

## SECTION H — ELECTRICITY

### H02 GENERATION, CONVERSION, OR DISTRIBUTION OF ELECTRIC POWER

**H02K DYNAMO-ELECTRIC MACHINES** (measuring instruments G01; dynamo-electric relays H01H 53/00; conversion of dc or ac input power into surge output power H02M 9/00; loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers H04R)

#### Note(s)

1. This subclass covers the structural adaptation of the machines for the purposes 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 are 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 commutator.....17/00, 19/00, 21/00, 27/00
- dc machines or universal ac/dc motors: with mechanical commutator; with interrupter.....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
- Machines not otherwise provided for.....57/00

##### 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

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| <p><b>1/00 Details of the magnetic circuit</b> (magnetic circuits or magnets in general, magnetic circuits for transformers for power supply H01F; magnetic circuits for relays H01H 50/16)</p> <p>1/02 • characterised by the magnetic material</p> <p>1/04 • characterised by the material used for insulating the magnetic circuit or parts thereof (insulation of windings H02K 3/30)</p> <p>1/06 • characterised by the shape, form, or construction</p> <p>1/08 • • Salient poles</p> <p>1/10 • • • Commutating poles</p> <p>1/12 • • • Stationary parts of the magnetic circuit</p> <p>1/14 • • • Stator cores with salient poles</p> <p>1/16 • • • Stator cores with slots for windings</p> <p>1/17 • • • Stator cores with permanent magnets [5]</p> | <p>1/18 • • • Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures</p> <p>1/20 • • • with channels or ducts for flow of cooling medium</p> <p>1/22 • • Rotating parts of magnetic circuit</p> <p>1/24 • • • Rotor cores with salient poles</p> <p>1/26 • • • Rotor cores with slots for windings</p> <p>1/27 • • • Rotor cores with permanent magnets [5]</p> <p>1/28 • • • Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures</p> <p>1/30 • • • • using intermediate part or parts, e.g. spider</p> <p>1/32 • • • with channels or ducts for flow of cooling medium</p> <p>1/34 • • Reciprocating, oscillating, or vibrating part of magnetic circuit</p> |
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**3/00 Details of windings** (coils in general H01F 5/00)

- 3/02 • Windings characterised by the conductor material (conductors in general H01B 1/00, H01B 5/00)
- 3/04 • Windings characterised by the conductor shape, form, or construction, e.g. with bar conductor
- 3/12 • • arranged in slots
- 3/14 • • • with transposed conductors, e.g. twisted conductor
- 3/16 • • • for damping, commutating, or other auxiliary purposes
- 3/18 • • Windings for salient poles
- 3/20 • • • for damping, commutating, or other auxiliary purposes
- 3/22 • • consisting of hollow conductors
- 3/24 • • with channels or ducts between the conductors for flow of cooling medium
- 3/26 • • consisting of printed conductors
- 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)
- 3/30 • Windings characterised by the insulating material (insulating bodies in general H01B 3/00, H01B 17/00)
- 3/32 • Windings characterised by the shape, form, or construction of the insulation
- 3/34 • • between conductors or between conductor and core, e.g. slot insulation [3]
- 3/38 • • around winding heads, equalising connectors, or connections thereto
- 3/40 • • for high voltage, e.g. affording protection against corona
- 3/42 • Means for preventing or reducing eddy-current losses in the winding heads, e.g. by shielding [2]
- 3/44 • Protection against moisture or chemical attack; Windings specially adapted for operation in liquid or gas
- 3/46 • Fastening of windings on stator or rotor structure
- 3/47 • • Air-gap windings, i.e. iron-free windings [3]
- 3/48 • • in slots
- 3/487 • • • Slot-closing devices [3]
- 3/493 • • • • where the devices are magnetic [3]
- 3/50 • • Fastening of winding heads, equalising connectors, or connections thereto
- 3/51 • • • applicable to rotors only [3]
- 3/52 • • Fastening salient pole windings or connections thereto

