H02K

DYNAMO-ELECTRIC MACHINES (dynamo-electric relays H01H 53/00; conversion of DC or AC input power into surge output power {H03K 3/53})

Definition statement

This place covers:

- Dynamo-electric generators or motors, i.e. AC or DC continuously rotating, oscillating or linear machines;
- Dynamo-electric stepping motors, i.e. with rotor rotating step by step;
- Dynamo-electric torque motors, i.e. machines adapted to exert a torque when stalled;
- Dynamo-electric machines for transmitting angular displacements, e.g. Synchro, Selsyn;
- Machines involving dynamo-electric interaction with a plasma or a flow of conductive liquid or of fluid-borne conductive or magnetic particles, e.g. magnetohydrodynamic (MHD) pumps or generators;
- Dynamo-electric converters, e.g. AC/DC converters and vice versa, AC/AC converters, DC/DC converters;
- Dynamo-electric clutches or brakes;
- 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;
- Alleged perpetua mobilia obtained by dynamo-electric means, including arrangements of permanent magnets (PM) only;
- Machines not otherwise provided for and based on dynamo-electric interaction,
- Structural adaptation of the above mentioned machines for the purposes of their control.

Relationships with other classification places

The subject matter of starting, regulating, electronically commutating, braking, or otherwise controlling the machines covered by this subclass is classified in subclass H02P.

Measuring the electric or magnetic variables involved in the functioning of the machines covered by this subclass is classified in subclass G01R.

Electric machines not based on dynamo-electric interaction, like e.g. electrostatic machines, piezoelectric actuators, electric motors using thermal effects, or electric machines based on not otherwise provided effects, are classified in subclass H02N.

The structural association with loads / prime motors can be classified either in H02K, or in the subclass covering the load / prime motor involved, or in both the subclasses, depending on which aspect is relevant. Relevant aspects of the dynamo-electric machine should always be classified in H02K, unless a reference explicitly indicate otherwise; on the contrary dynamo-electric machines only schematically represented in an a specific application (e.g. a wind turbine) are not classified in H02K and should only be classified in the relative application-oriented place.

The structural association with a specific component (e.g. connectors, bearings, sensors, magnetic and electric elements per se etc.) is classified, if relevant, in H02K. On the contrary specific aspects of the component, relevant for the component but not for the structural association with the electro-dynamic machine, are not classified in H02K and should only be classified in the relative function-oriented place.

References

Limiting references

This place does not cover:

Dynamo-electric relays	H01H 53/00
Conversion of DC or AC input power into surge output power	H03K 3/53

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Motor assisted furniture (e.g. beds)	A47C
Vacuum cleaners	A47L
Motor assisted medical furniture (e.g. operating tables, chairs for dentistry)	A61G
Equipment for supplying molten metal using dynamo-electric effects	B22D 39/003
Drills, portable power-driven screw drivers, combination or multi-purpose tools	B23B, B25B, B25F
Robots	B25J
Cutting machines	B26D
Arrangement or mounting of propulsion units in vehicles, hybrid vehicles	B60K, B60W
Electrically-propelled vehicles	B60L
Windscreen wipers	B60S
Power steering	B62D 1/00
Conveyors using dynamo-electric effects	B65G 54/02
Washing machines: arrangements or adaptations of electric motors	D06F 37/304
Paper making machines	D21F
Power-operated mechanism for wings, e.g. vehicle windows	E05F 15/00
Power plants comprising turbines and boilers (also for electricity generation)	F01K 27/00
IC engine starters	F02N
Positive-displacement pumps	F04B
Fans, ventilators, compressors, non-positive displacement pumps	F04D
Measuring instruments based on dynamo-electric effects	G01
Vibrators	G08B 6/00
Information storage (e.g. hard discs, tapes, etc.)	G11B
Magnets, coils, inductances, transformers	H01F
Holding or levitation devices using magnetic attraction or repulsion	H02N 15/00
Loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers	H04R

Special rules of classification

Groups H02K 1/00-H02K 13/00 and H02K 17/00-H02K 99/00.

Details or general arrangements only applicable to specific dynamoelectric machines of a single basic type, are classified in the group (H02K 17/00-H02K 99/00) appropriate to the dynamo-electric machines of that basic type, e.g. H02K 21/12 (unless a specific group for this details exists in the details group, e.g. H02K 1/27).

Details or arrangements for a generic type of dynamo-electric machine (i.e. for a machine of unspecified type, or disclosed as applicable to two or more kinds of machines, or in any case not necessarily related to a specific type of machine) are classified in groups H02K 1/00-H02K 13/00.

The above mentioned rules for "special" machines covered by groups H02K 24/00 - H02K 26/00, H02K 31/00-H02K 35/00, H02K 41/00-H02K 99/00 are applied in the following way:

the document is always classified as invention information in the corresponding machine group, e.g. H02K 41/03;

relevant details which are not specific of the "special" machine (i.e. which could be used in any type of machine) are classified as invention in the corresponding detail groups (H02K 1/00-H02K 13/00);

on the contrary relevant details which are specific of the "special" machine, although invention information, are classified as additional information in the corresponding detail groups (H02K 1/00-H02K 13/00).

H02K 16/00 takes precedence over groups H02K 17/00-H02K 53/00. A machine consisting of a combination of two or more machines of the type covered in groups H02K 17/00-H02K 53/00 should also be classified as additional information in the groups corresponding to said machines.

Classification of additional information.

For example, a connector (H02K 5/225) in a geared motor (H02K 7/116) is classified:

only in H02K 5/225 as invention information if the connector is the invention and the fact that the machine is a gear motor is not relevant at all;

in H02K 5/225 as invention information and H02K 7/116 as additional information if the connector is the invention and the fact that the machine is a gear motor, although not interesting per se, could be a useful information for a search;

in both H02K 5/225 and H02K 7/116 as invention information if, beside the connector, the geared motor presents other inventive aspects covered by H02K 7/116;

in H02K 7/116 as invention information and H02K 5/225 as additional information if the invention refers to the gear motor, and the connector although not interesting per se, could contain useful information for a search;

in both / either / neither H02K 5/225, H02K 7/116 as additional information if the invention relates to some other aspect (which is classified as invention information in another subgroup) and both / either / neither the connector and the type of machine contain information which could play a role in a search.

Classification in a subgroup.

The subgroups characterised by a specific feature, e.g. H02K 1/165 (which is characterized by the form or location of the slot), cover only said specific feature. Documents comprising also other relevant features covered by the head group (e.g. H02K 1/16) should therefore also be classified in said head group (or, if appropriate, in relevant subgroups of said head group).

Subgroups being a subdivision based on general typological considerations of a larger group, e.g. H02K 21/14, H02K 21/22, H02K 21/24 (which are subdivisions of H02K 21/12 for PM machines with respectively inner rotor, outer rotor and axial rotor) cover all the machines / machine elements of a certain type. Documents in these subgroups are generally classified according to their type (e.g. inner / outer rotors) also when their relevant features are not specific to said type. Documents are classified in the head group (e.g. H02K 21/12) if the machine / machine element type is not clear, or if

several types are only schematically indicated. In this latter case the document can also be classified as additional information in the concerned subgroups.

Documents concerning aspects which are covered by several subgroups dependent on the same higher hierarchy group (e.g. H02K 7/102-H02K 7/12, depending on H02K 7/10):

if it is the combination of the aspects covered by the subgroups which is relevant, the document is classified as invention information in the head group (e.g. H02K 7/10); furthermore the document should also be classified as additional information in all the concerned subgroups;

if the aspects covered by the subgroups are per se relevant (and not the combination), the document is classified as invention information in the subgroups for which relevant information is present.

A combination of the two cases is possible.

Example:

a motor comprising a gear box and a brake should be classified:

if only the combination of the brake and the gear is relevant (the brake and the gear being per se well known): in H02K 7/10 as invention, in H02K 7/102 and H02K 7/116 as additional information;

if beside the combination also the brake is relevant per se: in H02K 7/10 and H02K 7/102 as invention, in H02K 7/116 as additional information;

if the brake and the gear are relevant per se and the combination is obvious: in H02K 7/102 and H02K 7/116 as invention.

The groups H02K 2201/00 - H02K 2213/00 are used as transversal classification scheme to tag aspects, not otherwise provided for in this subclass.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Dynamo-electric	refers to the conversion of mechanical energy to electrical energy or vice versa by electromagnetic means.
PM	Permanent magnets

H02K 1/00

Details of the magnetic circuit (magnetic circuits for relays H01H 50/16)

Definition statement

This place covers:

- Details of the magnetic cores covering any aspect, e.g.
- magnetic aspects,
- electric aspects,
- mechanical aspects,
- cooling.

References

Limiting references

This place does not cover:

Magnetic circuit for relays	H01H 50/16

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic circuits or magnets in general, magnetic materials in general	H01F

H02K 1/02

characterised by the magnetic material

Definition statement

This place covers:

- Chemical composition of the magnetic material;
- Chemical composition of the plastic used for binding magnetic powders;
- Magnetic circuit characterised by the unusual type of magnetic material used (with or without indication of the chemical composition).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Metallic powders per se	B22F

Special rules of classification

Old documents relating to magnetic circuits characterised by the unusual type of magnetic material and without indication of the chemical composition could also be found in H02K 1/06 and subgroups.

H02K 1/04

characterised by the material used for insulating the magnetic circuit or parts thereof

Definition statement

This place covers:

Materials used for insulating or coating the magnetic circuit.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Materials used for the insulation of the windings	H02K 3/30

Informative references

Attention is drawn to the following places, which may be of interest for search:

Materials used for binding magnetic powders	H02K 1/02

H02K 1/06

characterised by the shape, form or construction

Special rules of classification

Certain details of non-magnetic parts , e.g. windage screens between salient poles, are classified in the group of the corresponding magnetic circuit part.

Air gap shapes:

when obtained by a generic combination of shapes of both the rotor and the stator are classified in H02K 1/06;

when obtained by a specific shape of either the rotor or the stator (the other member being normal) are classified in the subgroup specific for the member with the specific shape.

In any case relevant aspects of the air gap should be also classified in H02K 2201/03.

Following the rules of classification within this subclass:

a combination of stator and rotor features for a generic machine (i.e. not necessarily related to a specific type of machine) is classified in this group;

a combination of stator and rotor features which necessarily relates to a specific type of machine (e.g. a particular ratio of rotor and stator pole numbers, or a particular combination of rotor and stator pole shapes, for reducing torque ripples in a brushless motor) is classified in the group appropriate to said specific machine (e.g. H02K 29/03).

H02K 1/08

Salient poles

Definition statement

This place covers:

Poles in general (i.e. which could be either for rotors or stators)

Special rules of classification

This group mainly contains old documents and is rarely used, most of the documents with salient poles being classified in the relevant subgroups of H02K 1/12, H02K 1/22.

H02K 1/12

Stationary parts of the magnetic circuit

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Laminations with means for reducing eddy currents in the axial ends of the lamination package	H02K 3/42

H02K 1/14

Stator cores with salient poles

Special rules of classification

Stators consisting of a single, or of a plurality of separate I, E or similarly shaped cores, are classified in H02K 1/14. The I, E-shaped cores must be at least magnetically separated, but can be mechanically linked by tiny bridges (e.g. Fig. 12-15 in EP1248347)

I, E or similarly shaped cores which are not magnetically isolated, but are joined together to form a core, e.g. in which the magnetic flux can circulate in all the parts of the "annular" back iron are classified in H02K 1/148

H02K 1/141

{consisting of C-shaped cores}

Definition statement

This place covers:

Stators consisting of single or multiple C or U-shaped cores, separated or joined together, wherein the C or U-shaped core must have the poles at the two ends of the C/U (e.g. EP0743737, fig 14) and not in its centre. The C or U-shaped cores can consist of separate parts (e.g. WO9624187, fig. 1-12)

Special rules of classification

The C or U-shaped cores can be joined together, but they must be still clearly recognisable as C/U shapes (e.g. WO9624187, fig. 18-40); if they are combined and modified (e.g. two cores with some part in common) or combined with non-C-shaped cores, they are classified in H02K 1/14 .

H02K 1/143

{of the horse-shoe type}

Definition statement

This place covers:

- Cores consisting of a single C or U-shaped cores with a rotor between the poles;
- Cores consisting of a plurality of single cores of the type mentioned above, positioned along the axis of the rotor and shifted to obtain a plurality of phases.

H02K 1/145

{having an annular coil, e.g. of the claw-pole type}

Definition statement

This place covers:

Cores having one or more annular coils which are coaxial with the rotor axis.

Special rules of classification

This group covers annular undulated coils (e.g. fig 3, DE29623132U) only, if the undulation is not excessive. Annular coils with broad undulation ,see e.g. fig. 7-9 DE29623132U, are classified in H02K 1/146.

H02K 1/146

{consisting of a generally annular yoke with salient poles}

Definition statement

This place covers:

Annular cores or cores forming a closed circuit.

Special rules of classification

The shape of the "annular" ring must be a close circuit but it can have any shape, circular, rectangular etc.

The poles can extend radially or axially, be asymmetrical or even consist of only one salient pole.

The stator can be annular in the circumferential direction (very common), but the annular form can even lay in a plane containing the axis.

H02K 1/148

{Sectional cores (H02K 1/141 takes precedence)}

Definition statement

This place covers:

Cores of the general shape, but consisting of more than one part when seen in a section perpendicular to the rotor axis, e.g. parts joined together

References

Limiting references

This place does not cover:

Cores consisting only of C or U-shaped elements (even if the final result is an annular core of the H02K 1/148 type)	H02K 1/141

Special rules of classification

Cores consisting of several annular parts, e.g. each made of one single piece, stacked axially and skewed are classified in H02K 1/146. Single packages of laminations consisting of sectional laminations (typically stacked axially and shifted around the axial direction), are also classified in H02K 1/146.

Cores consisting of strings of (e.g. T-shaped) elements, linked by mechanically links are normally classified in this group, unless the link is very thick (H02K 1/146).

H02K 1/16

Stator cores with slots for windings

Special rules of classification

It is not always evident to differentiate between cores with slots / teeth and cores with numerous salient poles. The terminology used in the patent is taken into consideration but not decisive. When possible the type of winding is used as discriminating factor (concentrate winding being usually used around salient poles and distributed winding in cores with slots).

Stator cores with every kind of slot, punched or not, are classified here, but older documents relating to non-punched slots could also be found in H02K 1/12

H02K 1/17

Stator cores with permanent magnets

Definition statement

This place covers:

Constructional aspects of PM (permanent magnet) stator cores e.g.:

positioning and / or fixation of the magnets to the back iron / housing or of the back iron to the housing;

protection of the magnets (also against corrosion);

Magnetic aspects of stator cores in unspecified machines.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Stator cores for PM synchronous machines in which the excitation flux is regulated by mechanical means	H02K 21/021
Field windings for additional excitation in PM synchronous motors or generators	H02K 21/04
Magnetic aspects of PM stators specific to commutator machines	H02K 23/04

Special rules of classification

Means for mounting or fastening cores with PM are classified:

if the means are only suitable for PM arrangements: H02K 1/17;

if the means are suitable for magnetic cores in general (with or without PM): H02K 1/18. Further classification as additional information is made in H02K 1/17 whenever appropriate.

The back irons of H02K 1/17 machines without casing are classified here and not in H02K 5/04 (and subgroups); however the simple fixation of a tubular back iron to the end shield are classified in H02K 5/15

H02K 1/18

Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures

Definition statement

This place covers:

Mounting means between casing or similar support structures and magnetic stationary parts.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Casing details	H02K 5/04
Mounting arrangements for bearing-shields or end plates	H02K 5/15
Casing adaptation for suppression of noise or vibration	H02K 5/24

Special rules of classification

Means for mounting or fastening, including vibration dampers, magnetic stationary parts are classified in:

- H02K 1/18 and subgroups (and not classified, not even as additional information, in H02K 5/04 and subgroups in particular H02K 5/24) if these means are part of the magnetic stationary parts or are positioned between the magnetic stationary parts and the stator structures (e.g. the casing);
- H02K 5/04 and subgroups and in particular H02K 5/24 (and classified as additional information in H02K 1/18 and subgroups) if these means are part of the casing.

Means for mounting or fastening cores with PM are classified:

- in H02K 1/17, if the means are only suitable for PM arrangements;
- in H02K 1/18, if the means are suitable for magnetic cores in general, with or without PM.

Further classification as additional information is made in H02K 1/17 whenever appropriate.

The fixation of magnetic stationary parts with other magnetic stationary parts, e.g. fixing the laminations together to form a lamination package, is classified in H02K 1/14 - H02K 1/17.

The fixation of I, E or similarly shaped cores (e.g. DE102010015441) is classified in H02K 1/18 as invention and in H02K 1/14 as additional information.

