

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 (systems for regulating electric or magnetic variables in general, e.g. using transformers, reactors or choke coils, combination of such systems with static converters [G05F](#); {digital function or clock generators} for digital computers [G06F 1/00](#), {[G06F 1/025](#), [G06F 1/04](#)}; transformers [H01F](#); connection or control of one converter with regard to conjoint operation with a similar or other source of supply [H02J](#); dynamo-electric converters [H02K 47/00](#); controlling transformers, reactors or choke coils, control or regulation of electric motors, generators or dynamo-electric converters [H02P](#); pulse generators [H03K](#); {static converters specially adapted for igniting or operating discharge lamps [H05B 41/28](#)})

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](#), 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	
2001/0003	. {Details of control, feedback and regulation circuits}	2001/0025 . . {Arrangements for modifying reference value, feedback value or error value in the control loop of a converter}
2001/0006	. . {Arrangements for supplying an adequate voltage to the control circuit of a converter}	2001/0029 . . {Circuits or arrangements for limiting the slope ("slew rate") of switching signals}
2001/0009	. . {Devices and circuits for detecting current in a converter}	2001/0032 . . {Control circuits allowing low power mode operation, e.g. "standby"}
2001/0012	. . {Control circuits using digital or numerical techniques (in dc/dc converters H02M 3/157 , H02M 3/33515 ; in dc-ac converters H02M 7/53873)}	2001/0035 . . . {by burst mode control}
2001/0016	. . {Control circuits providing compensation of output voltage deviations using feedforward of disturbance parameter}	2001/0038 . . {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}
2001/0019	. . . {the disturbance parameter being load current fluctuations}	2001/0041 . . {Control circuits in which a clock signal is selectively enabled or disabled}
2001/0022	. . . {the disturbance parameter being input voltage fluctuations}	

- 2001/0045 . {Converters combining the concepts of switch-mode regulation and linear regulation, e.g. linear preregulator to switching converter, linear and switching converter in parallel, same converter or same transistor operating either in linear or switching mode}
- 2001/0048 . {Circuits or arrangements for reducing losses (using snubbers [H02M 1/34](#))}
- 2001/0051 . . {Diode reverse recovery losses}
- 2001/0054 . . {Transistor switching losses (periodically suspending operation of switching converter in low power mode [H02M 2001/0035](#))}
- 2001/0058 . . . {by employing soft switching techniques, i.e. commutation of transistor when voltage applied to it is zero and/or when current flowing through it is zero (in resonant inverters [H02M 2007/4815](#); in inverters operating from a resonant dc source [H02M 7/4826](#); 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 2007/4811](#))}
- 1/0061 . {using discharge tubes}
- 2001/0064 . {Magnetic structures combining different functions, e.g. storage, filtering, transformation}
- 2001/0067 . {Converter structures employing plural converter units, other than for parallel operation of the units on a single load}
- 2001/007 . . {Plural converter units in cascade (push-pull dc/dc converters with preregulator [H02M 3/3374](#); dc-ac converters following a dc-dc stage which includes a high frequency transformer [H02M 7/4807](#), dc-ac converters following a dc-dc conversion stage which generates a periodically varying voltage [H02M 7/4826](#))}
- 2001/0074 . . {Plural converter units whose inputs are connected in series}
- 2001/0077 . . {Plural converter units whose outputs are connected in series}
- 2001/008 . . {Plural converter units for generating at least two independent, non-parallel outputs, e.g. systems with plural point of load switching regulators}
- 2001/0083 . {Converters characterized by their input or output configuration}
- 2001/0087 . . {adapted for receiving as input a current source}
- 2001/009 . . {having more than one output with independent control (for dc-dc converter with intermediate ac [H02M 3/33561](#))}
- 2001/0093 . . {wherein the output is created by adding a regulated voltage to or subtracting it from an unregulated input}
- 2001/0096 . {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. thyatrons, 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
- 2001/123 . . {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 (emergency protective circuit arrangements specially adapted for converters with automatic disconnection [H02H 7/10](#))
- 2001/322 . . {Means for rapidly discharging a capacitor of the converter, in order to protect electrical components or prevent electrical shock}
- 2001/325 . . {with means for allowing continuous operation despite a fault, i.e. fault tolerant converters}
- 2001/327 . . {against abnormal temperatures}
- 1/34 . Snubber circuits
- 2001/342 . . . {Active non-dissipative snubbers}
- 2001/344 . . . {Active dissipative snubbers}
- 2001/346 . . . {Passive non-dissipative snubbers}
- 2001/348 . . . {Passive dissipative snubbers}
- 1/36 . Means for starting or stopping converters
