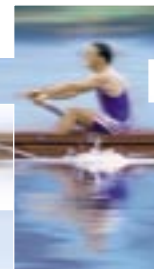
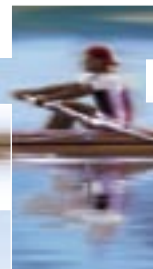
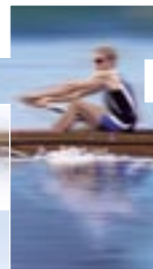
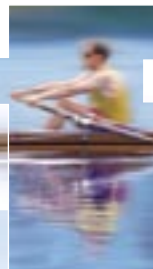
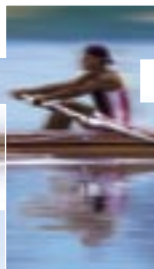


AC500 – the scalable PLC for customized automation

Technical information



ABB

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

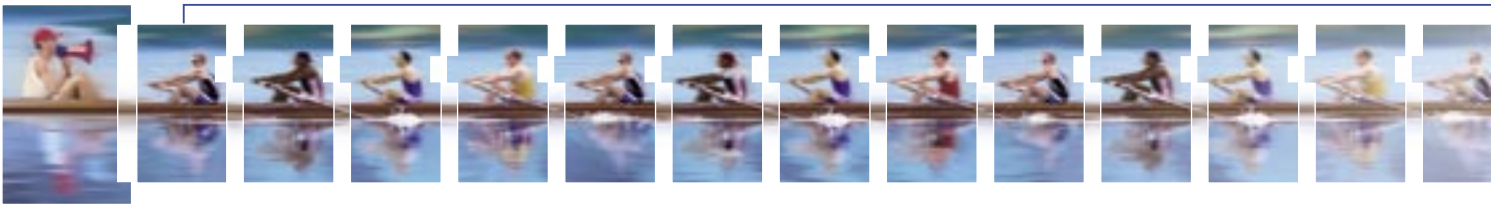
Customers' requirements met to perfection

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

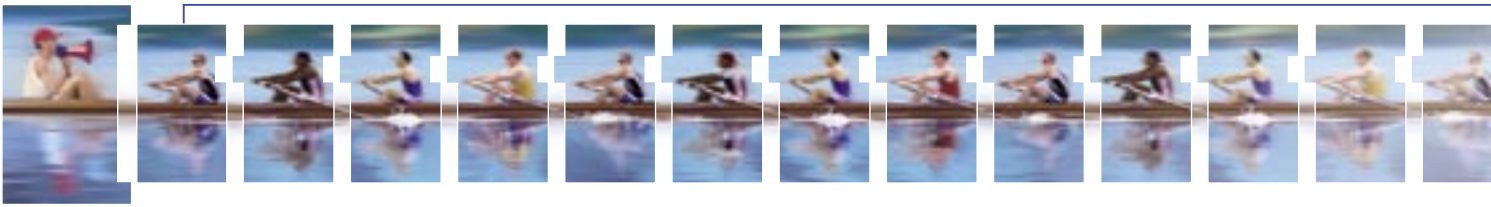


Motor Starter



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 Proximity Switches



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

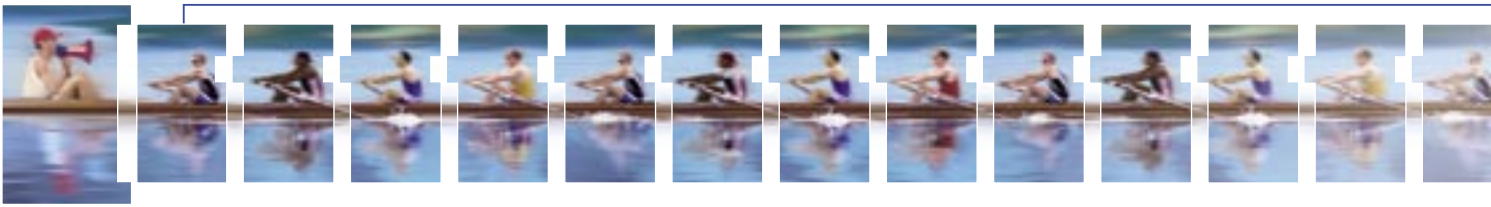
The CPUs

are available in the performance classes PM571, PM581 and PM591, can all be programmed in five different languages, and provide an LCD display, an operator keypad, an SD card slot, and two integrated 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 communication 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. seven 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 FBP connector. For decentralized expansion by up to seven I/O modules.

The SD card

Optional for data logging, downloading and uploading the user program without a PC or a firmware update for all devices (CPU, couplers or I/O modules).



- 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 FBP interface (for slave)
- 6 Two serial interfaces for programming, ASCII, Modbus or CS31 field bus (master)
- 7 Expandable by up to seven local I/O modules

AC500 grows to meet requirements

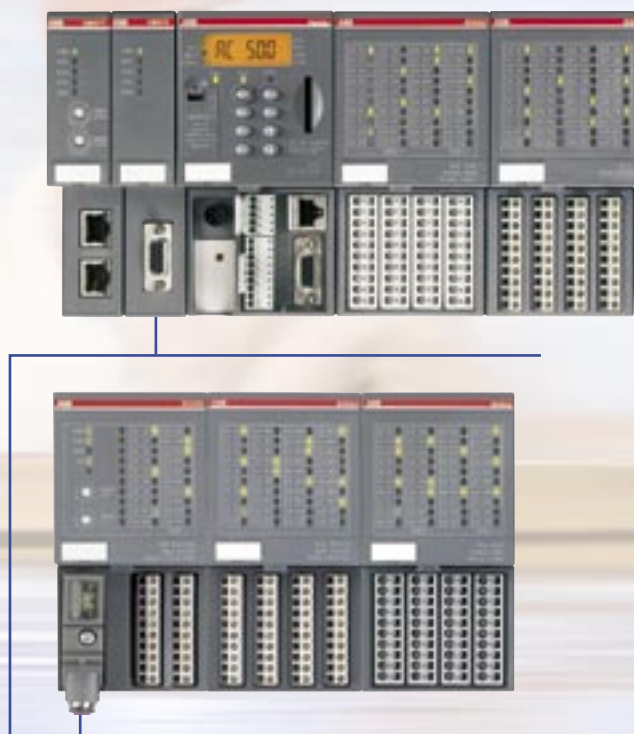
Control + communication:

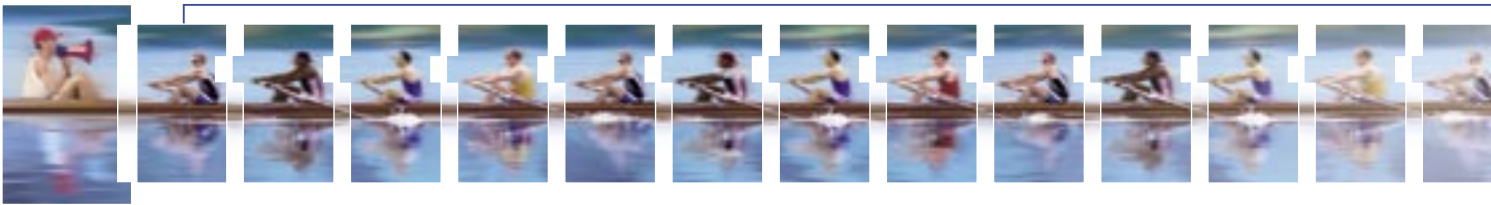


Centralized expansion:



Decentralized expansion:





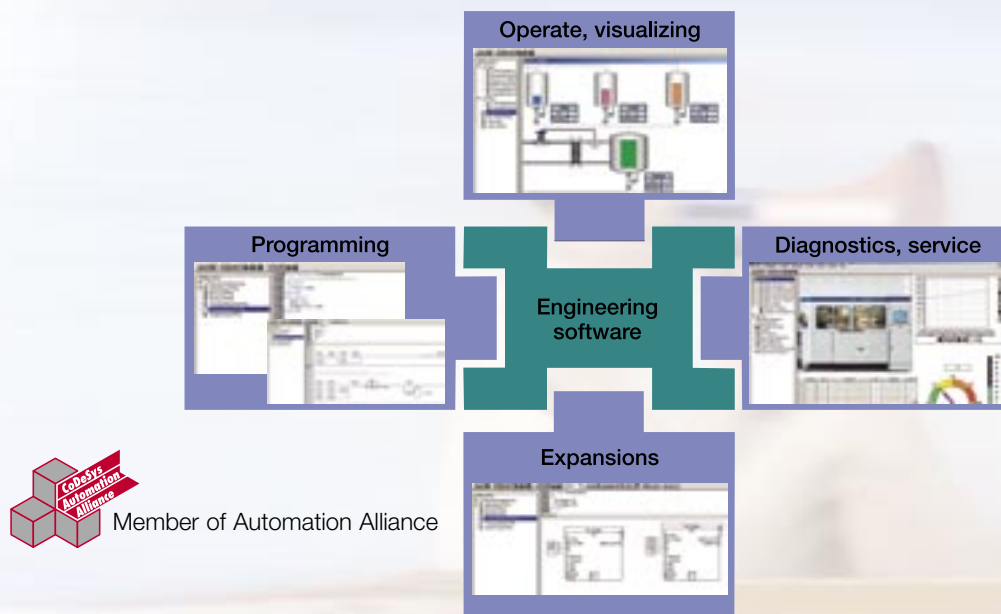
Networked and communicative



Programming

Control Builder AC500

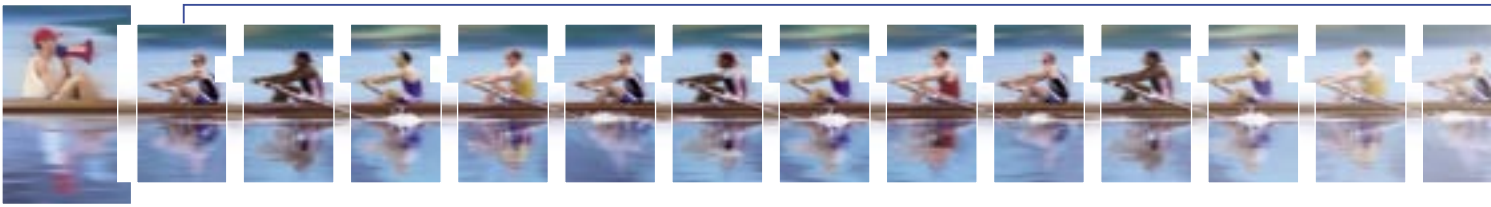
Control Builder AC500 is the engineering tool for all CPU performance classes of the AC500, designed for standardized IEC 61131-3 programming in five different languages. Other features of this tool are: Configuration of the overall system including field buses and interfaces, extensive diagnostic functions, alarm handling, integrated visualization and open software interfaces.



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



Offline simulation

IEC 61131-3 commands can be simulated without a PLC being connected, including the relevant mal-functions. 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. Pre-defined 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.

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.

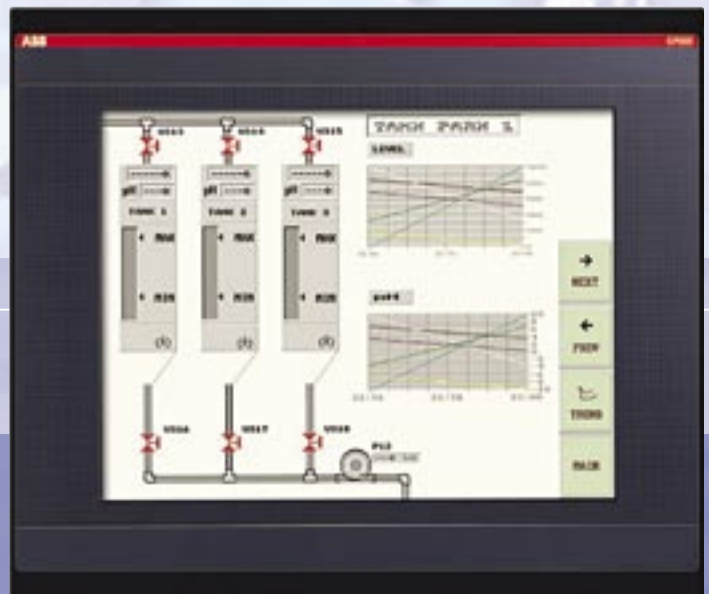
- Comprehensive libraries.
- Windows 32-bit standard.
- Operating systems Windows NT, 2000 and XP.

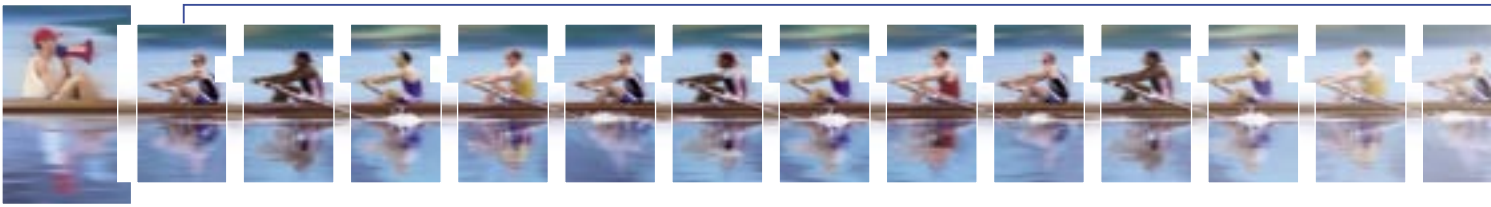
CP500 – the operator interfaces

Obvious man-machine communication

The AC500 offers as well an extensive range of products for communication between operator and machine.

There are 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.

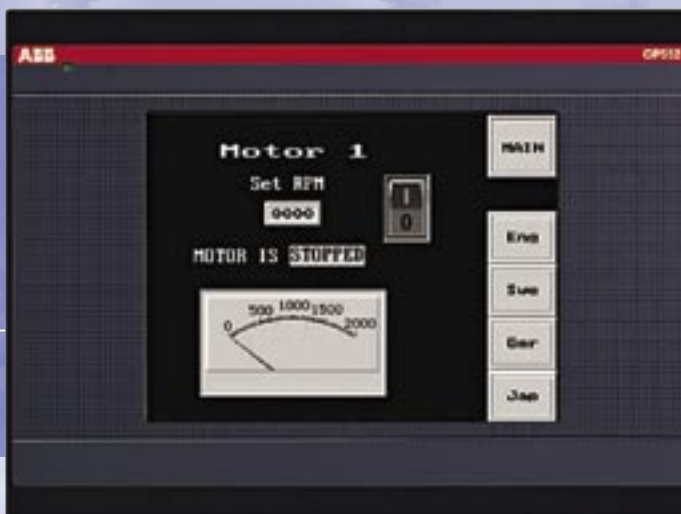
Configuration is quick and easy to perform, using the same software for all devices. Commands and programming languages are identical for all devices. With regard to frequently harsh conditions at the place of installation, all operator panels fulfill IP65 protection at the front.