Mounting means for machines with more than one stator (with the exception of axial air gap machines), e.g. with inner and outer stators are classified in H02K 1/18 (not in the subgroups)

H02K 1/223

{Rotor cores with windings and permanent magnets (for additional excitation in synchronous motors or generators H02K 21/042; in synchronous motors having additional short-circuited winding for starting as an asynchronous motor H02K 21/46)}

Definition statement

This place covers:

Rotors with permanent magnets (PM) and magnetisation windings or short-circuit windings

References

Limiting references

This place does not cover:

Field windings for additional excitation in synchronous motors or generators	H02K 21/042
Rotors for PM synchronous motors having additional short-circuited winding, e.g. cages, for starting as an asynchronous motor	H02K 21/46

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of rotor cores with windings	H02K 1/24, H02K 1/26
Details of rotor cores with magnets	H02K 1/27
Combination of different rotors some with windings and some with PM	H02K 16/00, H02K 16/02
Rotor cores for PM synchronous machines in which the excitation flux is regulated by mechanical means	H02K 21/021

Special rules of classification

Only the combination of PM and windings is classified in the groups H02K 1/223, H02K 21/04 and H02K 21/46; if other aspects relevant for a specific subgroup of H02K 1/22 are present, the document should also be classified in the relevant subgroup thereof.

H02K 1/243

{of the claw-pole type}

Definition statement

This place covers:

Minor modifications of the core only related to the problem of fastening the coil

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Coil contacts	H02K 3/528

H02K 1/246

{Variable reluctance rotors}

Definition statement

This place covers:

Details of reluctance rotors including reluctance rotors with additional permanent magnets, when the function of the magnets is not the generation of extra excitation field but the achievement of an additional secondary effect, e.g. flux guide/reduction of stray flux.

Special rules of classification

PM rotors have sometimes some reluctance effect i.e. some low / high reluctance path, while reluctance rotors can comprise auxiliary PM e.g. for reducing the stray fields along the quadrature axis. The rule of classification is the following:

rotors of the PM type (where the PMs generate the excitation field) with a secondary and well known reluctance effect (this is often the case for embedded PM rotors like DE102005062922 figure 8): H02K 1/27;

rotors of PM type with an interesting although secondary reluctance effect (EP1830451, figure 1b): H02K 1/27 (invention), H02K 1/246 (additional information);

rotors with both relevant PM and reluctance features (including doubtful cases, in which it is not clear whether the rotor are PM rotors with consistent auxiliary reluctance features or reluctance rotors with consistent auxiliary PM, see e.g. DE102005062922 figures 2, 3, 6, 7): H02K 1/27 (invention) and H02K 1/246 (invention);

reluctance rotors with auxiliary PM having an additional secondary effect (e.g. flux guide/reduction of stray or quadrature flux, see e.g. EP1837980, the figures 3, 4): H02K 1/246 (invention) and H02K 1/27 (additional information);

H02K 1/27

Rotor cores with permanent magnets

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Rotors with permanent magnets and additional windings other than field windings and squirrel cages	H02K 1/223
Rotor cores with permanent magnets in which the excitation flux is regulated by mechanical means	H02K 21/021
Rotors with permanent magnets and field windings	H02K 21/042, H02K 21/046
Rotors with permanent magnets and squirrel cages	H02K 21/46

Special rules of classification

Means for mounting or fastening cores with PM are classified:

- in H02K 1/27, if the means are only suitable for PM arrangements
- in H02K 1/28 or H02K 1/30, if the means are suitable for magnetic cores in general, with or without PM

Further classification as additional information is made in H02K 1/27 whenever appropriate.

PM rotors have sometimes some reluctance effect i.e. some low / high reluctance path, while reluctance rotors can comprise auxiliary PM e.g. for reducing the stray fields along the quadrature axis. The rule of classification is the following:

rotors of the PM type (where the PMs generate the excitation field) with a secondary and well known reluctance effect (this is often the case for embedded PM rotors like DE102005062922 figure 8): H02K 1/27;

rotors of PM type with an interesting although secondary reluctance effect (EP1830451, figure 1b): H02K 1/27 (invention), H02K 1/246 (additional information);

rotors with both relevant PM and reluctance features (including doubtful cases, in which it is not clear whether the rotor are PM rotors with consistent auxiliary reluctance features or reluctance rotors with consistent auxiliary PM, see e.g. DE102005062922 figures 2, 3, 6, 7): H02K 1/27 (invention) and H02K 1/246 (invention);

reluctance rotors with auxiliary PM having an additional secondary effect (e.g. flux guide/reduction of stray or quadrature flux, see e.g. EP1837980, the figures 3, 4): H02K 1/246 (invention) and H02K 1/27 (additional information).

Rotors between inner and outer stators, e.g. for transversal flux machines and combined outer and inner rotors (also with magnets on one side only) are classified in H02K 1/27 (not in the subgroups)

H02K 1/2726

the rotor consisting of a single magnet or two or more axially juxtaposed single magnets

Definition statement

This place covers:

- Magnets consisting of a single body (e.g. ring, disc, cylinder, or more complex forms) magnetized with all the magnetic poles;
- Several magnets consisting of a single body, which are axially mounted one after the other

H02K 1/2733

Annular magnets

Definition statement

This place covers:

Annular magnets (including special forms like US4857786, figure 6)

H02K 1/2746

the rotor consisting of magnets arranged with the same polarity, e.g. consequent pole type

Definition statement

This place covers:

Arrangements consisting of a plurality of magnets presenting in the circumferential direction the same, i.e. not alternating, polarity;

H02K 1/2753

the rotor consisting of magnets or groups of magnets arranged with alternating polarity

Definition statement

This place covers:

- Arrangements consisting of a plurality of magnets presenting in the circumferential direction an alternating polarity, i.e. the classical arrangement of north-south poles.

Special rules of classification

- The following cases are classified specifically in H02K 1/2753 (not in the subgroups):
- magnets mounted in proximity of the rotor surface, but not on the surface, e.g. mounted on the internal surface of a sleeve surrounding the rotor;
- magnets mounted on other bodies, e.g. the blades of a ventilator;
- magnets embedded in a non-magnetic, e.g. resin, rotor.

H02K 1/276

Magnets embedded in the magnetic core, e.g. interior permanent magnets [IPM]

Definition statement

This place covers:

Magnets embedded in a magnetic core;

Magnets mounted on the surface of a magnetic core, but with polar extensions, pole shoes (even thin, e.g. EP1829188, figure 1, magnetic pole shoe 12).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reluctance rotors with additional permanent magnets, when the magnets are not generating excitation field, e.g. the PM as flux guide	H02K 1/246
Magnets embedded in a non-magnetic, e.g. resin, rotor	H02K 1/2753

Special rules of classification

The following cases are classified as follows:

Rotors with magnets located in pockets provided in the laminations, even if the outer thickness of the pockets is small (US2006131976, figure 2), are classified in H02K 1/276.

Rotors comprising a thin sleeve or similar cylindrical bandages, magnetic or not (EP1830451, figure 3) are classified in H02K 1/278.

However thick magnetic sleeves are classified in H02K 1/276.

The classical case of 4 or 6 radial magnets magnetized along the circumference (e.g. CH217877, figures 2 and 3) is classified in H02K 1/2773. However, when only 2 magnets are present (CH217877 figure 1), then, classification is made in H02K 1/276.

H02K 1/2766

{having a flux concentration effect}

Definition statement

This place covers:

Embedded magnets having any type of configuration that involves the concentration of flux generated by magnets

H02K 1/2773

{consisting of tangentially magnetized radial magnets}

Definition statement

This place covers:

All the magnets have to be disposed radially (i.e. each magnet has to be placed along a radius) and to be magnetized tangentially to the rotor circumference

Special rules of classification

The following cases are classified as follows:

- Two parallel magnets with directions substantially radial but not exactly radial are classified in H02K 1/2766 (flux concentration);
- Arrangements consisting of tangentially magnetized radial magnets AND other (auxiliary) magnets, e.g. radially magnetized, arranged between the main magnets, are classified in H02K 1/2766;

The classical case of 4 or 6 radial magnets magnetized along the circumference (e.g. CH217877, figures 2 and 3) is classified in H02K 1/2773. However, when only 2 magnets are present (CH217877 figure 1), classification is made in H02K 1/276.

H02K 1/278

Surface mounted magnets; Inset magnets

Definition statement

This place covers:

Magnets mounted on a surface of any rotor (in case directly on the shaft), hollow or not, magnetic or not.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnets mounted in proximity of the rotor surface, but not on the surface, e.g. mounted on the internal surface of a sleeve surrounding the rotor; Magnets mounted on the surface of other bodies, e.g. the blades of a ventilator	H02K 1/2753

Special rules of classification

The following cases are classified as follows:

- Rotors comprising a thin sleeve or similar cylindrical bandages, magnetic or not (EP1830451, figure 3) are classified in H02K 1/278;
- Rotors with thick magnetic sleeves are classified in H02K 1/276;
- Rotors with thick non magnetic sleeves (WO2007037738, figure 2f, 24 is non magnetic) are classified in H02K 1/2753;
- Magnetic pole pieces, even as thin as thin sleeves (WO2008067705, figure 5) are classified in H02K 1/276.

H02K 1/28

Means for mounting or fastening rotating magnetic parts on to, or to, the rotor structures

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of the shaft	H02K 7/003

Special rules of classification

The classification of claw poles follows the following rules:

fastening between shaft and the rotor (parts): H02K 1/28

fastening between the rotor parts, e.g. the two parts carrying each half of the poles which form the rotor: H02K 1/243

Means for mounting or fastening cores with PM are classified:

- in H02K 1/27, if the means are only suitable for PM arrangements;
- in H02K 1/28 or H02K 1/30, if the means are suitable for magnetic cores in general, with or without PM;

H02K 1/30

using intermediate parts, e.g. spiders

Definition statement

This place covers:

any intermediate part or parts, including spiders, sleeves, resin moulded between magnetic part and shaft

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic parts fastened to the shaft by a thin layer of adhesive, positioned between the magnetic part and the shaft	H02K 1/28

H02K 1/32

with channels or ducts for flow of cooling medium

Special rules of classification

Cooling channels (partially) in the shaft supporting the rotor magnetic core are also classified in this group, (together with the channels in the rotor magnetic core)

H02K 1/325

{between salient poles}

Definition statement

This place covers:

Cooling channels extending in a generally axial direction in the zone between the salient poles;

Cooling channels between poles of claw pole rotors.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Radial cooling channels, e.g. between laminations, between poles or a combination of both	H02K 1/32
Winding fixing means with air passages	H02K 3/527
Heat sinks between salient poles	H02K 9/22

Special rules of classification

Cooling channels between salient poles working as ventilators are only classified in H02K 1/325, but not systematically classified, not even as additional information, in H02K 9/06.

H02K 3/00

Details of windings

Definition statement

This place covers:

Details of the winding covering any aspect, e.g. electric aspects, mechanical aspects, cooling.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Conductive, insulating or dielectric properties of materials	H01B
Coils in general	H01F 5/00

H02K 3/02

Windings characterised by the conductor material

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Conductors in general	H01B 1/00, H01B 5/00

H02K 3/12

arranged in slots

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Other type of slots, other than in a magnetic core	H02K 3/04

Special rules of classification

The slots are usually in a magnetic core;

H02K 3/14

with transposed conductors, e.g. twisted conductors

Definition statement

This place covers:

Any winding with conductor transposed within a slot or between the slots e.g.:

- Röbel bars
- Litz wires

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

High voltage insulation for e.g. Röbel bars	H02K 3/40

H02K 3/16

for auxiliary purposes, e.g. damping or commutating

Special rules of classification

The auxiliary windings are classified according to the main winding, i.e. if the main winding is in slots the additional winding is classified in H02K 3/16

H02K 3/18

Windings for salient poles

Definition statement

This place covers:

Windings for all type of salient poles, including claw poles.

H02K 3/20

for auxiliary purposes, e.g. damping or commutating

Special rules of classification

The auxiliary windings are classified according to the main winding, i.e. if the main winding is for salient poles the additional winding is classified in H02K 3/20

H02K 3/24

with channels or ducts for cooling medium between the conductors

Definition statement

This place covers:

Any type of channel between conductors e.g. channels, openings, spaces between or around conductors in the active part of the conductor or in the winding heads.

H02K 3/26

consisting of printed conductors

Definition statement

This place covers:

- Printed conductors;
- Conductors obtained by etching;
- Conductors stamped or press-cut from a laminar material.

H02K 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)

Definition statement

This place covers:

Winding schemes.

References

Limiting references

This place does not cover:

Windings for pole-changing	H02K 17/06, H02K 17/14, H02K 19/12, H02K 19/32

H02K 3/30

Windings characterised by the insulating material

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Insulating bodies in general	H01B 3/00, H01B 17/00

H02K 3/32

Windings characterised by the shape, form or construction of the insulation

Definition statement

This place covers:

Insulation sheets,

Insulation plates

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Insulators having also supporting functions, e.g. bobbins; supporting structures for the coil ends	H02K 3/46

Special rules of classification

Insulators are classified in this group only, when they have exclusively an insulation function; insulation elements having also a supporting function, e.g. a bobbin which is supporting the winding and isolating it from the core, are classified in H02K 3/46.

H02K 3/46

Fastening of windings on the stator or rotor structure

Definition statement

This place covers:

- Fastening of toroidal windings;
- Fastening means for fixed annular coils for claw poles rotors (for alternators)

H02K 3/47

Air-gap windings, i.e. iron-free windings

Definition statement

This place covers:

Fastening of windings arranged in the air gap (with or without a ferromagnetic back iron)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Air-gap windings per se	H02K 3/04, H02K 3/26
Iron free rotors for DC machines	H02K 23/56
Air core gages, e.g. having a moving P.M. moving inside coreless coils supported by bobbins	G01R

Special rules of classification

Supports shaped like air gap cans, but with the only function of supporting the winding are not classified in H02K 5/128.

H02K 3/487

Slot-closing devices

Definition statement

This place covers:

Slot-closing devices, e.g. slot wedges.

Special rules of classification

Elements between salient poles but similar to slot wedges are classified in H02K 3/52 as invention information and, if relevant, classified in H02K 3/487 as additional information

H02K 3/50

Fastening of winding heads, equalising connectors, or connections thereto

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Fastening salient pole windings or connections thereof	H02K 3/52

Informative references

Attention is drawn to the following places, which may be of interest for search:

Terminal boxes or connection arrangements on the casing	H02K 5/225

Special rules of classification

When it is not clear, whether the machine has salient pole windings or not, the document is classified in H02K 3/50.

H02K 3/505

{for large machine windings, e.g. bar windings (H02K 3/51 takes precedence)}

References

Limiting references

This place does not cover:

Fastening of windings consisting of cables	H02K 3/50
Fastening for rotor windings Iron free rotors for DC machines	H02K 3/51

Special rules of classification

Connections from the winding ends till the bus rings included (supported in any way, on the stator, the casing etc.) H02K 3/505; leads between the bus rings and the external connections: H02K 5/225

H02K 3/52

Fastening salient pole windings or connections thereto

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Terminal boxes or connection arrangements on the casing	H02K 5/225

Special rules of classification

When it is not clear, whether the machine has salient pole windings or not, the document is classified in H02K 3/50.

H02K 3/522

{for generally annular cores with salient poles}

Definition statement

This place covers:

Fastening salient pole windings or connections thereto for annular cores with salient poles; the shape of the core can also be irregular and only generally annular, the air gap could be either radial or axial.

H02K 3/524

{for U-shaped, E-shaped or similarly shaped cores}

Definition statement

This place covers:

Fastening salient pole windings or connections thereto for U-shaped, E-shaped, I-shaped or similarly shaped cores.

H02K 3/525

{Annular coils, e.g. for cores of the claw-pole type}

Definition statement

This place covers:

Fastening salient pole for windings consisting of one ore more annular coils which are coaxial with the rotor axis.

Special rules of classification

The terminals of annular coils are classified: in H02K 3/525, if the structural association with the coil is relevant, and in H02K 5/225, if the connection arrangement with the casing is relevant.

H02K 3/528

{of the claw-pole type}

Definition statement

This place covers:

Details of the bobbins including their connectors or wire guiding parts.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fixed annular coils for claw poles rotors, e.g. for alternators	H02K 3/46
Connecting conductors / connections along a rotor shaft for non-salient pole windings	H02K 3/51
Connecting conductors / connections along a rotor shaft for rotating rectifiers	H02K 11/042
Details of the connections with the slip rings, e.g. the routing of the winding wire along the poles and the shaft	H02K 13/02
Connecting conductors / connections along a rotor shaft for exciting machines	H02K 19/38

H02K 5/00

Casings; Enclosures; Supports

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Frames, casings, beds, stands or supports in general	F16F
Printed circuits; casings or constructional details of electrical apparatuses in general	H05K 5/00

Special rules of classification

Means for supporting the casing and / or fixing it to an external support not covered by H02K 5/24, H02K 5/26 are classified in H02K 5/00.