- 1/38 . Means for preventing simultaneous conduction of switches

2001/385	. . {with means for correcting output voltage deviations introduced by the dead time}	2003/078	. . . . . {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 converter}
1/40	. Means for preventing magnetic saturation	3/08	. . . using discharge tubes without control electrode or semiconductor devices without control electrode
1/42	. Circuits or arrangements for compensating for or adjusting power factor in converters or inverters	3/10	. . . using discharge tubes with control electrode or semiconductor devices with control electrode (H02M 3/07 takes precedence)
1/4208	. . {Arrangements for improving power factor of AC input}	3/125	. . . . using devices of a thyatron or thyristor type requiring extinguishing means
1/4216	. . . {operating from a three-phase input voltage (H02M 1/4233 takes precedence)}	3/13	. . . . . using discharge tubes only
1/4225	. . . {using a non-isolated boost converter}	3/135	. . . . . using semiconductor devices only
1/4233	. . . {using a bridge converter consisting of active switches}	3/137	. . . . . with automatic control of output voltage or current, e.g. switching regulators
1/4241	. . . {using a resonant converter}	3/139	. . . . . with digital control
1/425	. . . {using a single converter stage both for correction of AC input power factor and generation of a high frequency AC output voltage}	3/142	. . . . . including plural semiconductor devices as final control devices for a single load
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)}	3/145	. . . . using devices of a triode or transistor type requiring continuous application of a control signal
1/4266	. . . {using passive elements}	3/15	. . . . . using discharge tubes only
2001/4275	. . . {by adding an auxiliary output voltage in series to the input}	3/155	. . . . . using semiconductor devices only
2001/4283	. . . {by adding a controlled rectifier in parallel to a first rectifier feeding a smoothing capacitor}	2003/1552	. . . . . {Boost converters exploiting the leakage inductance of a transformer or of an alternator as boost inductor}
2001/4291	. . . {by using a Buck converter to switch the input current}	2003/1555	. . . . . {for the generation of a regulated current to a load whose impedance is substantially inductive}
1/44	. Circuits or arrangements for compensating for electromagnetic interference in converters or inverters	2003/1557	. . . . . {Single ended primary inductor converters [SEPIC]}
3/00	Conversion of dc power input into dc power output {(converters specially adapted for use in combination with a battery H02J 7/0065)}	3/156	. . . . . with automatic control of output voltage or current, e.g. switching regulators
3/005	. {using Cuk converters}	3/1563	. . . . . {without using an external clock (H02M 3/158 takes precedence)}
3/02	. without intermediate conversion into ac	2003/1566	. . . . . {with means for compensating against rapid load changes, e.g. with auxiliary current source, with dual mode control, with inductance variation}
3/04	. . by static converters	3/157	. . . . . with digital control
3/06	. . . using resistors or capacitors, e.g. potential divider	3/158	. . . . . including plural semiconductor devices as final control devices for a single load
3/07	. . . . using capacitors charged and discharged alternately by semiconductor devices with control electrode {, e.g. charge pumps (for substrate bias voltage generators G05F 3/205; for static stores G11C 5/145, G11C 16/06; charge pumping structures for internal polarisation H01L 27/0222)}	3/1582	. . . . . {Buck-boost converters (H02M 3/1584 takes precedence)}
2003/071	. . . . . {adapted to generate a negative voltage output from a positive voltage source}	3/1584	. . . . . {with a plurality of power processing stages connected in parallel}
2003/072	. . . . . {adapted to generate an output voltage whose value is lower than the input voltage}	2003/1586	. . . . . {switched with a phase shift, i.e. interleaved}
3/073	. . . . . {Charge pumps of the SCHENKEL type}	3/1588	. . . . . {comprising at least one synchronous rectifier element (H02M 3/1582, H02M 3/1584 take precedence)}
2003/075	. . . . . {including a plurality of stages and two sets of clock signals, one set for the odd and one set for the even numbered stages}	3/16	. . by dynamic converters
2003/076	. . . . . {the clock signals being boosted to a value which is higher than input voltage value}	3/18	. . . using capacitors or batteries which are alternately charged and discharged, e.g. charged in parallel and discharged in series
2003/077	. . . . . {with parallel connected charge pump stages}	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 thyatron 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 ([H02M 3/33561](#), [H02M 3/33569](#) take precedence)}
- 3/33515 {with digital control}
- 3/33523 {with galvanic isolation between input and output}
- 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}
- 3/33561 {having more than one output with independent control}
- 3/33569 {having several active switching elements ([H02M 3/3353](#) takes precedence)}
