

M-Bus specification

Heat Meter

Supercal 5

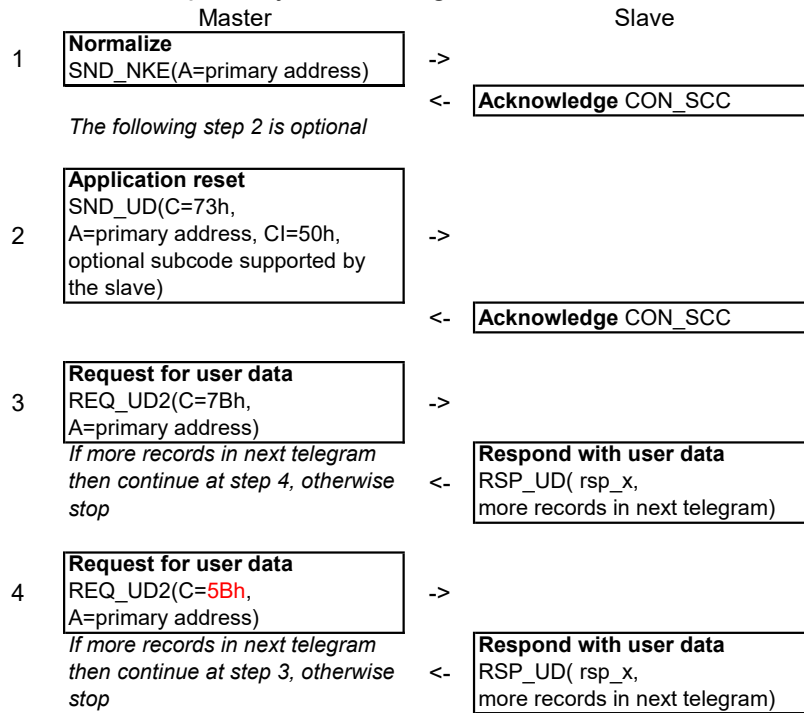
Document: M-Bus_Frames_SC5_2023-08-21
Firmware: SC5 V1.0.5 + V1.0.x

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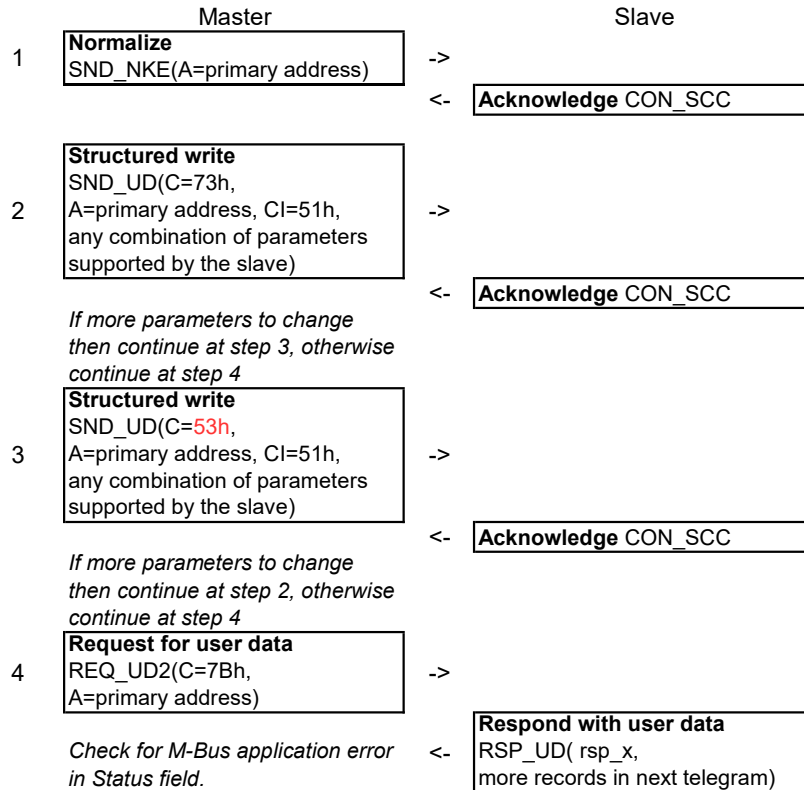
Revision:

Date	Author	Description
24.06.2019	JMM	
10.09.2020	JMM	Modified frames: r5, r6, r7, r8, c1, c10_
17.09.2020	JMM	Modified sheets: Stx, c1, c7, c8, c12, s
01.10.2020	JMM	Modified sheets: s
17.11.2020	JMM	Modified sheets: r5
08.02.2021	JMM	Modified sheets: Keys, Frames, he, c3, c4
17.02.2022	JMM	Modified sheets: Keys, Frames, r5, r6, r7, r8, v1, c1, c2, c4_, c5, c14, c16
11.03.2022	JMM	Modified frames: Frames, c4, c14
17.03.2022	JMM	M-Bus version 71 (47h)
07.06.2022	FS	Added r4 Lora default frames
06.07.2022	JMM	M-Bus version 72 (49h); Modified sheets: Keys, Frames; Add new M-Bus field "Application reset"
16.11.2022	JMM	Correction of sheet C4_; Modified sheet c5
30.03.2023	NU	Add notes in "c8" with range to implement in Superprog

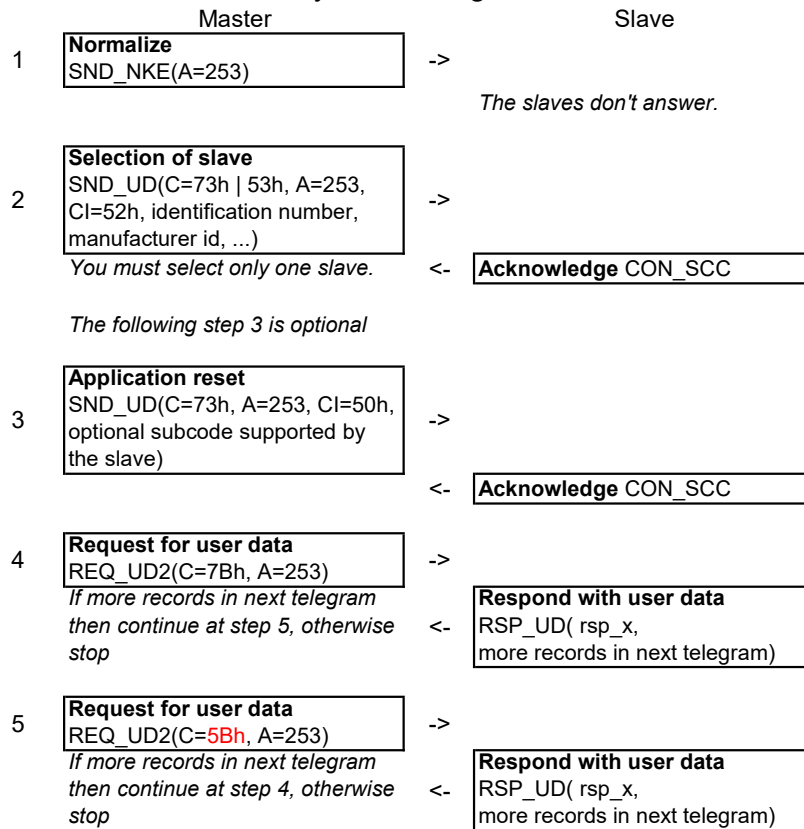
Read data with primary addressing



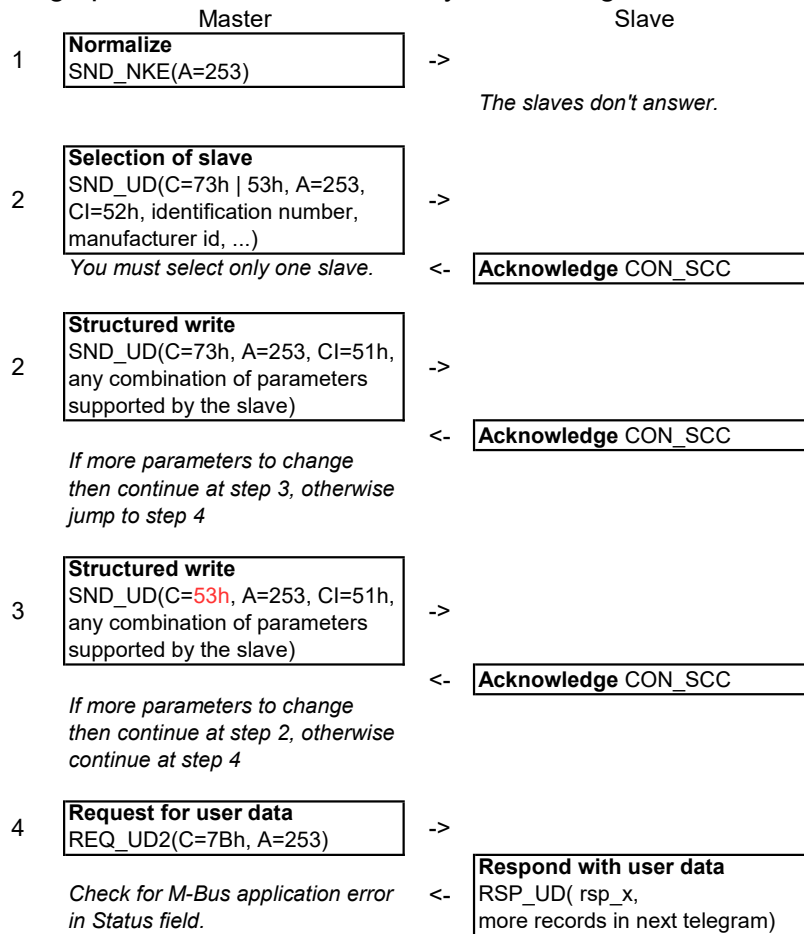
Change parameters with primary addressing



Read data with secondary addressing



Change parameters with secondary addressing



Keys

	Optional record																																				
xx	Value LSByte first																																				
yy	Value MSByte first																																				
ar ar	Application Reset	bit2..0 Interface to apply the application reset 000b reserved 001b Wire 010b Optical 011b Module 1 100b NFC 101b Module 2 110b Radio MFD 111b Radio wM-Bus bit6..3 reserved bit7 0: without subcode1: subcode in bit15..8 bit15..8 Subcode																																			
br	Baudrate	0 2380 bit/s 1 300 bit/s 2 600 bit/s 3 1200 bit/s 4 2400 bit/s 5 4800 bit/s																																			
ch	ASCII character	The LCD supports only the character codes 20h..7Eh																																			
cs	The value of Check Sum is calculated from arithmetical sum modulo 256 of each byte of																																				
di	INx pulse factor display unit	<table border="0"> <thead> <tr> <th></th> <th>Allowed only if</th> </tr> </thead> <tbody> <tr> <td>00 m3/pulse</td> <td></td> </tr> <tr> <td>01 pulse/m3</td> <td></td> </tr> <tr> <td>02 L/pulse</td> <td>unter INx unitiu iu = vu v</td> </tr> <tr> <td>03 pulse/L</td> <td></td> </tr> <tr> <td>04 gal/pulse</td> <td></td> </tr> <tr> <td>05 pulse/gal</td> <td></td> </tr> <tr> <td>06 kWh/pulse</td> <td></td> </tr> <tr> <td>07 pulse/kWh</td> <td></td> </tr> <tr> <td>08 MJ/pulse</td> <td></td> </tr> <tr> <td>09 pulse/MJ</td> <td>unter INx unitiu iu = eu e</td> </tr> <tr> <td>0A kBtu/pulse</td> <td></td> </tr> <tr> <td>0B pulse/kBtu</td> <td></td> </tr> <tr> <td>0C Mcal/pulse</td> <td></td> </tr> <tr> <td>0D pulse/Mcal</td> <td></td> </tr> <tr> <td>0E unit/pulse</td> <td>ter INx unitiu iu = 00, 00</td> </tr> <tr> <td>0F pulse/unit</td> <td></td> </tr> </tbody> </table>		Allowed only if	00 m3/pulse		01 pulse/m3		02 L/pulse	unter INx unitiu iu = vu v	03 pulse/L		04 gal/pulse		05 pulse/gal		06 kWh/pulse		07 pulse/kWh		08 MJ/pulse		09 pulse/MJ	unter INx unitiu iu = eu e	0A kBtu/pulse		0B pulse/kBtu		0C Mcal/pulse		0D pulse/Mcal		0E unit/pulse	ter INx unitiu iu = 00, 00	0F pulse/unit		
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0D pulse/Mcal																																					
0E unit/pulse	ter INx unitiu iu = 00, 00																																				
0F pulse/unit																																					

dt	Device type		Flowmeter position	
	04	Heat	outlet, return	cold pipe
	0A	Cooling	outlet, return	hot pipe
	0B	Cooling	inlet, flow	cold pipe
	0C	Heat	inlet, flow	hot pipe
	0D	Heat / Cooling load meter		

en en en	Physical unit coding of energy (depends on Energy unit "eu eu")			en en En
	03	0.001 kWh		03
	04	0.01 kWh		04
	05	0.1 kWh		05
	06	1 kWh 0.001 MWh	kWhMWh	06
	07	0.01 MWh		07
	85 7D	0.1 MWh		85 7D
	FB 01	1 MWh		FB 01
	0B	0.001 MJ		0B
	0C	0.01 MJ		0C
	0D	0.1 MJ		0D
	0E	1 MJ 0.001 GJ	MJGJ	0E
	0F	0.01 GJ		0F
	FB 08	0.1 GJ		FB 08
	FB 09	1 GJ		FB 09
	80 3D	0.001 kBtu		80 3D
	81 3D	0.01 kBtu		81 3D
	82 3D	0.1 kBtu		82 3D
	83 3D	1 kBtu 0.001 MBtu	kBtuMBtu	83 3D
	84 3D	0.01 MBtu		84 3D
	85 3D	0.1 MBtu		85 3D
	86 3D	1 MBtu		86 3D
	FB 8C 74	0.001 Mcal		FB 8C 74
	FB 8C 75	0.01 Mcal		FB 8C 75
	FB 0C	0.1 Mcal		FB 0C
	FB 0D	1 Mcal 0.001 Gcal	McalGcal	FB 0D
	FB 0E	0.01 Gcal		FB 0E
	FB 0F	0.1 Gcal		FB 0F
	FB 8D 7D	1 Gcal		FB 8D 7D

er er er

Detailed errors

Supercal 5	
bit0	AD ref1 error
bit1	AD ref2 error
bit2	AD Pt sensor 1
bit3	AD Pt sensor 2
bit4	Temperature 1 below min
bit5	Temperature 1 above max
bit6	Temperature 2 below min
bit7	Temperature 2 above max
bit8	Sum of all temperatures and AD errors
bit9	Flow in saturation
bit10	Case is open
bit11	Main power cut
bit12	Module 1 error
bit13	Module 2 error
bit14	Firmware checksum error
bit15	Radio error
bit16	Unknown C field
bit17	Unknown CI field
bit18	Unknown record
bit19	Access right violation.
bit20	Bad record size
bit21	Bad record value
bit22	Incorrect password
bit23	†

† Not used

eu eu

Energy unit

en en en

01 03	0.001 kWh		03
01 02	0.01 kWh		04
01 01	0.1 kWh		05
01 00	1 kWh	kWhMWh	06
02 03	0.001 MWh		06
02 02	0.01 MWh		07
02 01	0.1 MWh		85 7D
02 00	1 MWh		FB 01
03 03	0.001 MJ		0B
03 02	0.01 MJ		0C
03 01	0.1 MJ		0D
03 00	1 MJ	MJGJ	0E
04 03	0.001 GJ		0E
04 02	0.01 GJ		0F
04 01	0.1 GJ		FB 08
04 00	1 GJ		FB 09
05 03	0.001 kBtu		80 3D
05 02	0.01 kBtu		81 3D
05 01	0.1 kBtu		82 3D
05 00	1 kBtu	kBtuMBtu	83 3D
06 03	0.001 MBtu		83 3D
06 02	0.01 MBtu		84 3D
06 01	0.1 MBtu		85 3D
06 00	1 MBtu		86 3D
07 03	0.001 Mcal		FB 8C 74
07 02	0.01 Mcal		FB 8C 75
07 01	0.1 Mcal		FB 0C
07 00	1 Mcal	McalGcal	FB 0D
08 03	0.001 Gcal		FB 0D
08 02	0.01 Gcal		FB 0E
08 01	0.1 Gcal		FB 0F
08 00	1 Gcal		FB 8D 7D

in in in

Physical unit coding of counter INx (depends on Counter INx unit "iu iu")

FD BA 73	0.001 unit	
FD BA 74	0.01 unit	unit
FD BA 75	0.1 unit	
FD 3A	1 unit	
vo vo	see Physical unit coding of volume	
en en en	see Physical unit coding of energy	

ip ip ip

Physical unit coding of INx pulse factor (depends on Counter INx unit "iu iu")

FD BA 28	Unit [unit/pulse]
96 28	Volume [m3/pulse]
88 28	Energy [J/pulse]

iu iu

Counter INx unit

		in in in	ip ip ip
00 03	0.001 unit	FD BA 73	FD BA 28
00 02	0.01 unit	FD BA 74	FD BA 28
00 01	0.1 unit	FD BA 75	FD BA 28
00 00	1 unit	FD 3A	FD BA 28
vu vu	see Volume unit	vo vo	96 28
eu eu	see Energy unit	en en en	88 28

Le

Length of the M-Bus frame. The fields Start, Length, Check Sum and Stop (6 bytes) are not

Ln

Length of the ASCII character string

The allowed range is indicated in the "Coding" column.

