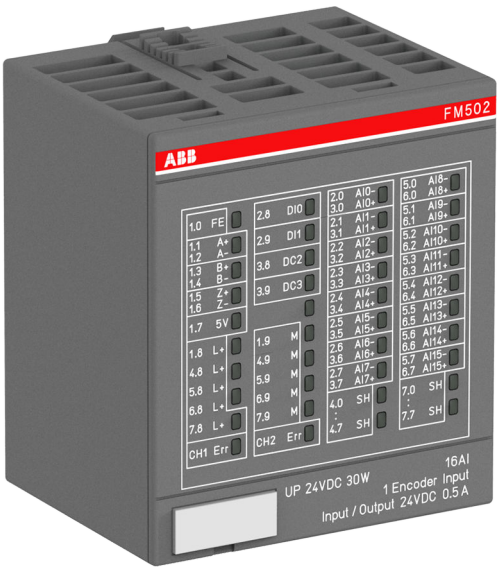


# FM502

## Function module



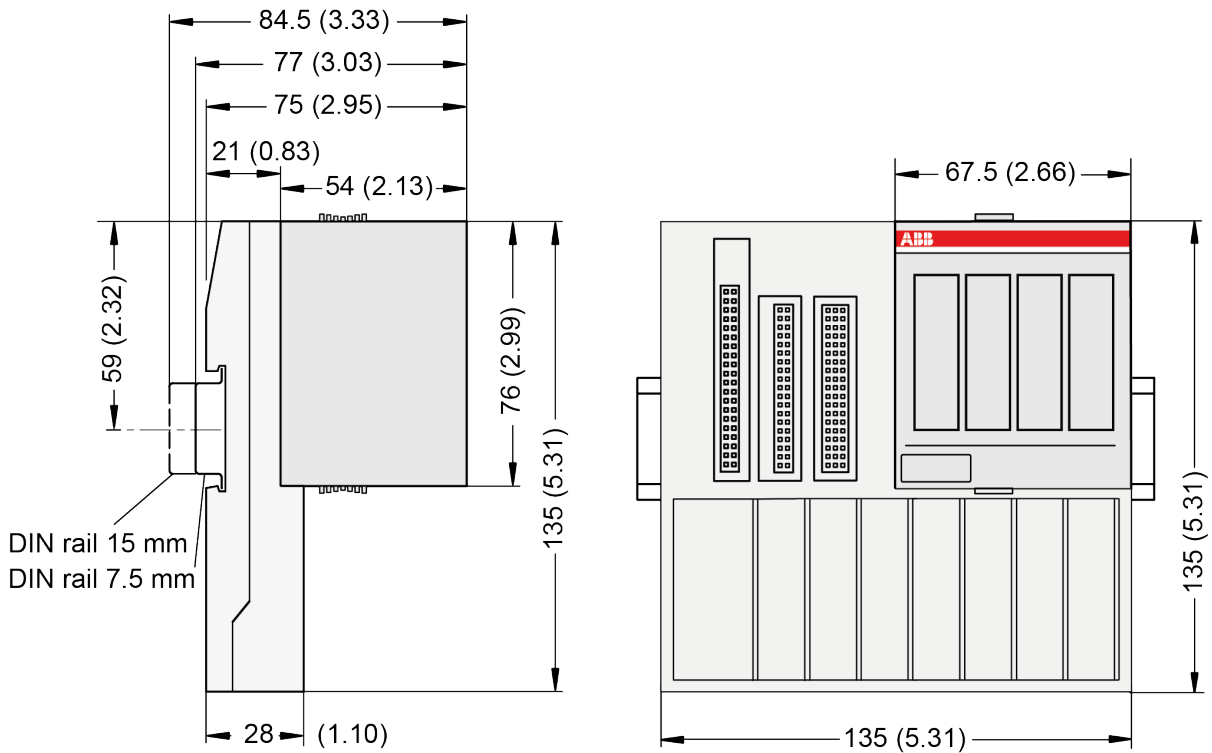
### 1 Ordering data

Part no.	Description	Product life cycle phase *)
1SAP260400R0001	Function module FM502-CMS	Active
1SAP460400R0001	Function module FM502-CMS-XC, XC version	Active



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

2 Dimensions



The dimensions are in mm and in brackets in inch.

3 Technical data

The system data of AC500 and S500 are applicable to the standard version ↗ *Chapter 4 “System data AC500” on page 8.*

The system data of AC500-XC are applicable to the XC version ↗ *Chapter 5 “System data AC500-XC” on page 12.*

Only additional details are therefore documented below.

The technical data are also applicable to the XC version.

Table 1: Technical data of process supply voltage

Parameter	Value
Connections of terminals	The terminals 1.8, 4.8 ... 7.8, 1.9, 4.9 ... 7.9, 4.0 ... 4.7, 7.0 ... 7.7 are electrically interconnected within the TF5x1-CMS. Terminals 1.8, 4.8 ... 7.8: process voltage L+ = +24 V DC Terminals 1.9, 4.9 ... 7.9: process voltage M = 0 V Terminals 4.0 ... 4.7, 7.0 ... 7.7: analog shield clamps SH Terminal 1.0: FE shield clamp of encoder
Protection against reverse voltage	Yes
Rated protection fuse at UP	10 A fast

Parameter	Value
Rated value	24 V DC
Max. ripple	5 %
Current consumption from L+ (FM502-CMS and PM592-ETH, no communication module)	Max. 0.43 A + max. 0.5 A per output
Inrush current from L+ (at power up, FM502-CMS and PM592-ETH, no communication module)	1.2 A <sup>2</sup> s
Galvanic isolation	Yes, PM592-ETH and FM502-CMS to other I/O bus modules
Max. power dissipation within the FM502-CMS	6.5 W (outputs unloaded)



#### 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.

For maritime applications a metal cabinet is required

Table 2: Technical data of the device

Parameter	Value
Weight FM502-CMS	215 g
Weight FM502-CMS-XC	220 g
Mounting position	Horizontal Vertical with derating: max. temperature +40 °C
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the control cabinet.
Deratings for operation of FM502-CMS-XC between +60 °C and +70 °C	No use of 24 V encoder mode. Analog inputs: maximum number of configured input channels limited to 75 % per group AI0 ... AI7 and AI8 ... AI15.
Required Terminal Base	TF501 or TF521

Table 3: Technical data of the 5 V encoder supply

Parameter	Value
Number of supplies	1
Connections	Terminal 1.7
Rated value	5 V DC (+/- 5%)

Parameter	Value
Resistance to feedback against reverse polarity	No
Resistance to feedback against 24 V signals	Yes
Output current	100 mA max.
Output diagnosis	Yes, with diagnosis LED and error message

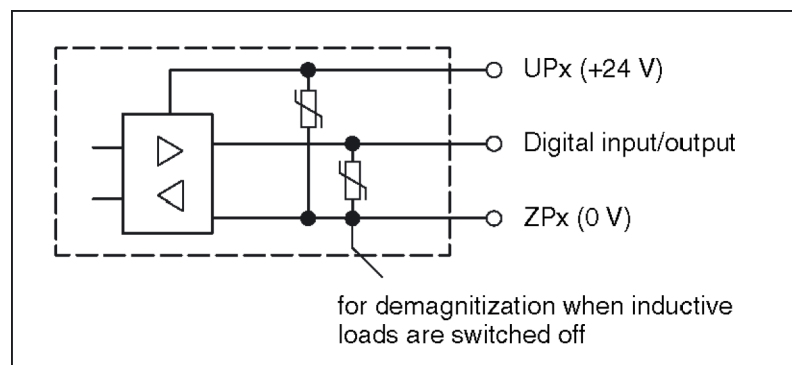
*Table 4: Technical data of the digital inputs*

Parameter	Value
Number of channels	2 + 2 configurable inputs/outputs
Connections	Terminals 2.8, 2.9, 3.8, 3.9
Reference potential	Terminals 1.9, 4.9, 5.9, 6.9, 7.9 for M (0 V)
Indication of the input signals	One yellow LED per channel, the LED is ON when the input signal is high (signal 1)
Input type acc. to EN 61131-2	Type 1
Input delay (0->1 or 1->0)	Typ. 8 ms, configurable from 0.1 ms ... 32 ms
Input signal voltage	24 V DC
Signal 0	-3 V ... +5 V  Due to the direct connection to the output, the demagnetizing varistor is also effective at the input. This is why the difference between L+ and the input signal must not exceed the clamp voltage of the varistor. The varistor limits the clamp voltage to approx. 36 V. The input voltage must range from -12 V ... +30 V when L+ = 24 V and from -6 V ... +30 V when L+ = 30 V.
Undefined signal	> +5 V ... < +15 V
Signal 1	+15 V ... +30 V
Ripple with signal 0	Within -3 V ... +5 V
Ripple with signal 1	Within +15 V ... +30 V
Input current per channel	
Input voltage +24 V	Typ. 5 mA
Input voltage +5 V	> 1 mA
Input voltage +15 V	> 5 mA
Input voltage +30 V	< 8 mA
Max. cable length	
Shielded	1000 m
Unshielded	600 m

*Table 5: Technical data of digital outputs*

Parameter	Value
Number of channels per module	2 configurable inputs/outputs
Connection	Terminal 3.8, 3.9
Reference potential	Terminals 1.9, 4.9, 5.9, 6.9, 7.9 for M (0 V)
Indication of the output signal	One LED per channel

