

DATA SHEET

TA5101-4DI

Option board



1 Ordering data

Part no.	Description	Product life cycle phase *)
1SAP 187 000 R0001	TA5101-4DI: AC500-eCo, digital input option board, 4DI 24 V DC, spring/cable front terminal 3.50 mm pitch	Active
1SAP 187 000 R0201	TA5101-4DIW: AC500-eCo, digital input option board, 4DI 24 V DC, spring/cable front terminal 3.50 mm pitch, wide temperature range	Active
Spare parts		
1SAP 187 400 R0012 **)	TA5220-SPF5: spring terminal block, removable, 5-pin, spring front, cable front, 6 pieces per packing unit	Active

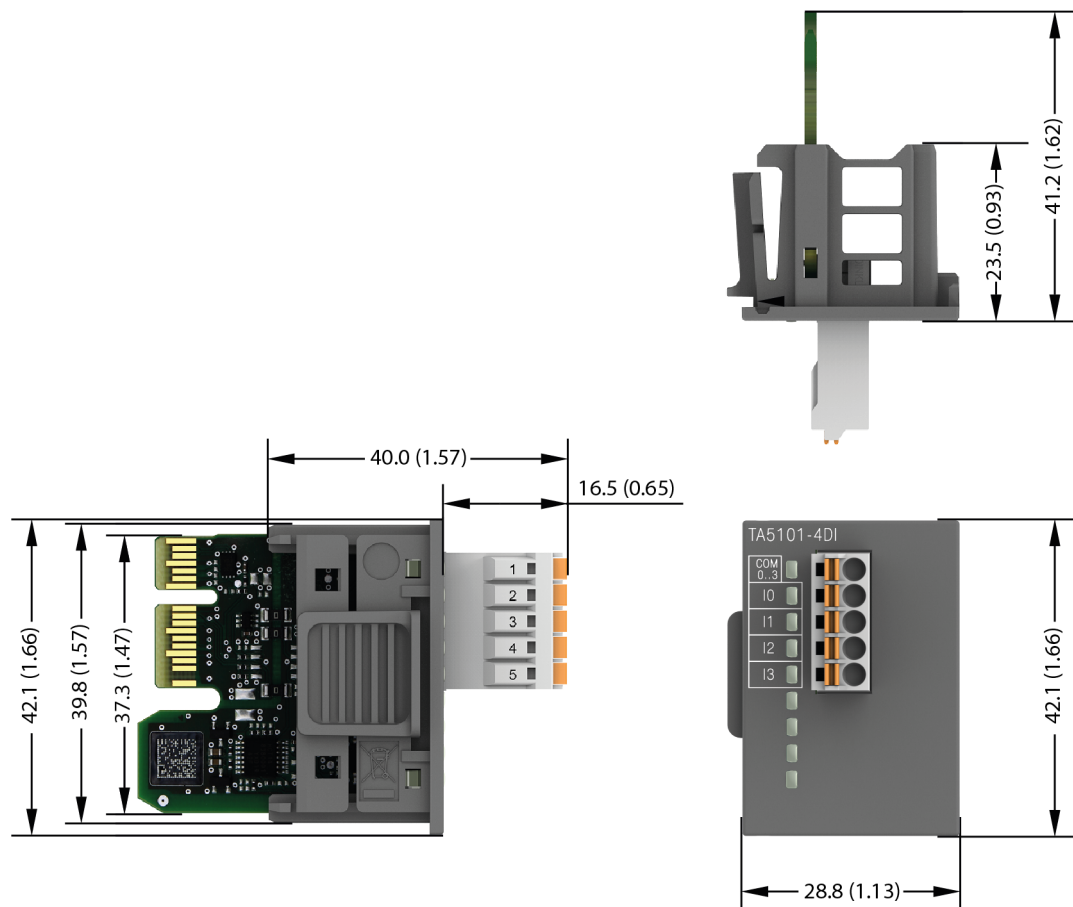


*) Modules in lifecycle Classic are available from stock but not recommended for planning and commissioning of new installations.



**) The needed spring terminal block is always delivered with the option board. The terminal block listed in the table is for spare part only if needed.

2 Dimensions



The dimensions are in mm and in brackets in inch.

3 Technical data

The system data apply.

🔗 Chapter 4 “System data AC500-eCo” on page 4

Only additional details are therefore documented below.

Parameter	Value
Galvanic isolation	Yes, between the input group and the rest of the module
Isolated groups	1 (4 channels per group)
Current consumption from 24 V DC power supply at the L+ and M terminals of the CPU	Ca. 10 mA
Max. power dissipation within the module	0.8 W
Weight	15 g

Parameter	Value
Mounting position	Horizontal or vertical
Cooling	The natural convection cooling must not be hindered by cable ducts or other parts in the control cabinet.

Table 1: Technical data of the digital inputs

Parameter	Value	
Number of channels per module	4 inputs 24 V DC	
Distribution of the channels into groups	1 (4 channels per group)	
Connections of the channels I0 to I3	Terminals 2 to 5	
Reference potential for the channels I0 to I3	Terminal 1 (plus or negative pole of the process supply voltage, signal name COM 0 ... 3)	
Indication of the input signals	1 yellow LED per channel; the LED is ON when the input signal is high (signal 1). The module is powered through the CPU connection.	
Monitoring point of input indicator	LED	
Input type according to EN 61131-2	Type 1 source	Type 1 sink
Input signal range	-24 V DC	+24 V DC
Signal 0	-5 V ... +3 V	-3 V...+5 V
Undefined signal	-15 V ... -5 V	+5 V ... +15 V
Signal 1	-30 V ... -15 V	+15 V ... +30 V
Input current per channel		
Input voltage 24 V	Typ. 5 mA	
Input voltage 5 V	Typ. 1 mA	
Input voltage 14 V		
Input voltage 15 V	< 3 mA	
Input voltage 27 V		
Input voltage 30 V	< 7 mA	
Max. permissible leakage current (at 2-wire proximity switches)	1 mA	
Input delay (0->1 or 1->0)	Typ. 8 ms	
Input data length	1 byte	
Max. cable length		
Shielded	500 m	
Unshielded	300 m	

4 System data AC500-eCo

4.1 Environmental conditions

Table 2: Process and supply voltages

Parameter		Value
24 V DC		
	Voltage	24 V (-15 %, +20 %)
	Protection against reverse polarity	Yes
24 V AC		
	Voltage	24 V (-15 %, +10 %)
	Frequency	50/60 Hz (-6 %, +4 %)
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
	DC supply (only for analog option boards TA512x)	Interruption < 1 ms, time between 2 interruptions > 1s, PS1



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** and the **technical data** of the used module.
- 🔗 Chapter 4 "System data AC500-eCo" on page 4



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.

4.1.1 Processor modules

Table 3: Temperature ranges for processor modules revision 0

Parameter		Value			
		PM5012-x-ETH	PM5032-x-ETH, PM5052-x-ETH, PM5072-T-2ETH	PM5072-T-2ETHW	
Temperature					
	Operating				
		Horizontal mounting	0 °C ... +55 °C	0 °C ... +60 °C	-20 °C ... +70 °C Between 60 °C ... 70° C: I/O derating to 75 % Only 75 % of the I/O channels are allowed to be energized simultaneously, e.g., only 6 of 8 output channels.
		Vertical mounting (output load reduced to 50 % per group)	0 °C ... +40 °C		-20 °C ... +40 °C
	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		



The PM5072-T-2ETHW (R0273) can be used down to -40 °C from the production index B0. The production index and the temperature range are printed on the side stickers of the module and packaging stickers.

Table 4: Temperature ranges for processor modules revision 1

Parameter		Value		
		PM5012-x-ETH	PM5032-x-ETH, PM5052-x-ETH, PM5072-T-2ETH, PM5082-T-2ETH, PM5092-T-2ETH	PM5072-T-2ETHW
Temperature				
	Operating			
	Horizontal mounting	0 °C ... +55 °C	-20 °C ... +60 °C	-40 °C ... +70 °C Between 60 °C ... 70 °C: I/O derating to 75 % Only 75 % of the I/O channels are allowed to be energized simultaneously, e.g., only 6 of 8 output channels.

Parameter			Value		
			PM5012-x-ETH	PM5032-x-ETH, PM5052-x-ETH, PM5072-T-2ETH, PM5082-T-2ETH, PM5092-T-2ETH	PM5072-T-2ETHW
		Vertical mounting (output load reduced to 50 % per group)	0 °C ... +40 °C	-20 °C ... +40 °C	-40 °C ... +40 °C
	Storage		-40 °C ... +70 °C		
	Transport		-40 °C ... +70 °C		
Humidity			Max. 95 %, without condensation		
Coating			-		Basic PCB coating to enhance robustness.
Air pressure					
	Operating		> 800 hPa / < 2000 m		
	Storage		> 660 hPa / < 3500 m		

4.1.2 Option boards

Table 5: Standard temperature ranges with processor modules revision 0

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating	
Digital I/O option boards					
TA5101-4DI	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating	
TA5105-4DOT		PM50x2-x-ETH	0 °C ... +60 °C	No derating	
TA5110-2DI2DOT		PM5072-T-2ETH			
Analog input option boards					
TA5120-2AI-UI	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating	
TA5122-2AI-TC		PM50x2-x-ETH	0 °C ... +60 °C	No derating	
TA5123-2AI-RTD		PM5072-T-2ETH			
Analog output option boards					
TA5126-2AO-UI	0 V ... +10 V	PM5012-T-ETH	0 °C ... +55 °C	No derating	
		PM50x2-R-ETH			
		PM50x2-T-ETH	0 °C ... +60 °C	No derating	
	0 mA ... +20 mA	PM5072-T-2ETH	PM5072-T-2ETH		
			PM50x2-x-ETH	0 °C ... +45 °C	No derating
					Load: 0 Ω ... 500 Ω
		+45 °C ... +50 °C	50 %	Load: 250 Ω ... 500 Ω	
		+50 °C ... +55 °C	100 %	Load: 500 Ω	
Analog input/output option boards					
TA5128-2AI1AO	Input: 0 V ... +10 V	PM5012-x-ETH	0 °C ... +55 °C	No derating	

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
		PM50x2-x-ETH PM5072-T-2ETH	0 °C ... +60 °C	No derating
	Output: 0 V ... +10 V	PM5012-x-ETH	0 °C ... +55 °C	No derating
		PM50x2-x-ETH PM5072-T-2ETH	0 °C ... +60 °C	No derating
	Output: 0 mA ... +20 mA	PM50x2-x-ETH PM5072-T-2ETH	0 °C ... +45 °C	No derating Load: 0 Ω ... 500 Ω
			+45 °C ... +50 °C	50 % Load: 250 Ω ... 500 Ω
			+50 °C ... +55 °C	100 % Load: 500 Ω
	Accessory option boards			
TA5130-KNXPB	Not relevant	PM5072-T-2ETH	0 °C ... 60 °C	No derating
TA5131-RTC	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
Option boards for serial interface				
TA5141-RS232I	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
TA5142-RS485I		PM50x2-x-ETH	0 °C ... +60 °C	No derating
TA5142-RS485		PM5072-T-2ETH		

Table 6: Standard temperature ranges with processor modules revision 1

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
Digital I/O option boards				
TA5101-4DI	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
TA5105-4DOT		PM50x2-x-ETH	-20 °C ... +60 °C	No derating
TA5110-2DI2DOT		PM50x2-T-2ETH		
Analog input option boards				
TA5120-2AI-UI	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
TA5122-2AI-TC		PM50x2-x-ETH	-20 °C ... +60 °C	No derating
TA5123-2AI-RTD		PM50x2-T-2ETH		
Analog output option boards				
TA5126-2AO-UI	0 V ... +10 V	PM5012-T-ETH	0 °C ... +55 °C	No derating
		PM50x2-R-ETH	-20 °C ... +55 °C	No derating
		PM50x2-T-ETH PM50x2-T-2ETH	-20 °C ... +60 °C	No derating
	0 mA ... +20 mA	PM5012-x-ETH	0 °C ... +45 °C	No derating
		PM50x2-x-ETH PM50x2-T-2ETH	-20 °C ... +45 °C	Load: 0 Ω ... 500 Ω
		PM50x2-x-ETH PM50x2-T-2ETH	+45 °C ... +50 °C	50 % Load: 250 Ω ... 500 Ω

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
		PM50x2-x-ETH PM50x2-T-2ETH	+50 °C ... +55 °C	100 % Load: 500 Ω
Analog input/output option boards				
TA5128-2AI1AO	Input: 0 V ... +10 V	PM5012-x-ETH	0 °C ... +55 °C	No derating
		PM50x2-x-ETH PM50x2-T-2ETH	-20 °C ... +60 °C	No derating
	Output: 0 V ... +10 V	PM5012-x-ETH	0 °C ... +55 °C	No derating
		PM50x2-x-ETH PM50x2-T-2ETH	-20 °C ... +60 °C	No derating
	Output: 0 mA ... +20 mA	PM5012-x-ETH	0 °C ... +55 °C	No derating
		PM50x2-x-ETH PM50x2-T-2ETH	-20 °C ... +60 °C	No derating
Accessory option boards				
TA5130-KNXPB	Not relevant	PM50x2-T-2ETH	-20 °C ... 60 °C	No derating
TA5131-RTC	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
Option boards for serial interface				
TA5141-RS232I	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
TA5142-RS485I		PM50x2-x-ETH	-20 °C ... +60 °C	No derating
TA5142-RS485		PM50x2-T-2ETH		
TA5146-CN	Not relevant	PM50x2-x-ETH PM50x2-T-2ETH	-20 °C ... +60 °C	No derating



The option boards W version can be used down to -40 °C from the production index B0. The production index and the temperature range are printed on the side stickers of the module and packaging stickers.

