

SECTION H — ELECTRICITY

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 (conversion of current or voltage specially adapted for use in electronic time-pieces with no moving parts G04G 19/02; 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; for digital computers G06F 1/00; 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) **[4, 5]**

Note(s)

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.
2. This subclass does not cover the individual electro-technical devices employed when converting electric power. Such devices are covered by the relevant subclasses, e.g. inductors, transformers H01F, capacitors, electrolytic rectifiers H01G, mercury-vapour rectifying or other discharge tubes H01J, semiconductor devices H01L, impedance networks or resonant circuits not primarily concerned with the transfer of electric power H03H.
3. 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.

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TYPES OF CONVERSION	
dc to dc.....	3/00
ac to ac.....	5/00
ac to dc and <u>vice versa</u>	7/00
dc or ac to surge output power.....	9/00
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1/00 Details of apparatus for conversion [1, 2007.01]

- 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
- 1/06 • Circuits specially adapted for rendering non-conductive gas discharge tubes or equivalent semiconductor devices, e.g. thyatrons, thyristors **[2]**
- 1/08 • Circuits specially adapted for the generation of control voltages for semiconductor devices incorporated in static converters
- 1/084 • • using a control circuit common to several phases of a multi-phase system **[4]**
- 1/088 • • for the simultaneous control of series or parallel connected semiconductor devices **[4]**
- 1/092 • • • the control signals being transmitted optically **[4]**
- 1/096 • • • the power supply of the control circuit being connected in parallel to the main switching element (H02M 1/092 takes precedence) **[4]**
- 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
- 1/14 • Arrangements for reducing ripples from dc input or output
- 1/15 • • using active elements **[4]**
- 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 by automatic disconnection (emergency protective circuit arrangements specially adapted for converters with automatic disconnection H02H 7/10) **[2007.01]**
- 1/34 • • Snubber circuits **[2007.01]**
- 1/36 • Means for starting or stopping converters **[2007.01]**
- 1/38 • Means for preventing simultaneous conduction of switches **[2007.01]**
- 1/40 • Means for preventing magnetic saturation **[2007.01]**

- 1/42 • Circuits or arrangements for compensating for or adjusting power factor in converters or inverters **[2007.01]**
- 1/44 • Circuits or arrangements for compensating for electromagnetic interference in converters or inverters **[2007.01]**
- 3/00 Conversion of dc power input into dc power output**
- 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 **[4]**
- 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) **[4]**
- 3/125 • • • • using devices of a thyatron or thyristor type requiring extinguishing means **[2]**
- 3/13 • • • • • using discharge tubes only **[2]**
- 3/135 • • • • • using semiconductor devices only **[2]**
- 3/137 • • • • • • with automatic control of output voltage or current, e.g. switching regulators **[4]**
- 3/139 • • • • • • • with digital control **[4]**
- 3/142 • • • • • • • including plural semiconductor devices as final control devices for a single load **[4]**
- 3/145 • • • • using devices of a triode or transistor type requiring continuous application of a control signal **[2]**
- 3/15 • • • • • using discharge tubes only **[2]**
- 3/155 • • • • • using semiconductor devices only **[2]**
- 3/156 • • • • • • with automatic control of output voltage or current, e.g. switching regulators **[4]**
- 3/157 • • • • • • • with digital control **[4]**
- 3/158 • • • • • • • including plural semiconductor devices as final control devices for a single load **[4]**
- 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
- 3/305 • • • • using devices of a thyatron or thyristor type requiring extinguishing means **[2]**
- 3/31 • • • • • using discharge tubes only **[2]**
- 3/315 • • • • • using semiconductor devices only **[2]**
- 3/325 • • • • • using devices of a triode or a transistor type requiring continuous application of a control signal **[2]**
- 3/33 • • • • • using discharge tubes only **[2]**
- 3/335 • • • • • using semiconductor devices only **[2]**
- 3/337 • • • • • • in push-pull configuration **[4]**
- 3/338 • • • • • • in a self-oscillating arrangement (H02M 3/337 takes precedence) **[4]**
- 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**
- 5/02 • without intermediate conversion into dc
- 5/04 • • by static converters (controlling transformers, reactors or choke coils, e.g. by tap changing, H02P 13/00) **[4]**
- 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
- 5/25 • • • • using devices of a thyatron or thyristor type requiring extinguishing means (H02M 5/27 takes precedence) **[2]**
- 5/253 • • • • • using discharge tubes only **[2]**
- 5/257 • • • • • using semiconductor devices only **[2]**
- 5/27 • • • • • for conversion of frequency **[2]**
- 5/275 • • • • • using devices of a triode or transistor type requiring continuous application of a control signal (H02M 5/297 takes precedence) **[2]**
- 5/29 • • • • • using discharge tubes only **[2]**
- 5/293 • • • • • using semiconductor devices only **[2]**
- 5/297 • • • • • for conversion of frequency **[2]**
- 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 **[2]**
- 5/447 • • • • • using discharge tubes only **[2]**