Warning: according to the M-Bus standard, the first byte following the length byte is the rightmost character of the string, and the last byte is the leftmost character.

Lw

Length of the wM-Bus frame. The field Length itself and the CRCs are not included in the

me me

Module error

Common to all modules

bit0	Module missing
bit1	Insufficient support
bit2	Incompatible power supply
bit3	RESERVED for "USE_LAST_BAUDRATE"
bit4	Reserved
bit5	Reserved
bit6	Reserved
bit7	Reserved

Specific to module D/A

bit8	Frame error
bit9	Application error
bit10	Parameter error
bit11	Power fail
bit12	Reserved
bit13	Reserved
bit14	Reserved
bit15	Reserved

Specific to LoRaWAN module

Frame error
Unsupported slot

Specific to SC5U module

Frame error
Reverse flow
No water
Overflow
Amplitude low
Temperature alarm

mo

More records in next telegram :

0Fh	no
1Fh	yes

sf sf sf
sf

Selected frames

		M-Bus wire	Optical	NFC	Radio M	wM-Bus
bit0	r1: Customisable M-Bus frame 1	yes				no
bit1	r2: Customisable M-Bus frame 2	yes				no
bit2	r3: Customisable M-Bus frame 3	yes				no
bit3	r4: Customisable M-Bus frame 4	yes				no
bit4	r5: Current totalizers: energy, volume, IN1, IN2	yes				no
bit5	r6: Totalizers at set day 1 and set day 2(energy)	yes				no
bit6	r7: IN3, IN4	yes				no
bit7	r8: IN5, IN6	yes				no
bit8	wM: Wireless M-Bus, OMS	no				yes
bit9	h1: History 1 of totalizers	yes				no
bit10	h2: History 2 of totalizers	yes				no
bit11	h3: History 3 of totalizers	yes				no
bit12	h4: History 4 of totalizers	yes				no
bit13	h5: History of average values	yes				no
bit14	h6: History of peak values	yes				no
bit15	he: Events log	yes				no
bit16..31	Reserved	no				no

st	Status	Supercal 5	M-Bus standard
bit1..0		Application	Application
00b		No error	No error
01b		†	Application busy
10b		Any application error	Any application error
11b		†	Reserved
bit2		Main power cut	Power low
bit3		†	Permanent error
bit4		Temporary error	Temporary error
bit5		Flow in saturation	Manufacturer specific
bit6		Temperature	Manufacturer specific
bit7		Case is open	Manufacturer specific

vo vo	Physical unit coding of volume (depends on volume unit "vu vu")	
10	0.001 L	
11	0.01 L	
12	0.1 L	
13	1 L 0.001 m3	Lm3
14	0.01 m3	
15	0.1 m3	
16	1 m3	
90 3D	0.001 gal	
91 3D	0.01 gal	
92 3D	0.1 gal	
93 3D	1 gal 0.001 kgal	galkgal
94 3D	0.01 kgal	
95 3D	0.1 kgal	
96 3D	1 kgal	

vu vu	Volume unit		vo vo
09 03	0.001 L		10
09 02	0.01 L		11
09 01	0.1 L		12
09 00	1 L	Lm3	13
0A 03	0.001 m3		13
0A 02	0.01 m3		14
0A 01	0.1 m3		15
0A 00	1 m3		16
0B 03	0.001 gal		90 3D
0B 02	0.01 gal		91 3D
0B 01	0.1 gal		92 3D
0B 00	1 gal	galkgal	93 3D
0C 03	0.001 kgal		93 3D
0C 02	0.01 kgal		94 3D
0C 01	0.1 kgal		95 3D
0C 00	1 kgal		96 3D

† Not used.

Normalize SND_NKE (master to slave)

	Field	Frame bytes in hex	Byte	Coding	Comment
Start	Start	10	1		
	Control	40	1		Normalize, SND_NKE
	Address	xx	1		
End	Check Sum	cs	1		
	Stop	16	1		

Frame size: 5 bytes

Acknowledge CON_SCC (slave to master)

	Field	Frame bytes in hex	Byte	Coding	Comment
		E5	1		Acknowledge

Frame size: 1 bytes

Application reset SND_UD (master to slave)

						<MbusRecord> XML attributes					
						Name	SubUnit	Tariff	Storage	Function	Origin
	Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start, Length	68, Le Le, 68	4								
	Control	73 53	1		Send user data to slave, SND_UD						
	Address	xx	1								
Use	Control Information	50	1		Application reset						
	Subcode	xx	1	C, 8 bits	For subcode see table below.						
End	Check Sum	cs	1								
	Stop	16	1								

Frame size: 10 bytes

Subcode	Frames selected	M-Bus standard
00h	r5..r8, h1..h4, h5, h6, he	All
10h	<i>Selection defined by the user</i>	User data (consumption)
20h	r5, r6, r7, r8	Simple billing (current and fixed date value)
30h	h1, h2, h3, h4	Enhanced billing (historic values)
31h	h1	
32h	h2	
33h	h3	
34h	h4	
40h		Multi tariff billing
50h		Instantaneous values (for regulation)
60h	h5, h6, he	Load profile values for management
61h	h5	
62h	h6	
63h	he	
70h		Reserved
80h	c1..c16	Installation and startup (bus address, fixed)
90h	v1	Testing (high resolution values)
91h	v1	Start NOWA
92h	v1	Stop NOWA
93h	v1	Force measure
A0h		Calibration
B0h	s	Manufacturing
C0h		Development
D0h		Self test
E0h		Reserved
F0h		Reserved
<i>Without subcode</i>	<i>Selection defined by the user</i>	

Frames selected after a reset

Notes

- For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Request for user data REQ_UD2 (master to slave)

Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment
Start	10	1		
Control	7B 5B	1		Request for class 2 data, REQ_UD2
Address	xx	1		
Check Sum	cs	1		
Stop	16	1		

Frame size: 5 bytes

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Selection of slaves SND_UD (master to slave)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start, Length	68, 1e 1e, 68	4								
Control	73 53	1		Send user data to slave, SND_UD						
Address	FD	1		A: 253						
Control Information	52	1		Selection of slaves						
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber					
Manufacturer ID	xx xx	2	C, 16 bits		Manufacturer					
Version of meter	xx	1	C, 8 bits		Version					
Device type	xx	1	D, 8 bits		DeviceType					
Check Sum	cs	1								
Stop	16	1								

Frame size: 17 bytes

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Structured write SND_UD (master to slave)

		<MbusRecord> XML attributes					
		Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment			
Start	Start Length	68,1e 1e,68	4				
	Control	73 53	1	Send user data to slave_SND_UD			
	Address	xx	1				
User Data	Control Information	51	1	Structured write telegram			
			0				
	Enter the installer password	0C,FD 13,xx xx xx xx	7	A, 32 bits	Ⓒ Ⓜ Note 2	AccessCodeOperator	0 0 0 0
	Change the installer password	4C,FD 13,xx xx xx xx	7	A, 32 bits	Ⓘ Note 2, Note 3	AccessCodeOperator	0 0 1 0
			0				
	Primary address	01,7A,xx	3	C, 8 bits	Ⓘ Primary addr. of the channel itself	PrimaryAddress	0 0 0 0
	Identification number	0C,79,xx xx xx xx	6	A, 32 bits	Ⓘ Id number of the channel itself	IdentificationNumber	0 0 0 0
			0				
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits	Ⓒ Only adjust ±30 min, 1 time/day Ⓘ No limitation, Note 4	DateAndTime	0 0 0 0
			0				
	M-Bus storage number of history 1	82 B0 B0 20,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 47 0 0
	M-Bus storage number of history 2	82 80 80 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 48 0 0
	M-Bus storage number of history 3	82 90 80 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 49 0 0
	M-Bus storage number of history 4	82 A0 80 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 50 0 0
	M-Bus storage number of history of average	82 B0 80 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 51 0 0
	M-Bus storage number of history of peak	82 80 90 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 52 0 0
	M-Bus storage number of event log	82 90 90 30,FF FE 28,xx xx	9	C, 16 bits	Ⓘ Ⓜ	DeviceSpecificValue40	0 53 0 0
			0				
	Energy totalizer tariff 2 remainder	85 A0 10,en en en,xx xx xx xx	10	H, 32 bits	Ⓧ Ⓜ; Note 5	Energy	0 6 0 0
	Volume totalizer tariff 2 remainder	85 A0 10,vo vo,xx xx xx xx	9	H, 32 bits	Ⓧ Ⓜ; Note 6	Volume	0 6 0 0
			0				
	Counter IN1 remainder	85 C0 10,in in in,xx xx xx xx	10	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	1 4 0 0
	Counter IN2 remainder	85 80 50,in in in,xx xx xx xx	10	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	2 4 0 0
Counter IN3 remainder	85 C0 50,in in in,xx xx xx xx	10	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	3 4 0 0	
Counter IN4 remainder	85 80 90 40,in in in,xx xx xx xx	11	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	4 4 0 0	
Counter IN5 remainder	85 C0 90 40,in in in,xx xx xx xx	11	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	5 4 0 0	
Counter IN6 remainder	85 80 D0 40,in in in,xx xx xx xx	11	H, 32 bits	Ⓘ Ⓜ; Note 7	Dimensionless Volume Energy	6 4 0 0	
		0					
Application reset	02,FF FE 32,ar ar	6	C, 16 bits	Ⓧ	DeviceSpecificValue50	0 0 0 0	
		0					
End	Check Sum	cs	1				
	Stop	16	1				

Max frame size: 189 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. To intentionally loss all access rights without a "incorrect password" error, enter the value FFFFFFFFh.
- 3.
4. Use the standard time all the year regardless of the daylight-saving time (as the radio devices).
5. The value of "en en" depends on Energy unit, see key "eu eu"
6. The value of "vo vo" depends on Volume unit, see key "vu vu"
7. The value of "in in" depends on Counter INx unit, see key "iu iu"

- Ⓒ No special access right is needed to change this value.
- Ⓘ The installer access right (or higher) is needed to change this value.
- Ⓧ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓘ This value is read only.
- Ⓧ This value is write only.

Change baud rate SND_UD (master to slave)

	Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment
Start	Start, Length	68, 1e 1e, 68	4		
	Control	73 53	1		Send user data to slave, SND_UD
	Address	xx	1		
User Data	Control Information	B8 B9 BA BB BC	1		Set baud rate: B8h: 300; B9h: 600; BAh: 1200; BBh: 2400; BCh: 4800
	Check Sum	cs	1		
End	Stop	16	1		

Frame size: 9 bytes

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Effective change of baud rate

Communication channel	Change baud rate, Ct: B8..BCh
M-Bus wire	Immediate
Optical	Ignored, detected by wakeup
Module 1	Immediate
NFC	Ignored
Module 2	Immediate
Radio MFD, wM-Bus	Ignored

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes						
					Name	SubUn	Tariff	Storage	Function	Origin	
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment							
Start	Start Length	68, 1e 1e, 68	4								
	Control	08	1	Respond with user data, RSP_UD							
	Address	xx	1								
User Data	Control Information	72	1	Variable structure respond							
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber						
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
	Version of meter	48	1	C, 8 bits	72	Version					
	Device type	dt	1	D, 8 bits		DeviceType					
	Access number	xx	1	C, 8 bits		AccessNumber					
	Status	st	1	Ds, 8 bits		Status					
	Configuration	00 00	2	C, 16 bits		Signature					
			0								
	Encryption verification	2F 2F	2			IdleFiller					
			0								
	Customisable M-Bus frame (encrypted part)										
			##								
	Encryption block filling	2F 2F 2F 2F 2F 2F 2F 2F	8			IdleFiller					
			0								
Customisable M-Bus frame (unencrypted part)											
		10									
More records in next telegram	RD	1		Start of manufacturer specific data	ManufacturerDataBlock						
Check Sum	cs	1									
Stop	16	1									

Max frame size: 192 bytes

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	Sub Unit	Tariff	Storage	Function ‡	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start, Length	68, 1e 1e, 68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					Header
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Encryption verification	2F 2F	2		🔒	IdleFiller				
			0							
	Current date & time	04, 6D, xx xx xx xx	6	F, 32 bits	🕒 Ⓜ️	DateAndTime	0	0	0	0
			0							
	Energy totalizer tariff 0	04, en en en, xx xx xx xx	8	B, 32 bits	🔒 Ⓜ️; Note 2	Energy	0	0	0	0
	Volume totalizer tariff 0	04, vo vo, xx xx xx xx	7	B, 32 bits	🔒 Ⓜ️; Note 3	Volume	0	0	0	0
	Energy totalizer tariff 1	84 10, en en en, xx xx xx xx	9	B, 32 bits	🔒 Ⓜ️; Note 2	Energy	0	1	0	0
	Volume totalizer tariff 1	84 10, vo vo, xx xx xx xx	8	B, 32 bits	🔒 Ⓜ️; Note 3	Volume	0	1	0	0
	Energy totalizer tariff 2	84 20, en en en, xx xx xx xx	9	B, 32 bits	🔒 Ⓜ️; Note 2	Energy	0	2	0	0
	Volume totalizer tariff 2	84 20, vo vo, xx xx xx xx	8	B, 32 bits	🔒 Ⓜ️; Note 3	Volume	0	2	0	0
			0							
	Counter IN1 device type	81 40, FD 09, xx	5	D, 8 bits	🔒 Ⓜ️	DeviceType	1	0	0	0
	Counter IN1 identification	8C 40, 79, xx xx xx xx	7	A, 32 bits	🔒 Ⓜ️	IdentificationNumber	1	0	0	0
	Counter IN1 totalizer	84 40, in in in, xx xx xx xx	9	B, 32 bits	🔒 Ⓜ️; Note 4	Dimensionless Volume Energy	1	0	0	0
	Counter IN2 device type	81 80 40, FD 09, xx	6	D, 8 bits	🔒 Ⓜ️	DeviceType	2	0	0	0
	Counter IN2 identification	8C 80 40, 79, xx xx xx xx	8	A, 32 bits	🔒 Ⓜ️	IdentificationNumber	2	0	0	0
	Counter IN2 totalizer	84 80 40, in in in, xx xx xx xx	10	B, 32 bits	🔒 Ⓜ️; Note 4	Dimensionless Volume Energy	2	0	0	0
			0							
	High temperature	02, 59, xx xx	4	B, 16 bits	🔒 Ⓜ️ [0.01 °C]	FlowTemperature	0	0	0	0
	Low temperature	02, 5D, xx xx	4	B, 16 bits	🔒 Ⓜ️ [0.01 °C]	ReturnTemperature	0	0	0	0
	Flow	04, 39, xx xx xx xx	6	B, 32 bits	🔒 Ⓜ️ [0.01 l/h]	VolumeFlow	0	0	0	0
	Power	04, 2B, xx xx xx xx	6	B, 32 bits	🔒 Ⓜ️ [1 W]	Power	0	0	0	0
			0							
	Encryption block filling	2F 2F 2F 2F 2F 2F	6		🔒	IdleFiller				
		0								
Device access right	01, FF 2B, xx	4	D, 8 bits	🔒 0: Consumer; 1: Installer; 2: Verifier; 3: Manufacturer	DeviceAccessRightLevel	0	0	0	0	
Detailed errors	03, FF 2C, er er er	6	D, 24 bits	🔒 §	ManufacturerErrorFlags	0	0	0	0	
Fabrication Number	0C, 78, xx xx xx xx	6	A, 32 bits	Ⓜ️	FabricationNumber	0	0	0	0	
Internal version	0C, FD 0F, xx xx xx 1c	7	A, 32 bits	🔒 lc = language code: 0: en-GB; 1: de-DE; 2: fr-FR; 3: it-IT; 4: es-ES;	OtherSoftwareVersion	0	0	0	0	
Running hours	03, 22, xx xx xx	5	B, 24 bits	🕒 [h]	OnTime	0	0	0	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 178 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The value of "en en" depends on Energy unit, see key "eu eu"
3. The value of "vo vo" depends on Volume unit, see key "vu vu"
4. The value of "in in" depends on Counter INx unit, see key "iu iu"

