CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H02 GENERATION; CONVERSION OR DISTRIBUTION OF ELECTRIC POWER

H02M APPARATUS FOR CONVERSION BETWEEN AC AND AC, BETWEEN AC AND DC, OR BETWEEN DC AND DC, AND FOR USE WITH MAINS OR SIMILAR POWER SUPPLY SYSTEMS; CONVERSION OF DC OR AC INPUT POWER INTO SURGE OUTPUT POWER; CONTROL OR REGULATION THEREOF (transformers H01F; dynamo-electric converters H02K 47/00; controlling transformers, reactors or choke coils, control or regulation of electric motors, generators or dynamo-electric converters H02P)

NOTES

1. This subclass covers only circuits or apparatus for the conversion of electric power, or arrangements for control or regulation of such circuits or apparatus. The electrotechnical elements employed are dealt within the appropriate subclasses, e.g. inductors, transformers H01F, capacitors, electrolytic rectifiers H01G, mercury rectifying or other discharge tubes H01J, semiconductor devices H01L, H10 impedance networks or resonant circuit not primarily concerned with the transfer of electric power H03H.
2. In this subclass, the following term is used with the meaning indicated:
   - "conversion", in respect of an electric variable, e.g. voltage or current, means the change of one or more of the parameters of the variable, e.g. amplitude, frequency, phase, polarity.

WARNINGS

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

H02M 9/00	covered by	H03K 3/53
H02M 9/02	covered by	H03K 3/53
H02M 9/04	covered by	H03K 3/53
H02M 9/06	covered by	H03K 3/53

2. 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.

1/00 Details of apparatus for conversion

1/0003 . {Details of control, feedback or regulation circuits}

1/0006 . . {Arrangements for supplying an adequate voltage to the control circuit of converters}

1/0009 . . {Devices or circuits for detecting current in a converter}

1/0012 . . {Control circuits using digital or numerical techniques (in DC/DC converters H02M 3/157, H02M 3/33515; in DC-AC converters H02M 7/53873)}

1/0016 . . {Control circuits providing compensation of output voltage deviations using feedforward of disturbance parameters}

1/0019 . . . {the disturbance parameters being load current fluctuations}

1/0022 . . . {the disturbance parameters being input voltage fluctuations}

1/0025 . . {Arrangements for modifying reference values, feedback values or error values in the control loop of a converter}

1/0029 . . {Circuits or arrangements for limiting the slope of switching signals, e.g. slew rate}

1/0032 . . {Control circuits allowing low power mode operation, e.g. in standby mode}

1/0035 . . . {using burst mode control}

1/0038 . . {Circuits or arrangements for suppressing, e.g. by masking incorrect turn-on or turn-off signals, e.g. due to current spikes in current mode control}

1/0041 . . {Control circuits in which a clock signal is selectively enabled or disabled}

1/0043 . {Converters switched with a phase shift, i.e. interleaved (non-isolated DC/DC converters H02M 3/1586)}

1/0045 . {Converters combining the concepts of switch-mode regulation and linear regulation, e.g. linear pre-regulator to switching converter, linear and switching converter in parallel, same converter or same transistor operating either in linear or switching mode}

1/0048 . {Circuits or arrangements for reducing losses (using snubbers H02M 1/34)}

1/0051 . . {Diode reverse recovery losses}

1/0054 . . {Transistor switching losses (periodically suspending operation of switching converter in low power mode H02M 1/0035)}

1/0058 . . . {by employing soft switching techniques, i.e. commutation of transistors when applied voltage is zero or when current flow is zero (using an auxiliary actively switched resonant commutation circuit connected to an intermediate DC voltage or between two push-pull branches of an inverter bridge H02M 7/4811; in resonant inverters H02M 7/4815; in inverters operating from a resonant DC source H02M 7/4826)}

1/0061 . {using discharge tubes}

1/0064 . {Magnetic structures combining different functions, e.g. storage, filtering or transformation}

