AC500 – the scalable PLC for customized automation

AC 500

ABB

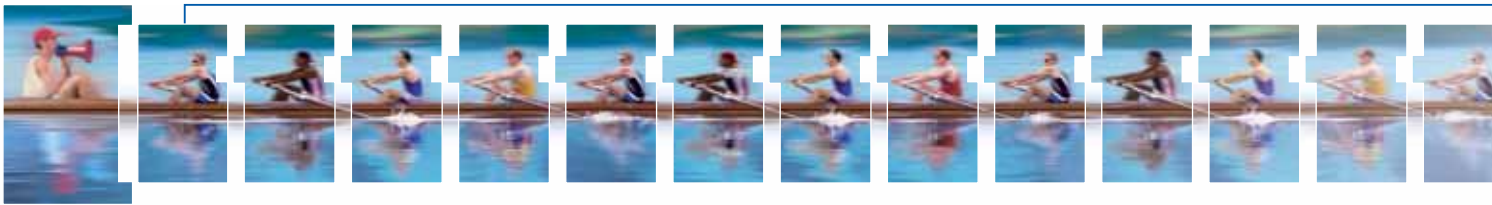# The scalable AC500 PLC – flexible, cost-efficient, future-friendly

Customers' requirements met to perfection

Simple, consistent expandability, flexible when choosing a field bus, and designed for future market trends – those are some of the demands made on an automation platform, particularly in the mechanical engineering sector, but in plant engineering as well. These needs have been worked out in a close dialog with customers and end-users. And now, they have been realized in the design and high functionality of the new scalable AC500 PLC.

Parallel connection to several buses

The new AC500 consists of different devices that can be combined and flexibly expanded to suit the customer's individual requirements. It is also possible, for instance, to operate several field buses simultaneously in any desired combination with a single control system. Customers can choose between different CPU performance classes, which can even be easily replaced subsequently to meet increasing requirements. Our common engineering tool AC500 Control Builder provides standardized programming of the entire platform according to IEC 61131-3, as well as further features and utilities.

Guarantees your safe investment in future

Besides the high performance capabilities of the system regarding handling, reliability and ease of maintenance, also the long-term availability of the chosen system plays a decisive role: Your safe investment must be ensured in future. With the new AC500, ABB offers a modern high-performance platform which is suitable for future-oriented automation concepts and open for new trends and market requirements.

AC500 – the first choice everywhere

The AC500 is an optimum selection for applications like the following:

- packaging machines
- plastics machines
- printing presses
- crane engineering
- energy optimization
- building engineering
- pumping installations
- marine engineering
- wind power installations
- air-conditioning/refrigeration systems
- tunnel construction
- …

Everything you need for switching and control

Flexible choice of the field bus

Flexibility in the choice of a field bus without needing to replace any field devices: That's the basic idea behind the field bus plug (FBP). Thanks to this intelligent plug connector, field devices „become" field-bus-neutral. Thus, changing the field bus (often due to end-user's wishes), only requires the replacement of the plug connector itself – the field devices and terminal wiring can be retained.

The FBP is the link to a communicative series of switching and automation components, which can thus be combined with standard field bus systems in the easiest way.

Bus-neutral field devices:

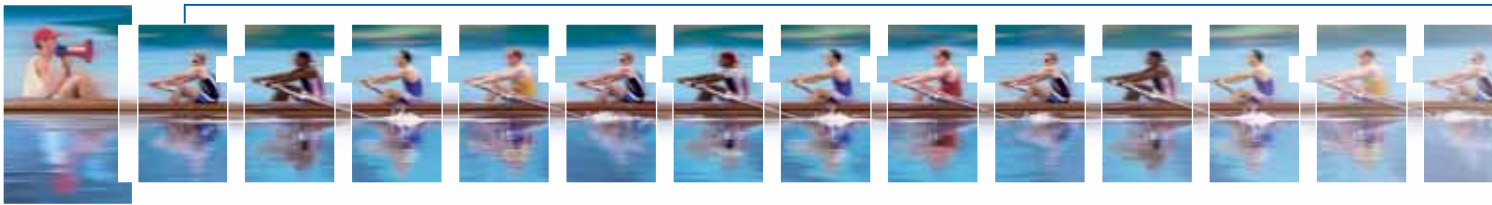Circuit-breaker   Universal Motor Controller   Motor Starter   AC500 Slave

Complete product portfolio

ABB offers a complete range of low-voltage devices from one source: PLC,
devices for switching and protection, such as soft starters, contactors, and
circuit-breakers, up to standard sensors. Many of these ABB components have
already been integrated into the innovative system concept involved. Examples
here include the UMC22-FBP Universal Motor Controller for effective motor
protection and particularly user-friendly motor control, the interactive circuit-
breakers Tmax T4, T5, the PSS soft starter and the wireless proximity switch.
With the AC500, the FBP product range has been extended by field-bus-neutral I/
O modules and a CPU which can also be used as a field bus slave via the FBP.

S500 remote I/Os   **Soft Starters**   **Wireless Automation**

Clear advantages thanks to clear structures

Flexibility as program

Thanks to its scalability, the AC500 PLC can be adapted to the most different automation tasks: The devices concerned can be used and combined in a flexible way. The number of different parts to be kept in stock is correspondingly minimized.

The AC500's system architecture

The CPUs

are available in different performance classes, can all be programmed in five different languages, and provide an LCD display, an operator keypad, an SD card slot, and two inte-grated serial interfaces. The CPUs can be simply plugged onto the CPU terminal base. Optionally,

they are also available with integrated Ethernet or ARCNET.

The communication modules

For connection to standard field bus systems and integration into existing networks. Up to four com-munication modules in any desired combination are allowed at one CPU, resulting in a high degree of communication.
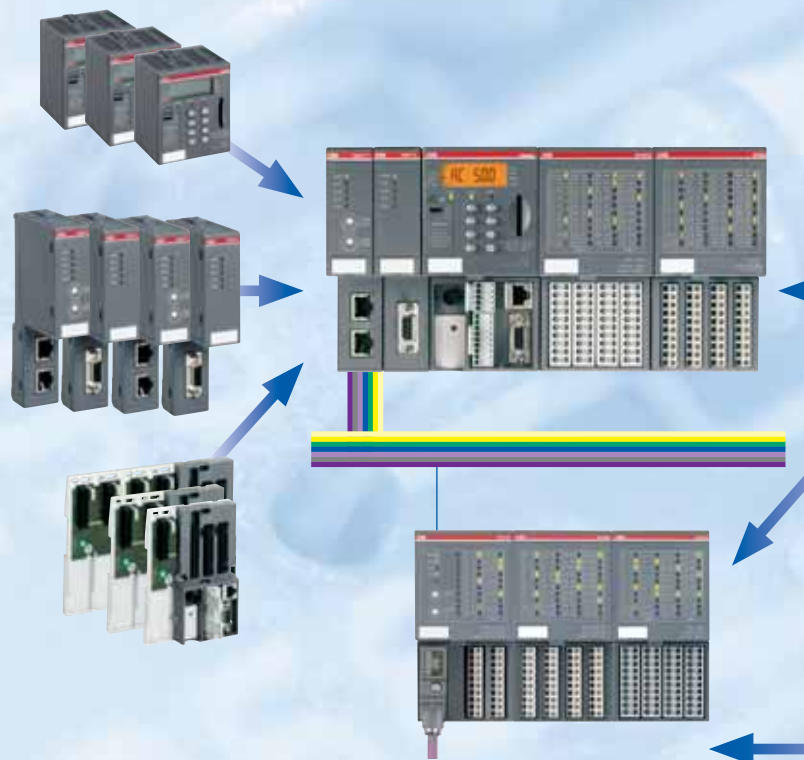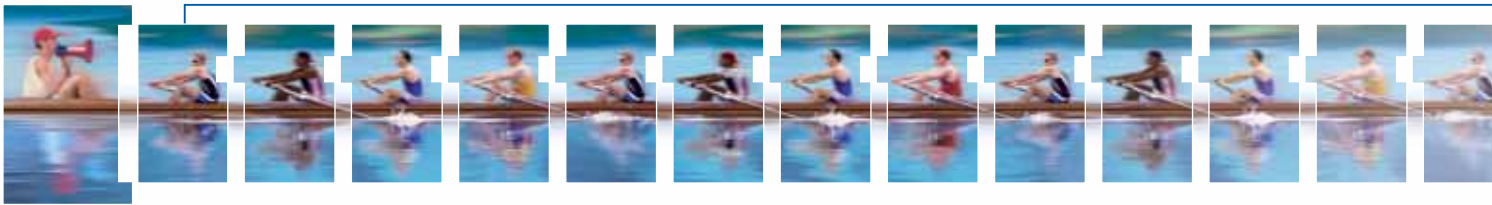
The CPU terminal base

Available in three different versions, enables easy plugging of the CPU and one, two or four communication modules.

The I/O modules

Digital and analog in different versions. Can be simply plugged onto the terminal units – for local expansion of the CPU (max. ten local I/O modules) and decentralized expansion via the FBP interface. Flexible use thanks to configurable channels.

The terminal units

Multi-purpose usage for both digital and analog I/Os, for 1, 2 and 3-wire designs. Enable simple prewiring without electronics. For 24 V DC and 230 V AC, optionally for spring or screw-type terminals.

The FBP interface module

With embedded digital I/Os and a field-bus-neutral interface for connecting the chosen Fieldbus Plug (FBP). For decentralized expansion by up to seven I/O modules.

The SD card

Optional downloading and uploading the user program without a PC and for data logging.

1   Back-lighted LCD display and keypad

2   SD card slot

3   Plug-in communication modules (1 to max. 4)

4   Optionally with integrated Ethernet or ARCNET

5   Fieldbus neutral interface for slave function and for programming

6   Two serial interfaces for programming, ASCII, Modbus or CS31 field bus (master)

7   Expandable by up to ten local I/O modules

AC500 grows to meet requirements

Control + communication:

Centralized expansion:

Decentralized expansion:
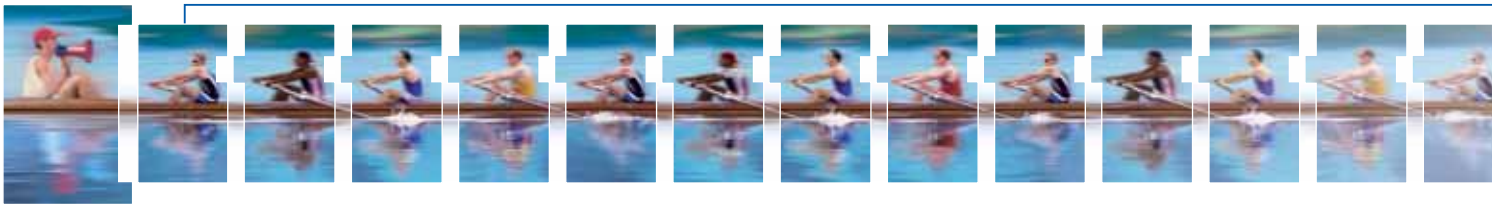
Networked and communicative

Network

Modem
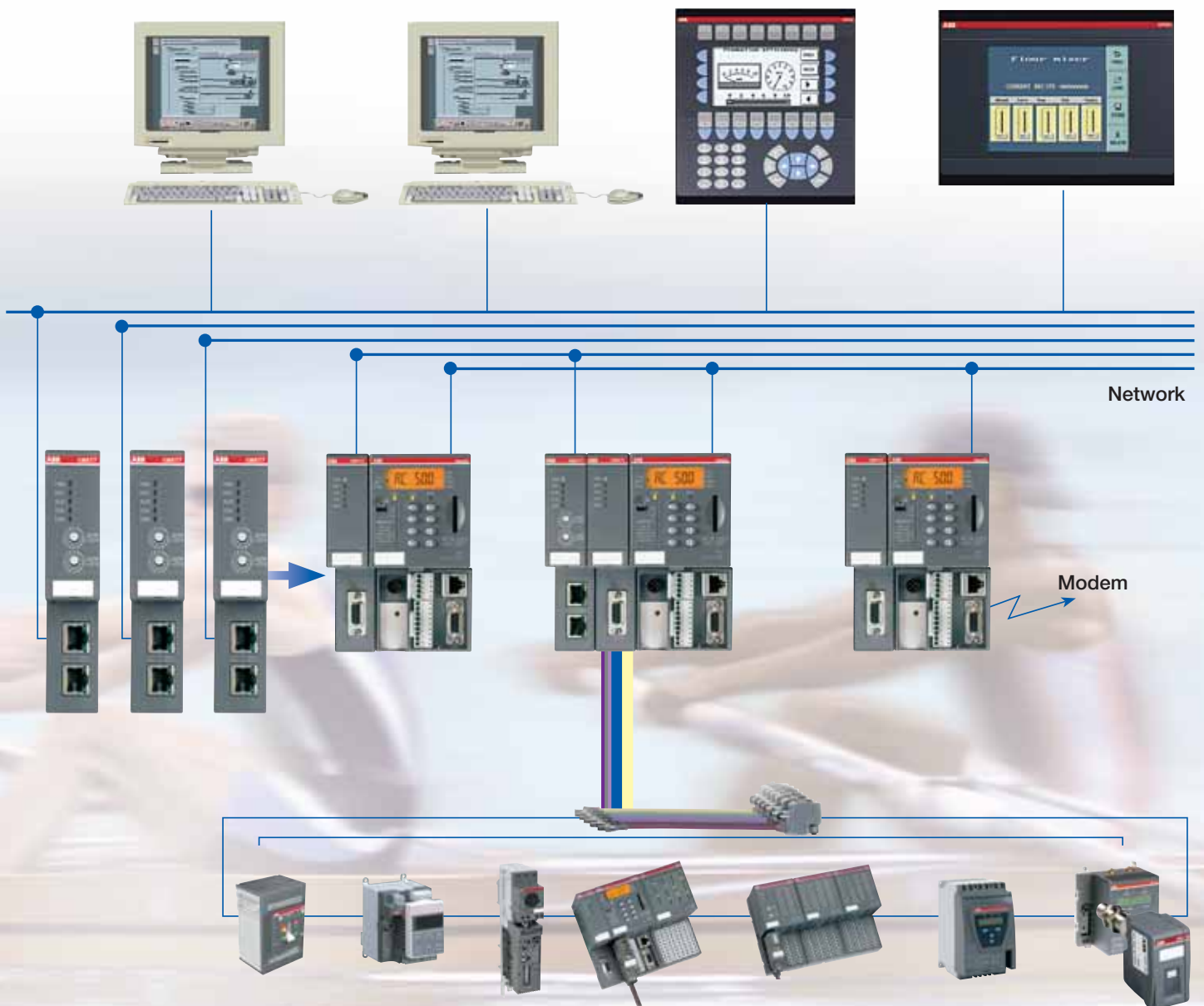
Programming

Control Builder AC500, Programming Tool PS501

Control Builder AC500 is the engineering tool for all CPU performance classes of the AC500, designed for

standardized IEC 61131-3 programming in five different languages. Other features of this tool are: Configurati-

on of the overall system including field buses and interfaces, extensive diagnostic functions, alarm handling,

integrated visualization and open software interfaces.

