

## ECLA EUROPEAN 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

Guide heading: **Heating**

#### H05B1/00 Details of electric heating devices

- H05B1/02 . Automatic switching arrangements specially adapted to apparatus; [N: Control of heating devices] (control of temperature in general [G05D23/00](#); thermally-actuated switches [H01H37/00](#)) [C0704]
- H05B1/02A . . [N: Switches] [C0704]
- H05B1/02A1 . . . [N: using a fusible material] [N0704]
- H05B1/02A2 . . . [N: actuated by the expansion or evaporation of a gas or liquid] [N0704]
- H05B1/02A3 . . . [N: using the expansion of an electric conductive liquid] [N0704]
- H05B1/02A4 . . . [N: using bimetallic elements] [N0704]
- H05B1/02A5 . . . [N: actuated by the expansion of a solid element, e.g. wire or rod] [N0704]
- H05B1/02A6 . . . [N: actuated by modification of the magnetic properties of a material] [N0704]
- H05B1/02A7 . . . [N: actuated by changing weight, level or centre of gravity] [N0704]
- H05B1/02A8 . . . [N: actuated by timers] [N0704]
- H05B1/02B . . [N: Applications] [C0704]
- H05B1/02B1 . . . [N: Industrial applications] [N0704]
- H05B1/02B1A . . . . [N: for semiconductors manufacturing] [N0704]
- H05B1/02B1B . . . . [N: for vehicles] [N0704]
- H05B1/02B1B1 . . . . . [N: For seats] [N0704]
- H05B1/02B1C . . . . [N: For photocopiers] [N0704]
- H05B1/02B1D . . . . [N: Heating of fluids (H05B1/02B1E takes precedence)] [N0704]
- H05B1/02B1E . . . . [N: For chemical processes] [N0704]
- H05B1/02B1F . . . . [N: For medical applications] [N0704]
- H05B1/02B2 . . . [N: Domestic applications] [N0704]
- H05B1/02B2A . . . . [N: Irons] [N0704]
- H05B1/02B2B . . . . [N: For cooking] [N0704]
- H05B1/02B2B1 . . . . . [N: of food] [N0704]
- H05B1/02B2B1A . . . . . [N: Ovens] [N0704]
- H05B1/02B2B1B . . . . . [N: Cooktops] [N0704]
- H05B1/02B2B2 . . . . . [N: For heating of fluids] [N0704]
- H05B1/02B2C . . . . [N: For heating of fabrics] [N0704]

- H05B1/02B2D . . . . [N: Heating of spaces, e.g. rooms, wardrobes] [N0704]
- H05B1/02B2D1 . . . . . [N: Electric radiators] [N0704]
- H05B1/02B2D2 . . . . . [N: Airconditioning] [N0704]
- H05B1/02B2D3 . . . . . [N: For heating of fluids, e.g. water heaters] [N0704]
- H05B1/02B2D4 . . . . . [N: Heat storages] [N0704]
- H05B1/02B3 . . . . [N: for non specified applications] [N0704]
- H05B1/02B3A . . . . . [N: Tubular elements] [N0704]
- H05B1/02B3B . . . . . [N: Planar elements] [N0704]
- H05B1/02B4 . . . . [N: Heating of fluids for non specified applications] [N0704]

### H05B3/00 Ohmic-resistance heating

- H05B3/00A . [N: Devices wherein the heating current flows through the material to be heated (electrical diagrams [H05B3/00C](#); details [H05B3/02A](#), [H05B3/03](#); for granular, powdered or fluid material [H05B3/60](#))]
- H05B3/00A1 . . [N: the material to be heated being in motion]
- H05B3/00B . [N: Devices wherein the heating current flows through particular resistances]
- H05B3/00C . [N: Electrical diagrams]
- H05B3/00C1 . . [N: Electrical diagrams for heating by passing the current directly across the material to be heated]
- H05B3/00C2 . . [N: electrical diagrams for heating by particular resistances]
- H05B3/00L . [N: Heating devices using lamps (devices for radiation therapy A61N)] [C0611]
- H05B3/00L1 . . [N: for industrial applications] [N0611]
- H05B3/00L1A . . . [N: used in motor vehicles] [N0611]
- H05B3/00L1B . . . [N: for semi-conductors manufacture] [N0611]
- H05B3/00L1C . . . [N: for fluid treatments] [N0611]
- H05B3/00L1D . . . [N: for plastic handling and treatment (including molds B29C)] [N0611]
- H05B3/00L1E . . . [N: for metal treatment] [N0611]
- H05B3/00L1F . . . [N: for photocopying] [N0611]
- H05B3/00L2 . . [N: for domestic applications] [N0611]
- H05B3/00L2A . . . [N: for cooking, e.g. in ovens (lamps specially adapted for non-metallic cooking plates H05B3/74C, H05B3/74L)] [N0611]
- H05B3/00L2B . . . [N: for heating of inner spaces] [N0611]
- H05B3/00L3 . . [N: for medical applications] [N0611]
- H05B3/00L4 . . [N: related to general description of heaters without specification of field of application] [N0611]
- H05B3/00R . [N: Heating devices in the form of rollers (heated by induction [H05B6/14R](#))]
- H05B3/02 . Details
- H05B3/02A . . [N: the current passing through the material to be heated]
- H05B3/02B . . [N: the current passing through particular resistances]
- H05B3/03 . . Electrodes (electrothermic treatment of ores [C22B4/00](#))