1/0067 . {Converter structures employing plural converter units, other than for parallel operation of the units on a single load}

1/007 . . {Plural converter units in cascade (push-pull DC/DC converters with pre-regulator H02M 3/3374; DC-AC converters following a DC-DC stage including a high frequency transformer H02M 7/4807; DC-AC converters following a DC-DC conversion stage generating periodically varying voltages H02M 7/4826)}

1/0074 . . {Plural converter units whose inputs are connected in series}

1/0077 . . {Plural converter units whose outputs are connected in series}

1/008 . . {Plural converter units for generating at two or more independent and non-parallel outputs, e.g. systems with plural point of load switching regulators}

1/0083 . {Converters characterised by their input or output configuration}

1/0085 . . {Partially controlled bridges}

1/0087 . . {adapted for receiving as input a current source}

1/009 . . {having two or more independently controlled outputs (for DC-DC converter with intermediate AC H02M 3/33561)}

1/0093 . . {wherein the output is created by adding a regulated voltage to or subtracting it from an unregulated input}

1/0095 . {Hybrid converter topologies, e.g. NPC mixed with flying capacitor, thyristor converter mixed with MMC or charge pump mixed with buck}

1/0096 . {Means for increasing hold-up time, i.e. the duration of time that a converter's output will remain within regulated limits following a loss of input power}

1/02 . Circuits specially adapted for the generation of grid-control or igniter-control voltages for discharge tubes incorporated in static converters

1/04 . . for tubes with grid control

1/042 . . . {wherein the phase of the control voltage is adjustable with reference to the AC voltage}

1/045 . . . . {for multiphase systems}

1/047 . . . . {for ignition at the zero-crossing of voltage or current}

1/06 . Circuits specially adapted for rendering non-conductive gas discharge tubes or equivalent semiconductor devices, e.g. thyratrons, thyristors

1/065 . . {for discharge tubes}

1/08 . Circuits specially adapted for the generation of control voltages for semiconductor devices incorporated in static converters

1/081 . . {wherein the phase of the control voltage is adjustable with reference to the AC source}

1/082 . . . {with digital control}

1/083 . . {for the ignition at the zero crossing of the voltage or the current}

1/084 . . using a control circuit common to several phases of a multi-phase system

1/0845 . . . {digitally controlled (or with digital control)}

1/088 . . for the simultaneous control of series or parallel connected semiconductor devices

1/092 . . . the control signals being transmitted optically

1/096 . . . the power supply of the control circuit being connected in parallel to the main switching element (H02M 1/092 takes precedence)

1/10 . Arrangements incorporating converting means for enabling loads to be operated at will from different kinds of power supplies, e.g. from ac or dc

1/12 . Arrangements for reducing harmonics from ac input or output

1/123 . . {Suppression of common mode voltage or current}

1/126 . . {using passive filters}

1/14 . Arrangements for reducing ripples from dc input or output

1/143 . . {using compensating arrangements (for reducing noise from the supply in transmission systems H04B 15/005)}

1/146 . . {using discharge tubes}

1/15 . . using active elements

1/16 . Means for providing current step on switching, e.g. with saturable reactor

1/20 . Contact mechanisms of dynamic converters

1/22 . . incorporating collectors and brushes

1/24 . . incorporating rolling or tumbling contacts

1/26 . . incorporating cam-operated contacts

1/28 . . incorporating electromagnetically-operated vibrating contacts

1/30 . . incorporating liquid contacts

1/32 . Means for protecting converters other than automatic disconnection

1/322 . . {Means for rapidly discharging a capacitor of the converter for protecting electrical components or for preventing electrical shock}

1/325 . . {with means for allowing continuous operation despite a fault, i.e. fault tolerant converters}

1/327 . . {against abnormal temperatures}

1/34 . . Snubber circuits

1/342 . . . {Active non-dissipative snubbers}

1/344 . . . {Active dissipative snubbers}

1/346 . . . {Passive non-dissipative snubbers}

1/348 . . . {Passive dissipative snubbers}

1/36 . Means for starting or stopping converters

1/38 . Means for preventing simultaneous conduction of switches

1/385 . . {with means for correcting output voltage deviations introduced by the dead time}

