M-Bus Communication Protocol

Ultrasonic Energy Meter - DEM

Change History

Date	Issue	Author
20/09/2014	Version 1.0 released	FH

The implementation is based on the following documents:

1. EN 1434-3 with sub document EN 60870-5
2. The M-Bus: A Documentation Version 4.8 November 11, 1997, M-Bus Usergroup

Configuration: 2400, Even, 8, 1

Sheet 1 - Description

<table>
<tr><th>Code</th><th>Description</th></tr>
<tr><td>PA</td><td>Primary Address(0 to 252): 0x00~0xFC</td></tr>
<tr><td>CS</td><td>8 bit Checksum</td></tr>
<tr><td>BR</td><td>Baudrate:0xB8 300, 0xB9 600, 0xBA 1200, 0xBB 2400, 0xBC 4800, 0xBD 9600</td></tr>
<tr><td>SN</td><td>Serial Number(4Bytes) Example: SN: 30001234
0x34 0x12 0x00 0x30 Little endian</td></tr>
<tr><td>MF</td><td>Manufacturer ID(DYN, 0x132E, 2Bytes): 0x2E 0x13
IEC 870 Man. ID = [ASCII(1st letter) - 64] • 32 • 32
+ [ASCII(2nd letter) - 64] • 32
+ [ASCII(3rd letter) - 64]</td></tr>
<tr><td>DT</td><td>Date & Time: Data Type F
<table><tr><td>2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0</td></tr><tr><td>2^{15} 2^{14} 2^{13} 2^{12} 2^{11} 2^{10} 2^9 2^8</td></tr><tr><td>2^{23} 2^{22} 2^{21} 2^{20} 2^{19} 2^{18} 2^{17} 2^{16}</td></tr><tr><td>2^{31} 2^{30} 2^{29} 2^{28} 2^{27} 2^{26} 2^{25} 2^{24}</td></tr></table>min : bit[0 to 5], value<0, 59>
hour : bit[8 to 12], value<0, 23>
day :bit[16, 20], value<1, 31>
month :bit[24 to 27], value<1 to 12>
year :bit[21 to 23, 28 to 31]; value<0, 99> hundred year: bit[13 to 14], value<0, 3>
actual year = 1900 + 100 * hundred year + year</td></tr>
<tr><td>HOF</td><td>Frame head: Start L-Field L-Field Start C-Field A-Field (6Bytes)
68 xx xx 68 08 PA</td></tr>
<tr><td>HOD</td><td>Data head: Sec-Addr Manu. Version Medium Access-No. Status Signature(12Bytes)
SN MF 01 04 01 00 0000</td></tr>
</table>

Sheet 2 - Status

Value	Description
0x00	Normal
0x04	No Water

Request from master

Primary addressing

Description	Command	Response
Initializing a slave	10 40 PA CS 16	E5
Reading	10 5B/7B PA CS 16	RSP_UD: Appendix RSP
Read SN	68 05 05 68 53/73 PA 51 08 78 CS 16	E5
Change PA	68 06 06 68 53/73 PA 51 01 7A newPA CS 16	E5
Change SN	68 09 09 68 53/73 PA 51 0C 79 newSN CS 16	E5
Change Baud rate	68 03 03 68 53/73 PA BR CS 16	E5
Change Time	68 09 09 68 53/73 PA 51 04 6D DT CS 16	E5
Change Unit	Reserved	E5
Read Status	Reserved	Sheet 2 - ERR
Read Data-N	Reserved	Reserved

Secondary addressing

Description	Command	Response
Selecting a slave	68 0B 0B 68 53/73 FD 52 SN MF 01 04 CS 16	E5
Reading	10 5B/7B FD 58 16	RSP_UD: Appendix RSP
Change PA	68 0E 0E 68 53/73 FD 51 SN MF 01 04 01 7A newPA CS 16	E5
Change SN	68 11 11 68 53/73 FD 51 newSN MF 01 04 0C 79 SN CS 16	E5
Change Baud rate	68 0B 0B 68 53/73 FD BR SN CS 16	E5
Change Time	68 09 09 68 53/73 FD 51 SN MF 01 04 04 6D DT CS 16	E5
Change Unit	Reserved	E5
Read Status	Reserved	Sheet 2 - ERR
Read Data-N	Reserved	Reserved

Appendix RSP – Response from slave

Readout – General

68 xx xx 68	Header of RSP_UD telegram			
08 01 72	Primary Address 1, CI-Field 72H			
78 56 34 12	Identification-No. 12345678(SN)			
2E 13	Manufacturer DYN (132E)			
01 04	Generation = 1, Media = Heat			
01 00	TC =1, State = 00h			
00 00	Signature = 0000h			
	Name	Value	Unit	Type
0C 13 78 56 34 12	Total Energy +	12345678	L	BCD 8
0C 07 78 56 34 12	Total Energy -	12345678	10KWH	BCD 8
0C 03 xx xx xx xx	Power		WH	32 Bit Integer
04 38 xx xx xx xx	Volume Flow		mL/H	32 Bit Integer
0C 10 78 56 34 12	Total Volume +	12345678	mL	BCD 8
0C 10 78 56 34 12	Total Volume -	12345678	mL	BCD 8
04 58 xx xx xx xx	Flow Temp		m℃	32 Bit Integer
04 5C xx xx xx xx	Return Temp		m℃	32 Bit Integer
04 22 00 00 00 10	Time Counter		hour	32 Bit Integer
04 6D 34 37 21 01	Date & Time			Type F
01 FD 17 00	Error Code	0		8 Bit Integer
xx	Checksum			
16	Stop			

Readout – SN

68 15 15 68	Header of RSP_UD telegram
08 01 72	Primary Address 1, CI-Field 72H
78 56 34 12	Identification-No. 12345678 (SN)
2E 13	Manufacturer DYN (132E)
01 04	Generation = 1, Media = Heat
01 00	TC =1, State = 00h
00 00	Signature = 0000h
0C 78 78 56 34 12	SN
6E	Checksum
16	Stop

Appendix Unit

Energy				Power			
DIF	VIF	VIFE	Description	DIF	VIF	VIFE	Description
0x0C	0x03		WH	0x0C	0x28		mW
0x0C	0x04		10WH	0x0C	0x29		10mW
0x0C	0x05		100WH	0x0C	0x2A		100mW
0x0C	0x06		KWH	0x0C	0x2B		W
0x0C	0x07		10KWH	0x0C	0x2C		10W
0x0C	0x87	0x77	100KWH	0x0C	0x2D		100W
0x0C	0x86	0x7D	MWH	0x0C	0x2E		KW
0x0C	0x0E		MJ	0x0C	0x2F		10KW
0x0C	0x0F		10MJ	0x0C	0xAF	0x77	100KW
0x0C	0x8F	0x77	100MJ	0x0C	0xAE	0x7D	MW
0x0C	0x8E	0x7D	GJ				
Total Volume				**Volume Flow**			
0x0C	0x10		mL	0x0C	0x38		mL/H
0x0C	0x11		10mL	0x0C	0x39		10mL/H
0x0C	0x12		100mL	0x0C	0x3A		100mL/H
0x0C	0x13		L	0x0C	0x3B		L/H
0x0C	0x14		10L	0x0C	0x3C		10L/H
0x0C	0x15		100L	0x0C	0x3D		100L/H
0x0C	0x16		M3	0x0C	0x3E		M3/H
0x0C	0x17		10M3	0x0C	0x3F		10M3/H
0x0C	0x18		100M3				
Flow Temp				**Return Temp**			
0x0C	0x58		m℃	0x0C	0x5C		m℃
0x0C	0x59		10m℃	0x0C	0x5D		10m℃
0x0C	0x5A		100m℃	0x0C	0x5E		100m℃
0x0C	0x5B		℃	0x0C	0x5F		℃