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EXAMPLE

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[Example] One example of this invention is explained below. The system chart of a data recorder is shown in drawing 2 . In addition, below taking the case of the data recorder to the control unit for engine control including electronic formula throttle control, it explains.
[0019] In drawing 2 , closing motion actuation of the throttle valve 3 is carried out by the throttle actuator 2, the inhalation air content to an engine 1 is controlled, and the amount of fuel supply is controlled by the fuel injection valve 4. and the inhalation in an engine 1 -- having ignition timing controlled, it is lit by the ignition plug 5 and gaseous mixture burns. Here, the throttle actuator 2, a fuel injection valve 4, and an ignition plug 5 are controlled by the signal from a control unit 20.
[0020] The signal from the crank angle sensor 6 which detects an engine speed, the accelerator sensor 8 which accelerator BEDARU 7 steps on and detects an angle (accelerator opening), the speed sensor 10 which detects the vehicle speed from the output-shaft revolution of transmission 9, and an ignition switch 11 is inputted into the control unit 20 for this control. In addition, 12 in drawing shows car electric load.
[0021] The control unit 20 is constituted including CPU21, RAM22, EEPROM23, the input circuit 24, and the output circuit 25. And the electronic system diagnostic circuit tester 30 is connected to a control unit 20, and this electronic system diagnostic circuit tester 30 can do the data exchange by communication link with CPU21.
[0022] In such a system, always CPU21 detects an engine speed, an accelerator opening, etc., and uses them for control, and also it records data on RAM22. In this case, the field which records the data for for 20 seconds is secured to RAM22, and data are overwritten and recorded in a cycle of 20 seconds. And the data in [ after recording data ] RAM22 are moved to EEPROM23 until it judges it as a stop and 10 seconds pass after a stop, when the vehicle speed becomes 0 km/h.
[0023] Moreover, an engine shutdown is judged with an ignition switch 11, and as shown in drawing 3 , storage maintenance of the data before and behind the stop of front [ an engine shutdown (ignition switch 11 OFF) ] 3 batch is carried out on EEPROM23. In addition, the field which records 10= 30 3x data for for 20 seconds (data for [ before a stop ] 10 seconds and for 10 seconds after a stop) as shown in drawing 4 is secured to EEPROM23, and the ten-piece record maintenance of the data before and behind the stop of front [ engine shutdown ] 3 batch shown in drawing 3 can be carried out.
[0024] The detail of record actuation is as the program shown in the flow chart of drawing 5 and drawing 6 ( drawing 6 is a continuation of drawing 5 ). This program is performed repeatedly every 10msec(s). Step 1 (it is described as S1 in drawing.) In order to carry out record maintenance of the data fundamentally in it being the same as that of the following at the time of a stop, based on the signal from a speed sensor 10, it judges whether the vehicle speed is 0 km/h. In addition, you may judge with the time of a stop with an engine speed being below a predetermined value.
[0025] When the vehicle speed is not 0 km/h, Flag FMEMO is set to 0 at step 2, and the address counter N for RAM is counted up at step 3 the back. In addition, when N is set to 2000, it returns to 0 (steps 4 and 5), and thereby, count-up to 0-1999 is repeated, and is made to perform. And it writes in and records on Nx10th - the Nx10+9th street in RAM corresponding to N which inputs the record data D1 - D10 at

step 6, and repeats even 0-1999 at step 7.
[0026] Thus, when the vehicle speed is larger than 0 km/h, the data for for 20 seconds are always recorded by writing in in order, overwriting the newest data to the predetermined field (the 0-19999th street) of RAM22. When the vehicle speed becomes 0 km/h, before it judges whether 10 seconds passed and 10 seconds pass it at step 8, steps 3-7 are performed and record to above-mentioned RAM22 is continued.
[0027] After the judgment of the flag FMEMO in step 9, after setting after 10-second progress to FMEMO=1 at step 10, it progresses to step 11. At step 11, the value of the engine shutdown counter M which counts up for every engine shutdown by steps 20-22 later mentioned from the 600060 or 600061st street (area for M storing of drawing 4) of EEPROM23, and repeats even 0-9 is read . This counter M is used as an object for upper address assignment of EEPROM23.
[0028] Next, the stop counter L is counted up at step 12. In addition, when L is set to 3, it returns to 0 (steps 13 and 14), and thereby, count-up to 0-2 is repeated, and is made to perform. Therefore, this counter L is counted up for every stop, and is used as an object for lower address assignment of EEPRPM23 [ 2 / 0-].
[0029] And at step 15, they are read-out and 23 EEPROMs x(Mx3+L) 20000 from 0th - the 19999th street of RAM22 about the record data for 20 seconds. Address -(Mx3+L) x20000+19999 It writes in an address. Moreover, at step 16, the value of the counter N which shows the newest data location is written in the 2nd [ 600000+(Mx3+L) x] 600000+(Mx3+L) x2+1 street among the area for N storing of EEPROM23 (refer to drawing 4 ; the 600000-600059th street).
[0030] Thereby, they are 23 EEPROMs x(Mx3) 20000 by L repeating even 0-2. Address -(Mx3+2) x20000+19999 It comes to be recorded on it, the data before and behind the stop of the three newest batches always being overwritten by the field of an address. Since it is FMEMO=1 after this, it progresses to step 17 ( drawing 6 ) from step 9.
[0031] At step 17, when an ignition switch 11 judges whether it is ON and becomes off, it judges whether 10 seconds passed after off at step 18, and when 10 seconds pass, it progresses to step 19. That is, 10 seconds after an ignition switch 11 becomes off, an engine shutdown is detected because it is, and it progresses to step 19. In addition, an engine shutdown may be judged from an engine speed.
[0032] In step 19, the value of the engine shutdown counter M is read from the 600060 or 600061st street of EEPROM23, and the value of the engine shutdown counter M is counted up at step 20. In addition, when M is set to 10, it returns to 0 (steps 21 and 22), and thereby, count-up to 0-9 is repeated, and is made to perform. At the following step 23, the value of the counted-up engine shutdown counter M is written in the 600060 or 600061st street of EEPROM23.
[0033] Thereby, record maintenance of the data before and behind the stop of the three newest batches is performed to another field of EEPROM23 at the time of the transit after the next start up. Thus, in this example, M can carry out [ by ] storage maintenance of the data for [ before and after a stop ] 20 seconds of front [ engine shutdown ] 3 batch and a total of 30 batches altogether about transit of the ten batches till then, when taking the value to 0-9 and reading data in a service station.
[0034] And it becomes a quite high probability that the data in case of accident are in this.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]
[Drawing 1] The functional block diagram showing the configuration of this invention
[Drawing 2] The system chart of the data recorder in which one example of this invention is shown
[Drawing 3] The timing chart of data logging of an example same as the above
[Drawing 4] Drawing showing the EEPROM record section of an example same as the above
[Drawing 5] The flow chart of an example same as the above (the 1)
[Drawing 6] The flow chart of an example same as the above (the 2)
[Drawing 7] The timing chart of data logging showing the conventional example
[Drawing 8] The flow chart of the conventional example same as the above
[Description of Notations]
1 Engine
6 Crank Angle Sensor
10 Speed Sensor
11 Ignition Switch
20 Control Unit
21 CPU
22 RAM
23 EEPROM
30 Electronic System Diagnostic Circuit Tester

