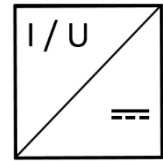
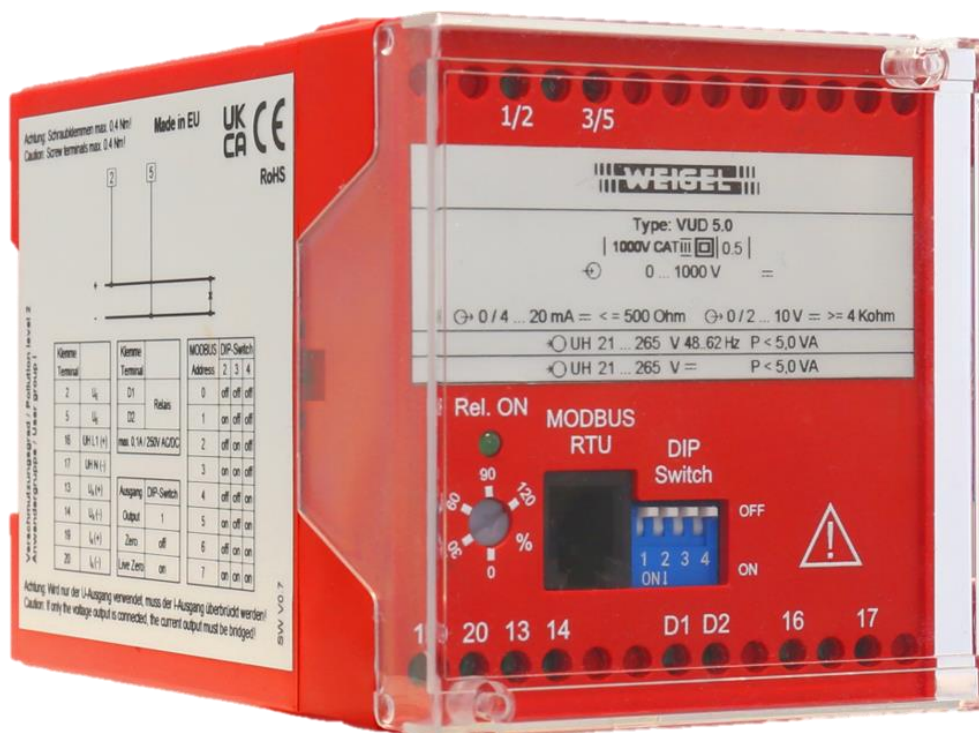


# Measuring transducers for DC systems up to 1000 V (CAT III)



**AUD 5.0**  
**VUD 5.0**



## Application

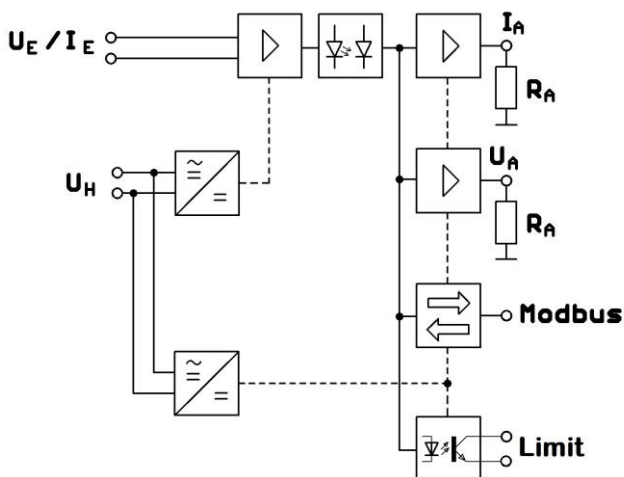
The **Series 5.0** transducer converts DC voltage or DC current into a load independent DC current or an impressed DC voltage. The output signal can be indicated, recorded and/or used for controlling directly at the test point or in measuring facilities located far away. It is possible to connect more than one indicator, recorder, controller, computer etc. to the output circuit provided the total impedance does not exceed the rating. Power supply is effected by a separate auxiliary voltage input. Input, output and auxiliary voltage input are **galvanically isolated** from each other. The outputs are **short-circuit proof** and **safe against idling**.

