Library Description

WAGO-I/O-SYSTEM 750

CODESYS 2 Library

ThiesModbusWeatherStation_01.lib

Integrating the Thies Weather Station

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WAGO Kontakttechnik GmbH & Co. KG

Hansastraße 27
D-32423 Minden

Phone: +49 (0) 571/8 87 – 0
Fax: +49 (0) 571/8 87 – 1 69

Email: info@wago.com

Web: http://www.wago.com

Technical Support

Phone: +49 (0) 571/8 87 – 5 55
Fax: +49 (0) 571/8 87 – 85 55

Email: support@wago.com

Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally protected by trademark or patent.

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Information about This Documentation

Note

Always retain this documentation!
This documentation is an important part of the product. Retain the documentation for the entire service life of the product. Pass on the documentation to any subsequent user of the product. In addition, ensure that any supplement to this documentation is included, if necessary.

Copyright

Symbols

Attention

Attention!
Boundary 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).

Number Notation

Table 1: Number Notation

Number Code	Example	Comment
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated by a period

Font Conventions

Table 2: Font Conventions

Font Type	Explanation
italic	Names of the paths and files are displayed in italics, e.g.: *C:\Programs\WAGO Software*
Menu	Menu options are displayed in bold e.g. **Save**
>	A “greater than” symbol between two names denotes the selection of a menu option from a menu, e.g.: **File > New**
Input	Designation of input or optional fields are displayed in bold; e.g.: **Start of measurement range**
“Value”	Input or selection values are displayed in quotation marks, e.g.: Enter the value “4 mA” under **Start of measurement range**.
[Button]	Button labels in the dialogs are displayed in bold and enclosed in square brackets, e.g.: **[input]**
[Key]	Key labels on the keyboard are displayed in bold and enclosed in square brackets, e.g.: **[F5]**

Important Notes

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

Subject to Change

WAGO Kontakttechnik GmbH & Co. KG reserves the right to make any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

Personnel Qualification

The use of the product described 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 appropriate current standards. WAGO Kontakttechnik GmbH & Co. KG assumes no 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.

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 send your requests for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

Technical Condition of Specified Devices

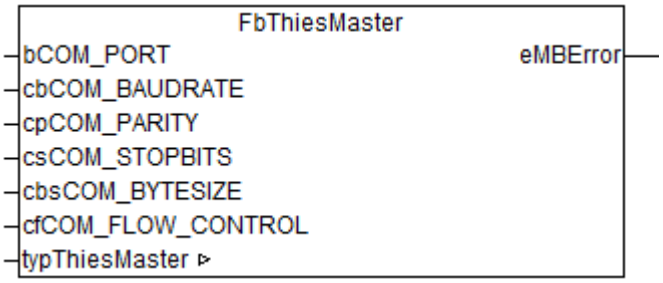
For each individual application, the devices are supplied from the factory with a dedicated hardware and software configuration. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG. Please send your requests for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

Modules

Master Function Block (FbThiesMaster)

WAGO-I/O-*PRO* Library Elements			
Category:	Building automation		
Name:	FbThiesMaster		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	ThiesModbusWeatherSensors_01.lib		
Applicable to:	See Release Note		
Library used:	Modb_I05.lib, Serial_Interface_01.lib		
Input parameter:	**Data type:**	**Comment:**	
bCOM_PORT	BYTE	COM port number of the serial I/O module Default: 2	
cbCOM_BAUDRATE	COM_BAUDRATE	Baud rate for serial communication Default: 960 (9600 baud)	
cpCOM_PARITY	COM_PARITY	Parity for serial communication Default: 0 (“no parity”)	
csCOM_STOPBITS	COM_STOPBITS	Stop bits for serial communication Default: 1	
cbsCOM_BYTESIZE	COM_BYTESIZE	Data bits for serial communication Default: 8	
cfCOM_FLOW_CONTROL	COM_FLOW_CONTROL	Serial communication mode Default: HALFDUPLEX	
Input/Output parameters:	**Data type:**	**Comment:**	
typThiesMaster	typThiesMaster	Data type for I/O module communication	
.typModbusQuery	typModbusQuery	Modbus send data	
.typModbusResponse	typModbusResponse	Modbus receive data	
.xReadWriteData	BOOL	Signal to read or write the Modbus data	
.eMBError	enumMB_ERROR	Error in Modbus communication	
.iAvailableFBs	INT	Number of instantiated Thies modules in the project Default: 0	
.iActiveFB	INT	Number of the currently active module Default: 1	

Graphical illustration:



Function description:

The **FbThiesMaster** function block is used for sensor module communication. It executes the module instances called up one after the other, preventing duplicate Modbus communication. The module may only be called up once per Modbus line (COM port).

