EUROPEAN PATENT OFFICE
U.S. PATENT AND TRADEMARK OFFICE

CPC NOTICE OF CHANGES 323

DATE: JANUARY 1, 2017

PROJECT DP0171

The following classification changes will be effected by this Notice of Changes:

Action	Subclass	Group(s)
New/modified/deleted Definitions:	H02P	5/00
	H02P	5/485
	H02P	5/505
	H02P	5/51
	H02P	5/60
	H02P	5/68
	H02P	5/74
	H02P	6/00
	H02P	6/04
	H02P	6/08
	H02P	6/10
	H02P	6/15
	H02P	6/16
	H02P	6/185
	H02P	6/20
	H02P	6/21
	H02P	6/28
	H02P	6/30
	H02P	7/00
	H02P	7/281
	H02P	7/291
	H02P	7/293
	H02P	7/32
	H02P	7/34
	H02P	21/00
	H02P	21/32
	H02P	21/04
	H02P	21/16
	H02P	23/00
	H02P	23/0004
	H02P	23/04
	H02P	23/16
	H02P	23/18
	H02P	23/183
	H02P	23/186
	H02P	23/26
	H02P	23/30
	H02P	25/00
	H02P	25/026
	H02P	25/034
	H02P	25/083

CPC NOTICE OF CHANGES 323

DATE: JANUARY 1, 2017

PROJECT DP0171

Action	Subclass	Group(s)
	H02P	25/089
	H02P	25/098
	H02P	25/10
	H02P	25/14
	H02P	27/00
	H02P	29/00
	H02P	29/02
	H02P	29/50
	H02P	29/60

No other subclasses/groups are impacted by this Notice of Changes.

This Notice of Changes includes the following *[Check the ones included]:*

1.   CLASSIFICATION SCHEME CHANGES
☐   A. New, Modified or Deleted Group(s)

☐   B. New, Modified or Deleted Warning Notice(s)

☐   C. New, Modified or Deleted Note(s)

☐   D. New, Modified or Deleted Guidance Heading(s)

2.   DEFINITIONS (New or Modified)
☒   A.   DEFINITIONS (Full definition template)

☐   B.   DEFINITIONS (Definitions Quick Fix)

3.   ☐   REVISION CONCORDANCE LIST (RCL)

4.   ☐   CHANGES TO THE CPC-TO-IPC CONCORDANCE LIST (CICL)

5.   ☐   CROSS-REFERENCE LIST (CRL)

2. A. DEFINITIONS (i.e., new and modified)

Definitions New
Insert the following <u>new</u> definitions.

H02P 5/485

Definition statement

This place covers:

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

H02P 5/505

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

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 6/04

References

Limiting references

This place does not cover:

Arrangements for providing reduced torque ripple; arrangements for controlling torque ripple	H02P6/10

H02P 6/15

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	H02P6/10

H02P 6/21

Definition statement

This place covers:

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

H02P 6/28

References

Limiting references

This place does not cover:

Arrangements for reducing or controlling torque ripple	H02P6/10

H02P 6/30

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	H02P6/22

H02P 7/281

Special rules of classification

Group H02P7/281 takes precedence over groups H02P7/282 - H02P7/298.

H02P 7/291

Definition statement

This place covers:

Using a Schmitt trigger with two thresholds.

H02P 7/293

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	H02P7/295

H02P 21/16

Definition statement

This place covers:

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

H02P 21/32

References

Limiting references

This place does not cover:

Arrangements for starting	H02P21/34

Informative references

This place does not cover:

Position detection in general	H02P6/16

H02P 23/0004

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	H02P23/14
Control of angular speed of one shaft by controlling the prime mover	H02P23/16

H02P 23/16

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	H02P23/18

H02P 23/18

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

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	H02P29/0022

H02P 23/186

Definition statement

This place covers:

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

H02P 23/26

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

Glossary of terms

In this subclass, 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 25/026

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	H02P6/00

H02P 25/034

References

Limiting references

This place does not cover:

Voice coil motors driven by DC	H02P7/025

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 25/089

References

Limiting references

This place does not cover:

Direct torque control	H02P23/30

H02P 25/098

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	H02P23/04
Reduction of harmonics	H02P29/50

H02P 29/50

References

Informative references

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

EMI interference reduction on the converter side	H02M
From commutation	H02P6/00
Motor oscillation	H02P23/04
In Reluctance motors	H02P25/08

H02P 29/60

References

Limiting references

This place does not cover:

Protection against overload	H02P29/02

Informative references

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

Measuring temperature	G01K7/42
Protection against faults of stepper motors	H02P8/36
Motor parameter estimation for vector control	H02P21/14
AC motor parameter estimation	H02P23/14

Definitions (modified)

Insert the following <u>modified</u> definitions.

H02P 5/00

References

Limiting references

Delete: The entire *Limiting References* table.