Operator panels and automation devices are linked either simply via serial interfaces, or in case of complex applications via Ethernet, Modbus or PROFIBUS DP.

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



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

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.

EtherNet™

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.

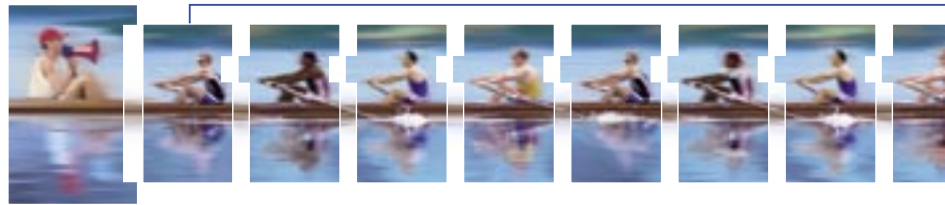
Transmission media

Twisted-pair cables with RJ45 connector. The maximum cable length is 100 m for 100 MB/s.

Diagnostics

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

In addition, the device status is indicated at the communication module by four LEDs.



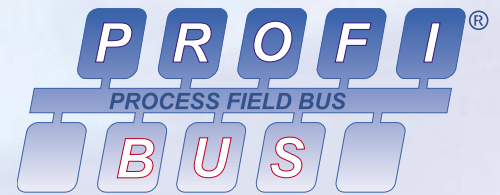
Communication – PROFIBUS DP

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

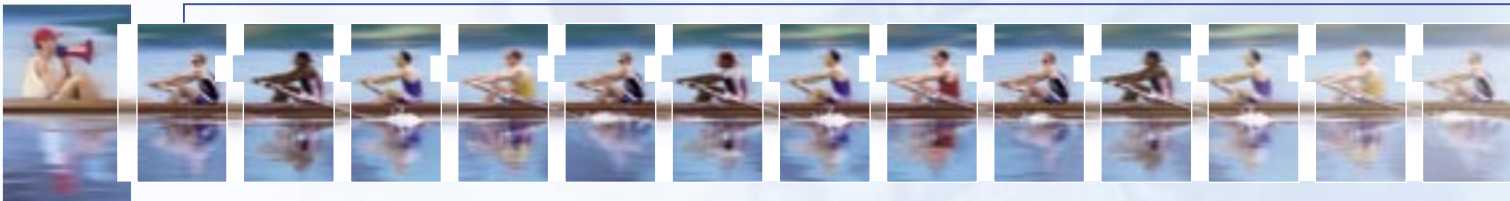
This is handled predominantly in cyclical mode between master and slave. The requisite communication functions have been specified by the PROFIBUS DP basic functions in accordance with EN 50170. Each master has full write and read access to its assigned slaves, but only read access to the slaves assigned 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.

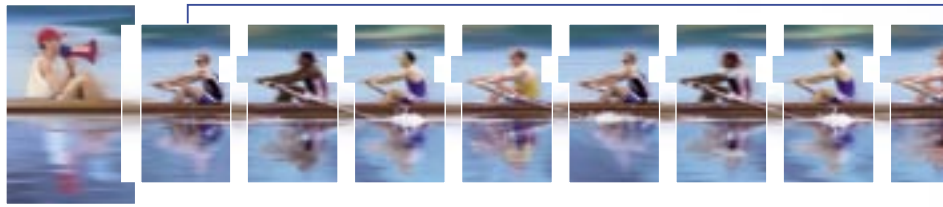
PROFIBUS DP – the functionality at a glance

- Max. 126 subscribers via amplifier and max. 32 subscribers (master/slaves) per bus segment
- Data transmission rate from max. 12 MBit/s with a cable length of 100 m, up to 93.75 kBit/s with 1200 m
- Multi-master or master/slave communication. Bus access of the masters using token
- Connection of the master CPU and the associated communication module via a 9-pole SUB-D plug connector. Connection of slaves (CPU, I/Os and intelligent switching devices) via FieldBusPlug
- The system cable is a shielded twisted-pair line or a fiber-optic cable; transmission standard EIA RS485

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 – 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. 187.5 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.

Communication – CANopen and DeviceNet

The logo for CANopen, featuring the word "CAN" in a bold, dark green font and "open" in a lighter green, lowercase font.The logo for DeviceNet, featuring a yellow sphere above a blue swoosh, with the text "DeviceNet™" in a bold, blue font.

CANopen (Controller Area Network) and DeviceNet

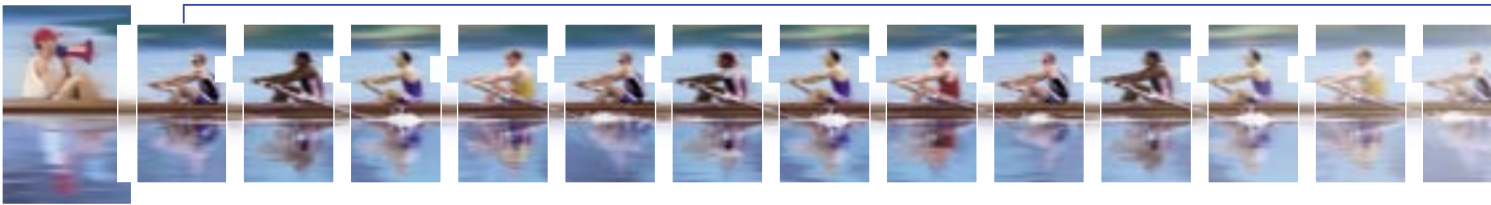
The CAN protocol was originally developed for the European automotive industry, so as to replace expensive cabling by an affordable network cable. Today, it is also used in the field of automation for transmitting process data between control systems, decentralized I/O modules, drives, valves, etc. CAN 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), via the CANopen-FBP plug connector.

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.

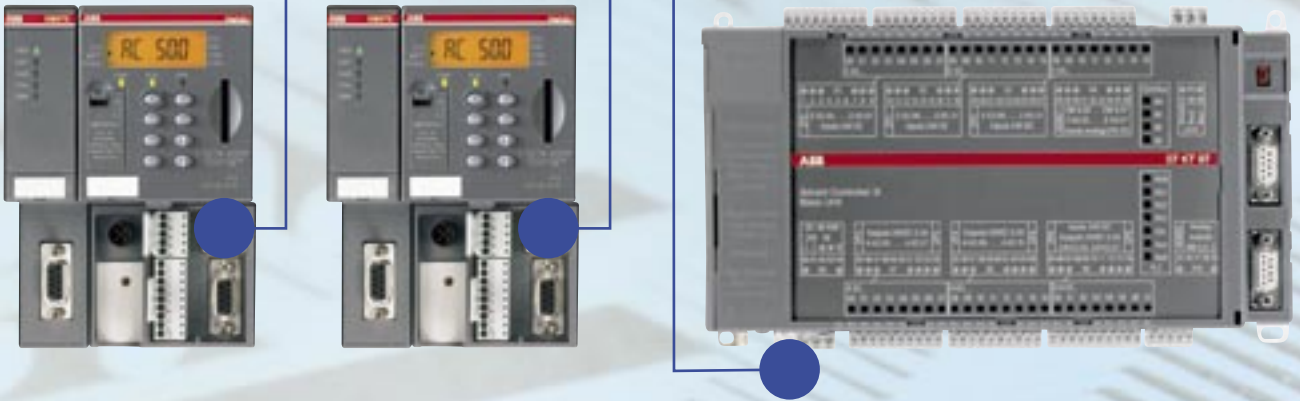
Transmission rate	125 kBit/s	250 kBit/s	500 kBit/s
Max. cable length of trunk line Trunk cable	500 m (1610 ft)	250 m (820 ft)	100 m (328 ft)
Max. cable length of trunk line Drop cable	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)
Max. cable length per branch line Trunk cable/Drop cable	6 m (20 ft)	6 m (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 troubleshooting are shown on the CPU display. In addition, the device status is indicated at the communication module by four LEDs.

