Utgivare
T, Lars Mathisson

Datum
99-06-01

Ersätter
-

Dokumentnr
mbusflex.doc

SVM Implementation of M-Bus in F3/4 meter

*** Variable format (multi telegram readout)**

Mbus-coded is:
Energy
Volume from watermeter
Volume according to energy
Forward temperature
Return temperature
Difference temperature
On time
Operationtime
Flow
Power
Time&date
Pulsecounter 1 H.C.A coded
Pulsecounter 2 H.C.A coded
2 Account- and 37 monthstorages:
- Energy
- Volume from watermeter
- Volume according to energy
- Pulsecounter 1 H.C.A coded
- Pulsecounter 2 H.C.A coded
- Date

All other data coded as manufacture specific

*** Broadcast**
*** Primary addressing**
*** Secondary addressing**
*** Test addressing (point to point)**
*** Selection of slaves**
*** Normalize (should be sent before start of readout)**
*** Baudrate change between 300 and 2400**

Dokument	Ärende	Sida
Flex	variabel format	2(11)

Utgivare	Datum	Ersätter	Dokumentnr
T, Lars Mathisson	98-11-30	98-05-12	mbusflex.doc

This is a Multi-telegram readout includes at least 43 different telegrams
1st telegram standard values M-bus coded **(all data is hexcoded).**

No	size	value	meaning
1	**1B**	**68h**	**Start**
2	**1B**	**xxh**	**L length**
3	**1B**	**xxh**	**L length calculated from C field to last userdata**
4	**1B**	**68h**	**Start**
5	**1B**	**08h**	**C-field RSP_UD**
6	**1B**	**xxh**	**address**
7	**1B**	**72h**	**CI-field var data respond data LSB first**
8-11	**4B**	**xxxxxxxxBCD**	**ID No 8 BCD digits**
12-13	**2B**	**4ECDh**	**Manufacture No SVM**
14	**1B**	**xxh**	**version**
15	**1B**	**04h**	**Medium: 04h =Return flow 0Ch=Forward flow**
16	**1B**	**xxh**	**Number of accesses**
17	**1B**	**xxh**	**Status (see page 11). bits 0,1 are unused**
18-19	**2B**	**0000h**	**signature for future use**
20	1B	04h	DIF size ***0*** means fixed zero
21	1B	0Fh	VIF for units J with resolution 1.***00***GJ 0dec
		0Fh	" 0.1***0***GJ 1dec
		0Fh	" 0.01GJ 2dec
		0Eh	" 0.001GJ 3dec
		07h	VIF for units Wh with res 1.***00***MWh 0dec
		07h	" 0.1***0***MWh 1dec
		07h	" 0.01MWh 2dec
		06h	" 0.001MWh 3dec
		06h	VIF for units Wh with resolution 1kWh 0dec
		05h	" 0.1kWh 1dec
		04h	" 0.01kWh 2dec
		03h	" 0.001kWh 3dec
22-25	4B	xxxxxxxxh	Energy
26	1B	04h	DIF size
27	1B	16h	VIF for units m3 with resolution 1m3 0dec
		15h	" 0.1m3 1dec
		14h	" 0.01m3 2dec
		13h	" 0.001m3 3dec
28-31	4B	xxxxxxxxh	Volume from watermeter

1st telegram standard values continued M-bus coded

No	size	value	meaning		
32	1B	84h	DIF size and extbit 1		
33	1B	40h	DIFE unit 1		
34	1B	16h	VIF for units m3 with resolution 1m3		0dec
		15h	"	0.1m3	1dec
		14h	"	0.01m3	2dec
		13h	"	0.001m3	3dec
35-38	4B	xxxxxxxxh	Volume		
39	1B	02h	DIF size		
40	1B	5Bh	VIF for units C with resolution 1C		
41-42	2B	xxxxh	Forward temperature		
43	1B	02h	DIF size		
44	1B	5Fh	VIF for units C with resolution 1 C		
45-46	2B	xxxxh	Return temperature		
47	1B	02h	DIF size		
48	1B	62h	VIF for units C with resolution 0,1 C		
39-50	2B	xxxxh	Diferrence temperature		
51	1B	04h	DIF size		
52	1B	22h	VIF for on time resolution 1hour		
53-56	4B	xxxxxxxxh	on time (Runtime)		
57	1B	04h	DIF size		
58	1B	26h	VIF for operationtime resolution 1 hour		
59-62	4B	xxxxxxxxh	operationtime (Runtime-Errortime)		
63	1B	04h	DIF size		**floating resolution**
64	1B	3Eh	VIF for units m3/h with resolution 1m3/h		0dec
		3Dh	"	0.1m3/h	1dec
		3Ch	"	0.01m3/h	2dec
		3Bh	"	0.001m3/h	3dec
65-68	4B	xxxxxxxxh	Flow		
69	1B	04h	DIF size		**floating resolution**
70	1B	2Eh	VIF for units W with resolution 1kW		0dec
		2Dh	"	0.1kW	1dec
		2Ch	"	0.01kW	2dec
		2Bh	"	0.001kW	3dec
71-74	4B	xxxxxxxxh	Power		
75	1B	04h	DIF size		
76	1B	6Dh	VIF for time &date stamp type F		
77-80	4B	xxxxxxxxh	time &date		

