

SECTION H — ELECTRICITY

H02 GENERATION, CONVERSION, OR DISTRIBUTION OF ELECTRIC POWER

H02K DYNAMO-ELECTRIC MACHINES (dynamo-electric relays H01H 53/00; conversion of DC or AC input power into surge output power H02M 9/00)

Note(s) [7]

1. This subclass covers the structural adaptation of dynamo-electric machines for the purpose of their control.
2. This subclass does not cover starting, regulating, electronically commutating, braking, or otherwise controlling motors, generators or dynamo-electric converters, in general, which is covered by subclass H02P.
3. Attention is drawn to the Notes following the titles of class B81 and subclass B81B relating to "micro-structural devices" and "micro-structural systems".

Subclass index

GENERATORS OR MOTORS

Continuously rotating

AC machines: asynchronous; synchronous; with mechanical commutators.....17/00, 19/00, 21/00, 27/00

DC machines or universal AC/DC motors: with mechanical commutators; with interrupters.....23/00, 25/00

with non-mechanical commutating devices.....29/00

Acyclic machines; oscillating machines; motors rotating step by step.....31/00, 33/00, 35/00, 37/00

Generators producing a non-sinusoidal waveform.....39/00

Machines with more than one rotor or stator.....16/00

SPECIAL DYNAMO-ELECTRIC APPARATUS

Machines for transmitting angular displacements; torque motors.....24/00, 26/00

Machines involving dynamo-electric interaction with a plasma or a flow of conductive liquid or of fluid-borne conductive or magnetic particles.....44/00

Systems for propulsing a rigid body along a path.....41/00

Converters.....47/00

Dynamo-electric clutches or brakes; dynamo-electric gears.....49/00, 51/00

Alleged perpetua mobilia.....53/00

Machines operating at cryogenic temperatures.....55/00

Other machines.....99/00

DETAILS

Magnetic circuits; windings; casings.....1/00, 3/00, 5/00

Arrangements structurally associated with the machine for handling mechanical energy; cooling; measuring or protective devices; current collection or commutation.....7/00, 9/00, 11/00, 13/00

MANUFACTURE.....15/00

1/00	Details of the magnetic circuit (magnetic circuits for relays H01H 50/16) [1, 2006.01]	1/18	• • • Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures [1, 2006.01]
1/02	• characterised by the magnetic material [1, 2006.01]		
1/04	• characterised by the material used for insulating the magnetic circuit or parts thereof [1, 2006.01]	1/20	• • • with channels or ducts for flow of cooling medium [1, 2006.01]
1/06	• characterised by the shape, form or construction [1, 2006.01]	1/22	• • Rotating parts of the magnetic circuit [1, 2006.01]
1/08	• • Salient poles [1, 2006.01]	1/24	• • • Rotor cores with salient poles [1, 2006.01]
1/10	• • • Commutating poles [1, 2006.01]	1/26	• • • Rotor cores with slots for windings [1, 2006.01]
1/12	• • Stationary parts of the magnetic circuit [1, 2006.01]	1/27	• • • Rotor cores with permanent magnets [5, 2006.01]
1/14	• • • Stator cores with salient poles [1, 2006.01]	1/28	• • • Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures [1, 2006.01]
1/16	• • • Stator cores with slots for windings [1, 2006.01]	1/30	• • • using intermediate parts, e.g. spiders [1, 2006.01]
1/17	• • • Stator cores with permanent magnets [5, 2006.01]	1/32	• • • with channels or ducts for flow of cooling medium [1, 2006.01]

