

# Raritan EMX Modbus Interface

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## Introduction

The EMX device can act as a Modbus/TCP server. The Modbus service can be enabled in the Network Services section of the Device Settings menu in the web UI.

## Supported Modbus Functions

The following Modbus function codes are supported:

- General Commands:
  - Read Device Identification (0x2b)
- 16-bit Word Access:
  - Read Holding Registers (0x03)
  - Write Single Register (0x06)
  - Write Multiple Registers (0x10)

## Feature Set

The following features of the EMX are available via Modbus:

- Peripheral sensor readings
- Peripheral actuator control

## Register Layout

### Conventions

- All register addresses are hexadecimal, indicated by a 0x prefix.
- Data types which span multiple 16-bit registers are big-endian, i.e. the lowest register address contains the most significant bits.
- The following data types are supported for holding registers:
  - Word: 16-bit unsigned integer
  - DWord: 32-bit unsigned integer (two registers, big-endian)
  - QWord: 64-bit unsigned integer (four registers, big-endian)
  - Float: IEEE 32-bit floating point value (two registers, big-endian)
  - Bit Mask: 16 individual bits
- The access flags column can have the following values:
  - R: Read-only register
  - W: Write-only register (writing triggers an action, always reads 0)
  - R/W: Read-write register
- Reading a reserved register usually yields zero, but the meaning may change in future versions.

### Holding Register Map

Start	End	Function
0x0000	0x0010	Basic EMX parameters
...		
0x1000	0x100f	Peripheral sensor 1
0x1010	0x101f	Peripheral sensor 2
...		
0x1810	0x181f	Peripheral sensor 130

### Basic EMX Parameters

Address	Type	Access	Parameter
0x0000	Word	R	Register set version (8 bit major, 8 bit minor)

## Peripheral Sensors

- Up to 130 sensors, 16 holding registers each
- Base address ( $i = 0..129$ ):  $0x1000 + i * 0x0010$

Offset	Type	Access	Parameter
0x00	Word	R	Sensor type: <ul style="list-style-type: none"> <li>• 0: unassigned</li> <li>• 1: Temperature in degrees Celsius</li> <li>• 2: Relative humidity in %</li> <li>• 3: Air flow in m/s</li> <li>• 4: Air pressure in Pa</li> <li>• 5: Contact closure (0: off, 1: on)</li> <li>• 6: Vibration in G</li> <li>• 7: Water leak (0: normal, 1: alarm)</li> <li>• 8: Smoke detector (0: normal, 1: alarm)</li> <li>• 9: Ambient light in lux</li> <li>• 10: Dry contact (actuator, 0: off, 1: on)</li> <li>• 11: Magnetic contact (0: off, 1: on)</li> <li>• 12: Passive IR motion detector (0: off, 1: on)</li> <li>• 13: Tamper detector (0: normal, 1: alarm)</li> <li>• 14: Powered dry contact (actuator, 0: off, 1: on)</li> <li>• 15: Absolute humidity in <math>g/m^3</math></li> <li>• 16: Acceleration in G</li> <li>• 17: Door state (0: open, 1: closed)</li> <li>• 18: Door lock state (0: open, 1: closed)</li> <li>• 19: Door handle lock switch (0: open, 1: closed)</li> </ul>
0x01	Word	R	State (for discrete sensors)
0x02~0x03	Float	R	Sensor reading (for numerical sensors, see above for unit)
0x04	Word	R/W	Actuator control
0x05~0x0f			Reserved