1st telegram standard values continued M-bus coded eccept end part

No	size	value	meaning
81	1B	84h	DIF size extbit 1
82	1B	40	DIFE unit 1
83	1B	6Eh	VIF for H.C.A dimensionless
84-87	4B	xxxxxxxxh	pulsecounter 1
88	1B	84h	DIF size extbit 1
89	1B	80h	DIFE extbit 1
90	1B	40h	DIFE unit 2
91	1B	6Eh	VIF for H.C.A dimensionless
92-95	4B	xxxxxxxxh	pulsecounter 2
96	**1B**	**1Fh**	**DIF more records will follow in next telegram**
97-148	52B		man. spec. data, see page 9
149	**1B**	**xxh**	**CS checksum is calculated from C field to last data**
150	**1B**	**16h**	**stopsign**

2 ‘nd telegram manufacture specific data **(all data is hexcoded).**

No	size	value	meaning
1	**1B**	**68h**	**Start**
2	**1B**	**xxh**	**L length**
3	**1B**	**xxh**	**L length calculated from C field to last userdata**
4	**1B**	**68h**	**Start**
5	**1B**	**08h**	**C-field RSP_UD**
6	**1B**	**xxh**	**address**
7	**1B**	**72h**	**CI-field var data respond data LSB first**
8-11	**4B**	**xxxxxxxxBCD**	**ID No 8 BCD digits**
12-13	**2B**	**4ECDh**	**Manufacture No SVM**
14	**1B**	**xxh**	**version**
15	**1B**	**04h**	**Medium: 04h =Return flow 0Ch=Forward flow**
16	**1B**	**xxh**	**Number of accesses**
17	**1B**	**xxh**	**Status (see page 11). bits 0,1 are unused**
18-19	**2B**	**0000h**	**signature for future use**
20	**1B**	**1Fh**	**DIF more records will follow in next telegram**
21-226	206B		man. spec. data, see page 9
227	**1B**	**xxh**	**CS checksum is calculated from C field to last data**
228	**1B**	**16h**	**stopsign**

telegram 3 - 42 Readoutday 1-2 , and monthreg 1-37

No	size	value	meaning	
1	**1B**	**68h**	**Start**	
2	**1B**	**xxh**	**L length**	
3	**1B**	**xxh**	**L length calculated from C field to last userdata**	
4	**1B**	**68h**	**Start**	
5	**1B**	**08h**	**C-field RSP_UD**	
6	**1B**	**xxh**	**address**	
7	**1B**	**72h**	**CI-field var data respond data LSB first**	
8-11	**4B**	**xxxxxxxxBCD**	**ID No 8 BCD digits**	
12-13	**2B**	**4ECDh**	**Manufacture No SVM**	
14	**1B**	**xxh**	**version**	
15	**1B**	**04h**	**Medium: 04h =Return flow 0Ch=Forward flow**	
16	**1B**	**xxh**	**Number of accesses**	
17	**1B**	**xxh**	**Status (see page 11). bits 0,1 are unused**	
18-19	**2B**	**0000h**	**signature for future use**	
20	1B	C4h	DIF size and storage number 1 ***0*** means fixed zero	
21	1B	80h	DIFE extbit 1	
22	1B	00h	DIFE	
23	1B	0Fh	VIF for units J with resolution 1.***00***GJ	0dec
		0Fh	" 0.1***0***GJ	1dec
		0Fh	" 0.01GJ	2dec
		0Eh	" 0.001GJ	3dec
		07h	VIF for units Wh witrh res 1.***00***MWh	0dec
		07h	" 0.1***0***MWh	1dec
		07h	" 0.01MWh	2dec
		06h	" 0.001MWh	3dec
		06h	VIF for units Wh with resolution 1kWh	0dec
		05h	" 0.1kWh	1dec
		04h	" 0.01kWh	2dec
		03h	" 0.001kWh	3dec
24-27	4B	xxxxxxxxh	Energy	
28	1B	C4h	DIF size and storage number 1	
29	1B	80h	DIFE extbit 1	
30	1B	00h	DIFE	
31	1B	16h	VIF for units m3 with resolution 1m3	0dec
		15h	" 0.1m3	1dec
		14h	" 0.01m3	2dec
		13h	" 0.001m3	3dec
32-35	4B	xxxxxxxxh	Volume	

