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(54) **Electronic throttle control system**

(57) An electronic throttle control system is described where a throttle position sensor has multiple slopes depending on the operating region. At low throttle positions, a greater slope, and thus a greater sensitivity is provided, thereby increasing control resolution. At greater throttle positions, a lower slope, and thus lower

sensitivity is provided. In this way, an output signal that varies across the entire operating region of the throttle is provided for monitoring and control, while improved performance at low throttle angles can be simultaneously achieved. A method for learning a transition region is also described.

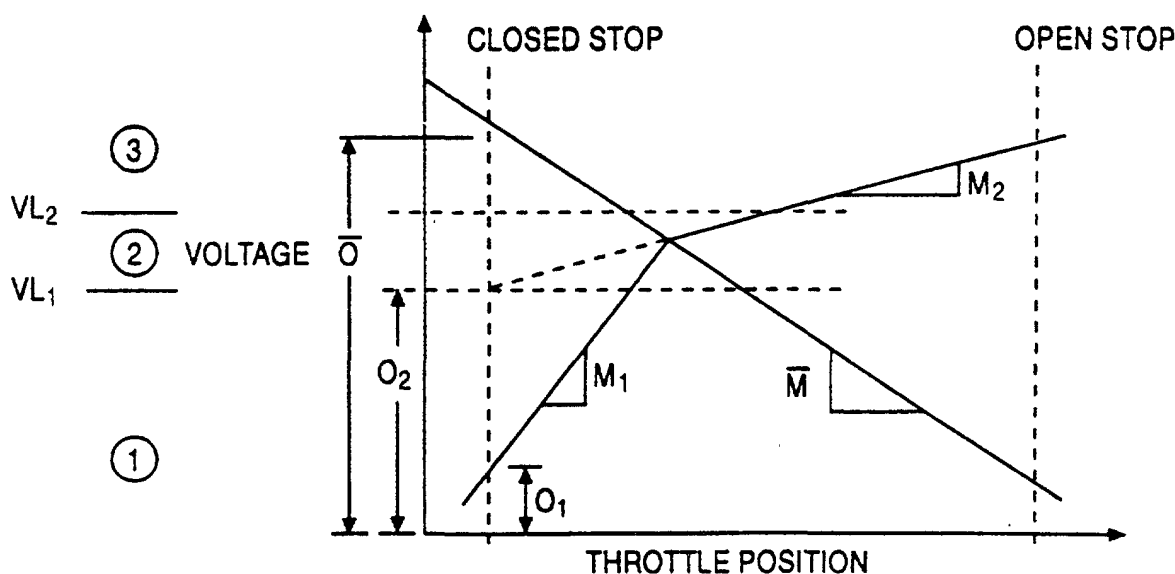


FIG. 4



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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 (Int.Cl.7) |
| X | US 4 718 272 A (PLAPP GUENTHER) 12 January 1988 (1988-01-12) | 1-7,12, 13,16 | F02D11/10 |
| Y | * column 2, line 67 - column 3, line 3 * * column 3, line 47 - line 55 * * column 4, line 4 - column 6, line 2 * * figures 2A,2B,3B,4D * | 8-11,14, 15 | |
| Y | US 5 452 697 A (SASAKI YASUSHI ET AL) 26 September 1995 (1995-09-26) | 8-11,14, 15 | |
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| Y | US 4 901 695 A (KABASIN DANIEL F ET AL) 20 February 1990 (1990-02-20) | 1,12 | |
| A | * abstract; figure 1 * * column 2, line 38 - column 4, line 30 * | 2-11, 13-16 | |
| A | DE 43 35 913 A (BOSCH GMBH ROBERT) 27 April 1995 (1995-04-27) * column 4, line 26 - line 53; figures 2,3,7,8 * | 1-16 | TECHNICAL FIELDS SEARCHED (Int.Cl.7) |
| A | DE 40 04 083 A (BOSCH GMBH ROBERT) 14 August 1991 (1991-08-14) * column 5, line 55 - column 7, line 8; figures 2,3 * | 1-16 | F02D G01D |
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| -The present search report has been drawn up for all claims | | | |
| Place of search | | Date of completion of the search | Examiner |
| MUNICH | | 31 March 2003 | Wettemann, M |
| 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 | | | |

EPO FORM 1503 03/82 (P04C01)



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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:

1-16



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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 01 30 1438

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: 1-16

Method of learning a transition region between a first and a second operating range of a position sensor.

2. Claims: 17-19, 21

Method of calculating the position of a throttle valve.

3. Claim : 20

Method of determining a characteristic of a position sensor

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

EP 01 30 1438

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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31-03-2003

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82