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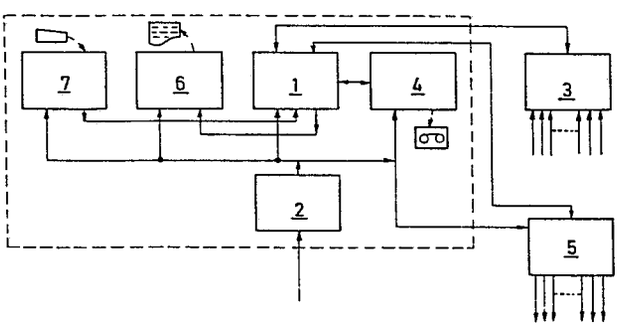
(54) An electronic system for the capture and register of data on a magnetic support for control.

(57) An electronic system for the capture and register of data onto a magnetic support for control is claimed and described that consists at least of a central processing unit (1), a power supply module (2), a couple of capture transducers (3), and a data capture cassette at a data capture unit (4). Preferably actuation transducers (5), a graphical information display (6), and an external communication module (7) are provided. This system offers the advantages of greater data register capacity, a more accurate registration of data, direct processing of data collected via the data capture unit, easy adaptability, simplicity of use, possibility of visualizing accumulated or instantaneous data.



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An Electronic System for the Capture and Register of Data on a Magnetic Support for Control

This invention relates to an electronic system for capturing and registering magnitudes of physical parameters before their processing on a magnetic tape cassette. It is ingenious and based on a microprocessor with a stored program, which provides it with possibilities for control and a wide field of applications mainly in the area of transportation and general mechanics. This system will be known throughout this disclosure as TRANSDALO (Transport data logger).

This system consists at least of the following modules:

- A central processing unit,
- A power supply module,
- Capture transducers,
- A data capture cassette.

These modules are essential for any application. Others will be useful depending on the specific application for which the system is designed such as:

- Actuation transducers,
- Graphical information display,
- External communication module.

The central processing unit is based on a microprocessor with its corresponding memories for the storage of programs (of the ROM type) and intermediate data (of the RAM type), an interface for inlets and outlets, a magnetic tape control, a communication system in series and in parallel, a real time clock and various auxiliary circuitry systems.

The power supply module is used to convert available electric power, whether alternating or direct of whatever voltage, and continuously stabilizes the characteristics required for the operation of the rest of the modules comprising the system. Also included are the adequate protective and safety systems which function before overloads such as the uninterrupted power supply and automatic switching systems designed to function in case of misfeed or overload.

The capture transducers are used for the reception and measurement of physical parameters in direct or indirect form, located in the proper places of the vehicle and which can be of the voltage free contact, optico-electric, voltage or current loop, etc. types. The number and type in each case are dictated by the specific application.

The data capture module functions to store the collected data after its preprocessing. It consists of a magnetic tape system of the cassette type with its capture and control circuitry, providing both for the storage of data and its subsequent retrieval.

The actuation transducers are used to actuate the process controlled in accordance with simple or complex conditions, previously defined in the control programs stored in the memory of the central processing unit, according to the data received at each moment. Its application is optional in accordance with the use of the system.

The graphical information display comprises corresponding acoustical and optical indicators of specific situations of the operation, a numerical or alphanumerical display for the retrieval of information regarding situations or events, and optionally can carry continuous paper microprinters. Its application is optional depending on the use of the system.

The communication module is used to solicit or initiate particular processes or data on same, on the part of the driver or any other authorized persons. Its application is optional in accordance with the use of the system.

The central unit functional modules, power supply, data capture, graphical display of information and communications, are collected in a waterproof and dustproof box, which is properly thermally insulated and fireproof, shock resistant within acceptable values and which is mounted onto a vibration damping support.

The modules are mounted as double ply fiberglass circuits with their corresponding multipoint connectors. Power supply connectors leave from the above-mentioned box with the necessary conductor inlets and outlets for each application.

The system according to this invention offers the following advantages with respect to other direct data register systems:

a) A greater data register capacity with an estimation on one month as regards the register time of the cassette tape provided. Tachographs and other paper register devices have a maximum capacity of one week.

b) More accurate data because they are registered numerically or proportionately and not graphically.

c) Direct processing of data collected on the tape by means of any computer that has as a peripheral input device a magnetic tape cassette or which can have one adapted to it.

d) Possibility of adapting it to the register of other parameters which are not the most common, by simply coupling the proper collector and modifying the program instructions. For this reason, the system has a much wider application than present day mechanical or electrical tachographs.

e) Simplicity of use; the cassette tape is simply changed when completed, and the apparatus is always in operating condition.

f) Possibility of visualizing accumulated or instantaneous data when the particular application requires it.

g) Ease of adaptation to any vehicle or machine.

