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(71) Applicant: INTERNATIONAL TRUCK AND ENGINE CORPORATION [US/US]; 455 North Cityfront Plaza Drive, Chicago, IL 60611 (US).

(72) Inventors: BALEKAI, Priyankar, S.: 1041 Susan Collins Lane, Oak Park, IL 60302 (US). ANDERSON, Scott: 9700 Male Crest Lane, Palos Hills, IL 60465 (US). BANDY, Steven, M.: 2671 Stanton Court, Aurora, IL 60504 (US).

(74) Agents: SULLIVAN, Dennis, Kelly et al.: Suite 1300, 455 North Cityfront Plaza Drive, Chicago, IL 60611 (US).

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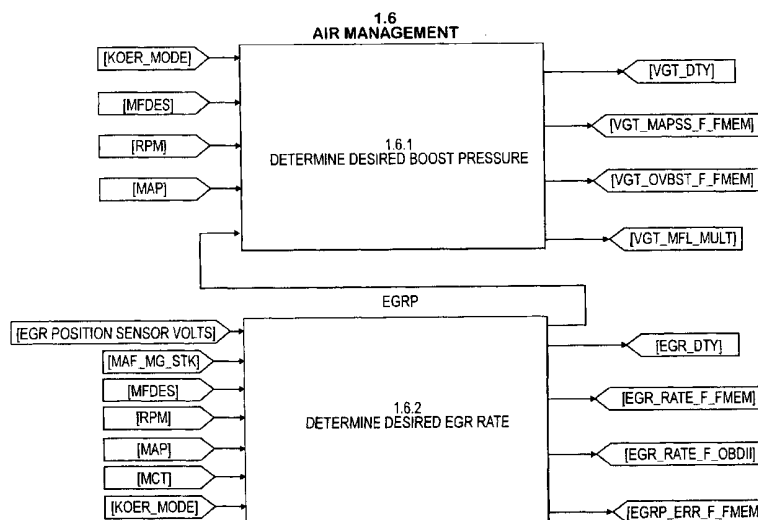
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CLOSED LOOP DIESEL ENGINE EGR CONTROL INCLUDING EVENT MONITORING



(57) Abstract: A control system and method for an EGR valve (54), particularly in a diesel engine (30). A processor processes data in feedback control of the position of the valve element to develop from the data a position control signal for setting the extent to which the valve is open. The processing includes processing data (EGRP) corresponding to actual position of the valve and data (EGRP\_DES) representing a desired position of the valve to develop a position error signal (EGRP\_ERR), processing data (EGR\_RATE\_FDBK) that defines actual EGR rate and data (EGR\_RATE\_DES) representing a desired EGR rate to develop a rate error signal (EGR\_RATE\_ERR), and processing the position error signal (EGRP\_ERR) and the rate error signal (EGR\_RATE\_ERR) to develop the position control signal (EGRP\_DTY). Emission control system event monitors (200, 202) flag potential error sources in their incipency to afford opportunity for correction before mandatory logging occurs.



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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/33142

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 F02D21/08 F02D41/22

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)  
 IPC 7 F02D

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 practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 753 488 A (RENAULT) 20 March 1998 (1998-03-20) abstract the whole document ---	1-8, 11, 12, 14-20
X	US 4 279 235 A (WESSEL WOLF ET AL) 21 July 1981 (1981-07-21)  abstract figures 2-8 column 1, line 34 - line 52 column 3, line 28 - column 7, line 2 ---	1-3, 9, 13-16, 21, 23
A	DE 43 22 319 A (BOSCH GMBH ROBERT) 12 January 1995 (1995-01-12) the whole document ---  -/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in 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 document 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.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search  12 July 2001	Date of mailing of the international search report  20. 07. 2001
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Trotureau, D

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/33142

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 884 466 A (RENAULT) 16 December 1998 (1998-12-16)	24, 26
Y	abstract column 4, line 21 - line 34 figure 4	28, 30-35
Y	----- US 5 823 164 A (KITAMURA TAKAMASA ET AL) 20 October 1998 (1998-10-20) abstract claims 1-3	28, 30-35
A	----- DE 196 07 071 A (BOSCH GMBH ROBERT) 28 August 1997 (1997-08-28) claims -----	24, 26

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 00/33142

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.:  
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:
  
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

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

see additional sheet

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 fee, this Authority did not invite payment of any additional fee.
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.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-23

EGR control method and system with nested feedback loops.

2. Claims: 24-35

Event monitoring system and method in and EGR system.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/33142

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DE 19607071    A	28-08-1997	NONE	