



Q.raxx A104-16 *slimline* RS / EC Multi Channel System for Thermocouples

The Q.raxx *slimline* product is based on the standardized 19" technology, one rack unit (1 U) and is designed for measurements with a high level of flexibility, reliability and accuracy in the field of stationary testing and assembly.

The EC version includes a Test Controller that offers the user a powerful solution with PAC functionality, synchronized data acquisition, sequencing, mathematics, combinations a Ethernet TCP/IP interface as well as a EtherCAT fieldbus. It is possible to connect three *slimline* basic units to the Test Controller of a *slimline* EC unit.

Beside the pre-defined standard versions customized systems regarding numbers of channels, kind of measurement inputs/connectable sensors as well as the required connectors are configurable.

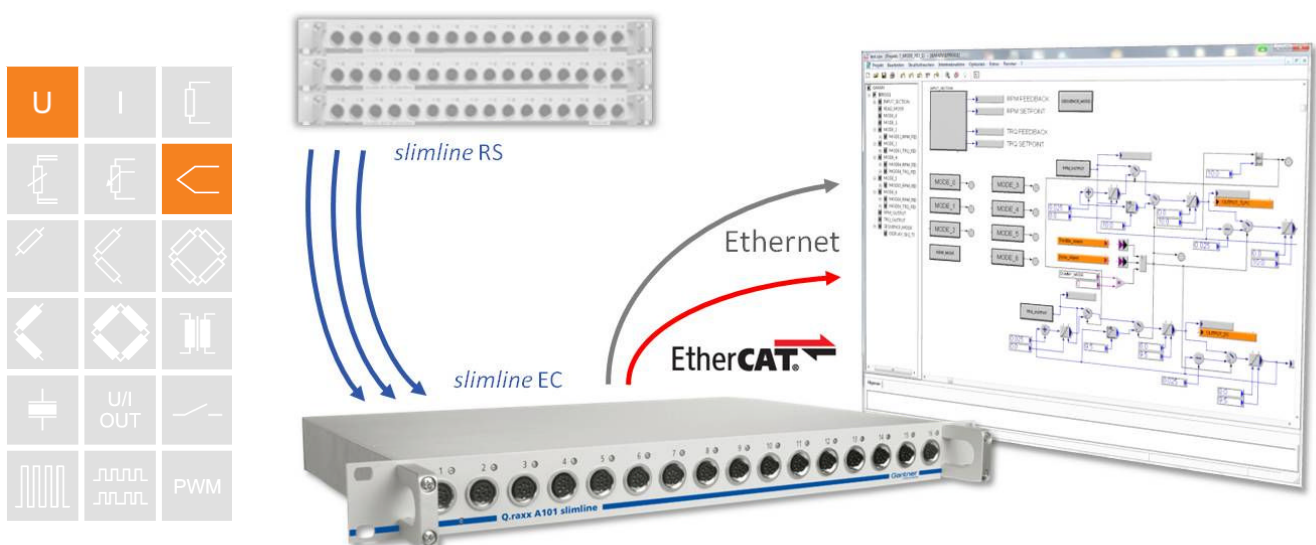
This modularity permits to design an optimized individual solution for any application. Further it is possible to mix different product lines like Q.raxx, Q.bloxx within Q.series.

Most important features:

- **16 galvanic isolated input channels**
thermocouples and voltages in the range of ± 80 mV
- **Cold junction compensation**
Integrated CJC each input
- **High accuracy digitalization**
24 bit ADC, 100 Hz sample rate per channel,
sum sample rate 1600 Hz
- **Dynamic linearization**
optimized positioning of the interpolation points within the
selected range, type B, E, J, K, L N, R, S, T, U
- **Galvanic isolation**
channels to power supply and to interface,
 V_{iso} 500 VDC
- **Electromagnetic Compatibility**
according EN 61000-4 and EN 55011
- **Power supply 10...30 VDC**

With embedded Test Controller (version EC):

