SYSTEMS FOR PRESSURE MONITORING AND CONTROL, USED IN INDUSTRIAL AUTOMATION PROCESSES

eng. Diana Mura BADEA
President of the Scientific Council of INCDMF-CEFIN,
Sos. Pantelimon nr.6-8 Bucharest,Romania
diana.badea@cefin.ro

Abstract:

Large scale applicability in safety and automation for installations from various industrial sectors-energetic, chemistry, etc (witch constitutes in users)-makes the development of this devices to represent an important point in the actual strategy of the economy.

In the process of industrial automation a major importance is given to the control and monitoring micro-systems for pressure in the purpose of optimizing transport installations and usage of different energetic or manufacturing agents for industrial processes.

Considering the national and international context in this area, the main purpose for future development is to realize new methods and micro-systems based on new principles, characterized by performance, small dimensions and low costs. The new micro-systems must to bring a response to the new developments in industry.

DESCRIPTION OF THE INVENTION

The invention refers to a switch-pressure with potentiometer that is meant to maintain the pressure of a gas very close to an established value.

A device is already known for this purpose. This device takes over the pressure that is to be controlled through an elastic membrane and causes the oscillation of an articulated arm through a rod with a spherical main-stay. A cursor that moves in front of a rheostat is fixed on this arm and the arm is maintained in equilibrium with the help of a spring with an adjustable force.

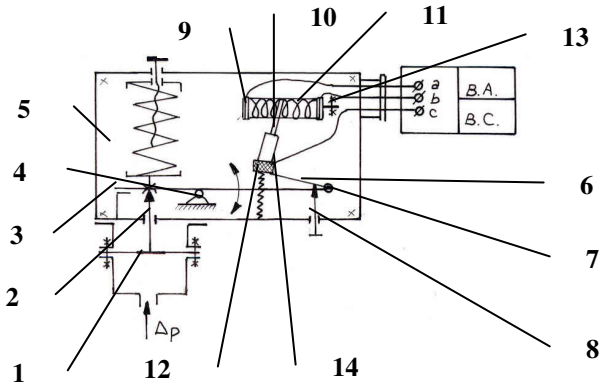
This device has the disadvantage of having a relatively large gauge because of the construction adopted in order to move the cursor of the potentiometer.

The purpose of this invention is the reduction of the gauge and, implicitly, of the consumption of the incorporated materials.

The issue solved by this invention is the realization of a switch-pressure with potentiometer where the cursor moves with the help of a compact mechanism.

According to this invention, the switch-pressure with potentiometer removes the above mentioned disadvantage since it has an arm that supports the resorts on one end and on the other there is a cut in which there is a secondary arm. This secondary arm oscillates comparing to a rod that is blocked in the arm and on which it is fixed the cursor of the potentiometer.

The following lines are an example of the realization of the invention in connection with figures 1 and 2 that represent:



- **fig. 1** – simplified, vertical section through the switch-pressure;

The switch-pressure with potentiometer that is now invented is made out of a membrane **1** that is joint with a rod **2** that presses on a arm **3** articulated on a bolt **4** fixed in a carcass **5.**

The arm **3** has a cut in which there is a secondary arm **6** that oscillates comparing to a rod **7** blocked in the arm **3** and is supported by a pointed/sharp rod **8** fixed in the carcass **5**.

A cursor **10** is fixed on the secondary arm **6** with the help of some screws **9**. The cursor moves on the spires of a coiling **11** and makes out a potentiometer that changes the electrical

resistance within the alimentation circuit of an electrical engine that is not presented here.

The left end of the arm **3** supports a resort **12** that is manually activated by a screw **13** through which the point of adjusting the field pressure is modified. The same end also supports a second resort **14** activated by a screw **15** through which the adjustment of the proportional field in which the switch-pressure works is made. When the invention is applied we have the following advantages:

- reduction of the gauge;
- improvement of the feasibility;
- reduction of the materials consumption.

Claim

Switch-pressure with potentiometer made out of a membrane with a rod in order to take over the pressure, which is regulated with the help of resorts activated by screws. The movement of the membrane is converted into a change of the resistance of a potentiometer with cursor. The switch-pressure with potentiometer is characterized by the fact that, in order to reduce the gauge, has a arm **3** that supports on one end the resorts (**12** and **14**) and on the other it has a cut (a) in which there is a secondary arm **6** that oscillates comparing to a rod **7** blocked in the arm **3** and on which the cursor **10** of the potentiometer **11** is fixed.