- H05B3/04 . . Waterproof or air-tight seals for heaters
- H05B3/06 . . Heater elements structurally combined with coupling elements or holders [C1205]
- H05B3/08 . . . having electric connections specially adapted for high temperatures
- H05B3/10 . 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)
- H05B3/12 . . characterised by the composition or nature of the conductive material [N: electric conductive compositions characterised by PTC or NTC resistance, per se [H01C7/02](#), [H01C7/04](#)]
- H05B3/14 . . . the material being non-metallic [N: (non-metallic, non-adjustable resistors [H01C7/02C](#), [H01C7/04C](#))]
- H05B3/14C . . . . [N: Conductive ceramics, e.g. metal oxides, metal carbides, barium titanate, ferrites, zirconia, vitrous compounds]
- H05B3/14C2 . . . . . [N: applied to semi conductors, e.g. wafers heating (apparatus for thermal treatment of semiconductor or solid-state devices or of parts thereof [H01L21/00S2H](#))] [N0404]
- H05B3/14G . . . . [N: Carbon only, e.g. carbon black, graphite]
- H05B3/14P . . . . [N: Conductive polymers, e.g. polyethylene, thermoplastics]
- H05B3/14S . . . . [N: Silicon, e.g. silicon carbide, magnesium silicide, heating transistors or diodes]
- H05B3/16 . . the conductor being mounted on an insulating base
- H05B3/18 . . the conductor being embedded in an insulating material
- H05B3/20 . Heating elements having extended surface area substantially in a two-dimensional plane, e.g. plate-heater ([H05B3/62](#), [H05B3/68](#), [H05B3/78](#), [H05B3/84](#) take precedence)
- H05B3/22 . . non-flexible
- H05B3/24 . . . heating conductor being self-supporting
- H05B3/26 . . . heating conductor mounted on insulating base [N: (for transparent areas [H05B3/84](#), [H05B3/86](#))] [C0002]
- H05B3/26B . . . . [N: the insulating base being an insulated metal plate] [N0002]
- H05B3/26C . . . . [N: the insulating base being an inorganic material, e.g. ceramic ([H05B3/26B](#) takes precedence)] [N0002]
- H05B3/26D . . . . [N: the insulating base being an organic material, e.g. plastic ([H05B3/26B](#) takes precedence)] [N0002]
- H05B3/28 . . . heating conductor embedded in insulating material
- H05B3/28C . . . . [N: the insulating material being an inorganic material, e.g. ceramic] [N0002]
- H05B3/28D . . . . [N: the insulating material being an organic material, e.g. plastic] [N0002]
- H05B3/30 . . . . on or between metallic plates
- H05B3/32 . . . heating conductor mounted on insulators on a metallic frame
- H05B3/34 . . flexible, e.g. heating nets or webs
- H05B3/34B . . . . [N: heaters used in textiles (making textile fabrics D04H)] [C1203]
- H05B3/34B2 . . . . [N: knitted fabrics]
- H05B3/34B4 . . . . [N: woven fabrics]
- H05B3/36 . . . heating conductor embedded in insulating material
- H05B3/38 . . . . powder conductors
- H05B3/40 . Heating elements having the shape of rods or tubes ([H05B3/62](#), [H05B3/68](#), [H05B3/78](#))

- take precedence)
- H05B3/42 . . non-flexible
  - H05B3/44 . . . heating conductor arranged within rods or tubes of insulating material
  - H05B3/46 . . . heating conductor mounted on insulating base
  - H05B3/48 . . . heating conductor embedded in insulating material
  - H05B3/50 . . . . heating conductor arranged in metal tubes, the radiating surface having heat-conducting fins
  - H05B3/52 . . . . Apparatus or processes for filling or compressing insulating material in tubes
  - H05B3/54 . . flexible
  - H05B3/56 . . . Heating cables
  - H05B3/56A . . . . [N: flat cables] [N1204]
  - H05B3/58 . . . Heating hoses; Heating collars
  
  - H05B3/60 . Heating arrangements wherein the heating current flows through granular powdered or fluid material, e.g. for salt-bath furnace, electrolytic heating ([H05B3/38](#) takes precedence)
  
  - H05B3/62 . Heating elements specially adapted for furnaces ([H05B3/60](#) takes precedence; arrangements of such elements in furnaces [F2Z](#), e.g. [F27D11/00](#))
  - H05B3/64 . . using ribbon, rod, or wire heater
  - H05B3/66 . . Supports or mountings for heaters on or in the wall or roof
  
  - H05B3/68 . Heating arrangements specially adapted for cooking plates or analogous hot-plates
  - H05B3/68C . . [N: Plates having mobile parts coming into contact with the bottom of the kettles, pans, or the like]
  - H05B3/68D . . [N: Plates having their feeding circuit closed as the kettles, pans or the like are put on ([H05B3/74](#) takes precedence)]
  - H05B3/68E . . [N: Plates having magnetic means attracting the kettles, pans, or the like]
  - H05B3/68J . . [N: Heat-storage plates]
  - H05B3/68Z . . [N: Fabrication of the plates (for single-step processes see the appropriate subclass, e.g. in [B23C](#), sub-section metallurgy)]
  
  - Note**
  - Group [H05B3/76](#) takes precedence over groups [H05B3/70](#), [H05B3/72](#), [H05B3/74](#).
  
  - H05B3/70 . . Plates of cast metal
  - H05B3/72 . . Plates of sheet metal
  - H05B3/74 . . Non-metallic plates, [N: e.g. vitroc ceramic, ceramic or glassceramic hobs, also including power or control circuits]
  - H05B3/74C . . . [N: Plates having both lamps and resistive heating elements]
  - H05B3/74L . . . [N: Lamps as heat source, i.e. heating elements with protective gas envelope, e.g. halogen lamps]
  - H05B3/74P . . . [N: Protection, e.g. overheat cutoff, hot plate indicator]
  - H05B3/74R . . . [N: Resistive heating elements, i.e. heating elements exposed to the air, e.g. coil wire heater ([H05B3/74C](#) takes precedence)]
  - H05B3/76 . . Plates with spirally-wound heating tubes
  
  - H05B3/78 . Heating arrangements specially adapted for immersion heating

- H05B3/80 . . Portable immersion heaters
- H05B3/82 . . Fixedly-mounted immersion heaters
- H05B3/84 . Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields
- H05B3/84E . . [N: specially adapted for reflecting surfaces, e.g. bathroom - or rearview mirrors] [N9606]
- H05B3/86 . . the heating conductors being embedded in the transparent or reflecting material [N: (H05B3/84C, H05B3/84E, H05B3/84P take precedence)] [C9606]

**H05B6/00** **Heating by electric, magnetic, or electromagnetic fields** (for therapeutic purposes [A61N5/00](#); joining of preformed parts by heating of plastics or substances in a plastic state [B29C65/02](#))

