

When legacy automation systems are expanded or modernized, operators are often left with a heterogeneous landscape. Open, standardized communication protocols must be used if the individual systems are to be combined to a comprehensive, high-performance system.

MODBUS/TCP is a convenient way of integrating SIMATIC automation systems into multi-vendor landscapes.

### The challenge

MODBUS is an open protocol used around the world and supported by many different manufacturers. Along with MODBUS, MODBUS/TCP was developed for use in modern networks. This protocol now ranks as an open Internet draft standard introduced to IETF, the Internet Engineering Task Force responsible for Internet standardization. As a result, manufacturers and users everywhere are free to implement this open protocol, and many leading manufacturers have already taken advantage of this opportunity.

With the increasing popularity of Ethernet communications in both industry and offices, MODBUS/TCP is enjoying an increasingly broad use in all industries. In particular heterogeneous system landscapes are typical areas of application.

#### SIMATIC systems on MODBUS/TCP networks

Networking SIMATIC systems to other systems via MODBUS Industrial Ethernet is a very attractive option, especially when

- SIMATIC automation systems are being used to expand or modernize legacy configurations
- controllers and systems from multiple vendors are being networked (including when constructing new plants)

So far, however, SIMATIC systems didn't feature MODBUS/TCP for Industrial Ethernet as a standard. Therefore we have now designed an interface solution.



#### Good reasons for MODBUS/TCP:

- Multi-vendor systems can be easily linked to SIMATIC automation systems by Industrial Ethernet
- Step-by-step expansion or modernization of legacy systems with the latest SIMATIC technology is highly cost-effective
- You can rely on dependable, Siemens-quality support
- Using the MODBUS function block requires no specific expertise
- You benefit from the familiar look and feel of SIMATIC engineering of STEP 7 and PCS 7
- For PN-CPU's, a Wizard is used for configuration

## Open MODBUS/TCP for SIMATIC systems

The easy way to interface SIMATIC controls to multi-vendor systems

Industrial Technologies

**SIEMENS**

## Our solution

### MODBUS Versions

#### MODBUS block for CPs

This MODBUS version is applicable to SIMATIC S7 300 and 400 PLCs. A CP343-1 or CP443-1 is additionally required for the MODBUS communication.

#### MODBUS block for PN PLCs

This MODBUS version is applicable to SIMATIC S7 PN PLCs and ET200S PN PLCs. In this case, the integrated PN-interface is used for the MODBUS communication.

#### MODBUS block with redundancy functionality

This MODBUS version is applicable to SIMATIC S7 400H systems. A CP443-1 is additionally required for every subsystem for the MODBUS communication.

### Range of Functions

#### Client/Server

The server mode as well as the client mode is supported. For the server mode, please note that not all SIMATIC PN PLCs support port 502 for the communication.

#### MODBUS services in accordance with the specification

All MODBUS versions support conformance class 0 with the function codes 3 und 16. The 2nd version also supports conformance class 1 (only for PN-CPU).

#### Redundancy

The block with redundancy function provides the possibility to establish a redundant communication. If one connection is interrupted, the block automatically switches to another connection. Depending on the partner, the redundancy can be created either one-sided or double sided.

#### Mode of Operation

Native TCP connections are established for the MODBUS communication between SIMATIC stations and other MODBUS partners. In this case, the standard functions of the SIMATIC S7 library are used (AG\_SEND, AG\_RECV for the CP versions

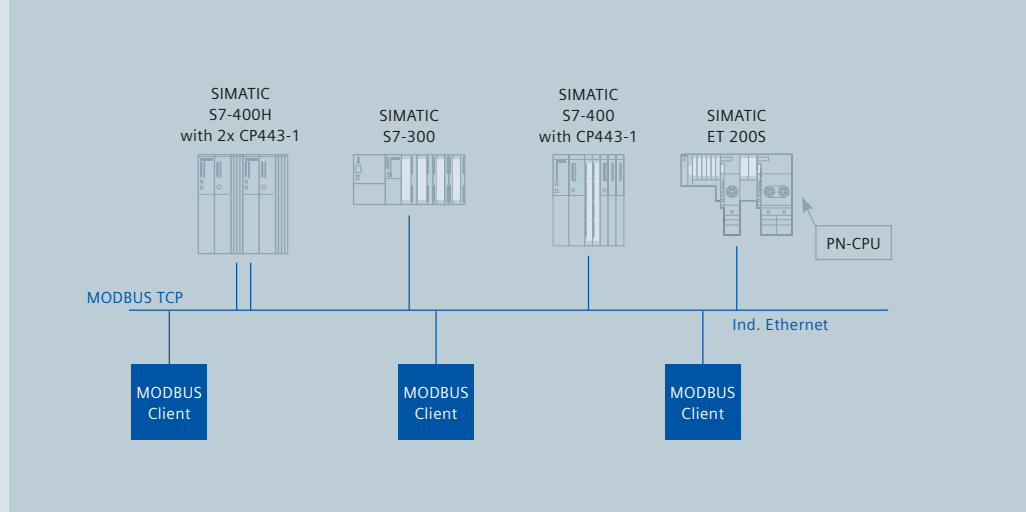


Illustration of how SIMATIC systems can be connected to the MODBUS/TCP network

and T blocks for the PN PLC versions).

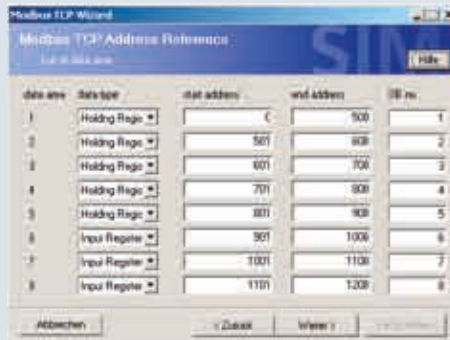
All MODBUS blocks have multi-instance capability.

#### Hardware Requirements

For the current hardware requirements for the different MODBUS versions see: [www.siemens.com/s7modbus](http://www.siemens.com/s7modbus)

#### Software Requirements

- SIMATIC STEP 7 version 5.3 or higher for the CP versions of the MODBUS blocks and
- SIMATIC STEP 7 version 5.4 SP4 or higher for the PN PLC versions of the MODBUS blocks



#### Simple Configuration

The configuration is carried out with the standard tool SIMATIC STEP 7. For the MODBUS block for the PN PLCs, there is the additional option of a Wizard which provides the possibility of a very fast and comfortable configuration.

### Scope of Delivery and Documentation

Included in delivery are:

- SIMATIC S7 library with the relevant MODBUS block
- Functionblock onlinehelp (F1)
- STEP 7 sample project
- Manual (PDF format) in German and English

The installation is done with a setup program.

#### Order Data

**S7 OpenMODBUS/TCP Single License**  
MODBUS communication via CPs;  
order number: **2XV9450-1MB00**

**S7 OpenMODBUS/TCP RED Single License**

Redundant MODBUS communication via CPs (S7-400H system);  
order number: **2XV9450-1MB01**

**S7 OpenMODBUS/TCP PN PLC Single License**

MODBUS communication via the integrated PN-interface;  
order number: **2XV9450-1MB02**

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