Sontex ▪ Thermal Energy ▪ Flow Metering ▪

M-Bus specification

Compact heatmeter

Supercal 739
Superstatic 749
Superstatic 789

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Firmware: 739 V1.6.0

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Revision:

Issue	Date	Author	Description
28-02-2013	28.02.2013	NU / PB	First version
03-07-2013	03.07.2013	NU / PB	New fields and ready for encryption AES
12-08-2013	12.08.2013	NU / PB	New fields optical period
21-01-2014	21.01.2014	NU / PB	New fields for W-Mbus
17-03-2014	17.03.2014	NU / PB	Fluids parameters (access right)
16-03-2015	16.03.2015	NU / PB	Complete key "fm" for flowmeter 789
09-07-2015	09.07.2015	NU	New bit in parameter activation (bit3) (flotting point values)
02-09-2015	02.09.2015	NU / PB	New bit in parameter activation (bit5..4) (Operating mode) New bit in detailled errors (bit15) Device disabled
03-02-2016	03.02.2016	NU	The PT sensor are now in editable verfier access mode
26-06-2017	26.06.2017	NU	Add comment for application reset with subcode 0x93

	Master		Slave
1	**Normalize** SND_NKE(A=primary address)	->	
		<-	**Acknowledge** CON_SCC
2	**Request for user data** REQ_UD2(C=7Bh, A=primary address)	->	
	If more records in next telegram then continue at step 3	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)
3	**Request for user data** REQ_UD2(C=5Bh, A=primary address)	->	
	If more records in next telegram then continue at step 2	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)

Read data with secondary addressing

	Master		Slave
1	**Normalize** SND_NKE(A=253)	->	
			The slaves don't answer.
2	**Selection of slave** SND_UD(C=73h | 53h, A=253, identification number, manufacturer id, ...)	->	
	You must select only one slave.	<-	**Acknowledge** CON_SCC
3	**Request for user data** REQ_UD2(C=7Bh, A=253)	->	
	If more records in next telegram then continue at step 4	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)
4	**Request for user data** REQ_UD2(C=5Bh, A=253)	->	
	If more records in next telegram then continue at step 3	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)

Change parameters with primary addressing

	Master		Slave
1	**Normalize** SND_NKE(A=primary address)	->	
		<-	**Acknowledge** CON_SCC
2	**Stuctured write** SND_UD(C=73h, A=primary address, any combination of parameters supported by 539)	->	
		<-	**Acknowledge** CON_SCC

3	**Request for user data** REQ_UD2(C=7Bh, A=primary address)	->	
	Check for M-Bus application error in Status field.	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)

Change parameters with secondary addressing

	Master		Slave
1	**Normalize** SND_NKE(A=253)	->	
			The slaves don't answer.
2	**Selection of slave** SND_UD(C=73h | 53h, A=253, identification number, manufacturer id, ...)	->	
		<-	**Acknowledge** CON_SCC
3	**Stuctured write** SND_UD(C=73h, A=253, any combination of parameters supported by 539)	->	
		<-	**Acknowledge** CON_SCC
4	**Request for user data** REQ_UD2(C=7Bh, A=253)	->	
	Check for M-Bus application error in Status field.	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)

Change baudrate with primary addressing

	Master		Slave
1	**Normalize** SND_NKE(A=primary address)	->	
		<-	**Acknowledge** CON_SCC
2	**Set baurate** SND_UD(C=73h, A=primary address, CI=B8h | BBh)	->	
		<-	**Acknowledge** CON_SCC
	From here, you can use the new baudrate		
3	**Request for user data** REQ_UD2(C=7Bh, A=primary address)	->	
	Check for M-Bus application error in Status field. *If you don't have a response, repeat step 3 with the old baudrate.*	<-	**Respond with user data** RSP_UD(rsp_x, more records in next telegram)

Keys

Optional record
All value of keys are in hexadecimal

`xx` Value LSByte first
`yy` Value MSByte first

`ar` Device access rights

`00`	Consumer
`01`	Installer
`02`	Verifier
`03`	Manufacturer

`bd bd` Wire M-Bus baudrate

`2C 01`	300 Bauds
`60 09`	2400 Bauds

`ce` Complementary counter enabled

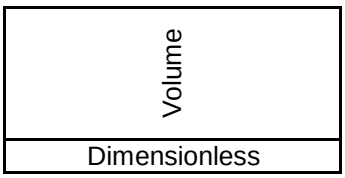
`00`	disabled
`01`	enabled

`cf cf` Complementary counter pulse factor

`93`	0.001 m3/pulse
`94`	0.01 m3/pulse
`95`	0.1 m3/pulse
`96`	1 m3/pulse
`FD BA`	unit/pulse

`co co` Physical unit coding of complementary counter :

`13`	0.001 m3
`14`	0.01 m3
`15`	0.1 m3
`16`	1 m3
`FD 3A`	1 without unit



`cs` The value of Check Sum is calculated from arithmetical sum modulo 256 of each byte of the frame except the fields: Start, Length (if any), Check Sum and Stop.

