QUANTUMX

# MX840B

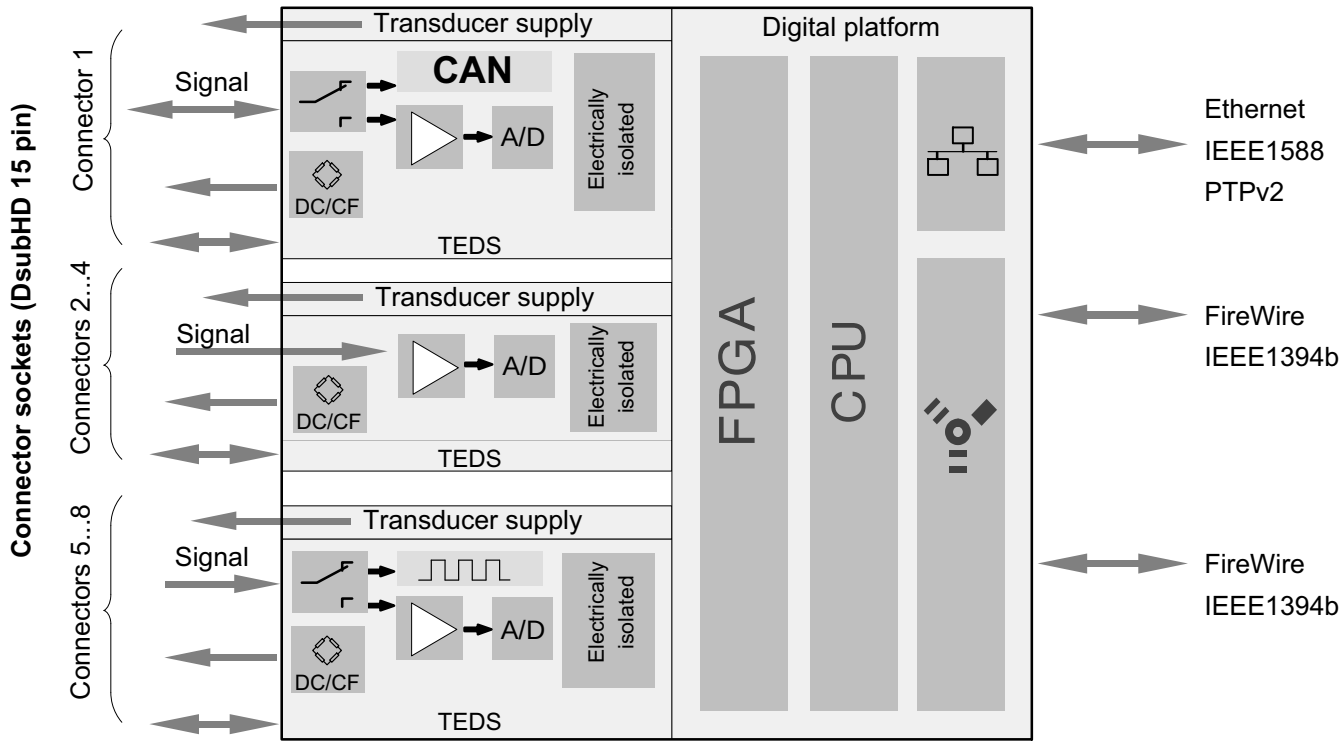
## Universal amplifier

### Special features

- **8 individually configurable measurement channels (galvanically isolated)**
- **Connection of more than 16 different transducer technologies per channel**
- **Individual sample rates up to 40 kS/s per channel, active low pass filter**
- **24-bit A/D converter per channel**
- **Automatic channel parameterization (TEDS)**
- **Supply voltage for active transducers (DC): 5 V ... 24 V**
- **CANbus Input/Output (port 1)**

Data sheet

### Block diagram



## Specifications MX840B

| General specifications | | |
|---|---|---|
| **Inputs** | Number | 8, electrically isolated from each other and from the supply voltage[1)] |
| **Transducer technologies** | | Strain gauge full and half bridge, quarter-bridge with 1-SCM-SG120/350/700/1000, inductive full and half bridge, piezoresistive full bridge, current-fed piezoelectric transducer (IEPE, ICP®), potentiometric transducers, electrical voltage (100 mV, 10 V, 60 V direct, up to 300 V CAT II with 1-SCM-HV), electrical current (20 mA); resistance (e. g. PTC, NTC, KTY); resistance thermometer (Pt100, Pt500, Pt1000); thermocouples (K, N, E, T, S, ...) with cold junction in the plug (1-THERMO-MXBOARD)<br>**Additional support on channel 5-8:**<br>frequency, incremental rotary encoder, speed sensor (rpm), pulse counter, HBM torque, SSI protocol<br>**Additional for channel 1:**<br>CAN bus, receive any signal or send measurement signals |
| **A/D converter** | | 24 Bit Delta Sigma converter |
| **Sample rates** (Domain selectable by software, Factory setting is HBM Classic) | S/s | Decimal: 0.1 … 40,000<br>HBM Classic: 0.1 … 38,400 [5)] |
| **Signal bandbwidth** | Hz | 7770 (-3dB) with filter Linear phase,<br>6667 Hz |
| **Active low-pass filter** | | Bessel, Butterworth, Linear phase,<br>0.01 … 6667 Hz (-3dB), Filter OFF [6)] |
| **Transducer identification** | | TEDS, IEEE 1451.4 |
| max. distance of the TEDS module | m | 100 |
| **Transducer connection** | | D-SUB-15HD |
| **Supply voltage range (DC)** | V | 10 ... 30 (24 V nominal (rated) voltage) |
| **Supply voltage interruption** | | max. 5 ms at 24 V |
| **Power consumption** | | |
| without adjustable transducer excitation | W | < 9 |
| with adjustable transducer excitation | W | < 12 |
| **Transducer Excitation** (active transducers) | | |
| Adjustable supply voltage (DC) | V | 5 ... 24; adjustable for each channel |
| Maximum output power | W | 0.7 each channel / a total of 2 |
| **Ethernet** (data link) | | 10Base-T / 100Base-TX |
| Protocol/addressing | - | TCP/IP (direct IP address or DHCP) |
| Connection | - | 8P8C plug (RJ-45) with twisted pair cable, Streaming (CAT-5) |
| Max. cable length to module | m | 100 |
| **Synchronization** | | |
| Firewire | | IEEE1394b (2 ports per device) |
| Ethernet | | IEEE1588 (PTPv2) or NTP |
| EtherCAT®[4)] | | via CX27B EtherCAT Gateway module |
| IRIG-B | | IRIG-B (B000 up to B007; B120 up to B127) via MX440B / MX840B input channel |
| **IEEE1394b FireWire** (module synchronization, data link, optional supply voltage) | | IEEE 1394b (HBM modules only) |
| Baud rate | MBaud | 400 (approx. 50 MByte/s) |
| Max. current from module to module | A | 1.5 |
| Max. cable length between the nodes | m | 5 |
| Max. number of modules connected in series (daisy chain) | - | 12 (=11 Hops) |
| Max. number of modules in a IEEE1394b FireWire system (including hubs[2)], backplane) | - | 24 |
| Max. number of hops[3)] | - | 14 |
| **Nominal (rated) temperature range** | °C [°F] | -20 ... +65 [-4 ... +149] |
| **Storage temperature range** | °C [°F] | -40 ... +75 [-40 ... +167] |
| **Rel. humidity** | % | 5 ... 95 (non condensing) |
| **Protection class** | | III |
| **Degree of protection** | | IP20 per EN 60529 (IP67-version available) |
| **Mechanical tests[7)]** | | |
| Vibration (30 min) | $m/s^2$ | 50 |
| Shock (6 ms) | $m/s^2$ | 350 |

1) When the variable transducer supply is used, there is no electrical isolation from the supply voltage.
2) Hub: IEEE1394b FireWire node or distributor
3) Hop: Transition from module to module or signal conditioning / distribution via IEEE1394b FireWire (hub, backplane)
4) EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
5) When bridge excitation with carrier frequency (CF) is used, the maximum sample rate is 19.2 kS/s per channel.
6) Filter OFF is recommended only for real-time applications, e.g. to enable short latency times to be implemented.

