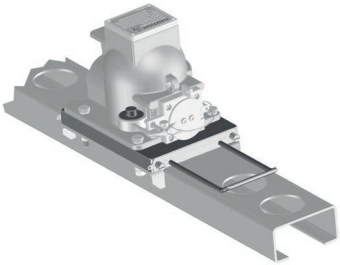
Supplementary instructions

Reference absorber

For WEIGHTRAC 31



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Contents

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1 Product description

The Referenzabsorber is a test facility for the radiation-based measuring system WEIGHTRAC 31 in combination with the source holder SHLD-1. It is suitable for reference measurement on conveyor belts and screw conveyors.

Reference absorber

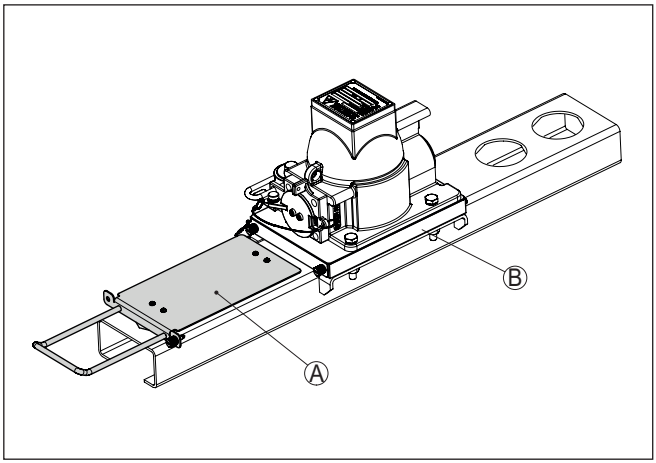

Fig. 1: Reference module in disassembled state

A Reference module (complete)
B Reference absorber (assembled)

1.2 Reference measurement

It is suitable for reference measurement on conveyor belts and screw conveyors.

With the reference absorber you can reproduce a certain measured value exactly for test purposes with an empty belt.

2 Mounting

2.1 Mounting the reference absorber

Operating instructions

Take note of the operating instructions of the corresponding sensor WEIGHTRAC 31 and the source holder SHLD-1.

Reference absorber

Mount the reference absorber according to the following assembly drawing:

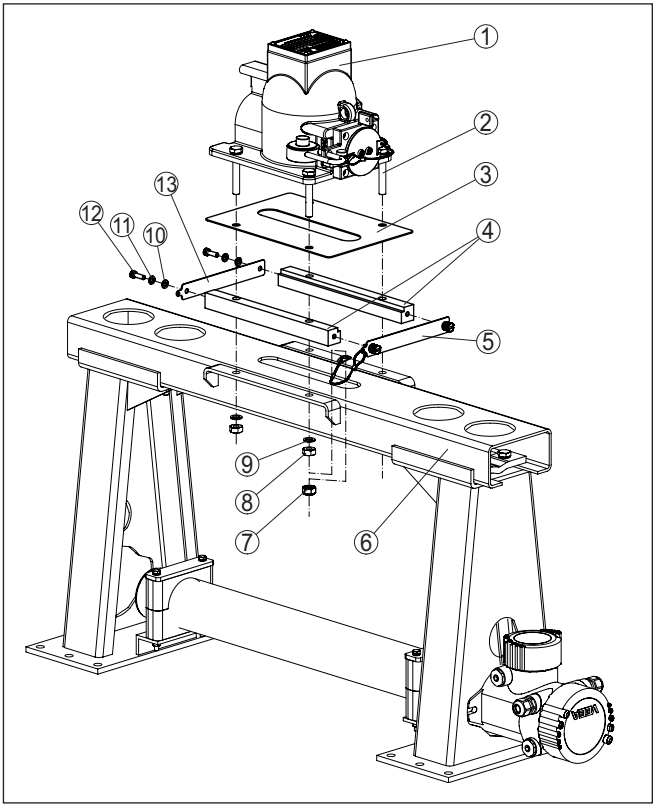

Fig. 2: Mounting the reference absorber

1 *Source holder SHLD-1*
2 *Screw M10 x 65 (4 pcs.)*
3 *Cover plate with cut-out (1 piece)*
4 *Fixing strips (2 pieces)*
5 *Detachable cover with holding rope (1 piece)*
6 *Mounting frame for WEIGHTRAC*
7 *Retaining nut M10 (1 piece)*
8 *Hexagon nut M10 (4 pieces)*
9 *Spring ring M10 (4 pieces)*
10 *Spring ring M6 (2 pieces)*
11 *Washer M6 (2 pieces)*
12 *Screws M6 (2 pieces)*
13 *Cover (1 piece)*

Danger:
Before mounting make sure that the source is securely closed. Use a padlock to secure the source container in the closed condition and prevent it from being inadvertently opened. Also take note of the instructions in the operating instructions manual of the source holder.

