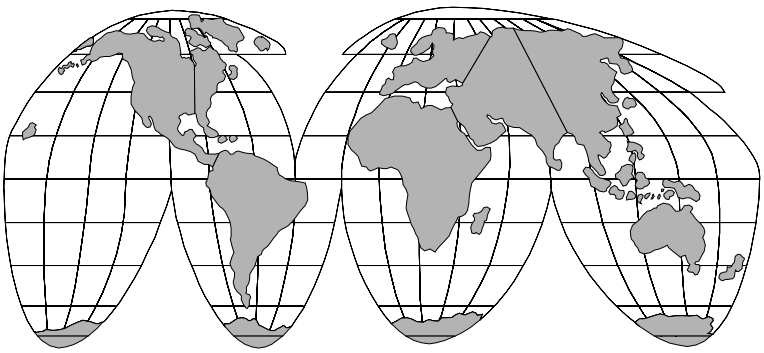
PLCopen

for efficiency in automation



WORLDWIDE

Profiles, Products & Services of PLCopen Members

April 2006

	PLCopen		
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Foreword

Software plays an ever-increasing role in industrial automation. With this, the associated software costs increase, even to the point that it becomes the highest part of the total system. And not all costs are directly visible: the required maintenance over the life cycle, adding new functionalities, coping with new governmental rules.

To control these costs, one needs higher efficiency during the application development, while increasing the software quality.

PLCopen, as an organization active in Industrial Control, is creating a higher efficiency in your application software development: in one-off projects as well as in higher volume products. As such it is based on standard available tools to which extensions are and will be defined.
With results like Motion Control Library, Safety, XML specification, Reusability Level and Conformity Level, PLCopen made solid contributions to the community, extending the hardware independence from the software code, as well as reusability of the code and coupling to external software tools.

To contribute to your work, such work should be supported by products covering a wide range of application areas. Therefore we are proud to present this edition of 'Profiles, Products and Services of PLCopen members', providing an overview of the activities and capabilities of a large part of PLCopen members. By presenting this overview, we, as an association supported by our members, again show our commitment to the IEC 61131-3 standard.

Since its foundation in 1992, PLCopen has grown into a professional worldwide association with around 100 members and offices in Europe, USA and Japan. This clearly shows the success of the worldwide IEC 61131-3 standard and the objective of PLCopen as an independent promoter of this standard for programming of industrial controllers. This is supported by the high percentage of user members within our association, and our one member - one vote principle, making the association independent of any single company.

All PLCopen members are active in the industrial automation market. As such they all have one interest in common - the proliferation of standardization in programming of industrial control systems.
Pursuing this goal I am confident that PLCopen and IEC 61131-3 can serve your interests too. Contact us, directly or at our web site at www.plcopen.org , to see how.

Eelco van der Wal
Managing Director PLCopen

Introduction into PLCopen

PLCopen is a vendor- and product-independent worldwide association supporting IEC 61131-3. By implementing this standard on many program development environments, users can move between different brands and types of control with very little training and exchange applications with a minimum of effort.
The organization PLCopen works on the promotion of the usage and/or supply of the standard, as well a to enhance the standard in a technical sense. This latter includes certification and exchange.
Members of PLCopen can participate in the committees, and as such have upfront information, a stronger identity, as well as influence on the results. In addition, they can use the defined PLCopen logo's for their promotion. The committees working within PLCopen and their results are described in short form hereunder.

Technical results

The Technical Committees, TCs, with representatives of PLCopen members, work on specific items.
Within **TC1 - Standards**, PLCopen collects proposals from its members for the IEC 65B WG7 working group, develops a joint position, and distributes related information. This was specifically focused to the second edition of the standard, which was released at the beginning of 2001.

TC2 - Functions defines common libraries of Function (Blocks) for specific application areas. An example is the library definition of Function Blocks for Motion Control. This standardization couples motion control in a logical way to the industrial control. As such, it provides a common look-and-feel towards the users: programmers as well as installation and maintenance people. With multiple implementations of this library, scaling of the control system is much easier, even if there are different architectures and / or controller brands used. The exchange of part of the programs via the PLCopen Reusability Level (see below for more information) plays an essential role here too.

TC3 - Certification defines a certification system for PSEs, Program Support Environments (development environments). Each PSE can be tested to show that it complies with a

PLCopen specified subset of the IEC 61131-3 standard. This standard contains a large number of so called feature tables and PLCopen has defined which elements of these tables must be supported to fulfill compliancy requirements. In addition, PLCopen extended the standard to support the reusability of user derived Function Blocks between PSEs.

Conformity Level, CL

With the broad range of application areas for IEC 61131-3 not all implementations use exactly the same data types. To accompany this, the certification according to Conformity Level, CL, implies that the supplier of a PSE selects the data types supported by his product matching his compliance statement. All supported IEC features are tested. This means that although the test is a Yes/No test (conformant or non-conformant), there can be differences between two certified products. These differences can influence the reusability of user derived function blocks.
In addition **Reusability Level, RL**, is dedicated to making the programming units functions and function blocks reusable on a different PSE. This is done via exchange in a plain textual format of the language Structured Text, ST. This is a major, but natural, contribution of PLCopen to the IEC 61131-3 standard.

Historically there exists a lower class called **Base Level**, defining a core kernel per language of the standard. Although rather restricted, it is feasible to develop applications based on it. Base Level provides an entrance level for the suppliers, showing their commitment to the standard. For the users it provides a normalized interpretation of the standard, especially important if they have to work with systems of different vendors.

Detailed specifications of most of the IEC 61131-3 languages are already finished. Work is in progress for the remaining languages. The compliance test procedure and the accreditation procedure for test laboratories have been established. Independent test laboratories have been accredited and an increasing number of products have been certified. For a complete list please refer to the website www.plcopen.org.

TC4 - Communications works on the relation between communication and programming languages, like the mapping of Profibus and CANopen via IEC 61131-5 onto IEC 61131-3.

TC5 - Safe Software provided a specification to include safety aspects in the IEC 61131-3 environments easily for the users from scratch on. As such it provides a harmonized look and feel across platforms. This specification includes knowledge from multiple standards like IEC 61508 and IEC 62061 and provides a basis for easier commissioning by certifying bodies.

TC6 - XML defined XML schemes for all languages, as well as full projects. This specification provides the basis for exchange, as well as coupling to other software tools, including higher-level development tools, documentation tools, and verification tools.

Promotional Events

An important task of PLCopen is to inform users / programmers about standardized industrial control programming, via:
- the PLCopen website: www.plcopen.org;
- publication of a free electronic and printed newsletter, called "PLCopening";
- publications in the press;
- participation at trade shows and conferences;
- organization of conferences, like the ICP in October, and seminars.

The Promotional Committees **PC1, PC3, PC4, and PC5** support these activities in Europe, North America, Japan, and China.

PC2 - Common training has defined a common basis for training. This includes certification. In this way, certified training centers for training on IEC 61131-3 can be easily identified. Also, certificates to the participants of these courses can be provided.

One of the core activities of PLCopen is focused around IEC 61131-3, the only global standard for industrial control programming. It harmonizes the way people design and operate industrial controls by standardizing the programming interface. A standard programming interface allows people with different backgrounds and skills to create different elements of a program during different stages of the software lifecycle: specification, design, implementation, testing, installation and maintenance. Yet all pieces adhere to a common structure and work together harmoniously. The standard includes the definition of the Sequential Function Chart (SFC) language, used to structure the internal organization of a program, and four inter-operable programming languages: Instruction List (IL), Ladder Diagram (LD), Function Block Diagram (FBD) and Structured Text (ST). Via decomposition into logical elements, modul-arization and modern software techniques, each program is structured, increasing its reusability, reducing errors and increasing programming and user efficiency.

Benefits of Membership

A membership of PLCopen has many benefits for users, vendors, and institutes. By joining PLCopen, one makes a clear statement about your commitment to standards. In addition, one can participate in the committees, and as such have upfront information as well as influence on the work done, and use the PLCopen logos.
The annual contribution depends on voting and non-voting rights, the number of relevant employees active in the field of Industrial Control, IC, and the nature of the organization. There are 3 different sizes: over 1,000 relevant employees, between 100 and 1,000 and less than 100. The different organizational types are:
- Companies: commercial organizations active in the IC
- Users: focused to the application and usage of IC
- System Integrators / Re-sellers: added value is not in the IC or its programming environment
- Non-profit organizations
- Educational institutes

For on-going information, please check the website www.plcopen.org, as well as the electronic magazine to which you can subscribe at this website.

Status of the Standard:

Enhanced IEC 61131-3: Proven standard fit for future
The international standard "IEC 61131-3" was released in 1993 and, since its adoption, has become widely accepted by the international user and vendor community. Today, it is, as such, the worldwide recognized standard for programming and configuring industrial control devices. The popularity of IEC 61131-3 in the industry is evident. The world's leading industrial control manufacturers have adopted the programming model for a wide range of controllers; various software companies offer compliant development tools; and the standard is certainly the world's leading paradigm for industrial control languages. The success of PLCopen and its increasing number of members prove this, too.

IEC 61131-3 second edition
There are, however, several reasons why the standard must be revised: First of all, since 1993 a great deal of practical experience has been gained in which a number of inconsistencies and contradictions have been detected. These include inconsistent definitions and features which are needlessly complicated. In addition, many users of the standard proposed revisions and enhancements. These were originally described in the Addendum and in the Corrigendum as belonging to the standard. Also, the demands on industrial control systems and their engineering environments have considerably changed over the years, where the most important item is the migration of large centralized control systems towards distributed systems. IEC 61131-3 exclusively applies to local controllers including their communication interfaces to other local systems, not the programming of distributed systems. That is why the reciprocal integration of the IEC 61131-3 programming languages with IEC 61499 (the new architectural model for distributed industrial process measurement and control systems) is proposed. Only through this, long-term company investments in control systems can be assured. This third proposed stage is in a much less mature development stage.

This planned harmonization work can lead to a third edition of the standard.

