ABB Ability™ System 800xA®

Control and I/O Overview

Flexible Control and I/O solutions

Powerful and versatile portfolio equally effective for small hybrid systems and large integrated, automation and power applications.

AC 800M Control and I/O seamlessly integrate traditionally isolated process, power and safety devices and systems into the 800xA system environment.

This combined environment enables a simplified software representation of the plant, from on/off-type switches and valves to smart field devices, dedicated control systems, variable-speed drives, intelligent switchgear, protection relays (IED) and PC-based supervisory systems.

Digital solutions begin with the integration of field device information (configuration, documentation, process data, analytics) into the automation system. This integration is accomplished through the use of process controllers, I/O and fieldbus technologies.

System 800xA's Control and I/O provides the foundation for process, power and safety automation solutions. Key features include:

- Wide selection of communications modules for Ethernet-based fieldbus, serial and ABB equipment interfaces
- Multi-channel and single channel I/O options (including SIL rated safety I/O)
- Additional specialty and cost-efficient I/O options
- Scalable controller family with available redundancy for high availability applications
- Fault-tolerant hardware design with hot swap, HART and safety options
- Built in self-diagnostics
- Integrated engineering tools

Photographer: Mikael Sjöberg

How System 800xA Delivers

The AC 800M controllers and associated communications and I/O options use the same base hardware. A wide variety of CPUs, I/O types, communications modules and power supply options provide flexibility in terms of functionality, performance and size. This modular approach ensures commonality of features and functionality across the portfolio..

Fault-tolerant Design
Fault tolerance gives maximum availability. Robust design and redundancy options in all critical areas of the controller and its components eliminate single point of failures and secure maximum availability.

Self-diagnostics
Modules are equipped with self-diagnostics in the software. This reports faults to the system where alarms are raised and forwarded to operations and maintenance engineers. All modules are equipped with LEDs on the front, indicating functions and malfunctions in real time.

Online Upgradeable
Updating to the next version is supported by upgrade/update tools which minimize manual interaction and risk of downtime of the plant. Latest system enhancements include an installer-assisted online update with the system continuously controlling the plant.

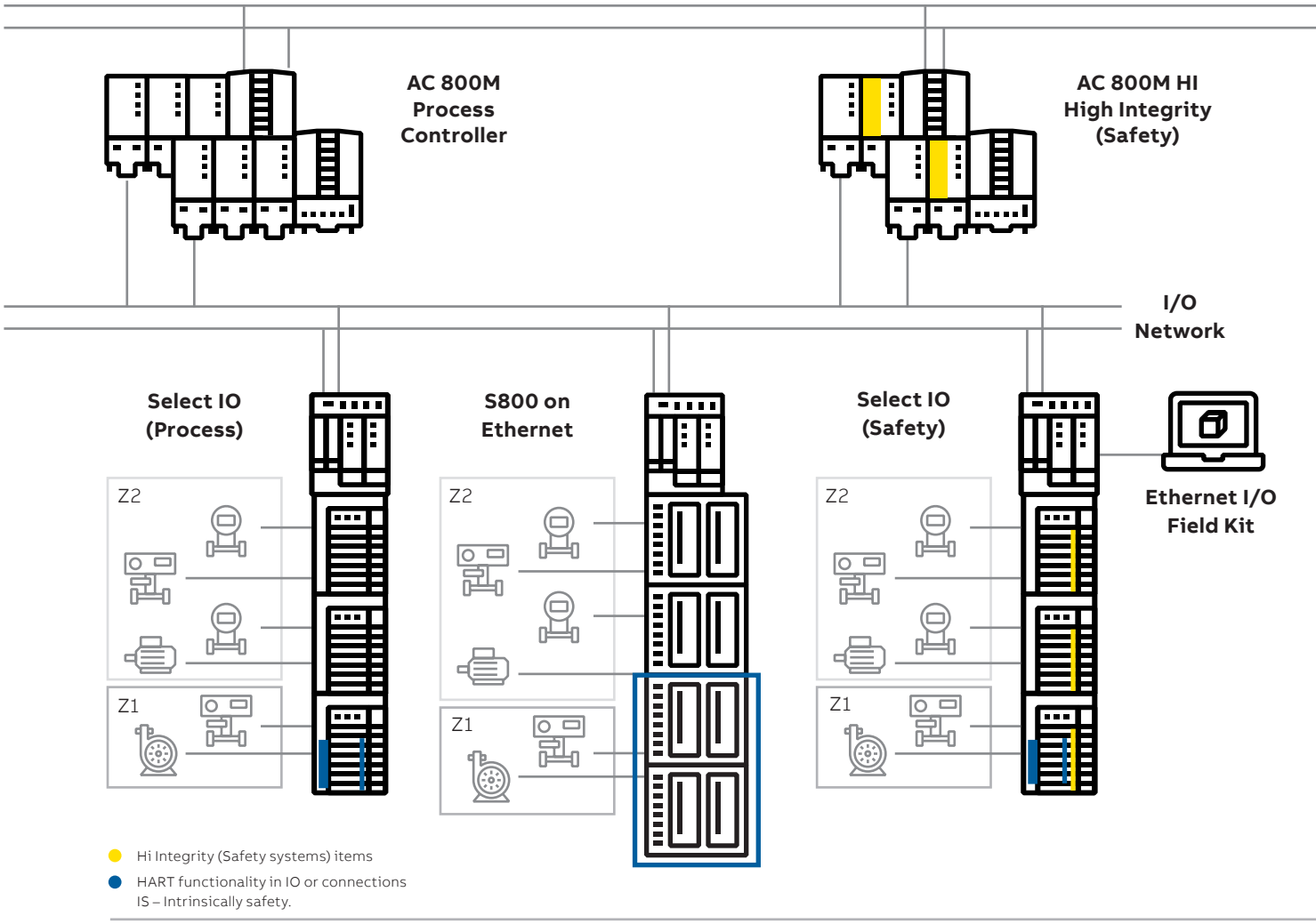
Hot Swappable Modules
A faulty I/O module can be replaced live, without powering down the station and without the rest of the station being affected. A hardware key ensures that only modules of the right type can be inserted.

DIN Rail Mountable
Rail-mounted modules include CPUs, communication modules, power supply modules and accessories. Connectivity and flexible expansion options make AC 800M exceptionally open and scalable, easy to connect and easy to adapt according to current control needs.

Low Power Consumption
Low power consumption allows for installation in sealed enclosures without requiring fans, louvers, air filters or other forced cooling techniques.

Certifications and Standards
General specifications include international certification and compliance: CE Mark, G3 (ISA-71.04), EMC, Electrical Safety EN 61010-1/EN 61010-2-210/UL508, TÜV (safety versions), Hazardous Locations (by module type), RoHS, WEEE.
See **https://800xahardwareselector.com/** for certifications by module.

