



WAGO-I/O-SYSTEM 750
Serial interface RS 485
750-653/003-000
Connecting the ELSNER
Weather station P03/3-Modbus(-GPS)

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1 Important Notes

To ensure quick installation and start-up of the units, we strongly recommend that the following information and explanations are carefully read and adhered to.

1.1 Legal Principles

1.1.1 Subject to Changes

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1.1.3 Personnel Qualification

The use of the product detailed in this document is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines any liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this document.

1.1.4 Intended Use

For each individual application, the components are supplied from the factory with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in this document. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Scope of Validity

This application note is based on the stated hardware and software of the specific manufacturer as well as the associated documentation. This application note is therefore only valid for the described installation.

New hardware and software versions may need to be handled differently.

Please note the detailed description in the specific manuals.

1.3 Symbols

CAUTION

Advise Caution!

Marginal conditions that must always be observed to ensure smooth operation.

Note



Important Note!

Routines or advice for efficient use of a device and software optimization.

Information



Additional Information:

Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.4 Number Notation

Table 1: Number Notation

Number code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.5 Font Conventions

Table 2: Font Conventions

Font type	Indicates
<i>italic</i>	Names of paths and data files are marked in italic-type. e.g.: <i>C:\Programme\WAGO-I/O-CHECK</i>
Menu	Menu items are marked in bold letters. e.g.: Save
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: File > New
Input	Designation of input or optional fields are marked in bold letters, e.g.: Start of measurement range
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under Start of measurement range .
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: [Input]
[Key]	Keys are marked with bold letters in square brackets. e.g.: [F5]

2 Description

This application note describes how communication between the WAGO I/O System and the ELSNER P03/3 weather station with Modbus interface can be realized.

3 Components

Table 3: Components

Supplier	Pieces	Name	Item No.
WAGO	1	Programmable Fieldbus Controller	750-8xx
WAGO	1	2-Channel Digital Input Module 24VDC	750-402
WAGO	1	Serial interface Module RS-485	750-653 / 003-000
WAGO	1	End Module	750-600
WAGO	1	WAGO-I/O-PRO CAA	759-333
ELSNER	1	Weather station P03/3 with Modbus interface	P03/3-Modbus(-GPS)

Optional components:

Table 4: Optional Components

Supplier	Pieces	Name	Item No.
WAGO		USB Communication Cable	750-923



Note

Node structure

The node structure described is only one example of how communication with the P03 weather station can be realized. The modules may be expanded as required by the respective application.

CAUTION

Bus Termination

To ensure trouble-free communication between the controller and P03/3 Modbus (GPS) weather station, set the corresponding DIP switch on the printed circuit board of the weather station to the "Termination" function.



Information

Further information

You will find further information on the weather station at www.elsner-elektronik.de