The second edition of the IEC 61131-3 includes these three stages. This new edition has been published as International Standard beginning 2003.

A major additional goal was to maintain upward compatibility for all amendments. This means, a control program, which complies with the previous standard, is also expected to comply with the new standard without conflicts.

For more detailed information, please check the website www.plcopen.org

What about this '6' in IEC 61131 ?
The International Electrotechnical Commission, IEC, is a worldwide standardization body. Nearly all countries over the world have their own, national standardization bodies. In Germany for instance this is the Deutsche Elektrotechnischen Kommission, DKE. These commis-sions have agreed to accept the IEC approved and published standards. At local publication, often after translation, the standard was published under a local number. This local number often had no match to the number of the IEC published standard. For a standardization body this looked awkward. To harmonize this, they searched for a world wide numbering system that was available to use. This is where the famous '6' came in. And so IEC 1131-3 became IEC 661131-3, without any changes to the standard itself. Moreover, during the transition phase, you have to order the IEC 61131 standard to get a publication that clearly has on its front cover 'IEC 1131-3'. As this might be confusing to non-insiders, we decided to wait for a new edition of the standard to migrate to the new number. In this way it is coupled to change. With the second edition now available, we changed consistently to the use of the additional '6' also.

How to order the standard?

American National Standards Institute
11 West 42nd Street
New York, NY 10036, USA
Telephone: 212-642 4900 / Fax: 212-449-8067
http://www.ansi.org

British Standards Institution
BSI Sales department
Linford Wood, MK14 GLE Milton Keynes,
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http://www.din.de/beuth

IEC
For other countries check with PLCopen.
In case you cannot get the document through your local standardization organization, you can contact:
3, rue de Varembé, 211 Geneva 20, Switzerland
Tel: 41-22-919-0211 / Fax: 41-22-919-0300
http://www.iec.ch

IEC 61131-3: a standard programming resource

IEC 61131-3 is the first real endeavor to standardize programming languages for industrial automation. With its worldwide support, it is independent of any single company.

IEC 61131-3 is the third part of the IEC 61131 family. This consists of:

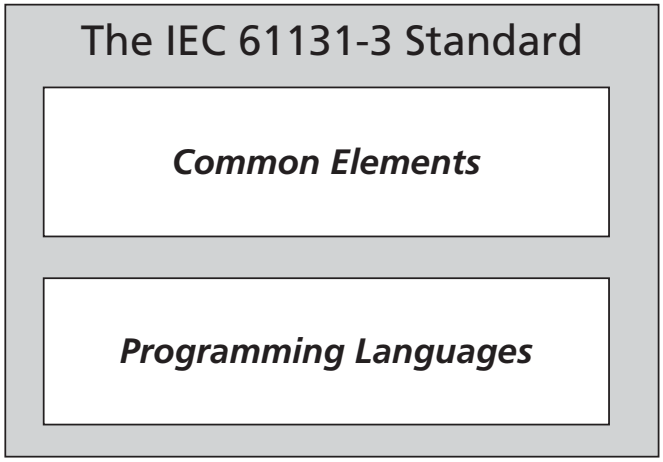
- Part 1: General Overview
- Part 2 Hardware
- Part 3 Programming Languages
- Part 4 User Guidelines
- Part 5 Communication
- Part 7 Fuzzy Logic
- Part 8 Application Guidelines

There are many ways to look at part 3 of this standard. Just to name a few:

- the result of the Task Force 3, Programming Languages, within IEC TC65 SC65B
- the result of hard work by 7 international companies adding tens of years of experience in the field of industrial automation
- approx. 200 pages of text, with 60-something tables, including features tables
- the specification of the syntax and semantics of a unified suite of programming languages, including the overall software model and a structuring language.

Another elegant view is by splitting the standard in two parts (see figure 1):

1. Common Elements
2. Programming Languages



Let's look more in detail to these parts:

Common Elements

Data Typing

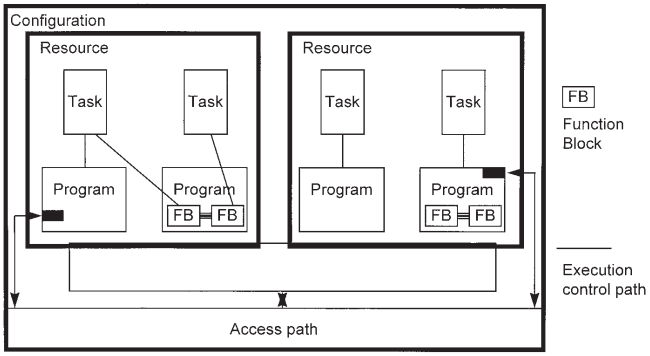
Within the common elements, the data types are defined. Data typing prevents errors in an early stage. It is used to define the type of any parameter used. This avoids for instance dividing a Date by an Integer.
Common datatypes are Boolean, Integer, Real and Byte and Word, but also Date, Time_of_Day and String. Based on these, one can define own personal data types, known as derived data types. In this way one can define an analog input channel as data type, and re-use this over an over again.

Variables

Variables are only assigned to explicit hardware addresses (e.g. input and outputs) in configurations, resources or programs. In this way a high level of hardware independency is created, supporting the reusability of the software.
The scopes of the variables are normally limited to the organization unit in which they are declared, e.g. local. This means that their names can be reused in other parts without any conflict, eliminating another source of errors, e.g. the scratchpad. If the variables should have global scope, they have to be declared as such (VAR_GLOBAL). Parameters can be assigned an initial value at start up and cold restart, in order to have the right setting.

Configuration, Resources and Tasks

To understand these better, let us look at the software model, as defined in the standard (see below).



At the highest level, the entire software required to solve a particular control problem can be formulated as a *Configuration*. A configuration is specific to a particular type of control system, including the arrangement of the hardware, i.e. processing resources, memory addresses for I/O channels and system capabilities.
Within a configuration one can define one or more *Resources*. One can look at a resource as a processing facility that is able to execute IEC programs.
Within a resource, one or more *Tasks* can be defined. Tasks control the execution of a set of programs and/or function blocks. These can either be executed periodically or upon the occurrence of a specified trigger, such as the change of a variable.
Programs are built from a number of different software elements written in any of the IEC defined languages. Typically, a program consists of a network of *Functions* and F*unction Blocks*, which are able to exchange data. Function and Function Blocks are the basic building blocks, containing a datastructure and an algorithm.
Let's compare this to a conventional PLC: this contains one resource, running one task, controlling one program, running in a closed loop. IEC 61131-3 adds much to this, making it

open to the future. A future that includes multi-processing and event driven programs. And this future is not so far: just look at distributed systems or real-time control systems. IEC 61131-3 is suitable for a broad range of applications, without having to learn additional programming languages.

Program Organization Units

Within IEC 61131-3, the Programs, Function Blocks and Functions are called Program Organization Units, POUs.

Functions
IEC has defined standard functions and user defined functions. Standard functions are for instance ADD(ition), ABS (absolute), SQRT, SINus and COSinus. User defined functions, once defined, can be used over and over again.

Function Blocks, FBs
Function Blocks are the equivalent to Integrated Circuits, ICs, representing a specialized control function. They contain data as well as the algorithm, so they can keep track of the past (which is one of the differences w.r.t. Functions). They have a well-defined interface and hidden internals, like an IC or black box. In this way they give a clear separation between different levels of programmers, or maintenance people.
A temperature control loop, or PID, is an excellent example of a Function Block. Once defined, it can be used over and over again, in the same program, different programs, or even different projects. This makes them highly re-usable.
Function Blocks can be written in any of the IEC languages, and in most cases even in "C". It this way they can be defined by the user. Derived Function Blocks are based on the standard defined FBs, but also completely new, customized FBs are possible within the standard: it just provides the framework.

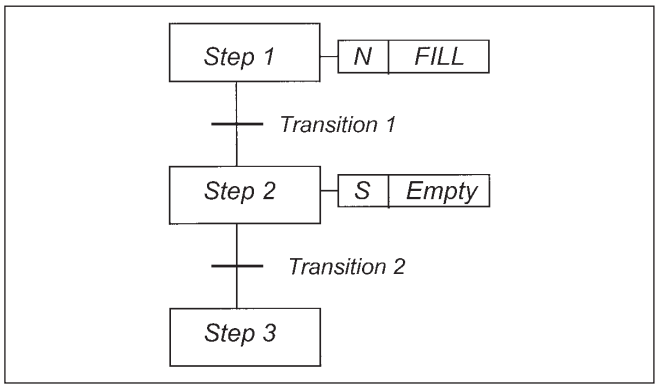
The interfaces of functions and function blocks are described in the same way:

```
FUNCTION_BLOCK Example

VAR_INPUT:
      X :   BOOL;
      Y :   BOOL;
END_VAR

VAR_OUTPUT
      Z :   BOOL;
END_VAR

     (* statements of functionblock body *)

END_FUNCTION_BLOCK
```

The declarations above describe the interface to a function block with two Boolean input parameters and one Boolean output parameter.

Programs
With the above-mentioned basic building blocks, one can say that a program is a network of Functions and Function Blocks. A program can be written in any of the defined programming languages.

Sequential Function Chart, SFC



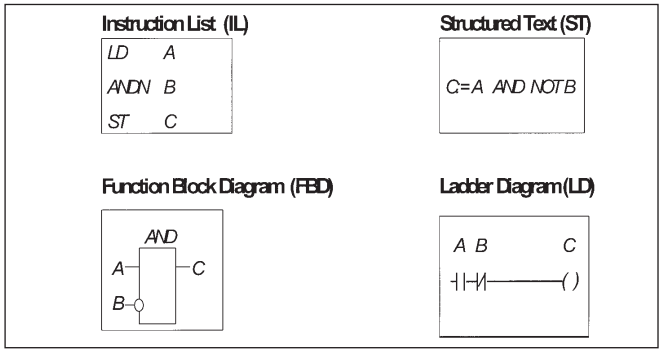
SFC describes graphically the sequential behavior of a control program. It is derived from Petri Nets and IEC 848 Grafcet, with the changes necessary to convert the representation from a documentation standard to a set of execution control elements.
SFC structures the internal organization of a program, and helps to decompose a control problem into manageable parts, while maintaining the overview.
SFC consists of Steps, linked with Action Blocks and Transitions. Each step represents a particular state of the systems being controlled. A transition is associated with a condition, which, when true, causes the step before the transition to be deactivated, and the next step to be activated. Steps are linked to action blocks, performing a certain control action. Each element can be programmed in any of the IEC languages, including SFC itself.
One can use alternative sequences and even parallel sequences, such as commonly required in batch applications. For instance, one sequence is used for the primary process, and the second for monitoring the overall operating constraints.
Because of its general structure, SFC provides also a communication tool, combining people of different backgrounds, departments or countries.