**5/00 Casings; Enclosures; Supports** (casings for electric apparatus in general H05K 5/00)

- 5/02 • Casings or enclosures characterised by the material thereof
- 5/04 • Casings or enclosures characterised by the shape, form, or construction thereof
- 5/06 • • Cast metal casings
- 5/08 • • Insulating casings
- 5/10 • • affording protection from ingress, e.g. of water, of fingers
- 5/12 • • specially adapted for operating in liquid or gas (combined with cooling arrangements H02K 9/00)
- 5/124 • • • Sealing of the shaft [3]
- 5/128 • • • using air-gap sleeve or air-gap disc [3]
- 5/132 • • • Submersible electric motor (H02K 5/128 takes precedence; pumping installations or systems for submerged use F04D 13/08) [3]
- 5/136 • • • explosion-proof [3]

- 5/14 • • Means for supporting or protecting brushes or brush holders [3]
- 5/15 • • Mounting arrangements for bearing-shields or end plates [3]
- 5/16 • • Means for supporting bearings, e.g. insulating support, means for fitting the bearing in the bearing-shield (magnetic bearings H02K 7/09)
- 5/167 • • • using sliding-contact or spherical cap bearings [3]
- 5/173 • • • using ball bearings or bearings with rolling contact [3]
- 5/18 • • with ribs or fins for improving heat transfer
- 5/20 • • with channels or ducts for flow of cooling medium
- 5/22 • • Other additional parts of casings, e.g. shaped to form connection or terminal box
- 5/24 • specially adapted for suppression or reduction of noise or vibration
- 5/26 • Means for adjusting the casing relative to its support

**7/00 Arrangements for handling mechanical energy structurally associated with the machine, e.g. structural association with mechanical driving motor or auxiliary dynamo-electric machine**

- 7/02 • Additional mass for increasing inertia, e.g. flywheel
- 7/04 • Balancing means
- 7/06 • Means for converting reciprocating into rotary motion or *vice versa*
- 7/065 • • Electromechanical oscillators; Vibrating magnetic drives (in time-pieces G04C 5/00) [3]
- 7/07 • • using pawl and ratchet wheel [3]
- 7/075 • • using crankshaft or eccentric [3]
- 7/08 • Structural association with bearings (support in machine casing H02K 5/16)
- 7/09 • • with magnetic bearings [3]
- 7/10 • Structural association with clutches, brakes, gears, pulleys, mechanical starters
- 7/102 • • with friction brakes
- 7/104 • • with eddy-current brakes
- 7/106 • • with dynamo-electric brakes
- 7/108 • • with friction clutches
- 7/11 • • with dynamo-electric clutches
- 7/112 • • with friction clutches and brakes
- 7/114 • • with dynamo-electric clutches and brakes
- 7/116 • • with gears
- 7/118 • • with starting device
- 7/12 • • with auxiliary limited movement of stator, rotor, or core parts, e.g. rotor axially movable for the purpose of clutching or braking
- 7/14 • Structural association with mechanical load, e.g. hand-held machine tool, fan (with fan or impeller for cooling the machine H02K 9/06; for suction cleaners A47L)
- 7/16 • • for operation above critical speed of vibration of rotating parts
- 7/18 • Structural association of electric generator with mechanical driving motor, e.g. turbine (if the driving-motor aspect predominates, see the relevant place of section F, e.g. F03B 13/00)
- 7/20 • Structural association with auxiliary dynamo-electric machine, e.g. with electric starter motor, with exciter
- 9/00 Systems 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)
- 9/02 • by ambient air flowing through the machine