4 Setup

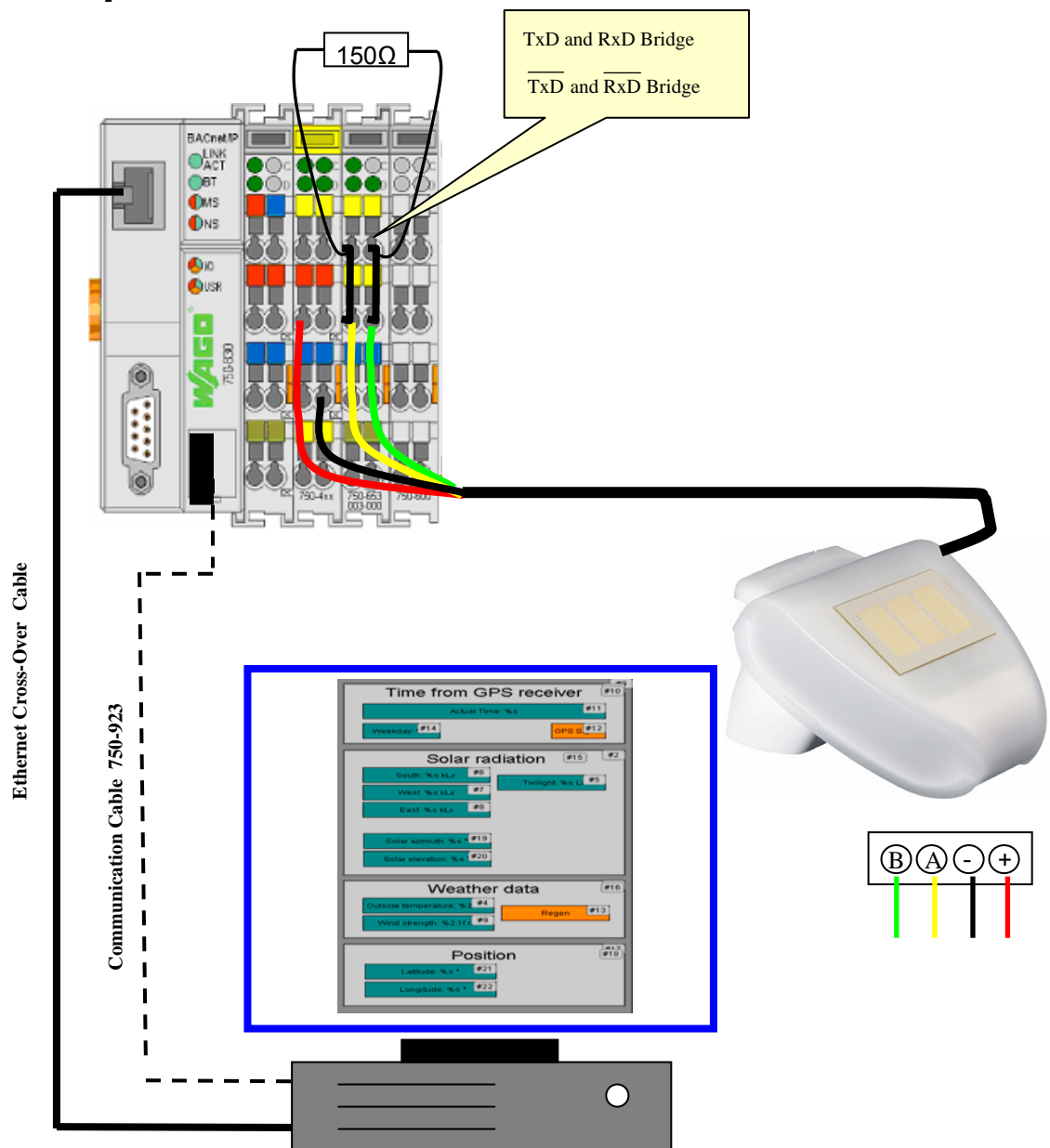


Fig. 1: Connection diagram WAGO-IO-SYSTEM / WAGO IO PRO CAA

Note



Connectivity

For the visualization of the WAGO-I/O-PRO CAA, a connection between the PC and the WAGO Fieldbus controller must be established. There are two possibilities available independent from the Fieldbus controller used. The first option is available in all Fieldbus controllers. In doing so, the connection is established to the service interface of the Fieldbus controller using the USB communication cable 750-923. With Ethernet Fieldbus controllers (e.g. KNX IP und BACnet/IP), there is an alternative possibility to carry out the connection using the Ethernet interface.

5 Configuration of the Serial Interface Module

The **WAGO I/O Check 3** program is used to make the following settings for the 750-653/003-000 serial module:

- 1) Read the I/O node using the [**Identify**] button.
- 2) Right-click on the serial module > select [**Settings**].
- 3) Set the parameters represented in Figure

Parameter	
Baudrate	19200 Baud
Data frame	8 Databits, Even-Parity
Stopbits	1 *
Output format	Standard
Data bytes (BK)	5
Duplex Mode	Halfduplex
Copy State Byte	Normal *
XON/XOFF (Send)	OFF *
XON/XOFF (Receive)	OFF *
Module Type	R5485 *
Continuous Send	ON

Fig. 2: Parameters for the serial module

- 4) Save the parameters to the control by clicking the [**Write**] button in the settings window.



Note

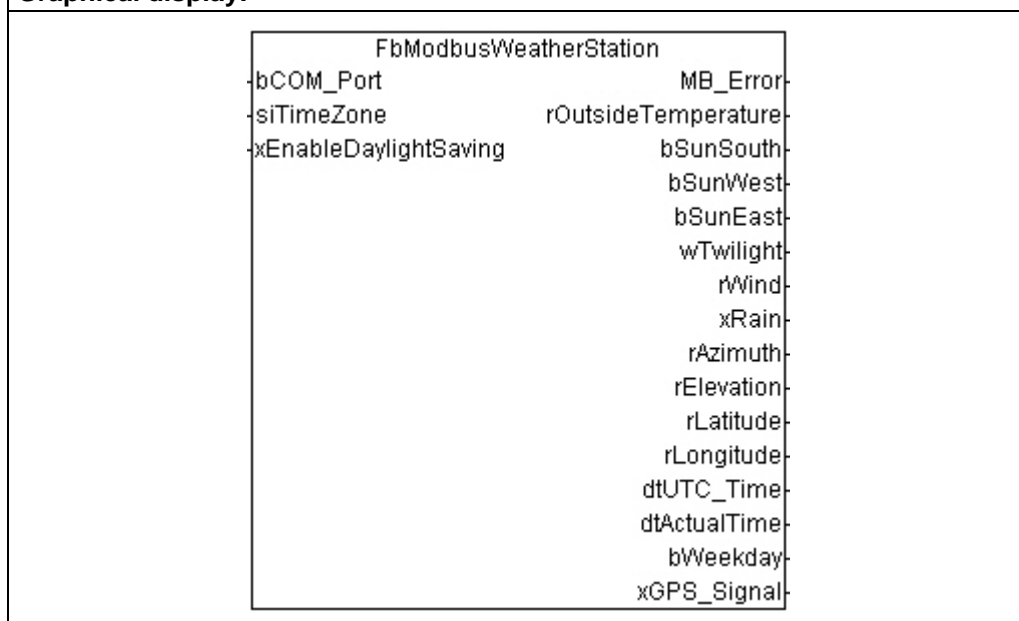
5 Byte Modus

If a control configuration is created in the CoDeSys project, a 5-byte variant must be selected in the control configuration (e.g. 750-653/003-000 #05).

6 Function Block Description

WAGO-I/O-PRO CAA Library Elements			
Category:		Building Automation	
Name:		FbModbusWeatherStation	
Type:		Function <input type="checkbox"/>	Function block <input checked="" type="checkbox"/> Program <input type="checkbox"/>
Name of library:		ElsnerModbusWeatherStation_01.lib	
Applicable to:		See Release Note	
Libraries used:		SerComm.lib Modb_I05.lib Serial_Interface_01.lib	
Input parameter:		Data type:	Comment:
bCom_Port		BYTE	No. of the serial interface used 1 -> Internal service port 2 ->1st connected serial module 3 ->2nd connected serial module
siTimeZone		SINT	Time zone Default value =1
xEnableDaylightSaving		BOOL	Enable Daylight Saving for CET Default value =TRUE
Return value:		Data type:	Comment:
MB_Error		enumMB_ERROR;	16#00 = MB_NO_ERROR 16#01 = MB_NOT_SUPPORTEDFUNCTION 16#03 = MB_ILLEGAL_DATA 16#90 = MB_EXTENDED_SLAVE_ERROR 16#96 = MB_CRC_ERROR 16#97 = MB_ILLEGAL_NUMBER_OF_POINTS 16#98 = MB_OVERRUN 16#99 = MB_TIME_OUT
rOutsideTemperature		REAL	Current outside temperature [°C]
bSunSouth		BYTE	Solar radiation South [kLx]
bSunWest		BYTE	Solar radiation West [kLx]
bSunEast		BYTE	Solar radiation East [kLx]
xTwilight		BOOL	Twilight (TRUE)
rWind		REAL	Wind strength [m/s]
xRain		BOOL	Rain (TRUE)
rAzimuth		REAL	Solar azimuth [°]
rElevation		REAL	Solar elevation [°]
rLatitude		REAL	Latitude [°]
rLongitude		REAL	Longitude [°]

dtUTC_Time	DT	Actual UTC-Time from GPS-receiver
dtActualTime	DT	Local Time
bWeekday	BYTE	Current day of the week 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday
xGPS_Signal	BOOL	GPS Signal received (TRUE)

Graphical display:**Function description:**

The "**FbModbusWeatherStation**" function block is used for connecting the ELSNER P03 weather station with Modbus interface to the WAGO I/O System.

The serial interface used is set with "**bCom_Port**"

Example:

- 1 -> Internal service port
- 2 -> 1st connected serial module
- 3 -> 2nd connected serial module

An error can be identified by the error code that is displayed at the output "**bError**".

The output "**rOutsideTemperature**" shows the current outside temperature in °C.

The outputs "**bSunSouth**", "**bSunWest**" and "**bSunEast**" show the solar radiation in kLx from the respective directions.

The output "**wTwilight**" shows the brightness level in the measuring range 0 - 999 Lx using a separate brightness sensor. A dimmer switch can be implemented with this output.

The output "**rWind**" shows the current wind speed in m/s.

If the weather station detects rain, this is indicated by the output "**xRain**".

To switch automatically between standard time and daylight savings, the "**xEnableDaylightSaving**" input is set to TRUE.

The following functions are only put into operation when using the P03/3 Modbus GPS weather station:

The output "**xGPS_Signal**" is TRUE when there is a GPS connection.

The time of day and date are shown at the output "**dtActualTime**". The time of day is regularly synchronized with the GPS time and a time shift, as well as the optional standard time "**siTimeZone**" and daylight savings changeover are also taken into account.

The current world time UTC is output at output "**dtUTC_Time**".

If faults in the GPS signal occur during operation, the time is carried on from the weather station, but loses its data in case of power failure.

The day of the week is calculated from the current date and is shown at output "**bWeekday**".

Output "**rAzimuth**" shows the actual azimuth and output "**rElevation**" the elevation in degrees.

Outputs "**rLatitude**" and "**rLongitude**" output the latitude and longitude of the location of the weather station. These values are determined by the internal GPS receiver.

Note:

The freely-configurable 750-653/003-000 interface module or the 750-652 interface module should be used as the Modbus interface.

7 Example Program

7.1 Task

The data from the P03/3 weather station should be read by the WAGO-I/O-SYSTEM. For this purpose, the weather station is connected to the WAGO-I/O-SYSTEM using an RS 485 interface module (see Fig.1). In addition to the weather data, the time from the GPS receiver is also evaluated and continues to be calculated by the weather station should the GPS signal fail. Application programming is described briefly below.

7.2 Programming

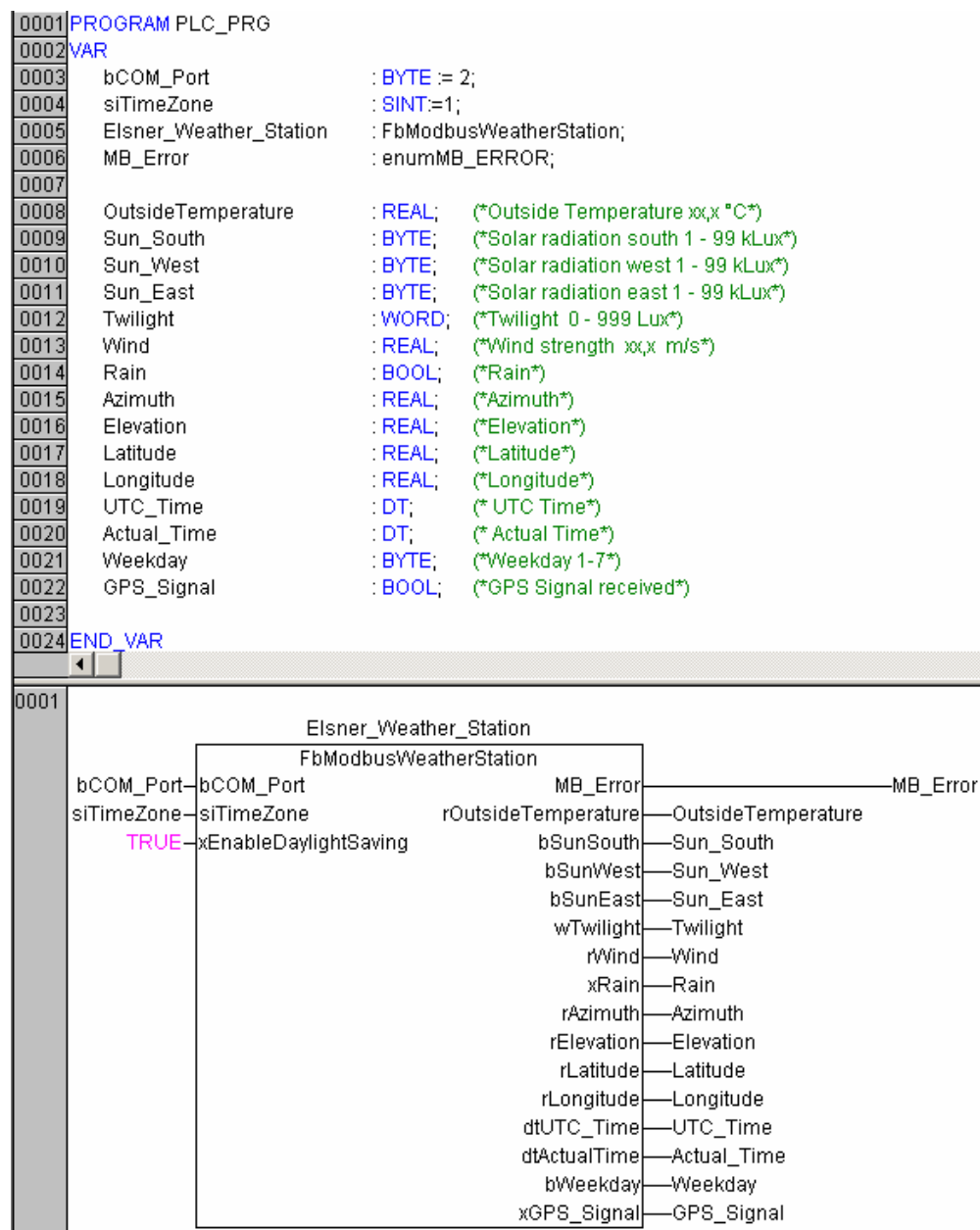


Fig. 3: Evaluating the data from the weather station

In order to communicate with the P03 weather station, it is only necessary to select the COM port in the "*FbModbusWeatherStation*" block. All other communications parameters are set automatically by the function block.

For module-internal calculation of the time, the time zone of the location must be entered and the daylight savings changeover enabled or disabled.

The values measured by the weather station are shown at the outputs of the function block. If an error occurs during communication, this is indicated at the "*bError*" output by means of a numerical code.

7.3 Visualization Interface

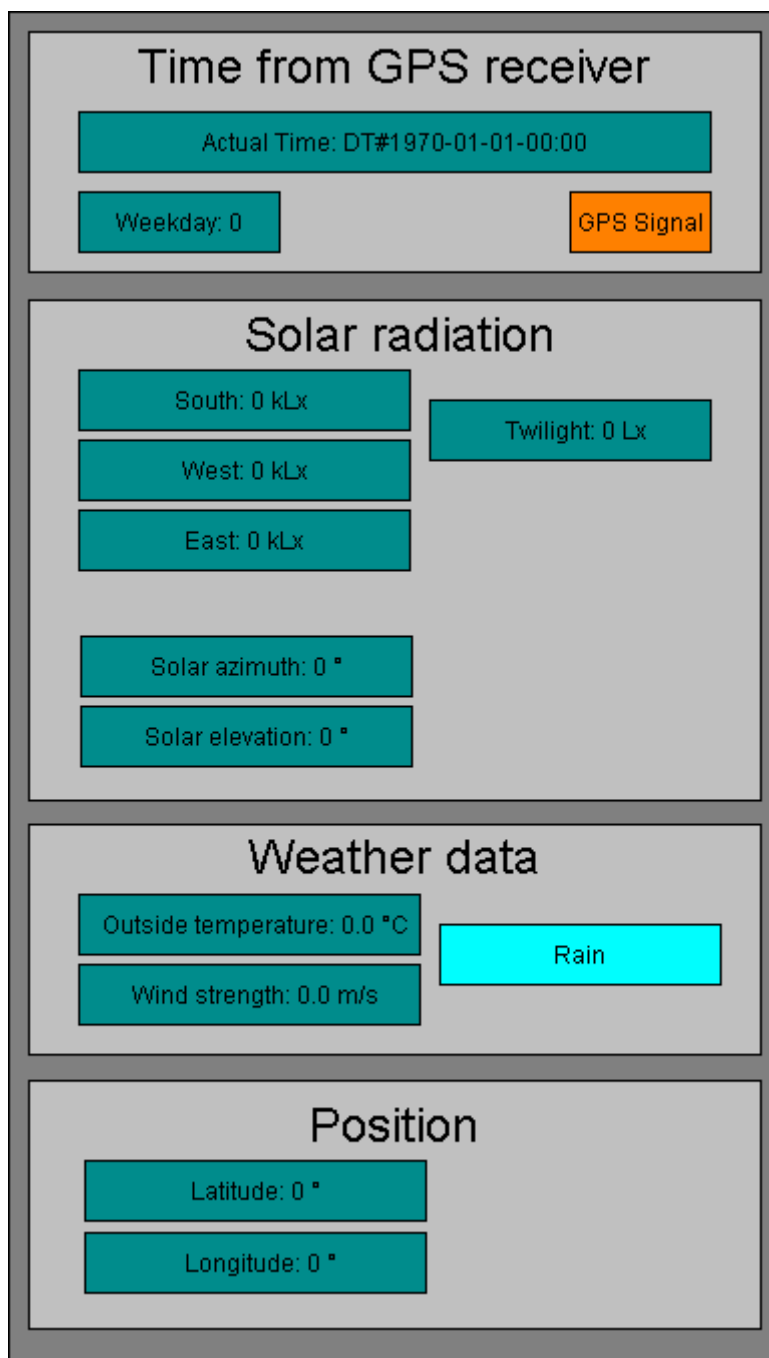


Fig. 4: Visualization interface for displaying the weather data

The visualization interface is used for displaying the weather data and is linked directly to the variables from the PLC_PRG.

The data received from the function block are displayed in the visualization with the appropriate units or, in the case of Boolean values, a color change takes place. When a Boolean value is TRUE, the appropriate field is shown in blue.

Required Libraries

Table 5: Required Libraries

Library	Description
ElsnerModbusWeather Station_01.lib	Function block for the weather station
Standard.lib	Standard functions
SerComm.lib	Basic serial interface functions
Serial_Interface_01.lib	Communications block for the serial module
Modb_I05.lib	Communications module for the Modbus protocol

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