# Raritan EMX Modbus Interface

## Contents

# 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:<br>• 0: unassigned<br>• 1: Temperature in degrees Celsius<br>• 2: Relative humidity in %<br>• 3: Air flow in m/s<br>• 4: Air pressure in Pa<br>• 5: Contact closure (0: off, 1: on)<br>• 6: Vibration in G<br>• 7: Water leak (0: normal, 1: alarm)<br>• 8: Smoke detector (0: normal, 1: alarm)<br>• 9: Ambient light in lux<br>• 10: Dry contact (actuator, 0: off, 1: on)<br>• 11: Magnetic contact (0: off, 1: on)<br>• 12: Passive IR motion detector (0: off, 1: on)<br>• 13: Tamper detector (0: normal, 1: alarm)<br>• 14: Powered dry contact (actuator, 0: off, 1: on)<br>• 15: Absolute humidity in g/m^3<br>• 16: Acceleration |

| Offset | Type | Access | Parameter |
|---|---|---|---|
| 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 |