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DRAWINGS

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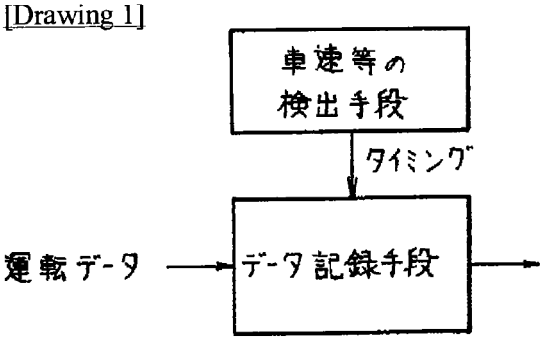
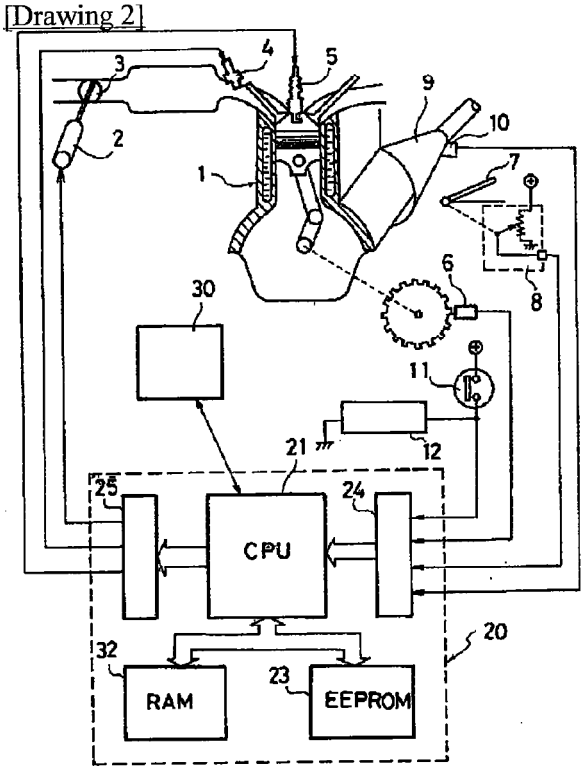
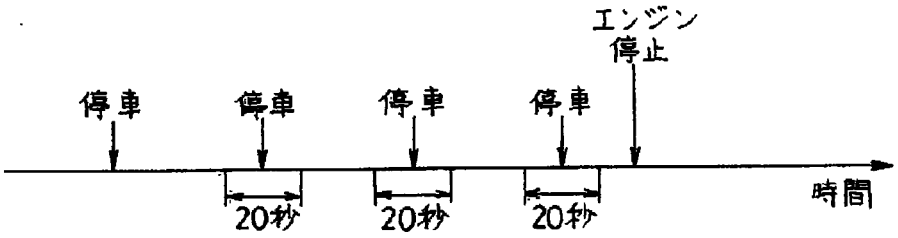
[Drawing 1]



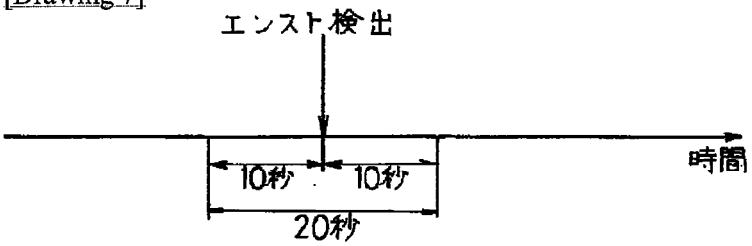

[Drawing 2]




[Drawing 3]




[Drawing 7]




[Drawing 4]

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