

## PROGRAMMABLE LOGIC CONTROLLER USED IN DIMENSIONAL CONTROL

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**Abstract.** This paper deals with PLC systems used in industry, their characteristics and similarities and differences between the two categories (PLC and PAC) analyzed.

**Keywords:** P.L.C., P.A.C., PLC systems,

### 1. INTRODUCTION

Computer systems have evolved and are evolving with the development of technology for the electronics. However the performance of a computer system can be improved without changing the technology, just by changing the system architecture.

Architecture defines the organization, the interconnection of units (blocks) constituting the system and drives itself. It is a concept different from the block diagram, block diagram represents a particular hardware implementation, while the architecture only defines the functional organization of the components of the system.

A computer system (SC) is a physical system that automatically process coded information as discrete values, according to a program consisting of a sequence determined by the arithmetic and logic operations.

A computer system is an assembly composed of two main components:

- hardware (physical equipment components);
- software components (programs and data structures).

A modern computer system is really a set of processors, memories, functional units, interconnection networks, peripherals, networking channels and compilers, operating systems, programming languages, software tools and applications. [1]

### 2. CURRENT STAGE

In our days are present many programmable automated systems (so called industrial processors), which are used in different industrial fields due to their working characteristics.

Automatic systems (industrial processors) can be classified in two classes after the programming mode:

- Programmable Logic Controllers (PLC);
- Programmable Automation Controllers (PAC).

The programmable logic controller (PLC) is a digital computer used for automation of electromechanical processes, control equipment on the assembly line in a factory. This type of devices is used in various industries and can be integrated into a variety of systems with different functions.

This type of automation is designed with multiple inputs and outputs can be used for an extended

temperature range and is resistant to vibration generated by kinematics machines they control and the impact of various factors caused accidentally.



Figura 2.1. P.L.C.

The program for the control of these types of automated is generally protected by a copy or is stored on a nonvolatile memory.

PLC (figure 2.1.) is system working in real time because the results must be produced in response to input conditions within a limited time, otherwise unintended operation will occur that will lead to undesirable results, spoilage in the case of machines that made parts or assemblies, or even damage the machine itself.

PLC is programmed into graphical logic ("ladder logic"), the notation used for programming was designed to reduce programming time.

Main features of the PLC system are: the number of instructions, number of inputs, number of outputs, input type, input scan time, memory dedicated data memory designed program, programming mode, programming.



Figura 2.2. P.A.C.

Programmable automation with operating system (PAC) is a compact automatic system that combines the capabilities of a computer operating system and a PLC sequential logic (figure 2.2.).

This type of control systems is used in industry for process control, data acquisition, monitoring equipment, motion control, etc.

Due to communication protocols that programmable automation is equipped with TCP/IP, SMTP and OLE for process control he is able to transfer data from the machine which he controls to other machines on the network and applications and databases for further analysis.

PAC is primarily characterized by specific-purpose processors, modularity with specialized modules for specific applications, various ways for connecting and by processing speed.

These automated systems are used in various fields and in various applications, for example conveyor belts drive systems in the automotive industry, energy industry to automate different systems of energy production, chemical industry to control various chemical reactions, etc.

### **3. PROGRAMMABLE AUTOMATIC INTEGRATED IN MEASUREMENT AND DIMENSIONAL CONTROL SYSTEMS**

As parts of the dimensional control systems the programmable controllers perform the in-line measuring process (for the machining operations), or the post-process control, by recording and analyzing the data and highlighting the errors.

PLCs in the measurement systems provide performance measurement, analysis, detection of inadequate parts and system status monitoring transmission to higher system, and provides operator protection if the system is semi-automatic .

PLC follows the general trend of more powerful computing systems, to have small dimensions, to have an energy system more efficient and to have an communication interface and programming language as simple and easy to use.

For example, in the dimensional measurement and control systems equipped with SIEMENS PLC design and produce by INCDMTM, they fulfill the following functions: user interface, the drive fastening elements of different types of parts, to achieve dimensional control, to warn if the system is tampered during operation and if the part does not belong in quotas imposed.

User interface function is accomplished by flashing lights and audible signal for open power panel during operation, by function keys that transmit controller functions to be executed and operator panel that displays if the part falls in quotas imposed and the state in which the system is in that moment.

Function to achieve dimensional control is

accomplished directly or through acquisition interfaces signals for transducers. PLC processes the signals and accept or reject basis following an analysis.

Driving function of clamping elements is necessary to set piece in a position that allows a precise measurement, is a condition of extreme importance in the measurement process.

Warning function when the handle is inappropriate in the work space is designed to provide protection against events that can cause accidents.

### **4. CONCLUSIONS**

PLCs provide, in various fields that are integrated different functions in normal working conditions and in working conditions characterized by corrosive environment, above normal temperatures, humidity and dust.

Working conditions is an important feature of which is taken into account in the design and operation of PLCs.

The role of PLC systems is highlighted by the industry with high-risk factor in wich human operator may be exposed to danger of accident.

PLCs currently ensure commercial activities progress in many factories around the globe through their diversity and their integration capabilities in the different systems that work automatically or semi-automatic.

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