

# Rexroth Inline analog output terminal, 2 outputs

**R911338449**

Edition 02

## Data sheet R-IB IL AO 2/UI-PAC

2 analog outputs  
0 - 10 V,  $\pm 10$  V  
0 - 20 mA, 4 - 20 mA,  $\pm 20$  mA  
2-wire technology

11 / 2015



## 1 Description

The terminal is designed for use within an Inline station.

It is used to output analog current or voltage signals.

### Features

- 2 analog output channels
- Connection of actuators in 2-wire technology
- Current ranges: 0 mA ... 20 mA, 4 mA ... 20 mA,  $\pm 20$  mA
- Voltage ranges: 0 V ... 10 V, -10 V ... +10 V
- Diagnostic and status indicators



This data sheet is only valid in association with the "Automation terminals of the Rexroth Inline product range" application description (DOK-CONTRL-ILSYS-INS\*\*\*-AW..-EN-P, MNR R911317021).



Make sure you always use the latest documentation.

It can be downloaded under  
[www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

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### 3 Ordering data

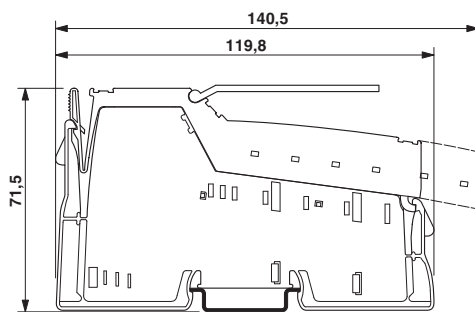
| Description   | Type                                 | MNR        | Pcs./Pkt. |
|---|--------------------------------------|------------|-----------|
| Rexroth Inline terminal with two analog output for either voltage or current signals; complete with accessories (connector and labeling field)<br>Actuator connection in 2-wire technology<br>Current ranges: 0 mA to 20 mA, 4 mA to 20 mA, $\pm 20$ mA<br>Voltage range: 0 V to 10 V, $\pm 10$ V | R-IB IL AO 2/UI-PAC                  | R911173634 | 1         |
| Documentation   | Type                                 | MNR        | Pcs./Pkt. |
| Application description<br>Automation terminals of the Rexroth Inline product range   | DOK-CONTRL-ILSYSINS***-<br>AW..-EN-P | R911317021 | 1         |

#### Additional ordering data

For additional ordering data (accessories), please refer to the product catalog at [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

### 4 Technical data

#### Dimensions (nominal sizes in mm)



|        |          |
|--------|----------|
| Width  | 12.2 mm  |
| Height | 119.8 mm |
| Depth  | 71.5 mm  |

#### General data

|  |   |
|--|---|
| Weight                                   | 66 g (with connector)                             |
| Ambient temperature (operation)          | -25 °C ... 55 °C                                  |
| Ambient temperature (storage/transport)  | -25 °C ... 85 °C                                  |
| Permissible humidity (operation)         | 10 % ... 95 % (according to DIN EN 61131-2)       |
| Permissible humidity (storage/transport) | 10 % ... 95 % (according to DIN EN 61131-2)       |
| Air pressure (operation)                 | 70 kPa ... 106 kPa (up to 3000 m above sea level) |
| Air pressure (storage/transport)         | 70 kPa ... 106 kPa (up to 3000 m above sea level) |
| Degree of protection                     | IP20  |
| Protection class                         | III, IEC 61140, EN 61140, VDE 0140-1              |

**Connection data**

|  |   |
|--|---|
| Designation                              | Inline connector  |
| Connection method                        | Spring-cage connection  |
| Conductor cross section solid / stranded | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> / 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section [AWG]            | 24 ... 16   |
| Stripping length                         | 8 mm  |

**Interface Inline local bus**

|                      |                    |
|----------------------|--------------------|
| Number               | 2                  |
| Connection method    | Inline data jumper |
| Transmission speed   | 500 kBit/s         |
| Transmission physics | Copper             |