1/40 . Means for preventing magnetic saturation

1/42 . Circuits or arrangements for compensating for or adjusting power factor in converters or inverters

1/4208 . . {Arrangements for improving power factor of AC input}

1/4216 . . . {operating from a three-phase input voltage (H02M 1/4233 takes precedence)}

1/4225 . . . {using a non-isolated boost converter}

1/4233 . . . {using a bridge converter comprising active switches}
1/4241 . . . {using a resonant converter}
1/425 . . . {using a single converter stage both for correction of AC input power factor and generation of a high frequency AC output voltage}
1/4258 . . . {using a single converter stage both for correction of AC input power factor and generation of a regulated and galvanically isolated DC output voltage (H02M 1/4241 takes precedence)}
1/4266 . . . {using passive elements}
1/4275 . . . {by adding an auxiliary output voltage in series to the input}
1/4283 . . . {by adding a controlled rectifier in parallel to a first rectifier feeding a smoothing capacitor}
1/4291 . . . {by using a Buck converter to switch the input current}
1/44 . Circuits or arrangements for compensating for electromagnetic interference in converters or inverters

3/00 Conversion of dc power input into dc power output
3/003 . {Constructional details, e.g. physical layout, assembly, wiring or busbar connections}
3/005 . {using Cuk converters}
3/01 . {Resonant DC/DC converters}
3/015 . . {with means for adaptation of resonance frequency, e.g. by modification of capacitance or inductance of resonance circuit}
3/02 . without intermediate conversion into ac
3/04 . . by static converters
3/06 . . . using resistors or capacitors, e.g. potential divider
3/07 . . . . using capacitors charged and discharged alternately by semiconductor devices with control electrode {, e.g. charge pumps}
3/071 . . . . . {adapted to generate a negative voltage output from a positive voltage source}
3/072 . . . . . {adapted to generate an output voltage whose value is lower than the input voltage}
3/073 . . . . . {Charge pumps of the Schenkel-type}
3/075 . . . . . {including a plurality of stages and two sets of clock signals, one set for the odd and one set for the even numbered stages}
3/076 . . . . . {the clock signals being boosted to a value being higher than the input voltage value}
3/077 . . . . . {with parallel connected charge pump stages}
3/078 . . . . . {with means for reducing the back bias effect, i.e. the effect which causes the threshold voltage of transistors to increase as more stages are added to the converters}
3/08 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
3/10 . . . using discharge tubes with control electrode or semiconductor devices with control electrode (H02M 3/07 takes precedence)
3/125 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
3/13 . . . . . using discharge tubes only
3/135 . . . . . using semiconductor devices only
3/137 . . . . . with automatic control of output voltage or current, e.g. switching regulators
3/139 . . . . . with digital control
3/142 . . . . . including plural semiconductor devices as final control devices for a single load
3/145 . . . . using devices of a triode or transistor type requiring continuous application of a control signal
3/15 . . . . . using discharge tubes only
3/155 . . . . . using semiconductor devices only
3/1552 . . . . . {Boost converters exploiting the leakage inductance of a transformer or of an alternator as boost inductor}
3/1555 . . . . . {for the generation of a regulated current to a load whose impedance is substantially inductive}
3/1557 . . . . . {Single ended primary inductor converters [SEPIC]}
3/156 . . . . . with automatic control of output voltage or current, e.g. switching regulators
3/1563 . . . . . {without using an external clock (H02M 3/158 takes precedence)}
3/1566 . . . . . {with means for compensating against rapid load changes, e.g. with auxiliary current source, with dual mode control or with inductance variation}
3/157 . . . . . with digital control
3/158 . . . . . including plural semiconductor devices as final control devices for a single load
3/1582 . . . . . {Buck-boost converters (H02M 3/1584 takes precedence)}
3/1584 . . . . . {with a plurality of power processing stages connected in parallel}
3/1586 . . . . . {switched with a phase shift, i.e. interleaved}
3/1588 . . . . . {comprising at least one synchronous rectifier element (H02M 3/1582, H02M 3/1584 take precedence)}
3/16 . . by dynamic converters
3/18 . . . using capacitors or batteries which are alternately charged and discharged, e.g. charged in parallel and discharged in series
3/20 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
3/22 . with intermediate conversion into ac
3/24 . . by static converters
3/26 . . . using discharge tubes without control electrode or semiconductor devices without control electrode to produce the intermediate ac
3/28 . . . using discharge tubes with control electrode or semiconductor devices with control electrode to produce the intermediate ac