Communication – ARCNET

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

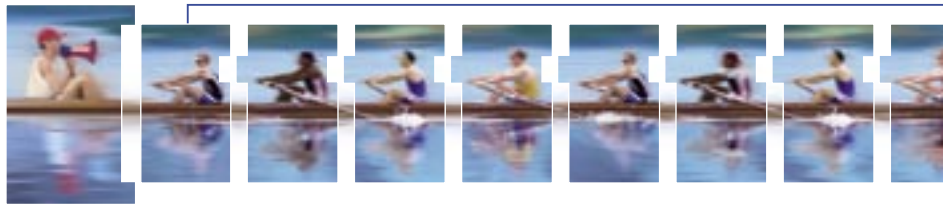
ARCNET is one of the few networks that can be operated in every conceivable topology. Options include bus, star, or tree topologies, or mixtures of these. This means that ARCNET can be used for a broad field of different applications.

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.



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.

ARCNET – the functionality at a glance

- Guaranteed collision-free data transmission, guaranteed response times and real-time capability thanks to token-passing
- Large network dimensions: network length 300 m, with amplifier max. 16 km
- Secure, thanks to checksums in the data packet and handshake protocol between transmitter and receiver
- Variable network structure: bus, tree and star topologies are possible, plus any desired mixtures of them
- Variable networking media, coaxial cables, twisted-pair cables and fiber-optic cables can be mixed
- Automatic subscriber log-on and log-off; the network automatically incorporates new stations in the ring and cancels them as well
- Master-master access: the subscriber that holds the token is the master. With up to 255 masters at the same network
- Data transmission rate of max. 2.5 MBit/s
- ARCNET is configured and programmed using the AC500 Control Builder engineering tool

Communication – CS31

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

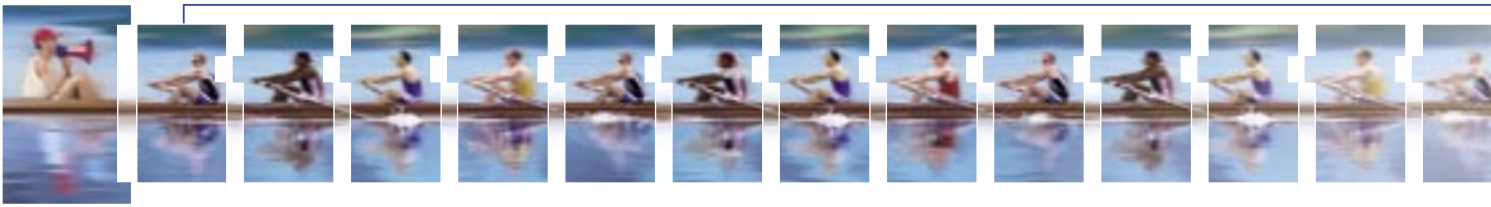
CS31 is a proprietary master/slave field bus. It is characterized by simple handling, easy configuration, and inexpensive installation. The COM1 interface of the AC500 can be configured as a CS31 field bus master.

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.



CS31



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.

Diagnostics

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

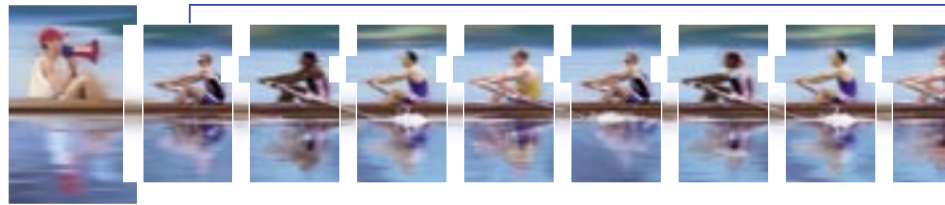
Transmission medium

Primarily a twisted-pair, shielded cable with terminators. 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.

Scalable automation system

AC500

DetailsType:	PM571	PM571-ETH	PM581	PM581-ETH	PM581-ARC	PM591	PM591-ETH	PM591-ARC
Supply voltage 24 V DC	24 V DC		24 V DC			24 V DC		
Total memory								
SDRAM (kByte)	4026		8192			32768		
Flash (kByte)	1024		2048			8192		
SRAM (kByte)	128		512			2048		
Program memory								
Flash EPROM und RAM [kByte]	64		256			4096		
Data memory integrated [kByte]	21, incl. 1 KB RETAIN		288, incl. 32 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	0.3		0.15			0.05		
Word	0.3		0.15			0.05		
Floating-point	6		3			0.5		
Number of centralized inputs/outputs max.								
Binary inputs	224		224			224		
Binary outputs	168		168			168		
Analog inputs	112		112			112		
Analog outputs	112		112			112		
Number of decentralized inputs/outputs max.	depends on used field bus							
Data buffering	Battery		Battery			Battery		
Real-time clock	x		x			x		
Program execution								
Cyclical	x		x			x		
Time-controlled	x		x			x		
Multitasking	x		x			x		
User program protection by password	x		x			x		
Interfaces integrated								
COM1:								
RS232/RS485 configurable Connection	x		x			x		
Prog., Modbus, ASCII, CS31	Terminal block		Terminal block			Terminal block		
	x		x			x		
COM2:								
RS232/RS485 configurable Connection	x		x			x		
Prog., Modbus, ASCII	SUB-D		SUB-D			SUB-D		
	x		x			x		
Ethernet coupler integrated								
Connection Ethernet	x		x			x		
	RJ45		RJ45			RJ45		
ARCNET coupler integrated								
Connection ARCNET			x			x		
			Coax			Coax		
Display and 8 function keys	x		x			x		
Function	RUN/STOP		RUN/STOP			RUN/STOP		
	Status, diagnostics		Status, diagnostics			Status, diagnostics		
Timers	unlimited		unlimited			unlimited		
Counters	unlimited		unlimited			unlimited		
Function Block Diagram (FBD)	x		x			x		
Instruction List (IL)	x		x			x		
Ladder Diagram (LD)	x		x			x		
Structured Text (ST)	x		x			x		
Sequential Function Chart (SFC)	x		x			x		
Continuous Function Chart (CFC)	x		x			x		
Approvals	CE, GL, DNV, BV, RINA, LRS, cUL							