3rd telegram readout day 1 part 1 continued M-bus coded

No	size	value	meaning	
36	1B	C4h	DIF size and storage number 1 extbit 1	
37	1B	C0h	DIFE unit 1, extbit 1	
38	1B	00h	DIFE	
39	1B	16h	VIF for units m3 with resolution 1m3	0dec
		15h	" 0.1m3	1dec
		14h	" 0.01m3	2dec
		13h	" 0.001m3	3dec
40-43	4B	xxxxxxxxh	Volume from water meter	
44	1B	C4h	DIF size and storage number 1 extbit 1	
45	1B	C0h	DIFE unit 1, extbit 1	
46	1B	00h	DIFE	
47	1B	6Eh	VIF for H.C.A dimensionless	
48-51	4B	xxxxxxxxh	pulscounter 1	
52	1B	C4h	DIF size and storage number 1 extbit 1	
53	1B	80h	DIFE extbit 1	
54	1B	40h	DIFE unit 2	
55	1B	6Eh	VIF for H.C.A dimensionless	
56-59	4B	xxxxxxxxh	pulscounter 2	
60	1B	C2h	DIF size storage number 1	
61	1B	80h	DIFE extbit 1	
62	1B	00h	DIFE	
63	1B	6Ch	VIF for date stamp type G	
64-65	2B	xxxxh	date 1	
66	**1B**	**1Fh**	**DIF more records will follow**	
67-70	4B		man. spec. data, see page 9	
71	**1B**	**xxh**	**CS checksum is calculated from C field to last data**	
72	**1B**	**16h**	**stopsign**	

Dokument	Ärende		Sida
Flex	Manufacture specific		8(11)
Utgivare	Datum	Ersätter	Dokumentnr
T, Lars Mathisson	98-11-30	98-05-12	mbusflex.doc

Telegram 43 manufacture specific data **(all data is hexcoded).**
This telegram is always moved to the end if any added extracard add telegrams.

No	size	value	meaning
1	**1B**	**68h**	**Start**
2	**1B**	**xxh**	**L length**
3	**1B**	**xxh**	**L length calculated from C field to last userdata**
4	**1B**	**68h**	**Start**
5	**1B**	**08h**	**C-field RSP_UD**
6	**1B**	**xxh**	**address**
7	**1B**	**72h**	**CI-field var data respond data LSB first**
8-11	**4B**	**xxxxxxxxBCD**	**ID No 8 BCD digits**
12-13	**2B**	**4ECDh**	**Manufacture No SVM**
14	**1B**	**xxh**	**version**
15	**1B**	**04h**	**Medium: 04h =Return flow 0Ch=Forward flow**
16	**1B**	**xxh**	**Number of accesses**
17	**1B**	**xxh**	**Status (see page 11). bits 0,1 are unused**
18-19	**2B**	**0000h**	**signature for future use**
20	**1B**	**1Fh**	**DIF more records will follow in next telegram**
21-31	11B		man. spec. data, see page 9
32	**1B**	**xxh**	**CS checksum is calculated from C field to last data**
33	**1B**	**16h**	**stopsign**

Manufacture specific coded data

DATA from telegram 1

pulsevalue	byte 97-98, byte 102 and byte 148
battery change day	byte 99
battery change month	byte 100
battery change year	byte 101
serial ID	byte 119-122 BCD coded

DATA from telegram 2

error code	byte 21-22
actual error time	byte 23-24
high resolution energy	byte 25-28
high resolution volume	byte 29-32
high resolution volume 2	byte 33-36
last error code	byte 49-50
last error time	byte 51-52
time since last comm.	byte 61-62
last remote read energy	byte 223-226

DATA from telegram 3 - 42

actual error time	byte 67-68
error code	byte 69-70

DATA from the last telegram (43)

Program version P&P	byte 21
Type of meter in ascii	byte 22-25
Info extracard in pos A	byte 26
Info extracard in pos B	byte 27
Info extracard in pos C	byte 28
Info extracard in pos D	byte 29
Info extracard in pos E	byte 30
Info extracard in pos F	byte 31

All data with 2 or 4 bytes are transmitted with least significant byte first.

To calculate the pulsvalue we need 4 bytes.

bytes 97-98 are the value with 4 digits.

byte 148 is the decimal setting for the 4 digits

byte 102 is the change in decimal setting, if the pulsevalue was changed in service mode.

The formula for calculating number of decimals for the 4 digits:

no_of_dec = (low nibble of byte 148) + (high nibble of byte 148) + (byte 102”signed”) - 3

Coding of status field in M-bus protocoll for SVM

1. STATUS BYTE

BIT	BIT=1	BIT=0	Our use
0	Counter 1,2 coded signed binary	Counter 1,2 coded BCD	(V=0 Not used)
1	Counter 1,2 are stored at fixed date	Counter 1,2 are actual values	(V=0 Not used)
2	Power low	Not Power low	
3	Permanent error	Not Permanent error	
4	Temporary error	Not Temporary error	
5	S Tempsensors	Not Tempsensors	
6	S Flow sensor	Not Flow sensor	
7	S EEprom	Not EEprom	

Errors	BITs
Alarm in	4+6
Low flow	6
Temp sensor error	4+5
IIC error	4
EEprom	3+7
Battery time error	3

V=Variable format
S=specific to manufacture(SVM)