- Ⓜ️ No special access right is needed to change this value.
- 🕒 The installer access right (or higher) is needed to change this value.
- 🔒 The verifier access right (or higher) is needed to change this value.
- Ⓜ️ The manufacturer access right (or higher) is needed to change this value.
- 🔒 This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUnit	Tariff	Storage	Function†	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start_Length	68, Le Le, 68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					Header
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	Encryption verification	2F 2F	2		IdleFiller					
			0							
	Set day	42, 6C, xx xx	4	G, 16 bits	Ⓜ ⓘ Note 2	Date	0	0	1	0
			0							
	Energy totalizer tariff 0 at set day	44, en en en, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	0	1	0
	Volume totalizer tariff 0 at set day	44, vo vo, xx xx xx xx	7	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	0	1	0
	Energy totalizer tariff 1 at set day	C4 10, en en en, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	1	1	0
	Volume totalizer tariff 1 at set day	C4 10, vo vo, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	1	1	0
	Energy totalizer tariff 2 at set day	C4 20, en en en, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	2	1	0
	Volume totalizer tariff 2 at set day	C4 20, vo vo, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	2	1	0
			0							
	Counter IN1 totalizer at set day	C4 40, in in in, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 5	Dimensionless Volume Energy	1	0	1	0
	Counter IN2 totalizer at set day	C4 80 40, in in in, xx xx xx xx	10	B, 32 bits	Ⓜ ⓘ Note 5	Dimensionless Volume Energy	2	0	1	0
			0							
	Set day 2	82 01, 6C, xx xx	5	G, 16 bits	Ⓜ ⓘ Note 2	Date	0	0	2	0
			0							
	Energy totalizer tariff 0 at set day 2	84 01, en en en, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	0	2	0
	Volume totalizer tariff 0 at set day 2	84 01, vo vo, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	0	2	0
Energy totalizer tariff 1 at set day 2	84 11, en en en, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	1	2	0	
Volume totalizer tariff 1 at set day 2	84 11, vo vo, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	1	2	0	
Energy totalizer tariff 2 at set day 2	84 21, en en en, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 3	Energy	0	2	2	0	
Volume totalizer tariff 2 at set day 2	84 21, vo vo, xx xx xx xx	8	B, 32 bits	Ⓜ ⓘ Note 4	Volume	0	2	2	0	
		0								
Counter IN1 totalizer at set day 2	84 41, in in in, xx xx xx xx	9	B, 32 bits	Ⓜ ⓘ Note 5	Dimensionless Volume Energy	1	0	2	0	
Counter IN2 totalizer at set day 2	84 81 40, in in in, xx xx xx xx	10	B, 32 bits	Ⓜ ⓘ Note 5	Dimensionless Volume Energy	2	0	2	0	
		0								
		0								
Encryption block filling	2F 2F 2F 2F 2F 2F 2F 2F 2F 2F	11		IdleFiller						
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
Stop	16	1								

Max frame size: 182 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The year equal to 2000 indicates that the values at set day are not yet stored.
The year different than 2000 indicates that the date is the date of the last storage.
3. The value of "en en en" depends on Energy unit, see key "eu eu"
4. The value of "vo vo" depends on Volume unit, see key "vu vu"
5. The value of "in in in" depends on Counter INx unit, see key "iu iu"

- Ⓜ No special access right is needed to change this value.
- ⓘ The installer access right (or higher) is needed to change this value.
- Ⓜ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓜ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	Sub Unit	Tariff	Storage	Function ‡	Origin
	Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment					
Start	Start, Length	68, 1e 1e, 68	4							
	Control	08	1		Respond with user data, RSP_UD					
	Address	xx	1							
User Data	Control Information	72	1		Variable structure respond					
	Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber				Header
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Encryption verification	2F 2F	2		Ⓜ	IdleFiller				
			0							
	Counter IN3 device type	81 C0 40, FD 09, xx	6	D, 8 bits	Ⓜ Ⓜ	DeviceType	3	0	0	0
	Counter IN3 identification	8C C0 40, 79, xx xx xx xx	8	A, 32 bits	Ⓜ Ⓜ	IdentificationNumber	3	0	0	0
	Counter IN3 totalizer	84 C0 40, in in in, xx xx xx xx	10	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	3	0	0	0
	Counter IN3 totalizer at set day	C4 C0 40, in in in, xx xx xx xx	10	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	3	0	1	0
	Counter IN3 totalizer at set day 2	84 C1 40, in in in, xx xx xx xx	10	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	3	0	2	0
			0							
	Counter IN4 device type	81 80 80 40, FD 09, xx	7	D, 8 bits	Ⓜ Ⓜ	DeviceType	4	0	0	0
	Counter IN4 identification	8C 80 80 40, 79, xx xx xx xx	9	A, 32 bits	Ⓜ Ⓜ	IdentificationNumber	4	0	0	0
	Counter IN4 totalizer	84 80 80 40, in in in, xx xx xx xx	11	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	4	0	0	0
	Counter IN4 totalizer at set day	C4 80 80 40, in in in, xx xx xx xx	11	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	4	0	1	0
	Counter IN4 totalizer at set day 2	84 81 80 40, in in in, xx xx xx xx	11	B, 32 bits	Ⓜ Ⓜ Note 2	Dimensionless Volume Energy	4	0	2	0
			0							
Encryption block filling	2F	1		Ⓜ	IdleFiller					
		0								
		0								
		0								
		0								
More records in next telegram	mo	1			Start of manufacturer specific data	ManufacturerDataBlock				
Check Sum	cs	1								
End	Stop	16	1							

Max frame size: 118 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The value of "in in in" depends on Counter INx unit, see key "iu iu"

- Ⓜ No special access right is needed to change this value.
- Ⓜ The installer access right (or higher) is needed to change this value.
- Ⓜ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓜ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUnit	Tariff	Storage	Function†	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start, Length	68, Le Le, 68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Encryption verification	2F 2F	2		🔒	IdleFiller				
			0							
	Counter IN5 device type	81 C0 80 40, FD 09, xx	7	D, 8 bits	🔒 ⓘ	DeviceType	5	0	0	0
	Counter IN5 identification	8C C0 80 40, 79, xx xx xx xx	9	A, 32 bits	🔒 ⓘ	IdentificationNumber	5	0	0	0
	Counter IN5 totalizer	84 C0 80 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	5	0	0	0
	Counter IN5 totalizer at set day	C4 C0 80 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	5	0	1	0
	Counter IN5 totalizer at set day 2	84 C1 80 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	5	0	2	0
			0							
	Counter IN6 device type	81 80 C0 40, FD 09, xx	7	D, 8 bits	🔒 ⓘ	DeviceType	6	0	0	0
	Counter IN6 identification	8C 80 C0 40, 79, xx xx xx xx	9	A, 32 bits	🔒 ⓘ	IdentificationNumber	6	0	0	0
	Counter IN6 totalizer	84 80 C0 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	6	0	0	0
	Counter IN6 totalizer at set day	C4 80 C0 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	6	0	1	0
	Counter IN6 totalizer at set day 2	84 81 C0 40, in in in, xx xx xx xx	11	B, 32 bits	🔒 ⓘ Note 2	Dimensionless Volume Energy	6	0	2	0
			0							
	Encryption block filling	2F 2F 2F 2F 2F 2F 2F 2F 2F 2F 2F 2F	12		🔒	IdleFiller				
			0							
		0								
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 134 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The value of "in in in" depends on Counter INx unit, see key "iu iu"

- Ⓞ No special access right is needed to change this value.
- ⓘ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Send no reply SND_NR, wM-Bus OMS (slave to master)

					<MbusRecord> XML attributes						
					Name	SubUn	Tariff	Storage	Function	Origin	
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment							
DLL	Length	Lw	1								
	Control	44 46	1	44h: SND_NR (Send No Reply) 46h: SND_IR (Installation Request)							
	Manufacturer ID	EE 4D	2	C, 16 bits "SON"	Manufacturer						
	Radio serial number	xx xx xx xx	4	A, 32 bits Unchangeable	IdentificationNumber						
	Version of meter	48	1	C, 8 bits 72	Version						
TPL	Device type	dt	1	D, 8 bits	DeviceType						
	Control Information	7A	1	Variable structure respond							
	Access number	xx	1	C, 8 bits	AccessNumber						
	Status	st	1	Ds, 8 bits	Status						
	Configuration	00 00	2	C, 16 bits	Signature						
ABL	Encryption verification	2F 2F	2	☞	IdleFiller						
			0								
	Current date & time	04, 6D, xx xx xx xx	6	F, 32 bits	DateAndTime	0	0	0	0		
	Energy totalizer tariff 0	04, en en en, xx xx xx xx	8	B, 32 bits	☞	Energy	0	0	0	0	
	Volume totalizer tariff 0	04, vo vo, xx xx xx xx	7	B, 32 bits	☞	Volume	0	0	0	0	
	Energy totalizer tariff 1	84 10, en en en, xx xx xx xx	9	B, 32 bits	☞	Energy	0	1	0	0	
	Volume totalizer tariff 1	84 10, vo vo, xx xx xx xx	8	B, 32 bits	☞	Volume	0	1	0	0	
	Counter IN1 totalizer	84 40, in in in, xx xx xx xx	9	B, 32 bits	☞	Dimensionless Volume Energy	1	0	0	0	
	Counter IN2 totalizer	84 80 40, in in in, xx xx xx xx	10	B, 32 bits	☞	Dimensionless Volume Energy	2	0	0	0	
			0								
	Set day	42, 6C, xx xx	4	G, 16 bits	☞	Date	0	0	1	0	
	Energy totalizer tariff 0 at set day	44, en en en, xx xx xx xx	8	B, 32 bits	☞	Energy	0	0	1	0	
	Volume totalizer tariff 0 at set day	44, vo vo, xx xx xx xx	7	B, 32 bits	☞	Volume	0	0	1	0	
	Energy totalizer tariff 1 at set day	C4 10, en en en, xx xx xx xx	9	B, 32 bits	☞	Energy	0	1	1	0	
	Volume totalizer tariff 1 at set day	C4 10, vo vo, xx xx xx xx	8	B, 32 bits	☞	Volume	0	1	1	0	
	Counter IN1 totalizer at set day	C4 40, in in in, xx xx xx xx	9	B, 32 bits	☞	Dimensionless Volume Energy	1	0	1	0	
	Counter IN2 totalizer at set day	C4 80 40, in in in, xx xx xx xx	10	B, 32 bits	☞	Dimensionless Volume Energy	2	0	1	0	
			0								
	High temperature	02, 59, xx xx	4	B, 16 bits	☞ (P) [0.01 °C]	FlowTemperature	0	0	0	0	
	Low temperature	02, 5D, xx xx	4	B, 16 bits	☞ (P) [0.01 °C]	ReturnTemperature	0	0	0	0	
	Flow	04, 39, xx xx xx xx	6	B, 32 bits	☞ (P) [0.01 l/h]	VolumeFlow	0	0	0	0	
	Power	04, 2B, xx xx xx xx	6	B, 32 bits	☞ (P) [1 W]	Power	0	0	0	0	
			0								
	Encryption block filling	2F 2F 2F 2F 2F 2F 2F 2F	10		☞	IdleFiller					
			0								
Detailed errors	03, FF 2C, er er er	6	D, 24 bits	☞ §	ManufacturerErrorFlags	0	0	0	0		
		0									

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Max frame size: 165 bytes

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Send no reply SND_NR, wM-Bus OMS (slave to master)

					<MbusRecord> XML attributes						
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment	Name	SubUn	Tariff	Storage	Function	Origin	
DLL	Length	Lw	1								
	Control	44 46	1		44h: SND_NR (Send No Reply) 46h: SND_IR (Installation Request)						
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
	Radio serial number	xx xx xx xx	4	A, 32 bits	Unchangeable	IdentificationNumber					
	Version of meter	48	1	C, 8 bits	72	Version					
Device type	dt	1	D, 8 bits		DeviceType						
ELL	Control Information	8C	1		Short Extended Link Layer						
	CC	20	1		Communication Control						
	ACC	xx	1		Access Counter						
AFL	Control Information	90	1		Authentication and Fragmentation Layer						
	AFFL	0F	1		AFL Length						
	FLC	00 2C	2		Fragmentation Control Field						
	MCL	25	1		Message Control Field						
	MCR	xx xx xx xx	4		Message Counter						
	MAC	xx xx xx xx xx xx xx xx	8		CMAC-AES-128						
TRL	Control Information	7A	1		Variable structure respond						
	Access number	xx	1	C, 8 bits		AccessNumber					
	Status	st	1	Ds, 8 bits		Status					
	Configuration	x0 07	2	C, 16 bits		Signature					
CFE	10	1									
APL	Encryption verification	2F 2F	2		🔒	IdleFiller					
			0								
	Current date & time	04, 6D, xx xx xx xx	6	F, 32 bits	🔒	DateAndTime	0	0	0	0	
	Energy totalizer tariff 0	04, en en en, xx xx xx xx	8	B, 32 bits	🔒	Energy	0	0	0	0	
	Volume totalizer tariff 0	04, vo vo, xx xx xx xx	7	B, 32 bits	🔒	Volume	0	0	0	0	
	Energy totalizer tariff 1	84 10, en en en, xx xx xx xx	9	B, 32 bits	🔒	Energy	0	1	0	0	
	Volume totalizer tariff 1	84 10, vo vo, xx xx xx xx	8	B, 32 bits	🔒	Volume	0	1	0	0	
	Counter IN1 totalizer	84 40, in in in, xx xx xx xx	9	B, 32 bits	🔒	Dimensionless Volume Energy	1	0	0	0	
	Counter IN2 totalizer	84 80 40, in in in, xx xx xx xx	10	B, 32 bits	🔒	Dimensionless Volume Energy	2	0	0	0	
			0								
	Set day	42, 6C, xx xx	4	G, 16 bits	🔒	Date	0	0	1	0	
	Energy totalizer tariff 0 at set day	44, en en en, xx xx xx xx	8	B, 32 bits	🔒	Energy	0	0	1	0	
	Volume totalizer tariff 0 at set day	44, vo vo, xx xx xx xx	7	B, 32 bits	🔒	Volume	0	0	1	0	
	Energy totalizer tariff 1 at set day	C4 10, en en en, xx xx xx xx	9	B, 32 bits	🔒	Energy	0	1	1	0	
	Volume totalizer tariff 1 at set day	C4 10, vo vo, xx xx xx xx	8	B, 32 bits	🔒	Volume	0	1	1	0	
	Counter IN1 totalizer at set day	C4 40, in in in, xx xx xx xx	9	B, 32 bits	🔒	Dimensionless Volume Energy	1	0	1	0	
	Counter IN2 totalizer at set day	C4 80 40, in in in, xx xx xx xx	10	B, 32 bits	🔒	Dimensionless Volume Energy	2	0	1	0	
			0								
	High temperature	02, 59, xx xx	4	B, 16 bits	🔒 (P) [0.01 °C]	FlowTemperature	0	0	0	0	
	Low temperature	02, 5D, xx xx	4	B, 16 bits	🔒 (P) [0.01 °C]	ReturnTemperature	0	0	0	0	
Flow	04, 39, xx xx xx xx	6	B, 32 bits	🔒 (P) [0.01 l/h]	VolumeFlow	0	0	0	0		
Power	04, 2B, xx xx xx xx	6	B, 32 bits	🔒 (P) [1 W]	Power	0	0	0	0		
		0									
Encryption block filling	2F 2F 2F 2F 2F 2F 2F 2F	10		🔒	IdleFiller						
		0									
Detailed errors	03, FF 2C, er er er	6	D, 24 bits	🔒 §	ManufacturerErrorFlags	0	0	0	0		
		0									

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Max frame size: 186 bytes

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

Respond with user data RSP_UD, Variable structure response (slave to master)

Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment	<MbusRecord> XML attributes						
					Name	Sub/In	Tariff	Storage	Function	Origin	
Start Length	68, Le Le, 68	4									
Control	08	1		Respond with user data, RSP_UD							
Address	xx	1									
Control Information	72	1		Variable structure respond							
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber						Header
Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer						
Version of meter	48	1	C, 8 bits	72	Version						
Device type	dt	1	D, 8 bits		DeviceType						
Access number	xx	1	C, 8 bits		AccessNumber						
Status	st	1	Ds, 8 bits		Status						
Configuration	00 00	2	C, 16 bits		Signature						
		0									
Encryption verification	2F 2F	2		Ⓜ	IdleFiller						
		0									
Date history	84 80 8A 0F, 6D, xx xx xx xx	9	F, 32 bits	Ⓜ Ⓞ	DateAndTime	0	0	8000	0		
Energy tariff 0 history	84 80 8A 0F, en en en, xx xx xx xx	11	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8000	0		
Energy tariff 0 history	8D 80 8A 0F, en en en 1E, 7E, §4 §§	11	LVAR	Ⓜ Ⓞ Note 2	Energy_CompactProfileWithRegisters	0	0	8000	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8001	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8002	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8003	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8004	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8005	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8006	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8007	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8008	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8009	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8010	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8011	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8012	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8013	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8014	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8015	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8016	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8017	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8018	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8019	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8020	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8021	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8022	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8023	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8024	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8025	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8026	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8027	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8028	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8029	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8030	0		
	xx xx xx xx	4	B, 32 bits	Ⓜ Ⓞ	Energy	0	0	8031	0		
		0									
Encryption block filling	2F 2F 2F	3		Ⓜ	IdleFiller						
		0									
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock						
End Check Sum	cS	1									
Stop	16	1									

Max frame size: 182 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The bit7 of the last "en en" byte is setted.