**Inline potentials / Power consumption**

|                                    |  |
|------------------------------------|--|
| Communications power $U_L$         | 7.5 V DC (via voltage jumper)  |
| Current consumption from $U_L$     | typ. 55 mA<br>max. 65 mA   |
| I/O supply voltage $U_{ANA}$       | 24 V DC  |
| Current consumption from $U_{ANA}$ | typ. 24 mA (No-load)<br>max. 30 mA (No-load)<br>typ. 38 mA (Nominal voltage load ( $U_{OUT1/2} = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ))<br>max. 45 mA (Nominal voltage load ( $U_{OUT1/2} = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ))<br>typ. 65 mA (Nominal current load ( $I_{OUT1/2} = 20\text{ mA}$ , $R_L = 0\text{ }\Omega$ ))<br>max. 75 mA (Nominal current load ( $I_{OUT1/2} = 20\text{ mA}$ , $R_L = 0\text{ }\Omega$ )) |
| Power consumption                  | typ. 1.32 W (Nominal voltage load ( $U_{OUT1/2} = 10\text{ V}$ , $R_L = 1\text{ k}\Omega$ ))<br>typ. 1.97 W (Nominal current load ( $I_{OUT1/2} = 20\text{ mA}$ , $R_L = 0\text{ }\Omega$ ))   |

**Analog outputs**

|                                       |   |
|---------------------------------------|---|
| Number of outputs                     | 2   |
| Connection method                     | 2-wire (shielded, twisted pair)   |
| D/A resolution                        | 12 bit  |
| D/A conversion time                   | typ. 10 $\mu$ s   |
| Representation of output values       | 12 bits (11 bits + sign bit)  |
| Data formats                          | IB IL   |
| Process data update                   | bus-synchronous   |
| Permissible cable length              | max. 250 m (The specifications refer to nominal operation after complying with installation instructions. The specifications refer to the following reference cable type: Shielded power station cable: LiYCY; 2 x 2 x 0,5 mm <sup>2</sup> ; VDE0812) |
| Short-circuit and overload protection | Electronic  |
| Transient protection                  | Suppressor diode  |

**Analog outputs, Current**

|                                 |  |
|---------------------------------|--|
| Current output signal           | 0 mA ... 20 mA, 4 mA ... 20 mA, -20 mA ... 20 mA |
| Load/output load current output | $\leq 450\text{ }\Omega$                         |
| Precision                       | typ. 0.1 % (of output range final value)         |

**Analog outputs, Voltage**

|                                 |  |
|---------------------------------|--|
| Voltage output signal           | 0 V ... 10 V, -10 V ... 10 V             |
| Load/output load voltage output | $> 1\text{ k}\Omega$                     |
| Precision                       | typ. 0.1 % (of output range final value) |

**Programming Data**

|                         |        |
|-------------------------|--------|
| ID code (hex)           | 5B     |
| ID code (dec.)          | 91     |
| Length code (hex)       | 04     |
| Length code (dec.)      | 04     |
| Process data channel    | 64 Bit |
| Input address area      | 8 Byte |
| Output address area     | 8 Byte |
| Parameter channel (PCP) | 0 Byte |
| Register length (bus)   | 64 Bit |

**Configuration and parameter data in a PROFIBUS system**

|                             |         |
|-----------------------------|---------|
| Required parameter data     | 10 Byte |
| Need for configuration data | 5 Byte  |

**Error messages to the higher level control or computer system**

|                                       |  |
|---------------------------------------|--|
| Failure of the internal I/O supply    | I/O error message sent to the bus coupler            |
| I/O supply failure                    | Message in the diagnostic code (in the IB IL format) |
| Short circuit/overload of the outputs | Message in the diagnostic code (in the IB IL format) |
| Configuration invalid                 | Message in the diagnostic code (in the IB IL format) |

**Electrical isolation/isolation of the voltage areas**

| Test section  | Test voltage           |
|---|------------------------|
| 7.5 V supply (bus logics)/24 V analog supply (analog I/O) | 500 V AC, 50 Hz, 1 min |
| 7.5 V supply (bus logics) / functional earth ground       | 500 V AC, 50 Hz, 1 min |
| 24 V analog supply (analog I/O) / functional earth ground | 500 V AC, 50 Hz, 1 min |



To achieve electrical isolation between the logic level and the I/O area, supply these areas from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted (see also user manual).

**Conformance with EMC Directive 2004/108/EC****Noise immunity test in accordance with EN 61000-6-2**

|  |  |
|--|--|
| Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2   | Criterion B; 6 kV contact discharge, 8 kV air discharge  |
| Electromagnetic fields EN 61000-4-3/IEC 61000-4-3          | Criterion A; Field intensity: 10 V/m   |
| Fast transients (burst) EN 61000-4-4/IEC 61000-4-4         | Criterion B, 2 kV  |
| Transient surge voltage (surge) EN 61000-4-5/IEC 61000-4-5 | Criterion B; DC: $\pm 0.5$ kV/ $\pm 1$ kV (symmetrical/unsymmetrical) supply cables; shielded I/O cables: $\pm 1$ kV |
| Conducted interference EN 61000-4-6/IEC 61000-4-6          | Criterion A; Test voltage 10 V   |

**Noise emission test according to EN 61000-6-3**

|  |         |
|--|---------|
| Radio interference properties EN 55022 | Class A |
|--|---------|

**Approvals**

For the latest approvals, please visit [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

## 5 Additional technical data

### 5.1 Tolerance specifications

| Tolerances at $T_A = +25^\circ\text{C}$           |                        |                        |             |             |
|---|------------------------|------------------------|-------------|-------------|
| Output range                                      | Absolute               |                        | Relative    |             |
|   | Typ.                   | Max.                   | Typ.        | Max.        |
| 0 V ... 10 V, $\pm 10$ V                          | $\pm 10$ mV            | $\pm 20$ mV            | $\pm 0.1\%$ | $\pm 0.2\%$ |
| 0 mA ... 20 mA,<br>4 mA ... 20 mA,<br>$\pm 20$ mA | $\pm 20$ $\mu\text{A}$ | $\pm 60$ $\mu\text{A}$ | $\pm 0.1\%$ | $\pm 0.3\%$ |

The typical specifications contain the typical offset, gain and linearity errors.

All tolerances indicated as a percentage are related to the positive output range final value.

The data is valid for nominal operation ( $U_{ANA} = 24$  V) in the default configuration.

Default configuration: IB IL format

Please also observe the values for the temperature drift.

The maximum tolerance values represent the worst case measurement inaccuracy. Besides maximum offset and gain drift, they also comprise longtime drift as well as the maximum tolerances of the test and calibration equipment.

| Tolerance and temperature response at $T_A = -25^\circ\text{C} \dots +55^\circ\text{C}$ |                |                |
|---|----------------|----------------|
| Output range  | Drift          |                |
|   | Typ.           | Max.           |
| 0 V ... 10 V, $\pm 10$ V  | $\pm 30$ ppm/K | $\pm 50$ ppm/K |
| 0 mA ... 20 mA,<br>4 mA ... 20 mA, $\pm 20$ mA  | $\pm 30$ ppm/K | $\pm 50$ ppm/K |

The drift values refer to the relevant output range final value.

The values refer to nominal operation with default settings.