The measuring transducers are intended for installation in plants, devices or switchboards. The regulations regarding the construction of those electrical systems must be observed.

## Operating Principle

Current measurement is effected by means of a shunt, voltage measurement by means of a voltage divider. The signal will then be galvanically isolated from input via an optical path and converted into a proportionally impressed DC voltage or into a load independent DC current proportional to the input signal.

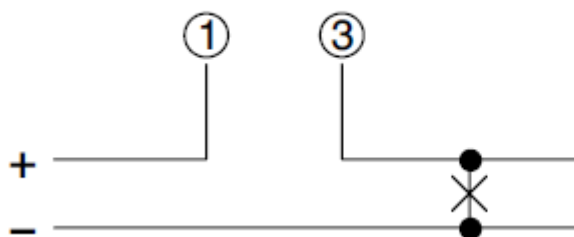
## Block Circuit Diagram



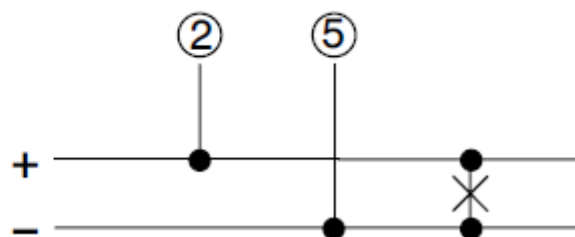
**Note:**  
Input, outputs and auxiliary voltage are galvanically isolated from each other.

## Connections

current AUD 5.0



voltage VUD 5.0



## Inputs - Types

| type    | input quantites | Rated input value      |
|---------|-----------------|------------------------|
| AUD 5.0 | DC current      | 0-200 $\mu$ A to 0-5 A |
| VUD 5.0 | DC voltage      | 0-60 mV to 0-1500 V    |

|                             |                                                                 |                                                                |
|-----------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|
| Frequency range             | DC                                                              |                                                                |
| Input resistance<br>Voltage | 4.25 M $\Omega$ at 1500 V                                       |                                                                |
| Voltage drop current        | 60 mV                                                           |                                                                |
| Power consumption           | IE x 0.1 V on voltage input<br>0.54 W at 1500 V                 |                                                                |
| Operating voltage           | max. 1500 VDC (1000 V CAT III)                                  |                                                                |
| Overload                    | Current                                                         | Voltage                                                        |
| Modulation range            | 1.2 I <sub>EN</sub>                                             | 1.2 U <sub>EN</sub>                                            |
| Overload limit              | 1.2 I <sub>EN</sub> continuously<br>20 I <sub>EN</sub> max. 1 s | 1.2 U <sub>EN</sub> continuously<br>2 U <sub>EN</sub> max. 1 s |

## Outputs

### Current output

|                               |                            |
|-------------------------------|----------------------------|
| Output current I <sub>A</sub> | impressed direct current   |
| Rated current I <sub>AN</sub> | 0 ... 20 mA or 4 ... 20 mA |
| Burden area R <sub>A</sub>    | 0 ... 500 $\Omega$         |
| Current limitation            | to 130 % of the end value  |

### Voltage output

|                               |                          |
|-------------------------------|--------------------------|
| Output voltage U <sub>A</sub> | impressed direct voltage |
| Rated voltage U <sub>AN</sub> | 0 ... 10 V or 2 ... 10 V |
| Burden R <sub>A</sub>         | $\geq$ 4 k $\Omega$      |

### Current/voltage output

|                      |                             |
|----------------------|-----------------------------|
| Residual ripple      | $\leq$ 0.3 % <sub>eff</sub> |
| Setting time         | < 250 ms                    |
| Open circuit voltage | $\leq$ 17 V                 |

