



# AZ-02N

## 5-digit Digital Display and Control Unit



## Features

- / Direct voltage and direct current
  - / Direct voltage (Shunt)
    - / Potentiometer
      - / Resistance
        - / PT100
          - / Thermocouple
            - / Frequency
              - / AC voltage & alternating current
                - / DMS-4-wire
                  - / Weighing technology

## Description:

The AZ-02N Digital Display offers to the user everything that the current process measuring technology demands from electronic evaluation devices. This device is freely scalable and capable of utilizing a wide spectrum of input signals. Equipped with a 5-digit LED display, it optionally provides an output for sensor power supply and a power or voltage output for further processing of the measurement as well as possible setpoints.

## Application:

This universal display unit is capable of processing signals from all commonly used sensors in fill level, pressure, flow control or temperature measuring technology and displaying them visually. The relay and analogue outputs freely configurable for hysteresis and range optimally evaluate and process the measurement. The AZ-02N is, therefore, also capable of serving as a control unit for simple system operations. Particularly noteworthy is the easy handling and programming of the device, which is carried out on the frontside keys and leaves no questions open. Through the highlighted properties the universal display units are suitable for practically all applications in the industrial or laboratory operation.

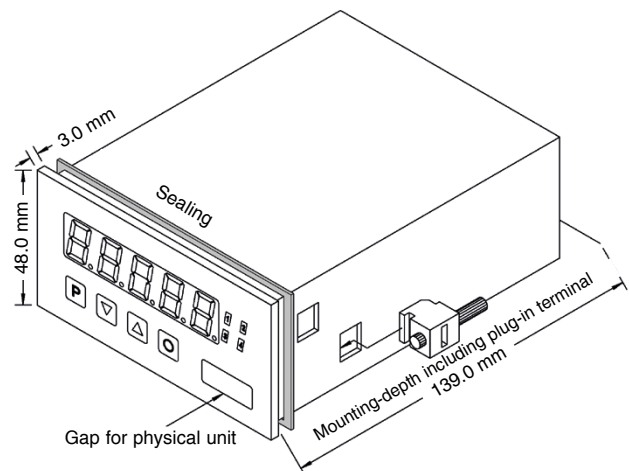


## Technical Specifications:

|                           |   |
|---------------------------|---|
| <b>Housing dim. /</b>     | W 96 x H48 x D120 mm<br>incl. plug-in terminal D=139 mm                 |
| <b>Panel cut-out /</b>    | 92.0 <sup>+0,8</sup> x 45.0 <sup>+0,6</sup> mm                          |
| <b>Fastening /</b>        | screw elements for walls up to 15 mm thick                              |
| <b>Housing material /</b> | PC Polycarbonate, black   |
| <b>Sealing material /</b> | EPDM, 65 Shore, black   |
| <b>Protection class /</b> | front side IP65 standard back side IP00                                 |
| <b>Weight /</b>           | approx.. 350 g  |
| <b>Connection /</b>       | plug-in terminal; line cross-section<br>up to 2.5 mm <sup>2</sup>       |
| <b>Display /</b>          | 5-digit   |
| <b>Digit height /</b>     | 14 mm   |
| <b>Segment colour /</b>   | red (standard), optional available in<br>green, blue and orange         |
| <b>Range of display /</b> | -19999 to 99999   |
| <b>Threshold /</b>        | optical display flashing  |
| <b>Overflow /</b>         | horizontal bars at the top  |
| <b>Underflow /</b>        | horizontal bars at the bottom   |
| <b>Display time /</b>     | 0.1 . .10 seconds   |
| <b>Working temp. /</b>    | 0°C . .+50°C  |
| <b>Storing temp. /</b>    | -20°C . .+80°C  |
| <b>Climatic proof /</b>   | relative humidity 0 to 85% on years<br>average without dew              |
| <b>On request /</b>       | devices for working temperatures of<br>-20°C to +60°C or -40°C to +70°C |

|                          |   |
|--------------------------|---|
| <b>Digital input /</b>   | < 2.4 V OFF; 10 V ON; max. 30 VDC, R <sub>i</sub> ~5 kΩ               |
| <b>Interface /</b>       |   |
| Protocol:                | Modbus with ASCII or RTU  |
| RS232:                   | 9600 Baud, no parity, 8 DataBit, 1 StopBit                            |
| Wire length:             | max. 3 m  |
| RS485:                   | 9600 Baud, no parity, 8 DataBit, 1 StopBit                            |
| Wire length:             | max. 1000 m   |
| <b>Memory /</b>          | EEPROM Data life ≥ 100 years at 25°C                                  |
| <b>CE-sign /</b>         | Conformity to directive 2004/108/EG                                   |
| <b>EMC /</b>             | EN 61326, EN 5501   |
| <b>Safety standard /</b> | according to low voltage directive<br>2006/95/EG EN 61010; EN 60664-1 |

