

# Q.raxx A109

## Analog Output Module with Digital I/Os

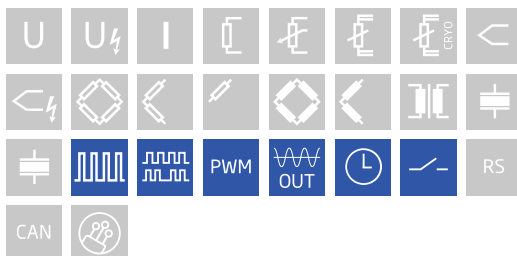
Q.raxx is the ideal 19" rackmount DAQ solution for applications that require high channel density. Q.raxx DAQ systems can utilize an integrated, high-performance controller for communication, control, and data logging purposes. With a controller, multiple Q.raxx systems can be synchronized to each other allowing for efficient DAQ distribution with low jitter and gradual expansion up to thousands of channels.

- **High Density**  
up to 13 I/O modules per Q.raxx 3U chassis with up to 16 channels per I/O module
- **User Friendly**  
front panel indicators for module status, power, and input range error
- **Fully Customizable**  
multiple front panel termination options available
- **Maximum Flexibility**  
parallel communication available in TCP/IP, CAN, PROFIBUS, Modbus, and EtherCAT



### Key Features

- **4 Analog output channels**  
voltage ( $\pm 10$  VDC) or current (0 - 20 mA), configurable per channel
- **DAC-resolution 16 bit**  
100 kHz each channel
- **Outputs freely scalable**
- **4 digital inputs and outputs**  
configurable as 2 counter, 2 frequency, or 2 PWM inputs, 4 frequency out, 4 PWM output or 4 state out
- **Frequency measurement**  
Frequency measurement up to 1 MHz, direction detection
- **Counter**  
Forward-backward counter, quadrature counter with reference position recognition (reset/enable), up to 1 MHz
- **PWM input**  
Measurement of duty cycle and frequency
- **3-Way galvanic isolation**  
500 VDC channel to channel, channel to power supply, and bank



### Technical Data

#### Analog Output

Channels	4
Accuracy	0.02 % typical
Output type	voltage or current, configurable per channel
Isolation voltage	500 VDC channel to channel to power supply channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

#### Output Mode Voltage

Output voltage	±10 VDC	
Allowable load resistance	>2 kΩ	
Long-term drift	<1 mV / 24 hrs	<2.5 mV / 8000 hrs
Temperature influence	<2 mV / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise voltage	<10 mV at 1000 Hz	< 2 mV at 10 Hz

#### Current Output

Output current	0 - 20 mA	
Load burden	<400 Ω	
burden influence	<0.1 μA / Ω	
Long-term stability	<2 μA / 24 hrs	<5 μA / 8000 hrs
Temperature drift	<4 μA / 10 K Offset drift	<0.05 % / 10 K Gain drift
Noise current	<20 μA at 1000 Hz	<4 μA at 10 Hz

#### Digital Input

Channels	4
Logic levels	TTL or 24 VDC according to IEC 61131-2, Type 1
TTL logic voltage	< 0.8 VDC (Low) > 3 VDC (High)
24 VDC logic voltage	-3 to 5 VDC (Low) 11 to 30 VDC (High)
Input type	PNP (current sinking)
Input voltage	30 VDC max.
Input current	2 mA max.
Isolation voltage	500 VDC, group to group, group to power supply, channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Digital Input Modes

<b>Status</b>	
Response time	10 µs
<b>Frequency measurement</b>	
Method	Chronos method (optimized by a combination of time measurement and pulse counting), detection of rotational direction (0 deg. / 90 deg.)
Frequency range	0.1 Hz to 1 MHz
Time base	0.001 s to 1 s
Internal reference frequency	48 MHz
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns
<b>Pulse counting</b>	
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns
Counter frequency	1 MHz
Mode(s) of operation	<ul style="list-style-type: none"> <li>- Forward and reverse counting (additional input for direction of counting)</li> <li>- Quadrature counter (additional input for detection of rotational direction)</li> <li>- Quadrature counter with zero reference and reset/enable (two additional inputs)</li> </ul>
<b>Pulse-width measurement</b>	
Input frequency	0.1 Hz to 1 MHz
Accuracy	0.01% at timebase > 1ms
Resolution	21 ns

### Digital Output

Channels	4
Contact	open drain p-channel MOSFET
Output voltage	12 to 30 VDC (external supply required)
Load capacity	30 VDC / 500 mA (ohmic load)
Isolation voltage	500 VDC, group to group, group to power supply, channel to bus <sup>1</sup>

<sup>1</sup> noise pulses up to 1000 VDC, continuous up to 250 VDC

### Digital Output Modes

Status				
	Response time	10 μs (>0.5 A)	100 μs (>0.1 A)	1000 μs (<0.1 A)
Frequency output				
	Frequency range	0.1 Hz to 1 kHz / 10 kHz (depending on load capacity)		
	Accuracy	0.1 %		
	Resolution	1 μs		
PWM output				
	Frequency range	0.1 Hz to 1 kHz / 10 kHz (depending on load capacity)		
	Accuracy	0.1 %		
	Resolution	1 μs		

### Digital to Analog Conversion

Resolution	16-bit
Update rate	100 kHz per channel
Settling time	3 $\mu$ s

### Communication Interface

Protocols	proprietary Localbus (115200 bps to 24 Mbps, latency <100 ns) ASCII (19200 bps to 115200 bps) Modbus RTU Profibus-DP (19200 bps to 12 Mbps) (special Firmware required)
Data format	8E1
Electrical standard	ANSI/TIA/EIA-485-A, 2-wire

### Input Power

Input voltage	10 to 30 VDC, overvoltage and overcurrent protection
Power consumption	2 W (approx.)
Input voltage influence	<0.001 % / V

### Environmental Specifications

Electromagnetic compatibility	according to IEC 61000-4 and EN 55011
Operating temperature	-20°C to +60°C
Storage temperature	-40°C to +85°C
Relative humidity	5 - 95 % at 50°C (non-condensing)

### Remarks

Validity of all listed specifications are subject to a warm-up period of at least 45 minutes

Specifications subject to change without notice

### Mechanical information

Material	Aluminum
Measurements (W x H x D)	30 x 128 x 118 mm
Weight	approx. 100 g

### Ordering Information

Article number	102015
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