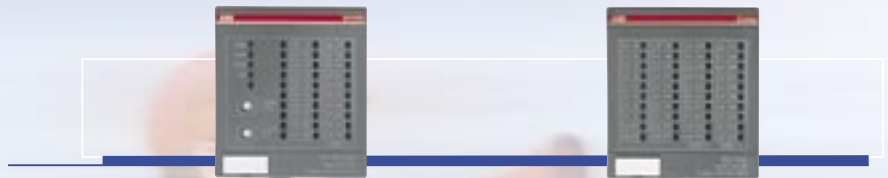


Binary I/O modules	DI524	DC532	DX522	DX531
Supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
Number of binary inputs and outputs DI/DO/DC (configurable channels)	32/-/-	16/-/16	8/8/-	8/4/-
Input voltage	24 V DC	24 V DC	24 V DC	120 / 230 V AC
Input time-delay ms	typ. 8 configurable 0,1/1/8/32	typ. 8 configurable 0,1/1/8/32	typ. 8 configurable 0,1/1/8/32	typ. 20
Inputs as fast counters*	2	2	2	
Counting frequency kHz max.	50	50	50	
counter operating modes	1 up counter 1 up counter w. release 1 up-down counter 2 up-down counter 1 up-down counter with direction detection	1 up counter 1 up counter w. release 1 up-down counter 2 up-down counter 1 up-down counter with direction detection	1 up counter 1 up counter w. release 1 up-down counter 2 up-down counter 1 up-down counter with direction detection	
Outputs Transistor 24 V DC, 0,5 A Relay 230 V AC, 3 A		x	x ¹⁾	x ¹⁾
Total current per module		6 A		
Short-circuit/overload protection		yes		
Potential isolation	per module	per module	per module	per module
Notes	¹⁾ changeover contacts	*when local I/O modules		

Analog I/O modules	AX522
Supply voltage	24 V DC
Number of analog inputs	8
Input ranges	0 ... 10 V ±10 V 0 ... 20 mA 4 ... 20 mA Pt100 -50 ... +70 °C 2/3-wire Pt100 -50 ... +400 °C 2/3-wire Pt1000 -50 ... +400 °C 2/3-wire Ni1000 -50 ... +150 °C 2/3-wire digital input 24 V DC
Number of analog outputs	8
Output ranges	±10 V 0 ... 20 mA 4 ... 20 mA (max. 4 current outputs)
Short-circuit/overload protection	x
Resolution	12 bit + sign, temperature 0.1 °C
Potential isolation	per module
Status indication for each input/output	LED yellow, brightness depends on signal input/output



Scalable automation system AC500

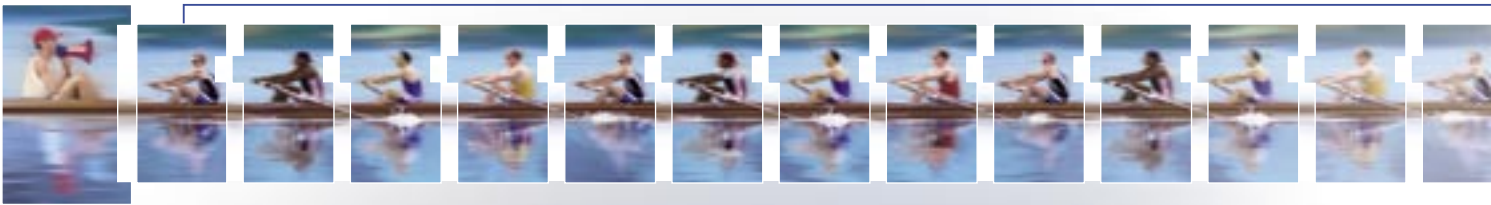


Interface modules	DC505-FBP	DC551-CS31
Field buses	PROFIBUS DP ^{*)} CANopen ^{*)} DeviceNet ^{*)} Modbus RTU ^{*)}	CS31
Interface	via FBP	integrated
Supply voltage	24 V DC	24 V DC
Number of binary inputs and outputs DI/DO/DC (configurable channels)	8/-/8	8/-/16
Input voltage	24 V DC	24 V DC
Input time-relay	configurable 0.1/1/8/32 ms	configurable 0.1/1/8/32 ms
Outputs transistor Output voltage/current	24 V DC/0,5 A	24 V DC/0,5 A
Total current per module	4 A	8 A
Short-circuit/overload protection	yes	yes
Operating state indicators		
Supply voltage FBP	LED green	LED green
FBP communication	LED green	
CS31 communication		LED green
Sumcheck error	LED red	LED red
I/O bus communication	LED green	LED green
Status indication for each input/output	LED yellow	LED yellow
Supply voltage I/Os	LED green	LED green
Fault indicator I/Os	LED red	LED red
Potential isolation	from the bus per module	from the bus per module

Operating and environmental conditions

^{*)} depending on the FBP; the module itself is field-bus-neutral

Voltages according to EN 61131-2		
24 V DC	Process and supply voltage	24 V DC (-15%, +20% without residual ripple)
	Absolute limits	19,2 V ... 30 V incl. residual ripple
	Residual ripple	< 5 %
	Polarity reversal protection	10 s
120 V AC	Supply voltage	120 V AC (-15%, +10%)
	Frequency	47 Hz ... 62,4 Hz/50 ... 60 Hz (-6%, +4%)
230 V AC	Supply voltage	230 V AC (-15%, +10%)
	Frequency	47 Hz ... 62,4 Hz/50 ... 60 Hz (-6%, +4%)
120–240 V AC	Wide voltage input	
	Voltage	102 V ... 264 V/120 V ... 240 V (-15%, +10%)
	Frequency	47 Hz ... 62,4 Hz/50 ... 60 Hz (-6%, +4%)



System data

Power failure bridging time according to EN 61131-2		
Temperature	DC-supply	Failure < 10 ms, time between 2 failures > 1 s
	AC-supply	Failure < 0,5 periods, time between 2 failures > 1 s
Humidity Air pressure	Operation	0 °C ... +55 °C
	Storage	-25 °C ... +75 °C
	Transport	-25 °C ... +75 °C
		50 ... 95 %, without condensation
	Operation	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m

Creepage distances and clearances

The creepage and clearance distances correspond to Overvoltage Category II, Pollution Severity 2

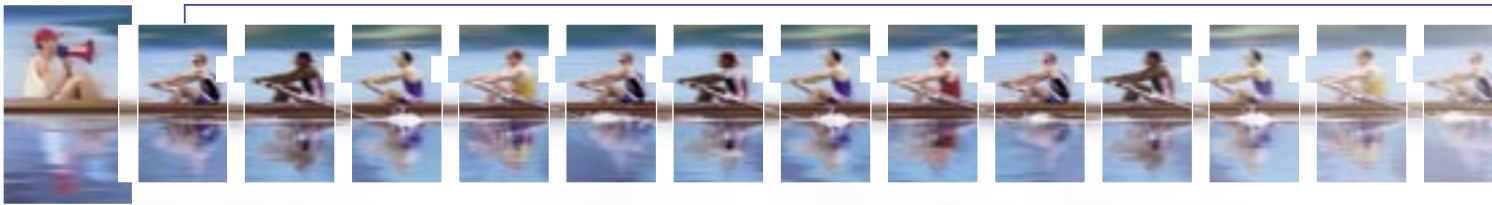
Electromagnetic compatibility Interference immunity against electrostatic discharge (ESD) Interference voltage with air discharge Interference voltage with contact discharge	acc. to EN 61000-4-2, Zone B, Criteria B 8 kV 6 kV
Interference immunity against radiated interference (CW radiated) Test field 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 interference 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	acc. to EN 55011, Group 1, Class A horizontal IP 20 acc. to UL 94 all three axes 2 Hz ... 15 Hz, continuous 3,5 mm 15 Hz ... 150 Hz, continuous 4 g 15 Hz ... 150 Hz, continuous 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