The Power of Integration



NETWORK CENTRIC I/O

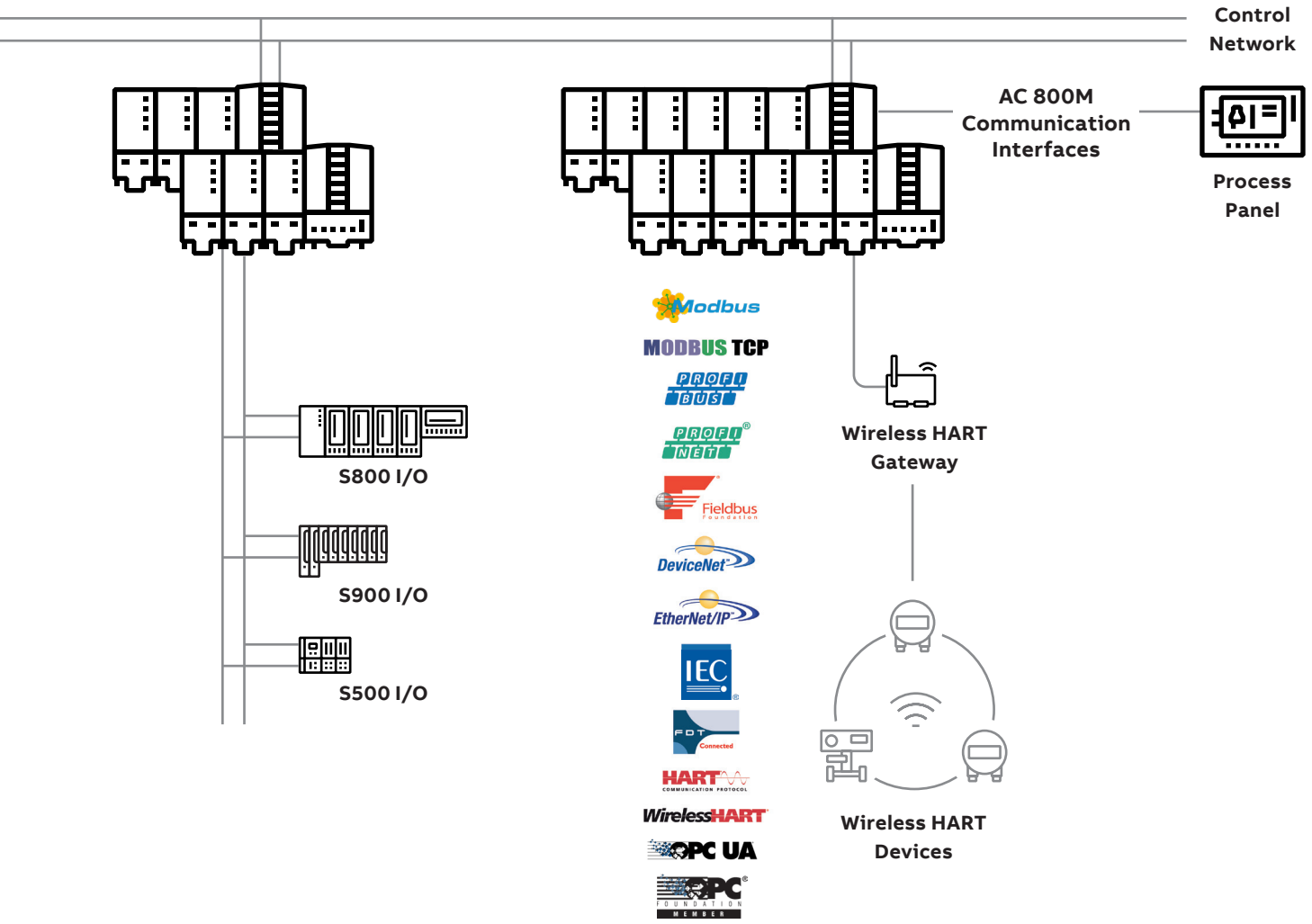
AC 800M Control and I/O seamlessly integrates traditionally isolated process, power and safety devices and systems into the 800xA system environment.

System 800xA's family of controllers, communication interfaces and I/O modules match the most challenging requirements in industrial automation thanks to ABB's rich experience in general and industry-specific process and power automation. Designed for installation in the field, close to sensors and actuators, AC800M Control and I/O helps eliminate installation costs by reducing field cabling.

The AC 800M controller family includes a selection of communications modules that make it possible to access a wide range of field devices and third-party systems. The interfaces include:

- Ethernet-based interfaces / protocols
- Serial communications
- Interfaces to ABB equipment
- Communication interfaces to heritage systems

The new System 800xA Industrial Ethernet I/O Network brings the remaining hardwired I/O into the system via a standard and future-proof Ethernet network. All available I/O options, including fieldbus technologies, serial protocols and hardwired I/O, work together seamlessly in a single control system communicating with smart and "dumb" devices alike.



With the industrial Ethernet I/O network, System 800xA can support protocols from simple daisy chain, to star to ring topologies. High availability configurations such as redundant daisy chain, redundant “ring of stars” and redundant ring provide the flexibility to handle almost any type of project requirement.

While fieldbus technologies have long enabled online configuration, provided access to diagnostic data and supported “soft” marshalling and late binding, the new System 800xA single channel Select I/O brings these same benefits to hardwired I/O. This includes utilizing the same Ethernet I/O network to seamlessly integrate traditional S800 I/O. Digital (soft) marshalling and late binding are now available for all I/O types.

Having additional hardwired I/O options means increased flexibility for control system network design as well as more efficient project execution.

800xA’s flexible I/O solutions together with new intelligent engineering tools enable:

- Choice of right I/O for your project
- Ethernet I/O options for future-ready new projects and expansions
- Hardware-independent engineering
- Digital marshalling
- I/O cabinets placed as needed in the field
- Elimination / reduction of marshalling cabinets

AC 800M Controller Family

Through its modular design and integrated engineering tools, AC 800M controllers contribute to lower costs, higher engineering quality and enhanced operating efficiency.

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01 AC 800M with CI modules on left hand and I/O module on the right

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02 PM867 controller with a SM812 module on left side.

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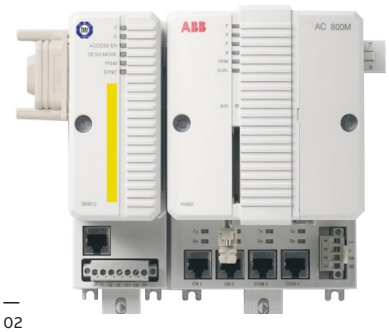

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AC 800M Controllers

The AC 800M 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.

