Main catalog

PLC Automation
PLCs, Control Panels, Engineering Suite

Power and productivity
for a better world™

WONDER-BAKE

A71
ZPMC

PLC Automation
PLCs, Control Panels, Engineering Suite

PLC Automation product family 1

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AC500-XC - PLC operating in eXtreme Conditions 5

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PLC Automation product family
Overview

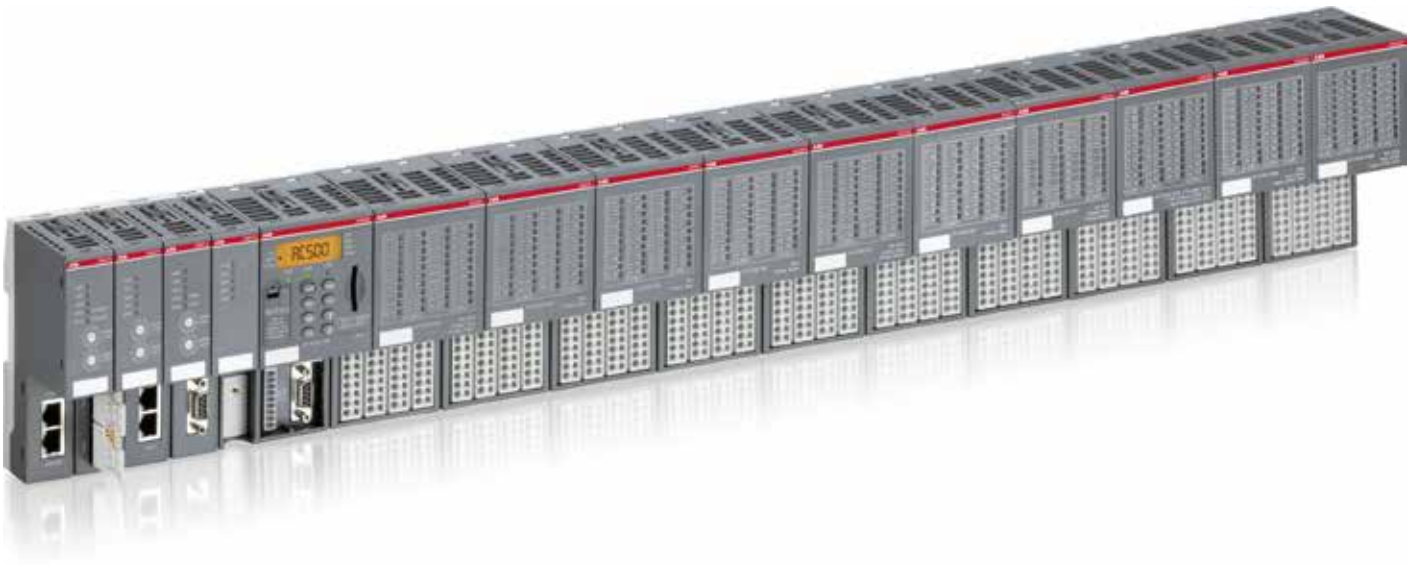


ABB offers a comprehensive range of scalable PLCs and robust HMI control panels as well as high-availability solutions. Since its launch in 2006, the AC500 PLC platform has achieved significant industry recognition for delivering high performance, quality and reliability.

Comprehensive range

ABB delivers scalable, flexible and efficient ranges of automation components to fulfill all conceivable automation applications. 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.

Engineering suite

ABB Automation Builder is the integrated software suite for machine builders and system integrators wanting to automate their machines and systems in a productive way. Combining the tools required for configuring, programming, debugging and maintaining automation projects from a 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, middle and high-end applications. Our AC500 platform offers different performance levels and is the ideal choice for high availability, extreme environments 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

The 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 a single touch.

Automation Builder

Automation Builder integrates engineering and maintenance for PLC, Drives, Motion, HMI and Robotics. Automation Builder complies with the IEC 61131-3 standard offering all 5 IEC programming languages for PLC and drive configuration. In addition, Automation Builder includes continuous function chart, C/C++, extensive function block libraries and powerful embedded simulation and visualization features. Automation Builder supports various languages (English, German, French, Chinese, Spanish) and comes with new libraries, FTP functions, SMTP, SNTP, smart diagnostics and debugging capabilities. Download Automation Builder from www.abb.com/automationbuilder.

AC500-eCo

This compact PLC offers flexible and economical configurations for your modern control system. The ideal choice for smaller applications.

AC500

Our powerful flagship PLC with a wide range of performance, communications and I/O capabilities for industrial applications. The ideal choice for complex high speed machinery and networking solutions.

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 conditions.

AC500-S

This safety PLC (SIL3, PL e) is designed for safety applications involved in factory or machinery automation area. The ideal choice to implement and manage complex safety solutions.

CP600-eCo

The economic control panel series offers touch screen graphic displays from 4.3" up to 10.1". The user-friendly configuration software PB610-B Panel Builder 600 Basic provides the most commonly used HMI functions. Comprehensive sets of graphic symbols are available to support the design of tailor-made HMI solutions.

CP600

This control panel series offers a wide range of touch screen graphic displays from 4.3" up to 15". The user-friendly configuration software PB610 Panel Builder 600 provides state-of-the-art HMI functions. Comprehensive sets of graphic symbols are available to support the design of tailor-made HMI solutions. CP600-WEB panels are available for the visualization of HMI applications provided by the AC500 WebServer. They include the Microbrowser instead of an HMI application.

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)		□	□

(1) TCP protocols, Modbus, IEC60870-5-104, CS31
(2) PROFIBUS, PROFINET, EtherCAT, CAN
(3) Drive composer pro license needs to be purchased
(4) No Fieldbus connectivity in Automation Builder Basic
(5) PLC, Safety, Panel, Drive, Motion, Robotics
(6) C/C++, ECAD data exchange, CSV interface extensions, project compare
(7) Project Version Control

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 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 and safety applications.

Benefit from the simplicity of IEC 61131-3, PLCopen, C/ C++, RAPID and MINT programming languages.

Speed up your project with the powerful ECAD and MS EXCEL® interfaces of Automation Builder.

Simplified diagnostics and maintenance reduce downtime.

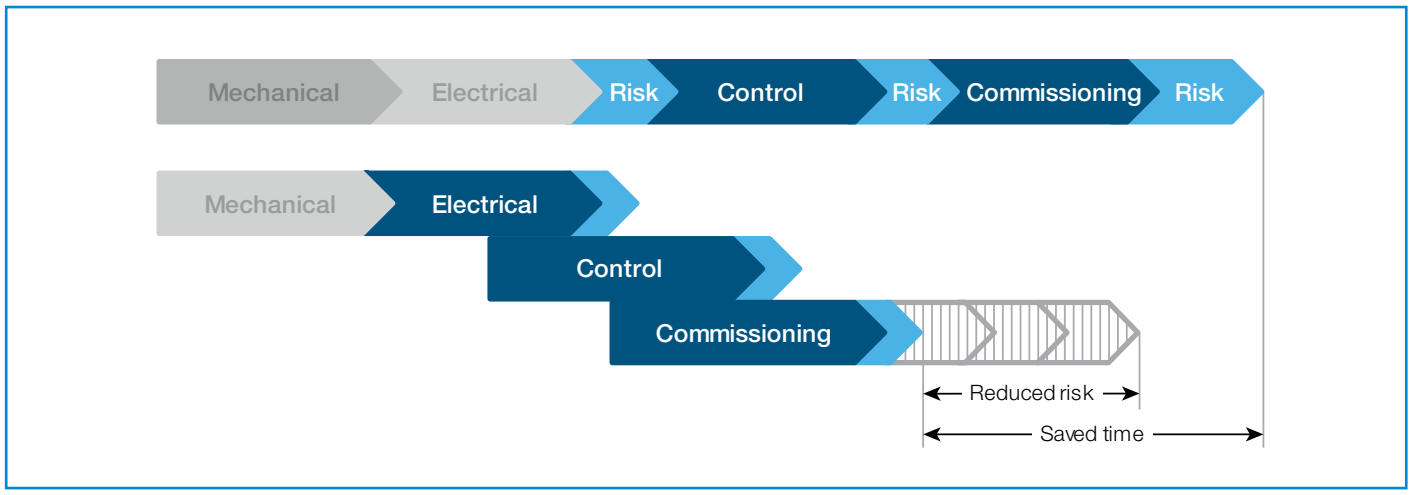
Automation Builder is the perfect software suite for the configuration and programming of various ABB controller families in one single project.

Safe and restore your applications with a consistent joint backup.

Download Automation Builder from www.abb.com/automationbuilder.

Familiarize with Automation Builder using a 30 days test license.

After having tried and tested with your individual applications, you can use the free Automation Builder Basic or purchase the Automation Builder Standard or Premium.

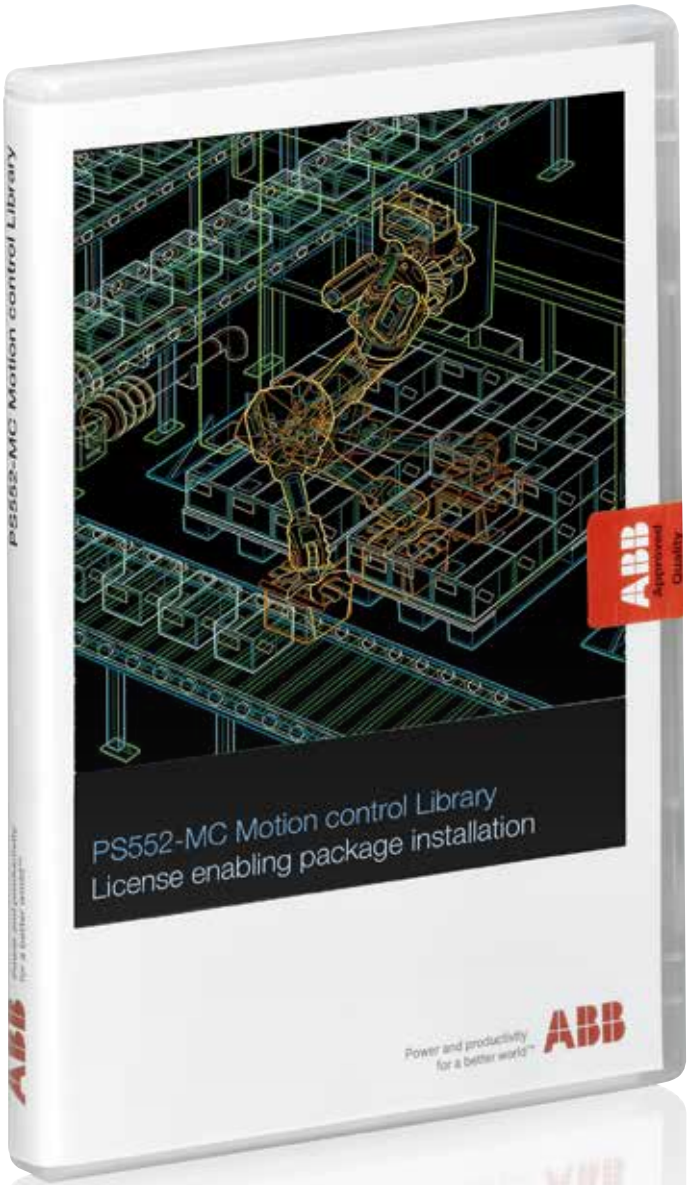


Streamline and simplify your engineering process: Reduce risk and save time.

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.



1 Motion control library

2 Solar library

3 Water library

4 Temperature control library

AC500 libraries deliver the seamless integration of drives, HMI and supervisory systems 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 – free-of-charge included in Automation Builder.

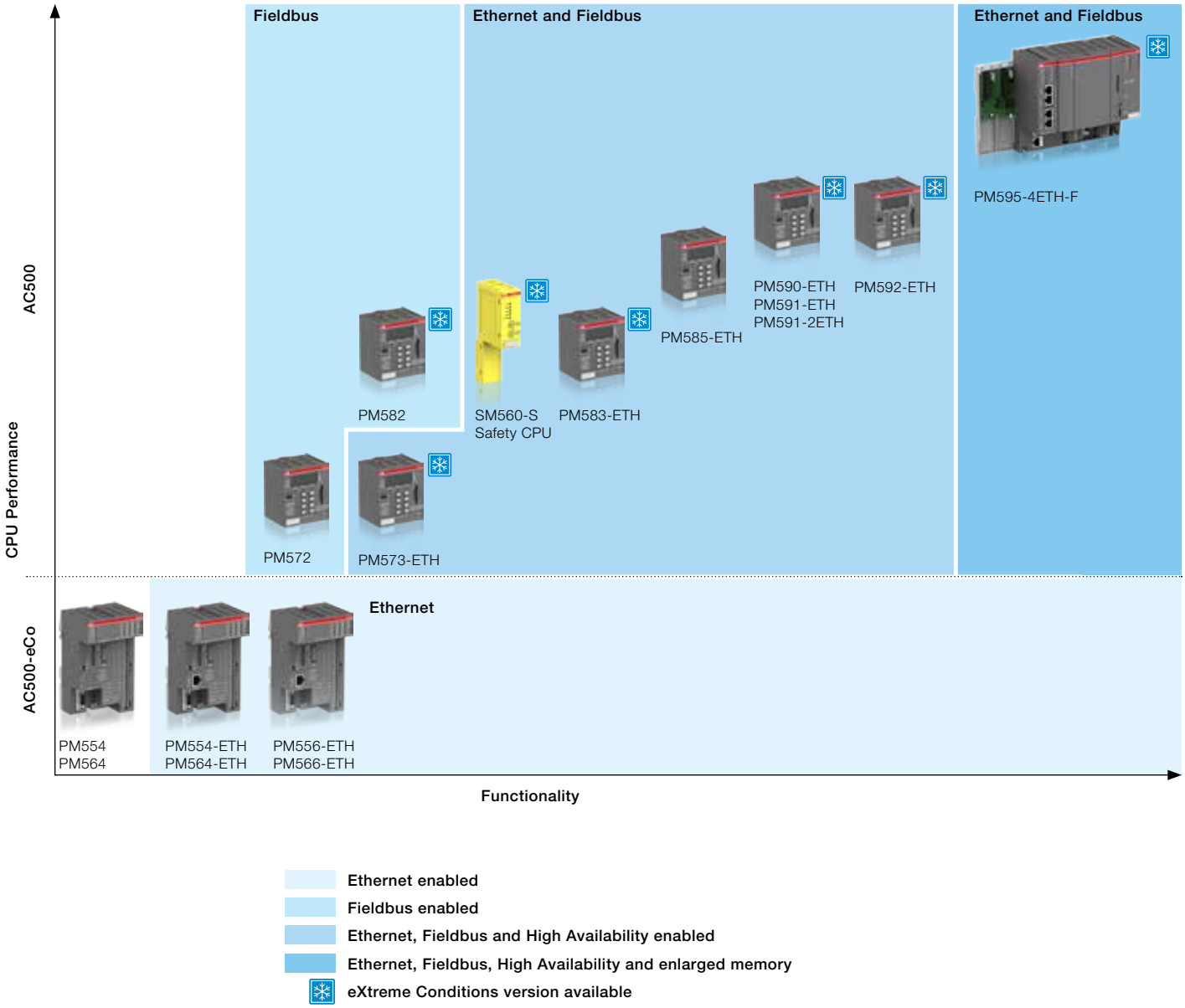
Temperature control library
Library package for the advanced PID temperature control of demanding applications, for example extrusion.

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.



Ethernet enabled
Fieldbus enabled
Ethernet, Fieldbus and High Availability enabled
Ethernet, Fieldbus, High Availability and enlarged memory
eXtreme Conditions version available

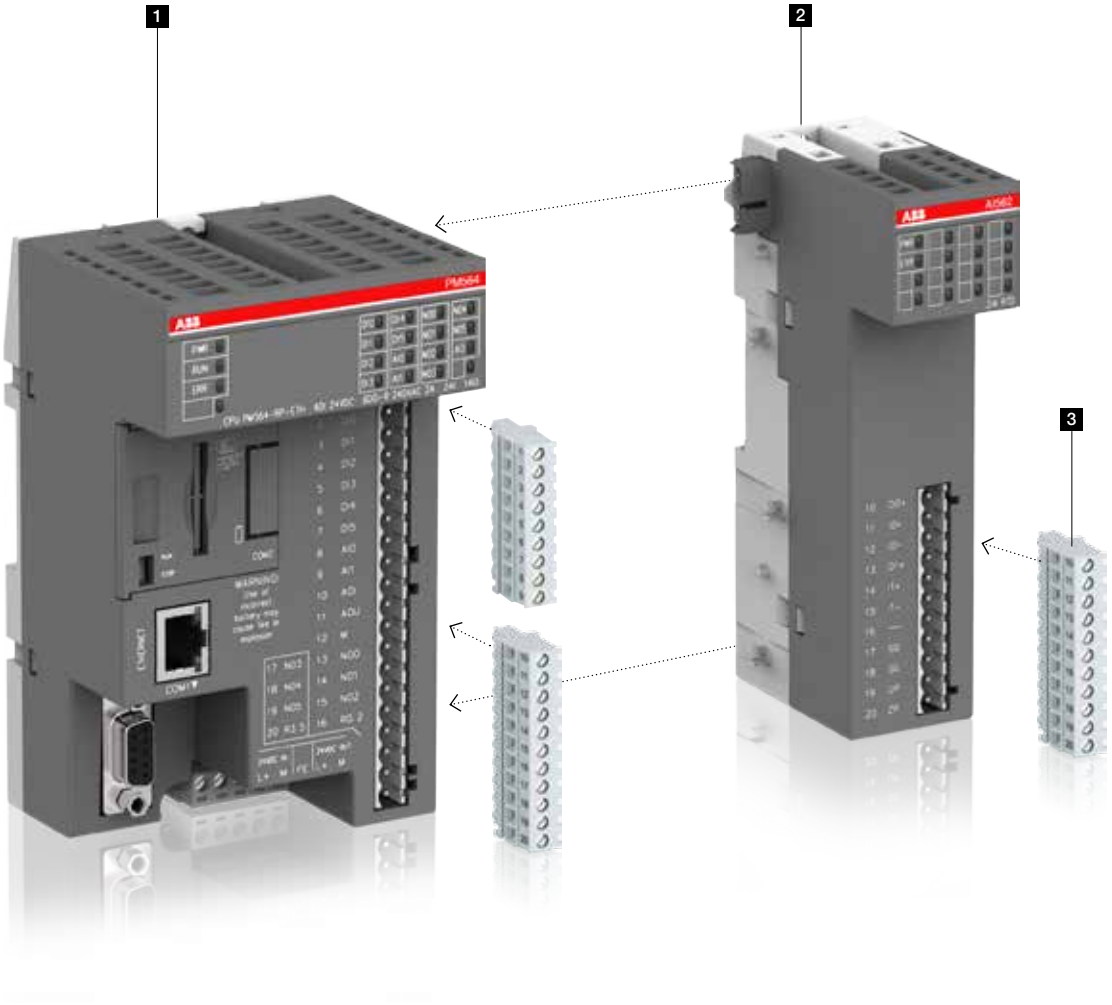
PLC Automation product family
PLCs at a glance...

