

Libraries for Building Automation



Module Description for Connecting Thermokon WRF08 RS-485 Modbus® Multifunction Room Operating Units

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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.

WAGO-I/O-PRO CAA Library for Building Automation

Contents

Important Notes	4
Copyright	4
Personnel Qualification	4
Intended Use	4
Scope of Validity	5
Function Blocks	6
Master WRF08 (FbWRF08Master)	6
WRF08 Configuration (FbWRF08Config)	8
WRF08 Control (FbWRF08)	9
Visualization Elements	13
Configuration Interface WRF08 (WRF08Config)	13

Important Notes

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

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Intended Use

For each individual application, the components are supplied from the factory with a dedicated hardware and software configuration. Modifications are only permitted 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.

Scope of Validity

This application note is based on the stated hardware and software from 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.

Function Blocks

Master WRF08 (FbWRF08Master)

WAGO-I/O-PRO CAA Library Elements			
Category:		Building Technology	
Name:		FbWRF08Master	
Type:		Function <input type="checkbox"/>	Function block <input checked="" type="checkbox"/> Program <input type="checkbox"/>
Name of library:		ThermokonWRF08.lib	
Applicable to:		Fieldbus controller (not 750-812 / 814 / 815 / 816 and 758-870)	
Libraries used:		SerComm.lib Serial_Interface_01.lib mod_com.lib Modb_I05.lib	
Input parameters:		Data type:	Comment:
bCOM_PORT		BYTE	No. of the serial interface used 1 -> Internal service interface 2 -> 1st plugged serial module 3 -> 2st plugged serial module
cbCOM_BAUDRATE		COM_BAU DRATE	Baud rate: BAUD_9600 = 960 BAUD_57600 = 5760 Default = BAUD_9600
Input/output parameters:		Data type:	Comment:
typWRF08		typWRF08	Data exchange between the master module and the slave modules
Graphical illustration:			
<div><div>FbWRF08Master</div><div><div>bCOM_PORT</div><div>cbCOM_BAUDRATE</div><div>typWRF08 ▶</div></div></div>			
Function description:			
<p>The FbWRF08Master function block can be used to connect WRF08 multifunction room operating units with Modbus® protocol to the WAGO-I/O-SYSTEM. Modbus® communication is implemented via an RS-485 interface module.</p> <p>The FbWRF08Master enables communication with the multifunction room operating units via an RS-485 serial interface module. The “typWRF08” variable facilitates the connection with other “WRF08” function blocks.</p>			

The number of the serial interfaces used can be set at the “**bCOM_PORT**” input.

Example:

- 1 -> Internal service interface
- 2 -> 1st plugged serial module
- 3 -> 2st plugged serial module

The baud rate is set at the “**cbCOM_BAUDRATE**” input. The baud rate set here must match the baud rate of the multifunction room operating units from Thermokon.

Hardware:

Either the permanently-configured 750-653/000-021 module or the freely-configurable 750-653/003-000 module can be used as RS-485 module.

The configurable module is to be parameterized using the WAGO-I/O-CHECK 2 (759-302) software as follows:

Baud rate:	9600 or 57600
Data bits:	8
Stop bits:	1
Parity:	Even
Data bytes:	5
Duplex mode:	Half duplex
Continuous transmission:	Yes

Note:

- 1.) The maximum number of WRF08 multifunction room operating units on an RS-485 bus segment is limited to 10 devices.
- 2.) Multiple RS-485 bus segments can be set up per node.
- 3.) The WRF08 master may only be called once per RS-485 bus segment.

WRF08 Configuration (FbWRF08Config)

