

CPC COOPERATIVE PATENT CLASSIFICATION

Y GENERAL TAGGING OF NEW TECHNOLOGICAL DEVELOPMENTS; GENERAL TAGGING OF CROSS-SECTIONAL TECHNOLOGIES SPANNING OVER SEVERAL SECTIONS OF THE IPC; TECHNICAL SUBJECTS COVERED BY FORMER USPC CROSS-REFERENCE ART COLLECTIONS [XRACs] AND DIGESTS

(NOTES omitted)

Y04 INFORMATION OR COMMUNICATION TECHNOLOGIES HAVING AN IMPACT ON OTHER TECHNOLOGY AREAS

Y04S SYSTEMS INTEGRATING TECHNOLOGIES RELATED TO POWER NETWORK OPERATION, COMMUNICATION OR INFORMATION TECHNOLOGIES FOR IMPROVING THE ELECTRICAL POWER GENERATION, TRANSMISSION, DISTRIBUTION, MANAGEMENT OR USAGE, i.e. SMART GRIDS

Systems supporting electrical power generation, transmission or distribution

10/00 Systems supporting electrical power generation, transmission or distribution

- 10/10 . Systems characterised by the monitored, controlled or operated power network elements or equipment
- 10/12 . . the elements or equipment being or involving energy generation units, including distributed generation [DER] or load-side generation
- 10/123 . . . the energy generation units being or involving renewable energy sources
- 10/126 . . . the energy generation units being or involving electric vehicles [EV] or hybrid vehicles [HEV], i.e. power aggregation of EV or HEV, vehicle to grid arrangements [V2G] (remote or cooperative charging [Y04S 30/12](#); details associated with the interoperability in the section of transportation, e.g. vehicle recognition, authentication, identification or billing [Y04S 30/14](#))
- 10/14 . . the elements or equipments being or involving energy storage units (for systems comprising uninterruptible power supplies or standby generators [Y04S 20/12](#))
- 10/16 . . the elements or equipments being or involving electric power substations
- 10/18 . . the elements or equipments being or involving switches, relays or circuit breakers, e.g. intelligent electronic devices [IED]
- 10/20 . . the elements or equipments being or involving protection elements, arrangements or systems
- 10/22 . . the element or elements being flexible AC transmission systems [FACTS] or power factor or reactive power compensating or correcting units
- 10/24 . . the elements or equipments being or involving voltage regulating units
- 10/26 . . the elements or equipments being or involving measuring units
- 10/265 . . . the measuring units being or involving phasor measuring units [PMU]
- 10/30 . Systems characterised by state monitoring, e.g. fault, temperature monitoring, insulator monitoring, corona discharge

- 10/40 . Systems characterised by the display of information, e.g. of data or controls
- 10/50 . Systems or methods supporting the power network operation or management, involving a certain degree of interaction with the load-side end user applications
- 10/52 . . Outage or fault management
- 10/522 . . . Fault detection or location
- 10/525 . . . Power restoration
- 10/527 . . . Power quality monitoring
- 10/54 . . Management of operational aspects
- 10/542 . . . Planning, load or production forecast
- 10/545 . . . Computing methods or systems for efficient or low carbon management or operation of electric power systems
- 10/547 . . . Maintenance, construction or extension
- 10/56 . . Supply chain or logistics, e.g. warehousing, distribution, inventory, stock management, order filling, procurement or balancing against orders
- 10/58 . . Financial or economic aspects related to the network operation
- 10/60 . . Reporting; Information providing; Statistics or analysis

Systems supporting the management or operation of end-user stationary applications, including also the last stages of power distribution and the control, monitoring or operating management systems at local level

- 20/00 Systems supporting the management or operation of end-user stationary applications, including also the last stages of power distribution and the control, monitoring or operating management systems at local level** (the energy generation units being or involving electricity based vehicles [Y04S 10/126](#); remote or cooperative charging of electric or hybrid vehicles [Y04S 30/12](#))
- 20/10 . System characterised by the monitored, controlled or operated end-user elements or equipments
- 20/12 . . the elements or equipments being or involving energy storage units, uninterruptible power supply [UPS] systems or standby or emergency generators involved in the last power distribution stages

