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Instruction Manual Charge Attenuator MQ 20 / MQ 40

Application

The output signal of sensitive piezoelectric transducers with charge output is often too high to be processed with regular charge amplifiers resulting in overload. The Charge Attenuators MQ20 and MQ40 are used to reduce the transducer sensitivity by 20 or 40 dB depending on the model. This allows to use the full dynamic range of a piezoelectric sensor. Typical applications are shock measurements with piezoelectric accelerometers or force measurements with piezoelectric force transducers.

Description

The Charge Attenuator MQ20 reduces the charge output of a connected sensor by 20 dB. The resulting sensitivity at the MQ20 output is calculated as follows:

$$B_{MQ20} = \frac{B_{Sensor}}{10}$$

B_{Sensor} Charge sensitivity of transducer at MQ20 input

B_{MQ20} Charge sensitivity at MQ20 output

The Charge Attenuator MQ40 works in the same way but with 40 dB attenuation:

$$B_{MQ40} = \frac{B_{Sensor}}{100}$$

B_{Sensor} Charge sensitivity of transducer at MQ40 input

B_{MQ40} Charge sensitivity at MQ40 output

The attenuation is independent of the connected sensor provided that the capacitive load at the input of the Charge Attenuator is below 3000 pF. This will be normally the case since charge transducers are usually connected with less than 10 m cable which corresponds to about 1 nF cable capacitance. The input load is calculated as follows:

$$C_I = C_{i\,Sensor} + C_{Cable}$$
$$C_I = 3000 \text{ pF}$$

C_I	Capacitive load at Charge Attenuator input
$C_{i\,Sensor}$	Inner capacitance of piezoelectric sensor, typically 400..1600 pF
C_{Cable}	Capacitance of sensor cable, typically 100 pF/m

Connection

The sensor is connected at via the BNC-socket marked as SENSOR. The other BNC-socket is the output which is connected to the charge amplifier, for instance Metra Model M68D1:

Please make sure to use only low noise cables for the connection of input and output, for instance the Metra cables Models 009 and 010. Only with low noise cables optimum resolution and accuracy will be reached.

Cables longer than 10 m are not recommended. If longer cables cannot be avoided, the longer cable should be between sensor and Charge Attenuator.

Please do not exceed the maximum capacitance of 3000 pF to obtain the stated accuracy.

Technical Data

Attenuation (C_I < 3000 pF)	
MQ20:	- 20 dB ± 1 %
MQ40:	- 40 dB ± 1 %
Maximum input capacitance C_I:	3000 pF
Frequency range:	0.1 Hz .. 50 kHz
Input:	Charge input, BNC socket (female)
Output:	Charge output, BNCsocket
Operating temperature range:	-20 .. 80 °C
Case:	Aluminum, connected to ground
Dimensions without socket :	72 mm x ∅24 mm
Weight:	55 g

Limited Warranty

Metra warrants for a period of

24 months

that its products will be free from defects in material or workmanship and shall conform to the specifications current at the time of shipment.

The warranty period starts with the date of invoice.

The customer must provide the dated bill of sale as evidence.

The warranty period ends after 24 months. Repairs do not extend the warranty period.

This limited warranty covers only defects which arise as a result of normal use according to the instruction manual.

Metra's responsibility under this warranty does not apply to any improper or inadequate maintenance or modification and operation outside the product's specifications.

Shipment to Metra will be paid by the customer.

The repaired or replaced product will be sent back at Metra's expense.

CE

Declaration of Conformity

Product: Charge Attenuator
Models: MQ20 and MQ40

It is hereby certified that the above mentioned product
complies with the demands pursuant to the following standards:

- EN 50081-1
- EN 50082-1

Responsible for this declaration is the producer

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Declared by Manfred Weber

Radebeul, 3rd of August, 1997

Version: Nov 2015