Programming Languages

Within the standard four programming languages are defined. This means that their syntax and semantics have been defined, leaving no room for dialects. Once you have learned them, you can use a wide variety of systems based on this standard.
The languages consist of two textual and two graphical versions:

Textual:
- Instruction List, IL
- Structured Text, ST

Graphical:
- Ladder Diagram, LD
- Function Block Diagram, FBD



In the above figure, all four languages describe the same simple program part.
The choice of programming language is dependent on:

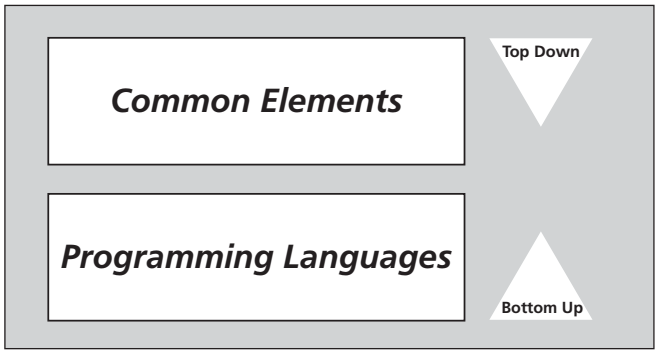
- the programmers' background
- the problem at hand
- the level of describing the problem
- the structure of the control system
- the interface to other people / departments

All four languages are interlinked: they provide a common suite, with a link to existing experience. In this way they also provide a communication tool, combining people of different backgrounds.

Ladder Diagram has its roots in the USA. It is based on the graphical presentation of Relay Ladder Logic.
Instruction List is its European counterpart. As textual language, it resembles assembler.
Function Block Diagram is very common to the process industry. It expresses the behavior of functions, function blocks and programs as a set of interconnected graphical blocks, like in electronic circuit diagrams. It looks at a system in terms of the flow of signals between processing elements.
Structured Text is a very powerful high-level language with its roots in Ada, Pascal and "C". It contains all the essential elements of a modern programming language, including selection branches (IF-THEN-ELSE and CASE OF) and iteration loops (FOR, WHILE and REPEAT). These elements can also be nested. It can be used excellently for the definition of complex function blocks, which can be used within any of the other languages.

```
I:=25;
WHILE J<5 DO
      Z:= F(I+J);
END_WHILE

IF B_1 THEN
      %QW100:= INT_TO_BCD(Display)
ENDIF

CASETW OF
      1,5:   TEMP := TEMP_1;
      2:     TEMP := 40;
      4:     TEMP := FTMP(TEMP_2);
ELSE
      TEMP := 0;
      B_ERROR :=1;
END_CASE
```

Top-down vs. bottom-up



Also, the standard allows two ways of developing your program: top down and bottom up. Either you specify your whole application and divide it into sub parts, declare your variables, and so on. Or you start programming your application at the bottom, for instance via derived functions and function blocks. Whichever you choose, the development environment will help you through the whole process.

Implementations

The overall requirements of IEC 61131-3 are not easy to fulfill. For that reason, the standard allows partial implementations in various aspects. This covers the number of supported languages, functions and function blocks. This leaves freedom at the supplier side, but a user should be well aware of it during his selection process. Also, a new release can have a dramatically higher level of implementation.

Many current IEC programming environments offer everything you expect from modern environments: mouse operation, pull down menus, graphical programming screens, support for multiple windows, built in hypertext functions, verification during design. Please be aware that this is not specified within the standard itself: it is one of the parts where suppliers can differentiate.

Conclusion

The technical implications of the IEC 61131-3 standard are high, leaving enough room for growth and differentiation. This makes this standard suitable to evolve well into the next century.
IEC 61131-3 will have a great impact on the whole industrial control industry. It certainly will not restrict itself to the conventional PLC market. Nowadays, one sees it adopted in the motion control market, distributed systems and softlogic / PC based control systems, including SCADA packages. And the areas are still growing.
Having a standard over such a broad application area, brings numerous benefits for users / programmers. The benefits for adopting this standard are various, depending on the application areas. Just to name a few for the mindset:

- reduced waste of human resources, in training, debugging, maintenance and consultancy
- creating a focus to problem solving via a high level of software reusability
- reduced misunderstanding and errors
- programming techniques usable in a broad environment: general industrial control
- combining different components from different programs, projects, locations, companies and/or countries

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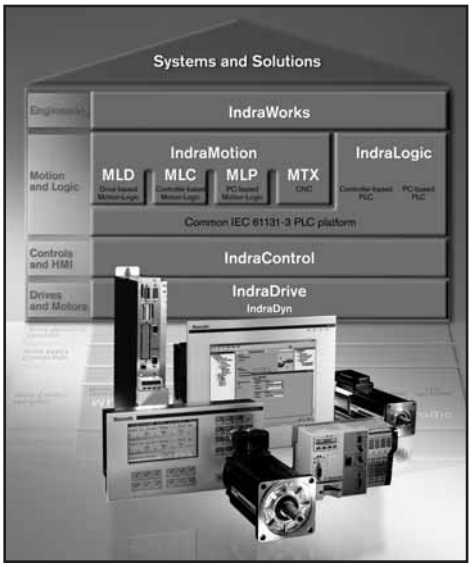
- IndraMotion – the family of open system products offering integrated motion, logic and technology functionality
- IndraWorks – the standardized software framework for the complete engineering workflow



ESR Pollmeier GmbH

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Servo drive technology:
- **Servo drives**
- **Multi-axis servo systems**
- **Servo motors**
- **Linear motors**
- **Positioning controls**
- **Fieldbuses**
- **Software**
- **Accessories**
- **Consulting, Solutions & Support**

ESR. The Dynamic Solution

Complete servo drive systems from a single source

– this is an accurate summary of ESR's corporate policy. All parts of the drive packages are matching and have been tested as combinations. This delivery from a single source guarantees trouble-free commissioning, reliable operation, and a definite system responsibility on the part of only one supplier.

Applications

Machine manufacturers as well as end users who build their own machines use ESR servo drives in

- Handling and assembly systems
- Optical discs production machinery (CDs, DVDs,...)
- Electronics production machinery
- Semiconductor production machinery
- Measuring and testing machinery
- Machine tools and metal working machinery
- Packaging machinery, textile machinery, plastics processing machinery, coiling machinery, ...

Also system integrators, motor and controller manufacturers distribute ESR products in order to complete their own offer.

Solutions

ESR's experience offers made-to-measure solutions for your application:

- Software solutions based on the integrated positioning control
- Function blocks for controllers
- Complete solutions consisting of linear or servo motor (with gear box if required), and multi-axis servo system or servo drive with operator terminal

Products and Services

Products

- Digital and analog servo drives
- Modular multi-axis servo systems for any type of servo motors
- Servo motors, also with gear boxes and brakes
- Linear motors, on request as complete modules
- Positioning controls, servo drive-integrated
- Fieldbuses (EtherCAT, CANopen, Profibus-DP, Interbus)
- Software for convenient parameterization and diagnostics via PC
- Function blocks for easy integration of the digital ESR servo drives into automation systems
- Accessories like mounting parts, cables, and connectors

Services

- Drive system configuration in cooperation with users
- Customer-specific adaptations
- Technical support, commissioning, and servicing throughout the entire machine life

ICS Triplex ISaGRAF

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- **Compliant with IEC 61131 and IEC 61499**
- **Highly portable runtime**
- **Fast virtual machine cycle**
- **Small foot print**
- **Complete porting kit**
- **Distributed with multi-resources**
- **One-box solution**
- **Serial, ODBC, Matrix, PID packs**

ICS Triplex ISaGRAF, a privately-held company with offices in Canada and France, is the world's leading automation software technology partner. The company's flagship product ISaGRAF, is the foremost technology for open automation, applicable to the traditional automation, embedded control and soft logic markets. ISaGRAF sustains a high level of standardization, integration and communication within modern automation systems, resulting in high-end, real-time open control systems with crash-proof reliability, powerful performance and flexibility.

ICS Triplex ISaGRAF has sold over 400,000 runtimes in more than 100 countries.

ICS Triplex ISaGRAF's parent company, ICS Triplex plc, is a global provider of high availability and high reliability solutions for the automation industry. The company's headquarters are located in Maldon, UK.

Products and Services

ISaGRAF

ISaGRAF is a comprehensive set of software technologies used to develop leading-edge local or distributed control products. The technology is designed to be scalable, allowing for the development of a range of solutions from tiny controllers to large automation systems without having to compromise. ISaGRAF gives you the flexibility to use it in combination with the hardware platform and operating system of your choice, thereby permitting the development or automation products that exactly meet your requirements.

ISaGRAF not only addresses the technical aspects in the design of the automation product, but also addresses the usability, meeting the industrial market expectations for standards, performance and functionality. ISaGRAF, with its compliance with IEC 61131 and IEC 61499, allows products to meet international automation standards, facilitating certification towards IEC 61508 and critical application safety levels such as SIL 3. ISaGRAF addresses the requirements of wide variety of applications and specific market needs while at same time providing for flexible licensing, the ability to brand-label and the integration and encryption of your core competency to protect your intellectual property.