- H05B6/02 . Induction heating
- H05B6/04 . . Sources of current
- H05B6/06 . . Control, e.g. of temperature, of power
- H05B6/06C . . . [N: for cooking plates or the like] [C1105]
- H05B6/06C8 . . . . [N: using coordinated control of multiple induction coils]
- H05B6/06F . . . [N: for melting furnaces]
- H05B6/08 . . . using compensating or balancing arrangements
- H05B6/10 . . Induction heating apparatus, other than furnaces, for specific applications
- H05B6/10A . . . [N: for local heating of metal pieces]
- H05B6/10A1 . . . . [N: the metal pieces being rotated while induction heated] [C1201]
- H05B6/10A2 . . . . [N: multiple metal pieces successively being moved close to the inductor] [N1201]
- H05B6/10A2A . . . . . N: metal pieces being elongated like wires or bands] [N1201]
- H05B6/10S . . . [N: using a susceptor]
- H05B6/10S2 . . . . [N: in the form of fillings]
- H05B6/10S4 . . . . [N: for continuous movement of material] [N1201]
- H05B6/10S6 . . . . [N: for heating a fluid] [N1201]
- H05B6/10S8 . . . . [N: using magnets rotating with respect to a susceptor] [N1201]
- H05B6/12 . . . Cooking devices
- H05B6/12A . . . . [N: induction cooking plates or the like and devices to be used in combination with them]
- H05B6/12A1 . . . . . [N: with arrangements using lights for heating zone state indication]
- H05B6/12A2 . . . . . [N: for wok pans and wok pans supports for induction cooking plates]
- H05B6/12A3 . . . . . [N: adapted to induce current in a coil to supply power to a device and electrical heating devices powered in this way]
- H05B6/12A4 . . . . . [N: with special coil arrangements]
- H05B6/12A4A . . . . . . [N: using conductive pieces to direct the induced magnetic field]
- H05B6/12A4B . . . . . . [N: using coil cooling arrangements]
- H05B6/12A4C . . . . . . [N: with more than one coil or coil segment per heating zone]
- H05B6/12A4D . . . . . . [N: with flat coils]
- H05B6/12Y . . . . . [N: induction ovens]

- H05B6/14 . . . Tools, e.g. nozzles, rollers, calenders
- H05B6/14R . . . . [N: Heated rollers]
- H05B6/16 . . . Furnaces having endless cores ([H05B6/34](#) takes precedence)
- H05B6/18 . . . . having melting basin
- H05B6/20 . . . . having melting channel only
- H05B6/22 . . . Furnaces without an endless core ([H05B6/34](#) takes precedence)
- H05B6/24 . . . . Crucible furnaces ([H05B6/30](#) takes precedence)
- H05B6/26 . . . . . using vacuum or particular gas atmosphere
- H05B6/28 . . . . . Protective systems
- H05B6/30 . . . . Arrangements for remelting or zone melting
- H05B6/32 . . . . Arrangements for simultaneous levitation and heating
- H05B6/34 . . . Arrangements for circulation of melts
- H05B6/36 . . . Coil arrangements
- H05B6/36B . . . . [N: with flat coil conductors] [C1105]
- H05B6/36D . . . . [N: using supplementary conductive or ferromagnetic pieces]
- H05B6/36F . . . . [N: for melting furnaces]
- H05B6/38 . . . . specially adapted for fitting into hollow spaces of workpieces
- H05B6/40 . . . . Establishing desired heat distribution, e.g. to heat particular parts of workpieces
- H05B6/40A . . . . . [N: for heating gear-wheels]
- H05B6/42 . . . . Cooling of coils
- H05B6/44 . . . . having more than one coil or coil segment
  
- H05B6/46 . . . Dielectric heating ([H05B6/64](#) takes precedence)
- H05B6/48 . . . Circuits
- H05B6/50 . . . . for monitoring or control
- H05B6/52 . . . Feed lines
- H05B6/54 . . . Electrodes
- H05B6/56 . . . . Rolling electrodes
- H05B6/58 . . . . "sewing machine" type
- H05B6/60 . . . Arrangements for continuous movement of material
- H05B6/62 . . . Apparatus for specific applications
  
- H05B6/64 . . . Heating using microwaves [N: (containers, packaging elements or packages specially adapted to be heated by microwaves [B65D81/34M](#))] [C9712]
- H05B6/64A . . . . [N: Aspects relating to the microwave cavity] [N1007]
- H05B6/64A1 . . . . . [N: Self-cleaning cavity] [N1007]
- H05B6/64C . . . . [N: Supports or covers specially adapted for use in microwave heating apparatus] [N9712] [C1007]
- H05B6/64C1 . . . . . [N: the supports being rotated] [N1007]
- H05B6/64D . . . . [N: Aspects relating to the door of the microwave heating apparatus] [N1007]
- H05B6/64D1 . . . . . [N: Door interlocks of the microwave heating apparatus and related circuits] [N1007]
- H05B6/64E . . . . [N: Cooling of the microwave components and related air circulation systems ([H05B6/64T1](#) takes precedence)] [N1007]

- H05B6/64E1 . . . [N: wherein the microwave oven air circulation system is also used as air extracting hood] [N1007]
- H05B6/64F . . [N: Aspects relating to the exterior of the microwave heating apparatus, e.g. metal casing, power cord] [N1007]
- H05B6/64F1 . . . [N: Aspects relating to mounting assemblies of wall-mounted microwave ovens] [N1007]
- H05B6/64J . . [N: Aspects relating to testing or detecting leakage in a microwave heating apparatus] [N1007]
- H05B6/64K . . [N: Aspects relating to the user interface of the microwave heating apparatus] [N1007]
- H05B6/64K3 . . . [N: allowing the recording of a program of operation of the microwave heating apparatus] [N1007]
- H05B6/64K4 . . . [N: allowing the input of coded operation instructions, e.g. bar code reader] [N1007]
- H05B6/64L . . [N: Aspects relating to lighting devices in the microwave cavity] [N1007]
- H05B6/64S . . [N: Method of operation or details of the microwave heating apparatus related to the use of detectors or sensors] [N1007]
- H05B6/64S1 . . . [N: using temperature sensors] [N1007]
- H05B6/64S1C . . . . [N: the sensors being in contact with the heated product] [N1007]
- H05B6/64S1R . . . . [N: the sensors being infra-red detectors] [N1007]
- H05B6/64S2 . . . [N: using humidity or vapor sensors] [N1007]
- H05B6/64S3 . . . [N: using fire or fume sensors] [N1007]
- H05B6/64S4 . . . [N: using weight sensors] [N1007]
- H05B6/64S5 . . . [N: using detectors with R.F. transmitters] [N1007]
- H05B6/64T . . [N: Aspects related to microwave heating combined with other heating techniques] [N1007]
- H05B6/64T1 . . . [N: combined with convection heating ([H05B6/64T2A](#) takes precedence)] [N1007]
- H05B6/64T1A . . . . [N: the refrigerating air being used for convection] [N1007]
- H05B6/64T1B . . . . [N: using steam] [N1007]
- H05B6/64T2 . . . [N: combined with radiant heating, e.g. infra-red heating] [N1007]
- H05B6/64T2A . . . . [N: further combined with convection heating] [N1007]
- H05B6/64T3 . . . [N: combined with induction heating] [N1007]
- H05B6/64T4 . . . [N: combined with the use of susceptors ([H05B6/80](#) and subgroups takes precedence)] [N1007]
- H05B6/64T4C . . . . [N: for cooking] [N1007]
- H05B6/64T4C1 . . . . . [N: the susceptors being liquids] [N1007]
- H05B6/66 . . Circuits
- H05B6/66B . . . [N: Aspects related to the boost transformer of the microwave heating apparatus] [N1007]
- H05B6/66P . . . [N: Aspects related to the power supply of the microwave heating apparatus] [N1007]
- H05B6/66S . . . [N: Safety circuits (emergency protective circuits in general [H02H](#))]
- H05B6/66T . . . [N: Microwave heating devices connected to a telecommunication network] [N1007]
- H05B6/68 . . . for monitoring or control