H02K 5/04

Casings or enclosures characterised by the shape, form or construction thereof

Special rules of classification

Means for mounting or fastening, including vibration dampers, magnetic stationary parts are classified in:

- H02K 1/18, but not classified, not even as additional information, in H02K 5/04, if these means are part of the magnetic stationary parts or are positioned between the magnetic stationary parts and the stator structures, e.g. the casing;

- H02K 5/04 and subgroups and in particular H02K 5/24, optionally classified as additional information in H02K 1/18, if these means are part of the casing.

H02K 5/08

Insulating casings

Definition statement

This place covers:

- Non metallic housings,
- Casing comprising resin (moulded) parts, e.g. coated with resin
- Housing consisting of a lamination package and resin moulded in the slots and/or around the winding ends, with or without other casing elements

Special rules of classification

Shafts with insulating parts are classified as invention in H02K 7/003 (details of the shafts) and as additional information in H02K 5/08.

H02K 5/10

with arrangements for protection from ingress, e.g. water or fingers

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Means for protecting brushes or brush holders	H02K 5/14
Venting means for gearboxes	F16H 57/027
Devices, e.g. valves, for venting or aerating enclosures	F16K 24/00

Special rules of classification

Drain passages and venting, breathing or pressure compensating means are always tagged in H02K 2205/09

H02K 5/12

specially adapted for operating in liquid or gas (combined with cooling arrangements H02K 9/00)

References

Limiting references

This place does not cover:

Casing adapted for operating in liquid or gas combined with cooling arrangements	H02K 9/00

H02K 5/124

Sealing of shafts

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Sealing in general	F16J

H02K 5/132

Submersible electric motors (H02K 5/128 takes precedence)

References

Limiting references

This place does not cover:

Submersible motors using air-gap sleeve or air-gap disc	H02K 5/128

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motors for pumping units used in mining bore holes	E21B 34/00
Pumping installations or systems for submerged use	F04D 13/08

Special rules of classification

Electrical connections specific to submersible machine are classified in H02K 5/132 (as invention) and in H02K 5/225 (as additional information).

H02K 5/14

Means for supporting or protecting brushes or brush holders

Definition statement

This place covers:

Brush holder supports

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association of slip rings	H02K 13/003
Structural association of commutators	H02K 13/006
DC commutator motors or generators having displaceable main or auxiliary brushes	H02K 23/18
Brushes, commutators, slip rings per se	H01R 39/00

Special rules of classification

Elastically supported brush or brush holders, e.g. for avoiding noise / vibrations, are classified as invention in H02K 5/14 and as additional information in H02K 5/24. If however other relevant aspects of a casing specially adapted for avoiding noise / vibrations are present, the document should also be classified as invention in H02K 5/24.

Schematically described displaceable, e.g. rotatable, brush holder supports in DC commutator motors or generators having displaceable main or auxiliary brushes are only classified in H02K 23/18. Details interesting for brush holders in general are classified in H02K 5/14.

Means for keeping the brushes in a retracted position during assembly are always tagged in the group H02K 2205/06

H02K 5/15

Mounting arrangements for bearing-shields or end plates

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Means for mounting or fastening magnetic stationary parts on to, or to, the stator structures in general	H02K 1/18
Other details of bearing-shields or end plates	H02K 5/04

H02K 5/16

Means for supporting bearings, e.g. insulating supports or means for fitting bearings in the bearing-shields (magnetic bearings H02K 7/09)

Definition statement

This place covers:

Mounting arrangements e.g. details of the parts (of the electrical machine) supporting the bearing

References

Limiting references

This place does not cover:

Means for supporting magnetic bearings	H02K 7/09

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with bearings i.e. particular position or size or properties of the bearings in relation to the machine	H02K 7/08
Bearings in general, including magnetic bearing, e.g. details of the bearing per se	F16C 17/00 - F16C 43/00
Means for supporting bearings in general	F16C 35/00

Special rules of classification

Classification in H02K 5/16 versus H02K 7/08.

The document is classified in H02K 5/16 if the bearing is a "normal bearing" placed in the "normal position" and the invention deals with the means for supporting the bearing or with other aspects (e.g. cooling) of the area where the bearing is supported.

The document is classified in H02K 7/08 if the invention deals with the structural association of the bearing with the machine or some other element, e.g.:

bearings integrated with other elements or supported by elements usually having a different function;

bearings mounted in unusual positions or in a specific position in relation to other elements of the machine;

bearings having particular properties in relation to the machine (aspects of the bearing "per se" are however not classified in H02K, but in F16C);

a particular combination of bearings (with regard to e.g. their position, distance, materials, type, properties).

Elastically mounted bearings are classified as invention in H02K 5/16 and as additional information in H02K 5/24. If however other relevant aspects of a casing specially adapted for avoiding noise / vibrations are present, the document should also be classified as invention in H02K 5/24.

The lubrication aspects of the bearings are generally classified in H02K 5/16. If cooling is present, e.g. oil circulation for lubrication and cooling of the bearings the documents are classified as follows.

If the invention refers to details of the elements adjacent to the bearing, e.g. channels in the end shield bearing mounting area, the document is classified in H02K 5/16 as invention information and classified either as invention (if the cooling aspects are relevant per se) or as additional information in the most appropriate subgroup of H02K 9/00.

If the invention refers to a cooling/lubricating scheme without or with little physical details of the mounting area of the bearing, the document is classified in H02K 7/08 as invention information and as invention or as additional information in the most appropriate subgroup of H02K 9/00.

If a combination of the two cases mentioned above is present the document is classified in both H02K 5/16 and H02K 7/08.

If relevant details of the cooling channels are present the document should also be classified in e.g. H02K 1/20, H02K 1/32, H02K 5/20).

The subgroups of H02K 5/16 are subdivided according to the position of the bearings radially supporting the rotor (shaft).

Arrangements wherein the radial bearings are on both sides of the rotor, i.e. the rotor is supported between the bearings, are classified in H02K 5/161, H02K 5/1672, H02K 5/1732.

Arrangements wherein the radial bearings are on one side only of the rotor, i.e. the rotor is supported in a cantilevered position, are classified in H02K 5/163, H02K 5/1675, H02K 5/1735.

Arrangements wherein the rotor is supported about a fixed spindle or the rotor is supported directly are classified in H02K 5/165, H02K 5/1677, H02K 5/1737 (these last groups take precedence over the previous groups)

H02K 5/167

using sliding-contact or spherical cap bearings

Definition statement

This place covers:

Sliding-contact bearings including fluid bearings, e.g. hydrostatic and hydrodynamic bearings

H02K 5/20

with channels or ducts for flow of cooling medium

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Drain passages and venting, breathing or pressure compensating means	H02K 2205/09
Heat exchangers, radiators etc. per se	B21D 53/02

H02K 5/225

{Terminal boxes or connection arrangements (specially adapted for submersible motors H02K 5/132)}

Definition statement

This place covers:

Structural association of a connection, connector, terminal or terminal box with the casing.

References

Limiting references

This place does not cover:

Electrical connections specific to submersible machines.	H02K 5/132

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association of a fusite plug (the classical sealed connector for compressors) with a compressor sealed casing (containing also the electric motor); Terminal box connected to a fusite plug	F25B
Connectors in general.	H01R

Special rules of classification

Electrical connections specific to submersible machine are classified in H02K 5/132 (as invention) and in H02K 5/225 (as additional information).

Connections arrangements associated with the housing are classified in H02K 5/225, other connections, e.g. the coil terminations on the magnetic core, are classified in H02K 3/50, H02K 3/52.

Connections from the winding ends till the bus rings included, supported in any way, on the stator, the casing etc., are classified in H02K 3/50, H02K 3/52, leads between the bus rings and the external connections are classified in H02K 5/225.

The terminals of annular coils are classified: in H02K 3/525, if the structural association with the coil is relevant, in H02K 5/225, if the connection arrangement with the casing is relevant.

H02K 5/24

specially adapted for suppression or reduction of noise or vibrations

Definition statement

This place covers:

Casings with vibration / acoustic dampening arrangements.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Vibration dampeners or dampening arrangement between magnetic cores and supporting structures (e.g. casing, other stator structures)	H02K 1/18
Elastic means for supporting brush holders	H02K 5/14
Elastic means for supporting bearings	H02K 5/16
Simple ventilation opening shaped for noise prevention	H02K 5/20
Dampening masses on the rotor	H02K 7/02, H02K 7/04
Damping vibrations in general	F16F
Measuring vibrations in general	G01M 7/00

Special rules of classification

Means for mounting or fastening, including vibration dampers, magnetic stationary parts are classified in:

- H02K 1/18, but not classified, not even as additional information, in H02K 5/04, if these means are part of the magnetic stationary parts or are positioned between the magnetic stationary parts and the stator structures, e.g. the casing;

H02K 5/04 and in particular H02K 5/24, optionally classified as additional information in H02K 1/18 and subgroups, if these means are part of the casing.

Elastically supported brush or brush holders, e.g. for avoiding noise or vibrations, are classified as invention in H02K 5/14 and as additional information in H02K 5/24. Elastically mounted bearings are classified as invention in H02K 5/16 and as additional information in H02K 5/24. If, however, other relevant aspects of a casing specially adapted for avoiding noise / vibrations are present, the document is also classified as invention in H02K 5/24.

H02K 5/26

Means for adjusting casings relative to their supports

Definition statement

This place covers:

Every arrangement allowing a movement of the entire machine with respect to its support, its load, its driving motor e.g. the adjustable supports for moving the machine and tensioning the belt in an electric machine driven / driving via a pulley.

Special rules of classification

The adjustable supports for moving the machine and tensioning a belt of a pulley are only classified here and not in H02K 7/1004

H02K 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

Special rules of classification

The following arrangements are classified in H02K 7/00 (not in the subgroups):

- Electric motors structurally associated with other non-electric motors, e.g. a pneumatic piston;
- Generators associated with other driven mechanisms, e.g. pumps.

H02K 7/003

{Couplings; Details of shafts (means for mounting rotors on shafts H02K 1/28)}

Definition statement

This place covers:

- Couplings, joints on the machine shaft,
- Details of the shafts

References

Limiting references

This place does not cover:

Means for mounting rotors on shafts	H02K 1/28

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with clutches	H02K 7/10
Aspects of the shaft for operating above critical speed	H02K 7/16
Shaft in general	F16C
Couplings between shafts in general	F16D

Special rules of classification

Shafts with insulating parts are classified in H02K 7/003 (invention) and H02K 5/08 (additional information).

H02K 7/006

{Structural association of a motor or generator with the drive train of a motor vehicle}

Definition statement

This place covers:

The structural association of an electric machine, often a motor-generator with any element, e.g. flywheel, shaft, connecting the main I.C. (internal combustion) engine to the wheels.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with additional mass for increasing the inertia of an electric machine, e.g. fly-wheel	H02K 7/02
Structurally association of a (motor-)generator with a reciprocating piston engines	H02K 7/1815
Motor or generators for hybrid vehicles	B60K
Starter-generators in general	F02N

Special rules of classification

The structural association of an electric machine with a flywheel is classified:

- in H02K 7/02, if the additional mass, e.g. flywheel is used for increasing the inertia of an electric machine;
- in H02K 7/006 or in H02K 7/1815, if the flywheel is used for increasing the inertia of the I.C. engine, e.g. if the electric machine is associated with a drive train;

H02K 7/02

Additional mass for increasing inertia, e.g. flywheels

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Flywheels for space applications	B64G 1/28
Flywheels in general	F16F 15/30
Gyroscopes	G01C 19/00

Special rules of classification

The structural association of an electric machine with a flywheel is classified:

- in H02K 7/02, if the additional mass, e.g. flywheel is used for increasing the inertia of an electric machine;

- if the flywheel is used for increasing the inertia of the I.C. engine either in H02K 7/006, if the electric machine is associated with a drive train, or in H02K 7/1815.

H02K 7/025

{for power storage}

Definition statement

This place covers:

Flywheels for storing electrical energy as mechanical energy, e.g. rotary battery.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Systems based on flywheels for electrical energy storage	H02J 3/30, H02J 15/00
Uninterruptible power supplies groups	H02J 9/00

Special rules of classification

A flywheel is always a device for storing energy. The flywheels, in which the amount of energy is relatively limited and only used to smooth an oscillation / vibration or to add some inertia to a tool, are classified in H02K 7/02, while the flywheel in which electrical energy is stored as mechanical energy, e.g. rotary battery, are classified in H02K 7/025.

H02J concerns the complete system for energy storage (and its control), the structural aspects are covered by H02K 7/025, F16F 15/30.

H02K 7/04

Balancing means

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or apparatus for balancing the rotor of dynamoelectric machines:	H02K 15/165

H02K 7/06

Means for converting reciprocating motion into rotary motion or vice versa

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motorized pieces of furniture	A47B 96/00
Drive means for Injection moulding machines using axially movable screws	B29C 45/5008

Screw and nut mechanisms in general, e.g. electric linear actuators comprising a screw mechanisms	F16H 25/20

Special rules of classification

Electrical linear actuators are classified in H02K 7/06, when the structural association with the electric motor is relevant. Actuators disclosed as "black box" in a more complex system, are only classified with the system application; actuators only relevant for the screw mechanism are only classified in F16H 25/20.

Similar devices driven by stepping motors can also be found in H02K 37/24

Electric linear actuators comprising an electric motor rotor structurally associated with a screw mechanism are classified in H02K 7/06.

H02K 7/061

{using rotary unbalanced masses (for generating mechanical vibrations in general B06B 1/16)}

Definition statement

This place covers:

Machines producing vibrations by any sort of unbalance e.g. static unbalance, dynamic unbalance, eccentric bearings, eccentric forces.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines for generating mechanical vibrations in general	B06B 1/045, B06B 1/16
Tactile signalling systems, e.g. silent alarm vibrators in general	G08B 6/00

H02K 7/063

{integrally combined with motor parts, e.g. motors with eccentric rotors}

Definition statement

This place covers:

Machines using as unbalanced masses elements of the machine itself, e.g. eccentric rotors, shafts or windings.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machine with additional eccentric / unbalanced masses (either separately mounted or integrally built e.g. with the shaft)	H02K 7/061

H02K 7/065

Electromechanical oscillators; Vibrating magnetic drives

Definition statement

This place covers:

Electromechanical oscillators as US3585424 or US3355645.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Magnetic means for converting oscillatory to rotary motion in time-pieces	G04C 5/00

H02K 7/08

Structural association with bearings

Definition statement

This place covers:

Particular position or size or properties of the bearing in relation to the machine.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Support in machine casing, i.e. bearing mounting arrangements	H02K 5/16
Bearings in general, including magnetic bearing, e.g. details of the bearing per se	F16C 17/00 - F16C 43/00

Special rules of classification

Classification in H02K 5/16 versus H02K 7/08.

The document is classified in H02K 5/16 if the bearing is a "normal bearing" placed in the "normal position" and the invention deals with the means for supporting the bearing or with other aspects (e.g. cooling) of the area where the bearing is supported.

The document is classified in H02K 7/08 if the invention deals with the structural association of the bearing with the machine or some other element, e.g.:

bearings integrated with other elements or supported by elements usually having a different function;

bearings mounted in unusual positions or in a specific position in relation to other elements of the machine;

bearings having particular properties in relation to the machine (aspects of the bearing "per se" are however not classified in H02K, but in F16C);

a particular combination of bearings (with regard to e.g. their position, distance, materials, type, properties).

The lubrication aspects of the bearings are generally classified in H02K 5/16. If cooling is present and the invention refers to a cooling/lubricating scheme without or with little physical details of the mounting area of the bearing, the document is classified in H02K 7/08 as invention information and as invention or as additional information in the most appropriate subgroup of H02K 9/00.

The subgroups H02K 7/083 - H02K 7/086 are subdivided according to the position of the bearings radially supporting the rotor (shaft).

Arrangements wherein the radial bearings are on both sides of the rotor, i.e. the rotor is supported between the bearings, are classified in H02K 7/083;

Arrangements wherein the radial bearings are on one side only of the rotor, i.e. the rotor is supported in a cantilevered position, are classified in H02K 7/085;

Arrangements wherein the rotor is supported about a fixed spindle or in which the rotor is directly supported are classified in H02K 7/086 (this last group take precedence over the previous groups).

Magnetic bearings are classified in H02K 7/09 (i.e. H02K 7/09 takes precedence over the subgroups H02K 7/083 - H02K 7/086).

Particular cases.

