

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H02 GENERATION; CONVERSION OR DISTRIBUTION OF ELECTRIC POWER

H02J CIRCUIT ARRANGEMENTS OR SYSTEMS FOR SUPPLYING OR DISTRIBUTING ELECTRIC POWER; SYSTEMS FOR STORING ELECTRIC ENERGY (for digital computers [G06F 1/18](#); circuits or apparatus for the conversion of electric power, arrangements for control or regulation of such circuits or apparatus [H02M](#); interrelated control of several motors, control of a prime-mover/generator combination [H02P](#); control of high-frequency power [H03L](#); additional use of power line or power network for transmission of information [H04B](#))

NOTES

1. This subclass covers:
 - ac or dc mains or distribution networks;
 - circuit arrangements for battery supplies, including charging or control thereof, or coordinated supply from two or more sources of any kind;
 - circuit arrangements or systems for wireless supply or distribution of electric power.
2. This subclass does not cover:
 - control of a single motor, generator or dynamo-electric converter, of the types covered by subclass [H01F](#) or [H02K](#), which is covered by subclass [H02P](#);
 - control of a single motor or generator, of the types covered by subclass [H02N](#), which is covered by that subclass.

WARNING

The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

[H02J 7/10](#)

covered by

[H02J 7/0072](#)

1/00	Circuit arrangements for dc mains or dc distribution networks	1/16	• . using dynamo-electric machines coupled to flywheels
2001/002	• {Intermediate ac, e.g. dc supply with intermediated ac distribution}	3/00	Circuit arrangements for ac mains or ac distribution networks
2001/004	• {Distribution of power generated by fuel cells}	2003/001	• {Emergency control, e.g. method to deal with contingencies}
2001/006	• {Provisions for temporary connection of dc sources of essentially the same voltage, e.g. jumpstart cables}	2003/002	• {Flicker reduction, e.g. compensation of flicker introduced by non linear load}
2001/008	• {Plural dc voltage, e.g. dc supply voltage with at least two different dc voltage levels}	2003/003	• {Load forecast, e.g. method and systems for forecasting future load demand}
1/02	• Arrangements for reducing harmonics or ripples (in converters H02M 1/14)	3/005	• {Arrangements for selectively connecting the load to one among a plurality of power lines or power sources (for providing uninterruptable power supply H02J 9/00)}
1/04	• Constant-current supply systems	3/006	• . {for providing alternative feeding paths between load and source when the main path fails, e.g. transformers, busbars}
1/06	• Two-wire systems	2003/007	• {Simulating, e. g. planning, reliability check, modeling}
1/08	• Three-wire systems; Systems having more than three wires	3/008	• {involving trading of energy or energy transmission rights}
1/10	• Parallel operation of dc sources (involving batteries H02J 7/34)	3/01	• Arrangements for reducing harmonics or ripples (in converters H02M 1/12)
1/102	• . {being switching converters (H02J 1/108 , H02J 1/12 take precedence)}	3/02	• 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
2001/104	• . . {for synchronisation}	3/04	• for connecting networks of the same frequency but supplied from different sources
2001/106	• . . {for load balancing or load symmetrisation}		
1/108	• . {using diodes blocking reverse current flow (H02J 1/12 takes precedence)}		
1/12	• . Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier		
1/14	• Balancing the load in a network (by batteries H02J 7/34)		

3/06	. . Controlling transfer of power between connected networks; Controlling sharing of load between connected networks	2003/365	. . {Reducing harmonics or oscillations in HVDC}
3/08	. . Synchronising of networks	3/38	. Arrangements for parallelly feeding a single network by two or more generators, converters or transformers
3/10	. Constant-current supply systems	3/381	. . {Dispersed generators}
3/12	. for adjusting voltage in ac networks by changing a characteristic of the network load	3/382	. . . {the generators exploiting renewable energy}
3/14	. . by switching loads on to, or off from, network, e.g. progressively balanced loading	3/383	. . . . {Solar energy, e.g. photovoltaic energy (generation of electric power by conversion of light H02S)}
2003/143	. . . {Household appliances management}	3/385	. . . . . {Maximum power point tracking control for photovoltaic sources}
2003/146	. . . {Tariff based load management}	3/386	. . . . . {Wind energy (wind motors F03D)}
3/16	. . by adjustment of reactive power	3/387	. . . {using fuel cells (fuel cells per se H01M 8/00)}
3/18	. Arrangements for adjusting, eliminating, or compensating reactive power in networks (for adjustment of voltage H02J 3/12; use of Petersen coils H02H 9/08)	2003/388	. . {Islanding, i.e. disconnection of local power supply from the network}
3/1807	. . {using series compensators}	3/40	. . Synchronising a generator for connection to a network or to another generator
3/1814	. . . {wherein at least one reactive element is actively controlled by a bridge converter, e.g. unified power flow controllers [UPFC]}	3/42	. . . with automatic parallel connection when synchronisation is achieved
3/1821	. . {using shunt compensators (H02J 3/1807, H02J 3/1878 take precedence)}	3/44	. . . with means for ensuring correct phase sequence
3/1828	. . . {with stepwise control, the possibility of switching in or out the entire compensating arrangement not being considered as stepwise control}	3/46	. . Controlling of the sharing of output between the generators, converters, or transformers
3/1835	. . . {with stepless control}	3/48	. . . Controlling the sharing of the in-phase component
3/1842	. . . . {wherein at least one reactive element is actively controlled by a bridge converter, e.g. active filters}	3/50	. . . Controlling the sharing of the out-of-phase component
3/185	. . . . . {wherein such reactive element is purely inductive, e.g. superconductive magnetic energy storage systems [SMES]}	4/00	Circuit arrangements for mains or distribution networks not specified as ac or dc
3/1857	. . . . . {wherein such bridge converter is a multilevel converter}	5/00	Circuit arrangements for transfer of electric power between ac networks and dc networks (H02J 3/36 takes precedence)
3/1864	. . . . . {wherein the stepless control of reactive power is obtained by at least one reactive element connected in series with a semiconductor switch}		WARNING
3/1871	. . . {Methods for planning installation of shunt reactive power compensators}		Group H02J 5/00 is impacted by reclassification into groups H02J 50/00 – H02J 50/90.
3/1878	. . {using tap changing or phase shifting transformers}		Groups H02J 5/00 and H02J 50/00 – H02J 50/90 should be considered in order to perform a complete search.
3/1885	. . {using rotating means, e.g. synchronous generators}	5/005	. {with inductive power transfer (for charging H02J 7/025)}
3/1892	. . {the arrangements being an integral part of the load, e.g. a motor, or of its control circuit}		WARNING
3/20	. . in long overhead lines		Group H02J 5/005 is impacted by reclassification into groups H02J 50/00 – H02J 50/90.
3/22	. . in cables		Groups H02J 5/005 and H02J 50/00 – H02J 50/90 should be considered in order to perform a complete search.
3/24	. Arrangements for preventing or reducing oscillations of power in networks (by control effected upon a single generator H02P 9/00)	7/00	Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries
3/26	. Arrangements for eliminating or reducing asymmetry in polyphase networks	2007/0001	. {Authentication, i.e. circuits for checking compatibility between one component, e.g. a battery or a battery charger, and another component, e.g. a power source}
3/28	. Arrangements for balancing of the load in a network by storage of energy	7/0003	. {with provision for charging different types of batteries}
3/30	. . using dynamo-electric machines coupled to flywheels	7/0004	. . {with data exchange between battery and charger (H02J 7/0011 takes precedence)}
3/32	. . using batteries with converting means	7/0006	. . {using passive battery identification means, e.g. resistors, capacitors (H02J 7/0011 takes precedence; identification by mechanical connections H02J 7/0045)}
3/34	. Arrangements for transfer of electric power between networks of substantially different frequency (frequency-convertors H02M)		
3/36	. Arrangements for transfer of electric power between ac networks via a high-tension dc link		

- 7/0008 . . . {in response to measured battery parameters, e.g. voltage, current, temperature profile}
 - 7/0009 . . . {using switches, contacts or markings, e.g. optical, magnetic, barcode}
 - 7/0011 . . {with charge circuits contained within battery unit}
 - 7/0013 . {for charging several batteries simultaneously or sequentially ([H02J 7/1423](#) takes precedence)}
 - 7/0014 . . {Circuits for equalisation of charge between batteries}
 - 7/0016 . . . {using shunting, discharge or bypass circuits}
 - 7/0018 . . . {using separate charge circuits}
 - 7/0019 . . . {using switched or multiplexed charge circuits}
 - 7/0021 . . {Monitoring or indicating circuits ([H02J 7/0026](#) takes precedence)}
 - 7/0022 . . {Management of charging with batteries permanently connected to charge circuit ([H02J 7/0014](#) takes precedence)}
 - 7/0024 . . {Parallel/serial switching of connection of batteries to charge or load circuit}
 - 7/0026 . . {using safety or protection circuits, e.g. overcharge/discharge disconnection}
 - 7/0027 . . {Stations for charging mobile units, e.g. of electric vehicles, of mobile telephones ([H02J 7/0021](#), [H02J 7/0026](#) take precedence)}
 - 7/0029 . {with safety devices ([H02J 7/0026](#) takes precedence)}
 - 7/0031 . . {using battery or load disconnect circuits ([H02J 9/002](#) takes precedence)}
 - 7/0032 . . . {disconnection of loads if battery is not under charge, e.g. in vehicle if engine is not running}
 - 7/0034 . . {using reverse polarity correcting or protecting circuits (mechanical means of polarity protection [H02J 7/0045](#))}
 - 7/0036 . . {using connection detecting circuits ([H02J 7/0034](#) takes precedence)}
 - 2007/0037 . . {Overcharge protection}
 - 2007/0039 . . {Overcurrent protection}
 - 2007/004 . . {Overdischarge protection}
 - 7/0042 . {characterised by the mechanical construction ([H02J 7/355](#) takes precedence)}
 - 7/0044 . . {specially adapted for holding portable devices containing batteries ([H02J 7/0045](#) takes precedence)}
 - 7/0045 . . {concerning the insertion or the connection of the batteries (charging from ac mains using non-contact coupling [H02J 7/025](#))}
 - 7/0047 . {with indicating devices ([H02J 7/0021](#) takes precedence)}
 - 2007/0049 . . {Detection of fully charged condition}
 - 2007/005 . . {Detection of remaining charge capacity}
 - 7/0052 . {Charge circuits only ([H02J 7/0003](#), [H02J 7/0013](#), [H02J 7/007](#) take precedence)}
 - 7/0054 . . {Battery to battery charging (with circuits for polarity protection [H02J 7/0034](#))}
 - 7/0055 . . {adapted for charging from various sources, e.g. AC, DC, multivoltage}
 - 7/0057 . . {adapted for charge maintenance or battery rejuvenation ([H02J 7/0075](#) takes precedence)}
 - 2007/0059 . . {characterised by the converter}
 - 2007/006 . . {Charge provided using dc bus or data bus of a computer}
 - 2007/0062 . . {Charge provided using USB port connectors}
 - 7/0063 . {Circuits adapted for supplying loads only}
 - 7/0065 . . {using converters specially adapted for use with a battery}
 - 2007/0067 . . {Discharge management, i.e. discharge current reduction at low state of charge, sequential battery discharge in systems with a plurality of battery}
 - 7/0068 . {Battery or charger load switching, e.g. concurrent charging and load supply ([H02J 7/0013](#) takes precedence)}
 - 7/007 . {Regulation of charging current or voltage}
 - 7/0072 . . {using semiconductor devices only}
 - 7/0073 . . . {with a programmable charge schedule ([H02J 7/0093](#) takes precedence)}
 - 7/0075 {for charge maintenance, battery initiation or rejuvenation}
 - 7/0077 . . . {the charge cycle being terminated in response to electric parameters ([H02J 7/0093](#) takes precedence)}
 - 7/0078 {in response to discharge current, e.g. using a coulometer, pilot cell}
 - 7/008 {with the battery connected to the charge circuit}
 - 7/0081 {and in response to battery voltage gradient}
 - 7/0083 {and in response to charge current gradient}
 - 7/0085 {with the battery disconnected from the charge circuit}
 - 7/0086 {and in response to battery voltage}
 - 7/0088 . . . {the charge cycle being terminated in response to non-electric parameters ([H02J 7/0093](#) takes precedence)}
 - 7/009 {in response to degree of gas development in the battery}
 - 7/0091 {in response to temperature of the battery}
 - 7/0093 . . . {with introduction of pulses during the charging process}
 - 2007/0095 . {Control circuit supply, e.g. means for supplying power to the control circuit}
 - 2007/0096 . {Charger exchanging data with an electronic device, i.e. telephone, whose internal battery is under charge}
 - 2007/0098 . {Smart battery, e.g. battery with means for data exchanging with charger}
 - 7/02 . . for charging batteries from ac mains by converters
- WARNING**
- Group [H02J 7/02](#) is impacted by reclassification into groups [H02J 50/00](#) – [H02J 50/90](#).
Groups [H02J 7/02](#) and [H02J 50/00](#) – [H02J 50/90](#) should be considered in order to perform a complete search.
- 7/022 . . {characterised by the type of converter}
 - 7/025 . . . {using non-contact coupling, e.g. inductive, capacitive}
- WARNING**
- Group [H02J 7/025](#) is impacted by reclassification into groups [H02J 50/00](#) – [H02J 50/90](#).
Groups [H02J 7/025](#) and [H02J 50/00](#) – [H02J 50/90](#) should be considered in order to perform a complete search.

7/027	. . {with safety or indicating device}	7/242	. . . . {using semiconductor devices as final control devices}
7/04	. . Regulation of charging current or voltage	7/244	. . . . . {with on/off action}
7/041	. . . {with a programmable charge schedule}	7/245	. . . . . {with pulse modulation}
7/042	. . . {the charge cycle being controlled in response to a measured parameter}	7/247	. . . . . {using thyristors or triacs as final control devices}
7/044	. . . . {in response to integrated charge or discharge current}	7/248	. . . . . {characterised by the mechanical construction}
7/045	. . . . {in response to voltage or current}	7/26	. . . using magnetic devices with controllable degree of saturation
7/047	. . . . {in response to temperature}	7/28	. . . using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device
7/048	. . . . {in response to degree of gas development in the battery}	7/30	. . . using armature-reaction-excited machines
7/06	. . . using discharge tubes or semiconductor devices	7/32	. for charging batteries from a charging set comprising a non-electric prime mover {rotating at constant speed}
7/08	. . . . using discharge tubes only	7/322	. . {by variation of field, using discharge tubes}
7/082	. . . . . {with a programmable charge schedule}	7/324	. . {by variation of field, using semiconductor devices}
7/085	. . . . . {the charge cycle being terminated in response to electric parameters}	7/326	. . {by variation of field, using armature-reaction-excited machines}
7/087	. . . . . {the charge cycle being terminated in response to non-electric parameters}	7/328	. . {by variation of field, using magnetic devices having controllable degree of saturation}
2007/10	. . . . {using semiconductor devices only}	7/34	. Parallel operation in networks using both storage and other dc sources, e.g. providing buffering (H02J 7/14 takes precedence)
2007/105	. . . . . {with introduction of pulses during the charging process}	7/345	. . {using capacitors as storage or buffering devices}
7/12	. . . using magnetic devices having controllable degree of saturation, i.e. transducers	7/35	. . with light sensitive cells
7/125	. . . . {in combination with discharge tubes or semiconductor devices}	7/355	. . . {characterised by the mechanical construction}
7/14	. for charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle	7/36	. Arrangements using end-cell switching
7/1407	. . {on vehicles not being driven by a motor, e.g. bicycles}	9/00	Circuit arrangements for emergency or standby power supply, e.g. for emergency lighting (with provision for charging standby battery H02J 7/00)
7/1415	. . {with a generator driven by a prime mover other than the motor of a vehicle}	9/002	. {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}
7/1423	. . {with multiple batteries or generators}	9/005	. {using a power saving mode (for copiers G03G 15/5004) }
2007/143	. . . {Multiple generators}	2009/007	. . {Detection of the absence of a load}
7/1438	. . {in combination with power supplies for loads other than batteries}	9/02	. in which an auxiliary distribution system and its associated lamps are brought into service
7/1446	. . {in response to parameters of a vehicle}	9/04	. in which the distribution system is disconnected from the normal source and connected to a standby source
7/1453	. . {with temperature compensation}	9/06	. . with automatic change-over
7/1461	. . {with safety or indicating devices}	9/061	. . . {characterised by the use of electronic means (H02J 9/062 and H02J 9/065 take precedence) }
7/1469	. . {Regulation of the charging current or voltage otherwise than by variation of field}	9/062	. . . {involving non rotating DC/AC converters}
7/1476	. . . {by mechanical action on the generator}	2009/063	. . . . {Common neutral, e.g. ac input neutral line connected to ac output neutral line and dc middle point}
7/1484	. . . {by commutation of the output windings of the generator}	9/065	. . . . {for lighting purposes}
7/1492	. . . {by means of controlling devices between the generator output and the battery}	9/066	. . . {characterised by the use of dynamo-electric machines (H02J 9/08 takes precedence) }
7/16	. . Regulation of the charging current or voltage by variation of field	2009/067	. . . {using multi-primary transformers, e.g. transformer having one primary for each ac energy source and a secondary for the loads}
7/163	. . . {with special means for initiating or limiting the excitation current}	2009/068	. . . {Electronic means for switching from one power supply to another power supply, e.g. to avoid parallel connection}
7/166	. . . {with safety or indicating devices}		
7/18	. . . due to variation of ohmic resistance in field circuit, using resistance switching in or out of circuit step by step		
7/20	. . . due to variation of continuously variable ohmic resistor		
7/22	. . . due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator		
7/225	. . . . {characterised by the mechanical construction}		
7/24	. . . using discharge tubes or semiconductor devices		
7/241	. . . . {using discharge tubes only}		

9/08 . . . requiring starting of a prime-mover

11/00 Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed, or converted (emergency or standby arrangements [H02J 9/00](#))

13/00 Circuit arrangements for providing remote indication of network conditions, e.g. an instantaneous record of the open or closed condition of each circuitbreaker 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 {(circuits for indication of single switches [H01H 9/167](#); circuits specially adapted for remote switching of lighting via the power line [H05B 37/0263](#))}

13/0003 . {for DC networks}

13/0006 . {for single frequency AC networks}

13/001 . . {characterised by the display, e.g. of data or controls}

13/0013 . . {characterised by transmission structure between the control or monitoring unit and the controlled or monitored unit}

13/0017 . . . {with direct transmission between the control or monitoring unit and the controlled or monitored unit}

13/002 {using the power network as support for the transmission}

13/0024 {using pulsed signals}

13/0027 {Details of signals treatment means}

13/0031 {using static semiconductor means}

13/0034 {Transmitters}

13/0037 {Receivers}

13/0041 {using lamps or electromechanical means}

13/0044 {using DC signal superposition}

13/0048 {using modification of a parameter of the network power signal}

13/0051 {Zero-crossing time}

13/0055 {using an auxiliary transmission line}

13/0058 {carrying signals having the network frequency or DC signals}

13/0062 {using a data transmission bus}

13/0065 {using optical means}

13/0068 {using ultrasonic means}

13/0072 {using phone lines}

13/0075 {using radio means}

13/0079 . . . {with transmission using an intermediate treatment level between the control or monitoring unit and the controlled or monitored unit}

13/0082 {using the power network as transmission support}

13/0086 . . . {with transmission using plurality of intermediate treatment level between the control or monitoring unit and the controlled or monitored unit}

13/0089 {using the power network as transmission support}

13/0093 . {for AC networks with plurality frequencies}

13/0096 . {for networks combining AC and DC power}

15/00 Systems for storing electric energy (mechanical systems therefor [F01 - F04](#); in chemical form [H01M](#))

15/003 . {in the form of hydraulic energy}

15/006 . {in the form of pneumatic energy (accumulators for supplying fluid under pressure [F15B 1/04](#))}

17/00 Systems for supplying or distributing electric power by electromagnetic waves

WARNING

Group [H02J 17/00](#) is no longer used for the classification of documents as of February 1, 2016. The content of this group is being reclassified into groups [H02J 50/00](#) – [H02J 50/90](#).

Groups [H02J 17/00](#) and [H02J 50/00](#) – [H02J 50/90](#) should be considered in order to perform a complete search.

50/00 Circuit arrangements or systems for wireless supply or distribution of electric power

NOTES

1. In this main group, the specific types of wireless technology used for the power transmission are covered in groups [H02J 50/05-H02J 50/30](#), while aspects relevant to the circuit arrangements or systems thereof are covered in groups [H02J 50/40-H02J 50/90](#).
2. In this main group, multi-aspect classification is applied, so that subject matter characterised by aspects covered by more than one of its groups should be classified in each of those groups.

WARNING

Groups [H02J 50/00](#) – [H02J 50/90](#) are incomplete pending reclassification of documents from groups [H02J 5/00](#), [H02J 5/005](#), [H02J 7/02](#) and [H02J 17/00](#).

Groups [H02J 5/00](#), [H02J 5/005](#), [H02J 7/02](#) and [H02J 17/00](#) and [H02J 50/00](#) – [H02J 50/90](#) should be considered in order to perform a complete search.

50/05 . using capacitive coupling

50/10 . using inductive coupling

50/12 . . of the resonant type

50/15 . using ultrasonic waves

50/20 . using microwaves or radio frequency waves

50/23 . . characterised by the type of transmitting antennas, e.g. directional array antennas or Yagi antennas

50/27 . . characterised by the type of receiving antennas, e.g. rectennas

50/30 . using light, e.g. lasers

50/40 . using two or more transmitting or receiving devices ([H02J 50/50](#) takes precedence)

50/50 . using additional energy repeaters between transmitting devices and receiving devices

50/60 . responsive to the presence of foreign objects, e.g. detection of living beings

50/70 . involving the reduction of electric, magnetic or electromagnetic leakage fields

50/80 . involving the exchange of data, concerning supply or distribution of electric power, between transmitting devices and receiving devices

50/90 . involving detection or optimisation of position, e.g. alignment