



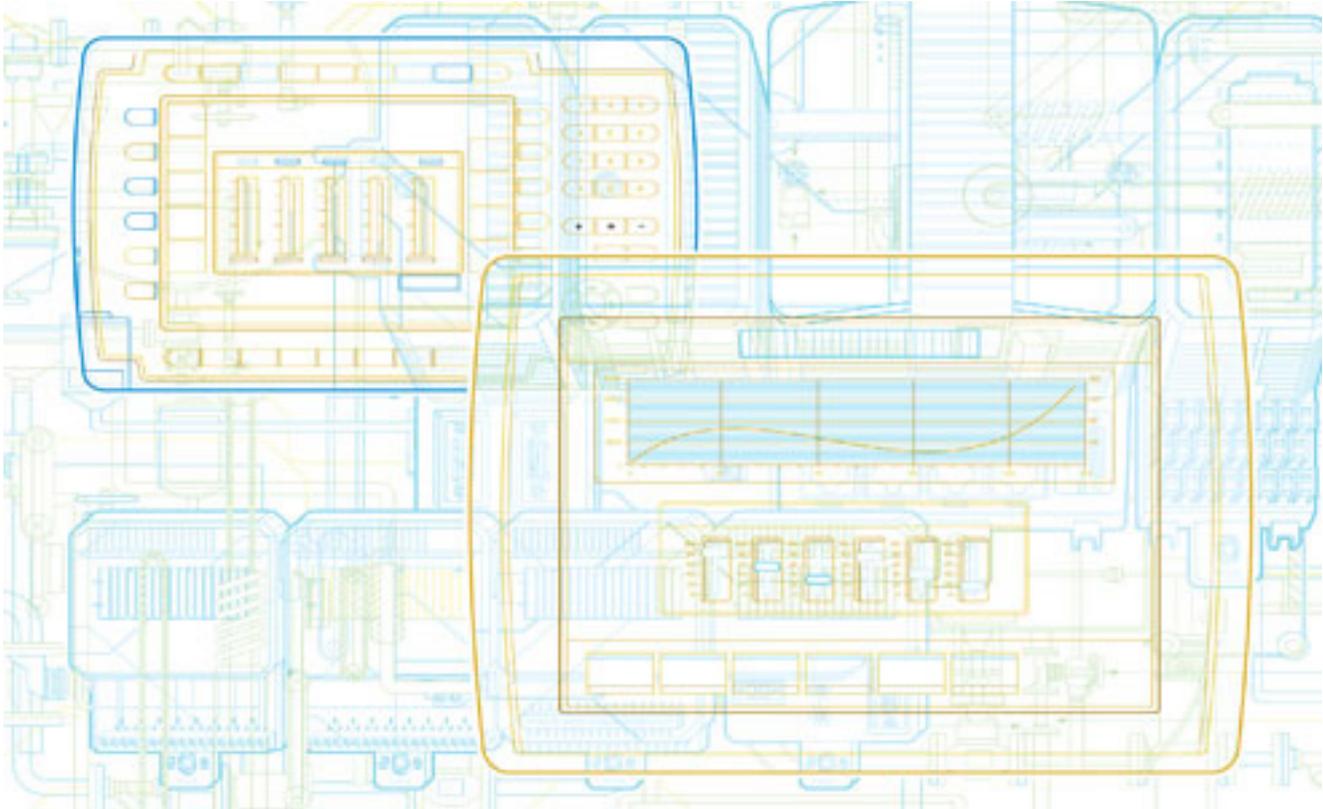
Compact Product Suite Control products for process automation

Power and productivity
for a better world™



Compact Product Suite

Intuitive automation products for the process industry



The Compact Product Suite is a comprehensive family of automation and control products for your system integration and OEM business. It is the keystone to any automation task in the process industry where engineers like to build their own solutions.

These products can be combined as a tailored solution or, as standalones to complement an existing solution. However you use them, ABB will ensure that you receive maximum benefit.

The Compact Product Suite is a set of automation building blocks that help you achieve the quality and productivity your production site deserves. It helps you focus on the missing block/component to add value to the production cell or simply get it going.

Whether it's process controllers, recorders, field interfaces, HMI's or safety controllers, our comprehensive suite of products enables automation with seamless perfection. When it comes to finding the best solution for your process, ABB's Compact Product Suite is your answer.

Every product in the Compact Product Suite portfolio provides the highest level of performance, security, connectivity and reliability in its class. This is the result of ABB's 50 plus years of proven expertise in automation control and technologies in the process industry.

From the process field, to panels, to your central operator room, Compact Product Suite will support all your automation needs.

Essentials of automation

Scale up, scale out or scale within your existing resource with Compact Product Suite

This suite gives you the components to design and implement tailored, customer-specific and cost-effective control solutions that increase productivity, maximize availability, improve efficiency and drive profitability.

Explore the infinite possibilities and benefits that Compact Product Suite can provide.

Essential Controllers Suite

- AC 800M and Compact Control Builder
- AC 700F and Control Builder F
- AC500 Programmable Logic Controller
- ControlMaster Panel-Mount Single-Loop Controller Series (CM10, CM30 and CM50)

Essential Connect Suite

- S800 I/O Family
- S800L I/O Family
- S700 I/O Family
- S500 I/O Family
- S900 I/O Family

Essential HSI Suite

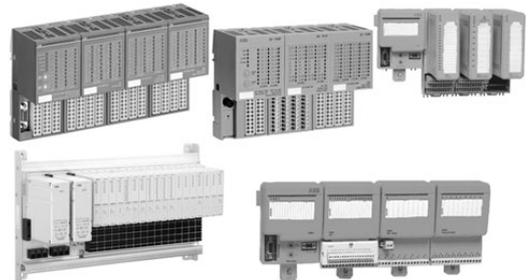
- Compact HMI PC-based SCADA
- Panel 800 Panel-based HMI
- ControlMaster CM15 Panel-Mount Indicator

Essential Recorders Suite

- ScreenMaster SM500F, RVG200 and SM3000 paperless recorders
- Commander C1300, C1900-R, C1900-RC, C1901, C1950 and C1960 Circular Chart Recorder Series
- Commander SR100-A and SR100-B Strip Chart Recorders

Essential Safety Suite

- AC 800M High Integrity Controller
- S800 High Integrity I/O Family
- Control Builder Safe



Essential Controllers

AC 800M, AC 700F, AC500 and ControlMaster CM10, CM30 and CM50

AC 800M



AC 800M

The AC 800M is a Programmable Application Controller, designed to achieve high availability for control applications in the process industry. The rich function block library includes several types of control loops, including advanced control and auto-tune capabilities as well as integration for ABB drives and motors. The controller communication by means of Ethernet includes on board RNRP redundancy along with a broad set of communication modules to connect to third-party devices. A superior redundancy concept allows for fast switch-over times and topologically separated CPU-modules. Several CPU modules are available, varying in terms of processing power, memory size and redundancy support. Priority controlled, time-based tasks allow the highest stability in even complex control tasks.

Supporting standard IEC 61131-3 programming languages, Compact Control Builder is the tool for engineering the control code and the hardware layout of AC 800M. It creates logic, sequential and analog control-intensive automation solutions for all existing controllers in the automation system to be handled in one database. The flash memory card allows loading applications without the need to utilize the engineering tool to support OEM and remote solutions.

AC 700F



AC 700F

Although it comes in a PLC shape, the AC 700F controller has the true DCS background of ABB's Freelance process control system. Its small footprint allows it to be used in smallest housings of your skid or OEM solution. It can easily connect to other controllers to build an integrated system. This makes it perfect when it comes to a modular concept, where one or several of the same skids are used in one application. The high signal density of S700 I/O gives an excellent value for money and space used. The S700 I/O modules can be directly plugged to the CPU module, with as many as eight direct modules connected to one controller. Serial and Profibus communication completes this controller. AC 700F also offers expanded flexibility via a pluggable SD card for controller backup, firmware updates and application download without engineering tool. Engineering with IEC61131-3 includes a broad process automation library plus the ability for user defined function blocks. In case operator stations are needed, an integrated Operation and Monitoring software called DigiVis can be utilized.

AC500



ControlMaster series



AC500 Programmable Logic Controller

Sometimes the application requires open and close loop control for machines or smaller and remote units. The AC500 family delivers a universal controller in a small form factor with a broad range of communication means designed for the manufacturing environment. Along with the small form factor and the very versatile and cost efficient S500 I/O family, it offers different performance levels and is the ideal choice for high availability, extreme environments as well as safety solutions. The AC500Eco series offers the most cost efficient solution, whereas the AC500 S safety controller supports SIL3 Safety levels.

ControlMaster Panel-Mount Single-Loop Controller: CM10, CM30 and CM50

This is a range of easy-to-use yet powerful universal process controllers. Each instrument provides a comprehensive display of process status using crystal clear, full color, TFT technology. The simple-to-use user interface delivers clear text prompts that make installation, commissioning and operation quick and easy. Suitable for basic through to demanding applications, its functionality includes cascade, feed forward, adaptive, predictive and ratio control strategies. The faceplate has IP66 and NEMA 4X environmental protection rating and communication options includes Ethernet, RS485, Modbus TCP/RTU and a web server for remote process monitoring.

Essential Connect S800, S800L, S700, S500 and S900 I/O Family

S800



S800

The S800 I/O is a distributed, highly modularized and flexible I/O system with an efficient design, providing easy installation of the I/O modules, process cabling and connection to drives systems. It provides high precision and comfort for process automation tasks. A tight integration into AC 800M and Freelance Engineering tool provide extra benefit to the user over standard Profibus I/O. Redundancy can be reached on all levels and the modules can easily be exchanged and reconfigured while under operation. S800 offers highest accuracy analog modules.

S800L



S800L

S800L I/O modules are both cost-effective and space-saving. They connect to any PLC or controller via Profibus. The S800L I/O is also fully integrated with the AC 800M advanced process controller. In addition, its modules can be freely combined with high-performance S800 I/O modules to bring advanced field interface functionality into any S800L configuration. Its cost-effective design at an installation depth of 59 mm makes it an economic and space saving choice for PLC applications in the process industry.

S700



S700

The S700 I/O is meant for applications where PLC I/Os have been traditionally used. The small footprint and flexible functionality per module allows cost-efficient automation solution. The AC 700F controller permits comfortable configuration and diagnostics in the Control Builder F engineering tool and in its DigiVis operator console. S700 I/O can be used as direct I/O together with the AC 700F controller, as well as remote I/O to any PLC with a Profibus master module. The equivalent S500 I/O Family provides even more communication means including Profinet functionality, but less integration into the controllers Engineering Tools and operator consoles.

S500



S500

The high signal density of S500 I/O gives an excellent value for money and space used. The S500 I/O modules can be directly plugged to an AC500 CPU, with as many as ten direct modules connected to one controller. It is an ideal solution for System Integrators and OEMs in machine automation. Used as a remote IO, a field- bus-neutral communication is provided by the patented ABB Fieldbus Plug to connect to virtually any desired field bus. The compact size and the variety of modules with combined functionality means substantial space savings in the control panel and a cost efficient design.

S900



S900

The S900 remote I/O system is designed for applications in the chemical, pharmaceutical and oil and gas industries. It can be mounted directly in process areas classified explosion hazard zone 1 (ATEX), significantly reducing installation costs. It communicates with controllers by means of redundant Profibus communication powered by a redundant power supply. Further savings can be achieved through S900's extended diagnostics and the use of HART®-compliant field devices. A field mounted IP66 variant with temperature range -20 to 60 °C is available.

Essential HMI

Compact HMI, Panel 800 and ControlMaster CM15

Compact HMI



Compact HMI

This SCADA system lets you use the latest ergonomic design to take full control of your process. Based on the premium technology of ABB's System 800xA DCS it can economically scale from applications with just 50 signals and one operator workplace to applications with up to ten workplaces and 10,000 signals. Compact HMI runs on PCs with MS Windows® 7 or Windows® Server 2008/2008 R2 (32-bit and 64-bit versions). A High Performance Graphics library and options for alarm management, text messaging and read-only remote access via ABB's Smart Client technology complete the offering.

Panel 800



Panel 800 Version 6

Panel 800 Version 6 is a user-friendly, intuitive and ergonomic operator panel that combines slim, space-saving dimensions with a comprehensive range of advanced functions. Explore modern controlling using scroll and swipe gestures to make your application intuitive and more efficient to navigate. Also - save a lot of screen space while you're at it.

On top of the standard panels PP871, PP874 and PP877, Panel 800 has two high-performance panels: PP882 and PP885, offering more power, functionality and flexibility. The panel supports online language switch and includes simplified traditional Chinese. The communication includes protocol conversion and secure separation of Ethernet networks.

CM15



ControlMaster CM15

This panel-mount indicator is a feature-packed 1/8 DIN universal process indicator. A crystal-clear, full-color, TFT display shows operators exactly the information they need to know and provides operation and configuration menus in full text, making the CM15 intuitive to use and very quick to install and commission.

Available as a basic indication-only model, or enhanced through plug and play function keys and I/O modules, the CM15 offers totalization, level, math, logic, counter and alarm functions, making it extremely flexible and able to solve many tricky application requirements. Modbus and Ethernet communication options ensure easy integration and connectivity to supervisory or control systems.

Essential Recorders

ScreenMaster Paperless Recorders and Commander Circular Chart Recorders

SM500F



SM500F

The SM500F is probably the world's first field-mountable paperless data recorder. Featuring seven process inputs, seven recording channels and it is available with wall, panel and pipe mounting options. It's fully sealed IP66 and FNEMA 4X enclosure means it is ideal for use in even the most hostile environments, including hosedown and dusty applications.

RVG200



RVG200

The RVG200 recorder takes the established operating and security benefits of the ScreenMaster range one step further. Features include touchscreen 'swipe' operation, front and rear USB ports for connecting peripheral devices, including a barcode scanner and keyboard, and Ethernet and RS485 communications.

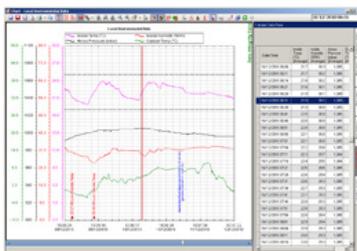
SM3000



SM3000

Using the SM3000, up to 36 channels can be recorded, with data arranged in a variety of views to provide users with a tailored view of their process. Six process groups are provided, allowing channels to be grouped together and individual displays created for different processes.

DataManager Pro



DataManager Pro

This PC-based analysis software provides the complete data collection, analysis and storage solution for data recorded by a ScreenMaster recorder. Via Ethernet communications, DataManager Pro can be integrated with any number of ScreenMaster recorders to create a fully automatic data gathering and storage system.

C1900



Commander Circular Chart Recorders: C1300, C1900-R, C1900-RC, C1901, C1950 and C1960

With over 100 years experience in the industry ABB's circular chart recorder offering is world class. Our range is extremely easy to use, offers up to four pens, NEMA 4X and IP66 environmental protection, integrated PID control and data logging.

- C1901: Basic functionality single pen circular chart recorder
- C1900: 1 to 4 pen general purpose circular chart recorder with integrated PID control
- C1960: Circular chart recorder/controller for profile control applications
- C1900R: 1 to 4 pen general purpose circular chart recorder
- C1950: Circular chart recorder/controller for pasteurization applications
- C1300: 1 to 4 pen advanced circular chart recorder

Essential Safety

AC 800M High Integrity Controller and S800 I/O High Integrity

AC 800M HI

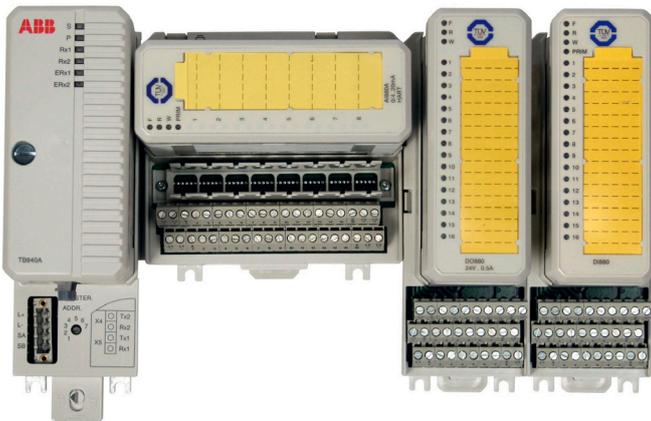


AC 800M HI

The AC 800M HI offers a SIL3 TÜV certified control environment for combining safety and business critical process control in one controller without sacrificing safety integrity.

The AC 800M High Integrity controller is achieved by combining the processor module (PM865) with the safety module (SM811). When configured as a SIL1-2 system, the AC 800M HI is realized in a 1oo1D structure by combining application execution in the PM865 with diagnostic and monitoring functions in the SM811/SM810. As a SIL3 system, it is achieved in a 1oo2D structure in both PM865 and SM811.

S800 I/O High Integrity



S800 I/O High Integrity

S800 I/O is a distributed, highly modularized and flexible I/O system, providing easy installation of I/O modules and process cabling. S800 I/O modules and its termination units can be mounted and combined in many different configurations to fit any space requirements or meet any application needs. A comprehensive assortment of I/O modules and accessories are available for safety critical and non-critical use. Within the S800 I/O family, there are SIL3 compliant modules that can be used for safety critical applications.

The High Integrity I/O is certified for IEC 61508-SIL3, DIN V 19250/DIN V VDE 0801-AK6 and EN954-1 Category 4. The High Integrity I/O are used together with a certified controller to comply with the standards. There are three modules that belong to the High Integrity I/O family that are certified for these standards, AI880/AI880A, DI880 and DO880. The modules are supported by the AC 800M controller PM865 only and have to use the optical ModuleBus modem TB840 when adding optical clusters.

Control Safe Engineering

Control Safe Engineering is a TUV-certified engineering tool for the programming of SIL applications including certified libraries, IEC61131-3 programming languages, access and override (force) control and difference reports.

The object oriented engineering environment with SIL compliant function libraries efficiently supports the entire safety lifecycle. The engineering environment includes safeguards against non-SIL compliant configurations. The engineering system will automatically limit user configuration choices and will prevent download if SIL requirements are not met.

Lifecycle services



A comprehensive customer service is worth gold

Service means a profitable investment in continually maximizing and optimizing the availability, performance, quality and security of a plant. ABB and our authorized value providers support covers the following areas:

- Customer Support Services
- Training
- Spare Parts & Logistics, Repair Shops
- Process, Application & Consulting Services
- Service agreements
- Extensions, upgrades and retrofits

Through the resulting specialization of our employees, we guarantee maximum competence for each task we perform. Whether it's more traditional service support such as commissioning and maintenance or individual consulting services – the result is measurable customer benefits.

Our comprehensive Life Cycle Services enable us to increase the value of your plant over its entire lifetime. The conventional, reactive service can reduce production downtimes, while the use of new technologies offers an increased number of capabilities for preventive service measures to identify and avoid cost-intensive faults at an early stage. Proactive services such as asset management or ongoing modernization increase the value of our customers' plants and give them a distinct competitive edge.

Life cycle management

We offer an unrivalled Life Cycle commitment to our customers: Our products are designed to last and to be taken to the next level when technology moves ahead. We will always thrive to offer you compatible, next-generation parts so that you can keep your control code without having to make major changes to it as you move to the next generation.

Moreover, ABB offers Automation Sentinel for selected software products, which is the essential life cycle management and support program for your control system from ABB. With this program, you can keep your control system up-to-date and maintain a flexible path to new technology. Automation Sentinel helps manage automation software assets with timely delivery of the latest releases, thus providing you with better productivity, lower support cost and simpler software management.

ABB's 'Evolution without obsolescence' policy provides for incremental, planned steps, adding new technologies or upgrading technologies in existing systems while protecting installed asset investments.

For more information about Automation Sentinel please refer to [Automation Sentinel Program - Lifecycle Management Program for Control Systems \(3BDD015294\)](#).

System 800xA 5.1 and feature releases

Improved user, system and plant performance



System 800xA is ABB's flagship Collaborative Process Automation System (CPAS) offering for all major industrial process manufacturing facilities globally. Since its introduction in 2004, nearly 9,000 systems have been installed across 100 countries. This large and growing installed base has helped make ABB the #1 DCS supplier in the world.

System 800xA serves as the foundation for a number of unique industry-specific automation applications. Removing the barriers in traditional distributed control systems, it provides unparalleled capacity to embed enterprise and plant systems, applications and devices, enabling plant-wide collaboration between people, systems and equipment.

System 800xA has been shown to improve engineering, operations, control and maintenance while reducing total cost of ownership. System 800xA also help operators to collaborate effectively with each other and the systems and equipment they monitor and control. With Feature Pack 4 functionality included it will be even better.

800xA 5.1 and feature releases – key highlights:

- We offer productized control room design by the introduction of Extended Operator Workplaces
- Integrated Alarm analysis for continuous analysis and optimization to avoid nuisance alarm
- Tabbed Navigation with Alarm Status
- Extended communication support for Foundation Fieldbus, Profinet and IEC 61850
- Increased Ethernet IP, DeviceNet, WirelessHART, PROFINET, UDP/IP (User defined) support
- Device Management HART provides full support for HART 7
- Simplified batch scheduling with one tool to organize parameters and schedule batch recipes
- The Batch Spreadsheet Scheduler can now be used on an office PC without the need of an 800xA system
- New Control Diagram Editor
- Increased virtualization support & doubled system capacity reduces the number of servers and installation costs
- Smart Client workplace for presenting 800xA information in the office environment
- SIL Inter-application Communication
- Protection Library for SIL3 Machine safety
- Industrial Defender Certification

Operator Effectiveness

Over a total life cycle, many important decisions are made by operators, decisions that have a great impact on safety, productivity and quality. Operator effectiveness can be optimized by focusing greater attention on the operator and on human factors.

Alarm Management

800xA 5.1 includes advanced alarm management capabilities that help users implement successful alarm management strategies. New Alarm Shelving and Alarm Analysis features have been added to help keep alarms in check. In addition to traditional reporting of alarm statistics, built-in Alarm Analysis displays are accessible to operators via graphics based on Microsoft Windows Presentation Foundation (WPF). This involves them in the process and helps ensure your alarm management strategy's continued success.

The feature release September 2011, Feature Pack 1 (FP1) includes enhancements to 800xA Alarm management that improve operator response to alarms (for information about the concept of feature packs, see page 7).

The new functionality Group Alarms enables display of a single 'grouped alarm' that represents multiple alarms reported from different sources related to a common cause in the system. This reduces the number of events listed, thereby helping operators handle key tasks with their full, undisturbed attention. By minimizing the number of alarm list entries that have to be read and assessed, alarm grouping helps operators work more effectively.

Another feature available in FP1 is the Alarm response navigation that speeds up decisions and action by providing fast navigation from an alarm to detailed information needed to handle it correctly. Trend display, faceplate and related documentation can all be brought up with just two mouse clicks.

In Feature Pack 4 we further improve the offering by the introduction of Alarm help and long term alarm analyses and reports.

In addition we introduce video surveillance and recording capabilities, this dramatically increases the transparency from the control room to the plant floor.

Control responsibilities

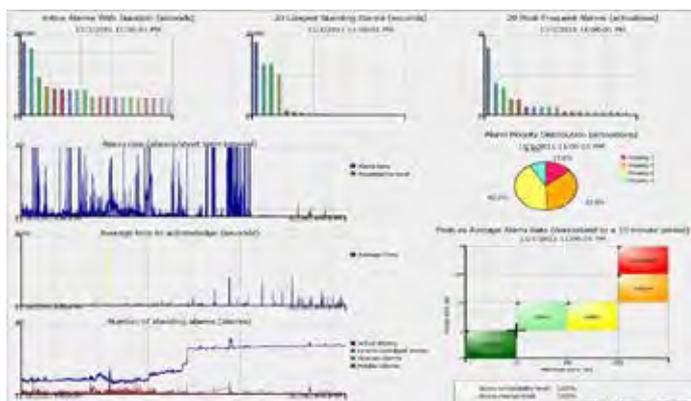
Another function introduced in 5.1 is Point of Control. This allows an operator in one area of a facility to request permission to take over the control a plant area or unit from the currently responsible operator. Once approved, permission to operate that part of the facility is transferred to the requesting operator and captured in the audit trail log. The area or unit alarm and event messages are now routed to the new operator, thereby reducing the number of alarms sent to the original operator.

New EOW workplaces

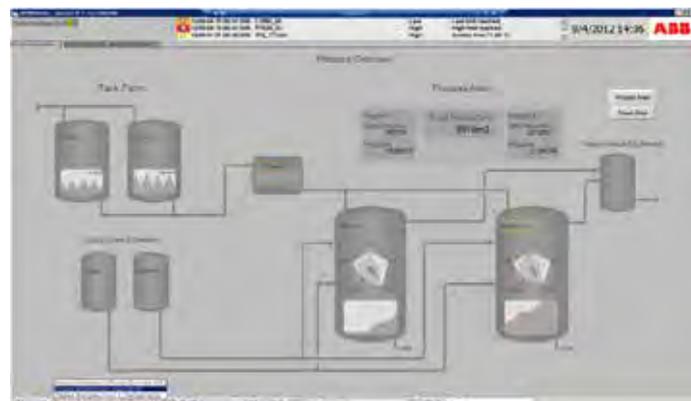
In FP4 we have four standardized, pre-package extended Operator Workplaces (EOW) that includes all of the necessary hardware and software to make it easier to create high performance local and remote control centers.

In FP4 we have also added high performance graphics elements, alarm history and reports, mobile client workplace and guide, smart client with PG2 graphic support, Video server and CAD Viewer, larger harmonized icons and much more...

1



2



- 1. Alarm analysis according to ISA 18.2 and EEMUA 191 that includes calculations of the 20 longest standing alarms, 20 most frequent alarms etc. |
- 2. Tabbed navigation, including alarm severity and status shown in buttons & tabs, promote operator responsiveness and effective navigation and action.

High performance HMI

The release of Feature Pack 1 enhances the high performance HMI with support for tabbed navigation, facilitating fast, intuitive and secure navigation between displays using buttons and tabs.

Tab-based navigation enables quick and direct access to primary displays and minimal keystroke access to secondary and associated displays, thus improving situation awareness and responsiveness to alarms and events. With the release of Feature Pack 3, alarm severity and status can be displayed in the buttons and tabs, further improving responsiveness and plant safety.

Another feature introduced in Feature Pack 3 is an enhancement to the application bar icons that enables larger size icons, making it easier for the operators to navigate to 800xA features. Also, Feature Pack 3 introduces the combined one line tool bar that is a collection of tools from the Display bar, the Application bar, and the Status bar. This saves vertical screen space and is well suited for wide screen displays, providing the operator with more display area and the simplicity of having one tool bar only.

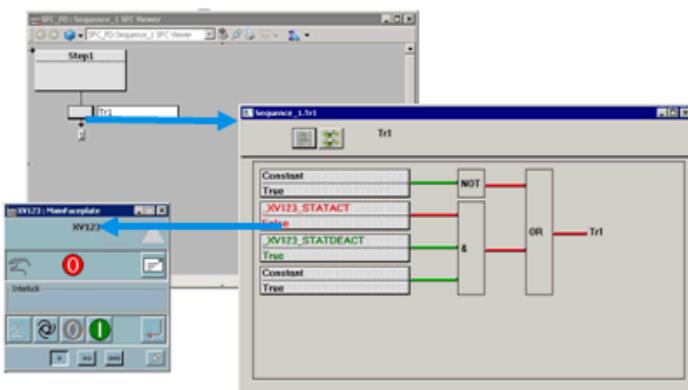
Furthermore, with Feature Pack 3 aspect links will now indicate if the link points to the previous display. This is useful when there are two or more aspect links and is an excellent complement to the existing display history.

Finally; Feature Pack 4 introduces the possibility for the operator to use high performance graphics elements, alarm help and web reports and use of 800xA mobility guide.

Operation of several systems

Multi-system integration promotes control consolidation since

1



1. SFC viewer-guided operator action | 2. Automation and power integration with IEC 61850

it makes it possible to supervise and operate several 800xA systems from one central control room in a safe and effective way. With FP1, integration capabilities are enhanced with MS support for Foundation Fieldbus and IEC 61850. Support for two subscribers to a provider is also available. Point of Control also applies for multi-system integration set-ups from FP1.

Sequential Function Chart (SFC) Viewer

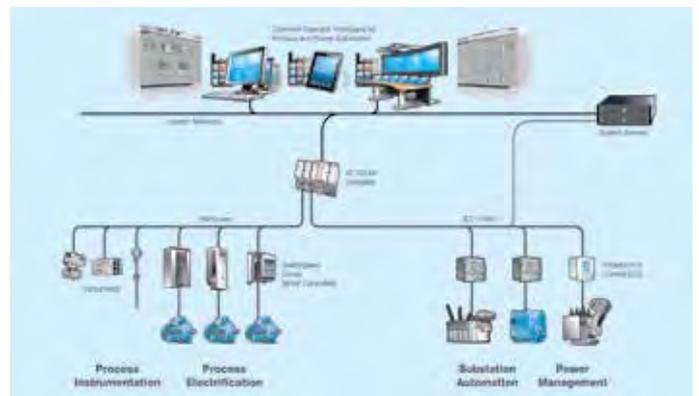
FP1 introduces guided operator action by SFC Viewer for AC 800M. The operator can navigate directly from the transition in the SFC Viewer to the context menu for the related object and bring up the faceplate, trend, etc. This speedy and accurate response to process upsets improves stability and availability.

Automation and power integration

By embedding power and process systems on the common 800xA platform, plants optimize the design and performance of their electrical and automation systems and gain additional benefits in reduced maintenance, engineering and overall lifecycle costs. According to ARC, typical savings can result in a 20% reduction in CAPEX (capital expenditures) and OPEX (operating expenditures) by integrating these two, usually separate, automation infrastructures.

To provide even deeper and wider integration with electrical systems, 800xA's IEC 61850 Communications Interface capability has been enhanced by increasing the number of supported Intelligent Electrical Devices (IEDs) per communication interface card and by improving alarm and event support.

2



The capacity of the IEC 61850 connectivity package has also been increased in FP2. It is possible to use 4 OPC servers per connectivity server. This doubles the capacity, or cuts the footprint for IEC 61850 servers in half, thus reducing installation costs.

In FP3 Function Designer IO Allocation now also supports IO fieldbus devices connected via IEC 61850, Profinet and Foundation Fieldbus Communication Protocols.

Enterprise Asset Management

An effective asset management strategy combines the needs of the production and maintenance organizations. It increases both equipment availability and production rate by providing insight into asset health, corrective action instructions and organizational visibility.

Integration of the maintenance system

Integrated CMMS is a key enabler for shifting to predictive maintenance by increasing the number of fault reports from operators, for example. This helps the maintenance department to attend to anomalies before they cause disturbances and unplanned shutdowns.

800xA provides extensive support for integration of EAM/CMMS maintenance systems (e.g. Mincom, Maximo, SAP, IFS, etc). The FP1 release supports integration of the latest versions of IBM Maximo (version 7.1) and SAP/PM ERP Central Component 6.0 (ECC6), as well as the previous ones.

Object diagnostics

Another important parameter for predictive maintenance is asset monitors that detect anomalies and provide maintenance with early warnings. To meet the increasing use of Control Loop Asset Monitors (CLAM), this capability has been increased to 500 CLAMs in one system with Rev A.

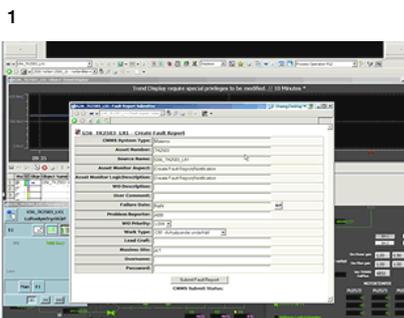
Control and I/O

Several performance enhancements make 800xA's already robust Control and I/O offering even more versatile, flexible, and scalable. The 5.1 version includes a new member of the AC 800M controller family, the PM891. This has approximately three times the clock speed (450 MHz) and four times the memory of its predecessor, making it the most powerful controller of its class. PM 891 helps plants do more with less, requiring fewer controllers for applications and providing 1-1 controller evolution for previous generation ABB and third-party controller platforms. In FP4 we release more powerful AC 800M controllers and some new I/O models and connectivity options to assist operators with the installation of field equipment such as Ethernet IP and UDP/IP communication.

Communication

800xA has added to and enhanced its portfolio of communication interfaces to help users further leverage its powerful integration capabilities. These include new communication interfaces for PROFINET, DeviceNet via Ethernet IP, and WirelessHART. 800xA's WirelessHART solution seamlessly integrates Pepperl+Fuchs WirelessHART Gateway, providing wireless connectivity to HART-enabled devices such as sensors and actuators, and making process variables and diagnostic data available in 800xA's controller, HMI, and integrated Asset Optimization application. 800xA's FOUNDATION Fieldbus interfaces also now support EDDL. These interfaces make it easier to access and use diagnostic data from smart instruments, regardless of manufacturer or physical device location.

Enhancements for more efficient and faster commissioning in Device Management for FOUNDATION Fieldbus are also included in the FP2 release. The traditional overview pane and life list in commissioning mode of Fieldbus Builder FF have been replaced by the Device List View and Diagnostic List View. Both lists give comprehensive overviews about all device data relevant for the FF commissioning steps.



1. Integrated CMMS | 2. PM 891 | 3. P+F WirelessHART Gateway

Engineering

800xA 5.1 includes multiple engineering improvements such as simplified bulk data handling when engineering FOUNDATION Fieldbus projects. In addition, three new features improve and streamline change management procedures.

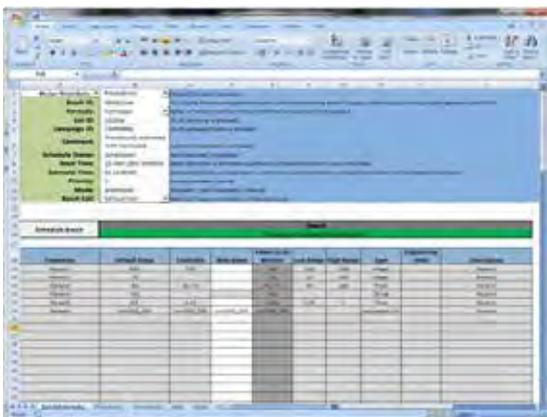
Task Analysis Tool lets users evaluate how their application will be executed based on the current task rates assigned prior to downloading. It clearly shows any latency or conflicts and then prevents the new application from being downloaded to avoid a controller error. It also performs 'what if' scenarios to pinpoint where problems may occur when modifying task execution cycle times.

Detailed Difference Report provides a way to easily see changes made in control applications and graphics, and reports exactly what has been modified, added, or removed in an easy-to-read user interface. It provides the engineer and quality personnel with precisely the information needed to pinpoint changes and evaluate their impact. This is especially useful in change management processes, as it can verify that no other changes have been made except the ones present in the change request. This can save hours of change request verification and testing.

With the release of FP3, Function Designer IO Allocation now also supports IO fieldbus devices connected via IEC 61850, Profinet and FOUNDATION Fieldbus Communication Protocols.

In FP3 a new Bulk Data Manager Excel template has been added that allows configuration of sequences in Excel. The SFC structure can be configured for Control Builder as well as for Function Designer sequences.

1



1. Simplified batch scheduling | 2. Task analysis tool

Bulk upload functionality for SFC Viewer has been made available on Control Applications in order to simplify engineering processes.

In FP4 we have a New Control Diagrams Editor, Task Analysis Tool, easier method of engineering IEC 61850 and much more.

Batch

Simple Batch and Parameter Management introduced in FP1 has in FP3 been enhanced to include new security features. These provide stricter user access on the Excel spreadsheet scheduler and user formulations. It also simplifies scheduling and improves stability and availability. Now users only need one tool to organize parameters and schedule batch recipes.

This provides all the information the operator needs to schedule batches in one simple application, easily integrated into the user graphics. As it requires little or no knowledge and training to use, operators can focus on the process instead of the tool. It's ideal for procedures where multiple formulations apply to one recipe.

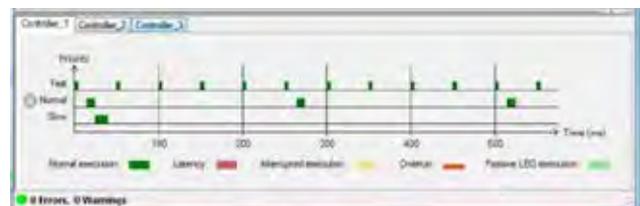
The multi-write capability to OPC is also improved in FP1. Application performance is improved with new 'putm' and 'subscribe' function calls now added to the batch expression language.

In FP3 a new Batch Scheduling aspect is available. This configurable graphic element allows a scheduling dialog to be embedded directly into a PG2 graphic display or through a separate overlap display to better match operational workflows. Batch Status, Priority and Mode OPC properties have been exposed providing improved visibility to operators during batch execution.

Virtualization

Virtualization reduces the physical number of PCs required for installations by as much as 75%. This significantly reduces footprint, energy consumption and maintenance requirements.

2



Thanks to FP1, virtualization with 800xA now supports SAN storage, which has the potential to increase availability. Virtual machines can either reside on hard disks local in the ESX server, or in a network storage device such as a Storage Area Network (SAN) server. In both cases, the storage is added to the ESX server and seen as data stores.

One advantage of having virtual machines residing on a SAN server is that they can be moved from one ESX server to another. Since both ESX servers have access to the same shared storage, Only the execution context needs to be moved, rather than the much larger virtual machine hard disk.

Increased support for virtualization is also introduced with FP1. The majority of 800xA servers are now supported for virtualized systems. The additional ones released in FP1 are DCI, Harmony, and IEC 61850. This further reduces the number of servers needed. Increased support for virtualization is also introduced with FP1. The majority of 800xA servers are now supported for virtualized systems. The additional ones released in FP1 are DCI, Harmony, and IEC 61850. This further reduces the number of servers needed.

System improvements

Security

800xA has been built with security in focus and has a rich set of security functions that support secure plant operation. Revision A includes important improvements in secure communications, password protection and overall system security recommendations.

Communication on the client/server network can be protected from unauthorized access using the Internet Protocol Security (IPsec), which will authenticate and encrypt all traffic on the network. Its purpose is to ensure that only legitimate nodes in the 800xA System can talk to each other, and hence prevent intrusion through nodes added to the network without proper configuration.

Support is introduced for configuring IPsec to only allow communication between clients and servers that are members of the system's Active Directory Domain and additional nodes that are explicitly defined. IPsec can be configured for a newly installed system as well as existing systems using 800xA 5.1 or later. The tool automates deployment of settings to all nodes, thus off-loading system administrators and minimizing risks for manual mistakes.

Support for 64bit

800xA 5.1 is available in a 64bit compatible version intended for Windows 7 64bit and Windows Server 2008R2. The existing 32bit version will continue to be supported.

System capacity

Increased system size is supported with the release of FP1. The number of nodes on a Control Network is increased to sixty. This includes controllers as well as servers. The increase supports consolidation and plant-wide control and monitoring systems. It also reduces the number of servers needed, thus lowering installation costs.

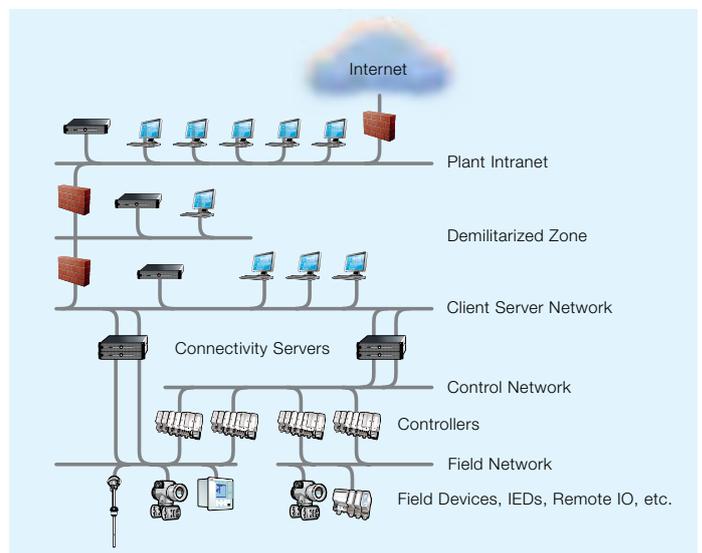
In addition, the number of rich clients (i.e. normal operations clients) is increased to eighty.

Finally, controller connectivity server throughput is increased. In practical terms, this means most installations can manage with one single pair of connectivity servers, thereby reducing installation costs.

Cyber security

Based on User Centered Design practices, the 800xA 5.1 includes a System Administration Console and a Security Update Tool to help keep the system running securely and at an optimum level. The Security Update Tool allows users to download Security Patches from Microsoft and cross match that to ABB's qualified list. Users can then create a loadable set of supported, tested security updates that can be rolled out to 800xA. This helps users save valuable time and effort while providing a more robust, secure system.

Cyber security with 800xA



Smart Client

Smart Client is a desktop client for presenting information from 800xA in the office environment. This improves plant visibility and production follow-up. Users have easy access to process data for KPIs and easy-to-use tools for analysis and reports for process optimization.

With the Smart Client 2.2 release, users can bring up 800xA PG 2 graphics directly in smart client, view live process data and trends, and navigate to related displays.



Smart client mill overview

The concept of feature packs

This is the conceptual model of how revisions and feature pack add-ons to 800xA relate to each other:

- A user can choose to update to the current revision and keep his installation at that level. This means he will get recently-found problems corrected. The functionality of his system will remain as it was at the time when the original installation was made. This improves the stability of the actual installation, plus that the user does not have to adopt any new functions, updated user interfaces, or anything else that differs from before the revision was installed.
- A feature pack adds functions and features to an installation. Users can optionally choose to install a feature pack.
- A feature pack may require a certain revision level of the system in order to work as intended. The install media for a feature pack also contain the required revision level. This means that by installing the feature pack, the system will be updated to the required revision level. Feature pack installation kits also normally contain the revision. This means that checking the installation usually requires only one entry in addition to the base installation. For some functional areas in 800xA, where the whole installation is replaced when an update is made, there is only one entry visible for the whole functional area.

800xA 5.1 and related feature releases

5.1	July 2010
5.1 Rev A	May 2011
Feature Pack 1 (FP1)	September 2011
800xA Smart Client v2.2	December 2011
5.1 64bit	February 2012
Feature Pack 2 (FP2)	March 2012
5.1 Rev B	July 2012
Feature Pack 3 (FP3)	September 2012
5.1 Rev C	December 2012
Feature Pack 4 (FP4)	April 2013

Operator Workplaces

Operator Workplaces

	Article no.	
Operator Workplace - Additional Client, 800xA 5.1 Includes Excel based reporting aspects, MS Excel is NOT included. Possibility to use up to two screens per workplace. (One Operator Workplace is included with Core System so this limit to Total-1). The total quantity of Operator Workplace-Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces - must not exceed 55.	3BSE061255R1	
Large Operator Workplace Client, 800xA 5.1 Includes one Operator Workplace with the possibility to use up to four screens per workplace and/or large desktop functionality. The total quantity of Operator Workplace - Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces - must not exceed 55.	3BSE061257R1	

Office Workplaces

Office Workplaces

Smart Client Workplaces - Includes access to system information from the office network. Includes: View Process Graphics 2 displays, Trend displays, Build/view business graphics, historic data, alarm & events analyse (H & AE analyse requires IM).

	Article no.	
Smart Client Workplace - Client 1-25 Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE070899R25	
Smart Client Workplace - Client 26-50 Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE070899R50	
Smart Client Workplace - Client 51-100 Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE070899R100	

Extended Operator Workplaces

Extended Operator Workplaces



EOW-x2

Operator Console including motorized ergonomic desk, 1 large screen area (3840x1080 mm (2 monitors)), 2 sets of 2 wide screen motorized monitors, multi-client keyboard, public speakers, directed sound shower speaker, high frequency lighting, operator video camera, remote graphical distribution (25 m fiber cables and interface cards).

Software included: 1 EOW Workplace, 3 Large Operator Workplaces, 1 Video Camera Input Channel, 3 Video Clients.

Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.

Article no.

3BSE070124R1



EOW-x3

Operator Console including motorized ergonomic desk, 1 large screen area (5760x1080 mm (3 monitors)), 2 sets of 3 wide screen motorized monitors, multi-client keyboard, public speakers, directed sound shower speaker, high frequency lighting, operator video camera, remote graphical distribution (25 m fiber cables and interface cards).

Software included: 1 EOW Workplace, 3 Large Operator Workplaces, 1 Video Camera Input Channel, 3 Video Clients.

Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.

3BSE070125R1



EOW-f2

Operator Console including desk, 1 large screen area (3840x1080 mm (2 monitors)), 2 sets of 2 wide screen monitors, multi-client keyboard, speakers, remote graphical distribution (25 m fiber cables and interface cards).

Software included: 1 EOW Workplace, 3 Large Operator Workplaces.

Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.

3BSE070126R1



EOW-f3

Operator Console including desk, 1 large screen area (5760x1080 mm (3 monitors)), 2 sets of 3 wide screen monitors, multi-client keyboard, speakers, remote graphical distribution (25 m fiber cables and interface cards).

Software included: 1 EOW Workplace, 3 Large Operator Workplaces.

Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.

3BSE070127R1

Extended Operations

Extended Operations

	Article no.	
Video Input Channel Connection to attach a video stream from one video camera for recording or live viewing in the system. Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE070134R1	
Video Client One concurrent client using video stream viewing from either recorded or live video source. Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE070135R1	
CAD Viewer View CAD drawings in DXF and DWG formats store in aspects DWG (version 13, 14, 2000, 2004, 2007, 2010) DXF(version 12, 13, 14, 2000, 2004, 2007, 2010). Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE072023R1	

Batch Management

Batch Management

	Article no.	
<p>Batch Base System, 800xA 5.1</p> <p>Provides the basic server functionality for batch management. The batch server includes 10 Batch Equipment and 2000 Batch Procedures. 1 Batch client included.</p>	3BSE061258R1	
<p>Redundant Batch Server Option, 800xA 5.1</p> <p>Provides redundancy for the basic server functionality for batch management. (Requires Batch Base System, 3BSE061258R1)</p>	3BSE061259R1	
<p>Batch Management Full Client, 800xA 5.1</p> <p>This Client feature provides access to Batch Management functions. The Client feature is based upon concurrent users, not physical workstation installation. Including SL and SQL server licenses. Requires Operator Workplace Client - 3BSE061255R1, 3BSE061256R1 or 3BSE061257R1; or Engineering Workplace Client - 3BSE061342R1. Maximum 40. One Client is included with the Batch Base System.</p>	3BSE061260R1	
<p>Batch Schedule Interface, 800xA 5.1</p> <p>This feature provides external interface to Batch Management via the Web Service scheduling commands. Included in this feature is the Spreadsheet Scheduling interface desktop version, unlimited license. No need to order Simple Batch Parameter Management if you have this feature.</p>	3BSE061261R1	
<p>10 Additional Batch Equipment, 800xA 5.1</p> <p>The number of batch equipment instances includes each piece of equipment configured in Batch Management including both Units and Shared Equipment Modules.</p>	3BSE061262R1	
<p>100 Additional Batch Equipment, 800xA 5.1</p> <p>The number of batch equipment instances includes each piece of equipment configured in Batch Management including both Units and Shared Equipment Modules.</p>	3BSE061263R1	
<p>Batch Advanced Phase Templates, 800xA 5.1</p> <p>This feature provides access to the batch advanced templates control modules for phases, units and shared equipment modules. For use with AC 800M controllers. Batch Phase Control library option, includes 2000 Advanced Phases.</p>	3BSE061264R1	
<p>Simple Batch Parameter Management - Spreadsheet Scheduling interface desktop version</p> <p>Batch spreadsheet recipe scheduling tool for desk top PC interface to Batch Management. Supports Excel 2007 and 2010. XP or Win 7, Requires Feature Pack 3.</p>	3BSE070685R1	

Basic Historian

Logging of signals for Operator trends is included in the core system for up to three months. Logging for a longer time period, archiving to external media like DVD, discs or web based Historian tools require Basic Historian Server.

Max 120,000 logs allowed in one server. (Includes archiving license, PDL, up to 12,000,000 events, MDI client and one Excel Data Access).

	Article no.
Basic Historian Server, 800xA 5.1 With storage and archiving functions for: history data, events (Message Log), and production data (Production Data Log-PDL). Includes Licenses for: 500 History Logs one Multi-Display Interface (MDI) client one Display Builder for MDI one Desktop Trend client one Excel Data Access Batch reports with trending requires an additional licensed option, see Historian Data Access Options.	3BSE061265R1

History Logs

Number of initial Information Management Hierarchical Logs in the system. Each signal to be logged counts as one log. Note: Information Management provides only Hierarchical Logs. (Total max 300,000 and max 50,000/Server.)

	Article no.
100 History Logs, 800xA 5.1	3BSE061266R1
1,000 History Logs, 800xA 5.1	3BSE061267R1
15,000 History Logs, 800xA 5.1	3BSE061268R1

Dual History Logs

For parallel logging in two history servers. (Two Basic Historian Servers are required).
 Number of initial Information Management Hierarchical Logs in the system. Each signal to be logged counts as one log. Note: Information Management provides only Hierarchical Logs. (Total max 150,000 and max 50,000/Server.)

	Article no.
100 Dual History Logs, 800xA 5.1	3BSE061269R1
1,000 Dual History Logs, 800xA 5.1	3BSE061270R1
15,000 Dual History Logs, 800xA 5.1	3BSE061271R1

Consolidated History Logs

Consolidated logs collect data from multiple History Servers and store it in a single location. This provides a common history repository for viewing and reporting. (Total max 300,000 and max 50,000/Server.)

	Article no.
100 Consolidated History Logs, 800xA 5.1	3BSE061328R1
1,000 Consolidated History Logs, 800xA 5.1	3BSE061329R1
15,000 Consolidated History Logs, 800xA 5.1	3BSE061330R1

Historian Display and Reporting Options

	Article no.
Display Builder for MDI - Additional Client, 800xA 5.1 Provides the ability to create MDI information displays for desktop applications.	3BSE061331R1
Multi-Display Interface (MDI) - Additional Client, 800xA 5.1 (Max 64 per Server). Provides the ability to view MDI information displays for desktop applications.	3BSE061332R1
Desktop Trends - Additional Client, 800xA 5.1 Provides trend viewing for desktop applications. Includes web enabled trend display for long and short term history and stock ticker like viewer. (Max 64 per Server).	3BSE061333R1

Historian Data Access Options

To access historical data through SQL from third party applications.

Batch Reports with trending requires the ODBC Server (3BSE061335R1) and ODBC Client (3BSE061336R1) option. This option provides the links necessary to connect the Oracle database (PDL) and the numeric log and process data.

Applications which utilize commercial third party reporting tools should also include the ODBC Server (3BSE061335R1) and ODBC Client (3BSE061336R1) option. The number of client connection is based on whether the applications utilizes the connection directly or indirectly. If the connection is made indirectly (using Oracle), then the client connection requires is only one. If the client connections are direct, then the number of clients should equal the number of concurrent users.

	Article no.
Excel Data Access, 800xA 5.1 To access historical data through SQL from third party applications. Used to access historical data in Excel from non 800xA PC's. For 800xA Client PC's Excel Data Access is included. (Max 64 per Server).	3BSE061334R1
ODBC Historical Data Server, 800xA 5.1 ODBC, includes third party code. (One per server.)	3BSE061335R1
ODBC Client Connection, 800xA 5.1 ODBC Clients are purchased separately from the ODBC server. (Max 10 per ODBC Server.)	3BSE061336R1

800xA History Signals - Logs

History signals capable of storing actual and historic values retrieved from 800xA, Heritage ABB DCS systems and OPC sources. The signals include logging, trending, calculations and archiving. (Max 75,000 per Server node, signal storage for up to 6 data sources per Server).

	Article no.	
800xA History Signals - Basic 100 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067077R1	
800xA History Signals - Basic 1000 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067077R10	
800xA History Signals - Basic 15000 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067077R150	

800xA Dual History Signals - Logs

History signals for parallel logging in two history servers.

The number of dual history signals should match the number of history signals

	Article no.	
800xA Dual History Signals - 100 signals Note: At pricebook release a TSA was NEEDED for this item. Please, check current need of a TSA in the TSA Database before ordering.	3BSE073477R1	
800xA Dual History Signals - 1000 signals Note: At pricebook release a TSA was NEEDED for this item. Please, check current need of a TSA in the TSA Database before ordering.	3BSE073477R10	
800xA Dual History Signals - 15000 signals Note: At pricebook release a TSA was NEEDED for this item. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067079R150	

External Data access to 800xA History Signals

External access to history data via OPC and ODBC connectivity. This gives access to both, the current and the historical data. (Same size as total number of 800xA History Signals).

	Article no.	
Data Access to 800xA History Signals - 100 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067079R1	
Data Access to 800xA History Signals - 1000 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067079R10	
Data Access to 800xA History Signals - 15000 signals Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE067079R150	

Control

Control Software Licenses

The licensing model for the Control Software Integration has changed in 800xA 5.1. Licensing is now scaled on installed controller capacity instead of licensing on connected signals and devices to the controllers (CLPs). This change has been made to make the calculation of required Control Software licenses easier. Each installed controller or redundant pair in the plant requires a separate Control Software license, which is ordered through the price list. The easiest way to calculate the licenses is by using the 800xA Wizard. Each controller type has its own license, where the price of it depends on the capacity of the controller.

If a Control Software license that is too small is chosen initially, it is possible to upgrade to a larger one by ordering one, or several expansion items. The 800xA Wizards helps to do the calculation in this scenario as well. Each PM type has internally a unique Controller Capacity Points figure that relates to the capacity for the controller.

While ordering the different controller licenses, the total Controller Capacity Points are automatically calculated and summed up in the license. The 800xA system validates the actual points count against the current license; the license will be granted as long as there are enough points in the license.

	Article no.	
PM851/PM851A Software License, 800xA 5.1 13 Controller Capacity Points	3BSE061897R1	
PM856/PM856A Software License, 800xA 5.1 25 Controller Capacity Points	3BSE061898R1	
PM860/PM860A Software License, 800xA 5.1 40 Controller Capacity Points	3BSE061899R1	
PM861/PM861A Software License, 800xA 5.1 50 Controller Capacity Points	3BSE061900R1	
PM864/PM864A Software License, 800xA 5.1 67 Controller Capacity Points	3BSE061901R1	
PM865 Software License, 800xA 5.1 67 Controller Capacity Points	3BSE061916R1	
PM866 Software License, 800xA 5.1 100 Controller Capacity Points	3BSE061902R1	
PM891 Software License, 800xA 5.1 150 Controller Capacity Points	3BSE061903R1	

Safety

Enabler for combined PA Control and Certified Safety software

	Article no.	
AC 800M High Integrity and Process Control, 800xA 5.1 One fixed license feature per AC 800M controller running both non-SIL and SIL applications in the same controller.	3BSE061341R1	

Asset Optimization

	Article no.	
<p>100 Asset Monitors, 800xA 5.1 Asset monitoring and Basic Asset Monitor Library. Each Aspect Object being monitored by one or more asset monitors counts as one.</p>	3BSE061350R1	
<p>1000 Asset Monitors, 800xA 5.1 Asset monitoring and Basic Asset Monitor Library. Each Aspect Object being monitored by one or more asset monitors counts as one.</p>	3BSE061351R1	
<p>Generic Heat Exchanger Asset Monitor, 800xA 5.1 It monitors the performance against standard operating parameters independent of type of heat exchanger.</p>	3BSE061352R1	
<p>Shell and Tube Heat Exchanger Asset Monitor, 800xA 5.1 It monitors the performance against standard operating parameters based on the size of shell and tube heat exchanger.</p>	3BSE061353R1	
<p>Advanced Harmony Control System Monitoring, 800xA 5.1 Enables Harmony Control Network monitors for diagnostic monitoring, reporting, and analysis.</p>	3BSE061354R1	
<p>100 Control Loop Asset Monitors, 800xA 5.1 Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the controller and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.</p>	3BSE061355R1	
<p>300 Control Loop Asset Monitors, 800xA 5.1 Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the controller and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.</p>	3BSE064667R1	
<p>500 Control Loop Asset Monitors, 800xA 5.1 Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the controller and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.</p>	3BSE064668R1	
<p>PC, Network and Software Monitoring, 800xA 5.1 Enables monitoring & supervision of IT assets.</p>	3BSE061356R1	
<p>800xA Maximo Integration, 800xA 5.1 Enables integration into Maximo for work order management. Application Engineering available through ConsultIT. At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE061357R1	
<p>800xA SAP / Plant Maintenance Integration, 800xA 5.1 Enables integration into SAP for work order management. Application Engineering available through ConsultIT. At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE061358R1	

Device Management & Fieldbuses

Device Management HART

For HART devices to be accessed using Device Type Manager (DTM's) within System 800xA. Includes HART Device Library with generic and specific HART Device Aspect Objects incl. DTM's, I/O DTM for S800 and S900, HART Instruments Asset Monitor Library and OPC Server. Each HART device aspect object accessed with DTM counts as one. (Max 2500 per Connectivity Server if OPC Communication is used. For details refer to System Guide)

	Article no.	
100 HART Device Aspect Objects, 800xA 5.1	3BSE061359R1	
1,000 HART Device Aspect Objects, 800xA 5.1	3BSE061360R1	
10,000 HART Device Aspect Objects, 800xA 5.1	3BSE061361R1	
HART Multiplexer Connect, 800xA 5.1 Enables HART Device Integration to connect to HART devices using HART Multiplexers.	3BSE061362R1	

Device Management FOUNDATION Fieldbus

For FOUNDATION Fieldbus (FF) devices to be accessed using Fieldbus Builder FF within System 800xA. Includes FF Device Library with FF Device Aspect Objects, FF Instruments Asset Monitor Library and OPC Server. Each FF device aspect object counts as one. (Max 1000 per Connectivity Server. For details refer to System Guide.)

	Article no.	
100 FF Device Aspect Objects, 800xA 5.1	3BSE061363R1	
1,000 FF Device Aspect Objects, 800xA 5.1	3BSE061364R1	
10,000 FF Device Aspect Objects, 800xA 5.1	3BSE061365R1	

Device Management PROFIBUS

For PROFIBUS DP/PA devices to be accessed using Device Type Manager (DTM's) within System 800xA. Includes PROFIBUS Device Library with specific PROFIBUS Device Aspect Objects incl. DTM's, I/O DTM for S800 and S900, and PROFIBUS Instruments Asset Monitor Library. Each PROFIBUS device aspect object accessed with DTM counts as one. (Max 2500 per Connectivity Server if OPC communication is used. For details refer to System Guide.)

	Article no.	
100 PROFIBUS Device Aspect Objects, 800xA 5.1	3BSE061366R1	
1,000 PROFIBUS Device Aspect Objects, 800xA 5.1	3BSE061367R1	
10,000 PROFIBUS Device Aspect Objects, 800xA 5.1	3BSE061368R1	

Device Management & Fieldbuses

IEC 61850 Connect

For order of IEC 61850 related products, local organizations must comply with the Demands on the Purchaser to secure successful sales of IEC 61850 with System 800xA. Ref doc, 3BSE058798.

	Article no.
<p>IEC 61850-Ed1 Connect, 800xA 5.1</p> <p>Allows clients to access data directly from electrical devices (IEDs). Handles alarms from IEDs. Each item includes one IEC61850 OPC server instance and IEC 61850 Substation Operation Library with Faceplates to control substation equipment (Bay, Breaker, Switch,...) is included.</p>	3BSE061369R1
<p>Redundant IEC 61850-Ed1 Connect Option, 800xA 5.1</p> <p>Allows operation clients to access data and alarm and event values from Intelligent Electronic Devices (IEDs) through redundant Connectivity Servers.</p> <p>Requires IEC 61850-Ed1 Connect. The number of Redundant IEC 61850 OPC server instance licenses shall be less then or equal to the number of IEC 61850 OPC server instances, when redundancy is chosen.(max. 16 per System).</p>	3BSE061370R1

Libraries

Libraries

	Article no.
<p>INF190 Function Code Library for AC 800M, 800xA 5.1</p> <p>Requires separate media.</p>	3BSE061211R1
<p>MOD 300 CCF Library for AC 800M, 800xA 5.1</p> <p>Requires separate media.</p>	3BSE061210R1
<p>TCP Communication Library License</p> <p>Control functions to create TCP based communication protocols in the AC800M controller. Once licence is needed for each controller using the library.</p> <p>Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE070889R1
<p>UDP Communication Library License</p> <p>Control functions to create UDP based communication protocols in the AC800M controller. Once licence is needed for each controller using the library.</p> <p>Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE070891R1
<p>Machine Safety Library License Points</p> <p>Control functions for machine safety applications. Same amount of library points is needed as the summed up controller capacity points using the library.</p> <p>Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.</p>	

Localization

National Language Support (NLS) is intended for the localization of the operator interface to the desired language. NLS contains a set of functions that are harmonized with the Windows regional settings to enable a multilingual environment for the System 800xA.

The System 800xA supports translations, mainly the operator interface and the operator manuals as shown in the Table 3 and Table 4. The translation, or System 800xA Language Package, is implemented as a system extension and is possible to install without stopping the system.

The NLS Localization Guide describes what and how localization can be performed by a project with or without an installed Language Package. The English version of the Windows operating system is required. The System 800xA Language Packages can be downloaded free of charge from ABB Library.

Table 3. Supported Language Packages for Functional Areas

Language Packages	Functional Areas							
	Base System	Safety	SMS & eMailing	*Asset Optimization	FOUNDATION FIELDBUS	Batch Management	** Information Management	* IEC 61850
English (default)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chinese	Yes	Yes		Yes	Yes	Yes	Yes	
French	Yes	Yes	Yes				Yes	
German	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Russian	Yes	Yes					Yes	
Spanish	Yes	Yes	Yes				Yes	
Swedish	Yes	Yes	Yes			Yes	Yes	Yes

* Only system messages

** Storage of messages in local language

Table 4. Supported Language Packages for Connectivity

Language Packages	Connectivity			
	800xA for AC 800M	800xA for Advant Master	PLC Connect	800xA for Melody
English (default)	Yes	Yes	Yes	Yes
Chinese	Yes	Yes	Yes	
French	Yes	Yes		
German	Yes	Yes		Yes
Russian	Yes	Yes		
Spanish	Yes			
Swedish	Yes	Yes		

Localization

System 800xA Language Package

	Article no.	
System 800xA 5.1 Chinese Language Package	9ARD183928-001	
System 800xA 5.1 French Language Package	9ARD183928-002	
System 800xA 5.1 German Language Package	9ARD183928-003	
System 800xA 5.1 Russian Language Package	9ARD183928-004	
System 800xA 5.1 Spanish Language Package	9ARD183928-005	
System 800xA 5.1 Swedish Language Package	9ARD183928-006	

Translated Operator Manuals

	Article no.	
Extended Operation in Chinese	3BSE036904-510	
Extended Operation in French	3BSE036904-510	
Extended Operation in German	3BSE036904-510	
Extended Operation in Russian	3BSE036904-510	
Extended Operation in Spanish	3BSE036904-510	
Extended Operation in Swedish	3BSE036904-510	

Installation and Localization

	Article no.	
NLS installation manual	2PAA102031	
NLS localization guide	2PAA101940	



System 800xA 6.0 AC 800M, Control and I/O Overview

It's all about control

AC 800M Control and I/O seamlessly integrate traditionally isolated Process, Power and Safety devices and systems into the 800xA system environment, thereby extending the reach of the automation system to all plant areas. The result is a simplified, software representation of the plant, from simple on/off-type switches and valves to smart field devices, dedicated control subsystems, variable-speed drives, intelligent switchgear, protection relays (IED) and popular PC-based supervisory systems.

ABB's Aspect Object technology makes all information in plant devices available and presented in a consistent, ready-to-use manner at the controller, engineering, and process visualization levels. Process objects include familiar items such as motor and valve controls. They can also include Operator interface objects, such as faceplates, trend displays, and other graphic elements, engineering objects and maintenance support objects. In this manner, AC 800M Control and I/O provide system applications with transparent, real-time access to all connected field devices, for everything from configuration and setup to production monitoring and maintenance.

Comprehensive maintenance features reduce downtime

AC 800M Control and I/O contribute to lower maintenance costs through a comprehensive set of self-diagnostics. All modules are equipped with front-panel LED displays that show faults and degraded performance.

Modules can report these errors to operators and maintenance personnel as alarm and event messages - and the system forwards them to key plant personnel by e-mail and/or SMS. For information on reporting features, see the 800xA Operations Overview document.

AC 800M Control and I/O can be fully integrated with the 800xA's Asset Optimization features to electronically submit fault reports to a computerized maintenance management system as a basis for work orders, thereby streamlining maintenance processes. For more information on 800xA Computerized Maintenance Management System (CMMS) integration features, please refer to the 800xA Asset Optimization Overview document.

Modules can be replaced under power and are keyed to ensure replacement with the proper module types. The application and data can also be stored in Flash memory to secure its contents e.g. after a power failure or during replacement or transportation. AC 800M Control and I/O also support on-line upgrading of embedded firmware in CPUs and communication modules to avoid downtime.

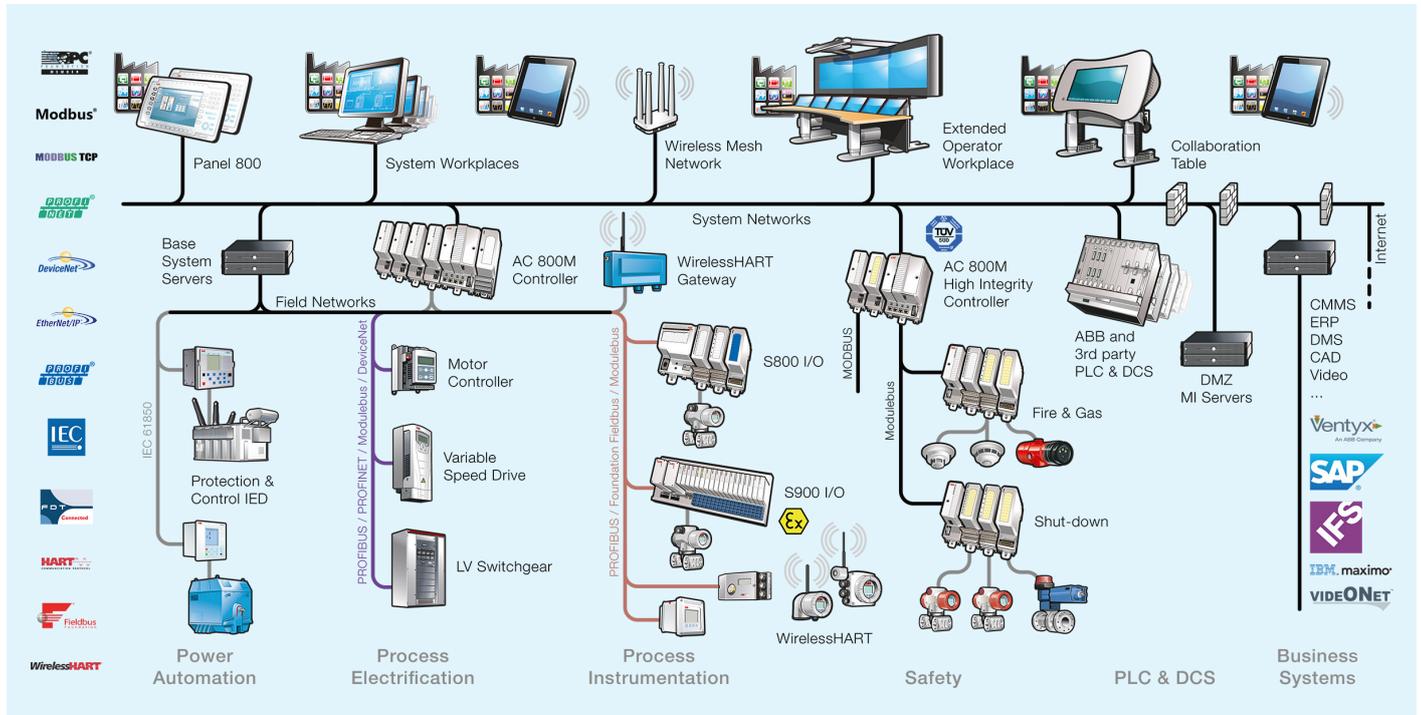




Features and benefits

- Common Environment for Process and Power Automation and Safety: The High Integrity controller provides the ability to combine safety loops with control applications even within the same controller to facilitate maximum utilization of process equipment. The support of the IEC 61850 standard for substation makes System 800xA an efficient platform for a combined Process and Power Automation solutions.
- Fault Tolerance for Maximum Plant Availability: Robust design, distributed functionality and highly flexible redundancy options secure productivity, yield, and return.
- Open Architecture Reduces Lifecycle Costs: Industry-standard fieldbus, network, wireless and data interchange protocols are supported, making it easy to integrate third-party plant systems.
- Comprehensive Maintenance Features Reduce Downtime: Comprehensive self-diagnostics and hot-swap capability reduce maintenance costs and increase uptime and plant productivity.
- Flexible I/O for all Plant Environments: A full line of industrial I/O types including intrinsically safe and SIL-rated. Packaging and mounting options are available for remote and local I/O installations.
- Wide-ranging Control Functionality Meeting all Needs: Controller software to fit all Process, Power and safety applications, from simple to complex, discrete to continuous, and basic regulatory to advanced expert applications.
- HART pass-through
- Redundancy on all levels, also on I/O module level
- High Integrity I/O modules certified to SIL3
- I/O modules with Intrinsic Safety interfaces

System 800xA configuration



Collaboration between people, systems, and equipment

In order to be competitive, various plant entities, departments and personnel have to work as one flexible, integrated, collaborative environment. For this to be accomplished, an automation platform with incredible connectivity capabilities is needed.

Collaboration is a necessity to increase engineering efficiency, asset utilization, energy savings, and operator effectiveness.

System 800xA's 'xA' stands for Extended Automation and utilizes the Industrial IT architecture, which was built for collaboration in a fully redundant, reliable environment. It provides connectivity to all seven ABB DCS systems, as well as other ABB and 3rd party plant systems and applications. In addition, System 800xA's integration capabilities extend from Process Automation to Power Automation and Safety for highest operator effectiveness and optimized control.

The controller is the heart of the control system and often

taken for granted as a commodity. This is not the case with System 800xA.

800xA's flagship controller, the AC 800M, has the ability to integrate various networks, fieldbusses, serial protocols, and I/O providing seamless execution of advanced and unhindered process control strategies as well as functional safety, electrical, quality control, and power management applications.

By permitting installation in the field, close to sensors and actuators, S800 I/O reduces the installation cost by reducing the cost of cabling. And thanks to features such as hot swap of modules, on-line reconfiguration and redundancy options, it contributes to keeping production -- and thereby profits up.

Scalable, cost-effective design



AC 800M Control and I/O provide the functionality to support the entire production facility's control requirements, from discrete and continuous to batch and advanced control and safety applications.

Through its modular design, AC 800M controllers and associated I/O options contribute to lower costs, higher engineering quality and higher operating efficiency.

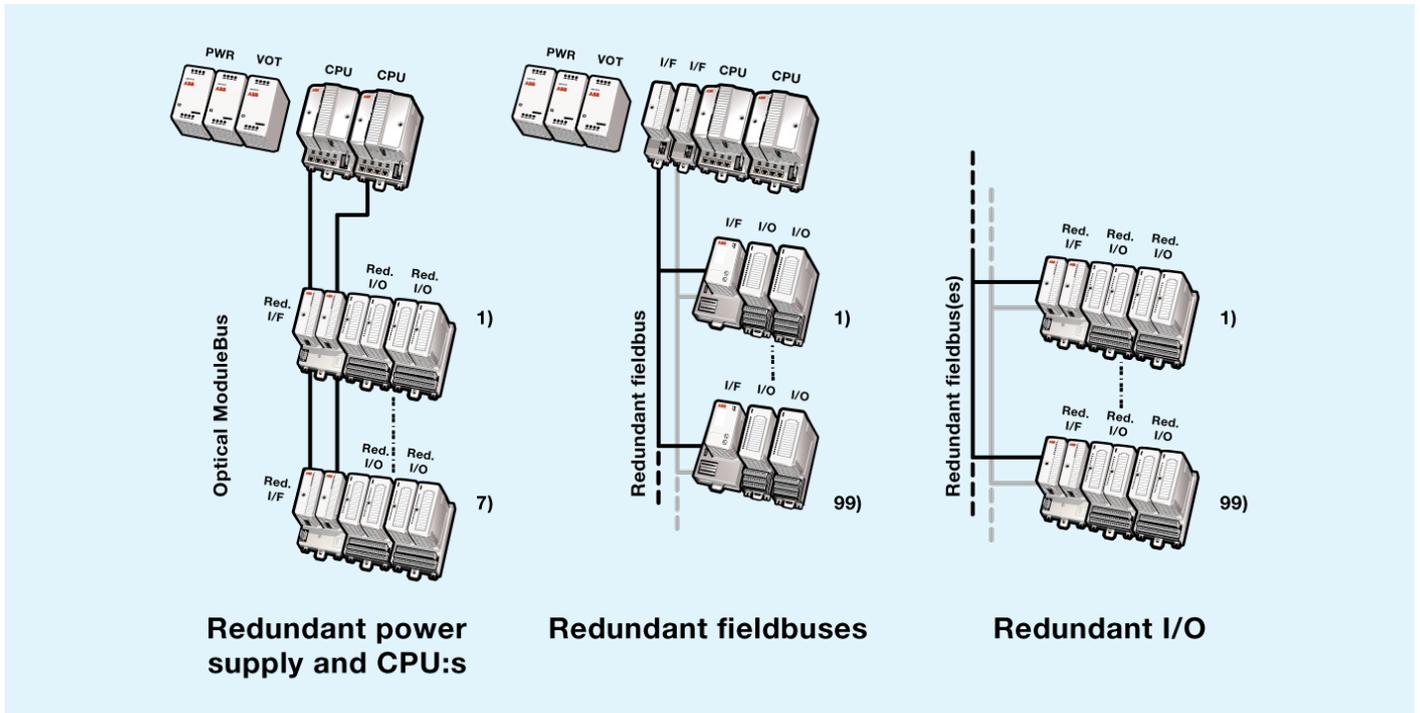
Equally effective for small hybrid systems as for large, integrated automation applications, the modularity of the sub-system results in higher return on assets by providing the flexibility to choose the specific functions required to meet actual requirements. Using the same base hardware, a wide variety of central processing units (CPUs), I/O, communication modules, and power-supply options is offered to provide flexibility in terms of functionality, performance, and size.

For example, a basic controller may consist of a power supply module, a controller, and local I/O modules. A large system can consist of several AC 800M controllers that communicate over an Ethernet-based control network. These stations may employ subclustered I/O assemblies connected to their host controllers via cable, fiber-optic or wireless industry-standard fieldbuses.

Redundancy at the I/O, controller and communication levels is available as options, affording maximum flexibility and availability. System 800xA Operations, Engineering, and other applications communicate with AC 800M Control and I/O sub-systems over the same Ethernet control network. Additionally, localized communication is possible via dedicated serial links.

The Control Builder software can be used to configure AC 800M control and safety applications. In addition to editors compliant with IEC 61131, the Control Module Diagram Editor is provided for object-oriented design and engineering of control applications.

Fault tolerance for maximum plant availability



Optional redundancy in all areas of importance: power supply, CPUs, communication links and I/O circuits, is only one of many features of AC 800M Control and I/O that contributes to the highest possible plant availability.

The fault tolerance of AC 800M Control and I/O results in maximum control system availability with no single point of failure, thereby securing production and profits.

At the core, the base controller's inherent reliability features contribute to high availability. Industrial-grade, conservatively loaded, on-board electronics result in a controller designed for installation in harsh environments. Low power consumption allows for installation in sealed enclosures without requiring fans, louvers, air filters or other forced cooling techniques. This simplicity eliminates many potential trouble-factors and thus contributes to the controller's high reliability.

Maximum availability is achieved when the redundancy options are implemented. Redundancy is available in all critical areas of the AC 800M Control and I/O subsystem. These include control networks, field buses, internal buses, power supplies, CPUs and I/O. If a fault occurs in a primary circuit, bumpless transfer to the back-up ensures uninterrupted operation.

If one of the controller CPUs fails, fieldbus communication redundancy can be maintained unimpaired through the subsystem's communication bus isolation and switchover scheme.

The AC 800M HI controller offers a TÜV certified control environment for combining safety and business critical process control in one controller without sacrificing safety integrity.

The AC 800M, in combination with the Safety Module, performs advanced diagnostics and monitoring of application execution and I/O scanning.

Control modules, applications and hardware settings, may be changed on line, in real time and under power, resulting in maximum control availability.

The "Load Evaluate Go" function takes this handling ease a step further by supporting actions such as Modify, Download and Evaluate, making it possible to download a new version of the running application to the controller without it interfering with the running version.

The modified version is started in passive mode in parallel with the running version and an Evaluation Report and a Task Analysis tool shows the differences in real time.

The application(s) and data can optionally be stored in Flash memory to secure its contents e.g. after a power failure or during transport.

Finally, noise-immune fiber-optic communication is also available, safeguarding the operation of the AC 800M Control and I/O subsystem even under the most extreme electromagnetic conditions.

Open architecture reduces lifecycle costs

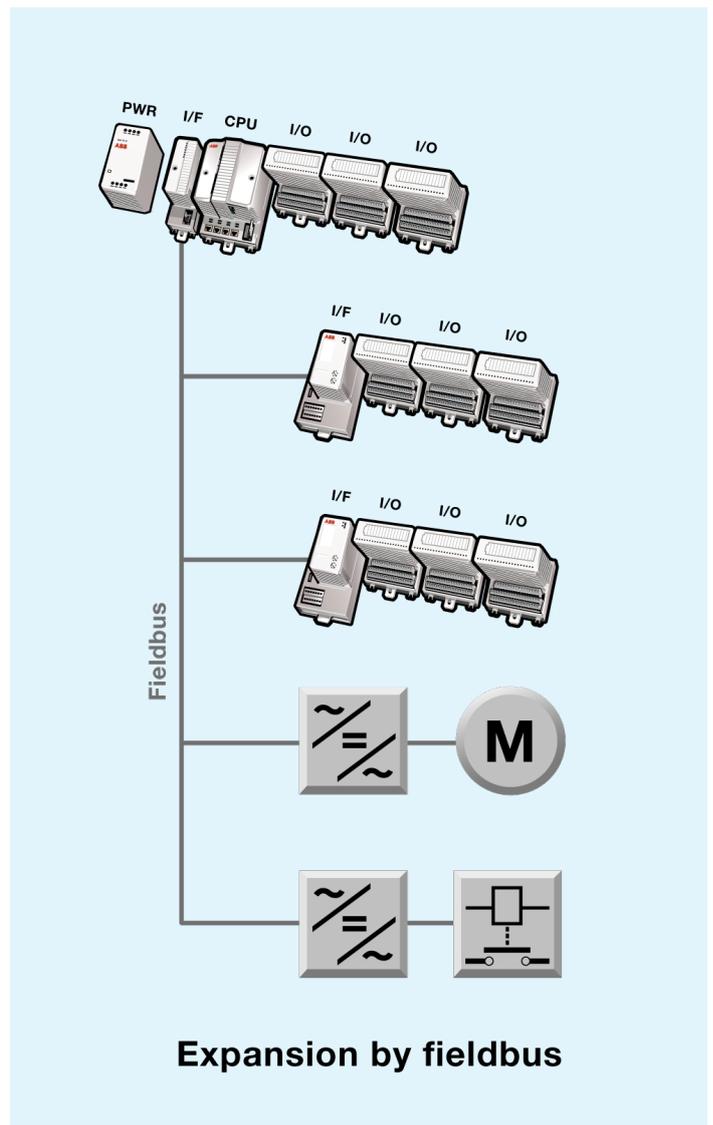
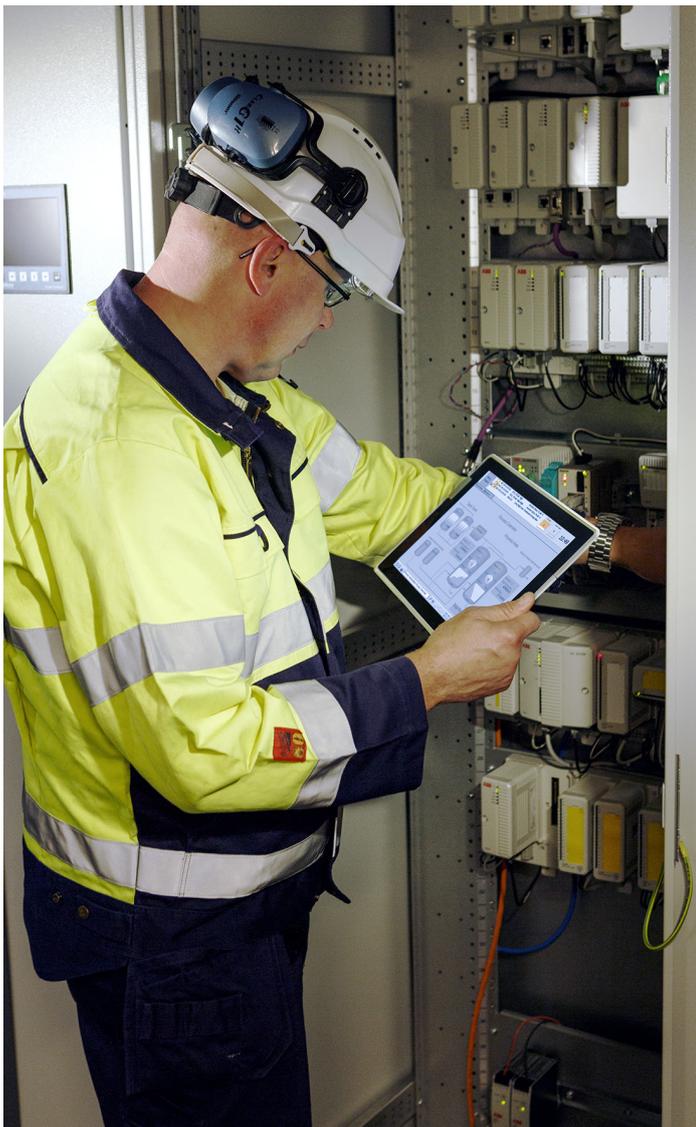
Open architecture reduces lifecycle costs

The open architecture of AC 800M Control and I/O reduces lifecycle costs by simplifying the task of integrating plant systems and devices. Additionally, the subsystem's useful life is extended since the open architecture allows for easy integration of new commercially-off-the-shelf (COTS) applications and products. In System 800xA, seemingly disparate plant systems and devices are accessed via OPC, Ethernet, Ethernet IP, DeviceNet, Modbus TCP, PROFIBUS DP,

PROFINET I/O and FOUNDATION Fieldbus (H1 and HSE) and their resident information used in control strategies and higher-level applications to produce tighter and more reliable process control solutions.

The open design of AC 800M Control and I/O ensures peer-to-peer communication with existing, distributed control systems by ABB. Wireless communication options exist at both the controller and I/O levels.

AC 800M Control and I/O support industry-standard data interfaces, network protocols and field buses. Consequently the subsystem can interact with – and integrate – a wide range of devices and systems by both ABB and others.



AC 800M control and I/O products

AC 800M controller

The AC 800M controller is a family of rail-mounted modules, consisting of CPUs, communication modules, power supply modules and various accessories. Several CPU modules are available that vary in terms of processing power, memory size, SIL-rating, and redundancy support.

Each CPU module is equipped with two Ethernet ports for communication with other controllers and for interaction with operators, engineers, managers, and higher level applications. These ports can be configured for redundancy for those cases where availability is of paramount importance. It is also equipped with two RS-232C ports that can be used for point-to-point communication with programming/debugging tools and with third-party systems and devices. A Flash memory card can be inserted into a slot in the CPU module to store the application and data.

PM 891



PM 851



AC 800M controller ensures availability to meet all production requirements, with redundancy options practical at all levels.

To this module, a number of communication and I/O modules can be added, for example:

- Additional RS-232C ports, making it possible to connect third-party systems and devices.
- PROFIBUS DP, DP-V1 interfaces, providing integration of S200, S800 and S900 I/O systems and access to the wide range of field devices, supporting these protocols.
- FOUNDATION Fieldbus HSE interface, provides a back-bone for access to FOUNDATION Fieldbus system solutions.
- PROFINET IO, PROFIBUS and DeviceNet interface providing integration of a wide range of process equipments and I/O-systems.
- IEC 61850 interface, making it possible to protect and control substation equipments by IEDs (Intelligent Electronic Devices) or protection relays.
- ABB INSUM interface, facilitating efficient supervision and control of electric switchgear over multidrop bus connections.
- MasterBus 300 and AF100 interface, providing compatibility with Advant OCS and ABB Master systems.
- S100 I/O interface, making it possible to upgrade from existing Advant Controller 410 or 450 – or even MasterPiece 200 - systems to AC 800M and retain existing I/O sections.
- TRIO I/O interface, making it possible to upgrade from existing MOD300 Controllers to AC 800M and retain existing TRIO I/O sections.
- Satt I/O interface, making it possible to upgrade from existing Satt Controllers to AC 800M and retain existing Satt I/O sections.
- Modbus TCP interface, combining the MODBUS RTU with the Ethernet and TCP standards, thus providing communication with 3rd-party equipment.
- I/O modules from the S800 I/O family as direct I/O.

These connectivity and expansion options make the AC 800M exceptionally open and scalable, that is, easy to connect to the surrounding world of supervisory systems and intelligent devices of all kinds - and adaptable to changing requirements as the process it controls changes, expands or contracts.

AC 800M control and I/O products

S800 I/O family

The S800 I/O system is closely related to AC 800M, not only in appearance but also in features.

- Comprehensive: The S800 family of I/O covers virtually all conceivable signal types and ranges. From basic analog and digital inputs and outputs to pulse counters and intrinsic-safety I/O.
- Flexible configuration: S800 I/O may be set up in a variety of ways, from directly connected to the host controller, to sub-clustered (using fiber-optic cables), to PROFIBUS-connected. Redundancy solutions are available at all levels including; power supply, communication interfaces and I/O circuits.

Flexible installation

Three mechanical designs are available:

- Compact (plug-in modules with a basic I/O signal termination area).
- Extended (plug in modules with ample space for I/O cable termination, fuses, jumpering and field power distribution).
- S800L (all-in-one modules and bases with detachable screw terminal blocks for I/O signals) for installations not requiring hot-swap capability.

Easy to set up

Once station numbers have been allocated and set, all other settings can be made from a network-connected engineering tool. A pass-through feature makes it possible to configure and examine all HART®-compliant field devices in a similar way.

Reliable

S800 I/O offer availability-improving features such as:

- Input/Output Set as Predefined (ISP/OSP). Each input/output can be set individually to default to a predefined value or freeze in case of communication loss.
- Hot swap of modules. A faulty I/O module can be replaced live, i.e. without powering the station down and without the rest of the station being affected. A hardware key ensures that only modules of the right type can be inserted.
- Hot configuration in run (HCIR). An S800 I/O station can be reconfigured while in full normal operation, i.e. without having to switch it over to configuration mode.
- Redundancy options in all areas: power supply, fieldbus media, fieldbus interfaces and I/O modules.

Accurate

S800 I/O modules can time-stamp events, i.e. input signal transitions, at the source with millisecond accuracy. Thereby providing the basis for meaningful sequence-of-events recording by the host system. In tightly interlocked processes this is essential to finding the root causes of production disturbances.

For harsh environments, all control and I/O modules are compliant to G3 severity level of ISA-S71.04, Environmental Conditions for Process Measurement and Control Systems.