- 5/45 • • • • • using semiconductor devices only [2]
- 5/451 • • • • • with automatic control of output voltage or frequency [4]
- 5/452 • • • • • with automatic control of output waveform [4]
- 5/453 • • • • • using devices of a triode or transistor type requiring continuous application of a control signal [2]
- 5/456 • • • • • using discharge tubes only [2]
- 5/458 • • • • • using semiconductor devices only [2]
- 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**
- 7/02 • Conversion of ac power input into dc power output without possibility of reversal
- 7/04 • • by static converters
- 7/06 • • • using discharge tubes without control electrode or semiconductor devices without control electrode
- 7/08 • • • • arranged for operation in parallel
- 7/10 • • • • arranged for operation in series, e.g. for multiplication of voltage
- 7/12 • • • using discharge tubes with control electrode or semiconductor devices with control electrode
- 7/145 • • • • using devices of a thyatron or thyristor type requiring extinguishing means [2, 4]
- 7/15 • • • • • using discharge tubes only [2]
- 7/155 • • • • • using semiconductor devices only [2]
- 7/162 • • • • • in a bridge configuration [4]
- 7/17 • • • • • arranged for operation in parallel [2, 4]
- 7/19 • • • • • arranged for operation in series, e.g. for voltage multiplication [2, 4]
- 7/21 • • • • using devices of a triode or transistor type requiring continuous application of a control signal [2, 4]
- 7/213 • • • • • using discharge tubes only [2]
- 7/217 • • • • • using semiconductor devices only [2]
- 7/219 • • • • • in a bridge configuration [4]
- 7/23 • • • • • arranged for operation in parallel [2, 4]
- 7/25 • • • • • arranged for operation in series, e.g. for multiplication of voltage [2, 4]
- 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 (self-interrupters in general H01H 51/34)
- 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
- 7/46 • • • 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 [1, 2007.01]
- 7/483 • • • • Converters with outputs that each can have more than two voltage levels [2007.01]
- 7/487 • • • • • Neutral point clamped inverters [2007.01]
- 7/49 • • • • • Combination of the output voltage waveforms of a plurality of converters [2007.01]
- 7/493 • • • • the static converters being arranged for operation in parallel [2007.01]
- 7/497 • • • • sinusoidal output voltages being obtained by combination of several voltages being out of phase [2007.01]
- 7/501 • • • • sinusoidal output voltages being obtained by the combination of several pulse-voltages having different amplitude and width [2007.01]
- 7/505 • • • • using devices of a thyatron or thyristor type requiring extinguishing means [2]
- 7/51 • • • • • using discharge tubes only [2]
- 7/515 • • • • • using semiconductor devices only [2, 2007.01]
- 7/516 • • • • • Self-oscillating arrangements [2007.01]
- 7/517 • • • • • with special starting equipment [4]
- 7/519 • • • • • in a push-pull configuration (H02M 7/517 takes precedence) [4]
- 7/521 • • • • • in a bridge configuration [4]
- 7/523 • • • • • with LC-resonance circuit in the main circuit [4]
- 7/525 • • • • • with automatic control of output waveform or frequency (H02M 7/517-H02M 7/523 take precedence) [4]
- 7/527 • • • • • by pulse width modulation [4]
- 7/529 • • • • • using digital control [4]
- 7/53 • • • • using devices of a triode or transistor type requiring continuous application of a control signal [2]
- 7/533 • • • • • using discharge tubes only [2]
- 7/537 • • • • • using semiconductor devices only, e.g. single switched pulse inverters [2]
- 7/5375 • • • • • with special starting equipment [4]
- 7/538 • • • • • in a push-pull configuration (H02M 7/5375 takes precedence) [4, 2007.01]
- 7/5381 • • • • • Parallel type [2007.01]
- 7/5383 • • • • • in a self-oscillating arrangement (H02M 7/538 takes precedence) [4, 2007.01]
- 7/53838 • • • • • using a single commutation path [2007.01]
- 7/53846 • • • • • Control circuits [2007.01]
- 7/53854 • • • • • using thyristor type converters [2007.01]
- 7/53862 • • • • • using transistor type converters [2007.01]
- 7/5387 • • • • • in a bridge configuration [4, 2007.01]
- 7/5388 • • • • • with asymmetrical configuration of switches [2007.01]
- 7/539 • • • • • with automatic control of output wave form or frequency (H02M 7/5375-H02M 7/5387 take precedence) [4]
- 7/5395 • • • • • by pulse-width modulation [4]
- 7/54 • • by dynamic converters

H02M

- 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) [2]
- 7/753 • • • • • using discharge tubes only [2]
- 7/757 • • • • • using semiconductor devices only [2]
- 7/758 • • • • • with automatic control of output waveform or frequency [4]
- 7/77 • • • • • arranged for operation in parallel [2]
- 7/79 • • • • using devices of a triode or transistor type requiring continuous application of a control signal (H02M 7/81 takes precedence) [2]

- 7/793 • • • • • using discharge tubes only [2]
- 7/797 • • • • • using semiconductor devices only [2]
- 7/81 • • • • • arranged for operation in parallel [2]
- 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
- 9/00 Conversion of dc or ac input power into surge output power [2]**
 - 9/02 • with dc input power [2]
 - 9/04 • • using capacitive stores [2]
 - 9/06 • with ac input power [2]
- 11/00 Power conversion systems not covered by the other groups of this subclass [4]**