

ECLA**EUROPEAN CLASSIFICATION****H02J**

CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (for digital computers [G06F1/18](#); circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus H02M; interrelated control of several motors, control of a prime-mover/generator combination H02P; control of high-frequency power H03L; additional use of power line or power network for transmission of information H04B)

[N: **WARNING**
[C9910]

- The following IPC groups are not used in the internal ECLA classification scheme. Subject matter covered by these groups is classified in the following ECLA groups :

[H02J7/10](#) covered by [H02J7/00M10](#)

]

Notes

- This subclass covers:

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

- This subclass does not cover:

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

H02J1/00

Circuit arrangements for dc mains or dc distribution networks

H02J1/02

- . Arrangements for reducing harmonics or ripples (in converters H02M1/14) [C0703]

H02J1/04

- . Constant-current supply systems

H02J1/06

- . Two-wire systems

H02J1/08

- . Three-wire systems; Systems having more than three wires

H02J1/10

- . Parallel operation of dc sources (involving batteries [H02J7/34](#))

- H02J1/10C . . [N: being switching converters ([H02J1/10D](#), [H02J1/12](#) take precedence)] [N9807]
- H02J1/10D . . [N: using diodes blocking reverse current flow ([H02J1/12](#) takes precedence)] [N9807]
- H02J1/12 . . Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier
- H02J1/14 . Balancing the load in a network (by batteries [H02J7/34](#))
- H02J1/16 . . using dynamo-electric machines coupled to fly-wheels

H02J3/00 **Circuit arrangements for ac mains or ac distribution networks**

- H02J3/00M . [N: Arrangements for selectively connecting the load to one among a plurality of power lines or power sources (for providing uninterruptable power supply [H02J9/00](#))] [N0101]
- H02J3/00M2 . . [N: for providing alternative feeding paths between load and source when the main path fails, e.g. transformers, busbars] [N0101]
- H02J3/00T . [N: involving trading of energy or energy transmission rights] [N0101]
- H02J3/01 . Arrangements for reducing harmonics or ripples (in converters [H02M1/12](#)) [C0703]
- H02J3/02 . using a single network for simultaneous distribution of power at different frequencies; using a single network for simultaneous distribution of ac power and of dc power
- H02J3/04 . for connecting networks of the same frequency but supplied from different sources
- H02J3/06 . . Controlling transfer of power between connected networks; Controlling sharing of load between connected networks
- H02J3/08 . . Synchronising of networks
- H02J3/10 . Constant-current supply systems
- H02J3/12 . for adjusting voltage in ac networks by changing a characteristic of the network load
- H02J3/14 . . by switching loads on to, or off from, network, e.g. progressively balanced loading
- H02J3/16 . . by adjustment of reactive power
- H02J3/18 . Arrangements for adjusting, eliminating, or compensating reactive power in networks (for adjustment of voltage [H02J3/12](#); use of Petersen coils [H02H9/08](#))
- H02J3/18B . . [N: using series compensators] [N9812]
- H02J3/18B1 . . . [N: wherein at least one reactive element is actively controlled by a bridge converter, e.g. unified power flow controllers (UPFC)] [N9812]
- H02J3/18C . . [N: using shunt compensators ([H02J3/18B](#), [H02J3/18F](#) take precedence)] [N9812]
- H02J3/18C1 . . . [N: with stepwise control, the possibility of switching in or out the entire compensating arrangement not being considered as stepwise control] [N9812]
- H02J3/18C3 . . . [N: with stepless control] [N9812]
- H02J3/18C3A [N: wherein at least one reactive element is actively controlled by a bridge converter, e.g. active filters] [N9812]
- H02J3/18C3A1 [N: wherein such reactive element is purely inductive, e.g. superconductive magnetic energy storage systems (SMES)] [N9812]
- H02J3/18C3A3 [N: wherein such bridge converter is a multilevel converter] [N9812]
- H02J3/18C3B [N: wherein the stepless control of reactive power is obtained by at least one reactive element connected in series with a semiconductor switch] [N9812]

