Data Sheet

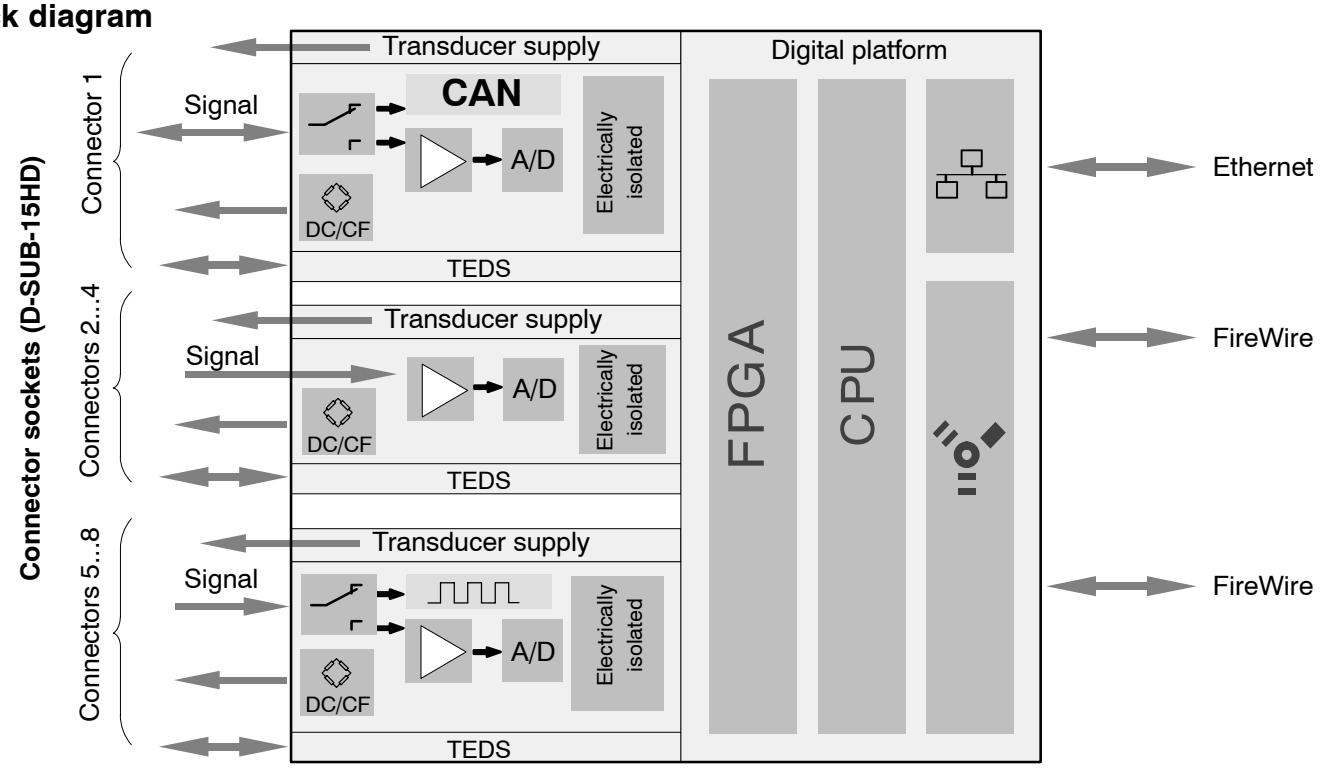
QUANTUMX MX840A

Universal amplifier

Special features

- **8 individually configurable inputs (electrically isolated)**
- **Connection of more than 15 transducers technologies**
- **Data rate: up to 19,200 Hz**
- **24–bit A/D converter per channel for synchronous, parallel measurements**
- **Active low pass filter**
- **TEDS support**
- **CANbus Input/Output**
- **Supply voltage for active transducers (DC): 5 V ... 24 V**
- **External synchronization IRIG–B**

Block diagram



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Specifications MX840A

General specifications		
Inputs	Number	8, electrically isolated from each other and from the supply voltage[1)]
Transducer technologies		Strain gage full and half bridge, inductive full and half bridge, piezoresistive full bridge, potentiometric transducers, three voltage ranges, current; resistance (e. g. PTC, NTC, KTY); resistance thermometer (PT100, PT1000); thermocouples (K, N, E, T, S, ...) with cold junction in the plug (1−THERMO−MXBOARD). Frequency, pulse counting, SSI, incremental rotary encoder (connectors 5−8 only) CAN (ISO 11898; connector 1 only)
A/D converter		24 Bit Delta Sigma converter
Data rate	Hz	0.1 ... 19,200, adjustable for each channel
Active low-pass filter (Bessel/Butterw., can be switched off)	Hz	0.01 ... 3,200 (−3 dB)
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 (CAT-5)
Max. cable length to module	m	100
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 FireWire system (including hubs[2)], backplane)	–	24
Max. number of hops[3)]	–	14
Synchronization options		FireWire (only QuantumX, automatically, recommended)
EtherCAT		via CX27
NTP		via Ethernet
IRIG−B (B000 to B007; B120 to B127)		via MX440A- or MX840A input channel
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]
Rel. humidity	%	5 ... 95 (non condensing)
Protection class		III
Degree of protection		IP20 per EN 60529
Mechanical tests[4)]		
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 6)		
PIN 1, 2, 3, 4, 5, 7, 8, 10, 13, 15	V	5.5 (no transients)
PIN 14 (voltage)	V	60 (no transients)/typ. 500
Dimensions, horizontal (W x H x D)	mm	52.5 x 200 x 124 (with case protection) 44 x 174 x 124 (without case protection)
Weight, approx.	g	980

1) When the variable transducer supply is used, there is no electrical isolation from the supply voltage.

2) Hub: FireWire node or distributor

3) Hop: Transition from module to module or signal conditioning / distribution via FireWire (hub, backplane)

4) 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.

Specifications MX840A (Continued)

5 mV/V CF strain gage full bridge with 1 V or 2.5 V excitation (AC, effective)		
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 gage full bridges
Permissible cable length between MX840A and transducer	m	100
Measuring ranges		
at 2.5 V excitation	mV/V	±5
at 1 V excitation	mV/V	±10
Measurement frequency range (–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	< 0.2
with filter 10 Hz Bessel	µV/V	< 0.5
with filter 100 Hz Bessel	µV/V	< 1
with filter 1 kHz Bessel	µV/V	< 4
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

5 mV/V CF strain gage half bridge with 1 V or 2.5 V excitation (AC, effective)		
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 gage half bridges
Permissible cable length between MX840A and transducer	m	100
Measuring ranges		
at 2.5 V excitation	mV/V	±5
at 1 V excitation	mV/V	±10
Measurement frequency range (–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	< 0.5
with filter 10 Hz Bessel	µV/V	< 0.7
with filter 100 Hz Bessel	µV/V	< 1
with filter 1 kHz Bessel	µV/V	< 4
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 MX840A (Continued)

100 mV/V DC piezoresistive strain gage full bridge with 2.5 V (DC) excitation		
Accuracy class		0.05
Excitation voltage (DC)	V	2.5 ±5%
Transducers that can be connected		piezoresistive strain gage full bridges
Permissible cable length between MX840A and transducer	m	100
Measuring range	mV/V	±100
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Transducer impedance	Ω	300 ... 1,000
Noise at 25 °C (peak to peak)		
with filter 1 Hz Bessel	µV/V	< 4
with filter 10 Hz Bessel	µV/V	< 6
with filter 100 Hz Bessel	µV/V	< 15
with filter 1 kHz Bessel	µV/V	< 80
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

1000 mV/V DC piezoresistive strain gage full bridge with 2.5 V (DC) excitation		
Accuracy class		0.05
Bridge excitation voltage (DC)	V	2.5 ±5%
Transducers that can be connected		piezoresistive strain gage full bridges
Permissible cable length between MX840A and transducer	m	100
Measuring range	mV/V	±1,000
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Transducer impedance	Ω	300 ... 1,000
Noise at 25 °C (peak to peak)		
with filter 1 Hz Bessel	µV/V	< 40
with filter 10 Hz Bessel	µV/V	< 100
with filter 100 Hz Bessel	µV/V	< 200
with filter 1 kHz Bessel	µV/V	< 700
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 MX840A (Continued)

100 mV/V CF inductive full bridge with 1 V or 2.5 V excitation (AC, effective)		
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 MX840A and transducer	m	100
Measuring ranges at 2.5 V excitation at 1 V excitation	 mV/V mV/V	 ±100 ±300
Measurement frequency range (–3 dB)	kHz	0 ... 1.6
Transducer impedance at 2.5 V excitation at 1 V excitation	 Ω Ω	 300 ... 1,000 80 ... 1,000
Noise at 25 °C and 2.5 V excitation (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV/V µV/V µV/V µV/V	 < 3 < 5 < 15 < 50
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

1000 mV/V CF inductive full bridge with 1 V excitation (AC, effective)		
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 MX840A and transducer	m	100
Measuring range	mV/V	±1,000
Measurement frequency range (–3 dB)	kHz	0 ... 1.6
Transducer impedance	Ω	80 ... 1000
Noise at 25 °C (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV/V µV/V µV/V µV/V	 < 40 < 100 < 500 < 1,200
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 MX840A (Continued)

100 mV/V CF inductive half bridge with 1 V or 2.5 V excitation (AC, effective)		
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 MX840A and transducer	m	100
Measuring ranges at 2.5 V excitation at 1 V excitation	 mV/V mV/V	 ±100 ±300
Measurement frequency range (–3 dB)	kHz	0 ... 1.6
Transducer impedance at 2.5 V excitation at 1 V excitation	 Ω Ω	 300 ... 1,000 80 ... 1,000
Noise at 25 °C and 2.5 V excitation (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV/V µV/V µV/V µV/V	 < 3 < 5 < 15 < 50
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		
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 MX840A and transducer	m	100
Measuring range	mV/V	±3,000
Measurement frequency range (–3 dB)	kHz	0 ... 1.6
Transducer impedance	mH	4 ... 33
Noise at 25 °C (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV/V µV/V µV/V µV/V	 < 40 < 100 < 500 < 1,200
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

Specifications MX840A (Continued)

Potentiometric transducer		
Accuracy class		0.1
Excitation voltage (DC)	V	2.5 (±5 %)
Transducers that can be connected		potentiometric transducers
Permissible cable length between MX840A and transducer	m	100
Measuring range	mV/V	±500
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Transducer impedance	Ω	300 ... 5,000
Noise at 25 °C (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV/V µV/V µV/V µV/V	 < 40 < 100 < 200 < 700
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

10 V DC voltage		
Accuracy class		0.05
Transducers that can be connected		voltage generator up to ±10 V
Permissible cable length between MX840A and transducer	m	100
Measuring range	V	±10
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Internal resistance of the voltage source	Ω	< 500
Internal impedance, typ.	MΩ	1
Noise at 25 °C (peak to peak) with filter 1 Hz Bessel with filter 10 Hz Bessel with filter 100 Hz Bessel with filter 1 kHz Bessel	 µV µV µV µV	 < 150 < 300 < 600 < 3,000
Linearity error	%	< 0.02 of full scale
Common-mode rejection with DC common mode with 50 Hz common mode, typ.	 dB dB	 > 100 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

Specifications MX840A (Continued)

60 V DC voltage		
Accuracy class		0.05
Transducers that can be connected		voltage generator up to ±60 V
Permissible cable length between MX840A and transducer	m	100
Measuring range	V	±60
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Internal resistance of the voltage source	Ω	< 500
Input impedance, typ.	MΩ	1
Noise at 25 °C (peak to peak)		
with filter 1Hz Bessel	µV	< 150
with filter 10Hz Bessel	µV	< 300
with filter 100Hz Bessel	µV	< 600
with filter 1kHz Bessel	µV	< 3,000
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	±60
Zero drift	% / 10 K	< 0.02 of full scale
Full-scale drift	% / 10 K	< 0.05 of measurement value

100 mV DC voltage		
Accuracy class		0.05
Transducers that can be connected		voltage generator
Permissible cable length between MX840A and transducer	m	100
Measuring range	mV	±300
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Input impedance	MΩ	> 20
Noise at 25 °C (peak to peak)		
with filter 1 Hz Bessel	µV	< 5
with filter 10 Hz Bessel	µV	< 100
with filter 100 Hz Bessel	µV	< 1,000
with filter 1 kHz Bessel	µV	< 1,500
Linearity error	%	< 0.02 of full scale
Common-mode rejection		
with DC common mode	dB	> 90
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

Specifications MX840A (Continued)

20 mA DC 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 MX840A and transducer	m	100
Measuring range	mA	±30
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
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

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 MX840A and transducer	m	100
Measuring ranges	Ω	0 ... 5,000
Speisestrom	mA	0.4 ... 0.8
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
Noise at 25 °C (peak to peak)		
with filter 1 Hz Bessel	K	< 0.5
with filter 10 Hz Bessel	K	< 1
with filter 100 Hz Bessel	K	< 2
with filter 1 kHz Bessel	K	< 6
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, PT1000)		
Accuracy class		0.1
Transducers that can be connected		PT100, PT1000 (connection with 4 wire configuration)
Permissible cable length between MX840A and transducer	m	100
Linearization range	°C [°F]	–200 ... +848 [–328 ... +1558.4]
Measurement frequency range (–3 dB)	kHz	0 ... 3.2
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	K / 10 K	<0.2
with PT1000	K / 10 K	<0.1
Full-scale drift		
with PT100	K / 10 K	<0.5
with PT1000	K / 10 K	<1

Specifications MX840A (Continued)

Thermocouples[5]		
Transducers that can be connected		Thermocouples (type B, E, J, K, N, R, S, T)
Permissible cable length between MX840A 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 E (Ni-Cr and Cu-Ni)	°C [°F]	−200 ... +900 [−328 ... +1,652]
Type J (Fe and Cu-Ni)	°C [°F]	−210 ... +1,200 [−346 ... +2,192]
Type K (Ni-Cr and Ni-Al)	°C [°F]	−270 ... +1,372 [−454 ... +2,501.6]
Type N (Ni-14,2 % Cr and Ni-4,4 % Si-0,1 % Mg)	°C [°F]	−270 ... +1,300 [−454 ... +2,372]
Type R (Pt-13 % Rh and Pt)	°C [°F]	−50 ... +1,768 [−58 ... +3214.4]
Type S (Pt-10 % Rh and Pt)	°C [°F]	−50 ... +1,768 [−58 ... +3214.4]
Type T (Cu and Cu-Ni)	°C [°F]	−270 ... +400 [−454 ... +752]
Transducer impedance	Ω	< 500
Measurement frequency range (−3 dB)	kHz	0 ... 3.2
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	K	±1
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]

[5] The external cold junction is required for connecting thermocouples to the MX840A (Order no.: 1−THERMO−MXBOARD).

Specifications MX840A (Continued)

Frequency or pulse counting (connections 5 ... 8)		
Accuracy class		0.01
Transducers that can be connected		HBM-torque transducers, Frequency signal sources (square), incremental encoder, pulse counters, SSI transducers
Permissible cable length between MX840A and transducer	m	50
Signals F_1 (±) F_2 (±) Zero index (±)		 Frequency or pulse signal Direction of rotation signal shifted by ±90° to F_1 Zero position signal
Input level with differential operation Low level High level		 Differential inputs (RS422): Signal (+) < Signal (–) –200 mV Differential inputs (RS422): Signal (+) > Signal (–) +200 mV
Input level with unipolar operation Low level High level	 V V	 <1.5 > 3.5
Maximum input voltage at transducer socket to ground (pin 6)	V	5.5 (no transients)
Measuring ranges Frequency Pulse counting	 Hz pulses/s	 0.1 ... 1,000,000 0 ... 1,000,000
Input impedance, typ.	kΩ	10
Temperature drift	%/10K	< 0,01 of measurement value
SSI mode (differentially) Shift clock Word length Code Input level Low level High level Signals Data Shift clock	 kHz Bit	 100, 200, 500, 1,000 12–31 dual or gray Differential inputs (RS422): Signal (+) < Signal (–) –200 mV Differential inputs (RS422): Signal (+) > Signal (–) +200 mV Data+, Data– (RS-422) Clk+, Clk– (RS-422)

Digital control output (Triggering shunt calibration, reset of external charge amplifiers)		
Output type		open collector
Reference potential		Pin 6 (ground)
High level Output unloaded, typ. I_{out} = 5 mA	 V V	 5 > 4.5
Permissible load impedance	kΩ	> 1

CAN (connection 1/read only)		
Supported protocols		CAN 2.0A, CAN 2.0B
Number of CAN ports		only connection 1
Bus link		two wire, according to ISO11898
Baud rates and permissible cable lengths	kBit/s m	1000, 500, 250, 125, 100 25, 100, 250, 500, 600
Formats		Motorola, Intel
Receiving Sampling rate Number of CAN signals CAN signal types	signals/s	 max. 10,000 ≤ 128 standard, mode-dependent, mode-Signal
Transmitting Data rate (max.) Number of CAN signals (module–internal only) Generate dbc file (Assistant)	Hz	 100 per signal 8

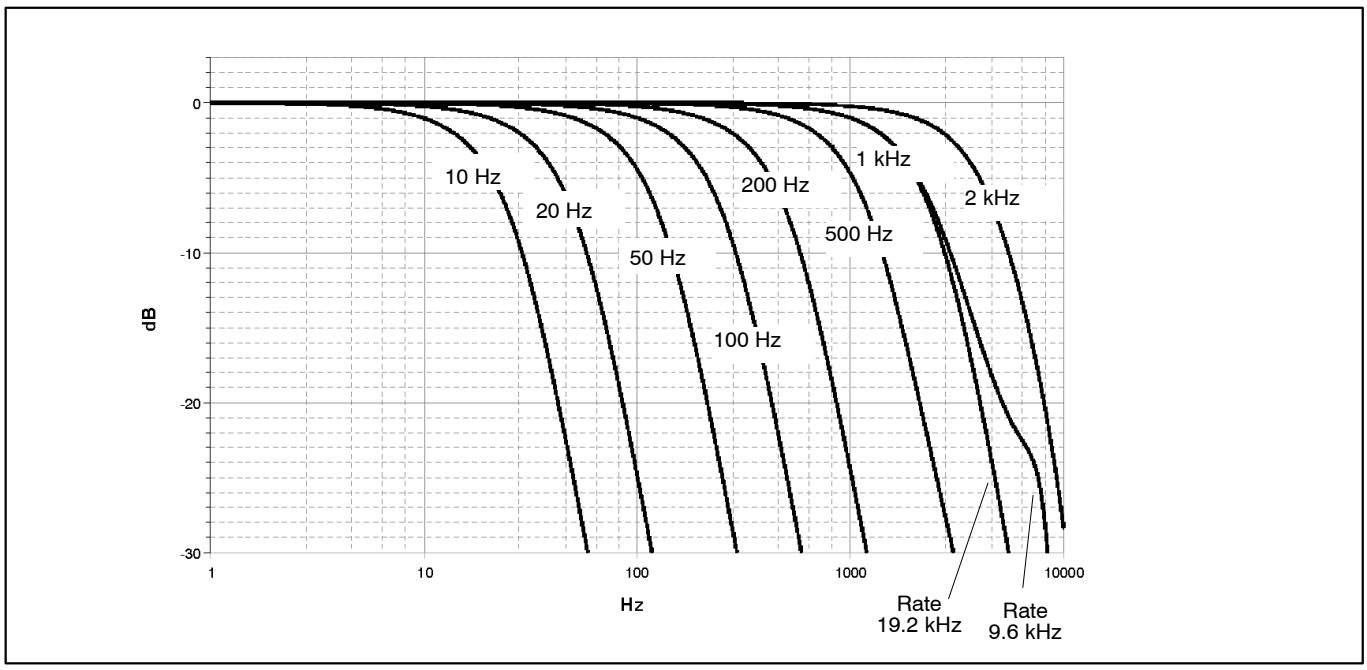
Active low pass filter data MX840A

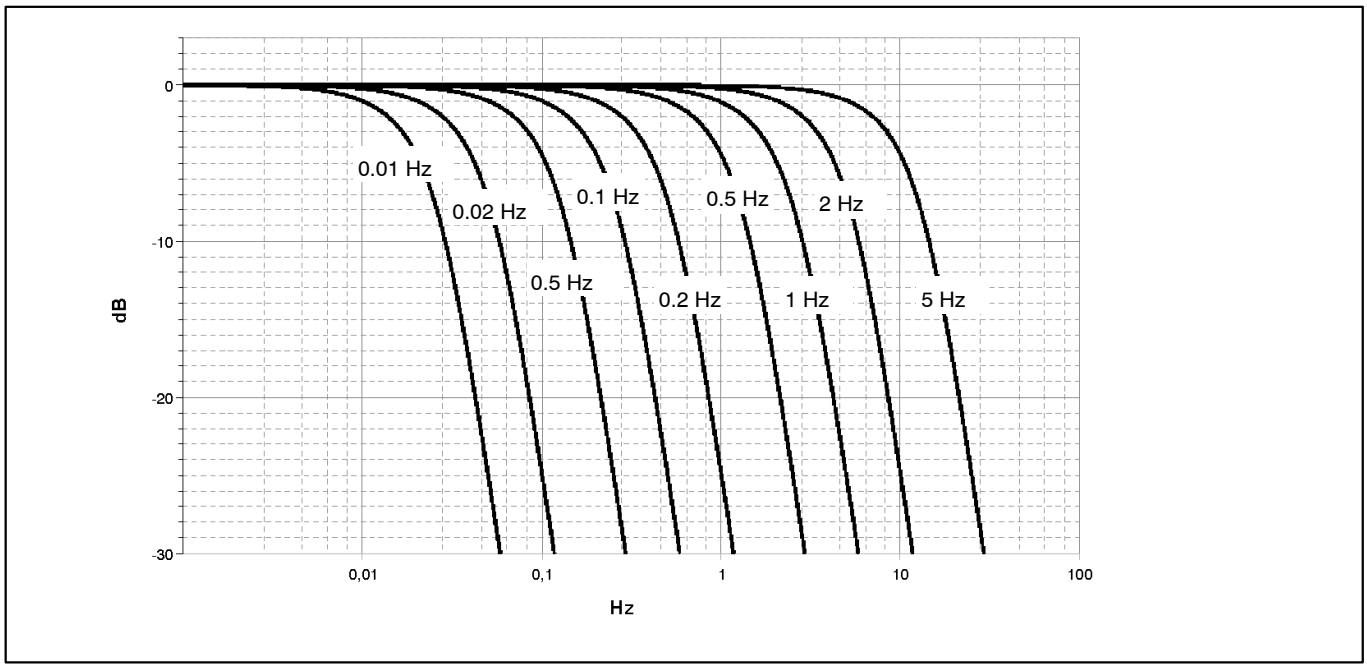
(4th order Bessel/Butterworth)

Type	–1dB (Hz)	–3dB (Hz)	–20dB (Hz)	Phase delay (ms)*)	Rise time (ms)	Overshoot (%)	Data rate (Hz)
Bessel	2000	3210	8100	0.15	0.1	1.5	19200
	1000	1630	4050	0.24	0.2	1.4	19200
	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	10000	10600	0.8	20
	0.01	0.017	0.042	20100	21300	0.8	20
Butterworth	2000	2360	4331	0.2	0.15	11	19200
	1000	1178	2100	0.38	0.3	11	19200
	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	17500	16000	11	20
	0.01	0.012	0.021	34600	32000	11	20

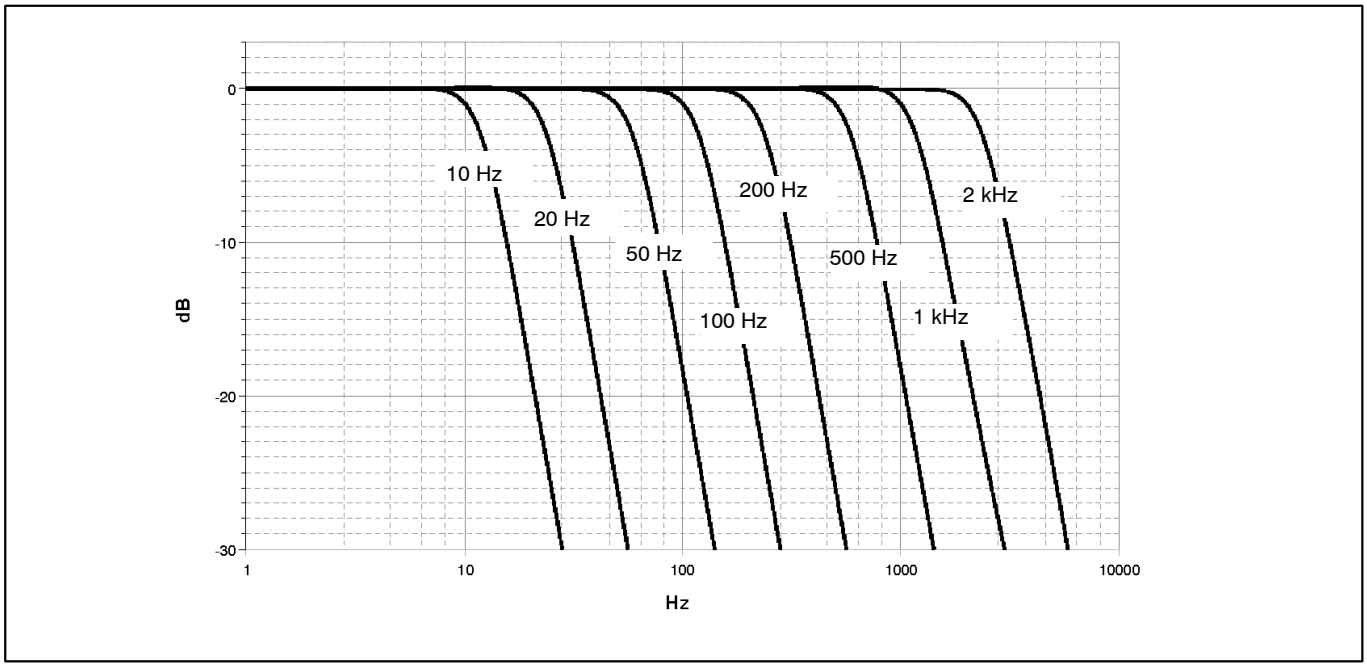
*) The analog-to-digital converter's delay time is 128 µs for all data rates and has not been accounted for in the "Phase delay" column!

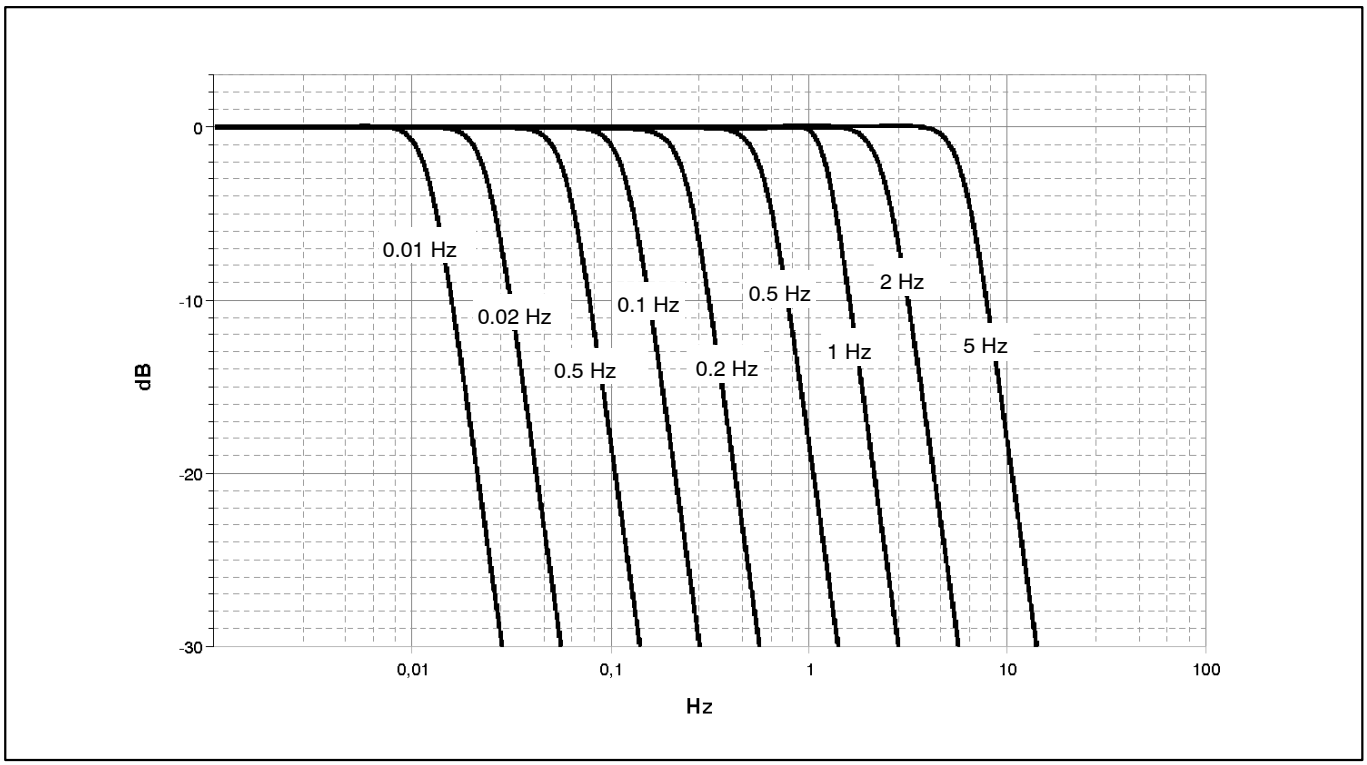
Amplitude response of MX840A Bessel filter





Amplitude response of MX840A Butterworth filter





Specifications Power pack NTX001

NTX001		
Nominal input voltage (AC)	V	100 ... 240 (±10%)
Stand-by power consumption at 230 V	W	0.5
Nominal load U_A I_A	 V A	 24 1.25
Static output characteristics U_A I_A U_{Br} (Output voltage ripple; peak to peak)	 V A mV	 24 ± 4% 0 – 1.25 ≤ 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]

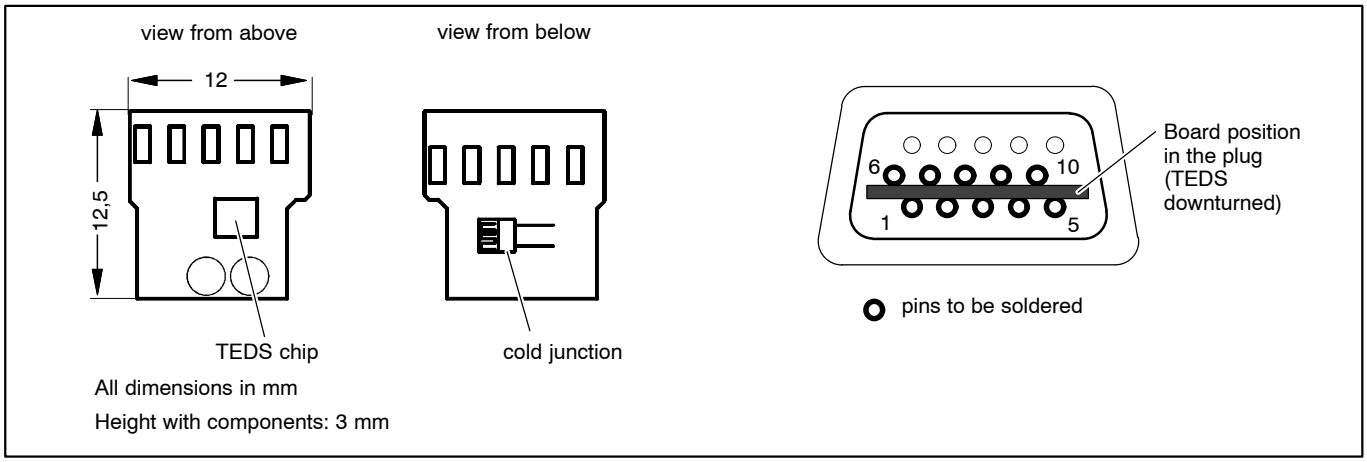
Accessories, to be ordered separately

Accessories MX840A		
Article	**Description**	**Order No.**
Cold junction for thermocouples on MX840, MX840A, MX440A	Electronics for temperature compensation for measurements with thermocouples including: – PT1000 cold junction – incl. TEDS chip for transducer identification Note: Installation in DSubHD 15-pole transducer plug.	1–THERMO–MXBOARD
DSubHD 15 pole-to-DSub 15 pole adapter	DSubHD 15 pole-to-DSub 15 pole adapter for connection of transducers with pre-wired DSub plug (length approx. 0.3 m); Note: Pre-wired for full bridge (6-wire).	1–KAB416
DSubHD15-to-DSub9 (CAN) adapter	Adapter for connection of CAN instruments. DSubHD 15-pole (plug) to DSub 9-pole (socket); Length: approx. 0.3 m.	1–KAB418

Accessories, to be ordered separately

General accessories		
Article	**Description**	**Order No.**
AC-DC power supply / 24 V	Input : 100 ... 240 V AC (±10%), 1.5 m cable 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; Suitable plug (ODU Medi-Snap S11M08-P04MJGO-5280) on one side and open strands on the other end.	1-KAB271-3
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: Metallised plastic with knurled screws. Note: The TEDS chip comes blank.	1-SUBHD15-MALE
Ethernet cross over cable	Ethernet cross over cable for direct operation between a PC or Notebook and a modul / device, length 2 m, type CAT5+	1-KAB239-2
FireWire cable PC-to-module	Firewire connection cable from the PC to the first module for data transfer from QuantumX modules to the PC; With matching plugs on both sides; Length: 3 m.	1-KAB270-3
FireWire cable (module-to-module)	FireWire connection cable for QuantumX modules; with matching plugs on both sides. Lengths 0.2 m/2 m/5 m Note: The cable enables QuantumX modules to be supplied with voltage (max. 1.5 A, from the source to the last drain).	1-KAB269-0.2 1-KAB269-2 1-KAB269-5
FireWire IEEE PC-Card	FireWire IEEE 1394b PC-Card (PCMCIA adapter) to connext QuantumX modules to a Notebook or a PC	1-IF001
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

Cold junction 1-THERMO-MXBOARD



All dimensions in mm

Height with components: 3 mm

Hottinger Baldwin Messtechnik GmbH

Im Tiefen See 45 · 64293 Darmstadt · Germany
Tel. +49 6151 803-0 · Fax: +49 6151 803-9100
Email: info@hbm.com · www.hbm.com

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