The Programming Tool PS501 also allows to select between different languages such as English, German,

Spanish, French, Italian, Russian and Chinese.

Operate, visualizing

Programming

Engineering software

Diagnostics, service

Expansions
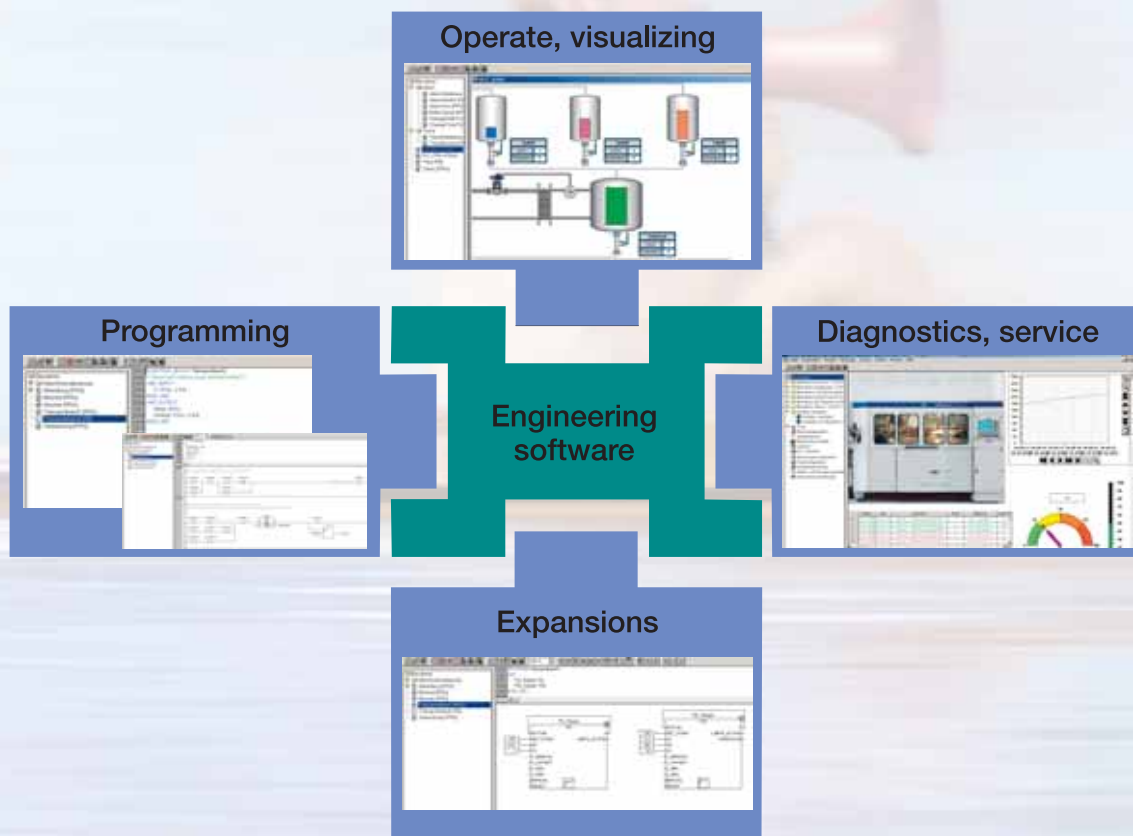
Member of Automation Alliance
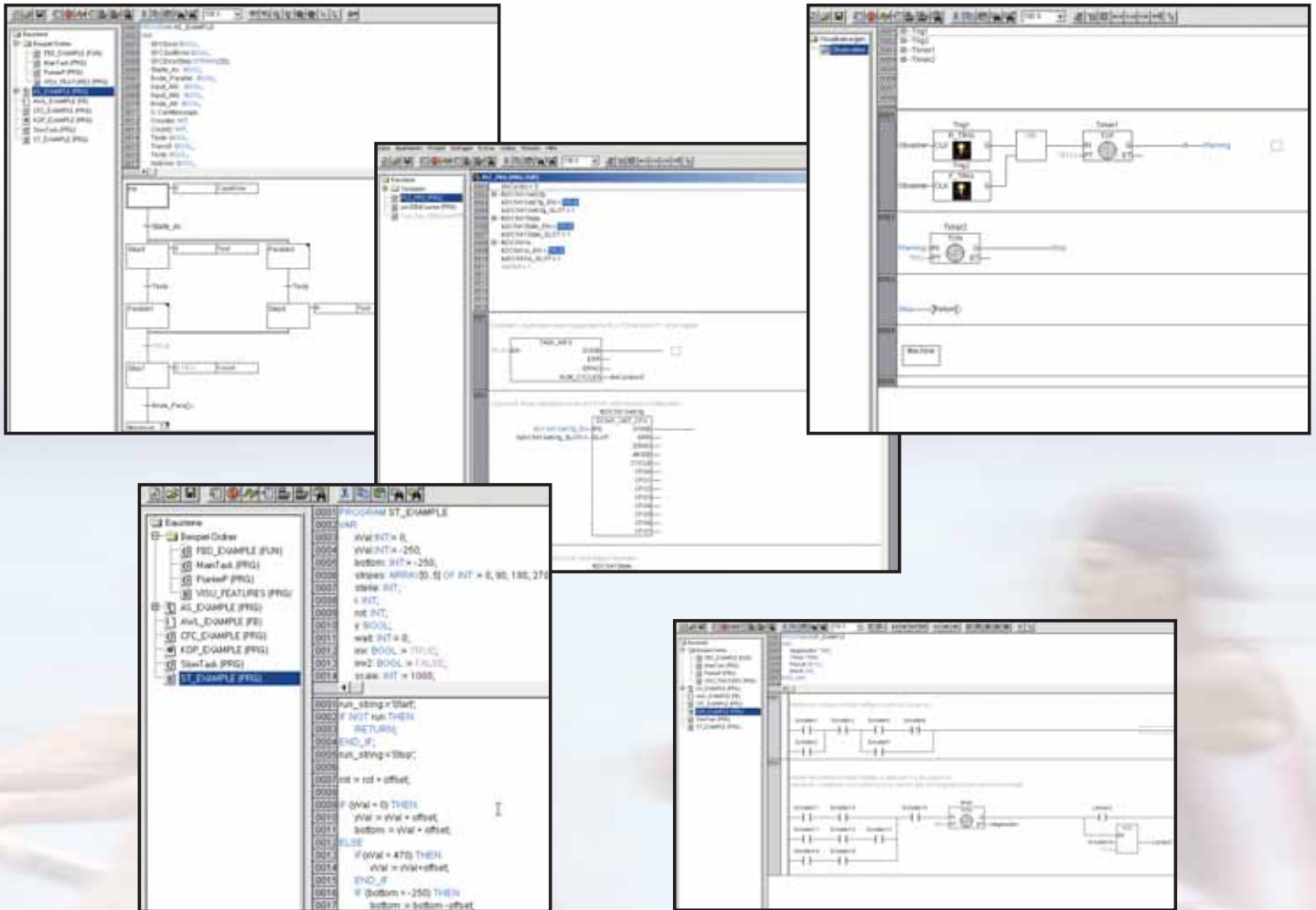
Programming in conformity with IEC 61131-3

Besides the suitable hardware, a high-performance, user-friendly and convenient engineering tool is indispensable for simple planning, programming, testing and commissioning of an automation application. AC500 Control Builder provides the following functionalities:

■ Five standardized programming languages:

Function Block Diagram (FBD), Instruction List (IL),

Ladder Diagram (LD), Structured Text (ST), Sequential

Function Chart (SFC)

■ Free graphical function chart (CFC)

■ Debugging functions for the program test:

  • Single step

  • Single cycle

  • Breakpoint

Programming

Offline simulation

IEC 61131-3 commands can be simulated without a PLC being connected, including the relevant malfunctions. After the program test, the application can be downloaded to the control system.

Sampling trace

Timing diagrams for process variables and storage of data in a ring buffer with event trigger.

Recipe management and watch lists

Values of selected variables are displayed. Predefined values can be assigned to variables which can then be downloaded to the control system all at once ("Write recipe"). Ongoing values from the control system can also be pre-assigned for reading into the

Watch and Recipe Manager, and stored in memory there ("Read recipe). These functions are also helpful, for example, for setting and entering control parameters.
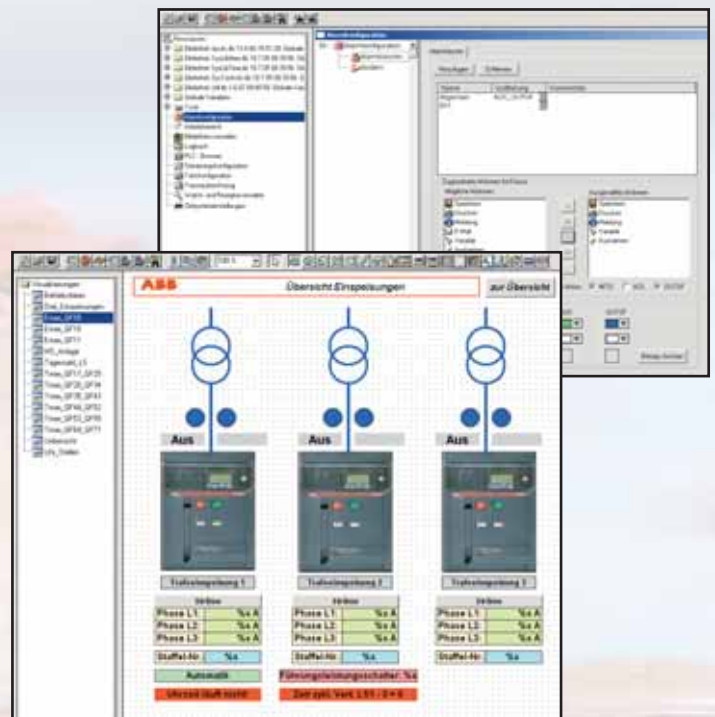
Visualization

Includes color change, moving elements, bitmaps, text display, allows input of setpoint values and display of process variables read from the PLC, dynamic bar diagrams, alarm and event management, function keys and ActiveX elements. The visualizations package is also available individually as a separate software-licence (PS501-HMI).
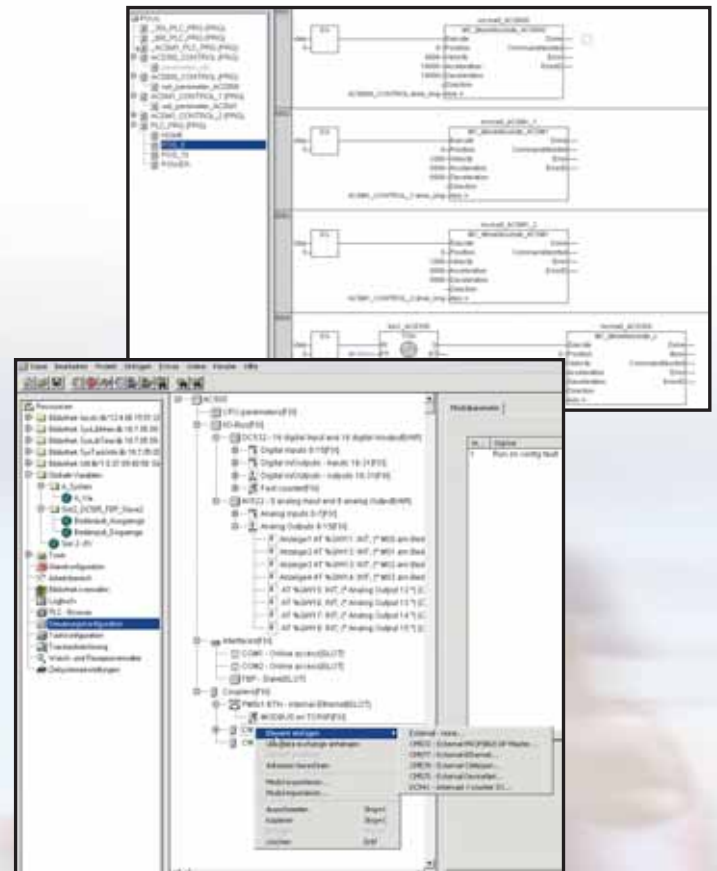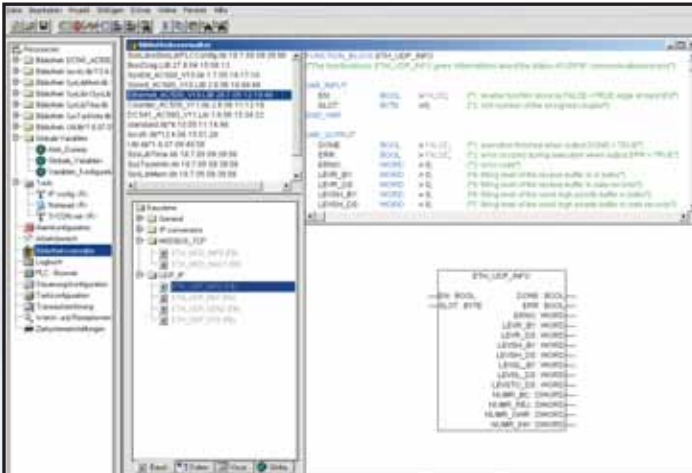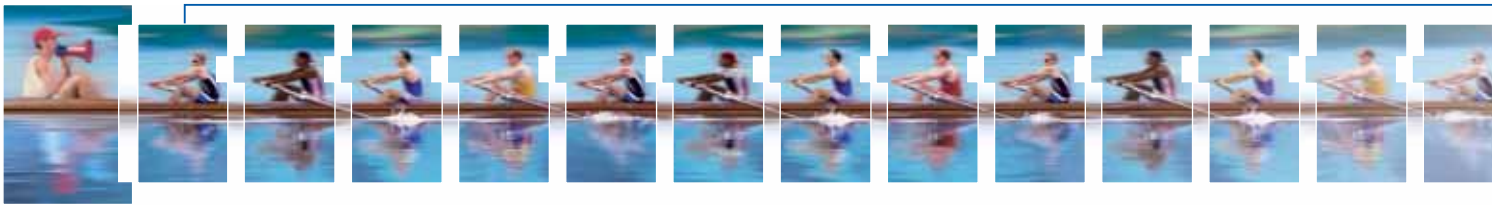
Configurators of the communication interfaces

For PROFIBUS DP, CANopen, DeviceNet, Ethernet,

Modbus and CS31.

Open interfaces

DDE and OPC.

Programming

Serial or via Ethernet or ARCNET networks.

Engineering interface

Provides access from the programming system to an

external project database in which the program

source code of one or several automation projects is

managed. Optionally, a version control system, such

as Visual Source Safe, can be used in order to

ensure data consistency of the program code for

several different users and projects.

Miscellaneous

• Comprehensive libraries.

• Windows 32-bit standard.

• Operating systems Windows 2000 and XP

CP400 and CP500 –
the operator interfaces

Obvious Human-machine communication

ABB offers an extensive range of human machine interfaces (HMIs). The two families CP400 and CP500

provide many different displays to choose from, which satisfy application-specific demands regarding required

operator actions and information density. Whether it's a simple device for displaying text, a graphic-capability

device or a touch-panel with color display, the entire range of control terminals meets the requirements for

maximized transparency and efficiency for the automation task.
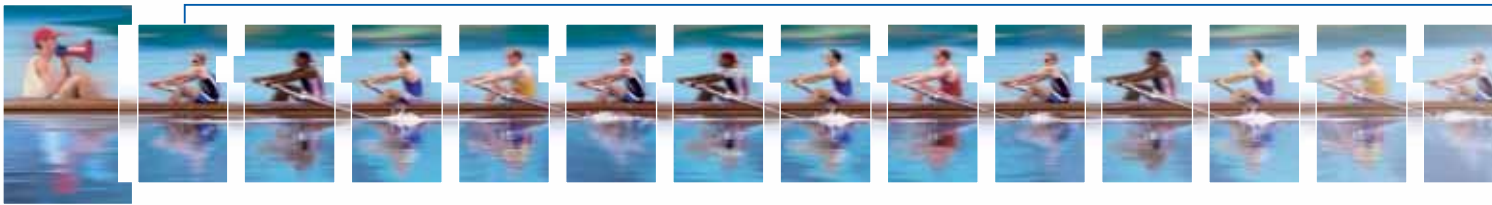
Simple handling

Users can communicate with the AC500's CPUs via the various operator panels, read and write access on device data is possible.

The configuration of the operator panels can be done easy and fast with the programming software CPsoft. With regard to frequently harsh conditions at the place of installation, all operator panels fulfill IP65 protection at the front. Operator panels and automation devices are linked either simply via serial interfaces, or in case of complex applications via Ethernet.

Functionalities in line with demand

Depending on the used device type, the operator panels feature the following functions:

- real-time clock
- alarm management in several different groups
- trend curves and datalogger
- recipe management
- report printouts
- password protection
- Flash memory up to 1600 kB
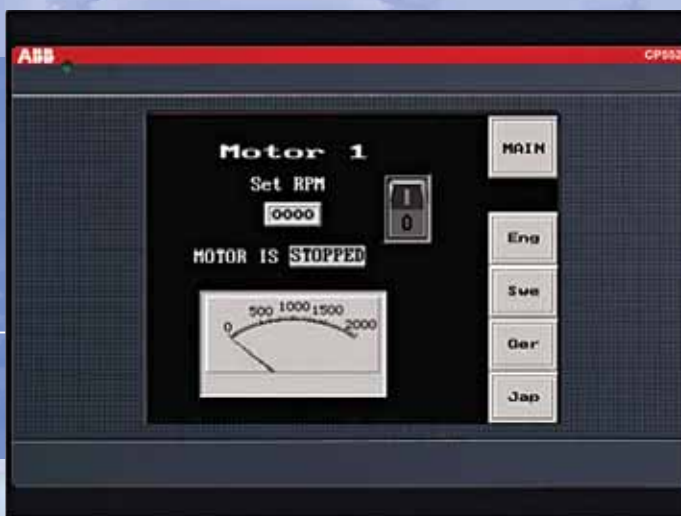
Operator Terminals CP400

Performance

Quick and easy project creation and management

Quickly view and easily manage your project components using the screen manager (detailed list or screen miniatures). Simplify the creation, modification, sorting and identification of your project data via the cross-references function.
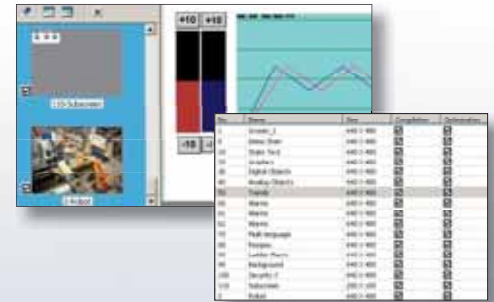
Easy testing and use

Test your projects, screens and alarms as well as your communication and controller functions quickly via on- and off-line simulation. Change language quickly and easily using the multi-language support function.

Secured data and operations

Protect your files and machine configurations using global and object-specific passwords (9 protection levels) to prevent downloading of the application.
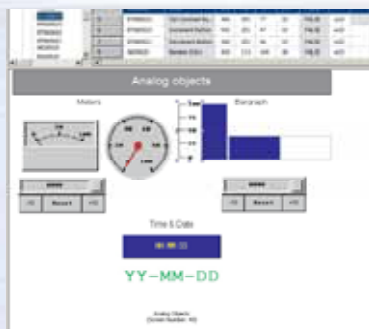
Simplified adaptability and connectivity

SConnect your HMIs to the various automation equipment:

- via the various possible protocols for ABB AC31, series 40&50, series 90, AC500 PLCs and more than 100 leading PLCs on the market, where the display acts as gateway. The multi protocol also allows data to be exchanged between the various controllers.
- via multi-channel communication (Connecting a controller to each available port via different protocols, transferring values between drivers via macros, using the values of various controllers in the calculations).
- via the multiple connection media (RS232, RS485, RS422or Ethernet…) increasing connection capacities.
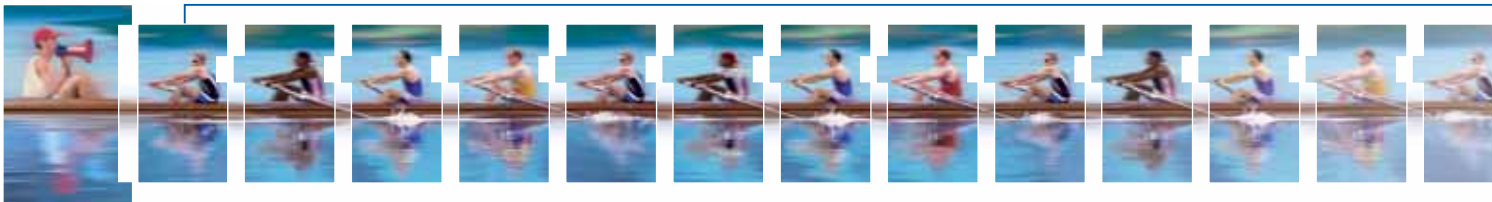
Comfort

Simplified creation

Simplify the creation of your projects using:

- the Macro and Ladder functions, providing you with ready-to-use modules such as arithmetic functions

- quick and easy retrieval of your PLC's variables by variable import.

Easy template choice

Satisfy your requirements by choosing the HMI which is most adapted to your needs in terms of dimensions, colours, functions and connection.
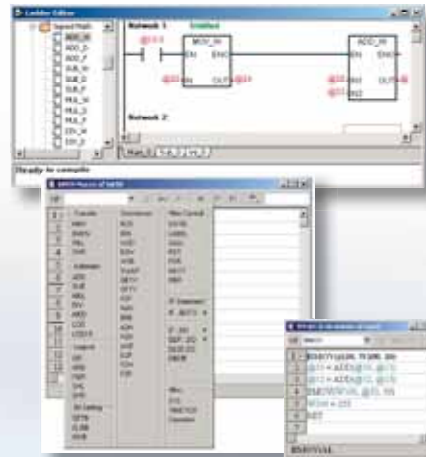
Controller/PLC

AB DH-485
AB SLC 5/03, 5/04
ABB AC31 Series 40,50
ABB AC31 Series 90
ABB AC500 PM571
ABB AC500 PM58X
ABB AC500 PM59X
ASCII Device
Computer (as master)
Computer (as master) V2
Computer (as slave)
Danfoss VLT Series Inverter
DELTA DVP-ES/SS/EP/EH PLC
Delta VFD-B Inverter
Dupline DKG2
Elmo SimpleIQ
Facon FB Series(RS232/RS485)
Facon FB Series(RS232-RTS)
Hitachi EC Series
Hitachi H/EH1 (RS-485)
Hitachi H/EH1 Series
Idec MicroSmart
Jetter-process-PLC
Koyo Direct DL Series
Matsushita FP Series
Mitsubishi A1S/A2S CPU Port
Mitsubishi A3N/A1SH CPU Port
Mitsubishi AnA/U Link
Mitsubishi AnN/S Link
Mitsubishi FX Series
Mitsubishi FX2N
Mitsubishi FX2N-485ADP
Mitsubishi FX3UC
Mitsubishi FX3UC-485ADP
Mitsubishi MELSEC-Q(CPU)
Mitsubishi MELSEC-Q00(CPU)
Mitsubishi MELSEC-QnA(LINK)
ModBus Master
ModBus RTU Slave (Beijer Addressing)
ModBus Slave
ModBus(ASCII) Master
ModBus(ASCII) Master -- V2
ModBus(ASCII) Slave
Modicon 984 (RTU, Master)
Modicon 984 (RTU, Slave)
Null
OEMAX NX7 Series
Omron C Series
SAIA PCD1/PCD3
Samco-e Inverter
Schneider-Electric Twido
Shinko DCL Series
SIDE MIDA 20/20D
Simatic S7-200 (via PPI; 1-to-1)
Simatic S7-300 (via MPI Port)
Simatic S7-300 (via PC adapter)
Taian TP02 Series
Taian TP03 Series
Texmate 320
Vigor M/VB Series
VIPA Sys200V MPI
Yokogawa FA-M3 Series

Die Treiberliste wird laufend aktualisert

Enhanced visual comfort

Embellish your screens by using available or imported fonts and by importing animated Gif images.
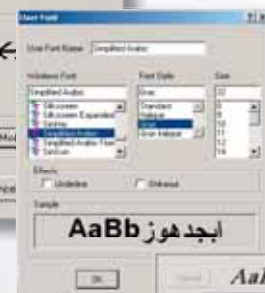
Communication – Ethernet

Ethernet

Ethernet operates with a data rate of 10 MBit/s and as Fast-

Ethernet with 100 MBit/s. Ethernet utilizes the producer/consumer

EtherNet™

model. This means that every station possesses equal rights. While it is transmitting, all other stations listen

in and accept the data directed to them. Bus access is regulated by the CSMA/CD procedure (Carrier-

Sense Multiple-Access with Collision Detection), where each station may autonomously transmit when the

bus is free. If a collision occurs, if two stations begin to transmit simultaneously, both of them will stop

transmission and wait for a randomly determined time before they transmit again. Ethernet defines the

Layers 1 (Physical Link) and 2 (Data Link) of the OSI model.

The AC500 supports transmission and reception of data using TCP/IP and/or UDP/IP. Further application

layers can be implemented by subsequent loading. Simultaneous operation of TCP/IP, UDP/IP and applica-

tion layer is also assured. The IP, TCP, UDP, ARP, RP, BOOTP, and DHCP protocols are supported as a

standard feature, as application layer Modbus/TCP.

Topology

Star- or ring-shaped using Ethernet hub or switch.

Data transmission

Max. 10 MB/s with 10 Base T and max. 100 MB/s

with Fast-Ethernet.

Transmission media

Twisted-pair cables with RJ45 connector. The

maximum cable length is 100 m for 100 MB/s.

Diagnostics

Detailed diagnostic messages for rapid trouble-

shooting are shown on the CPU display.

In addition, the device status is indicated at the

communication module by four LEDs.

Ethernet - Functionality at a glance

Ethernet functionality	AC500 CPU with integrated Ethernet interface	AC500 with communication module CM577-ETH
Protocols supported		
Modbus TCP/IP	yes (client/server), up to 8 client/server connections simultaneously. Supported functions: 1, 2, 3, 4, 5, 6, 7, 15, 16	
Ethernet TCP/IP	for programming only, not for communication	
UDP/IP	yes, using special function blocks and with ABB header	
BOOTP	yes	
DHCP	yes	
ARP	yes	
ICMP	yes	
Associated libraries	for Modbus/TCP and UDP/IP communication	
Diagnosis		
Error indication	on LCD display of the CPU	LED's on the communication modul
Online diagnosis	using SYCON.net tool (part of programming software)	
Error code	yes	
Physical layer		
Connection	RJ45 10Base-T oder 100Base-TX	
Baud rate	10 / 100 Mbit/s	
Number of sockets	up to 16	
Ethernet switch integrated	no	yes
Configuration	using SYCON.net tool (part of programming software)	
Station address configuration	yes, using display and keypad of CPU	yes, via rotary switch on the communicating coupler

Communication – PROFIBUS DP

PROFIBUS DP

(Process Field Bus - Decentral Periphery)

PROFIBUS DP is an open, high-speed and widely-used field bus.

It provides multi-master and master-slave communication in the field

area. This field bus can accordingly be used for AC500 and AC31 control system series and for field-bus-

neutral FBP devices (decentralized I/Os and intelligent switching devices) via the PROFIBUS-FBP connector.
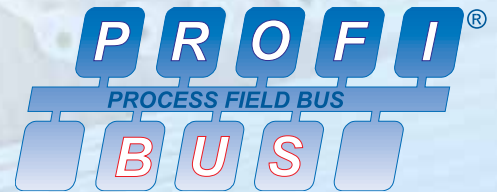
Communication

The masters rule data traffic on the bus. When in possession of the bus access authorization (token), the masters can transmit data without an external request. The passive devices, known as slaves, do not receive any bus access rights; they acknowledge messages received, or respond to a query from a master. Baud rates from 9.6 kBaud to 12 MBaud are supported. A maximum of 126 devices can be operated on the bus.

Data exchange

This is handled predominantly in cyclical mode be-tween master and slave. The requisite communication functions have been specified by the PROFIBUS DP

basic functions in accordance with EN 50170. Each master has full write and read access to its assigned slaves, but only read access to the slaves assigned to other bus masters. There is no direct data exchange between masters. Acyclical services (DP-V1) for parameterization and diagnostics between master and slave are also available. This is performed in parallel to the master's cyclical user data traffic.

