



Main catalog

## PLC Automation

PLCs, Control Panels, Engineering Suite  
AC500, CP600, Automation Builder



# PLC Automation

## PLCs, Control Panels, Engineering Suite

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# PLC Automation product family

## Overview



1

ABB offers a comprehensive range of scalable PLCs and robust HMI control panels. Since its launch in 2006, the AC500 PLC platform has achieved significant industry recognition for delivering high performance, quality and reliability.

### Comprehensive range

- ABB delivers scalable, flexible and efficient ranges of automation components to fulfill all conceivable requirements of the most diverse automation applications.
- ABB's automation devices deliver solutions with high performance and flexibility to be effectively deployed within various industries and applications including water, building infrastructure, data centers, renewable energy, machinery automation, material handling, marine and many more.

### Engineering suite

- ABB Automation Builder is the integrated software suite for machine builders and system integrators requiring state-of-the-art productive machine and system automation.
- Combining the tools required for configuring, programming, debugging and maintaining automation projects from one common intuitive interface, Automation Builder addresses the largest single cost element of most of today's industrial automation projects - software.

### Programmable Logic Controllers PLCs

- The AC500, AC500-eCo, AC500-S and AC500-XC scalable PLC ranges provide solutions for small, medium and high-end applications.
- Our AC500 PLC platform offers different performance levels and is the ideal choice for high availability, extreme environments, condition monitoring, motion control or safety solutions.
- Our AC500 PLC platform offers interoperability and compatibility in hardware and software from compact PLCs up to high end and safety PLCs.

### Control panels

- CP600-eCo and CP600 HMI control panels offer a wide range of features and functionalities for maximum operability.
- ABB control panels are distinguished by their robustness and easy usability, providing all the relevant information from production plants and machines at one single touch.

# PLC Automation product family

## Overview



### Automation Builder

ABB Automation Builder is the software for machine builders and system integrators wanting to automate their machines and systems in a unified and efficient way.

Integrated engineering is key for products, technology and people working seamlessly together. Automation Builder connects the engineering tools for PLC, safety, control panels, SCADA, drives, motion and robots. The software suite integrates products into solutions that create value for your customers, giving you greater control of your projects, reducing risk and saving time.

Automation Builder enables you to adapt the tool chain to your needs and workflows. The software is open for your specific product and communication technology to build your distinct solution.

### AC500-eCo

Compact PLC offering optimally suited flexible and economical configurations for automation solutions in smaller applications.

Save money by starting small – the flexibility of the AC500 platform enables to scale up as and when needs dictate. ABB's AC500-eCo has been designed to integrate seamlessly into the broader AC500 PLC platform.

Engineering integrated in Automation Builder.

### AC500

Powerful PLC featuring a wide range of performance, communications and I/O capabilities for industrial applications. The ideal choice for complex, high-speed machinery and networking solutions.

Machine controller: high-end PLC enhanced with fast communication and calculation performance for large complex automation solutions with maximum precision available.

Condition monitoring solution available: integrated condition monitoring system for further reliability and easy integration in all kinds of machinery systems, enabling precise management of the real-time condition of operations.

Engineering integrated in Automation Builder.

### New

Automation Builder 2.0 offers next generation features – in particular in virtual commissioning, fieldbus engineering productivity and integrated engineering for SCADA.

### New

AC500 V3 CPU range with even more performance, features and communication possibilities.



### AC500-XC

Extreme condition PLC variant of the AC500 platform with extended operating temperature, immunity to vibration and hazardous gases, use at high altitudes and in humid environments.

Machine controller: high-end PLC enhanced with fast communication and calculation performance for large complex automation solutions with maximum precision available. Condition monitoring solution available: integrated condition monitoring system for further reliability and easy integration in all kinds of machinery systems, enabling precise management of the real-time condition of operations.

Engineering integrated in Automation Builder.



### AC500-S

Integrated safety PLC (SIL3, PL e) designed for safety applications involved in factory or machinery automation area in order to implement and manage complex safety solutions.

Support of safety-relevant calculations makes the AC500-S the ideal solution for crane engineering, wind power generation, robotics and hoisting applications. The AC500-S Safety PLC is also available in a version for extreme conditions.

Engineering integrated in Automation Builder.



### CP600-eCo

The economical CP600-eCo control panel is aimed for machine builders and system integrators requiring basic functions and high usability for clear interaction with operation processes.

The CP600-eCo range is compatible with ABB PLCs and drives, enabling easy integration and scalability for a diverse range of applications.

Engineering integrated in Automation Builder.



### CP600

The robust CP600 HMI is dedicated for machines and systems requiring high visualization performance, versatile communication and/or representative design.

Comprehensive functionalities provide information for production plants and machines at a single touch in a clear and understandable way. CP600 control panels enable efficient and user-friendly machine operation.

Engineering integrated in Automation Builder.

### New

CP635-FB, CP635-FW, designed especially for operation of machines in meat production. High protection class and product design are made for withstanding the high pressure and high temperature cleaning processes for those applications.

# PLC Automation product family

## Automation Builder

1

Engineering Productivity for Machine Builders and System Integrators



### Product license options

	Automation Builder Basic	Automation Builder Standard	Automation Builder Premium
Free	■		
AC500-eCo	■	■	■
AC500 with local I/O & network (1)	■	■	■
AC500 with fieldbus (2)		■	■
AC500-S Safety		□	□
Drive Manager		■	■
Drive application programming (3)	■	■	■
Motion programming	■ (4)	■	■
Panel Builder 600	□	■	■
Panel Builder 600 Basic	■	■	■
Integrated engineering (5)		■	■
Productivity features (6)			■
Additional features (7)		□	□

■ fully  
□ partly

(1) TCP protocols, Modbus, IEC60870-5-104, CS31

(2) PROFIBUS, PROFINET, EtherCAT, CAN

(3) Drive application programming for drives with embedded PLCs. Drive Composer pro license included in Standard and Premium Edition.

(4) No Fieldbus connectivity in Automation Builder Basic

(5) PLC, Safety, Panel, Drive, Motion, Robotics, SCADA

(6) C/C++, ECAD data exchange, CSV interface extensions, project compare

(7) Virtual Commissioning Platform for virtual system testing, Professional Developer Tools for system design, management, analysis, optimization and test



### Discover engineering productivity when engineering your discrete automation solutions

Automation Builder is ABB's integrated programming, maintenance and simulation environment for PLCs, safety, robots, motion, drives, SCADA and control panels.

Automation Builder combines the proven ABB tools RobotStudio, Drive Manager, Mint WorkBench, Panel Builder and succeeds Control Builder Plus.

### The Automation Builder minimizes your efforts for project code and data administration

Improve your productivity with seamless engineering, common data storage, a single project archive, time-saving library blocks for device integration, and one common software installer.

Reduce engineering efforts and maintenance costs using easy-to-use libraries for wind, water, solar, drives, motion, robotics, safety and building automation applications.

### Easily create a connected world

Configure and program various devices in one single project. The integration of ABB's Automation Builder 2.0 and zenon software makes it easier than ever to develop effective automation solutions and unlock the potential of the Internet of Things (IoT).

### Next level engineering productivity

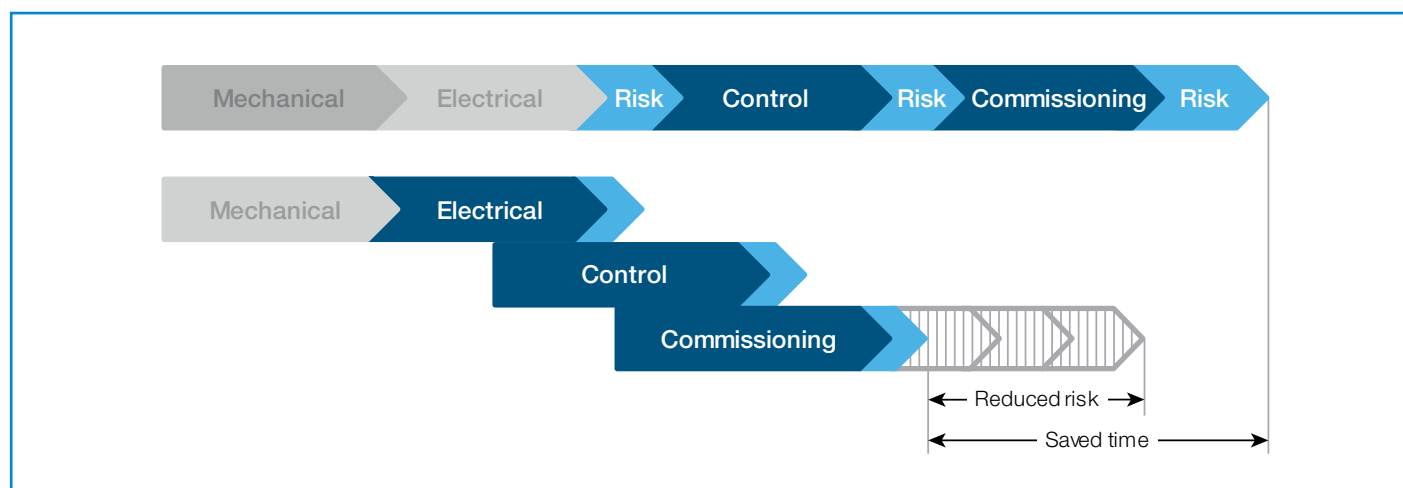
Automation Builder 2.0 comes with easy-to-use solution-oriented wizards, which provide access to ABB's application knowledge and libraries. Benefit from easy connectivity and perform fieldbus scanning and diagnosis on a new level. Manage complexity using state-of-the-art professional engineering features in system design, programming, test, and team support.

### Virtual commissioning – a game changer in engineering

Simulate and automate all kinds of applications with minimum effort. Test the complete system seamlessly before involving real hardware. Even complex systems can be built up quickly and efficiently, ensuring smooth interaction of all components, as well as high reliability and system safety.

### Download Automation Builder from [www.abb.com/automationbuilder](http://www.abb.com/automationbuilder)

Familiarize with Automation Builder using a 30 days test license.



Streamline and simplify your engineering process: Reduce risk and save time.

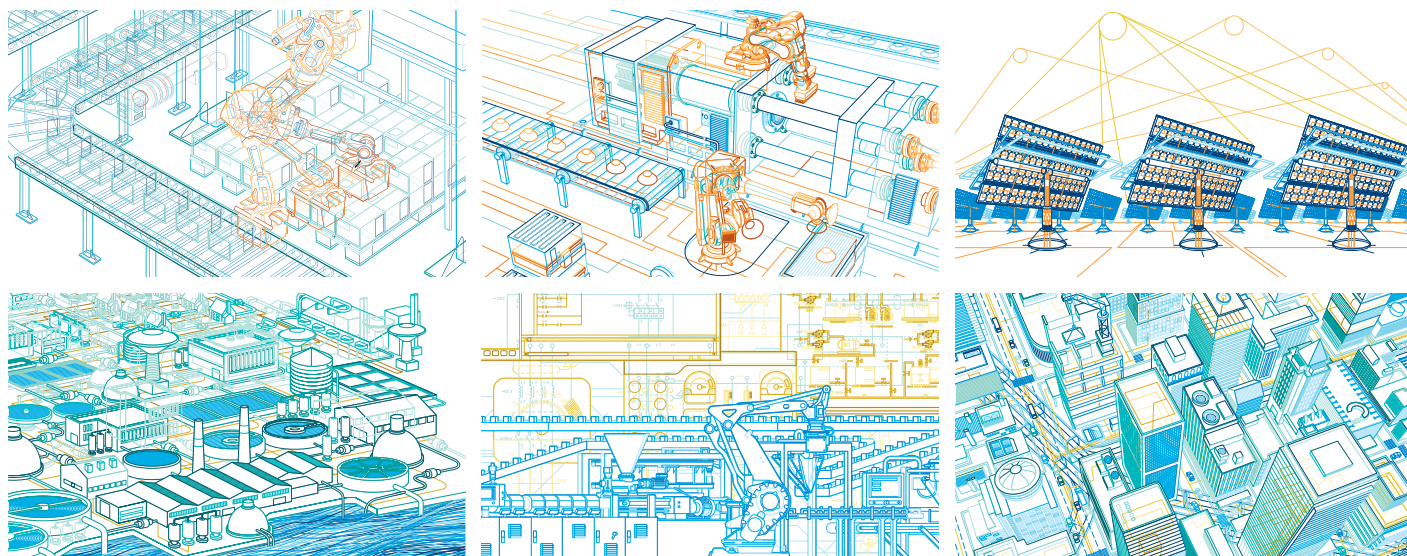
# PLC Automation product family

## AC500 libraries

1

A good investment for system integrators and end-users, AC500 libraries improve stability while reducing warranty costs and service. Library packages contain easy-to-use examples for minimal programming effort and quick implementation of complex and demanding applications.





AC500 libraries deliver the seamless integration of PLCs, drives and HMI for the quick and easy building and commissioning of automation solutions. AC500 solution libraries by ABB are maintained to ensure that your programs can also be used with less risk.

#### **Motion control library**

Library package for decentral, central and coordinated motion according to the PLCopen® standard.

#### **Solar library**

Library package for solar trackers increasing energy efficiency, providing quick commissioning and excellent positioning accuracy.

#### **Water library**

Library package with energy efficiency functionalities offering quick commissioning of water applications, such as pump stations with remote communication.

#### **Drive integration library**

Library package for the quick integration of ABB ACS drives using different fieldbusses.

#### **Temperature control library**

Library package for the advanced PID temperature control of demanding applications, for example extrusion.

#### **BACnet library**

Library package adds BACnet-ASC Device Profile for communication to BMS Building Management Systems in larger infrastructure projects.

# PLC Automation product family

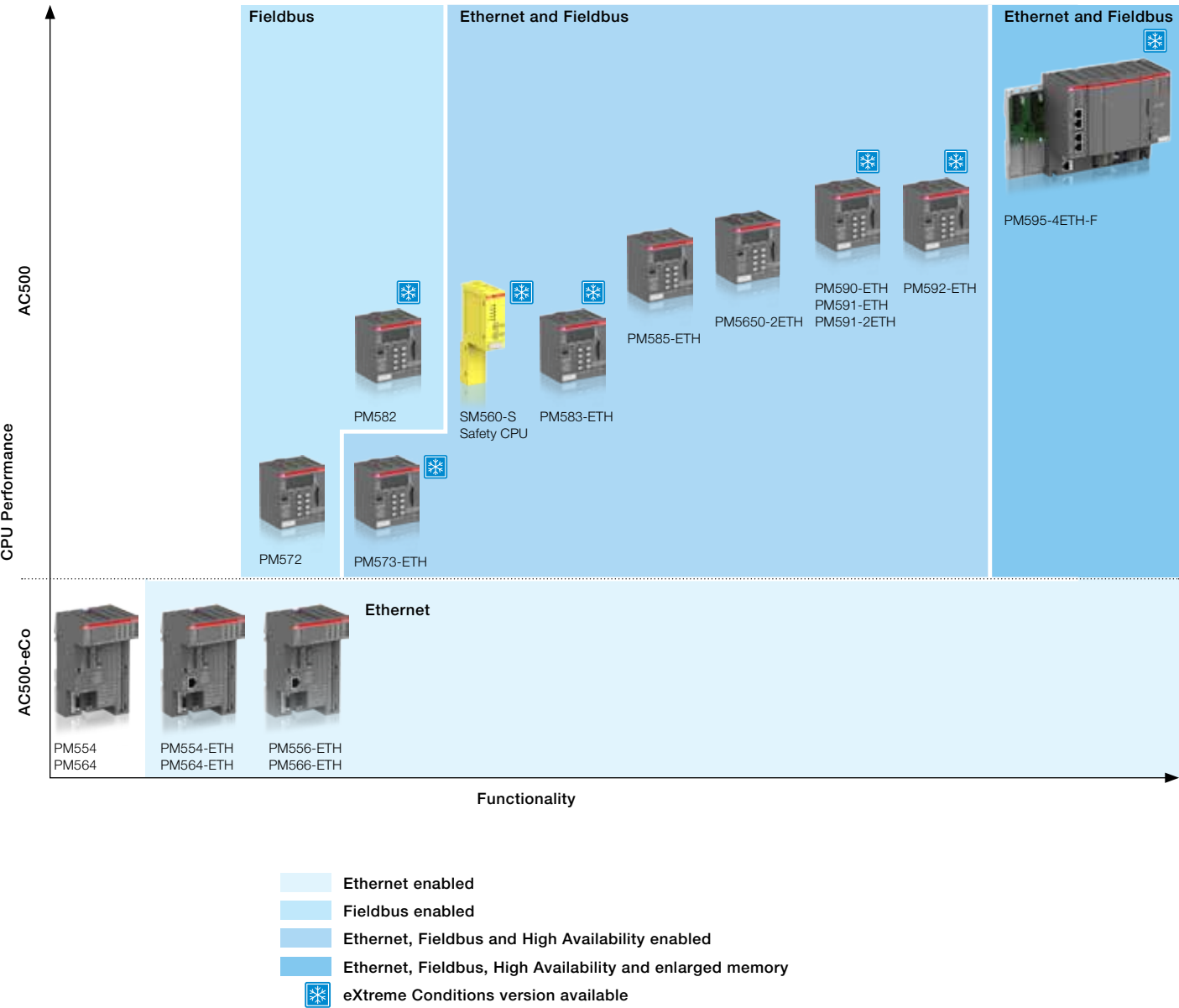
## PLCs at a glance...

1

AC500 Programmable Logic Controllers with scalable, state-of-the-art technology for better performance.

Standard industrial communication fieldbus, network and protocols supported by the 'One Platform' solution make the AC500 the perfect automation solution in even the most

demanding environments. Flexible and scalable superior CPUs deliver performance whenever and wherever you need it.





	AC500-eCo	AC500	AC500 V3	AC500-XC	AC500-S (2)	AC500-S-XC (2)
<b>System Configuration and Application programming</b>						
Automation Builder (common programming tool)	■	■	■	■	■	■
<b>Application Features</b>						
Extended temperature range						■
Functional safety					■	■
Support of simple motion with FM562 module (1)	■	■	■ (3)(5)	■	■	■
Support of coordinated motion (1)		■	■ (3)(5)	■	■	■
Support of High Availability (HA)		■	■ (3)(5)	■		
<b>CPU Features</b>						
	AC500-eCo	AC500	AC500 V3	AC500-XC	AC500-S (2)	AC500-S-XC (2)
Performance (time per binary instruction)	0.08 µs	0.0006...0.06 µs	0.01 µs	0.0006...0.06 µs	0.05 µs	0.05 µs
Program memory	128...512 kB	128 kB...16 MB	80 MB	128 kB...16 MB	1024 kB	1024 kB
User data memory	14...130 kB	128 kB...16 MB		128 kB...16 MB	1024 kB	1024 kB
Remanent data (= saved)	2 kB	12 kB...3 MB	256 kB	12 kB...3 MB	120 kB	120 kB
<b>Serial communication</b>						
RS232		■	■	■	■	■
RS485	■	■	■	■	■	■
Isolated interface		■	■	■	■	■
<b>CAN communication interface</b>						
CANopen Master, J1939 and CAN 2A/2B protocols			■			
<b>Ethernet features on CPU with integrated Ethernet or external communication module</b>						
Online access (Programming)	■	■	■	■	■	■
ICMP (Ping), DHCP, IP configuration protocol	■	■	■ (5)	■	■	■
UDP data exchange, Modbus TCP	■	■	■	■	■	■
<b>Ethernet features on CPU with integrated Ethernet only</b>						
HTTP (integrated web server)	■	■	■	■	■	■
HTML 5			■			
SNTP (Time synchronization)	■	■	■ (5)	■	■	■
FTP server	■	■	■	■	■	■
FTP client	■ (7)	■ (7)		■ (7)	■ (7)	■ (7)
SMTP client (Simple Mail Transfer Protocol)	□	■	■ (5)	■	■	■
IEC 60870-5-104 remote control protocol		■	■	■	■	■
Network variables on UDP			■			
Socket programming		■	■	■	■	■
OPC DA	■	■		■	■	■
OPC UA			■			
BACnet (B-ASC profile)	□ (4)	■ (4)		■ (4)	■ (4)	■ (4)
<b>Selectable protocol</b>						
EtherCAT Master		■ (6)	■ (4)(5)	■ (6)		
PROFINET IO Controller		■ (6)	■ (4)(5)	■ (6)		
EthernetIP Adapter			■ (4)(5)			
<b>Capability to connect Fieldbus Modules</b>						
I/Os integrated on CPU	■		■	■	■	■
<b>I/O Modules Features</b>						
	S500-eCo	S500	S500 V3	S500-XC	S500-S (2)	S500-S-XC (2)
<b>Analog modules</b>						
Configurable		■	■	■		
Dedicated	■				■	■
<b>Digital modules</b>						
Configurable	□	■	■	■		
Dedicated	■	■	■	■	■	■
Transistor outputs short circuit protected		■	■	■	■	■
Output diagnosis		■	■	■	■	■
Extension with S500-eCo and S500(-XC) I/O modules	■	■	■	■	■ (2)	■ (2)

■ fully  
□ partly

(1) Requires Library PS552-MC-E

(2) AC500-S and AC500-S-XC are extension CPU modules. They require an AC500 or AC500-XC CPU to operate. The latter supports all communication interfaces.

(3) Requires Library PS5520-MC-E

(4) Licensed features

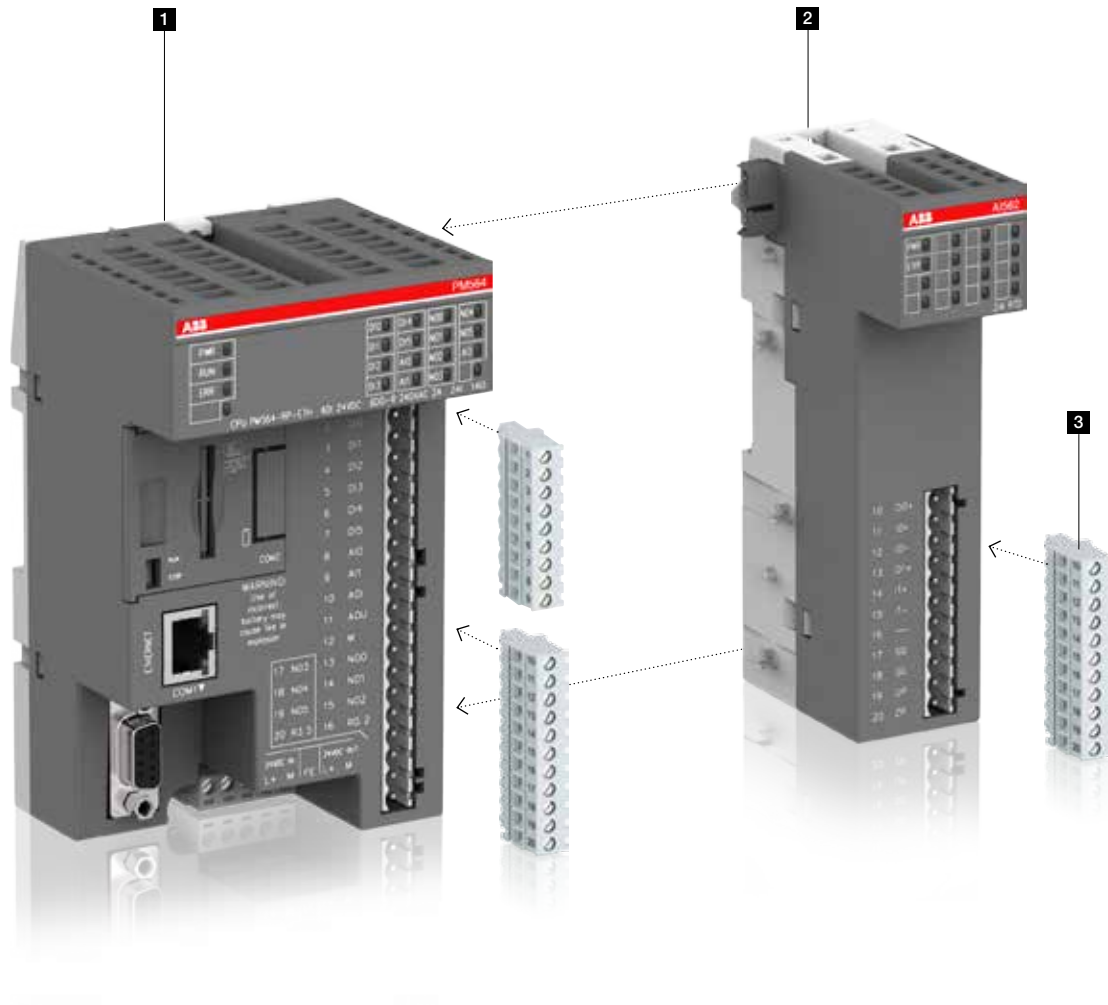
(5) In development

(6) PM595 only

(7) application library download from "application examples"

# PLC Automation product family

## AC500-eCo – modular concept



### 1 AC500-eCo central processing unit (CPU)

- Different memory options
- Integrated communication option.

### 2 S500-eCo I/O modules

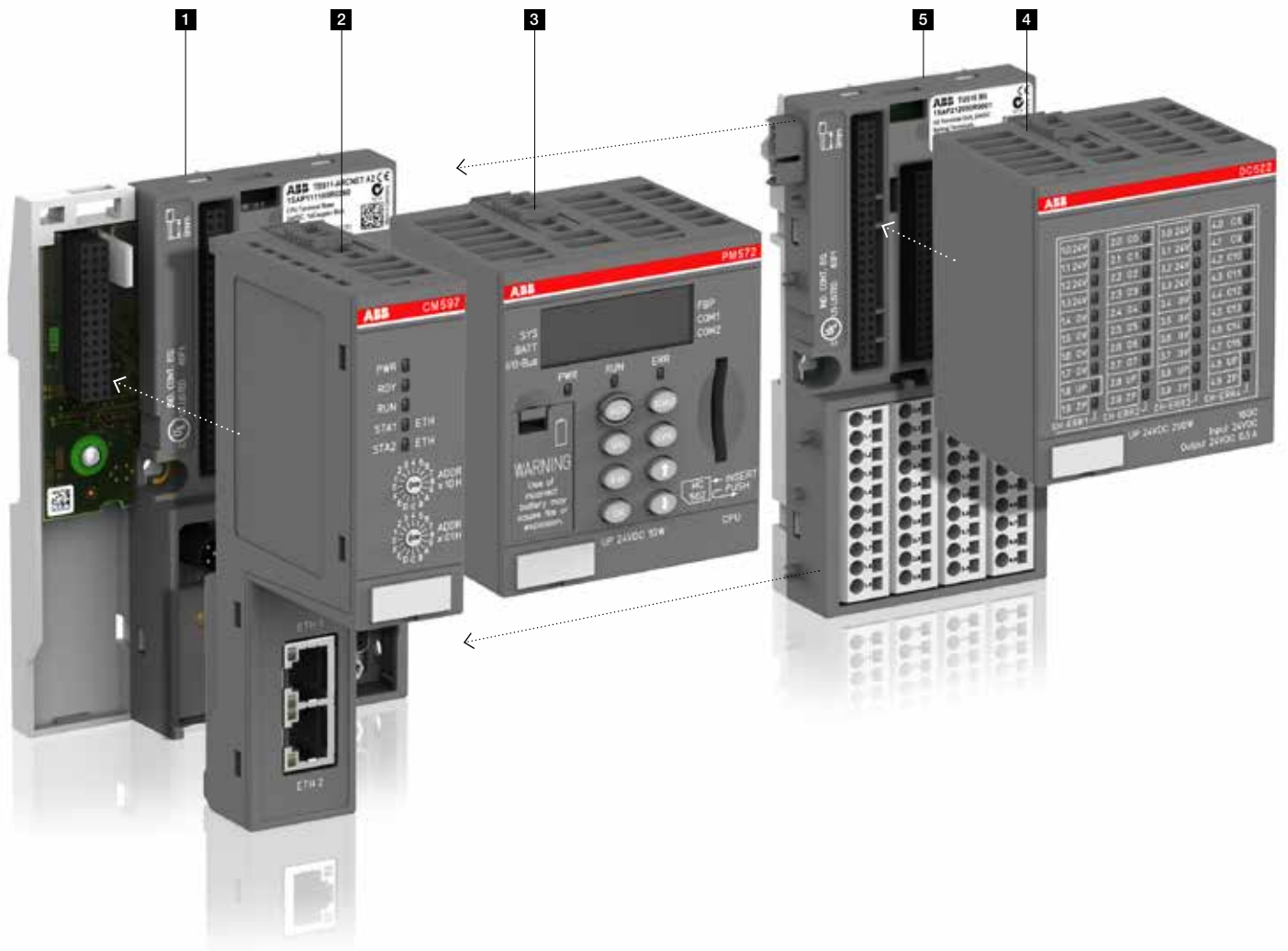
- Up to 10 expansions
- Decentralized extension available.

### 3 Terminal blocks

- Three types of pluggable terminal blocks available.

# PLC Automation product family

## AC500 and AC500-XC – modular concept



### 1 Terminal base

- Common for all AC500 CPU types
- For 1, 2 or 4 communication modules
- With serial interfaces
- With 1 or 2 Ethernet interfaces
- New specific terminal base only for AC500 V3 CPU with 2 Ethernet interfaces and CAN interface.

### 2 Communication modules

- For PROFIBUS DP®, Ethernet, Modbus TCP, EtherCAT®, CANopen®, PROFINET® IO or serial programmable
- Up to 4 pluggable.

### 3 AC500 central processing unit (CPU)

- Different performance, memory, network, operating conditions options
- Integrated communication
- New AC500 V3 CPU with large memory and high performance (requires new specific terminal base).

### 4 S500 I/O modules

- Up to 10 expansions
- Decentralized extension available.

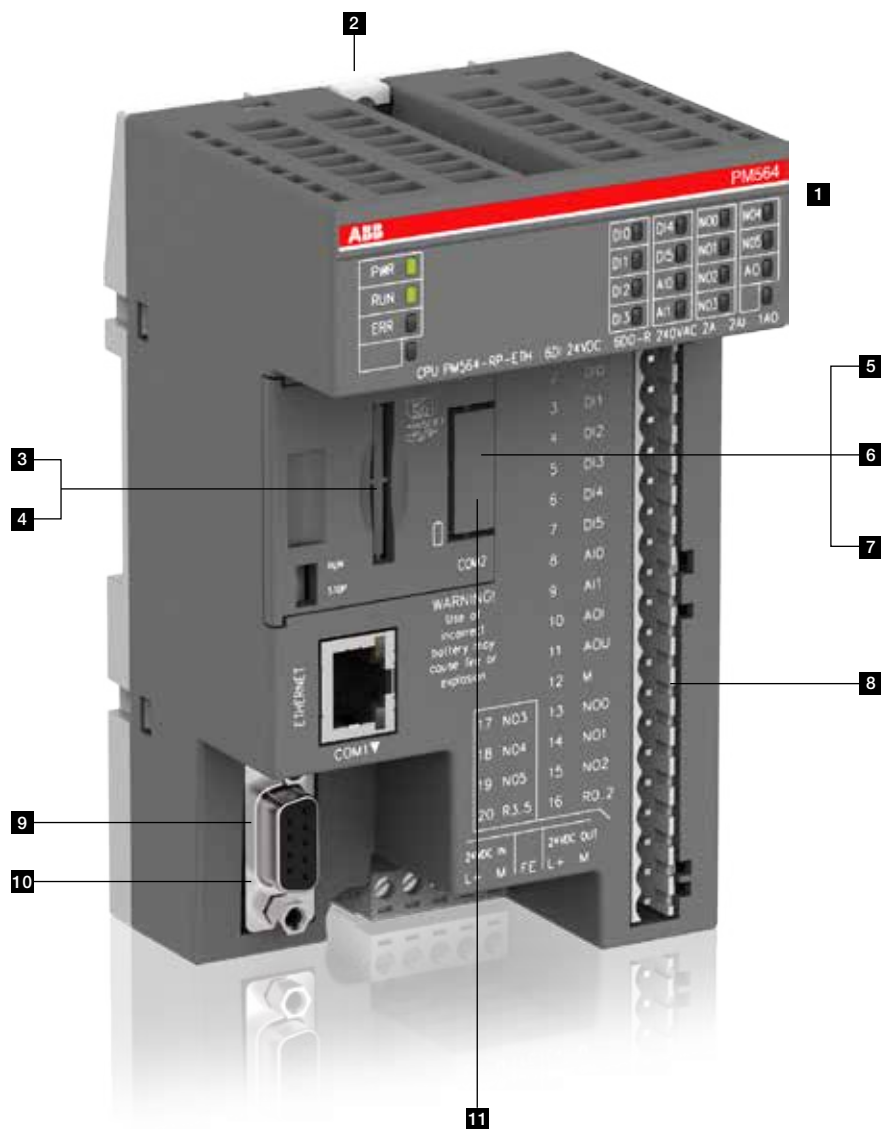
### 5 Terminal units

- Up to 10 terminal units
- Decentralized extension available.

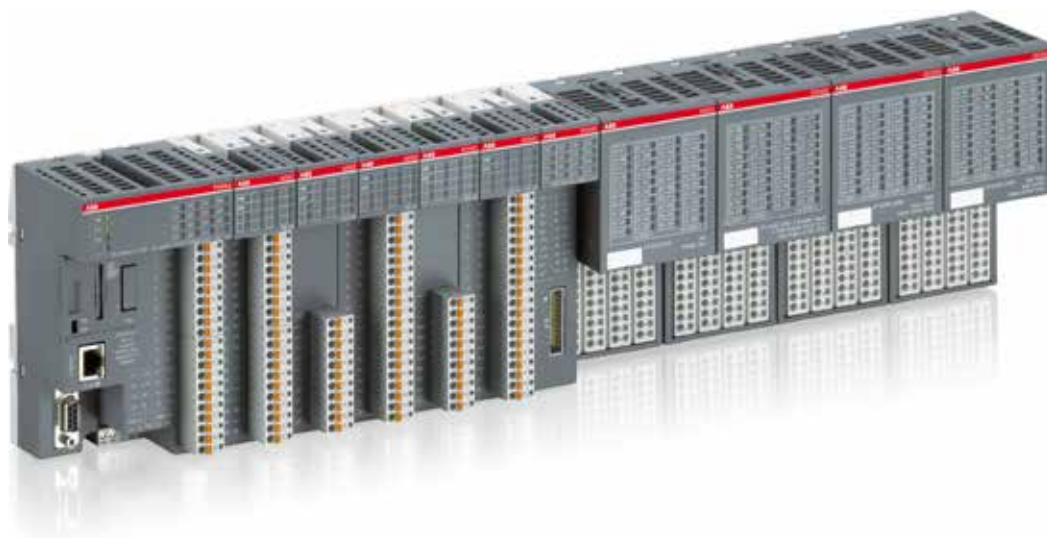
# PLC Automation product family

## AC500-eCo system characteristics

- 1
- Locally, AC500-eCo CPUs are expandable with up to 10 I/O modules. AC500-eCo CPUs with different performance levels are available.







**1** AC500-eCo CPUs are locally expandable with up to 10 I/O modules (standard S500 and S500-eCo I/O modules can be mixed).



**2** Wall mounting



**3** SD-card adapter



**4** SD-card



**5** Adapter with realtime clock

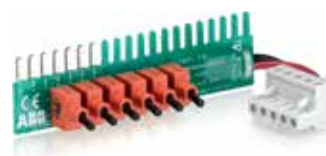
**6** Adapter with COM2 & realtime clock



**7** Adapter with COM2



**8** Terminal blocks



Input simulator



**9** RS485 isolator for COM1



**10** COM1 USB

**11** COM2 USB programming cable



AC500-eCo Starter kit.  
For more information,  
see page 167

# PLC Automation product family

## AC500 system characteristics

1 AC500 offers superior local expansion capabilities for I/O communication, best-in-class CPU functionality and industry-leading performance.





- 1** AC500 CPUs are locally expandable with up to 10 I/O modules (standard S500 and S500-eCo I/O modules can be mixed).



**2** Terminal base / Terminal base V3



**3** Communication module  
Up to 4 modules for multiple combinations to communicate on nearly every protocol available



**4** CPU module / CPU V3 module



**5** S500 Terminal unit



**6** S500 I/O module



Pluggable marker holder for S500 I/O modules with template



**7** S500-eCo I/O module



**8** SD-card



**9** Battery

# PLC Automation product family

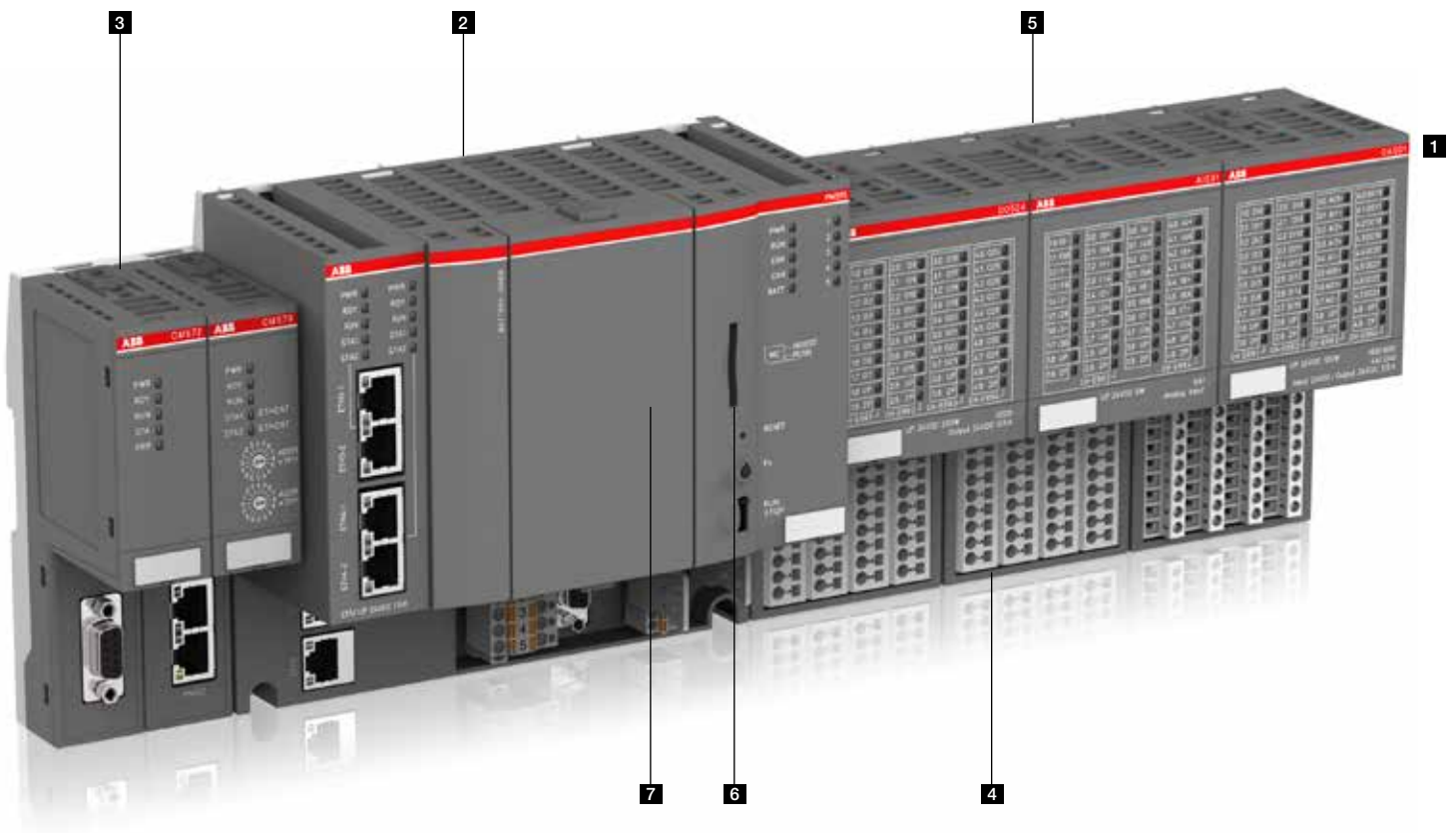
## AC500 PM595 Controller system characteristics

1

The flagship of the AC500 platform, the AC500 PM595 Controller, was designed as scalable, flexible and efficient as the entire AC500 range.

With the AC500 CPU PM595, ABB launched a new core for machine control applications. Its high-performance processor with generous memory offers performance, security and reliability for the upcoming challenges of automation applications.

A variety of connectivity capabilities, integrated safety and utilizability even under rough environment provide machine builders with valuable benefits when performing their automation tasks.





- 1** AC500 CPUs are locally expandable with up to 10 I/O modules (standard S500 and S500-eCo I/O modules can be mixed).



- 2** CPU with integrated connectivity and terminal base



- 3** Communication module  
Up to 2 modules for multiple combinations to communicate on nearly every protocol available



- 4** S500 Terminal unit



- 5** S500 I/O module



- 5** S500-eCo I/O module



- 6** SD-card



- 7** Battery



- Pluggable marker holder for S500 I/O modules with template

## 1 Predictable performance for your operations

## 1 Predictable performance for your operations



### Add predictable performance and productivity

The new CMS module brings further reliability and easy integration with all kinds of machinery systems, enabling precise management of the real-time condition of your operation. This transparency takes your business and productivity to a new level with more efficient machines, predictable performance and significant reduction in maintenance costs.

No matter whether as stand-alone condition monitoring or integrated into machine or process control, the module is perfectly suited to build optimized, self-analyzing automation solutions that simultaneously perform condition monitoring, control, protection, safety and data logger functions with one controller. The fast data logger function also contributes to consistent high quality production, due to the possibility to combine control and production information directly.

CMS also protects against machine failures, unforeseen sudden damage, incorrect installation, and reduces maintenance and wear. Virtually no unscheduled downtimes boost plant availability and reliability.

### Advantages

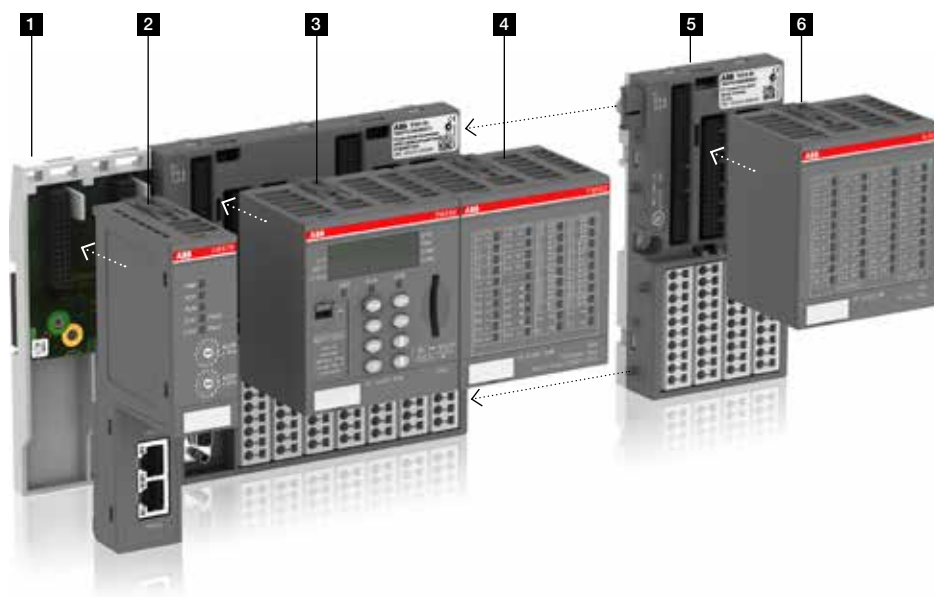
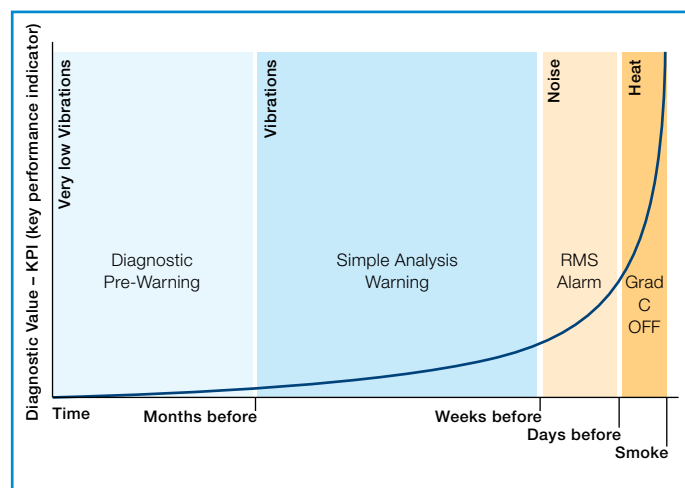
- Planned maintenance rather than spontaneous repair ensures predictable performance
- Approaching damage is identified very early
- Protection against spontaneous failures and operation in critical conditions
- Reduction of costs in maintenance and lost production time
- Plant availability is increased
- Optimum utilization of the aggregates until real end of life
- Simple to use, maintain, adapt or expand

### AC500 + CMS = increased machine efficiency

All based on the AC500 platform modularity provides ultimate flexibility: Communication and I/O modules can be added and combined with Safety.

### Expandable, robust and proven

- Stand-alone CMS or control integrated
- Expandable by AC500 communication modules and S500 I/O modules
- Proven and future proof, as based on AC500 platform
- Extreme conditions XC version available
- Fast data logger, e. g. for production quality
- Fast protection in parallel to condition monitoring



- 1 Terminal base: TF501 or TF521
- 2 Accomodating: 0 - 2 communication modules
- 3 PM592 CPU
- 4 FM502 CMS module
- 5 Expandable by I/O terminal units
- 6 Expandable by further I/O modules

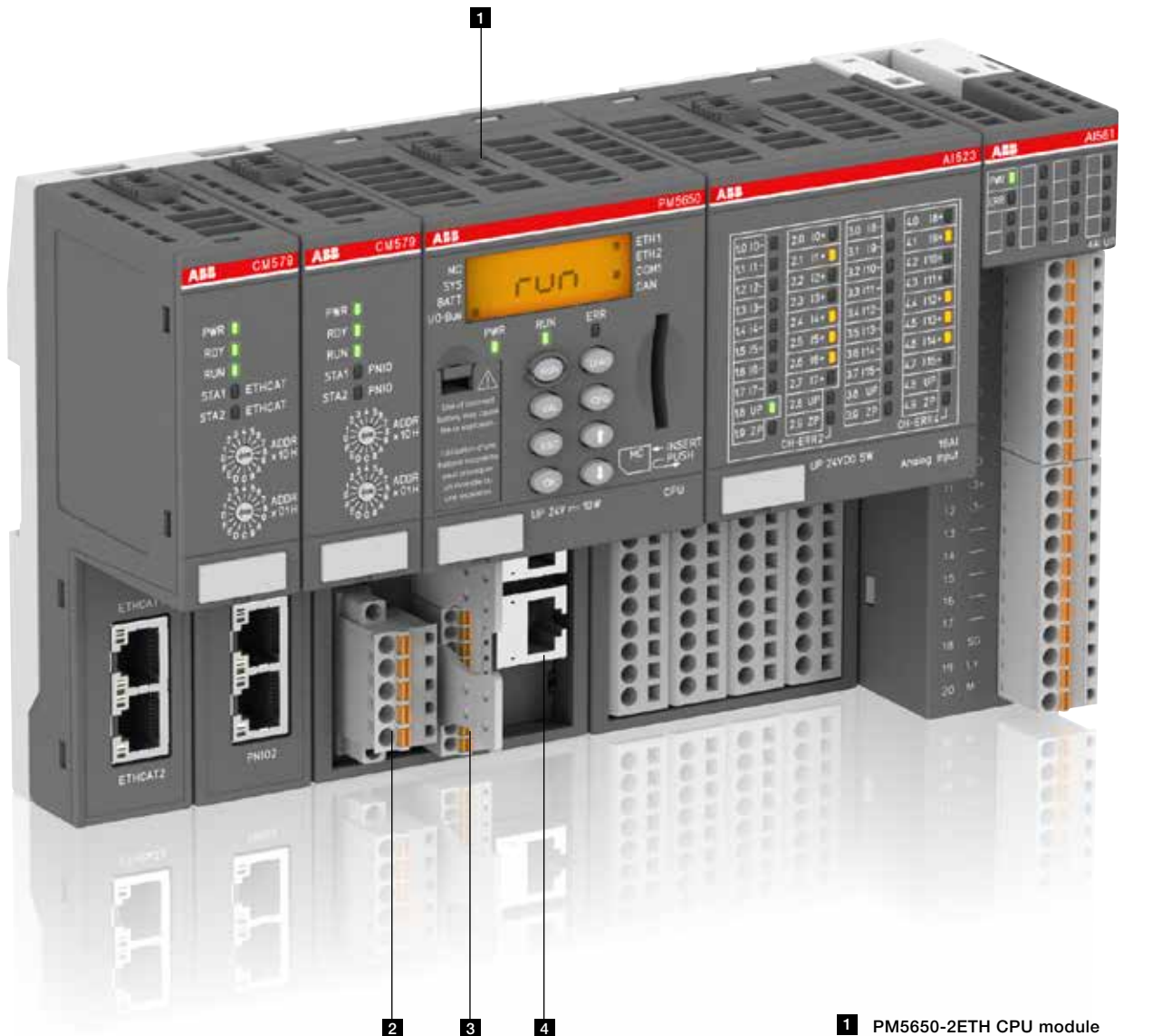
# PLC Automation product family

## AC500 V3

1

### AC500 V3 delivers new features and higher performance

New CPU range PM56xx with higher hardware performance and state-of-the-art features, such as OPC UA, WebVisu, Object oriented programming, selectable fieldbus protocols, and much more



- 1 PM5650-2ETH CPU module
- 2 One CAN serial interface
- 3 One COM1 serial interface
- 4 Two Ethernet interfaces on RJ45

### Improved features and performance

The AC500 platform features a new more powerful CPU with larger memory for various automation solutions ranging from simple to complex motion control applications.

Configurable Ethernet fieldbus protocols, such as PROFINET IO® (\*), EtherCAT® (\*) or EthernetIP® (\*) running on standard Ethernet interfaces, enable the CPU to be used for applications with embedded protocols. The integrated Ethernet switch (\*) simplifies the network architecture, making additional external switches obsolete, and thereby also saving cabinet space. Fewer hardware types facilitate spare-parts stocking thus increasing flexibility.

The CPU also provides an integrated CAN / CANopen® interface offering an easy-to-use and fast connection to remote I/Os or drives. Various CAN protocols, e.g. CANopen Master and Slave (\*), J1939 or CAN 2A/2B are available, and modular CAN is also supported.