- H02J3/18C5 . . . [N: Methods for planning installation of shunt reactive power compensators] [N9812]
- H02J3/18F . . [N: using tap changing or phase shifting transformers] [N9812]
- H02J3/18G . . [N: using rotating means, e.g. synchronous generators] [N9812]
- H02J3/18P . . [N: the arrangements being an integral part of the load, e.g. a motor, or of its control circuit] [N9812]
- H02J3/20 . . in long overhead lines
- H02J3/22 . . in cables
- H02J3/24 . Arrangements for preventing or reducing oscillations of power in networks (by control effected upon a single generator [H02P9/00](#))
- H02J3/26 . Arrangements for eliminating or reducing asymmetry in polyphase networks
- H02J3/28 . Arrangements for balancing of the load in a network by storage of energy
- H02J3/30 . . using dynamo-electric machines coupled to fly-wheels
- H02J3/32 . . using batteries with converting means
- H02J3/34 . Arrangements for transfer of electric power between networks of substantially different frequency (frequency-convertors [H02M](#))
- H02J3/36 . Arrangements for transfer of electric power between ac networks via a high-tension dc link
- H02J3/38 . Arrangements for parallelly feeding a single network by two or more generators, converters or transformers
- H02J3/38D . . [N: Dispersed generators] [N1206]
- H02J3/38D1 . . . [N: the generators exploiting renewable energy] [N1204] [C1207]
- H02J3/38D1S [N: Solar energy, e.g. photovoltaic energy (generation of electric power by conversion of light [H02S](#))] [N1204] [C1207]
- H02J3/38D1S2 [N: Maximum power point tracking control for photovoltaic sources (inverter means associated with the PV module [H02S40/32](#))] [N1204]
- H02J3/38D1W [N: Wind energy (wind motors [F03D](#))] [N1206]
- H02J3/38D2 [N: using fuel cells (fuel cells per se [H01M8/00](#))] [N1206]
- H02J3/40 . . Synchronising a generator for connection to a network or to another generator
- H02J3/42 . . . with automatic parallel connection when synchronisation is achieved
- H02J3/44 . . . with means for ensuring correct phase sequence
- H02J3/46 . . Controlling of the sharing of output between the generators, converters, or transformers
- H02J3/48 . . . Controlling the sharing of the in-phase component
- H02J3/50 . . . Controlling the sharing of the out-of-phase component
- H02J4/00** **Circuit arrangements for mains of distribution networks not specified as ac or dc**
- H02J5/00** **Circuit arrangements for transfer of electric power between ac networks and dc networks ([H02J3/36](#) takes precedence)**
- H02J5/00T . [N: with inductive power transfer (for charging [H02J7/02B1](#))] [N9806]

H02J7/00	Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries
H02J7/00B	. [N: with provision for charging different types of batteries]
H02J7/00B1	. . [N: with data exchange between battery and charger (H02J7/00B3 takes precedence)] [N9806] [C9911]
H02J7/00B2	. . [N: using passive battery identification means, e.g. resistors, capacitors (H02J7/00B3 takes precedence; identification by mechanical connections H02J7/00E2)] [N9806] [C9911]
H02J7/00B2A	. . . [N: in response to measured battery parameters, e.g. voltage, current, temperature profile] [N9911]
H02J7/00B2B	. . . [N: using switches, contacts or markings, e.g. optical, magnetic, barcode] [N9911]
H02J7/00B3	. . [N: with charge circuits contained within battery unit] [N9911]
H02J7/00C	. [N: for charging several batteries simultaneously or sequentially (H02J7/14D takes precedence)] [C9806]
H02J7/00C1	. . [N: Circuits for equalisation of charge between batteries] [N9801]
H02J7/00C1B	. . . [N: using shunting, discharge or bypass circuits] [N9801]
H02J7/00C1C	. . . [N: using separate charge circuits] [N9801]
H02J7/00C1S	. . . [N: using switched or multiplexed charge circuits] [N9801]
H02J7/00C2	. . [N: Monitoring or indicating circuits (H02J7/00C5 takes precedence)] [N9801] [C9806]
H02J7/00C3	. . [N: Management of charging with batteries permanently connected to charge circuit (H02J7/00C1 takes precedence)] [N9801]
H02J7/00C4	. . [N: Parallel/serial switching of connection of batteries to charge or load circuit] [N9801]
H02J7/00C5	. . [N: using safety or protection circuits, e.g. overcharge/discharge disconnection] [N9806]
H02J7/00C6	. . [N: Stations for charging mobile units, e.g. of electric vehicles, of mobile telephones (H02J7/00C2 , H02J7/00C5 take precedence)] [N9911]
H02J7/00D	. [N: with safety devices (H02J7/00C5 takes precedence)] [C9806]
H02J7/00D1	. . [N: using battery or load disconnect circuits (H02J9/00R takes precedence)] [N9801] [C0010]
H02J7/00D1D	. . . [N: disconnection of loads if battery is not under charge, e.g. in vehicle if engine is not running] [N0010]
H02J7/00D2	. . [N: using reverse polarity correcting or protecting circuits (mechanical means of polarity protection H02J7/00E2)] [N9801]
H02J7/00D3	. . [N: using connection detecting circuits (H02J7/00D2 takes precedence)] [N9801]
H02J7/00E	. [N: characterised by the mechanical construction (H02J7/35M takes precedence)] [C9911]
H02J7/00E1	. . [N: specially adapted for holding portable devices containing batteries (H02J7/00E2 takes precedence)] [N0011]
H02J7/00E2	. . [N: concerning the insertion or the connection of the batteries (charging from ac mains using non-contact coupling H02J7/02B1)] [C9806]
H02J7/00F	. [N: with indicating devices (H02J7/00C2 takes precedence)] [N9801]

