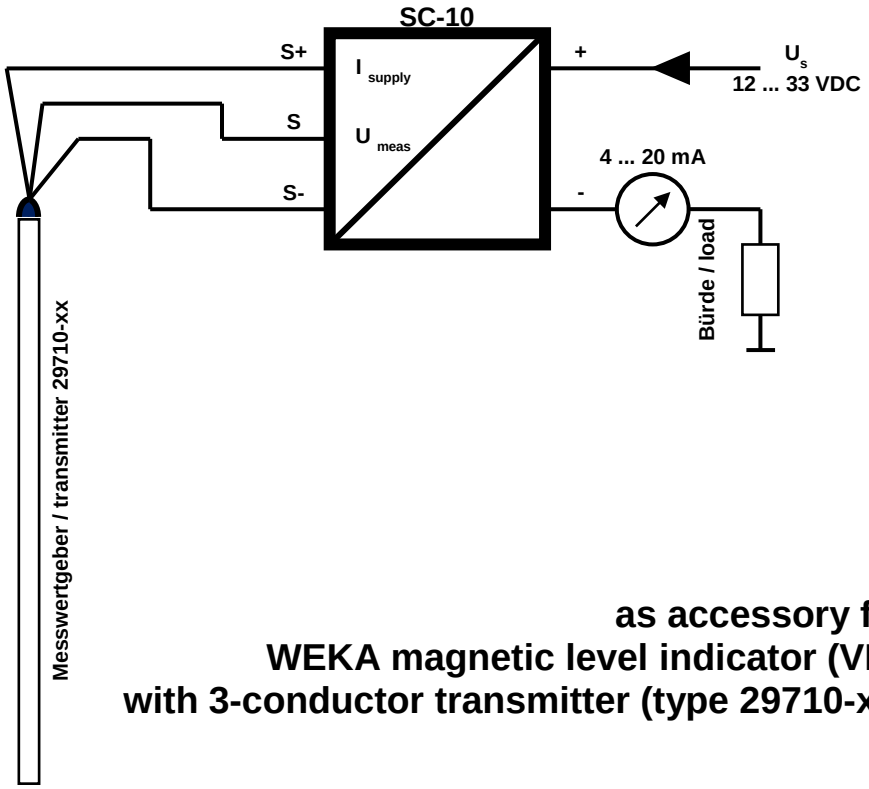
Operating Instructions

Converter

SC-10



as accessory for
WEKA magnetic level indicator (VLI)
with 3-conductor transmitter (type 29710-xx)

Order no.: 45755

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1. Symbols and Signs used in the Operating Instructions

	**Warning** Refers to potential damage to the device and/or injury of the operator or user in case of non-compliance with the instructions.
	**Caution** Refers to possible damage of the device in case of non-compliance with the instructions.
	**Safety instruction** For equipment with intended use in potentially explosive areas according to Directive 2014/34/EU (ATEX) and IECEx scheme.

2. Safety Instructions and Warnings

The manufacturer is not liable for damage caused as a consequence of non-compliance with the safety instructions.

- Risk of burning! Working at hot magnetic level indicators may lead to physical injuries and burns. The surfaces of the float chamber and the process connections may get hot. Allow the tank to cool down to ambient temperature before working at the magnetic level indicator. Wear suitable protective equipment (gloves, face protection, breathing apparatus, if applicable). During operation, keep sufficient distance to the device.
- The float may get stuck and consequently, the magnetic level indicator and thus also the transmitter may become non-functional without this being noticed. The output signal will then no longer correspond to the actual filling level. In case of uncertainty regarding the displayed liquid level, the magnetic level indicator should be checked using a different method.
- If you assume or determine a malfunction, it has to be remedied.
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- Only use the magnetic level indicator with transmitter and converter after you have completely read and understood these operating instructions.
- The present operating instructions must also be available for future users.
- Keep magnetic and magnetisable parts (solenoids, structural steel, iron wire or clamps, etc.) away from the magnetic level indicator and the accessories such as the transmitter. This is also true for strong electromagnetic fields (transformers, welding units, etc.); they may both impair the magnetic force of the solenoids located in the magnetic level indicator or in the transmitter and lead to malfunctions and failure of the display and the attached accessories (magnetic switch, transmitter).
- Replace damaged or faulty components by original spare parts.
- Solvents may make the plastic parts used blunt or brittle. Only clean the devices using water and soap or a plastic cleaner.

- The converter described herein has not been designed or certified for use in potentially explosive atmospheres or in connection with a potentially explosive atmosphere. If explosion protection is requested, please contact your WEKA representation in any case.

3. Intended Use

- The converter may only be used in connection with original Weka magnetic level indicators and their individual parts, e.g. float and transmitter.
- The converter may only be used for the purpose specified on the name plate. The data indicated on the name plate and the data sheet must correspond to the maximum operating parameters occurring in the system.
- Any use, modification and change at the converter not intended by the manufacturer is completed at your own risk and may be dangerous (guarantee exclusion).
- The converter may only be assembled, commissioned and maintained by trained specialists.
- The manufacturer is not liable for damage caused by improper use or incorrect operation.
- The converters are classified into protection class III according to EN 61140. The insulation is checked in 100 % individual inspection using a high-voltage test.