3/285 . . . . {Single converters with a plurality of output stages connected in parallel (parallel operation of a plurality of converters in dc distribution networks H02J 1/10)}
3/305 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
3/31 . . . . . using discharge tubes only
3/315 . . . . . using semiconductor devices only
3/3155 . . . . . {with automatic control of the output voltage or current}
3/325 . . . . using devices of a triode or a transistor type requiring continuous application of a control signal
3/33 . . . . . using discharge tubes only
3/335 . . . . . using semiconductor devices only
3/33507 . . . . . {with automatic control of the output voltage or current, e.g. flyback converters (H02M 3/33561, H02M 3/33569 take precedence)}
3/33515 . . . . . {with digital control}
3/33523 . . . . . {with galvanic isolation between input and output of both the power stage and the feedback loop}
3/3353 . . . . . {having at least two simultaneously operating switches on the input side, e.g. "double forward" or "double (switched) flyback" converter}
3/33538 . . . . . {of the forward type (H02M 3/3353, H02M 3/33569 take precedence)}
3/33546 . . . . . {with automatic control of the output voltage or current (H02M 3/33561 takes precedence)}
3/33553 . . . . . {with galvanic isolation between input and output of both the power stage and the feedback loop}
3/33561 . . . . . {having more than one ouput with independent control}
3/33569 . . . . . {having several active switching elements (H02M 3/3353 takes precedence)}
3/33571 . . . . . {Half-bridge at primary side of an isolation transformer}
3/33573 . . . . . {Full-bridge at primary side of an isolation transformer}
3/33576 . . . . . {having at least one active switching element at the secondary side of an isolation transformer}
3/33584 . . . . . {Bidirectional converters}
3/33592 . . . . . {having a synchronous rectifier circuit or a synchronous freewheeling circuit at the secondary side of an isolation transformer}
3/337 . . . . . in push-pull configuration {(H02M 3/33576 takes precedence; with self-oscillating arrangements H02M 3/3382, H02M 3/3385)}
3/3372 . . . . . {of the parallel type}
3/3374 . . . . . {with preregulator, e.g. current injected push-pull}
3/3376 . . . . . {with automatic control of output voltage or current}
3/3378 . . . . . {in a push-pull configuration of the parallel type (H02M 3/3374 takes precedence)}
3/338 . . . . . in a self-oscillating arrangement (H02M 3/337 takes precedence)
3/3381 . . . . . {using a single commutation path}
3/3382 . . . . . {in a push-pull circuit arrangement}
3/3384 . . . . . {of the parallel type}
3/3385 . . . . . {with automatic control of output voltage or current (H02M 3/33561 takes precedence)}
3/3387 . . . . . {in a push-pull configuration}
3/3388 . . . . . {of the parallel type}
3/34 . . by dynamic converters
3/36 . . . using mechanical parts to select progressively or to vary continuously the input potential
3/38 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
3/40 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
3/42 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper
3/44 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

5/00 Conversion of ac power input into ac power output, e.g. for change of voltage, for change of frequency, for change of number of phases

