



## AIO208, AIO216 Universal Analog Input/Output Module

The AIO208 and AIO216 modules enable the measuring or output of all standard analog signals. The AIO208 offers 8 channels and the AIO216 16 channels compactly in a single module. The standard signal types for current (0 to 20 mA and 4 to 20 mA) and voltage ranges ( $\pm 10$  V to  $\pm 10$  mV) allow the connection of a wide range of sensors and actuators. A minimum 14-bit resolution makes it possible to also measure signals that do not fully utilize the measuring range (e.g. 0 to 5 V) with a sufficiently high resolution. Temperatures are playing an important role in an increasing number of processes. These modules therefore also support Pt100/Pt1000 in 2, 3 and 4-wire measuring circuits, as well as all standard thermocouples.

For each channel, a second channel with unused signal types can be used in addition to the primary configured signal type. For example, a current output can be assigned to a voltage input so that up to twice the number of channels per module are provided.

This enables one module to cover virtually all analog signal measuring tasks instead of having to use many different modules for each signal type. A cost-effective solution that simplifies logistics and servicing. Different modes can be combined and set simply using a configuration wizard in the SolutionCenter engineering tool.

| Item      | Item-No.    |
|-----------|-------------|
| AIO208    | 00020628-00 |
| AIO208 CC | On request  |
| AIO216    | 00020627-00 |
| AIO216 CC | 00020631-00 |

- 8 channels AIO208, 16 channels AIO216
- Analog inputs and outputs
- Modes that can be selected per channel:
  - Analog voltage input  $\pm 10$  V to  $\pm 10$  mV
  - Analog current input 0(4) to 20 mA
  - Temperature sensor Pt elements as 2-,3-,4-wire
  - Thermo couples type J, K, T, N, E, R, S, B
  - Analog voltage output  $\pm 10$  V
  - Analog current output 0(4) to 20 mA
- Resolution: 16-bit input with filter, 14-bit output
- Filter adjustable from 4 kHz to 0.5 Hz per channel
- All outputs overload, short circuit and external voltage-proof
- Measuring range monitoring freely adjustable ( $\pm 105$  %)
- Error message on overload and overtemperature and under-voltage of the supply
- Galvanic isolation from the system 500 V
- Optional condensation-proof ColdClimate (☼)

| AIO208, AIO216                |     |   |             |
|-------------------------------|-----|---|-------------|
| Inputs/Outputs                |     | AIO208  | AIO216      |
| Quantity                      |     | 8 channels  | 16 channels |
| Modes per channel             |     | Analog input  |             |
|                               |     | Temperature measurement input for Pt elements and thermo couples                                      |             |
|                               |     | Analog output   |             |
| SYNC signal                   | In  | Analog input, temperature measurement   |             |
|                               | Out | Analog output   |             |
| Analog inputs in general      |     |   |             |
| Digital resolution            |     | 16-bit  |             |
| Measuring range               |     | ±105 % of nominal range   |             |
| Measuring range monitoring    |     | Lower and upper measuring range limit, error message as status or measuring range monitoring          |             |
| Allowed common mode voltage   |     | Max. ±1 V   |             |
| Refresh cycle time            |     | 100 µs  |             |
| Cut-off frequency             |     | 4 kHz to 0.5 Hz adjustable channel by channel   |             |
| Filtering slope               |     | >80 dB/decade   |             |
| Voltage inputs                |     |   |             |
| Input voltage                 |     | ±10 V, ±1 V, ±100 mV, ±10 mV  |             |
| Basic accuracy at 25 °C       |     | Range ±10 V: ±0.05 %FS<br>Range ±1 V: ±0.05 %FS<br>Range ±100 mV: ±0.05 %FS<br>Range ±10 mV: ±0.2 %FS |             |
| Current inputs                |     |   |             |
| Input current                 |     | ±20 mA or 0 to 20 mA or 4 to 20 mA  |             |
| Basic accuracy at 25 °C       |     | Range ±20 mA: ±0.1 %FS<br>Range 0 to 20 mA: ±0.2 %FS<br>Range 4 to 20 mA: ±0.2 %FS                    |             |
| Input impedance               |     | Max. 300 Ohm  |             |
| Shunt short-circuit proof     |     | Up to +24 V   |             |
| Interference voltage strength |     | +24 V   |             |
| Temperature inputs PTC        |     |   |             |
| Temperature inputs            |     | Pt100/Pt1000  |             |
| Connection type               |     | 2-, 3- or 4-wire  |             |
| Input impedance               |     | >100 kOhm   |             |
| Temperature range             |     | -100 to +800 °C   |             |
| Basic accuracy at 25 °C       |     | PT100/Pt1000: 0.15 % of 900 ° (measuring range -100 to 800 °C)  |             |
| Value of the LSB              |     | 0.1 K, measurement values in 1/10 Kelvin  |             |

| AIO208, AIO216                    |   |                              |
|-----------------------------------|---|------------------------------|
| <b>Temperature inputs TE</b>      |   |                              |
| Temperature elements              | Types J, K, T, N, E, R, S, B can be selected                    |                              |
| Temperature ranges per type       | J   | -100 to +1200 °C             |
|                                   | K   | -100 to +1370 °C             |
|                                   | T   | -100 to +400 °C              |
|                                   | N   | -100 to +1300 °C             |
|                                   | E   | -100 to +1000 °C             |
|                                   | R   | -50 to +1768 °C              |
|                                   | S   | -50 to +1768 °C              |
|                                   | B   | +600 to +1820 °C             |
| Ground                            | Up to ±3 V  |                              |
| Basic accuracy at 25 °C           | Max. ±0.15 % of input current range<br>(S, R, T, B max. ±0.3 %) |                              |
| Value of the LSB                  | 0.1 K; measurement values in 1/10 Kelvin                        |                              |
| <b>Analog outputs in general</b>  |   |                              |
| Digital resolution                | 14-bit  |                              |
| Output signal range               | ±105 % nominal range  |                              |
| <b>Voltage outputs</b>            |   |                              |
| Output voltage                    | ±10 V   |                              |
| Output current                    | Max. 10 mA  |                              |
| Basic accuracy at 25 °C           | Min. 1 kOhm, max. ±0.05 % of output range                       |                              |
| <b>Current outputs</b>            |   |                              |
| Output current                    | 0(4) to 20 mA   |                              |
| Basic accuracy at 25 °C           | Max. ±0.2 % FS  |                              |
| Apparent ohmic resistance         | Up to 600 Ohm   |                              |
| <b>Power supply</b>               |   |                              |
| Supply internal                   | Via backplane BS2xx   |                              |
| Current consumption internal      | 80 mA   |                              |
| Voltage range external            | 18 to 34 VDC  |                              |
| Current consumption external 24 V | Typically 200 mA without external load                          |                              |
| Galvanic isolation I/O to system  | 500 V   |                              |
| <b>Approvals / Certificates</b>   |   |                              |
| General                           | CE, cULus, CCC  |                              |
| Marine                            | DNV GL, LR, ABS, BV   |                              |
| <b>Ambient conditions</b>         |   |                              |
|                                   | Standard  | ColdClimate (❄)              |
| Operating temperature             | -30 to +60 °C   |                              |
| Rel. humidity operation           | 5 to 95 % without condensation                                  | 5 to 95 % with condensation  |
| Storage temperature               | -40 to +85 °C   |                              |
| Rel. humidity storage             | 5 to 95 % with condensation                                     | 5 to 95 % with condensation  |
| Pollution degree                  | 2 (without condensation; according to IEC 60664-1)              | 2 (according to IEC 60664-1) |

| Order Codes   |             |  |
|---------------|-------------|--|
| Item          | Item No.    | Description  |
| AIO208        | 00020628-00 | Universal analog input/output module; 8x analog In $\pm 10\text{V}$ $\pm 20\text{mA}$ 0/4 to 20mA Pt TC; 16bit; analog Out $\pm 10\text{V}$ 20 mA; 14bit; configurable analog filter; 100 $\mu\text{s}$ sample and refresh time; threshold monitoring; isolated  |
| AIO208 CC     | On request  | Like AIO208; ColdClimate (❄)   |
| AIO216        | 00020627-00 | Universal analog input/output module; 16x analog In $\pm 10\text{V}$ $\pm 20\text{mA}$ 0/4 to 20mA Pt TC; 16bit; analog Out $\pm 10\text{V}$ 20 mA; 14bit; configurable analog filter; 100 $\mu\text{s}$ sample and refresh time; threshold monitoring; isolated |
| AIO216 CC     | 00020631-00 | Like AIO216; ColdClimate (❄)   |
| Accessories   |             |  |
| KS-AIO208 B+C | 00023149-00 | Terminal set cage clamp small (2 x KS 35/20; 1 x KZ 51/02) with labeling strip and coding elements   |
| KS-AIO216 B+C | 00023148-00 | Terminal set cage clamp small (4 x KS 35/20; 1 x KZ 51/02) with labeling strip and coding elements   |