Insert: The following new *Limiting references* table:

Arrangements for controlling or regulating speed or torque of two or more synchronous motors, or motors with electronic commutators	H02P6/04
Arrangements for controlling two or more stepping motors	H02P8/40

Insert: The following <u>new</u> *Informative references* section:

Informative references

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

Starting	H02P1/00
Stopping	H02P3/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P6/00
Motors rotating step by step	H02P8/00
Vector control	H02P21/00

H02P 5/60

Definition statement

This place/subgroup/subclass covers:

<u>Replace:</u>   The existing ***Definition statement*** with the following <u>new</u> text:

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:

<u>Replace:</u>   The following text in the <u>existing</u> ***Limiting references*** table:

For speed regulation of two or more dynamo-electric motors in relation to one another	H02P5/46

with the following <u>new</u> text:

Speed regulation of two or more dynamo-electric motors in relation to one another	H02P5/46

<u>Insert:</u>   The following <u>new</u> ***Informative references*** table:

Informative references

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

Commutator motors supplied with AC	H02P 5/74

<u>Insert:</u>   The following <u>new</u> section:

Special rules of classification

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

H02P 5/68

Definition statement

This place covers:

Replace: The existing ***Definition statement***:

In this group a DC motor is 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.

with the following <u>new</u> ***Definition statement***:

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:

Delete: From the existing ***Limiting references*** table the following row:

Commutator motor supplied with AC	H02P5/74

Insert: The following <u>new</u> ***Informative references*** table:

Informative References

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

Commutator motor supplied with AC	H02P5/74

Insert: The following <u>new</u> section:

Special rules of classification

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

H02P 5/74

Definition statement

This place covers:

<u>Replace:</u>   The existing *Definition statement*:

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

with the following <u>new</u> *Definition statement*:

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:

<u>Replace:</u>   The following row of the *Limiting references* table:

For speed regulation of two or more dynamo-electric motors in relation to one another	H02P5/46

with the following <u>new</u> text:

Speed regulation of two or more dynamo-electric motors in relation to one another	H02P5/46

H02P 6/00

Definition statement

Delete: The following text from the existing ***Definition statement***:

, EC motors

as shown below:

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

References

Limiting references

This place does not cover:

Delete: From the existing ***Limiting references*** table:

Motors rotating step by step…   H02P1/00, and

Reluctance motors…   H02P25/08

Informative references

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

Insert: The following <u>new</u> rows to the ***Informative reference*** table:

Motors rotating step by step	H02P8/00
Control of linear AC synchronous motors	H02P25/06
Reluctance motors	H02P25/08

Insert: The following <u>new</u> section:

Special rules of classification

Group H02P6/26 takes precedence over groups H02P6/04 - H02P6/24 and H02P6/28 - H02P6/34.

H02P 6/08

References

Limiting references

Insert: The following <u>new</u> row to the ***Limiting reference*** table:

This place does not cover:

Arrangements for controlling the torque ripple	H02P6/10

Insert: The following <u>new</u> ***Informative reference*** section:

Informative references

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

Controlling commutation	H02P6/15

H02P 6/10

Insert: The following <u>new</u> ***Definition statement*** section:

Definition Statement

This place covers:

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

H02P 6/16

References

Informative references

<u>Replace:</u>   The following row of the *Informative references* table:

Synchronous motor detecting rotor position	H02P25/026

with the following new text:

Detecting rotor position in synchronous AC motors	H02P25/026

<u>Replace:</u>   The following row of the *Informative references* table:

Structural arrangement of position sensors	H02K29/06

with the following new text:

Structural arrangement of position sensors associated with brushless motors or generators	H02K29/06

H02P 6/185

References

Delete: The entire *Limiting references* section.

Insert: The following <u>new</u> *Informative references* section:

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	H02P6/18

H02P 6/20

References

Limiting references

Delete: The following row of the *Limiting references* table:

Starting in a selected direction	H02P6/22

Insert: The following <u>new</u> *Informative references* section:

Informative References

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

Starting in a selected direction	H02P6/22

H02P 7/00

Definition statement

This place covers:

Replace: The existing *Definition statement* with:

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 the field winding or field magnet. The role of the "field" 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

<u>Delete:</u>   The entire **Limiting references** section.

<u>Insert:</u>   The following **Informative References** section:

Informative References

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

Starting	H02P1/00
Stopping	H02P3/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P6/00
Motors rotating step by step	H02P8/00
Vector control	H02P21/00

H02P 7/32

Glossary of terms

Delete   row 2 – Amplidyne… is a special type … by a factor of 10,000 or more.