S800 I/O



S800L



S800 I/O is available in three different designs: Compact, Extended, and S800L.

AC 800M High Integrity controller

The AC 800M HI offers a certified TÜV control environment for combining safety and business critical process control in one controller without sacrificing safety integrity.

The AC 800M HI, in combination with a diverse co-processor, performs diagnostics and monitoring of application execution and I/O scanning.

To enable use of the same controller for both SIL and non-SIL applications, all functions/types in standard AC 800M HI Controller libraries are marked non-SIL or SIL to show their usability in the two application types. Embedded safety measures prevent inadvertent degradation of safety applications.

High Integrity I/O

Within the S800 family, there are SIL3 certified modules that can be used for safety critical applications.

These I/O modules include those for 4 - 20 mA analog inputs, 24 Vdc normally closed digital inputs, and 24 Vdc digital outputs. The digital output module provides both Normally Energized (ESD) and Normally De-energized (F&G) outputs.

Analog inputs support HART routing for easy calibration checking and diagnosis with configurable access, while the digital inputs support local time-tagging of signal changes for high-accuracy sequence-of-events logging.

AC 800M High Integrity Controller



The SIL 3-rated, IEC 61508-certified AC 800M HI Controller is ideally suited to running both process control and safety application concurrently, in the same machine.

High Integrity I/O



A comprehensive assortment of I/O modules are available for safety-critical use. These include a range of SIL-3-rated S800 I/O modules for analog inputs, digital inputs, and digital outputs.

S900 I/O family

The S900 remote I/O system communicates with 800xA or other controllers over PROFIBUS.

Suitable for applications in the chemical, pharmaceutical, oil and gas industries, S900 I/O can be installed in hazardous areas, thereby reducing marshalling and wiring costs. Further maintenance savings can be achieved through S900's extended diagnostics and the use of HART®-compliant field devices.

Three versions of S900 I/O

- S-series for applications in Zone 1 hazardous areas
- B-series for applications in Zone 2 hazardous areas
- N-series for applications in non hazardous areas

Series	Assembly	Field devices / signals	Hazardous area approval
S series	In Zone 1	In Zones 2, 1 and 0 (intrinsically safe signals)	ATEX Zone 1
B series	In Zone 2	In Zones 2, 1 and 0 (intrinsically safe signals)	ATEX Zone 2
N series	In safe areas	In safe areas	No

Additional solutions for specific applications

- Field housing – for wall mounting and field mounting in Zone 1 installations with system approval fully certified in accordance with ATEX. The high-grade steel housing is prepared for wall-mounting with facility for insulated screen rails or terminals.

- CB220 compact box – S900 in compact form (with up to 4 I/O modules). This variant is suitable for use in applications such as temperature multiplexers and solenoid valve circuits.

The S900 components are based on a passive backplane suitable for mounting on a DIN rail or directly in a sub-distribution board. The passive backplane includes internal bus communication, terminals for field circuits, communication, and power supply. The function modules are plugged into the backplane in their appropriate slots. The redundant backplane has two slots for power supply units, two slots for communication interfaces, and 16 slots for function modules. Digital function modules have up to 8 channels, analog modules up to four. Therefore, when using a redundant backplane, 128 digital or 64 analog channels can be connected per station. In the case of the S and B series, up to ten S900 stations can be connected on a single fieldbus line.

Key S900 benefits

- Intrinsically safe – can be installed in Zone 1 and Zone 2 areas.
- Good price/performance ratio because external barriers have been removed and costs are reduced in terms of cabling, installation, hardware, and maintenance.
- High reliability thanks to smooth automatic transfer of data and to auto-diagnostics.
- Easy configuration using either FDT/DTM or GSD files, allowing easy integration with 800xA process control systems.
- High availability of the plant thanks to redundancy and hot-swap capability of all components during operation.



The intrinsically safe S900 I/O system can be installed in Zone 1 and Zone 2 areas and offers features such as hot swap and optional redundancy.

Engineering software



System 800xA Engineering provides real-time information integration for better and faster access.

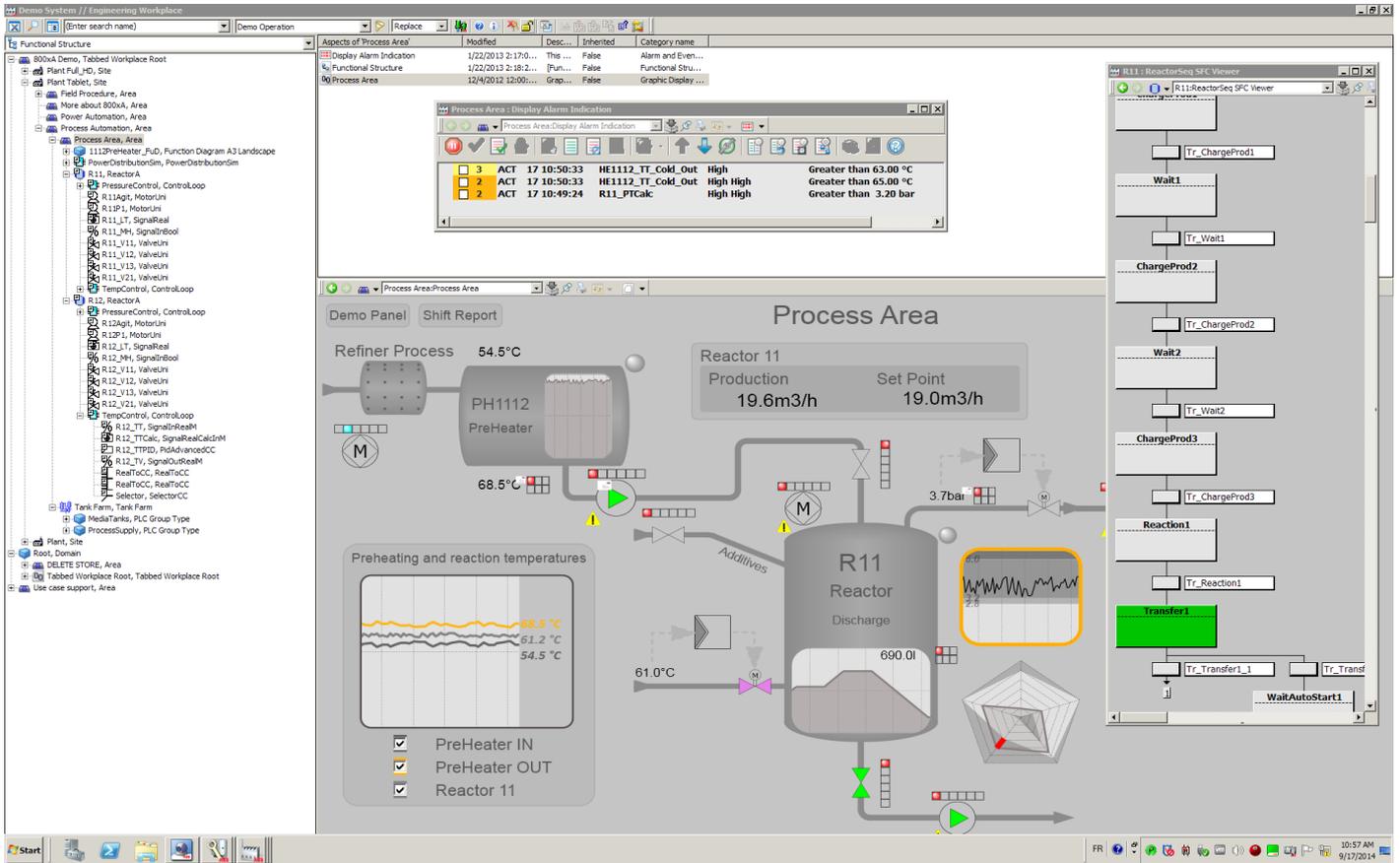
800xA Engineering, is designed to facilitate one-time data entry for all areas within the automation system, from field devices to asset optimization, while ensuring built-in data consistency.

Providing a single source of accurate and real-time plant information results in maximum engineering performance, quality, and reliability.

This integrated environment results in fewer startup delays, reduced maintenance costs, and more effective engineering practices.

800xA Engineering features

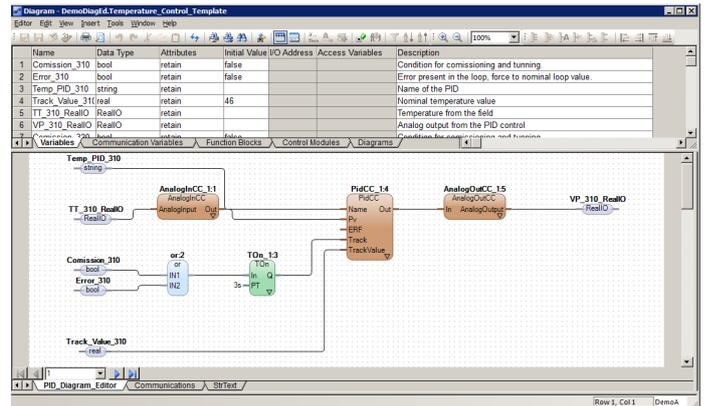
- Graphic display configuration
- Control application design
- Safety application design
- Control system configuration
- Field device and instrumentation configuration
- Control System and field device maintenance
- Trend and history configuration
- Integration with CAE tools as Intergraph SmartPlant® Instrumentation



Control builder Software includes an extensive library of pre-defined and support of user-defined control elements, ranging from simple AND gates to powerful adaptive PID controllers and ready-to-use process objects and control functions e.g. for motors, valves and switchgear. These can be used to easily design simple to complex control strategies to fit any application, including continuous, sequential, batch and advanced control.

Control builder Software and its engineering tools support all five of the IEC61131-3 programming languages (function block diagram, structured text, ladder diagram, sequential function chart and instruction list) plus ABB's own high-powered Control Module language.

For scenarios where the plant design is driven by highly repetitive units, the Control Modules are available. With Control Modules, user defined types covering a unit like a reactor can be designed and efficiently parameterized and instantiated multiple times.



For most efficient engineering the Control Diagram Editor can be used. This Graphical Engineering tool is in addition to the 61131 languages and brings it all together allowing for function blocks, structured text and sequences etc to all be in one engineering environment making it easier to create and maintain application software.



System 800xA 6.0 Product Catalog

Contents

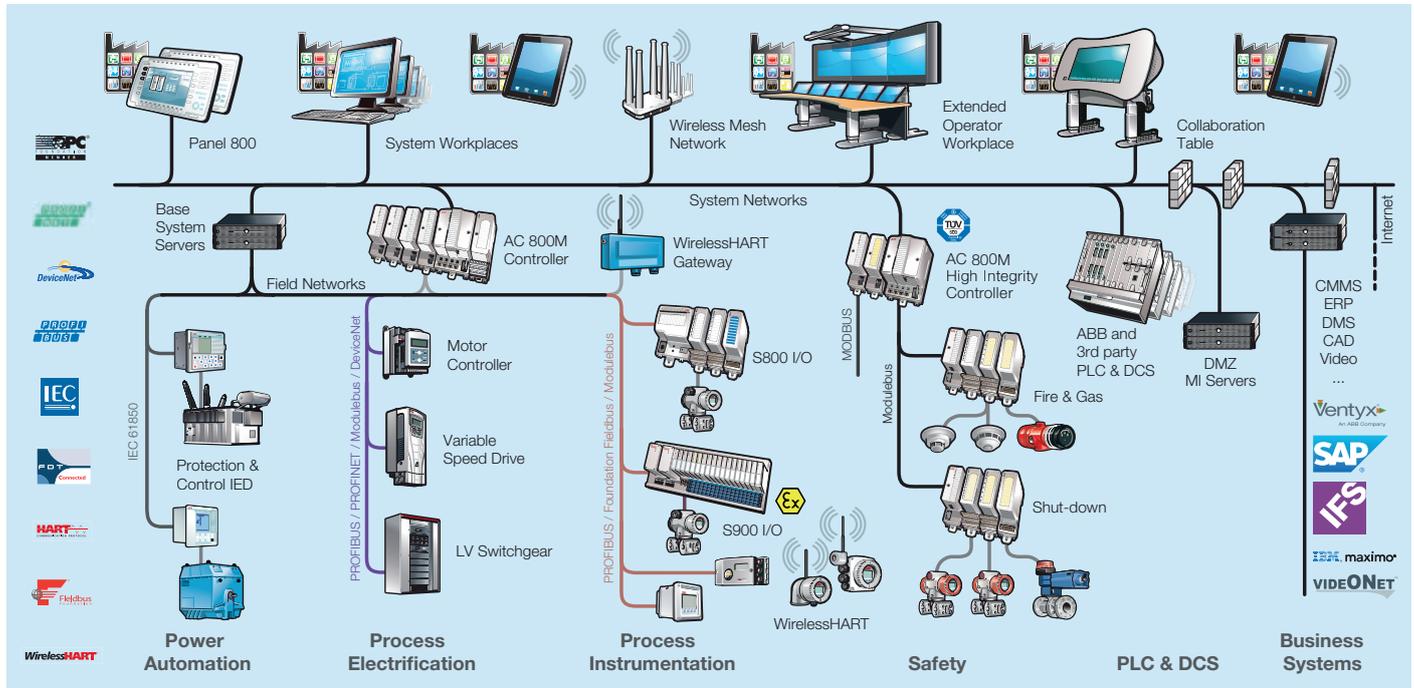
System 800xA Extended Automation It's all about control _____	4	Decathlon based SW licenses for 800xA.....	21
System 800xA Software _____	6	800xA History.....	22
License	6	IM Historian.....	23
Lifecycle Management – System Expansion _____	7	Safety	25
Automation Sentinel Program.....	7	Asset Optimization.....	25
Software Updates and upgrades	7	Asset Monitors	26
Cyber and IT security reports and updates.....	7	Device Management & Fieldbuses	26
System Benchmark Tool.....	7	Libraries.....	28
Expert product technical support.....	7	Options for Extended Operator Workplace.....	28
800xA 6.0 System Identifier _____	8	Localization.....	30
Control System Lifecycle Management Program.....	8	AC 800M Processor Units _____	31
System Identifier.....	8	AC 800M Controllers and users guide.....	32
800xA 6.0 System _____	9	Hardware Upgrade orders	33
Remark	9	AC 800M Hardware	33
Automation Sentinel Upgrade Orders.....	9	System Units.....	35
800xA Base System	9	Communication	36
Tag Expansion.....	10	AC 800M Power supply	42
Subscriber System Tags.....	11	AC 800M Mounting Rails.....	42
800xA Applications.....	12	S800 I/O Modules _____	43
Connectivity	12	S800 I/O Modules.....	44
System Extensions	14	Extended warranty for S800 I/O Hardware	47
Cyber Security.....	15	ISA-S71.04 level G3 Compliance.....	47
Operator Workplaces.....	15	Field Communication Interface	47
Extended Operator Workplaces.....	16	Upgrade Kit and Tool Cables.....	48
Extended Operations	17	S800 I/O Modules.....	49
Public Addressing.....	18	Pulse Counting Modules	53
Batch Management	19	Label sets for I/O Modules	53
Standard Engineering Tools.....	20	High Integrity I/O Modules.....	53
Engineering Systems	20	Module Termination Units.....	54
Professional Engineering Tools	21	S800L I/O Modules.....	56
		Label sets for S800L I/O Modules.....	56
		ModuleBus Communication Parts.....	57

Power Supply	59
User Documentation	60
Process Industries Application Libraries	60
PIAL Media.....	60
Process Control Device Library.....	61
PCDL Application Engineering.....	61
Process Control Equipment Library.....	62
Process Control Equipment Library.....	63
Additional Control Equipment Library Licenses.....	63
PCEL Application Engineering	64
ProBase.....	64
S900 Remote I/O System _____	65
Ex zone 1 system components.....	66
Ex zone 2 system components.....	68
Safe area system components	70
Accessories.....	72
Field Housing S900-FH660S	73
Field Housing S900-FH680S	74
Accessories.....	75
FOUNDATION Fieldbus Network Components.....	75
PROFIBUS Network Components.....	78
Media and Documentation _____	79
Industrial IT 800xA.....	80
Library	80
Dongles	80
800xA Base System User Documentation	81
Panel 800 Version 6 _____	83
Specifications Panel 800 Version 6	84
Software Management Program	85
Panel Builder 800	85
Operator Panels	86

Accessories.....	87
Dongles	88
Panel 800 Version 5 _____	89
Specifications Panel 800 Version 5	90
Control System Lifecycle Support Program	91
Panel Builder 800	91
Operator Panels	92
Touch Panels.....	93
Accessories.....	94
IEC 61850 Engineering Tool for 800xA 6.0 _____	95
Extended Warranty Time _____	96
Extended warranty time on hardware for S800 I/O, S900 I/O, Fieldbus and AC800M.....	96
800xA Marketing Material_____	97
Brochures	98
Data Sheets	99
USB with configuration graphics.....	99
Posters	100
Roll Ups	100
Accessories.....	101
Giveaways.....	102
Safety – Brochures	103
Safety – Data Sheets	103
Safety – Posters	104
Safety – Roll Ups	104
Safety – Giveaways.....	104
Reference documentation _____	105

System 800xA Extended Automation

It's all about control



800xA is not only a DCS (Distributed Control System) it's also an Electrical Control System, a Safety System and a collaboration enabler with the capacity to improve engineering efficiency, operator performance and asset utilization.

Promoting collaboration

Collaboration between people and systems is a necessity to increase engineering efficiency, asset utilization, energy savings, and operator effectiveness. System 800xA's 'xA' stands for Extended Automation and utilizes the system architecture which was built for collaboration. System 800xA is the only automation platform that has the ability to engineer, commission, control, and operate automation strategies for process, power, electrical and safety in the same, redundant, reliable system. Also, facilitating collaboration is System 800xA's pre-integrated applications such as a full featured historian, asset optimization and batch management.

System 800xA

ABB's award winning System 800xA provides you with a better way to achieve measurable productivity and profitability improvements. 800xA extends the scope of traditional DCS systems to include all automation functions in a single operations and engineering environment; enabling your plants to perform smarter and better at substantial cost savings.

Embracing the principles of open, real-time networking, System 800xA provides a scalable solution that spans and integrates loop, unit, area, plant, and inter plant controls. From providing a secure foundation with robust, but flexible, base level regulatory and sequence control to higher level management and advanced control functions that include safety controls, batch management, maintenance management, information management, and network management solutions, 800xA meets the application needs of a wide variety of industries.

System 800xA provides you with a secure, reliable control environment with minimum effort through built-in security features such as access control, user authentication, and audit trail capability. ABB enhances secure system operations by actively participating on security standards committees, conducting threat-modeling studies, and incorporating "safe design" practices into product development.

Based upon the Aspect Object technology and a common set of hardware, 800xA seamlessly integrates traditionally isolated DCS and Safety systems. SIS realization is achieved by either utilizing individual controllers or through dedicated applications within the same controller. With this embedded control and safety architecture, 800xA reduces costs significantly; achieving the objectives of both systems – maximum plant availability at minimum risk.

For more information about 800xA please visit our web:
www.abb.com/800xA



System 800xA Software

The system installation is supported by the Automated Installation program. The Automated Installation program is a shell framework to ease the installation and configuration of your 800xA System.

Installation is never prevented due to lack of licensing, but licenses are required to unlock features for operating or engineering the system. Updates and security related software from non-ABB companies must be downloaded and installed separately, as guided from the Automated Installation program.

The Automated Installation program is supplied on the 800xA media box. The common part is to specify the system details of your system in the Automated Installation program System Planner and generate a unique setup package for each node (workstation) describing what should be installed from the 800xA media box, or a file server, onto each node, and how it should be configured.

The System 800xA Installer is installed on each node, and then the following steps are executed to install and configure your node:

- Windows configuration
- System Verifier tool
- System installation
- System configuration

The setup-files may also reside on the file server. Windows configuration configures the environment (IP address, host-name, Windows components, and Windows services) connect to the workgroup or domain. The System Verifier tool checks for the necessary 3rd party software and where installations are required.

License

The central licensing system (CLS) is local to each system. Each system is ordered separately, and a separate license file is fetched for each system from the Software Factory. This also means that each system is managed individually updates and upgrades, as well as initial system installation

The software or hardware described in the document is furnished under a license and may be used, copied, or disclosed only in accordance with the terms of such license.



800xA 6.0 System Lifecycle Management – System Expansion

Automation Sentinel Program

Automation Sentinel is the control system lifecycle support program and is aimed at providing services for the maintenance, continuous enhancement and evolution of the ABB installed base of control systems.

Each and every control system under Automation Sentinel can make use, depending on the active subscription mode, of the following main program deliverables listed below:

Software Updates and upgrades

Automation Sentinel users have the exclusive right to receive control system software updates and upgrades:

- Automation Sentinel users with a Maintain subscription have the possibility to receive technical corrections, roll-ups, service packs and software revisions for the current 800xA software version in use.
- Automation Sentinel users with a Maintain Plus subscription receive all what the Maintain users are receiving PLUS software upgrades to move from any 800xA version to the latest available 800xA software version.
- Automation Sentinel users with a Maintain&Evolve subscription receive all what the Maintain Plus users are receiving PLUS the possibility to take an ABB heritage control system (and selected 3rd party control systems) all the way to the latest available 800xA software version.

Cyber and IT security reports and updates

Automation Sentinel users have the exclusive right to access IT security validation reports:

ABB reviews, tests and validates on a regular basis Microsoft security updates and 3rd party virus scanner software for compatibility with the 800xA control system. Automation Sentinel users will have access to all available cyber and IT security reports and updates for application as needed in order to ensure that the running control systems are better protected against any security risks which are encountered more often now than ever before. Each and every control system must be under Automation Sentinel before making use of the published IT security validation reports.

System Benchmark Tool

Automation Sentinel users will have the right to use, at no additional cost, the following service tools:

- 800xA Control System Software and Performance Benchmark
- 800xA Control System Security Benchmark

The above listed service tools are employed to perform health and security checks on the 800xA control system and generate 'Traffic light' reports of the findings.

Expert product technical support

Automation Sentinel users have access to ABB expert and R&D support organizations. This support is being provided for troubleshooting of product defects and issues they encounter during the validity of the subscription.

Program Options	Maintain Basic	Maintain	Maintain Plus	Maintain & Evolve
Basic Deliverables	<ul style="list-style-type: none"> - IT Security verification and validation reports - Web access via My Control System and SolutionsBank - Access to expert product support (L3/L4 support) 			
Maintenance Deliverables		<ul style="list-style-type: none"> - Software maintenance updates & corrections - System status and performance Benchmark tool - Scalable discount on selected service products - Scalable discount on selected expansion HW & SW 		
Enhancement Deliverables			<ul style="list-style-type: none"> - New software versions & enhancements 	
Evolution Deliverables				<ul style="list-style-type: none"> - Evolution from ABB Heritage OCS and 3rd party control systems to the latest ABB control platform

800xA 6.0 System Identifier

Control System Lifecycle Management Program

Control System Lifecycle Management Program

Automation Sentinel is the ABB control system lifecycle management program. An introductory trial period to the Automation Sentinel program will be included, at no additional cost, with each new ABB control system software delivery. Please contact your designated Automation Sentinel responsible for any questions or please refer to the Automation Sentinel 3.0 product guide for detailed information on the program and on how to calculate and order Automation Sentinel subscriptions.

System Identifier

800xA System Identifier

System identifier, used as identifier for each individual 800xA system. The ID must be used when ordering hardware and software to a system. After ordering this item a system license in design phase can be downloaded from SOFA.

	Article no.	
800xA System Identifier	3BSE081075R1	

800xA 6.0 System

Remark

Remark

When System Software Expansion licenses are ordered, the Serial Number of the ABB Software License Certificate for the previously ordered System Software licenses must be stated on the order to the ABB Supplier.

Automation Sentinel Upgrade Orders

Automation Sentinel Upgrade

	Article no.	
Automation Sentinel Upgrade	3BSE047992R1	

Base System – 800xA Base System

The base system is used as the base for 800xA production system, mulitsystem integration subscriber system and as Read only system. Tags can be added to all these systems. Only one type of subscriber tags (ie. subscriber tags or read only subscriber tags) can be added to a subscriber system. A subscriber system can not be converted from read only to read and write and vice versa.

800xA Base System

Includes one Operator Workplace, one Engineering Workplace, AC800M Connectivity, Redundant Aspect Server, Plant Explorer, Logging of Operator Actions, Topology Status Viewer, Softpoint Server, Scheduler, Primary History Logs (logging of signals for operator trends for up to 3 months), 10 Asset Monitors and Diagnostics Collection. Fast log-over of users.

	Article no.	
800xA Base System	3BSE078781R1	

800xA Production License

Ordered to be able to download a production license to switch the system from Engineering Phase to Production Phase.

	Article no.	
800xA Production License	3BSE081642R1	

Base System – Tag Expansion

Tags

All process objects with faceplate for operator interactions counts as a tag.
(Total max 120,000. Can not be mixed with redundant tags)

	Article no.	
100 tags, non-redundant	3BSE078782R1	
1,000 tags, non-redundant	3BSE078782R2	
10,000 tags, non-redundant	3BSE078782R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Redundant Tags

All process objects with an operator faceplate counts as a tag.
(Total max 120,000. Can not be mixed with non-redundant tags)
Enables tag access through redundant Connectivity Servers.

	Article no.	
100 tags, redundant	3BSE078783R1	
1,000 tags, redundant	3BSE078783R2	
10,000 tags, redundant	3BSE078783R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Non-Redundant to Redundant Tag Conversion

All process objects with faceplate for operator interaction counts as a tag.
(Total max 120,000. Redundant and non-redundant tags can not be mixed)
Enables tag access through redundant Connectivity Servers.

	Article no.	
100 Non-redundant to Redundant Tag Expansion	3BSE079637R1	
1,000 Non-redundant to Redundant Tag Expansion	3BSE079637R2	
10,000 Non-redundant to Redundant Tag Expansion	3BSE079637R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Base System – Subscriber System Tags

Subscriber System Tags

Tags in the subscriber system in a Multisystem Integration configuration. These tags are Object with a faceplate that collects data from a provider system. Subscriber tags are only required in the subscriber system.

Note that non-redundant Multisystem Subscriber Tags can not be mixed with Multisystem Subscriber Redundant Tags.

Note that Multisystem Subscriber Tags can not be mixed with Multisystem Read Only Subscriber Tags.

Multisystem Subscriber Tags

Tags in the subscriber system in a Multisystem Integration configuration.

	Article no.	
100 Multisystem Subscriber Tags	3BSE079526R1	
1,000 Multisystem Subscriber Tags	3BSE079526R2	
10,000 Multisystem Subscriber Tags	3BSE079526R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Multisystem Subscriber Redundant Tags

Tags in the subscriber system in a Multisystem Integration configuration.

	Article no.	
100 Multisystem Subscriber Redundant Tags	3BSE079527R1	
1,000 Multisystem Subscriber Redundant Tags	3BSE079527R2	
10,000 Multisystem Subscriber Redundant Tags	3BSE079527R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Non-Redundant to Redundant Multisystem Subscriber Tag Conversion

Tags in the subscriber system in a Multisystem Integration configuration.

	Article no.	
100 Multisystem Subscriber Non-Redundant to Redundant Tags	3BSE079641R1	
1,000 Multisystem Subscriber Non-Redundant to Redundant Tags	3BSE079641R2	
10,000 Multisystem Subscriber Non-Redundant to Redundant Tags	3BSE079641R3	

A TSA is NEEDED for a system with more than 60,000 tags.

Base System – 800xA Applications

Multisystem Read Only Subscriber Tags

Tags in a Read Only Subscriber system in a Multisystem Integration configuration. Read only subscriber systems provides aspect object enabled clients read only clients to office users. Subscriber tags are only required in the subscriber system. Subscriber tag is required for every provider tag that needs to be accessed from graphics, alarms, trends etc, in the subscriber system.

Note that Multisystem Read Only Subscriber Tags can not be mixed with Multisystem Subscriber Tags.

	Article no.	
100 Multisystem Read Only Subscriber Tags	3BSE079104R1	
1,000 Multisystem Read Only Subscriber Tags	3BSE079104R2	
10,000 Multisystem Read Only Subscriber Tags	3BSE079104R3	
NOTE: At pricebook release a TSA was NEEDED for a system with more than 60,000 tags. Please, check current need of a TSA in the TSA Database before ordering		
Office Workplace – Read Only Client	3BSE078864R1	
Includes one local or remote read-only operator workplace, Excel based reporting aspects, MS Excel is NOT included, use of up to 2 screens is included. (One is included with Core system so this limit to Total-1) (Only in systems with read-only MI tags)		

Base System – Connectivity

Connectivity

Note that there may be 800xA price list options that are not supported with a particular OCS controller. Please refer to the table “Available functions per Controller Connectivity” in the System Guide “Technical Data and Configuration Information”. To check what connectivity combinations that are valid, use the Project Wizard or refer to the System 800xA System Guide for information.

	Article no.	
PLC Connect	3BSE078822R1	
Faceplates, graphical elements and means to communicate with the system. (one per system)		
PLC Connect Dial-Up	3BSE078823R1	
Scaled on number of dial up lines in a system.		
KNX Connect	3BSE078865R1	
Data access to KNX devices connected via ABB KNX IP router. The 800xA server node communicates over TCP/IP with the router.		
800xA for Advant Master	3BSE078816R1	
Faceplates, graphical elements and means to communicate with the system (One per system.) RTA hardware needs to be ordered separately. Please refer to pricebook 3BSE001706, Advant OCS with Master Software, for RTA hardware.		

Connectivity

Note that there may be 800xA price list options that are not supported with a particular OCS controller. Please refer to the table “Available functions per Controller Connectivity” in the System Guide “Technical Data and Configuration Information”. To check what connectivity combinations that are valid, use the Project Wizard or refer to the System 800xA System Guide for information.

	Article no.	
Advant Master Central Backup Backup and restore of applications for Advant Master controllers(AC410, AC450, MP200/1, SG400) One license per system. Requires 800xA for Advant Master.	3BSE078817R1	
800xA for Harmony Faceplates, graphical elements and means to communicate with the system.	3BSE078819R1	
800xA for AC 870P / Melody Graphical elements and means to communicate with the system (Faceplates not included) (One per system.)	3BSE078821R1	
800xA for MOD 300 Faceplates, graphical elements and means to communicate with the system. RTA hardware needs to be ordered separately. Please refer to pricebook 3BSE001709, Advant OCS with MOD 300 SW, for RTA hardware.	3BSE078818R1	
800xA for DCI Faceplates, graphical elements and means to communicate with the Harmony Distributed Control Unit (HDCU), includes: Batch connectivity, VB6 and PG2 faceplates, HDCU maintenance functions.	3BSE078820R1	
800xA for Safeguard Faceplates, graphical elements and means to communicate with the system. Note: Requires also 800xA for Advant Master.	3BSE078824R1	
800xA for AC 100 Faceplates, graphical elements and means to communicate with the AC 100 Controller, OPC server included.	3BSE078825R1	

Base System – System Extensions

System Extensions

	Article no.	
<p>Multicore support</p> <p>Enables the possibility to run 800xA on servers with more than 4 cores. Scaled on max number of cores in any server scaled in steps of 4 cores. (4 cores are included in the base system)</p>	3BSE078862R1	
<p>Point of Control</p> <p>Collaboration based transfer of plant operation responsibility between locations and users.</p>	3BSE078830R1	
<p>800xA OPC Client Connection</p> <p>This enables third party OPC clients to connect to 800xA via the 800xA OPC server, includes OPC DA, AE & HDA. One per external access.</p>	3BSE078826R1	
<p>OLE-DB Real Time Data Client Connection</p> <p>Allows realtime system data to be accessed via an OLE-DB interface. One per external access.</p>	3BSE078827R1	
<p>SMS and e-mail Messaging</p> <p>Sending messages based on alarm and event information to user devices such as mobile telephones, e-mail accounts and pagers.</p>	3BSE078828R1	
<p>Calculation Engine</p> <p>Provides the ability to run mathematical calculations on any available System 800xA aspect property or attribute. One license per server or redundant server pair.</p>	3BSE078829R1	
<p>Snapshot Reports</p> <p>Makes it possible to create aspects that automatically executes a query and produces a report consisting of properties of objects in the system.</p>	3BSE078832R1	
<p>CAD Viewer license</p> <p>View CAD drawings in DXF and DWG formats stored in aspects. DWG (version 13, 14, 2000, 2004, 2007, 2010) DXF (version 12, 13, 14, 2000, 2004, 2007, 2010)</p>	3BSE079674R1	

Base System – Cyber Security

Cyber Security

	Article no.	
Digital Signature Makes it possible to digitally sign aspects to ensure that data is kept unchanged after approval.	3BSE078833R1	
Advanced Access Control Reauthentication, double reauthentication and inactivity logout.	3BSE078834R1	
Audit Trail Logging of all user initiated actions in a system. e.g. Graphics editing, Control Logic editing, Batch recipe editing and start/stop of servers etc.	3BSE078835R1	
800xA for Industrial Defender Industrial Defender monitoring is updated with 800xA security events (one per system)	3BSE079528R1	
Whitelisting SE46 Whitelisting SE46 provides advanced threat protection, through checks of executing SW on clients and servers. The number of licenses should match the number of clients in a system. Protection of servers are included.	3BSE079529R1	
Whitelisting Studio SE46 Configuration tool required when using Whitelisting SE46 option. One tool needed per site using Whitelisting SE46.	3BSE079530R1	

Operations – Operator Workplaces

Operator Workplaces

	Article no.	
Operator Workplace – Additional Client Includes one local or remote operator workplace, Excel based reporting aspects, MS Excel is NOT included, use of up to 2 screens is included. (One is included with Core system so this limit to Total-1) The total quantity of Operator Workplaces, Large Operator Workplaces and Engineering Workplaces - must not exceed 80.	3BSE078749R1	
Large Operator Workplace Client Includes one local or remote Operator Workplace, with the possibility to use up to 4 screens and Large Desktop. The total quantity of Operator Workplaces, Large Operator Workplaces and Engineering Workplaces - must not exceed 80.	3BSE078750R1	
Convert Operator Workplace to large Operator Workplace	3BSE079107R1	

Operations – Extended Operator Workplaces

Extended Operator Workplaces

Additional options for the Extended Operator Workplaces must be selected in the sections 12.1 to 12.5 at the end of this price list.

		Article no.	
	<p>EOW-x2 workplace</p> <p>Operator Cockpit with adjustable ergonomic desk, 1 close large screen area and 2 sets of 2 wide screen motorized adjusted monitors each. Network switches and 3x quiet client PCs with 1 multifunctional keyboard and mouse for control. Built in sound, light and video camera for communication. Installation manuals, Partly assembled for easy commissioning.</p> <p>Ships with EOW-x Base License, which includes 1 camera input, cad and video view on all three screen areas.</p> <p>Options for desk color, keyboard layout and 110/230V are needed.</p>	3BSE079114R1	
	<p>EOW-x3 workplace</p> <p>Operator Cockpit with adjustable ergonomic desk, 1 close large screen area and 2 areas with 3 adjustable monitor each. Network switches and 3x quiet client PCs with 1 multifunctional keyboard and mouse for control. Built in sound, lighting and video camera for communication. Installation manuals, Partly assembled for easy commissioning. Ships with EOW-x Base License, which includes 1 camera input, cad and video view on all three screen areas.</p> <p>Operator Cockpit with adjustable ergonomic desk, 1 close large screen area and 2 sets of 3 wide screen motorized adjusted monitors. Network switches and 3x quiet client PCs with 1 multifunctional keyboard and mouse for control. Built in sound, lighting and video camera for communication. Installation manuals, Partly assembled for easy commissioning.</p> <p>Ships with EOW-x Base License, which includes 1 camera input, cad and video view on all three screen areas.</p> <p>Options for desk color, keyboard layout and 110/230V are needed.</p>	3BSE079115R1	
	<p>EOW-f2 workplace</p> <p>Operator console including fixed ergonomic desk, 1 close large screen area and 2x2 personal screen setup. 1 programmable keyboard and mouse for control. Installation manuals. Delivered disassembled. Ships with EOW-f base license. Option needed for keyboard layout and 110/230 V.</p>	3BSE079116R1	
	<p>EOW-f3 workplace</p> <p>Operator console including fixed ergonomic desk, 1 close large screen area and 2x3 personal screen setup. 1 programmable keyboard and mouse for control. Installation manuals. Delivered disassembled. Ships with EOW-f base license. Option needed for keyboard layout and 110/230 V.</p>	3BSE079117R1	

Operations – Extended Operations

Extended Operations

	Article no.	
<p>Control Room Review Prestudy</p> <p>Results in a customer unique future design of an existing or new control room. Based on general information, Plans and Photos, a questionnaire and phone interviews. Final result will be presented in a webmeeting.</p>	3BSE079590R1	
<p>Control Room Design Prestudy</p> <p>Results in a customer unique future design of an existing or new control room. Based on general information, Plans and Photos, a questionnaire and on site interviews with a work flow study. Final result will be presented in a webmeeting. The onsite work is included in the price.</p>	3BSE079591R1	
<p>Complete Control Room Prestudy</p> <p>Results in a customer unique future design of an existing or new control room. Based on general information, Plans and Photos, a questionnaire and on site interviews with a work flow study. Final result will be presented in a webmeeting. The onsite work is included in the price.</p>	3BSE079592R1	
<p>Video Input Channel</p> <p>Connection to attach a video stream from one video camera for recording or live viewing in the system.</p>	3BSE079118R1	
<p>Video Client</p> <p>One concurrent client using video stream viewing from either recorded or live video source. Each Client need a compatible video codec to uncompress the video stream. The codec is not included. The total quantity of Video clients must not exceed the total number of clients in a system.</p>	3BSE079119R1	
<p>Alarm awareness light control (per area)</p> <p>Situation awareness with colored light showing the alarm priority. Led light combined with soundabsorbers, covered surface approx 6 Sqm.</p>	3BSE078868R1	
<p>Alarm Operations, < 2000 Tags</p> <p>Alarm Grouping, Alarm Shelving and Basic Alarm Analysis. Alarm Help aspects. (Alarm Hiding and Alarm Response are parts of the base system)</p> <p>NOTE: At pricebook release a TSA was NEEDED for the Alarm Help item. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE078751R1	
<p>Alarm Operations, < 5000 Tags</p> <p>Alarm Grouping, Alarm Shelving and Basic Alarm Analysis. Alarm Help aspects. (Alarm Hiding and Alarm Response are parts of the base system)</p> <p>NOTE: At pricebook release a TSA was NEEDED for the Alarm Help item. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE078751R2	
<p>Alarm Operations, >= 5000 Tags</p> <p>Alarm Grouping, Alarm Shelving and Basic Alarm Analysis. Alarm Help aspects. (Alarm Hiding and Alarm Response are parts of the base system)</p> <p>NOTE: At pricebook release a TSA was NEEDED for the Alarm Help item. Please, check current need of a TSA in the TSA Database before ordering.</p>	3BSE078751R3	

Operations – Extended Operations

Extended Operations

	Article no.	
Alarm History and Reports, < 2000 Tags Long term Alarm storage and analyze, Alarm system KPI reports, web and e-mail distribution of reports. Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE078869R1	
Alarm History and Reports, < 5000 Tags Long term Alarm storage and analyze, Alarm system KPI reports, web and e-mail distribution of reports. Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE078869R2	
Alarm History and Reports, >= 5000 Tags Long term Alarm storage and analyze, Alarm system KPI reports, web and e-mail distribution of reports. Note: At pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE078869R3	
Symbol Factory for Process Graphics Support for Symbol Factory graphics items in graphics displays.	3BSE080146R1	

Operations – Public Addressing

Extended Operations

	Article no.	
Public Addressing output channel One output channel with one language. The channel can convert alarms in alarmlists and predefined text messages to sound. The sound content can be configured differently for each output channel. A TSA is NEEDED to buy this item	3BSE078808R1	
Public Addressing additional language One additional language for all channels. A TSA is NEEDED to buy this item	3BSE078809R1	

800xA 6.0 System – Batch Management

Batch Management

	Article no.	
<p>Batch Base System</p> <p>Provides the basic server functionality for batch management. The batch server includes 10 Batch Equipment and 2000 Batch Procedures. 1 Batch client included.</p>	3BSE078752R1	
<p>10 Additional Batch Equipment</p> <p>The number of batch equipment instances includes each piece of equipment configured in Batch Management including both Units and Shared Equipment Modules.</p>	3BSE078756R1	
<p>100 Additional Batch Equipment</p> <p>The number of batch equipment instances includes each piece of equipment configured in Batch Management including both Units and Shared Equipment Modules.</p>	3BSE078757R1	
<p>Batch Management Full Client</p> <p>This Client feature provides access to Batch Management functions. The Client feature is based upon concurrent users, not physical workstation installation. Including SL and SQL server licenses. Requires Operator Workplace Client - item C010 or C030; or Engineering Workplace Client - item D510. Maximum 40 Clients. One Client is included with the Batch Base System.</p>	3BSE078754R1	
<p>Redundant Batch Server Option</p> <p>Provides redundancy for the basic server functionality for batch management. Requires Batch Base System, item D010.</p>	3BSE078753R1	
<p>Batch Advanced Phase Templates</p> <p>This feature provides access to the Batch Advanced templates control modules for phases, units and shared equipment modules. For use with AC 800M controllers. Batch Phase Control library option, includes 2000 Advanced Phases.</p>	3BSE078758R1	
<p>Batch Schedule Interface</p> <p>This feature is used to interface Batch Management to external applications such as schedulers and ERP systems. Webservice interface to batch scheduling and equipment status.</p>	3BSE078755R1	
<p>Simple Batch Parameter Management</p> <p>Batch spreadsheet recipe scheduling tool for desktop PC interface to Batch Management using Excel. (Not required when Batch Schedule Interface is ordered) Requires a minimum of System 800xA 5.1 Feature Pack 3.</p>	3BSE079105R1	

Engineering – Standard Engineering Tools

Standard Engineering Tools

	Article no.	
<p>Engineering Workplace – Additional Client</p> <p>Includes Control Configuration for AC 800M, Bulk Data Handling, Graphic Configuration, Document Manager, Parameter Manager, I/O allocation function and Script Manager Professional. (one client is included with the Base system)</p> <p>The total quantity of Operator Workplaces-Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces – must not exceed 80.</p>	3BSE078790R1	
<p>Engineering Workplace with Application Change Management – Client</p> <p>Includes one Engineering Workplace and in addition Application Change Management.</p> <p>The total quantity of Operator Workplaces-Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces - must not exceed 80.</p>	3BSE078810R1	
<p>Engineering Workplace with Load Evaluate Go - Client</p> <p>Includes one Engineering Workplace and in addition Load Evaluate Go. The total quantity of Operator Workplaces-Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces - must not exceed 80.</p> <p>A TSA is NEEDED for a system with more than 60,000 tags.</p>	3BSE079103R1	
<p>Advanced Engineering Workplace – Client</p> <p>Includes one Engineering Workplace and in addition Application Change Management and Load Evaluate Go. The total quantity of Operator Workplace-Additional and Remote Clients, Large Operator Workplaces and Engineering Workplaces - must not exceed 80.</p> <p>A TSA is NEEDED for a system with more than 60,000 tags.</p>	3BSE079106R1	
<p>SoftController</p> <p>To be used with the programming tool Control Builder M. This product is to be used as a test tool only. One license is required per SoftController.</p>	3BSE078794R1	

Engineering – Engineering Systems

Engineering Systems

	Article no.	
<p>Engineering System small</p> <p>Includes a copy of the licenses in a corresponding production system but the license can only run in engineering mode.</p> <p>Systems up to 2000 Tags.</p>	3BSE080147R1	
<p>Engineering System large</p> <p>Includes a copy of the licenses in a corresponding production system but the license can only run in engineering mode.</p> <p>Systems larger than 2000 Tags.</p>	3BSE079593R1	

Engineering – Professional Engineering Tools

Professional Engineering Tools

Aspect Studio and Aspect Express are not available in the price list. Please, contact your BU Area Sales Manager for quotation.

	Article no.	
Reuse Assistant Wizard help for selection of reusable solutions.	3BSE078791R1	
Process Engineering Tool Integration – Base for INtools Supports synchronization of properties between INtools objects and existing 800xA objects and property map definition changes. New 800xA object creation is NOT supported.	3BSE078792R1	
Process Engineering Tool Integration – New Object Creation Support for INtools Supports new 800xA object creation.	3BSE078793R1	

Information Management – Decathlon based SW licenses for 800xA

Smart Client Workplaces

Smart Client Workplaces - Includes access to system information from the office network. Includes: View Process Graphics 2 displays, Trend displays, Build/view business graphics, historic data, alarm & events analyze (H & AE analyze requires IM or 800xA History)

	Article no.	
Smart Client Workplace - Client 1-10	3BSE079531R10	
Smart Client Workplace - Client 11-50	3BSE079531R50	
Smart Client Workplace - Client 51-100	3BSE079531R100	

Information Management – 800xA History

800xA History Signals – Logs

History signals capable of storing actual and historic values retrieved from 800xA, Heritage ABB DCS systems and OPC sources. The signals include logging, trending, calculations, Alarm and Events, and archiving. Max 75,000 per Server node, signal storage for upto 6 data sources per Server.

	Article no.	
800xA History Signals – Basic 100 signals	3BSE079539R1	
800xA History Signals – Basic 1,000 signals	3BSE079539R10	
800xA History Signals – Basic 15,000 signals	3BSE079539R150	

800xA Dual History Signals – Logs

History signals for parallel logging in two history servers. The number of dual history signals should match the number of history signals that should be logged in two servers. Including Decathlon history service.

	Article no.	
800xA Dual History Signals – 100 signals	3BSE079540R1	
800xA Dual History Signals – 1,000 signals	3BSE079540R10	
800xA Dual History Signals – 15,000 signals	3BSE079540R150	

Data access to 800xA History Signals

OPC and ODBC access to data stored in history signals. Gives access to both the current and the historical values, and in addition Alarms and Events for the signals. (Same size as total number of 800xA History Signals)

	Article no.	
Data Access to 800xA History Signals – 100 signals	3BSE079541R1	
Data Access to 800xA History Signals – 1,000 signals	3BSE079541R10	
Data Access to 800xA History Signals – 15,000 signals	3BSE079541R150	

IM Historian

Logging of signals for Operator trends is included in the core system for up to three months. Logging for a longer time period, archiving to external media like DVD, discs or web based Historian tools require Historian server. Max 120,000 logs allowed in one server. (Includes archiving license, PDL, up to 12,000,000 events, MDI client and one Excel Data Access).

	Article no.	
IM Historian Server Logging of signals for Operator trends is included in the core system for up to three months. Logging for a longer time period, archiving to external media like DVD, discs or web based Historian tools require Historian server. 500 logs are included. Max 120 000 logs allowed in one server (Includes Archiving license, PDL, up to 12000000 events, MDI client and one Excel Data Access).	3BSE078842R1	

History Logs

	Article no.	
100 History Logs	3BSE078843R1	
1,000 History Logs	3BSE078843R2	
15,000 History Logs	3BSE078843R3	

Dual History Logs

For parallel logging in two history servers. (Two Basic Historian Servers are required). Number of initial Information Management Hierarchical Logs in the system. Each signal to be logged counts as one log. Note: Information Management provides only Hierarchical Logs. (Total max 150,000 and max 50,000/Server.)

	Article no.	
100 Dual History Logs	3BSE078844R1	
1,000 Dual History Logs	3BSE078844R2	
15,000 Dual History Logs	3BSE078844R3	

Consolidated History Logs

Consolidated logs collect data from multiple History Servers and store it in a single location. This provides a common history repository for viewing and reporting. (Total max 300,000 and max 50,000/Server.)

	Article no.	
100 Consolidated History Logs	3BSE078845R1	
1,000 Consolidated History Logs	3BSE078845R2	
15,000 Consolidated History Logs	3BSE078845R3	

Convert History Logs to Dual History Logs

(Total max 150,000, and max 50,000/Server) Use this option when converting an existing systems single History Logs to Dual History Logs.

	Article no.
100 Convert Single to Dual History Logs	3BSE079643R1
1,000 Convert Single to Dual History Logs	3BSE079643R2
15,000 Convert Single to Dual History Logs	3BSE079643R3

Historian Display and Reporting Options

	Article no.
Display Builder for MDI – Additional Client Provides the ability to create MDI information displays for desktop applications.	3BSE078846R1
Multi-Display Interface (MDI) – Additional Client Provides the ability to view MDI information displays on any PC Desktop (Max 64 per Server)	3BSE078847R1
Desktop Trends – Additional Client Provides trend viewing for desktop applications. Includes web enabled trend display for long and short term history and stock ticker like viewer. (Max 64 per Server)	3BSE078848R1

Historian Data Access Options

To access historical data through SQL from third party applications.

Batch Reports with trending requires the ODBC Server (E510) and ODBC Client (E520) option. This option provides the links necessary to connect the Oracle database (PDL) and the numeric log and process data.

Applications which utilize commercial third party reporting tools should also include the ODBC Server (E510) and ODBC Client (E520) option. The number of client connection is based on whether the applications utilizes the connection directly or indirectly.

If the connection is made indirectly (using Oracle), then the client connection requires is only one. If the client connections are direct, then the number of clients should equal the number of concurrent users.

	Article no.
Excel Data Access To access historical data through SQL from third party applications. Used to access historical data in Excel from non-800xA PC"s. For 800xA Client PC"s Excel Data Access is included. (Max 64 per Server)	3BSE078849R1
ODBC Historical Data Server ODBC, includes third party code. (One per server.)	3BSE078850R1
ODBC Client Connection ODBC Clients are purchased separately from the ODBC server. (Max 10 per ODBC Server.)	3BSE078851R1

800xA 6.0 System – Safety

Enabler for combined PA Control and Certified Safety software

	Article no.	
AC 800M High Integrity and Process Control One fixed license feature per AC 800M controller running both non-SIL and SIL applications in the same controller.	3BSE078759R1	

800xA 6.0 System – Asset Optimization

Asset Optimization

	Article no.	
100 Asset Monitors Asset monitoring and Basic Asset Monitor Library. Each Aspect Object being monitored by one or more asset monitors counts as one.	3BSE078871R1	
1000 Asset Monitors Asset monitoring and Basic Asset Monitor Library. Each Aspect Object being monitored by one or more asset monitors counts as one.	3BSE078871R2	
800xA Maximo Integration Enables integration into Maximo for work order management. Application Engineering available through ConsultIT. Note: at pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE078873R1	
800xA SAP / Plant Maintenance Integration Enables integration into SAP for work order management. Application Engineering available through ConsultIT. Note: at pricebook release this item required a TSA to be ordered. Please, check current need of a TSA in the TSA Database before ordering.	3BSE078874R1	

Asset Optimization – Asset Monitors

Asset Monitors

	Article no.	
Generic Heat Exchanger Asset Monitor It monitors the performance against standard operating parameters independent of type of heat exchanger.	3BSE078875R1	
Shell and Tube Heat Exchanger Asset Monitor It monitors the performance against standard operating parameters based on the size of shell and tube heat exchanger.	3BSE078876R1	
Advanced Harmony Control System Monitoring Enables Harmony Control Network monitors for diagnostic monitoring, reporting, and analysis	3BSE078877R1	
100 Control Loop Asset Monitors Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the control loop and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.	3BSE078878R100	
300 Control Loop Asset Monitors Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the control loop and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.	3BSE078878R300	
500 Control Loop Asset Monitors Each Control Loop Asset Monitor monitors and assesses the performance of a control loop in real-time and report significant problems related to the control loop and final control element. The total quantity of Control Loop Asset Monitors must not exceed 500.	3BSE078878R500	
PC, Network and Software Monitoring Enables availability monitoring of IT assets.	3BSE078879R1	

800xA 6.0 System – Device Management & Fieldbuses

Device Management HART

For HART devices to be accessed using Device Type Manager (DTM"s) within System 800xA. Includes HART Device Library with generic and specific HART Device Aspect Objects incl. DTM"s, I/O DTM for S800 and S900, HART Instruments Asset Monitor Library and OPC Server. Each HART device aspect object accessed with DTM counts as one. (Max 2500 per Connectivity Server if OPC Communication is used. For details refer to System Guide)

	Article no.	
100 HART Device Aspect Objects	3BSE078880R1	
1,000 HART Device Aspect Objects	3BSE078880R2	
10,000 HART Device Aspect Objects	3BSE078880R3	
HART Multiplexer Connect Enables HART Device Integration to connect to HART devices using HART Multiplexers.	3BSE078881R1	

800xA 6.0 System – Device Management & Fieldbuses

Device Management FOUNDATION Fieldbus

For FOUNDATION Fieldbus (FF) devices to be accessed using Fieldbus Builder FF within System 800xA. Includes FF Device Library with FF Device Aspect Objects, FF Instruments Asset Monitor Library and OPC Server. Each FF device aspect object counts as one. (Max 1000 per Connectivity Server. For details refer to System Guide.)

	Article no.	
100 FF Device Aspect Objects	3BSE078882R1	
1,000 FF Device Aspect Objects	3BSE078882R2	
10,000 FF Device Aspect Objects	3BSE078882R3	

Device Management PROFIBUS

For PROFIBUS DP/PA devices to be accessed using Device Type Manager (DTM"s) within System 800xA. Includes PROFIBUS Device Library with specific PROFIBUS Device Aspect Objects incl. DTM"s, I/O DTM for S800 and S900, and PROFIBUS Instruments Asset Monitor Library. Each PROFIBUS device aspect object accessed with DTM counts as one. (Max 2500 per Connectivity Server if OPC communication is used. For details refer to System Guide.)

	Article no.	
100 PROFIBUS Device Aspect Objects	3BSE078883R1	
1,000 PROFIBUS Device Aspect Objects	3BSE078883R2	
10,000 PROFIBUS Device Aspect Objects	3BSE078883R3	

IEC 61850-Ed1 Connect

For order of IEC 61850 related products, local organizations must comply with the Demands on the Purchaser to secure successful sales of IEC 61850 with System 800xA. Ref doc, 3BSE058798.

	Article no.	
IEC 61850-Ed1 Connect Allows operation clients to access data and alarm and event values from Intelligent Electronic Devices (IEDs) according IEC 61850-Ed1 (Edition1). Package includes IEC 61850 OPC server software with configuration tool on Connectivity Servers. You have to order number of used OPC server instances (max. 16 per System) IEC 61850 Substation Operation Library with Faceplates to control substation equipment (Bay, Breaker, Switch,...) is included.	3BSE078884R1	
Redundant IEC 61850-Ed1 Connect Option Allows operation clients to access data, and alarm and event values through redundant OPC-servers from Intelligent Electronic Devices (IEDs) through redundant Connectivity Servers according IEC 61850-Ed1 (Edition1). Package includes IEC 61850 OPC server software with configuration tool on Connectivity Servers. You have to order the number of used OPC server instances. (max. 16 per System) Requires IEC 61850-Ed1 Connect. IEC 61850 Substation Operation Library with Faceplates to control substation equipment (Bay, Breaker, Switch,...) is included.	3BSE078885R1	

800xA 6.0 System – Libraries

Libraries

	Article no.	
INF190 Function Code Library for AC 800M Requires separate media.	3BSE078890R1	
MOD 300 CCF Library for AC 800M Requires separate media.	3BSE078889R1	
TCP Communication Library License Control functions to create TCP based communication protocols in the AC800M controller. One licence is needed for each controller using the library.	3BSE079542R1	
UDP Communication Library License Control functions to create UDP based communication protocols in the AC800M controller. One licence is needed for each controller using the library.	3BSE079543R1	

800xA 6.0 System – Options for Extended Operator Workplace

Options for Regional Power Supply

Regional power supply

	Article no.	
110V System	3BSE073373R1	
220V System	3BSE073374R1	

Options for Advanced Operator Keyboard Layout

Advanced Operator Keyboard layout.

	Article no.	
US English Keyboard layout	3BSE073301R1	
Belgian Keyboard layout	3BSE073302R1	
Spanish Keyboard layout	3BSE073303R1	
French Keyboard layout	3BSE073304R1	
German Keyboard layout	3BSE073305R1	
Italian Keyboard layout	3BSE073306R1	
Swiss Keyboard layout	3BSE073307R1	
British English Keyboard layout	3BSE073308R1	
Danish Keyboard layout	3BSE073309R1	
Swedish Keyboard layout	3BSE073310R1	
Russian Keyboard layout	3BSE073311R1	
Norwegian Keyboard layout	3BSE073312R1	

800xA 6.0 System – Options for Extended Operator Workplace

Options for Packaging

Delivery option for EOW.

	Article no.	
Disassembled system Reduce packages dimension and decrease cost for air freight. We recommend an additional service to assist with the assembly on site when you chose this option.	3BSE073375R1	

Options for Desk Surface

Desk surface.

	Article no.	
Birch desk surface	3BSE073295R1	
Grey desk surface	3BSE073294R1	

800xA 6.0 System – Localization

National Language Support (NLS) is intended for the localization of the operator interface to the desired language. NLS contains a set of functions that are harmonized with the Windows regional settings to enable a multilingual environment for the System 800xA.

The System 800xA supports translations, mainly the operator interface and the operator manuals as shown in the Table 3 and Table 4. The translation, or System 800xA Language Package, is implemented as a system extension and is possible to install without stopping the system.

The NLS Localization Guide describes what and how localization can be performed by a project with or without an installed Language Package. The English version of the Windows operating system is required. The System 800xA Language Packages can be downloaded free of charge from ABB Library.

Table 3. Supported Language Packages for Functional Areas

Language Packages	Functional Areas						
	Base System	Safety	SMS & eMailing	*Asset Optimization	FOUNDATION FIELDBUS	Batch Management	** Information Management
English (default)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arabic	Yes	Yes					
Chinese	Yes	Yes		Yes	Yes	Yes	Yes
French	Yes	Yes	Yes				Yes
German	Yes	Yes	Yes	Yes		Yes	Yes
Russian	Yes	Yes					Yes
Spanish	Yes	Yes	Yes				Yes
Swedish	Yes	Yes	Yes			Yes	Yes

* Only system messages

** Storage of messages in local language

Table 4. Supported Language Packages for Connectivity

Language Packages	Connectivity			
	800xA for AC 800M	800xA for Advant Master	PLC Connect	800xA for Melody
English (default)	Yes	Yes	Yes	Yes
Arabic	Yes			
Chinese	Yes	Yes	Yes	
French	Yes	Yes		
German	Yes	Yes		Yes
Russian	Yes	Yes		
Spanish	Yes			
Swedish	Yes	Yes		

AC 800M Processor Units

CPU Modules

Several CPU modules are available that vary in terms of processing power, memory size, and redundancy support. Each CPU module is equipped with built in Ethernet port(s) for communication with other controllers and for interaction with operators, engineers, managers, and higher level applications. These ports can be configured for redundancy for those cases where availability is of paramount importance. It is also equipped with two RS-232C ports that can be used for point-to-point communication with programming/debugging tools and with third-party systems and devices.

The SIL3-rated and IEC61508-certified, AC 800HI controller supports running both process control and safety application, in the same machine.

The AC 800M controller can be configured with 800xA control builder. When configured with the 800xA control builder AC 800M becomes a tightly integrated part of the System 800xA.

Communication & I/O Modules

To each CPU module, a number of communication and I/O modules can be added, for example:

- Additional RS-232C ports
- PROFIBUS DP, PROFINET IO
- Foundation Fieldbus HSE/H1
- DeviceNet
- IEC 61850
- Ethernet IP
- MasterBus 300
- MODBUS TCP
- S100 I/O
- S800 I/O

PM891



AC 800M



AC 800M high integrity



AC 800M Controllers and users guide

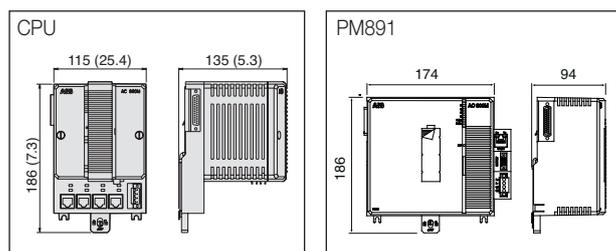
CPU's / Features	PM851A	PM856A	PM860A	PM861A	PM864A	PM865	PM866	PM891	
Processor Unit	PM851K01 incl: 1 PM851 CPU and required optional items	PM856K01 incl: 1 PM856 CPU and required optional items	PM860K01 incl: 1 PM860 CPU and required optional items	PM861AK01 incl: 1 PM861A CPU and required optional items PM861AK02 incl: 2 PM861A CPUs and required optional items	PM864AK01 incl: 1 PM864A CPU and required optional items PM864AK02 incl: 2 PM864A CPUs and required optional items	PM865AK01 incl: 1 PM865K01 CPU and required optional items PM865AK02 incl: 2 PM865K02 CPUs and required optional items	PM866K01 incl: 1 PM866 CPU and required optional items PM866K02 incl: 2 PM866 CPUs and required optional items	PM891K01 incl: 1 PM891 CPU and required optional items PM891K02 incl: 2 PM891 CPUs and required optional items	
High Integrity Controller	No	No	No	No	No	Yes	No	No	
Clock frequency	48 MHz	48 MHz	48 MHz	48 MHz	96 MHz	96 MHz	133 MHz	450 MHz	
Memory (RAM)	12 MB *	16 MB *	16 MB *	16 MB	32 MB	32 MB	64 MB	256 MB	
RAM available for application	6.372 MB	10.456 MB	10.457 MB	7.320 MB	23.663 MB	24.242 MB 22.415 MB w SM810 22.386 MB w SM811	51.402 MB	199.233 MB	
CPU redundancy support	No	No	No	Yes	Yes	Yes	Yes	Yes	
Communication interfaces	1 Ethernet port 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports	2 Ethernet ports 2 RS-232C ports		
Performance, 1000 boolean operations (a:=b and c)	0.46 ms	0.46 ms	0.23 ms	0.23 ms	0.15 ms	0.15 ms	0.09 ms	0.043 ms	
Recommended Control Network backbone	100 Mbit/s - 1 Gbit/s Ethernet (IEEE 802.3)								
Dimensions	W 119 x H 186 x D 135 mm (4.7 x 7.3 x 5.3 in.)							W 174 x H 186 x D 94 mm	
Weight (including base)	1100 g (2.4 lb)	1100 g (2.4 lb)	1100 g (2.4 lb)	1200 g (2.6 lb)	1200 g (2.6 lb)	1200 g (2.6 lb)	1200 g (2.6 lb)	1600 g (3.5 lb)	

* Available with 5.1 FP4 Firmware (or newer) else its 8 / 12 / 12 MB

Environmental Data for AC 800M

Climatic Operating Conditions	0 to +55 C (Storage -40 to +70C), RH = 5 to 95 % no condensation, IEC/EN 61131-2
Protection class	IP20 according to EN 60529, IEC 529
Corrosive protection	G3 compliant according to ISA-71.04
Electromagnetic Compatibility and CE-mark	Meets EMC directive 2004/108/EC according to EN 61000-6-2 and EN 61000-6-4
Electromagnetic Emission	Tested according to EN 61000-6-4 EMC – Generic Emission Standard, Part 2 – Industrial Environment
Electromagnetic Immunity	Tested according to EN 61000-6-2 EMC – Generic Immunity Standard, Part 2 – Industrial Environment
Electrical Safety	UL508, IEC/EN 61131-2
Hazardous Classified Locations	UL60079-15 (Class 1 Zone 2)
Hazardous Classified Locations ATEX	S890 series of I/O modules: Category 3 (1) G, EEx nA [ia] IIC T4
Safety Integrity (IEC 61508)	PM865, AI880A, DI880, DO880: IEC 61508 up to SIL3

Measurements



AC 800M Hardware – Hardware Upgrade orders

Hardware Upgrade orders

For Hardware Upgrade orders please send your inquiry to Service Center mail box: offer.selog@se.abb.com

ISA-S71.04 level G3 Compliance

Modules are compliant to ISA-S71.04 level G3, unless explicitly stated differently.

Extended Warranty for AC 800M Hardware

We can offer an extended warranty for one, two, or three years in addition to normal warranty conditions for AC 800M Hardware. See price list Extended Warranty 3BSE049908.

AC 800M Hardware – System Units



System Units

The Tool Cable TK212A is most useful when working with AC 800M.

Please order a cable (Item P215) together with your first order of PM851AK01, PM856AK01, PM860AK01, PM861AK01, PM861AK02, PM864AK01, PM864AK02, PM865K01, PM865K02, PM866K01, PM866K02, PM891K01 or PM891K02.

AC 800M Hardware – AC 800M Processor Units

800M Processor Units



	Article no.	
PM851AK01 Processor Unit Package including: -PM851A, CPU -TP830, Baseplate, width=115 mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -Battery for memory backup (4943013-6)	3BSE066485R1	
PM856AK01 Processor Unit Package including: -PM856A, CPU -TP830, Baseplate, width=115 mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -Battery for memory backup (4943013-6)	3BSE066490R1	

AC 800M Hardware – AC 800M Processor Units

800M Processor Units



	Article no.
<p>PM860AK01 Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> -PM860A, CPU -TP830, Baseplate, width=115 mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -Battery for memory backup (4943013-6) 	3BSE066495R1
<p>PM861AK01 Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> -PM861A, CPU -TP830, Baseplate, width =115mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -TB852, RCU-Link terminator -Battery for memory backup (4943013-6) 	3BSE018157R1
<p>PM861AK02 Redundant Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> 2 pcs PM861AK01, Processor unit. 1 pcs TK850, CEX-bus expansion cable. 1 pcs TK851, RCU-Link cable. 	3BSE018160R1
<p>PM864AK01 Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> -PM864A, CPU -TP830, Baseplate, width =115mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -TB852, RCU-Link terminator -Battery for memory backup (4943013-6) 	3BSE018161R1
<p>PM864AK02 Redundant Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> 2 pcs PM864AK01, Processor unit. 1 pcs TK850, CEX-bus expansion cable. 1 pcs TK851, RCU-Link cable. 	3BSE018164R1
<p>PM866K01 Processor Unit</p> <p>Package including:</p> <ul style="list-style-type: none"> -PM866, CPU -TP830, Baseplate, width =115mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -TB852, RCU-Link terminator -Battery for memory backup (4943013-6) 	3BSE050198R1
<p>PM866K02 Redundant Processor Units</p> <p>Package including:</p> <ul style="list-style-type: none"> 2 pcs PM866K01, Processor unit. 1 pcs TK850, CEX-bus expansion cable. 1 pcs TK851, RCU-Link cable. 	3BSE050199R1

System Units – AC 800M Processor Units

800M Processor Units



	Article no.	
PM891K01 Processor Unit Package including: -PM891 CPU Module -TB850, CEX-bus terminator -TB853, RCU Control Link Terminator	3BSE053241R1	
PM891K02 Redundant Processor Unit Package including: 2 pcs PM891K01 Processor Unit 1 pcs TK850V007 CEX-bus Extension Cable 1 pcs TK855 RCU Data Link Cable 1 pcs TK856 RCU Control Link Cable Please note: The BC810K02 is not included in the PM891K02 Redundant Processor Unit kit. In order to make hot replacement of PM891 Processor Unit possible, the BC810K02 is required and has to be ordered separately.	3BSE053242R1	
SB822 Rechargeable battery unit External DIN-rail mounted rechargeable battery unit including lithium-ion battery, 24V DC connector and connection cable TK821V020. Width=85 mm. Equivalent amount of Lithium metal=0,8g (0,03oz)	3BSE018172R1	

System Units – AC 800M High Integrity Units

AC 800M High Integrity Units

The PM865 CPU Unit is intended for use in High Integrity systems.

Local organizations must comply with the Qualifications to secure successful sales of ABB safety systems, to order safety equipment. Ref doc, 3BSE047224



	Article no.	
PM865K01 Processor Unit Package including: -PM865, CPU -TP830, Baseplate, width =115mm -TB850, CEX-bus terminator -TB807, ModuleBus terminator -TB852, RCU-Link terminator -Battery for memory backup (4943013-6)	3BSE031151R1	
PM865K02 Redundant Processor Unit Package including: 2 pcs PM865K01, Processor unit. 1 pcs TK850, CEX-bus expansion cable. 1 pcs TK851, RCU-Link cable.	3BSE031150R1	
SM811K01 Safety CPU module kit Collaborating safety CPU. Connects to CEX bus after BC810 CEX bus interconnection box. Including: -SM811, Safety Module -TP868, Baseplate, width=60mm -TK852V10, Synchronization link cable	3BSE018173R1	
SS823 Voting Device Required in a High Integrity 800xA system. One per power supply unit, also at redundant configurations	3BSE038226R1	

System Units – Extra Batteries



Extra Batteries

For extra Lithium batteries (4943013-6), please refer to ABB Parts Online; www.abb.com/partsonline.

Communication – Control Network

Control Network

No articles, such as cables, hubs, switches etc, for Control Network are included in this price list. Please refer to Product Guide AC 800M, for recommended articles.

Recommended network components are available in 800xA Networks price list, 3BSE081392

Communication – Serial Interfaces on TP830

Serial Interfaces on TP830

RS232-C interfaces for protocols COMLI, MODBUS, Siemens 3964R, the free-programmable serial protocol etc. Also for connection of engineering tool.



TK212A Tool cable

RJ45 (male) to Dsub-9 (female), length 3 m. RJ45 8P8C plug (with shell). Cable : UL2464 26 AWG x 8C.

Article no.

3BSC630197R1



TC562 Short Distance Modem, G1 Compliant

Length < 10 km. Point-to-point up to 1 km at 19200 bps. Power 24V d.c. Width=55 mm

3BSC630049R1



TK853V020 Modem Cable

Length 2 m. Cable for connection between modem TC562 and TP830.

3BSC950201R1

Communication – Serial Communication Interface

Serial Communication Interface

RS232-C interfaces for protocols COMLI, MODBUS, Siemens 3964R, the free-programmable serial protocol etc.



CI853K01 Dual RS232-C interface

Package including:
-CI853, Communication Interface
-TP853, Baseplate, width = 60 mm

Article no.

3BSE018103R1

Communication – MODBUS TCP



MODBUS TCP

CI867K01 Modbus TCP Interface

Package including:

- CI867 , Communication Interface
- TP867 , Baseplate, width=60mm

Article no.

3BSE043660R1

Communication – PROFIBUS DP



PROFIBUS DP

The required PROFIBUS network components (Linking Devices, etc) must be ordered from price list 3BDD 013 232, PROFIBUS Network Components.

CI854BK01 Profibus Communication Interface

Package including:

- CI854B, Communication Interface
- TP854, Baseplate, width = 60 mm

Article no.

3BSE069449R1

Communication – PROFINET IO



PROFINET IO

CI871K01 PROFINET IO Communication Interface

Package including:

- CI854A, Communication Interface
- TP854, Baseplate, width = 60 mm

Article no.

3BSE056767R1

Communication – FOUNDATION Fieldbus

FOUNDATION Fieldbus

The required FOUNDATION Fieldbus network components (Linking devices, etc) must be ordered from price list 3BDD 013 231, FOUNDATION Fieldbus Network Components.

CI871K01 PROFINET IO Communication Interface

Package including:

- CI860, Communication Interface
- TP860, Baseplate, width = 60 mm

Article no.

3BSE032444R1

Communication – IEC 61850

IEC 61850

For order of IEC 61850 related products, local organizations must comply with the Demands on the Purchaser to secure successful sales of IEC 61850 with System 800xA. Ref doc, 3BSE058798.



	Article no.
CI868K01 IEC61850-Ed1 (Edition 1) Communication Interface Package including: - CI868, Communication Interface - TP867, Baseplate, width=60mm	3BSE048845R1

Communication – Ethernet/IP

Ethernet/IP

For order of IEC 61850 related products, local organizations must comply with the Demands on the Purchaser to secure successful sales of IEC 61850 with System 800xA. Ref doc, 3BSE058798.



	Article no.
CI873K01 Ethernet/IP Communication Interface Packaging including: - CI873, Communication Interface - TP867, Baseplate width=60mm	3BSE056899R1
LD 800DN EtherNet/IP to DeviceNet Linking Device, G1 Compliant Package including: 1 pcs LD 800DN 1 pcs Installation Guide 2 pcs Termination resistors for DeviceNet, 1/4 W, 121 Ohm May only be used with CI873 Communication Interface.	3BSC690164R1



Communication – Advant Fieldbus 100

Advant Fieldbus 100



	Article no.
CI869K01 AF 100 Communication Interface Package including: - CI869, Communication Interface - TP869, Baseplate, width=60mm	3BSE049110R1

Communication – MasterBus 300



MasterBus 300

	Article no.
CI855K01 MB 300 Dual Ethernet port interface Package including: - CI855, MB300 Interface Module - TP853, Base plate	3BSE018106R1

Communication – S100 I/O Bus



S100 I/O Bus

	Article no.
CI856K01 S100 I/O Interface Installed on DIN rail. Communication bridge between AC800M and S100 system. Package including: - CI856, Communication Interface - TP856, Baseplate, width = 60mm	3BSE026055R1

Communication – TRIO



TRIO

	Article no.
CI862K01 TRIO Interface Kit, G1 Compliant Package including: - CI862, Communication Interface - TP862, Baseplate, width = 60mm	3BUA000037R1



CI862K02 Redundant TRIO Interface Kit with Connection Cable, G1 Compliant Package including: - 2xCI862, Communication Interface - 2xTP862, Baseplate, width = 60mm - TK862 Cable, 1m	3BUA000111R1
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Communication – Satt I/O



S100 I/O Bus

For SATT 19" rack I/O and S200 I/O via ControlNet. For additional Satt 19" rack I/O components, see price list 3BSE014353 (Interface) in price book 3BSE014360. (SattLine/SattCon).

	Article no.
CI865K01 Communication Interface Module for Satt I/O Package including: - CI865, Communication Interface - TP865, Baseplate, width = 60 mm	3BSE040795R1

Communication – INSUM



INSUM

	Article no.
CI857K01 INSUM Ethernet Interface Package including: - CI857, Communication Interface - TP853, Baseplate, width = 60 mm	3BSE018144R1

Communication – DriveBus



DriveBus

	Article no.
CI858K01 DriveBus Interface Package including: - CI858, Communication Interface - TP858, Baseplate, width = 60 mm	3BSE018135R1

Communication – MOD5



MOD5

	Article no.
CI872K01 MOD5 Communication interface Installed on DIN rail. Communication interface between AC800M and MOD5 system. Package including: - CI872, Communication module - TP858, Baseplate, width=60mm	3BSE051129R1

Communication – Bus Accessories

Bus Accessories



	Article no.	
TK850V007 CEX-Bus Extension Cable Length = 0.7 m Use of TK850V007 needs TK851 as CEX-bus terminator.	3BSC950192R1	
TB850 CEX-Bus Terminator With 25-pin DB25P male connector. With screw fixing. A TB850 CEX-Bus terminator must always be installed on the last unit on the CEX bus.	3BSC950193R1	
TB851 CEX-Bus Terminator With 25-pin DB25S female connector. With screw fixing.	3BSC950194R1	
BC810K02 CEX-bus Interconnection Unit Including: <ul style="list-style-type: none"> - BC810, Interconnection Unit, 2 units - TP857, Baseplate, width = 60 mm, 2 units - TK851, Interconnection Cable - TB850, CEX-Bus Terminator, 2 units 	3BSE031155R1	
BC820K02 RCU-Link and CEX-Bus Interconnection Units Including: <ul style="list-style-type: none"> - BC820, RCU-Link and CEX-Bus Interconnection Unit, 2 units - TP850, Baseplate, width = 60 mm, 2 units - TK857 RCU-Link Cable for BC820, 2 units - TB850, CEX-Bus Terminator, 2 units PM866 PR: H or later is required.	3BSE071500R1	
TK851V010 Connection Cable Length = 1.0 m. Used as: <ul style="list-style-type: none"> - RCU Link Cable - BC810 Interconnection Cable 	3BSC950262R1	
TB852 RCU Link Terminator	3BSC950263R1	
TB853 RCU Control Link Terminator	3BSE057022R1	
TK855 RCU Data Link Cable Length = 1.0 m. Used as: <ul style="list-style-type: none"> - RCU Data Link Cable 	3BSC950356R1	
TK856 RCU Control Link Cable Length = 1.0 m. Used as: <ul style="list-style-type: none"> - RCU Control Link Cable 	3BSE057021R1	
TK857V003 RCU Link Cable	3BSC950375R1	

AC 800M Processor Units – AC 800M Power supply

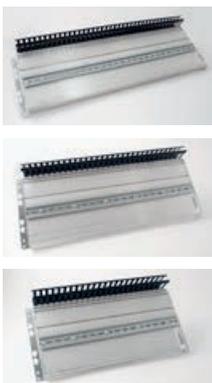
AC 800M Power supply



	Article no.
SD822Z Power Supply Device Input 115/230V a.c. switch selectable, output 24V d.c., 5A. If redundant power application is required connect to SS822Z Voting Unit.. Width=65 mm. DIN rail mounted.	3BSC610054R1
SD831 Power Supply Device, G2 Compliant Input a.c. 100-240 V or d.c. 110-300 V. Output d.c. 24 V 3A. If redundant power application is required connect to SS8XX. Voting unit. Width=35mm. DIN rail mounted.	3BSC610064R1
SD832 Power Supply Device, G2 Compliant Input a.c. 100-120/200-240 V. Output d.c. 24 V 5A, auto-select input. If redundant power application is required connect to SD8XX. Voting unit. Width=35mm. DIN rail mounted.	3BSC610065R1
SSD833 Power Supply Device, G2 Compliant Input a.c. 100-120/200-240 V, auto-select input. Output d.c. 24 V 10A. If redundant power application is required connect to SD8XX. Voting unit. Width=60mm. DIN rail mounted.	3BSC610066R1
SD834 Power Supply Device, G2 Compliant Input a.c. 100-240 V or d.c. 110-300 V. Output d.c. 24 V 20A. If redundant power application is required connect to SS8XX. Voting unit. Width=85mm. DIN rail mounted.	3BSC610067R1
SS822Z Power Voting Unit With dual 24V d.c 20A inputs, single 24V d.c. 20A output. Each power input supervised. Used if redundant power supply is required. For use with power supply SD822Z. Width=50 mm. DIN rail mounted.	3BSC610055R1
SS832 Voting Device, G2 Compliant Input d.c. 24 V. Dual 24 V to single 24 V, 2x10A. Width=35mm. DIN rail mounted.	3BSC610068R1
Mains Breaker Kit for DIN Rail 115/230V a.c. with input terminals, breaker and 3 fused (6.3A), double output terminals. Width=102,5 mm.	3BSE022262R1

AC 800M Processor Units – AC 800M Mounting Rails

AC 800M Mounting Rails



	Article no.
AI-profile with DIN rail and Cable Duct for RE820, mounting 719mm (28,3") DIN rail length 683mm (26,9")	3BSE022257R1
AI-profile with DIN Rail and Cable Duct for RM550, mounting 592mm (24") DIN rail length 556mm (21,9")	3BSE022256R1
AI-profile with DIN Rail and Cable Duct, mounting 465mm (19") DIN rail length 429mm (16,9")	3BSE022255R1

S800 I/O Modules

S800 I/O is a comprehensive and modular process I/O system that communicates with parent controllers either direct connected using the Modulebus or over industry-standard field buses. Thanks to its broad connectivity it fits a wide range of process controllers from ABB and others.

By permitting installation in the field, close to sensors and actuators, S800 I/O reduces the installation cost by reducing the cost of cabling. And thanks to features such as hot swap of modules, on-line reconfiguration and redundancy options, it contributes to keeping production – and thereby profits up.

S800 I/O features include:

- Comprehensive coverage
- Flexible configuration and installation
- Ease of set up
- Reliability and accuracy
- HART pass-through
- Redundancy also on I/O module level
- High Integrity I/O modules certified to SIL3
- High accuracy time tagging
- Defined outputs at communication errors
- I/O modules with Intrinsic Safety interfaces

With its cost-effective design and just 59 mm depth installation, S800L I/O modules are the perfect choice for PLC applications. Robust mechanics, one-piece handling, easy mounting and smart connections save your time in all phases of installation. The comprehensive S800 I/O system consists of more than 40 different module types to respond to every need. Classification of corrosive protection, electrical safety, hazardous location and marine certification brings the possibility to install S800 I/O in a wide variety of applications. S800 I/O is installed with more than 30 million channels worldwide.

S800



S800



S800L



S800 I/O Modules

Digital input modules	
DI810	16 channels, 2 groups of 8 channels, 24 V d.c., current sink.
DI811	16 channels, 2 groups of 8 channels, 48 V d.c., current sink.
DI814	16 channels, 2 groups of 8 channels, 24 V d.c., current source.
DI818	32 Channels, 2 groups of 16 channels, 24 V d.c., current sink.
DI820	8 channels, separate returns, 110 V d.c., 120 V a.c.
DI821	8 channels, separate returns, 220 V d.c., 230 V a.c.
DI825	With time tagging, 8 channels, separate returns, 125 V d.c.
DI828	16 Channels, separate returns, 110 V d.c, 120 V a.c. / d.c
DI830	With time tagging. 16 channels, 2 groups of 8 channels, 24 V d.c., current sink. Resolution: < 0.5 ms.
DI831	With time tagging. 16 channels, 2 groups of 8 channels, 48 V d.c., current sink. Resolution: < 0.5 ms.
DI885	With time tagging & wire-fault detection. 8 channels, common return, 24-48 V d.c., current sink. Resolution: 1 ms.
Pulse input module	
DP820	2 channels, separate returns, 0.25 Hz - 1.5 MHz, signal voltage: 5 / 12 V d.c.
DP840	8 channels, extended diagnostics, wire-fault detection, current limited sensor supply, 0.5-20 kHz, 12/24 V d.c or NAMUR, common return.
Digital output modules	
DO810	16 channels, 2 groups of 8 channels, 24 V, max 0.5 A d.c., transistor, current source, short-circuit-proof.
DO814	16 channels, 2 groups of 8 channels, 24 V d.c., max 0.5 A, transistor, current sink, short-circuit-proof.
DO815	8 channels, 2 groups of 4 channels, 24 V d.c., max 2 A, transistor, current source, short-circuit-proof, wire-fault detection.
DO818	32 Channels, 2 groups of 16 channels, 24 V, max 0.5 A d.c., transistor, current source, short-circuit-proof.
DO820	8 channels, separate returns, 5-250 V, max 3 A a.c./d.c., relay (N.O.).
DO821	8 channels, separate returns, 5-250 V, max 3 A a.c./d.c., relay (N.C.).
DO828	16 Channels, separate returns, 5-250 V a.c / 5-125 V d.c, max 2 A a.c./d.c., relay (N.O.).
Analog input modules	
AI810	8 channels, single-ended, 0(4)-20 mA, 0(2)-10 V, 12 bits.
AI815	8 channels with HART. 0(4)..20 mA, 0(1)..5 V, 12 bit, single ended, current limited transmitter supply.
AI820	Differential inputs, 4 channels, 0(1)-5 V, $\pm 0(2)$ -10 V, $\pm 0(4)$ -20 mA, 14 bits + sign.
AI825	Individually galvanically isolated channels, 4 channels, $\pm 0(2)$ -10 V, $\pm 0(4)$ - 20 mA, 14 bits + sign.
AI830A	RTD inputs, 8 channels, Pt100, Ni100, Ni120, Cu10, resistor 0-400 ohms, 14 bits, 3-wire.
AI835A	TC inputs, 8 channels, (7+ ref. junction), separate returns. TC types B, C, D, E, J, K, L, N, R, S, T, U, - 30...75 mV, 15 bits.
Analog output modules	
AO810V2	8 channels, common return, 0(4)-20 mA, 14 bits, load: 850 ohms (short-circuit-proof).
AO815	8 channels with HART. 4..20 mA, 12 bit, load: 750 ohms, common return, short-circuit-proof.
AO820	4 channels, individually galvanically isolated, separate returns, measuring range: $\pm 0(2)$ -10 V, $\pm 0(4)$ -20 mA, resolution: 12 bits + sign, load: 500 ohms (current) / 5 kohms (voltage), short-circuit-proof.
Intrinsic-safety modules	
DI890	8 channels, separate returns, proximity sensors (NAMUR) or voltage-free contact., current sink, wire-fault detection.
DO890	4 channels, separate returns, load 150-5000 ohms, 11 V @ 40 mA, current source, wire-fault detection, short circuit-proof.
AI890	8 channels, single-ended, 0(4)-20 mA, 12 bits, transmitter power supply.
AI893	8 channels, TC: 7 + ref. junction, sep. returns. TC types B, C, E, J, K, L, N, R, S, T, U, -10...80 mV. RTD: Pt50-1000, Ni100-500, Cu 10-100, resistor 0-4000 W, 3-wire. 15 bits + sign.
AI895	8 channels, single-ended, 4-20 mA, 12 bits, transmitter power supply, HART pass-through.
AO890	8 channels, common return, 0(4)-20 mA, 12 bits, load: 725 ohms short-circuit-proof.
AO895	8 channels, common return, 4-20 mA, 12 bits, load: 725 ohms short-circuit-proof, HART pass-through.
Redundant modules	
DI840	16 channels, common return, 24 V d.c., current sink, extended diagnostics, time-tagging, current limited sensor supply.
DP840	8 channels, common return, 0.5-20 kHz, 12/24 V d.c or NAMUR, extended diagnostics, wire-fault detection.
DO840	16 channels, common return, 24 V d.c., max. 0,5 A, transistor, current source, short-circuit-proof, extended diagnostics.
AI843	TC input, 8 channels + ref. junction. TC types: B, C, E, J, K, L, N, R, S, T, U, -30...75 mV, 16 bits, extended diagnostics.
AI845	8 channels, 12 bits, 0(4)-20 mA 0(1)-5 V, extended diagnostics, HART pass-through, current limited transmitter supply, single ended.
AO845	8 channels, 12 bits, common return, 4-20 mA, extended diagnostics, HART pass-through, 750 ohms.
High Integrity modules	
AI880A	4..20 mA, 8 channels, 12 bits, SIL3, current limited transmitter supply, also 0-20 mA, single ended, extended diagnostics, HART communication.
DI880	24 V d.c., 16 channels, 24 V d.c. inputs, SIL3, time-tagging, current limited sensor supply, common return, current sink, extended diagnostics.
DO880	24 V d.c., 16 channels, 0,5 A outputs, SIL3, wire-fault detection, 24 V, transistor, current source short-circuit-proof, common return, extended diagnostics.
SS823	Required in a High Integrity 800xA system. One per power supply unit, also at redundant configurations.