Table 7: Wide temperature ranges

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
Digital I/O option boards				
TA5101-4DIW	Not relevant	PM5072-T-2ETHW	-40 °C ... +60 °C	No derating
TA5105-4DOTW			+60 °C ... +70 °C	I/O derating to 75 %
TA5110-2DI2DOW				Only 3 of 4 I/O channels are allowed to be energized simultaneously.
Analog input option boards				
TA5120-2AI-UIW	Not relevant	PM5072-T-2ETHW	-40 °C ... +60 °C	No derating
TA5122-2AI-TC				
TA5123-2AI-RTW				
Analog output option boards				

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
TA5126-2AO-UIW	0 V ... +10 V	PM5072-T-2ETHW	-40 °C ... +60 °C	No derating
	0 mA ... +20 mA	PM5072-T-2ETHW	-40 °C ... +45 °C	No derating Load: 0 Ω ... 500 Ω
			+45 °C ... +50 °C	50 % Load: 250 Ω ... 500 Ω
			+50 °C ... +55 °C	100 % Load: 500 Ω
Analog input/output option boards				
TA5128-2AI1AOW	Input: 0 V ... +10 V	PM5072-T-2ETHW	-40 °C ... +70 °C	No derating
	Output: 0 V ... +10 V	PM5072-T-2ETHW	-40 °C ... +70 °C	No derating
	Output: 0 mA ... +20 mA	PM5072-T-2ETHW	-40 °C ... +65 °C	No derating
Option boards for serial interface				
TA5141-RS232IW TA5142-RS485IW TA5142-RS485W	Not relevant	PM5072-T-2ETHW	-40 °C ... +70 °C	No derating
TA5146-CNW	Not relevant	PM5072-T-2ETHW	-40 °C ... +70 °C	No derating

4.1.3 I/O modules

Table 8: Temperature ranges and environmental conditions for I/O modules

Parameter		Value	
Temperature			
	Operating		
	Horizontal mounting		
	Module type	Index below E0	From index E0
	AI561	0 °C ... +60 °C	-20 °C ... +60 °C
	AI562	0 °C ... +60 °C	
	AI563	0 °C ... +60 °C	
	AI568	-20 °C ... +60 °C	
	AO561	0 °C ... +60 °C	-20 °C ... +60 °C
	AO562	-20 °C ... +60 °C	
	AO568	-20 °C ... +60 °C	
	AX561	0 °C ... +60 °C	-20 °C ... +60 °C
	DC562	0 °C ... +60 °C	
	DI561	0 °C ... +60 °C	-20 °C ... +60 °C
	DI562	0 °C ... +60 °C	-20 °C ... +60 °C
	DI571	0 °C ... +60 °C	

Parameter			Value	
		DI572	0 °C ... +60 °C	
		DO561	0 °C ... +60 °C	-20 °C ... +60 °C
		DO562	0 °C ... +60 °C	
		DO571	0 °C ... +60 °C	
		DO572	0 °C ... +60 °C	
		DO573	0 °C ... +60 °C	
		DX561	0 °C ... +60 °C	-20 °C ... +60 °C
		DX571	0 °C ... +60 °C	
	Vertical mounting			
	(output load reduced to 50 % per group)			
		Module type	Index below E0	From index E0
		AI561	0 °C ... +40 °C	-20 °C ... +40 °C
		AI562	0 °C ... +40 °C	
		AI563	0 °C ... +40 °C	
		AI568	-20 °C ... +40 °C	
		AO561	0 °C ... +40 °C	-20 °C ... +40 °C
		AO562	-20 °C ... +40 °C	
		AO568	-20 °C ... +40 °C	
		AX561	0 °C ... +40 °C	-20 °C ... +40 °C
		DC562	0 °C ... +40 °C	
		DI561	0 °C ... +40 °C	-20 °C ... +40 °C
		DI562	0 °C ... +40 °C	-20 °C ... +40 °C
		DI571	0 °C ... +40 °C	
		DI572	0 °C ... +40 °C	
		DO561	0 °C ... +40 °C	-20 °C ... +40 °C
		DO562	0 °C ... +40 °C	
		DO571	0 °C ... +40 °C	
DO572		0 °C ... +40 °C		
DO573		0 °C ... +40 °C		
DX561		0 °C ... +40 °C	-20 °C ... +40 °C	
DX571	0 °C ... +40 °C			
Storage				
	All module types	-40 °C ... +70 °C		
Transport				
	All module types	-40 °C ... +70 °C		
Humidity				
	All module types	Max. 95 %, without condensation		
Air pressure				
	Operating			
	All module types	> 800 hPa / < 2000 m		

Parameter		Value
Storage		
	All module types	> 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 9: 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 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): 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 • With all modules or option boards plugged in. • With all terminals plugged in. • With all covers closed.
Housing	Classification V-0 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
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*](#).