Diagnostics

Detailed diagnostic messages for rapid trouble-shooting are shown on the CPU display. In addition, the device status is indicated at the communica-tion module by four LEDs.
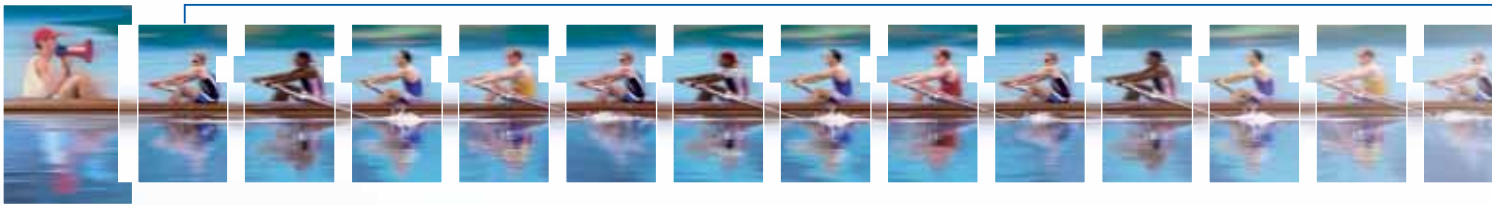
PROFIBUS DP - Functionality at a glance

Profibus DP functionality	AC500 CPU with CM572-DP	AC500 CPU with Profibus FieldBusPlug (FBP DPV1)	S500 I/Os with bus interface DC505-FBP and Profibus FieldBusPlug (FBP DPV1)
Profibus master	yes	no	no
Multi master	yes, bus access via token	no	no
Profibus slave	no	yes	yes
Protocols supported			
Profibus DP V0	yes	yes	yes
Profibus DP V1 with service MSAC1_read (read data) + MSCA1_write (write data)	yes	no	yes
Diagnosis			
Error indication	via LEDs on the communication module	via LCD display of the CPU and via LEDs on the FBP	via LED on the interface module and the FBP
Online diagnosis	using SYCON.net tool (part of the programming software)		
Error code	yes	no	no
Associated function blocks	yes	no	no
Physical layer			no
Connection	9-polig D-Sub	M12 FBP (standard)	
Baud rate	up to 12 Mbit/s		
Distance	up to 1200 m at 90 kbit/s		
Max. number of subscribers	DP V1: max. 32. DP V0: max 126 via amplifier and max. 32 (master/slave) per bus segment		
Configuration	using SYCON.net tool (part of programming software)	using SYCON.net tool (part of programming software), if another AC500 is the master	
Using GSD file	yes, using the specific GSD file of the slave device	yes, using the AC500 GSD file	
Station address configuration	no	Yes using display and keypad of CPU (99 max.)	yes, via rotary switches (99 max.)

Communication – Modbus®

Modbus® RTU (developed by Modicon in 1979)

Modbus® RTU is an open master/slave protocol, and can be easily implemented on serial interfaces.

Numerous automation systems have Modbus® RTU interfaces as standard or optional features, and are thus easily able to communicate with the AC500 via its integrated COM1 and COM2 interfaces (RS232 or RS485). The Modbus® is used not only in industrial applications, but also in building installations, in energy optimization systems, for long-distance data transmission and for linking up operator panels.

Communication

By polling, i.e. the master transmits a request to the slave and then receives the response. Both interfaces COM1 and COM2 can operate simultaneously as Modbus interfaces. The Modbus operating mode of an interface is set using the engineering tool.

Topology

Point-to-point via RS232 or multi-point via RS485. With RS232, a maximum of one master and one slave is possible, while with RS485 one master and a maximum of 31 slaves can be operated. The maximum cable length is 15 m with RS232 and 1.2 km with RS485.

Data transfer

Max. 115.2 kB/s. Each telegram has a 16-bit CRC appended. The telegrams permit process data (input/output data) to be written and read, either individually or in groups. The data are packed in the RTU format.

Transmission media

May vary. One widely used option is the RS485 bus physics, a twisted-pair, shielded cable with terminators.

Diagnostics

Detailed diagnostic messages for rapid trouble-shooting are shown on the CPU display.
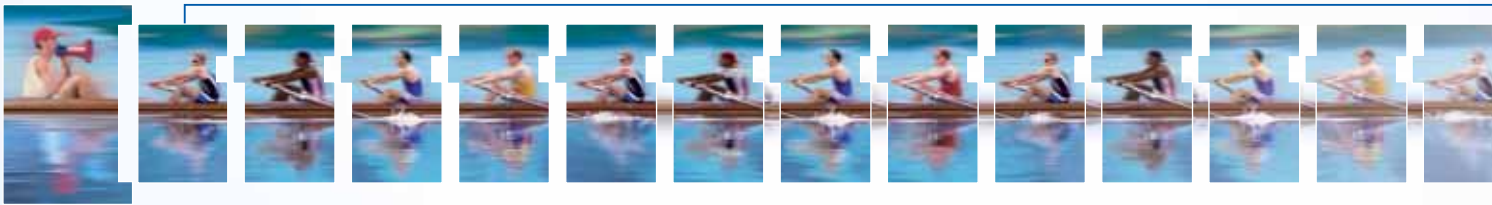
Modbus - Functionality at a glance

Modbus functionality	AC500 CPU with integrated Modbus interface
Master or slave at COM1	yes
Master or slave at COM2	yes
Slave at FBP interface	no
Protocols supported	Modbus RTU
Diagnosis	
Error indication	on LCD display of the CPU
Online diagnosis	yes
Physical layer	RS485
Connection	9-pole D-Sub (COM2) or plug (COM1)
Baud rate	up to 115.2 kbit/s
Distance	up to 1200 m (at slow baud rate)
Configuration	using configuration tool (part of programming software)
Station address configuration	using configuration tool (part of programming software)

Communication –
CANopen and DeviceNet

CANopen (Controller Area Network) and DeviceNet

The CAN protocol was originally developed for the European automotive industry, so as to replace expensive cabling by an affordable network cable. Today, it is also used in the field of automation for transmitting process data between control systems, decentralized I/O modules, drives, valves, etc. CAN features a high level of transmission security, since large portions of the monitoring mechanisms have been implemented directly in the CAN chip. DeviceNet and CANopen utilize the physical structure and the data transport mechanisms of CAN (Controller Area Network). The difference lies in the transmission protocols. DeviceNet and CANopen can be used correspondingly for the AC500 and AC31 controller series and for field-bus-neutral FBP devices (decentralized I/Os and intelligent switching devices).

Data transmission

Two types of message have been defined: I/O data transfer and direct link. I/O data transfer is used for time-critical process data, while the direct link can be, for example, used for diagnostic messages.

Bus access for subscribers

The connection ID with the lower address has higher priority on the bus. Data is transmitted by the source, while the sinks (i.e. receivers of the data) have likewise been specified during the configuration phase.
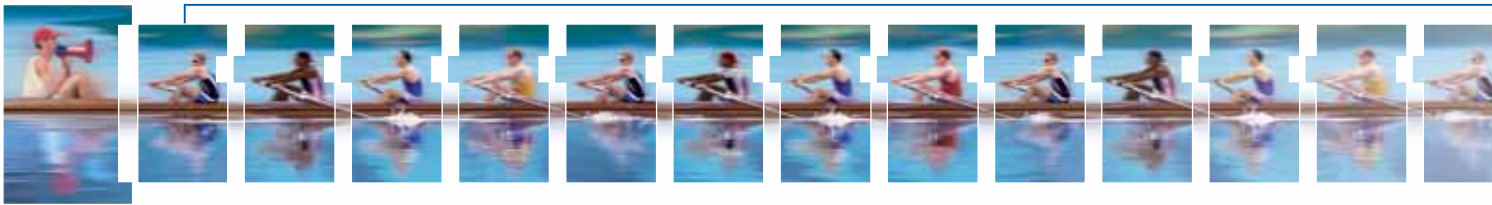
CANopen

The bus operates on the master/slave principle with one master and up to 127 slaves. A shielded twisted-pair cable is used, according to ISO 11898. Cable lengths and transmission rates: from max. 40 m at 1 MBit/s to 1000 m at 20 kBit/s.

DeviceNet

The bus operates on the multi-master and/or the master/slave principle, with up to 64 bus subscribers. Two types of shielded twisted-pair cables are used: trunk cable for the main line and drop cable for the branch line.

Transmission rate	125 kBit/s	250 kBit/s	500 kBit/s
Max. cable length of trunk line Trunk cable	500 m (1610 ft)	250 m (820 ft)	100 m (328 ft)
Max. cable length of trunk line Drop cable	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)
Max. cable length per branch line Trunk cable/Drop cable	6 m (20 ft)	6 m (20 ft)	6 m (20 ft)
Max. cable length total branch line Trunk cable/Drop cable	156 m (512 ft)	78 m (256 ft)	39 m (128 ft)

Diagnostics

Detailed diagnostic messages for rapid trouble-shooting are shown on the CPU display. In addition, the device status is indicated at the communication module by four LEDs.

Communication –
CANopen and DeviceNet

CANopen - Functionality at a glance

CANopen functionality	AC500 with communication module CM578-CN	AC500 CPU with CANopen FieldBusPlug (FBP)	S500 I/Os with bus interface DC505-FBP and CANopen FieldBusPlug (FBP)
Master	yes (client)	no	no
Slave	no	yes	yes
Protocols supported			
CAN 2.0A (11 bit identifier)	yes	yes	yes
CAN 2.0B (29 bit identifier)	yes	no	no
CiA DS401 integrated device profile	yes	no	no
CiA DS402 integrated device profile	yes	no	no
CiA DS406 integrated device profile	yes	no	no
Data transfer			
Event triggered	yes	yes	yes
Synchronous	yes	yes	yes
Cyclic	yes	yes	yes
Remote PDO transmission	yes	yes	yes
Node guarding	yes	yes	yes
Heartbeat	yes	yes	yes
Diagnosis			
Error indication	using LEDs on the communication module	via LCD-Display of the CPU and the LEDs on the FBP	via LEDs on the interface module and on the FBP
Online diagnosis	using SYCON.net tool (part of programming software)		
Error code	yes	no	no
Associated function blocks	yes	no	no
Physical layer			
ISO11898	yes	yes	yes
Connection	5-pole Combicon	M12	M12
Baud rate	up to 1 Mbit/s	up to 500 kbit/s	up to 500 kbit/s
Distance		up to 1000 m at 20 kbit/s	
Configuration	using SYCON.net tool (part of programming software)		
Configuration using EDS file	yes, using the specific EDS file of the slave device; non-modular EDS files only	yes, EDS-file of the AC500	yes, EDS file to be configured according the existing HW (EDS Generator part of the programming software)
Station address configuration	no	yes, via display and keypad of the CPU (max. 99)	yes, via rotary switch on the interface module (max. 99)
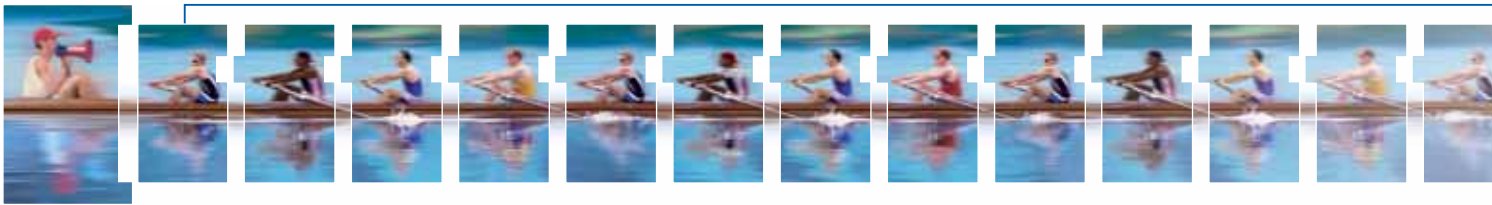
DeviceNet - Functionality at a glance

DeviceNet Functionality	AC500 with communication module CM575-DN	AC500 CPU with DeviceNet FieldBusPlug (FBP)	S500 I/Os with bus interface DC505-FBP and DeviceNet FieldBusPlug (FBP)
Master	yes	no	no
Slave	no	yes	yes
Protocols supported			
DeviceNet (server)	no	yes	yes
DeviceNet (client)	yes	no	no
Data transfer			
Polling	yes	yes	yes
State changes	yes	yes	yes
Cyclic	yes	yes	yes
Bit strobe	yes	no	no
Peer-to-Peer (acyclic)	yes	no	yes
Diagnosis			
Error indication	using LEDs on the communication module	via LCD display of the CPU and LEDs on the FBP	via LEDs on the interface module and the FBP
Online diagnosis	using SYCON.net tool (part of programming software)		
Error code	yes	no	no
Associated function blocks	yes	no	no
Physical layer			
ISO11898	yes	yes	yes
Connection	5-pole Combicon	M12	M12
Baud rate	up to 500 kbit/s	up to 500 kbit/s	up to 500 kbit/s
Distance		up to 500m at 125 kbit/s	
Configuration	using SYCON.net tool (part of programming software)		
Using EDS file	yes, using the specific EDS file of the slave device; non-modular EDS files only	yes, using AC500 EDS file	yes, EDS file to be configured according the existing HW (EDS Generator part of the programming software)
Station address configuration		yes, using display and keypad of the CPU (99 max.)	yes, via rotary switches on the communication module (max. 99)

Communication – ARCNET

ARCNET (Attached Resource Computer NETwork)

ARCNET is an open, multi-purpose field bus solution with real-time capability. It can be used for multi-master networking and for programming the AC500 and AC31 controller series, but also for connecting additional ARCNET subscribers, e.g. PCs via an appropriate interface card (see catalog).

Topology

ARCNET is one of the few networks that can be operated in every conceivable topology. Options include bus, star, or tree topologies, or mixtures of these. This means that ARCNET can be used for a broad field of different applications.

Bus assignments

ARCNET operates on the token-passing procedure, where each subscriber has equal rights.

Configuration mechanisms

ARCNET allows to add and to remove subscribers from the network during runtime. When a new subscriber is added, the entire network will be re-configured.

ARCNET functionality	AC500 CPU with integrated ARCNET interface
ARCNET for programming	yes
ARCNET for communication	in preparation
Collision-free data transmission	yes
Guaranteed response times	yes
Real-time support through token passing	yes
Handshake protocol between sender and recipient	yes
Variable network topology: Bus, tree and star topologies incl. mixed topologies	yes
Variable use of media for networking: Coax cable, twisted-pair cable and optical fibre	yes
Automatic connect/disconnect of subscribers	yes
Diagnosis	
Error indication	on LCD display of the CPU
Online diagnosis	yes
Error code	yes
Physical layer	Token-passing system
Connection	Coax cabel, type RG62/U 93Ω
Baud rate	2.5 Mbit/s
Max. number of stations	255, with max. 8 stations per segment
Maximum length of segments	300m
Hub/switch integrated	no
Configuration	using configuration tool (part of programming software)
Station address configuration	using display and keypad of the CPU

Security mechanisms

A 16-bit CRC is appended to every data packet, and checked by the recipient. If the token is lost, a reconfiguration routine will be initiated, and the network will automatically be restructured. Additionally, diagnostic registers are available.

Physical characteristics

ABB recommends coaxial cables as transmission medium, for direct connection to the CPU. But also twisted-pair cables or (glass, plastic) fiber-optic cables can be connected via bus converters. The line lengths that can be achieved without any intermediate amplifiers depend not only on the used medium, but also on the selected baud rate and the number of subscribers. The ranges per segment vary from approximately 120 m for a simple two-wire bus, up to 3 km for fiber-optics, in each case at 2.5 MBit/s. By providing appropriate hubs, different topologies and transmission media can be combined with each other and the transmission distance can be increased. The coaxial cables used are a type with 93 Ohm, e.g. RG 62.

The permissible twisted-pair cables are specified in IEEE 802.3i-1990. At 2.5 MBit/s and with coaxial cables, for example, the maximum length of a bus segment is 300 m with eight subscribers and without a hub. With twisted-pair cables, under the same conditions, a maximum length of approximately 120 m can be achieved. The maximum transmission length depends on the number of connected subscribers. With coaxial cables, a maximum of 16 km can be achieved; with twisted-pair cables approximately 6 km, in each case at 2.5 MBit/s. The fiber-optic link provides the highest degree of interference immunity. With glass fiber-optics, distances of up to 3 km are possible at 2.5 MBit/s; with plastic fiber-optic cables only small distances of up to approximately 100 m. The baud rate plays no significant role in fiber-optic cable transmission. Here, the range can as well be extended using hubs.

