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Datasheet for the decision of 16 March 2010

Case Number: T 0510/07 - 3.5.02

Application Number: 00119511.4

Publication Number: 1083654

IPC: H02H 7/122

Language of the proceedings: EN

Title of invention:
Motor drive unit and method of detecting malfunction of the motor drive unit

Applicant:
Toyota Jidosha Kabushiki Kaisha

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inadmissible extension (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0510/07 **-** 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 16 March 2010

Appellant: Toyota Jidosha Kabushiki Kaisha
1, Toyota-cho
Toyota-shi, Aichi-ken, 471-8571 (JP)

Representative: TBK-Patent
Bavariaring 4-6
D-80336 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 26 October 2006 refusing European patent application No. 00119511.4 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: M. Ruggiu
Members: J.-M. Cannard
E. Lachacinski

Summary of Facts and Submissions

I. The appellant contests the decision of the examining division of 26 October 2006 to refuse European patent application No. 00 119 511.4.

II. With a communication dated 12 November 2009 annexed to summons to oral proceedings, the Board observed that independent claims 1 and 7 of the set of claims 1 to 8 filed with the statement of grounds of appeal in a letter dated 5 March 2007 to replace "the hitherto valid claims 1 to 11" appeared to contravene Article 123(2) EPC.

III. Oral proceedings before the Board were held on 16 March 2010. As announced in a letter dated 22 December 2009, in which a decision in writing was requested, the appellant did not attend the oral proceedings. It can be understood from the written submissions of the appellant that he requests that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 8 filed with the letter dated 5 March 2007.

IV. Independent claims 1 and 7 filed with the letter of 5 March 2007 read as follows:

"1. A motor drive unit having a bridge circuit (31) having four sides that each have a switching element, an electric motor (10) having two ends connected to the bridge circuit (31) and a motor drive device (30) which is adapted to operate the electric motor (10) by connecting one of the switching elements to a power line and grounding an other one of the switching elements and which is adapted to control the electric motor (10) by

performing pulse width modulation control of the switching elements, the motor drive unit **characterized by** comprising:

terminal voltage detection circuits (37, 38) functioning as a low pass filter connected to the two ends of the electric motor,

a malfunction judging means (S112, S114, 32) which is adapted to judge the occurrence of a malfunction in at least one of the bridge circuit (31), the electric motor (10) and the motor drive device (30) when a sum of respective terminal voltages (Vm1, Vm2) at the two ends of the electric motor outputted from the terminal voltage detection circuits (37, 38) is different from a power voltage (Vb) is equal to or greater than 3·Vb/2 or is equal to or smaller than Vb/2 during operation of the electric motor (10)."

"7. A method of detecting a malfunction for a motor drive unit having a bridge circuit having four sides that each have a switching element, an electric motor having two ends connected to the bridge circuit, a power circuit operating the electric motor by connecting one of the switching elements to a power line and grounding an other one of the switching elements, and a motor drive device controlling the electric motor by performing pulse width modulation control of the switching elements, comprising the step of:

detecting a sum of the voltages at the switching elements of the electric motor;

characterized by the step of

performing a low pass filtering by terminal voltage detection circuits (37, 38) connected to the two ends of the electric motor,

judging the occurrence of a malfunction in at least one of the bridge circuit, the electric motor and the motor drive device if the sum of respective terminal voltages (Vm1, Vm2) at the two ends of the electric motor outputted from the terminal voltage detection circuits (37, 38) is equal to or greater than 3·Vb/2 or is equal to or smaller than Vb/2 during operation of the electric motor (10)."

V. The appellant argued that current claims 1 and 7 met the requirement of Article 123(2) EPC because:

the new independent claims 1 and 7 were based on the original independent claim 1, the subject-matter of claim 7 being formulated as a method claim;

the feature regarding the terminal voltage detection circuits was originally disclosed in the last paragraph of page 8 of the application as filed; the features regarding the sum of the voltages being greater than 3·Vb/2 or equal to or smaller than Vb/2 were originally disclosed on page 15, first paragraph, for example;

the phrase "is equal to or greater than 3·Vb/2 or is equal to or smaller than Vb/2" was considered to be a limitation of the original phrase "by a predetermined value (ΔVb) or more".

Reasons for the Decision

1. The appeal is admissible.

2. According to current claim 1, the judging means is adapted to judge the occurrence of a malfunction when "a sum of the respective terminal voltages (Vm1,Vm2)... **is different from a power voltage (Vb) is equal to or greater than 3·Vb/2 or is equal to or smaller than Vb/2**" (emphasis added by the Board). This wording appears to cover different alternative conditions for judging the occurrence of a malfunction. In particular, a first alternative malfunction condition for the sum is that it "is equal to or greater than 3·Vb/2" and a second alternative malfunction condition for the sum is that it "is equal to or smaller than Vb/2".

3. Accordingly, claim 1 covers alternative embodiments of the motor drive unit in which the malfunction judging means are adapted to judge the occurrence of a malfunction when only one of the first malfunction condition and the second malfunction condition is met. As appears from figure 3 (S112 and S114) and page 15, lines 1 to 24, the application as originally filed, as regards the particular voltage values 3·Vb/2 and Vb/2, only supports a motor drive unit in which the malfunction judging means are adapted to judge the occurrence of a malfunction when the sum of the voltages (Vm1,Vm2) is outside the range defined by the values Vb/2 and 3·Vb/2. Accordingly, claim 1 relates to subject-matter which extends beyond the content of the application as originally filed and contravenes Article 123(2) EPC.

4. Similar considerations apply ***mutatis mutandis*** to independent method claim 7 which also contravenes Article 123(2) EPC.

5. Since the application does not meet the requirements of the EPC, the appeal has to be dismissed.

Order

For these reasons it is decided that :

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann M. Ruggiu