1. Place the two fastening rails (4) onto the lateral straps of the mounting frame (6) for WEIGHTRAC.

   The machined guide groove must be on top.
2. Two covers are provided for closing the module section. One cover is screwed on permanently (13), the other can be opened by hand with knurled screws (5).

   Depending on accessibility, you can choose which side you want to put the detachable cover (5) on. Generally this is the side with the instrument housing.

   Mount the lateral cover (5) on the two fastening rails (4) according to the above illustration.
3. Place the cover plate (3) onto the two fastening rails (4).
4. Place the source holder (1) onto the cover plate (3).
5. Insert the four screws from above through the holes of the source holder (2).
6. Fasten the source holder(1) and the reference absorber acc. to the above figure.

Caution:
The reference absorber changes the distance of the source to the sensor.

You have to adapt the adjustment settings when you retrofit the reference absorber on an existing measurement facility.

You do not have to carry out a fresh adjustment. It is sufficient to adapt the characteristics to the modified distance.

You can find further information on how to adapt the characteristics in the operating instructions of the sensor.

Install a protective grid

If there are gaps or empty spaces around the installation, provide protective fences or grids to keep hands away from the dangerous area. Such areas must be marked accordingly.

2.2 Mounting of the absorber plates

Absorber plates

Depending on the application, the reference module must be equipped with one or several absorber plates of lead having a different thickness.

Caution:
Always wear protective gloves when handling with lead.

Do not eat, drink and smoke while working with lead.

Five absorber plates of lead are part of the scope of delivery and already premounted.

- Absorber plate 3.18 mm (0.125 in) (1 piece)

- Absorber plate 1.59 mm (0.063 in) (2 pieces)
- Absorber plate 0.79 mm (0.031 in) (2 pieces)

Prerequisites

Carry out the adjustment/linearisation acc. to the instructions in the sensor operating instructions manual.

A precise setup of the sensor is a requirement for a reliable test result.

Read out the linearisation table from the DTM in PACTware.

Use the linearisation table with the highest loading or the lowest pulse rate (Ct/s).

Danger:
Stop the conveyor belt or the screw conveyor.

For your own safety, make sure the conveyor unit is not in operation while working on the sensor or the source holder.

Determination of the absorption value

1. For safety reasons, you have to stop the belt.

   Make sure that the belt is clean and free of deposits and that the detector tube of the sensor is free of buildup.
2. Change the indication of the sensor to "Ct/s".
3. Read out the linearisation table from the DTM in PACTware.

   Use the linearisation table with the highest loading or the lowest pulse rate (Ct/s).
4. Mount the absorber plates on the reference module according to the following illustration.

   With the plates you have to reproduce almost exactly the absorption value of the linearisation point.

   Start with the thick absorber plate of lead (15). The cover plate of steel (14) must always be mounted as upper protective cover on the lead absorber plates.
5. Mount the absorber plates according to the following illustration:

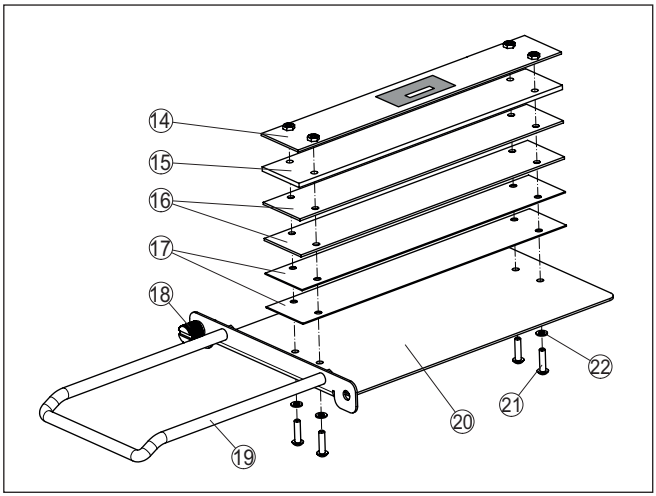

Fig. 3: Reference module with absorber plate

14 Cover plate - steel (with type label)
15 Absorber plate: lead 3.18 mm (0.125 in) (1 piece)
16 Absorber plate: lead 1.59 mm (0.063 in) (2 pieces)
17 Absorber plate: lead 0.79 mm (0.031 in) (2 pieces)
18 Knurled screw (2 pieces)
19 Sliding handle (1 piece)
20 Reference module (1 piece)
21 Screw M4 x 16 - hexagon socket (4 pieces)
22 Washer M4 (4 pieces)

6. Slide the reference module into the reference absorber and note the value (Ct/s) indicated by WEIGHTRAC.

   Insert additional plates one by one until the indicated value corresponds to the absorption value of the linearisation point.