## Dimensions in mm:



## Electrical Specifications:

|                   |   |
|-------------------|---|
| <b>Supply 1 /</b> | 100-240 VAC 50/60 Hz, DC ±10% (max. 15 VA)  |
| <b>Supply 2 /</b> | 10-40 VDC galvanically insulated, 18-30 VAC<br>50/60 Hz (max. 15 VA)  |
| <b>Output /</b>   |   |
| Relays:           | with change-over contact<br>250 VAC/ 5 A, 30 VDC/ 5 A   |
| Switching cycles: | 30 x 10 <sup>3</sup> at 5 A, ohmic load<br>10 x 10 <sup>6</sup> mechanically<br>separation as per DIN EN50178 /<br>specifications as per DIN EN 60255 |
| PhotoMos output:  | NO-contact: 30 VDC/ AC 0.4 A  |
| Impulse output:   | max. 10 kHz (for frequency measurement)   |
| Analog output:    | 0 . .10 VDC, load ≥ 10 kΩ, 0(4) . .20 mA, load<br>≤ 500 Ω, 16 Bit)  |
| Sensor supply:    | 24 VDC/ 50 mA 10 VDC/ 20 mA   |
| Bridge supply:    | 10 VDC/ 20 . .40 mA/ 250 . .500 Ω   |

## Measuring inputs:

| E1: Direct voltage / direct current |  |                                     |
|-------------------------------------|--|-------------------------------------|
| <b>Span</b>                         | -12 . .12 V                            | -22 . .24 mA                        |
| <b>Measuring range</b>              | 0 . .10 VDC                            | 0/4 . .20 mA                        |
| <b>Input resistance</b>             | R <sub>i</sub> at ~200 kΩ              | R <sub>i</sub> at ~100 Ω            |
| <b>Measuring fault</b>              | 0.1% of measuring<br>range ±1 Digit    | 0.1% of measuring<br>range ±1 Digit |
| <b>Temperature drift</b>            | 100 ppm/K                              |                                     |
| <b>Measuring time</b>               | 0.1 . .10.0 seconds                    |                                     |
| <b>Measuring principle</b>          | U/F-Converter                          |                                     |
| <b>Resolution</b>                   | approx. 18 Bit at 1s<br>measuring time |                                     |



| E2: Direct voltage/ Direct current H-Version (High Voltage) |                                     |                         |                           |                          |
|---|-------------------------------------|-------------------------|---------------------------|--------------------------|
| Span  | -600 .. 600 VDC                     | -300 .. 300 VDC         | -50 .. 50 VDC             | -1 .. 1 ADC              |
| Measuring range   | 0 .. 600 VDC                        | 0 .. 300 VDC            | 0 .. 50 VDC               | 0 .. 1 ADC               |
| Input resistance  | R <sub>i</sub> at ~2 MΩ             | R <sub>i</sub> at ~1 MΩ | R <sub>i</sub> at ~200 kΩ | R <sub>i</sub> at ~0,2 Ω |
| Measuring fault   | 0.5% of measuring range             |                         |                           |                          |
| Temperature drift   | 100 ppm/K                           |                         |                           |                          |
| Measuring time  | 0.1 .. 10.0 seconds                 |                         |                           |                          |
| Measuring principle   | U/F-Converter                       |                         |                           |                          |
| Resolution  | approx. 18 Bit at 1s measuring time |                         |                           |                          |

| E3: Direct voltage - Shunt |                                     |                                   |                                   |                                   |
|----------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Span                       | -5 .. 75 mV                         | -15 .. 180 mV                     | -30 .. 360 mV                     | -100 .. 1200 mV                   |
| Measuring range            | 0 .. 60 mV                          | 0 .. 150 mV                       | 0 .. 300 mV                       | 0 .. 1000 mV                      |
| Input resistance           | R <sub>i</sub> at ~12 kΩ            | R <sub>i</sub> at ~30 kΩ          | R <sub>i</sub> at ~60 kΩ          | R <sub>i</sub> at ~200 kΩ         |
| Measuring fault            | 0.5% of measuring range, ±1 Digit   | 0.5% of measuring range, ±1 Digit | 0.5% of measuring range, ±1 Digit | 0.5% of measuring range, ±1 Digit |
| Temperature drift          | 100 ppm/K                           |                                   |                                   |                                   |
| Measuring time             | 0.1 .. 10.0 seconds                 |                                   |                                   |                                   |
| Measuring principle        | U/F-Converter                       |                                   |                                   |                                   |
| Resolution                 | approx. 18 Bit at 1s measuring time |                                   |                                   |                                   |

