

QUANTUM^X

MX809B

Amplifier for thermocouples
and voltages (insulated)

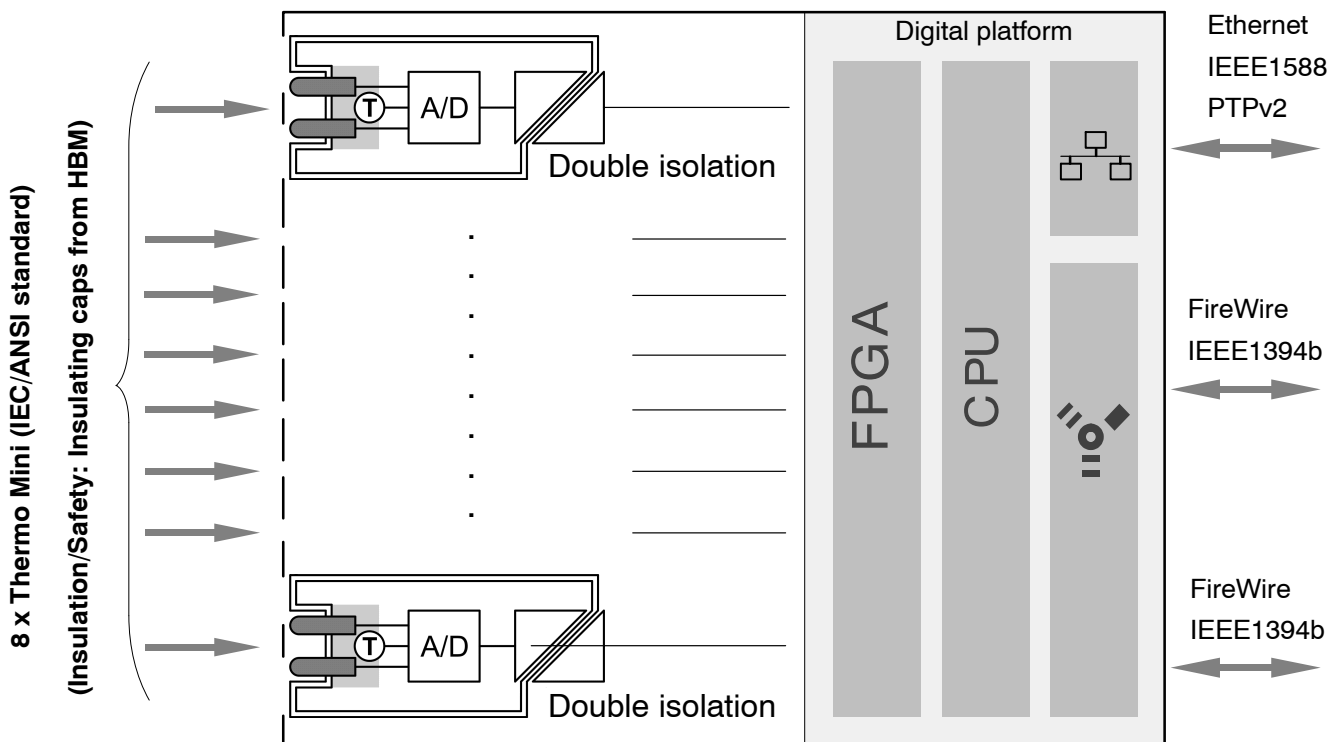
Special features

- 8 individually configurable inputs, thermocouples of types K, J, T, B, E, N, R, S, C or electrical 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-tested safety
- Innovative connectors based on standard Thermo Mini (safe to touch)
- Internal cold junctions for each connector
- Mobile and test bench use


