H02P

CONTROL OR REGULATION OF ELECTRIC MOTORS, ELECTRIC GENERATORS OR DYNAMO-ELECTRIC CONVERTERS; CONTROLLING TRANSFORMERS, REACTORS OR CHOKE COILS

Definition statement

This place covers:

Arrangements for

- starting,
- regulating,
- electronically commutating,
- braking,

or otherwise controlling:

- motors,
- generators,
- dynamo-electric converters, clutches, brakes, gears,
- transformers,
- reactors or choke coils, of the types classified in the relevant subclasses, e.g. H01F, H02K.

References

Limiting references

This place does not cover:

Arrangements for merely turning on an electric motor to drive a machine or device, e.g.: vacuum cleaner, vehicle starter motor	A47L 9/28, F02N 11/00
Arrangements for controlling electric generators for charging batteries	H02J 7/00
Arrangements for starting, regulating, electronically commutating, braking, or otherwise controlling electric machines not otherwise provided for, e.g. machines using piezoelectric effects	H02N

Informative references

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

Curtain	A47H
Hand hammers, drills	B25D 17/00
Printers	B41J
Power steering	B42D 5/00
Heating cooling ventilating	B60H 1/00
Hybrid vehicle, conjoint control, arrangements for mounting	B60K, B60W
Electrically propelled vehicles, current collector, maglev	B60L
Lighting	B60Q 1/00
Electric circuits for vehicle	B60R, H02J
Wiper control	B60S 1/00
Marine	B63H

Elevator	B66B
Washing machines, household appliances	D06F 39/00
Sliding roof, power window	E05F
Gas turbine	F02C
Starting of engine with electric motor	F02N 11/00
Windmills	F03D
Pumps, compressors	F04B
Motor cooling	F04D
Structure of the mechanical brake	F16D
Air-conditioning	F24F
Refrigeration	F25B
Measuring arrangements	G01B 7/00
Electromagnetic actuators	G02B 26/00
Safety, control principles	G05B 9/00
Position control, servos	G05B 19/00
Structure of the mechanical speed regulator	G05D
Control of linear speed, control of angular speed; control of acceleration or deceleration	G05D 13/00
Systems for regulating electric or magnetic variables using transformers, reactors or choke coils	G05F
Cooling fans for computers	G06F 1/00
Data storage device (hard disk CD, DVD BlueRay...)	G11B
Structure of the variable resistor	H01C
Magnets, inductances or transformers structurally associated with motors, generators, dynamo-electric converters, transformers, reactors or choke coils	H01F
Structure of the starter switch	H01H
Emergency protective arrangements with automatic interruption of supply	H02H
Circuit arrangement or systems for supplying or distributing electric power; Systems for storing electric energy, connection or control of one generator, transformer, reactor, choke coil or dynamo-electric converter with regard to conjoint operation with similar or other source of supply	H02J
Dynamo-electric machines structurally associated with motors, generators, dynamo-electric converters, transformers, reactors or choke coils	H02K
Apparatus for conversion between AC and AC, AC and DC or DC and DC and for use with mains or similar power supply systems; conversion of DC or AC input power into surge output power; control or regulation thereof	H02M
Automatic control, starting, synchronisation, or stabilisation of generators of electronic oscillations or pulses	H03L
Housing, cooling of housing	H05K

Glossary of terms

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

control	means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation
regulation	means maintaining a variable automatically at a desired value or within a desired range of values, in which the variable is detected in the system and fed back for determining its deviation from the desired value. The determined deviation is used by the means for maintaining the variable to its desired value or values. Regulation is a form of "control".

H02P 1/00

Arrangements for starting electric motors or dynamo-electric converters (starting of synchronous motors with electronic commutators H02P 6/20, H02P 6/22; starting dynamo-electric motors rotating step by step H02P 8/04; vector control H02P 21/00)

References

Limiting references

This place does not cover:

Starting of synchronous motors with electronic commutators except reluctance motors	H02P 6/20, H02P 6/22
Starting dynamo-electric motors rotating step by step	H02P 8/04
Vector control	H02P 21/00

H02P 1/021

{Protection against "no voltage condition"}

Definition statement

This place covers:

Arrangements or measures for starting a motor when the power re-establishes after a power failure, e.g. when the motor does not automatically starts turning.

H02P 1/029

{Restarting, e.g. after power failure}

Definition statement

This place covers:

In particular restarting before the motor has stopped.

H02P 1/10

Manually-operated on/off switch controlling relays or contactors operating sequentially for starting a motor

References

Informative references

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

Sequence determined by power-operated multi-position switch	H02P 1/08

H02P 1/12

Switching devices centrifugally operated by the motor

Definition statement

This place covers:

Repulsion start induction motor (RS-IM):

An alternating-current motor that starts as a repulsion motor; at a predetermined speed the commutator bars are short-circuited to give the equivalent of a squirrel-cage winding for operation as an induction motor with constant-speed characteristics.

References

Informative references

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

Starting an individual polyphase induction motor	H02P 1/26

H02P 1/18

for starting an individual DC motor

Definition statement

This place covers:

- Starting of DC motors supplied with a DC voltage, whereby the motor is seen as an independent block not being further elaborated.
- Starting of commutated motors
- Starting of fan motors for a PC, also being supplied with DC

References

Informative references

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

Starting of a commutator motor supplied with AC	H02P 1/24
Computer fans	G06F 1/20

H02P 1/20

by progressive reduction of resistance in series with armature winding

Definition statement

This place covers:

The resistance may be an actual resistor or it could also be a semiconductor operating in its linear region.

References

Informative references

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

PWM controlled semiconductors	H02M 3/00

H02P 1/24

for starting an individual AC commutator motor (starting of AC/DC commutator motors H02P 1/18)

Definition statement

This place covers:

In this group is for starting a commutator motor supplied by AC.