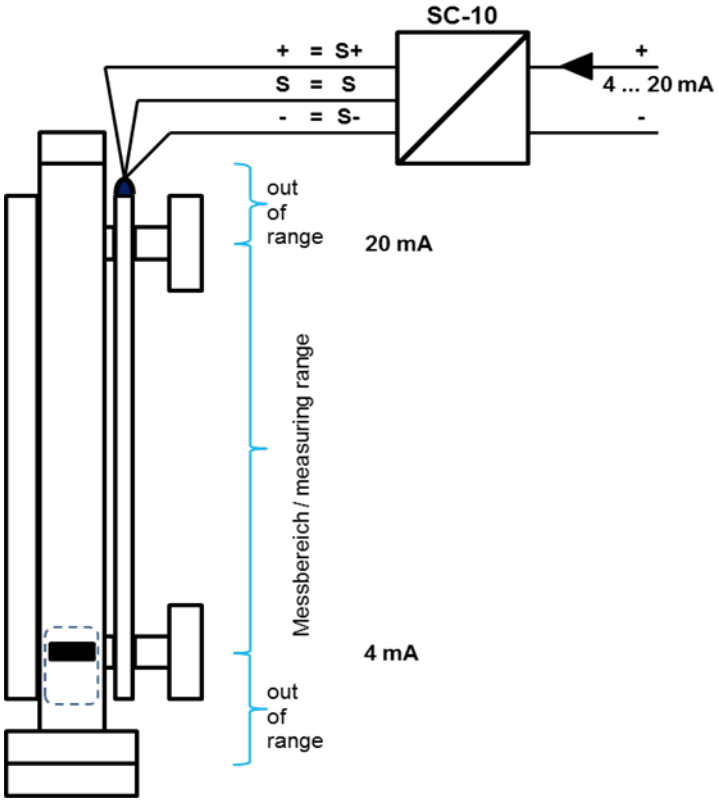
4. Functional Description

The SC-10 converter is designed for connection to a 3-conductor transmitter (29710-xx). The converter provides the resistor chain of the transmitter with constant current. Via the signal conductor, the transmitter provides a voltage analogous to the filling level in the float chamber, which is then converted into a passive 4 … 20 mA current signal (current sink).
You can also use all other resistance transducers with identical function and connection type, the resistance values of which comply with the technical data of the converter.

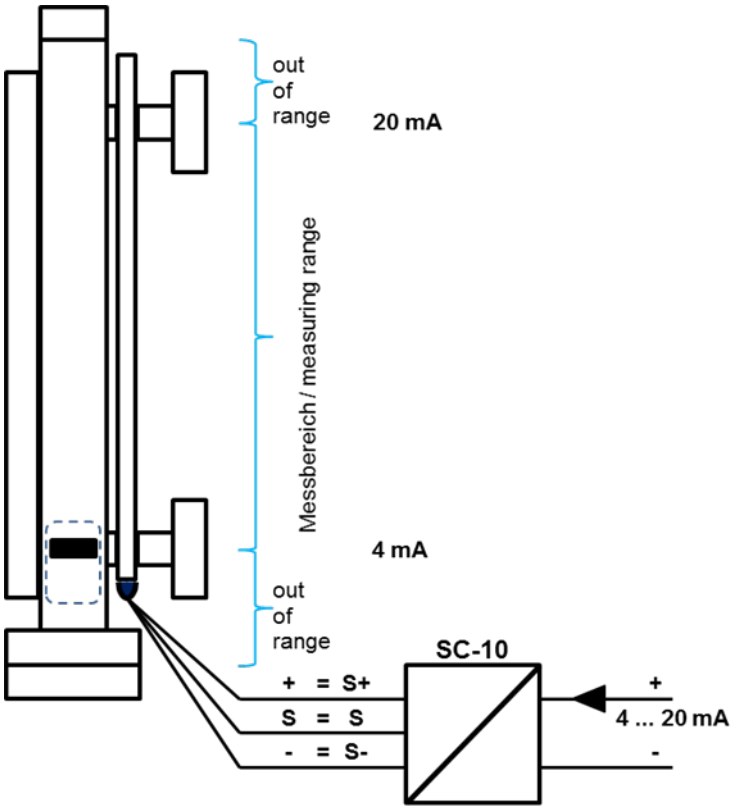
- The connection for the current sink supply voltage is reverse polarity protected, i.e. positive and negative pole of the supply can be interchanged.
- In order to ensure the converter operating temperature range, it may be necessary to place the converter away from the level indicator (VLI). Due to the internal resistance of the cable, the distance should not be greater than 10 m.

5. Combination Possibilities

Standard: VLI with transmitter and cable outlet at top



Option: VLI with transmitter and cable outlet at bottom



6. Status Detection

Apart from the transmission of the actual measuring signal, the converter also detects other statuses that are displayed by means of the three LEDs and transmitted as current signal level outside the 4 … 20 mA.