### Limit Value Output

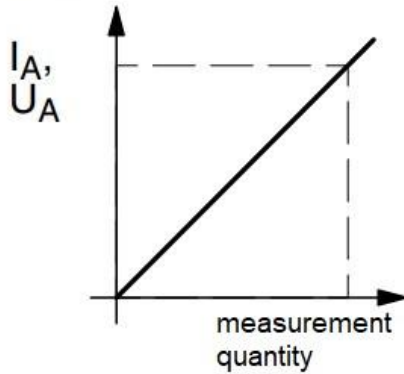
1 normally open contact, hysteresis 5% of the setpoint (adjustable via MODBUS RTU),  
contact rating: max. 0.1 A AC/DC, 250 V AC/DC

### Function indicator

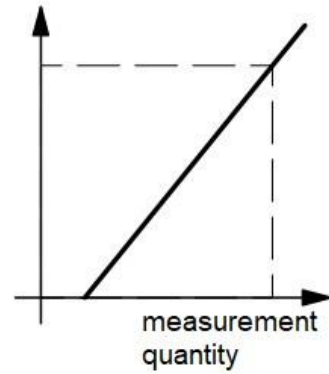
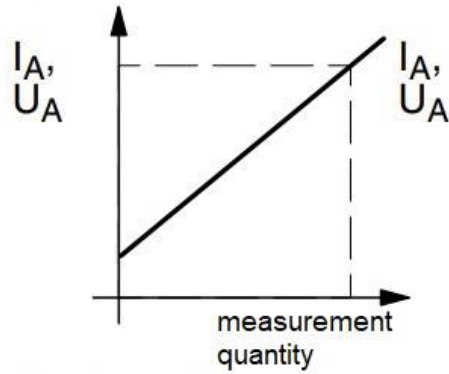
green LED illuminates when the limit value is exceeded

## Conversion Characteristics

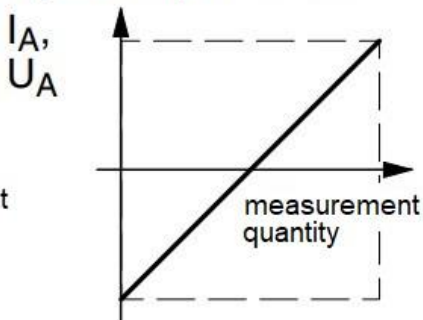
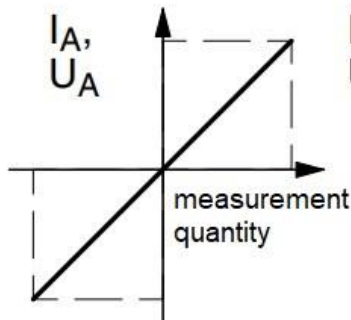
Standard



„live zero“



bipolar output



## Auxiliary power

Power supply

Auxiliary voltage

Power consumption

21 ... 265 V= or 21 ... 265 V~

< 5 VA

## Installation

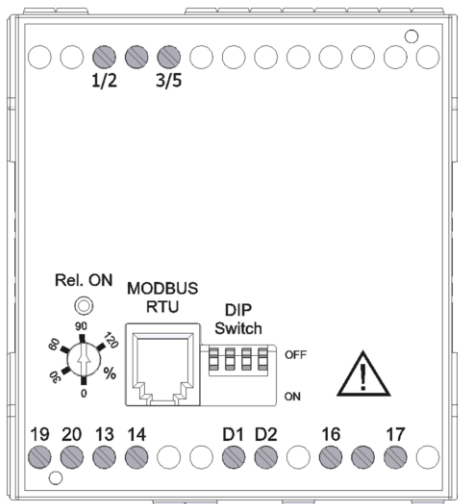
The devices have a snap fastening for mounting on a TH 35 mm standard rail (DIN EN 60715). The devices are suitable for close-to-close installation. The screw connections are suitable for a cable cross-section up to 2.5 mm<sup>2</sup> and can be tightened with a maximum torque of 0.4 Nm.

## Terminal connection

### Attention:

The outputs must not be connected to each other!

If only the voltage output is connected, terminals 19 and 20 (current output) must be bridged!