	AC500-eCo	AC500	AC500-XC	AC500-S (2)	AC500-S-XC (2)
System Configuration and Application programming					
Automation Builder (common programming tool)	■	■	■	■	■
Application Features					
Extended temperature range			■		■
Functional safety				■	■
Support of simple motion with FM562 module (1)	■	■	■	■	■
Support of coordinated motion (1)		■	■	■	■
Support of High Availability (HA)		■	■		
CPU Features	**AC500-eCo**	**AC500**	**AC500-XC**	**AC500-S (2)**	**AC500-S-XC (2)**
Performance (time per binary instruction)	0.08 µs	0.0006…0.06 µs	0.0006…0.06 µs	0.05 µs	0.05 µs
Program memory	128...512 kB	128…16 MB	128…16 MB	1024 kB	1024 kB
User data memory	14...130 kB	128…16 MB	128…16 MB	1024 kB	1024 kB
Remanent data (= saved)	2 kB	12…3 MB	12…3 MB	120 kB	120 kB
Serial communication					
RS232		■	■	■	■
RS485	■	■	■	■	■
Isolated interface		■	■	■	■
Ethernet features on CPU with integrated Ethernet or external communication module					
Online access (Programming)	■	■	■	■	■
ICMP (Ping), DHCP, IP configuration protocol	■	■	■	■	■
UDP data exchange, Modbus TCP	■	■	■	■	■
Ethernet features on CPU with integrated Ethernet only					
HTTP (integrated web server)	■	■	■	■	■
SNTP (Time synchronization)	■	■	■	■	■
FTP server	■	■	■	■	■
SMTP client (Simple Mail Transfer Protocol)	□	■	■	■	■
IEC 60870-5-104 remote control protocol		■	■	■	■
Socket programming		■	■	■	■
Downloadable protocol		■	■		
Capability to connect Fieldbus Modules		■	■	■	■
I/Os integrated on CPU	■				
I/O Modules Features	**S500-eCo**	**S500**	**S500-XC**	**S500-S (2)**	**S500-S-XC (2)**
Analog modules					
Configurable		■	■		
Dedicated	■			■	■
Digital modules					
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.

PLC Automation product family
AC500-eCo

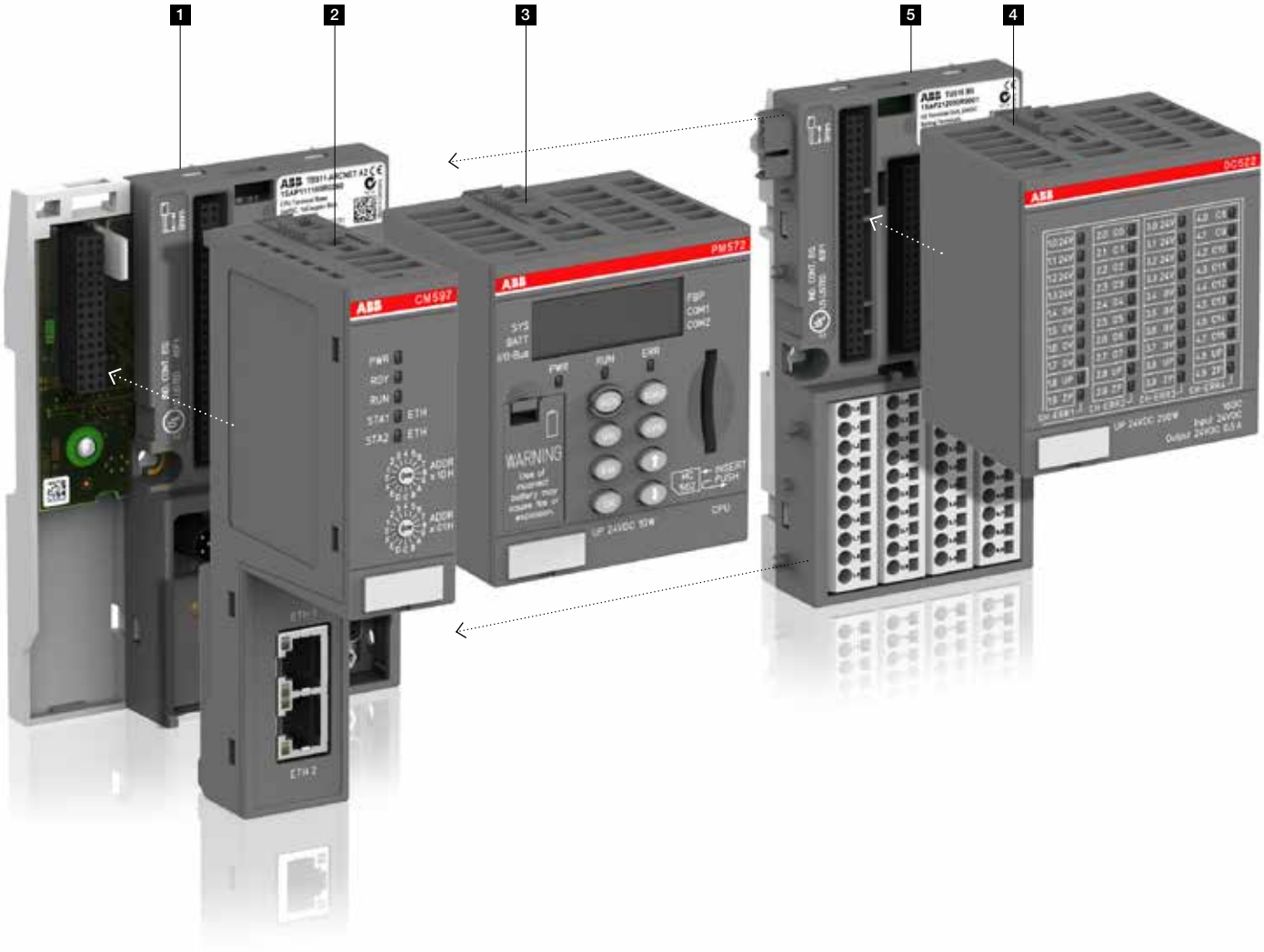


1 AC500-eCo central processing unit (CPU)
- Different memory options
- Integrated communication option.

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



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

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

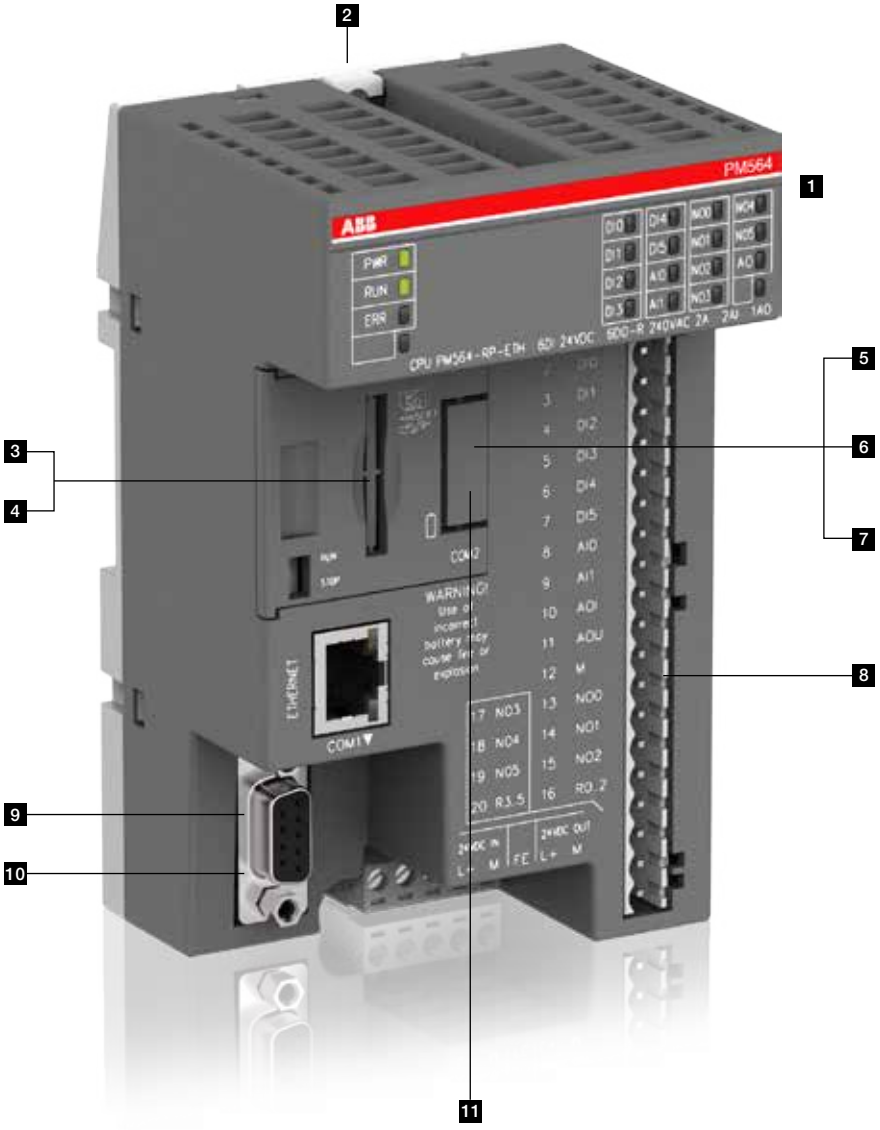
3 AC500 central processing unit (CPU)
- Different performance, memory, network, operating conditions options
- Integrated communication.

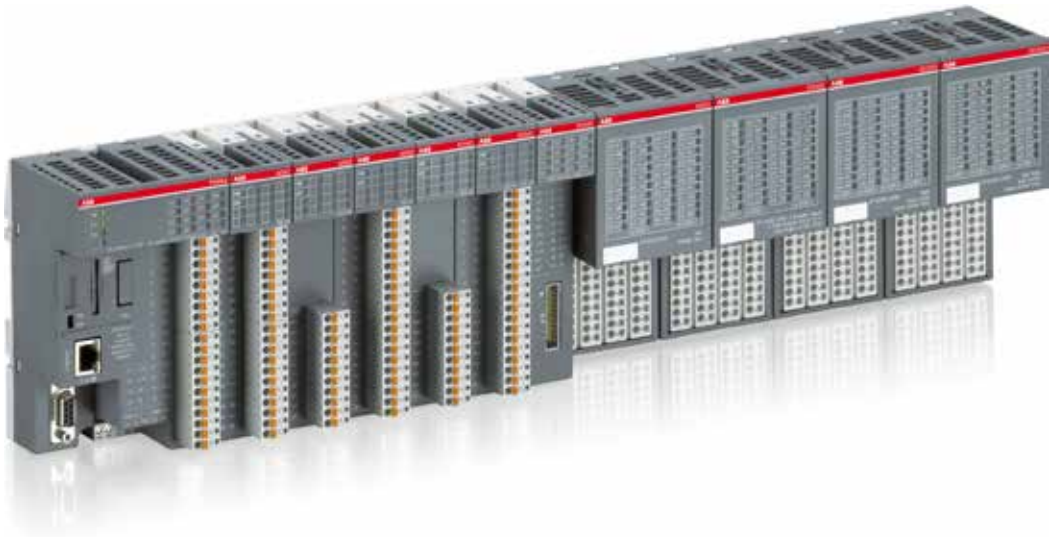
4 S500 I/O modules
- Up to 10 expansions
- Decentralized extension available.

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

9 RS485 isolator for COM1

10 COM1 USB

11 COM2 USB programming cable

AC500-eCo Starter kit.
For more information, see page 149

PLC Automation product family
AC500 system characteristics

1 AC500 offers superior local extension 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

3 Communication module
Up to 4 modules for multiple combinations to communicate with nearly everything

4 CPU module

5 S500 Terminal unit

6 S500 I/O module

7 S500-eCo I/O module

8 SD-card

9 Battery

10 Pluggable marker holder for I/O modules with template

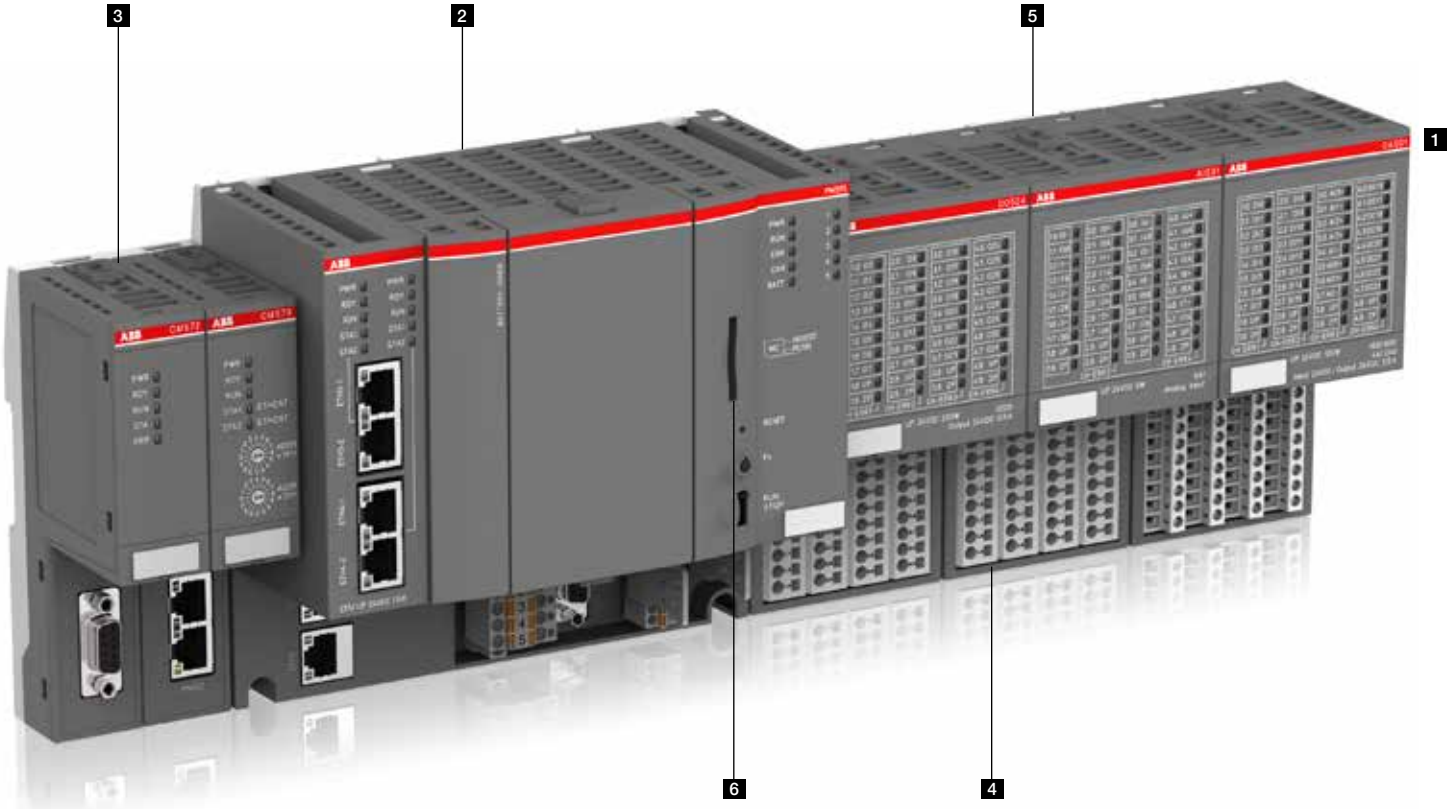
PLC Automation product family
AC500 PM595 Controller system characteristics

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 with nearly everything

4 S500 Terminal unit

5 S500 I/O module

5 S500-eCo I/O module

6 SD-card

7 Battery

8 Pluggable marker holder for I/O modules with template

PLC Automation product family
Condition monitoring system CMS based on AC500

1

Predictable performance for your operations

Optimize your assets with a condition monitoring system (CMS) based on the proven AC500 platform. The new FM502 module can help you to improve your operations resulting in greater efficiency and higher reliability while minimizing service and operating costs.

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

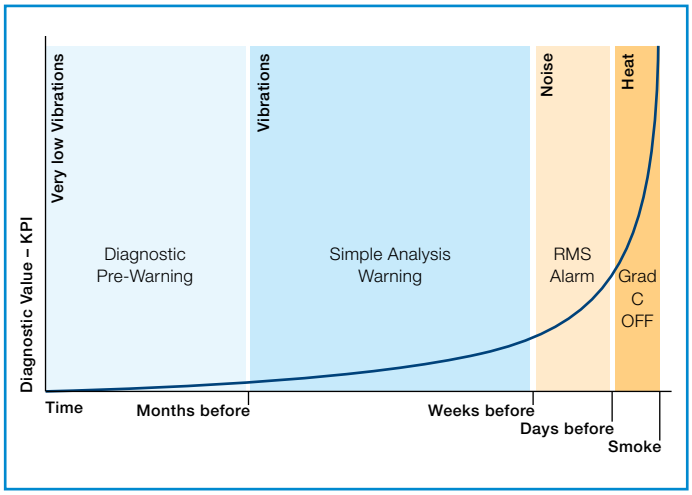
- Planned maintenance rather than spontaneous repair ensures predictable performance
- Approaching damage is identified very early
- Protection against spontaneous failures and operation in critical conditions
- Reduction of costs in maintenance and lost production time
- Plant availability is increased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

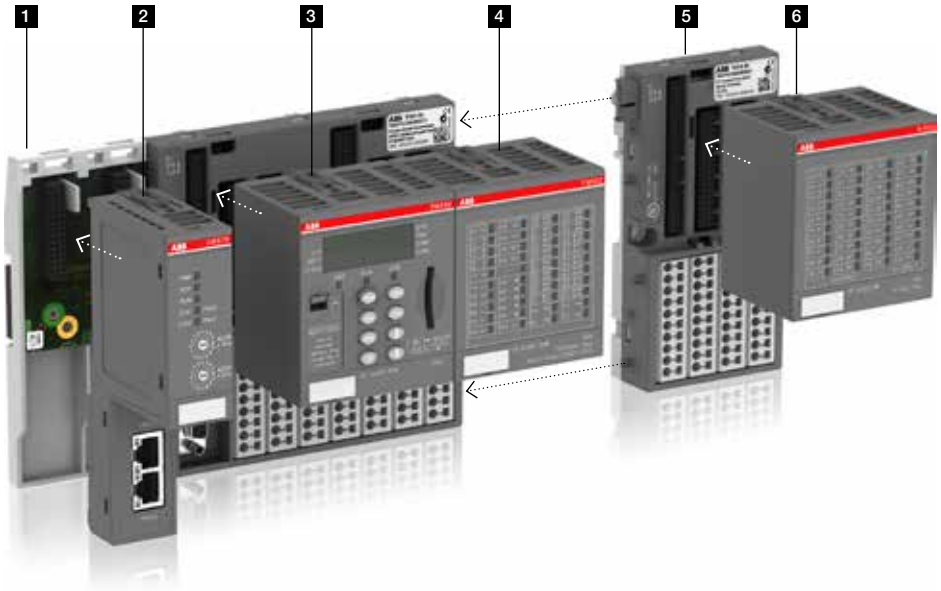
AC500 + CMS = increased machine efficiency

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 AC500 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 or 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
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 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 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 and robot 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.

