 33/0833](#), [H05B 33/0875](#) and respective subgroups

H05B 33/0887	.....	{ of the conversion stage }
H05B 33/089	.....	{ of the load stage }
H05B 33/0893	.....	{ involving end of life detection of LEDs }
H05B 33/0896	...	{ for light emitting diodes (LEDs) comprising organic materials, e.g. polymer LEDs (PLEDs) or OLEDs }

H05B 33/10	.	Apparatus or processes specially adapted to the manufacture of electroluminescent light sources
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H05B 33/12	.	Light sources with substantially two-dimensional radiating surfaces
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H05B 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 }
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NOTE

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

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

H05B 35/00	Electric light sources using a combination of different types of light generation (combinations of dissimilar light sources F21 , H01J 61/96)
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H05B 37/00	Circuit arrangements for electric light sources in general ({ vehicle lights B60L 1/14 , B60Q ; railways light signals B61L ; lighting for photographic purposes G03B 15/02 , for advertising purposes G09F)}
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H05B 37/02	.	Controlling ({ apparatus for performing colour music A63J 17/00 ; regulating light by electrical means without regulating the light source itself G05D 25/00 }; regulating voltage or current G05E ; { illuminated switch circuits G08B , G08C , H02B 15/00 ; traffic
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- signals [G08G 1/00](#))}
- H05B 37/0209 . . { the instant of the ignition or of the extinction ([H05B 37/029](#) takes precedence; light or sound activated electronic switches [H03K 17/94](#))}
- H05B 37/0218 . . . { by the ambient light }
- H05B 37/0227 . . . { by detection only of parameters other than ambient light, e.g. by sound detectors, by passive infra-red detectors }
- H05B 37/0236 { by detection of audible sound }
- H05B 37/0245 . . . { by remote-control involving emission and detection units }
- H05B 37/0254 { linked via data bus transmission }
- H05B 37/0263 { linked via power line carrier transmission }
- H05B 37/0272 { linked via wireless transmission, e.g. IR transmission }
- H05B 37/0281 . . . { by timing means ([H05B 37/0245](#) takes precedence; time-controlled switching in general [G04](#), [H01H](#), [H03K](#))}
- H05B 37/029 . . { a plurality of lamps following a preassigned sequence, e.g. theater lights, diapositive projector }
- H05B 37/03 . Detecting lamp failure {([monitoring vehicle lamps B60Q 11/00](#); changing to a reserve source of current [H02J 9/00](#))}
- H05B 37/032 . . { of a plurality of lamps connected in parallel }
- H05B 37/034 . . . { with communication between the lamps and a central unit }
- H05B 37/036 . . { of a plurality of lamps connected in series }
- H05B 37/038 . . . { with communication between the lamps and a central unit }
- H05B 37/04 . . Circuits providing for substitution of the light source in case of its failure { e.g. by switching over to a reserve light source ([incandescent lamps with reserve body H01K](#))}
- H05B 39/00** **Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application {([incandescent lamps per se H01K](#))}**
- H05B 39/02 . Switching on, e.g. with predetermined rate of increase of lighting current
- H05B 39/04 . Controlling ([regulating voltage in general G05F](#))
- H05B 39/041 . . { the light-intensity of the source ([H05B 39/08](#) takes precedence)}
- H05B 39/042 . . . { by measuring the incident light }
- H05B 39/044 . . . { continuously ([H05B 39/042](#) takes precedence)}
- H05B 39/045 { with high-frequency bridge converters ([H05B 39/048](#) takes precedence)}
- H05B 39/047 { with pulse width modulation from a DC power source }
- H05B 39/048 { with reverse phase control }
- H05B 39/06 . . Switching arrangements, e.g. from series operation to parallel operation
- H05B 39/08 . . by shifting phase of trigger voltage applied to gas-filled controlling tubes { also in controlled semiconductor devices ([in converters H02M 5/00](#); with regulation [G05F 1/44](#))}
- H05B 39/081 . . . { by measuring the incident light ([H05B 39/083](#) takes precedence)}
- H05B 39/083 . . . { by the variation-rate of light intensity }
- H05B 39/085 { by touch control }