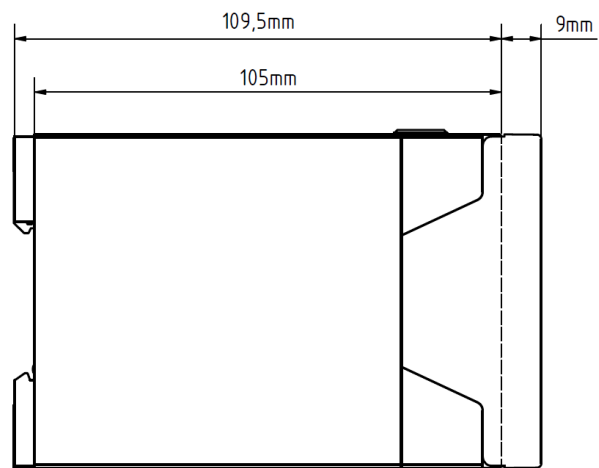
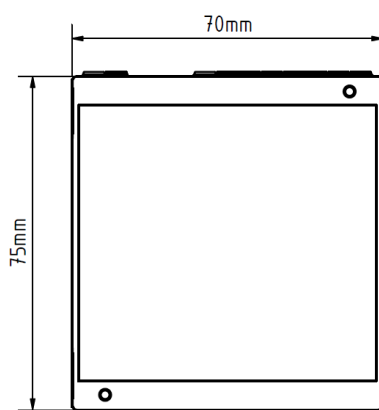
| Terminal |             |
|----------|-------------|
| 1/2      | $I_E / U_E$ |
| 3/5      | $I_E / U_E$ |
| 16       | UH L1 (+)   |
| 17       | UH N (-)    |
| 13       | $U_A (+)$   |
| 14       | $U_A (-)$   |
| 19       | $I_A (+)$   |
| 20       | $I_A (-)$   |

|                        |        |
|------------------------|--------|
| Terminal               |        |
| D1                     | Relais |
| D2                     |        |
| max. 0,1A / 250V AC/DC |        |

| Output    | DIP-Switch |
|-----------|------------|
|           | 1          |
| Zero      | off        |
| Live Zero | on         |

| MODBUS Address | DIP-Switch |     |     |
|----------------|------------|-----|-----|
|                | 2          | 3   | 4   |
| 0              | off        | off | off |
| 1              | on         | off | off |
| 2              | off        | on  | off |
| 3              | on         | on  | off |
| 4              | off        | off | on  |
| 5              | on         | off | on  |
| 6              | off        | on  | on  |
| 7              | on         | on  | on  |

## Dimensions



(Symbolic representation)



### !!! Danger !!

The changeover switch and the potentiometer may only be operated when there is no voltage!  
At first disconnect all the transmitter connections and use suitable tools!

## General technical data

|                                 |                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Design                          | Surface-mounted housing for snap mounting<br>on DIN rail TH 35 according to DIN EN 60 715                                                                                                                                                                                                      |
| Case material                   | ABS red<br>self-extinguishing according to UL 94 V-0                                                                                                                                                                                                                                           |
| Connections                     | Screw terminals, max. torque 0.4 Nm                                                                                                                                                                                                                                                            |
| Wire cross section              | max. 2.5 mm <sup>2</sup>                                                                                                                                                                                                                                                                       |
| Protection class                | IP 30 housing<br>IP 20 terminals                                                                                                                                                                                                                                                               |
| Test voltages                   | Measurement circuit against all circuits and housing: 7400 Vrms 5 sec<br>Outputs (analog, Modbus) against auxiliary voltage and relay contacts: 3510 Vrms 5 sec<br>Relay contacts against auxiliary voltage and housing: 3510 Vrms 5 sec<br>Auxiliary voltage against housing: 3510 Vrms 5 sec |
| Working voltage                 | 1000 V (nominal line voltage phase-zero)                                                                                                                                                                                                                                                       |
| Protection class                | II                                                                                                                                                                                                                                                                                             |
| Measurement category            | CAT III                                                                                                                                                                                                                                                                                        |
| Pollution level                 | 2                                                                                                                                                                                                                                                                                              |
| Sealevel of the<br>place of use | max. 2000 m above sea level                                                                                                                                                                                                                                                                    |
| Dimensions                      | 70 x 75 x 118.5 mm                                                                                                                                                                                                                                                                             |
| Weight                          | 200 g                                                                                                                                                                                                                                                                                          |