References

Limiting references

This place does not cover:

Starting of AC/DC commutator motors	H02P 1/18

H02P 1/26

for starting an individual polyphase induction motor

Definition statement

This place covers:

Repulsion start induction motor (RS-IM):

An alternating-current motor that starts as a repulsion motor; at a predetermined speed the commutator bars are short-circuited to give the equivalent of a squirrel-cage winding for operation as an induction motor with constant-speed characteristics.

Relationships with other classification places

The polyphase refers to the supply. An induction motor having main and auxiliary windings could be considered as a polyphase motor, but not within the meaning of H02P 1/26. They are classified in H02P 1/42 because they are supplied by a single phase power supply which supplies the main and auxiliary windings.

References

Informative references

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

Repulsion start induction motor (RS-IM)	H02P 1/12

H02P 1/265

{Means for starting or running a triphase motor on a single phase supply}

Definition statement

This place covers:

Other means than an inverter

H02P 1/28

by progressive increase of voltage applied to primary circuit of motor

Definition statement

This place covers:

Other means than an inverter.

H02P 1/30

by progressive increase of frequency of supply to primary circuit of motor

Definition statement

This place covers:

Other means than an inverter.

H02P 1/34

by progressive reduction of impedance in secondary circuit

Definition statement

This place covers:

The resistance may be an actual resistor or it could also be a semiconductor operating in its linear region.

References

Informative references

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

PWM controlled semiconductors	H03M 3/00

H02P 1/38

by pole-changing

References

Informative references

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

Pole changing for purposes other then starting	H02P 25/20

H02P 1/42

for starting an individual single-phase induction motor {(H02P 27/04 takes precedence)}

References

Limiting references

This place does not cover:

Using variable-frequency supply voltage, e.g. inverter or converter supply voltage	H02P 27/04

Informative references

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

Running of a single phase induction motor	H02P 25/04

H02P 1/426

{by using a specially adapted frequency converter}

Definition statement

This place covers:

Any typical frequency converter can be used to start from almost DC to nominal speed without modifications. These documents are not to be classified in this group except in the case where special measures are integrated with the sole purpose of starting.

H02P 1/46

for starting an individual synchronous motor {(H02P 27/04 takes precedence)}

References

Limiting references

This place does not cover:

Using variable-frequency supply voltage, e.g. inverter or converter supply voltage	H02P 27/04

H02P 1/48

by pole-changing

References

Informative references

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

Pole changing for purposes other then starting	H02P 25/20

H02P 1/50

by changing over from asynchronous to synchronous operation (H02P 1/48 takes precedence)

References

Limiting references

This place does not cover:

Starting an individual synchronous motor by pole-changing	H02P 1/48

Informative references

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

Pole changing for purposes other than starting	H02P 25/20

H02P 3/00

Arrangements for stopping or slowing electric motors, generators, or dynamo-electric converters (stopping of synchronous motors with electronic commutators H02P 6/24; stopping dynamo-electric motors rotating step by step H02P 8/24; vector control H02P 21/00)

References

Limiting references

This place does not cover:

Stopping of synchronous motors with electronic commutators except reluctance motors,	H02P 6/24
Stopping dynamo-electric motors rotating step by step	H02P 8/24
Vector control	H02P 21/00

Informative references

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

Arrangements for controlling dynamo-electric brakes or clutches	H02P 15/00
Electrodynamic brake systems for vehicles in general	B60L 7/00
Dynamic electric resistor braking	B60L 7/02

Dynamic electric regenerative braking	B60L 7/10
Eddy-current braking	B60L 7/28

H02P 3/04

Means for stopping or slowing by a separate brake, e.g. friction brake or eddy-current brake

References

Informative references

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

Brakes	F16D, H02K 49/00

H02P 3/08

for stopping or slowing a DC motor

Definition statement

This place covers:

DC motors, i.e. a motor supplied with a DC voltage, whereby the motor is seen as an independent block not further elaborated. Typically this is a commutated motor, however e.g. a fan motor for a PC is also supplied with DC and therefore the starting of a PC fan motor is also classified here.

References

Informative references

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

Commutator motor supplied with AC	H02P 3/18

H02P 3/12

by short-circuit or resistive braking

Definition statement

This place covers:

Arrangements where energy is not regenerated but lost in resistors or in the impedances of the motor.

H02P 3/14

by regenerative braking

Definition statement

This place covers:

Arrangements or measures where the energy is regenerated, e.g. kinetic energy is reused by sending it back to the supply or stored in an energy buffer.

H02P 3/18

for stopping or slowing an AC motor

Glossary of terms

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

AC motor	a motor supplied with an AC voltage, whereby the motor is seen as an independent block not further elaborated

H02P 3/22

by short-circuit or resistive braking

Definition statement

This place covers:

Arrangements where energy is not regenerated but lost in resistors or in the impedances of the motor.

H02P 4/00

Arrangements specially adapted for regulating or controlling the speed or torque of electric motors that can be connected to two or more different electric power supplies (vector control H02P 21/00)

References

Limiting references

This place does not cover:

Vector control	H02P 21/00

Informative references

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

Starting	H02P 1/00
Stopping or slowing	H02P 3/00

H02P 5/00

Arrangements specially adapted for regulating or controlling the speed or torque of two or more electric motors (H02P 6/04, H02P 8/40 take precedence)

References

Limiting references

This place does not cover:

Arrangements for controlling or regulating speed or torque of two or more synchronous motors, or motors with electronic commutators	H02P 6/04
Arrangements for controlling two or more stepping motors	H02P 8/40

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00
Motors rotating step by step	H02P 8/00
Vector control	H02P 21/00

H02P 5/485

using differential movement of the two motors, e.g. using differential gearboxes

Definition statement

This place covers:

Differential gearboxes, where the output speed or phase represents the difference in speeds or phase.

H02P 5/505

using equalising lines, e.g. rotor and stator lines of first and second motors

Definition statement

This place covers:

Arrangements, wherein the rotor and stator lines of first motor are coupled in parallel with the rotor and stator lines of second motor.