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Production Control System
OpenPCS features:
- FDT / DTM interface
- IEC 61131 editors as ActiveX
- offline simulation
- HMI / SCADA integration

IEC 61131-3 runtime system source code and royalty free

We are an industrial automation and medical engineering company since 1983. You will find infoteam software in many products of our customers ranging from PLC / DCS manufacturers to motion control, HVAC, medical devices, weighing systems and many more. infoteam is the only software company whose products are certified by PLCopen to fulfill the requirements of Portability Level.

Today, leading manufacturers of programmable controllers throughout the world sell infoteam Software under their own brand names. infoteam Software and its international partners guarantee customers both at home and abroad optimum service from highly qualified personnel. We support customers with individual solutions on an international basis and are always ready to face new challenges.

Products and Services

OpenPCS is royalty free

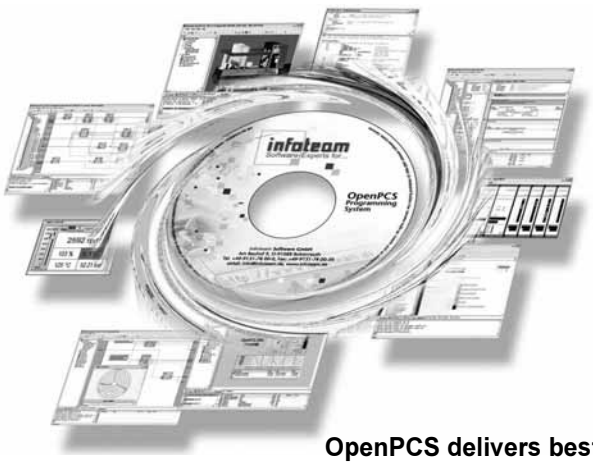
OpenPCS is a product, which follows the modern concept of Open Source Software. We license our software to you once, but after that we allow you to sell your products without the penalty of paying royalties for each piece of hardware you deliver. You purchase infoteam's software once and then sell it bundled with your hardware free of charge.

SmartPLC/embedded

The OpenPCS runtime system is a SoftPLC compliant with IEC 61131-3. This virtual machine executes UCODE, a universal, target indepen-dent code, emulating a PLC. Since there is a wide range of different target systems, our focus was to implement a portable runtime kernel, which may be easily adapted to any controller and any operating system within two days.

OpenPCS supports CANopen

The necessary interfaces to implement CANopen are already built into OpenPCS. If you wish we also deliver the source code for CANopen master and slave implementations. These generic interfaces may also be used to implement other fieldbus stacks easily.



OpenPCS has open interfaces

OpenPCS consists of a set of tools including editors for all five languages of IEC 61131-3. The editors are implemented as ActiveX controls to be easily integrated in other environments and frameworks. This makes OpenPCS perfectly suitable for specialised application areas, where you only need one of the editors and a very runtime environment. OPC is integral part OpenPCS to make integration with HMI tools and SCADA packages a snap. If you prefer a total solution we are ready to deliver anything you need including the outstanding GENESIS 32 tool suite.

OpenPCS delivers best performance

Our compiler architecture is
- optimised for small footprint runtime systems using our target independent UCODE interpreter
- and delivers outstanding performance generating native, microprocessor specific binary code.

You choose which technology best fits your product!

OpenPCS supports Motion Control

Small footprint, outstanding performance, support for standard microprocessors and DSP's. That's all you need to implement PLCopen Motion Control Library

KEBA AG

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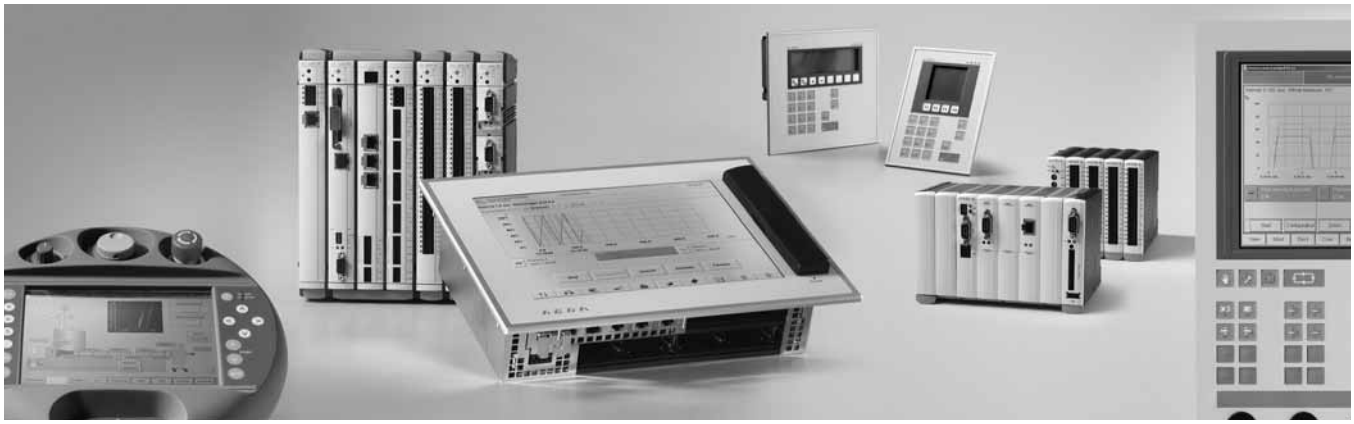
Internet: www.keba.com

Kemro K2:

- **One platform - many performance classes**
- **Integrated robotics**
- **Programming according to IEC 61131-3**

Products and Services



The innovative total solution for machine and robot control

Based on a universal modular system, Kemro can be used to quickly and efficiently realize customized automation solutions for every performance range. Kemro includes a number of scalable product lines of complex control systems, a wide range of display systems, handheld operating panels as well as decentralized terminal I/O and motive solutions. Special technological emphasis is placed on the Process Control and Motion Control sectors.

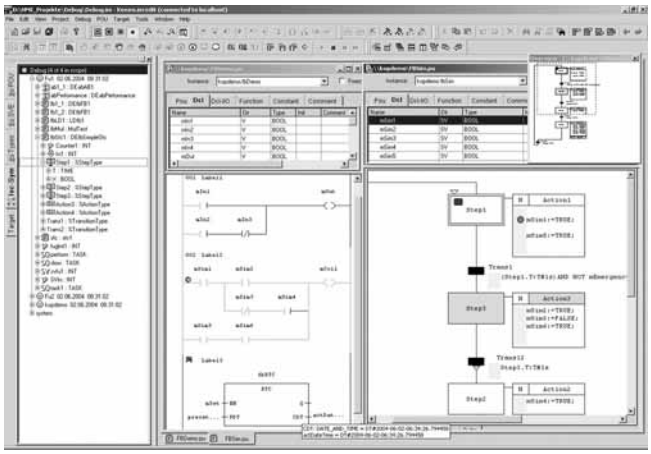
KEBA provides optimised system solutions for selected industries. They consist of the standard products of the Kemro K2 system modules and components developed specially for the respective industry. The costs for software production are minimized by the use of ready-made application frameworks. This results in a fast time-to-market for lower development costs at the same time.

All editors in a single integrated programming environment

Kemro.studio is a special toolset that is adapted to individual problems and that contains tools that communicate optimally with one another. The integrated programming platform provides all necessary programming tools and the common database for the complete system, consisting of machine and robot control including visualization.

Kemro.manager - Navigation and configuration
The Kemro.manager acts as a hardware and software configurator for all system components which are used, for example, as master modules or assigned to the application variables as I/O points.

Kemro.iecedit - Programming in IEC 61131-3
The programming of machine operation and process control is performed with Kemro.iecedit. The programming languages KOP, AWL, ST and AS of IEC 61131-3 are supported.



Kemro.teachedit - Macros for robot applications
Kemro.teachedit is the programming and debug tool for Kemro.teachcontrol. With this, the machine programmer creates technological command (“macros”). The main applications are robotics and handling applications.

kirchner SOFT GmbH

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- **Graphical programming system for PLCs, micro-controllers and industrial PCs**
- **Offline simulation tools**
- **Convenient resource type development kits**
- **Different code generators**
- **OEM development kits**

kirchner SOFT has been developing target-system-neutral graphical programming systems for the entire automation industry for more than 16 years. Our product logiCAD/16 is an efficient programming tool for different PLC systems and industry PCs. It has already been sold over 9.000 times in Europe, leading the way for graphical programming systems with offline simulation.

At the beginning of 1993 kirchner SOFT started the development of a new programming-device-generation , integrating our long experience and the feedback of our customers. The result is **logiCAD**, the object oriented project planning and programming tool, based on IEC 61131-3. To cope with the trend towards manufacturer-neutral automation concepts, kirchner SOFT offers **openPLC** and **RTS** for logiCAD – an IEC 61131-3 conform SoftPLC. This product is not only outstanding because of its target-platform-independence but it can also be integrated easily in any real-time operating system. Standars solutions are available for Windows NT/2000/XP/CE, VxWorks, RMX and RT Linux.

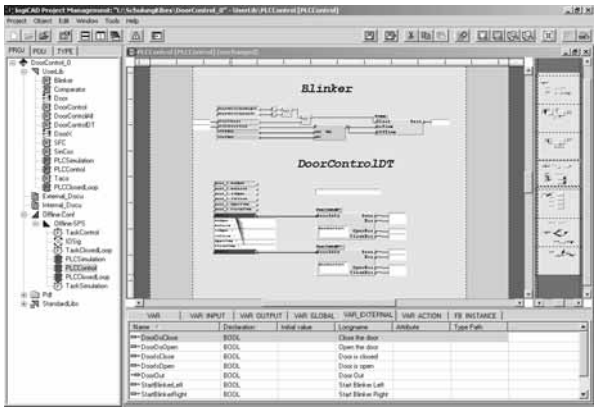
The company's head office is in Oberwölbling, Austria. The German and Benelux market is handled by kirchner SOFT´s subsidiary in Langenfeld. More than 40 OEM-partners in whole Europe can be named as our content customers at this time being.

Products and Services

Both range and complexity of the tasks, to be solved nowadays by using PLCs, Micro-controllers and IPCs, demand new programming methods and devices. Not only the reduction of the periods of project planning and putting-into-operation but also the long maintenance of production plants are important. Therefore, with development of logiCAD, comfortable programming of automation tasks according to IEC 61131-3 has been considered very important and all aspects for a controlled project progression have been taken into account.

HIGHLIGHTS

- object oriented programming system according to IEC 61131-3
- available for Windows NT/2000/XP
- version and revision management
- full documentation mangement
- access and history control
- workgroup support
- integration possibility into customer-specific data bases
- offline simulation and online test with full graphic support
- graphical module and system configuration tools
- C-code generator incl. adjustable kernel based on our MBRT Components (Modular Basic Resouce Type)
- openPLC and RTS - target-platform-independent SoftPLC according to IEC 61131-3
- embedded web server and OPC server for our SoftPLCs
- runtime data interfaces for our SoftPLCs
- extensive developing tools for OEM-partners
- custom control automation systems based on standard Win-CE with different fieldbus available
- micro-controller support for HC12 and others



OEM-customers can integrate specific functionality directly into the user interface of logiCAD by developing plugin-modules (DLLs).

Of course, logiCAD is available for different languages.

KW-Software GmbH

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- **MULTIPROG/ProConOS**
  the IEC 61131 progamming and runtime system
- **ProVisIT**
  the machine visualization
- **SAFEPROG/SafeOS**
  the IEC 61131 programming system and runtime system for safety applications
- **Automation Framework**
  the component based software platform for Tools and Frameworks based on Microsoft .NET

KW-Software – your partner for integrated automation solutions

KW-Software is the leading provider of open solutions in the field of control and automation software in the world. More than 20 years of experience guarantee technically matured solutions and products. Within thousands of applications of leading manufactures worldwide, the products provided proof of their performance. We made it our job to develop intuitive software with high functionality which can be easily integrated into customer specific environments. Innovation and implementation of standards are in the foreground while we are designing our software.

Products and Services

MULTIPROG® SUITE
The automation platform MULTIPROG Suite allows the operation of programmable and parameterizable devices in one platform.
Due to the deep integration of IEC 61131 programming, machine visualization (ProVisIT), fieldbus configuration (SyCon.NET) and PLC Motion Control function blocks into one tool, engineering is strongly simplified. Data has to be entered only once and is then permanently available for all tools within the Suite. Customer-specific device parameterization software can be integrated by means of the open interface technology. In addition, programming of networks with distributed controls within one project is supported.

Software for Safety Technology according to IEC 61508 up to SIL3
KW-Software is the leading provider of software for safety technology according to IEC 61508 up to SIL3. Already today, KW-Software offers a complete platform for parameterization up to programming of varying applications containing certified software components according to IEC 61508:

- **SAFEGRID** for parameterizing safe automation devices (drives, sensors, relays)
- **SAFECONF/SafeOS** for configuration of safety controls by connecting function blocks
- **SAFEPROG/SafeOS** for free-programmable logic according to IEC 61131 for safety controls with integration into the non-safe area

KW-Software is the first company that offers the support of the PLCopen Safety Specification.

Our .NET technologies
The use of Microsoft.NET enables entirely new possibilities for engineering and programming as well as for the PLC runtime system. Based on this, interdisciplinary Programmable Automation Controllers (PAC) can be developed which combine logic, motion, visualization and process control in one hardware platform.

KW-Software substantially pushes this trend with: Automation Framework, the component-based software platform for single tools and frameworks, based on Microsoft.NET. Applications based on Automation Framework can either be a standalone application or integrated into an application suite. It is also possible to integrate only one component, e.g. the FBD/CFC editor, into your self-developed .NET-based automation environment. Committed to these mentioned advantages, KW-Software also uses Automation Framework 2.0 for developing the new software platform. Both, MULTIPROG.NET, the new development of the well-established IEC 61131 programming system, and ProVisIT.NET, the new development of KW-Software's machine visualization, are based on the component architecture of Automation Framework 2.0.

ProConOS embedded CLR
The new open IEC 61131 PLC runtime system
The new generation of the KW-Software runtime system, ProConOS embedded CLR, is the unified runtime system for different automation tasks (PAC). By using the internationally standardized Microsoft Intermediate Language (MSIL) as device interface, ProConOS embedded CLR can be programmed in C# and in IEC 61131.

Mitsubishi Electric Europe B.V.

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Fax +49 (21029 486-4050
Contact: Charles Pontes

- **PLC based Automation Systems**
- **Robot**
- **Drives**
- **Brakers**

A total of more than forty independent companies all over the world belong to the MITSUBISHI Group. Engaged in activities ranging from tanker building to oil production and refining to cameras (Nikon) to financial services and the production of the world-famous Mitsubishi cars.

MITSUBISHI ELECTRIC is part of this world-wide family. Its activities are organized in five main divisions:

- Industrial Automation Systems
- Energy and Electric Systems
- Information and Communication Systems
- Electronic Devices
- Home Appliances

MITSUBISHI ELECTRIC is a leader in many areas, e.g. as the most important supplier of the home market for programmable logic controllers.

MITSUBISHI ELECTRIC gave high priority to its European activities from a very early date. The co-operation now has subsidiaries and branches in all major European countries. Manufacturing in Europe, for Europe. Ratingen is the European Headquarter of the European Business Group Factory Automation, which controls all European activities. To emphasize the importance of thorough and sophisticated H/W and S/W development the Business Unit has set focus with the European Development Center FA-EDC.

Products and Services

MITSUBISHI ELECTRIC is one of the very small groups of full-range industrial automation system suppliers, who really can provide comprehensive world-wide support for their products.

The range of industrial products of the Ratingen-based corporation includes PLCs (programmable logic controllers), frequency inverters, robots, control terminals and low-voltage switchgear. In addition to this, the firm also supplies software for these products, conducts training programs all over Germany and develops systems solutions.

As a world-wide operating organization, the MITSUBISHI Corporation offers products according to international standards. This holds also true for the programming software *MELSOFT GX IEC Developer*, which is in accordance with the IEC-standard 61131-3. The language variety includes the five programming languages Structured Text (ST), Instruction List (IL), Ladder Diagram (LD), Function Block Diagram (FBD) and Sequential Function Chart (SFC). In the same way program types PRG, function and function blocks are supported. Besides the possibility of program structuring, special emphasis was laid on powerful help functions, sophisticated online-tests and diagnose selections. A special feature is, that all existing PLC of Mitsubishi Electric are supported in one software-package.

ORMEC Systems Corp.

19 Linden Park
Rochester, NY 14625
USA
585-385-3520 (Phone)
585-385-5999 (Fax)
Charlene McNeil

- **Total System Solution Programmed using IEC 61131-3**
- **State-of-the-Art FireWire-based motion networking**
- **Fully Integrated Family of Products**

ORMEC is an ISO 9001:2000 certified company that manufactures motion control systems that integrate motion controllers, logic control, drives, servomotors and FireWire-based networking into cost-effective solutions. ORMEC is fully committed to excellence in applications engineering and technical consulting, applications programming assistance, on-site service and support. The company continues to be a leader in the development of motion control technology, including being the first company to introduce an industrial motion control system using the high-speed FireWire network.
ORMEC has been providing motion control solutions for over 20 years in the packaging, converting, printing, food and beverage, pharmaceutical and medical industries – along with many others. We also provide customized products and software to support specialized motion control needs.

Products and Services

ServoWire Motion & Logic Controller (SMLC)
ORMEC's *ServoWire Motion & Logic Controller* (SMLC) is a fully integrated control solution based on ORMEC's high performance ServoWire Soft Motion technology. By combining Pentium-class processors, IEEE 1394b (FireWire) drive networking and Ethernet connectivity, the SMLC is a system that can control your entire machine. CoDeSys IEC 61131-3 programming with PLCopen motion function blocks -- plus powerful ORMEC extensions provide proven, open standard tools for developing application programs for motion and I/O control. General purpose I/O options are fully supported using Ethernet and Profibus.

ORMEC's motion programming implementation (ServoWire Motion Blocks) conforms to the PLCopen motion function block definitions and also provides powerful, flexible functionality beyond that defined in the standard. Using the ServoWire Motion Blocks, a variety of applications can be written in any of the IEC 61131-3 programming languages.

ServoWire SD Drives
ORMEC's has expanded its lineup of networked servodrives with the release of the ServoWire SD family featuring IEEE 1394b. The 1394b network is more robust, efficient and faster than the previous 1394a network. The introduction of this drive family, combined with our new series of SMLC controllers, allows ORMEC to provide a complete motion control system with the advantages of 1394b.

Customer Support Services
ORMEC is an organization that is fully committed to excellence in applications engineering and technical consulting, applications programming assistance, manufacturing, on-site service and support. We provide hardware and software assistance via telephone, e-mail, and 24-hour emergency service.

Application Engineering Services
Our applications engineering assistance and technical consulting covers all aspects of system design from specification, through application programming, panel design and field installation. Our applications engineers can either work with your engineering staff in a supporting design role, build a complete turnkey system, or some combination of both.

Training
ORMEC offers a PLCopen Certified Training Course for IEC 61131-3 programming. Students are introduced to the CoDeSys development environment and PLCopen Motion Control function blocks. Upon completion of this course, students will be able to read and understand an IEC program, know which language features are IEC compliant and which are vendor specific. Students will also create function blocks and learn how to write and debug IEC 61131-3 programs.

Also available is standard application development training, on-site courses, as well as customized courses tailored to your specific needs.

