

**WAGO I/O SYSTEM 750**

**Connecting a  
serial Modbus Master to  
the WAGO-IO-SYSTEM**

**Application note**

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Version 1.0.1

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**WAGO Kontakttechnik GmbH**

Hansastraße 27  
D-32423 Minden

Phone: +49 (0) 571/8 87 – 0

Fax: +49 (0) 571/8 87 – 1 69

E-Mail: [info@wago.com](mailto: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

E-Mail: [support@wago.com](mailto:support@wago.com)

Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded we would appreciate any information or ideas at any time.

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 trademark or patent protected.

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# TABLE OF CONTENTS

<b>1 Important comments .....</b>	<b>4</b>
1.1 Legal principles.....	4
1.1.1 Copyright.....	4
1.1.2 Personnel qualification .....	4
1.1.3 Intended use.....	4
1.2 Range of validity.....	5
1.3 Symbols .....	5
<b>2 Description.....</b>	<b>6</b>
<b>3 Material.....</b>	<b>6</b>
<b>4 Application .....</b>	<b>7</b>
4.1 Using an RS232 module (750-650/003-000).....	7
4.2 Using an RS485 module (750-653/003-000).....	7
<b>5 Controller program .....</b>	<b>8</b>
5.1 Modbus slave driver.....	8
5.2 Data exchange.....	9
<b>6 Required Libraries .....</b>	<b>10</b>

# 1 Important comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanation is carefully read and adhered to.

## 1.1 Legal principles

### 1.1.1 Copyright

This manual is copyrighted, together with all figures and illustrations contained therein. Any use of this manual which infringes the copyright provisions stipulated herein, is not permitted. Reproduction, translation and electronic and photo-technical archiving and amendments require the written consent of WAGO Kontakttechnik GmbH. Non-observance will entail the right of claims for damages.

### 1.1.2 Personnel qualification

The use of the product detailed in this manual 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 declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

### 1.1.3 Intended use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only admitted within the framework of the possibilities documented in the manuals. 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.

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

## 1.2 Range of validity

This application note is based on the stated hardware and software of the specific manufacturer as well as the correspondent 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



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**Danger**

Always observe this information to protect persons from injury.

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**Warning**

Always observe this information to prevent damage to the device.

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**Attention**

Marginal conditions must always be observed to ensure smooth operation.

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**ESD (Electrostatic Discharge)**

Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.

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**Note**

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

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**More information**

References to additional literature, manuals, data sheets and INTERNET pages

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## 2 Description

This application example demonstrates how to connect a Modbus master device, e.g. a touchpanel, to a WAGO controller (part number 750-8xx). The function block `TERMINAL_MODBUSSLAVE_RTU` is applicable for all controllers, except the 750-812, 750-814, 750-815, and 750-816 Modbus controllers.

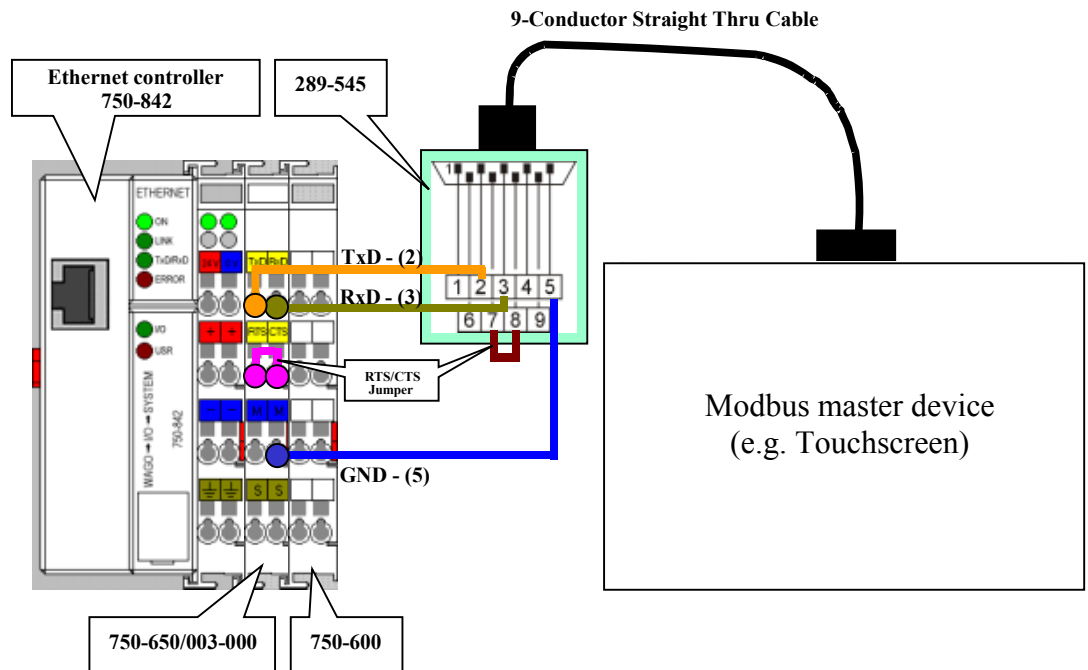
## 3 Material

The example in this document has been tested with the following hardware/software configuration:

Supplier	Description	Part Number
WAGO	Programmable controller	750-8xx (except 750-812/814/815/816)
WAGO	Serial Interface module	750-65x/xxx-xxx (recommended 750-65x / 003-000)
WAGO	Termination module	750-600
WAGO	Interface module	289-545
WAGO	WAGO-I/O-PRO 32	750-332/000-00x x: 1= german 2= english 3= french

## 4 Application

### 4.1 Using an RS232 module (750-650/003-000)



**Fig. 1: Wiring Diagram for Connecting the WAGO-I/O-SYSTEM to a Modbus Master.**

Using a WAGO Interface module (Part Number 289-545), a standard 9 conductor cable can be used to interface a Modbus master device to the WAGO-I/O-System.

### 4.2 Using an RS485 module (750-653/003-000)

When using an RS485 interface, it is possible to interface using a 2-wire or 4-wire connection. It is necessary to distinguish between the two interfaces.

#### **Wiring a 2-Wire RS485 connection**

Insert jumpers between terminals 1 and 2 and between terminals 5 and 6 on the 750-653 module. Connect the 2-wire cable to terminals 1 and 5. Set the function block input “cfCOM\_FLOW\_CONTROL” to HALFDUPLEX.

#### **Wiring a 4-Wire RS485 connection**

Connect the 4-wire cable to terminals 1, 2, 5, and 6. Set the function block input “cfCOM\_FLOW\_CONTROL” to FULLDUPLEX.

## 5 Controller program

### 5.1 Modbus slave driver

Insert the function block `TERMINAL_MODBUSSLAVE_RTU` into the main program. Assign values to the inputs of the function block according to the communication parameters of the serial module. Make sure the settings in the Modbus master fit with the input parameters on the function block. (For additional information, see the library document “Terminal-Slave\_03.lib”).

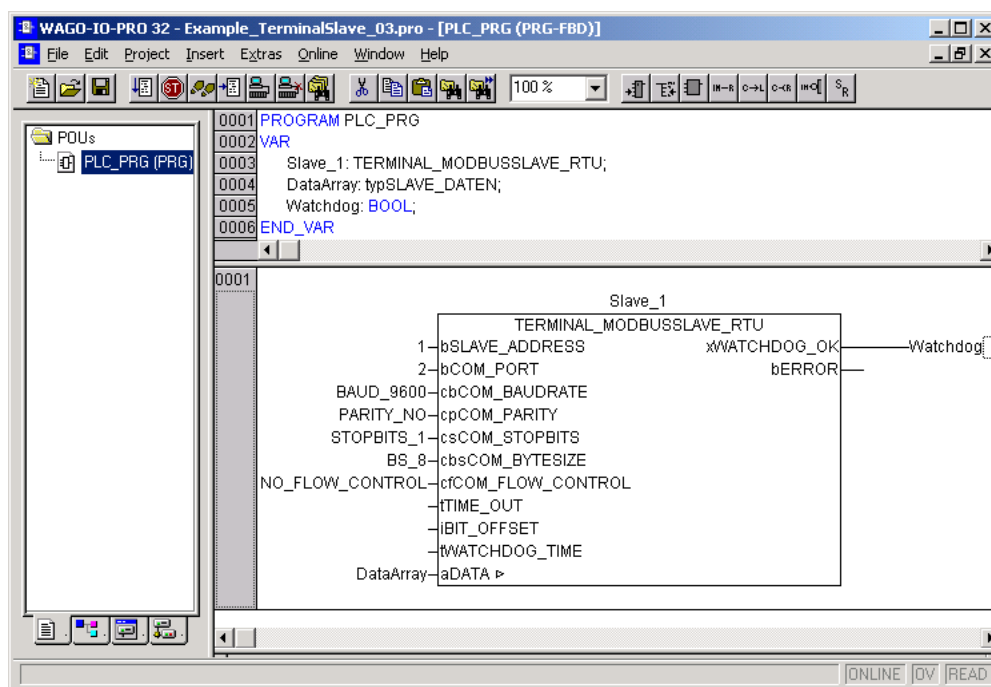


Fig. 2: Example showing `TERMINAL_MODBUSSLAVE_RTU` function block



It is recommended to use the module 750-65x/003-000. The following communication parameters of this module are configurable by the user:

- `cbBAUDRATE`
- `cbsBYTESIZE`
- `csSTOP BITS`
- `cpPARITY`
- `cfFLOW_CONTROL`

The modules 750-65x/000-xxx have factory preset configurations that cannot be defined by the user. When using these modules, the parameters specified above are not to be used, or should only be used with the default values. Incorrect usage of these parameters will result in the following error: “bError := 0x09: Not supported parameterset”.