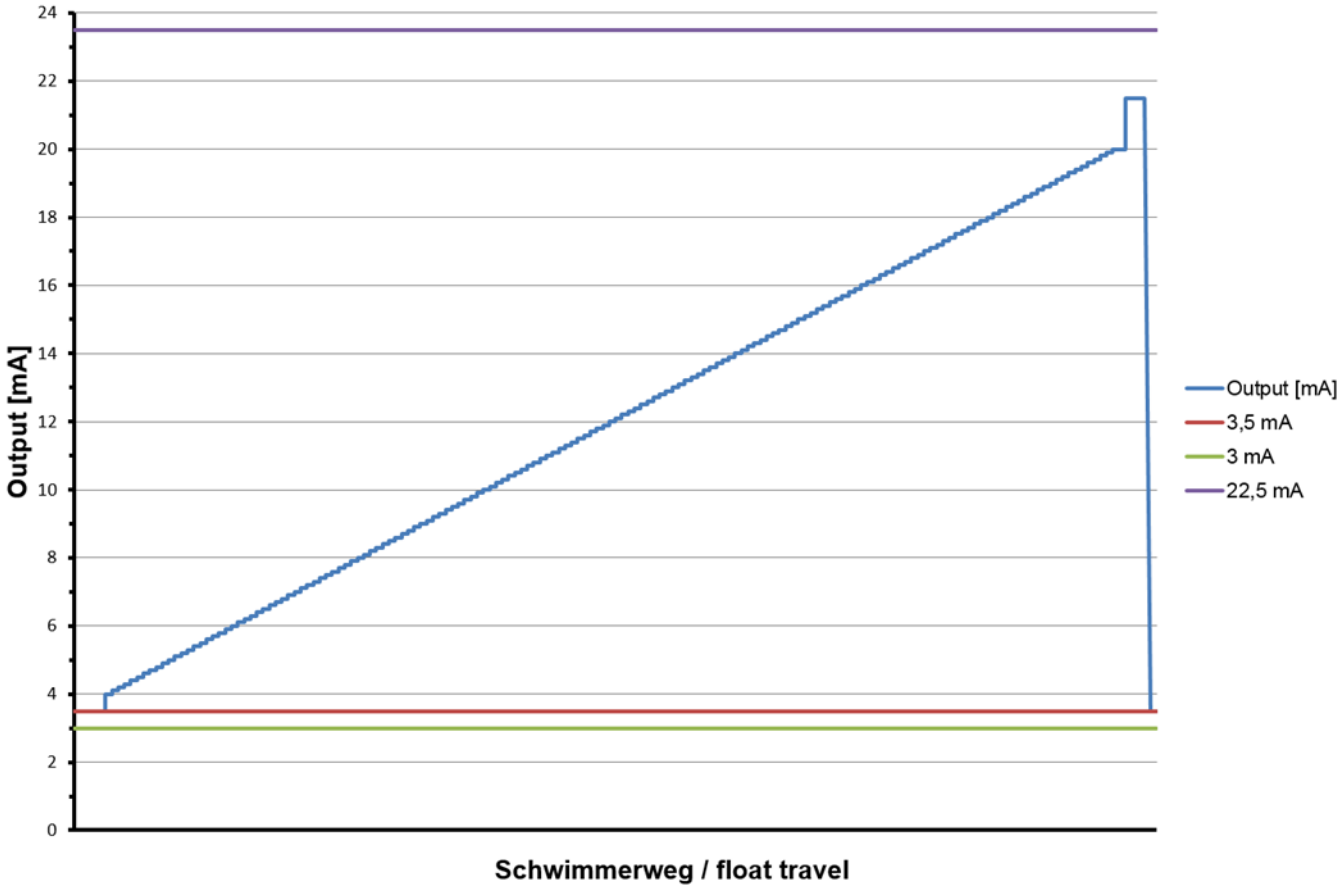
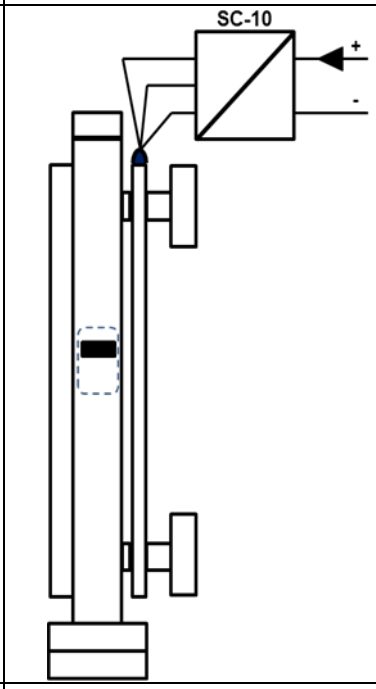
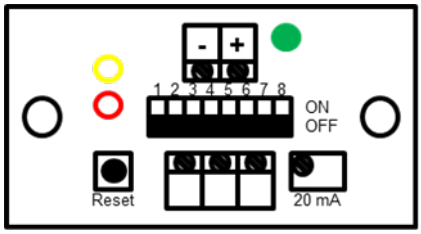
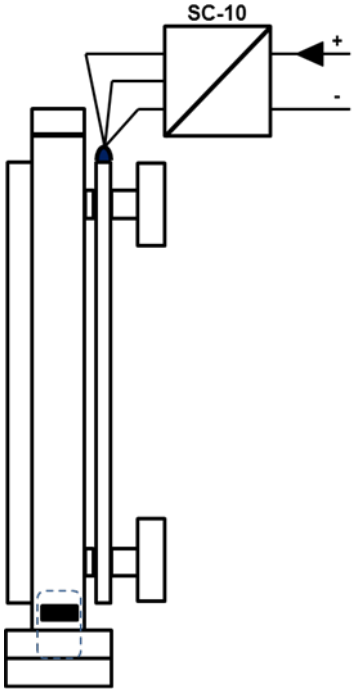
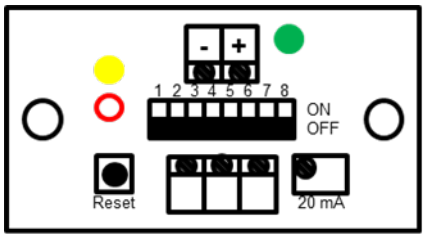
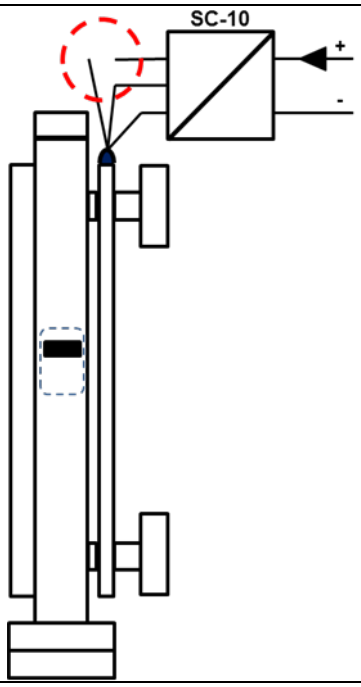
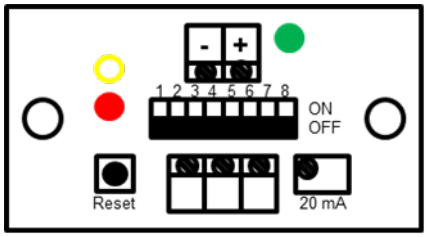
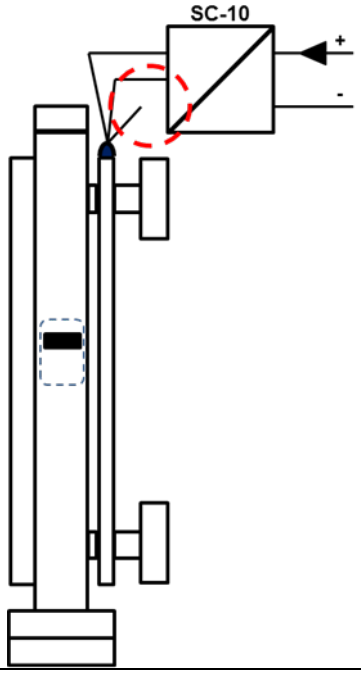
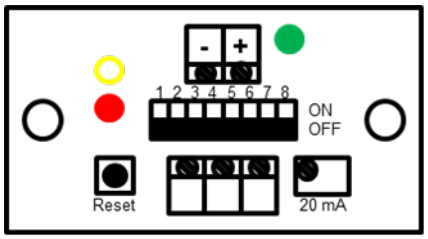


