

# 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

### 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

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

<b>1/00</b>	<b>Circuit arrangements for dc mains or dc distribution networks</b>	<b>3/005</b>	• {Arrangements for selectively connecting the load to one among a plurality of power lines or power sources (for providing uninterruptable power supply <a href="#">H02J 9/00</a> )}
<a href="#">2001/002</a>	• {Intermediate ac, e.g. dc supply with intermediated ac distribution}	<b>3/006</b>	• • {for providing alternative feeding paths between load and source when the main path fails, e.g. transformers, busbars}
<a href="#">2001/004</a>	• {Distribution of power generated by fuel cells}	<b>2003/007</b>	• {Simulating, e. g. planning, reliability check, modeling}
<a href="#">2001/006</a>	• {Provisions for temporary connection of dc sources of essentially the same voltage, e.g. jumpstart cables}	<b>3/008</b>	• {involving trading of energy or energy transmission rights}
<a href="#">2001/008</a>	• {Plural dc voltage, e.g. dc supply voltage with at least two different dc voltage levels}	<b>3/01</b>	• Arrangements for reducing harmonics or ripples
<a href="#">1/02</a>	• Arrangements for reducing harmonics or ripples	<b>3/02</b>	• 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
<a href="#">1/04</a>	• Constant-current supply systems	<b>3/04</b>	• for connecting networks of the same frequency but supplied from different sources
<a href="#">1/06</a>	• Two-wire systems	<b>3/06</b>	• • Controlling transfer of power between connected networks; Controlling sharing of load between connected networks
<a href="#">1/08</a>	• Three-wire systems; Systems having more than three wires	<b>3/08</b>	• • Synchronising of networks
<a href="#">1/10</a>	• Parallel operation of dc sources	<b>3/10</b>	• Constant-current supply systems
<a href="#">1/102</a>	• • {being switching converters ( <a href="#">H02J 1/108</a> , <a href="#">H02J 1/12</a> take precedence)}	<b>3/12</b>	• for adjusting voltage in ac networks by changing a characteristic of the network load
<a href="#">2001/104</a>	• • • {for synchronisation}	<b>3/14</b>	• • by switching loads on to, or off from, network, e.g. progressively balanced loading
<a href="#">2001/106</a>	• • • {for load balancing or load symmetrisation}	<b>2003/143</b>	• • • {Household appliances management}
<a href="#">1/108</a>	• • {using diodes blocking reverse current flow ( <a href="#">H02J 1/12</a> takes precedence)}	<b>2003/146</b>	• • • {Tariff based load management}
<a href="#">1/12</a>	• • Parallel operation of dc generators with converters, e.g. with mercury-arc rectifier	<b>3/16</b>	• • by adjustment of reactive power
<a href="#">1/14</a>	• Balancing the load in a network	<b>3/18</b>	• Arrangements for adjusting, eliminating or compensating reactive power in networks (for adjustment of voltage <a href="#">H02J 3/16</a> )
<a href="#">1/16</a>	• • using dynamo-electric machines coupled to flywheels	<b>3/1807</b>	• • {using series compensators}
<b>3/00</b>	<b>Circuit arrangements for ac mains or ac distribution networks</b>		
<a href="#">2003/001</a>	• {Emergency control, e.g. method to deal with contingencies}		
<a href="#">2003/002</a>	• {Flicker reduction, e.g. compensation of flicker introduced by non linear load}		
<a href="#">2003/003</a>	• {Load forecast, e.g. method and systems for forecasting future load demand}		