Scalable and flexible for all environments
Equally as effective for small hybrid systems and as for large, high availability, integrated automation applications, the modularity of the AC 800M subsystem results in higher return on assets by providing the flexibility to choose the specific functions needed 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 systems may employ sub-clustered I/O assemblies connected to their host controllers via cable, fiber-optic or wireless industry-standard fieldbuses.

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

Designed for maximum reliability and availability
AC 800M controller subsystems are redundant at all levels – CPU, I/O, power, internal buses, fieldbuses and control networks for maximum flexibility and availability.

Redundancy at the I/O, controller and communication levels is available as options. For CPU redundancy, if a fault occurs in a primary circuit, bumpless transfer to the backup ensures uninterrupted operation. Implementing all redundancy options eliminates single-point failures, thus helping secure maximum availability.

Network redundancy is based on the ABB RNRP (Redundant Network Routing Protocol) and is designed for rapid detection of network failure and instant switching to alternative paths.

Compliance with international standards assures the highest level of reliability and quality needed to meet the most rigorous global specifications and requirements. Together, they provide users with fast, accurate, uninterrupted control of their process.

Security
The application and data can be stored in a detachable flash memory to secure its contents, e.g., after a power failure or during replacement or transportation.

On-board Communications
The AC 800M family of controllers come with several communications interfaces built into the main controller module. These interfaces include four RS-232C ports, a communication expansion bus connector for CEX-Bus and the Electrical ModuleBus for connection of the local I/O communications bus.

Battery-backup
The AC 800M controllers (except the PM891) come standard with an internal lithium battery for backup of memory and the real-time clock. In addition, standard and rechargeable external lithium batteries are available for extended battery life. System status monitoring is provided for the battery to ensure correct maintenance replacement times.

Flash Card
The application and data can be stored in a detachable flash memory to secure its contents, e.g., after a power failure or during replacement or transportation.

High Integrity

The AC 800M HI controllers, PM857, PM863 and PM867, offer a certified TÜV control environment for process safety applications in both integrated and stand-alone environments.

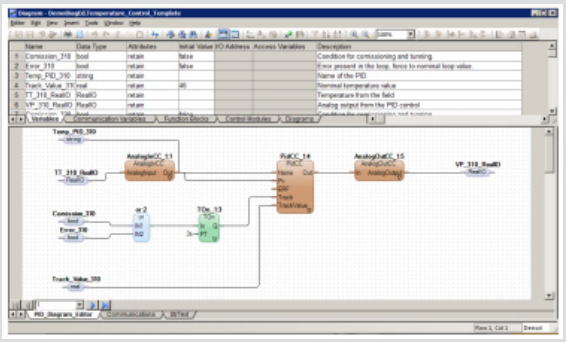
The AC 800M HI controller, in combination with a diverse co-processor, SM812, performs diagnostics and monitoring of application execution and I/O scanning. The HI controllers offer flexibility of network design as they can be used for integrated but separate safety operations or for fully integrated applications where safety and business-critical process control are combined in one controller without sacrificing safety integrity.

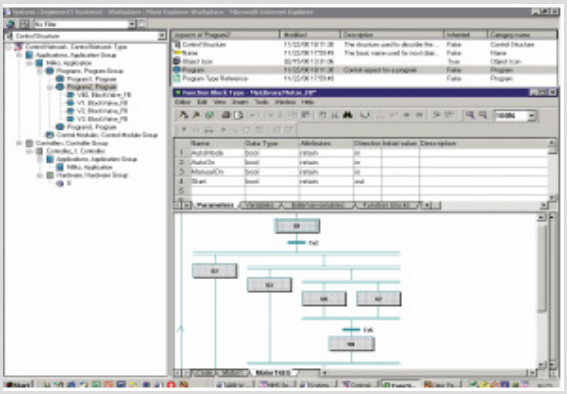
The SIL 3-rated, IEC 61508-certified AC 800M HI Controller is ideally suited for either.

Intelligent Engineering for Control and I/O

Control Builder is a powerful tool for creating control and safety solutions including reusable control libraries for the AC 800M controller. It is also used for the hardware configuration. Everything is done in a Windows-based environment, offering a wide range of control functionality for ABB's industrial controller AC 800M. It supports all five programming languages according to IEC 61131-3.

Control Builder software includes an extensive library of predefined 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.





Device integration

System 800xA is designed to be the best system for integrating fieldbus solutions to meet the demanding requirements of system owners.

Fieldbus interfaces

ABB Ability™ System 800xA has a wide variety of communication interfaces and support for the most common fieldbuses such as FF, Profibus, HART and IEC61850.

At the heart of fieldbus technology is a common theme of reducing wiring. Early fieldbus protocols (MODBUS) allowed a single pair of wires to do the job of many. Later developments allowed for analog and digital signals to be carried on the same wires used to power the device giving us protocols such as HART, PROFIBUS PA and FOUNDATION Fieldbus H1.

With the advantage of Ethernet-based communication interfaces, smart devices can be efficiently integrated into a control system with minimal wiring. They also support “digital marshalling” concepts where I/O can be configured and used in a system regardless of its physical location. As companies look to reduce project schedules and rework costs, this technology provides the flexibility not only during design and installation, but throughout the project life cycle.

PROFINET
Like many of the other protocols looking for higher throughput capability, PROFINET now provides many of the features of PROFIBUS DP on an Ethernet backbone using the tools and seamless connectivity features already familiar to PB/DP and PB/PA users. PROFINET is one of the key networking infrastructure protocols

PROFIBUS DP
A core component of System 800xA control for many years, PROFIBUS DP and PA are used for many applications, including remote I/O with S800 and S900 products, connectivity to PB/ PA devices like transmitters and valves, and solutions with AC and DC drives.

EtherNet/IP / DeviceNet
EtherNet/IP is the TCP/IP Ethernet extension of DeviceNet (and ControlNet). In addition to the speed increases achievable with Ethernet, the protocol also includes standard object and device models that simplify communication message structures. A primary application of EtherNet/ IP within System 800xA provides high-speed connections to PLCs and Motor Control Centers (MCCs) that use this protocol.

FOUNDATION™ Fieldbus (FF)
FF focuses on connecting field instruments to the controller as well as providing control-in-the-field. The integration of FF into System 800xA is based on High-Speed Ethernet (HSE) and utilizes a backbone approach for connecting low-speed H1 buses to the high-speed backbone. FF offers the unique capability to fully distribute control into field devices using function blocks similar to those used in most DCSs today.