`ct` Communication module type

`00`	None
`01`	M-Bus
`02`	MFD
`03`	OMS

`cu` Complementary counter unit

`00`	0.001 m3
`01`	0.01 m3
`02`	0.1 m3
`03`	1 m3
`04`	1 without unit

`dt`

`04`	Heat
`0C`	Heat (Volume measured at flow temperature: inlet)
`0D`	Heat / Cooling load meter
`0A`	Cooling (Volume measured at flow temperature: outlet)

0B Cooling (Volume measured at return temperature: inlet)

ee Energy tariff 1
- 00 None
- 01 Cooling

en Physical unit coding of energy :
- 05 0.1 kWh
- 06 1 kWh
- 07 0.01 MWh
- 0E 1 MJ
- 0F 0.01 GJ

er er Detailed errors ***7x9*** ***M-Bus standard***
- bit0 ref1 error AD
- bit1 sensor1 error AD
- bit2 ref2 error AD
- bit3 sensor2 error AD
- bit4 AD timeout error
- bit5 temperature 1 out of range
- bit6 temperature 2 out of range
- bit7 flow in saturation
- bit8 Application error unknow field C
- bit9 Application error unknow field CI
- bit10 Application error unknow record
- bit11 Application error access right
- bit12 Application error record size
- bit13 Application error record value
- bit14 †
- bit15 Device disabled

† Not used.

et Energy meter type
- 00 Heat
- 01 Heat / Cooling
- 02 Cooling

eu Energy unit
- 00 0.1 kWh
- 01 1 kWh
- 02 0.001 MWh
- 03 0.01 MWh
- 04 0.001 GJ
- 05 0.01 GJ

fp Flow meter position
- 00 in cold pipe
- 01 in hot pipe

fm Flow meter model
- 00 qp 0.6, 3/4'', 110mm
- 01 qp 1.0, 3/4'', 110mm
- 02 qp 1.5, 3/4'', 110mm
- 03 qp 1.5, 1'', 130mm
- 04 qp 2.5, 1'', 130mm
- 05 qp 0.6, G2''
- 06 qp 1.5, G2''

07	qp 2.5, G2"
08	qp 0.6, M77
09	qp 1.5, M77
0A	qp 2.5, M77
0B	749 qp 0.6, 3/4", 110mm
0C	749 qp 1.5, 3/4", 110mm
0D	749 qp 1.5, 1", 130mm
0E	749 qp 1.5, 1", 190mm
0F	749 qp 2.5, 1", 130mm
10	749 qp 2.5, 1", 190mm
11	789 qp 0.6, 3/4", 110mm
12	789 qp 1.5, 3/4", 110mm
13	789 qp 1.5, 1", 130mm
14	789 qp 1.5, 1", 190mm
15	789 qp 2.5, 1", 130mm
16	789 qp 2.5, 1", 190mm

`Le` Length of the M-Bus frame. The fields Start, Length, Check Sum and Stop (6 bytes) are not included in the calculation of the Length field. The Length field is repeated twice preceded and followed by the Start field 68h.

`mo` More records in next telegram :

0F	no
1F	yes

`o1 o2 o3` Output totalizers sources

Array of 3 bytes o1 o2 o3,
the byte o1 is the output 1,
the byte o2 is the output 2,
the byte o3 is the ouptut 3,
each output has a source :
00 : None
01: Volume
02: Energy
03: Energy cooling

`ob` Output burst totalizers sources

bit0	"0" = TOT1 delta test energies disable "1" = TOT1 delta test energies enable
bit1	"0" = TOT2 volume disable "1" = TOT2 volume enable