Data sheet



Block diagram



Specifications MX809B

General specifications		
Certification		VDE, Certificate No. 40044716 
Inputs		8, electrically isolated from each other, from the supply and from the data link
Isolation per EN 60664 (channels from one another, from housing, from supply, from digital backend) Max. RMS value of working voltage ¹⁾ AC or DC Max. peak value of working voltage ¹⁾ Max. additional temporary overvoltage Max. additional transient overvoltage Min. loop impedance	V V V V mΩ	1000 1414 0 2500 100
Isolation per EN 61010 (channels from one another, from housing, from supply, from digital backend) Measurement categories Max. RMS value of working voltage ¹⁾ AC or DC Max. peak value of working voltage ¹⁾	V V	CAT II / CAT III 600 / 300 848 / 424
Transducer technologies per connector Device side Line side		Mini thermocouple plugs Mini thermocouple couplings, in conjunction with the HBM Thermo mini insulating cap connector system, safe to touch as per EN 60664 Not included in the scope of supply of the 1-MX809B !
A/D conversion per channel		24-bit delta-sigma converter
Sample rates (Domain adjustable by 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
Supply voltage range (DC) (SELV in accordance with IEC / EN / DIN EN 60950-1 ²⁾)	V	10 ... 30
Permissible supply voltage interruption, max.	ms	5, for 24 V DC
Supply voltage fluctuation, max.	V	9 ... 33
Power consumption (MX809B module only, no other modules also supplied)	W	<6
Current consumption, max.	A	5
Ethernet (data link) Protocol/Addressing Connection Max. cable length to module	- - m	10Base-T / 100Base-TX TCP/IP/direct IP address or DHCP 8P8C plug (RJ-45) with twisted pair cable (CAT-5) 100
FireWire (module synchronization, data link, optional supply voltage) Baud rate Max. current from module to module Max. cable length between the nodes Max. number of modules connected in series (daisy chain) Max. number of modules in a FireWire system (including hubs ³⁾ , backplane) Max. number of hops ⁴⁾	MBaud A m - - -	IEEE 1394b (HBM modules only) 400 (approx. 50 MByte/s) 1.5 5 12 (=11 Hops) 24 14
Synchronization Firewire Ethernet EtherCAT ^{®5)} IRIG-B		IEEE1394b (2 ports per device) IEEE1588 (PTPv2) or NTP via CX27 EtherCAT Gateway module IRIG-B (B000 up to B007; B120 up to B127) via MX440B / MX 840B input channel
Nominal temperature range	°C	-20 ... +65
Storage temperature range	°C	-40 ... +75
Relative humidity	%	≤ 80 (at 31°C, decreasing linearly to 50% at 40°C)

¹⁾ Voltage applied over isolation

²⁾ 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).

³⁾ Hub: IEEE1394b FireWire node or distributor

⁴⁾ Hop: Transition from module to module or signal conditioning / distribution via IEEE1394b FireWire (hub, backplane)

⁵⁾ EtherCAT[®] is a registered brand and patented technology, licensed by Beckhoff Automation GmbH, Germany

Specifications MX809B (continued)

Degree of pollution		2
Operating altitude max. per EN 61010	m	2000
Degree of protection , per EN 60529		IP20
EMC requirements		per EN 61326
Mechanical tests⁶⁾ (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 mm	53 x 200 x 128 (with case protection) 44 x 174 x 119 (without case protection)
Weight, approx.	g	1000

⁶⁾ 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/s² 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/s² for 6 ms, half sine pulse shape, with 3 shocks in each of the 6 possible directions.

Thermocouple		
Transducers that can be connected		Thermocouples (types B, C, E, J, K, N, R, S, T)
Permissible line lengths between MX809B and transducer, max.	m	30
Linearization ranges Type B (Pt-30 % Rh and Pt-6 % Rh) Type C (W und 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 [°F] °C [°F] °C [°F] °C [°F] °C [°F] °C [°F] °C [°F] °C [°F] °C [°F]	+100 ... +1820 [212 ... 3308] 0 ... +2300 [32 ... 4172] -200 ... +900 [-328 ... 1652] -200 ... +1200 [-328 ... 2192] -100 ... +1300 [-148 ... 2372] -270 ... +1300 [-454 ... 2372] -50 ... +1768 [-58 ... 3214] -50 ... +1768 [-58 ... 3214] -270 ... +400 [-454 ... 752]
Transducer impedance	Ω	< 500
Signal bandwidth (-3 dB)	Hz	55
Noise type K (peak-to-peak) with 1 Hz Bessel filter	K	0.2
Total error limit at 22°C 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/10 K	< ± 0.4
Optional post-scaling of the temperature values Number of pairs of values in the MX1609KB, max.		64

Specifications MX809B (continued)




Electric voltage ± 5 V		
Accuracy class		0.02
Transducers that can be connected		Voltage sources up to ± 5 V
Measurement range	V	± 5
Permissible input voltage	V	± 15
Permissible cable length between MX809B and measurement location, max.	m	30
Measurement frequency range (-3 dB)	Hz	0 ... 55
Internal resistance of voltage source	Ω	< 500
Input impedance, typical	M Ω	> 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

MX809B accessories		
Article	Description	Ordering no.
Voltage supply		
AC/DC power supply / 24 V	Input: 100 ... 240 V AC ($\pm 10\%$), 1.5 m cable Output: 24 V DC, max. 1.25 A, 2 m cable with ODU plug	1-NTX001
3 m cable – QuantumX supply	3 m cable for voltage supply of QuantumX modules; suitable plug (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 (standard)	QuantumX backplane for a maximum of 9 modules – Wall or control cabinet installation (19") – Connection of external modules via FireWire possible – 24 V DC / max. 5 A (150 W) power supply	1-BPX001
QuantumX backplane (rack)	QuantumX backplane – rack for a maximum of 9 modules; – 19" control cabinet installation with handles on left and right; – Connection of external modules via FireWire possible; – Power supply: 24 V DC / max. 5 A (150 W)	1-BPX002
Transducer side		
Thermo couple type K ready to use	Type K thermocouple for temperature measurement ready for use. Spot-welded thermocouple, green/white stranded wire, 3-m-long, double-insulated and protected orange/green wire lead, visible green thermo mini coupling, insulating cap for protection against hazardous electric potential.	1-ITC-K1000
Thermo Mini insulating cap	Kit with a total of 4 insulating caps (ISO caps) for Self-assembly and integration of Thermo Mini couplings for connecting thermocouples or signal leads for the measurement of voltage up to 5V (copper coupling) using QuantumX MX809B. Each kit comprises of 4 transparent insulating caps, spacers for short and long couplings, twist-type cable glands for strain relief, kink protection, PT screws and grooved pins.	1-CON-A1018
Type K Thermo Mini coupling	4 x Thermo Mini coupling for connecting Type K thermocouple (NiCr-NiAl, green)	1-CON-S1016
Type K Thermo lead	Type K thermo lead, IEC584 Class 1, 2x0.6 mm, double-insulated: 1000 V / 600 V CAT II / 300 V CAT III, VDE tested, outside diameter: 3 mm, sheath color: orange-white, 180 °C, lead length as desired	4-3301.0233
Voltage measurement line ready to use	Voltage measurement line type copper ready for use. Open wires on one side, 3-m-long, double-insulated and protected wire lead; visible white thermo mini coupling, insulating cap for protection against hazardous electric potential.	1-ITC-U1001
Thermo Mini insulating cap	Kit with a total of 4 insulating caps (ISO caps) for Self-assembly and integration of Thermo Mini couplings for connecting thermocouples or signal leads for the measurement of voltage up to 5V (copper coupling) using QuantumX MX809B. Each kit comprises of 4 transparent insulating caps, spacers for short and long couplings, twist-type cable glands for strain relief, kink protection, PT screws and grooved pins.	1-CON-A1018
Thermo Mini couplings for voltage measurement	4 x Thermo Mini coupling for voltage measurement (copper-copper, white)	1-CON-S1017
Copper measuring lead	Copper measuring lead, 2x0.6 mm, double insulated: 1000 V / 600 V CAT II / 300 V CAT III, VDE tested, outside diameter: 3 mm, sheath color: orange-green, 180 °C, lead length as desired	4-3301.0234