OPC FOUNDATION MEMBER
Modbus
Fieldbus Foundation
IEC
MODBUS TCP
OPC UA
PROFIBUS
DeviceNet
HART COMMUNICATION PROTOCOL
PROFINET
EtherNet/IP
WirelessHART

IEC 61850
System 800xA's IEC 61850 communication interface is the basis for integrating the electrical part of a plant including Intelligent Electronic Devices (IEDs) with process automation. It will enable users to finally optimize in real time how they use their electrical subsystems within a facility relative to the power utilization required by process manufacturing needs.

MODBUS TCP (WirelessHART)
MODBUS TCP now brings the MODBUS communication protocol into the Ethernet environment, improving data communication rates to normal Ethernet speeds. MODBUS TCP will greatly enhance peer-to-peer communication applications where MODBUS is a common protocol, providing communication with third-party equipment including Wireless HART routers.

COMLI / MODBUS RTU
MODBUS (serial) has been used for more than 15 years to connect devices and remote I/Os to PLC and DCS controllers. It is used for simple peer-to-peer applications between different brands of controllers. Point-to-point applications use RS232 and RS422 communications, while networked structures for up to 32 devices use RS485. MODBUS connectivity can be done directly to an AC 800M controller on port 3 or with a CI853 module (two connections).

OPC UA

Open Platform Communication Unified Architecture brings many flexibility and compatibility benefits by making communication between various machines easy and efficient. It does not sacrifice performance when dealing with communication between totally different machines with different hardware. By helping raise the level of plant automation OPC UA optimizes communication.

The benefit of OPC UA is the ability to allow communication between machines of different hardware, different operating systems, and different platforms, thus providing greater flexibility and possibly efficiency in a plant. This flexibility with older products allows for backwards compatibility while extending to future products that alleviates the need to completely upgrade.

With AC800M's horizontal integration of OPC UA, it can be used for machine-to-machine communications with third party controllers. This flexibility allows for a common language to be utilized between control devices and sensors. It allows data to be communicated and transferred in a reliable and secure way between systems and subsystems in smart machine applications.

Comprehensive I/O portfolio

ABB Ability™ System 800xA offers a distributed, highly modularized and flexible I/O-system with an eco-efficient design that provides easy installation of I/O modules, process cabling and connections to drives systems.

By permitting installation in the field, close to sensors and actuators, 800xA I/Os reduce installation costs by cutting the cost of cabling. Thanks to features such as hot swap of modules, on-line reconfiguration and redundancy options, it contributes to keeping production up.

800xA I/Os 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.

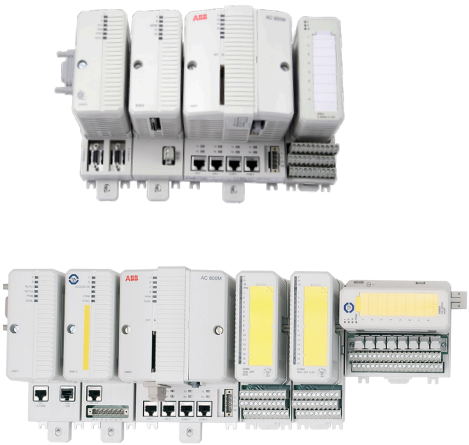
System 800xA Process I/O features include:
- Comprehensive coverage
- Flexible configuration and installation
- Easy set up
- Reliability and accuracy
- HART pass-through
- Redundancy also on I/O module level
- High Integrity I/O modules certified to IEC 61508 SIL3
- High accuracy time tagging
- Defined outputs at communication errors
- I/O modules with Intrinsic Safety interfaces
- Ethernet I/O Field-Kit makes S800 I/O and Select I/O on Ethernet to support xStream commissioning

Comprehensive coverage
800xA has an extensive scope of Digital and Analog input/output modules. The I/O system provides a variety of I/O modules, covering analog and digital signals of various types, as well as interfaces for various types RTDs and TCs.

For positioning applications using incremental encoders, special interface units are available comprising a complete positioning loop. This allows flexible configuration and installation plus easy set up.

The I/O system is highly flexible and modular, permitting a virtually infinite number of installation arrangements for any application:
- Small to large
- Step-by-step expansion
- Easy mounting on a DIN-rail

Online Configuration Changes
An 800xA I/O station supports Hot Configuration In Run (HCIR). This means that the station can be reconfigured while in normal operation, i.e. without having to switch over to configuration mode.



Hot Swap of I/O Modules
All I/O modules can be replaced in a running system and will automatically be configured and initiated.

Redundancy
Redundancy options in all areas: power supply, fieldbus media, fieldbus interfaces and I/O modules.

High Accuracy Time Tagging
SOE (Sequence Of Events) is supported from 800xA I/O. The I/O modules are synchronized to the controller real-time clock with accuracy better than 1 ms. Events are time stamped on the I/O module. Following a trip, it is thus possible to determine the exact sequence of events that led up to it – regardless of the physical placement of the I/O signals.

Defined outputs at communication errors
All output I/O modules have an internal watchdog providing logic to set each output to a predefined value in case of communication loss. Each output channel can either be set to keep the current value or a specific value. To support to the application, input modules have similar functionality.

HART pass-through
800xA I/O support HART pass-through communication. In addition, Select I/O and S900 I/O support HART Device Variables to be directly connected to the AC 800M application.

Supported ABB I/O systems
AC 800M controller supports the following common ABB I/O systems and families:

- Select I/O, a comprehensive solution for simplified engineering, installation, commissioning and late changes. Also for Ethernet and hazardous areas
- S800 I/O, a distributed modular I/O system for communication via PROFIBUS-DP or directly connected to an AC 800M Controlle.r This is the most common I/O. Also for Ethernet and hazardous areas
- S900 I/O, a remote I/O system for use in hazardous areas including Zone 1 mounting
- S200 I/O and S200L I/O, two compatible, modular I/O systems (S200L I/O is the compact version)
- S100 I/O, a rack-based I/O system
- Satt 19 inch rack I/O, a rack-based I/O system
- S500 I/O, for each field-bus slave, up to ten I/O modules can be connected

Support for third-party I/O systems
AC 800M can connect to virtually any third-party I/O system on PROFIBUS-DP, PROFINET, DeviceNet and EtherNet/IP. All that's needed is a Device Capability Description File that details the relevant characteristics. A Wizard easily transforms third-party I/O systems into 800xA I/O objects.

The following files are supported:

- PROFIBUS-DP GSD files
- PROFINET GSDML files
- DeviceNet and EtherNet/IP EDS files

Comprehensive I/O portfolio
Single channel I/O

Select I/O is an Ethernet-based single channel I/O for integrating hardwired I/O and enabling features such as digital marshalling and late binding.

