Unified-E Modbus Adapter
User Manual

Configure Modbus Endpoints and Datapoints

Software version 3.1.0.0, last updated: July 2025

Publisher: Unified-E AG, Winterthur, Switzerland

Content

1 General

1.1 Introduction

The Modbus adapter allows access to external devices via the Modbus protocol and makes the read or written values available in the visualization. Both Modbus TCP (via Ethernet) and Modbus RTU (via serial ports) are supported.

1.2 Storage Areas in Modbus

Modbus has four memory areas, which can be accessed via register numbers:

- Hold registers:
  These are 16-bit registers that can be read as well as set
- Digital output:
  This is where the registers of the digital outputs can be found, which can be read as well as set. The register value is always 0 or 1 (BOOL)
- Input registers:
  These are 16-bit registers, each reflecting an analog input. An input register can only be read
- Digital Input:
  This is where the registers of digital inputs can be found, which can therefore only be read. The register value is always 0 or 1 (BOOL)

Even though the Modbus protocol only addresses 16-bit registers (WORD), the Unified-E Modbus adapter can also be used to process individual bits, 32-bit values, strings or array structures (as described in Chapter 3).

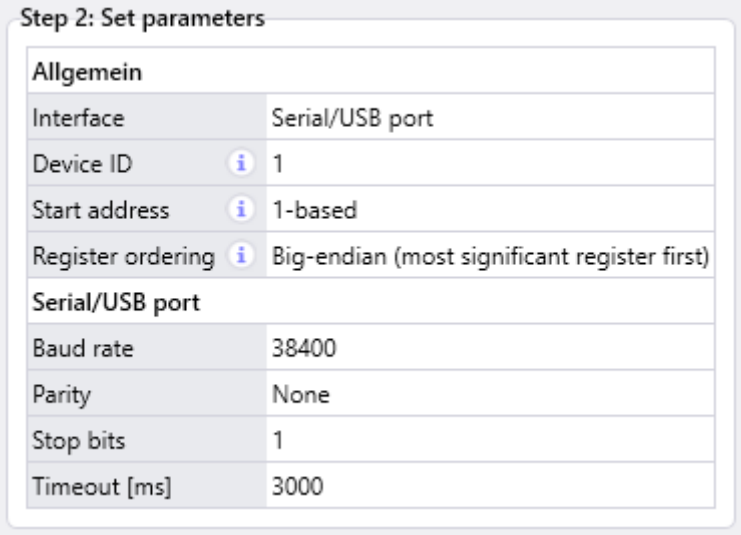
2 Communication Parameters of the Adapter

Basic communication parameters must be configured for each Modbus endpoint. The selection of the interface determines whether communication takes place via TCP/IP or Serial/USB. Depending on the interface you choose, different parameters are displayed.

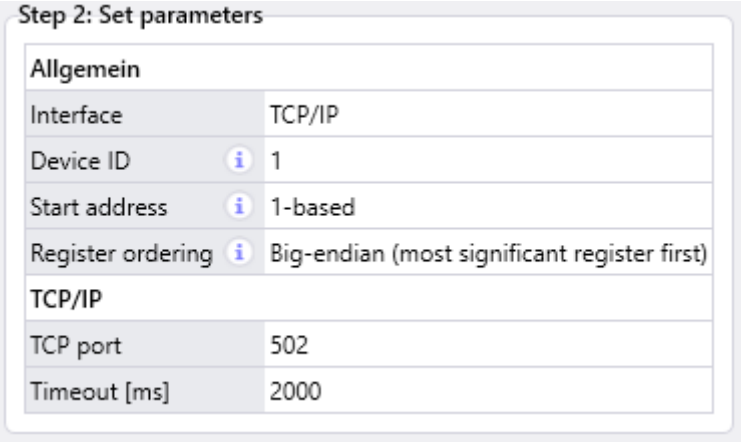
Configure endpoint address:

- TCP/IP interface: The IP address, e.g. "192.168.1.40"
- Serial port: The COM port, e.g. "COM6"

Example: Serial port:



Example: Ethernet interface:



2.1 General Parameters

These parameters are available for both types of interfaces:

- Interface: Selection of the desired type of communication:
  - TCP/IP for Modbus TCP Connections
  - Serial/USB for Modbus RTU via serial ports
- Device ID: Specifies the slave ID (also unit ID) of the connected Modbus device
  - Valid values: 1 to 247 (depending on the device)
- Start Address: Specifies whether register addresses are specified 0 or 1 based.
  - Typically, 1-based is used, meaning the first register has address 1
- Register Order: Determines the order of multi-word values (for example, 32-bit values)

- Big-endian (highest register first): The register with the higher index contains the higher-order bits
- Little-endian (lowest register first): The register with the lower index contains the higher-order bits
- This setting affects the interpretation of multi-word data types such as Int32 or Float

2.2 TCP/IP-specific Parameters

These parameters only apply if the interface is set to TCP/IP:

- TCP port: The port of the Modbus TCP server to use
  - Default value: 502
- Timeout [ms]: Time in milliseconds how long it waits for a response from the Modbus TCP server
  - This timeout applies to connection establishment and data access.
  - Example: 2000 = 2 seconds

2.3 Serial/USB-specific Parameters

These parameters only apply if the interface is set to Serial/USB:

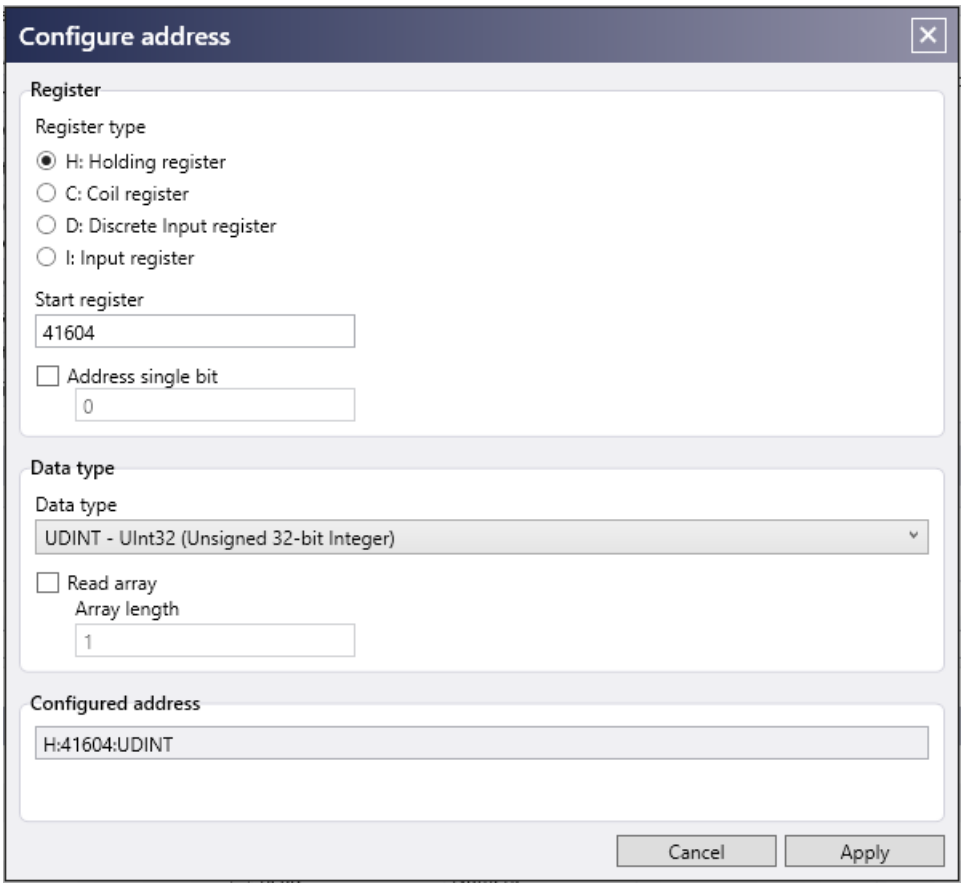
- Baud rate: Transmission speed in bits per second.
  - Possible values: 2400 to 230400
  - Example: 38400
- Parity: Parity check to detect transmission errors
- Stop Bits: Specifies how many stop bits are used in the transfer
  - Common values: 1 or 2
- Timeout [ms]: Time in milliseconds how long it waits for a response when reading or writing through the serial port
  - Example: 3000 = 3 seconds

3 Configure Datapoint Addresses

3.1 Configure the Datapoint Address in the Dialog

In the Unified-E App Designer, the Datapoint addresses of Modbus endpoints can be created directly via a configuration dialog. The address of a Modbus Datapoint describes which register in the external Modbus device is to be accessed.

The "Configure address" dialog can be accessed in the Datapoints table in the "Address" column via the "..." and offers a structured input mask for the most important addressing parameters:



- Register type: Specifies which Modbus tab area to access:
  - H: Holding register: Read and write 16-bit registers (FC 03 / FC 06)
  - C: Output register (coil register): 1-bit register for digital outputs (FC 01 / FC 05)
  - D: Discrete input register: 1-bit register for digital inputs, read-only (FC 02)
  - I: Input register: Readable 16-bit registers only (FC 04)
- Start register: The numeric address of the register to be accessed
  - Example: 41018 (corresponds to register address 41018 within the selected range)
- Address single bit: Only visible on Boolean data types. Select this option if you want to read or write a single bit within a 16-bit register
  - Bit number (0-15): Specifies which bit to use within the register
- Data type: Determines how the register contents are interpreted. There are various integers, floating point numbers and Boolean values to choose from:
  - Example: DINT – Int32 (Signed 32-bit Integer)

3.2 Format of the Datapoint Address

The address of a Datapoint in the Datapoint table has the following format:

<Address range>:<Start register[.<Bit number>]>:<Data rype>

Address range abbreviations:

- "H": Holding register
- "C": Digital output (coil), data type BOOL must be set
- "I": Input register
- "D": Digital input, data type BOOL must be set

Start register:

The Modbus start address for the Datapoint.

Bit number:

For numeric data types, ".<bit number>" can be used to address the respective bit.

For example, "H:100.3:WORD" addresses the fourth bit of the WORD value.

Data type:

For data types that are larger than the register size, the following registers are also used, starting from the start register.

Possible data types:

- BOOL, use only for digital inputs and outputs (address range "C" and "D")
- BYTE, USINT
- SINT
- WORD, UINT
- DWORD, UDINT
- INT
- DINT
- LINT
- ULINT
- REAL
- LREAL

- STRING[<number>]; the number must be in the range of 1 to 100, the starting address (first byte) is the current length, the individual characters are interpreted as ANSI bytes.
- ARRAY with numeric values. Syntax: <Base Type>[<Number of Elements>]

Examples:

C:0:BOOL: Addresses a digital output 0

H:0:REAL: Addresses a REAL value, starting at start address 0

Example: Modbus Datapoints in the Datapoints table: