

## 16. COP-ADA (Analogue IO)

COP-ADA

611042130

The COP-ADA module is equipped with eight fast analogues 16-bit inputs and outputs. The inputs are differential, and the outputs apply to the GND line of the COP node power supply. For the inputs, a hardware filter can be configured, which will average up to 64 sample values. In addition, there is a 10V power supply, including feedback, for connection to an external measuring bridge. The outputs can be configured as voltage or current outputs.



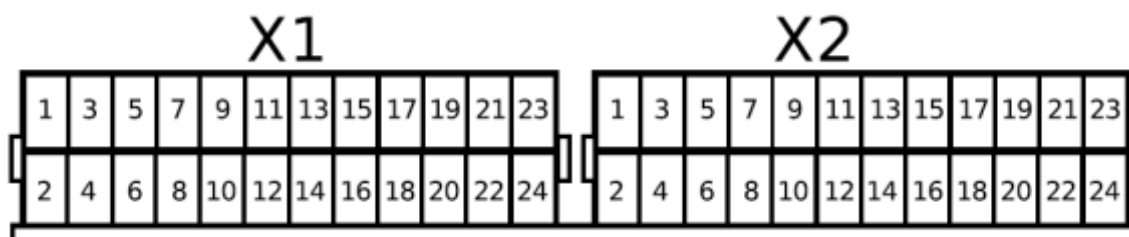
### 16.1. Technical Specifications

| Analogue Inputs                                                |                                     |                     |
|----------------------------------------------------------------|-------------------------------------|---------------------|
| Number of inputs                                               | 8                                   |                     |
| Technology                                                     | Differential                        |                     |
| ADC sampling rate                                              | 200                                 | kHz                 |
| COP bus sampling rate                                          | 1 ... 16                            | kHz                 |
| Voltage ranges                                                 | $\pm 0.1, \pm 1, \pm 10$            | V                   |
| Resolution                                                     | 16                                  | Bit                 |
| Deviation $\pm 10\text{ V} / \pm 1\text{ V} / \pm 0.1\text{V}$ | $< 0.01 / 0.01 / 0.02$              | % FSR <sup>3)</sup> |
| Input impedance                                                | 10                                  | M $\Omega$          |
| Hardware filter <sup>1)</sup>                                  | Mean value filter: 4, 32, 64 values |                     |
| Full scale drift                                               | 20                                  | ppm/K               |
| Common mode                                                    | $\pm 12$ relative to GND            | V                   |
| Analogue Outputs                                               |                                     |                     |
| Number of outputs                                              | 8                                   |                     |
| Technology                                                     | Single-ended                        |                     |
| Sampling rate for all channels                                 | 16                                  | kHz                 |
| Voltage range <sup>2)</sup>                                    | $0 \dots 5, \pm 10$                 | V                   |
| Deviation Voltage Output                                       | $< 0.02$                            | % FSR <sup>3)</sup> |
| Maximum output current in the voltage mode                     | 16                                  | mA                  |
| Current range <sup>2)</sup>                                    | $0 \dots 20$                        | mA                  |
| Resolution                                                     | 16                                  | Bit                 |
| Deviation Current Output                                       | $< 0.025$                           | % FSR <sup>3)</sup> |
| Full scale drift                                               | 50                                  | ppm/K               |

| Measuring Bridge                                   |     |          |
|----------------------------------------------------|-----|----------|
| Bridge voltage                                     | 10  | V        |
| Minimum load resistance                            | 250 | $\Omega$ |
| Drift                                              | 50  | ppm/K    |
| Module                                             |     |          |
| Warm-up time                                       | 15  | min      |
| Maximum power consumption at 24V node power supply | 260 | mA       |

- 1) The hardware filter applies for all eight inputs.
- 2) Switching between different ranges during 120 $\mu$ s returns incorrect values on all channels.
- 3) FSR: Full-Scale Range. E.g.  $\pm 10$  V Range: FSR = 20V

## 16.2. Pin Assignment



| X1  |     |        |        |     |     |
|-----|-----|--------|--------|-----|-----|
| No. | Dir | Id.    | Id.    | Dir | No. |
| 2   | In  | +A 01  | +A 00  | In  | 1   |
| 4   | In  | -A 01  | -A 00  | In  | 3   |
| 6   |     | Shield | Shield |     | 5   |
| 8   | In  | +A 03  | +A 02  | In  | 7   |
| 10  | In  | -A 03  | -A 02  | In  | 9   |
| 12  |     | Shield | Shield |     | 11  |
| 14  | In  | +A 05  | +A 04  | In  | 13  |
| 16  | In  | -A 05  | -A 04  | In  | 15  |
| 18  |     | Shield | Shield |     | 17  |
| 20  | In  | +A 07  | +A 06  | In  | 19  |
| 22  | In  | -A 07  | -A 06  | In  | 21  |
| 24  |     | Shield | Shield |     | 23  |

| X2  |     |         |         |     |     |
|-----|-----|---------|---------|-----|-----|
| No. | Dir | Id.     | Id.     | Dir | No. |
| 2   | Out | A 01    | A 00    | Out | 1   |
| 4   |     | GND     | GND     |     | 3   |
| 6   | Out | A 03    | A 02    | Out | 5   |
| 8   |     | GND     | GND     |     | 7   |
| 10  | Out | A 05    | A 04    | Out | 9   |
| 12  |     | GND     | GND     |     | 11  |
| 14  | Out | A 07    | A 06    | Out | 13  |
| 16  |     | GND     | GND     |     | 15  |
| 18  |     | GND     | GND     |     | 17  |
| 20  | Out | -Vcc MB | +Vcc MB | Out | 19  |
| 22  | In  | -FB MB  | +FB MB  | In  | 21  |
| 24  |     | Shield  | Shield  |     | 23  |



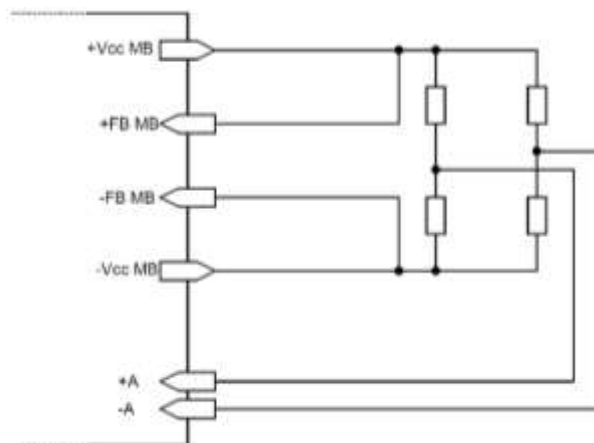
### Remarks on the versions:

- In HW-Rev0 the pins 23 and 24 are connected to GND.
- From HW-RevA the pins are connected to the shield.

### 16.3. Connection Examples

#### Measuring bridge

The module has an extra interface for connection to a measuring bridge. The voltage of the measuring bridge is regulated by the module independently via feedback. The bridge voltage is measured using any of the COP-ADA card's analogue inputs.



### 16.4. Available Options

| Item Number | Label   | Option | Description                                                               |
|-------------|---------|--------|---------------------------------------------------------------------------|
| 611042130   | COP-ADA |        | 8 x ADC 16kHz, 16Bit, multi-range,<br>8 x DAC current and voltage outputs |