

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	19.12.2017
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Applicant's or agent's file reference 2016P-0254WO	FOR FURTHER ACTION See paragraph 2 below
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International application No. PCT/JP2017/034522	International filing date (day/month/year) 25.09.2017	Priority date (day/month/year) 30.09.2016
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International Patent Classification (IPC) or both national classification and IPC

Applicant
NIDEC TOSOK CORPORATION

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed
 - a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
 - on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No. PCT/JP2017/034522
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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement			
Novelty (N)	Claims	1-22	YES
	Claims	_____	NO
Inventive step (IS)	Claims	1-22	YES
	Claims	_____	NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims	_____	NO

2. Citations and explanations:	
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Document 1: JP 2013-207891 A (FUJITSU GENERAL LIMITED) 07 October 2013, entire text, all drawings (Family: none)

Document 2: JP 2007-229256 A (SHARP CORP.) 13 September 2007, entire text, all drawings (Family: none)

Document 3: JP 2013-163237 A (SEIKO EPSON CORP.) 22 August 2013, entire text, all drawings (Family: none)

Document 4: JP 2003-227468 A (ASAHI SUNAC CORP.) 15 August 2003, entire text, all drawings (Family: none)

Document 5: JP 2014-9655 A (JTEKT CORP.) 20 January 2014, entire text, all drawings (Family: none)

The invention as in claims 1-2, 4-16, and 19-22 is novel and involves an inventive step in relation to documents 1-5.

None of documents 1-5 indicate that "there is: a second calculation unit that calculates an estimated

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

rotation speed of the rotor on the basis of a time interval between a point in time at which the first calculation unit receives the position signal and a provisional point in time at which a subsequent position signal is received assuming that the first calculation unit has received a position signal subsequent to the position signal; a comparison unit that compares an actual rotation speed of the rotor calculated on the basis of a time interval between when the first calculation unit receives the position signal and when a position signal prior to the position signal is received, the estimated rotation speed calculated by the second calculation unit, and a prescribed rotation speed of the rotor during a period from when the first calculation unit receives the position signal until when the subsequent position signal is actually received; and a control unit that calculates a control signal for adjusting a voltage to be applied to the coil from the actual rotation speed or the estimated rotation speed and controls a voltage to be applied to the coil on the basis of the calculated control signal, and as a result of the comparison by the comparison unit, the control unit increases the voltage to be applied to the coil on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the prescribed rotation speed, increases the voltage to be applied to the coil on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the prescribed

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

rotation speed and when the actual rotation speed is equal to or less than the prescribed rotation speed, and decreases the voltage to be applied to the coil on the basis of a control signal for decreasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the prescribed rotation speed and when the actual rotation speed is higher than the prescribed rotation speed". Moreover, not even a person skilled in the art could easily conceive of this feature.

The invention as in claim 3 is novel and involves an inventive step in relation to documents 1-5 cited in the ISR.

None of documents 1-5 indicate that "there is: a second calculation unit that calculates an estimated rotation speed of the rotor on the basis of a time interval between a point in time at which the first calculation unit receives the position signal and a provisional point in time at which the subsequent position signal is received assuming that the first calculation unit has received a position signal subsequent to the position signal; a comparison unit that compares an actual rotation speed of the rotor calculated on the basis of a time interval between when the first calculation unit receives the position signal and when a position signal prior to the position signal is received, the estimated rotation speed calculated by the second calculation unit, and a prescribed rotation speed of the rotor during a period from when the first calculation unit receives the position signal until when the

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

subsequent position signal is actually received; and a control unit that calculates a control signal for adjusting a voltage to be applied to the coil from the actual rotation speed or the estimated rotation speed and controls a voltage to be applied to the coil on the basis of the calculated control signal, and as a result of the comparison by the comparison unit, the control unit increases the voltage to be applied to the coil on the basis of a control signal for increasing the voltage to be applied to the coil that is calculated on the basis of the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the actual rotation speed and when the estimated rotation speed is equal to or less than the prescribed rotation speed, as a result of the comparison by the comparison unit, the control unit decreases the voltage to be applied to the coil on the basis of a control signal for decreasing the voltage to be applied to the coil that is calculated on the basis of the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the actual rotation speed and when the estimated rotation speed is higher than the prescribed rotation speed, increases the voltage to be applied to the coil on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the actual rotation speed and when the actual rotation speed is equal to or less than the prescribed rotation speed, and decreases the voltage to be applied to the coil on the basis of a control signal for decreasing the voltage to be applied to the coil as calculated from the

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
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actual rotation speed at a point in time at which the estimated rotation speed is higher than the actual rotation speed and when the actual rotation speed is higher than the prescribed rotation speed". Moreover, not even a person skilled in the art could easily conceive of this feature.

The invention as in claim 17 is novel and involves an inventive step in relation to documents 1-5 cited in the ISR.

None of documents 1-5 indicate that "an estimated rotation speed of the rotor is calculated on the basis of a time interval between a point in time at which the position signal is received and a provisional point in time at which the subsequent position signal is received assuming that a position signal subsequent to the position signal is received, the actual rotation speed, the estimated rotation speed, and the prescribed rotation speed of the rotor during a period from when the position signal is received until when the subsequent position signal is received are compared, and as a result of the comparison, the voltage to be applied to the coil is increased on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the prescribed rotation speed, the voltage to be applied to the coil is increased on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the prescribed rotation speed and when the actual

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

rotation speed is equal to or less than the prescribed rotation speed, and the voltage to be applied to the coil is decreased on the basis of a control signal for decreasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the prescribed rotation speed and when the actual rotation speed is higher than the prescribed rotation speed". Moreover, not even a person skilled in the art could easily conceive of this feature.

The invention as in claim 18 is novel and involves an inventive step in relation to documents 1-5 cited in the ISR.

None of documents 1-5 indicate that "an estimated rotation speed of the rotor is calculated on the basis of a time interval between a point in time at which the position signal is received and a provisional point in time at which the subsequent position signal is received assuming that a position signal subsequent to the position signal is received, the actual rotation speed, the estimated rotation speed, and the prescribed rotation speed of the rotor during a period from when the position signal is received until when the subsequent position signal is received are compared, and as a result of the comparison, the voltage to be applied to the coil is increased on the basis of a control signal for increasing the voltage to be applied to the coil that is calculated on the basis of the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the actual rotation speed and when the estimated rotation speed is equal to or less than the

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

prescribed rotation speed, as a result of the comparison by the comparison unit, the voltage to be applied to the coil is decreased on the basis of a control signal for decreasing the voltage to be applied to the coil that is calculated on the basis of the estimated rotation speed at a point in time at which the estimated rotation speed is equal to or less than the actual rotation speed and when the estimated rotation speed is higher than the prescribed rotation speed, the voltage to be applied to the coil is increased on the basis of a control signal for increasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the actual rotation speed and when the actual rotation speed is equal to or less than the prescribed rotation speed, and the voltage to be applied to the coil is decreased on the basis of a control signal for decreasing the voltage to be applied to the coil as calculated from the actual rotation speed at a point in time at which the estimated rotation speed is higher than the actual rotation speed and when the actual rotation speed is higher than the prescribed rotation speed". Moreover, not even a person skilled in the art could easily conceive of this feature.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/JP2017/034522

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

H02P6/16(2016.01)i, F04B43/04(2006.01)i, F04B49/06(2006.01)i, F04C2/10(2006.01)i,
H02P6/15(2016.01)i, H02P23/03(2006.01)i, H02P27/08(2006.01)i