### Improved application flexibility and facilitated customer engineering

Less hardware products but more configurable and licensed features allow for customizing the product according to your specific application.

Due to the 80MB of memory and dynamic allocation to User Data, Program or Web Server, the new CPU meets almost every application requirement by adapting its configuration according to your needs.

### State-of-the-art features tailored to your needs

Improved communication features integrated in the CPUs lower hardware costs and reduce the number of versions. Compatibility (\*) with existing S500 / S500-eCo I/O modules, communication modules, communication interface modules and AC500-S safety modules of the existing AC500 PLC platform.

### Connection to third-party systems in open architecture

The integrated EthernetIP® protocol (\*) enables to connect existing applications or third-party systems. Standardized protocols or features such as OPC UA save time and costs and simplify the connection to SCADA.

New Web Server based on HTML 5

Two embedded Ethernet Interfaces:

- Independent (2xMAC) or Switched (\*)
- A lot of onboard ETH features:
  - OPC UA Server (easier connection to SCADA, panels, third-party, IoTSP)
- Ethernet IP adapter
- Modbus TCP client/server
- IEC 60870 (with new features)
- Network variables (UDP)

### Reduced cabinet space with more integrated features

Integrated interfaces and configurable protocols reduce the CPU size thus saving cabinet space.

### Motion capability and features

The high calculation performance of the CPU allows the implementation of complex synchronized motion applications.

### New PS5520-MC (\*) Motion control library

Compatible with the new Automation Builder Motion Solution configuration assistant. For use with PM5650-2ETH CPU.

Based on PS552-MC-E, the new library provides motion function blocks compliant with PLCopen® for single and multi-axis movements with enhanced features, such as continuous updates and move buffering.

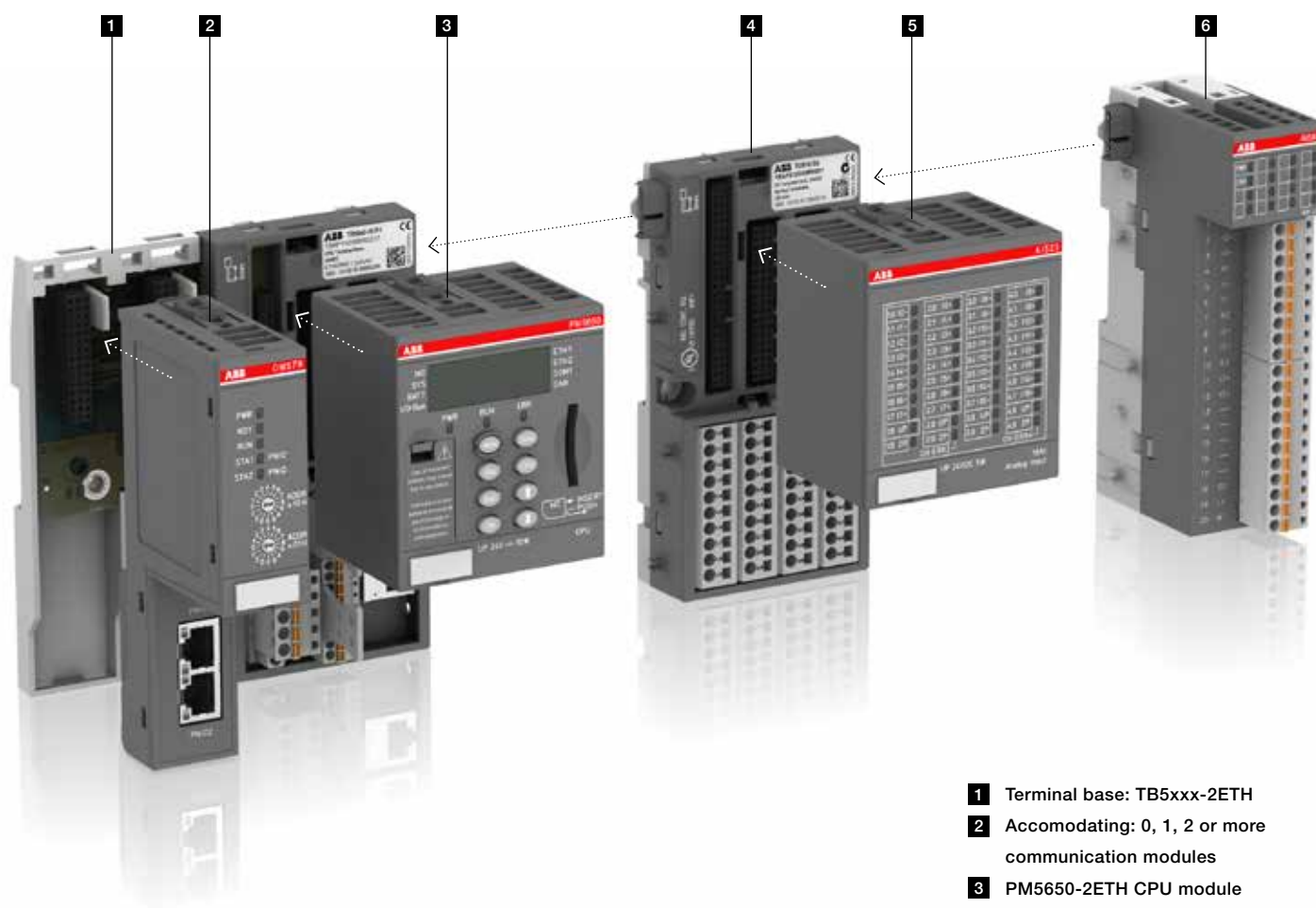
(\*) scheduled for 2017



# PLC Automation product family

## AC500 V3

1



- 1** Terminal base: TB5xxx-2ETH
- 2** Accomodating: 0, 1, 2 or more communication modules
- 3** PM5650-2ETH CPU module
- 4** Expandable by I/O terminal units
- 5** Expandable by further I/O modules from the S500 product range
- 6** or S500-eCo product range

### Optimized for motion control

The new PLC controller uses Motion Solution features in Automation Builder.

Create a motion application quickly and easily with the Motion Solution configuration assistant providing:

- Intuitive set-up process for single or multi-axis systems
- Guidance and validation of data
- Automatic generation of template program

### Reliability and security

Signed boot projects (\*) and Firmware (\*) protect your application from unauthorized changes and strengthen your protection.

### Functional safety

Reusing AC500-S safety solutions (\*) provides state-of-the-art safety features and reduces engineering time.

### Protection of customer investment

Reusing AC500/S500 products protects your investments and allows easy upgrades / migration from current applications to the latest technology for the coming years.

The PM56xx CPU uses the new terminal base range TB56xx but can also reuse many existing AC500 platform products.

### Improved engineering, programming and debugging

Running on the new AC500 V3 CPU, several new features of the Automation Builder software make the AC500 platform more powerful and easier to use:

- Professional UML - model-based application development
- Professional Application Composer - functional engineering
- Professional Version Control with subversion - application project management
- Professional Static Analysis - identification of potential application errors
- Professional Profiler - dynamic runtime analysis of the application
- Professional Test Manager - automated application tests
- Object-oriented programming
- New optimized editors for IEC programming languages
- Virtual commissioning
- Motion Solution in Automation Builder and enhanced library

For details, please refer to Automation Builder 2.0, section Highlights - productivity features page 43.

(\*) scheduled for 2017

# PLC Automation product family

## Extreme conditions

1

PLC AC500-XC – the rugged variant of AC500 for extreme indoor and outdoor conditions.

The PLC AC500-XC is reliable, functionally safe and operational even under rough environmental conditions.





**1** Terminal base



**2** Extreme conditions communication module



**3** Extreme conditions CPU



**4** Extreme conditions CPU with integrated connectivity and terminal base



**5** Extreme conditions S500 terminal unit



**6** Extreme conditions S500 I/O module



#### Operation in extremely humid environments

- Increased resistance against 100 % humidity and condensation.



#### Extended operating temperature

- -40 °C up to +70 °C operating temperature.



#### Reliable in high altitudes

- Operation in altitudes up to 4000 m above sea level or air pressures up to 620 hPa.



#### Extended immunity to corrosive gases and salt mist

- G3, 3C2 / 3C3 immunity
- Salt mist EN 60068-2-52 / EN 60068-2-11.



#### Extended immunity to vibration

- 4 g rms random vibration up to 500 Hz
- 2 g sinusoidal vibration up to 500 Hz.



#### Extended EMC requirements

- EN 61000-4-5 surge immunity test
- EN 61000-4-4 transient / burst immunity test.

# PLC Automation product family

## Functional Safety

1

AC500-S Safety PLC is the solution for both simple and complex machine safety applications requiring maximum reliability, efficiency and flexibility.

This safety PLC protects people, machines and processes, the environment and investments - the ideal choice for wind turbine, crane, hoist, robot and other factory applications.







**1** Safety CPU



**2** S500 Safety I/O module



**3** Safety terminal unit

### Better integration and ease of programming

Featuring a consistent look and feel across the entire range, the AC500 is the PLC of choice for applications where uncompromised flexibility, comprehensive integration and seamless communication are a must. Automation Builder seamlessly integrates your safety application in ABB PLC, Safety, Drives, Motion, HMI and Robotics. Through integrated standard languages, such as IEC 61131-3, Automation Builder is easy to use thus allowing you to get started in virtually no time at all. And what is more: intuitive system configuration using one single tool ensures optimal transparency.

The AC500-S Safety PLC, ABB's latest addition to the AC500 family, facilitates the implementation of even most complex safety applications. Support of safety-relevant calculations, such as COS, SIN, TAN, ASIN, ACOS and LOG makes the AC500-S the ideal solution for crane engineering, wind power generation, robotics and hoisting applications. Safety programming with Structured Text (ST) and full support for Function Block Diagram (FBD) and Ladder Diagram (LD) programming gives you greater flexibility and simplifies safety application development. The AC500-S Safety PLC is also available in a version for extreme conditions.

# PLC Automation product family

## CP600-eCo and CP600 control panels

1

With comprehensive but easy-to-use functionalities, ABB control panels stand out from competitor products. At one single touch, they intuitively provide operators with tailor-made operational information for production plants and machines. CP600-eCo / CP600 control panels make machine operation efficient, predictable and user-friendly.



## Build effective graphic interfaces with Panel Builder 600 - efficient representation of your information



Automation Builder  
programming station



CP600-eCo / CP600



AC500  
without web server

## Save engineering time by using Automation Builder for both your PLC and WebVisu



Automation Builder  
programming station



AC500  
with web server



CP600-WEB  
with visualization for  
AC500 V2.3 web server

## Connectivity with Drives directly without PLC



Automation Builder  
programming station



CP600-eCo / CP600



Drives

# PLC Automation product family

## PLC Automation website – online tools

1

The [www.abb.com/plc](http://www.abb.com/plc) website is a mine of information on our products and documentation.

The screenshot shows the ABB PLC Automation website homepage. At the top, the ABB logo is on the left, and navigation links 'HOME + OFFERINGS + PLC AUTOMATION' and 'GLOBAL SITE' are on the right. A search icon is also present. Below the header, the main section is titled 'PLC Automation' with a sub-header 'ABB's automation devices deliver solutions with high performance and flexibility to be effectively deployed within diverse industries and applications including water, building infrastructure, data centers, renewable energy, machinery automation, material handling, marine and more.' To the right of this text is a large image of a PLC rack. Below the text is a call to action: 'Are you looking for support or purchase information?' with a 'Contact us' link. The 'Our offering' section features four main product categories, each with an image and a label: 1. Programmable Logic Controllers PLCs (image of a PLC rack), 2. Automation Builder (image of a computer monitor displaying the software), 3. ABB zenon (image of a computer monitor displaying a graphical interface), and 4. Control panels (image of several control panel units). Below these is a carousel with a '5' indicator. The 'Highlights' section (6) includes links for 'Latest product news', 'Main catalog', and 'Follow us' with a YouTube icon. The 'Industries and applications' section (7) displays a grid of images representing various industries: Cranes, Food and beverage, HVAC, Marine, Mining, and Plastics and rubber. A separate image for 'Water and wastewater' is shown below the grid. The 'Services' section (8) includes links for 'Documents and downloads', 'Application examples', 'Frequently asked questions', 'Training locations', 'Training courses', 'Business Online (spare parts)', and 'Success stories'.

**ABB** HOME + OFFERINGS + PLC AUTOMATION GLOBAL SITE


## PLC Automation

ABB's automation devices deliver solutions with high performance and flexibility to be effectively deployed within diverse industries and applications including water, building infrastructure, data centers, renewable energy, machinery automation, material handling, marine and more.

Are you looking for support or purchase information?  
↓ Contact us

### Our offering

1



Programmable Logic Controllers PLCs

2



Automation Builder

3



ABB zenon

4



Control panels


5

### Highlights

Latest product news

Main catalog


Follow us



### Industries and applications



Cranes



Food and beverage




HVAC



Marine



Mining



Plastics and rubber



Water and wastewater

### Services

Documents and downloads

Application examples

Frequently asked questions

Training locations

Training courses

Business Online (spare parts)

Success stories

**1** Programmable Logic Controllers PLCs

- AC500-eCo (CPUs, S500-eCo I/O modules, Accessories)
- AC500 (CPUs, Communication modules, Communication interface modules, S500 I/O modules, Accessories, Condition Monitoring CMS)
- AC500-XC (CPUs, Communication modules, Communication interface modules, S500 I/O modules, Accessories, Condition Monitoring CMS)
- AC500-S (CPUs, S500 I/O modules)

**2** Automation Builder engineering suite

- Download link [www.abb.com/automationbuilder](http://www.abb.com/automationbuilder)

**3** ABB zenon**4** Control panels

- CP600-eCo (Devices, Software, Accessories)
- CP600 (Devices, Software, Accessories)

**5** Legacy products

- AC31 and previous series
- CP400
- CP500
- DigiVis 500
- Wireless products

**6** Highlights

- Latest product news
- Main catalog
- YouTube

**7** Industries and applications**8** Services

- Documents and Downloads
- Application examples (for Automation Builder programming)
- FAQs
- Training locations and courses
- Business Online (spare parts)
- Success Stories

**9** Related products (Drives, Drives channel network, Motion control, Robotics)**10** Contact information for your country

**9 Related products**

[Drives](#)
[Drives channel network](#)
[Motion control](#)
[Robotics](#)

**10 Contact information**

What would you like to do?

[I need more information](#)

**Submit your inquiry**

Please select country from the list below

Country ▼

Please select country ▼

Name

Company

E-Mail

Phone

Your message

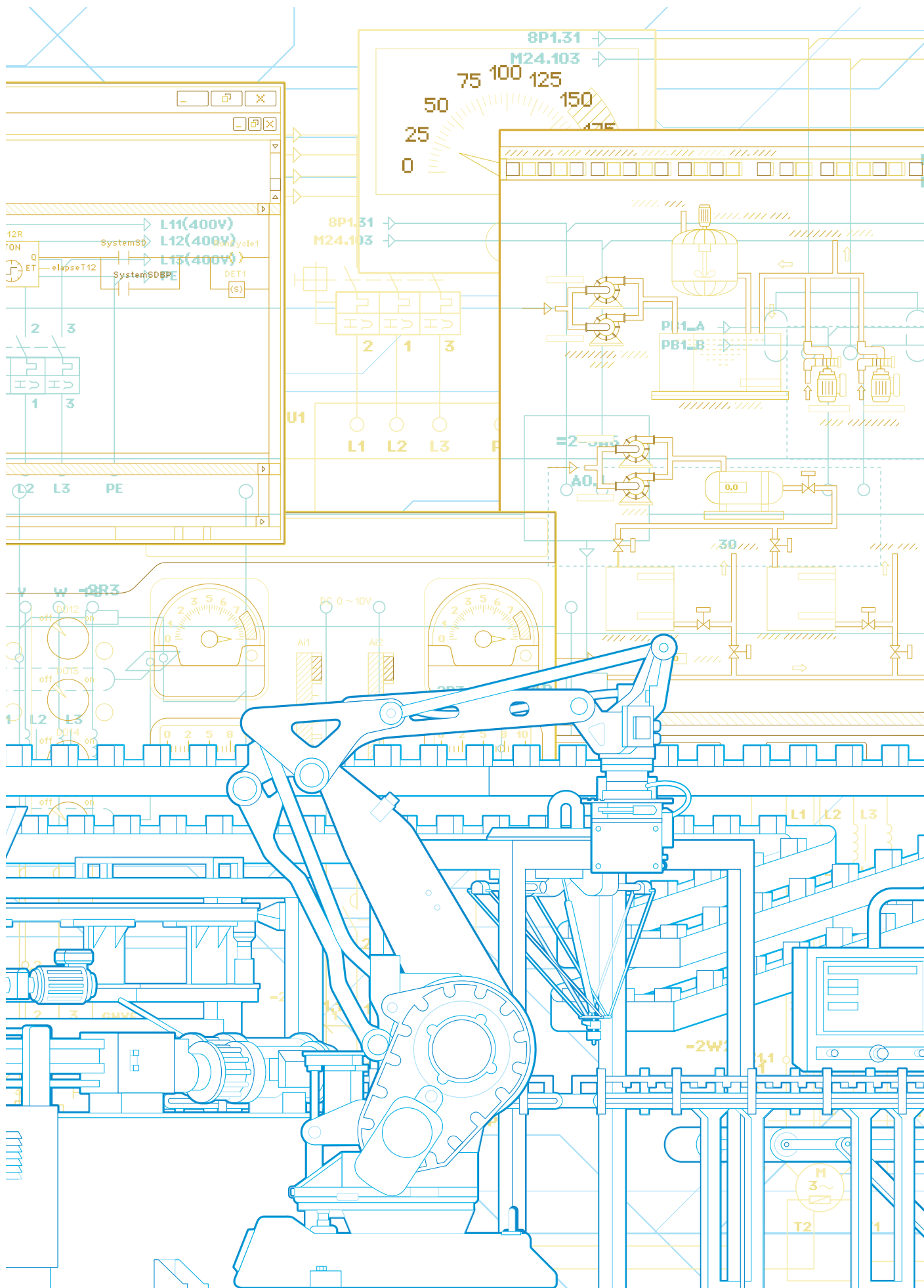
[→ Privacy policy](#)
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**Your local ABB Sales Team**

Please select country from the list

Close





# Automation Builder

## Integrated engineering suite

<a href="#">Key features</a>	<a href="#">2/36</a>
<a href="#">Ordering data</a>	<a href="#">2/37</a>
<a href="#">Software features</a>	<a href="#">2/38</a>
<a href="#">Libraries features</a>	<a href="#">2/40</a>
<a href="#">Highlights – productivity features</a>	<a href="#">2/43</a>
<a href="#">Virtual Commissioning Platform – virtual system testing</a>	<a href="#">2/44</a>

# Automation Builder

## Key features

2

Stay in control of your project: Automation Builder integrates engineering tools for PLCs, safety, control panels, SCADA, drives, motion and robots

Reduce risk: Manage complexity and realize connectivity easily

Save time: Test systems effortlessly in virtual time without real hardware using Virtual Commissioning technology

Increase efficiency: Build comprehensive solutions with integrated engineering that add value to your business



Download Automation Builder from [www.abb.com/automationbuilder](http://www.abb.com/automationbuilder)

# Automation Builder

## Ordering data



Automation Builder

### Automation Builder

- Automation Builder connects the engineering tools for PLC, safety, control panels, SCADA, drives, motion and robots. The software suite integrates products into solutions that create value for your customers, giving you greater control of your projects, reducing risk and saving time.
- Open systems win. They lead to more innovation, value and freedom of choice for your business. Automation Builder enables you to adapt the tool chain to your needs and workflows. The software is open for your specific product and communication technology to build your distinct solution.
- Automation Builder 2.0 provides advanced features, further increasing engineering productivity for discrete automation solutions.
- For details please refer to Automation Builder – Software Features.

### Automation Builder Editions

For	Description	Type	Order code	Price	Weight (1 pce) kg
Free 61131-3 engineering for simple PLC solutions	Automation Builder 2.x Basic (1)	-	-	FREE	-
Integrated Engineering for PLC, drives, motion, SCADA, panels	Automation Builder 2.x Standard (2)	DM200-TOOL	1SAS010000R0102		0.005
	Automation Builder 2.x Standard Upgrade (2)(3)	DM201-TOOL-UPGR	1SAS010001R0102		0.005
Integrated Engineering for PLC, drives, motion, SCADA, panels and features for engineering productivity and collaboration	Automation Builder 2.x Premium (5)	DM202-PREM	1SAS010002R0102		0.005
	Automation Builder 2.x Premium Upgrade (4)(5)	DM203-PREM-UPGR	1SAS010003R0102		0.005

### Automation Builder add-ons

Functional safety engineering	AC500-S Safety PLC programming	DM220-FSE (2) DM221-FSE-NW (5)	1SAS010020R0102 1SAS010021R0102		0.005
Virtual system testing based on Virtual commissioning technology	Virtual Commissioning Platform for Automation Builder 2.x (6)(8)(9)	DM250-VCP (2) DM251-VCP-NW (5)	1SAS010050R0102 1SAS010051R0102		0.005
Collaborative engineering support	Professional Version Control with Subversion for Automation Builder 2.x (6)(9)	DM207-PVC (2) DM214-PVC-NW (5)	1SAS010007R0102 1SAS010014R0102		0.005
Functional engineering	Professional Application Composer for Automation Builder 2.x (6)(9)	DM208-PAC (2) DM215-PAC-NW (5)	1SAS010008R0102 1SAS010015R0102		0.005
Object-oriented system design	Professional UML for Automation Builder 2.x (6)(9)	DM209-PUM (2) DM216-PUM-NW (5)	1SAS010009R0102 1SAS010016R0102		0.005
Control code analysis	Professional Static Analysis for Automation Builder 2.x (6)(9)	DM210-PSA (2) DM217-PSA-NW (5)	1SAS010010R0102 1SAS010017R0102		0.005
Optimization of runtime performance	Professional Profiler for Automation Builder 2.x (6)(9)	DM211-PPR (2) DM218-PPR-NW (5)	1SAS010011R0102 1SAS010018R0102		0.005
System, module and regression testing	Professional Test Manager for Automation Builder 2.x (6)(9)	DM212-PTM (2) DM219-PTM-NW (5)	1SAS010012R0102 1SAS010019R0102		0.005

### Accessories

Automation Builder licensing based on a USB Key	USB Key for Automation Builder without license (7)	DM-KEY	1SAP193600R0001		0.010
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### Libraries

For	Description	Type	Order code	Price	Weight (1 pce) kg
all AC500 CPUs	Solar library (10) (5)	PS562-SOLAR	1SAP195000R0101		0.010
all AC500 CPUs	Water library (10) (5)	PS563-WATER	1SAS030000R0101		0.010
all AC500 CPUs	Motion Control library, Extended (10) (5)	PS552-MC-E	1SAP192100R0102		0.010
all AC500 CPUs	Temperature control library (10) (5)	PS564-TEMPCTRL	1SAS030010R0101		0.010
all AC500 CPUs	BACnet library B-ASC profile (10) (5)	PS565-BACnet-ASC	1SAP195500R0101		0.010

(1) Free license

(2) Single user license - bound to PC or DM-KEY (USB Key)

(3) Purchase this option to upgrade Automation Builder 1.x Standard to Automation Builder 2.x Standard

(4) Purchase this option to upgrade Automation Builder 1.x Premium to Automation Builder 2.x Premium

(5) Network license for shared usage within a local area network. Per license one user can use the license at the same time.

(6) Add-on to Automation Builder 2.x Premium edition. Automation Builder 2.x Premium must be purchased separately

(7) Does not contain license. Automation Builder license must be purchased separately. Can carry an arbitrary number of licenses.

(8) Enables virtual Drives (ACS380, ACS580) and virtual PLCs (AC500 V2, AC500 V3).

(9) Expert function - limited availability

(10) Delivery includes single user license - bound to PC or DM-KEY (USB Key), software can be downloaded.

### Further application libraries and examples:

Please check and download further libraries and examples from: [www.abb.com/plc](http://www.abb.com/plc)

Use English language setting, then click on "Application Examples".

Application Examples explain functionality by using e.g. standard Automation Builder libraries and functions in simple examples. They are tested in the described example configuration and functionality only, they come with documentation and are free of charge.

Applications Examples help to minimize valuable programming and testing time for specific applications.



AC500 libraries

# Automation Builder

## Software features



2

Automation Builder 2.0		Basic Basic system engineering FREE	Standard Integrated system engineering	Premium Productivity and collaboration
Features and target hardware				
Productive engineering	Integrated engineering for PLCs, safety, robots, motion, drives, SCADA and control panels	◇	■	■
	Integrated tool suite installation and maintenance (online and offline)	■	■	■
	Project handling including project archive and backup features	■	■	■
	Project lifecycle support (version profiles and project migration)	■	■	■
	Native language support in EN, DE, ES, FR, CN	■	■	■
	Support of standardization and re-use by flexible configurations of machine variants and advanced IO device handling	■	■	■
	Support of re-use by cross project and cross Automation Builder instance copy&paste	■	■	■
	ECAD roundtrip engineering - AC500 and EPLAN® / Zuken E3®			■
	ECAD roundtrip engineering for 3rd party devices - PLC and EPLAN® / Zuken E3®			■
	Bulk data import/export with change control to any tool via CSV (also via copy&paste)			■
	Bulk data import/export of device and I/O lists and IEC 60870-5-104			■
	Change management support by project compare			■
	Device type editor for Open Device Integration			■
	Virtual system testing based on Virtual Commissioning Technology			□
	Collaborative engineering support by Professional Version Control with Subversion			□
	Functional engineering with Professional Application Composer			□
	Object-oriented system design with Professional UML			□
	Control code analysis with Professional Static Analysis			□
	Optimization of runtime performance with Professional Profiler			□
	System, module and regression testing with Professional Test Manager			□
PLC engineering (AC500 V2)	<b>For: AC500-eCo, AC500 V2, AC500-XC, AC500-S Safety, AC500 local I/O modules, AC500 extension modules</b>			
	PLC application programming (IL, LD, FBD, SFC, ST) plus CFC	■	■	■
	PLC firmware update, download and online change to single or several PLCs	■	■	■
	PLC simulation and debugging	■	■	■
	Integrated firmware identification and update (PM and CM devices)	■	■	■
	Configuration of communication protocols for TCP/IP, Modbus, CS31, IEC60870-5-104	■	■	■
	Open device integration for Modbus devices		■	■
	Configuration of communication protocols for PROFINET, PROFIBUS, EtherCAT, CAN		■	■
	C/ C++ application programming (GNU compiler)			■
	Virtual system testing including PLCs based on Virtual Commissioning Technology			□
PLC engineering (AC500 V3)	<b>For: AC500 V3 and supported AC500 local I/O modules and AC500 extension modules</b>			
	PLC application programming (LD, FBD, SFC, ST) plus CFC	■	■	■
	PLC firmware update, download and online change to single PLC	■	■	■
	PLC simulation and debugging	■	■	■
	Integrated firmware identification and update (PM and CM devices)	■	■	■
	Configuration of communication protocols for TCP/IP, Modbus TCP, IEC60870-5-104, CAN	■	■	■
	Configuration of communication protocols for PROFINET, EtherCAT, CM Devices		■	■
	Virtual system testing including PLCs based on Virtual Commissioning Technology			□
Safety PLC engineering (integrated solutions)	<b>For: AC500-S Safety CPU, Safety I/Os and PROFIsafe devices</b>			
	Safety PLC application programming (LD, FBD, ST)		□	□
	Fieldbus protocol engineering for PROFIsafe		□	□
Safety PLC engineering (stand-alone solutions)	<b>For: Pluto Safety PLC</b>			
	Safety Engineering with Pluto Manager	□	□	□
SCADA engineering	<b>For: ABB zenon</b>			
	Integrated SCADA and PLC engineering with ABB zenon Editor		■	■



# Automation Builder

## Software features

2

Automation Builder 2.0		Basic	Standard	Premium
Features and target hardware		Basic system engineering FREE	Integrated system engineering	Productivity and collaboration
Control Panel engineering	For: CP600, CP600-eCo, CP600-WEB, PB610-R			
	Panel configuration with Panel Builder (PB610 Panel Builder 600)	◇	■	■
	Panel configuration with Panel Builder (PB610 Panel Builder 600, basic features) for CP600-eCo	■	■	■
	PLC tag data import	□	■	■
Drive engineering	Control Panel simulation for Virtual Commissioning Technology	□	■	■
	For: ACS355, ACS380, ACS550, ACS580, ACS850, ACQ810, ACS880, DCT880 (runtime license needed), ACSM1			
	Drive application programming (IL, LD, FBD, SFC, ST) plus CFC	■	■	■
	Drive management, configuration and diagnosis with common process data editor (Drive - PLC)		■	■
Motion engineering	Drive engineering in Drive composer pro	◇	■	■
	Virtual system testing including Drives based on Virtual Commissioning Technology (only for ACS380, ACS580)			■
	For: MicroFlex e150, Motiflex e180			
	Motion application engineering with Mint WorkBench	■	■	■
Robotics engineering	PLC tag data import	■	■	■
	Motion solution engineering with Automation Builder (*)			■
	For: IRC5 (on selected fieldbusses)			
	Robot engineering with RobotStudio Basic		■	■
Solution engineering	Robot engineering with RobotStudio Premium	■	■	■
	Tag interface between PLC and robot controller	□	□	□
	Drive library (PS553-DRIVES)	■	■	■
	Motion Control for AC500 V2 PLCopen® Motion library (PS552-MC-E)	□	□	□
Further features	Motion Control for AC500 V3 (PS5640) (*)	■	■	■
	Solar library (PS562-SOLAR)	□	□	□
	Water library (PS563-WATER)	□	□	□
	Temperature Control library (PS564)	□	□	□
	BACnet -ASC library (PS565)	□	□	□
	AC500 High Availability (HA) library	□	□	□
	PackML Library (*)		■	■
	FTP client Library (PS554) (*)		■	■
	Signal Processing Package (*)		■	■
	Pumping Library (PS571) (*)		■	■
	HVAC Library (*)		■	■
	PLC Multidownload tool for large installations		■	■
Operating systems	OPC server and clients, service tool, PLC gateway, IP configuration and visualization		■	■
	Recommended: Windows 7 32/64-bit, Windows 8.1 32/64-bit, Windows 10 32/64-bit	■	■	■
PC requirements	Minimum: 1 GHz, 3 GB RAM, 14 GB free disk space	■	■	■

■ included

□ optional (additional license required) as integrated tool / feature / library

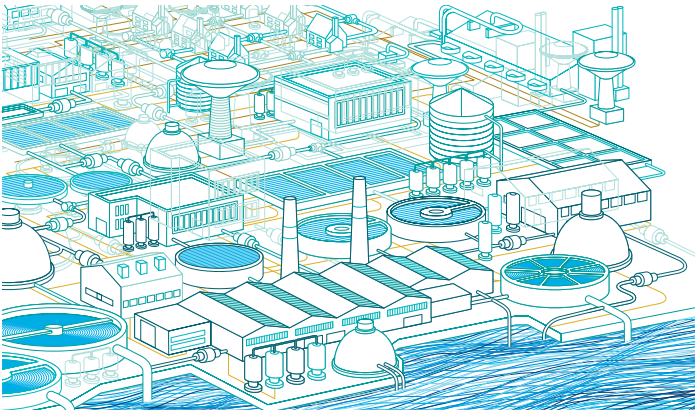
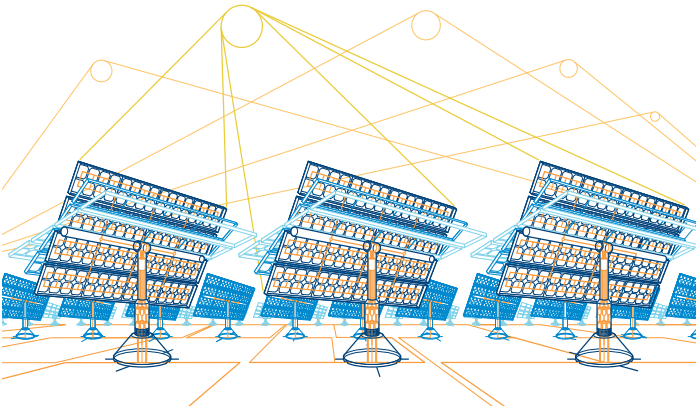
◇ optional (additional license required) as standalone tool / feature - not integrated in Automation Builder

(\*) Technology Preview: Technology Previews are non-final versions of our product and should not be taken as a measure of the fit, finish, capability, and overall quality of the product. While we don't stop using these versions in projects, we don't recommend it if data loss and the usual quirks of preview software cannot be afforded.

# Automation Builder

## Libraries features

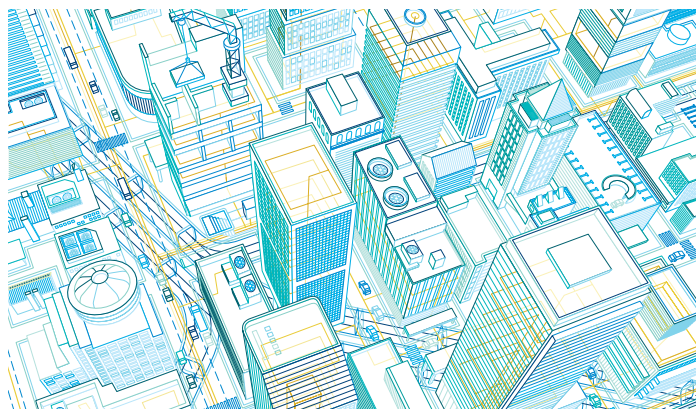
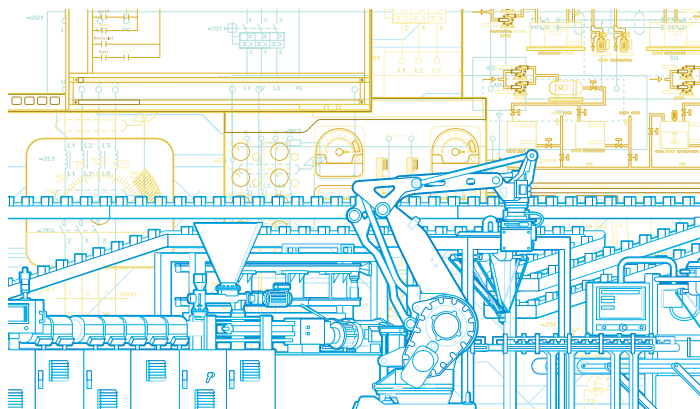
2



PS562-SOLAR	PS563-WATER
<b>Solar tracker solution library</b> <p>Library for solar tracking applications enabling fast engineering, especially together with ABB's drives and motors</p> <p>Covers different tracker configurations and different algorithms for accuracy needs</p> <ul style="list-style-type: none"> <li>Control of trackers in parabolic trough, power tower, PV and CPV applications.</li> </ul> <p>Complete library package for different tracking use cases, plug and play:</p> <p>Example program with detailed explanations and visualizations</p> <ul style="list-style-type: none"> <li>Control of the tracker adaptable to different needs and conditions, to achieve maximum efficiency of installation</li> <li>Exact positioning of different axes with the following accuracies: <ul style="list-style-type: none"> <li>NOAA algorithm 0.03 Grad</li> <li>NREL algorithm 0.0003 Grad.</li> </ul> </li> <li>Input / sensor adaptation</li> <li>Communication</li> <li>Different actuators / drives control</li> <li>All needed modes for simple commissioning and manual operation: <ul style="list-style-type: none"> <li>Fast and simple calibration of the trackers, offering manual repositioning and fine tuning</li> <li>Safety positions</li> <li>Back tracking.</li> </ul> </li> </ul>	<b>Water solution library</b> <p>Library supporting the most common functions in many water applications</p> <p>Flexible data logging options:</p> <ul style="list-style-type: none"> <li>Especially suited for remote communication like GSM/GPRS</li> <li>Timestamp in logging</li> <li>Integrated variants for simple use with IEC 60870-5-104</li> <li>Logging to files: storage capacity only dependent on memory availability</li> <li>Flexible log conditions (cyclic, event or tolerance based).</li> </ul> <p>Support for pumping station functions with different operation modes</p> <ul style="list-style-type: none"> <li>Standard multidrive functions (PLC based)</li> <li>Advanced functionality together with ABB ACS and ACQ810 drives</li> <li>Detailed diagnosis</li> <li>Energy efficiency functions</li> <li>Multidrive functions</li> <li>Flow estimation.</li> </ul> <p>Control Panel CP600 support for ACQ810: Fast and simple configuration for pumping stations with reduced programming effort via pre-built visualization screen templates.</p> <p>Application examples for fast engineering and startup.</p>
License Package (Software is part of Automation Builder)	
NOAA: PM554-XX and above NREL: PM573-ETH and above.	All AC500 CPUs. Logging: PM573 and above.

# Automation Builder

## Libraries features

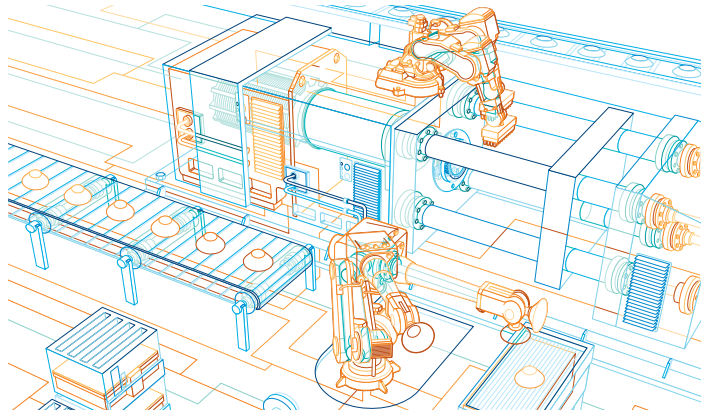
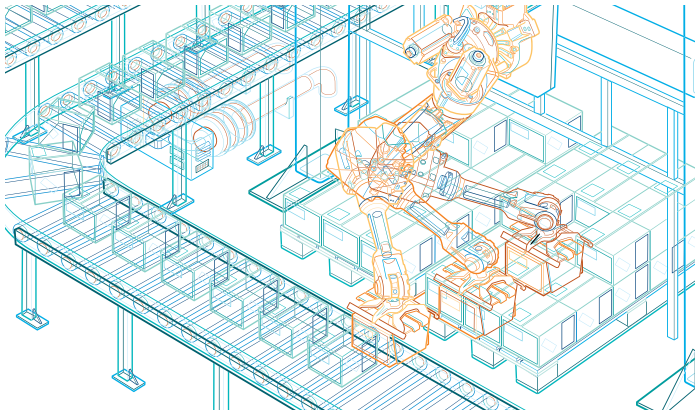


PS564-TEMPCTRL	PS565-BACnet-ASC
<b>Temperature control library</b>	<b>BACnet communication library</b>
Library packet for advanced temperature control applications	This library enables AC500 PLCs to connect OEM or infrastructure applications to BMS (Building Management Systems) or other controllers.
Includes extended, flexible PID functionality with Auto-tune for temperature control	The PS565-BACnet-ASC library enables AC500 to serve as BACnet server device, complying with the B-ASC Device Profile and interfacing control requirements, and acting as hardwired or Modbus-to-BACnet gateway.
<ul style="list-style-type: none"> <li>Enhanced response time and reduced overshoots and oscillations</li> <li>Option to optimize control for very different heating and cooling characteristics.</li> <li>Enhanced tolerance to thermocouple input noise</li> <li>Normal and standby- setpoints</li> <li>Multi-level temperature monitoring and alarms provides flexible operation and protection for machine and process</li> <li>Logging enables complete overview of the actual situation and past behavior</li> <li>Configurable output timing, synchronization for peak load shaving in multi-zone setups</li> <li>Simulation blocks enable off-line setup and pre-test of a new project</li> <li>Group-programming</li> </ul>	It supports BACnet IP (Ethernet) and BACnet MS/TP (serial) networks. The scalable AC500 platform is compatible with the BACnet library starting from eCo PM5x6 with larger memory (~ 300 objects) up to PM595 (more than 5000 objects).
Example projects, including adaptable HMI project for CP600 family, well suited for multi zone and grouped temperature control e.g. in Extrusion:	The very transparent, object-oriented publish and subscribe approach of BACnet allows efficient and well-documented engineering and collaboration of many different parties in large infrastructure projects.
<ul style="list-style-type: none"> <li>Easy to use operator interface</li> <li>Provides quick access to setup, monitoring and tuning screens for multiple zones</li> <li>Easily expandable to a large number of zones</li> <li>Zones: heat-, cool-only or heat-and-cool</li> </ul>	<b>Highlights</b> <ul style="list-style-type: none"> <li>Easy-to-use BACnet communication directly in the CPU</li> <li>No coupler or gateways required</li> <li>Cost-efficient particularly for OEMs and projects</li> <li>Interfacing other non-BACnet devices to BMS.</li> </ul>
License Package (Software is part of Automation Builder)	PS565 for AC500 is BTL-approved and certified
All AC500 CPUs.	All AC500 CPUs, starting from PM5x6 (~300 objects) up to PM595 (>5000 objects)

# Automation Builder

## Libraries features

2



### PS552-MC-E

#### Motion control library

Library enabling fast and standardized engineering according to PLCopen® standard when using ABB's AC500 PLC for motion control, especially together with ABB's motion control Drives.

Covers different motion control options for single and multiaxis motion control applications:

- Drive-Based and PLC-Based motion
- In PLC based motion, the position control loop could be closed in the PLC or drive (with synchronized network)
- Single axis, multiaxis and coordinated motion
- Defined Jerk limitation by polynomial interpolation
- Spline interpolation or polynomial interpolation for cam curves, position velocity or acceleration profiles available
- Possible to switch over between different movements and cam curves directly
- latch functionality by utilizing fast drive inputs for ACS350, ACS800, ACSM1
- Drive based motion: commands from PLC, drives perform interpolation and control loop
- Supports the new Pulse Train Output module FM562.

PLCopen® functions:

- Administrative Function Blocks
- Single axis Function Blocks
- Multiple axis Function Blocks
- Homing Function Blocks
- Coordinated Motion Function Blocks
- Additional ABB specific Function Blocks for further simplification.

License Package (Software is part of Automation Builder)

All AC500 CPUs (options and no. of blocks/functions and performance will depend on CPU size and memory).

### New (\*) PS5520-MC

#### Motion control library

- Compatible with new Automation Builder Motion Solution configuration assistant.
- For use with PM5650-2ETH CPU module.
- Based on PS552-MC-E library and provides PLCopen® compliant motion function blocks for single and multiaxis moves with enhanced features such as continuous update and move buffering.

Integrates with ABB Automation Builder 2.0 and utilises the new Motion Solution configuration assistant.

- Benefit from enhanced user-friendly programming environment with all IEC 61131-3 editors (FBD, LD, IL, ST, SFC)
- Utilize real object-oriented programming (OOP) with Inheritance of POU's to reduce development time and errors
- Motion Solution tool to simplify the process of configuring a motion system.
  - Define axes configurations via an intuitive user interface. Use standard settings or include additional features.
  - Enter only essential data which is validated in real time.
  - Receive help and tips during the data entry phase.
  - Automatically generate application configuration, including:
    - EtherCAT mappings
    - Appropriate libraries
    - Create and configure tasks and application programs
    - Create a program template, preconfigured using axis settings.

**Note** - Not all PS552-MC-E library function blocks are currently available in the PS5520-MC library and some of the behaviour may differ to maintain full compliance with PLCopen® motion definitions

(\*) scheduled for 2017



# Automation Builder

## Highlights – productivity features

### Improved engineering, programming and debugging

Running on the new AC500 V3 CPU, several new features from Automation Builder software make the AC500 Platform more powerful and easy to use.

The integrated tools help to optimize the coding phase and increase the performance and quality of applications.

### Object-oriented programming

All essential features of standard object-oriented programming are included in Automation Builders object-oriented programming:

- Better structured program code with “separation of concerns” and information hiding
- Flexible extensibility by new types of objects (e.g. software representations of new types of drives)

- Reuse of code for defining specialized subclasses (inheritance), reuse of code operating on different implementations of an interface (polymorphism)
- New optimized editors for IEC programming languages
- Continuous Function Chart (CFC) with auto routing of connections between POU's, unrestricted definition and display of the execution order
- Structured Text (ST) with Support for quick editing with common help, such as grouping, collapsible tree structure, and indented brackets

Design	Design	Management
<b>Professional UML</b> Professional UML (Unified Modeling Language) increases the legibility and overview of the project by providing a common basis for technologists and software developers. The following models are supported: Class Diagram - Design and display of object-oriented project structures in a graphical editor with bidirectional code conversion. State Chart - Additional graphical implementation language with a direct link to the code generator.	<b>Professional application composer – functional engineering</b> The Professional Application Composer is a development tool for efficiently creating application variants consisting of recurring function blocks, it helps for Engineering of serial machine variants, equipped and installed according to specific customer requirements, directly from the sales process. Increases efficiency by automated generation of applications from predefined modules.	<b>Professional version control – management of the application project</b> Professional Version Control is an integrated link to the version control system Subversion® (SVN). End users can use this tool to manage independently both the complete IEC 61131-3 project version, as well as the individual application objects. End users benefit from automated management of the source code when developing a project in various teams or over a long period of time.

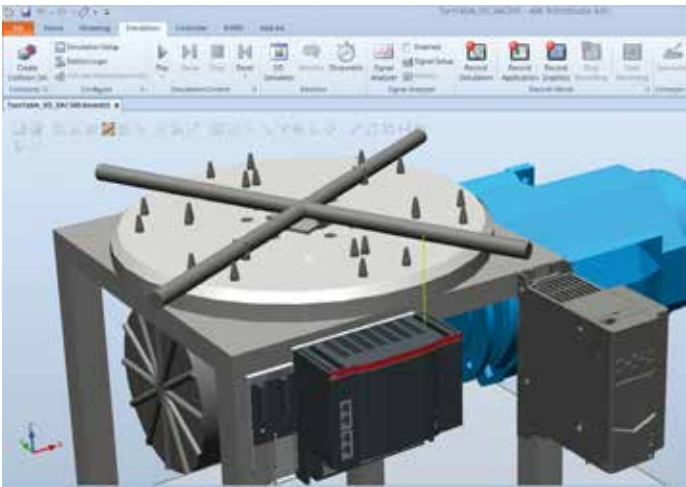
Analysis	Optimization	Test
<b>Professional static analysis – identification of potential application errors</b> Source code is tested based on defined rules and threshold values – all above and beyond the syntax check in the compiler. The source code can be improved by early recognition of logical and formal program errors. In addition, end users are relieved of performing syntax checks, which are now automated and reproducible, for example by applying the integrated coding guidelines.	<b>Professional profiler – dynamic runtime analysis of the application</b> With Professional Profiler, end users can measure the runtime performance of individual IEC 61131-3 program blocks. Based on individual results, users are then able to optimize the source code. Verification of individual predefined portions of code or a complete cycle. Clear display of the measured times in a call tree. Start and end of measurements at any time.	<b>Professional test manager – automated application tests</b> The Professional Test Manager provides users with comprehensive functions for system tests, module tests, and regression tests. These functions enable the user to create, manage, and perform automated recurring tests for quality assurance before commissioning and when releasing an IEC 61131-3 controller application.



# Automation Builder

## Virtual Commissioning Platform – virtual system testing

2

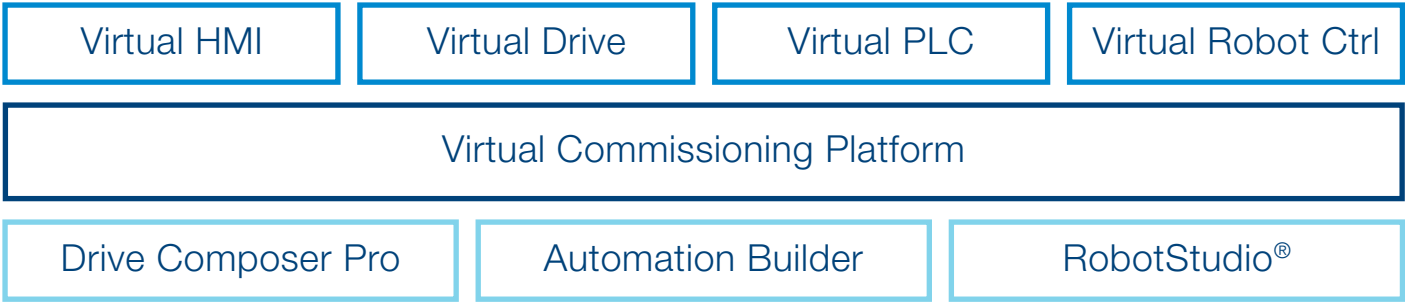


Automation Builder 2.0 introduces virtual system testing which allows machine builders and system integrators to simulate and automate all kinds of applications with minimum effort. This gives seamless testing of the complete system at an early stage, even when all the necessary hardware is not yet ready. Even complex systems can be built up quickly and efficiently, ensuring smooth interaction of all the components.

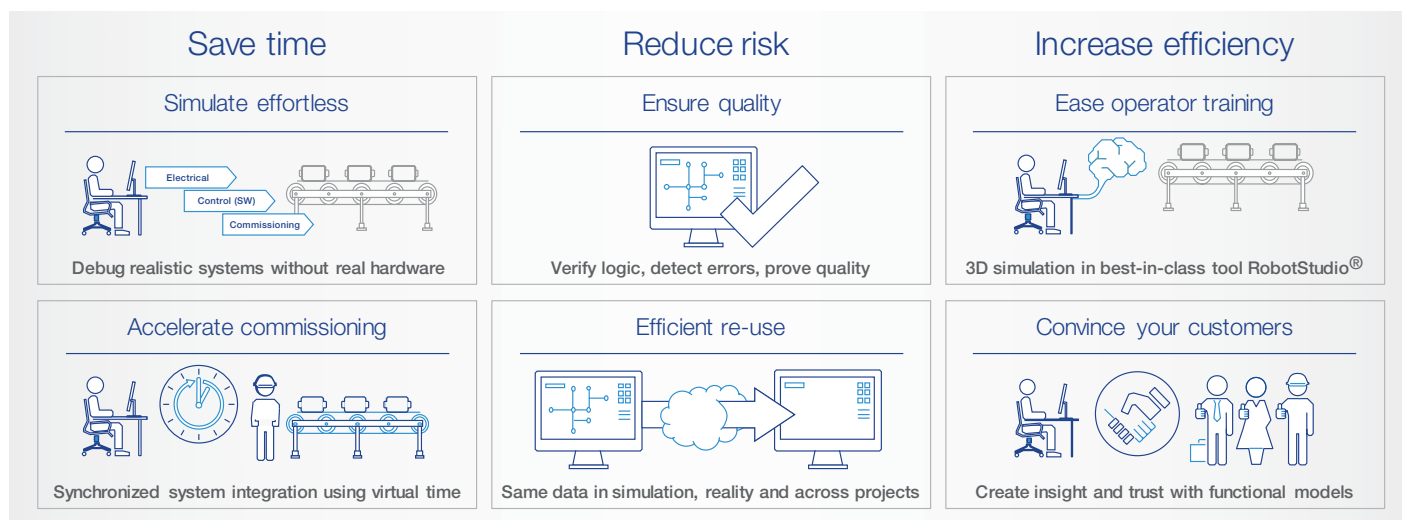
Virtual Commissioning Technology builds on ABB's proven engineering tools RobotStudio and Automation Builder as basis for simulation. It lets you build simulation models from virtual devices and manage the virtual time and signal exchange between the virtual devices.

