

Sensorbox containing one sensor and one signal conditioner with 4...20mA, 2-wire output

Features

- robust pressure die cast aluminium housing (IP67) with saltwater proof coating
- twist free 4-point fastening of rigid, 3.2mm thick base PCB
- integrated signal conditioner with 4...20mA, 2-wire output
- temperature drift compensation of the sensitivity
- no separate supply voltage necessary
- all SEIKA sensors can be installed, in different directions of operation
- the output signal of the sensor is calibrated to customer's specifications in the required direction of operation
- sensor and signal conditioner electrically isolated from housing
- EMC certified
- highly stable sensor supply voltage
- 10V ... 30V terminal voltage
- programmable dynamic response
- loop current limitation
- high mechanical overload resistance
- either connection polarity
- low pass filter with optional choice of cut-off frequency for suppression of interference frequencies

Description

The SB11 is a pressure die cast aluminium sensor housing (IP67) with an integrated sensor for measuring uniaxial acceleration or inclination.

In addition to the sensor, the box contains a signal conditioner with 4...20mA, 2-wire output and a separate, highly stable supply voltage feeding off the current loop. Furthermore, the signal conditioner includes an active low pass filter, whose upper cut-off frequency / settling time can be adjusted to suit the measurement task, an output stage with current limitation, a noise voltage filter and a diode bridge for unipolar coupling to the current loop. Interference signals caused by unwanted ground currents are avoided by electrically isolating sensor and signal conditioner from the housing. Unlike the SB2., the SB11 can accommodate larger inclinometers, such as the NG-series, that have a higher measuring accuracy. Electronic temperature compensation largely compensates for the temperature drift of the implemented sensor's sensitivity. Optionally, the temperature drift of both offset and sensitivity can be reduced significantly through individual compensation.

The compact metal cable guide and small housing size in combination with the 2-wire connection enable the use of this high quality measuring system in harsh operating conditions.

Application

The SB11 is suitable for applications requiring precise inclination or acceleration measurements under harsh circumstances and returning of a 4...20mA output signal. Areas of successful implementation include construction, mining, agricultural machinery, transportation and conveyor systems, ships, operation and automation technology as well as general mechanical engineering.

Specifications

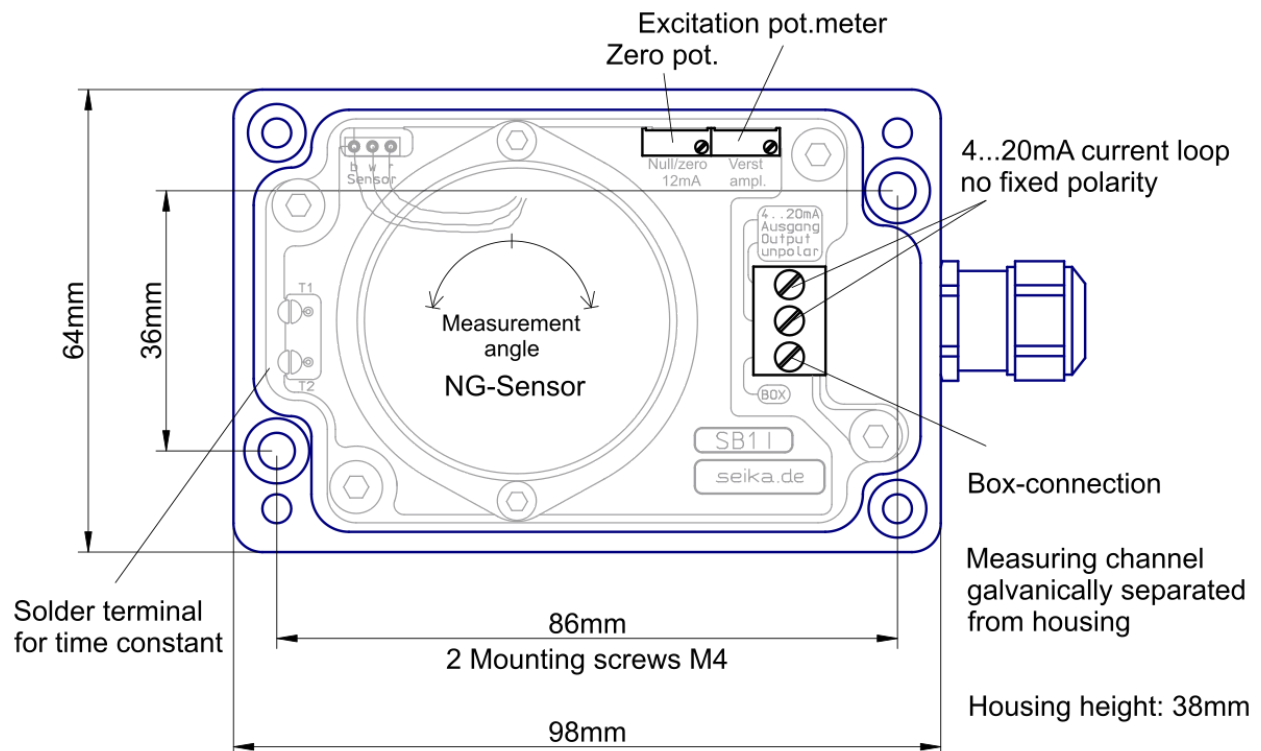
Terminals	3 x 1.5 mm ²
Cable gland	M12 x 1.5, metal cable gland with integrated strain relief, clamping range 6mm ... 7.5mm
Measuring range, Resolution, etc.	depending on implemented SEIKA sensor
Degree of protection	IP67
Mounting orientation	any (standard: wall mounting, cable on the right)
Measuring planes (N sensor)	3 main housing planes
Measuring plane (NG sensor)	parallel to bottom of housing
Measuring directions (B or BDK sensor)	X,Y,Z coordinates of housing
Torque housing lid	1.5Nm
Terminal voltage	10V ... 30V
Minimum loop current	2.1mA ... 3.5mA
Maximum loop current	22mA ... 26mA
Output signal loop current	4...20mA (12mA for sensor zero position)
Adjustable variables	zero point (12mA), amplification
Maximum load resistance	500 Ohm (for 24 Volt supply voltage)
Operating temperature	-40°C ... +85°C
Weight	approx. 300g

