

M-Bus Protocol

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1 M-Bus Protocol

All bytes transmitted over the M-bus and the optical interface has the format 8E1:

1	8	1	1
Start bit	Data bits	Parity bit (even)	Stop bit

For communication three different telegram types are used. These are:

1. Single character h'E5 (only used by slave)
2. Short frame (only used by master)
3. Long frame (used by both master and slave)

1.1 Single character

The single character h'E5 (CON_ACK) is only used by the meter. It serves as an acknowledgement of the reception of a valid frame (it does not say anything about whether the command was accepted and executed or not!)

1.2 Short frame:

10	C	A	CSUM	16
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Short frames always consist of 5 bytes.

They are initiated by the master.

There are two different frames: SND_NKE and REQ_UD2

„C“ Command

„A“ Address

“csum” Low byte of the sum of “C” and “A”

1.2.1 REQ_UD2

Request for a data frame

Short frame identifier	10
C	5b or 7b
A	Adds
Checksum	Csum
Stop byte	16

If it received successfully, the relevant data is returned by basic meter

The return format of the slave is RSP_UD

1.3 Long frame

68	Len	Len	68	C	A	CI	userdata	Csum	16
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“C” Command

“A” Address

“CI” Control information

“len” Length bytes

“csum” Checksum

1.3.1 Set primary M-bus address

Long frame identifier	68
Length bytes	06
Length bytes	06
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
Set the primary address command	01 74
New adrs	New adrs
Checksum	Csum
Stop byte	16

“new_adrs”for setting a new M-bus address

Frame length:12 bytes

Acknowledged by h'E5.

1.3.2 Set identification number

Long frame identifier	68
Length bytes	09
Length bytes	09
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
Set identification number command	0C 79
Identification number (meter number)	ID _{LOW} ~ID _{HIGH}
Checksum	Csum
Stop byte	16

Identification number for setting a new identification number

Frame length: 15 bytes

Acknowledged by h'E5.

1.3.3 Select meter by secondary address

Long frame identifier	68
Length bytes	0B
Length bytes	0B
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	52
Set identification number command	0C 79
4-byte identification number (meter number)	S _{LOW} ~S _{HIGH}
2-byte manufacturer code	MAN _{LOW} ~MAN _{HIGH}
1-byte meter version number	VER
1-byte device type	TYPE
Checksum	Csum
Stop byte	16

Frame length: 19 bytes

Acknowledged by h'E5.

1.3.4 Set billing date command

Long frame identifier	68
Length bytes	0B
Length bytes	0B
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
3-byte set billing date command	03 FB 7A
1-byte billing date	TT
Checksum	Csum
Stop byte	16

Frame length: 13 bytes

Acknowledged by h'E5.

1.3.5 Modify forward flow temperature coefficient

Long frame identifier	68
Length bytes	09
Length bytes	09
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
Modify forward flow temperature coefficient command	03 FB 7B
3-byte temperature coefficient	TA1 TA2 TA3
Checksum	Csum
Stop byte	16

Illustration: TA1 is sign bits, e.g. When TA1 is 00, it means that the data is positive, e.g. when TA1 is 01, it means that the data is negative, TA2~TA3 is data, format is format "B"

Frame length: 15 bytes

Acknowledged by h'E5.

1.3.6 Modify return flow temperature coefficient

Long frame identifier	68
Length bytes	09
Length bytes	09
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
3-byte modify return flow temperature coefficient command	03 FB 7C
3-byte temperature coefficient	TA1 TA2 TA3
Checksum	Csum
Stop byte	16

Illustration: TA1 is sign bits, e.g. When TA1 is 00, it means that the data is positive, e.g. when TA1 is 01, it means that the data is negative, TA2~TA3 is data, format is format "B"

Frame length: 15 bytes

Acknowledged by h'E5.