- H02J7/00G . [N: Charge circuits only ([H02J7/00B](#), [H02J7/00C](#), [H02J7/00M](#) take precedence)] [N9911]
- H02J7/00G1 . . [N: Battery to battery charging (with circuits for polarity protection [H02J7/00D2](#))] [N9911]
- H02J7/00G2 . . [N: adapted for charging from various sources, e.g. AC, DC, multivoltage] [N9911]
- H02J7/00G3 . . [N: adapted for charge maintenance or battery rejuvenation ([H02J7/00M10B1](#) takes precedence)] [N9911]

- H02J7/00K . [N: Circuits adapted for supplying loads only] [N9911]
- H02J7/00K1 . . [N: using converters specially adapted for use with a battery] [N9911]

- H02J7/00L . [N: Battery or charger load switching, e.g. concurrent charging and load supply ([H02J7/00C](#) takes precedence)] [N9806]

- H02J7/00M . [N: Regulation of charging current or voltage] [N9910]
- H02J7/00M10 . . [N: using semiconductor devices only] [N9910]
- H02J7/00M10B . . . [N: with a programmable charge schedule ([H02J7/00M10E](#) takes precedence)] [N9910]
- H02J7/00M10B1 [N: for charge maintenance, battery initiation or rejuvenation] [N9910]
- H02J7/00M10C [N: the charge cycle being terminated in response to electric parameters ([H02J7/00M10E](#) takes precedence)] [N9910]
- H02J7/00M10C2 [N: in response to discharge current, e.g. using a coulometer, pilot cell] [N9910]
- H02J7/00M10C3 [N: with the battery connected to the charge circuit] [N9910]
- H02J7/00M10C3B [N: and in response to battery voltage gradient] [N9910]
- H02J7/00M10C3C [N: and in response to charge current gradient] [N9910]
- H02J7/00M10C4 [N: with the battery disconnected from the charge circuit] [N9910]
- H02J7/00M10C4B [N: and in response to battery voltage] [N9910]
- H02J7/00M10D [N: the charge cycle being terminated in response to non-electric parameters ([H02J7/00M10E](#) takes precedence)] [N9910]
- H02J7/00M10D2 [N: in response to degree of gas development in the battery] [N9910]
- H02J7/00M10D3 [N: in response to temperature of the battery] [N9910]
- H02J7/00M10E [N: with introduction of pulses during the charging process] [N9910]

- H02J7/02 . for charging batteries from ac mains by converters
- H02J7/02B . . [N: characterised by the type of converter]
- H02J7/02B1 . . . [N: using non-contact coupling, e.g. inductive, capacitive] [N9806]
- H02J7/02C . . [N: with safety or indicating device]
- H02J7/04 . . Regulation of charging current or voltage
- H02J7/04B . . . [N: with a programmable charge schedule]
- H02J7/04C . . . [N: the charge cycle being controlled in response to a measured parameter]
- H02J7/04C2 [N: in response to integrated charge or discharge current]
- H02J7/04C3 [N: in response to voltage or current]
- H02J7/04C4 [N: in response to temperature]
- H02J7/04C5 [N: in response to degree of gas development in the battery]