S800L I/O Modules

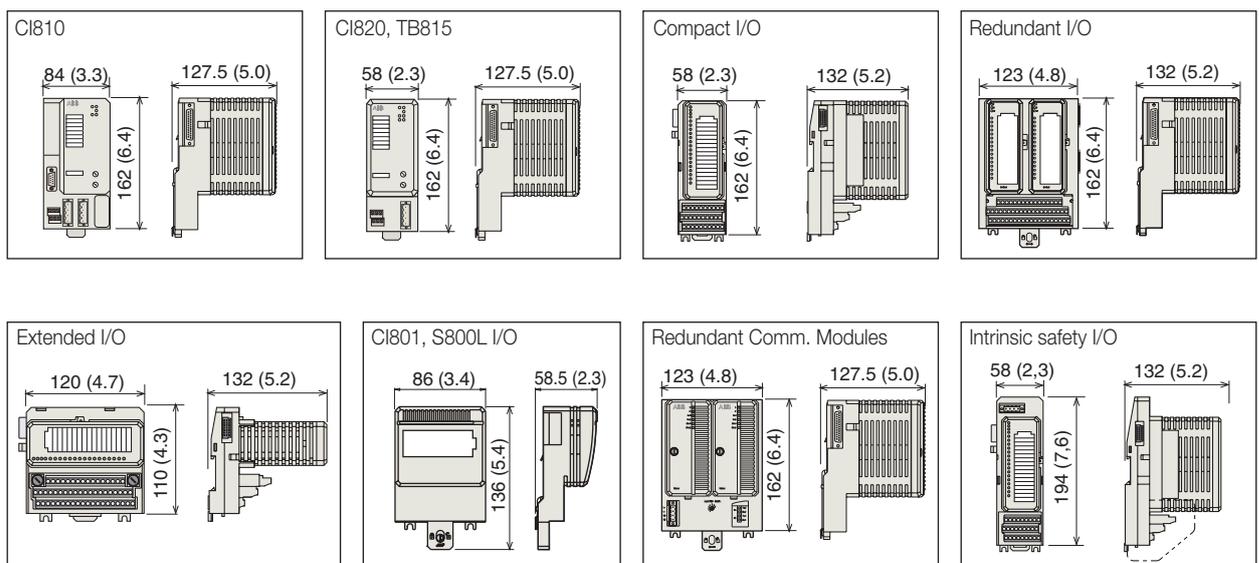
S800L modules

DI801	16 channels, 1 group, 24 V d.c., current sink.
DI802	8 channels, 110 V d.c., 150 V a.c.
DI803	8 channels, 220 V d.c., 230 V a.c.
DO801	16 channels, common return, 24 V, max 0.5 A d.c., transistor, current source, short-circuit-proof.
DO802	8 channels, 5-250 V, max 2 A a.c./d.c., relay (N.O.).
AI801	8 channels, single-ended, 0(4)-20 mA, 12 bits.
AO801	8 channels, common return, 0(4)-20 mA, 12 bits, load: less than 750 ohms.

Environmental Data for AC 800M and S800 I/O

Climatic Operating Conditions	0 to +55 C (Storage -40 to +70C), RH=5 to 95 % no condensation, IEC/EN 61131-2
Protection class	IP20 according to EN 60529, IEC 529
Corrosive protection	G3 compliant according to ISA-71.04
Electromagnetic Compatibility and CE-mark	Meets EMC directive 2004/108/EC according to EN 61000-6-2 and EN 61000-6-4
Electromagnetic Emission	Tested according to EN 61000-6-4 EMC – Generic Emission Standard, Part 2 – Industrial Environment
Electromagnetic Immunity	Tested according to EN 61000-6-2 EMC – Generic Immunity Standard, Part 2 – Industrial Environment
Electrical Safety	UL508, IEC/EN 61131-2
Hazardous Classified Locations	C1 Div 2 cULus, C1 Zone 2 cULus, ATEX Zone 2
Hazardous Classified Locations ATEX	S890 series of I/O modules: Category 3 (1) G, EEx nA [ia] IIC T4
Safety Integrity (IEC 61508)	PM865, AI880A, DI880, DO880: IEC 61508 up to SIL3

Measurements



Dimensions in mm (in.)

S800 I/O modules – Users guide

	NAMUR inputs	Binary 24 V	Binary 48 V	Binary 110 V	Binary 230 V	Binary Relay	Analog Unipolar	Analog Bipolar	Temperature RTD	Temperature T/C	SOE	HART	Intrinsic safety	Redundant	High integrity
I/O Features S800															
Digital input modules															
DI810		<input checked="" type="checkbox"/>													
DI811			<input checked="" type="checkbox"/>												
DI814		<input checked="" type="checkbox"/>													
DI818		<input checked="" type="checkbox"/>													
DI820				<input checked="" type="checkbox"/>											
DI821					<input checked="" type="checkbox"/>										
DI825				<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>				
DI828				<input checked="" type="checkbox"/>											
DI830		<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>				
DI831			<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>				
DI840		<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
DI880		<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DI885		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>				
DI890	<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>		
Digital output modules															
DO810		<input checked="" type="checkbox"/>													
DO814		<input checked="" type="checkbox"/>													
DO815		<input checked="" type="checkbox"/>													
DO818		<input checked="" type="checkbox"/>													
DO820						<input checked="" type="checkbox"/>									
DO821						<input checked="" type="checkbox"/>									
DO828						<input checked="" type="checkbox"/>									
DO840		<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>	
DO880		<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DO890													<input checked="" type="checkbox"/>		
Pulse input modules															
DP820		<input checked="" type="checkbox"/>													
DP840	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												<input checked="" type="checkbox"/>	
Analog input modules															
AI810							<input checked="" type="checkbox"/>								
AI815							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			
AI820								<input checked="" type="checkbox"/>							
AI825								<input checked="" type="checkbox"/>							
AI830A									<input checked="" type="checkbox"/>						
AI835A										<input checked="" type="checkbox"/>					
AI843										<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
AI845							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
AI880A							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AI890							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
AI893									<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		
AI895							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Analog output modules															
AO810V2							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
AO815							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
AO820								<input checked="" type="checkbox"/>							
AO845							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
AO890							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
AO895							<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
S800L modules															
DI801		<input checked="" type="checkbox"/>													
DI802				<input checked="" type="checkbox"/>											
DI803					<input checked="" type="checkbox"/>										
DO801		<input checked="" type="checkbox"/>													
DO802						<input checked="" type="checkbox"/>									
AI801							<input checked="" type="checkbox"/>								
AO801							<input checked="" type="checkbox"/>								

S800 I/O – Extended warranty for S800 I/O Hardware

Extended warranty for S800 I/O Hardware

We can offer an extended warranty for one, two, or three years in addition to normal warranty conditions for S800 I/O Hardware. See price list Extended Warranty Time 3BSE049908.

S800 I/O – ISA-S71.04 level G3 Compliance

ISA-S71.04 level G3 Compliance

Modules are compliant to ISA-S71.04 level G3, unless explicitly stated differently.

Communication – Field Communication Interface

Field Communication Interface



	Article no.	
CI801 PROFIBUS DP-V1 Communication Interface Including: 1 pce Power Supply Connector 1 pce TB807 Modulebus Terminator	3BSE022366R1	
CI801 Engineering kit SW1.3 Including: 1 pce CD with GSD file, Memory Maps and Release Note. 1 pce Reference Manual Memory Maps for CI801.	3BSE038540R1300	
CI840A Profibus DP-V1 Communication Interface. For 1+1 redundant operation. New article, replace CI840.	3BSE041882R1	
CI840 Engineering kit SW 4.0 Including: 1 pce CD with GSD file, Memory Maps and Release Notes. 1 pce Reference Manual Memory Maps for CI840.	3BSE031694R4000	
TU846 Module Termination Unit, MTU, for 1+1 CI840. Support for redundant I/O. Vertical mounting of modules. Including: 1 pce Power Supply Connector 2 pcs TB807 Modulebus Terminator	3BSE022460R1	
TU847 Module Termination Unit for 1+1 CI840. Support for non-redundant I/O. Vertical mounting of modules. Including: 1 pce Power Supply Connector 1 pce TB807 Modulebus Terminator	3BSE022462R1	

Communication – Field Communication Interface

Field Communication Interface



	Article no.
Extra, Front label set FCI/AC 70/TB Sheet with 12 labels	3BSC970089R1
Extra, Label set, item design. FCI/AC70/TB Sheet with 40 labels	3BSC970091R1
Mounting kit For vertical mounting of CI801, CI840, and TB840 on a vertical DIN rail.	3BSE040749R1
Mounting profile 1800, 2 DIN rails and 1 cable duct DIN rail length: 1650 mm + 210mm (65") + (8.3")	3BSE049768R1
AI-profile with DIN Rail and Cable Duct, mounting 465 mm (19") DIN rail length 429 mm (16,9")	3BSE022255R1
AI-profile with DIN Rail and Cable Duct for RM550, mounting 592 mm (24") DIN rail length 556 mm (21,9")	3BSE022256R1

Communication – Upgrade Kit and Tool Cables

Upgrade Kit and Tool Cables

Upgrading of CI801, CI810, CI820, CI830, CI840 or CI840A to latest software version are available for download from ABB Library/Solutions Bank.

Item R160 is cable connecting a PC to CI810, CI820 and CI830 for download of software.

Item R165 is cable connecting a PC to CI840 or CI840A for download of software.

CI801 requires items A160 and A165 for download of software.



	Article no.
TK527V030 Interface cable, L = 3 m. DE9 pin to DE9 socket.	3BSC950004R1
TK212A Tool cable RJ45 (male) to Dsub-9 (female), length 3 m. RJ45 8P8C plug (with shell). Cable : UL2464 26 AWG x 8C.	3BSC630197R1
FS801K01 Service adapter kit Including: 1 pcs Service adapter FS801 1 pcs cable TK802	3BSE038407R1

S800 I/O – S800 I/O Modules

Analog Input Modules



	Article no.
AI810 Analog input 1x8 ch. 0(4)..20mA, 0..10V, 12Bit, single ended, 0.1%, Rated isol. 50V Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU835, TU838, TU850.	3BSE008516R1
AI815 Analog Input 1x8 ch with HART 0(4)..20mA, 0(1)..5V, 12bit, single ended, 0.1%, Rated isol. 50V. Current limited transmitter power distribution. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU835, TU838.	3BSE052604R1
AI820 Analog input 4x1 ch. +-20mA, 0(4)..20mA, +-10V, +-5V, 0(1)..5V, diff., 50V CMV, 14bit+sign. Rin(curr)250 Ohms, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008544R1
AI825 Analog Input 4x1 ch Galv. isol. -20..20mA, 0(4)..20mA, -10..10V, 0(2)..10V, Galvanically isolated channels 14Bit+sign, 0.1%, Rated isol. 250V Use Module Termination Unit TU811, TU813, TU831.	3BSE036456R1
AI830A Analog input 1x8ch RTD Pt100, Ni100/120, Cu10, R, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE040662R1
AI835A Analog input 8 ch. Thermocouple/mV Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833.	3BSE051306R1
AI843 Analog Input , Redundant or Single 1x8ch Thermocouple/mV Rated isol. 50V. Use Modules Termination Unit TU818, TU830, TU833, TU842, TU843, TU852.	3BSE028925R1
AI845 Analog Input. Redundant or single 1x8ch. HART. 0(4)..20mA, 0(1)..5V, 12bit, single ended, 0.1%, Rated isol. 50V. Current limited transmitter power distribution. Advanced on-board diagnostics. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU835, TU838, TU844, TU845, TU854.	3BSE023675R1
AI890 Analog Input 1x8 ch with Intrinsic Safety Interface 0 (4)..20mA single ended 0,1%. Rated isol. 50V Use Module Termination Unit TU890 or TU891.	3BSC690071R1
AI893 Analog Input 8 ch. Temp. measuring. Intrinsic Safety Interf. For TC and RTD sensors. Rated isol. 50V.	3BSC690141R1
AI895 Analog Input 1x8 ch with Intrinsic Safety and HART. 4..20mA single ended 0,1%. Rated isol. 50V. Use Module Termination Unit TU890 or TU891	3BSC690086R1

S800 I/O – S800 I/O Modules

Analog Output Modules



	Article no.
AO810V2 Analog Output 1*8 channels, 0(4)...20mA 0(4)..20mA, 14bit RLmax 500/850 Ohms, Rated isolation 50V. Use module Termination Unit TU810, TU812, TU814, TU830 or TU833.	3BSE038415R1



AO815 Analog Output 1x8 ch with HART 4..20mA, 12bit, 0.1%, RLmax 750 ohm, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830 or TU833.	3BSE052605R1
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AO820 Analog Output 4x1 ch, +-20mA, 0(4)...20mA, +-10V, 12bit+sign. Indiv. isol. ch. RL max 500 Ohms, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008546R1
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AO845A Analog Output Redundant or single 1x8ch HART 4..20mA, 12bit, 0.1%, RLmax 750 ohm, Rated isol. 50V. Advanced on-board diagnostics. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843, TU852.	3BSE045584R1
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AO890 Analog Output 1x8 ch with Intrinsic Safety Interface 0 (4)...20mA 0,1%. RL max 750 ohm Rated isol. 50V Use Module Termination Unit TU890 or TU891.	3BSC690072R1
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AO895 Analog Output 1x8 ch with Intrinsic Safety and HART. 4...20mA 0,1%. RL max 750 ohm Rated isol. 50V. Use Module Termination Unit TU890 or TU891.	3BSC690087R1
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S800 I/O – S800 I/O Modules

Digital Input Modules



	Article no.
DI810 Digital Input 24V d.c. 2x8 ch. Rated isolation 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU850.	3BSE008508R1
DI811 2x8 ch 48V Digital input 48Vd.c. 2x8ch, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU850.	3BSE008552R1
DI814 Digital Input 24V d.c. Current Source 2x8 ch, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BUR001454R1
DI818 Digital Input 24V d.c. 32 ch 2x16 ch, Rated isol. 50V, Use Module Termination Unit TU818, TU819, TU830.	3BSE069052R1
DI820 Digital Input 120V a.c./d.c. 8x1 ch, Rated isol. 250V. Use Module Termination Unit TU811, TU813, TU831, TU839, TU851.	3BSE008512R1
DI821 Digital Input 230V a.c./d.c. 8x1 ch, Rated isol. 250V. Use Module Termination Unit TU811, TU813, TU831, TU839, TU851.	3BSE008550R1
DI825 Digital Input 1x8ch, 125V d.c. SOE Individually Isolated channels, Rated isol. 250V. Use Module Termination Unit TU811, TU813, TU831, TU839, TU851.	3BSE036373R1
DI828 Digital Input, 120V a.c./d.c. 16 ch 16x1 ch, Rated isol. 250V, Use Module Termination Unit TU851.	3BSE069054R1
DI830 Digital Input 24V d.c. SOE 2x8 ch, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU850.	3BSE013210R1
DI831 Digital Input 48V d.c., SOE 2x8 ch, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU850.	3BSE013212R1
DI840 Digital Input. Redundant or single, 24V d.c., 1x16 ch. Advanced On-Board diagnostics. Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU842, TU843, TU852.	3BSE020836R1
DI885 Digital Input 24/48V d.c., SOE 1x8 ch, Rated isol. 50V Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833.	3BSE013088R1
DI890 Digital Input 8x1 ch with Intrinsic Safety Interface Rated isol. 50V. Use Module Termination Unit TU890 or TU891.	3BSC690073R1

Digital Output Modules



	Article no.
DO810 Digital Output 24 V d.c. 2x8 ch 0.5A, Short circuit proof, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008510R1
DO814 Digital Output current sinking 2x8 ch 0,5A , shortcut circuit proof, Rated isol.50V Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BUR001455R1
DO815 Digital Output 24V d.c 2x4 ch, 2.0A short circuit proof. Rated isolation 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE013258R1
DO818 Digital Output 24V d.c. 32 ch 2x16 ch, 0.5A, Short circuit proof, Rated isol. 50V, Use Module Termination Unit TU818, TU819, TU830.	3BSE069053R1
DO820 Digital Output, Relay, Normal open 8x1 ch, 24-230V a.c./d.c. 3A, cos phi>0.4, d.c. 42W, Rated isol. 250V. Use Module Termination Unit TU811, TU813, TU831, TU836, TU837, TU851.	3BSE008514R1
DO821 Digital Output, Relay, Normal closed 8x1 ch, 24-230V a.c./d.c.. 3A, cos phi>0.4, d.c. 42W, Rated isol.250V. Use Module Termination Unit TU811, TU813, TU831, TU836, TU837, TU851.	3BSE013250R1
DO828 Digital Output, Relay Normally Open, 16 ch 16x1 ch, 5-250V a.c and 5-125V d.c, max 2A, Rated isol. 250V, Use Module Termination Unit TU851.	3BSE069055R1
DO840 Digital Output. Redundant or single. 24V d.c., 0.5A. 2x8 ch. Advanced On-board diagnostics. Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843, TU852.	3BSE020838R1
DO890 Digital Output 4x1 ch with Intrinsic Safety Interface Rated isol. 50V. Use Module Termination Unit TU890 or TU891.	3BSC690074R1

S800 I/O – Pulse Counting Modules

Pulse Counting Modules



	Article no.
DP820 Pulse Counter RS-422, Current, 5V, (12V), 24V 2 ch bidirectional pulse counters and frequency measurement. 1,5MHz Rated isol 50V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE013228R1
DP840 Pulse Counter or Frequency Measurement Module. Redundant or single. 1x8ch, 20kHz. Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU842, TU843, TU844, TU845, TU852, TU854.	3BSE028926R1

S800 I/O – Label sets for I/O Modules

Label sets for I/O Modules



	Article no.
Transparent film fronts 1Set of 12 transparent plastic film fronts. To be used with ordinary paper quality.	3BSE072159R1
White colored plastic coated paper One sheet of size A4. Original paper quality. No need to use transparent films.	3BSE072160R1
Yellow colored plastic coated paper One sheet of size A4. Original paper quality. No need to use transparent films. To be used with DI880, DO880, AI880A.	3BSE072161R1

S800 I/O – High Integrity I/O Modules

High Integrity I/O Modules

The modules can only be connected to AC800M controller PM865. Direct connection to the module-bus and via the optical modulebus via TB840 (not TB820).



	Article no.
AI880A High Integrity Analog Input. Single or Redundant. HART 4..20mA, 8 ch. Current input. HART communication. Certified for SIL3. Requires configuration according to Safety Manual. Use Module Termination Unit TU834, TU844, TU845, TU854.	3BSE039293R1
DI880 High Integrity Digital Input Single or Redundant 24V d.c., 16 ch. 24V d.c. inputs. Certified for SIL3. Requires configuration according to Safety Manual. Use Module Termination Unit TU810, TU812, TU814, TU818, TU830, TU833, TU838, TU842, TU843, TU852.	3BSE028586R1
DO880 High Integrity Digital Output. Single or Redundant. 24V d.c., 16 ch. 0,5A Outputs. Certified for SIL3. Requires configuration according to Safety Manual. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843, TU852.	3BSE028602R1

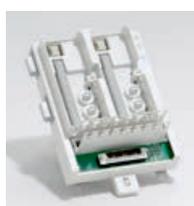
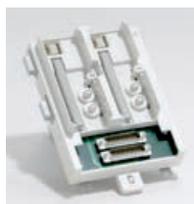
S800 I/O – Module Termination Units

Module Termination Units



	Article no.
TU805K01 Termination Units for two or three wire connection of DI801 and DO801 Include 10 pcs of Termination Unit TU805.	3BSE035990R1
TU810V1 Compact Module Termination Unit, MTU, 50V. 2x8 signal terminals, rated isol. 50V.	3BSE013230R1
TU811V1 Compact Module Termination Unit, MTU, 250V. 1x8 signal terminals, rated isol. 250V.	3BSE013231R1
TU812V1 Compact Module Termination Unit, MTU, 50V. With 25 pin D-sub connector, rated isol. 50V. D-sub (female) connector is not enclosed.	3BSE013232R1
TU813 Compact Module Termination Unit, MTU, 250V 2x8 Signal terminals, Rated isol. 250V Detachable (pluggable) connectors are enclosed.	3BSE036714R1
TU814V1 Compact Module Termination Unit, MTU, 50V. 2x8 Signal terminals, rated isol. 50V. Detachable (pluggable) connectors are enclosed.	3BSE013233R1
TU818 Compact Module Termination Unit, MTU, 50V 1x32 (and 2x16) signal terminals, Rated isol. 50V	3BSE069209R1
TU819 Compact Module Termination Unit, MTU, 50V. With 2x25 pin D-sub connector, Rated isol. 50V, D-sub (female) connector is not enclosed.	3BSE068891R1
TU830V1 Extended Module Termination Unit, MTU, 50V. 2x16 signal terminals, rated isol. 50V.	3BSE013234R1
TU831V1 Extended Module Termination Unit, MTU, 250V. 2x8 signal terminals, rated isol. 250V.	3BSE013235R1
TU833 Extended Module Termination Unit, MTU, 50V. 2x16 signal terminals, Rated isol. 50V. Spring-cage terminals.	3BSE038726R1
TU834 Extended Module Termination Unit, MTU 50V Used with AI880/AI880A. Rated isol. 50V. Shunt Stick not included.	3BSE040364R1
TU835V1 Extended Module Termination Unit, MTU, 50V. 8 fused power outlets, 8 signal terminals, rated isol. 50V.	3BSE013236R1
TU836V1 Extended Module Termination Unit, MTU, 250V. 2x4 fused signals, 2x4 return terminals, 2x2 L 2x2N terminals, rated isol. 250V.	3BSE013237R1
TU837V1 Extended Module Termination Unit, MTU, 250V. 8x1 fused isol. signals, 8x1 L terminals, 2x6 N terminals, rated isol. 250V.	3BSE013238R1
TU838 Extended Module Termination Unit, MTU, 50V. 2x4 fused transducer power outlets, 16 signal terminals, 2x4 return terminals, 2x2 L+, 2x2 L- terminals, rated isol. 50V. Module is mounted horizontally.	3BSE008572R1
TU839 Extended Module Termination Unit, 250V 2x8 signal terminals. 2x4 fused sensor power. Rated isol. 250V	3BSE046966R1
TU842 Module Termination Unit, MTU, for redundant applications, 50V. Used for AO845, DI840, DO840. Horizontal mounted DIN rail. Rated isol. 50V.	3BSE020850R1
TU843 Module Termination Unit, MTU, for redundant applications, 50V. Used for AO845, DI840, DO840. Vertical mounted DIN rail. Rated isol. 50V.	3BSE021443R1

S800 I/O and S800L I/O – Module Termination Units



Module Termination Units

	Article no.	
TU844 Module Termination Unit, MTU, for redundant applications, 50V. Used with AI845, AI880 and DP840. Horizontal mounted DIN rail. Rated isol. 50V. Shunt Stick not included.	3BSE021445R1	
TU845 Module Termination Unit, MTU, for redundant applications, 50V. Used with AI845, AI880A and DP840. Vertical mounted DIN rail. Rated isol. 50V. Shunt Stick not included.	3BSE021447R1	
TU850 Extended Module Termination Unit, MTU, 50V 2x8 signal terminals and 2x8 disconnectable current limited sensor/transmitter outlet power terminals. Rated isol. 50V.	3BSE050930R1	
TU851 Extended Module Termination Unit, MTU, 250V 2x16 signal terminals, Rated isol. 250V	3BSE068782R1	
TU852 Module Termination Unit, MTU, for redundant applications, 50V Horizontal mounted DIN rail, used with redundnat AO, DI, DO and DP I/O modules, with 2x25 pin D-sub connector, Rated isol. 50V	3BSE069964R1	
TU854 Module Termination Unit, MTU, for redundant applications, 50V Horizontal mounted DIN rail, used with redundnat AI and DP I/O modules, with 1x25 pin D-sub connector, Rated isol. 50V, Shunt Stick not included.	3BSE069966R1	
TU890 Module Termination Unit for Intrinsic Safety applications 3x9 signal terminals Rated isol. 50V. Including wiring separator.	3BSC690075R1	
TU891 Module Termination Unit for non Intrinsic Safety applications 3x9 signal terminals Rated isol. 50V.	3BSC840157R1	
TY801K01 8pcs Shunt Stick TY801 125 + 125 ohms shunt. Used for AI845 and AI880A on TU844, TU845, TU854.	3BSE023607R1	
TY804K01 8pcs Shunt Stick TY804 1000 ohms shunt. Used for DP840 on TU844, TU845, TU854	3BSE033670R1	
TY820K01 10pcs Temperature Sensor TY820 TY820 is a temperature sensor with a PT 100 element. Can be used with AI835/AI835A and AI843 to measure cold junction Temperature.	3BSE056980R1	

S800L I/O – S800L I/O Modules



Analog Input Modules

	Article no.
AI801 Analog input 1x8 ch, 0(4)..20mA, 12bit, single ended, 0.1%, Rated isol. 50V.	3BSE020512R1



Analog Output Modules

	Article no.
AO801 Analog output 1x8 ch, 0(4)..20mA, 12 bit, RLmax 850 Ohm, Rated isol. 50V.	3BSE020514R1



Digital Input Modules

	Article no.
DI801 Digital Input 24V d.c. 1x16 ch, Rated isol.50V	3BSE020508R1
DI802 Digital Input 120V a.c./d.c., 8x1ch. Rated isol. 250V.	3BSE022360R1
DI803 Digital Input 230V a.c./d.c., 8x1ch. Rated isol. 250V.	3BSE022362R1



Digital Output Modules

	Article no.
DO801 Digital Output 16ch. 24V d.c. 0.5A. Short circuit proof, Rated isol. 50V	3BSE020510R1
DO802 Digital Output, Relay. Normal open 8x1 ch, 24-230V, a.c./d.c. Rated isol. 250V	3BSE022364R1



S800L I/O – Label sets for S800L I/O Modules

Label sets for S800L I/O Modules



	Article no.
Label Set S800L, 16ch Sheet with 12 labels for 16 channels I/O modules.	3BSE019419R1
Label Set S800L, 8ch Sheet with 12 labels for 8 channels I/O modules	3BSE019419R2

S800 I/O and S800L I/O – ModuleBus Communication Parts

ModuleBus Communication Parts



	Article no.	
TB805 Bus Outlet Modulebus extension cable adaptor D-sub 25, female. One required per extension cable TK801.	3BSE008534R1	
TB845, Dual Modulebus outlet Modulebus extension cable adaptor two D-sub, female. Two TK801 cables for redundancy.	3BSE021437R1	
TB806 Bus Inlet Modulebus extension cable adaptor D-sub 25, male. One required per extension cable TK801.	3BSE008536R1	
TB846, Dual Modulebus inlet Modulebus extension cable adaptor two D-sub, male. Two TK801 cables for redundancy.	3BSE021439R1	
TK801V003 Cable. Modulebus Extension Shielded Cable 0.3m D-sub 25, male-female.	3BSC950089R1	
TK801V006 Cable. Modulebus Extension Shielded Cable 0.6m D-sub 25, male-female.	3BSC950089R2	
TK801V012 Cable. Modulebus Extension Shielded Cable 1.2m D-sub 25, male-female.	3BSC950089R3	
TB807 Modulebus terminator.	3BSE008538R1	
TB820V2 Modulebus Cluster Modem Optical cluster modem for non redundant operation. Including: 1 pce Power Supply Connector 1 pce TB807 Modulebus Terminator	3BSE013208R1	
TB825 Optical Media Converter Multi Mode Short to long distance optical fiber conversion. For modulebus communication up to 1000m.	3BSE036634R1	
TB826 Optical Media Converter Single Mode Short to long distance optical fiber conversion. For modulebus communication up to 5000m, for S800 I/O HI up to 20000m.	3BSE061637R1	
TB840A Modulebus Cluster Modem Optical cluster modem for 1+1 redundant operation.	3BSE037760R1	
TB842 Modulebus Optical Port Used together with CI801 and CI840, connected via TB806 or TB846. 10 Mbits driver.	3BSE022464R1	
TU807 Termination Unit for TB840/TB840A Support for single modulebus I/O. Including: 1 pcs TB807	3BSE039025R1	
TU840 Termination Unit for 1+1 TB840. Support for redundant I/O Including: 1 pce Power Supply Connector 2 pcs TB807 Modulebus Terminator	3BSE020846R1	
TU841 Termination unit for 1+1 TB840. Support for non-redundant I/O. Including: 1 pce Power Supply Connector 1 pce TB807 Modulebus Terminator	3BSE020848R1	

S800 I/O and S800L I/O – ModuleBus Communication Parts

ModuleBus Communication Parts



TU848, MTU with individual power supply for red. TB840/ TB840A. Support for dual modulebus.

Including:
2 pcs TB807

Article no.

3BSE042558R1



TU849, MTU with individual power supply for red. TB840/ TB840A. Support for single modulebus

Including:
1 pcs TB807

3BSE042560R1



TK811V015 POF Cable, 1.5m, Duplex

L=1.5m latching duplex connector Duplex plastic fibre

3BSC950107R1

TK811V050 POF Cable, 5m, Duplex

L=5m latching duplex connector Duplex plastic fibre.

3BSC950107R2

TK811V150 POF Cable, 15m, Duplex

L=15m latching duplex connector Duplex plastic fibre.

3BSC950107R3



TK812V015 POF Cable, 1.5m, Simplex

L=1.5m latching connector Simplex plastic fibre.

3BSC950118R1

TK812V050 POF Cable, 5m, Simplex

L=5.0m latching connector Simplex plastic fibre.

3BSC950089R1

TK812V150 POF Cable, 15m, Simplex

L=15m latching connector Simplex plastic fibre.

3BSC950118R3



Power Supply

	Article no.	
<p>SD822Z Power Supply Device Input 115/230V a.c. switch selectable, output 24V d.c., 5A. If redundant power application is required connect to SS822Z Voting Unit. Width=65 mm. DIN rail mounted.</p>	3BSC610054R1	
<p>SS822Z Power Voting Unit With dual 24V d.c 20A inputs, single 24V d.c. 20A output. Each power input supervised. Used if redundant power supply is required. For use with power supply SD822Z. Width=50 mm. DIN rail mounted.</p>	3BSC610055R1	
<p>SD831 Power Supply Device, G2 Compliant Input a.c. 100-240 V or d.c. 110-300 V. Output d.c. 24 V 3A. If redundant power application is required connect to SS8XX. Voting unit. Width=35mm. DIN rail mounted.</p>	3BSC610064R1	
<p>SD832 Power Supply Device, G2 Compliant Input a.c. 100-120/200-240 V. Output d.c. 24 V 5A, auto-select input. If redundant power application is required connect to SD8XX. Voting unit. Width=35mm. DIN rail mounted.</p>	3BSC610065R1	
<p>SD833 Power Supply Device, G2 Compliant Input a.c. 100-120/200-240 V, auto-select input. Output d.c. 24 V 10A. If redundant power application is required connect to SD8XX. Voting unit. Width=60mm. DIN rail mounted.</p>	3BSC610066R1	
<p>SD834 Power Supply Device, G2 Compliant Input a.c. 100-240 V or d.c. 110-300 V. Output d.c. 24 V 20A. If redundant power application is required connect to SS8XX. Voting unit. Width=85mm. DIN rail mounted.</p>	3BSC610067R1	
<p>SS832 Voting Device, G2 Compliant Input d.c. 24 V. Dual 24 V to single 24 V, 2x10A. Width=35mm. DIN rail mounted.</p>	3BSC610068R1	

S800 I/O – User Documentation

User Documentation

	Article no.	
S800 I/O Getting Started	3BSE020923-600	
S800 I/O Modules and Termination Units	3BSE020924-600	
S800 I/O Fieldbus Communication Interface for PROFIBUS DP/DPV1	3BSE020926-600	
S800 I/O Modules and Termination Units with Intrinsic Safety Interface	3BSE020927-600	

800xA – Process Industries Application Libraries

Process Industries Application Libraries

The Process Industries Application Libraries (PIAL) in this book include Process Control Device Library (PCDL), Process Control Equipment Library (PCEL) and ProBase Library.

One valid license is required per 800xA system. User documentation is provided electronically with the product media. The licenses support use with System 800xA. These licenses entitle license holders to use the library in one system, meaning one Aspect Server.

Please refer to System Guide Ordering and Licensing (3BSE041435) for more information.

800xA – PIAL Media

PIAL Media

	Article no.	
CD media with Process Industries Application Libraries for System 800xA	3BSE057164R1	

800xA – Process Control Device Library

Process Industries Application Libraries

The 800xA PC Device Library provides device-level objects. The PCDeviceLib is a customized library for the process industry. It builds upon the 800xA - AC800M library to provide additional functionality and engineering efficiency. Benefits include minimizing the initial learning curve for the Industrial IT Extended Automation System 800xA and to minimize the engineering effort. The PCDevice Library contains an extensive list of objects, but it is licensed only by the number of Control Elements used. Control Elements are the Valves, Motors and PID Loops in a system.

The following PCDevice library control modules are categorized as Control Elements - Valve, ValveMan, MotorOnOff, MotorOnOffAdv, Motor2Speed, MotorVarSpeed, ControllerPIDLoop, ControlValvePneumatic, ControlValveElectric, ChokeValve, MotorOnOffCore, Motor2SpeedCore and MotorVarSpeedCore

Process Control Device Library Licenses

	Article no.	
Base Process Control Device Library (including 125 Control Elements) The PCDevice Library comes with all PCDevice library objects but only the 13 objects listed above are counted as Control Elements. To arrive at the correct number of Control Elements to purchase, count the number of Valve, Motor and ControllerPID-Loop objects associated with the project.	3BSE081553R1	

Additional Control Device Library Licenses

	Article no.	
Additional 125 Control Elements	3BSE081554R1	

800xA – PCDL Application Engineering

PCDL Application Engineering

	Article no.	
PCDL License for Application Engineering This Engineering system License is intended to use for Application Engineering purpose only. A maximum of 2500 Control Elements will be issued as a part of the license. For production system, appropriate quantity of Control Elements license must be purchased separately. Media is ordered separately.	3BSE081555R1	

PCDL Application Engineering

	Article no.	
PCDL Additional License for Application Engineering Each additional license comes with 2500 control elements license.	3BSE081556R1	

800xA – Process Control Equipment Library

Process Control Equipment Library

Process Control Equipment Library (PCEquipmentLib) is a comprehensive library of Equipment Module templates, and toolkit components for industrial IT Extended Automation System 800xA.

PCEquipmentLib is designed to optimize the specification and building of ANSI/ISA-88.01-1995 style Equipment Modules and customized Process Units. Designed to “plug and produce” with standard PCDeviceLib control objects, PCEquipmentLib shares common terminology, engineering principles, and naming conventions to make engineering consistent and easy. It is a requirement to use a compatible version of PCDevice Library in conjunction with PCEquipment Library. Refer to PCEquipment Library release notes for appropriate version information.

The PCEquipment Library contains an extensive list of Pre-engineered and Validated objects like Unit template and Standard Phases, Equipment Modules, Quality Monitor, pcc Supervision, EqTimer, Prompts/PromptsAlarmOwner etc. The PCEquipment Library also contains Pre-engineered Facility Automation Solution objects.

Process Control Equipment Library Licenses

	Article no.
Base Process Control Equipment Library With Production Management This license is for working with up to 125 PCDevice Lib Control Elements. This license shall allow using any number of PCEL Batch Unit type with Standard Phases. All other modules for Equipment module implementation, quality monitoring, PCC configuration, and operator visualization are included with this license. This license also includes Pre-engineered Facility Automation Solutions like AHUs, Scheduler, ZoneMonitor, Facility, Start-Stop sequence, Operator visualization etc. With one base license, a maximum of 125 PCDeviceLib Control Elements can be used. An incremental purchase of PCDevice Lib Control Elements (License Expansion) requires an incremental purchase of PCEquipment Lib license (License Expansion). Note: License for PCDevice Lib Control Elements to be purchased separately.	3BSE081558R1

800xA – Process Control Equipment Library

Process Control Equipment Library Licenses

	Article no.	
Base Process Control Equipment Library Without Production Management This license is for working with up to 125 PCDevice Lib Control Elements. This license shall allow using any number of PCEL Equipment Module (EM) types with Device Summary and ModeControl. Other modules like Prompt, PromptAlarmOwner and EqTimer are included in the license. This license also includes Pre-engineered Facility Automation Solution objects like AHUs, Scheduler, ZoneMonitor, Facility Start-Stop sequence, Operator visualization etc. With one base license, a maximum of 125 PCDL Control Elements can be used. An incremental purchase of PCDevice Lib Control Elements (License Expansion) requires an incremental purchase of PCEquipment Lib license (License Expansion). Note: License for PCDevice Lib Control Elements to be purchased separately.	3BSE081559R1	

800xA – Additional Control Equipment Library Licenses

Additional Control Equipment Library Licenses

It is a requirement to use a compatible version of PCDevice Library in conjunction with PCEquipment Library. Refer to PCEquipment Library release notes for appropriate version information. Additional expansion licenses can be purchased. When ordering additional licenses, the original quantity and the license information must be included with the expansion order.

Additional Control Equipment Library Licenses

	Article no.	
Additional Process Control Equipment Library With Production Management Each Expansion license is for working with up to 125 PCDevice Lib Control Elements.	3BSE081560R1	
Additional Process Control Equipment Library Without Production Management Each Expansion license is for working with up to 125 PCDevice Lib Control Elements.	3BSE081561R1	

800xA – PCEL Application Engineering

PCEL Application Engineering

	Article no.
PCEL License for Application Engineering This Engineering system License is intended to use for Application Engineering purpose only. A maximum of 20 'PCEL With Production Management'. License quantity will be issued as a part of this license, which can be used with both Batch and Non-Batch version of PCEquipmentLib. For production system, appropriate quantity of PCEL With Production Management or WithOut Production Management license quantities must be purchased separately. Media is ordered separately.	3BSE081562R1

PCEL Application Engineering

	Article no.
PCEL Additional License for Application Engineering Each additional license comes with 20 PCEL WithBatch license.	3BSE081557R1

800xA – ProBase

ProBase

ProBase is a set of System 800xA libraries with industry specific functionality targeting liquid process handling or other applications where routing, storage of material, CIP, etc. are a major concern in the application. Example industries are food & beverage, chemical, pharmaceuticals, tank farms, etc.

ProBase Licenses

ProBase licensing is based on type and number of controllers executing ProBase and the number of ProBase operator workplaces.

	Article no.
ProBase 6.0 Operator Workplace - First Client	3BSE081563R1
ProBase 6.0 Operator Workplace - Additional Client	3BSE081564R1
ProBase 6.0 PM861/PM861A Software License	3BSE081565R1
ProBase 6.0 PM864/PM864A Software License	3BSE081566R1
ProBase 6.0 PM865 Software License	3BSE081567R1
ProBase 6.0 PM866 Software License	3BSE081568R1
ProBase 6.0 PM891 Software License	3BSE081569R1
ProBase 6.0 Demo License and Application Engineering License This license is to be used with the 800xA Demo License and Application Engineering License. The intended use is sales related activities such as fairs, training centers etc that requires a full sized system. It is also intended for application engineering. Media is ordered separately.	3BSE081570R1

S900 Remote I/O System

The S900 remote I/O system communicates with 800xA or other controllers over PROFIBUS. Suitable for applications in the chemical, pharmaceutical, oil and gas industries, S900 I/O can be installed in hazardous areas, thereby reducing marshalling and wiring costs. Further maintenance savings can be achieved through S900's extended diagnostics and the use of HART®-compliant field devices.

Three series of S900 I/O are available:

- S-series for applications in Zone 1 hazardous areas
- B-series for applications in Zone 2 hazardous areas
- N-series for applications in non hazardous areas

Additional solutions for specific applications are available:

- Field housing - for wall mounting and field mounting in Zone 1 installations with system approval fully certified in accordance with ATEX. The high-grade steel housing is prepared for wall-mounting with facility for insulated screen rails or terminals.
- CB220 compact box - S900 in compact form (with up to 4 I/O modules). This variant is suitable for use in applications such as temperature multiplexers and solenoid valve circuits.

The S900 components are based on a passive backplane suitable for mounting on a DIN rail or directly in a sub-distribution board. The passive backplane includes internal bus communication, terminals for field circuits, communication, and power supply. The function modules are plugged into the backplane in their appropriate slots. The redundant backplane has two slots for power supply units, two slots for communication interfaces, and 16 slots for function modules. Digital function modules have up to 8 channels, analog modules up to four. Therefore, when using a redundant backplane, 128 digital or 64 analog channels can be connected per station. In the case of the S and B series, up to ten S900 stations can be connected on a single fieldbus line.

Key S900 benefits include:

- Intrinsically safe - can be installed in Zone 1 and Zone 2 areas.
- Good price/performance ratio because external barriers have been removed and costs are reduced in terms of cabling, installation, hardware, and maintenance.
- Easy configuration using either FDT/DTM or GSD files, allowing easy integration with 800xA process control systems.
- High availability of the plant thanks to redundancy and hot-swap capability of all components during operation.

Series	Assembly	Field devices / signals	Hazardous area approval
S series	In Zone 1	In Zones 2, 1 and 0 (intrinsically safe signals)	ATEX Zone 1
B series	In Zone 2	In Zones 2, 1 and 0 (intrinsically safe signals)	ATEX Zone 2
N series	In safe areas	In safe areas	No

S900



I/O Features S900	NAMUR inputs	Binary 24 V	Binary 48 V	Binary 110 V	Binary 230 V	Binary Relay	Analog Unipolar	Analog Bipolar	Temperature RTD	Temperature T/C	SOE	HART	Intrinsic safety	Redundant	High integrity
Digital I/O modules															
DX910S,B,N*	<input checked="" type="checkbox"/>														S,B
Digital output modules															
DO910S,B,N*															S,B
DO930N			<input checked="" type="checkbox"/>												
Pulse input modules															
DP910S,B,N*						<input checked="" type="checkbox"/>									S,B
Analog input modules															
AI910S,B,N*							<input checked="" type="checkbox"/>								S,B
AI930S,B,N*							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			S,B
AI931S,B,N*							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			S,B
AI950S,B,N*									<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					S,B
Analog output modules															
AO910S,B,N*							<input checked="" type="checkbox"/>								S,B
AO920S,B,N*							<input checked="" type="checkbox"/>								S,B
AO930S,B,N*							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>			S,B

S900 Remote I/O System – Ex zone 1 system components

Termination Unit



TU921S Redundant Termination Unit (TU16R-Ex)

for 16 I/O-modules
 redundant communication and power
 (Delivery includes CD910)

Article no.

3KDE175111L9210

Power Supply



SA920S Power Supply

for 24 V DC
 Do not mix SA910S with SA920S for redundancy (observe
 Release Notes)

Article no.

3BDH000602R1

Communication Interface



CI920AS Communication Interface V 2.1 (CIPBA-Ex)

Use only CI920AS with the same firmware for redundancy for
 PROFIBUS DP-V1 (observe Release Notes).

Article no.

3BDH000690R1

Digital Input or Output



DX910S Digital Input or Output (DIO8-Ex)

input for dry contact or NAMUR initiator
 output for low power Intrinsic Safe valves

Article no.

3KDE175311L9100

DO910S Digital Output (DO4-Ex)

output for Intrinsic Safe valves

3KDE175321L9100

DP910S Frequency Input (FI2-Ex)

input for dry contact or NAMUR initiator

3KDE175361L9100

S900 Remote I/O System – Ex zone 1 system components

Analog Input



	Article no.	
AI910S Analog input (AI4-Ex) transmitter power supply, 4...20 mA	3KDE175511L9100	
AI930S Analog Input, HART (AI4H-Ex) transmitter power supply, 4...20 mA	3KDE175511L9300	
AI931S Analog Input, HART (AI4H-Ex) passive input, 0/4...20 mA	3KDE175511L9310	
AI950S Temperature (TI4-Ex) Pt100, Pt1000, Ni100 in 2-/3-/4-technology thermocouples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel	3KDE175521L9500	

Analog Output



	Article no.	
AO910S Analog output (AO4-Ex) output 0/4...20 mA	3KDE175531L9100	
AO920S Analog output, isolated (AO4I-Ex) output 0/4...20 mA isolated outputs channel by channel	3KDE175531L9200	
AO930S Analog output HART (AO4H-Ex) output 0/4...20 mA	3KDE175531L9300	

S900 Remote I/O System – Ex zone 2 system components

Termination Unit



TU921B Redundant Termination Unit (TU16R-B)

for 16 I/O-modules
 redundant communication and power
 (Delivery includes CD910)

Article no.

3KDE175112L9210

Power Supply



SA920B Power Supply

for 24 V DC
 the power supply filter type BP901S is not required
 SA920B is the functional replacement for SA910B do not mix
 SA910B with SA920B for redundancy (observe Release Notes)

Article no.

3BDH000601R1

Communication Interface



CI920AB Communication Interface V 2.1 (CIPBA-B)

Use only CI920AB with the same firmware for redundancy for
 PROFIBUS DP-V1 (observe Release Notes).

Article no.

3BDH000691R1

Digital Input or Output



DX910B Digital Input or Output (DIO8-B)

input for dry contact or NAMUR initiator
 output for low power I.S. valves

Article no.

3KDE175312L9100

DO910B Digital Output (DO4-B)

output for I.S. valves

3KDE175322L9100

DP910B Frequency Input (FI2-B)

input for dry contact or NAMUR initiator

3KDE175362L9100

S900 Remote I/O System – Ex zone 2 system components

Analog Input



	Article no.	
AI910B Analog input (AI4-B) transmitter power supply, 4...20 mA	3KDE175512L9100	
AI930B Analog Input, HART (AI4H-B) transmitter power supply, 4...20 mA	3KDE175512L9300	
AI931B Analog Input, HART (AI4H-B) passive input, 0/4...20 mA	3KDE175512L9310	
AI950B Temperature (TI4-B) Pt100, Pt1000, Ni100 in 2-/3-/4-technology thermocouples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel	3KDE175522L9500	

Analog Output



	Article no.	
AO910B Analog output (AO4-B) output 0/4...20 mA	3KDE175532L9100	
AO920B Analog output, isolated (AO4I-B) output 0/4...20 mA isolated outputs channel by channel	3KDE175532L9200	
AO930B Analog output HART (AO4H-B) output 0/4...20 mA	3KDE175532L9300	

S900 Remote I/O System – Safe area system components

Termination Unit



TU921N Redundant Termination Unit (TU16R)

for 16 I/O-modules
 redundant communication and power
 (Delivery includes CD910)

Article no.

3KDE175113L9210

Power Supply



SA920N Power Supply

for 24 V DC
 Do not mix SA910N with SA920N for redundancy (observe
 Release Notes)

Article no.

3BDH000600R1

Communication Interface



CI920AN Communication Interface V 2.1 (CIPBA)

use only CI920AN with the same firmware for redundancy
 for PROFIBUS DP-V1 (observe Release Notes)

Article no.

3BDH000692R1

Digital Input or Output



DX910N Digital Input or Output (DIO8)

input for dry contact or NAMUR initiator
 output for low power valves

Article no.

3KDE175313L9100

DO910N Digital Output (DO4)

output for valves

3KDE175323L9100

DO930N Relay Output (RO6)

with 4 normally-open contacts and 2 changeover contacts

3BDS014114

DP910N Frequency Input (FI2)

input for dry contact or NAMUR initiator

3KDE175363L9100

S900 Remote I/O System – Safe area system components

Analog Input



	Article no.	
AI910N Analog input (AI4) transmitter power supply, 4...20 mA	3KDE175513L9100	
AI930N Analog Input, HART (AI4H) transmitter power supply, 4...20 mA	3KDE175513L9300	
AI931N Analog Input, HART (AI4H) passive input, 0/4...20 mA	3KDE175513L9310	
AI950N Temperature (TI4) Pt100, Pt1000, Ni100 in 2-/3-/4-technology thermocouples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel	3KDE175523L9500	

Analog Output



	Article no.	
AO910N Analog output (AO4) output 0/4...20 mA	3KDE175533L9100	
AO920N Analog output, isolated (AO4I) output 0/4...20 mA isolated outputs channel by channel	3KDE175533L9200	
AO930N Analog output HART (AO4H) output 0/4...20 mA	3KDE175533L9300	

Compact-Box



	Article no.	
CB220N Compact-Box for power supply SA911N, communication interface CI920AN and four I/O modules S900 type N (Delivery includes CD910)	3KDE175613L2210	
SA911N Power supply for CB220N for 24 V DC	3KDE175613L9110	

S900 Remote I/O System – Accessories

Fieldbus isolating repeater

	Article no.	
BI914S Fieldbus isolating repeater separates an intrinsically safe RS485 fieldbus from a non intrinsically safe RS485 fieldbus with bus termination mounted in DIN rail mounted housing with IP20 protection one channel version BARTEC - 07-7311-97WP/K1E0	3BDH000649R1	
BI923S Ring-coupler RS485 / FO - intrinsically safe - Slave separates an intrinsically safe fibre optic ring from a non intrinsically safe RS485 fieldbus BARTEC - 07-7311-97WP5400 mounted in DIN rail mounted housing with IP20 protection (Slave) Optical Plug FSMA	3KDE175831L9230	
BI924S Ring-coupler RS485 / FO intrinsically safe - Master separates an intrinsically safe fibre optic ring from a non intrinsically safe RS485 fieldbus BARTEC - 07-7311-97WP5400 mounted in DIN rail mounted housing with IP20 protection (Master) Optical Plug FSMA	3KDE175831L9240	
BI934S Ring-coupler RS485 / FO intrinsically safe – Slave Separates an intrinsically safe fibre optic ring from one intrinsically safe RS485 fieldbus segment Mounted in separate field housing BARTEC - 07-3103-2512/9003 Optical Plug FSMA	3BDH000674R0001	

Accessories

	Article no.	
BP914S Intrinsically safe PROFIBUS-DP connector for CI920AS and CI920AB D-SUB Connector (color blue) for operating the intrinsically safe PROFIBUS-DP with CI920AS and CI920AB. Siemens 6ES7972-0DA60-0XA0 Connector can only be used with CI920AS and CI920AB. Do not use in combination with CI920S or CI920B. This would violate the explosion protection and could cause destruction of CI920S or CI920B. For CI920S and CI920B connector BP910S has to be ordered as spare part via BOL or Parts OnLine.	3BSE067082R1	
IP920 Module housing IP20 protection for empty slots on the termination unit for use in S900 S, B, and N systems	3KDE175831L9200	
IL910 Insert labels 380 pcs.	3KDE175839L9101	

Software

	Article no.	
CD910, S900 I/O Media CD-ROM CD-ROM incl S900 Documentation, Certificates, GSD (file) CD-ROM will be delivered with all TU921 and CB220 deliveries	3KDE175839L9100	

S900 Remote I/O System – Field Housing S900-FH660S

General Information

The Ex e field housings FH660S from stainless steel (1.4301) serves for the reception of one redundant termination unit (backplane) TU16R-Ex (Order-No. TU921S) as well as further components with ATEX-certification for the hazardous area in zone 1.

Dimensions 600x600x300 mm / for max 100 field cables

The field housings are pre-mounted with stopping plugs instead of cable glands. The cable glands have to be ordered separately at manufacturer Hummel or manufacturer Bimed.

To fulfill the ATEX-certification the following cable glands are recommended:

Manufacturer Hummel:

- Type HSK-M-EMV-Ex M16 (article no. 1646160050)
- Type HSK-M-EMV-Ex M20 (article no. 1646200051)
- Type HSK-M-EMV-Ex M32 (article no. 1646320050)

Manufacturer Bimed:

- Type EBS M16 (article no. EBS01M)
- Type EBS M20 (article no. EBS1M)
- Type EBS M25 (article no. EBS2M)

All S900 modules and power supply components have to be ordered separately!
Additional costs of air transport and courier transport ask under e-mail:
Orderbox-CtrlPr DEAPR/DEAPR/ABB or orderbox.control-products@de.abb.com

Internal Installation

With system certificate.



	Article no.
FH660S-2000 Field housing including the following components: - Termination Unit (backplane) TU921S - 4 Terminals (UK10N) Field housings are delivered without cable glands. Cable glands have to be ordered separately (see General information and Product Update 2PAA112874)	3KDE175804V2000
FH660S-2020 Field housing including the following components: - Termination Unit (backplane) TU921S - 4 Terminals (UK10N) - 2 Switches Field housings are delivered without cable glands. Cable glands have to be ordered separately (see General information and Product Update 2PAA112874)	3KDE175804V2020

S900 Remote I/O System – Field Housing S900-FH680S

General Information

The Ex e field housings FH680S from stainless steel (1.4301) serves for the reception of one redundant termination unit (backplane) TU16R-Ex (Order-No. TU921S) as well as further components with ATEX-certification for the hazardous area in zone 1.

Dimensions 600x800x300 mm / for max 100 field cables

The field housings are pre-mounted with stopping plugs instead of cable glands. The cable glands have to be ordered separately at manufacturer Hummel or manufacturer Bimed. To fulfill the ATEX-certification the following cable glands are recommended:

Manufacturer Hummel:

- Type HSK-M-EMV-Ex M16 (article no. 1646160050)
- Type HSK-M-EMV-Ex M20 (article no. 1646200051)
- Type HSK-M-EMV-Ex M32 (article no. 1646320050)

Manufacturer Bimed:

- Type EBS M16 (article no. EBS01M)
- Type EBS M20 (article no. EBS1M)
- Type EBS M25 (article no. EBS2M)

All S900 modules and power supply components have to be ordered separately!
Additional costs of air transport and courier transport ask under e-mail:
Orderbox-CtrlPr DEAPR/DEAPR/ABB or orderbox.control-products@de.abb.com

Internal Installation

With system certificate.

	Article no.
FH680S-2020 Field housing including the following components: <ul style="list-style-type: none">- Termination Unit (backplane) TU921S- 4 Terminals (UK10N)- 2 Switches Field housings are delivered without cable glands. Cable glands have to be ordered separately (see General information and Product Update 2PAA112874)	3KDE175811V2020

S900 Remote I/O System – Accessories

Accessories

	Article no.
Field Housing roof weather protection fits to all field housing	3KDE175831L1000

Fieldbus Network – FOUNDATION Fieldbus Network Components

FOUNDATION Fieldbus HSE/H1 Linking Device

LD 800HSE links the FOUNDATION Fieldbus HSE protocol to the FOUNDATION Fieldbus H1 protocol and vice versa. Up to 4 external powered H1 lines can be connected to one LD 800HSE. Two LD 800HSE can be combined to a redundant set of devices. In this case the Redundancy Link cable is required.

Linking Devices



Linking Device LD 800HSE

LD 800 HSE module for DIN rail mounting with 4 H1 links and one HSE connector. The module itself needs external 24 VDC power supply. H1 links must be powered separately.

Restrictions:

Both Linking Device versions, 3BDH000320R02 and 3BSE073314R1 are not suitable for replacing a device with article no 3BDH000320R0101 in a redundant set of devices. So this restriction is valid for both LDs, the EX and the non-EX version.

For this purpose a limited number of spare devices 3BDH000320R0101 are available via:

ABB AB/Service Center
 B357, Tvarleden 2
 SE-721 59 Vasteras
 Sweden
 E-Mail: offer.selog@se.abb.com

Article no.

3BDH000320R02

Linking Devices



Linking Device LD 800HSE EX

LD 800HSE EX module for DIN rail mounting with 4 H1 links and one HSE connector. Certified for hazardous area Zone 2 acc. to ATEX and IECEx. (Observe Release Notes).

The module itself needs external 24 VDC power supply.

H1 links must be powered separately

Restrictions:

Both Linking Device versions, 3BDH000320R02 and 3BSE073314R1 are not suitable for replacing a device with article no 3BDH000320R0101 in a redundant set of devices. So this restriction is valid for both LDs, the EX and the non-EX version.

For this purpose a limited number of spare devices

3BDH000320R0101 are available via:

ABB AB/Service Center

B357, Tvarleden 2

SE-721 59 Vasteras

Sweden

E-Mail: offer.selog@se.abb.com

Article no.

3BSE073314R1

Accessories Linking Device LD 800HSE

Redundancy Link Cable, 0,5m

Redundancy Link Cable links two LD 800HSE to a redundant set of devices.

Article no.

3BDH000281R1

Media and Documentation

	Article no.	
Media CD-ROM LD 800HSE, Version 3.5.0, English Documentation in pdf-format, tools, capabilities file, and bitmaps for LD 800HSE.	3BDD011678R0701	
Media CD-ROM LD 800HSE/LD 800HSE Ex, Version 3.6.0, English Documentation in pdf-format, tools, capabilities file, and bitmaps for LD 800HSE/LD 800HSE EX.	3BDD011678R0801	
Device Management FOUNDATION Fieldbus Linking Device, LD 800HSE 3.5.0/0 Describes in detail the FOUNDATION Fieldbus Linking Device LD 800HSE features, hardware installation, configuration, and diagnostics.	3BDD011677-510	
Device Management FOUNDATION Fieldbus Linking Device, LD 800HSE 3.6.0 Describes in detail the FOUNDATION Fieldbus Linking Device LD 800HSE/LD 800HSE EX features, hardware installation, configuration, and diagnostics.	3BDD011677-600	

Network Components – PROFIBUS Network Components

PROFIBUS Redundancy Link Module RLM01

The RLM01 is delivered with a printed manual.

	Article no.	
RLM01, PROFIBUS Redundancy Link Module for PROFIBUS line redundancy Converts a non-redundant PROFIBUS line to two redundant RS485 lines or vice versa. Germanischer Lloyd (GL) certified (cat. A,B,C,D) in connection with power supply filter (3BDZ000397R1).	3BDZ000398R1	
Power Supply Filter (surge) 24 V DC Mandatory to fulfill the requirements of Germanischer Lloyd (GL). WAGO article no. 750-626	3BDZ000397R1	

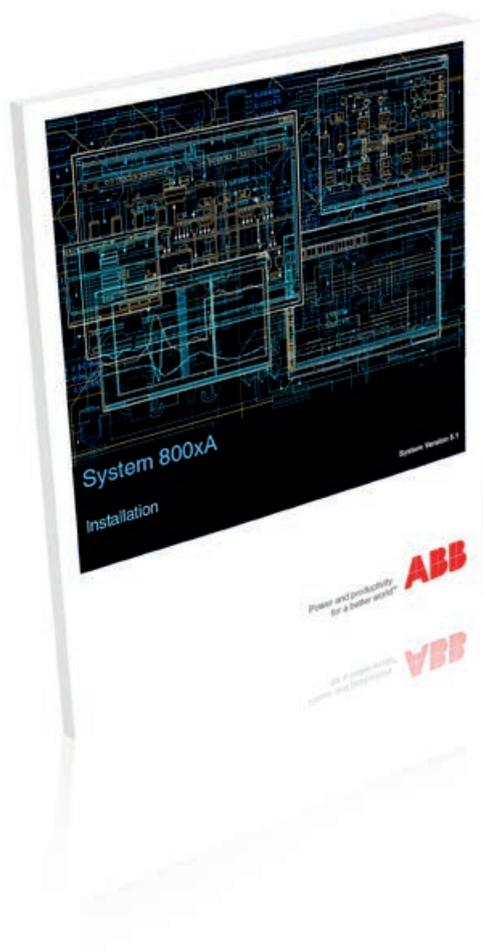
PROFIBUS DP Accessories

	Article no.	
PCO 010, PROFIBUS DP connector, standard max. 12 Mbit/s, 35° cable outlet, IP40, without bus termination Phoenix Contact article no. 2744597	3BDZ000370R1	
PCO 011, PROFIBUS DP connector with bus termination max. 12 Mbit/s, 35° cable outlet, IP40, switchable bus termination Phoenix Contact article no. 2708232.	3BDZ000371R1	
PCO 012, PROFIBUS DP connector with bus termination and adapter max. 12 Mbit/s, 35° cable outlet, IP40, switchable bus termination, programming connection SUB-D Phoenix Contact article no. 2708245	3BDZ000372R1	

800xA 6.0 System – Media and Documentation

Related Documentation

A complete list of all documents applicable to the 800xA System is provided in Released User Documents (3BUA000263-600). This document lists applicable Release Notes and User Instructions. It is provided in PDF format and is included on the Release Notes/Documentation media provided with your system. Released User Documents are updated with each release and a new file is provided that contains all user documents applicable for that release with their applicable document number. Whenever a reference to a specific instruction is made, the instruction number is included in the reference.



Media and Documentation – Industrial IT 800xA

Industrial IT 800xA – Media

The articles in section 1 may only be selected when ordering a new 800xA system, or if the end user has a valid Automation Sentinel agreement.

	Article no.	
System 800xA 6.0, Media Box (Solid State Drive) Including: System 800xA 6.0, and User Documentation on a Solid State Drive device.	3BSE079233R600	
System 800xA 6.0, Media Box (CD/DVD) Including: System 800xA 6.0, and User Documentation on DVD and CD.	3BSE078932R600	

Media and Documentation – Library

Library – Media

	Article no.	
INF190 Function Code Library for AC 800M CD/DVD Media – INF190FCLib Latest Revision	3BSE079546R200	
MOD 300 CCF Library for AC 800M CD/DVD Media MODCCFLib 2.1-x latest revision – Supports System version 5.1.	3BSE079547R21	
CD media with Process Industries Application Libraries for System 800xA	3BSE057164R1	

Media and Documentation – Dongles

Dongles



	Article no.	
Dongle for USB Port To be used with 800xA 5.1 Rev A. For USB Dongle to 800xA 5.1 (not Rev A), 800xA 5.0, 800xA 4.1 and 800xA 3.1, please, purchase the Dongle from price book 3BSE41710, System 800xA Expansion.	3BSE064644R1	

800xA Base System User Documentation



800xA Base System User Documentation

Note! User Manuals are printed on demand and delivery time expects to 15 working days. For S900 I/O documentation, please, refer to the S900 I/O and Fieldbus Network Components price book, 2PAA102823.

	Article no.	
800xA Base System Documentation Documents included: Manual Installation, Automated Installation, Upgrade, Network Configuration, IEC 61850 Engineering Workflow, IEC 61850 Configuration, IEC 61850 Operation Library Substation Equipment, PC Network and Software Monitoring Operation, PC Network and Software Monitoring Configuration, Administration and Security, Post Installation, Configuration, Operations, System Planning, Site Planning, Server Node Virtualization, Tools, Multisystem Integration, Maintenance, VideONet Connect.	3BSE079003-600	
800xA for Advant Master – Connectivity Documentation Documents included: Advant Master Configuration, Advant Master Operation, Advant Master Graphic Library, Advant Master Extended Graphic Library	3BSE079004-600	
800xA for Harmony – Connectivity Documentation Documents included: Harmony Configuration, Harmony Operation	3BSE079005-600	
800xA for DCI – Connectivity Documentation Documents included: DCI Configuration, DCI Operation	3BSE079006-600	
800xA for AC 870P/Melody – Connectivity Documentation Documents included: AC 870P/Melody Configuration, AC 870P/Melody Asset Management for HART devices Configuration.	3BSE079007-600	
800xA for MOD 300 – Connectivity Documentation Documents included: MOD 300 Configuration, MOD 300 Operation	3BSE079008-600	
PLC Connect – Connectivity Documentation Documents included: PLC Connect Operation, PLC Connect Configuration	3BSE079009-600	
800xA for Safeguard – Connectivity Documentation Documents included: Safeguard Configuration, Safeguard Operation, Safeguard Graphic Library	3BSE079010-600	
800xA for AC 100 – Connectivity Documentation Documents included: AC 100 Aspect Object Types, AC 100/AC 100 OPC Server Installation, AC 100 OPC Server Configuration and Operation, AC 100 Configuration and Operation	3BSE079011-600	
Operations Documentation Documents included: Operations Operator Workplace Configuration, Mobile Devices Support	3BSE079012-600	
Batch Management Documentation Documents included: Batch Management Operation, Batch Management Configuration	3BSE079013-600	
Information Management Documentation Documents included: Information Management Getting Started, Information Management Configuration, Information Management Display Services, Information Management Data Access and Reports.	3BSE079014-600	

800xA Base System User Documentation

800xA Base System User Documentation

	Article no.	
<p>Engineering Documentation</p> <p>Documents included: Engineering Studio, Engineering Studio Function Designer, Engineering Studio Topology Designer, Engineering Process Graphics, Engineering Process Graphics Migration Tool, Engineering Process Graphics based on Visual Basic, Engineering Process Engineering Tool Integration, Engineering Studio Function Designer Getting Started, Engineering and Production Environments, Engineering Programmers Guide, Engineering Application Change Management.</p>	3BSE079015-600	
<p>AC 800M Documentation</p> <p>Documents included: AC 800M Getting Started, AC 800M Configuration, AC 800M Planning, AC 800M Binary and Analog Handling, AC 800M Library Object Style Guide, AC 800M OPC Server, AC 800M Communication Protocols, AC 800M FOUNDATION Fieldbus HSE, AC 800M PROFIBUS DP Configuration, AC 800M PROFIBUS DP Installation, AC 800M ProfiNet IO Configuration, AC 800M AC 800M DriveBus, AC 800M Ethernet/IP DeviceNet Configuration, AC 800M Ethernet/IP DeviceNet Installation, AC 800M IEC 61850 Configuration, AC 800M Controller Hardware, AC 800M Interfacing SATT I/O. Advant Fieldbus 100 User Manual, TRIO/Genius Getting Started, TRIO/Genius</p>	3BSE079016-600	
<p>S800 I/O Documentation</p> <p>Documents included: S800 I/O Getting Started, S800 I/O Modules and Termination Units, S800 I/O Fieldbus Communication Interface for PROFIBUS DP/DP-V1, S800 I/O Modules and Termination Units with Intrinsic Safety, S800 I/O DTM 5.3</p>	3BSE079017-600	
<p>S200 I/O Documentation</p> <p>Documents included: S200 I/O Hardware</p>	3BSE079018-600	
<p>AC 800M High Integrity Documentation</p> <p>Documents included: Safety Manual AC 800M High Integrity, Safety Manual AC 800M High Integrity Reliability and Availability Data</p>	3BSE079019-600	
<p>Asset Optimization Documentation</p> <p>Documents included: Asset Optimization Configuration, Asset Optimization Operation</p>	3BSE079020-600	
<p>Device Management and Fieldbus Documentation</p> <p>Documents included: Device Management Device Library Wizard</p>	3BSE079021-600	
<p>Device Management FOUNDATION Fieldbus Documentation</p> <p>Documents included: Device Management FOUNDATION Fieldbus Configuration</p>	3BSE079022-600	
<p>Device Management PROFIBUS and HART Documentation</p> <p>Documents included: Device Management PROFIBUS and HART Configuration, Device Management Basic PROFIBUS DTM 5.3, Device Management Basic HART DTM 5.2, Device Management PROFIBUS DTM Builder 5.3, Device Management HART DTM Builder 5.2.</p>	3BSE079023-600	

Panel 800 Version 6

Panel 800 is a user-friendly, intuitive and ergonomic operator panel that combines slim, space saving dimensions with a comprehensive range of advanced functions.

All panels are equipped with advanced functionality for process and equipment control, maneuvered either by function keys located next to the screen or by touching the LCD display. Combined with market leading performance and stunning graphical ability, the Panel 800 erodes the line between ordinary Operator Panels and PC based HMIs. Panel 800 is the successor after the Process Panels.

Panel 800 is designed specifically for ABB Control Network and AC 800M controllers, but thanks to the extensive driver library, the Panel 800 is compatible with most makes of PLC and ABB legacy control systems. When using it together with AC 800M, certain unique features become available, such as integrated alarm handling with the controller.

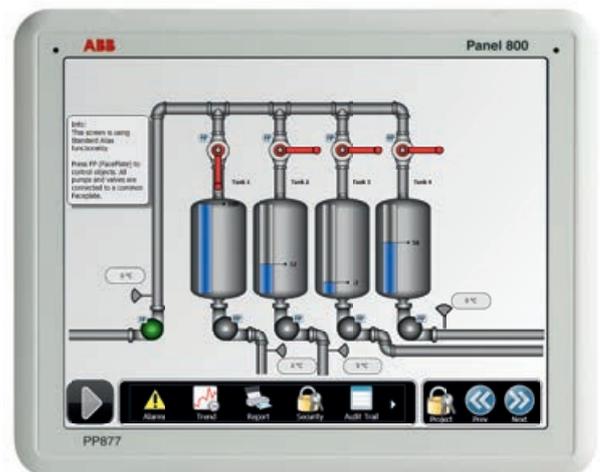
Panel 800 consists of a modern powerful hardware platform, which enables a very limited mounting depth. The frame is made of powder-coated aluminum, giving the panels a very robust look-and-feel. The front enclosure is designed to withstand demanding industrious usage according to the IP66 standard. The panels have also been certified by DNV and UL.

In December 2012, ABB launched the Panel 800 version 6 series. All Panel 800 Version 6 are developed to satisfy the demands of human-machine communication. Built-in functions such as displaying and controlling text, dynamic indication, time channels, alarm and recipe handling are included.

The Panel 800 Version 6 works primarily in an object-oriented way, making it easy to understand and use. Configuration is carried out on a PC using the Panel Builder configuration tool. The project can then be transferred and stored in the operator panel itself.

Various types of automation equipment such PLCs, servos or drives can be connected to the Panel 800 Version 6.

Touch panels



Specifications Panel 800 Version 6

Specifications Panel 800	
Display backlight	CCFL/LED backlight with dimming function
CPU	316 or 416 MHz RISC CPU (Intel Xscale)
Memory, flash	32 MB (Intel StrataFlash)
Memory, RAM	64 MB
Flash memory for application	12 MB
Real time clock	YES
Power supply	+24 C14 20-30 V
Ambient temperature	0 ° to +50 °C
Relative humidity	5 - 85 % non-condensing
Housing material	Powder-coated aluminium
Front side material	Autotex F250 / F157 (keyboard), (PP865S in Stainless Steel 316/1.4401)
Peripherals	
Serial Ports	RS422/RS485, female, 25-pin D-Sub, RS232C, male, 9-pin D-Sub
Ethernet	Shielded RJ45 10/100 Mbit/sec
USB	Host type A (power consumption max. 500 mA), Device type B
PROFIBUS	Expansion slot for PROFIBUS DP
Environmental Data for Panel 800	
Climatic Operating Conditions	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C Storage temperature -20 °C to +70 °C Relative humidity 5 - 85 % non-condensed
Protection class	Front panel seal IP 66 Rear panel seal IP 20
Electromagnetic Compatibility and CE-mark	Meets EMC directive 2004/108/EC
Electromagnetic Emission	Tested according to EN61000-6-4 (2007)
Electromagnetic Immunity	Tested according to EN61000-6-2 (2005)
Electrical Safety	UL508
Hazardous Classified Locations	UL 1604 Class I, Div 2 Groups A, B, C, D, T4
Marine Certificates	ABS, DNV, GL, RINA

Specifications	PP871	PP874	PP877
Display size	4,3"	7"	10,4"
Resolution	480 x 272 pixels (16:9)	800 x 480 pixels (16:9)	640 x 480 pixels (4:3)
Interaction type	Resistive Touch	Resistive Touch	Resistive Touch
LED	-	-	-
Power consumption (normal/max)	3,6 W	6,0 W	9,6 W
Dimensions			
Front panel, W x H x D	145 x 103 x 49 mm	204 x 143 x 49 mm	280 x 228 x 51 mm
Cut-out dimensions	128 x 87 x 43 mm	187 x 126 x 43 mm	262 x 209 x 46 mm
Mounting	Panel mount and VESA 50 x 50	Panel mount and VESA 75 x 75	Panel mount and VESA 75 x 75
Net weight	ca. 0.5 kg	ca. 0.8 kg	ca. 1.5 kg

Specifications	PP882	PP885	PP893	PP896
Display size	12.1"	15.4"	15.4"	21.5"
Resolution	1280 x 800 pixels (16:10)	1280 x 800 pixels (16:10)	1280 x 800 pixels (16:10)	1920 x 1080 pixels (16:9)
Interaction type	Resistive Touch	Resistive Touch	Resistive touch, 1 million finger touch operations	Resistive touch, 1 million finger touch operations
LED	-	-	-	-
Power consumption (normal/max)	22 W	24 W	114 W	125 W
Dimensions				
Front panel, W x H x D	340 x 242 x 79 mm	410 x 286 x 83 mm	410 x 286 x 83 mm	556 x 347 x 87 mm
Cut-out dimensions	324 x 226 mm	394 x 270 mm	394 x 270 mm	539 x 331 mm
Mounting	Panel mount and VESA 75 x 75	Panel mount and VESA 75 x 75	Panel mount and VESA 100 x 100	Panel mount and VESA 100 x 100
Net weight	ca. 2.6 kg	ca. 3.85 kg	ca. 5.4 kg	ca. 8.1 kg

Panel 800 Version 6 – Software Management Program

Software Management Program

Automation Sentinel is the ABB control system lifecycle support program. An introductory trial period to the Automation Sentinel program will be included, at no additional cost, with each new ABB control system software delivery. Please contact your designated Automation Sentinel responsible for any questions or please refer to the Automation Sentinel 3.0 product guide for detailed information on the program and on how to calculate and order Automation Sentinel subscriptions.

Upgrade Orders

	Article no.	
Panel Builder 800 Version 6, for upgrades only Media folder with Panel Builder 800 Version 6 containing the latest version of: <ul style="list-style-type: none">- Panel Builder 800 Version 6- Firmware for panels- Manuals as pdf-files- Release Notes- Renewed license- Mouse Pad This item can be ordered by users with a valid Automation Sentinel agreement for Panel Builder 800 Version 6.	3BSE069301R1	

Panel 800 Version 6 – Panel Builder 800

Panel Builder 800



	Article no.	
Panel Builder 800 Version 6 Media folder with Panel Builder 800 Version 6 containing the latest version of: <ul style="list-style-type: none">- Panel Builder 800 Version 6- Firmware for panels- Manuals as pdf-files- Release Notes- License for one Panel Builder 800 Version 6- Mouse Pad	3BSE069300R1	

Panel 800 Version 6 – Operator Panels

Touch Panels



	Article no.
PP871 Touch panel 4.3" TFT 480x272 (16:9) Requires Panel Builder 800 Version 6 for configuration.	3BSE069270R1
PP874 Touch panel 7" TFT 800x480 (16:9) Requires Panel Builder 800 Version 6 for configuration.	3BSE069271R1
PP877 Touch panel 10.4" TFT 640x480 (4:3) Requires Panel Builder 800 Version 6 for configuration.	3BSE069272R1

High Performance Touch Panels



	Article no.
PP882 High performance touch panel 12" TFT 1280x800 (16:9) Requires Panel Builder 800 Version 6 for configuration.	3BSE069275R1
PP885 High performance touch panel 15" TFT 1280x800 (16:9) Requires Panel Builder 800 Version 6 for configuration.	3BSE069276R1

Top Performance Touch Panels



	Article no.
PP893 Top performance touch panel 10.4" TFT 640x480 (4:3) Requires Panel Builder 800 Version 6 for configuration.	3BSE069277R1
PP896 Top performance touch panel 10.4" TFT 640x480 (4:3) Requires Panel Builder 800 Version 6 for configuration.	3BSE069278R1

Panel 800 Version 6 – Accessories

Communication Interface for Panel 800

	Article no.	
CB810 USB to Ethernet adapter for programming USB to Ethernet adapter with software Cross over Ethernet patch cable included	3BSE042255R1	

Connection Cables for Panel 800

	Article no.	
TK858V002 Adapter cable (CAB 107, TK855V002) Adapter cable RS232 - RS485 0.2 m 9 pin D-Sub to 25 pin D-Sub. For using 5.1 RS422/485 cables on Version 6 panels.	3BSE069474R1	
TK859V000 Gender changer (TK856V000) Gender changer 9 pin D-Sub male/male.	3BSE069475R1	
TK860V001 Splitter cable (CAB 109, TK857V001) Splitter cable Version 6 panel. Y-split cable to utilize more than two COM ports on Version 6 panels.	3BSE069476R1	

Miscellaneous

	Article no.	
RX871 Touch cover for PP871	3BSE069286R1	
RX874 Touch cover for PP874	3BSE069287R1	
RX877 Touch cover for PP877	3BSE069288R1	
RX882 Touch cover for PP882	3BSE069291R1	
RX885/893 Touch cover for PP885/893	3BSE069292R1	
RX896 Touch cover for PP896	3BSE069294R1	
MB802V2 SD card 2GB Secure Digital memory card 2GB Industrial grade for Version 6 panels.	3BSE069477R1	

Panel 800 Version 6 – Dongles

Dongles

	Article no.	
Panel 800 Version 6 dongle 250 tags Dongle 250 tags.	3BSE069282R1	
Panel 800 Version 6 dongle 2000 tags Dongle 2000 tags.	3BSE069283R1	
Panel 800 Version 6 dongle 4000 tags Dongle 4000 tags.	3BSE069284R1	

Panel 800 Version 5

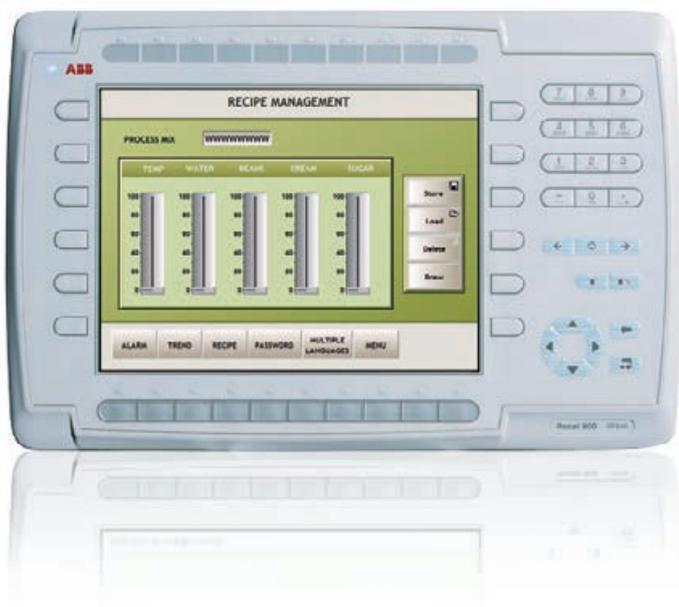
Panel 800 is a user-friendly, intuitive and ergonomic operator panel that combines slim, space saving dimensions with a comprehensive range of advanced functions.

All panels are equipped with advanced functionality for process and equipment control, maneuvered either by function keys located next to the screen or by touching the LCD display. Combined with market leading performance and stunning graphical ability, the Panel 800 erodes the line between ordinary Operator Panels and PC based HMI's. Panel 800 is the successor after the Process Panels.

Panel 800 is designed specifically for ABB Control Network and AC 800M controllers, but thanks to the extensive driver library, the Panel 800 is compatible with most makes of PLC and ABB legacy control systems. When using it together with AC 800M, certain unique features become available, such as integrated alarm handling with the controller.

Panel 800 consists of a modern powerful hardware platform, which enables a very limited mounting depth. The frame is made of powder-coated aluminum, giving the panels a very robust look-and-feel. The front enclosure is designed to withstand demanding industrious usage according to the IP66 standard. The panels have also been certified by DNV and UL.

Key panel



Touch panel



Specifications Panel 800 Version 5

Specifications Panel 800	
Display backlight	CCFL/LED backlight with dimming function
CPU	316 or 416 MHz RISC CPU (Intel Xscale)
Memory, flash	32 MB (Intel StrataFlash)
Memory, RAM	64 MB
Flash memory for application	12 MB
Real time clock	YES
Power supply	+24 C14 20-30 V
Ambient temperature	0 ° to +50 °C
Relative humidity	5 - 85 % non-condensing
Housing material	Powder-coated aluminium
Front side material	Autotex F250 / F157 (keyboard), (PP865S in Stainless Steel 316/1.4401)
Peripherals	
Serial Ports	RS422/RS485, female, 25-pin D-Sub, RS232C, male, 9-pin D-Sub
Ethernet	Shielded RJ45 10/100 Mbit/sec
USB	Host type A (power consumption max. 500 mA), Device type B
PROFIBUS	Expansion slot for PROFIBUS DP
Environmental Data for Panel 800	
Climatic Operating Conditions	Vertical installation: 0 ° to +50 °C Horizontal installation: 0 ° to +40 °C Storage temperature -20 °C to +70 °C Relative humidity 5 - 85 % non-condensed
Protection class	Front panel seal IP 66 Rear panel seal IP 20
Electromagnetic Compatibility and CE-mark	Meets EMC directive 2004/108/EC
Electromagnetic Emission	Tested according to EN61000-6-4 (2007)
Electromagnetic Immunity	Tested according to EN61000-6-2 (2005)
Electrical Safety	UL508
Hazardous Classified Locations	UL 1604 Class I, Div 2 Groups A, B, C, D, T4
Marine Certificates	ABS, DNV, GL, RINA

Specifications	PP820A	PP826A	PP836A	PP846A
Display size	-	5,7"	6,5"	10,4"
Active area of display, W x H	127,0 x 33,8 mm			
Resolution	240 x 64 pixels	320 x 240 pixels	640 x 480 pixels	800 x 600 pixels
Interaction type	Function key	Function key	Function key	Function key
LED	16 (2 color)	16 (2 color)	16 (2 color)	20 (2 color)
Power consumption (normal/max)	0,15 A	0,3 A	0,4 A / 0,9 A	0,5 A / 1 A
Dimensions				
Front panel, W x H x D	202 x 187 x 57 mm	275 x 168 x 57 mm	285 x 177 x 60 mm	382 x 252 x 60 mm
Cut-out dimensions	166 x 149 mm	240 x 130 mm	246 x 139 mm	343 x 208 mm
Mounting depth	57 mm	58 mm	55 mm	58 mm
Weight	0,875 kg	1,11 kg	1,3 kg	2,3 kg

Specifications	PP815A	PP825A	PP835A	PP845A	PP865A
Display size	3,8"	5,7"	6,5"	10,4"	15"
Resolution	320 x 240 pixels	320 x 240 pixels	640 x 480 pixels	800 x 600 pixels	1024 x 768 pixels
Interaction type	Resistive Touch				
LED	-	-	-	-	-
Power consumption (normal/max)	0,15 A	0,25 A	0,4 A / 0,9 A	0,5 A / 1 A	1,2 A / 1,7 A
Dimensions					
Front panel, W x H x D	156 x 119 x 59 mm	201 x 152 x 57 mm	219 x 154 x 60 mm	302 x 228 x 60 mm	398 x 304 x 60 mm
Cut-out dimensions	139 x 105 mm	180 x 130 mm	189 x 138 mm	265 x 206 mm	356 x 279 mm
Mounting depth	57 mm	57 mm	55 mm	58 mm	60 mm
Weight	0,56 kg	0,87 kg	1,1 kg	2 kg	3,7 kg

Specifications	PP871	PP874	PP877
Display size	4,3"	7"	10,4"
Resolution	480 x 272 pixels (16:9)	800 x 480 pixels (16:9)	640 x 480 pixels (4:3)
Interaction type	Resistive Touch	Resistive Touch	Resistive Touch
LED	-	-	-
Power consumption (normal/max)	3,6 W	6,0 W	9,6 W
Dimensions			
Front panel, W x H x D	145 x 103 x 49 mm	204 x 143 x 49 mm	280 x 228 x 51 mm
Cut-out dimensions	128 x 87 x 43 mm	187 x 126 x 43 mm	262 x 209 x 46 mm
Mounting	Panel mount and VESA 50 x 50	Panel mount and VESA 75 x 75	Panel mount and VESA 75 x 75
Net weight (kg)	ca. 0,5 kg	ca. 0,8 kg	ca. 1,5 kg

Panel 800 Version 5 – Control System Lifecycle Support Program

Control System Lifecycle Support Program

Automation Sentinel is the ABB control system lifecycle support program. An introductory trial period to the Automation Sentinel program will be included, at no additional cost, with each new ABB control system software delivery. Please contact your designated Automation Sentinel responsible for any questions or please refer to the Automation Sentinel 3.0 product guide for detailed information on the program and on how to calculate and order Automation Sentinel subscriptions.

Upgrade Orders

	Article no.	
Panel Builder 800 Version 5 Media folder with Panel Builder 800 Version 5 containing the latest version of: <ul style="list-style-type: none">- Panel Builder 800 Version 5 and Panel Tools- Firmware for panels- Manuals as pdf-files- Release Notes- Renewed license This item can be ordered by users with a valid Automation Sentinel agreement for Panel Builder 800 Version 5.	3BSE052516R1	

Panel 800 Version 5 – Panel Builder 800

Panel Builder 800



	Article no.	
Panel Builder 800 Version 5 Media folder with Panel Builder 800 Version 5 containing the latest version of: <ul style="list-style-type: none">- Panel Builder 800 Version 5 and Panel Tools- Firmware for panels- Manuals as pdf-files- Release Notes- License for one Panel Builder 800 Version 5	3BSE042250R1	

Panel 800 Version 5 – Operator Panels

Functional Key Panels



PP820A

240*64 pixels, graphics & text, black/white.
 New CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring. To protect the front, it's recommended to use the RX820 Key Cover.

Article no.

3BSE042243R2



PP826A

5,7" TFT, 320x240 pixels, graphics & text, color.
 New display, CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring. To protect the front, it's recommended to use the RX826 Key Cover.

3BSE042244R3



PP836A

6,5" TFT, 640x480 pixels, graphics & text, color.
 New display, CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring. To protect the front, it's recommended to use the RX836 Key Cover.

3BSE042237R2



PP846A

10,4" TFT, 800x640 pixels, graphics & text, color.
 New CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring. To protect the front, it's recommended to use the RX846 Key Cover.

3BSE042238R2

Panel 800 Version 5 – Touch Panels

Touch Panels



PP815A

3,5" TFT, 320x240 pixels, graphics & text, touch, color.
 New display, CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring.
 To protect the touch screen, it's recommended to use the
 RX815 Touch Cover.

Article no.

3BSE042239R2



PP825A

5,7" TFT, 320*240 pixels, graphics & text, touch, color.
 New display, CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring.
 To protect the touch screen, it's recommended to use the
 RX825 Touch Cover.

3BSE042240R3



PP835A

6,5" TFT, 640x480 pixels, graphics & text, touch, color.
 New display, CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring.
 To protect the touch screen, it's recommended to use the
 RX835 Touch Cover.

3BSE042234R2



PP845A

10,4" TFT, 800x640 pixels, graphics & text, touch, color.
 New CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring.
 To protect the touch screen, it's recommended to use the
 RX845 Touch Cover.

3BSE042235R2



PP865A

15" TFT, 1024x768 pixels, graphics & text, touch, color.
 New CPU and power boards – no UL 1604 certification.
 Requires Panel Builder 800 version 5 for configuring.
 To protect the touch screen, it's recommended to use the
 RX865 Touch Cover.

3BSE042236R2

Panel 800 Version 5 – Accessories

Connection Cables for Panel 800



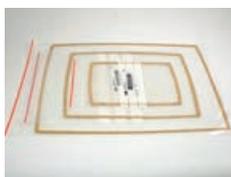
	Article no.
TK854V030 Programming Cable RS232 programming cable Panel 800 Version 5 <--> PC Length 3 m.	3BSE042251R1
TK212A Tool cable RJ45 (male) to Dsub-9 (female), length 3 m. RJ45 8P8C plug (with shell). Cable : UL2464 26 AWG x 8C. For serial communi- cation between Panel 800 Version 5 panels and AC 800M.	3BSC630197R1

Communication Interface for Panel 800



	Article no.
CB801 PROFIBUS DP Communication Interface PROFIBUS DP slave expansion module for Panel 800 Version 5 panels.	3BSE042245R1
CB810 USB to Ethernet adapter for programming USB to Ethernet adapter with software. Cross over Ethernet patch cable included.	3BSE042255R1

Miscellaneous



	Article no.
RX815 Touch cover for PP815/PP815A, 1 pcs	3BSE049366R1
RX820 Key cover for PP820/PP820A, 1 pcs	3BSE049367R1
RX825 Touch cover for PP825/PP825A, 1 pcs	3BSE042246R1
RX826 Key cover for PP826/PP826A, 1 pcs	3BSE049368R1
RX835 Touch cover for PP835/PP835A, 1 pcs	3BSE042247R1
RX836 Key cover for PP836/PP836A, 1 pcs	3BSE049369R1
RX845 Touch cover for PP845/PP845A, 1 pcs	3BSE042248R1
RX846 Key cover for PP846/PP846A, 1 pcs	3BSE049370R1
RX865 Touch cover for PP865/PP865A, 1 pcs	3BSE042249R1



MB801V512 Compact Flash card Expansion Compact Flash memory for Panel 800 Version 5 panels, 512 MB	3BSE042257R1
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IEC 61850 Engineering Tool for 800xA 6.0

With the built-in electrical control system, ABB's 800xA provides ways to be in control of the complete electrical system, from high-voltage switchgear to low-voltage motor control. Whether together with 800xA DCS or not, 800xA is the ideal solution as your Engineering Tool for Electrical Control Systems.

Reduce hardwired cabling on switchgear by connecting to intelligent devices, no matter which standard protocol you have.

The high reliability on digital communication improves the information flow from the devices and additional electrical measurement equipment can be removed. Simpler installations and reduced automation system are easier to engineer and maintain.

