

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)

- (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”. [7]

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

1/00 Details of the magnetic circuit (magnetic circuits or magnets in general, magnetic circuits for transformers for power supply H01F; magnetic circuits for relays H01H 50/16)
 1/02 . characterised by the magnetic material
 1/04 . characterised by the material used for insulating the magnetic circuit or parts thereof (insulation of windings H02K 3/30)
 1/06 . characterised by the shape, form, or construction
 1/08 . . Salient poles
 1/10 . . . Commutating poles
 1/12 . . Stationary parts of the magnetic circuit
 1/14 . . . Stator cores with salient poles
 1/16 . . . Stator cores with slots for windings
 1/17 . . . Stator cores with permanent magnets [5]
 1/18 . . . Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures
 1/20 . . . with channels or ducts for flow of cooling medium
 1/22 . . Rotating parts of magnetic circuit

1/24 . . . Rotor cores with salient poles
1/26 . . . Rotor cores with slots for windings
1/27 . . . Rotor cores with permanent magnets [5]
1/28 . . . Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures
 1/30 using intermediate part or parts, e.g. spider
 1/32 . . . with channels or ducts for flow of cooling medium
 1/34 . . Reciprocating, oscillating, or vibrating part of magnetic circuit

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

H02K

- 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
- 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)
- 9/10 . by gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing
- 9/12 . . wherein the cooling medium circulates freely within the casing

- 9/14 . wherein gaseous cooling medium circulates between the machine casing and a surrounding mantle
- 9/16 . . wherein the cooling medium circulates through ducts or tubes within the casing
- 9/18 . . wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing
- 9/19 . for machines with closed casing and with closed-circuit cooling using a liquid cooling medium, e.g. oil
- 9/193 . . with provision for replenishing the cooling medium; with means for preventing leakage of the cooling medium
- 9/197 . . in which the rotor or stator space is fluid-tight, e.g. to provide for different cooling media for rotor and stator
- 9/20 . . wherein the cooling medium vaporises within the machine casing
- 9/22 . by solid heat conducting material embedded in, or arranged in contact with, stator or rotor, e.g. heat bridge
- 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)
- 9/26 . Structural association with machine of devices for cleaning or drying cooling medium, e.g. of filter
- 9/28 . Cooling of commutators, slip-rings, or brushes, e.g. by ventilating (current collectors in general H01R 39/00)
- 11/00 Structural association with measuring or protective devices or electric components, e.g. with resistor, with switch, with suppressor for radio interference**
- 11/02 . for suppression of radio interference [6]
- 11/04 . for rectification [6]
- 13/00 Structural associations of current collectors with motors or generators, e.g. brush mounting plates, 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**
- 13/02 . Connections of slip-rings with the winding
- 13/04 . Connections of commutator segments with the winding
- 13/06 . . Resistive connections between winding and commutator segments, e.g. by high-resistance choke, by transistor
- 13/08 . . Segments formed by extensions of winding
- 13/10 . Special arrangements of brushes or commutators for the purpose of improving commutation
- 13/12 . Means for producing an axial reciprocation of the rotor and its associated current collector part, e.g. for polishing commutator surface
- 13/14 . Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive element
- 15/00 Methods or apparatus specially adapted for manufacturing, assembling, maintaining, or repairing dynamo-electric machines (manufacture of current collectors in general H01R 43/00)**
- 15/02 . of stator or rotor bodies
- 15/03 . . having permanent magnets [5]
- 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)

- 15/06 . Embedding prefabricated windings in the machine
- 15/08 . Forming windings by laying conductors into or around core part
- 15/085 . . by laying conductors into slotted stators
- 15/09 . . by laying conductors into slotted rotors
- 15/095 . . by laying conductors around salient poles
- 15/10 . Applying solid insulation to the windings, the stator, or the rotor
- 15/12 . Impregnating, heating or drying of windings, stators, rotors, or machines
- 15/14 . Casings; Enclosures; Supports
- 15/16 . Centering the rotor within the stator; Balancing the rotor (balancing in general G01M)
- 16/00 Machines with more than one rotor or stator [2]**
- 16/02 . Machines with one stator and two rotors [2]
- 16/04 . Machines with one rotor and two stators [2]