Operating and displaying

Operator panels CP500 – Overview



	CP501	CP502	CP503	CP511	CP512
Ident. No.	1SBP 260 170 R1001	1SBP 260 171 R1001	1SBP 260 172 R1001	1SBP 260 173 R1001	1SBP 260 174 R1001
Display type	STN LCD with backlight	STN LCD with backlight	STN LCD with backlight	STN LCD with backlight	B/W STN LCD with backlight
Representation	Text	Text	Text	Graphic and text	Graphic and text
Display size	2 lines x 16 characters	2 lines x 20 characters	4 lines x 20 characters	240 x 64 pixels (5.2")	240 x 128 pixels (5.3")
Display area W x H (mm)	55.7 x 11.0	73.5 x 11.5	70.4 x 20.8	127.2 x 33.9	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	4	3	5	8	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	developing of values
Datalogger					
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
Power supply	5/ 24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Current consumption	200 mA	150 mA	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 or RS422	RS232, RS422 RS485 (of which 2 at the same time)	RS232, RS422 RS485 (of which 2 at the same time)	RS232, RS422	RS232, RS422
Expansion slots	–	–	–	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



CP513	CP551	CP552	CP554	CP555
1SBP 260 175 R1001	1SBP 260 176 R1001	1SBP 260 177 R1001	1SBP 260 178 R1001	1SBP 260 179 R1001
TFT 256 Color LCD with backlight	Touch B/W STN with backlight	16 grey levels Touch LCD with backlight	TFT 256 Color touch LCD	TFT 256 Color touch LCD
Graphic and text	Graphic and text	Graphic and text	Graphic and text	Graphic and text
320 x 240 pixels (5.7")	320 x 240 pixels (5.7")	320 x 240 pixels (5.7")	320 x 240 pixels (5.7")	640 x 480 pixels (10.4")
115.2 x 86.4	78.0 x 58.5	115.2 x 86.4	115.2 x 86.4	211.2 x 158.4
variable	variable	variable	variable	variable
16 (2 colours)				
16 (8 with labeling strip)				
●	●	●	●	●
●	●	●	●	●
16 groups	4 groups	5 groups	5 groups	11 groups
●	●	●	●	●
●	●	●	●	●
developing of values	developing of values	developing of values	developing of values	developing of values
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
8 levels	8 levels	8 levels	8 levels	8 levels
●	●	●	●	●
400 kB Flash	400 kB Flash	400 kB Flash	400 kB Flash	1600 kB Flash
24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
550 mA	150 mA	400 mA	450 mA	1 A
0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 50 °C	0 – 50 °C
RS232, RS422	RS232, RS422 RS485, Ethernet (of which 2 at the same time)	RS232, RS422 RS485 (of which 2 at the same time)	RS232, RS422 RS485 (of which 2 at the same time)	RS232, RS422
2	-	1	1	2
IP65	IP65	IP65	IP65	IP65
276 x 198 x 89	138 x 100 x 30	200 x 150 x 69	200 x 150 x 69	290 x 250 x 105
1.7	1,4	1.5	1.5	3.3

Ordering data

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 7 expansion modules
- Up to 4 external communication modules simultaneously and in any desired combination
- Optional: SD card for data storage and program backup



The AC500, PM571 basic units					
Type	Program-memory	Cycle time ms 1000 instruct. Bit/Word/Float	Integrated coupler	Ordering Number	Weight 1 pc./kg
PM571	64 KB	0.3/0.3/6	-	1SAP 130 100 R0100	0.135
PM571-ETH	64 KB	0.3/0.3/6	Ethernet	1SAP 130 100 R0170	0.150

The AC500, PM581 basic units					
Type	Program-memory	Cycle time ms 1000 instruct. Bit/Word/Float	Integrated coupler	Ordering Number	Weight 1 pc./kg
PM581	256 KB	0.15/0.15/3	-	1SAP 140 100 R0100	0.135
PM581-ETH	256 KB	0.15/0.15/3	Ethernet	1SAP 140 100 R0170	0.150
PM581-ARCNET	256 KB	0.15/0.15/3	ARCNET	available 2006	0.160

The AC500, PM591 basic units					
Type	Program-memory	Cycle time ms 1000 instruct. Bit/Word/Float	Integrated coupler	Ordering Number	Weight 1 pc./kg
PM591	4096 KB	0.05/0.05/0.5	-	1SAP 150 100 R0100	0.135
PM591-ETH	4096 KB	0.05/0.05/0.5	Ethernet	1SAP 150 100 R0170	0.150
PM591-ARCNET	4096 KB	0.05/0.05/0.5	ARCNET	available 2006	0.160

Communication Module Ethernet

10/100 MBit/s Full/Half Duplex with auto-sensing

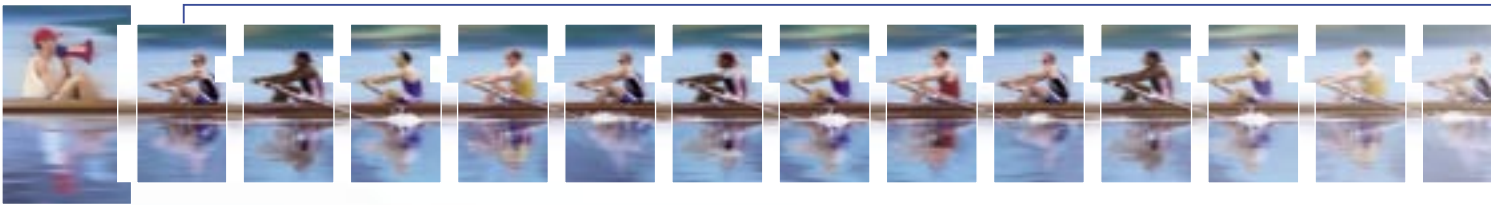
2-Port switch integrated

Transport protocols TCP/IP, UDP/IP, Modbus TCP

A maximum of 4 CM577-ETH modules can be operated simultaneously at one CPU

No external power supply required

Type	Protocol	Interfaces	Ordering Number	Weight 1 pc./kg
CM577-ETH	TCP/IP, UDP/IP, Modbus TCP	2 x RJ45	1SAP 170 700 R0001	0.115



Communication module Profibus DP

Profibus DP Master up to 12 MBit/s

A maximum of 4 CM572-DP modules can be operated simultaneously at one CPU

No external power supply required

Type	Interface	Ordering Number	Weight 1 pc./kg
CM572-DP	Sub-D socket	1SAP 170 200 R0001	0.115

Communication module DeviceNet

Type	Interface	Connector	Ordering Number	Weight 1 pc./kg
CM575-DN	Plug-in terminal block	Spring-type terminals	available 2006	0.115

Communication module CANopen

Type	Interface	Connection	Ordering Number	Weight 1 pc./kg
CM578-CN	Plug-in terminal block	Spring-type terminals	available 2006	0.115

Terminal base

For mounting and connecting 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 7 expansion modules

Field-bus-neutral FieldBusPlug-Slave interface

Connection COM1: 9-pole with pluggable terminal block

Connection COM2: 9-pole SUB-D (socket)

