SYSTEM OF DATES ACQUISITION FOR THE TEMPERATURE MONITORISING AT THE INDUCTION HEATING FOR THE STICKING OF THE CONNECTION IN ELECTRICAL MACHINES COILS.

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Monitorising the temperature for heating through induction for pasting the connection of the coils of the power electrical machines, is offering the possibility to optimize the technological process. In the present paper are presented solutions for data acquisition in two variants:

Measuring temperature up to 125º C using DS1620 and measuring temperature from 250ºC up, using DS 2760 circuit and a thermocouple.

Is also presented the practical realization for the first part.

Keywords: acquisition, temperature, monitorising, electrical, machines.

1. Introduction

Heating through induction for pasting the connection of the coils of the power electrical machines, is a very economical technology.

The temperature monitorising is providing the possibility to optimize the process, growing it's efficiency.

Data acquisition system used is related with measured temperature. Are presented two variants: temperature up to 125º C and temperature beginning from 250º C.

2.Heating through induction for pasting of the coils connexion.

The electrical chart of an induction heating installation is presented in figure1.

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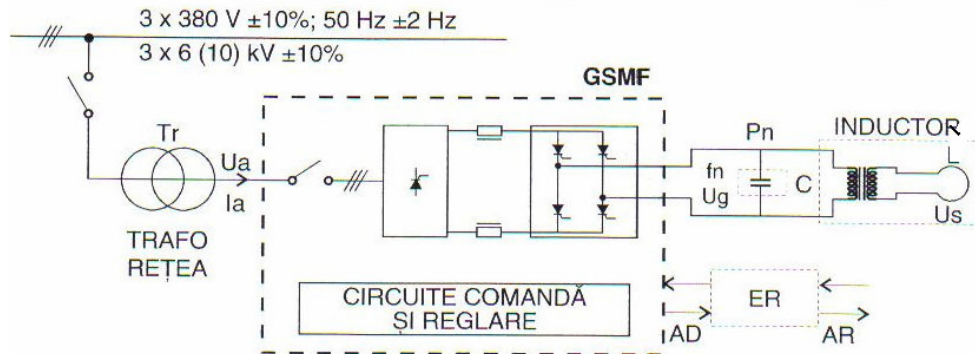[4] Engineer M.Ap. Romania

Fig. 1. The electrical chart of an induction heating installation

The installation is equipped with a medium static frequency generator. In this application the inductor is heating the ends of the coil's bars. Sticking is made with metal alloy The alloy is going among the conductors through the capillarity phenomenon. . The heating time must be very short (approximately 60 seconds), to not deteriorate the end of the bars, but also long enough to allow the alloy to penetrate the parallel conductors which form the coil's bars.

3. Data acquisition system for measuring temperature up to 125º C

For temperature measuring were developed in the present time, specialized circuits for connection with microprocessors and microcontrollers, allow as to build complex systems with real time acquisition.

In figure 2 is presented a basic diagram of a data acquisition system made to acquire and process data of a technological process of sticking coils through induction that can make follows:

- data acquisition;

- write data to a database;

- generate de rapports;
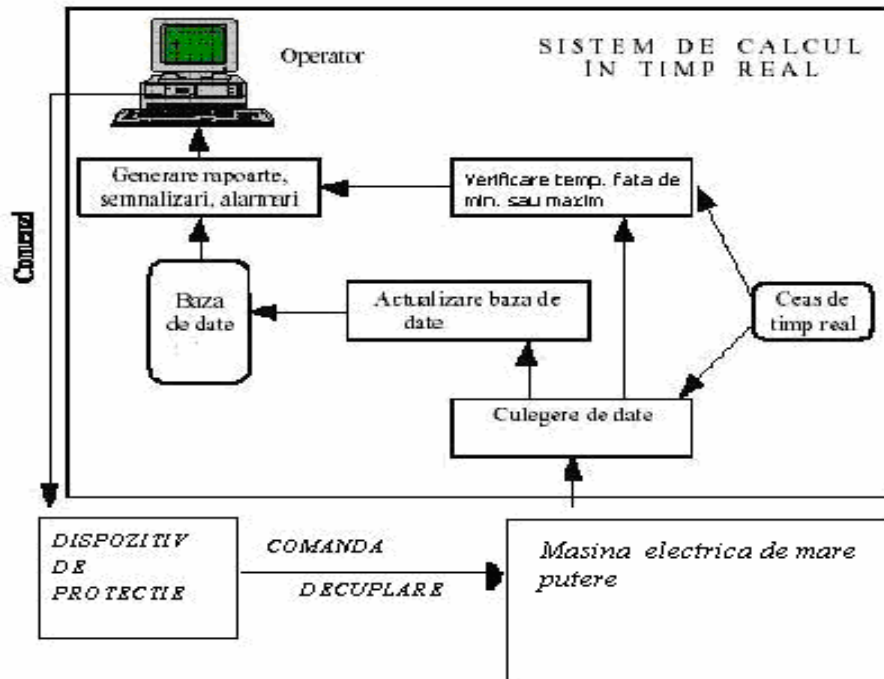
- Surveillance and disconnect the heating installations;