- 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](#) and [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 ([self-interrupters in general H01H 51/34](#))
- 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 thyatron or thyristor type requiring extinguishing means {([H02M 5/225](#)), [H02M 5/27](#) take precedence}
- 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}	7/06	. . . using discharge tubes without control electrode or semiconductor devices without control electrode
5/275	. . . . using devices of a triode or transistor type requiring continuous application of a control signal (H02M 5/225 , H02M 5/297 take precedence)	7/062	. . . . {Avoiding or suppressing excessive transient voltages or currents}
5/29	. . . . . using discharge tubes only	7/064	. . . . . {with several outputs}
5/293	. . . . . using semiconductor devices only	7/066	. . . . . {particular circuits having a special characteristic}
2005/2932	. . . . . {with automatic control of output voltage, current or power}	7/068	. . . . . {mounted on a transformer}
2005/2935	. . . . . {using reverse phase control, i.e. turn-on of switch in series with load at zero crossing of input voltage, turn-off before next zero crossing}	7/08	. . . . . arranged for operation in parallel
2005/2937	. . . . . {using whole cycle control, i.e. switching an integer number of whole (half) cycles of the ac input voltage}	7/10	. . . . . arranged for operation in series, e.g. for multiplication of voltage
5/297	. . . . . for conversion of frequency	7/103	. . . . . {Containing passive elements (capacitively coupled) which are ordered in cascade on one source}
5/32	. . by dynamic converters	7/106	. . . . . {With physical arrangement details}
5/34	. . . using mechanical contact-making and -breaking parts	7/12	. . . using discharge tubes with control electrode or semiconductor devices with control electrode
5/36	. . . . wherein the parts are rotating and collectors co-operate with brushes or rollers	7/125	. . . . {Avoiding or suppressing excessive transient voltages or currents}
5/38	. . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters	7/145	. . . . using devices of a thyatron or thyristor type requiring extinguishing means
5/40	. with intermediate conversion into dc	7/15	. . . . . using discharge tubes only
5/42	. . by static converters	7/151	. . . . . {with automatic control (H02M 7/153 takes precedence)}
5/44	. . . using discharge tubes or semiconductor devices to convert the intermediate dc into ac	7/153	. . . . . {arranged for operation in parallel}
5/443	. . . . using devices of a thyatron or thyristor type requiring extinguishing means	7/155	. . . . . using semiconductor devices only
5/447	. . . . . using discharge tubes only	7/1552	. . . . . {in a biphasic or polyphase arrangement (voltage multipliers H02M 7/19)}
5/45	. . . . . using semiconductor devices only	7/1555	. . . . . {with control circuit}
5/4505	. . . . . {having a rectifier with controlled elements}	7/1557	. . . . . {with automatic control of the output voltage or current}
5/451	. . . . . with automatic control of output voltage or frequency	7/162	. . . . . in a bridge configuration
5/452	. . . . . with automatic control of output waveform	7/1623	. . . . . {with control circuit}
5/453	. . . . using devices of a triode or transistor type requiring continuous application of a control signal	7/1626	. . . . . {with automatic control of the output voltage or current}
5/456	. . . . . using discharge tubes only	7/17	. . . . . arranged for operation in parallel
5/458	. . . . . using semiconductor devices only	7/19	. . . . . arranged for operation in series, e.g. for voltage multiplication
5/4585	. . . . . {having a rectifier with controlled elements}	7/21	. . . . using devices of a triode or transistor type requiring continuous application of a control signal
5/46	. . by dynamic converters	7/213	. . . . . using discharge tubes only
5/48	. . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters	7/217	. . . . . using semiconductor devices only
7/00	Conversion of ac power input into dc power output; Conversion of dc power input into ac power output	7/2173	. . . . . {in a biphasic or polyphase circuit arrangement (H02M 7/2176 takes precedence; voltage multipliers H02M 7/25)}
7/003	. {Constructional details, e.g. physical layout, assembly, wiring, busbar connections}	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}
7/006	. {using discharge tubes}	7/219	. . . . . in a bridge configuration
7/02	. Conversion of ac power input into dc power output without possibility of reversal	2007/2195	. . . . . {the switches being synchronously commutated at the same frequency of the AC input voltage}
7/04	. . by static converters	7/23	. . . . . arranged for operation in parallel {(H02M 7/2176 takes precedence)}
7/043	. . . {using transformers or inductors only}	7/25	. . . . . arranged for operation in series, e.g. for multiplication of voltage
7/046	. . . {using discharge tubes}	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	7/515	. . . . . using semiconductor devices only
7/34	. . . . wherein the parts are rotating and collectors co-operate with brushes or rollers	7/5152	. . . . . {with separate extinguishing means}
7/36	. . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)	7/5155	. . . . . {wherein each commutation element has its own extinguishing means}