Virtual devices emulate real hardware. They function as real hardware, provide signals (onboard, local, fieldbus/remote IOs) and variables. Virtual time lets you control the execution of the simulation. Speed up, slow down or freeze the execution for testing and debugging.

Additional components can be included to these models. This allows to simulate the real system including physical inputs or actuators. The flexible architecture of the Virtual Commissioning Technology allows to extend your simulation to more advanced aspects, e.g. the dynamic system behavior.



Virtual Commissioning Technology – Basics



#### Virtual Commissioning Technology – Benefits

#### Efficient simulation in three variants

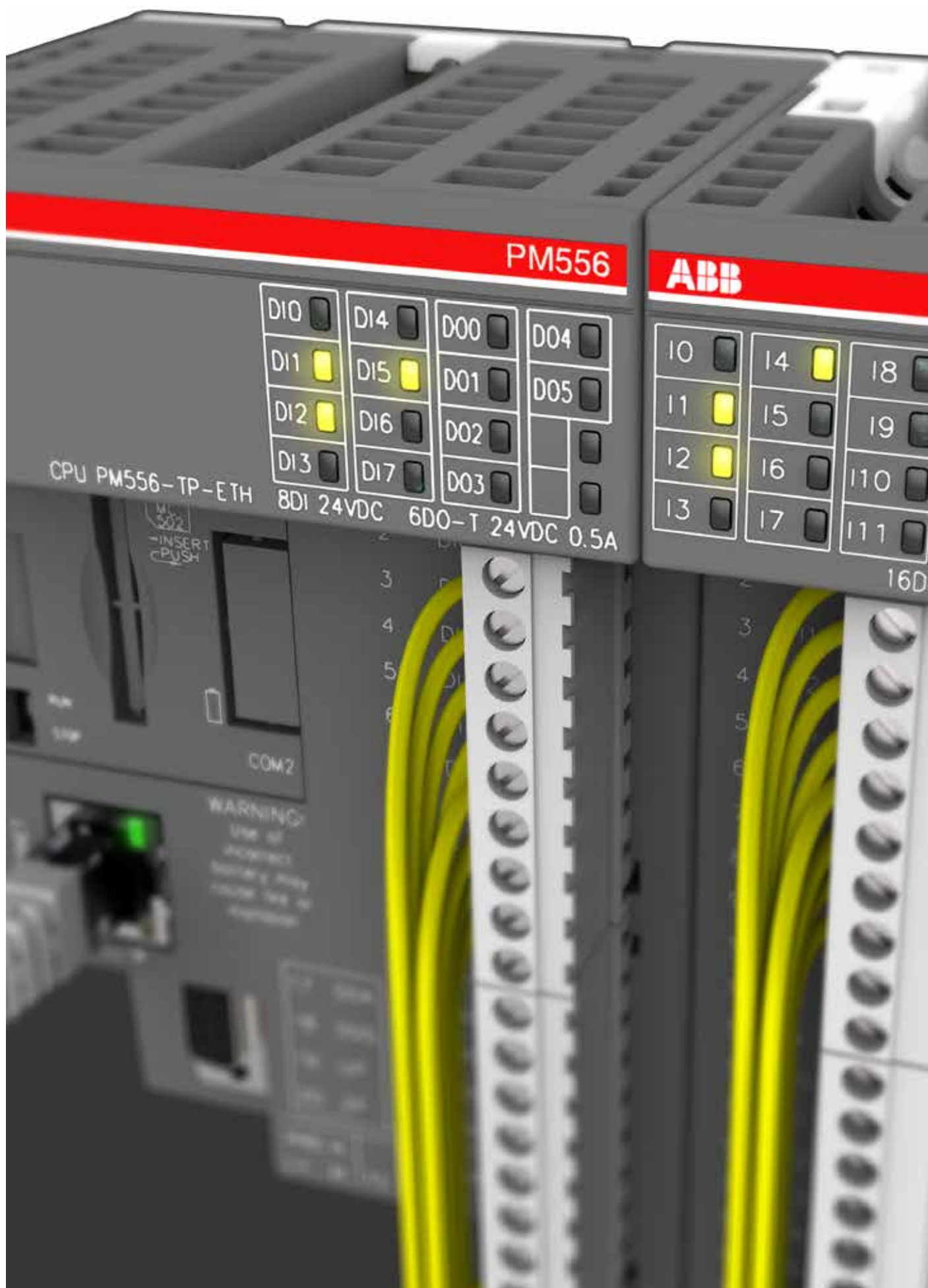
Virtual Commissioning Technology comes in three variants to match your need

- **Virtual drive tuning:** Configure and tune your drive offline before connecting to a real drive.
- **Virtual system testing:** Go online to your automation system without real control hardware using familiar engineering tools.
- **Virtual commissioning:** Build 3D models of your system in RobotStudio® and simulate the system behavior like it was real.



Virtual drive tuning: Drive composer pro	Virtual system testing: Automation Builder	Virtual commissioning: RobotStudio®
Drive engineering <ul style="list-style-type: none"> <li>– Start and connect virtual drives</li> <li>– Set parameters and do adaptive programming offline</li> <li>– Define load models</li> </ul>	Automation system engineering <ul style="list-style-type: none"> <li>– Configuration and programming of PLC, drives and HMIs</li> <li>– Functional modelling of any devices, e.g. sensors, simple actuators, power trains (incl. gears, transformations, ...)</li> <li>– Deployment of virtual PLCs, drives and HMIs</li> <li>– Offline system testing without 3D</li> </ul>	3D modelling and robot engineering <ul style="list-style-type: none"> <li>– Robot control configuration and programming</li> <li>– Modelling of geometry and kinematics</li> <li>– Modelling of component behavior, e.g. sensors and actuators</li> <li>– Importing and connecting of configured PLCs, power trains (including drives) and other devices</li> <li>– Communication with other virtual devices</li> <li>– Deployment of virtual Robot Control</li> <li>– 3D simulation</li> </ul>

#### Virtual Commissioning Technology – Variants



# AC500-eCo

## Entry level PLC solutions

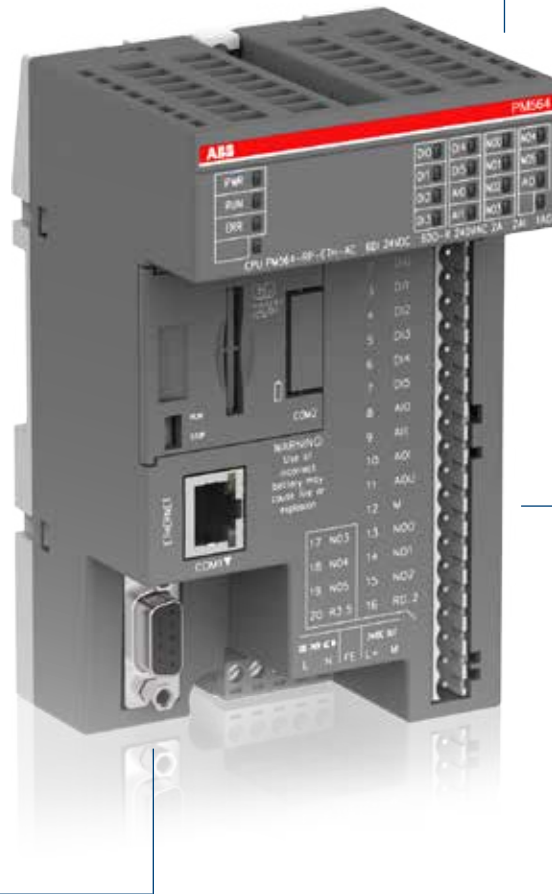
<a href="#">Key features</a>	<a href="#">3/48</a>
<a href="#">Ordering data</a>	<a href="#">3/49</a>
<a href="#">Technical data</a>	<a href="#">3/52</a>
<a href="#">System data</a>	<a href="#">3/59</a>

# AC500-eCo

## Key features

3

- Up to 10 I/O modules connected to the CPU
- Compatible with all standard I/O modules (S500 and S500-eCo)
- Digital I/O module with configurable I/O available



High performance variant with large memory available

- Three different types of terminal blocks available
- Integrated onboard I/O
- AC versions with integrated power supply

Comprehensive communication options:

- Ethernet for communication and web server for user defined visualization
- Up to two serial ports for decentralized I/O and communication



# AC500-eCo

## Ordering data



PM554



PM556



PM564



PM566

### AC500-eCo CPUs

- 1 RS485 serial interface (2nd is optional)
- Centrally expandable with up to 10 I/O modules (standard S500 and/or S500-eCo modules can be mixed)
- Optional SD card adapter for data storage and program backup
- Variants with integrated Ethernet (Ethernet includes web server)
- Minimum cycle time per instruction: Bit 0.08 µs, Word 0.1 µs, Float-point 1.2 µs.

Program memory	Onboard I/Os	Relay / Transistor outputs	Integrated communication	Power supply	Type	Order code	Price	Weight (1 pce)
kB	DI/DO/AI/AO							kg

#### PM554: digital I/Os

128	8 / 6 / - / -	Transistor	-	24 V DC	PM554-TP	1SAP120600R0001		0.300
128	8 / 6 / - / -	Relay	-	24 V DC	PM554-RP	1SAP120700R0001		0.400
128	8 / 6 / - / -	Relay	-	100-240 V AC	PM554-RP-AC	1SAP120800R0001		0.400
128	8 / 6 / - / -	Transistor	Ethernet	24 V DC	PM554-TP-ETH	1SAP120600R0071		0.400

#### PM556: digital I/Os, 512 kB program memory

512	8 / 6 / - / -	Transistor	Ethernet	24 V DC	PM556-TP-ETH	1SAP121200R0071		0.400
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#### PM564: digital and analog I/Os (1)

128	6 / 6 / 2 / 1	Transistor	-	24 V DC	PM564-TP	1SAP120900R0001		0.300
128	6 / 6 / 2 / 1	Relay	-	24 V DC	PM564-RP	1SAP121000R0001		0.400
128	6 / 6 / 2 / 1	Relay	-	100-240 V AC	PM564-RP-AC	1SAP121100R0001		0.400
128	6 / 6 / 2 / 1	Transistor	Ethernet	24 V DC	PM564-TP-ETH	1SAP120900R0071		0.300
128	6 / 6 / 2 / 1	Relay	Ethernet	24 V DC	PM564-RP-ETH	1SAP121000R0071		0.400
128	6 / 6 / 2 / 1	Relay	Ethernet	100-240 V AC	PM564-RP-ETH-AC	1SAP121100R0071		0.400

#### PM566: digital and analog I/Os, 512 kB program memory (1)

512	6 / 6 / 2 / 1	Transistor	Ethernet	24 V DC	PM566-TP-ETH	1SAP121500R0071		0.400
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Terminal blocks (9 and 11 poles) are necessary for each AC500-eCo I/O. The terminal blocks must be ordered separately.

(1) All analog inputs on PM564 and PM566 can be configured as digital inputs.

# AC500-eCo

## Ordering data

3



DI561



AI562



AX561

### S500-eCo I/O modules

- For central expansion of the AC500 or AC500-eCo CPUs
- For decentralized expansion in combination with communication interface module DC551-CS31, PROFINET® CI50x modules, CI592-CS31, PROFIBUS® modules CI54x, EtherCAT® modules CI51x, and CANopen® modules CI58x (not usable with DC505-FBP module and CI590-CS31-HA).

### Digital I/O

- DC: Channels can be configured individually as inputs or outputs.

Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal block required		Type	Order code	Price	Weight (1 pce) kg
				9 poles	11 poles				
8 / - / -	24 V DC	-	-	1	-	DI561	1TNE968902R2101		0.12
16 / - / -	24 V DC	-	-	1	1	DI562	1TNE968902R2102		0.12
8 / - / -	100-240 V AC	-	-	1	1	DI571	1TNE968902R2103		0.15
16 / - / -	100-240 V AC	-	-	1	1	DI572	1SAP230500R0000		0.19
- / 8 / -	-	Transistor	24 V DC, 0.5 A	-	1	DO561	1TNE968902R2201		0.12
- / 16 / -	-	Transistor	24 V DC, 0.5 A	1	1	DO562	1SAP230900R0000		0.16
- / 8 / -	-	Relay	24 V DC, 120 / 240 V AC, 2 A	-	1	DO571	1TNE968902R2202		0.15
- / 8 / -	-	Triac	100-240 V AC, 0.3 A	1	1	DO572	1TNE968902R2203		0.12
- / 16 / -	-	Relay	24 V DC, 120 / 240 V AC, 2 A	1	1	DO573	1SAP231300R0000		0.19
8 / 8 / -	24 V DC	Transistor	24 V DC, 0.5 A	1	1	DX561	1TNE968902R2301		0.12
8 / 8 / -	24 V DC	Relay	24 V DC, 120 / 240 V AC, 2 A	1	1	DX571	1TNE968902R2302		0.15
- / - / 16	24 V DC	Transistor	24 V DC, 0.1A	HE10-20	-	DC561	1TNE968902R2001		0.12
- / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	1	1	DC562	1SAP231900R0000		0.15

Terminal blocks (9 or 11 poles) are necessary for each S500-eCo I/O. The terminal blocks must be ordered separately.

### Analog I/O

- Each channel can be configured individually
- Resolution:
  - AI561, AO561, AX561: 12 bits/11 bits + sign
  - AI562, AI563: 15 bits + sign.

Number of AI/AO	Input signal	Output signal	Terminal block required		Type	Order code	Price	Weight (1 pce) kg
			9 poles	11 poles				
4 / 0	±2.5 V, ±5 V, 0...5 V, 0...10 V, 0...20 mA, 4...20 mA	-	1	1	AI561	1TNE968902R1101		0.12
2 / 0	PT100, PT1000, Ni100, Ni1000, Resistance: 150 Ω, 300 Ω	-	-	1	AI562	1TNE968902R1102		0.12
4 / 0	S, T, R, E, N, K, J, Voltage range: ±80 mV	-	1	1	AI563	1TNE968902R1103		0.12
0 / 2	-	-10...+10 V, 0...20 mA, 4...20 mA	-	1	AO561	1TNE968902R1201		0.12
4 / 2	±2.5 V, ±5 V, 0...5 V, 0...10 V, 0...20 mA, 4...20 mA	-10...+10 V, 0...20 mA, 4...20 mA	1	1	AX561	1TNE968902R1301		0.13

Terminal blocks (9 or 11 poles) are necessary for each S500-eCo I/O. The terminal blocks must be ordered separately.

# AC500-eCo

## Ordering data



FM562

### Positioning module

- For central expansion of the AC500 or AC500-eCo CPUs
- For decentralized expansion in combination with communication interface modules CI50X-PNIO or CI54X-DP
- The FM562 module provides Pulse Train Outputs for 2 axes. Profile generator integrated.

Number of axis	Input signal	Output signal	Terminal block required		Type	Order code	Price	Weight (1 pce) kg
			9 poles	11 poles				
2	4 digital inputs 24 V (2 per axis)	4 pulse outputs RS422 (2 per axis)	1	1	FM562	1SAP233100R0001		0.15

Terminal blocks (9 or 11 poles) are necessary for each S500-eCo I/O. The terminal blocks must be ordered separately. Library PS552-MC-E is required for programming this module.

### Accessories

Description	Type	Order code	Price	Weight (1 pce) kg
SD Memory Card 2 GB needs the MC503 option	MC502	1SAP180100R0001		0.020
SD Memory Card adapter	MC503	1TNE968901R0100		0.010
Programming cable USB => RS485 Sub-D, 3 m	TK503	1TNE968901R1100		0.400
Programming cable USB => RS485 Terminal block, 3 m	TK504	1TNE968901R2100		0.400
RS485 isolator, Sub-D 9 poles / Terminal 5 poles for COM1	TK506	1SAP186100R0001		0.080
Real time clock option board, battery CR2032 not included	TA561-RTC (1)	1SAP181400R0001		0.007
RS485 serial adapter COM2, pluggable screw terminal block included	TA562-RS	1TNE968901R4300		0.007
Combined real time clock option with RS485 serial adapter COM2, pluggable screw terminal block included	TA562-RS-RTC (1)	1SAP181500R0001		0.012
Wall mounting accessory for AC500-eCo CPU and S500-eCo I/O modules (100 pieces per case)	TA566	1TNE968901R3107		0.450
Set of accessories: 6 x plastic cover for option slot, 6 x 5 pole terminal block, 6 x 5 pole screw terminal block for COM2 serial interface.	TA570	1TNE968901R3203		0.090
Digital input simulator for onboard I/O of CPU, 6 x switch, 24 V DC	TA571-SIM	1TNE968903R0203		0.040

(1) Standard battery CR 2032 has to be purchased separately.

### Terminal blocks for S500-eCo I/O modules and AC500-eCo CPUs

Number of poles	Connection type	Cable entry	Type	Order code	Price	Weight (1 pce) kg
9	Screw	Side	TA563-9	1TNE968901R3101		0.017
11	Screw	Side	TA563-11	1TNE968901R3102		0.020
9	Screw	Front	TA564-9	1TNE968901R3103		0.026
11	Screw	Front	TA564-11	1TNE968901R3104		0.035
9	Spring	Front	TA565-9	1TNE968901R3105		0.016
11	Spring	Front	TA565-11	1TNE968901R3106		0.020



Only ABB terminal blocks must be used with AC500-eCo. Sales package for these terminal blocks = 6.



TK506



TA561-RTC



TA562-RS



TA562-RS-RTC



TA570



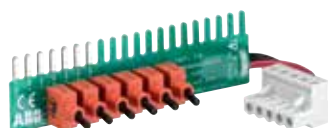
TA565-9



TA564-11



TA563-9



TA571-SIM

# AC500-eCo

## Technical data

### AC500-eCo CPUs

Type	PM554-TP	PM554-RP	PM554-RP-AC		PM554-TP-ETH	PM556-TP-ETH
Supply voltage	24 V DC		100-240 V AC		24 V DC	
Current consumption on	24 V DC		100 V AC	240 V AC	24 V DC	
Min. (module alone)	0.06 A	0.08 A	0.02 A	0.012 A	0.07 A	0.07 A
Max. (I/Os)	0.18 A	0.22 A	0.2 A	0.11 A	0.19 A	0.19 A
Program memory	128 kB					512 kB
Integrated data memory	14 kB thereof 2 kB saved					130 kB thereof 2 kB saved
Web server's data for user RAM disk	–				512 kB	1024 kB
Data buffering (of saved data)	flash memory					
Real-time clock (option with battery back-up) (1)	●					
Program execution						
Cyclical	●					
Time controlled	●					
Multi tasking	no, 1 task + 1 interrupt task max.					
Interruption	●					
User program protection by password	●					
Cycle time for 1 instruction (minimum)						
Binary	0.08 µs					
Word	0.1 µs					
Floating	1.2 µs					
Onboard digital inputs						
Channels	8 (including 2 counter inputs, or up to 4 interrupt inputs)					
Signal voltage	24 V DC					
Onboard digital outputs						
Channels	6 (including 2 PWM outputs for types with transistor outputs)					
Relay / Transistor	Transistor	Relay	Relay	Relay	Transistor	Transistor
Rated voltage	24 V DC	240 V AC	240 V AC	240 V AC	24 V DC	24 V DC
Nominal current per channel	0.5 A	2 A resistive	2 A resistive	2 A resistive	0.5 A	0.5 A
Onboard analog outputs						
Channels	-					
signal ranges	-					
Onboard analog inputs						
Channels	-					
signal ranges	-					
Max. number of centralized inputs/outputs						
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)					
Digital	inputs	320 + 8				
	outputs	320 + 6				
Analog	inputs	160				
	outputs	160				
Max. number of decentralized inputs/outputs						
I/O modules	decentralized	on CS31 bus: up to 31 stations with up to 120 DI / 120 DO each or up to 32 AI/32 AO per station				
Internal interfaces						
COM1						
RS485	●					
Sub-D connection	●					
Programming, Modbus-RTU, ASCII, CS31	●					
COM2 (option) (2)						
RS485	●					
Terminal block	●					
Programming, Modbus-RTU, ASCII	●					
Ethernet						
RJ45	–				●	
Ethernet functions: Programming, Modbus TCP/IP, UDP/IP, integrated Web server, DHCP, FTP server, SNMP client	–				●	
SMTP	–					
RUN/STOP switch	●					
LED display for power, status and error	●					
Approvals	see detailed overview page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>					

(1) Real-time clock requires optional TA561-RTC or TA562-RS-RTC.

(2) COM2 requires TA562-RS-RTC or TA562-RS.

# AC500-eCo

## Technical data

### AC500-eCo CPUs

Type	PM564-TP	PM564-RP	PM564-RP-AC	PM564-TP-ETH	PM566-TP-ETH	PM564-RP-ETH	PM564-RP-ETH-AC
Supply voltage	24 V DC		100-240 V AC	24 V DC			100-240 V AC
Current consumption on	24 V DC		100 V AC; 240 V AC	24 V DC			100 V AC; 240 V AC
Min. (module alone)	0.095 A	0.11 A	0.02 A	0.011 A	0.10 A	0.10 A	0.023 A
Max. (I/Os)	0.21 A	0.24 A	0.21 A	0.125 A	0.22 A	0.22 A	0.13 A
Program memory	128 kB				512 kB	128 kB	
Integrated data memory	14 kB thereof 2 kB saved				130 kB thereof 2 kB saved	14 kB thereof 2 kB saved	
Web server's data for user RAM disk				512 kB	1024 kB	512 kB	
Data buffering (of saved data)	flash memory						
Real-time clock (option with battery back-up) (1)	●						
<b>Program execution</b>							
Cyclical	●						
Time controlled	●						
Multi tasking	no, 1 task + 1 interrupt task max.						
Interruption	●						
User program protection by password	●						
<b>Cycle time for 1 instruction (minimum)</b>							
Binary	0.08 µs						
Word	0.1 µs						
Floating	1.2 µs						
<b>Onboard digital inputs</b>							
Channels	6 (including 2 counter inputs, or up to 4 interrupt inputs)						
Signal voltage	24 V DC						
<b>Onboard digital outputs</b>							
Channels	6 (including 2 PWM outputs for types with transistor outputs)						
Relay / Transistor	Transistor	Relay	Relay	Transistor	Transistor	Relay	Relay
Rated voltage	24 V DC	240 V AC	240 V AC	24 V DC	24 V DC	240 V AC	240 V AC
Nominal current per channel	0.5 A	2 A resistive	2 A resistive	0.5 A	0.5 A	2 A resistive	2 A resistive
<b>Onboard analog inputs</b>							
Channels	2						
signal ranges	0...10 V / can be configured as digital input 24 V DC						
<b>Onboard analog outputs</b>							
Channels	1						
signal ranges	0...10 V / 0...20 mA / 4...20 mA						
<b>Max. number of centralized inputs/outputs</b>							
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)						
Digital	inputs	320 + 8					
	outputs	320 + 6					
Analog	inputs	160 + 2					
	outputs	160 + 1					
<b>Max. number of decentralized inputs/outputs</b>							
I/O modules	decentralized	on CS31 bus: up to 31 stations with up to 120 DI / 120 DO each or up to 32 AI/32 AO per station					
<b>Internal interfaces</b>							
COM1							
RS485	●						
Sub-D connection	●						
Programming, Modbus-RTU, ASCII, CS31	●						
COM2 (option) (2)							
RS485	●						
Terminal block	●						
Programming, Modbus-RTU, ASCII	●						
Ethernet							
RJ45	—			●			
Ethernet functions: Programming, Modbus TCP/IP, UDP/IP, integrated Web server, DHCP, FTP server, SNMP client	—			●			
SMTP	—				●	—	
RUN/STOP switch	●						
LED display for power, status and error	●						
Approvals	see detailed overview page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>						

(1) Real-time clock requires optional TA561-RTC or TA562-RS-RTC.

(2) COM2 requires TA562-RS-RTC or TA562-RS.



# AC500-eCo

## Technical data

### Digital S500-eCo I/O modules

Type	DI561	DI562	DI571	DI572	DO561	DO562
Supply voltage	–	–	–	–	24 V DC	24 V DC
Current consumption on UP Max. (without load current)	–	–	–	–	0.005 A	0.005 A

#### Number of channels per module

Digital	inputs	8	16	8 (AC)	16 (AC)	–	–
	outputs	–	–	–	–	8	16
Configurable as Input or Output DC		–	–	–	–	–	–
Relay / Transistor		–	–	–	–	Transistor	Transistor

#### Additional configuration of channels as:

Fast Counter	no					not applicable	
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#### Digital inputs

Input signal voltage	24 V DC		100-240 V AC		–	–
Input time delay	typically 4...8 ms		typically 15 ms / 30 ms		–	–

#### Input current per channel

At Input voltage	24 V DC	typically 5 mA	–	–	–	–
	5 V DC	typically 1 mA	–	–	–	–
	15 V DC	> 2.5 mA	–	–	–	–
	30 V DC	< 8 mA	–	–	–	–
	40 V AC	–	< 3 mA	–	–	–
	164 V AC	–	> 6 mA	–	–	–

#### Output current

Nominal current per channel	–	–	–	–	0.5 A at UP = 24 V	–
Maximum (total current of all channels)	–	–	–	–	4 A	8 A
Residual current at signal state 0	–	–	–	–	< 0.5 mA	–
Demagnetization when switching off inductive loads	–	–	–	–	must be provided externally	–

#### Switching frequency

For resistive load	–	–	–	–	limited by CPU cycle time	–
For inductive load	–	–	–	–	max. 0.5 Hz	–
For lamp load	–	–	–	–	max. 11 Hz at max. 5 W	–
Short circuit / overload proofness	–	–	–	–	no	–
Overload indication (I > 0.7 A)	–	–	–	–	no	–
Output current limiting	–	–	–	–	no	–
Proofness against reverse feeding of 24 V signals	–	–	–	–	no	–

#### Contact rating

For resistive load, max.	–	–	–	–	–	–
For inductive load, max.	–	–	–	–	–	–
For lamp load	–	–	–	–	–	–

#### Lifetime (switching cycles)

Mechanical lifetime	–	–	–	–	–	–
Lifetime under load	–	–	–	–	–	–

#### Maximum cable length for connected process signals

Cable	shielded	500 m				
	unshielded	300 m			150 m	

#### Potential isolation

Per module	●	●	●	●	●	●
Between the channels	input	–	per group of 8	●	per group of 8	–
	output	–	–	–	–	–
Voltage supply for the module's logic		internal via I/O bus				

#### Fieldbus connection

Suitable communication interface module	CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI511-ETHCAT, CI512-ETHCAT, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31					
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# AC500-eCo

## Technical data

### Digital S500-eCo I/O modules

Type	DO571		DO572	DO573
Supply voltage	24 V DC			
Current consumption on UP Max. (without load current)	0.050 A		–	0.050 A
Number of channels per module				
Digital	inputs	–	–	–
	outputs	8	8	16
Configurable as Input or Output DC	–		–	–
Relay / Transistor	Relay (n.o.)		Triac (AC)	Relay (n.o.)
Process voltage				
DC	24 V		–	–
Digital inputs				
Input signal voltage	–		–	–
Input time delay	–		–	–
Input current per channel				
At Input voltage	24 V DC	–	–	–
	5 V DC	–	–	–
	15 V DC	–	–	–
	30 V DC	–	–	–
Output current				
Nominal current per channel	2 A (24 V DC / 120 V AC / 240 V AC, resistive load)		0.3 A at 100...240 V AC	2 A (24 V DC / 120 V AC / 240 V AC, resistive load)
Maximum (total current of all channels)	2 x 8 A		2.4 A / 8 x 0.3 A	max 10 A per group (20 A per module)
Residual current at signal state 0	–		1.1 mA rms at 132 V AC and 1.8 mA rms at 264 V AC	–
Demagnetization when switching off inductive loads	must be performed externally			
Switching frequency				
For resistive load	1 Hz max.		10 Hz max.	1 Hz max.
For inductive load	–		–	–
For lamp load	1 Hz max.		10 Hz max.	1 Hz max.
Short circuit / overload proofness	no		–	–
Overload indication (I > 0.7 A)	no		–	–
Output current limiting	no		–	–
Proofness against reverse feeding of 24 V signals	yes		–	yes
Contact rating				
For resistive load, max.	2 A		0.3 A	2 A
For inductive load, max.	–		–	–
For lamp load	200 W at 230 V AC 30 W at 24 V DC		–	200 W at 230 V AC 30 W at 24 V DC
Lifetime (switching cycles)				
Mechanical lifetime	100 000		–	100 000
Lifetime under load	100 000 at rated load		–	100 000 at rated load
Maximum cable length for connected process signals				
Cable	shielded	500 m	–	–
	unshielded	150 m	–	–
Potential isolation				
Per module	between outputs and logic		●	between outputs and logic
Between the channels	input	–	–	–
	output	per group of 4	●	per group of 8
Voltage supply for the module's logic	internal via I/O bus			
Fieldbus connection				
Suitable communication interface module	CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI511-ETHCAT, CI512-ETHCAT, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31			

# AC500-eCo

## Technical data

### Digital S500-eCo I/O modules

Type	DX561	DX571	DC561	DC562
Supply voltage	24 V DC			
Current consumption on UP				
Max. (without load current)	0.005 A	0.050 A	0.010 A	0.010 A
Number of channels per module				
Digital				
inputs	8	8	–	–
outputs	8	8	–	–
Configurable as Input or Output DC	–	–	16	16
Relays / Transistor	Transistor	Relay (n.o.)	Transistor	Transistor
Process voltage				
DC	24 V	24 V	24 V	24 V
Digital inputs				
Input signal voltage	24 V DC	24 V DC	24 V DC	24 V DC
Input time delay	typically 4...8 ms			typically 8 ms
Input current per channel				
At Input voltage	24 V DC	typically 5 mA	typically 5 mA	typically 5 mA
	5 V DC	< 1 mA	< 1 mA	typically 1 mA
	15 V DC	> 2.5 mA	> 2.5 mA	> 2.5 mA
	30 V DC	< 6.5 mA	< 6 mA	< 8 mA
Output current				
Nominal current per channel	0.5 A at UP = 24 V DC	2 A (24 V DC / 120 V AC / 240 V AC, resistive load)	0.1 A at UP = 24 V DC	0.5 A at UP = 24 V DC
Maximum (total current of all channels)	4 A	2 x 8 A	1.6 A	8 A
Residual current at signal state 0	< 0.5 mA	–	< 0.5 mA	< 0.5 mA
Demagnetization when switching off inductive loads	must be performed externally			
Switching frequency				
For resistive load	Limited by CPU cycle time	1Hz max.	Limited by CPU cycle time	
For inductive load	0.5 Hz max.	–	0.5 Hz max.	0.5 Hz max.
For lamp load	11 Hz max. at max. 5 W	1 Hz max.	–	11 Hz max. at max. 5 W
Short circuit / overload proofness	no			
Overload indication (I > 0.7 A)	no			
Output current limiting	no			
Proofness against reverse feeding of 24 V signals	no	yes	no	no
Contact rating				
For resistive load, max.	–	2 A	–	–
For inductive load, max.	–	–	–	–
For lamp load	–	200 W at 230 V AC 30 W at 24 V DC	–	–
Lifetime (switching cycles)				
Mechanical lifetime	–	100 000	–	–
Lifetime under load	–	100 000 at rated load	–	–
Maximum cable length for connected process signals				
Cable	shielded	500 m		
	unshielded	150 m		
Potential isolation				
Per module	●	–	●	●
Between the channels	input	–	–	–
	output	–	per group of 4	–
Voltage supply for the module's logic	internal via I/O bus			
Fieldbus connection				
Suitable communication interface module	CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI511-ETHCAT, CI512-ETHCAT, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31			

# AC500-eCo

## Technical data

### Analog S500-eCo I/O modules

Type		AI561	AO561	AX561	AI562	AI563
Supply voltage		24 V DC				
Current consumption on UP						
Max. (without load current)		0.100 A	0.100 A	0.140 A	0.040 A	0.100 A
Number of channels per module						
Analog	inputs	4	–	4	2	4
	outputs	–	2	2	–	–
Inputs, individually configurable						
-2.5...+2.5 V	11 bits + sign	●	–	●	–	–
-5...+5 V	11 bits + sign	●	–	●	–	–
-10...+10 V	11 bits + sign	–	–	–	–	–
0...5 V	12 bits	●	–	●	–	–
0...10 V	12 bits	●	–	●	–	–
0...20 mA, 4...20 mA	12 bits	●	–	●	–	–
RTD		–	–	–	2	–
Pt100		–	–	–	●	–
Pt1000		–	–	–	●	–
	-50...+400 °C (2/3-wire)	–	–	–	●	–
Ni100 / Ni1000		–	–	–	●	–
	-50...+150 °C (2/3-wire)	–	–	–	●	–
Resistor	0...150 Ω/0...300 Ω	–	–	–	●	–
Thermocouple	Types J, K, T, N, S, E, R	–	–	–	–	●
Voltage	-80...+80 mV	–	–	–	–	●
Outputs, individually configurable						
-10...+10 V	11 bits + sign	–	●	●	–	–
0...20 mA	12 bits	–	●	●	–	–
4...20 mA	12 bits	–	●	●	–	–
Potential isolation						
Per module		–	–	–	●	●
Fieldbus connection						
Suitable communication interface module		CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI511-ETHCAT, CI512-ETHCAT, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31				

# AC500-eCo

## Technical data

### FM562 positioning module

The FM562 module contains Pulse Train Outputs for 2 axes. Profile generator for simple motion control tasks are integrated. The RS422 outputs allow a direct connection to Stepper- or Servo drives. Function blocks in PLCopen® motion control style allow the integration of the module in an application. These function blocks are contained in the library PS552-MC-E.

Type	FM562	
Functionality		
Number of axis	2	
Digital inputs	2 digital inputs per axis Function: for axis enable or limit switch	
Pulse outputs	Modes cw/ccw or pulse/direction Built in profile generators	
Data of the digital inputs		
Signal voltage	24 V DC	
Input current at 24 V DC	typically 5 mA	
Potential isolation	by groups of 2	
Data of pulse outputs		
Signal	RS422 (differential)	
Frequency range	0...250 kHz	
Potential isolation	RS422 outputs of both axis in one group isolated against the inputs, the process voltage and the PLC CPU logic	
Maximum cable length for digital inputs		
Cable	shielded	500 m
	unshielded	300 m
Maximum cable length for pulse outputs		
Cable	shielded	300 m
	unshielded	30 m
Process voltage UP		
Nominal voltage	24 V DC	
Current consumption on UP	typically 0.04 A	
Reverse polarity protection	●	
Potential isolation		
Per module	●	
Voltage supply for the internal logic	From UP / ZP with isolation	
Fieldbus connection		
Suitable communication interface module	CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI541-DP, CI542-DP	



# AC500-eCo

## System data

### Environmental Conditions

#### Process and supply voltages

24 V DC	Line Voltage	18 V...31.2 V / nom. 24 V DC (-25 %, +30 % inclusive ripple)
	Absolute limits	inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	yes
100 V...240 V AC	Line Voltage	85...264 V / nom. 100...240 V (-15 %, +10 %)
Wide Range Supply	Line Frequency	47...62.4 Hz / nom. 50...60 Hz (-6 %, +4 %)
Allowed interruptions of power supply	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
	AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s

**Important:** Exceeding the maximum process or supply voltage for 24V DC(< -35 V DC and > + 35 V DC) could lead to unrecoverable damage of the system. For the supply of the modules, power supply units according to PELV or SELV specifications must be used. The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

#### Temperature

Operating	0 °C ... +60 °C	horizontal mounting of modules
	0 °C ... +40 °C	vertical mounting of modules and output load reduced to 50 % per group
Storage / Transport	-40 °C ... +70 °C	

#### Humidity

Operating / Storage	Max 95 % r. H. without condensation
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#### Air pressure

Operating	-1000 m ... 2000 m (1080 hPa ... 800 hPa)
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#### Electromagnetic Compatibility

Radiated emission (radio disturbances)	Yes, according to: CISPR 16-2-3
Conducted emission (radio disturbances)	Yes, according to: CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)	Yes, according to: IEC 61000-4-2, zone B, criterion B Electrostatic voltage in case of air discharge: 8 kV Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B Supply voltage units (DC): 2 kV Supply voltage units (AC): 2 kV Digital inputs/outputs (24 V DC): 1 kV Digital inputs/outputs (100...240 V AC): 2 kV Analog inputs/outputs: 1 kV Communication lines shielded: 1 kV I/O supply (DC-out): 1 kV
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B Supply voltage units (DC): 1 kV CM* / 0.5 kV DM* Supply voltage units (AC): 2 kV CM* / 1 kV DM* Digital inputs/outputs (24 V DC): 1 kV CM* / 0.5 kV DM* Digital inputs/outputs (100...240 V AC): 2 kV CM* / 1 kV DM* Analog inputs/outputs: 1 kV CM* / 0.5 kV DM* Communication lines shielded: 1 kV CM* I/O supply (DC-out): 0.5 kV CM* / 0.5 kV DM* * CM = Common Mode, * DM = Differential Mode
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A Test field strength: 10 V/m
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A Test voltage: 10 V
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A 30 A/m 50 Hz 30 A/m 60 Hz

In order to prevent malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

#### WARNING!

##### Risk of malfunctions and damages to persons!

Unused slots for Communication Modules are not protected against accidentally touch. Dust and Dirt may cause contact problems and malfunctions.  
I/O-Bus connectors must not be touched during operation.

# AC500-eCo

## System data

### Environmental Conditions

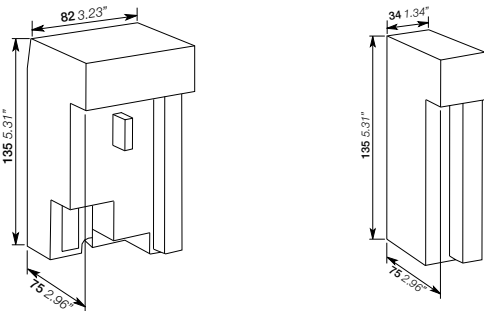
#### Environmental Tests

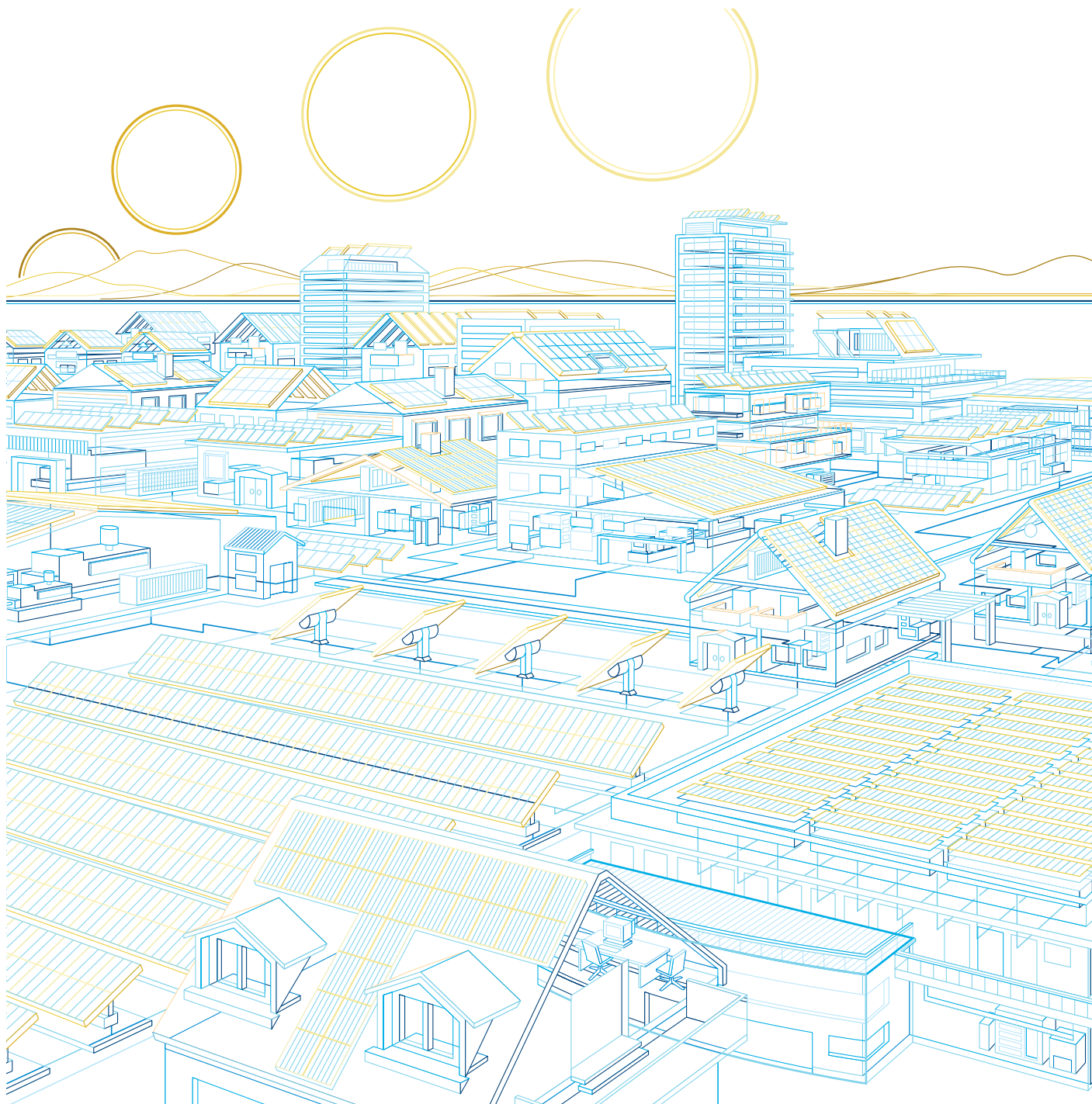
Storage	IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h IEC 60068-2-2 Test Bb: dry heat withstand test +70 °C / 16 h
Humidity	IEC 60068-2-30 Test Db: Cyclic (12 h / 12 h) Damp-Heat Test 55 °C, 93 % r. H. / 25 °C, 95 % r. H., 2 cycles
Vibration resistance	IEC 61131-2 / IEC 60068-2-6: 5 Hz ... 150 Hz, 1 g (with SD Memory Card inserted)
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

#### Mechanical Data

Wiring method		Spring terminals / Screw terminals
Degree of protection		IP 20
Vibration resistance		Yes, according to: IEC 61131-2 IEC 60068-2-6
Shock resistance		Yes, according to: IEC 61131-2 IEC 60068-2-27
Assembly position		Horizontal Vertical
Assembly on DIN rail	DIN rail type	According to IEC 60715 35 mm, depth 7.5 mm or 15 mm
Assembly with screws	Screw diameter	4 mm
	Fastening torque	1.2 Nm

### Main dimensions mm, inches







# AC500

## High performance modular PLC

<a href="#">Key features</a>	<a href="#">4/64</a>
<a href="#">Ordering data</a>	<a href="#">4/65</a>
<a href="#">Technical data</a>	<a href="#">4/73</a>
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# AC500

## Key features

4

Common AC500 platform benefits: Automation Builder engineering suite, I/O modules, scalable and flexible

A high performance PLC:

- Large memory up to 80MB
- Highly modular
- From 8 to +80 000 I/Os
- More communication possibilities (Ethernet, Internet, PROFINET®, PROFIBUS®, Modbus®, CANopen®, EtherCAT®, EthernetIP, OPC UA, ...)



- Eight programming languages available (five IEC61131-3, CFC, C-code and C++)
- Object oriented Engineering
- Virtual controller
- Webvisu
- Data logging
- SD card for program back-up
- High Availability (HA) option
- Screw or spring terminal for I/Os
- Extensive programming libraries



# AC500

## Ordering data



PM572



PM592



PM585-MC-KIT



PM595-4ETH-F

### AC500 CPUs

- 2 internal serial interfaces, RS232 / RS485 configurable
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 I/O modules, 320 I/Os (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of up to 4 external communication modules in any desired combination
- Optional SD card for data storage and program backup
- Can also be used as slave on PROFIBUS® DP, DeviceNet or CANopen® via FieldBusPlug, CANopen® also using CM588 slave communication module
- Ethernet version provides web server and IEC 60870-5-104 remote control protocol

Program memory kB	Cycle time in $\mu$ s per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
128	0.06 / 0.09 / 0.7	2 x serial	PM572	1SAP130200R0200		0.135
512	0.06 / 0.09 / 0.7	Ethernet (2), 2 x serial	PM573-ETH (1)	1SAP130300R0271		0.150
512	0.05 / 0.06 / 0.5	2 x serial	PM582	1SAP140200R0201		0.135
1024	0.05 / 0.06 / 0.5	Ethernet (2), 2 x serial	PM583-ETH (1)	1SAP140300R0271		0.150
1024	0.004 / 0.008 / 0.008	Ethernet (2), 2 x serial	PM585-ETH (1)	1SAP140500R0271		0.150
2048	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM590-ETH (1)	1SAP150000R0271		0.150
2048	0.002 / 0.004 / 0.004	ARCNET BNC, 2 x serial	PM590-ARCNET	1SAP150000R0261		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM591-ETH (1)	1SAP150100R0271		0.150
4096	0.002 / 0.004 / 0.004	2 x Ethernet (2), 1 x serial	PM591-2ETH (1)(4)	1SAP150100R0277		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM592-ETH (1)(3)	1SAP150200R0271		0.150

### AC500 Machine controller kits

- Complete product bundle providing all the needed devices for a machine controller delivered under one single order code

Program memory kB	Cycle time in $\mu$ s per instruction min. Bit/Word/Float. point	Contents / Integrated communication	Type	Order code	Price	Weight (1 pce) kg
1024	0.004 / 0.008 / 0.008	PM585-ETH, CM579-ETHCAT, TB511-ETH Ethernet (2), 2 x serial, EtherCAT Master	PM585-MC-KIT	1SAP140500R0379		0.500
2048	0.002 / 0.004 / 0.004	PM590-ETH, CM579-ETHCAT, TB521-ETH, TA524 Ethernet (2), 2 x serial, EtherCAT Master	PM590-MC-KIT	1SAP150000R0379		0.500

### AC500 CPU PM595

- 2 Ethernet interfaces with integrated switch and software configurable protocol (PROFINET, EtherCAT)
- 2 independent Ethernet interfaces
- 2 serial interfaces, RS232 / RS485 configurable
- Provides web server and IEC 60870-5-104 telecontrol protocol
- Centrally expandable with up to 10 I/O modules (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of up to 2 external communication modules in any desired combination

Program memory MB	Cycle time in $\mu$ s per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
16	0.0006/0.001/0.001	2 x Ethernet (2 Ports switch), 2 x Ethernet (2), 2 x serial	PM595-4ETH-F (3)	1SAP155500R0279		1.050

(1) Ethernet communication.

(2) Provides integrated web server and IEC 60870-5-104 remote control protocol on each interface independently.

(3) Provides integrated 4 GB flashdisk for user data storage and data logging.

(4) Only to be used with dedicated terminal base TB523-2ETH.

# AC500

## Ordering data



TB511-ETH



TB541-ETH



FM502-CMS



TF501-CMS



TF521-CMS

### Terminal base

- For mounting and connection of the CPUs and communication modules, not needed for PM595
- 1 to 4 plug-in communication modules
- Connection for communication coupler integrated in the CPU
- I/O interface for direct connection of up to 10 expansion modules
- Fieldbus-neutral FieldBusPlug-Slave interface not for TB523-2ETH
- Connection COM1: 9-pole pluggable terminal block
- Connection COM2: 9-pole Sub-D (not for TB523-2ETH).

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce) kg
1	ARCNET BNC	TB511-ARCNET (2)	1SAP111100R0260		0.215
2	ARCNET BNC	TB521-ARCNET (2)	1SAP112100R0260		0.215
1	Ethernet RJ45	TB511-ETH	1SAP111100R0270		0.215
2	Ethernet RJ45	TB521-ETH	1SAP112100R0270		0.215
2	2x Ethernet RJ45	TB523-2ETH (1)	1SAP112300R0277		0.250
4	Ethernet RJ45	TB541-ETH	1SAP114100R0270		0.215

Note: These TBs are compatible with previous AC500 CPU versions (R01xx) and new ones (R02xx).

(1) Can only be used together the PM591-2ETH.

(2) Can be only used with PM590-ARCNET CPU.

### AC500 Condition Monitoring CMS

- PLC integrated condition monitoring and fast protection for high frequency signals (vibration, current, voltage, speed/encoder)
- FM502-CMS module needs function module terminal base TF5x1 for direct interfacing to CPU, communication couplers, other I/O
  - for stand-alone or control/safety integrated condition monitoring
- PM592 CPU to be used on same TF5x1 for data storage and signal processing or communication
  - C-code interface for own complex diagnosis algorithms, 4GB Flash disk for raw fingerprints and indicator trending
- FM502-CMS module:
  - 16 fast, precise analog inputs, all synchronously sampled; configurable as IEPE or +-10V
  - individual measurement configuration (start,stop,trigger) per channel
  - per channel up to 50ksamples/s and 24bit ADC resolution, adjustable sampling
  - encoder inputs (5V or 24V) up to 300kHz counter; 12 modes, incl. absolute SSI (1MHz)
  - fast data logging, compact WAV-Files delivered automatically to CPU, incl. synchronized encoder signal if configured
  - analogue values always available for fast protection in I/O image of CPU
- Included in Automation Builder: Configuration, libraries for CMS control and wav file handling, examples
- Available download package: Signal processing library, example programs with simple diagnosis, logging and automated triggering (2)

Number of coupler slots	Description	Type	Order code	Price	Weight (1 pce) kg
n.a.	Function Module for Condition Monitoring Systems, 16AI, 2DI, 2DC, 1x Encoder (A, B, Z)	FM502-CMS (3)	1SAP260400R0001		0.215
0	Function module terminal base for FM502, no coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF501-CMS (1)(3)	1SAP117000R0271		0.350
2	Function module terminal base for FM502, 2x coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF521-CMS (1)(3)	1SAP117200R0271		0.400

(1) Can only be used together with FM502 and PM592-ETH

(2) Download of Package under "Application Examples" at [www.abb.com/plc](http://www.abb.com/plc)

(3) Availability planned for Q1/2016.

# AC500

## Ordering data



PM5650-2ETH

### AC500 V3 CPUs

- 1 internal serial interface, RS232 / RS485 configurable
- 2 independent Ethernet interfaces and software configurable protocol (PROFINET IO®, Ethernet IP® or EtherCAT®) (2)(3)
- 1 internal CAN interface, with CANopen Master, CAN 2A/2B and J1939 protocols
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 I/O modules, 320 I/Os (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of several external communication modules in any desired combination
- To be used exclusively with new TB56xx-2ETH
- Optional SD card for data storage and program backup
- Web server with WebVisu HTML5 and IEC 60870-5-104 remote control protocol
- To be used only with Automation Builder 2.x

Program / Data memory MB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
80	0.010 / 0.010 / 0.010	2 x Ethernet (1)(4), 1 x serial, 1 x CAN interface	PM5650-2ETH (1)(4)	1SAP141000R0278		0.135

(1) Provides integrated web server and IEC 60870-5-104 remote control protocol on each interface independently.

(2) Availability on demand.

(3) Some communication protocols are licensed see following lines.

(4) Only to be used with dedicated terminal base TB562x-2ETH.



TB5620-2ETH

### AC500 V3 Terminal base

- For mounting and connection of the AC500 V3 CPUs only and communication modules
- 2 plug-in communication modules
- Connection for communication coupler integrated in the CPU
- I/O interface for direct connection of up to 10 expansion modules
- Connection COM1: 9-pole pluggable spring terminal block
- Connection CAN: 5-pole pluggable spring terminal block
- 2 RJ45 Ethernet interfaces

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce) kg
2	2x RJ45 for Ethernet, 1x serial COM1 with pluggable spring connector and 1x5 poles pluggable spring connector for CAN/CANopen interface	TB5620-2ETH	1SAP112300R0278		

# AC500

## Ordering data



CM592-DP



CM574-RS  
CM574-RCOM



CM598-CN



CM579-PNIO



DO524

### Communication modules

Protocol	Connections	Type	Order code	Price	Weight (1 pce) kg
PROFIBUS® DP V0/V1 master	Sub-D socket 9 poles	CM592-DP	1SAP173200R0001		0.115
PROFIBUS® DP V0/V1 slave	Sub-D socket 9 poles	CM582-DP (1)	1SAP172200R0001		0.115
Ethernet (TCP/IP, UDP/IP, Modbus® TCP)	2 x RJ45 - integrated switch	CM597-ETH	1SAP173700R0001		0.115
CANopen® master	Terminal block 2 x 5 poles spring	CM598-CN	1SAP173800R0001		0.115
CANopen® slave	Terminal block 2 x 5 poles spring	CM588-CN	1SAP172800R0001		0.115
PROFINET® I/O RT controller	2 x RJ45 - integrated switch	CM579-PNIO	1SAP170901R0101		0.115
PROFINET® IO RT device	2 x RJ45 - integrated switch	CM589-PNIO	1SAP172900R0011		0.115
PROFINET® IO RT with 4 devices	2xRJ45 - integrated switch	CM589-PNIO-4 (1)	1SAP172900R0111		0.115
EtherCAT® master	2 x RJ45	CM579-ETHCAT	1SAP170902R0101		0.115
Serial + co-processor	2 x RS-232/485 on spring terminal blocks	CM574-RS	1SAP170400R0201		0.115
Serial RCOM	2 x RS-232/485 (1 x RCOM/1 x Console)	CM574-RCOM	1SAP170401R0201		0.115

(1) Availability planned from Q2/2017

### I/O modules

- For central expansion of the AC500 or AC500-eCo CPUs
- For decentralized expansion in combination with communication interface modules on CS31, PROFINET® IO, PROFIBUS® DP, CANopen® modules
- DC: Channels can be configured individually as inputs or outputs
- Plug-in electronic modules, terminal unit required (refer to table below).

### Digital I/O

Number of	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
<b>DI/DO/DC</b>								
32 / – / –	24 V DC	–	–	TU515 / TU516	DI524	1SAP240000R0001		0.200
– / – / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC522	1SAP240600R0001		0.200
– / – / 24	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC523	1SAP240500R0001		0.200
16 / – / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DC532	1SAP240100R0001		0.200
8 / 8 / –	24 V DC	Relay	230 V AC, 3 A (2)	TU531 / TU532	DX522	1SAP245200R0001		0.300
8 / 4 / –	230 V AC	Relay	230 V AC, 3 A (2)	TU531 / TU532	DX531	1SAP245000R0001		0.300
– / 32 / –	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DO524	1SAP240700R0001		0.200
– / 8 / –	–	Transistor	24 V DC, 2 A	-- / TU542	DO526	1SAP240800R0001		0.200

(2) Relay outputs, changeover contacts.

# AC500

## Ordering data



AO523



AI531



DA501



CD522

### Analog I/O

Number of	Input signal	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
<b>AI/AO</b>							
16 / 0	0...10 V, ±10 V	–	TU515 / TU516	AI523	1SAP250300R0001		0.200
4 / 4	0/4...20 mA, PT100, PT1000, Ni1000	±10 V 0/4...20 mA	TU515 / TU516	AX521	1SAP250100R0001		0.200
8 / 8 (max. 4 current outputs)			TU515 / TU516	AX522	1SAP250000R0001		0.200
0 / 16 (max. 8 current outputs)	–		TU515 / TU516	AO523	1SAP250200R0001		0.200
8 / 0	0...5 V, 0...10 V, ±50 mV, ±500 mV, 1 V, ±5 V, ±10 V, 0/4...20 mA, ±20 mA, PT100, PT1000, Ni1000, Cu50, 0...50 kΩ, S, T, N, K, J	–	TU515 / TU516	AI531	1SAP250600R0001		0.200

### Analog/digital mixed I/O

Standard I/O module with high functionality:

- 16 digital input channels
- 8 configurable In/Output channels
- first two inputs are also usable as high-speed counter (up to 50 kHz) together with AC500 CPU, CS31 or CI5xx communication interface modules.
- 4 independent analog input channels configurable for voltage, current, 12 bit + sign, 1-2 wire connection
- Galvanic isolation per module
- Compatible with all CI5xx modules.

Number of	Input signal	Output type	Output signal	Terminal unit Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
<b>AI/AO/DI/DO/DC</b>								
4 / 2 / 16 / - / 8	24 V DC/0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU515 / TU516	DA501	1SAP250700R0001		0.200

### Multifunctional modules

Functionality	Number of	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
<b>DI/DO/DC</b>									
<b>Encoder module</b>									
Encoder and PWM module	2 / - / 8	24 V DC and 2 encoder inputs A/B/C differential	2 PWM outputs	24 V DC, 0.1 A	TU515 / TU516	CD522	1SAP260300R0001		0.125

- DC541 occupies one communication module slot on the AC500 CPU terminal base, no terminal block required
- Usable with all CI5xx modules.

Functionality	Number of	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
<b>Interrupt I/O and fast counter module</b>									
Interrupt I/O and fast counter	- / - / 8	24 V DC	Transistor	24 V DC, 0.5 A	N/A (2)	DC541-CM (1)	1SAP270000R0001		0.100

(1) Multifunctional module, refer to table on page 83 for details.

(2) Occupies a communication module slot.

# AC500

## Ordering data



CI541-DP



CI581-CN



CI511-ETHCAT



CI501-PNIO



CI504-PNIO

### Communication interface modules

Number of	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
<b>AI/AO/DI/DO/DC</b>								
<b>For CS31-Bus</b>								
- / - / 8 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU551-CS31 / TU552-CS31	DC551-CS31	1SAP220500R0001		0.200
- / - / - / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU551-CS31 / TU552-CS31	CI590-CS31-HA	1SAP221100R0001		0.200
4 / 2 / 8 / - / 8	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU551-CS31 / TU552-CS31	CI592-CS31	1SAP221200R0001		0.200
<b>For PROFIBUS®-DP</b>								
4 / 2 / 8 / 8 / -	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA (1)	TU509/TU510/ TU517/TU518	CI541-DP	1SAP224100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU509/TU510/ TU517/TU518	CI542-DP	1SAP224200R0001		0.200
<b>For CANopen®</b>								
4 / 2 / 8 / 8 / -	24 V DC/ 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU509/TU510/ TU517/TU518	CI581-CN	1SAP228100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU509/TU510/ TU517/TU518	CI582-CN	1SAP228200R0001		0.200
<b>For Ethernet based protocol - EtherCAT®</b>								
4 / 2 / 8 / 8 / -	24 V DC/0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU507-ETH / TU508-ETH	CI511-ETHCAT	1SAP220900R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU507-ETH / TU508-ETH	CI512-ETHCAT	1SAP221000R0001		0.200
<b>For Ethernet based protocol - PROFINET® IO RT</b>								
4/2/8/8/-	24 V DC/0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A/ -10...+10 V, 0...20 mA, 4...20 mA	TU507-ETH / TU508-ETH	CI501-PNIO	1SAP220600R0001		0.200
-/-/8/8/8	24 V DC	Transistor	24 V DC, 0.5 A	TU507-ETH / TU508-ETH	CI502-PNIO	1SAP220700R0001		0.200

From	To	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
<b>Gateway on Ethernet based protocol - PROFINET® IO RT</b>							
PROFINET® I/O	-	3 x RS232/485 ASCII serial interfaces	TU520-ETH	CI504-PNIO	1SAP221300R0001		0.200
PROFINET® I/O	1x CAN 2A/2B or CANopen® Master	2 x RS232/485 ASCII serial interfaces	TU520-ETH	CI506-PNIO	1SAP221500R0001		0.200



# AC500

## Ordering data



TU515



TU520-ETH



TU510



TU518



TU508-ETH

### Terminal units

For digital and analog expansion modules and interface modules. Please note: for modules with relay outputs, terminal units for 230 V AC (TU531 / TU532) are required.

For	Supply	Connection type	Type	Order code	Price	Weight (1 pce) kg
Ethernet communication interface modules	24 V DC	Screw	TU507-ETH	1SAP214200R0001		0.300
		Spring	TU508-ETH	1SAP214000R0001		0.300
Ethernet gateway modules	24 V DC	Spring	TU520-ETH	1SAP214400R0001		0.300
CANopen® / PROFIBUS® DP (1) communication interface modules	24 V DC	Screw	TU517	1SAP211400R0001		0.300
		Spring	TU518	1SAP211200R0001		0.300
PROFIBUS® DP / CANopen® communication interface modules	24 V DC	Screw	TU509	1SAP211000R0001		0.300
		Spring	TU510	1SAP210800R0001		0.300
I/O modules	24 V DC	Screw	TU515	1SAP212200R0001		0.300
		Spring	TU516	1SAP212000R0001		0.300
I/O modules AC / relay	230 V AC	Screw	TU531	1SAP217200R0001		0.300
		Spring	TU532	1SAP217000R0001		0.300
I/O module DO526	24 V DC	Spring	TU542	1SAP213200R0001		0.300
CS31 interface modules	24 V DC	Screw	TU551-CS31	1SAP210600R0001		0.300
		Spring	TU552-CS31	1SAP210400R0001		0.300

(1) TU517/TU518 Terminal units can also be used with PROFIBUS® DP CI54x modules up to 1 Mbaud.

### Terminal units compatibility

Type	For I/O modules			For communication interface modules				
	TU515 TU516	TU542	TU531 TU532	TU507-ETH TU508-ETH	TU509 TU510	TU517 TU518	TU520-ETH	TU551-CS31 TU552-CS31
DA501	●							
DC522	●							
DC523	●							
DC532	●							
DI524	●							
DX522			●					
DX531			●					
DO524	●							
DO526		●						
CD522	●							
AI523	●							
AI531	●							
AO523	●							
AX521	●							
AX522	●							
DC551-CS31								●
CI590-CS31-HA								●
CI592-CS31								●
CI501-PNIO				●				
CI502-PNIO				●				
CI504-PNIO							●	
CI506-PNIO							●	
CI511-ETHCAT				●				
CI512-ETHCAT				●				
CI541-DP					●	● (1)		
CI542-DP					●	● (1)		
CI581-CN					●	●		
CI582-CN					●	●		

(1) Can be used with baud rate up to 1 Mbaud.

# AC500

## Ordering data



MC502



AC500 basic training case  
CPU, I/Os, HMI

### Accessories for AC500

For	Description	Type	Order code	Price	Weight (1 pce) kg
AC500 CPUs COM1	Programming cable Sub-D / terminal block, length 5 m	TK502	1SAP180200R0101		0.400
AC500 CPUs COM2	Programming cable Sub-D / Sub-D, length 5 m	TK501	1SAP180200R0001		0.400
AC500 CPUs	Memory card (2 GB SD card)	MC502	1SAP180100R0001		0.020
	Lithium battery for data buffering	TA521	1SAP180300R0001		0.100
I/O modules	Pluggable marker holder for I/O modules, packing unit incl. 10 pcs. Template available in the AC500 online help	TA523	1SAP180500R0001		0.300
AC500 CPU's, interface module, communication module and I/O modules	White labels, packaging unit incl. 10 pcs.	TA525	1SAP180700R0001		0.100
Terminal base	Communication Module, blind cap	TA524	1SAP180600R0001		0.120
CPU terminal base	Accessories for wall mounting, packing unit includes 10 pcs	TA526	1SAP180800R0001		0.200
	5-pole power plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1. Packing unit includes 5 pcs	TA527	1SAP181100R0001		0.200
	9-pole COM1 plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1 or on TU520-ETH. Packing unit includes 5 pcs	TA528	1SAP181200R0001		0.200
Communication modules	9-pole spring plug for CM574-RS/RCOM. Spare part. Packing includes 10 pcs	TA532	1SAP182000R0001		
	5-pole spring plug for CM575-DN/CM578-CN. Spare part. Packing includes 5 pcs	TA533	1SAP182100R0001		
	2x5-pole spring plug for CM588-CN and CM598-CN. Spare part. Packing includes 5 pcs.	TA534	1SAP182200R0001		
	10-pole spring plug for DC541-CM. Spare part. Packing includes 10 pcs.	TA536	1SAP183100R0001		
AC500 basic training case: CPU, I/Os, HMI	PM583-ETH + MC502 + CM572-DP + AX561 + DC551-CS31 + CI542-DP + CP635 + power supply + Ethernet cables + simulation stand	TA512-BAS	1SAP182400R0001		7.000
AC500 advanced training case: CPU, I/Os, COM, encoder	PM583-ETH + CM502 + CM574-RS + CM578-CN + CM579-PNIO + CM579-ETHCAT + CI512-ETHCAT + CP635 + CD522 + power supply + cables + simulation stand	TA513-ADV	1SAP182500R0001		8.800
AC500 CPUs PM595	Protective cap, spare-parts, 3 pieces	TA540	1SAP182600R0001		0.200
	Lithium battery for real-time-clock buffering	TA541	1SAP182700R0001		0.030
	Accessories for screw-mounting, 20 pieces	TA543	1SAP182800R0001		0.100

# AC500

## Technical data

### AC500 CPUs

Type	PM572	PM573-ETH	PM582	PM583-ETH	PM585-ETH	PM590-ETH	PM591-ETH	PM591-2ETH	PM592-ETH	PM595-4ETH-F
Supply voltage	24 V DC									
Current consumption on 24 V DC										
Min. (module alone)	0.050 A	0.110 A	0.050 A	0.110 A	0.150 A	0.150 A				0.400 A
Max. (all couplers and I/Os)	0.750 A	0.810 A	0.750 A	0.810 A	0.850 A	0.850 A				1.2 A
User program memory – Flash EPROM and RAM	128 kB	512 kB	512 kB	1024 kB	1024 kB	2048 kB	4096 kB			16384 kB
Integrated user data memory	128 kB thereof 12 kB saved	512 kB thereof 288 kB saved	416 kB thereof 288 kB saved	1024 kB thereof 288 kB saved	2560 kB thereof 1536 kB saved	3072 kB thereof 1536 kB saved	5632 kB thereof 1536 kB saved			16384 kB thereof 3072 kB saved
User Flashdisk (Data-storage, programm access or also external with FTP)	–								Yes, 4 GB Flash non removable	
Plug-in memory card	Depending on SD-Card used : no SD-HC card allowed, use MC502 accessory									
Web server's data for user RAM disk	–	1 024 kB	–	4 096 kB	4 096 kB	8 MB				32 MB
Cycle time for 1 instruction (minimum)										
Binary	0.06 µs		0.05 µs		0.004 µs	0.002 µs				0.0006 µs
Word	0.09 µs		0.06 µs		0.008 µs	0.004 µs				0.001 µs
Floating-point	0.7 µs		0.5 µs		0.008 µs	0.004 µs				0.001 µs
Max. number of centralized inputs/outputs										
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)									
Digital inputs/outputs	320/320									
Analog inputs/outputs	160/160									
Max. number of decentralized inputs/outputs depends on the used standard Fieldbus (1)										
Data buffering	battery									
Real-time clock (with battery back-up)	●									
Program execution										
Cyclical / Time controlled / Multi tasking	● / ● / ●									
User program protection by password	●									
Internal interfaces										
COM1										
RS232 / RS485 configurable	●									
Connection (on terminal bases or CPU module)	pluggable spring terminal block, use TK502 cable in accessory									
Programming, Modbus® RTU, ASCII, CS31 master	●									
COM2										
RS232 / RS485 configurable	●									
Connection (on terminal bases or CPU module)	Sub-D female 9 poles, use TK501 cable in accessory									
Programming, Modbus® RTU, ASCII	●									
FieldBusPlug										
Serial neutral interface	●									
Connection (on terminal bases)	M12 male, 5 poles									
Functions	programming cable UTF-21-FBP, slave communication depending on FieldBusPlug used (PROFIBUS® DP, CANopen®, DeviceNet)									
Ethernet										
Ethernet connection (on terminal bases)	–	RJ45	–	RJ45	RJ45	RJ45	RJ45	2 x RJ45	RJ45	2 x RJ45
Ethernet functions: Programming, TCP/IP, UDP/IP, Modbus® TCP, integrated Web server, IEC60870-5-104 remote control protocol, SNTP (simple Network Time Protocol), DHCP, FTP server HTTP, SMTP, PING	–	●	–	●	●	●	●	●	●	●
Ethernet based Fieldbus										
Ethernet connection (on CPU module)										
Downloadable protocols like: PROFINET® IO RT Controller / Device (2) EtherCAT® Master										
LCD display	LCD display and 8 function keys									
Function	RUN / STOP, status, diagnosis									
LEDs for various status display	–									
Timer/Counter	unlimited/unlimited									
Approvals	See detailed page 176 or www.abb.com/plc									

(1) e.g. CS31 Fieldbus: up to 31 stations with up to 120 DI / 120 DOs or up to 32 AI / 32 AO per station.

(2) Availability on demand

# AC500

## Technical data

### AC500 V3 CPUs

Type	PM5650-2ETH
Supply voltage	24 V DC
Current consumption on 24 V DC	
Min. (module alone)	0.200 A
Max. (all couplers and I/Os)	0.900 A
User program memory / User Data memory	80 MB
Web server's data	
– Flash EPROM and DRAM	
User data memory saved	256 KB
Plug-in memory card	Depending on SD-Card used: SD-HC card allowed, use MC502 preferably accessory
Web server's data for user RAM disk	No limitation, included into the global User Program/Data memory
Cycle time for 1 instruction (minimum)	
Binary	0.01 µs
Word	0.01 µs
Floating-point	0.01 µs
Communication modules supported	
Max. number of communication modules on TBs	Up to 6 depending on available terminal bases (2)
Type of communication module supported	CM579-PNIO, CM589-PNIO, CM579-ETHCAT, CM592-DP (2) and CM597-ETH (2)
Max. number of centralized inputs/outputs	
Max. number of extension modules on I/O bus	up to max. 10 (S500 and/or S500-eCo modules allowed)
Digital inputs/outputs	320/320
Analog inputs/outputs	160/160
Max. number of decentralized inputs/outputs	depends on the used standard Fieldbus (1)
Data buffering	battery
Real-time clock (with battery back-up)	●
Program execution	
Cyclical / Time controlled / Multi tasking	● / ● / ●
User program protection by password	●
Internal interfaces	
COM1	
RS232 / RS485 configurable	●
Connection (on terminal bases or CPU module)	pluggable spring terminal block, use TK502 cable in accessory
Programming, Modbus® RTU, ASCII	● (2)
CANopen®	
Serial I interface	CAN serial interface
Connection (on terminal bases)	Pluggable spring terminal block, 5 poles
Functions	CANopen® Master communication, CAN 2A/2B, J1939 protocol
Ethernet	
Ethernet connection (on terminal bases)	2 x RJ45 with 2 x separated interfaces could be used as 2-port switch (2)
Ethernet functions (2):	
Online Access, ICMP (Ping), DHCP, IP configuration protocol, UDP data exchange, Network variables, Modbus® TCP, HTTP (integrated Web server), IEC60870-5-104 remote control protocol, SNTP (Time synchronization), FTP server, SMTP client, Socket programming	●
WebVisu for data visualisation on webserver	●
OPC UA	●
Ethernet Switch on ETH1 / ETH2	● (2)
Ethernet based Fieldbus	
Selectable protocols (licensed feature):	available on one Ethernet interface, the other interface can be sometimes used as switch (2)
PROFINET® IO RT Controller	● (2)(3)
EtherCAT® Master	● (2)(3)
EthernetIP Adapter	● (2)(3)
LCD display	LCD display and 8 function keys
Function	RUN / STOP, status, diagnosis
LEDs for various status display	●
Timer/Counter	unlimited/unlimited
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>

(1) e.g. CANopen® Fieldbus: up to 127 stations with up to 320 Digital channels or up to 160 Analog channels per station.

(2) Availability on demand

(3) Feature is licensed

# AC500

## Technical data

### Digital S500 I/O modules

Type	DI524	DC522	DC523	DC532
Number of channels per module				
Digital	inputs	32	–	–
	outputs	–	–	–
Configurable channels DC (configurable as inputs or outputs)		–	16	24
Additional configuration of channels as				
Fast counter		configuration of max. 2 channels per module, operating modes see table on page 97		
Occupies max. 1 DO or DC when used as counter		–	●	●
Connection via terminal unit		●	●	●
Digital inputs				
Input signal voltage		24 V DC		
Input characteristic acc. to EN 61132-2		Type 1		
0 signal		–3...+5 V DC		
Undefined signal state		5...15 V DC		
1 signal		15...30 V DC		
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms		
Input current per channel				
At input voltage		24 V DC	5 mA typically	
		5 V DC	> 1 mA	
		15 V DC	> 5 mA	
		30 V DC	< 8 mA	
Digital outputs				
Transistor outputs 24 V DC, 0.5 A		–	●	●
Readback of output		–	●	●
Switching of load 24 V		–	●	●
Output voltage at signal state 1		–	process voltage UP minus 0.8 V	
Output current				
Nominal current per channel		–	500 mA at UP = 24 V	
Maximum (total current of all channels)		–	8 A	
Residual current at signal state 0		–	< 0.5 mA	
Demagnetization when switching off inductive loads		–	by internal varistors	
Switching frequency				
For inductive load		–	0.5 Hz max.	
For lamp load		–	11 Hz max. at max. 5 W	
Short-circuit / overload proofness		–	●	●
Overload indication (I > 0.7 A)		–	after approx. 100 ms	
Output current limiting		–	yes, with automatic reclosure	
Proofness against reverse feeding of 24 V signals		–	●	●
Process voltage UP				
Nominal voltage		24 V DC		
Maximum ripple		5 %		
Current consumption on UP				
	Min. (module alone)	0.150 A	0.100 A	0.150 A
	Max. (min. + loads)	0.150 A	0.100 A + load	0.150 A + load
Reverse polarity protection		●	●	●
Fuse for process voltage UP		10 A miniature fuse		
Connections for sensor voltage supply. Terminal 24 V and 0 V for each connection. Permitted load for each group of 4 or 8 connections: 0.5 A		–	8	4
Short-circuit and overload proof 24 VDC sensor supply voltage		–	●	●
Maximum cable length for connected process signals				
Cable	shielded	1000 m		
	unshielded	600 m		
Potential isolation				
Per module		●	●	●
Between channels	input	–	–	–
	output	–	–	–
Voltage supply for the module		internally via extension bus interface (I/O bus)		
Fieldbus connection		via AC500 CPU or all communication interface modules		
Address setting		automatically (internal)		

# AC500

## Technical data

### Digital S500 I/O modules

Type	DX522	DX531	DO524	DO526
<b>Number of channels per module</b>				
Digital inputs	8	8	–	–
Digital outputs	8 relays	4 relays	32	8
Configurable channels DC (configurable as inputs or outputs)	–	–	–	–
<b>Additional configuration of channels as</b>				
Fast counter	configuration of max. 2 channels per module, operating modes see page 97	–	–	–
Occupies max. 1 DO or DC when used as counter	–	–	–	–
Connection via terminal unit	●	●	●	●
<b>Digital inputs</b>				
Input signal voltage	24 V DC	230 V AC or 120 V AC	–	–
Frequency range	–	47...63 Hz	–	–
Input characteristic acc. to EN 61132-2	Type 1	Type 2	–	–
0 signal	-3...+5 V DC	0...40 V AC	–	–
Undefined signal state	5...15 V DC	> 40 V AC...< 74 V AC	–	–
1 signal	15...30 V DC	74...265 V AC	–	–
Input time delay (0 -> 1 or 1 -> 0)	8 ms typically, configurable from 0.1 up to 32 ms	20 ms typically	–	–
<b>Input current per channel</b>				
At input voltage	24 V DC	5 mA typically	–	–
	5 V DC	> 1 mA	–	–
	15 V DC	> 5 mA	–	–
	30 V DC	< 8 mA	–	–
	159 V AC	–	> 7 mA	–
	40 V AC	–	< 5 mA	–
<b>Digital outputs</b>				
Transistor outputs 24 V DC	–	–	0.5 A	2 A
Readback output	–	–	–	–
Relay outputs, supplied via process voltage UP, changeover contacts	●	●	–	–
Switching of load	24 V	●	●	●
	230 V	●	–	–
Output voltage at signal state 1	–	–	process voltage UP minus 0.8 V	process voltage UP minus 0.4 V
<b>Output current</b>				
Nominal current per channel	–	–	500 mA at UP = 24 V	2 A at UP = 24 V
Maximum (total current of all channels)	–	–	8 A	16 A
Residual current at signal state 0	–	–	< 0.5 mA	< 0.1 mA
Demagnetization when switching off inductive loads	–	–	by internal varistors	by internal clamping diode
<b>Switching frequency</b>				
For inductive load	2 Hz	–	0.5 Hz max.	2 Hz max.
For lamp load	11 Hz max. at max. 5 W	–	–	11 Hz max. 48 W
Short-circuit / overload proofness	by external fuse / circuit breaker. 6 A gL/gG per channel	–	●	by external fuse 10A fast
Overload indication (I > 0.7 A)	–	–	after approx. 100 ms	–
Output current limiting	–	–	yes, with automatic reclosure	–
Proofness against reverse feeding of 24 V signals	–	–	●	●
<b>Contact rating</b>				
For resistive load, max.	3 A at 230 V AC 2 A at 24 V DC	–	–	–
For inductive load, max.	1.5 A at 230 V AC 1.5 A at 24 V DC	–	–	–
For lamp load	60 W at 230 V AC 10 W at 24 V DC	–	–	–



# AC500

## Technical data

### Digital S500 I/O modules

Type	DX522	DX531	DO524	DO526
<b>Lifetime (switching cycles)</b>				
Mechanical lifetime	300 000		–	–
Lifetime under load	300 000 at 24 V DC / 2 A 200 000 at 120 V AC / 2 A 100 000 at 230 V AC / 3 A		–	–
Spark suppression for inductive AC load	external measure depending on the switched load		–	–
Demagnetization for inductive DC load	external measure: free-wheeling diode connected in parallel to the load		–	–
<b>Process voltage UP</b>				
Nominal voltage	24 V DC			
Maximum ripple	5 %			
Current consumption on UP				
Min. (module alone)	0.050 A	0.150 A	0.050 A	0.050 A
Max. (module + loads)	0.050 A + load	0.150 A + load	0.100 A + load	0.100 A + load
Reverse polarity protection	●	●	●	●
Fuse for process voltage UP	10 A miniature fuse			
<b>Maximum cable length for connected process signals</b>				
Cable				
shielded	1000 m			
unshielded	600 m			
<b>Potential isolation</b>				
Per module	●	●	●	●
Between the channels	–	● (per 2)	–	–
input	–	–	–	–
output	●	●	–	–
Voltage supply for the module	internally via extension bus interface (I/O bus)			
Fieldbus connection	via AC500 CPU or all communication interface modules			
Address setting	automatically (internal)			

# AC500

## Technical data

### Analog S500 I/O modules

Type		AX521	AX522	AI523	AO523	AI531
<b>Number of channels per module</b>						
Individual configuration, analog	inputs	4	8	16	–	8
	outputs	4	8	–	16	–
<b>Signal resolution for channel configuration</b>						
-10...+10 V		12 bits + sign				15 bits + sign
0...10 V		12 bits				15 bits
0...20 mA, 4...20 mA		12 bits				15 bits
Temperature: 0.1 °C		●	●	●	●	●
<b>Monitoring configuration per channel</b>						
Plausibility monitoring		●	●	●	●	●
Wire break & short-circuit monitoring		●	●	●	●	●
<b>Analog Inputs AI</b>						
Signal configuration per AI		max. number per module and with regard to the configuration: AIs / Measuring points (depending on the use of 2/3-wire connection or differential input)				
-50...+50 mV, -500...+500 mV, -1...+1 V, -5...+5 V, 0...+5 V		–	–	–	–	8 / 8
0...10 V		4 / 4	8 / 8	16 / 16	–	8 / 8
-10...+10 V		4 / 4	8 / 8	16 / 16	–	8 / 8
0...20 mA		4 / 4	8 / 8	16 / 16	–	8 / 8
4...20 mA		4 / 4	8 / 8	16 / 16	–	8 / 8
-20...+20 mA		–	–	–	–	8 / 8
<b>Pt100</b>						
-50...+400 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	8 / 8
-50...+70 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+70 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+70 °C (4-wire)		–	–	–	–	8 / 8
<b>Pt1000</b>						
-50...+400 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+400 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+400 °C (4-wire)		–	–	–	–	8 / 8
<b>Ni1000</b>						
-50...+150 °C (2-wire)		4 / 4	8 / 8	16 / 16	–	8 / 8
-50...+150 °C (3-wire), 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-50...+150 °C (4-wire)		–	–	–	–	8 / 8
<b>Cu50 -200...+200 °C</b>		–	–	–	–	8 / 8
<b>Resistor</b>		–	–	–	–	8 / 8
<b>Thermocouples of types J, K, T, N, S</b>		–	–	–	–	●
0...10 V using differential inputs, 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
-10...+10 V using differential inputs, 2 channels		4 / 2	8 / 4	16 / 8	–	8 / 8
<b>Digital signals (digital input)</b>		4 / 4	8 / 8	16 / 16	–	8 / 8
Input resistance per channel		voltage: > 100 kΩ current: approx. 330 Ω				voltage: > 100 kΩ current: approx. 330 Ω
Time constant of the input filter		voltage: 100 µs current: 100 µs				voltage: 100 µs current: 100 µs
Conversion cycle		2 ms (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000				1 ms (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000
Overvoltage protection		●	●	●	–	●
<b>Data when using the AI as digital input</b>						
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms				8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	24 V DC				24 V DC
Signal	0	-30...+5 V				-30...+5 V
	1	13...30 V				13...30 V

(1) Half can be used on current (the other half remains available).

# AC500

## Technical data

### Analog S500 I/O modules

Type	AX521	AX522	AI523	AO523	AI531
Analog outputs AO					
Possible configuration per AO		Max. number of AOs per module and with regard to the configuration:			
-10...+10 V	4	8 (1)	–	16 (1)	–
0...20 mA	4	–	–	8	–
4...20 mA	4	–	–	8	–
Output	resistance (burden) when used as current output	0...500 Ω	–	0...500 Ω	–
	loading capability when used as voltage output	Max. ±10 mA	–	Max. ±10 mA	–
Process voltage UP					
Nominal voltage	24 V DC				
Maximum ripple	5 %				
Current consumption on UP					
Min. (module alone)	0.150 A				0.130 A
Max. (min. + loads)	0.150 A + load	0.150 A + load	–	0.150 A + load	●
Reverse polarity protection	●	●	●	●	●
Max. line length of the analog lines, conductor cross section > 0.14 mm²	100 m				
Conversion error of analog values caused by non-linearity, calibration errors ex works and the resolution in the nominal range	0.5 % typically, 1 % max.				Voltage: 0.1 % typically, current/resistor 0.3 % typically
Potential isolation					
Per module	●	●	●	●	–
Fieldbus connection	Via AC500 CPU or all communication interface modules				
Voltage supply for the module	Internally via extension bus interface (I/O bus)				–

# AC500

## Technical data

### CD522 encoder module

The CD522 module offers accuracy and dynamic flexibility for a customized solution. It has two independent encoder inputs onboard and is easily configured using the Automation Builder software for 10 different operation modes and for frequencies up to 300 kHz (depending on CPU cycle time). The CD522 module also integrates outputs for pulses and for PWM as well as normal inputs and outputs, depending on selected encoder mode.

<b>Type</b>		<b>CD522</b>
<b>Functionality</b>		
<b>Digital inputs/outputs</b>	24 V DC, dedicated inputs/outputs can be used for specific counting functions. All unused inputs/outputs can be used as input/output with standard specification.	
	Input options	Catch/Touch operation, counter value stored in separate variable on external event (rising or falling) Set to preset counter register with predefined value Set to reset counter register
	End value output	Output set when predefined value is reached
	Reference point initialization (RPI) input for relative encoder initialization	●
<b>High-speed counter/encoder</b>		
<b>Integrated counters</b>	Counter characteristics	2 counters (24 V DC, 5 V DC, differential and 1 Vpp sinus input)
	Counter mode	one 32 bits or two 16 bits
	Relative position encoder	X1, X2, X4
	Absolute SSI encoder	●
	Time frequency meter	●
	Frequency input	up to 300 kHz
<b>PWM/pulse outputs</b>		
<b>Output mode specification</b>	Number of outputs	2
	Push pull output	24 V DC, 100 mA max
	Current limitation	Thermal and overcurrent
<b>PWM mode specification</b>	Frequency	1...100 kHz
	Value	0...100 %
<b>Pulse mode specification</b>	Frequency	1...15 kHz
	Pulse emission	1...65535 pulses
	Number of pulses emitted indicator	0...100 %
<b>Frequency mode specification</b>	Frequency output	100 kHz
	Duty Cycle	Set to 50 %
<b>Number of channels per module</b>		
<b>Digital</b>	input	2
	output	2
<b>Configurable channels DC (configurable as inputs or outputs)</b>		8
<b>Additional configuration of channels as</b>		
<b>Fast counter</b>		Integrated 2 counter encoders
<b>Connection via terminal unit</b>		●
<b>Digital Inputs</b>		
<b>Input</b>	signal voltage	24 V DC
	time delay	8 ms typically configurable from 0.1 up to 32 ms
<b>Input current per channel</b>		
<b>At input voltage</b>	<b>24 V DC</b>	Typically 5 mA
	<b>5 V DC</b>	> 1 mA
	<b>15 V DC</b>	> 5 mA
	<b>30 V DC</b>	< 8 mA
<b>Digital outputs</b>		
<b>Output voltage at signal state 1</b>		UP – 0.8 V
<b>Output current</b>		
<b>Nominal current per channel</b>		0.5 A at UP = 24 V
<b>Maximum (total current of all channels)</b>		8 A
<b>Residual current at signal state 0</b>		< 0.5 mA
<b>Demagnetization when switching off inductive loads</b>		By internal varistors
<b>Switching frequency</b>		
<b>For inductive load</b>		Max. 0.5 Hz
<b>For lamp load</b>		Max. 11 Hz with max. 5 W
<b>Short-circuit / Overload proofness</b>		●
<b>Overload indication (I &gt; 0.7 A)</b>		After approx. 100 ms
<b>Output current limiting</b>		●
<b>Proofness against reverse feeding of 24 V signals</b>		●

# AC500

## Technical data

### CD522 encoder module

Type	CD522
Maximum cable length for connected process signals	
Cable	shielded 1000 m unshielded 600 m
Potential isolation	
Per module	●
Technical data of the high-speed inputs	
Number of channels per module	6
Input type	24 V DC, 5 V DC / Differential / Sinus 1 Vpp
Frequency	300 kHz
Technical data of the fast outputs	
Number of channels	2
Indication of the output signals	Brightness of the LED depends on the number of pulses emitted (0 % to 100 %) (pulse output mode only)
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
De-magnetization when inductive loads are switched off	with varistors integrated in the module
Overload message ( $I > 0.1 \times A$ )	Yes, after ca. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24 V signals	Yes
Process voltage UP	
Nominal voltage	24 V DC
Maximum ripple	5 %
Current consumption on UP	
Min. (module alone)	0.070 A
Max. (min. + loads)	0.070 A + load
Reverse polarity protection	●
Fuse for process voltage UP	10 A miniature fuse

# AC500

## Technical data

### Analog/digital mixed I/O expansion modules

For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones.  
For all Input modules, the signal resolution for channel configuration is: -10...+10 V: 12 bit + sign; 0...10 V, 0...20 mA, 4...20 mA: 12 bits.

Type	DA501	
Number of Channels per Module		
Digital	inputs	16
	outputs	–
Analog	inputs	4
	outputs	2
Digital configurable channels DC (configurable as inputs or outputs)		8
Additional configuration of channels as		
Fast counter		Yes
Occupies max. 1 DO or DC when used as counter		Configuration of max. 2 channels per module. Operating modes see table on page 97
Connection via terminal unit TU 5xx		●
Digital inputs		
Input	signal voltage	24 V DC
	characteristic acc. to EN 61132-2	Type 1
0 signal		-3...+5 V DC
Undefined signal state		5...15 V DC
1 signal		15...30 V DC
Residual ripple, range for	0 signal	-3...+5 V DC
	1 signal	15...30 V DC
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms
Digital outputs		
Transistor outputs 24 V DC, 0.5 A		●
Readback of output		●
Outputs, supplied via process voltage UP		●
Switching of 24 V load		●
Output voltage at signal state 1		Process voltage UP - 0.8 V
Output current		
Nominal current per channel		500 mA at UP = 24 V DC
Maximum (total current of all channels)		4 A
Residual current at signal state 0		< 0.5 mA
Demagnetization when switching off inductive loads		By internal varistors
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points
Signal configuration per AI		●
0...10 V / -10 ... +10 V		4 / 4
0...20 mA / 4...20 mA		4 / 4
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2
0...10 V using differential inputs, needs 2 channels		4 / 2
-10...+10 V using differential inputs, needs 2 channels		4 / 2
Digital signals (digital input)		4 / 4
Data when using the AI as digital input		
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	24 V DC
Outputs, single configurable as		
Possible configuration per AO		●
-10...+10 V		●
0...20 mA / 4...20 mA		●
Output resistance (load) when used as current output		0...500 Ω
Output loading capability when used as voltage output		±10 mA max.
Potential isolation		
Per module		●
Process voltage UP		
Nominal voltage		24 V DC
Maximum ripple		5 %
Current consumption on UP		
Min. (module alone)		0.070 A
Max. (min. + loads)		0.070 A + load
Reverse polarity protection		●
Fuse for process voltage UP		10 A miniature fuse
Approvals		See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>



# AC500

## Technical data

### DC541-CM interrupt I/O and fast counter module

In the operating mode counter, the channels can be configured as follows:

Input, Output, 32-bit up/down counter (uses C0...C3) as a 32-bit counter without limit, 32-bit periodic counter as a 32-bit counter with a limit, limiter for a 32-bit counter (limit channel 0), 32-bit up counter (forward counter) with the frequencies 50 kHz, 5 kHz and 2.5 kHz, pulse-width modulation (PWM) with a resolution of 10 kHz, time and frequency measurement, frequency output.

Type	DC541-CM	
Number of channels per module		
Configurable channels DC (configurable as inputs or outputs)	8	
Additional configuration of channels as		
Fast counter	Yes	
Connection via CPU terminal base. Occupies one communication module slot	●	
Digital inputs		
Input signal voltage	24 V DC	
characteristic acc. to EN 61132-2	Type 1	
0 signal	-3...+5 V DC	
Undefined signal state	5...15 V DC	
1 signal	5...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)	20 µs	
	Clamp to clamp - 300 µs with interrupt task	
Input current per channel		
At input voltage	24 V DC	5 mA typically
	5 V DC	> 1 mA
	15 V DC	> 5 mA
	30 V DC	< 8 mA
Digital outputs		
Transistor outputs 24 V DC, 0.5 A	●	
Readback of output	●	
Switching of 24 V load	●	
Output voltage at signal state 1	Process voltage UP minus 0.8 V	
Output current		
Nominal current per channel	500 mA at UP = 24 V	
Maximum (total current of all channels)	4 A	
Residual current at signal state 0	< 0.5 mA	
Demagnetization when switching off inductive loads	by internal varistors	
Potential isolation		
Per module	●	
Voltage supply for the module	Internally via backplane bus	

### Interrupt I/O table

Configuration as		Configuration for channel no.					Max. no. of channels for this function	Remarks and notes regarding possible alternative combinations of the remaining channels (a and b)
		Chan. 0	Chan. 1	Chan. 2	Chan. 3	Chan. 4-7		
Mode 1: Interrupt functionality								
Interrupt	Digital input	1	1	1	1	4	8	Each channel can be configured individually as interrupt input or output
	Digital output	1	1	1	1	4	8	
Mode 2: Counting functionality								
Digital I/Os PWM (1)	Digital input	1	1	1	1	4	8	Usual input
	Digital output	1	1	1	1	4	8	Usual output
	PWM, resolution 10 kHz	1	1	1	1	4	8	Outputs and pulsed signal with and adjustable on-off ratio

(1) Counter and fast counter data available on technical documentation.

# AC500

## Technical data

### AC500 Condition Monitoring CMS: FM502-CMS

The FM502-CMS function module offers precision and dynamic flexibility for customized solutions in condition monitoring, precise measurement or fast data logging applications. It has 16 fast, precise and synchronized analog inputs with 50k Samples/s (SPS), 24bit ADC resolution, completed with encoder inputs (incremental or absolute) with counter and additional DI and DC inputs/outputs onboard. It is easily configured using the Automation Builder software and the special libraries. Overall it has 12 different operation modes. One FM502 function module can be placed on the right side of PM592-ETH CPU with a special function module terminal base TF5x1, to interface directly to the CPU. While long measurements can be flexibly configured, started and stopped, all inputs are available in the I/O Image of CPU for immediate use (measurement, protection, control, ...)

Type	FM502-CMS	
Data storage		
Fast user data memory of FM502	128 MB (ca. 33 million Samples: e.g 40 s record length on 16 channels at 50k SPS or 5.8 h record length on 16 channels at 100 SPS or 93 h on 1 channel at 100 SPS)	
File Format delivered to PM592 flash	WAV (compact binary) per channel, all channels in one *.zip w. time stamp	
Analog inputs		
Number of channels	16 (synchronous sampled)	
Resolution	24 bit ADC, stored in DINT in WAV file (4byte per value)	
Accuracy at +25 °C	< +/- 0.1 %	
Accuracy over operating temperature and vibration	< +/- 0.5 %	
Sample rate / Bandwidth (High, 0 dB)	50k SPS / 20 kHz to 100 SPS / 40 Hz (digitally downsampled, selectable per channel)	
Indication of the input signal	One bicolor LED per channel for configuration, measurement status, error messages	
Input option:	IEPE (with Sensor supply current)	+ - 10V
Bandwidth low (- 3 dB)	digital < 0.1 Hz	digital < 0.1 Hz or DC (selectable)
Pass band high (- 3 dB)	analog > 90 kHz, digital > 24.5 kHz	
Stop band high (> - 100 dB)	analog > 1 MHz, digital > 27.5 kHz	
Dynamic Range (SFDR)	> 100 dB	
SINAD (300 Hz/1 kHz sine, 50 k SPS) 0dB from full scale	< -90 dB	< - 95 dB
IEPE Current Source per channel	Typ. 4.2 mA (+/- 7% over temperature)	(n.a.)
Resistance AI- to M (ground)	Typ ~ 270hm (PTC)	
Channel input impedance (AI+/AI-):		
< 1kHz	> 1 MOhm	> 2 MOhm
5kHz	> 100 kOhm	> 40 kOhm
10kHz	> 60 kOhm	> 25 kOhm
20kHz	> 40 kOhm	> 8 kOhm
Error detection	Short circuit, open wire	
Max. cable length, shielded (depending on sensor)	100 m	
Digital inputs/outputs		
	24 V DC, dedicated inputs/outputs can be used for specific counting functions.	
	All unused inputs/outputs can be used as normal input/output with standard specification.	
Channels and types	2 DI + 2 DC (configurable inputs/outputs); Type 1, LED indication	
Input options	Catch/Touch operation, counter value stored in separate variable on external event (rising or falling)	
	Set to preset counter register with predefined value	
	Set to reset counter register	
End value output	Output set when predefined value is reached	
Reference point initialization (RPI) input for relative encoder initialization	●	
Input current p. channel @ V DC		
24 V DC	Typically 5 mA	
5 V DC	> 1 mA	
15 V DC	> 5 mA	
30 V DC	< 8 mA	

# AC500

## Technical data

Type	FM502-CMS	
Digital outputs		
Output voltage at signal state 1	(L+) – 0.8 V	
Output current		
Nominal current per channel	0.5 A at UP = 24 V	
Residual current at signal state 0	< 0.5 mA	
Demagnetization when switching off inductive loads	By internal varistors	
Switching frequency		
For inductive load	Max. 0.5 Hz	
For lamp load	Max. 11 Hz with max. 5 W	
Short-circuit / Overload proofness	●	
Overload indication (I > 0.7 A)	After approx. 100 ms	
Output current limiting	●	
Resistance against reverse feeding of 24 V signals	●	
Maximum cable length for connected process signals		
shielded	1000 m	
unshielded	600 m	
High-speed counter/encoder		
Integrated counters		
Counter characteristics	2 counters (24 V DC, 5 V DC, differential RS422: 5 V or 1 Vpp sinus input)	
Counter mode	one counter 32 bits or two counters 16 bits	
Relative position encoder	X1, X2, X3	
Absolute SSI encoder	●	
Time frequency meter	●	
Frequency input	up to 300 kHz	
Additional configuration of channels as		
Fast counter	Integrated 2 counter encoders	
high-speed inputs		
Number of channels, type per module	3 (A,B,Z), type 1	
Input type	24 V DC	5 V DC / Differential / Sinus 1 Vpp
Frequency	up to 300 kHz (input filter: 50,500, 5 k, 20 k Hz)	
Input frequency max. (frequency measurement only)	100 kHz (accuracy -0 %/+3 %)	
Max. cable length, shielded (depending on sensor)	300 m	100 m
Fast outputs		
SSI CLK output B	f. optical Interface (according SSI): Pin 1.3	RS-422 differential (according SSI) Pins 1.3, 1.4
Output delay (0->1 or 1->0)	Max. 0.35 µs	
Output current	≤ 10 mA	
Switching frequency (selectable)	200 kHz, 500 kHz and 1 MHz	
Short-circuit proof / overload proof	Yes	
Output current limitation	Yes, automatic reactivation after short-circuit/overload	
Resistance to feedback against 24V signals	Yes	
Resistance to feedback against reverse polarity	Yes	
Max. cable length, shielded (depending on sensor)	100 m	
Process voltage L+		
Nominal voltage	24 V DC	
Max. ripple	0,05	
Current consumption from L+ (FM502 and PM592, no communication module)	Max. 0.43 A + max. 0.5 A per output	
Inrush current from L+ (at power up, FM502 and PM592, no communication module)	1.2 A²s	
Electrical isolation	Yes, (PM592 and FM502 to other I/O-Bus modules )	
Max. power dissipation within the FM502 module	6.5 W (outputs unloaded)	
5-V-encoder supply output		
Nominal voltage	5 V DC (+/- 5%), 100 mA max.	

# AC500

## Technical data

### AC500 communication modules

- Up to 4 communications modules can be used on an AC500 CPU
- No external power supply required.

Type	CM592-DP	CM582-DP (3)	CM597-ETH	CM598-CN	CM588-CN	CM579-PNIO	CM589-PNIO	CM589-PNIO-4 (3)	CM579-ETHCAT	CM574-RS	CM574-RCOM
<b>Communication interfaces</b>											
<b>RJ45</b>	–	–	● (x 2) (2)	–	–	● (x 2) (2)	● (x 2) (2)	● (x 2) (2)	● (x 2)	–	–
<b>RS-232 / 485</b>	–	–	–	–	–	–	–	–	–	● (x 2)	● (x 2)
<b>Terminal blocks (1)</b>	–	–	–	●	●	–	–	–	–	● (x 2)	● (x 2)
<b>Sub-D socket</b>	●	●	–	–	–	–	–	–	–	–	–
<b>Protocols</b>	PROFIBUS® DP V0/V1 master	PROFIBUS® DP V0/V1 slave	Ethernet (TCP/IP, UDP/IP, Modbus® TCP)	CANopen® master	CANopen® slave	PROFINET® IO controller	PROFINET® IO device	PROFINET® IO 4 x devices	EtherCAT® master	Serial COM ASCII, Modbus® RTU, CS31	Serial RCOM/RCOM+
<b>CPU interface</b>	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory
<b>Transfer Rate</b>	9.6 kbit/s to 12 Mbit/s	9.6 kbit/s to 12 Mbit/s	10 / 100 Mbit/s	10 kbit/s to 1 Mbit/s	10 kbit/s to 1 Mbit/s	10 / 100 Mbit/s	10 / 100 Mbit/s	10 / 100 Mbit/s	10 / 100 Mbit/s	9.6 kBit/s up to 187.5 kBit/s	2,4 kBit/s to 19.2 kBit/s
<b>Co-processor</b>	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Programmable CPU like PM57x with PowerPC 50 MHz processor	PowerPC 50 MHz processor
<b>Memory</b>	–	–	–	–	–	–	–	–	–	256 kB program memory 384 kB data memory	–
<b>Additional features</b>	Multi master functionality Max. Number of subscribers: – 126 (V0) – 32 (V1)	–	Online access, ICMP (Ping), DHCP, IP configuration protocol, UDP data-exchange, Modbus TCP	CAN 2.0A CAN 2.0B CANopen®	NMT Slave PDO server Heartbeat Nodeguard	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic Protocol DCP Discovery and Configuration Protocol CL-RPC - Connectionless Remote Procedure Call	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol	RTC - Real-time Cyclic Protocol, Class 1 RTA - Real-time Acyclic protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol	CoE (Can over Ethercat) process data (PDO) (cyclic) CoE Mailbox data (SDO) (acyclic) Distributed Clock (32-bit, 64-bit)	– Stand alone CPU in coupler module housing allowing to be used as standard serial interface or as free programmable serial interface coupler. – Independant internal CPU programmable for own communication protocol or data processing. – 2 x CS31 master, Modbus® master/slave, free configurable, protocols ASCII.	–

(1) Plug-in terminal block included.