- H05B6/68A . . . . [N: Circuits comprising an inverter, a boost transformer and a magnetron] [N1007]
- H05B6/68A1 . . . . . [N: wherein the switching control is based on measurements of electrical values of the circuit] [N1007]
- H05B6/68A1H . . . . . [N: the measurements being made at the high voltage side of the circuit] [N1007]
- H05B6/68A1L . . . . . [N: the measurements being made at the low voltage side of the circuit] [N1007]
- H05B6/68B . . . . [N: Circuits comprising a signal generator and power amplifier, e.g. using solid state oscillators] [N1007]
- H05B6/68C . . . . [N: for cooking] [N1007]
- H05B6/68T . . . . [N: for thawing] [N1007]
- H05B6/70 . . Feed lines
- H05B6/70A . . . [N: using microwave applicators] [N1007]
- H05B6/70C . . . [N: using coaxial cables] [N1007]
- H05B6/70P . . . [N: using microwave polarisers] [N1007]
- H05B6/70T . . . [N: using microwave tuning] [N1007]
- H05B6/70W . . . [N: using waveguides] [N1007]
- H05B6/70W1 . . . . [N: in particular slotted waveguides] [N1007]
- H05B6/72 . . Radiators or aerials
- H05B6/72R . . . [N: Rotatable antennas] [N1007]
- H05B6/74 . . Mode transformers or mode stirrers
- H05B6/74R . . . [N: Rotatable stirrers] [N1007]
- H05B6/76 . . Prevention of microwave leakage, e.g. door sealings
- H05B6/76D . . . [N: Microwave radiation seals for doors] [N1007]
- H05B6/76W . . . [N: Microwave radiation screens for windows] [N1007]
- H05B6/78 . . Arrangements for continuous movement of material
- H05B6/78F . . . [N: wherein the material moved is food] [N1007]
- H05B6/78P . . . [N: wherein the material is moved using a tubular transport line, e.g. screw transport systems] [N1204]
- H05B6/78S . . . [N: wherein the material is moved using mechanical vibrations of plates] [N1204]
- H05B6/78T . . . [N: wherein an elongated material is moved by applying a mechanical tension to it] [N1204]
- H05B6/80 . . Apparatus for specific applications ([stoves or ranges F24C7/02](#))
- H05B6/80F . . . [N: for heating fluids ([methods of heating fluids in conventional microwave ovens H05B6/66M](#))] [N1007]
- H05B6/80F1 . . . . [N: Water heaters, water boilers] [N1007]
- H05B6/80L . . . [N: for laboratory use] [N1007]
- H05B6/80V . . . [N: Microwave heating adapted for vending machines] [N1007]
  
- H05B7/00** **Heating by electric discharge** ([electron beam or ion beam tubes for localised treatment of objects H01J37/30](#); [plasma torches H05H1/26](#))
  
- H05B7/00C . [N: Electrical diagrams]

- H05B7/02 . Details
- H05B7/06 . . Electrodes
- H05B7/07 . . . designed to melt in use
- H05B7/08 . . . non-consumable
- H05B7/085 . . . . mainly consisting of carbon
- H05B7/09 . . . . . Self-baking electrodes e.g. Söderberg type electrodes
- H05B7/10 . . Mountings, supports, terminals or arrangements for feeding or guiding electrodes
- H05B7/101 . . . [N: Mountings, supports or terminals at head of electrode, i.e. at the end remote from the arc]
- H05B7/102 . . . . specially adapted for consumable electrodes
- H05B7/103 . . . Mountings, supports or terminals with jaws ([H05B7/101](#) takes precedence)
- H05B7/105 . . . . comprising more than two jaws equally spaced along circumference, e.g. ring holders
- H05B7/107 . . . specially adapted for self-baking electrodes
- H05B7/109 . . . Feeding arrangements ([H05B7/107](#) takes precedence; where the electrode movement is part of a closed loop for automatic control of power [H05B7/148](#))
- H05B7/11 . . Arrangements for conducting current to the electrode terminals (non-insulated conductors or conductive bodies in general [H01B5/00](#); insulated conductors or cables in general [H01B7/00](#))
- H05B7/12 . . Arrangements for cooling, sealing or protecting electrodes
- H05B7/14 . . Arrangements or methods for connecting successive electrode sections
- H05B7/144 . . 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](#))
- H05B7/148 . . . Automatic control of power (electrode feeding arrangements [H05B7/109](#); automatic feeding of electrodes for spot or seam welding or cutting [B23K9/12](#); disposition of electrodes in or on furnaces [F27D11/10](#); control of position in general [G05D3/00](#); regulating electric characteristics of arcs in general [G05F1/02](#); regulating electric power in general [G05F1/66](#))
- H05B7/152 . . . . by electromechanical means for positioning of electrodes
- H05B7/156 . . . . by hydraulic or pneumatic means for positioning of electrodes
- H05B7/16 . Heating by glow discharge
- H05B7/18 . Heating by arc discharge
- H05B7/18A . . [N: Heating gases for arc discharge (gas-filled discharge tubes [H01J37/32](#))]
- H05B7/20 . . 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
- H05B7/22 . . Indirect heating by arc discharge
- H05B7/22A . . . [N: by arc image (heating by means of lamps [H05B3/00L](#))]
- H05B11/00 Heating by combined application of processes covered by two or more of groups [H05B3/00](#) to [H05B7/00](#) ([H05B7/20](#) takes precedence)**