In addition, 800xA electrical control system allows the asset management strategies to be extended to electrical equipment. The result is reduced plant downtime and an optimal level of production.

IEC 61850 Engineering Tool

The engineering tool is licensed on a per seat basis, separate from System 800xA licenses. The detailed license process is described in Ref. Doc 2PAA113852.

This ABB IEC 61850 Engineering Tool version can be used for 800xA 5.1 FP4 and 800xA 6.0

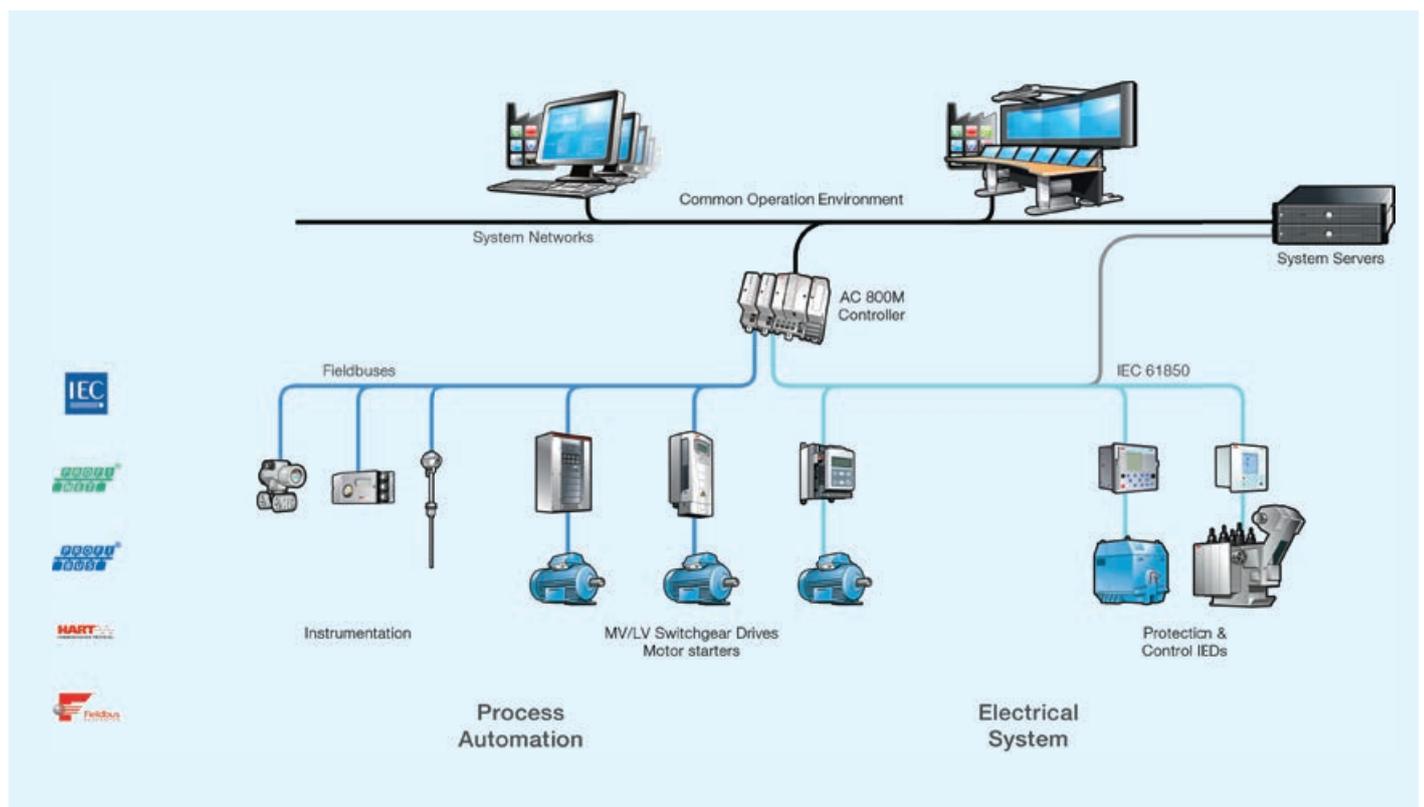
IEC 61850 Engineering Tool for 800xA 6.0 – Project Engineering and End Customer use

This ABB IEC 61850 Engineering Tool version IET 600 5.x is used ABB wide and can be ordered from one central place ABB Power Products.

Product type IET 600 5.x – Integrated Engineering Tool with USB-dongle.

This tool version is released for Microsoft Windows 7/8.1 and Microsoft Server 2008/2012.

This license is a one-time fee (no renewal is necessary) and can be ordered via the ABB Power Product division Website: [CCP – Common Configurator Platform](#)



Extended Warranty Time – S800 I/O, S900 I/O, Fieldbus and AC 800M

Extended warranty time on hardware for S800 I/O, S900 I/O, Fieldbus and AC 800M

Terms and conditions for the supply of products from Local Division Process Automation, LBU Control Technologies within ABB AB in Sweden is valid.

Note that the price for the Extended Warranty Time order will be calculated as a percentage of the affected S800 I/O, S900 I/O, Fieldbus and AC 800M articles in the accompanying order.

- Item A100 => 3% of the affected HW articles within the whole order
- Item A110 => 6% of the affected HW articles within the whole order
- Item A120 => 9% of the affected HW articles within the whole order

	Article no.	
12 additional months warranty time – S800 I/O, S900 I/O, Fieldbus and AC 800M	3BSE049878R1	
24 additional months warranty time – S800 I/O, S900 I/O, Fieldbus and AC 800M	3BSE049878R2	
36 additional months warranty time – S800 I/O, S900 I/O, Fieldbus and AC 800M	3BSE049878R3	

S800



AC 800M



S900

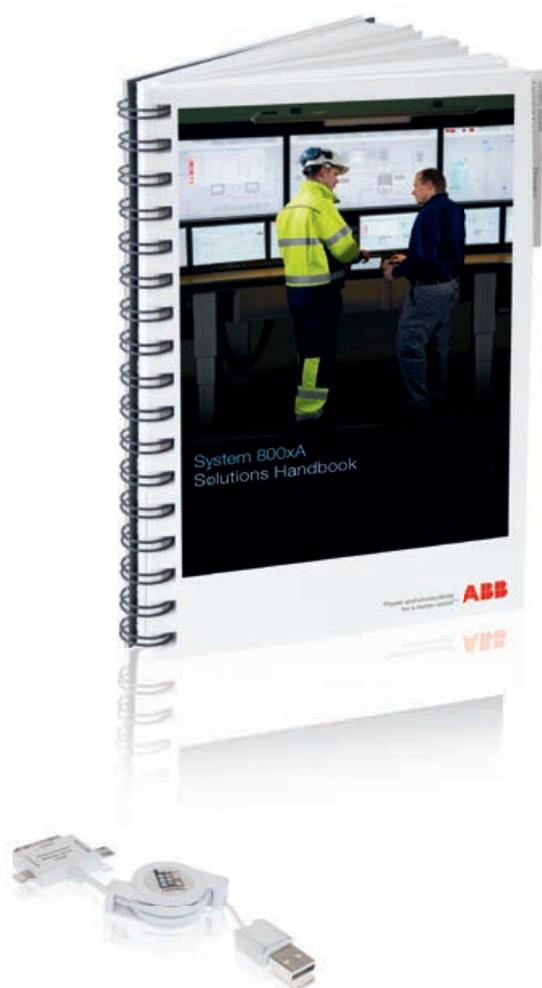


System 800xA Marketing Material

Marketing material available for 800xA

This is a new service for order and delivery of our 800xA marketing material from Operation Center in Västerås, Sweden, via BOL (Business Online)

If you have further questions on order and shipping for marketing material, please contact dc-orderbox@se.abb.com, alternatively by phone +46 21 325700 (order department)



Marketing Materials

Orders greater than max quantity on request.

Brochures



Brochures

Print on Demand. Delivery time up to 10 days.

	Article no.
ABB Value Provider Program – A Partnership for growth and profit Revised 2014. 8 pages brochure. Rev F	3BSE048129-EN

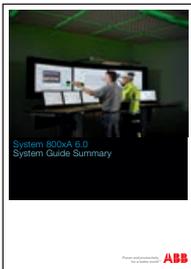
Brochures – System 800xA



Brochures

Print on Demand.

	Article no.
800xA System Introduction	3BSE077506-EN
800xA Solutions Handbook	3BSE069330-EN
800xA 6.0 System Guide Summary	3BSE078159-EN
800xA 6.0 Product Catalog	3BSE078160-EN
Panel 800 Version 6 Overview	3BSE070214-EN
800xA Engineering Overview	3BDD013082-EN
800xA Asset Management Overview	3BUS095292-EN
800xA Batch Management Overview	3BUS095068-EN
800xA AC 800M Control and I/O Overview	3BSE047351-EN
800xA S800 I/O System – Overview	3BSE009891-EN
800xA Electrical Control System Overview	3BSE062087-EN
800xA Device Management Overview	3BDD013081-EN
800xA Simulator – Improve safety and productivity through simulation	3BSE059989-EN
800xA Enables Effective Operations	3BSE059723-EN
800xA Server Node Virtualization	3BSE065912-EN
800xA Alarm Management Overview	3BSE067466-EN
System 800xA Evolve your plant into the future	3BSE063622-EN
Evolution of TDC3000 Connect to System 800xA	3BSE051328-EN
800xA 5.1 and feature releases Executive Summary	3BSE069638-EN
800xA Control rooms of the future are here now	3BSE068791-EN



Brochures – System 800xA related material



Brochures

	Article no.	
Food & Beverage Manufacturing Solutions Overview	3BSE065421-EN	
ProBase – System 800xA libraries for food and beverage operations	3BSE042371-EN	
Control Technologies Service Center – Life Cycle Parts Services	3BSE065503-EN	

Data Sheets



Data Sheets

Print on Demand. Delivery time up to 10 days.

	Article no.	
800xA System Capabilities Data Sheet	3BSE039129-EN	
AC 800M Controller Data Sheet	3BSE063691-EN	
S800 IO System – Outline of all modules	3BSE025986-EN	
S800 I/O Communication interfaces	3BSE039116-EN	
800xA Power supplies and voters	3BSE054914-EN	
System 800xA – Life Cycle Parts Services	3BSE042708-EN	
Control Technologies – Preventive Maintenance Kits for System 800xA	3BSE065040D0011	

USB with configuration graphics



USB with configuration graphics

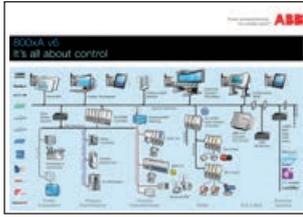
Customer material on USB media.

	Article no.	
BUCT Clipart USB 2014 Configuration graphics and ppt artwork for System 800xA (with High Integrity, Electrical Control System and Cyber Security), Freelance, Compact Products Suite, Advant Master and CT related clipart and Visio objects.	3BSE054491-EN	

Posters

Posters

Print on Demand. Delivery time up to 10 days.

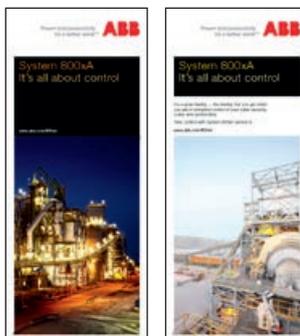


	Article no.
800xA Its all about control Configuration Poster 700 x 500 mm. Delivers in a paper tube.	3BSE045753-EN
800xA Electrical Control System Configuration Poster Poster 700 x 500 mm. Delivered in a paper tube.	3BSE063646-EN
800xA Cyber Security Configuration Poster Poster 700 x 500 mm. Delivered in a paper tube.	3BSE076592-EN

Roll Ups

Roll Ups

Portable, foldable exhibition display. Delivery time up to 10 days.



	Article no.
800xA v6 Industry, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079170-EN
800xA v6 Industry, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079171-EN
800xA v6 Offshore, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079200-EN
800xA v6 Offshore, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079201-EN
800xA v6 Mining, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079537-EN
800xA v6 Mining, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079533-EN
800xA Extended Automation EOW Picture, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE062963-EN
800xA v6 Operator Effectiveness, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079174-EN
800xA v6 Operator Effectiveness, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079175-EN
800xA Cyber Security, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE076250-EN
800xA Cyber Security, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE076251-EN
800xA Wireless, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079538-EN
800xA Wireless, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079518-EN

Roll Ups

Roll Ups

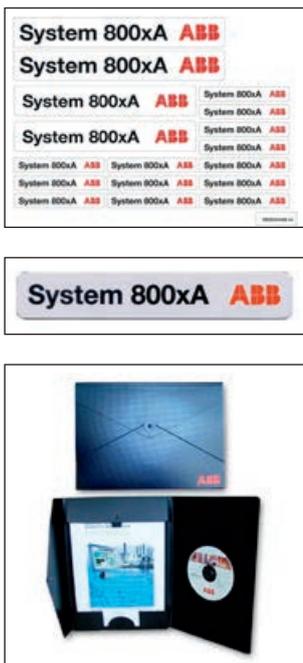
Portable, foldable exhibition display. Delivery time up to 10 days.



	Article no.
800xA 35 years in safety. Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE057722-EN
800xA High Integrity SIL3., Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE057723-EN
800xA Enterprise Asset Management, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE070955-EN
800xA Electrical Control System, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079176-EN
800xA Electrical Control System, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079177-EN
800xA Collaboration Table, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE079520-EN
800xA Evolve your DCS investment to 800xA. Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE067179-EN
800xA Networks, Level 1 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE081072-EN
800xA Networks, Level 2 850 x 2000 mm. Expolinc Compact. Delivered in a canvas bag.	3BSE081073-EN

Accessories

Accessories



	Article no.
System 800xA sticker kit With self-adhesive backside. 2 large, 2 medium and 13 small.	3BSE054488-EN
System 800xA – Aluminium sign 120 x 20 mm. With self-adhesive backside.	3BSE053648-EN
Black doc folder – Accessories Black cardboard box with ABB logo in right lower corner. Height 10 mm; for printed matters in A4 format, CD/DVD, small size giveaways etc. With business card holder.	3BSE051893-EN

Giveaways



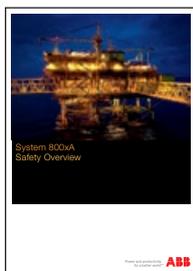
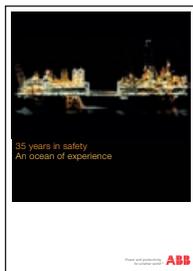
	Article no.	
<p>800xA mouse pad 240 x 195 mm 800xA mouse pad with the text “ 800xA, People, System & Equipment collaboration”. Full color print on thin plastic with anti-glide surface.</p>	3BSE072638-EN	
<p>800xA – Multi-Tool Stainless steel. Knife and other tools. Length 100 mm. Delivered in black canvas cover. Can be placed in a waist belt. Text: System 800xA.</p>	3BSE041996-EN	
<p>800xA, Ballpoint pen Black Pen in steel, delivered in transparent pen box. Text: System 800xA. With ABB logo.</p>	3BSE041998-EN	
<p>800xA Memory Stick 8GB Stainless steel and black plastic. Red ABB logo printed on and with the text “System 800xA” (in black) below. USB 2.0. Delivered in a small plastic box</p>	3BSE048610-EN	
<p>Plastic carry bag – Accessories White bag with red ABB logo.</p>	3BSE049373-EN	
<p>800xA Backpack Nice and comfortable backpack with many pockets. Text “System 800xA”. Size: 400 x 300 x 200 mm in grey, black and beige color.</p>	3BSE045360-EN	
<p>800xA Multi adapter for charging mobile devices A convenient 3 in 1 USB charger for iPhone 3/4 and 5, Blackberry, HTC, Samsung, and Sony. Suitable for transferring data. White color. Text: System 800xA.</p>	3BSE077546-EN	
<p>800xA Bluetooth mini speaker and radio A mini speaker with built-in Bluetooth with good sound quality and bass effect. Supports iPhone, iPad and other devices with Bluetooth functionality. Built-in Li-ion battery with micro USB interface. Black color, and with the text “ I want an xA”. White ABB logo printed on side. The Bluetooth speaker has FM radio function and a card reader function for micro SD (SD card is not included).</p>	3BSE077547-EN	
<p>800xA Power Bank – External Battery Charger Charge your mobile devices everywhere and anytime! A smart, small and flexible solution. Ideal for long flights and business trips. Works with multiple devices such as iPhone 4, iPhone 5, HTC, Nokia, Palm, LG and SONY, mp3/mp4 players and Bluetooth devices. Micro Input and USB Output. Easy to be recharged by normal computer, laptop, wall charger, car charger etc. With 2600 mA capacity. Measurements 94 x 22 x 21mm. Net weight 130g. With the xA factory symbol in white followed by the text “ I want an xA” on black plastic.</p>	3BSE077548-EN	
<p>800xA v6 Cleaning Cloth Colored front and white back-page. Delivered in a plastic envelope. Ideal for eyeglasses, mobile devices, computer screens, iPads and tablets. Size 150 x 150 mm.</p>	3BSE079409-EN	
<p>800xA v6 Soccer Foam Stress Ball Black and white with the 800xA v6 symbol on. Foam stress reliever, soft and nice. Size 60 mm high.</p>	3BSE080822-EN	
<p>800xA v6 Card Deck Custom back player cards in clear box containing 55 cards. Size Size 63 x 88 mm. Full color/ 1-location logo. ABB logo on and small text System 800xA. Will be delivered in a clear plastic box.</p>	3BSE080823-EN	

Safety – Marketing Materials

Marketing Materials

Orders greater than max quantity on request

Safety – Brochures

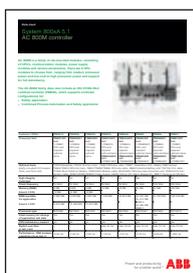
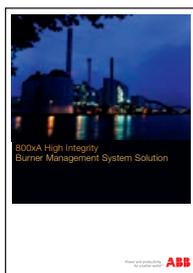


Brochures

Print on Demand. Delivery time up to 10 days.

	Article no.	
Safety, 35 years in safety. Revised 2014 6 pages brochure	3BSE055300-EN	
System 800xA Safety Overview Revised 2014. Rev E	3BSE038820-EN	
ABB - your partner in functional safety	3BUS094322-EN	
System 800xA - Safety Lifecycle Services	3BUS092094-EN	
Evergreen Safety Solutions	3AJE000124-139	
Independent High Integrity Safety System	3BUS095645	

Safety – Data Sheets

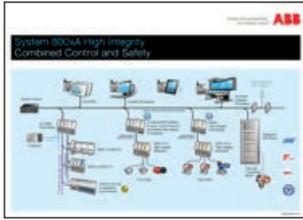


Data Sheets

Printed matters.

	Article no.	
800xA High Integrity - Burner Management System Solution Revised 2014 8 page brochure.	3BSE055219-EN	
800xA High Integrity - Emergency Shutdown Solution Revised 2014. 8 page brochure.	3BSE055220-EN	
800xA High Integrity - Fire & Gas Solution Revised 2014 8 page brochure.	3BSE055221-EN	
AC 800M Controller Data Sheet	3BSE063691-EN	

Safety – Posters



Posters

Printed matters.

	Article no.
System 800xA - High Integrity Configuration - Poster 500x700 mm Revised 2014. Delivers in a paper tube. Rev D	3BSE052805-EN

Safety – Roll Ups



Roll Ups

Portable, foldable exhibition display. Delivery time up to 10 days.

	Article no.
800xA - 35 years in safety , Level 1 Size 850 x 2000 mm Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE057722-EN
8800xA - High Integrity SIL 3 , Level 1 Size 850 x 2000 mm Expolinc Compact. Delivered in a canvas bag. Revised 2014.	3BSE057723-EN
Your trusted partner in safety , Level 1 Size 850 x 2000 mm Expolinc Compact. Delivered in a canvas bag.	3BSE081151-EN
ABB Safety Systems, Level 2 Size 850 x 2000 mm Expolinc Compact. Delivered in a canvas bag.	3BSE081152-EN
Independent High Integrity Safety, Level 2 Size 850 x 2000 mm Expolinc Compact. Delivered in a canvas bag.	3BSE081154-EN

Safety – Giveaways



Giveaways

	Article no.
ABB Safety Stress Ball -2009	3BSE058211-EN

Reference documentation

This document includes listings of the Release Notes and User Instructions applicable for 800xA 6.0 version. The listings include the title of the document and the corresponding document number. The documents are grouped by functional areas within the system and by Release Notes and User Instructions.

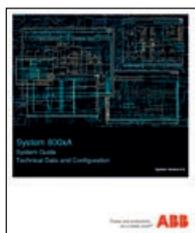
For more information about System 800xA please visit our web: www.abb.com/800xA



Release Notes

This table lists the Release Notes and applicable document numbers that are released for use with 800xA System 6.0

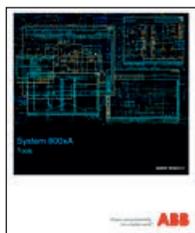
Functional Area		Document number.	
System 800xA	System 800xA 6.0 Release Notes New Functions and Known Problems	2PAA111899-600	
	System 800xA 6.0 Release Notes Resolved Issues	2PAA112277-600	



System Guides

This table lists the System Guides and applicable document numbers that are released for use with 800xA System 6.0

Functional Area		Document number.	
System 800xA	System 800xA 6.0 System Guide Technical Data and Configuration	3BSE041434-600	
	System 800xA Pre-installed Product Guide	3BSE042730-600	
	800xA 6.0 System Guide Summary	3BSE078159	



User Manuals

This table lists the User Manuals and associated document numbers that are released for use with 800xA System 6.0

Functional Area	Document title	Document number.	
System 800xA	System 800xA 6.0 Installation and Upgrade Getting Started	2PAA111708-600	
	System 800xA 6.0 Tools	2PAA101888-600	
	System 800xA 6.0 Configuration	3BDS011222-600	
	System 800xA 6.0 Network Configuration	3BSE034463-600	
	System 800xA 6.0 Manual Installation	2PAA112455-600	
	System 800xA 5.1 to 6.0 Upgrade	2PAA111694-600	

Reference documentation

Functional Area	Document title	Document number.	
System 800xA	System 800xA 5.0 SP2 to 6.0 Upgrade	2PAA111695-600	
	System 800xA 6.0 Multisystem Integration	3BSE037076-600	
	System 800xA 6.0 Administration and Security	3BSE037410-600	
	System 800xA 6.0 System Planning	3BSE041389-600	
	System 800xA 6.0 Maintenance	3BSE046784-600	
	System 800xA 6.0 Post Installation	2PAA111693-600	
	System 800xA 6.0 Virtualization	3BSE056141-600	
	System 800xA 6.0 Licensing Information	2PAA111691-600	
	System 800xA PC, Network and Software Monitoring	System 800xA 6.0 PC, Network, and Software Monitoring Operation	3BUA000446-600
		System 800xA 6.0 PC, Network, and Software Monitoring Configuration	3BUA000447-600
System 800xA PLC Connect	System 800xA 6.0 PLC Connect Operation	3BSE035040-600	
	System 800xA 6.0 PLC Connect Configuration	3BSE035041-600	
Asset Optimization	System 800xA Asset Optimization 6.0 Operation	3BUA000150-600	
	System 800xA Asset Optimization 6.0 Configuration	3BUA000118-600	
AC 800M	6.0 AC 800M DriveBus	2PAA113566-600	
	AC 800M 6.0 FOUNDATION Fieldbus HSE	3BDD012903-600	
	AC 800M 6.0 PROFIBUS DP Installation	3BDS009029-600	
	AC 800M 6.0 PROFIBUS DP Configuration	3BDS009030-600	
	AC 800M 6.0 Communication Protocols	3BSE035982-600	
	AC 800M 6.0 OPC Server	3BSE035983-600	
	AC 800M 6.0 Controller Hardware	3BSE036351-600	
	AC 800M 6.0 Interfacing SATT IO	3BSE042821-600	
	AC800M 6.0 Library Object Style Guide	3BSE042835-600	

Reference documentation

Functional Area	Document title	Document number.
AC 800M (Continued)	AC 800M 6.0 IEC 61850 Configuration for CI868	9ARD171385-600
	AC 800M 6.0 PROFINET IO Configuration	3BDS021515-600
	AC 800M 6.0 Ethernet/IP DeviceNet Configuration	9ARD000014-600
	AC 800M 6.0 Ethernet/IP DeviceNet Installation	9ARD000015-600
	AC 800M 5.1 Ethernet/IP DeviceNet Linking Device LD 800DN	3BSE059754R0001
	AC 800M 6.0 Controller Hardware Product Guide	3BSE036352-600
	Control	System 800xA Control 6.0 AC 800M Configuration
System 800xA Control 6.0 AC 800M Binary and Analog Handling		3BSE035981-600
System 800xA Control 6.0 AC 800M Getting Started		3BSE041880-600
System 800xA Control 6.0 AC 800M Planning		3BSE043732-600
Advant Fieldbus 100 User Manual		3BSE000506-600
Compact Control Builder AC 800M 6.0 Getting Started		3BSE041584-600
Compact Control Builder AC 800M 6.0 Configuration		3BSE040935-600
Compact Control Builder AC 800M 6.0 Planning		3BSE044222-600
Compact Control Builder AC 800M 6.0 Binary and Analog Handling		3BSE041488-600
Compact Control Builder AC 800M 6.0 Product Guide		3BSE041586-600

Reference documentation

Functional Area	Document title	Document number.	
Device Management	System 800xA 6.0 Device Management Device Library Wizard	2PAA102573-600	
	System 800xA Device Management 6.0 FOUNDATION Fieldbus Configuration	3BDD012902-600	
	System 800xA 6.0 Device Management PROFIBUS and HART Configuration	3BDD011934-600	
	Device Management Basic PROFIBUS DTM	3BDD011938-600	
	Device Management Basic HART DTM	3BDD011939-600	
	Device Management PROFIBUS DTM Installation	3BDD011941-600	
	Device Management HART DTM Installation	3BDD011942-600	
	Field IT Linking Device Integration Pepperl Fuchs Power Hub	2PAA102122R0201	
	Device Management PROFIBUS DP FMS Redundancy Link Module RLM01	3BDD011600R0601	
	Device Management FOUNDATION Fieldbus Linking Device LD 800HSE 3.6.0	3BDD011677-600	
	Device Management PROFIBUS DTM Builder	3BDD011945-600	
	Device Management HART DTM Builder	3BDD011946-600	
	System 800xA Engineering	System 800xA Engineering 6.0 Engineering Studio	3BDS011223-600
		System 800xA Engineering 6.0 Engineering Studio Function Designer	3BDS011224-600
		System 800xA Engineering 6.0 Engineering Studio Function Designer Getting Started	3BDS100968-600
System 800xA Engineering 6.0 Application Change Management		2PAA108438-600	
System 800xA Engineering 6.0 Engineering and Production Environments		3BSE045030-600	
System 800xA Engineering 6.0 Engineering Studio Topology Designer		3BDS011225-600	
System 800xA Engineering 6.0 Process Engineering Tool Integration		3BUA000184-600	
System 800xA Engineering 6.0 Process Graphics		3BSE049230-600	
System 800xA 6.0 .NET Aspects Programmers Guide		2PAA107043-600	

Reference documentation

Functional Area	Document title	Document number.
IEC 61850	System 800xA 6.0 IEC 61850 Engineering Workflow	9ARD171384-600
	System 800xA 6.0 IEC 61850 Connect Configuration	9ARD171387-600
	System 800xA 6.0 IEC 61850 Operation Library Substation Equipment	2PAA108626-600
System 800xA Information Management	System 800xA Information Management 6.0 Getting Started	3BUF001091-600
	System 800xA Information Management 6.0 Configuration	3BUF001092-600
	System 800xA Information Management 6.0 Display Services	3BUF001093-600
	System 800xA Information Management 6.0 Data Access and Reports	3BUF001094-600
	System 800xA Information Management 6.0 Profile Historian Operation	3BUF001121-600
	System 800xA Information Management 6.0 Enterprise Historian Migration	3BUF001150-600
	System 800xA Information Management 6.0 Technical Support Reference	3BUF001147-600
I/O	S900 I/O Manual DTM 6.x	3BDD010407-600
	S900 I/O S- and N-System with SA920 Installation	3BDD010421R0401
	S900 I/O Digital I/O Modules DO910 and DX910	3BDD010423R0601
	S900 I/O Frequency Input/ Pulse Counter DP910	3BDD010424R0601
	S900 I/O Temperature Input Module AI950	3BDD010426R0601
	S900 I/O B-System with SA920 Installation	3BDD010432R0401
	S900 I/O Manual Communication Interface for PROFIBUS DP CI920A V2.1	2PAA107375
	S900 I/O Manual Installation-Guide S-N-System SA920 CI920A	3BDD010421R0601
	S900 I/O PROFIBUS DP Communication Interface, CI920 1.5	3BDD015031R0101
	S900 I/O Digital I/O Relay Module DO930N	3BDD010435R0601
	S900 I/O Analog I/O Modules (HART) AI930, AI931, AO930	3BDD010425R0601

Reference documentation

Functional Area	Document title	Document number.	
I/O (Continued)	S900 I/O Manual Installation-Guide B-System SA920 CI920A	3BDD010432R0601	
	S800 I/O Getting Started	3BSE020923-600	
	S800 I/O Modules and Termination Units	3BSE020924-600	
	S800 I/O Fieldbus Communication Interface for PROFIBUS DP/DPV1	3BSE020926-600	
	S800 I/O DTM 6.0	3BSE027630-600	
	S200 I/O Hardware	3BSE021356-600	
	S200L I/O Hardware	3BSE021357-600	
	S800 I/O Product Guide	3BSE015969-600	
	S800 I/O CI801 Memory Maps	3BSE036959-600	
	S800 I/O CI840 Memory Maps	3BSE025251-600	
	S800 I/O Modules and Termination Units with Intrinsic Safety Interface	3BSE020927-600	
	System 800xA Operations	System 800xA Operations 6.0 Operator Workplace Configuration	3BSE030322-600
		System 800xA Operations 6.0	3BSE036904-600
System 800xA 6.0 Snapshot Reports User Guide		3BSE060242-600	
VideoNet Connect for 800xA User Manual		2PAA109407-600	
System 800xA Operations Operator Workplace Support for Mobile Devices		2PAA110154-600	
System 800xA 6.0 ABB System Extension Configuration and Packager Tool		2PAA111022-600	
System 800xA Batch Management		System 800xA Batch Management 6.0 Operation	3BUA000145-600
	System 800xA Batch Management 6.0 Configuration	3BUA000146-600	
800xA for AC 100	AC 100 OPC Server 6.0 Installation	3BSE077523-600	
	System 800xA for AC 100 6.0 Aspect Object Types	3BDS013986-600	
	800xA for AC 100 6.0 Configuration and Operation	3BDS013989-600	
	AC 100 OPC Server 6.0 Configuration and Operation	3BDS013988-600	
	AC 100 OPC Server 6.0 Product Guide	3BSE078405-600	

Reference documentation

Functional Area	Document title	Document number.
800xA for Advant Master	800xA for Advant Master 6.0 Extended Graphic Library	3BSE026427-600
	800xA for Advant Master 6.0 Configuration	3BSE030340-600
	800xA for Advant Master 6.0 Operation	3BSE030352-600
	800xA for Advant Master 6.0 Graphic Library	3BSE030430-600
800xA for DCI	800xA for DCI 6.0 Operation	3BUA000129-600
	800xA for DCI 6.0 Configuration	3BUA000135-600
800xA for Harmony	800xA for Harmony 6.0 Configuration	3BUA000157-600
	800xA for Harmony 6.0 Operation	3BUA000158-600
800xA for AC 870P/Melody	System 800xA for AC870P/ Melody 6.0 Configuration	3BDD011741-600
	System 800xA for AC870P/ Melody 6.0 Asset Management for HART Devices Configuration	2VAA000938-600
800xA for MOD 300	800xA for MOD 300 6.0 Configuration	3BUR002417-600
	800xA for MOD 300 6.0 Operation	3BUR002418-600
800xA for Safeguard	800xA for Safeguard 6.0 Configuration	3BNP004848-600
	800xA for Safeguard 6.0 Operation	3BNP004849-600
	800xA for Safeguard 6.0 Graphic Library	3BSE044423-600
800xA for TRIO/Genius	800xA for TRIO/Genius 6.0 Getting Started	3BUR002459-600
	800xA for TRIO/Genius 6.0	3BUR002460-600
800xA History	800xA History 6.0 Installation	2PAA107280-600
	800xA History 6.0 Administration and Configuration	2PAA107563-600
Freelance Connect	800xA for Freelance 6.0 Installation	3BDD011810-600
	800xA for Freelance 6.0 Operation	3BDD011811-600
	800xA for Freelance 6.0 Configuration	3BDD011812-600
	800xA for Freelance 6.0 Product Guide	3BDD011861-600
	800xA for Freelance 6.0 Release Notes	2PAA111455-600



S800 I/O System Overview

S800 I/O meet all automation and safety needs



S800 I/O is an open comprehensive, distributed, process I/O system that communicates with controllers by direct connection or over industry-standard field buses. Thanks to its open connectivity it fits a wide range of process controllers from ABB and others. And it bears the name ABB, the world leader in process automation.

By permitting installation in the field, close to sensors and actuators, S800 I/O reduces the installation cost by reducing the cost of cabling. And thanks to benefits such as:

- flexibility, permitting a virtually infinite number of installation arrangements, small or large, indoors or outdoors, wall mounting or floor standing,
 - modularity, permitting step-by-step expansion without bottlenecks ever developing,
 - cost-effectiveness, making for savings on hardware, cabling, installation and maintenance,
 - reliability thanks to features such as autodiagnosics and redundancy with bumpless, automatic, change-over,
- it helps industrial operators get a tighter grip on production and thereby improve profitability.

Features and Benefits

- Comprehensive: S800 I/O offers cost-effective solutions to practically all needs for field-device interfacing, including basic analog and digital I/O, as well as intrinsic-safety and high-integrity solutions.
- Structurally flexible: S800 I/O is highly modular and offers a number of ways in which the modules can be interconnected. Consequently, S800 I/O networks can be built in a near-infinite number of ways, from highly centralized to highly distributed.
- Supports industry-standard field bus PROFIBUS DP which makes S800 I/O compatible also with non-ABB controllers.
- S800 I/O supports also ABB's Advant Fieldbus 100.
- Easy to configure: S800 I/O devices are configured transparently as part of their parent controllers, like local I/O. No additional knowledge or skills are required.
- Reliable: Comprehensive diagnostics, hot swapping of modules and redundancy solutions are available, ensuring that both the I/O system and the production plant will stay up.

Comprehensive and flexible

- **Comprehensive:** The S800 family of I/O covers virtually all conceivable signal types and ranges. From basic analog and digital inputs and outputs to pulse counters and intrinsic-safety I/O.
- **Flexible configuration:** S800 I/O may be set up in a variety of ways, from directly connected to the host controller, to subclustered (using fiber-optic cables), to PROFIBUS-connected. Redundancy solutions are available at all levels including; power supply, communication interfaces and I/O circuits.

Flexible installation

Three mechanical designs are available:

- **Compact** (plug-in modules with a basic I/O signal termination area).
- **Extended** (plug in modules with ample space for I/O cable termination, fuses, jumpering and field power distribution).
- **S800L** (all-in-one modules and bases with detachable screw terminal blocks for I/O signals) for installations not requiring hot-swap capability.

Easy to set up

Once station numbers have been allocated and set, all other settings can be made from a network-connected engineering tool. A pass-through feature makes it possible to configure and examine all HART®-compliant field devices in a similar way.

Reliable

S800 I/O offer availability-improving features such as:

- Input/Output Set as Predefined (ISP/OSP). Each input/output can be set individually to default to a predefined value or freeze in case of communication loss.
- Hot swap of modules. A faulty I/O module can be replaced live, i.e. without powering the station down and without the rest of the station being affected. A hardware key ensures that only modules of the right type can be inserted.

- Hot configuration in run (HCIR). An S800 I/O station can be reconfigured while in full normal operation, i.e. without having to switch it over to configuration mode.
- Redundancy options in all areas: power supply, fieldbus media, fieldbus interfaces and I/O modules.
- To withstand harsh environments, all S800 modules are compliant to G3 severity level of ISA-S71.04, Environmental Conditions for Process Measurement and Control Systems.

Accurate

S800 I/O modules can time-stamp events, i.e. input signal transitions, at the source with millisecond accuracy. Thereby providing the basis for meaningful sequence-of-events recording by the host system. In tightly interlocked processes this is essential to finding the root causes of production disturbances.

Analog inputs/outputs support HART routing for easy calibration checking and diagnosis with configurable access.

High Integrity I/O

Within the S800 family, there are SIL3 certified modules that can be used for safety critical applications.

These I/O modules include those for 4 - 20 mA analog inputs, 24 Vdc normally closed digital inputs, and 24 Vdc digital outputs. The digital output module provides both Normally Energized (ESD) and Normally De-energized (F&G) outputs.

S800 I/O



S800 I/O is available in three different designs: Compact, Extended, and S800L.

High Integrity I/O



A comprehensive assortment of I/O modules are available for safety-critical use. These include a range of SIL-3-rated S800 I/O modules for analog inputs, digital inputs, and digital outputs.

Build your I/O system freely



PROFIBUS DP or Advant Fieldbus 100

S800 I/O support both PROFIBUS DP and Advant Fieldbus 100 and make thereby the I/O system compatible with a wide range of process control systems from ABB and others, including System 800xA with AC 800M, Advant Master, Advant MOD, Freelance, Melody / AC 870P, Harmony, and DCI System Six.

Single or redundant solutions

S800 I/O offer redundancy options for I/O channels, power supply and all host-connection modes: direct, fiberoptic, and field bus. And it follows through with redundancy options for all downstream links: internal bus and I/O channels. Meaning that all weak links can be eliminated and availability maximized.

Analog or digital I/O

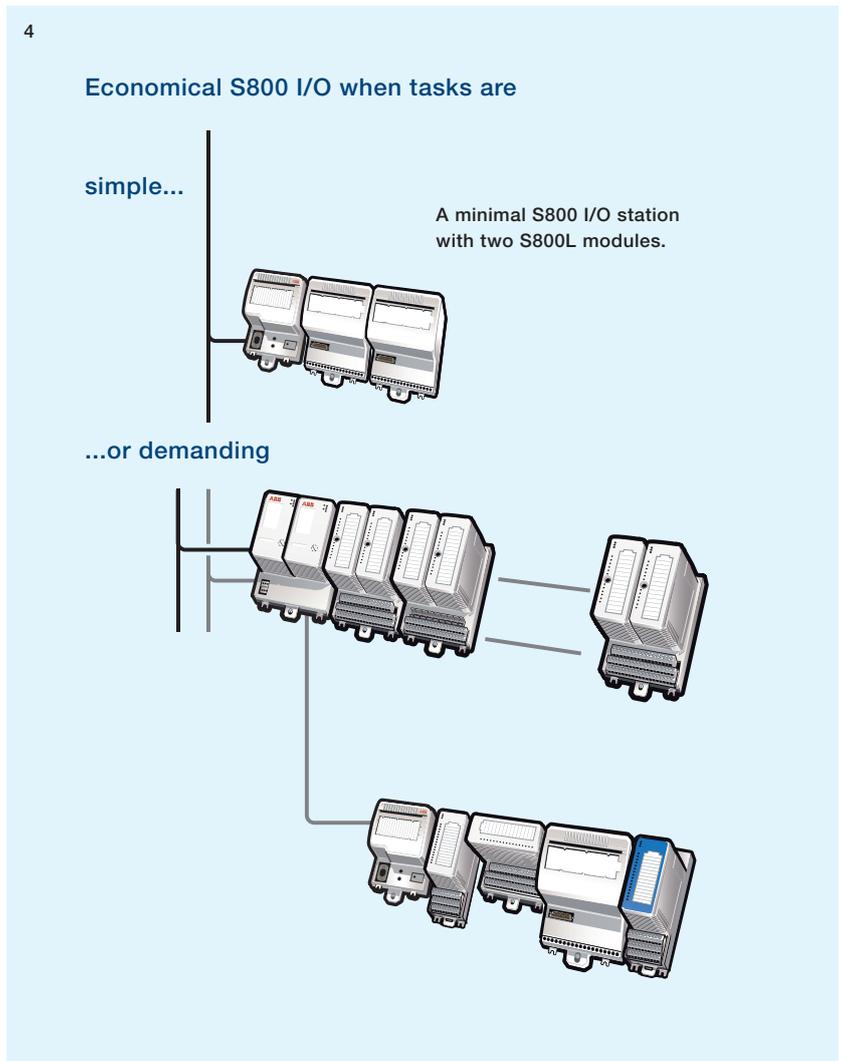
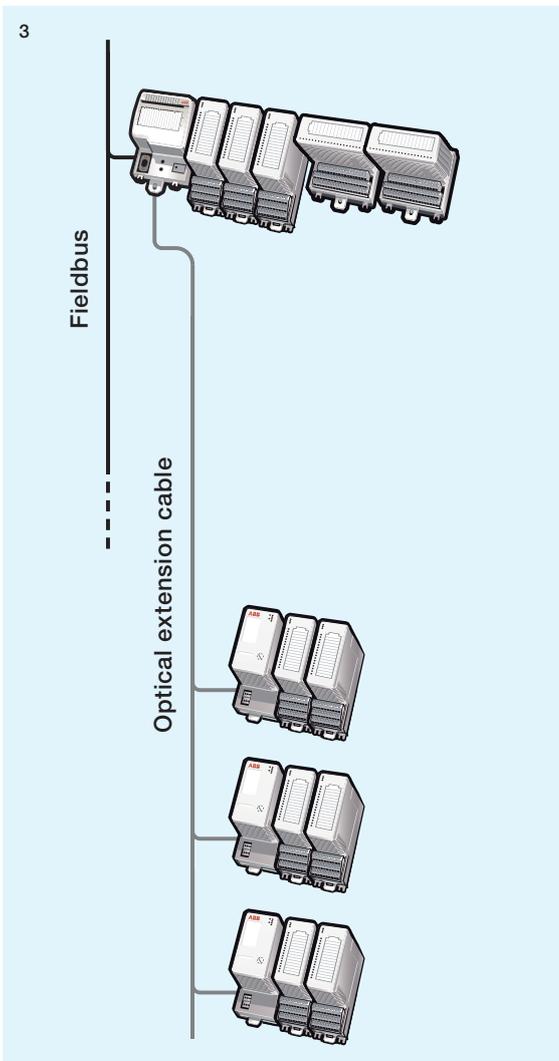
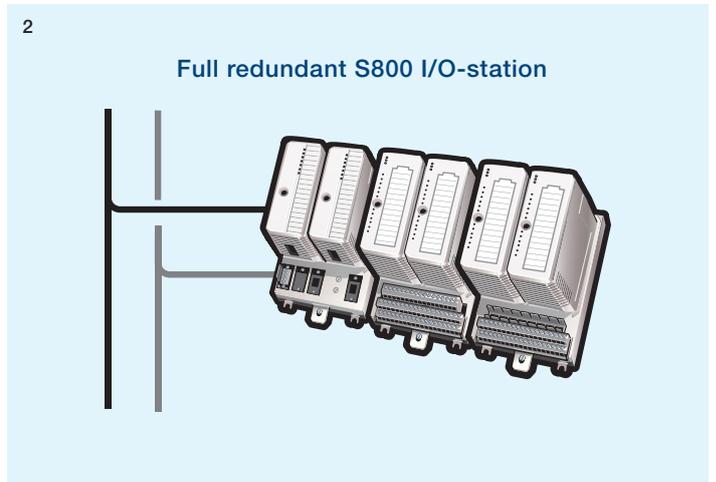
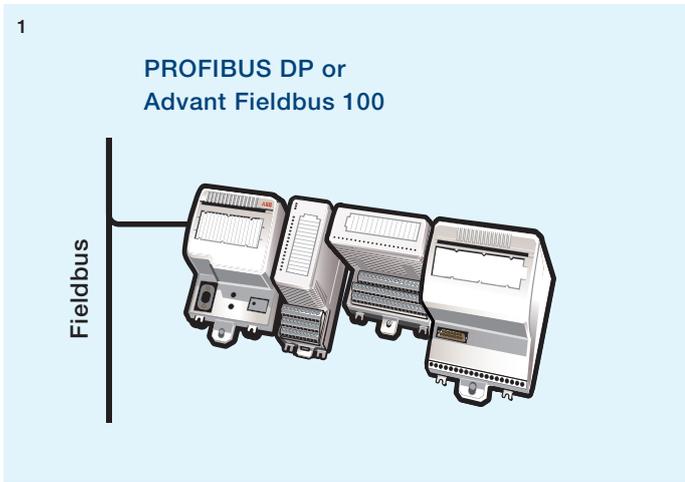
Digital process interfacing modules typically provide 16 channels while analog modules offer 8. Since an S800 I/O station can accommodate 12 I/O modules, this means up to 192 digitals or 96 analogs per station or any mix between the two extremes.

With optional Modulebus expansion, up to 24 I/O modules can be accommodated, thus doubling the above-mentioned I/O capacity.

The I/O modules of a station can all be mounted on a single rail or be distributed across several, in the latter case using plug-in interconnecting cables.

These alternatives make S800 I/O fit a wide range of standard wall-mounting and floor-standing enclosures. A fiber-optic Modulebus even makes it possible to break up S800 I/O stations into clusters installed hundreds of meters apart. A cost-effective and noise-immune way of implementing distributed control.

There are inputs and outputs for industry-standard d.c. and a.c. signal levels and devices, including resistance-temperature sensors and thermocouples. There are even pulse and frequency counters as well as intrinsic safety- and HART®-supporting modules. So just about all the process devices we can think of can be wired up to S800 I/O stations with a minimum of field cabling and intermediate signal conditioning.



- 1 S800 I/O supports both PROFIBUS DP and Advant Fieldbus 100, making the I/O system compatible with a wide range of industrial controllers.
- 2 From left to right, redundant pairs of fieldbus interfaces, process inputs and process outputs.
- 3 Subordinated I/O clusters can be connected as far as 200 m away by fiber-optic extension cable (Modulebus). Ideal for electrically noisy environments and sprawling equipment sets.
- 4 The S800 I/O family supports cost-effective solutions from minimal I/O-stations with few signals to demanding I/O-stations including mix of redundancy and I/O types.

Efficient engineering and maintenance



Transparent configuration

S800 I/O stations are configured as part of the parent controller like local I/O, which means that no additional knowledge or skills are required. Configurations defined in this way are downloaded automatically on start-up. Similarly, the I/O system supports the FDT/ DTM standard and offers HART® pass-through. That is, a consistent, easy-to use interface toward fieldbusconnected devices. Thanks to it all, such devices can be managed in the same easy way, regardless of type or make.

Ample means for keeping production up

Plenty of features are built into S800 I/O to make it reliable, fault tolerant and autodiagnosing, e.g.:

- Diagnostic LEDs on all modules,
- High data communication security for zero errors,
- Optional dual redundancy in everything from power supply, through fieldbus communication, to I/O channels,
- Each input and output can be set individually to take on a predefined value or freeze in case of communication failure,
- S800 I/O modules can be withdrawn and reinserted live without disturbing the rest of the station. Hardware and software keys ensure that only modules of the right type can be inserted – and adopted – by the system.
- Hot Configuration In Run. Each I/O circuit can be reconfigured from the host system while in full uninterrupted service.

These and other features, improve reliability, boost availability and shorten downtimes.

Industrialized hardware



Reliability and ruggedness confirmed

S800 I/O has passed tough type tests by leading maritime inspection and classification societies, confirming that the equipment is able to operate reliably and durably even under the most extreme conditions. G3 compliant to ISA-S71.04 standard, adds even more environmental immunity to the system.

Safe or hazardous areas

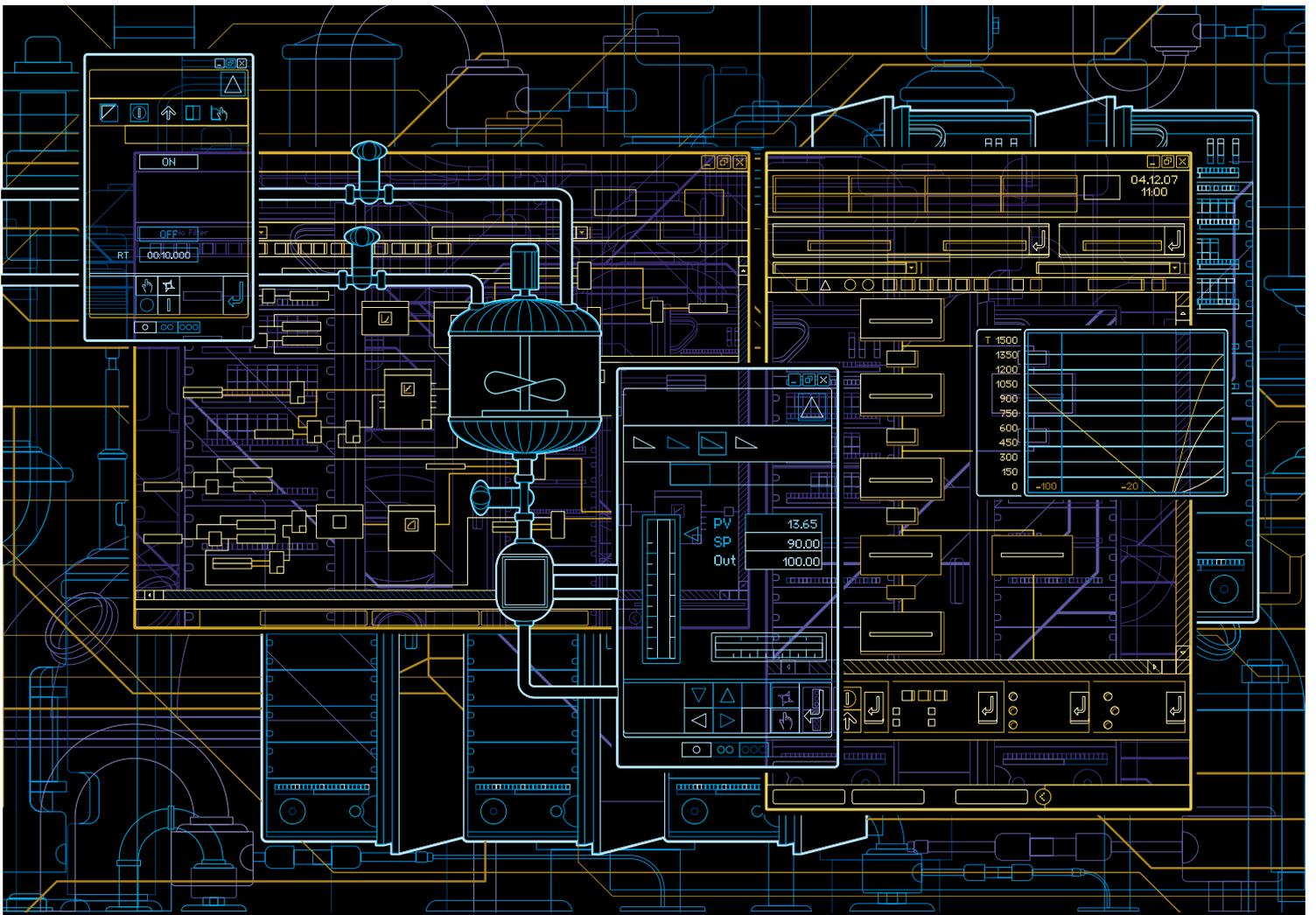
S800 I/O includes intrinsic safety I/O modules, facilitating installation of I/O stations in safe or potentially hazardous areas and connection to field devices in hazardous areas by means of modules with built-in barriers. Consequently, S800 I/O can be used throughout the plant, standardization that all involved will benefit from.

Investment protection

Thanks to S800 I/O's wide-ranging compatibility with different kinds of control systems, it is the perfect choice for safeguarding the investments made in field cabling when upgrading to newer control systems.

Environment-friendly

The S800 I/O family is designed and manufactured according to the environmental protection standard ISO 14001, thereby offering a clear conscience as a bonus.



Freelance
Product Catalog
Version 2013

Table of Contents

Chapter 1 Freelance – distributed control system for process applications	7
Chapter 2 System architecture	9
2.3 The operator level	9
2.3 Engineering tool	9
2.3 The process level	9
2.3 System communication	10
2.3.1 Control network	11
2.3.2 OPC	11
2.3.3 Advanced application programming DMS-API	11
2.3.4 Technical details of the control network	11
Chapter 3 The controllers	13
3.3 Functions	14
3.3 The controller AC 900F	16
3.3.1 Hardware and certificates	16
3.3.2 Redundancy concept	19
3.3.3 Central processing unit PM 902F	20
3.3.4 PROFIBUS Modules CI 930F and CM 772F	22
3.3.5 Accessories	24
3.3 The controller AC 800F	26
3.3.6 Hardware and certificates	26
3.3.7 Redundancy concept	30
3.3.8 AC 800F, pre-assembled stations	34
3.3.9 AC 800F, base units PM 803F	34
3.3.10 Power supply	36
3.3.11 Ethernet interface	40
3.3.12 Fieldbus interface modules	42
3.3.13 Coated and G3 compliant hardware	48
3.3.14 Accessories	50
3.0.14.1 Battery modules and holder	50
3.0.14.2 Front panel	52
3.0.14.3 Auxiliary power supply	52
3.0.14.4 Cables	53
3.0.14.5 Miscellaneous	53
3.3 The controller AC 700F	54
3.3.15 Hardware and certificates	54
3.3.16 Central processing unit PM 783F	57
3.3.17 PROFIBUS module CM 772F	58
3.3.18 CPU terminal base TB 711F	60
3.0.18.1 Dimensional drawings	61
3.3.19 Accessories for CPU module	62

Chapter 4 Power supplies for AC 900F, AC 700F and S700 I/O	63
4.3 Power supply modules.	63
4.3 Accessories	65
Chapter 5 Remote I/Os	67
5.3 S700 I/O	68
5.3.1 S700 I/O modules	69
5.3.2 Fieldbus interface module DC 705F	70
5.3.3 Digital I/O Modules.	74
5.1.3.1 Frequency input module CD 722F.	74
5.1.3.2 Digital input/output module DC 722F.	80
5.1.3.3 Digital input/output module DC 723F.	84
5.1.3.4 Digital input / output module DC 732F.	88
5.1.3.5 Digital input module DI 724F	92
5.1.3.6 Digital input / output module DX 722F.	94
5.1.3.7 Digital input / output module DX 731F.	97
5.3.4 Analog I/O Modules	100
5.1.4.1 Analog input/output module AC 722F	100
5.1.4.2 Analog input module AI 723F	104
5.1.4.3 Analog input module AI 731F (Thermocouple)	108
5.1.4.4 Analog output module AO 723F	110
5.1.4.5 Analog input/output module AX 721F	114
5.1.4.6 Analog input / output module AX 722F	118
5.3.5 Digital/Analog I/O module	122
5.1.5.1 Digital / analog module DA 701F	122
5.3.6 I/O terminal units	128
5.1.6.1 Dimensional drawings I/O terminal units	128
5.1.6.2 TU 705F / TU 706F	129
5.1.6.3 TU 715F / TU 716F	130
5.1.6.4 TU 731F / TU 732F	131
5.3.7 S 700 I/O Accessories	132
5.1.7.1 FieldBusPlug	132
5.1.7.2 Markers for I/O modules	133
5.1.7.3 Connectors	133
5.1.7.4 Cables.	133
5.3 S800 Remote I/O.	134
5.3.8 Communication	134
5.0.8.1 Field communication interfaces	134
5.0.8.2 Upgrade kit and tool cables.	135
5.3.9 S800 I/O modules	136
5.0.9.1 Analog input modules	136
5.0.9.2 Analog output modules	137
5.0.9.3 Digital input modules	138
5.0.9.4 Digital output modules.	139

5.0.9.5	Pulse counting modules	140
5.0.9.6	Label sets for I/O modules.	140
5.0.9.7	Module termination units	141
5.3.10	S800L modules	142
5.0.10.1	Analog input modules	142
5.0.10.2	Analog output modules	142
5.0.10.3	Digital input modules	142
5.0.10.4	Digital output modules	142
5.0.10.5	Label sets for S800L I/O modules	143
5.0.10.6	ModuleBus communication parts	143
5.3.11	Power supplies	145
5.3.12	User documentation	146
5.3	S900 Remote I/O	147
5.3.13	System description of S900 Remote I/O system	147
5.3.14	Technical data of S900 Remote I/O system	151
5.3.15	Redundant termination unit TU921S/B/N	152
5.3.16	Power supply SA920S/B/N	154
5.3.17	Communication interface CI920AS/AB/AN	156
5.3.18	Digital I/O modules	157
5.3.19	Analog I/O modules	161
5.3.20	Field housing	168
5.3.21	Accessories	172
5.3.22	Software	173

Chapter 6 Fieldbus network components and Profibus configuration for S700 175

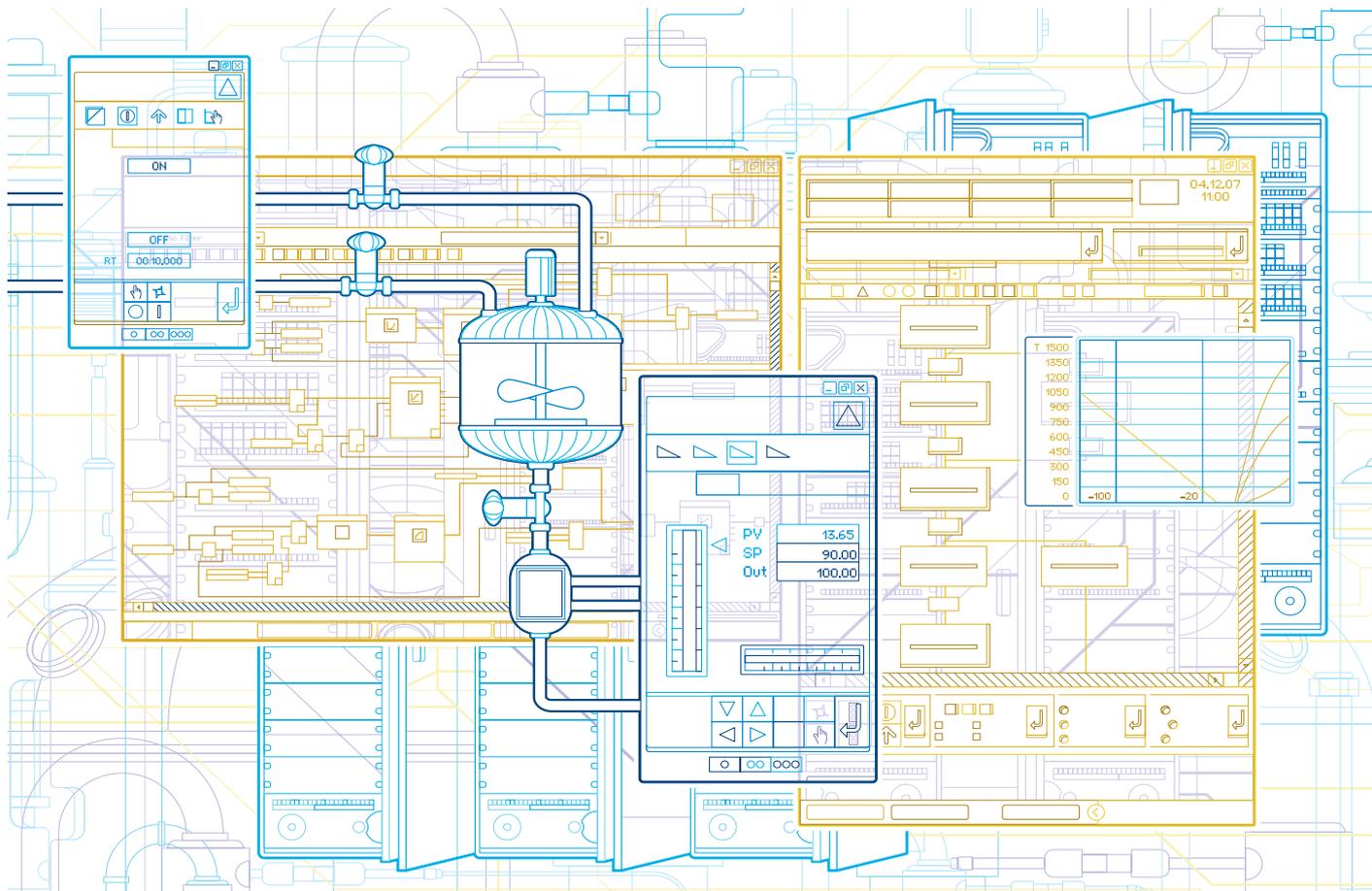
6.3	Profibus DP configuration for S700	175
6.3	PROFIBUS network components	177
6.3	FOUNDATION Fieldbus network components	178

Chapter 7 Freelance Operations (DigiVis) 179

7.3	Messages & operator hints	183
7.3	Software subscription	185
7.3	DigiVis languages	185
7.3	DigiVis license V10.1	185
7.3	DigiVis options	186
7.3	DigiVis hardkeys	187

- Chapter 8 Freelance Engineering (Control Builder F) 189**
 - 8.3 Configuration of functions 191
 - 8.3 Hardware structure 194
 - 8.3 Commissioning 195
 - 8.3 Control Builder F languages 197
 - 8.3 Control Builder F license 197
 - 8.3 Control Builder F options 198
 - 8.3 Control Builder F hardkeys 198
 - 8.3 Control - Software license 199
 - 8.3.1 Base License 199
 - 8.3.2 Additional basic I/Os 199
 - 8.3.3 Control software options 200
 - 8.3.4 Batch 200
- Chapter 9 Media and documentation 201**
- Chapter 10 Add-ons, extensions, and service 203**
- Chapter 11 Automation Sentinel Program 205**
- Chapter 12 Repairs 209**
- Notes 210**
- Index 212**

Chapter 1 Freelance – distributed control system for process applications



Freelance is a full-fledged distributed control system that combines the advantages of both worlds – DCS and PLC. It offers the small footprint of a PLC, together with the full functionality of a DCS. The integrated environment simplifies engineering, commissioning, maintenance and fieldbus management. The intuitive operator interface enables easy operation and diagnosis of the entire system.

The objective of process industry companies today is clearly defined: increased automation at lower cost. Today, people are impressed by the global success story of Freelance, with more than 18,000 applications covering all industry sectors. With Freelance, ABB has taken a further step forward, providing powerful automation that is not only cost-effective in terms of hardware and software, but is also very easy to use.

Freelance is ABB's process control system solution covering the full range from very small to medium size applications. The advanced design of Freelance makes the process control system ideal for numerous applications in power, process or environmental technology plants.

For PLCs, processing speed, scalable performance, small footprint and low component prices are competitive requirements. In contrast to this, high engineering efficiency, collaboration of the entire plant crew and full lifecycle support are highly demanded in DCS markets. Freelance, the control system, offers the best of two worlds: The full scalability with PLC type controllers and the comfort of a full-blown DCS.

When PLCs are used instead of control systems in process industries, application engineers have to deal with various tools and programs from different providers. This implies a lot of disadvantages with respect to seamless configuration procedures, reliable visualization and operation and uncertainty about long term availability of individual tools.

The advantages of using Freelance for different application types are evident. For example, consider a small automation task: only a few measured analog values, a few actuators and push buttons for control operation. Even these very small applications benefit – when implemented with the AC 700F controller – a lot from the comfort of the process control system:

- Easy setup of configuration including process control and visualization
- High reliability through use of well-tested and ready-made function blocks for any kind of applications
- Reduced testing efforts
- Being well prepared for any kind of future modifications and improvements

The latter argument really points to the unquestioned realm of Freelance, the control system.

Consider even a small application where you like to perform just a minor modification. How many different, non-integrated tools are affected when running in a PLC type scenario? How much effort do you have to spend just to assure that everything is well tested as before?

What a difference with Freelance. Project reports show that it makes sense to replace older PLCs with AC 700F controllers to gain efficiency and productivity.

The advantages described above apply in the same manner to bigger projects or applications with several AC 700F and AC 800F or AC 900F controllers and different fieldbus lines.

As almost all applications are designed to run 10 to 20 years or even longer, life cycle considerations always play a major role. This is where ABB as a strong partner stays committed over the entire life cycle.

With Freelance all engineering work is performed with one single tool, Control Builder F, which works hand in hand with the visualization and operation tool DigiVis. Ease of use is the important design factor for Freelance: Configuration of all plant objects ranging from process graphics to field devices and operation of the entire plant is easy and intuitive to perform. Some of the advantages of Freelance are listed here:

- Three controller types (AC 700F, AC 800F and AC 900F) for any kind of applications
- Use of just one engineering tool (Control Builder F) to configure the entire system, consisting of automation functions, graphics, the operator interface, fieldbus lines (Profibus®, FOUNDATION™ Fieldbus, HART®, etc.) and field devices
- Automatic generation of the entire communication between controllers and operator stations
- System-wide single source data treatment for controllers, operator stations, and field devices, leading to data consistency within the entire system
- Fully compatible to former versions

- Uniform, system-wide plausibility check of user programs covering all process and operator stations up to intelligent field devices. The plausibility check includes the formal check for completeness and consistency of the user programs
- Graphical configuration with high-performance editors in programming languages according to IEC 61131-3
 - Function block diagram (FBD)
 - Ladder diagram (LD)
 - Instruction list (IL)
 - Sequential function chart (SFC)
 - Structured text (ST)
- Extensive function block library, to which user defined function blocks can be added; macro libraries and graphic symbols to create graphics and faceplates for user defined function blocks
- Integration of any PROFIBUS-DP and PA slave using the concept of the generic slave (via a GSD-file) with the possibility of configuring these components in user-defined dialogs
- Integration of PROFIBUS devices using FDT technology

The same user-friendly configuration and support features also apply to the operation level. The operator is supported by a mechanism providing not only information from the plant but also operating hints, which can serve as simplified SOP (Standard Operating Procedures). For this purpose, for example, an intuitive operator interface, logs and sophisticated alarm and message management function are available.

The quality of Freelance is also reflected in the robust hardware, which is immune to electromagnetic interference and bears the CE, UL and GL Mark as a quality symbol for all its components.

In cases where demands on availability are particularly high, it is possible to configure the controller including the modules redundantly. Fieldbus lines and the operator stations can also be configured redundantly. The availability of the control network can be increased by using ring topologies. Redundant configuration is done without any additional engineering effort.

The Freelance control system provides powerful automation that is cost-effective and easy to use. Freelance is ideally suited to applications requiring simple handling and attractively-priced hardware and software in power, process or environmental industry.

It is a sound investment in the future, with a straightforward and clearly designed system based on the motto:

Minimum engineering – maximum automation

Chapter 2 System architecture



Freelance provides both, operator level and process level. The operator level contains the functions for operation, process monitoring, archives and logs, trends and alarms. Open- and closed-loop control functions are processed in the controllers which communicate with actuators and sensors in the field.

2.3 The operator level

The Freelance Operations station is a software that runs on a simple PC-environment under Microsoft Windows. It installs in five minutes. Freelance Operations supports dual-monitor operation, which offers the benefit to stay continuously tuned with essential information like the alarm list, while inspecting at the same time for example the progress of a sequential function chart, trend archives, or the system display with extended diagnostics. In a plant, several Freelance Operator Workplaces can work seamlessly together.

The extended automation functionality of ABB's System 800xA can be utilized for Freelance as well by utilizing the "800xA for Freelance" connectivity package. This way you can concentrate several Freelance systems under one common operator console in parallel to the existing operator stations.

2.3 Engineering tool

The Freelance engineering station is used to configure and commission the whole system including the controllers, field devices and Freelance Operations. Usually, portable equipment such as laptops, which allow configuration both in the office and on site, is used. The operator level PCs can also be used for system engineering. A permanent connection to the engineering station is not necessary.



2.3 The process level

A Freelance system can consist of one or combination of several AC 700F, AC 800F and/or AC 900F controllers. It can be connected to field devices through fieldbuses, direct and remote I/Os.

With the AC 800F and AC 900F controllers, you have the option of configuring your entire system in redundancy.

As shown in the architecture drawing (see [Figure 1 on page 10](#)), Freelance can go from a typical OEM offering with an AC 700F controller, a Panel 800 and around 50-100 I/Os. The AC 700F can have up to eight direct I/O modules connected to it or have remote I/Os connected via PROFIBUS. Modbus RTU and TCP are also supported. The Freelance Lite offering can typically have an AC 700F or AC 900F controller and will be in the 250 to 400 I/O range with possibly a combination license and a few operator stations. This can ramp up to the Freelance Standard and Premium offerings with the AC 800F and/or AC 900F, with or without redundancy. Freelance can go up to thousands of I/Os. Connections include Foundation Fieldbus, PROFIBUS and Hart as well. There is also the possibility to connect to supervisory control stations running on ABB's 800xA system.

- The AC 700F controller has a small footprint that supports PROFIBUS. It can support up to eight direct I/O modules. The AC 700F optionally supports PROFIBUS line redundancy. It offers expanded flexibility via a pluggable SD card.
- The AC 800F controller can be equipped with as many as four fieldbus modules of type serial, PROFIBUS, FF HSE or Freelance CAN bus. Optionally, AC 800F supports redundancy.

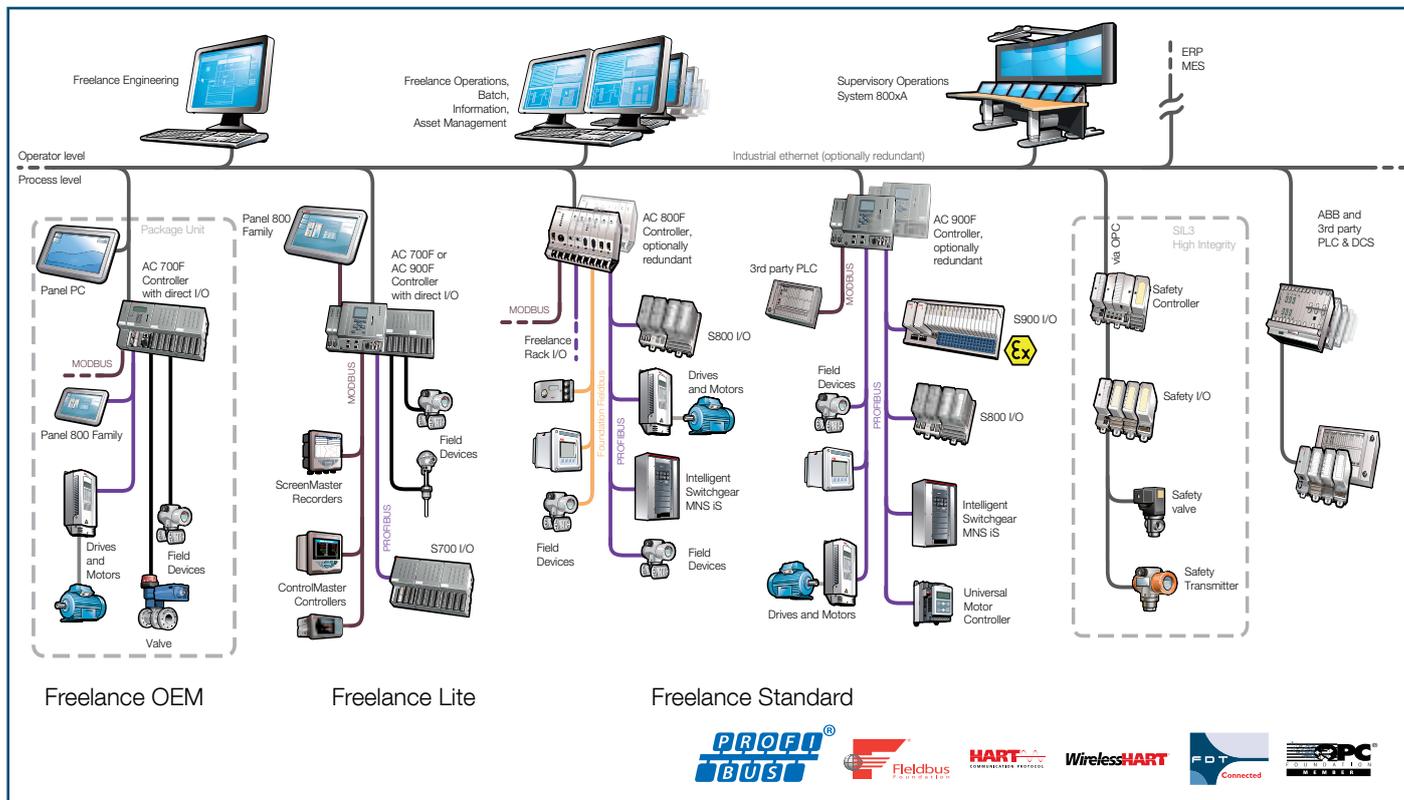


Figure 1: Freelance System Architecture

- The new AC 900F controller also supports PROFIBUS and truly extends the hardware portfolio of the Freelance distributed control system. The AC 900F modular controller offers expanded flexibility via a pluggable SD card, more Ethernet ports, redundancy options for high availability and power enough for around 1,500 I/Os per controller. AC 900F can be equipped with either up to 10 direct I/Os or remote I/Os via PROFIBUS. Optionally, AC 900F supports redundancy.

Integration of 3rd party PLCs like Safety PLCs or package units can easily be achieved by using the new OPC based “PLC Integration” functionality of Freelance. This not only provides the ability read or write data, but also to create faceplates based on existing Freelance ones to interact with those units and to integrate the alarms into the Freelance alarm management.

2.3 System communication

The operator and the process level communicate via the control network, which is based on Standard Ethernet. You can choose between various transmission media such as twisted pair or fiber optic cable. The system components use a specific protocol called DMS, which is an enhanced MMS (Machine Message Specification) protocol. This protocol can be utilized by 3rd party network subscribers using the application interface DMS-API. This is a „C“ programming interface for MS Windows to enable programmers to create tailored solutions. A more standardized and generic approach to connect to the system is provided by the Freelance OPC server to access real-time process values (DA) and alarms/ events (AE) from the Freelance System.

A Freelance system in theory can have up to 100 controllers and 100 operator stations. However - the majority of the systems are in the range of 1 to 5 controllers/ operator stations.

Each controller can communicate to a total of 10 Freelance operator stations, OPC- or trend servers. If the number of those exceeds 10, the system allows to segment the data communication accordingly per simply setting some check marks.

Note: a DigiVis operator station or the Freelance OPC-server can talk to more than 10 controllers. So, if the number of controllers exceed 10, there is no further action required.

2.3.1 Control network

The control network connects the controllers, operator stations and engineering station in the Freelance system.

The control network complies with the Ethernet Standard according to DIN/ISO 8802, Part 3 (IEEE 802.3) and can be used with twisted pair or coaxial cable. It is also possible to use a combination of these standards or to implement 1-GBit/s components within a network as high-speed backbone. Freelance uses confirmed and unconfirmed services. The unconfirmed UDP service is used for screen updating and lateral communication between controllers. The confirmed TCP/IP service is used for alarming and trend archiving.

The control network has the following features:

- The ability to cover long distances
- A high data throughput
- A flexible network layout

2.3.2 OPC

Freelance provides an OPC gateway (server), which allows OPC clients to access data and alarms from the Freelance controllers. The OPC server also allows access to the DPV1 parameters and user parameters of PROFIBUS and HART devices. In the case of HART devices, this is only possible if they are connected to an S900 remote I/O unit. For Freelance version 8.2 and higher, the parameters of FOUNDATION Fieldbus devices can also be accessed. It is possible to limit access to this data at the OPC gateway such that an OPC client cannot see certain tags and variables at all, can only read other tags and variables, or has both read and write access to certain tags and variables.

The DigiVis operator station has a built-in OPC client, which permits you to access data from external OPC servers. Using this, for example, data from third-party controllers with OPC support can be integrated into a custom graphic in DigiVis. With Version 9.2, when using DigiVis PLC Integration, also Faceplate creation and Alarm & Events are supported.

As several OPC gateways can be used in the Freelance system, server redundancy can be established using OPC clients that support this function. The Control Builder F engineering software supports this with the redundant OPC gateway configuration.

The trend server option provides a special OPC gateway that is used by the DigiVis operator stations for user-defined trend displays. Access to the trend server is fixed to "read only", and all trend variables are automatically available. There is one trend server per Freelance system.

2.3.3 Advanced application programming DMS-API

The DMS Application Programming Interface provides C programmers with a Windows interface through which they can access internal Freelance communications services. This enables them to create their own Windows applications that can read online data from the Freelance system and create values

2.3.4 Technical details of the control network

Details of the control network		
Bus type:	Twisted Pair (TP)	Fiber optic (FL)
Max. length:	5 x 100 m 5 x 400 m for shielded TP	4500 m
Application:	Control network connection of Freelance operator stations (for operation and observation), engineering station and controllers	
Standard:	DIN/ISO 8802 Part 3 (IEEE 802.3) 10BASE-FL	DIN/ISO 8802 Part 3 10BASE-FL (IEEE 802.3)
Transmission rate:	10/100 MBit/s	10/100 MBit/s

Chapter 3 The controllers

AC 900F



Freelance comes with three different types of controllers, AC 700F, AC 800F and its latest Freelance controller – the AC 900F. This controller truly extends the hardware portfolio of Freelance distributed control system.

AC 900F

- SD card support
- Typically around 1,500 I/Os supported
- G3 compliant as standard
- Redundancy option for high availability
- Four (4) built-in Ethernet ports supporting Modbus TCP/IP or 60870-5-104 telecontrol protocol
- Two (2) serial ports supporting Modbus RTU/ASCII or IEC 60870-5-101 telecontrol protocol
- Optional PROFIBUS master modules (up to two) providing integrated line redundancy
- Direct connection of I/O modules (as many as 10), including modules combining inputs and outputs in just one module can reduce footprint and costs.
- I/O modules can also be connected remotely via PROFIBUS

AC 800F



AC 800F

- The outstanding feature is it can be equipped with a set of fieldbus modules, covering all major fieldbuses used in process automation.
- Option to run controllers either redundantly (CPU redundancy, fieldbus module redundancy) or non-redundantly.
- Fieldbus-compliant components such as remote I/O, field devices, and network components can be used.
- Optional G3-compliant
- A single controller can typically support around 1,000 I/Os

AC 700F



AC 700F

- Typically supports around 300 I/O signals per AC 700F controller.
- This PLC-like controller comes with a very small footprint. As many as eight (8) S700 direct I/O modules can be plugged to the right of the controller module.
- The connection to the Freelance control network is via Ethernet as for all other controllers. As an alternative to remote I/Os, AC 700F can be placed directly in the field, offering a very flexible and cost-effective solution for an “intelligent” I/O station.
- I/O modules can also be connected remotely via PROFIBUS. This allows for high flexibility in installation.
- SD card support

All three controller types can be used side by side within a project and can easily communicate with each other via the Ethernet based control network. The engineering is performed with one engineering tool, Freelance. All function blocks and pre-engineered functions are available for all controllers in the same way.

3.3 Functions

The scope of functions provided by the Freelance system corresponds to the basic supply defined in IEC 61131-3, in addition to numerous other high performance, industry-proven functions and function blocks. Furthermore user-specific function blocks can be added for dedicated tasks. During configuration, the processing capacity and speed of the controllers can be easily adapted to the demands of the automation task. Program execution in the controller is based on real-time multitasking operating system, leading to flexible strategies for processing programs.

The operating system of the controllers has two different types of tasks, system tasks and user tasks. System tasks supervise the system for example at cold start or in case of an error. User tasks execute the application programs.

Different modes are available for user task execution:

- Up to eight tasks with individual cycle times between 5 ms and 24 hours
- Processing as fast as possible (PLC mode); one task only

System tasks are automatically available. These tasks are executed once in case of the following events:

- RUN
- STOP
- COLD START
- WARM START (voltage restored)
- REDUNDANCY TOGGLE
- ERROR

It is possible to add your own applications to these tasks.

Functions and function blocks	
Analog value processing	Input and output conversion Linearization Delay and dead-time filter Average / extreme value determination in time Setpoint adjustment Counter with analog input Time scheduler
Binary value processing	Binary output, monostable Input and output delay Pulse / Time Counter, pushbutton
Closed-loop control	Continuous controllers (PID) Step controllers On / Off controller, three-position controller Ratio controller Basic functions Auto-tuning
Open-loop control	Individual drive functions Sequence control, dosing circuits
Logic functions	Logic processing Average / Extreme value determination Comparator, binary switch Multiplexer Converter (data type & code) Flip-flop, edge detection String blocks Radio controlled adjustment of daylight-saving time
Monitoring	Analog and binary monitoring Event monitoring Audible alarm control Connection monitoring
Acquisition functions	Disturbance course acquisition, trend acquisition
Arithmetic functions	Basic arithmetic functions, numerical functions Logarithmic functions Trigonometric functions Analog value and time limitation
Modbus functions	Master and slave functions
PROFIBUS	DPV1 master functions
Telecontrol functions	Master and slave functions
Phase logic processing	Interface module for batch applications



3.3 The controller AC 900F

3.3.1 Hardware and certificates

The AC 900F controller truly extends the hardware portfolio of Freelance distributed control system. Apart from its highly sophisticated automation functions, the AC 900F modular controller offers expanded flexibility via a pluggable SD card, more Ethernet ports, redundancy options for high availability and powers for around 1,500 I/Os.

A key feature of the AC 900F is the support of SD cards. Especially the new optional display for AC 900F allows to load applications or firmware into the controller without the need of a terminal program on a computer.

Benefits at a glance:

- More power than any previous generation Freelance controller
- More connectivity with 2 serial ports and 4 Ethernet ports
- Built-in SD card support
- New Ethernet based protocols – Modbus TCP & IEC 60870-5-104
- G3 compliant as standard
- Built-in power supply
- Optional LCD
- Small footprint
- Optional redundancy

Mechanical design

Thanks to its four holes in the rear, the CPU module PM 902F allows easy wall-mounting.

DIN rail mounting is even faster and easier by just placing the component on top of the DIN rail and pushing it down to lock it in place.

Technical data

The AC 900F controller consists of a CPU module which is the main component. According to the application and requirements, further modules can be added to the controller. These modules are fieldbus interface modules and I/O modules.

The AC 900F consists of:

- CPU module PM 902F with
 - four Ethernet interfaces
 - one diagnostic interface
 - two serial interfaces
 - display unit (optional)
- As many as ten S700 I/O modules directly attached on terminal units
- A maximum of two fieldbus interface modules

The AC 900F controller can be arranged in a single or redundant manner. The controller supports remote I/Os, transmitters, actuators, drives and other devices, for example through PROFIBUS and other fieldbus protocols. At present, the following field busses are available for the AC 900F controller:

- PROFIBUS DP V0/V1
- Modbus and Modbus TCP
- Telecontrol and Telecontrol TCP

Input/output modules are used as direct I/O and remote I/O in accordance with the type and quantity of process signals.

The hardware configuration of AC 900F is based on a hardware function block concept similar to the configuration like AC 700F and AC 800F.

AC 900F can be equipped with a maximum of two PROFIBUS modules. You have the option to run these controllers in redundancy.

Modular plug-in I/O modules are used in accordance with the type and quantity of process signals.

With AC 900F controllers, fieldbus compliant components such as remote I/O, field devices, and network components can be used. ABB offers equipment for applications covering standard and hazardous areas.

Certificates

The AC 900F controller has the following certificates:

- CE (2004/108/EC), c(UL)us, ISA-S71.04 G3.

Environmental conditions

The temperature range of AC 900F ranges from 0 - 60°C, no forced cooling required.

Controller temperature	Operating:	0 ... 60°C (32°F ... 140°F)
	Storage:	- 40 °C ... +85°C (-40°F ... 185°F)
	Storage (TD 951F inserted):	- 25 °C ... +70 °C (13°F ... 158°F)
Module temperature	Operating:	0 °C ... +60 °C (32°F ... 140°F)
	Storage:	- 40 °C ... +70 °C (-40°F ... 58°F)
Display temperature	Operating:	0 °C ... +60 °C (32°F ... 140°F)
	Storage:	- 25 °C ... +70 °C (13°F ... 158°F)
Battery temperature	Operating:	- 40 °C ... +85 °C (-40°F ... 185°F)
	Storage:	- 40 °C ... +85 °C (-40°F ... 185°F)
Humidity		Maximum 93%, without condensation
Air pressure	Operating:	< 2000 m (2187 yd.)
	Storage:	< 3500 m (3827 yd.)
Climatic category		3K3 according to EN 60721-3-3
Degree of protection		IP 20
G3 severity level		ISA-S71.04 G3

Electromagnetic compatibility

2004/108/EC	Complies with the European directive
NAMUR NE21	Electromagnetic Compatibility of Industrial Process and Laboratory Control Equipment
IEC/EN 61000-4-3	Electromagnetic compatibility (EMC) – Testing and measurement techniques, Radiated, radio-frequency, electromagnetic field immunity test
IEC/EN 61000-6-4	Electromagnetic compatibility (EMC) – Generic standards, Emission standard for industrial environments

Mechanical stress / Mounting

Mounting	Horizontal
Mounting of the modules	Wall mounting or DIN rail according to DIN EN 50022, 35 mm, depth 7,5 mm or 15 mm, mounting with screws of type M4, fastening torque 1.2 Nm
Flammability	According to UL 94 V0
Vibration resistance according to IEC/EN 60068-2-6	2 g, 2 Hz ... 150 Hz
Shock test according to IEC/EN 60068-2-27	15 g, 11 ms, half-sinusoidal

Electric data / Electrical protection

Voltages according to EN 61131-2

Process- and Supply-voltage	24 VDC
Absolute limits	+19.2 V ... +32.5 V incl. ripple (see below)
Ripple	< 5 %
Protection against reverse polarity	Yes

Permissible interruptions of power supply as per EN 61131-2

DC supply	Interruptions < 7.5 ms, time between 2 interruptions > 1 s, PS2
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Creepage distances and clearances

The creepage distances and clearances meet the overvoltage category II, pollution degree 2.

Power supply units

Power supply units meeting the PELV specification should be used for powering the modules.

Power dissipation for the calculation of cooling systems

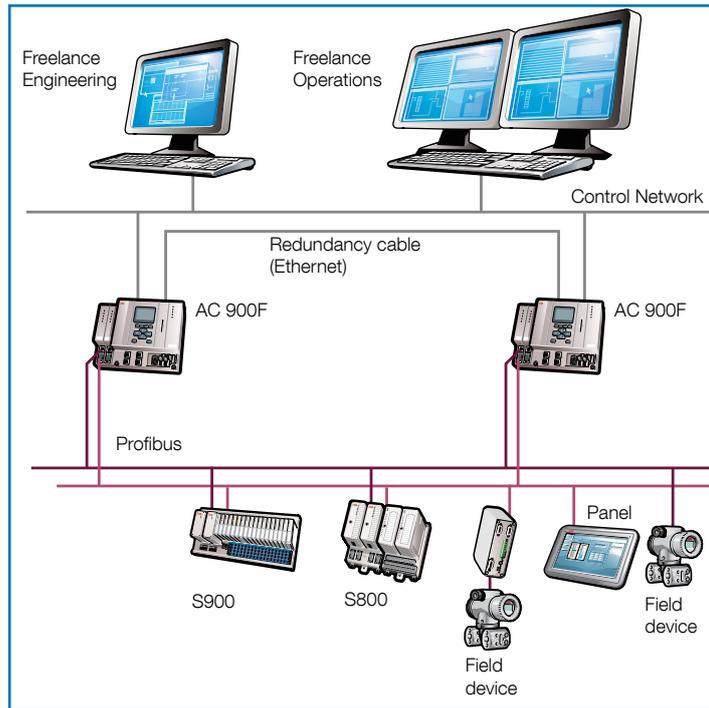
The following table lists the anticipated power dissipation (heat dissipation) of individual AC 900F modules.