5/005 . {using discharge tubes}
5/02 . without intermediate conversion into dc
5/04 . . by static converters (controlling transformers, reactors or choke coils, e.g. by tap changing H02P 13/00)
5/06 . . . using impedances
5/08 . . . . using capacitors only
5/10 . . . using transformers
5/12 . . . . for conversion of voltage or current amplitude only
5/14 . . . . for conversion between circuits of different phase number
5/16 . . . . for conversion of frequency
5/18 . . . . for conversion of waveform
5/20 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
5/22 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
5/225 . . . . {comprising two stages of AC-AC conversion, e.g. having a high frequency intermediate link}
5/25 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
5/253 . . . . . using discharge tubes only
5/257 . . . . . using semiconductor devices only
5/2573 . . . . . {with control circuit}
5/2576 . . . . . {with digital control}
5/27 . . . . . for conversion of frequency
5/271 . . . . . {from a three phase input voltage}
5/272 . . . . . {for variable speed constant frequency systems}
5/273 . . . . . {with digital control}

5/275 . . . . using devices of a triode or transistor type requiring continuous application of a control signal
5/29 . . . . . using discharge tubes only
5/293 . . . . . using semiconductor devices only
5/2932 . . . . . {with automatic control of output voltage, current or power}
5/2935 . . . . . {using reverse phase control, i.e. turn-on of switches in series with load at zero crossing of input voltage, turn-off before next zero crossing}
5/2937 . . . . . {using whole cycle control, i.e. switching an integer number of whole or half cycles of the AC input voltage}
5/297 . . . . . for conversion of frequency
5/32 . . by dynamic converters
5/34 . . . using mechanical contact-making and -breaking parts
5/36 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
5/38 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
5/40 . with intermediate conversion into dc
5/42 . . by static converters
5/44 . . . using discharge tubes or semiconductor devices to convert the intermediate dc into ac
5/443 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
5/447 . . . . . using discharge tubes only
5/45 . . . . . using semiconductor devices only
5/4505 . . . . . {having a rectifier with controlled elements}
5/451 . . . . . with automatic control of output voltage or frequency
5/452 . . . . . with automatic control of output waveform
5/453 . . . . using devices of a triode or transistor type requiring continuous application of a control signal
5/456 . . . . . using discharge tubes only
5/458 . . . . . using semiconductor devices only
5/4585 . . . . . {having a rectifier with controlled elements}
5/46 . . by dynamic converters
5/48 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

7/00 Conversion of ac power input into dc power output; Conversion of dc power input into ac power output

7/003 . {Constructional details, e.g. physical layout, assembly, wiring or busbar connections}
7/006 . {using discharge tubes}
7/02 . Conversion of ac power input into dc power output without possibility of reversal
7/04 . . by static converters
7/043 . . . {using transformers or inductors only}
7/046 . . . {using discharge tubes}
7/05 . . . {Capacitor coupled rectifiers}
7/06 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/062 . . . . {Avoiding or suppressing excessive transient voltages or currents}
7/064 . . . . {with several outputs}
7/066 . . . . {particular circuits having a special characteristic}
7/068 . . . . {mounted on a transformer}
7/08 . . . . arranged for operation in parallel
7/10 . . . . arranged for operation in series, e.g. for multiplication of voltage
7/103 . . . . . {Containing passive elements (capacitively coupled) which are ordered in cascade on one source}
7/106 . . . . . {With physical arrangement details}
7/12 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
7/125 . . . . {Avoiding or suppressing excessive transient voltages or currents}
7/145 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
7/15 . . . . . using discharge tubes only
7/151 . . . . . {with automatic control (H02M 7/153 takes precedence)}
7/153 . . . . . {arranged for operation in parallel}
7/155 . . . . . using semiconductor devices only
7/1552 . . . . . {in a biphase or polyphase arrangement (voltage multipliers H02M 7/19)}
7/1555 . . . . . {with control circuit}
7/1557 . . . . . {with automatic control of the output voltage or current}
7/162 . . . . . in a bridge configuration
7/1623 . . . . . {with control circuit}
7/1626 . . . . . {with automatic control of the output voltage or current}
7/17 . . . . . arranged for operation in parallel
7/19 . . . . . arranged for operation in series, e.g. for voltage multiplication
7/21 . . . . using devices of a triode or transistor type requiring continuous application of a control signal
7/213 . . . . . using discharge tubes only
7/217 . . . . . using semiconductor devices only
7/2173 . . . . . {in a biphase or polyphase circuit arrangement (H02M 7/2176 takes precedence; voltage multipliers H02M 7/25)}
7/2176 . . . . . {comprising a passive stage to generate a rectified sinusoidal voltage and a controlled switching element in series between such stage and the output}
7/219 . . . . . in a bridge configuration
7/2195 . . . . . {the switches being synchronously commutated at the same frequency of the AC input voltage}
7/23 . . . . . arranged for operation in parallel {(H02M 7/2176 takes precedence)}
7/25 . . . . . arranged for operation in series, e.g. for multiplication of voltage
7/26 . . . using open-spark devices, e.g. Marx rectifier
7/28 . . . using electrolytic rectifiers
7/30 . . by dynamic converters

