

PM5630, PM5650, PM5670, PM5675

Processor module



1 Ordering data

Processor modules for AC500 (Standard) V3 products

To enable better product availability into the production and to provide some new features, a revision 3 of the existing AC500 V3 processor module was necessary. The existing AC500 V3 processor module revision 2 with rubric R0278 will move to classic and will be replaced by compatible new AC500 V3 processor module revision 3 with rubric R0378.

For example:

The processor module revision 3 PM5630-2ETH (1SAP131 000 **R0378**) replaces the existing processor module revision 2 PM5630-2ETH (1SAP 131 000 **R0278**) and provides the same features or functionality of the previous ones.

Following points must be considered with the processor module revision 3:



- The processor module revision 3 (R037x) requires a new BootFW / CPUFW from V3.6.x and higher.
- **It cannot be downgraded** and used with lower FW versions than V3.6.0.
- The processor module revision 3 (R037x) provides the same features as the processor module revision 2 (R027x) existing today and is fully compatible.
- An existing application using a processor module revision 2 (R027x) built with Automation Builder < 2.6 can run on a processor module revision 3 (R037x) but the application **must be upgraded** to at least AB 2.6.0 or higher.

What must be done using a new processor module revision 3 (R037x)?

- On a new application?
 - Just use the new processor module revision 3 (R037x)
 - Use the latest Automation Builder software from 2.6.0 or higher.
- On an existing application using an Automation Builder software version smaller than 2.6.0?
 - To use a new processor module revision 3 in an existing application (e.g., replacement of the processor module revision 2), the application must be upgraded to at least AB 2.6.0 or higher.
 - If several processor module (revision 3 and revision 2) are used within the same project, all the processor modules used in the same application must be upgraded to the FW Version V3.6.x and higher.

Table 1: Processor modules for AC500 (Standard) V3

Part no.	Description	Product life cycle phase *)
1SAP 131 000 R0278 (processor module revision 2)	PM5630-2ETH, processor module, memory 8 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	Active -> Classic (replaced by processor module revision 3)
1SAP 131 000 R0378 (processor module revision 3)	PM5630-2ETH, processor module, memory 8 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	In preparation
1SAP 331 000 R0278 (processor module revision 2)	PM5630-2ETH-XC, processor module, memory 8 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	Active -> Classic (replaced by processor module revision 3)
1SAP 331 000 R0378 (processor module revision 3)	PM5630-2ETH-XC, processor module, memory 8 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	In preparation
1SAP 141 000 R0278 (processor module revision 2)	PM5650-2ETH, processor module, memory 80 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	Active -> Classic (replaced by processor module revision 3)
1SAP 141 000 R0378 (processor module revision 3)	PM5650-2ETH, processor module, memory 80 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	In preparation