Select I/O is designed to provide maximum project flexibility and resilience to late changes. This single-channel I/O solution consists of several components including the Ethernet Field Communication Interface (FCI), the I/O Module Termination Unit (MTU) and the Signal Conditioning Modules (SCM). The Ethernet FCI enables both the Select I/O single channel modules and the traditional S800 multi-channel modules to be connected to the industrial Ethernet I/O network.

The Select I/O is available for both process control and process safety (SIL3). Process and safety I/O can be mixed in the same I/O system, providing additional flexibility.

Select I/O is a great solution in the high availability markets where redundancy, built-in signal conditioning and the flexibility provided by the single-channel architecture help users significantly reduce costs associated with marshalling and changes late in the project.

Certifications
The Select I/O hardware is designed for remote installation and has the following certifications:
- CE
- Electrical Safety EN 61010-1/EN 61010-2-210
- cULus Class 1 Div 2 / Zone 2
- ATEX and IECEx Zone 2
- SIL3 (safety I/O only)
- Marine (ABS and DNV-GL)

Select I/O Features
- Single or redundant including the Signal Conditioning Module
- Ethernet connectivity to I/O Network
- Digital marshalling by channel
- Built-in signal conditioning
- Channel-to-channel galvanic isolation
- Loop supervision for all I/O types (exception 120/230V)
- Hot swap
- LED status indication
- HART pass-through
- HART device variables to the application
- SOE with 1 ms resolution (DI)
- SIL3 including AO and high current AI/DO modules
- Built-in field disconnect
- Built-in Intrisically Safe Barriers

Communication
Communication between the new Select I/O and the industrial Ethernet I/O network is managed by the 100 Mbit/s built-in two-port switches on the Ethernet FCI. Any AC 800M controller can communicate with any Select I/O cluster by simply adding a CI871 communication module.

With the industrial Ethernet I/O network, System 800xA can support protocols from simple daisy chain, to star to ring topologies. High availability configurations such as redundant daisy chain, redundant “ring of stars” and redundant ring provide the flexibility to handle almost any type of project requirement.

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

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01 TU860 MTU with CI845, TC810 and HI880 module.

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02 Module Termination Unit TUS810 with Select I/O modules.

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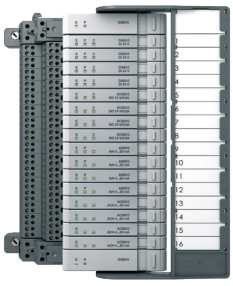

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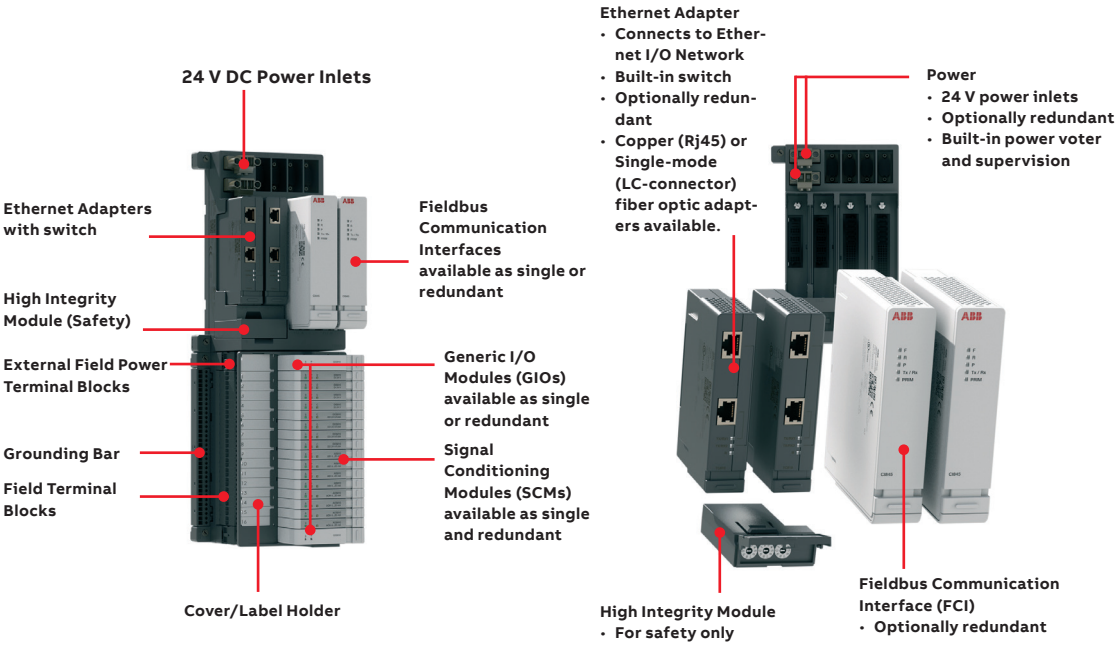
Select I/O Details

Select I/O was designed with parallel project execution in mind. Termination units can be installed on site long before the electronics are installed. Site engineering can be done completely independently from application programming.



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Select I/O is made up of two main sub-assemblies – the Ethernet FCI and up to 12 Select I/O Modular Termination Units each including up to 16 Signal Conditioning Modules (SCMs)

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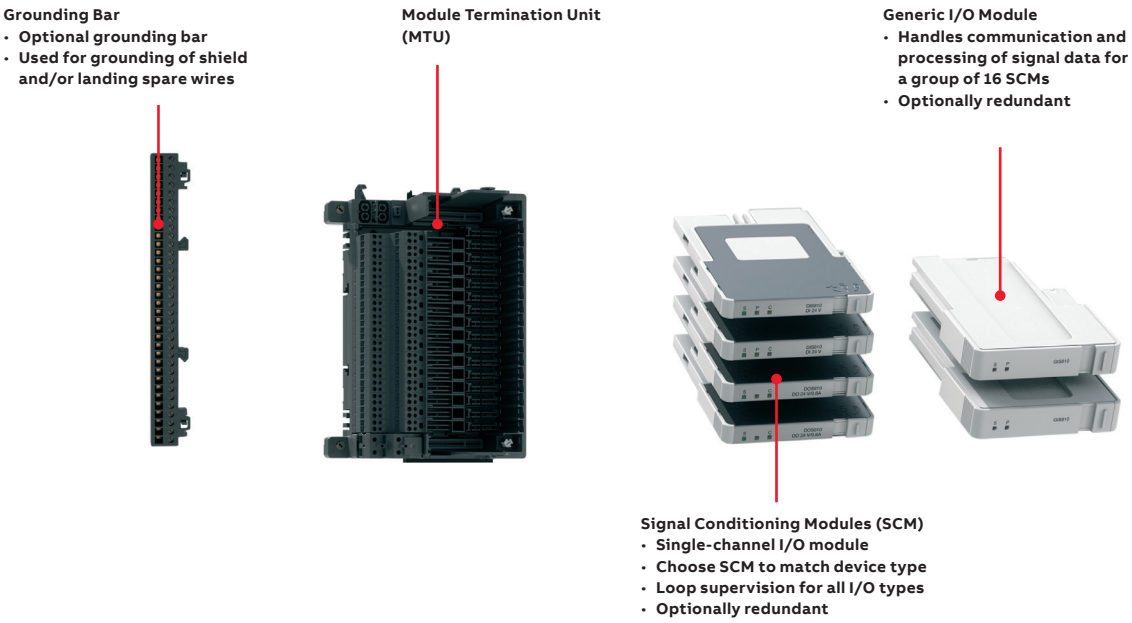
The Ethernet FCI connects the MTUs, populated with Generic I/O and Signal Conditioning Modules (SCM), with the I/O network.