### 5.2 Step response (signal rise time)

#### Voltage step 0 V ... 10 V (typical values)

| Load   | Time for 10 % ... 90 % | Time for 0 % ... 99 % |
|--|------------------------|-----------------------|
| $R_L = 2\text{ k}\Omega$                               | 9 $\mu\text{s}$        | 15 $\mu\text{s}$      |
| $R_L = 2\text{ k}\Omega \parallel C_L = 10\text{ nF}$  | 9 $\mu\text{s}$        | 15 $\mu\text{s}$      |
| $R_L = 2\text{ k}\Omega \parallel C_L = 220\text{ nF}$ | 135 $\mu\text{s}$      | 180 $\mu\text{s}$     |
| $R_L = 2\text{ k}\Omega + L_L = 3\text{ mH}$           | 8 $\mu\text{s}$        | 15 $\mu\text{s}$      |

#### Current step 0 mA ... 20 mA (typical values)

| Load  | Time for 10 % ... 90 % | Time for 0 % ... 99 % |
|---|------------------------|-----------------------|
| $R_L = 500\ \Omega$                                 | 3 $\mu\text{s}$        | 5 $\mu\text{s}$       |
| $R_L = 500\ \Omega \parallel C_L = 10\text{ nF}$    | 18 $\mu\text{s}$       | 30 $\mu\text{s}$      |
| $R_L = 500\ \Omega \parallel C_L = 220\text{ nF}$   | 300 $\mu\text{s}$      | 590 $\mu\text{s}$     |
| $R_L = 500\ \Omega + L_L = 3\text{ mH}$             | 1.6 $\mu\text{s}$      | 3 $\mu\text{s}$       |
| $R_L = 50\ \Omega \parallel C_L = 100\ \mu\text{F}$ | 11 $\mu\text{s}$       | 27 $\mu\text{s}$      |

#### Current step 4 mA ... 20 mA (typical specifications)

| Load  | Time for 10 % ... 90 % | Time for 0 % ... 99 % |
|---|------------------------|-----------------------|
| $R_L = 500\ \Omega$                               | 2.3 $\mu\text{s}$      | 4 $\mu\text{s}$       |
| $R_L = 500\ \Omega \parallel C_L = 10\text{ nF}$  | 15 $\mu\text{s}$       | 26 $\mu\text{s}$      |
| $R_L = 500\ \Omega \parallel C_L = 220\text{ nF}$ | 260 $\mu\text{s}$      | 450 $\mu\text{s}$     |
| $R_L = 500\ \Omega + L_L = 3\text{ mH}$           | 1.5 $\mu\text{s}$      | 2.8 $\mu\text{s}$     |

5.3 Tolerances influenced by electromagnetic interference

| Type of electromagnetic interference   | Typical deviation in % referencing the output range final value |                |
|--|---|----------------|
|  | Voltage output  | Current output |
| Electromagnetic fields; field strength 10 V/m according to EN 61000-4-3/ IEC 61000-4-3                     | < 1 %   | < 1 %          |
| Conducted interference, Class 3 (10 V test voltage) according to EN 61000-4-6/ IEC 61000-4-6               | < 1 %   | < 1.2 %        |
| Fast transients (burst) up to an interference voltage of ±2.2 kV in acc. with EN 61000-4-4 / IEC 61000-4-4 | < 1 %   | < 2 %          |

6 Internal circuit diagram

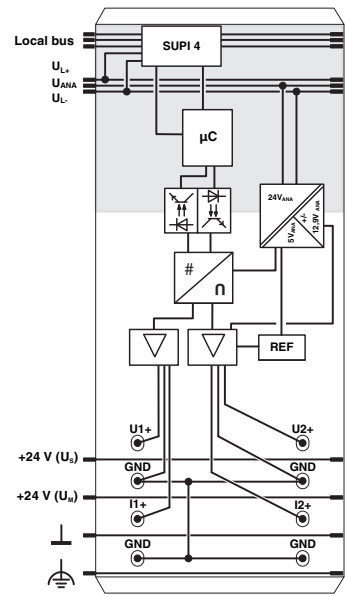


Fig. 1 Internal wiring of the terminal points

Key:

|  |   |
|--|---|
|  | Protocol chip                               |
|  | Microprocessor                              |
|  | Optocoupler                                 |
|  | Power supply unit with electrical isolation |
|  | Digital/analog converter                    |
|  | Output amplifier                            |
|  | Electrically isolated area                  |
|  | Reference voltage source                    |



For an explanation of the other symbols used, please refer to the “Automation terminals of the Rexroth Inline product range” application description (DOK-CONTRL-ILSYSINS\*\*\*-AW..-EN-P, MNR R911317021).

