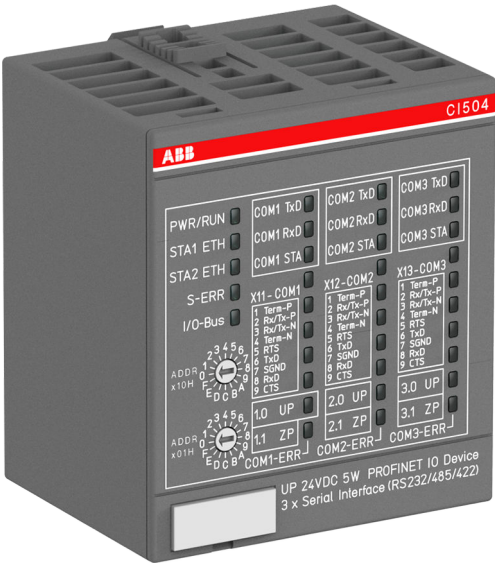


CI504

PROFINET communication interface module



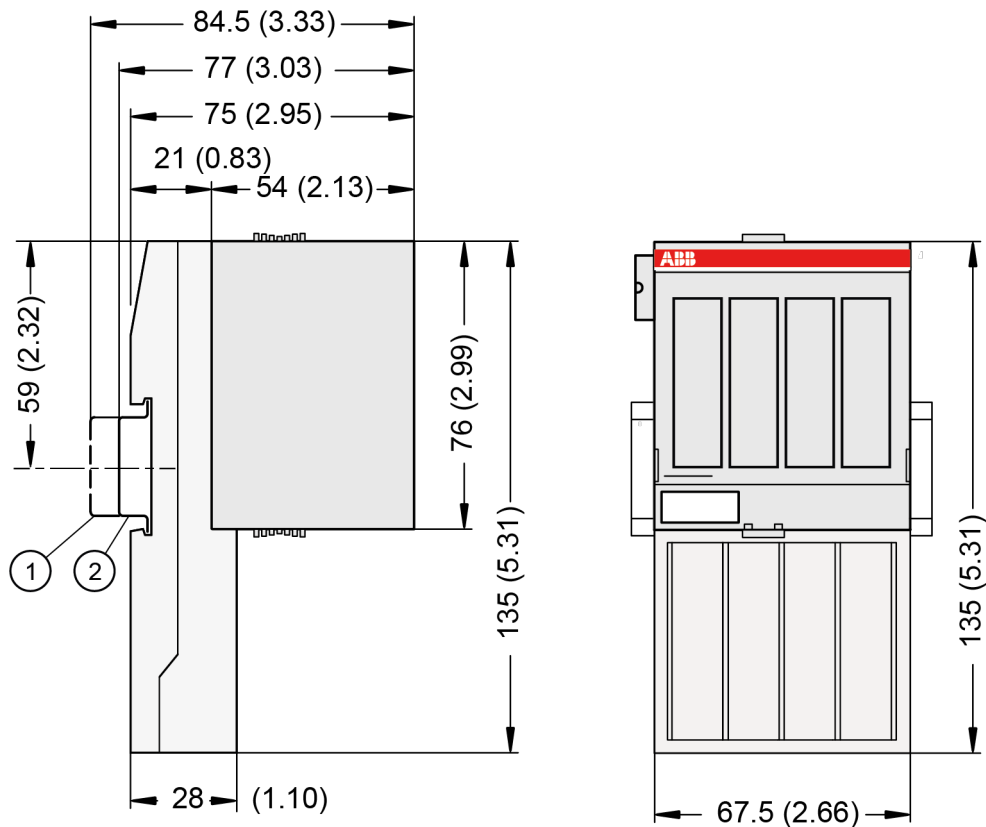
1 Ordering data

Part no.	Description	Product life cycle phase *)
1SAP 221 300 R0001	CI504-PNIO, PROFINET communication interface module with 3 serial interfaces	Active
1SAP 421 300 R0001	CI504-PNIO-XC, PROFINET communication interface module with 3 serial interfaces, XC version	Active



*) Modules in lifecycle Classic are available from stock but not recommended for planning and commissioning of new installations.