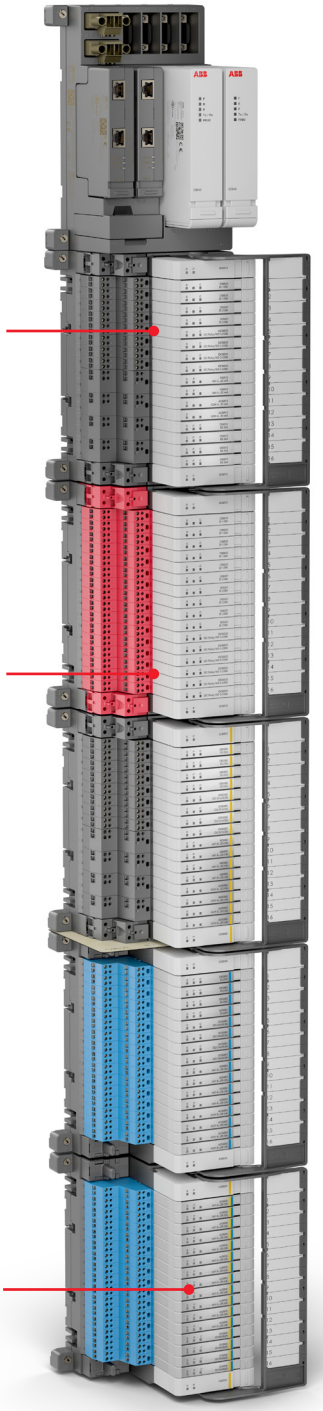
Redundancy when and where you need it. Flexible, modular redundancy available from Ethernet Adapters, Field Communications Interface (FCI), Generic I/O (GIO) and Signal Conditioning Modules (SCMs). Where single and redundant channels can be mixed in the same MTU.

MTUs for Process IO, IS and 120/230 V
The local I/O bus distributes communication, system power and field power to the I/O modules (GIO and SCM). The power is distributed in the back plane. For 120/230 V and high current channels, the field power has to be supplied from the PTB.

There is a static coding on the FTB which prohibits insertion of IS-SCM in non-IS FTB and vice versa, also prevents 24 V modules to be inserted in a FTB for 120/230 V. There is also a dynamic coding on the FTB designed for the SCM so that, if an SCM is replaced, only the exact same type of SCM can be inserted.

After all wiring is connected to the FTBs, the terminal cover should be pulled down over the FTBs. With this cover in place, the MTU fulfills the protection class IP30.

Multiple signal types – only 1 MTU. – With Select I/O, you can design your solution using the same MTU and then add the components you require. The same MTU is used regardless of process, safety, and IS applications. Just add the correct modules and terminal blocks, that are required, later.



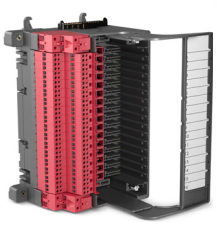
Reducing the impact of change. Each Ethernet FCI head station can communicate with up to 10 AC 800M controllers so if you move applications to a or re-work of the cabinet is required. Select I/O's flexible networking can be arranged and deployed as daisy chain, star, ring, ring of stars, and redundant rings.

One drop – multiple signal types. Each cluster can handle multiple signal types from process, safety, HART with or without IS barriers and 120/230 V. Note: process and safety; IS and non-IS installed in separate termination units as shown.

Change is good. An individual Signal Conditioning Module can be changed quickly and easily to accommodate changes in the project by resetting the terminal block key and inserting a new SCM.

Field terminal blocks
- Replaceable field terminal block with 4 screws
- Self learning keying between Terminal Block and SCM
- Four types of field terminal blocks are available (IS, non-IS, redundant and 120/230 V)

External Field Power Terminal Blocks
- Replaceable external field power terminal block
- 4 screws for daisy chaining power



Comprehensive I/O portfolio
Multi-channel I/O

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S800 I/O

The S800 family of I/O is a multi-channel I/O that has a comprehensive portfolio of signal types available in local, remote and redundant configurations including SIL3 certified safety I/O modules.

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01 CI801 with S800 I/O modules

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02 S800 High Integrity I/Os

The comprehensive S800 I/O system consists of more than 50 different module types to respond to every need. S800 I/O has more than 40 million channels worldwide.

S800 I/O features include:
- 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. 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.
- Timestamping with millisecond accuracy for SOE recording and root cause analysis.
- Built-in Intrisically Safe Barriers.

Flexible and scalable
S800 I/O may be set up in a variety of ways, from directly connected to the host controller via sub-clusters (using fiberoptic cables), to PROFIBUS connected. In combination with an Ethernet FCI, S800 I/O can communicate to any AC 800M controller over the Ethernet I/O network.

Redundancy solutions available at all levels include power supply, communication interfaces and I/O circuits.

S800 I/O packaging options include:
- 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, jumpers 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.

For harsh environments, all S800 I/O modules are compliant to G3 severity level of ISA-S71.04, Environmental Conditions for Process Measurement and Control Systems.

S800 High Integrity I/O

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

When paired with the AC 800M HI SIL3 certified process controllers and libraries (ESD, F&G, BMS), the S880 I/O can be used in integrated, interfaced and stand-alone safety applications.

These I/O modules include those for 4–20mA 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.

S900 I/O

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.

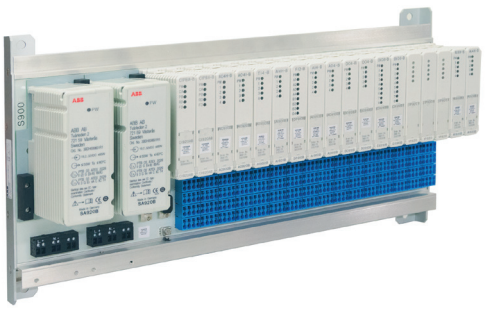
S900 provides all input and output modules needed for intrinsically safe field signal connection. Supervisory process control systems, DCS or SCADA systems use an intrinsically safe fieldbus to communicate with the communication interface. Further maintenance savings can be achieved through S900's extended diagnostics and the use of HART®- compliant field devices.

For harsh environments, all S900 I/O modules are compliant to G3 severity level of ISA-S71.04, Environmental Conditions for Process Measurement and Control Systems.

S900 I/O solutions are available for:
- Zone 1 hazardous areas
- Zone 2 hazardous areas
- Non-hazardous areas

S800 HI I/O

03 S900 I/O



High Integrity Safety Automation

System 800xA High Integrity features a flexible and scalable SIL compliant design. The modular design of the hardware platform supports safety applications from small to large, single or redundant, with local or remote cabinet installations in configurations from integrated to combined to independent.

—
01 AC 800M High Integrity controller with CI module and I/O

—
02 Select I/O Module Termination unit TUS810 with Safety and IS SCMs.

—
01

—
02

AC 800M High Integrity Controllers

The AC 800M HI offers a SIL3 TÜV certified control environment for process safety in a single controller. The AC 800M High Integrity controller is realized by combining a processor module with a safety module (i.e PM867 with SM812). Multiple controllers are available to provide scalability and flexible redundancy schemes are available enable up to and including Quad configuration.

S880 High Integrity I/O
The S880 high integrity system is a distributed, highly modularized and flexible I/O system, providing easy installation of I/O modules and process cabling. S880 I/O modules and their termination units can be mounted and combined in many different configurations.

Within the S880 I/O family, there are SIL3 compliant modules for safety critical applications including 4–20 mA analog inputs, 24 Vdc digital inputs and 24 Vdc digital outputs. Analog inputs support HART routing and the digital inputs support local time stamping of signal changes for high accuracy sequence-of-events logging.

Redundancy of the S800 I/O modules can increase system availability and allow for maintenance activities, such as hot swap, without process interruption.

Select I/O for Safety
Select I/O for Safety is a modular, ethernet based, single channel granular I/O system that promotes using xStream Engineering to help decouple project tasks, minimizes the impact of late changes and optimize project schedules.

Select I/O for Safety offers flexible redundancy schemes and conditions each individual signal coming from the field with a Signal Conditioning Module (SCM) designed for SIL 3 safety applications.

In addition to SIL 3 certified HART enabled AI, AO and 24V DI, DO SCMs, intrinsically safe and higher current AI and DO SCMs are available to reduce the need for ancillary hardware such as barriers and interposing relays. Each SCM offers line monitoring, current limiting, galvanic isolation and is rated for Zone2 / Class 1 Division 2 environments with extended temperature ranges (–40 to +70 deg C).

Safety system architectures

ABB's System 800xA High Integrity has a flexible and diverse architecture meets safety standard requirements while addressing practically any architecture required for a specific project implementation.

Architecture options:

- Integrated – Separate process and safety controllers on the same control network
- Separate – Separate process and safety controllers in separate systems with a hardwired or direct communication link between controllers
- Independent – Independent AC800M High Integrity Controller and I/O used with any HMI or DCS system. Non-System 800xA

TÜV Certification

The System 800xA High Integrity product including controllers, I/O modules, communication modules, firmware, libraries and engineering tool are certified according to IEC 61508 Edition 2 and IEC 61511-1. All relevant standards and tests are documented with the certificate and report which are available upon request.

SIL 3 certification without resorting to redundancy

It is the diversity of both architecture and product implementation that enables System 800xA to be certified by TÜV according to IEC 61508 Edition for SIL 3 without resorting to redundancy. Redundancy is available when high availability or hot swap are required.

- Diverse application execution engine in the controller and safety module
- Diverse architecture (MCU & FPGA) in I/O modules
- Use of different toolsets during design and implementation
- Different manufacturers of electronic components

ISA Security for System 800xA and AC 800M Controllers

ABB has achieved ISASecure® System Security Assurance (SSA™) Level 1 certification for System 800xA version 6.1.1.x . The AC 800M controller family including PM857, PM863 and PM867 with SM812 are now also ISA Secure certified.

Intelligent Engineering

Working within a common engineering environment, 800xA Engineering supports a consistent information flow from design, through installation and commissioning, to operation and maintenance of the System 800xA Safety System.

SIL compliant application environment

The System 800xA engineering environment includes safeguards against non-SIL compliant configurations. Once identified as a safety application, the engineering system will automatically limit user configuration choices and will prevent download if SIL requirements are not met.

Certified Libraries

System 800xA's Control Builder is delivered with an extensive set of predefined type solutions stored in standard, or object type, libraries. These include data types, functions, function blocks and control modules that can be used to create safety applications. The SIL certified objects and functions in the standard libraries are identified with a SIL marking in the engineering tool and include pre-configured aspects such as faceplates and trends to be used for operator interaction.