Diagram 1: Signal level

The detection of the magnetic field interruption is moreover provided with a holding function that can be reset using a Reset button. This function can, for example, be used for the preventative maintenance or for troubleshooting if there is a suspected malfunction which only occurs shortly and cannot be monitored by personnel on a permanent basis.

Table 1: Status detection

Description	Sketch	Electronics	Output
<u>Normal operation</u> Float within the measurement range		 LED, green	4 … 20 mA
<u>Magnetic field interruption</u> Float outside the measurement range Transmitter not or incorrectly mounted at the VLI Interruption of the signal line (S) from the transmitter to the converter		 LED, yellow (until error remedied and Reset button has been pressed or supply voltage has been interrupted)	3.5 mA (until error remedied)

<u>Sensor interruption</u> Float within the measurement range Interruption of the positive line (S+) from the transmitter to the converter		 LED, red	3 mA
<u>Sensor interruption</u> Float within the measurement range Interruption of the negative line (S-) from the transmitter to the converter		 LED, red	≥ 23.5 mA

- The sensor interruption display (red) takes priority over the magnetic field interruption display (yellow). If both statuses occur simultaneously, a sensor interruption will be detected.
- Operation of the Reset button deletes the magnetic field interruption status display. To this end, the error must have been remedied in advance.
- Short-time interruption of the supply voltage has the same effect as the operation of the Reset button.

7. Scope of Delivery

- When ordering level indicators with transmitter and converter, all assembly parts are included and all products are pre-assembled.
- If for temperature reasons the converter is installed at a distance to the VLI, the necessary assembly parts for the converter have to be provided on site, by the customer.
- When ordering a converter as spare part, the existing assembly parts should be reused.

8. Unpacking

1. Open the packaging and take out the converter.
2. Ensure that there are no more parts in the packaging.
3. Visually check the converter and all supplied parts for potential damage caused by the transport. Do not use damaged or dubious parts.

9. Disposal of the Packaging

Protect the environment and provide for proper disposal / recycling of the packaging material.

10. Assembly (Mechanical)

Before the assembly, the preparations for unpacking the converter must have been completed.
Open the converter cover.
Assembly on holding sheet at the VLI:
Have the tools (size 4 screwdriver and size 10 ring spanner) and materials (M4 screws and nuts) required for the converter assembly ready.
Position the converter on the holding sheet and insert the two M4 screws into the intended holes at the housing and at the holding sheet. Secure the connection by means of M4 nuts and tighten them.
Assembly separated from the VLI (with medium temperatures > 85 °C):
Have the tools and materials required for the converter assembly ready (to be provided on site, by the customer). Position and assemble the converter on a firm and stable base, e.g. wall. The base temperatures must not be > 85 °C. After completion of the works, ensure tight seat of the converter.