## Accuracy at reference conditions

|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| <b>Accuracy class</b> | 0.5 (± 0.5 % of end value)                             |
| Temperature drift     | ≤ 0.02 %/K, valid for standard version and max. 1 year |

### Reference conditions

|                     |                                     |
|---------------------|-------------------------------------|
| Input voltage       | U <sub>EN</sub> ± 2 %               |
| Frequency           | DC                                  |
| Auxiliary voltage   | U <sub>HN</sub> ± 2 %, 50 ... 60 Hz |
| Ambient temperature | 23 °C ± 1 K                         |
| Warm-up time        | ≤ 1 min                             |

### Influence quantity

|                      |        |
|----------------------|--------|
| Stray magnetic field | 0.5 mT |
|----------------------|--------|

## Environmental conditions

|                                       |                                                                     |
|---------------------------------------|---------------------------------------------------------------------|
| Measuring transducer class K55        | User group I                                                        |
| Rated operating range                 | -20 ... +55 °C                                                      |
| Limit operating range                 | -20 ... +55 °C                                                      |
| Limit range for storage and transport | -25 ... +70 °C                                                      |
| Relative humidity                     | ≤ 75 % annual average, no condensation, only use the device indoors |

## Ordering Guide AUD 5.0 / VUD 5.0

| Order number |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| IMU54-       | AUD 5.0                                                                             |
| UMU55-       | VUD 5.0                                                                             |
|              | <b>Input</b>                                                                        |
|              | <b>AUD 5.0</b>                                                                      |
| 1            | 0... 200 µA                                                                         |
| 2            | 0... 20 mA                                                                          |
| 3            | 0... 0.5 A                                                                          |
| 4            | 0... 1 A                                                                            |
| 5            | 0... 2 A                                                                            |
| 6            | 0... 5 A                                                                            |
| 7            | -                                                                                   |
| 8            | -                                                                                   |
| 9            | special range up to ±5 A                                                            |
| A            | -                                                                                   |
| B            | -                                                                                   |
| C            | -                                                                                   |
| D            | -                                                                                   |
| E            | -                                                                                   |
| F            | -                                                                                   |
| G            | -                                                                                   |
| H            | -                                                                                   |
| I            | -                                                                                   |
| J            | -                                                                                   |
| K            | -                                                                                   |
| L            | -                                                                                   |
| M            | -                                                                                   |
|              | <b>Frequency range input</b>                                                        |
| 0            | DC                                                                                  |
|              | <b>Output</b>                                                                       |
| A            | 0...10 mA and 0...10V                                                               |
| B            | 0...5 mA and 0...10V                                                                |
| E            | -20...0...20 mA and -10...0...10 V                                                  |
| F            | 0...20 mA and 0...10 V as well as 4...20 mA and 2...10 V at frontside switchable *) |
| Z            | special output                                                                      |
|              | <b>Accuracy</b>                                                                     |
| 1            | ±0.5 % of end value                                                                 |
|              | <b>Response time</b>                                                                |
| 2            | 250 ms                                                                              |
|              | <b>Auxiliary supply</b>                                                             |
| 6            | 21...265 V AC / DC                                                                  |
|              | <b>Manufacturing certificate</b>                                                    |
| 0            | without *)                                                                          |
| 1            | with                                                                                |

\*) standard

Order example:

Transmitter for DC VUD 5.0

Input: 1000 V, Frequency range: DC, Output: 0... 20 mA and 0... 10 V as well as 4... 20 mA and 2... 10 V at frontside switchable , accuracy ± 0.5 % , setting time: 250 ms, auxiliary supply: 21...265 V AC / DC, without Manufacturing certificate.