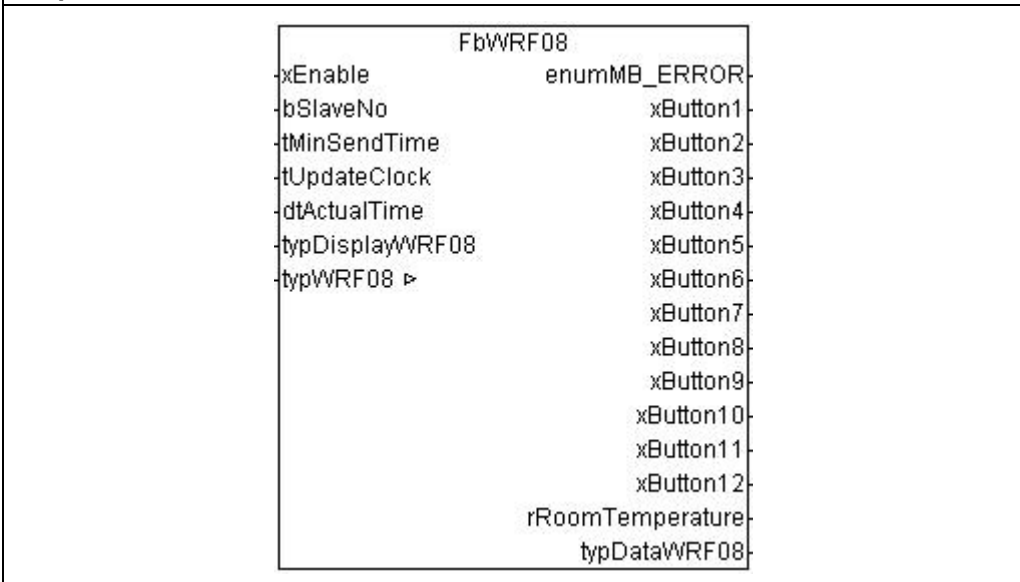
WAGO-I/O-PRO CAA Library Elements			
Category:		Building Technology	
Name:		FbWRF08Config	
Type:		Function <input type="checkbox"/>	Function block <input checked="" type="checkbox"/> Program <input type="checkbox"/>
Name of library:		ThermokonWRF08.lib	
Applicable to:		Fieldbus controller (not 750-812 / 814 / 815 / 816 and 758-870)	
Visualizations used:		ConfigWRF08	
Input parameters:		Data type:	Comment:
xEnable		BOOL	Enables the configuration interface
Input/output parameters:		Data type:	Comment:
typWRF08		typWRF08	Data exchange with the FbWRF08Master function block
Return value:		Data type:	Comment:
enumMB_ERROR		enumMB_ERROR	Indication of communication errors 16#00 = MB_NO_ERROR 16#01 = MB_NOT_SUPPORTED_FUNCTION 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
Graphical illustration:			
<div><div>FbWRF08Config</div><div><div>xEnable</div><div>enumMB_ERROR</div><div>typWRF08</div></div></div>			
Function description:			
<p>The <i>FbWRF08Config</i> function block is used to configure the WRF08 multifunction room operating units (WRF08-RS-485 Modbus®). The room operating units can only be configured in conjunction with the ConfigWRF08 visualization interface.</p> <p>The “typWRF08” input/output variable allows communication with the master function block and must be connected at FbWRF08Master with the variables of the same name.</p> <p>A communication error can be identified by the error code displayed at the “enumMB_ERROR” output. The “enumMB_ERROR” enumeration is in the Modb_I05.lib.</p> <p>Note: The configuration module and visualization interface is needed only once for each bus segment (max. 10 subscribers).</p>			

WRF08 Control (FbWRF08)

WAGO-I/O-PRO CAA Library Elements			
Category:	Building Technology		
Name:	FbWRF08		
Type:	Function <input type="checkbox"/>	Function block X <input checked="" type="checkbox"/>	Program <input type="checkbox"/>
Name of library:	ThermokonWRF08.lib		
Applicable to:	Fieldbus controller (not 750-812 / 814 / 815 / 816 and 758-870)		
Input parameters:	Data type:	Comment:	
xEnable	BOOL	Enables communication with the room operating unit	
bSlaveNo	BYTE	Slave No. of the room operating unit	
tMinSendTime	TIME	Minimum time between transmission of new display values Default: t#5s	
tUpdateClock	TIME	Time for synchronizing the clock on the display Default = t#0s (no update)	
dtActualTime	DT	Actual time for synchronizing the clock on the display	