If the main bearing is a magnetic bearing combined with a non-magnetic backup bearing, classify in H02K 7/09 as invention information and,

if the backup bearings are only relevant in combination with the magnetic bearing, in the corresponding H02K 7/08 subgroup as additional information;

if the backup bearing are also relevant per se, in the corresponding H02K 7/08 subgroup (and if relevant in H02K 5/16 subgroups) as invention information.

If the main bearing is non-magnetic bearing with a secondary magnetic bearing effect (e.g. a biasing effect), classify as invention information in H02K 7/08 or H02K 5/16 subgroups and as additional information in H02K 7/09.

H02K 7/081

{specially adapted for worm gear drives (H02K 7/09 takes precedence)}

Definition statement

This place covers:

Bearing arrangements specially adapted to worm-wheel or worm-nut drive, e.g. bearing arrangements allowing axial movement of the rotor in the bearing system, needed because of the interaction with the gears, or biasing the rotor in a specific axial position.

References

Limiting references

This place does not cover:

Structural association with magnetic bearings	H02K 7/09

Informative references

Attention is drawn to the following places, which may be of interest for search:

Bearings adjustable for wear or play in general	F16C 25/00

Special rules of classification

H02K 7/081 takes precedence over H02K 7/1166

H02K 7/09

with magnetic bearings

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Grinding spindles with magnetic bearings	B24B 41/044
Magnetic bearing in general (structure and control)	F16C 32/0406
Magnetic levitation in general	H02N 15/00

Special rules of classification

Magnetic bearings are classified in H02K 7/09 (i.e. H02K 7/09 takes precedence over the subgroups H02K 7/083 - H02K 7/086).

Particular cases.

If the main bearing is a magnetic bearing combined with a non-magnetic backup bearing, classify in H02K 7/09 as invention information and,

- if the backup bearings are only relevant in combination with the magnetic bearing, in the corresponding H02K 7/08 subgroup as additional information;
- if the backup bearing are also relevant per se, in the corresponding H02K 7/08 subgroup (and if relevant in H02K 5/16 subgroups) as invention information.

If the main bearing is non-magnetic bearing with a secondary magnetic bearing effect (e.g. a biasing effect), classify as invention information in H02K 7/08 or H02K 5/16 subgroups and as additional information in H02K 7/09.

H02K 7/10

Structural association with clutches, brakes, gears, pulleys or mechanical starters

Special rules of classification

Group H02K 7/12 takes precedence over groups H02K 7/102 - H02K 7/118

Brakes or clutches with teeth or similar members engaging corresponding notches (e.g. mechanical locks acting by interference and not by friction) are classified in H02K 7/10, not in the subgroups covering friction brakes or clutches

H02K 7/1004

{with pulleys}

Definition statement

This place covers:

Pulleys or similar devices (e.g. drums)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Adjustable supports for moving the machine and tensioning the pulley belt.	H02K 5/26
Motorized pulleys or drums in general.	B66B 11/0438
Arrangement with pulleys in IC engines.	F02B 63/04, F02B 67/06

H02K 7/1008

{structurally associated with the machine rotor (H02K 7/1012 takes precedence)}

Definition statement

This place covers:

Pulleys directly attached, integrated with, or mounted to the rotor.

References

Limiting references

This place does not cover:

Machine arranged inside the pulley, Pulleys directly mounted on the outer surface of an outer motor rotor	H02K 7/1012 , H02K 7/1016

Informative references

Attention is drawn to the following places, which may be of interest for search:

Pulleys mounted on rotor shafts or on additional shafts connected to the rotor	H02K 7/1004

H02K 7/1012

{Machine arranged inside the pulley}

Definition statement

This place covers:

Machines, with inner or outer rotor, positioned inside the pulley

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Operating devices or mechanisms comprising an electric motor positioned inside the roller for roll-type closures	E06B 9/72

H02K 7/1016

{Machine of the outer rotor type}

Definition statement

This place covers:

Pulleys directly mounted on the outer surface of an outer motor rotor.

Special rules of classification

The tubular motors in which the motor drives a cylinder arranged around the motor, e.g. rolls for conveyor belts, are also classified together with the pulley in H02K 7/1012.

H02K 7/102

with friction brakes

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Starting devices with means for breaking and reversing the rotation direction of the rotor	H02K 7/1185

H02K 7/1021

{Magnetically influenced friction brakes}

Definition statement

This place covers:

- Brakes activated by e.g.:
- electromagnets,
- stray fields,
- additional electric motors,
- magnetostrictive motors,
- permanent magnets

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Brakes actuated by the mechanical rotation of the main electric motor rotor	H02K 7/102
Electromagnetically operated brakes with braking members co-operating with a track	B61H 7/08

Electrically or magnetically actuated brakes in general	F16D 65/00

H02K 7/1025

{using axial electromagnets with generally annular air gap}

Definition statement

This place covers:

Brakes using annular electromagnets with axial air-gap acting along the machine axis, including array of several electromagnets generally annularly arranged.

H02K 7/1026

{using stray fields}

Definition statement

This place covers:

Brakes actuated by magnetic field derived by the motor magnetic field by means of e.g. flux deflectors.

H02K 7/1028

{axially attracting the brake armature in the frontal area of the magnetic core}

Definition statement

This place covers:

Brakes activated by stray fields acting on the brake "armature" in an area close to the stator/rotor magnetic core axial ends

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Brakes activated at a certain distance from the core, e.g. by guiding the flux from the core with flux guiding structures, including the casing	H02K 7/1026

Special rules of classification

The brake element that must be close to a motor/generator frontal area is the brake armature and not the braking pad support, which very often coincides with the armature.

H02K 7/104

with eddy-current brakes

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

H02K 7/106

with dynamo-electric brakes

Definition statement

This place covers:

Structural association with separate dynamo-electric brakes, including permanent magnets for locking the rotor in a predetermined position.

Structural adaptation of a motor / generator in order to brake it (or locking it at still stand) by electrodynamic forces e.g. generated by using the machine main windings and magnetic circuit.

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with eddy-current brakes	H02K 7/104
Dynamo-electric brakes in general	H02K 49/00
Circuital aspects of arrangements for stopping or slowing dynamoelectric machines	H02P 3/06, H02P 3/12

H02K 7/108

with friction clutches

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Starting devices comprising clutches or devices which allow a partial free rotation of the rotor from the load	H02K 7/118, H02K 7/1185
Electrically or magnetically actuated clutches	F16D 27/00 , F16D 29/00

H02K 7/11

with dynamo-electric clutches

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

H02K 7/112

with friction clutches in combination with brakes

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

H02K 7/114

with dynamo-electric clutches in combination with brakes

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

H02K 7/116

with gears

References

Limiting references

This place does not cover:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Common housing for motor and gear box in power steering systems	B62D 5/0403
Gears in general	F16H

H02K 7/1166

{comprising worm and worm-wheel (structural association with bearings specially adapted for worm gear drives H02K 7/081)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with bearing specially adapted for worm gear drives	H02K 7/081
Automotive power windows	B60J
Power driven arrangements, e.g. electrical, for car power roofs	B60J 7/0573
Windshield wipers	B60S
Power operated mechanism for wings	E05F 15/697

Special rules of classification

Electric actuators of this type can be found in several application fields. Said actuators are classified in H02K 7/1166, when the structural association with the electric motor is relevant. Actuators disclosed as "black box" in a more complex system, should only be classified with the system application; actuators only relevant for the screw mechanism should be only classified in F16H.

H02K 7/118

with starting devices

Definition statement

This place covers:

Mechanical starting devices e.g.:

- starting devices comprising clutches or devices which allow a partial free rotation of the rotor from the load;
- starting motors (e.g. hydraulic, manually operated);
- mechanical means for positioning the rotor in a specific starting position.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

With auxiliary limited movement of stator, rotor, or core parts	H02K 7/12
Electric starter motors	H02K 7/20
Electrical or magnetic starting devices (e.g. a specific winding / switch arrangement; auxiliary magnets to position the rotor in a specific starting position)	H02K 21/02, H02K 29/03
Motor driven pumps using mechanical starting devices	F04D 13/021

Special rules of classification

Starting devices comprising clutches or devices which allow a partial free rotation of the rotor (from the load) are classified in H02K 7/118 (without reversing means) and in H02K 7/1185 (with reversing means).

H02K 7/1185

{with a mechanical one-way direction control, i.e. with means for reversing the direction of rotation of the rotor}

Definition statement

This place covers:

Starting devices comprising means for blocking the rotation of the rotor when started in the "wrong" direction and reversing said rotation (often, but not necessarily including clutches or devices which allow a partial free rotation of the rotor from the load).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clutches / brakes for avoiding the rotation of the rotor under the influence of the load	H02K 7/10
Mechanical means to set the rotor in movement, e.g. hydraulic motors; mechanical means to position the rotor in a specific starting position	H02K 7/118
Electrical or magnetic means, e.g. a specific winding / switch arrangement; auxiliary magnets, to position the rotor in a specific starting position	H02K 29/03, H02K 21/02

Special rules of classification

Starting devices comprising clutches or devices which allow a partial free rotation of the rotor (from the load) are classified in H02K 7/118 (without reversing means) and in H02K 7/1185 (with reversing means).

H02K 7/12

with auxiliary limited movement of stators, rotors or core parts, e.g. rotors axially movable for the purpose of clutching or braking

Special rules of classification

H02K 7/12 is used as invention information only for cases covered by H02K 7/10 (structural association with clutches, brakes, gears, pulleys, mechanical starters). If this is not the case, the document is classified in H02K 7/12 as additional information only and classified as invention in the most appropriate group, e.g. H02K 7/00. In particular means for mechanical adjustment of the flux in PM synchronous machines are only classified H02K 21/021.

H02K 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)

References

Limiting references

This place does not cover:

Structural association with fan or impeller for cooling the electrical machine	H02K 9/06

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Structural association of a motor with the drive train of a motor vehicle	H02K 7/006

Informative references

Attention is drawn to the following places, which may be of interest for search:

Suction cleaners	A47L
Implantable blood pumps	A61M 1/00
Spindle motors	B23Q 5/10
Motor powered spindles	B23Q 5/10
Powered screwdrivers	B25B
Motorized wheels	B60K 7/00
Driving gear for endless conveyors with self-contained driving mechanisms, e.g. motors	B65G 23/00
Operating arrangements for roll-type closures comprising an electric motor positioned inside the roller	E06B 9/72
Centrifugal pumps driven by electric motors	F04D 13/06
Ventilators driven by electric motors	F04D 25/0606

Special rules of classification

If the driving-load aspect predominates, see the relevant subclass.

Relevant aspects of a motor, concerning the structurally association with a driven load are classified in H02K 7/14. On the contrary machines described as a black box should be only classified in the application field.

The tubular motors in which the motor drives a cylinder arranged around the motor, e.g. rolls for conveyor belts, are classified together with the pulleys in H02K 7/1012.

H02K 7/16

for operation above the critical speed of vibration of the rotating parts

Definition statement

This place covers:

Machines with shafts, bearing, rotors etc. specially modified for operation at high speed (problems with oscillation at critical speeds)

H02K 7/18

Structural association of electric generators with mechanical driving motors, e.g. with turbines

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Shoes, hats or lighters including generators	A43B, A42B, F23Q
Electronic locks or locks with generating means	E05B 49/00, E05B 47/00, E05B 2047/0062
Spring, weight, inertia or like motors	F03G
Portable lighting devices with built-in generators	F21V 33/00, F21L 13/08
Generators used in watches	G04C 10/00
Remote controls with generators	G08C 17/00

Special rules of classification

If the driving-motor aspect predominates, see the relevant subclass, e.g. F03B 13/00 for turbines. Relevant aspects of a generator, concerning the structurally association with a driving motor are classified in H02K 7/18. On the contrary machines described as a black box should be only classified in the corresponding application field.

H02K 7/1807

{Rotary generators (H02K 7/006 takes precedence)}

References

Limiting references

This place does not cover:

Structural association of a generator with the drive train of a motor vehicle	H02K 7/006

H02K 7/1815

{structurally associated with reciprocating piston engines (general aspects of generating sets, e.g. housing, F02B 63/04)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

IC (internal combustion) engines adapted for driving an electric generator; General aspects of gensets (generating set) driven by a piston I.C. engine	F02B 63/04

Special rules of classification

The only aspects of gensets (generating set driven by a piston I.C. engine), which are classified in H02K 7/1815, are the ones relating to the adaptation of the generator. All other aspects, e.g. general aspects, of gensets are classified in F02B 63/04.

The structural association of an electric machine with a flywheel is classified:

- if the additional mass (e.g. flywheel) is used for increasing the inertia of an electric machine, in H02K 7/02;
- if the flywheel is used for increasing the inertia of the I.C. engine either in H02K 7/006 (if the electric machine is associated with a drive train), or in H02K 7/1815.

H02K 7/1823

{structurally associated with turbines or similar engines}

Definition statement

This place covers:

Rotary generators driven by any turbine like machine e.g.

- turbines,
- water wheels and similar machines having a positive displacement rotary member, e.g. rotary piston

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Generators driven by radiometers	H02K 7/1807, **H02N/00**
Steam turbines	F01D 15/10
Gas turbines	F02C
Submerged units incorporating electric generators	F03B 13/10

H02K 7/183

{wherein the turbine is a wind turbine (adaptation of a wind turbine to an electric generator F03D 9/25)}

References

Limiting references

This place does not cover:

Sectional generators structurally associated with a wind turbine	H02K 7/1869

Informative references

Attention is drawn to the following places, which may be of interest for search:

Adaptation of a wind turbine to an electric generator	F03D 9/25

Special rules of classification

Documents concerning a generator for wind generators are classified in H02K 7/183 or H02K 7/1838.

Generators described as "black box" in a wind turbine are classified only in F03D 9/25. Documents are classified in H02K, when relevant aspects, e.g. electrical, magnetic, thermal, structural, of the generator are present. When classified in H02K 7/183 or H02K 7/1838 the documents are classified as:

invention, in case of structural association between generator and wind turbine, i.e. shared components; general structure of the generator specifically adapted to the use in a wind turbine,

additional information, if a clear structural association is not present (please note that even if the use in a wind turbine is just hinted a class as additional information is given).

In any case specific aspects of the generator, e.g. cooling channels, windings, cores, are classified in the respective H02K subgroups.

A bearing common to the blade rotor and the generator rotor is only classified in F03D 9/25 if the blade rotor aspects are clearly predominant, i.e. it is essentially the same bearing that would be used to support the blade rotor.

H02K 7/1846

{structurally associated with wheels or associated parts (dynamos arranged in the wheel hub of cycles B62J 6/12)}

References

Limiting references

This place does not cover:

Generators arranged in the wheel hub of cycles	B62J 6/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Skates with generators, e.g. inside the wheel	A63C 17/26
Generators specially adapted to a bicycle wheel	B62J 6/06

H02K 7/1853

{driven by intermittent forces}

Definition statement

This place covers:

Generators structurally associated with prime motors that intrinsically deliver power to the generators in a non continuous way, .e.g.:

- Generators driven by the wheel of passing vehicles;
- Hand-held generators actuated by repetitively pulling a lever;
- Generators driven by prime motors which have to be intermittently reset to a starting position, e.g.: a weight driven motor, or a loaded spring motor.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric torches without electric accumulators	H02J 7/32

H02K 7/1861

{driven by animals or vehicles (H02K 7/1853 takes precedence)}

Definition statement

This place covers:

Generators continuously driven by animals (including humans) or vehicles, e.g.:

- by the wheel of a vehicle (e.g. generator driven by rolls on which the vehicle stands);
- by a pedal arrangement (like in a bicycle), or by a hand driven similar device;
- by animals like in a horse driven mill; similar generator arrangements driven by a vehicle.

References

Limiting references

This place does not cover:

Generators driven by animals or vehicle intermittently, e.g. by the wheel of passing vehicles, by hand by repetitively pulling a lever	H02K 7/1853

Informative references

Attention is drawn to the following places, which may be of interest for search:

Devices for producing mechanical power from muscle energy	F03G 5/00
Battery chargers including strange generators, e.g. hand driven	H02J 7/32

H02K 7/1869

{Linear generators; sectional generators}

Definition statement

This place covers:

the sectional generators structurally associated with a wind turbine;

non-reciprocating linear generators, e.g. continuously moving on a rail (like a train).

Special rules of classification

The following generators are specifically classified in H02K 7/1869:

the sectional generators structurally associated with a wind turbine,

non-reciprocating linear generators, e.g. continuously moving on a rail (like a train)

Sectional generators structurally associated with a wind turbine, are classified:

in F03D only, if schematically described / if described as a black box;

in H02K 7/1869 (and possibly F03D), if described with some relevant detail of the generator.