Fig. 2. Basic chart for data acquisition system for temperature

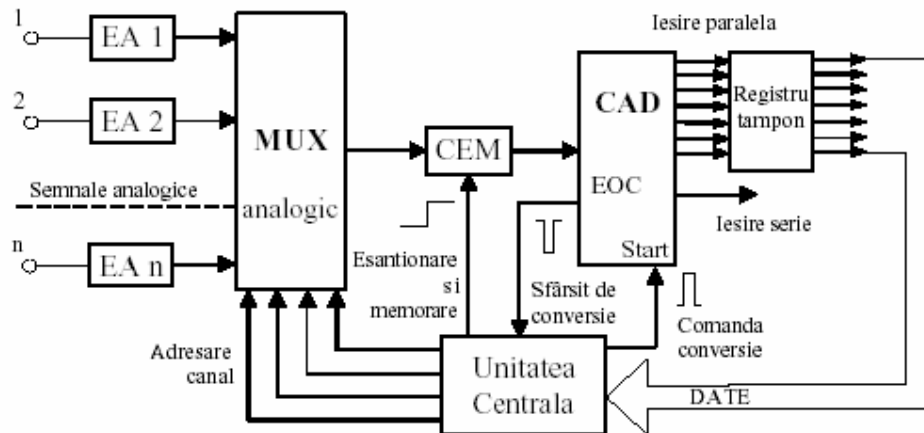For our acquisition system we use a multichanel system with temporal multiplexing, presented in figure 3

Fig 3. Basic chart for multichanel system with temporal multiplexing

In this application we chose this architecture because the acquisition is made via a parallel port that has 8 bidirectional bits.
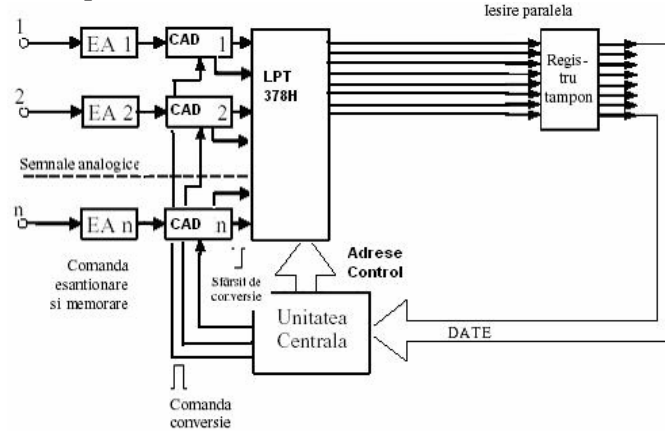