**Guide heading: Lighting**

**H05B31/00**

**Electric arc lamps** (regulating electric characteristics of arcs [G05F1/02](#); with non-consumable electrodes [H01J61/00](#))

- H05B31/00A . [N: the arc being outside, in the open][N9507]
- H05B31/00A1 . . [N: with superimposed electrodes] [N9507]
- H05B31/00A2 . . [N: with parallel or oblique disposition of the electrodes; Special form of the electrodes] [N9507]
- H05B31/00A3 . . [N: with a plurality of electrode pairs] [N9507]
- H05B31/00A4 . . [N: with spare electrodes] [N9507]
- H05B31/00B . [N: in a closed vessel] [N9507]
- H05B31/00B1 . . [N: Construction, in particular closure, of the vessel] [N9507]
- H05B31/00B2 . . [N: Outlet valves] [N9507]
- H05B31/00B3 . . [N: with special gasfilling] [N9507]
- H05B31/00C . [N: of a special type] [N9507]
- H05B31/00C1 . . [N: with glowrod and candle] [N9507]
- H05B31/00C2 . . [N: for projection, copying or stage lighting] [N9507]
- H05B31/00C3 . . [N: Projectors, the construction of which depends upon the presence of the arc] [N9507]
- H05B31/00D . [N: Mounting; Connecting] [N9507]
- H05B31/00D1 . . [N: of individual lamps; Associated impedances] [N9507]
- H05B31/00D2 . . [N: of plural lamps] [N9507]
- H05B31/00D3 . . [N: Bypassing circuit devices for arc lamps] [N9507]
- H05B31/00D4 . . [N: Short circuit devices for arc lamps] [N9507]
- H05B31/00E . [N: Accessories for arc lamps] [N9507]
- H05B31/00E2 . . [N: Electromagnets or armatures; Arc blowing electromagnets] [N9507]
- H05B31/00E3 . . [N: Damping devices] [N9507]
- H05B31/00E4 . . [N: Saving arrangements; Ventilation devices] [N9507]
- H05B31/00E5 . . [N: Vessels; Closing of vessels] [N9507]
- H05B31/00E6 . . [N: Reflectors for arc lamps] [N9507]
- H05B31/00E7 . . [N: Incandescent mantles] [N9507]
- H05B31/00E8 . . [N: Devices for starting or extinguishing] [N9507]
- H05B31/00F . [N: Controlling of arc lamps] [N9507]
- H05B31/00F1 . . [N: with stirrups or levers] [N9507]
- H05B31/00F2 . . [N: with a thread or chain] [N9507]
- H05B31/00F3 . . [N: with tightening devices] [N9507]
- H05B31/00F4 . . [N: with a threaded rod] [N9507]
- H05B31/00F5 . . [N: with hydraulic or pneumatic means] [N9507]
- H05B31/02 . Details

- H05B31/04 . . Housings
- H05B31/06 . . Electrodes
- H05B31/06A . . . [N: for flame arc lamps] [N9507]
- H05B31/08 . . . Carbon electrodes
- H05B31/10 . . . . Cored carbon electrodes
- H05B31/12 . . . . Beck-effect electrodes
- H05B31/14 . . . Metal electrodes
- H05B31/16 . . . Apparatus or processes specially adapted for manufacturing electrodes
- H05B31/18 . . Mountings for electrodes; Electrode feeding devices
- H05B31/20 . . . Mechanical arrangements for feeding electrodes [N: (for controlling arc lamps [H05B31/00F](#))] [C9507]
- H05B31/22 . . . Electromagnetic arrangements for feeding electrodes [N: (using electromagnets [H05B31/00E2](#))] [C9507]
- H05B31/24 . . Cooling arrangements
- H05B31/26 . . Influencing the shape of arc discharge by gas blowing devices
- H05B31/28 . . Influencing the shape of arc discharge by magnetic means [N: (using electromagnets [H05B31/00E2](#))] [C9507]
- H05B31/30 . . Starting; Igniting [N: (devices therefor [H05B31/00E8](#))] [C9507]
- H05B31/30A . . . [N: Ignition devices] [N9507]
- H05B31/32 . . Switching-off
- H05B31/34 . . Indicating consumption of electrodes
  
- H05B31/36 . . having two electrodes in line [N: (electrodes in the open [H05B31/00A1](#))] [C9507]
- H05B31/38 . . specially adapted for ac
  
- H05B31/40 . . having two electrodes at an angle [N: (electrodes in the open [H05B31/00A2](#))] [C9507]
- H05B31/42 . . specially adapted for ac
  
- H05B31/44 . . having two parallel electrodes [N: (electrodes in the open [H05B31/00A2](#))] [C9507]
- H05B31/46 . . specially adapted for ac
  
- H05B31/48 . . having more than two electrodes [N: (electrodes in the open [H05B31/00A3](#))] [C9507]
- H05B31/50 . . specially adapted for ac
- H05B31/52 . . . electrodes energised from different phases of the supply
  
- H05B33/00** **Electroluminescent light sources** (discharge lamps [H01J61/00](#) to [H01J65/00](#); semi-conductor devices with at least one particular jump barrier or surface barrier adapted for light emission [H01L27/15](#), [H01L33/00](#); organic light emitting devices [H01L27/32](#), [H01L51/50](#); lasers [H01S3/00](#), [H01S5/00](#); compositions per se, see the relevant subclasses; [N: luminescent scales or hands [G01D13/20](#), [G01D13/28](#); luminescent dials [G09F13/20](#); conductive layers on isolated substrate [H01B1/00](#); solid state image amplifiers [H01L31/14](#); electronic gates with electroluminescent elements [H03K17/78](#); pulse generation with electroluminescent elements [H03K3/00](#)]) [C0501]
  
- H05B33/02 . . Details
- H05B33/04 . . Sealing arrangements, [N: e.g. against humidity]
- H05B33/06 . . Electrode terminals