The data for the modules contain the combined power consumption from internal and external supply sources. For detailed information see the Mounting and Installation Instructions, AC 900F manual.

Module	Max. power dissipation
Central processing unit PM 902F	18 W
Communication interface CI 930F	1.8 W
Communication module CM 772F	1.2 W
Display unit TD 951F	0.35 W
Power supply CP-C 24/5.0 and CP-C 24/10.0	< 15 W / < 29 W

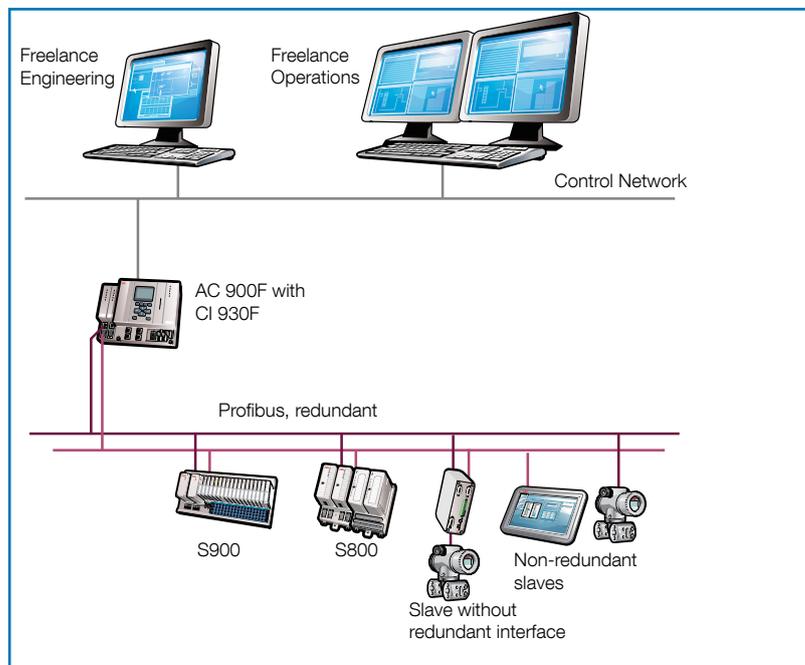
3.3.2 Redundancy concept

Controller redundancy



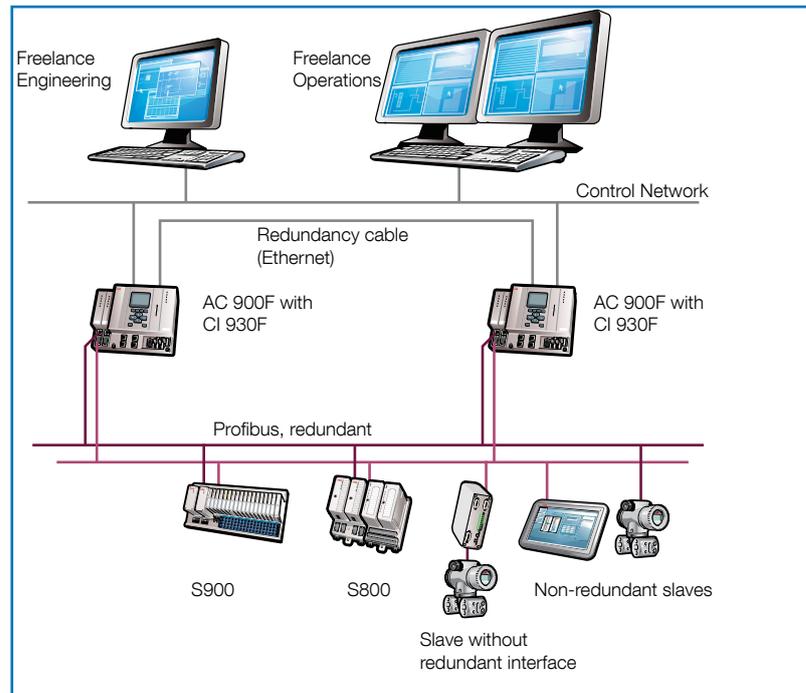
Controller redundancy can be achieved by installing two AC 900F. To ensure quick and smooth takeover by the secondary AC 900F in case the primary AC 900F fails, a dedicated redundancy communications link through the second Ethernet module makes sure that both AC 900F are always synchronized. All inputs and outputs are designed to support redundant operation.

Profibus line redundancy



The CI 930F communication interface supports Profibus line redundancy. An alternative solution to the Profibus line redundancy is to use a Fiber Optic Ring. Controller redundancy together with Profibus line redundancy

Controller redundancy together with Profibus line redundancy



You can achieve the highest availability when doing both, controller redundancy and Profibus line redundancy by using two AC 900F with a CI 930F communication interface each. This topology combines the advantages of controller redundancy with the one of line redundancy as described in the preceding paragraphs.

3.3.3 Central processing unit PM 902F

Name	Short Description	Article No.
PM 902F	<p>Central Processing Unit</p> <p>Without operating system. The operating system has to be loaded during software installation.</p> <p>Needs external 24 VDC power supply</p> <p>Requires software version 2013 or higher.</p> <p>A two-slot terminal base for CI/CM modules is integral part of this CPU module. Without battery.</p>	3BDH001000R0001

The PM 902F CPU module is the central part of the AC 900F controller. It provides a high performance processor for multitasking and executing fast loop cycle times. It comes with four on-board 100 Mbit/s Ethernet network connections and two serial interfaces. A third serial interface is reserved for diagnosis purpose and radio clock connection. Coupler bus slots and an I/O bus interface enables for adding further modules left and right to the CPU modules.

The front panel display shows status and diagnostic information directly at the module. Operating modes can be modified by switches on the front panel.

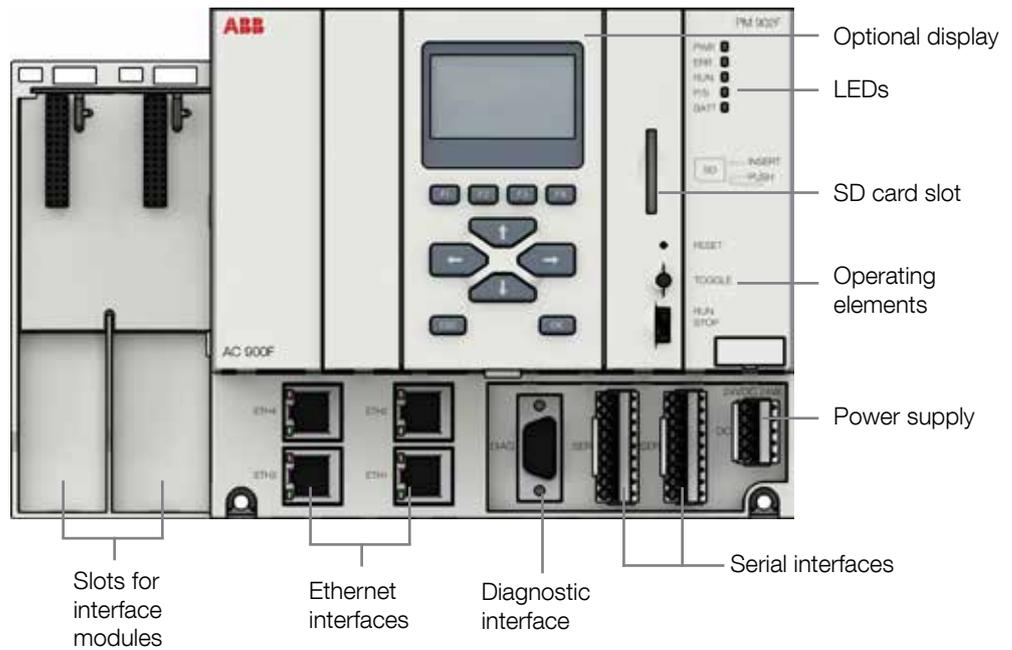


Figure 2: CPU module PM 902F

Technical data

Technical data PM 902F	
CPU	Power PC (II Pro family)
RAM	8 MB SRAM battery backed 16 MB DDR-RAM
SD card support	For controller backup and firmware update
Display	128 x 64 Dot Matrix LCD (optional)
Processing time for 1000 instructions	0.120 ms for binary instructions 0.130 ms for word instructions 0.640 ms for floating point instructions
Number of direct I/O modules	As many as 10
Power consumption	24 W (full station assembly)
Power supply	Terminal for 24 VDC power supply DC-IN +24 VDC
Max. power dissipation within the module	18 W
Current consumption from 24 VDC	1 A
Inrush current at 24 VDC	1,5 A
Data backup source	Lithium battery for SRAM contents and real time clock
Buffering time at +40 °C	> 2 years After battery low warning: 14 days

Technical data PM 902F	
Battery low indication	Warning indication issued about 2 weeks before the battery charge becomes critical
Real-time clock, with battery backup	Yes
Multitasking program execution Cyclic (equidistant) Cyclic (as fast as possible) Event driven	Configurable cycle times from 5 ms PLC mode Predefined events
Serial interfaces (SER1 and SER2) Physical link: Connection: Usage:	Configurable for RS-232 or RS-485 (from 600 bps to 38400 bps), Pluggable terminal block with spring connection Modbus - ASCII (Master / Slave) - RTU (Master / Slave) Telecontrol IEC 60870-5-101
Onboard network interface	4 Ethernet interfaces (RJ45) Ethernet 1: for Control Net (optional Modbus TCP and Telecontrol IEC 60870-5-104) Ethernet 2: for redundancy link Ethernet 3 & 4: for Modbus TCP and Telecontrol IEC 60870-5-104
Weight	1.07 kg (2.36 lbs)
Dimensions	Width 227 mm (8.94 inch) Height 152 mm (5.98 inch) Depth 95 mm (3.74 inch)

3.3.4 PROFIBUS Modules CI 930F and CM 772F

Two types of PROFIBUS Interface Modules can be used with AC 900F: CI 930F and CM 772F.

For AC 900F can be located on the left side of the CPU module PM 902F. PROFIBUS Interface modules make communication over the PROFIBUS DP field bus possible. The internal coupler bus makes the connection to CPU..

PROFIBUS modules will be configured in the Control Builder F hardware structure. Information on configuring the PROFIBUS module in hardware structure, see Engineering Manual System Configuration, Hardware Structure.

The parameter data directly influence the functionality of the module. Further information on configuration and parameterization of the module, refer to the Engineering Manual AC 900F.



Communication Interface CI 930F

CI 930F is a more powerful module than CM 772F. It is also a PROFIBUS DP master, but with additional features and enhanced performance.

Each PROFIBUS module allows the connection of a PROFIBUS line of maximum of 126 slaves. Each of these slaves can be modular.

Technical data CI 930F

Protocol	PROFIBUS DP master, DP-V0/V1 protocol
Transmission rate	9.6 kBit/s to 12 MBit/s
Fieldbus connector D-SUB, 9-pole, female Number of slaves	126
Useable CPU	PM 902F, PM 783F
Data interchange	16 kByte (AC 700F) / 64 kByte (AC 900F)
PROFIBUS line redundancy	yes, TU 951F required
Support controller redundancy	With AC 900F only
Hotplug, hot configuration in run	With AC 900F only
Current consumption	80 mA, via 24 V terminal of CPU module
Power dissipation	1,8 W
Status display	PWR, STA, RUN, Line A, Line B
Weight	102 g (0.22 lbs)
Dimension	Width: 28 mm (1.1 inch) Height: 135 mm (5.3 inch) Depth: 75 mm (2.95 inch)

LED Status Displays

The PROFIBUS module CI 930F runs a self test during the power ON process. During the initialization procedure if the module is newly configured or if the operating mode is changed then all the LEDs may light up for a short period of time before reaching a definite condition.



PROFIBUS DP Master Module CM 772F

The number of possible slaves depends on their total number of input and output bytes. As a rule, many PA devices (few I/O bytes) or a restricted number remote I/O (many I/O bytes) can be connected to the bus.

Technical data CI 930F

Protocol	PROFIBUS master, DP-V0/V1 protocol
Baud rate	9.6 kBit/s to 12 MBit/s
Connector	D-SUB, 9-pole, female
Number of slaves	126, depending on I/O data
Useable CPU	PM 902F, PM 783F
Data interchange	8 kByte
PROFIBUS line redundancy	no
Support controller redundancy	no
Current consumption	50 mA, via 24 V terminal of CPU module
Power dissipation	1.2 W
Status display	PWR, RDY, RUN, STA, ERR
Weight	96 g (0.21 lbs)
Dimension	Width: 28 mm (1.1 inch) Height: 135 mm (5.3 inch) Depth: 75 mm (2.95 inch)

LED Status Displays

The PROFIBUS module CM 772F runs a self test during the power ON process. If the test is successful, the yellow RDY LED goes ON. Otherwise the LED starts flashing and aborts further initialization. If the RDY LED remains OFF then the module is defective. During the initialization procedure if the module is newly configured or if the operating mode is changed then all the LEDs may light up for a short period of time before reaching a definite condition.

3.3.5 Accessories

TD 951F Display Unit



This is an optional accessory. It provides a dot matrix LCD with 128 x 64 pixel resolution, keypad with six predefined and four function keys. The display unit allows the following functions:

- Network settings
- Backup/Restore application
- Status display
- Display of process variables
- Module exchange
- Firmware update

TA 951F Battery for RAM buffering

TA 951F contains a 2/3A Lithium battery with cable connection. The battery is sealed within a plastic pack. It is possible to exchange this battery without stopping the CPU module. In the event of power failure, the TA 951F Lithium battery supplies power to store the SRAM contents (e.g. process and configuration data) and to back-up the real time clock. The CPU module is supplied without a Lithium battery. New battery TA 951F is inserted before starting the CPU module.

Although the CPU module can work without a battery, its use is still recommended in order to avoid losing process data. The CPU module monitors the discharge status of the battery. A pre-warning indication is displayed before (at least two weeks in advance) the battery status becomes critical. The battery should be replaced in fixed intervals or as soon as possible after this error indication is displayed. The TA 951F Lithium battery is the only battery that can be used with CPU module PM 902F. It is a primary cell and cannot be recharged.

Technical data:

- Lithium cylindrical cell
- 3 V, 1200 mAh
- Primary cell, non rechargeable
- Protection against reverse polarity is by mechanical coding of the plug



TU 951F PROFIBUS Terminal for Line B

This accessory provides a second PROFIBUS terminal (B). The communication interface CI 930F together with TU 951F enable for PROFIBUS line redundancy. An associated cable makes the link between the RJ45 plug on TU 951F and CI 930F. The connection of PROFIBUS line A to CI 930F and line B to TU 951F is carried out as usual with SUB-D plugs (male). Managing the PROFIBUS telegrams on both lines takes place in CI 930F.

A new module with two D plugs is planned for beginning of 2014.



Dummy coupler Module

Name	Short Description	Article No.
TA 724F	Dummy Coupler Module Empty module, to protect an unused coupler slot from dust and touch.	3BDH000367R0001

White Plastic Markers

Name	Short Description	Article No.
TA525	White Plastic Markers, 10 pcs. For labelling CPU and I/O modules in AC 700F.	1SAP180700R0001

3.3 The controller AC 800F



The AC 800F controller has a modular structure. The CPU is designed as a backplane to which various modules – power supply units, Ethernet and fieldbus modules – can be attached in line with the application. On the fieldbus side, modules for PROFIBUS-DPV1, FOUNDATION Fieldbus HSE, MODBUS (master / slave, RTU or ASCII), IEC 60870-5-101, IEC 60870-5-104 and CAN for Freelance Rack I/O are available.

The fieldbus line and the connected field devices are entirely configured and parameterized using the engineering tool Freelance. No further external tools are needed for configuration. Fieldbus and device configuration can be performed offline without connection to the field devices. In case of Profibus, field devices or slaves can be integrated into the system using device specific GSD¹ files or DTMs². If for a certain device no DTM is available, generic GSD files of Profibus slaves can be used instead. Together with S900 remote I/O, HART variables are cyclically available as process data.

In the case of FOUNDATION Fieldbus, configuration takes place using specific CFF³ or DD⁴ files. Field devices are connected to H1 links, which in turn are connected via LD 800HSE linking devices to the high-speed HSE subnet.

Even a single AC 800F controller can be connected to both buses, Profibus and FOUNDATION Fieldbus at the same time. This makes it very convenient to run loops of an FF application using „control in the field“ technology, while at the same time gathering fast binary data via high-speed Profibus using remote I/Os.

3.3.6 Hardware and certificates

Mechanical design

The front panel connection technique of the AC 800F controller makes it exceptionally easy to assemble and to service. Mounting on the wall can be achieved very easily. All AC 800F modules are inserted into slots from the front and secured in position with screws. The modules are activated using a lock switch, which conceals the upper screw opening. The lock switch must be opened to reach the upper screw opening.

By moving the screw-cover, the wish to remove the module from the CPU is signalized, and the fieldbus is automatically shut down. As a result, the remote I/Os and field device outputs have time enough to go to configured safety values, avoiding undefined states when the module is removed.

All modules are surrounded by metal housing when installed, which gives them optimum mechanical and electrical protection. All housing materials used are simply screwed together, allowing them to be separated for future recycling. Last but not least, Freelance has taken environmental protection into account by using a minimal amount of paint.

-
- 1 GSD = Device Master Data, abbreviation for the German term „Gerätstammdaten“. A GSD is the device database file (also called device data sheet)
 - 2 DTM = Device Driver based on FDT technology
 - 3 CFF= Capabilities File
 - 4 DD= Device Description

Technical data

The AC 800F opens up the flexibility of fieldbus technology to the user. The AC 800F collects and processes diagnostic and process data from four fieldbus lines, which may be of different types.

The AC 800F is available with 16 MB for typically up to 1000 I/Os.

Up to 4 fieldbus modules can be plugged into the AC 800F. The communication with other controllers runs via Ethernet.

AC 800F optionally provides several levels of redundancy:

- Controller redundancy with two identically equipped AC 800F controllers, which means full redundancy versus just a CPU-board redundancy. Possibility to mount the redundant unit far away from each other, e.g. in a fire proof room
- Cable redundancy for Profibus DP, by using external equipment (RLM01)

The availability of the control network can be increased by using ring topologies.

The data protection is made via battery backup.

Features:

- Controller with built-in fieldbus capability
- 4 high-speed fieldbus lines
- Supports different fieldbus types, even simultaneously:
 - PROFIBUS-DP, up to 12 MBd
 - FOUNDATION Fieldbus H1 (with LD 800HSE)
 - HART
 - Modbus
 - Telecontrol
 - CAN (for Freelance Rack I/O)
- Easy engineering: fully integrated in Freelance
- One system-wide database for field devices shared by the control level and the Human System Interface
- Module recognition with factory and operational parameters
- Comprehensive diagnostics for predictive maintenance
- Compact, rugged design
- Front panel connectors
- DIN Rail (C-rail) or wall mounting for easy installation
- Ambient temperature 0-60 °C / 32-140 °F with temperature monitoring
- EMC certification according to EN50082

Certificates

The AC 800F controller has the following certificates:

- CE, NAMUR, UL, EN61000-6-2, G3 ISA71.04, ISO 9001

System Communication

Details of system communication					
Bus type:	Twisted Pair (TP)	Fiber optic (FL)	Thin-Ethernet (Cheapernet)	Control network Full-Ethernet (Yellow Cable)	Station bus (CAN-Bus)
Max. length:	5 x 100 m 5 x 400 m for shielded TP	4500 m	5 x 185 m	5 x 500 m for Coax, 50 m for AUI	80 m, 400 m
Application:	Control network connection of Freelance operator stations (for operation and observation), engineering station and controllers				Station bus and as connection to I/O units
Standard:	DIN/ISO 8802 Part 3 (IEEE 802.3) 10BASE-FL	DIN/ISO 8802 Part 3 10BASE-FL (IEEE 802.3)	DIN/ISO 8802 Part 3 (IEEE 802.3) 10BASE2	DIN/ISO 8802 Part 3 (IEEE 802.3) 10BASE5	ISO/DIN 11898
Transmission rate:	10 MBit/s	10 MBit/s	10 MBit/s	10 MBit/s	500 KBit/s for 80 m 100 KBit/s for 400 m

Fieldbus modules

The AC 800F uses the fieldbus modules to collect and process real-time and diagnostic data. Up to four fieldbus modules can be mounted into one AC 800F.

The fieldbus modules have the following tasks and characteristics:

- Electrical isolation between the process and the Controller
- Status LEDs for each module
- Independent fault detection and fault signaling
- Connection of the fieldbus segments and subnets

Details of the fieldbus modules			
Type	Channels	Function	Max. number of modules per controller
CAN module	3	Connection of up to 5 Freelance I/O racks	1
Serial module	2	RS232 / RS422 / RS485 configurable for MODBUS, IEC 60870-5-101 telecontrol protocol	4
PROFIBUS module	1	Full-value PROFIBUS DPV1 Master	4
FF-HSE module	1	For the connection of up to 10 LD 800HSE Linking Devices with 10/100 MBaud auto-sense twisted pair connection	4

Ethernet modules

Controllers, operator stations, and engineering stations communicate with each other via the Ethernet based control network.

Ethernet modules for the control network

Type	Channels	Function
Ethernet module EI 813F	1	Twisted pair connection 10 base T for connection to hubs or switches

Linking devices

As the AC 800F is equipped with high-speed connections to both PROFIBUS (PROFIBUS DP) and FOUNDATION Fieldbus (FF-HSE), the slower buses of the two fieldbus technologies (PROFIBUS PA and FF-H1) can be connected using intelligent linking devices. These devices allow to connect several slow buses to one fast bus, with the advantage that a lot more field devices can be connected to an AC 800F station than when the slow fieldbuses are connected directly.

PROFIBUS DP / PA linking device

The PROFIBUS Power Hub is an interface between the PROFIBUS DP and the PROFIBUS PA. Combining a PROFIBUS Power Hub with a field barriers and segment protectors makes it possible to connect field devices to a control system, which are located in intrinsic safe areas. The field barriers and segment protectors can be connected to the non-intrinsically safe outputs (trunks) of PROFIBUS Power Hub. PROFIBUS Power Hub is a device from Pepperl+Fuchs.

FOUNDATION Fieldbus linking device LD 800HSE

FOUNDATION Fieldbus (FF) is a fieldbus protocol based on international standards and designed for applications in the manufacturing industry, process automation and buildings automation. FF defines two communication profiles, H1 and HSE. The H1 profile, with a transmission rate of 31.25 kbit/s, is preferably used for direct communication between field devices in one link (H1 link).

The HSE profile, which is based on standard Ethernet and typically features a transmission rate of 100 Mbit/s, serves a backbone for the connection between H1 links. The LD 800HSE connects the HSE Ethernet with the field devices on the H1 link side. They serve as a gateway between the field devices on the H1 link and the HSE subnet. LD 800HSE is also designed for redundancy.

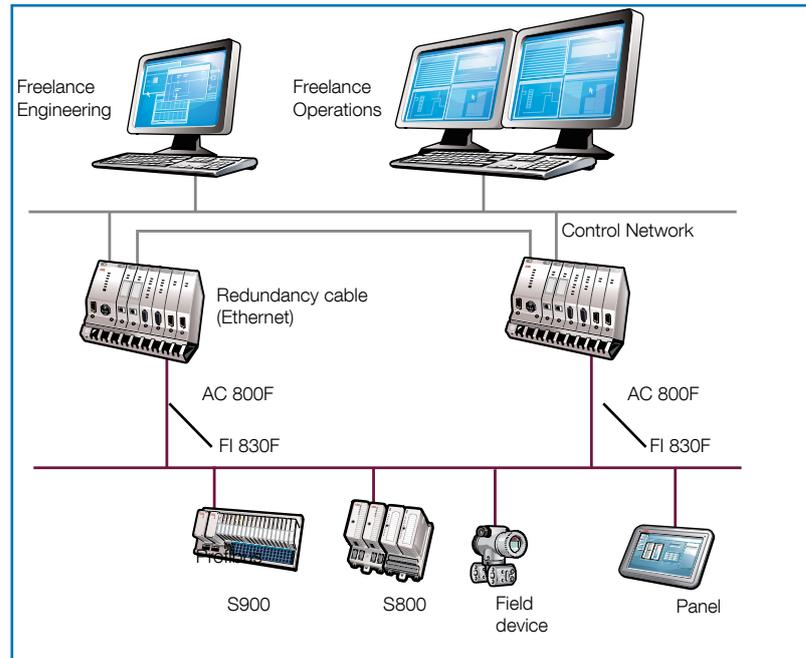
Fieldbus infrastructure

To protect fieldbus segments and links, appropriate fieldbus barriers can be used. For H1 links, power conditioners have to provide sufficient current.

Furthermore proper network switches should be used to connect AC 800F FF modules and several LD 800HSE.

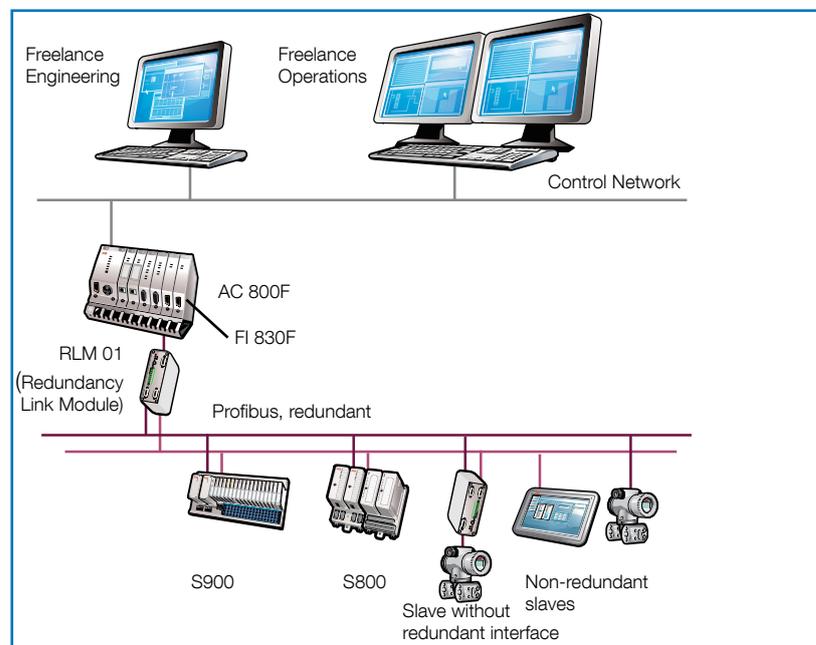
3.3.7 Redundancy concept

Controller redundancy



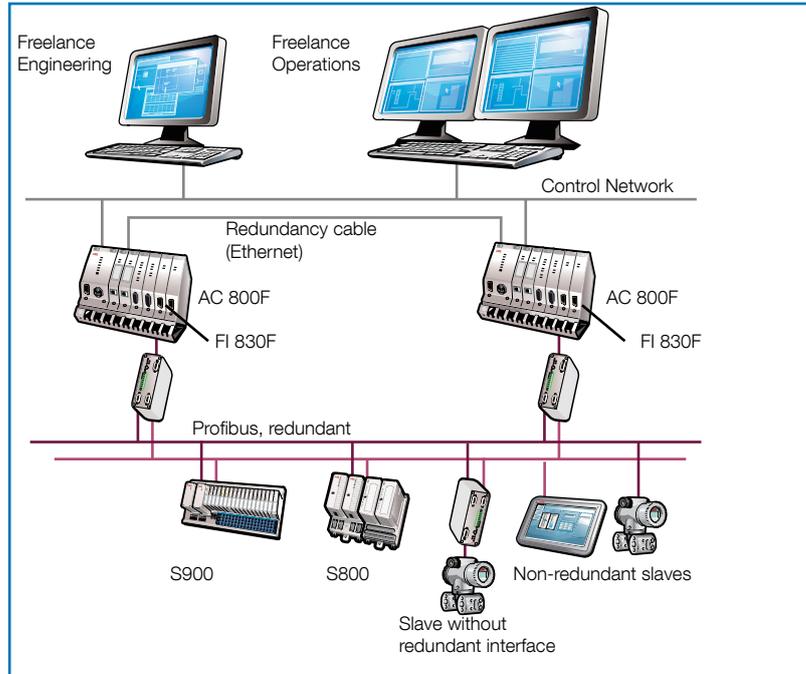
Controller redundancy can be achieved by installing two AC 800F. To ensure quick and smooth takeover by the secondary AC 800F in case the primary AC 800F fails, a dedicated redundancy communications link through the second Ethernet module makes sure that both AC 800F are always synchronized. All inputs and outputs are designed to support redundant operation.

Profibus line redundancy



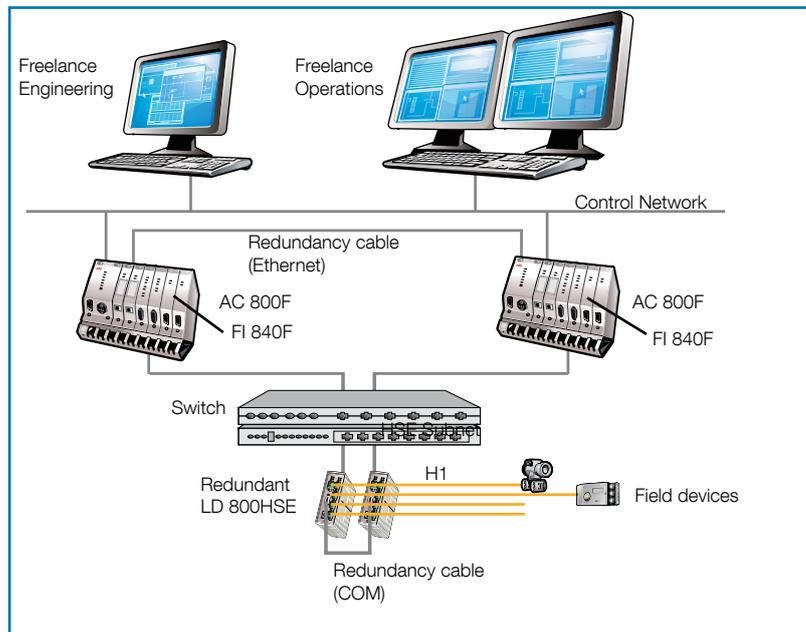
Using the Redundancy Link Module RLM 01 will do the conversion of one simple, non-redundant Profibus line into two reciprocally redundant lines. You can position the Redundancy Link Module RLM 01 directly after a Profibus module (master), before a bus segment with several slaves or before an individual slave. PROFIBUS stations with redundant couplers can be directly connected to the PROFIBUS set redundant by RLM 01. Stations with only one interface can be optionally assigned to the one or other line. An alternative solution to the Profibus line redundancy is to use a Fiber Optic Ring.

Controller redundancy together with Profibus line redundancy



You can achieve the highest availability when doing both, controller redundancy and Profibus line redundancy by using two AC 800F with one RLM01 each. This topology combines the advantages of controller redundancy with the one of line redundancy as described in the above paragraphs.

Controller redundancy together with FOUNDATION Fieldbus redundancy



FOUNDATION Fieldbus redundancy can be achieved by installing two LD 800HSE. To ensure quick and smooth takeover by the secondary LD 800HSE in case the primary LD 800HSE fails, both devices are linked via a redundancy cable (COM).

Environmental conditions

Permissible ambient temperature	0 °C - 60 °C / 32 °F - 140 °F
Permissible module internal temperature	0 °C - 70 °C / 32 °F - 158 °F (temperature monitoring on basic unit)
Temperature gradient	In operation: 1 °C (33.8 °F) / min, according to DIN IEC 68, Part 14 / EN 60068-2-14(11.99)
Transport and storage temperature	-25 °C - +85 °C / -13 °F / 185 °F
Permissible relative humidity	Non-condensing, ≤ 80 % annual average ≤ 95 % for 30 days per year maximum
Degree of humidity	RH-1, according to EN 61131-2: 1994 (IEC 1131-2)
Climatic category	KWF according to DIN 40040 (replaced by EN 60721-3-3 and EN 61709) 3K3 according to DIN IEC 721 / EN 60721-3-3
Degree of protection	For basic unit with module complement: IP20
G3 severity level	ISA71.04 G3 compliant (-Z variant)

Electromagnetic compatibility (EMC)

2004/108/EC	Complies with the European directive
EN 61000-6-2	Electromagnetic compatibility (EMC) – Generic standards, Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) – Generic standards, Emission standard for industrial environments
2006/95/EC	Low Voltage Directive
NAMUR NE21	Electromagnetic Compatibility of industrial process and laboratory control equipment

Electrical protection

Safety class	II
Overvoltage category	II for all connectors, pollution degree 2
Designed according to	IEC 1010-1 (1990 - 09); EN 61010-1 / 3.94 or DIN/EN 61010-Part 1 / 3.94 (VDE 0411-Part 1), CSAC 22.2, No. 1010-1 and No. 213 (Class I, Div 2), SIQ (CB Scheme 97NK2421), CSA / NTRL.
Module supply power	Extra low voltage with protective separation from other circuits which may be grounded according to DIN VDE 0100, Part 410-1.97/IEC 60364-4-41/10.92
Power supply SA 811F	Safety isolating transformer according to DIN VDE 0551, Part 1 (9.95); EN 60742 Optocoupler for protective separation against electrical shock (German standard VDE 0884 / 8.87)
Power supply SD 812F	No electrical separation!

Shock and vibration data

Tested according to DIN IEC 68, Part 2-6, 2-27 / EN 60068-2-6, 2-27 (11.99)

Transport

Shock 30 g / 11 ms / 3 times to each axis
Max. values for the individual modules. The values are valid for correct mounted modules.

In operation

Vibration, 3x5 cycles 2 g / 0.15 mm / 5 - 150 Hz

Power dissipation for the calculation of cooling system

The following table lists the anticipated power dissipation (heat dissipation) of individual AC 800F modules.

The data for the modules contain the combined power consumption from internal and external supply sources. For detailed information see the Mounting and Installation Instructions, AC 800F manual.

Module	Max. power dissipation
Basic unit PM 803F	
power supply SA 811F	26.8 W
power supply SD 812F	13.8 W
Ethernet module EI 813F	1.2 W
CAN-module FI 810F	2.6 W
Serial module FI 820F	2.6 W
Profibus module FI 830F	2.8 W
FF / HSE module FI 840F	2.1 W
Battery module AM 811F	0.28 W

3.3.8 AC 800F, pre-assembled stations

Name	Short Description	Article No.
AC 800F – 16 MB, 115 / 230 VAC	With Ethernet 10BaseT, PROFIBUS module and Base Unit PM 803F Incl. standard system test, battery SB 808F, mains cable TK 807F (open end). Slot assignment: P = SA 811F, E1 = EI 813F, F3 = FI 830F, E2, F1, F2, F4 = Front panel. Compliant to UL by using mains cable TK 809F (3BDM000212R1). Freelance V7.1SP2a or higher is mandatory.	3BDH000103R1
AC 800F – 16 MB, prepared for Redundancy, 24 VDC	With Ethernet 10BaseT, PROFIBUS module and Base Unit PM 803F Incl. standard system test, 2 batteries SB 808F, 2 mains cable TK 802F (open end). Slot assignment: P = SD 812F, E1, E2 = EI 813F, F3 = FI 830F, F1, F2, F4 = Front panel. Freelance V7.1SP2a or higher is mandatory.	3BDH000133R1

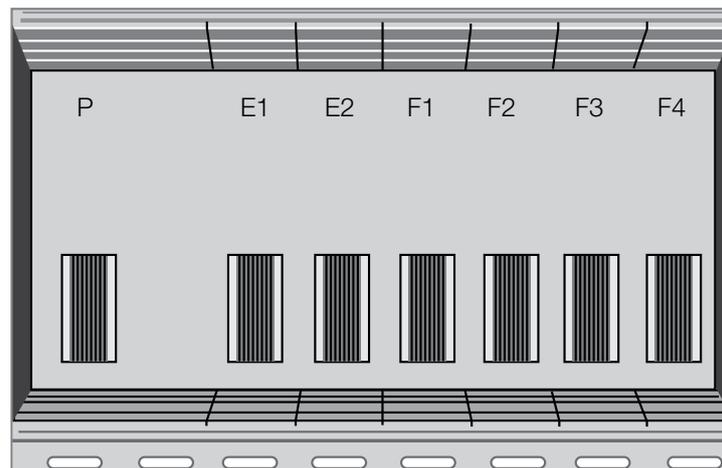
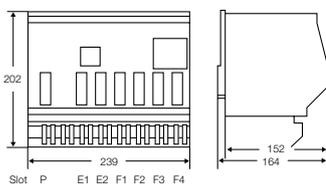


Figure 3: AC 800F Housing with slot assignment

3.3.9 AC 800F, base units PM 803F



Name	Short Description	Article No.
PM 803F	Base Unit 16 MB, battery-buffered RAM Without operating system. The operating system has to be loaded during software installation. With special Contact Ledge RW 855F. Freelance V7.1PS2a or higher is mandatory.	3BDH000530R1

The basic unit PM 803F, cyclically scans signals from the fieldbus lines via the corresponding fieldbus modules, processes these signals according the application programs installed by the user and sends appropriate signals to the fieldbus actuators via the fieldbus modules.

Controller redundancy can be achieved by using two AC 800F. To ensure quick and smooth takeover in milliseconds by the secondary AC 800F in case the primary AC 800F fails, a dedicated redundancy communications link through the second Ethernet module makes sure that both AC 800F are always synchronized. All inputs and outputs are designed to support redundant operation.

Data communication between AC 800F, the engineering and operator stations runs via the control network. Engineering station communications can involve new or updated configuration files being downloaded to the controller, or information about the connected modules being reported back. When fieldbus modules are installed or exchanged, the required configuration information is automatically updated.

Configuration and real-time process data is stored in the controllers. To safeguard this data in case of power loss, the RAM power is backed up with batteries located either on the Ethernet modules or on battery modules.

Features:

- Super Scalar RISC microprocessor (up to 150 MIPS)
- 16 K internal CPU cache RAM
- RAM memory with error detection and correction
 - 16 MB synchronous dynamic
- Flash-EEPROM
 - 8 MB, 32-bit words
- EEPROM, serial, 16 kbit
- Monitoring of the temperature inside the device
- Watchdog
- 4 slots for fieldbus modules
- 2 slots for Ethernet communications modules, 32-bit data bus, 10 Mbps/s
- Battery backup incl. battery watchdog
- G3 compliant Z variant available

Technical data

Technical data PM 803F	
CPU	CPU Intel® 32-bit RISC Super Scalar processor up to 150 MIPS
RAM	16 MB synchronous dynamic read / write memory, battery back up
I/O scan cycle time	Selectable by configuration. Depends on the capabilities of the fieldbus module
Processing time for 1000 instructions	0.78 ms for binary instructions 0.78 ms for word instructions 1.09 ms for floating point instructions
Power consumption:	Basic unit only: max. 7.8 W depending on CPU usage and cycle time
Power supply	115 - 230 VAC SA 811F 24 VDC SD 812F
Max. power output	See power supply modules
Weight	1.6 kg / 3.3 lbs max. 5 kg / 11 lbs (fully assembled)
Dimensions	Width 239 mm, 9.4" Height 202 mm, 8" Depth 164 mm, 6.5"

3.3.10 Power supply



SA 811F

Name	Short Description	Article No.
SA 811F	Power Supply 115 / 230 VAC To use together with PM 803F. Freelance V7.1SP2a or higher is mandatory.	3BDH000013R1

The AC 800F modules are supplied with 5 VDC / 5.5 A and 3.3 VDC / 6.5 A by SA 811F. The power supply has open-circuit, overload and sustained short-circuit protection. The electronically controlled output voltage provides high stability and low residual ripple.

In case of power loss ≥ 5 ms, the power supply module generates a power-fail signal. This signal is used by the CPU module to shut down operations and enter to a safe state of connected outputs of Remote I/Os. This is required for a controlled restart of the system and the user application when power is restored. The output voltage remains within its tolerance limits for at least another 15 ms. Altogether a mains voltage drop of 20 ms will be managed.

Features:

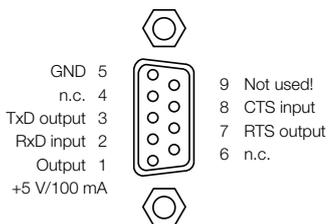
- Input voltage 115 - 230 VAC (self adjusting), output is electrically isolated
- Power supply outputs provide: 5 VDC / 5.5 A and 3.3 VDC / 6.5 A
- Enhanced power-fail prediction and shutdown procedures
- LED indication for power supply status and operating status of the AC 800F
- Short circuit proof, current limited
- 20 ms backup energy for use in the event of primary power failure, according to NAMUR
- G3 compliant Z variant available.

Technical data

Technical data SA 811F	
Input voltage	Alternating current 115 - 230 VAC Permissible range 90 - 260 VAC Frequency: 50 - 60 Hz (47 - 63 Hz)
Input current at nominal load	230 VAC: 275 mA 115 VAC: 541 mA
Rated input power	63 VA
Backup energy for the event of power failure	> 20 ms
Fuse	Subminiature fuse 2.5 AT, soldered
Output voltage	3.3 VDC ($\pm 3\%$) typical 5 VDC ($\pm 3\%$) typical
Output current	0.5 - 6.5 A to 3.3 V 0.5 - 5.5 A to 5.0 V
Current limit	Approx. 7.5 A Automatic return to normal operation after short circuit
Total output power	Max. 35 W
Weight	0.460 kg, 1.014 lbs

LED displays	Status	Description
Power	Green	Internal supply voltage is available
	Failure	Normal status
Failure	Orange	Self test
	Flashing orange	Overtemperature occurred during operation
	Red	Hardware failure of the basic unit
	Flashing red	Software failure of the system
	Run/Stop	Green
Run/Stop	Flashing green	Process was stopped and is now started again
	Red	Processing inactive
	Flashing red	Process was active and is stopped now
	Orange	Self test
	Off	Software initialization
	Prim/Sec	In case of redundancy please see the LEDs description in the manual "Mounting and Installation Instruction".
	For non-redundancy the states are:	
	Orange	Self test
	Off	Normal status

Operator controls	Description
Run/Stop switch	Connected to LED
Toggle Prim/Sec	For redundancy. Toggles between primary and secondary AC 800F (operational on primary AC 800F only, and only if a secondary AC 800F is available)
Reset	Reset button press and hold > 4 s for coldstart



Front panel connections	Description
Power supply	One connector for 115 - 230 VAC input
Diag	For diagnostics and optional radio-controlled clock 9-pin male connector



SD 812F

Name	Short Description	Article No.
SD 812F	Power Supply 24 VDC To use together with PM 803F. Freelance V7.1SP2a or higher is mandatory.	3BDH000014R1

The AC 800F modules are supplied with 5 VDC / 5.5 A and 3.3 VDC / 6.5 A by SD 812F. The power supply has open-circuit, overload and sustained short-circuit protection. The electronically controlled output voltage provides high stability and low residual ripple.

In case of power loss ≥ 5 ms, the power supply module generates a power-fail signal. This signal is used by the CPU module to shut down operations and enter to a safe state. This is required for a controlled restart of the system and the user application when power is restored. The output voltage remains within its tolerance limits for at least another 15 ms. Altogether an input voltage drop of 20 ms will be managed..

Features:

- Redundant input voltage 24 VDC, provides operation in accordance with NAMUR
- Power supply outputs provide: 5 VDC / 5.5 A and 3.3 VDC / 6.5 A
- Enhanced power-fail prediction and shutdown procedures
- LED indication for power supply status and operating status of the AC 800F
- Short circuit proof, current limited
- 20 ms backup energy for use in the event of primary power failure, according to NAMUR
- G3 compliant Z variant available

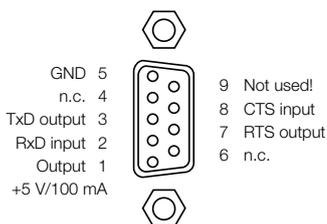
Technical data

Technical data SD 812F	
Input voltage	24 VDC, 2 redundant inputs permissible range 19.2 - 32.5 VDC
Input current at nominal load	1.7 A at 24 VDC
Rated input power	41 W
Backup energy for the event of power failure	> 20 ms
Fuse	For each supply: subminiature fuse 3.15 AT, soldered
Output voltage	3.3 VDC ($\pm 3\%$) typical 5 VDC ($\pm 3\%$) typical
Output current	0.5 - 6.5 A to 3.3 V 0.5 - 5.5 A to 5.0 V
Current limit	Approx. 7.5 A Automatic return to normal operation after short circuit
Total output power	Max. 35 W
Weight	0.460 kg, 1.014 lbs

LED displays	Status	Description
Power	Green	Internal supply voltage is available
Failure	Off	Normal status
	Orange	Self test
	Flashing orange	Overtemperature occurred during operation
	Red	Hardware failure of the basic unit
	Flashing red	Software failure of the system
Run/Stop	Green	Processing active
	Flashing green	Process was stopped and is now started again
	Red	Processing inactive
	Flashing red	Process was active and is stopped now
	Orange	Self test
	Off	Software initialization
Prim/Sec	In case of redundancy please see the LEDs description in the manual "Mounting and Installation Instruction".	
	For non-redundancy the states are:	
	Orange	Self test
	Off	Normal status

Operator controls	Description
Run/Stop switch	Connected to LED
Toggle Prim/Sec	For redundancy. Toggles between primary and secondary AC 800F (operational on primary AC 800F only, and only if a secondary AC 800F is available)
Reset	Reset button press and hold > 4 s for coldstart

Front panel connections	Description
Power supply	Two connectors for 24 VDC, automatic input selection when used with single power supply
Diag	For diagnostics and optional radio-controlled clock 9-pin male connector



3.3.11 Ethernet interface



EI 813F, 10BaseT

Name	Short Description	Article No.
EI 813F	Ethernet Module 10BaseT (Twisted pair) To use together with PM 803F. Battery not included. Freelance V7.1SP2a or higher is mandatory.	3BDH000022R1

These communication modules provide Ethernet communications to the control network compliant with IEEE802.3 standard.

Communications module, compliant with 10BaseT shielded Twisted Pair (STP, cable category 3, 4 or 5 advanced)

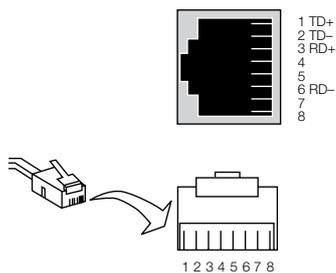
Features:

- IEEE802.3 Ethernet standard
- Provides 10BaseT compliant communication (10Mbit)
- 32-bit data bus
- Transmission rate 10 Mbit/s
- Direct memory access to main memory, < 4% CPU overhead for operation
- Optional battery for redundant battery backup of main memory
- G3 compliant Z variant available

Technical data

Technical data EI 813F	
Rated voltage	3.3 V / 5 V, $\pm 3\%$, from CPU board
Power consumption	Max. 1.2 W
STP	10BaseT cable category 3, 4 or 5 advanced
RAM and real-time-clock buffering time	PM 803F:
New battery inserted	≥ 10 days
After "Low" warning	≥ 5 hours
Battery	3.6 V lithium battery, 950 mAh (has to be ordered separately)
Weight	Approx. 0.150 kg, 0.33 lbs (without battery)

LED displays	Status	Description
Status	Off	No supply voltage, module is isolated
	Green	Power supply on, module identified and ready to operate as configured
	Orange	Power supply on, module identified and either: Normal transitory state after module startup Configuration mode of Boot Loader
	Orange flashing	Power supply on, module identified; module not connected to proper bus structure
	Red	Power supply on and either: Module not yet identified (normal for short time during module startup) Error occurred during module test
Battery (PM 803F)	Off	AC 800F is active, EI 812F not active => buffering from power supply module AC 800F is off (no watchdog of the batteries voltage) => buffering from battery
	Orange	During battery recovery or start-up phase
	Red	Warning: battery low, no battery inserted, insufficient electrical contact etc
	Green	Battery inserted and data protection provided



Front panel connections

RJ-45 female connector (shielded)

There are two integrated LED's indicating the current communication status. The LEDs are not labeled but can be identified by their color. The upper yellow LED indicates the link state; the lower green LED indicates active communication.

LED 10BaseT link	Off	No active link. No communication possible.
	Static yellow	Active link. communication possible.
LED 10BaseT active	Off	No communication.
	Flashing green	Communication.

3.3.12 Fieldbus interface modules

CAN-3 module FI 810

Name	Short Description	Article No.
FI 810F	Fieldbus Module, CAN (triple channel) for rack I/O To use together with PM 803F.	3BDH000030R1

The FI 810F module provides connectivity to the Freelance rack I/O - up to 5 racks can be connected. It provides functionality according CAN 2.0 specification and supports baud rates up to 1 MBd. All interfaces are electrically isolated and support redundant operation in conjunction with a second AC 800F.

Only one FI 810F module may be plugged per AC 800F. The slot of the FI 810F module has to be F1.

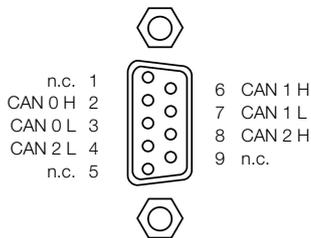
Features:

- 3-channel CAN modules
- Transmission rate: up to 1 MBd
- Module can be removed or inserted during operation
- Redundant operation, with redundant AC 800F
- G3 compliant Z variant available

Technical data

Technical data FI 810F	
Rated voltage	5 V, \pm 3% from basic unit
Power consumption	1.6 W - 2.6 W, appending from communication
Channel supply:	
Rated voltage	5 V, \pm 10%
Power consump. per channel	0.15 W, when idling 0.30 W, during communication
Weight	Approx. 0.145 kg, 0.32 lbs

LED displays	Status	Description
Status	Off	No supply power, module is isolated
	Green	Module is active and working properly
	Orange	Module has been identified by AC 800F, but has not yet been activated
	Red	Module powered up, but not yet identified, or an error has occurred
RxD0	Green	Receive data on channel 0
TxD0	Green	Transmit data on channel 0
RxD1	Green	Receive data on channel 1
TxD1	Green	Transmit data on channel 1
RxD2	Green	Receive data on channel 2
TxD2	Green	Transmit data on channel 2



Front panel connections

CAN 3 9-pin female connector



Serial module FI 820F

Name	Short Description	Article No.
FI 820F	Fieldbus Module, Serial (dual channel) To use together with PM 803F.	3BDH000031R1

The FI 820F module provides connectivity to a variety of serial fieldbuses and serial protocols. Standard protocol is MODBUS

By using different connection cables the physical interface can easily be selected: RS485 (half duplex), RS422 (full duplex) or RS232. All interfaces are electrically isolated and support redundant operation in conjunction with a second AC 800F.

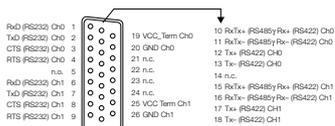
Features:

- Provides 2 serial interfaces
- Transmission rates up to 38.4 kBd configurable
- Physical interfaces RS485, RS422, RS232 selectable
- Electrical isolation
- Module can be removed or inserted during operation
- Redundant operation, with redundant AC 800F
- G3 compliant Z variant available

Technical data

Technical data FI 820F	
Rated voltage	5 V, ± 3% from basic unit
Power consumption	1.6 W - 2.6 W, appending from communication
Channel supply: Rated voltage Power consump. per channel	5 V, ± 10% 0.15 W, when idling 0.30 W, during communication
Output voltage for termination (Vcc_Term) Rated voltage Max. output current	5 V, ± 10% 20 mA
Weight	Approx. 0.145 kg, 0.32 lbs

LED displays	Status	Description
Status	Off	No supply power, module is isolated
	Green	Module is active and working properly
	Orange	Module has been identified by AC 800F, but has not yet been activated
	Red	Module powered up, but not yet identified, or an error has occurred
RxD0	Green	Receive data on channel 0
TxD0	Green	Transmit data on channel 0
RxD1	Green	Receive data on channel 1
TxD1	Green	Transmit data on channel 1



Front panel connections

Serial - 26-pin female connector



Profibus module FI 830F

Name	Short Description	Article No.
FI 830F	Fieldbus Module, PROFIBUS-DP To use together with PM 803F.	3BDH000032R1

The FI 830F module interfaces to the Profibus fieldbus. It provides functionality according to the PROFIBUS-DP V1 standard (DIN 19245 amendment 1) and supports baud rates up to 12 MBd.

The module is the master on the Profibus line and allows connecting up to 126 Profibus slaves. Configuration and parameterization is carried out completely with Freelance — no additional external configuration tools are required.

Line redundancy can be achieved using an external device (RLM 01) which drives two Profibus lines in parallel. In conjunction with a second AC 800F the module can also operate in a redundant-master mode without limiting any other feature.

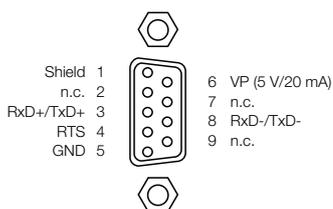
Features:

- PROFIBUS-DP Module (DIN 19245)
- Transmission rate up to 12 MBd
- Supports up to 126 slaves
- Physical interface: RS485
- Electrical isolation
- Shared memory (256 KB) onboard, to minimize the use of basic unit memory
- Module can be removed or inserted during operation
- Redundant operation, with redundant AC 800F
- G3 compliant Z variant available

Technical data

Technical data FI 830F	
Power consumption	In the active state, depends on the communication cycle time: 2.8 W
Max. output current	20 mA for bus termination / repeater supply
Output voltage	5 V, ± 5%
Overvoltage protection	+7.5 V / -5 V either transmission line to GND
Weight	Approx. 0.150 kg, 0.33 lbs

LED displays	Status	Description
Status	Off	No supply power, module is isolated
	Green	Module is active and working properly
	Orange	Module has been identified by AC 800F, but has not yet been activated
	Red	Module powered up, but not yet identified, or an error has occurred
Busy	Off	Module is in passive state on the Profibus
	Green	Module has token and, thus, is acting as the master



Front panel connections
Profibus 9-pin female connector (DIN 41652)



FF / HSE module FI 840F

Name	Short Description	Article No.
FI 840F	Fieldbus Module, FF HSE To use together with PM 803F. UL certified. Freelance V7.1SP2a or higher is mandatory.	3BDH000033R1

The FI 840F is a high speed ethernet fieldbus module designed for fast data exchange in production engineering with decentralized peripherals.

The FF / HSE module FI 840F is a Fieldbus Foundation-(FF)-Master. Using the Freelance it is possible to configure diverse Fieldbus Foundation devices.

The FF / HSE module FI 840F is designed to connect the AC 800F to a FF / HSE network. It can be mounted on slots F1...F4. It is used if high transmission rates are required or shall be made available for future use. FF / HSE wiring is always a point-to-point connection. Therefore a networks with more than two nodes always requires network switches or hubs.

Features:

- ARM-CPU with integrated Ethernet controller, 32-bit data bus, 32-bit address bus
- Flash EPROM for module CPU and protocol software
- Software / firmware update without EPROM exchange
- Separate memory for module CPU
- Shared memory for data exchange between main processor and module CPU. Data protection by parity check
- Automatic detection if 10BaseT or 100BaseTX is connected
- Electrical isolation for TP interface
- ESD protector on RJ45 socket
- Serial interface / Manchester encoder for generating a serial bit stream
- EEPROM for configuration data and diagnostic data memory independent from battery buffering
- Isolator for electrical isolation of the bus signals
- RJ45 connector with two link LEDs
- G3 compliant Z variant available

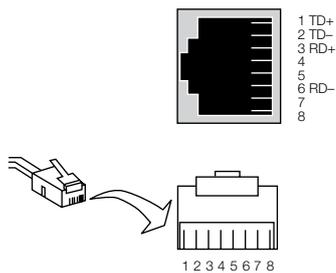
Technical data

Technical data FI 840F	
Rated voltage	5 V ± 3 % 3.3 V ± 3 % and 2.5 V ± 5 %
Power consumption	In the active state, 1.4 W - 2.1 W depending on communications load
Module memory	8 MBytes synchronous dynamic RAM
Shared memory	1 MByte synchronous static RAM used for data exchange between CPU board and module
Firmware memory	2 MByte Flash EPROM, 32-bit word length, capable of programming in the system and direct programming from AC 800F CPU board
EEPROM	Serial 16 kbit EEPROM, write cycles ≥ 10 ⁷ buffering time ≥ 10 years
Weight	Approx. 0.150 kg, 0.33 lbs

Static characteristics	
Power consumption	Max. 2.1 W
Medium	100BaseTx cable, category 5
Max. segment length	100 m
Max. number of nodes per segment	2

Dynamic characteristics	
Transmission rate 10 Mbit/s or 100 Mbit/s	

LED displays	Status	Description
State	Off	No voltage applied, module is separated
	Green	Power on, module is identified and ready for operation according to the configuration
	Orange	Power on, Module has been identified by AC 800F, Intermediate state during start-up Configuration mode of the boot loader
	Flashing orange	Power on, module has been identified by AC 800F. Module is not connected to corrected bus physics
	Red	Power on Module not yet identified (on a short-term basis during startup) An error has occurred during module test



Front panel connections

RJ-45 female connector (shielded)
There are two integrated LEDs indicating the current communication status. The LEDs are not labeled but can be identified by their color. The upper yellow LED indicates the transmission rate, the lower green LED indicates the communication state.

LED FF / HSE Speed	Off	Module has detected 10 Mbit/s data connection.
	Static yellow	Module has detected 100 Mbit/s data connection
LED FF / HSE Link	Off	No active link, neither 10Mbit nor 100 Mbit. No communication possible.
	Static green	Active link. Communication possible. No data transfer.
	Flashing green	Active link. Communication possible.

3.3.13 Coated and G3 compliant hardware

G3 compliant components are protected with a special coating against corrosive gases. The following Freelance ISA71.04 G3 compliant components can be ordered under the same conditions as any ordinary Freelance component. G3 compliance for AC 800F requires exclusively use of -Z components. AM 810F-Z serves for closing unused slots and the behind system plug.

G3 compliant components are identified by "Z" added to the module name, for example AC 800F-Z-4 MB.

Base units

Name	Short Description	Article No.
PM 803F-Z	Base Unit 16 MB, battery-buffered RAM Coated and G3 compliant version. Without operating system. The operating system has to be loaded during software installation. With special Contact Ledge RW 855F. Freelance V7.1SP2a or higher is mandatory.	3BDH000530Z1

Power supplies

Name	Short Description	Article No.
SA 811F-Z	Power Supply 115 / 230 VAC Coated and G3 compliant version. To use together with PM 803F-Z. Software V7.1SP2a or higher is mandatory.	3BDH000013Z1
SD 812F-Z	Power Supply 24 VDC Coated and G3 compliant version. To use together with PM 803F-Z. Software V7.1SP2a or higher is mandatory.	3BDH000014Z1

Ethernet interface modules

Name	Short Description	Article No.
EI 813F-Z	Ethernet Module 10BaseT (Twisted pair) Coated and G3 compliant version. To use together with PM 803F-Z. Battery not included. Software V7.1SP2a or higher is mandatory.	3BDH000022Z1

Fieldbus interface modules

Name	Short Description	Article No.
FI 810F-Z	Fieldbus Module, CAN (triple channel) for Rack I/O Coated and G3 compliant version. To use together with PM 803F-Z.	3BDH000030Z1
FI 820F-Z	Fieldbus Module, Serial (dual channel) Coated and G3 compliant version. To use together with PM 803F-Z.	3BDH000031Z1
FI 830F-Z	Fieldbus Module, PROFIBUS-DP Coated and G3 compliant version. To use together with PM 803F-Z.	3BDH000032Z1
FI 840F-Z	Fieldbus Module, FF HSE Coated and G3 compliant version. To use together with PM 803F-Z. Software V7.1SP2a or higher is mandatory.	3BDH000033Z1

Auxiliary modules

Name	Short Description	Article No.
AM 810F-Z	Cover Module G3 compliant station assembly requires AM 810F-Z for closing unused slots and the behind system plug.	3BDH000062Z1
AM 811F-Z	Battery Module Coated and G3 compliant version. To use together with PM 803F-Z. Without battery SB 808. Software V7.1SP2a or higher is mandatory.	3BDH000050Z1

3.3.14 Accessories

3.0.14.1 Battery modules and holder

Name	Short Description	Article No.
SY 809F	Battery Holder Without battery SB 808F.	3BDH000042R1
SB 808F	Battery for RAM buffering, 2 pcs.	3BDM000199R1



AC 800F battery module

Name	Short Description	Article No.
AM 811F	Battery Module To use together with PM 803F Battery not included SB 808. Freelance V7.1SP2a or higher is mandatory.	3BDH000050R1

The battery module can be used in non-redundant controllers with only one Ethernet module to increase the buffering time.

Features:

- Provides battery backup
- Enables redundant battery energy backup on the AC 800F
- G3 compliant Z variant available

Technical data

Technical data AM 811F	
Rated voltage	3.3 V / 5 V \pm 3%, from CPU board
Power consumption	Approx. 0.28 W
Battery	3.6 V lithium battery, 950 mAh (included in delivery)
Low battery signaling	\leq 3.2 V
RAM and real-time-clock buffering time	PM 803F:
New battery inserted	\geq 10 days
After "Low" warning	\geq 5 hours
Weight	Approx. 0.150 kg, 0.33 lbs without buffer battery Approx. 0.170 kg, 0.375 lbs with buffer battery

LED displays	Status	Description
Status	Off	No supply voltage, module is isolated
	Green	Power supply on, module identified and ready to operate as configured
	Orange	Power supply on, module identified and either: Normal transitory state after module startup Configuration mode of Boot Loader
	Red	Module power supply on and either: Module not yet identified (normal for short time during module startup) Error occurred during module test
Battery (PM 803F)	Off	AC 800F is active, AM 811F not active => buffering from power supply module AC 800F is off (no watchdog of the batteries voltage): => buffering from Battery.
	Orange	During battery recovery or start-up phase
	Red	Warning: battery low, no battery inserted, insufficient electrical contact etc.
	Green	Battery inserted and data protection provided..

3.0.14.2 Front panel

Name	Short Description	Article No.
AM 895F	Front Panel, 4 pcs Covering unused slots of AC 800F.	3BDH000044R1

3.0.14.3 Auxiliary power supply

Name	Short Description	Article No.
TK 807F	Supply Cable 115 / 230 VAC, ferrules, 2 m For SA 811F.	3BDM000210R1
TK 808F	Supply Cable 115 / 230 VAC, Euro plug, 2 m For SA 811F.	3BDM000211R1
TK 809F	Supply Cable 115 / 230 VAC, US plug, 2 m For SA 811F.	3BDM000212R1
TK 802F	Supply Cable 24 VDC, ferrules, 2 m For SD 812F.	3BDM000213R1
DPW 02	Power Supply, 24 VDC - 24 VDC, 5 A 74 x 30 x 120 (W, H, D)	8018277M
DPW 03	Power Supply, 115 / 230 VAC - 24 VDC, 5 A 65 x 125 x 103 (W, H, D)	8018544M
DSU 45	Mains Cable for 230 VAC, Euro plug, 1.5 m	0339140M
DSU 45	Mains Cable for 230 VAC, Euro plug, 5 m	0339141M

3.0.14.4 Cables

Name	Short Description	Article No.
TK 831F	CAN Cable (3 channel), integral connectors, 0.5 m 3 x 2 x 0.25 mm ² , Identical with DFA 031. Connection FI 810F to Terminal Block TB 870F.	3BDM000100R1
TK 811F	CAN Cable, open end, ferrules, 3 m 3 x 2 x 0.25 mm ² , Identical with DFA 011. Connection FI 8x0F to Terminal Block TB 870F.	3BDM000103R1
TK 817F	CAN Cable, open end, ferrules, 100 m 3 x 2 x 0.5 mm ² , Identical with DFA 007.	3BDM000356R1
TK 821F	Serial Cable (2 channel), integral connectors, 0.5 m Identical with DFA 021. Connection FI 820F to Terminal Block TB 870F.	3BDM000150R1
TK 891F	Diagnostics Cable, 5 m Identical with DSU 141.	3BDM000201R1
TK 890F	Diagnostics Cable, 10 m Identical with DSU 141.	3BDM000202R1

3.0.14.5 Miscellaneous

Name	Short Description	Article No.
TB 870F	Terminal Block, for serial interface	3BDM000160R1
RW 856F	Mounting Accessory, for enforced wall mounting	3BDM000190R1
Clips and clams		
RY 885F	Grounding Strap, 2 pcs.	3BDM000169R1
TV 821F	Clip for shielding, 6 mm, 5 pcs.	3BDM000171R1
TV 822F	Clip for shielding, 16 mm, 5 pcs.	3BDM000172R1
TV 823F	Clip for shielding, 16..25 mm, 5 pcs.	3BDM000173R1
TV 824F	Clip for shielding, 23..35 mm, 5 pcs.	3BDM000174R1
TV 825F	Clip for shielding, 25..40 mm, 5 pcs.	3BDM000175R1
TV 831F	Clamp-type terminal, 3..10 mm, 5 pcs.	3BDM000180R1
TV 832F	Clamp-type Terminal, 16...20 mm, 5 pcs.	3BDM000181R1



3.3 The controller AC 700F

The AC 700F controller comes in a really small footprint and high signal density of S700 I/O. The S700 I/O modules are directly plugged to the CPU module or can be used as remote I/O via Profibus. A maximum of eight modules can be connected to one controller. 3rd party I/O's can be connected via a MODBUS ASCII / RTU serial bus or via Profibus. AC 700F now also offers expanded flexibility via a pluggable SD card for controller backup and firmware update.

AC 700F is based on hardware that is successfully used as PLC in practice for years in factory automation. The AC 700F controller, as a member of Freelance, has numerous advantages over a PLC based solution: The compact process control system simplifies engineering, commissioning, and maintenance of the automation system. Visualization is directly incorporated into the engineering, making configuration particularly straightforward. Small or distributed plant components can be implemented cost effectively by using AC 700F. The competitive advantage is clear: the same engineering, operation and maintenance method for all plant components hand in hand with the well-known ease of use of Freelance.

3.3.15 Hardware and certificates

AC 700F comes with a modular design. The base elements are different types of terminal units, for the CPU module, for the FBP interface module, and for S700 I/O modules. Both, screw type and spring type terminal units are available. The modules can be easily plugged to the terminal units and then the terminal units can be plugged one to the other. The entire controller is then mounted on a DIN rail.

Certificates

The AC 700F controller has the following certificates:

- CE, GL, UL, ISO 9001.

Technical data

The CPU and the local S700 I/O modules communicate very fast. I/O scan times of 2 ms are possible. Short circuit and line break detection is realized for each channel.

The AC 700F controller is designed according to the EN 61131-2 / IEC 61131-2 standards. Data that differ from the IEC 61131 standards are caused due to the high requirements of Maritime Services.

Environmental conditions

The temperature range of AC 700F and S700 I/O extends from 0 °C to 60 °C / 32-140 °F.

Module temperature	Operating:	Temperature range: 0 °C (32 °F) ..+60 °C (140 °F) With FieldbusPlug: 0 °C (32 °F) ..+55 °C (131 °F) Highly recommended mounting: horizontally
	Storage: Transport:	Vertical mounting: Vertical mounting is possible, however, derating considerations should be made to avoid problems with poor air circulation and the potential for excessive temperatures. Temperature range: 0 °C (32 °F) ..+40 °C / 104 °F 50% output load derating -25 °C (-13 °F)...+75 °C (167 °F) -25 °C (-13 °F)...+75 °C (167 °F)
Battery temperature	Operating:	0 °C (32 °F)...+60 °C (140 °F)
	Storage:	-20 °C (-4 °F)...+60 °C (140 °F)
	Transport:	-20 °C (-4 °F)...+60 °C (140 °F)
Humidity		Maximum 95%, without condensation
Air pressure	Operating:	> 800 hPa / < 2000 m
	Storage:	> 660 hPa / < 3500 m

Mechanical stress

Mounting	Horizontal
Degree of protection	IP 20
Housing	According to UL 94
Vibration resistance according to EN 61131-2	All three axes 2 Hz...15 Hz, continuous 3.5 mm (0.1379 inch) 15 Hz...150 Hz, continuous 1 g (0.04 oz) (4 g (0.14 oz) in preparation)
Shock test	All three axes 15 g (0.53 oz), 11 ms, half-sinusoidal
Mounting of the modules	DIN-rail according to DIN EN 50022, 35 mm (1.38 inch), depth 7.5 mm (0.2955 inch) or 15 mm (0.591 inch), mounting with screws of type M4, fastening torque 1.2 Nm

Electromagnetic compatibility

2004/108/EC	Complies with the European directive
EN 61000-6-2	Electromagnetic compatibility (EMC) – Generic standards, Immunity for industrial environments
EN 61000-6-4	Electromagnetic compatibility (EMC) – Generic standards, Emission standard for industrial environments
2006/95/EC	Low Voltage Directive

Electric data

Voltages according to EN 61131-2	
Process- and Supply-voltage	24 VDC (-15 %, +20 % without ripple)
Absolute limits	19.2 V...30 V incl. Ripple (see below)
Ripple	< 5 %
Protection against reverse polarity	10 s
Permissible interruptions of power supply as per EN 61131-2	
DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
Creepage distances and clearances	
The creepage distances and clearances meet the overvoltage category II, pollution degree 2.	
Power supply units	
Power supply units meeting the PELV specification should be used for powering the modules.	

Insulation test voltages, routine test, as per EN 61131-2

230 V circuits against other circuitry	2500 V	Surge 1.2 / 50 µs
120 V circuits against other circuitry	1500 V	Surge 1.2 / 50 µs
120-240 V circuits against other circuitry	2500 V	Surge 1.2 / 50 µs
24 V circuits (supply, 24 V inputs / outputs), if they are electrically isolated against other circuitry.	500 V	Surge 1.2 / 50 µs
COM interfaces, electrically isolated	500 V	Surge 1.2 / 50 µs
Ethernet	500 V	Surge 1.2 / 50 µs
24 V circuits (supply, 24 inputs / outputs), if they are electrically isolated against other circuitry	350 V	AC 2 s
COM interfaces, electrically isolated	350 V	AC 2 s
Ethernet	350 V	AC 2 s



3.3.16 Central processing unit PM 783F

Name	Short Description	Article No.
PM 783F	Central Processing Unit (2 MB) Needs external 24 VDC power supply. Without terminal base. The operating system has to be loaded by Freelance. For AC 700F, Freelance of Version 9.1 or later is mandatory.	3BDH000364R0001

The Central Processing Unit (CPU) module is equipped with a high-performance processor for fast loop cycle times. It comes with on-board 100 Mbit/s Ethernet network connection used for communication between controllers, operator stations, and engineering tool. Two serial line interfaces complement the connectivity. One interface can be used for Modbus communication, while the other is used for diagnostics. For demanding applications, eight cyclic and priority driven tasks with adjustable cycle time can be configured, as well as a cyclic PLC type task, which runs as fast as possible. This multi-tasking scenario enables engineers to design applications that reflect all demands of process control, while at the same time balancing the CPU load. This keeps the resources needed in a project at the minimum.

The small front panel display shows status and diagnostic information directly at the module.

Technical data

Technical data PM 783F	
CPU	Freescall PowerPC™
RAM	Program memory (battery backed up) 2 MB SRAM Internal memory 8 MB SDRAM, 4 MB FLASH ROM
Processing time for 1000 instructions	0.71 ms for binary instructions 0.84 ms for word instructions 1.36 ms for floating point instructions
Max. number of I/O modules	8
Power supply	CP-C 24 / 5.0, power supply, 5 A / 24 VDC output CP-C 24 / 10.0, power supply, 10 A / 24 VDC output
Max. power dissipation within the module	10 W
Current consumption from 24 VDC	80 mA (max)
Inrush current at 24 VDC	1 A ² s
Data backup source	Lithium battery
Data buffering time at 25 °C / 77 °F	Approximately 1.5 years
Battery low indication	Warning indication issued about 2 weeks before the battery charge becomes critical
Real-time clock, with battery backup	Yes
Multitasking program execution	
Cyclic (equidistant)	8 tasks
Cyclic (as fast as possible)	1 PLC type task
Event driven	Upon any of these events: "Run, Stop, Warm start, Cold start, Error"
Serial interface "SER" (COM1) (see Figure 4 of the Terminal Base TB 711F)	

Technical data PM 783F	
Physical link:	Configurable for RS-232 or RS-485 (from 1200 bps to 38400 bps)
Connection:	Pluggable terminal block, spring connection
Usage:	Modbus - ASCII (Master / Slave) - RTU (Master / Slave) - IEC 60870-5-101 telecontrol protocol
Serial interface "DIAG" (COM2) (see Figure 4 of the Terminal Base TB 711F)	
Physical link:	RS-232
Connection:	SUB-D female connector
Usage:	For diagnostics
Onboard network interface	1 x Ethernet (RJ45) 100 Mbit/s
Usage:	Modbus TCP Telecontrol (IEC 60870-5-104)
LEDs, LCD display, 8 function keys	For RUN / STOP switch-over, status displays and diagnostics
Weight (CPU without the Terminal Base)	150 g / 5.29 oz.
Dimensions (CPU without the Terminal Base)	Width 67.5 mm, 2.66 inches Height 76 mm, 2.99 inches Depth 54 mm, 2.13 inches

3.3.17 PROFIBUS module CM 772F



Name	Short Description	Article No.
CM 772F	PROFIBUS DP Master Modul DP-V0/V1, 12 MBit/s D-Sub, 9-pole Requires one slot on CPU terminal base TB	3BDH000368R0001

The Profibus module CM 772F makes communication over the PROFIBUS DP field bus possible. The module is mounted on the left side of the CPU on the same terminal Base. The communication between the CPU and the coupler takes place through the coupler bus (coupler interface), which is integrated in the Terminal Base. The data interchange is realized by a dual-port RAM.

Technical data

Functionality CM 772F	
Protocol	PROFIBUS DP Master V0/V1
Fieldbus connector	D-SUB, 9-pole, female
Internal power supply	Through the coupler interface of the Terminal Base
LEDs	Five for status display

Technical data CM 772F

Fieldbus	PROFIBUS DP
Transmission rate	9.6 kBit/s to 12 MBit/s
Protocol	PROFIBUS DP Master V0/V1
Field bus connector	D-SUB, 9-pole, female
Processor	EC1
Clock frequency	48 MHz
Usable CPU	PM 783F
Coupler interface	Dual-port memory, 8 kByte
Current consumption from 24 V DC power supply at the Terminal Base of the CPU	typ. 60 mA
Internal RAM memory (EC1)	256 kByte
External RAM memory	-
External Flash memory	512 kByte (firmware)
Status display	PWR, RDY, RUN, STA, ERR
Weight	Approx. 150 g (5.29 oz)



3.3.18 CPU terminal base TB 711F

Name	Short Description	Article No.
TB 711F	CPU Terminal Base 24 VDC, 1x Coupler slots, Ethernet RJ45.	3BDH000365R0001

Technical data

Technical data TB 711F	
Connection of the 24 VDC process voltage	With a 5-pole removable terminal block
Slots	1 CPU, 1 Communication module (not used currently)
Interfaces	Field I/O: 1 for I/O-Bus Serial ports: 2 ("SER" (COM1), "DIAG" (COM2)) Networking: 1 Ethernet (RJ45) Profibus Master port
Weight	175 g / 6.17 oz.
Dimensions (with CPU inserted)	Width 95.5 mm, 3.75 inches Height 135 mm, 5.31 inches Depth 75 mm, 2.95 inches

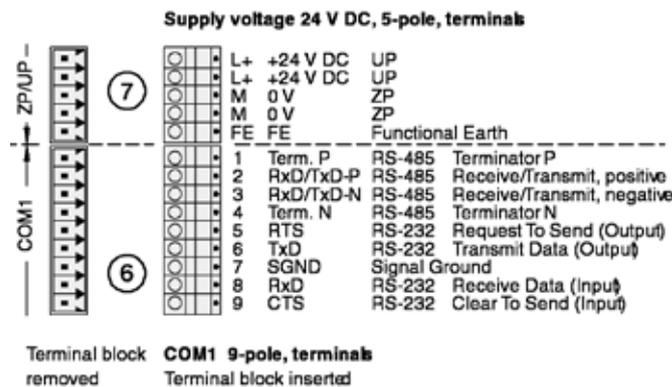
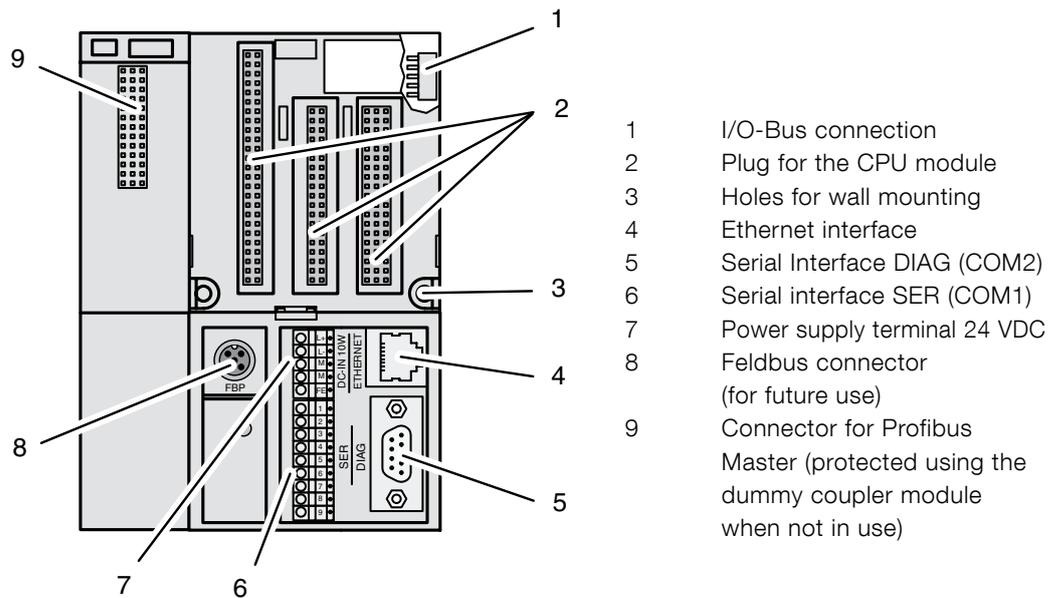


Figure 4: Terminal assignment for supply voltage (24 VDC) and the serial interface SER (COM1)

3.0.18.1 Dimensional drawings

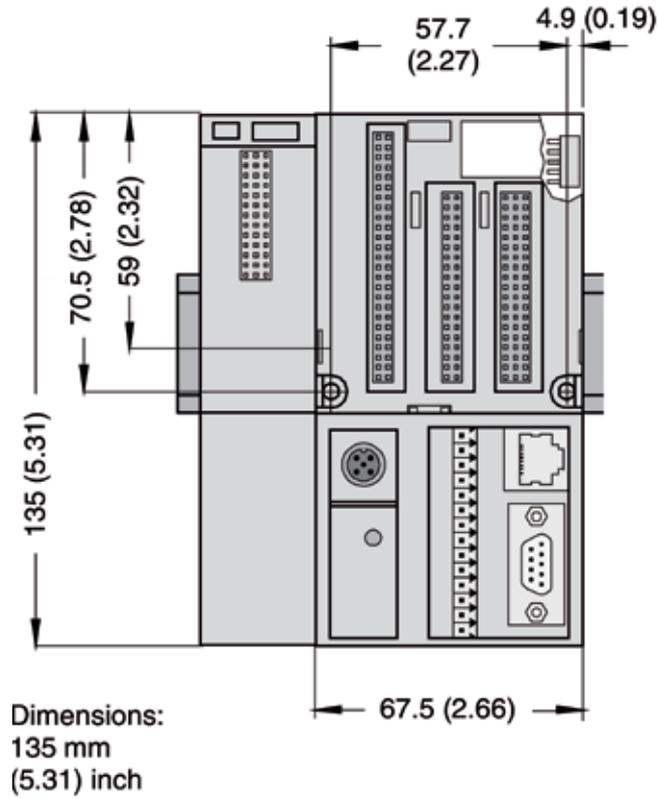


Figure 5: Front view terminal base

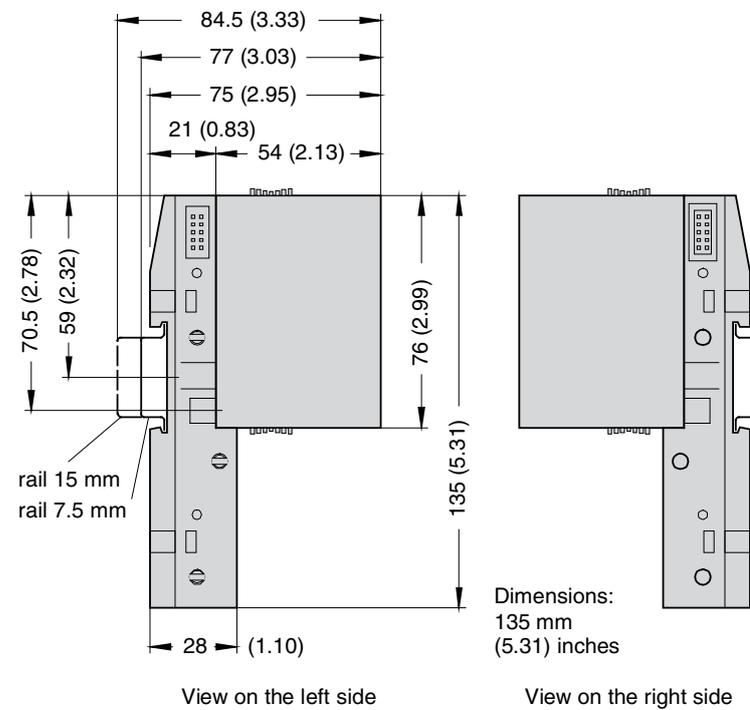
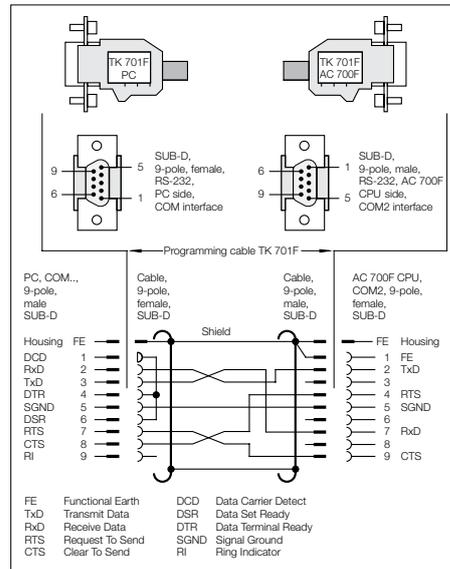


Figure 6: Side view terminal base

3.3.19 Accessories for CPU module

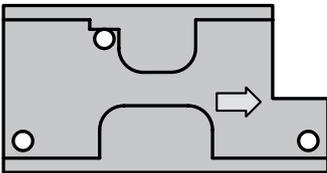
Name	Short Description	Article No.
TK 701F	Diagnostic Serial Cable, Sub-D / Sub-D, 5 m / 16.4 ft.	3BDH000366R0001



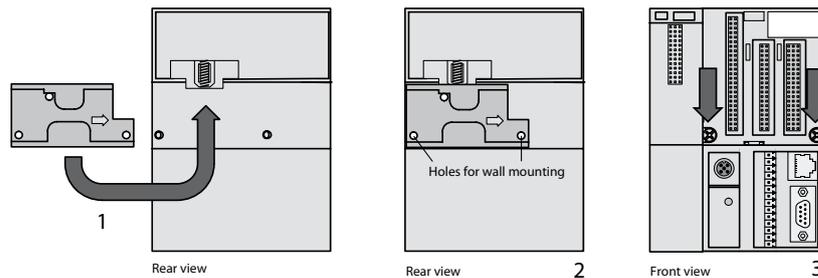
Name	Short Description	Article No.
TA521	Battery for RAM buffering	1SAP180300R0001



Name	Short Description	Article No.
TA 724F	Dummy Coupler Module	3BDH000367R0001
	Empty module, to protect an unused coupler slot from dust and touch when AC 700F is used without a Profibus Master module CM 772F. Is mounted on the CPU Terminal Base TB 711F.	