H02K 7/1884

{structurally associated with free piston engines}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reciprocating generator structurally associated with floaters, even if inside a cylinder	H02K 7/1876
Free piston I.C. (internal combustion) engines in general	F02B 71/00
Adaptation of free-pistons I.C. engines for driving a load, e.g. a generator, in general	F02B 71/04
Stirling or other non I.C. free piston engines, in general	F02G 1/0435

Special rules of classification

The pistons must be "free pistons", i.e. not connected to a rotary shaft, of an engine (moved by a fluid inside the cylinder). The free pistons could also be linked one to another and could even consist of membranes.

H02K 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)

References

Limiting references

This place does not cover:

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

Informative references

Attention is drawn to the following places, which may be of interest for search:

Channels or ducts in the casing	H02K 5/20

Special rules of classification

In H02K 9/00 subgroups, documents often contain, explicitly or implicitly, aspects of a plurality of cooling means, which are covered by different subgroups.

As a general rule all the relevant aspects of said cooling means should be classified either as invention (if interesting also per se) or as additional information (if only interesting in combination with aspects covered by other subgroups). Aspects which are not relevant should however not be classified.

For example:

- in DE925596, fig. 2, relevant (at least in combination) aspects of two different cooling means are disclosed, i.e. H02K 9/14 (air circulated around the machine casing) and H02K 9/08 (air circulated wholly within the machine casing), so both classes should be attributed.
- In EP1802842, fig. 2-5, similar cooling means of the H02K 9/14 type are disclosed, but no information is disclosed about the inside of the machine. Although it is likely that the air wholly enclosed inside the casing will somehow circulate having some cooling effect (as in the previous example), no relevant aspect of this cooling means is present and the document is only classified in H02K 9/14.

Cooling by using compressed air (in an open circuit) should be classified in this group

H02K 9/06

with fans or impellers driven by the machine shaft

Definition statement

This place covers:

Cooling systems in which ambient air flows through the machine, having means for generating flow of cooling medium, consisting of i.e.

- fans or impellers driven by the machine shaft,
- rotor parts acting as a fan or impeller.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling channels between salient poles working as ventilators	H02K 1/325

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

H02K 9/08

by gaseous cooling medium circulating wholly within the machine casing (H02K 9/10 takes precedence)

References

Limiting references

This place does not cover:

Gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing	H02K 9/10

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

Conventional definition of the casing boundaries.

When classifying in the subgroups H02K 9/08 - H02K 9/18, in order to decide whether a gaseous cooling medium circulates inside/outside the casing, it is necessary to define where the boundaries of the casing are.

Since this is not always evident (because often the casing consists of additional elements, e.g. channels, assembled around the basic casing), for the purpose of classifying in all said groups, the casing is considered to be conventionally limited:

- in the axial direction by the bearing shields of the machine or by an equivalent structure supporting the bearings;
- in the radial direction by a geometrical cylindrical surface corresponding to the outer surface of the stator magnetic core (in case of an inner rotor machine) or of the rotor magnetic core (in case of an outer rotor machine).

Please note that in simple machines said conventional boundaries coincide with the real casing).

Example of classification (only the cooling closed circuits inside the machine, e.g. passing through the winding heads 4, are considered).

- DE925596, fig. 2: the conventional radial boundary of the casing corresponds to the real machine casing, therefore the cooling closed circuits are wholly within the machine casing; classify in H02K 9/08.
- DE925596, fig. 3: although in general the conventional radial boundary of the casing corresponds to the real machine casing, the elements 13 are outside said conventional boundary, therefore a part of the cooling close circuits is external to the conventional machine casing; classify in H02K 9/10.
- DE925596, fig. 4: the conventional radial boundary of the casing corresponds to the outer surface of the stator core and not to the real machine casing; since a part of the cooling close circuits is external to the conventional machine casing, classify in H02K 9/10.

H02K 9/10

by gaseous cooling medium flowing in closed circuit, a part of which is external to the machine casing

References

Limiting references

This place does not cover:

Cooling systems wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing and wherein the heat exchanger is cooled by gaseous cooling medium whose flow is generated by means, e.g. fan, structurally associated to the machine casing.	H02K 9/18

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

For the conventional definition of the casing boundaries see classification rules of H02K 9/08.

Example of systems classified in H02K 9/10:

- EP1162718, the outer part of the cooling circuit (e.g. heat exchanger) is external and separated (fig. 9-20) from the motor casing or is external but adjacent/integral (fig. 1-8) with the inner casing 11a (which corresponds to the conventional boundary of the casing as defined above);

- DE925596, fig. 3 (considering only the cooling circuit inside the machine): air is circulated in general within the machine casing, but in the area of the elements 13 it flows outside the conventionally defined casing).
- EP1959544, fig. 1, the circuit of the cooling air is external to the conventional casing both axially (in the area 40, which is beyond the left bearing shield) and radially (in the area 56, which is beyond the conventional boundary of the casing as defined above, which corresponds to the casing 4).

H02K 9/12

wherein the cooling medium circulates freely within the casing

Definition statement

This place covers:

Cooling systems in which a gaseous cooling medium flows in closed circuit, a part of which is external to the machine casing, wherein there are no means, inside the machine casing, for generating flow of cooling medium

Special rules of classification

For the conventional definition of the casing boundaries see classification rules of H02K 9/08.

H02K 9/14

wherein gaseous cooling medium circulates between the machine casing and a surrounding mantle

Definition statement

This place covers:

Cooling systems in which gaseous cooling medium circulates:

- outside the machine casing, e.g. between the machine casing and a surrounding mantle
- through ducts or tubes within the casing, i.e. said gaseous cooling medium is separated from the gaseous medium contained inside the machine casing

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

Any system in which cooling gaseous medium cools the machine by cooling the outside of the machine casing, with or without a surrounding mantle, is classified in this group, including systems in which the fluid circulates in ducts built in the thickness of the casing wall.

Systems wherein the fluid circulates in ducts built inside the conventional casing boundaries are classified in H02K 9/16 (for the conventional definition of the casing boundaries see classification rules of H02K 9/08).

Classification examples:

- in DE925596, fig. 2, relevant (at least in combination) aspects of two different cooling means are disclosed; the document is classified in both H02K 9/14 and H02K 9/08.
- In EP1802842, fig. 2-5, similar cooling means of the H02K 9/14 type are disclosed, but no relevant information is disclosed about the inside of the machine; the document is only classified in H02K 9/14.

H02K 9/16

wherein the cooling medium circulates through ducts or tubes within the casing

Special rules of classification

In order to be classified in H02K 9/16 the fluid must circulate in ducts built inside the conventional casing boundaries (for the conventional definition of the casing boundaries see classification rules of H02K 9/08). In systems classified in H02K 9/16 the "ducts within the casing" can at least in part coincide with cooling ducts in the stator laminations, see e.g. US5780946, fig. 1, 2.

Systems in which the fluid circulates in ducts built in the thickness of the casing walls are classified in H02K 9/14.

H02K 9/18

wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing

Definition statement

This place covers:

Cooling system in which (all these conditions must be fulfilled):

- gaseous cooling medium flows in closed circuit, a part of which is external to the machine casing (as the cooling systems classified in H02K 9/10, H02K 9/12),
- wherein the external part of the closed circuit comprises a heat exchanger structurally associated with the machine casing,
- wherein the heat exchanger is cooled by gaseous cooling medium, whose flow is generated by means, e.g. fan, structurally associated to the machine casing.

Special rules of classification

Consequently to the definition, if the heat exchanger is cooled:

- by liquid,
- or by a gaseous medium, e.g. air, and the means, e.g. fan, for generating this medium flow are not structurally associated to the machine casing (but are e.g. mounted instead directly on the heat exchanger casing),
- or by a gaseous medium, e.g. air, and the means for generating this medium flow are absent or not indicated,

the system is not classified in H02K 9/18, but in H02K 9/10, H02K 9/12 instead.

H02K 9/19

for machines with closed casing and closed-circuit cooling using a liquid cooling medium, e.g. oil

Definition statement

This place covers:

Machines with closed circuit liquid cooling;

Machine with any other form of liquid cooling.

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

H02K 9/193

with provision for replenishing the cooling medium; with means for preventing leakage of the cooling medium

Definition statement

This place covers:

Openings, ducts, and other arrangements for providing the cooling medium.

H02K 9/197

in which the rotor or stator space is fluid-tight, e.g. to provide for different cooling media for rotor and stator

Definition statement

This place covers:

e.g. Machines with air gap sleeves or similar devices to provide for different cooling media

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines with air gap sleeves not for cooling purposes	H02K 5/128, H02K 5/132

H02K 9/20

wherein the cooling medium vaporises within the machine casing

Definition statement

This place covers:

Cooling system in which the medium vaporises within the casing;

Heat pipes

H02K 9/22

by solid heat conducting material embedded in, or arranged in contact with, the stator or rotor, e.g. heat bridges

Definition statement

This place covers:

Heat bridges

Heat sinks and other radiating means

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling with heat pipes	H02K 9/20
Heat exchangers, radiators etc. in general	B21D 53/02

Special rules of classification

For the classification of documents containing aspects of a plurality of cooling means covered by different subgroups see special classification rules of H02K 9/00.

H02K 9/223

{Heat bridges}

Definition statement

This place covers:

Passive solid heat conducting materials creating a path of least resistance for heat transfer between the stator or the rotor and another solid material.

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Thermal bridge
- Cold bridge
- Thermal bypass

H02K 9/225

{Heat pipes}

Definition statement

This place covers:

Vessels (e.g. pipes) containing a medium undergoing a phase transition and transferring heat between a first interface of the vessel in contact with the stator or the rotor and a second interface of the vessel in contact with a cooling medium (e.g. air, a liquid or a solid).

H02K 9/227

{Heat sinks}

Definition statement

This place covers:

Passive solid heat conducting materials in thermal contact with the stator or the rotor and transferring heat to a fluid medium (e.g. air or a liquid coolant).

H02K 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

Definition statement

This place covers:

Safety devices;

Devices for rinsing the machine from H2 to avoid explosions.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Emergency protective circuit arrangements	H02H 7/00

H02K 9/28

Cooling of commutators, slip-rings or brushes e.g. by ventilating

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Commutators, slip-rings, or brushes in general	H01R 39/00

H02K 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)

Definition statement

This place covers:

Structural association

- with electric measuring or protective devices;
- with mechanical measuring or protective devices (very few cases);
- with electric components in general.

References

Limiting references

This place does not cover:

Casings, enclosures or supports	H02K 5/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with devices for standstill heating	H02K 15/125
Structural association with auxiliary electric devices specific to a kind of machine	H02K 17/30, H02K 19/36, H02K 23/66, H02K 27/28
Sensors in general	G01
Inductors in general	H01F
Capacitors in general	H01G
Switches in general	H01H
Rectifiers in general	H01L 25/00
Connectors in general.	H01R
Emergency protective circuit arrangements in general	H02H
Printed circuits in general;	H05K

Special rules of classification

Casing and cooling aspects only relevant for details covered by H02K 11/00, e.g. the casing / cooling of the electronics, are in general only classified in H02K 11/00 and not in H02K 5/00 and H02K 9/00, unless they are also relevant for the machine in general.

When the electronics covered by H02K 11/00 is the only invention information and the machine to which the electronics is mounted does not have other relevant aspects the documents are in general classified (according to the special rules of classification within the subclass):

as invention information in H02K 11/00 or subgroups,

as additional information in the class of the type of machine, e.g. H02K 7/1166

H02K 11/0094

{Structural association with other electrical or electronic devices}

Definition statement

This place covers:

Structural association with e.g. transformers, batteries, fuel cells, lamps, resistors, capacitors.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Elements typical of a machine of a specific kind, e.g. starting capacitors for asynchronous motors	H02K 17/30, H02K 19/36, H02K 23/66, H02K 27/28
PM machines with additional coils for controlling the excitation flux	H02K 21/04

H02K 11/01

for shielding from electromagnetic fields {, i.e. structural association with shields} (means for preventing or reducing eddy-current losses in the winding heads by shielding H02K 3/42)

Definition statement

This place covers:

Shielding by any means, e.g. screens or coils.

References

Limiting references

This place does not cover:

Means for preventing or reducing eddy-current losses in the winding heads by shielding	H02K 3/42

H02K 11/02

for suppression of electromagnetic interference

Definition statement

This place covers:

Suppressing RFI [radio frequency interference] or EMI [electromagnetic interference].

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements of brushes or commutators specially adapted for improving commutation	H02K 13/10
Improving current transfer in rotary current collectors, or reducing or preventing sparking or arcing, by the use of impedances between brushes or segments	H01R 39/54
Suppression or limitation of noise interference in radio	H04B 15/02
Screening of apparatus or components against electric or magnetic fields in general	H05K 9/0066

H02K 11/028

Suppressors associated with the rotor

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spark suppressors associated with the commutator	H02K 13/105

Special rules of classification

If the suppressor is clearly associated (explicitly or even implicitly) with spark suppression, it is classified in H02K 13/105 (only), otherwise in H02K 11/028.

H02K 11/20

for measuring, monitoring, testing, protecting or switching (rectifiers H02K 11/04; power electronics H02K 11/33)

Definition statement

This place covers:

Devices for measuring distances or positions other that the position of the rotor in the rotary direction, e.g. measuring the air gap while the machine is operating.

References

Limiting references

This place does not cover:

Rectifiers	H02K 11/04
Power electronics	H02K 11/33

H02K 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)

Definition statement

This place covers:

- Devices for measuring the speed or the position of the rotor in the rotary direction.

References

Limiting references

This place does not cover:

Position or speed sensing for the commutation of electronically commutated motors	H02K 29/06 - H02K 29/14

Informative references

Attention is drawn to the following places, which may be of interest for search:

Devices for measuring distances or positions other than the position of the rotor in the rotary direction, e.g. for measuring the thickness of the air-gap	H02K 11/20
Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchros, selsyns, resolvers	H02K 24/00
Speed sensors per se	G01P

Special rules of classification

In this group, both the detectors and the detected elements are classified.

Position or speed sensors used for commutating brushless machines are classified in H02K 29/06 - H02K 29/14 even if they are additionally used for measuring position or speed for other purposes, i.e. this type of sensors is in general not classified in H02K 11/21 and subgroups.

RF-chips are classified in H02K 11/21 (not in the subgroups)

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

RF-chips	chip that when energized by an external magnetic field emit an identification code or other signal identifying the position of the chip

H02K 11/215

Magnetic effect devices, e.g. Hall-effect or magneto-resistive elements

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hall sensors in general	G01R 33/07, G01R 15/20, G01D 5/145

H02K 11/225

Detecting coils

Definition statement

This place covers:

Using separate detecting coils;

Using the machine windings also as detecting coils (i.e. sensorless position control).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

RF chips	H02K 11/21
Synchros, selsyns, resolvers in general	H02K 24/00

Special rules of classification

Sensorless arrangements are classified in this group, when the coils or other parts of the machine, e.g. the rotor, are specifically adapted to the function of sensing speed or position.

H02K 11/24

Devices for sensing torque, or actuated thereby (H02K 11/27 takes precedence)

References

Limiting references

This place does not cover:

Devices for sensing current, or actuated thereby	H02K 11/27

Informative references

Attention is drawn to the following places, which may be of interest for search:

Torque sensors in general	G01L 3/00, G01L 5/00
Power steering with torque sensors (without electric motor details)	G01L 5/221 or B62D 5/04

H02K 11/25

Devices for sensing temperature, or actuated thereby

Definition statement

This place covers:

- Sensors;
- Fuses responding (melting) to the ambient temperature.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Over-current protection sensitive to other parameters than temperature, e.g. fuses responding (melting) to a current passing through the fuse	H02K 11/27

H02K 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)

Definition statement

This place covers:

Fuses responding (melting) to a current passing through the fuse

References

Limiting references

This place does not cover:

Devices for sensing temperature, or actuated thereby	H02K 11/25

H02K 11/30

Structural association with control circuits or drive circuits

Definition statement

This place covers:

Control circuits in general with or without PCB

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

PCBs with very simple circuits for connectors, sensors etc.	H02K 5/225, H02K 11/20

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

PCB	printed circuit board

H02K 11/33

Drive circuits, e.g. power electronics (H02K 11/38 takes precedence)

Definition statement

This place covers:

Control circuits comprising power electronics

References

Limiting references

This place does not cover:

Control circuits or drive circuits associated with geared commutator motors of the worm-and-wheel type	H02K 11/38

Informative references

Attention is drawn to the following places, which may be of interest for search:

Rectifier circuits	H02K 11/04
Voltage regulators of synchronous motors (e.g. vehicle alternators)	H02K 19/365
Power steering gear motor systems with electronic control units	B62D 5/0406

H02K 11/35

Devices for recording or transmitting machine parameters, e.g. memory chips or radio transmitters for diagnosis

Definition statement

This place covers:

Devices

- for recording or transmitting machine parameters
- for scheduling maintenance intervals,
- for calculating the lifetime of a machine

H02K 11/38

Control circuits or drive circuits associated with geared commutator motors of the worm-and-wheel type

Definition statement

This place covers:

Control circuits, with or without power electronics, associated with small gear motors of the worm and wheel type, e.g. of the type used in windshield wipers

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control circuits associated with larger gear motors of the worm and wheel type e.g. of the type used for power steering)	H02K 11/33

H02K 11/40

Structural association with grounding devices

Definition statement

This place covers:

- Brush arrangement for short circuiting shafts;
- Ground connections on laminations or electronics.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spark suppressors on commutators	H02K 13/105

Special rules of classification

Simple grounding of casing are additionally classified in H02K 5/225.