2 Dimensions



- 1 Din rail 15 mm
- 2 Din rail 7.5 mm



The dimensions are in mm and in brackets in inch.

3 Technical data

3.1 Technical data of the module

The system data of AC500 and S500 are applicable to the standard version ↗ *Chapter 4 “System data AC500” on page 4.*

The system data of AC500-XC are applicable to the XC version ↗ *Chapter 5 “System data AC500-XC” on page 8.*

Only additional details are therefore documented below.

The technical data are also applicable to the XC version.

Parameter		Value
Process supply voltages UP		
	Rated value	24 V DC
	Max. load for the terminals	10 A
	Protection against reversed voltage	Yes

Parameter	Value
Rated protection fuse on UP	10 A fast
Inrush current from UP (at power up)	On request
Current consumption via UP (normal operation)	0.15 A
Connections	Terminals 1.0, 2.0 and 3.0 for +24 V (UP) Terminals 1.1, 2.1 and 3.1 for 0 V (ZP)
Input data length	0 ... 36 bytes
Output data length	0 ... 36 bytes
Max. power dissipation within the module	5 W
Setting of the I/O module identifier	With 2 rotary switches at the front side of the module
Operation and error displays	18 LEDs (total)
Weight (without terminal unit)	ca. 125 g
Mounting position	Horizontal or vertical
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the control cabinet.

Galvanic isolation	Ethernet interface against the rest of the module, each serial port against each other and the rest of the module
Diagnosis	See Diagnosis

**NOTICE!**

All I/O channels (digital and analog) are protected against reverse polarity, reverse supply, short circuit and temporary overvoltage up to 30 V DC.

**Multiple overloads**

No effects of multiple overloads on isolated multi-channel modules occur, as every channel is protected individually by an internal smart high-side switch.

Parameter	Value
Bus connection	2 x RJ45
Switch	Integrated
Technology	Hilscher NETX 100
Transfer rate	10/100 Mbit/s (full-duplex)
Transfer method	According to Ethernet II, IEEE 802.3
Ethernet	100 base-TX, internal switch, 2x RJ45 socket
Expandability	Max. 10 S500 I/O modules
Adjusting elements	2 rotary switches for generation of an explicit name

Parameter	Value
Supported protocols	RTC - real time cyclic protocol, class 1 *) RTA - real time acyclic protocol DCP - discovery and configuration protocol CL-RPC - connectionless remote procedure Call LLDP - link layer discovery protocol MRP - MRP Client
Acyclic services	PNIO read / write sequence (max. 1024 bytes per telegram) Process-Alarm service
Supported alarm types	Process Alarm, Diagnostic Alarm, Return of Sub-Module, Plug Alarm, Pull Alarm
Min. bus cycle	1 ms
Conformance class	CC A
Protective functions (according to IEC 61131-3)	Protected against: <ul style="list-style-type: none"> • short circuit • reverse supply • overvoltage • reverse polarity Galvanic isolation from the rest of the module

*) Priorization with the aid of VLAN-ID including priority level

3.2 Technical data of the serial interfaces

Parameter	Value
Number of serial interfaces	3
Connectors for serial interfaces	X11 for COM1 X12 for COM2 X13 for COM3
Supported physical layers	RS-232 RS-422 RS-485
Supported protocols	ASCII
Transmission rate	Configurable from 300 bit/s to 115.200 bit/s

4 System data AC500


4.1 Environmental conditions

Table 1: Process and supply voltages

Parameter	Value
24 V DC	
Voltage	24 V (-15 %, +20 %)

Parameter		Value
	Protection against reverse polarity	Yes
100 V AC...240 V AC wide-range supply		
	Voltage	100 V ... 240 V (-15 %, +10 %)
	Frequency	50/60 Hz (-6 %, +4 %)
Allowed interruptions of power supply, according to EN 61131-2		
	DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
	AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s

**NOTICE!****Risk of damaging the PLC due to improper voltage levels!**

- Never exceed the maximum tolerance values for process and supply voltages.
- Never fall below the minimum tolerance values for process and supply voltages. Observe the **system data**  Chapter 4 "System data AC500" on page 4 and the **technical data** of the module used.

