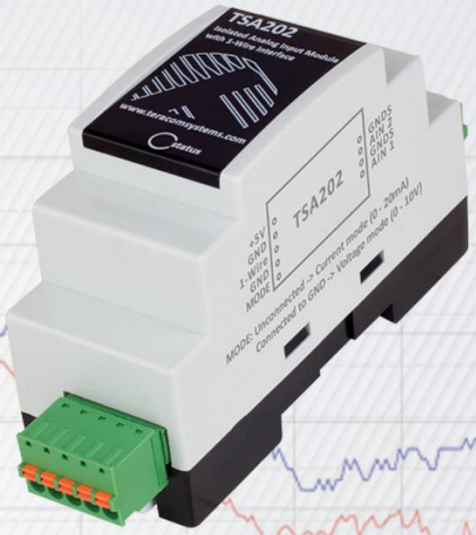
control solutions
TERACOM




# TSA202
# 1-wire analog input module

## USER MANUAL

www.teracomsystems.com

## 1. Short description

The TSA202 is a high-precision dual-channel analog input module utilizing the 1-Wire digital protocol. It provides a reliable solution for measuring various analog signals, ensuring accurate data acquisition in industrial and automation applications. The analog inputs are galvanically isolated from the interface, enhancing signal integrity and protection.

The TSA202 operates in two selectable modes – 0-20mA current loop or 0-10V voltage input. The extended current loop range (0-20mA) allows not only standard 4-20mA signals but also the detection of special states such as sensor errors or calibration values.

The input mode is chosen by the user and applies to both analog input channels simultaneously. This flexibility allows adaptation to different types of sensors and measurement systems.

The TSA202 is suitable for measuring both electrical and non-electrical parameters when used with appropriate sensors. The raw analog readings, whether in mA or V, can be easily converted into specific measurement units using an offset and multiplier within the master controller. This feature enables compatibility with a wide range of sensor outputs, ensuring precise and application-specific data interpretation.

The TSA202 is an essential component for any system requiring precise analog measurement over a digital interface, offering flexibility, ease of use, and broad sensor compatibility.

## 2. Features

- Functional isolation between the analog inputs and the 1-Wire interface
- LED indicator for communication status
- Selectable input mode (0-10V or 0-20mA) configurable via the connector
- Firmware updates via the 1-Wire interface.

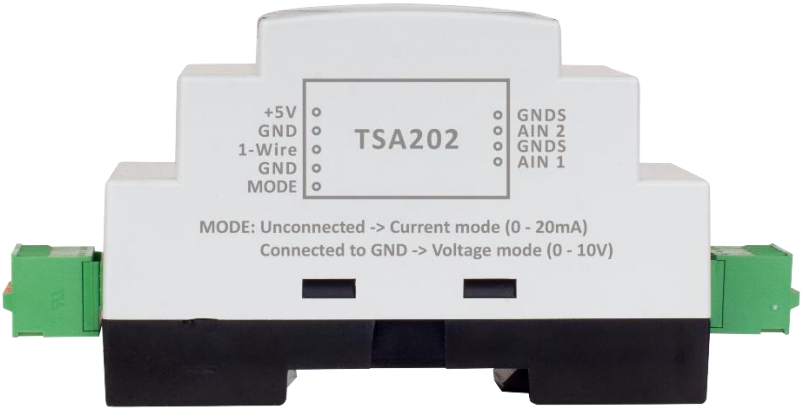
## 3. Applications

- Liquid level monitoring – Suitable for measuring fluid levels in water tanks, fuel reservoirs, and industrial storage systems
- Air pressure measurement – Ideal for HVAC systems, pneumatic controls, and industrial process monitoring
- Gas concentration analysis – Used in environmental monitoring, industrial safety, and hazardous gas detection
- Acidity (pH) measurement – Supports chemical processing, water treatment, and laboratory applications

## 4. Specifications

- Physical characteristics
  Dimensions: 120 x 36 x 60mm
  Weight: 65g
- Environmental limits
  Operating temperature range: -20 to 60°C
  Operating relative humidity range: 10 to 90% (non-condensing)
  Ingress protection: IP20
- Power requirements
  Operating voltage range (including -15/+20% according to IEC 62368-1): 4.5 to 5.5VDC
  Current consumption:  25mA@5VDC
- Input ranges
  Current loop mode: 0 to 20mA
  Voltage mode: 0 to 10V
- Measurement accuracy
  Internal ADC: 16-bit conversion
  Accuracy: ±1%
  Resolution: 0.001mA/0.001V
- Isolation
  Functional isolation: 1000Vdc

## 5. Pinout




**Connector 1**

Pin **+5V** – Positive power supply

Pin **GND** – Ground

Pin **1-Wire** – 1-Wire data

Pin **GND** – Ground

Pin **MODE**

**Connector 2**

Pin **AIN1** – Analog input 1

Pin **GNDS** – Ground of analog inputs

Pin **AIN2** – Analog input 2

Pin **GNDS** - Ground of analog inputs

Note: The ground of the interface side (GND) is galvanically isolated from the ground of the analog inputs (GNDS) to ensure signal integrity and protection against ground loops.