9/04	• • having means for generating flow of cooling medium, e.g. having fan	13/14	• Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive element
9/06	• • • with fan or impeller driven by the machine shaft		
9/08	• by gaseous cooling medium circulating wholly within the machine casing (H02K 9/10 takes precedence)	<b>15/00</b>	<b>Methods or apparatus specially adapted for manufacturing, assembling, maintaining, or repairing dynamo-electric machines</b> (manufacture of current collectors in general H01R 43/00)
9/10	• by gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing	15/02	• of stator or rotor bodies
9/12	• • wherein the cooling medium circulates freely within the casing	15/03	• • having permanent magnets [5]
9/14	• wherein gaseous cooling medium circulates between the machine casing and a surrounding mantle	15/04	• of windings, prior to mounting into the machine (insulating windings H02K 15/10, H02K 15/12; coil manufacture in general H01F 41/02)
9/16	• • wherein the cooling medium circulates through ducts or tubes within the casing	15/06	• Embedding prefabricated windings in the machine
9/18	• • wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing	15/08	• Forming windings by laying conductors into or around core part
9/19	• for machines with closed casing and with closed-circuit cooling using a liquid cooling medium, e.g. oil	15/085	• • by laying conductors into slotted stators
9/193	• • with provision for replenishing the cooling medium; with means for preventing leakage of the cooling medium	15/09	• • by laying conductors into slotted rotors
9/197	• • in which the rotor or stator space is fluid-tight, e.g. to provide for different cooling media for rotor and stator	15/095	• • by laying conductors around salient poles
9/20	• • wherein the cooling medium vaporises within the machine casing	15/10	• Applying solid insulation to the windings, the stator, or the rotor
9/22	• by solid heat conducting material embedded in, or arranged in contact with, stator or rotor, e.g. heat bridge	15/12	• Impregnating, heating or drying of windings, stators, rotors, or machines
9/24	• Protection against failure of cooling arrangements, e.g. due to loss of cooling medium, due to interruption of the circulation of cooling medium (circuit arrangements affording such protection H02H 7/00)	15/14	• Casings; Enclosures; Supports
9/26	• Structural association with machine of devices for cleaning or drying cooling medium, e.g. of filter	15/16	• Centering the rotor within the stator; Balancing the rotor (balancing in general G01M)
9/28	• Cooling of commutators, slip-rings, or brushes, e.g. by ventilating (current collectors in general H01R 39/00)	<b>16/00</b>	<b>Machines with more than one rotor or stator [2]</b>
<b>11/00</b>	<b>Structural association with measuring or protective devices or electric components, e.g. with resistor, with switch, with suppressor for radio interference</b>	16/02	• Machines with one stator and two rotors [2]
11/02	• for suppression of radio interference [6]	16/04	• Machines with one rotor and two stators [2]
11/04	• for rectification [6]		
<b>13/00</b>	<b>Structural associations of current collectors with motors or generators, e.g. brush mounting plates, connections to windings</b> (supporting or protecting brushes or brush holders in motor casings or enclosures H02K 5/14); <b>Disposition of current collectors in motors or generators; Arrangements for improving commutation</b>	<b>Note(s)</b>	Group H02K 16/00 takes precedence over groups H02K 17/00-H02K 53/00.
13/02	• Connections of slip-rings with the winding	<b>17/00</b>	<b>Asynchronous induction motors; Asynchronous induction generators</b>
13/04	• Connections of commutator segments with the winding	17/02	• Asynchronous induction motors
13/06	• • Resistive connections between winding and commutator segments, e.g. by high-resistance choke, by transistor	17/04	• • for single phase current
13/08	• • Segments formed by extensions of winding	17/06	• • • having windings arranged for permitting pole-changing
13/10	• Special arrangements of brushes or commutators for the purpose of improving commutation	17/08	• • • Motors with auxiliary phase obtained by externally fed auxiliary winding, e.g. capacitor motor
13/12	• Means for producing an axial reciprocation of the rotor and its associated current collector part, e.g. for polishing commutator surface	17/10	• • • Motors with auxiliary phase obtained by split-pole carrying short-circuited winding
		17/12	• • for multi-phase current
		17/14	• • • having windings arranged for permitting pole-changing
		17/16	• • having rotor with internally short-circuited windings, e.g. cage rotor
		17/18	• • • having double- or multiple-cage rotor
		17/20	• • • having deep-bar rotor
		17/22	• • having rotor with windings connected to slip-rings
		17/24	• • • in which both stator and rotor are fed with ac
		17/26	• • having rotor or stator designed to permit synchronous operation
		17/28	• • having compensating winding for improving phase angle
		17/30	• • Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the motor, e.g. with impedance, with switch (control arrangements external to the motor H02P)
		17/32	• • Structural association with auxiliary mechanical devices, e.g. clutch, brake (control arrangements external to the motor H02P)