These advantages of the system which is the object of this invention, will become clearer in the light of the following description of the operation and the accompanying figure.

Figure 1 is a block diagram in accordance with the system which is the object of this invention where,

1 denotes the central processing unit, 2 the power supply module,3 the capture transducers, 4 the data capture module, 5 the actuation transducers, 6 the graphical information display and 7 the communication module.

Variable or pulsed continuous electrical signals, at any frequency, arrive into the system of this invention, known in abbreviated form as TRANSDALO, which originate from the proper transducers at magnitudes to be adjusted. These signals have proper characteristics according to the parameters to be registered in each specific application and are received through the capture transducer 3.

The physical parameters to be measured can, in general, be of any type, these being usually as follows:

- axle RPM,
- Temperatures, either continous or having limiting values,

- pressures, either continous or having limiting values,
- flow rates,
- advance distances, absolute or relative,
- voltages, alternating, direct, pulsating,
- electrical intensities, alternating and continuous,
- luminous intensities, either continous or having limiting values,
- noise levels,
- openings or closures of mechanisms,
- accelerations and decelerations,
- alarms,

to which is associated, besides the corresponding process, the datum relating to the hour in which they occurred, which hour is established on a permanent and real basis by the electronics of the system.

The signals received, although they are read intermittently or continuously, are stored for period of one second in the main memory 1. Each minute, the maximum, minimum or mean values are registered, depending on the magnitude to be measured, which are then captured onto the cassette type 4 in the format suitable for its subsequent processing outside the system.

The data captured in the capture module 4 make it possible to have knowledge of the information necessary to determine the operating conditions of the machine in the period of time established, hours, days, weeks, with an indication of its operators, idle and operating times, speeds, accelerations, pressures, temperatures and various accidents, these being reflected, if it is deemed convenient, in the graphical display module 6.

Furthermore, precise data are maintained in the main memory of the central processing unit 1, which are necessary to obtain the information required by the legislation in force and any other information of interest to the user, by means of requests using adequate controls.

Under specification, it is possible to emit alarms to the operator of the machine or intervene by specific maneuvers through the communication module 7, in accordance with the conditions defined in the operating programs as a whole present in the memory of the control unit module 1.

For each specific application, the programs as a whole suitable for the operations to be carried out are prepared so that it is possible to reduce to a maximum the register and operating times, by means of the installation time configuration.

For purposes of clarification of this invention, the following example is given:

A firm transporting merchandise by truck has the following problem:

a) To carry into effect the schedule of its drivers in accordance with the real working time, giving priority to regularity and the number of km travelled per month.

b) To exercise a control on the maximum working speeds, idle times and at which times these occurred, average speeds on each route, monthly hours of use, freight carrying times, etc.

c) In case of accident, speed and circumstances in which it occurred, with a maximum of detail.

d) Control of fuel consumption and its relationship to operating regularity.

e) Knowledge of gasoline and water temperatures during every hour of operation.

f) Forecasts of preventive maintenance.

In a case such as this, the system according to this invention TRANSDALO, would be used with the following capture devices:

- Crank-shaft rotations,
- Transmission rotations (proportional to speed),
- Gasoline temperature,
- Water temperature,
- Gas-oil deposit level.

The data captured would be semiprocessed in the micro-computer of the apparatus and immediately captured by the cassette tape. The data to be captured would be the following or be proportional to them:

- Starting time and idle time,
- RPM of the motor (maximum for each minute),
- Accumulated RPM of the motor (proportional time measurement),
- Maximum speed of the vehicle for each minute,
- Number of meters covered each minute,
- Maximum water temperature for each hour,

- Maximum gasoline temperature for each hour,
- Fuel consumption for each trip.

With these data captured, the tape would then be processed completely once, in a suitable computer and with the proper program, it would be possible to obtain the above information which would answer the initial questions of our transportation firm.

It will, of course, be understood by experts in the art that this invention can be used in a wide range of applications which, in some cases, may have some similarity with the illustrated embodiment. Nevertheless, they will not exceed the scope of this invention insofar as they are embodied in the field circumscribed by the claims.

CLAIMS

1. An electronic system for the capture and register of data onto a magnetic support for control, characterized in that it integrates at least one central processing unit (1) comprising memories for programs, intermediate data, an interface for inputs and outputs, a magnetic tape control and means of communication, means for stabilization, protection and safety as regards the power supply (2), means for uninterrupted power supply (2) for automatic switching, capture transducers (3) for reception and direct or indirect measurement of physical parameters and means for storing the data collected after their preprocessing.

2. A system according to the previous claim, characterized in that the data are registered in their numerical or proportional value, are processed by means of any computer provided with a peripheral device for the input of a magnetic tape cassette, which may register any parameter upon coupling the adequate capturing device and establish the program instructions.

3. A system according to the previous claims, characterized in that it receives continuous electrical signals originating from the transducers (3) depending on the parameters to be measured through the capture transducer (3) at the same time that permanent and real signals are obtained regarding the times of the data taken, the data being stored for periods of one second in the main memory, the maxi-

mum, minimum and mean values of each prefixed interval, preferably of each minute, being registered on a cassette tape for its subsequent processing outside the system.

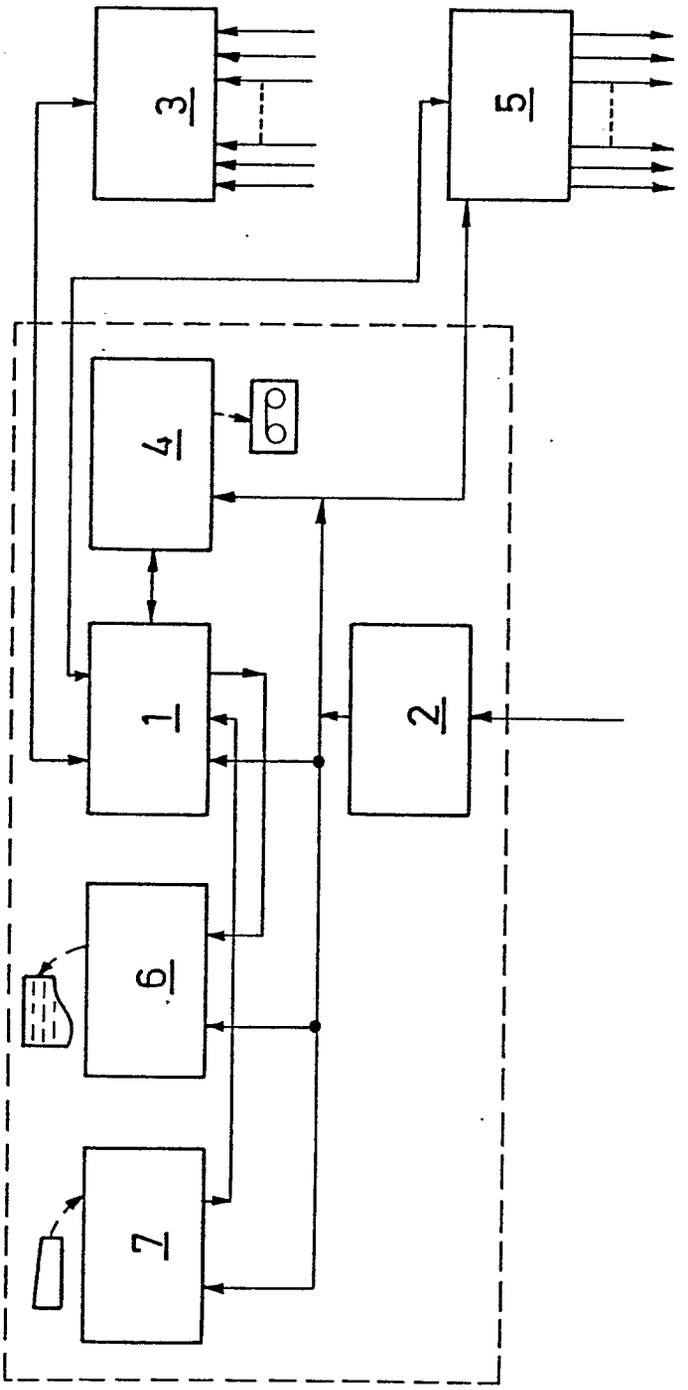
4. A system according to the previous claims, characterized in that said central processing unit (1) integrates means of communication in series, in parallel, means for measuring real time, various means of auxiliary circuitry and on occasion, means for emitting alarms on controlled equipment.

5. A system according to the previous claims, characterized in that the capture transducers (3) mentioned are located at suitable points of the equipment, vehicles or machinery to be controlled, which can be, preferably of the voltage free contact, optico-electric, voltage or current loop types.

6. A system according to the previous claims, characterized in that said means for storing the data consists of a magnetic tape system of the cassette type with its capture and control circuitry (4), providing for subsequent storage and retrieval.

7. A system according to the previous claims, characterized in that, in this particular case, it includes actuation transducers (5), a graphical information display (6) and a communication module (7) for soliciting or initiating particular processes or data on them.

8. A system according to the previous claims, characterized in that the control unit (1), power supply (2), data capture (4), graphical information (6) and communication display (7) modules are located in a waterproof and dustproof compartment with adequate thermal and fireproof insulation, resistant to shock and on a vibration damping support, provision being made so that all the modules (4,6,7) are mounted as two-ply fiberglass circuit plates, with their corresponding multipoint connectors, the power supply connectors leaving the above-mentioned box, with the inlets and outlets of the necessary conductors.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