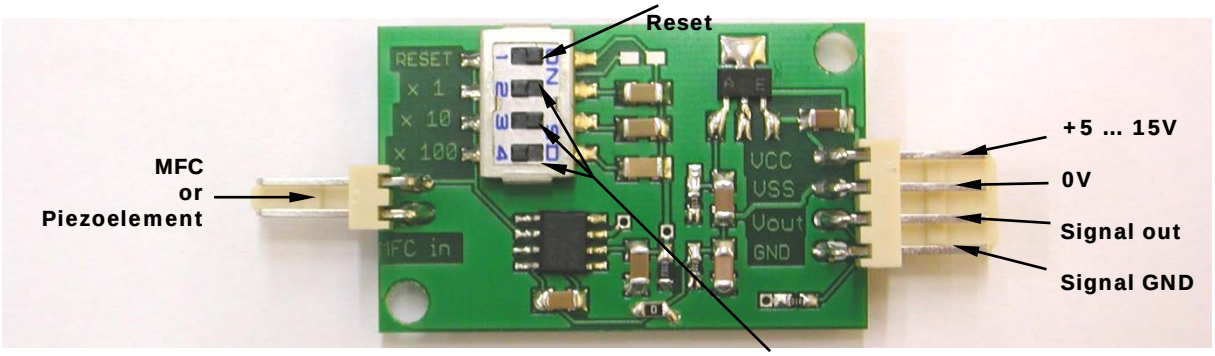
SMART *Charge*™ *Instructions*

Description

The measurement of static or low frequency deformations using piezoelectric strain gauges is an engineering challenge. A piezo electric strain gauge is generating a charge proportional to the strain. This charge will dissipate in a relatively short period of time due to the finite input impedance of the data acquisition circuits used. Strain events < 1Hz were normally very difficult to measure reliable with piezo electric devices.
Smart Material has revisited this problem with a new approach: The store&hold technique which transfers the generated charge to a high-end, leakage free capacitor, while the charge proportional voltage across the capacitance can be measured closely load-free with a special designed high impedance operational amplifier. This guarantees constant output signals over up to 3 minutes without any significant drift.

Termination and Pin Configuration

After unpacking the module from the transport box the DC power and the signal output need to be connected to the SMARTCharge Module using the included connector. ***Please don't connect the MFC Sensor (not included) at this time.*** Make sure that the pin configuration for the Quad-connector was done properly as shown in the picture below otherwise the module might be damaged. Furthermore please note that the 0V and Signal GND pins are internally not on the same potential and may in principle not be connected.



Start-up Procedure

At first please switch ON the DC power supply and a measurement device, e.g. an oscilloscope. At this point normally one can observe a certain DC output with the scope due to a possible remaining charge inside the integration capacitor. Setting the on-board reset switch to ON will short this capacitor and reset the output voltage to zero. After this step you can connect the MFC or any other piezoelectric sensor. ***Make sure that the piezo element was discharged before*** (short its contacts), otherwise the module might be damaged. Set the sensitivity selector x1 to ON and switch OFF the reset switch. Now your SMARTCharge is ready to measure any deformation of the MFC sensor in a quasi-static or dynamic manner. The sensitivity can be adjusted selecting one of the three sensitivity switches (x1/x10/x100). A smaller long term DC drift of the output signal is normal and typical for this type of charge related measurement circuits. Therefore the SMARTCharge system can be set back to its initial stage at any time using the on-board reset switch. Furthermore we recommend to switch reset ON at any time when the module is not connected to the power supply.

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