Input/output parameters:	Data type:	Comment:
typDisplayWRF08	typDisplay WRF08	Data structure with the display values to be written to the room operating unit.
xSymbolFault	BOOL	Display "Failure" symbol.
xSymbolHeating	BOOL	Display "Heating" symbol.
xSymbolCooling	BOOL	Display "Cooling" symbol.
xSymbolWindow	BOOL	Display "Window open" symbol.
xSymbolRoom Occupancy	BOOL	Display "Room occupied" symbol.
bLevelFan	BYTE	Fan stage setting
xLedButton5	BOOL	Actuation of LED on push-button 5
:		:
:		:
xLedButton12		Actuation of LED on push-button 12 (Note configuration parameters)
rOutdoorTemperature	REAL	Outside temperature
rExtTemperatureDefault1	REAL	External temperature specification 1 [°C]
rExtTemperatureDefault2	REAL	External temperature specification 2 [°C]
rExtPercentDefault1	REAL	External percent default 1 [%]
rExtPercentDefault2	REAL	External percent default 2 [%]
xValueWithComma	BOOL	Display of values with comma (Note configuration parameters)
rExtValueDefault1	REAL	External value default 1
rExtValueDefault2	REAL	External value default 2
rBasicSetPoint Temperature1	REAL	Setpoint temperature 1 after reset [°C]
rSetPointTemperature Offset1	REAL	Offset setpoint temperature 1 [K]
rBasicSetPoint Temperature2	REAL	Setpoint temperature 2 after reset [°C]
rSetPointTemperature Offset2	REAL	Offset setpoint temperature 2 [K]
rBasicSetPoint PercentValue1	REAL	Setpoint percent 1 after reset [%]
rSetPointPercentOffset1	REAL	Offset setpoint percent 1 [%]
rBasicSetPoint PercentValue2	REAL	Setpoint percent 2 after reset [%]
rSetPointPercentOffset2	REAL	Offset setpoint percent 2 [%]
rBasicSetPointValue1	REAL	Setpoint 1 after reset
rSetPointValueOffset1	REAL	Offset setpoint 1
rBasicSetPointValue2	REAL	Setpoint 2 after reset
rSetPointValueOffset2	REAL	Offset setpoint 2
typWRF08	typWRF08	Data exchange with the FbWRF08Master function block

Return value:	Data type:	Comment:
enumMB_ERROR	enumMB_ERROR	Indication of communication errors 16#00 = MB_NO_ERROR 16#01 = MB_NOT_SUPPORTED_FUNCTION 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
xButton1 : : : xButton12	BOOL	Status of button 1 : : : Status of button 12
rRoomTemperature	REAL	Current room temperature
typDataWRF08	typDataWRF08	Data structure with the current values of the room operating unit
bLevelFan	BYTE	Display of the fan stage
xRoomOccupancy	BOOL	Display of room occupancy
rSetTemperature1_Offset	REAL	Offset setpoint temperature 1 [K]
rSetTemperature1_Effective	REAL	Setpoint temperature 1 effective value [°C]
rSetTemperature2_Offset	REAL	Offset setpoint temperature 2 [K]
rSetTemperature2_Effective	REAL	Setpoint temperature 2 effective value [°C]
rSetPercentValue1_Offset	REAL	Offset setpoint percent 1 [%]
rSetPercentValue1_Effective	REAL	Setpoint percent 1 effective value [%]
rSetPercentValue2_Offset	REAL	Offset setpoint percent 2 [%]
rSetPercentValue2_Effective	REAL	Setpoint percent 2 effective value [%]
rSetValue1_Offset	REAL	Setpoint 1 offset
rSetValue1_Effective	REAL	Set point 1 effective value
rSetValue2_offset	REAL	Setpoint 2 offset
rSetValue2_Effective	REAL	Set point 2 effective value

Graphical illustration:

Function description:

The **FbWRF08** is used to specify the display values to be displayed on the multifunction room operating unit display. In addition, the current status of the room operating unit is read out.

The “**bSlaveNo**” input specifies the slave address of the WRF08 room operating unit.

The “**xEnable**” input enables cyclic reading of the status values from the room operating unit.

The function block transmits the display values when there is a change in the “**typDisplayWRF08**” structure or when a button is pressed. The “**tMinSendTime**” input specifies the minimum time interval for sending new display values.

The “**tUpdateClock**” input specifies the interval for synchronizing the time. The time is specified at the “**dtActualTime**” input, with which the room operating unit should be synchronized. The time is not synchronized if the update time is t#0s.