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 ( <a href="#">H02J 3/1807</a> , <a href="#">H02J 3/1878</a> 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]}	<b>4/00</b>	<b>Circuit arrangements for mains or distribution networks not specified as ac or dc</b>
3/1857	. . . . {wherein such bridge converter is a multilevel converter}	<b>5/00</b>	<b>Circuit arrangements for transfer of electric power between ac networks and dc networks (<a href="#">H02J 3/36</a> takes precedence)</b>
3/1864	. . . . {wherein the stepless control of reactive power is obtained by at least one reactive element connected in series with a semiconductor switch}		<b>WARNING</b>
3/1871	. . . {Methods for planning installation of shunt reactive power compensators}		Group <a href="#">H02J 5/00</a> is impacted by reclassification into groups <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> .
3/1878	. . {using tap changing or phase shifting transformers}		Groups <a href="#">H02J 5/00</a> and <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> 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 ( <a href="#">for charging <a href="#">H02J 7/025</a></a> )}
3/1892	. . {the arrangements being an integral part of the load, e.g. a motor, or of its control circuit}		<b>WARNING</b>
3/20	. . in long overhead lines		Group <a href="#">H02J 5/005</a> is impacted by reclassification into groups <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> .
3/22	. . in cables		Groups <a href="#">H02J 5/005</a> and <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> should be considered in order to perform a complete search.
3/24	. Arrangements for preventing or reducing oscillations of power in networks ( <a href="#">by control effected upon a single generator <a href="#">H02P 9/00</a></a> )	<b>7/00</b>	<b>Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries</b>
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 ( <a href="#">H02J 7/0011</a> takes precedence)}
3/32	. . using batteries with converting means	7/0006	. . {using passive battery identification means, e.g. resistors, capacitors ( <a href="#">H02J 7/0011</a> takes precedence; identification by mechanical connections <a href="#">H02J 7/0045</a> )}
3/34	. Arrangements for transfer of electric power between networks of substantially different frequency	7/0008	. . . {in response to measured battery parameters, e.g. voltage, current, temperature profile}
3/36	. Arrangements for transfer of electric power between ac networks via a high-tension dc link	7/0009	. . . {using switches, contacts or markings, e.g. optical, magnetic, barcode}
2003/365	. . {Reducing harmonics or oscillations in HVDC}	7/0011	. . {with charge circuits contained within battery unit}
3/38	. Arrangements for parallelly feeding a single network by two or more generators, converters or transformers	7/0013	. {for charging several batteries simultaneously or sequentially ( <a href="#">H02J 7/1423</a> takes precedence)}
3/381	. . {Dispersed generators}	7/0014	. . {Circuits for equalisation of charge between batteries}
3/382	. . . {the generators exploiting renewable energy}	7/0016	. . . {using shunting, discharge or bypass circuits}
3/383	. . . . {Solar energy, e.g. photovoltaic energy (generation of electric power by conversion of light <a href="#">H02S</a> )}	7/0018	. . . {using separate charge circuits}
3/385	. . . . . {Maximum power point tracking control for photovoltaic sources}	7/0019	. . . {using switched or multiplexed charge circuits}
3/386	. . . . {Wind energy ( <a href="#">wind motors <a href="#">F03D</a></a> )}	7/0021	. . {Monitoring or indicating circuits ( <a href="#">H02J 7/0026</a> takes precedence)}
3/387	. . . {using fuel cells ( <a href="#">fuel cells per se <a href="#">H01M 8/00</a></a> )}	7/0022	. . {Management of charging with batteries permanently connected to charge circuit ( <a href="#">H02J 7/0014</a> takes precedence)}
2003/388	. . {Islanding, i.e. disconnection of local power supply from the network}		
3/40	. . Synchronising a generator for connection to a network or to another generator		

7/0024	. . {Parallel/serial switching of connection of batteries to charge or load circuit}	7/0078	. . . . {in response to discharge current, e.g. using a coulometer, pilot cell}
7/0026	. . {using safety or protection circuits, e.g. overcharge/discharge disconnection}	7/008	. . . . {with the battery connected to the charge circuit}
7/0027	. . {Stations for charging mobile units, e.g. of electric vehicles, of mobile telephones ( <a href="#">H02J 7/0021</a> , <a href="#">H02J 7/0026</a> take precedence)}	7/0081	. . . . . {and in response to battery voltage gradient}
7/0029	. {with safety devices ( <a href="#">H02J 7/0026</a> takes precedence)}	7/0083	. . . . . {and in response to charge current gradient}
7/0031	. . {using battery or load disconnect circuits ( <a href="#">H02J 9/002</a> takes precedence)}	7/0085	. . . . . {with the battery disconnected from the charge circuit}
7/0032	. . . {disconnection of loads if battery is not under charge, e.g. in vehicle if engine is not running}	7/0086	. . . . . {and in response to battery voltage}
7/0034	. . {using reverse polarity correcting or protecting circuits (mechanical means of polarity protection <a href="#">H02J 7/0045</a> )}	7/0088	. . . {the charge cycle being terminated in response to non-electric parameters ( <a href="#">H02J 7/0093</a> takes precedence)}
7/0036	. . {using connection detecting circuits ( <a href="#">H02J 7/0034</a> takes precedence)}	7/009	. . . . {in response to degree of gas development in the battery}
2007/0037	. . {Overcharge protection}	7/0091	. . . . {in response to temperature of the battery}
2007/0039	. . {Overcurrent protection}	7/0093	. . . {with introduction of pulses during the charging process}
2007/004	. . {Overdischarge protection}	2007/0095	. {Control circuit supply, e.g. means for supplying power to the control circuit}
7/0042	. {characterised by the mechanical construction ( <a href="#">H02J 7/355</a> takes precedence)}	2007/0096	. {Charger exchanging data with an electronic device, i.e. telephone, whose internal battery is under charge}
7/0044	. . {specially adapted for holding portable devices containing batteries ( <a href="#">H02J 7/0045</a> takes precedence)}	2007/0098	. {Smart battery, e.g. battery with means for data exchanging with charger}
7/0045	. . {concerning the insertion or the connection of the batteries (charging from ac mains using non-contact coupling <a href="#">H02J 7/025</a> )}	7/02	. for charging batteries from ac mains by converters
7/0047	. {with indicating devices ( <a href="#">H02J 7/0021</a> takes precedence)}	<b>WARNING</b>	
2007/0049	. . {Detection of fully charged condition}	Group <a href="#">H02J 7/02</a> is impacted by reclassification into groups <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> .	
2007/005	. . {Detection of remaining charge capacity}	Groups <a href="#">H02J 7/02</a> and <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> should be considered in order to perform a complete search.	
7/0052	. {Charge circuits only ( <a href="#">H02J 7/0003</a> , <a href="#">H02J 7/0013</a> , <a href="#">H02J 7/007</a> take precedence)}	7/022	. . {characterised by the type of converter}
7/0054	. . {Battery to battery charging (with circuits for polarity protection <a href="#">H02J 7/0034</a> )}	7/025	. . . {using non-contact coupling, e.g. inductive, capacitive}
7/0055	. . {adapted for charging from various sources, e.g. AC, DC, multivoltage}	<b>WARNING</b>	
7/0057	. . {adapted for charge maintenance or battery rejuvenation ( <a href="#">H02J 7/0075</a> takes precedence)}	Group <a href="#">H02J 7/025</a> is impacted by reclassification into groups <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> .	
2007/0059	. . {characterised by the converter}	Groups <a href="#">H02J 7/025</a> and <a href="#">H02J 50/00</a> – <a href="#">H02J 50/90</a> should be considered in order to perform a complete search.	
2007/006	. . {Charge provided using dc bus or data bus of a computer}	7/027	. . {with safety or indicating device}
2007/0062	. . {Charge provided using USB port connectors}	7/04	. . Regulation of charging current or voltage
7/0063	. {Circuits adapted for supplying loads only}	7/041	. . . {with a programmable charge schedule}
7/0065	. . {using converters specially adapted for use with a battery}	7/042	. . . {the charge cycle being controlled in response to a measured parameter}
2007/0067	. . {Discharge management, i.e. discharge current reduction at low state of charge, sequential battery discharge in systems with a plurality of battery}	7/044	. . . . {in response to integrated charge or discharge current}
7/0068	. {Battery or charger load switching, e.g. concurrent charging and load supply ( <a href="#">H02J 7/0013</a> takes precedence)}	7/045	. . . . {in response to voltage or current}
7/007	. {Regulation of charging current or voltage}	7/047	. . . . {in response to temperature}
7/0072	. . {using semiconductor devices only}	7/048	. . . . {in response to degree of gas development in the battery}
7/0073	. . . {with a programmable charge schedule ( <a href="#">H02J 7/0093</a> takes precedence)}	7/06	. . . using discharge tubes or semiconductor devices
7/0075	. . . . {for charge maintenance, battery initiation or rejuvenation}	7/08	. . . . using discharge tubes only
7/0077	. . . {the charge cycle being terminated in response to electric parameters ( <a href="#">H02J 7/0093</a> takes precedence)}	7/082	. . . . . {with a programmable charge schedule}
		7/085	. . . . . {the charge cycle being terminated in response to electric parameters}
		7/087	. . . . . {the charge cycle being terminated in response to non-electric parameters}