## Specifications MX840B (Continued)

| | | |
|---|---|---|
| **Mechanical tests**[7)] | | |
| Vibration (30 min) | $m/s^2$ | 50 |
| Shock (6 ms) | $m/s^2$ | 350 |
| **EMC requirements** | | per EN 61326 |
| **Max. input voltage at transducer socket to ground** | | |
| PIN 1, 2, 3, 4, 5, 7, 8, 10, 13, 15 to Pin 6 | V | + 5.5 (no transients) |
| PIN 14 (voltage) to Pin 9 | V | ± 60 (no transients) |
| **Dimensions, horizontal (W x H x D)** | mm | 52.5 x 200 x 121 (with case protection)<br>44 x 174 x 116.5 (without case protection) |
| **Weight, approx.** | g | 980 |

7) Mechanical stress is tested according to European Standard EN60068-2-6 for vibrations and EN60068-2-27 for shock. The equipment is subjected to an acceleration of 50 $m/s^2$ in a frequency range of 5...65 Hz in all 3 axes. Duration of this vibration test: 30min per axis. The shock test is performed with a nominal acceleration of 350 $m/s^2$ for 6 ms, half sine pulse shape, with 3 shocks in each of the 6 possible directions.

| | | |
|---|---|---|
| **Strain gauge full bridge, 5 or 10 mV/V measuring range, bridge excitation AC / carrier frequency** | | |
| **Accuracy class** | | 0.05 |
| **Carrier frequency (sine)** | Hz | 4800 ±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | strain gauge full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges** | | |
| at 2.5 V excitation | mV/V | ±5 |
| at 1 V excitation | mV/V | ±10 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance** | | |
| at 2.5 V excitation | Ω | 300 ... 1,000 |
| at 1 V excitation | Ω | 80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)** | | |
| with filter 1 Hz Bessel | µV/V | < 0.1 |
| with filter 10 Hz Bessel | µV/V | < 0.2 |
| with filter 100 Hz Bessel | µV/V | < 0.6 |
| with filter 1 kHz Bessel | µV/V | < 3 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.05 of measurement value |
| **Strain gauge half bridge, 5 or 10 mV/V measuring range, bridge excitation AC / carrier frequency** | | |
| **Accuracy class** | | 0.1 |
| **Carrier frequency (sine)** | Hz | 4,800 ±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | strain gauge half bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges** | | |
| at 2.5 V excitation | mV/V | ±5 |
| at 1 V excitation | mV/V | ±10 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance** | | |
| at 2.5 V excitation | Ω | 300 ... 1,000 |
| at 1 V excitation | Ω | 80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)** | | |
| with filter 1 Hz Bessel | µV/V | < 0.1 |
| with filter 10 Hz Bessel | µV/V | < 0.2 |
| with filter 100 Hz Bessel | µV/V | < 0.6 |
| with filter 1 kHz Bessel | µV/V | < 3 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.1 of measurement value |

## Specifications MX840B (Continued)

| | | |
|---|---|---|
| **Strain gauge full bridge, 5 or 10 mV/V measuring range, bridge excitation DC voltage** | | |
| **Accuracy class** | | 0.1 |
| **Bridge excitation voltage (DC)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | strain gauge full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges**<br>at 2.5 V excitation<br>at 1 V excitation | <br>mV/V<br>mV/V | <br>±5<br>±10 |
| **Transducer impedance**<br>at 2.5 V excitation<br>at 1 V excitation | <br>Ω<br>Ω | <br>300 ... 1,000<br>80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 1<br>< 1.2<br>< 1.5<br>< 2 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.05 of measurement value |
| **Strain gauge half bridge, 5 or 10 mV/V measuring range, bridge excitation DC voltage** | | |
| **Accuracy class** | | 0.1 |
| **Bridge excitation voltage (effective)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | strain gauge half bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges**<br>at 2.5 V excitation<br>at 1 V excitation | <br>mV/V<br>mV/V | <br>±5<br>±10 |
| **Transducer impedance**<br>at 2.5 V excitation<br>at 1 V excitation | <br>Ω<br>Ω | <br>300 ... 1,000<br>80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 1<br>< 1.2<br>< 1.5<br>< 2 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.1 of measurement value |
| **Resistive (strain gauge) full bridge, 100 mV/V measuring range, bridge excitation DC voltage** e.g. for piezoresistive transducers | | |
| **Accuracy class** | | 0.05 |
| **Excitation voltage (DC)** | V | 2.5 ±5% |
| **Transducers that can be connected** | | piezoresistive strain gauge full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV/V | ±100 |
| **Transducer impedance** | Ω | 300 ... 1,000 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 3<br>< 4<br>< 5<br>< 10 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

## Specifications MX840B (Continued)

| | | |
|---|---|---|
| **Resistive (strain gauge) full bridge, 1000 mV/V measuring range, bridge excitation DC voltage** e.g. for piezoresistive transducers | | |
| **Accuracy class** | | 0.05 |
| **Bridge excitation voltage (DC)** | V | 2.5 ±5% |
| **Transducers that can be connected** | | piezoresistive strain gauge full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV/V | ±1,000 |
| **Transducer impedance** | Ω | 300 ... 1,000 |
| **Noise at 25 °C (peak to peak)** | | |
| with filter 1 Hz Bessel | µV/V | < 10 |
| with filter 10 Hz Bessel | µV/V | < 20 |
| with filter 100 Hz Bessel | µV/V | < 40 |
| with filter 1 kHz Bessel | µV/V | < 100 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |
| **Inductive full bridge, 100 mV/V measuring range, bridge excitation AC** | | |
| **Accuracy class** | | 0.05 |
| **Carrier frequency (sine)** | Hz | 4,800 ±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | inductive full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges** | | |
| at 2.5 V excitation | mV/V | ±100 |
| at 1 V excitation | mV/V | ±300 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance** | | |
| at 2.5 V excitation | Ω | 300 ... 1,000 |
| at 1 V excitation | Ω | 80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)** | | |
| with filter 1 Hz Bessel | µV/V | < 1 |
| with filter 10 Hz Bessel | µV/V | < 2 |
| with filter 100 Hz Bessel | µV/V | < 5 |
| with filter 1 kHz Bessel | µV/V | < 15 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.05 of measurement value |
| **Inductive full bridge, 1000 mV/V measuring range, bridge excitation AC** | | |
| **Accuracy class** | | 0.1 |
| **Carrier frequency (sine)** | Hz | 4800 ±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 (±5 %) |
| **Transducers that can be connected** | | inductive full bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV/V | ±1,000 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance** | Ω | 80 ... 1000 |
| **Noise at 25 °C (peak to peak)** | | |
| with filter 1 Hz Bessel | µV/V | < 10 |
| with filter 10 Hz Bessel | µV/V | < 30 |
| with filter 100 Hz Bessel | µV/V | < 100 |
| with filter 1 kHz Bessel | µV/V | < 300 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift** | % / 10 K | < 0.1 of measurement value |

## Specifications MX840B (Continued)

| | | |
|---|---|---|
| **Inductive half bridge, 100 mV/V measuring range, bridge excitation AC** | | |
| **Accuracy class** | | 0.1 |
| **Carrier frequency (sine)** | Hz | 4,800 ±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 and 2.5 (±5 %) |
| **Transducers that can be connected** | | inductive half bridges |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges**<br>at 2.5 V excitation<br>at 1 V excitation | <br>mV/V<br>mV/V | <br>±100<br>±300 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance**<br>at 2.5 V excitation<br>at 1 V excitation | <br>Ω<br>Ω | <br>300 ... 1,000<br>80 ... 1,000 |
| **Noise at 25 °C and 2.5 V excitation (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 1<br>< 2<br>< 5<br>< 15 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (2.5 V excitation)** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift (2.5 V excitation)** | % / 10 K | < 0.1 of measurement value |
| **LVDT, Linear Variable Differential Transformer (i.e. displacement transducer), AC bridge excitation** | | |
| **Accuracy class** | | 0.1 |
| **Carrier frequency (sine)** | Hz | 4800±1.5 |
| **Bridge excitation voltage (effective)** | V | 1 (±5 %) |
| **Transducers that can be connected** | | LVDT |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV/V | ±3,000 |
| **Signal bandwidth (-3 dB)** | kHz | 0 ... 1.6 |
| **Transducer impedance** | mH | 4 ... 33 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 10<br>< 30<br>< 100<br>< 300 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift** | % / 10 K | < 0.1 of measurement value |
| **Potentiometric transducers / potentiometer** | | |
| **Accuracy class** | | 0.1 |
| **Excitation voltage (DC)** | V | 2.5 (±5 %) |
| **Transducers that can be connected** | | potentiometric transducers |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV/V | ±500 |
| **Transducer impedance** | Ω | 300 ... 5,000 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV/V<br>µV/V<br>µV/V<br>µV/V | <br>< 10<br>< 20<br>< 40<br>< 100 |
| **Linearity error** | % | < 0.02 of full scale |
| **Zero drift (1 V excitation)** | % / 10 K | < 0.1 of full scale |
| **Full-scale drift (1 V excitation)** | % / 10 K | < 0.1 of measurement value |

