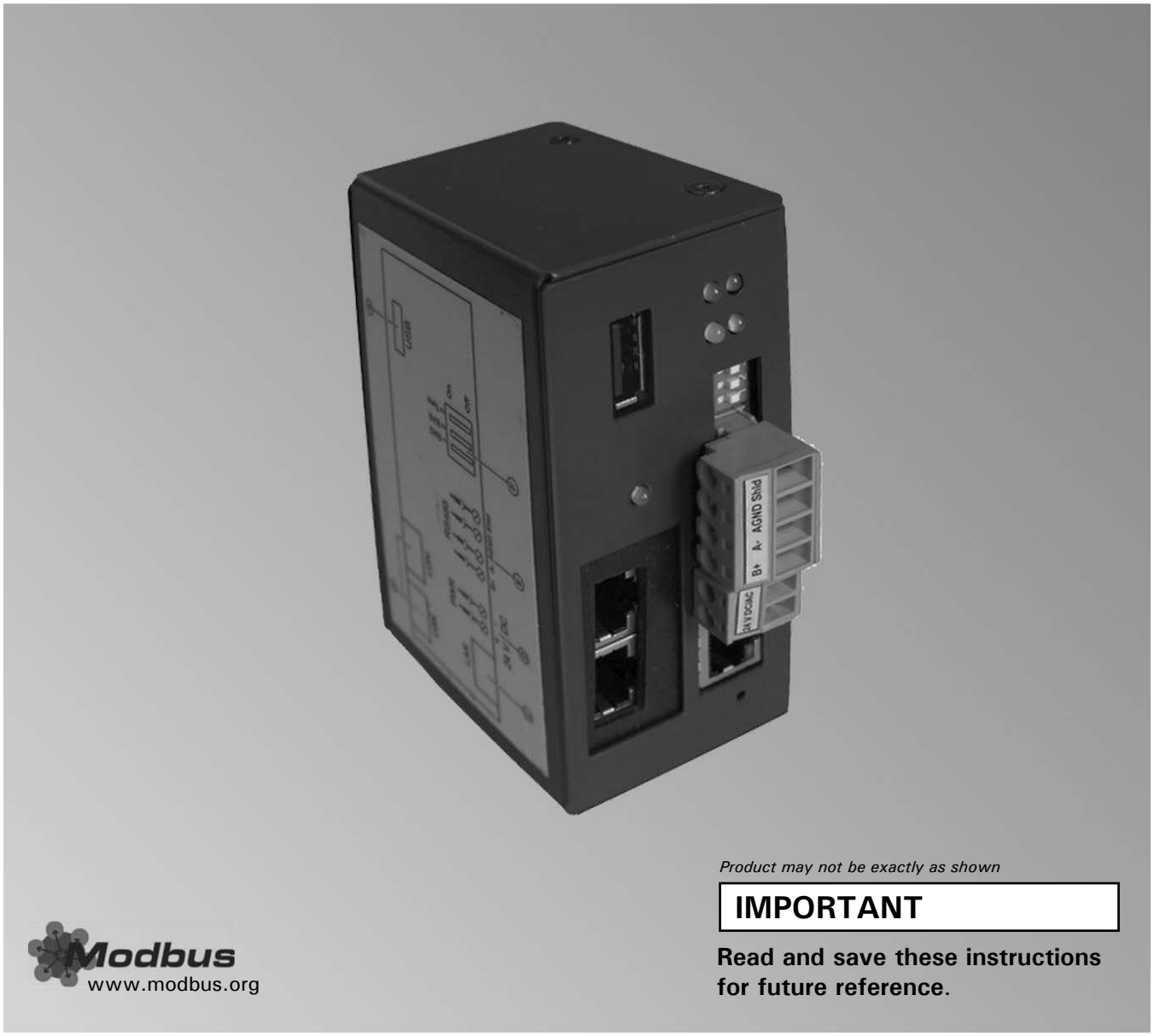
Modbus Specification

for use by heating contractor

Communication with heating systems via Modbus

Vitogate 300



Product may not be exactly as shown

IMPORTANT

Read and save these instructions for future reference.

Modbus
www.modbus.org

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Introduction

MODBUS is a protocol used around the world which is open to all users and supported by many manufacturers. MODBUS was developed in 1979 by Modicon (a French company). Its objective was simple serial PLC communication via the RS232 and RS485 interfaces.

MODBUS/TCP was developed on the basis of it, for use in modern networks. Today, this protocol is an open internet draft standard that has been introduced to IETF (Internet Engineering Task Force), the organization responsible for Internet standardization. Since 2007, MODBUS/TCP has been part of the standard IEC 61 158.

The MODBUS user organization publishes the technical specifications so that any manufacturer and user can implement the protocol, and many leading manufacturers have already taken advantage of this opportunity.
Data is transmitted as:

- ASCII (7 or 8 data bits)
- RTU (Remote Terminal Unit; characters are binary encoded)

ASCII is relatively rare and is prone to “eavesdropping”.

Master/Slave Protocol

Communication takes place in polling mode only (typical for PLCs). Master is the active part of the communication; it can transmit. Normally, it polls the slaves cyclically. The slave is passive and can only respond when it is addressed by a master.
In serial MODBUS networks, there is only one master.

Slave Address

Every slave must have a unique address by design/ configuration. The slaves receive addresses in the range from 1 to 247; 248 to 255 are reserved. Address 0 is reserved as the broadcasting address and must not be used.

Modbus/TCP

MODBUS over IP uses the TCP via standard port 502.

Data Access

Data can be addressed via individual coils or registers using a number. Data is grouped in tables according to type. This data can be divided into binary data (coil and status) and analogue data (holding and input).

Binary registers

- Coils

"Discrete output coils" (read-write boolean, 1 bit)
Table 1 to 9999

- Status

"Discrete input coils" (read-only boolean, 1 bit)
Table 10001 to 19999

Analogue registers

- Input registers

Analog input register (read-only integer, 16 bit)
Table 30001 to 39999

- Holding registers

Analog output holding register (read-write integer, 16 bit)
Table 40001 to 49999

The meaning of the specific bits or registers can only be assigned in the form of a data point list. Additional information, such as the name of the information, unit of measurement, limit thresholds or min./max. information, cannot be defined.
The 16 bit data register may need to be scaled or converted.

Vitogate uses the following formats:

- Unsigned and signed integer (u – unsigned, s – signed)
- Factor of 10 (one decimal place) (ut, unsigned tenth, st – signed tenth)
- Factor of 100 (two decimal places) (uh, unsigned hundredths, sh – signed hundredths)
- Factor of 1000 (three decimal places) (um, unsigned mega, sm – signed mega)

The conversion must be carried out on the master side (at the client).

Supported Function Codes

Vitogate supports the following MODBUS function codes for reading and writing data:

- 01 (0x01) Read Coils
- 02 (0x02) Read Discrete Inputs
- 03 (0x03) Read Holding Registers
- 04 (0x04) Read Input Registers
- 05 (0x05) Write Single Coil
- 06 (0x06) Write Single Register

Up to 64 holding/input registers and up to 255 coil/status registers can be read.

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