Replace   row 1 – Metadyne, and

               row 3 – A rototrol …

with the following, respectively:

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
A 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

Delete: The entire *Special rules of classification* section

Insert: The following <u>new</u> *Glossary of terms* section:

Glossary of terms

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 21/00

Special rules of classification

Replace: The existing paragraph:

"The stator phase currents are … then applied to the motor "

with the following <u>new</u> text:

When classifying in this group, classification should also be made under H02P25/00 when the method of control is characterised by the kind of motor being controlled. Classification should also be made under H02P27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

Insert: The following new *Glossary of terms* section:

Glossary of terms

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 21/04

References

Informative references

Insert: The following row in the *Informative References* section:

Arrangements or methods for the control of AC motors specially adapted for very low speeds	H02P23/03

H02P 23/00

References

Delete: The entire *Limiting references* section

Insert: The following <u>new</u> *Informative references* section:

Informative references

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

Starting	H02P1/00
Stopping	H02P3/00
Two or more motor	H02P5/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P6/00
DC motors	H02P7/00

Insert: The following <u>new</u> *Special rules of classification* Section:

Special rules of classification

When classifying in this group, subject matter relating to vector control should also be made under H02P21/00. Classification should also be made under H02P25/00 when the method of control is characterised by the kind of motor being controlled. Classification should also be made under H02P27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

H02P 23/04

Definition statement

Replace: The existing ***Definition statement*** "A Synchronous motor … and induces noise"

with the following <u>new</u> text:

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

References

Delete: The entire ***Limiting references*** section

Insert: The following <u>new</u> ***Informative references*** section:

Informative references

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

Motor oscillations that are synchronous to the motor position	H02P29/50
Control of reluctance motors	H02P25/08
Arrangements for controlling or reducing torque ripple in synchronous motors or electronically commutated motors	H02P6/10

Insert the following <u>new</u> ***Glossary*** section:

Glossary of terms

In this group/subgroup/, 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 25/00

References

<u>Delete:</u>   The entire ***Limiting references*** section

<u>Insert:</u>   The following <u>new</u> ***Informative references*** sections:

Informative references

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

Starting	H02P1/00
Stopping	H02P3/00
Two or more motor	H02P5/00
Synchronous motors or other dynamo-electric motors with electronic commutators in dependence on the rotor position	H02P6/00
DC motors	H02P7/00
Stepping motors	H02P8/00

Special rules of classification

When classifying in this group, subject matter relating to vector control should also be classified under H02P21/00. Classification should also be made under H02P27/00 when the method of control is characterised by the kind of supply voltage of the motor being controlled.

H02P 25/083

<u>Insert:</u>   The following row in the ***Informative references*** table:

Informative references

Arrangements for reducing torque ripple	H02P25/098

H02P 25/10

References

Delete: The entire *Limiting references* section:

Insert: The following <u>new</u> *Informative references* table:

Informative references

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

DC motors	H02P7/00

H02P 25/14

Glossary of terms

Replace: The existing text in the *Glossary* with:

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 27/00

References

Limiting references

Delete: The following rows from the *Limiting references* table:

Starting	H02P1/00
Stopping	H02P3/00

Replace: The following rows in the *Limiting references* table:

DC motors	H02P7/00
Stepping motors	H02P8/00

with the following <u>new</u> text:

Controlling the speed or torque of DC motors	H02P7/00
Controlling stepping motors	H02P8/00

Insert: The following <u>new</u> *Informative references* section:

Informative references

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

Starting	H02P1/00
Stopping	H02P3/00

Special rules of classification

Insert: The following <u>new</u> paragraph:

When classifying in this group, subject matter relating to vector control should also be classified under H02P21/00. Classification should also be made under H02P25/00 when the method of control is characterised by the kind of motor being controlled.

before the existing paragraph:

"If the supply is not particularly … position, motor parameters, etc.)

H02P 29/00

References

Limiting references

<u>Delete:</u>   The following rows from the ***Limiting references*** table:

Emergency protective circuit arrangements for electric machines involving automatic switching	H02H7/00
Emergency protective circuit arrangements for electric machines for limiting excess current or voltage without disconnection	H02H9/00

<u>Insert:</u>   The following <u>new</u> row in the ***Limiting references*** table:

Arrangements specially adapted for regulating or controlling the speed or torque of two or more electric motors	H02P5/00

<u>Insert:</u>   The following new ***Informative references*** section and table:

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	H02H7/00
Emergency protective circuit arrangements for electric machines for limiting excess current or voltage without disconnection	H02H9/00

H02P 29/02

Definition statement

This subgroup covers:

<u>Replace:</u>   The existing ***Definition statement*** with the following:

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

<u>Delete:</u>   From the existing ***Limiting references*** table the following rows:

Protection during start	H02P1/022
Generator overload and transient protection	H02P9/10
Protection of inverter circuit	H02M1/32

<u>Insert:</u>   The following <u>new</u> rows in the ***Informative references*** table:

Informative references

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

Protection during start	H02P1/022
Generator overload and transient protection	H02P9/10
Protection of inverter circuit	H02M1/32