- 1/34 • • Reciprocating, oscillating or vibrating parts of the magnetic circuit [1, 2006.01]
- 3/00 Details of windings [1, 2006.01]**
- 3/02 • Windings characterised by the conductor material [1, 2006.01]
- 3/04 • Windings characterised by the conductor shape, form or construction, e.g. with bar conductors [1, 2006.01]
- 3/12 • • arranged in slots [1, 2006.01]
- 3/14 • • • with transposed conductors, e.g. twisted conductors [1, 2006.01]
- 3/16 • • • for auxiliary purposes, e.g. damping or commutating [1, 2006.01]
- 3/18 • • Windings for salient poles [1, 2006.01]
- 3/20 • • • for auxiliary purposes, e.g. damping or commutating [1, 2006.01]
- 3/22 • • consisting of hollow conductors [1, 2006.01]
- 3/24 • • with channels or ducts for cooling medium between the conductors [1, 2006.01]
- 3/26 • • consisting of printed conductors [1, 2006.01]
- 3/28 • • Layout of windings or of connections between windings (windings for pole-changing H02K 17/06, H02K 17/14, H02K 19/12, H02K 19/32) [1, 2006.01]
- 3/30 • Windings characterised by the insulating material [1, 2006.01]
- 3/32 • Windings characterised by the shape, form or construction of the insulation [1, 2006.01]
- 3/34 • • between conductors or between conductor and core, e.g. slot insulation [1, 3, 2006.01]
- 3/38 • • around winding heads, equalising connectors, or connections thereto [1, 2006.01]
- 3/40 • • for high voltage, e.g. affording protection against corona discharges [1, 2006.01]
- 3/42 • Means for preventing or reducing eddy-current losses in the winding heads, e.g. by shielding [1, 2, 2006.01]
- 3/44 • Protection against moisture or chemical attack; Windings specially adapted for operation in liquid or gas [1, 2006.01]
- 3/46 • Fastening of windings on the stator or rotor structure [1, 2006.01]
- 3/47 • • Air-gap windings, i.e. iron-free windings [3, 2006.01]
- 3/48 • • in slots [1, 2006.01]
- 3/487 • • • Slot-closing devices [3, 2006.01]
- 3/493 • • • • magnetic [3, 2006.01]
- 3/50 • • Fastening of winding heads, equalising connectors, or connections thereto [1, 2006.01]
- 3/51 • • • applicable to rotors only [3, 2006.01]
- 3/52 • • Fastening salient pole windings or connections thereto [1, 2006.01]
- 5/00 Casings; Enclosures; Supports [1, 2006.01]**
- 5/02 • Casings or enclosures characterised by the material thereof [1, 2006.01]
- 5/04 • Casings or enclosures characterised by the shape, form or construction thereof [1, 2006.01]
- 5/06 • • Cast metal casings [1, 2006.01]
- 5/08 • • Insulating casings [1, 2006.01]
- 5/10 • • with arrangements for protection from ingress, e.g. of water or fingers [1, 2006.01]
- 5/12 • • specially adapted for operating in liquid or gas (combined with cooling arrangements H02K 9/00) [1, 2006.01]
- 5/124 • • • Sealing of shafts [3, 2006.01]
- 5/128 • • • using air-gap sleeves or air-gap discs [3, 2006.01]
- 5/132 • • • Submersible electric motors (H02K 5/128 takes precedence) [3, 2006.01]
- 5/136 • • • explosion-proof [3, 2006.01]
- 5/14 • • Means for supporting or protecting brushes or brush holders [1, 3, 2006.01]
- 5/15 • • Mounting arrangements for bearing-shields or end plates [3, 2006.01]
- 5/16 • • Means for supporting bearings, e.g. insulating supports or means for fitting bearings in the bearing-shields (magnetic bearings H02K 7/09) [1, 2006.01]
- 5/167 • • • using sliding-contact or spherical cap bearings [3, 2006.01]
- 5/173 • • • using bearings with rolling contact, e.g. ball bearings [3, 2006.01]
- 5/18 • • with ribs or fins for improving heat transfer [1, 2006.01]
- 5/20 • • with channels or ducts for flow of cooling medium [1, 2006.01]
- 5/22 • • Auxiliary parts of casings not covered by groups H02K 5/06-H02K 5/20, e.g. shaped to form connection boxes or terminal boxes [1, 2006.01]
- 5/24 • specially adapted for suppression or reduction of noise or vibrations [1, 2006.01]
- 5/26 • Means for adjusting casings relative to their supports [1, 2006.01]
- 7/00 Arrangements for handling mechanical energy structurally associated with dynamo-electric machines, e.g. structural association with mechanical driving motors or auxiliary dynamo-electric machines [1, 2006.01]**
- 7/02 • Additional mass for increasing inertia, e.g. flywheels [1, 2006.01]
- 7/04 • Balancing means [1, 2006.01]
- 7/06 • Means for converting reciprocating motion into rotary motion or vice versa [1, 2006.01]
- 7/065 • • Electromechanical oscillators; Vibrating magnetic drives [3, 2006.01]
- 7/07 • • using pawls and ratchet wheels [3, 2006.01]
- 7/075 • • using crankshafts or eccentrics [3, 2006.01]
- 7/08 • Structural association with bearings [1, 2006.01]
- 7/09 • • with magnetic bearings [3, 2006.01]
- 7/10 • Structural association with clutches, brakes, gears, pulleys or mechanical starters [1, 2006.01]
- 7/102 • • with friction brakes [1, 2006.01]
- 7/104 • • with eddy-current brakes [1, 2006.01]
- 7/106 • • with dynamo-electric brakes [1, 2006.01]
- 7/108 • • with friction clutches [1, 2006.01]
- 7/108 • • with dynamo-electric clutches [1, 2006.01]
- 7/112 • • with friction clutches in combination with brakes [1, 2006.01]
- 7/114 • • with dynamo-electric clutches in combination with brakes [1, 2006.01]
- 7/116 • • with gears [1, 2006.01]
- 7/118 • • with starting devices [1, 2006.01]
- 7/12 • • with auxiliary limited movement of stators, rotors or core parts, e.g. rotors axially movable for the purpose of clutching or braking [1, 2006.01]
- 7/14 • Structural association with mechanical loads, e.g. with hand-held machine tools or fans (with fan or impeller for cooling the machine H02K 9/06) [1, 2006.01]
- 7/16 • • for operation above the critical speed of vibration of the rotating parts [1, 2006.01]

- 7/18 • Structural association of electric generators with mechanical driving motors, e.g. with turbines [1, 2006.01]
- 7/20 • Structural association with auxiliary dynamo-electric machines, e.g. with electric starter motors or exciters [1, 2006.01]
- 9/00 **Arrangements for cooling or ventilating** (channels or ducts in parts of the magnetic circuit H02K 1/20, H02K 1/32; channels or ducts in or between conductors H02K 3/22, H02K 3/24) [1, 2006.01]
- 9/02 • by ambient air flowing through the machine [1, 2006.01]
- 9/04 • • having means for generating a flow of cooling medium [1, 2006.01]
- 9/06 • • • with fans or impellers driven by the machine shaft [1, 2006.01]
- 9/08 • by gaseous cooling medium circulating wholly within the machine casing (H02K 9/10 takes precedence) [1, 2006.01]
- 9/10 • by gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing [1, 2006.01]
- 9/12 • • wherein the cooling medium circulates freely within the casing [1, 2006.01]
- 9/14 • wherein gaseous cooling medium circulates between the machine casing and a surrounding mantle [1, 2006.01]
- 9/16 • • wherein the cooling medium circulates through ducts or tubes within the casing [1, 2006.01]
- 9/18 • • wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing [1, 2006.01]
- 9/19 • for machines with closed casing and closed-circuit cooling using a liquid cooling medium, e.g. oil [1, 2006.01]
- 9/193 • • with provision for replenishing the cooling medium; with means for preventing leakage of the cooling medium [1, 2006.01]
- 9/197 • • in which the rotor or stator space is fluid-tight, e.g. to provide for different cooling media for rotor and stator [1, 2006.01]
- 9/20 • • wherein the cooling medium vaporises within the machine casing [1, 2006.01]
- 9/22 • by solid heat conducting material embedded in, or arranged in contact with, the stator or rotor, e.g. heat bridges [1, 2006.01]
- 9/24 • Protection against failure of cooling arrangements, e.g. due to loss of cooling medium or due to interruption of the circulation of cooling medium [1, 2006.01]
- 9/26 • Structural association of machines with devices for cleaning or drying cooling medium, e.g. with filters [1, 2006.01]
- 9/28 • Cooling of commutators, slip-rings or brushes, e.g. by ventilating [1, 2006.01]
- 11/00 **Structural association of dynamo-electric machines with electric components or with devices for shielding, monitoring or protection** (casings, enclosures or supports H02K 5/00) [1, 2006.01, 2016.01]
- 11/01 • for shielding from electromagnetic fields (means for preventing or reducing eddy-current losses in the winding heads by shielding H02K 3/42) [2016.01]
- 11/02 • for suppression of electromagnetic interference [6, 2006.01, 2016.01]
- 11/026 • • Suppressors associated with brushes, brush holders or their supports [2016.01]
- 11/028 • • Suppressors associated with the rotor [2016.01]
- 11/04 • for rectification [6, 2006.01, 2016.01]
- 11/042 • • Rectifiers associated with rotating parts, e.g. rotor cores or rotary shafts [2016.01]
- 11/049 • • Rectifiers associated with stationary parts, e.g. stator cores [2016.01]
- 11/05 • • • Rectifiers associated with casings, enclosures or brackets [2016.01]
- 11/20 • for measuring, monitoring, testing, protecting or switching (rectifiers H02K 11/04; power electronics H02K 11/33) [2016.01]
- 11/21 • • Devices for sensing speed or position, or actuated thereby (specially adapted for machines having non-mechanical commutating devices H02K 29/06, H02K 29/14) [2016.01]
- 11/215 • • • Magnetic effect devices, e.g. Hall-effect or magneto-resistive elements [2016.01]
- 11/22 • • • Optical devices [2016.01]
- 11/225 • • • Detecting coils [2016.01]
- 11/23 • • • Mechanically-actuated centrifugal switches [2016.01]
- 11/24 • • Devices for sensing torque, or actuated thereby (H02K 11/27 takes precedence) [2016.01]
- 11/25 • • Devices for sensing temperature, or actuated thereby [2016.01]
- 11/26 • • Devices for sensing voltage, or actuated thereby, e.g. overvoltage protection devices [2016.01]
- 11/27 • • Devices for sensing current, or actuated thereby (overcurrent protection responsive to temperature of the machines or parts thereof, e.g. windings, H02K 11/25) [2016.01]
- 11/28 • • Manual switches [2016.01]
- 11/30 • Structural association with control circuits or drive circuits [2016.01]
- 11/33 • • Drive circuits, e.g. power electronics (H02K 11/38 takes precedence) [2016.01]
- 11/35 • • Devices for recording or transmitting machine parameters, e.g. memory chips or radio transmitters for diagnosis [2016.01]
- 11/38 • • Control circuits or drive circuits associated with geared commutator motors of the worm-and-wheel type [2016.01]
- 11/40 • Structural association with grounding devices [2016.01]
- 13/00 **Structural associations of current collectors with motors or generators, e.g. brush mounting plates or connections to windings** (supporting or protecting brushes or brush holders in motor casings or enclosures H02K 5/14); **Disposition of current collectors in motors or generators; Arrangements for improving commutation** [1, 2006.01]
- 13/02 • Connections between slip-rings and windings [1, 2006.01]
- 13/04 • Connections between commutator segments and windings [1, 2006.01]
- 13/06 • • Resistive connections, e.g. by high-resistance chokes or by transistors [1, 2006.01]
- 13/08 • • Segments formed by extensions of the winding [1, 2006.01]
- 13/10 • Arrangements of brushes or commutators specially adapted for improving commutation [1, 2006.01]
- 13/12 • Arrangements for producing an axial reciprocation of the rotor and its associated current collector part, e.g. for polishing commutator surfaces [1, 2006.01]

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- 13/14 • Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive elements [1, 2006.01]
- 15/00 Methods or apparatus specially adapted for manufacturing, assembling, maintaining or repairing of dynamo-electric machines [1, 2006.01]**
 - 15/02 • of stator or rotor bodies [1, 2006.01]
 - 15/03 • • having permanent magnets [5, 2006.01]
 - 15/04 • of windings, prior to mounting into machines (insulating windings H02K 15/10, H02K 15/12) [1, 2006.01]
 - 15/06 • Embedding prefabricated windings in machines [1, 2006.01]
 - 15/08 • Forming windings by laying conductors into or around core parts [1, 2006.01]
 - 15/085 • • by laying conductors into slotted stators [1, 2006.01]
 - 15/09 • • by laying conductors into slotted rotors [1, 2006.01]
 - 15/095 • • by laying conductors around salient poles [1, 2006.01]
 - 15/10 • Applying solid insulation to windings, stators or rotors [1, 2006.01]
 - 15/12 • Impregnating, heating or drying of windings, stators, rotors or machines [1, 2006.01]
 - 15/14 • Casings; Enclosures; Supports [1, 2006.01]
 - 15/16 • Centering rotors within the stator; Balancing rotors [1, 2006.01]
- 16/00 Machines with more than one rotor or stator [2, 2006.01]**
 - 16/02 • Machines with one stator and two rotors [2, 2006.01]
 - 16/04 • Machines with one rotor and two stators [2, 2006.01]