## Specifications MX840B (Continued)

| Current-fed piezoelectric transducers (IEPE - Integrated Electronics Piezo Electric, ICP®) | | |
|---|---|---|
| **Accuracy class** | | 0.1 |
| **Transducer technology** | | IEPE<br>(BNC adapter available: 1-SUBHD15-BNC) |
| **Permissible cable length between MX840B and transducer**<br>May be laid inside closed buildings only | m | < 30 |
| **Transducer identification (TEDS, IEEE 1451.4)** | | only version 1.0 |
| **Transducer excitation** | mA | 4,0 ±15% |
| **Measuring ranges (AC)** | V | ±10 |
| **IEPE Compliance Voltage, typ.** | V | 21 |
| **Noise at 25 °C and measuring range ±10 V (peak to peak)**<br>at 1 Hz Bessel filter<br>at 10 Hz Bessel filter<br>at 100 Hz Bessel filter<br>at 1 kHz Bessel filter | <br><br>µV<br>µV<br>µV<br>µV | <br><br>< 200<br>< 300<br>< 500<br>< 1.000 |
| **Linearity error** | % | < 0.1 of full scale value |
| **Common-mode rejection**<br>at DC common-mode<br>at 50 Hz common-mode, typically | <br>dB<br>dB | <br>> 100<br>75 |
| **Max. common-mode voltage**<br>(to housing and supply ground) | V | ±60 |
| **Zero drift** | % / 10 K | < 0.1 of full scale value |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

| ±10 V electrical voltage | | |
|---|---|---|
| **Accuracy class** | | 0.05 |
| **Transducers that can be connected** | | voltage generator up to ±10 V |
| **Permissible cable length between MX840B and transducer** | m | BNC adapter available: 1-SUBHD15-BNC<br>< 100 |
| **Measuring range** | V | ±10 |
| **Internal resistance of the voltage source** | Ω | < 500 |
| **Internal impedance, typ.** | MΩ | 1 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV<br>µV<br>µV<br>µV | <br>< 200<br>< 300<br>< 500<br>< 1.000 |
| **Linearity error** | % | < 0.02 of full scale |
| **Common-mode rejection**<br>with DC common mode<br>with 50 Hz common mode, typ. | <br>dB<br>dB | <br>> 100<br>75 |
| **Maximum common-mode voltage**<br>(to housing and supply ground) | V | ±60 |
| **Zero drift** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

## Specifications MX840B (Continued)

| ±60 V voltage | | |
|---|---|---|
| **Accuracy class** | | 0.05 |
| **Transducers that can be connected** | | voltage generator up to ±60 V |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | V | ±60 |
| **Internal resistance of the voltage source** | Ω | < 500 |
| **Input impedance, typ.** | MΩ | 1 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1Hz Bessel<br>with filter 10Hz Bessel<br>with filter 100Hz Bessel<br>with filter 1kHz Bessel | <br>µV<br>µV<br>µV<br>µV | <br>< 300<br>< 400<br>< 1.000<br>< 3,000 |
| **Linearity error** | % | < 0.02 of full scale |
| **Common-mode rejection**<br>with DC common mode<br>with 50 Hz common mode, typ. | <br>dB<br>dB | <br>> 100<br>75 |
| **Maximum common-mode voltage** (to housing and supply ground) | V | ±60 |
| **Zero drift** | % / 10 K | < 0.02 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

| ±100 mV voltage | | |
|---|---|---|
| **Accuracy class** | | 0.05 |
| **Transducers that can be connected** | | voltage generator |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV | ±300 |
| **Input impedance** | MΩ | > 20 |
| **Noise at 25 °C (peak to peak)**<br>with filter 1 Hz Bessel<br>with filter 10 Hz Bessel<br>with filter 100 Hz Bessel<br>with filter 1 kHz Bessel | <br>µV<br>µV<br>µV<br>µV | <br>< 5<br>< 10<br>< 30<br>< 100 |
| **Linearity error** | % | < 0.02 of full scale |
| **Common-mode rejection**<br>with DC common mode<br>with 50 Hz common mode, typ. | <br>dB<br>dB | <br>> 90<br>75 |
| **Maximum common-mode voltage** (to housing and supply ground) | V | ±30 |
| **Zero drift** | % / 10 K | < 0.05 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

## Specifications MX840B (Continued)

| 0 / 4…20 mA (2, 3, 4-wire) signal current | | |
|---|---|---|
| **Accuracy class** | | 0.05 |
| **Transducers that can be connected** | | transducers with current output (0 ... 20 mA or 4 ... 20 mA) |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mA | ±20 |
| **Measurement resistance value, typ.** | Ω | 10 |
| **Noise at 25 °C (peak to peak)** | | |
| with filter 1 Hz Bessel | µA | < 1 |
| with filter 10 Hz Bessel | µA | < 1.5 |
| with filter 100 Hz Bessel | µA | < 15 |
| with filter 1 kHz Bessel | µA | < 40 |
| **Linearity error** | % | < 0.02 of full scale |
| **Common-mode rejection** | | |
| with DC common mode | dB | > 100 |
| with 50 Hz common mode, typ. | dB | 75 |
| **Maximum common-mode voltage** (to housing and supply ground) | V | ±30 |
| **Zero drift** | % / 10 K | < 0.05 of full scale |
| **Full-scale drift** | % / 10 K | < 0.05 of measurement value |

| Ohmic resistance | | |
|---|---|---|
| **Accuracy class** | | 0.1 |
| **Transducers that can be connected** | | PTC, NTC, KTY, TT-3, resistances generally (connection with 4 wire configuration) |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring ranges** | Ω | 0 ... 5,000 |
| **Excitation current** | mA | 0.4 ... 0.8 |
| **Noise at 25 °C (peak to peak)** | | |
| with filter 1 Hz Bessel | Ω | < 0.1 |
| with filter 10 Hz Bessel | Ω | < 0.2 |
| with filter 100 Hz Bessel | Ω | < 0.5 |
| with filter 1 kHz Bessel | Ω | < 1.5 |
| **Linearity error** | % | <±0.02 of full scale |
| **Zero drift** | % / 10K | <0.02 of full scale |
| **Full-scale drift** | % / 10 K | <0.1 of measurement value |

| Resistance thermometer (Pt100, Pt500, Pt1000) | | |
|---|---|---|
| **Accuracy class** | | 0.1 |
| **Transducers that can be connected** | | Pt100, Pt500, Pt1000 (connection with 4 wire configuration) |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Linearization range** | °C [°F] | -200 ... +848 [-328 ... +1558.4] |
| **Noise at 25 °C (peak to peak)** | | |
| with filter 1 Hz Bessel | K | < 0.1 |
| with filter 10 Hz Bessel | K | < 0.2 |
| with filter 100 Hz Bessel | K | < 0.5 |
| with filter 1 kHz Bessel | K | < 1.5 |
| **Linearity error** | K | <±0.3 |
| **Zero drift** | | |
| with Pt100, Pt500 | K / 10 K | <0.2 |
| with Pt1000 | K / 10 K | <0.1 |
| **Full-scale drift** | | |
| with Pt100 | K / 10 K | <0.5 |
| with Pt500 | K / 10 K | < 0.8 |
| with Pt1000 | K / 10 K | < 1 |

## Specifications MX840B (Continued)

| **Thermocouples**[1)] | | |
|---|---|---|
| **Transducers that can be connected** | | Thermocouples (type B, C, E, J, K, N, R, S, T) |
| **Permissible cable length between MX840B and transducer** | m | < 100 |
| **Measuring range** | mV | ±100 |
| **Linearization ranges** | | |
| Type B (Pt-30 % Rh and Pt-6 % Rh) | °C [°F] | +100 ... +1,820 [+212 ... +3,308] |
| Type C (W and W-26 % Re) | °C [°F] | 0 ... +2300 [+32 ... +4,172] |
| Type E (Ni-Cr and Cu-Ni) | °C [°F] | -210 ... +1,200 [-346 ... +2,192] |
| Type J (Fe and Cu-Ni) | °C [°F] | -270 ... +1,372 [-454 ... +2,501.6] |
| Type K (Ni-Cr and Ni-Al) | °C [°F] | -270 ... +1,300 [-454 ... +2,372] |
| Type N (Ni-14,2 % Cr and Ni-4,4 % Si-0,1 % Mg) | °C [°F] | -50 ... +1,768 [-58 ... +3214.4] |
| Type R (Pt-13 % Rh and Pt) | °C [°F] | -50 ... +1,768 [-58 ... +3214.4] |
| Type S (Pt-10 % Rh and Pt) | °C [°F] | -270 ... +400 [-454 ... +752] |
| Type T (Cu and Cu-Ni) | | |
| **Transducer impedance** | Ω | < 500 |
| **Noise Type K (peak to peak)** | | |
| with Filter 1 Hz Bessel | K | 0.05 |
| with Filter 10 Hz Bessel | K | 0.1 |
| with Filter 100 Hz Bessel | K | 0.5 |
| with Filter 1 kHz Bessel | K | 1 |
| **Total error limit at 22 °C ambient temperature** | | |
| Type E, J, K, T, C | K | ±1.5 |
| Type R, S | K | ±4 |
| Type B | K | ±15 |
| **Temperature drift** (type K) | K / 10K | <±0.5 |
| **Cold junction 1-THERMO-MXBOARD** | | |
| Nominal (rated) temperature range | °C [°F] | -20 ... +60 [-4 ... +140] |
| Operating temperature range | °C [°F] | -20 ... +65 [-4 ... +149] |
| Storage temperature range | °C [°F] | -40 ... +75 [-40 ... +167] |

1) One of the following cold junctions is required for connecting thermocouples to the MX840B (ordering no.: 1-THERMO-MXBOARD; 1-SCM-TCK; 1-SCM-TCE; 1-SCM-TCJ; 1-SCM-TCT).