- H05B 39/086 { with possibility of remote control }
- H05B 39/088 { by wireless means, e.g. infra-red transmitting means }
- H05B 39/09 . in which the lamp is fed by pulses {(automatic circuit devices built into or on the incandescent lamp [H01K 1/625](#); vehicle winking devices [B60Q 1/38](#))}
- H05B 39/10 . Circuits providing for substitution of the light source in case of its failure {(changing to a reserve current source [H02J 9/00](#))}
- H05B 39/105 . . { with a spare lamp in the circuit, and a possibility of shunting a failed lamp (lamp changing devices [H01R 33/00](#), [H01R 43/00](#); incandescent lamps with a reserve body [H01K](#))}

- H05B 41/00** **Circuit arrangements or apparatus for igniting or operating discharge lamps**
 {(circuit elements structurally associated with discharge lamps [H01J 7/44](#), [H01J 19/78](#); discharge lamps per se [H01J 61/00](#) to [H01J 65/00](#); arc lamps with consumable electrodes [H05B 31/00](#); transformers or chokes for supplying discharge lamps [H01F 38/08](#))}

- H05B 41/02 . Details
- H05B 41/04 . . Starting switches {(igniting arrangements for discharge lamps [H01J 7/30](#), [H01J 17/30](#), [H01J 61/54](#); switches in general [H01H](#))}
- H05B 41/042 . . . { using semiconductor devices }
- H05B 41/044 . . . { for lamp provided with pre-heating electrodes }
- H05B 41/046 . . . { using controlled semiconductor devices }
- H05B 41/048 . . . { using electromagnetic relays }
- H05B 41/06 . . . thermal only
- H05B 41/08 . . . heated by glow discharge
- H05B 41/10 . . . magnetic only
- H05B 41/12 . . . combined thermal and magnetic

- H05B 41/14 . Circuit arrangements
- H05B 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 } ([H01J 41/26](#) takes precedence)
- H05B 41/18 . . . having a starting switch
- H05B 41/19 . . . for lamps having an auxiliary starting electrode
- H05B 41/20 . . . having no starting switch
- H05B 41/22 . . . for lamps having an auxiliary starting electrode
- H05B 41/23 . . . for lamps not having an auxiliary starting electrode
- H05B 41/231 for high-pressure lamps
- H05B 41/232 for low-pressure lamps
- H05B 41/2325 { provided with pre-heating electrodes }
- H05B 41/233 using resonance circuitry
- H05B 41/234 to eliminate stroboscopic effects, e.g. feeding two lamps with different phases

- H05B 41/24 . . in which the lamp is fed by high frequency ac, { or with separate oscillator frequency } ([H05B 41/26](#) takes precedence)
- H05B 41/245 . . . { for a plurality of lamps }

H05B 41/26	..	in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc
H05B 41/28	...	using static converters
H05B 41/2806	....	{ with semiconductor devices and specially adapted for lamps without electrodes in the vessel, e.g. surface discharge lamps, electrodeless discharge lamps }
H05B 41/2813	.....	{ Arrangements for protecting lamps or circuits against abnormal operating conditions }
H05B 41/282	....	With semiconductor devices ({ H05B 41/2806 }, H05B 41/288 , H05B 41/295 take precedence)
H05B 41/2821	.....	{ by means of a single-switch converter or a parallel push-pull converter in the final stage (H05B 41/285 takes precedence) }
H05B 41/2822	.....	{ using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations }
H05B 41/2824	.....	{ using control circuits for the switching element (H05B 41/2822 takes precedence) }
H05B 41/2825	.....	{ by means of a bridge converter in the final stage (H05B 41/285 takes precedence) }
H05B 41/2827	.....	{ using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations }
H05B 41/2828	.....	{ using control circuits for the switching elements (H05B 41/2827 takes precedence) }
H05B 41/285	.....	Arrangements for protecting lamps or circuits against abnormal operating conditions
H05B 41/2851	.....	{ for protecting the circuit against abnormal operating conditions }
H05B 41/2853	.....	{ against abnormal power supply conditions }
H05B 41/2855	.....	{ against abnormal lamp operating conditions }
H05B 41/2856	.....	{ against internal abnormal circuit conditions }
H05B 41/2858	.....	{ for protecting the lamp against abnormal operating conditions }
H05B 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 })
H05B 41/2881	.....	{ Load circuits; Control thereof }
H05B 41/2882	.....	{ the control resulting from an action on the static converter }
H05B 41/2883	.....	{ the controlled element being a DC/AC converter in the final stage, e.g. by harmonic mode starting }
H05B 41/2885	.....	{ Static converters especially adapted therefor; Control thereof (H05B 41/2882 takes precedence) }
H05B 41/2886	.....	{ comprising a controllable preconditioner, e.g. a booster }
H05B 41/2887	.....	{ characterised by a controllable bridge in the final stage }
H05B 41/2888	.....	{ the bridge being commutated at low frequency, e.g. 1kHz }
H05B 41/292	.....	Arrangements for protecting lamps or circuits against abnormal operating conditions
H05B 41/2921	.....	{ for protecting the circuit against abnormal operating conditions }
H05B 41/2923	.....	{ against abnormal power supply conditions }

H05B 41/2925	.....	{ against abnormal lamp operating conditions }
H05B 41/2926	.....	{ against internal abnormal circuit conditions }
H05B 41/2928	.....	{ for protecting the lamp against abnormal operating conditions }
H05B 41/295	....	with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps
H05B 41/298	.....	Arrangements for protecting lamps or circuits against abnormal operating conditions
H05B 41/2981	.....	{ for protecting the circuit against abnormal operating conditions }
H05B 41/2983	.....	{ against abnormal power supply conditions }
H05B 41/2985	.....	{ against abnormal lamp operating conditions }
H05B 41/2986	.....	{ against internal abnormal circuit conditions }
H05B 41/2988	.....	{ for protecting the lamp against abnormal operating conditions }
H05B 41/30	..	in which the lamp is fed by pulses, e.g. flash lamp {(welding with accumulated energy B23K 11/24 ; for gas discharge lasers H01S 3/097 ; electrical pulse generators with charge and discharge of an accumulating element H03K 3/53)}
H05B 41/32	...	for single flash operation
H05B 41/325	....	{ by measuring the incident light }
H05B 41/34	...	to provide a sequence of flashes
H05B 41/36	..	Controlling (regulating voltage or current G05F)
H05B 41/38	...	Controlling the intensity of light
H05B 41/382	....	{ during the transitional start-up phase }
H05B 41/384	.....	{ in case of hot-restriking }
H05B 41/386	.....	{ for speeding-up the lighting-up }
H05B 41/388	.....	{ for a transition from glow to arc }
H05B 41/39	....	continuously
H05B 41/391	.....	using saturable magnetic devices
H05B 41/392	.....	using semiconductor devices, e.g. thyristor
H05B 41/3921	.....	{ with possibility of light intensity variations }
H05B 41/3922	.....	{ and measurement of the incident light }
H05B 41/3924	.....	{ by phase control, e.g. using a triac (H05B 41/3922 takes precedence)}
H05B 41/3925	.....	{ by frequency variation (H05B 41/3922 takes precedence)}
H05B 41/3927	.....	{ by pulse width modulation (H05B 41/3922 takes precedence)}
H05B 41/3928	.....	{ for high-pressure lamps, e.g. high-intensity discharge lamps, high-pressure mercury or sodium lamps }
H05B 41/40	....	discontinuously
H05B 41/42	.....	in two steps only
H05B 41/44	...	for providing special optical effects, e.g. progressive motion of light {(advertising using lights G09F)}
H05B 41/46	..	Circuits providing for substitution in case of failure of the lamp {(changing to a reserve current source H02J 9/00)}
H05B 43/00		Circuit arrangements for light sources, not otherwise provided for (H05B 37/00 takes precedence)
H05B 43/02	.	for light sources using a charge of combustible material, { e.g. magnesium lamps }

H05B 2203/00**Aspects relating to Ohmic resistive heating covered by group [H05B 3/00](#)**

- [H05B 2203/002](#) . Heaters using a particular layout for the resistive material or resistive elements
- [H05B 2203/003](#) . . using serpentine layout
- [H05B 2203/004](#) . . using zigzag layout
- [H05B 2203/005](#) . . using multiple resistive elements or resistive zones isolated from each other
- [H05B 2203/006](#) . . using interdigitated electrodes
- [H05B 2203/007](#) . . using multiple electrically connected resistive elements or resistive zones
- [H05B 2203/008](#) . . with layout including a portion free of resistive material, e.g. communication window