1.3.7 Modify the flow coefficient

Long frame identifier	68
Length bytes	09
Length bytes	09
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
3-byte modify return flow temperature coefficient command	03 FB 7C
3-byte temperature coefficient	TA1 TA2 TA3
Checksum	Csum
Stop byte	16

1.3.8 General election data message

Long frame identifier	68
Length bytes	LEN
Length bytes	LEN
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
Select code (combination)	A0~~~An
Checksum	Csum
Stop byte	16

Illustration: Select code (combination) can choose any of the following pre-code data or any combination (such as pre-set to read out the total heat energy and total flow, message format is as follows :

68 LL 68 53/73 A 51 08 14 08 2D CS 16)

Total heat energy	08h 00h...0Fh
Total flow	08h 10h...17h
Current heat energy	08h 28h...37h
Current flow	08h 38h...4Fh

Supply water temperature	08h 58h...5Bh
Return water temperature	08h 5Ch...5Fh
Temperature difference	08h 60h...63h
Serial number	08h 78h
Days in operation	08h 20h...23h
Date and time	08h 6Ch
Billing date	48h 6Ch

Frame length: 11 to 31 bytes

Acknowledged by h'E5.

1.3.9 Switch to immediate mode

Long frame identifier	68
Length bytes	05
Length bytes	05
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
Switch to immediate mode	0F A1
Checksum	Csum
Stop byte	16

Frame length: 11 bytes

Acknowledged by h'E5.

1.4 Production and use frame (Used in the production and maintenance)

1.4.1 Start the factory opened

Long frame identifier	68
Length bytes	05
Length bytes	05
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
DIF byte	2F

DIFE byte	0F
Function	00 24
Parameter	00 00 00
Checksum	Csum
Stop byte	16

Frame length: 16 bytes
Acknowledged by h'E5.

1.4.2 Revocation the factory opened

Long frame identifier	68
Length bytes	05
Length bytes	05
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
DIF byte	2F
DIFE byte	0F
Function	00 25
Parameter	00 00 00
Checksum	Csum
Stop byte	16

Frame length: 16bytes
Acknowledged by h'E5.

1.4.3 Zero setting

Long frame identifier	68
Length bytes	05
Length bytes	05
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
DIF byte	2F
DIFE byte	0F
Function	01 01
Parameter	00 00 00
Checksum	Csum

Stop byte	16
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Frame length: 16 bytes
Acknowledged by h'E5.

1.4.4 Set the date and time

Long frame identifier	68
Length bytes	0B
Length bytes	0B
Long frame identifier	68
C byte	53or73
A byte	adrs
CI byte	51
DIF byte	2F
DIFE byte	0F
Function	04 58
Parameter	SSMMHHDDMMYY
Checksum	Csum
Stop byte	16

Frame length: 16 bytes
Acknowledged by h'E5.

Attention: It may affect the monthly value during the billing period if you change the date, parameter are minute, hour, day, month, year.

1.5 Long frame slave to master

1.5.1 REQ_UD2

Response to a REQ_UD2 command.

Long frame identifier	68
Length bytes	Len
Length bytes	Len
Long frame identifier	68
C byte	08
A byte	adrs
CI byte	72
4-byte identification number	S _{LOW} ~S _{HIGH}
2-byte manufacturer code	MAN _{LOW} ~MAN _{HIGH}
1-byte meter version number	VER
1-byte device type	TYPE
Access number	ACC

Status	STA
Signature	00 00
Data bytes read	B0~~~~Bn
Checksum	Csum
Stop byte	16

Frame length: 29 to 89 bytes

Definition of the data bytes (Normal format)

Length	name	DIF (type)	VIF(E)	Data type
6	Serial number	0C	78	32-bit type A
6	Current date and time	04	6D	32-bit type F
6	Total heat energy	0A	0D	32-bit type A
6	Total flow	0A	15	32-bit type A
6	Current heat energy	0A	2E	32-bit type A
6	Current flow	0A	3E	32-bit type A
6	Forward flow temperature	0A	5B	32-bit type A
6	Return flow temperature	0A	5F	32-bit type A
6	Temperature difference	0A	63	32-bit type A
6	Days in operation	0A	22	32-bit type A
7	billing date	02	6C	16-bit type G
7	History heat	CC 00	04	32-bit type A
7	History heat	C0 01	04	32-bit type A
7	History heat	C1 01	04	32-bit type A
7	History heat	C0 02	04	32-bit type A
7	History heat	C1 02	04	32-bit type A
7	History heat	C0 03	04	32-bit type A
7	History heat	04	32-bit type A
7	History heat	C0 09	04	32-bit type A