   Combine the plates in any way to achieve the desired result.

7. As soon as the result corresponds nearly to the absorption value of the linearization point, you have to note the determined value (Ct/s) with inserted reference module (full belt).

   Write this value permanently on the type label of the upper adapter plate (14) and also enter it in the following table.

8. Remove the reference module from the reference absorber and note the value (Ct/s) indicated by WEIGHTRAC.

   Also enter the value without reference module (conveyor belt empty) in the following table.

9. The difference between the two values is the basis for the tolerance at 1 % repeat accuracy.

Enter the adjustment values of the measurement (in Counts/second) with empty and full conveyor belt into the table.

Calculate the difference between the two values. The difference is the basis for the tolerance at 1 % repeat accuracy.

See also the following calculation example.

Adjustment	Status	Measured value in Counts/second (Ct/s)
Date:	Adjustment - without reference module (empty belt)	Ct/s
Date:	Adjustment - with reference module (full belt)	Ct/s
Date:	Differential value (Ct/s) between (full and empty)	Ct/s
Date:	Tolerance value (1 % of the difference value)	Ct/s

Method of calculation

Calculation of the tolerance value by means of an example:

Measurement loop
The specifications of this measurement loop are:

- Belt with 1 m width
- Belt speed: 2 m/s
- Bulk density: 4300 kg/m^3
- Medium: Ore
- Delivery rate, max.: approx. 650 t/h
- Delivery rate, typically: approx. 400 t/h

Measurement
The measuring results of the sensor are:

- Adjustment value - Empty belt: 54,000 Ct/s
- Adjustment value - Full belt: 32,000 Ct/s

Calculation of the tolerance value
Difference value:

54,000 Ct/s - 32,000 Ct/s = 22,000 Ct/s

1 (2 pieces)% of 22,000 Ct/s ≙ 220 Ct/s

The tolerance value for the assessment of the repeat accuracy:
± 220 Ct/s

Information:
Use the Ct/s unit for the following test sequence to achieve the best possible repeat accuracy.

Units such as t/h, for example, factor in belt speed and are thus inaccurate.

Safekeeping of the reference module

During operation, the reference module must not remain in the reference absorber.

Keep the reference module close to the measuring site and make sure that it does not get damaged or lost during operation.

2.3 Function - Reference absorber

The reference absorber can be used to check the measurement whenever necessary.

You can use the reference absorber anytime to check if the calibration is still correct. You can also use it to check if the calibration has been changed by mistake or intentionally.

Test sequence

1. Let the belt run without load.

   Make sure that the belt is clean and free of deposits and that the detector tube of the sensor is free of buildup and contamination.
2. Note the display value (empty) of WEIGHTRAC.

   Compare the displayed value with the "empty" value of the adjustment.

   The difference should be within the tolerance value of 1 %. You can find the calculation in chapter " *Mounting of the absorber plates*".
3. Open the knurled screws of the detachable cover.
4. Slide the reference module completely into the reference absorber acc. to the following illustration.

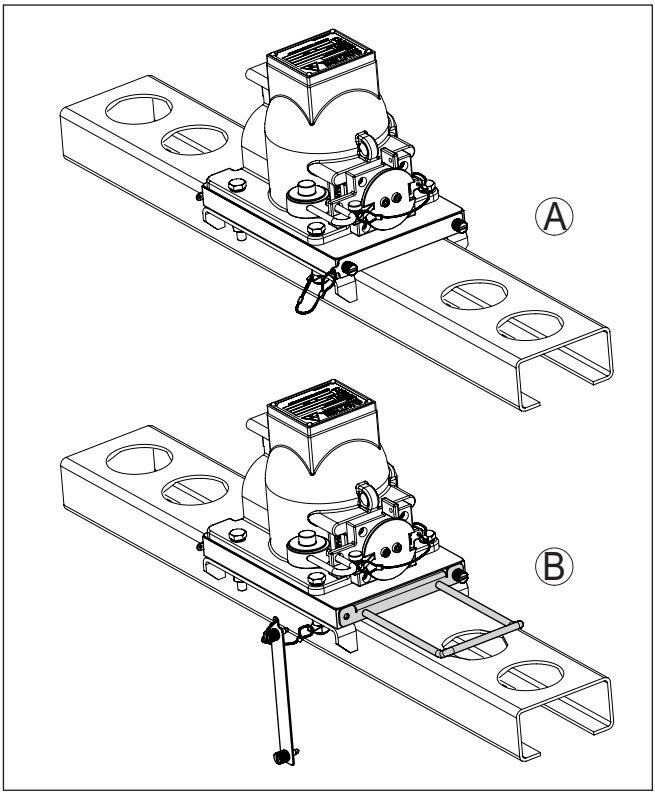

Fig. 4: Reference module with absorber plate

A Reference absorber without reference module
B Reference absorber with inserted reference module
Easy to see from the side: the detached cover

5. Note the display value (full) of WEIGHTRAC.

   Compare the displayed value with the "full" value of the adjustment.