| E4: Potentiometer   |                                     |
|---------------------|-------------------------------------|
| Span                | > 1 kΩ .. < 1000 kΩ                 |
| Measuring range     | 0 .. 100 %                          |
| Measuring fault     | 0.5% of measuring range, ±1 Digit   |
| Temperature drift   | 100 ppm/K                           |
| Measuring time      | 0.1 .. 10.0 seconds                 |
| Measuring principle | U/F-Converter                       |
| Resolution          | approx. 18 Bit at 1s measuring time |

| E5: Resistance      |                                     |                                   |                                   |
|---------------------|-------------------------------------|-----------------------------------|-----------------------------------|
| Span                | 0 .. 11 kΩ                          | 0 .. 11 kΩ                        | 0 .. 110 kΩ                       |
| Measuring range     | 0 .. 1 kΩ                           | 0 .. 10 kΩ                        | 0 .. 100 kΩ                       |
| Measuring fault     | 0.5% of measuring range, ±1 Digit   | 0.5% of measuring range, ±1 Digit | 0.5% of measuring range, ±1 Digit |
| Temperature drift   | 100 ppm/K                           |                                   |                                   |
| Measuring time      | 0.1 .. 10.0 seconds                 |                                   |                                   |
| Measuring principle | U/F-Converter                       |                                   |                                   |
| Resolution          | approx. 18 Bit at 1s measuring time |                                   |                                   |

| E6: PT100 (3-/4-wire) (2-wire via Offset) |                                   |                                   |
|---|-----------------------------------|-----------------------------------|
| Measuring range                           | -200.0 .. 850.0 °C                | -328.0 .. 1562.0 °F               |
| Measuring fault                           | 0.1% of measuring range, ±1 Digit | 0.1% of measuring range, ±1 Digit |
| Temperature drift                         | 100 ppm/K                         |                                   |
| Measuring time                            | 0.1 .. 10.0 seconds               |                                   |
| Measuring principle                       | U/F-Converter                     |                                   |
| Resolution                                | 0.1 °C or 0.1 °F                  |                                   |

| E7: Thermal elements       |   |
|----------------------------|---|
| Measuring range            | Type L -200 .. 900°C Type N -270 .. 1300°C<br>Type J -210 .. 1200°C Type E -270 .. 1000°C<br>Type K -270 .. 1372°C Type T -270 .. 400°C<br>Type B 80 .. 1820°C Type R -50 .. 1768°C<br>Type S -50 .. 1768°C |
| Measuring fault            | 2 K, ±1 Digit   |
| Temperature drift          | 100 ppm/K   |
| Measuring time             | 0.1 .. 10.0 seconds   |
| Measuring principle        | U/F-Converter   |
| Resolution                 | 0.1°C   |
| Characteristic curve fault | < ± 1 K   |
| Reference junction         | Thermistor  |

| E8: Frequency    |  |
|------------------|--|
| Signal           | Pulse input, TTL, Namur, 3-wire initiator PNP/NPN  |
| Input resistance | R <sub>i</sub> at 24 V / 4 kΩ<br>High/Low level > 15 V / < 4 V<br>High/Low TTL-level > 4.6 V / < 1.9 V |
| Input frequency  | 0.01 Hz selectable up to 999.99 kHz  |
| Measuring fault  | 0.05% of measuring range, ±1 Digit   |



**E9: AC voltage, alternating current (true RMS)**

|                            |  |                          |                           |                          |
|----------------------------|--|--------------------------|---------------------------|--------------------------|
| <b>Measuring range</b>     | 50 VAC   | 10 VAC                   | 5 AAC                     | 1 AAC                    |
| <b>Input resistance</b>    | R <sub>i</sub> at ~200 kΩ  | R <sub>i</sub> at ~40 kΩ | R <sub>i</sub> at ~0,05 Ω | R <sub>i</sub> at ~0,2 Ω |
| <b>Measuring fault</b>     | at 50 Hz to 1 kHz up to crestfactor 4 for input signals of 1% to 100% of final value |                          |                           |                          |
| <b>Temperature drift</b>   | 100 ppm/K  |                          |                           |                          |
| <b>Measuring time</b>      | 0.1 . .10.0 seconds  |                          |                           |                          |
| <b>Measuring principle</b> | U/F-Converter  |                          |                           |                          |
| <b>Resolution</b>          | approx. 18 Bit at 1s measuring time  |                          |                           |                          |