7/32 . . . using mechanical contact-making and -breaking parts
7/34 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/36 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper
7/38 . . . using one or more sparking electrodes rotating over counterelectrodes
7/40 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
7/42 . Conversion of dc power input into ac power output without possibility of reversal
7/44 . . by static converters
7/445 . . . {using discharge tubes}
7/46 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/48 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
7/4803 . . . . {with means for reducing DC component from AC output voltage}
7/4807 . . . . {having a high frequency intermediate AC stage}
7/4811 . . . . {having auxiliary actively switched resonant commutation circuits connected to intermediate DC voltage or between two push-pull branches}
7/4815 . . . . {Resonant converters (H02M 7/4811 and H02M 7/4826 take precedence)}
7/4818 . . . . . {with means for adaptation of resonance frequency, e.g. by modification of capacitance or inductance of resonance circuits}
7/4826 . . . . {operating from a resonant DC source, i.e. the DC input voltage varies periodically, e.g. resonant DC-link inverters}
7/483 . . . . Converters with outputs that each can have more than two voltages levels
7/4833 . . . . . {Capacitor voltage balancing}
7/4835 . . . . . {comprising two or more cells, each including a switchable capacitor, the capacitors having a nominal charge voltage which corresponds to a given fraction of the input voltage, and the capacitors being selectively connected in series to determine the instantaneous output voltage}
7/4837 . . . . . {Flying capacitor converters}
7/487 . . . . . Neutral point clamped inverters
7/49 . . . . . Combination of the output voltage waveforms of a plurality of converters
7/493 . . . . the static converters being arranged for operation in parallel
7/497 . . . . sinusoidal output voltages being obtained by combination of several voltages being out of phase
7/501 . . . . sinusoidal output voltages being obtained by the combination of several pulse-voltages having different amplitude and width
7/505 . . . . using devices of a thyratron or thyristor type requiring extinguishing means {(H02M 7/4807, H02M 7/483, H02M 7/493 and H02M 7/4826 take precedence)}
7/51 . . . . . using discharge tubes only
7/515 . . . . . using semiconductor devices only
7/5152 . . . . . {with separate extinguishing means}
7/5155 . . . . . {wherein each commutation element has its own extinguishing means}
7/5157 . . . . . {wherein the extinguishing of every commutation element will be obtained by means of a commutation inductance, by starting another main commutation element in series with the first}
7/516 . . . . . Self-oscillating arrangements
7/517 . . . . . with special starting equipment
7/519 . . . . . in a push-pull configuration (H02M 7/517 takes precedence)
7/521 . . . . . in a bridge configuration
7/523 . . . . . with LC-resonance circuit in the main circuit
7/5233 . . . . . {the commutation elements being in a push-pull arrangement}
7/5236 . . . . . {in a series push-pull arrangement}
7/525 . . . . . with automatic control of output waveform or frequency (H02M 7/517 - H02M 7/523 take precedence)
7/527 . . . . . by pulse width modulation
7/529 . . . . . using digital control
7/53 . . . . using devices of a triode or transistor type requiring continuous application of a control signal {(H02M 7/4807, H02M 7/493 and H02M 7/4826 take precedence)}
7/533 . . . . . using discharge tubes only
7/537 . . . . . using semiconductor devices only, e.g. single switched pulse inverters
7/5375 . . . . . with special starting equipment
7/538 . . . . . in a push-pull configuration (H02M 7/5375 takes precedence {; with oscillating arrangements H02M 7/53832, H02M 7/53846})
7/53803 . . . . . {with automatic control of output voltage or current}
7/53806 . . . . . {in a push-pull configuration of the parallel type}
7/5381 . . . . . Parallel type
7/5383 . . . . . in a self-oscillating arrangement (H02M 7/538 takes precedence)
7/53832 . . . . . {in a push-pull arrangement}
7/53835 . . . . . {of the parallel type}
7/53838 . . . . . using a single commutation path
7/53846 . . . . . Control circuits