## Specifications MX840B (Continued)

| **Frequency or pulse counting (connections 5 ... 8)** | | |
|---|---|---|
| **Accuracy class** | | 0.01 |
| **Transducers that can be connected** | | in general timer-based digital signal sources (single lane, dual lane, with/without index), pulse counter, incremental rotary encoder, HBM-torque transducer (digital), SSI transducers (absolute position) |
| **Permissible cable length between MX840B and transducer** | m | < 50 |
| **Signals**<br>$F_1$ (±)<br>$F_2$ (±)<br>Zero index (±) | | <br>Frequency or pulse signal<br>Direction of rotation signal shifted by ±90° to $F_1$ or static<br>Zero position signal |
| **Input level with differential operation**<br>Low level<br>High level | | <br>Differential inputs (RS422): Signal (+) < Signal (-) -200 mV<br>Differential inputs (RS422): Signal (+) > Signal (-) +200 mV |
| **Input level with unipolar operation**<br>Low level<br>High level | <br>V<br>V | <br><1.5<br>> 3.5 |
| **Maximum input voltage at transducer socket to ground (pin 6)** | V | 5.5 (no transients) |
| **Measuring ranges**<br>Frequency<br>Pulse counting | <br>Hz<br>pulses/s | <br>0.1 ... 1,000,000<br>0 ... 1,000,000 |
| **Input impedance, typ.** | kΩ | 10 |
| **Temperature drift** | % / 10 K | < 0,01 of measurement value |
| **SSI mode (differentially)** | | |
| Shift clock | kHz | 100, 200, 500, 1,000 |
| Word length | Bit | 12-31 |
| Code | | binary or gray |
| Input level<br>Low level<br>High level | | <br>Differential inputs (RS422): Signal (+) < Signal (-) -200 mV<br>Differential inputs (RS422): Signal (+) > Signal (-) +200 mV |
| Signals<br>Data<br>Shift clock | | <br>Data+, Data- (RS-422)<br>Clk+, Clk- (RS-422) |

| **Digital control output** (e.g. for triggering of external shunts, reset of external charge amplifiers) | | |
|---|---|---|
| **Output type** | | High side switch |
| **Reference potential** | | Pin 6 (ground) |
| **High level** | | |
| Output unloaded, typ. | V | 5 |
| $I_{out}$ = 5 mA | V | > 4.5 |
| **Permissible load impedance** | kΩ | > 1 |

| **CAN (connection 1)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Supported protocols** | | CAN 2.0A, CAN 2.0B | | | | | | | |
| **Number of CAN ports** | | only connector 1 | | | | | | | |
| **Bus link** | | two wire, according to ISO11898 | | | | | | | |
| **Bit rates** | KBit / s | 1000 | 800 | 666,6 | 500 | 400 | 250 | 125 | 100 |
| **Permissible cable lengths** | m | 25 | 50 | 80 | 100 | 100 | 250 | 500 | 500 |
| **Bit sequence** | | Intel standard, Motorola forward MSB | | | | | | | |
| **Receiving**[1], can be parameterized via CANdb *.dbc<br>Rate in total<br>Number of CAN signals<br>CAN signal types | 1/s | <br>max. 10,000<br>≤ 128<br>standard, mode-dependent, mode-Signal | | | | | | | |
| **Transmitting,** MX Assistant generates CANdb (*.dbc)<br>Transmission rate per signal (max.)<br>Number of analog input signals (modul-internal only)<br>Generate dbc file (Assistant) | 1/s | <br>100 per signal<br>7<br>with MX Assistant | | | | | | | |

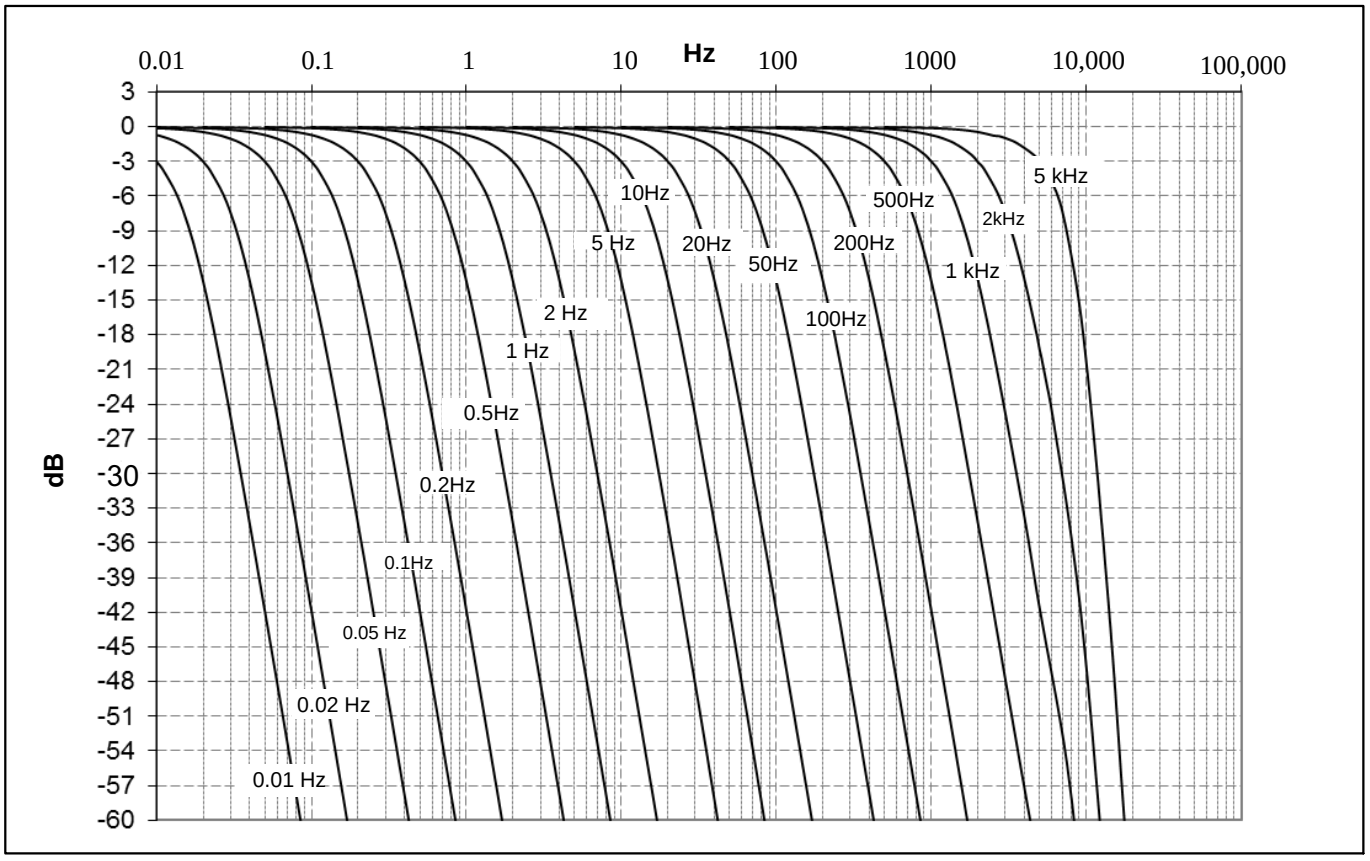
1) Parameterization from CANdb via catman® EASY or MX Assistant

## Decimal sample rates and digital low pass filter, type Bessel 4th order

| Type | -1dB (Hz) | -3dB (Hz) | -20dB (Hz) | Phase delay*) (ms) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Bessel | 3,041 | 5,000 | 9,935 | 0.043 | 0.08 | 3.6 | 40,000 |
| | 1,188 | 2,000 | 5,141 | 0.13 | 0.2 | 0.9 | 40,000 |
| | 594 | 1,000 | 2,561 | 0.29 | 0.3 | 0.85 | 40,000 |
| | 296 | 500 | 1273 | 0.62 | 0.7 | 0.8 | 40,000 |
| | 118 | 200 | 508 | 1.6 | 1.7 | 0.8 | 40,000 |
| | 59 | 100 | 254 | 3.2 | 3.5 | 0.8 | 40,000 |
| | 30 | 50 | 127 | 6.5 | 7 | 0.8 | 40,000 |
| | 12 | 20 | 51 | 16.4 | 17.5 | 0.8 | 40,000 |
| | 6 | 10 | 25 | 34.5 | 35 | 0.8 | 20,000 |
| | 3 | 5 | 13 | 69 | 70 | 0.8 | 10,000 |
| | 1.2 | 2 | 5.1 | 168 | 175 | 0.8 | 10,000 |
| | 0.6 | 1 | 2.5 | 332 | 350 | 0.8 | 5000 |
| | 0.3 | 0.5 | 1.3 | 663 | 700 | 0.8 | 1000 |
| | 0.1 | 0.2 | 0.5 | 1652 | 1750 | 0.8 | 1000 |
| | 0.06 | 0.1 | 0.25 | 3299 | 3500 | 0.8 | 500 |
| | 0.03 | 0.05 | 0.13 | 6598 | 7003 | 0,8 | 100 |
| | 0.01 | 0.02 | 0.05 | 16,495 | 17,508 | 0,8 | 100 |
| | 0.006 | 0.01 | 0.02 | 32,989 | 35,016 | 0,8 | 50 |

*) The delay time of the ADC is 65 µs for the sample rate 38,400 Hz and 128 µs for the all other sample rates. This value has not been accounted in the “phase delay” column above.