   The difference should be within the tolerance value of 1 %. You can find the calculation in chapter " *Mounting of the absorber plates*".

Measured value outside the tolerance

First check the following points if one of the two measured values is outside the tolerance of 1 %:

Check	Corrective measure
Are dirt and deposits on the conveyor belt?	Remove deposits from the belt.
Is there dirt and buildup on the sensor?	Remove buildup from the sensor.

Check	Corrective measure
Have structural changes to the conveying system been carried out in the intervening time?	Struts, cables and tubes leading through the measuring frame can influence the measurement.
Does the belt run lopsided or eccentrically?	Make sure that the belt runs correctly.
Is the aperture of the source holder opened correctly?	Strong vibration can change the position of the switching lever. Make sure that the lever of the source holder is in position "ON".
Has a new linearisation (taring) been carried out?	Modified settings can cause deviating measuring results. Check the settings.
Has a new conveyor belt been installed?	A new belt can influence the measurement through its modified thickness or material composition.

If all these points do not lead to the desired result, you should carry out a fresh calibration.

You can find the adjustment procedure in the operating instructions of the sensor.

Contact our service department if the deviation occurs again.

3 Supplement

3.1 Technical data

General data

Take note of the information in the operating instructions manual of the installed WEIGHTRAC level sensor and the source holder

Material 316L corresponds to 1.4404 or 1.4435

Materials	
– Fixing strips	316L
– Cover plate	316L
– Reference module	316L
– Reference plates	Lead
Weight - total	12.2 kg (26.9 lbs)
Torques	
– Screws (M10) - Fastening, source holder	15 Nm (11.06 lbf ft)
– Screws (M4) - Fastening, reference plates	5 Nm (3.7 lbf ft)

3.2 Dimensions

Reference absorber

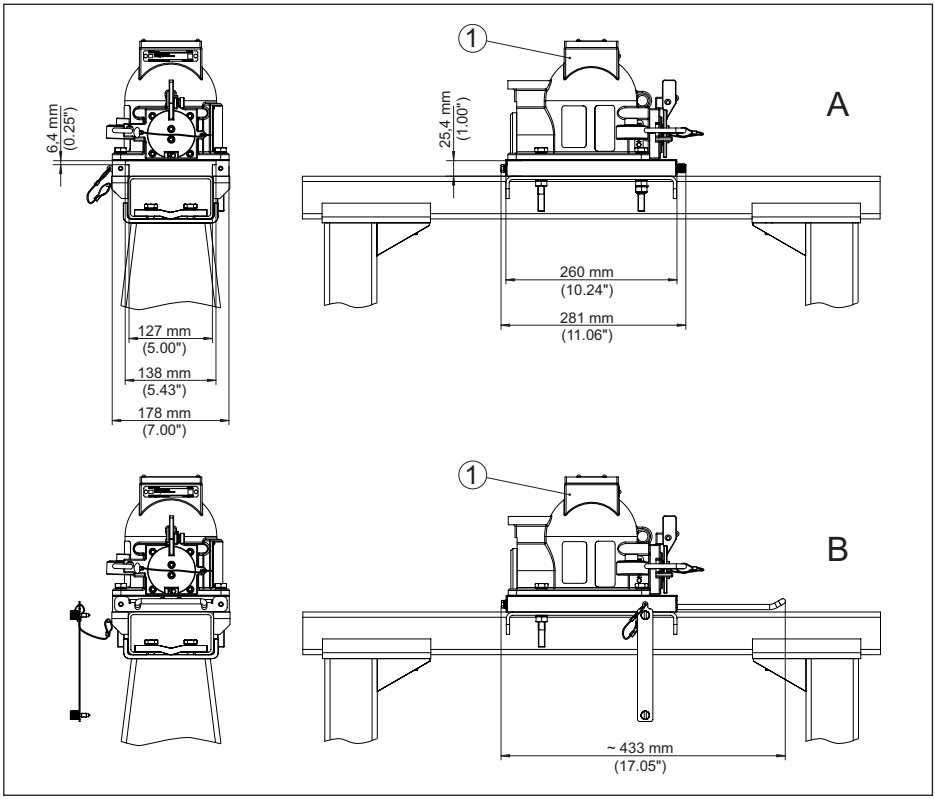

Fig. 5: Mounted reference absorber

A Reference absorber without reference module
B Reference absorber with mounted reference module
1 Source holder

3.3 Industrial property rights

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