Note(s) [2]
Group H02K 16/00 takes precedence over groups H02K 17/00-H02K 53/00.
- 17/00 Asynchronous induction motors; Asynchronous induction generators [1, 2006.01]**
 - 17/02 • Asynchronous induction motors [1, 2006.01]
 - 17/04 • • for single phase current [1, 2006.01]
 - 17/06 • • • having windings arranged for permitting pole-changing [1, 2006.01]
 - 17/08 • • • Motors with auxiliary phase obtained by externally fed auxiliary windings, e.g. capacitor motors [1, 2006.01]
 - 17/10 • • • Motors with auxiliary phase obtained by split-pole carrying short-circuited windings [1, 2006.01]
 - 17/12 • • for multi-phase current [1, 2006.01]
 - 17/14 • • • having windings arranged for permitting pole-changing [1, 2006.01]
 - 17/16 • • having rotors with internally short-circuited windings, e.g. cage rotors [1, 2006.01]
 - 17/18 • • • having double-cage or multiple-cage rotors [1, 2006.01]
 - 17/20 • • • having deep-bar rotors [1, 2006.01]
 - 17/22 • • having rotors with windings connected to slip-rings [1, 2006.01]
 - 17/24 • • • in which both stator and rotor are fed with AC [1, 2006.01]
 - 17/26 • • having rotors or stators designed to permit synchronous operation [1, 2006.01]
 - 17/28 • • having compensating winding for improving phase angle [1, 2006.01]
- 17/30 • • Structural association of asynchronous induction motors with auxiliary electric devices influencing the characteristics of the motor or controlling the motor, e.g. with impedances or switches [1, 2006.01]
- 17/32 • • Structural association of asynchronous induction motors with auxiliary mechanical devices, e.g. with clutches or brakes [1, 2006.01]
- 17/34 • • Cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter [1, 2006.01]
- 17/36 • • • with another asynchronous induction motor [1, 2006.01]
- 17/38 • • • with a commutator machine [1, 2006.01]
- 17/40 • • • with a rotary AC/DC converter [1, 2006.01]
- 17/42 • Asynchronous induction generators (H02K 17/02 takes precedence) [1, 4, 2006.01]
- 17/44 • • Structural association with exciting machines [1, 2006.01]
- 19/00 Synchronous motors or generators (having permanent magnets H02K 21/00) [1, 2006.01]**
 - 19/02 • Synchronous motors [1, 2006.01]
 - 19/04 • • for single-phase current [1, 2006.01]
 - 19/06 • • • Motors having windings on the stator and a variable-reluctance soft-iron rotor without windings, e.g. inductor motors [1, 2006.01]
 - 19/08 • • • Motors having windings on the stator and a smooth rotor without windings of material with large hysteresis, e.g. hysteresis motors [1, 2006.01]
 - 19/10 • • for multi-phase current [1, 2006.01]
 - 19/12 • • • characterised by the arrangement of exciting windings, e.g. for self-excitation, compounding or pole-changing [1, 2006.01]
 - 19/14 • • having additional short-circuited windings for starting as asynchronous motors [1, 2006.01]
 - 19/16 • Synchronous generators [1, 2006.01]
 - 19/18 • • having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar generators [1, 2006.01]
 - 19/20 • • • with variable-reluctance soft-iron rotors without winding [1, 2006.01]
 - 19/22 • • having windings each turn of which co-operates alternately with poles of opposite polarity, e.g. heteropolar generators [1, 2006.01]
 - 19/24 • • • with variable-reluctance soft-iron rotors without winding [1, 2006.01]
 - 19/26 • • characterised by the arrangement of exciting windings [1, 2006.01]
 - 19/28 • • • for self-excitation [1, 2006.01]
 - 19/30 • • • for compounding [1, 2006.01]
 - 19/32 • • • for pole-changing [1, 2006.01]
 - 19/34 • • Generators with two or more outputs [1, 2006.01]
 - 19/36 • • Structural association of synchronous generators with auxiliary electric devices influencing the characteristic of the generator or controlling the generator, e.g. with impedances or switches [1, 2006.01]
 - 19/38 • • Structural association of synchronous generators with exciting machines [1, 2006.01]
- 21/00 Synchronous motors having permanent magnets; Synchronous generators having permanent magnets [1, 2006.01]**
 - 21/02 • Details [1, 2006.01]

21/04	• • Windings on magnets for additional excitation [1, 2006.01]	23/20	• • having additional brushes spaced intermediately of the main brushes on the commutator, e.g. cross-field machines, metadynes, amplidynes or other armature-reaction excited machines [1, 2006.01]
21/10	• • Rotating armatures [1, 2006.01]	23/22	• • having compensating or damping windings [1, 2006.01]
21/12	• with stationary armatures and rotating magnets [1, 2006.01]	23/24	• • having commutating-pole windings [1, 2006.01]
21/14	• • with magnets rotating within the armatures [1, 2006.01]	23/26	• characterised by the armature windings [1, 2006.01]
21/16	• • • having annular armature cores with salient poles (with homopolar co-operation H02K 21/20) [1, 2006.01]	23/28	• • having open windings, i.e. not closed within the armatures [1, 2006.01]
21/18	• • • having horse-shoe armature cores (with homopolar co-operation H02K 21/20) [1, 2006.01]	23/30	• • having lap windings; having loop windings [1, 2006.01]
21/20	• • • having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar machine [1, 2006.01]	23/32	• • having wave winding; having undulating winding [1, 2006.01]
21/22	• • with magnets rotating around the armatures, e.g. flywheel magnetos [1, 2006.01]	23/34	• • having mixed windings [1, 2006.01]
21/24	• • with magnets axially facing the armatures, e.g. hub-type cycle dynamos [1, 2006.01]	23/36	• • having two or more windings; having two or more commutators; having two or more stators [1, 2006.01]
21/26	• with rotating armatures and stationary magnets [1, 2006.01]	23/38	• • having winding or connection for improving commutation, e.g. equipotential connection [1, 2006.01]
21/28	• • with armatures rotating within the magnets [1, 2006.01]	23/40	• characterised by the arrangement of the magnet circuits [1, 2006.01]
21/30	• • • having annular armature cores with salient poles (with homopolar co-operation H02K 21/36) [1, 2006.01]	23/42	• • having split poles, i.e. zones for varying reluctance by gaps in poles or by poles with different spacing of the air gap [1, 2006.01]
21/32	• • • having horse-shoe magnets (with homopolar co-operation H02K 21/36) [1, 2006.01]	23/44	• • having movable, e.g. turnable, iron parts [1, 2006.01]
21/34	• • • having bell-shaped or bar-shaped magnets, e.g. for cycle lighting (with homopolar co-operation H02K 21/36) [1, 2006.01]	23/46	• • having stationary shunts, i.e. magnetic cross flux [1, 2006.01]
21/36	• • • with homopolar co-operation [1, 2006.01]	23/48	• • having adjustable armatures [1, 2006.01]
21/38	• with rotating flux distributors, and armatures and magnets both stationary [1, 2006.01]	23/50	• Generators with two or more outputs [1, 2006.01]
21/40	• • with flux distributors rotating around the magnets and within the armatures [1, 2006.01]	23/52	• Motors acting also as generators, e.g. starting motors used as generators for ignition or lighting [1, 2006.01]
21/42	• • with flux distributors rotating around the armatures and within the magnets [1, 2006.01]	23/54	• Disc armature motors or generators [1, 2006.01]
21/44	• • with armature windings wound upon the magnets [1, 2006.01]	23/56	• Motors or generators having iron cores separated from armature winding [1, 2006.01]
21/46	• Motors having additional short-circuited winding for starting as an asynchronous motor [1, 2006.01]	23/58	• Motors or generators without iron cores [1, 2006.01]
21/48	• Generators with two or more outputs [1, 2006.01]	23/60	• Motors or generators having rotating armatures and rotating excitation field [1, 2006.01]
23/00	DC commutator motors or generators having mechanical commutator; Universal AC/DC commutator motors [1, 2006.01]	23/62	• Motors or generators with stationary armatures and rotating excitation field [1, 2006.01]
23/02	• characterised by arrangement for exciting [1, 2006.01]	23/64	• Motors specially adapted for running on DC or AC by choice [1, 2006.01]
23/04	• • having permanent magnet excitation [1, 2006.01]	23/66	• Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine, e.g. with impedances or switches [1, 2006.01]
23/06	• • having shunt connection of excitation windings [1, 2006.01]	23/68	• Structural association with auxiliary mechanical devices, e.g. with clutches or brakes [1, 2006.01]
23/08	• • having series connection of excitation windings [1, 2006.01]	24/00	Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn [1, 2006.01]
23/10	• • having compound connection of excitation windings [1, 2006.01]	25/00	DC interrupter motors or generators [1, 2006.01]
23/12	• • having excitation produced by current sources independent of the armature circuit [1, 2006.01]	26/00	Machines adapted to function as torque motors, i.e. to exert a torque when stalled [1, 2006.01]
23/14	• • having high-speed excitation or de-excitation, e.g. by neutralising the remanent excitation field [1, 2006.01]	27/00	AC commutator motors or generators having mechanical commutator [1, 2006.01]
23/16	• • having angularly adjustable excitation field, e.g. by pole reversing or pole switching [1, 2006.01]	27/02	• characterised by the armature winding [1, 2006.01]
23/18	• • having displaceable main or auxiliary brushes [1, 2006.01]	27/04	• having single-phase operation in series or shunt connection [1, 2006.01]
		27/06	• • with a single or multiple short-circuited commutator, e.g. repulsion motor [1, 2006.01]