**NOTICE!**

Improper voltage level or frequency range which cause damage of AC inputs:

- AC voltage above 264 V
- Frequency below 47 Hz or above 62.4 Hz

**NOTICE!**

Improper connection leads cause overtemperature on terminals.


PLC modules may be destroyed by using wrong cable type, wire size and cable temperature classification.

Parameter		Value
Temperature		
	Operating	0 °C ... +60 °C: Horizontal mounting of modules. 0 °C ... +40 °C: Vertical mounting of modules. Output load reduced to 50 % per group.
	Storage	-40 °C ... +70 °C
	Transport	-40 °C ... +70 °C
Humidity		Max. 95 %, without condensation
Air pressure		
	Operating	> 800 hPa / < 2000 m
	Storage	> 660 hPa / < 3500 m

4.2 Creepage distances and clearances

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

4.3 Power supply units




AC500 and AC500-eCo PLC devices are Class II/Class III devices and do not require a Protective Earth (PE) connection.

For proper EMC performance, all metal parts, DIN rails, mounting screws, and cable shield connection terminals are connected to a common ground and provide Functional Earth (FE). This is typically connected to a common reference potential, such as equipotential bonding rails.


Signal Grounds (SGND or GND) are used for signal reference and must not be connected to cable shields, FE or other signals unless otherwise specified in the specific device description.

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



Safety Extra Low Voltage (SELV) and Protective Extra Low Voltage (PELV)

To ensure electrical safety of AC500/AC500-eCo extra low voltage circuits, 24 V DC supply, communication interfaces, I/O circuits, and all connected devices must be powered from sources meeting requirements of SELV, PELV, class 2, limited voltage or limited power according to applicable standards.



WARNING!

Improper installation can lead to death by touching hazardous voltages!

To avoid personal injury, safe separation, double or reinforced insulation and separation of the primary and secondary circuit must be observed and implemented during installation.

- Only use power converters for safety extra-low voltages (SELV) with safe galvanic separation of the primary and secondary circuit.
- Safe separation means that the primary circuit of mains transformers must be separated from the secondary circuit by double or reinforced insulation. The protective extra-low voltage (PELV) offers protection against electric shock.

4.4 Electromagnetic compatibility

Table 2: Electromagnetic compatibility

Parameter	Value
Device suitable only as <i>Control Equipment for Industrial Applications</i> , including marine applications. IEC 61131-2, zone B 🔗 Chapter 4.6 “Approvals and certifications” on page 8	
Radiated emission according to IEC 61000-6-4 CISPR11, class A	Yes

Parameter	Value
Conducted emission according to IEC 61000-6-4 CISPR11, class A	Yes
Electrostatic discharge (ESD) according to IEC 61000-4-2, criterion B	Air discharge: 8 kV Contact discharge: 6 kV
Fast transient interference voltages (burst) according to IEC 61000-4-4, criterion B	Power supply (DC): 2 kV Digital inputs/outputs (24 V DC): 1 kV Digital inputs/outputs (240 V AC): 2 kV Analog inputs/outputs: 1 kV Communication lines shielded: 1 kV
High energy transient interference voltages (surge) according to IEC 61000-4-5, criterion B	Power supply (DC): - Line to ground: 1 kV - Line to line: 0,5 kV Digital inputs/outputs/relay: (24 V DC): - Line to ground: 1 kV (AC): - Line to ground: 2 kV - Line to line: 1 kV Analog inputs/outputs: - Line to ground: 1 kV Communication lines: - Line to ground: 1 kV
Influence of radiated disturbances IEC 61000-4-3, criterion A	Test field strength: 10 V/m
Influence of line-conducted interferences IEC 61000-4-6, criterion A	Test voltage: 10 V
Power frequency magnetic fields IEC 61000-4-8, criterion A	30 A/m 50 Hz 30 A/m 60 Hz

4.5 Mechanical data

Parameter	Value
Mounting	Horizontal/Vertical
Wiring method	Spring/screw terminals
Degree of protection	PLC system: IP 20 <ul style="list-style-type: none"> with all modules or option boards plugged in with all terminals plugged in with all covers closed
Housing	Classification V-2 according to UL 94