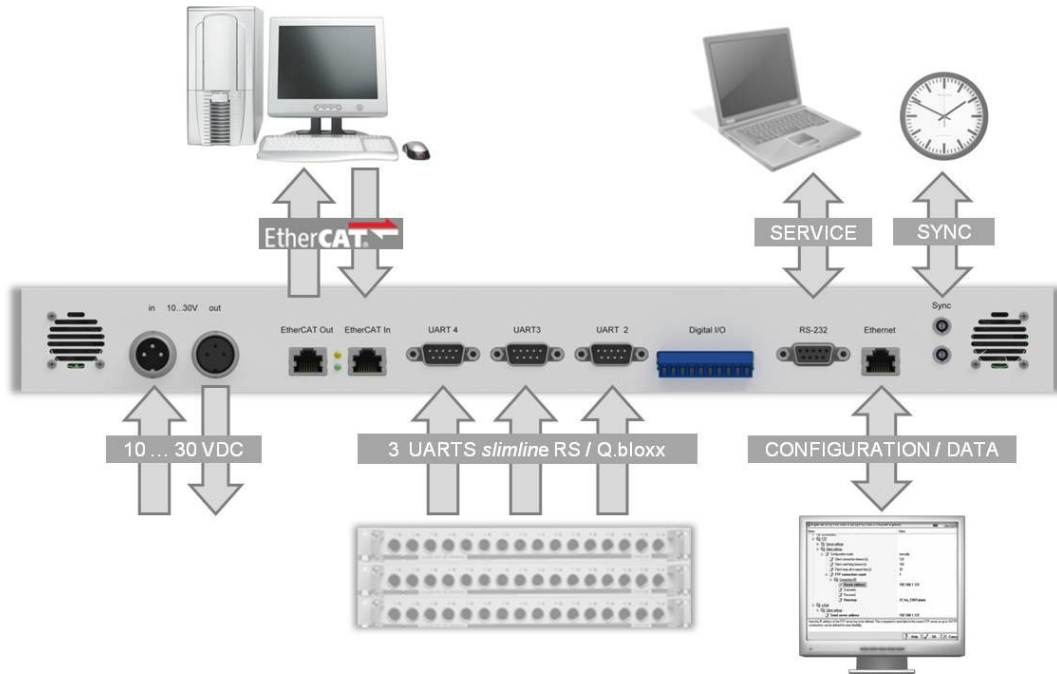
- **Optional fieldbus interface EtherCAT**
EtherCAT according specification ETG,
256 read and 256 write variable with 10 kHz
- **Ethernet interface for configuration and data output**
FTP, TCP/IP, UDP
- **FTP Server and FTP Client functionality**
configurable function
- **High data rate over Ethernet**
16 real variables with 10 kHz (block transfer)
64 real variables with 300 Hz (online)
- **Data buffer memory dyn. 16 MByte (RAM), stat. 128 MByte (flash)**
data buffer at block transfer of measurements
- **Connection of additional racks to the Test Controller**
up to 3 *slimline* racks without Test Controller can be connected to a
slimline EC system with embedded controller





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Connection Diagram Q.raxx slimline EC



Analog Inputs			
Number	16		
Accuracy	0.01 % typical		
	0.02 % in controlled environment ¹		
	0.05 % in industrial area ²		
Linearity error	0.01 % of the final value typical		
Repeatability	0.003 % typical (within 24 h)		
Input resistance	>10 MΩ		
Isolation voltage	100 VDC permanent channel to channel		
	500 VDC channels to power supply to interface ³		
Measurement Voltage			
	Range	max. Deviation	Resolution
	±80 mV	±10 μV	320 nV
Long term drift	<1 μV/24 h; 2.5 μV/8000 h		
Temperature influence	on zero		on sensitivity
	<1 μV / 10 K		<0.005 % / 10 K
Signal-noise-ratio	100 dB at 100 Hz		

