

QUANTUM^X MX1609

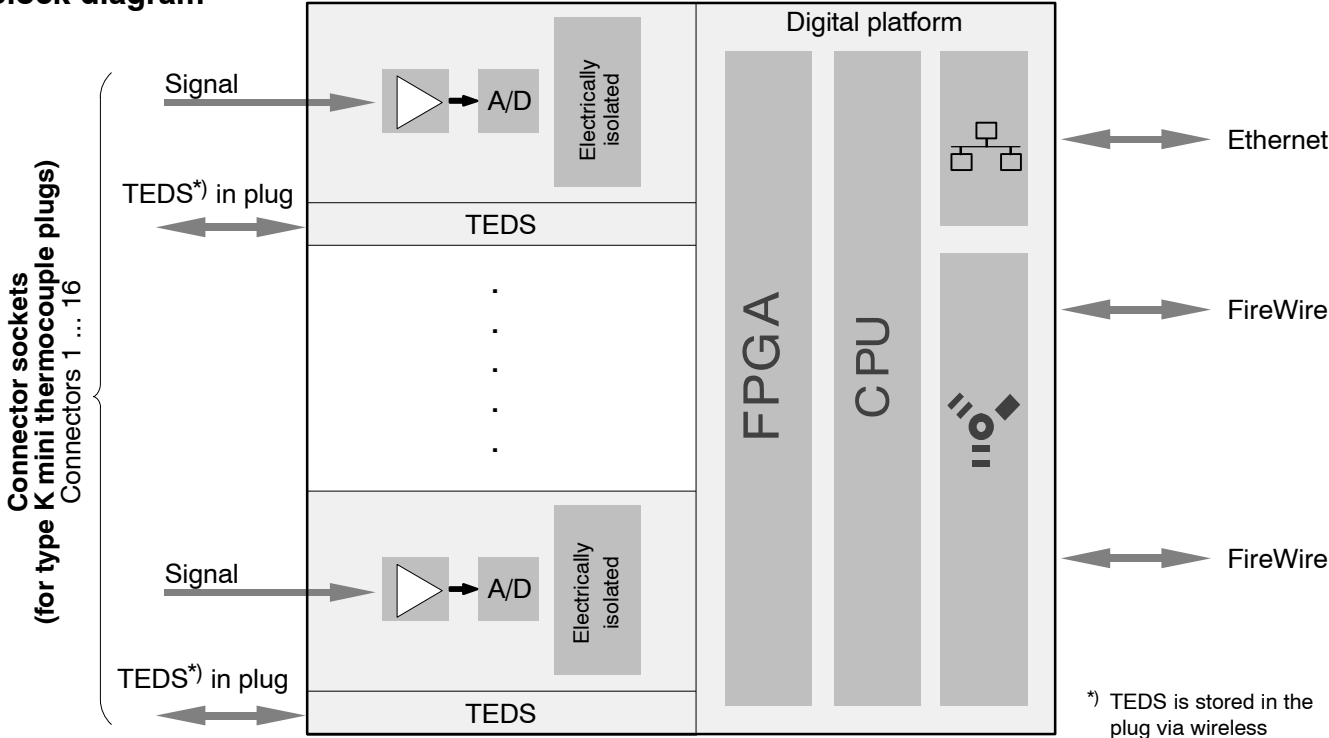
Thermocouple
amplifier

Special features

- 16 inputs (electrically isolated)
- Thermocouple mini type K
- Measuring point identification
- Data rate up to 300 Hz
- 8 internal cold junction
- Optional subsequent scaling and TEDS storage
- Active low pass filter