Prepare the connection of the cabling.
Shorten the cables to an adequate minimum length. We recommend considering a reserve length. The cable should be stripped at the ends and the individual wires provided with wire end ferrules.
Lead the cables through the cable glands into the housing inside of the converter complying with the connection diagram. Seal the cable glands by tightening the cap nuts.

After completed adjustment, re-close the cover and check its correct seat.

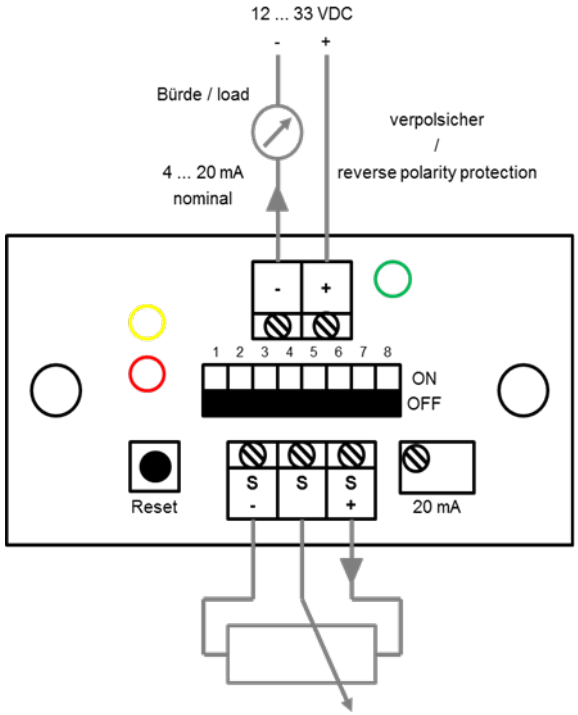
- Before connecting the converter, de-energize all lines. Only reconnect the voltage if you have ensured compliance of the values with the technical converter data.

- The cables are to be laid in a fixed manner.
- The cap nuts of the cable glands have to be tightened so that the IP degree of protection specified in the data sheet is achieved. Cables may be deformed over a longer period which makes it necessary to re-tighten the cable glands.

11. Connection (Electrical) and Commissioning

Before the commissioning, the assembly must have been entirely completed.

- If the data (voltage values, max. operating temperature, performance data, etc.) specified on the name plate do not comply with those of the application, the converter may be damaged and constitute a risk for human beings and the environment. Make sure that the data specified on the name plate comply with those of the application.
- Unsuitable mounting parts (magnetic, etc.) may lead to malfunctions and damage and endanger human beings and the environment. Only use components suitable for the application.
- Before use, check the converter for externally visible damage. Do not commission a damaged converter.



1. Insert the supply line wires into the intended terminals according to the connection diagram and tighten them.
2. Switch on the supply voltage. The green and the red LED should light up.
3. Switch the supply voltage off again.

4. Connect the wires of the transmitter cable to the 3 connection terminals. When doing so, ensure correct polarity – irrespective of the transmitter attachment (standard with cable outlet at top or optionally with cable outlet at bottom):

Terminal designation	Transmitter signal	Colour
S+	Positive line	Standard: GN
S	Signal line	Standard: WH
S-	Negative Line	Standard: BN

Switch the supply voltage on.
The green and the yellow LED (if applicable) should light up.

5. Align the transmitter according to the operating instructions at the VLI (180° vis-à-vis display rail +/- specified tolerance).
6. As soon as the solenoid is in the transmitter's sphere of influence, the yellow LED can be deleted using the Reset button and only the green LED should be illuminated.
7. As next step, continue with the adjustment.

- If the signal lines (S+ and S-) are interchanged, the effective direction of the output signal is changed: 4 mA with float at top and 20 mA with float at bottom.

- Before connecting the converter, de-energize all lines. Only reconnect the voltage if you have ensured compliance of the values with the technical converter data.

- The connection for the current sink supply voltage is reverse polarity protected, i.e. positive and negative pole of the supply can be interchanged.

12. Adjustment

The 4-mA value does not have to be adjusted and is independent of the 20-mA value. The position of the 4-mA signal is determined by the attachment of the transmitter. The 0-point sticker of the transmitter serves as orientation and marks the point at which the 4-mA signal is to be expected. So the 0-point sticker of the transmitter should be assembled at the height of the VLI (bottom) at which the 4-mA signal is desired.

For the 20-mA value, the converter has to be adjusted to the internal transmitter resistance.

There are generally two procedures for simulating the end positions (4 / 20 mA) for the adjustment:

1. With connected transmitter, independent of the float position (simulation mode adjustment). Attention: grinder input remains open or
2. With normally connected transmitter and "approaching" of the end positions (4 / 20 mA) using the float, by filling/emptying the tank.

The adjustment range is determined using DIP switch 5. DIP switch 5 should generally be set to "OFF". For short transmitters with internal resistance < 500 Ω, the range extension has to be connected.
Set DIP switch 5 to "ON" for

- Transmitter 29710-010-10 (10 mm resolution) and L < 500 mm or
- Transmitter 29710-010-05 (5 mm resolution) and L < 250 mm.