Diagnostics

Detailed diagnostic messages for rapid troubleshooting are shown on the CPU display.

Communication – CS31

CS31 (Communication Serial Field Bus, developed by ABB in 1989) for continuity and migration

CS31 is a proprietary master/slave field bus. It is characterized by simple handling, easy configuration, and inexpensive installation. The COM1 interface of the AC500 can be configured as a CS31 field bus master.

Communication

Is handled using polling, i.e. the master sends a request to the slave and then receives the response. The CS31 operating mode of COM1 is set using the engineering tool.

Topology

Multi-point line, RS485, approved without branch lines. A system consists of one master and up to 31 slaves. The maximum cable length is 500 m, or 2 km with an amplifier. Slaves are primarily decentralized input/output modules with integrated CS31 bus connection.

Data transmission

Is performed at 187.5 kB/s. Each telegram has an 8-bit CRC appended. The telegrams enable process data (input/output data) to be written and read.

Transmission medium

Primarily a twisted-pair, shielded cable with termina-tors. Other transmission media: fiber-optic cables via a converter (glass fibers max. 3 km, plastic max. 100 m), contact lines, slip rings (bus length max. 50 m) and data photocells.

Diagnostics

Detailed diagnostic messages for rapid trouble-shooting are shown on the CPU display.
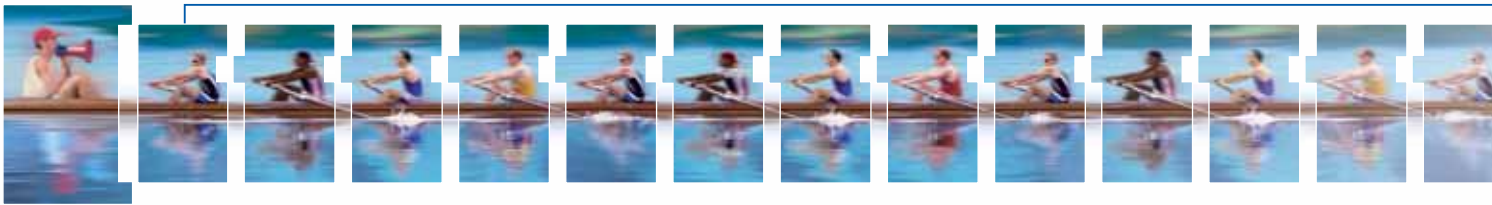
CS31

CS31 functionality	AC500 CPU with integrated CS31 interface	S500-FBP I/O with bus interface DC551-CS31
Master	yes, at COM1	no
Slave	no	yes
Protocols supported	ABB CS31 protocol	
Diagnosis		
Error indication	on LCD display of the CPU	via module LEDs
Online diagnosis	yes	
Error code	erros are recorded in the diagnosis system of the CPU	
Associated function blocks	yes	
Physical layer	RS485	
Connection	plug at COM1	screw-type or spring-type terminals
Baud rate	187.5 kbit/s	
Distance	up to 500 m; up to 2000 m using a repeater	
Max. number of modules on fieldbus	31 modules max. Please note: The DC551 bus interface occupies one or two module addresses (if counters are configured onboard). Depending on the configuration, connected extension modules can occupy further module addresses.	
Configuration	using configuration tool (part of programming software)	
Station address configuration	no	using rotary switches (99 max.)

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Details/Type:	PM571	PM571-ETH	PM581	PM581-ETH	PM581-ARC
Supply voltage	24 V DC		24 V DC		
Program memory Flash EPROM and RAM [kB]	64		256		
Integrated data memory [kB]	21, incl. 4 KB RETAIN		288, incl. 32 KB RETAIN		
Plug-in memory card [SD card]	128 MB		128 MB		
Cycle time for 1000 instructions in ms binary word floating-point	0.09 0.3 6		0.07 0.07 1.6		
Max. number of centralized inputs/outputs Digital inputs Digital outputs Analog inputs Analog outputs	320 240 160 160		320 240 160 160		
Max. number of decentralized inputs/outputs	depends on the used standard fieldbus CS31 field bus only: up to 31 stations with up to 120 DIs / 120 DOs per station				
Data buffering	battery		battery		
Real-time clock (with battery back-up)	x		x		
Program execution cyclical time-controlled multi tasking	x x x		x x x		
User program protection by password	x		x		
Internal interfaces					
COM1: RS232/RS485 configurable Connection Programming, Modbus, ASCII, CS31	x terminal block x		x terminal block x		
COM2: RS232/RS485 configurable Connection Programming, Modbus, ASCII	x SUB-D x		x SUB-D x		
Integrated Ethernet coupler Ethernet connection		x RJ45		x RJ45	
Integrated ARCNET coupler ARCNET connection					x Coax
Display and 8 function keys Function	x RUN/STOP status, diagnosis		x RUN/STOP status, diagnosis		
Timers	unlimited		unlimited		
Counters	unlimited		unlimited		
Function Block Diagram (FBD) Instruction List (IL) Ladder Diagram (LD) Structured Text (ST) Sequential Function Chart (SFC) Continuous Function Chart (CFC)	x x x x x x		x x x x x x		

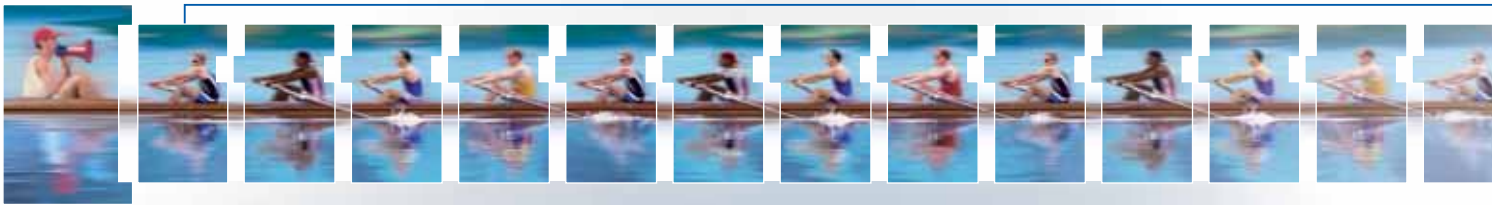| Details/Type:	PM582	PM582-ETH	PM582-ARC	PM590	PM590-ETH	PM590-ARC	PM591	PM591-ETH	PM591-ARC
Supply voltage	24 V DC			24 V DC			24 V DC		
Program memory Flash EPROM and RAM [kB	512			2056			4096		
Integrated data memory [kB]	288, incl. 32 KB RETAIN			3072, incl. 512 KB RETAIN			3072, incl. 512 KB RETAIN		
Plug-in memory card [SD card]	128 MB			128 MB			128 MB		
Cycle time for 1000 instructions in ms binary word floating-point	0.07 0.07 1.6			0.002 0.006 0.006			0.002 0.006 0.006		
Max. number of centralized inputs/outputs Digital inputs Digital outputs Analog inputs Analog outputs	320 240 160 160			320 240 160 160			320 240 160 160		
Max. number of decentralized inputs/outputs	depends on the used standard fieldbus CS31 field bus only: up to 31 stations with up to 120 DIs / 120 DOs per station								
Data buffering	battery			battery			battery		
Real-time clock	x			x			x		
Program execution cyclical time-controlled multi tasking	x x x			x x x			x x x		
User program protection by password	x			x			x		
Internal interfaces									
COM1: RS232/RS485 configurable Connection Programming, Modbus, ASCII, CS31	x terminal block x			x terminal block x			x terminal block x		
COM2: RS232/RS485 configurable Connection Programming, Modbus, ASCII	x SUB-D x			x SUB-D x			x SUB-D x		
Integrated Ethernet coupler Ethernet connection		x RJ45			x RJ45			x RJ45	
Integrated ARCNET coupler ARCNET connection			x Coax			x Coax			x Coax
Display and 8 function keys Function	x RUN/STOP status, diagnosis			x RUN/STOP status, diagnosis			x RUN/STOP status, diagnosis		
Timers	unlimited			unlimited			unlimited		
Counters	unlimited			unlimited			unlimited		
Function Block Diagram (FBS) Instruction List (IL) Ladder Diagram (LD)) Structured Text (ST) Sequential Function Chart (SFC) Continuous Function Chart (CFC)	x x x x x x			x x x x x x			x x x x x x		

	Digital I/O modules							Interface modules	
	DI524	DC522	DC523	DC532	DX522	DX531	DC541	DC505-FBP	DC551-CS31
Number of channels per module									
Digital inputs DI	32	–	–	16	8	8	–	8	8
Digital outputs DO	–	–	–	–	8	4	–	–	–
Configurable channels DC (configurable as inputs or outputs)	–	16	24	16	–	–	8	8	16
Additional configuration of channels as									
fast counter		Configuration of max. 2 channels per module. Operating modes see table on page 33.				–	Yes. See table on page 34 for possible configurations	–	Configuration of max. 2 channels p. module. Operating modes see table on page 33.
pulse-width modulator	–	–	–	–	–	–		–	–
rpm, time and frequency counter	–	–	–	–	–	–		–	–
interrupt I/O	–	–	–	–	–	–		–	–
Occupies max. 1 DO or DC when used as counter	–	x	x	x	–	–	–	–	x
Connection via terminal block TB5xx	x	x	x	x	x	x	–	x	x
Connection via CPU terminal base. Occupies one communication module slot.	–	–	–	–	–	–	x	–	–
Digital inputs									
Input signal voltage		24 V DC				230 V AC or 120 V AC	24 V DC	24 V DC	24 V DC
Frequency range		–				47 … 63 Hz	–	–	–
Input characteristic acc. to EN61132-2		Type 1				Type 2	Type 1	Type 1	Type 1
0 signal		− 3 V DC … + 5 V DC				0 … 40 V AC	− 3 V DC … + 5 V DC		− 3 V DC … + 5 V DC
Undefined signal state		> + 5 V DC … < + 15 V DC				> 40 V AC … < 74 V AC	> + 5 V DC … < + 15 V DC		> + 5 V DC … < + 15 V DC
1 signal		+ 15 V DC … + 30 V DC				74 … 265 V AC	> + 5 V DC … < + 15 V DC		+ 15 V DC … + 30 V DC
Residual ripple, range for 0 signal		− 3 V DC … + 5 V DC				–	− 3 V DC … + 5 V DC		− 3 V DC … + 5 V DC
Residual ripple, range for 1 signal		+ 15 V DC … + 30 V DC				–	+ 15 V DC … + 30 V DC		+ 15 V DC … + 30 V DC
Input time delay (0 -> 1 or 1 -> 0)		8 ms typically, configurable from 0.1 up to 32 ms				20 ms typically	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 typ.				–	5 mA typ.		5 mA typ.
at input voltage + 5 V DC		> 1 mA				–	> 1 mA		> 1 mA
at input voltage + 15 V DC		> 5 mA				–	> 5 mA		> 5 mA
at input voltage + 30 V DC		< 8 mA					< 8 mA		< 8 mA
at input voltage 159 V AC		–				> 7 mA	–		–
at input voltage 40 V AC		–				< 5 mA	–		–
Digital outputs									
Transistor outputs 24 V DC, 0.5 A	–	x	x	x	–	–	x	x	x
Readback of output	–	x	x	x	–	–	x	x	x
Relay outputs, supplied via process voltage UP, changeover contacts	–	–	–	–	x	x	–	x	–
Switching of 24 V load	–	x	x	x	x	x	x	x	x
Switching of 230 V load	–	–	–	–	x	x	–	–	–
Output voltage at signal state 1		Process voltage UP minus 0.8 V			–	–	Process voltage UP minus 0.8 V		Process voltage UP minus 0.8 V
Output current									
Nominal current per channel	–		500 mA at UP = 24 V				500 mA at UP = 24 V		500 mA at UP = 24 V
Maximum (total current of all channels)	–		8 A				8A	4 A	8 A
Residual current at signal state 0	–		< 0.5 mA				< 0.5 mA		< 0.5 mA
Demagnetization when switching off inductive loads	–		by internal varistors				by internal varistors		by internal varistors

	Digital I/O modules							Interface modules	
	DI524	DC522	DC523	DC532	DX522	DX531	DC541	DC505-FBP	DC551-CS31
Switching frequency									
for inductive load	–	0.5 Hz max.			2 Hz max.		0.5 Hz max.	0.5 Hz max.	
for lamp load	–	11 Hz max. at max. 5 W			xx Hz max.	11 Hz max. at max. 5 W	11 Hz max. at max. 5 W	11 Hz max. at max. 5 W	
Short-circuit / overload proofness	–	x	x	x	by external fuse / circuit breaker. 6 A gL/gG per channel		x	x	x
Overload indication (I > 0.7 A)	–	after approx. 100 ms			–	–	–	after approx. 100 ms	
Output current limiting	–	0.7 A typ.			–	–	0.7 A typ.	Automatic reclosure	
Proofness against reverse feeding of 24 V signals	–	x	x	x	–	–	x	x	x
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		–	–	–
Process voltage UP									
Nominal voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Maximum ripple	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %	5 %
Reverse polarity protection	x	x	x	x	x	x	x	x	x
Fuse for process voltage UP	10 A miniature fuse							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	–	x	x	–	–	–	–	–	–
Maximum cable length for connected process signals									
Shielded cable [m]	1000	1000	1000	1000	1000	1000	1000	1000	1000
Unshielded cable [m]	600	600	600	600	600	600	600	600	600
Potential isolation									
per module	x	x	x	x	x	x	x	x	x
between the input channels	–	–	–	–	–	–	–	–	–
between the output channels	–	–	–	–	x	x	–	–	–
Voltage supply for the module	internally via extension bus interface (I/O bus)						internally via backplane bus	via FBP	by external 24 V DC voltage via terminal
Field bus connection	via AC500 CPU or interface module						via AC500 CPU	via FBP	CS31 field bus, via terminal
Address setting	via software						via software	via FBP	by code switch on the front side
Operating state indicators									
Yellow LED for I/O state	32	16	24	32	16	12	8	16	24
Green LED for voltage supply	1	1	1	1	1	1	1	1	1
Red LED for module and group errors	4	4	4	4	2	2	1	2	1
Mounting position	1. Horizontal mounting. 2. Vertical mounting possible with restrictions (max. output load per group: 50 % at 40 °C).								
Cooling	Cooling by natural convection must not be obstructed by cable ducts or other interior components of the switchgear cabinet.								

