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(54) **Valve control strategy and controller**

(57) A controller for controlling the operation of a valve in an engine system, the valve being in communication with a battery and a further voltage supply means and comprising an actuator, the controller comprising inputs for receiving data representing the voltage across the battery and further voltage supply means and the current through the actuator; a processor programmed to determine a control function for controlling the operation of the valve in dependence on the voltage across the further voltage supply means and the current through the actuator; and outputs for outputting the control function as determined by the processor to the battery and further voltage supply means.

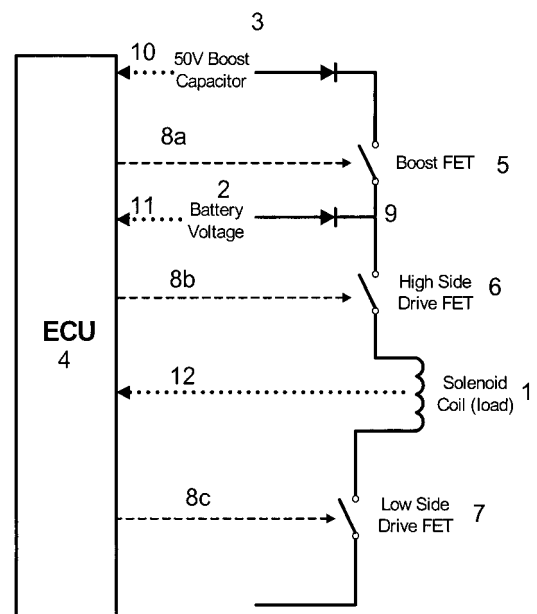


FIGURE 1

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European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 01 8287

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 March 2008	Examiner Marti Almeda, Rafael
<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>			

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European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 01 8287

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 March 2008	Examiner Marti Almeda, Rafael
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	

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EPO FORM 1503 03.82 (P04C01)

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:
- ☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-21, 24, 25

A controller for controlling the operation of a valve in an engine system, the valve being in communication with a battery and further voltage supply means, the controller comprising:

- a processor programmed to determine a control function for controlling the operation of a solenoid valve, the processor determines:
- the resistance of the actuator with data representing the voltage across the further voltage supply means and the current through the actuator
- the control function in dependence on the voltage across the battery and the resistance of the actuator.
- outputs

2. claims: 22, 23

A vehicle injection system comprising:

- at least one solenoid valve,
- a battery,
- a further voltage supply means,
- a controller, that comprises a processor programmed to determine a control function applying a pulse from a further voltage supply means at a first voltage in a pull-in phase, and applying a second voltage potential or series of pulses at a second voltage potential in a hold phase.

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

07-03-2008

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