

WAGO-I/O-SYSTEM 750

**Connecting energy meters with M-Bus interface to the
WAGO-I/O-SYSTEM**

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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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1 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.

1.1 Legal Principles

1.1.1 Subject to Change

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1.1.2 Copyright

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1.1.3 Personnel Qualification

The use of the product described in this document is exclusively geared to specialists having qualifications in SPS 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.

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

1.2 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.

1.3 Symbols

NOTE



NOTE

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).

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	Explanation
<i>italic</i>	Names of paths and files are displayed in italics, e.g.: <i>C:\Programs\WAGO-I/O-CHECK</i>
Menu	Menu options are displayed e.g. Save
>	A "greater than" between two names characterizes 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 "4mA" 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]

2 Description

The M-Bus (meter bus) is used for reading out resource meters such as electricity meters, heat meters, water meters and many more.

It is standardised as the European Norm for all meters with the exception of electricity meters.

This manual describes the connection of different M-Bus meters to the WAGO-I/O-System via a serial connection using the M-Bus protocol.

3 Material

Table 3: Material

Supplier	Qty.	Designation	Item No.
WAGO	1	Programmable Fieldbus Controller	750-8xx
WAGO	1	Serialles Interface RS232	750-652
WAGO	1	End module	750-600
Relay	1	Level converter	e.g. PW3
DZG	1	Consumption meter	DVS3016.11-M1(M)

The following software is also required for creating the program and commissioning:

Table 4: Software

Supplier	Qty.	Designation	Item No.
WAGO		WAGO-I/O-PRO	759-333

Note:



Material

The node structure described is only an example for a possible realization of communication to M-Bus meters. The modules may be expanded as required by the respective application.

Information



Additional information:

The library and documentation used are available at www.wago.de/ → Downloads

4 Configuration

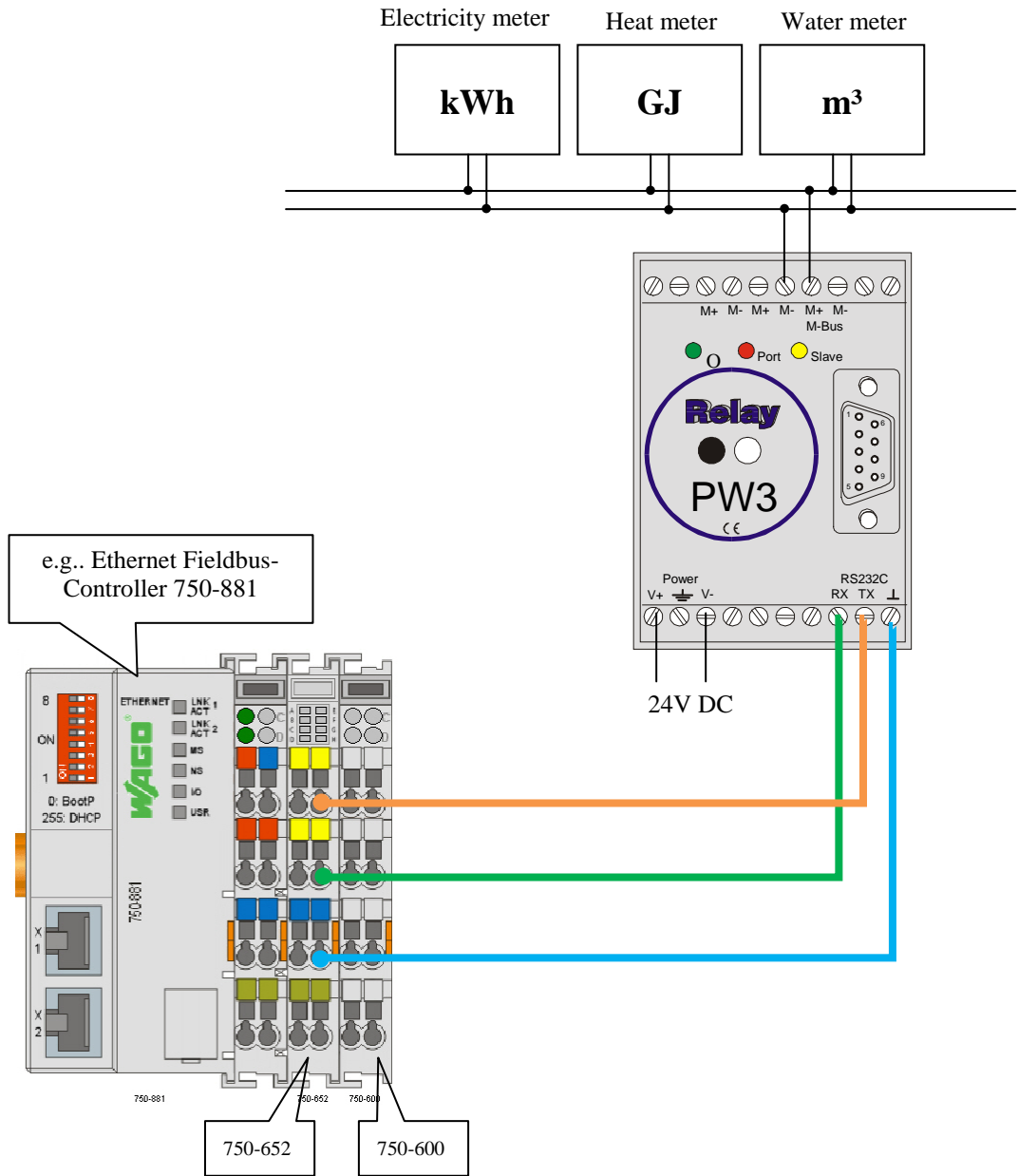


Figure 1: Connection diagram with Relay M-Bus level converter

5 Reading an electricity meter

5.1 Task

Two electricity meters with M-Bus interface are to be read with the help of the WAGO-I/O- SYSTEM. To do this, the meter is connected to the serial interface of the WAGO-I/O-SYSTEM via a level converter (see Fig. 1). The programming of the application is described briefly below

