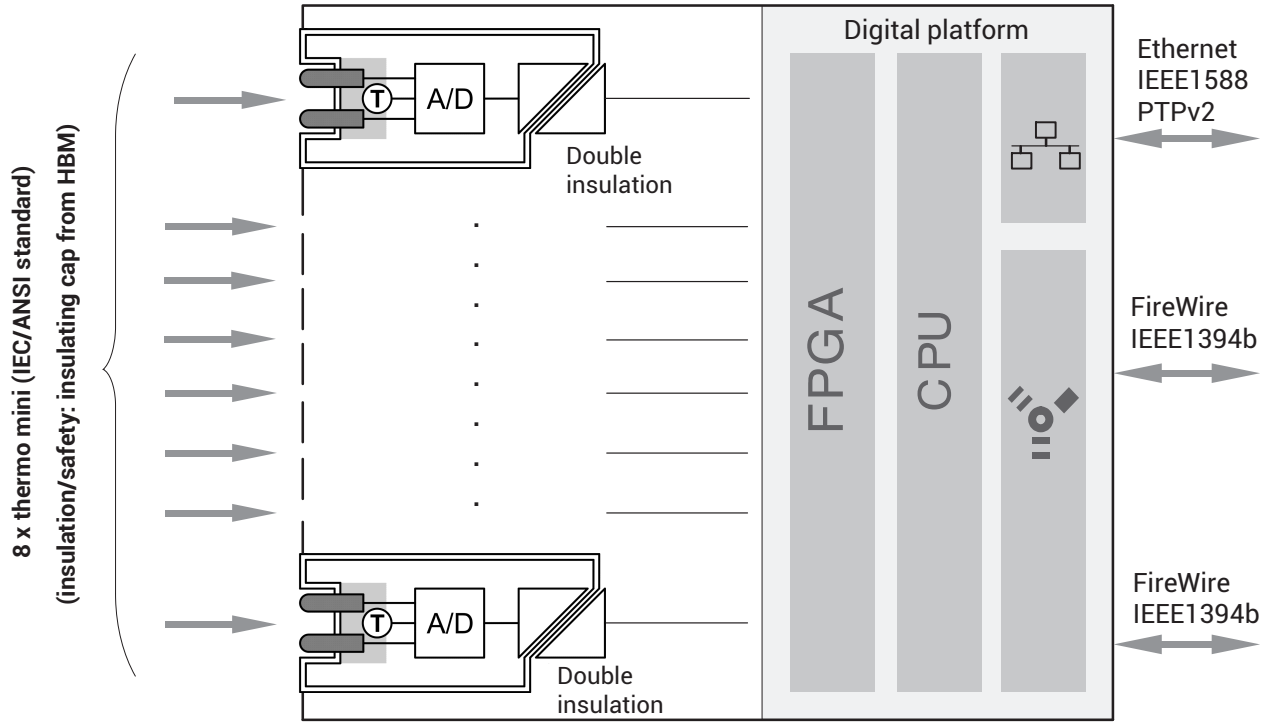
DATA SHEET

QuantumX MX809B
Measuring amplifier for thermocouples and voltages (insulated)

SPECIAL FEATURES

- 8 individually configurable inputs, thermocouple types K, J, T, B, E, N, R, S, C or voltages up to 5 V
- Insulation up to 1000 V (additional transients up to 2500 V)
- Measurement categories: 600 V CAT II, 300 V CAT III
- VDE-certified safety
- Innovative connectors based on standard thermo mini insulating caps (safe to touch)
- Internal cold junction for each connection
- Portable and suitable for the test bench

BLOCK DIAGRAM



SPECIFICATIONS FOR MX809B

General specifications		
Certification		VDE, ID no. 40044716
Inputs		8, electrically isolated from each other, from the supply and from the data link
Insulation as per EN 60664 (channels from one another, from housing, from supply, from digital backend)		
Max. RMS value of working voltage[2] AC or DC	V	1000
Max. peak value of working voltage[2]	V	1414
Max. additional temporary overvoltage	V	0
Max. additional transient overvoltage	V	2500
Min. loop impedance	mΩ	100
Insulation per EN 61010 (channels from one another, from housing, from supply, from digital backend)		
Measurement categories		CAT II / CAT III
Max. RMS value of working voltage[2] AC or DC	V	600 / 300
Max. peak value of working voltage[2]	V	848 / 424
Transducer technologies per connector		
Device side		Mini thermocouple plugs
Line side		Mini thermocouple connectors, safe to touch as per EN 60664 in conjunction with the HBM thermo mini insulating cap system **Not included with the 1-MX809B!**
A/D conversion per channel		24-bit delta-sigma converter
Sampling rates (domain can be set via the software, factory setting is "HBM Classic")	S/s	Decimal: 0.2 … 600 HBM Classic: 0.1 … 600
Active low-pass filter	Hz	Bessel, Butterworth, 0.01 ... 20 (-3 dB), filter OFF
Nominal (rated) voltage (DC) (SELV in accordance with EC / EN / DIN EN 60950-1[3])	V	10 … 30
Permissible supply voltage interruption, max.	ms	5, for 24 V DC
Supply voltage range	V	9 … 33
Power consumption (MX809B module only, no additional modules supplied)	W	< 6
Current consumption, max.	A	5
Ethernet (data link)		10Base-T/100Base-TX
Protocol/addressing	-	TCP/IP (static IP/DHCP, IPv4/IPv6)
Plug connection	-	8P8C connector (RJ-45) with twisted-pair cable, streaming (Cat 5)
Max. cable length to module	m	100
FireWire (module synchronization, data link, optional power supply)		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 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[4], backplane)	-	24
Max. number of hops[5]	-	14