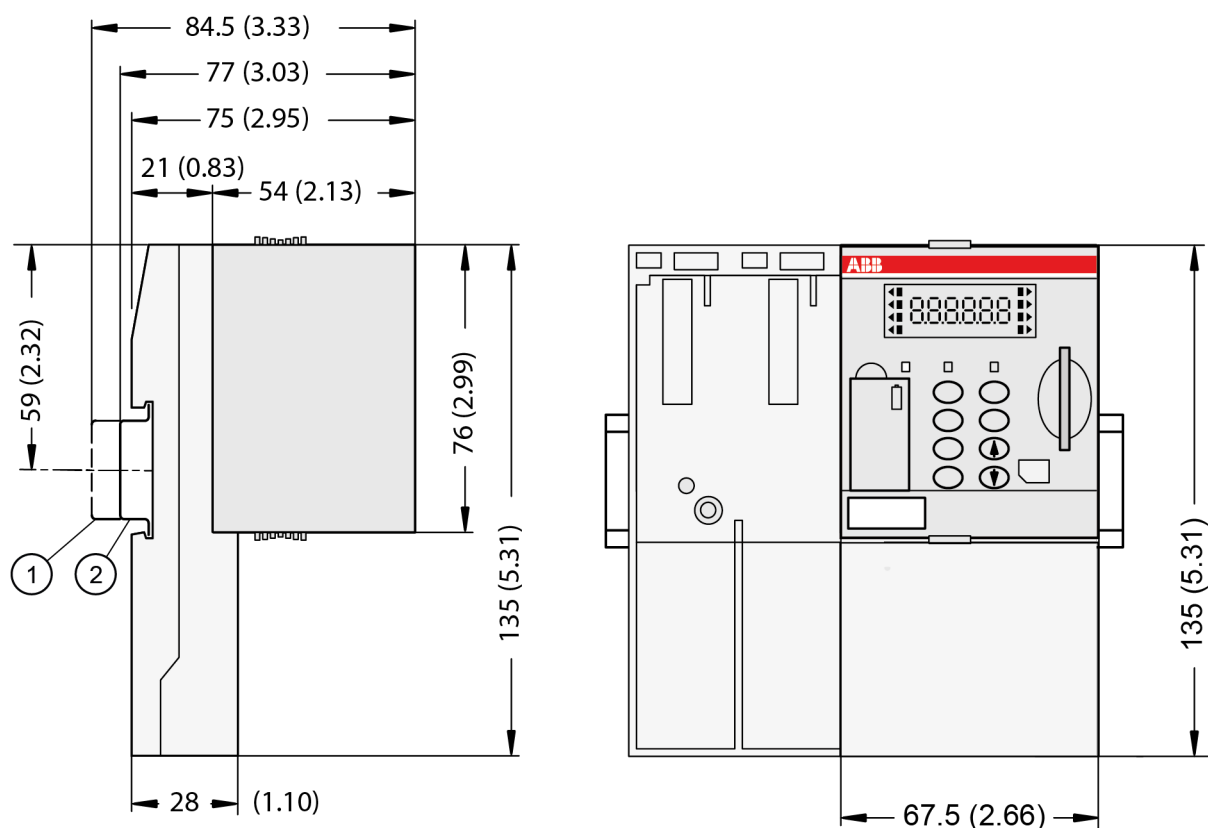
Part no.	Description	Product life cycle phase *)
1SAP 341 000 R0278 (processor module revision 2)	PM5650-2ETH-XC, processor module, memory 80 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	Active -> Classic (replaced by processor module revision 3)
1SAP 341 000 R0378 (processor module revision 3)	PM5650-2ETH-XC, processor module, memory 80 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	In preparation
1SAP 151 000 R0278 (processor module revision 2)	PM5670-2ETH, processor module, memory 160 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	Active -> Classic (replaced by processor module revision 3)
1SAP 151 000 R0378 (processor module revision 3)	PM5670-2ETH, processor module, memory 160 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	In preparation
1SAP 351 000 R0278 (processor module revision 2)	PM5670-2ETH-XC, processor module, memory 160 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	Active -> Classic (replaced by processor module revision 3)
1SAP 351 000 R0378 (processor module revision 3)	PM5670-2ETH-XC, processor module, memory 160 MB, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	In preparation
1SAP 151 500 R0278 (processor module revision 2)	PM5675-2ETH, processor module, memory 160 MB, 8 GB flash disk, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	Active -> Classic (replaced by processor module revision 3)

Part no.	Description	Product life cycle phase *)
1SAP 151 500 R0378 (processor module revision 3)	PM5675-2ETH, processor module, memory 160 MB, 8 GB flash disk, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols	In preparation
1SAP 351 500 R0278 (processor module revision 2)	PM5675-2ETH-XC, processor module, memory 160 MB, 8 GB flash disk, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	Active -> Classic (replaced by processor module revision 3)
1SAP 351 500 R0378 (processor module revision 3)	PM5675-2ETH-XC, processor module, memory 160 MB, 8 GB flash disk, 24 V DC, memory card slot, interface 1 RS-232/485, display, 2 RJ45 independent onboard Ethernet TCP/IP interfaces with Modbus TCP, web server, IEC60870-5-104 or selectable Ethernet based protocols, XC version	In preparation
1SAP 131 000 R0379	PM5630-MC-KIT: AC500, Machine Controller Kit with PM5630-2ETH, CM579-ETHCAT, TB5610-ETH, PS5611-MC	Active
1SAP 141 000 R0379	PM5650-MC-KIT: AC500, Machine Controller Kit with PM5650-2ETH, CM579-ETHCAT, TB5610-ETH, PS5611-MC	Active
1SAP 151 000 R0379	PM5670-MC-KIT: AC500, Machine Controller Kit with PM5670-2ETH, CM579-ETHCAT, TB5610-ETH, PS5611-MC	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