- H05B33/08 . . . Circuit arrangements not adapted to a particular application
- H05B33/08D . . . [N: for light emitting diodes (LEDs) comprising only inorganic semi-conductor materials] [C0207]
- H05B33/08D1 . . . . [N: Structural details of the circuit] [N0911]
- [N: **WARNING** [N0911]  
This group and its subgroups are not complete pending reorganisation; see also groups [H05B33/08D2](#), [H05B33/08D4](#) and respective subgroups ]
- H05B33/08D1C . . . . . [N: in the conversion stage] [N0911]
- H05B33/08D1C2 . . . . . [N: with a controlled linear regulator] [N0911]
- H05B33/08D1C4 . . . . . [N: with a controlled switching regulator] [N0911]
- H05B33/08D1C4H . . . . . {7 dots} [N: wherein HF AC or pulses are generated in the final stage] [N0911]
- H05B33/08D1L . . . . . [N: in the load stage] [N0911]
- H05B33/08D1L2 . . . . . [N: with an active control inside the LED load configuration] [N0911]
- H05B33/08D1L2P . . . . . {7 dots} [N: organized essentially in parallel configuration] [N0911]
- H05B33/08D1L2S . . . . . {7 dots} [N: organized essentially in string configuration with shunting switches] [N0911]
- H05B33/08D2 . . . . . [N: with control of the intensity of light emitted by the LEDs] [N0101]
- [N: **WARNING** [N0911]  
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 [H05B33/08D1](#), [H05B33/08D3](#), [H05B33/08D5](#) and subgroups ]
- H05B33/08D2R . . . . . [N: by means of a linear regulator] [N0101]
- H05B33/08D2S . . . . . [N: by means of a switching converter] [N0101]
- H05B33/08D3 . . . . . [N: with control ([H05B33/08D5](#) takes precedence)] [N0911]
- [N: **WARNING** [N0911]  
This group and its subgroups are not complete pending reorganisation; see also groups [H05B33/08D2](#), [H05B33/08D4](#) and respective subgroups ]
- H05B33/08D3B . . . . . [N: of the light intensity ([H05B33/08D3K](#) takes precedence)] [N0911]
- H05B33/08D3B2 . . . . . [N: involving load characteristic sensing means] [N0911]
- H05B33/08D3B2F . . . . . {7 dots} [N: with permanent feedback from the light source] [N0911]
- H05B33/08D3B4 . . . . . [N: involving load external environment sensing means] [N0911]
- H05B33/08D3K . . . . . [N: of the color point of the light] [N0911]
- H05B33/08D3K2 . . . . . [N: involving set point control means] [N0911]
- H05B33/08D3K2U . . . . . {7 dots} [N: by user interfaces] [N0911]
- H05B33/08D3K4 . . . . . [N: involving load characteristic sensing means] [N0911]
- H05B33/08D3K4F . . . . . {7 dots} [N: optical sensing means] [N0911]
- H05B33/08D3K6 . . . . . [N: involving load external environment sensing means] [N0911]
- H05B33/08D4 . . . . . [N: with detection of abnormal operating conditions] [N0101]
- [N: **WARNING** [N0911]

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 [H05B33/08D1](#), [H05B33/08D3](#), [H05B33/08D5](#) and subgroups ]

[H05B33/08D4C](#) . . . . . [N: of the circuit arrangement] [N0101]

[H05B33/08D4L](#) . . . . . [N: of the LEDs] [N0101]

[H05B33/08D5](#) . . . . . [N: with monitoring or protection] [N0911]

[N: **WARNING** [N0911]

This group and its subgroups are not complete pending reorganisation; see also groups [H05B33/08D2](#), [H05B33/08D4](#) and respective subgroups ]

[H05B33/08D5C](#) . . . . . [N: of the conversion stage] [N0911]

[H05B33/08D5L](#) . . . . . [N: of the load stage] [N0911]

[H05B33/08D5L2](#) . . . . . [N: involving end of life detection of LEDs] [N0911]

[H05B33/08P](#) . . . [N: for light emitting diodes (LEDs) comprising organic materials, e.g. polymer LEDs (PLEDs) or OLEDs] [N0207]

[H05B33/10](#) . Apparatus or processes specially adapted to the manufacture of electroluminescent light sources

[H05B33/12](#) . Light sources with substantially two-dimensional radiating surfaces

[H05B33/14](#) . . characterised by the chemical or physical composition or the arrangement of the electroluminescent material, [N: or by the simultaneous addition of the electroluminescent material in or onto the light source] [C1011]

[N: **Notes**[N1011]

When classifying in this group, the chemical composition of the electroluminescent material is also classified in the appropriate subgroup of [C09K11/00](#) ]

[H05B33/14F](#) . . . [N: Arrangements of the electroluminescent material] [N1011]

[H05B33/18](#) . . characterised by the nature or concentration of the activator

[H05B33/20](#) . . characterised by the chemical or physical composition or the arrangement of the material in which the electroluminescent material is embedded

[H05B33/22](#) . . characterised by the chemical or physical composition or the arrangement of auxiliary dielectric or reflective layers

[H05B33/24](#) . . . of metallic reflective layers ([H05B33/26](#) takes precedence)

[H05B33/26](#) . . characterised by the composition or arrangement of the conductive material used as an electrode

[H05B33/28](#) . . . of translucent electrodes

[H05B35/00](#) **Electric light sources using a combination of different types of light generation** (combinations of dissimilar light sources [F21](#), [H01J61/96](#))

[H05B37/00](#) **Circuit arrangements for electric light sources in general** [N: (vehicle lights [B60L1/14](#), [B60Q](#); railways light signals [B61L](#); lighting for photographic purposes [G03B15/02](#), for advertising purposes [G09F](#))]

[H05B37/02](#) . Controlling ([N: apparatus for performing colour music [A63J17/00](#); regulating light by electrical means without regulating the light source itself [G05D25/00](#)]; regulating