Name	Short Description	Article No.
TA526	Accessories for back-plate mounting, 10 pcs. With wall mounting of Terminal Bases and Terminal Units.	1SAP180800R0001



Chapter 4 Power supplies for AC 900F, AC 700F and S700 I/O

4.3 Power supply modules

Power supplies



CP-C 24/5.0

Name	Short Description	Article No.
CP-C 24 / 5.0	Power Supply, 5 A / 24 VDC Output 110-240 VAC / 100-350 VDC Input. For extended protection against accidental contact, mounting in a cabinet is recommended.	3BDH001040R0001
CP-C 24 / 10.0	Power Supply, 10 A / 24 VDC Output 110-240 VAC / 100-350 VDC Input. For extended protection against accidental contact, mounting in a cabinet is recommended.	3BDH001041R0001



CP-C 24/10.0

Technical data

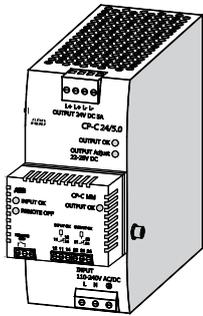
Technical data CP-C 24 / 5.0 / 10.0	
Power dissipation	CP-C 24 / 5.0: typically < 15 W CP-C 24 / 10.0: typically < 29 W
Efficiency	Typically 89 %
MTBF	500.000 h
Dimensions W x H x D	CP-C 24 / 5.0: 56.5 x 130 x 137 mm / 2.22 x 5.12 x 5.39 inch CP-C 24 / 10.0: 90 x 130 x 137 mm / 3.54 x 5.12 x 5.39 inch
Weight	CP-C 24 / 5.0: approx. 0.96 kg / 2.11 lb CP-C 24 / 10.0: approx. 1.34 kg / 2.95 lb
Mounting	DIN-rail (DIN EN 50022) snap mechanism
Mounting position	Horizontal
Minimum distance between devices	Horizontal 10 mm (0.39 inch) Vertical 80 mm (3.15 inches)
Degree of Protection	IP 20 Protection class (EN 61140)
Environmental data	
Ambient temperature range	
Operation	-25 °C (-13 °F)...+70 °C (158 °F)
Full load	0 °C (32 °F)...+60 °C (140 °F) (without derating)
Storage	-40 °C (-40 °F)...+85 °C (185 °F)
Damp heat (IEC/EN 60068-2-3)	93 % at +40 °C (104 °F), no condensation
Pollution category (EN 50178)	24 VDC
Climatic category (IEC/EN 60721)	3K3
Isolation data	

Technical data CP-C 24 / 5.0 / 10.0

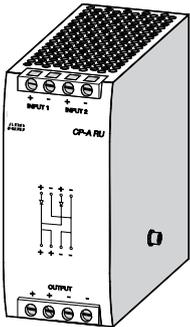
Insulation voltage	
Input	3 kVAC (type test), 1.2 kVAC (routine test)
Input / PE	1.5 kVAC (type test), 1.2 kVAC (routine test)
Output / PE	350 VAC (routine test)
Input (L,N)	
Rated input voltage V_{IN}	110 - 240 VAC
Input voltage range	85 - 264 VAC, 100 - 350 VDC (external fuse)
Frequency range AC	47 - 63 Hz
Current consumption at 110 - 240 VAC	Approx. 2.2 - 1.2 A
Power consumption	Typ. 135 W
Inrush current / I _{2t} (cold start)	< 23 A / approx. 0.9 A ² s
Power failure buffering at rated load	Min. 100 ms
Starting time after applying supply voltage	Typ. < 100 ms
Transient overvoltage protection	Varistors
Internal input fuse (apparatus protection), not accessible	CP-C 24 / 5.0: 4 A (slow-acting) CP-C 24 / 10.0: 6.3 A (slow-acting)
Discharge current for PE	< 3.5 mA
Output (L+, L+, L-, L-)	
Short-circuit, no-load and overload proof	
Rated output voltage	24 VDC
Tolerance of the output voltage	±1 %
Adjustment range of the output voltage	22 – 28 V, factory setting 24 V ±0,5%
Rated output power	CP-C 24 / 5.0: 120 W CP-C 24 / 10.0: 240 W
Rated output current I_r at $T_A < 60\text{ °C}$ (140 °F)	CP-C 24 / 5.0: 5 A CP-C 24 / 10.0: 10 A
Resistance to reverse feed	Approx. 35 VDC
Power Factor Correction (PFC)	Yes
Overload performance	
Output characteristics	U/I curve with power reserve
Current limitation at short circuit	Approx. 11 A
Short-circuit protection	Approx. 11 A
Short-circuit protection	Continuous short-circuit stability
Overload protection	Thermal protection
Starting of capacitive loads	Unlimited
Standards	
Product standard	IEC/EN 61204
Low Voltage Directive	2006/95/EC
EMC directive	2004/108/EC
Electrical safety	EN 50178, EN 60950, UL 60950, UL 508
Protective low voltage	SELV (EN 60950)
Electromagnetic Compatibility	
Interference immunity	IEC/EN 61000-6-2
Electrostatic discharge (ESD)	IEC/EN 61000-4-2, Level 4 8 kV / 15 kV
Electromagnetic field	IEC/EN 61000-4-3, Level 3 10 V/m
Fast transient (Burst)	IEC/EN 61000-4-4, Level 4 4 kV
Powerful impulses (Surge)	IEC/EN 61000-4-5, Level 4 2 kV sym., Level 3, 3 kV non symmetric
HF line emission	IEC/EN 61000-4-6, Level 3 10 V
Interference emission	IEC/EN 61000-6-3
Electromagnetic field	IEC/CISPR 22, EN 55022, Class B
HF line emission	IEC/CISPR 22, EN 55022, Class B

4.3 Accessories

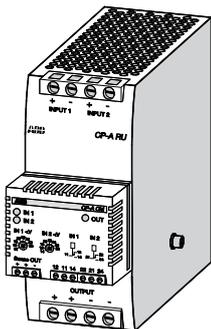
Accessories for power supplies



Name	Short Description	Article No.
CP-C MM	Messaging Module for CP-C, relay outputs The message module CP-C MM indicates the correct function of the power supply unit via LEDs and energized output relays. The module will be plugged at the front side of the power supply.	3BDH001043R0001

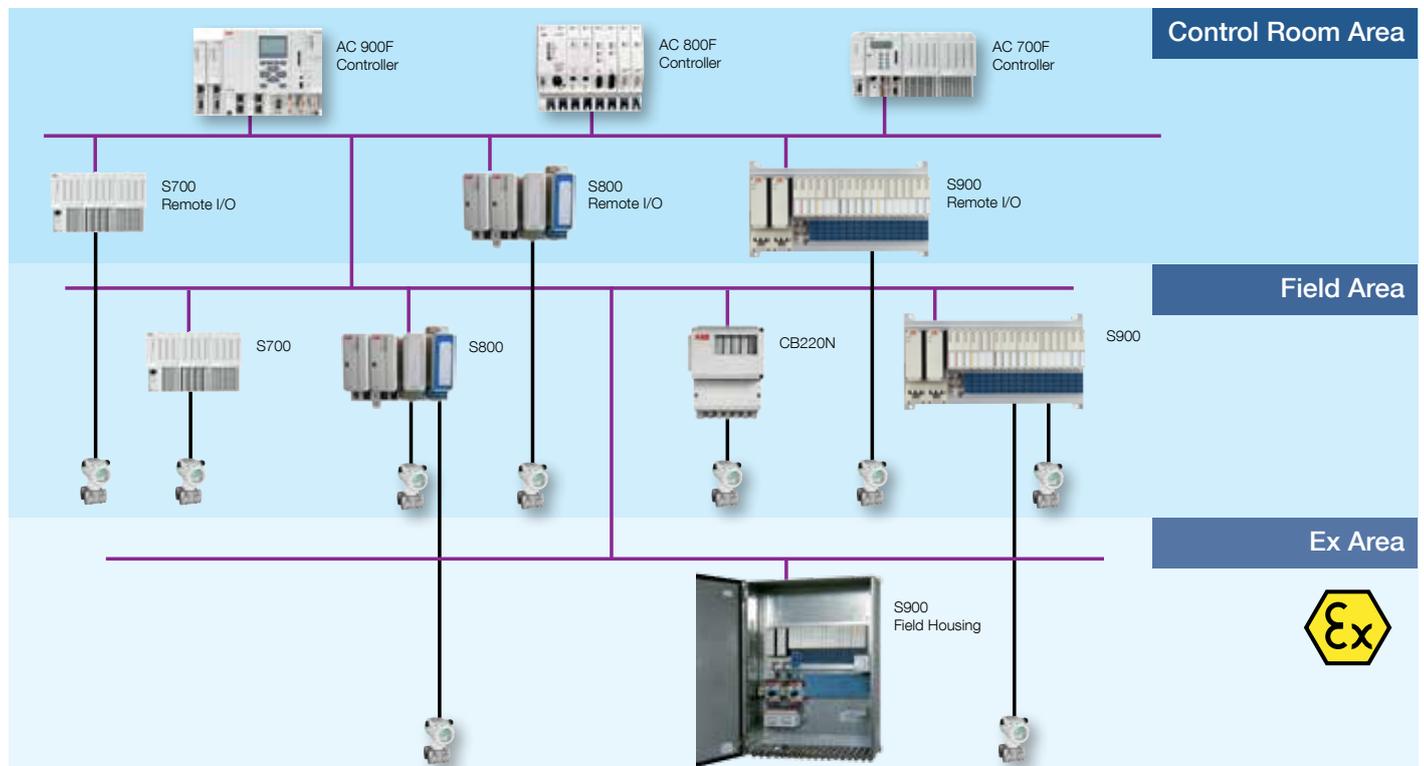


Name	Short Description	Article No.
CP-A RU	Redundancy Unit If a fault occurs in the first power supply circuit, the total current requirement of all consumers can be completely covered by a second power supply unit, and the output circuits are decoupled by means of the redundancy unit CP-A RU.	3BDH001044R0001



Name	Short Description	Article No.
CP-C MM	Messaging Module for CP-C, relay outputs The message module CP-C MM indicates the correct function of the power supply unit via LEDs and energized output relays. The module will be plugged at the front side of the power supply.	3BDH001043R0001

Chapter 5 Remote I/Os



The following chapter will give you a brief overview about the Remote I/O systems S700, S800 and S900. For more detailed information please see the data sheets.

The picture above shows a possible Profibus topology.

The controllers are assembled in the control room. Remote I/O systems S700, S800 and S900 can be assembled in the control room or directly in the field. Furthermore S900 can be placed locally in the field in hazardous area, depending on the customer's wishes. Field devices are connected to the remote I/O systems. With AC 700F and AC 900F a subset of S700 I/O can be plugged as direct I/O to the right side of the controller.

Remote I/O systems can also be mounted locally in the field, near field devices. This type of installation reduces the costs for cabling from the field device to the system.

On-site assembly of the remote I/O systems is easy, as only a single cable is required for Profibus communication and just one suitable field housing is needed for mounting. This field housing usually has the IP66 degree of protection. Other devices such as fiber optic couplers, pneumatic valves, terminals, terminal blocs or additional electrical devices can also be mounted in such a field housing. This reduces both design, engineering and cabling costs.

In order for devices to be installed in hazardous areas, extra regulations and functional rules need to be considered in addition to the usual engineering rules.

All devices which are used in hazardous area have to be certified. The devices shall have a certificate for either Zone 1 or Zone 2.

The S900 remote I/O system (S and B series) is suitable for installation in hazardous areas.

Series	Assembly	Field devices / signals	Hazardous area approval
S series	in Zone 1	in Zones 2, 1, and 0 (intrinsically safe signals)	ATEX Zone 1
B series	in Zone 2	in Zones 2, 1, and 0 (intrinsically safe signals)	ATEX Zone 2
N series	in safe areas	in safe areas	no

5.3 S700 I/O

S700 I/O modules can be used as direct I/O together with the AC 700F and AC 900F controller as well as remote I/O at any Profibus DP segment. A typical setup as remote I/O is shown in Figure 7.

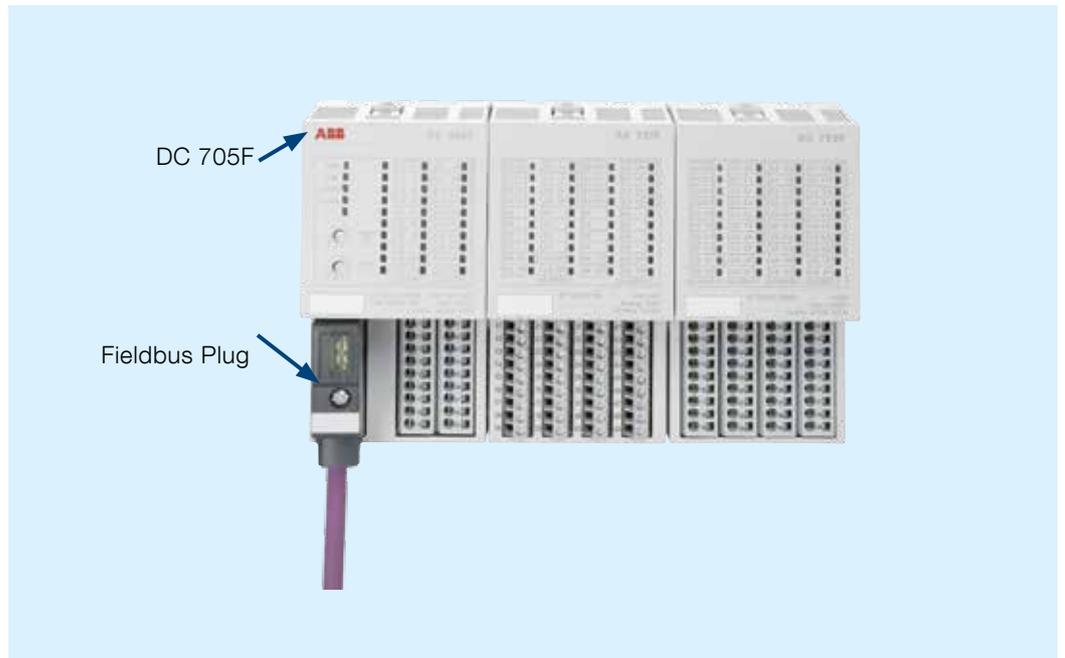


Figure 7: S700 Remote I/O

5.3.1 S700 I/O modules

The following table lists the entire set of S700 I/O modules. All modules can be used as remote I/O at Profibus DP. The indicated subset can be used as direct I/O together with the AC 700F and AC 900F controller.

	Module Name	Type (Channel Groups)	Input Range	Output Range	
AC 700F Direct I/O	DC 732F	16 DI, 16 DI/DO configurable	24V DC, 1-wire, standard binary signals, all signals share common ground	24 V DC, 0.5 A	
	AI 723F	16 AI, 12-Bit+Sign	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI	-	
	AX 722F	8 AI + 8 AO (2x4), 12 Bit+Sign	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI, Ch 0-3: -10...+10 V, 0/4...20 mA; Ch 4-7: -10...+10 V	
	AO 723F	16 AO (2x8), 12 Bit+Sign	-	Ch 0-3: & 8-11: -10...+10 V, 0/4...20 mA, Ch 4-7 & 12-15: -10...+10 V	
	DX 722F	8 DI, 8 DO Relay	24 V DC	24 V DC, 110 V/ 230 V AC	
	DX 731F	8 DI, 4 DO Relay	110 V/ 230 V AC	24 V DC, 110 V/ 230 V AC	
	AI 731F	8 AI, 15 Bit+Sign	-50 mV...+50 mV, -500 mV...+500 mV, -1 V...+1 V, 0...10 V, -10 V...+10 V, 0 V...+5 V, -5 V...+5 V, 0...20 mA, 4...20 mA, -20...+20 mA, Pt100/1000, Ni1000, Cu50 (1.426), Cu50 (1.428), 0...50 kOhm, Thermocouple J K T N S Type, DI	-	
	DI 724F	32 DI	24 V DC, 1-wire, standard binary signals, all signals share common ground	-	
	AX 721F	4 AI + 4 AO, 12 Bit+Sign	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI	0...10 V, -10...+10 V, 0/4...20 mA	
	DA 701F	16 DI, 8 DC, 4 AI, 2 AO	24 V DC (for DI), 0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI	24 V DC, 0.5 A (for DO), -10...+10 V, 0/4...20 mA	
	S700 Remote I/O	DC 705F	FBP Interface + 8 DI, 8 DC	24 V DC, 1-wire, this is the communication module for Profibus	24V DC, 0.5 A
		AC 722F	8 AC, 12 Bit+Sign	24 V DC, 2-wire ...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000, DI	24 V DC, 2-wire Ch 0-3: -10...+10 V, 0/4...20 mA, Ch 4-7: -10...+10 V
		DC 722F	16 DC, 24 V DC	24 V DC (2/3-wire DI possible)	24 V DC, 0.5 A
DC 723F		24 DC, 24 V DC	24 V DC (2/3-wire DI possible)	24 V DC, 0.5 A	
CD 722F		2 counter inputs, 2PWM, 2DI, 8DC	RS-422, 5-V-TTL, 24-V-totem-pole, 1-Vpp, SSI interface	PWM, 24V DC, 0.5 A, frequency (pulse) module	



Environmental Conditions

Please refer to chapter „Hardware and certificates“ auf Seite 16.

5.3.2 Fieldbus interface module DC 705F

Name	Short Description	Article No.
DC 705F	Fieldbus interface module Interface for Fieldbus Plug FBP 8 DI: 24 VDC 8 DI/DO: 24 VDC/0.5 A 1-wire, 24 VDC 100 W TU 705F /TU 706F (terminal unit not included)	3BDH000388R0001

The FBP Interface Module DC 705F is used as a decentralized I/O module for Profibus. The bus connection is performed by a neutral FieldBusPlug interface, to which the FieldBusPlug PDP22 is plugged in. In addition FBP Interface Module DC 705F provides 16 I/O channels with the following features:

- 8 digital inputs 24 V DC in one groups (1.0...1.7)
- 8 digital inputs/outputs in one group (2.0...2.7), of which each can be used as an input,
 - as a transistor output with short-circuit and overload protection with 0.5 A rated current or
 - as a re-readable output (combined input/output) and can be addressed accordingly.

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.



This I/O module cannot be used directly with the CPU module PM 783F or PM 902F and should be used with S700 remote I/O.

Environmental Conditions

Please refer to chapter „Hardware and certificates“ auf Seite 16.

Technical data

Functionality DC 705F	
Interface	Neutral FieldBusPlug interface
Supply of the module's electronic circuitry	From the FieldBusPlug
Supply of the electronic circuitry of the I/O expansion modules attached	Through the expansion bus interface (I/O-Bus)
Address switches	For setting the field bus address (0 to 99)
Digital Inputs	8 (24 V DC)
Digital Inputs/Outputs	8 (24 V DC)
LED displays	For system displays, signal status, errors and power supply
External supply voltage	Via the terminals ZP and UP (process voltage 24 V DC)

Technical Data DC 705F	
Rated supply voltage of the module	24 V DC (through the FieldBusPlug)
Current consumption of the module	15 mA (through the FieldBusPlug)
Process voltage UP	
rated value	24 V DC (for inputs and outputs)
max. current loadability for the supply terminals	10 A
Protection against reversed voltage	yes
Rated protection fuse at UP	10 A fast
Electrical isolation	FBP system bus interface from the rest of the module
Inrush current from UP (at power-up)	0.008 A ² s
Current consumption from UP at normal operation / with outputs	0.005 A + max. 0.5 A per output
Connections	Terminals 1.8 - 2.8 for +24 V (UP) and 1.9 - 2.9 for 0 V (ZP)
Max. power dissipation within the module	6 W (outputs unloaded)
Number of digital inputs	8
Number of configurable digital inputs/outputs	8
Reference potential for all digital inputs and outputs	Minus pole of the supply voltage, signal name ZP
Address setting	with 2 rotary switches on the front panel
Operating and error displays	23 LEDs altogether
Weight (without Terminal Unit)	ca. 125 g
Mounting position	horizontal or vertical with derating (output load reduced to 50 % at 40°C per group)
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the switch-gear cabinet.

Technical Data of the digital inputs	
Number of channels per module	8
Distribution of the channels into groups	1 group of 8 channels
Terminals of the channels I0 to I7	1.0 to 1.7
Terminals of the channels C8 to C16	2.0 to 2.7
Reference potential for all inputs	terminals 1.9...4.9 (Minus pole of the process supply voltage, signal name ZP)
Electrical isolation	from the FBP system bus
Indication of the input signals	one yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1-> 0)	typ. 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 V DC

Technical Data of the digital inputs	
Signal 0	-3 V...+5 V
undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	within -3 V...+5 V
Ripple with signal 1	within +15 V...+30 V
Input current per channel	
input voltage +24 V	typ. 5 mA
input voltage +5 V	> 1 mA
input voltage +15 V	> 2 mA
input voltage +30 V	< 8 mA
Max. cable length	
shielded	1000 m
unshielded	600 m

Technical Data of of the configurable digital inputs/outputs	
Number of channels per module	8 inputs/outputs (with transistors)
Distributen of the channels into groups	1 group of 8 channels
if the channels are used as inputs	
channels I8...I15	terminals 2.0...2.7
if the channels are used as outputs	
channels Q8...Q15	terminals 2.0...2.7
Indication of the input/output signals	one yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Electrical isolation	from the FBP system bus

Technical Data of the digital inputs/outputs if used as outputs	
Number of channels per module	max. 8 transistor outputs
Reference potential for all outputs	terminals 1.9...2.9 (minus pole of the process supply voltage, signal name ZP)
Common power supply voltage	for all outputs: terminals 1.8...2.8 (plus pole of the process supply voltage, signal name UP)
Output voltage for signal 1	UP (-0.8 V)
Output current	
rated value, per channel	500 mA at UP = 24 V
maximum value (all channels together)	10 A
Leakage current with signal 0	< 0.5 mA
Rated protection fuse	10 A fast
De-magnetization when inductive loads are switched off	with varistors integrated in the module
Switching frequency	

Technical Data of the digital inputs/outputs if used as outputs	
with inductive loads	max. 0.5 Hz
with lamp loads	max. 11 Hz with max. 5 W
Short-circuit proof / overload proof	yes
Overload message ($I > 0.7 \text{ A}$)	yes, after ca. 100 ms
Output current limitation	yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24V signals	yes
Max. cable length	
shielded	1000 m
unshielded	600 m

Technical Data of the digital inputs/outputs if used as inputs	
Number of channels per module	max. 8 digital inputs
Reference potential for all inputs	terminals 1.9...2.9 (minus pole of the process supply voltage, signal name ZP)
Input current, per channel	see "Digital inputs"
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	typ. 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V *
undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	within -3 V...+5 V *
Ripple with signal 1	within +15 V...+30 V
Max. cable length	
shielded	1000 m
unshielded	600 m

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input (see figure) above. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from - 12 V to + 30 V when UPx = 24 V and from - 6 V to + 30 V when UPx = 30 V.



5.3.3 Digital I/O Modules

5.1.3.1 Frequency input module CD 722F

Name	Short Description	Article No.
CD 722F	Frequency input module 2 Counter Inputs: 5/24 VDC, 1 Vpp sinus, fmax 300 kHz 2 DO: 24 VDC/0,1 A, pulse width PWM 2 DI: 24 VDC 8 DI/DO: 24 VDC/0,5 A 1/2-wire, 24 VDC 100 W TU 715F /TU 716F (terminal unit not included)	3BDH000393R0001

The frequency input module CD 722F is installed as a remote expansion module at the FBP interface module DC 705F. It has the following features:

- 2 independent counting functions with up to 12 configurable modes (including incremental position encoder and frequency input up to 300 kHz)
- 2 independent PWM (pulse-width modulator) or pulse outputs with push- pull driver.
- Dedicated inputs/outputs for specific counting functions (e.g. touch, set, reset)
- All unused inputs/outputs can be used with the specifications of standard inputs/outputs range



This I/O module cannot be used directly with the CPU module PM 783F or PM 902F and should be used with S700 remote I/O.

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Digital inputs/outputs	<p>24 V DC, dedicated inputs/outputs can be used for specific counting functions:</p> <hr/> <p>Catch/touch operation, counter value stored in separate variable on external event (rising or falling edge)</p> <hr/> <p>Set input to preset counter register with predefined value</p> <hr/> <p>Set input to reset counter register</p> <hr/> <p>End value output; the output is set when predefined value is reached</p> <hr/> <p>Reference point initialization (RPI) input for incremental encoder initialization</p> <hr/> <p>All unused inputs/outputs can be used with the specification of standard input/output range.</p>
High-speed counter/encoder	<p>integrated, 2 counters (hardware interface with +24 V DC, +5 V DC, differential and 1 V_{pp} sinus input) with up to 12 configurable operation modes:</p> <hr/> <p>32 bits one counter mode</p> <hr/> <p>16 bits two counter mode</p> <hr/> <p>Incremental position encoder</p> <hr/> <p>Absolute SSI encoder</p> <hr/> <p>Time frequency meter</p> <hr/> <p>Frequency input up to 300 kHz</p>
PWM/pulse outputs	<p>2 pulse-width-modulators or pulse outputs</p> <hr/> <p>Output specification</p> <hr/> <p>Push-pull output: 24 V DC, 100 mA max.</p> <hr/> <p>Current limitation (thermal and over current)</p> <hr/> <p>PWM specification</p> <hr/> <p>Frequency from 1 Hz to 100 kHz</p> <hr/> <p>Value from 0 to 100 %</p> <hr/> <p>Pulse specification</p> <hr/> <p>Frequency from 1 Hz to 15 kHz</p> <hr/> <p>Pulse emission from 1 to 65535 pulses</p> <hr/> <p>Number of pulses emitted indicator (0 to 100 %)</p> <hr/> <p>Frequency specification</p> <hr/> <p>Frequency output = 100 kHz when duty cycle set to 50 %</p>
Power supply for encoders	Two 5 V power supplies, max. 100mA
LEDs	For system displays, indicating signal statuses, errors and power supply
Internal power supply	Via I/O Bus
External power supply	Via the terminals UP(process voltage 24 V DC) and ZP (0 V DC)

Technical Data	
Process voltage	
Connection	Terminals 1.8,2.8,3.8 and 4.8 for UP (+24 V DC) and 1.9, 2.9, 3.9 and 4.9 for ZP (0V)
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Rated value	24 V DC
max. ripple	5 %
Current consumption	
From UP	0.07 A + max. 0.008 A per input + max. 0.5 A per output + 0.01 A for A, B and Z inputs
Via I/O Bus	Approx. 5 mA
Inrush current from UP (at power up)	0.04 A ² s
Electrical isolation	Yes, per module
Max. power dissipation within the module	6 W (outputs not loaded)
Dimensions (without the Terminal Unit)	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inches width x height x depth
Weight	125 g/ 4.41 oz.
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data for the digital inputs/outputs if used as standard inputs	
Number of channels per module	2 + 8 configurable digital inputs/outputs
Reference potential for all inputs	Terminals 1.9...4.9 (Minus pole of the supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	1 yellow LED per channel, the LED is ON when the input signal is high (signal1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	typically 8 ms, configurable from 0.1...32 ms
Input signal voltage	24 V DC
signal 0	-3 V...+5 V
undefined signal	> +5 V...< +15 V
signal 1	+15 V...+30 V
Ripple with signal 0	within -3 V...+5 V*
Ripple with signal 1	within +15 V...+30 V
Input current per channel	
input voltage +24 V	typically 5 mA
input voltage +5 V	> 1 mA
input voltage +15 V	> 5 mA

Technical data for the digital inputs/outputs if used as standard inputs

input voltage +30 V	< 8 mA
Max. cable length	
shielded	1000 m (3280.83 ft)
unshielded	600 m (1968.50 ft)

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from -12 V to +30 V when UPx = 24 V and from -6 V to +30 V when UPx = 30 V.

Technical data for the digital inputs/outputs if used as standard outputs

Number of channels per module	8 configurable digital inputs/outputs
Reference potential for all inputs	Terminals 1.9...4.9 (Minus pole of the supply voltage, signal name ZP)
Common power supply voltage	For all outputs: terminals 1.8...4.8 (plus pole of the process supply voltage, signal name UP)
Output voltage for signal 1	UP (-0.8 V)
Input delay (0->1 or 1->0)	typically 10 µs
Output current	
Rated value, per channel	500 mA at UP = 24 V
Maximum value (all channels together, PWM included)	8 A
Leakage current with signal 0	< 0.5 mA
Rated protection fuse on UP	10 A fast
Demagnetization when inductive loads are switched off	With varistors integrated in the module
Switching frequency	
With inductive loads	Max. 0.5 Hz
With lamp loads	Max. 11 Hz with max. 5 W
Short circuit proof/overload proof	yes
Overload message (I > 0.7 A)	Yes, after approx. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24 V signals	Yes
Max. cable length	
shielded	1000 m (3280.83 ft)
unshielded	600 m (1968.50 ft)

Technical data for the high-speed inputs (A0, B0, Z0; A1, B1, Z1)

Number of channels per module	6	
Reference potential for all inputs	Terminals 1.9, 2.9, 3.9 and 4.9 (Minus pole of the process voltage, signal name ZP)	
Input Type	24 V DC	5 V DC / Differential / Sinus 1 Vpp
Input current per channel		
Input voltage +24 V	Typically 14 mA	
Input voltage +5 V	> 4.8 mA	
Input voltage +15 V	> 12 mA	
Input voltage +30 V	< 15 mA	
Input type according to EN 61131-2	Type 1	
Input frequency (max.)	300 kHz	300 kHz
Input signal voltage	24 V DC	5 V DC
Signal 0	-3 V...+ 5 V	-3 V...+ 0.5 V
Undefined signal	> +5 V...< +15 V	--
Signal 1	+ 15 V...+30 V	+ 0.5 V...+30 V
Ripple with signal 0	Within -3 V...+5 V	Within -3 V...+0.5 V
Ripple with signal 1	Within +15 V...+30 V	Within +0.5 V...+30 V
Max. cable length		
shielded	1000 m (3280.83 ft)	
unshielded	600 m (1968.50 ft)	

Technical data of the fast outputs

Number of channels per module	2	
Reference potential for all inputs	Terminals 1.9...4.9 (Minus pole of the process voltage, signal name ZP)	
Common power supply voltage	For all outputs: terminals 1.8...4.8 (plus pole of the process supply voltage, signal name UP)	
Indication of the output signals	Brightness of the LED depends on the number of pulses emitted (0% to 100%) – pulse output mode only	
Output voltage for signal 1		
Output voltage for signal 0		
Output delay (0->1 or 1->0)	Typically 1 µs	
Output current		
Rated value, per channel	100 mA at UP = 24 V	
Maximum value (all channels together, configurable outputs included)	8 A	
Leakage current with signal 0	< 0.5 mA	
Rated protection fuse on UP	10 A fast	

Technical data of the fast outputs

De-magnetization when inductive loads are switched off	With varistors integrated in the module
Switching frequency	PWM: upto 100 kHz (min. step for PWM value: 2 μ s) Pulse: upto 15 k Hz
Short circuit proof/overload proof	yes
Overload message ($I > 0.7A$)	Yes, after approx. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit/ overload
Resistance to feedback against 24 V signals	Yes, with positive polarity only
Max. cable length	
shielded	1000 m (3280.83 ft)
unshielded	600 m (1968.50 ft)

Technical data of the 5-V-sensor supply

Number of supplies	2, independent configuration
Voltage supply (outputs unloaded)	5 V DC +/- 5%
Resistance to feedback against reverse polarity	No
Output current	100 mA max. (independently) 200 mA max. (parallel use)
Output diagnosis	Yes, with diagnosis LED and error message



5.1.3.2 Digital input/output module DC 722F

Name	Short Description	Article No.
DC 722F	Digital input/output module 16 DI/DO: 24 VDC/0.5 A 2-wire, 24 VDC 200 W TU 715F /TU 716F (terminal unit not included)	3BDH000372R0001

The digital I/O Module DC 722F is installed as a remote expansion module at the FBP Interface Module DC 705F. It has 16 channels with the following features:

- Two 24 V DC 0.5 A sensor power supplies with short-circuit and overload protection
- 16 digital Inputs/Outputs 24 V DC in one groups (2.0...2.7 and 4.0...4.7), each of which can be used
 - as an input,
 - as a transistor output with short-circuit and overload protection with 0.5 A rated current or
 - as a re-readable output (combined input/output) and can be addressed accordingly.



This I/O module cannot be used directly with the CPU module PM 783F or PM 902F and should be used with S700 remote I/O.

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality DC 722F	
Digital Inputs/Outputs	24 digital Inputs/Outputs
Supply voltage	24 V DC
High-speed counter	Integrated, many configurable operating mode
Power supply	Internal: through the expansion bus interface (I/O-Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	For indicating signal statuses, errors and supply voltage

Technical data DC 722F

Process supply voltage UP	
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 – 4.9 for 0 V (ZP)
Rated value	24 V DC
max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
From 24 V DC power supply at the terminals UP/L+ and ZP/M of the CPU/Bus Module	Approx. 1 mA
Current consumption via UP in case of normal operation	50 mA + max. 8 mA per input + max. 0.5 A per output
Inrush current from UP (at power-up)	0.008 A ² s
Max. power dissipation within the module	6 W (outputs not loaded)
Sensor power supply	
Connections	Terminals 1.0...1.3 = +24 V, 1.4...1.7 = 0V Terminals 3.0...3.3 = +24 V, 3.4...3.7 = 0V
Voltage	24 V DC with short-circuit and overload protection
Loadability	Terminals 1.0...1.3, in total max. 0.5 A Terminals 3.0...3.3, in total max. 0.5 A
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without terminal unit)	Approx. 125 g / 4.41 oz.
Mounting position	Horizontal or vertical with limitations (Output load per group is 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs/outputs

Number of channels per module	16
Distribution of the channels into groups	1 group of 16 channels
If the channels are used as inputs	
Connections to the channels C0 to C7	Terminals 2.0 to 2.7
Connections to the channels C8 to C15	Terminals 4.0 to 4.7
If the channels are used as outputs	
Connections to the channels C0 to C7	Terminals 2.0 to 2.7
Connections to the channels C8 to C15	Terminals 4.0 to 4.7
Indication of the input/output signals	One yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Electrical isolation	From the rest of the module

Technical data digital inputs/outputs if used as inputs

Each of the configurable I/O channels is defined as input or output by the user program. This is done through scanning or allocation of the corresponding channel.

Number of channels per module	16 inputs digital
Reference potential for all inputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Input type according to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 VP*
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V *
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from -12 V to +30 V when UPx = 24 V and from -6 V to +30 V when UPx = 30 V.

Technical data digital inputs/outputs if used as outputs	
Number of channels per module	Max. 16 digital outputs
Reference potential for all outputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Common power supply voltage	For all outputs: terminals 1.8...4.8 (plus pole of the process supply voltage, signal name UP)
Output voltage for signal 1	UP (-0.8 V)
Output current	
rated value, per channel	500 mA at UP = 24 V
maximum value (all channels)	8 A
Leakage current with signal 0	< 0.5 mA
Rated protection fuse on UP	10 A fast
Demagnetization when inductive loads are switched off	Via varistors integrated in the module
Switching frequency	
With inductive loads	Max. 0.5 Hz
With lamp loads	Max. 11 Hz with max. 5 W
Short-circuit proofed /overload proofed	Yes
Overload message ($I > 0,7$ A)	Yes, after approx. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit / overload
Resistance to feedback against 24 V signals	Yes
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)



5.1.3.3 Digital input/output module DC 723F

Name	Short Description	Article No.
DC 723F	Digital input/output module 24 DI/DO: 24 VDC/0.5 A 1-wire, 24 VDC 300 W TU 715F /TU 716F (terminal unit not included)	3BDH000373R0001

The digital I/O Module DC 723F is installed as a remote expansion module at the FBP Interface Module DC 705F. It has 24 channels with the following features:

- One 24 V DC 0.5 A sensor power supply with short-circuit and overload protection
- 24 digital Inputs/Outputs 24 V DC in three groups (2.0...4.7), each of which can be used
 - As an input,
 - As a transistor output with short-circuit and overload protection with 0.5 A rated current or
 - As a re-readable output (combined input/output) and can be addressed accordingly.



This I/O module cannot be used directly with the CPU module PM 783F or PM 902F and should be used with S700 remote I/O.

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality DC 723F	
Digital Inputs/Outputs	24 digital Inputs/Outputs
Supply voltage	24 V DC
High-speed counter	Integrated, many configurable operating mode
Power supply	Internal: through the expansion bus interface (I/O-Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	For indicating signal statuses, errors and supply voltage

Technical data DC 723F

Process supply voltage UP	
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 – 4.9 for 0 V (ZP)
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
From 24 V DC power supply at the terminals UP/L+ and ZP/M of the CPU/Bus Module	Approx. 1 mA
Current consumption via UP in case of normal operation	50 mA + max. 8 mA per input + max. 0.5 A per output
Inrush current from UP (at power-up)	0.008 A ² s
Max. power dissipation within the module	6 W (outputs not loaded)
Sensor power supply	
Connections	Terminals 1.0...1.3 = +24 V, 1.4...1.7 = 0V
Voltage	24 V DC with short-circuit and overload protection
Loadability	Terminals 1.0...1.3, in total max. 0.5 A
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without terminal unit)	Approx. 125 g / 4.41 oz.
Mounting position	Horizontal or vertical with limitations (Output load per group is 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs/outputs

Number of channels per module	24
Distribution of the channels into groups if the channels are used as inputs	1 group of 24 channels
Connections to the channels C0 to C7	Terminals 2.0 to 2.7
Connections to the channels C8 to C15	Terminals 3.0 to 3.7
Connections to the channels C16 to C23	Terminals 4.0 to 4.7
If the channels are used as outputs	
Connections to the channels C0 to C7	Terminals 2.0 to 2.7
Connections to the channels C8 to C15	Terminals 3.0 to 3.7
Connections to the channels C16 to C23	Terminals 4.0 to 4.7
Indication of the input/output signals	One yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Electrical isolation	From the rest of the module

Technical data digital inputs/outputs if used as inputs

Each of the configurable I/O channels is defined as input or output by the user program. This is done through scanning or allocation of the corresponding channel.

Number of channels per module	24 inputs digital
Reference potential for all inputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Input type according to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V*
Undefined signal	+5 V...+15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V*
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from -12 V to +30 V when UPx = 24 V and from -6 V to +30 V when UPx = 30 V.

Technical data digital inputs/outputs if used as outputs

Number of channels per module	Max. 24 digital outputs
Reference potential for all outputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Common power supply voltage	for all outputs: terminals 1.8...4.8 (plus pole of the process supply voltage, signal name UP)
Output voltage for signal 1	UP (-0.8 V)
Output current	
Rated value, per channel	500 mA at UP = 24 V
Maximum value (all channels)	8 A
Leakage current with signal 0	< 0.5 mA
Rated protection fuse on UP	10 A fast
Demagnetization when inductive loads are switched off	Via varistors integrated in the module
Switching frequency	
With inductive loads	Max. 0.5 Hz
With lamp loads	Max. 11 Hz with max. 5 W
Short-circuit proofed /overload proofed	Yes
Overload message ($I > 0,7$ A)	Yes, after approx. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit / overload
Resistance to feedback against 24 V signals	Yes
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)



5.1.3.4 Digital input / output module DC 732F

Name	Short Description	Article No.
DC 732F	Digital Input / Output Module 16 DI, 16 DI/DO, 24 VDC / 0.5 A, 1-Wire, 24 VDC 200 W. Without terminal unit.	3BDH000375R0001

The DC 732F module offers 32 channels. 16 channels are assigned as digital inputs, while the remaining 16 channels can be configured as input or as output.

Technical data

Functionality DC 732F	
Digital inputs	16 (24 VDC)
Digital inputs / outputs (configurable)	16 (24 VDC)
LED displays	For signal statuses, errors and supply voltage
External power supply	Via the terminals ZP and UP (process voltage 24 VDC) of the modules terminal unit TU 715F

Technical data DC 732F	
Process supply voltage UP	
Connections	Terminals 1.8 - 4.8 for +24 V (UP) and 1.9 - 4.9 for 0 V (ZP)
Rated value	24 VDC
Max. ripple	5%
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
Internal (via I/O-Bus)	ca. 5 mA at 3.3 VDC
Current consumption from UP at normal operation / with outputs	50 mA + max. 8 mA per input + max. 0.5 A per output
Inrush current from UP (at power up)	0.007 A ² s
Max. power dissipation within the module	6 W (outputs unloaded)
Width x height x depth (without the Terminal Unit)	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch
Weight (without Terminal Unit)	Approx. 125 g / 4.41 Oz.
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data of the digital inputs DC 732F

Number of channels per module	16
Distribution of the channels into groups	1 group of 16 channels
Terminals of the channels I0 to I7	1.0 to 1.7
Terminals of the channels I8 to I15	2.0 to 2.7
Reference potential for all inputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module (I/O-Bus)
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typ. 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 VDC
Signal 0	-3 V...+5 V
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	Typ. 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m / 3280 ft.
Unshielded	600 m / 1968 ft.

Technical data of the configurable digital inputs / outputs DC 732F

Each of the configurable I/O channels can be wired as input or output by the user.

Number of channels per module	16 inputs / outputs (with transistors)
Distribution of the channels into groups	1 group of 16 channels
If the channels are used as inputs	
Channels I16...I23	Terminals 3.0...3.7
Channels I24...I31	Terminals 4.0...4.7
If the channels are used as outputs	
Channels O16...O23	Terminals 3.0...3.7
Channels O24...O31	Terminals 4.0...4.7
Indication of the input / output signals	One yellow LED per channel, the LED is ON when the input / output signal is high (signal 1)
Electrical isolation	From the rest of the module

Technical data of the digital inputs / outputs if used as outputs DC 732F

Number of channels per module	Max. 16 transistor outputs
Reference potential for all outputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Common power supply voltage	For all outputs: terminals 1.8...4.8 (plus pole of the process supply voltage, signal name UP)
Output voltage for signal 1	UP -0.8 V
Output current	
Rated value, per channel	500 mA at UP = 24 V
Maximum value (all channels together)	8 A
Leakage current with signal 0	< 0.5 mA
Rated protection fuse on UP	10 A fast
De-magnetization when inductive loads are switched off	With varistors integrated in the module
Short-circuit proof / overload proof	Yes
Overload message ($I > 0.7$ A)	Yes, after ca. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit / overload
Resistance to feedback against 24 V signals	Yes
Max. cable length	
Shielded	1000 m / 3280 ft.
Unshielded	600 m / 1968 ft.

Technical data of the digital inputs / outputs if used as inputs DC 732F

Number of channels per module	Max. 16 digital inputs
Reference potential for all inputs	Terminals 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typ. 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 VDC
Signal 0	-3 V...+5 V *
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	within -3 V...+5 V *
Ripple with signal 1	within +15 V...+30 V
Max. cable length	
Shielded	1000 m / 3280 ft.
Unshielded	600 m / 1968 ft.

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from - 12 V to + 30 V when UPx = 24 V and from - 6 V to + 30 V when UPx = 30 V.

The configurable channels are defined by the wiring. As you can see from Figure 8, some of the first 16 input channels show the corresponding wiring. For the next 16 configurable channels you see some examples for inputs (channel 16, 23, 24, and 31) and some examples for outputs (channel 19 and 27). Note that the power has to be supplied depending on the planned power consumption as indicated. The I/O bus supplies the power for the modules electronics only.

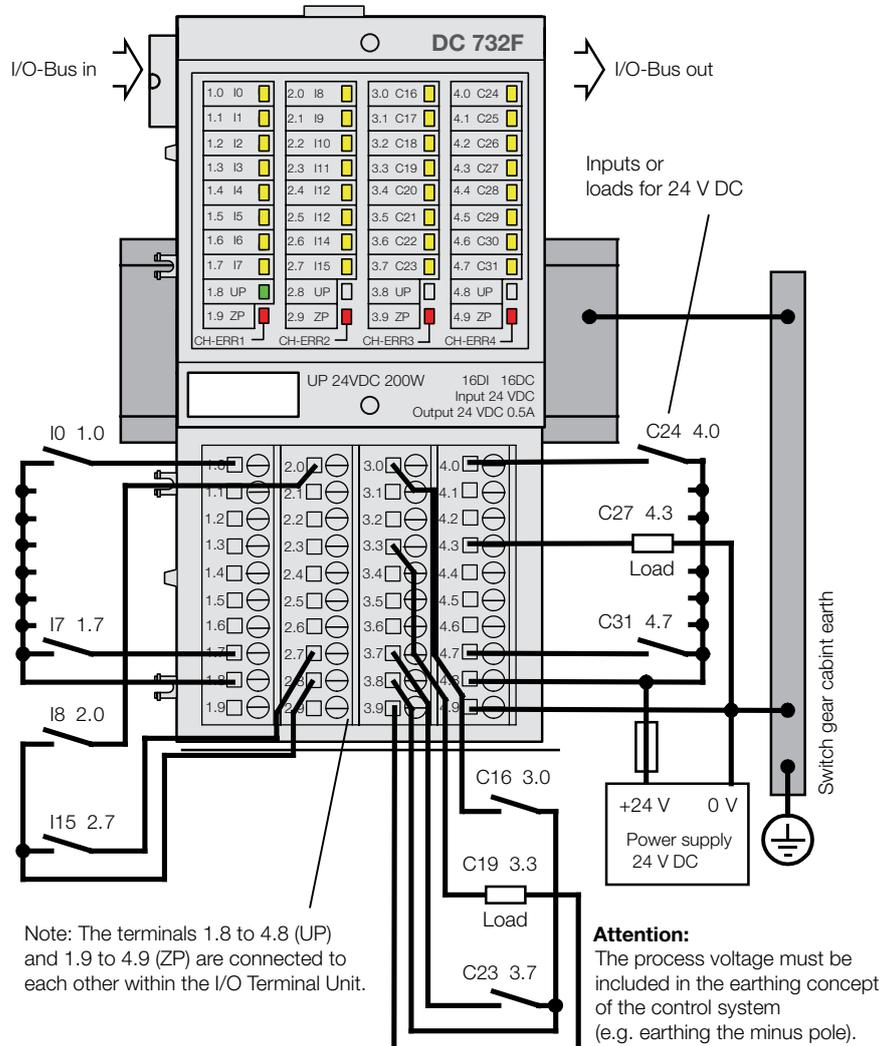


Figure 8: Wiring of DC 732F



5.1.3.5 Digital input module DI 724F

Name	Short Description	Article No.
DI 724F	Digital input module 32 DI: 24 VDC 1-wire, 24 VDC 1 W TU 715F /TU 716F (terminal unit not included)	3BDH000374R0001

The digital I/O module DI 724F can be installed either as direct I/O to an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 32 channels with the following features:

- 32 digital inputs 24V DC in four groups (1.0...4.7)

The technical data correspond to the input values. The inputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality DI 724F	
Digital Inputs	32 digital inputs
Supply voltage	24 V DC
High-speed counter	Integrated, many configurable operating mode
Power supply	Internal: through the expansion bus interface (I/O-Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	For indicating signal statuses, errors and supply voltage
Technical data DI 724F	
Process supply voltage UP	
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 – 4.9 for 0 V (ZP)
Rated value	24 V DC
max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
From 24 V DC power supply at the terminals UP/L+ and ZP/M of the CPU/Bus Module	approx. 1 mA
Current consumption via UP in case of normal operation	50 mA + max. 8 mA per input
Inrush current from UP (at power-up)	0.008 A ² s

Technical data DI 724F	
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch Width x height x depth
Weight (without Terminal Unit)	Approx. 105 g / 3.7 oz.
Mounting position	Horizontal or vertical with limitations (output load per group is 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs	
Number of channels per module	32
Distribution of the channels into groups	1 group of 32 channels
Connections to the channels I0 to I7	Terminals 1.0 to 1.7
Connections to the channels I8 to I15	Terminals 2.0 to 2.7
Connections to the channels I16 to I23	Terminals 3.0 to 3.7
Connections to the channels I24 to I31	Terminals 4.0 to 4.7
Reference potential for all inputs	Terminal 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 8 ms, configurable from 0.1 to 32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)



5.1.3.6 Digital input / output module DX 722F

Name	Short description	Article No.
DX 722F	Digital input / output module 8 DI: 24 VDC 8 DO: relay contacts, 24 VDC, 230 VAC 1/3-wire, 24 VDC 2 W TU 731F /TU 732F (terminal unit not included)	3BDH000383R0001

The digital I/O module DX 722F can be installed either as direct I/O to an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 16 channels with the following features:

- 8 digital inputs 24 V DC in one group (1.0...1.7)
- as well as 8 relay outputs (2.0...2.7), with one switch-over contact each

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the input channels.

Technical data

Functionality DX 722F	
Inputs/outputs	8 digital inputs 8 relay outputs with one switch-over contact each
Relay contact supply voltage	24 V DC
Power supply	internal: through the expansion bus interface (I/O Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	module-wise
LEDs	for indicating signal statuses, errors and supply voltage

Technical data DX 722F	
Process supply voltage UP	
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 – 4.9 for 0 V (ZP)
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
internal (via I/O-Bus)	approx. 1 mA at 24 V DCs
current consumption via UP in case of normal operation	0.05 A + output loads)
inrush current from UP (at power-up)	0.010 A ² s

Technical data DX 722F	
Max. power dissipation within the module	6 W (outputs not loaded)
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without terminal unit)	approx. 300 g/10.58 oz.
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs DX 722F	
Number of channels per module	8
Distribution of the channels into groups	1 group of 8 channels
Connections to the channels I0 to I7	Terminals 1.0 to 1.7
Reference potential for all inputs	Terminal 1.9...4.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type according to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 8 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V
Undefined signal	+5 V... +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	Typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Maximal cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

Technical data relay outputs DX 722F	
Number of channels per module	8 relay outputs
Distribution of the channels into groups	8 groups of 1 channel each
Connection of the channel R0	Terminal 2.0 (common), 3.0 (NO) and 4.0 (NC)
Connection of the channel R1	Terminal 2.1 (common), 3.1 (NO) and 4.1 (NC)
Connection of the channel R6	Terminal 2.6 (common), 3.6 (NO) and 4.6 (NC)
Connection of the channel R7	Terminal 2.7 (common), 3.7 (NO) and 4.7 (NC)
Electrical isolation	Between the channels and from the rest of the module
Indication of the output signals	One yellow LED per channel, the LED is ON when the relay coil is energized
Relay power supply	By UP process voltage
Relay outputs	
Output short-circuit protection	Should be provided externally with a fuse or circuit breaker
Rated protection fuse	6A gL/gG per channel
Output switching capacity	
Resistive load max.	3 A; 3A (120/230V AC), 2A (24 V DC)
Inductive load max.	1.5 A; 1.5A (120/230V AC), 1.5 A (24 V DC)
Lamp load	60 W (230V AC), 10 W (24 V DC)
Life times (cycles)	Mechanical: 300 000; under load: 300 000 (24 V DC at 2 A), 200 000 (120 V AC at 2 A), 100 000 (230 V AC at 3 A)
Spark suppression with inductive AC load	Must be performed externally according to driven load specifications
Demagnetization with inductive DC load	A free-wheeling diode must be circuited in parallel to the inductive load
Switching frequency	
With resistive load	Max. 10 Hz
With inductive load	Max. 2 Hz
Maximal cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)



5.1.3.7 Digital input / output module DX 731F

Name	Short description	Article No.
DX 731F	Digital input / output module 8 DI: 120/230 VAC 4 DO: relay contacts, 24 VDC, 120/230 VAC 2-wire, 24 VDC 2 W TU 731F /TU 732F (terminal unit not included)	3BDH000387R0001

The digital I/O module DX 731F can be installed either as direct I/O to an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 12 channels with the following features:

- 8 digital inputs 230 V DC in two groups (2.0...3.3)
- as well as 4 relay outputs (2.4...2.7), with one switch-over contact each

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module.

Technical data

Functionality DX 731F	
Inputs/outputs	8 digital inputs 4 relay outputs with one switch-over contact each
Supply voltage	230 V AC
Power supply	internal: through the expansion bus interface (I/O Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	module-wise
LEDs	for indicating signal statuses, errors and supply voltage

Technical data DX 731F	
Process supply voltage UP	
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 – 4.9 for 0 V (ZP)
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	
internal (via I/O-Bus)	approx. 1 mA
current consumption via UP in case of normal operation	0.05 A + output loads)
inrush current from UP (at power-up)	0.004 A ² s

Technical data DX 731F	
Max. power dissipation within the module	6 W (outputs not loaded)
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without terminal unit)	approx. 300 g/10.58 oz.
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs DX 731F	
Number of channels per module	8
Distribution of the channels into groups	4 group of 2 channels
Terminals of the channels I0 to I7	Terminals 2.0 to 2.3, 3.0 to 3.3, 4.0 to 4.3
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 2
Input delay (0->1 or 1->0)	Typically 20 ms
Input signal voltage	230 V AC or 120V AC
Signal 0	0 V...40 V AC
Undefined signal	> 40 V AC...< 74 V AC
Signal 1	74 V...265 V AC
Input current per channel	
Input voltage 159 V AC	> 7 mA
Input voltage 40 V AC	< 5 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

Technical data relay outputs DX 731F	
Number of channels per module	4 relay outputs
Distribution of the channels into groups	4 groups of 1 channel each
Connection of the channel R0	Terminal 2.4 (common), 3.4 (NO) and 4.4 (NC)
Connection of the channel R1	Terminal 2.5 (common), 3.5 (NO) and 4.5 (NC)
Connection of the channel R2	Terminal 2.6 (common), 3.6 (NO) and 4.6 (NC)
Connection of the channel R3	Terminal 2.7 (common), 3.7 (NO) and 4.7 (NC)
Electrical isolation	Between the channels and from the rest of the module

Technical data relay outputs DX 731F

Indication of the output signals	one yellow LED per channel, the LED is ON when the relay coil is energized
Relay power supply	By UP process voltage
Relay outputs	
output short-circuit protection	Should be provided externally with a fuse or circuit breaker
rated protection fuse	6A gL/gG per channel
Output switching capacity	
resistive load max.	3 A; 3A (230V AC), 2A (24 V DC)
inductive load max.	1.5 A; 1.5A (230V AC), 1.5 A (24 V DC)
lamp load	60 W (230V AC), 10 W (24 V DC)
Life times (cycles)	mechanical: 300 000;
under load: 300 000 (24 V DC at 2 A), 200 000 (120 V AC at 2 A), 100 000 (230 V AC at 3 A)	
Spark suppression with inductive AC load	must be performed externally according to driven load specifications
Demagnetization with inductive DC load	a free-wheeling diode must be circuited in parallel to the inductive load
Switching frequency	
with resistive load	max. 10 Hz
with inductive load	max. 2 Hz
Max. cable length	
shielded	1000 m (3280.83 ft)
unshielded	600 m (1968.50 ft)



5.3.4 Analog I/O Modules

5.1.4.1 Analog input/output module AC 722F

Name	Short Description	Article No.
AC 722F	Analog input/output module 8 AI/AO: +/-10 V, 0/4-20 mA, RTD 12 Bit + sign, 2-wire, 24 VDC 5 W TU 715F /TU 716F (terminal unit not included)	3BDH000369R0001

The analog input/output AC 722F is installed as a remote expansion module at the FBP Interface Module DC 705F. It has 8 channels with the following features:

- 8 analog inputs/outputs in one group (2.0...2.7 and 3.0...3.7), of which each can be used
 - as an input or
 - as an output



This I/O module cannot be used directly with the CPU module PM 783F and PM 902F and should be used with S700 remote I/O.

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality AC 722F	
8 channels, when used as individually configurable analog inputs	unused (default setting)
	0...10 V
	-10 V...+10 V
	0...20 mA
	4...20 mA
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire), requires 2 channels
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (2-wire)
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (3-wire), requires 2 channels
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire), requires 2 channels
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (2-wire)
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (3-wire), requires 2 channels
	0...10 V with differential inputs, requires 2 channels
-10 V...+10 V with differential inputs, requires 2 channels digital signals (digital input)	
4 channels, when used as individually configurable analog outputs	unused (default setting)
	-10 V...+10 V
	0...20 mA 4...20 mA
4 channels, when used as individually configurable analog outputs	Unused (default setting)
	-10 V...+10 V
Resolution of the analog channels	Voltage -10 V... +10 V: 12 bits plus sign Voltage 0...10 V: 12 bits Current 0...20 mA, 4...20 mA: 12 bits Temperature: 0.1 °C/0.18 °F
Power supply	Internal: through the expansion bus interface (I/O Bus) external: via the terminals (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	10 LEDs for signals and error messages

Technical data AC 722F	
Process voltage	
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption from UP at normal operation	0.10 A + output load
Inrush current from UP (at power up)	0.040 A ² s
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 - 4.9 for 0 V (ZP)
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m (328.08 ft)
Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range	Typically 0.5 %, max. 1 %
Dimensions (without the Terminal Unit)	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight	300 g/10.58 oz.
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet

Technical data analog inputs AC 722F	
Number of channels per module	8
Distribution of channels into groups	1 group of 8 channels
Connections to channels C0- to C7-	Terminals 2.0 to 2.7
Connections to channels C0+ to C7+	Terminals 3.0 to 3.7
Type of Inputs	Bipolar (not in the case of current or Pt100/Pt1000/Ni1000)
Electrical isolation	Against internal supply and other modules
Configurability	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000 (each input can be configured individually)
Channel input resistance	Voltage: > 100 kΩ, current: approx. 330 Ω
Time constant of the input filter	Voltage: 100 μs, current: 100 μs
Indication of the input signals	One LED per channel
Conversion cycle	2 ms (for 8 inputs + 8 outputs), with Pt/Ni... 1 s
Resolution	Range 0...10 V: 12 bits Range -10...+10 V: 12 bits + sign Range 0...20 mA: 12 bits Range 4...20 mA: 12 bits
Unused voltage inputs	Are configurable as “unused”
Surge protection	Yes

Technical data analog inputs AC 722F if they are used as digital inputs

Number of channels per module	max. 8
Distribution of channels into groups	1 group of 8 channels
Connections to channels C0+ to C7+	Terminals 3.0 to 3.7
Reference potential for the inputs	Terminals 1.8 to 4.8 (ZP)
Input signal delay	Typically 8 ms, configurable from 0.1 to 32 ms
Indication of the input signals	One LED per channel
Input signal voltage	24 V DC
Signal 0	-30 V...+5 V
Undefined signal	+5 V...+13 V
Signal 1	+13 V...+30 V
Input current per channel	
Input voltage +24 V	Typically 7 mA
Input voltage +5 V	Typically 1.4 mA
Input voltage +15 V	Typically 4.3 mA
Input voltage +30 V	< 9 mA
Input resistance	Approx. 3.5 kΩ

Technical data for analog outputs AC 722F

Number of channels per module	8, all channels for voltage, the first 4 are also for current
Distribution of channels into groups	1 group of 8 channels
Channels C0-...C7-	Terminals 2.0...2.7
Channels C0+...C7+	Terminals 3.0...3.7
Output type	Bipolar with voltage, unipolar with current
Electrical isolation	Against internal supply and other modules
Configurability	-10...+10 V, 0...20 mA, 4...20 mA (each output can be configured individually), current output in channels 0...3 only
Output resistance (load), as current output	0...500 Ω
Output load capacity, as voltage output	Max. ±10 mA
Indication of the output signals	One LED per channel
Resolution	12 bits (+ sign)
Unused outputs	Can be left open circuited



5.1.4.2 Analog input module AI 723F

Name	Short Description	Article No.
AI 723F	Analog input module 16 AI: +-10 V, 0/4-20 mA 24 VDC, Pt100 12 bit + Sign, 2-wire, 24 VDC 5 W. Without terminal unit.	3BDH000376R0001

The AI 723F module comes with 16 input channels. Each of these channels can be individually configured depending on its intended usage.

Possible applications are:

- Sensing a voltage (0...10 V or -10...+10 V)
- Sensing a current (0...20 mA or 4...20 mA)
- Temperature measurement (platinum or nickel resistance thermometers Pt100, Pt1000, Ni1000)
- For 3-wired connections two channels are required

Technical data

Functionality AI 723F	
Inputs	16 analog inputs, individually configurable for Unused (default setting)
	0...10 V
	-10 V...+10 V
	0...20 mA
	4...20 mA
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) 2-wire or 3-wire, requires 2 channels
	Pt100, -50 °C (-58 °F)...+70 °C (+158 °F) 2-wire or 3-wire, requires 2 channels
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) 2-wire or 3-wire, requires 2 channels
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) 2-wire or 3-wire, requires 2 channels
	0...10 V with differential inputs, requires 2 channels
	-10 V...+10 V with differential inputs, requires 2 channels
	Digital signals (digital input)

Technical data AI 723F

LED displays	19 LEDs for signals and error indication
Internal power supply	Through the expansion bus interface (I/O-Bus)
External power supply	Via the terminals ZP and UP (process voltage 24 VDC) of TU 715F
Process voltage	
Rated value	24 VDC
Max. ripple	5%
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Per module
Current consumption from UP at normal operation	0.15 A
Inrush current from UP (at power up)	0.050 A ² s
Connections	Terminals 1.8 - 4.8 for +24 V (UP) and 1.9 - 4.9 for 0 V (ZP)
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m / 328 ft.
Conversion error of the analog values caused by nonlinearity, adjustment error at factory and resolution within the normal range	Typ. 0.5 %, max. 1 %
Width x height x depth (without the Terminal Unit)	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch
Weight	300 g / 10.52 oz
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data of the analog inputs AI 723F	
Number of channels per module	16
Distribution of channels into groups	2 groups of 8 channels each
Connections of the channels I0- to I7- Connections of the channels I0+ to I7+	Terminals 1.0 to 1.7 Terminals 2.0 to 2.7
Connections of the channels I8- to I15- Connections of the channels I8+ to I15+	Terminals 3.0 to 3.7 Terminals 4.0 to 4.7
Electrical isolation	Against internal supply and other modules
Configuration	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000 (each channel can be configured individually)
Channel input resistance	Voltage: > 100 kOhm, current: ca. 330 Ohm
Time constant of the input filter	Voltage: 100 µs, current: 100 µs
Indication of the input signals	One LED per channel
Resolution	Range 0...10 V: 12 bits Range -10...+10 V: 12 bits + sign Range 0...20 mA: 12 bits Range 4...20 mA: 12 bits Temperature: 0.1 °C / 0.18 °F
Overvoltage protection	Yes

Technical data of the analog inputs, if they are used as digital inputs AI 723F	
Number of channels per module	Max. 16
Distribution of channels into groups	2 groups of 8 channels each
Connections of the channels I0+ to I7+ Connections of the channels I8+ to I15+	Terminals 2.0 to 2.7 Terminals 4.0 to 4.7
Reference potential for the inputs	Terminals 1.8 to 4.8 (ZP)
Input signal delay	Typ. 8 ms
Indication of the input signals	One LED per channel
Input signal voltage	24 VDC
Signal 0	-30 V...+5 V
Signal 1	+13 V...+30 V

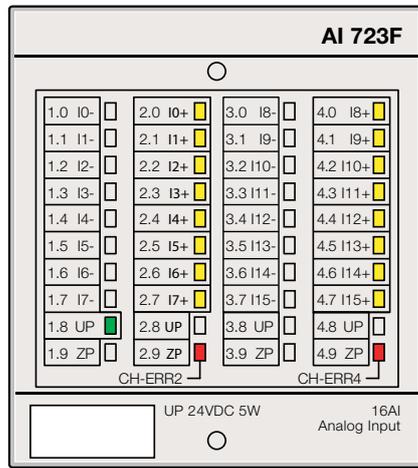


Figure 9: AI 723F

Two example of wiring are shown with the following figures. Figure 10 shows wiring for a current input for 4...20 mA while Figure 11 shows a voltage sensor with differential inputs. Note that the latter one needs two adjacent channels, starting with an even channel number.

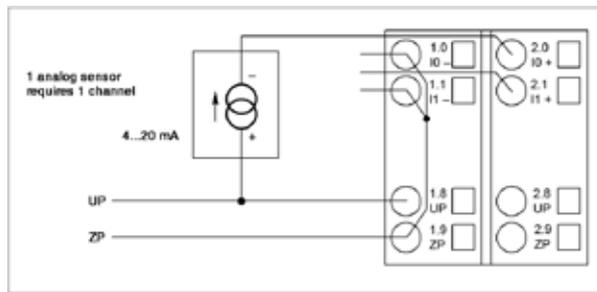


Figure 10: Connection of passive-type analog sensors (current)

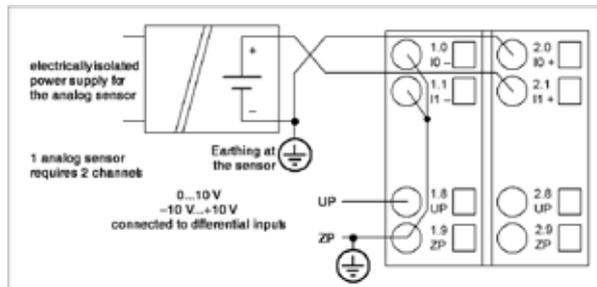


Figure 11: Connection of active-type analog sensors (voltage) to differential inputs

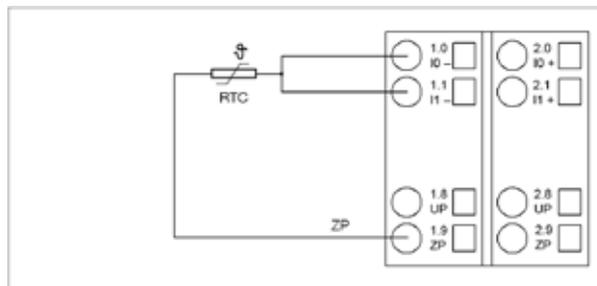


Figure 12: 3 wire RTC



5.1.4.3 Analog input module AI 731F (Thermocouple)

Name	Short Description	Article No.
AI 731F	Analog input module 8 AI: TC, RTD, mV/V, mA, kOhm and 24 VDC 15 Bit + sign, 2-, 3- and 4-wire, 24 VDC 5 W TU 715F /TU 716F (terminal unit not included)	3BDH000385R0001

The analog input module AI 731F can be installed as a local expansion module on a AC 700F or AC 900F CPU. This module can also be used as a remote expansion module at the Interface Module DC 705F. It has 8 channels with the following features:

- 8 configurable analog inputs in two groups (1.0...2.7 and 2.0...2.7 as well as 3.0...3.7 and 4.0...4.7)

Technical data

Functionality AI 731F	
Input	8 analog inputs, individually configurable for: unused (default setting)
	0...5V, 0...10 V
	-50...+50 mV, -500...+500 mV
	-1...+1 V, -5...+5 V, -10 V...+10 V
	0...20 mA
	4...20 mA
	-20...+20 mA
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (2-wire)
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (3-wire)
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (4-wire)
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (2-wire), resolution 0.01 K
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (3-wire), resolution 0.01 K
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (4-wire), resolution 0.01 K
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire)
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (4-wire)
	Pt100, -200 °C (-328°F)...+850 °C (+1562°F) (2-wire)
	Pt100, -200 °C (-328°F)...+850 °C (+1562°F) (3-wire)
	Pt100, -200 °C (-328°F)...+850 °C (+1562°F) (4-wire)
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire)
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (4-wire)
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (2-wire)
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (3-wire)
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (4-wire)
	Cu50 1.426, -50 °C (-58 °F)...+200 °C (+392°F) (2-wire)
	Cu50 1.426, -50 °C (-58 °F)...+200 °C (+392°F) (3-wire)

Functionality AI 731F

	Cu50 1.426, -50 °C (-58 °F)...+200 °C (+392°F) (4-wire)
	Cu50 1.428, -200 °C (-328°F)...+200 °C (+392°F) (2-wire)
	Cu50 1.428, -200 °C (-328°F)...+200 °C (+392°F) (3-wire)
	Cu50 1.428, -200 °C (-328°F)...+200 °C (+392°F) (4-wire)
	0...50 kOhm
	Thermocouples of types J, K, T, N, S
	digital signals (digital input)
Resolution of the analog channels	Voltage -1...+1V, -5...+5V, -10 V... +10 V: 15 bits plus sign Voltage 0...5 V, 0...10 V: 15 bits Current 0...20 mA, 4...20 mA, -20...+20 mA: 15 bits Temperature: 0.1 °C (0.18 °F), 0.01°C at Pt100 -50°C...+70°C
Power supply	internal: through the expansion bus interface (I/O Bus) external: via the terminals (process voltage 24 V DC)
Potential separation	module-wise
LEDs	11 LEDs for signals and error messages

Technical data AI 731F

Process voltage	
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Power consumption through UP during normal operation	130 mA (depending on output loads)
Connections	Terminals 1.8, 2.8, 3.8, and 4.8 for +24 V (UP) as well as 1.9, 2.9, 3.9 and 4.9 for 0 V (ZP))
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m (328.08 ft)
Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range	Typically 0.5 %, max. 1 %
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight	Approx. 130 g / 4.6 oz
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data analog inputs AI 731F

Number of channels per module	8
-------------------------------	---

Technical data analog inputs AI 731F	
Distribution of channels into groups	2 groups of 4 channels each
Connections to the channels I0- to I3	Terminals 1.0 to 1.7 and terminals 2.0 to 2.7
Connections to the channels I4- to I7-	Terminals 3.0 to 3.7 and Terminals 4.0 to 4.7
Type of inputs	bipolar (not in the case of current or Pt100/Pt1000/Ni1000/Cu50/resistor)
Electrical isolation	against internal supply and other modules
Configurability	Digital input, -50...+50 mV, -500...+500 mV, -1...+1V, -5...+5V, -10...+10V, 0...+5V, 0...+10V, -20...+20mA, 0/4...20 mA, Pt100/1000, Ni1000, Cu50, resistor, thermocouple types J, K, N,S,T(each input can be configured individually)
Channel input resistance	Voltage: > 100 k Ω , current: approx. 330 Ω
Time constant of the input filter	Line-frequency suppression 50 Hz, 60 Hz, none
Indication of the input signals	one yellow LED per channel
Conversion cycle	1ms (none), 100ms (60 Hz), 120ms(50 Hz) per channel
Resolution	Range unipolar 15 bits
	Range bipolar 15 Bit + sign
Unused voltage inputs	are configured as "unused"
Unused current inputs	have a low resistance, can be left open-circuited
Surge protection	Yes

Technical data analog inputs AI 731F, if used as digital inputs	
Number of channels per module	Max. 8
Distribution of channels into groups	2 groups of 4 channels each
Connections to channels I0+ to I3+	Terminals 2.0, 2.2, 2.4, 2.6
Connections to channels I4+ to I7+	Terminals 4.0, 4.2, 4.4, 4.6
Reference potential for the inputs	Terminals 1.8, 2.8, 3.8 and 4.8 (ZP)
Input signal delay	Typically 2 ms
Indication of the input signals	One LED per channel
Input signal voltage	24 V DC
Signal 0	-30 V...+5 V
Undefined signal	+5 V...+13 V
Signal 1	+13 V...+30 V
Input current per channel	
Input voltage +24 V	typically 5mA
Input voltage +5 V	typically 1mA
Input voltage +15 V	typically 3.1 mA
Input voltage +30 V	< 7 mA
Input resistance	approx. 4.8 k Ω

5.1.4.4 Analog output module AO 723F



Name	Short Description	Article No.
AO 723F	Analog output module 16 AO: +-10 V, 0/4-20 mA max. 8 AO usable as current outputs 12 Bit + sign, 2-wire, 24 VDC 8 W TU 715F /TU 716F (terminal unit not included)	3BDH000384R0001

The analog output module AO 723F is installed either as direct I/O beside an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 16 channels with the following features:

- 16 configurable analog outputs in two groups (1.0...2.7 and 3.0...4.7)

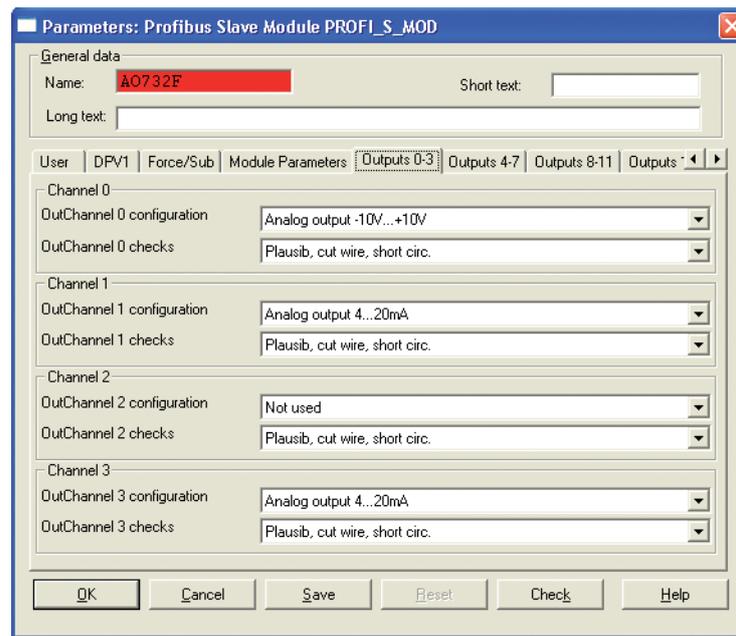


Figure 13: AO 723F output configuration using predefined template; configurable channels

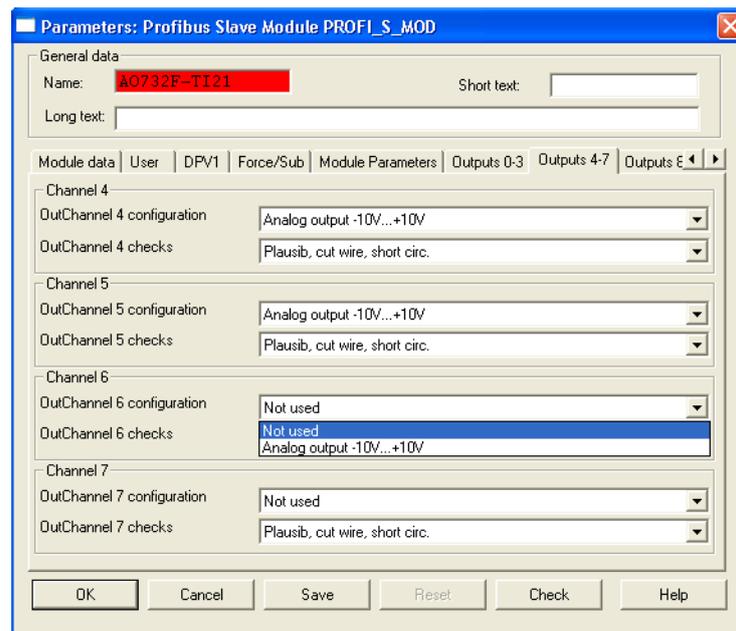


Figure 14: Output group 2 with voltage only channels

Technical data

Functionality AO 723F

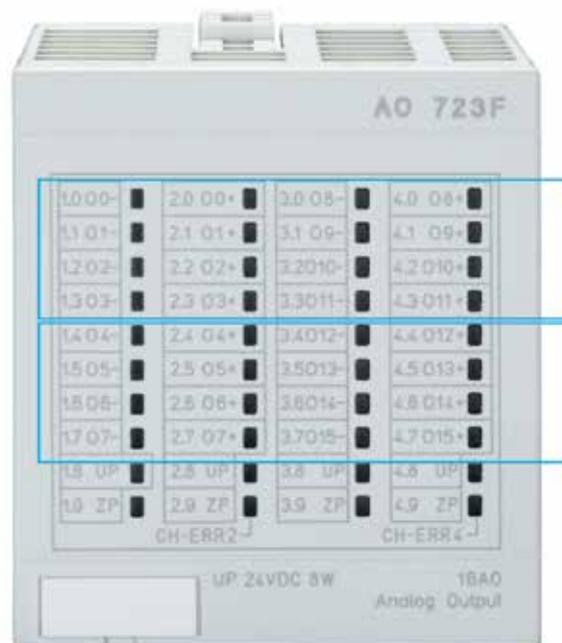
Outputs	16 analog outputs, individually configurable for: unused (default setting) -10 V...+10 V 0...20 mA 4...20 mA
Resolution of the analog channels	Voltage 10 V... +10 V: 12 bits plus sign Current 0...20 mA, 4...20 mA: 12 bits Temperature: 0.1 °C (0.18 °F)
Power supply	internal: through the expansion bus interface (I/O Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	module-wise
LEDs	19 LEDs for signals and error messages

Technical data AO 723F

Process voltage	
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption from UP at normal operation	0.15 A + output load
Inrush current from UP (at power up)	0.020 A ² s
Connections	Terminals 1.8 – 4.8 for +24 V (UP) and 1.9 - 4.9 for 0 V (ZP)
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m (328.08 ft)
Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range	typically 0.5 %, max. 1 %
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without the terminal unit)	approx. 300 g/10.58 oz.
Mounting position	horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	the natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data of analog outputs AO 723F

Number of channels per module	16, O0...O3 and O8...O11 for voltage and current, and channels O4...7 and O12...15 only for voltage
Distribution of channels into groups	2 group of 8 channels
Channels O0-...O7-	Terminals 1.0...1.7
Channels O0+...O7+	Terminals 2.0...2.7
Channels O8-...O15-	Terminals 3.0...3.7
Channels O8+...O15+	Terminals 4.0...4.7
Output type	bipolar with voltage, unipolar with current
Electrical isolation	against internal supply and other modules
Configurability	-10...+10 V, 0...20 mA, 4...20 mA (each output can be configured individually), current output in channels 0...3 only
Output resistance (load), as current output	0...500 Ω
Output load capacity, as voltage output	max. ± 10 mA
Indication of the output signals	one LED per channel
Resolution	12 bits (+ sign)
Unused outputs	can be left open circuited



Each channel is configurable as unused, voltage or current

Each channel is configurable as unused or voltage



5.1.4.5 Analog input/output module AX 721F

Name	Short Description	Article No.
AX 721F	Analog input/output module 4 AI: +-10 V, 0/4-20 mA, RTD, 24 VDC 4 AO: +-10 V, 0/4-20 mA 12 Bit + sign, 2-wire, 24 VDC 5 W TU 715F /TU 716F (terminal unit not included)	3BDH000370R0001

The analog input/output AX 721F can be installed either as direct I/O beside an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 8 channels with the following features:

- 4 configurable analog inputs in one group (1.0...2.3)
- 4 configurable analog outputs in one group (3.0...4.3)

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality AX 721F	
Inputs	4 analog inputs, individually configurable for: unused (default setting)
	0...10 V
	-10 V...+10 V
	0...20 mA
	4...20 mA
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire), requires 2 channels
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (2-wire)
	Pt100, -50 °C (-58 °F)...+70 °C (+158°F) (3-wire), requires 2 channels
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (2-wire)
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) (3-wire), requires 2 channels
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (2-wire)
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) (3-wire), requires 2 channels
	0...10 V with differential inputs, requires 2 channels
-10 V...+10 V with differential inputs, requires 2 channels digital signals (digital input)	
Outputs	4 analog outputs, individually configurable for: unused (default setting)
	0...10 V
	-10 V...+10 V
	0...20 mA
	4...20 mA

Functionality AX 721F

Resolution of the analog channels	Voltage -10 V... +10 V: 12 bits plus sign Voltage 0...10 V: 12 bits Current 0...20 mA, 4...20 mA: 12 bits
Power supply	Temperature: 0.1 °C/0.18 °F internal: through the expansion bus interface (I/O Bus) external: via the terminals (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	11 LEDs for signals and error messages

Technical data AX 721F

Process voltage	
Rated value	24 V DC
Max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption from UP at normal operation	0.10 A + output load
Inrush current from UP (at power up)	0.020 A ² s
Connections	Terminals 1.8, 2.8, 3.8 and 4.8 for +24 V (UP) and 1.9, 2.9, 3.9 and 4.9 for 0 V (ZP)
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m (328.08 ft)
Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range	Typically 0.5 %, max. 1 %
Dimensions (without the Terminal Unit)	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight	300 g/10.58 oz.
Mounting position	Horizontal or vertical with limitations (output load per group 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet

Technical data analog inputs AX 721F	
Number of channels per module	4
Distribution of channels into groups	1 group of 4 channels
Connections to channels I0- to I3-	Terminals 1.0 to 1.3
Connections to channels I0+ to I3+	Terminals 2.0 to 2.3
Type of Inputs	Bipolar (not in the case of current or Pt100/ Pt1000/Ni1000)
Electrical isolation	Against internal supply and other modules
Configurability	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000 (each input can be configured individually)
Channel input resistance	Voltage: > 100 k Ω , current: approx. 330 Ω
Time constant of the input filter	Voltage: 100 μ s, current: 100 μ s
Indication of the input signals	one LED per channel
Conversion cycle	2 ms (for 8 inputs + 8 outputs), with Pt/Ni... 1 s
Resolution	Range 0...10 V: 12 bits Range -10...+10 V: 12 bits + sign Range 0...20 mA: 12 bits Range 4...20 mA: 12 bits
Unused voltage inputs	Are configurable as "unused"
Unused current inputs	Have a low resistance, can be left open circuited
Surge protection	Yes

Technical data analog inputs if they are used as digital inputs AX 721F	
Number of channels per module	Max. 4
Distribution of channels into groups	1 group of 4 channels
Connections to channels I0+ to I3+	Terminals 2.0 to 2.3
Reference potential for the inputs	Terminals 1.8, 2.8, 3.8 and 4.8 (ZP)
Input signal delay	Typically 8 ms, configurable from 0.1 to 32 ms
Indication of the input signals	One LED per channel
Input signal voltage	24 V DC
Signal 0	-30 V...+5 V
Undefined signal	+5 V...+13 V
Signal 1	+13 V...+30 V
Input current per channel	
Input voltage +24 V	Typically 7 mA
Input voltage +5 V	Typically 1.4 mA
Input voltage +15 V	Typically 4.3 mA
Input voltage +30 V	< 9 mA
Input resistance	Approx. 3.5 k Ω

Technical data analog outputs AX 721F

Number of channels per module	4, all channels for voltage, the first 4 are also for current
Distribution of channels into groups	1 group of 4 channels
Channels O0-...O3-	Terminals 3.0...3.3
Channels O0+...O3+	Terminals 4.0...4.3
Output type	bipolar with voltage, unipolar with current
Electrical isolation	against internal supply and other modules
Configurability	-10...+10 V, 0...20 mA, 4...20 mA (each output can be configured individually), current output in channels 0...3 only
Output resistance (load), as current output	0...500 Ω
Output load capacity, as voltage output	max. ± 10 mA
Indication of the output signals	one LED per channel
Resolution	12 bits (+ sign)
Unused outputs	can be left open circuited



5.1.4.6 Analog input / output module AX 722F

Name	Short Description	Article No.
AX 722F	Analog input / output module 8 AI: +-10 V 0/4-20 mA 24 VDC, Pt100. 8 AO: +-10 V 0/4-20 mA 24 VDC. 12 bit + Sign, 2-wire, 24 VDC 5 W. Without terminal unit.	3BDH000377R0001

The AX 722F module offers even more flexibility, as it combines analog input and output channels in one module with 16 channels.

Eight of these channels can be individually configured as inputs, which can again sense voltage, current, or temperatures.

Furthermore four channels can be configured as analog voltage outputs (-10 V to +10 V) or analog current outputs (0 ... 20 mA or 4 ... 20 mA) and the remaining four channels can provide voltage signals in the range from -10 V to +10 V.

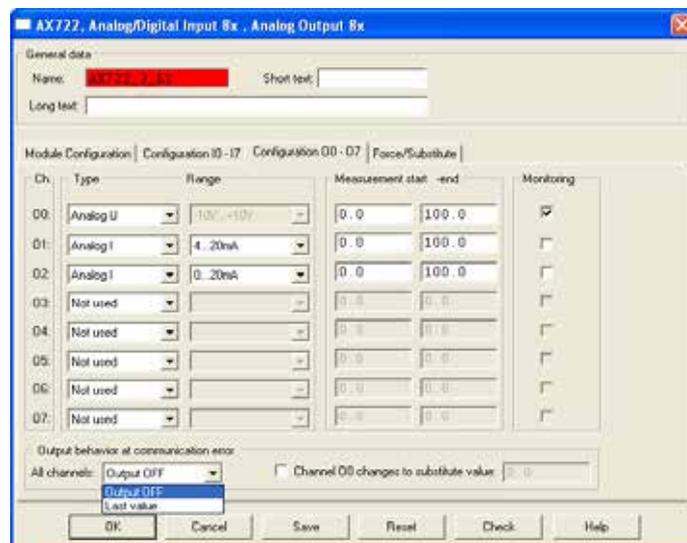
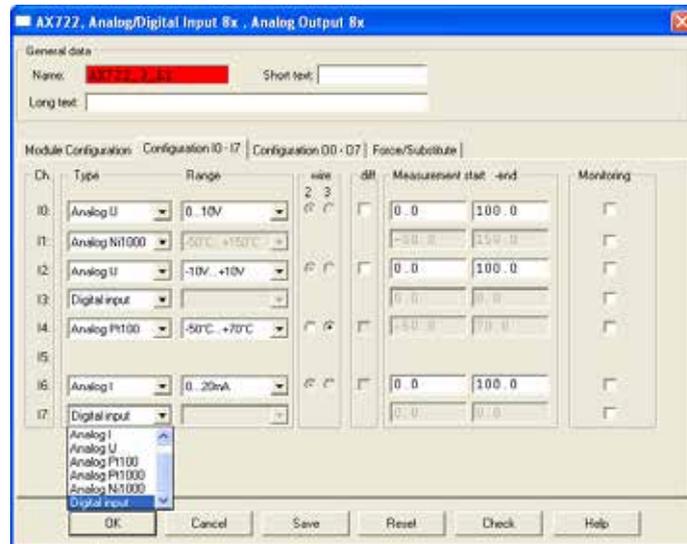


Figure 15: AX 722F options

Technical data

Functionality AX 722F	
8 analog inputs, (channels I0 - I7) individually configurable for	Unused (default setting)
	0...10 V
	-10 V...+10 V
	0...20 mA
	4...20 mA
	Pt100, -50 °C (-58 °F)...+400 °C (+752 °F) 2-wire or 3-wire, requires 2 channels
	Pt100, -50 °C (-58 °F)...+70 °C (+158 °F) 2-wire or 3-wire, requires 2 channels
	Pt1000, -50 °C (-58 °F)...+400 °C (+752 °F) 2-wire or 3-wire, requires 2 channels
	Ni1000, -50 °C (-58 °F)...+150 °C (+302 °F) 2-wire or 3-wire, requires 2 channels
	0...10 V with differential inputs, requires 2 channels
-10 V...+10 V with differential inputs, requires 2 channels	
Digital signals (digital input)	
4 analog outputs, (channels O0 - O3) individually configurable for	Unused (default setting)
	-10 V...+10 V
	0...20 mA 4...20 mA
4 analog outputs, (channels O4 - O7) individually configurable for	unused (default setting)
	-10 V...+10 V
Technical data AX 722F	
LED displays	19 LEDs for signals and error indication, where the brightness depends on the current (or signal level)
Internal power supply	Through the expansion bus interface (I/O-Bus)
External power supply	Via the terminals ZP and UP (process voltage 24 VDC) of TU 715F
Process voltage	
Rated value	24 VDC
Max. ripple	5%
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption from UP at normal operation	0.10 A output loads
Inrush current from UP (at power up)	0.020 A ² s
Connections	Terminals 1.8 - 4.8 for +24 V (UP) and 1.9 - 4.9 for 0 V (ZP)

Technical data AX 722F	
Max. length of analog cables, conductor cross section > 0.14 mm ² (~26 AWG)	100 m / 328 ft.
Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range	Typ. 0.5 %, max. 1 %
Width x height x depth	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inches
Weight (without the Terminal Unit)	approx. 300 g / 10.58 oz.
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data of the analog inputs AX 722F	
Number of channels per module	8
Distribution of the channels into groups	1 group of 8 channels
Connections of the channels I0- to I7-	Terminals 1.0 to 1.7
Connections of the channels I0+ to I7+	Terminals 2.0 to 2.7
Electrical isolation	Against internal supply and other modules
Configuration	0...10 V, -10...+10 V, 0/4...20 mA, Pt100/1000, Ni1000 (each channel can be configured individually)
Channel input resistance	Voltage: > 100 kOhm, current: ca. 330 Ohm
Time constant of the input filter	Voltage: 100 µs, current: 100 µs
Indication of the input signals	One LED per channel
Conversion cycle	2 ms (for 8 inputs + 8 outputs), with Pt / Ni...1 s
Resolution	Range 0...10 V: 12 bits Range -10...+10 V: 12 bits + sign Range 0...20 mA: 12 bits Range 4...20 mA: 12 bits Temperature : 0.1 °C / 0.18 °F
Unused voltage inputs	Are configured as „unused“
Unused current inputs	Have a low resistance, can be left open-circuited
Overvoltage protection	Yes

Technical data of the analog inputs, if they are used as digital inputs AX 722F	
Number of channels per module	Max. 8
Distribution of channels into groups	1 group of 8 channels
Connections of the channels I0+ to I7+	Terminals 2.0 to 2.7
Reference potential for the inputs	Terminals 1.8 to 4.8 (ZP)
Input signal delay	Typ. 8 ms
Indication of the input signals	One LED per channel
Input signal voltage	24 VDC
Signal 0	-30 V...+5 V
Signal 1	+13 V...+30 V

Technical data of the analog outputs AX 722F

Number of channels per module	8, all channels for voltage, the first 4 channels also for current
Distribution of channels into groups	1 group of 8 channels
Channels 00-...07- Channels 00+...07+	Terminals 3.0...3.7 Terminals 4.0...4.7
Output type	Bipolar with voltage, unipolar with current
Electrical isolation	Against internal supply and other modules
Configurability	-10...+10 V, 0...20 mA, 4...20 mA (each output can be configured individually), current outputs only channels 0...3
Output resistance (load), as current output	0...500 Ohm
Output loadability, as voltage output	max. ± 10 mA
Indication of the output signals	One LED per channel, where the brightness depends on the current (or signal level)
Resolution	12 bits (+ sign)
Unused outputs	Can be left open-circuited



5.3.5 Digital/Analog I/O module

5.1.5.1 Digital / analog module DA 701F

Name	Short Description	Article No.
DA 701F	Digital / analog module 16 DI: 24 VDC 8 DI/DO: 24 VDC/0.5 A 4 AI: +-10 V 0/4-20 mA, RTD , 24 VDC 2 AO: +-10 V, 0/4-20 mA 12 Bit + sign, 1-wire, 24 VDC 200 W TU 715F /TU 716F (terminal unit not included)	3BDH000371R0001

The digital / analog I/O module DA 701F can be installed either as direct I/O beside an AC 700F or AC 900F CPU or as remote I/O module for any Profibus remote I/O system. It has 30 channels with the following features:

- 16 digital inputs, 24 V DC
- 8 configurable digital inputs/outputs 24 V DC, 0.5 A max.
- 4 analog inputs, voltage, current and RTD, resolution 12 bits plus sign
- 2 analog outputs, voltage and current, resolution 12 bits plus sign

The technical data correspond to the input and output values. The inputs and outputs are electrically isolated from the other electronic circuitry of the module. There is no potential separation between the channels.

