

OFFSET CALIBRATION



OBJECTIVE

To improve the offset accuracy of inclinometers at room temperature.

DESCRIPTION OF THE PROBLEM

A: After component mounting and final instrument assembly, zero deviation from factory calibration settings in component type inclinometers cannot be guaranteed. This is because during each assembly stage a small angular misalignment is added, which will cause an offset shift.

B: The factory trimming of the offset is done digitally. The accuracy is approx. 0.1° for SCA61T-FAHH1G, and

0.2° for SCA61T-FA1H1G. This is the offset accuracy for the analogue output. Output noise density, $15\mu\text{g}/\sqrt{\text{Hz}}$ (1s int.), determines the resolution of 0.001° ($(15\mu\text{g}/\sqrt{\text{Hz}}) * \sqrt{1\text{Hz}} \Rightarrow 15\mu\text{g} \approx 0.001^\circ$).

The digital output has an 11bit resolution over FS ($\pm 30^\circ \Rightarrow \text{resolution} \approx 0.03^\circ$), which is added to B. The total offset trimming accuracy for the digital output is approx. 0.13° for SCA61T-FAHH1G and 0.26° for SCA61T-FA1H1G respectively.

SOLUTION

To compensate for A and B, a final adjustment is recommended after the product is assembled (or mounted, if possible).

PROCEDURE

1: After power is switched on wait 2 min. Place the product in a calibrated horizontal position. Memorise the output in the micro controller as the 0° value.

2: If you do not have an accurately horizontal plane, use any stable plane. Measure the output in positions A and B (Figure 1), calculate the average $\{V(\text{outA}) + V(\text{outB})\}/2$ and memorise as the 0° value.

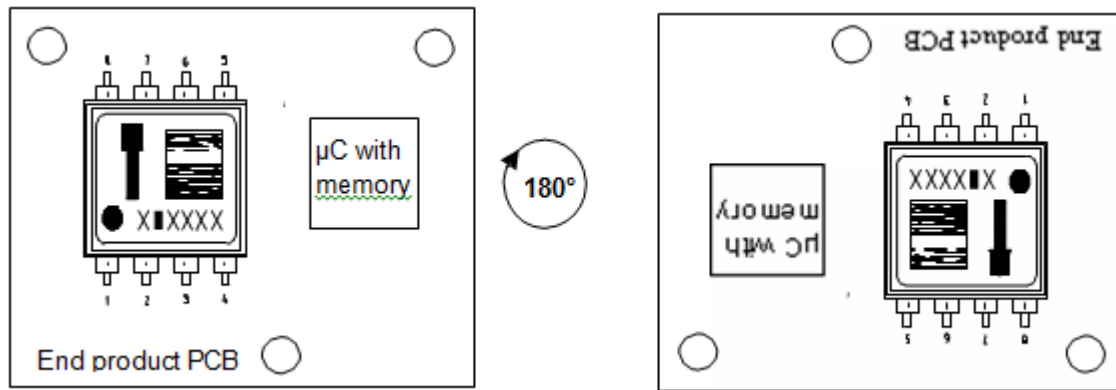


Figure 1: Top view, position A

Position B

APPLICATION EXAMPLES

- horizontal calibration of measuring instruments (spirit level, theodolite, distometer, etc.)
- tilt measurement for height measuring instruments (hypsonometer, etc.)
- angle measurement for tilt protection (cranes, load lifters, lift platforms, etc.)
- vertical alignment for elevators, pile-drivers etc.
- tilt compensation in weighing machines