Block diagram



Specifications

General specifications		
Inputs	Number	16, electrically isolated from each other
Transducer		Thermocouples Type K (NiCr–NiAl)
Data rate	Hz	0.1 ... 300
A/D converter		24 Bit Delta Sigma converter
Active low-pass filter (Bessel/Butterworth)	Hz	0.01 ... 14 (-3 dB)
TEDS transducer identification max. distance between RFID transponder and housing	mm	1
Transducer connection		Mini thermocouple socket Type K
Permissible cable length between MX1609 and transducer	m	<30
Supply voltage range (DC)	V	10 ... 30, 24 V nominal (rated) voltage
Supply voltage interruption		max. 5 ms at 24 V
Power consumption	W	< 6
Ethernet (data link) Protocol/Addressing Transmission bandwidth Connection Max. cable length to module	- MBit/s - m	10Base-T / 100Base-TX TCP/IP/direct IP address or DHCP 100 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 ¹⁾ , backplane) Max. number of hops ²⁾	MBaud A m - - -	IEEE 1394b (HBM modules only) 400 (approx. 50 MByte/s) 1.5 5 12 (=11 Hops) 24 14
Synchronization options EtherCAT NTP IRIG-B (B000 to B007; B120 to B127)		FireWire (only QuantumX, automatically, recommended) via CX27 via Ethernet 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
EMC requirements		per EN 61326
Mechanical tests³⁾ (transport tests) Vibration (30 min) Shock (6 ms)	m/s ² m/s ²	50 350
Maximum input voltage at transducer (to housing and ground)	V	60 (no transients)
Dimensions, horizontal (H x W x D)	mm	52.5 x 200 x 122 (with case protection) 44 x 174 x 119 (without case protection)
Weight, approx.	g	900

¹⁾ Hub: FireWire node or distributor

²⁾ Hop: Transition from module to module/signal conditioning

³⁾ 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.

Specifications

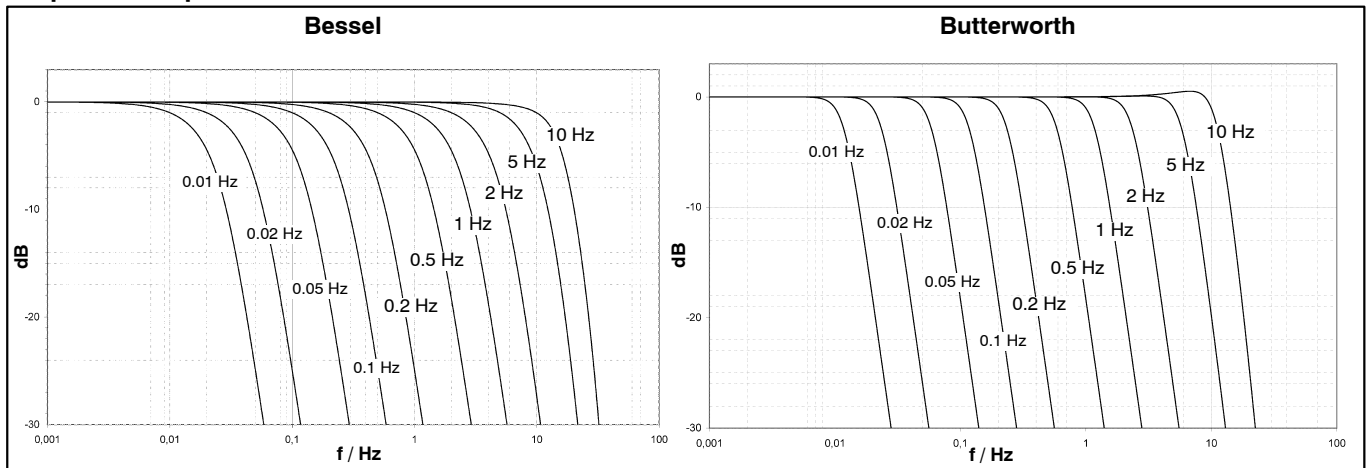
Thermocouples		
Linearization range Type K	°C [°F]	-100 ... +1300 [-148 ... +2372]
Transducer impedance	Ω	<500
Measurement frequency range (-1 dB)	Hz	0 ... 10
Noise (peak to peak) with Filter 0.1 Hz Bessel	K	0.1
with Filter 1 Hz Bessel	K	0.2
with Filter 10 Hz Bessel	K	0.4
Total error limit at 22 °C ambient temperature	K	±0,7
Temperature drift	K/10K	±0.2
Optional post-scaling of the temperature values Number of pairs of values in the MX1609, max.		64
Number of pairs of values from TEDS, max. (from Template Calibration Table)		14

Specifications

MX1609 active low-pass filter data (4th order Bessel/Butterworth)