Parameter		Value
Power supply voltage		Terminals 1.8, 4.8, 5.8, 6.8, 7.8 for L+ (+24 V)
Output voltage for signal 1		L+ (-0.8 V)
Output delay (0->1 or 1->0)		On request
Output current		
	Rated value, per channel: 500 mA at UP = 24 V	500 mA at L+ = 24 V
	Maximum value: 1 A	1 A
Leakage current with signal 0		< 0.5 mA
Demagnetization when inductive loads are switched off		With varistors integrated in the module
Switching frequency		
	With resistive load	On request
	With inductive loads	Max. 0.5 Hz
	With lamp loads	Max. 11 Hz with max. 5 W
Short-circuit proof / overload proof		Yes
Overload message ( $I > 0.7$ A)		Yes, after ca. 100 ms
Output current limitation		Yes, automatic reactivation after short circuit/overload
Resistance to feedback against 24 V signals		Yes
Max. cable length		
	Shielded	1000 m
	Unshielded	600 m



*Fig. 1: Circuitry of a digital input/output with the varistors for demagnetization when inductive loads are switched off.*

*Table 6: Technical data of high speed input (Encoder, A/B/Z)*

Parameter	Value
Number of channels per module	3 (sampled synchronously with IEPE inputs)
Connection	Terminals 1.1, 1.2, 1.3, 1.4, 1.5, 1.6
Reference potential	Terminals 1.9, 4.9, 5.9, 6.9, 7.9 for M (0 V)
Indication of the input signals	One LED per channel
Resolution	32 bits

Parameter	Value		
Input type	24 V DC	5 V DC	Differential RS-422 and 1 Vpp sine
Input current per channel			
Input voltage + 24 V	Typ. 6 mA		
Input voltage + 5 V	> 1 mA		
Input voltage + 15 V	> 5 mA		
Input voltage + 30 V	< 8 mA		
Input type acc. to EN61131-2	Type 1		
Input frequency max. (frequency measurement)	100 kHz (accuracy -0 %/+3 %)		
Input signal voltage	24 V DC	5 V DC	Differential
Input frequency max.	300 kHz	1 MHz	1 MHz
Signal 0	-30 V ... +5 V	-30 V ... +0.8 V	≤ 200 mV
Undefined signal	> +5 V ... < +15 V	> +0.8 V ... < +2.0 V	-
Signal 1	+15 V ... +30 V	+2.0 V ... +30 V	≥ +200 mV
Ripple with signal 0	Within -30 V ... +5 V	Within -30 V ... +0.8 V	-
Ripple with signal 1	Within +15 V ... +30 V	Within +2.0 V ... +30 V	-
Max. cable length, shielded (depending on sensor)	300 m	100 m	

Table 7: Technical data of the fast outputs (SI CLK output B for optical interface)

Parameter	Value
Number of channels	1
Connection	Terminals 1.3, 1.4
Reference potential	Terminals 1.9, 4.9, 5.9, 6.9, 7.9 for M (0 V)
Indication of output signal	One LED per channel, the LED is ON when SSI CLK output B is active
Differential output voltage for signal 1	> 2.4 V at 10 mA
Differential output voltage for signal 0	≤ -2.4 V at 10 mA
Output delay (0->1 or 1->0)	Max. 0.35 µs
Output current	≤ 10 mA
Switching frequency (selectable)	200 kHz, 500 kHz and 1 MHz
Short-circuit-proof/overload-proof	Yes
Output current limitation	Yes, automatic reactivation after short circuit/overload
Resistance to feedback against 24 V signals	Yes
Resistance to feedback against reverse polarity	Yes
Max. cable length, shielded (depending on sensor)	Typ. 12.5 m at 1MHz

Table 8: Technical data of the fast outputs (SSI CLK output B, RS-422 differential)

Parameter	Value
Number of channels	1
Connection	Terminals 1.3, 1.4
Reference potential	Terminals 1.9, 4.9, 5.9, 6.9, 7.9 for M (0 V)
Differential output voltage	$\geq 2.4$ V at 10 mA
Output delay (0→1 or 1→0)	Max. 0.35 $\mu$ s
Switching frequency (selectable)	200 kHz, 500 kHz, 1 MHz
Short-circuit-proof/overload-proof	Yes
Output current limitation	Yes, automatic reactivation after short-circuit/overload
Resistance to feedback against 24 V signals	Yes
Resistance to feedback against reverse polarity	Yes
Max. cable length, shielded (depending on sensor)	100 m