Note

Group H02K 16/00 takes precedence over groups H02K 17/00 to H02K 53/00. [2]

17/00 Asynchronous induction motors; Asynchronous induction generators

- 17/02 . Asynchronous induction motors
- 17/04 . . for single phase current
- 17/06 . . . having windings arranged for permitting pole-changing
- 17/08 . . . Motors with auxiliary phase obtained by externally fed auxiliary winding, e.g. capacitor motor
- 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)
- 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)	21/32	. . . having a horse-shoe magnet (with homopolar co-operation H02K 21/36)
19/02	. Synchronous motors	21/34	. . . having bell-shaped or bar-shaped magnet, e.g. for cycle lighting (with homopolar co-operation H02K 21/36)
19/04	. . for single-phase current	21/36	. . . with homopolar co-operation
19/06	. . . Motors having windings on the stator and a variable-reluctance soft-iron rotor without windings, e.g. inductor motor	21/38	. with rotating flux distributor, and armature and magnet both stationary
19/08	. . . Motors having windings on the stator and a smooth rotor of material with large hysteresis without windings, e.g. hysteresis motor	21/40	. . flux distributor rotating around magnet and within armature
19/10	. . for multi-phase current	21/42	. . flux distributor rotating around armature and within magnet
19/12	. . . characterised by the arrangement of exciting windings, e.g. for self-excitation, for compounding, for pole-changing	21/44	. . armature windings wound upon magnet
19/14	. . having additional short-circuited winding for starting as an asynchronous motor	21/46	. Motors having additional short-circuited winding for starting as an asynchronous motor
19/16	. Synchronous generators	21/48	. Generators with two or more outputs
19/18	. . having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar generator	23/00	Dc commutator motors or generators having mechanical commutator; Universal ac/dc commutator motors
19/20	. . . with variable-reluctance soft-iron rotor without winding	23/02	. characterised by the exciting arrangement
19/22	. . having windings each turn of which co-operates alternately with poles of opposite polarity, e.g. heteropolar generator	23/04	. . having permanent magnet excitation
19/24	. . . with variable-reluctance soft-iron rotor without winding	23/06	. . having shunt connection of excitation windings
19/26	. . characterised by the arrangement of exciting winding	23/08	. . having series connection of excitation windings
19/28	. . . for self-excitation	23/10	. . having compound connection of excitation windings
19/30	. . . for compounding	23/12	. . having excitation produced by a current source independent of the armature circuit
19/32	. . . for pole-changing	23/14	. . having high-speed excitation or de-excitation, e.g. by neutralising the remanent excitation field
19/34	. . Generators with two or more outputs	23/16	. . having angularly adjustable excitation field, e.g. by pole reversing, by pole switching
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)	23/18	. . having displaceable main or auxiliary brushes
19/38	. . Structural association with exciting machine	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
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)	23/22	. . having compensating or damping winding
21/02	. Details	23/24	. . having commutating-pole winding
21/04	. . Windings on magnet for additional excitation	23/26	. characterised by the armature winding
21/10	. . Rotating armatures	23/28	. . having open winding, i.e. not closed within armature
21/12	. with stationary armature and rotating magnet	23/30	. . having lap winding; having loop winding
21/14	. . magnet rotating within armature	23/32	. . having wave winding; having undulating winding
21/16	. . . having an annular armature core with salient poles (with homopolar co-operation H02K 21/20)	23/34	. . having mixed windings
21/18	. . . having horse-shoe armature core (with homopolar co-operation H02K 21/20)	23/36	. . having more than one winding; having more than one commutator; having more than one stator
21/20	. . . having windings each turn of which co-operates only with poles of one polarity, e.g. homopolar machine	23/38	. . having winding or connection for improving commutation, e.g. equipotential connection
21/22	. . magnet rotating around armature, e.g. flywheel magneto	23/40	. characterised by the arrangement of the magnet circuit
21/24	. . magnet axially facing armature, e.g. hub-type cycle dynamo	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
21/26	. with rotating armature and stationary magnet	23/44	. . having movable or turnable iron parts
21/28	. . armature rotating within magnet	23/46	. . having stationary shunts, i.e. magnetic cross flux
21/30	. . . having an annular armature core with salient poles (with homopolar co-operation H02K 21/36)	23/48	. . having adjustable armature
		23/50	. Generators with two or more outputs
		23/52	. Motors acting also as generators, e.g. starting motor used as generator for ignition or lighting
		23/54	. Disc armature motors or generators
		23/56	. Motors or generators having the iron core separated from armature winding
		23/58	. Motors or generators having no iron core
		23/60	. Motors or generators having a rotating armature and a rotating excitation field