Scalable automation system AC500

	Analog I/O modules			
	AX521	**AX522**	**AI523**	**AO523**
Number of channels per module				
Analog inputs AI, individual configuration	4	8	16	–
Analog outputs AO, individual configuration	4	8	–	16
Signal resolution for channel configuration				
– 10 V ... + 10 V: 12 bits + sign	x	x	x	x
0 ... 10 V: 12 bits	x	x	x	–
0 ... 20 mA, 4 ... 20 mA: 12 bits	x	x	x	x
Temperature: 0.1 °C	x	x	x	–
Monitoring configuration per channel				
Plausibility monitoring	x	x	x	x
Wire break & short-circuit monitoring	x	x	x	x
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	–
– 10 V ... + 10 V	4 / 4	8 / 8	16 / 16	–
0 ... 20 mA	4 / 4	8 / 8	16 / 16	–
4 ... 20 mA	4 / 4	8 / 8	16 / 16	–
Pt100, – 50 °C ... + 400 °C (2-wire)	4 / 4	8 / 8	16 / 16	–
Pt100, – 50 °C ... + 400 °C (3-wire), occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
Pt100, – 50 °C ... + 70 °C (2-wire)	4 / 4	8 / 8	16 / 16	–
Pt100, – 50 °C ... + 70 °C (3-wire), occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
Pt1000, – 50 °C .. .+ 400 °C (2-wire)	4 / 4	8 / 8	16 / 16	–
Pt1000, – 50 °C ... + 400 °C (3-wire), occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
Ni1000, – 50 °C ... + 150 °C (2-wire)	4 / 4	8 / 8	16 / 16	–
Ni1000, – 50 °C ... + 150 °C (3-wire), occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
0 ... 10 V using differential inputs, occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
– 10 V ... + 10 V using differential inputs, occupies 2 AIs	4 / 2	8 / 4	16 / 8	–
Digital signals (digital input)	4 / 4	8 / 8	16 / 16	–
Input resistance per channel	Voltage: > 100 kΩ, Current: approx. 330 Ω			–
Time constant of the input filter	Voltage: 100 µs, Current: 100 µs			–
Conversion cycle	2 ms (for 8 AI + 8 AO), 1 s for Pt/Ni...			–
Overvoltage protection	x	x	x	–
Data when using the AI as digital input				
Input time delay	8 ms typ., configurable from 0.1 up to 32 ms			–
Input signal voltage	24 V DC			–
0 signal	– 30 V ... + 5 V			–
1 signal	+ 13 V ... + 30 V			–
Analog outputs AO				
Possible configuration per AO	Max. number of AOs per module and with regard to the configuration:			
– 10 V ... + 10 V	4	8	–	16
0 ... 20 mA	4	4	–	8
4 ... 20 mA	4	4	–	8
Output resistance (burden) when used as current output	0 ... 500 Ω		–	0 ... 500 Ω
Output loading capability when used as voltage output	max. ± 10 mA		–	max. ± 10 mA

	Analog I/O modules			
	AX521	AX522	AI523	AO523
Process voltage UP				
Nominal voltage	24 V DC	24 V DC	24 V DC	24 V DC
Maximum ripple	5 %	5 %	5 %	5 %
Reverse polarity protection	x	x	x	x
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 % typ., 1 % max.			
Potential isolation				
per module	x	x	x	x
between the input channels	–	–	–	–
between the output channels	–	–	–	–
Voltage supply for the module	internally via extension bus interface (I/O bus)			
Operating state indicators				
Yellow LED for I/O state	8	16	16	16
Green LED for voltage supply	1	1	1	1
Red LED for module and group errors	2	2	2	2
Mounting position	1. Horizontal mounting. 2. Vertical mounting possible with restrictions (max. output load per group: 50 % at + 40 °C).			
Cooling	Cooling by natural convection must not be obstructed by cable ducts or other interior components of the switchgear cabinet.			

Table: Digital I/O modules, „fast counter" operating modes. Not applicable for DC541

Operating mode, configured in the user program of the AC500		Occupied inputs DI or DC	Occupied outputs DO or DC	Maximum counting frequency	Notes
0	No counter	0	0	–	–
1	One count-up counter with „end value reached" indication	1	1	50 kHz	Note for input module DI524: It is not possible to set an output directly. As an alternative, the status byte should be evaluated and applied to another output in the system.
2	One count-up counter with „enable" input and „end value reached" indication	2	1	50 kHz	
3	Two up/down counters	2	0	50 kHz	„End value" interrogation via status byte.
4	Two up/down counters with 1 counting input inverted	2	0	50 kHz	
5	One up/down counter with „dynamic set" input	2	0	50 kHz	Acts to the rising signal edge (0->1). „End value" interrogation via status byte.
6	One up/down counter with „dynamic set" input	2	0	50 kHz	Acts to the falling signal edge (1->0). „End value" interrogation via status byte.
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 kHz	For synchro transmitters with 24 V signals. Incase of 5 V synchro transmitters, the signal has to be increased to 24 V. The zero track of the synchro transmitter is not processed. Interrogation of the „end value" indication via the status byte. Single evaluation.
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 kHz	See operating mode 7. Difference: Double evaluation, i.e. evaluation of the rising edge and the falling edge of track A -> higher accuracy due to the double number of counting pulses.
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 kHz	See operating mode 7. Difference: Fourfold evaluation, i.e. evaluation ofthe rising edge and the falling edge of track A and track B -> higher accuracy due to the fourfold number of counting pulses.

Table: Possible configurations for the multifunctional module DC541

Configuration as	Function/ Configuration for channel no.	Chan. 0	Chan. 1	Chan. 2	Chan. 3	Chan. 4-7	Max. no. of channels for this function	Remarks and notes regarding possible alternative combinations of the remaining channels (a and b)
Mode 1: Interrupt functionality, mutually exclusive with mode 2 (counting functionality)								
Interrupt	Digital input	1	1	1	1	4	8	Each channel can be configured individually as interrupt input or interrupt output.
	Digital output	1	1	1	1	4	8	
Mode 2: Counting functionality and multifunctional I/Os, mutually exclusive with mode 1 (interrupt functionality)								
Multifunctional I/Os, digital I/Os, PWM, counter, time and frequency measurement	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 a pulsed signal with an adjustable on-off ratio.
	Up/down counter, 50 kHz	1	1	OK *1)	OK *1)	OK *1)	2	*1) a) Both channels (0 and 1) configured as 50 kHz counters => channels 2 to 7 can be configured as digital I/Os. b) Only one channel (0 or 1) configured as 50 kHz counter => the second channel can be configured as counter < 50 kHz or for time/frequency measurement with a max. resolution of 200 µs. The remaining channels (2 to 7) can be configured as digital I/Os.
	Up/down counter, 5 kHz	1	1	1	1	OK *2)	4	*2) a) Four channels (0 to 3) configured as 5 kHz counters => channels 4 to 7 can be configured as digital I/Os. b) Not all of the four channels 0 to 3 configured as 5 kHz counter => the remaining channels (of chan. 0 to 3) can be configured as counters for 2.5 kHz or for time/frequency measurement with a max. resolution of 200 µs as desired. The remaining channels (4 to 7) can be configured as digital I/Os.
	Up/down counter, 2.5 kHz	1	1	1	1	4	8	
	Time/frequency measurement, resolution 1 µs	1	OK *3)	OK *3)	OK *3)	OK *3)	1	*3) Channel 0 configured for a max. resolution of 50 µs => channels (1 to 7) can be configured as digital I/Os.
	Time/frequency measurement, resolution 100 µs	1	1	OK *4)	OK *4)	OK *4)	2	*4) a) Both channels (0 and 1) configured for a max. resolution of 50 µs => chan. 2 to 7 can be configured as digital I/Os. b) Only one channel (0 or 1) configured for a max. resolution of 50 µs => the second channel can be configured as counter < 50 kHz or for time/frequency measurement with a max. resolution of 200 µs. The remaining channels (2 to 7) can be configured as digital I/Os.
	Time/frequency measurement, resolution 200 µs	1	1	1	1	4	8	Times, frequencies and rotational speeds are measured with a maximum resolution of 200 µs.
Fast counter	Bidirectional 32 bit counter, 50 kHz max.	Channels 0 to 3: track A, track B, zero track, touch trigger				OK *6)	1	For connection of an incremental transmitter. For signals up to 50 kHz (corresponds to a motor with a rotational speed of 3000 rpm). The counter always occupies the first 4 channels (0 to 3). *6) The remaining channels (4 to 7) can be configured as limit values, as 5 kHz counters, for time/frequency measurement with a resolution of 200 µs or as digital I/Os.
	Shaft (endless counting)	1				OK *7)	1	„Endless" forward counting. An overflow occurs corresponding to the 32 bit value. *7) The remaining channels can be configured as limit values, as 5 kHz counters, for time/frequency measurement with a resolution of 200 µs or as digital I/Os.
	32 bit counter incl. sign	1				OK *8)	1	*8) The remaining channels can be configured as limit values, as 5 kHz counters, for time/frequency measurement with a resolution of 200 µs or as digital I/Os.
	Limit values for 32 bit counter	OK *9)				1	1	Various counting values of the 32 bit counter can be displayed directly via these outputs. *9) In this case, the channels 0 to 3 are used as 32 bit counters.
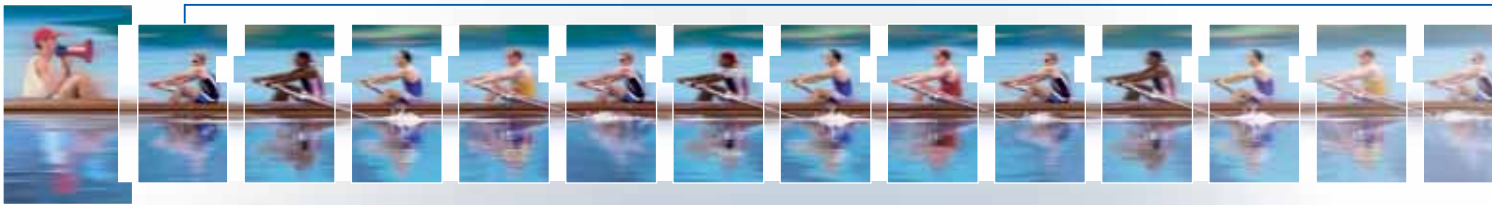
Operating and environmental conditions / System data		
Voltages according to EN 61131-2		
24 V DC	Process and supply voltage Absolute limits Residual ripple Polarity reversal protection	24 V DC (–15%, +20% without residual ripple) 19.2 V ... 30 V incl. residual ripple < 5 % 10 s
120 V AC	Supply voltage Frequency	120 V AC (–15%, +10%) 47 Hz ... 62.4 Hz/50 ... 60 Hz (–6%, +4%)
230 V AC	Supply voltage Frequency	230 V AC (–15 %, +10%) 47 Hz ... 62.4 Hz/50 ... 60 Hz (–6%, +4%)
120–240 V AC	Wide voltage input Voltage Frequency	 102 V ... 264 V/120 V ... 240 V (–15%, +10%) 47 Hz ... 62.4 Hz/50 ... 60 Hz (– 6%, +4%)
Power failure bridging time according to EN 61131-2	DC supply AC supply	Failure < 10 ms, time between 2 failures > 1 s, PS2 Failure < 0.5 periods, time between 2 failures > 1 s
Temperature	Operation Storage Transport	0 °C ... +60 °C for horizontal mounting -25 °C ... +75 °C -25 °C ... +75 °C
Humidity		95% max., no condensation
Air pressure	Operation Storage	> 800 hPa / < 2000 m > 660 hPa / < 3500 m
Creepage distances and clearances		The creepage distances and clearances correspond to Overvoltage Category II, Pollution Severity 2
Electromagnetic compatibility **Interference immunity** against electrostatic discharge (ESD) interference voltage with air discharge interference voltage with contact discharge		 acc. to EN 61000-4-2, Zone B, Criteria B 8 kV 6 kV
Interference immunity against radiated interferences (CW radiated) Test field strength		 acc. to EN 61000-4-3, Zone B, Criteria A 10 V/m
Interference immunity against transient interference voltages (burst)		 acc. to EN 61000-4-4, Zone B, Criteria B
Interference immunity against conduction-bound interferences (CW conducted) Test voltage		 acc. to EN 61000-4-6, Zone B, Criteria A 3V Zone B
Impulse voltage		acc. to EN 61000-4-5, Zone B, Criteria B
Emitted interferences		acc. to EN 55011, Group 1, Class A
Mechanical data Connection type / terminals Mounting Degree of protection Housing Vibration resistance Vibration resistance with SD card plugged in Shock resistance Device mounting DIN top-hat rail acc. to DIN EN 50022 Screw mounting Torque		 horizontal IP 20 acc. to UL 94 all three axes 2 Hz ... 15 Hz, continuously 3.5 mm 15 Hz ... 150 Hz, continuously 1 g (4 g in preparation) 15 Hz ... 150 Hz, continuously 1 g all three axes 15 g, 11 ms, semi-sinusoidal 35 mm, overall height 7,5 mm or 15 mm Screws with 4 mm diameter 1.2 Nm

Operating and displaying
Operator panels CP400 – Overview

- 32-Bit-RISC-Prozessor
- Graphic and Text
- Macro and Ladder
- Online- and Offline-Simulation
- Real Time Clock
- Password protection

- 4 MB Flash Memory
- 24 V DC ± 15% supply voltage
- Ambient temperature: 0 bis 50 °C
- Protection class IP65
- Conform to RoHs