General specifications		
Synchronization options FireWire Ethernet EtherCAT®[1] IRIG-B (B000 to B007; B120 to B127)		 IEEE1394b (2 per device) IEEE1588 (PTPv2) or NTP via CX27 EtherCAT gateway IRIG-B (B000 to B007; B120 to B127) via MX440B/MX840B measurement channel
Nominal (rated) temperature range	°C	-20 … +65
Storage temperature range	°C	-40 … +75
Relative humidity	%	≤ 80 (at 31 °C, with linear decrease to 50% at 40 °C)
Max. operating altitude acc. to EN 61010	m	2000
Degree of protection acc. to EN 60529		IP20
EMC requirements		per EN 61326
Contamination level		2
Mechanical tests[6] **(transport tests)** Vibration (30 min) Shock (6 ms)	 m/s^2 m/s^2	 50 350
Housing		QuantumX, metal
Application position		as required
Dimensions, without leads (H x W x D)	mm	53 x 200 x 128 (with case protection) 44 x 174 x 119 (without case protection)
Weight, approx.	g	1000

1) EtherCAT® is a registered brand and patented technology, licensed by Beckhoff Automation GmbH, Germany.
2) Voltage applied over insulation
3) The DC voltage supply must meet the requirements of IEC 60950-1 on a SELV voltage supply. If necessary, the supply voltage must be protected by an adequate DC fuse (e.g. LITTELFUSE KLKD 6, LFPHV001).
4) Hub: FireWire node or distributor
5) Hop: Transition from module to module/signal conditioning
6) Mechanical stress is tested in accordance with European standards EN60068-2-6 for vibration and EN60068-2-27 for shock. The devices are exposed to an acceleration of 50 m/s^2 within the frequency range 5...65 Hz in all 3 axes. Duration of this vibration test: 30 minutes per axis. The shock test is implemented at a nominal acceleration of 350 m/s^2 for a duration of 6 ms, half sine and with shocks in each of the six possible directions.

Thermocouple		
Transducers that can be connected		Thermocouples (types B, C, E, J, K, N, R, S, T)
Max. permissible line length between MX809B and transducer	m	30
Linearization ranges Type B (Pt-30 % Rh and Pt-6 % Rh) Type C (W and W-26 % Re) Type E (Ni-Cr and Cu-Ni) Type J (Fe and Cu-Ni) Type K (Ni-Cr and Ni-Al) Type N (Ni-14.2 % Cr and Ni-4,4 % Si-0.1 % Mg) Type R (Pt-13 % Rh and Pt) Type S (Pt-10 % Rh and Pt) Type T (Cu and Cu-Ni)	 °C °C °C °C °C °C °C °C °C	 +100 ... +1820 0 ... +2300 -200 ... +900 -200 ... +1200 -100 ... +1300 -270 ... +1300 -50 ... +1768 -50 ... +1768 -100 ... +400
Transducer impedance	Ω	< 500
Signal bandwidth (-3 dB)	Hz	55
Type K noise (peak-to-peak) With 1 Hz Bessel filter	K	0.2

Total error limit at 22ºC ambient temperature Types E, J, K, N, T, C Types R, S Type B	 K K K	 ±1 ±4 ±15
Temperature drift (type K)	K/10K	<±0.4
Optional rescaling of temperature data Max. no. of value pairs in the MX809B		 64
Electric voltage ±5 V		
Accuracy class		0.02
Transducers that can be connected		Voltage sources up to ±5 V
Measuring range	V	±5
Allowed input voltage	V	±15
Max. permissible line length between MX809B and measurement location	m	30
Signal bandwidth (-3 dB)	Hz	0 ... 55
Internal resistance of voltage source	Ω	< 500
Typical input impedance	MΩ	> 2.5
Noise at 25 °C (peak-to-peak) With 1 Hz Bessel filter With 10 Hz Bessel filter With filter OFF, 1000 S/s	 mV mV mV	 < 0.1 < 0.2 < 0.3
Non-linearity	%	< 0.02 of full scale value
Common mode rejection for UCM_RMS 707V, 80 Hz	dB	> 100
Zero drift	%/10 K	< 0.01 of full scale value
Full-scale drift	%/10 K	< 0.02 of measured value

ACCESSORIES, TO BE ORDERED SEPARATELY

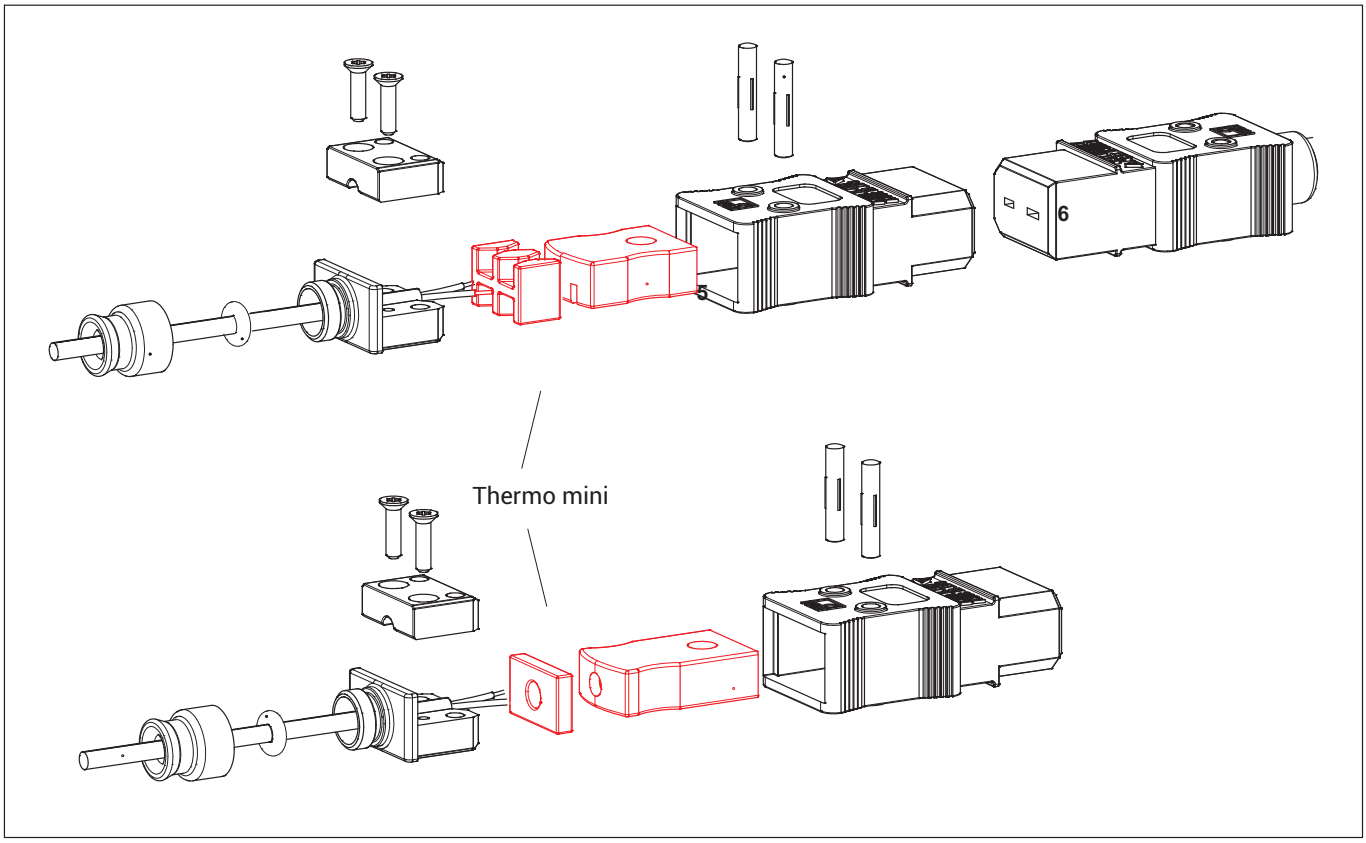
Article	Description	Ordering number
Power supply		
AC/DC power pack / 24 V	Input: 100 ... 240 V AC (±10%), 1.5 m cable Output: 24 V DC, max. 1.25 A, 2 m cable with ODU male connector	1-NTX001
3 m cable – QuantumX supply	3 m cable for supplying power to QuantumX modules; matching connector (ODU Medi-Snap S11M08-P04MJGO-5280) at one end and exposed wires at the other.	1-KAB271-3
Mechanical		
Connecting elements for QuantumX modules	Connecting elements (clips) for QuantumX modules; set comprising 2 connecting elements and including assembly material for fast connection of 2 modules.	1-CASECLIP
Connecting elements for QuantumX modules	Mounting plate for installing QuantumX modules using connecting elements (1-CASECLIP), lashing strap or cable ties. Basic fastening by 4 screws	1-CASEFIT
QuantumX backplane (large)	QuantumX backplane for a maximum of 9 modules - Wall or control cabinet installation (19") - External modules can be connected via FireWire - Power supply 18 … 30 V DC / max. 5 A (150 W)	1-BPX001
QuantumX backplane (rack)	QuantumX backplane – rack for a maximum of 9 modules; - 19'' control cabinet installation with left and right handles - External modules can be connected via FireWire - Power supply: 18 … 30 V DC/max. 5 A (150 W)	1-BPX002

Article	Description	Ordering number
QuantumX backplane (small)	QuantumX backplane for a maximum of 5 modules - External modules can be connected via FireWire - Power supply 11 … 30 V DC / max. 5 A (90 W)	1-BPX003
Transducer-side		
Thermocouple type K, immediately ready for use	Thermocouple type K for temperature measurement, immediately ready for use. Spot-welded thermocouple, stranded wire green/white, double insulation, sheath color: orange/green, length 3 m, visible thermo mini connector green, insulating cap for protection against dangerous electrical potential.	1-ITC-K1000
Insulating caps for thermo mini	Kit with a total of 4 insulating caps (ISO caps) for self-assembly and integration of thermo mini connectors for connecting thermocouples or signal leads for the measurement of voltage up to 5 V (copper connector) with QuantumX MX809B. One kit contains 4 transparent insulating caps, spacers for long and short connectors, twist nipples for strain relief, kink protection, PT screws and grooved pins.	1-CON-A1018
Thermo mini connector type K	4 x thermo mini connector for connecting type K thermocouples (NiCr-NiAl, green)	1-CON-S1016
Thermo lead type K	Thermo lead type K, IEC584 Class 1, 2 x 0.6 mm, double insulated: 1000 V / 600 V CAT II / 300 V CAT III, VDE-certified, outside diameter: 3 mm, sheath color: orange/green, 180 °C, free line length	4-3301.0233
Thermo mini connector for voltage measurement	4 x thermo mini connector for voltage measurement (copper-copper, white)	1-CON-S1017
Measurement lead, copper	Measurement lead, copper, 2 x 0.6 mm, double insulated: 1000 V / 600 V CAT II / 300 V CAT III, VDE-certified, outside diameter: 3 mm, sheath color: orange/white, 180 °C, free line length	4-3301.0234
Communication		
Ethernet cable	Ethernet cable for direct operation of devices on a PC or notebook, length 2 m, type CAT5+	1-KAB239-2
FireWire cable (module-to-module)	FireWire connection cable between QuantumX modules; fitted with matching plugs on both ends. Lengths 0.2 m/2 m/5 m. Note: Voltage can also be supplied to the QuantumX modules via the cable (max. 1.5 A, from source to last acceptor).	1-KAB272-W-0.2 1-KAB272-2 1-KAB272-5
Software and product packages		
catman®AP	All-inclusive package, comprising catman®Easy functionality plus add-on modules such as video camera integration (EasyVideoCam), full post-process analysis (EasyMath), automation of recurring activities (EasyScript), offline preparation of measurement projects (EasyPlan), and additional functions such as electrical power calculation, special filters, frequency spectrum, and a great deal more. Details at www.hbm.-com/catman/	1-CATMAN-AP
catman®EASY	This basic software package for data acquisition includes simple channel parameterization using TEDS or the sensor database, measurement job parameterization, individual visualization, data storage and reporting.	1-CATMAN-EASY
catman®PostProcess	PostProcess edition for visualization, analysis and processing of measurement data with many different mathematical functions, data export and reporting.	1-CATEASY-PROCESS

Article	Description	Ordering number
LabVIEW™ driver[1)]	Universal driver from HBM for LabVIEW™.	1-LabVIEW-DRIVER
DIAdem® driver	QuantumX device driver for DIAdem® software from National Instruments. German user interface.	1-DIADEM-DRIVER
CANape® driver	QuantumX device driver for CANape® software from Vector Informatik. CANape version 10.0 and higher are supported.	1-CANAPE-DRIVER

1) Further drivers and partners at www.hbm.com/quantumx/

ASSEMBLY DIAGRAM OF THERMO MINI INSULATING CAP (1-CON-A1018)



B04332 05 E00 01 01.06.2022

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