- voltage or current [G05F](#); [N: illuminated switch circuits [G08B](#), [G08C](#), [H02B15/00](#); traffic signals [G08G1/00](#)]
- [H05B37/02B](#) . . [N: the instant of the ignition or of the extinction ([H05B37/02S](#) takes precedence; light or sound activated electronic switches [H03K17/94](#))] [C9812]
- [H05B37/02B2](#) . . . [N: by the ambient light]
- [H05B37/02B4](#) . . . [N: by detection only of parameters other than ambient light, e.g. by sound detectors, by passive infra-red detectors]
- [H05B37/02B4S](#) . . . . [N: by detection of audible sound] [N9812]
- [H05B37/02B6](#) . . . . [N: by remote-control involving emission and detection units]
- [H05B37/02B6D](#) . . . . [N: linked via data bus transmission] [N0009]
- [H05B37/02B6P](#) . . . . [N: linked via power line carrier transmission] [N0009]
- [H05B37/02B6R](#) . . . . [N: linked via wireless transmission, e.g. IR transmission] [N0009]
- [H05B37/02B8](#) . . . [N: by timing means ([H05B37/02B6](#) takes precedence; time-controlled switching in general [G04](#), [H01H](#), [H03K](#))]
- [H05B37/02S](#) . . [N: a plurality of lamps following a preassigned sequence, e.g. theater lights, diapositive projector]
- [H05B37/03](#) . Detecting lamp failure [N: (monitoring vehicle lamps [B60Q11/00](#); changing to a reserve source of current [H02J9/00](#))]
- [H05B37/03P](#) . . [N: of a plurality of lamps connected in parallel]
- [H05B37/03P2](#) . . . [N: with communication between the lamps and a central unit]
- [H05B37/03S](#) . . [N: of a plurality of lamps connected in series]
- [H05B37/03S2](#) . . . [N: with communication between the lamps and a central unit]
- [H05B37/04](#) . . Circuits providing for substitution of the light source in case of its failure [N: e.g. by switching over to a reserve light source (incandescent lamps with reserve body [H01K](#))]
- [H05B39/00](#) Circuit arrangements or apparatus for operating incandescent light sources and not adapted to a particular application [N: (incandescent lamps per se [H01K](#))]**
- [H05B39/02](#) . Switching on, e.g. with predetermined rate of increase of lighting current
- [H05B39/04](#) . Controlling (regulating voltage in general [G05F](#))
- [H05B39/04B](#) . . [N: the light-intensity of the source ([H05B39/08](#) takes precedence)]
- [H05B39/04B2](#) . . . [N: by measuring the incident light] [C9911]
- [H05B39/04B4](#) . . . [N: continuously ([H05B39/04B2](#) takes precedence)] [C9911]
- [H05B39/04B4B](#) . . . . [N: with high-frequency bridge converters ([H05B39/04B4R](#) takes precedence)] [N9911]
- [H05B39/04B4M](#) . . . . [N: with pulse width modulation from a DC power source] [N9911]
- [H05B39/04B4R](#) . . . . [N: with reverse phase control] [N9911]
- [H05B39/06](#) . . Switching arrangements, e.g. from series operation to parallel operation
- [H05B39/08](#) . . by shifting phase of trigger voltage applied to gas-filled controlling tubes [N: also in controlled semiconductor devices (in converters [H02M5/00](#); with regulation [G05F1/44](#))]
- [H05B39/08B](#) . . . [N: by measuring the incident light ([H05B39/08R](#) takes precedence)]
- [H05B39/08R](#) . . . [N: by the variation-rate of light intensity]

- H05B39/08R2 . . . . . [N: by touch control] [N9603]
- H05B39/08R2D . . . . . [N: with possibility of remote control] [N9603]
- H05B39/08R2D2 . . . . . [N: by wireless means, e.g. infra-red transmitting means] [N9603]
  
- H05B39/09 . . . . . in which the lamp is fed by pulses [N: (automatic circuit devices built into or on the incandescent lamp [H01K1/62A](#); vehicle winking devices [B60Q1/38](#))]
  
- H05B39/10 . . . . . Circuits providing for substitution of the light source in case of its failure [N: (changing to a reserve current source [H02J9/00](#))]
  
- H05B39/10B . . . . . [N: with a spare lamp in the circuit, and a possibility of shunting a failed lamp (lamp changing devices [H01R33/00](#), [H01R43/00](#); incandescent lamps with a reserve body [H01K](#))]
  
- H05B41/00**                    **Circuit arrangements or apparatus for igniting or operating discharge lamps [N: (circuit elements structurally associated with discharge lamps [H01J7/44](#), [H01J19/78](#); discharge lamps per se [H01J61/00](#) to [H01J65/00](#); arc lamps with consumable electrodes [H05B31/00](#); transformers or chokes for supplying discharge lamps [H01F38/08](#))]**
  
- H05B41/02 . . . . . Details
- H05B41/04 . . . . . Starting switches [N: (igniting arrangements for discharge lamps [H01J7/30](#), [H01J17/30](#), [H01J61/54](#); switches in general [H01H](#))]
- H05B41/04B . . . . . [N: using semiconductor devices]
- H05B41/04B2 . . . . . [N: for lamp provided with pre-heating electrodes]
- H05B41/04B2C . . . . . [N: using controlled semiconductor devices]
- H05B41/04R . . . . . [N: using electromagnetic relays]
- H05B41/06 . . . . . thermal only
- H05B41/08 . . . . . heated by glow discharge
- H05B41/10 . . . . . magnetic only
- H05B41/12 . . . . . combined thermal and magnetic
  
- H05B41/14 . . . . . Circuit arrangements
- H05B41/16 . . . . . in which the lamp is fed by dc or by low-frequency ac, e.g. by 50 cycles/sec ac, [N: or with network frequencies] ([H01J41/26](#) takes precedence)
- H05B41/18 . . . . . having a starting switch
- H05B41/19 . . . . . for lamps having an auxiliary starting electrode
- H05B41/20 . . . . . having no starting switch
- H05B41/22 . . . . . for lamps having an auxiliary starting electrode
- H05B41/23 . . . . . for lamps not having an auxiliary starting electrode
- H05B41/231 . . . . . for high-pressure lamps
- H05B41/232 . . . . . for low-pressure lamps
- H05B41/232B . . . . . [N: provided with pre-heating electrodes]
- H05B41/233 . . . . . using resonance circuitry
- H05B41/234 . . . . . to eliminate stroboscopic effects, e.g. feeding two lamps with different phases
- H05B41/24 . . . . . in which the lamp is fed by high frequency ac, [N: or with separate oscillator frequency] ([H05B41/26](#) takes precedence)
- H05B41/24P . . . . . [N: for a plurality of lamps] [N9809]