H02P 5/51

Direct ratio control

Definition statement

This place covers:

Providing control for a first motor which switches a second motor on during a limited portion of one revolution, in a fixed or predetermined ratio of movement, e.g. 120 degrees of 360 degrees.

H02P 5/52

additionally providing control of relative angular displacement

Definition statement

This place covers:

Not only the speed is equalized but also the phase, e.g. newspaper printing presses where a phase difference results in paper jams.

H02P 5/60

controlling combinations of DC and AC dynamo-electric motors (H02P 5/46 takes precedence)

Definition statement

This place covers:

Arrangement for controlling both a DC motor supplied with a DC voltage and an AC motor supplied with an AC voltage, whereby the DC motor or AC motor is seen as an independent load.

References

Limiting references

This place does not cover:

Speed regulation of two or more dynamo-electric motors in relation to one another	H02P 5/46

Informative references

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

Commutator motors supplied with AC	H02P 5/74

Special rules of classification

A fan motor for a PC supplied with DC is also classified here.

H02P 5/68

controlling two or more DC dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence)

Definition statement

This place covers:

Arrangement for controlling two or more DC motors supplied with a DC voltage, whereby the motor is seen as an independent load.

References

Limiting references

This place does not cover:

For speed regulation of two or more dynamo-electric motors in relation to one another	H02P 5/46
Controlling combinations of DC and AC dynamo-electric motors	H02P 5/60

Informative references

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

Commutator motor supplied with AC	H02P 5/74

Special rules of classification

A fan motor for a PC supplied with DC is also classified here.

H02P 5/74

controlling two or more AC dynamo-electric motors (H02P 5/46, H02P 5/60 take precedence)

Definition statement

This place covers:

Arrangement for controlling two or more AC motors supplied with an AC voltage, whereby the motor is seen as an independent load.

References

Limiting references

This place does not cover:

Speed regulation of two or more dynamo-electric motors in relation to one another	H02P 5/46
Controlling combinations of DC and AC dynamo-electric motors	H02P 5/60

H02P 6/00

Arrangements for controlling synchronous motors or other dynamo-electric motors using electronic commutation dependent on the rotor position; Electronic commutators therefor (vector control H02P 21/00)

Definition statement

This place covers:

Arrangements for controlling synchronous motors with electronic commutators where commutation is done in dependence on the rotor position, or other dynamo-electric motors with electronic commutators where commutation is done in dependence on the rotor position; Electronic commutators therefore

Brushless DC motors, e.g. BLDC motors, BL motors, electronically commutated motors, ECMs.

References

Limiting references

This place does not cover:

Vector control	H02P 21/00

Informative references

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

Motors rotating step by step	H02P 8/00
Other aspects of synchronous motors	H02P 25/022
Control of linear AC synchronous motors	H02P 25/06
Reluctance motors	H02P 25/08

Special rules of classification

Group H02P 6/26 takes precedence over groups H02P 6/04 - H02P 6/24 and H02P 6/28 -H02P 6/34.

H02P 6/04

Arrangements for controlling or regulating the speed or torque of more than one motor (H02P 6/10 takes precedence)

References

Limiting references

This place does not cover:

Arrangements for providing reduced torque ripple; arrangements for controlling torque ripple	H02P 6/10

H02P 6/08

Arrangements for controlling the speed or torque of a single motor (H02P 6/10, H02P 6/28 take precedence)

References

Limiting references

This place does not cover:

Arrangements for controlling the torque ripple	H02P 6/10
Arrangements for controlling the current	H02P 6/28

Informative references

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

Controlling commutation	H02P 6/15

H02P 6/10

Arrangements for controlling torque ripple, e.g. providing reduced torque ripple

Definition statement

This place covers:

Control of torque ripple by controlling current wave shape, e.g. by using trapezoidal current.

Relationships with other classification places

The source of the torque ripple is commutation in this group. Reducing is done e.g. by controlling with trapezoidal current or other waveforms.

References

Informative references

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

Reduction by changing commutation time	H02P 6/15
Any other source for reduction in torque ripple	H02P 29/50

H02P 6/15

Controlling commutation time

Definition statement

This place covers:

Delaying or advancing the moment of commutation of the electronic commutators from the time at which the commutation would have occurred based solely on the position of the rotor.

References

Informative references

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

Change in current for reducing torque ripple	H02P 6/10

H02P 6/16

Circuit arrangements for detecting position

Definition statement

This place covers:

All circuits and methods which detect the rotor position inside the motor (or outside if the rotor is mounted on the outside and the stator on the inside).

References

Informative references

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

Detecting rotor position in synchronous AC motors	H02P 25/026
Position control outside the motor e.g. position of elements which are externally connected to the motor	G05B 19/00
Structural arrangement of position sensors associated with brushless motors or generators	H02K 29/06

H02P 6/18

without separate position detecting elements

References

Informative references

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

Circuit arrangements for detecting position	H02P 6/16

H02P 6/185

using inductance sensing, e.g. pulse excitation

References

Informative references

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

Current being modulated, e.g. by a high frequency component	H02P 6/18

H02P 6/20

Arrangements for starting (H02P 6/08 takes precedence)

References

Limiting references

This place does not cover:

Controlling speed or torque of a single motor	H02P 6/08

Informative references

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

Starting in a selected direction	H02P 6/22

H02P 6/21

Open loop start

Definition statement

This place covers:

Starting without feedback from the position detection, e.g. when back emf is too low.

H02P 6/22

in a selected direction of rotation

Definition statement

This place covers:

Starting without a movement in the wrong direction e.g. for hard disks spindle motor.