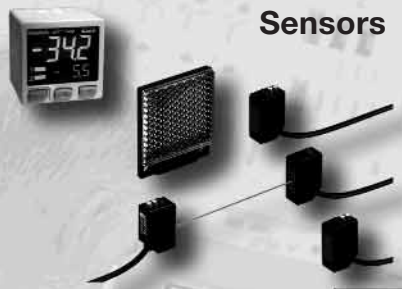
Panasonic
ideas for life

Panasonic Automation Solutions

Amazing innovation – highest quality

Machine Vision

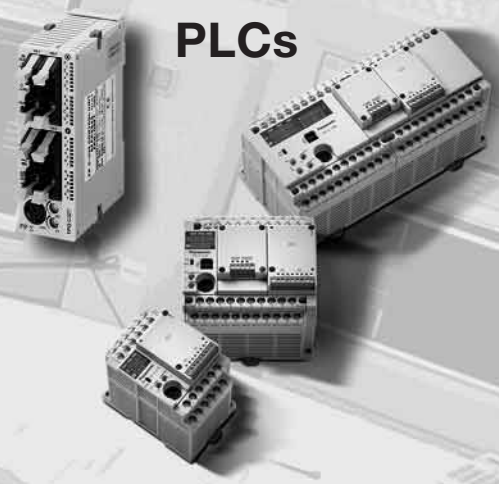
Sensors



Laser Marking Systems

Operator Terminals

PLCs



Servo Drives & Inverters

Limit Switches

Timers & Counters

Temperature Controllers

PLCopen CONFORMITY LEVEL
No. C-34
ST
04.04.2003
Datatypes supported: 10 of 26

PLCopen motion control

PLCopen reusability level
No. C-35
04.04.2003
DS: 10 of 26

Panasonic Electric Works Europe AG

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Panasonic	**Rudolf-Diesel-Ring 2** **83607 Holzkirchen** **Germany** **Tel.: +49 (0) 8024-648-0** **Fax: +49 (0) 8024-648-111** **www.panasonic-electric-works.com**	• Relays, Switches, Connectors • Timers, Counters, Temperature Controllers, Limit Switches • SUNX Sensors • Programmable Logic Controllers • Machine Vision Systems • Human Machine Interfaces • Servo Drives, Inverters

Panasonic Electric Works in Europe

The activities of Panasonic Electric Works in Europe started more than 30 years ago by developing new generations of electromechanical relays.

Meanwhile, our European organisation is involved in the sales, production and development of all products from MEW in Japan. This is mainly done under the "Panasonic" brand (sensors under the "SUNX" brand).

Panasonic Electric Works Europe AG is the headquarters for the sales companies in a large number of European countries.

Our sales companies are organised on a local basis to better access national interests and take into account the economic conditions specific to each country.

The Automation Controls Division is involved in the development of factory automation equipment that increases the efficiency and sophistication of modern production processes as well as responds to strong demands for labor and cost savings. The automation control technology we have developed in factory automation is also applied to the automation of public and private buildings, power monitoring and remote control systems, for example.

The worldwide Panasonic organization with over 338,000 employees guarantees high-quality products under one company name and one global brand, Panasonic.

Products and Services

Automation Control Advantages

Panasonic Programmable Logic Controllers (PLCs) include the latest developments in automation technology.

The FP0 compact PLC is the smallest in its class yet packs a full range of features.

The mid-class modular FP2 PLC is also extremely compact for its class and features several highly intelligent instructions. The latest PLC technology has been integrated into the new FPΣ (Sigma), the next generation smart controller in FP0 size, and the FP-X PLC.

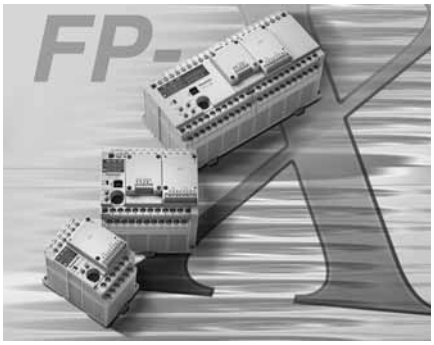
The FPΣ (Sigma) is powerful in communication and positioning.

FP-X is the advanced compact model for AC applications. The new cassette concept allows for many expansion possibilities and increased flexibility.

The programming software Control FPWIN Pro complies with the IEC-61131-3 standard and offers several user benefits. The programming software is identical across our whole PLC range.

FP Series Software – Special Features

- 5 programming languages (SFC, IL, ST, FBD, LD)
- very efficient “debugging“ in 5 languages
- convenient comment application in 5 languages
- programming and communication via modem, PROFIBUS and Ethernet
- reuse of software and excellent library features



FP-X PLC
The advanced compact model

3S-Smart Software Solutions GmbH

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Email info@3s-software.com
Contact Roland Wagner

- **CoDeSys**
  The IEC 61131-3 Programming System
- **CoDeSys SP RTE**
  Real time SoftPLC under WinXP
- **CoDeSys SP**
  Portable PLC runtime kernel
- **CoDeSys Visualization**
  Visualization products integrated in CoDeSys
- **CoDeSys SoftMotion**
  Integrated motion control

3S is one of the leading software manufacturers in the European automation industry. The company's main focus is CoDeSys the well-known IEC 61131-3 programming system for controller applications and CoDeSys SP the platform independent controller system. The specialists from 3S have developed a complete automation suite around their core products and also offer integrated product extensions for motion control, visualization, I/O configuration and project version control management.
With CoDeSys 3.0, 3S-Smart Software Solutions GmbH introduces the next level of PLC programming, a complete Automation Platform with real Object Orientation, PLC Networks, Version Profiles and IEC 61131-3 Visualization.

Products and Services

CoDeSys

- The High-End IEC 61131-3 PLC Programming System
- Suitable for Compact PLCs and High-End Automation Devices alike
- Kernel of the CoDeSys Automation Suite
- Integrated compilers for a wide range of 8, 16 and 32 bit controllers
- More than 200 OEM clients rely on CoDeSys
- Thousands of end users in machine and plant building

CoDeSys SP RTE

- The SoftPLC under Windows NT / 2000 / XP
- Hard real time properties (µs)
- Supports common field bus cards
- Open driver interface

CoDeSys SP

- The PLC runtime kernel for embedded and PC based devices
- For devices with or without operating system
- Fast because of native code
- Easy adaptation to the device

CoDeSys Visualization

- Complete integration of the visualization editor in the programming system CoDeSys
- Available runtime platforms:
  CoDeSys HMI (runtime version under Windows)
  Target visualization (directly on the embedded controller)
  Web visualization (via internet browser)
- One project source for all variants
- Easy connection to all controllers programmable with CoDeSys

CoDeSys SoftMotion

- Motion control integrated in the IEC 61131-3 programming system CoDeSys
- Comfortable CNC and CAM editors
- Function blocks conformal to PLCopen
- CNC function blocks for 2 ½ dimensional interpolation
- Freely connectable or programmable motion POUs
- Integrated drive connection and configuration
- Executable on all 32-bit CoDeSys platform

SEW-EURODRIVE GmbH & Co KG

Ernst-Blickle-Straße 42
D-76646 Bruchsal
Germany
Phone: + 49 7251 75-0
Fax: + 49 7251 75 - 1970
sew@sew-eurodrive.de
http://www.sew-eurodrive.de

- **MOVI-PLC®: universal - scalable - efficient**
- **According to IEC 61131-3 and PLCopen**
- **Controls up to 64 drives**
- **Supports the complete SEW portfolio**
- **Numerous communication interfaces**

SEW-EURODRIVE driving the world

SEW-EURODRIVE is an internationally successful, family-owned business with more than 10,000 employees and sales of € 1.2 billion. As one of the leading companies in the field of drive engineering, SEW-EURODRIVE is a motor for progress and its gearmotors and frequency inverters, servo drive systems, decentralized drive systems and industrial gear units keep the world moving every day.

Gear units and motors from SEW-EURODRIVE have always set the trend and established new standards in the field of drive engineering. For this reason, the quality label “made by SEW” has become a hallmark of quality in the drive industry. The complete range of gearmotors from SEW-EURODRIVE offers customers the right drive for every task. Market-oriented products developed and manufactured in-house as well as uncompromising quality are the cornerstones of the company’s success. "People do not need products, they need solutions." Based on this maxim, SEW-EURODRIVE decided to develop and manufacture not only gearmotors but also electronic parts custom-made for these motors.

However, good drive technology products are not everything; perfectly matched service is also a part of the process. SEW-EURODRIVE combines both elements in offering outstanding products and services that enable the operation and availability of entire drive systems every day. Worldwide. The comprehensive SEW-EURODRIVE service network ensures that complete drives and spare parts are available all over the world, within 24 hours in many areas.

Products and Services

MOVI-PLC® *advanced* - for top performance in drive automation

Following the successful introduction of the MOVI-PLC® *basic* motion controller, SEW-EURODRIVE presents MOVI-PLC® *advanced**. It is designed for the most powerful automation of highly sophisticated drive applications. Up to 64 axes can be controlled synchronously via the Ethernet-based system bus. MOVI-PLC® *advanced* includes the full functionality of MOVI-PLC® *basic* and also offers sufficient power reserves to execute complex online computations, for example, curves to be calculated during operation, multi-axis interpolation and kinematic transformations. The controller architecture includes a 400MHz processor, 8MB program memory, 4MB data memory and 32kB retain variables to provide sufficient resources for comprehensive automation tasks. Another essential feature is the wide range of interfaces available. Two CAN system busses and one Ethernet-based system bus allow optimized and universal control of all inverters and servo drives from SEW-EURODRIVE as well as CANopen I/O modules.

MOVI-PLC® *advanced* as a compact controller

Eight digital I/Os, five of them interrupt-capable, are integrated into the MOVI-PLC® unit itself. Users can choose from two RS485 serial interfaces, for example, for connecting a DOP (Drive Operator Panel), for engineering or for controlling an inverter without CAN or Ethernet interfaces. Several interfaces (TCP/IP, Modbus/TCP, Ethernet/IP, PROFINET IO RT and PROFIBUS DP-V1) are available for communication with a higher-level controller. MOVI-PLC® *advanced* is programmed in IEC 61131 in accordance with the PLCopen motion control specification. The IEC program has permanent and complete access to the parameters of all the connected drives and to the complete area of the memory card reserved for the user. In this way, even extended curve or path data and recipes can be stored and managed by the MOVI-PLC® unit. All these features make it a pleasure to work with MOVI-PLC®, thanks particularly to user-friendly engineering with the fully-integrated MOVITOOLS®-MotionStudio, connected via the high-speed interfaces Ethernet or USB.