- Ⓒ No special access right is needed to change this value.
- Ⓘ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓞ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

	Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment	<MbusRecord> XML attributes								
						Name	SubUn	Tarif	Storage	Function	Origin			
Start	Start_Length	68, Le Le, 68	4											
	Control	08	1		Respond with user data, RSP_UD									
User Data	Address	xx	1											
	Control Information	72	1		Variable structure respond									
Records	Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber								
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer								
	Version of meter	48	1	C, 8 bits	72	Version								
	Device type	dt	1	D, 8 bits		DeviceType								
	Access number	xx	1	C, 8 bits		AccessNumber								
	Status	st	1	Ds, 8 bits		Status								
	Configuration	00 00	2	C, 16 bits		Signature								
			0											
	Encryption verification	2F 2F	2		Ⓜ	IdleFiller								
			0											
	Date history	84 84 8C 09, 6D, xx xx xx xx	9	F, 32 bits	Ⓜ Ⓞ	DateAndTime	0	0	5000	0				
	Average power history	85 84 8C 09, 2B, xx xx xx xx	9	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5000	0				
	Average power history	8D 84 8C 09, AB 1E, 7E, 5\$ 5\$	9	LVAR	Ⓜ Ⓞ	Power_CompactProfileWithRegisters	0	0	5000	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5001	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5002	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5003	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5004	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5005	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5006	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5007	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5008	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5009	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5010	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5011	0				
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5012	0				
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5013	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5014	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5015	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5016	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5017	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5018	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5019	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5020	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5021	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5022	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5023	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5024	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5025	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5026	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5027	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5028	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5029	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5030	0					
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓞ [W]	Power	0	0	5031	0					
		0												
	Encryption block filling	2F 2F 2F 2F 2F 2F 2F	7		Ⓜ	IdleFiller								
		0												
	More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock								
End	Check Sum	c8	1											
	Stop	16	1											

Max frame size: 182 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

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- Ⓞ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

		<MbusRecord> XML attributes						
		Name	SubUn	Tariff	Storage	Function	Origin	
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment				
Start	Start, Length	68, 1E, 1E, 68	4					
	Control	08	1	Respond with user data, RSP_UD				
User Data	Address	xx	1					
	Control Information	72	1	Variable structure respond				
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber			
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer		
	Version of meter	48	1	C, 8 bits	72	Version		
	Device type	dt	1	D, 8 bits		DeviceType		
	Access number	xx	1	C, 8 bits		AccessNumber		
	Status	st	1	Ds, 8 bits		Status		
	Configuration	00 00	2	C, 16 bits		Signature		
			0					
	Encryption verification	2F 2F	2		IdleFiller			
			0					
	Peak power history	9D 8C 8A 0D, AB 1E, 46, 05 00	9	LVAR	Ⓜ Ⓡ	Power_CompactProfileWithRegisters	0 0	7000 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7000 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7001 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7002 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7003 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7004 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7005 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7006 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7007 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7008 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7009 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7010 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7011 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7012 1
		xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7013 1
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7014 1	
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7015 1	
	xx xx xx xx	4	H, 32 bits	Ⓜ Ⓡ [W]	Power	0 0	7016 1	
		0						
Dates of the peak power	9D 8C 8A 0D, ED 1E, 46, 04 00	9	LVAR	Ⓜ Ⓡ	DateAndTime_CompactProfileWithRegisters	0 0	7000 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7000 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7001 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7002 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7003 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7004 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7005 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7006 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7007 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7008 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7009 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7010 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7011 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7012 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7013 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7014 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7015 1	
	xx xx xx xx	4	F, 32 bits	Ⓜ Ⓡ	DateAndTime	0 0	7016 1	
		0						
Encryption block filling	2F 2F 2F 2F	4		IdleFiller				
		0						
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock			
End	Check Sum	cs	1					
	Stop	16	1					

Max frame size: 182 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓒ No special access right is needed to change this value.
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Respond with user data RSP_UD, Variable structure response (slave to master)

Start	Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment	<MbusRecord> XML attributes					
						Name	SubUn	Tarif	Storage	Function	Origin
Start	Start_Length	68, 1e 1e, 68	4								
	Control	08	1		Respond with user data, RSP_UD						
	Address	xx	1								
	Control Information	72	1		Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
	Version of meter	48	1	C, 8 bits	72	Version					
	Device type	dt	1	D, 8 bits		DeviceType					
	Access number	xx	1	C, 8 bits		AccessNumber					
	Status	st	1	Ds, 8 bits		Status					
	Configuration	00 00	2	C, 16 bits		Signature					
	Encryption verification	00	0								
	Encryption verification	2F 2F	2		Ⓜ	IdleFiller					
	Event	8D 8C 8A 0D, FF C3 1E, 1D, 01 0D	10	LVAR	Ⓜ (r)	DeviceSpecificValue3_CompactProfileWithRegisters	0	0	7000	0	
		xx	1	C, 8 bits	Ⓜ (r) See Coding below	DeviceSpecificValue3	0	0	7000	0	
		xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7001	0	
		xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7002	0	
		xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7003	0	
		xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7004	0	
		xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7005	0	
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7006	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7007	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7008	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7009	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7010	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7011	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7012	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7013	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7014	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7015	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7016	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7017	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7018	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7019	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7020	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7021	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7022	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7023	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7024	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7025	0		
	xx	1	C, 8 bits	Ⓜ (r)	DeviceSpecificValue3	0	0	7026	0		
		0									
User Data	Date of the event	8D 8C 8A 0D, ED 1E, 6E, 04 00	9	LVAR	Ⓜ (r)	DateAndTime_CompactProfileWithRegisters	0	0	7000	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7000	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7001	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7002	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7003	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7004	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7005	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7006	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7007	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7008	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7009	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7010	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7011	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7012	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7013	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7014	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7015	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7016	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7017	0	
		xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7018	0	
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7019	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7020	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7021	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7022	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7023	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7024	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7025	0		
	xx xx xx xx	4	F, 32 bits	Ⓜ (r)	DateAndTime	0	0	7026	0		
		0									
	Encryption block filling	2F 2F 2F 2F	4		Ⓜ	IdleFiller					
		00	0								
	More records in next telegram	8D	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	c8	1								
	Stop	16	1								

Max frame size: 182 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓒ No special access right is needed to change this value.
- Ⓓ The installer access right (or higher) is needed to change this value.
- Ⓔ The verifier access right (or higher) is needed to change this value.
- Ⓕ The manufacturer access right (or higher) is needed to change this value.
- Ⓖ This value is read only.

Coding

Event		
LOG_UNEXPECTED,		0
LOG_ERR_AD_REF_1_START,		1
LOG_ERR_AD_REF_1_END,		2
LOG_ERR_AD_REF_2_START,		3
LOG_ERR_AD_REF_2_END,		4
LOG_ERR_AD_PT_SENSOR_1_START,		5
LOG_ERR_AD_PT_SENSOR_1_END,		6
LOG_ERR_AD_PT_SENSOR_2_START,		7
LOG_ERR_AD_PT_SENSOR_2_END,		8
LOG_ERR_TEMPERATURE_1_MIN_START,		9
LOG_ERR_TEMPERATURE_1_MIN_END,		10
LOG_ERR_TEMPERATURE_1_MAX_START,		11
LOG_ERR_TEMPERATURE_1_MAX_END,		12
LOG_ERR_TEMPERATURE_2_MIN_START,		13
LOG_ERR_TEMPERATURE_2_MIN_END,		14
LOG_ERR_TEMPERATURE_2_MAX_START,		15
LOG_ERR_TEMPERATURE_2_MAX_END,		16
LOG_ERR_TEMPERATURE_START,	Sum of all temperatures and AD e	17
LOG_ERR_TEMPERATURE_END,		18
LOG_ERR_FLOW_SATURATION_START,		19
LOG_ERR_FLOW_SATURATION_END,		20
LOG_ERR_CASE_OPENED,		21
LOG_ERR_CASE_CLOSED,		22
LOG_ERR_MAIN_POWER_CUT_START,		23
LOG_ERR_MAIN_POWER_CUT_END,		24
LOG_MODULE1_ERROR_START,		25
LOG_MODULE1_ERROR_END,		26
LOG_MODULE2_ERROR_START,		27
LOG_MODULE2_ERROR_END,		28
LOG_FIRMWARE_CHECKSUM_START,		29
LOG_FIRMWARE_CHECKSUM_END,		30
LOG_RADIO_ERROR_START,		31
LOG_RADIO_ERROR_END,		32
LOG_AWAKE_FROM_RESET,		33
LOG_DEVICE_SEALED,		34
LOG_DEVICE_UNSEALED,		35

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment						
Start	Start, Length	68,1e,1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits	Ⓜ	FabricationNumber	0	0	0	0
			0							
	High temperature	05,5B,xx xx xx xx	6	H, 32 bits	Ⓘ [°C]	FlowTemperature	0	0	0	0
	Low temperature	05,5F,xx xx xx xx	6	H, 32 bits	Ⓘ [°C]	ReturnTemperature	0	0	0	0
	Temperature difference	05,63,xx xx xx xx	6	H, 32 bits	Ⓘ [K]	TemperatureDifference	0	0	0	0
	Flow	05,3E,xx xx xx xx	6	H, 32 bits	Ⓘ [m3/h]	VolumeFlow	0	0	0	0
	Power	05,2B,xx xx xx xx	6	H, 32 bits	Ⓘ [W]	Power	0	0	0	0
			0							
	Volume totalizer tariff 0 for test	84 80 20,vo vo,xx xx xx xx	9	B, 32 bits	Ⓢ; Note 3	Volume	0	8	0	0
	Volume remainder tariff 0 for test	85 80 30,vo vo,xx xx xx xx	9	H, 32 bits	Ⓢ; Note 3	Volume	0	12	0	0
			0							
Energy totalizer tariff 0	04,en en en,xx xx xx xx	8	B, 32 bits	Ⓢ; Note 2	Energy	0	0	0	0	
Energy totalizer tariff 0 remainder	85 80 10,en en en, xx xx xx xx	10	H, 32 bits	Ⓢ; Note 2	Energy	0	4	0	0	
		0								
Volume totalizer tariff 0	04,vo vo,xx xx xx xx	7	B, 32 bits	Ⓢ; Note 3	Volume	0	0	0	0	
Volume totalizer tariff 0 remainder	85 80 10,vo vo,xx xx xx xx	9	H, 32 bits	Ⓢ; Note 3	Volume	0	4	0	0	
Energy totalizer tariff 1	84 10,en en en,xx xx xx xx	9	B, 32 bits	Ⓢ; Note 2	Energy	0	1	0	0	
Energy totalizer tariff 1 remainder	85 90 10,en en en,xx xx xx xx	10	H, 32 bits	Ⓢ; Note 2	Energy	0	5	0	0	
		0								
Volume totalizer tariff 1	84 10,vo vo,xx xx xx xx	8	B, 32 bits	Ⓢ; Note 3	Volume	0	1	0	0	
Volume totalizer tariff 1 remainder	85 90 10,vo vo, xx xx xx xx	9	H, 32 bits	Ⓢ; Note 3	Volume	0	5	0	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
End	Stop	16	1		Max frame size: 146 bytes					

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Notes

- For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
- The value of "en en en" depends on Energy unit, see key "eu eu"
- The value of "vo vo" depends on Volume unit, see key "vu vu"

- Ⓒ No special access right is needed to change this value.
- Ⓘ The installer access right (or higher) is needed to change this value.
- Ⓢ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓘ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

		<MbusRecord> XML attributes								
		Name	SubUn	Tariff	Storage	Function	Origin			
Start	Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment					
	Start, Length	68, Le Le, 68	4							
User Data	Control	08	1		Respond with user data, RSP_UD					
	Address	xx	1							
	Control Information	72	1		Variable structure respond					
	Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber				
	Manufacturer ID	EE 4D	2	C, 16 bits		Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
			0							
	Sealing state	01, FF 04, xx	4	C, 8 bits	Ⓡ 0: unsealed; 1: sealed	DeviceWriteProtect	0	0	0	0
	Commissioning date	82 B0 90 30, 6C, xx xx	7	G, 16 bits	Ⓢ	Date	0	55	0	0
			0							
	Firmware check code (CRC-32)	04, FF FF 1B, xx xx xx xx	8	C, 32 bits	Ⓡ	FirmwareCheckCode	0	0	0	0
			0							
			0							
	Energy meter type	01, FF FF 10, xx	5	C, 8 bits	Ⓜ 0: heat; 1: heat/cooling; 2: cooling;	EnergyMeterType	0	0	0	0
	Heating switching temperature	25, FB 77, xx xx xx xx	7	H, 32 bits	Ⓢ [°C] Note 2	ColdWarmTemperatureLimit	0	0	0	2
	Cooling switching temperature	15, FB 77, xx xx xx xx	7	H, 32 bits	Ⓢ [°C] Note 2	ColdWarmTemperatureLimit	0	0	0	1
			0							
	Visible data	02, FF FE 27, xx xx	6	C, 16 bits	Ⓢ bit0: tariff 1; bit1: tariff 2; bit2: IN1; bit3: IN2; bit4: IN3; bit5: IN4; bit6: IN5; bit7: IN6; bit8: OUT1; bit9: OUT2; bit10: OUT3; bit11: OUT4; bit12: OUT5; bit13: OUT6	DeviceSpecificValue39	0	0	0	0
			0							
Radio type	01, FF FF 0F, xx	5	C, 8 bits	Ⓜ 0: none; 1: mfd; 2: wmbus; 3: lora	InterfaceType	0	0	0	0	
MFD, encryption method	81 80 C0 40, FF FF 39, xx	8	C, 8 bits	Ⓢ 0: none; 1: mode 5	EncryptionEnabled	6	0	0	0	
wM-Bus, encryption method	81 C0 C0 40, FF FF 39, xx	8	C, 8 bits	Ⓢ 0: none; 1: mode 5; 2: mode 7	EncryptionEnabled	7	0	0	0	
wM-Bus, transmit mode (C1, T1)	81 C0 C0 40, FF FF 3A, xx	8	C, 8 bits	Ⓢ 0: C1; 1: T1	RadioCommunicationMode	7	0	0	0	
		0								
M-Bus wire, identification number	8C F0 A0 30, 79, xx xx xx xx	9	A, 32 bits	Ⓢ	IdentificationNumber	1	59	0	0	
M-Bus wire, primary address	81 40, 7A, xx	4	C, 8 bits	Ⓢ	PrimaryAddress	1	0	0	0	
		0								
Flow cutoff	05, BE 40, xx xx xx xx	7	H, 32 bits	Ⓢ [m3/h]	VolumeFlow_LowerLimitOf	0	0	0	0	
		0								
Special supplier information 1	0D, FD 67, Ln, ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	20	LVAR	Ⓢ 0..16 characters	SpecialSupplierInformation	0	0	0	0	
Special supplier information 2	4D, FD 67, Ln, ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	20	LVAR	Ⓢ 0..16 characters	SpecialSupplierInformation	0	0	1	0	
		0								
		0								
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 155 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The heating energy totalizer (tariff 0) is counting if:
delta_t > 0 AND t_inlet >= HeatingSwitchingTemperature
The cooling energy and volume totalizers (tariff 1) are counting if:
delta_t < 0 AND t_inlet < CoolingSwitchingTemperature