(2) 10 / 100 Mbit/s, full/half duplex with auto-sensing, 2-port switch integrated.

(3) Availability planned from Q2/2017.

# AC500

## Technical data

### Communication interface modules

For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones.  
For all Input modules, the signal resolution for channel configuration is: -10...+10 V: 12 bits + sign; 0...10 V, 0...20 mA, 4...20 mA: 12 bits.  
Temperature: 0.1 °C.

Type	DC551-CS31	CI590-CS31-HA (1)	CI592-CS31
Communication Interface			
Protocol	Proprietary CS31 bus protocol on RS485 interface		
ID configuration	Per rotary switches on front face from 00d to 99d		
Field bus connection on terminal units	CS31 field bus, via terminal / redundant for CI590-CS31-HA on TU551-CS31 or TU552-CS31		
Number of Channels per Module			
Digital	inputs	8	8
	outputs	–	–
Analog	inputs	–	4
	outputs	–	2
Digital configurable channels DC (configurable as inputs or outputs)	16	16	8
Additional configuration of channels as			
Fast counter	Configuration of max. 2 channels per module		
Occupies max. 1 DO or DC when used as counter	●	●	●
Connection			
Via terminal unit TU5xx	●	●	●
Local I/O extension			
Max. number of extension modules	max. 7 x S500 extension modules (standard or eCo), up to 31 stations with up to 120 DI/120 DOs or up to 32 AI/32AOs per station		
		not for S500-eCo I/O modules	
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)	8 ms typically, configurable from 0.1 up to 32 ms		
Digital outputs			
Transistor outputs 24 V DC, 0.5 A	●		
Readback of output	●		
Outputs, supplied via process voltage UP	●		
Switching of 24 V load	●		
Output voltage at signal state 1	Process voltage UP - 0.8 V		
Output current			
Nominal current per channel	500 mA at UP = 24 V DC		
Maximum (total current of all channels)	8 A	8 A	4 A
Residual current at signal state 0	< 0.5 mA		
Demagnetization when switching off inductive loads	By internal varistors		
Analog inputs AI	Max. number per module and with regard to the configuration: AI/ Measuring points		
Signal configuration per AI	–	●	
0...10 V / -10...+10 V	–	4 / 4	
0...20 mA / 4...20 mA	–	4 / 4	
RTD using 2/3 wire needs 1/2 channel(s)	–	4 / 2	
0...10 V using differential inputs, needs 2 channels	–	4 / 2	
-10...+10 V using differential inputs, needs 2 channels	–	4 / 2	
Digital signals (digital input)	–	4 / 4	
Data when using the AI as digital input			
Input	time delay	–	8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	–	24 V DC

(1) Dedicated to High Availability.

# AC500

## Technical data

### Communication interface modules

Type	DC551-CS31	CI590-CS31-HA (1)	CI592-CS31
Outputs, single configurable as			
Possible configuration per AO	–		●
-10...+10 V	–		●
0...20 mA / 4...20 mA	–		●
Output	resistance (load) when used as current output		0...500 Ω
	loading capability when used as voltage output		±10 mA max.
Potential isolation			
Per module	●	●	●
Between fieldbus interface against the rest of the module	●	●	●
Voltage supply for the module	By external 24 V DC voltage via terminal UP		
Process voltage UP			
Nominal voltage	24 V DC		
Maximum ripple	5 %		
Current consumption on UP			
Min. (module alone)	0.100 A	0.100 A	0.070 A
Max. (min. + loads)	0.100 A + load	0.100 A + load	0.070 A + load
Reverse polarity protection	●		
Fuse for process voltage UP	10 A miniature fuse		
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>		

(1) Dedicated to High Availability.



# AC500

## Technical data

### PROFIBUS®-DP modules

Type		CI541-DP	CI542-DP
Communication Interface			
Protocol		PROFIBUS® DP (DP-V0 and DP-V1 slave)	
ID configuration		Per rotary switches on front face from 00h to FFh	
Field bus connection on terminal units		Sub-D 9 poles on TU509, TU510 preferred but TU517/TU518 can be used with baud rate up to 1Mbaud	
Number of Channels per Module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		Configuration of max. 2 DI channels per module	
Occupies max 1 DO or DC when used as counter		●	
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.	
Via terminal unit TU5xx		●	
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog Inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / -10...+10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
-10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	Input time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–
Outputs, single configurable as			
Possible configuration per AO		●	–
-10...+10V		●	–
0...20 mA / 4...20 mA		●	–
Output	resistance (load) when used as current output	0...500 Ω	–
	loading capability when used as voltage output	±10 mA max.	–

# AC500

## Technical data

### PROFIBUS®-DP modules

Type	CI541-DP	CI542-DP
Potential isolation		
Per module	●	●
Between fieldbus interface against the rest of the module	●	●
Between the channels		
input	—	—
output	—	—
Voltage supply for the module	By external 24 V DC voltage via terminal UP	
Process voltage UP		
Nominal voltage	24 V DC	
Maximum ripple	5 %	
Current consumption on UP		
Min. (module alone)	0.260 A	
Max. (min. + loads)	0.260 A + load	
Reverse polarity protection	●	
Fuse for process voltage UP	10 A miniature fuse	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	

# AC500

## Technical data

### CANopen® modules

Type		CI581-CN	CI582-CN
Communication interface			
Protocol		CANopen® slave, DS401 profile selectable using rotary switches	
ID configuration		Per rotary switches on front face for CANopen® ID node from 00h to 7Fh and 80h to FFh for CANopen® DS401 profile	
Field bus connection on terminal units		Terminal blocks on TU517/TU518 or TU509/TU510	
Number of channels per module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		Configuration of max. 2 DI channels per module	
Occupies max. 1 DO or DC when used as counter		●	●
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules (standard or eCo modules are allowed)	
Via terminal unit TU5xx		●	●
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		–3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	–3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog Inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / –10...+10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
–10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–
Outputs, single configurable as			
Possible configuration per AO		●	–
–10...+10 V		●	–
0...20 mA / 4...20 mA		●	–
Output	resistance (load) when used as current output	0...500 Ω	–
	loading capability when used as voltage output	±10 mA max.	–

# AC500

## Technical data

### CANopen® modules

Type	CI581-CN	CI582-CN
Potential isolation		
Per module	●	●
Between fieldbus interface against the rest of the module	●	●
Between the channels		
input	–	–
output	–	–
Voltage supply for the module	By external 24 V DC voltage via terminal UP	
Process voltage UP		
Nominal voltage	24 V DC	
Maximum ripple	5 %	
Current consumption on UP		
Min. (module alone)	0.260 A	
Max. (min. + loads)	0.260 A + load	
Reverse polarity protection	●	
Fuse for process voltage UP	10 A miniature fuse	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	

# AC500

## Technical data

### PROFINET® IO RT device modules

Type	CI501-PNIO	CI502-PNIO	CI504-PNIO	CI506-PNIO
Communication interface				
Ethernet Interface				
Main protocol	PROFINET® IO RT device			
ID Device configuration	By rotary switch on the front side, from 00h to FFh			
Ethernet connection on terminal units	2 x RJ45 with switch functionality for simple daisy chain on TU507-ETH or TU508-ETH or TU520-ETH			
Gateway Interface				
Gateway to	–	–	3 x RS232 / RS422 / RS485 ASCII serial interfaces	CAN / CANopen® Master + 2 x RS232 / RS422 / RS485 ASCII serial interfaces
Fieldbus Protocol used				
	–	–	–	CAN 2A/2B Master - CANopen® Master (1)
CAN physical interface	–	–	–	1 x 10 poles pluggable spring connector
Baudrate	–	–	–	Baudrate up to 1 MBit/s, Support for up to 126 CANopen® Slaves
Serial interface				
	–	–	3 x RS232 / RS422 or RS485	2 x RS232 / RS422 or RS485
Protocol used	–	–	ASCII	ASCII
Baudrate	–	–	Configurable from 300 bit/s to 115200 bit/s	
Fieldbus or serial connection on terminal units	–	–	3 x pluggable terminal blocks with spring on TU520-ETH	
Number of channels per module				
Digital	inputs	8	8	–
	outputs	8	8	–
Analog	inputs	4	–	–
	outputs	2	–	–
Digital configurable channels DC (configurable as inputs or outputs)	–	8	–	–
Additional configuration of channels as				
Fast counter (onboard I/O)	Configuration of max. 2 DI channels per module		–	–
Occupies max. 1 DO or DC when used as counter	●		–	–
Connection				
Local I/O extension	●		●	●
Max. number of extension modules	max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.		Valid for CI501, 502, 504 and 506. All modules can have extension up to 10 modules	
Via terminal unit TU5xx	●		●	●
Digital inputs				
Input	signal voltage	24 V DC		–
	characteristic acc. to EN 61132-2	Type 1		–
0 signal		-3...+5 V DC		–
Undefined signal state		5...15 V DC		–
1 signal		15...30 V DC		–
Residual ripple, range for	0 signal	-3...+5 V DC		–
	1 signal	15...30 V DC		–
Input time delay (0 -> 1 or 1 -> 0)	8 ms typically, configurable from 0.1 up to 32 ms		–	–
Digital outputs				
Transistor outputs 24 V DC, 0.5 A	●		–	–
Readback of output	–	● (on DC outputs)	–	–
Outputs, supplied via process voltage UP	●		–	–
Switching of 24 V load	●		–	–
Output voltage at signal state 1	Process voltage UP - 0.8 V		–	–
Output current				
Nominal current per channel	500 mA at UP = 24 V DC		–	–
Maximum (total current of all channels)	8 A		–	–
Residual current at signal state 0	< 0.5 mA		–	–
Demagnetization when switching off inductive loads	By internal varistors		–	–

(1) Not simultaneously.

# AC500

## Technical data

### PROFINET® IO RT device modules

Type	CI501-PNIO	CI502-PNIO	CI504-PNIO	CI506-PNIO
<b>Analog inputs AI</b>				
Max. number per module and with regard to the configuration: AIs / Measuring points				
Signal configuration per AI	4	–	–	–
0...10 V / -10... +10 V	4 / 4	–	–	–
0...20 mA / 4...20 mA	4 / 4	–	–	–
RTD using 2/3 wire needs 1/2 channel(s)	4 / 2	–	–	–
0...10 V using differential inputs, needs 2 channels	4 / 2	–	–	–
-10...+10 V using differential inputs, needs 2 channels	4 / 2	–	–	–
Digital signals (digital input)	4 / 4	–	–	–
<b>Data when using the AI as digital input</b>				
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–	–
	signal voltage	24 V DC	–	–
<b>Outputs, single configurable as</b>				
Possible configuration per AO	●	–	–	–
-10...+10 V	●	–	–	–
0...20 mA / 4...20 mA	●	–	–	–
Output	resistance (load) when used as current output	0...500 Ω	–	–
	loading capability when used as voltage output	±10 mA max.	–	–
<b>Potential isolation</b>				
Per module	●	●	●	●
Between Ethernet interface against the rest of the module	●	●	●	●
Voltage supply for the module	By external 24 V DC voltage via terminal UP			
<b>Process voltage UP</b>				
Nominal voltage	24 V DC			
Maximum ripple	5 %			
Current consumption on UP				
min. (module alone)	0.260 A		0.150 A	
max. (min. + loads)	0.260 A + load		0.150 A	
Reverse polarity protection	●			
Fuse for process voltage UP	10 A miniature fuse			
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>			



# AC500

## Technical data

### EtherCAT® modules

Type		CI511-ETHCAT	CI512-ETHCAT
Communication interface			
Protocol		EtherCAT® slave	
ID Device configuration		Address is defined by position on Ethernet bus	
Field bus connection on TUs		2 x RJ45 with switch functionality for simple daisy chain on TU507-ETH or TU508-ETH	
Number of channels per module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		–	
Occupies max. 1 DO or DC when used as counter		–	
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules (standard or eCo modules allowed). Fast counter from digital IO modules can be also used.	
Via terminal unit TU5xx		●	
Digital inputs			
Input signal voltage		24 V DC	
Input characteristic acc. to EN 61 132-2		Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / -10 V... +10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
-10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–
Outputs, single configurable as:			
Possible configuration per AO		●	–
-10...+10 V		●	–
0...20 mA / 4...20 mA		●	–
Output resistance (load) when used as current output		0...500 Ω	–
Output loading capability when used as voltage output		±10 mA max.	–

# AC500

## Technical data

### EtherCAT® modules

Type	CI511-ETHCAT	CI512-ETHCAT
Potential isolation		
Per module	●	●
Between Ethernet interface against the rest of the module	●	●
Between the channels	input	–
	output	–
Voltage supply for the module	By external 24 V DC voltage via terminal UP	
Process voltage UP		
Nominal voltage	24 V DC	
Maximum ripple	5 %	
Current consumption on UP		
min. (module alone)	0.260 A	
max. (min. + loads)	0.260 A + load	
Reverse polarity protection	●	
Fuse for process voltage UP	10 A miniature fuse	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	

# AC500

## Technical data

### CS31 functionality

	AC500 CPU with integrated CS31 interface	S500 I/O with communication interface DC551-CS31 CI590-CS31-HA CI592-CS31
Master	Yes, at COM1	—
Slave	No	Yes / Redundant for CI590-CS31-HA
Protocols supported	ABB CS31 protocol	
Diagnosis		
Error indication	On LCD display of the CPU / AC500-eCo error LED	Via module LEDs
Online diagnosis	Yes	
Error code	Errors are recorded in the diagnosis system of the CPU	
Associated function blocks	Yes	
Physical layer	RS485 / 2 x RS485 for CI590-CS31-HA for redundancy	
Connection	Plug at COM1	Screw-type or spring-type terminals
Baud rate	187.5 kbit/s	
Distance	AC500-eCo: up to 50 m and up to 500 m using the isolator TK506 / AC500: up to 500 m; up to 2000 m using a repeater	
Max. number of modules on fieldbus	31 modules max. Please note: The CS31 bus interface occupies one or two module addresses (if counters are configured onboard or if the module is a mixed digital analog module). Depending on the configuration, or if the module contains also mixed digital analog I/O, connected extension modules can occupy further module addresses.	
Configuration		
Station address configuration	No	Using rotary switches (99 max.)

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### Digital and mixed signal I/O modules, "Fast Counter" operating modes. Not applicable for DC541 or eCo-I/O modules (1)

Operating mode, configured in the user program of the AC500		Occupied inputs DI or DC	Occupied outputs DO or DC	Maximum counting frequency kHz
0	No counter	0	0	–
1	One count-up counter with "end value reached" indication	1	1	50
2	One count-up counter with "enable" input and "end value reached" indication	2	1	50
3	Two up/down counters	2	0	50
4	Two up/down counters with 1 counting input inverted	2	0	50
5	One up/down counter with "dynamic set" input	2	0	50
6	One up/down counter with "dynamic set" input	2	0	50
7	One up/down counter with directional discriminator For synchro transmitters using two counting pulses with an offset of 90° (track A and B)	2	0	50
8	–	0	0	–
9	One up/down counter with directional discriminator and double evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	30
10	One up/down counter with directional discriminator and fourfold evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	15

(1) See technical documentation for details.

# AC500

## System data

### Environmental Conditions

#### Process and supply voltages

24 V DC	Line Voltage	18 V...31.2 V / nom. 24 V DC (-25 %, +30 % inclusive ripple)
	Absolute limits	inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	yes
120V...240V AC	Line Voltage	102...264 V / nom. 120...240 V (-15 %, +10 %)
Wide Range Supply	Line Frequency	47...62.4 Hz / nom. 50...60 Hz (-6 %, +4 %)
Allowed interruptions of power supply	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
	AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s

**Important:** Exceeding the maximum process or supply voltage for 24V DC (< -35 V DC and > +35 V DC) could lead to unrecoverable damage of the system. For the supply of the modules, power supply units according to PELV or SELV specifications must be used. The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

#### Temperature

Operating	0 °C ... +60 °C	horizontal mounting of modules
	0 °C ... +40 °C	vertical mounting of modules and output load reduced to 50 % per group
Storage / Transport	-40 °C ... +70 °C	

#### Humidity

Operating / Storage	Max 95 % r. H. without condensation
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#### Air pressure

Operating	-1000 m ... 2000 m (1080 hPa ... 800 hPa)
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#### Electromagnetic Compatibility

Radiated emission (radio disturbances)	Yes, according to: CISPR 16-2-3
Conducted emission (radio disturbances)	Yes, according to: CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)	Yes, according to: IEC 61000-4-2, zone B, criterion B Electrostatic voltage in case of air discharge: 8 kV Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B Supply voltage units (DC): 2 kV Supply voltage units (AC): 2 kV Digital inputs/outputs (24 V DC): 1 kV Digital inputs/outputs (120...240 V AC): 2 kV Analog inputs/outputs: 1 kV Communication lines shielded: 1 kV I/O supply (DC-out): 1 kV
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B Supply voltage units (DC): 1 kV CM* / 0.5 kV DM* Supply voltage units (AC): 2 kV CM* / 1 kV DM* Digital inputs/outputs (24 V DC): 1 kV CM* / 0.5 kV DM* Digital inputs/outputs (120...240 V AC): 2 kV CM* / 1 kV DM* Analog inputs/outputs: 1 kV CM* / 0.5 kV DM* Communication lines shielded: 1 kV CM* I/O supply (DC-out): 0.5 kV CM* / 0.5 kV DM* * CM = Common Mode, * DM = Differential Mode
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A Test field strength: 10 V/m
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A Test voltage: 10 V
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A 30 A/m 50 Hz 30 A/m 60 Hz

In order to prevent malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

#### WARNING!

##### Risk of malfunctions and damages to persons!

Unused slots for Communication Modules are not protected against accidentally touch. Dust and Dirt may cause contact problems and malfunctions.

Unused slots for Communication Modules must be covered with Dummy Communication Modules ("TA524 - Dummy Communication Module").

I/O-Bus connectors must not be touched during operation.

# AC500

## System data

### Environmental Conditions

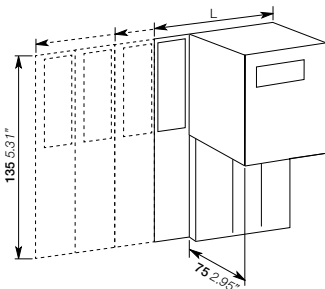
#### Environmental Tests

Storage	IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h
Humidity	IEC 60068-2-2 Test Bb: dry heat withstand test +70 °C / 16 h IEC 60068-2-30 Test Db: Cyclic (12 h / 12 h) Damp-Heat Test 55 °C, 93 % r. H. / 25 °C, 95 % r. H., 2 cycles
Vibration resistance	IEC 61131-2 / IEC 60068-2-6: 5 Hz ... 150 Hz, 1 g (with SD Memory Card inserted)
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

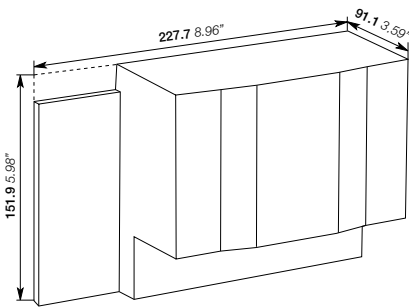
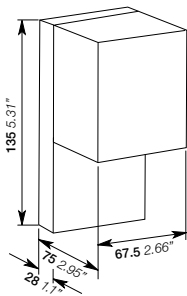
#### Mechanical Data

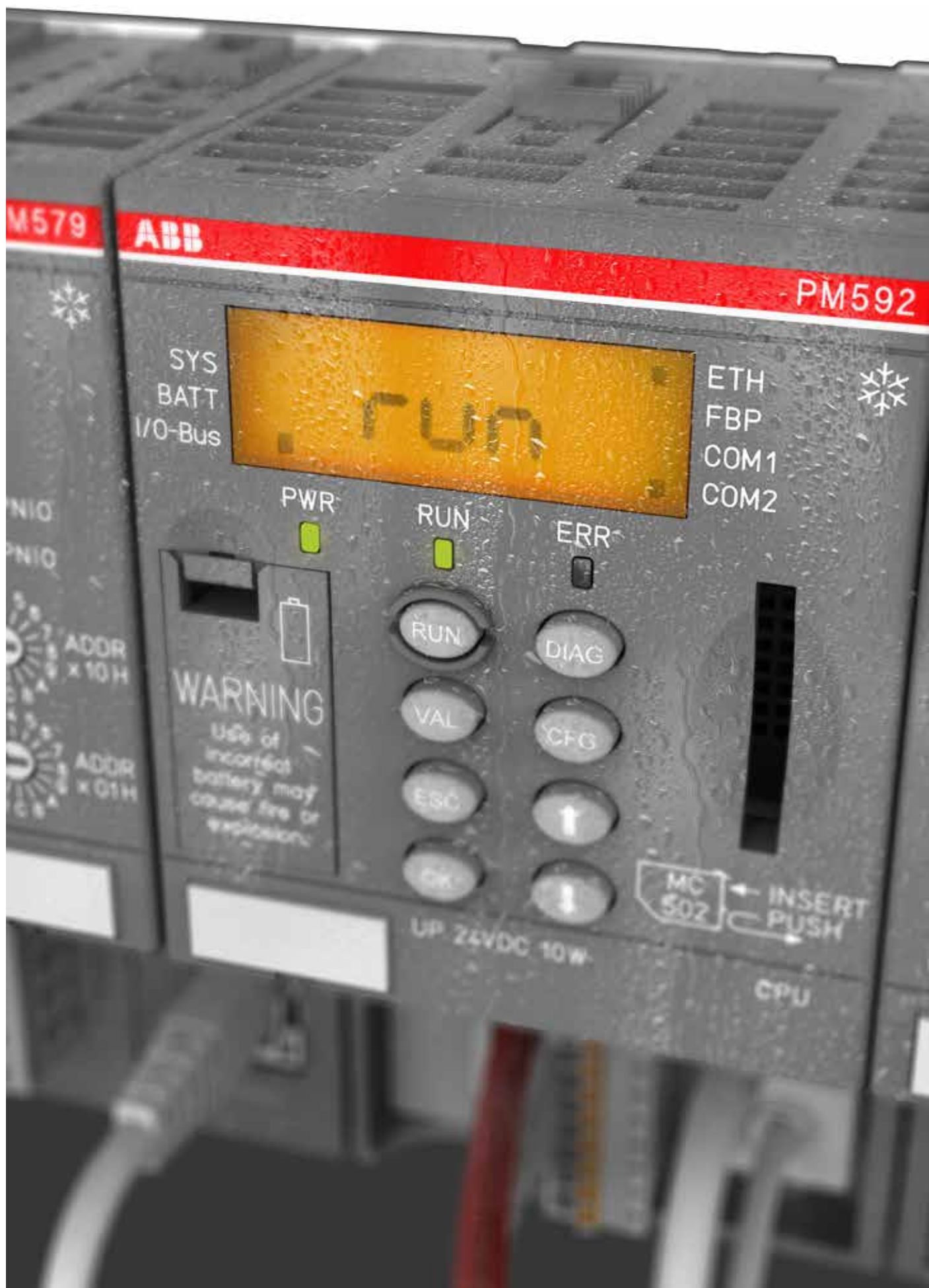
Wiring method	Spring terminals / Screw terminals
Degree of protection	IP 20
Vibration resistance	Yes, according to: IEC 61131-2 IEC 60068-2-6
Shock resistance	Yes, according to: IEC 61131-2 IEC 60068-2-27
Assembly position	Horizontal Vertical
Assembly on DIN rail	DIN rail type According to IEC 60715 35 mm, depth 7.5 mm or 15 mm
Assembly with screws	Screw diameter Fastening torque
	4 mm 1.2 Nm

### Main dimensions mm, inches



Type	Nr communication modules	Length L	
		mm	inches
TB511-ETH	1	95.5	3.76
TB52x-xETH / TB562x-2ETH	2	123.5	4.86
TB5620-2ETH	2	123.5	4.86
TB541-ETH	4	179.5	7.07







# AC500-XC

## PLC operating in eXtreme Conditions

<a href="#">Key features</a>	<a href="#">5/102</a>
<a href="#">Ordering data</a>	<a href="#">5/103</a>
<a href="#">Technical data</a>	<a href="#">5/109</a>
<a href="#">System data</a>	<a href="#">5/131</a>

# AC500-XC

## Key features

5

Lower lifetime cost and many of the traditional practices are not required, such as: HVAC for the panel, shock absorbers, door sealing, etc...



Resistance to:

- High humidity
- Salt mist
- Vibration
- High altitude
- Corrosive gases
- Temperature: from -40 to +70 °C

All the benefits from AC500 range: Automation Builder engineering suite, I/O modules, scalable and flexible, same high performance communication, libraries and web services.

# AC500-XC

## Ordering data



PM573-ETH-XC



PM592-ETH-XC



PM595-4ETH-M-XC



TB511-ETH-XC



TB541-ETH-XC

### AC500 CPUs

- 2 internal serial interfaces, RS232 / RS485 configurable
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 I/O modules (S500) for a total of 320 Digital I/Os or 160 Analog I/Os
- Simultaneous operation of up to 4 external communication modules in any desired combination
- Optional SD card for data storage and program backup
- Can also be used as slave CANopen® using CM588-CN-XC slave coupler
- Ethernet version provides web server and IEC 60870-5-104 remote control protocol.

Program memory kB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
512	0.06 / 0.09 / 0.7	Ethernet (2), 2 x serial	PM573-ETH-XC (1)	1SAP330300R0271		0.150
512	0.05 / 0.06 / 0.5	2 x serial	PM582-XC	1SAP340200R0201		0.135
1024	0.05 / 0.06 / 0.5	Ethernet (2), 2 x serial	PM583-ETH-XC (1)	1SAP340300R0271		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM591-ETH-XC (1)	1SAP350100R0271		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM592-ETH-XC (1)(3)	1SAP350200R0271		0.150

### AC500 CPU PM595

- 2 Ethernet interfaces with integrated switch and software configurable protocol (PROFINET, EtherCAT)
- 2 independent Ethernet interfaces
- 2 serial interfaces, RS232 / RS485 configurable
- Provides web server and IEC 60870-5-104 telecontrol protocol
- Centrally expandable with up to 10 I/O modules (S500 and/or S500-eCo modules allowed)
- Simultaneous operation of up to 2 external communication modules in any desired combination

Program memory MB	Cycle time in µs per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
16	0.0006/0.001/0.001	2 x Ethernet (2 Ports switch), 2 x Ethernet (2), 2 x serial	PM595-4ETH-M-XC (3)	1SAP351500R0279		1.050

(1) Ethernet communication.

(2) Provides integrated web server and IEC 60870-5-104 remote control protocol on each interface independently.

(3) Provides integrated 4 GB flashdisk for user data storage and data logging.

### Terminal base

- For mounting and connection of the CPUs and communication modules, not needed for PM595
- 1 to 4 plug-in communication modules
- Connection for communication coupler integrated in the CPU
- I/O interface for direct connection of up to 10 expansion modules
- Connection COM1: 9-pole pluggable terminal block
- Connection COM2: 9-pole Sub-D (socket).

Number of coupler slots	Connection for coupler integrated in the CPU	Type	Order code	Price	Weight (1 pce) kg
1	Ethernet RJ45	TB511-ETH-XC	1SAP311100R0270		0.215
2	Ethernet RJ45	TB521-ETH-XC	1SAP312100R0270		0.215
4	Ethernet RJ45	TB541-ETH-XC	1SAP314100R0270		0.215

# AC500-XC

## Ordering data



FM502-CMS-XC



TF501-CMS-XC



TF521-CMS-XC



CM592-DP-XC



CM579-PNIO-XC



DI524-XC



DO524-XC

### AC500 Condition Monitoring CMS-XC

- PLC integrated condition monitoring and fast protection for high frequency signals (vibration, current, voltage, speed/encoder)
- FM502-CMS module needs function module terminal base TF5x1 for direct interfacing to CPU, communication couplers, other I/O
  - for stand-alone or control/safety integrated condition monitoring
- PM592 CPU to be used on same TF5x1 for data storage and signal processing or communication
  - C-code interface for own complex diagnosis algorithms, 4GB Flash disk for raw fingerprints and indicator trending
- FM502-CMS module:
  - 16 fast, precise analog inputs, all synchronously sampled; configurable as IEPE or +-10V
  - individual measurement configuration (start, stop, trigger) per channel
  - per channel up to 50ksamples/s and 24bit ADC resolution, adjustable sampling
  - encoder inputs (5V or 24V) up to 300kHz counter; 12 modes, incl. absolute SSI (1MHz)
  - fast data logging, compact WAV-Files delivered automatically to CPU, incl. synchronized encoder signal if configured
  - analogue values always available for fast protection in I/O image of CPU
- Included in Automation Builder: Configuration, libraries for CMS control and wav file handling, examples
- Available download package: Signal processing library, example programs with simple diagnosis, logging and automated triggering (2)

Number of coupler slots	Description	Type	Order code	Price	Weight (1 pce) kg
n.a.	Function Module for Condition Monitoring Systems, 16AI, 2DI, 2DC, 1x Encoder (A, B, Z)	FM502-CMS-XC (3)	1SAP460400R0001		0.215
0	Function module terminal base for FM502, no coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF501-CMS-XC (1)(3)	1SAP317000R0271		0.350
2	Function module terminal base for FM502, 2x coupler slots, 1x ETHERNET, 1x serial, spring terminals, 24VDC	TF521-CMS-XC (1)(3)	1SAP317200R0271		0.400

(1) Can only be used together with FM502 and PM592-ETH

(2) Download of Package under "Application Examples" at [www.abb.com/plc](http://www.abb.com/plc)

(3) Availability planned for Q2/2016.

### Communication modules

Protocol	Connections	Type	Order code	Price	Weight (1 pce) kg
PROFIBUS® DP V0/V1 master	Sub-D socket 9 poles	CM592-DP-XC	1SAP373200R0001		0.115
PROFIBUS® DP V0/V1 slave	Sub-D socket 9 poles	CM582-DP-XC (1)	1SAP372200R0001		0.115
Ethernet (TCP/IP, UDP/IP, Modbus TCP)	2 x RJ45 - integrated switch	CM597-ETH-XC	1SAP373700R0001		0.115
CANopen® master	Terminal block 2 x 5 poles spring	CM598-CN-XC	1SAP373800R0001		0.115
CANopen® slave	Terminal block 2 x 5 poles spring	CM588-CN-XC	1SAP372800R0001		0.115
PROFINET® I/O RT controller	2 x RJ45 - integrated switch	CM579-PNIO-XC	1SAP370901R0101		0.115
PROFINET® I/O RT device	2 x RJ45 - integrated switch	CM589-PNIO-XC	1SAP372900R0011		0.115
PROFINET® IO RT with 4 devices	2xRJ45 - integrated switch	CM589-PNIO-4-XC (1)	1SAP372900R0111		0.115

(1) Availability planned from Q2/2017

### I/O modules

- For central expansion of the AC500-XC CPU
- For decentralized expansion in combination with communication interface module (not for DC505-FBP)
- DC: channels can be configured individually as inputs or outputs
- Terminal unit required (refer to table below).

### Digital I/O

Number of	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
DI/DO/DC								
32 / - / -	24 V DC	-	-	TU516-XC	DI524-XC	1SAP440000R0001		0.200
- / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC522-XC	1SAP440600R0001		0.200
- / - / 24	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC523-XC	1SAP440500R0001		0.200
16 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DC532-XC	1SAP440100R0001		0.200
- / 32 / -	24 V DC	Transistor	24 V DC, 0.5 A	TU516-XC	DO524-XC	1SAP440700R0001		0.200
8 / 8 / -	24 V DC	Relay	230 V AC, 3 A (1)	TU532-XC	DX522-XC	1SAP445200R0001		0.200

(1) Relay outputs, changeover contacts.

# AC500-XC

## Ordering data



AI523-XC

### Analog I/O

Number of	Input signal	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce)
<b>AI/AO</b>							
16 / 0	0...10 V, ±10 V 0/4...20 mA	–	TU516-XC	AI523-XC	1SAP450300R0001		0.200
4 / 4	PT100, PT1000, Ni1000	±10 V	TU516-XC	AX521-XC	1SAP450100R0001		0.200
8 / 8 (max. 4 current outputs)		0/4...20 mA	TU516-XC	AX522-XC	1SAP450000R0001		0.200
0 / 16 (max. 8 current outputs)	–		TU516-XC	AO523-XC	1SAP450200R0001		0.200
8 / 0	0...5 V, 0...10 V, ±50 mV, ±500 mV, 1 V, ±5 V, ±10 V, 0/4...20 mA, ±20 mA PT100, PT1000, Ni1000, Cu50, 0...50 kΩ, S, T, N, K, J	–	TU516-XC	AI531-XC	1SAP450600R0001		0.200



AI531-XC

### Analog/digital mixed I/O

Standard I/O module with high functionality:

- 16 digital input channels
- 8 configurable In/Output channels
- First two inputs are also usable as high-speed counter (up to 50 kHz) together with AC500-XC CPU, CS31 or CI5xx-XC communication interface modules
- 4 independent analog input channels configurable for voltage, current, 12 bit + sign, 1-2 wire connection
- Galvanic isolation per module
- Usable with all CI5xx modules.



DA501-XC

Number of	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce)
<b>AI/AO/DI/DO/DC</b>								
4 / 2 / 16 / - / 8	24 V DC, 0...10 V, ±10 V, 0/4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A ±10 V, 0/4...20 mA	TU516-XC	DA501-XC	1SAP450700R0001		0.200

### Multifunctional modules

Functionality	Number of	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce)
<b>DI/DO/DC</b>									
<b>Encoder module</b>									
Encoder and PWM module	2 / - / 8	24 V DC and 2 encoder inputs	2 PWM outputs	–	TU516-XC	CD522-XC	1SAP460300R0001		0.125



CD522-XC

- DC541-XC occupies one communication module slot on the AC500-XC CPU terminal base, no terminal block required
- Usable with all CI5xx-XC modules.

Functionality	Number of	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce)
<b>DI/DO/DC</b>									
<b>Interrupt I/O and fast counter module</b>									
Interrupt I/O and fast counter	- / - / 8	24 V DC	Transistor	24 V DC, 0.5 A	N/A (2)	DC541-CM-XC (1)	1SAP470000R0001		0.100

- (1) Multifunctional module, refer to table on page 117 for details.  
 (2) Occupies a communication module slot.

# AC500-XC

## Ordering data



DC551-CS31-XC



CI541-DP-XC



CI581-CN-XC



CI502-PNIO-XC



CI506-PNIO-XC

### Communication interface modules

Number of	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce)
AI/AO/DI/DO/DC								kg

#### For CS31-Bus

- / - / 8 / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU552-CS31-XC	DC551-CS31-XC	1SAP420500R0001		0.200
- / - / - / - / 16	24 V DC	Transistor	24 V DC, 0.5 A	TU552-CS31-XC	CI590-CS31-HA-XC	1SAP421100R0001		0.200
4 / 2 / 8 / - / 8	24 V DC / 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A / -10...+10 V, 0...20 mA, 4...20 mA	TU552-CS31-XC	CI592-CS31-XC	1SAP421200R0001		0.200

#### For PROFIBUS®-DP

4 / 2 / 8 / 8 / -	24 V DC / 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A / -10...+10 V, 0...20 mA, 4...20 mA	TU510-XC / TU518-XC	CI541-DP-XC	1SAP424100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU510-XC / TU518-XC	CI542-DP-XC	1SAP424200R0001		0.200

#### For CANopen®

4 / 2 / 8 / 8 / -	24 V DC / 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A / -10...+10 V, 0...20 mA, 4...20 mA	TU510-XC / TU518-XC	CI581-CN-XC	1SAP428100R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU510-XC / TU518-XC	CI582-CN-XC	1SAP428200R0001		0.200

#### For Ethernet based protocol - PROFINET® IO RT

4 / 2 / 8 / 8 / -	24 V DC / 0...10 V, -10...+10 V, 0...20 mA, 4...20 mA, PT100, PT1000, Ni100, Ni1000	Transistor	24 V DC, 0.5 A / -10...+10 V, 0...20 mA, 4...20 mA	TU508-ETH-XC	CI501-PNIO-XC	1SAP420600R0001		0.200
- / - / 8 / 8 / 8	24 V DC	Transistor	24 V DC, 0.5 A	TU508-ETH-XC	CI502-PNIO-XC	1SAP420700R0001		0.200

From	To	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce)
							kg

#### Gateway for Ethernet based protocol - PROFINET® IO RT

PROFINET® I/O	-	3 x RS232/485 ASCII serial interfaces	TU520-ETH-XC	CI504-PNIO-XC	1SAP421300R0001		0.200
PROFINET® I/O	1 x CAN 2A/2B or CANopen® Master	2 x RS232/485 ASCII serial interfaces	TU520-ETH-XC	CI506-PNIO-XC	1SAP421500R0001		0.200



# AC500-XC

## Ordering data



TU516-XC



TU520-ETH-XC



TU510-XC



TU508-ETH-XC

### Terminal units

For digital and analog expansion modules and interface modules. Please note: for modules with relay outputs, terminal units for 230 V AC (TU532-XC) is required.

For	Supply	Connection type	Type	Order code	Price	Weight (1 pce) kg
Ethernet interface modules	24 V DC	Spring	TU508-ETH-XC	1SAP414000R0001		0.300
CANopen®/PROFIBUS® DP interface modules	24 V DC	Spring	TU510-XC	1SAP410800R0001		0.300
I/O modules	24 V DC	Spring	TU516-XC	1SAP412000R0001		0.300
CANopen®/PROFIBUS® DP interface modules	24 V DC	Spring	TU518-XC (1)	1SAP411200R0001		0.300
Ethernet gateway modules	24 V DC	Spring	TU520-ETH-XC	1SAP414400R0001		0.300
I/O modules AC / Relay	230 V AC	Spring	TU532-XC	1SAP417000R0001		0.300
CS31 interface modules	24 V DC	Spring	TU552-CS31-XC	1SAP410400R0001		0.300

(1) TU518-XC Terminal units can also be used with PROFIBUS® DP CI modules with baud rate up to 1Mbaud.

### Terminal units compatibility

Type	For I/O modules		For communication interface modules				
	TU516-XC	TU532-XC	TU508-ETH-XC	TU510-XC	TU518-XC	TU520-ETH-XC	TU552-CS31-XC
DA501-XC	●						
DC522-XC	●						
DC523-XC	●						
DC532-XC	●						
DI524-XC	●						
DO524-XC	●						
DX522-XC		●					
CD522-XC	●						
AI523-XC	●						
AI531-XC	●						
AO523-XC	●						
AX521-XC	●						
AX522-XC	●						
DC551-CS31-XC							●
CI590-CS31-HA-XC							●
CI592-CS31-XC							●
CI501-PNIO-XC			●				
CI502-PNIO-XC			●				
CI504-PNIO-XC						●	
CI506-PNIO-XC						●	
CI541-DP-XC				●	● (1)		
CI542-DP-XC				●	● (1)		
CI581-CN-XC					●		
CI582-CN-XC					●		

(1) Can be used with baudrate up to 1Mbaud.

# AC500-XC

## Ordering data



MC502

5

### Accessories for AC500-XC

For	Description	Type	Order code	Price	Weight (1 pce) kg
AC500 CPUs COM1	Programming cable Sub-D / terminal block, length 5 m	TK502	1SAP180200R0101		0.400
AC500 CPUs COM2	Programming cable Sub-D / Sub-D, length 5 m	TK501	1SAP180200R0001		0.400
AC500 CPUs	Memory card (2 GB SD card)	MC502	1SAP180100R0001		0.020
	Lithium battery for data buffering	TA521	1SAP180300R0001		0.100
I/O modules	Pluggable marker holder for I/O modules, packing unit incl. 10 pcs. Template available in the AC500 online help	TA523	1SAP180500R0001		0.300
AC500 CPU's, interface module, communication module and I/O modules	White labels, packing unit incl. 10 pcs	TA525	1SAP180700R0001		0.100
Terminal base	Communication Module, blind cap	TA524	1SAP180600R0001		0.120
CPU terminal base	Accessories for mounting, packing unit includes 10 pcs	TA526	1SAP180800R0001		0.200
	5-pole power plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1. Packing unit includes 5 pcs	TA527	1SAP181100R0001		0.200
	9-pole COM1 plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1 or on TU520-ETH-XC. Packing unit includes 5 pcs	TA528	1SAP181200R0001		0.200
Communication modules	9-pole spring plug for CM574-RS/RCOM. Spare part. Packing includes 10 pcs	TA532	1SAP182000R0001		
	5-pole spring plug for CM575-DN/CM578-CN. Spare part. Packing includes 5 pcs	TA533	1SAP182100R0001		
	2x5-pole spring plug for CM588-CN and CM598-CN. Spare part. Packing includes 5 pcs.	TA534	1SAP182200R0001		
	10-pole spring plug for DC541-CM. Spare part. Packing includes 10 pcs.	TA536	1SAP183100R0001		
Protective caps for TB, TU and CM	10 x Sub-D plastic caps 20 x RJ45 plastic caps, 3 x RJ45 female 10 x M12 plastic caps	TA535	1SAP182300R0001		0.300
AC500 CPUs PM595	Protective cap, spare-parts, 3 pieces	TA540	1SAP182600R0001		0.200
	Lithium battery for real-time-clock buffering	TA541	1SAP182700R0001		0.030
	Accessories for screw-mounting, 20 pieces	TA543	1SAP182800R0001		0.100

# AC500-XC

## Technical data

### AC500-XC CPUs

Type	PM573-ETH-XC	PM582-XC	PM583-ETH-XC	PM591-ETH-XC	PM592-ETH-XC	PM595-4ETH-M-XC
Supply voltage	24 V DC					
Current consumption on 24 V DC						
Min. (module alone)	0.110 A	0.050 A	0.110 A	0.150 A		0.400 A
Max. (all couplers and I/Os)	0.810 A	0.750 A	0.810 A	0.850 A		1.2 A
User program memory - Flash EPROM and RAM	512 kB	512 kB	1024 kB	4096 kB		16384 kB
Integrated user data memory	512 kB thereof 288 kB saved	416 kB thereof 288 kB saved	1024 kB thereof 288 kB saved	5632 kB thereof 1536 kB saved		16384 kB thereof 3072 kB saved
User Flashdisk (Data-storage, program access or also external with FTP)	–				Yes, 4 GB Flash non removable	
Plug-in memory card	depending on SD-Card used: no SD-HC card allowed, use MC502 accessory					
Web server's data for user RAM disk	1 024 kB	–	4 096 kB	8 MB		32 MB
Cycle time for 1 instruction (minimum)						
Binary	0.06 µs	0.05 µs		0.002 µs		0.0006 µs
Word	0.09 µs	0.06 µs		0.004 µs		0.001 µs
Floating-point	0.7 µs	0.5 µs		0.004 µs		0.001 µs
Max. number of centralized inputs/outputs						
Max. number of extension modules on I/O bus	up to max. 10 (S500 allowed)					
Digital inputs / outputs	320 / 320					
Analog inputs / outputs	160 / 160					
Max. number of decentralized inputs/outputs						
depends on the used standard Fieldbus (1)						
Data buffering	battery					no battery needed
Real-time clock (with battery back-up)	●					
Program execution						
Cyclical / Time controlled / Multi tasking	● / ● / ●					
User program protection by password	●					
Internal interfaces						
COM1						
RS232 / RS485 configurable	●					
Connection (on terminal bases)	pluggable spring terminal block, use TK502 cable in accessory					
Programming, Modbus® RTU, ASCII, CS31 master	●					
COM2						
RS232 / RS485 configurable	●					
Connection (on terminal bases)	Sub-D female 9 poles, use TK501 cable in accessory					
Programming, Modbus® RTU, ASCII	●					
FieldBusPlug						
Serial neutral interface	●					–
Connection (on terminal bases)	M12 male, 5 poles					–
Functions	programming cable UTF-21-FBP, slave communication depending on FieldBusPlug used (PROFIBUS® DP, CANopen®, DeviceNet)					–
Ethernet						
Ethernet connection (on terminal bases)	RJ45	–	RJ45	RJ45	RJ45	2x RJ45
Ethernet functions: online Access, ICMP (Ping), DHCP, IP configuration protocol, UDP data exchange, Modbus® TCP, HTTP (integrated Web server), IEC60870-5-104 remote control protocol, SNTP (Time synchronization), FTP server, SMTP client, Socket programming	●	–	●	●	●	●
Ethernet based Fieldbus						
Ethernet connection (on CPU module)	–					4 x RJ45 (2 x interfaces with 2-port switch)
Downloadable protocols like: PROFINET® IO RT Controller / Device (2) EtherCAT® Master	–					●
LCD display and 8 function keys						–
Function	RUN / STOP, status, diagnosis					Status, diagnosis
RUN / STOP, RESET push buttons	–					●
LEDs for various status display	–					●
Timers / Counters	unlimited / unlimited					
Approvals	See detailed page 176 or www.abb.com/plc					

(1) e.g. CS31 Fieldbus: up to 31 stations with up to 120 DIs / 120 DOs or up to 32 AIs / 32 AOs per station.

(2) Availability on demand

# AC500-XC

## Technical data

### Digital S500-XC I/O modules

Type		DI524-XC	DC522-XC	DC523-XC	DC532-XC	DO524-XC	DX522-XC
Number of channels per module							
Digital	inputs	32	–	–	16	–	8
	outputs	–	–	–	–	32	8 relays
Configurable channels DC (configurable as inputs or outputs)		–	16	24	16	–	
Additional configuration of channels as							
Fast counter		configuration of max. 2 channels per module, operating modes see table on page 130					
Occupies max. 1 DO or DC when used as counter		–	●	●	●	–	
Connection via terminal unit		●	●	●	●	●	●
Digital inputs							
Input signal voltage		24 V DC				–	24 V DC
Input characteristic acc. to EN 61132-2		Type 1				–	Type 1
0 signal		-3...+5 V DC				–	-3...+5 V DC
Undefined signal state		5...15 V DC				–	5...15 V DC
1 signal		15...30 V DC				–	15...30 V DC
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms				–	8 ms typically, configurable from 0.1 up to 32 ms
Input current per channel							
At input voltage		24 V DC	5 mA typically			–	5 mA typically
		5 V DC	> 1 mA			–	> 1 mA
		15 V DC	> 5 mA			–	> 5 mA
		30 V DC	< 8 mA			–	< 8 mA
Digital outputs							
Transistor outputs 24 V DC, 0.5 A		–	●	●	●	●	–
Readback of output		–	●	●	●	–	–
Relay outputs, supplied via process voltage UP, changeover contacts		–	–	–	–	–	●
Switching of load		24 V	●	●	●	●	●
		230 V	–	–	–	–	●
Output voltage at signal state 1		–	process voltage UP minus 0.8 V				–
Output current							
Nominal current per channel		–	500 mA at UP = 24 V				
Maximum (total current of all channels)		–	8 A				
Residual current at signal state 0		–	< 0.5 mA				
Demagnetization when switching off inductive loads		–	by internal varistors				
Switching frequency							
For inductive load		–	0.5 Hz max.			0.5 Hz max.	2 Hz
For lamp load		–	11 Hz max. at max. 5 W				
Short-circuit / overload proofness		–	●	●	●	●	by external fuse / circuit breaker 6 A gL/gG per channel
Overload indication (I > 0.7 A)		–	after approx. 100 ms				
Output current limiting		–	yes, with automatic reclosure				
Proofness against reverse feeding of 24 V signals		–	●	●	●	●	–
Contact rating							
For resistive load, max.		–					3 A at 230 V AC 2 A at 24 V DC
For inductive load, max.		–					1.5 A at 230 V AC 1.5 A at 24 V DC
For lamp load		–					60 W at 230 V AC 10 W at 24 V DC
Lifetime (switching cycles)							
Mechanical lifetime		–					300 000
Lifetime under load		–					300 000 at 24 V DC / 2 A 200 000 at 120 V AC / 2 A 100 000 at 230 V AC / 3 A
Spark suppression for inductive AC load		–					external measure depending on the switched load
Demagnetization for inductive DC load		–					external measure: free-wheeling diode connected in parallel to the load

# AC500-XC

## Technical data

### Digital S500-XC I/O modules

Type		DI524-XC	DC522-XC	DC523-XC	DC532-XC	DO524-XC	DX522-XC
Process voltage UP							
Nominal voltage		24 V DC					
Maximum ripple		5 %					
Current consumption on UP							
Min. (module alone)		0.150 A	0.100 A	0.150 A		0.050 A	0.050 A
Max. (min. + loads)		0.150 A	0.100 A + load	0.150 A + load		0.100 A + load	0.050 A + load
Reverse polarity protection		●	●	●	●	●	●
Fuse for process voltage UP		10 A miniature fuse					
Connections for sensor voltage supply. Terminal 24 V and 0 V for each connection. Permitted load for each group of 4 or 8 connections: 0.5 A		–	8	4	–	–	–
Short-circuit and overload proof 24 V DC sensor supply voltage		–	●	●	–	–	–
Maximum cable length for connected process signals							
Cable	shielded	1000 m					
	unshielded	600 m					
Potential isolation							
Per module		●	●	●	●	●	●
Between channels	input	–	–	–	–	–	–
	output	–	–	–	–	–	●
Voltage supply for the module		internally via extension bus interface (I/O bus)					
Fieldbus connection		via AC500-XC CPU or all communication interface modules (except DC505-FBP Fieldbus Plug module)					
Address setting		automatically (internal)					

# AC500-XC

## Technical data

### Analog S500-XC I/O modules

Type		AX521-XC	AX522-XC	AI523-XC	AO523-XC	AI531-XC
<b>Number of channels per module</b>						
Individual configuration, analog	inputs	4	8	16	–	8
	outputs	4	8	–	16	–

#### Signal resolution for channel configuration

-10...+10 V	12 bits + sign					15 bits + sign
0...10 V	12 bits					15 bits
0...20 mA, 4...20 mA	12 bits					15 bits
Temperature: 0.1 °C	●	●	●	●	●	●

#### Monitoring configuration per channel

Plausibility monitoring	●	●	●	●	●	●
Wire break & short-circuit monitoring	●	●	●	●	●	●

#### Analog Inputs AI

Signal configuration per AI	max. number per module and with regard to the configuration: AIs / Measuring points (depending on the use of 2/3-wire connection or differential input)					
0...10 V	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
-10...+10 V	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
0...20 mA	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
4...20 mA	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
Pt100						
-50...+400 °C (2-wire)	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
-50...+400 °C (3-wire), 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
-50...+400 °C (4-wire)	–	–	–	–	8 / 8	8 / 8
-50...+70 °C (2-wire)	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
-50...+70 °C (3-wire), 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
-50...+70 °C (4-wire)	–	–	–	–	8 / 8	8 / 8
Pt1000						
-50...+400 °C (2-wire)	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
-50...+400 °C (3-wire), 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
-50...+400 °C (4-wire)	–	–	–	–	8 / 8	8 / 8
Ni1000						
-50...+150 °C (2-wire)	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
-50...+150 °C (3-wire), 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
-50...+150 °C (4-wire)	–	–	–	–	8 / 8	8 / 8
Thermocouples of types J, K, T, N, S	–	–	–	–	●	●
0...10 V using differential inputs, 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
-10...+10 V using differential inputs, 2 channels	4 / 2	8 / 4	16 / 8	–	8 / 8	8 / 8
Digital signals (digital input)	4 / 4	8 / 8	16 / 16	–	8 / 8	8 / 8
Input resistance per channel	voltage: > 100 kΩ current: approx. 330 Ω			–	voltage: > 100 kΩ current: approx. 330 Ω	
Time constant of the input filter	voltage: 100 μs current: 100 μs			–	voltage: 100 μs current: 100 μs	
Conversion cycle	2 ms (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000			–	1 ms (for 8 AI + 8 AO), 1 s for Pt100/1000, Ni1000	
Overvoltage protection	●	●	●	–	●	●

#### Data when using the AI as digital input

Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms			–	8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	24 V DC			–	24 V DC
Signal	0	-30...+5 V			–	-30...+5 V
	1	13...30 V			–	13...30 V

#### Analog outputs AO

Possible configuration per AO	Max. number of AOs per module and with regard to the configuration:					
-10...+10 V	4	8 (1)	–	16 (1)	–	–
0...20 mA	4	–	–	8	–	–
4...20 mA	4	–	–	8	–	–
Output	resistance (burden) when used as current output	0...500 Ω		–	0...500 Ω	
	loading capability when used as voltage output	Max. ±10 mA		–	Max. ±10 mA	

(1) Half can be used on current (the other half remains available).