H02P 6/28

Arrangements for controlling current (H02P 6/10 takes precedence)

References

Limiting references

This place does not cover:

Arrangements for reducing or controlling torque ripple	H02P 6/10

H02P 6/30

Arrangements for controlling the direction of rotation (H02P 6/22 takes precedence)

Definition statement

This place covers:

A direct link between the Hall sensors and the switching transistors enables a brushless motor to turn only in one direction and an additional circuit for enabling the brushless motor to run in both directions of rotation.

References

Limiting references

This place does not cover:

Arrangements for starting in a selected direction of rotation	H02P 6/22

H02P 7/00

Arrangements for regulating or controlling the speed or torque of electric DC motors

Definition statement

This place covers:

Circuitry or apparatus for regulating or controlling the speed or torque of electrical DC motors, e.g. brushed commutator motors, homopolar motors or a ball bearing motors.

The DC motor can be supplied by an AC voltage or AC current.

There are three types of connections used for DC electric commutator motors: series, shunt and compound.

An armature generally refers to one of the two principal electrical components of an electromechanical machine–generally in a motor or generator, but it may also mean the pole piece of a permanent magnet or electromagnet, or the moving iron part of a solenoid or relay.

The other component is simply to create a magnetic field, or a magnetic flux, for the armature to interact with, so this component can comprise either permanent magnets, or electromagnets formed by a conducting coil.

The armature, in contrast, must carry current so it is always a conductor or a conductive coil, oriented normal to both the field and to the direction of motion, torque (rotating machine), or force (linear machine). The armature's role is twofold. The first is to carry current crossing the field, thus creating shaft torque in a rotating machine or force in a linear machine. The second role is to generate an electromotive force (EMF).

Other DC motors are:

- A homopolar motor, which is an electric motor that works without the need for a commutator, by rotating along a fixed axis that is parallel to the external magnetic field produced by a permanent magnet. The name homopolar indicates that the electrical polarity of the motor does not change, i.e. that it does not require commutation. Such motors necessarily have a single-turn coil, which restricts their practical applications, since they must be used with low voltages and produce relatively small torques.
- A ball bearing motor, which is an electric motor that consists of two ball-bearing-type bearings, with the inner races mounted on a common conductive shaft, and the outer races connected to a high current, low voltage power supply.

References

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00
Motors rotating step by step	H02P 8/00
Vector control	H02P 21/00

H02P 7/066

{using a periodic interrupter, e.g. Tirrill regulator}

Definition statement

This place covers:

Tirrill regulator: A device for regulating the voltage of a generator, in which the field resistance of the exciter is short-circuited temporarily when the voltage drops.

H02P 7/14

of voltage applied to the armature with or without control of field

Definition statement

This place covers:

A Ward Leonard drive is a high-power amplifier in the multi-kilowatt range, built from rotating electrical machinery. A Ward Leonard drive unit consists of a motor and generator with shafts coupled together. The motor, which turns at a constant speed, may be AC or DC powered. The generator is a DC generator, with field windings and armature windings. The input to the amplifier is applied to the field windings, and the output comes from the armature windings. The amplifier output is usually connected to a second motor, which moves the load, such as an elevator. With this arrangement, small changes in current applied to the input, and thus the generator field, result in large changes in the output, allowing smooth speed control. Armature voltage control only controls the motor speed from zero to motor base speed. If higher motor speeds are needed the motor field current can be lowered, however by doing this the available torque at the motor armature will be reduced. Another advantage for this method is that the speed of the motor can be controlled in both directions of rotation.

H02P 7/20

using multi-position switch, e.g. drum, controlling motor circuit by means of relays (H02P 7/24, H02P 7/30 take precedence)

References

Limiting references

This place does not cover:

Using discharge tubes or semiconductor devices	H02P 7/24
Using magnetic devices with controllable degree of saturation, i.e. transductors	H02P 7/30

H02P 7/22

using multi-position switch, e.g. drum, controlling motor circuit by means of pilot-motor-operated multi-position switch or pilot-motor-operated variable resistance (H02P 7/24, H02P 7/30 take precedence)

References

Limiting references

This place does not cover:

Using discharge tubes or semiconductor devices	H02P 7/24
Using magnetic devices with controllable degree of saturation, i.e. transductors	H02P 7/30

H02P 7/281

the DC motor being operated in four quadrants

Special rules of classification

Group H02P 7/281 takes precedence over groups H02P 7/282 - H02P 7/298.

H02P 7/288

using variable impedance

Definition statement

This place covers:

The use of a transistor or FET in linear mode (non switching)

H02P 7/291

with on-off control between two set points, e.g. controlling by hysteresis

Definition statement

This place covers:

Using a Schmitt trigger with two thresholds.

H02P 7/293

using phase control (H02P 7/295 takes precedence)

References

Limiting references

This place does not cover:

Of the kind having a thyristor or the like in series with the power supply and the motor	H02P 7/295

H02P 7/295

of the kind having one thyristor or the like in series with the power supply and the motor

Definition statement

This place covers:

Electronic switches that do not extinguish automatically.

H02P 7/32

using armature-reaction-excited machines, e.g. metadyne, amplidyne, rototrol

Definition statement

This place covers:

Rotating amplifiers, e.g. metadyne, amplidyne, rototrol, magnicon and magnavolt.

Glossary of terms

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

metadyne, amplidyne	The Metadyne and Amplidyne are special-purpose DC generators historically used as high power electro-mechanical amplifiers in control systems. In use, such machines are driven at constant speed by a motor. The electrical output is varied by control of field excitation, as in a Ward-Leonard system. The Metadyne and the Amplidyne include an arrangement of cross-connected brushes on one axis and a further set of brushes on a perpendicular axis. This arrangement allows the machine to provide very high gain, that is, large changes of output may be controlled by small changes in the controlling field current.
rototrol (American Westinghouse Co.)	The rototrol is a two-stage machine with static and dynamic characteristics similar to those of the Amplidyne. The Rototrol may also be operated as a three-stage machine (also known as a Magnicon) in which the output is further used to excite a pole winding.