The “**typWRF08**” input/output variable allows communication with the master function block and must be connected at **FbWRF08Master** with the variables of the same name.

A communication error can be identified by the error code displayed at the “**enumMB_ERROR**” output. The “**enumMB_ERROR**” enumeration is in the Modb_I05.lib.

The “**xButton1**” to “**xButton12**” outputs display the status of the buttons of the room operating unit.

The “**rRoomTemperature**” output displays the room temperature measured by the WRF08 room operating unit.

The current setpoints & offset from the room operating unit are displayed in the “**typDataWRF08**” structure. In addition, the fan level and the status of the room occupancy are displayed.

Visualization Elements

Configuration Interface WRF08 (WRF08Config)

WAGO-I/O-PRO CAA Library Elements		
Category:	Building Technology	
Name:	WRF08Config	
Name of library:	ThermokonWRF08.lib	
Applicable to:	Programmable fieldbus controllers (not 750-812 / 814 / 815 / 816 and 758-870)	
Placeholder:	Data type:	Comment:
FbWRF08Config	Instance of FbWRF08Config	Link between the instance from FbWRF08Config and the configuration interface
Graphical illustration:		
1. General settings		
<div style="border: 1px solid #ccc; background-color: #f0f0f0; padding: 10px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid #ccc; margin-bottom: 10px;"> General Setpoint Display Buttons </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>Parameter</p> <p>Modbus address: <input type="text" value="1"/> </p> <p>Updating interval of display [s]: <input type="text" value="10"/> </p> </div> <div style="width: 48%;"> <p>Version</p> <p>Device coding: <input type="text" value="0"/></p> <p>Firmware version: <input type="text" value="18"/></p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 48%;"> <p>General settings</p> <p>Device location: <input type="text" value="11"/> </p> <p>Min-Response-time [ms]: <input type="text" value="10"/> </p> <p>Number of fan stages: <input type="text" value="3"/> </p> <p>Temperature offset [K]: <input type="text" value="0.0"/> </p> <p>Operating buttons:</p> <div style="display: flex; gap: 5px;"> <input type="checkbox"/> 2T <input type="checkbox"/> 4T <input checked="" type="checkbox"/> 8T <input type="checkbox"/> 12T </div> </div> <div style="width: 48%;"> <p>Intensity background illumination</p> <p>LCD:</p> <p>Without button actuation: <input type="text" value="232"/> </p> <p>With button actuation: <input type="text" value="30"/> </p> <p>Labelling area:</p> <p>Without button actuation: <input type="text" value="232"/> </p> <p>With button actuation: <input type="text" value="30"/> </p> </div> </div> <div style="margin-top: 10px;"> <p>Display date and time</p> <div style="display: flex; justify-content: space-between;"> <div> <p>Weekday: <input type="checkbox"/> Fade out <input checked="" type="checkbox"/> English <input checked="" type="checkbox"/> German</p> </div> <div> <p>Date: <input type="checkbox"/> Fade out <input checked="" type="checkbox"/> English <input checked="" type="checkbox"/> German</p> </div> <div> <p>Time: <input type="checkbox"/> Fade out <input checked="" type="checkbox"/> With Seconds <input type="checkbox"/> Without Seconds</p> </div> <div> <p>Time-mode: <input checked="" type="checkbox"/> 24 h mode <input type="checkbox"/> 12 h mode</p> </div> </div> </div> <div style="margin-top: 10px; border-top: 1px solid #ccc; padding-top: 5px;"> <p>Error Message: MB_NO_ERROR</p> <div style="text-align: right; margin-top: 5px;"> <input type="button" value="Readout"/> <input type="button" value="Write"/> </div> </div> </div>		

