

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 447 546 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
27.09.2006 Bulletin 2006/39

(51) Int Cl.:
F02D 11/10 (2006.01) F02D 41/30 (2006.01)

(43) Date of publication A2:
18.08.2004 Bulletin 2004/34

(21) Application number: **04003045.4**

(22) Date of filing: **11.02.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR
 Designated Extension States:
AL LT LV MK

- **Ishizuka, Kouji**
Kariya-city
Aichi-pref.
448-8661 (JP)
- **Ooshima, Keiji**
Kariya-city
Aichi-pref.
448-8661 (JP)

(30) Priority: **12.02.2003 JP 2003034232**

(71) Applicant: **DENSO CORPORATION**
Kariya-city,
Aichi-pref. 448-8661 (JP)

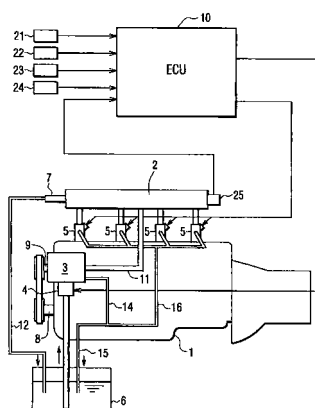
(74) Representative: **TBK-Patent**
Bavariaring 4-6
80336 München (DE)

(72) Inventors:
 • **Takahashi, Tomohiro**
Kariya-city
Aichi-pref.
448-8661 (JP)

(54) Engine control unit including phase advance compensator

(57) A peak gain of target torque with respect to a change in an accelerator position from 40% to 70% is expressed by a constant K. A time constant of phase advance compensation corresponding to a period for the target torque to change from a peak value to 63.2% of the peak value in the case where the accelerator position is changed from 40% to 70% is expressed by a constant ω . A target torque response with respect to the change in the accelerator position is calculated through a phase advance compensator (26) by using the peak gain K and the time constant ω , which have physical meanings. Thus, the target torque response with respect to the change in the accelerator position can be defined quantitatively, directly based on an elapsed time.

FIG. 1

**EP 1 447 546 A3**



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 00 3045

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 894 829 A (SCHMID ET AL) 20 April 1999 (1999-04-20) * figures 1,2 *	1-7	INV. F02D11/10 F02D41/30
X	US 5 746 183 A (PARKE ET AL) 5 May 1998 (1998-05-05) * abstract *	1-7	
X	WO 03/008788 A (OPTIMUM POWER TECHNOLOGY, L.P) 30 January 2003 (2003-01-30) * abstract *	1-7	
X	EP 1 260 695 A (HONDA GIKEN KOGYO KABUSHIKI KAISHA) 27 November 2002 (2002-11-27) * abstract; figure 10 *	1	
X	DE 199 55 649 A1 (ROBERT BOSCH GMBH; AUDI AG) 13 June 2001 (2001-06-13) * abstract; figure 1 *	1	
P,X	EP 1 318 287 A (RENAULT S.A.S) 11 June 2003 (2003-06-11) * abstract; figure 1 *	1	TECHNICAL FIELDS SEARCHED (IPC)
A	US 4 886 030 A (OBA ET AL) 12 December 1989 (1989-12-12) * figures 3,4 *	1	F02D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 August 2006	Examiner Bradley, D
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

1
EPO FORM 1503 03.82 (P04C01)

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

EP 04 00 3045

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

18-08-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5894829	A	20-04-1999	BR 9705411 A	28-09-1999
			DE 19645389 C1	26-03-1998
			EP 0839998 A2	06-05-1998
US 5746183	A	05-05-1998	DE 19828710 A1	07-01-1999
			GB 2328037 A	10-02-1999
WO 03008788	A	30-01-2003	CA 2449896 A1	30-01-2003
			CN 1529792 A	15-09-2004
			EP 1412629 A2	28-04-2004
			JP 2004536254 T	02-12-2004
			MX PA03011672 A	08-07-2004
EP 1260695	A	27-11-2002	JP 2002349317 A	04-12-2002
			US 2002170541 A1	21-11-2002
DE 19955649	A1	13-06-2001	WO 0138709 A1	31-05-2001
			EP 1147300 A1	24-10-2001
			JP 2003515044 T	22-04-2003
EP 1318287	A	11-06-2003	FR 2833041 A1	06-06-2003
US 4886030	A	12-12-1989	DE 3807175 A1	15-09-1988
			JP 2973418 B2	08-11-1999
			JP 63215848 A	08-09-1988