Item number according to number code: UMU55-E0F1260

# MODBUS

## 1) General:

This document defines communication over Modbus RTU.

Refer to <http://www.modbus.org>

## 2) serial setting, transmission mode

The device is factory set to 19200 baud with even parity and 1 stop bit.

Serial setting can be changed – see the specification of the registers.

A power cycle is needed to take effect of these changes.

The device supports RTU transmission mode in HEX only.

## 3) Slave address:

The Modbus address range from 1 to 247.

If the register is set to zero (=factory set) the Modbus address is set by Dipswitch 2, 3 and 4 = range 1..7. If other addresses are needed, set it on Register “37”.

The address should be set if several devices are on the bus, otherwise broadcast “0” can be used.

## 4) Modbus class, function:

Following codes are supported within the Modbus interface

0x03: Read Holding Registers

0x06: Write Single Holding Register

Class: Basic

Serial Line Diagnostics: Not implemented

## 5) Exception response:

The device will respond with several exception codes:

The device will respond with several exception codes:

- In case of function codes other than 3 or 6: Exception Code 1 (invalid function code)
- In case of invalid addresses: Exception Code 2 (invalid data address)
- In case of invalid passcode: Exception Code 2 (invalid data address)
- In case of values out of range: Exception Code 3 (invalid data value)

## 6) Write protection:

A write to a register is protected via the passcode register.

Prior to a register write the passcode register has to be set to 23205dec (0x5AA5).

After that, the registers that are specified to be a read/write Register, can be set.

The passcode register can be cleared via a bus-write with zero or by a power-cycle. After 10min the passcode register will be cleared via software.

An attempt to write without correct passcode register will be responded with an exception.

## 7) 32-bit definition:

Values with 32bit are transmitted big endian, that means high register first.

To set a 32bit value two 16bit Register writes have to be performed.

Example:

Read Address 0+1

### Raw Data

```
[RTU]>Tx > 11:11:42:579 - 00 03 00 00 00 02 C5 DA  
[RTU]>Rx > 11:11:42:604 - 00 03 04 00 00 03 69 2A 2D
```

→ Result in 0x00000369 = 873



Read Address 2+3

#### Raw Data

```
[RTU]>Tx > 11:12:26:006 - 00 03 00 02 00 02 64 1A
[RTU]>Rx > 11:12:26:044 - 00 03 04 00 02 C4 8E 99 97
```

→ Result in 0x0002C48E = 181390

#### 8) Register map

Addresses for holding registers are defined to be > 40000, but this is ignored in this document since this defines function code 3 and 6. That means: Register "40001" is listed as Register "1" and transferred with function code 3 / 6 as address "0" on the bus.

##### a. Reading values:

| Register | Adr. | Format | unit  | name  | comment | R/W | W Lev |
|----------|------|--------|-------|-------|---------|-----|-------|
| Adr+1    | 0    | I16    | 0.01% | value | +10000  | R   | -     |
| Adr+1    | 1    | I16    | 0.1%  | value | +1000   | R   | -     |
| Adr+1    | 2    | I16    | 1%    | value | +100    | R   | -     |

| Register | Adr. | Format | unit | name            | comment            | R/W | W Lev |
|----------|------|--------|------|-----------------|--------------------|-----|-------|
| Adr+1    | 3    | I16    | 0.1% | Output 0-10V    | Calculated         | R   | -     |
| Adr+1    | 4    | I16    | 0.1% | Output 0-20mA   | Calculated         | R   | -     |
| Adr+1    | 5    | I16    | sec  | On-time counter |                    | R   | -     |
| Adr+1    | 6    | I16    | 0.1% | Trimmer         |                    | R   | -     |
| Adr+1    | 7    | I16    | b    | ADC-Wert        | Reduced to +-11bit | R   | -     |
| Adr+1    | 8    | I16    | *)   | Status          |                    | R   | -     |
| Adr+1    | 9    | I16    | -    | Relais          |                    | R   | -     |
| Adr+1    | 10   | I16    |      | Dipswitch       | 0000 ... 1111      | R   | -     |
| Adr+1    | 11   | I16    | mV   | Vcc             | Typ 3300           | R   | -     |
| Adr+1    | 12   | I16    |      | Version         |                    | R   | -     |
| Adr+1    | 13   | I16    |      | YYYY            |                    | R   | -     |
| Adr+1    | 14   | I16    |      | MMDD            |                    | R   | -     |