## H02K

- 17/34 • • Cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter (control of cascade arrangements H02P)
- 17/36 • • • with another asynchronous induction motor
- 17/38 • • • with a commutator machine
- 17/40 • • • with a rotary ac/dc converter (cascade ac/dc converters H02K 47/06)
- 17/42 • Asynchronous induction generators (H02K 17/02 takes precedence) [4]
- 17/44 • • Structural association with exciting machine
- 19/00 Synchronous motors or generators (having permanent magnet H02K 21/00)**
- 19/02 • Synchronous motors
- 19/04 • • for single-phase current
- 19/06 • • • Motors having windings on the stator and a variable-reluctance soft-iron rotor without windings, e.g. inductor motor
- 19/08 • • • Motors having windings on the stator and a smooth rotor of material with large hysteresis without windings, e.g. hysteresis motor
- 19/10 • • for multi-phase current
- 19/12 • • • characterised by the arrangement of exciting windings, e.g. for self-excitation, for compounding, for pole-changing
- 19/14 • • having additional short-circuited winding for starting as an asynchronous motor
- 19/16 • Synchronous generators
- 19/18 • • having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar generator
- 19/20 • • • with variable-reluctance soft-iron rotor without winding
- 19/22 • • having windings each turn of which co-operates alternately with poles of opposite polarity, e.g. heteropolar generator
- 19/24 • • • with variable-reluctance soft-iron rotor without winding
- 19/26 • • characterised by the arrangement of exciting winding
- 19/28 • • • for self-excitation
- 19/30 • • • for compounding
- 19/32 • • • for pole-changing
- 19/34 • • Generators with two or more outputs
- 19/36 • • Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the generator, e.g. with impedance, with switch (control arrangements external to the generator H02P)
- 19/38 • • Structural association with exciting machine
- 21/00 Synchronous motors having permanent magnet; Synchronous generators having permanent magnet (stator cores with permanent magnets H02K 1/17; rotor cores with permanent magnets H02K 1/27)**
- 21/02 • Details
- 21/04 • • Windings on magnet for additional excitation
- 21/10 • • Rotating armatures
- 21/12 • with stationary armature and rotating magnet
- 21/14 • • magnet rotating within armature
- 21/16 • • • having an annular armature core with salient poles (with homopolar co-operation H02K 21/20)
- 21/18 • • • having horse-shoe armature core (with homopolar co-operation H02K 21/20)
- 21/20 • • • having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar machine
- 21/22 • • magnet rotating around armature, e.g. flywheel magneto
- 21/24 • • magnet axially facing armature, e.g. hub-type cycle dynamo
- 21/26 • with rotating armature and stationary magnet
- 21/28 • • armature rotating within magnet
- 21/30 • • • having an annular armature core with salient poles (with homopolar co-operation H02K 21/36)
- 21/32 • • • having a horse-shoe magnet (with homopolar co-operation H02K 21/36)
- 21/34 • • • having bell-shaped or bar-shaped magnet, e.g. for cycle lighting (with homopolar co-operation H02K 21/36)
- 21/36 • • • with homopolar co-operation
- 21/38 • with rotating flux distributor, and armature and magnet both stationary
- 21/40 • • flux distributor rotating around magnet and within armature
- 21/42 • • flux distributor rotating around armature and within magnet
- 21/44 • • armature windings wound upon magnet
- 21/46 • Motors having additional short-circuited winding for starting as an asynchronous motor
- 21/48 • Generators with two or more outputs
- 23/00 Dc commutator motors or generators having mechanical commutator; Universal ac/dc commutator motors**
- 23/02 • characterised by the exciting arrangement
- 23/04 • • having permanent magnet excitation
- 23/06 • • having shunt connection of excitation windings
- 23/08 • • having series connection of excitation windings
- 23/10 • • having compound connection of excitation windings
- 23/12 • • having excitation produced by a current source independent of the armature circuit
- 23/14 • • having high-speed excitation or de-excitation, e.g. by neutralising the remanent excitation field
- 23/16 • • having angularly adjustable excitation field, e.g. by pole reversing, by pole switching
- 23/18 • • having displaceable main or auxiliary brushes
- 23/20 • • having additional brushes spaced intermediately of the main brushes on the commutator, e.g. cross-field machine, metadyne, amplidyne, other armature-reaction excited machine
- 23/22 • • having compensating or damping winding
- 23/24 • • having commutating-pole winding
- 23/26 • characterised by the armature winding
- 23/28 • • having open winding, i.e. not closed within armature
- 23/30 • • having lap winding; having loop winding
- 23/32 • • having wave winding; having undulating winding
- 23/34 • • having mixed windings
- 23/36 • • having more than one winding; having more than one commutator; having more than one stator
- 23/38 • • having winding or connection for improving commutation, e.g. equipotential connection
- 23/40 • characterised by the arrangement of the magnet circuit
- 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