7/38	. . . using one or more sparking electrodes rotating over counterelectrodes	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}
7/40	. . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters	7/516	. . . . . Self-oscillating arrangements
7/42	. Conversion of dc power input into ac power output without possibility of reversal	7/517	. . . . . with special starting equipment
7/44	. . by static converters	7/519	. . . . . in a push-pull configuration (H02M 7/517 takes precedence)
7/445	. . . {using discharge tubes}	7/521	. . . . . in a bridge configuration
7/46	. . . using discharge tubes without control electrode or semiconductor devices without control electrode	7/523	. . . . . with LC-resonance circuit in the main circuit
7/48	. . . using discharge tubes with control electrode or semiconductor devices with control electrode	7/5233	. . . . . {the commutation elements being in a push-pull arrangement}
2007/4803	. . . . {with means for reducing dc component from AC output voltage}	7/5236	. . . . . {in a series push-pull arrangement}
7/4807	. . . . {having a high frequency intermediate AC stage}	7/525	. . . . . with automatic control of output waveform or frequency (H02M 7/517 - H02M 7/523 take precedence)
2007/4811	. . . . {having an auxiliary actively switched resonant commutation circuit connected to an intermediate dc voltage or between two push-pull branches}	7/527	. . . . . by pulse width modulation
2007/4815	. . . . {Resonant converters (H02M 2007/4811 and H02M 7/4826 take precedence)}	7/529	. . . . . using digital control
2007/4818	. . . . {with means for adaptation of resonance frequency, e.g. by modification of capacitance or inductance of resonance circuit}	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)}
2007/4822	. . . . {arranged for operation in parallel}	7/533	. . . . . using discharge tubes only
7/4826	. . . . {operating from a resonant DC source, i.e. the DC input voltage varies periodically, e.g. resonant DC-link inverters}	7/537	. . . . . using semiconductor devices only, e.g. single switched pulse inverters
7/483	. . . . Converters with outputs that each can have more than two voltages levels	7/5375	. . . . . with special starting equipment
2007/4835	. . . . {comprising a plurality of cells, each including a switchable capacitor, the capacitors having a nominal charge voltage which corresponds to a given fraction of the input voltage, the capacitors being selectively connected in series to determine the instantaneous output voltage}	7/538	. . . . . in a push-pull configuration (H02M 7/5375 takes precedence ; with oscillating arrangements H02M 7/53832 , H02M 7/53846)
7/487	. . . . . Neutral point clamped inverters	7/53803	. . . . . {with automatic control of output voltage or current}
7/49	. . . . . Combination of the output voltage waveforms of a plurality of converters	7/53806	. . . . . {in a push-pull configuration of the parallel type}
7/493	. . . . the static converters being arranged for operation in parallel	7/5381	. . . . . Parallel type
7/497	. . . . sinusoidal output voltages being obtained by combination of several voltages being out of phase	7/5383	. . . . . in a self-oscillating arrangement (H02M 7/538 takes precedence)
7/501	. . . . sinusoidal output voltages being obtained by the combination of several pulse-voltages having different amplitude and width	7/53832	. . . . . {in a push-pull arrangement}
7/505	. . . . using devices of a thyatron or thyristor type requiring extinguishing means {(H02M 7/4807 , H02M 7/483 , H02M 7/493 and H02M 7/4826 take precedence)}	7/53835	. . . . . {of the parallel type}
7/51	. . . . . using discharge tubes only	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}	7/90	. . . .	using mechanical contact-making and -breaking parts to interrupt a single potential
2007/53876	. . . . .	{based on synthesising a desired voltage vector via the selection of appropriate fundamental voltage vectors, and corresponding dwelling times}	7/92	. . . .	wherein the parts are rotating and collectors co-operate with brushes or rollers
2007/53878	. . . . .	{by time shifting switching signals of one diagonal pair of the bridge with respect to the other diagonal pair}	7/94	. . . .	wherein the parts are operated by rotating cams or cam-like devices
7/5388	. . . . .	with asymmetrical configuration of switches	7/95	. . . .	with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
WARNING			7/96	. . . .	with moving liquid contacts
Group H02M 7/5388 is not complete, see provisionally also H02M 7/5387 and subgroups			7/98	. .	by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
7/539	. . . . .	with automatic control of output wave form or frequency (H02M 7/5375 - H02M 7/5387 take precedence)	11/00	Power conversion systems not covered by the preceding groups	
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 (self-interrupters in general H01H 51/34)			
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 thyatron or thyristor type requiring extinguishing means (H02M 7/77 takes precedence)			
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 (H02M 7/81 takes precedence)			
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			