2007/10	. . . . {using semiconductor devices only}	7/324	. . {by variation of field, using semiconductor devices}
2007/105	. . . . {with introduction of pulses during the charging process}	7/326	. . {by variation of field, using armature-reaction-excited machines}
7/12	. . . using magnetic devices having controllable degree of saturation, i.e. transducers	7/328	. . {by variation of field, using magnetic devices having controllable degree of saturation}
7/125	. . . . {in combination with discharge tubes or semiconductor devices}	7/34	. Parallel operation in networks using both storage and other dc sources, e.g. providing buffering ( <a href="#">H02J 7/14 takes precedence</a> )
7/14	. for charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle	7/345	. . {using capacitors as storage or buffering devices}
7/1407	. . {on vehicles not being driven by a motor, e.g. bicycles}	7/35	. . with light sensitive cells
7/1415	. . {with a generator driven by a prime mover other than the motor of a vehicle}	7/355	. . . {characterised by the mechanical construction}
7/1423	. . {with multiple batteries or generators}	7/36	. Arrangements using end-cell switching
2007/143	. . . {Multiple generators}	<b>9/00</b>	<b>Circuit arrangements for emergency or stand-by power supply, e.g. for emergency lighting</b>
7/1438	. . {in combination with power supplies for loads other than batteries}	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}
7/1446	. . {in response to parameters of a vehicle}	9/005	. {using a power saving mode ( <a href="#">for copiers G03G 15/5004</a> )}
7/1453	. . {with temperature compensation}	2009/007	. . {Detection of the absence of a load}
7/1461	. . {with safety or indication devices}	9/02	. in which an auxiliary distribution system and its associated lamps are brought into service
7/1469	. . {Regulation of the charging current or voltage otherwise than by variation of field}	9/04	. in which the distribution system is disconnected from the normal source and connected to a standby source
7/1476	. . . {by mechanical action on the generator}	9/06	. . with automatic change-over
7/1484	. . . {by commutation of the output windings of the generator}	9/061	. . . {characterised by the use of electronic means ( <a href="#">H02J 9/062 and H02J 9/065 take precedence</a> )}
7/1492	. . . {by means of controlling devices between the generator output and the battery}	9/062	. . . {involving non rotating DC/AC converters}
7/16	. . Regulation of the charging current or voltage by variation of field	2009/063	. . . . {Common neutral, e.g. ac input neutral line connected to ac output neutral line and dc middle point}
7/163	. . . {with special means for initiating or limiting the excitation current}	9/065	. . . . {for lighting purposes}
7/166	. . . {with safety or indicating devices}	9/066	. . . {characterised by the use of dynamo-electric machines ( <a href="#">H02J 9/08 takes precedence</a> )}
7/18	. . . due to variation of ohmic resistance in field circuit, using resistance switching in or out of circuit step by step	2009/067	. . . {using multi-primary transformers, e.g. transformer having one primary for each ac energy source and a secondary for the loads}
7/20	. . . due to variation of continuously variable ohmic resistor	2009/068	. . . {Electronic means for switching from one power supply to another power supply, e.g. to avoid parallel connection}
7/22	. . . due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator	9/08	. . . requiring starting of a prime-mover
7/225	. . . . {characterised by the mechanical construction}	<b>11/00</b>	<b>Circuit arrangements for providing service supply to auxiliaries of stations in which electric power is generated, distributed or converted</b>
7/24	. . . using discharge tubes or semiconductor devices	<b>13/00</b>	<b>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 <a href="#">H01H 9/167</a>; circuits specially adapted for remote switching of lighting via the power line <a href="#">H05B 37/0263</a>)}</b>
7/241	. . . . {using discharge tubes only}	13/0003	. {for DC networks}
7/242	. . . . {using semiconductor devices as final control devices}	13/0006	. {for single frequency AC networks}
7/244	. . . . . {with on/off action}	13/001	. . {characterised by the display, e.g. of data or controls}
7/245	. . . . . {with pulse modulation}		
7/247	. . . . . {using thyristors or triacs as final control devices}		
7/248	. . . . . {characterised by the mechanical construction}		
7/26	. . . using magnetic devices with controllable degree of saturation		
7/28	. . . using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device		
7/30	. . . using armature-reaction-excited machines		
7/32	. for charging batteries from a charging set comprising a non-electric prime mover {rotating at constant speed}		
7/322	. . {by variation of field, using discharge tubes}		



- 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**  
(Frozen)

**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