- 23/62 . Motors or generators with stationary armature and rotating excitation field
- 23/64 . Motors specially adapted for running on dc or ac by choice
- 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)
- 23/68 . Structural association with auxiliary mechanical devices, e.g. with clutch, with brake (control arrangements external to the machine H02P)
- 24/00 **Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn**
- 25/00 **Dc interrupter motors or generators**
- 26/00 **Machines adapted to function as torque motors, i.e. to exert a torque when stalled**
- 27/00 **Ac commutator motors or generators having mechanical commutator** (universal ac/dc motors H02K 23/64)
 - 27/02 . characterised by the armature winding
 - 27/04 . having single-phase operation in series or shunt connection
 - 27/06 . . with a single or multiple short-circuited commutator, e.g. repulsion motor
 - 27/08 . . with multiple-fed armature
 - 27/10 . . with switching devices for different modes of operation, e.g. repulsion-induction motor
 - 27/12 . having multi-phase operation
 - 27/14 . . in series connection
 - 27/16 . . in shunt connection with stator feeding
 - 27/18 . . in shunt connection with rotor feeding
 - 27/20 . Structural association with a speed regulating device
 - 27/22 . having means for improving commutation, e.g. auxiliary fields, double windings, double brushes
 - 27/24 . having two or more commutators
 - 27/26 . having disc armature
 - 27/28 . Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine (control arrangements external to the machine H02P)
 - 27/30 . Structural association with auxiliary mechanical devices, e.g. clutch, brake (control arrangements external to the machine H02P)
- 29/00 **Motors or generators having non-mechanical commutating devices, e.g. discharge tubes, semiconductor devices**
 - 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]
 - 29/08 . . using magnetic effect devices, e.g. Hall-plates, magneto-resistors (H02K 29/12 takes precedence) [4]
 - 29/10 . . using light effect devices [4]
 - 29/12 . . using detecting coils [4]
 - 29/14 . with speed sensing devices (H02K 29/03 takes precedence) [4,6]
- 31/00 **Acyclic motors or generators, i.e. dc machines having a drum or disc armature with continuous current collectors**
 - 31/02 . with solid-contact collectors
 - 31/04 . with at least one liquid-contact collector
- 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)
 - 33/02 . with armature moved one way by energisation of a single coil system and returned by mechanical force, e.g. by spring
 - 33/04 . . wherein the frequency of operation is determined by the frequency of uninterrupted ac energisation
 - 33/06 . . . with polarised armature
 - 33/08 . . . with dc energisation superimposed on ac energisation
 - 33/10 . . wherein the alternate energisation and de-energisation of the single coil system is effected or controlled by movement of the armature
 - 33/12 . with armature moving in alternate directions by alternate energisation of two coil systems
 - 33/14 . . wherein the alternate energisation and de-energisation of the two coil systems are effected or controlled by movement of the armature
 - 33/16 . with polarised armature moving in alternate directions by reversal or energisation of a single coil system
 - 33/18 . with coil system moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnet
- 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)
 - 35/02 . with moving magnet and stationary coil system
 - 35/04 . with moving coil system and stationary magnet
 - 35/06 . with moving flux distributor, and both coil system and magnet stationary
- 37/00 **Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors**
 - 37/02 . variable reluctance type [4]
 - 37/04 . . Rotor situated within stator [4]
 - 37/06 . . Rotor situated around stator [4]
 - 37/08 . . Rotor axially facing stator [4]
 - 37/10 . permanent magnet type (H02K 37/02 takes precedence) [4]
 - 37/12 . . with stationary armature and rotating magnet [4]
 - 37/14 . . . Magnet rotating within armature [4]
 - 37/16 having horseshoe armature core [4]
 - 37/18 homopolar type [4]
 - 37/20 . . with rotating flux distributor, the armature and magnet both being stationary [4]
 - 37/22 . Damping units [4]
 - 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 to H02K 55/00 [3]**