¹ according EN 61326: 1997, appendix B

² according EN 61326: 1997, appendix A

³ noise pulses up to 1000 VDC, permanent up to 250 VDC



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Measurement Thermocouple	Type	whole range incl. cold junction compens.
	Type B	better than $\pm 2.5^{\circ}\text{C}$ ^{*)}
	Type E, J, K, L, T, U	better than $\pm 0.5^{\circ}\text{C}$ ^{*)}
	Type N	better than $\pm 1^{\circ}\text{C}$ ^{*)}
	Type R, S	better than $\pm 1.5^{\circ}\text{C}$ ^{*)}
Long term drift	<0.025°C / 24 h; <0.15°C / 8000 h	
Temperature influence (Type K)	on zero	on sensitivity
	<0.025°C / 10 K	<0.005 % / 10 K
Uncertainty cold junction compensation	<0.3°C	
Analog/Digital Conversion		
Resolution	24 bit	
Sample rate	100 Hz at 16 channels, 400 Hz at 4 active channels, 10 Hz each channel using 50/60 Hz filter	
Conversion method	Sigma-Delta	
Anti-aliasing filter	low pass 3 rd order per channel (-3 dB at 20 Hz)	
Digital filter	variable digital low pass filter 1 st order	
Averaging	sliding 10 x 10 ms for optimization of the precision (always active)	
	in addition optional filter for mains rejection 50 Hz/60 Hz, measuring rate is 10 Hz	
Digital Inputs (<i>slimline</i> EC only)		
Function	fixed definition	
Input voltage	max. 30 VDC	
Input current	max. 1.5 mA	
Upper switching threshold	>3.5 V (high)	
Lower switching threshold	<1.0 V (low)	
Digital Outputs (<i>slimline</i> EC only)		
Function	fixed definition	
Type of output	Open Drain p-Kanal MOSFET	
Output voltage	max. 30 VDC	
Output current	max. 100 mA	
Communication Interface (<i>slimline</i> RS) to connect to a Test Controller		
Standard	RS-485, 2-wire	
Data format	8e1	
Protocols	Local-Bus: 115200 bps up to 48 Mbps	
	Modbus-RTU, ASCII: 19200 bps up to 115200 bps	



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Host Interface Ethernet (<i>slimline</i> EC only)		
Protocols	TCP/IP, UDP, PING, ASCII, Modbus TCP/IP	
Services	DHCP, FTP-Server, FTP-Client, e-Mail-Send-Client (SMTP)	
Baud rate	10/100 Mbps	
Data rate	max. 800 kByte/s	
Number of simultaneous Clients	10	
Isolation voltage	500 V	
Host Interface EtherCAT (<i>slimline</i> EC only)		
Standard	Ethernet	
Number of channels	1024 Byte read and write data	
Baud rate	100 Mbps	
Cycle time	≥100 µs	
Isolation voltage	500 V	
Slave Interfaces RS 485 (<i>slimline</i> EC only) to connect further <i>slimline</i> RS, see Connection Diagram		
Number of interfaces	3	
Standard	RS 485	
Data format	8E1	
Protocol	Local Bus	
Baud rate	9.6 kbps up to 24 Mbps	
Isolation voltage	500 V	
Data Memory (<i>slimline</i> EC only)		
RAM	16 MByte (optional 90 MByte), cycle buffer	
Flash	128 MByte	
Synchronization of a Multi Device System (<i>slimline</i> EC only)		
Interface	RS485 Standard	
Mode	Master Slave principle, IRIG standard	DCF77, AFNOR etc, GPS over IRIG standard
	GPS NMEA over RS232	SNTP over Ethernet



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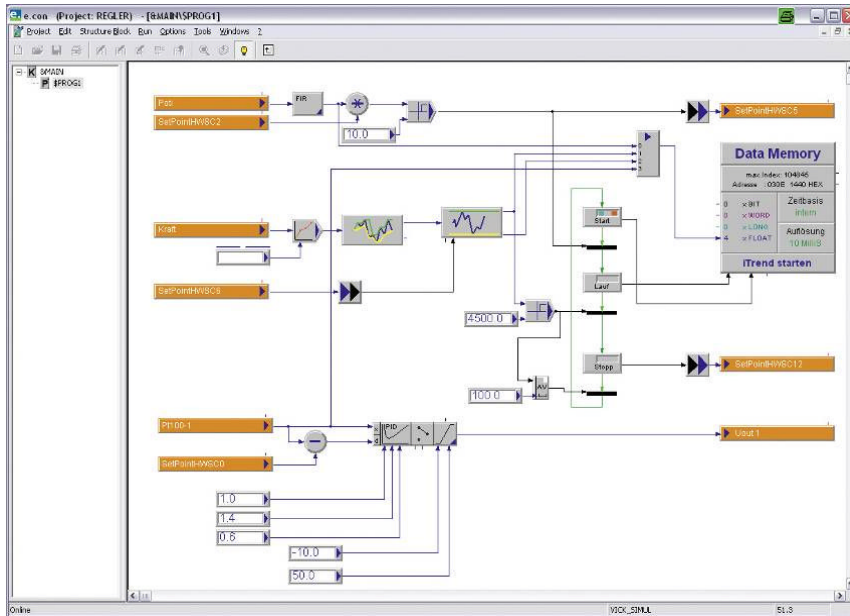
Power Supply	
Power supply	10 bis 30 VDC, Überspannungs- und Verpolungsschutz
Power consumption <i>slimline</i> RS	approx. 8 W
Power consumption <i>slimline</i> EC	approx. 13 W
Influence of the voltage	<0,001 %/V
Mechanical	
Type	19" Standard, 1 unit
Dimensions (W x H x D)	(444 x 44 x 260) mm
Protection system	IP20
Environmental	
Operating temperature	-20°C up to +60°C
Storage temperature	-40°C up to +85°C
Relative humidity	5 % up to 95 % at 50°C, non condensing
PAC Functionality (<i>slimline</i> EC only)	
Cycle time	≥1 ms
Processing	cyclic or synchronized with data acquisition