5.2 Program

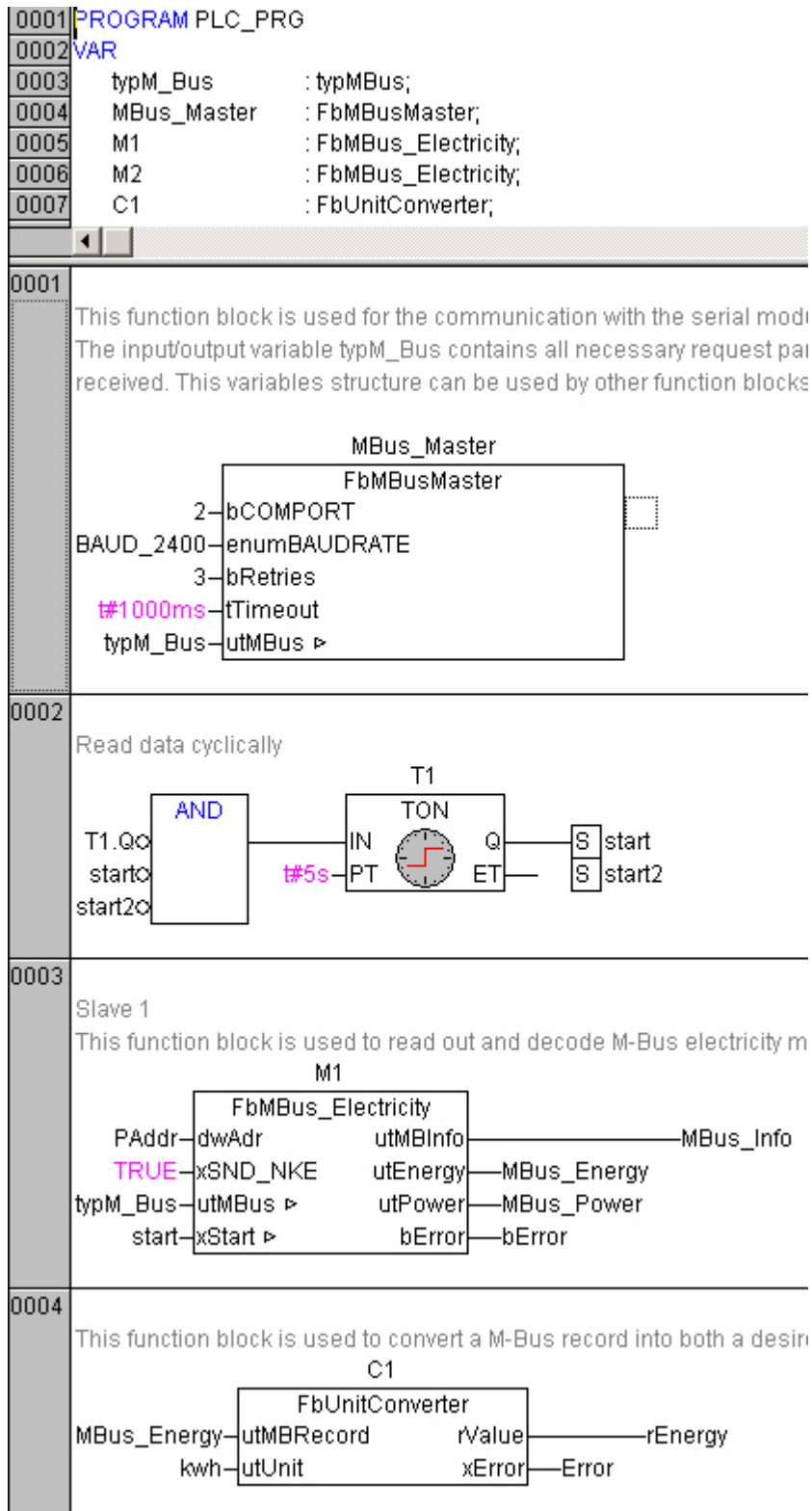


Figure 2: Program structure for reading an electricity meter

Figure 2 shows the basic structure for programming an M-Bus application. A prerequisite for communicating with the M-Bus meter is a 750-652 serial terminal and the "*FbMbusMaster*" function module. The parameters for baud rate, number of telegram repeats and timeout are specified in this module. The "*FbMbus_Electricity*" module is used for reading out and decoding the data from an M-Bus electricity meter. It can only be used in conjunction with the "FbMbusMaster" module. The two modules are synchronised by means of the "typMbus" variable structure. All further meter modules must be connected to the master by means of the same variable structure.

The "xSND_NKE" input should be set if a so-called normalisation command is to be sent before the query. This command ensures that, in the case of meters with sequential telegrams, the first (most important) telegram is sent as a reply to the next query.

The reading process can be started by setting the signal level of the "start" variable to TRUE.

The "*FbUnitConverter*" function block is added to convert the meter readings from STRING data to a required unit and into a REAL type data value. In this way, the meter reading can be made available in REAL data format via a higher-level system (e.g. visualisation system).

The "utUnit" variable determines the units of the output value. The units are abbreviated as follows, e.g.:

kWh = kilowatt hours,
miJps = millijoules per second,
gpm = grams per minute,
...

Note



Rounding errors

Rounding errors in the converted meter readings can occur when using REAL data types. Conversion errors occur with meter readings of 10-digits (6-digit negative) and above.

A timer is integrated in network 2 of the program code, allowing both M-Bus meters to be read cyclically.

This timer resets both "start" and "start2" variables once meter reading is completed.

0009	start = FALSE	
0010	⊖ MBus_Info	
0011	...bPAdr = 38	← Primary address
0012	...stID = '00302438'	
0013	...stMAN = 'DZG'	← Manufacturer ID
0014	...stMED = 'Electricity'	
0015	...bMGen = 2	
0016	...bMStatus = 128	
0017	...bAllRecords = 2	
0018	...bGoodRecords = 1	
0019	⊖ MBUS_Energy	
0020	...Value = '5127'	← Value = 5127
0021	...Pof10 = '0'	Pof10 = 0 (power of 10)
0022	...Unit = 'Wh'	Unit = Wh
0023	...Enum_Unit = Wh	=> Mbus_Energy = 5127 Wh
0024	⊖ MBus_Power	
0025	error = 0	
0026	⊖ C1	
0027	unit = kWh	
0028	value = 5.127	
0029	error_1 = FALSE	
0030		

Figure 3: Values of the variables in online mode

Figure 3 shows the program in online mode. The read and decoded data can now be read off under the respective output variables. The output variables of the FbMBus_Electricity module have a structure in which the individual elements are contained (e.g. meter reading, power of ten, units).

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