- H02J7/06 . . . using discharge tubes or semiconductor devices
- H02J7/08 using discharge tubes only
- H02J7/08B [N: with a programmable charge schedule]
- H02J7/08C [N: the charge cycle being terminated in response to electric parameters]
- H02J7/08D [N: the charge cycle being terminated in response to non-electric parameters]
- H02J7/12 . . . using magnetic devices having controllable degree of saturation, i.e. transducers
- H02J7/12E [N: in combination with discharge tubes or semiconductor devices]
- H02J7/14 . for charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle
- H02J7/14B . . [N: on vehicles not being driven by a motor, e.g. bicycles] [C9911]
- H02J7/14C . . [N: with a generator driven by a prime mover other than the motor of a vehicle] [C9911]
- H02J7/14D . . [N: with multiple batteries or generators] [C9806]
- H02J7/14E . . [N: in combination with power supplies for loads other than batteries]
- H02J7/14F . . [N: in response to parameters of a vehicle] [C9911]
- H02J7/14G . . [N: with temperature compensation]
- H02J7/14H . . [N: with safety or indicating devices]
- H02J7/14K . . [N: Regulation of the charging current or voltage otherwise than by variation of field]
- H02J7/14K2 . . . [N: by mechanical action on the generator]
- H02J7/14K4 . . . [N: by commutation of the output windings of the generator]
- H02J7/14K6 . . . [N: by means of controlling devices between the generator output and the battery]
- H02J7/16 . . Regulation of the charging current or voltage by variation of field
- H02J7/16B . . . [N: with special means for initiating or limiting the excitation current]
- H02J7/16C . . . [N: with safety or indicating devices]
- H02J7/18 . . . due to variation of ohmic resistance in field circuit, using resistance switching in or out of circuit step by step
- H02J7/20 . . . due to variation of continuously variable ohmic resistor
- H02J7/22 . . . due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator
- H02J7/22B [N: characterised by the mechanical construction]
- H02J7/24 . . . using discharge tubes or semiconductor devices
- H02J7/24B [N: using discharge tubes only]
- H02J7/24C [N: using semiconductor devices as final control devices]
- H02J7/24C2 [N: with on/off action]
- H02J7/24C4 [N: with pulse modulation]
- H02J7/24C6 [N: using thyristors or triacs as final control devices]
- H02J7/24C8 [N: characterised by the mechanical construction]
- H02J7/26 . . . using magnetic devices with controllable degree of saturation
- H02J7/28 . . . using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device

- H02J7/30 . . . using armature-reaction-excited machines
- H02J7/32 . for charging batteries from a charging set comprising a non-electric prime mover [N: rotating at constant speed]
- H02J7/32B . . [N: by variation of field, using discharge tubes]
- H02J7/32D . . [N: by variation of field, using semiconductor devices]
- H02J7/32F . . [N: by variation of field, using armature-reaction-excited machines]
- H02J7/32H . . [N: by variation of field, using magnetic devices having controllable degree of saturation]
- H02J7/34 . Parallel operation in networks using both storage and other dc sources, e.g. providing buffering ([H02J7/14](#) takes precedence)
- H02J7/34C . . [N: using capacitors as storage or buffering devices] [N9911]
- H02J7/35 . . with light sensitive cells
- H02J7/35M . . . [N: characterised by the mechanical construction] [N9911]
- H02J7/36 . Arrangements using end-cell switching
- H02J9/00** **Circuit arrangement for emergency or standby power supply, e.g. for emergency lighting (with provision for charging standby battery [H02J7/00](#))**
- H02J9/00R . [N: in which a reserve is maintained in an energy source by disconnecting non-critical loads, e.g. maintaining a reserve of charge in a vehicle battery for starting an engine] [N0010]
- H02J9/00S . [N: using a power saving mode (for copiers [G03G15/00C1](#))] [N9911]
- H02J9/02 . in which an auxiliary distribution system and its associated lamps are brought into service
- H02J9/04 . in which the distribution system is disconnected from the normal source and connected to a standby source
- H02J9/06 . . with automatic change-over
- H02J9/06B . . . [N: characterised by the use of electronic means ([H02J9/06C](#) and [H02J9/06C2](#) take precedence)]
- H02J9/06C . . . [N: involving non rotating DC/AC converters]
- H02J9/06C2 [N: for lighting purposes]
- H02J9/06D . . . [N: characterised by the use of dynamo-electric machines ([H02J9/08](#) takes precedence)]
- H02J9/08 . . . requiring starting of a prime-mover
- H02J11/00** **Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed, or converted (emergency or standby arrangements [H02J9/00](#))**
- H02J13/00** **Circuit arrangements for providing remote indication of network conditions, e.g. an instantaneous record of the open or closed condition of each circuit-breaker in the network; Circuit arrangements for providing remote control of switching means in a power distribution network, e.g. switching in and out of current consumers by using a pulse code signal carried by the network [N: (circuits for indication of single**