##### b. Parameters / Setting Values

W Lev" specifies the necessary level to write that register

| Register | Adr. | Format | unit | name               | comment                                                              | R/W | W Lev |
|----------|------|--------|------|--------------------|----------------------------------------------------------------------|-----|-------|
| Adr+1    | 20   | I16    |      | UserLevel          | Set with pass, returns level x 10                                    | R/W | 0     |
| Adr+1    | 21   | I16    | %    | Relais Start       | Typical 0%                                                           | R/W | 3     |
| Adr+1    | 22   | I16    | %    | Relais End         | Typical 120%                                                         | R/W | 3     |
| Adr+1    | 23   | I16    | 0-3  | Relais Function    | 0= overfill<br>1= undercut<br>2= overfill blink<br>3= undercut blink | R/W | 1     |
| Adr+1    | 24   | I16    | %    | Relais hysteresis  | 1-50%                                                                | R/W | 1     |
| Adr+1    | 25   | I16    |      | Gain               | 1,2,4,8,20,(40,80)                                                   | R/W | 3     |
| Adr+1    | 26   | I16    |      | Config 0-10V       | 0=off, 1=10V-zero, 2=10V-live, 3= 10V-DIPSW                          | R/W | 1     |
| Adr+1    | 27   | I16    | %    | Max Output 0-10V   | Typ 130 %                                                            | R/W | 1     |
| Adr+1    | 28   | I16    | %    | Start 0-10V @Input | typ 0%                                                               | R/W | 1     |
| Adr+1    | 29   | I16    | %    | End 0-10V @Input   | typ 100%                                                             | R/W | 1     |
| Adr+1    | 30   | I16    |      | Config 0-20mA      | 0=off, 1=20mA-zero, 2=20mA-live, 3= 20mA-DIPSW                       | R/W | 1     |
| Adr+1    | 31   | I16    | %    | Max Output 0-20mA  | typ 130 %                                                            | R/W | 1     |
| Adr+1    | 32   | I16    | %    | Start 0-20mA@Input | typ 0%                                                               | R/W | 1     |
| Adr+1    | 33   | I16    | %    | End 0-20mA @Input  | typ 100%                                                             | R/W | 1     |

|       |    |     |   |                  |                                                |     |   |
|-------|----|-----|---|------------------|------------------------------------------------|-----|---|
| Adr+1 | 34 | I16 |   | Res              |                                                |     |   |
| Adr+1 | 35 | I16 |   | parity           | 0=no, 1= even, 2=odd                           | R/W | 1 |
| Adr+1 | 36 | I16 |   | baud             | 9600 / 19200                                   | R/W | 1 |
| Adr+1 | 37 | I16 |   | Modbus address   | 0-247<br>If "0" Dipsw2,3 and 4 set the address | R/W | 1 |
| Adr+1 | 38 | I16 | - | Offset Input     | internal                                       | R/W | 3 |
| Adr+1 | 39 | I16 | - | Slope Input high | internal                                       | R/W | 3 |
| Adr+1 | 40 | I16 | - | Slope Input      | internal                                       | R/W | 3 |
| Adr+1 | 41 | I16 | - | Offset 0-10V     | internal                                       | R/W | 3 |
| Adr+1 | 42 | I16 | - | Slope 0-10V      | internal                                       | R/W | 3 |
| Adr+1 | 43 | I16 | - | Offset 0-20mA    | internal                                       | R/W | 3 |
| Adr+1 | 44 | I16 | - | Slope 0-20mA     | internal                                       | R/W | 3 |