# AC500-XC

## Technical data

### Analog S500-XC I/O modules

Type	AX521-XC	AX522-XC	AI523-XC	AO523-XC	AI531-XC
Process voltage UP					
Nominal voltage	24 V DC				
Maximum ripple	5 %				
Current consumption on UP					
Min. (module alone)	0.150 A				0.130 A
Max. (min. + loads)	0.150 A + load	0.150 A + load	–	0.150 A + load	
Reverse polarity protection	●	●	●	●	●
Max. line length of the analog lines, conductor cross section > 0.14 mm²	100 m				
Conversion error of analog values caused by non-linearity, calibration errors ex works and the resolution in the nominal range	0.5 % typically, 1 % max.				Voltage: 0.1 % typically, current/resistor 0.3 % typically
Potential isolation					
Per module	●	●	●	●	–
Fieldbus connection	Via AC500-XC CPU or all communication interface modules (except DC505-FBP)				
Voltage supply for the module	Internally via extension bus interface (I/O bus)				–

# AC500-XC

## Technical data

### CD522-XC encoder module

The CD522-XC module offers accuracy and dynamic flexibility for a customized solution. It has two independent encoder inputs onboard and is easily configured using the Automation Builder software for 10 different operation modes and for frequencies up to 300 kHz (depending on CPU cycle time). The CD522-XC module also integrates outputs for pulses and for PWM as well as normal inputs and outputs, depending on selected encoder mode.

Type		CD522-XC
<b>Functionality</b>		
<b>Digital inputs/outputs</b>	24 V DC, dedicated inputs/outputs can be used for specific counting functions. All unused inputs/outputs can be used as input/output with standard specification.	
	Input options	Catch/Touch operation, counter value stored in separate variable on external event (rising or falling) Set to preset counter register with predefined value Set to reset counter register
	End value output	Output set when predefined value is reached
	Reference point initialization (RPI) input for relative encoder initialization	●
<b>High-speed counter/encoder Integrated counters</b>	Counter characteristics	2 counters (24 V DC, 5 V DC, differential and 1 Vpp sinus input)
	Counter mode	one 32 bits or two 16 bits
	Relative position encoder	X1, X2, X3
	Absolute SSI encoder	●
	Time frequency meter	●
	Frequency input	up to 300 kHz
<b>PWM/pulse outputs</b>		
<b>Output mode specification</b>	Number of outputs	2
	Push pull output	24 V DC, 100 mA max
	Current limitation	Thermal and overcurrent
<b>PWM mode specification</b>	Frequency	1...100 kHz
	Value	0...100 %
<b>Pulse mode specification</b>	Frequency	1...15 kHz
	Pulse emission	1...65535 pulses
	Number of pulses emitted indicator	0...100 %
<b>Frequency mode specification</b>	Frequency output	100 kHz
	Duty Cycle	Set to 50 %
<b>Number of channels per module</b>		
<b>Digital</b>	input	2
	output	2
<b>Configurable channels DC (configurable as inputs or outputs)</b>		8
<b>Additional configuration of channels as</b>		
<b>Fast counter</b>		Integrated 2 counter encoders
<b>Connection via terminal unit</b>		●
<b>Digital Inputs</b>		
<b>Input</b>	signal voltage	24 V DC
	time delay	8 ms typically configurable from 0.1 up to 32 ms
<b>Input current per channel</b>		
<b>At input voltage</b>	24 V DC	Typically 5 mA
	5 V DC	> 1 mA
	15 V DC	> 5 mA
	30 V DC	< 8 mA
<b>Digital outputs</b>		
<b>Output voltage at signal state 1</b>		UP – 0.8 V
<b>Output current</b>		
<b>Nominal current per channel</b>		0.5 A at UP = 24 V
<b>Maximum (total current of all channels)</b>		8 A
<b>Residual current at signal state 0</b>		< 0.5 mA
<b>Demagnetization when switching off inductive loads</b>		By internal varistors
<b>Switching frequency</b>		
<b>For inductive load</b>		Max. 0.5 Hz
<b>For lamp load</b>		Max. 11 Hz with max. 5 W
<b>Short-circuit / Overload proofness</b>		●
<b>Overload indication (I &gt; 0.7 A)</b>		After approx. 100 ms
<b>Output current limiting</b>		●
<b>Proofness against reverse feeding of 24 V signals</b>		●

# AC500-XC

## Technical data

### CD522-XC encoder module

Type	CD522-XC
Maximum cable length for connected process signals	
Cable	shielded 1000 m unshielded 600 m
Potential isolation	
Per module	●
Technical data of the high-speed inputs	
Number of channels per module	6
Input type	24 V DC, 5 V DC / Differential / Sinus 1 Vpp
Frequency	300 kHz
Technical data of the fast outputs	
Number of channels	2
Indication of the output signals	Brightness of the LED depends on the number of pulses emitted (0 % to 100 %) (pulse output mode only)
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
De-magnetization when inductive loads are switched off	with varistors integrated in the module
Overload message ( $I > 0.1 \times A$ )	Yes, after ca. 100 ms
Output current limitation	Yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24 V signals	Yes
Process voltage UP	
Nominal voltage	24 V DC
Maximum ripple	5 %
Current consumption on UP	
Min. (module alone)	0.070 A
Max. (min. + loads)	0.070 A + load
Reverse polarity protection	●
Fuse for process voltage UP	10 A miniature fuse

# AC500-XC

## Technical data

### Analog/digital mixed I/O expansion module

For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones.  
For all Input modules, the signal resolution for channel configuration is: -10...+10 V: 12 bit + sign; 0...10 V, 0...20 mA, 4...20 mA: 12 bits.

Type	DA501-XC	
Number of Channels per Module		
Digital	inputs	16
	outputs	–
Analog	inputs	4
	outputs	2
Digital configurable channels DC (configurable as inputs or outputs)		8
Additional configuration of channels as		
Fast counter		Yes
Occupies max. 1 DO or DC when used as counter		Configuration of max. 2 channels per module. Operating modes see table on page 130
Connection via terminal unit TU 5xx		●
Digital inputs		
Input	signal voltage	24 V DC
	characteristic acc. to EN 61132-2	Type 1
0 signal		-3...+5 V DC
Undefined signal state		5...15 V DC
1 signal		15...30 V DC
Residual ripple, range for	0 signal	-3...+5 V DC
	1 signal	15...30 V DC
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms
Digital outputs		
Transistor outputs 24 V DC, 0.5 A		●
Readback of output		●
Outputs, supplied via process voltage UP		●
Switching of 24 V load		●
Output voltage at signal state 1		Process voltage UP - 0.8 V
Output current		
Nominal current per channel		500 mA at UP = 24 V DC
Maximum (total current of all channels)		4 A
Residual current at signal state 0		< 0.5 mA
Demagnetization when switching off inductive loads		By internal varistors
Analog inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points
Signal configuration per AI		●
0...10 V / -10 ... +10 V		4 / 4
0...20 mA / 4...20 mA		4 / 4
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2
0...10 V using differential inputs, needs 2 channels		4 / 2
-10...+10 V using differential inputs, needs 2 channels		4 / 2
Digital signals (digital input)		4 / 4
Data when using the AI as digital input		
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage	24 V DC
Outputs, single configurable as		
Possible configuration per AO		●
-10...+10 V		●
0...20 mA / 4...20 mA		●
Output resistance (load) when used as current output		0...500 Ω
Output loading capability when used as voltage output		±10 mA max.
Potential isolation		
Per module		●
Process voltage UP		
Nominal voltage		24 V DC
Maximum ripple		5 %
Current consumption on UP		
Min. (module alone)		0.070 A
Max. (min. + loads)		0.070 A + load
Reverse polarity protection		●
Fuse for process voltage UP		10 A miniature fuse
Approvals		See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>

# AC500-XC

## Technical data

### DC541-CM-XC interrupt I/O and fast counter module

In the operating mode counter, the channels can be configured as follows:

Input, Output, 32-bit up/down counter (uses C0...C3) as a 32-bit counter without limit, 32-bit periodic counter as a 32-bit counter with a limit, limiter for a 32-bit counter (limit channel 0), 32-bit up counter (forward counter) with the frequencies 50 kHz, 5 kHz and 2.5 kHz, pulse-width modulation (PWM) with a resolution of 10 kHz, time and frequency measurement, frequency output.

Type	DC541-CM-XC	
Number of channels per module		
Configurable channels DC (configurable as inputs or outputs)	8	
Additional configuration of channels as		
Fast counter	Yes	
Connection via CPU terminal base. Occupies one communication module slot	●	
Digital inputs		
Input signal voltage	24 V DC	
characteristic acc. to EN 61132-2	Type 1	
0 signal	-3...+5 V DC	
Undefined signal state	5...15 V DC	
1 signal	5...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)	20 µs	
	Clamp to clamp - 300 µs with interrupt task	
Input current per channel		
At input voltage	24 V DC	5 mA typically
	5 V DC	> 1 mA
	15 V DC	> 5 mA
	30 V DC	< 8 mA
Digital outputs		
Transistor outputs 24 V DC, 0.5 A	●	
Readback of output	●	
Switching of 24 V load	●	
Output voltage at signal state 1	Process voltage UP minus 0.8 V	
Output current		
Nominal current per channel	500 mA at UP = 24 V	
Maximum (total current of all channels)	4 A	
Residual current at signal state 0	< 0.5 mA	
Demagnetization when switching off inductive loads	by internal varistors	
Potential isolation		
Per module	●	
Voltage supply for the module	Internally via backplane bus	

### Interrupt I/O table

Configuration as		Configuration for channel no.					Max. no. of channels for this function	Remarks and notes regarding possible alternative combinations of the remaining channels (a and b)
		Chan. 0	Chan. 1	Chan. 2	Chan. 3	Chan. 4-7		
Mode 1: Interrupt functionality								
Interrupt	Digital input	1	1	1	1	4	8	Each channel can be configured individually as interrupt input or output
	Digital output	1	1	1	1	4	8	
Mode 2: Counting functionality								
Digital I/Os PWM (1)	Digital input	1	1	1	1	4	8	Usual input
	Digital output	1	1	1	1	4	8	Usual output
	PWM, resolution 10 kHz	1	1	1	1	4	8	Outputs and pulsed signal with and adjustable on-off ratio

(1) Counter and fast counter data available on technical documentation.

# AC500-XC

## Technical data

### AC500 Condition Monitoring CMS: FM502-CMS-XC

The FM502-CMS-XC function module offers precision and dynamic flexibility for customized solutions in condition monitoring, precise measurement or fast data logging applications. It has 16 fast, precise and synchronized analog inputs with 50k Samples/s (SPS), 24bit ADC resolution, completed with encoder inputs (incremental or absolute) with counter and additional DI and DC inputs/outputs onboard. It is easily configured using the Automation Builder software and the special libraries. Overall it has 12 different operation modes. One FM502 function module can be placed on the right side of PM592-ETH-XC CPU with a special function module terminal base TF5x1, to interface directly to the CPU. While long measurements can be flexibly configured, started and stopped, all inputs are available in the I/O Image of CPU for immediate use (measurement, protection, control, ...)

Type	FM502-CMS-XC	
Data storage		
Fast user data memory of FM502	128 MB (ca. 33 million Samples: e.g 40 s record length on 16 channels at 50k SPS or 5.8 h record lenght on 16 channels at 100 SPS)	
File Format delivered to PM592 flash	WAV (compact binary) per channel, all channels in one *.zip w. time stamp	
Analog inputs		
Number of channels	16 (synchronous sampled)	
Resolution	24 bit ADC, stored in DINT in WAV file (4byte per value)	
Accuracy at +25 °C	< +/- 0.1 %	
Accuracy over operating temperature and vibration	< +/- 0.5 %	
Sample rate / Bandwidth (High, 0 dB)	50k SPS / 20 kHz to 100 SPS / 40 Hz (digitally downsampled, selectable per channel)	
Indication of the input signal	One bicolor LED per channel for configuration, measurement status, error messages	
Input option:	IEPE (with Sensor supply current)	+ - 10V
Bandwidth low (- 3 dB)	digital < 0.1 Hz	digital < 0.1 Hz or DC (selectable)
Pass band high (- 3 dB)	analog > 90 kHz, digital > 24.5 kHz	
Stop band high (> - 100 dB)	analog > 1 MHz, digital > 27.5 kHz	
Dynamic Range (SFDR)	> 100 dB	
SINAD (300 Hz/1 kHz sine, 50 k SPS) 0dB from full scale	< -90 dB	< - 95 dB
IEPE Current Source per channel	Typ. 4.2 mA (+/- 7% over temperature)	(n.a.)
Resistance AI- to M (ground)	Typ ~ 270hm (PTC)	
Channel input impedance (AI+/AI-):		
< 1 kHz	> 1 MOhm	> 2 MOhm
5 kHz	> 100 kOhm	> 40 kOhm
10 kHz	> 60 kOhm	> 25 kOhm
20 kHz	> 40 kOhm	> 8 kOhm
Error detection	Short circuit, open wire	
Max. cable length, shielded (depending on sensor)	100 m	
Digital inputs/outputs		
	24 V DC, dedicated inputs/outputs can be used for specific counting functions.	
	All unused inputs/outputs can be used as normal input/output with standard specification.	
Channels and types	2 DI + 2 DC (configurable inputs/outputs); Type 1, LED indication	
Input options	Catch/Touch operation, counter value stored in separate variable on external event (rising or falling)	
	Set to preset counter register with predefined value	
	Set to reset counter register	
End value output	Output set when predefined value is reached	
Reference point initialization (RPI) input for relative encoder initialization	●	
Input current p. channel @ V DC		
24 V DC	Typically 5 mA	
5 V DC	> 1 mA	
15 V DC	> 5 mA	
30 V DC	< 8 mA	



# AC500-XC

## Technical data

Type	FM502-CMS-XC	
Digital outputs		
Output voltage at signal state 1	(L+) – 0.8 V	
Output current		
Nominal current per channel	0.5 A at UP = 24 V	
Residual current at signal state 0	< 0.5 mA	
Demagnetization when switching off inductive loads	By internal varistors	
Switching frequency		
For inductive load	Max. 0.5 Hz	
For lamp load	Max. 11 Hz with max. 5 W	
Short-circuit / Overload proofness	●	
Overload indication (I > 0.7 A)	After approx. 100 ms	
Output current limiting	●	
Resistance against reverse feeding of 24 V signals	●	
Maximum cable length for connected process signals		
shielded	1000 m	
unshielded	600 m	
High-speed counter/encoder		
Integrated counters		
Counter characteristics	2 counters (24 V DC, 5 V DC, differential RS422: 5 V or 1 Vpp sinus input)	
Counter mode	one counter 32 bits or two counters 16 bits	
Relative position encoder	X1, X2, X3	
Absolute SSI encoder	●	
Time frequency meter	●	
Frequency input	up to 300 kHz	
Additional configuration of channels as		
Fast counter	Integrated 2 counter encoders	
high-speed inputs		
Number of channels, type per module	3 (A,B,Z), type 1	
Input type	24 V DC	5 V DC / Differential / Sinus 1 Vpp
Frequency	up to 300 kHz (input filter: 50,500, 5 k, 20 k Hz)	
Input frequency max. (frequency measurement only)	100 kHz (accuracy -0 %/+3 %)	
Max. cable length, shielded (depending on sensor)	300 m	100 m
Fast outputs		
SSI CLK output B	f. optical Interface (according SSI): Pin 1.3	RS-422 differential (according SSI) Pins 1.3, 1.4
Output delay (0->1 or 1->0)	Max. 0.35 µs	
Output current	≤ 10 mA	
Switching frequency (selectable)	200kHz, 500kHz and 1 MHz	
Short-circuit proof / overload proof	Yes	
Output current limitation	Yes, automatic reactivation after short-circuit/overload	
Resistance to feedback against 24V signals	Yes	
Resistance to feedback against reverse polarity	Yes	
Max. cable length, shielded (depending on sensor)	100 m	
Process voltage L+		
Nominal voltage	24 V DC	
Max. ripple	0,05	
Current consumption from L+ (FM502 and PM592, no communication module)	Max. 0.43 A + max. 0.5 A per output	
Inrush current from L+ (at power up, FM502 and PM592, no communication module)	1.2 A²s	
Electrical isolation	Yes, (PM592 and FM502 to other I/O-Bus modules )	
Max. power dissipation within the FM502 module	6.5 W (outputs unloaded)	
5-V-encoder supply output		
Nominal voltage	5 V DC (+/- 5%), 100 mA max.	

(1) High Temperatures:

Operation of FM502-XC version in the operating temperature range between +60 °C and +70 °C with following deratings:

No use of 24 V encoder mode

Analog inputs: maximum number of configured input channels limited to 75 % per group AI0..AI7 and AI8..AI15

# AC500-XC

## Technical data

### AC500-XC communication modules

- Up to 4 communications modules can be used on an AC500-XC CPU
- No external power supply required.

Type	CM592-DP-XC	CM582-DP-XC (3)	CM597-ETH-XC	CM598-CN-XC	CM588-CN-XC	CM579-PNIO-XC	CM589-PNIO-XC	CM589-PNIO-4-XC (3)
<b>Communication interfaces</b>								
RJ45	–	–	● (x2) (2)	–	–	● (x2) (2)	● (x2) (2)	● (x2) (2)
RS-232 / 485	–	–	–	–	–	–	–	–
Terminal blocks (1)	–	–	–	●	●	–	–	–
Sub-D socket	●	●	–	–	–	–	–	–
Protocols	PROFIBUS® DP V0/V1 master	PROFIBUS® DP V0/V1 slave	Ethernet (TCP/IP, UDP/IP, Modbus TCP)	CANopen® master	CANopen® slave	PROFINET® IO controller	PROFINET® IO device	PROFINET® IO 4 x device
CPU interface	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory	8 kB Dual-port memory
Transfer Rate	9.6 kbit/s to 12 Mbit/s	9.6 kbit/s to 12 Mbit/s	10/100 Mbit/s	10 kbit/s to 1 Mbit/s	10 kbit/s to 1 Mbit/s	10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
Co-processor	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100	Communication processor netX 100
Additional features	Multi master functionality Max. Number of subscribers: - 126 (V0) - 32 (V1)	–	Online Access, ICMP (Ping), DHCP, IP configuration protocol, UDP dataexchange, Modbus TCP	CAN 2.0A CAN 2.0B CANopen®	NMT slave PDO SDO server Heartbeat Nodeguard	RTC - Real-Time Cyclic protocol, Class 1 RTA - Real-Time Acyclic protocol DCP Discovery and Configuration Protocol CL-RPC - Connectionless Remote Procedure Call	RTC - Real-Time Cyclic protocol, Class 1 RTA - Real-Time Acyclic protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol	RTC - Real-Time Cyclic protocol, Class 1 RTA - Real-Time Acyclic protocol DCP Discovery and Configuration Protocol LLDP - Link Layer Discovery Protocol

(1) Plug-in terminal block included.

(2) 10/100 Mbit/s, full/half duplex with auto-sensing, 2-port switch integrated.

(3) Availability planned from Q2-2017.

# AC500-XC

## Technical data

### Communication interface modules

For all modules: max cable length for connected process signals is 1000 m for shielded cable and 600 m for unshielded ones.  
For all Input modules, the signal resolution for channel configuration is: -10...+10 V: 12 bits + sign; 0...10 V, 0...20 mA, 4...20 mA: 12 bits.  
Temperature: 0.1 °C.

Type	DC551-CS31-XC		CI590-CS31-HA-XC (1)	CI592-CS31-XC
Communication Interface				
Protocol	Proprietary CS31 bus protocol on RS485 interface			
ID configuration	Per rotary switches on front face from 00d to 99d			
Field bus connection on TUs	CS31 field bus, via terminal / redundant for CI590-CS31-HA-XC on TU552-CS31-XC			
Number of Channels per Module				
Digital	inputs	8	–	8
	outputs	–	–	–
Analog	inputs	–	–	4
	outputs	–	–	2
Digital configurable channels DC (configurable as inputs or outputs)		16	16	8
Additional configuration of channels as				
Fast counter	Configuration of max. 2 channels per module			
Occupies max. 1 DO or DC when used as counter	●	●		●
Connection				
Via terminal base TU5xx	●	●		●
Local I/O extension				
Max. number of extension modules	max. 7 x S500 extension modules, up to 31 stations with up to 120 DI/120 DOs or up to 32 AIs/ 32AOs per station			
Digital inputs				
Input	signal voltage	24 V DC		
	characteristic acc. to EN 61132-2	Type 1		
0 signal		-3...+5 V DC		
Undefined signal state		5...15 V DC		
1 signal		15...30 V DC		
Residual ripple, range for	0 signal	-3...+5 V DC		
	1 signal	15...30 V DC		
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms		
Digital outputs				
Transistor outputs 24 V DC, 0.5 A		●		
Readback of output		●		
Outputs, supplied via process voltage UP		●		
Switching of 24 V load		●		
Output voltage at signal state 1		Process voltage UP - 0.8 V		
Output current				
Nominal current per channel		500 mA at UP = 24 V DC		
Maximum (total current of all channels)		8 A	8 A	4 A
Residual current at signal state 0		< 0.5 mA		
Demagnetization when switching off inductive loads		By internal varistors		
Analog inputs AI				
Signal configuration per AI				●
0...10 V / -10...+10 V				4 / 4
0...20 mA / 4...20 mA				4 / 4
RTD using 2/3 wire needs 1/2 channel(s)				4 / 2
0...10 V using differential inputs, needs 2 channels				4 / 2
-10...+10 V using differential inputs, needs 2 channels				4 / 2
Digital signals (digital input)				4 / 4
Data when using the AI as digital input				
Input	time delay			8 ms typically, configurable from 0.1 up to 32 ms
	signal voltage			24 V DC

(1) Dedicated to High Availability. Not compatible with S500-eCo I/O modules.

# AC500-XC

## Technical data

### Communication interface modules

Type	DC551-CS31-XC	CI590-CS31-HA-XC (1)	CI592-CS31-XC
Outputs, single configurable as			
Possible configuration per AO	–		●
-10...+10 V	–		●
0...20 mA / 4...20 mA	–		●
Output	resistance (load) when used as current output	–	0...500 Ω
	loading capability when used as voltage output	–	±10 mA max.
Potential isolation			
Per module	●	●	●
Between fieldbus interface against the rest of the module	●	●	●
Voltage supply for the module	By external 24 V DC voltage via terminal UP		
Process voltage UP			
Nominal voltage	24 V DC		
Maximum ripple	5 %		
Current consumption on UP			
Min. (module alone)	0.100 A	0.100 A	0.070 A
Max. (min. + loads)	0.100 A + load	0.100 A + load	0.070 A + load
Reverse polarity protection	●		
Fuse for process voltage UP	10 A miniature fuse		
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>		

(1) Dedicated to High Availability.

# AC500-XC

## Technical data

### PROFIBUS®-DP modules

Type	CI541-DP-XC		CI542-DP-XC
Communication Interface			
Protocol		PROFIBUS® DP (DP-V0 and DP-V1 slave)	
ID configuration		Per rotary switches on front face from 00h to FFh	
Field bus connection on terminal units		Sub-D 9 poles on TU510-XC or TU518-XC with baud rate up to 1Mbaud	
Number of Channels per Module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		Configuration of max. 2 DI channels per module	
Occupies max 1 DO or DC when used as counter		●	●
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500 extension modules, fast counter from digital IO modules can be also used	
Via terminal base TU5xx		●	●
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		-3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	-3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog Inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / -10...+10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
-10...+10 V using differential inputs, needs 2 channels		4 / 2	–
2 channels			
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–
Outputs, single configurable as			
Possible configuration per AO		●	–
-10...+10V		●	–
0...20 mA / 4...20 mA		●	–
Output	resistance (load) when used as current output	0...500 Ω	–
	loading capability when used as voltage output	±10 mA max.	–

# AC500-XC

## Technical data

### PROFIBUS®-DP modules

Type	CI541-DP-XC	CI542-DP-XC
Potential isolation		
Per module	●	●
Between fieldbus interface against the rest of the module	●	●
Between the channels	input	—
	output	—
Voltage supply for the module	By external 24 V DC voltage via terminal UP	
Process voltage UP		
Nominal voltage	24 V DC	
Maximum ripple	5 %	
Current consumption on UP		
Min. (module alone)	0.260 A	
Max. (min. + loads)	0.260 A + load	
Reverse polarity protection	●	
Fuse for process voltage UP	10 A miniature fuse	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	



# AC500-XC

## Technical data

### CANopen® modules

Type		CI581-CN-XC	CI582-CN-XC
Communication interface			
Protocol		CANopen® slave, DS401 profile selectable using rotary switches	
ID configuration		Per rotary switches on front face for CANopen® ID node from 00h to 7Fh and 80h to FFh for CANopen® DS401 profile	
Field bus connection on terminal units		Terminal blocks on TU518-XC	
Number of channels per module			
Digital	inputs	8	8
	outputs	8	8
Analog	inputs	4	–
	outputs	2	–
Digital configurable channels DC (configurable as inputs or outputs)		–	8
Additional configuration of channels as			
Fast counter (onboard I/O)		Configuration of max. 2 DI channels per module	
Occupies max. 1 DO or DC when used as counter		●	●
Connection			
Local I/O extension		●	
Max. number of extension modules		max. 10 x S500-XC extension modules	
Via terminal unit TU5xx		●	●
Digital inputs			
Input	signal voltage	24 V DC	
	characteristic acc. to EN 61132-2	Type 1	
0 signal		–3...+5 V DC	
Undefined signal state		5...15 V DC	
1 signal		15...30 V DC	
Residual ripple, range for	0 signal	–3...+5 V DC	
	1 signal	15...30 V DC	
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	
Digital outputs			
Transistor outputs 24 V DC, 0.5 A		●	
Readback of output		–	● (on DC outputs)
Outputs, supplied via process voltage UP		●	
Switching of 24 V load		●	
Output voltage at signal state 1		Process voltage UP - 0.8 V	
Output current			
Nominal current per channel		500 mA at UP = 24 V DC	
Maximum (total current of all channels)		8 A	
Residual current at signal state 0		< 0.5 mA	
Demagnetization when switching off inductive loads		By internal varistors	
Analog Inputs AI		Max. number per module and with regard to the configuration: AIs / Measuring points	
Signal configuration per AI		4	–
0...10 V / –10...+10 V		4 / 4	–
0...20 mA / 4...20 mA		4 / 4	–
RTD using 2/3 wire needs 1/2 channel(s)		4 / 2	–
0...10 V using differential inputs, needs 2 channels		4 / 2	–
–10...+10 V using differential inputs, needs 2 channels		4 / 2	–
Digital signals (digital input)		4 / 4	–
Data when using the AI as digital input			
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–
	signal voltage	24 V DC	–
Outputs, single configurable as			
Possible configuration per AO		●	–
–10...+10 V		●	–
0...20 mA / 4...20 mA		●	–
Output	resistance (load) when used as current output	0...500 Ω	–
	loading capability when used as voltage output	±10 mA max.	–

# AC500-XC

## Technical data

### CANopen® modules

Type	CI581-CN-XC	CI582-CN-XC
Potential isolation		
Per module	●	●
Between fieldbus interface against the rest of the module	●	●
Between the channels	input	—
	output	—
Voltage supply for the module	By external 24 V DC voltage via terminal UP	
Process voltage UP		
Nominal voltage	24 V DC	
Maximum ripple	5 %	
Current consumption on UP		
Min. (module alone)	0.260 A	
Max. (min. + loads)	0.260 A + load	
Reverse polarity protection	●	
Fuse for process voltage UP	10 A miniature fuse	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	

# AC500-XC

## Technical data

### PROFINET® IO RT device modules

Type	CI501-PNIO-XC	CI502-PNIO-XC	CI504-PNIO-XC	CI506-PNIO-XC
Communication interface				
Ethernet Interface				
Main protocol	PROFINET® IO RT device			
ID Device configuration	By rotary switch on the front side, from 00h to FFh			
Ethernet connection on terminal units	2 x RJ45 with switch functionality for simple daisy chain on TU508-ETH-XC or TU520-ETH-XC			
Gateway Interface				
Gateway to	–	–	3 x RS232/RS422/RS485 ASCII serial interfaces	CAN / CANopen® Master + 2 x RS232/RS422/RS485 ASCII serial interfaces
Fieldbus Protocol used				
	–	–	–	CAN 2A/2B Master - CANopen® Master (1)
CAN physical interface	–	–	–	1 x 10 poles pluggable spring connector
Baudrate	–	–	–	Baudrate up to 1 MBit/s, Support for up to 126 CANopen® Slaves
Serial interface	–	–	3 x RS232 / RS422 or RS485	2 x RS232 / RS422 or RS485
Protocol used	–	–	ASCII	ASCII
Baudrate	–	–	Configurable from 300 bit/s to 115200 bit/s	
Fieldbus or serial connection on TUs	–	–	3 x pluggable terminal blocks with spring on TU520-ETH	
Number of channels per module				
Digital	inputs	8	8	–
	outputs	8	8	–
Analog	inputs	4	–	–
	outputs	2	–	–
Digital configurable channels DC (configurable as inputs or outputs)	–	8	–	–
Additional configuration of channels as				
Connection via terminal unit TU5xx	–	–	●	●
Fast counter (onboard I/O)	Configuration of max. 2 DI channels per module		–	–
Occupies max. 1 DO or DC when used as counter	●	–	–	–
Connection				
Local I/O extension	●	–	●	●
Max. number of extension modules	max. 10 x S500-XC extension modules. Fast counter from digital IO modules can be also used.		Valid for CI501-XC, 502-XC, 504-XC and 506-XC. All modules can have extension up to 10 modules	
Digital inputs				
Input	signal voltage	24 V DC	–	–
	characteristic acc. to EN 61132-2	Type 1	–	–
0 signal		-3...+5 V DC	–	–
Undefined signal state		5...15 V DC	–	–
1 signal		15...30 V DC	–	–
Residual ripple, range for	0 signal	-3...+5 V DC	–	–
	1 signal	15...30 V DC	–	–
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms	–	–
Digital outputs				
Transistor outputs 24 V DC, 0.5 A	●	–	–	–
Readback of output	–	● (on DC outputs)	–	–
Outputs, supplied via process voltage UP	●	–	–	–
Switching of 24 V load	●	–	–	–
Output voltage at signal state 1	Process voltage UP - 0.8 V		–	–
Output current				
Nominal current per channel	500 mA at UP = 24 V DC		–	–
Maximum (total current of all channels)	8 A		–	–
Residual current at signal state 0	< 0.5 mA		–	–
Demagnetization when switching off inductive loads	By internal varistors		–	–

(1) Not simultaneously.

# AC500-XC

## Technical data

### PROFINET® IO RT device modules

Type	CI501-PNIO-XC	CI502-PNIO-XC	CI504-PNIO-XC	CI506-PNIO-XC
<b>Analog inputs AI</b>				
Max. number per module and with regard to the configuration: AIs / Measuring points				
Signal configuration per AI	4	–	–	–
0...10 V / -10... +10 V	4 / 4	–	–	–
0...20 mA / 4...20 mA	4 / 4	–	–	–
RTD using 2/3 wire needs 1/2 channel(s)	4 / 2	–	–	–
0...10 V using differential inputs, needs 2 channels	4 / 2	–	–	–
-10...+10 V using differential inputs, needs 2 channels	4 / 2	–	–	–
Digital signals (digital input)	4 / 4	–	–	–
<b>Data when using the AI as digital input</b>				
Input	time delay	8 ms typically, configurable from 0.1 up to 32 ms	–	–
	signal voltage	24 V DC	–	–
<b>Outputs, single configurable as</b>				
Possible configuration per AO	●	–	–	–
-10...+10 V	●	–	–	–
0...20 mA / 4...20 mA	●	–	–	–
Output	resistance (load) when used as current output	0...500 Ω	–	–
	loading capability when used as voltage output	±10 mA max.	–	–
<b>Potential isolation</b>				
Per module	●	●	●	●
Between Ethernet interface against the rest of the module	●	●	●	●
Voltage supply for the module	By external 24 V DC voltage via terminal UP			
<b>Process voltage UP</b>				
Nominal voltage	24 V DC			
Maximum ripple	5 %			
Current consumption on UP				
min. (module alone)	0.260 A		0.150 A	
max. (min. + loads)	0.260 A + load		0.150 A + load	
Reverse polarity protection	●			
Fuse for process voltage UP	10 A miniature fuse			
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>			

# AC500-XC

## Technical data

### CS31 functionality

	AC500-XC CPU with integrated CS31 interface	S500 I/O with communication interface DC551-CS31-XC CI590-CS31-HA-XC CI592-CS31-XC
Master	Yes, at COM1	–
Slave	No	Yes / Redundant for CI590-CS31-HA-XC
Protocols supported	ABB CS31 protocol	
Diagnosis		
Error indication	On LCD display of the CPU	Via module LEDs
Online diagnosis	Yes	
Error code	Errors are recorded in the diagnosis system of the CPU	
Associated function blocks	Yes	
Physical layer	RS485 / 2 x RS485 for CI590-CS31-HA-XC for redundancy	
Connection	Plug at COM1	Screw-type or spring-type terminals
Baud rate	187.5 kbit/s	
Distance	AC500-XC: up to 500 m; up to 2000 m using a repeater	
Max. number of modules on fieldbus	31 modules max. Please note: The CS31 bus interface occupies one or two module addresses (if counters are configured onboard or if the module is a mixed digital analog module). Depending on the configuration, or if the module contains also mixed digital analog I/O, connected extension modules can occupy further module addresses.	
Configuration		
Station address configuration	No	Using rotary switches (99 max.)

# AC500-XC

## Technical data

### Digital I/O modules, "Fast Counter" operating modes. Not applicable for DC541-XC (1)

Operating mode, configured in the user program of the AC500-XC		Occupied inputs DI or DC	Occupied outputs DO or DC	Maximum counting frequency kHz
0	No counter	0	0	–
1	One count-up counter with "end value reached" indication	1	1	50
2	One count-up counter with "enable" input and "end value reached" indication	2	1	50
3	Two up/down counters	2	0	50
4	Two up/down counters with 1 counting input inverted	2	0	50
5	One up/down counter with "dynamic set" input	2	0	50
6	One up/down counter with "dynamic set" input	2	0	50
7	One up/down counter with directional discriminator For synchro transmitters using two counting pulses with an offset of 90° (track A and B)	2	0	50
8	–	0	0	–
9	One up/down counter with directional discriminator and double evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	30
10	One up/down counter with directional discriminator and fourfold evaluation For synchro transmitters using two counting pulses with an offset of 90° towards each other (track A and B)	2	0	15

(1) See technical documentation for details.

# AC500-XC

## System data

### Environmental Conditions

#### Process and supply voltages

<b>24 V DC</b>	Line Voltage	18 V...31.2 V / nom. 24 V DC (-25 %, +30 % inclusive ripple)
	Absolute limits	inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	yes
<b>120V...240V AC</b>	Line Voltage	102...264 V / nom. 120...240 V (-15 %, +10 %)
<b>Wide Range Supply</b>	Line Frequency	47...62.4 Hz / nom. 50...60 Hz (-6 %, +4 %)
<b>Allowed interruptions of power supply</b>	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
	AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s

Important: Exceeding the maximum process or supply voltage for 24V DC (< -35 V DC and > + 35 V DC) could lead to unrecoverable damage of the system. For the supply of the modules, power supply units according to PELV or SELV specifications must be used. The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

#### Temperature

<b>Operating</b>	-40 °C ... +70 °C	
	-40 °C ... -30 °C	Proper start-up of system; technical data not guaranteed
	-40 °C ... 0 °C	Due to the LCD technology, the display might not be readable
	-40 °C...+40 °C	vertical mounting of modules possible, output load limited to 50 % per group
	+60 °C ...+70 °C	with the following deratings: System is limited to max. 2 Communication Modules per Terminal Base Applications certified for cULus up to 60 °C Digital inputs: maximum number of simultaneously switched on input channels limited to 75 % per group (e.g. 8 channels => 6 channels) Digital outputs: output current maximum value (all channels together) limited to 75 % per group (e.g. 8 A => 6 A) Analog outputs only if configured as voltage output: maximum total output current per group is limited to 75 % (e.g. 40 mA => 30 mA) Analog outputs only if configured as current output: maximum number of simultaneously used output channels limited to 75 % per group (e.g. 4 channels => 3 channels)
<b>Storage / Transport</b>	-40 °C ... +85 °C	

#### Humidity

<b>Operating / Storage</b>	100 % r. H. with condensation
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#### Air pressure

<b>Operating</b>	-1000 m .... 4000 m (1080 hPa ... 620 hPa) >2000 m (<795 hPa): max. operating temperature must be reduced by 10 K (e.g. 70 °C to 60°C)
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#### Immunity to corrosive gases

<b>Operating</b>	Yes, according to: ANSI/ISA-71.04: Containment group A, G3 - Harsh / GX - Severe IEC 60068-2-60: Method 4 IEC 60721-3-3: Class 3C2 / 3C3  Gases and concentrations: Hydrogen sulfide (H <sub>2</sub> S): (10 ± 5) ppb Nitrogen dioxide (NO <sub>2</sub> ): (200 ± 20) ppb Chlorine (Cl <sub>2</sub> ): (10 ± 5) ppb Sulfur dioxide (SO <sub>2</sub> ): (200 ± 20) ppb
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#### Immunity to salt mist

<b>Operating</b>	Yes, horizontal mounting only, according to: IEC 60068-2-52 severity level: 1 NOTICE! Risk of corrosion! Unused connectors and slots may corrode, if using XC devices in salt mist environments. Protect unused connectors and slots with TA535 protective caps for XC devices TA535 "Protective Caps TA535 for XC Devices".
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# AC500-XC

## System data

### Environmental Conditions

#### Electromagnetic Compatibility

Radiated emission (radio disturbances)	Yes, according to: CISPR 16-2-3
Conducted emission (radio disturbances)	Yes, according to: CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)	Yes, according to: IEC 61000-4-2, zone B, criterion B
	Electrostatic voltage in case of air discharge: 8 kV
	Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B Supply voltage units (DC): 4 kV Digital inputs/outputs (24 V DC): 2 kV Analog inputs/outputs: 2 kV Communication lines shielded: 2 kV I/O supply (DC-out): 2 kV
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B Supply voltage units (DC): 1 kV CM* / 0.5 kV DM* Supply voltage units (AC): 2 kV CM* / 1 kV DM* Digital inputs/outputs (24 V DC): 1 kV CM* / 0.5 kV DM* Digital inputs/outputs (120...240 V AC): 2 kV CM* / 1 kV DM* Analog inputs/outputs: 1 kV CM* / 0.5 kV DM* Communication lines shielded: 1 kV CM* I/O supply (DC-out): 0.5 kV CM* / 0.5 kV DM* * CM = Common Mode, * DM = Differential Mode
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A Test field strength: 10 V/m
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A Test voltage: 10 V
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A 30 A/m 50 Hz 30 A/m 60 Hz

In order to prevent malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

#### WARNING!

##### Risk of malfunctions and damages to persons!

Unused slots for Communication Modules are not protected against accidentally touch. Dust and Dirt may cause contact problems and malfunctions.

Unused slots for Communication Modules must be covered with Dummy Communication Modules ("TA524 - Dummy Communication Module").

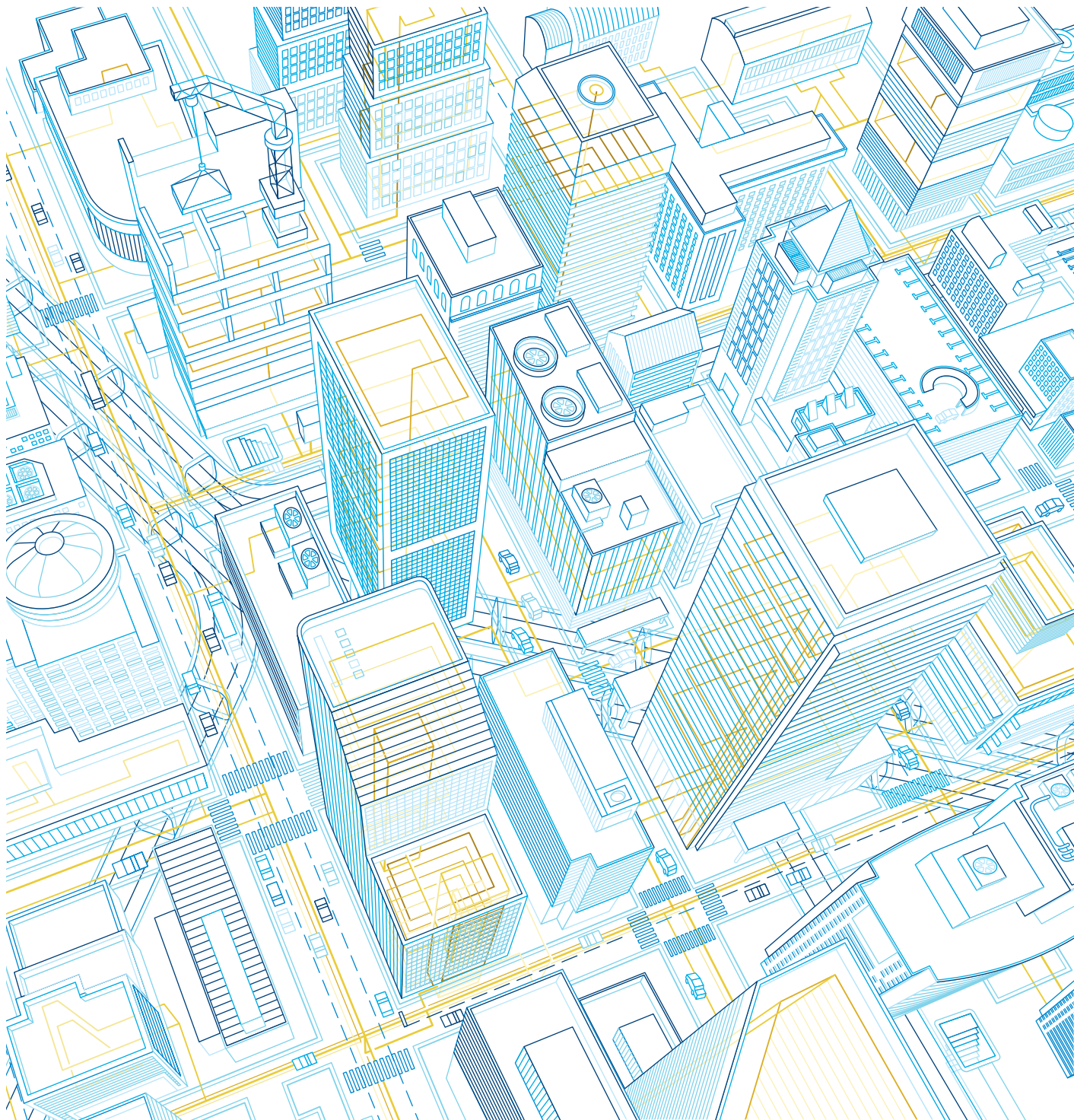
I/O-Bus connectors must not be touched during operation.

#### Environmental Tests

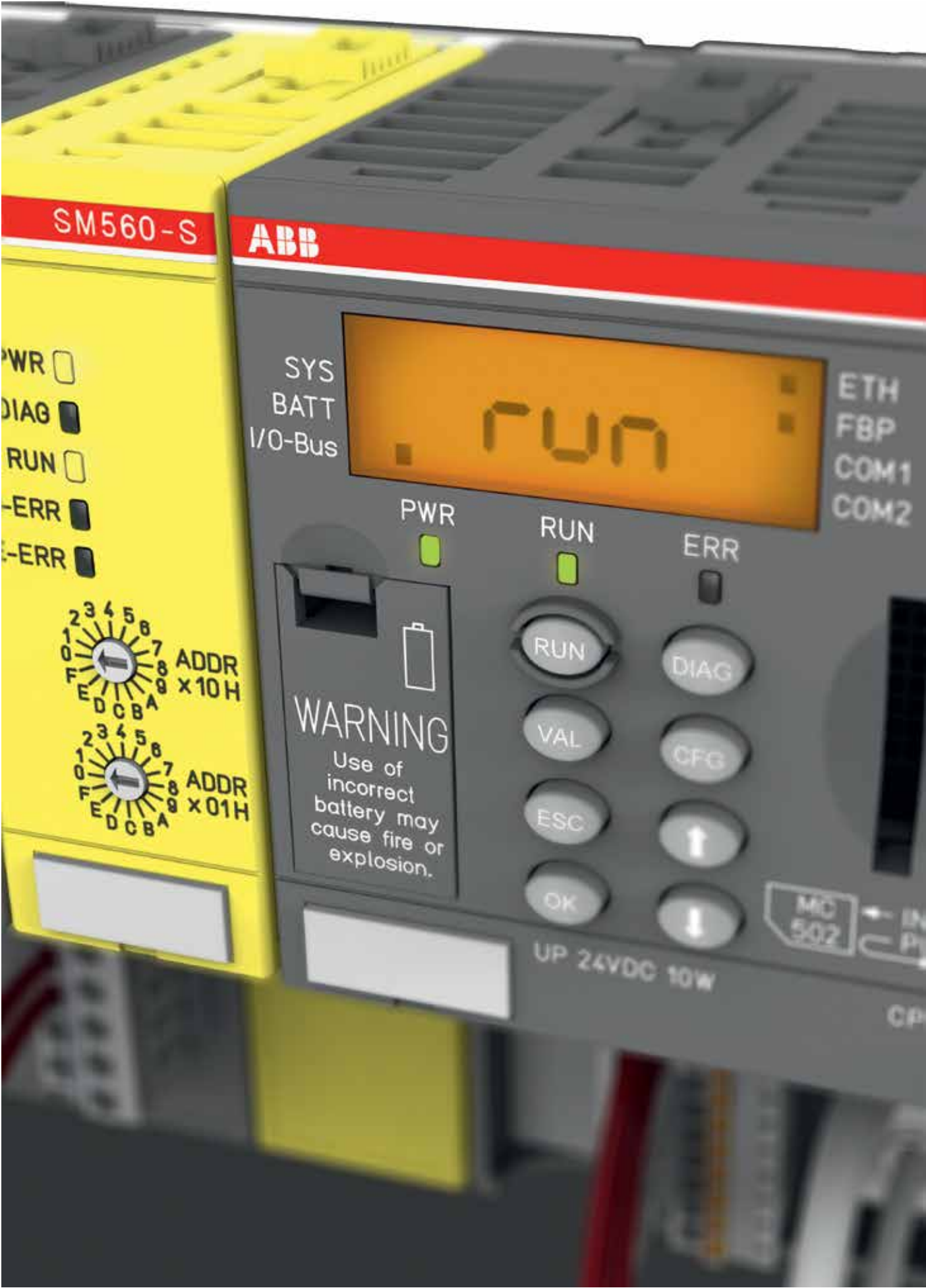
Storage	IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h IEC 60068-2-2 Test Bb: dry heat withstand test +85 °C / 16 h
Humidity	IEC 60068-2-30 Test Db: Cyclic (12 h / 12 h) Damp-Heat Test 55 °C, 93 % r. H. / 25 °C, 95 % r. H., 6 cycles IEC 60068-2-78, Stationary Humidity Test: 40 °C, 93 % r. H., 240 h IEC 61131-2 / IEC 60068-2-6: 5 Hz ... 500 Hz, 2 g (with SD Memory Card inserted) IEC 60068-2-64: 5 Hz ... 500 Hz, 4 g rms
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

#### Mechanical Data

Wiring method	Spring terminals / Screw terminals
Degree of protection	IP 20
Vibration resistance	Yes, according to: IEC 61131-2 IEC 60068-2-6 IEC 60068-2-64
Shock resistance	Yes, according to: IEC 61131-2 IEC 60068-2-27
Assembly position	Horizontal Vertical (no application in salt mist environment)
Assembly on DIN rail	DIN rail type According to IEC 60715 35 mm, depth 7.5 mm or 15 mm
Assembly with screws	Screw diameter Fastening torque 4 mm 1.2 Nm







# AC500-S

## Functional Safety PLC

<a href="#">Key features</a>	<a href="#">6/136</a>
<a href="#">Ordering data AC500-S</a>	<a href="#">6/137</a>
<a href="#">Ordering data AC500-S-XC</a>	<a href="#">6/138</a>
<a href="#">Technical data</a>	<a href="#">6/139</a>
<a href="#">System data</a>	<a href="#">6/142</a>

# AC500-S

## Key features

Easy integration: Simple expansion of ABB PLC with safety functions. One common diagnostic system for safety and standard CPUs. eXtreme Conditions (-XC) version is available.



