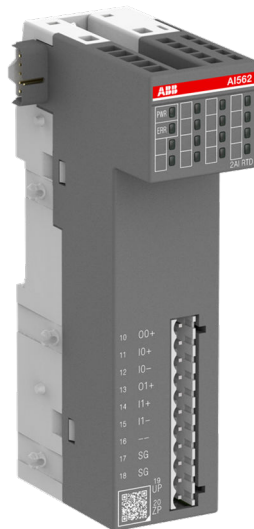


# AI562

# Analog Input Module



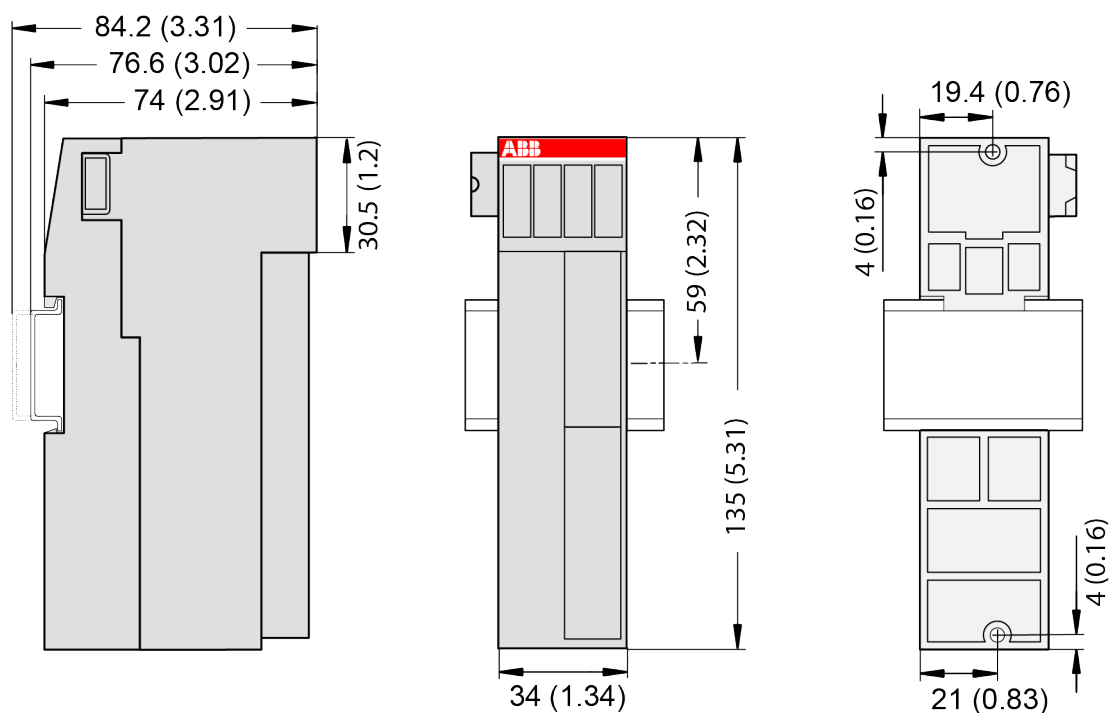
## 1 Ordering data

| Part no.           | Description                                                                    | Product life cycle phase *) |
|--------------------|--------------------------------------------------------------------------------|-----------------------------|
| 1TNE 968 902 R1102 | AI562, analog input module, 2 AI, RTD                                          | Active                      |
| 1TNE 968 901 R3102 | Terminal block TA563-11, 11 pins, screw front, cable side, 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 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 4

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)                                                                              |
| Rated value                         | 24 V DC                                                                                                                                 |
| Current consumption                 | 0.04 A;<br>0.02 A (version E0 or later)                                                                                                 |
| Inrush current (at power-up)        | Typ. 0.1 A <sup>2</sup> s, Max. 0.16 A <sup>2</sup> s;<br>Typ. 0.015 A <sup>2</sup> s, Max. 0.03 A <sup>2</sup> s (version E0 or later) |
| Max. ripple                         | 5 %                                                                                                                                     |
| Protection against reversed voltage | Yes                                                                                                                                     |
| Protection fuse for UP              | Yes, external additional fuse recommended                                                                                               |

| Parameter                                                                                                               | Value                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Current consumption from 24 V DC power supply at the terminals UP/L+ and ZP/M of the CPU/communication interface module | Ca. 5 mA                                                                                                  |
| Galvanic isolation                                                                                                      | Yes, between the input group and the rest of the module. Isolation voltage 500 V DC.                      |
| Isolated groups                                                                                                         | 1 (2 channels per group)                                                                                  |
| Surge-voltage (max.)                                                                                                    | 35 V DC for 0.5 s                                                                                         |
| Max. power dissipation within the module                                                                                | 1.1 W;<br>0.6 W (version E0 or later)                                                                     |
| 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. |