23/44	• • having movable or turnable iron parts	29/08	• • using magnetic effect devices, e.g. Hall-plates, magneto-resistors (H02K 29/12 takes precedence) [4]
23/46	• • having stationary shunts, i.e. magnetic cross flux	29/10	• • using light effect devices [4]
23/48	• • having adjustable armature	29/12	• • using detecting coils [4]
23/50	• Generators with two or more outputs	29/14	• with speed sensing devices (H02K 29/03 takes precedence) [4, 6]
23/52	• Motors acting also as generators, e.g. starting motor used as generator for ignition or lighting	<b>31/00</b>	<b>Acyclic motors or generators, i.e. dc machines having a drum or disc armature with continuous current collectors</b>
23/54	• Disc armature motors or generators	31/02	• with solid-contact collectors
23/56	• Motors or generators having the iron core separated from armature winding	31/04	• with at least one liquid-contact collector
23/58	• Motors or generators having no iron core	<b>33/00</b>	<b>Motors with reciprocating, oscillating, or vibrating magnet, armature, or coil system</b> (arrangements for handling mechanical energy structurally associated with motors H02K 7/00, e.g. H02K 7/06)
23/60	• Motors or generators having a rotating armature and a rotating excitation field	33/02	• with armature moved one way by energisation of a single coil system and returned by mechanical force, e.g. by spring
23/62	• Motors or generators with stationary armature and rotating excitation field	33/04	• • wherein the frequency of operation is determined by the frequency of uninterrupted ac energisation
23/64	• Motors specially adapted for running on dc or ac by choice	33/06	• • • with polarised armature
23/66	• Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine, e.g. with impedance, with switch (control arrangements external to the machine H02P)	33/08	• • • with dc energisation superimposed on ac energisation
23/68	• Structural association with auxiliary mechanical devices, e.g. with clutch, with brake (control arrangements external to the machine H02P)	33/10	• • wherein the alternate energisation and de-energisation of the single coil system is effected or controlled by movement of the armature
<b>24/00</b>	<b>Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn</b>	33/12	• with armature moving in alternate directions by alternate energisation of two coil systems
<b>25/00</b>	<b>Dc interrupter motors or generators</b>	33/14	• • wherein the alternate energisation and de-energisation of the two coil systems are effected or controlled by movement of the armature
<b>26/00</b>	<b>Machines adapted to function as torque motors, i.e. to exert a torque when stalled</b>	33/16	• with polarised armature moving in alternate directions by reversal or energisation of a single coil system
<b>27/00</b>	<b>Ac commutator motors or generators having mechanical commutator</b> (universal ac/dc motors H02K 23/64)	33/18	• with coil system moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnet
27/02	• characterised by the armature winding	<b>35/00</b>	<b>Generators with reciprocating, oscillating, or vibrating coil system, magnet, armature, or other part of the magnetic circuit</b> (arrangements for handling mechanical energy structurally associated with generators H02K 7/00, e.g. H02K 7/06)
27/04	• having single-phase operation in series or shunt connection	35/02	• with moving magnet and stationary coil system
27/06	• • with a single or multiple short-circuited commutator, e.g. repulsion motor	35/04	• with moving coil system and stationary magnet
27/08	• • with multiple-fed armature	35/06	• with moving flux distributor, and both coil system and magnet stationary
27/10	• • with switching devices for different modes of operation, e.g. repulsion-induction motor	<b>37/00</b>	<b>Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors</b>
27/12	• having multi-phase operation	37/02	• variable reluctance type [4]
27/14	• • in series connection	37/04	• • Rotor situated within stator [4]
27/16	• • in shunt connection with stator feeding	37/06	• • Rotor situated around stator [4]
27/18	• • in shunt connection with rotor feeding	37/08	• • Rotor axially facing stator [4]
27/20	• Structural association with a speed regulating device	37/10	• permanent magnet type (H02K 37/02 takes precedence) [4]
27/22	• having means for improving commutation, e.g. auxiliary fields, double windings, double brushes	37/12	• • with stationary armature and rotating magnet [4]
27/24	• having two or more commutators	37/14	• • • Magnet rotating within armature [4]
27/26	• having disc armature	37/16	• • • • having horseshoe armature core [4]
27/28	• Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine (control arrangements external to the machine H02P)	37/18	• • • • homopolar type [4]
27/30	• Structural association with auxiliary mechanical devices, e.g. clutch, brake (control arrangements external to the machine H02P)	37/20	• • with rotating flux distributor, the armature and magnet both being stationary [4]
<b>29/00</b>	<b>Motors or generators having non-mechanical commutating devices, e.g. discharge tubes, semiconductor devices</b>	37/22	• Damping units [4]
29/03	• with a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems [6]		
29/06	• with position sensing devices (H02K 29/03 takes precedence) [4, 6]		