Parameter	Value
Vibration resistance (sinusoidal) acc. to IEC 60068-2-6	All three axes 2 Hz ... 8.4 Hz, 3.5 mm peak, 8.4 Hz ... 150 Hz, 1 g
Shock test acc. to IEC 60068-2-27	All three axes 15 g, 11 ms, half-sinusoidal
Mounting of the modules:	
Mounting Rail Top Hat according to IEC 60715	35 mm, depth 7.5 mm or 15 mm
Mounting with screws	M4
Fastening torque	1.2 Nm

4.6 Approvals and certifications

The PLC Automation catalog contains an [overview of the available approvals and certifications](#).

5 System data AC500-XC

5.1 Environmental conditions

Table 3: Process and supply voltages

Parameter	Value
24 V DC	
Voltage	24 V (-15 %, +20 %)
Protection against reverse polarity	Yes
100 V AC...240 V AC wide-range supply	
Voltage	100 V ... 240 V (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
Allowed interruptions of power supply, according to EN 61131-2	
DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2
AC supply	Interruption < 0.5 periods, time between 2 interruptions > 1 s



NOTICE!

Risk of damaging the PLC due to improper voltage levels!

- Never exceed the maximum tolerance values for process and supply voltages.
 - Never fall below the minimum tolerance values for process and supply voltages.
- Observe the **system data** [Chapter 4 "System data AC500" on page 4](#) and the **technical data** of the module used.

**NOTICE!**

Improper voltage level or frequency range which cause damage of AC inputs:

- AC voltage above 264 V
- Frequency below 47 Hz or above 62.4 Hz

**NOTICE!**

Improper connection leads cause overtemperature on terminals.

PLC modules may be destroyed by using wrong cable type, wire size and cable temperature classification.

Parameter		Value
Temperature		
	Operating	<p>-40 °C ... +70 °C</p> <p>-40 °C ... 0 °C: Due to the LCD technology, the display might respond very slowly.</p> <p>-40 °C ... +40 °C: Vertical mounting of modules possible, output load limited to 50 % per group</p> <p>+60 °C ... +70 °C with the following deratings:</p> <ul style="list-style-type: none"> • System is limited to max. 2 communication modules per terminal base • Applications certified for cULus up to +60 °C • Digital inputs: maximum number of simultaneously switched on input channels limited to 75 % per group (e.g. 8 channels => 6 channels) • Digital outputs: output current maximum value (all channels together) limited to 75 % per group (e.g. 8 A => 6 A) • Analog outputs only if configured as voltage output: maximum total output current per group is limited to 75 % (e.g. 40 mA => 30 mA) • Analog outputs only if configured as current output: maximum number of simultaneously used output channels limited to 75 % per group (e.g. 4 channels => 3 channels)
	Storage / Transport	-40 °C ... +85 °C
Humidity		Operating / Storage: 100 % r. H. with condensation
Air pressure		<p>Operating:</p> <p>-1000 m 5000 m (1080 hPa ... 620 hPa)</p> <p>> 2000 m (< 795 hPa):</p> <ul style="list-style-type: none"> • Max. operating temperature must be reduced by 10 K for each 1000 m exceeding 2000 m • I/O module relay contacts must be operated with 24 V nominal only

Parameter	Value
Immunity to corrosive gases	Yes, according to: ISA S71.04.1985 Harsh group A, G3/GX IEC60068-2-60 Method 4 with following concentrations: <ul style="list-style-type: none">• H2S 100 ± 10ppb• NO2 1250 ± 20ppb• CL2 100 ± 10ppb• SO2 300 ± 20ppb
Immunity to salt mist	Yes, horizontal mounting only, according to IEC 60068-2-52 severity level: 1



NOTICE!
Risk of corrosion!
Unused connectors and slots may corrode if XC devices are used in salt-mist environments.
Protect unused connectors and slots with TA535 protective caps for XC devices.



NOTICE!
Risk of malfunctions!
Unused slots for communication modules are not protected against accidental physical contact.

- Unused slots for communication modules must be covered with dummy communication modules to achieve IP20 rating.
- I/O bus connectors must not be touched during operation.