## Decimal sample rates : Amplitude response Bessel filter

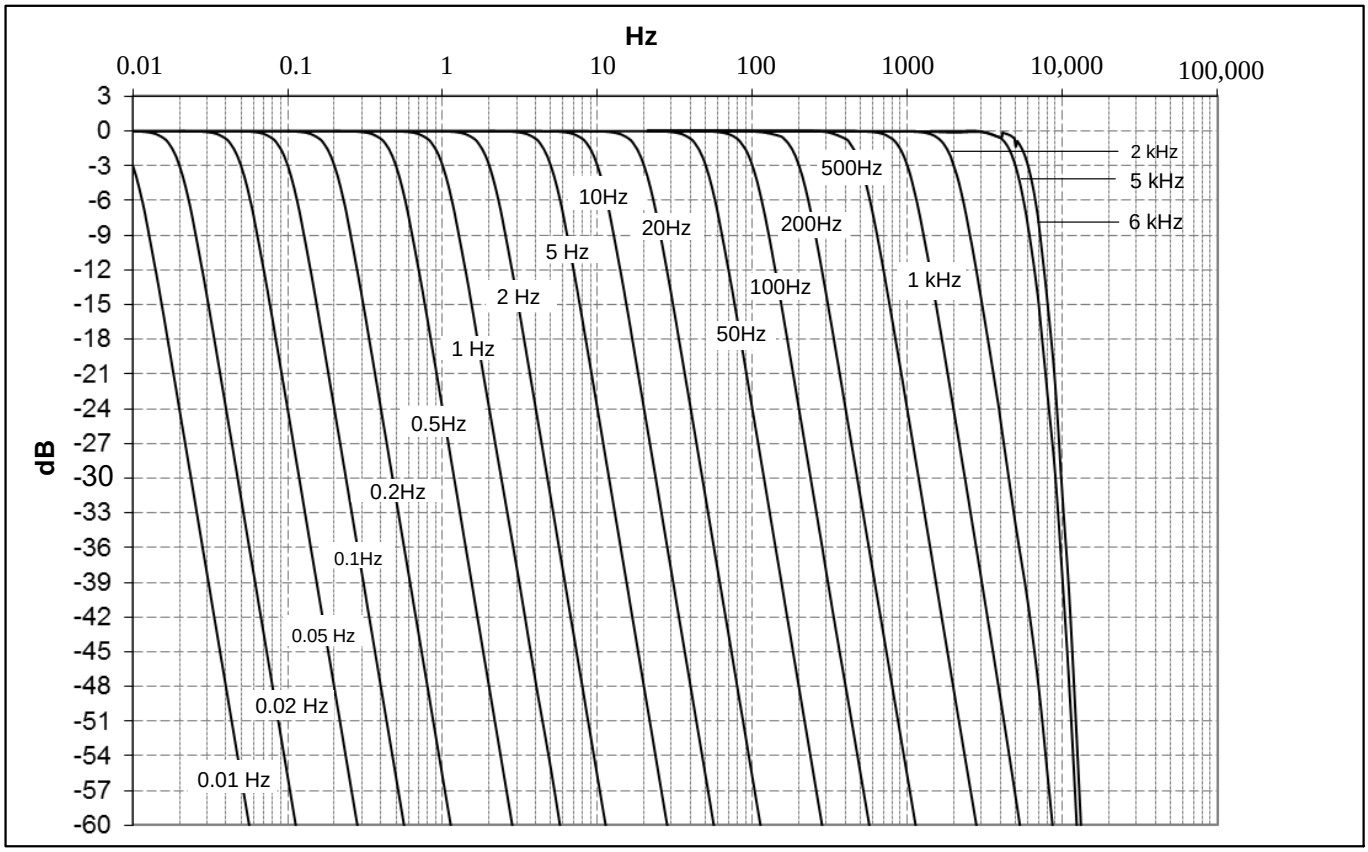


## Decimal sample rates and digital low pass filter, type Butterworth 4th order

| Type | -1dB (Hz) | -3dB (Hz) | -20dB (Hz) | Phase delay*) (ms) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Butterworth | 5,198 | 6,090 | 8,722 | 0.08 | 0.08 | 15.2 | 40,000 |
| | 4,274 | 5,000 | 7,667 | 0.10 | 0.09 | 13.7 | 40,000 |
| | 1,690 | 2,000 | 3,491 | 0.23 | 0.2 | 11 | 40,000 |
| | 844 | 1,000 | 1,768 | 0.46 | 0.4 | 10.9 | 40,000 |
| | 422 | 500 | 888 | 0.9 | 0.8 | 10.8 | 40,000 |
| | 169 | 200 | 355 | 2.2 | 1.9 | 10.8 | 40,000 |
| | 84 | 100 | 178 | 4.5 | 3.9 | 10.8 | 40,000 |
| | 42 | 50 | 89 | 9.2 | 7.7 | 10.8 | 20,000 |
| | 17 | 20 | 35.5 | 23 | 19.3 | 10.8 | 20,000 |
| | 8.4 | 10 | 17.8 | 45 | 39 | 10.8 | 20,000 |
| | 4 | 5 | 8.9 | 90 | 77 | 10.8 | 20,000 |
| | 1.7 | 2 | 3.5 | 225 | 193 | 10.9 | 20,000 |
| | 0.8 | 1 | 1.8 | 449 | 387 | 10.8 | 20,000 |
| | 0.4 | 0.5 | 0.9 | 898 | 774 | 10.8 | 10,000 |
| | 0.17 | 0.2 | 0.3 | 2241 | 1930 | 10.9 | 10,000 |
| | 0.08 | 0.1 | 0.18 | 4481 | 3861 | 10.9 | 5000 |
| | 0.04 | 0.05 | 0.09 | 8962 | 7721 | 10.9 | 1000 |
| | 0.02 | 0.02 | 0.03 | 22,405 | 19,303 | 10.9 | 1000 |
| | 0.008 | 0.01 | 0.02 | 44,810 | 38,606 | 10.9 | 500 |

*) The delay time of the ADC is 65 µs for the sample rate 38,400 Hz and 128 µs for the all other sample rates. This value has not been accounted in the "phase delay" column above.

