DATA SHEET

DX561

Digital input/output module

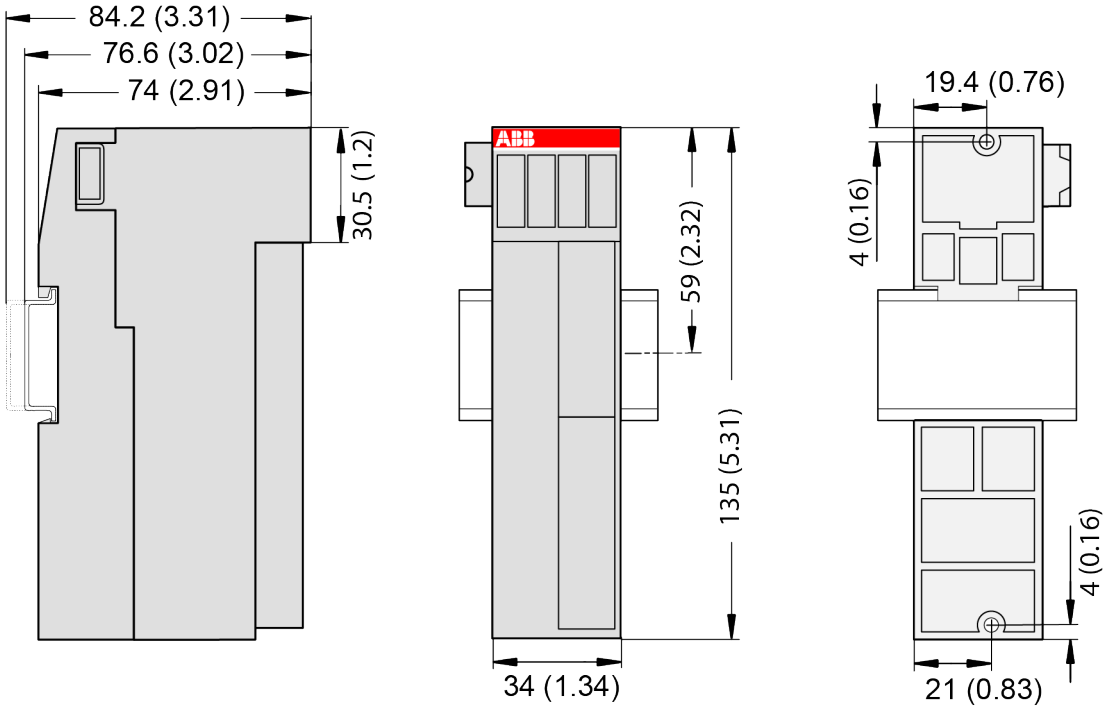


1 Ordering data

Part no.	Description	Product life cycle phase *)
1TNE 968 902 R2301	DX561, digital input/output module, 8 DI 24 V DC, 8 DO 24 V DC, transistor output	Active
1TNE 968 901 R3101	Terminal block TA563-9, 9 pins, screw front, cable side, 6 pieces per unit	Active
1TNE 968 901 R3102	Terminal block TA563-11, 11 pins, screw front, cable side, 6 pieces per unit	Active
1TNE 968 901 R3103	Terminal block TA564-9, 9 pins, screw front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3104	Terminal block TA564-11, 11 pins, screw front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3105	Terminal block TA565-9, 9 pins, spring front, cable front, 6 pieces per unit	Active
1TNE 968 901 R3106	Terminal block TA565-11, 11 pins, spring front, cable front, 6 pieces per unit	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

3.1 Technical data of the module

The system data of AC500-eCo 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 19 for UP (+24 V DC) and terminal 20 for ZP (0 V DC)
	Rated value	24 V DC
	Current consumption via UP terminal	8 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	Recommended: the outputs must be protected by an 3 A fast-acting fuse

Parameter	Value
Current consumption from 24 V DC power supply at the L+/UP and M/ZP terminals of the CPU/communication interface module	Ca. 5 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 8 input channels, 1 group for 8 output channels)
Surge-voltage (max.)	35 V DC for 0.5 s
Max. power dissipation within the module	2.3 W
Weight	ca. 120 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.

No effects of multiple overloads

No effects of multiple overloads on isolated multi-channel modules occur, as every channel is protected individually by an external fuse.

3.2 Technical data of the digital inputs

Parameter		Value	
Number of channels per module		8	
Distribution of the channels into groups		1 group for 8 channels	
Connections of the channels I0 ... I7		Terminals 2 ... 9	
Reference potential for the channels I0 ... I7		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 is part of the input circuitry	
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	> 2.5 mA	
	Input voltage +30 V	< 8 mA	
Max. permissible leakage current (at 2-wire proximity switches)		1 mA	
Input delay (0->1 or 1->0)		Typ. 8 ms	

Parameter		Value
Input data length		1 byte
Max. cable length		
	Shielded	500 m
	Unshielded	300 m

3.3 Technical data of the digital outputs

Parameter		Value
Number of channels per module		8 transistor outputs (24 V DC, 0.5 A max.)
Distribution of the channels into groups		1 group of 8 channels
Connection of the channels O0 ... O7		Terminals 11 ... 18
Reference potential for the channels O0 ... O7		Terminal 20 (negative pole of the process voltage, name ZP)
Common power supply voltage		Terminal 19 (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
Max. output voltage at signal 1		20 V DC at max. current consumption
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
	Rated current per group (max.)	4 A
	Rated current (all channels together, max.)	4 A
	Lamp load (max.)	5 W
	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)		3 A fast
Demagnetization when inductive loads are switched off		Must be performed externally according to driven load specification
Switching Frequencies		
	With inductive loads	Max. 0.5 Hz
	With lamp loads	Max. 11 Hz at max. 5 W
Short-circuit-proof / Overload-proof		No
	Overload message	No
	Output current limitation	No

Parameter		Value
	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 1: 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
	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** and the **technical data** of the used module.

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.

Parameter		Value
Temperature		
	Operating	0 °C ... +60 °C (horizontal mounting of modules) 0 °C ... +40 °C (vertical mounting of modules and 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 2: Range of use

Application
Device suitable only as *Control Equipment for Industrial Applications*.

Table 3: 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 9*	
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*.

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