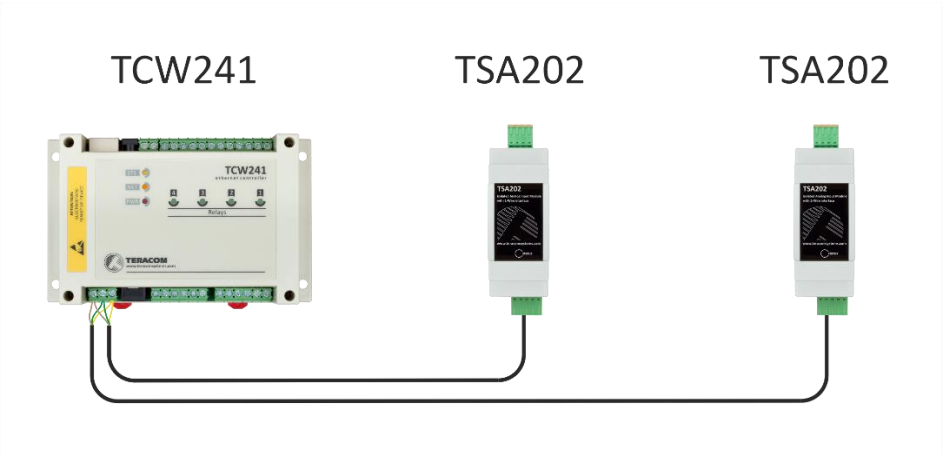
## 6. Operating mode of the analog inputs

The Mode pin is used to select the operating mode of the analog inputs:

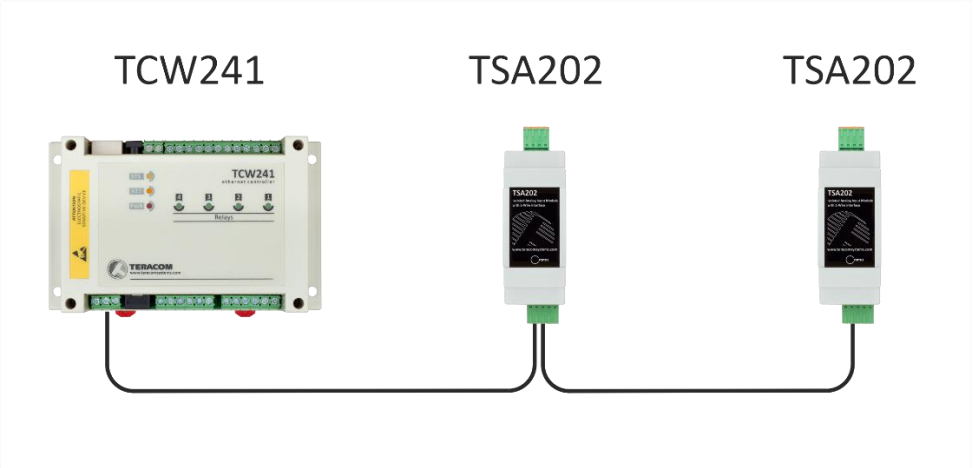
- When left unconnected, the analog inputs operate in current loop mode (0-20mA).
- When connected to the adjacent GND pin, the analog inputs operate in voltage input mode (0-10V).

## 7. Installation

For optimal performance, it is strongly recommended to use UTP/FTP cables and follow a daisy-chained (linear) topology when connecting multiple sensors. To ensure reliable communication and minimal signal degradation, keep the total cable length within 30 meters.



The "star" topology should only be used as a last resort, and only for up to 4 sensors with a maximum total cable length of 10 meters. Using a star topology may lead to increased signal interference and reduced communication reliability.




## 8. LED indicator

The device status is indicated by a single LED, located inside the enclosure. The LED behavior provides quick diagnostics of the device's operation and communication status:

- Blinking every 1 second – The device is operating normally;
- Blinking every 3 seconds – No communication with the master controller;
- No blinking (LED off) – No power supply detected.

## 9. Firmware update

The sensor's firmware can be updated using any Teracom controller that supports the 1-Wire interface. This ensures compatibility and easy maintenance.

For more details on the update process, please refer to the controller's documentation or contact your authorized dealer.

## 10. Recycling

Please recycle all applicable materials in accordance with local regulations.



Do not dispose of the device as regular household waste.
Electronic components should be properly recycled to minimize environmental impact.

