

DATA SHEET

TA5110-2DI2DOT

Option board

**1 Ordering data**

Part no.	Description	Product life cycle phase *)
1SAP 187 000 R0003	TA5110-2DI2DOT: AC500-eCo V3, digital I/O option board, 2DI 24 V DC, 2DO-T 24 V DC / 0.5 A, spring/cable front terminal 3.50 mm pitch	Active
1SAP 187 000 R0203	TA5110-2DI2DOW: AC500-eCo V3, digital I/O option board, 2DI 24 V DC, 2DO-T 24 V DC / 0.5 A, spring/cable front terminal 3.50 mm pitch, wide temperature range	Active
Spare parts		
1SAP 187 400 R0014 **)	TA5220-SPF7: spring terminal block, removable, 7-pin, spring front, cable front, 6 pieces per packing unit	Active

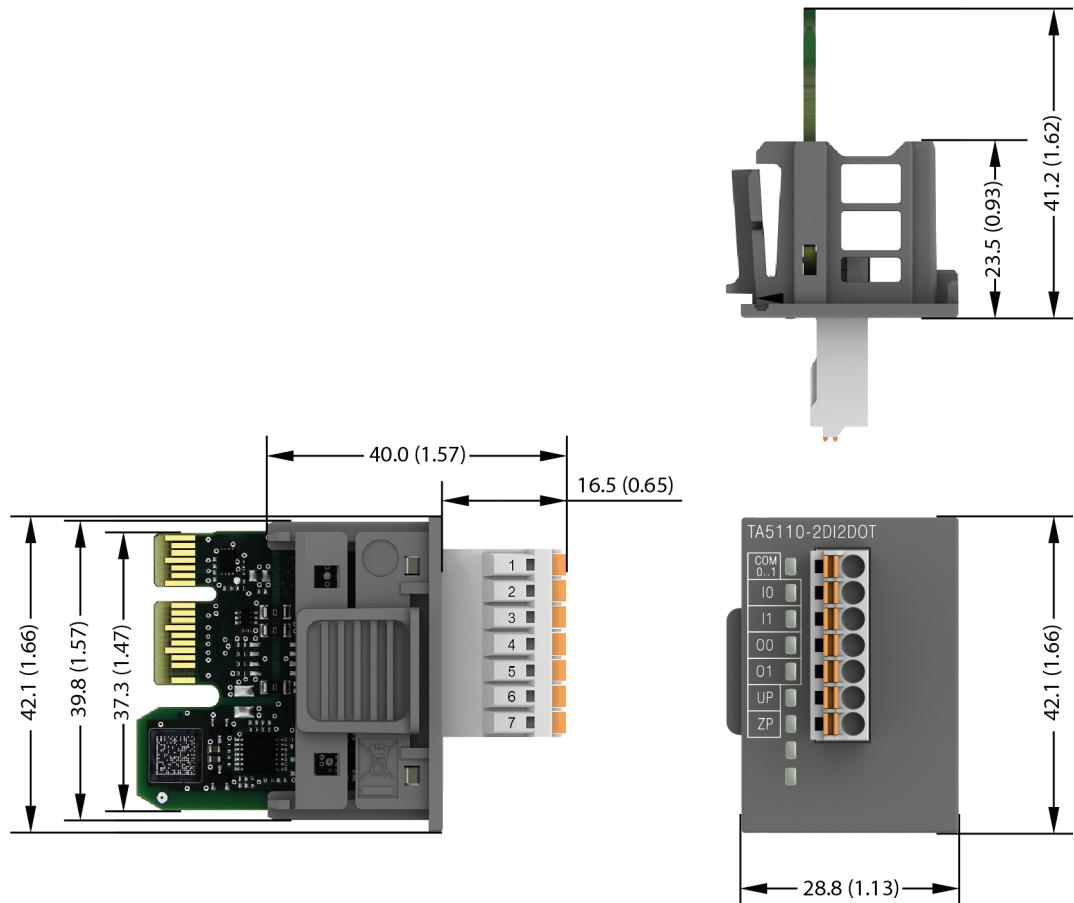


*) Modules in lifecycle Classic are available from stock but not recommended for planning and commissioning of new installations.



**) 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 of AC500-eCo V3 apply [↳ Chapter 4 “System data AC500-eCo” on page 5](#). Only additional details are therefore documented below.

Parameter	Value
Process supply voltage UP	
Connections	Terminal 6 for UP (+24 V DC) and terminal 7 for ZP (0 V DC)
Rated value	24 V DC
Current consumption via UP terminal	5 mA + max. 0.5 A per output
Max. ripple	5 %
Inrush current	0.000002 A ² s
Protection against reversed voltage	Yes
Rated protection fuse for UP	On request

Parameter	Value
Current consumption from 24 V DC power supply at the L+/M terminals of the CPU	Ca. 10 mA
Galvanic isolation	Yes, between the input group and the output group and the rest of the module
Isolated groups	2 groups (1 group for 2 input channels, 1 group for 2 output channels)
Surge-voltage (max.)	35 V DC for 0.5 s
Max. power dissipation within the module	0.7 W
Weight	15 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.