## Decimal sample rates : Amplitude response Butterworth filter

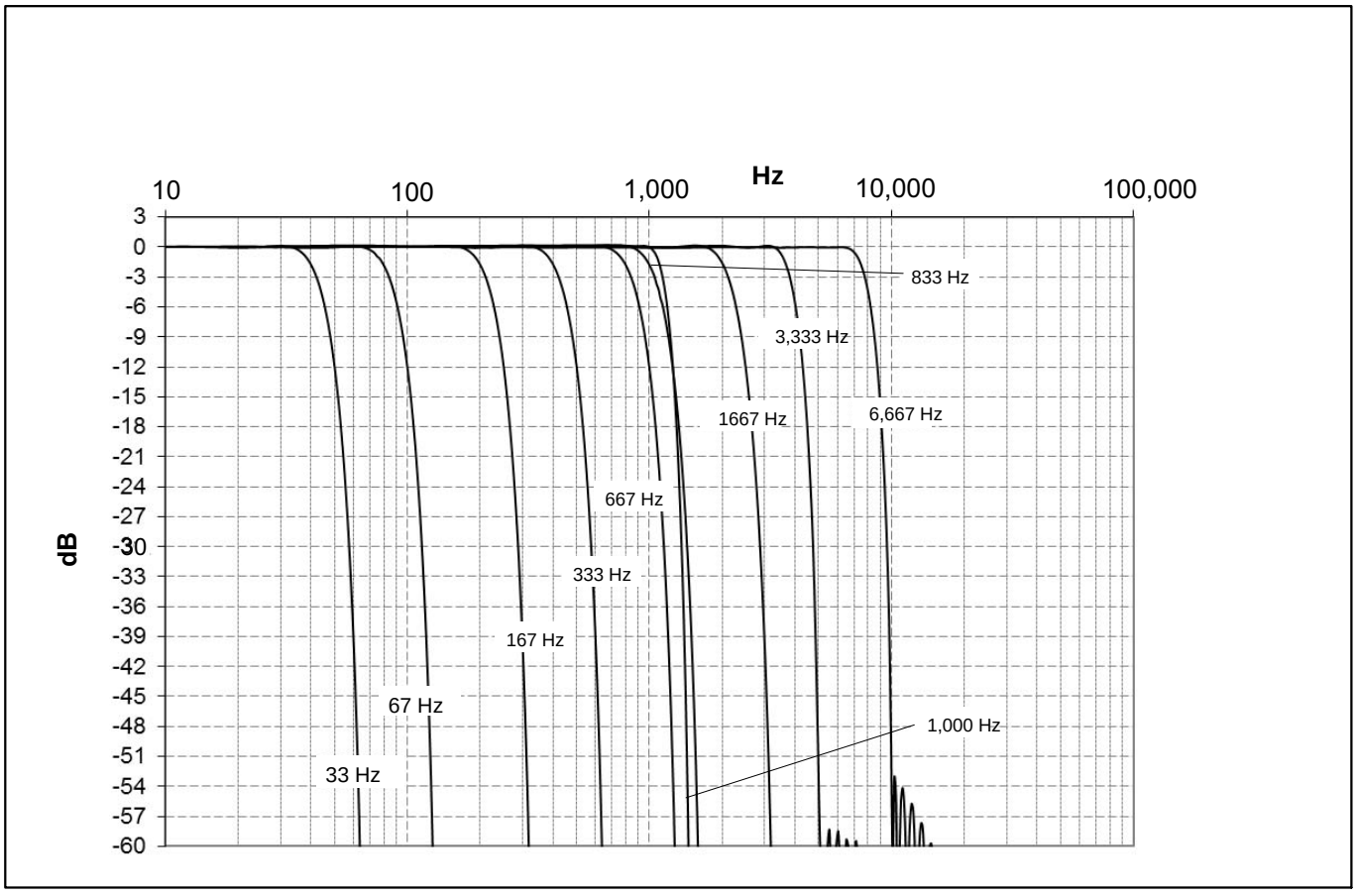


## Decimal sample rates and digital low-pass filters, linear phase (FIR)

| Type | Start of level drop (Hz) | -3 dB (Hz) | -20 dB (Hz) | Runtime*) (ms) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Linear Phase | 6,667 | 7,770 | 9,220 | 0.41 | 0.06 | 8.6 | 40,000 |
| | 3,333 | 3,800 | 4,540 | 0.78 | 0.12 | 8.6 | 40,000 |
| | 1,667 | 2,120 | 2,700 | 2.41 | 0.28 | 8.6 | 5,000 |
| | 1,000 | 1,130 | 1,300 | 6.21 | 0.544 | 8.6 | 2,500 |
| | 833 | 1,050 | 1,345 | 4.01 | 0.551 | 8.6 | 2,500 |
| | 667 | 840 | 1,080 | 4.8 | 0.694 | 8.6 | 1,000 |
| | 333 | 420 | 540 | 10.4 | 1.39 | 8.6 | 1,000 |
| | 167 | 210 | 270 | 26.9 | 2.73 | 8.6 | 500 |
| | 67 | 84 | 108 | 50.2 | 6.88 | 8.6 | 200 |
| | 33 | 42 | 54 | 108 | 13.8 | 8.6 | 100 |

*) The A/D converter's delay time for all sample rates is 65 µs and this is not taken into account in the “runtime" column!

## Decimal sample rates: amplitude response, linear phase (FIR)

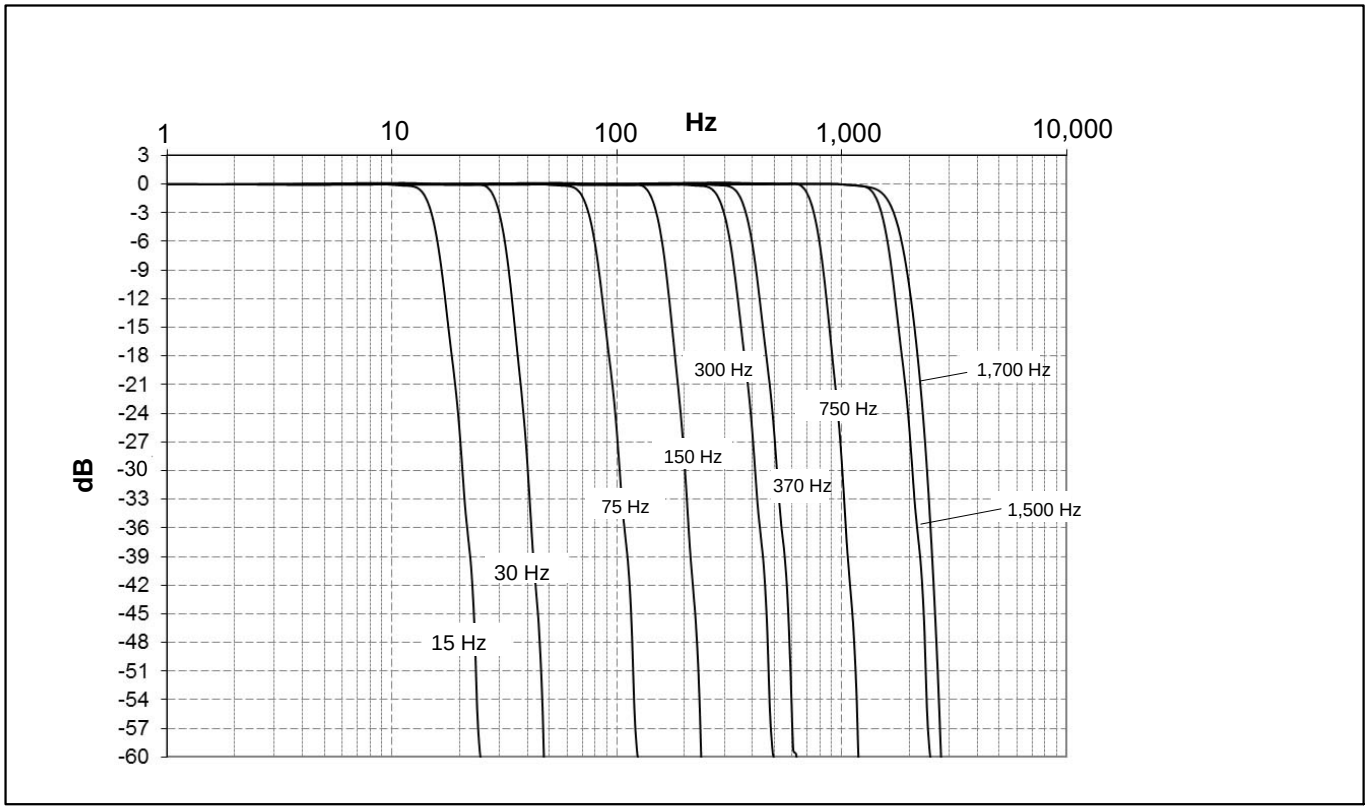


## Decimal sample rates and digital low-pass filters, Butterworth (FIR)

| Type | Start of level drop (Hz) | -3 dB (Hz) | -20 dB (Hz) | Runtime*) (ms) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Butterworth | 1,498 | 1,700 | 2,220 | 3.2 | 0.285 | 15.6 | 10,000 |
| | 1,384 | 1,500 | 1,887 | 3.48 | 0.346 | 18.7 | 10,000 |
| | 698 | 750 | 924 | 5.56 | 0.682 | 18.7 | 5,000 |
| | 344 | 370 | 471 | 14.1 | 1.40 | 18.7 | 2,500 |
| | 275 | 300 | 377 | 17.3 | 1.75 | 18.7 | 1,000 |
| | 140 | 150 | 185 | 27.6 | 3.41 | 18.7 | 1,000 |
| | 69 | 75 | 94 | 71.8 | 6.97 | 18.7 | 500 |
| | 28 | 30 | 37 | 139 | 17.0 | 18.7 | 200 |
| | 14 | 15 | 19 | 358 | 34.9 | 18.7 | 100 |

*) The A/D converter's delay time for all sample rates is 65 µs and this is not taken into account in the “runtime" column!

## Decimal sample rates: Butterworth filter amplitude response (FIR)

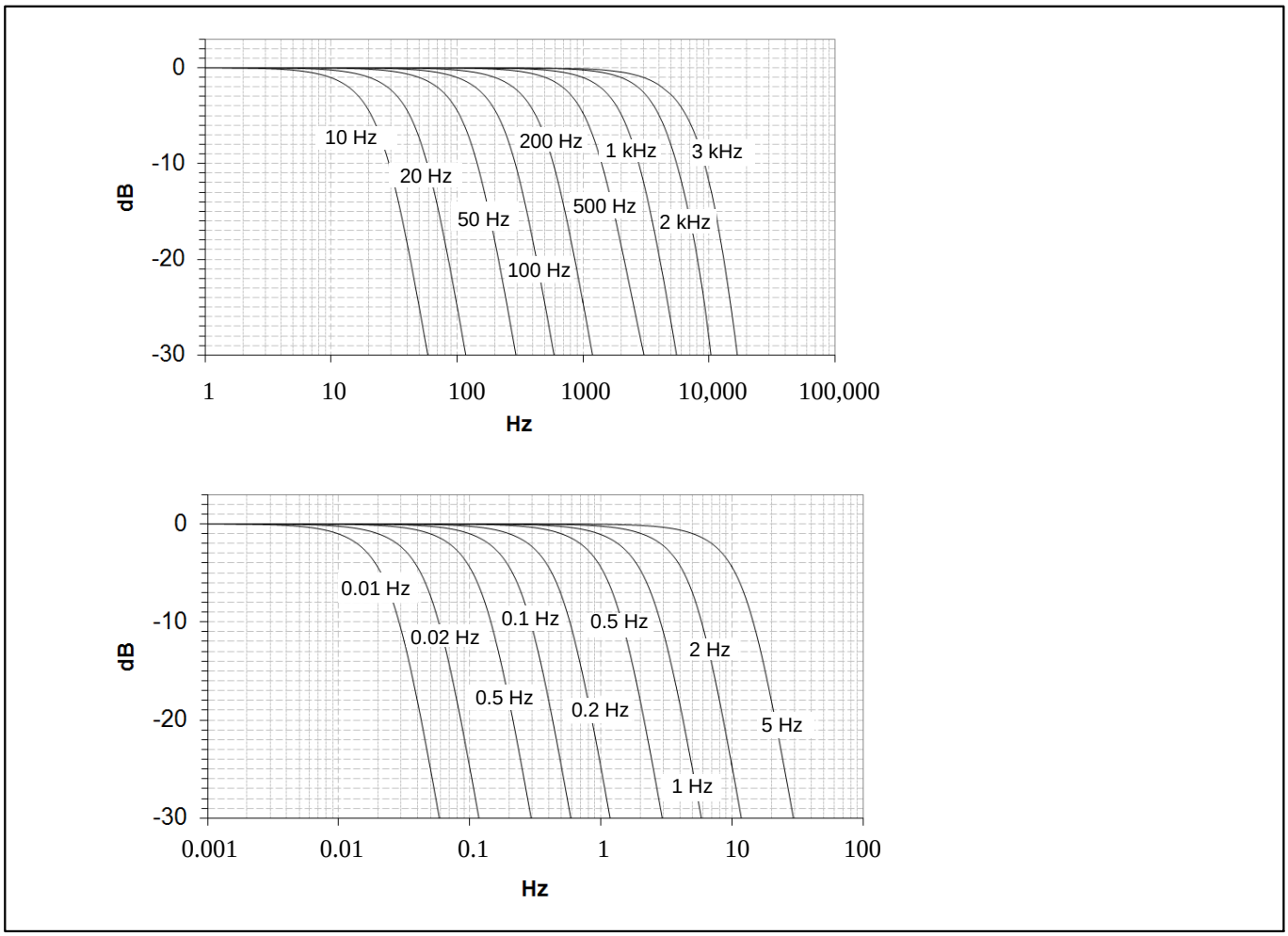


## Classic HBM sample rates and digital low pass filter, type Bessel 4th order

| Type | -1dB (Hz) | -3dB (Hz) | -20dB (Hz) | Phase delay (ms)*) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Bessel | 3000 | 5161 | 13,086 | 0.012 | 0.07 | 0.157 | 38,400 |
| | 2000 | 3210 | 8100 | 0.15 | 0.1 | 1.5 | 19,200 |
| | 1000 | 1630 | 4050 | 0.24 | 0.2 | 1.4 | 19,200 |
| | 1000 | 1640 | 5150 | 0.21 | 0.2 | 0.7 | 9600 |
| | 500 | 820 | 2120 | 0.4 | 0.43 | 1.4 | 9600 |
| | 200 | 335 | 860 | 1 | 1.04 | 1 | 9600 |
| | 100 | 167 | 430 | 2 | 2.1 | 0.8 | 9600 |
| | 50 | 83 | 215 | 4 | 4.28 | 0.8 | 9600 |
| | 20 | 33.7 | 85 | 10 | 10.6 | 0.8 | 9600 |
| | 10 | 16.5 | 42 | 20 | 21.3 | 0.8 | 9600 |
| | 5 | 8.4 | 21 | 40 | 41.6 | 0.8 | 2400 |
| | 2 | 3.4 | 8.5 | 99 | 104 | 0.8 | 2400 |
| | 1 | 1.6 | 4.2 | 200 | 214 | 0.8 | 2400 |
| | 0.5 | 0.83 | 2.1 | 400 | 420 | 0.8 | 300 |
| | 0.2 | 0.34 | 0.85 | 1000 | 1060 | 0.8 | 300 |
| | 0.1 | 0.17 | 0.43 | 2000 | 2130 | 0.8 | 300 |
| | 0.05 | 0.084 | 0.21 | 3940 | 4200 | 0.8 | 20 |
| | 0.02 | 0.033 | 0.085 | 10,000 | 10,600 | 0.8 | 20 |
| | 0.01 | 0.017 | 0.042 | 20,100 | 21,300 | 0.8 | 20 |

*) The delay time of the ADC is 65 µs for the sample rate 38,400 Hz and 128 µs for the all other sample rates. This value has not been accounted in the “phase delay” column above.

## Classic HBM sample rates : Amplitude response Bessel filter

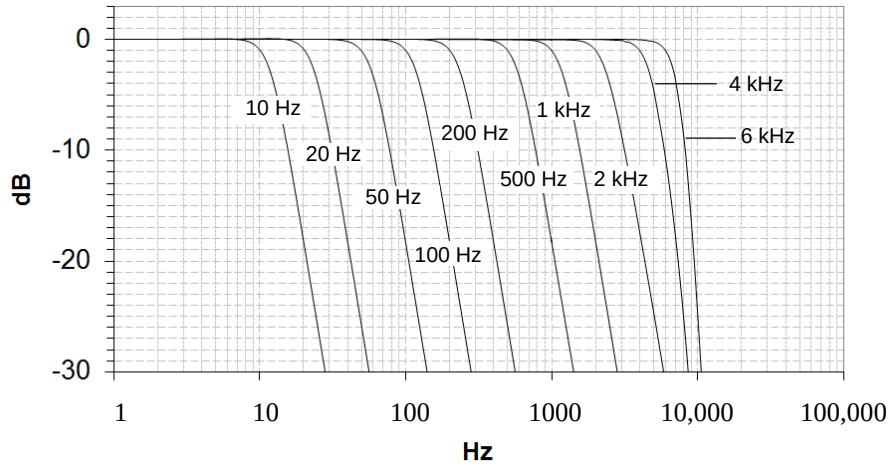


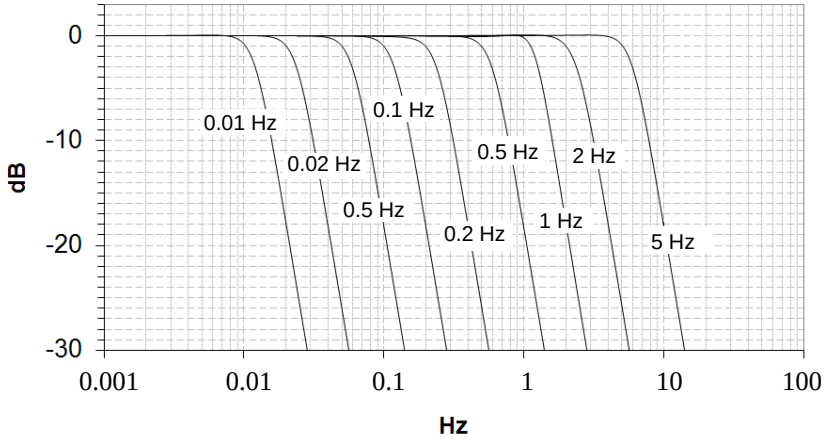
## Classic HBM sample rates and digital low pass filter, type Butterworth 4th order

| Type | -1dB (Hz) | -3dB (Hz) | -20dB (Hz) | Phase delay (ms)*) | Rise time (ms) | Overshoot (%) | Sample rate (Hz) |
|---|---|---|---|---|---|---|---|
| Butterworth | 6000 | 6868 | 9433 | 0.07 | 0.07 | 15.90 | 38,400 |
| | 4000 | 4660 | 7324 | 0.10 | 0.09 | 13.52 | 38,400 |
| | 2000 | 2360 | 4331 | 0.2 | 0.15 | 8.5 | 19,200 |
| | 1000 | 1178 | 2100 | 0.38 | 0.3 | 11 | 19,200 |
| | 1000 | 1168 | 2140 | 0.32 | 0.32 | 11 | 9600 |
| | 500 | 586 | 1050 | 0.66 | 0.66 | 11 | 9600 |
| | 200 | 235 | 420 | 1.7 | 1.6 | 11 | 9600 |
| | 100 | 118 | 210 | 3.46 | 3.2 | 11 | 9600 |
| | 50 | 59 | 105 | 6.98 | 6.6 | 11 | 9600 |
| | 20 | 24 | 42 | 17.3 | 16 | 11 | 9600 |
| | 10 | 12 | 21 | 34.9 | 32 | 11 | 9600 |
| | 5 | 5.95 | 10.5 | 69 | 66 | 11 | 2400 |
| | 2 | 2.37 | 4.24 | 173 | 160 | 11 | 2400 |
| | 1 | 1.26 | 2.1 | 347 | 320 | 11 | 2400 |
| | 0.5 | 0.59 | 1.05 | 701 | 660 | 11 | 300 |
| | 0.2 | 0.236 | 0.421 | 1760 | 1600 | 11 | 300 |
| | 0.1 | 0.118 | 0.21 | 3510 | 3200 | 11 | 300 |
| | 0.05 | 0.059 | 0.105 | 6950 | 6600 | 11 | 20 |
| | 0.02 | 0.0235 | 0.042 | 17,500 | 16,000 | 11 | 20 |
| | 0.01 | 0.012 | 0.021 | 34,600 | 32,000 | 11 | 20 |

*) The delay time of the ADC is 65 µs for the sample rate 38,400 Hz and 128 µs for the all other sample rates. This value has not been accounted in the “phase delay” column above.

## Classic HBM sample rates : Amplitude response Butterworth filter



## **Specifications** Power pack NTX001

| **30 W AC / DC power pack (1-NTX001)** | | |
|---|---|---|
| **Nominal input voltage (AC)** | V | 100 ... 240 (±10%) |
| **Stand-by power consumption at 230 V** | W | 0.5 |
| **Nominal load**<br>$U_A$<br>$I_A$ | <br>V<br>A | <br>24<br>1.25 |
| **Static output characteristics**<br>$U_A$<br>$I_A$<br>$U_{Br}$ (Output voltage ripple; peak to peak) | <br>V<br>A<br>mV | <br>24± 4%<br>0 - 1.25<br>≤ 120 |
| **Current limiting,** typically from | A | 1.6 |
| **Primary - secondary separation** | | galvanically, by optocoupler and converter |
| **Creep distance and clearance** | mm | ≥ 8 |
| **High-voltage test** | kV | ≥ 4 |
| **Ambient temperature range** | °C [°F] | 0... +40 [+32 ... +104] |
| **Storage temperature** | °C [°F] | -40 ... +70 [-40 ... +158] |

## **Accessories,** to be ordered separately

| **MX840B accessories** | | |
|---|---|---|
| **Article** | **Description** | **Order No.** |
| **Power** | | |
| AC-DC power supply / 30 W | Input : 100 ... 240 V AC (±10%), 1.5 m cable<br>Output: 24 V DC, max. 1.25 A, 2 m cable with ODU connector | 1-NTX001 |
| 3m cable - QuantumX supply | 3 m cable for voltage supply of QuantumX modules;<br>Suitable plug (ODU Medi-Snap<br>S11M08-P04MJGO-5280) on one side and open strands on the other end. | 1-KAB271-3 |
| **Communication** | | |
| Ethernet cable | Ethernet patch cable for direct operation between a PC or Notebook and a module / device, length 2 m, type CAT6A | 1-KAB239-2 |
| IEEE1394b FireWire cable (module-to-module) | FireWire connection cable for QuantumX or SomatXR-modules; with matching plugs on both sides.<br>Length 0.2 m (angled) / 2 m / 5 m<br>Note: The cable enables modules to be supplied with power (max. 1.5 A, from the source to the last drain). | 1-KAB272-W-0.2<br>1-KAB272-2<br>1-KAB272-5 |

## **Accessories,** to be ordered separately (continued)

| **Accessories MX840B** | | |
|---|---|---|
| **Article** | **Description** | **Order No.** |
| **Mechanic** | | |
| Connecting elements for QuantumX modules | Connecting elements (clips) for QuantumX modules; Set comprising 2 case clips including mounting material for fast connection of 2 modules. | 1-CASECLIP |
| Connecting elements for QuantumX modules | Fitting panel for mounting of QuantumX modules using case clips (1-CASECLIP), lashing strap or cable tie. Basic fastening by 4 screws. | 1-CASEFIT |
| QuantumX Backplane (small) | QuantumX Backplane - for a maximum of 5 modules;<br>- Connection of external modules by FireWire possible<br>- Power supply: 24 V DC / max. 3.75 A (90 W) | 1-BPX003 |
| QuantumX Backplane (big) | QuantumX Backplane – for a maximum of 9 modules<br>- Mounting on wall or control cabinet (19”)<br>- Connection of external modules by FireWire possible<br>- Power supply: 24 V DC / max. 5 A (150 W) | 1-BPX001 |
| QuantumX Backplane (Rack) | QuantumX Backplane - Rack for maximum 9 modules<br>- 19'' rack mounting with handles left and right<br>- Connection of external modules via FireWire possible<br>- Power supply: 24 V DC / max. 5 A (150 W) | 1-BPX002 |
| **Transducer side** | | |
| Thermocouple Type K Adapter | Thermo Mini coupling type K adapter at QuantumX input with thermocouple support, integrated cold junction (THERMO-MXBOARD), TEDS, DSubHD-15 device connection | 1-SCM-TCK |
| Thermocouple Type T Adapter | Thermo Mini coupling type T adapter at QuantumX input with thermocouple support, integrated cold junction (THERMO-MXBOARD), TEDS, DSubHD-15 device connection | 1-SCM-TCT |
| Thermocouple Type E Adapter | Thermo Mini coupling type E adapter at QuantumX input with thermocouple support, integrated cold junction (THERMO-MXBOARD), TEDS, DSubHD-15 device connection | 1-SCM-TCE |
| Thermocouple Type J Adapter | Thermo Mini coupling type J adapter at QuantumX input with thermocouple support, integrated cold junction (THERMO-MXBOARD), TEDS, DSubHD-15 device connection | 1-SCM-TCJ |
| Cold junction for thermocouples on MX840, MX840B/MX440B | Electronics for temperature compensation for measurements with thermocouples including:<br>- Pt1000 cold junction<br>- incl. TEDS chip for transducer identification<br>Note: Installation in DSubHD 15-pole transducer plug. | 1-THERMO-MXBOARD |
| 120 ohm strain gauge quarter bridge module | Signal conditioning of strain gauge quarter bridge at QuantumX full bridge input. Integrated 120-ohm completion resistor; soldering points for transducer cable (3 wire); TEDS; D-Sub-HD device connection. | 1-SCM-SG120 |
| 350 ohm strain gauge quarter bridge module | Signal conditioning of strain gauge quarter bridge at QuantumX full bridge input. Integrated 350-ohm completion resistor; soldering points for transducer cable (3 wire); TEDS; D-Sub-HD device connection. | 1-SCM-SG350 |
| 1000 ohm strain gauge quarter bridge module | Signal conditioning of strain gauge quarter bridge at QuantumX full bridge input. Integrated 1000-ohm completion resistor; soldering points for transducer cable (3 wire); TEDS; D-Sub-HD device connection. | 1-SCM-SG1000 |
| High-voltage signal conditioner | High-voltage signal conditioner for differential measurement of voltages up to 300 V CAT II with type MX840, MX840B, MX410 and MX440A QuantumX modules, with DSubHD connector and fixed, 1-m-long measuring leads with 4-mm laboratory plugs. | 1-SCM-HV |
| DSubH 15-pol. to-BNC pole adapter | Adapter for QuantumX, BNC socket to DSubHD 15-pole (pin 14), for connecting 60 V, +/10 V or IEPE / ICP®), provided that the amplifier supports this function | 1-SUBHD15-BNC |
| DSubHD 15-pole connector kit with TEDS chip | DSubHD 15-pole connector kit (male) with TEDS chip for storage of a sensor data sheet; Housing: Metallized plastic with knurled screws. Note: The TEDS chip comes blank. | 1-SUBHD15-MALE |
| TEDS-Package (10 piece) | Package of TESDS chips. Package of 10 1-wire-EEPROM DS24B33 (IEEE 1451.4 TEDS) | 1-TEDS-PAK |
| Port saver, SubHD 15 pol. | 4 x DSubHD 15 pin male to female port savers; protecting the wear and tear for frequent plugging and unplugging. Extends contact durability by min. 500. Adaptor attaches securely with screws 4-40 UNC. | 1-SUBHD15-SAVE |

## **Accessories,** to be ordered separately (continued)

| General accessories | | |
|---|---|---|
| **Article** | **Description** | **Order No.** |
| **Software and product packages** | | |
| catman®AP  | Complete package including catman®Easy functionality plus additional modules such as integration of video cameras (EasyVideoCam), complete post-process analysis (EasyMath), automation of recurring processes (EasyScript), offline preparation of measurement projects (EasyPlan) as well as additional functions such as calculating electrical power, special filters, frequency spectrum, etc. More details at www.hbm.com\catman\ | 1-CATMAN-AP |
| catman®EASY  | The basic software package for measurement data acquisition comprises convenient channel parameterization using TEDS or the sensor database, measurement job parameterization, individual visualization, data storage and reporting. | 1-CATMAN-EASY |
| catman®PostProcess  | Post Process edition for visualization, preparation and analysis of measurement data, including many mathematical functions, data export and reporting. | 1-CATEASY-PROCESS |
| MX840B + catman®EASY | Package including:<br>- amplifier<br>- Power supply (1-NTX001)<br>- 8 transducer plugs with TEDS (1-SUBHD15-MALE)<br>- Ethernet Cross-over cable (1-KAB239-2)<br>- catman®Easy software from HBM (1-CATMAN-EASY)<br>- Including software maintenance for the first 12 months | 1-MX840-PAKEASY |
| MX840B + catman®AP | Package including:<br>- amplifier<br>- Power supply (1-NTX001)<br>- 8 transducer plugs with TEDS (1-SUBHD15-MALE)<br>- Ethernet Cross-over cable (1-KAB239-2)<br>- catman®AP software from HBM (1-CATMAN-AP)<br>- Including software maintenance for the first 12 months | 1-MX840-PAKAP |
| LabVIEW™-driver[1)] | Universal driver from HBM for LabVIEW™. | 1-LabVIEW-DRIVER |
| CANape® driver | QuantumX driver for the software CANape® from Vector Informatik. CANape versions from 10.0 are supported. | 1-CANAPE-DRIVER |

[1)] More drivers and partners at www.hbm.com\quantumX\



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