The number of the serial interface used is set by ***"bCOM_PORT"***.

Example:

1 -> Internal service interface

2 ->1st connected serial I/O module

3 ->2nd connected serial I/O module

The ***"typThiesMaster"*** is used for communication with the module instances called up and contains the following parameters:

- **".typModbusQuery"**: Data sent via Modbus.
- **".typModbusResponse"**: Data received via Modbus.
- **".xReadWriteData"**: Signal to read or write the Modbus data.
- **".eMBError"**: Display of Modbus status messages.
- **".iAvailableFBs"**: Number of instances called up.
- **".iActiveFB"**: Number of instances currently active.

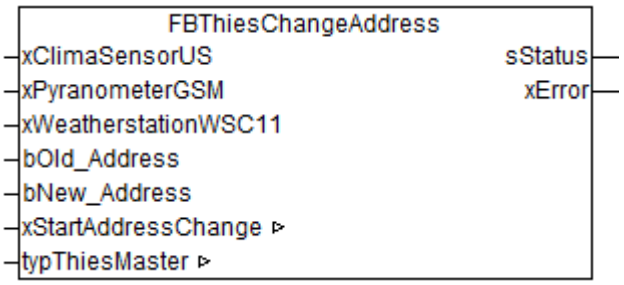
Like the **"eMBError"** output, the *"typThiesMaster.eMBError"* outputs the Modbus communication status. The other parameters are used for internal processing and can be ignored.

Note:

- Integration of this module is required for communication with Thies weather sensors.

Change Address Module (FbThiesChangeAddress)

WAGO-I/O-*PRO* Library Elements			
Category:	Building automation		
Name:	FbThiesChangeAddress		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	ThiesModbusWeatherSensors_01.lib		
Applicable to:	See Release Note		
Library used:	Modb_I05.lib, Serial_Interface_01.lib		
Input parameter:	**Data type:**	**Comment:**	
xClimaSensorUS	BOOL	Selection of the Clima Sensor US for readressing	
xPyranometerGSM	BOOL	Selection of the Pyranometer GSM for readressing	
xWeatherstationWSC11	BOOL	Selection of the Compact WSC11 weather station for readdressing	
bOld_Address	BYTE	Previous address of the weather sensor	
bNew_Address	BYTE	Desired address of the weather sensor	
Input/Output parameters:	**Data type:**	**Comment:**	
xStartAddressChange	BOOL	Start signal for readdressing; this input/output parameter is reset after readdressing is complete.	
typThiesMaster	typThiesMaster	Data type for communication with the master module	
Output parameter:	**Data type:**	**Comment:**	
sStatus	STRING(30)	Status message about the current status of readdressing	
xError	BOOL	Binary feedback if there is an error	
Graphical Illustration:			



Function description:

The **FbThiesChangeAdress** function block is used to readdress a Thies sensor. Readdressing is required when 2 or more sensors have the same address on a Modbus line.

Set the ***"xClimaSensorUS"*** input if you want to readdress a Clima Sensor US.

Set the ***"xPyranometerGSM"*** input if you want to readdress a Pyranometer GSM.

Set the ***"xWeatherstationWSC11"*** input if you want to readdress a Compact WSC11 weather station.

The address is specified at the ***"bOld_Address"*** input that was set for the sensor before readdressing.

The required address is specified at the ***"bNew_Address"*** input that must be set for the sensor after readdressing.

The ***"xStartAddressChange"*** input/output parameter starts the readdressing of the selected sensor. The parameter is set to FALSE if readdressing was successful or if readdressing was aborted due to an error.

The ***"typThiesMaster"*** input/output parameter is used for communication with the master module and must have the same structure as at the input/output of the master module of the same name.

The ***"sStatus"*** output reads out the current status of the module as a text after activating the start signal.