H02P 7/34

using Ward-Leonard arrangements

Glossary of terms

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

Ward-Leonard system	a method of controlling the speed and direction of rotation of a DC motor by varying and if necessary reversing its armature voltage. A DC generator provides the variable armature supply. The output of the generator is controlled by control of its field current.
Ward-Leonard drive	a high-power amplifier in the multi-kilowatt range, built from rotating electrical machinery. A Ward-Leonard drive unit consists of a motor and generator with shafts coupled together. The motor, which turns at a constant speed, may be AC or DC powered. The generator is a DC generator, with field windings and armature windings. The input to the amplifier is applied to the field windings, and the output comes from the armature windings. The amplifier output is usually connected to a second motor, which moves the load, such as an elevator. With this arrangement, small changes in current applied to the input, and thus the generator field, result in large changes in the output, allowing smooth speed control. Armature voltage control only controls the motor speed from zero to motor base speed. If higher motor speeds are needed the motor field current can be lowered, however by doing this the available torque at the motor armature will be reduced. Another advantage for this method is that the speed of the motor can be controlled in both directions of rotation.
Armature	a rotor which carries a winding connected to a commutator

H02P 8/00

Arrangements for controlling dynamo-electric motors rotating step by step

Definition statement

This place covers:

Stepper motors have typically a large number poles which results in a large number of steps, and use permanent magnets resulting in high cogging torque and therefore in a large holding torque, even when the motor is not energized. The motor's position can be controlled precisely without any feedback mechanism (Open-loop control).

References

Informative references

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

Vector control	H02P 21/00

H02P 8/12

Control or stabilisation of current

Definition statement

This place covers:

Control of current to increase commutation speed through the inductive windings, e.g. by measuring the coil current and generating a PWM controlled current or e.g. by applying a first higher voltage and a thereafter a lower voltage.

H02P 8/14

Arrangements for controlling speed or speed and torque (H02P 8/12, H02P 8/22 take precedence)

References

Limiting references

This place does not cover:

Using two level supply voltage	H02P 8/12
Control of step size; Intermediate stepping, e.g. microstepping	H02P 8/22

H02P 8/16

Reducing energy dissipated or supplied

Definition statement

This place covers:

e.g. by lowering the current to the minimum required to hold the position or by increasing the current when a step is required in particular using feedback to determine the movement.

H02P 8/18

Shaping of pulses, e.g. to reduce torque ripple {(Reducing overshoot H02P 8/32 takes precedence)}

References

Limiting references

This place does not cover:

Reducing overshoot	H02P 8/32

H02P 8/22

Control of step size; Intermediate stepping, e.g. microstepping

Definition statement

This place covers:

Control of step size, including half step.

H02P 8/24

Arrangements for stopping (H02P 8/32 takes precedence)

References

Limiting references

This place does not cover:

Holding position when stopped	H02P 8/32

H02P 8/34

Monitoring operation (H02P 8/36 takes precedence)

References

Limiting references

This place does not cover:

Protection against faults	H02P 8/32

H02P 8/36

Protection against faults, e.g. against overheating or step-out; Indicating faults

References

Informative references

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

Emergency protective arrangements with automatic interruption of supply	H02H 7/08

H02P 9/00

Arrangements for controlling electric generators for the purpose of obtaining a desired output

References

Informative references

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

Ward-Leonard arrangements	H02P 7/34
Vector control	H02P 21/00
Feeding a network by two or more generators	H02J
For charging batteries	H02J 7/14

H02P 9/006

{Means for protecting the generator by using control (control effected upon generator excitation circuit to reduce harmful effects of overloads or transients H02P 9/10)}

References

Limiting references

This place does not cover:

Control effected upon generator excitation circuit to reduce harmful effects of overloads or transients	H02P 9/10

Informative references

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

Emergency protective arrangements with automatic interruption of supply	H02H 7/06

H02P 9/007

{Control circuits for doubly fed generators}

Definition statement

This place covers:

Typically the rotor is moved by an external force and the rotor current is controlled such that a desired output voltage is achieved without an additional converter at the power output stage. The generator has typically two electrical connections and one mechanical input.

References

Informative references

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

Wind mills	F03D 7/00, H02P 9/42

H02P 9/14

by variation of field (H02P 9/08, H02P 9/10 take precedence)

References

Limiting references

This place does not cover:

Control of generator circuit during starting or stopping of driving means	H02P 9/08
Control effected upon generator excitation circuit to reduce harmful effects of overloads or transients, e.g. sudden application of load, sudden removal of load, sudden change of load	H02P 9/10

H02P 9/24

due to variation of make-to-break ratio of intermittently-operating contacts, e.g. using Tirrill regulator

Glossary of terms

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

Tirrill regulator	A device for regulating the voltage of a generator, in which the field resistance of the exciter is short-circuited temporarily when the voltage drops (source: McGraw-Hill Dictionary of Scientific & Technical Terms).

H02P 9/26

using discharge tubes or semiconductor devices (H02P 9/34 takes precedence)

References

Limiting references

This place does not cover:

Using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device	H02P 9/34

H02P 9/305

{controlling voltage (H02P 9/302 takes precedence)}

References

Limiting references

This place does not cover:

Brushless excitation	H02P 9/302

H02P 9/32

using magnetic devices with controllable degree of saturation (H02P 9/34 takes precedence)

References

Limiting references

This place does not cover:

Using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device	H02P 9/34

H02P 9/42

to obtain desired frequency without varying speed of the generator

References

Informative references

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

Control circuits for doubly fed generators	H02P 9/007

H02P 9/48

Arrangements for obtaining a constant output value at varying speed of the generator, e.g. on vehicle (H02P 9/04 - H02P 9/46 take precedence)

References

Limiting references

This place does not cover:

Control effected upon non-electric prime mover and dependent upon electric output value of the generator (effecting control of the prime mover in general, see the relevant class for such prime mover)	H02P 9/04
Using magnetic devices with controllable degree of saturation in combination with controlled discharge tube or controlled semiconductor device	H02P 9/34