- Ⓢ No special access right is needed to change this value.
- Ⓢ The installer access right (or higher) is needed to change this value.
- Ⓢ The verifier access right (or higher) is needed to change this value.
- Ⓢ The manufacturer access right (or higher) is needed to change this value.
- Ⓢ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
Configuration	00 00	2	C, 16 bits	Signature						
		0								
User Data	Energy unit	02,FF 40,eu eu	5	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	0	0	0	0
	Volume unit	02,FF 41,vu vu	5	C, 16 bits	ⓧ Note 2	DeviceSpecificValue1	0	0	0	0
	Counter IN1 unit	82 40,FF 40,iu iu	6	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	1	0	0	0
	Counter IN2 unit	82 80 40,FF 40,iu iu	7	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	2	0	0	0
	Counter IN3 unit	82 C0 40,FF 40,iu iu	7	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	3	0	0	0
	Counter IN4 unit	82 80 80 40,FF 40,iu iu	8	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	4	0	0	0
	Counter IN5 unit	82 C0 80 40,FF 40,iu iu	8	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	5	0	0	0
	Counter IN6 unit	82 80 C0 40,FF 40,iu iu	8	C, 16 bits	ⓧ Note 2	DeviceSpecificValue0	6	0	0	0
			0							
	Flowmeter position	01,FF FF 06,xx	5	C, 8 bits	ⓧ 0: cold pipe; 1: hot pipe	FlowmeterPosition	0	0	0	0
	Flowmeter input filter	01,FF 4C,xx	4	C, 8 bits	ⓧ 0: slow pulses; 1: fast pulses	DeviceSpecificValue12	0	0	0	0
	Flowmeter pulse factor	05,96 28,xx xx xx xx	7	H, 32 bits	ⓧ [m3/pulse]	Volume_perInputPulseOnChannel0	0	0	0	0
	Counter IN1 pulse factor	85 40,ip ip ip,xx xx xx xx	9	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	1	0	0	0
	Counter IN2 pulse factor	85 80 40,ip ip ip,xx xx xx xx	10	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	2	0	0	0
	Counter IN3 pulse factor	85 C0 40,ip ip ip,xx xx xx xx	10	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	3	0	0	0
	Counter IN4 pulse factor	85 80 80 40,ip ip ip,xx xx xx xx	11	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	4	0	0	0
	Counter IN5 pulse factor	85 C0 80 40,ip ip ip,xx xx xx xx	11	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	5	0	0	0
	Counter IN6 pulse factor	85 80 C0 40,ip ip ip,xx xx xx xx	11	H, 32 bits	ⓧ [unit/pulse] [m3/pulse] [J/pulse]; Note 3	Dimensionless Volume Energy_perInputPulseOnChannel0	6	0	0	0
			0							
	Input IN1 use	81 40,FF 0C,xx	5	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	1	0	0	0
	Input IN2 use	81 80 40,FF 0C,xx	6	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	2	0	0	0
	Input IN3 use	81 C0 40,FF 0C,xx	6	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	3	0	0	0
	Input IN4 use	81 80 80 40,FF 0C,xx	7	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	4	0	0	0
	Input IN5 use	81 C0 80 40,FF 0C,xx	7	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	5	0	0	0
	Input IN6 use	81 80 C0 40,FF 0C,xx	7	C, 8 bits	ⓧ 0: state; 1: slow counter; 2: fast counter	InputType	6	0	0	0
			0							
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
Stop	16	1								

Max frame size: 192 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. When this unit is changed, the linked totalizers are not rescaled. It is advised to clear the linked totalizers.
3. The value of "ip ip ip" depends on "Counter INx unit", see key "iu iu".
If necessary, change the "Counter INx unit" first, then the "Counter INx pulse factor"

- Ⓒ No special access right is needed to change this value.
- ⓧ The installer access right (or higher) is needed to change this value.
- ⓧ The verifier access right (or higher) is needed to change this value.
- ⓧ The manufacturer access right (or higher) is needed to change this value.
- ⓧ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start										
Start, Length	68,Le Le,68	4								
Control	08	1		Respond with user data, RSP_UD						
Address	xx	1								
Control Information	72	1		Variable structure respond						
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber					Header
Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
Version of meter	48	1	C, 8 bits	72	Version					
Device type	dt	1	D, 8 bits		DeviceType					
Access number	xx	1	C, 8 bits		AccessNumber					
Status	st	1	Ds, 8 bits		Status					
Configuration	00 00	2	C, 16 bits		Signature					
		0								
Output OUT1 use	81 40,FF 0D,xx	5	C, 8 bits	① 0: state; 1: slow pulses; 2: fast pulses	OutputType	1	0	0	0	
Output OUT2 use	81 80 40,FF 0D,xx	6	C, 8 bits	See above	OutputType	2	0	0	0	
Output OUT3 use	81 C0 40,FF 0D,xx	6	C, 8 bits	See above	OutputType	3	0	0	0	
Output OUT4 use	81 80 80 40,FF 0D,xx	7	C, 8 bits	See above	OutputType	4	0	0	0	
Output OUT5 use	81 C0 80 40,FF 0D,xx	7	C, 8 bits	See above	OutputType	5	0	0	0	
Output OUT6 use	81 80 C0 40,FF 0D,xx	7	C, 8 bits	See above	OutputType	6	0	0	0	
		0								
Output OUT1 pulse source	81 40,FF FF 17,xx	6	C, 8 bits	① 0: energy tariff 0; 1: volume tariff 0; 2: energy tariff 1; 3: volume tariff 1; 4: energy tariff 2; 5: volume tariff 2	TotalizationOutputSource	1	0	0	0	
Output OUT2 pulse source	81 80 40,FF FF 17,xx	7	C, 8 bits	See above	TotalizationOutputSource	2	0	0	0	
Output OUT3 pulse source	81 C0 40,FF FF 17,xx	7	C, 8 bits	See above	TotalizationOutputSource	3	0	0	0	
Output OUT4 pulse source	81 80 80 40,FF FF 17,xx	8	C, 8 bits	See above	TotalizationOutputSource	4	0	0	0	
Output OUT5 pulse source	81 C0 80 40,FF FF 17,xx	8	C, 8 bits	See above	TotalizationOutputSource	5	0	0	0	
Output OUT6 pulse source	81 80 C0 40,FF FF 17,xx	8	C, 8 bits	See above	TotalizationOutputSource	6	0	0	0	
		0								
Output OUT1 pulse multiplier	85 40,FF 46,xx xx xx xx	8	H, 32 bits	① Note 2	DeviceSpecificValue6	1	0	0	0	
Output OUT2 pulse multiplier	85 80 40,FF 46,xx xx xx xx	9	H, 32 bits	① Note 2	DeviceSpecificValue6	2	0	0	0	
Output OUT3 pulse multiplier	85 C0 40,FF 46,xx xx xx xx	9	H, 32 bits	① Note 2	DeviceSpecificValue6	3	0	0	0	
Output OUT4 pulse multiplier	85 80 80 40,FF 46,xx xx xx xx	10	H, 32 bits	① Note 2	DeviceSpecificValue6	4	0	0	0	
Output OUT5 pulse multiplier	85 C0 80 40,FF 46,xx xx xx xx	10	H, 32 bits	① Note 2	DeviceSpecificValue6	5	0	0	0	
Output OUT6 pulse multiplier	85 80 C0 40,FF 46,xx xx xx xx	10	H, 32 bits	① Note 2	DeviceSpecificValue6	6	0	0	0	
		0								
		0								
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
End										
Check Sum	cs	1								
Stop	16	1								

Max frame size: 160 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The weight of one output pulse depends on:
 - the totalizer selected by "Output OUTx pulse source"
 - the unit selected by "Energy unit" or "Volume unit"
 - the number of pulses to send for each unit defined by "Output OUTx pulse multiplier"

Example:
 "Output OUT1 pulse source" = 0 (energy tariff 0)
 "Energy unit" = 01 00 = 1 kWh
 "Output OUT1 pulse multiplier" = 10.0
 One OUT1 pulse represents: 1 kWh / 10.0 = **0.1 kWh**
 Displayed OUT1 pulse factor = 0.1 kWh/pulse

- ⓐ No special access right is needed to change this value.
- ⓐ The installer access right (or higher) is needed to change this value.
- ⓐ The verifier access right (or higher) is needed to change this value.
- ⓐ The manufacturer access right (or higher) is needed to change this value.
- ⓐ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start	Start, Length	68,Le Le,68	4							
	Control	08	1	Respond with user data, RSP_UD						
User Data	Address	xx	1							
	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	Temperature display unit	01,FF FE 20,xx	5	C, 8 bits	① 0: degree Celsius; 1: degree Fahrenheit	DeviceSpecificValue32	0	0	0	0
	Temperature difference display unit	01,FF FE 2C,xx	5	C, 8 bits	① 0: degree Kelvin; 1: degree Fahrenheit	DeviceSpecificValue44	0	0	0	0
	Flow display unit	01,FF FE 21,xx	5	C, 8 bits	① 0: L/h; 1: m3/h; 2: gal/min	DeviceSpecificValue33	0	0	0	0
	Power display unit	01,FF FE 22,xx	5	C, 8 bits	① 0: kW; 1: MW; 2: Btu/h	DeviceSpecificValue34	0	0	0	0
	Volume pulse factor display unit	01,FF FE 23,xx	5	C, 8 bits	① 0: m3/pulse; 1: pulse/m3; 2: L/pulse; 3: pulse/L; 4: gal/pulse; 5: pulse/gal	DeviceSpecificValue35	0	0	0	0
Decimal places of pulse factor	41,FF FE 23,xx	5	B, 8 bits	① 1..6	DeviceSpecificValue35	0	0	1	0	
		0								
IN1 pulse factor display unit	81 40,FF FE 24,di	6	C, 8 bits	①	DeviceSpecificValue36	1	0	0	0	
IN2 pulse factor display unit	81 80 40,FF FE 24,di	7	C, 8 bits	①	DeviceSpecificValue36	2	0	0	0	
IN3 pulse factor display unit	81 C0 40,FF FE 24,di	7	C, 8 bits	①	DeviceSpecificValue36	3	0	0	0	
IN4 pulse factor display unit	81 80 80 40,FF FE 24,di	8	C, 8 bits	①	DeviceSpecificValue36	4	0	0	0	
IN5 pulse factor display unit	81 C0 80 40,FF FE 24,di	8	C, 8 bits	①	DeviceSpecificValue36	5	0	0	0	
IN6 pulse factor display unit	81 80 C0 40,FF FE 24,di	8	C, 8 bits	①	DeviceSpecificValue36	6	0	0	0	
		0								
		0								
Custom display positions	0D,FF FE A6 1E,12,01 00	8	LVAR	①	DeviceSpecificValue38_ CompactProfileWithRegisters	0	0	0	0	
	xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	16	C, 8 bits	See next sheet C4_ for more details	DeviceSpecificValue38	0	0	0..1 5	0	
		0								
Hide totalizers	01,FF FF 11,xx	5	C, 8 bits	① 0: visible; 1: hidden	HiddenTotalizers	0	0	0	0	
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 125 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
- Ⓒ No special access right is needed to change this value.
 - ① The installer access right (or higher) is needed to change this value.
 - Ⓥ The verifier access right (or higher) is needed to change this value.
 - Ⓜ The manufacturer access right (or higher) is needed to change this value.
 - Ⓡ This value is read only.

Name	Index
POS_E0_V0,	8
POS_E1_V1,	9
POS_E2_V2,	10
POS_IN1_IN2,	11
POS_IN3_IN4,	12
POS_IN5_IN6,	13
POS_MOUNTING_POS,	14
POS_TYPE_ID,	19
POS_FLUID,	20
POS_MET_ENE,	21
POS_MET_VOL,	22
POS_TEMPERATURES,	23
POS_POWER_FLOW,	24
POS_SETDAY1,	25
POS_SETDAY2,	26
POS_CONFIGURATION_MBUS,	69
POS_CONFIGURATION_DATE_TIME,	70
POS_SERVICE_FABNMB,	83
POS_SERVICE_FW_CHK,	84
POS_SERVICE_RUNNING_HOURS,	85
POS_SERVICE_LCD_ALL_DOTS,	90
POS_SERVICE_LCDTEST1,	91
POS_SUPPLIER_INFO,	101

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start										
Start, Length	68,1e 1e,68	4								
Control	08	1		Respond with user data, RSP_UD						
Address	xx	1								
Control Information	72	1		Variable structure respond						
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber					Header
Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
Version of meter	48	1	C, 8 bits	72	Version					
Device type	dt	1	D, 8 bits		DeviceType					
Access number	xx	1	C, 8 bits		AccessNumber					
Status	st	1	Ds, 8 bits		Status					
Configuration	00 00	2	C, 16 bits		Signature					
		0								
Fluid parameter access right	01,FF FE 2E,xx	5	C, 8 bits	† 1: installer; 2: verifier; ‡ 3: manufacturer	DeviceSpecificValue43	0	0	0	0	
Fluid type	02,FF 2E,xx xx	5	C, 16 bits	Note 2; id = x / 10; rev = x mod 10;	SpecialFluidType	0	0	0	0	
Fluid concentration	01,FF 2F,xx	4	C, 8 bits	Note 2; [%]	SpecialFluidConcentration	0	0	0	0	
Fluid name	0D,FF 42,LR, ch ch ch ch ch ch ch ch ch ch ch ch ch ch	20	LVAR	Note 2; 0..16 characters	DeviceSpecificValue2	0	0	0	0	
		0								
Specific heat polynomial degree	81 B0 B0 30,FF 45,xx	7	C, 8 bits	Note 2; 0..5	DeviceSpecificValue5	0	63	0	0	
Specific heat polynomial	8D B0 B0 30,FF AD 1E,1A,05 00	10	LVAR	Note 2	Coefficient_	0	63	0	0	
					CompactProfileWithRegisters					
a0	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	0	0	
a1	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	1	0	
a2	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	2	0	
a3	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	3	0	
a4	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	4	0	
a5	xx xx xx xx	4	H, 32 bits		Coefficient	0	63	5	0	
		0								
Density polynomial degree	81 A0 B0 30,FF 45,xx	7	C, 8 bits	Note 2; 0..5	DeviceSpecificValue5	0	62	0	0	
Density polynomial	8D A0 B0 30,FF AD 1E,1A,05 00	10	LVAR	Note 2	Coefficient_	0	62	0	0	
					CompactProfileWithRegisters					
a0	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	0	0	
a1	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	1	0	
a2	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	2	0	
a3	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	3	0	
a4	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	4	0	
a5	xx xx xx xx	4	H, 32 bits		Coefficient	0	62	5	0	
		0								
Inverse viscosity polynomial degree	81 90 B0 30,FF 45,xx	7	C, 8 bits	Note 2; 0..5	DeviceSpecificValue5	0	61	0	0	
Inverse viscosity polynomial	8D 90 B0 30,FF AD 1E,1A,05 00	10	LVAR	Note 2	Coefficient_	0	61	0	0	
					CompactProfileWithRegisters					
a0	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	0	0	
a1	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	1	0	
a2	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	2	0	
a3	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	3	0	
a4	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	4	0	
a5	xx xx xx xx	4	H, 32 bits		Coefficient	0	61	5	0	
		0								
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End										
Check Sum	c5	1								
Stop	16	1								

Max frame size: 179 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The needed access right depends on the "Fluid parameters access right".