The following status messages are possible:

- *ADDRESS CHANGE COMPLETED*
  The slave address was changed successfully. The sensor can be accessed immediately at the new address.
- *PLEASE CHOOSE ONE DEVICE*
  No sensor to address has been selected. Please select a sensor.
- *ERROR – CHOOSE ONLY ONE DEVICE*
  More than one sensor to address is selected. Select only one sensor.
- *MB ERROR*
  There is an error in the Modbus communication. More information is available from the *"eMBError"* in the *"typThiesMaster"* structure.

In the form of a binary signal, the ***"xError"*** output indicates when there is an error.

Notes:

- Only one input can be set between the "xClimaSensorUS", "xPyranometerGSM" and "xWeatherstationWSC11" inputs. If more than one of these inputs is set, the module outputs a tip at the "stStatus" output and points to an error at the "xError" output.
- If you want to operate a Pyranometer GSM and Compact WSC 11 weather station on a Modbus line with the same address, the sensors can only be readdressed if one of the sensors is disconnected from the bus.

Clima Sensor US (FbThiesClimaSensorUS)

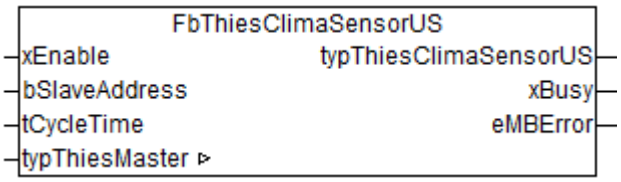
WAGO-I/O-*PRO* Library Elements			
Category:	Building automation		
Name:	FbThiesClimaSensorUS		
Type:	Function ☐	Function block ☒	Program ☐
Name of library:	ThiesModbusWeatherSensors_01.lib		
Applicable to:	See Release Note		
Library used:	Modb_I05.lib, Serial_Interface_01.lib		
Input parameter:	**Data type:**	**Comment:**	
xEnable	BOOL	Enables cyclic reading of the data Default: TRUE	
bSlaveAddress	BYTE	Slave address of the sensor Default: 1	
tCycleTime	TIME	Cycle time for reading the sensor Default: t#1s	
Input/Output parameters:	**Data type:**	**Comment:**	
typThiesMaster	typThiesMaster	Data type for communication with the master module	
Return value:	**Data type:**	**Comment:**	
typThiesClimaSensorUS	typThiesClimaSensorUS	Measured values read from the sensor	
.xGlobalError	BOOL	Displays if a measured value was read incorrectly or if Modbus communication is disrupted	
.typMedianWindSpeed	typThies_rValue	Median wind velocity in m/s	
rValue	REAL	Measured value	
.xError	BOOL	Error indication	
.typMedianWindDirection	typThies_rValue	Median wind direction in °(degrees)	
rValue	REAL	Measured value	
.xError	BOOL	Error indication	
.typAirTemperature	typThies_rValue	Air temperature in °C	
rValue	REAL	Measured value	
.xError	BOOL	Error indication	
.typCaseTemperature	typThies_rValue	Building inside temperature in °C	
rValue	REAL	Measured value	
.xError	BOOL	Error indication	
.typAcusticalTemperature	typThies_rValue	Acoustic temperature in °C	
rValue	REAL	Measured value	
.xError	BOOL	Error indication	

WAGO-I/O-*PRO* Library Elements		
.typUncorrectedAirTemperature	typThies_rValue	Uncorrected air temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typRelativeHumidity	typThies_rValue	Relative humidity in % r.H.
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typDewpointTemperature	typThies_rValue	Dew point temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAbsoluteAirPressure	typThies_rValue	Absolute air pressure in hPa
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typRelativeAirPressure	typThies_rValue	Relative air pressure at sea level in hPa
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessNorth	typThies_rValue	Brightness north in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessEast	typThies_rValue	Brightness east in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessSouth	typThies_rValue	Brightness south in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessWest	typThies_rValue	Brightness west in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typDirectionOfBrightness	typThies_rValue	Direction of brightness in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typMaxBrightness	typThies_rValue	Maximum brightness value in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typStatusOfRain	typThies_xValue	Precipitation status 0: No precipitation 1: Precipitation
.xValue	BOOL	Measured value
.xError	BOOL	Error indication

WAGO-I/O-*PRO* Library Elements		
.typRainIntens	typThies_rValue	Precipitation intensity (extrapolated to the last minute of the hour) in in mm/h
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typRainfall	typThies_rValue	Amount of precipitation (reset at 12:00 AM) in mm/d
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typKindOfRain	typThies_rValue	Type of precipitation Synoptic encrypted (see Table 4)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typDateTime	typThies_dtValue	Date and time in the format DT#YYYY-MM-DD-HH:MM:SS
.dtValue	DT	Measured value
.xError	BOOL	Error indication
.typLongitude	typThies_rValue	Longitude in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typLatitude	typThies_rValue	Latitude in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typElevation	typThies_rValue	Position of the sun, elevation in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAzimut	typThies_rValue	Position of the sun, azimuth in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typHeightNZ	typThies_rValue	Station height above NN in m (determined by GPS signal)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typGeneralDisturbance	typThies_xValue	General disturbance 0: No disturbance 1: Disturbance For additional information: (see Table 5)
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typPuffer	typThies_bValue	Used message memory For additional information: (see Table 5)
.bValue	BYTE	Measured value
.xError	BOOL	Error indication

WAGO-I/O-*PRO* Library Elements		
.typPlausibility	typThies_xValue	Plausibility 0: Plausibility check ON 1: Plausibility check OFF For additional information: (see Table 5)
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typStaticDisturbance	typThies_xValue	Static disturbance 0: No disturbance 1: Static disturbance For additional information: (see Table 5)
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typHeatingControlActive	typThies_xValue	Heating System Control 0: Heating system control OFF 1: Heating system control ON For additional information: (see Table 5)
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typHeatingOn	typThies_xValue	Heating 0: Heating OFF 1: Heating ON For additional information: (see Table 5)
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typSensorVoltage	typThies_rValue	Sensor supply voltage in V
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typLiveCounter	typThies_rValue	Live counter in ms
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typErrorStatusLastMeasurement	typThies_xValue	Error status of the last measured value 0: No error 1: Measured value was faulty
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typ2ndBrightnessNorth	typThies_rValue	Brightness north in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typ2ndBrightnessEast	typThies_rValue	Brightness east in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typ2ndBrightnessSouth	typThies_rValue	Brightness south in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication

WAGO-I/O-*PRO* Library Elements		
.typ2ndBrightnessWest	typThies_rValue	Brightness west in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typ2ndMaxBrightness	typThies_rValue	Maximum brightness value in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication
xBusy	BOOL	Ready indication FALSE: Ready TRUE: Not ready, module working
eMBError	enumMB_ERROR	Modbus error code
Graphical illustration:		



Function description:

The **FbThiesClimaSensorUS** function block reads the measured values from the Thies “Clima Sensor US” weather station and presents them as a structure.

A permanent TRUE signal at the ***“xEnable”*** input activates and a FALSE signal deactivates the readout process. If the input is not enabled, the readout process starts automatically.

The sensor address is determined at the ***“bSlaveAddress”*** input. By assigning different addresses, multiple sensors can be pinged via one serial I/O module. This input is assigned with “1” by default.

The maximum interval time to be maintained when reading is determined at the ***“tCycleTime”*** input. The actual time between the read-outs can be greater depending on the number of instantiated read-out modules on one Modbus line. This input is assigned with “t#1s” by default.

The ***“typThiesMaster”*** input/output parameter is used for communication with the master module and must have the same structure as at the input/output of the master module of the same name.

The measured values read from the Clima Sensor US are presented in a structure at the ***“typThiesClimaSensorUS”*** output. There is an “xError” variable for each measured value that displays if there is an error for the measured value. The ***“.xGlobalError”*** parameter provides a global overview if all values have been read correctly or if there is an error at one position.

The ***“xBusy”*** output indicates that the module is currently in a read-out process. If the output is “TRUE”, communication is in progress. If the output is “FALSE”, the module is idle.

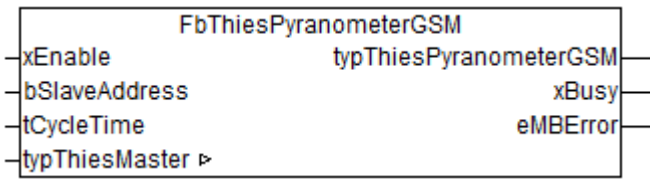
The current status of the Modbus communication is output at the ***“eMBError”*** output.

Pyranometer GSM 10.7 (FbThiesPyranometerGSM)

WAGO-I/O-*PRO* Library Elements		
Category:	Building automation	
Name:	FbThiesPyranometerGSM	
Type:	Function ☐	Function block ☒ Program ☐
Name of library:	ThiesModbusWeatherSensors_01.lib	
Applicable to:	See Release Note	
Library used:	Modb_I05.lib, Serial_Interface_01.lib	
Input parameter:	**Data type:**	**Comment:**
xEnable	BOOL	Enables cyclic reading of the data Default: TRUE
bSlaveAddress	BYTE	Slave address of the sensor Default: 1
tCycleTime	TIME	Cycle time for reading the sensor Default: t#1s
Input/Output parameters:	**Data type:**	**Comment:**
typThiesMaster	typThiesMaster	Data type for communication with the master module
Return value:	**Data type:**	**Comment:**
typThiesPyranometerGSM	typThiesPyranometerGSM	Measured values read from the sensor
.xGlobalError	BOOL	Displays if a measured value was read incorrectly or if Modbus communication is disrupted.
.typCaseTemperature	typThies_rValue	Building inside temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typGlobalRadiation	typThies_rValue	Global radiation in W/m²
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typGainX1	typThies_xValue	1x gain 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typGainX2	typThies_xValue	2x gain 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typGainX64	typThies_xValue	64x gain 0: Deactivated 1: Activated

WAGO-I/O-*PRO* Library Elements		
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typGainX128	typThies_xValue	128x gain 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typADConversionRate10SPS	typThies_xValue	A/D conversion rate 10SPS 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typADConversionRate80SPS	typThies_xValue	A/D conversion rate 80SPS 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typSourceRadiationMeasurement	typThies_xValue	Source for the radiation measurement 0: Peltier element 1: Photodiode
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typCyclesPerSecond	typThies_rValue	Main loop cycles per seconds in 1/s
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typOperationTime	typThies_rValue	Operating time in s
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typVoltagePeltierElement	typThies_rValue	Voltage of the Peltier element in mV
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typVoltagePhotodiode	typThies_rValue	Voltage of the photodiode in mV
rValue	REAL	Measured value
.xError	BOOL	Error indication
xBusy	BOOL	Ready indication FALSE: Ready TRUE: Not ready, module working
eMBError	enumMB_ERROR	Modbus error code

Graphical illustration:



Function description:

The **FbThiesPyranometerGSM** function block reads the measured values of the "Pyranometer GSM 10.7" and presents them as a structure.

A permanent TRUE signal at the ***"xEnable"*** input activates and a FALSE signal deactivates the readout process. If the input is not enabled, the readout process starts automatically.

The sensor address is determined at the ***"bSlaveAddress"*** input. By assigning different addresses, multiple sensors can be pinged via one serial I/O module. This input is assigned with "1" by default.

The maximum interval time to be maintained when reading is determined at the ***"tCycleTime"*** input. The actual time between the read-outs can be greater depending on the number of instantiated read-out modules on one Modbus line. This input is assigned with "t#1s" by default.

The ***"typThiesMaster"*** input/output parameter is used for communication with the master module and must have the same structure as at the input/output of the master module of the same name.

The measured values read from the Pyranometer GSM are presented in a structure at the ***"typThiesPyranometerGSM"*** output. There is an "xError" variable for each measured value that displays if there is an error for the measured value. The ***".xGlobalError"*** parameter provides a global overview if all values have been read correctly or if there is an error at one position.

The ***"xBusy"*** output indicates that the module is currently in a read-out process. If the output is "TRUE", communication is in progress. If the output is "FALSE", the module is idle.

The current status of the Modbus communication is output at the ***"eMBError"*** output.

Compact WSC11 Weather Station (FbThiesWeatherstationCompactWSC11)

WAGO-I/O-*PRO* Library Elements		
Category:	Building automation	
Name:	FbThiesWeatherstationCompactWSC11	
Type:	Function ☐ | Function block ☒ | Program ☐	
Name of library:	ThiesModbusWeatherSensors_01.lib	
Applicable to:	See Release Note	
Library used:	Modb_I05.lib, Serial_Interface_01.lib	
Input parameter:	**Data type:**	**Comment:**
xEnable	BOOL	Enables cyclic reading of the data Default: TRUE
bSlaveAddress	BYTE	Slave address of the sensor Default: 1
tCycleTime	TIME	Cycle time for reading the sensor Default: t#1s
Input/Output parameters:	**Data type:**	**Comment:**
typThiesMaster	typThiesMaster	Data type for communication with the master module
Return value:	**Data type:**	**Comment:**
typThiesWSC11	typThiesWSC11	Measured values read from the sensor
.xGlobalError	BOOL	Displays if a measured value was read incorrectly or if Modbus communication is disrupted.
.typWindSpeed	typThies_rValue	Wind velocity in m/s
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typMedianWindSpeed	typThies_rValue	Median wind velocity in m/s
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typWindDirection	typThies_rValue	Wind direction in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typMedianWindDirection	typThies_rValue	Median wind direction in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAirTemperature	typThies_rValue	Air temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication

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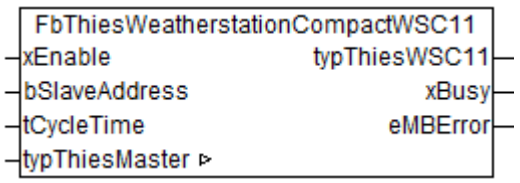
.typCaseTemperature	typThies_rValue	Building inside temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typDewpointTemperature	typThies_rValue	Dew point temperature in °C
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typRelativeHumidity	typThies_rValue	Relative humidity in % r.H.
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAbsoluteHumidity	typThies_rValue	Absolute humidity in g/m³
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAbsoluteAirPressure	typThies_rValue	Absolute air pressure in hPa
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typRelativeAirPressure	typThies_rValue	Relative air pressure at sea level in hPa
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typGlobalRadiation	typThies_rValue	Global radiation in W/m²
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessNorth	typThies_rValue	Brightness north in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessEast	typThies_rValue	Brightness east in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessSouth	typThies_rValue	Brightness south in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typBrightnessWest	typThies_rValue	Brightness west in kLux
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typTwilight	typThies_rValue	Twilight in Lux
rValue	REAL	Measured value
.xError	BOOL	Error indication

WAGO-I/O-*PRO* Library Elements		
.typStatusOfRain	typThies_xValue	Precipitation status 0: No precipitation 1: Precipitation
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typDateTime	typThies_dtValue	Date and time in the format DT#YYYY-MM-DD-HH:MM:SS
.dtValue	DT	Measured value
.xError	BOOL	Error indication
.typTimeFormat	typThies_rValue	Offset for UTC time in h
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typLongitude	typThies_rValue	Longitude in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typLatitude	typThies_rValue	Latitude in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typElevation	typThies_rValue	Position of the sun, elevation in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typAzimut	typThies_rValue	Position of the sun, azimuth in °(degrees)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typHeightNZ	typThies_rValue	Station height above NN in m (determined by GPS signal)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typMedianHeightNZ	typThies_rValue	Median station height above NN in m (determined by GPS signal)
rValue	REAL	Measured value
.xError	BOOL	Error indication
.typDewProtection	typThies_xValue	Dew protection 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication
.typDryingPhaseSensorSurface	typThies_xValue	Drying phase sensor surface 0: Deactivated 1: Activated
.xValue	BOOL	Measured value
.xError	BOOL	Error indication

WAGO-I/O-*PRO* Library Elements		
.xInvalidADCData	BOOL	Status of the A/D converter values 0: Values valid 1: Values invalid
.xWatchdogReset	BOOL	Last reset by watchdog reset? 0: No 1: Yes
.xInvalidEEPROMParameter	BOOL	Status of the internal EEPROM parameters 0: Parameters valid 1: Parameters invalid
.xEEPROMParameterStandardValues	BOOL	Internal EEPROM parameters receive default values 0: Inactive 1: Active
.xNewFirmware	BOOL	Last restart with new firmware 0: Not true 1: True
.rCyclesPerSecond	REAL	Main loop cycles in 1/s
.rSHT2xTemperature	REAL	Temperature of the internal sensor in °C (can be ignored)
.xNTCTemperature	REAL	Temperature of the internal sensor in °C (can be ignored)
.rOperationTime	REAL	Operating time in s
xBusy	BOOL	Ready indication FALSE: Ready TRUE: Not ready, module working
eMBError	enumMB_ERROR	Modbus error code

Graphical Illustration:



Function description:

The **FbThiesWeatherstationCompactWSC11** function block reads the measured values from the Thies “Compact WSC11” weather station and presents them as a structure.

A permanent TRUE signal at the ***“xEnable”*** input activates and a FALSE signal deactivates the readout process. If the input is not enabled, the readout process starts automatically.

The sensor address is determined at the ***“bSlaveAddress”*** input. By assigning different addresses, multiple sensors can be pinged via one serial I/O module. This input is assigned with “1” by default.

WAGO-I/O-*PRO* Library Elements

The maximum interval time to be maintained when reading is determined at the ***"tCycleTime"*** input. The actual time between the read-outs can be greater depending on the number of instantiated read-out modules on one Modbus line. This input is assigned with "t#1s" by default.

The ***"typThiesMaster"*** input/output parameter is used for communication with the master module and must have the same structure as at the input/output of the master module of the same name.

The measured values read from the Compact WSC11 are presented in a structure at the ***"typThiesWSC11"*** output. There is an "xError" variable for each measured value that displays if there is an error for the measured value. The ***".xGlobalError"*** parameter provides a global overview if all values have been read correctly or if there is an error at one position.

The ***"xBusy"*** output indicates that the module is currently in a read-out process. If the output is "TRUE", communication is in progress. If the output is "FALSE", the module is idle.

The current status of the Modbus communication is output at the ***"eMBError"*** output.

Note:

- The Compact WSC11 weather station does not determine the "Station height above NN" by the GPS signal at the factory. The module configures this setting during the first cycle or automatically when changing the slave address. Please regard this note if you have configured the "Station height above NN" yourself.

Global Constants

GVL_THIES

Table 3: “GVL_THIES” Global Constants

Glob. constants	Explanation
bCyclesToVerifyError	Number of read cycles in which the sensor has to permanently read an error until it is transferred to the output structure. This offset filters unique non-critical errors that are reported by the sensor.

Appendix

Type of Precipitation for Clima Sensor US

Table 4

Synop key	Explanation
0	No precipitation
40	Precipitation
51	Light drizzle
52	Moderate drizzle
53	Heavy drizzle
61	Light rain
62	Moderate rain
63	Heavy rain
67	Light rain and/or drizzle with snow
68	Moderate rain and/or drizzle with snow
70	Snow
71	Light snow
72	Moderate snow
73	Heavy snow
74	Ice pellets
89	Heavy hail

Sensor Status for Clima Sensor US

Table 5

Bit No.	Function	Description	
Bit 0	General disturbance	Averaging time < 10 s	An error is output if no new measured value can be determined over a period of 10 s.
		Averaging time >= 10 s	An error is output if values are contained in the averaging buffer based on a one-second measuring rate less than 50%. Example: At an averaging time of 10 s, three must be at least 5 measured values in the averaging buffer.
Bit 1 Bit 2 Bit 3	Used message memory	Indicates the used message memory, bit 1 to bit 3 indicate the fill level of the averaging buffer in binary format. 0: Buffer 0 < x <= 1/8 1: Buffer 1/8 < x <= 1/4 full 2: Buffer 1/4 < x <= 3/8 full 3: Buffer 3/8 < x <= 1/2 full 4: Buffer 1/2 < x <= 5/8 full 5: Buffer 5/8 < x <= 3/4 full 6: Buffer 3/4 < x <= 7/8 full 7: Buffer 7/8 < x <= 1 full	
Bit 4	Plausibility ON	Set if plausibility is ON	
Bit 5	Static disturbance	Set if a static disturbance has occurred. For example, persistent violation of the VT, no measured values. (>1 min.)	
Bit 6	Hearing release	Set if the heating system control is activated	
Bit 7	Heating status	Set if heating is ON	

WAGO Kontakttechnik GmbH & Co. KG
Postfach 2880 • D-32385 Minden
Hansastraße 27 D-32423 Minden
Phone: +49 (0)5 71/8 87 – 0
Fax: +49 (0)5 71/8 87 – 1 69
Email: info@wago.com

Online: http://www.wago.com