## 7 Electrical isolation

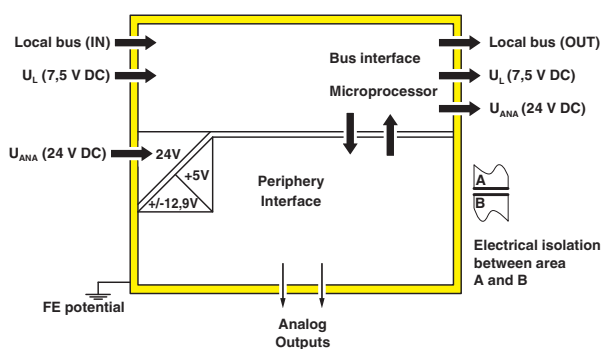


Fig. 2 Electrical isolation of the individual function areas

## 8 Terminal point assignment

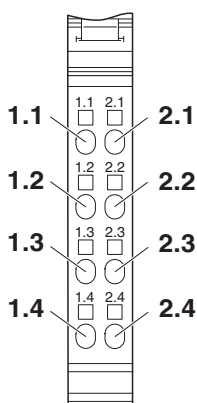


Fig. 3 Terminal point assignment

| Terminal point | Signal | Meaning                                   |
|----------------|--------|---|
| 1.1            | +U1    | Positive voltage connection for channel 1 |
| 1.2            | AGND   | Analog ground                             |
| 1.3            | +I1    | Positive current connection for channel 1 |
| 1.4            | AGND   | Analog ground                             |
| 2.1            | +U2    | Positive voltage connection for channel 2 |
| 2.2            | AGND   | Analog ground                             |
| 2.3            | +I2    | Positive current connection for channel 2 |
| 2.4            | AGND   | Analog ground                             |

## 9 Connection example

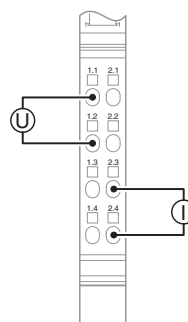


Fig. 4 Connection for voltage and current output

## 10 Connection notes

Always connect the analog actuators using shielded twisted-pair cables.

Connect the shielding with the shielding accessories given in the ordering data.

Insulate the shielding at the actuator or connect it with a high resistance and capacitance to the PE potential.

## 11 Installation instructions

High current flowing through potential jumpers  $U_M$  and  $U_S$  leads to a temperature rise in the potential jumpers and inside the terminal. To keep the current flowing through the potential jumpers of the analog terminals as low as possible, always place the analog terminals after all the other terminals at the end of the main circuit (for the sequence of the Inline terminals: see also "Automation terminals of the Rexroth Inline product range" application description (DOK-CONTRL-ILSY-SINS\*\*\*-AW..-EN-P, MNR R911317021).



12 Local status and diagnostic indicators



Fig. 5 Local status and diagnostic indicators

| Designation | Color | Meaning                             |
|-------------|-------|-------------------------------------|
| D           | green | Diagnostics (bus and logic voltage) |



For more detailed information on diagnostics, please refer to the “Automation terminals of the Rexroth Inline product range” application description (DOK-CONTRL-ILSYSINS\*\*\*-AW..-EN-P, MNR R911317021).

Function identification

Yellow

13 Process data

The terminal uses four input process data words and four output process data words.

Two words are also available for each channel.



**Delivery state**  
By default, the terminal is configured for the voltage range of 0 V ... 10 V and the representation of the process data is configured in IB IL format.  
The terminal is therefore ready for operation immediately after switching on.  
You can change the configuration of the terminal at any time.

### 13.1 OUT process data

In the output process data, the configuration and the output value is transmitted for each channel.

#### Order of the process data words

| OUT1      | OUT2      | OUT3      | OUT4      |
|-----------|-----------|-----------|-----------|
| Channel 1 | Channel 2 | Channel 1 | Channel 2 |
| Conf      | Conf      | AV        | AV        |

Conf Configuration word

AV Output value

#### Assignment of the configuration words

| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5           | 4               | 3 | 2 | 1 | 0 |
|----|----|----|----|----|----|---|---|---|---|-------------|-----------------|---|---|---|---|
| K  | 0  | 0  | 0  | 0  | 0  | 0 | 0 | 0 | 0 | For-<br>mat | Output<br>range |   |   |   |   |

K Configuration

#### Bit 15

| Code | Configuration |
|------|---------------|
| 0    | Do not accept |
| 1    | Accept        |

The configuration specified in the word is accepted if bit 15 is set. If bit 15 is not set, the last accepted configuration is used.

The bit can be set permanently. It has no influence on operation as long as the configuration does not change.

The configuration is not saved retentively in the terminal.

The module starts with the default settings after a voltage reset (power up).

#### Bit 5 ... 4

| Code  | Format                  |
|-------|-------------------------|
| 00    | IB IL (default setting) |
| Other | Reserved                |

#### Bit 3 ... 0

| Code             | Output range           | Note            |
|------------------|------------------------|-----------------|
| 0000             | 0 V ... 10 V (default) |                 |
| 0001             | -10 V ... +10 V        |                 |
| 0010             | Reserved               |                 |
| 0011             | Reserved               |                 |
| 0100             | 0 mA ... 20 mA         | S20 standard    |
| 0101             | -20 mA ... +20 mA      | S20 standard    |
| 0110             | 4 mA ... 20 mA         | S20 standard    |
| 0111             | Reserved               |                 |
| 1000             | 0 mA ... 20 mA         | Inline standard |
| 1001             | -20 mA ... +20 mA      | Inline standard |
| 1010             | 4 mA ... 20 mA         | Inline standard |
| 1011 ...<br>1111 | Reserved               |                 |

#### Output value

| 15 | 14           | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----|--------------|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| V  | Analog value |    |    |    |    |   |   |   |   |   |   | X | X | X | X |

The output values are mapped in IB&nbsp;IL format. In this format the output value is represented in bits 14 to 0. An additional bit (bit&nbsp;15) is available as a sign bit.

See also the section "Measured value representation in the different formats".

V Sign bit

X Not relevant bit

### 13.2 IN process data

The following data is transmitted in the input process data:

- During normal error-free operation, the configuration and the output value are mirrored in the input process data.
- If an error occurs, the mirrored configuration and the diagnostics message (in IB IL format) are mapped in the input process data for each channel.
- If the firmware version is to be read out, the firmware is mapped in word 1.

#### Order of the process data words

| IN1       | IN2       | IN3       | IN4       |
|-----------|-----------|-----------|-----------|
| Channel 1 | Channel 2 | Channel 1 | Channel 2 |
| Conf*     | Conf*     | AW*/Diag  | AW*/Diag  |

Conf\* Mirrored configuration word

AW\*/Diag Mirrored output value or diagnostics messages (in IB IL format)

#### Mirrored configuration word

| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3    | 2      | 1 | 0 |
|----|----|----|----|----|----|---|---|---|---|---|---|------|--------|---|---|
| EB | 0  | 0  | 0  | 0  | 0  | 0 | 0 | 0 | 0 | 0 | 0 | For- | Output |   |   |
|    |    |    |    |    |    |   |   |   |   |   |   | mat  | range  |   |   |

EB Error

EB = 0 No error has occurred.

EB = 1 An error has occurred.

#### Mirrored output value or diagnostics messages (in IB IL format)

| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| V  |    |    |    |    |    |   |   |   |   |   |   | X | X | X | X |

V Sign bit

X Not relevant bit

### 13.3 Read firmware version

| OUT1             |                       |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |
|------------------|-----------------------|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|
| Bit              | 15                    | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Assignment (hex) | 3                     |    |    |    | C  |    |   |   | 0 |   |   |   | 0 |   |   |   |
| Meaning          | Read firmware version |    |    |    |    |    |   |   |   |   |   |   |   |   |   |   |

To read the firmware version, transmit the value 3C00<sub>hex</sub> in the output data word OUT1.

During enquiry of the firmware version, the first channel is deactivated and it is also not possible to change the configuration of the first channel.

The output data words OUT2 and OUT4 keep their meaning. The second channel is active and can also be configured.

The firmware version is contained in the IN1 input data word. The input data words IN2 to IN4 keep their meaning.

| IN1 (example)    |                       |    |    |    |    |    |   |   |   |   |   |   |           |   |   |   |
|------------------|-----------------------|----|----|----|----|----|---|---|---|---|---|---|-----------|---|---|---|
| Bit              | 15                    | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3         | 2 | 1 | 0 |
| Assignment (hex) | 1                     |    |    |    | 2  |    |   |   | 3 |   |   |   | 4         |   |   |   |
| Meaning          | Firmware version 1.23 |    |    |    |    |    |   |   |   |   |   |   | Device ID |   |   |   |

The device ID allows you to distinguish between two devices with the same programming data (ID code, length code).

| Inline terminal     | ID code           | Length code       | Device ID |
|---------------------|-------------------|-------------------|-----------|
| R-IB IL AO 2/UI-PAC | 5B <sub>hex</sub> | 04 <sub>hex</sub> | 4         |

## 14 Representation of the output values

### IB IL format

| Output data |                                       | 0 V ... 10 V | -10 V ... +10 V |
|-------------|---------------------------------------|--------------|-----------------|
| hex         | dec                                   | V            | V               |
| 8001        | Measuring range exceeded (over-range) | 10.837       | 10.837          |
| 7F00        | 32512                                 | 10.837       | 10.837          |
| 7530        | 30000                                 | 10.0         | 10.0            |
| 0010        | 16                                    | 0.00533      | 0.00533         |
| 0000        | 0                                     | 0            | 0               |
| FFF0        | -16                                   | -            | -0.00533        |
| 8AD0        | -30000                                | -            | -10.0           |
| 8100        | -32512                                | -            | -10.837         |
| 8080        | Below measuring range (underrange)    | -            | -10.837         |
| 8002        | Open circuit                          | -            | -               |

| Output data |                                       | 0 mA ... 20 mA | -20 mA ... +20 mA | 4 mA ... 20 mA |
|-------------|---------------------------------------|----------------|-------------------|----------------|
| hex         | dec                                   | mA             | mA                | mA             |
| 8001        | Measuring range exceeded (over-range) | 21.675         | 21.675            | 21.339         |
| 7F00        | 32512                                 | 21.675         | 21.675            | 21.339         |
| 7530        | 30000                                 | 20.000         | 20.000            | 20.000         |
| 0010        | 16                                    | 0.010667       | 0.010667          | 4.008533       |
| 0000        | 0                                     | 0              | 0                 | 4.0            |
| FFF0        | -16                                   | -              | -0.010677         | -              |
| 8AD0        | -30000                                | -              | -20.0             | -              |
| 8100        | -32512                                | -              | -21.675           | -              |
| 8080        | Below measuring range (underrange)    | -              | -21.675           | -              |
| 8002        | Open circuit                          | -              | -                 | 4.0            |

In the IB IL format a diagnostic code is mapped to the input data in the event of an error.

| Code (hex) | Cause                                 |   |
|------------|---------------------------------------|---|
| 8002       | Open circuit                          | The output is configured as current output and the set current cannot flow. |
| 8003       | Short-circuit/overload of the output. | The output is configured as voltage output and is short circuited.          |
| 8010       | Configuration invalid                 |   |
| 8020       | Faulty supply voltage                 | Periphery supply voltage  |
| 8040       | Device faulty                         |   |