The system data of AC500 and S500 are applicable to the standard version. ↗ *Chapter 4 “System data AC500” on page 10*

The system data of AC500-XC are applicable to the XC version. ↗ *Chapter 5 “System data AC500-XC” on page 15*

Only additional details are therefore documented below.

The technical data are also applicable to the XC version.

Processor module and terminal base

Parameter	Value
Connection of the supply voltage 24 V DC at the terminal base of the processor module	Removable 5-pin terminal block with spring connection
Current consumption on 24 V DC	

Parameter	Value
Min. typ. (module alone)	PM5630-2ETH: 110 mA PM5650-2ETH: 120 mA PM5670-2ETH: 140 mA PM5675-2ETH: 140 mA
Max. typ. (all communication modules and I/Os)	PM5630-2ETH: 850 mA PM5650-2ETH: 900 mA PM5670-2ETH: 950 mA PM5675-2ETH: 950 mA
Number of slots for processor modules	1 (on all terminal bases)
Processor module interfaces at the terminal bases TB56xx	I/O bus, ETH1, ETH2, CAN, COM1
Weight (processor module without terminal base)	135 g
Mounting position	Horizontal or vertical

Table 2: Comparison: PM56xx

Processor module		PM5630	PM5650	PM5670	PM5675
Total maximum downloadable application size ¹⁾		9 MB	84 MB	176 MB	176 MB
	Thereof user program code and data (dynamically allocated)	2 MB	8 MB	32 MB	32 MB
	Thereof user webserver data max.	6 MB	72 MB	128 MB	128 MB
Flash memory for User data					
	Remaining for all other usage (project save, infrastructure...)	30 MB	285 MB	643 MB	643 MB
Buffered (SRAM)		256 kB	256 kB	1.5 MB	1.5 MB
	Thereof VAR retain persistent	128 kB	128 kB	1024 kB	1024 kB
	Thereof %M memory (e.g. Modbus register)	128 kB	128 kB	512 kB	512 kB
Expandable memory		None	None	None	None
Integrated mass storage memory (FLASH)		None	None	None	8 GB
Slot for pluggable memory card		x	x	x	x
Processor type		TI ARM Cortex-A9 32-bit-RISC			
Processor clock speed		300 MHz	600 MHz	1 GHz	1 GHz
Cycle time for 1 instruction (minimum):					
	Binary	Min. 0.02 μ s	Min. 0.01 μ s	Min. 0.002 μ s	Min. 0.002 μ s
	Word	Min. 0.02 μ s	Min. 0.01 μ s	Min. 0.002 μ s	Min. 0.002 μ s

Processor module		PM5630	PM5650	PM5670	PM5675
	Floating point	Min. 0.12 μ s	Min. 0.01 μ s	Min. 0.002 μ s	Min. 0.002 μ s
Mathematic co-processor		x	x	x	x
Motion capability					
	No. synchronized axis per 1 ms on EtherCAT CM typically	-	8*	16*	16*
	No. synchronized axis per 2 ms on EtherCAT CM typically	4*	16*	32*	32*
	No. synchronized axis per 4 ms on EtherCAT CM or CANopen onboard typically	8*	32*	64*	64*
	Min. bus cycle time for EtherCAT using external CM579	2 ms	1 ms	0,5 ms	0,5 ms
* in addition: 1 virtual axis					
Max. number of central inputs and outputs (10 exp. modules):					
	Digital inputs	320			
	Digital outputs	320			
	Analog inputs	160			
	Analog outputs	160			
Number of decentralized inputs and outputs		Depends on the used fieldbus			
Data backup		Battery			
Data buffering time at 25 °C		Typ. 3 years			
Battery low indication		via application program			
Real-time clock:					
	With battery backup	x			
	Accuracy	Typ. \pm 2 s / day at +25 °C			
Program execution:					
	Cyclic	x			
	Time-controlled	x			
	Multitasking	x			
	Minimum cycle time configurable for cyclical task	1 ms	1 ms	0,5 ms	0,5 ms
User program protection by password		x (user management)			
Internal interfaces for communication:					
Serial interface COM1:					
	Physical link	Configurable for RS-232 or RS-485 (9.6 kb/s, 19.2 kb/s, 38.4 kb/s, 57.6 kb/s and 115.2 kb/s)			
	Connection	Pluggable terminal block, spring connection			