Table 9: Technical data of analog inputs

Parameter	Value
Number of channels per module	16 (synchronous sampled)
Connection	Terminals 2.0 ... 2.7, 5.0 ... 5.1 for AI-, 3.0 ... 3.7, 6.0 ... 6.7 for AI+
Indication of the input signal	One bicolor LED per channel for signal and error messages.
Measurement resolution	$\geq 23$ Bit
Resolution	32 bits external use
Accuracy at +25 °C	$\leq \pm 0.1$ %
Accuracy over operating temperature and vibration	$\leq \pm 0.5$ %
Sample rate/bandwidth high (0 dB)	50 kHz/20 kHz (min. -121 dB/22.5 kHz) 25 kHz/10 kHz (min. -116 dB/11.25kHz) 12.5 kHz/5 kHz (min. -116 dB/5.63 kHz) 6.25 kHz/2.5 kHz (min. -116 dB/2.81 kHz) 3.13 kHz/1.25 kHz (min. -116 dB/1.41 kHz) 1.56 kHz/0.625 kHz (min. -116 dB/0.70 kHz) 0.78 kHz/0.312 kHz (min. -120 dB/0.36 kHz) 0.39 kHz/0.156 kHz (min. -121 dB/0.18 kHz) 0.20 kHz/0.080 kHz (min. -121 dB/0.09 kHz) 0.10 kHz/0.040 kHz (min. -130 dB/0.05 kHz) selectable per channel
Data storage	128 MB
Measurement time	Selectable per channel
Input type default setting	unused
Input type (selectable per input)	IEPE -10 V...+10 V

Parameter		Value	
Bandwidth low		min. 3 dB/< 0.1 Hz	min. 3 dB/< 0.1 Hz or DC (selectable)
Dynamic range (SFDR)		> 100 dB	
SINAD (300 Hz/1 kHz sine, 50 k SPS)			
	0 dB from full scale	< -90 dB	< -95 dB
	-20 dB from full scale	< -75 dB	< -80 dB
	-40 dB from full scale	< -55 dB	< -60 dB
Input range		+2 V ... +18 V	-10 V ... +10 V
Measurement range		+/-6 V (DC coupled)	-10 V ... +10 V
Input DC bias range, common mode range		+8 V ... +12 V	+/-1 V
Current source per channel		Typ. 4.2 mA (+/- 7 % over temperature)	-
Input resistance AI- to M		Typ. 27 Ohm (PTC)	
Channel input impedance (AI+/AI-)			
	< 1 kHz	> 1 MOhm	> 2 MOhm
	5 kHz	> 100 kOhm	> 40 kOhm
	10 kHz	> 60 kOhm	> 25 kOhm
	20 kHz	> 40 kOhm	> 8 kOhm
Error detection		Short circuit, open wire	-
Max. cable length, shielded (depending on sensor)		100 m	

## 4 System data AC500

### 4.1 Environmental conditions

Table 10: 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 8* 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 11: 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 12	
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

Parameter	Value
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"> <li>with all modules or option boards plugged in</li> <li>with all terminals plugged in</li> <li>with all covers closed</li> </ul>
Housing	Classification V-2 according to UL 94
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
<b>Mounting of the modules:</b>	

Parameter	Value
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 12: 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 8](#) 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"> <li>• System is limited to max. 2 communication modules per terminal base</li> <li>• Applications certified for cULus up to +60 °C</li> <li>• Digital inputs: maximum number of simultaneously switched on input channels limited to 75 % per group (e.g. 8 channels =&gt; 6 channels)</li> <li>• Digital outputs: output current maximum value (all channels together) limited to 75 % per group (e.g. 8 A =&gt; 6 A)</li> <li>• Analog outputs only if configured as voltage output: maximum total output current per group is limited to 75 % (e.g. 40 mA =&gt; 30 mA)</li> <li>• Analog outputs only if configured as current output: maximum number of simultaneously used output channels limited to 75 % per group (e.g. 4 channels =&gt; 3 channels)</li> </ul>
	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>&gt; 2000 m (&lt; 795 hPa):</p> <ul style="list-style-type: none"> <li>• Max. operating temperature must be reduced by 10 K for each 1000 m exceeding 2000 m</li> <li>• I/O module relay contacts must be operated with 24 V nominal only</li> </ul>
Immunity to corrosive gases		<p>Yes, according to:</p> <p>ISA S71.04.1985 Harsh group A, G3/GX</p> <p>IEC60068-2-60</p> <p>Method 4 with following concentrations:</p> <ul style="list-style-type: none"> <li>• H<sub>2</sub>S 100 ± 10ppb</li> <li>• NO<sub>2</sub> 1250 ± 20ppb</li> <li>• Cl<sub>2</sub> 100 ± 10ppb</li> <li>• SO<sub>2</sub> 300 ± 20ppb</li> </ul>
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 13: 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 16	
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
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

Parameter	Value
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"> <li>with all modules or option boards plugged in</li> <li>with all terminals plugged in</li> <li>with all covers closed</li> </ul>
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
<b>Mounting of the modules:</b>	
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\*](#).