	CP410M	CP420B	CP430B	CP430-ETH
Reference	1SBP 260 181 R1001	1SBP 260 182 R1001	1SBP 260 183 R1001	1SBP 260 184 R1001
Screen type	LCD 16 gray	Touch 16 blue, STN	Touch 16 blue, STN	Touch 16 blue, STN
Screen size	3''	4.7''	5.7''	5.7''l
Display resolution (pixels)	160 x 80	320 x 240	320 x 240	320 x 240
Helligkeit (cd/m^2)	36	110	110	110
Contrast adjustment	via rotary switch	via touch panal	via touch panel and via rotary switch on the back	via touch panel and via rotary switch on the back
Backlight type	LED	CCFT	CCFT	CCFT
Backlight life time (h)	75.000	50.000	50.000	50.000
Touch screen life time (number of touch operations)	> 500.000	> 1.000.000	> 1.000.000	> 1.000.000
Function keys	16 (10 can be used as function keys)	-	5 function keys + 1 menu key	5 function keys + 1 menu key
Ethernt	-	-	-	●
Alarm management	-	●	●	●
Recipe management	-	-	-	●
Memory	-	-	-	512 KB
Trend curves	-	●	●	●
Data storage (CF card – Compact Flash)	-	-	-	-
Communication interface	1	2	2	2
USB 2.0	-	-	-	-
Printer port	-	-	-	●
Voltage supply	< 330 mA	< 500 mA	< 840 mA	< 840 mA
Housing dimensions (W x H x D) in mm	173 x 106 x 52	170 x 103 x 45	195 x 145 x 60	195 x 145 x 60
Weight (kg)	0,65	0,47	0,81	0,81
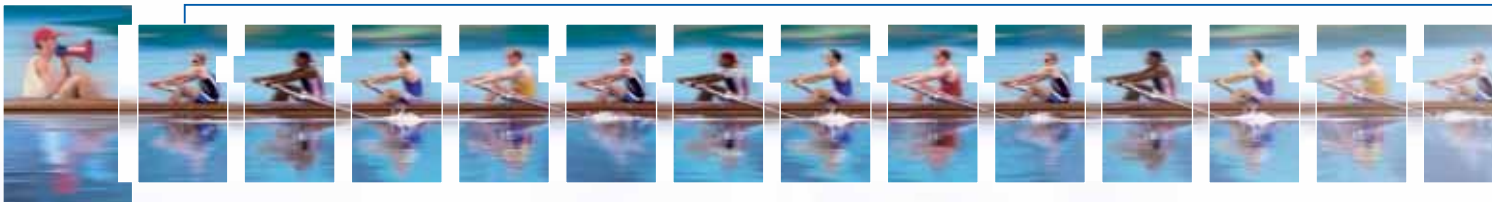
CP430C	CP430B-ETH	CP440C-ETH	CP450T	CP450T-ETH
1SBP 260 185 R1001	1SBP 260 186 R1001	1SBP 260 187 R1001	1SBP 260 188 R1001	1SBP 260 189 R1001
Touch 256 colors, STN	Touch 256 colors, STN	Touch 64.000 colors, STN	Touch 64.000 colors, TFT	Touch 64.000 colors, TFT
5.7''	5.7''	7.5''	10.4''	10.4''
320 x 240	320 x 240	640 x 480	640 x 480	640 x 480
300	300	350	350	350
via touch panel and via rotary switch on the back	via touch panel and via rotary switch on the back	via touch panal	-	-
CCFT	CCFT	CCFT	CCFT	CCFT
75.000	75.000	45.000	50.000	50.000
> 1.000.000	> 1.000.000	> 1.000.000	> 1.000.000	> 1.000.000
5 function keys + 1 menu key	5 function keys + 1 menu key	6 function keys + 1 menu key	7 function keys + 1 menu key	7 function keys + 1 menu key
-	●	●	-	●
●	●	●	●	●
●	●	●	●	●
512 KB	512 KB	512 KB	512 KB	512 KB
●	●	●	●	●
-	-	●	●	●
2	2	3	3	3
-	-	2 Master + 1 peripheral device	2 Master + 1 peripheral device	2 Master + 1 peripheral device
●	●	USB	USB	USB
< 840 mA	< 840 mA	< 1 A	< 1,25 A	< 1,25 A
195 x 145 x 60	195 x 145 x 60	231 x 176 x 47	297 x 222 x 52	297 x 222 x 52
0,81	0,81	1,20	1,90	1,90
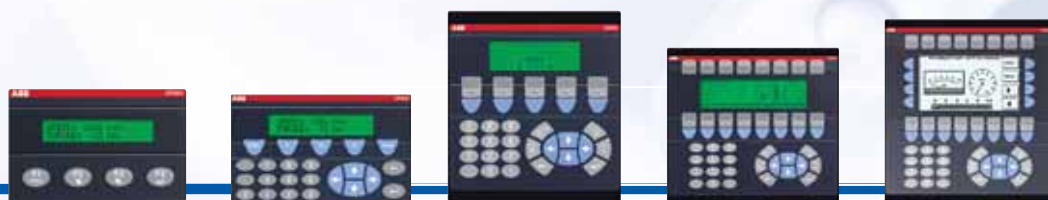
	CP501	CP502	CP503	CP511	CP512
Ident. Nr.	1SBP 260170 R1001	1SBP 260171 R1001	1SBP 260172 R1001	1SBP 260173 R1001	1SBP 260174 R1001
Display type	STN-LCD with backlight	STN-LCD with backlight	STN-LCD with backlight	STN-LCD with backlight	S/W-STN-LCD with backlight
Display	Text	Text	Text	graphics and text	graphics and text
Display size	2 lines x 16 characters	2 lines x 20 characters	4 lines x 20 characters	240 x 64 pixels	240 x 128 pixels
Display area W x H (mm)	55.7 x 11.0	73.5 x 11.5	70.4 x 20.8	5.2" 127.2 x 33.9	5.3" 120.0 x 64.0
Text height (mm)	5	5	5	variable	variable
LEDs			5 (2 colors)	16 (2 colors)	16 (2 colors)
Function keys/ other keys	4	3 / 20	5 / 22 (with labels)	8 (with labels)	16 (8 with labeling strip)
Web functions				●	●
Buzzer				●	●
Alarm management			1 group	4 groups	4 groups
Time channel		●	●	●	●
Real-time clock		●	●	●	●
Trend curves				real-time	historical
Data logger					
Recipe management		●	●	●	●
Report printing		●	●	●	●
Password protection		8 levels	8 levels	8 levels	8 levels
Multilanguage support		●	●	●	●
Application memory	16 kB Flash	64 kB Flash	64 kB Flash	400 kB Flash	400 kB Flash
Voltage supply	5 / 24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Current consumption			150 mA	450 mA	450 mA
Ambient temperature	0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 50 °C
Communication interfaces	RS232 oder RS422	RS232, RS422 RS485	RS232, RS422	RS232, RS422 Ethernet	RS232, RS422
Expansion slot	–	–	–	1	1
Degree of protection front cover	IP65	IP65	IP65	IP65	IP65
Dimensions W x H x D (mm)	104 x 69 x 38	142 x 100 x 29	147 x 163,5 x 38	211 x 198 x 69	214 x 232 x 87
Weight (kg)	0.2	0.5	0.7	1.5	1.4
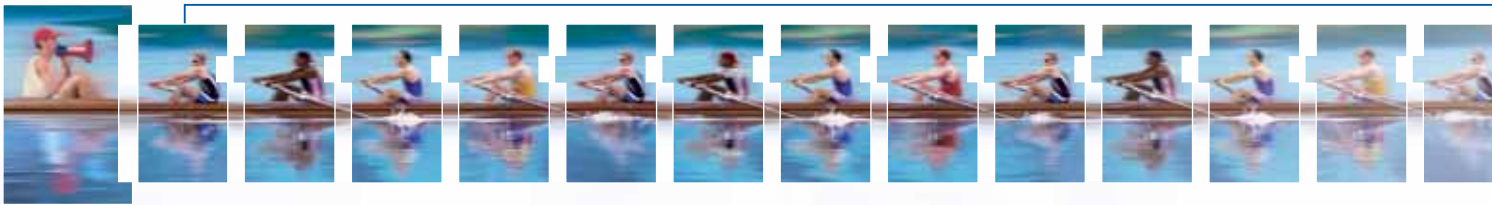
	CP551	CP552	CP554
	1SBP 260176 R1001	1SBP 260177 R1001	1SBP 260178 R1001
	Touch-S/W-STN with backlight	Touch-LCD 16 gray levels	256 Colors TFT touch display
	graphics and text	graphics and text	graphics and text
	320 x 240 pixels	320 x 240 pixels	320 x 240 pixels
	3.8" 78.0 x 58.5	5.7" 115.2 x 86.4	5.7" 115.2 x 86.4
	variable	variable	variable
	●	●	●
	●	●	●
	4 groups	5 groups	5 groups
	●	●	●
	●	●	●
	historical	historical	historical
	●	●	●
	●	●	●
	●	●	●
	8 levels	8 levels	8 levels
	●	●	●
	400 kB Flash	400 kB Flash	400 kB Flash
	24 V DC	24 V DC	24 V DC
	450 mA	400 mA	450 mA
	0 – 50 °C	0 – 50 °C	0 – 50 °C
	Ethernet RS232, RS422 RS485	RS232, RS422/RS485	RS232, RS422/RS485
	-	1	1
	IP65	IP65	IP65
	138 x 100 x 30	200 x 150 x 69	200 x 150 x 69
	1.4	1.5	1.5

Ordering data AC500

The AC500 CPU´s

- 2 serial interfaces integrated, RS232/RS485 configurable
- Display and 8 function keys for diagnosis and status
- Centrally expandable with up to 10 expansion modules locally
- Up to 4 external communication modules simultaneously and in any desired combination
- Optional: SD card for data storage and program backup
- Can also be used as slave on Profibus DP, CANopen and DeviceNet via FieldBusPlug
- Available with communication processors for Ethernet and ARCNET
  (PM5xx-ARC; PMxx-ETH)

AC500 CPUs, type PM571

Type	Program memory	Cycle time in ms 1000 instructions Bit/Word/Float. point	Integrated coupler	Order code	Weight per piece/kg
PM571	64 KB	0.09/0.3/6	-	1SAP 130 100 R0100	0.135
PM571-ETH	64 KB	0.09/0.3/6	Ethernet	1SAP 130 100 R0170	0.15

AC500 CPUs, type PM581 and PM582

Type	Program memory	Cycle time in ms 1000 instructions Bit/Word/Float. point	Integrated coupler	Order code	Weight per piece/kg
PM581	256 KB	0.07/0.07/1.6	-	1SAP 140 100 R0100	0.135
PM581-ETH	256 KB	0.07/0.07/1.6	Ethernet	1SAP 140 100 R0170	0.15
PM581-ARCNET	256 KB	0.07/0.07/1.6	ARCNET	1SAP 140 100 R0160	0.16
PM582	512 KB	0.07/0.07/1.6	–	1SAP 140 200 R0100	0.135
PM582-ETH	512 KB	0.07/0.07/1.6	Ethernet	1SAP 140 200 R0170	0.15
PM582-ARCNET	512 KB	0.07/0.07/1.6	ARCNET	1SAP 140 200 R0160	0.15

AC500 CPUs, type PM590 and PM591

Type	Program memory	Cycle time in ms 1000 instructions Bit/Word/Float. point	Integrated coupler	Order code	Weight per piece/kg
PM590	2048 KB	0.002/0.006/0.006	-	1SAP 150 000 R0100	0.135
PM590-ETH	2048 KB	0.002/0.006/0.006	Ethernet	1SAP 150 000 R0170	0.15
PM590-ARCNET	2048 KB	0.002/0.006/0.006	ARCNET	1SAP 150 000 R0160	0.16
PM591	4096 KB	0.002/0.006/0.006	-	1SAP 150 100 R0100	0.135
PM591-ETH	4096 KB	0.002/0.006/0.006	Ethernet	1SAP 150 100 R0170	0.15
PM591-ARCNET	4096 KB	0.002/0.006/0.006	ARCNET	1SAT 150 100 R0160	0.16

Ethernet communication module
10/100 Mbit/s, full/half duplex with auto-sensing.
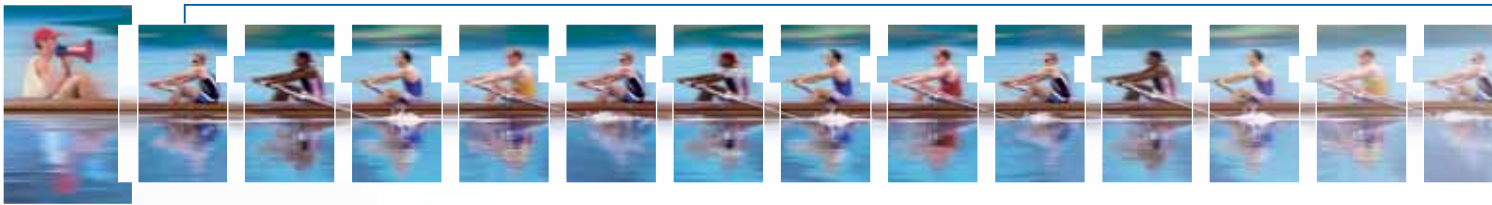2-port switch integrated.
Transport protocols TCP/IP, UDP/IP, Modbus TCP.
CPU interface: 8 kB dual-port memory.
Contains a separate communication processor, 256 kB RAM memory and 512 kB flash memory.
No external power supply required.

Type	Interfaces	Order code	Weight per piece/kg
CM577-ETH	2 x RJ45	1SAP 170 700 R0001	0.115

Profibus DP communication module

For Profi bus DP master V0/V1. Multi master funcitonality. Transfer rate: 9.6 kbit/s up to 12 Mbit/s.
Max. no. of subscribers: 126 (V0) or 32 (V1). CPU interface: 8 kB dual-port memory.
Contains a separate communication processor and 256 kB RAM memory.
No external power supply required.

Type	Interface	Order code	Weight per piece/kg
CM572-DP	Sub-D socket	1SAP 170 200 R0001	0.115

DeviceNet communication module

For DeviceNet master. Transfer rate: 125 kbit/s, 250 kbit/s, 500 kbit/s.
CPU interface: 8 kB dual-port memory.
Contains a separate communication processor, 256 kB RAM memory and 512 kB fl ash memory.
No external power supply required.

Type	Interface	Order code	Weight per piece/kg
CM575-DN	Plug-in terminal block, spring-type terminals	1SAP 170 500 R0001	0.115

CANopen communication module

For CANopen master. Transfer rate: 10 kbit/s up to 1 Mbit/s.
CPU interface: 8 kB dual-port memory.
Contains a separate communication processor, 256 kB RAM memory and 512 kB fl ash memory.
No external power supply required.

Type	Interface	Order code	Weight per piece/kg
CM578-CN	Plug-in terminal block, spring-type terminals	1SAP 170 800 R0001	0.115

Terminal base

For mounting and connection of the CPUs and communication modules
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
Connection COM1: 9-pole pluggable terminal block
Connection COM2: 9-pole SUB-D (socket)

Type	Number of coupler slots	Connection for coupler integrated in the CPU	Order code	Weight per piece/kg
TB511-ETH	1	Ethernet RJ45	1SAP 111 100 R0170	
TB511-ARCNET	1	ARCNET COAX	1SAP 111 100 R0160	
TB521-ETH	2	Ethernet RJ45	1SAP 112 100 R0170	0.215
TB521-ARCNET	2	ARCNET COAX	1SAP 112 100 R0160	
TB541-ETH	4	Ethernet RJ45	1SAP 114 100 R0170	

Interface modules

For decentralized I/Os

DC505-FBP	Communication via FieldBusPlug with Profi bus DP or DeviceNet (in preparation: CANopen)
	Fieldbus-dependent FieldBusPlug required
DC551-CS31	Communication via internal interface with CS31 system bus
	Plug-in electronic modules, terminal block TU551 or TU552 required
	DC: Channels can be confi gured individually as inputs or outputs

Type	Number of DI/DO/DC	Input signal	Output signal	Order code	Weight per piece/kg
DC505-FBP	8/–/ 8	24 V DC	Trans. 24 V DC, 0.5 A	1SAP 220 000 R0001	0.3
DC551-CS31	8/ –/16	24 V DC	Trans. 24 V DC, 0.5 A	1SAP 220 500 R0001	0.3

Ordering data AC500

Digital input/output modules
- For central expansion of the AC500 CPUs (up to 10 digital or analog modules in any combination)
- For decentralized expansion in combination with interface module DC505-FBP or DC551-CS31 (up to 7 digital or analog modules with a maximum of 4 analog modules)
- Plug-in electronic modules, terminal block required (refer to table below)
- Exception: DC541 (occupies one communication module slot on the CPU terminal base, no terminal block required)
- DC: Channels can be confi gured individually as inputs or outputs.