**c. Infofield:**

| Register | Adr.  | Format | Unit | Name                          | Comment | R/W | W Lev |
|----------|-------|--------|------|-------------------------------|---------|-----|-------|
| Adr+1    | 50-69 | U16    | -    | Info like Numbers, ASCII etc. |         | R/W | 3     |

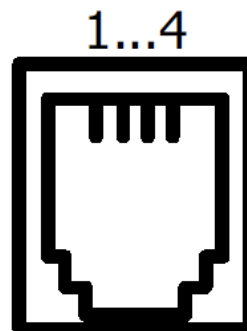
**d. Calibration:**

| Register | Adr. | Format | unit  | name                     | comment           | R/W | W Lev |
|----------|------|--------|-------|--------------------------|-------------------|-----|-------|
| Adr+1    | 70   | u16    | -     | Calibration value Input  | 0=0 Volt at Input | R/W | 3     |
| Adr+1    | 71   | I16    |       | Calibration modus Out    | 1=0 %<br>2=100%   | R/W | 3     |
| Adr+1    | 72   | I16    | 0.01% | Calibration value 0-10V  | Typ 10000         | R/W | 3     |
| Adr+1    | 73   | I16    | 0.01% | Calibration value 0-20mA | Typ 10000         | R/W | 3     |

**9) Connection**

View of the contacts of the connector on the device

1. no connect
- 2.. D+ / A
- 3.. D- / A
- 4.. GND



## Guidelines and standards

|                      |                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------|
| Directive 2014/30/EU | EMC Directive                                                                                    |
| Directive 2014/35/EU | Low Voltage Directive                                                                            |
| Directive 2011/65/EU | RoHS Directive                                                                                   |
| DIN EN 60529         | Protection types through housing                                                                 |
| DIN EN 60688         | measuring transducer for converting alternating current variables into analog or digital signals |
| DIN EN 60715         | Dimensions of low-voltage switching devices                                                      |
|                      | Standardized mounting rails for the mechanical fastening of electrical devices in switchgear     |
| DIN EN 61010-1       | Safety regulations for electrical measuring, control, regulation and laboratory devices          |
|                      | Part 1: General requirements                                                                     |
| DIN EN 61326-1       | Electrical measuring, control, regulating and laboratory devices - EMC requirements -            |
|                      | Part 1: General requirements                                                                     |

## Safety regulations and general information



- Check the relevant details for installation of the device against the nameplate and the terminal connections to ensure that they are suitable for your area of application.
- The front switch may only be operated when device is disconnected from voltages.
- The device may only be operated with the front cover in place.
- The device may only be installed by qualified electricians.
- The device must be checked for transport damage before commissioning and may only be put into operation if it is in perfect condition. In case of safety-relevant damages the device may not be put into operation.



- Ensure that the connections match the terminal connections.
- Circuits must be fused for the maximum permissible currents.
- When commissioning and using the device, the applicable laws, regulations and provisions for the respective area of use and application must be observed.
- The device is not suitable for use in environments with explosive gases or explosive substances.
- The device may only be operated in the environmental and ambient conditions specified in the data sheet. Direct sunlight must be avoided.
- The device may only be installed on non-flammable materials. The applicable fire protection regulations in the area of use and application must be observed.
- Due to the operating voltage, the distance or insulation from other devices must be observed in accordance with the applicable regulations.
- Stranded cables are only permitted if they are fitted with wire end sleeves.
- Connecting cables must be laid away from electromagnetic interference fields.
- Dangerous electrical voltage (more than 75 V DC or more than 50 V AC) can lead to electric shock and burns.
- The device must always be disconnected when fitting, removing, installing, uninstalling or troubleshooting.
- The device is maintenance-free when used as intended.
- Improper use and non-compliance with these safety instructions can lead to serious injury or even death.



## Weigel Meßgeräte GmbH

Am Farnbach 4a  
D-90556 Cadolzburg

Phone: +49 9103 / 62694-0  
[www.weigel-messgeraete.de](http://www.weigel-messgeraete.de)  
[info@weigel-messgeraete.de](mailto:info@weigel-messgeraete.de)

Technical changes reserved  
(07.2026)