



***MBUS - Driver of M-BUS Protocol  
User's Manual***

Doc. No. ENP4031  
Version: 29-08-2005

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# 1. MBUS - Driver of M-BUS Protocol

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## 1.1. Driver Use

The M-Bus standard was developed as a standard for communication with heat counters and is the most widespread in this branch. This protocol was tested and developed in connection with MULTICAL heat meters of KAMSTRUP A/S.

## 1.2. Driver Configuration

The driver is configured in the line defining the logical channel in the [ASMEN] section of the application INI file. The definition of the channel is as follows:

*Channel\_name=Unidriver, mbus, Driver\_parameters*

*Driver\_parameters* have the following form:

*Name=value[,Name=value] ....*

or

*[section\_name]*

where:

*section\_name* - section name in the application INI file where all the driver parameters are written (each in a separate line).

### EXAMPLE

MBUS1=UniDriver, mbus,[*section\_name*]

[*section\_name*]

Adres=48

...



*Address =number*

Meaning - determines the address of a given M-BUS device. The parameter is an obligatory parameter.

Default value - lack.

Parameter:

*number* - the parameter is a number from a range 1 to 250.



*Alarmn =alarm\_numbers*

Meaning - is a set of parameters with names from *Alarm0* to *Alarm7*. Each parameter determines a number of **asix** system alarm, which will be generated by the driver after appearance of an analog alarm

in the M-BUS device. The meanings of alarms generated by the M-BUS device is specified by the manufacturer.

Default value

- lack.



***Alarm\_Code =alarm\_number***

Meaning

- the parameter determines the alarm number in the **asix** system which is generated by the driver after a lost of connection with the M-BUS device.

Default value

- lack.



***Port = COMn[:baud[:word[:parity[:stop]]]***

Meaning

- determines a serial port used for the communication and transmission parameters.

Default value

- COMn:2400:8:even:1.

Parameter:

- n* - serial port number,
- baud* - transmission speed,
- word* - word length,
- parity* - parity (none, even, odd, mark, space),
- stop* - number of stop bits.

The parameter *Port* is obligatory. If transmission parameter was omitted, then the default values are taken. The port no. must be always given.



***Refresh\_Period =number***

Meaning

- determines an interval by means of which the driver reads data from the M-BUS device.

Default value

- 15.

Parameter:

- number* - is passed in seconds.



***Refresh\_Delay =number***

Meaning

- the parameter determines the minimal time between successive data readings from the M-BUS device. Some devices (e.g. MULTICAL) needs a considerable time to prepare data. The parameter determines the time necessary for preparing data by the M-BUS device.

Default value

- 12.

Parameter:

- number* - is passed in seconds.



***Double\_Read =Yes/No***

Meaning

- some devices (e.g. MULTICAL) return the data prepared after a previous reading. If the parameter has a value *Yes*, then driver will do two successive reading in order to obtain the most actual data.

Default value

- Yes.

***Invalid\_Statues =number,number,...***

Meaning - the M-BUS device send a status byte with measured data. Each of bits of this byte determines a specified data value. The parameter determines what status bits make the received data invalid.

Default value - +1,+2,+3,+4,+5.

Parameter:

*number,number,...* - the parameter has a form of set of bit numbers separated with a comma. The least significant bit has the number 1. The default value (1,2) means that the data are found incorrect if the device signals the error „application busy" (1), „application error" (2), „power drop" (3), „constant error" (4) and „temporary error" (5). The manufacturer may define additional statuses.

***Log =file\_name***

Meaning - the parameter value is a name of file where diagnostic information is written. The parameter may be used only for diagnostic purposes.

Default value - lack.

***timeout =number***

Meaning - the parameter determines a maximal waiting time for an answer. The time is expressed in milliseconds.

Default value - the default value is determined on the ground of transmission parameters according to the M-BUS protocol specification.

Parameter:

*number* - time in miliseconds.

***Timeout2=number***

Meaning - the parameter determines the maximal waiting time to receive one character.

Default value - the default value is determined on the ground of transmission parameters according to the M-BUS protocol specification.

Parameter:

*number* - time in miliseconds.

***Dump=file\_name***

Meaning - the parameter value is a name of the file where the data will be written. The parameter may be used only for diagnostic purposes.

Default value - lack.

### 1.3. Defining the Process Variables

The set of variables handled by the driver may be divided into several groups:

- sequential variables, i.e. the variables the address of which is the number of the datum transferred by the M-BUS device;
- variables, the address of which contains the name of measured variable;
- variables, which enable to read the manufacturer's data and other variables.