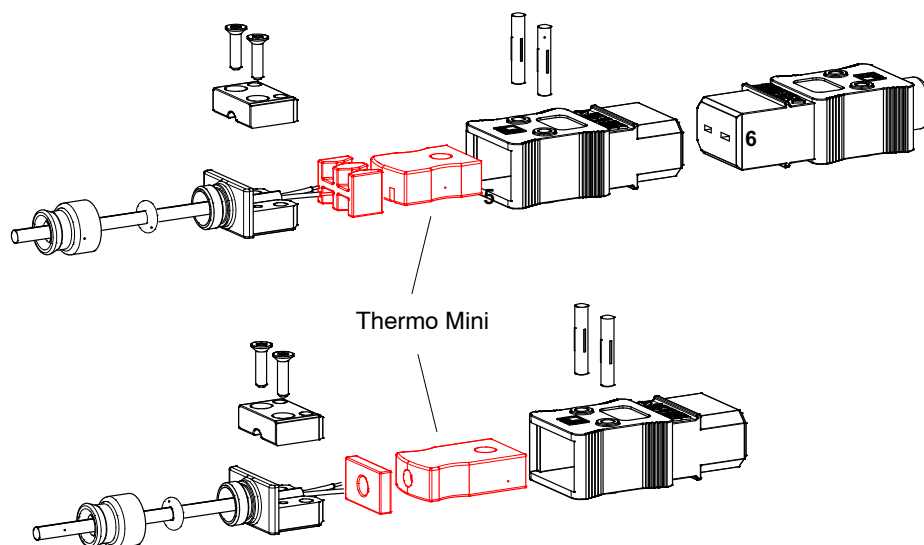
MX809B accessories, to be ordered separately (continued)

MX809B accessories		
Article	Description	Ordering no.
Communication		
Ethernet crossover cable	Ethernet crossover 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 suitable plugs at 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-KAB272-0.2 1-KAB272-2 1-KAB272-5
IEEE1394b FireWire IEEE ExpressCard	FireWire IEEE 1394b ExpressCard (ExpressCard/34) for connecting QuantumX modules to a notebook or PC	1-IF002
IEEE1394b FireWire cable PC to module, IP20/IP68	FireWire connection cable from measurement modules to PC. Fitted with suitable plugs at both ends. Length: 3 m. Module voltage supply not possible via KAB293.	1-KAB293-5
IEEE1394b FireWire cable hub to module, IP68	FireWire connection cable between HUB and module. For data transfer from QuantumX or SomatXR modules to HUB. Fitted with suitable plugs at both ends. Length: 3 m.	1-KAB276-3

Software and product packages		
catman [®] AP 	Full package, comprising catman [®] Easy functionality plus add-on modules such as video camera integration (EasyVideoCam), full postprocess analysis (EasyMath), automation of recurrent activity (EasyScript), preparing measurement projects offline (EasyPlan), and additional functions such as electrical power calculation, special filters, frequency spectrum, etc. Details at www.hbm.com/catman/	1-CATMAN-AP
catman [®] EASY 	The 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 	Post Process edition for visualization, analysis and processing of measurement data with many mathematical functions, data export and reporting.	1-CATEASY-PROCESS
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 later are supported.	1-CANAPE-DRIVER

¹⁾ Other drivers and partners at www.hbm.com/quantumX/

Assembly overview: Thermo Mini insulating cap (1-CON-A1018)



Subject to modifications.
All product descriptions are for general information
only. They are not to be understood as a guarantee
of quality or durability.

托驰（上海）工业传感器有限公司
上海市嘉定区华江路348号1号楼707室
电话：+86 021 51069888
传真：+86 021 51069009
邮箱：zhang@yanatoo.com
网址：www.sensor-hbm.com

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