- [H05B 2203/009](#) . Heaters using conductive material in contact with opposing surfaces of the resistive element or resistive layer
- [H05B 2203/01](#) . . Heaters comprising a particular structure with multiple layers

- [H05B 2203/011](#) . Heaters using laterally extending conductive material as connecting means

- [H05B 2203/012](#) . Heaters using non- flexible resistive rods or tubes not provided for in [H05B 3/42](#)

- [H05B 2203/013](#) . Heaters using resistive films or coatings

- [H05B 2203/014](#) . Heaters using resistive wires or cables not provided for in [H05B 3/54](#)
- [H05B 2203/015](#) . . Heater wherein the heating element is interwoven with the textile

- [H05B 2203/016](#) . Heaters using particular connecting means

- [H05B 2203/017](#) . Manufacturing methods or apparatus for heaters

- [H05B 2203/018](#) . Heaters using heating elements comprising mosi2

- [H05B 2203/019](#) . Heaters using heating elements having a negative temperature coefficient

- [H05B 2203/02](#) . Heaters using heating elements having a positive temperature coefficient

- [H05B 2203/021](#) . Heaters specially adapted for heating liquids

- [H05B 2203/022](#) . Heaters specially adapted for heating gaseous material
- [H05B 2203/023](#) . . Heaters of the type used for electrically heating the air blown in a vehicle compartment by the vehicle heating system
- [H05B 2203/024](#) . . Heaters using beehive flow through structures

- [H05B 2203/025](#) . Heaters specially adapted for glass melting or glass treatment

- [H05B 2203/026](#) . Heaters specially adapted for floor heating

- [H05B 2203/027](#) . Heaters specially adapted for glow plug igniters

- [H05B 2203/028](#) . Heaters specially adapted for trays or plates to keep food or liquids hot

- [H05B 2203/029](#) . Heaters specially adapted for seat warmers

- H05B 2203/03 . Heaters specially adapted for heating hand held tools
- H05B 2203/031 . Heaters specially adapted for heating the windscreen wiper area
- H05B 2203/032 . Heaters specially adapted for heating by radiation heating
- H05B 2203/033 . Heater including particular mechanical reinforcing means
- H05B 2203/034 . Heater using resistive elements made of short fibbers of conductive material
- H05B 2203/035 . Electrical circuits used in resistive heating apparatus
- H05B 2203/036 . Heaters specially adapted for garment heating
- H05B 2203/037 . Heaters with zones of different power density

- H05B 2206/00** **Aspects relating to heating by electric, magnetic, or electromagnetic fields covered by group [H05B 6/00](#)**

- H05B 2206/02 . Induction heating
- H05B 2206/022 . . Special supports for the induction coils
- H05B 2206/023 . . using the curie point of the material in which heating current is being generated to control the heating temperature
- H05B 2206/024 . . the resistive heat generated in the induction coil is conducted to the load

- H05B 2206/04 . Heating using microwaves
- H05B 2206/042 . . Microwave oven combined with a toaster or including a toaster
- H05B 2206/043 . . Methods or circuits intended to extend the life of the magnetron
- H05B 2206/044 . . Microwave heating devices provided with two or more magnetrons or microwave sources of other kind
- H05B 2206/045 . . Microwave disinfection, sterilization, destruction of waste...
- H05B 2206/046 . . Microwave drying of wood, ink, food, ceramic, sintering of ceramic, clothes, hair

- H05B 2213/00** **Aspects relating both to resistive heating and to induction heating, covered by [H05B 3/00](#) and [H05B 6/00](#)**

- H05B 2213/02 . Stirring of melted material in melting furnaces
- H05B 2213/03 . Heating plates made out of a matrix of heating elements that can define heating areas adapted to cookware randomly placed on the heating plate
- H05B 2213/04 . Heating plates with overheat protection means
- H05B 2213/05 . Heating plates with pan detection means
- H05B 2213/06 . Cook-top or cookware capable of communicating with each other
- H05B 2213/07 . Heating plates with temperature control means

H05B 2214/00 Aspects relating to resistive heating, induction heating and heating using microwaves, covered by groups [H05B 3/00](#), [H05B 6/00](#)

[H05B 2214/02](#) . Heaters specially designed for de-icing or protection against icing

[H05B 2214/03](#) . Heating of hydrocarbons

[H05B 2214/04](#) . Heating means manufactured by using nanotechnology