* Available from fall 2006

Siemens AG

SIEMENS

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Automation and Drives
P.O. Box 4848
D-90327 Nuremberg
Germany
Web: www.siemens.com

- **Totally Integrated Automation**
- **Industrial Software STEP 7**
- **Programmable Logic & Motion Controllers SIMATIC / SIMOTION**
- **Componend Based Automation**
- **PC Based Control**
- **Process Control System PCS 7**

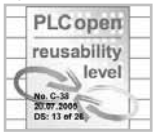
Siemens Automation and Drives (A&D), the worldwide leading manufacturer in its field is located in Nuremberg/Erlangen. A&D offers standard products and solutions for the manufacturing and process industry. The optimized interplay of A&D products ("Totally Integrated Automation") leads to cost reduction for investments as well as for the whole lifecycle of a system.

Products and Services

The **A&D Industrial Software** is the basis that integrates all automation solution components. The common data base maintains data consistency throughout the entire automation project.

Engineering Tools
High-level languages and graphical programming help reducing engineering costs:

S7-SCL



S7-SCL

S7-GRAPH

- SIMATIC STEP 7 Professional

The STEP 7 software is the basis for configuring and programming SIMATIC devices with the following programming languages:
STEP 7 - Instruction List (IL), Ladder Diagram (LAD), Function Block Diagram (FBD), S7-SCL - Structured Text (ST), S7-GRAPH - Sequential Function Chart (SFC)

- Additional tools

S7-HiGraph (State Diagram), S7-PLCSIM (PLC Simulation), S7-PDIAG (Process Diagnostics), TeleService (Remote Service), CFC (Continuous Function Chart)

- SIMOTION SCOUT

The SIMOTION SCOUT software is the basis for configuring and programming SIMOTION devices with different programming languages:
ST (Structured Text), LAD(Ladder Diagram), FBD (Function Block Diagram), MCC (Motion Control Chart)

- Human Machine Interface/Visualization

ProTool/Pro, WinCC, WinCC flexible

- Communication/Component Based Automation

iMap (Interconnection editor for CBA)

Safety Function Blocks
Siemens A&D takes actively part in the creation of the specifications of safety related function blocks for dedicated applications in the machinery sector.

Motion Control Function Blocks

- Easy Motion Control

Basic function blocks for Positioning and Gear Synchronism, for SIMATIC CPU S7 300/400, WinAC

- S7 Technology

Function blocks for almost all Motion Control requirements, especially for CPU 315T/CPU 317T and Microbox 420-T

- SIMOTION

Function blocks for almost all Motion Control requirements on all SIMOTION controllers and considerably flexible system functions

Classical, PC based and Drive based **controllers** are available in all performance classes:
SIMATIC S7-200, S7-300, S7-400
Programmable Logic Controllers and Technology CPU 315T/317T for Motion Control
SIMATIC C7
Complete Control Systems combining the S7-300 with an operator panel
Componend Based Automation (CBA)
Interconnection of PLC components via ProfiNet
SIMATIC WinAC
PC based control - a combined solution consisting of control, technological tasks, visualization, data processing and communication on a single PC
SIMATIC Embedded Automation
Ready-to-run SIMATIC Embedded PCs with integrated Software-PLC WinAC RTX and optional Motion Control functionality or as a Panel PC.
SIMOTION
Merge of Logic, Motion control and Technology with programmable Controllers on different platforms:
Drive based D425/D435/D445, Controller based C230, PC based P350

Field PGs - the PC compatible programming devices used to program and test components, with all interfaces and software tools on board

TEAM S.A.

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- **R&D and production of electronic equipment and SW.**
- **Solutions in fields of automation, control of electrical machinery and power electronics.**
- **Projects for industry, power generation and transmission, railways, fluid carrying and shipping.**

Técnica Electrónica de Automatismo y Medida (TEAM) was founded in 1972. It stands at the heart of the Ingeteam Group's efforts in R&D and production of electronic equipment and software.

TEAM provides technologically advanced solutions in the fields of **automation**, **control of electrical machinery** and **power electronics**. It is a reference point for the development of new high-powered energy control equipment, and has worked on major projects all over the world in the fields of **industry**, **power generation** and **transmission**, **railways, fluid carrying** and **shipping**.

TEAM has currently 168 employees. Continued investment in R&D&i, with more than 85 highly qualified engineers and graduates on its work-force and close co-operation with the country's technology centres and universities, enables TEAM to maintain high standards of technological development.

TEAM's emphasis on customer service can clearly be seen in its training courses, immediate technical assistance service, 24-hour hot-line and on-line troubleshooting.

TEAM is certified under the UNE-EN-ISO 9001:2000 quality standard. Its products are accompanied by a manufacturer's statement of compliance with the applicable European (CE) directives (LV and EMC).

Products and Services

Since the company was founded, TEAM has provided products for the **energy sector** for controlling electricity generation, the control and remote control of distribution networks and for control stations. At the present moment in time, TEAM has a strong presence in the area of renewable energy (wind, solar and hydro-power generation). In this respect, particular mention must be made of wind energy, an area in which TEAM has brought about considerable technological innovation in variable frequency generation and electrical pitch control.

Regarding the **industry sector**, TEAM has over 30 years experience in the design and manufacture of products for industrial process automation, providing technology and equipment regulation, control and drive system solutions in the iron and steel, petrochemical, paper, glass and cement sectors, amongst others. We are fully and constantly committed to research, to producing innovative ideas, thus enabling us to produce competitive, state-of-the-art in-house products to meet market demands. Our know-how and expertise have made TEAM a reference company on the international market.

For several years now, driven by an awareness of the technological change taking place in the area of ship control and drive systems, TEAM's R&D&i activity has been focused on producing products for the **marine sector**. TEAM-manufactured equipment such as electrical drives for main and auxiliary drive systems, energy monitoring machinery, suction pump drive systems, energy monitoring machinery, suction pump drive systems and vessel automation equipment are currently in use in the sector. In this highly specialized and technologically demanding field, TEAM has adapted its knowledge and experience to meet the requirements of the sector.

After several years of R&D work in the area, TEAM has emerged as a major player in the **railway sector**, providing a wide range of technological equipment - traction systems, auxiliary services, vehicle control, traction substation equipment, providing solutions with energy recovery - in the areas of light train and trams, and long distance trains. We also offer customized support and maintenance services.

With its wide range of experience in the field of automation, TEAM provides process monitoring, control and regulation products perfectly adaptable to the control requirements of **water treatment processes**, **waste recovery and elimination** and **distribution network management.** We have worked on major projects in the area of medium and low voltage, maximum 10 MW variable frequency drive systems for fluid suction and impulse pumps, with IGBT technology. These systems have a wide field for application in **transport** and **lifting infrastructure**.

Teco a.s.

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280 58 Kolin
Czech Republic
www.tecomat.com
teco@tecomat.cz

- PLC**: TECOMAT / TECOREG**
- HMI: **- TEMPO**
- SCADA: **RELIANCE**

Teco is leading Czech company developing and manufacturing PLC, HMI and controllers for Building Management Systems.
The controllers are supported by MOSAIC – IEC61131-3 compatible software package and SCADA system Reliance

Teco was established in 1993. Company is certified according EN ISO 9001 since 1996. Products are working in more than 20 countries worldwide in machines, process control and buildings and in transport systems

Products and Services

HW products

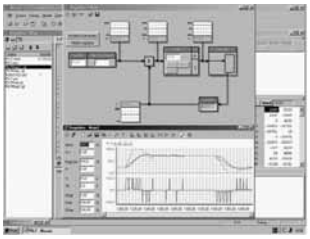
TECOMAT – full range of PLC controllers from micro to High-End PLC

TECOREG - controllers for Building Management applications

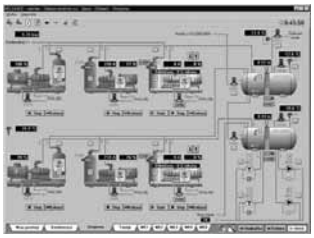
HMI products are represented by **TEMPO** – panel computer powered by Windows CE.net and Linux

SW products

MOSAIC – the programming package based on the IEC 61131-3 standard enables to create application program in ST, IL, LD and FBD language as one project or group of projects.



PIDMaker, GraphMaker and PanelMaker are excellent tool, part of **MOSAIC** for debugging closed loops, time based events and programming operator panels



RELIANCE - SCADA for PC based operator workstations. It is **OPC** client

Evaluation of software:
Buying /licensing software development environment

If you are in the buying process of an IEC 61131-3 development environment, there are nowadays a large number of (independent software) suppliers to choose from. To make your selection process easier, the following topics can help you in the evaluation.
They are not so much technical details, but additional topics, which should be evaluated.

First: there is no best overall product. A product should meet your needs, which means that you have to evaluate it. Below are some guidelines for it.
Even if there is a best product nowadays, it can be surpassed with a new release of a competitor. Also, the actual status of the software product itself can be of minor importance: a next version is probably around the corner.

