



- (51) International Patent Classification:
H02K 11/00 (2006.01) *H02K 29/08* (2006.01)
- (21) International Application Number:
PCT/GB2013/053337
- (22) International Filing Date:
18 December 2013 (18.12.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
1300132.6 4 January 2013 (04.01.2013) GB
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: POSITION SENSING SYSTEM

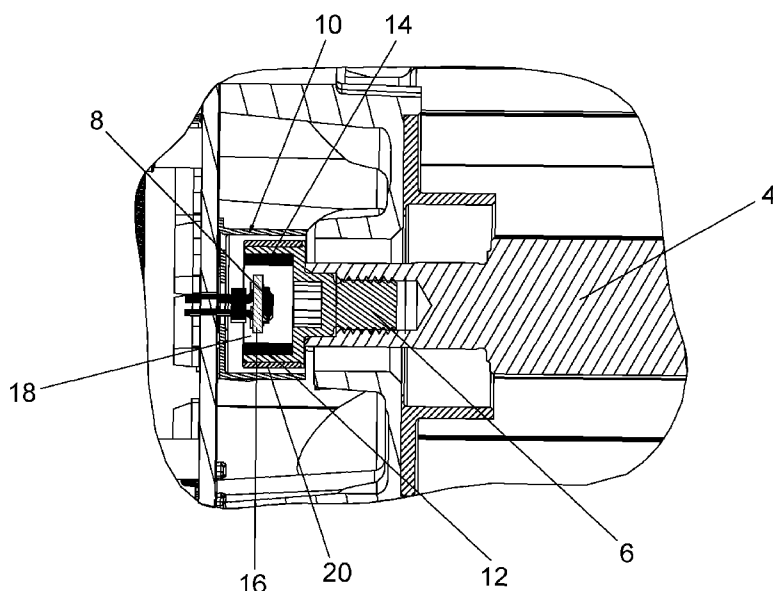


Figure 3

(57) Abstract: A position sensing system for a switched reluctance machine, such as that of an Integrated Starter Generator, Turbogenerator or electric Supercharger wherein the system comprises a pair magnets, a magnet carrier, and a sensor element, wherein the sensor element is mounted upon an end of a rotatable shaft of the SR machine, and wherein the sensor element is mounted on a circuit board, and sits in a well formed by the magnets which are arranged such that the magnetic flux follows a path similar to that of a horseshoe magnet, and whereby magnetic flux produced by the magnets is concentrated within the well of the magnet carrier in a direction normal to the axial direction of the shaft of the SR machine.



(88) Date of publication of the international search report:

26 March 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2013/053337

A. CLASSIFICATION OF SUBJECT MATTER
INV. H02K11/00 H02K29/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 10 2007 031301 A1 (BOSCH GMBH ROBERT [DE]) 8 January 2009 (2009-01-08)	1,2
Y	paragraphs [0002], [0019], [0020]; figures 1,2	3,4
Y	----- US 2010/176695 A1 (TEZUKA SHUNICHI [JP] ET AL) 15 July 2010 (2010-07-15) paragraph [0035]; figure 1	3,4
A	----- DE 196 35 280 A1 (NIPPON DENSO CO [JP]) 6 March 1997 (1997-03-06) page 3, lines 6-31; figures 8,9A,9B	1-4



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 January 2015

Date of mailing of the international search report

27/01/2015

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2013/053337

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 5
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 5

Claim 5 is not clear (Article 6 PCT). Claim 5 does not define the claimed subject matter in terms of description of its features only in reference to the figures of the application:

A position sensing system
substantially as hereinbefore described and with reference to the accompanying Figures 2 to 11.

This formulation is only allowable in exceptional cases, however in the present case it seems that the application does not include any particular feature that can only be described in that manner (see Guidelines PCT/GL/ISPE/1 5.10).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2013/053337

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102007031301 A1	08-01-2009	NONE	

US 2010176695 A1	15-07-2010	CN 101689789 A	31-03-2010
		DE 112007003557 T5	29-04-2010
		JP 4964303 B2	27-06-2012
		US 2010176695 A1	15-07-2010
		WO 2009001399 A1	31-12-2008

DE 19635280 A1	06-03-1997	DE 19635280 A1	06-03-1997
		JP H0968403 A	11-03-1997
		US 5698778 A	16-12-1997