Table 1: Technical data of the digital inputs

Parameter	Value	
Number of channels per module	2	
Distribution of the channels into groups	1 group for 2 channels	
Connections of the channels I0 to I1	Terminals 2 to 3	
Reference potential for the channels I0 to I1	Terminal 1	
Indication of the input signals	1 yellow LED per channel; the LED is ON when the input signal is high (signal 1)	
Monitoring point of input indicator	LED It is not part of input circuit (its controlled by processor side, not process side)	
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
Ripple with signal 0	-5 V ... +3 V	-3 V ... +5 V
Ripple with 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 +15 V	< 3 mA
	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		

Parameter	Value
Shielded	500 m
Unshielded	150 m

Table 2: Technical data of the digital outputs

Parameter	Value
Number of channels per module	2 transistor outputs (24 V DC, 0.5 A max.)
Distribution of the channels into groups	1 group of 2 channels
Connection of the channels O0 to O1	Terminals 4 to 5
Reference potential for the channels O0 to O17	Terminal 7 (negative pole of the process voltage, name ZP)
Common power supply voltage	Terminal 6 (positive pole of the process voltage, name UP)
Indication of the output signals	1 yellow LED per channel; the LED is on when the output signal is high (signal 1) and the module is powered via the I/O bus
Monitoring point of output indicator	Controlled together with transistor
Way of operation	Non-latching type
Min. output voltage at signal 1	UP - 0.1 V
Output delay	
0 to 1	50 µs
1 to 0	200 µs
Output data length	1 byte
Output current	
Rated current per channel (max.)	0.5 A at UP 24 V DC (resistance, general use and pilot duty)
Rated current per group (max.)	1 A
Rated current (all channels together, max.)	1 A
Max. leakage current with signal 0	0.5 mA
Output type	Non-protected
Protection type	External fuse on each channel
Rated protection fuse (for each channel)	On request
Demagnetization when inductive loads are switched off	Must be performed externally according to driven load specification
Switching Frequencies	
With resistive load	Limited by CPU cycle time
With inductive load	Max. 0.5 Hz
With lamp load	Max. 11 Hz at max. 5 W
Short-circuit-proof / Overload-proof	No
Overload message	No
Output current limitation	No
Resistance to feedback against 24 V DC	No
Connection of 2 outputs in parallel	Not possible

Parameter	Value
Max. cable length	
Shielded	500 m
Unshielded	150 m

4 System data AC500-eCo

4.1 Environmental conditions

Table 3: 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 5


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.

CPUs

Table 4: 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		
	> 660 hPa / < 3500 m		

Table 5: Temperature ranges for processor modules revision 1

Parameter	Value		
	PM5012-x-ETH	PM5032-x-ETH, PM5052-x-ETH, PM5072-T-2ETH, PM5082-T-2ETH	PM5072-T-2ETHW
Temperature			
Operating	Horizontal mounting	0 °C ... +55 °C -20 °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	-20 °C ... +40 °C
Storage		-40 °C ... +70 °C	
Transport		-40 °C ... +70 °C	
Humidity		Max. 95 %, without condensation	
		-	
		Simple coating for acci- dental condensation	

Parameter	Value		
	PM5012-x-ETH	PM5032-x-ETH, PM5052-x-ETH, PM5072-T-2ETH, PM5082-T-2ETH	PM5072-T-2ETHW
Air pressure			
Operating	> 800 hPa / < 2000 m		
	Storage	> 660 hPa / < 3500 m	

Option boards

Table 6: Standard temperature ranges with processor modules revision 0

Option boards	Configuration	Processor modules	Operating temper- ature 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
TA5123-2AI-RTD		PM50x2-x-ETH	0 °C ... +60 °C	No derating
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		
	0 mA ... +20 mA	PM50x2-T-ETH	0 °C ... +60 °C	No derating
		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 TA5142-RS485I TA5142-RS485	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	No derating
		PM50x2-x-ETH	0 °C ... +60 °C	No derating
		PM5072-T-2ETH		

Table 7: 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
TA5123-2AI-RTD		PM50x2-x-ETH	-20 °C ... +60 °C	No derating
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	-20 °C ... +60 °C	No derating
		PM50x2-T-2ETH		
	0 mA ... +20 mA	PM5012-x-ETH	0 °C ... +45 °C	No derating
		PM50x2-x-ETH	-20 °C ... +45 °C	Load: 0 Ω ... 500 Ω
		PM50x2-T-2ETH		
		PM50x2-x-ETH	+45 °C ... +50 °C	50 % Load: 250 Ω ... 500 Ω
		PM50x2-T-2ETH	+50 °C ... +55 °C	100 % Load: 500 Ω
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		

Table 8: Wide temperature ranges

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
Digital I/O option boards				
TA5101-4DIW	Not relevant	PM5072-T-2ETHW	-20 °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	-20 °C ... +60 °C	No derating
TA5123-2AI-RTW				

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
Analog output option boards				
TA5126-2AO-UIW	0 V ... +10 V	PM5072-T-2ETHW	-20 °C ... +60 °C	No derating
	0 mA ... +20 mA		-20 °C ... +45 °C Load: 0 Ω ... 500 Ω	No derating
			+45 °C ... +50 °C Load: 250 Ω ... 500 Ω	50 %
			+50 °C ... +55 °C Load: 500 Ω	100 %
Accessory option boards				
TA5130-KNXPBW	Not relevant	PM5072-T-2ETHW	-20 °C ... 70 °C	No derating
Option boards for serial interface				
TA5141-RS232IW TA5142-RS485IW TA5142-RS485W	Not relevant	PM5072-T-2ETHW	-20 °C ... +70 °C	No derating

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 11	
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

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

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-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](#).