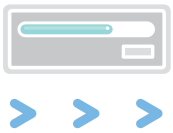
PLC Automation product family
CP600-eCo and CP600 control panels

1

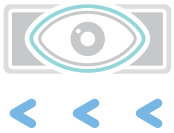
With comprehensive but easy-to-use functionalities, ABB control panels stand out from competitor products. At one single touch, they intuitively provide operators with tailor-made operational information for production plants and machines. CP600-eCo / CP600 control panels make machine operation efficient,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

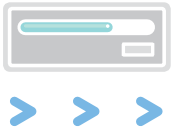
Automation Builder
programming station

AC500
with web server

CP600-WEB
with visualization for
AC500 web server

Connectivity with Drives directly without PLC

Automation Builder
programming station

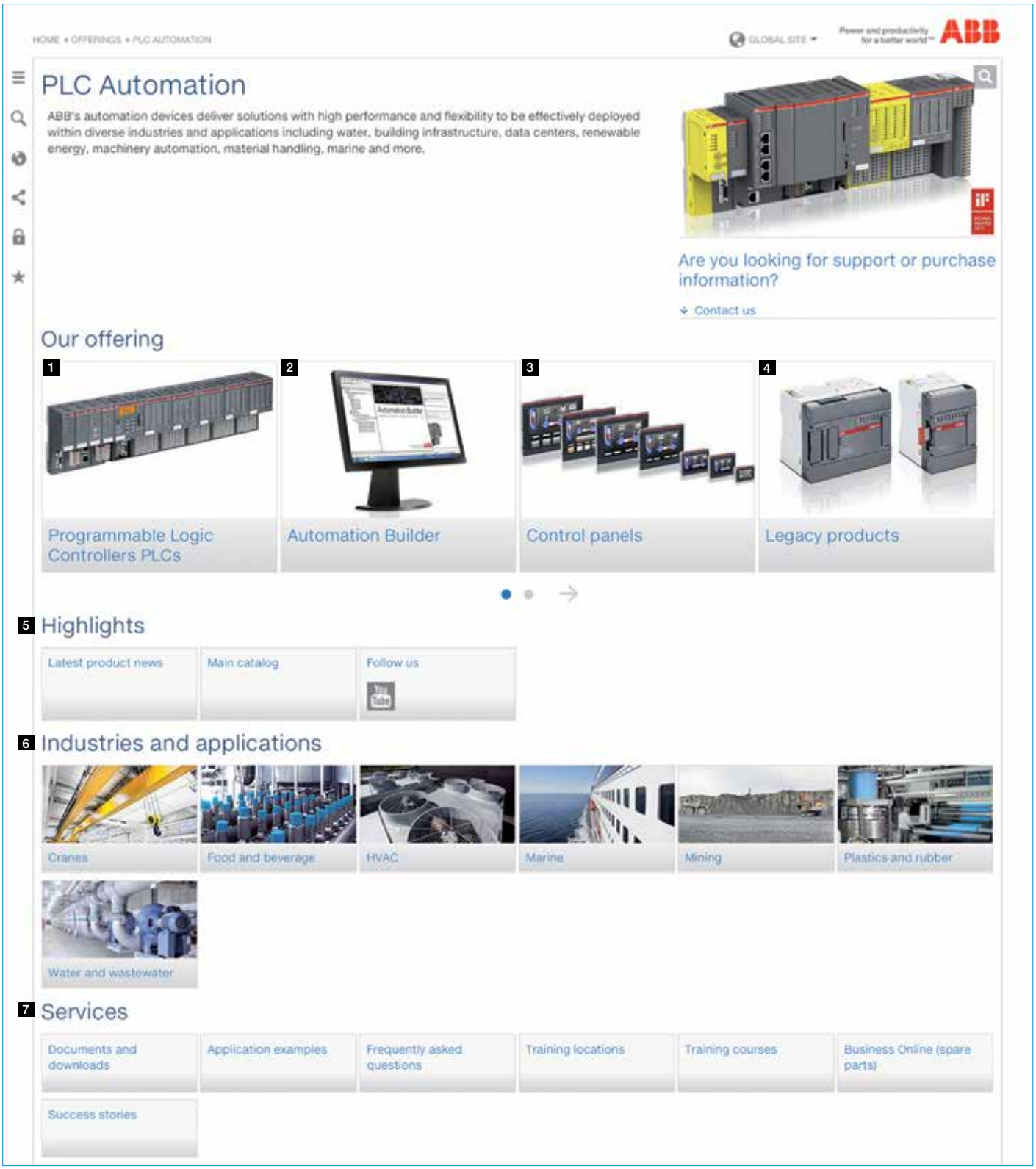


CP600-eCo / CP600

Drives

PLC Automation product family
PLC Automation website – online tools

1 The www.abb.com/plc website is a mine of information on our products and documentation.



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

3 Control panels
- CP400 (Devices, Software, Accessories)
- CP600-eCo (Devices, Software, Accessories)
- CP600 (Devices, Software, Accessories)

4 Legacy products
- AC31 and previous series
- CP500
- Wireless products

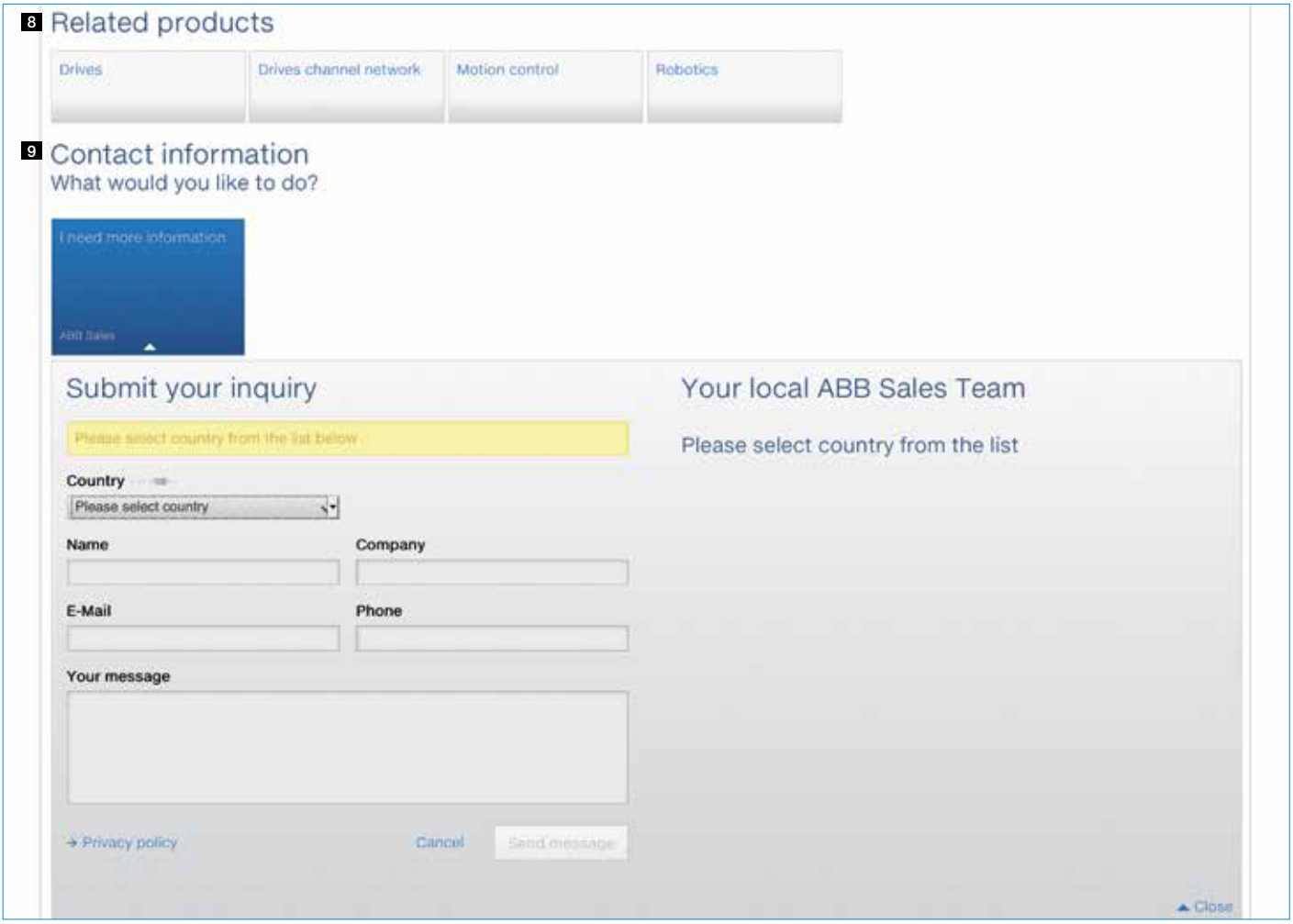
5 Highlights
- Latest product news
- Main catalog
- YouTube

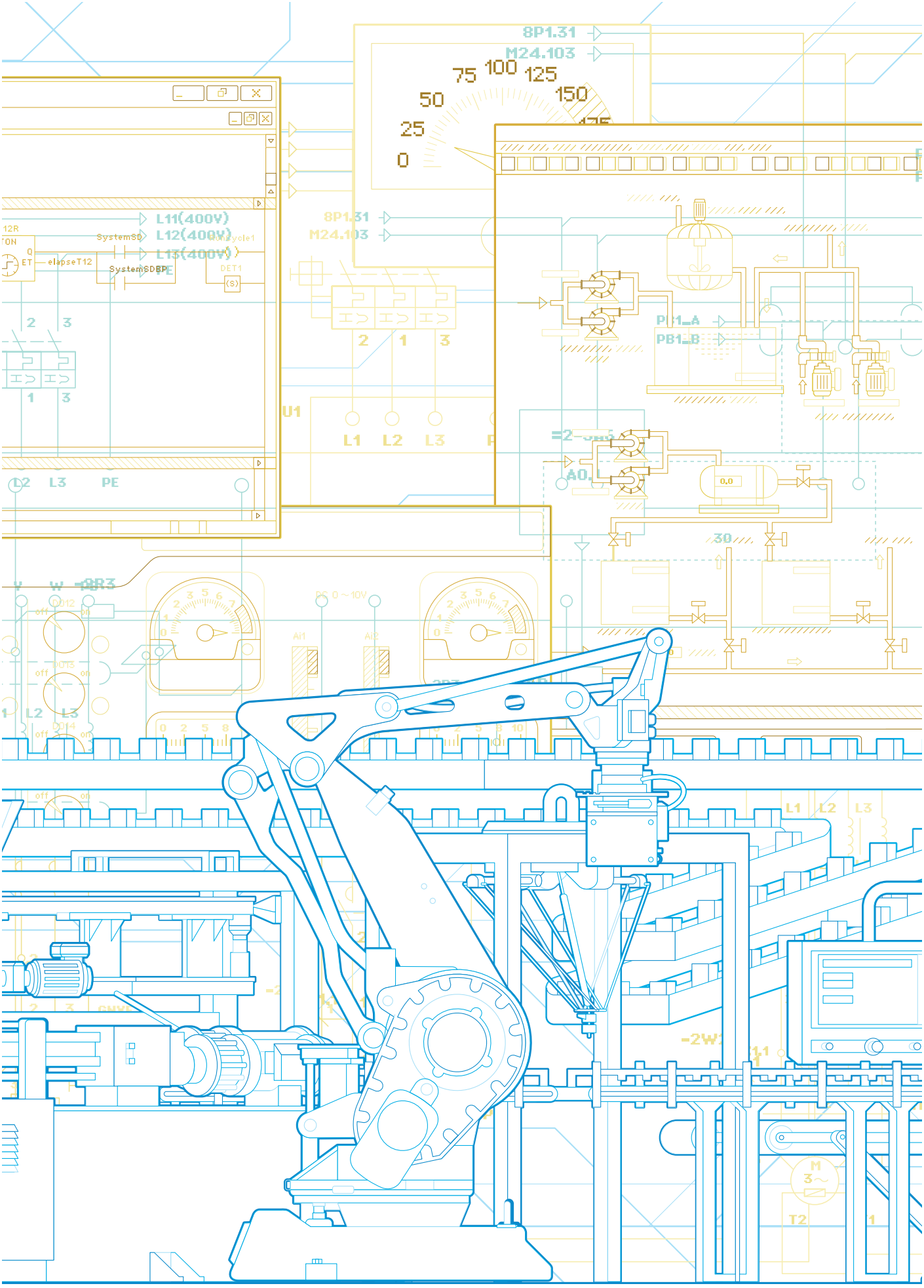
6 Industries and applications

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

8 Related products (Drives, Drives channel network, Motion control, Robotics)

9 Contact information for your country




8P1.31
M24.103
L11(400V)
L12(400V)
L13(400V)
SystemSD
SystemSDBP
elapseT12
PB1_A
PB1_B
L1
L2
L3
PE
U1
T2

Automation Builder
Integrated engineering suite

Key features 2/30

Ordering data 2/31

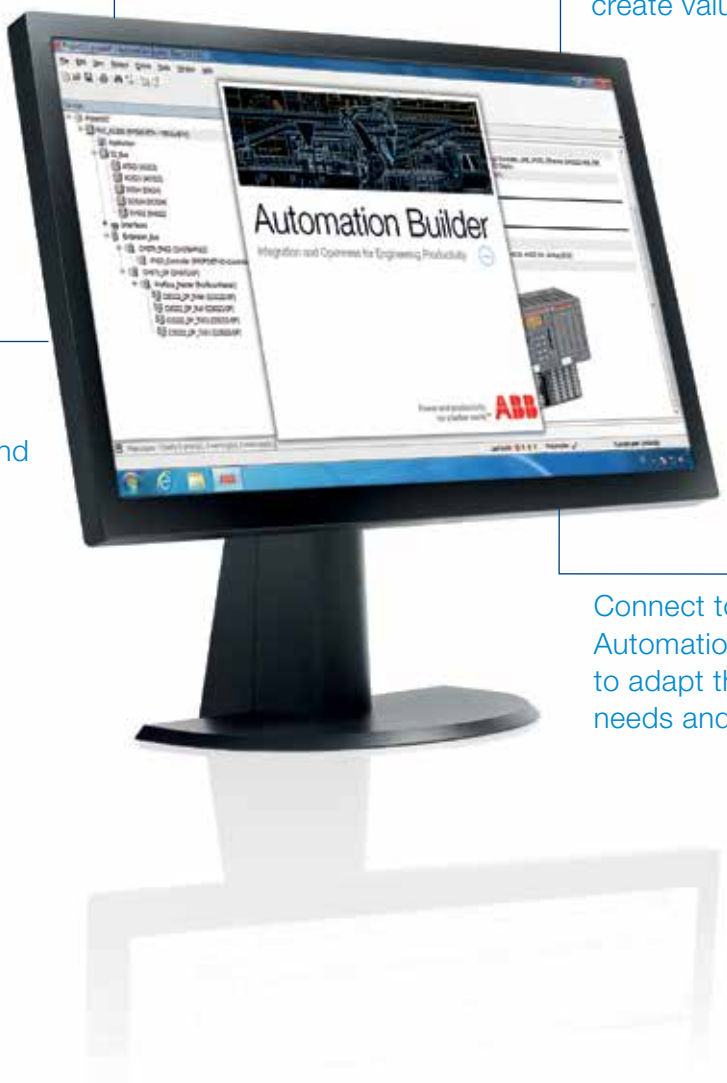
Software features 2/32

Libraries features 2/33

Automation Builder
Key features

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

Reduce risk and save time: Automation Builder integrates products into solutions that create value for your customers.



Build your distinct solution: Automation Builder is open for your specific products and communication technology.

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Download Automation Builder from www.abb.com/automationbuilder

Automation Builder
Ordering data

Automation Builder

Solar library

Water library

Motion control library

Temperature control library

Automation Builder Engineering Suite

– Engineering Productivity and Maintenance for PLCs, safety, robots, motion, drives and control panels.
– Supports IEC61131-3, CFC, C/ C++. Optional: MINT, Rapid for motion and robotics applications.
– Language packs for English, German, Chinese, Spanish, French

For	Description	Type	Order code	Price	Weight (1 pce) kg
Free 61131-3 engineering for simple PLC solutions (AC500 w/o fieldbus and safety)	Automation Builder 1.x Basic Single (1)	-	-		-
Integrated Engineering for PLC, drives, motion, panels	Automation Builder 1.x Standard Single (2)	DM100-TOOL	1SAS010000R0101		0.005
	Automation Builder 1.x Version Upgrade Single (2)(3)	DM101-TOOL-UPGR	1SAS010001R0101		0.005
Integrated Engineering for PLC, drives, motion, panels and features for engineering productivity and collaboration	Automation Builder 1.x Premium Single (2)	DM102-PREM	1SAS010002R0101		0.005
	Automation Builder 1.x Premium Upgrade Single (2)(4)	DM103-PREM-UPGR	1SAS010003R0101		0.005
Automation Builder editions for a network of engineering PCs	Automation Builder 1.x Standard Network (5)	DM104-TOOL-NETW	1SAS010004R0101		0.005
	Automation Builder 1.x Premium Network (5)	DM105-PREM-NETW	1SAS010005R0101		0.005
	Automation Builder 1.x Premium Upgrade Network (5)(6)	DM106-PREM-UPGR-NETW	1SAS010006R0101		0.005
Project version control to support engineering teams and solutions	Project Version Control for Automation Builder 1.x Single (2)(7)	DM107-VCON	1SAS010007R0101		0.005
	Project Version Control for Automation Builder 1.x Network (5)(7)	DM108-VCON-NETW	1SAS010008R0101		0.005
Automation Builder licensing based on a USB Key	USB Key for Automation Builder licenses (8)	DM-KEY	1SAP193600R0001		0.010

(1) Free license
(2) Single user license - bound to PC or DM-KEY (USB Key)
(3) Purchase this option to upgrade Control Builder Plus to Automation Builder Standard Single
(4) Purchase this option to upgrade Automation Builder Standard Single to Automation Builder Premium Single
(5) Network license for shared usage within a local area network. Per license one user can use the license at the same time.
(6) Purchase this option to upgrade Automation Builder Standard Network to Automation Builder Premium Network
(7) Add-on to Automation Builder Standard or Premium edition. Automation Builder Standard / Premium must be purchased separately
(8) Does not contain license. Automation Builder license must be purchased separately. Can carry an arbitrary number of licenses.

Libraries

For	Description	Type	Order code	Price	Weight (1 pce) kg
all AC500 CPUs	Solar library (9)	PS562-SOLAR	1SAP195000R0001		0.300
all AC500 CPUs	Water library (10)	PS563-WATER	1SAS030000R0101		0.300
all AC500 CPUs	Motion Control library, Extended (9)	PS552-MC-E	1SAP192100R0002		0.300
all AC500 CPUs	Temperature control library (10)	PS564-TEMPCTRL	1SAS030010R0101		0,010

(9) Delivery on USB stick that includes: library, single license code and documentation.
(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

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.

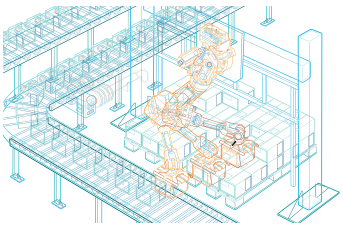
Applications Examples help to minimize valuable programming and testing time for specific applications.

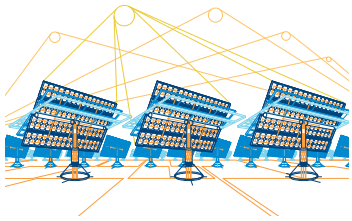
Automation Builder
Software features

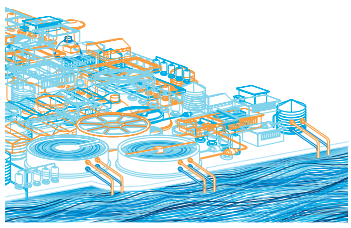
	Automation Builder Basic	Automation Builder Standard	Automation Builder Premium
Description	Basic system engineering for FREE	Integrated engineering of complex systems	Productivity and Collaboration for System Integrators and Machine Builders
Features	- AC500-eCo, AC500 with local I/O, TCP/IP, Modbus, CS-31, IEC60870-5 - All 5 IEC 61131-3 languages IL, LD, FBD, SFC, ST, plus CFC - Drive application programming (IEC 61131-3) - Mint WorkBench for motion applications - RobotStudio Basic - PLC firmware update, download and online change to single or several PLCs - PLC simulation and debugging - Language packs available for EN, DE, ES, FR, CN	Automation Builder Basic features plus - Integrated engineering for Panel, Drive, Motion, Robotics - AC500 PROFIBUS, PROFINET, EtherCAT, CAN, CMS - AC500 Safety (1) - Drive Manager	Automation Builder Standard features plus - C/ C++ application programming interface - ECAD Interface AC500/ AC500-eCo for EPLAN P8® and Zuken E3® - Advanced CSV data exchange - Project compare
Minimum PC requirements	1 GHz, 3 GB RAM, 10 GB free disk space		
Recommended Operating Systems	Windows 7 32/64-bit, Windows 8.1 32/64-bit		
Target Systems	- PLC AC500-eCo, AC500, AC500-XC, ACS880, DCT880 - Robot Controller IRC5 - NextMove motion controllers, MicroFlex and MotiFlex drives	- AC500-S (1), - Control Panel CP600 and CP600-WEB	
Supported devices on PLC fieldbus	-	- All I/O and fieldbus modules for AC500 family - ACS355, ACS380, ACS580, ACS850, ACS880, ACQ810, DCT880, ACSM1, MicroFlex e150, Motiflex e180, IRC5 on selected fieldbuses	
Included components	- IEC61131-3 Editor - PS553-DRIVES drive library - RobotStudio (Basic license) - Mint WorkBench - OPC server and clients, service tool, PLC gateway, IP configuration and visualization - PB610-B	Automation Builder Basic plus - Drive Manager - Drive Composer pro license - Panel Builder 600	Automation Builder Standard plus - GNU compiler, C/ C++ programming (2) - ECAD interface for EPLAN P8® and Zuken E3®
Additional options	- RobotStudio Premium license - Panel Builder 600 license - Drive composer pro license	- PS501-S safety library - PS541-HMI visualization - PS552-MC-E PLCopen® motion library - Project Version Control	- Project Version Control

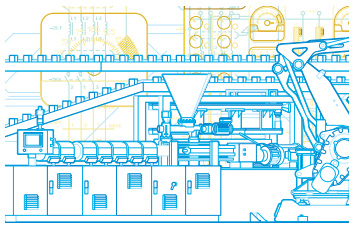
(1) requires PS501-S safety library.
(2) for AC500 and AC500-XC targets.

Automation Builder
Libraries features

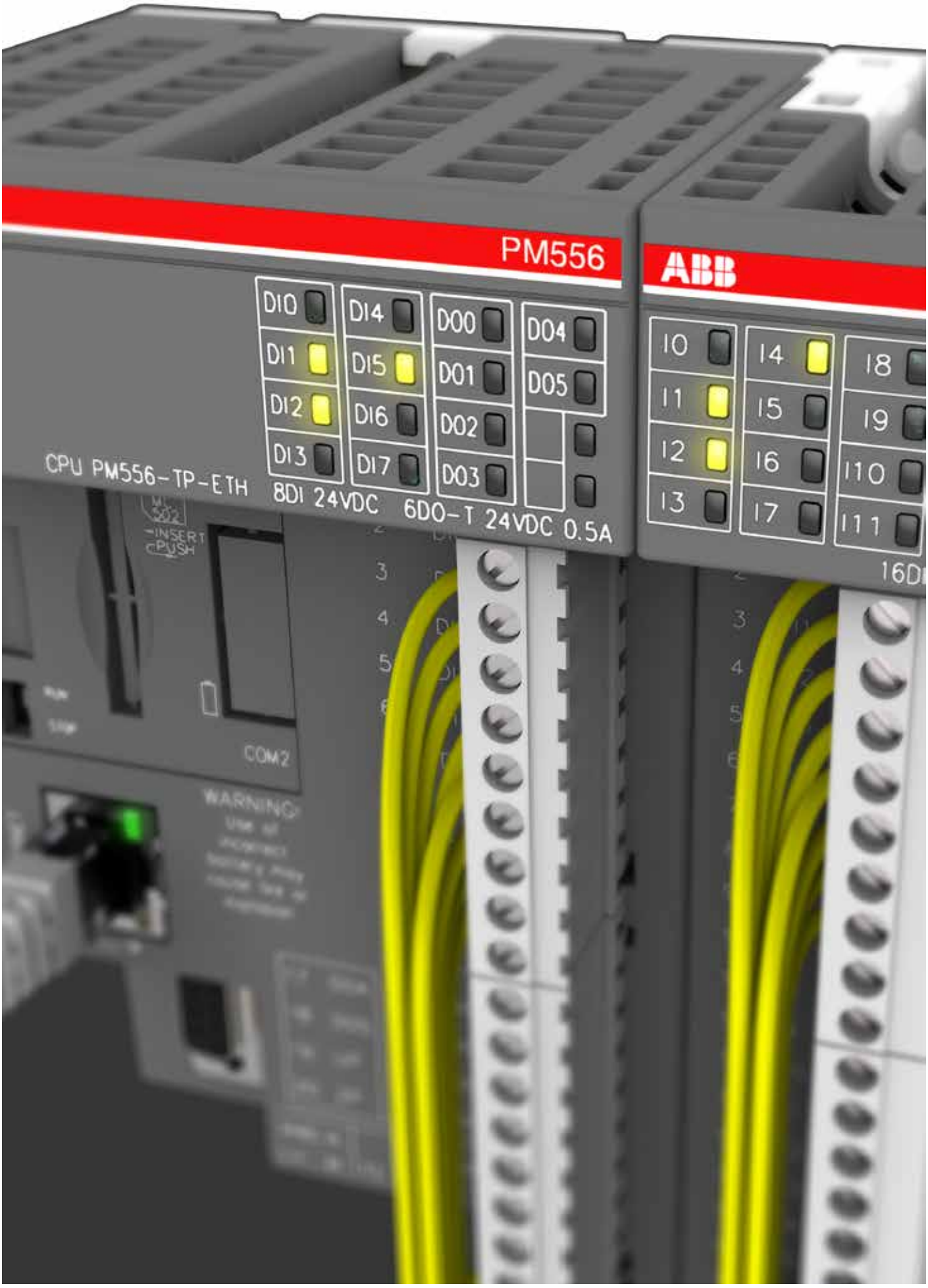








PS552-MC-E	PS562-SOLAR	PS563-WATER	PS564-TEMPCTRL
Motion control library	**Solar tracker solution library**	**Water solution library**	**Temperature Control Library**
Library enabling fast and standardized engineering according to PLCopen® standard when using ABB's AC500 PLC for motion control, especially 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.	Library for solar tracking applications enabling fast engineering, especially together with ABB's drives and motors Covers different tracker configurations and different algorithms for accuracy needs – Control of trackers in parabolic trough, power tower, PV and CPV applications. Complete library package for different tracking use cases, plug and play: Example program with detailed explanations and visualizations – Control of the tracker adaptable to different needs and conditions, to achieve maximum efficiency of installation – Exact positioning of different axes with the following accuracies: - NOAA algorithm 0.03 Grad - NREL algorithm 0.0003 Grad. – Input / sensor adaptation – Communication – Different actuators / drives control – All needed modes for simple commissioning and manual operation: - Fast and simple calibration of the trackers, offering manual repositioning and fine tuning - Safety positions - Back tracking.	Library supporting the most common functions in many water applications Flexible data logging options: – Especially suited for remote communication like GSM/GPRS – Timestamp in logging – Integrated variants for simple use with IEC 60870 – Logging to files: storage capacity only dependent on memory availability – Flexible log conditions (cyclic, event or tolerance based). Support for pumping station functions with different operation modes – Standard multidrive functions (PLC based) – Advanced functionality together with ABB ACS and ACQ810 drives – Detailed diagnosis – Energy efficiency functions – Multidrive functions – Flow estimation. Control Panel CP600 support for ACQ810: Fast and simple configuration for pumping stations with reduced programming effort via pre-built visualization screen templates. Application examples for fast engineering and startup.	Library packet for advanced temperature control applications Includes extended, flexible PID functionality with Auto-tune for temperature control – Enhanced response time and reduced overshoots and oscillations – Option to optimize control for very different heating and cooling characteristics. – Enhanced tolerance to thermocouple input noise – Normal and standby- setpoints – Multi-level temperature monitoring and alarms provides flexible operation and protection for machine and process – Logging enables complete overview of the actual situation and past behavior – Configurable output timing, synchronization for peak load shaving in multi-zone setups – Simulation blocks enable off-line setup and pre-test of a new project – Group-programming Example projects, including adaptable HMI project for CP600 family, well suited for multi zone and grouped temperature control e.g. in Extrusion: – Easy to use operator interface – Provides quick access to setup, monitoring and tuning screens for multiple zones – Easily expandable to a large number of zones – Zones: heat-, cool-only or heat-and-cool
Package with self installing software and license code on USB-stick.	Package with self installing software and license code on USB-stick.	License Package (Software is part of Automation Builder)	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).	NOAA: PM554-XX and above NREL: PM573-ETH and above.	All AC500 CPUs. Logging: PM573 and above.	All AC500 CPUs.


PM556
ABB
DI0
DI1
DI2
DI3
DI4
DI5
DI6
DI7
DO0
DO1
DO2
DO3
DO4
DO5
CPU PM556-TP-ETH
8DI 24VDC
6DO-T 24VDC 0.5A
10
11
12
13
14
15
16
17
18
19
110
111
COM2
WARNING

AC500-eCo
Entry level PLC solutions

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System data 3/47

3

AC500-eCo
Key features

High performance variant with large memory available

– 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

– 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
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

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

DI561

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, 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 9 poles	11 poles	Type	Order code	Price	Weight (1 pce) kg
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.

AI562

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 9 poles	11 poles	Type	Order code	Price	Weight (1 pce) kg
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.

AX561

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)
			9 poles	11 poles				kg
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.

TK506

TA561-RTC

TA562-RS

TA562-RS-RTC

TA570

TA565-9

TA564-11

TA563-9

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.

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. typ. (module alone)	0.06 A	0.08 A	0.02 A	0.012 A	0.07 A	0.07 A
Max. typ. (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)					
Signal voltage	24 V DC					
Onboard digital outputs						
Channels	6 (including 2 PWM 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					
Digital outputs	320 + 6					
Analog inputs	160					
Analog 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, ASCII, CS31	●					
COM2 (option) (2)						
RS485	●					
Terminal block	●					
Programming, Modbus, ASCII	●					
Ethernet						
RJ45	–				●	
Ethernet functions: Programming, Modbus TCP/IP, UDP/IP, integrated Web server, DHCP, FTP server, SNTP client	–				●	
SMTP	–					●
RUN/STOP switch	●					
LED display for power, status and error	●					
Approvals	see detailed overview page 154 or www.abb.com/plc					

(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. typ. (module alone)	0.095 A	0.11 A	0.02 A	0.011 A	0.10 A	0.10 A	0.12 A	0.023 A	0.014 A
Max. typ. (I/Os)	0.21 A	0.24 A	0.21 A	0.125 A	0.22 A	0.22 A	0.25 A	0.22 A	0.13 A
Program memory	128 kB					512 kB	128 kB	0.22 A	0.13 A
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)	●								
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	6 (including 2 counter inputs)								
Signal voltage	24 V DC								
Onboard digital outputs									
Channels	6 (including 2 PWM 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	
Onboard analog inputs									
Channels	2								
signal ranges	0...10 V / can be configured as digital input 24 V DC								
Onboard analog outputs									
Channels	1								
signal ranges	0...10 V / 0...20 mA / 4...20 mA								
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 + 2								
outputs	160 + 1								
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, ASCII, CS31	●								
COM2 (option) (2)									
RS485	●								
Terminal block	●								
Programming, Modbus, ASCII	●								
Ethernet									
RJ45	–				●				
Ethernet functions: Programming, Modbus TCP/IP, UDP/IP, integrated Web server, DHCP, FTP server, SNTP client	–				●				
SMTP						●			
RUN/STOP switch	●								
LED display for power, status and error	●								
Approvals	see detailed overview page 154 or www.abb.com/plc								

(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. typ. (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	
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, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31					

AC500-eCo
Technical data

Digital S500-eCo I/O modules

Type		DO571	DO572	DO573
Supply voltage		24 V DC		
Current consumption on UP				
Max. typ. (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	triac (AC)	Relay
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, 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. typ. (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	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 4 mA	typically 5 mA
	5 V DC	< 1 mA	< 1 mA	< 1 mA	typically 1 mA
	15 V DC	> 2.5 mA	> 2.5 mA	> 2.5 mA	> 2.5 mA
	30 V DC	< 6.5 mA	< 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, 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. typ. (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						
	-50…+400 °C (2/3- wire)	–	–	–	●	–
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		–	●	●	–	–
0…20 mA		–	●	●	–	–
4…20 mA		–	●	●	–	–
Potential isolation						
Per module		–	–	–	●	●
Fieldbus connection						
Suitable communication interface module		CI501-PNIO, CI502-PNIO, CI504-PNIO, CI506-PNIO, CI541-DP, CI542-DP, CI581-CN, CI582-CN, DC551-CS31, CI592-CS31				

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	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	10 s
120 V AC	Line voltage	120 V AC (-15 %, +10 %)
	Frequency	47...62.4 Hz / 50...60 Hz (-6 %, +4 %)
230 V AC	Line voltage	230 V AC (-15 %, +10 %)
	Frequency	47...62.4 Hz / 50...60 Hz (-6 %, +4 %)
120–240 V AC	Wide-range supply	
	Line voltage	102...264 V / 120..240 V (-15 %, +10 %)
	Frequency	47...62.4 Hz / 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 power supply voltage (>30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.
The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.
For the supply of the modules, power supply units according to PELV specifications must be used.

Climatic conditions

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
	Transport	-40...+70 °C
Humidity	Without condensation	Max. 95 %
Air pressure	Operation	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m

Electromagnetic Compatibility

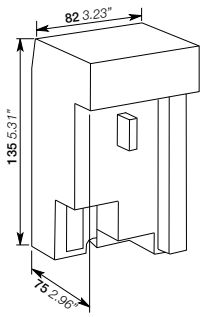
Radiated emission (radio disturbances)	Acc. to IEC61000-6-4
Conducted emission (radio disturbances)	Acc. to IEC61000-6-4
Electrostatic discharge (ESD)	Acc. to EN 61000-4-2, zone B, criterion B
Fast transient interference voltages (burst)	Acc. to EN 61000-4-4, zone B, criterion B
High energy transient interference voltages (surge)	Acc. to EN 61000-4-5, zone B, criterion B
Influence of radiated disturbances	Acc. to IEC 61000-4-3, zone B, criterion A
Influence of line-conducted interferences	Acc. to IEC 61000-4-6, zone B, criterion A

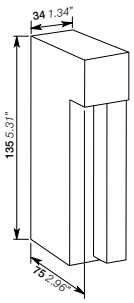
In order to prevent operating malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges. The connector of the I/O-Bus must not be touched during operation.

Mechanical data

Wiring method	Available types of terminal	Spring terminals, screw terminals
Degree of protection		IP 20 (if all terminal screws are tightened)
Vibration resistance		Acc. to IEC 61131-2
Shock resistance		Acc. to IEC 60068-2-27
Assembly position	Horizontal	no derating
	Vertical	max. ambient temp. 40°C and output load reduced to 50% per group
Assembly on DIN rail		Acc. to IEC 60715
	DIN rail type	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*





Environmental tests

Climatic and mechanical tests

Storage	Cold withstand test	IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h
	Dry heat withstand test	IEC 60068-2-2 Test Bb: dry heat withstand test +70 °C / 16 h
Humidity	Damp heat test	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
Insulation Test		Acc. to IEC 61131-2
Vibration resistance	DIN rail mounting	all three axes 5...11.9 Hz, continuous 3.5 mm 11.9...150 Hz, continuous 1 g
	With SD Memory Card inserted	15...150 Hz, continuous 1 g
Shock resistance	DIN rail mounting	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

EMC immunity tests

Electrostatic discharge (ESD)	Electrostatic voltage in case of air discharge	8 kV
	Electrostatic voltage in case of contact discharge	6 kV
Fast transient interference voltages (burst)	Supply voltage units (AC, DC)	2 kV
	Digital inputs/outputs (24 V DC)	2 kV
	Digital inputs/outputs (120/230 V AC)	2 kV
	Analog inputs/outputs	1 kV
	CS31 system bus	2 kV
	Serial RS-485 interfaces (COM)	2 kV
	Ethernet	1 kV
	I/O supply, DC-out	1 kV
High energy transient interference voltages (surge)	Power supply AC	2 kV CM (1) / 1 kV DM (2)
	Power supply DC	1 kV CM (1) / 0.5 kV DM (2)
	DC I/O supply, add. DC-supply-out	0.5 kV CM (1) / 0.5 kV DM (2)
	Buses, shielded	1 kV CM (1)
	AC-I/O unshielded	2 kV CM (1) / 1 kV DM (2)
	I/O analog, I/O DC unshielded	1 kV CM (1) / 0.5 kV DM (2)
Influence of radiated disturbances	Test field strength	10 V/m
Influence of line-conducted interferences	Test voltage	3V zone B, 10 V is also met.

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

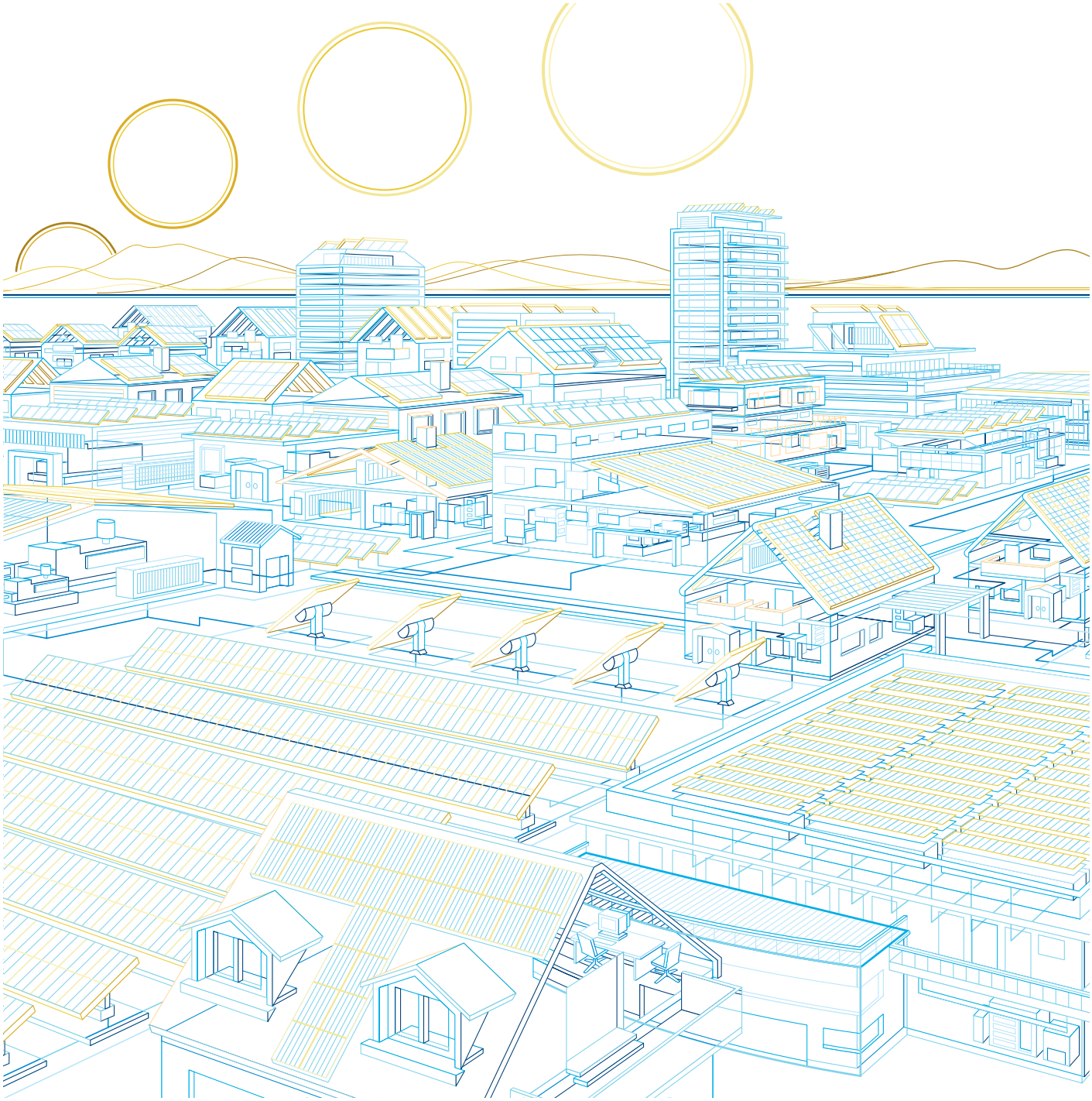


ABB
PM592
SYS
BATT
I/O-Bus
run
ETH
FBP
COM1
COM2
PWR
RUN
ERR
RUN
DIAG
VAL
CFG
ESC
OK
WARNING
Use of incorrect battery may cause fire or explosion.
ADDR x10 H
ADDR x01 H
MC 502
INSERT PUSH
UP 24VDC 10W
CPU

AC500
High performance modular PLC

Key features 4/52

Ordering data 4/53

Technical data 4/60

System data 4/84

AC500
Key features

A high performance PLC:
– Highly modular
– From 8 to +80 000 I/Os
– More communication possibilities (Ethernet, Internet, PROFINET®, PROFIBUS®, Modbus®, CANopen®, EtherCAT®…)

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

– Eight programming languages available (five IEC61131-3, CFC, C-code and C++)
– 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

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 µs 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
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)(5)	1SAP150100R0277		0.150
4096	0.002 / 0.004 / 0.004	Ethernet (2), 2 x serial	PM592-ETH (1)(3)	1SAP150200R0271		0.150

PM585-MC-KIT

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 µs 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

PM595-4ETH-F

AC500 CPU PM595

- 2 Ethernet interfaces with integrated switch and software configurable protocol (PROFINET, EtherCAT (4))
- 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-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) Availability on demand.
(5) Only to be used with dedicated terminal base TB523-2ETH.

AC500
Ordering data

TB511-ETH

TB541-ETH

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	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.

FM502-CMS

TF501-CMS

TF521-CMS

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 algorithmns, 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. absloute 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
(3) Availability planned for Q1/2016.

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 (1)	1SAP173200R0001		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 (1)	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	2xRJ45 - integrated switch	CM589-PNIO	1SAP172900R0011		0.115
EtherCAT® master	2 x RJ45	CM579-ETHCAT (1)	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 for Q1/2016

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 DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
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 (1)	TU531 / TU532	DX522	1SAP245200R0001		0.300
8 / 4 / –	230 V AC	Relay	230 V AC, 3 A (1)	TU531 / TU532	DX531	1SAP245000R0001		0.300
– / 32 / –	24 V DC	Transistor	24 V DC, 0.5 A	TU515 / TU516	DO524	1SAP240700R0001		0.200

(1) Relay outputs, changeover contacts..

AC500
Ordering data

AO523

Analog I/O

Number of AI/AO	Input signal	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
16 / 0	0...10 V, ±10 V 0/4...20 mA, PT100, PT1000, Ni1000	–	TU515 / TU516	AI523	1SAP250300R0001		0.200
4 / 4		±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

DA501

Analog/digital mixed I/O

Standard I/O module with high functionality:

- 16 digital input or 16 digital output 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.

DA502

Number of AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal unit Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
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
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	DA502	1SAP250800R0001		0.200

CD522

Multifunctional modules

Functionality	Number of DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
Encoder module									
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 DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
Interrupt I/O and fast counter module									
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 69 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 AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal units Screw / Spring	Type	Order code	Price	Weight (1 pce) kg
For CS31-Bus								
- / - / 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
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 (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
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	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
For Ethernet based protocol - EtherCAT®								
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
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	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
Gateway on Ethernet based protocol - PROFINET® IO RT							
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
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	TU531 TU532	TU507-ETH TU508-ETH	TU509 TU510	TU517 TU518	TU520-ETH	TU551-CS31 TU552-CS31
DA501	●						
DA502	●						
DC522	●						
DC523	●						
DC532	●						
DI524	●						
DX522		●					
DX531		●					
DO524	●						
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. 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. 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. typ. (module alone)	0.050 A	0.110 A	0.050 A	0.110 A	0.150 A	0.150 A				0.400 A
Max. typ. (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)										4 x RJ45 (2 x interfaces with 2-port switch)
Dowloadable prototcols like: PROFINET® IO RT Controller / Device (2) EtherCAT® (2) Master / Slave										●
LCD display	LCD display and 8 function keys									
Function	RUN / STOP, status, diagnosis									RUN / STOP, status, diagnosis, RESET
LEDs for various status display	–									●
Timer/Counter	unlimited/unlimited									
Approvals	See detailed page 154 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
Technical data

Digital S500 I/O modules

Type		DI524	DC522	DC523	DC532
Number of channels per module					
Digital	inputs	32	–	–	16
	outputs	–	–	–	–
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 83			
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. typ. (module alone)		0.150 A	0.100 A	0.150 A	
Max. typ. (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
Number of channels per module				
Digital	inputs	8		–
	outputs	8 relays	4 relays	32
Configurable channels DC (configurable as inputs or outputs)		–	–	–
Additional configuration of channels as				
Fast counter		configuration of max. 2 channels per module, operating modes see page 83	–	–
Occupies max. 1 DO or DC when used as counter		–	–	–
Connection via terminal unit		●	●	●
Digital inputs				
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	–
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	–	–
	159 V AC	–	> 7 mA	–
	40 V AC	–	< 5 mA	–
Digital outputs				
Transistor outputs 24 V DC, 0.5 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
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		2 Hz		0.5 Hz max.
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		–

AC500
Technical data

Digital S500 I/O modules

Type		DX522	DX531	DO524
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		–
Process voltage UP				
Nominal voltage		24 V DC		
Maximum ripple		5 %		
Current consumption on UP				
Min. typ. (module alone)		0.050 A	0.150 A	0.050 A
Max. typ. (min. + loads)		0.050 A + load	0.150 A + load	0.100 + load
Reverse polarity protection		●	●	●
Fuse for process voltage UP		10 A miniature fuse		
Maximum cable length for connected process signals				
Cable	shielded	1000 m		
	unshielded	600 m		
Potential isolation				
Per module		●	●	●
Between the channels	input	–	● (per 2)	–
	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
Number of channels per module						
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
-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
Pt100						
-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
Pt1000						
-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
Ni1000						
-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
Thermocouples of types J, K, T, N, S		–	–	–	–	●
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
Digital signals (digital input)		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		●	●	●	–	●
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
Technical data

Analog S500 I/O modules

Type	AX521	AX522	AI523	AO523	AI531
Process voltage UP					
Nominal voltage	24 V DC				
Maximum ripple	5 %				
Current consumption on UP					
Min. typ. (module alone)	0.150 A				0.130 A
Max. typ. (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)				–

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.

Type		CD522
Functionality		
Digital inputs/outputs		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	●
High-speed counter/encoder		
Integrated counters	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
PWM/pulse outputs		
Output mode specification	Number of outputs	2
	Push pull output	24 V DC, 100 mA max
	Current limitation	Thermal and overcurrent
PWM mode specification	Frequency	1...100 kHz
	Value	0...100 %
Pulse mode specification	Frequency	1...15 kHz
	Pulse emission	1...65535 pulses
	Number of pulses emitted indicator	0...100 %
Frequency mode specification	Frequency output	100 kHz
	Duty Cycle	Set to 50 %
Number of channels per module		
Digital	input	2
	output	2
Configurable channels DC (configurable as inputs or outputs)		8
Additional configuration of channels as		
Fast counter		Integrated 2 counter encoders
Connection via terminal unit		●
Digital Inputs		
Input	signal voltage	24 V DC
	time delay	8 ms typically configurable from 0.1 up to 32 ms
Input current per channel		
At input voltage	**24 V DC**	Typically 5 mA
	5 V DC	> 1 mA
	15 V DC	> 5 mA
	30 V DC	< 8 mA
Digital outputs		
Output voltage at signal state 1		UP – 0.8 V
Output current		
Nominal current per channel		0.5 A 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		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		●
Proofness against reverse feeding of 24 V signals		●

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 x 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. typ. (module alone)	0.070 A
	Max. typ. (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	DA502 (1)
Number of Channels per Module				
Digital		inputs	16	–
		outputs	–	16
Analog		inputs	4	4
		outputs	2	2
Digital configurable channels DC (configurable as inputs or outputs)			8	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 83	
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. typ. (module alone)			0.070 A	
Max. typ. (min. + loads)			0.070 A + load	
Reverse polarity protection			●	
Fuse for process voltage UP			10 A miniature fuse	
Approvals			See detailed page 154 or www.abb.com/plc	

(1) In preparation

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)		8 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 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 lenght 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)	
Accurracy at +25 °C	< +/- 0.1 %	
Accurracy 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 ~ 27Ohm (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 A^2s	
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	CM597-ETH	CM598-CN	CM588-CN	CM579-PNIO	CM589-PNIO	CM579-ETHCAT	CM574-RS	CM574-RCOM
Communication interfaces									
RJ45	–	● (x 2) (2)	–	–	● (x 2) (2)	● (x 2) (2)	● (x 2)	–	–
RS-232 / 485	–	–	–	–	–	–	–	● (x 2)	● (x 2)
Terminal blocks (1)	–	–	●	●	–	–	–	● (x 2)	● (x 2)
Sub-D socket	●	–	–	–	–	–	–	–	–
Protocols	PROFIBUS® DP Master V0/V1	Ethernet (TCP/IP, UPD/IP, Modbus® TCP)	CANopen® master	CANopen® slave	PROFINET® IO Controller	PROFINET® IO Device	EtherCAT®	Serial COM ASCII, Modbus® RTU, CS31	Serial RCOM/ RCOM+
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	8 kB Dual-port memory
Transfer Rate	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	9.6 kBit/s up to 187.5 kBit/s	2,4 kBit/s to 19.2 kBit/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	Programmable CPU like PM57x with PowerPC 50 MHz processor	PowerPC 50 MHz processor
Memory	–	–	–	–	–	–	–	256 kB program memory 384 kB data memory	–
Additional features	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 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 Protot-col, Class 1 RTA - Real-time Acyclic protocol DCP Discovery and Configuration Prototocol LLDP - Link Layer Discovery Prototocl	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 program-mable serial interface coupler. – Independant internal CPU programmable for own communica-tion 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.

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 DIs/120 DOs or up to 32 AIs/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: 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

(1) Dedicated to High Availability.

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. typ. (module alone)	0.100 A	0.100 A	0.070 A
	Max. typ. (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 154 or www.abb.com/plc		

(1) Dedicated to High Availability.

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.	–

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. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

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.	–

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. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

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.

PROFINET® IO RT device modules

Type		CI501-PNIO	CI502-PNIO	CI504-PNIO	CI506-PNIO
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.	–	–	–
Potential isolation					
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			
Process voltage UP					
Nominal voltage		24 V DC			
Maximum ripple		5 %			
Current consumption on UP					
	min. typ. (module alone)	0.260 A		0.150 A	
	max. typ. (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 154 or www.abb.com/plc			

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.	–

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. typ. (module alone)		0.260 A	
max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

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	Using configuration tool (included in Automation Builder software suite)	
Station address configuration	No	Using rotary switches (99 max.)

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

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	10 s
120 V AC	Line voltage	120 V AC (-15 %, +10 %)
	Frequency	47...62.4 Hz / 50...60 Hz (-6 %, +4 %)
230 V AC	Line voltage	230 V AC (-15 %, +10 %)
	Frequency	47...62.4 Hz / 50...60 Hz (-6 %, +4 %)
120-240 V AC	Wide-range supply	–
	Line voltage	102...264 V / 120...240 V (-15 %, +10 %)
	Frequency	47...62.4 Hz / 50...60 Hz (-6 %, +4 %)
Allowed interruptions of power supply acc. to EN 61131-2	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 power supply voltage (> 30 V DC) for process or supply voltages could lead to unrecoverable damage of the system. The system could be destroyed.

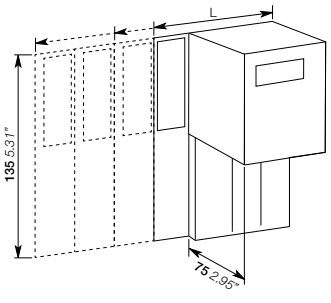
Temperature	Operation	0...60 °C (horizontal mounting of modules)
		0...40 °C (vertical mounting of modules and output load reduced to 50 % per group)
	Storage	-40...+70 °C
	Transport	-40...+70 °C
Humidity		Max. 95 %, without condensation
Air pressure	Operation	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m

Creepage distances and clearances

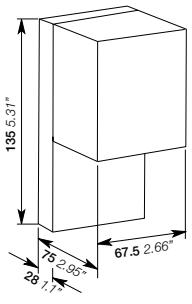
Insulation Test Voltages, Routine Test, according to EN 61131-2		High voltage pulse 1.2/50 µs	AC voltage during 2 seconds
Circuits against other circuitry	230 V	2500 V	1350 V
	120 V	1500 V	820 V
	120...240 V	2500 V	1350 V
24 V circuits (supply, 24 V inputs/outputs), if they are electrically isolated against other circuitry		500 V	350 V
COM interfaces, electrically	isolated	500 V	350 V
	not isolated	not applicable	not applicable
FBP interface		500 V	350 V
Ethernet		500 V	350 V

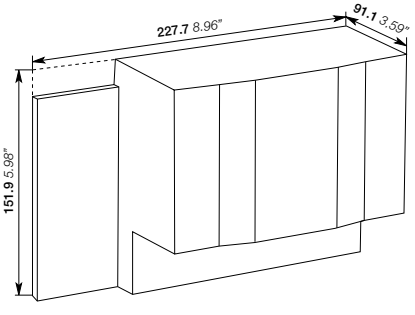
The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

Main dimensions mm, *inches*



Type	Nr communication modules	Length L	
		mm	*inches*
TB511-ETH	1	95.5	*3.76*
TB521-ETH	2	123.5	*4.86*
TB541-ETH	4	179.5	*7.07*





Power supply units

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

Electromagnetic Compatibility

Immunity

Against electrostatic discharge (ESD)		According to EN 61000-4-2, zone B, criterion B
Electrostatic voltage in case of	air discharge	8 kV
	contact discharge	4 kV, in a closed switch-gear cabinet 6 kV (1)
ESD with communication connectors		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.
ESD with connectors of Terminal Bases		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.
Against the influence of radiated (CW radiated)		According to EN 61000-4-3, zone B, criterion A
Test field strength		10 V/m
Against transient interference voltages (burst)		According to EN 61000-4-4, zone B, criterion B
Supply voltage units	AC / DC	2 kV
Digital inputs/outputs	24 V DC	2 kV
	120/230 V AC	2 kV
Analog inputs/outputs		1 kV
CS31 system bus		2 kV
Serial RS485 interfaces (COM)		2 kV
Serial RS232 interfaces (COM, not for PM55x and PM56x)		1 kV
ARCNET		1 kV
FBP		1 kV
Ethernet		1 kV
I/O supply, DC-out		1 kV
Against the influence of line-conducted interferences (CW conducted)		According to EN 61000-4-6, zone B, criterion A
Test voltage		3 V zone B, 10 V is also met
High energy surges		According to EN 61000-4-5, zone B, criterion B
Power supply DC		1 kV CM (2) / 0.5 kV DM (2)
DC I/O supply		0.5 kV CM (2) / 0.5 kV DM (2)
Buses, shielded		1 kV CM (2)
AC-I/O unshielded		2 kV CM (2) / 1 kV DM (2)
I/O analog, I/O DC unshielded		1 kV CM (2) / 0.5 kV DM (2)
Radiation (radio disturbance)		According to EN 55011, group 1, class A

(1) High requirement for shipping classes are achieved with additional specific measures (see specific documentation).
(2) CM = Common Mode - DM = Differential Mode.

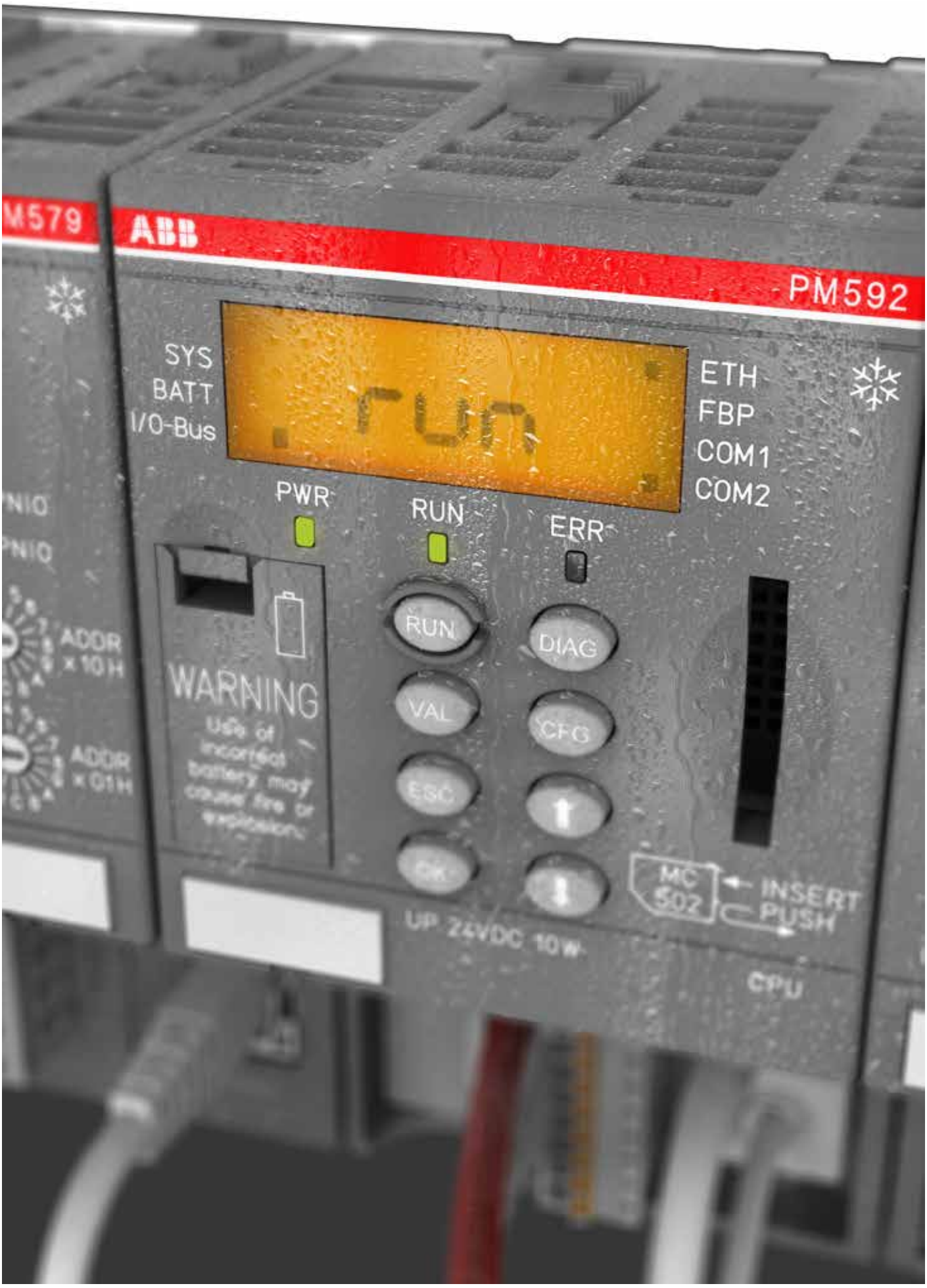
Mechanical Data

Wiring method / terminals

Mounting	Horizontal
Degree of protection	IP20 (if all terminal screws are tightened)
Housing	According to UL 94
Vibration resistance acc. to EN 61131-2	all three axes 2...15 Hz, continuous 3.5 mm 15...150 Hz, continuous 1 g (higher values on request)
Vibration resistance with SD Memory Card inserted	15...150 Hz, continuous 1 g
Shock resistance	All three axes 15 g, 11 ms, half-sinusoidal
Shipping specific requirements	–

Mounting of the modules

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


M579
ABB
PM592
SYS
BATT
I/O-Bus
run
ETH
FBP
COM1
COM2
PWR
RUN
ERR
RUN
DIAG
VAL
CFG
ESC
OK
WARNING
ADDR
x10H
ADDR
x01H
MC
502
INSERT
PUSH
UP 24VDC 10W
CPU

AC500-XC
PLC operating in eXtreme Conditions

Key features 5/88

Ordering data 5/89

Technical data 5/95

System data 5/117

AC500-XC
Key features

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

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

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	Cycle time in µs per instruction min.	Integrated communication	Type	Order code	Price	Weight (1 pce)
kB	Bit/Word/Float. point					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 (4))
- 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	Cycle time in µs per instruction min.	Integrated communication	Type	Order code	Price	Weight (1 pce)
MB	Bit/Word/Float. point					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.
(4) Availability on demand.

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 algorithmns, 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. absloute 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
(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 (1)	1SAP373200R0001		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 (1)	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

(1) Availability planned for Q1/2016.

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 DI/DO/DC	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
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 AI/AO	Input signal	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) kg
16 / 0	0...10 V, ±10 V 0/4...20 mA PT100, PT1000, Ni1000	–	TU516-XC	AI523-XC	1SAP450300R0001		0.200
4 / 4		±10 V 0/4...20 mA	TU516-XC	AX521-XC	1SAP450100R0001		0.200
8 / 8 (max. 4 current outputs)			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

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AI531-XC

Analog/digital mixed I/O

Standard I/O module with high functionality:

- 16 digital input or 16 digital output 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 AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
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
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	DA502-XC	1SAP450800R0001		0.200

CD522-XC

Multifunctional modules

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

- 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 DI/DO/DC	Input signal	Output type	Output signal	Terminal unit	Type	Order code	Price	Weight (1 pce) kg
Interrupt I/O and fast counter module									
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 103 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 AI/AO/DI/DO/DC	Input signal	Output type	Output signal	Terminal units	Type	Order code	Price	Weight (1 pce) 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

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.

TU520-ETH-XC

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	●						
DA502-XC	●						
DC522-XC	●						
DC523-XC	●						
DC532-XC	●						
DI524-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.

TU510-XC

TU508-ETH-XC

AC500-XC
Ordering data

MC502

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. 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. 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. typ. (module alone)	0.110 A	0.050 A	0.110 A	0.150 A		0.400 A
Max. typ. (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
Dowloadable prototcols like: PROFINET® IO RT Controller / Device (2) EtherCAT® (2) Master / Slave	–					●
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 154 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 116					
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. typ. (module alone)		0.150 A	0.100 A	0.150 A		0.050 A	0.050 A
Max. typ. (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
Number of channels per module						
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
-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
Pt100						
-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
Pt1000						
-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
Ni1000						
-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
Thermocouples of types J, K, T, N, S		–	–	–	–	●
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
Digital signals (digital input)		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		●	●	●	–	●
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. typ. (module alone)	0.150 A				0.130 A
Max. typ. (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
Functionality		
Digital inputs/outputs		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	●
High-speed counter/encoder		
Integrated counters	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
PWM/pulse outputs		
Output mode specification	Number of outputs	2
	Push pull output	24 V DC, 100 mA max
	Current limitation	Thermal and overcurrent
PWM mode specification	Frequency	1...100 kHz
	Value	0...100 %
Pulse mode specification	Frequency	1...15 kHz
	Pulse emission	1...65535 pulses
	Number of pulses emitted indicator	0...100 %
Frequency mode specification	Frequency output	100 kHz
	Duty Cycle	Set to 50 %
Number of channels per module		
Digital	input	2
	output	2
Configurable channels DC (configurable as inputs or outputs)		8
Additional configuration of channels as		
Fast counter		Integrated 2 counter encoders
Connection via terminal unit		●
Digital Inputs		
Input	signal voltage	24 V DC
	time delay	8 ms typically configurable from 0.1 up to 32 ms
Input current per channel		
At input voltage	**24 V DC**	Typically 5 mA
	5 V DC	> 1 mA
	15 V DC	> 5 mA
	30 V DC	< 8 mA
Digital outputs		
Output voltage at signal state 1		UP – 0.8 V
Output current		
Nominal current per channel		0.5 A 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		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		●
Proofness against reverse feeding of 24 V signals		●

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 x 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. typ. (module alone)	0.070 A
	Max. typ. (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	DA502-XC (1)
Number of Channels per Module			
Digital	inputs	16	–
	outputs	–	16
Analog	inputs	4	4
	outputs	2	2
Digital configurable channels DC (configurable as inputs or outputs)		8	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 116	
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. typ. (module alone)		0.070 A	
Max. typ. (min. + loads)		0.070 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

(1) In preparation

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)		8 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)	
Accurracy at +25 °C	< +/- 0.1 %	
Accurracy 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 ~ 27Ohm (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 A^2s	
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	CM597-ETH-XC	CM598-CN-XC	CM588-CN-XC	CM579-PNIO-XC	CM589-PNIO-XC
Communication interfaces						
RJ45	–	● (x2) (2)	–	–	● (x2) (2)	● (x2) (2)
RS-232 / 485	–	–	–	–	–	–
Terminal blocks (1)	–	–	●	●	–	–
Sub-D socket	●	–	–	–	–	–
Protocols	PROFIBUS® DP master V0/V1	Ethernet (TCP/IP, UPD/IP, Modbus TCP)	CANopen® master	CANopen® slave	PROFINET® IO controller	PROFINET® IO 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
Transfer Rate	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
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
Additional features	Multi master functionality Max. Number of subscribers: - 126 (V0) - 32 (V1)	Online Access, ICMP (Pimg), 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 prototcol, Class 1 RTA - Real-Time Acyclic protocol DCP Discovery and Configuration Prototocol 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.

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 DIs/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			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

(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. typ. (module alone)	0.100 A	0.100 A	0.070 A
	Max. typ. (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 154 or www.abb.com/plc		

(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	–
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. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

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. typ. (module alone)		0.260 A	
Max. typ. (min. + loads)		0.260 A + load	
Reverse polarity protection		●	
Fuse for process voltage UP		10 A miniature fuse	
Approvals		See detailed page 154 or www.abb.com/plc	

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.

PROFINET® IO RT device modules

Type			CI501-PNIO-XC	CI502-PNIO-XC	CI504-PNIO-XC	CI506-PNIO-XC
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.	–	–	–
Potential isolation						
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			
Process voltage UP						
Nominal voltage			24 V DC			
Maximum ripple			5 %			
Current consumption on UP						
	min. typ. (module alone)		0.260 A		0.150 A	
	max. typ. (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 154 or www.abb.com/plc			

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	Using configuration tool (included in Automation Builder software suite)	
Station address configuration	No	Using rotary switches (99 max.)

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

24 V DC	Process and supply voltage	24 V DC (-25 %, +30 % inclusive ripple)
	Absolute limits	18 ... 31.2 V inclusive ripple
	Ripple	< 10 %
	Protection against reverse polarity	yes
Allowed interruptions of power supply	DC supply	Interruption < 10 ms, time between 2 interruptions > 1s, PS2

Important: Exceeding the maximum process or supply voltage (< -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	-40 ... +70 °C	
	-40 ... -30 °C	Proper start-up of system; technical data not guaranteed
	-40 ... 0 °C	Due to the LCD technology, the display might not be readable
	-40 ... +40 °C	vertical mounting of modules possible, output load limited to 50% per group
	+60 ... +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)
Storage / Transport	-40 ... +85 °C	

Humidity

Operating / Storage	100 % r. H. with condensation

Air pressure

Operating	-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)

Immunity to corrosive gases

Operating	Yes, according to: ISA S71.04.1985 Harsh group A, G3/GX IEC 60721-3-3 3C2 / 3C3

Immunity to salt mist

Operating	Yes, horizontal mounting only, according to: IEC 60068-2-52 severity level 1

Note: Unused communication sockets (RJ45, Sub-D, FBP) must be covered with TA535 Protective Caps for XC devices in case of salt mist environments.

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
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A

Note: 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. Unused sockets for Communication Modules on Terminal Bases must be covered with TA524 Dummy Communication Module. I/O-Bus connectors must not be touched during operation.

AC500-XC
System data

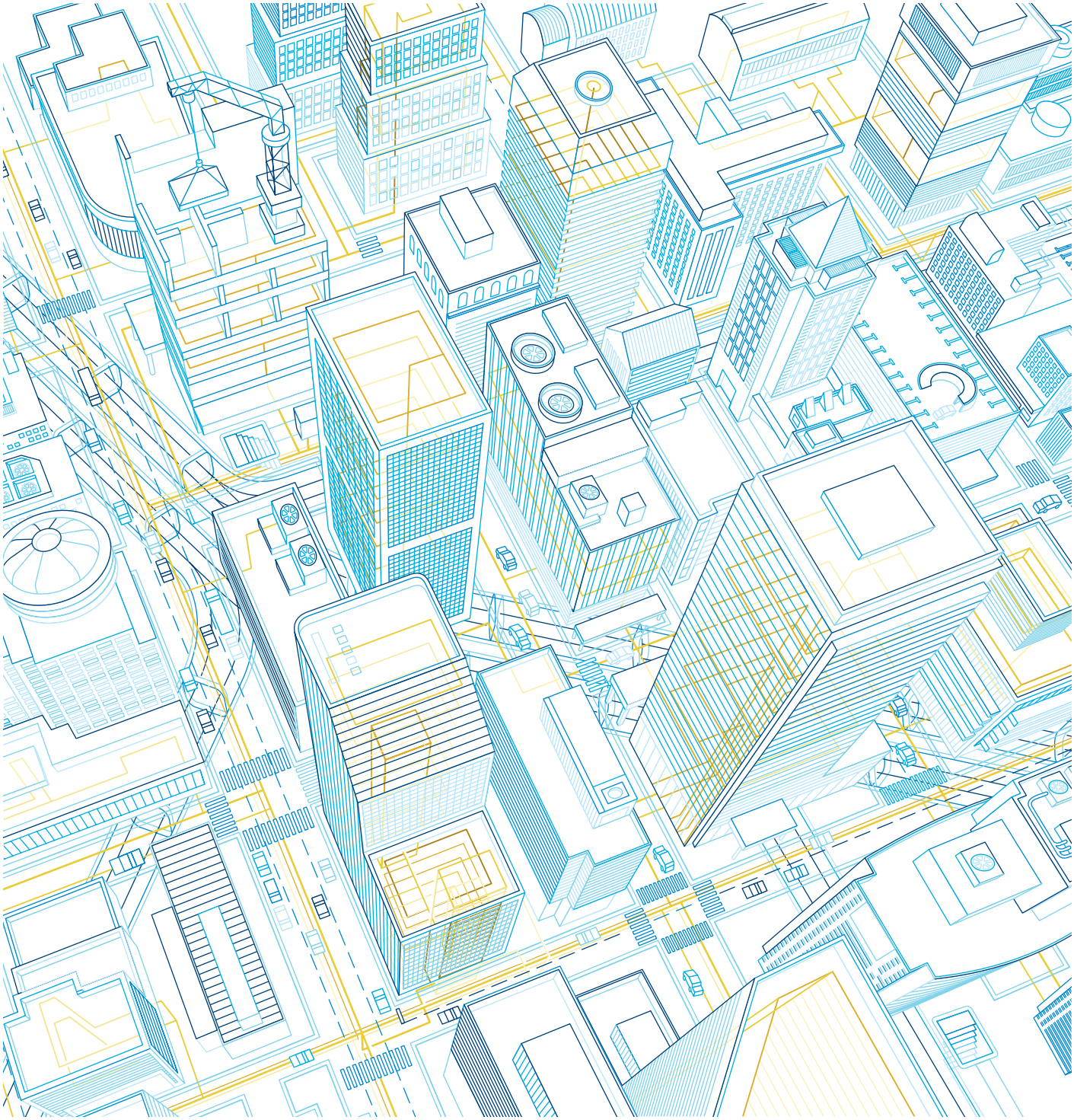
Mechanical data

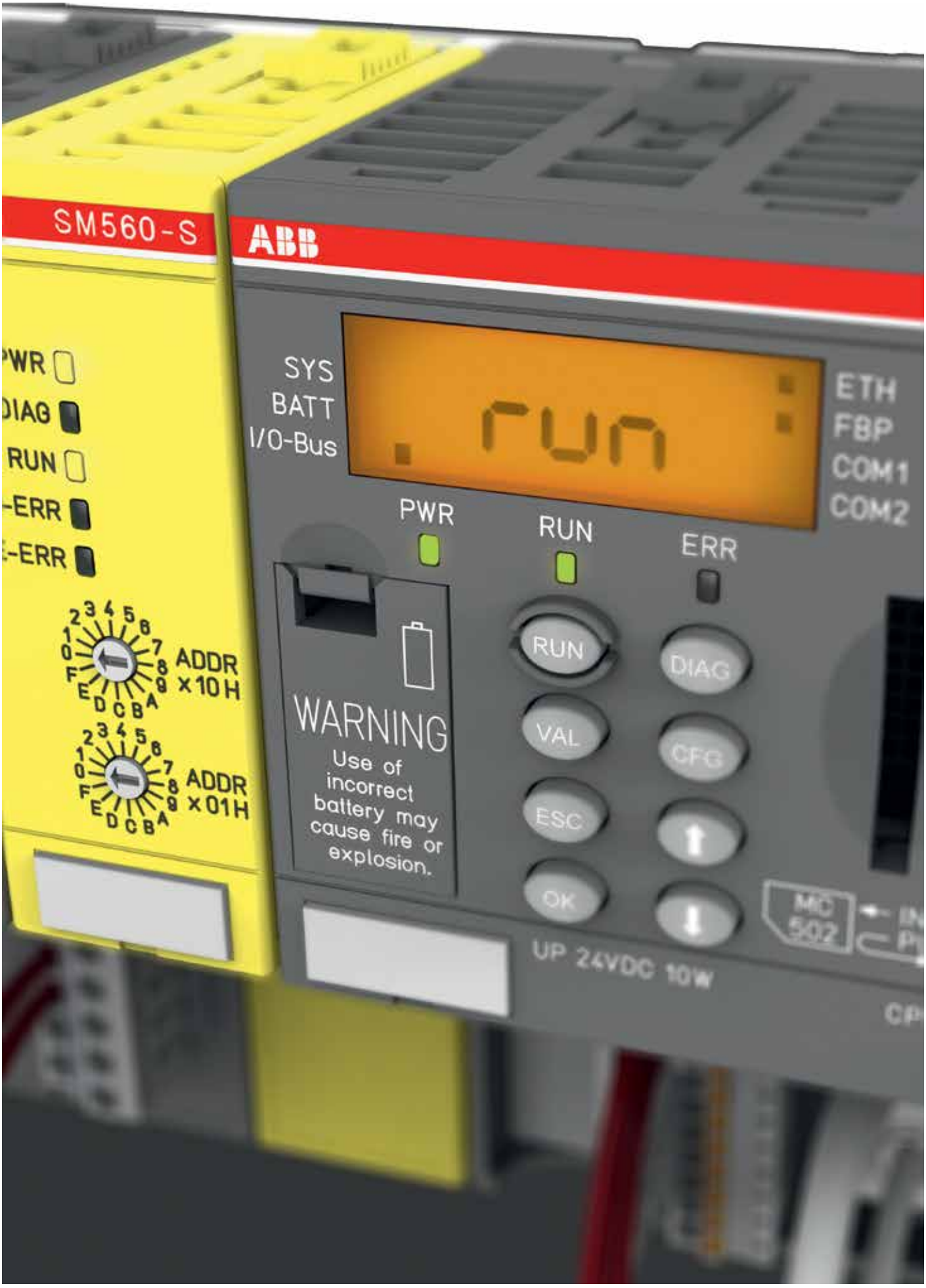
Wiring method		Spring terminals
Degree of protection		IP20
Vibration resistance		Yes, according to: IEC 61131-2, IEC 60068-2-6, IEC 60068-2-64
Shock resistance		Yes, according to: IEC 60068-2-27
Assembly position		Horizontal Vertical (no application in salt mist environment)
Assembly on DIN rail	DIN rail type	According to IEC 60715: 35 mm, depth 7.5 mm or 15 mm
Assembly with screws	Screw diameter	4 mm
	Fastening torque	1.2 Nm

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
Insulation Test	IEC 61131-2
Vibration resistance	IEC 61131-2 / IEC 60068-26: 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
EMC Immunity	
Electrostatic discharge (ESD)	Electrostatic voltage in case of air discharge: 8 kV
	Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	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) (1)	Supply voltage units (DC): 1 kV CM / 0.5 kV DM
	Digital inputs/outputs (24 V DC): 1 kV CM / 0.5 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
Influence of radiated disturbances	Test field strength: 10 V/m
Influence of line-conducted interferences	Test voltage: 10 V
Power frequency	30 A/m 50 Hz
Magnetic fields	30 A/m 60 Hz

(1) CM = Common Mode, DM = Differential Mode.




SM560-S
ABB
SYS
BATT
I/O-Bus
run
ETH
FBP
COM1
COM2
PWR
RUN
ERR
RUN
DIAG
VAL
CFG
ESC
OK
WARNING
Use of incorrect battery may cause fire or explosion.
ADDR x10H
ADDR x01H
UP 24VDC 10W

AC500-S
Functional Safety PLC

Key features 6/122

Ordering data AC500-S 6/123

Ordering data AC500-S-XC 6/124

Technical data 6/125

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AC500-S
Key features

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

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

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

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 kinematic tasks.

AC500-S
Ordering data

SM560-S

Safety CPU

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

S500 Safety I/O

Description	Input signal SIL2	Input signal SIL3	Output signal SIL3	Type	Order code		Weight (1 pce) kg
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

DI581-S /
DX581-S /
AI581-S

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

Description	Type	Order code		Weight (1 pce) kg
Licence enabling package for AC500-S Safety PLC programming	PS501-S	1SAP198000R0001		0.100

TU582-S

AC500-S training case

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

Safety XC CPU

Description	User program memory	Type	Order code		Weight (1 pce)
	MB				kg
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)
	SIL2	SIL3	SIL3				kg
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

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

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

TU582-S-XC

AC500-S and AC500-S-XC
Technical data

Safety CPUs

Type		SM560-S / SM560-S-XC
Performance level		PL e (ISO 13849)
Safety	integrity level	SIL3 (IEC 61508: 2010, IEC 62061)
	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

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)		
Safety Integrity Level	SIL3 (IEC 61508: 2010, IEC 62061)		
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	-	●	-

S500 and S500-XC Safety I/O

Type	DI581-S / DI581-S-XC	DX581-S / DX581-S-XC	AI581-S / AI581-S-XC
Analog inputs			
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	-	-	-
Signal resolution for channel configuration			
0...20 mA, 4...20 mA	-	-	14 bits
Process voltage UP			
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 %
Maximum cable length for connected process signals			
Shielded cable	1000 m	1000 m	-
Unshielded cable	600 m	600 m	-
Max. line length of the analog lines, conductor cross section > 0.14 mm²	-	-	100 m
Potential isolation			
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

Important: 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
	Transport	-40...+70 °C
Humidity		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.

Power supply units

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

Electromagnetic Compatibility

Immunity

Against electrostatic discharge (ESD)		According to EN 61000-4-2, zone B, criterion B
Electrostatic voltage in case of	air discharge	±8 kV
	contact discharge	±4 kV
ESD with communication connectors		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.
ESD with connectors of Terminal Bases		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.
Against the influence of radiated (CW radiated)		According to EN 61000-4-3, zone B, criterion A
Test field strength		10 V/m
Against transient interference voltages (burst)		According to EN 61000-4-4, zone B, criterion B
Supply voltage units	DC	2 kV
Digital inputs/outputs	24 V DC	2 kV
Analog inputs		1 kV
Against the influence of line-conducted interferences (CW conducted)		According to EN 61000-4-6, zone B, criterion A
Test voltage		10 V zone B
High energy surges		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)
Radiation (radio disturbance)		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

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

Mounting of the modules

DIN rail according to DIN EN 50022	35 mm, depth 7.5 mm or 15 mm
Mounting with screws	Screws with a diameter of 4 mm
Fastening torque	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

Important: 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

Against electrostatic discharge (ESD)		According to EN 61000-4-2, zone B, criterion B
Electrostatic voltage in case of	air discharge	±8 kV
	contact discharge	±4 kV
ESD with communication connectors		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.
ESD with connectors of Terminal Bases		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.
Against the influence of radiated (CW radiated)		According to EN 61000-4-3, zone B, criterion A
Test field strength		10 V/m
Against transient interference voltages (burst)		According to EN 61000-4-4, zone B, criterion B
Supply voltage units	DC	2 kV
Digital inputs/outputs	24 V DC	2 kV
Analog inputs		1 kV
Against the influence of line-conducted interferences (CW conducted)		According to EN 61000-4-6, zone B, criterion A
Test voltage		10 V zone B
High energy surges		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)
Radiation (radio disturbance)		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.

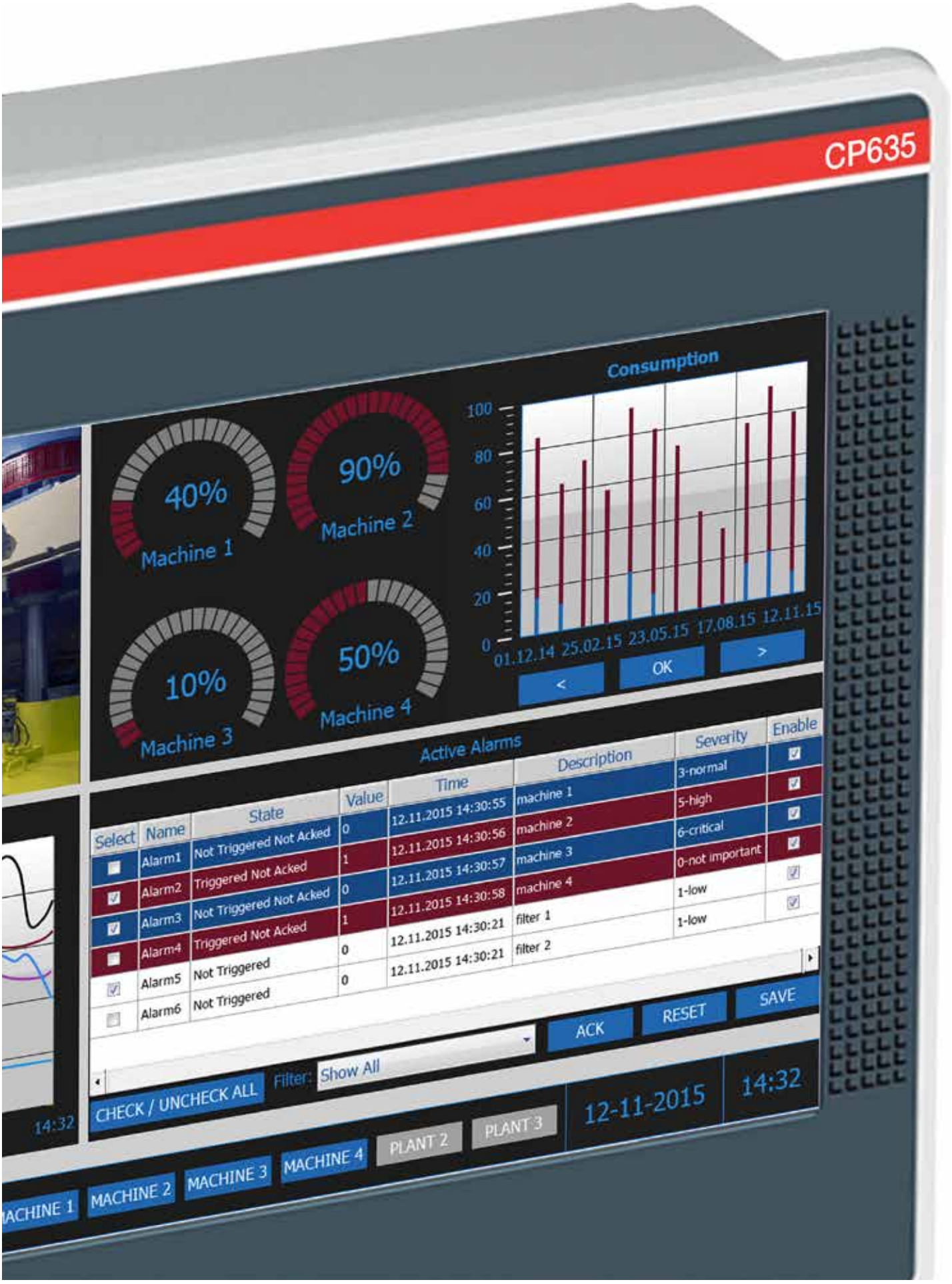
Mechanical Data

Wiring method / terminals

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

Mounting of the modules

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


CP635
Consumption
40%
Machine 1
90%
Machine 2
10%
Machine 3
50%
Machine 4
100
80
60
40
20
0
01.12.14 25.02.15 23.05.15 17.08.15 12.11.15
<
OK
>
Active Alarms
Select Name State Value Time Description Severity Enable
Alarm1 Not Triggered Not Acked 0 12.11.2015 14:30:55 machine 1 3-normal
Alarm2 Triggered Not Acked 1 12.11.2015 14:30:56 machine 2 5-high
Alarm3 Not Triggered Not Acked 0 12.11.2015 14:30:57 machine 3 6-critical
Alarm4 Triggered Not Acked 1 12.11.2015 14:30:58 machine 4 0-not important
Alarm5 Not Triggered 0 12.11.2015 14:30:21 filter 1 1-low
Alarm6 Not Triggered 0 12.11.2015 14:30:21 filter 2 1-low
ACK
RESET
SAVE
CHECK / UNCHECK ALL
Filter: Show All
12-11-2015
14:32
PLANT 3
PLANT 2
MACHINE 4
MACHINE 3
MACHINE 2
ACHINE 1
14:32

CP600-eCo and CP600
Control panels

Key features 7/134

Ordering data 7/135

Technical data 7/136

CP600-eCo and CP600
Key features

– Improved flexibility and integration
– Two versions available:
  - CP600-eCo / CP600: Configuration with Panel Builder 600 for clear tailor made visualization.

  - CP600-WEB: visualization of AC500 web server with Automation Builder visualization. The Automation Builder debugging and diagnostics screens can be converted effortless for use with CP600-WEB control panels.

– Housing
  CP600-eCo: Plastic
  CP600: Aluminium
– Front protection IP66
– Engineering software Panel Builder 600 integrated in Automation Builder

– Brilliant colored display
– Free reusable 3D graphic elements (Widgets)
– Import tags from PLC, drives, motion controller and robots configuration within Automation Builder

– Slim design for easily installation even in compact spaces

7

CP600-eCo and CP600
Ordering data

CP607

CP665

CP600-eCo control panels

Display size	Resolution pixels		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

CP600 control panels

Display size	Resolution pixels		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 WebServer 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 WebServer 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	for AC500 WebServer 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 WebServer 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 WebServer 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 WebServer 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 WebServer visualization	CP676-WEB	1SAP576200R0001		3.800

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-B Panel Builder 600 Basic, engineering tool for CP600-eCo control panels, for stand-alone installation via Automation Builder setup. PB610-B is included in Automation Builder Basic.	PB610-B	1SAP500910R0001		0.005
PB610 Panel Builder 600, engineering tool for CP600 control panels, for stand-alone installation via Automation Builder setup. PB610 is included in Automation Builder Standard.	PB610	1SAP500900R0101		0.005
PB610-R Panel Builder 600 runtime for running a PB610 application on one Win32 platform. Installation via Automation Builder setup.	PB610-R	1SAP500901R0101		0.005

CP600-eCo series
Technical data

Type	CP604	CP607	CP610
Application	control panels for PB610-B Panel Builder 600 Basic 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 side 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-condesing		
Storage temperature range	-20...+70 °C		
Storage humidity range	5...85 % relative humidity, non-condesing		
Approvals	See detailed page 154 or www.abb.com/plc		

CP600 series
Technical data

Type	CP620	CP630	CP635	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 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 restitive, 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 side 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 fuction)						
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-condesing						
Storage temperature range	-20…+70 °C						
Storage humidity range	5…85 % relative humidity, non-condesing						
Approvals	See detailed page 154 or www.abb.com/plc						

Application descriptions and additional information

Application descriptions

Network architecture **8**/140
AC500 HA offers hot standby redundancy **8**/142
Real-time Ethernet functionality **8**/143
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PLC Trainer AC500 **8/148**

AC500-eCo Starter kit **8/149**

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Application descriptions
Network architecture

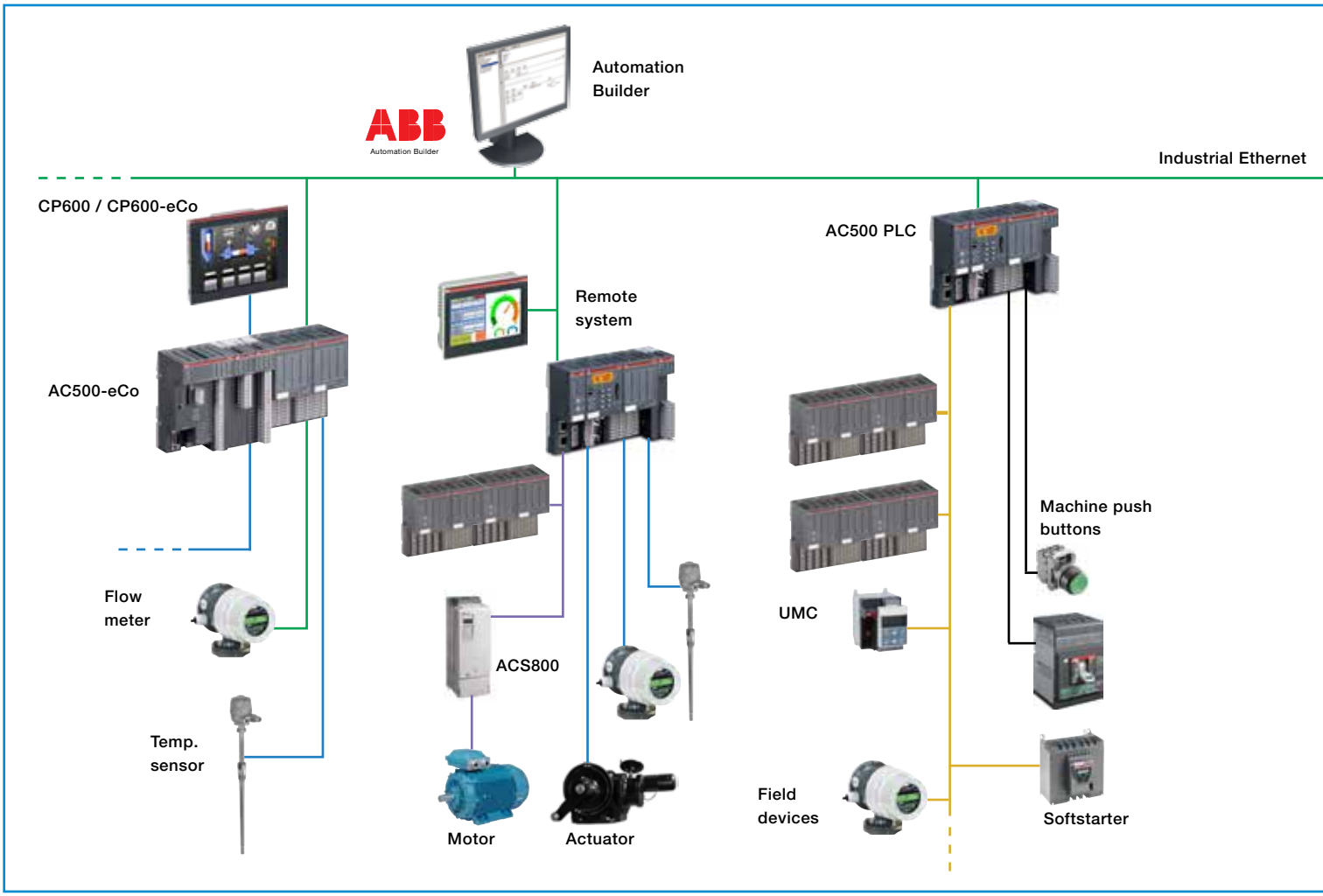
Communication with AC500 – the perfect solution
Flexibility, real-time capability and maximum data transfer speed are just some of the communication demands automation systems must meet. With the AC500, ABB has developed a communication platform offering customer-oriented solutions for the most diverse communication tasks. Simple network configuration and diagnostics options using the 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:

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.

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.

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
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.



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.

RCOM

RCOM is a proprietary ABB bus protocol for master/slave communication via RS232/485. Expandable to 254 RCOM slaves and provided with diverse diagnostics options, this protocol is ideal for applications in the water and waste water industry.

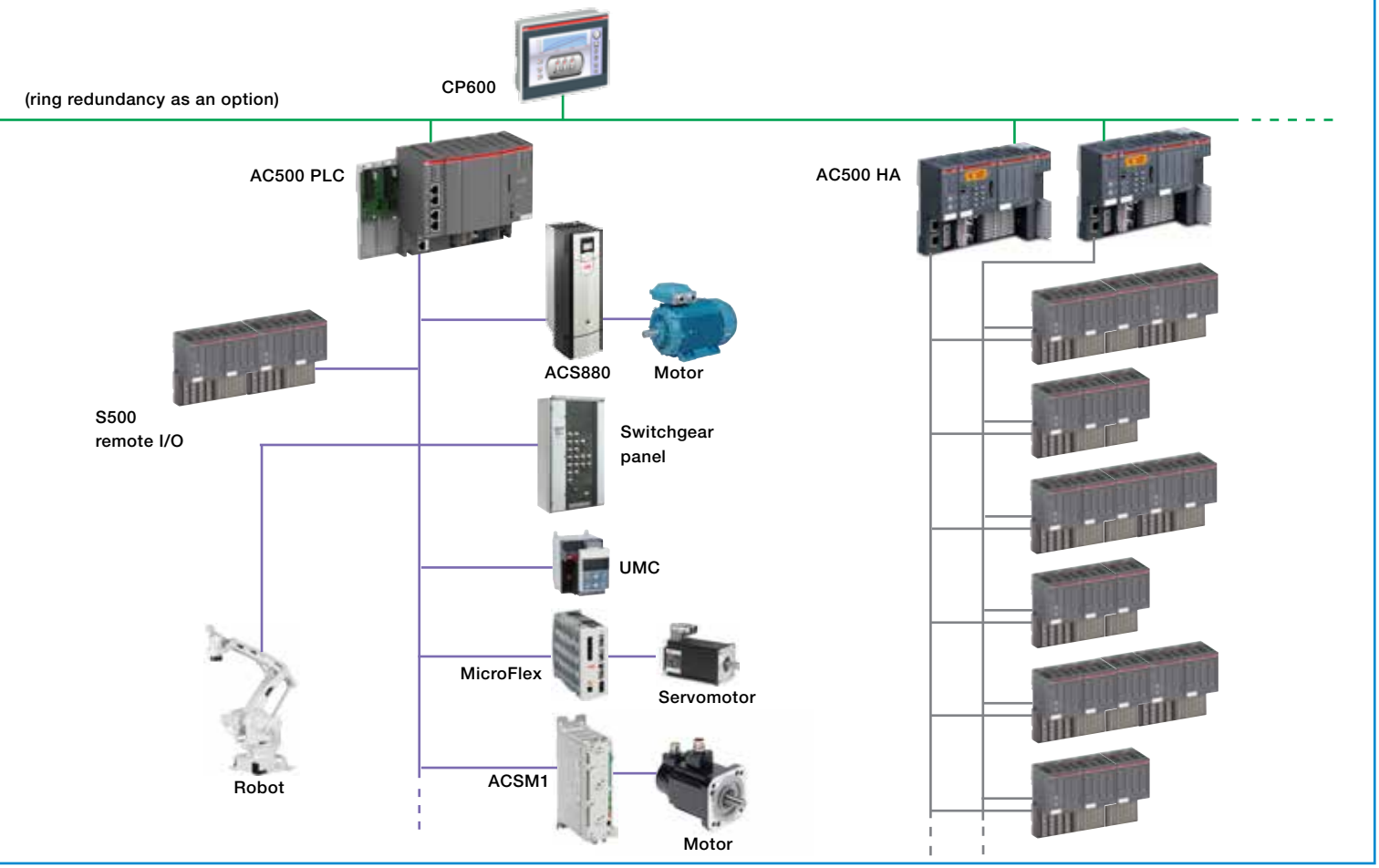
Ethernet and Internet

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

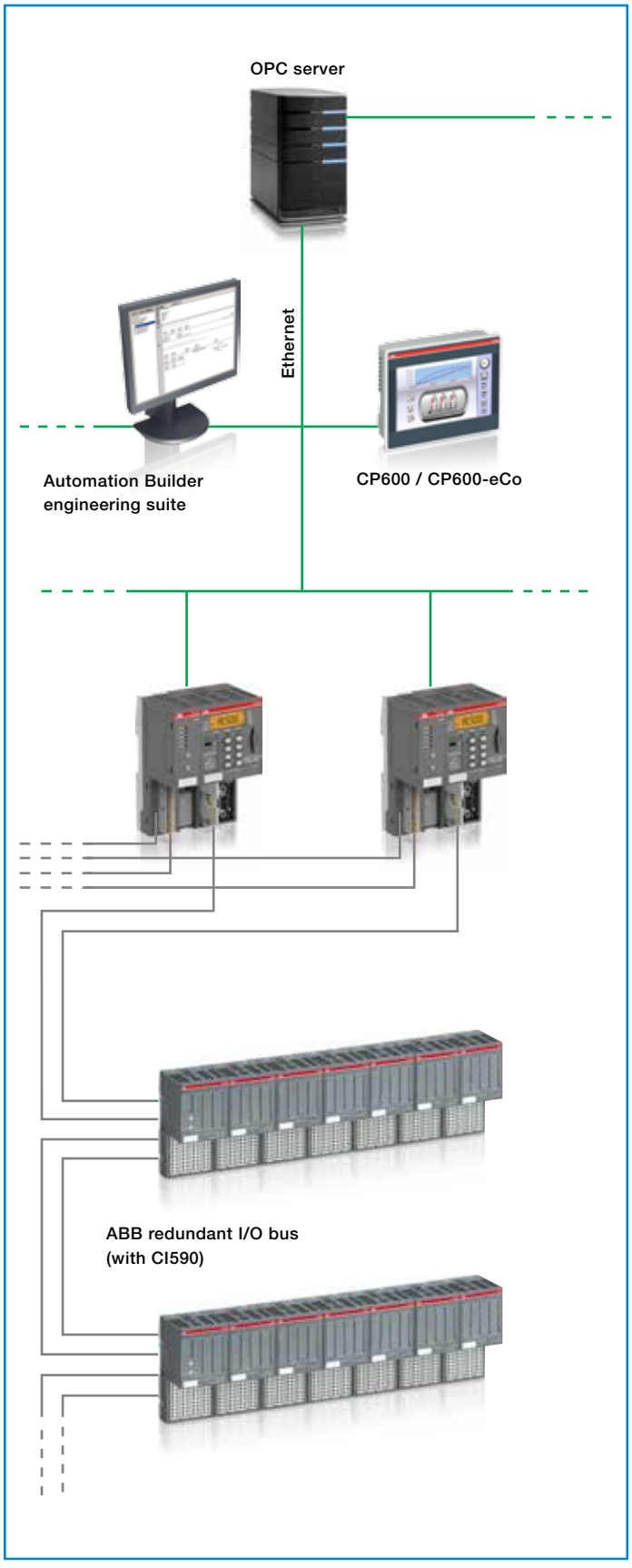
- HTTP for web server. Visualization for remote operation and maintenance
- FTP for data file transfer
- Simple Network Time Protocol (SNTP) offering PLC time synchronization using Internet-hosted time services
- SMTP for e-mails with attachments
- TCP and UDP ports programmable for project-specific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



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 bus to the CI590 module 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.

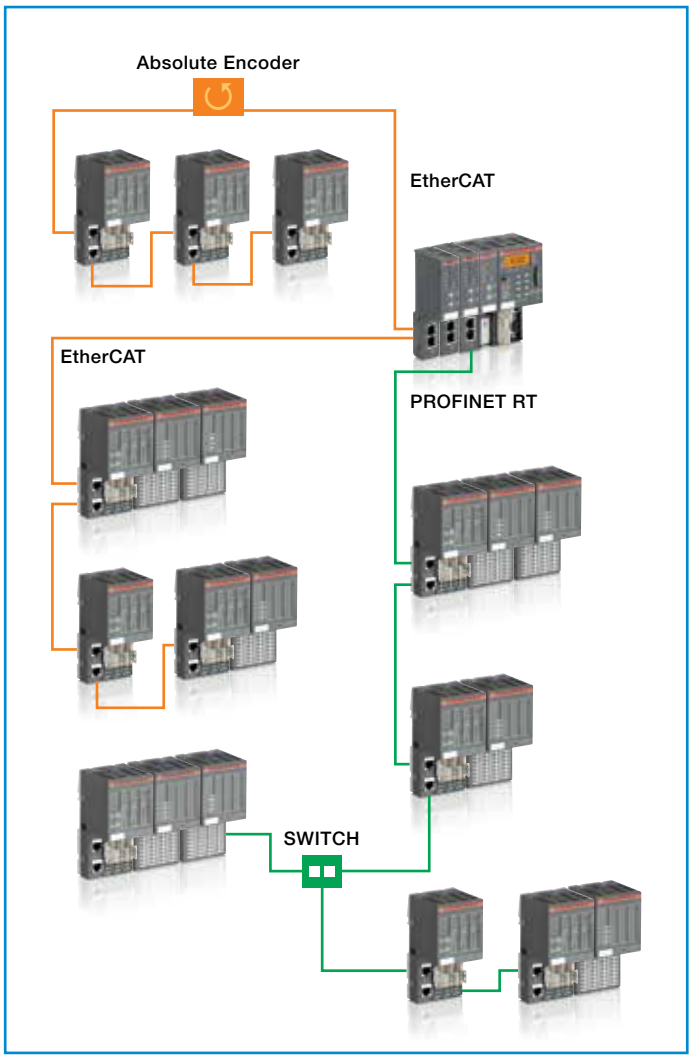
What are the benefits of AC500 HA for your high availability solution?

- Hot standby: Both CPUs (and all communication or buslines) 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 a CS31 line is disconnected, 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 from PM573-ETH to PM592-ETH: Cost matching hot standby quality for small or large systems
- 3 cycles or 50 ms changeover time
- Scalable: Up to a total of seven redundant I/O-busses via CM574 modules offer scalability of large-sized applications.

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.



Application descriptions
Condition Monitoring with AC500 PLC

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.

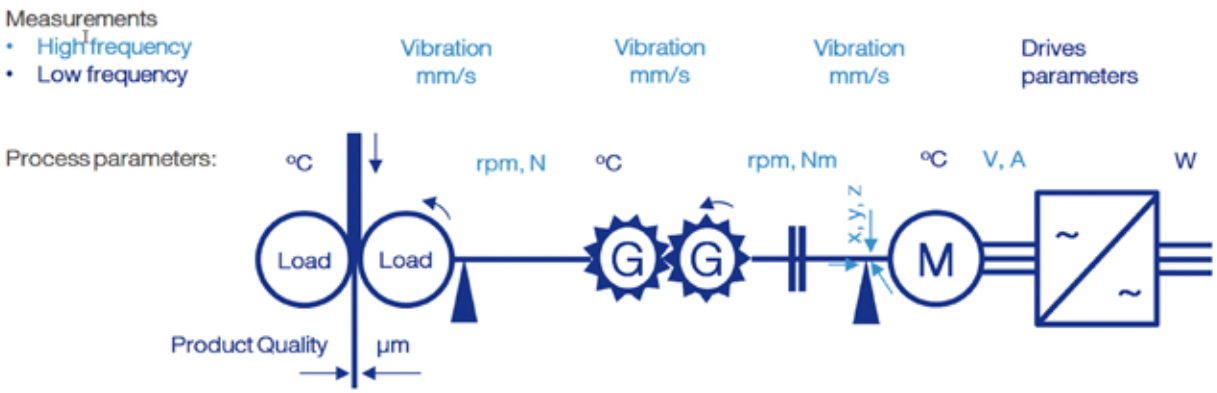
As many as 16 vibration sensors + 2 encoder counters can be connected.

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.

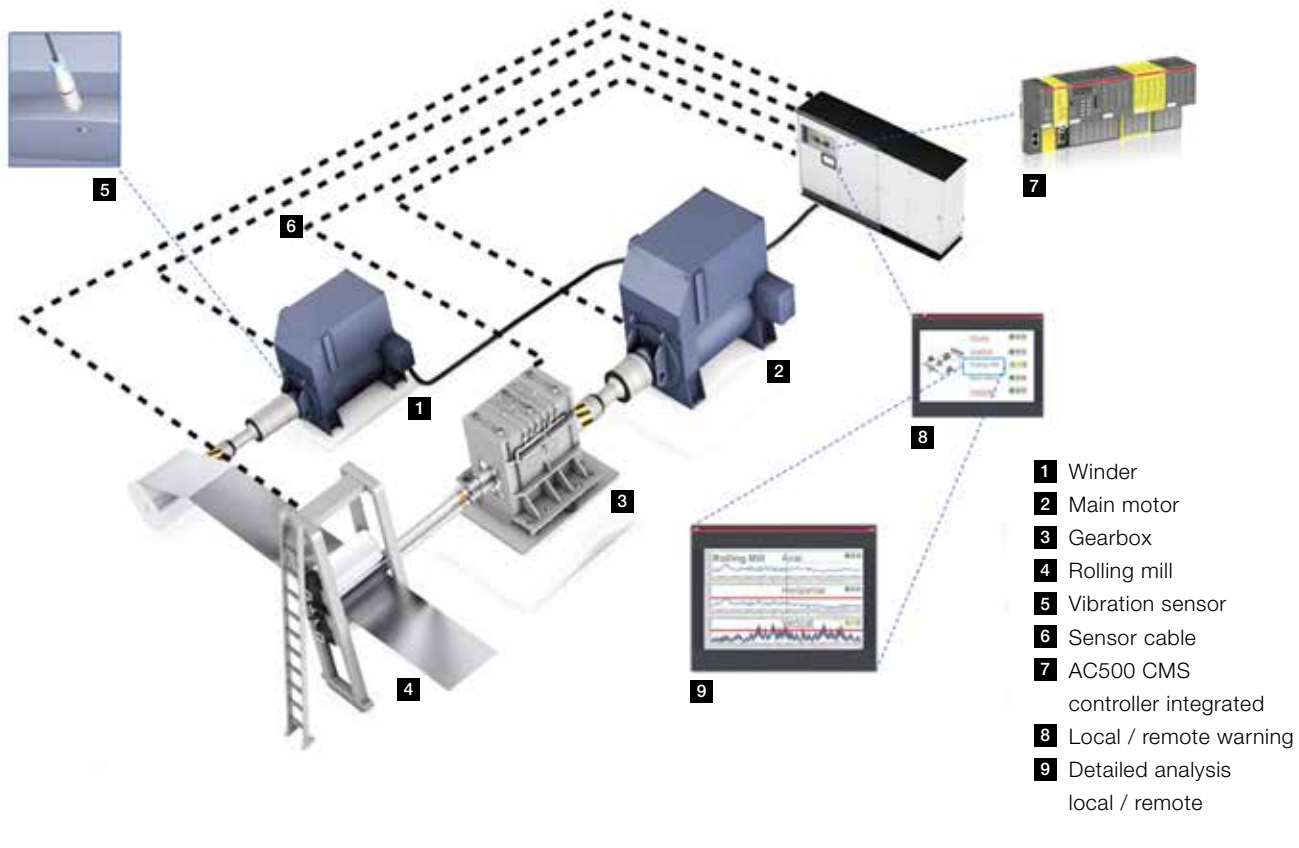
Predictive performance for your process or machines

- 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 perfomance 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



B



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 und 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

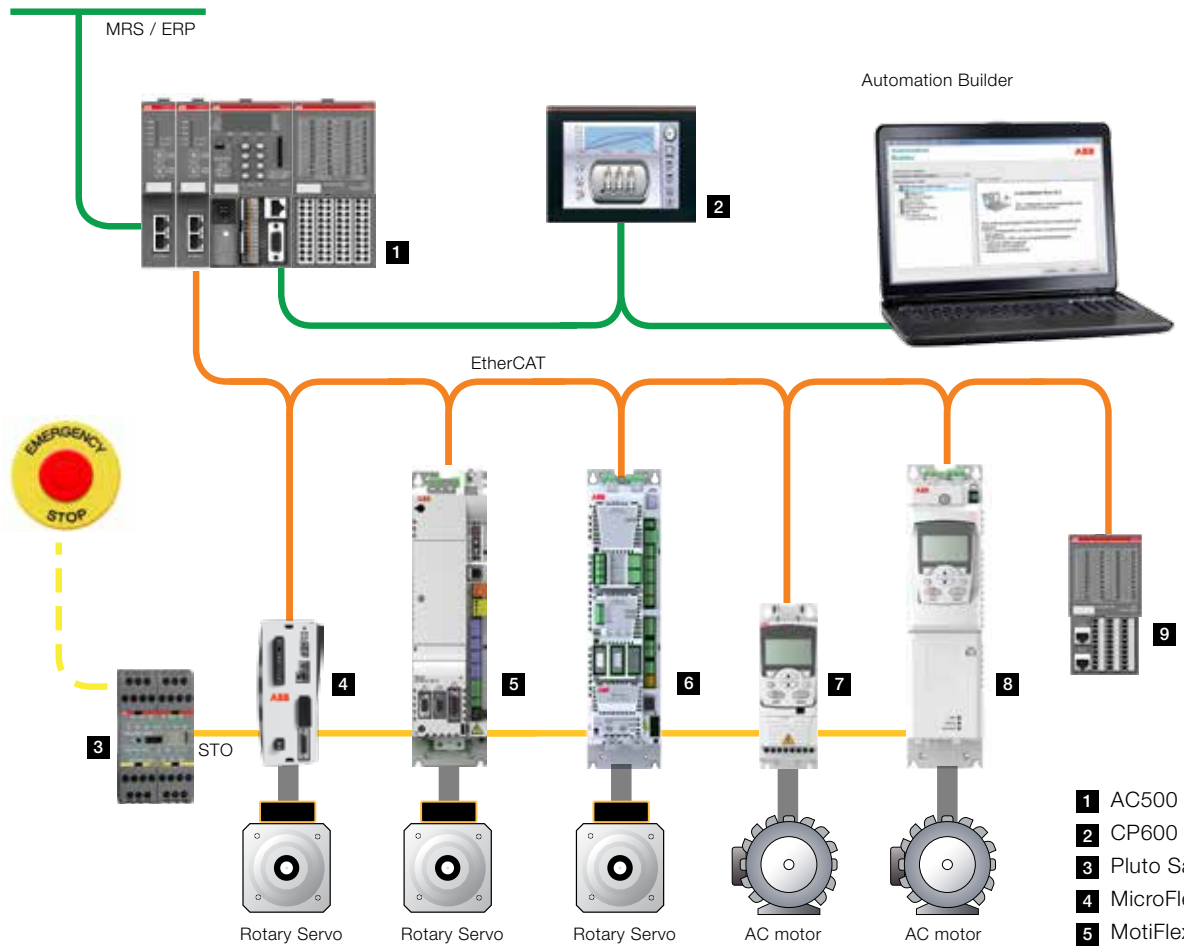
Multi-axis motion coordination with EtherCAT®

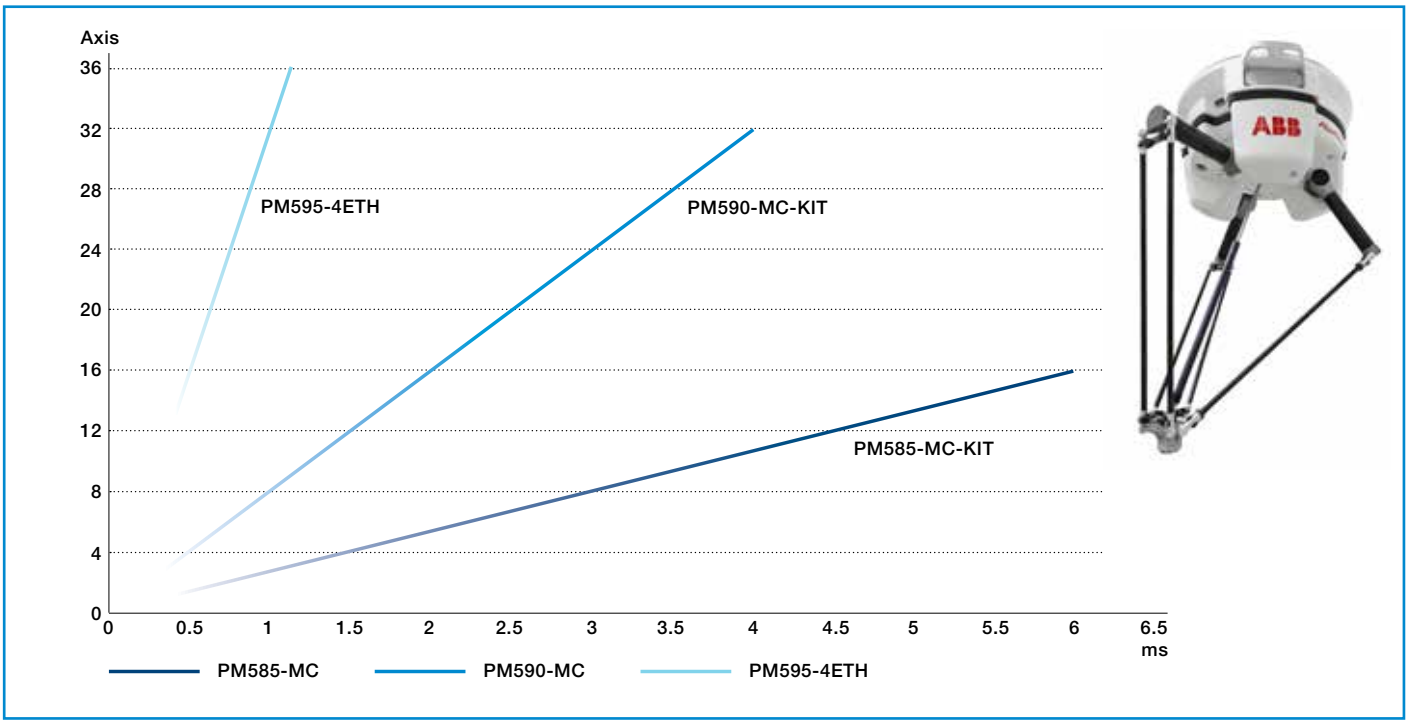
ABB's AC500 PLC using EtherCAT® real-time bus delivers high performance for multi-axis control applications.

The AC500 PLC provides an industry solution with IEC 61131-3 programming and PLCopen® motion functions in combination with ABB drives such as ACSM1 fitted with the FECA-01 EtherCAT module for higher power axes or ACS355 and ACS850 drives or with MicroFlex e150.

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 µs 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 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-F	1SAP155500R0279		1.050

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.

PLC Trainer AC500 basic package

Description:

- 1 PLC Trainer ABB 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.

For more information please visit
www.ikhds.com/abb

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, engineering tool and getting started manual.

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, digital input simulator and engineering tool.

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 which are either directly compatible or need minor adjustments to the existing user program.

8

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 and reuse of existing programming with e.g. AC1131 software.
- 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
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

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
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	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	RoHS
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	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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AX561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CD522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CD522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI501-PNIO	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CI501-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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CI504-PNIO-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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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	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM588-CN	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM588-CN-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CM589-PNIO	■	■	■	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
CM589-PNIO-XC	■	■	■	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
CM592-DP	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CM592-DP-XC	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div 2											
CM597-ETH	■	■	■	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
CM597-ETH-XC	■	■	■	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
CM598-CN	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CM598-CN-XC	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
CP604	■	■	–	◇	■	◇	–	–	–	–	–	–	–	■
CP607	■	■	–	◇	■	◇	–	–	–	–	–	–	–	■
CP610	■	■	–	◇	■	◇	–	–	–	–	–	–	–	■
CP620	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP620-WEB	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP630	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP630-WEB	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP635	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP635-WEB	■	■	■	■	■	■	–	–	■	–	–	–	–	■
CP651	■	■	■	■	■	□	–	–	■	–	–	–	–	■
CP651-WEB	■	■	■	■	■	□	–	–	■	–	–	–	–	■
CP661	■	■	■	◇	■	□	–	–	■	–	–	–	–	■
CP661-WEB	■	■	■	◇	■	□	–	–	■	–	–	–	–	■
CP665	■	■	■	◇	■	□	–	–	■	–	–	–	–	■
CP665-WEB	■	■	■	◇	■	□	–	–	■	–	–	–	–	■
CP676	■	■	■	■	■	□	–	–	■	–	–	–	–	■
CP676-WEB	■	■	■	■	■	□	–	–	■	–	–	–	–	■
DA501	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DA501-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DA502	■	■	◇	■	■	◇	◇	◇	◇	◇	◇	◇	◇	■
DA502-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	■	■	■	■	■	□	◇	◇	◇	◇	◇	◇	◇	■
DO561	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO562	■	■	■	■	■	□	◇	◇	◇	◇	◇	◇	◇	■
DO571	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO572	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DO573	■	■	■	■	■	□	◇	◇	◇	◇	◇	◇	◇	■
DX522	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX522-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX531	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DX561	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div 2											
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	■	■	■	■	■	□	■	■	■	■	■	■	■	■
PM566-TP-ETH	■	■	■	□	■	◇	◇	◇	◇	◇	◇	◇	◇	■
PM572	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM573-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM573-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM582	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM582-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM583-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM583-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PM585-ETH	■	■	◇	■	□	◇	◇	◇	◇	◇	◇	◇	◇	■
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	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TA562-RS	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TA562-RS-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	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	RoHS
Abbreviation	CE	cULus		EAC	RCM	KCC	ABS	BV	DNV	GL	LR	RINA	RMRS	ROHS
Name		Ordinary Locations	Hazardous Locations Class I Div 2											
TA563-11	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA563-9	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA564-11	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA564-9	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA565-11	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA565-9	–	–	–	■	–	–	■	■	■	■	■	■	■	■
TA566	–	■	■	–	–	–	■	■	■	■	■	■	■	–
TA570	–	■	■	■	–	–	–	–	–	–	–	–	–	–
TA571-SIM	■	–	–	■	■	■	–	–	–	–	–	–	–	◇
TB511-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TB511-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TB521-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TB521-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TB523-2ETH	■	■	◇	◇	■	◇	◇	◇	◇	◇	◇	◇	◇	■
TB541-ETH	■	■	■	□	■	■	■	■	■	■	■	■	■	■
TB541-ETH-XC	■	■	■	□	■	■	■	■	■	■	■	■	■	■
TF501-CMS	■	■	◇	◇	■	◇	◇	◇	◇	◇	◇	◇	◇	■
TF501-CMS-XC	■	■	◇	◇	■	◇	◇	◇	◇	◇	◇	◇	◇	■
TF521-CMS	■	■	◇	◇	■	◇	◇	◇	◇	◇	◇	◇	◇	■
TF521-CMS-XC	■	■	◇	◇	■	◇	◇	◇	◇	◇	◇	◇	◇	■
TK501	–	■	■	■	–	–	■	–	–	–	–	■	–	■
TK502	–	■	■	■	–	–	■	–	–	–	–	■	–	■
TK503	■	■	■	■	■	■	■	■	■	■	■	■	■	◇
TK504	■	■	■	■	■	■	■	■	■	■	■	■	■	◇
TK506	■	■	■	■	■	■	■	■	■	■	■	■	■	◇
TU507-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU508-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU508-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU509	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU510	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU510-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU515	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU516	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU516-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU517	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU518	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU518-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU520-ETH	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU520-ETH-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU531	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU532	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU532-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU551-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU552-CS31	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU552-CS31-XC	■	■	■	■	■	■	■	■	■	■	■	■	■	■
TU582-S	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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3ADR020077C0203 - Printed in Finland (Edition 12.2015 Hansa Print)

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