#### Sequential Variables

The definition of sequential variables needs the sequence in which the M-BUS device sends measured data to be known.

The address of sequential variables is as follows:

$$P_n$$

where  $n$  is a variable order number.

#### Addressing by Means of the Variable Name

The variable address is as follows:

$$Name [.Un][.Tn][.Sn]$$

where:

<i>Name</i>	- name of a measured variable;
<i>Un</i>	$n$ - unit number (if omitted, then it is assumed to be equal 0). The unit number is applied when the device consists of several units;
<i>Tn</i>	$n$ - tariff number (if omitted, then it is assumed to be equal to 0);
<i>Sn</i>	$n$ - cell number to store historical data (storage) (if omitted, then it is assumed to be equal 0).

It is allowed to use the following names (see: **Table 1**).

**Table 1. Set of Acceptable Measured Variable Names.**

<b>Name</b>	<b>Meaning</b>
ACCESSNUMBER	Next number of data reading
ACTDURATION	Duration time in seconds
AVGDURATION	Duration time in seconds
BAUDRATE	Transmission speed
BUSADD	Device address
CREDIT	Credit
CUSTOMERLOC	Localization of client
DEBIT	Debit
DIGINPUT	Digital input
DIGOUTPUT	Digital output
EIDENT	Extended identification
ELCURRENT	Current in amperes
ENERGY	Energy
FABRNO	Factory number
FLOWTEMP	Temperature
FVERSION	Firmware version
HVERSION	Equipment version
MANUFACTURER	Manufacturer
MASS	Mass
MASSFLOW	Masse flow
MEDIUM	Code of measured medium
MODEL	Model
ONTIME	Time from turning on
OPERTIME	Work time
PARAMSETID	Identification of parameters
POWER	Power
PRESS	Pressure
RESPDELAY	Delay of device response
RETTEMP	Return temperature
SVERSION	Software version
TEMPDIFF	Difference of temperatures
TIMEPOINT	Time stamp
VOLUME	Volume
VOLFLOW	Volume flow
XVOLFLOW	External volume flow
XTEMP	External temperature

### Addressing the Manufacturer's Data

Manufacturer's data are the data, that are not described in the protocol definition. To read them, the knowledge of manufacturer's data structure of a given device is necessary.

The address of a manufacturer's datum is as follows:

*Mposition.length*

where:

- position* - byte number in the manufacturer's data block, from which a given value begins; the first byte has the number 0;
- length* - data length in bytes.

The driver assumes that the manufacturer's data are expressed in the BCD code.

### Access to Unit Symbol of Measurement

For sequential variables and variables addressed with a variable name it is allowed to define variables that return the symbol of a measured physical unit (e.g. Wh for energy). To do it, you should add /UNIT to the variable address e.g. ENERGY/UNIT. As a conversion function you should define NOTHING\_TEXT. In order to display the unit on technological diagram you can use the object STRING.

### Other Data

Data transferred by the M-BUS device may be provided with a header. Variables allowing to access the data in a header (see: **Table 2**).

**Table 2. Set of Variables Allowing to Access the Data in a Header.**

Address	Meaning	Type
H.IDENT	Identifier of device	DWORD
H.MANUFACTURER	Manufacturer code	
H.VERSION	Version	DWORD
H.MEDIUM	Medium code	BYTE
H.ACCESSNO	Next number of reading	BYTE
H.STATUS	Data status	BYTE

### Data Status

Devices operating according to the M-BUS protocol make available the datum of 1 byte length, the individual bits of which determine the device status in the following way (see: **Table 3**).

**Table 3. Data Statuses for M-BUS Devices.**

Number	Meaning	Byte Number
1	application engaged	0
2	application error	1
3	voltage drop	2
4	constant error	3
5	temporary error	4
6	error specific for the device	5
7	error specific for the device	6
8	error specific for the device	7

Statuses with the successive number from 1 to 5 cause all the data sent by the device to be cancelled by the driver i.e. they take the status *bad datum*. It doesn't apply to the data contained in the header described in point *Other Data*. This default operation of the driver may be changed by the parameter *Invalid\_Statuses* (see: *Driver Configuration*). The datum containing the device status may be read by the variable H.STATUS described in point *Other Data*. The first column of the above table determines the byte number, which corresponds to the specified status, in the variable.

Not all the devices make available the statuses 1 and 2. The meaning of statuses 6,7 and 8 is defined by the manufacturer.



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