Type	No. of coupler slots	Connection for coupler integrated in CPU	Ordering Number	Weight 1 pc./kg
TB511-ETH	1	Ethernet RJ45	1SAP 111 100 R0170	0.215
TB521-ETH	2	Ethernet RJ45	1SAP 112 100 R0170	
TB541-ETH	4	Ethernet RJ45	1SAP 114 100 R0170	
TB521-ARCNET	2	ARCNET COAX	available 2006	

Ordering data

Interface modules

For decentralized I/Os

DC505-FBP Communication via FieldBusPlug with Profibus DP, CANopen, DeviceNet, Modbus
Field-bus-dependent field bus plug required

DC551-CS31 Communication via integrated interface with CS31 system bus

Plug-in electronic modules, terminal block TU5xx required

DC: Channels can be individually configured as input or output

Type	Number of DI/DO/DC	Input signal	Output signal	Ordering Number	Weight 1 pc./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	available 2006	0.3

Binary input/output modules

For central expansion of the AC500 CPUs

For decentralized expansion in combination with interface module DC505-FBP or DC551-CS31

Plug-in electronic modules, terminal block TU5xx required

DC: channels can be individually configured as input or output

Type	Number of DI/DO/DC	Input signal	Relay/ Transistor-outputs	Output signal	Ordering Number	Weight 1 pc./kg
DI524	32/-/-	24 V DC	-	-	1SAP 240 000 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

¹⁾ Relay outputs, changeover contacts

Analog input/output modules

For central expansion of the AC500 CPUs

For decentralized expansion in combination with interface module DC505-FBP or DC551-CS31

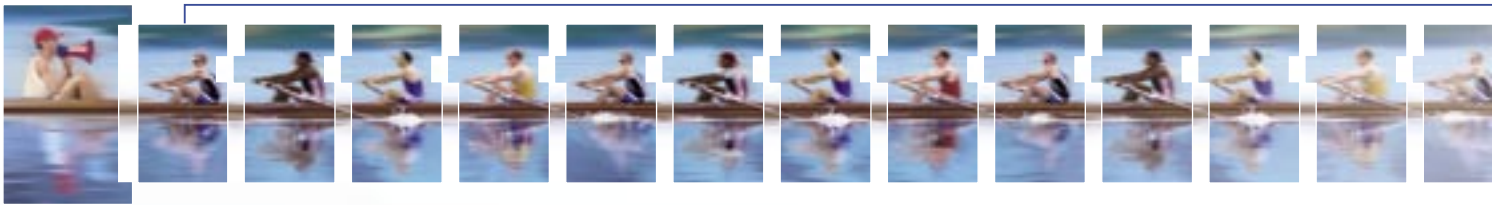
Plug-in electronic modules, TU5xx required

Analog inputs can be used as digital inputs

Range individually configurable for each channel

Resolution 12 bits + sign

Type	Number of AI/AO	Input signal	Output signal	Ordering Number	Weight 1 pc./kg
AX522	8/8	0 ... 10 V, ±10 V 0/4 ... 20 mA Pt100, Pt1000 Ni1000	±10 V 0/4 ... 20 mA (max. 4 current outputs)	1SAP 250 000 R0001	0.2



Terminal units

For binary 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 module-to-terminal-unit assignments, please consult the table!

	TU505 Screw	TU506 Spring	TU515 Screw	TU516 Spring	TU531 Screw	TU532 Spring	TU551 Screw	TU552 Spring
DC505-FBP	x	x						
DC551-CS31							x	x
DI524			x	x				
DC532			x	x				
DX522					x	x		
DX531					x	x		
AX522			x	x				

Type	for	Supply	Connection	Ordering Number	Weight 1 pc. /kg
TU505	FBP Interface modules		Screw terminals	1SAP 210 200 R0001	0.3
TU506	FBP Interface modules		Spring terminals	1SAP 210 000 R0001	0.3
TU515	I/O modules	24 V DC	Screw terminals	1SAP 212 200 R0001	0.3
TU516	I/O modules	24 V DC	Spring terminals	1SAP 212 000 R0001	0.3
TU531	I/O modules AC/Relay	230 V AC	Screw terminals	1SAP 217 200 R0001	0.3
TU532	I/O modules AC/Relay	230 V AC	Spring terminals	1SAP 217 000 R0001	0.3
TU551	CS31-Interface modules	24 V DC	Screw terminals	1SAP 210 600 R0001	0.3
TU552	CS31-Interface modules	24 V DC	Spring terminals	1SAP 210 400 R0001	0.3

Accessories for the AC500

Type	for	Description	Ordering Number	Weight 1 pc. /kg
TK501	CPUs AC500 COM2	Programming cable Sub-D/Sub-D length 5 m	1SAP 180 200 R0001	0.4
TK502	CPUs AC500 COM1	Programming cable Sub-D/ terminal Block, length 5 m	1SAP 180 200 R0101	0.4
MC502	CPUs AC500	Memory card (SD card) 128 MB	1SAP 180 100 R0001	0.1
TA521	CPUs AC500	Lithium battery for data buffering	1SAP 180 300 R0001	0.1
TA523	I/O modules	Pluggable marker holder (10 pcs.)	1SAP 180 500 R0001	0.3
TA524	Terminal base	Dummy communication module	1SAP 180 600 R0001	
TA525	I/O modules	Set of 10 white plastic markers	1SAP 180 700 R0001	0.1
TA526	I/O terminal	Accessories for backplane mounting base (10 pcs.)	1SAP 180 800 R0001	0.2

Programming package PS501 Control Builder

For all CPUs AC500

System requirements Windows 2000/XP

All programming languages according to IEC 61131-3

Contains: 5 programming languages, Sampling - Trace, Debugging, Offline simulation