switches [H01H9/16D](#); circuits specially adapted for remote switching of lighting via the power line [H05B37/02B6P](#)) [C0009]

- H02J13/00E . [N: for DC networks] [N9511]
- H02J13/00F . [N: for single frequency AC networks] [N9511]
- H02J13/00F2 . . [N: characterised by the display, e.g. of data or controls] [N9511]
- H02J13/00F4 . . [N: characterised by transmission structure between the control or monitoring unit and the controlled or monitored unit] [N9511]
- H02J13/00F4B . . . [N: with direct transmission between the control or monitoring unit and the controlled or monitored unit] [N9511]
- H02J13/00F4B2 [N: using the power network as support for the transmission] [N9511]
- H02J13/00F4B2B [N: using pulsed signals] [N9511]
- H02J13/00F4B2B2 [N: Details of signals treatment means] [N9511]
- H02J13/00F4B2B2B {7 dots} [N: using static semiconductor means] [N9511]
- H02J13/00F4B2B2B2 {8 dots} [N: Transmitters] [N9511]
- H02J13/00F4B2B2B4 {8 dots} [N: Receivers] [N9511]
- H02J13/00F4B2B2D {7 dots} [N: using lamps or electromechanical means] [N9511]
- H02J13/00F4B2D [N: using DC signal superposition] [N9511]
- H02J13/00F4B2F [N: using modification of a parameter of the network power signal] [N9511]
- H02J13/00F4B2F2 [N: Zero-crossing time] [N9511]
- H02J13/00F4B3 [N: using an auxiliary transmission line] [N9511]
- H02J13/00F4B3B [N: carrying signals having the network frequency or DC signals] [N9511]
- H02J13/00F4B4 [N: using a data transmission bus] [N9511]
- H02J13/00F4B5 [N: using optical means] [N9511]
- H02J13/00F4B6 [N: using ultrasonic means] [N9511]
- H02J13/00F4B7 [N: using phone lines] [N9511]
- H02J13/00F4B8 [N: using radio means][N9511]
- H02J13/00F4D [N: with transmission using an intermediate treatment level between the control or monitoring unit and the controlled or monitored unit] [N9511]
- H02J13/00F4D2 [N: using the power network as transmission support] [N9511]
- H02J13/00F4F [N: with transmission using plurality of intermediate treatment level between the control or monitoring unit and the controlled or monitored unit] [N9511]
- H02J13/00F4F2 [N: using the power network as transmission support] [N9511]
- H02J13/00G . . [N: for AC networks with plurality frequencies] [N9511]
- H02J13/00H . . [N: for networks combining AC and DC power] [N9511]
- H02J15/00** **Systems for storing electric energy (mechanical systems therefor [F01](#) to [F04](#); in chemical form [H01M](#)) [C9508]**
- H02J15/00B . . [N: in the form of hydraulic energy] [N9508]

H02J15/00D

- [N: in the form of pneumatic energy (accumulators for supplying fluid under pressure [F15B1/04](#))] [N9508]

H02J17/00

Systems for supplying or distributing electric power by electromagnetic waves