



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**04.07.2018 Bulletin 2018/27**

(51) Int Cl.:  
**F02D 41/04** <sup>(2006.01)</sup> **F02D 41/14** <sup>(2006.01)</sup>  
**F02D 41/24** <sup>(2006.01)</sup> **F02N 19/00** <sup>(2010.01)</sup>  
**F02D 41/00** <sup>(2006.01)</sup>

(43) Date of publication A2:  
**20.10.2010 Bulletin 2010/42**

(21) Application number: **10159232.7**

(22) Date of filing: **07.04.2010**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
Designated Extension States:  
**AL BA ME RS**

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(30) Priority: **07.04.2009 JP 2009092759**

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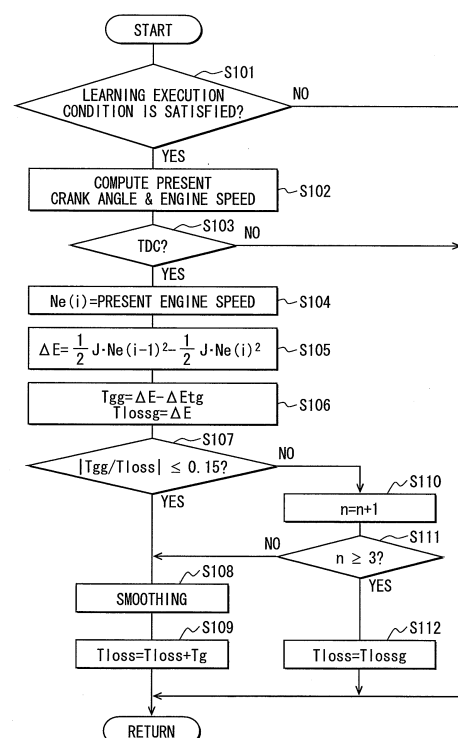
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(54) **Controller of a combustion engine for synchronizing the engine during the shutdown**

(57) An ECU includes a backup RAM which stores a learning value of a loss torque characteristic of an engine. The learning value is updated based on the loss torque characteristic which is computed based on an actual engine rotation behavior. The ECU includes a first learning portion (S109) for updating the learning value based on the learning value stored in the memory (Tloss) and a presently computed loss torque characteristic (Tg), and a second learning portion (S112) for updating the learning value based on the presently computed loss torque characteristic (Tlossg) without using the learning value stored in the memory. A switching portion (S107) switches between the first learning portion and the second learning portion in order to update the learning value (Tloss).

**FIG. 5**



**PARTIAL EUROPEAN SEARCH REPORT**

Application Number

under Rule 62a and/or 63 of the European Patent Convention.  
This report shall be considered, for the purposes of  
subsequent proceedings, as the European search report

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**DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	DE 10 2008 000384 A1 (DENSO CORP [JP]) 25 September 2008 (2008-09-25) * abstract; figures 1-10 * -----	1-7	INV. F02D41/04 F02D41/14 F02D41/24
A	US 7 054 738 B1 (STOTSKY ALEXANDER A [SE]) 30 May 2006 (2006-05-30) * abstract; figures 1-10 * -----	1-7	ADD. F02N19/00 F02D41/00
A	DE 10 2006 005701 A1 (BOSCH GMBH ROBERT [DE]) 9 August 2007 (2007-08-09) * abstract; figures 1-2 * -----	1-7	
A	DE 100 43 689 A1 (BOSCH GMBH ROBERT [DE]) 14 March 2002 (2002-03-14) * abstract; figures 1-3 * -----	1-7	
A	DE 10 2008 000547 A1 (DENSO CORP [JP]) 25 September 2008 (2008-09-25) * abstract; figures 1-17 * -----	1-7	
A	EP 0 904 972 A2 (FORD GLOBAL TECH INC [US]) 31 March 1999 (1999-03-31) * abstract; figures 1-2 * -----	1-7	TECHNICAL FIELDS SEARCHED (IPC)  F02D F02N

**INCOMPLETE SEARCH**

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

Place of search

Munich

Date of completion of the search

25 May 2018

Examiner

Mineau, Christophe

**CATEGORY OF CITED DOCUMENTS**

X : particularly relevant if taken alone  
Y : particularly relevant if combined with another document of the same category  
A : technological background  
O : non-written disclosure  
P : intermediate document