Fig 4 Basic chart for syncron data acquisition system

Analog signal sources are connected at one sensor that is build with an integrated CAD and an interface for signal transmitting. The command for switching to convert and memorizing is made in the same time for al the circuit, presented in figure 5.
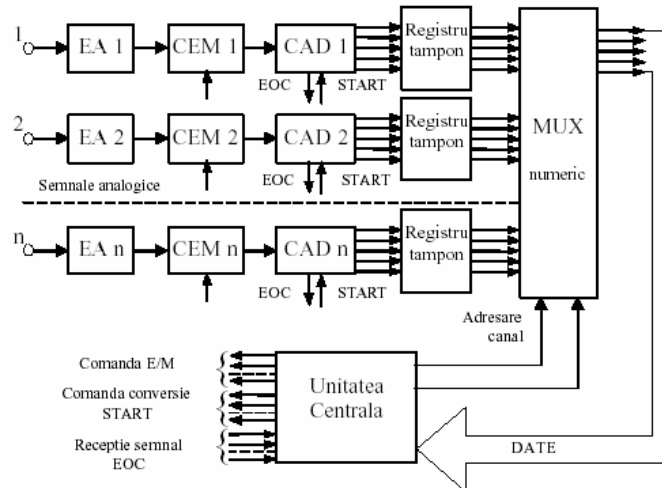

Fig.5. Schema Basic diagram for a real time data acquisition system

The sensors used for reading temperature can be from different type: thermistors, thermocouple, RTD, digital sensors integrated in circuits.

The DS 1620 circuit has the following characteristics:

- It doesn't need external components ;
- The power voltage can be between 2,7 and 5,5 Volts;
- Measure temperature from -55º C to 125º C ;
- The conversion step is 0,5º C;
- The temperature is read like a 9 bits value;
- Conversion of temperature in digital format can be made in approximately 0,750 s;
- Thermostatic settings are user customizable and are also non- volatile ;
- Data is read/write on 3 wire in serial format (CLK, DQ, RST);
- It is used on thermostatic control, industrial system, thermometer, end user product, etc.
 - package SOIC or DIP with 8 pins;

The application was developed in visual basic 6, a high efficiency programmer medium for windows, which provide high result at low costs.

The application is made from a main program who can call different function: read temperature, display graphics, write data in data base and execute reports. The main screen of application is presented in figure 5, and is reveling an image of heating points.
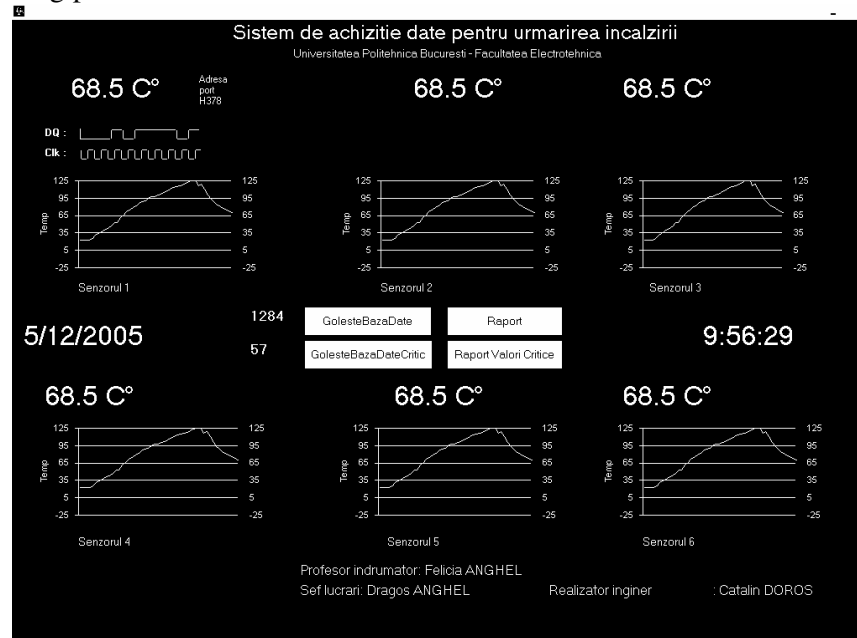