Type	Number of DI/DO/DC	Input signal	Relay/ transistor outputs	Output signal	Order code	Weight per piece/kg
DI524	32 /–/–	24 V DC	–	–	1SAP 240 000 R0001	0.2
DC522	–/–/16	24 V DC	Transistor	24 V DC, 0.5 A	1SAP 240 600 R0001	0.2
DC523	–/–/24	24 V DC	Transistor	24 V DC, 0.5 A	1SAP 240 500 R0001	0.2
DC532	16/–/16	24 V DC	Transistor	24 V DC, 0.5 A	1SAP 240 100 R0001	0.2
DX522	8/8/–	24 V DC	Relay	230 V AC, 3 A[1]	1SAP 245 200 R0001	0.3
DX531	8/4/–	230 V AC	Relay	230 V AC, 3 A[1]	1SAP 245 000 R0001	0.3
DC541-CM[2]	–/–/8	24 V DC	Transistor	24 V DC, 0.5 A	1SAP 270 000 R0001	0.1

[1] Relay outputs, changeover contacts
[2] Multifunctional module, refer to table on page 29 for details

Analog input/output modules
- For central expansion of the AC500 CPUs (up to 10 digital or analog modules in any combination)
- For decentralized expansion in combination with interface module DC505-FBP or DC551-CS31 (up to 7 digital or analog modules with a maximum of 4 analog modules)
- Plug-in electronic modules, terminal block required (refer to table below)
- Each channel can be confi gured individually
- Resolution: 12 bits + sign

Type	Number of AI/AO	Input signal	Output signal	Order code	Weight per piece/kg
AI523	16 / 0	0 ... 10 V, ±10 V	-	1SAP 250 300 R0001	0.2
AX521	4 / 4	0/4 ... 20 mA		1SAP 250 100 R0001	0.2
AX522	8 / 8 (max. 4 current outputs)	Pt100, Pt1000 Ni1000	±10 V 0 /4 ... 20 mA	1SAP 250 000 R0001	0.2
AO523	0 / 16 (max. 8 current outputs)	-		1SAP 250 200 R0001	0.2

Terminal blocks
For digital and analog expansion modules and interface modules.
Please note: For modules with relay outputs, terminal blocks for 230 V AC (TU531/TU532) are required!
For the module-terminal block assignments, please consult the table!

	for I/O modules				for interface modules			
	TU515 screw-type	TU516 spring-type	TU531 screw-type	TU532 spring-type	TU505-FBP screw-type	TU506-FBP spring-type	TU551-CS31 screw-type	TU552-CS31 spring-type
DI524	x	x						
DC522	x	x						
DC523	x	x						
DC532	x	x						
DX522			x	x				
DX531			x	x				
AI523	x	x						
AX521	x	x						
AX522	x	x						
AO523	x	x						
DC505-FBP					x	x		
DC551-CS31							x	x
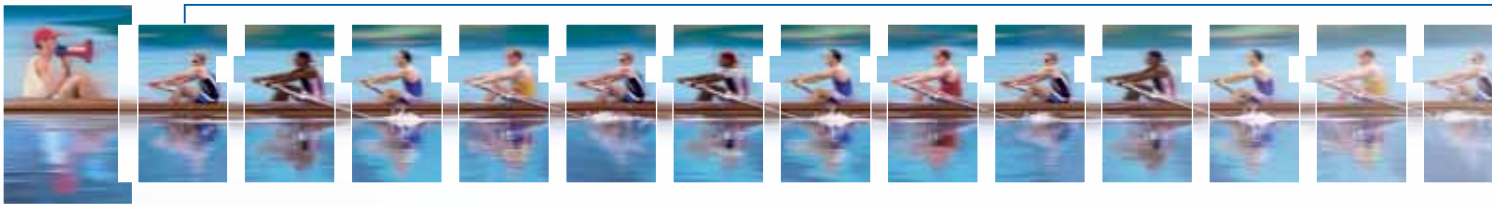
Type	for	Supply	Connection type	Order code	Weight per piece/kg
TU505-FBP	FBP interface modules		Screw-type terminals	1SAP 210 200 R0001	0.3
TU506-FBP	FBP interface modules		Spring-type terminals	1SAP 210 000 R0001	0.3
TU515	I/O modules	24 V DC	Screw-type terminals	1SAP 212 200 R0001	0.3
TU516	I/O modules	24 V DC	Spring-type terminals	1SAP 212 000 R0001	0.3
TU531	I/O modules AC / relay	230 V AC	Screw-type terminals	1SAP 217 200 R0001	0.3
TU532	I/O modules AC / relay	230 V AC	Spring-type terminals	1SAP 217 000 R0001	0.3
TU551-CS31	CS31 interface modules	24 V DC	Screw-type terminals	1SAP 210 600 R0001	0.3
TU552-CS31	CS31 interface modules	24 V DC	Spring-type terminals	1SAP 210 400 R0001	0.3

Accessories for AC500

Type	for	Description	Order code	Weight per piece/kg
TK501	AC500 CPUs COM2	Programming cable Sub-D/Sub-D, length 5 m	1SAP 180 200 R0001	0.4
TK502	AC500 CPUs COM1	Programming cable Sub-D/ terminal block, length 5 m	1SAP 180 200 R0101	0.4
UTF21-FBP	Cable for programming the AC500 via the integrated fieldbus neutral interface	Connection to PC via USB interface. Includes USB extension cable and installation CD.	1SAJ 929 400 R0001	0.1
MC502	AC500 CPUs	Memory card (SD card) 128 MB	1SAP 180 100 R0001	0.1
TA521	AC500 CPUs	Lithium battery for data buffering	1SAP 180 300 R0001	0.1
TA523	I/O modules	Pluggable marker holder for I/O modules, packing unit incl. 10 pcs.	1SAP 180 500 R0001	0.3
TA524	Terminal base	Communication module, dummy housing	1SAP 180 600 R0001	
TA525	I/O modules	White labels, packing unit incl. 10 pcs.	1SAP 180 700 R0001	0.1
TA526	CPU terminal base	Accessories for back plate mounting, packing unit incl. 10 pcs.	1SAP 180 800 R0001	0.2
TA527	CPU terminal base	5-pole power plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1. Packing unit incl. 5 pcs.	1SAP 181 100 R0001	0.2
TA528	CPU terminal base	9-pole COM1 plug for AC500. Spare part. Can be plugged to CPU terminal base TB5x1. Packing unit incl. 5 pcs.	1 SAP 181 200 R0001	0.2

Programming package PS501 Control Builder

For all AC500 CPUs
All programming languages according to IEC 61131-3

Contains: 5 programming languages, sampling - trace, debugging, offline simulation, integrated visualization, trace recording (multi-channel), recipe management, Continuous Function Chart
Languages: English, German, Spanish, French, Italian, Russian, Chinese
Scope of delivery: Software, libraries and documentation (PDF) on CD-ROM

Type	for	Description	Order code	Weight per piece/kg
PS501-PROG	all AC500 CPUs	Programming package PS501 Control Builder AC500	1SAP 190 100 R0002	0.3
PS541-HMI		License for runtime visualization package. For installation and visualization of images created with the programming package PS501. Delivery includes license code and documentation.	1SAP 190 500 R0001	0.3

Ordering data CP400

Operator panels with graphics display
LCD screen with backlight

Type	Pixels	Display	Order code	Weight p. piece/kg
CP410 M	160 x 80	3", 16 gray levels	1SBP 260 181 R1001	0.65

Operator panels with touch display

Type	Pixels	Display	Order code	Weight p. piece/kg
CP420 B	320 x 240	4,7", 16 blue levels	1SBP 260 182 R1001	0.47
CP430 B	320 x 240	5,7", 16 blue levels	1SBP 260 183 R1001	0.81
CP420 B-ETH	320 x 240	5,7", 16 blue levels	1SBP 260 184 R1001	0.81
CP430 C	320 x 240	5,7", 256 color STN	1SBP 260 185 R1001	0.81
CP430 C-ETH	320 x 240	5,7", 256 color STN	1SBP 260 186 R1001	0.81
CP440 C-ETH	640 x 480	7,7", 64.000 color STN	1SBP 260 187 R1001	1.20
CP450 T	640 x 480	10,4", 64.000 color TFT	1SBP 260 188 R1001	1.90
CP450 T-ETH	640 x 480	10,4", 64.000 color TFT	1SBP 260 189 R1001	1.90

Programming cables CP400

Type	Plug on CP400 side	Description	Order code	Weight p. piece/kg
TK401	SubD9	Connection to COM1 of CP400. Length: 4 m	1SBN 260 216 R1001	0.18
TK402	SubD25	Connection to COM2 of CP400. Length: 4 m	1SBN 260 217 R1001	0.23

Communication cables CP400 (connection operator panel <-> PLC)

Type	Plug on PLC side	PLC	Order code	Weight p. piece/kg
TK403	MiniDin	AC31 Series 40..50	1SBN 260 218 R1001	0.12
TK404	SubD9	AC31 Series 90	1SBN 260 220 R1001	0.12
TK405	SubD9	AC500	1SBN 260 221 R1001	0.13

Programming software

Type	Description	Order code	Weight p. piece/kg
CP400Soft	Programming software for CP400 operator panels. Delivery includes the programming software and corresponding documentation on CD-ROM.	1SBS 260 284 R1001	0.07
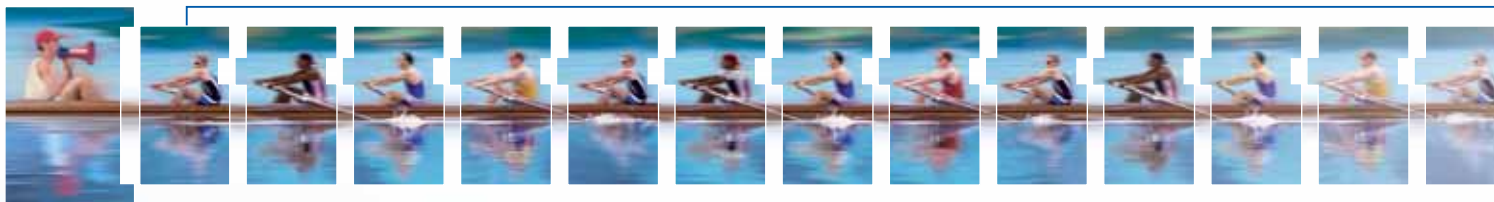
Ordering data CP500

Operator panels with text display

Type	Lines	Charact. per line	Function keys / other keys	LEDs	Interfaces	Order code	Weight p. piece/kg
CP501	2	16	4		RS232 or RS422	1SBP 260 170 R1001	0.1
CP502	2	20	3 / 20		RS232, RS422, RS485	1SBP 260 171 R1001	0.5
CP503	4	20	5 / 22	5	RS232, RS422	1SBP 260 172 R1001	0.7

Operator panels with graphics display

Type	Pixels	Function keys / other keys	LEDs	Interfaces	Order code	Weight p. piece/kg
CP511	240 x 64	8 / 22	16	RS232, RS422	1SBP 260 173 R1001	1.5
CP512	240 x 128	6 / 22	16	RS232, RS422	1SBP 260 174 R1001	1.4

Operator panels with touch display

Type	Pixels	Display	Interfaces	Order code	Weight p. piece/kg
CP551	320 x 240	B/W - STN	RS232, RS422, RS485	1SBP 260 176 R1001	1.4
CP552	320 x 240	B/W - STN	RS232, RS422, RS485	1SBP 260 177 R1001	1.5
CP554	320 x 240	Color TFT	RS232, RS422, RS485	1SBP 260 178 R1001	1.5

Programming cables

Type	Interface	Order code	Weight p. piece/kg
CAB5	RS232	1SBN 260 210 R1001	
CAB6	RS232/RS422 converter	1SBN 260 211 R1001	

Communication cables

Type	Controller	Order code	Weight p. piece/kg
CAB45	Series 40 / 50 MiniDin	1SBN 260 213 R1001	
CAB90	Series 90	1SBN 260 214 R1001	
CAB8	RS422/RS485 converter	1SBN 260 212 R1001	
CAB57	Series AC500 SubD9	1SBN 260 215 R1001	

Programming software for operator panels CP5xx

Type	Description	Order code	Weight p. piece/kg
CPsoft	Software, documentation on CD	1SBS 260 283 R1001	

Dimensions

CPU terminal base TB511, TB521 and TB541

| 40.3 (1.59) | 57.7 (2.27) | 4.9 (0.19) |

59 (2.32)
70.5 (2.78)
135 (5.31)

28 (1.10) | 28 (1.10) | 28 (1.10) | 28 (1.10) | 67.5 (2.66)

Dimensions:
135 mm
(5.31) inches

TB511   95.5 (3.76)
TB521   123.5 (4.86)
TB541   179.5 (7.07)

84.5 (3.33)
77 (3.03)
75 (2.95)
13 (0.51)
62 (2.44)
59 (2.32)
76 (2.99)
135 (5.31)

DIN rail 15 mm
DIN rail 7.5 mm

28 (1.10)

View on the left side

Dimensions:
135 mm
(5.31) inches

I/O expansion and interface module terminal unit

DC505

57.7 (2.27)

59 (2.32)
70.5 (2.78)
135 (5.31)

67.5 (2.66)
TU505/506

67.5 (2.66)
TU515/516/531/532

Dimensions:
135 mm
(5.31) inches

84.5 (3.33)
77 (3.03)
75 (2.95)
21 (0.83)
54 (2.13)
70.5 (2.78)
59 (2.32)
76 (2.99)
135 (5.31)

DIN rail 15 mm
DIN rail 7.5 mm

28 (1.10)

View on the left side

View on the right side

Dimensions:
135 mm
(5.31) inches

Relevant approvals

Like all ABB products, the AC500 components, are tested in conformity with the applicable European, North American and international guidelines, and approved by the organizations responsible. For the applicable approvals please refer to our ABB web site or contact your local ABB representative.

Certified quality

The entire process involved in creating an ABB product – from the original idea to the actual sale – is, of course, monitored by a quality management process certified under DIN ISO 9001.

In harmony with the natural environment

Protection of the natural environment is integral to ABB's corporate philosophy. This includes both resource-economy and the avoidance of problematical substances, plus recycling-friendly construction and long-lived products. These aspects are taken fully on board by an integrated eco-management system conforming to ISO 14001, whose implementation is repeatedly verified by regular eco-audits. And for newly developed products ABB now conducts a lifecycle assessment as well.

Comprehensively customer support

ABB draws upon its long years of experience in low-voltage engineering to provide you with a comprehensive range of support services available worldwide. You can call upon contact persons in our country sales offices. For all questions to do with automation engineering you can also contact our consultants by phone or fax.

Special seminars and training courses are offered for many ABB products and systems, not least covering the automation of machinery and production lines. On request, we will also be pleased to provide on-the-spot training at your own premises. Just talk to your regional consultant.

ABB

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