PLC-PROG A new graphical, object oriented and brand-independent programming framework for PLCs

Do you find it difficult to program a PLC? Do you find it annoying to use several programming software, depending on the brand you have chosen for your PLC? Do you find it difficult to integrate the automation with the graphical visualization and the industrial communications? The revolutionary idea of PLC-PROG project was born exactly with the intention to facilitate the PLCs programming tasks.

The project has been funded under the 7th Framework Programme of the European Community addressing the call ‘Research for the Benefit of SMEs Associations’. PLC-PROG allows to perform a unique development operation for each brand of PLC proving compliant with the European standard IEC-61131-3.

In the last 20 years the automation sector has experienced an incredible expansion, which was hardly imaginable just 10 years ago; today the monitoring and even the control of a factory located thousands of miles away has become possible, as well as the reception of production data, values of efficiency, consumption, etc. of a given real-time production is now possible directly on a mobile phone.
In an age when no frontiers exist anymore, business competitiveness has incredibly increased and costs must be reduced to the maximum in order to stay in business. PLCs have made great progress as for performance and complexity. They are designed to replace the hard-wired from relays, timers, counters, etc. substantially saving wiring and maintenance operations, and at the same time allowing the installations to have higher flexibility at the sole programming cost. Developments in the field of programming started from programs that could be fully understood only by the programmers themselves, these programs proving very expensive to maintain and implying huge dependence on the programmer.

In this situation, any necessary modification of the PLC program to be performed by a person other than the original programmer normally resulted in a complete re-

programming. It is known that it is extremely easier to create a new control program than trying to understand and interpret a program created by another author.
The problem has been now minimized in large companies - such as the ones operating in the automotive sector - by structuring the control program using templates. This allows a maintenance activity which is independent of the programmer.

The responsible engineering staff for process automation and industrial installations must be composed of several different experts capable of programming PLCs brand by brand, if PLCs programming is to be optimized and made efficient.
There is no automatic conversion, up to now, that allows a control program to be converted into different PLCs brands. The programmer is the only person who can manage the conversion, and perform it manually.
All the PLC brands supporting IEC-61131-3 actually work with different standard programming languages, from graphical to text ones. The most popular for a generic end-user, and the most diffused, is the so-called ‘Ladder’ or contact diagrams due to its similarity with the electrical line diagrams. On the other hand, some text languages are also very widely used by skilled programmers for their potential, even if these languages are barely known by end-users.
PLC-PROG Project aims to provide a single programming tool for PLCs which are compliant with the standard IEC 61131-3 to finally solve all the problems mentioned above related to PLCs programming.

This programming tool for PLCs will have the following features:
• It will be valid for all the PLC brands which are compliant with the IEC 611131-3 standard, among which we can find the most diffused in the automation market: Siemens, Telemecanique, ABB, B&R, Phoenix Contact, Beckhoff, etc. Using PLC-PROG tool you won’t need to be an expert in programming each single proprietary software of each specific brand, since the same project can be exported to any of the aforementioned brands. To do this, we have already developed the post-processors and are expanding them to more and more brands, planning for the future to implement the ‘automatically’ option that will generate the post-processor for a specific brand.
• It will be based on a graphical programming methodology showing evident analogies with the physical elements generally present in electrical installations and electrical panels in the plant, so that the maintenance staff in the facility is able to interpret, modify and even schedule the different operations, being the program based on the assembly of objects like in a switchboard.
• No specific programming skills will be requested while using PLC-PROG, as the tool only needs the assembly of different objects corresponding to the physical elements displaced in an electrical box; advanced users will perform the programming of a new functionality - which is not developed yet - in case this functionality appears to be necessary.
• It will be based on the object-oriented programming that has shown such

outstanding results in the computers world. The key is to create objects that represent existing electrical objects such as a relay, a PID controller, filters, etc. Thanks to the properties of the object oriented programming (polymorphism, inheritance, encapsulation, use of templates, etc.) it allows objects reusability.
• It will be possible to perform both the monitoring and the visualization from the tool or even from SCADA commercial packs, through an insertion of an object ActiveX or Applet which provide an insuperable functionality and versatility of the tool itself.

PLC-PROG: the first tool applied to PLC programming to take advantage of a completely brand independent and user-friendly OO approach, granting a reduction of the development times and an increase in the reliability of the developed programs.

LEARN MORE ABOUT THE PROJECT AND ITS OBJECTIVES AT: http://www.plc-prog.eu
OR FOLLOW THE PROJECT DEVELOPMENTS ON FACEBOOK: https://www.facebook.com/pages/PLC-Prog/143398389113402.

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COORDINATING COMPANY: LABOR SRL
LABOR is a laboratory of industrial research located in Rome. The company's mission is to carry out R&D activities and projects in close cooperation with industry and public research bodies, establishing with them long term research and cooperation agreements for access to research structures and the employment of research personnel. LABOR acts as official coordinator of the project PLC-PROG, being in charge of the communication with the EC officers, the representation of the consortium and the complex administrative and financial issues. Based on their expertise on industrial automation. LABOR will be in charge of the SCADA communication collaboration with the other RTDs.

Keywords

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