- 20/14 . . The elements or equipments being or involving protection elements, switches, relays or circuit breakers
- 20/16 . . The elements or equipments being or involving power plugs, sockets, adapters or power strips
- 20/18 . . The element or elements being a direct current power network, grid or distribution line
- 20/20 . End-user application control systems
- 20/22 . . characterised by the aim of the control
- 20/221 . . . General power management systems
- 20/222 . . . Demand response systems, e.g. load shedding, peak shaving
- 20/224 Curtailment; Interruptions; Retail price-responsive demand
- 20/225 . . . The system entering an energy saving mode, i.e. sleep, low-power or standby modes
- 20/227 . . . Domotics or building automation systems
- 20/228 Characterised by involving a home automation communication network
- 20/24 . . characterised by the end-user application
- 20/242 . . . the end-user application being or involving home appliances
- 20/244 the home appliances being or involving heating ventilating and air conditioning [HVAC] units
- 20/246 the system involving the remote operation of lamps or lighting equipment
- 20/248 . . . the end-user application involving UPS systems or standby or emergency generators
- 20/30 . Smart metering
- 20/32 . . Systems characterised by remote reading
- 20/322 . . . from a fixed location
- 20/325 . . . from a mobile location
- 20/327 . . . The remote reading system including mechanisms for turning on/off the supply
- 20/34 . . Systems which determine the environmental impact of user behavior
- 20/36 . . Methods or devices for detecting or reporting abnormalities, e.g. faults, outages, leaks
- 20/38 . . Identification of individual loads by analysing current or voltage waveforms
- 20/40 . . Displaying of usage with respect to time, e.g. monitoring evolution of usage, relating usage and weather conditions
- 20/42 . . Utility meters which are networked together, e.g. within a single building
- 20/44 . . Displaying utility price or cost
- 20/46 . . Remote display of meters readings
- 20/48 . . Methods for determining the topology of meters in a network
- 20/50 . . Retrofitting of installed meters
- 20/52 . . Systems oriented to metering of generated energy or power
- 20/525 . . . Monitoring the performance of renewable electricity generating systems, i.e. of solar panels

Systems supporting specific end-user applications in the sector of transportation

- 30/00 **Systems supporting specific end-user applications in the sector of transportation**
- 30/10 . Systems supporting the interoperability of electric or hybrid vehicles

- 30/12 . . Remote or cooperative charging
- 30/14 . . Details associated with the interoperability, e.g. vehicle recognition, authentication, identification or billing

Communication or information technology specific aspects supporting electrical power generation, transmission, distribution or end-user application management

- 40/00 **Systems for electrical power generation, transmission, distribution or end-user application management characterised by the use of communication or information technologies, or communication or information technology specific aspects supporting them**
- 40/10 . characterised by communication technology
- 40/12 . . characterised by data transport means between the monitoring, controlling or managing units and monitored, controlled or operated electrical equipment
- 40/121 . . . Using the power network as support for the transmission
- 40/122 Using pulsed signals
- 40/123 Using modification of a parameter of the network power signal
- 40/124 . . . using wired telecommunication networks or data transmission busses
- 40/125 . . . Using phone lines
- 40/126 . . . Using wireless data transmission
- 40/127 by means of mobile telephony
- 40/128 . . . involving the use of Internet protocol
- 40/14 . . Communication technology specific aspects
- 40/143 . . . using dedicated transmission supports
- 40/146 . . . using power networks as support for transmission
- 40/16 . . Details of management of the overlaying communication network between the monitoring, controlling or managing units and monitored, controlled or operated electrical equipment
- 40/162 . . . related to configuration or provisioning
- 40/164 . . . related to network topology
- 40/166 . . . related to fault management
- 40/168 . . . for performance monitoring
- 40/18 . . Network protocols supporting networked applications, e.g. including control of end-device applications over a network
- 40/20 . Information technology specific aspects
- 40/22 . . Computer aided design [CAD]; Simulation; Modelling
- 40/24 . . Arrangements for network security or for protecting computers or computer systems against unauthorised activity, e.g. cyber security

Market activities related to the operation of systems integrating technologies related to power network operation and communication or information technologies

- 50/00 **Market activities related to the operation of systems integrating technologies related to power network operation or related to communication or information technologies**
- 50/10 . Energy trading, including energy flowing from end-user application to grid
- 50/12 . Billing, invoicing, buying or selling transactions or other related activities, e.g. cost or usage evaluation

- 50/14 . Marketing, i.e. market research and analysis, surveying, promotions, advertising, buyer profiling, customer management or rewards
- 50/16 . Energy services, e.g. dispersed generation or demand or load or energy savings aggregation