- 27/08 • • with multiple-fed armature [1, 2006.01]
- 27/10 • • with switching devices for different modes of operation, e.g. repulsion-induction motor [1, 2006.01]
- 27/12 • having multi-phase operation [1, 2006.01]
- 27/14 • • in series connection [1, 2006.01]
- 27/16 • • in shunt connection with stator feeding [1, 2006.01]
- 27/18 • • in shunt connection with rotor feeding [1, 2006.01]
- 27/20 • Structural association with a speed regulating device [1, 2006.01]
- 27/22 • having means for improving commutation, e.g. auxiliary fields, double windings, double brushes [1, 2006.01]
- 27/24 • having two or more commutators [1, 2006.01]
- 27/26 • having disc armature [1, 2006.01]
- 27/28 • Structural association with auxiliary electric devices influencing the characteristic of the machine or controlling the machine [1, 2006.01]
- 27/30 • Structural association with auxiliary mechanical devices, e.g. with clutches or brakes [1, 2006.01]
- 29/00 Motors or generators having non-mechanical commutating devices, e.g. discharge tubes or semiconductor devices [1, 2006.01]**
- 29/03 • with a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems [6, 2006.01]
- 29/06 • with position sensing devices (H02K 29/03 takes precedence) [4, 6, 2006.01]
- 29/08 • • using magnetic effect devices, e.g. Hall-plates or magneto-resistors (H02K 29/12 takes precedence) [4, 2006.01]
- 29/10 • • using light effect devices [4, 2006.01]
- 29/12 • • using detecting coils [4, 2006.01]
- 29/14 • with speed sensing devices (H02K 29/03 takes precedence) [4, 6, 2006.01]
- 31/00 Acyclic motors or generators, i.e. DC machines having drum or disc armatures with continuous current collectors [1, 2006.01]**
- 31/02 • with solid-contact collectors [1, 2006.01]
- 31/04 • with at least one liquid-contact collector [1, 2006.01]
- 33/00 Motors with reciprocating, oscillating or vibrating magnet, armature or coil system (arrangements for handling mechanical energy structurally associated with motors H02K 7/00, e.g. H02K 7/06) [1, 2006.01]**
- 33/02 • with armatures moved one way by energisation of a single coil system and returned by mechanical force, e.g. by springs [1, 2006.01]
- 33/04 • • wherein the frequency of operation is determined by the frequency of uninterrupted AC energisation [1, 2006.01]
- 33/06 • • • with polarised armatures [1, 2006.01]
- 33/08 • • • with DC energisation superimposed on AC energisation [1, 2006.01]
- 33/10 • • wherein the alternate energisation and de-energisation of the single coil system is effected or controlled by movement of the armatures [1, 2006.01]
- 33/12 • with armatures moving in alternate directions by alternate energisation of two coil systems [1, 2006.01]
- 33/14 • • wherein the alternate energisation and de-energisation of the two coil systems are effected or controlled by movement of the armatures [1, 2006.01]
- 33/16 • with polarised armatures moving in alternate directions by reversal or energisation of a single coil system [1, 2006.01]
- 33/18 • with coil systems moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnets [1, 2006.01]
- 35/00 Generators with reciprocating, oscillating or vibrating coil system, magnet, armature or other part of the magnetic circuit (arrangements for handling mechanical energy structurally associated with generators H02K 7/00, e.g. H02K 7/06) [1, 2006.01]**
- 35/02 • with moving magnets and stationary coil systems [1, 2006.01]
- 35/04 • with moving coil systems and stationary magnets [1, 2006.01]
- 35/06 • with moving flux distributors, and both coil systems and magnets stationary [1, 2006.01]
- 37/00 Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors [1, 2006.01]**
- 37/02 • of variable reluctance type [4, 2006.01]
- 37/04 • • with rotors situated within the stators [4, 2006.01]
- 37/06 • • with rotors situated around the stators [4, 2006.01]
- 37/08 • • with rotors axially facing the stators [4, 2006.01]
- 37/10 • of permanent magnet type (H02K 37/02 takes precedence) [4, 2006.01]
- 37/12 • • with stationary armatures and rotating magnets [4, 2006.01]
- 37/14 • • • with magnets rotating within the armatures [4, 2006.01]
- 37/16 • • • • having horseshoe armature cores [4, 2006.01]
- 37/18 • • • • of homopolar type [4, 2006.01]
- 37/20 • • with rotating flux distributors, the armatures and magnets both being stationary [4, 2006.01]
- 37/22 • Damping units [4, 2006.01]
- 37/24 • Structural association with auxiliary mechanical devices [4, 2006.01]
- 39/00 Generators specially adapted for producing a desired non-sinusoidal waveform [1, 2006.01]**
- 41/00 Propulsion systems in which a rigid body is moved along a path due to dynamo-electric interaction between the body and a magnetic field travelling along the path [1, 2006.01]**
- 41/02 • Linear motors; Sectional motors [1, 3, 2006.01]
- 41/025 • • Asynchronous motors [3, 2006.01]
- 41/03 • • Synchronous motors; Motors moving step by step; Reluctance motors (H02K 41/035 takes precedence) [3, 2006.01]
- 41/035 • • DC motors; Unipolar motors [3, 2006.01]
- 41/06 • Rolling motors, i.e. motors having the rotor axis parallel to the stator axis and following a circular path as the rotor rolls around the inside or outside of the stator [1, 2006.01]
- 44/00 Machines in which the dynamo-electric interaction between a plasma or flow of conductive liquid or of fluid-borne conductive or magnetic particles and a coil system or magnetic field converts energy of mass flow into electrical energy or vice versa [3, 2006.01]**
- 44/02 • Electrodynamical pumps [3, 2006.01]
- 44/04 • • Conduction pumps [3, 2006.01]
- 44/06 • • Induction pumps [3, 2006.01]