H02K 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

References

Limiting references

This place does not cover:

Supporting or protecting brushes or brush holders in motor / generator casings or enclosures	H02K 5/14

Informative references

Attention is drawn to the following places, which may be of interest for search:

Current collectors (slip rings), commutators, brushes, brush holders, in general	H01R 39/00

Special rules of classification

The structural association of brushes, brush holders, commutators or collectors (slip rings) with the electric machine is classified in H02K 13/00 or H02K 5/14.

On the contrary the following is classified in H01R 39/00:

specific details of brushes or commutators / collectors per se;

aspects relating to the interaction brush-collector / commutator.

H02K 13/02

Connections between slip-rings and windings

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Connections of conductor to slip-rings in general	H01R 39/34

H02K 13/04

Connections between commutator segments and windings

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods for winding a wire around the commutator tags (together with the winding machines)	H02K 15/09

Method for soldering the tags to the winding	H01R, B23K
Connections of conductor to commutator segment	H01R 39/32

H02K 13/10

Arrangements of brushes or commutators specially adapted for improving commutation

Definition statement

This place covers:

Arrangements for improving commutation, which are structurally associated with the electric machine

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Improving commutation by improving aspects of the brushes, the commutator / collector per se, without relation with the rest of the electrical machine	H01R 39/00

H02K 13/105

{Spark suppressors associated with the commutator}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interference suppressors associated with the rotor	H02K 11/028

Special rules of classification

If the suppressor is clearly associated (explicitly or even implicitly) with spark suppression it is classified in H02K 13/105 (only), otherwise in H02K 11/028.

H02K 13/14

Circuit arrangements for improvement of commutation, e.g. by use of unidirectionally conductive elements

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spark suppressors, associated with the commutator	H02K 13/105

H02K 15/00

Methods or apparatus specially adapted for manufacturing, assembling, maintaining or repairing of dynamo-electric machines

Definition statement

This place covers:

Every method or apparatus specially adapted for the manufacturing, assembling, maintaining or repairing dynamo-electric machines.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cleaning in general	B08B
Shaping by press-cutting laminations for dynamo-electric machines	B21D 28/22
Forging	B21K 1/00
Press fitting	B23P 11/00, B23P 19/02, B21K 25/00
Combined processes	B23P 15/00
Arrangements for handling work or use in connection with machine tools	B23Q 7/00
Treatment of ferrous metals	C21D
Noise/vibration dampening; balancing	F16F
Measuring vibrations (of rotating machines)	G01H 1/00
Measuring mechanical properties	G01M
Measuring electrical properties on dynamo-electric machines in general	G01R 31/34
Manufacturing of current collectors in general	H01R 43/00

Special rules of classification

Documents referring to manufacturing methods are classified in H02K 15/00 and subgroups only if they disclose "real" methods, i.e. disclose relevant information about the manufacturing aspects. Documents describing or formally claiming a method, which in fact only consists in the reformulation of a product claim, without any relevant manufacturing information, are NOT classified in H02K 15/00.

In general measuring electric properties on dynamoelectric machines is classified only in G01R 31/34 and not in H02K, however:

the structural association of a dynamo-electric machine with measuring devices which are constantly mounted in the machine are classified: in H02K 11/00, H02K 17/30, H02K 19/36, H02K 23/66, H02K 27/28

the structural association with devices which are temporarily mounted to the machine during tests / manufacturing, etc. is classified in H02K 15/00 or in its specific subgroups.

Methods or apparatus not specific to a process covered by a subgroup, e.g. cleaning in general moving, transporting, storing of electric machines or components thereof (including production lines and pallets) between different working stations are classified in H02K 15/00

H02K 15/0006

{Disassembling, repairing or modifying dynamo-electric machines (repairing of cooling fluid boxes H02K 15/0093)}

References

Limiting references

This place does not cover:

Repairing of cooling fluid boxes	H02K 15/0093

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recycling in general	B09B 5/00

Special rules of classification

Methods to obtain a type of machine, e.g. a permanent magnet alternator, by modifying another type of machine, e.g. an asynchronous motor, are classified as invention in H02K 15/0006 and in the group of the obtained machine and as additional information in the group of the original machine.

H02K 15/0012

{Manufacturing cage rotors}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Casting rotors, stators for electric motors	B22D 19/0054

H02K 15/0025

{Shaping or compacting conductors or winding heads after the installation of the winding in the core or machine (methods or apparatus for simultaneously twisting a plurality of hairpins prior to mounting H02K 15/0428); Applying fastening means on winding heads}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or apparatus for simultaneously twisting a plurality of hairpins prior to mounting into the core	H02K 15/0428

H02K 15/0031

{Shaping or compacting conductors in slots or around salient poles (H02K 15/005 takes precedence)}

References

Limiting references

This place does not cover:

Shaping or compacting by means of electrodynamic forces	H02K 15/005

H02K 15/0037

{Shaping or compacting winding heads (H02K 15/005, H02K 15/0087 and H02K 15/0428 take precedence)}

References

Limiting references

This place does not cover:

Shaping or compacting by means of electrodynamic forces	H02K 15/005

H02K 15/0043

{Applying fastening means on winding headS (fastening by applying resin, glue, varnish and similar means H02K 15/12)}

Definition statement

This place covers:

Binding the winding heads

References

Limiting references

This place does not cover:

Fastening by means of resin, glue, etc,	H02K 15/12

H02K 15/0056

{Manufacturing winding connections}

Definition statement

This place covers:

Method or apparatus for manufacturing terminals or leads.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacturing connectors in general	H01R 43/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Random-wound windings	refers to windings (e.g. made of relatively thin wire) which are wound either substantially randomly or at least with no particular care for obtaining a predetermined specific position of the conductor in the winding bundle.
Form-wound windings	refers to windings (e.g. made of heavy gauge wire) wherein the conductors are wound in a specific position of the winding bundle.

H02K 15/0062

{Manufacturing the terminal arrangement per se; Connecting the terminals to an external circuit}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacturing the winding till the terminal, including connecting the winding (lead) to the terminal	H02K 15/0068.

H02K 15/0068

{Connecting winding sections; Forming leads; Connecting leads to terminals}

Definition statement

This place covers:

- Connecting separate sections of a winding;
- Connecting the winding to the terminals, e.g. forming the winding leads.

H02K 15/0081

{for form-wound windings}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Windings consisting of cables:	H02K 15/0056
Methods or apparatus for simultaneously twisting a plurality of hairpins prior to mounting into the core	H02K 15/0428

H02K 15/026

{Wound cores}

Definition statement

This place covers:

Helically wound cores

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cores consisting of a stack of laminations stacked straight and bent afterwards	H02K 15/024

H02K 15/03

having permanent magnets

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacturing permanent magnets in general	H01F

H02K 15/04

of windings, prior to mounting into machines (insulating windings H02K 15/10, H02K 15/12)

References

Limiting references

This place does not cover:

Insulating windings	H02K 15/10, H02K 15/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Coil manufacture in general	H01F 41/02

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Loop windings	refers to windings whose turns are wound concentrically
Lap windings	refers to windings consisting of partially overlapping loops, wherein each loop consists of a single turn or of a plurality of concentrically wound turns.

H02K 15/0442

{Loop windings (manufacturing of windings consisting of overlapped loops H02K 15/0464)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacturing of windings consisting of overlapped loops	H02K 15/0464

H02K 15/0464

{Lap windings (when on diagonally wound hollow coils H02K 15/0492)}

References

Limiting references

This place does not cover:

Lap windings on diagonally wound hollow coils	H02K 15/0492

H02K 15/0478

{Wave windings, undulated windings (when on diagonally wound hollow coils H02K 15/0492)}

References

Limiting references

This place does not cover:

Wave windings, undulated windings on diagonally wound hollow coils	H02K 15/0492

H02K 15/06

Embedding prefabricated windings in machines

Definition statement

This place covers:

Inserting the prefabricated windings in the machine, usually in a magnetic core;

Moulding metallic powders around the windings.

H02K 15/063

{Windings for large electric machines, e.g. bar windings (windings consisting of cables H02K 15/065)}

References

Limiting references

This place does not cover:

Winding consisting of cables	H02K 15/065

Special rules of classification

Here are classified documents describing inserting methods specially adapted for large windings, usually consisting of large bars. In case of doubt or when the method can also be used for smaller winding the documents are classified here and in the other relevant groups.

H02K 15/064

{Windings consisting of separate segments, e.g. hairpin windings (H02K 15/063 takes precedence)}

References

Limiting references

This place does not cover:

Windings for large electrical machines	H02K 15/063

H02K 15/065

{Windings consisting of complete sections, e.g. coils, waves (windings for large electric machines other than those consisting of cables H02K 15/063)}

Definition statement

This place covers:

- Magnetic wire windings;
- Cable windings.

References

Limiting references

This place does not cover:

Windings for large electrical machines, with the exception of cable windings	H02K 15/063

H02K 15/066

{inserted perpendicularly to the axis of the slots or inter-polar channels}

Definition statement

This place covers:

Windings inserted perpendicularly to the axis of the slots or inter-polar channels, e.g. in the radial direction when considering a machine with radial air-gap

Special rules of classification

There can be a component in an other direction (e.g. along a slot), but the winding is inserted mainly in the direction indicated in the title.

H02K 15/067

{inserted in parallel to the axis of the slots or inter-polar channels}

Definition statement

This place covers:

Windings inserted parallelly to the axis of the slots or inter-polar channels, e.g. in the axial direction when considering a machine with radial air-gap

Special rules of classification

There can be a component in an other direction (e.g. perpendicular to the slot), but the winding is inserted mainly in the direction indicated in the title.

H02K 15/068

{Strippers}

Definition statement

This place covers:

Windings inserted by means of a "stripper" inserter (e.g. US4750258).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Stripper	refers to a type of inserter having a winding supporting head, approximately cylindrical, with a diameter corresponding to the inner diameter of the magnetic core, e.g. US4750258

H02K 15/12

Impregnating, heating or drying of windings, stators, rotors or machines

Definition statement

This place covers:

- Impregnating,
- Heating,
- Drying,

- Moulding, e.g. with a resin

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Incorporating preformed parts in general	B29C 39/18
Injection moulding in general	B29C 45/00

H02K 15/16

Centering rotors within the stator; Balancing rotors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Balancing in general	G01M

H02K 15/165

{Balancing the rotor}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structurally association of balancing means with dynamoelectric machines	H02K 7/04
Balancing in general	G01M

H02K 16/00

Machines with more than one rotor or stator {(machines for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts H02K 51/00; permanent magnet machines with multiple rotors or stators relatively rotated for vectorially combining the excitation fields or the armature voltages H02K 21/029)}

References

Limiting references

This place does not cover:

PM Machines with multiple rotors or stators relatively turned for vectorially combining the excitation fields or the armature voltages	H02K 21/029
Machines for transmitting mechanical power from a driving shaft to a driven shaft and comprising structurally interrelated motor and generator parts	H02K 51/00

Special rules of classification

Group H02K 16/00 takes precedence over groups H02K 17/00 - H02K 53/00, unless otherwise explicitly indicated in the references relevant to classification valid for this group and its subgroups.

Machines classified in H02K 16/00 as invention information should have at least the casing in common; a plurality of associated independent electric machines (e.g. a single gear box driving several independent electric generators attached to it), if the structural association among the machines is relevant, are classified in H02K 16/00 as additional information only.

Machines classified as invention in H02K 16/00 and consisting of the combination of two or more "elementary" machines of the type covered in groups H02K 17/00- H02K 99/00 should also be classified, usually as additional information (as invention if interesting per se), in the groups of said "elementary" machines.

Modular electric machines or machines with redundant armature windings should at least be classified as additional information.

The following types of documents are NOT classified in this group (unless they are specially adapted in order to be modular machines):

a plurality of identical stators/rotors units, disposed along the rotor axis and shifted to form the phases of a multi-phase machine,

axial air-gap machines consisting of a plurality of identical stator/rotor units fixed to the same shaft.

It is not very clear if two separate windings on a rotor/ stator should be considered as two rotors/ stators; as a consequence many documents that could be classified in a subgroup are in fact classified in the top group H02K 16/00.

H02K 16/005

{Machines with only rotors, e.g. counter-rotating rotors (DC commutator machines or universal AC/DC commutator motors having a rotating armature and a rotating excitation field H02K 23/60)}

Definition statement

This place covers:

Machines with rotating "stators", i.e. armature and field counter-rotating.

References

Limiting references

This place does not cover:

DC commutator machines or universal AC/DC commutator motors having a rotating armature and a rotating excitation field	H02K 23/60

Special rules of classification

The movement of the "stators" must be substantial, e.g. stators only adjustable but essentially fixed are not classified in H02K 16/005

The rotating "stator" can be blocked in certain circumstances (e.g. by a brake)

H02K 16/025

{with rotors and moving stators connected in a cascade (cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter H02K 17/34)}

Definition statement

This place covers:

Machines in which a fixed stator drives a rotor which is mechanically connected with a moving "stator" which drives another rotor.

References

Limiting references

This place does not cover:

Cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter	H02K 17/34

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motor structurally associated to magnetic clutches	H02K 7/11

H02K 17/00

Asynchronous induction motors; Asynchronous induction generators

Special rules of classification

References / special rules are present for some of the subgroups (see the specific subgroup)

H02K 17/08

Motors with auxiliary phase obtained by externally fed auxiliary windings, e.g. capacitor motors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with capacitors	H02K 17/30

H02K 17/20

having deep-bar rotors

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Deep-bar	refers to bars extending radially (in a radial air gap machine) in order to control the skin effect at start up (it could be seen as a double bar cage with the radially superposed bars combined in a single bar)

H02K 17/26

having rotors or stators designed to permit synchronous operation

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronous motor respectively without or with permanent magnets having additional short-circuited winding for starting as an asynchronous motor	H02K 19/14, H02K 21/46

Special rules of classification

Synchronous motors with additional short-circuit winding are classified in H02K 19/14 or H02K 21/46

Asynchronous motors with additional means for synchronization (e.g. means for generating a rotor synchronous field by injecting in the rotor short-circuit winding a DC current, see e.g. WO2004079879; additional synchronizing electromagnetic devices, see GB2052885) are classified in H02K 17/26

In case of doubt classify in both subgroups

H02K 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

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control arrangements external to the motor	H02P

H02K 17/32

Structural association of asynchronous induction motors with auxiliary mechanical devices, e.g. with clutches or brakes

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control arrangements external to the motor	H02P

H02K 17/34

Cascade arrangement of an asynchronous motor with another dynamo-electric motor or converter

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines with rotors and moving stators connected in a cascade	H02K 16/025
Control of cascade-arrangements	H02P

H02K 17/40

with a rotary AC/DC converter

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cascade AC/DC converters	H02K 47/06

H02K 17/42

Asynchronous induction generators (H02K 17/02 takes precedence)

References

Limiting references

This place does not cover:

Asynchronous induction motors	H02K 17/02

H02K 19/00

Synchronous motors or generators (having permanent magnets H02K 21/00)

References

Limiting references

This place does not cover:

Synchronous motors or generators having permanent magnets	H02K 21/00

H02K 19/12

characterised by the arrangement of exciting windings, e.g. for self-excitation, compounding or pole-changing

Definition statement

This place covers:

Documents characterised by the arrangement of exciting windings or exciting systems in general.

H02K 19/14

having additional short-circuited windings for starting as asynchronous motors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Asynchronous motors having rotor or stator designed to permit synchronous operation	H02K 17/26
Synchrounous motors with permanent magnets having additional short-circuited winding for starting as an asynchronous motor	H02K 21/46

Special rules of classification

Synchronous motors with additional short-circuit winding are classified in H02K 19/14 or H02K 21/46

Asynchronous motors with additional means for synchronization (e.g. means for generating a rotor synchronous field by injecting in the rotor short-circuit winding a DC current, see e.g. WO2004079879; additional synchronizing electromagnetic devices, see GB2052885) are classified in H02K 17/26

In case of doubt classify in both subgroups

H02K 19/26

characterised by the arrangement of exciting windings

Definition statement

This place covers:

Documents characterised by the arrangement of exciting windings or exciting systems in general.