Example

68 C5 C5 68 08 00 72 13 19 00 14 F9 29 02 04 02 00 00 00 0C 04 00 00 00
00 0C 14 00 00 00 00 0C 2B 00 00 00 00 0C 3C 00 00 00 00 **0B 5B** 21 00 00
0B 5F 22 00 00 0B 63 00 00 00 0C 78 13 19 00 14 0B 22 58 94 00 04 6D 2D
2A FC 1A 8C 00 04 00 00 00 00 00 CC 00 04 00 00 00 00 00 8C 01 04 00 00 00 00
CC 01 04 00 00 00 00 8C 02 04 00 00 00 00 00 CC 02 04 00 00 00 00 8C 03 04
00 00 00 00 CC 03 04 00 00 00 00 8C 04 04 00 00 00 00 CC 04 04 00 00 00
00 8C 05 04 00 00 00 00 CC 05 04 00 00 00 00 8C 06 04 00 00 00 00 CC 06
04 00 00 00 00 8C 07 04 00 00 00 00 CC 07 04 00 00 00 00 8C 08 04 00 00

00 00 CC 08 04 00 00 00 00 77 16

OB----DIF you can see in EN13757-3 TABLE6 and code 1011---6bit BCD

So 21 00 00 is the value

5B----VIF you can see in EN13757-3 TABLE9 and E101 1011 means Flow Temperature and 1°C

Definition of the data bytes: (Precision formats)

Length	Name	DIF	VIF(E)	Data type
6	Total heat energy	05	0D	32-bit type A
6	Total flow	05	16	32-bit type A
6	Current heat energy	05	2E	32-bit type A
6	Current flow	05	3E	32-bit type A
6	Forward flow temperature	05	5B	32-bit type A
6	Return flow temperature	05	5F	32-bit type A

2 Summary of M-bus data types

2.1.1 32-bit Type A (without sign BCD)

LS word

15	12	11	08	07	04	03	00
3 (nibble 4)) 0	3 (nibble 3)) 0	3 (nibble 2)) 0	3 (nibble 1)) 0				

MS word

15	12	11	08	07	04	03	00
3 (nibble 4)) 0	3 (nibble 3)) 0	3 (nibble 2)) 0	3 (nibble 1)) 0				

Number h'A to h'F are not valid in any bit.

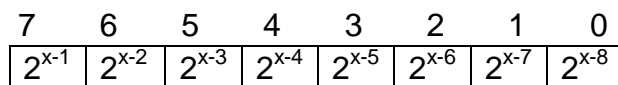
It is used for meter number.

2.1.2 Type B (represents a two's binary integer with sign.)

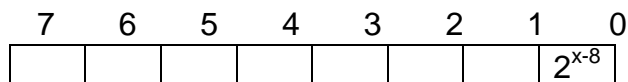
7	6	5	4	3	2	1	0
S	2^{x-2}	2^{x-3}	2^{x-4}	2^{x-5}	2^{x-6}	2^{x-7}	2^{x-8}

S represents the sign bit, S = 0 means the data is positive, S = 1 means the data is negative.

2.1.3 Type C (represents an binary integer without sign.)



2.1.4 Type D (Boolean type)

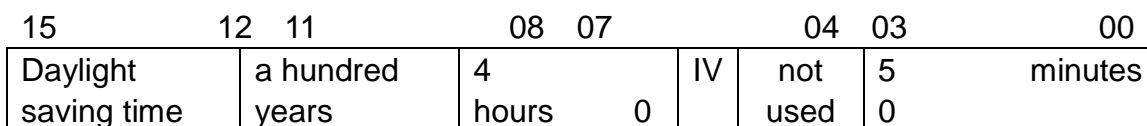


The first is 0 means false

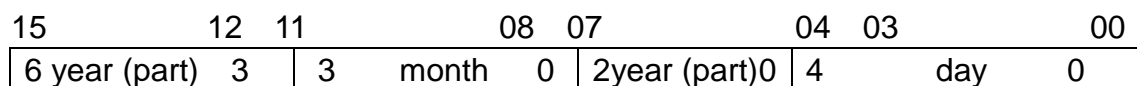
The first is 1 means true

2.1.5 Type F (time)

LS word

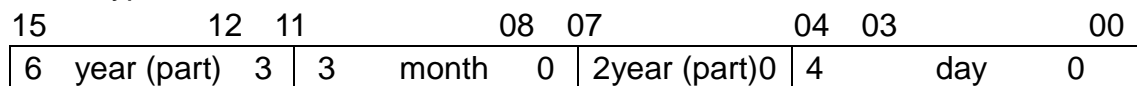


MS word



Application: date / time

2.1.6 Type G



Application: billing date