Points of attention:

adaptation costs: how much do they ask to adopt the package
- to your hardware? How much to include your additional hardware and /or software libraries
- the initial costs are different. In most cases the software environment needs adaptations. These can range over a broad area:
  - the name of the product as appears on the screen
  - the adaptation to your specific hardware environment
  - the adaptation of the user manuals to you needs
  - the creation of user manuals under your own name
  - the inclusion of additional requirements, like linking to your specific compiler
- licensing: besides the initial adaptation costs, licensing can be applicable. How much doe they charge? How much for a one time buy-out? Do the royalties include future updates?
- strategy to deal with minor and mayor updates
- the quality of the software and training manuals, and there availability in the required languages
- is the products itself, including the on line help functions, available in the required languages
- support: they all claim it, but who provides it best, and in your language. And at which costs. What is their strategy with respect to dealing with errors, minor and mayor
- training: can they provide on-site training for your people? Can they help your users? How does their training manuals look like? In which language are they? Can you use their material as basis for your own training?
- Update: how do they deal with updates? How do you deal with updates?
- does the system provide on-line help? In which languages? Does that cover your needs
- is the company financial stable?
- which references / installations does the company have? Do they include your competitors? Does that help you? Can you contact some of their references?
- how well can the company cope with your future architectures? Do they support distributed systems,if needed?
- if you have existing code that you want to include, can they support you? Does the environment support it? How well does it match? How much effort is estimated by them and by you to do the job?
  Are they willing to do it (at fixed costs), showing confidence and giving you a guarantee? At which costs? Which time frame
- can they provide an evaluation package?
- how fast are they in their response?
- do they speak your language, not only in your home language, but also do they know your environment?
- is the product certified by PLCopen? At which level? For which language? How many updates after their certificate? Can they show (a copy of) the certificate?
- can they provide a compliance statement by sending the IEC 61131-3 feature tables showing clearly what they support?
- what are your main (expected) programming languages for this environment? How long are these languages supported? Which release are they on?

Remember: you don't want to be the guinea pig: testing takes time and costs money.

A good way to get started:

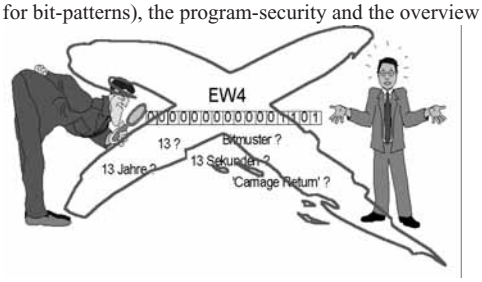
1. describe your (initial) requirements clearly on paper, including quotation procedure and deadline
2. send to all potential suppliers, minimal 5, preferably on the same day (fax)
3. note when the quotations get in, giving you a first impression of response speed
4. compare the overall quality of the offer
5. compare the fulfilment of your requirements
6. check the differences
7. talk to at least 3 companies

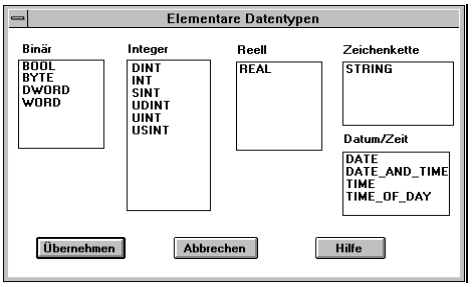
If you have any additions / suggestions, please let us know at evdwal@plcopen.org

How to recognize an IEC 61131-3 Programming system in 8 easy steps?

1. There is a solidly defined range of *Standard Data Types*, which exactly specifies how the content of a variable has to be interpreted.

Advantage: Thereby, that for each datatype only certain operations are allowed (e.g. mathematical operations for numerical data-types and not for bit-patterns), the program-security and the overview are improved.





2. The possibility exists to define *Derived Data Types* like *Fields* and *Structures*.

Advantage: the programming system supports possibilities as used in PC-High-Level-Languages. Matching data can be meaningfully grouped, and securely and easily used.

3. User-programs can be subdivided in exactly defined structuring elements, the Program Organization Units (POU) *Program*, *Function* and *Function Blocks*.

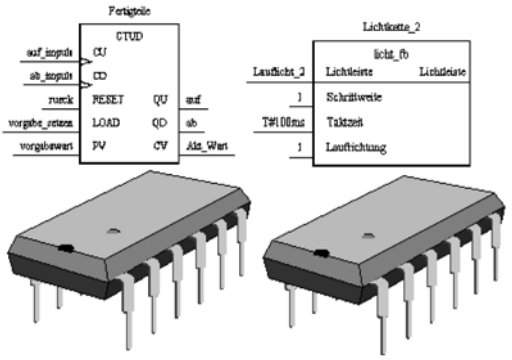
Advantage: The problem can be structured into sub tasks, making it much clearer than "spaghetti-programs." The spin-off of recurrent sub-tasks into own function blocks save in the programming effort

4. All Program Organization Units (POUs) can contain local data, i.e. data, which are only known and usable within this POU. This principle of data encapsulation stems also from the modern programming languages.

Advantage: A real decomposition of the work is possible, because the programmers do not need a on going coordination with respect to variables. Erroneous overwriting of variables is hardly possible anymore. POUs are address-independent and can be reused without any problems (see also point 5 and 6).

5. For the data-exchange between POUs there are well defined interfaces. Type and scope of the transfer are unambiguously defined.

Advantage: Recurrent functionalities can be transferred to libraries of Functions and/or Function Blocks. They are usable like "Black Boxes", therefore without knowledge of the internals, like Integrated Circuits with dedicated connections.



6. Functions and Function Blocks become pure symbolic, i.e. address and module independent programs.

Advantage: Through the connection between local data and pure symbolic programming, no unexpected interference between user-programs can occur. Function and Function Blocks are independent of the target system, and in many cases even independent supplier, and so reusable (see also point 8).

7. The used programming languages comply to those as specified within IEC 61131-3, i.e. comply with the unambiguously defined syntax and semantics. In addition, the standard Functions and Function Blocks are supported.

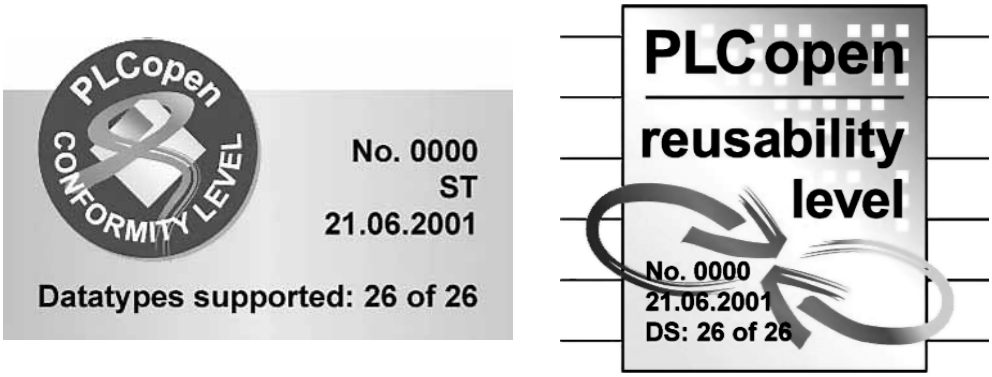
Advantage: users, having learned the languages and commands of the standard, can use this knowledge on different programming systems. The training-expenditure is reduced; users and especially service personnel meet a world-wide comprehensible and unified programming system. Programs and program parts can be used across systems.

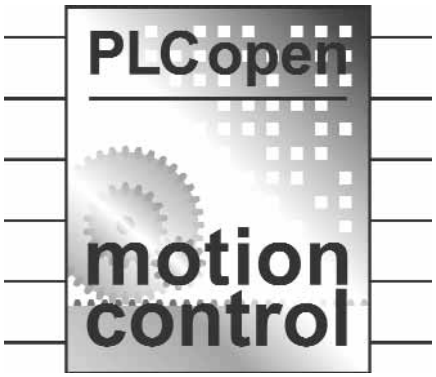
8. The Programming System is certified to one of the PLCopen defined compliancy levels, i.e. by an independent test-institute on conformity with the IEC 61131-3 standard.

Advantage: The user is assured that the used programming system complies to the standard, that he can reuse his knowledge with respect to IEC-programming and that the system is future-proof. With the certification at Portability Level he can exchange the Functions and Function Blocks, written compliant to the standard, with the common file-exchange-format with other certified systems, therefore saving time and money.

www.plcopen.org

Contributing to industrial automation – an organization to join.





YES

☐ **I am interested in PLCopen. Please keep me on the mailing list (free of charge)**
☐ **I want to become a member. Enroll me**

Name: .....
Position: .....
Company/ institute: .....
Department: .....
Address: .....
Postal code & city: .....
Country: .....
Telephone: ..... email: .....
Telefax: ..... www: .....

For membership application only

Type of membership: company / voting user / voting re-seller / non-voting user / non-voting re-seller / non-profit organisation / educational institute

Type of business: .....
Number of employees: .....
Date: ..... Place: ..... Signature: .....

Minimum annual fees. Please circle relevant group

Company Size	Voting Companies	Voting Users/ Resellers	Non-voting Users/ Resellers	Non-profit	Educational Institute
<100	€ / US$ 2,750	€ / US$ 1,375	€ / US$ 550		
100 .. 1000	€ / US$ 5,500	€ / US$ 2,750	€ / US$ 1,100		
>1000	€ / US$ 11,000	€ / US$ 5,500	€ / US$ 2,200		
				€ / US$ 900	€ / US$ 50

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PLCopen China
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PLCopen offerings

PRODUCTS & SERVICES	MEMBER FEE Currency: € / US$	NON-MEMBER FEE Currency: € / US$
Book: Progr. Ind. contr. syst. using IEC 61131, Lewis	69 / 86	69 / 86
Book: SPS standard: IEC 1131, Neumann et al.	50	50 / 50
Book: IEC 61131-3: Programming Industrial Automation Systems	76 / 95	76 / 95
Chinese version	15 / 19	15 / 19
Book: SPS-Programmierung mit IEC 61131-3 K.H John et al.	51	51
Book: IEC 61131-3 Programming Methodology	75 / 94	75 / 94
Book: Softlogic: Overcomming funel vision	17 / 21	17 / 21
Book: Grundkurs IEC1131-3	69	69
Advertisements in PLCopening		
1 page black/white	700 / 700	not possible
1/2 page black/white	400 / 400	not possible
Additional Newsletters in quantity	0.50 / 0.50	not applicable
Company profile catalogue	free of charge	free of charge
IEC 61131-3 Short description, English (in quantity)	0.50 / 0.50	not applicable
10th anniversary brochure: IEC in reality (in quantity)	0.50 / 0.50	0.50 / 0.50