**E10: AC voltage, alternating current (true RMS) H-Version (High Voltage)**

|                            |  |                         |                           |                          |
|----------------------------|--|-------------------------|---------------------------|--------------------------|
| <b>Measuring range</b>     | 600 VAC  | 300 VAC                 | 5 AAC                     | 1 AAC                    |
| <b>Input resistance</b>    | R <sub>i</sub> at ~2 MΩ  | R <sub>i</sub> at ~1 MΩ | R <sub>i</sub> at ~0,05 Ω | R <sub>i</sub> at ~0,2 Ω |
| <b>Measuring fault</b>     | at 50 Hz to 1 kHz up to crestfactor 4 for input signals of 1% to 100% of final value |                         |                           |                          |
| <b>Temperature drift</b>   | 100 ppm/K  |                         |                           |                          |
| <b>Measuring time</b>      | 0.1 . .10.0 seconds  |                         |                           |                          |
| <b>Measuring principle</b> | U/F-Converter  |                         |                           |                          |
| <b>Resolution</b>          | approx. 18 Bit at 1s measuring time  |                         |                           |                          |

**E11: DMS-4-wire with calibration**

**Sensor sensitivity** 1 mV/V, 2 mV/V, 3.3 mV/V, free up to 4 mV/V with 80% calibration

**E12: Weighing technology**

**Sensor sensitivity** 1 mV/V, 2 mV/V, 3.3 mV/V mit Tara

## Possible Configurations:

| Selection / Measuring input                 | E1 | E2 | E3 | E4 | E5 | E6 | E7 | E8 | E9 | E10 | E11 | E12 |
|---|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| Supply voltage 100 . .240 VAC               | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| Supply voltage 10 . .40 VDC                 | x  |    | x  | x  | x  | x  | x  | x  | x  |     | x   | x   |
| Sensor supply 10 VDC, 20 mA                 | x  |    | x  |    |    |    |    |    |    |     |     |     |
| Sensor supply 24 VDC, 50 mA                 | x  |    | x  |    |    |    |    | x  |    |     |     |     |
| 2x Relay output                             | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| 4x Relay output                             | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| 8x PhotoMos-output                          | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| 1x Analog output 0(4) . .20 mA, 0 . .10 VDC | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| 2x Analog output 0(4) . .20 mA, 0 . .10 VDC | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| 1x Digital input                            | x  | x  | x  | x  | x  |    |    | x  | x  | x   | x   | x   |
| Interface RS232                             | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |
| Interface RS485                             | x  | x  | x  | x  | x  | x  | x  | x  | x  | x   | x   | x   |



# Ordering Codes:

**Order no.** AZ-02N. 2. 1. 1. E1. 2. 1. 3. 1

**AZ-02N Digital Display**

**Size /**

2 = 96 x 48 mm

**Supply Voltage /**

1 = 100-240 VAC  
2 = 10-40 VDC, galvanic insulated

**Sensor supply (incl. digital input) /**

0 = without  
1 = 10 VDC, 20 mA  
2 = 24 VDC, 50 mA  
3 = 24 VDC, 50 mA (incl. impulse output)

**Measuring input /**

E1 = direct voltage / -current (0...10 VDC/ 0(4)...20 mA)  
E2 = direct voltage / -current H-Version  
E3 = direct voltage (Shunt)  
E4 = potentiometer 0 - 100% (> 1 kΩ...< 1000 kΩ)  
E5 = resistance (1 kΩ, 10 kΩ or 100 kΩ)  
E6 = Pt100 (3-/4-wire)  
E7 = thermocouple (type L, J, K, B, S, N, E, T, R)  
E8 = frequency (0.01 Hz...999.99 kHz)  
E9 = AC voltage, alternating current (true RMS)  
E10 = AC voltage, alternating current (true RMS) H-Version  
E11 = DMS-4-wire with calibration  
E12 = weighing technology

**Digital input /**

0 = without  
1 = 1 digital input  
2 = interface RS232 (galvanic insulated)  
3 = interface RS485 (galvanic insulated)  
4 = interface RS232 (incl. digital input)  
5 = interface RS485 (incl. digital input)

**Analog output /**

0 = without  
1 = 1 x 0(4)...20 mA, 0...10 VDC  
2 = 2 x 0(4)...20 mA, 0...10 VDC

**Switching output /**

0 = without  
1 = 2 relay outputs  
2 = 4 relay outputs  
3 = 8 PhotoMos-outputs (analog output 2 is not applicable)

**Options /**

0 = without  
1 = display colour blue (red standard)  
2 = display colour green  
3 = display colour orange  
4 = display colour tricolour (red-green-orange)  
5 = physical unit (selectable)

