MODERN DOCUMENTATION SYSTEM FOR INTEGRATED PROTECTION, CONTROL, AND MONITORING TERMINALS

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This paper compares the conventional and the modern, XML-based documentation systems from the user as well as from the producer point of view. It presents the composition of a complete system and the possibilities for its further development.

Modern protection, control, and monitoring devices are getting more and more integrated. They comprise within the same hardware unit a high number of different functions, like:

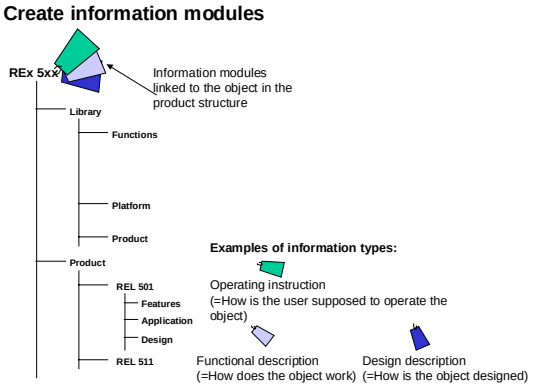
- Distance protection
- Line differential protection
- Directional OC E/F protection
- Auto reclosing function
- Synchro-check and dead-line check function
- Disturbance recording
- Control of circuit breakers and isolators
- Etc.

Each of older relays was usually presented by a corresponding documentation (user manual), which comprised necessary explanations of basic operating principles, setting instructions, testing and maintenance instructions, etc.

The complexity of each separate function within the modern terminals is very similar to the complexity of older relays with similar functionality, which have generally been built-up in a dedicated hardware.

Preparing the user related documentation systems today for the secondary terminals in power systems, industrial processes and production plants is becoming increasingly complex. This complexity results frequently in a package of bulky and non-standard documents. The situation becomes even more difficult when the documentation is maintained and updated as new system components are added or existing ones are modified.

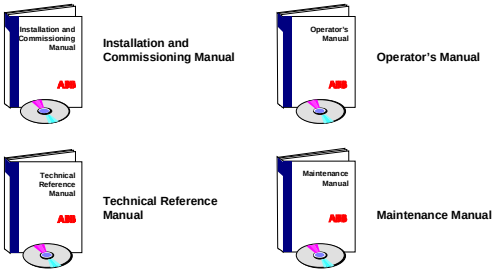
The modern and standardised documentation management system is easy to use and, at the same time adapted to tailored documentation handling. In this new concept, the documentation, in the form of information modules, is defined separately for each terminal, function or system and stored in a product structure.



Based on the current product structure and usage of different terminals, all the relevant information modules can be automatically assembled into a complete document (i.e. an information product). For a combined hardware and software product the user's manual will be divided into four separate media independent "books". This can be:

- Technical Reference Manual
- Installation and Commissioning Manual
- Operator's Manual
- Maintenance Manual

User's Manuals for combined hardware and software products

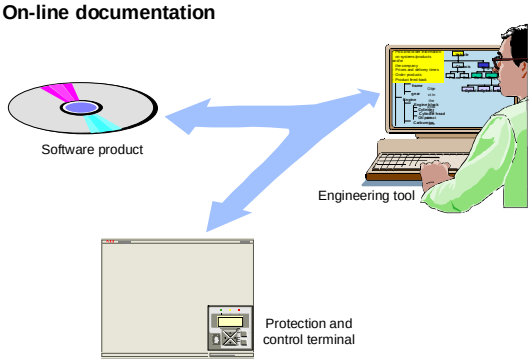


The different "books" have different target groups and different contents. Although a part of the information might be the same in some of the books, a commissioner might sometimes need the Technical Reference Manual for his job.

A user's manual can be delivered via the Internet, on a CD-ROM and on paper.
This means that the same information can be presented on multiple media without any major manual conversion. The first condition for this is that the information is stored in an intelligent and standardized format SGML/XML. The second condition is using style sheets, i.e. a kind of template that states how the information will be formatted at presentation.

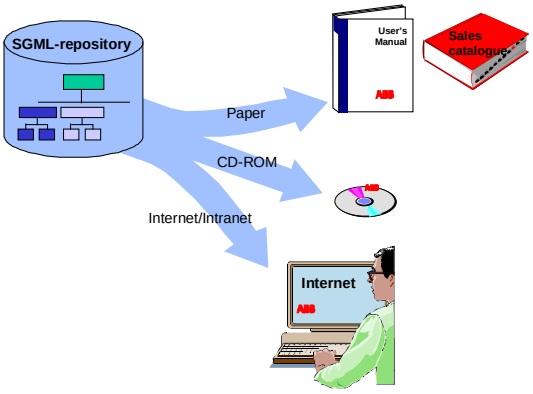
With a program in an engineering tool it is possible to automatically access the part of the manuals that correspond to the current session of the engineering tool (On-line documentation).

On-line documentation



According to the SGML/XML standard the information is stored separated from the format, the information is formatted at the presentation.

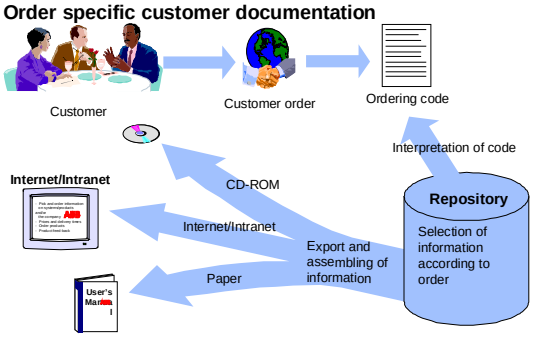
Documentation on multiple media



SGML/XML is an ISO standard (ISO 8879) enabling an international and standardized way of structuring information. Handling, reuse and administration are simplified by using SGML/XML.

The documents are available as a traditional paperback book, on CD-ROM or on the internet. They always reflect a customer specific order – we are discussing the "order-specific documentation"

Order specific customer documentation

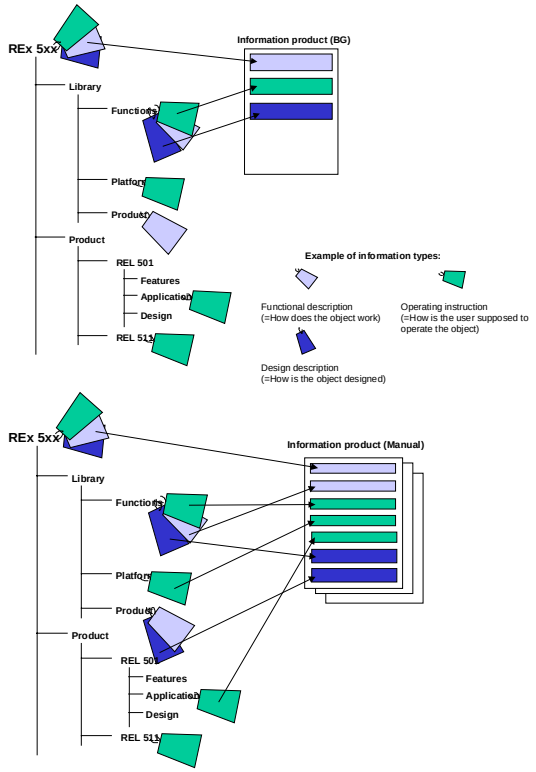


For the configurable products the attached documentation must mirror the product, i.e. the manuals contains only what is delivered.

The customer will be able to order a set of user's manuals without ordering a corresponding HW/SW product and select the preferred media for the manuals; which is Internet, paper or CD-ROM.

The documentation is at the same time dynamically updated as soon as a new or modified instruction composed with the help of XML is to be added, or when a new protection function is added or modified.

Create information products



One information module can be reused in a number of information products. In this way the information module is stored and administered at one location in the system but can be used in several different information products.

An information product, e.g. a manual or a catalogue, is created by linking a number of selected information modules to a virtual SGML/XML document.

Information products are then exported to a defined area (e.g. a web server). Those information products can then be viewed via a web browser (e.g. Internet Explorer or Netscape), with variable formats defined by XML-stylesheets.

The main benefits of this new document management system are that the information modules are always kept up to date as to reflect the actual situation and that the document handling is easier than is the case with traditional systems.

Users of the modern integrated protection, control, and monitoring terminals will benefit most from this modern documentation system. The product related documentation:

- Comprises only the information on hardware and software elements, which are built into a specific terminal
- Is specifically prepared for a special group of users: application engineer, commissioning engineer, design engineer, etc.
- Is always updated regarding all changes in different hardware elements, software functional blocks, etc.

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