Processor module		PM5630	PM5650	PM5670	PM5675
	Usage	Serial ASCII communication, Modbus RTU			
CAN interface:					
	Physical link	CAN 2A/2B (from 50 kb/s to 1 Mb/s)			
	Connection	Pluggable terminal block, spring connection			
	Usage	CANopen master communication, CAN 2A/2B, J1939 protocol, CAN sync			
	Max. number of variables allowed				
	Input variables	2 kB	4 kB	5 kB	5 kB
	Output variables	2 kB	4 kB	5 kB	5 kB
Network interface ETH1, ETH2:					
	Usage	Ethernet			
	Physical link	10/100 base-TX, configurable as internal switch or independent Interfaces			
	Connection	2x RJ45 socket, provided on TB56xx-2ETH			
LEDs, LCD display, function keys		RUN / STOP, status, diagnosis, settings			
Number of timers		Unlimited			
Number of counters		Unlimited			
Programming languages:					
	Structured Text ST	x			
	Instruction list IL	x			
	Function Block Diagram FBD	x			
	Ladder Diagram LD	x			
	Sequential function chart SFC	x			
	Continuous function chart (CFC)	x			

Remarks:

¹⁾: The values are for information only and cannot be fulfilled altogether. The available resources are limited at the end by the maximal downloadable application size for each CPU.

Table 3: Combination of TB56xx-2ETH(-XC) and PM56xx(-XC)

Processor module	PM5630	PM5650	PM5670	PM5675
TB5600-2ETH	0 slot	0 slot	0 slot	0 slot
TB5610-2ETH	1 slot	1 slot	1 slot	1 slot
TB5620-2ETH	2 slots	2 slots	2 slots	2 slots
TB5640-2ETH	-	4 slots	4 slots	4 slots

Processor module	PM5630	PM5650	PM5670	PM5675
TB5660-2ETH	-	-	6 slots ¹⁾	6 slots ¹⁾
Remarks:				
The slots can be used for connecting communication modules or AC500-S modules. Note that only one AC500-S module can be connected at one terminal base.				
¹⁾ PM567x must have an index $\geq C0$.				

Table 4: Comparison: TB56xx

Processor module	PM5630	PM5650	PM5670	PM5675
Max. number of variables allowed for each communication module supported				
Input variables	4 kB	4 kB	5 kB	5 kB
Output variables	4 kB	4 kB	5 kB	5 kB
Type of communication module supported				
CM574-RS/RCOM - serial interface	No	No	No	No
CM5610-2RS - 2 serial interfaces	x	x	x	x
CM582-DP - PROFIBUS DP V0/V1 slave	x	x	x	x
CM592-DP - PROFIBUS DP V0/V1 master	x	x	x	x
CM579-ETHCAT - EtherCAT master	x	x	x	x
CM579-PNIO - PROFINET IO RT controller	x	x	x	x
CM589-PNIO - PROFINET IO RT device	x	x	x	x
CM589-PNIO-4 - PROFINET IO RT with 4 devices	x	x	x	x
CM597-ETH - Ethernet interface	No	No	No	No
CM5640-2ETH - 2 Ethernet interfaces	x	x	x	x
CM588-CN - CAN, CANopen slave	No	No	No	No
CM598-CN - CAN, CANopen master	only CAN 2A/2B	only CAN 2A/2B	only CAN 2A/2B	only CAN 2A/2B
Type of AC500-S module supported				
SM560-S - safety module	x	x	x	x
SM560-S-FD-1 - safety module with F-Device functionality for 1 PROFI-safe network	x	x	x	x
SM560-S -FD-4 - safety module with F-Device functionality for 1 PROFI-safe network	x	x	x	x

