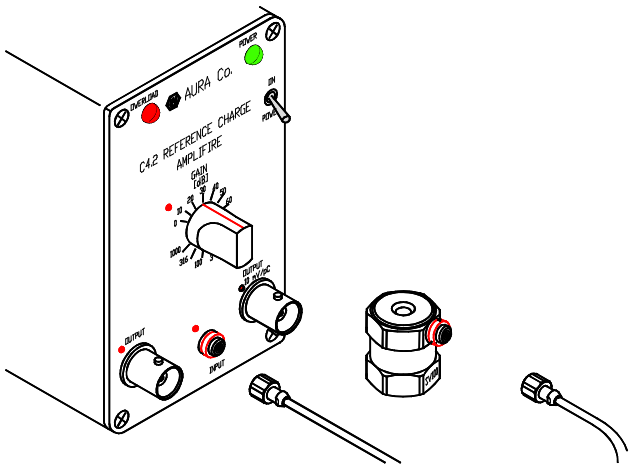
Referential measuring chain

- **Suitable as a secondary standard of vibrations**
- **High temporal stability**
- **Wide frequency range**
- **Exact transfer of the charge**
- **Low noise**
- **The switched gain**
- **Battery feeding**



Purpose

The referential measuring chain is a facility for keeping a specific known value of sensitivity to vibrations. It will find its use as a secondary etalon of vibrations or as a factory etalon of vibration. For this purpose, such a construction of the facility was selected that its stability satisfies the requirements for a measuring chain for calibration, as it is specified in the standard ISO 5347.

The facility consists of a sensor SV100, which is equipped with two contact pads – for connection to the source of vibrations, and for connection of the measured accelerometer or of the measured vibrometer. The accelerometer SV100 is connected by way of a low noise cable SK132 to the charge amplifier C4.2. This charge amplifier is equipped with two outputs. The first one has an exact transmission of charge 10 mV/pC and is to be used for referential measurement, which can be done both by way of a referential accelerometer and for the determination of the sensitivity of other vibration pickups. In that case, if the acceleration of 10 ms-2 is used, the output voltage numerically corresponds to the sensitivity of the sensor under test.

The second output has a sensitivity, which may be switched by steps of 10 dB in the range between 0 and 60 dB. The transmission of the charge amplifier can therefore be increased as much as 1000 times to the value of 10 V/pC. This output can be used for general measuring purposes, but also for referential purposes. Though in this case only within a certain range, in order to avoid a possible inaccuracy of the attenuator. The amplifier is constructed in such a manner as to show the same time and phase delay and the same frequency characteristics in all ranges.

Description

The charge amplifier is equipped with a resistant metal box of the size 64 x 105 x 164 mm, which guarantees a high mechanical resistance. As a source of energy is used a built-in accumulator, which may be charged from a network supply that is a part of the delivery. On the front panel of the charge amplifier there is a breaker of the feeding together with a pilot light showing that the apparatus is on, combined with a pilot light showing decrease of the voltage of the battery. In the right upper corner there is a pilot light indicating that the dynamic range was exceeded, and then there are small pilot lights with the individual levels of the amplifier. On the front panel there are also the connectors of the input and of the outputs, and a gain switch. On the backside there is a connector for the charging supply.

The referential sensing unit has a casing made of austenitic stainless steel. The signal is conducted by the connector of the Microdot type with a 10-32 UNF thread. The lower and upper contact pads for the connection to the source of vibrations and for the connection of the sensing unit of the measured vibrometer, are provided with a M5 thread. Connection is made by SK132/2m low noise cable.

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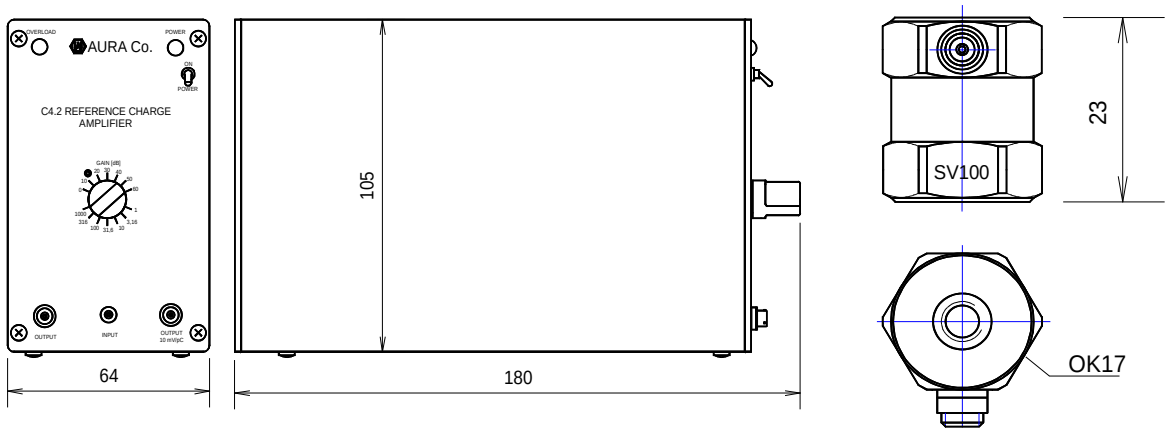
Referential measuring chain

Dimensions



Parameters	
Power	12 V built-in accumulator charging: 230 V/50 Hz
Ref. channel	from 0,2 Hz to 100 kHz
Sw. channel	from 0,2 Hz to 40 kHz
Frequency renge of the amplifier (-3dB)	0,2 Hz to 100 kHz
Accelerometer sensitivity	typ. 3016 pC/ms^{-2}
Basic charge smplifier sensitivity	10 mV/pC ± 0,25%
Sensitivity range	10 mV/pC to 10 V/pC, step 10 dB ± 0,2 dB
Noise of amplifier	
Ref. channel in range from 3 Hz to 100 kHz	typ. 2.10^{-3} pC
Sw. channel in range from 3 Hz to 40 kHz	typ. 14.10^{-3} pC (max. amplification)
Max. output voltage	± 4 V
Input dynamic range	1000 pC
Mass	amplifier: 1,16 kg accelerometer: 30 g
Dimensions	look at the figure below
Time stability of the basic otuput	better than 0,2% per year
Environment	
Temperature range	amplifier: +5 to +55 °C accelerometer: +5 to +85 °C cable: -40 to +200 °C

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