H05B41/26	. . . . .	in which the lamp is fed by power derived from dc by means of a converter, e.g. by high-voltage dc
H05B41/28	. . . . .	using static converters [C0311]
H05B41/28S	. . . . .	[N: with semiconductor devices and specially adapted for lamps without electrodes in the vessel, e.g. surface discharge lamps, electrodeless discharge lamps] [N9704]
H05B41/28S2	. . . . .	[N: Arrangements for protecting lamps or circuits against abnormal operating conditions] [N9704]
H05B41/282	. . . . .	With semiconductor devices ([N: <a href="#">H05B41/28S</a> ], <a href="#">H05B41/288</a> , <a href="#">H05B41/295</a> take precedence) [N9704]
H05B41/282M	. . . . .	[N: by means of a single-switch converter or a parallel push-pull converter in the final stage ( <a href="#">H05B41/285</a> takes precedence)] [N0003] [C0005]
H05B41/282M2	. . . . .	[N: using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations] [N0003] [C0005]
H05B41/282M4	. . . . .	[N: using control circuits for the switching element ( <a href="#">H05B41/282M2</a> takes precedence)] [N0003]
H05B41/282P	. . . . .	[N: by means of a bridge converter in the final stage ( <a href="#">H05B41/285</a> takes precedence)] [N0003] [C0005]
H05B41/282P2	. . . . .	[N: using specially adapted components in the load circuit, e.g. feed-back transformers, piezo-electric transformers; using specially adapted load circuit configurations][N0003][C0005]
H05B41/282P4	. . . . .	[N: using control circuits for the switching elements ( <a href="#">H05B41/282P2</a> takes precedence)] [N0003]
H05B41/285	. . . . .	Arrangements for protecting lamps or circuits against abnormal operating conditions [N9704]
H05B41/285C	. . . . .	[N: for protecting the circuit against abnormal operating conditions] [N9906]
H05B41/285C2	. . . . .	{7 dots} [N: against abnormal power supply conditions] [N9906]
H05B41/285C4	. . . . .	{7 dots} [N: against abnormal lamp operating conditions] [N9906]
H05B41/285C6	. . . . .	{7 dots} [N: against internal abnormal circuit conditions] [N9906]
H05B41/285L	. . . . .	[N: for protecting the lamp against abnormal operating conditons] [N9906]
H05B41/288	. . . . .	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 [N: ( <a href="#">H05B41/28S</a> takes precedence)] [N9704]
H05B41/288E	. . . . .	[N: Load circuits; Control thereof] [N0311]
H05B41/288E2	. . . . .	[N: the control resulting from an action on the static converter] [N0311]
H05B41/288E2B	. . . . .	{7 dots} [N: the controlled element being a DC/AC converter in the final stage, e.g. by harmonic mode starting] [N0311] [C0403]
H05B41/288K	. . . . .	[N: Static converters especially adapted therefor; Control thereof ( <a href="#">H05B41/288E2</a> takes precedence)] [N0311]
H05B41/288K2	. . . . .	[N: comprising a controllable preconditioner, e.g. a booster] [N0311]
H05B41/288K4	. . . . .	[N: characterised by a controllable bridge in the final stage] [N0311]
H05B41/288K4L	. . . . .	{7 dots} [N: the bridge being commutated at low frequency, e.g. 1kHz] [N0311]
H05B41/292	. . . . .	Arrangements for protecting lamps or circuits against abnormal operating conditions [N9704]

H05B41/292C	. . . . .	[N: for protecting the circuit against abnormal operating conditions] [N9906]
H05B41/292C2	. . . . .	{7 dots} [N: against abnormal power supply conditions] [N9906]
H05B41/292C4	. . . . .	{7 dots} [N: against abnormal lamp operating conditions] [N9906]
H05B41/292C6	. . . . .	{7 dots} [N: against internal abnormal circuit conditions] [N9906]
H05B41/292L	. . . . .	[N: for protecting the lamp against abnormal operating conditions] [N9906]
H05B41/295	. . . . .	with semiconductor devices and specially adapted for lamps with preheating electrodes, e.g. for fluorescent lamps [N9704]
H05B41/298	. . . . .	Arrangements for protecting lamps or circuits against abnormal operating conditions [N9704]
H05B41/298C	. . . . .	[N: for protecting the circuit against abnormal operating conditions] [N9906]
H05B41/298C2	. . . . .	{7 dots} [N: against abnormal power supply conditions] [N9906]
H05B41/298C4	. . . . .	{7 dots} [N: against abnormal lamp operating conditions] [N9906]
H05B41/298C6	. . . . .	{7 dots} [N: against internal abnormal circuit conditions] [N9906]
H05B41/298L	. . . . .	[N: for protecting the lamp against abnormal operating conditions] [N9906]
H05B41/30	. . . . .	in which the lamp is fed by pulses, e.g. flash lamp [N: (welding with accumulated energy <a href="#">B23K11/24</a> ; for gas discharge lasers <a href="#">H01S3/097</a> ; electrical pulse generators with charge and discharge of an accumulating element <a href="#">H03K3/53</a> )] [C9601]
H05B41/32	. . . . .	for single flash operation
H05B41/32B	. . . . .	[N: by measuring the incident light]
H05B41/34	. . . . .	to provide a sequence of flashes
H05B41/36	. . . . .	Controlling (regulating voltage or current <a href="#">G05F</a> )
H05B41/38	. . . . .	Controlling the intensity of light
H05B41/38R	. . . . .	[N: during the transitional start-up phase] [N0311]
H05B41/38R2	. . . . .	[N: in case of hot-restriking] [N0311]
H05B41/38R4	. . . . .	[N: for speeding-up the lighting-up] [N0311] [C0403]
H05B41/38R6	. . . . .	[N: for a transition from glow to arc] [N0311] [C0403]
H05B41/39	. . . . .	continuously
H05B41/391	. . . . .	using saturable magnetic devices
H05B41/392	. . . . .	using semiconductor devices, e.g. thyristor
H05B41/392D	. . . . .	[N: with possibility of light intensity variations] [N9704]
H05B41/392D2	. . . . .	{7 dots} [N: and measurement of the incident light] [N9704]
H05B41/392D4	. . . . .	{7 dots} [N: by phase control, e.g. using a triac ( <a href="#">H05B41/392D2</a> takes precedence)] [N9704]
H05B41/392D6	. . . . .	{7 dots} [N: by frequency variation ( <a href="#">H05B41/392D2</a> takes precedence)] [N9704]
H05B41/392D8	. . . . .	{7 dots} [N: by pulse width modulation ( <a href="#">H05B41/392D2</a> takes precedence)] [N9704]
H05B41/392D8H	. . . . .	{8 dots} [N: for high-pressure lamps, e.g. high-intensity discharge lamps, high-pressure mercury or sodium lamps] [N9802]
H05B41/40	. . . . .	discontinuously

- H05B41/42 . . . . . in two steps only
- H05B41/44 . . . . . for providing special optical effects, e.g. progressive motion of light [N: (advertising using lights [G09F](#))]
- H05B41/46 . . . Circuits providing for substitution in case of failure of the lamp [N: (changing to a reserve current source [H02J9/00](#))]
  
- H05B43/00** **Circuit arrangements for light sources, not otherwise provided for** ([H05B37/00](#) takes precedence)
  
- H05B43/02 . . . for light sources using a charge of combustible material, [N: e.g. magnesium lamps]