The rough adjustment is effected using the four DIP switches (4 to 1) by means of a dual system. That means every level has half the influence of the previous level.

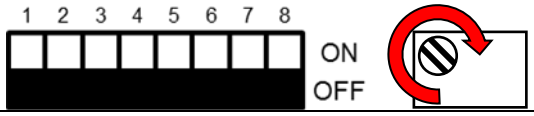
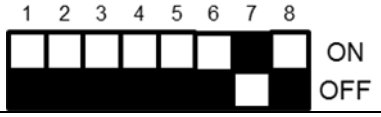
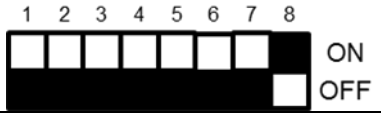
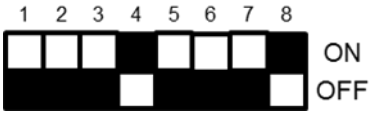
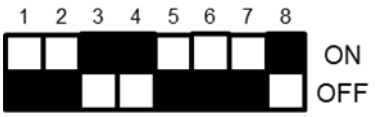
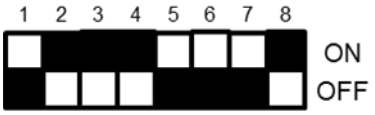
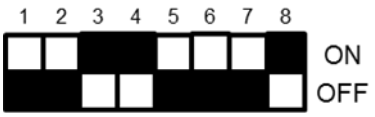
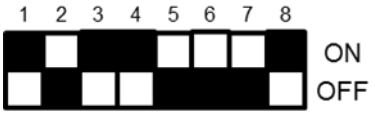
At the end, there is the fine adjustment using the potentiometer.

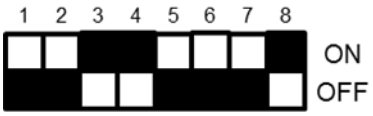
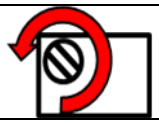
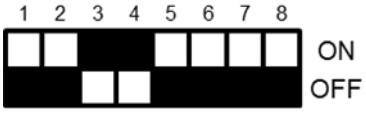
After completed adjustment and change from the simulation to the measuring mode, the values should be checked once again by covering the entire measurement range with the float.

Upon connection of a new transmitter (e.g. replacement), the adjustment should be repeated as otherwise, compliance with the values cannot be guaranteed.

13. Example: Simulation Mode Adjustment

Adjustment with connected 29710-010-10 with measuring length 1000 mm and 115 % resistance whereas the signal input (S) remains open.
If the range end of the transmitter is indicated by means of a step (115 % resistance), see diagram 1, there has to be an adjustment to the current value of the step (22.4mA).
The 20-mA value will then result automatically.

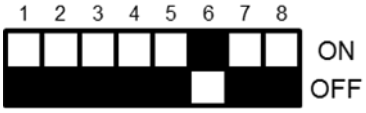
Action	Description	Value
Preparation - All DIP switches to OFF - Poti to CW end position		< 22.4 mA
Check 4 mA - DIP switch 7 shortly to ON		4 mA
Simulation 20 mA - DIP switch 8 to ON		< 22.4 mA
Rough adjustment DIP 4 **(value below 20 mA)** - DIP switch 4 to ON		< 22.4 mA
Rough adjustment DIP 3 **(value below 20 mA)** - DIP switch 3 to ON		< 22.4 mA
Rough adjustment DIP 2 **(value below 20 mA)** - DIP switch 2 to ON		**> 22.4 mA**
Rough adjustment DIP 2 **(value below 20 mA)** - DIP switch 2 to OFF		< 22.4 mA
Rough adjustment DIP 1 **(value below 20 mA)** - DIP switch 1 to ON		**> 22.4 mA**

Rough adjustment DIP 1 **(largest value below 20 mA)** - DIP switch 1 to OFF - Rough adjustment completed		< 22.4 mA
Fine adjustment - CCW poti to 20 mA		< 22.4 mA
Measuring mode - DIP switch 8 to OFF - Connect grinder - Adjustment completed		4 … 20 mA

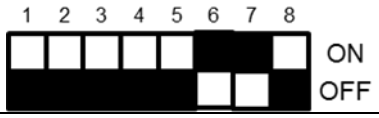
- If the output current is always above 20 mA, no adjustment can be carried out. Either the transmitter is connected incorrectly or the internal resistance is larger than 5.5 kΩ.
- If with short transmitters, the output current of 20 mA is not achieved despite connection of the range extension (DIP switch 5), no adjustment can be carried out. Either the transmitter is connected incorrectly or the internal resistance is less than 230 Ω.

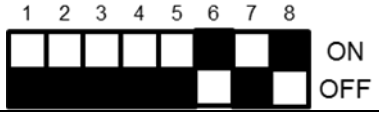
14. Transmitter Simulation

In this mode, no transmitter is connected!
It is used to check the internal function and to simulate an output current.
Internally, a resistance is switched simulating the transmitter.
In the condition as supplied (DIP switches 1-8 off, poti in CW end position), the SC-10 is already adjusted.