Type	-1 dB (Hz)	-3 dB (Hz)	-20 dB (Hz)	Phase delay (ms)	Rise time (ms)	Overshoot (%)	Rate (Hz)
Bessel	10	14.1	26.7	44.6	27.4	6.7	600
	5	7.7	17.1	63.4	46.6	3.2	600
	2	3.3	8.1	122.3	107.1	1.3	600
	1	1.7	4.2	221.8	210.2	1.0	600
	0.5	0.84	2.12	418.8	418.4	0.9	300
	0.2	0.34	0.85	1020.9	1045.0	0.9	300
	0.1	0.17	0.43	2023.4	2090.1	0.9	300
	0.05	0.085	0.214	3938.8	4184.2	0.8	20
	0.02	0.034	0.086	9959.6	10420.4	0.9	20
	0.01	0.017	0.043	19995.0	20900.9	0.9	20
Butterworth	10	11.3	18.4	76.6	35.4	15.7	600
	5	5.9	10.1	126.1	66.7	12.0	600
	2	2.4	4.2	283.3	164.6	11.0	600
	1	1.2	2.1	546.5	328.3	11.0	600
	0.5	0.60	1.05	1069.7	656.7	11.0	300
	0.2	0.24	0.42	2646.9	1631.6	11.0	300
	0.1	0.12	0.21	5278.4	3263.3	11.0	300
	0.05	0.059	0.106	10452.6	6566.6	11.0	20
	0.02	0.024	0.042	26253.9	16316.3	11.0	20
	0.01	0.012	0.021	52588.9	32632.6	11.0	20

Amplitude responses



Specifications Power pack NTX001

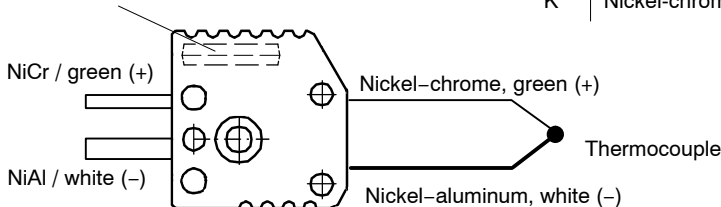
NTX001		
Nominal input voltage (AC)	V	100 ... 240 ($\pm 10\%$)
Stand-by power consumption at 230 V	W	0.5
Nominal load		
U_A	V	24
I_A	A	1.25
Static output characteristics		
U_A	V	$24 \pm 4\%$
I_A	A	0 – 1.25
U_{Br} (Output voltage ripple, peak to peak)	mV	≤ 120
Current limiting, typically from	A	1.6
Primary – secondary isolation		galvanically, by optocoupler and converter
Creep distance and clearance	mm	≥ 8
High-voltage test	kV	≥ 4
Ambient temperature range	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	0... +40 [+32 ... +104]
Storage temperature	$^{\circ}\text{C}$ [$^{\circ}\text{F}$]	-40 ... +70 [-40 ... +158]

Accessories, to be ordered separately

MX1609 Accessories		
Article	Description	Order No.
Pack comprising 10 mini thermocouple plugs for type K thermocouples, including integrated RFID chip	Package including 10 x Mini thermocouple plugs with integrated RFID chip for measuring point identification for MX1609 thermocouple amplifiers of the QuantumX family; Type K: NiCr–NiAl, integrated RFID, green, male.	1–THERMO–MINI
Pack comprising 10 RFID chips (for self-assembly)	Package including 10 x RFID chip for self-fitting on Mini thermocouple plugs for MX1609 thermocouple amplifiers of the QuantumX family.	1–THERMO–RFID
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
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 (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 connect QuantumX modules to a Notebook or a PC	1–IF001
3 m 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–KAB275–3
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

1–THERMO–MINI

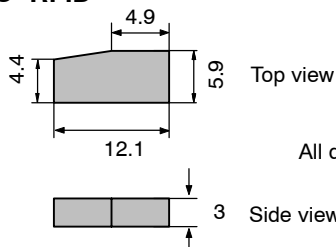
RFID transponder (TEDS)



Type	Thermo material 1 (+)	Thermo material 2 (-)
K	Nickel–chrome (core color green)	Nickel–aluminum (core color white)

NOTE: The green/white color codes relate to the IEC Standard and may vary.

1–THERMO–RFID



All dimensions in mm; 1 mm=0.03937 inches

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