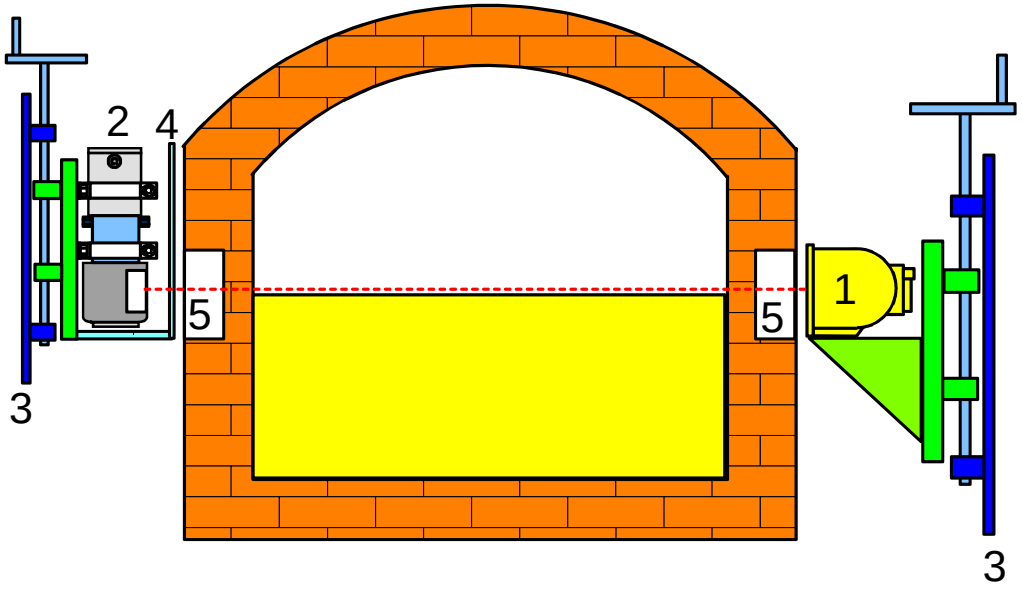
Guidelines for Installation and Alignment of the Radiometric Level Gauging System for Glass Level Measurements

The application of a level gauging system for glass level measurements is a special application for working with very small measuring ranges. In the following, we will describe the deviations and supplements to the standard operating manual of the level gauging system.



General arrangement of glass level measurement

1	source with lead shielding	4	protection shield against heat
2	water cooled detector	5	window in the fire proof wall
3	height adjustable fastening device for lead shielding and detector		

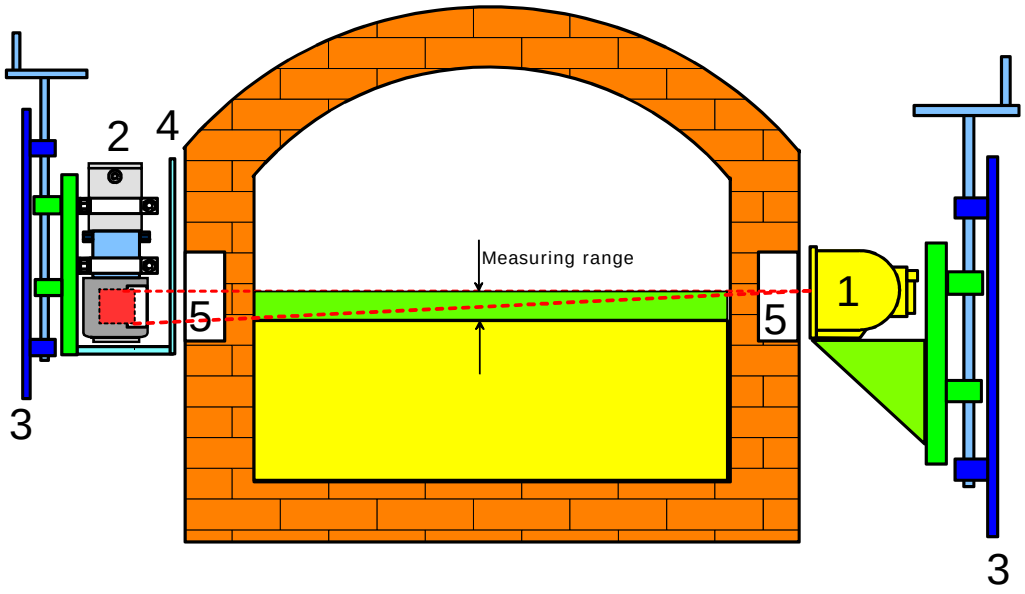
1. The source with its shielding (1) and the vertically aligned scintillation counter (2) must be mounted on sturdy supports (3) which have to be constructed at site, and which are fine-adjustable in height. It must be equipped with an accurate scale, so that the respective height adjustment can be read off. The accuracy and stability of the arrangement of source and scintillation counter relative to each other and to the construction of the glass melting tub will be an important factor determining the achievable measuring accuracy. Metal sheet (4) are necessary as heat protection for the detector und for the source shielding. In addition the detector requested a water cooling jacked.