Technical data

Functionality DA 701F	
Digital Inputs	16 (24 V DC; delay time configurable via software)
Configurable digital inputs/outputs	8 (24 V DC, 0.5 A max)
Analog inputs	4 (configurable via software), resolution 12 bits plus sign, voltage, current and RTD input
Analog outputs	2 (configurable via software), resolution 12 bits plus sign, voltage, current and RTD output
Power supply	Internal: through the expansion bus interface (I/O-Bus) external: via the terminals ZP and UP (process voltage 24 V DC)
Potential separation	Module-wise
LEDs	For system displays, indicating signal statuses, errors and power supply

Technical data DA 701F

Process supply voltage UP	
Connections	Terminals 1.8, 2.8, 3.8 and 4.8 for +24 V (UP) and 1.9, 2.9, 3.9 and 4.9 for 0 V (ZP)
Rated value	24 V DC
max. ripple	5 %
Protection against reversed voltage	Yes
Rated protection fuse on UP	10 A fast
Electrical isolation	Yes, per module
Current consumption	0.07 A + max. 0.5 A per output
From UP	Approx. 1 mA at 24 V DC
From 24 V DC power supply at the terminals UP/L+ and ZP/M of the CPU/Bus Module	Approx. 5 mA
Inrush current from UP (at power-up)	0.04 A ² s
Max. power dissipation within the module	6 W (outputs not loaded)
Dimensions	67.5 x 76 x 54 mm / 2.66 x 2.99 x 2.13 inch width x height x depth
Weight (without Terminal Unit)	Approx. 125g / 4.41 oz.
Mounting position	Horizontal or vertical with limitations (Output load per group is 50 % at 40°C (104°F))
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the mounting cabinet.

Technical data digital inputs DA 701F

Number of channels per module	16
Distribution of the channels into groups	2 group of 8 channels
Connections to the channels DI0 to DI7	Terminals 1.0 to 1.7
Connections to the channels DI8 to DI15	Terminals 2.0 to 2.7
Reference potential for all inputs	Terminal 1.9...3.9 (minus pole of the process supply voltage, signal name ZP)
Electrical isolation	From the rest of the module
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 0.1 ms, configurable from 0.1...32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 2 mA

Technical data digital inputs DA 701F	
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

Technical data digital inputs / outputs DA 701F	
Number of channels per module	8 inputs/outputs (with transistors)
Distribution of the channels into groups	1 groups of 8 channel
If channels are used as inputs:	
Channels DC16...DC23	Terminals 4.0...4.7
If channels are used as outputs:	
Channels DC16...DC23	Terminals 4.0...4.7
Indications of the input/output signals	1 yellow LED per channel, the LED is ON when the input/output signal is high (signal 1)
Electrical isolation	Yes, per module

Technical data digital inputs / outputs DA 701F if used as inputs	
Number of channels per module	8
Distribution of the channels into groups	1 groups of 8 channel
Channels DC16...DC23	Terminals 4.0...4.7
Reference potential for all inputs	Terminals 1.9...4.9 (Minus pole of the supply voltage, signal name ZP)
Indication of the input signals	1 yellow LED per channel, the LED is ON when the input signal is high (signal1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typically 0.1 ms, configurable from 0.1...32 ms
Input signal voltage	24 V DC
Signal 0	-3 V...+5 V
Undefined signal	> +5 V...< +15 V
Signal 1	+15 V...+30 V
Ripple with signal 0	Within -3 V...+5 V
Ripple with signal 1	Within +15 V...+30 V
Input current per channel	
Input voltage +24 V	Typically 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 2 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

* Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between UPx and the input signal may not exceed the clamp voltage of the varistor. The varistor limits the voltage to approx. 36 V. Following this, the input voltage must range from -12 V to +30 V when UPx = 24 V and from -6 V to +30 V when UPx = 30 V.

Technical data digital inputs / outputs DA 701F if used as outputs

Number of channels per module	8
Distribution of the channels into groups	1 groups of 8 channel
Channels DC16...DC23	Terminals 4.0...4.7
Reference potential for all outputs	Terminals 1.9...4.9 (Minus pole of the supply voltage, signal name ZP)
Common power supply voltage	For all output terminals 1.8, 2.8, 3.8 and 4.8 (plus pole of the supply voltage, signal name UP)
Output voltage for signal 1	UP (-0.8 V)
Output current	
Rated value per channel	500 mA @ UP = 24 V
Max. value (all channels together)	4 A
Leakage current with signal 0	<0.5 mA
Fuse for UP	10 A fast
Demagnetization with inductive DC load	Via internal varistors
Output switching frequency	
With inductive loads	Max. 0.5 Hz
With lamp loads	11Hz max. @ 5W max.
Overload message (I >0.7 A)	Yes
Output current limitation	Yes, after approx. 100 ms
Resistance to feedback against 24 V signals	Yes (Software controlled supervision)
Max. cable length	
Shielded	1000 m (3280.83 ft)
Unshielded	600 m (1968.50 ft)

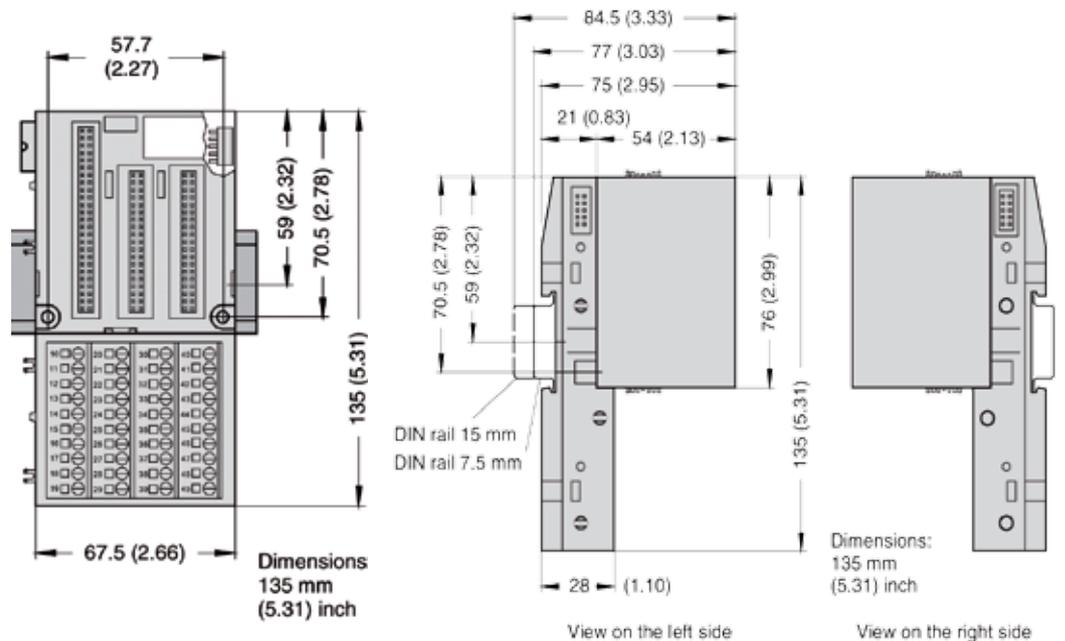
Technical data analog inputs DA 701F	
Number of channels per module	4
Distribution of the channels into groups	1 groups of 4 channel
Channels AI0+...AI3+	Terminals 3.0...3.3
Reference potential for AI0+...AI3+	Terminals 3.4 (AI-) for voltage and RTD measurement Terminal 1.9, 2.9, 3.9 and 4.9 for current measurement
Input type	
Unipolar	Voltage 0...10 V, current or Pt100/Pt1000/Ni1000
Bipolar	Voltage -10...+10V
Configurability	0...10 V, -10...+10 V, 0/4...20 mA, Pt1000/1000, Ni1000 (each input can be configured individually)
Channel input resistance	Voltage: >100 k Ω , current: approx. 330 Ω
Time constant of the input filter	Voltage: 100 μ s, current: 100 μ s
Indication of the input signals	1 LED per channel (brightness depends on the value of the analog signal)
Conversion cycle	1 ms (for 4 inputs + 2 outputs); with RTDs Pt/Ni... 1s
Resolution	Range 0...10 V: 12 Bits Range -10...+10 V: 12 Bits +sign Range 0...20 mA: 12 Bits Range 4...20 mA: 12 Bits Range RTD (Pt100, Pt1000, Ni1000): 0.1 $^{\circ}$ C ($^{\circ}$ F)
Unused inputs	Configured as 'unused'
Overvoltage protection	Yes

Technical data analog inputs DA 701F if used as digital inputs	
Number of channels per module	Max. 4
Distribution of the channels into groups	1 groups of 4 channel
Channels AI0+...AI3+	Terminals 3.0...3.3
Reference potential for all inputs	Terminals 1.9, 2.9, 3.9 and 4.9 (ZP)
Indication of the input signals	1 LED per channel
Input signal voltage	24 V DC
Signal 0	-30 V...+5 V
Undefined signal	+5 V...+13 V
Signal 1	+13 V...+30 V
Input current per channel	
Input voltage +24 V	typically 7 mA
Input voltage +5 V	typically 1.4 mA
Input voltage +15 V	typically 3.7 mA
Input voltage +30 V	< 9 mA
Input resistance	Approx. 3.5 k Ω

5.3.6 I/O terminal units

Name	Short Description	Article No.
TU 705F	FBP terminal unit, 24 VDC Screw type terminals	3BDH000389R0001
TU 706F	FBP terminal unit, 24 VDC Spring type terminals	3BDH000390R0001
TU 715F	I/O terminal unit, 24 VDC Screw type terminals, 1/2 wire.	3BDH000378R0001
TU 716F	I/O terminal unit, 24 VDC Spring type terminals, 1/2 wire.	3BDH000382R0001
TU 731F	I/O terminal unit, 230 VAC Screw type terminals	3BDH000380R0001
TU 732F	I/O terminal unit, 230 VAC Spring type terminals	3BDH000381R0001

5.1.6.1 Dimensional drawings I/O terminal units



5.1.6.2 TU 705F / TU 706F



TU 705F



TU 706F

Name	Short Description	Article No.
TU 705F	FBP terminal unit, 24 VDC Screw type terminals	3BDH000389R0001
TU 706F	FBP terminal unit, 24 VDC Spring type terminals	3BDH000390R0001

The FBP Terminal Units TU 705F (screw type terminal) and TU 706F (spring type terminal) are used as a socket for the FBP Interface Module. The FBP Interface Module is placed on the FBP Terminal Unit and locked into place using two mechanical locks. To loosen this connection a screw driver should be inserted in the recess provided and the Terminal units are carefully pulled away. All electrical connections are made through the Terminal Unit, which allows removal and replacement of the FBP Interface Module without disturbing the wiring at the FBP terminal unit.

The terminals 1.8 to 2.8 and 1.9 to 2.9 are electrically interconnected within the FBP Terminal Unit and always have the same assignment irrespective of which module is inserted:

- Terminals 1.8 to 2.8: Process voltage UP = +24 V DC
- Terminals 1.9 to 2.9: Process voltage ZP = 0 V

The assignment of other terminals is dependent on the FBP Interface Module inserted.

The supply voltage of +24 V DC device-voltage for the electronic circuitry of the device comes from the FieldBusPlug

Technical data

Technical data TU 705 F / TU 706 F	
Number of terminals	16
Distribution of the channels into groups	2 groups of 8 channels each (1.0...1.7, 2.0...2.7), the allocation of the channels is as per the FBP Interface Module inserted
Rated voltage	24 V DC
Max. permitted total current	10 A (between the terminal 1.8...2.8 and 1.9...2.9)
Earthing	direct connection to the earthed DIN rail or via the screws in the case of wall mounting
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
solid	0.08 - 2.5 mm ² (~26 - 14 AWG)
flexible	0.08 - 2.5 mm ² (~26 - 14 AWG)
with wire-end ferrule	0.25 - 1.5 mm ² (~24 - 16 AWG)
Length of the stripped conductor / TU 705F	8 mm (0.32 inch)
Length of the stripped conductor / TU 706F	7 mm (inch), min. 5 mm (inch)
Width of the screwdriver	3.5 mm (0.14 inch)
Fastening torque	0.6 Nm
Degree of protection	IP 20
Dimensions	67.5 x 135 x 30 mm / 2.66 x 5.31 x 1.18 inch width x height x depth
Weight	200 g / 7.05 oz.
Mounting position	horizontal or vertical



TU 715F



TU 716F

5.1.6.3 TU 715F / TU 716F

Name	Short Description	Article No.
TU 715F	I/O terminal unit, 24 VDC Screw type terminals, 1/2 wire.	3BDH000378R0001
TU 716F	I/O terminal unit, 24 VDC Spring type terminals, 1/2 wire.	3BDH000382R0001

The I/O Terminal Units TU 715F (screw type terminal) and TU 716F (spring type terminal) are used as a socket for the I/O module, which exclusively incorporates inputs and outputs for 24V DC digital or analog signals. The I/O Modules (I/O expansion modules) are placed on the I/O Terminal Unit and locked into place using two mechanical locks. To loosen this connection a screw driver should be inserted in the recess provided and the Terminal units are carefully pulled away. All electrical connections are made through the Terminal Unit, which allows removal and replacement of the I/O units without disturbing the wiring at the terminal unit.

The terminals 1.8 to 4.8 and 1.9 to 4.9 are electrically interconnected within the I/O Terminal Unit and always have the same assignment irrespective of which I/O expansion module is inserted:

- Terminals 1.8 to 4.8: Process voltage UP = +24 V DC
- Terminals 1.9 to 4.9: Process voltage ZP = 0 V

The assignment of other terminals is dependent on the I/O expansion module that is inserted.

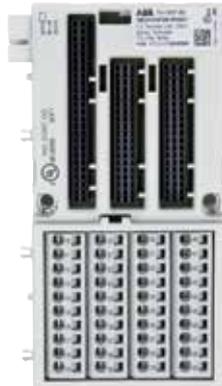
The supply voltage of +24 V DC device-voltage for the electronic circuitry of the device comes from the I/O expansion bus (I/O Bus) and from the CPU respectively.

Technical data

Technical data TU 715F / TU 716 F	
Number of terminals	32
Distribution of the channels into groups	4 groups of 8 terminals each (1.0...1.7, 2.0...2.7, 3.0...3.7, 4.0...4.7), the allocation of the channels is given by the inserted I/O expansion module
Rated voltage	24 VDC
Max. permitted total current	10 A (between the terminals 1.8...4.8 and 1.9...4.9)
Earthing	Direct connection to the earthed DIN rail or via the screws with wall mounting
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
Solid	0.08 mm ² to 2.5 mm ² (28 AWG to 13 AWG)
Flexible	0.08 mm ² to 2.5 mm ² (28 AWG to 13 AWG)
With wire-end ferrule	0.25 mm ² to 1.5 mm ² (23 AWG to 15 AWG)
Length of the stripped conductor / TU 715F	8 mm (0.31 inch)
Length of the stripped conductor / TU 716F	7 mm, min. 5 mm
Width of the screwdriver	3.5 mm (0.14 inch)
Fastening torque (screw type terminals)	0.6 Nm (5.3 Pound Inch)
Degree of protection	IP 20
Dimensions	67.5 x 135 x 30 mm / 2.66 x 5.31 x 1.18 inch width x height x depth
Weight	200 g / 7.05 oz.
Mounting position	horizontal or vertical



TU731F



TU 732F

5.1.6.4 TU 731F / TU 732F

Name	Short Description	Article No.
TU 731F	I/O terminal unit, 230 VAC Screw type terminals	3BDH000380R0001
TU 732F	I/O terminal unit, 230 VAC Spring type terminals	3BDH000381R0001

The I/O Terminal Units TU 731F (with screw-type terminals) and TU 732F (with spring type terminals) are specifically designed for use with AC 700F/AC 900F/S700 I/O modules that incorporate 115-230 V AC inputs and/or 115-230 V AC relay outputs.

The input/output modules (I/O expansion modules) plug into the I/O terminal Unit. When properly seated, they are secured with two mechanical locks. All the electrical connections are made through the Terminal Unit, which allows removal and replacement of the I/O modules without disturbing the wiring at the Terminal Unit.

The terminals 1.8 to 4.8 and 1.9 to 4.9 are electrically interconnected within the I/O Terminal Unit and have always the same assignment, irrespective of which I/O expansion module is inserted:

- Terminals 1.8 to 4.8: Process voltage UP = +24 V DC
- Terminals 1.9 to 4.9: Process voltage ZP = 0 V

The assignment of the other terminals is dependent on the inserted expansion module (see the description of the used expansion module).

The supply voltage 24 V DC for the module's electronic circuitry comes from the I/O expansion bus (I/O-Bus) or from the FieldBusPlug or from the AC 700F or AC 900F CPU.

Technical data TU 731F / TU 732 F

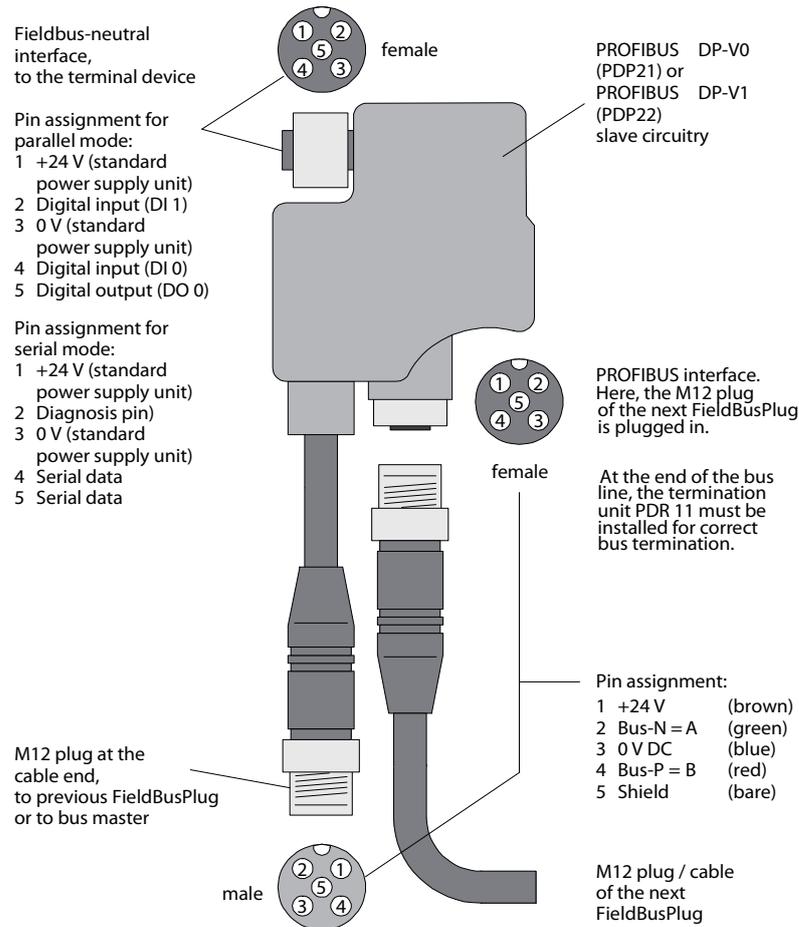
Number of terminals	32
Distribution of the channels into groups	4 groups of 8 channels each (1.0...1.7, 2.0...2.7, 3.0...3.7, 4.0...4.7), the allocation of the channels is given by the inserted I/O expansion module
Rated voltage	230 V AC
Max. permitted total current	10 A (between the terminals 1.8...4.8 and 1.9...4.9)
Earthing	Direct connection to the earthed DIN rail or via the screws with wall mounting
Type	Front terminal, conductor connection vertically with respect to the printed circuit board
Conductor cross section	
Solid	0.08 mm ² to 2.5 mm ² (28 AWG to 13 AWG)
Flexible	0.08 mm ² to 2.5 mm ² (28 AWG to 13 AWG)
With wire-end ferrule	0.25 mm ² to 1.5 mm ² (23 AWG to 15 AWG)
Length of the stripped conductor / TU 731F	8 mm (0.31 inch)
Length of the stripped conductor / TU 732F	7 mm, min. 5 mm
Width of the screwdriver	3.5 mm (0.14 inch)
Fastening torque (screw type terminals)	0.6 Nm (5.3 Pound Inch)
Degree of protection	IP 20
Dimensions	67.5 x 135 x 30 mm / 2.66 x 5.31 x 1.18 inch width x height x depth
Weight	200 g / 7.05 oz.
Mounting position	horizontal or vertical

5.3.7 S 700 I/O Accessories

5.1.7.1 FieldBusPlug



Name	Short Description	Article No.
PDP22-FBP.025	FieldBusPlug, DP-V0/1, 0,25 m	1SAJ240100R1003
PDP22-FBP.050	FieldBusPlug, DP-V0/1, 0,5 m	1SAJ240100R1005
PDP22-FBP.100	FieldBusPlug, DP-V0/1, 1 m	1SAJ240100R1010
PDP22-FBP.200	FieldBusPlug, DP-V0/1, 2 m	1SAJ240100R1020
PDP22-FBP.500	FieldBusPlug, DP-V0/1, 5 m	1SAJ240100R1050

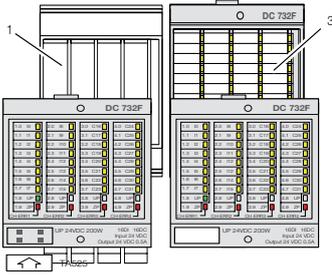


PDP22 represents a tee unit, which means that if the built in bus node in on of them fails then all remaining FieldBusPlugs are still connected with the bus master.

- A power unit, preferable situated near the bus master, is necessary to supply power to the FieldBusPlugs.
- A maximum baud rate of 12 Mbit/s is possible provided the termination on both ends is done correctly and the maximum bus length is not exceeded.

5.1.7.2 Markers for I/O modules

Name	Short Description	Article No.
TA523	Pluggable Marker Holder for I/O modules, 10 pcs. For labelling channels of I/O modules. The marking slips can be printed by users separately using a MS-Word based template.	1SAP180500R0001



Name	Short Description	Article No.
TA525	White Plastic Markers, 10 pcs. For labelling CPU and I/O modules in AC 700F.	1SAP180700R0001



PDM11-FBP

PDF11-FBP

5.1.7.3 Connectors

Name	Short Description	Article No.
PDM11-FBP.0	Male Assembling Connector	1SAJ924005R0001
PDF11-FBP.0	Female Assembling Connector	1SAJ924006R0001



PDR11-FBP

Name	Short Description	Article No.
PDR11-FBP.150	Termination Unit	1SAJ924007R0001



PDV11/12-FBP

Name	Short Description	Article No.
PDV12-FBP.0	Feed-In Connector, Code A-A	1SAJ924011R0001
PDV11-FBP.0	Feed-In Connector, Code B-A	1SAJ924008R0001

5.1.7.4 Cables



PDX11-FBP

Name	Short Description	Article No.
PDX11-FBP.100	Extension Cable, 1 m	1SAJ924001R0010
PDX11-FBP.300	Extension Cable, 3 m	1SAJ924001R0030
PDX11-FBP.500	Extension Cable, 5 m	1SAJ924001R0050



PDA11-FBP

Name	Short Description	Article No.
PDA11-FBP.050	Adapter-Cable, Dsub9-M12	1SAJ924009R0005
PDA12-FBP.050	Adapter-Cable, M12-Dsub9-M12	1SAJ924010R0005



PDA12-FBP



5.3 S800 Remote I/O

S800 I/O is a comprehensive, distributed and modular process I/O system that communicates with parent controllers via PROFIBUS. Thanks to its broad connectivity, the system is able to communicate with a wide range of process control systems from both ABB and other suppliers. By permitting installation in the field, close to sensors and actuators, S800 I/O greatly reduces the installation cost by reducing the cost of cabling. It is possible to exchange modules and reconfigure the system during operation. Redundancy options allow a high degree of availability.

With its cost-effective design and just 59 mm depth installation, S800L I/O modules are the perfect choice for PLC applications. Robust mechanics, one-piece handling, easy mounting and smart connections save your time in all phases of installation.

Furthermore S800L I/O is a subset of the comprehensive S800 I/O system. Consequently S800L I/O has the same full-featured signal interfacing and high availability as the S800 I/O system.

To withstand harsh environments, all S800 modules are compliant to G3 severity level ISA-S71.04 , Environmental Conditions for Process Measurement and Control Systems.

Note: The S800 modules that can be used with Freelance are listed here.

5.3.8 Communication

5.0.8.1 Field communication interfaces

Name	Short Description	Article No.
CI801	-PROFIBUS DP-V1 Communication Interface Including: 1x Power Supply Connector 1x TB807 ModuleBus Terminator The basic system software loaded in CI801 does not support the following I/O modules: DI830, DI831, DI885, AI880A, DI880 and DO880.	3BSE022366R1
CI801 Engineering kit	SW 1.2 Including: 1x CD with GSD file, Memory Maps and Release Note. 1x Reference Manual Memory Maps for CI801.	3BSE038540R1200
CI840A	Profibus DP-V1 Communication Interface. For 1+1 redundant operation. Two CI840A and one TU847 or one TU846 must be ordered. The basic system software loaded in CI840 does not support the following I/O modules: DI830, DI831, DI885, AI880A, DI880, DO880 and ABB Drives.	3BSE041882R1
CI840 Engineering kit	SW 4.0 Including: 1x CD with GSD file, Memory Maps and Release Notes. 1x Reference Manual Memory Maps for CI840.	3BSE031694R4000

Name	Short Description	Article No.
TU846	Module Termination Unit, MTU, for 1+1 CI840. Support for redundant I/O Vertical mounting of modules. Including: 1x Power Supply Connector 2x TB807 ModuleBus Terminator.	3BSE022460R1
TU847	Module Termination Unit for 1+1 CI840. Support for non-redundant I/O Vertical mounting of modules. Including: 1x Power Supply Connector 1x TB807 ModuleBus Terminator.	3BSE022462R1
Front label set	FCI / AC 70 / TB Sheet with 12 labels. For CI810, CI820, CI830, and TB820.	3BSC970089R1
Label set, item design	FCI / AC 70 / TB Sheet with 40 labels. For CI810, CI820, CI830, and TB820.	3BSC970091R1
Mounting kit	For vertical mounting of CI801, CI840 and TB840 on a vertical DIN rail	3BSE040749R1
Mounting profile 1800	2 DIN rails and 1 cable duct DIN rail length : 1650mm + 210mm (65") + (8.3")	3BSE049768R1
Al-profile	Al-profile with DIN Rail and Cable Duct, mounting 465 mm (19") DIN rail length 429mm (16,9")	3BSE022255R1
Al-profile	Al-profile with DIN Rail and Cable Duct for RM550, mounting 592 mm (24") DIN rail length 556mm (21,9")	3BSE022256R1

5.0.8.2 Upgrade kit and tool cables

Upgrading of CI801, CI810, CI820, CI830, CI840 or CI840A to latest software version are available for download from ABB Library/Solutions Bank.

Item A190 is cable connecting a PC to CI810, CI820 and CI830 for download of software. Item A195 is cable connecting a PC to CI840 or CI840A for download of software. CI801 requires items A195 and A197 for download of software

Name	Short Description	Article No.
TK527V030	Interface cable L = 3 m. DE9 pin to DE9 socket. For connection of CI810, CI820 and CI830 to PC.	3BSC950004R1
TK212A	Tool cable RJ45 (male) to Dsub-9 (female), length 3 m. RJ45 8P8C plug (with shell). Cable : UL2464 26 AWG x 8C.	3BSC630197R1
FS801K01	Service adapter kit Including: 1x Service adapter FS801 1x cable TK802 For connection of CI801 to PC. A cable TK812 is also needed.	3BSE038407R1

5.3.9 S800 I/O modules

5.0.9.1 Analog input modules

Name	Short Description	Article No.
AI810	Analog Input, 1x8 channels 0(4)..20 mA, 0...10 V, 12 bit, single ended, 0.1%, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU835, TU838.	3BSE008516R1
AI815	Analog Input, 1x8 channels, HART 0(4)..20mA, 0(1)..5V, 12bit, single ended, 0.1%, Rated isolation 50V. Current limited transmitter power distribution. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU835 or TU838.	3BSE052604R1
AI820	Analog Input, 4x1 channel +-20 mA, 0(4)..20 mA, +-10 V, +-5 V, 0(1)..5 V, diff., 5 OV CMV, 14 bit +sign. Rin(curr)250 Ohm, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008544R1
AI825	Analog Input, 4x1 channel, galvanically isolated -20..20 mA, 0(4)..20 mA, -10...10 V, 0(2)...10 V, Galvanically isolated channels. 14 bit+sign, 0.1%, Rated isolation 250 V. Use Module Termination Unit TU811, TU813, TU831.	3BSE036456R1
AI830A	Analog Input, 1x8 channels RTD Pt100, Ni100/120, Cu10, R, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE040662R1
AI835A	Analog Input, 8 channels, Thermocouple / mV Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE051306R1
AI843	Analog Input, Redundant or Single 1x8 channels Thermocouple / mV Rated isolation 50 V. Use Modules Termination Unit TU830, TU833, TU842, TU843.	3BSE028925R1
AI845	Analog Input, redundant or single, 1x8 channels HART 0(4)..20 mA, 0(1)...5 V, 12 bit, single ended, 0.1%, Rated isolation 50 V. Current limited transmitter power distribution. Advanced on-board diagnostics. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU835, TU838, TU844, TU845.	3BSE023675R1
AI890	Analog Input, 1x8 channels with Intrinsic Safety Interface (4)..20 mA single ended 0.1%. Rated isolation 50 V. Use Module Termination Unit TU890 or TU891	3BSC690071R1

Name	Short Description	Article No.
AI893	Analog Input 8 channels, temperature measuring. Intrinsic Safety Interface, G3 compliant For TC and RTD sensors. Rated isolation 50 V. Protection class G3. Use Module Termination Unit TU890 or TU891.	3BSC690141R1
AI895	Analog Input, 1x8 channels with Intrinsic Safety and HART, G3 compliant. 4..20 mA single ended 0,1%. Rated isolation 50 V. Protection class G3. Use Module Termination Unit TU890 or TU891.	3BSC690086R1

5.0.9.2 Analog output modules

Name	Short Description	Article No.
AO810V2	Analog Output, 1x8 channels, 0(4)..20 mA 0(4)..20 mA, 14 bit RLmax 500/850 Ohm, Rated isolation 50 V. Use module Termination Unit TU810, TU812, TU814, TU830 or TU833.	3BSE038415R1
AO815	Analog Output, 1x8 channels, HART 4..20mA, 12bit, 0.1%, RLmax 750 ohm, Rated isol. 50V. Use Module Termination Unit TU810, TU812, TU814, TU830 or TU833.	3BSE052605R1
AO820	Analog Output, 4x1 channel +-20 mA, 0(4)..20 mA, +-10 V, 12 bit+sign. Indiv. isolation channels. RL max 500 Ohm, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008546R1
AO845A	Analog Output, redundant or single, 1x8 channels, HART 4...20 mA, 12 bit, 0.1%, RLmax 750 ohm, Rated isolation 50 V. Advanced on-board diagnostics. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843.	3BSE045584R1
AO890	Analog Output, 1x8 channels with Intrinsic Safety Interface 0 (4)..20 mA 0,1%. RL max 750 Ohm Rated isolation 50 V. Use Module Termination Unit TU890 or TU891.	3BSC690072R1
AO895	Analog Output 1x8 channels with Intrinsic Safety and HART. G3 compliant 4..20 mA 0,1%. RL max 750 Ohm Rated isolation 50 V. Protection class G3. Use Module Termination Unit TU890 or TU891.	3BSC690087R1

5.0.9.3 Digital input modules

Name	Short Description	Article No.
DI810	Digital Input, 24 VDC, 2x8 channels Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BSE008508R1
DI811	Digital Input, 48 VDC, 2x8 channels Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BSE008552R1
DI814	Digital Input, 24 VDC, 2x8 channels Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BUR001454R1
DI818	Digital Input, 24 VDC, 2x16 channels Rated isolation 50 V. Use Module Termination Unit TU818, TU819, TU830.	3BSE069052R1
DI820	Digital Input, 120 VAC, 8x1 channel Rated isolation 250 V. Use Module Termination Unit TU811, TU813, TU831.	3BSE008512R1
DI821	Digital Input, 230 VAC, 8x1 channel Rated isolation 250 V. Use Module Termination Unit TU811, TU813, TU831.	3BSE008550R1
DI828	Digital Input, 120 V AC/DC, 16x1 channel Rated isolation 250 V. Use Module Termination Unit TU851.	3BSE069054R1
DI840	Digital Input, redundant or single, 24 VDC, 1x16 channels Advanced On-Board diagnostics. Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838, TU842, TU843.	3BSE020836R1
DI890	Digital Input, 8x1 channel with Intrinsic Safety Interface Rated isolation 50 V. Use Module Termination Unit TU890 or TU891.	3BSC690073R1

5.0.9.4 Digital output modules

Name	Short Description	Article No.
DO810	Digital Output, 24 VDC, 2x8 channels 0.5 A, Short circuit proof, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE008510R1
DO814	Digital Output, current sinking, 2x8 channels 0,5 A, shortcut circuit proof, Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU838.	3BUR001455R1
DO815	Digital Output, 24 VDC, 2x4 channels 2.0 A short circuit proof. Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE013258R1
DO818	Digital Output, 24 VDC, 2x16 channels 0.5A, Short circuit proof, Rated isolation 50V Use Module Termination Unit TU818, TU819, TU830.	3BSE069053R1
DO820	Digital Output, Relay, normal open, 8x1 channel 24-230 VAC 3 A, cos phi>0.4, d.c. 42 W, Rated isolation 250 V. Use Module Termination Unit TU811, TU813, TU831, TU836, TU837.	3BSE008514R1
DO821	Digital Output, Relay, normal closed, 8x1 channel 24-230 VAC 3 A, cos phi>0.4, d.c. 42 W, Rated isolation 250 V. Use Module Termination Unit TU811, TU813, TU831, TU836, TU837.	3BSE013250R1
DO828	DO828 Digital Output, Relay Normally Open, 16x1 channel 5-250VAC and 5-125VDC, max 2A, Rated isolation 250V. Use Module Termination Unit TU851.	3BSE069055R1
DO840	Digital Output, redundant or single, 2x8 channels 24 VDC, 0.5 A. Advanced On-board diagnostics. Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843.	3BSE020838R1
DO890	Digital Output, 4x1 channel with Intrinsic Safety Interface Rated isolation 50 V. Use Module Termination Unit TU890 or TU891.	3BSC690074R1

5.0.9.5 Pulse counting modules

Name	Short Description	Article No.
DP820	Pulse Counter RS-422, Current, 5 V, (12 V), 24 V 2 channels bidirectional pulse counters and frequency measurement. 1,5 MHz Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833.	3BSE013228R1
DP840	Pulse Counter or Frequency Measurement Module, redundant or single, 1x8 channels 20 kHz. Rated isolation 50 V. Use Module Termination Unit TU810, TU812, TU814, TU830, TU833, TU842, TU843, TU844, TU845.	3BSE028926R1

5.0.9.6 Label sets for I/O modules

Name	Short Description	Article No.
Extra, Front label set	I/O-box 16 channels Sheet with 12 labels for 16 channels I/O modules.	3BSC970087R1
Extra, Front label set	I/O-box 8 channels Sheet with 12 labels for 8 channels I/O modules.	3BSC970088R1
Label set	I/O-box 4 channels Sheet with 12 labels for 4 channel I/O modules.	3BSC970306R1

5.0.9.7 Module termination units

Name	Short Description	Article No.
TU805K01	Termination Units Termination Units for two or three wire connection of DI801 and DO801. Include 10 pcs of Termination Unit TU805.	3BSE035990R1
TU810V1	Compact Module Termination Unit 50 V 2x8 signal terminals, rated isolation 50 V.	3BSE013230R1
TU811V1	Compact Module Termination Unit 250 V 1x8 signal terminals rated isolation 250 V.	3BSE013231R1
TU812V1	Compact Module Termination Unit 50 V With 25 pin D-sub connector, rated isolation 50 V. D-sub (female) connector is not enclosed.	3BSE013232R1
TU813	Compact Module Termination Unit 250 V 2x8 Signal terminals, Rated isolation 250 V. Detachable (pluggable) connectors are enclosed.	3BSE036714R1
TU814V1	Compact Module Termination Unit 50 V 2x8 Signal terminals, rated isolation 50 V. Detachable (pluggable) connectors are enclosed.	3BSE013233R1
TU830V1	Extended Module Termination Unit 50 V 2x16 signal terminals rated isolation 50 V.	3BSE013234R1
TU831V1	Extended Module Termination Unit 250 V 2x8 signal terminals rated isolation 250 V.	3BSE013235R1
TU833	Extended Module Termination Unit 50 V 2x16 signal terminals, Rated isolation 50 V. Spring-cage terminals.	3BSE038726R1
TU834	Extended Module Termination Unit 50 V Used with AI880 / AI880A. Rated isolation 50 V. Shunt Stick not included.	3BSE040364R1
TU835V1	Extended Module Termination Unit 50 V 8 fused power outlets, 8 signal terminals, rated isolation 50 V	3BSE013236R1
TU836V1	Extended Module Termination Unit 250 V 2x4 fused signals, 2x4 return terminals, 2x2 L terminals, 2x2 N terminals. Rated isolation 250 V.	3BSE013237R1
TU837V1	Extended Module Termination Unit 250 V 8x1 fused isolated signals, 8x1 L terminals, 2x6 N terminals. Rated isolation 250 V.	3BSE013238R1

5.3.10 S800L modules



5.0.10.1 Analog input modules

Name	Short Description	Article No.
AI801	Analog Input, 1x8 channels 0(4)..20 mA, 12 bit, single ended, 0.1%, Rated isolation 50 V.	3BSE020512R1

5.0.10.2 Analog output modules

Name	Short Description	Article No.
AO801	Analog Output, 1x8 channels 0(4)..20 mA, 12 bit, RLmax 850 Ohm, Rated isolation 50 V.	3BSE020514R1

5.0.10.3 Digital input modules

Name	Short Description	Article No.
DI801	Digital Input, 24 VDC, 1x16 channels Rated isolation 50 V.	3BSE020508R1
DI802	Digital Input, 120 VAC / DC, 8x1 channel Rated isolation 250 V.	3BSE022360R1
DI803	Digital Input, 230 VAC / DC, 8x1 channel Rated isolation 250 V.	3BSE022362R1

5.0.10.4 Digital output modules

Name	Short Description	Article No.
DO801	Digital Output, 24 VDC, 16 channels 0.5 A. Short circuit proof, Rated isolation 50 V.	3BSE020510R1
DO802	Digital Output, Relay, normal open, 8x1 channel 24-230 V, AC Rated isolation 250 V.	3BSE022364R1

5.0.10.5 Label sets for S800L I/O modules

Name	Short Description	Article No.
Label Set S800L	16 channels Sheet with 12 labels for 16 channels I/O modules.	3BSE019419R1
Label Set S800L	8 channels Sheet with 12 labels for 8 channels I/O modules.	3BSE019419R2

5.0.10.6 ModuleBus communication parts

Name	Short Description	Article No.
TB805	Bus Outlet ModuleBus extension cable adaptor D-sub 25, female. One required per extension cable TK801.	3BSE008534R1
TB845	Dual ModuleBus outlet ModuleBus extension cable adaptor two D-sub, female. Two TK801 cables for redundancy.	3BSE021437R1
TB806	Bus Inlet ModuleBus extension cable adaptor D-sub 25, male. One required per extension cable TK801.	3BSE008536R1
TB846	Dual ModuleBus inlet ModuleBus extension cable adaptor two D-sub, male. Two TK801 cables for redundancy.	3BSE021439R1
TK801V003	TK801V003 Cable ModuleBus Extension Shielded Cable 0.3m D-sub 25, male-female. G3 compliant.	3BSC950089R1
TK801V006	TK801V006 Cable ModuleBus Extension Shielded Cable 0.6m D-sub 25, male-female. G3 compliant.	3BSC950089R2
TK801V012	TK801V012 Cable ModuleBus Extension Shielded Cable 1.2m D-sub 25, male-female. G3 compliant.	3BSC950089R3
TB807	ModuleBus terminator G3 compliant.	3BSE008538R1

Name	Short Description	Article No.
TB820V2	ModuleBus Cluster Modem Optical cluster modem for non redundant operation. Including: 1x Power Supply Connector 1x TB807 ModuleBus Terminator.	3BSE013208R1
TB825	Optical Media Converter Short to long distance optical fiber conversion. For ModuleBus communication up to 1000 m.	3BSE036634R1
TB840A	ModuleBus Cluster Modem Optical cluster modem for 1+1 redundant operation.	3BSE037760R1
TB810	ModuleBus Optical Port Used together with CI810, CI820, CI830. Use with S800 I/O and ABB Drives (10 Mbits driver)	3BSE008560R1
TB811	ModuleBus Optical Port Used together with CI810, CI820, CI830. Used with ABB Drives equipment. (5 Mbits driver).	3BSE008568R1
TB842	ModuleBus Optical Port Used together with CI801 and CI840, connected via TB806 or TB846. 10 Mbits driver.	3BSE022464R1
TK811V015	POF Cable, 1.5 m, Duplex L = 1.5 m latching duplex connector Duplex plastic fibre.	3BSC950107R1
TK811V050	POF Cable, 5 m, Duplex L = 5 m latching duplex connector Duplex plastic fibre.	3BSC950107R2
TK811V150	POF Cable, 15 m, Duplex L = 15 m latching duplex connector Duplex plastic fibre.	3BSC950107R3
TK812V015	POF Cable, 1.5 m, Simplex L = 1.5 m latching connector Simplex plastic fibre.	3BSC950118R1
TK812V050	POF Cable, 5 m, Simplex L = 5.0 m latching connector Simplex plastic fibre.	3BSC950118R2
TK812V150	POF Cable, 15 m, Simplex L = 15 m latching connector Simplex plastic fibre.	3BSC950118R3

5.3.11 Power supplies

Name	Short Description	Article No.
SD821	Power Supply Device Input 115 / 230 VAC, switch selectable, output 24 VDC, 2.5 A. If redundant power application is required connect to SS82x Voting Unit. Width = 50 mm. DIN rail mounted.	3BSC610037R1
SD822	Power Supply Device Input 115 / 230 VAC, switch selectable, output 24 VDC, 5 A. If redundant power application is required connect to SS82x Voting Unit. Width = 65 mm. DIN rail mounted.	3BSC610038R1
SD823	Power Supply Device Input 115 / 230 VAC, switch selectable, output 24 VDC, 10 A. If redundant power application is required connect to SS82x Voting Unit. Width = 120 mm. DIN rail mounted.	3BSC610039R1
SS822	Power Voting Unit With dual 24 VDC 20 A inputs, single 24 VDC, 20 A output. Each power input supervised. Used if redundant power supply is required. For use with SD821 / 822 / 823. Width=50 mm. DIN rail mounted.	3BSC610042R1
SD831	Power Supply Device Input 100-240 VAC or 110-300 VDC. Output 24 VDC, 3 A. If redundant power application is required connect to SS8XX Voting unit. Width = 35 mm. DIN rail mounted.	3BSC610064R1
SD832	Power Supply Device Input 100-120 / 200-240 VAC. Output 24 VDC, 5 A, auto-select input. If redundant power application is required connect to SD8XX Voting unit. Width = 35 mm. DIN rail mounted.	3BSC610065R1
SD833	Power Supply Device Input 100-120 / 200-240 VAC, auto-select input. Output 24 VDC, 10 A. If redundant power application is required connect to SD8XX Voting unit. Width = 60 mm. DIN rail mounted.	3BSC610066R1
SD834	Power Supply Device Input 100-240 VAC or 110-300 VDC. Output 24 VDC, 20 A. If redundant power application is required connect to SS8XX Voting unit. Width = 85 mm. DIN rail mounted.	3BSC610067R1
SS832	Voting Device Input 24 VDC. Dual 24 V to single 24 V, 2x 10 A. Width = 35 mm. DIN rail mounted.	3BSC610068R1

5.3.12 User documentation

Name	Short Description	Article No.
S800 I/O	General Information and Installation User's Guide.	3BSE020923R5001
S800 I/O	Modules and Termination Units User's Guide.	3BSE020924R5011
S800 I/O	Fieldbus Communication Interface for PROFIBUS DP / DP- V1 User's Guide.	3BSE020926R5001
S800 I/O	Modules and Termination Units with Intrinsic Safety Interface User's Guide.	3BSE020927R4001
S800 I/O	PROFIBUS FCI - Memory maps for CI830 Reference Manual.	3BSE019081R501
S800 I/O	PROFIBUS FCI - Memory maps for CI840 Reference Manual.	3BSE025251R5001
S800 I/O	PROFIBUS FCI - Memory maps for CI801 Reference Manual.	3BSE036959R5001

5.3 S900 Remote I/O



5.3.13 System description of S900 Remote I/O system

S900 provides the input and output modules needed for intrinsically safe field signal connection. The field signals are digitized in every S900 functional module, electrically isolated, and then output via an internal serial bus. The communication interface converts the signals to adapt them to the standardized PROFIBUS-DP V1 fieldbus protocol.

Supervisory process control systems, DCS or SCADA systems use an intrinsically safe fieldbus to communicate with the communication interface. A Profibus connect allows the configuration of the individual S900 stations with cyclic data exchange, acyclic services and communication with HART-compatible field instruments. All functional modules can be replaced easily and quickly, which is an advantage especially in the installation or maintenance phase in hazardous area. The functional modules and the – optionally redundant – communication interface modules placed in Zone 1 can be removed and plugged in while operation is running.

Integrated encapsulated switch-off mechanisms allow for hot swapping of the power supplies. Due to its little space requirements and robust design and its environmentally ruggedized case, the S900 Remote I/O System is a cost-saving solution for use on site, in hazardous Zone 1 or Zone 2 areas (ATEX).

Various installation solutions for different tasks

The S900 components are arranged in a passive termination unit for direct mounting in a junction box. The termination unit contains the internal redundant communication interface and all connectors for the field circuitry, communication and primary power. The functional modules are plugged in the appropriate slot of the termination unit.

Two termination unit versions are available: a redundant one with slots for two power supplies and two communication interfaces and 16 slots for the different functional modules (type TU921), and a non-redundant one (integrated in a field housing type CB220N) with a maximum of 4 slots. Digital functional modules are designed for up to 8 channels, and analog functional modules for up to 4 channels. Thus, up to 128 digital or up to 64 analog channels are possible for each fieldbus node when using a redundant termination unit. It is also possible to combine different functional modules. Up to 125 fieldbus nodes can be connected to a single fieldbus network. This means that up to 10,000 inputs or outputs can be handled by single S900 network. Extensions beyond this scope depend upon the fieldbus type used.

No external signal adaptation or routing required

S900 provides various input and output modules: Analog input modules with or without integral transmitter supply, or with direct temperature measuring input for 2-, 3- or 4-wire resistance thermometers or thermocouples with internal cold junction compensation. Analog output modules for direct positioner or actuator control. Solenoid driver units or NAMUR inputs for intrinsically safe and short-circuit-proof power supply of digital field instruments.

Additionally, options are available for critical applications, allowing for channel-wise electrical isolation of the inputs and outputs. S900 permits direct connection of the entire field level through only 2 lines. As no separate routing, power supply or fusing is needed, the installation cost is reduced considerably.

Consistent configuration

Just like local I/O modules, the individual S900 Remote I/O stations can be configured directly, using the engineering tool integrated in the Distributed Control System (DCS). The Device Type Manager (DTM) exactly “knows” the functionality and parameters of the individual functional modules and their interface to the bus. Besides the module configuration, the DTM also provides for forcing (simulation) of the inputs and outputs and for display of the diagnosis messages.

Due to the standardized FDT / DTM interface the DTM can be easily integrated in the configuration tool of the DCS. Since the DTM belongs to the instrument and not to the DCS, the user has to get familiar with the operating procedure only once. The complete configuration and all parameters are automatically loaded into the S900 stations when the bus network is starting up or upon replacement of a hardware component. So, this is a real “plug & play” system.

In consequence, there is no local service interface for the communication interface, since it is no longer needed. The configuration and parameter data is exclusively visualized and updated by the DTM. The data is stored in the central database of the engineering tool. Thus, system-wide data consistency is ensured. The efforts needed for commissioning and trouble-shooting are reduced to the minimum. Of course, it is alternatively possible to use the GSD file for commissioning/putting into operation.

System features of S900 Remote I/O system

S900 is a remote I/O system for use in hazardous areas. It provides bus-compatible local inputs and outputs (protection class IP20) for connection of digital and analog field instruments. Due to its degree of explosion protection it can be mounted in both hazardous areas (zone 1 and zone 2 / ATEX) and safe areas.

The system consists of a termination unit accommodating the power supply units, the communication interfaces, and the I/O modules.

The passive termination unit ensures power distribution and data transfer, and also provides the connection platform. The power supply units reliably power the entire system. One power supply unit is sufficient for normal operation. A second (redundant) power supply unit can be added, to improve the system availability (for termination unit TU921). The communication interface controls all data traffic between the I/O modules and the distributed control system (DCS) or the programmable logical controller (PLC). The communication interfaces can also be used in redundancy mode (line redundancy and station redundancy with termination unit TU921).

The termination unit is accommodated in a suitable field housing (junction box) to protect it from environmental exposure. When mounting the unit in a hazardous area you have to use a field housing with increased safety Ex-e. Appropriate ready-made S900 field housings are available.

The S900 Remote I/O System is powered / connected via sufficiently protected terminals on the termination unit, with increased safety. The power supply units, the communication interfaces, and the I/O modules are plugged into the termination unit and locked automatically. The power supply modules have a built-in shut-off mechanism with automatic locking and can be plugged / removed under power (even in zone 1 / ATEX), although the power supply in the primary circuit is still active in this case. As a result, the S900 Remote I/O system does not require a flame-proof enclosure or pressurized housing and, therefore, is easy to handle.

The termination unit and the power supply unit(s) ensure intrinsically safe power supply of the communication interfaces and up to 16 I/O modules. The mounting termination unit provides all internal connections. Thus, only the peripheral units need to be connected by the user. Also, hot swapping of the communication interfaces and I/O modules is possible, i.e. these units can be connected or removed during operation. This ensures easy replaceability of all active components, and a high degree of flexibility and user-friendliness.

Field instruments complying with protection class Ex ia IIC / IIID can be connected to the Ex I/O modules. Up to 16 I/O modules can be run on the same termination unit. Each I/O module is designed for connecting 2, 4, 6 or 8 field instruments, depending on the respective model. The I/O modules and the underlying field instrument level are powered via the termination unit. All intrinsically safe modules are self-feeding and short-circuit proof. No separate routing level with additional power supply and individual fusing is required.

HART communication in the field with all analog S900 I/O modules is possible via a PC or a hand-held terminal. In addition, the special HART variants allow for a consistent HART communication up to the distributed control system (DCS). Cyclic transmission of all secondary HART variables, HART diagnosis, and (acyclic) configuration of all HART devices are possible.

The S900 I/O modules are slot-addressed and, therefore, do not require any settings on the modules themselves. The PROFIBUS address is set via three coding switches on TU921 and two coding switches on CB220N. The S900 communication interface, the I/O modules, and the connected HART devices are configured and parameterized via a fieldbus network. No additional configuration and parameterization network is required. The communication interface and the I/O modules have built-in LEDs allowing for “on site” diagnostics. All diagnostic and status indicator LEDs comply with DIN EN 60073 and NAMUR NE44. In addition, PROFIBUS diagnosis down to channel-specific error messages is possible via the communication bus.

Required S900 components

The S900 Remote I/O System for hazardous area Ex zone 1 in its minimum hardware configuration (based on termination unit TU921S) consists of the following components:

Type TU921S	Extended Termination Unit / TU16R-Ex
Type SA920S	Power Supply 24 V DC
Type CI920AS	Communication Interface / CIPBA-Ex
Type BP914S	Sub D connector Ex i for intrinsically safe Profibus DP (RS485-IS)
Type DX910S	Digital I/O Module / DIO8-Ex
Type BI9xxS	Fieldbus isolating repeater / (see ordering information for accessories)

If required, a 230 VAC / 24 VDC power supply unit must be provided by the customer to ensure 24 VDC supply of the S900 Remote I/O System.

For more installation details refer to the installation guide on the CD910 (Catalog No. 3KDE175839L9100). The CD910 will be delivered with every ordered TU921 or CB220N.

Requirements on PLC/DCS master systems

S900 Remote I/O can be connected to systems with a PROFIBUS DP master.

The PROFIBUS-DP V0 services provide the following S900 Remote I/O functions:

- Configuring / setting parameters of the S900 Remote I/O station by restarting all slaves.
- S900 diagnosis messages
- Reading HART secondary variables from the connected field instruments
- Reading HART diagnosis from the connected field instruments through PROFIBUS diagnosis messages.

To be able to use the full range of functions provided by the S900 Remote I/O System, the master has to support additional functions. Modern, state of the art master systems support PROFIBUS-DP V1 services, and are capable to (re)load user-defined and configuration parameters while the system is running, without affecting other slaves or requiring to restart the network.

PROFIBUS-DP V1 services allow you to

- simulate (force) the S900 inputs and outputs
- configure HART field instruments connected to the system

You can select special user-defined and configuration parameters and (re)load them while the system is running to

- change the parameters of the communication interfaces or of individual I/O modules
- add more S900 Remote I/O groups
- add, remove or replace S900 I/O modules.

All I/O modules not involved in these parameter or configuration changes continue cyclic communication. The S900 outputs hold their values / states while the master is downloading the parameters.

Modern master systems meeting the requirements stated above are, for example

- System 800xA
- Melody / AC 870P
- Freelance
- other systems

Number of PROFIBUS nodes

With PROFIBUS-DP, a maximum of 32 nodes (including the master and the class 2 configuration tool, if applicable) can be connected to a segment. A maximum of 16 nodes per segment can be connected to the intrinsically safe PROFIBUS-DP. When using repeaters, you can connect up to 126 nodes to a DP master.

The specified transmission rate and the max. permissible cable length of the segments (see installation guide) must be observed. For example, a cable length of 400 m (1314 ft) is permissible for a network with a transmission rate of 500 Kbauds. Longer cables are possible when using fiber optic cables.

I/O module power supply

The S900 power supplies are designed for two communication interfaces and up to 16 I/O modules of any type. No system limitations result from the selection of typical combinations of the module types DX910, AI930, AI950 and DO910.

The power supply dimension on the secondary side can cause a reduction of the possible number of I/O modules, if:

- the type DO910 is used to power valves which support less than 1,500 Ohm input impedance
- types AO920 (or AI920 / AI921) are to be used exclusively.

In these cases, the user must ensure that the total power loss of all Ex modules and communication interfaces is less than 55 Watt. (For non-Ex modules / type N a total power loss of less than 60 Watt must be observed).

When using redundant termination units (e.g. TU921), a redundant slot can be left free for the power supply unit if required. The power supply units are designed to power the entire S900 station.

Number of I/O modules

In accordance with the PROFIBUS standard up to 240 user parameters are available for parameterizing the S900 System. The S900 System uses one byte per module in Mode 1, and six bytes per module in Mode 2 for the module parameterization. The 16 slots can be assigned as required.

The total quantity of I/O data must not exceed 216 bytes. If no HART variables are to be transmitted, no system limitations result from this, since the max. possible I/O data quantity is 128 bytes, with up to 8 bytes per module and a maximum of 16 modules. Thus, an S900 Remote I/O Station can be equipped with up to 16 I/O modules.

However, the max. number of transferable HART secondary variables is limited, since the maximum quantity of I/O data is 240 bytes. The max. number of HART variables can be derived from the table below. If the system is configured using a configuration tool based on the FDT/DTM technology, the DTM will monitor the system limits (see the DTM manual).

Modules	I/O Modules		HART Devices
	Out Bytes	In/Status Bytes	In Bytes
CI920 ¹	0	0	0
AI930 ¹	0	8	0/4/16/32 ²
AO930 ¹	8	0	0/4/16/32 ²
AI950 ¹	0	8	0
DX910 ¹	1	1	0
DI910 with Status ¹	1	2	0
DO910 ¹	1	0	0
DP910 ¹	2	8	0

I/O data of various I/O modules

¹⁾ stands for S900 S/B/N modules

²⁾ 0...8 (0/4/16/32) HART variables per channel can be selected here

Calculation of the total I/O data example

Modules: 1 x CI920, 6 x AI930, 4 x AO930, 6 x DX910 with status

Total of out bytes = $6 \times 0 + 4 \times 8 + 6 \times 1 = 38$

Total of in/status bytes = $6 \times 8 + 4 \times 0 + 6 \times 2 = 60$

Total of I/O bytes = $38 + 60 = 98$

Number of still available bytes = $216 - 98 = 118$

Number of possible HART variables = $118 / 4 = 29$

Cycle time

The PROFIBUS master defines the transmission rate used in the system. The internal CAN-Bus cycle time is 5 ms for processing 128 digital signals and 20 ms for processing 64 analog signals. The response time of the entire system, consisting of controller and remote I/O, depends on the total I/O data quantity of all PROFIBUS nodes and the processing speed of the supervisory system.

The S900 output data are synchronized with the PROFIBUS. Therefore, the internal cycle time only needs to be considered once.

The following approximation formula is valid $T_R = T_i + 2 \times T_B + T_S$

T_R = response time

T_i = internal cycle time

T_B = cycle time of the higher-level bus

T_S = cycle time of the DCS

With a bus cycle time of 5 ms and a DCS cycle time of 5 ms, a response time of $T_R = 5 + 2 \times 5 + 5 = 20$ ms results from this for the 128 digital signals for typical application.

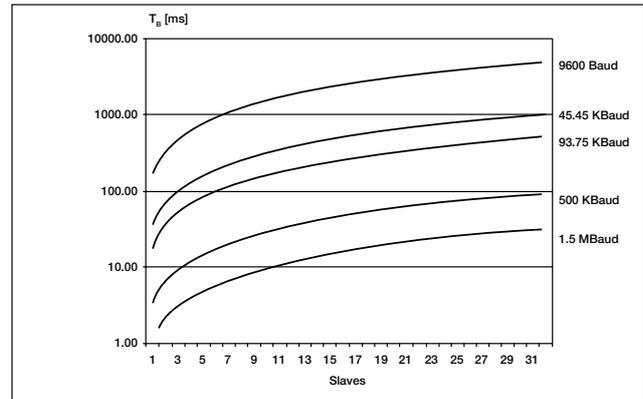


Figure 16: PROFIBUS DP cycle time

Range of applications

The S900 Remote I/O System is tailored to applications in the field of process engineering. It provides a variety of functions which make the system robust, fault-tolerant and easy to diagnose. The main features of the system are its compact design, the redundant bus architecture, and the direct access to the configuration data of the connected HART-compatible instruments via the fieldbus network.

The S900 Remote I/O System is the economic extension of your sensors and actors which can be directly contacted via the standardized fieldbus protocol. Due to the FDT technology both simple digital field instruments or temperature sensors and the well-proven basis of the intelligent HART instruments can be integrated easily into the fieldbus system.

As a result, the S900 Remote I/O System provides a considerable cost-saving potential for all applications in the field of process engineering.



5.3.14 Technical data of S900 Remote I/O system

Device variants for:

Safe area mounting	Type N
Zone 2 mounting	Type B
Zone 1 mounting	Type S

Attention: Do not mix Type N, B, S components!

General data of S900 Remote I/O system

Power supply

Material	Aluminum, powder coated
Color	RAL 9002 + black
External dimensions (W x H x D)	47 x 129 x 117 mm
Weight	Approx. 1.5 kg

I/O modules and communication interface

Material	PC
Fire protection class	V2, UL 94 (DIN IEC 707)
Color (light grey)	RAL 9002
External dimensions (W x H x D)	20 x 104 x 104 mm
Weight	Approx. 0.15 kg
Test voltage (fieldbus, PS, I/O)	1500 V
Test voltage (fieldbus -> I/O)	500 V (intrinsically safe Profibus)
Test voltage (I/O -> I/O)	500 V (with el. isolation)

Termination unit

Material	Aluminium corrosion protected, electrically conductive
Color	Aluminium + RAL 9002
External dimensions (W x H x D)	498 x 274 x 147 mm
Weight	Approx. 3 kg

Mounting	Zone1 / Zone 2 (modules B / S only)
----------	-------------------------------------

Operating temperature	
horizontal mounting	-20 °C...60 °C
vertical mounting	not allowed
Storage temperature	-40 °C...85 °C
Altitude above sea level	max. 2000 m

Standards

Transport / shock	15 g (IEC 60068-2-27)
Function / Vibration	2 g (IEC 60068-2-6)
EMC	EN 61326
Humidity	IEC 60068-2-30
Relative humidity	max. 93 % +/- 3 % at 40°C
Condensation	+/- 2 K for 24 hours
Corrosive gases	ANSI/ISA S71.04 G3 Harsh Group A DIN EN 60068-2-60 Method 4

System architecture of S900 Remote I/O system	
I/O modules per station	16 (on Termination Unit)
No. of channels	2, 4 and 8 channel
S900 stations for Zone 1 (IS fieldbus via IS isolating repeater)	
Mounting options	Safe area, Zone 2, Zone 1
Stations / isolating repeater	Max. 15 stations type S + 1 isolating repeater
S900 stations for Zone 2 (IS fieldbus via IS isolating repeater)	
Mounting options	Safe area, Zone 2
Stations / isolating repeater	Max. 15 stations type B + 1 isolating repeater
S900 stations for safe area (standard fieldbus)	
Mounting options	Safe area
S900 stations per bus line	PROFIBUS non-Ex standard
Bus length (copper)	200 m (1.5 MBaud) 400 m (0.5 MBaud)
Bus length (fibre optic)	(see instruction manual)

5.3.15 Redundant termination unit TU921S/B/N

- Termination unit for up to 16 I/O modules
- Prepared for redundant system power and communication
- Up to 4 terminals per channel
- Preselection of fieldbus address
- Prepared for certified field housing
- Mounting in Zone 1 or Zone 2 possible

Name	Short Description	Article No.
TU921S	Redundant Termination Unit (TU16R-Ex)	3KDE175111L9210
	For 16 I/O-modules. Redundant communication and power. (Delivery includes CD910).	
TU921B	Redundant Termination Unit (TU16R-B)	3KDE175112L9210
	For 16 I/O-modules. Redundant communication and power. (Delivery includes CD910).	
TU921N	Redundant Termination Unit (TU16R)	3KDE175113L9210
	For 16 I/O-modules. Redundant communication and power. (Delivery includes CD910).	

Technical data

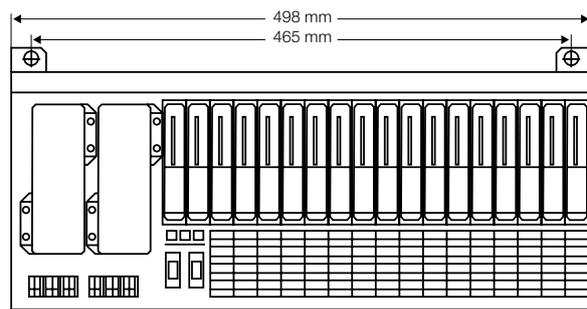
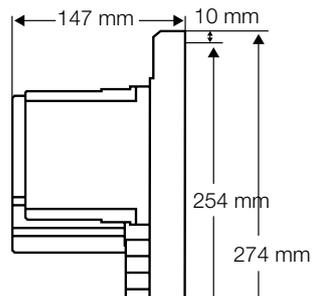
Technical data TU921S/B/N

Field Terminals

Rated supply voltage (PS)	Depending on power supply
System power terminals	Screw terminals
Wire CSA	0.5...2.5 mm ²
Fieldbus plug connector	SUB D, 9 pins
Preselection of bus address	0...126 (rotary switch)
I/O Terminals (type TU921N)	Black
I/O Terminals (type TU921B)	Ex i (blue)
I/O Terminals (type TU921S)	Ex i (blue)
Wire CSA	0.8...2.5 mm ²
Connection	Spring loaded

Explosion protection (type ...S)	PTB 00 ATEX 2156 U II 2(1) G Ex e ib [ia Ga] IIC Gb and II (1) D [Ex ia IIIC Da]
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Explosion protection (type ...B)	PTB 03 ATEX 2028 II (2) G [Ex ib] IIB/IIC PTB 03 ATEX 2029 II 3 G Ex nAC IIC T4
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5.3.16 Power supply SA920S/B/N

- Powering of communication interfaces and I/O modules
- Hot swap capability (SA920S in Zone 1, SA920B in Zone 2)
- Redundant powering
- Alarm in case of power failure (with redundancy)
- Switching On by tighten the 4 switch-on interlock screws (only SA920B and SA920S)

Name	Short Description	Article No.
SA920S	Power Supply For 24 VDC. The power supply filter type BP901S is not required. Do not mix SA910S with SA920S for redundancy (observe Release Notes).	3BDH000602R1
SA920B	Power Supply For 24 VDC. The power supply filter type BP901S is not required. SA920B is the functional replacement for SA910B Do not mix SA910B with SA920B for redundancy (observe Release Notes).	3BDH000601R1
SA920N	Power Supply For 24 VDC. The power supply filter type BP901S is not required. SA920N is the functional replacement for SA910N Do not mix SA910N with SA920N for redundancy (observe Release Notes).	3BDH000600R1

Technical data

Technical data SA920S	
Input	
Power supply (PS)	24 VDC (19.2...32 VDC)
Max. current consumption	< 2.71 A / 24 V; < 3.39 A / 19.2 V
Total power loss	≤ 65 Watt, Ta ≤ 60 °C
Output	
Available power for modules	≤ 55 Watt, Ta ≤ 60 °C ≤ 45 Watt, Ta ≤ 70 °C
Number of powered modules (Ta ≤ 60 °C)	16 I/O modules + 2 x CI920S * < 16 I/O modules + 2 x CI920S ** e.g. 7 x DO910S + 2 x CI920S *** e.g. 12 x AO920S + 2 x CI920S
* for any I/O module with power loss < 2.5 W	
** for I/O modules with power loss > 2.5 W	
*** DO910S with power loss > 2.2 W (for valves < 1500 Ohms)	
Explosion protection (type ...S)	PTB 07 ATEX 2020
Type of protection	II 2 G Ex de [ib] IIC T4

Technical data SA920B

Input

Power supply (PS)	24 VDC (19.2...32 VDC)
Max. current consumption	< 2.71 A / 24 V; < 3.39 A / 19.2 V
Total power loss	≤ 65 Watt, Ta ≤ 60 °C

Output

Available power for modules	≤ 55 Watt, Ta ≤ 60 °C ≤ 45 Watt, Ta ≤ 70 °C
Number of powered modules (Ta ≤ 60 °C)	16 I/O modules + 2 x CI920B * < 16 I/O modules + 2 x CI920B ** e.g. 7 x DO910B + 2 x CI920B *** e.g. 12 x AO920B + 2 x CI920B

* for any I/O module with power loss < 2.5 W

** for I/O modules with power loss > 2.5 W

*** DO910S with power loss > 2.2 W (for valves < 1500 Ohm)

Explosion protection (type ...B)	PTB 03 ATEX 2028
Type of protection	II (2) G [Ex ib] IIB/IIC PTB 03 ATEX 2029 II 3 G Ex nAC IIC T4

Technical data SA920N

Input

Power supply (PS)	24 VDC (19.2...32 VDC)
Max. current consumption	< 2.95 A / 24 V; < 3.65 A / 19.2 V
Total power loss	≤ 70 Watt, Ta ≤ 60 °C

Output

Available power for modules	≤ 60 Watt, Ta ≤ 60 °C ≤ 45 Watt, Ta ≤ 70 °C
Number of powered modules (Ta ≤ 60 °C)	16 I/O modules + 2 x CI920N * < 16 I/O modules + 2 x CI920N ** e.g. 9 x DO910N + 2 x CI920N ***

* for any I/O module with power loss < 3.4 W

** for I/O modules with power loss > 3.4 W

*** DO910N with power loss > 2.2 W (for valves < 1500 Ohm)

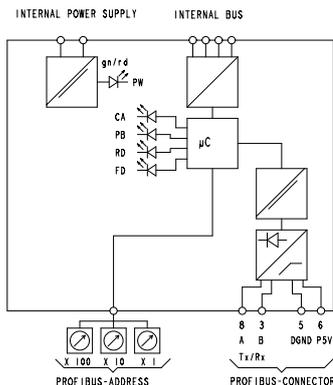


5.3.17 Communication interface CI920AS/AB/AN

- Fieldbus protocol PROFIBUS-DP V1 (IEC 61158)
- Coupling of the internal CAN bus to external PROFIBUS
- HART protocol on PROFIBUS-DP V1
- Line or media redundancy via two coupling modules
- Electrical isolation between field bus, power
- Diagnosis, configuration and parameterization via PROFIBUS

Name	Short Description	Article No.
CI920AS	Communication Interface V 2.1 (CIPBA-Ex) Use only CI920AS with the same firmware for redundancy for PROFIBUS DP-V1 (observe Release Notes)	3BDH000690R1
CI920AB	Communication Interface V 2.1 (CIPBA-B) Use only CI920AB with the same firmware for redundancy for PROFIBUS DP-V1 (observe Release Notes).	3BDH000691R1
CI920AN	Communication Interface V 2.1 (CIPBA) Use only CI920AN with the same firmware for redundancy for PROFIBUS DP-V1 (observe Release Notes).	3BDH000692R1

Technical data



Technical data CI920AS/AB/AN	
Fieldbus	PROFIBUS-DP V1, C1+C2 (IEC 61158), RS485-IS intrinsically safe for CI920AS/AB RS485 for CI920AN
DP baud rate	Max. 1.5 Mbaud Hot Configuration in Run (HCIR)
Explosion protection (type ...S)	PTB 11 ATEX 2001 II 2 G Ex ib IIC T4
Explosion protection (type ...B)	PTB 03 ATEX 2028 II (2) G [Ex ib] IIB/IIC PTB 03 ATEX 2029 II 3 G Ex nAC IIC T4

Via fieldbus

- Station diagnosis
- Redundancy diagnosis
- I/O module diagnosis
- Channel diagnosis

5.3.18 Digital I/O modules

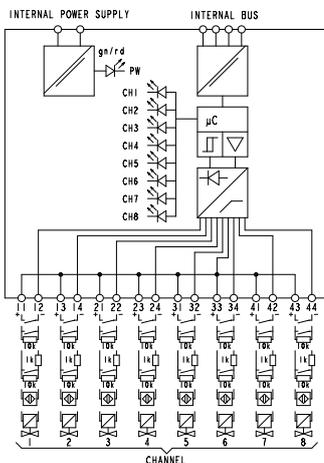


Digital I/O modules DX910S/B/N

- Input for dry contacts or proximity switches (NAMUR)
- Output for low power intrinsically safe valves
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs / outputs
- Configurable as a mixture of inputs and outputs
- 8 I/O channel

Name	Short Description	Article No.
DX910S	Digital Input or Output (DIO8-Ex) Input for dry contact or NAMUR initiator. Output for low power intrinsic safe valves.	3KDE175311L9100
DX910B	Digital Input or Output (DIO8-B) Input for dry contact or NAMUR initiator. Output for low power intrinsic safe valves.	3KDE175312L9100
DX910N	Digital Input or Output (DIO8) Input for dry contact or NAMUR initiator. Output for low power valves.	3KDE175313L9100

Technical data



Technical data DX910S/B/N	
Input	
No-load voltage	8 VDC
Short-circuit current	4 mA...5 mA
Switching point in range	1.4...1.8 mA
Switching hysteresis	0.2 mA
Switching frequency	< 100 Hz
Short-circuit detection	0...367 Ohms
Line-break detection	0...0.2 mA
Explosion protection (type ...S)	PTB 00 ATEX 2180 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Input or output	
Max. short-circuit current	$I_o = 44 \text{ mA}$
Max. voltage	$U_o = 9.6 \text{ V}$
Max. power	$P_o = 106 \text{ mW}$
External inductance	$L_o = 1 \text{ mH}$
External capacitance	$C_o = 1100 \text{ nF}$

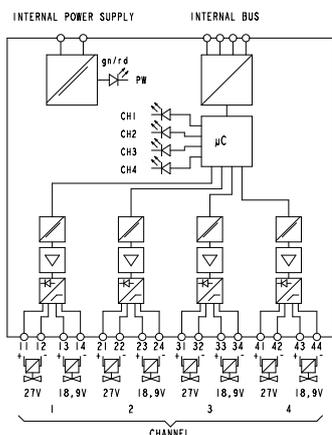


Solenoid driver DO910S/B/N

- Output for intrinsically safe valves or alarms
- Integrated driving power
- Short and break detection
- Electrical isolation between output / bus and output / power
- Electrical isolation channel to channel
- 4 channels

Name	Short Description	Article No.
DO910S	Digital Output (DO4-Ex) Output for intrinsic safe valves.	3KDE175321L9100
DO910B	Digital Output (DO4-B) Output for intrinsic safe valves.	3KDE175322L9100
DO910N	Digital Output (DO4) Output for valves.	3KDE175323L9100

Technical data



Technical data DO910S/B/N	
Output	Curve A: high-voltage Curve B: low-voltage
Supply voltage and current	Curve A: 21 V / 8 mA Curve A: 18 V / 20 mA Curve B: 15 V / 30 mA Curve B: 12 V / 40 mA
No-load voltage	Curve A: approx. 24 V DC Curve B: approx. 18 V DC
Switching frequency	< 100 Hz
Explosion protection (type ...S)	PTB 01 ATEX 2008 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIC Da]
Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Max. short-circuit current	Curve A: $I_o \leq 80$ mA Curve B: $I_o \leq 100$ mA
Max. voltage	Curve A: $U_o = 25$ V Curve B: $U_o = 19$ V
Max. power	Curve A: $P_o \leq 750$ mW Curve B: $P_o \leq 710$ mW
External inductance	Curve A: $L_o = 0.1$ mH Curve B: $L_o = 0.5$ mH
External capacitance	Curve A: $C_o = 110$ nF Curve B: $C_o = 140$ nF
Further information about power ratings see ATEX documents	

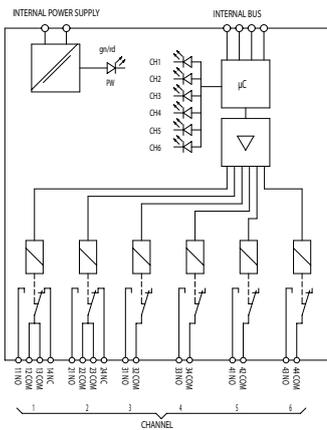


Relay output DO930N

- Relay output for higher switching power
- Output configurable as NO or NC contact
- Electrical isolation between output / bus and output / power
- Electrical isolation channel to channel
- Configurable as 4 x changeover contact
- Configurable as 6 x NO contact

Name	Short Description	Article No.
DO930N	Relay Output (RO6)	3BDS014114
With 4 normally-open contacts and 2 changeover contacts (only to use with CI920AN Article No. 3BDH000692R1).		

Technical data



Technical data DO930N

Output

Switching voltage

max. 60 VDC / 60 VAC

min. 12 VDC / 12 VAC

Switching current

max. 1 A (60 VAC, 30 VDC)

max. 0.7 A (60 VDC)

min. 10 mA (DC) / 10 mA (AC)

Switching delay

> 4 ms...< 12 ms

Contact type

2 x changeover (channel 1 and 2)

4 x NO contacts (channel 3 to 6)

The channels 3+4 and 5+6 resp. are switchable via software as changeover contacts.

For this an external bridge is required at the terminals.

Mechanical life time

30×10^6

switching cycles

Electrical isolation

Contact circuit to int. bus /
module supply

1500 V

between contact circuits

500 V



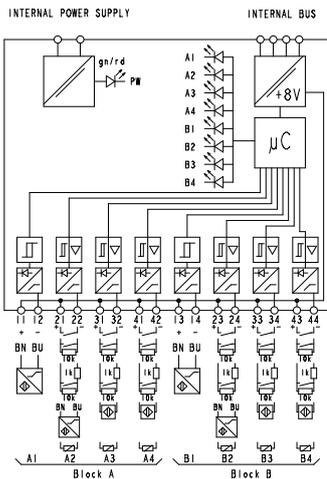
Frequency input DP910S/B/N

- Frequency input for dry contacts or proximity switches
- Short and break detection
- Electrical isolation between input / bus and input / power
- Frequency measurement or counting applications
- 2 Function blocks
- Reset via fieldbus or control input
- Status outputs / Direction recognition

Name	Short Description	Article No.
DP910S	Frequency Input (FI2-Ex) Input for dry contact or NAMUR initiator.	3KDE175361L9100
DP910B	Frequency Input (FI2-B) Input for dry contact or NAMUR initiator.	3KDE175362L9100
DP910N	Frequency Input (FI2) Input for dry contact or NAMUR initiator.	3KDE175363L9100

Technical data

Technical data DP910S/B/N



Input	
No-load voltage	8 VDC
Short-circuit current	4...5 mA
Switching point in range	1.4...1.8 mA
Switching hysteresis	0.2 mA
Short-circuit detection	300...350 Ohm
Line-break detection	0.1...0.2 mA
Input frequency	Max. 4 kHz, 1.25 kHz w. direction recognition
Counter	30 bit (29 bit and digit sign)
Explosion protection (type ...S)	
	PTB 00 ATEX 2180 II 2 (1) G EEx ib [ia] IIC T4 (only up to 2. supplement) ¹
Explosion protection (type ...B)	
	PTB 03 ATEX 2078 II (1) G [EEx ia] IIB/IIC (only up to 1. supplement) PTB 03 ATEX 2079 II 3 G EEx nA II T4 (only up to 1. supplement)
Max. short-circuit current	$I_o = 44 \text{ mA}$
Max. voltage	$U_o = 9.6 \text{ V}$
Max. power	$P_o = 106 \text{ mW}$
External inductance	$L_o = 1 \text{ mH}$
External capacitance	$C_o = 1100 \text{ nF}$

¹ New version is in preparation and will be released acc. to new ATEX standards (3. supplement). Release is planned for Q3/2014.

5.3.19 Analog I/O modules

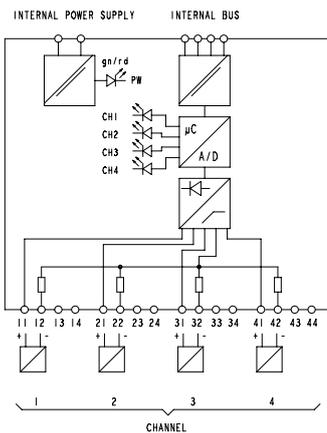


Analog input AI910S/B/N

- Power supply for 4...20 mA loop powered 2-wire transmitters
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channels

Name	Short Description	Article No.
AI910S	Analog Input (AI4-Ex) Transmitter power supply, 4..20 mA.	3KDE175511L9100
AI910B	Analog Input (AI4-B) Transmitter power supply, 4..20 mA.	3KDE175512L9100
AI910N	Analog Input (AI4) Transmitter power supply, 4..20 mA.	3KDE175513L9100

Technical data



Technical data AI910S/B/N

Input

Input current	4...20 mA
Transmitter supply	> 15 V (@ 20 mA)
Internal current limitation	24...26 mA
Input impedance	240 Ohm
Residual ripple	< 100 mV
Short-circuit detection	< 5 V
Line-break detection	< 2 mA

Explosion protection (type ...S)	PTB 00 ATEX 2058 X II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
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Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
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Max. short-circuit current	$I_o = 93 \text{ mA}$
Max. voltage	$U_o = 22.1 \text{ V}$
Max. power	$P_o = 640 \text{ mW}$
External inductance	$L_o = 0.5 \text{ mH}$
External capacitance	$C_o = 65 \text{ nF}$



Analog input, HART, AI930S/B/N

- Power supply for 4...20 mA loop powered 2-wire transmitters
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channels
- Transmission of HART frames via the fieldbus
- Cyclic HART variables

Name	Short Description	Article No.
AI930S	Analog Input, HART (AI4H-Ex) Transmitter power supply, 4..20 mA.	3KDE175511L9300
AI930B	Analog Input, HART (AI4H-B) Transmitter power supply, 4..20 mA.	3KDE175512L9300
AI930N	Analog Input, HART (AI4H) Transmitter power supply, 4..20 mA.	3KDE175513L9300

Technical data

Technical data AI930S/B/N

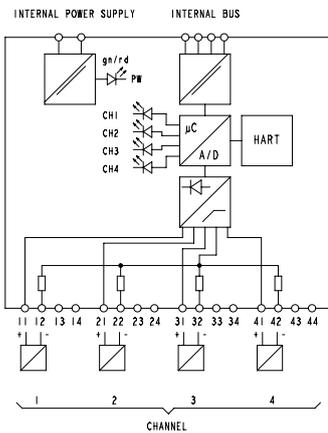
Input

Input current	4...20 mA
Transmitter supply	> 15 V (20 mA)
Internal current limitation	24...26 mA
Input impedance	240 Ohms
Residual ripple	< 100 mV
Short-circuit detection	< 5 V
Line-break detection	< 2 mA

Explosion protection (type ...S)	PTB 00 ATEX 2058 X II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIC Da]
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Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
----------------------------------	--

Max. short-circuit current	$I_o = 93 \text{ mA}$
Max. voltage	$U_o = 22.1 \text{ V}$
Max. power	$P_o = 640 \text{ mW}$
External inductance	$L_o = 0.5 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$



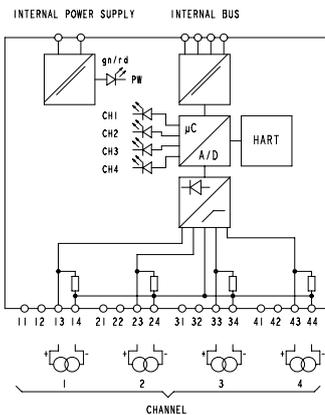


Analog input, HART, passive, AI931S/B/N

- Passive inputs for 0/4...20 mA
- Short and break detection
- Electrical isolation between input / bus and input / power
- Common return for all inputs
- 4 channels
- Transmission of HART frames via the fieldbus
- Cyclic HART variables

Name	Short Description	Article No.
AI931S	Analog Input, HART (AI4H-Ex) Passive input, 0/4..20 mA.	3KDE175511L9310
AI931B	Analog Input, HART (AI4H-B) Passive input, 0/4..20 mA.	3KDE175512L9310
AI931N	Analog Input, HART (AI4H) Passive input, 0/4..20 mA.	3KDE175513L9310

Technical data



Technical data AI931S/B/N	
Input	
Input current	0/4...20 mA
Input impedance	240 Ohm
Line-break / short circuit det.	< 2 mA (4...20 mA)
Explosion protection (type ...S)	PTB 00 ATEX 2058 X II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Max. short-circuit current	$I_o = 16 \text{ mA}$
Max. voltage	$U_o = 7.2 \text{ V}$
Max. power	$P_o = 29 \text{ mW}$



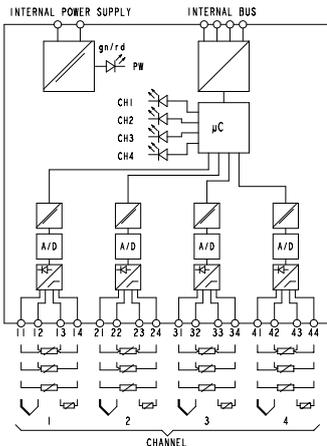
Temperature input AI950S/B/N

- Pt 100, Pt 1000, Ni 100, 0...3 kOhm in 2-/3-/4-wire technique
- Thermocouple Type B, E, J, K, L, N, R, S, T, U, mV
- Internal or external cold junction compensation
- Short and break detection
- Electrical isolation between input / bus and input / power
- Electrical isolation channel to channel
- 4 channels

Name	Short Description	Article No.
AI950S	Temperature (TI4-Ex) Pt100, Pt1000, Ni100 in 2-/3-/4-wire technique thermo-couples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel.	3KDE175521L9500
AI950B	Temperature (TI4-B) Pt100, Pt1000, Ni100 in 2-/3-/4-wire technique thermo-couples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel.	3KDE175522L9500
AI950N	Temperature (TI4) Pt100, Pt1000, Ni100 in 2-/3-/4-wire technique thermo-couples type B, E, J, K, L, N, R, S, T isolated inputs channel by channel.	3KDE175523L9500

Technical data

Technical data AI950S/B/N	
Input	
Input (Pt 100, Pt 1000)	
Wire resistance (4 wire)	< 50 Ohms for each wire
Wire resistance (3 wire)	0...10 Ohms symmetric
Wire resistance (2 wire)	< 10 Ohms
Short-circuit detection	< 5 Ohms
Sensor, line-break detection	> 10 kOhms
Input (Thermocouple)	
Line-break detection	< 100 nA , > 150 mV
Explosion protection (type ...S)	PTB 00 ATEX 2182 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
Explosion protection (type ...B)	PTB 00 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 00 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Max. short-circuit current	$I_o = 25 \text{ mA}$
Max. voltage	$U_o = 5.5 \text{ V}$
Max. power	$P_o = 35 \text{ mW}$
External inductance	$L_o = 2 \text{ mH}$
External capacitance	$C_o = 1600 \text{ nF}$



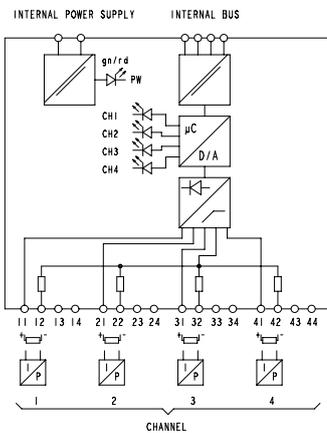


Analog output AO910S/B/N

- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Output with common ground
- 4 channels

Name	Short Description	Article No.
AO910S	Analog Output (AO4-Ex) Output 0/4..20 mA.	3KDE175531L9100
AO910B	Analog Output (AO4-B) Output 0/4..20 mA.	3KDE175532L9100
AO910N	Analog Output (AO4) Output 0/4..20 mA.	3KDE175533L9100

Technical data



Technical data AO910S/B/N	
Output	
Output current	0/4...20 mA
Range	0...24 mA
Load	700 Ohms (20 mA)
Short-circuit detection	< 30 Ohms ($I_a > 2$ mA)
Line-break detection	15...18 V
Explosion protection (type ...S)	PTB 02 ATEX 2029 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Max. short-circuit current	$I_o = 93$ mA
Max. voltage	$U_o = 22.1$ V
Max. power	$P_o = 640$ mW
External inductance	$L_o = 0.5$ mH
External capacitance	$C_o = 65$ nF

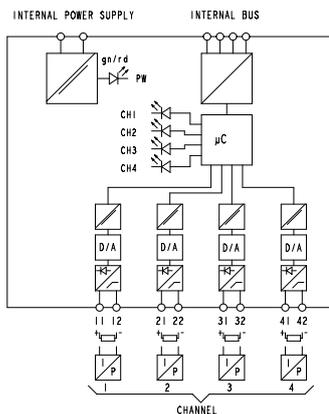


Analog output, isolated AO920S/B/N

- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Electrical isolation channel to channel
- 4 channels

Name	Short Description	Article No.
AO920S	Analog Output, isolated (AO4I-Ex) Output 0/4...20 mA. Isolated outputs channel by channel.	3KDE175531L9200
AO920B	Analog Output, isolated (AO4I-B) Output 0/4...20 mA. Isolated outputs channel by channel.	3KDE175532L9200
AO920N	Analog Output, isolated (AO4I) Output 0/4...20 mA. Isolated outputs channel by channel.	3KDE175533L9200

Technical data



Technical data AO920S/B/N	
Output	
Output current	0/4...20 mA
Range	0...22 mA
Load	700 Ohms (20 mA)
Short-circuit detection	< 50 Ohms
Line-break detection	< 2 mA
Explosion protection (type ...S)	PTB 00 ATEX 2200 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia IIIC Da]
Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia IIIC Da] PTB 03 ATEX 2079 II 3 G Ex nA IIC T4 Gc
Max. short-circuit current	$I_o = 80 \text{ mA}$
Max. voltage	$U_o = 18.9 \text{ V}$
Max. power	$P_o = 510 \text{ mW}$
External inductance	$L_o = 2 \text{ mH}$
External capacitance	$C_o = 100 \text{ nF}$

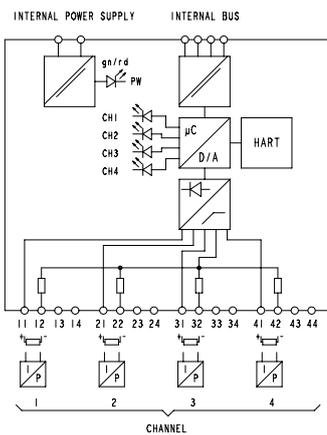


Analog output, HART, AO930S/B/N

- Output signal 0/4...20 mA for actuators
- Short and break detection
- Electrical isolation between output / bus and output / power
- Output with common ground
- 4 channels
- Transmission of HART frames via the fieldbus
- Cyclic HART variables

Name	Short Description	Article No.
AO930S	Analog Output, HART (AO4H-Ex) Output 0/4..20 mA.	3KDE175531L9300
AO930B	Analog Output, HART (AO4H-B) Output 0/4..20 mA.	3KDE175532L9300
AO930N	Analog Output, HART (AO4H) Output 0/4..20 mA.	3KDE175533L9300

Technical data



Technical data AO930S/B/N

Output

Output current	0/4...20 mA
Range	0...24 mA
Load	700 Ohm (20 mA)
Short-circuit detection	< 30 Ohm ($I_a > 2$ mA)
Line-break detection	15...18 V

Explosion protection (type ...S)	PTB 02 ATEX 2029 II 2 (1) G Ex ib [ia Ga] IIC T4 Gb and II (1) D [Ex ia III C Da]
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Explosion protection (type ...B)	PTB 03 ATEX 2078 II (1) G [Ex ia IIC Ga] and II (1) D [Ex ia III C Da] PTB 03 ATEX 2079 III 3 G Ex nA IIC T4 Gc
----------------------------------	---

Max. short-circuit current	$I_o = 93$ mA
Max. voltage	$U_o = 22.1$ V
Max. power	$P_o = 640$ mW
External inductance	$L_o = 0.5$ mH
External capacitance	$C_o = 65$ nF

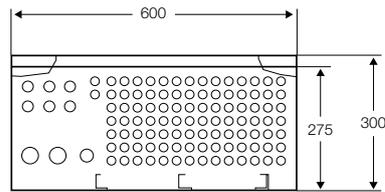
5.3.20 Field housing

Field housing FH660S, FH680S

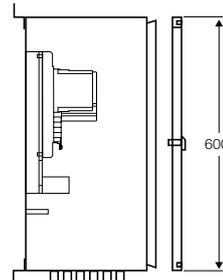
- Stainless steel field housing for extended termination unit
- Prepared for wall mounting
- Mounting in Zone 1 or Zone 2



Name	Short Description	Article No.
FH660S - 2000	Field housing Including the following components: Termination Unit TU921S and 4 Terminals UK10N	3KDE175804V2000
FH660S - 2020	Field housing Including the following components: Termination Unit TU921S, 4 Terminals UK10N and 2 Switches	3KDE175804V2020
FH680S - 2020	Field housing Including the following components: Termination Unit TU921S, 4 Terminals UK10N and 2 Switches	3KDE175811V2020



Bottom view FH660S



Side view FH660S

Technical data

Technical data FH660S/FH680S

Explosion protection (type ...S)	PTB 02 ATEX 1133
Type of protection	II 2(1) G Ex d e ia/ib [ia Ga] mb IIC T4 Gb II 2(1) D Ex tb [Ex ia IIIC Da] IIIC T135°C Db

General Data FH660S

External dimensions (W x H x D)	600 x 600 x 300 mm
Protection degree	IP 66 (EN 60529)
Drain plug/breather	M25, IP 56
Door hinges	Left hand side
Material	M6, stainless steel 1.4301
Cable gland	Brass (chromium-plated)
for central power	6 x M20 / 2 x M32
cable diameter	8.5...13 mm / 17.5...25 mm
for field signals and fieldbus	100 x M16
cable diameter	6...11 mm
External earth	M6, stainless steel 1.4301
Weight	
without S900 Process I/O	Approx. 24 kg
fully equipped	Approx. 33 kg

General Data FH680S

External dimensions (W x H x D)	600 x 800 x 300 mm
Protection degree	IP 66 (EN 60529)
Drain plug/breather	M25, IP 56
Door hinges	Left hand side
Material	M6, stainless steel 1.4301
Cable gland	Brass (chromium-plated)
for central power	6 x M20 / 2 x M32
cable diameter	8.5...13 mm / 17.5...25 mm
for field signals and fieldbus	100 x M16
cable diameter	6...11 mm
External earth	M6, stainless steel 1.4301
Weight	
without S900 Process I/O	Approx. 31 kg
fully equipped	Approx. 40 kg

Field Housing roof

Name	Short Description	Article No.
S900 - BI100	Field Housing roof Weather protection. Fits to all field housing.	3KDE175831L1000



Compact box CB220N

- Field housing for power supply and communication interface
- Mounting of max. 4 I/O modules
- Preselection of fieldbus address (0 ... 99)
- Separation of function level and wiring level
- Mounting in safe area

Name	Short Description	Article No.
CB220N	Compact-Box	3KDE175613L2210
	For power supply SA911N, communication interface CI920AN and four I/O modules S900 type N (Delivery includes CD910).	

Technical data

Technical data CB220N	
I/O modules and communication interface	
Material	PC
Fire protection class	V2, UL 94 (IEC/DIN EN 60695-11)
Color (light grey)	RAL 9002
External dimensions (W x H x D)	20 x 104 x 104 mm
Weight	Approx. 0.15 kg
Test voltage (fieldbus, PS, I/O)	1500 V
Test voltage (fieldbus -> I/O)	500 V
Test voltage (I/O -> I/O)	500 V (with el. isolation)
Mounting	Non-hazardous area
Operating temperature	
Horizontal mounting	-20 °C...60 °C, Observe equipping !
Vertical mounting	Not allowed
Storage temperature	-40 °C...85 °C
Fieldbus connection	PROFIBUS DP
Preselection of bus address	0 ... 99 (rotary switch)
Bus termination	(see manual)
Standards:	
Transport / shock	15 g (IEC 60068-2-27)
Function / Vibration	2 g (IEC 60068-2-6)
EMC	EN 61326
Humidity	IEC 60068-2-30
Relative humidity	max. 93 % +/- 3 % at 40°C +/- 2 K for 24 hours
Corrosive gases	ANSI/ISA S71.04 G3 Harsh Group A DIN EN 60068-2-60 Method 4

System architecture

System architecture CB220N	
I/O modules per station	Max. 4
No. of channels	2, 4, 6 and 8 channel
Bus length (copper)	200 / 400 m (1.5 / 0.5 MBaud)
CB220 in safe area (type N)	
Mounting possibilities	Safe area
Stations per bus line	PROFIBUS non-Ex standard
General Data:	
Protection class	IP66 (EN60529)
Door hinges	Left hand side
Material	Aluminium, powder coated
Color (light grey)	RAL 9002
External dimensions (W x H x D)	208 x 278 x 153 mm
Weight	
Only CB220	Approx. 3.8 kg
Fully equipped	Approx. 5.8 kg
Cable gland	
For central power	Brass (chromium-plated)
Cable diameter	1 x M20
For field signals and fieldbus	8...12 mm
Cable diameter	12 x M16
	6...9 mm
External earth	M6, stainless steel 1.4301
Fastening drillings	4 x 6.8 mm diameter
Terminals	
System power terminals	EEx e (black)
Wire CSA	0.5 ... 2.5 mm ²
Connection	Screw terminals
I/O and fieldbus terminals (type N)	Black
Wire CSA	0.08 ... 2.5 mm ²
Connection	Spring loaded
Power	
Supply voltage	24 VDC (19.2...32 V)
Max. current consumption	See power supply
Total power loss	See power supply



illustration similar

Power supply SA911N for CB220N

- Powering of communication interfaces and I/O modules
- Hot swap capability

Name	Short Description	Article No.
SA911N	Power supply for CB220N For 24 VDC.	3KDE175613L9110

Technical data

Technical data SA911N	
Input	
Power supply (PS)	24 VDC (19.2...32 V)
Max. current consumption	< 1.25 A / 24 V; < 1.56 A / 19.2 V
Total power loss	< 30 Watt
Output:	
Available power for modules	< 27 Watt
Diagnosis:	
System / Module power on	LED green / green
General data:	
External dimensions (W x H x D)	45 x 135 x 105 mm
Weight	
SA911N	Approx. 0.8 kg

5.3.21 Accessories

Fieldbus isolating repeater

Name	Short Description	Article No.
BI914S	Fieldbus isolating repeater separates one intrinsically safe RS485 fieldbus segment from a non intrinsically safe RS485 fieldbus with bus termination BARTEC - 07-7311-97WP/K1E0 DIN rail housing with IP20 protection	3BDH000649R1

Ring-coupler

Name	Short Description	Article No.
BI923S	Ring-coupler RS485 / FO - intrinsically safe - Slave	3KDE175831L9230
	Separates an intrinsically safe fibre optic ring from a non intrinsically safe RS485 interface BARTEC - 07-7311-97WP5400 integrated in DIN rail mounted housing with IP20 protection Optical Plug FSMA (Slave)	
BI924S	Ring-coupler RS485 / FO intrinsically safe - Master	3KDE175831L9240
	Separates an intrinsically safe fibre optic ring from a non intrinsically safe RS485 interface BARTEC - 07-7311-97WP5400 integrated in DIN rail mounted housing with IP20 protection Optical Plug FSMA (Master)	
BI934S	Ring-coupler RS485 / FO intrinsically safe (slave)	3BDH000674R0001
	separates an intrinsically safe fibre optic ring from one intrinsically RS485 fieldbus segment integrated in separate field housing BARTEC - 07-3103-2512/9003 Optical Plug FSMA	

Additional accessories

Name	Short Description	Article No.
IP920	Module housing	3KDE175831L9200
	IP20 protection for empty slots on the termination unit. For use in S900 S, B, and N systems.	
IL910	Insert labels	3KDE175839L9101
	380 pcs.	
BP914S	Intrinsically safe PROFIBUS-DP connector for CI920AS and CI920AB	3BSE067082R1
	D-SUB Connector (color blue) for operating the intrinsically safe PROFIBUS-DP with CI920AS and CI920AB (Siemens 6ES7972-0DA60-0XA0)	

5.3.22 Software

Name	Short Description	Article No.
CD910	Additional Software	3KDE175839L9100
	CD ROM incl. S900 Documentation, Certificates, GSD (file) ABB DTM S900 DP and Software Tools CD ROM will be delivered with all TU921 and CB220 deliveries	

Chapter 6

Fieldbus network components and Profibus configuration for S700



6.3 Profibus DP configuration for S700

When the Freelance controllers are equipped with the appropriate Profibus Master module they can communicate over a single Profibus DP segment with several remote I/O stations. Some configurations are shown in the following figures. They describe different ways how to feed the PDP22-FBP fieldbus plug, which is an active element, with power.

Figure 17 shows the first variant, where the power is fed in with the PDA11 adapter cable. The twisted-pair cable has to be connected to an external 24 V DC power supply. The M12 connector of the cable is directly connected close to the controller using the fieldbus plug. The adapter cable has four wires, two more than a standard Profibus cable. The additional wires are used to feed the external power to both fieldbus plugs shown in Figure 17.

The Profibus DP segment has to be terminated with a PDR11-FBP terminator.

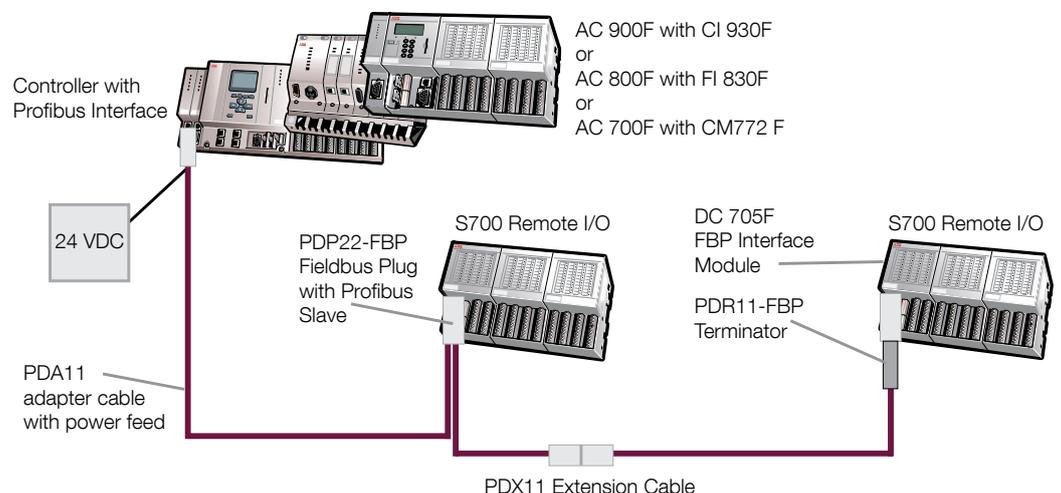


Figure 17: Profibus configuration with AC 900F, AC 800F or AC 700F, S700 remote I/O and PDA11 adapter cable

Another variant to feed the fieldbus plug with power is shown in Figure 18. In this case a standard Profibus cable (D-Sub9 - M12) is used instead of PDA11. To supply the power, a feed-in connector of type PDV11 or PDV 12 is used. The cable of the fieldbus plug is connected close to the remote I/O feed-in connector.

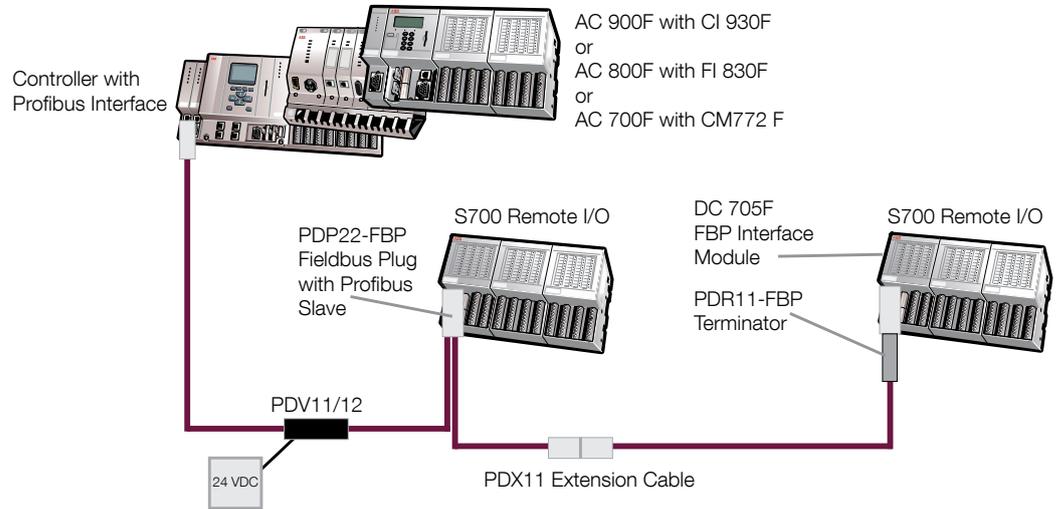


Figure 18: Profibus configuration with AC 900F, AC 800F or AC 700F, S700 remote I/O and power feed-in connector

Figure 19 shows a Profibus configuration where two different types of remote I/O stations are connected to a Freelance controller. Standard cables are used to connect the S900 station. The power for the fieldbus plug will be again fed by a PDV11 or PDV12 feed-in connector.

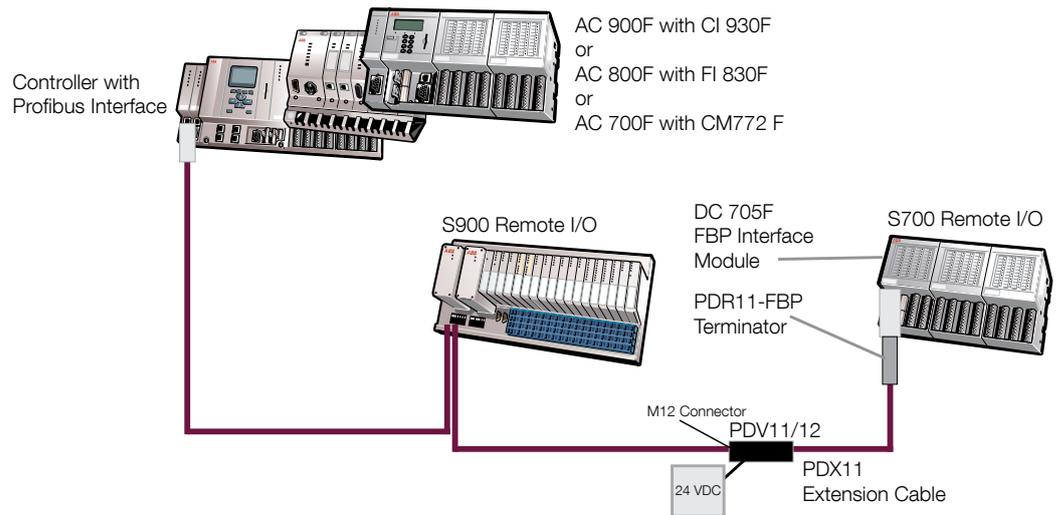


Figure 19: Profibus configuration with S900 and S700 remote I/O; and power feed-in connector

6.3 PROFIBUS network components



Name	Short Description	Article No.
RLM01	<p>PROFIBUS Redundancy Link Module for PROFIBUS line redundancy</p> <p>Converts a non-redundant PROFIBUS line to two redundant RS485 lines or vice versa. Germanischer Lloyd (GL) certified (cat. A,B,C,D) in connection with power supply filter (3BDZ000397R1).</p>	3BDZ000398R1
Power Supply Filter	<p>Power Supply Filter (surge) 24 VDC</p> <p>Mandatory to fulfill the requirements of Germanischer Lloyd (GL).</p>	3BDZ000397R1
PCO 010	<p>PROFIBUS DP connector, standard</p> <p>Max. 12 Mbit/s, 35° cable outlet, IP40, without bus termination.</p>	3BDZ000370R1
PCO 011	<p>PROFIBUS DP connector with bus termination</p> <p>Max. 12 Mbit/s, 35° cable outlet, IP40, switchable bus termination.</p>	3BDZ000371R1
PCO 012	<p>PROFIBUS DP connector with bus termination and adapter</p> <p>Max. 12 Mbit/s, 35° cable outlet, IP40, switchable bus termination, programming connection SUB-D.</p>	3BDZ000372R1

6.3 FOUNDATION Fieldbus network components



Name	Short Description	Article No.
LD 800HSE	Linking Device LD 800HSE LD 800 HSE module for DIN rail mounting with 4 H1 links and one HSE connector. The module itself needs external 24 VDC power supply. H1 links must be powered separately.	3BDH000320R02
LD 800HSE EX	Linking Device LD 800HSE EX LD 800 HSE module for DIN rail mounting with 4 H1 links and one HSE connector. Certified for hazardous area Zone 2 acc. to ATEX and IECEx (observe Release Notes). The module itself needs external 24 VDC power supply. H1 links must be powered separately.	3BSE073314R1
Redundancy Link Cable	Redundancy Link Cable, 0.5 m Redundancy Link Cable links two LD 800HSE to a redundant set of devices.	3BDH000281R1
Media CD LD 800HSE	Version 3.5.0, English Documentation in pdf-format, tools, capabilities file, and bitmaps for LD 800HSE.	3BDD011678R0701
Media CD LD 800HSE and LD 800HSE EX	Version 3.6.0, English Documentation in pdf-format, tools, capabilities file, and bitmaps for LD 800HSE. and LD 800HSE EX	3BDD011678R0801
Printed User Instructions LD 800HSE	Version 3.5.0, English Describes in detail the FOUNDATION Fieldbus Linking Device LD 800HSE features, hardware installation, configuration, and diagnostics.	3BDD011677R0701
Printed User Instructions LD 800HSE and LD 800HSE EX	Version 3.6.0, English Describes in detail the FOUNDATION Fieldbus Linking Device LD 800HSE/LD 800HSE EX features, hardware installation, configuration, and diagnostics.	3BDD011677-600

Chapter 7 Freelance Operations (DigiVis)

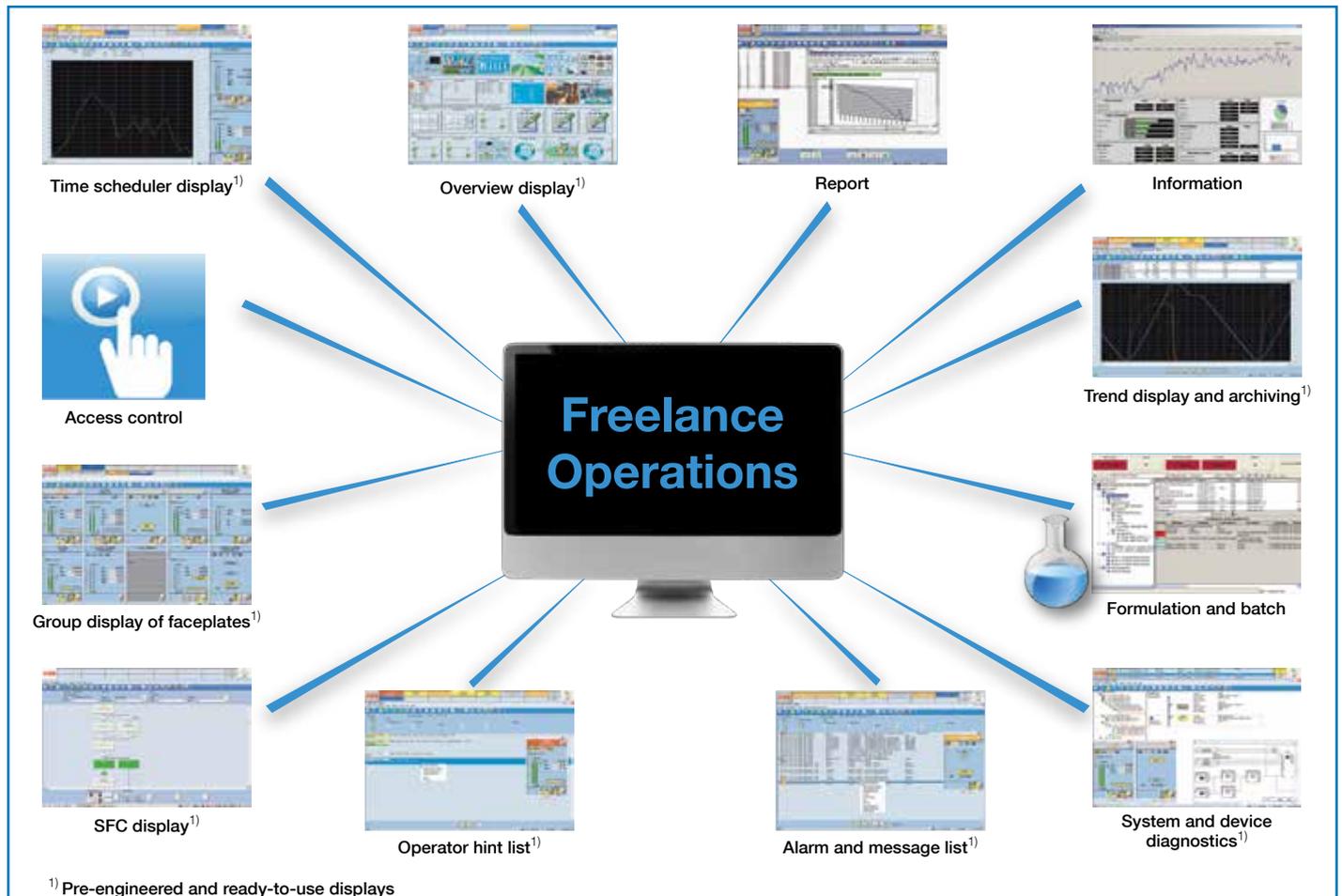
Freelance Operations or DigiVis, based on Microsoft Windows as a graphical user interface, enhances the ease of use and the performance of process operation. In addition, you can also use any PC peripherals such as monitors, printers, mice and keyboards that are available on the market for Windows compliant PCs.

The operation (DigiVis) and engineering (Control Builder F) functions can also be performed together on one PC. For operation, DigiVis offers the following features:

- Transparent and rapid operation due to a clearly structured information hierarchy
- User-specific function key assignment for fast display selection
- A large number of pre-engineered displays
- Rapid and secure action in case of process alarms
- Trend displays with archiving
- Logging of all operator actions, including name and time-stamp
- System diagnostics, even down to the field device, allowing extended field device diagnostics

- Uniform process alarm and message concept and clearly arranged display of messages and operator hints
- Up to 16 user groups / access profiles, with up to 1000 users, specific password for each user (with optional Security Lock software)
- Various language versions: English, Chinese, German, Spanish, Brazilian Portuguese, Swedish, Russian, Polish, French, and Japanese
- A control aspect, providing access to automatically generated dynamic interlocking displays for the selected tag (in connection with OPC or trend server)
- External aspects, providing access to additional information such as PDF documentation, live videos from the plant, standard operational procedures (SOPs), etc.
- Configurable voice output on the PC for process alarms
- Dual-monitor operation on a single PC, with one mouse and one keyboard

The process visualization is supported by plant-specific custom graphic displays, faceplates for tags and up to 15 plant areas with plain text labeling.



Plant-specific displays

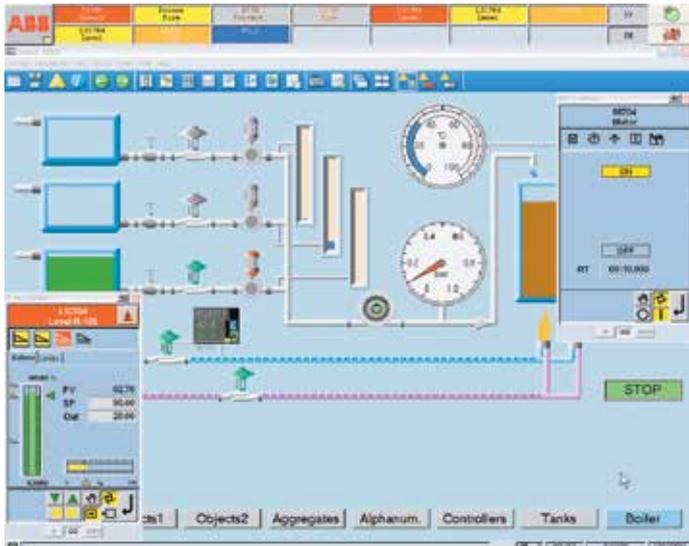


Figure 20: Graphic display with faceplates

Plant-specific displays geared to the specific demands of the plant operator can be configured to depict process activities. Static sections of the graphic displays can be created using the graphics editor. In addition, you also have the option of inserting such static sections in the form of bitmaps, created by any other graphic editor, scanner, or digital photograph. Current process data or process states can be animated at every suitable position using features such as bar graphs, level indicators and trend windows.

Depending on process states, graphic symbols can, flash, change color and position or be replaced in the graphic display. Tags can be viewed either via faceplates in the graphic displays or via the standard group displays. Display selector fields or buttons can be used to setup a specific selection hierarchy within custom graphics for operation. The number of custom graphics available in Freelance Operations is limited only by the hard disk capacity.

Pre-engineered, ready-to-use displays

Pre-engineered displays are adapted to the needs of process control engineering with regard to structure and information content.

The following displays are available:

- Overview display
- Group display
- Faceplate
- Sequential Function Cart (SFC) display
- Time scheduler display
- Trend display
- Web display
- Message list and operator hint list
- Logs
- System display for hardware diagnostics

Therefore, most functions already have fully prepared displays for operation and observation, and can be used without additional work.

Overview display

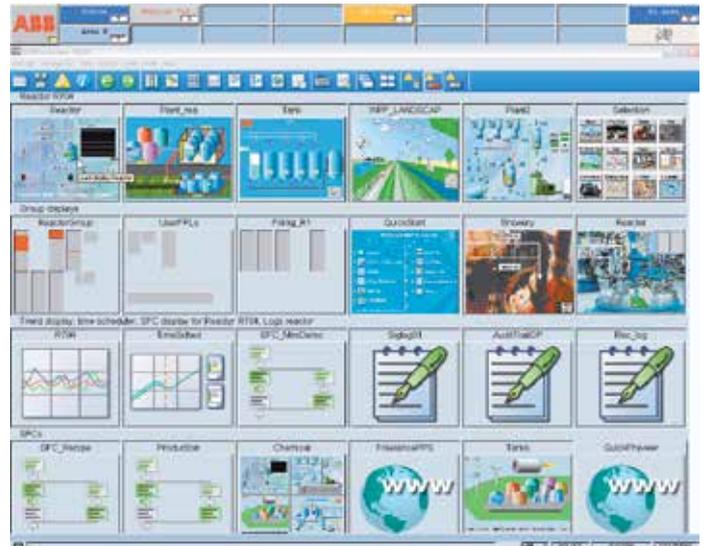


Figure 21: Overview display

The process information for the entire plant is presented in a condensed manner in a single overview display. It offers facilities for selecting the group, graphic, SFC, Web, time scheduler and trend displays. Logs can also be called up directly from the overview display. Up to 96 displays can be shown in the overview display. The group display symbols within the overview display also feature dynamic updating of tags, allowing disturbance states to be detected rapidly through appropriate symbols and colors. If required, you can also set a graphic display of your choice as overview display. It then replaces the standardized display.

Faceplates

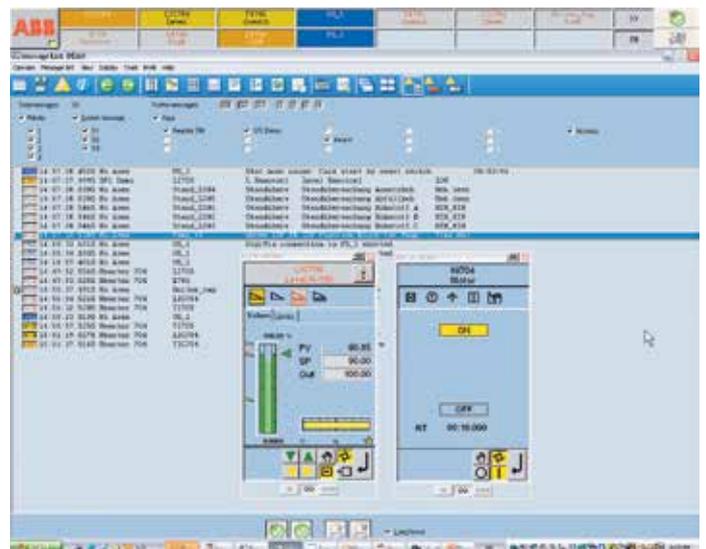


Figure 22: Faceplates

Faceplates allow both overview and detailed information to be obtained simultaneously. Since faceplates are predefined, they are available immediately in the system following the definition of a tag, without any additional programming. This is also the case for user-defined faceplates. Therefore, faceplates can be displayed together with standardized and freely designed displays.

Group display

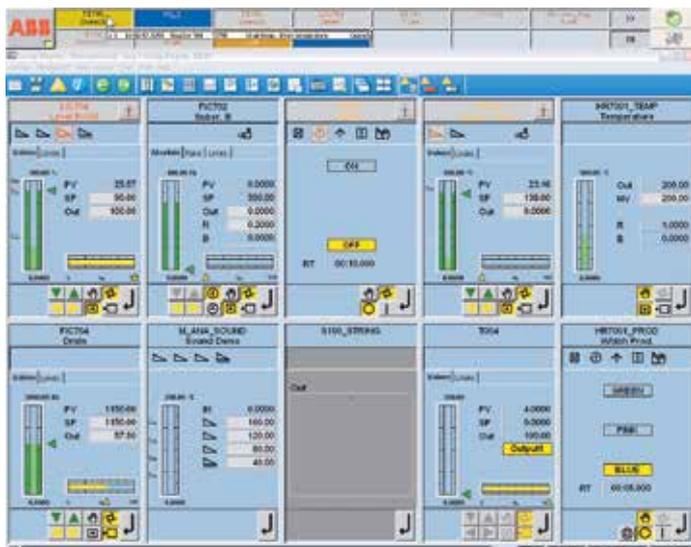


Figure 23: Group display

The group display is a combination of several faceplates and contains detailed information about associated tags. All functions, including controllers, PID-loops, time and monitoring functions as well as open-loop control functions, can be displayed and operated.

To provide a quick source of information, analog values are displayed as colored bars. To allow more precise reading, they are also shown as alphanumeric values. Pending disturbance states in the respective variables can be detected immediately through a change in color and flashing, and can be acknowledged directly in the faceplate or message list. Configured limits can be additionally displayed as symbols. You can create your own faceplates for user-defined function blocks.

SFC display

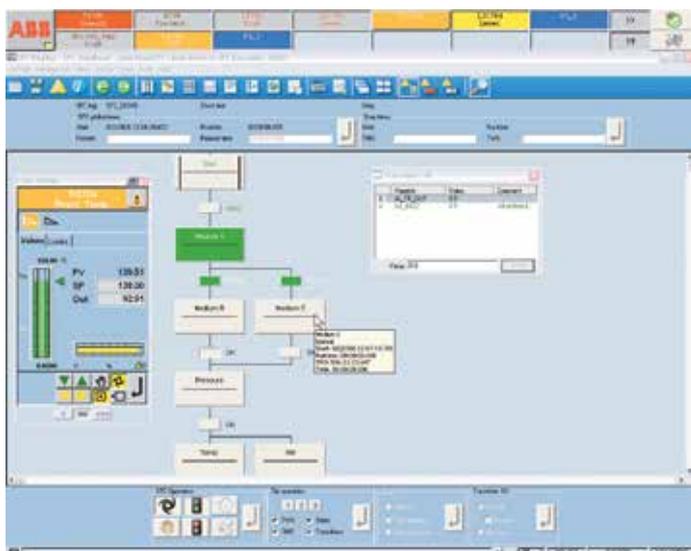


Figure 24: SFC display

The sequential function chart (SFC) based on the IEC 61131-3 standard is viewed in a standardized SFC display showing the current program state of the sequential function chart.

In the SFC display, you see the actual processing status, where already finished and coming steps are marked with different colors. Disturbance states, such as non-fulfilled process criteria or time outs can be easily detected by a color change within a criteria window for steps and transitions. Furthermore, a display selection can be configured for each step and transition. The variables shown in the criteria window can be operated.

An SFC overview display allows direct access to a step or transition, and the desired information can be selected immediately. This is particularly beneficial in the case of complex open-loop control structures, when rapid intervention by the operator is essential. The Control Aspect allows the animated display of the transition program, similar to the commissioning display in Control Builder F.

The display is generated automatically and is an alternative to the criteria window, which allows you to configure a standardized, reduced display of the criterias.

Time scheduler display

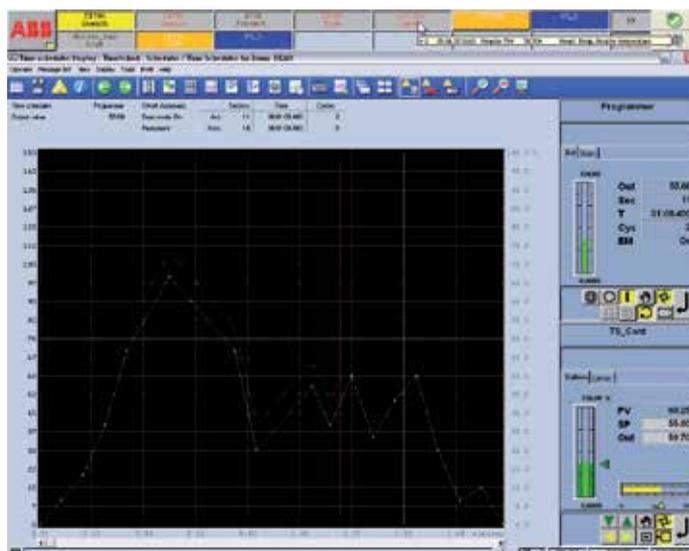


Figure 25: Time scheduler display

The time scheduler module makes it possible to define analog variables during a pre-defined time by default, e.g. as a set point value for a connected controller. The current set point is determined from a series of up to 32 configured values describing a set point curve. The time scheduler display is easy to operate. Apart from enabling the switching of operation modes, it also permits the modification of the current set point. Manual alterations to the set point are displayed in a separate curve.

A manual set point can be defined by offsetting the configured set point. A return (time-delayed) to the original value is possible at any time. A program can be executed cyclically or by stating a certain number of runs.

Web display

The Web display provides a simple way to display web pages on the operator station, without covering the message line. For example, this allows you to observe the picture of a camera using a built-in Web server, making it easy to monitor flames or observe chimneys. However, in addition to showing Web pages, it is also possible to start other applications and display documents using this display type.

Trend display and archiving

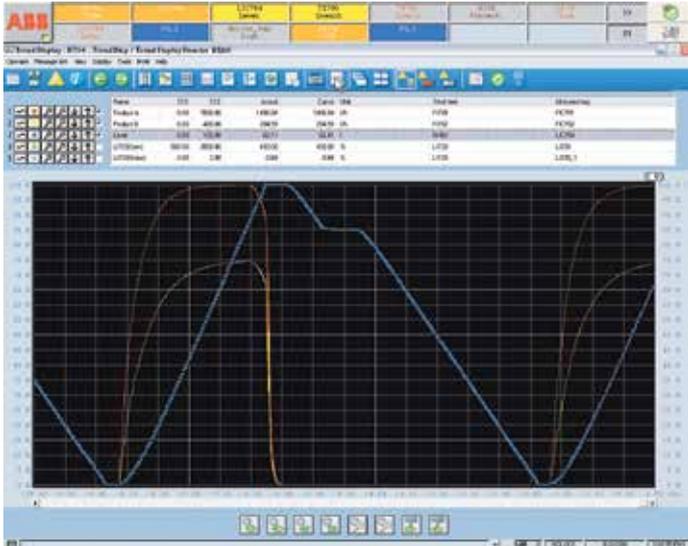


Figure 26: Trend display

The chronological sequence of analog and binary process variables can be displayed as a trend display.

The following can be shown in one trend display:

- Up to six signals in different colors
- The associated measuring point name with short text
- The current measured value with scale and unit used

The trend display can be altered by:

- Moving the time axis to show previous values
- Hiding trends
- Increasing and decreasing the signal range
- Selecting specific settings for each trend progression (e.g. color or interpolation)
- Highlighting individual trend curves
- Using a variable time range (seconds through to weeks)

If a trend display is configured with archiving, the measured values are recorded as a cyclical function of the operator station. The archived values can be backed up on any data medium or sent via file transfer protocol (FTP) to any subscriber on the Ethernet.

They are then available for further evaluations and can be exported in CSV¹ format using the separate DigiBrowse software. The original data is binary coded and therefore protected against manipulation.

¹ CSV = comma separated value, a format in which data can easily be imported into Microsoft Excel and evaluated.

User-defined trend displays

Operators can compile any process values in a trend display themselves by selecting the required process values from a list of all variable names. No additional engineering effort is necessary. The task of archiving this trend data on the hard disk of the operator station PC can also be carried out easily in the same way.

A prerequisite for user-defined trends is that the system contains a trend server.

7.3 Messages & operator hints

Process disturbances are detected by the controllers and forwarded to the operator stations with a timestamp.

The Freelance system allows the following message types: system alarm (S1-S3), process alarm (P1-P4) fault message and operator hint message (P5). Process alarms are divided into fault messages (P1-P3) and switching messages (P4). When parameterizing the function blocks, it is possible to assign up to 4 messages to its limit monitoring units integrated into the block. Whereas the internal controller time is generally used for the timestamp for messages, you also have the option of using a special function block to assign external timestamps to alarms. In this way, for example, you can generate an alarm from a device connected to the Modbus in the correct chronological order with the device's timestamp. Different methods of acknowledgement can be selected for each priority level. Incoming messages are displayed in different colors, along with the name and disturbed status of the tag in accordance with their priority.

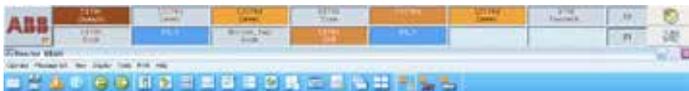
Message line

The upper area of the display is always reserved as a message line for the higher-level display of all message types from the entire process.

The message line optionally displays either the newest or oldest messages, as well as buttons for acknowledging messages and viewing operator hints. There is also a field for indicating overflow, a field for acknowledging alarms and a field showing the number of unacknowledged messages in the message list. For quick operation, the faceplate of the disturbed tag can be accessed directly from the message line.

Operators can choose between three different message line views:

- Standard view



- Area view



- List view



Message list

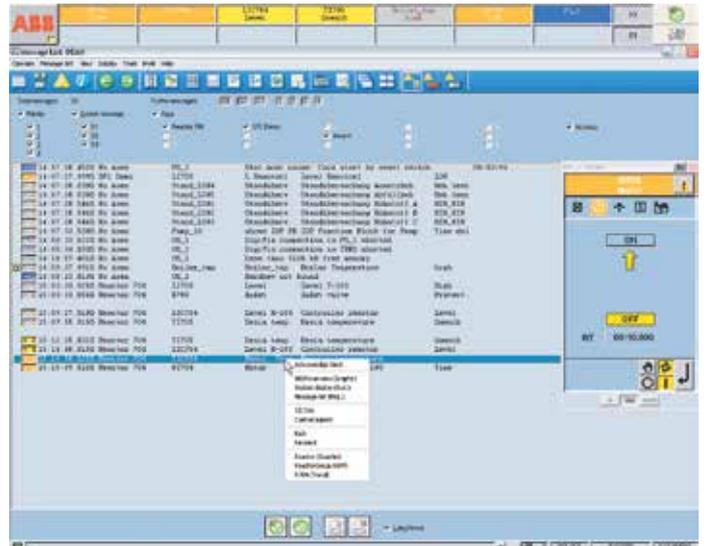


Figure 27: Message list

The message list offers an overview of all pending messages. It features a chronological list of fault, switch and system alarm messages. The latest message is placed at the beginning or end of the list, as configured. This message sequence can be altered by configuration.

Just as in the message line, different priorities are color-coded. Messages can be acknowledged both by block and by page. To provide a better overview, the user can filter certain priorities or plant areas on the screen display.

Other displays belonging to the tag, such as faceplates, graphic or trend displays, can be selected via tag specific aspect navigation from the message list simply by a right-click.

Operator hint list

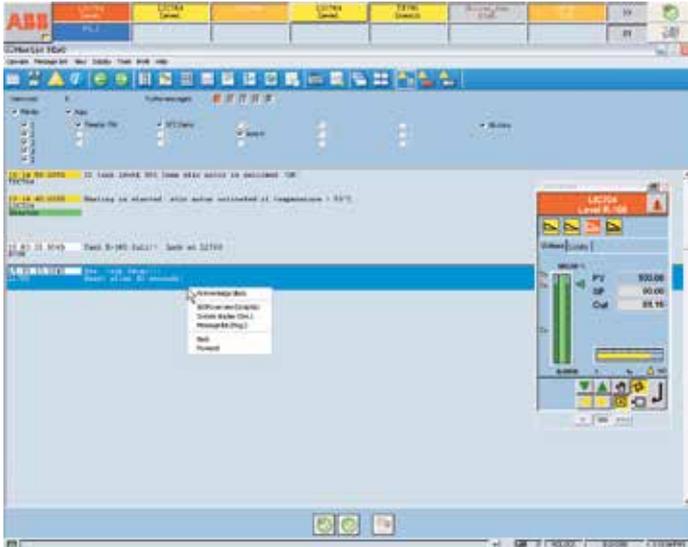


Figure 28: Operator hint list

A hint for the operator can be configured for each process alarm or event. Hints are intended to inform the operator about the cause of the message or about the procedure to be adopted for eliminating a process alarm. If necessary, hints can also provide further user help.

All configured hints are displayed in the hint list. Faceplates or other displays can also be called up directly from the hint list to operate a tag or analyze critical process situations.

Logging

Logs are used to document events, states and sequences from the process. Log files can be displayed on the screen, printed, and saved on a CD, DVD, or memory stick for further evaluation.

In addition, the archived files can be automatically sent to any subscriber on the Ethernet via the file transfer protocol. The DigiBrowse software makes it possible to view the data and to convert it into ASCII (CSV file) for further evaluation, for instance using Excel.

The Freelance system features the following log types:

Signal sequence log

The signal sequence log is used for logging events such as process and system messages, switching messages and hints. Even operator intervention can be logged in detail together with the user name and timestamp. The user can determine which message priorities are to be logged. Process messages and alarms are logged with time stamps of 1 ms resolution. "Signal sequence log 1" allows the operation of a line printer in order to immediately print every alarm when it is received.

Operation log

At certain intervals or in certain situations, the plant log records the current values or states of process variables. It can run cyclically, or can be started and stopped manually or by an event. The output format is freely configurable as table or fill-in-the-blanks text.

Disturbance course log

The disturbance course log is used to examine the course of disturbances. The process values before and after a disturbance are recorded with a high time resolution and archived in an operator station. Four logs of each type can be configured in one operator station.

System diagnostics

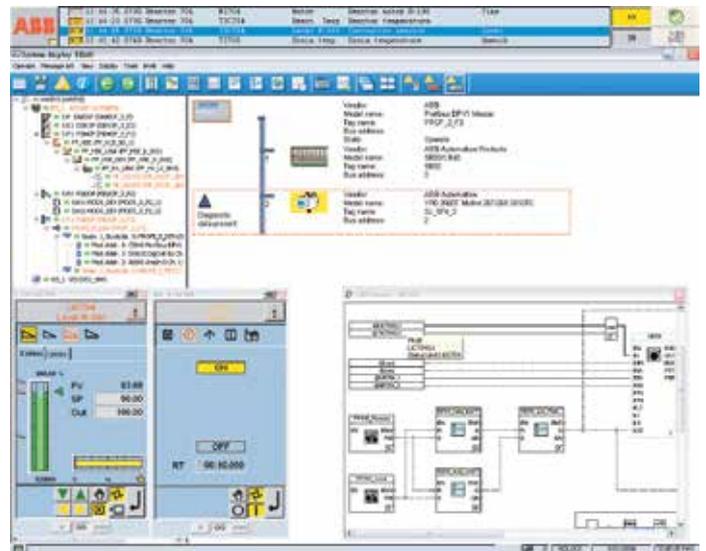


Figure 29: Easy system diagnostics with the system display

The current state of the hardware and software of a Freelance system is shown in the automatically generated system display. Here, information can be obtained in various degrees of detail about the status of an individual controller to a specific field device.

The simple system display is available to all operators of a DigiVis operator station. Additional information is also available for field devices on Profibus or FOUNDATION Fieldbus.

7.3 Software subscription

Name	Short Description	Article No.
Automation Sentinel Upgrade	Provides software licenses for upgrades/updates free of charge based on an existing and valid 'Automation Sentinel' agreement. For Freelance systems < 6.2 indicate the DigiTool/DigiVis. hardkey number and for a system replacement enter the text "New Hardkey". Enter the "System ID" into the "Quotation ID" input field of the Wizard.	2PAA103267R01

7.3 DigiVis languages

Name	Short Description	Article No.
Changing the current language	Changing the current language Indicate the DigiVis hardkey number and the new language. Setup CD and the documentation manuals in the chosen language are to be ordered additional. The language change becomes part of the existing Software Management Program.	3BDS008503R07
English language	English language	3BDS008502R0701
German language	German language	3BDS008502R0703
other languages	DigiVis is available in many other languages. Please refer to the price list.	see price list

7.3 DigiVis license V10.1

Name	Short Description	Article No.
DigiVis	DigiVis, Software License	3BDS008790R07
DigiBrowse	DigiBrowse DigiBrowse doesn't need a hardkey.	3BDS008792R067
Combined Workplace	Expands an engineering workplace to a combined workplace (Control Builder + DigiVis). Only in combination with Control Builder F licenses. A Combi Hardkey will be required for each workplace	3BDS008794R07

7.3 DigiVis options

Name	Short Description	Article No.
DigiVis Combi-Version	DigiVis Combi-Version Allows for engineering and operation on the same workplace (PC). Only in combination with Control Builder F.	3BDS008794R07
WEB Display run time	WEB Display run time Enables a DigiVis Station to execute a configured Web Display. Enables a Combi Station to execute a configured Web Display.	3BDS008785R07
Dual Monitor Support	Dual Monitor Support For a single operator station. A graphic interface with dual monitor support is required. See release note.	3BDS008784R07
Control Aspect	Control Aspect Display (read only) of Control Builder F function block diagrams in DigiVis.	3BDS009973R07
Extended Diagnostic	Extended Diagnostic A Control Builder F Professional license supporting the Security Lock function is recommended. Intended only for use with one DigiVis station per system.	2PAA102040R07

7.3 DigiVis hardkeys

Name	Short Description	Article No.
Combi Hardkey	Combi Hardkey for Parallel Port Hardkey for DigiVis and Control Builder F.	3BDH000196R1
Combi Hardkey	Combi Hardkey for USB Hardkey for DigiVis and Control Builder F. DigiBrowse doesn't need a hardkey.	3BDH000196R2
DigiVis Hardkey	DigiVis Hardkey for Parallel Port	3BDH000197R1
DigiVis Hardkey	DigiVis Hardkey for USB Port	3BDH000197R2
Replacement Hardkey	Replacement Hardkey This will render the old hardkey obsolete. Licenses noted for the old hardkey will be moved to the replacement hardkey. Indicate the hardkey number of the key you want to replace.	3BDH000199R1
Change Hardkey	Change Hardkey type to USB Port For PC replacement without parallel interface. This will render the old hardkey obsolete. Licenses noted for the old hardkey will be moved to the replacement hardkey. Indicate the hardkey number of the key you want to replace.	3BDH000199R2

Chapter 8 Freelance Engineering (Control Builder F)

With Freelance, all engineering work is performed with one single tool, Freelance Engineering, which works hand in hand with the visualization and operation tool Freelance Operations. Configuration of all plant objects – ranging from process graphics to field devices and operation of the entire plant – is easy and intuitive to perform.

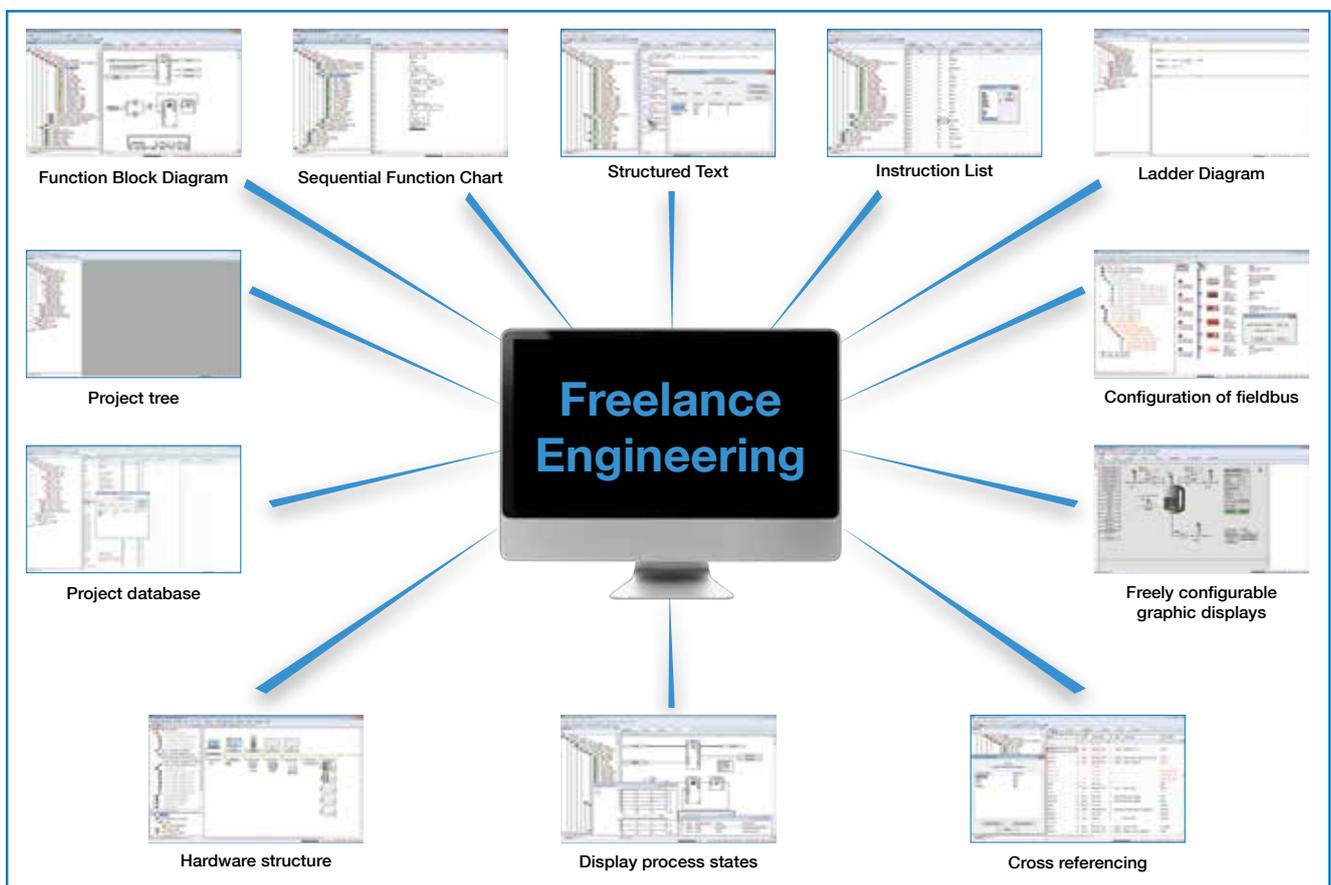
The entire Freelance system can be configured either online, while the engineering tool is connected to a controller, or offline. For offline configuration, no controller is necessary. The application program, that was created during offline configuration, can later on be downloaded to a controller.

In particular, this is also true for FOUNDATION Fieldbus configuration, whereby Control Builder F can be used to generate the control-in-the-field application even without any devices being available.

Freelance Engineering offers the following features for configuration, parameterization and commissioning:

- A single software tool for configuration of the automation functions, the operator interface with displays and logs, and fieldbus parameters.
- Graphical configuration with powerful editors according to IEC 61131-3: Function block diagram (FBD); Instruction List (IL); Ladder diagram (LD); Sequential function chart (SFC) and Structured text (ST).

- A function block library with more than 220 tried and tested functions, greatly exceeding the basic ones outlined in IEC 61131-3.
- An extensive macro library containing more than 200 graphic symbols, which can be extended by the user.
- A project tree for flexible program generation and transparent program structuring.
- Verification of automation functions, with the chance to find and remove errors quickly and easily.
- Cross-reference function allowing variables and tags to be found easily in any editor right up to the graphic display.
- Importing and exporting of programs, displays, variables, tags and parts of the project tree.
- Password protection to prevent unauthorized project modification.
- Password protection for user-defined function blocks.
- Uniform and auto-generated system-wide graphical documentation of the entire user program, system communication and all field device parameters.
- Project file (application) backup on any data medium (hard disk, CD, memory stick, etc.). The project file includes the complete project with all programs, graphics, controllers, and field device parameters.
- Testing and simulation of user programs (e.g. interlocks) even without connected hardware using the controller emulator.
- Bulk data manager allows to import signal lists from planning tools via Excel and fast duplicating of typical solutions.



Project tree

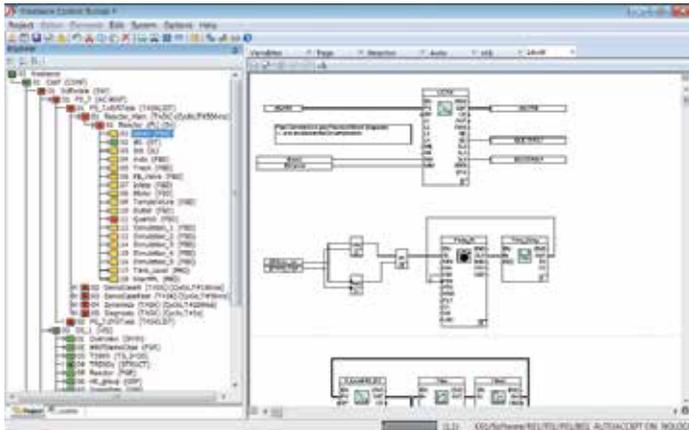


Figure 30: Project tree with Function Block Diagram

The project tree is the central instrument for managing the entire user program and commissioning. All project configuration data is displayed as a tree structure.

Within the project tree:

- The configuration data in a project is structured
- Task levels and cycle times are defined
- Programs are assigned to the task levels
- Programs, displays and logs can be opened for editing, copied and moved
- Programs are checked for plausibility and their processing status displayed
- Project configuration data is exported and imported
- User programs are loaded into the process and operator stations

Project data base

Name	Type	Area	Long text	Table name
11000_1	PLC	No Area		
11000_2	PLC	No Area		
11000_3	PLC	No Area		
11000_4	PLC	No Area		
11000_5	PLC	No Area		
11000_6	PLC	No Area		
11000_7	PLC	No Area		
11000_8	PLC	No Area		
11000_9	PLC	No Area		
11000_10	PLC	No Area		
11000_11	PLC	No Area		
11000_12	PLC	No Area		
11000_13	PLC	No Area		
11000_14	PLC	No Area		
11000_15	PLC	No Area		
11000_16	PLC	No Area		
11000_17	PLC	No Area		
11000_18	PLC	No Area		
11000_19	PLC	No Area		
11000_20	PLC	No Area		
11000_21	PLC	No Area		
11000_22	PLC	No Area		
11000_23	PLC	No Area		
11000_24	PLC	No Area		
11000_25	PLC	No Area		
11000_26	PLC	No Area		
11000_27	PLC	No Area		
11000_28	PLC	No Area		
11000_29	PLC	No Area		
11000_30	PLC	No Area		
11000_31	PLC	No Area		
11000_32	PLC	No Area		
11000_33	PLC	No Area		
11000_34	PLC	No Area		
11000_35	PLC	No Area		
11000_36	PLC	No Area		
11000_37	PLC	No Area		
11000_38	PLC	No Area		
11000_39	PLC	No Area		
11000_40	PLC	No Area		
11000_41	PLC	No Area		
11000_42	PLC	No Area		
11000_43	PLC	No Area		
11000_44	PLC	No Area		
11000_45	PLC	No Area		
11000_46	PLC	No Area		
11000_47	PLC	No Area		
11000_48	PLC	No Area		
11000_49	PLC	No Area		
11000_50	PLC	No Area		

Figure 31: Tag list with cross references

All configured signals, variables and tags are managed in the Freelance system as lists in a common project database:

- List of variables (inputs, outputs, internal variables)
- Tag list (function blocks)
- Graphics
- Programs

Because the database is system-wide, data only needs to be entered once, avoiding further potential errors during configuration. The single project database file makes archiving or backup ease of use.

The list of variables and tags is created automatically when a user program is generated.

Other list functions include:

- Project-wide modification of name, comments, data or module type
- Search and display based on specified search criteria
- Cross-reference function permitting rapid, system-wide location of all programs and displays in which a selected variable or tag is used. This makes debugging very easy to do.

Operation and observation functions

The following functions can be configured for operation and display:

- Custom graphic displays
- Web displays
- Standard display types: overview display, group display, trend display, time scheduler display
- SFC display
- Signal sequence, disturbance course and plant log
- Message list and message line
- Operator hint list.

Since the common system database is automatically accessed while configuring these functions, there is no need to re-enter the data.

Standardized displays (pre-engineered)

Standard displays can be configured very easily using Control Builder F. To configure a group display, for example, it is only necessary to select the tags via the selection list. The entry is made automatically.

In this manner, up to 10 large analog faceplate tags can be entered per group display. The configuration procedure for the overview display is equally simple, as the containing displays are entered from a selection list.

Freely configurable graphic displays

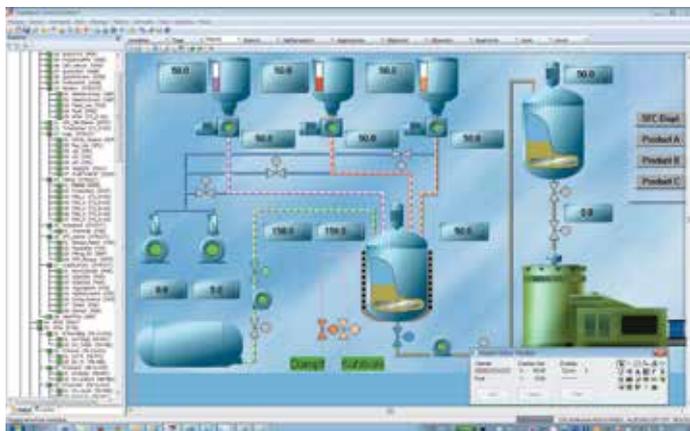


Figure 36: Graphics editor

Plant-specific graphic displays can be constructed for displaying the process. The graphic displays contain static and dynamic display elements.

The static part of the plant display – the background display – is composed of separate graphic elements which can be modified in color, line type and filling pattern and can, for example, display the schematic plant layout.

The following constructional aids in the system make it easier to create displays:

- Static elements such as lines, polylines, rectangles, polygons, ellipses, arcs and texts are created, for example, by specifying the start and end points
- Display sections already created can be duplicated, moved, rotated in 90° steps, transposed or superimposed
- The combination of several graphic elements can be saved as a macro and stored in libraries to be used when desired
- The zoom function facilitates precise construction of the individual graphic display elements
- Import of bitmap files facilitates the generation of static background displays

The process variables are displayed in the dynamic section of the display – the foreground display. Specific process variables can be visualized simply by making the display elements dynamic.

The following types of dynamic elements can be used: Bar graphs and dynamic filling set to operate in different directions

- Superimposed numerical values and text variables
- Trend window
- Color change or symbol change to depict states
- Continuous or discrete position modifications of the graphic symbol
- Keys (buttons) for the direct execution of actions (e.g. write value or similar)
- Animated objects, e.g. mixers that turn realistically
- Tool tips

Selection fields can be defined at any position so that the operator can access any other displays using the mouse or keyboard.

8.3 Hardware structure

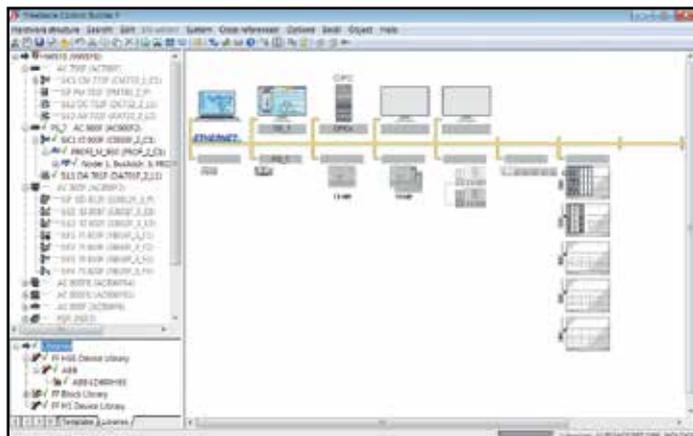


Figure 37: Definition of the hardware structure

The required hardware structure can be configured in a graphical system overview and the system communication can also be defined there. It is possible to assign particular DigiVis operator stations to specific controllers. Furthermore, detailed information can be obtained on the operator and process stations, together with their modules and the controllers with their connected fieldbus lines. In the station overview display, the operator and process stations can be equipped using selection lists. Specifications for processing, display and I/O channel assignment can be made for the individual modules of the controllers.

And all this with just a few clicks.

Fieldbus and field device configuration

The respective bus parameters, for instance the baud rate, number of subscribers and time constants, can be set for each fieldbus module. Control Builder F also suggests a setting for the bus parameters in line with how the fieldbus is equipped. This makes work easier for those new to the subject.

PROFIBUS

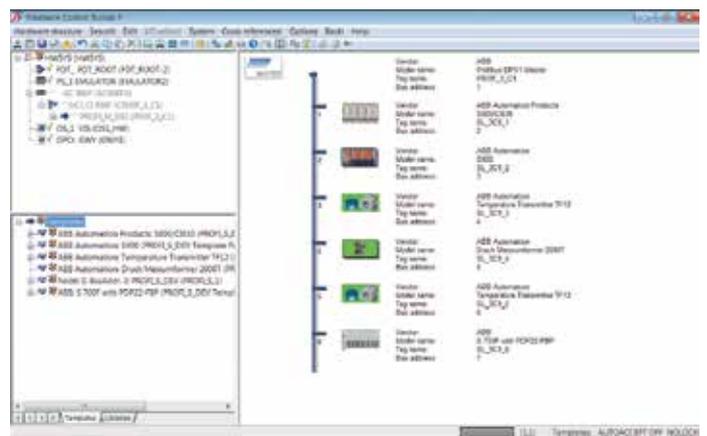


Figure 38: Configuration of the fieldbus line (PROFIBUS)

In the configuration view of the fieldbus line, new PROFIBUS slaves can be integrated into the fieldbus line using a GSD-file or FDT technology.

Using the template concept, it is also possible to integrate completely pre-configurable PROFIBUS slaves by means of drag and drop. The intelligent DP / PA Linking Device is transparent with regard to configuration, allowing PA devices to be viewed as if they were connected to the PROFIBUS DP. Parameter definition screens are then available in the device display for defining parameters for both remote I/O and PA field devices.

HART

HART devices connected to the S800 or S900 Remote I/O can be configured with the aid of HART DTMs. For S900, also HART templates can be used. They consist of preconfigured DPV1 services which tunnel a HART command via the PROFIBUS to the HART device on the analog channel of a particular S900 I/O module. Users can also create HART templates themselves.

8.3 Commissioning

FOUNDATION Fieldbus

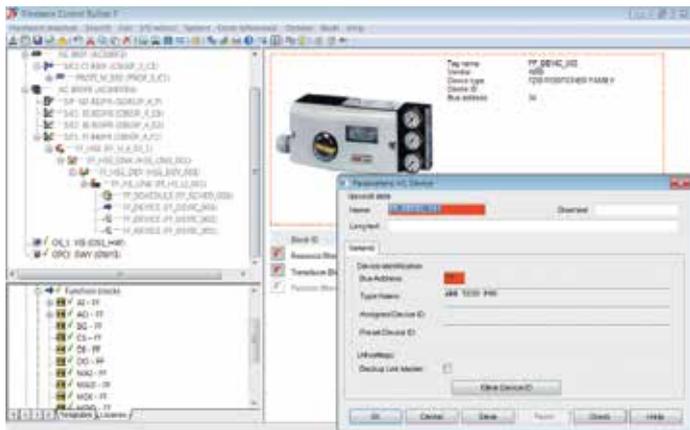


Figure 39: Configuration of the fieldbus line (FF)

The devices are configured in the feedforward part by linking the Device Description (DD) files. This makes it possible to configure the FF without the field devices being physically connected to the controllers.

The devices are configured on the H1 links of the LD 800HSE Linking Devices. As Control Builder F supports control in the field for FF devices, it is possible to configure function charts that interconnect the function blocks in the individual FF devices. Control Builder F then automatically generates a process that is passed on to the Link Active Scheduler (LAS). Redundant Link Active Schedulers are also supported. However, it is also possible to use the FF devices “only” as I/O suppliers and use the function blocks in the controllers.

Graphical documentation

The fully graphical forward documentation allows configured programs and displays to be printed. The documentation is always up-to-date, as the current configuration data is accessed. Various sorting criteria, such as drawing numbers, assure an orderly and transparent output of the data to be documented.

The scope of documentation can be specified as desired by the user, such as:

- Program and display contents, cross references, parameter definition data and comments
- System overview and hardware configuration

The documentation specification can be stored for future use. The FBD, IL, LD, SFC and ST programs, displays, etc. are documented in the form in which they appear on the screen. Using Freelance documentation management, complete or partial project documentation can be produced without effort. It is also possible to include bitmaps (such as customer logos) in the drawing footer.

During commissioning, the user programs are loaded into the operator and process stations. It is also possible to:

- Load modifications
- Start and stop process stations
- Start, stop or reset tasks
- Define and activate parameters for function blocks
- Define and activate parameters for field devices
- Display, set and track process values
- Combine any process values at any time in a trend window
- Perform version and status checks
- Perform system diagnoses right up to the field device

Displaying process states

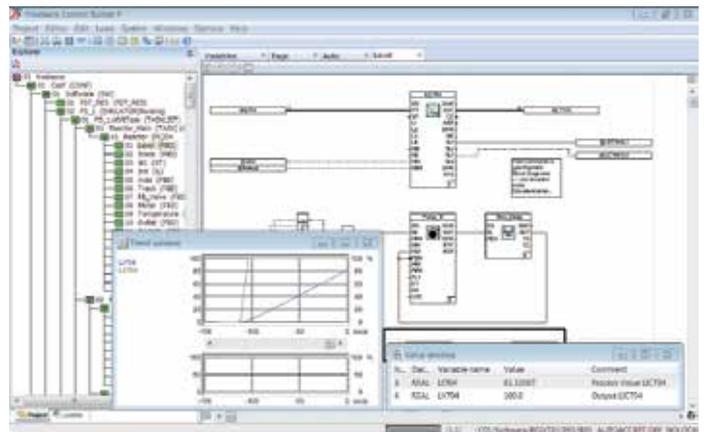


Figure 40: Trend and value window during commissioning

The editors for displaying the configured programs can also be accessed during commissioning. As opposed to during configuration, the process states of the I/O variables are also displayed in the program.

The status of the binary process signals is displayed in the FBD display by a change in the graphical representation of the signal flow lines.

Value and trend windows are available for displaying process values. They offer an optimal overview of the current process values for commissioning and test purposes.

Here, the user is not restricted to the display of I/O variables for the program currently shown on the screen. Variables from other programs and / or controllers can also be displayed, as well as values from connections between various function blocks of the current program.

Modifying parameters

Parameters can also be modified during the commissioning phase, allowing optimal program settings for the process. These parameters can be altered from either the engineering station or the operator station.

Whether the changes made are retained permanently or only temporarily is decided by the commissioner.

Through a parameter upload, it is possible to view all parameter modifications made in a particular period of time and to select those which are to be saved in order to be used at the next cold start.

Other features allow you to force inputs and outputs and to specify new values for simulation purposes.

Commissioning the fieldbus lines

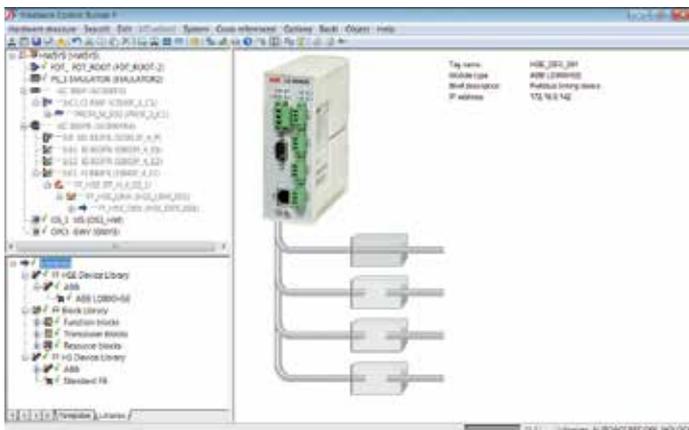


Figure 41: Online diagnosis of fieldbus components

PROFIBUS

The fieldbus line overview shows whether the configured PROFIBUS I/O and PA devices are available. In addition, the bus can be scanned using Control Builder F in order to detect new or incorrectly configured devices. Such devices can then be given the correct address from Control Builder F via the PROFIBUS.

During commissioning, Freelance allows you to compare configured parameters with the parameters that exist in the device. This makes it possible to detect device parameters that have been changed locally and transfer them to the configuration by means of uploading. When the PROFIBUS device transmits diagnoses, they can be displayed by Control Builder F. When FDT / DTM technology is used, specific diagnostic options can be used, provided that the device manufacturer has incorporated such options in the DTM.

Individual PROFIBUS devices can be removed from cyclical data traffic in order to perform maintenance without it being necessary to stop the fieldbus.

FOUNDATION Fieldbus

Live lists displaying which devices exist are available for HSE and H1.

During commissioning, Freelance allows you to compare configured parameters for the device modules with the parameters that exist in the device. This makes it possible to detect device parameters that have been changed locally and transfer them to the configuration by means of uploading.

The Link Active Scheduler (LAS) can be stopped in order to interrupt processing of the control loops in a H1 link.

8.3 Control Builder F languages

Name	Short Description	Article No.
Changing the current language	Changing the current language Indicate the Control Builder F hardkey number and the new language. Setup CD and the user documentation in the chosen language are to order additional. The language change becomes part of the existing Software Management Program.	3BDS008503R07
Available languages	Control Builder F is available in various languages, such as English, Chinese, French, German, Brazilian Portuguese. For article numbers see the price list.	see price list

8.3 Control Builder F license

For an executable system is necessary:

- One setup CD
- One Control Builder F license
- One hard key (part of Control Builder F license)
- One Control Software license for every used controller (station)

Name	Short Description	Article No.
Control Builder F Standard	Software License Control Builder F Standard supports: - 16 Character Tag Names - User Defined Function Blocks (Runtime license) - OPC Function Block Classes (runtime license)..	3BDS008510R07
Control Builder F Professional	Software License Control Builder F Professional supports: - all features of Control Builder F Standard - Security Lock - Creation of User Defined Function Blocks (developer license) - Creation of OPC Function Block Classes (developer license) - FDT Technology - DTM Device Driver Please check the list of DTMs which are approved by ABB for use with Control Builder F in version 2013. Order one Control Builder F hardkey for each engineering workplace.	3BDS008520R07

8.3 Control Builder F options

Name	Short Description	Article No.
WEB Display Configuration	WEB Display Configuration Enables Control Builder F Standard and Professional to configure Web Displays.	3BDS008786R07

8.3 Control Builder F hardkeys

Name	Short Description	Article No.
Control Builder F Hardkey	Control Builder F Hardkey for Parallel Port	3BDH000198R1
Control Builder F Hardkey	Control Builder F Hardkey for USB	3BDH000198R2
Replacement Hardkey	Replacement Hardkey This will render the old hardkey obsolete. Licenses noted for the old hardkey will be moved to the replacement hardkey. Indicate the hardkey number of the key you want to replace.	3BDH000199R1
Change Hardkey	Change Hardkey type to USB Port For PC replacement without parallel interface. This will render the old hardkey obsolete. Licenses noted for the old hardkey will be moved to the replacement hardkey. Indicate the hardkey number of the key you want to replace.	3BDH000199R2

8.3 Control - Software license

This Price List contains software licenses for the following controllers:

- AC 900F
- AC 800F
- AC 700F
- DCP 02/10, DFC 01/02

This license releases the specified number of controllers (process stations) in the Freelance project tree. For every used controller (process station) one license is needed:

- One redundancy couple = 1 controller = 1 control software license;
- Gateway (e.g. OPC) = no controller = no control software license.

8.3.1 Base License

Control Software license supports:

- IEC 61131-3, binary and analogue
- Closed loop control
- DigiVis
- 800xA Operation and Process Portal B. Requires item B050.

Included in a controller license

- 50 I/Os
- Tune (Self tune PID)
- Sequence of Events SOE
- CSO Gateway
- Phase Logic Interface PLI
- Programming Interface API
- Modbus Serial
- Modbus TCP (AC 700F/ AC 900F, AC 800F will supported later with a Service Pack from Mid 2014)

Not supported with AC 700F/AC 900F

- - Foundation Fieldbus
- - Coupling Sartorius
- - Protronic Remote Control.

Name	Short Description	Article No.
Control Software license	Number of supported controllers incl. 50 I/Os each	2PAA110432R08

8.3.2 Additional basic I/Os

The maximum number of I/O license depends on CPU type and application. Please use DigiSize for load calculation. The number of I/Os relevant for licensing is determined by counting only those I/Os that are in use in the field.

Name	Short Description	Article No.
Set of 50 I/Os	Set of additional 50 I/Os	2PAA110433R08

8.3.3 Control software options

Additional option to Control Software Basic. This option must be ordered for every controller, where you want to use it.

Name	Short Description	Article No.
TeleControl	Support for IEC 60870-5-101 and -104 ICheck whether the implemented subset of functionality meets your requirements. IEC 60870-5-104 is currently not released with DCP 02/10 and DFC 01/02..	3BDS008758R08

8.3.4 Batch

Name	Short Description	Article No.
Freelance Formulation	Essential Recipe Manager This license includes a license for the Freelance Formulation batch application.	2PAA110436R08
Freelance Batch	Interface to Workflow Manager (BCM module) Please refer to Decathlon Suite WFM price list for the batch application (license)..	2PAA110437R08
Batch for Extended Automation	Interface to 800xA Batch Please refer to Extended Automation 800xA price list for the batch application (license).	2PAA110438R08

Chapter 9 Media and documentation

Product box

Name	Short Description	Article No.
Product Box	Freelance, Product Box Including Software CD, Documentation CD, Manual "Getting Started".	3BDS008536R0703

Software CD

Name	Short Description	Article No.
Freelance Software V2013	available in various languages	3BDS008531Rxxxx (see price list)

Documentation CD

Name	Short Description	Article No.
Freelance Documentation V2013	German and English CD	3BDD012530R0703

Chapter 10 Add-ons, extensions, and service



ABB is one of the world's largest suppliers of equipment, systems and services for measurement and process automation.

A crucial factor in maintaining this market position is the quality of our products, from manufacture right through to services. The DQS Certificate based on DIN ISO 9001 awarded to ABB Automation as far back as 1990 bears testimony to this fact. The same applies for the EQNet Certificate based on ISO 9000/EN 29000.

Comprehensive customer service

Service means a profitable investment in continually maximizing and optimizing the availability, performance, quality and security of a plant. ABB's support covers the following areas:

- Customer Support Services
- Training
- Spare Parts & Logistics, Repair Shops
- Process, Application & Consulting Services
- Service agreements
- Extensions, upgrades and retrofits

Through the resulting specialization of our employees, we ensure maximum competence for each task we perform. Whether it's more traditional service support such as commissioning and maintenance or individual consulting services – the result is measurable customer benefits.

Our comprehensive Life Cycle Services enable us to increase the value of your plant over its entire lifetime. The conventional, reactive service can reduce production downtimes, while the use of new technologies offers an increased number of capabilities for preventive service measures to identify and

avoid cost-intensive faults at an early stage. Proactive services such as asset management or ongoing modernization increase the value of our customers' plants and give them a distinct competitive edge.

Life cycle management

Automation Sentinel is ABB's control system life cycle management and support program. With this program, you can keep your control system up-to-date and maintain a flexible path to new technology. Automation Sentinel helps manage automation software assets with timely delivery of the latest Freelance releases, thus providing you with better productivity, lower support cost and simpler software management. Migration from traditional control systems to Freelance enables ease-of-use and lower maintenance cost.

One valuable service of the Automation Sentinel program is the secure, web-based platform My Control System. It provides detailed information about your installed software, as well as operational data such as alerts and reports (including health status, performance, safety, and security reports) and all that in a single location.

More information about Automation Sentinel can be found in "Chapter 11 Automation Sentinel Program" on page 205.

My Control System presents, in dashboard format, important information about the control system's subscriptions and software licenses in terms of content, expiry dates, tools and license key downloads. All this data is available with just a few clicks. For convenience, the ABB local service contact information is listed on the starting page.

Using My Control System to access pre-filtered information dedicated to your installed control system can help you lowering your total support cost and reduce after-hours support or service calls.

Asset Management

If you want to keep your production plant up and running in the long term, you need information about the availability and degree of wear and tear of your equipment. All of the information necessary for this is available; integrated and included in the basic software package of the Freelance control system. As a result, several customers have been able to avoid making investments that appeared essential but were in fact unnecessary. Freelance allows the use of modern asset management methods for more efficient maintenance and optimization – helping for instance to make optimum use of plant capacity.

System Integration

Our instrumentation and control specialists, or our certified partners in system integration, will be happy to assist you in planning and implementing your automation project. ABB Automation's staff can also work with you to plan and implement the installation of a Freelance system in your plant.

Under this arrangement, the ABB Automation Engineering Department will compile the specific project documentation for you. This can include functional diagrams, circuit diagrams, configuration documentation, and operating documentation including system descriptions and instructions for operation, modes of operation and plant maintenance.

At many sites, ABB Automation has its own commissioning engineers who work together with planning engineers, process instructors and operators to commission your plant, optimize it, perform a test run and hand over the system to the operator.

Training

To make sure your operators are fully knowledgeable in the operation of the Freelance distributed control system, we offer a range of technical training courses.

In addition, we offer a computer-based training program for Freelance on a multimedia DVD. This will provide you with the basic knowledge you need for configuration, therefore allowing you to start using the system very quickly and efficiently.

Chapter 11 Automation Sentinel Program



Automation Sentinel is ABB's control system lifecycle management and support program that assists system owners to actively manage their control system lifecycle, support and maintenance. With this program, system owners can keep their control software up-to-date and maintain a flexible path forward to new system software technology. This program provides the fundamental software support deliverables required to maintain operation and maximize the availability of the installed Freelance control system.

Features and Benefits

Deliver Freelance software services to match operations needs

- Functionality to address increased performance demands
- Respond faster to production changes
- Higher production availability (24/7 operations)

Supports lifecycle management of control system software assets

- Make informed decisions
- Predictable costs for accurate budgets – remove uncertainty
- Eliminate unplanned upsets and trips due to system interruption

Lowers system software lifecycle costs and risks

- Extending the life of automation system
- Protects intellectual property investment
- Provides software upgrades to newer software versions

Extends lifecycle support periods for Freelance System software versions

- Provides software support for up to five years

Provides comprehensive software support and maintenance

- On-line access to software downloads
- On-line access to software product documentation
- Technical phone support to troubleshoot product and configuration issues

ABB offers two levels of services with options which are designed to be flexible to meet the varying needs of system owners: Maintain and Maintain Plus. Please see the table on the following page for a listing of the services provided in each of these options.

Furthermore, if you like to extend a Freelance system with 800xA Operations, a third level called Maintain and Evolve is available as well. See the System 800xA Pricelist.

Benefits:

- Extends the support of the system investment
- Provides flexibility in deciding when the timing is right to perform a system upgrade
- Ensures system owners can continue to use their software in their system with predictable support results
- Production environment
- Locate manuals for control systems on-line quickly and easily.

Overview maintain services:

System Lifecycle Needs	Description	Maintain Plus	Maintain
Enhancement	New software license versions / enhancements	•	
Maintenance	Software maintenance updates	•	•
	Extended version maintenance	•	•
	Device Library management updates	•	•
	Early access to software patch	•	•
	Product technical phone support	•	•
	Software security management	•	•
	On-line access to SolutionsBank	•	•

Subscribers are entitled to the following services, based on selected program options:

New software license versions / enhancements

Subscribers are eligible to upgrade their software licenses to new versions and/or receive enhancements of their existing products at no additional cost.

Benefits:

- Lowers the cost of lifecycle maintenance through a predictable annual fee
- Add new functions and features (improving performance)
- Maintains operation on current and available third-party technology (PC's, Microsoft Operating Systems, etc.)

Software Maintenance Updates

Automation Sentinel subscribers are entitled to software maintenance for the current version of installed software products, including service packs, patches and updates.

Benefits:

- Minimizes unplanned plant upsets and trips
- Reduce maintenance costs with improved overall reliability (improving quality)
- Incorporates third-party product updates to ensure compatibility and on-going lifecycle support

Extended Version Maintenance

Automation Sentinel delivers extended lifecycle support for Freelance System software versions for up to five years. This is achieved by providing corrections of business critical issues and support for security management strategies throughout the software version's lifecycle.

Benefits:

- Extends the support of the system investment
- Provides flexibility in deciding when the timing is right to

Benefits:

- Extends the support of the system investment
- Provides flexibility in deciding when the timing is right to perform a system upgrade
- Ensures system owners can continue to use their software in their system with predictable support results

Device Management Library Updates

Subscribers are entitled to updates for ABB's Device Management Library which provides support for new and updated devices including PROFIBUS, FOUNDATION Fieldbus and HART device types.

Benefits:

- Access to new device types for easy integration into your system
- Provides support for the replacement of failed devices with the latest available device types

Early access to software patches

Automation Sentinel subscribers may request¹ a patch to a critical issue within ABB's software products in advance of the normally planned schedule for release.

Benefits:

- Access to business critical issue corrections that have a significant impact on your business / production
- Minimizes impacts to production availability

¹ Eligibility requires installing the latest available software release and is limited based on technical & economic feasibility

Product Technical Phone Support

Automation Sentinel provides technical phone support, troubleshooting and assistance with product, application and configuration issues and questions.

Benefits:

- Access to product experts for assistance in troubleshooting system or product issues
- Escalation to product design engineers for expert troubleshooting assistance

Software Security Management

ABB reviews, tests and validates monthly Microsoft security updates and third-party virus scanner software for compatibility with our control system software. A monthly qualification report is provided to subscribers.

Benefits:

- Minimizes users efforts in evaluation and testing of security patches
- Reduces risk of introducing an unvalidated patch into the production environment

On-line Support Tools

Your Automation Sentinel subscription includes access to ABB's 24-hour access premium control systems content delivered through SolutionsBank. Each system subscription is entitled to two user accounts with access to the following features:

Publications

Technical product information for ABB control products and systems.

- Technical Bulletins/Application Guides:
Keep up to date with technical supplements describing system maintenance and configuration procedures.
- Product Manuals:
Locate manuals for control systems on-line quickly and easily.
- Change Notices:
Access engineering documents, which detail modifications and control systems enhancements, including new software releases and hardware design changes.

Downloads

Browse information by control system type and download the latest service packs, release notes and updates.

AutoNotification

Automatic e-mail notifications regarding technical updates and product release information, filtered according to your pre-defined installed ABB control system profile.

Troubleshooting

KnowledgeBankSM includes a variety of hardware and software solutions generated from actual support cases, dynamically incorporated as they are validated. A natural language-query search engine easily locates solutions.

Video Library

AVIBank¹ (ABB Video Instruction Bank) provides video instruction files, which demonstrate step-by-step procedures for ABB software products and tools.

Forums

Forums provide an interactive environment for discussion groups by creating communication channels. Information, ideas and questions can be presented and exchanged with other users.

My Solutions Bank

Customize your views of content based on individual preferences. Product-specific views present publications and downloads for specific products or product lines.

Benefits:

- Lower support cost through access to ABB's online self-help database
- Download service packs and updates for immediate installation
- Reduction of documentation and software delivery times
- Meet demands for self-support tools and reference resources
- Reduce cost of after-hours phone support or service calls by accessing self-help on-line
- Provides just-in-time answers to frequently asked questions

1 Not available for all technologies

Chapter 12 Repairs



Handling of cases under warranty

The Ratingen Repair Service carries out repairs and handling of warranty cases.

Rudolf Cypek,
Email: rudolf.cypek@de.abb.com
Phone: +49 2102 12-251450,
Fax: +49 2102 12-1588

Support under warranty where some sort of emergency actions and site visits are required, are not covered. This is beyond the responsibility of the Ratingen feeder factory (no delivery of complete configurations).

Warranty covers parts only.

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