Communication and onboard protocols

Table 5: OPC UA server / OPC DA server

Processor module	PM5630	PM5650	PM5670	PM5675
OPC UA server	x	x	x	x
Number of free tags	3.000	10.000	30.000	30.000
Number of connections	10	20	50	50
Min. sampling rate (limit)	500 ms	100 ms	50 ms	50 ms
OPC DA server AE	x	x	x	x
Number of connections	8	8	8	8

Table 6: Modbus, Telecontrol

Processor module	PM5630	PM5650	PM5670	PM5675
Modbus TCP client / server	x	x	x	x
Number of Modbus clients ModMast in parallel on a CPU master (server)	30	50	120	120
Number of Modbus server in parallel (e.g. for SCADA access)	15	25	50	50
IEC 60870-5-104 telecontrol protocol	x	x	x	x
Number of free tags	1.000	5.000	10.000	10.000
Control station (number of connections)	5	10	20	20
Sub-station (number of connections)	5	10	20	20

4 System data AC500

4.1 Environmental conditions


Table 7: Process and supply voltages

Parameter	Value
24 V DC	
Voltage	24 V (-15 %, +20 %)
Protection against reverse polarity	Yes
120 V AC	
Voltage	120 V (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
230 V AC	
Voltage	230 V AC (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
120 V AC...240 V AC wide-range supply	
Voltage	120 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 10 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 Insulation test voltages, routine test

According to EN 61131-2

Parameter	Value	
230 V circuits against other circuitry	2500 V	1.2/50 μ s
120 V circuits against other circuitry	1500 V	1.2/50 μ s
120 V ... 240 V circuits against other circuitry	2500 V	1.2/50 μ s
24 V circuits (supply, 24 V inputs/outputs, analog inputs/outputs), if they are galvanically isolated against other circuitry	500 V	1.2/50 μ s
COM interfaces, galvanically isolated	500 V	1.2/50 μ s

Parameter	Value	
Ethernet	500 V	1.2/50 μ s
230 V circuits against other circuitry	1350 V	AC 2 s
120 V circuits against other circuitry	820 V	AC 2 s
120 V ... 240 V circuits against other circuitry	1350 V	AC 2 s
24 V circuits (supply, 24 V inputs/outputs, analog inputs/outputs), if they are galvanically isolated against other circuitry	350 V	AC 2 s
COM interfaces, galvanically isolated	350 V	AC 2 s
Ethernet	350 V	AC 2 s

According to IEC 61010-2-201



The content of the following table is only valid for PM56xx, CM56xx and TB56xx.

Table 8: Insulation, test voltages and continuous voltages

	Insulation	Test Voltage	Continuous Voltage
COM interfaces, galvanically isolated	1.1 mm	1216 V DC (60 s) 1500 V (1.2/50 μ s)	75 V
CAN interface, galvanically isolated	1.1 mm	1216 V DC (60 s) 1500 V (1.2/50 μ s)	75 V
Ethernet	1.1 mm	1500 V rms (50-60 Hz, 60 s) 2400 V (1.2/50 μ s)	On request


4.4 Power supply units

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.

	<p>WARNING!</p> <p>Improper installation can lead to death by touching hazardous voltages!</p> <p>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.</p> <ul style="list-style-type: none"> – 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.
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4.5 Electromagnetic compatibility

Table 9: Range of use

Application
Device suitable only as <i>Control Equipment for Industrial Applications</i> .

Table 10: Immunity against electrostatic discharge (ESD), according to IEC 61000-4-2, zone B, criterion B

Parameter	Value
Electrostatic voltage in case of air discharge	8 kV
Electrostatic voltage in case of contact discharge	4 kV, in a closed control cabinet 6 kV ¹⁾
ESD with communication connectors	In order to prevent operating malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.
ESD with connectors of terminal bases	The connectors between the terminal bases and processor modules or communication modules must not be touched during operation. The same is valid for the I/O bus with all modules involved.

¹⁾ High requirement for shipping classes are achieved with additional specific measures (see specific documentation).