2. Configuration of the setpoint

General	Setpoint	Display	Buttons
<div>Setpoint temperature 1</div> <div>Upper adjustment range [K]: 10.0</div> <div>Lower adjustment range [K]: -10.0</div> <div>Resolution [K]: 0.5</div> <div>Basic setpoint after reset [°C]: 22.0</div>			
<div>Setpoint temperature 2</div> <div>Upper adjustment range [K]: 3.0</div> <div>Lower adjustment range [K]: -3.0</div> <div>Resolution [K]: 0.1</div> <div>Basic setpoint after reset [°C]: 22.0</div>			
<div>Setpoint percent value 1</div> <div>Upper adjustment range [%]: 100</div> <div>Lower adjustment range [%]: 0</div> <div>Resolution [%]: 5</div> <div>Basic setpoint after reset [%]: 50</div>			
<div>Setpoint percent value 2</div> <div>Upper adjustment range [%]: 100</div> <div>Lower adjustment range [%]: -100</div> <div>Resolution [%]: 5</div> <div>Basic setpoint after reset [%]: 55</div>			
<div>Setpoint value without unit 1</div> <div>Upper adjustment range: 200</div> <div>Lower adjustment range: 0</div> <div>Resolution: 20</div> <div>Basic setpoint after reset: 30</div>			
<div>Setpoint value without unit 2</div> <div>Upper adjustment range: 100</div> <div>Lower adjustment range: 0</div> <div>Resolution: 2</div> <div>Basic setpoint after reset: 25</div>			
<div>Error Message: MB_NO_ERROR</div> <div>Readout Write</div>			

3. Display of the individual values

General	Setpoint	Display	Buttons
<div>Parameter</div> <div>Measuring unit: <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F</div> <div>Display temperature: <input checked="" type="checkbox"/> With decimal point <input type="checkbox"/> Without decimal point</div> <div>Display value without unit: <input checked="" type="checkbox"/> Fade in decimal point <input type="checkbox"/> Fade out decimal point</div>			
<div>External value</div> <div>Room temperature(internal): <input checked="" type="checkbox"/> External percent 1: <input type="checkbox"/></div> <div>Outdoor temperature: <input checked="" type="checkbox"/> External percent 2: <input type="checkbox"/></div> <div>External temperature 1: <input type="checkbox"/> External value 1: <input type="checkbox"/></div> <div>External temperature 2: <input type="checkbox"/> External value 2: <input type="checkbox"/></div>			
<div>Setpoints</div> <div>Setpoint temperature 1 offset: <input checked="" type="checkbox"/> Setpoint percent 1 offset: <input type="checkbox"/> Setpoint value 1 offset: <input type="checkbox"/></div> <div>Setpoint temperature 1 effective: <input checked="" type="checkbox"/> Setpoint percent 1 effective: <input type="checkbox"/> Setpoint value 1 effective: <input type="checkbox"/></div> <div>Setpoint temperature 2 offset: <input type="checkbox"/> Setpoint percent 2 offset: <input type="checkbox"/> Setpoint value 2 offset: <input type="checkbox"/></div> <div>Setpoint temperature 2 effective: <input type="checkbox"/> Setpoint percent 2 effective: <input type="checkbox"/> Setpoint value 2 effective: <input type="checkbox"/></div> <div>With setpoint adjustment: <input checked="" type="checkbox"/> Effective <input type="checkbox"/> Offset With setpoint adjustment: <input checked="" type="checkbox"/> Effective <input type="checkbox"/> Offset With setpoint adjustment: <input checked="" type="checkbox"/> Effective <input type="checkbox"/> Offset</div>			
<div>Error Message: MB_NO_ERROR</div> <div>Readout Write</div>			

4. Configuration of the buttons

General		Setpoint		Display		Buttons	
Button configuration							
Function button				Function LED			
T 1:	default_value						
T 2:	default_value						
T 3:	default_value						
T 4:	default_value						
T 5:	Fan_stage_Minus_with_AUTO			<input type="checkbox"/>	Ext. triggering LED button		
T 6:	Fan_stage_Plus_with_AUTO			<input type="checkbox"/>	Ext. triggering LED button		
T 7:	Set_temperature_1_Minus			<input type="checkbox"/>	Ext. triggering LED button		
T 8:	Set_temperature_1_Plus			<input type="checkbox"/>	Ext. triggering LED button		
T 9:	Percent_value_2_Minus			<input type="checkbox"/>	Ext. triggering LED button		
T 10:	Percent_value_2_Plus			<input type="checkbox"/>	Ext. triggering LED button		
T 11:	default_value			<input type="checkbox"/>	Ext. triggering LED button		
T 12:	default_value			<input type="checkbox"/>	Ext. triggering LED button		

Error Message: MB_NO_ERROR



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