## 5.2 Data exchange

Communication with the Modbus master uses a word array. The array index corresponds with the modbus addresses of the variables.

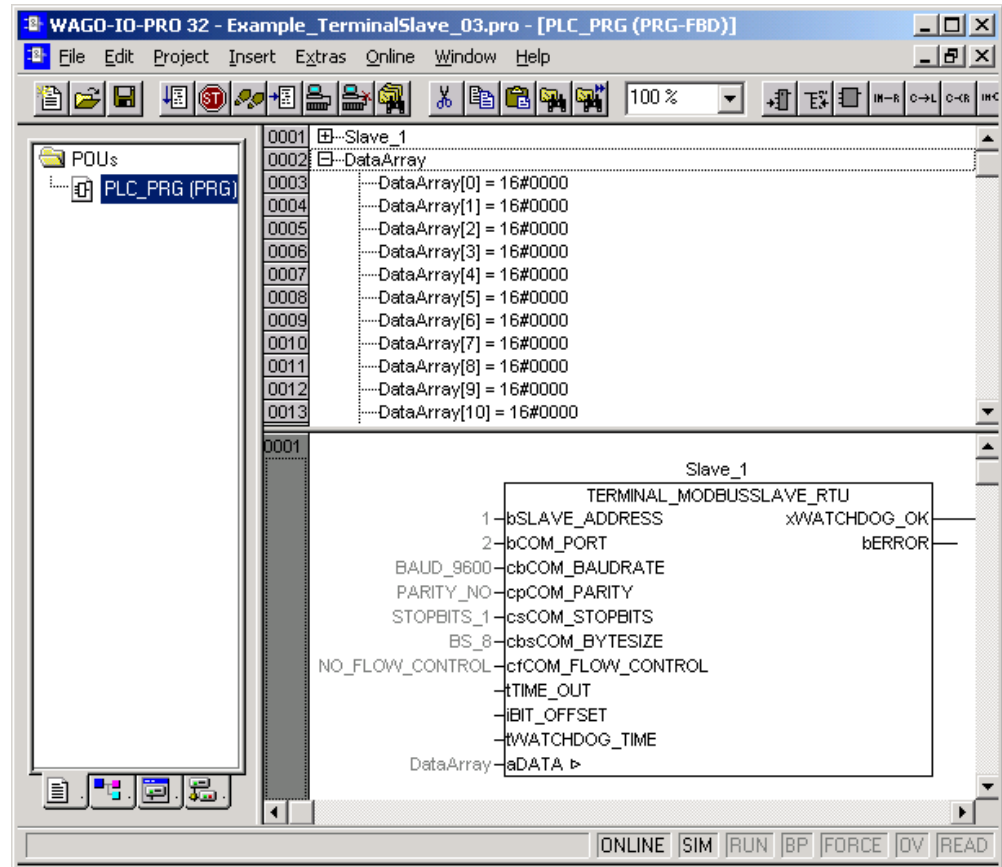


Fig. 3: Where to find the data.

When using the function block `TERMINAL_MODBUSSLAVE_RTU` for communications with a Modbus master device, a data table is maintained within the WAGO controller. This data table acts as a buffer for data written to and read from the WAGO controller. Data written by a master device to the WAGO controller is placed in the data table. Data read from the WAGO controller by a modbus master device is read from the data table. The data table occupies 256 words of data, and is shown above. When an object gets configured in the Modbus master application, it is given a word or bit value. This word or bit value takes the form of a Modbus register. Each word or bit value corresponds to an element, or WAGO Data Register, in the data table. The contents of the data table must be maintained in the WAGO controller program. Data to be read by the HMI device needs to be placed in the corresponding WAGO Data Register(s).

## 6 Required Libraries

The following table shows the files and libraries required by WAGO-IO-PRO 32 to build the example project shown in this document.

Required File/Library	Description
TerminalSlave_03.Lib	WAGO-IO-PRO 32 Library
mod_com.Lib	WAGO-IO-PRO 32 Library
mod_com.HEX	WAGO-IO-PRO 32 Hex File
Serial_Interface_01.Lib	WAGO-IO-PRO 32 Library
SerComm.Lib	WAGO-IO-PRO 32 Library
SerComm.HEX	WAGO-IO-PRO 32 Hex File
Standard.Lib	WAGO-IO-PRO 32 Library
Standard.HEX	WAGO-IO-PRO 32 Hex File





WAGO Kontakttechnik GmbH  
Postfach 2880 • D-32385 Minden  
Hansastraße 27 • D-32423 Minden  
Phone: 05 71/8 87 – 0  
Telefax: 05 71/8 87 – 1 69  
E-Mail: [info@wago.com](mailto:info@wago.com)

Internet: <http://www.wago.com>

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