Trace recording (multi-channel), recipe management, Continuous Function Chart

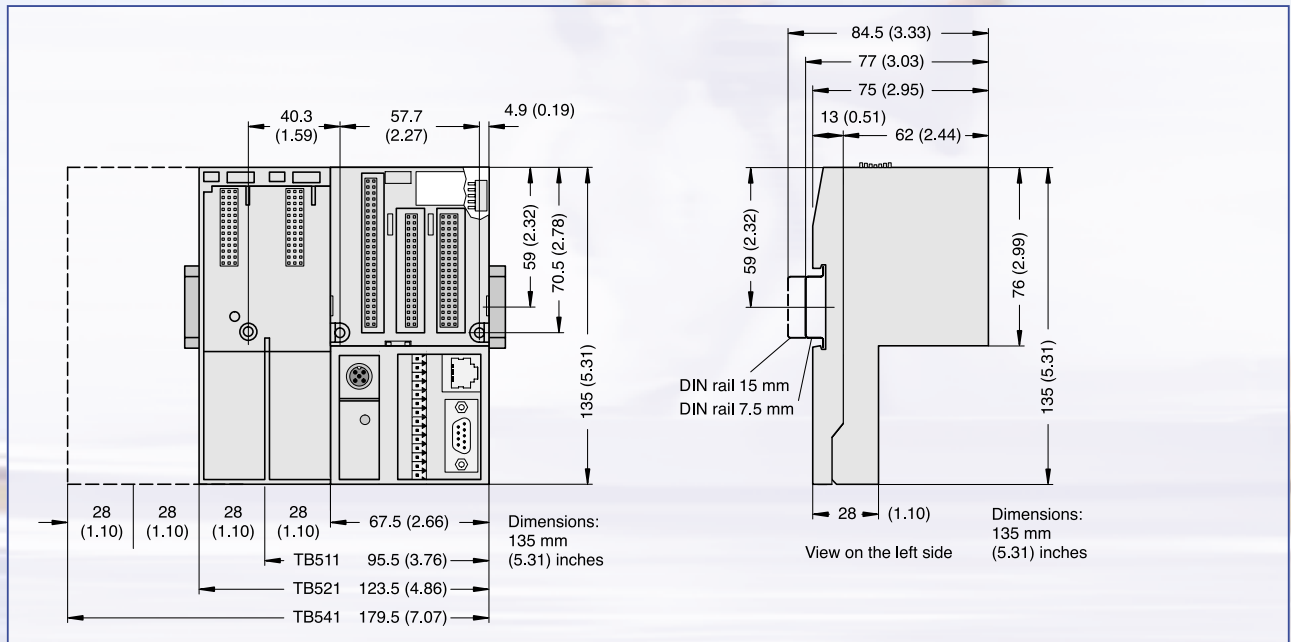
Languages: German/English/French

Scope of delivery: Software, libraries and documentation (PDF) on CD-ROM

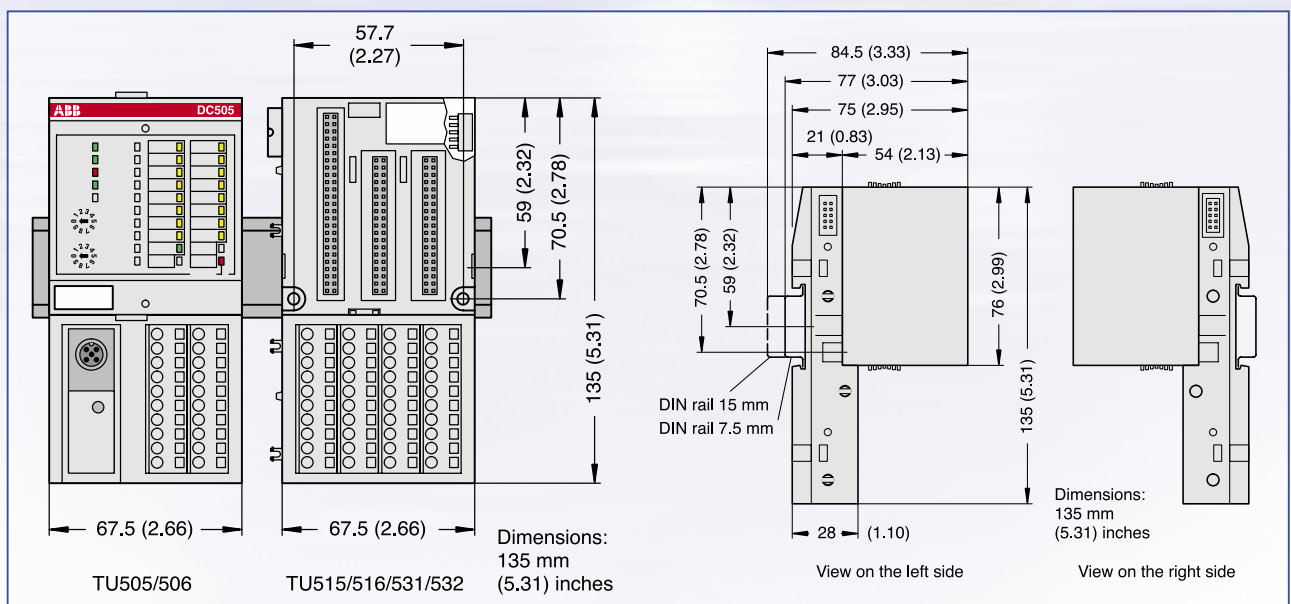
Type	for	Description	Ordering Number	Weight 1 pc. /kg
PS501	all CPUs AC500	Programming Package PS501 Control Builder AC500	1SAP 190 100 R0001	

Dimensions

CPU terminal base TB511, TB521 and TB541



I/O expansion and interface module terminal unit



Relevant approvals

Like all ABB products, the AC500 components, are as well tested in conformity with the applicable European, North American and international guidelines, and approved by the organizations responsible. These include GL, DNV, BV, RINA, LRS and cUL. The products bear the CE symbol.

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.

AC500 approvals



cUL, USA, Canada



GL, Germany



DNV, Norway



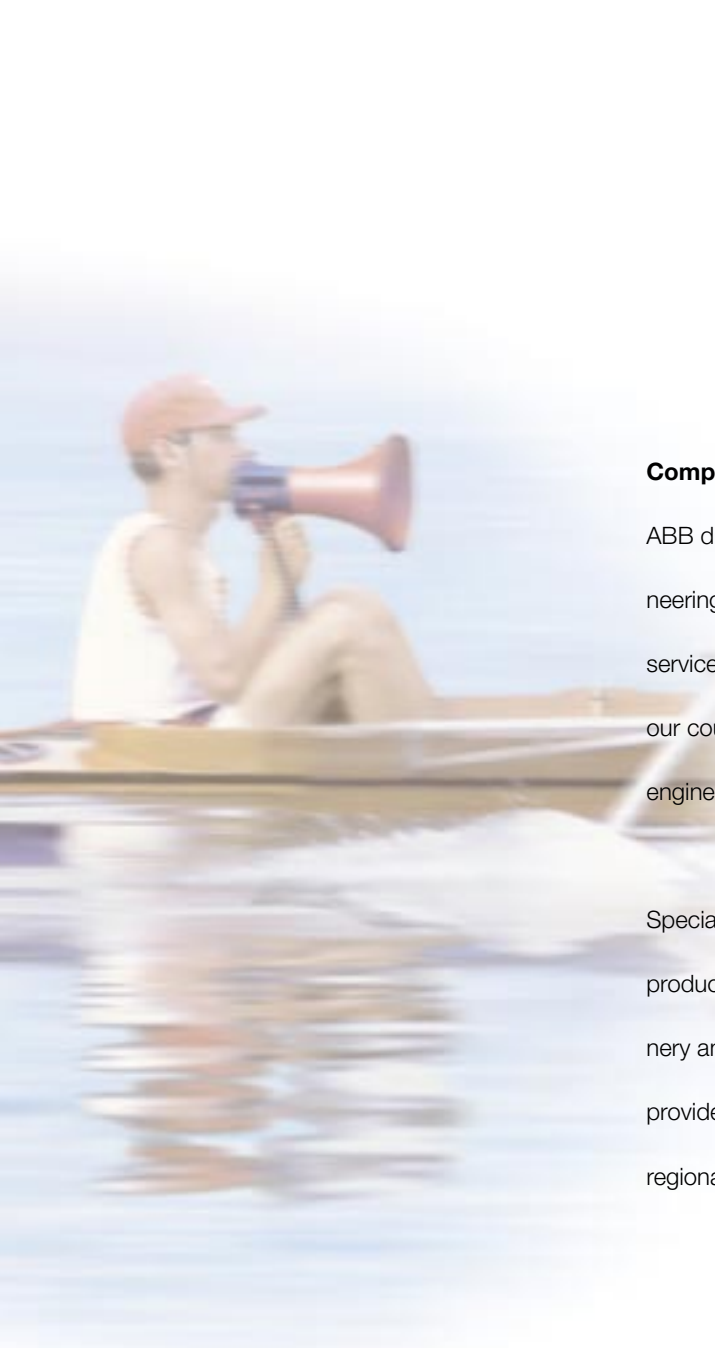
BV, France



RINA, Italy

Lloyd's
Register Of
Shipping

LRS, United Kingdom



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.



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