### 3.2 Technical data of the analog inputs

| Parameter                                                                                                                                       | Value                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Number of channels per module                                                                                                                   | 2 configurable RTD (resistance temperature detector) inputs                         |
| Distribution of channels into groups                                                                                                            | 1 (2 channels per group)                                                            |
| Resolution                                                                                                                                      |                                                                                     |
| RTD                                                                                                                                             | 0.1 °C                                                                              |
| Resistance                                                                                                                                      | 150 Ω: 1 LSB (5.4 mΩ);<br>300 Ω: 1 LSB (10.8 mΩ)                                    |
| Connection of the signals O0+ and O1+                                                                                                           | Terminals 10 and 13                                                                 |
| Connection of the signals I0+ and I1+                                                                                                           | Terminals 11 and 14                                                                 |
| Connection of the signals I0- and I1-                                                                                                           | Terminals 12 and 15                                                                 |
| Input type                                                                                                                                      | Module ground referenced RTD for 2-wire and 3-wire resistance temperature detectors |
| Galvanic isolation                                                                                                                              | Against internal power supply and other modules. Isolation voltage 500 V DC.        |
| Input ranges                                                                                                                                    | Pt100, Pt1000, Ni100, Ni1000<br>150 Ω, 300 Ω                                        |
| Indication of the input signals                                                                                                                 | No                                                                                  |
| Module update time                                                                                                                              | All channels: < 1 s                                                                 |
| Channel input resistance                                                                                                                        | > 100 kΩ                                                                            |
| Input filter attenuation                                                                                                                        | -3 dB at 3.6 kHz                                                                    |
| Conversion error of the analog values caused by non-linearity, adjustment error at factory and resolution within the normal range <sup>1)</sup> |                                                                                     |
| Before version E0                                                                                                                               | Typ. Depending on RTD max. ±0.6 % of full scale at +25 °C                           |

| Parameter                                              |                     | Value                                                 |                                                                                                                   |
|--------------------------------------------------------|---------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
|                                                        |                     | Max.                                                  | ±2 % of full scale at 0 °C ... +60 °C or EMC disturbances                                                         |
|                                                        | Version E0 or later | Typ.                                                  | Pt100, Pt1000, 300 Ω: ±0.05 % of full scale at +25 °C<br><br>Ni100, Ni1000, 150 Ω: ±0.1 % of full scale at +25 °C |
|                                                        |                     | Max.                                                  | ±0.2 % of full scale at -20 °C ... +60 °C;<br><br>±0.5 % of full scale at EMC disturbances                        |
| Measuring range                                        |                     |                                                       |                                                                                                                   |
| Analog to digital conversion time                      |                     | Typ. 190 ms per channel                               |                                                                                                                   |
| Unused inputs                                          |                     | Can be left open and should be configured as "unused" |                                                                                                                   |
| Input data length                                      |                     | 4 bytes                                               |                                                                                                                   |
| Power dissipation inside the sensor (max.)             |                     | 1 mW                                                  |                                                                                                                   |
| Suppression of interference                            |                     | On request                                            |                                                                                                                   |
| Basic error (resistance)                               |                     | 0.1 % of full-scale                                   |                                                                                                                   |
| Repeatability                                          |                     | 0.05 % of full-scale                                  |                                                                                                                   |
| Overvoltage protection                                 |                     | Yes, up to 30 V DC                                    |                                                                                                                   |
| Wire loop resistance                                   |                     | < 20 Ω                                                |                                                                                                                   |
| Max. cable length (conductor cross section > 0.14 mm²) |                     |                                                       |                                                                                                                   |
|                                                        | Unshielded wire     | 10 m                                                  |                                                                                                                   |
|                                                        | Shielded wire       | 100 m                                                 |                                                                                                                   |

Remarks:

|    |                                                                                                                                                                            |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) | For 2-wire connection, the cable should be as short as possible to reduce error. If the cable is long, use 3-wire connection to achieve the guaranteed measuring accuracy. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 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 |                                     |                       |

| Parameter                                                      |           | Value                                                          |
|----------------------------------------------------------------|-----------|----------------------------------------------------------------|
|                                                                | 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
- 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)<br>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 <i>Control Equipment for Industrial Applications</i> . |

Table 3: Electromagnetic compatibility

| Parameter                                                                                                                                                                                      | Value |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Device suitable only as <i>Control Equipment for Industrial Applications</i> , including marine applications.<br>IEC 61131-2, zone B<br>🔗 Chapter 4.6 “Approvals and certifications” on page 8 |       |
| Radiated emission according to<br>IEC 61000-6-4 CISPR11, class A                                                                                                                               | Yes   |

| Parameter                                                                                   | Value                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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<br>Contact discharge: 6 kV                                                                                                                                                                                                                                                                   |
| Fast transient interference voltages (burst) according to IEC 61000-4-4, criterion B        | Power supply (DC): 2 kV<br>Digital inputs/outputs (24 V DC): 1 kV<br>Digital inputs/outputs (240 V AC): 2 kV<br>Analog inputs/outputs: 1 kV<br>Communication lines shielded: 1 kV                                                                                                                                |
| High energy transient interference voltages (surge) according to IEC 61000-4-5, criterion B | Power supply (DC):<br>- Line to ground: 1 kV<br>- Line to line: 0,5 kV<br>Digital inputs/outputs/relay:<br>(24 V DC):<br>- Line to ground: 1 kV<br>(AC):<br>- Line to ground: 2 kV<br>- Line to line: 1 kV<br>Analog inputs/outputs:<br>- Line to ground: 1 kV<br>Communication lines:<br>- 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<br>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"> <li>with all modules or option boards plugged in</li> <li>with all terminals plugged in</li> <li>with all covers closed</li> </ul> |
| Housing              | Classification V-0 according to UL 94                                                                                                                                                   |

| Parameter                                               | Value                                                                     |
|---------------------------------------------------------|---------------------------------------------------------------------------|
| Vibration resistance (sinusoidal) acc. to IEC 60068-2-6 | All three axes<br>2 Hz ... 8.4 Hz, 3.5 mm peak,<br>8.4 Hz ... 150 Hz, 1 g |
| Shock test acc. to IEC 60068-2-27                       | All three axes<br>15 g, 11 ms, half-sinusoidal                            |
| <b>Mounting of the modules:</b>                         |                                                                           |
| 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](#).