Table 11: Immunity against the influence of radiated (CW radiated), according to IEC 61000-4-3, zone B, criterion A

Parameter	Value
Test field strength	10 V/m

Table 12: Immunity against fast transient interference voltages (burst), according to IEC 61000-4-4, zone B, criterion B

Parameter	Value
Power supply (DC)	2 kV
Power supply (AC)	2 kV
Digital inputs/outputs (24 V DC)	1 kV
Digital inputs/outputs (120 V AC ... 240 V AC)	2 kV

Parameter	Value
Analog inputs/outputs	1 kV
CS31 bus	1 kV
Serial RS-485 interfaces (COM)	1 kV
Serial RS-232 interfaces (COM)	1 kV
Ethernet	1 kV
I/O supply (DC-out)	1 kV

Table 13: Immunity against the influence of line-conducted interferences (CW conducted), according to IEC 61000-4-6, zone B, criterion A

Parameter	Value
Test voltage	3V zone B, 10 V is also met.
High energy surges	According to IEC 61000-4-5, zone B, criterion B
Power supply (DC)	1 kV CM / 0.5 kV DM ²⁾
DC I/O supply	0.5 kV CM / 0.5 kV DM ²⁾
Communication Lines, shielded	1 kV CM ²⁾
AC I/O unshielded ³⁾	2 kV CM / 1 kV DM ²⁾
I/O analog, I/O DC unshielded ³⁾	1 kV CM / 0.5 kV DM ²⁾
Radiation (radio disturbance)	According to IEC 55011, group 1, class A

²⁾ CM = Common Mode, DM = Differential Mode

³⁾ When DC I/O inputs are used with AC voltage, external filters limiting high energy surges to 1 kV CM / 0.5 DM are required to meet requirements according IEC 61131-2.

4.6 Mechanical data

Parameter	Value
Mounting	Horizontal
Degree of protection	PLC system: IP 20 <ul style="list-style-type: none"> ● with all modules plugged in ● with all terminals plugged in ● with all covers closed
Housing	Classification V-2 according to UL 94
Vibration resistance acc. to EN 61131-2	all three axes 2 Hz ... 8.4 Hz, continuous 3.5 mm 8.4 Hz ... 150 Hz, continuous 1 g (higher values on request)
Shock test	All three axes 15 g, 11 ms, half-sinusoidal
Mounting of the modules:	
DIN rail according to DIN EN 50022	35 mm, depth 7.5 mm or 15 mm
Mounting with screws	Screws with a diameter of 4 mm
Fastening torque	1.2 Nm

4.7 Approvals and certifications

Information on approvals and certificates can be found in the PLC Automation *catalog*, in the table "Certifications" in the chapter "Additional information".

5 System data AC500-XC



Assembly, construction and connection of devices of the variant AC500-XC is identical to AC500 (standard).

↪ Chapter 4 "System data AC500" on page 10

The following description provides information on general technical data of AC500-XC system.

5.1 Environmental conditions

Table 14: Process and supply voltages

Parameter	Value
24 V DC	
Voltage	24 V (-15 %, +20 %)
Protection against reverse polarity	Yes
120 V AC...240 V AC wide-range supply	
Voltage	120 ... 240 V (-15 %, +10 %)
Frequency	50/60 Hz (-6 %, +4 %)
Allowed interruptions of power supply	
DC supply	Interruption < 10 ms, time between 2 interruptions > 1 s, PS2



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.



NOTICE!

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



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

Parameter		Value
Temperature		
	Operating	-40 °C ... +70 °C -40 °C ... -30 °C: Proper start-up of system; technical data not guaranteed -40 °C ... 0 °C: Due to the LCD technology, the display might respond very slowly. -40 °C ... +40 °C: Vertical mounting of modules possible, output load limited to 50 % per group +60 °C ... +70 °C with the following deratings: <ul style="list-style-type: none"> ● System is limited to max. 2 communication modules per terminal base ● 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		Operating: -1000 m 4000 m (1080 hPa ... 620 hPa) > 2000 m (< 795 hPa): <ul style="list-style-type: none"> ● max. operating temperature must be reduced by 10 K (e.g. 70 °C ... 60°C) ● I/O module relay contacts must be operated with 24 V nominal only

Parameter	Value
Immunity to corrosive gases	Operating: Yes, according to: ISA S71.04.1985 Harsh group A, G3/GX IEC 60721-3-3 3C2 / 3C3
Immunity to salt mist	Operating: Yes, horizontal mounting only, according to IEC 60068-2-52 severity level: 1

**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.

Table 15: Electromagnetic compatibility

Parameter	Value
Device suitable only as <i>Control Equipment for Industrial Applications</i> .	
Radiated emission (radio disturbances)	Yes, according to: CISPR 16-2-3
Conducted emission (radio disturbances)	Yes, according to: CISPR 16-2-1, CISPR 16-1-2
Electrostatic discharge (ESD)	Yes, according to: IEC 61000-4-2, zone B, criterion B
Fast transient interference voltages (burst)	Yes, according to: IEC 61000-4-4, zone B, criterion B
High energy transient interference voltages (surge)	Yes, according to: IEC 61000-4-5, zone B, criterion B
Influence of radiated disturbances	Yes, according to: IEC 61000-4-3, zone B, criterion A
Influence of line-conducted interferences	Yes, according to: IEC 61000-4-6, zone B, criterion A
Influence of power frequency magnetic fields	Yes, according to: IEC 61000-4-8, zone B, criterion A



In order to prevent malfunctions, it is recommended, that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

**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 Mechanical data

Parameter	Value
Wiring method	Spring terminals
Degree of protection	PLC system: IP 20 <ul style="list-style-type: none"> • with all modules plugged in • with all terminals plugged in • with all covers closed
Vibration resistance	Yes, according to: IEC 61131-2 IEC 60068-2-6 IEC 60068-2-64
Shock resistance	Yes, according to: IEC 60068-2-27
Assembly position	Horizontal Vertical (no application in salt mist environment)
Assembly on DIN rail	
DIN rail type	According to IEC 60715 35 mm, depth 7.5 mm or 15 mm
Assembly with screws	
Screw diameter	4 mm
Fastening torque	1.2 Nm

5.3 Environmental tests

Parameter	Value
Storage	IEC 60068-2-1 Test Ab: cold withstand test -40 °C / 16 h IEC 60068-2-2 Test Bb: dry heat withstand test +85 °C / 16 h
Humidity	IEC 60068-2-30 Test Db: Cyclic (12 h / 12 h) damp-heat test 55 °C, 93 % r. H. / 25 °C, 95 % r. H., 6 cycles IEC 60068-2-78, stationary humidity test: 40 °C, 93 % r. H., 240 h
Insulation Test	IEC 61131-2

Parameter	Value
Vibration resistance	IEC 61131-2 / IEC 60068-26: 5 Hz ... 500 Hz, 2 g (with memory card inserted) IEC 60068-2-64: 5 Hz ... 500 Hz, 4 g rms
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

Table 16: EMC immunity

Parameter	Value
Electrostatic discharge (ESD)	Electrostatic voltage in case of air discharge: 8 kV Electrostatic voltage in case of contact discharge: 6 kV
Fast transient interference voltages (burst)	Power supply (DC): 4 kV Digital inputs/outputs (24 V DC): 2 kV Analog inputs/outputs: 2 kV Communication lines shielded: 2 kV I/O supply (DC-out): 2 kV
High energy transient interference voltages (surge)	Power supply (DC): 1 kV CM *) / 0.5 kV DM *) Digital inputs/outputs (24 V DC): 1 kV CM *) / 0.5 kV DM *) Digital inputs/outputs (AC): 4 kV Analog inputs/outputs: 1 kV CM *) / 0.5 kV DM *) Communication lines shielded: 1 kV CM *) I/O supply (DC-out): 0,5 kV CM *) / 0.5 kV DM *)
Influence of radiated disturbances	Test field strength: 10 V/m
Influence of line-conducted interferences	Test voltage: 10 V
Power frequency magnetic fields	30 A/m 50 Hz 30 A/m 60 Hz

*) CM = Common Mode, * DM = Differential Mode