Informative references

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

For the electrical supply of for the functioning of the battery or the electrical generator	B60R 16/03
Starter - generator	F02N 11/04
Balancing the load in a network (e.g. switching in extra loads like the airconditioning pump)	H02J 1/14
For charging batteries from dynamo-electric generators driven at varying speed, e.g. on vehicle	H02J 7/14

H02P 11/00

Arrangements for controlling dynamo-electric converters

References

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00, H02P 6/32
Vector control	H02P 21/00
Feeding a network in conjunction with a generator or another converter	H02J

Special rules of classification

Dynamo-electric converters are rotating machines whose purpose is not to provide mechanical power to loads but to convert one type of electric current into another, for example DC into AC. They are multi-field single-rotor devices with two or more sets of rotating contacts (either commutators or slip rings, as required), one to provide power to one set of armature windings to turn the device, and one or more attached to other windings to produce the output current. The rotary converter can directly convert, internally, any type of electric power into any other. This includes converting between direct current (DC) and alternating current (AC), three phase and single phase power, 25 Hz AC and 60 Hz AC, or many different output voltages at the same time. The size and mass of the rotor was made large so that the rotor would act as a flywheel to help smooth out any sudden surges or dropouts in the applied power. (source Wikipedia) Dynamo-electric converters are now obsolete technology. Modern electronic devices for controlling power in the kilowatt range include MOSFET and IGBT devices.

H02P 13/00

Arrangements for controlling transformers, reactors or choke coils, for the purpose of obtaining a desired output

References

Informative references

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

Regulation systems using transformers, reactors or choke coils	G05F
Transformers	H01F
Feeding a network in conjunction with a generator or a converter	H02J
Control or regulation of converters	H02M

H02P 15/00

Arrangements for controlling dynamo-electric brakes or clutches (vector control H02P 21/00)

References

Limiting references

This place does not cover:

Vector control	H02P 21/00

Informative references

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

Controlling speed of dynamo-electric motors by means of a separate brake	H02P 29/04

H02P 17/00

Arrangements for controlling dynamo-electric gears (vector control H02P 21/00)

References

Limiting references

This place does not cover:

Vector control	H02P 21/00

H02P 21/00

Arrangements or methods for the control of electric machines by vector control, e.g. by control of field orientation

Special rules of classification

When classifying in this group, classification should also be made under H02P 25/00 when the method of control is characterised by the kind of motor being controlled. Classification should also be made under H02P 27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

Glossary of terms

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

Vector control	a method of controlling the speed of a three-phase AC motor by varying its power supply in accordance with a mathematical model of the machine flux. Stator currents are measured and transformed into a complex current space vector, allowing control of flux and torque. The vector components are then transformed to a rotating coordinate system and voltages calculated in this system are generated by an inverter and applied to the motor.

H02P 21/0003

{Control strategies in general, e.g. linear type, e.g. P, PI, PID, using robust control}

References

Informative references

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

Control strategies in general	H02P 23/0004

H02P 21/04

specially adapted for very low speeds

References

Informative references

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

Arrangements for starting	H02P 6/20
Determining the initial rotor position	H02P 21/32
Arrangements for starting by vector control	H02P 21/34
Arrangements or methods for the control of AC motors specially adapted for very low speeds	H02P 23/03

H02P 21/05

specially adapted for damping motor oscillations, e.g. for reducing hunting

Definition statement

This place covers:

Synchronous Motor having an inherent instability, e.g. when it is used to drive a high inertia load. The motor ideally should spin at a constant angular velocity, but it instead sporadically oscillates about synchronous speed. This phenomenon is known as 'hunting'. This problem produces current ripples at the motor's electrical terminals and induces noise.

H02P 21/06

Rotor flux based control involving the use of rotor position or rotor speed sensors

Definition statement

This place covers:

- Reference frame conversion being based in the rotor
- Control is based on the rotor flux.

H02P 21/12

Stator flux based control involving the use of rotor position or rotor speed sensors

Definition statement

This place covers:

- Reference frame conversion being based in the rotor
- Control is based on the stator flux.

H02P 21/16

Estimation of constants, e.g. the rotor time constant

Definition statement

This place covers:

Estimation of changes in constants, e.g. temperature related changes in winding resistance.

H02P 21/32

Determining the initial rotor position (H02P 21/34 takes precedence)

References

Limiting references

This place does not cover:

Arrangements for starting	H02P 21/34

Informative references

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

Position detection in general	H02P 6/16

H02P 23/00

Arrangements or methods for the control of AC motors characterised by a control method other than vector control

References

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00
Two or more motor	H02P 5/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00
DC motors	H02P 7/00

Special rules of classification

When classifying in this group, subject matter relating to vector control should also be made under H02P 21/00. Classification should also be made under H02P 25/00 when the method of control is characterised by the kind of motor being controlled. Classification should also be made under H02P 27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

H02P 23/0004

{Control strategies in general, e.g. linear type, e.g. P, PI, PID, using robust control}

References

Informative references

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

Estimation or adaptation of motor parameters, e.g. rotor time constant, flux, speed, current or voltage	H02P 23/14
Control of angular speed of one shaft by controlling the prime mover	H02P 23/16

H02P 23/0077

{Characterised by the use of a particular software algorithm}

Definition statement

This place covers:

A software algorithm that is only suitable in motor control which enables the implementation of a strategy in a processor (minimalising computing steps).

The motor parameters are stored in the in memory chip located in (or in the proximity of e.g. installed coder) the motor identifying the motor.

H02P 23/04

specially adapted for damping motor oscillations, e.g. for reducing hunting

Definition statement

This place covers:

For attenuating the rotational velocity fluctuations of AC motors which spin at non-constant angular velocity.

