

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
Flex

Ärende
variabel format

Sida
2(11)

Utgivare
T, Lars Mathisson

Datum
98-11-30

Ersätter
98-05-12

Dokumentnr
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)**.

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>
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 1.00GJ 0dec
		0Fh	" 0.10GJ 1dec
		0Fh	" 0.01GJ 2dec
		0Eh	" 0.001GJ 3dec
		07h	VIF for units Wh with res 1.00MWh 0dec
		07h	" 0.10MWh 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

Dokument
Flex

Ärende
variabel format

Sida
3(11)

Utgivare
T, Lars Mathisson

Datum
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Dokumentnr
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1st telegram standard values continued M-bus coded

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>	
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	
49-50	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	

Dokument
Flex

Ärende
variabel format

Sida
4(11)

Utgivare
T, Lars Mathisson

Datum
98-11-30

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

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>
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	xxxxxxxh	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	xxxxxxxh	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

Dokument
Flex

Ärende
variabel format

Sida
5(11)

Utgivare
T, Lars Mathisson

Datum
98-11-30

Ersätter
98-05-12

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

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>
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

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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 1.00GJ 0dec
		0Fh	" 0.10GJ 1dec
		0Fh	" 0.01GJ 2dec
		0Eh	" 0.001GJ 3dec
		07h	VIF for units Wh with res 1.00MWh 0dec
		07h	" 0.10MWh 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 1m30dec
		15h	" 0.1m3 1dec
		14h	" 0.01m3 2dec
		13h	" 0.001m3 3dec
32-35	4B	xxxxxxxxh	Volume

Dokument
Flex

Ärende
variabel format

Sida
7(11)

Utgivare
T, Lars Mathisson

Datum
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Ersätter
98-05-12

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

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>
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 1m30dec
		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
Flex

Ärende
Manufacture specific

Sida
8(11)

Utgivare
T, Lars Mathisson

Datum
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Ersätter
98-05-12

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Telegram 43 manufacture specific data (**all data is hexcoded**).

This telegram is always moved to the end if any added extracard add telegrams.

<u>No</u>	<u>size</u>	<u>value</u>	<u>meaning</u>
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

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Flex	Manufacture specific	9(11)
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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

Dokument Flex	Ärende Status byte	Sida 10(11)
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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:

$$\text{no_of_dec} = (\text{low nibble of byte 148}) + (\text{high nibble of byte 148}) + (\text{byte 102"signed"}) - 3$$

Dokument
Flex

Ärende
Status byte

Sida
11(11)

Utgivare
T, Lars Mathisson

Datum
98-11-30

Ersätter
98-05-12

Dokumentnr
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Coding of status field in M-bus protocol 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)