## H02K

- 37/24 • Structural association with auxiliary mechanical devices [4]
- 39/00 Generators specially adapted for producing a desired non-sinusoidal waveform**
- 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**
  - 41/02 • Linear motors; Sectional motors [3]
  - 41/025 • • Asynchronous motors [3]
  - 41/03 • • Synchronous motors; Motors moving step by step; Reluctance motors (H02K 41/035 takes precedence) [3]
  - 41/035 • • Dc motors; Unipolar motors [3]
  - 41/06 • Rolling motors, i.e. 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
- 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]**
  - 44/02 • Electrodynamic pumps [3]
  - 44/04 • • Conduction pumps [3]
  - 44/06 • • Induction pumps [3]
  - 44/08 • Magnetohydrodynamic (MHD) generators [3]
  - 44/10 • • Constructional details of electrodes [3]
  - 44/12 • • Constructional details of fluid channel [3]
  - 44/14 • • • Circular or screw-shaped channel [3]
  - 44/16 • • Constructional details of the magnetic circuit [3]
  - 44/18 • • for generating ac power [3]
  - 44/20 • • • by changing the polarity of the magnetic field [3]
  - 44/22 • • • by changing the conductivity of the fluid [3]
  - 44/24 • • • by reversing the direction of fluid [3]
  - 44/26 • • • by creating a travelling magnetic field [3]
  - 44/28 • Association of MHD generators with conventional generators (nuclear power plants including a MHD generator G21D 7/02) [3]
- 47/00 Dynamo-electric converters**
  - 47/02 • Ac/dc converters or vice versa
  - 47/04 • • Motor/generators
  - 47/06 • • Cascade converters
  - 47/08 • • Single-armature converters
  - 47/10 • • • with booster machine on the ac side
  - 47/12 • Dc/dc converters
  - 47/14 • • Motor/generators
  - 47/16 • • Single-armature converters, e.g. metadyne
  - 47/18 • Ac/ac converters
  - 47/20 • • Motor/generators
  - 47/22 • • Single-armature frequency converters with or without phase-number conversion
    - 47/24 • • • having windings for different numbers of poles
    - 47/26 • • • operating as under- or over-synchronously running asynchronous induction machines, e.g. cascade arrangement of asynchronous and synchronous machines
    - 47/28 • • • operating as commutator machines with added slip-rings
    - 47/30 • • Single-armature phase-number converters without frequency conversion
- 49/00 Dynamo-electric clutches; Dynamo-electric brakes** (electrically or magnetically actuated clutches or brakes F16D 27/00, F16D 29/00, F16D 65/34, F16D 65/36; magnetic-particle clutches F16D 37/02; adapted for use as dynamometers G01L)
  - 49/02 • of the asynchronous induction type
  - 49/04 • • of the eddy-current hysteresis type
  - 49/06 • of the synchronous type
  - 49/08 • of the collector armature type
  - 49/10 • of the permanent-magnet type
  - 49/12 • of the acyclic type
- 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**
- 53/00 Alleged dynamo-electric perpetua mobilia**
- 55/00 Dynamo-electric machines having windings operating at cryogenic temperatures [3]**
  - 55/02 • of the synchronous type [3]
  - 55/04 • • with rotating field windings [3]
  - 55/06 • of the homopolar type [3]
- 57/00 Dynamo-electric machines not provided for in groups H02K 17/00-H02K 55/00 [3]**