References

Informative references

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

Arrangements for controlling or reducing torque ripple in synchronous motors or electronically commutated motors	H02P 6/10
Control of reluctance motors	H02P 25/08
Motor oscillations that are synchronous to the motor position	H02P 29/50

Glossary of terms

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

hunting	Hunting occurs when a synchronous motor is used to drive a high inertia load and sporadically oscillates about synchronous speed which induces noise.

H02P 23/10

Controlling by adding a DC current

References

Informative references

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

DC current braking	H02P 3/24

H02P 23/16

Controlling the angular speed of one shaft (H02P 23/18 takes precedence)

References

Informative references

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

Control of angular speed together with angular position or phase	H02P 23/18

H02P 23/18

Controlling the angular speed together with angular position or phase

Definition statement

This place covers:

The speed and the phase (or position) of a rotating shaft are both controlled to reach both a predetermined reference signal

H02P 23/183

{of one shaft without controlling the prime mover}

Definition statement

This place covers:

By acting on a device that is not the driving motor; for example, by acting on a brake.

References

Informative references

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

Suitable for AC and DC motors	H02P 29/0022

H02P 23/186

{of one shaft by controlling the prime mover}

Definition statement

This place covers:

By acting on the supply of the motor that drives the shaft.

H02P 23/26

Power factor control [PFC]

Definition statement

This place covers:

Special control of the motor, e.g. by adapting the voltage and the phase/frequency fed to the motor.

H02P 23/30

Direct torque control [DTC] or field acceleration method [FAM]

Glossary of terms

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

DTC	Direct torque control is one method used in variable frequency drives to control the torque (and thus finally the speed) of three-phase AC electric motors. This involves calculating an estimate of the motor's magnetic flux and torque based on the measured voltage and current of the motor.

H02P 25/00

Arrangements or methods for the control of AC motors characterised by the kind of AC motor or by structural details

References

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00
Two or more motor	H02P 5/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00
DC motors	H02P 7/00
Stepping motors	H02P 8/00

Special rules of classification

When classifying in this group, subject matter relating to vector control should also be classified under H02P 21/00. Classification should also be made under H02P 27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

H02P 25/026

thereby detecting the rotor position

Definition statement

This place covers:

Circuit or methods which controls and detects the rotor position of the AC motor.

References

Informative references

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

The motor being controlled based on the determined position	H02P 6/00

H02P 25/028

with four quadrant control

References

Informative references

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

Head positioning in hard disks	G11B

H02P 25/034

Voice coil motors (voice coil motors driven by DC H02P 7/025)

References

Limiting references

This place does not cover:

Voice coil motors driven by DC	H02P 7/025

Informative references

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

Driving or moving heads in hard disks	G11B

H02P 25/083

Arrangements for increasing the switching speed from one coil to the next one

References

Informative references

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

Direct torque control	H02P 23/30
Arrangements for reducing torque ripple	H02P 25/098

H02P 25/089

Sensorless control (direct torque control H02P 23/30)

References

Limiting references

This place does not cover:

Direct torque control	H02P 23/30

H02P 25/098

Arrangements for reducing torque ripple

Definition statement

This place covers:

Reduction of torque ripple or 'cogging' torque arising from the construction of the motor, wherein the reluctance of the magnetic circuit changes as the motor revolves, for example due to differing rotor and stator saliencies.

References

Informative references

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

AC motor control arrangements, other than vector control, specially adapted for damping motor oscillations or reducing hunting	H02P 23/04
Reduction of harmonics	H02P 29/50

H02P 25/10

Commutator motors, e.g. repulsion motors

References

Informative references

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

DC motors	H02P 7/00

H02P 25/102

{Repulsion motors}

Glossary of terms

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

Repulsion motor	a type of electric motor for use on alternating current. It was formerly used as a traction motor for electric trains but has been superseded by other types of motors and is now only of historical interest. Repulsion motors are classified under Single Phase motors. In magnetic repulsion motors the stator windings are connected directly to the AC power supply and the rotor is connected to commutator and brush assembly, similar to that of a DC armature.

H02P 25/12

with shiftable brushes

Definition statement

This place covers:

Shiftable brushes allow control of speed and/or torque

H02P 25/14

Universal motors (H02P 25/12 takes precedence)

References

Limiting references

This place does not cover:

Motors with shiftable brushes	H02P 25/12

Glossary of terms

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

Series-wound motor	a universal motor when it has been designed to operate on either AC or DC power. It can operate well on AC because the current in both the field and the armature (and hence the resultant magnetic fields) will alternate (reverse polarity) in synchronism, and hence the resulting mechanical force will occur in a constant direction of rotation.

H02P 25/186

{whereby the speed is regulated by using a periodic interrupter (H02P 25/30 takes precedence)}

References

Limiting references

This place does not cover:

Motor being controlled by a control effected upon an AC generator supplying it	H02P 25/30

H02P 25/20

for pole-changing

References

Informative references

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

Pole changing for starting an individual polyphase induction motor	H02P 1/38
Pole changing for starting an individual synchronous motor	H02P 1/46

H02P 27/00

Arrangements or methods for the control of AC motors characterised by the kind of supply voltage (of two or more motors H02P 5/00; of synchronous motors with electronic commutators H02P 6/00; of DC motors H02P 7/00; of stepping motors H02P 8/00)

References

Limiting references

This place does not cover:

Two or more motor	H02P 5/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P 6/00
Controlling the speed or torque of DC motors	H02P 7/00
Controlling stepping motors	H02P 8/00

Informative references

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

Starting	H02P 1/00
Stopping	H02P 3/00

Special rules of classification

When classifying in this group, subject matter relating to vector control should also be classified under H02P 21/00. Classification should also be made under H02P 25/00 when the method of control is characterised by the kind of motor being controlled.