H02K 19/34

Generators with two or more outputs

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronous generators with permanent magnets with two or more outputs	H02K 21/48

H02K 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

Definition statement

This place covers:

Schemes with rectifiers

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with a rectifier	H02K 11/04
Control arrangements external to the generator	H02P

H02K 21/00

Synchronous motors having permanent magnets; Synchronous generators having permanent magnets

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of stator cores with permanent magnets	H02K 1/17
Details of rotor cores with permanent magnets	H02K 1/27

H02K 21/02

Details

Special rules of classification

PM machines in which the excitation flux (i.e. field) is regulated:

- - by any means other than additional coils or mechanical means,
- - by combination of additional coils and mechanical means.

are classified in H02K 21/02 (not in the subgroups)

H02K 21/021

{Means for mechanical adjustment of the excitation flux}

Definition statement

This place covers:

PM synchronous motors or generators in which the excitation flux (i.e. field) acting on the windings is regulated by mechanical means i.e. by moving some parts of the magnetic core of the machine in order to change the amount of excitation flux which interacts with said windings, e.g. by partially extracting the PM rotor from the stator)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

PM machines in which the excitation flux (i.e. field) is regulated by means of additional coil.	H02K 21/04

Special rules of classification

Means for mechanical adjustment of the flux in PM (permanent magnets) synchronous machines are not classified in H02K 7/12.

Similar means for mechanical adjustment of the flux in machines which are NOT PM synchronous motors or generators (e.g. asynchronous machines, synchronous machine with wound field, PM coupling as classified in H02K 49/10) are not classified as invention in H02K 21/021, they are however classified in this group as additional information.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Field	refers to the part of the machine (generally the rotor) generating the excitation flux.
Armature	refers to the part of the machine (generally the stator) containing the windings on which the excitation flux acts.

H02K 21/022

{by modifying the relative position between field and armature, e.g. between rotor and stator (vectorial combination of field or armature sections H02K 21/029)}

Definition statement

This place covers:

Machines in which the amount of excitation flux acting on the windings is controlled:

- by varying the overlap, across the air gap, between rotor and stator surfaces
- by varying the thickness of the air gap.

References

Limiting references

This place does not cover:

Vectorial combination of field or armature sections	H02K 21/029

H02K 21/023

{by varying the amount of superposition, i.e. the overlap, of field and armature}

Definition statement

This place covers:

Machines in which the amount of excitation flux acting on the windings is controlled by varying the overlap, across the air gap, between rotor and stator surfaces, e.g. by relatively moving said rotor and / or stator in a direction perpendicular to the thickness of the air gap.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines in which a conical rotor is axially translated with respect to a conical stator (wherein both the air gap thickness and the overlap are simultaneously modified)	H02K 21/027

H02K 21/024

{Radial air gap machines}

Definition statement

This place covers:

Radial air gap machine machines regulated by axially extracting the rotor from the stator or vice versa

H02K 21/025

{by varying the thickness of the air gap between field and armature}

Definition statement

This place covers:

Machines in which the amount of excitation flux acting on the winding is controlled by varying the thickness of the air gap, i.e. by moving rotor and stator closer or further apart.

H02K 21/027

{Conical air gap machines}

Definition statement

This place covers:

Machines with a conical air gap, in which a conical rotor is axially translated with respect to a conical stator.

H02K 21/028

{by modifying the magnetic circuit within the field or the armature, e.g. by using shunts, by adjusting the magnets position, by vectorial combination of field or armature sections}

Definition statement

This place covers:

- Machines in which the amount of excitation flux acting on the windings is controlled by rearranging the magnetic circuit within the field and / or within the armature, e.g.:
- by introducing shunts close to the permanent magnets,
- by introducing shields in the air gap,
- by modifying the position of the single magnets within a field,
- by vectorially combining excitation fluxes of fields sub-units or emfs (electromotive forces) induced in armature sub-units

H02K 21/029

{Vectorial combination of the fluxes generated by a plurality of field sections or of the voltages induced in a plurality of armature sections}

Definition statement

This place covers:

Machines in which the modification of the excitation flux is obtained by:

- relatively moving (usually rotating) two or more field sub-units in order to modify the relative phases of the fluxes generated by the sub-units and vectorially combine them in a variable combined flux;
- relatively moving (usually rotating) two or more armature sub-units in order to modify the relative phases of the emfs (electromotive forces) induced in the sub-units and vectorially combine them in a variable combined emf.

H02K 21/04

Windings on magnets for additional excitation {; Windings and magnets for additional excitation}

Definition statement

This place covers:

- PM machines with additional field coils for controlling the PM field.
- PM machines with magnetizing coil for varying the magnetization of the PM, e.g. written pole type machines. The magnetizing coil could also be the machine armature winding controlled in an appropriate way.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Coil on rotors for magnetizing or re-magnetizing permanent magnets	H02K 1/223
PM machines with means for mechanical adjustment of the excitation flux	H02K 21/021

H02K 21/12

with stationary armatures and rotating magnets

Definition statement

This place covers:

Overhanging poles or magnets, i.e. machines with rotor and stator positioned essentially side by side along the machine axis, one of the two members having polar elements extending inside or outside the other member.

Special rules of classification

Overhanging poles or magnets, i.e. machines with rotor and stator positioned essentially side by side along the machine axis, one of the two members having polar elements extending inside or outside the other member, as in GB2083953, are classified in H02K 21/12 not in the subgroups.

H02K 21/125

{having an annular armature coil (H02K 21/14 - H02K 21/24 take precedence)}

Definition statement

This place covers:

Transversal flux machines with annular armature coils which are coaxial with the rotor axis.

References

Limiting references

This place does not cover:

Machines with magnet rotating within armature	H02K 21/145
Machines with magnet rotating around armature	H02K 21/227
Machines with magnet axially facing armature	H02K 21/24

H02K 21/145

{having an annular armature coil (with homopolar co-operation H02K 21/20)}

Definition statement

This place covers:

Transversal flux machines with annular armature coils which are coaxial with the rotor axis

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/20

H02K 21/16

having annular armature cores with salient poles (with homopolar co-operation H02K 21/20)

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/20

H02K 21/18

having horse-shoe armature cores (with homopolar co-operation H02K 21/20)

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/20

H02K 21/222

{Flywheel magnetos}

Definition statement

This place covers:

Vehicle generators with a pot-shaped rotor used as a flywheel

H02K 21/225

{having I-shaped, E-shaped or similarly shaped armature cores}

Special rules of classification

The machines are classified according to the shape of the main stator core

Machines in this group, which often comprise a plurality of armature cores, are not be classified in H02K 21/48.

H02K 21/30

having annular armature cores with salient poles (with homopolar co-operation H02K 21/36)

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/36

H02K 21/32

having horse-shoe magnets (with homopolar co-operation H02K 21/36)

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/36

H02K 21/34

having bell-shaped or bar-shaped magnets, e.g. for cycle lighting (with homopolar co-operation H02K 21/36)

References

Limiting references

This place does not cover:

Machines with homopolar co-operation	H02K 21/36

H02K 21/44

with armature windings wound upon the magnets

Definition statement

This place covers:

Machines with armature and magnets both on the same stationary member, the other member being the rotary flux distributor

H02K 21/46

Motors having additional short-circuited winding for starting as an asynchronous motor

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Asynchronous motors having rotor or stator designed to permit synchronous operation	H02K 17/26
Synchronous motors without permanent magnets having additional short-circuited winding for starting as an asynchronous motor	H02K 19/14

Special rules of classification

Synchronous motors with additional short-circuit winding are classified in H02K 19/14 or H02K 21/46

Asynchronous motors with additional means for synchronization (e.g. means for generating a rotor synchronous field by injecting in the rotor short-circuit winding a DC current, see e.g. WO2004079879; additional synchronizing electromagnetic devices, see GB2052885) are classified in H02K 17/26

In case of doubt classify in both subgroups

H02K 21/48

Generators with two or more outputs

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronous generators without permanent magnets with two or more output	H02K 19/34

H02K 23/00

DC commutator motors or generators having mechanical commutator; Universal AC/DC commutator motors

Special rules of classification

Generic universal motors are normally classified together with the DC motors in the relevant H02K 23/00 subgroup, i.e. they are not systematically classified in H02K 23/64.

H02K 23/26

characterised by the armature windings

Definition statement

This place covers:

Armature schemes, e.g. layout of windings and / or of connections with commutator blades

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of the armature winding, e.g. insulation, support, shape of the winding inside the slots	H02K 3/00

H02K 23/60

Motors or generators having rotating armatures and rotating excitation field

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines with rotating rotors and stators in general	H02K 16/005

H02K 23/64

Motors specially adapted for running on DC or AC by choice

Definition statement

This place covers:

only specific adaptation for running under DC/AC by choice, e.g. switches to select a particular circuit

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Generic universal motors	H02K 23/00

H02K 23/66

Structural association with auxiliary electric devices influencing the characteristic of, or controlling, the machine, e.g. with impedances or switches

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association with means for suppressing radio interference	H02K 11/02
Control arrangements external to the machine	H02P

H02K 23/68

Structural association with auxiliary mechanical devices, e.g. with clutches or brakes

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control arrangements external to the machine	H02P

H02K 24/00

Machines adapted for the instantaneous transmission or reception of the angular displacement of rotating parts, e.g. synchro, selsyn

Definition statement

This place covers:

Synchros, selsyns and resolvers and other similar devices working in the same ways, i.e. generating and sensing sinusoidal voltages/currents whose phase and amplitude is related to the rotor position. These machines can be used to measure an angle or to transmit the angle to a similar machine.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Measuring angles by electric, magnetic means (encoders in general)	G01B 7/30
Movable armature means for converting the angle of a sensing means	G01D 5/20
Electric signal transmission systems using dynamo-electric devices	G08C 19/38

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Synchro or selsyn	These terms refer to a type of rotary electrical transformer that is used for measuring an angle. In its general physical construction, this machine is much like an electric motor. The primary winding of the transformer, fixed to the rotor, is excited by a sinusoidal electric current (AC), which by electromagnetic induction causes currents to flow in three star-connected secondary windings fixed at 120 degrees to each other on the stator. The relative magnitudes of secondary currents are measured and used to determine the angle of the rotor relative to the stator, or the currents can be used to directly drive a receiver synchro that will rotate in unison with the synchro transmitter. In the latter case, the whole device (in some applications) is also called a selsyn.On a practical level, synchros resemble motors, in that there is a rotor, stator, and a shaft. Ordinarily, slip rings and brushes connect the rotor to external power. A synchro transmitter's shaft is rotated by the mechanism that sends information, while the synchro receiver's shaft rotates a dial, or operates a light mechanical load. Single and three-phase units are common in use, and will follow the other's rotation when connected properly. One transmitter can turn several receivers; if torque is a factor, the transmitter must be physically larger to source the additional current. In a motion picture interlock system, a large motor-driven distributor can drive as many as 20 machines, sound dubbers, footage counters, and projectors
Resolver	A resolver is similar to a synchro, but has a stator with four leads, the windings being 90 degrees apart physically instead of 120 degrees. It is considered an analog device, and has a digital counterpart, the rotary (or pulse) encoder. A resolver rotor might be synchro-like, or have two sets of windings 90 degrees apart. The most common type of resolver is however the brushless transmitter resolver, its stator portion houses three windings: an exciter winding and two two-phase windings (usually labeled "x" and "y"). A pair of resolvers could theoretically operate like a pair of synchros, in this case receiver resolvers are driven by transmitter resolvers (the system turns the rotor to obtain a zero voltage in the rotor winding. At this position, the mechanical angle of the rotor equals the electrical angle applied to the stator).Resolvers are mainly used for computation. Both synchros and resolvers have an accurate sine-function relationship between shaft position and transformation ratio for any pair of stator connections. Resolvers, in particular, can perform very accurate analog conversion from polar to rectangular coordinates. Shaft angle is the polar angle, and excitation voltage is the magnitude. The outputs are the [x] and [y] components.

H02K 25/00

DC interrupter motors or generators

Definition statement

This place covers:

Machines with mechanical interrupters.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machines with "normal" mechanical commutators (with brushes)	H02K 23/00, H02K 27/00

H02K 26/00

Machines adapted to function as torque motors, i.e. to exert a torque when stalled

Definition statement

This place covers:

- Machines able to rotate as a common electric motor, but able to exert a torque for extended periods of time when stalled (i.e. without having thermal problems);
- Motors able to rotate only for a fraction of a turn e.g. for valve actuation; rotary positioners.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Throttle valve actuators	F02D 11/10
Rotating valves driven by an electric motor	F16K 31/041
Multiple coil drivers for instruments (e.g. moving coil galvanometers)	G01R 5/00, G01R 7/06
Actuators for shutters	G03B 9/00
Electromagnets with moving armature	H01F 7/08
Electromagnets (solenoids) with rotary armature	H01F 7/145

Special rules of classification

A rule of the thumb to discriminate between electromagnets with movable armature (H01F 7/08) or even rotary armature (H01F 7/145) and torque motors (H02K 26/00) is to consider the action of the magnetic field in the air gap:

electromagnets (H01F 7/08) act by closing the air gap (when the armature is attracted by the coil system);

electric motors (H02K 26/00) orient stator and rotor structures, without closing the air gap (as in a normal rotary dynamoelectric machine).

Spherical motors are classified:

- in H02K 41/02 when they correspond to a wound linear motor,

- in H02K 26/00 when they are rounded configurations of torque motors

H02K 27/00

AC commutator motors or generators having mechanical commutator

Definition statement

This place covers:

Commutator machines having an armature connected to a commutator (like the machines of H02K 23/00) and a stator typical of an AC machine, e.g. an asynchronous motor.

References

Limiting references

This place does not cover:

Universal AC/DC motors	H02K 23/00, H02K 23/64

H02K 27/28

Structural association with auxiliary electric devices influencing the characteristic of the machine or controlling the machine

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control arrangements external to the motor	H02P

H02K 29/00

Motors or generators having non-mechanical commutating devices, e.g. discharge tubes or semiconductor devices

Special rules of classification

These machines are inherently synchronous machines with an electronic control; structural aspects not specifically covered by H02K 29/00 and subgroups are classified in the groups for the corresponding synchronous machines, e.g. H02K 21/00 for PM synchronous machines.

H02K 29/03

with a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems

Special rules of classification

If just details of the stator or of the rotor, winding etc. are involved the document can be classified as invention in the relevant detail group (e.g. H02K 1/27) and as additional information in H02K 29/03.

H02K 29/06

with position sensing devices (H02K 29/03 takes precedence)

Definition statement

This place covers:

Position sensing devices for commutation purposes

References

Limiting references

This place does not cover:

With a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems	H02K 29/03

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association of position sensors in general, i.e. not for commutation purposes	H02K 11/21
Processing of the signal; use of the signal for control of the commutation	H02P

H02K 29/08

using magnetic effect devices, e.g. Hall-plates, magneto-resistors (H02K 29/12 takes precedence)

References

Limiting references

This place does not cover:

Position sensing devices using detecting coils	H02K 29/12

H02K 29/12

using detecting coils {using the machine windings as detecting coil}

Definition statement

This place covers:

- Using separate detecting coils;
- Using the machine windings also as detecting coils (i.e. sensorless position control).

References

Limiting references

This place does not cover:

Structural association of detecting coils not for commutation purposes	H02K 11/225

H02K 29/14

with speed sensing devices (H02K 29/03 takes precedence)

References

Limiting references

This place does not cover:

With a magnetic circuit specially adapted for avoiding torque ripples or self-starting problems	H02K 29/03

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association of speed sensing devices in general, i.e. not for commutation purposes	H02K 11/21
Processing of the signal; use of the signal for control of the commutation	H02P

Special rules of classification

In this group are not classified normal position sensing devices (of the type classified H02K 29/06 - H02K 29/12) from which a speed indication can be in principle derived by processing of the sensor position signal. It is also noted that the aspects of signal processing are covered by H02P.

H02K 31/00

Acyclic motors or generators, i.e. DC machines having drum or disc armatures with continuous current collectors

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Acyclic machines	Refers to machines in which a conducting element, e.g. a disc or a drum consisting of a conductive material moves in a uniform magnetic field. In these machines the interaction between magnetic flux and electric conductors is continuous, or in other terms acyclic, contrary to the other type of machines in which the flux is "seen" by the conductors in a cyclical way, e.g. in cycles of positive-negative flux in a heteropolar machine, or in cycles of high-low flux of the same polarity in a homopolar machine.

H02K 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)

Definition statement

This place covers:

Motors in which the mover/rotor can assume only a limited number of positions (usually two) between which the mover/rotor uninterruptedly reciprocates (e.g. vibrating motors).