Easy implementation of flexible configuration concept (one safety program for various machine types). Safety CPU can be configured to work even if standard CPU is in STOP mode.

PROFINET®/PROFIsafe® interface for decentralized safety I/Os, safe position and speed monitoring as well as triggering of safety drive functions.

Automation Builder productivity suite providing integrated support of ST, Ladder (LD) and Function Block Diagram (FBD) programming. Trigonometric functions are supported for easy implementation of complex calculation tasks.

# AC500-S

## Ordering data



SM560-S



DI581-S /  
DX581-S /  
AI581-S



TU582-S



AC500-S training case

### Safety CPU

Description	User program memory	Type	Order code	Weight (1 pce) kg
	MB			
Safety CPU module	1	SM560-S	1SAP280000R0001	0.100

### S500 Safety I/O

Description	Input signal		Output signal	Type	Order code	Weight (1 pce) kg
	SIL2	SIL3	SIL3			
Safety digital input module	16	8	-	DI581-S	1SAP284000R0001	0.130
Safety digital input / output module	8	4	8	DX581-S	1SAP284100R0001	0.130
Safety analog input module	4	2	-	AI581-S	1SAP282000R0001	0.130

### S500 Safety terminal unit

Description	Type	Order code	Weight (1 pce) kg
Spring terminal unit for safety I/O modules	TU582-S	1SAP281200R0001	0.200

### Software

AC500-S Safety PLC programming license needs to be purchased as an additional feature of Automation Builder. For details, see ordering data of Automation Builder.

### Accessories for AC500-S

For	Description	Type	Order code	Price	Weight (1 pce) kg
AC500-S Safety PLC	SM560-S, DI581-S, DX581-S, AI581-S, TU582-S with PM573-ETH and PNIO	TA514-SAFETY	1SAP182900R0001		10

# AC500-S-XC

## Ordering data



SM560-S-XC



DI581-S-XC /  
DX581-S-XC /  
AI581-S-XC



TU582-S-XC

### Safety XC CPU

Description	User program memory	Type	Order code	Weight (1 pce) kg
	MB			
Safety CPU module	1	SM560-S-XC	1SAP380000R0001	0.100

### S500-XC Safety I/O

Description	Input signal		Output signal	Type	Order code	Weight (1 pce) kg
	SIL2	SIL3	SIL3			
Safety digital input module	16	8	-	DI581-S-XC	1SAP484000R0001	0.130
Safety digital input / output module	8	4	8	DX581-S-XC	1SAP484100R0001	0.130
Safety analog input module	4	2	-	AI581-S-XC	1SAP482000R0001	0.130

### S500-XC Safety terminal unit

Description	Type	Order code	Weight (1 pce) kg
Spring terminal unit for safety I/O modules	TU582-S-XC	1SAP481200R0001	0.200



# AC500-S and AC500-S-XC

## Technical data

### Safety CPUs

Type	SM560-S / SM560-S-XC	
Performance level	PL e (ISO 13849-1)	
Safety	integrity level	SIL3 (IEC 61508:2010, IEC 62061, IEC 61511)
	protocol	PROFIsafe® V2 via PROFINET®
Program memory flash EPROM and RAM	1 MB	
Integrated data memory	1 MB thereof 120 KB saved	

### Cycle time for 1 instruction

Binary	0.05 µs
Word	0.06 µs
Floating point	0.5 µs

### Max. number of centralized inputs/outputs

Max. nb. of safety extension modules on I/O bus	up to max. 10	
Digital	inputs	160 (SIL2) / 80 (SIL3)
	outputs	80 (SIL3)
Analog	inputs	40 (SIL2) / 20 (SIL3)
Max. number of decentralized inputs/outputs	On PROFINET®: up to 128 stations with up to 10 safety extension modules	

### Program execution

Cyclical	●
User program protection by password	●

### Interfaces

Ethernet	Via AC500 CPU or PROFINET® coupler
COM	Via AC500 CPU
Programming	Via AC500 CPU

Approvals	CE, cUL, UL, C-Tick and other on request
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# AC500-S and AC500-S-XC

## Technical data

### S500 and S500-XC Safety I/O

Type	DI581-S / DI581-S-XC	DX581-S / DX581-S-XC	AI581-S / AI581-S-XC
Performance Level	PL e (ISO 13849-1)		
Safety Integrity Level	SIL3 (IEC 61508:2010, IEC 62061, IEC 61511)		
Safety protocol	PROFIsafe® V2 via PROFINET®		

#### Digital inputs

Number of channels per module	16 (SIL2) / 8 (SIL3)	8 (SIL2) / 4 (SIL3)	-
Input signal voltage	24 V DC	24 V DC	-
Frequency range	65 Hz	65 Hz	-
Input characteristic acc. to EN61131-2	Type 1	Type 1	-
0 signal	-3...+5 V DC	-3...+5 V DC	-
Undefined signal state	5...15 V DC	5...15 V DC	-
1 signal	15...30 V DC	15...30 V DC	-
Input time delay (0 -> 1 or 1 -> 0)	Input filter configurable from 1, 2, 5...500 ms	Input filter configurable from 1, 2, 5...500 ms	-
Test pulse outputs	8	4	-

#### Input current per channel

At input voltage	24 V DC / 7 mA typically	24 V DC / 7 mA typically	-
	5 V DC / < 1 mA	5 V DC / < 1 mA	-
	15 V DC / > 4 mA	15 V DC / > 4 mA	-
	30 V DC / < 8 mA	30 V DC / < 8 mA	-

#### Digital outputs

Number of channels per module	-	8 (SIL3)	-
Transistor outputs 24 V DC, 0.5 A	-	●	-
Switching of 24 V load	-	●	-

#### Output current

Nominal current per channel	-	500 mA at UP = 24 V	-
Maximum (total current of all channels)	-	4 A / 500 mA / channel	-
Residual current at signal state 0	-	< 0.5 mA	-
Demagnetization when switching off inductive loads	-	By internal suppressor diodes	-

#### Switching frequency

Short-circuit / overload proofness	-	●	-
For inductive load	-	On request	-
For lamp load	-	On request	-
Proofness against reverse feeding of 24 V signals	-	●	-

# AC500-S and AC500-S-XC

## Technical data

### S500 and S500-XC Safety I/O

Type	DI581-S / DI581-S-XC	DX581-S / DX581-S-XC	AI581-S / AI581-S-XC
<b>Analog inputs</b>			
Number of channels per module	-	-	4 (SIL2) / 2 (SIL3)
Input resistance per channel	-	-	125 Ohm
Time constant of the input filter	-	-	10 ms
Conversion cycle	-	-	0.33 ms
Overvoltage protection	-	-	-
<b>Signal resolution for channel configuration</b>			
0...20 mA, 4...20 mA	-	-	14 bits
<b>Process voltage UP</b>			
Nominal voltage	24 V DC		
Maximum ripple	5 %		
Reverse polarity protection	●		
Fuse for process voltage UP	10 A miniature fuse		
Connections for sensor voltage supply	●		
Terminal 24 V and 0 V			
Conversion error of analog values caused by non-linearity, calibration errors ex and the resolution in the nominal range	-	-	±1.5 %
<b>Maximum cable length for connected process signals</b>			
Shielded cable	1000 m	1000 m	-
Unshielded cable	600 m	600 m	-
Max. line length of the analog lines, conductor cross section > 0.14 mm <sup>2</sup>	-	-	100 m
<b>Potential isolation</b>			
Per module	●		
Fieldbus connection	Via AC500 CPU or PROFINET® coupler		
Voltage supply for the module	Internally via extension bus interface (I/O bus)		
Approvals	CE, cUL, UL, C-Tick and other on request		

# AC500-S

## System data

### Operating and ambient conditions

Voltages according to EN 61131-2		
24 V DC	Process and supply voltage	24 V DC (-15 %, +20 % without ripple)
	Absolute limits	19.2...30 V inclusive ripple
	Ripple	< 5 %
	Protection against reverse polarity	Yes
Allowed interruptions of power supply acc. to EN 61131-2	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s
	<b>Important:</b> Exceeding the maximum power supply voltage (> 30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.	
Temperature	Operation	0...60 °C (horizontal mounting of modules)
		0...40 °C (vertical mounting of modules and output load reduced to 50 % per group)
	Storage	-40...+70 °C
Humidity	Transport	-40...+70 °C
		Max. 95 %, without condensation
Air pressure	Operation	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m

6

### Creepage distances and clearances

Insulation Test Voltages, Routine Test, according to EN 61131-2	AC voltage during 2 seconds
24 V circuits (supply, 24 V inputs/outputs), if they are electrically isolated against other circuitry	350 V

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

# AC500-S

## System data

### Power supply units

For the supply of the modules, power supply units according to PELV specifications must be used.

### Electromagnetic Compatibility

#### Immunity

<b>Against electrostatic discharge (ESD)</b>		According to EN 61000-4-2, zone B, criterion B
Electrostatic voltage in case of	air discharge	±8 kV
	contact discharge	±4 kV
<b>ESD with communication connectors</b>		In order to prevent operating malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.
<b>ESD with connectors of Terminal Bases</b>		The connectors between the Terminal Bases and CPUs or Communication Modules must not be touched during operation. The same is valid for the I/O-Bus with all modules involved.
<b>Against the influence of radiated (CW radiated)</b>		According to EN 61000-4-3, zone B, criterion A
Test field strength		10 V/m
<b>Against transient interference voltages (burst)</b>		According to EN 61000-4-4, zone B, criterion B
Supply voltage units	DC	2 kV
	Digital inputs/outputs	2 kV
	Analog inputs	1 kV
<b>Against the influence of line-conducted interferences (CW conducted)</b>		According to EN 61000-4-6, zone B, criterion A
Test voltage		10 V zone B
<b>High energy surges</b>		According to EN 61000-4-5, zone B, criterion B
Power supply	DC	1 kV CM (1) / 0.5 kV DM (2)
	DC I/O supply, add. DC-supply-out	0.5 kV CM (2) / 0.5 kV DM (2)
	I/O analog, I/O DC unshielded	1 kV CM (2) / 0.5 kV DM (2)
<b>Radiation (radio disturbance)</b>		According to EN 55011, group 1, class A

(1) High requirement for shipping classes is achieved with additional specific measures (see specific documentation).

(2) CM = Common Mode; DM = Differential Mode.

### Mechanical Data

#### Wiring method / terminals

<b>Mounting</b>	Horizontal (DIN rail mounting)
<b>Degree of protection</b>	IP20
<b>Housing</b>	According to UL 94
<b>Vibration resistance acc. to EN 61131-2</b>	all three axes (DIN rail mounting)
	5...11.9 Hz, continuous 3.5 mm
	11.9...150 Hz, continuous 1 g
<b>Shock resistance</b>	All three axes
	15 g, 11 ms, half-sinusoidal

#### Mounting of the modules

<b>DIN rail according to DIN EN 50022</b>	35 mm, depth 7.5 mm or 15 mm
<b>Mounting with screws</b>	Screws with a diameter of 4 mm
<b>Fastening torque</b>	1.2 Nm

# AC500-S-XC

## System data

### Operating and ambient conditions

Voltages according to EN 61131-2		
24 V DC	Process and supply voltage	24 V DC (-25 %, +30 % without ripple)
	Absolute limits	18...31.2 V inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	Yes
Allowed interruptions of power supply acc. to EN 61131-2	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s
<b>Important:</b> Exceeding the maximum power supply voltage (> 30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.		
Temperature	Operation	-40...+70 °C (horizontal mounting of modules)
		-40...+40 °C (vertical mounting of modules and output load reduced to 50 % per group)
	Storage	-40...+85 °C
	Transport	-40...+85 °C
Humidity		Max. 100 %, with condensation
Air pressure	Operation	620...1080 hPa / (-1000...4000 m)
		> 2000 m (< 795 hPa): max. operating temperature must be reduced by 10 °C.
	Storage	> 620 hPa / < 4000 m

6

### Creepage distances and clearances

Insulation Test Voltages, Routine Test, according to EN 61131-2	AC voltage during 2 seconds
24 V circuits (supply, 24 V inputs/outputs), if they are electrically isolated against other circuitry	350 V

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

# AC500-S-XC

## System data

### Power supply units

For the supply of the modules, power supply units according to PELV specifications must be used.

### Electromagnetic Compatibility

#### Immunity

<b>Against electrostatic discharge (ESD)</b>		According to EN 61000-4-2, zone B, criterion B
Electrostatic voltage in case of	air discharge	±8 kV
	contact discharge	±4 kV
<b>ESD with communication connectors</b>		In order to prevent operating malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.
<b>ESD with connectors of Terminal Bases</b>		The connectors between the Terminal Bases and CPUs or Communication Modules must not be touched during operation. The same is valid for the I/O-Bus with all modules involved.
<b>Against the influence of radiated (CW radiated)</b>		According to EN 61000-4-3, zone B, criterion A
Test field strength		10 V/m
<b>Against transient interference voltages (burst)</b>		According to EN 61000-4-4, zone B, criterion B
Supply voltage units	DC	2 kV
	Digital inputs/outputs	2 kV
	Analog inputs	1 kV
<b>Against the influence of line-conducted interferences (CW conducted)</b>		According to EN 61000-4-6, zone B, criterion A
Test voltage		10 V zone B
<b>High energy surges</b>		According to EN 61000-4-5, zone B, criterion B
Power supply	DC	1 kV CM (1) / 0.5 kV DM (2)
	DC I/O supply, add. DC-supply-out	0.5 kV CM (2) / 0.5 kV DM (2)
	I/O analog, I/O DC unshielded	1 kV CM (2) / 0.5 kV DM (2)
<b>Radiation (radio disturbance)</b>		According to EN 55011, group 1, class A

(1) High requirement for shipping classes is achieved with additional specific measures (see specific documentation).

(2) CM = Common Mode; DM = Differential Mode.

### Mechanical Data

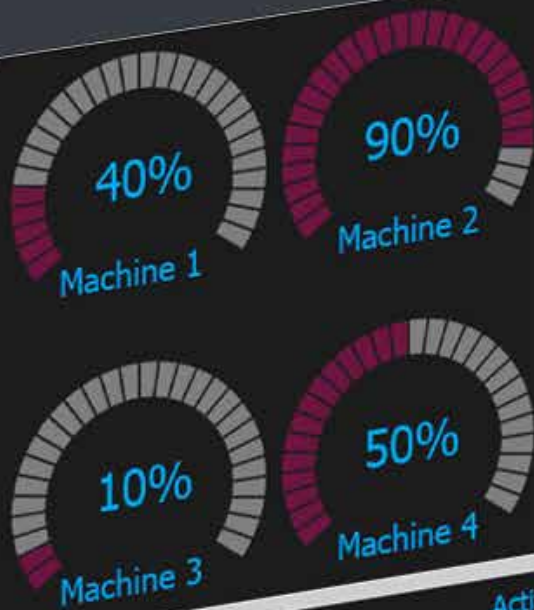
#### Wiring method / terminals

<b>Mounting</b>	Horizontal (DIN rail mounting)
<b>Degree of protection</b>	IP20
<b>Housing</b>	According to UL 94
<b>Vibration resistance acc. to EN 61131-2</b>	all three axes (DIN rail mounting)
	5...11.9 Hz, continuous 3.5 mm
	11.9...150 Hz, continuous 1 g
<b>Shock resistance</b>	All three axes
	15 g, 11 ms, half-sinusoidal

#### Mounting of the modules

<b>DIN rail according to DIN EN 50022</b>	35 mm, depth 7.5 mm or 15 mm
<b>Mounting with screws</b>	Screws with a diameter of 4 mm
<b>Fastening torque</b>	1.2 Nm





Active Alarms						Severity	Enable
Select	Name	State	Value	Time	Description		
<input type="checkbox"/>	Alarm1	Not Triggered Not Acked	0	12.11.2015 14:30:55	machine 1	3-normal	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Alarm2	Triggered Not Acked	1	12.11.2015 14:30:56	machine 2	5-high	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Alarm3	Not Triggered Not Acked	0	12.11.2015 14:30:57	machine 3	6-critical	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Alarm4	Triggered Not Acked	1	12.11.2015 14:30:58	machine 4	0-not important	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Alarm5	Not Triggered	0	12.11.2015 14:30:21	filter 1	1-low	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Alarm6	Not Triggered	0	12.11.2015 14:30:21	filter 2	1-low	<input checked="" type="checkbox"/>

14:32

CHECK / UNCHECK ALL Filter: Show All

ACK RESET SAVE

14:32

MACHINE 1

MACHINE 2

MACHINE 3

MACHINE 4

PLANT 2

PLANT 3

12-11-2015

14:32

# CP600-eCo and CP600

## Control panels

<a href="#">Key features</a>	<a href="#">7/148</a>
<a href="#">Ordering data</a>	<a href="#">7/149</a>
<a href="#">Technical data</a>	<a href="#">7/150</a>

# CP600-eCo and CP600

## Key features

- Front protection IP66
- Engineering software Panel Builder 600 integrated in Automation Builder

- Two versions available:
  - CP600-eCo / CP600: Configuration with Panel Builder 600 for clear tailor made visualization.
  - CP600-WEB: visualization of AC500 web server V2.3 with Automation Builder visualization.



- Brilliant colored display
- Use easily tags from PLC, drives, motion controller and robots configuration within Automation Builder

- Slim design for easily installation even in compact spaces
- Robust plastic housing
- Front protection IP66

# CP600-eCo and CP600

## Ordering data



CP607

### CP600-eCo control panels

Display size	Resolution pixels	Description	Type	Order code	Price	Weight (1 pce) kg
4.3"	480 x 272	for PB610-B Panel Builder 600 BASIC applications	CP604	1SAP504100R0001		0.400
7.0"	800 x 480	for PB610-B Panel Builder 600 BASIC applications	CP607	1SAP507100R0001		0.600
10.1"	1024 x 600	for PB610-B Panel Builder 600 BASIC applications	CP610	1SAP510100R0001		1.000



CP665

### CP600 control panels

Display size	Resolution pixels	Description	Type	Order code	Price	Weight (1 pce) kg
4.3"	480 x 272	for PB610 Panel Builder 600 applications	CP620	1SAP520100R0001		0.950
4.3"	480 x 272	for AC500 web server V2.3 visualization	CP620-WEB	1SAP520200R0001		0.950
5.7"	320 x 240	for PB610 Panel Builder 600 applications	CP630	1SAP530100R0001		1.150
5.7"	320 x 240	for AC500 web server V2.3 visualization	CP630-WEB	1SAP530200R0001		1.150
7.0"	800 x 480	for PB610 Panel Builder 600 applications	CP635	1SAP535100R0001		1.100
7.0"	800 x 480	black, for PB610 Panel Builder 600 applications	CP635-B (*)	1SAP535100R2001		1.100
7.0"	800 x 480	for AC500 web server V2.3 visualization	CP635-WEB	1SAP535200R0001		1.100
10.4"	800 x 600	for PB610 Panel Builder 600 applications	CP651	1SAP551100R0001		2.100
10.4"	800 x 600	for AC500 web server V2.3 visualization	CP651-WEB	1SAP551200R0001		2.100
12.1"	800 x 600	for PB610 Panel Builder 600 applications	CP661	1SAP561100R0001		2.800
12.1"	800 x 600	for AC500 web server V2.3 visualization	CP661-WEB	1SAP561200R0001		2.800
13.3"	1280 x 800	for PB610 Panel Builder 600 applications	CP665	1SAP565100R0001		2.600
13.3"	1280 x 800	for AC500 web server V2.3 visualization	CP665-WEB	1SAP565200R0001		2.600
15"	1024 x 768	for PB610 Panel Builder 600 applications	CP676	1SAP576100R0001		3.800
15"	1024 x 768	for AC500 web server V2.3 visualization	CP676-WEB	1SAP576200R0001		3.800

(\*) Other control panels with black front on request.



CP635-B

### CP600 control panels, sanitary design

Display size	Resolution pixels	Description	Type	Order code	Price	Weight (1 pce) kg
7.0"	800 x 480	stainless steel frame, front: IP69K, blue for PB610 Panel Builder 600 applications	CP635-FB	1SAP535110R6001		1.500
7.0"	800 x 480	stainless steel frame, front: IP69K, white for PB610 Panel Builder 600 applications	CP635-FW	1SAP535110R1001		1.500



CP635-FB

### Communication cables (connection control panel <--> PLC)

Description	Type	Order code	Price	Weight (1 pce) kg
Communication cable RS232: CP600(-eCo) - AC500	TK681	1SAP500981R0001		0.130
Communication cable RS485: CP600(-eCo) - AC500-eCo	TK682	1SAP500982R0001		0.130

### Programming software

Description	Type	Order code	Price	Weight (1 pce) kg
PB610 Panel Builder 600, engineering tool for CP600-eCo, CP600 control panels and PB610-R PC-runtime, for stand-alone installation via Automation Builder installer. PB610 is included in Automation Builder Standard.	PB610	1SAP500900R0101		0.005
PB610-R Panel Builder 600 runtime for running a PB610 application on one Windows 32-/64-Bit platform. Installation via Automation Builder installer.	PB610-R	1SAP500901R0101		0.005



# CP600-eCo series

## Technical data

Type	CP604	CP607	CP610
Application	control panels for PB610 Panel Builder 600 applications		
Display			
Exact display size diameter	4.3" widescreen	7" widescreen	10.1" widescreen
Resolution	480 x 272 pixels	800 x 480 pixels	1024 x 600 pixels
Display type, colors	TFT-LCD, 65536 colors		
Touch screen material	glass covered by plastic film		
Touch screen type	analog restitive, 4 wires		
Backlight type, life	LED, 20 000 h typ at 25 °C		
Brightness	150 cd/m²	200 cd/m²	
Housing			
Protection class front, rear	IP66, IP20		
Front frame material	Plastic		
Reverse side material	Plastic		
System resources			
Processor type	ARM 3352		
Operating system, version	Linux V3		
Application memory	for HMI projects of 30 MB in total plus 30 MB for fonts		
Interfaces			
Ethernet ports, number, type	1 - 10/100 Mbit		
USB Host ports number, type	1 - ver. 2.0		
Serial ports number, type	1 - RS-232/-485/-422 software configurable		
Additional ports number, type	none		
Card slot number, type	none		
Power supply voltage nominal, tolerance	24 V DC, 18...32 V DC		
Current consumption at nominal voltage	0.1 A	0.15 A	0.25 A
Battery type	Supercapacitor, 72 h at 25 °C		
Weight	0.4 kg	0.6 kg	1.0 kg
Faceplate dimensions (L x H)	147 mm x 107 mm	187 mm x 147 mm	282 mm x 197 mm
Faceplate depth	5 mm		6 mm
Housing depth	29 mm		
Cutout dimensions (L x H)	135 mm x 96 mm	176 mm x 136 mm	271 mm x 186 mm
Environmental conditions			
Operating temperature range	0...50 °C		
Operating humidity range	5...85 % relative humidity, non-condensing		
Storage temperature range	-20...+70 °C		
Storage humidity range	5...85 % relative humidity, non-condensing		
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>		

# CP600 series

## Technical data

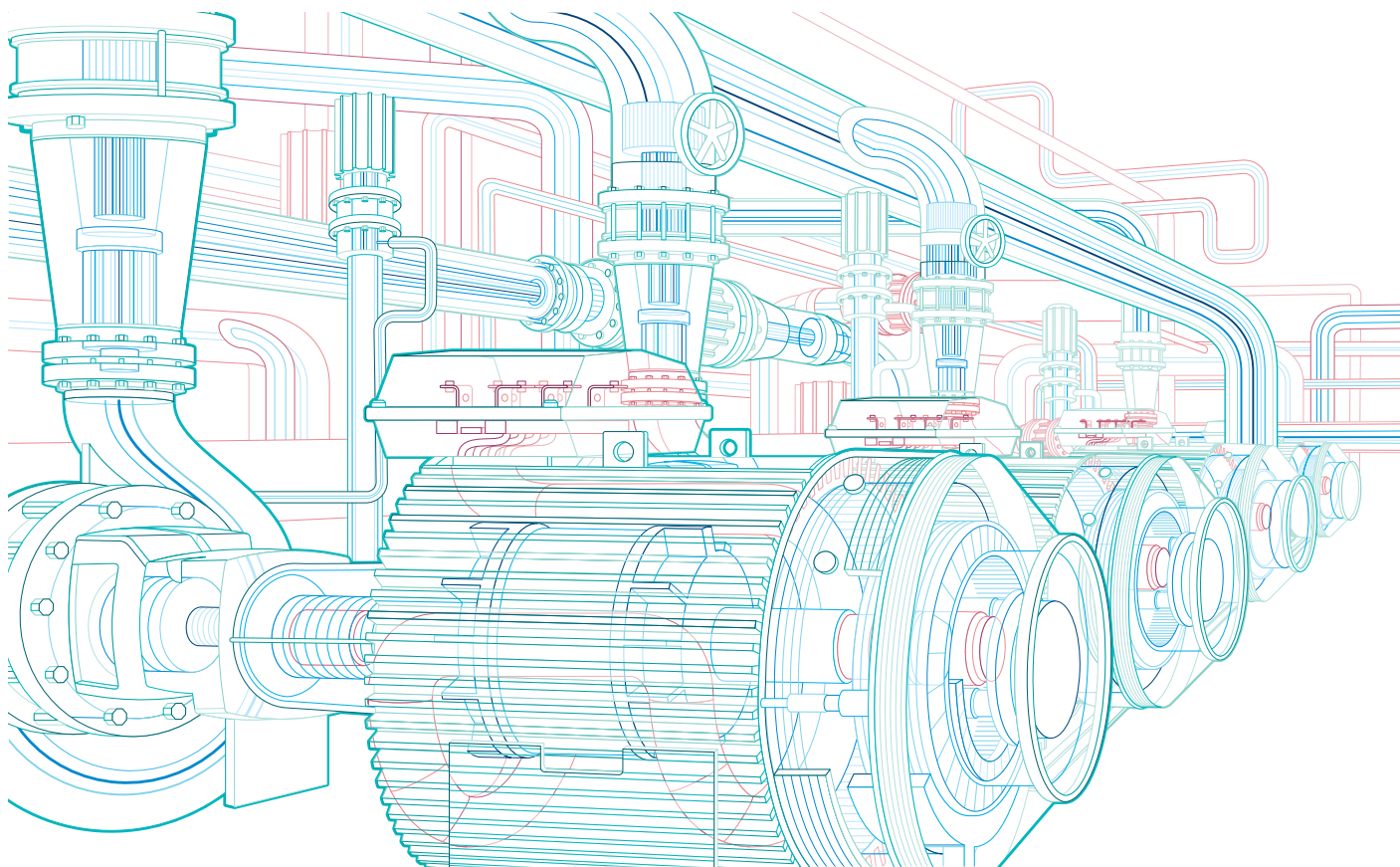
Type	CP620	CP630	CP635, CP635-B	CP651	CP661	CP665	CP676
Application	control panels for PB610 Panel Builder 600 applications						
Type	CP620-WEB	CP630-WEB	CP635-WEB	CP651-WEB	CP661-WEB	CP665-WEB	CP676-WEB
Application	control panels for visualization of AC500 web server V2.3 applications, provided by AC500, AC500-eCo PLCs						
Display							
Exact display size diameter	4.3" widescreen	5.7"	7" widescreen	10.4"	12.1"	13.3" widescreen	15"
Resolution	480 x 272 pixels	320 x 240 pixels	800 x 480 pixels	800 x 600 pixels	800 x 600 pixels	1280 x 800 pixels	1024 x 768 pixels
Display type, colors	TFT-LCD, 65536 colors						
Touch screen material	glass covered by plastic film						
Touch screen type	analog resistive, 4 wires						
Backlight type, life	LED, 40 000 h typ at 25 °C						
Brightness	150 cd/m²	200 cd/m²	300 cd/m²				
Housing							
Protection class front, rear	IP66, IP20						
Front frame material	Zamak			Aluminium			
Reverse side material	Zamak	Aluminium					
System resources							
Processor type	ARM Cortex A8: 600 MHz			ARM Cortex A8: 1 GHz			
Operating system, version	Microsoft Windows CE 6.0 Core						
Application memory	for HMI projects of up to 30 MB in total			for HMI projects of up to 60 MB in total			
Interfaces							
Ethernet ports, number, type	2 - 10/100 Mbit (with integrated switch function)						
USB Host ports number, type	1 - ver. 2.0	2 - 1 ver. 2.0, 1 ver. 2.0 and ver. 1.1					
Serial ports number, type	1 - RS-232/-485/-422 software configurable						
Additional ports number, type	1 - Expansion slot for future modules	2 - Expansion slots for future modules					
Card slot number, type	1 - SD card slot						
Power supply voltage nominal, tolerance	24 V DC, 18...32 V DC						
Current consumption at nominal voltage	0.4 A	0.7 A	0.7 A	1.0 A	1.05 A	1.15 A	1.4 A
Battery type	Rechargeable Lithium battery, not user-replaceable						
Weight	0.95 kg	1.15 kg	1.1 kg	2.1 kg	2.8 kg	2.6 kg	3.8 kg
Faceplate dimensions (L x H)	147 mm x 107 mm	187 mm x 147 mm		287 mm x 232 mm	336 mm x 267 mm		392 mm x 307 mm
Faceplate depth	4 mm						
Housing depth	52 mm	47 mm		56 mm			60 mm
Cutout dimensions (L x H)	136 mm x 96 mm	176 mm x 136 mm		276 mm x 221 mm	326 mm x 256 mm		381 mm x 296 mm
Environmental conditions							
Operating temperature range	0...50 °C						
Operating humidity range	5...85 % relative humidity, non-condensing						
Storage temperature range	-20...+70 °C						
Storage humidity range	5...85 % relative humidity, non-condensing						
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>						

# CP600 sanitary design

## Technical data

Type	CP635-FB	CP635-FW
Application	control panels, sanitary design for PB610 Panel Builder 600 applications	
Display		
Exact display size diameter	7" widescreen	
Resolution	800 x 480 pixels	
Display front color	blue, RAL 5010	white, RAL 9003
Display type, colors	TFT type, 65535 colors	
Touch screen material	glass covered by protection foil	
Touch screen type	PCAP, projective capacitive touchscreen	
Backlight type, life time	LED, 40 000 h typ at 25 °C	
Brightness	400 cd/m²	
Housing		
Protection class front, rear	IP69K, IP20	
Front frame material	stainless steel	
Reverse side material	aluminium	
System resources		
Processor type	ARM Cortex A8: 1 GHz	
Operating system, version	Microsoft Windows CE 6.0 Core	
Memory	for HMI projects of up to 60 MB in total	
Interfaces		
Ethernet ports, number, type	2 - 10/100 Mbit (with integrated switch function)	
USB Host ports, number, type	2 - 1 ver. 2.0, 1 ver. 2.0 and ver. 1.1	
Serial ports number, type	1 - RS-232/-485/-422 software configurable	
Additional ports number, type	2 - Expansion slots for future modules	
Card slot number, type	1 - SD card slot	
Power supply voltage nominal, tolerance	24 V DC, 18...32 V DC	
Current consumption at nominal voltage	0.9 A	
Backup power type, capacity	Rechargeable Lithium battery, not user-replaceable	
Weight	1.5 kg	
Faceplate dimensions (L x H)	215 mm x 175 mm	
Faceplate depth	9.5 mm	
Housing depth	46 mm	
Cutout dimensions (L x B)	176 mm x 136 mm	
Environmental conditions		
Operating temperature range	-20...+60 °C	
Operating humidity range	5...85 % relative humidity, non-condensing	
Storage temperature range	-40...+85 °C	
Storage humidity range	5...85 % relative humidity, non-condensing	
Approvals	See detailed page 176 or <a href="http://www.abb.com/plc">www.abb.com/plc</a>	







# Application descriptions and additional information

## Application descriptions

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# Application descriptions

## Network architecture

### Communication with AC500 – the perfect solution

Flexibility, real-time capability and maximum data transfer speed are just some of the communication demands automation systems must meet. With the AC500, ABB has developed a communication platform offering customer-oriented solutions for the most diverse communication tasks. Simple network configuration and diagnostics options using Automation Builder enable ease of planning, implementation and commissioning thus saving engineering time and project costs. Among others, ABB's AC500 supports the following communication protocols:

#### PROFIBUS DP®

PROFIBUS DP® delivers flexible configuration by means of a mono- and multi-master system structure and data transfer rates of up to 12 Mbit/s with twisted pair cables and/or optical fibers. PROFIBUS DP® allows for the connection of up to 126 devices (master/slave) to one bus segment thus enabling simple and reliable communication solutions.

#### PROFINET®

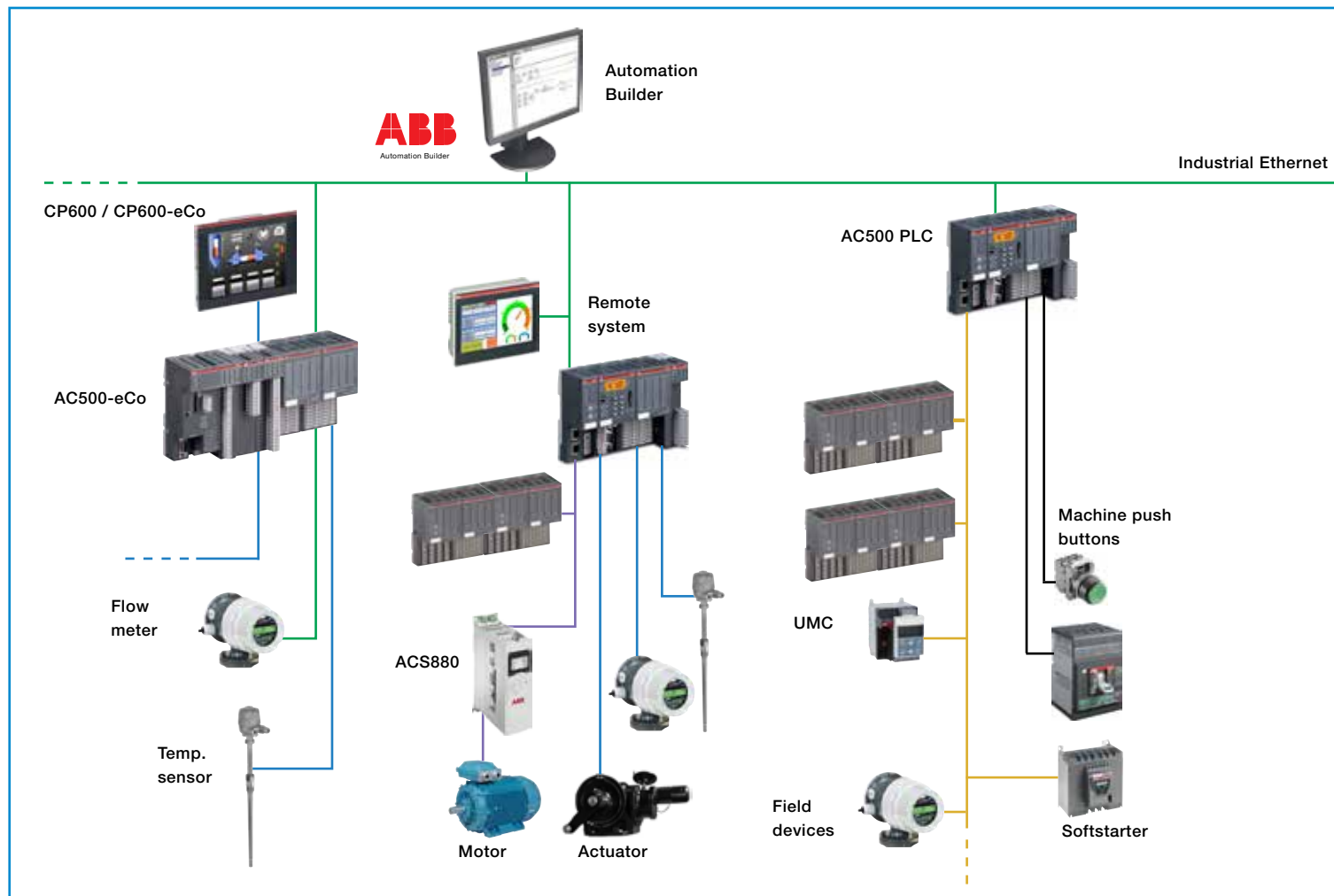
PROFINET® I/O meets the stringent requirements for real time Ethernet protocols in the world of automation. Very fast data transfer, integrated and standardized network structures from controller to field and flexible network management support users in the implementation of their automation solutions.

#### CANopen®

With up to 127 participants and transmission speeds of 10 kbit/s up to 1 Mbit/s depending on bus length, CANopen® offers high-speed data transfer and high immunity in master/slave network topologies.

#### CS31-Bus and RCOM

CS31-Bus is a high-performance, proprietary ABB communication standard featuring data transfer speeds of up to 187.5 kbit/s and enabling up to 31 bus participants to communicate via RS485, simple telephone cable or optical fiber. RCOM is a proprietary ABB bus protocol for master/slave communication via RS232/485. Expandable to 254 RCOM slaves.





### Modbus® TCP & RTU

Modbus® RTU is an open serial data protocol for master/slave networks of up to 31 network nodes. Different bus lengths depending on the type of serial communication interface enable data transfer speeds of up to 115.2 Kbit/s. Modbus® TCP is a common Ethernet-based network protocol.

### Ethernet and Internet

Integrated communication, high data transfer rates and the use of existing data networks enable simple, customer-specific solutions. Supported protocols are:

- HTTP for web server. Visualization for remote operation and maintenance
- FTP for data file transfer
- Simple Network Time Protocol (SNTP) offering PLC time synchronization using Internet-hosted time services
- SMTP for e-mails with attachments
- TCP and UDP ports programmable for project-specific protocols. Library functions available.

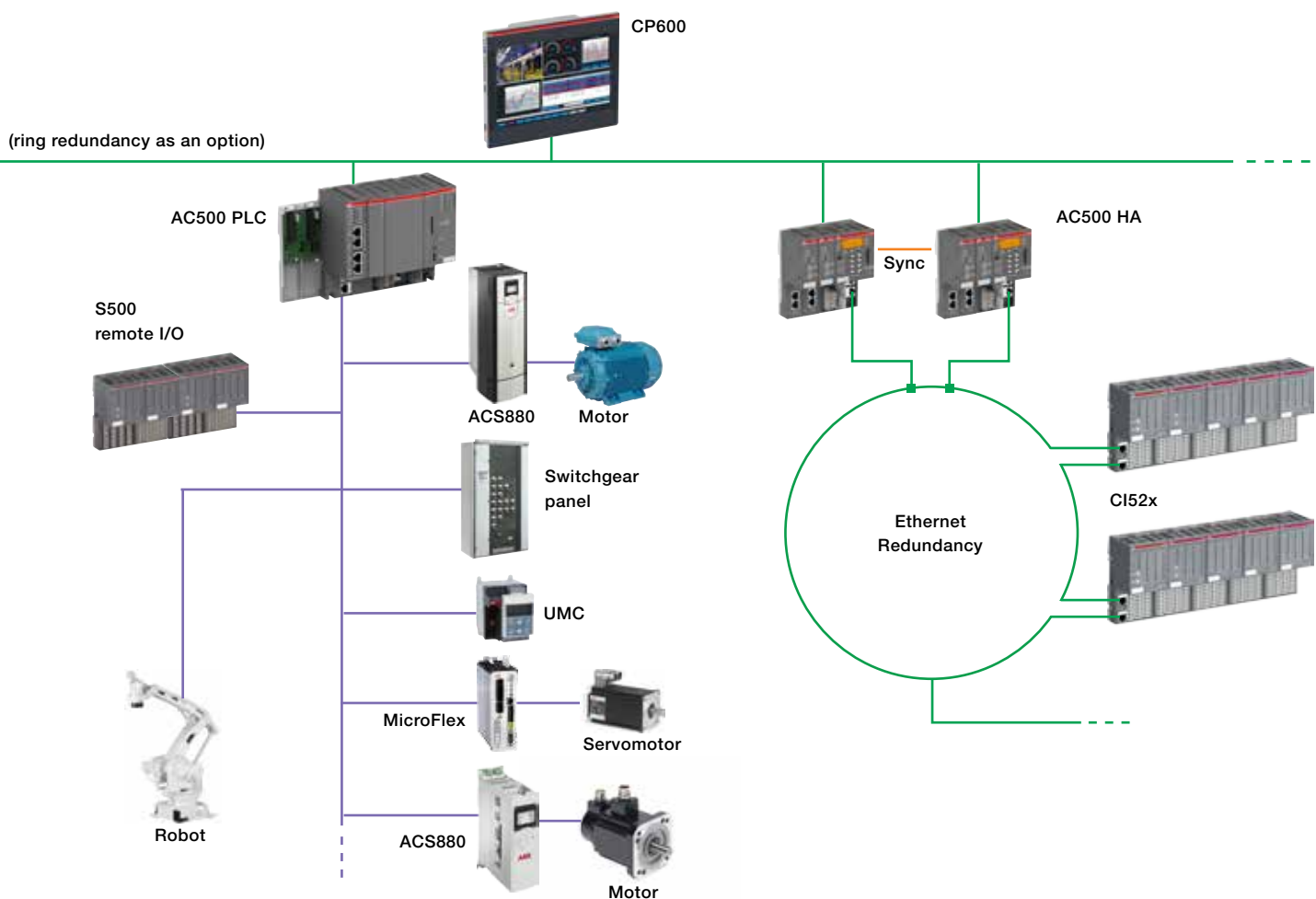
- IEC60870-5-104 telecontrol, mainly used for pipelines, water and waste-water. Suitable for protocol configuration with the Automation Builder software suite.
- DHCP for automatic IP address allocation
- PING for checking the connection with other automation devices

### EtherCAT®

EtherCAT® is an open Industrial Ethernet standard certified according to international standards IEC 61158, IEC 61784 and ISO 15745-4. Thanks to extremely high data transfer speeds, EtherCAT® can serve as real time Ethernet protocol for time critical motion control applications. Whether for "cam switch" functionalities or diverse master/slave network configurations, AC500 delivers the perfect solution for your application.

### BACnet

An object oriented open Infrastructure and Building Automation protocol supported by a Server Library (B-ASC) for OEM and project use cases.



# Application descriptions

## AC500 HA offers hot standby redundancy

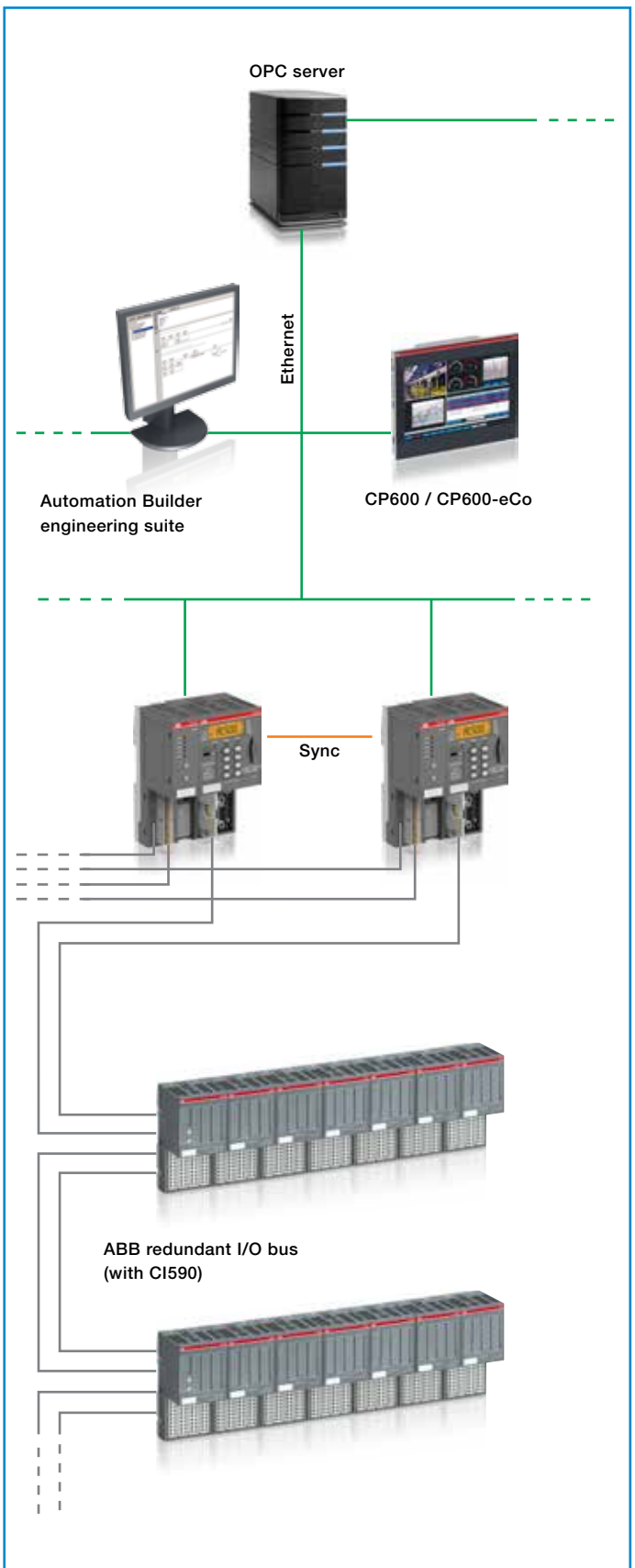
### Performance is the key

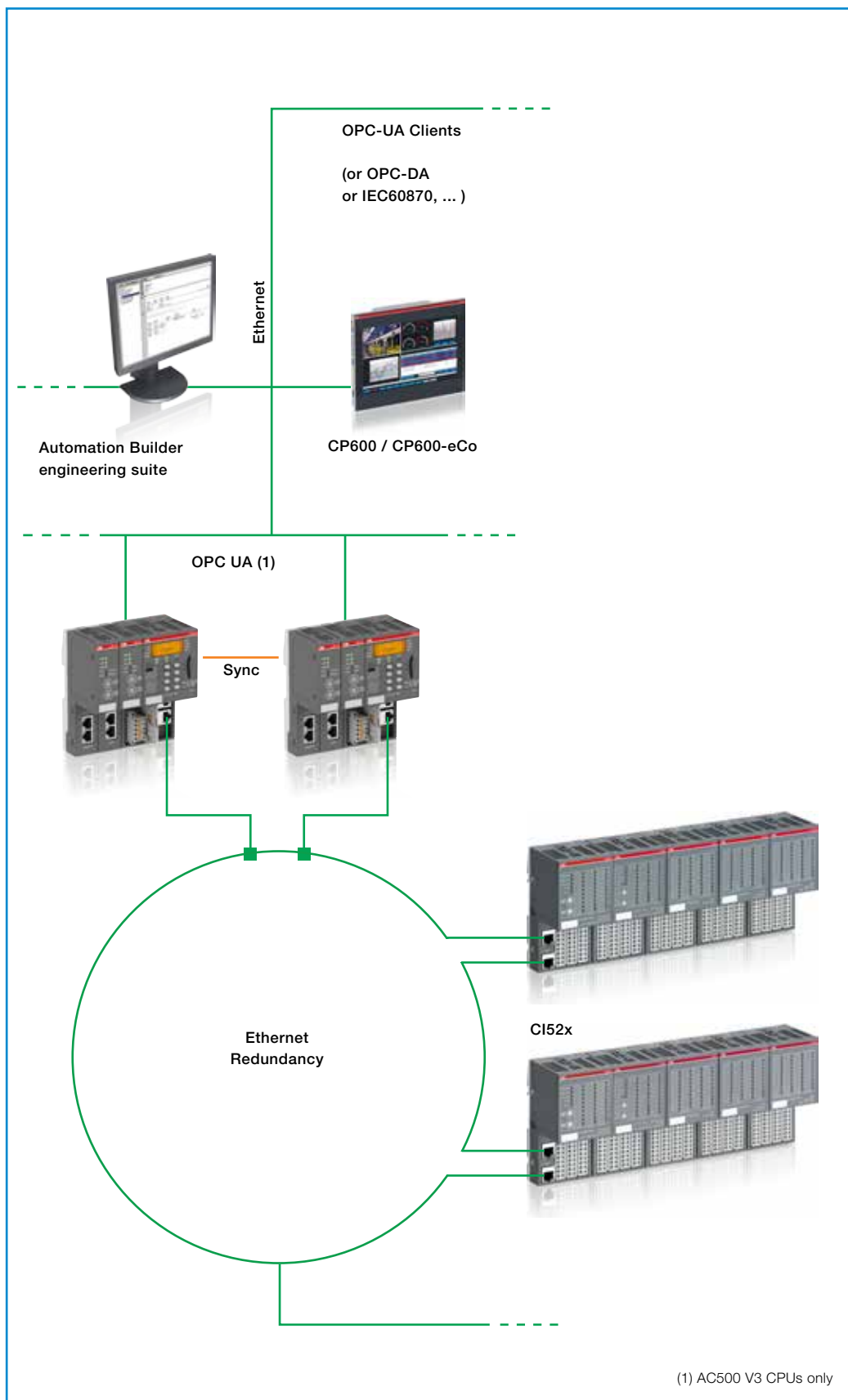
The high availability of AC500 HA prevents downtime caused by either human error or cabling/hardware/software malfunction. Redundant CPUs and the redundant I/O communication reduce the risk of total system failure, thus enhancing system availability.

If critical data retention and the avoidance of downtime are paramount to your application, ABB's AC500 HA is the perfect solution.

What are the benefits of AC500 HA for your high availability solution?

- Hot standby: Both CPUs (and all communication or bus-lines) are hot: Permanently running in parallel, continuously synchronizing each other and monitoring the system. If the primary CPU is stopped, powered off or crashed, or if an IO communication/cable has failed, the other hot standby CPU takes over immediately by adopting primary status.
- Higher resource utilization, no downtimes caused by cabling/hardware/software failure thanks to redundant CPUs and redundant communication to I/O and SCADA/HMI
- Cost efficiency and easy system maintenance through the use of standard hardware
- High availability is provided with standard CPUs. Cost matching hot standby quality for small or large systems
- 3 cycles or 50 ms changeover time
- Scalable: in both variants: CS31 redundancy bus or Ethernet







# Application descriptions

## Condition Monitoring with AC500 PLC



8

### Controller integrated or stand-alone condition monitoring

The AC500 condition monitoring module FM502 is a natural part of the AC500 platform and Automation Builder engineering suite, and can be used in different condition monitoring concepts, stand-alone or control integrated.

Due to the easy programming in PLC languages, it is usable for a variety of use cases and is especially suitable for plant, line and machine builders as easy extension of their offering.