- Ⓒ No special access right is needed to change this value.
- Ⓘ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start	Start, Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	Fluid minimal measurable temperature	25,FF FE 43,xx xx xx xx	8	H, 32 bits	Note 2; [°C]	DeviceSpecificTemperature0	0	0	0	2
	Fluid maximal measurable temperature	15,FF FE 43,xx xx xx xx	8	H, 32 bits	Note 2; [°C]	DeviceSpecificTemperature0	0	0	0	1
			0							
	M-Bus wire		0							
	M-Bus wire, frames selected by application reset Cf=50h with subcode 10h or without	84 40,FF 4E,sf sf sf sf	8	C, 32 bits	Ⓢ	DeviceSpecificValue14	1	0	0	0
	M-Bus wire, identification number	8C F0 A0 30,79,xx xx xx xx	9	A, 32 bits	Ⓢ	IdentificationNumber	1	59	0	0
	M-Bus wire, primary address	81 40,7A,xx	4	C, 8 bits	Ⓢ	PrimaryAddress	1	0	0	0
	M-Bus wire, baudrate	81 40,FD 1C,br	5	C, 8 bits	Ⓢ	BaudRate	1	0	0	0
			0							
	Optical		0							
Optical, frames selected by application reset Cf=50h with subcode 10h or without	84 80 40,FF 4E,sf sf sf sf	9	C, 32 bits	Ⓢ	DeviceSpecificValue14	2	0	0	0	
Optical, identification number	8C B0 E0 30,79,xx xx xx xx	9	A, 32 bits	Ⓢ	IdentificationNumber	2	59	0	0	
		0								
Module 1		0								
Module 1, frames selected by application reset Cf=50h with subcode 10h or without	84 C0 40,FF 4E,sf sf sf sf	9	C, 32 bits	Ⓢ	DeviceSpecificValue14	3	0	0	0	
Module 1, identification number	8C F0 E0 30,79,xx xx xx xx	9	A, 32 bits	Ⓢ	IdentificationNumber	3	59	0	0	
Module 1, primary address	81 C0 40,7A,xx	5	C, 8 bits	Ⓢ	PrimaryAddress	3	0	0	0	
Module 1, baudrate	81 C0 40,FD 1C,br	6	C, 8 bits	Ⓢ	BaudRate	3	0	0	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
End	Stop	16	1							

Max frame size: 111 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The needed access right depends on the "Fluid parameters access right".

- Ⓒ No special access right is needed to change this value.
- Ⓢ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start										
Start, Length	68,Le Le,68	4								
Control	08	1		Respond with user data, RSP_UD						
Address	xx	1								
Control Information	72	1		Variable structure respond						
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber					
Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer					
Version of meter	48	1	C, 8 bits	72	Version					
Device type	dt	1	D, 8 bits		DeviceType					
Access number	xx	1	C, 8 bits		AccessNumber					
Status	st	1	Ds, 8 bits		Status					
Configuration	00 00	2	C, 16 bits		Signature					
		0								
Radio MFD (and common with wM-Bus)		0								
MFD, frames selected by application reset CI=50h with subcode 10h or without	84 80 C0 40,FF 4E,sf sf sf sf	10	C, 32 bits	① The number of frame selected is limited to 4.	DeviceSpecificValue14	6	0	0	0	
MFD address (identification number)	8C B0 E0 70,79,xx xx xx xx	9	A, 32 bits	Ⓧ	IdentificationNumber	6	59	0	0	
MFD, encryption method	81 80 C0 40,FF FF 39,xx	8	C, 8 bits	① 0: none; 1: mode 5	EncryptionEnabled	6	0	0	0	
Radio activity calendar (common)	8D 80 C0 40,FD 76,E7,yy yy yy xx yy yy xx	14	LVAR	① See Coding below	DataContainerForManufacturerProtocol	6	0	0	0	
		0								
Radio wM-Bus		0								
wM-Bus, frames selected by application reset CI=50h with subcode 10h or without	84 C0 60 40,FF 4E,sf sf sf sf	10	C, 32 bits	① The number of frame selected is limited to 1.	DeviceSpecificValue14	7	0	0	0	
wM-Bus address (identification number)	8C F0 E0 70,79,xx xx xx xx	9	A, 32 bits	Ⓧ	IdentificationNumber	7	59	0	0	
wM-Bus, encryption method	81 C0 C0 40,FF FF 39,xx	8	C, 8 bits	① 0: none; 1: mode 5; 2: mode 7	EncryptionEnabled	7	0	0	0	
wM-Bus, transmit mode (C1, T1)	81 C0 C0 40,FF FF 3A,xx	8	C, 8 bits	① 0: C1; 1: T1	RadioCommunicationMode	7	0	0	0	
wM-Bus, transmission interval	82 C0 C0 40,FD 3C,xx xx	8	C, 16 bits	① [s]	PeriodOfNominalDataTransmissions	7	0	0	0	
wM-Bus, message counter	84 C0 C0 40,FD 08,xx xx xx xx	10	C, 32 bits	①	AccessNumber	7	0	0	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
End	16	1								

Max frame size: 116 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓧ No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- Ⓧ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Coding

Radio activity calendar	8D 80 C0 40, FD 76, E7,	7							
Hours of the day	YY YY YY	3	C, 24 bits	bit0: 0h00..0h59 bitX: Xh00..Xh59 bit 23: 23h00..23h59	Radio wM-Bus only				
Days of the week	xx	1	C, 8 bits	bit0: unused bit1: Monday bit2: Tuesday bit3: Wednesday bit4: Thursday bit5: Friday bit6: Saturday bit7: Sunday	Radio wM-Bus only. If used, "Day of the month" must be FFh.				
Months of the year	YY YY	2	C, 16 bits	bit0: unused bit1: January bit2: February bit3: March bit4: April bit5: May bit6: June bit7: July bit8: August bit9: September bit10: October bit11: November bit12: December bit13..15: unused	Radio wM-Bus only				
Days of the month	xx	1	C, 8 bits	bit0: From 1st to 4th of month bit1: From 5th to 8th of month bit2: From 9th to 12th of month bit3: From 13th to 16th of month bit4: From 17th to 20th of month bit5: From 21th to 24th of month bit6: From 25th to 28th of month bit7: From 29th to end of month	Radio MFD and wM-Bus. If used, "Days of the week" must be FFh.				

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start	Start_Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	Minimum pulses to start measure	02,FF FF 16,xx xx	6	C, 16 bits	Ⓧ	MinPulsesToStartMeasure	0	0	0	0
	Minimal measure period for battery	21,FF FE 63,xx	5	C, 8 bits	Ⓧ 10..30[s]	DeviceSpecificDuration0	0	0	0	2
	Minimal measure period for main power	61,FF FE 63,xx	5	C, 8 bits	Ⓧ 3..30[s]	DeviceSpecificDuration0	0	0	1	2
	Maximal measure period	11,FF FE 63,xx	5	C, 8 bits	Ⓧ 30..255[s]	DeviceSpecificDuration0	0	0	0	1
			0							
	Hot pipe sensor serial number	0E,FF FE 29,xx xx xx xx xx xx	10	A, 48 bits	Ⓧ BCD 12 digits	DeviceSpecificValue41	0	0	0	0
	Platinum coefficients of hot pipe sensor	8D 90 A0 30,FF AD 1E,0E,05 00	10	LVAR	Ⓧ	Coefficient_CompactProfileWithRegisters	0	57	0	0
	R0	xx xx xx xx	4	H, 32 bits	Ⓧ [Q]	Coefficient	0	57	0	0
	A	xx xx xx xx	4	H, 32 bits	Ⓧ	Coefficient	0	57	1	0
	B	xx xx xx xx	4	H, 32 bits	Ⓧ	Coefficient	0	57	2	0
			0							
	Cold pipe sensor serial number	0E,FF FE 2A,xx xx xx xx xx xx	10	A, 48 bits	Ⓧ BCD 12 digits	DeviceSpecificValue42	0	0	0	0
	Platinum coefficients of cold pipe sensor	8D A0 A0 30,FF AD 1E,0E,05 00	10	LVAR	Ⓧ	Coefficient_CompactProfileWithRegisters	0	58	0	0
	R0	xx xx xx xx	4	H, 32 bits	Ⓧ [Q]	Coefficient	0	58	0	0
A	xx xx xx xx	4	H, 32 bits	Ⓧ	Coefficient	0	58	1	0	
B	xx xx xx xx	4	H, 32 bits	Ⓧ	Coefficient	0	58	2	0	
		0								
Flow cutoff	05,BE 40,xx xx xx xx	7	H, 32 bits	Ⓧ [m3/h]	VolumeFlow_LowerLimitOf	0	0	0	0	
Flow saturation	05,BE 48,xx xx xx xx	7	H, 32 bits	Ⓧ [m3/h]	VolumeFlow_UpperLimitOf	0	0	0	0	
		0								
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 121 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
- Ⓒ No special access right is needed to change this value.
 - Ⓘ The installer access right (or higher) is needed to change this value.
 - Ⓧ The verifier access right (or higher) is needed to change this value.
 - Ⓜ The manufacturer access right (or higher) is needed to change this value.
 - Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start, Length	68, 1e 1e, 68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	NFC		0							
	NFC, frames selected by application reset Ci=50h with subcode 10h or without	84 80 80 40, FF 4E, sf sf sf sf	10	C, 32 bits	①	DeviceSpecificValue14	4	0	0	0
	NFC, identification number	8C B0 A0 70, 79, xx xx xx xx	9	A, 32 bits	①	IdentificationNumber	4	59	0	0
			0							
	Module 2		0							
	Module 2, frames selected by application reset Ci=50h with subcode 10h or without	84 C0 80 40, FF 4E, sf sf sf sf	10	C, 32 bits	①	DeviceSpecificValue14	5	0	0	0
Module 2, identification number	8C F0 A0 70, 79, xx xx xx xx	9	A, 32 bits	①	IdentificationNumber	5	59	0	0	
Module 2, primary address	81 C0 80 40, 7A, xx	6	C, 8 bits	①	PrimaryAddress	5	0	0	0	
Module 2, baudrate	81 C0 80 40, FD 1C, bf	7	C, 8 bits	①	BaudRate	5	0	0	0	
		0								
Encryption key AES128	0D, FD 19, F0, xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	20	LVAR, 128 bits	① Global for all channels Note 2, Note 4	SecurityKey	0	0	0	0	
Installer password	4C, FD 13, xx xx xx xx	7	A, 32 bits	① Note 2, Note 3	AccessCodeOperator	0	0	1	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
Stop	16	1								

Max frame size: 100 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. The reading of this value is possible only with verifier access right.
3. The installer password can be disabled by setting it to zero. Then the device has the installer access right by default, without the need to enter the password.
4. According to the standard, when this value is changed, the "wM-Bus message counter" must be reset.

- Ⓒ No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start_Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Customisable M-Bus frame 1	8D 10,FF C4 1E,42,02 00	8	LVAR	①	DeviceSpecificValue4_CompactProfileWithRegisters	0	1	0	0
		xx xx	64	C, 16 bits	xx xx: mbus_record_id See next sheet C10_ for more details	DeviceSpecificValue4	0	1	0,3 1	0
			0							
	Customisable M-Bus frame 2	8D 20,FF C4 1E,42,02 00	8	LVAR	①	DeviceSpecificValue4_CompactProfileWithRegisters	0	2	0	0
		xx xx	64	C, 16 bits	xx xx: mbus_record_id See next sheet C10_ for more details	DeviceSpecificValue4	0	2	0,3 1	0
		0								
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	05	1							
	Stop	16	1							

Max frame size: 166 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓒ No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- ⒱ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓒ This value is read only.

Value	Frame	Name	Size	Usefulness	1.0.0
REAL_TIME_CLOCK,	f	Current date & time	6	High	5
ENERGY_TARIFF_0,	r5	Energy totalizer tariff 0	8	High	23
VOLUME_TARIFF_0,	r5	Volume totalizer tariff 0	7	High	24
ENERGY_TARIFF_1,	r5	Energy totalizer tariff 1	9	High	25
VOLUME_TARIFF_1,	r5	Volume totalizer tariff 1	8	High	26
ENERGY_TARIFF_2,	r5	Energy totalizer tariff 2	9	High	27
VOLUME_TARIFF_2,	r5	Volume totalizer tariff 2	8	High	28
IN1_DEVICE_TYPE,	r5	Counter IN1 device type	5	High	29
IN1_ID_NUMBER,	r5	Counter IN1 identification	7	High	30
IN1_TOTALIZER,	r5	Counter IN1 totalizer	9	High	31
IN2_DEVICE_TYPE,	r5	Counter IN2 device type	6	High	32
IN2_ID_NUMBER,	r5	Counter IN2 identification	8	High	33
IN2_TOTALIZER,	r5	Counter IN2 totalizer	10	High	34
FABRICATION_NUMBER,	r5	Fabrication Number	6	High	35
RUNNING_HOURS,	r5	Running hours	5	High	
SETDAY1,	r6	Set day	4	High	36
ENERGY_TARIFF_0_SETDAY1,	r6	Energy totalizer tariff 0 at set day	8	High	37
VOLUME_TARIFF_0_SETDAY1,	r6	Volume totalizer tariff 0 at set day	7	High	38
ENERGY_TARIFF_1_SETDAY1,	r6	Energy totalizer tariff 1 at set day	9	High	39
VOLUME_TARIFF_1_SETDAY1,	r6	Volume totalizer tariff 1 at set day	8	High	40
ENERGY_TARIFF_2_SETDAY1,	r6	Energy totalizer tariff 2 at set day	9	High	41
VOLUME_TARIFF_2_SETDAY1,	r6	Volume totalizer tariff 2 at set day	8	High	42
IN1_TOTALIZER_SETDAY1,	r6	Counter IN1 totalizer at set day	9	High	43
IN2_TOTALIZER_SETDAY1,	r6	Counter IN2 totalizer at set day	10	High	44
SETDAY2,	r6	Set day 2	5	High	45
ENERGY_TARIFF_0_SETDAY2,	r6	Energy totalizer tariff 0 at set day 2	9	High	46
VOLUME_TARIFF_0_SETDAY2,	r6	Volume totalizer tariff 0 at set day 2	8	High	47
ENERGY_TARIFF_1_SETDAY2,	r6	Energy totalizer tariff 1 at set day 2	9	High	48
VOLUME_TARIFF_1_SETDAY2,	r6	Volume totalizer tariff 1 at set day 2	8	High	49
ENERGY_TARIFF_2_SETDAY2,	r6	Energy totalizer tariff 2 at set day 2	9	High	50
VOLUME_TARIFF_2_SETDAY2,	r6	Volume totalizer tariff 2 at set day 2	8	High	51
IN1_TOTALIZER_SETDAY2,	r6	Counter IN1 totalizer at set day 2	9	High	52
IN2_TOTALIZER_SETDAY2,	r6	Counter IN2 totalizer at set day 2	10	High	53
RUNNING_HOURS,	r6	Running hours	5	High	54
IN3_DEVICE_TYPE,	r7	Counter IN3 device type	6	High	55
IN3_ID_NUMBER,	r7	Counter IN3 identification	8	High	56
IN3_TOTALIZER,	r7	Counter IN3 totalizer	10	High	57
IN3_TOTALIZER_SETDAY1,	r7	Counter IN3 totalizer at set day	10	High	58
IN3_TOTALIZER_SETDAY2,	r7	Counter IN3 totalizer at set day 2	10	High	59
IN4_DEVICE_TYPE,	r7	Counter IN4 device type	7	High	61
IN4_ID_NUMBER,	r7	Counter IN4 identification	9	High	62
IN4_TOTALIZER,	r7	Counter IN4 totalizer	11	High	63
IN4_TOTALIZER_SETDAY1,	r7	Counter IN4 totalizer at set day	11	High	64
IN4_TOTALIZER_SETDAY2,	r7	Counter IN4 totalizer at set day 2	11	High	65