References

Limiting references

This place does not cover:

Arrangements for handling mechanical energy structurally associated with motors	H02K 7/00, H02K 7/06

Informative references

Attention is drawn to the following places, which may be of interest for search:

Torque motors	H02K 26/00
Linear motors in which the rotor can assume (almost) any intermediate positions (e.g. positioners):	H02K 41/02
Friction welding	B29C, B23K
Generators of mechanical vibrations driven by electromechanical means	B60B 1/04
Jigging conveyors	B65G
Reciprocating compressors	F04B
Active vibrations dampers	F16F 7/1005, F16F 15/03
Control of mechanical oscillations	G05D 19/02
Electromagnets with movable armature	H01F 7/08

Special rules of classification

A rule of the thumb to discriminate between electromagnets with movable armature (H01F 7/08) or even rotary armature (H01F 7/145) and reciprocating, oscillating, or vibrating motors (H02K 33/00) is to consider the action of the magnetic field in the air gap:

electromagnets (H01F 7/08) act by closing the air gap (when the armature is attracted by the coil system);

electric motors (H02K 33/00) orient stator and rotor structures, without closing the air gap (as in a normal rotary dynamoelectric machine).

The term "reciprocating" in the title of the group H02K 33/00 is construed as an uninterrupted back and forth movement between two end positions.

The motors of this type (e.g. motors for vibrators, reciprocating pumps etc.) are classified in H02K 33/00.

On the contrary motors which can position their moving parts anywhere between two end positions, are not considered as reciprocating machines, and are therefore classified in H02K 41/02.

It is the structure of the motor that matters not its control, use or application, i.e. a motor that because of its structure can in principle assume any intermediate position (as the ones covered by H02K 41/02), but controlled in order to reciprocate between only two positions (as the motors classified in H02K 33/00) is classified in H02K 41/02!

H02K 33/02

with armatures moved one way by energisation of a single coil system and returned by mechanical force, e.g. by springs

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Armatures elastically suspended, in which the armature is moved in alternate directions by energisation of two or more coil system(s)	H02K 33/12, H02K 33/16

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Single coil system	a system consisting of a single coil or of a plurality of coils, wherein all the coils are always fed with the same current

H02K 33/16

with polarised armatures moving in alternate directions by reversal or energisation of a single coil system

Definition statement

This place covers:

- Machines with the armature comprising permanent magnets;
- Machines with the armature consisting of reluctance member polarized by an external magnet or coil

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Single coil system	a system consisting of a single coil or of a plurality of coils, wherein all the coils are always fed with the same current

H02K 33/18

with coil systems moving upon intermittent or reversed energisation thereof by interaction with a fixed field system, e.g. permanent magnets

Definition statement

This place covers:

Vibrating voice coil motors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Voice coil motors used as actuators (i.e. for positioning a body):	H02K 41/0354

H02K 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)

Definition statement

This place covers:

- Continuously reciprocating or oscillating generators (structurally similar to the motors of H02K 33/00);
- Impulse generators, comprising vibrating masses.

References

Limiting references

This place does not cover:

Arrangements for handling mechanical energy structurally associated with generators	H02K 7/00, H02K 7/06, H02K 7/1876

Special rules of classification

Linear generators although structurally similar to the motors classified in H02K 41/02, e.g. linear motors used as generators, are not classified in H02K 41/02. Furthermore said generators, although maybe identical to the corresponding linear motors, usually are driven by a reciprocating prime mover, so that the generator moving part in fact reciprocates between two end positions (while the corresponding motor can position the mover anywhere between said end positions). These linear generators are classified in H02K 35/00 as invention information (in case as additional information e.g. for motors that can function also as generators as a secondary effect), and additionally classified as additional information in H02K 41/02 or the relevant subgroups for the equivalent motor (or as invention information if they disclose information relevant also for motors).

If the structural association with the prime mover is relevant the linear generators should also be classified in H02K 7/1876.

Linear generators NON reciprocating (e.g. mounted on a rail, like a train) are classified in H02K 7/1869 as invention and in H02K 41/02 (or relevant subgroups for the equivalent motor) as additional information (or as invention information if they disclose information relevant also for motors per se).

In generators in which the complete device moves (e.g. small energy harvesters whose casing is attached to a vibrating, oscillating or rotary body) the element (magnet or coil) stationary with respect to the housing is considered "stationary"

H02K 37/00

Motors with rotor rotating step by step and without interrupter or commutator driven by the rotor, e.g. stepping motors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronous motors	H02K 19/00

Synchronous motors with PM	H02K 21/00

H02K 37/18

of homopolar type

Definition statement

This place covers:

Motor with an homopolar field e.g. US2010133929, fig. 2

H02K 39/00

Generators specially adapted for producing a desired non-sinusoidal waveform

Definition statement

This place covers:

Dynamoelectric generators for performing tests

H02K 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 {(electromagnetic launchers F41B 6/00)}

References

Limiting references

This place does not cover:

Electromagnetic launchers	F41B 6/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magneto repulsion or processing sheet metal	B30B 1/42, B26D 5/08, B21D 28/002
Electrostatic, electric or magnetic conveyors in general	B65G 54/02
Investigating strength properties of solid materials by applying a single impulsive force generated by electromagnetic means	G01N 3/317

H02K 41/02

Linear motors; Sectional motors

Definition statement

This place covers:

- Linear motors in which the rotor can assume (almost) any different intermediate positions (e.g. positioners)
- Sectional motors

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reciprocating motors	H02K 33/00
Linear motors in vehicle suspensions	B60G 17/0157
Conveyors, arrangement or mounting of linear motors	B65G 23/22
Electrostatic, electric, magnetic conveyors	B65G 54/02
Linear motors in valves	F01L 3/02

Special rules of classification

The term "reciprocating" in the title of the group H02K 33/00 is construed as an uninterrupted back and forth movement between two end positions.

The motors of this type (e.g. motors for vibrators, reciprocating pumps etc.) are classified in H02K 33/00.

On the contrary motors which can position their moving parts anywhere between two end positions, are not considered as reciprocating machines, and are therefore classified in H02K 41/02.

It is the structure of the motor that matters not its control, use or application, i.e. a motor that because of its structure can in principle assume any intermediate position (as the ones covered by H02K 41/02), but controlled in order to reciprocate between only two positions (as the motors classified in H02K 33/00) is classified in H02K 41/02.

The linear generators structurally similar to the linear motors classified in H02K 41/02 are classified according to the special rules of classification of H02K 35/00.

Rotary machines with a stator consisting of several modules, but still essentially forming a circular array, as in a usual rotary machine, are not considered sectional machines and are therefore classified in the relevant group for rotary machines

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Sectional motors	Rotary motor in which either the rotor or the stator (normally the stator) consists of section(s) extending for a limited angular sector. The angular extension of the sections is such that these motors can be assimilated to a linear motor (at least in the proximity of the sections)

H02K 41/03

Synchronous motors; Motors moving step by step; Reluctance motors (H02K 41/035 takes precedence)

Definition statement

This place covers:

Synchronous motors of any type including e.g. PM motors, wound motors, reluctance motors, DC brushless motors;

Motors moving step by step

References

Limiting references

This place does not cover:

Unipolar motors	H02K 41/035

Special rules of classification

In practice the vast majority of linear synchronous motors are electronically commutated brushless machines.

H02K 41/035

DC motors; Unipolar motors

Definition statement

This place covers:

- Multipolar DC motors with mechanical commutators
- Unipolar motors

H02K 41/0352

{Unipolar motors}

Definition statement

This place covers:

Motors having windings each turn of which co-operates only with poles of one polarity; these machines can have magnet arrangements with only one polarity, or with two polarities.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Torque motors	H02K 26/00

H02K 41/0354

{Lorentz force motors, e.g. voice coil motors}

Definition statement

This place covers:

- Voice coil motors, e.g. with moving coil, or moving magnet.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Vibrating, reciprocating or oscillating moving coil motors	H02K 33/18

Special rules of classification

The motors classified in this group are always unipolar, i.e. each part of the winding co-operate only with poles of one polarity (in case of a field having two polarities one part of the winding co-operates only with the field of one polarity and the other part only with the field of the other polarity).

The field can consist of one or more magnets, with two or more poles; the coils can consist of several sections fed in different way, e.g. by brushes.

Specially adapted voice coil actuators are classified in the application field e.g. positioning of reading / writing heads G11B.

H02K 41/0356

{moving along a straight path}

Definition statement

This place covers:

Voice coil actuators with a mover moving substantially along a straight path

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Voice coil actuators with a mover moving along several paths	H02K 41/0354

H02K 41/0358

{moving along a curvilinear path}

Definition statement

This place covers:

Voice coil actuators with a mover moving substantially along a curvilinear path

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Voice coil actuators with a mover moving along several paths	H02K 41/0354

H02K 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 {; Nutating motors, i.e. having the rotor axis parallel to the stator axis inclined with respect to the stator axis and performing a nutational movement as the rotor rolls on the stator}

Definition statement

This place covers:

- Cylindrical or conical (i.e. nutating) rolling motors, including ball bearing motors, in which a current passes through the balls and interact with a magnetic field causing the movement of the balls

Special rules of classification

The stator and rotor magnetic parts could be in direct contact or be separated by an air-gap (and rolling on specific structures)

H02K 41/065

{Nutating motors}

Definition statement

This place covers:

Conical rolling motors

H02K 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

Definition statement

This place covers:

MHD (Magneto Hydro Dynamic) machines

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrostatic spraying apparatus	B05B 5/00
EHD (electro hydrodynamic) pumps	F04B 19/006
Electric motors based on EHD, or other non electrodynamic effects	H02N 11/006

H02K 44/02

Electrodynamic pumps

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Treating the metal, while it is molten, by means of electric or magnetic fields	B22D 27/00, B22D 11/00, B22D 39/00
Jet propulsion	B63H 11/025
Nuclear power plants (using liquid metal MHD pumps)	G21D

H02K 44/28

Association of MHD generators with conventional generators (nuclear power plants including a MHD generator G21D 7/02)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Nuclear power plants including a MHD generator	G21D 7/02

H02K 47/00

Dynamo-electric converters

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Systems for supplying or distributing electric power	H02J

H02K 49/00

Dynamo-electric clutches; Dynamo-electric brakes

Definition statement

This place covers:

Clutches or brakes without mechanical contact between the interacting members, i.e. in which the interaction between opposite members is only based on dynamoelectric forces.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structural association or application of magnetic coupling, brakes in dynamo-electric machines	H02K 7/104, H02K 7/106, H02K 7/11, H02K 7/114

Exercising machines using electromagnetic force resisters	A63B 21/005
Electrodynamic brake systems for vehicles in general	B60L
Structural association or application of magnetic coupling, brakes in vehicles (eddy current brakes, retarders)	B60L 7/28
Structural association of magnetic coupling in non positive displacement pumps	F04D 13/024
Electrically or magnetically actuated clutches or brakes (e.g. electromagnetic clutches or brakes wherein only the actuation of the coupling / brake members is (electro)magnetic, the interaction between opposite members being based on mechanical engagement or friction between said members)	F16D 27/00, F16D 29/00, F16D 65/28
Electro-rheological fluid clutches	F16D 37/008
Magnetic-particle clutches	F16D 37/02
Magnetic springs	F16F 6/00
Vibration dampers using (electro)magnetic means	F16F 15/03
Structural association of magnetic coupling in flow measuring devices	G01F 1/00
Dynamo-electric clutches or brakes adapted for use as dynamometers	G01L
Structural association of magnetic coupling in watches	G04B 11/005

Special rules of classification

The clutches and brakes per se are classified in H02K 49/00, while their structural association with dynamo-electric machines is classified H02K 7/104, H02K 7/106, H02K 7/11, H02K 7/114

Means for mechanical adjustment of the flux in PM (permanent magnets) synchronous motors or generators are classified in H02K 21/021.

Similar means in PM couplings or brakes of the type classified in H02K 49/10 and subgroups can not be classified as invention in H02K 21/021, however they are classified in this group as additional information.

H02K 49/02

of the asynchronous induction type

Definition statement

This place covers:

Asynchronous machines

- with wound and cage rotors,
- of the eddy current type

H02K 49/04

of the eddy-current hysteresis type

Definition statement

This place covers:

Clutches or brakes essentially based on eddy-currents; an additional hysteresis effect may be present.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Eddy current brakes cooperating with a rail	B61H 7/083

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hysteresis type clutches or brakes, i.e. based mainly/only on hysteresis effects	H02K 49/065
Eddy currents braking in vehicles	B60L 7/28

Special rules of classification

The title relates to the eddy current devices, in which eddy currents are induced in a conductive body supported by a magnetic body (forming a back iron for the magnetic flux), in which case also a (secondary) hysteresis effect is present. In any case in this group are classified devices based mainly on eddy-currents (an additional hysteresis effect may or may not be present.

The true hysteresis devices (where the interaction is mainly / only based on hysteresis) are classified in H02K 49/065.

Means for mechanical adjustment of the flux in PM (permanent magnets) synchronous motors or generators are classified in H02K 21/021.

Similar means in PM couplings or brakes of the type classified in H02K 49/04 and subgroups can not be classified as invention in H02K 21/021, however they are classified in this group as additional information.

H02K 49/06

of the synchronous type {(H02K 49/10 takes precedence)}

Definition statement

This place covers:

Couplings or brakes comprising electromagnets (on a first member) interacting with: electromagnets, PM (permanent magnets) or reluctance parts (on a second member).

References

Limiting references

This place does not cover:

Couplings or brakes wherein PM interact with PM or reluctance members	H02K 49/10

H02K 49/10

of the permanent-magnet type

Definition statement

This place covers:

- Couplings (also acting as magnetic gears) or brakes with PM (permanent magnets), on a first member, interacting with PM or reluctance members (on a second member).

References

Limiting references

This place does not cover:

Couplings or brakes wherein PM interact with windings	H02K 49/06

Special rules of classification

Means for mechanical adjustment of the flux in PM (permanent magnets) synchronous motors or generators are classified in H02K 21/021.

Similar means in PM couplings or brakes of the type classified in H02K 49/10 and subgroups can not be classified as invention in H02K 21/021, however they are classified in this group as additional information.

H02K 49/102

{Magnetic gearings, i.e. assembly of gears, linear or rotary, by which motion is magnetically transferred without physical contact (magnetized gearings with physical contact F16H 13/12, F16H 49/005)}

Definition statement

This place covers:

- arrangements corresponding to mechanical gearings, in which magnetic wheels engages with at least another magnetic wheel or with a magnetic rack in order to change (at least potentially) the speed or direction of transmitted motion, e.g. US2011266902;
- coaxial arrangements of magnetic members, linked by pole pieces or other type of flux conducting/ switching elements in order to change (at least potentially) the speed or direction of transmitted motion, e.g. EP2390993

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetized gearings for conveying rotary motion by friction	F16H 13/12
Mechanically interacting gears (the usual gears) with magnetized teeth	F16H 49/005

H02K 49/104

{Magnetic couplings consisting of only two coaxial rotary elements, i.e. the driving element and the driven element}

Definition statement

This place covers:

the classical PM couplings consisting of a driven and a driving member e.g. WO2011091578.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic-particle clutches	F16D 37/02

Special rules of classification

Coupling consisting of more members are classified in H02K 49/10 (if gear effects are present in H02K 49/102).

H02K 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

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Motor or generators in hybrid vehicles	B60K 6/26
Electric transmission in electric vehicles	B60L 50/10 - B60L 50/13
Electric transmission in locomotives	B61C 9/24
Electric transmission in ships	B63H 23/24

Special rules of classification

The "classical" coupling arrangements consisting of an input shaft - driving a generator rotor - inducing a voltage in a common stator - generating motion in a motor rotor - driving an output shaft are all classified in H02K 51/00; "strange" dynamoelectric machines linking an input and an output shaft and having functions of motor / generators / coupling could also be found in H02K 99/00. Many machines of this latter type are (also) classified in B60K (hybrid vehicles).

H02K 53/00

Alleged dynamo-electric perpetua mobilia

Definition statement

This place covers:

Perpetua mobilia obtained e.g. by

by combining electrodynamic machines (e.g. small motor driving a larger generator whose output is used to feed the driving motor;

by particular arrangements of PM (permanent magnets) only.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Perpetua mobilia by hydrostatic pressure (buoyancy)	F03B 17/04
Mechanical power producing mechanisms, not otherwise provided for or using energy sources not otherwise provided for	F03G 7/00
Perpetua mobilia by mechanical means	F03G 7/10
Perpetua mobilia by electric or magnetic means not otherwise provided for	H02N 11/00

H02K 55/00

Dynamo-electric machines having windings operating at cryogenic temperatures

Definition statement

This place covers:

- Dynamoelectric machines with:
- - Superconductive windings,
- - Superconductor type II materials (magnet-like with magnetic fields pinned by sustained eddy currents)

H02K 55/04

with rotating field windings

Definition statement

This place covers:

Synchronous machines with superconductive rotating field windings