If controller integrated

- it enables at very reasonable cost
- the best prediction horizon as it can measure online, when best measurement quality is given without scheduling production interruptions
- while continuously protecting the application in real time e.g. with the same or other sensor(s).
- Further inputs can be used as fast data logger e.g. precisely documenting process quality

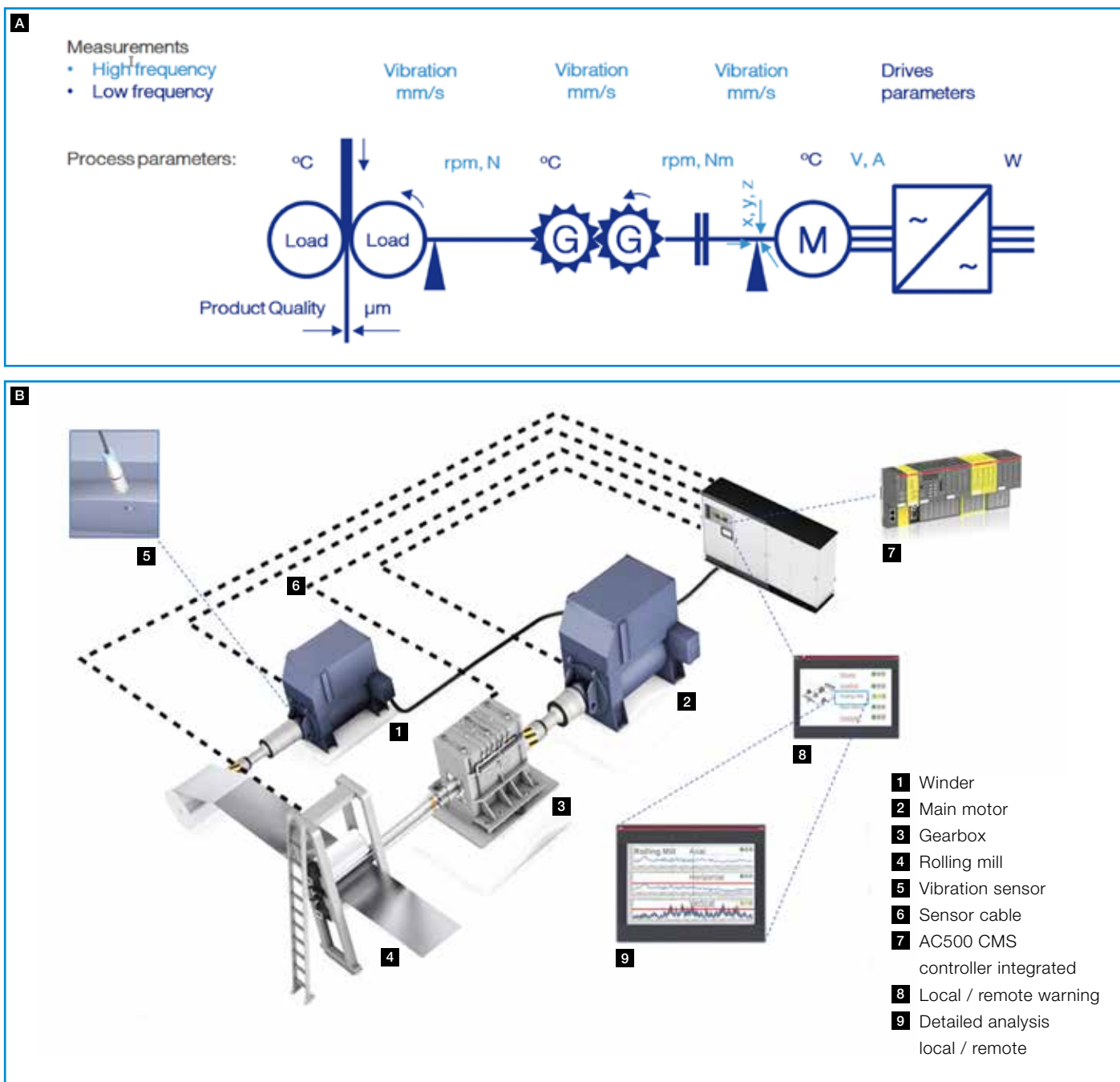
Therefore it is not only able to continually check the mechanical components but also gives fast protection for spontaneous and large failures even while measuring. The condition monitoring mode creates a database internally or externally for predictive maintenance. Automatic and user assisted responses can be enabled to prevent costly consequences including total failures.

As many as 16 vibration sensors + 2 encoder counters can be connected.

The recorded condition monitoring data can be stored in the CPU flash disc before communication or directly analyzed. Higher level indicators can be calculated and communicated to a local or remote HMI or database system.

### Predictive performance for your process or machines

- Easy and cost saving integration of condition monitoring into the AC500 platform
- Early detection of mechanical damages
- Fast protection from spontaneous failures
- Even complex C-code analytics can be used locally for meaningful own performance indicators
- Leads to optimized planning of maintenance instead of fixed, scheduled service and spontaneous repair
- No additional system or fixed software for diagnostics and visualization needed
- Easy storage of the data, locally (4GB) or in remote servers and databases
- Ideally suited also for retrofit of older equipment, as it can make use of mechanical reserves of still valuable equipment



**A** AC500 Condition Monitoring Module FM502-CMS: Controller integrated or stand-alone CMS covering a complete drive train. | **B** Acceleration sensor mounting for integrated condition monitoring in cold rolling mill. With local warnings by key performance indicators, first analysis with detailed verification possibility via CP600 and remote connectivity.

#### Example: Cold rolling mill in steel processing:

- One FM502-CMS module can execute differently configured measurements at the same time and can be reconfigured at runtime
- Several critical and unique components can be protected and condition predicted: Motors, gearbox, process (cold rolling mill)
- Production quality can be logged in parallel in real time
- Remote diagnostics expertise and detailed analysis and reports only in case of warnings

# Application descriptions

## Machine controllers based on AC500 PLC

### From simple to high end motion applications

- Convenient PLC portfolio for diverse applications
  - Simple machine control with AC500-eCo PLC
    - Point-to-point motion with PTO outputs or Modbus communication with the drive
  - Mid-range applications with AC500 PLC
    - EtherCAT communication with the drive or remote I/O and cam-switch for synchronized motion
  - High-end motion application with PM595
    - Axis interpolation e.g. for Delta robot
- Easy integration and excellent scalability using Automation Builder
- Motion library for complex applications

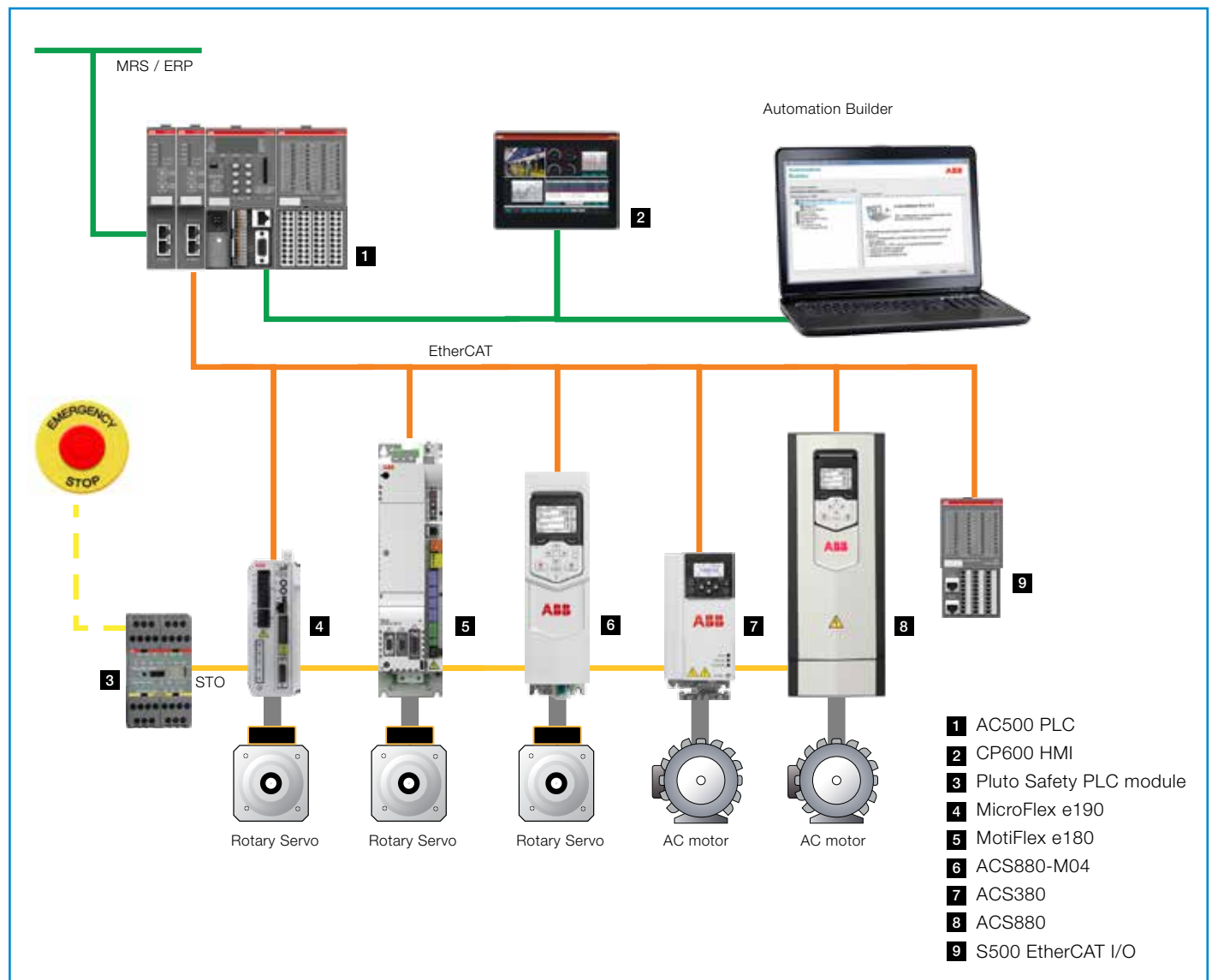
### Multi-axis motion coordination with EtherCAT®

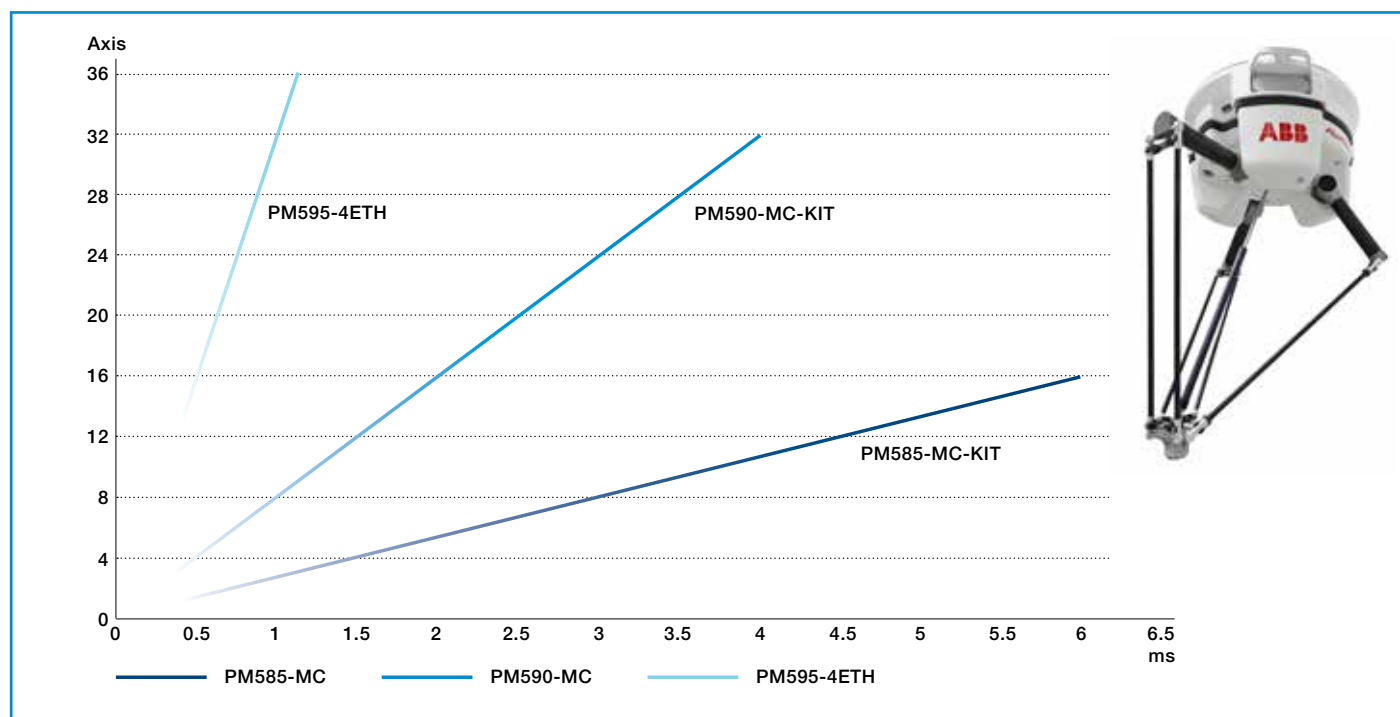
ABB's AC500 PLC using EtherCAT® real-time bus delivers high performance for multi-axis control applications.

The AC500 PLC provides an industry solution with IEC 61131-3 programming and PLCopen® motion functions in combination with ABB drives such as ACS880-M04 fitted with the FECA-01 EtherCAT module for higher power axes or ACS380 drives or with MicroFlex e190.

This popular high-performance motion bus provides simple 'daisy chain' connection.

### EtherCAT multi-axis coordinated motion





Number synchronized Axis / ms

### EtherCAT AC500 machine controller kits

In order to simplify your application, ABB offers products for the implementation of machine control or motion control applications. These products can be purchased individually or as a kit.

Two available EtherCAT kits contain the components required for your application.

Depending on the required performance, the kit provides a powerful CPU, an EtherCAT master communication module and the respective terminal base.

The kit can be expanded using standard I/Os, other communication products or software solutions.

### AC500 Machine controller kits

Program memory kB	Cycle time in $\mu$ s per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
1024	0.004 / 0.008 / 0.008	PM585-ETH, CM579-ETHCAT, TB511-ETH Ethernet (2), 2 x serial, EtherCAT Master	PM585-MC-KIT	1SAP140500R0379		0.500
2048	0.002 / 0.004 / 0.004	PM590-ETH, CM579-ETHCAT, TB521-ETH, TA524 Ethernet (2), 2 x serial, EtherCAT Master	PM590-MC-KIT	1SAP150000R0379		0.500

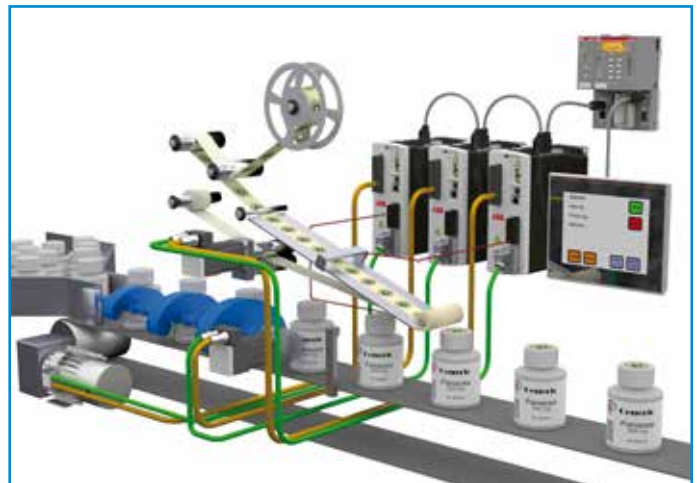
### AC500 CPU PM595

Program memory MB	Cycle time in $\mu$ s per instruction min. Bit/Word/Float. point	Integrated communication	Type	Order code	Price	Weight (1 pce) kg
16	0.0006/0.001/0.001	2 x Ethernet (2 Ports switch), 2 x Ethernet (2), 2 x serial	PM595-4ETH-F	1SAP155500R0279		1.050



# Application descriptions

## PLC based motion solution



### Motion Solution

The Automation Builder Motion Solution provides users of motion systems with a fast and simple method of creating and configuring a PLC motion application. The tools provided in the solution guide the user through the necessary steps. Only a minimal amount of application specific data needs to be entered before a PLC project is automatically generated. The output of the Motion Solution contains all of the mandatory configurational information and project settings in a state ready to start creating the application specific code.

The Motion Solution separates the application's axis settings from the hardware, giving a clearer view of the system configuration which is easier to navigate. The Generation feature automatically creates a project template from the entered data which includes adding libraries, tasks, programs, setup data and function blocks.

### Easy workflow

The configuration process starts by creating a motion project, selected from within the new solutions category. The application is then built by selecting the CPU module, the EtherCAT® coupler and adding the required drives.

The solution manager is included in Automation Builder's device tree and allows the user to define application specific data, create axes and then generates a configured PLC program framework.

### Axis setup

Within the Motion Solution each axis can be defined and configured. Essential axis related information can be entered for each axis. The values set here are used to define the top level behaviour of the axis and are transferred into the PLC project when the application code is generated.

In addition, the PLC to drive communications setup can be configured to define the data that will be exchanged during machine operation.

### Real time data validation

All entered data is validated in real time, missing or inappropriate settings are identified and can be easily corrected. Entered data can be directly accessed for review or edit at any time by clicking on and displaying the relevant screen and tab. A final check of entered data is made during the Generate process, errors are listed and can be corrected before completing the process.

### Automatically generated code

During the Generate operation the motion library is added, global data is defined for each axis, a high priority task is configured, synchronised to the EtherCAT® cycle and programs included for each axis including the core motion functionality.

### Fast configuration

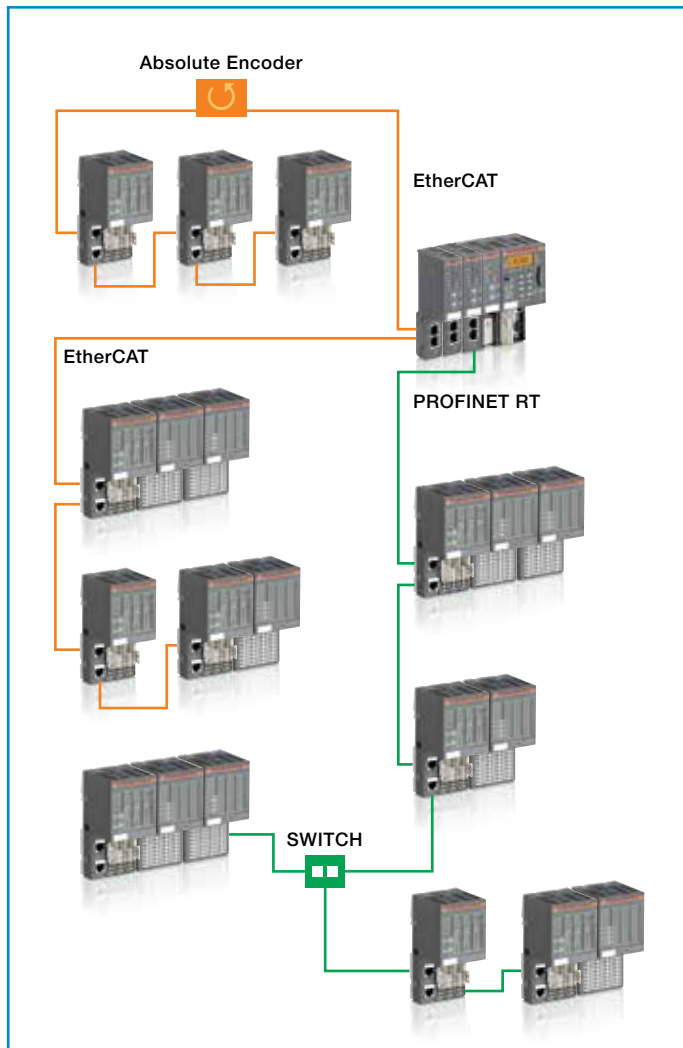
Motion applications can be created easily and rapidly within Automation Builder. The Motion Solution retains the same intuitive interface that is familiar to users of Automation Builder.

### Machine controllers based on AC500 PLC

- PM5650-2ETH + TB5620-2ETH - AC500 V3 PLC CPU and terminal base with enhanced motion features.
- New PLCopen® motion compliant library with single and multi-axis move function blocks for EtherCAT® drives.
- Integrates with ABB Automation Builder 2.0 and utilises the new Motion Solution configuration assistant.

# Application descriptions

## Real-time Ethernet functionality



### RT-Ethernet modules

Modules are available with two different communication protocols based on Ethernet (PROFINET® I/O, EtherCAT®). Master couplers connect AC500 CPUs to remote I/O modules. Various interface modules offer the connection of decentralized I/O modules to the real-time Ethernet networks.

### Cam-switch functionality

Modules based on the decentralized real-time EtherCAT® interface technology with integrated I/Os and programmed with PLCopen® function blocks are available.

# PLC Trainer AC500

## Training packages with didactic models, software, teachware for schools and universities

### IEC61131-3 based programming of ABB AC500 PLCs for training purposes

The ABB PLC Trainer AC500 addresses learners and students starting from the basic logic programming over motivating exercises up to Ethernet communication tasks and visualization with an integrated web server.

Exercises range from the basic logical functions to best-practice examples for hot water heating with solar panels, parking bay monitoring or IR remote gate control.

Expansion possibilities like Motor or Traffic Light plug-on module and the Solar Tracking module will increase the motivation of the learners.

These training packages are built in cooperation with IKH Didactic Systems.

For more information please visit [www.ikhds.com/abb](http://www.ikhds.com/abb)

### PLC Trainer AC500 basic package

Description:

- 1 ABB PLC Trainer AC500 with AC500-eCo CPU
- 1 Power supply 230 V AC / 24 V DC
- 1 IR remote control without batteries
- 45 Learning cards 110 x 81 mm laminated in transparent storage box
- Programming software, 45 practical exercises and solutions on USB stick
- 1 Programming cable.



ABB PLC trainer AC500

ABB PLC trainer AC500 with plug-on traffic light module

ABB PLC trainer AC500 with plug-on motor module



# AC500-eCo Starter kit

## Getting started is so simple

## More functionality and enhanced scalability

### AC500-eCo Starter kit

The AC500-eCo Starter kit helps you to get familiar with ABB AC500 PLC offerings and the engineering tool within a very short time. Learn how to connect and setup the components provided in the starter kit and how to program the PLC by means of several simple example applications. The starter kit comes with CPU, programming cable, digital input simulator and getting started manual. The latest version of the engineering tool Automation Builder is available via download. The getting started manual is integrated in Automation Builder.

### Easy to use

The AC500-eCo from ABB is a range of uniquely scalable PLCs offering you unrivalled cost effectiveness for modern industrial automation applications. The AC500-eCo integrates perfectly into the AC500 family - this provides you with the option to build customized solutions based on the standard S500 and S500-eCo I/O range.

### Easy to learn

Offering all of the advantages you would expect from the AC500 family of devices, the AC500-eCo delivers an impressive set of powerful programming features. In addition, thanks to the fact that ABB uses a standard IEC61131-3 based programming system for the entire AC500 family, it is a snap to learn and configure.

### Ordering data

Each kit consists of CPU, programming cable and digital input simulator. The engineering tool is available for download at [www.abb.com/automationbuilder](http://www.abb.com/automationbuilder).

CPU module in the starter kit	Programming cable (included)	Type	Order code	Price	Weight (1 pce) kg
PM554-TP-ETH	Ethernet	TA574-D-T-ETH	1SAP186200R0004		1.400



# AC31 adapter for retrofitting existing AC31 applications

## AC500 life cycle management protects your investment



### A long history

During more than 40 years in the PLC business, we have gained experience from hardwired, centralized and distributed PLCs to scalable PLCs. One of our previous product ranges, the AC31 series 90, was succeeded by the AC500 PLC platform.

For the protection of your investments and for ease of migration to the new AC500 PLC generation, ABB provides AC31 adapter modules based on AC500.

The modules have the same footprint, cabling and features as the previous AC31 series 90 products with up-to-date AC500 hardware.

AC31 adapter modules can replace existing AC31 devices with either direct compatible e.g. I/O modules or need adjustments with a new user program for the CPU using Automation Builder software.



### Main characteristics and architecture

The connection locations do not differ from the predecessor hardware and the number or type of I/O channels are comparable. For remote I/O products on the CS31 bus, I/Os of an existing field application can be modified without having to change the application or configuration. New modules can be configured with DIP switches.

Replacing the AC31 PLC with the 07KT98-x-AD PLC requires only minor program modifications using the Automation Builder engineering suite.

### Advantages at a glance

- Compatible with the existing AC31 series 90 remote I/O-modules, optionally with 1-to-1 replacement in the field, no change of application configuration required.
- Footprint identical to predecessor hardware.
- Automation Builder for PLC programming.
- Standard AC500 modules for seamless migration from AC31 to the new AC500.
- Longer life cycle of AC31 through migration to new solution.

### Ordering details

Please contact your local sales organization.



# Additional information

## Services

Services offered for ABB's automation products span the entire asset lifetime, from the moment a customer makes the first inquiry to disposal and recycling of the product. Throughout the life cycle of an asset, ABB provides training, technical support and customized contracts, supported by one of the world's most extensive global sales and service networks.



### Pre-purchase

ABB provides a range of services and support guiding the customers to the ideal products for their applications.

### Order and delivery

Orders can be placed at any ABB office or channel partner. In some countries, ABB also offers an online order tracking system. ABB's sales and service network ensures timely deliveries and also offers express delivery.

### Installation and commissioning

While many customers have the resources to perform installation and commissioning on their own, ABB and its channel partners offer professional installation and start-up services.

### Operation and maintenance

From maintenance assessments, preventive maintenance, reconditioning of spare parts and repairs on-site or in workshops, ABB has all the options covered to keep their customers' processes operational.

### Upgrade and retrofit

Frequently, ABB products can often be upgraded to the latest software or hardware in order to improve the performance of the application. Existing processes can be economically modernized by retrofitting with up-to-date technology.

### Replacement and recycling

ABB provides assistance in the best replacement of products while ensuring disposal and recycling observing the local environmental regulations.

## Additional information

# Life cycle management for maximum return on investment

ABB has developed a PLC life cycle management model aimed at providing proactive services for maximizing availability and performance. This model not only provides optimum support to end-users but also a smooth transition to a new product when the PLC has come to the end of its lifetime.

The life cycle management model divides a product's life cycle into four phases: active, classic, limited and obsolete. Each phase has different implications for the end-user in terms of services provided.

## Product life cycle management model



### Active phase

The active phase starts when the product is launched. In the active phase the end user benefits from different warranty options and other services such as training and technical support. Complete life cycle services from spare parts and maintenance are also provided. The active phase ends when the volume production of a particular PLC ceases and ABB issues an announcement of the life cycle phase change.

### Classic phase

ABB PLC users continue to benefit from complete life cycle services throughout the classic phase. The classic phase is closely aligned with ABB's research and development work to provide continuing support for its PLC products while developing future generations. In the classic phase new hardware and software development may be required to provide the maintenance techniques and upgrades needed to guarantee that the PLC continues to operate at its peak performance. Migration to a new PLC product is recommended before the product has entered the limited phase.

### Limited phase

In the limited phase the product development has come to its end. Spare parts are available as long as components and materials can be obtained. Towards the end of the limited phase, services gradually become obsolete. In addition to the annual life cycle status reviews, ABB issues a life cycle phase change announcement, half a year prior the product becoming obsolete. This is the last opportunity to transfer to new technology before product services end.

### Obsolete phase

The product is transferred to the obsolete phase when it is no longer possible to provide services at reasonable cost or when ABB can no longer support the product technically or the old technology is not available.

### Benefits of life cycle management

PLC life cycle management maximizes the value of the equipment and its maintenance investments by:

- ensuring spare parts and ABB competence availability throughout the lifetime
- enabling efficient product support and maintenance for improved reliability
- adding functionality to the initial product by upgrading or retrofitting
- providing a smooth transition to new technology at the end of the product lifetime

For more information, please see [www.abb.com/plc](http://www.abb.com/plc).

# Additional information

## Automation Builder product life cycle plan

### Product life cycle

ABB is committed to support our customers' installed system base. We want to maximize the useable life of our customers' system investment and provide our customers with the confidence that there is a well-defined support for, and a path forward for existing ABB systems. ABB's product life cycle policy provides advanced notification of planned changes in product availability and support.

This chapter shall not be understood as legally binding. Users are recommended to keep informed about updates by periodically checking relevant life cycle information.

### Predictive releases – continuous delivery

ABB continuously maintains and improves its software products. As part of this effort, we develop and release major versions, minor version and service releases.

Major and minor releases focus on new features whereas service releases deliver corrections and quality improvements. A new service release supersedes and replaces existing service releases within the same major/minor release. All releases contain corrections to issues identified both in ABB test labs as well as reported by our customers.

Release Type	Designation example	Purpose and frequency
Major Release	1.x, 2.x	Deliver new features extending Automation Builder scope
Minor Releases	1.1.x, 1.2.x	Deliver new features within current Automation Builder scope
Service Releases	1.2.1, 1.2.2	Deliver corrections, improvements and updates of existing components

ABB aims for continuous, consistent and coordinated delivery of engineering tool versions and device firmware versions. It is recommended to always use the latest release of Automation Builder.

### Version profiles – compatibility with installed base

ABB aims on maximizing availability and performance of the installed base. In this effort we follow these two principles: The engineering tool shall provide the latest features in best quality. The engineering tool and installed based shall always be compatible.

To meet these requirements Automation Builder introduced version profiles. A version profile contains all Automation Builder software components as released in the latest service release of a specific major/minor version, including respective device firmware versions.

Version profiles can be installed with every release of Automation Builder. Multiple version profiles can be installed in parallel. Each version profile goes through all product life cycle phases. Life cycle statements apply for each version profile and corresponding licenses. The availability of a version profile depends on the life cycle phase it is currently in.

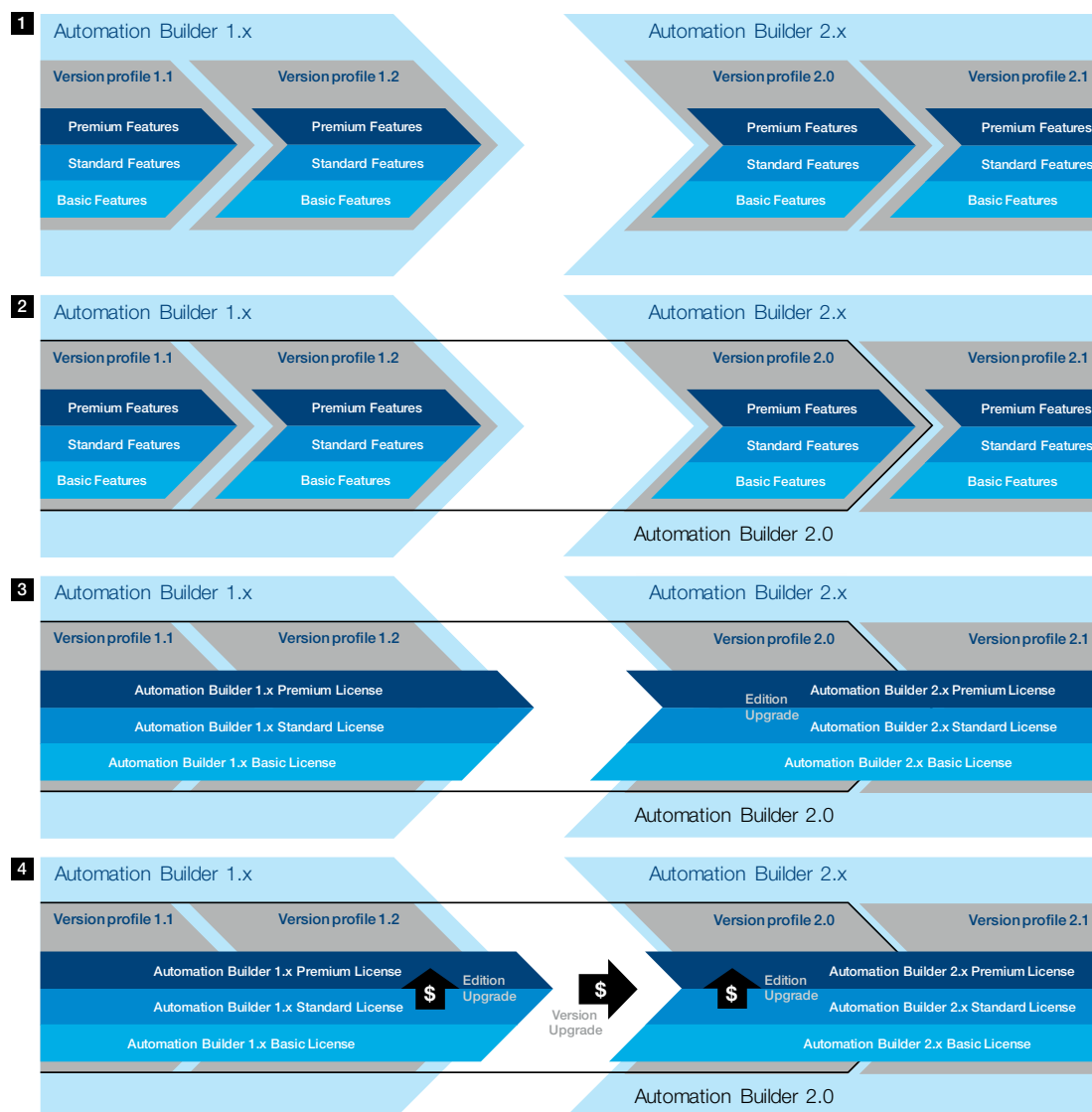
All this allows our users to install the latest version of Automation Builder and keep compatibility with the installed base. Updates of the runtime system are avoided. Latest Automation Builder release always contains the best quality for all profiles. Corrections are distributed via releases and not via hard to track patches.

### Automation Builder life cycle management model

The Automation Builder life cycle management model aims to provide service for maximizing availability and performance, support to end-users and a smooth transition to new product versions when the service life of the current product ends. The model divides a product's life cycle into four phases: active, classic, limited and obsolete. Each phase has different implications for the end-user in terms of software and license availability, services and support provided.

Active	The software product with complete life cycle services is available.
Classic	The software product with complete life cycle services is available for system extensions and spare part engineering.
Limited	The software product is available without maintenance and further corrections. Migration to a newer version is recommended.
Obsolete	Migration to a newer version is recommended.





## Version profiles and licenses

**1** Major versions come in several minor versions, e.g. Automation Builder 1.x comes as Automation Builder 1.1 and 1.2. Version profiles cover different sets of features, e.g. basic, standard and premium feature sets.

**2** An Automation Builder release contains multiple version profiles, each corresponding to a released minor version. E.g. release Automation Builder 2.0 contains version profile 2.0, 1.2, 1.1 and more.

**3** To use a feature a license is required. The license defines which feature set can be used, e.g. a premium license enables you to use the premium feature set. A license

corresponds to a major version of Automation Builder, e.g. Automation Builder 1.x Premium license enables to use the Premium features in version profiles 1.1 and 1.2.

**4** There are two different cases where you have to purchase a new Automation Builder license:

- Edition upgrade: Commercial upgrade from one license option to a higher value license option within the same major version of Automation Builder, e.g. Automation Builder 1.x Standard to Premium.
- Version upgrade: Commercial upgrade from one major Automation Builder version to another, e.g. Automation Builder 1.x to 2.x. – Note: Licenses for Automation Builder 1.x and Automation Builder 2.x can be used in parallel in order to support different version profiles.

# Additional information

## Automation Builder product life cycle plan

### Life cycle phases

#### Active

A newly released version profile of Automation Builder starts in life cycle phase Active. During the Active phase the version profile is available with complete life cycle services.

This means the version profile is available via Automation Builder installation manager from abb.com and will receive ABB's normal product maintenance including enhancements and corrections, and third party software updates.

The version is the base for current sales and active price list. Licenses can be purchased. Support and training is provided.

#### Classic

With release of the next major/minor version the predecesing version profile is going into life cycle phase Classic. During the Classic phase, the version profile with complete life cycle services is available for system extensions and spare part engineering.

8

Classic version profiles are available via Automation Builder installation manager from abb.com and will receive corrections only for critical issues. Classic version profiles are typically available as released in the latest respective service release (and additional corrections). New 3rd party products (e.g. OS) are not supported anymore.

Licenses can be purchased (some exceptions apply – see “Classic-Limited”). Training is not available anymore. Support is provided.

#### Classic-Limited

The Classic-Limited phase corresponds to the Classic phase with the following limitations: Corrections might be available upon request as billable service. Licenses are typically not available anymore but might be available upon request as spare part.

#### Limited

During the Limited phase, the version profile is available without maintenance and further corrections. Migration to a newer version is recommended.

This means it is no longer available from Automation Builder installation manager from abb.com, but could be obtained as offline installations via support. Corrections might be available upon request as billable service. New 3rd party products (e.g. OS) are not supported anymore.

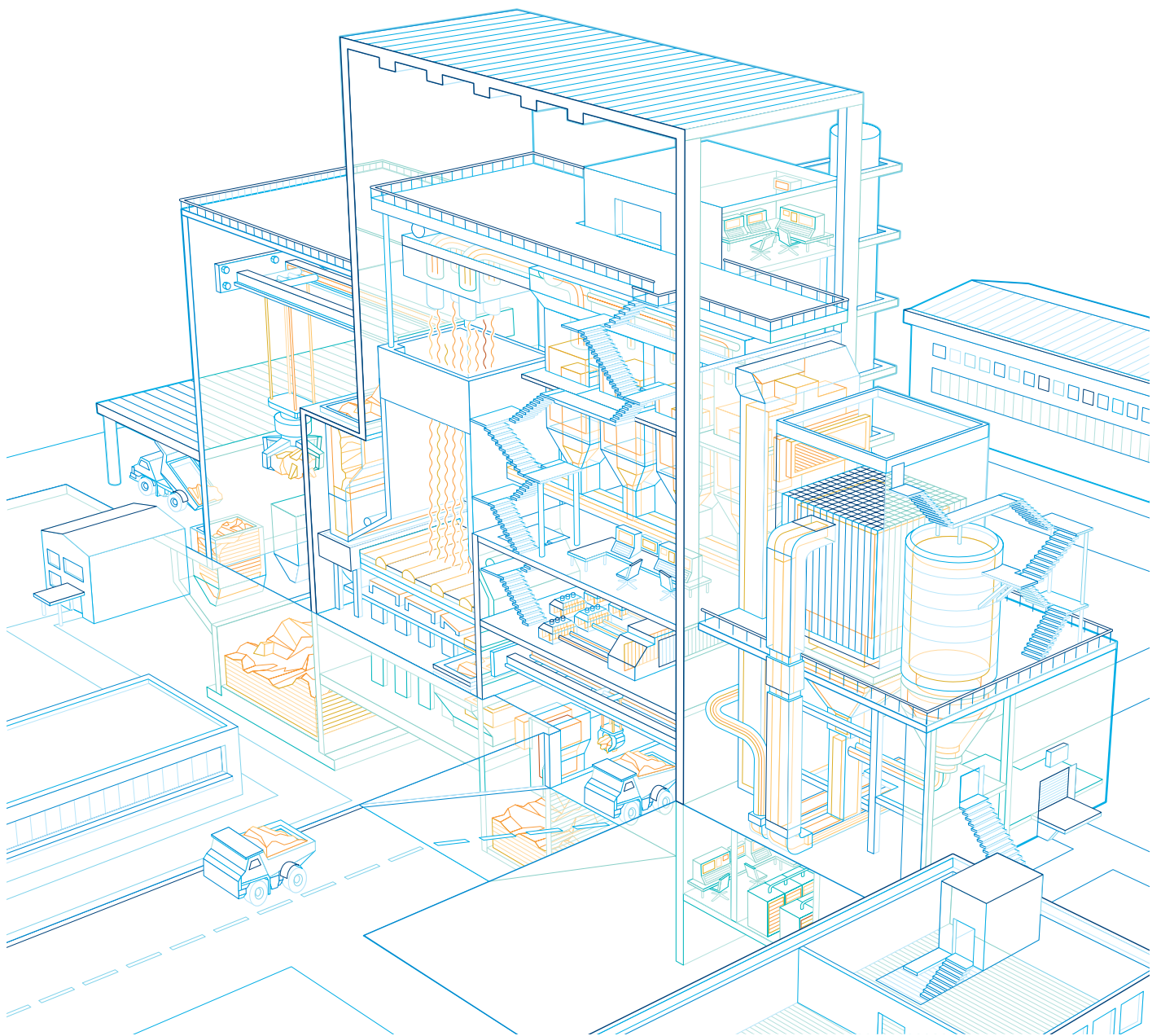
Licenses are typically not available anymore but might be available upon request as spare part. Training is not available anymore. Support is provided.

#### Obsolete

When entering the Obsolete phase, the version profile is not supported anymore. Migration to a newer version is strongly recommended.

This means it is not available anymore for installation. It will not receive corrections anymore.

Licenses are not available for purchase anymore. Training is not available anymore. Support is not available anymore.
















# Additional information

## Approvals and certifications

Symbols and legends:

■ Standard product certified: product label wears approval mark when mandatory  
□ Approval submitted (roadmap available upon request)

◇ Submission planned (roadmap available upon request)  
– Submission not planned or not applicable for product

	Approvals					Maritime classification companies								Others
Symbol														
Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div 2											
AI523	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI523-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI531	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI531-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI562	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI563	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI581-S	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AI581-S-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AO523	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AO523-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AO561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AX521	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AX521-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AX522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AX522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
AX561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CD522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CD522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI501-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI501-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI502-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI502-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI504-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI504-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI506-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI506-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI511-ETHCAT	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI512-ETHCAT	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI541-DP	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI541-DP-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI542-DP	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI542-DP-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI581-CN	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI581-CN-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI582-CN	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI582-CN-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI590-CS31-HA	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI590-CS31-HA-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI592-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI592-CS31-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM572-DP	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM572-DP-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM574-RCOM	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM574-RS	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM578-CN	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM578-CN-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM579-ETHCAT	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM579-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM579-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM582-DP	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CM582-DP-XC	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CM588-CN	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM588-CN-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM589-PNIO	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
CM589-PNIO-XC	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
CM589-PNIO-4	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■
CM589-PNIO-4-XC	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■














# Additional information

## Approvals and certifications

Symbols and legends:

■ Standard product certified: product label wears approval mark when mandatory  
□ Approval submitted (roadmap available upon request)

◇ Submission planned (roadmap available upon request)  
– Submission not planned or not applicable for product

	Approvals					Maritime classification companies								Others
Symbol														
Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div. 2											
CM592-DP	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■
CM592-DP-XC	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■
CM597-ETH	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
CM597-ETH-XC	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
CM598-CN	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■
CM598-CN-XC	■	■	■	◇	◇	◇	□	□	□	□	□	■	□	■
CP604	■	■	-	◇	■	◇	-	-	-	-	-	-	-	■
CP607	■	■	-	◇	■	◇	-	-	-	-	-	-	-	■
CP610	■	■	-	◇	■	◇	-	-	-	-	-	-	-	■
CP620	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP620-WEB	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP630	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP630-WEB	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP635	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP635-B	■	□	□	◇	◇	◇	-	-	■	-	-	-	-	■
CP635-FB	■	□	-	◇	◇	◇	-	-	■	-	-	-	-	■
CP635-FW	■	□	-	◇	◇	◇	-	-	■	-	-	-	-	■
CP635-WEB	■	■	■	■	■	■	-	-	■	-	-	-	-	■
CP651	■	■	■	■	■	□	-	-	■	-	-	-	-	■
CP651-WEB	■	■	■	■	■	□	-	-	■	-	-	-	-	■
CP661	■	■	■	◇	■	□	-	-	■	-	-	-	-	■
CP661-WEB	■	■	■	◇	■	□	-	-	■	-	-	-	-	■
CP665	■	■	■	◇	■	□	-	-	■	-	-	-	-	■
CP665-WEB	■	■	■	◇	■	□	-	-	■	-	-	-	-	■
CP676	■	■	■	■	■	□	-	-	■	-	-	-	-	■
CP676-WEB	■	■	■	■	■	□	-	-	■	-	-	-	-	■
DA501	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DA501-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC523	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC523-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC532	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC532-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC541-CM	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC541-CM-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC551-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC551-CS31-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DC562	■	■	■	■	■	□	□	□	□	□	□	■	□	■
DI524	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI524-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI562	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI571	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI572	■	■	■	◇	■	□	□	□	□	□	□	■	□	■
DI581-S	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DI581-S-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO524	■	■	■	■	■	□	□	□	□	□	□	■	□	■
DO524-XC	■	■	■	■	■	□	□	□	□	□	□	■	□	■
DO526	■	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	■
DO561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO562	■	■	■	■	■	□	□	□	□	□	□	■	□	■
DO571	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO572	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO573	■	■	■	■	■	□	□	□	□	□	□	■	□	■
DX522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■














# Additional information

## Approvals and certifications

Symbols and legends:

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□ Approval submitted (roadmap available upon request)

◇ Submission planned (roadmap available upon request)  
- Submission not planned or not applicable for product

	Approvals					Maritime classification companies								Others
Symbol														
Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div 2											
DX531	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX571	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX581-S	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX581-S-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FM502-CMS	■	■	□	■	■	◇	□	□	□	□	□	■	□	■
FM502-CMS-XC	■	■	□	■	■	◇	□	□	□	□	□	■	□	■
FM562	■	■	■	◇	■	□	◇	◇	◇	◇	◇	◇	◇	■
MC502	■	■	■	■	-	-	■	■	■	■	■	■	■	■
MC503	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM554-RP	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM554-RP-AC	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM554-TP	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM554-TP-ETH	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM556-TP-ETH	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-RP	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-RP-AC	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-RP-ETH	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-RP-ETH-AC	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-TP	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM564-TP-ETH	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM5650-2ETH	■	□	□	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	■
PM566-TP-ETH	■	■	■	□	■	◇	□	□	□	□	□	□	□	■
PM572	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM573-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM573-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM582	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM582-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM583-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM583-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM585-ETH	■	■	■	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
PM590-ARCNET	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM590-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM591-2ETH	■	■	◇	■	■	◇	□	□	□	□	□	■	□	■
PM591-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM591-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM592-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM592-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM595-4ETH-F	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
PM595-4ETH-M-XC	■	■	■	■	■	◇	□	□	□	□	□	■	□	■
SM560-S	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SM560-S-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TA521	-	■	■	■	-	-	-	■	-	-	-	■	-	-
TA523	-	■	■	■	-	-	-	■	-	-	-	■	-	■
TA524	-	■	■	■	-	-	-	■	■	■	-	■	-	■
TA525	-	■	■	■	-	-	-	■	■	■	-	■	-	■
TA526	-	■	■	■	-	-	-	■	■	■	-	■	-	■
TA527	-	-	-	■	-	-	-	-	-	-	-	-	-	-
TA528	-	-	-	■	-	-	-	-	-	-	-	-	-	-
TA532	-	-	-	■	-	-	-	-	-	-	-	-	-	■
TA533	-	-	-	■	-	-	-	-	-	-	-	-	-	■
TA534	-	-	-	■	-	-	-	-	-	-	-	-	-	■
TA535	-	-	-	■	-	-	-	-	-	-	-	-	-	■
TA536	-	-	-	■	-	-	-	-	-	-	-	-	-	■
TA540	-	-	-	■	-	-	-	-	-	-	-	-	-	-
TA541	-	-	-	■	-	-	-	-	-	-	-	-	-	-
TA543	-	-	-	■	-	-	-	-	-	-	-	-	-	-
TA561-RTC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
















# Additional information

## Approvals and certifications

Symbols and legends:

■ Standard product certified: product label wears approval mark when mandatory  
 □ Approval submitted (roadmap available upon request)

◇ Submission planned (roadmap available upon request)  
 – Submission not planned or not applicable for product

	Approvals					Maritime classification companies							Others
Symbol													
Abbreviation	CE	cULus	EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations Hazardous Locations Class I Div 2											
TA562-RS	■	■	■	■	■	■	■	■	■	■	■	■	■
TA562-RS-RTC	■	■	■	■	■	■	■	■	■	■	■	■	■
TA563-11	-	-	-	■	-	■	■	■	■	■	■	■	■
TA563-9	-	-	-	■	-	■	■	■	■	■	■	■	■
TA564-11	-	-	-	■	-	■	■	■	■	■	■	■	■
TA564-9	-	-	-	■	-	■	■	■	■	■	■	■	■
TA565-11	-	-	-	■	-	■	■	■	■	■	■	■	■
TA565-9	-	-	-	■	-	■	■	■	■	■	■	■	■
TA566	-	■	■	-	-	■	■	■	■	■	■	■	-
TA570	-	■	■	■	-	-	-	-	-	-	-	-	-
TA571-SIM	■	-	-	■	■	-	-	-	-	-	-	-	■
TB511-ARCNET	■	■	■	■	■	■	■	■	■	■	■	■	■
TB511-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■
TB511-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
TB521-ARCNET	■	■	■	■	■	■	■	■	■	■	■	■	■
TB521-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■
TB521-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
TB523-2ETH	■	■	◇	◇	■	◇	□	□	□	□	■	□	■
TB541-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■
TB541-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
TB5620-2ETH	■	□	□	◇	◇	◇	◇	◇	◇	◇	◇	◇	■
TF501-CMS	■	■	□	◇	◇	◇	□	□	□	□	■	□	■
TF501-CMS-XC	■	■	□	◇	■	◇	□	□	□	□	■	□	■
TF521-CMS	■	■	□	◇	■	◇	□	□	□	□	■	□	■
TF521-CMS-XC	■	■	□	◇	■	◇	□	□	□	□	■	□	■
TK501	-	■	■	■	-	■	-	-	-	-	■	-	■
TK502	-	■	■	■	-	■	-	-	-	-	■	-	■
TK503	■	■	■	■	■	■	■	■	■	■	■	■	■
TK504	■	■	■	■	■	■	■	■	■	■	■	■	■
TK506	■	■	■	■	■	■	■	■	■	■	■	■	■
TU507-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■
TU508-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■
TU508-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
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TU520-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
TU531	■	■	■	■	■	■	■	■	■	■	■	■	■
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TU542	■	■	◇	■	■	■	■	■	■	■	■	■	■
TU551-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■
TU552-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■
TU552-CS31-XC	■	■	■	■	■	■	■	■	■	■	■	■	■
TU582-S	■	■	■	■	■	■	■	■	■	■	■	■	■
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