IN5_DEVICE_TYPE,	r8	Counter IN5 device type	7	High	67
IN5_ID_NUMBER,	r8	Counter IN5 identification	9	High	68
IN5_TOTALIZER,	r8	Counter IN5 totalizer	11	High	69
IN5_TOTALIZER_SETDAY1,	r8	Counter IN5 totalizer at set day	11	High	70
IN5_TOTALIZER_SETDAY2,	r8	Counter IN5 totalizer at set day 2	11	High	71
IN6_DEVICE_TYPE,	r8	Counter IN6 device type	7	High	73
IN6_ID_NUMBER,	r8	Counter IN6 identification	9	High	74
IN6_TOTALIZER,	r8	Counter IN6 totalizer	11	High	75
IN6_TOTALIZER_SETDAY1,	r8	Counter IN6 totalizer at set day	11	High	76
IN6_TOTALIZER_SETDAY2,	r8	Counter IN6 totalizer at set day 2	11	High	77
SPECIAL_SUPPLIER_INFORMATION_1,	c1	Special supplier information 1	20	High	92
SPECIAL_SUPPLIER_INFORMATION_2,	c1	Special supplier information 2	20	High	93
FLOWMETER_PULSE_FACTOR,	c2	Flowmeter pulse factor	7	High	105
IN1_PULSE_FACTOR,	c2	Counter IN1 pulse factor	9	High	106
IN2_PULSE_FACTOR,	c2	Counter IN2 pulse factor	10	High	107
IN3_PULSE_FACTOR,	c2	Counter IN3 pulse factor	10	High	108
IN4_PULSE_FACTOR,	c2	Counter IN4 pulse factor	11	High	109
IN5_PULSE_FACTOR,	c2	Counter IN5 pulse factor	11	High	110
IN6_PULSE_FACTOR,	c2	Counter IN6 pulse factor	11	High	111
HIDE_TOTALIZERS,	c4	Hide totalizers	5	High	154
FLUID_TYPE,	c5	Fluid type	5	High	156
FLUID_CONCENTRATION,	c5	Fluid concentration	4	High	157
FLUID_NAME,	c5	Fluid name	20	High	158
FLOWMETER_SERIAL_NUMBER,	c14	Flowmeter serial number	9	High	226
FLOWMETER_TYPE,	c14	Flowmeter type	20	High	227
TEMPERATURE_HOT_PIPE,	read on!	High temperature	6	High	273
TEMPERATURE_HOT_PIPE_OMS,	read on!	High temperature	4	High	274
TEMPERATURE_COLD_PIPE,	read on!	Low temperature	6	High	275
TEMPERATURE_COLD_PIPE_OMS,	read on!	Low temperature	4	High	276
DELTA_TEMPERATURE,	read on!	Temperature difference	6	High	277
FLOW,	read on!	Flow	6	High	278
FLOW_OMS,	read on!	Flow	6	High	279
POWER,	read on!	Power	6	High	280
POWER_OMS,	read on!	Power	6	High	281
ACCESS_RIGHT,	read on!	Device access right	4	High	282
SEALING_STATE,	read on!	Sealing state	4	High	283
INTERNAL_VERSION,	read on!	Internal version	6	High	286
DETAILED_ERRORS,	read on!	Detailed errors	6	High	289
ENCRYPTION_VERIFICATION,	read on!	Encryption verification	2	High	290
ENCRYPTION_FILLING,	read on!	Encryption block filling	0..15	High	291
MORE_IN_NEXT_TELEGRAM,	read on!	More records in next telegram	1	High	292

Respond with user data RSP_UD, Variable structure response (slave to master)

		<MbusRecord> XML attributes								
		Name	SubUn	Tariff	Storage	Function	Origin			
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start_Length	68, 1E 1E, 68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer				
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Customisable M-Bus frame 3	8D 30, FF C4 1E, 42, 02 00	8	LVAR	①	DeviceSpecificValue4_CompactProfileWithRegisters	0	3	0	0
		xx xx	64	C, 16 bits	xx xx: mbus_record_id See previous sheet C10_ for more details	DeviceSpecificValue4	0	3	0.3	0
			0							
	Customisable M-Bus frame 4	8D 80 10, FF C4 1E, 42, 02 00	9	LVAR	①	DeviceSpecificValue4_CompactProfileWithRegisters	0	4	0	0
		xx xx	64	C, 16 bits	xx xx: mbus_record_id See previous sheet C10_ for more details	DeviceSpecificValue4	0	4	0.3	0
			0							
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	05	1							
	Stop	16	1							

Max frame size: 167 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓒ No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- ⒱ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓒ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

		<MbusRecord> XML attributes					
		Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment			
Start	Start_Length	68,1e 1e,68	4				
	Control	08	1	Respond with user data, RSP_UD			
	Address	xx	1				
	Control Information	72	1	Variable structure respond			
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber		
	Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer	
	Version of meter	48	1	C, 8 bits	72	Version	
	Device type	dt	1	D, 8 bits		DeviceType	
	Access number	xx	1	C, 8 bits		AccessNumber	
	Status	st	1	Ds, 8 bits		Status	
User Data	Configuration	00 00	2	C, 16 bits	Signature		
			0				
	PLA Input selector	0D, FF D8 1E, 12, 01 00	7	LVAR	①	DeviceSpecificValue24_CompactProfileWithRegisters	0 0 0 0
		xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	16	C, 8 bits	See Coding below	DeviceSpecificValue24	0 0 0.1 5
	PLA Input parameters	8D 10, FF D8 1E, 42, 04 00	8	LVAR	①	DeviceSpecificValue24_CompactProfileWithRegisters	0 1 0 0
		xx xx	64	C, 32 bits	See Coding below	DeviceSpecificValue24	0 1 0.1 5
			0				
			0				
			0				
	More records in next telegram	mo	1	Start of manufacturer specific data	ManufacturerDataBlock		
End	Check Sum	cs	1				
	Stop	16	1				

Max frame size: 117 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- © No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Coding

PLA Input selector	PLA Input parameters	True if ...
0: Unused	xx xx xx xx : 00 00 00 00	
1: Power	xx xx xx xx : floating point parameter	Power >= parameter
2: Flow	xx xx xx xx : floating point parameter	Flow >= parameter
3: Temperature hot pipe	xx xx xx xx : floating point parameter	Temperature hot pipe >= parameter
4: Temperature cold pipe	xx xx xx xx : floating point parameter	Temperature cold pipe >= parameter
5: Temperature delta	xx xx xx xx : floating point parameter	Temperature delta >= parameter
6: Time (daily interval)	xx : start.minute [0..59]xx : start.hour [0..23]xx : stop.minute	If start <= stop Then (Time >= start AND Time < stop) Else (Time >= start OR Time < stop)
7: Date (yearly interval)	xx : start.day [0..31]xx : start.month [1..12]xx : stop.day [0..31]	If start <= stop Then (Date >= start AND Date < stop) Else (Date >= start OR Date < stop)
8: Errors	bit0..bit15 : Detailed errors bit16..bit31 : reserved (must be 0)	One or more detailed errors are activated
9: Inputs	bit0 : IN1; bit1 : IN2; bit2 : IN3; bit3 : IN4; bit4 : IN5; bit5 : IN6	One or more inputs INx are activated

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment						
Start	Start Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
			0							
	PLA Input inverter	82 20,FF 58,xx xx	6	C, 16 bits	Ⓜ	DeviceSpecificValue24	0	2	0	0
			0							
	PLA AND gates	8D 30,FF D8 1E,22,02 00	8	LVAR	Ⓜ	DeviceSpecificValue24_CompactProfileWithRegisters	0	3	0	0
		xx xx	32	C, 16 bits		DeviceSpecificValue24	0	3	0..15	0
			0							
PLA OR gates	8D 80 10,FF D8 1E,22,02 00	9	LVAR	Ⓜ	DeviceSpecificValue24_CompactProfileWithRegisters	0	4	0	0	
	xx xx	32	C, 16 bits		DeviceSpecificValue24	0	4	0..15	0	
		0								
PLA Output inverter	82 90 10,FF 58,xx xx	7	C, 16 bits	Ⓜ Invert the selected outputs: bit0: tariff 1; bit1: tariff 2; bit2: OUT1; bit3: OUT2; bit4: OUT3; bit5: OUT4; bit6: OUT5; bit7: OUT6; bit8..bit15: reserved	DeviceSpecificValue24	0	5	0	0	
		0								
		0								
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
Stop	16	1								

Max frame size: 116 bytes

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓢ No special access right is needed to change this value.
- Ⓜ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment						
Start	Start, Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	Version					
	Device type	dt	1	D, 8 bits	DeviceType					
	Access number	xx	1	C, 8 bits	AccessNumber					
	Status	st	1	Ds, 8 bits	Status					
	Configuration	00 00	2	C, 16 bits	Signature					
			0							
	Supercal type	01,FF FE 2D,xx	5	C, 8 bits	Ⓜ 0: undefined; 1: Supercal 5S 2: Supercal 5I 3,255: unknown (to define)	DeviceSpecificValue45	0	0	0	0
	Approval identification	01,FF FE 2E,xx	5	C, 8 bits	Ⓜ 0: undefined; 1,255: unknown (to define)	DeviceSpecificValue46	0	0	0	0
			0							
	Flowmeter marking	01,FF 47,xx	4	C, 8 bits	Ⓧ 0: don't display marking on LCD; 1: display marking on LCD	DeviceSpecificValue7	0	0	0	0
	Flowmeter qi	A5 A0 90 30,3E,xx xx xx xx	9	H, 32 bits	Ⓧ [m3h], Note 2	VolumeFlow	0	54	0	2
	Flowmeter qp	85 A0 90 30,3E,xx xx xx xx	9	H, 32 bits	Ⓧ [m3h], Note 2	VolumeFlow	0	54	0	0
	Flowmeter qs	95 A0 90 30,3E,xx xx xx xx	9	H, 32 bits	Ⓧ [m3h], Note 2	VolumeFlow	0	54	0	1
	Flowmeter class	01,FF 48,xx	4	C, 8 bits	Ⓧ 1..3, Note 2	DeviceSpecificValue8	0	0	0	0
	Flowmeter PS	91 A0 90 30,6B,xx	6	B, 8 bits	Ⓧ [bar], Note 2	Pressure	0	54	0	1
	Flowmeter PN	81 A0 90 30,6B,xx	6	B, 8 bits	Ⓧ [bar], Note 2	Pressure	0	54	0	0
	Flowmeter Bq min	22,FF FE 4B,xx xx	6	B, 16 bits	Ⓧ [°C], Note 2	DeviceSpecificTemperature1	0	0	0	2
	Flowmeter Bq max	12,FF FE 4B,xx xx	6	B, 16 bits	Ⓧ [°C], Note 2	DeviceSpecificTemperature1	0	0	0	1
	Flowmeter DN	02,FF 49,xx xx	5	C, 16 bits	Ⓧ x = 0: don't display DN; x > 0: display DN Note 2	DeviceSpecificValue9	0	0	0	0
Flowmeter serial number	0E,FF 4A,xx xx xx xx xx	9	A, 48 bits	Ⓧ BCD 12 digits, Note 2	DeviceSpecificValue10	0	0	0	0	
Flowmeter type	0D,FF 4B,Ln, ch ch ch ch ch ch ch ch ch ch ch ch ch ch	20	LVAR	Ⓧ 0..16 characters, Note 2	DeviceSpecificValue11	0	0	0	0	
		0								
Flowmeter pulse factor (factory settings)	45,96 28,xx xx xx xx	7	H, 32 bits	Ⓜ [m3/pulse]	Volume_perInputPulseOnChan nel0	0	0	1	0	
Flowmeter position (factory settings)	41,FF FF 06,xx	5	C, 8 bits	Ⓜ 0: cold pipe; 1: hot pipe	FlowmeterPosition	0	0	1	0	
Flow deviation curve identification (factory settings)	44,FF 4D,xx xx xx xx	7	C, 32 bits	Ⓜ id = x / 1'000'000; version = (x / 1'000) mod 1'000 revision = x mod 1'000	DeviceSpecificValue13	0	0	1	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs	1							
	Stop	16	1							

Max frame size: 144 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. This value is displayed according to the field "Flowmeter marking"

- Ⓧ No special access right is needed to change this value.
- Ⓧ The installer access right (or higher) is needed to change this value.
- Ⓧ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓧ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment						
Start	Start Length	68,Le Le,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	History 1 of totalizers	8D B0 B0 20,FF 50,EC,	7	LVAR	①	DeviceSpecificValue16	0	47	0	0
	Next storage date and time	xx xx xx xx	4	F, 32 bits						
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	bit0: energy tariff 0; bit1: volume tariff 0; bit2: energy tariff 1; bit3: volume tariff 1; bit4: energy tariff 2; bit5: volume tariff 2; bit6: IN1; bit7: IN2; bit8: IN3; bit9: IN4; bit10: IN5; bit11: IN6						
		0								
History 2 of totalizers	8D 80 80 30,FF 50,EC,	7	LVAR	①	DeviceSpecificValue16	0	48	0	0	
Next storage date and time	xx xx xx xx	4	F, 32 bits							
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	See above						
		0								
History 3 of totalizers	8D 90 80 30,FF 50,EC,	7	LVAR	①	DeviceSpecificValue16	0	49	0	0	
Next storage date and time	xx xx xx xx	4	F, 32 bits							
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	See above						
		0								
History 4 of totalizers	8D A0 80 30,FF 50,EC,	7	LVAR	①	DeviceSpecificValue16	0	50	0	0	
Next storage date and time	xx xx xx xx	4	F, 32 bits							
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	See above						
		0								

records>

History of average values	8D B0 80 30, FF 50, EC,	7	LVAR	①	DeviceSpecificValue16	0	51	0	0	⌘
Next storage date and time	xx xx xx xx	4	F, 32 bits							
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	bit0: flow; bit1: power; bit2: temperature hot pipe; bit3: temperature cold pipe; bit4: temperature delta;						
		0								
History of peak values	8D 80 90 30, FF 50, EC,	7	LVAR	①	DeviceSpecificValue16	0	52	0	0	
Next storage date and time	xx xx xx xx	4	F, 32 bits							
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	xx	1	C, 8 bits	0: minute; 1: hour; 2: day; 3: month						
Storage period	xx	1	C, 8 bits	See next sheet C15_ for more details						
Selected values	xx xx	2	D, 16 bits	bit0 & 1: peak flow; bit2 & 3: peak power; bit4 & 5: peak temperature hot pipe; bit6 & 7: peak temperature cold pipe; bit8 & 9: peak temperature delta;						
		0								
Event log	8D 90 90 30, FF 50, EC,	7	LVAR	①	DeviceSpecificValue16	0	53	0	0	
Next storage date and time	3B 17 7F CC	4	F, 32 bits	Unused for event log, set to 2099-12-31T23:59						
M-Bus storage number	xx xx	2	C, 16 bits							
Storage count	xx xx	2	C, 16 bits							
Storage period unit	03	1	C, 8 bits	The value must be 3						
Storage period	06	1	C, 8 bits	The value must be 6						
Selected values	03 00	2	D, 16 bits	The value must be 3						
		0								
Event log mask	07, FF 57, xx xx xx xx xx xx xx xx	11	D, 64 bits	① See sheet "he" for Event; bit0 : enable log for Event = 1; bit1 : enable log for Event = 2; bitx : enable log for Event = x;	DeviceSpecificValue23	0	0	0	0	
		0								
Datalogger memory size	02, FF FE 2F, xx xx	6	C, 16 bits	Ⓡ [byte]	DeviceSpecificValue47	0	0	0	0	
		0								
More records in next telegram	Ⓜ○	1		Start of manufacturer specific data	ManufacturerDataBlock					
Ⓜ Check Sum	cS	1								
Ⓜ Stop	16	1								

Max frame size: 172 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

- Ⓢ No special access right is needed to change this value.
- ① The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

History 1 to 4 of totalizers

Storage	StoragePer	NextStorageDateAndTime	
1	hour	multiple of 1 h	xx:00
1	day	multiple of 1 day	00:00
1	month	day 1..28	00:00
3	month	day 1..28, month	00:00
6	month	day 1..28, month	00:00

History of average values

Storage	StoragePer	NextStorageDateAndTime				
15	minute	multiple of 15 min	xx:00	xx:15	xx:30	xx:45
30	minute	multiple of 30 min	xx:00	xx:30		
1	hour	multiple of 1 h	xx:00			
1	day	multiple of 1 day	00:00			

History of peak values

Storage	StoragePer	NextStorageDateAndTime	
1	day	multiple of 1 day	00:00
1	month	day 1..28	00:00

The storage period of peak values must be greater and a multiple of the storage period of average values.