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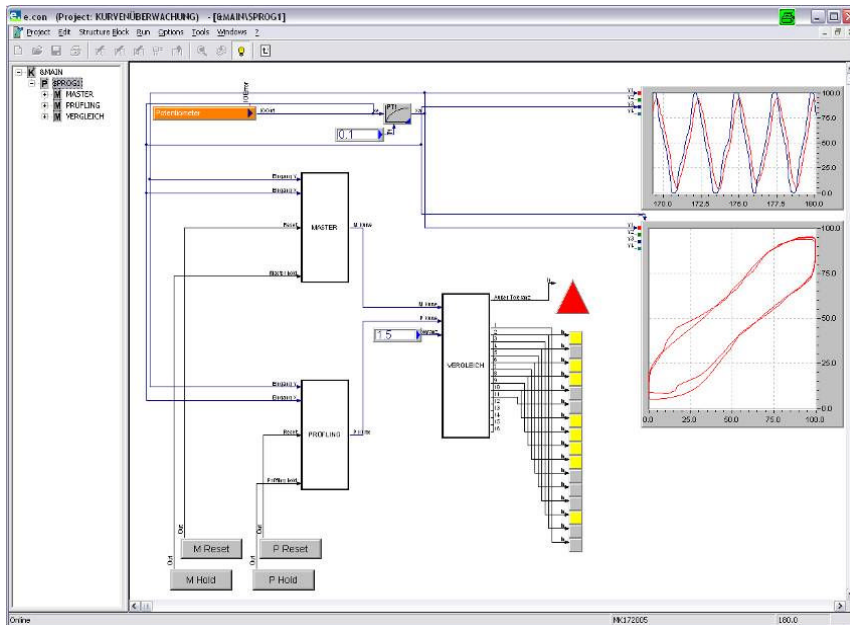
Programming Tool test.con

Using test.con for programming of the PAC-function in a graphical way:



Project Libraries

- Advanced System Functions (V1.0)
- Archive (V 5.0)
- Arithmetic (Time) V1.0
- Arithmetic (Word, Long, Float) (V4.0)
- Comparison (Time) V1.0
- Control elements (V0.0)
- Controller (Float)
- Converter (Bit, Byte, Word, Long, Float, Text) (V4.0)
- Converter (Time) V1.0
- Counter (Word)
- Device Data Access Functions
 - Read access
 - Write access
- Digital Filter (V1.0)
- Edge detection (Bit)
- Extended SFB
- Flipflops (Bit)
- Function generator (V 3.0)
- Global Variables and References (extended)
- Logic (Bit)
- Memory (V1.0)
- Numeric (Float)
- Operatingsystem-Functions (V1.0)
- Parameter (Time) V1.0
- Parameter blocks (V 1.0)
- Selection and comparison (Byte, Word, Long, Float)
 - Comparator
 - Limit indicator
 - Limiter
 - Maximum
 - Minimum
 - Multiplexer
 - Switch
- Sequence blocks
 - Joining transition
 - Preset
 - Splitting transition
 - Step
 - Transition
- Shift and rotate (Byte, Word, Long)
- Signal generators (V1.0)
- Signal processing (V1.0)
- Standard
- Standard transmission terms (Float)
- String Functions
- Timer (Float)
- Timer (Time) V2.0
- Visualization blocks (Time) V2.0
- Visualization Blocks (V6.0)



Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

Valid from January 2011. Specification subject to change without notice
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