T : theory or principle underlying the invention  
E : earlier patent document, but published on, or after the filing date  
D : document cited in the application  
L : document cited for other reasons

& : member of the same patent family, corresponding document



# INCOMPLETE SEARCH SHEET C

Application Number

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Claim(s) completely searchable:

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Claim(s) searched incompletely:

1-7

Reason for the limitation of the search:

1 The application does not meet the requirements of Article 84 EPC, because independent claim 1 is not clear for the following reasons:  
1.1 Independent claim 1 defines that the same parameter "the presently computed loss torque" is used in both first and second learning means (S109 respectively S112). However these both learning means are using different parameters.

In fact, the first learning means is using for updating the learning value (Tloss) the learning value used for computing a previous track, which seems to be defined in claim 1 by the term "the learning value stored in the memory means" and the presently computed loss torque characteristic, which is the parameter Tg according to fig. 5 and page 10 of the description. However the parameter Tg is not used by the second learning means (see step S112 of fig. 5), which is using the presently computed loss torque (Tlossg) and not the presently computed loss torque characteristic as defined in claim 1.

This contradiction between the claim 1 and the description/figures makes the application unclear.

1.1 The negative disclaimer "without using the learning value stored in the memory means" renders also the independent claim 1 unclear (see guidelines F-IV, 4.20).

1.2 The parameters Tloss and Tg are both stored in the memory (see page 10 of the description). The present claim 1 seems to use the phrase "based on the value stored in the memory" for defining the value, which was updated after the computation in a previous target. The means for storing updated value in the memory seems therefore to be essential to the definition of the independent claim 1.

1.3 It is clear from the description on page 9 that the means of S102 of fig. 5 is essential to the definition of the invention.

Since independent claim 1 does not contain this feature it does not meet the requirement following from Article 84 EPC, taken in combination with Rule 43(1) and (3) EPC, that any independent claim must contain all the technical features essential to the definition of the invention.

1.4 The filtered (Tg) and unfiltered (Tgg) presently computed loss torque characteristics can not be defined by the same term (like presently, see claims 1, 6 and 7). It makes the whole application unclear. It seems therefore that it is necessary to define the smoothing means and to distinguish the smoothed value from the raw value.

2 Non compliance with the substantive provisions is such that a meaningful search of the whole claimed subject matter could/can not be carried out (Rule 63 EPC and Guidelines B VIII, 3).

2.1 The search has been restricted to the subject-matter indicated by the applicant in his letter of May 7, 2018 filed in reply to the invitation pursuant to Rule 63(1) EPC, that means that the search report will be drawn up on the basis of the below-mentioned amended claim 1, which appears to comprise a reasonable definition of what is understood to be the invention for which protection is sought (amended text in bold;



# INCOMPLETE SEARCH SHEET C

Application Number

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reference of the amendment is put into brackets).

2.2 An engine controller comprising:

a memory means (41) for storing a loss torque characteristic of an engine as a learning value; and

a present crank angle and present engine speed computing means (S102); a loss torque learning means (40, S100) for updating the learning value (Tloss) based on a loss torque characteristic which is computed (this phrase is a repetition of the below-mentioned definition and makes the claim 1 unclear), wherein the loss torque learning means which includes; a computing means (S107) for computing a presently loss torque characteristic (Tgg) and a presently loss torque (Tlossg) based on the present computed crank angle and the present computed engine speed (see formulas pages 9 and 10);

a smoothing means (S108) for smoothing the presently loss torque characteristic (Tgg);

a first learning means (S109) for updating the learning value (Tloss) based on the learning value (Tloss) stored in the memory means and the presently computed smoothed loss torque characteristic (Tg) ;

a second learning means (S112) for updating the learning value based on the presently computed loss torque (Tlossg) characteristic without using the learning value stored in the memory means ; and

a switching means (S107) for switching between the first learning means and the second learning means in order to update the learning value;

an storing means for storing the updated learning value (Tloss) in the memory means (page 10, line 30).

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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