Transmitter simulation Float out of range - DIP switch 6 to ON		approx. 3.5 mA

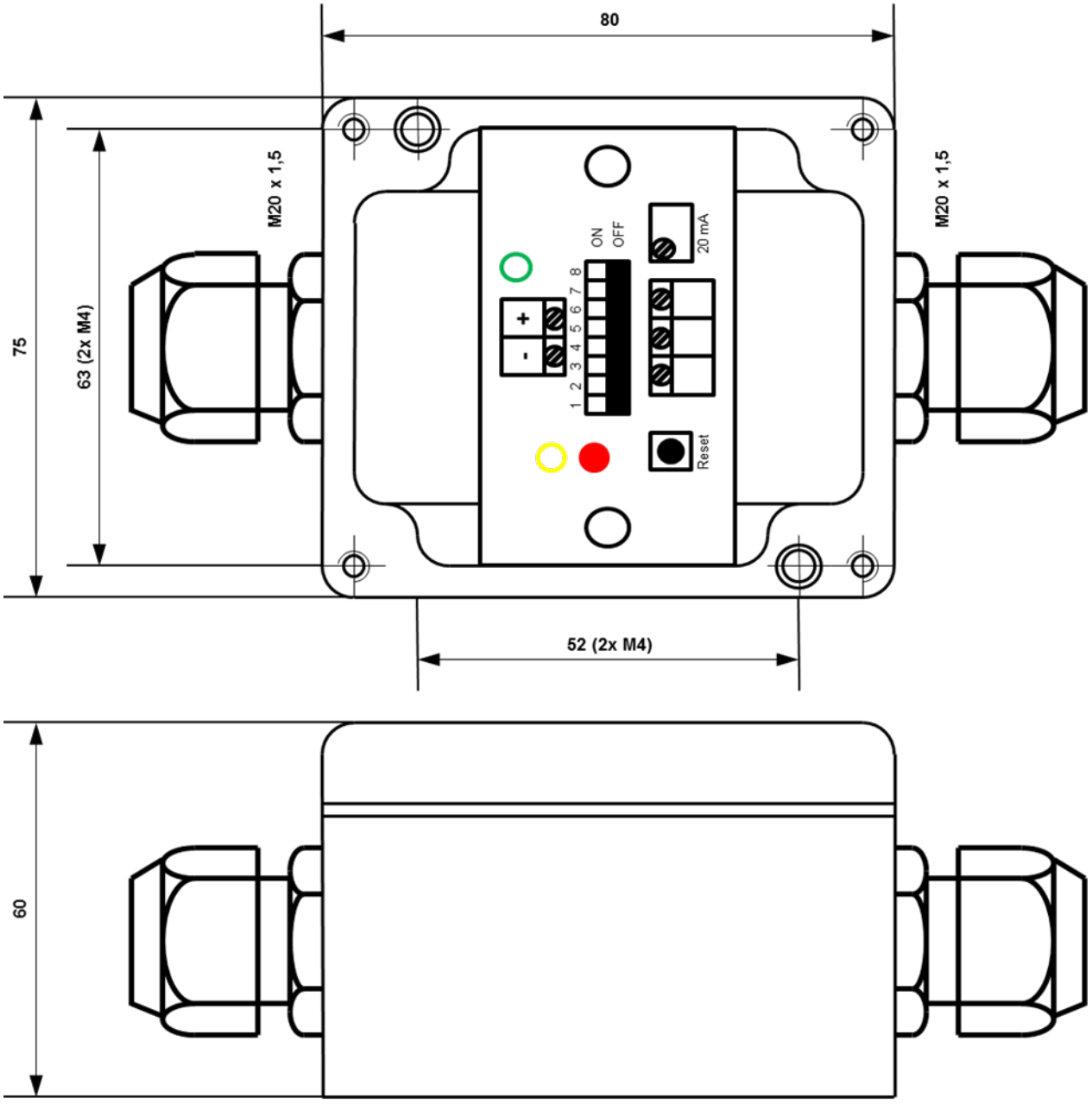
In combination with two other DIP switches, the minimum and the maximum output current can be simulated.

Transmitter simulation 4 mA. DIP switches 6 and 7 to ON		4 mA

Transmitter simulation 20 mA. DIP switches 6 and 8 to ON		approx. 20 mA

After completion of the simulation, DIP switches 6 to 8 to OFF.

15. Dimensional Drawing



16. Maintenance

The converter is generally maintenance-free.
You should only check the converter and thus the overall system in case of suspected malfunction.
For information regarding the procedure, please refer to the Connection (Electrical) and Commissioning (11).

- If you assume or determine a malfunction, it has to be remedied. Damaged or faulty components must be replaced by original spare parts.

- To check the switching function, only use manual solenoids that are not too strong and not able to influence the values of the internal solenoid of the switch. Otherwise, this may cause faulty behaviour of the magnetic switch.

- Clean the magnetic switches only with a damp cloth. Solvents and abrasive cleaners may destroy cables, plastic cable gland and name plate.

- Magnetic switches for potentially explosive atmospheres may only be repaired and modified by the manufacturer (in consultation with the notified body, if applicable).

