DATA SHEET

TA5105-4DOT

Option board

1 Ordering data

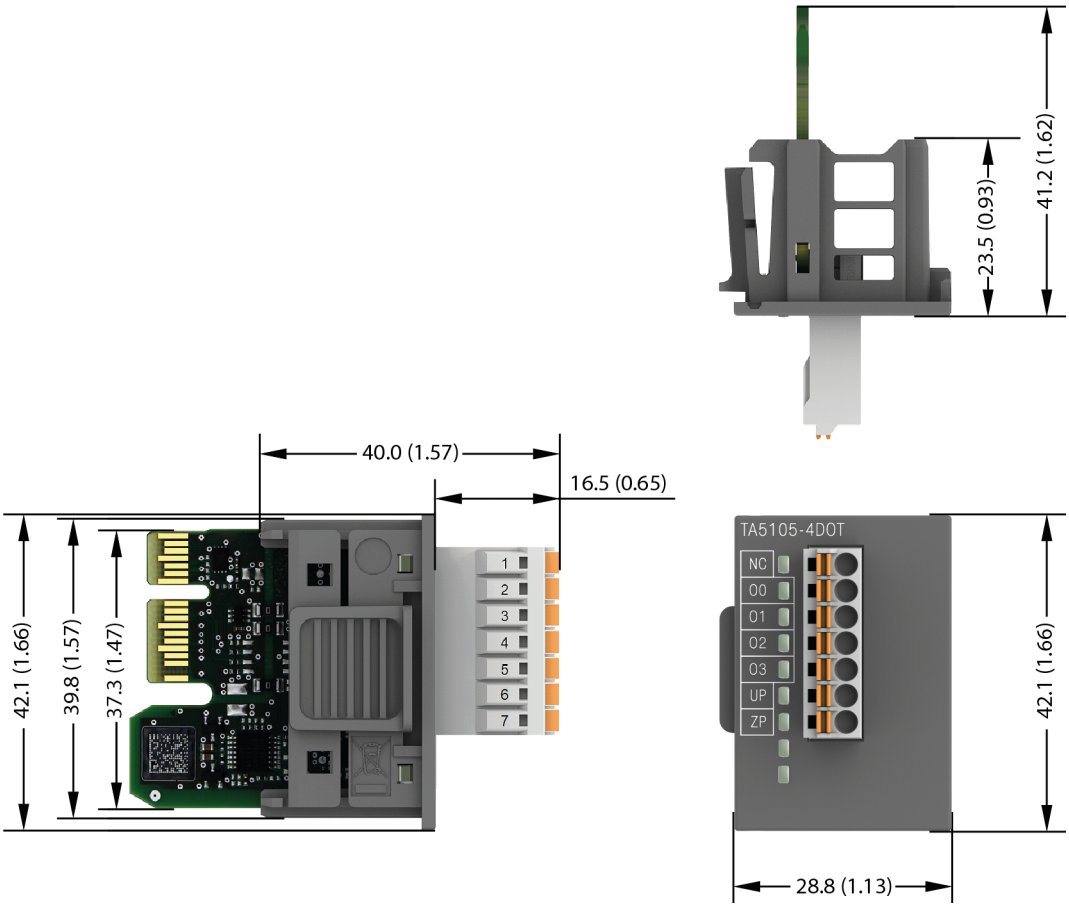
Part no.	Description	Product life cycle phase *)
1SAP 187 000 R0002	TA5105-4DOT: AC500-eCo V3, digital output option board, 4DO-T 24 V DC / 0.5 A, spring/cable front terminal 3.50 mm pitch	Active
1SAP 187 000 R0202	TA5105-4DOTW: AC500-eCo V3, digital output option board, 4DO-T 24 V DC / 0.5 A, spring/cable 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 4*

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^2s
	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 output group and the rest of the module
Isolated groups	1 (4 channels per group)
Surge-voltage (max.)	35 V DC for 0.5 s
Max. power dissipation within the module	0.5 W
Weight	16 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 outputs

Parameter		Value
Number of channels per module		4 transistor outputs (24 V DC, 0.5 A max.)
Distribution of the channels into groups		1 (4 channels per group)
Connection of the channels O0 to O3		Terminals 2 to 5
Common power supply voltage		Terminal 6 (positive pole of the process voltage, signal name UP)
Reference potential for the channels O0 to O3		Terminal 7 (negative pole of the process voltage, signal name ZP)
Indication of the output signals		1 yellow LED per channel; the LED is on when the output signal is high (signal 1). Only internal logic is powered from CPU. Outputs are powered from UP/ZP terminals.
Way of operation		Non-latching type
Min. output voltage at signal 1		UP - 0.1 V
Output delay (max. at rated load)		
	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.)	2 A (4 channels * 0.5 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		

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

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**	**PM5072-T-2ETHW**
Temperature				
	Operating			

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

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 TA5110-2DI2DOT		PM50x2-x-ETH PM5072-T-2ETH	0 °C ... +60 °C	**No derating**
Analog input option boards				
TA5120-2AI-UI	Not relevant	PM5012-x-ETH	0 °C ... +55 °C	**No derating**
TA5123-2AI-RTD		PM50x2-x-ETH PM5072-T-2ETH	0 °C ... +60 °C	**No derating**
Analog output option boards				
TA5126-2AO-UI	0 V ... +10 V	PM5012-T-ETH PM50x2-R-ETH	0 °C ... +55 °C	**No derating**
		PM50x2-T-ETH PM5072-T-2ETH	0 °C ... +60 °C	**No derating**
	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

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
			+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**
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 %**
		PM50x2-T-2ETH		Load: 250 Ω ... 500 Ω
		PM50x2-x-ETH	+50 °C ... +55 °C	**100 %**
		PM50x2-T-2ETH		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 7: Wide temperature ranges

Option boards	Configuration	Processor modules	Operating temperature ranges	Derating
Digital I/O option boards				
TA5101-4DIW TA5105-4DOTW TA5110-2DI2DOW	Not relevant	PM5072-T-2ETHW	-20 °C ... +60 °C	**No derating**
			+60 °C ... +70 °C	**I/O derating to 75 %** Only 3 of 4 I/O channels are allowed to be energized simultaneously.
Analog input option boards				
TA5120-2AI-UIW TA5123-2AI-RTW	Not relevant	PM5072-T-2ETHW	-20 °C ... +60 °C	**No 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	PM5072-T-2ETHW	-20 °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-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 8: Electromagnetic compatibility

Parameter	Value
Device suitable only as *Control Equipment for Industrial Applications*, 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

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

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*.