WARNING

Group H02M 7/53846 and subgroups is not complete, see provisionally also H02M 7/5383 and subgroups

7/538463 . . . . . {for thyristor type converters}
7/538466 . . . . . {for transistor type converters}
7/53854 . . . . . using thyristor type converters
7/53862 . . . . . using transistor type converters
7/5387 . . . . . in a bridge configuration
7/53871 . . . . . {with automatic control of output voltage or current}
7/53873 . . . . . {with digital control}

7/53875 . . . . . {with analogue control of three-phase output}
7/53876 . . . . . {based on synthesising a desired voltage vector via the selection of appropriate fundamental voltage vectors, and corresponding dwelling times}
7/53878 . . . . . {by time shifting switching signals of one diagonal pair of the bridge with respect to the other diagonal pair}
7/5388 . . . . . with asymmetrical configuration of switches

WARNING

Group H02M 7/5388 is not complete, see provisionally also H02M 7/5387 and subgroups

7/539 . . . . . with automatic control of output wave form or frequency (H02M 7/5375 - H02M 7/5387 take precedence)
7/5395 . . . . . by pulse-width modulation
7/54 . . by dynamic converters
7/56 . . . using mechanical parts to select progressively, or to vary continuously, the input potential
7/58 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
7/60 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/62 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper
7/64 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
7/66 . with possibility of reversal
7/68 . . by static converters
7/70 . . . using discharge tubes without control electrode or semiconductor devices without control electrode
7/72 . . . using discharge tubes with control electrode or semiconductor devices with control electrode
7/75 . . . . using devices of a thyratron or thyristor type requiring extinguishing means
7/753 . . . . . using discharge tubes only
7/757 . . . . . using semiconductor devices only
7/7575 . . . . . {for high voltage direct transmission link}
7/758 . . . . . with automatic control of output waveform or frequency
7/77 . . . . . arranged for operation in parallel
7/79 . . . . using devices of a triode or transistor type requiring continuous application of a control signal
7/793 . . . . . using discharge tubes only
7/797 . . . . . using semiconductor devices only
7/81 . . . . . arranged for operation in parallel
7/82 . . . using open-spark devices, e.g. Marx rectifier
7/84 . . . using electrolytic rectifiers
7/86 . . by dynamic converters
7/88 . . . using mechanical parts to select progressively or to vary continuously the input potential
7/90 . . . using mechanical contact-making and -breaking parts to interrupt a single potential
7/92 . . . . wherein the parts are rotating and collectors co-operate with brushes or rollers
7/94 . . . . wherein the parts are operated by rotating cams or cam-like devices
7/95 . . . . with electromagnetically-operated vibrating contacts, e.g. chopper
7/96 . . . . with moving liquid contacts
7/98 . . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters

11/00 **Power conversion systems not covered by the preceding groups**