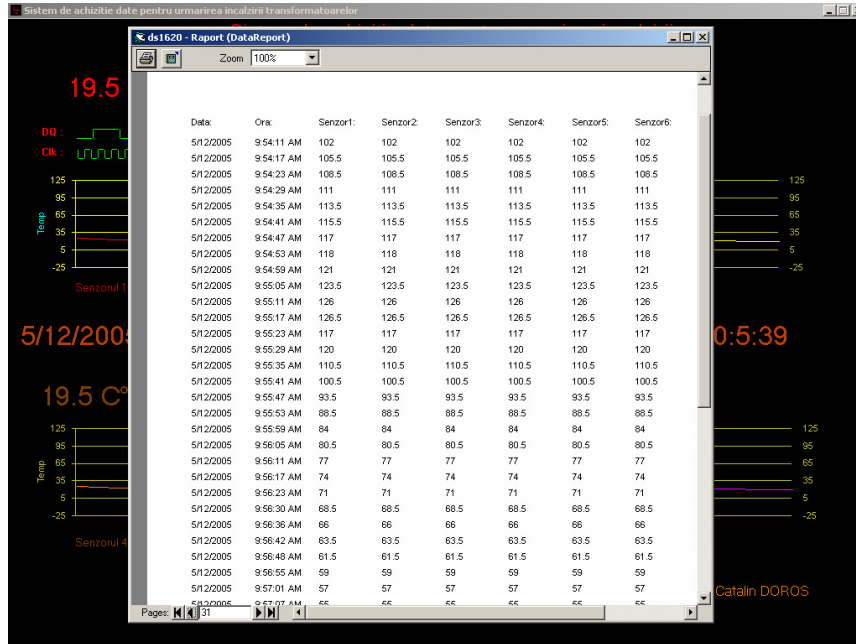Fig. 5. General presentation of temperature reading application

Fig 6. Report windows

4. Data acquisition system for measuring temperature from 250º C up

The system is made from three main components. The acquisition part is formed by a thermocouple connected at the input of an DS2760 integrated circuit, which make the conversion of analog voltage to digital signal. The second component is made by an interface with computer witch transform electrical signal from 1-wire protocol to RS-232 protocol. This part was released using a DS 2840B circuit. The third part is composed by a personal computer and software witch control the hardware part

4.1. Basic electric diagram.

 Basic electric diagram is presented in figure 6.

Data transfer from/to computer is released via a serial RS232 port The same port is providing power to the DS 2760 circuit through diode CR1 and the capacitor C1. The power voltage is stabilized by LM 2936Z or LM7805, which provide 5 volt voltage. Additional capacitors are use to filter the voltage.
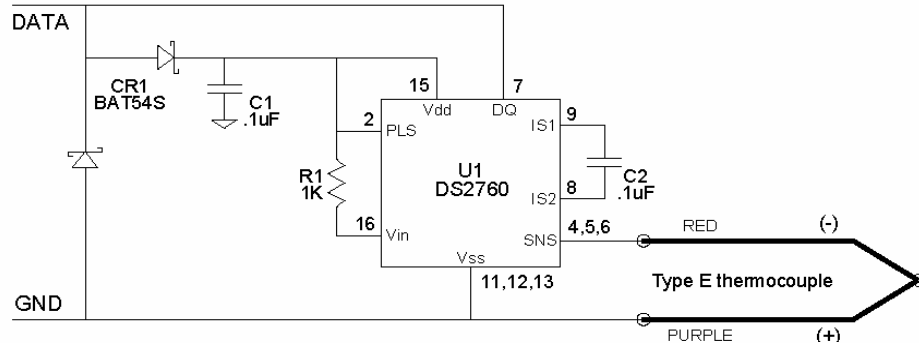.

Fig.6 Basic electric diagram of the system

Main characteristic of the system

- The system can measure a large variety of temperature. This can be done by using different type of thermocule.

- Conversion step is 0.125 °C

- Temperature resolution is on 10 bits.

- Temperature conversion is made in 0,1 second, providing a real time system

- The system can be extended to execute different commands, depending on input state.

- Any type of thermocouple can be used, this can be selected by user.

- Data is read/write via a serial RS232 interface .

- Voltage ca be supplied directly form serial port.

- Schema used is very simple, we used few components.

5.Conclusion

Data acquisition system presented for the temperature monitorising at the induction heating for the sticking of the connection in electrical machines coils is offering the possibility to optimize technological process making it more economic.

R E F E R E N C E S

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