17. Transport and Storage Conditions

- Protect the product from heavy impacts.
- Do not put heavy objects onto the converter and its packaging.
- Store the converter in a dry environment.
- Avoid contact with water and humidity.
- Temperature: -10 °C … +50 °C
- Relative humidity: 10 % … 95 %

18. Disassembly / Disposal

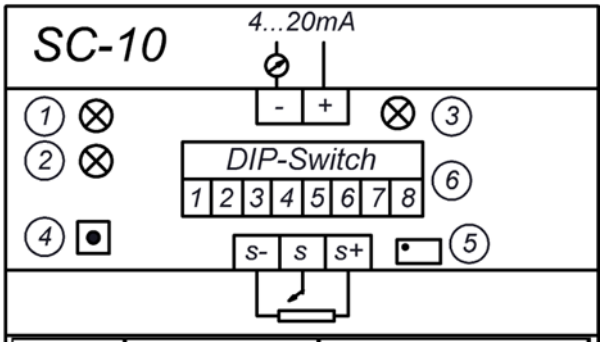
- **Disassembly**
  Ensure before the disassembly that the converter has been de-energized and that the missing output signal will not have any effect on downstream processes.

- **Disposal**
  Protect the environment and provide for proper disposal of the converter.

19. Technical Data

Dimensions	80 x 75 x 60 mm
Cable gland	Thread, M20 x 1.5
Fastening	52 x 63 mm, 2 M4 screws on holding plate (860528) at the VLI or loosely, for self-attachment
Supply voltage Us	12 … 33 VDC
Input voltage USC-1ß	11 … 32 VDC
Sensor resistance	230 Ω … 5.5 kΩ
Max. load vs supply voltage	Rmax = (US – 11 V) / 23.6 mA
Current output, nominal	4 … 20 mA (current sink)
Current output, transmitter interruption	3 mA +/- 5 % / ≥ 23.5 mA
Current output, magnetic field interruption	3.5 mA +/- 5 %
Insulation voltage at housing	500 VDC
Update time current output	ca. 50 ms
Update time magnetic field interruption	ca. 600 ms
Update time transmitter interruption	ca. 50 ms
Input voltage dependency	< 0.1‰
Automatic adjustment 4 mA	< +/- 2‰
Transmission characteristic curve error	< 5‰
Temperature coefficient current output	< 0.1‰/°C
Sensor current	170 µA … 2.1 A
Sensor voltage (RSensor > 500 Ω)	950 mV
Sensor voltage (RSensor < 500 Ω)	475 mV
<u>Operating temperatures</u>	
Ambient temperature (Ta)	-20 °C … +50 °C
Medium temperature	-40 °C …+85 °C (mounted at the VLI) > 85 °C (mounted at a distance to the VLI)
Protection class	IP65 (EN60529)
<u>Materials</u>	
Housing	Alu: grey
Cable gland	PA: grey, M20x1.5
- Sealing	Perbunan (NBR)
- for cables	Ø 3 … 7 mm
Max. wire cross-section terminals	2.5 mm²
Signs	Polyester: silver, printed in black

20. Connection Diagram



Pos. No	Position	Description
①	LED yellow	Float interrupt
②	LED red	Sensor interrupt
③	LED green	4 .. 20mA
④	Button	Reset float interrupt
⑤	Trimmer	Set 20mA
⑥	1 on	Adj. sensor, min
	2 on	Adj. sensor, mid-
	3 on	Adj. sensor, mid +
	4 on	Adj. sensor, max
	5 on	Short sensor
	6 on	Sensor internal
	7 on	Out 4mA(min)
	8 on	Out20mA(max)

21. Labelling

- The converter may only be used for the purposes specified on the name plate. Observe the information on the name plate.

22. Customer Service

A list with the WEKA representations worldwide is available at
www.weka-ag.ch ➢ Contact ➢ Representations and your country selection

or contact us directly at

WEKA AG
Schuerlistrasse 8
CH-8344 Baeretswil
Switzerland
Phone: +41 (0)43 833 43 43
Fax: +41 (0)43 433 43 49
E-Mail: info@weka-ag.ch

23. CE Declaration of Conformity

EU - KONFORMITÄTSERKLÄRUNG
EU - DECLARATION OF CONFORMITY

Wir
We **WEKA AG**

(Name des Herstellers) (Manufacturers name)

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product

Konverter / Converter

Typen: **SC-10 (45755)**

(Diese Produkte dürfen NICHT für Ex- Anwendungen eingesetzt werden /
These products should NOT be used for Ex applications)

(Bezeichnung Typ oder Modell, Los-, Chargen- oder Seriennummer, möglichst Herkunft und Stückzahl)
(Name, type or model, lot, batch or serial number, possibly sources and numbers of items)

auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt
to which this declaration relates is in conformity with the following standards or other normative documents

EN 61326-1:2013
EN 61326-2-3:2013
EN 55011:2011
EN 61010-1:2011

(Titel und/oder Nummer sowie Ausgabedatum der Normen oder der anderen normativen Dokumente)
(Title and/or number and date of issue of the standards or other normative documents)

Gemäss den Bestimmungen der Richtlinie(n),
Following the provisions of Directive(s),
(falls zutreffend) (if applicable)

2014/30/EU (EMV); 2014/35/EU (LVD)

(Ort und Datum der Ausstellung) (Place and date of issue)	(Name und Unterschrift des Befugten) (Name and signature of authorized person)	
Bäretswil, 03.07.2017	Marc Hofmann (Quality Manager)	Stefan Otto (Produkt Manager)