- 44/08 • Magnetohydrodynamic [MHD] generators [3, 2006.01]
- 44/10 • • Constructional details of electrodes [3, 2006.01]
- 44/12 • • Constructional details of fluid channels [3, 2006.01]
- 44/14 • • • Circular or screw-shaped channels [3, 2006.01]
- 44/16 • • Constructional details of the magnetic circuits [3, 2006.01]
- 44/18 • • for generating AC power [3, 2006.01]
- 44/20 • • • by changing the polarity of the magnetic field [3, 2006.01]
- 44/22 • • • by changing the conductivity of the fluid [3, 2006.01]
- 44/24 • • • by reversing the direction of fluid [3, 2006.01]
- 44/26 • • • by creating a travelling magnetic field [3, 2006.01]
- 44/28 • Association of MHD generators with conventional generators (nuclear power plants including a MHD generator G21D 7/02) [3, 2006.01]

- 47/00 Dynamo-electric converters [1, 2006.01]**
- 47/02 • AC/DC converters or vice versa [1, 2006.01]
- 47/04 • • Motor/generators [1, 2006.01]
- 47/06 • • Cascade converters [1, 2006.01]
- 47/08 • • Single-armature converters [1, 2006.01]
- 47/10 • • • with booster machines on the AC side [1, 2006.01]
- 47/12 • DC/DC converters [1, 2006.01]
- 47/14 • • Motor/generators [1, 2006.01]
- 47/16 • • Single-armature converters, e.g. metadyne [1, 2006.01]
- 47/18 • AC/AC converters [1, 2006.01]
- 47/20 • • Motor/generators [1, 2006.01]
- 47/22 • • Single-armature frequency converters with or without phase-number conversion [1, 2006.01]

- 47/24 • • • having windings for different numbers of poles [1, 2006.01]
- 47/26 • • • operating as under- or over-synchronously running asynchronous induction machines, e.g. cascade arrangement of asynchronous and synchronous machines [1, 2006.01]
- 47/28 • • • operating as commutator machines with added slip-rings [1, 2006.01]
- 47/30 • • Single-armature phase-number converters without frequency conversion [1, 2006.01]

- 49/00 Dynamo-electric clutches; Dynamo-electric brakes [1, 2006.01]**
- 49/02 • of the asynchronous induction type [1, 2006.01]
- 49/04 • • of the eddy-current hysteresis type [1, 2006.01]
- 49/06 • of the synchronous type [1, 2006.01]
- 49/08 • of the collector armature type [1, 2006.01]
- 49/10 • of the permanent-magnet type [1, 2006.01]
- 49/12 • of the acyclic type [1, 2006.01]

- 51/00 Dynamo-electric gears, i.e. dynamo-electric means for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts [1, 2006.01]**

- 53/00 Alleged dynamo-electric perpetua mobilia [1, 2006.01]**

- 55/00 Dynamo-electric machines having windings operating at cryogenic temperatures [3, 2006.01]**
- 55/02 • of the synchronous type [3, 2006.01]
- 55/04 • • with rotating field windings [3, 2006.01]
- 55/06 • of the homopolar type [3, 2006.01]

- 99/00 Subject matter not provided for in other groups of this subclass [2014.01]**