Orientations, directions, known objectives, the current stage.

The field of overseeing, regulating and controlling the pressure represent an important field within the industrial sector AIMEPROC-CAEN 3330 – especially automation devices.

These devices represent an industrial field with a low energy and materials consumption and have a high intrinsic value.

The large applicability of the field makes it a key point in the current economy strategy.

Taking into consideration the policy for joining the European Union we have studied the EU directives and standards and we have seen that special importance was given to the regulating, controlling and overseeing devices with respect to the protection of the consumer and to the safety of the exploitation.

This project proposal was made as a result of the fact that the current issues regarding the fabrication of the devices for the control, oversee and regulation of the pressure (named in the following pages switch-pressure and pressure connectors) needed to be solved in order to obtain competitive products on the EU market.

Starting from the current Romanian and foreign stage we want to realize a new range of switch-pressures with superior technical characteristics, reduced gauge dimensions, low cost price and with a simple fabrication technology for the components and subassembly.

Nowadays in Romania there are few commercial units that produce switch-pressures and pressure connectors.

The meaningful results and the applications means

On the international level there is the HERION company that has top products for the control, oversee and regulation of the pressure. The switch-pressures they make have the following characteristics:

- the pressure regulation domain: 0-0.02 bar … 20-1000 bar
- elastic element: - separation membrane and piston
  - ondulated pipes
  - membranes
- fixed differential: 0.003 bar … 40 bar
- adjustable differential: 0.008-0.011 bar … 50-300 bar
- electrical contacts: NI, ND with C point

This company produces devices with higher technical performances than the ones produced in Romania. In order to produce the devices there were used performing micro-switches, materials for the elastic elements such as the non-corrosive steel or CuBe2, heat-treatable, constructive or feasible solutions, top producing technology.

Potential users

The regulation, control and oversee of the pressure is a field developed on the horizontal of the economy and is thus indispensable in industrial fields such as: energetic (thermo, hydro, nuclear etc.), machinery construction, chemistry, petrochemistry, transportation (auto, railway, water, air), food industry, metallurgy, constructions, medicine, pharmaceutics, commerce, infrastructure, education (laboratories), agriculture, etc.

Among the potential beneficiaries there are SC AMC SA Vaslui, SC Mecanica Fina SA Bucharest, SC AMCO SA Otopeni or any other company that has the possibility to produce this device.

The relevance of the project for the respective field and the way it fits into the respective national policy

Analyzing the "fine mechanics and optics" industrial field and the "equipment for measuring, regulating and controlling for the industrial processes" field according to CAEN we see that the products in this domain are indispensable for all the industrial fields.

The Romanian policy for EU integration is considered in parallel with the predicted economic development.

This fact leads to a series of European Directives application methods, mostly regarding the protection of the consumer and the safety of the exploitation and mainly being based on the control, oversee and regulation devices.

At the same time, the EU integration requires products that can enter the European market and rise to the EU technical level.

Hypothesis and risks

The hypothesis this project is based upon are the following:

- the support of the priorities from the government program during the project development period
- the cooperation of the economic agent for the accomplishing of the project objectives through project co-financing.

The risks that might lead to the lack of accomplishment or the interdiction of accomplishment of the project objectives are:

- the economic recession and the decrease of the co-financer interest for the project objectives;
- the diminishing or the lack of finance;
- the diminishing or the lack of co-finance from the part of the beneficiary.

The economic and social impact

The results of this project are important as far as the following issues are concerned:

- scientifical applications since it is a contribution to the applied research;
- industrial applications, namely the realization of new products.

The products can be used as overseeing devices as far as the safety of the exploitation and functioning is concerned.

At the same time they can be used for overseeing, controlling and regulating the parameters of the environment.

Because of the way they are conceived, the products have no negative effects on the environment.

The application of the results of the project leads to:

- the economical re-launch of the partner company - co-financer - that would benefit from an increase in the selling volume of 25%;
- the decrease of the technical gap comparing to the EU that would result in the opportunity to enter the European market;
- the increase of the quality/price ratio;
- new technological lines as far as the co-financer is concerned, fact that would result in the creation of new jobs;
- the increase of the safety of exploitation and functioning;
- environment protection.

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