5.2 Creepage distances and clearances

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

5.3 Power supply units



AC500 and AC500-eCo PLC devices are Class II/Class III devices and do not require a Protective Earth (PE) connection.
For proper EMC performance, all metal parts, DIN rails, mounting screws, and cable shield connection terminals are connected to a common ground and provide Functional Earth (FE). This is typically connected to a common reference potential, such as equipotential bonding rails.
Signal Grounds (SGND or GND) are used for signal reference and must not be connected to cable shields, FE or other signals unless otherwise specified in the specific device description.


Safety Extra Low Voltage (SELV) and Protective Extra Low Voltage (PELV)

To ensure electrical safety of AC500/AC500-eCo extra low voltage circuits, 24 V DC supply, communication interfaces, I/O circuits, and all connected devices must be powered from sources meeting requirements of SELV, PELV, class 2, limited voltage or limited power according to applicable standards.


WARNING!
Improper installation can lead to death by touching hazardous voltages!

To avoid personal injury, safe separation, double or reinforced insulation and separation of the primary and secondary circuit must be observed and implemented during installation.

- Only use power converters for safety extra-low voltages (SELV) with safe galvanic separation of the primary and secondary circuit.
- Safe separation means that the primary circuit of mains transformers must be separated from the secondary circuit by double or reinforced insulation. The protective extra-low voltage (PELV) offers protection against electric shock.

5.4 Electromagnetic compatibility

Table 4: Electromagnetic compatibility

Parameter	Value
Device suitable only as <i>Control Equipment for Industrial Applications</i> , including marine applications. IEC 61131-2, zone B 🔗 Chapter 5.6 “Approvals and certifications” on page 13	
Radiated emission according to IEC 61000-6-4 CISPR11, class A	Yes
Conducted emission according to IEC 61000-6-4 CISPR11, class A	Yes
Electrostatic discharge (ESD) according to IEC 61000-4-2, criterion B	Air discharge: 8 kV Contact discharge: 6 kV
Fast transient interference voltages (burst) according to IEC 61000-4-4, criterion B	Power supply (DC): 4 kV Digital inputs/outputs (24 V DC): 2 kV Digital inputs/outputs (240 V AC): 4 kV Analog inputs/outputs: 2 kV Communication lines shielded: 2 kV

Parameter	Value
High energy transient interference voltages (surge) according to IEC 61000-4-5, criterion B	Power supply (DC): - Line to ground: 1 kV - Line to line: 0,5 kV Digital inputs/outputs/relay: (24 V DC): - Line to ground: 1 kV (AC): - Line to ground: 2 kV - Line to line: 1 kV Analog inputs/outputs: - Line to ground: 1 kV Communication lines: - Line to ground: 1 kV
Influence of radiated disturbances IEC 61000-4-3, criterion A	Test field strength: 10 V/m
Influence of line-conducted interferences IEC 61000-4-6, criterion A	Test voltage: 10 V
Power frequency magnetic fields IEC 61000-4-8, criterion A	30 A/m 50 Hz 30 A/m 60 Hz

5.5 Mechanical data

Parameter	Value
Mounting	Horizontal/vertical (no application in salt mist environment)
Wiring method	Spring terminals
Degree of protection	PLC system: IP 20 <ul style="list-style-type: none"> with all modules or option boards plugged in with all terminals plugged in with all covers closed
Housing	Classification V-2 according to UL 94
Vibration resistance (sinusoidal) acc. to IEC 60068-2-6	2 Hz ... 8.4 Hz, 3.5 mm peak, 8.4 Hz ... 500 Hz, 2 g
Vibration resistance (broadband random) acc. to IEC 60068-2-64	5 Hz ... 500 Hz, 1,9 g rms (operational) 5 Hz ... 500 Hz, 4 g rms (non operational)
Shock resistance	All three axes 15 g, 11 ms, half-sinusoidal
Mounting of the modules:	
Mounting Rail Top Hat according to IEC 60715	35 mm, depth 7.5 mm or 15 mm
Mounting with screws	M4
Fastening torque	1.2 Nm

5.6 Approvals and certifications

The PLC Automation catalog contains an *overview of the available approvals and certifications*.