Respond with user data RSP_UD, Variable structure response (slave to master)

		<MbusRecord> XML attributes					
		Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byt	Coding	Comment			
Start							
Start, Length	68,Le,Le,68	4					
Control	08	1		Respond with user data, RSP_UD			
Address	xx	1					
Control Information	72	1		Variable structure respond			
Identification number	xx xx xx xx	4	A, 32 bits		IdentificationNumber		Header
Manufacturer ID	EE 4D	2	C, 16 bits	"SON"	Manufacturer		
Version of meter	48	1	C, 8 bits	72	Version		
Device type	dt	1	D, 8 bits		DeviceType		
Access number	xx	1	C, 8 bits		AccessNumber		
Status	st	1	Ds, 8 bits		Status		
Configuration	00 00	2	C, 16 bits		Signature		
		0					
Flow compensation	01,FF FF 14,xx	5	C, 8 bits	⊙ 0: no; 1: yes;	FlowCompensationMethod	0 0 0 0	
Flow deviation curve identification	04,FF 4D,xx xx xx xx	7	C, 32 bits	⊙ id = x / '1000'000; version = (x / '1000) mod '1000 revision = x mod '1'000	DeviceSpecificValue13	0 0 0 0	
Flow deviation curve temperature	85 80 B0 30,5B,xx xx xx xx	9	H, 32 bits	⊙ [°C]	FlowTemperature	0 60 0 0	
Flow deviation curve	8D 80 B0 30,FF AD 1E,82,05 00	10	LVAR	⊙	Coefficient CompactProfileWithRegisters	0 60 0 0	
Point 0, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 0 0	
Point 0, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 1 0	
Point 1, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 2 0	
Point 1, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 3 0	
Point 2, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 4 0	
Point 2, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 5 0	
Point 3, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 6 0	
Point 3, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 7 0	
Point 4, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 8 0	
Point 4, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 9 0	
Point 5, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 10 0	
Point 5, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 11 0	
Point 6, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 12 0	
Point 6, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 13 0	
Point 7, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 14 0	
Point 7, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 15 0	
Point 8, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 16 0	
Point 8, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 17 0	
Point 9, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 18 0	
Point 9, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 19 0	
Point 10, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 20 0	
Point 10, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 21 0	
Point 11, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 22 0	
Point 11, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 23 0	
Point 12, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 24 0	
Point 12, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 25 0	
Point 13, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 26 0	
Point 13, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 27 0	
Point 14, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 28 0	
Point 14, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 29 0	
Point 15, flow	xx xx xx xx	4	H, 32 bits	[m3/h], Note 2, 3	Coefficient	0 60 30 0	
Point 15, deviation	xx xx xx xx	4	H, 32 bits	Note 3, 4	Coefficient	0 60 31 0	
		0					
More records in next telegram	m0	1		Start of manufacturer specific data	ManufacturerDataBlock		
End							
Check Sum	CS	1					
Stop	16	1					

Max frame size: 181 bytes

Symbols

- ‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
- § manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.
2. WARNING: each flow of point[n] **must be greater** than the flow of point[n - 1]
3. All points must be defined. Duplicate a point is not allowed.
4. Deviation of +0.01 = +1%, deviation of -0.01 = -1%

- Ⓒ No special access right is needed to change this value.
- Ⓘ The installer access right (or higher) is needed to change this value.
- Ⓥ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓡ This value is read only.

Respond with user data RSP_UD, Variable structure response (slave to master)

					<MbusRecord> XML attributes					
					Name	SubUn	Tariff	Storage	Function	Origin
Field	Frame bytes in hex (Note 1)	Byte	Coding	Comment						
Start	Start_Length	68,1e 1e,68	4							
	Control	08	1	Respond with user data, RSP_UD						
	Address	xx	1							
User Data	Control Information	72	1	Variable structure respond						
	Identification number	xx xx xx xx	4	A, 32 bits	IdentificationNumber					Header
	Manufacturer ID	EE 4D	2	C, 16 bits	Manufacturer					
	Version of meter	48	1	C, 8 bits	72	Version				
	Device type	dt	1	D, 8 bits		DeviceType				
	Access number	xx	1	C, 8 bits		AccessNumber				
	Status	st	1	Ds, 8 bits		Status				
	Configuration	00 00	2	C, 16 bits		Signature				
			0							
	Production NFI	8C 40,78,xx xx xx xx	7	A, 32 bits	Ⓜ	FabricationNumber	1	0	0	0
			0							
	RTC calibration	02,FF FE 31,xx xx	6	C, 16 bits	Ⓜ	DeviceSpecificValue49	0	0	0	0
			0							
	Carrier sense threshold	82 80 C0 40,FF 39,xx xx	8	B, 16 bits	Ⓜ [dBm] -130..-2	DeviceSpecificSignedValue1	6	0	0	0
	Rf power amplifier (common)	81 80 C0 40,FF 4F,pα	7	C, 8 bits	Ⓜ	DeviceSpecificValue15	6	0	0	0
	Frequency offset Tx (common)	84 80 C0 40,FF 3B,xx xx xx xx	10	B, 32 bits	Ⓜ	DeviceSpecificSignedValue3	6	0	0	0
			0							
	Ohmmeter calibration reference 1	05,FF FE 11,xx xx xx xx	8	H, 32 bits	Ⓜ [Q]	DeviceSpecificResistance0	0	0	0	0
	Ohmmeter calibration reference 2	85 10,FF FE 11,xx xx xx xx	9	H, 32 bits	Ⓜ [Q]	DeviceSpecificResistance0	0	1	0	0
	Ohmmeter polynomial degree	81 80 A0 30,FF 45,xx	7	C, 8 bits	Ⓜ 0..2	DeviceSpecificValue5	0	56	0	0
	Ohmmeter polynomial	8D 80 A0 30,FF AD 1E,0E,05 00	10	LVAR	Ⓜ	Coefficient_CompactProfileWithRegisters	0	56	0	0
	a0	xx xx xx xx	4	H, 32 bits	Ⓜ	Coefficient	0	56	0	0
	a1	xx xx xx xx	4	H, 32 bits	Ⓜ	Coefficient	0	56	1	0
	a2	xx xx xx xx	4	H, 32 bits	Ⓜ	Coefficient	0	56	2	0
			0							
	MFD radio scan counter wM-Bus radio sent counter	84 A0 B0 20,FD 61,xx xx xx xx	10	C, 32 bits	Ⓜ	CumulationCounter	0	46	0	0
	MFD radio carrier counter wM-Bus radio sent encrypted counter	C4 A0 B0 20,FD 61,xx xx xx xx	10	C, 32 bits	Ⓜ	CumulationCounter	0	46	1	0
MFD radio wakeup counter wM-Bus not used	84 A1 B0 20,FD 61,xx xx xx xx	10	C, 32 bits	Ⓜ	CumulationCounter	0	46	2	0	
MFD radio received frames counter wM-Bus not used	C4 A1 B0 20,FD 61,xx xx xx xx	10	C, 32 bits	Ⓜ	CumulationCounter	0	46	3	0	
MFD radio sent frames counter wM-Bus not used	84 A2 B0 20,FD 61,xx xx xx xx	10	C, 32 bits	Ⓜ	CumulationCounter	0	46	4	0	
		0								
		0								
Device reset counter	02,FD 75,xx xx	5	C, 16 bits	Ⓜ	NumberOfTimesTheMeterWasStopped	0	0	0	0	
		0								
Fabrication Number of cloning source	4C,78,xx xx xx xx	6	A, 32 bits	Ⓧ	FabricationNumber	0	0	1	0	
Detailed errors	03,FF 2C,er er er	6	D, 24 bits	Ⓧ §	ManufacturerErrorFlags	0	0	0	0	
Special flags	01,FF FE 30,xx	5	C, 8 bits	Ⓧ	DeviceSpecificValue48	0	0	0	0	
		0								
More records in next telegram	mo	1		Start of manufacturer specific data	ManufacturerDataBlock					
Check Sum	cs	1								
End	Stop	16	1							

Max frame size: 178 bytes

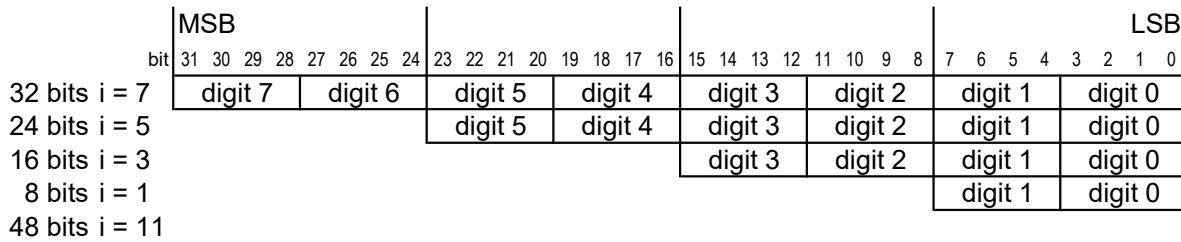
Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state
§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailed description in the Keys sheet.

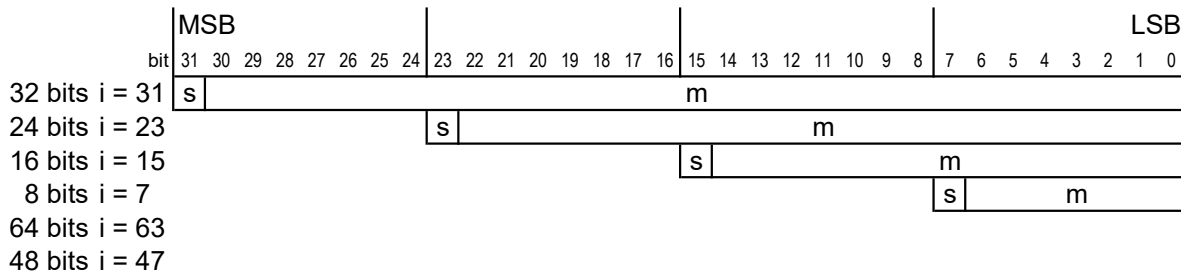
- Ⓧ No special access right is needed to change this value.
- Ⓜ The installer access right (or higher) is needed to change this value.
- Ⓧ The verifier access right (or higher) is needed to change this value.
- Ⓜ The manufacturer access right (or higher) is needed to change this value.
- Ⓧ This value is read only.

Type A Unsigned integer BCD

bit[x] : 0, 1

digit[x] : 0 .. 9

$$\text{digit}[x] = \text{bit}[x*4+3]*2^3 + \text{bit}[x*4+2]*2^2 + \text{bit}[x*4+1]*2^1 + \text{bit}[x*4+0]*2^0$$

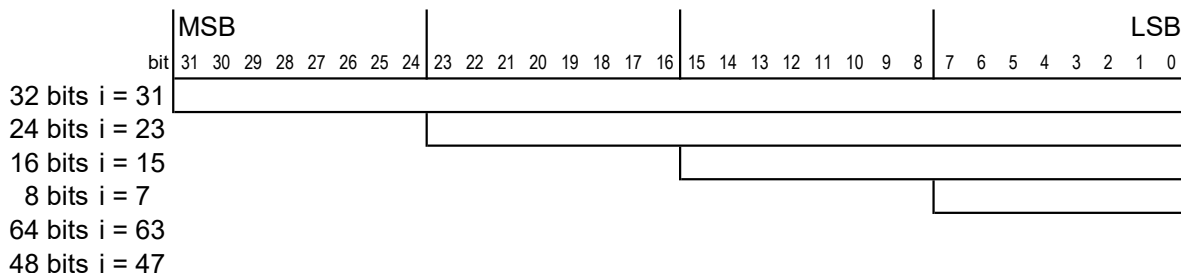
$$\text{number} = \text{digit}[i]*10^i + \text{digit}[i-1]*10^{(i-1)} + \text{digit}[i-2]*10^{(i-2)} + \dots + \text{digit}[0]*10^0$$
range : 0 .. 10⁽ⁱ⁺¹⁾-1**Type B** Binary integer

bit[x] : 0, 1

$$m = \text{bit}[i-1]*2^{(i-1)} + \text{bit}[i-2]*2^{(i-2)} + \dots + \text{bit}[0]*2^0$$

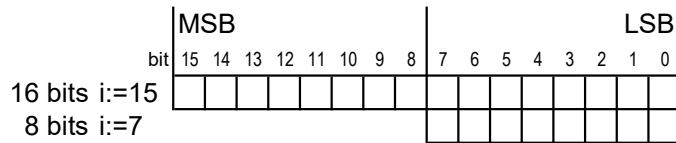
Sign : 0=positive, 1=negative

If Sign(bit[i]) = positive Then number = m

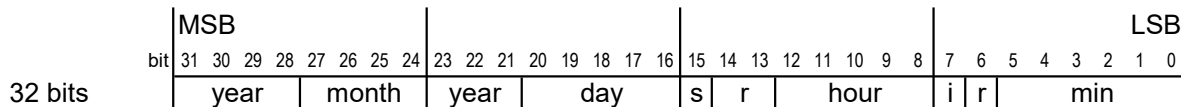
If Sign(bit[i]) = negative Then number = m - 2ⁱrange : -2ⁱ .. +(2ⁱ)-1**Type C** Unsigned integer

bit[x] : 0, 1

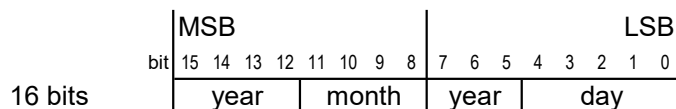
$$\text{number} = \text{bit}[i]*2^i + \text{bit}[i-1]*2^{(i-1)} + \text{bit}[i-2]*2^{(i-2)} + \dots + \text{bit}[0]*2^0$$
range : 0 .. +2⁽ⁱ⁺¹⁾-1

Type D Array of Boolean

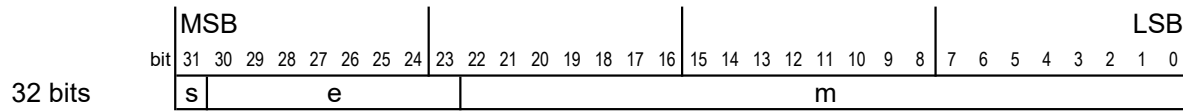
bit[x] : 0, 1
 Boolean : 0=false, 1=true
 Flag[i] = Boolean(bit[i])
 Flag[i-1] = Boolean(bit[i-1])
 ...
 Flag[0] = Boolean(bit[0])

Type F Date and Time

bit[x] : 0, 1
 min : 0 .. 59 min = bit[5]*2⁵ + ... + bit[0]*2⁰
 hour : 0 .. 23 hour = bit[12]*2⁴ + ... + bit[8]*2⁰
 day : 1 .. 31 day = bit[20]*2⁴ + ... + bit[16]*2⁰
 month : 1 .. 12 month = bit[27]*2³ + ... + bit[24]*2⁰
 year : 0 .. 99 year = bit[31]*2⁶ + ... + bit[28]*2³ + bit[23]*2² + ... + bit[21]*2⁰
 s : standard time (bit[15]=0), summer time (bit[15]=1)
 i : valid (bit[7]=0), invalid (bit[7]=1)
 r : reserved (bit[6],bit[13],bit[14] are always 0)

Type G Date

bit[x] : 0, 1
 day : 1 .. 31 day = bit[4]*2⁴ + ... + bit[0]*2⁰
 month : 1 .. 12 month = bit[11]*2³ + ... + bit[8]*2⁰
 year : 0 .. 99 year = bit[15]*2⁶ + ... + bit[12]*2³ + bit[7]*2² + ... + bit[5]*2⁰

Type H Floating point (IEEE STD 754)

bit[x] : 0, 1

$m = \text{bit}[22] \cdot 2^{-1} + \text{bit}[21] \cdot 2^{-2} + \dots + \text{bit}[0] \cdot 2^{-23}$

$e = \text{bit}[30] \cdot 2^7 + \text{bit}[29] \cdot 2^6 + \dots + \text{bit}[23] \cdot 2^0$

$s = -1^{\text{bit}[31]}$

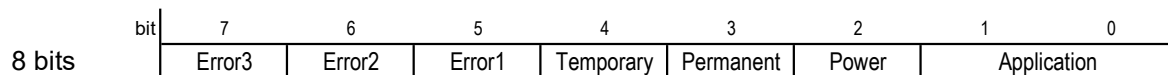
If (e>0) AND (e<255) Then number = $s \cdot 2^{(e-127)} \cdot (1 + m)$

If (e=0) AND (m<>0) Then number = $s \cdot 2^{(e-126)} \cdot m$

If (e=0) AND (m=0) Then number = $s \cdot 0$

If (e=255) AND (m=0) Then number = $s \cdot \text{infinite}$

If (e=255) AND (m<>0) Then number = not a number

Type Ds Status, array of boolean

bit[x] : 0, 1

Application = $\text{bit}[1] \cdot 2^1 + \text{bit}[0] \cdot 2^0$

Application: 0=no error, 1=busy, 2=error, 3=reserved

Power: 1=power low

Permanent: 1=permanent error

Temporary: 1=temporary error

Error1: manufacturer specific

Error2: manufacturer specific

Error3: manufacturer specific