- The box is delivered with an individual calibration record that includes the precise offset and sensitivity values, the static characteristic curve and the linearity deviation curve.

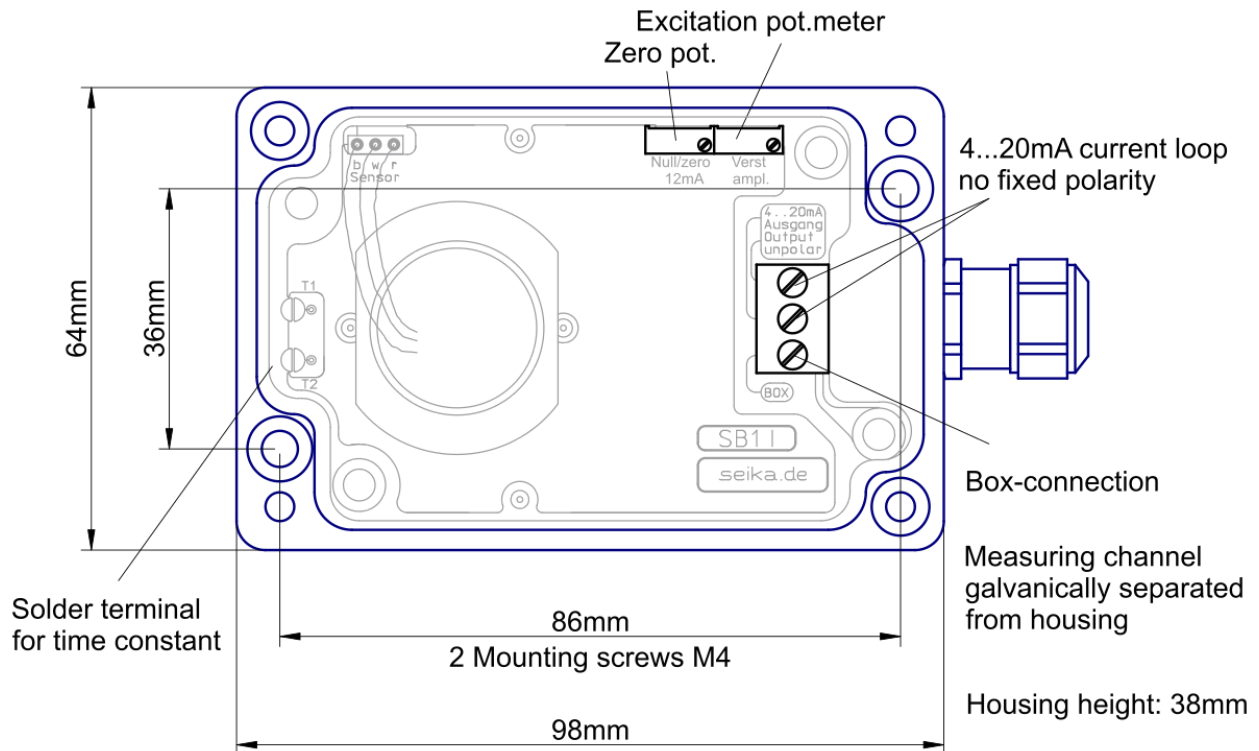
Options:

- special measuring ranges • silicon encapsulation • custom wiring
- individual temperature drift compensation of the offset and the sensitivity

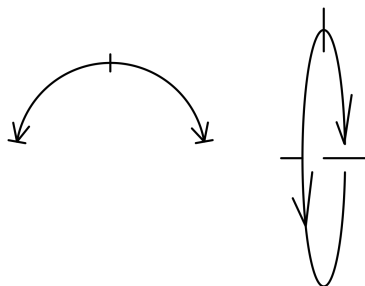
Dimensions (in mm) of SB1I containing NG inclinometer



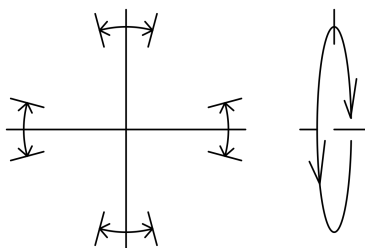
Dimensions (in mm) and Measuring Directions of SB11 with N inclinometer



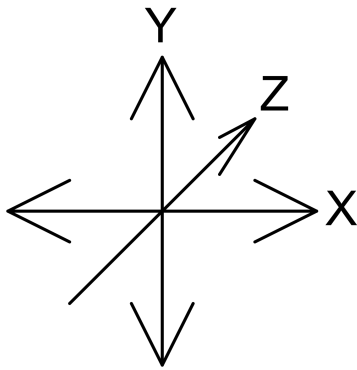
Measuring planes and directions for N..., NB..., B... und BDK... sensors:



N-sensors: any zero-angle and +/- rotation in both directions can be realised. The cable output can be on the right (as drawn), left, bottom or top of the box. The measuring direction as drawn for the NG-sensor (see drawing 1) can also be realised.



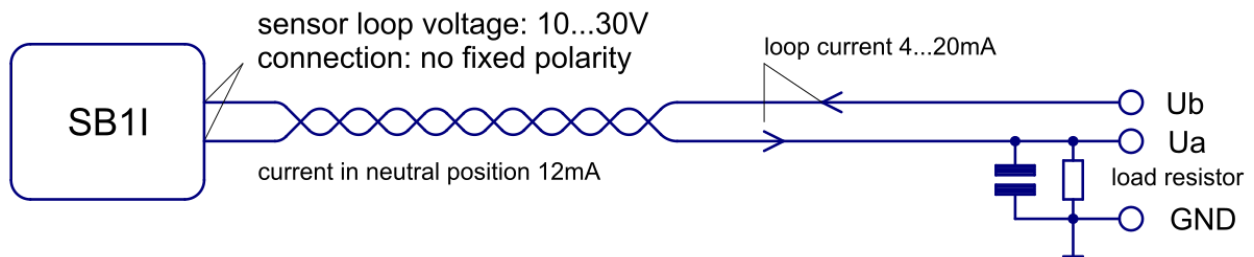
NB-sensors: four zero-angles offset by 90° can be realised as well as +/- rotation in both directions.



B-, BDK-sensors: acceleration can be measured in X-, Y- and Z-axes. For X- and Y-axes both +/- measuring directions can be realised.

As illustrated here most rotation planes and acceleration directions can be measured with SEIKA sensorboxes. The resulting multitude of possibilities make configuration difficult, however. We'd be glad to give you advice on putting together the components best suited for your measurement task and are happy to receive your information on what planes and directions the inclinations and/or accelerations are to be measured. A sketch of your situation is often very helpful.

Connections



Minimal loop current: 2.5mA ... 3.5mA. Loop current limitation: 22mA ... 26mA.

Since the SB1I supply voltage feeds off the current loop (the SB1I requires 3mA at most), a voltage of 10V across the SB1I terminals must be guaranteed to ensure correct functionality even for the maximum loop current of 24mA (maximum voltage drop across transmission line and load resistance).

Computing the minimal operating voltage $U_{b,min}$

$$U_{b,min} = 10V + \text{voltage drop at cabel} + \text{load resistor voltage drop at 20mA}$$

$$= 10V + 20mA \cdot R_{cabel} + 20mA \cdot R_{load}$$

Example computations:

$$U_{b,min} = 10V + (100m \text{ wire } 2 \times 0.14mm^2) 0.6V + (100 \text{ Ohm load}) 2V = 12.6V$$

$$U_{b,min} = 10V + (2km \text{ cabel } 2 \times 0.5mm^2) 3.2V + (500 \text{ Ohm load}) 10V = 23.2V$$