

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.

WARNING

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

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

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}

H02M

- 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. 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
- 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](#))
- WARNING**
Group [H02M 1/32](#) and its subgroup are not complete, see provisionally also [H02M 1/32](#), [H02M 3/00](#) and subgroups, [H02M 7/00](#) and subgroups
- 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
WARNING
 Group [H02M 1/36](#) is not complete, see provisionally also [H02M 3/00](#) and subgroups, [H02M 7/00](#) and subgroups
- 1/38 . Means for preventing simultaneous conduction of switches
WARNING
 Group [H02M 1/38](#) is not complete, see provisionally also [H02M 3/337](#) and subgroups, [H02M 7/538](#) and subgroups
- 2001/385 . . {with means for correcting output voltage deviations introduced by the dead time}
- 1/40 . Means for preventing magnetic saturation
WARNING
 Group [H02M 1/40](#) is not complete, see provisionally also [H02M 3/335](#)
- 1/42 . Circuits or arrangements for compensating for or adjusting power factor in converters or inverters
WARNING
 Group [H02M 1/42](#) is not complete, see provisionally also [H02M 1/32](#) and subgroups
- 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 consisting of 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}
- 2001/4275 . . . {by adding an auxiliary output voltage in series to the input}
- 2001/4283 . . . {by adding a controlled rectifier in parallel to a first rectifier feeding a smoothing capacitor}
- 2001/4291 . . . {by using a Buck converter to switch the input current}
- 1/44 . Circuits or arrangements for compensating for electromagnetic interference in converters or inverters
WARNING
 Group [H02M 1/44](#) is not complete, see provisionally also [H02M 7/00](#) and subgroups
- 3/00 Conversion of dc power input into dc power output**
{(converters specially adapted for use in combination with a battery [H02J 7/0065](#))}
- 3/005 . {using Cuk converters}
- 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 (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](#))}
- 2003/071 {adapted to generate a negative voltage output from a positive voltage source}
- 2003/072 {adapted to generate an output voltage whose value is lower than the input voltage}
- 3/073 {Charge pumps of the SCHENKEL type}
- 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}
- 2003/076 {the clock signals being boosted to a value which is higher than input voltage value}
- 2003/077 {with parallel connected charge pump stages}
- 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}
- 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
- 2003/1552 {Boost converters exploiting the leakage inductance of a transformer or of an alternator as boost inductor}
- 2003/1555 {for the generation of a regulated current to a load whose impedance is substantially inductive}
- 2003/1557 {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)}

2003/1566	. . . . .	{with means for compensating against rapid load changes, e.g. with auxiliary current source, with dual mode control, with inductance variation}	3/33553	. . . . .	{with galvanic isolation between input and output}
3/157	. . . . .	with digital control	3/33561	. . . . .	{having more than one output with independent control}
3/158	. . . . .	including plural semiconductor devices as final control devices for a single load	3/33569	. . . . .	{having several active switching elements (H02M 3/3353 takes precedence)}
3/1582	. . . . .	{Buck-boost converters (H02M 3/1584 takes precedence)}	3/33576	. . . . .	{having at least one active switching element at the secondary side of an isolation transformer}
3/1584	. . . . .	{with a plurality of power processing stages connected in parallel}	3/33584	. . . . .	{Bidirectional converters}
2003/1586	. . . . .	{switched with a phase shift, i.e. interleaved}	3/33592	. . . . .	{having a synchronous rectifier circuit or a synchronous freewheeling circuit at the secondary side of an isolation transformer}
3/1588	. . . . .	{comprising at least one synchronous rectifier element (H02M 3/1582 , H02M 3/1584 take precedence)}	3/337	. . . . .	in push-pull configuration {(H02M 3/33576 takes precedence; with self-oscillating arrangements H02M 3/3382 and H02M 3/3385)}
3/16	. .	by dynamic converters	3/3372	. . . . .	{of the parallel type}
3/18	. . .	using capacitors or batteries which are alternately charged and discharged, e.g. charged in parallel and discharged in series	3/3374	. . . . .	{with preregulator, e.g. current injected push-pull}
3/20	. .	by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters	3/3376	. . . . .	{with automatic control of output voltage or current}
3/22	. .	with intermediate conversion into ac	3/3378	. . . . .	{in a push-pull configuration of the parallel type (H02M 3/3374 takes precedence)}
3/24	. .	by static converters	3/338	. . . . .	in a self-oscillating arrangement (H02M 3/337 takes precedence)
3/26	. . .	using discharge tubes without control electrode or semiconductor devices without control electrode to produce the intermediate ac	3/3381	. . . . .	{using a single commutation path}
3/28	. . .	using discharge tubes with control electrode or semiconductor devices with control electrode to produce the intermediate ac	3/3382	. . . . .	{in a push-pull circuit arrangement}
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)}	3/3384	. . . . .	{of the parallel type}
3/305	. . . . .	using devices of a thyatron or thyristor type requiring extinguishing means	3/3385	. . . . .	{with automatic control of output voltage or current (H02M 3/33561 takes precedence)}
3/31	. . . . .	using discharge tubes only	3/3387	. . . . .	{in a push-pull configuration}
3/315	. . . . .	using semiconductor devices only	3/3388	. . . . .	{of the parallel type}
3/3155	. . . . .	{with automatic control of the output voltage or current}	3/34	. . .	by dynamic converters
3/325	. . . . .	using devices of a triode or a transistor type requiring continuous application of a control signal	3/36	. . . . .	using mechanical parts to select progressively or to vary continuously the input potential
3/33	. . . . .	using discharge tubes only	3/38	. . . . .	using mechanical contact-making and -breaking parts to interrupt a single potential
3/335	. . . . .	using semiconductor devices only	3/40	. . . . .	wherein the parts are rotating and collectors co-operate with brushes or rollers
3/33507	. . . . .	{with automatic control of the output voltage or current (H02M 3/33561 , H02M 3/33569 take precedence)}	3/42	. . . . .	with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)
3/33515	. . . . .	{with digital control}	3/44	. . .	by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters
3/33523	. . . . .	{with galvanic isolation between input and output}	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
3/3353	. . . . .	{having at least two simultaneously operating switches on the input side, e.g. "double forward" or "double (switched) flyback" converter}	5/005	. .	{using discharge tubes}
3/33538	. . . . .	{of the forward type (H02M 3/3353 , H02M 3/33569 take precedence)}	5/02	. .	without intermediate conversion into dc
3/33546	. . . . .	{with automatic control of the output voltage or current (H02M 3/33561 takes precedence)}	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}
- 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)
- 5/29 using discharge tubes only
- 5/293 using semiconductor devices only
- 2005/2932 {with automatic control of output voltage, current or power}
- 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}
- 2005/2937 {using whole cycle control, i.e. switching an integer number of whole (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 thyatron 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, 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}
- 7/06 . . . 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 thyatron 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 biphas 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	7/483	. . . . Converters with outputs that each can have more than two voltages levels
7/213	. . . . using discharge tubes only	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}
7/217	. . . . using semiconductor devices only	7/487	. . . . Neutral point clamped inverters
7/2173	. . . . {in a biphas or polyphase circuit arrangement (H02M 7/2176 takes precedence; voltage multipliers H02M 7/25)}	7/49	. . . . Combination of the output voltage waveforms of a plurality of converters
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}	7/493	. . . . the static converters being arranged for operation in parallel
7/219	. . . . in a bridge configuration	7/497	. . . . sinusoidal output voltages being obtained by combination of several voltages being out of phase
2007/2195	. . . . {the switches being synchronously commutated at the same frequency of the AC input voltage}	7/501	. . . . sinusoidal output voltages being obtained by the combination of several pulse-voltages having different amplitude and width
7/23	. . . . arranged for operation in parallel { (H02M 7/2176 takes precedence)}	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)}
7/25	. . . . arranged for operation in series, e.g. for multiplication of voltage	7/51	. . . . using discharge tubes only
7/26	. . . using open-spark devices, e.g. Marx rectifier	7/515	. . . . using semiconductor devices only
7/28	. . . using electrolytic rectifiers	7/5152	. . . . {with separate extinguishing means}
7/30	. . by dynamic converters	7/5155	. . . . {wherein each commutation element has its own extinguishing means}
7/32	. . . using mechanical contact-making and -breaking parts	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}
7/34	. . . . wherein the parts are rotating and collectors co-operate with brushes or rollers	7/516	. . . . Self-oscillating arrangements
7/36	. . . . with electromagnetically-operated vibrating contacts, e.g. chopper (self-interrupters in general H01H 51/34)	7/517	. . . . with special starting equipment
7/38	. . . using one or more sparking electrodes rotating over counterelectrodes	7/519	. . . . in a push-pull configuration (H02M 7/517 takes precedence)
7/40	. . by combination of static with dynamic converters; by combination of dynamo-electric with other dynamic or static converters	7/521	. . . . in a bridge configuration
7/42	. Conversion of dc power input into ac power output without possibility of reversal	7/523	. . . . with LC-resonance circuit in the main circuit
7/44	. . by static converters	7/5233	. . . . {the commutation elements being in a push-pull arrangement}
7/445	. . . {using discharge tubes}	7/5236	. . . . {in a series push-pull arrangement}
7/46	. . . using discharge tubes without control electrode or semiconductor devices without control electrode	7/525	. . . . with automatic control of output waveform or frequency (H02M 7/517 - H02M 7/523 take precedence)
7/48	. . . using discharge tubes with control electrode or semiconductor devices with control electrode	7/527	. . . . by pulse width modulation
2007/4803	. . . . {with means for reducing dc component from AC output voltage}	7/529	. . . . using digital control
7/4807	. . . . {having a high frequency intermediate AC stage}	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)}
2007/4811	. . . . {having an auxiliary actively switched resonant commutation circuit connected to an intermediate dc voltage or between two push-pull branches}	7/533	. . . . using discharge tubes only
2007/4815	. . . . {Resonant converters (H02M 2007/4811 and H02M 7/4826 take precedence)}	7/537	. . . . using semiconductor devices only, e.g. single switched pulse inverters
2007/4818	. . . . {with means for adaptation of resonance frequency, e.g. by modification of capacitance or inductance of resonance circuit}	7/5375	. . . . with special starting equipment
2007/4822	. . . . {arranged for operation in parallel}		WARNING
7/4826	. . . . {operating from a resonant DC source, i.e. the DC input voltage varies periodically, e.g. resonant DC-link inverters}		Incomplete, see also H02M 1/36

- 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}
- 2007/53876 {based on synthesising a desired
voltage vector via the selection of
appropriate fundamental voltage
vectors, and corresponding
dwelling times}
- 2007/53878 {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 ([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
- 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 ([self-interrupters in
general H01H 51/34](#))
- 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**