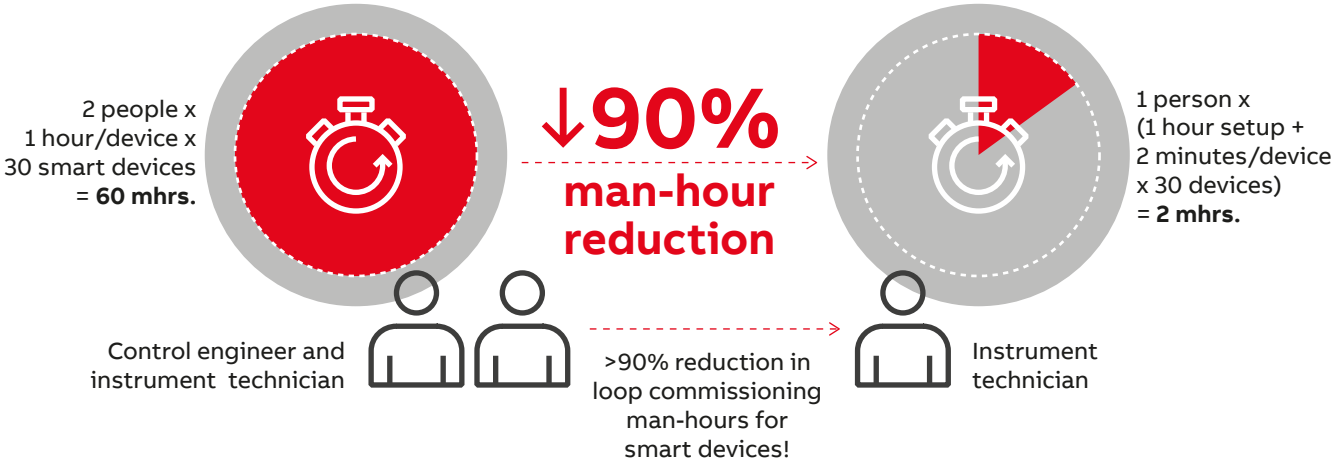
ISASecure®

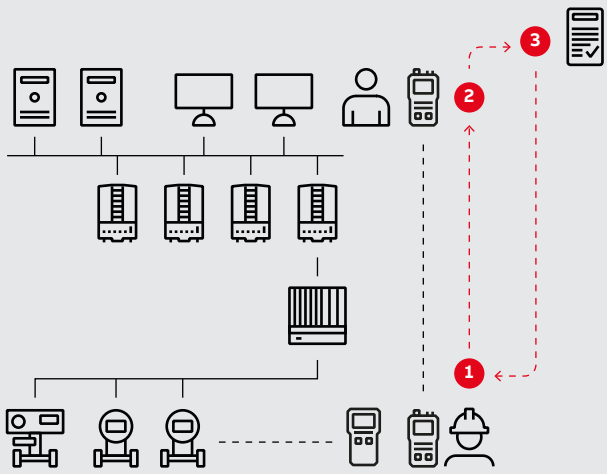
Ethernet I/O Field Kit

Smart Commissioning with the Ethernet I/O Field Kit
brings “xStream” benefits

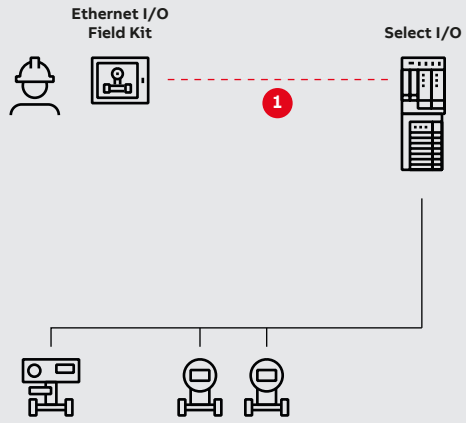
Traditional manual loop checks -
Smart junction box with 30 devices

Automated loop checks -
System 800xA Ethernet I/O Field Kit and Select I/O





1. The instrument technician connects handheld to a single device and forces values for each point of a multi-point loop check
2. Continuous contact between instrument technician and control engineer for each value reading on DCS
3. Control engineer documents results on each device… then repeat for the next device



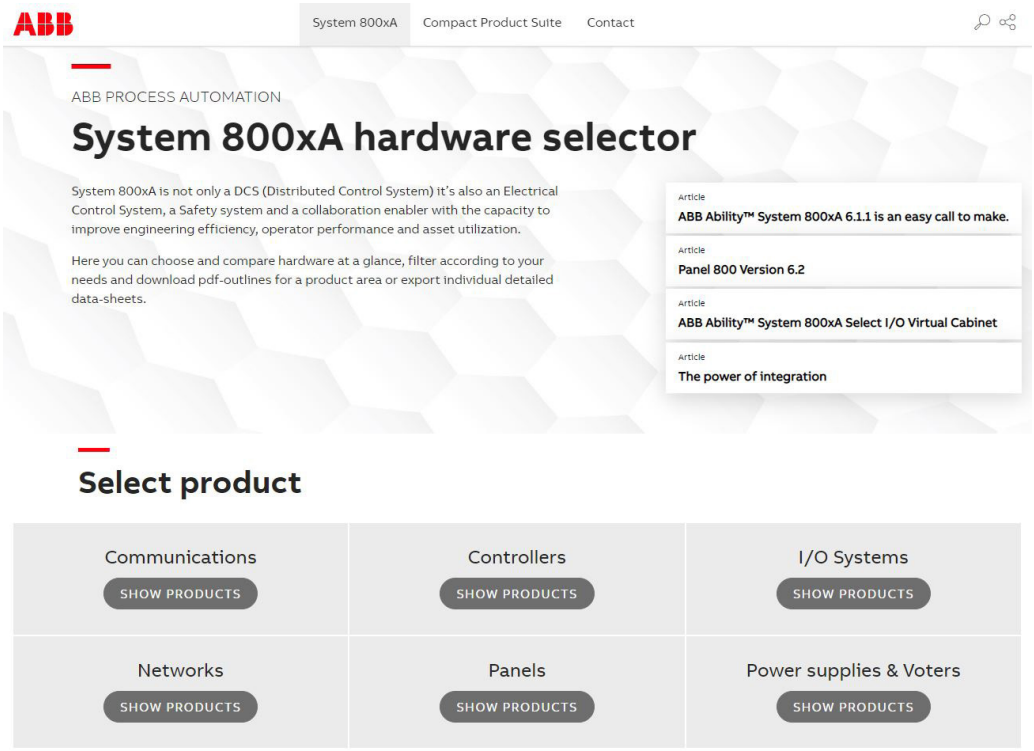
1. Instrument technician prepares an automatic loop check campaign for multiple devices and then executes it.
(Test results are automatically generated)

Hardware selector
Choosing the right hardware made easy

When planning your new project or expansion, finding the right hardware can be a challenge. Check out the new web-based tool that helps you find the hardware you need in a few clicks. Here you can choose and compare hardware at a glance, filter according to your needs and download PDF-outlines for a product area or export individual detailed data-sheets.

- Choose and compare hardware at a glance
- Filter according to your needs
- Download PDF-outlines for a specific product area
- Export individual detailed data-sheets for single items
- Web print compared items as PDF files

For more information, please visit the **800xahardwareselector.com.**



Why ABB

Experience
Customer focus, digital innovation and an extensive service network are how ABB has maintained a leadership position in Distributed Control Systems (DCS) for over 22 years. Having established an installed base of 35,000 DCS systems across more than 100 countries, ABB has become a trusted leader in creating digital solutions for customers in the industrial space.

Service
ABB provides not only highly qualified technical resources during project delivery, but also ensures competent local support and service in operation. We work hard with end-users to maintain and evolve existing installations, thereby maximizing customer value and ensuring safe plant operation.

Knowledge
ABB offers a broad portfolio of system solutions and applications for different industries and markets. Increased security as well as leaps in engineering, communications and I/O capabilities will help power your digital transformation.

Life cycle
Control system life cycle management and investment protection have always been cornerstones of ABB's development programs. Over the last 40 years, ABB has built a large installed base across diverse industries. ABB looks after its installed base by crafting solutions that ensure the continued productivity, reliability and capability of all installed ABB assets.

Cyber Security
ABB`s comprehensive approach to cyber security addresses both customer needs, industry standards and internal development processes. This ensures a secure control system by including risk mitigation system features on identified potential risks.

Evolution
Upgrade to newer control solutions will enable you to be safe, secure and compliant while still transforming your operations to meet your business goals even further. ABB can help you all the way!

solutions.abb/800xa
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