2. The desired normal glass level, the source center and the upper or lower edge respectvely of the crystal in the scintillation counter must be arranged in a horizontal level. It is also important that the width of the "window" (5) of the fire-proof wall at the points where the wall thickness has been reduced to 75 - 100 mm should be at least 100 mm, and the height should also be 100 mm, plus the space for the standard level adjustment, which may be desired later. In any case, the outer dimensions of the source and the crystal in the scintillation counter must always lie within the window area.

3. The size of the measuring range depends then on the position of source and crystal relative to each other. There are two typical arrangements for small or very small

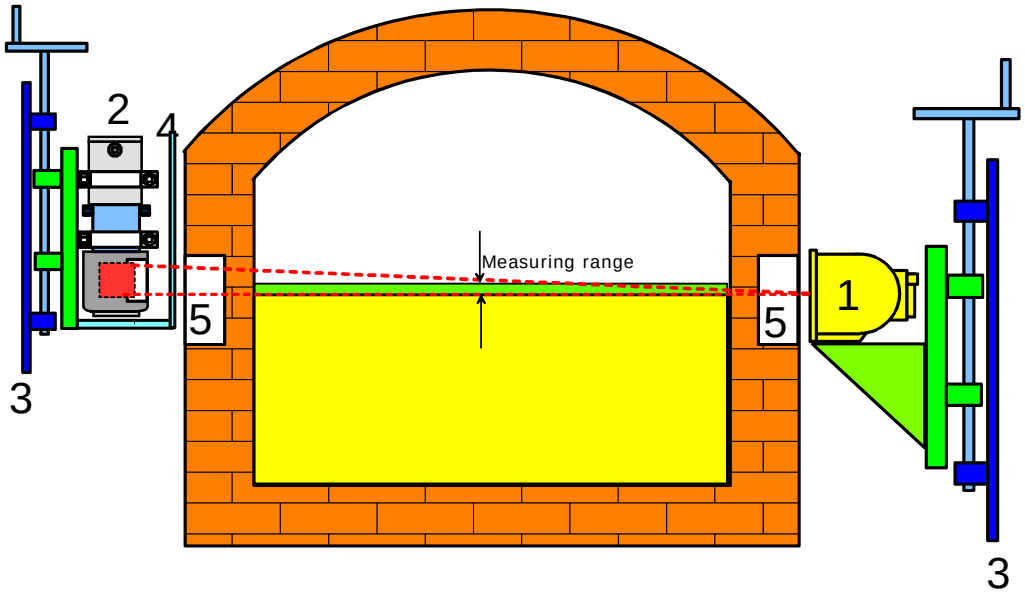
measuring ranges respectively, as described and illustrated below.

3.1 Arrangement for **small** measuring ranges



The source and the upper edge of the crystal must be in a horizontal line. The size of the measuring range is obtained from the points of intersection of the triangle outer edge of crystal - source with the inner tub wall on the **detector side**.

3.2 Arrangement for **very small** measuring ranges



For this arrangement, the source and the lower edge of the crystal must form a horizontal line. The size of the measuring range is then obtained from the points of intersection of the triangle outer edge of crystal - source with the inner tub wall on the **source side**.

4. For pre-adjustment roughly align the shielding with the source and the scintillation counter taking into account the crystal position, i.e. within the window area in the fire-proof wall, but above the current glass level in accordance with the arrangement for small measuring ranges. Using a hose scale may be quite helpful for this purpose.

   In this position, an output signal must be available at the level gauging system corresponding to a count rate of at least 400 cps.

5. The accurate adjustment of source and detector crystal cannot be done visually, but only electrically. Display the output signal of the level gauging system on a display unit which is located in the vicinity of the adjustment device for the source and the scintillation counter and which can easily be read off.

   Move the source and then the scintillation counter up or down respectively until the display indicates that the source or the lower crystal edge beginn to fall below the glass level. Write down the height adjustment for the source and the detector obtained in this manner and mark the detector clamping position. This is the arrangement for very small measuring ranges.

   Move the source to a position which is 25 mm higher than the scintillation counter to obtain the arrangement for small ranges.

6 To record a curve and to obtain the final height adjustment of the measuring range, move the source and the scintillation counter simultaneously in the established relative arrangement up and down in tiny steps (millimeters). The glass level must not change during these adjustments. Present the setting values and the output signal in a curve which indicates the size and the position of the measuring range.

   The diagram shows an example of a possible curve. When using analog level gauging instruments, you may straighten the round ends somewhat by setting the calibration point EMPTY somewhat below the zero point of the instrument and the calibration point FULL somewhat above the 100%-point.

   With the digital level gauging system LB 440, set the starting point of the power output signal about 5% below the maximum count rate and the final point of the power output signal about 5% above the minimum count rate.

7. Then perform the final height adjustment of source and detector in such a manner that the standard height of the glass level lies roughly in the middle of the curve at approx. 50% of the output signal.

   Important!

   When changing the adjustment, make sure that the source and the crystal in the scintillation counter with its full dimension plus some safety distance is within the window area of the wall.