If the supply is not particularly adapted for the control of a motor than it should not be classified here e.g. a variable voltage supply is suitable for a DC motor however it is suitable for various loads and therefore should be classified in a general voltage supply group e.g. H02M or G05B Only when the supply is exclusively for the control of AC motors these groups are used e.g. because control is influenced in function of a motor parameter (e.g. speed, torque, position, motor parameters etc)

H02P 27/05

using AC supply for both the rotor and the stator circuits, the frequency of supply to at least one circuit being variable

References

Informative references

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

Doubly fed motors	H02P 6/005
Doubly fed generators	H02P 9/007

H02P 27/06

using DC to AC converters or inverters (H02P 27/05 takes precedence)

References

Limiting references

This place does not cover:

AC supply for both rotor and stator circuits, the frequency of supply to at least one circuit being variable	H02P 27/05

H02P 27/10

using bang-bang controllers

Glossary of terms

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

Bang–bang controller (on–off controller)	is also known as a hysteresis controller, is a feedback controller that switches abruptly between two states

H02P 27/12

pulsing by guiding the flux vector, current vector or voltage vector on a circle or a closed curve, e.g. for direct torque control

References

Informative references

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

Direct torque control per se	H02P 23/30

Glossary of terms

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

DTC	Direct torque control is one method used in variable frequency drives to control the torque (and thus finally the speed) of three-phase AC electric motors. This involves calculating an estimate of the motor's magnetic flux and torque based on the measured voltage and current of the motor.

H02P 27/16

using AC to AC converters without intermediate conversion to DC (H02P 27/05 takes precedence)

References

Limiting references

This place does not cover:

Using AC supply for both rotor and stator circuits, the frequency of supply to at least one circuit being variable	H02P 27/05

H02P 29/00

Arrangements for regulating or controlling electric motors, appropriate for both AC and DC motors (arrangements for starting electric motors H02P 1/00; arrangements for stopping or slowing electric motors H02P 3/00; control of motors that can be connected to two or more different electric power supplies H02P 4/00; regulating or controlling the speed or torque of two or more electric motors H02P 5/00; vector control H02P 21/00)

References

Limiting references

This place does not cover:

Starting	H02P 1/00
Stopping	H02P 3/00
Control of motors that can be connected to two or more different voltage or current supplies	H02P 4/00

Arrangements specially adapted for regulating or controlling the speed or torque of two or more electric motors	H02P 5/00
Vector control	H02P 21/00

Informative references

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

Emergency protective circuit arrangements for electric machines involving automatic switching	H02H 7/00
Emergency protective circuit arrangements for electric machines for limiting excess current or voltage without disconnection	H02H 9/00

H02P 29/0016

{Control of angular speed of one shaft without controlling the prime mover}

Definition statement

This place covers:

The (prime mover) motor is supplied with a constant power supply. Some means connected (mechanically) with the motor and the load influences the speed.

H02P 29/02

Providing protection against overload without automatic interruption of supply (protection against faults of stepper motors H02P 8/36)

Definition statement

This place covers:

Motor regulation or control guarding against excessive voltage or amperage while power is maintained, e.g. protection against broken phase or power surge/failure

References

Limiting references

This place does not cover:

Protection for stepper motors	H02P 8/36

Informative references

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

Protection during start	H02P 1/022
Generator overload and transient protection	H02P 9/10
Emergency protective circuit arrangements specially adapted for specific types of electric machines or apparatus or for sectionalised protection of cable or line systems, and effecting automatic switching in the event of an undesired change from normal working conditions for dynamo-electric motors	H02H 7/08
Emergency protective arrangements with automatic interruption of supply	H02H 7/0833

Emergency protective circuit arrangements for limiting excess current or voltage without disconnection, in general	H02H 9/00
Protection of inverter circuit	H02M 1/32

H02P 29/50

Reduction of harmonics

References

Informative references

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

From commutation	H02P 6/00
Motor oscillation	H02P 23/04
In Reluctance motors	H02P 25/08
EMI interference reduction on the converter side	H02M

H02P 29/60

Controlling or determining the temperature of the motor or of the drive (H02P 29/02 takes precedence)

References

Limiting references

This place does not cover:

Protection against overload	H02P 29/02

Informative references

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

Protection against faults of stepper motors	H02P 8/36
Motor parameter estimation for vector control	H02P 21/14
AC motor parameter estimation	H02P 23/14
Measuring temperature	G01K 7/42

H02P 29/662

{the rotor having permanent magnets (H02P 29/67 takes precedence)}

References

Limiting references

This place does not cover:

By back-EMF evaluation to obtain the motor temperature	H02P 29/67

H02P 29/67

{Controlling or determining the motor temperature by back electromotive force [back-EMF] evaluation}

References

Informative references

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

Back-EMF based rotor position determination	H02P 6/182

H02P 2201/03

AC-DC converter stage controlled to provide a defined DC link voltage

References

Informative references

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

Conversion of DC or AC input power into surge output power	H02M

H02P 2201/07

DC-DC step-up or step-down converter inserted between the power supply and the inverter supplying the motor, e.g. to control voltage source fluctuations, to vary the motor speed

References

Informative references

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

Conversion of DC or AC input power into surge output power	H02M

H02P 2201/09

Boost converter, i.e. DC-DC step up converter increasing the voltage between the supply and the inverter driving the motor

References

Informative references

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

Conversion of DC or AC input power into surge output power	H02M

H02P 2201/11

Buck converter, i.e. DC-DC step down converter decreasing the voltage between the supply and the inverter driving the motor

References

Informative references

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

Conversion of DC or AC input power into surge output power	H02M

H02P 2201/15

Power factor correction [PFC] circuit generating the DC link voltage for motor driving inverter

References

Informative references

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

Power factor control [PFC] of AC motors	H02P 23/26

H02P 2203/11

Determination or estimation of the rotor position or other motor parameters based on the analysis of high-frequency signals

References

Informative references

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

Circuit arrangements for detecting rotor position using inductance sensing, e.g. pulse excitation, to control synchronous motors or other dynamo-electric motors	H02P 6/185