`pp` Parameter activation

bit0	"0" = Module OMS disable "1" = Module OMS enable
bit1	"0" = Encryption AES disable "1" = Encryption AES enable
bit2	"0" = OMS frame "1" = Walk-by frame(s)
bit3	"0" = Instantaneous values in floating "1" = Instantaneous values in integer
bit5..4	Operating mode
00b	Normal
01b	Storage **(only with device unsealed)**
10b	Storage + configurable **(only with device unsealed)**
11b	*Never use in futur*
bit6	*Never use in futur*
bit7	*Never use in futur*

st	Status	***7x9***	***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	†	*Power low*
	bit3	Permanent error	*Permanent error*
	bit4	Temporary error	*Temporary error*
	bit5	Flow error	*Manufacturer specific*
	bit6	Temperature error	*Manufacturer specific*
	bit7	†	
vo	Physical unit coding of volume :		
	13	0.001 m3	
	14	0.01 m3	
vu	Volume unit		
	00	0.001 m3	Not allowed with qp 2.5
	01	0.01 m3	

Normalize SND_NKE (master to slave)

	Field	Frame bytes in hex	Coding	Comment
Start	Start	10		
	Control	40		Normalize, SND_NKE
	Address	xx		
End	Check Sum	3D		
	Stop	16		

Frame size: 5 bytes

Acknowledge CON_SCC (slave to master)

	Field	Frame bytes in hex	Coding	
		E5		Acknowledge

Frame size: 1 bytes

Application reset SND_UD (master to slave)

	Field	Frame bytes in hex (Note 1)	Coding	Comment
Start	Start, Length	68,Le Le,68		
	Control	73|53		Send user data to slave, SND_UD
	Address	xx		
User data	Control Information	50		Application reset
	Subcode	xx	C, 8 bits	Empty, 00h, 01h : rsp_1_rsp_6 80h : rsp_conf_1..rsp_conf_4 91h : rsp_verif (Start Nowa Test) 92h : rsp_verif (Stop Nowa Test) 93h : rsp_verif (Simulate volume) *after sending this command, please wait 5sec before readout the result frame.*
End	Check Sum	cs		
	Stop	16		

Max frame size: 10 bytes

Request for user data REQ_UD2 (master to slave)

	Field	Frame bytes in hex	Coding	
Start	Start	10		
	Control	7B|5B		Request for class 2 data, REQ_UD2
	Address	xx		
End	Check Sum	cs		
	Stop	16		

Frame size: 5 bytes

Set baudrate SND_UD (master to slave)

	Field	Frame bytes in hex	Coding	
Start	Start, Length	68, 03 03, 68		
	Control	73|53		Send user data to slave, SND_UD
	Address	xx		
User Data	Control Information	B8|BB		Set baud rate: B8h: 300; BBh: 2400bit/s
End	Check Sum	cs		
	Stop	16		

Frame size: 9 bytes

Selection of slaves SND_UD (master to slave)

	Field	Frame bytes in hex (Note 1)	Coding	Comment	<MbusRecord> XML attributes: Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	73|53		Send user data to slave, SND_UD						
	Address	FD								
User data	Control Information	52		Selection of slaves						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					<Header>
	Manufacturer ID	xx xx	C, 16 bits		Manufacturer					
	Generation of meter	xx	C, 8 bits		Version					
	Measured media	xx	D, 8 bits		DeviceType					
End	Check Sum	cs								
	Stop	16								

Max 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 detailled description in the Keys sheet.

Stuctured write SND_UD (master to slave)

	Field	Frame bytes in hex (Note 1)	Coding	Comment	<MbusRecord> XML attributes: Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	73|53		Send user data to slave, SND_UD						
	Address	xx								
	Control Information	51		Stuctured write telegram						
	Current date & time	04,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	0	0	
	Enter the installer password	0C,FD 13,xx xx xx xx	A, 32 bits		AccessCodeOperator	0	0	0	0	
	Change the installer password	4C,FD 13,xx xx xx xx	A, 32 bits	Note 2	AccessCodeOperator	0	0	1	0	
	Wire M-Bus primary address	01,7A,xx	C, 8 bits	Note 2	PrimaryAddress	0	0	0	0	
	Wire M-Bus baudrate	02,FD 1C,bd bd	C, 16 bits	Note 2	BaudRate	0	0	0	0	
	Identification number	0C,79,xx xx xx xx	A, 32 bits	Note 2	IdentificationNumber	0	0	0	0	
	Battery use duration	03,22,xx xx xx	B, 24 bits	[h] Note 2	OnTime	0	0	0	0	
	Set day	82 0A,6C,xx xx	G, 16 bits	Note 2	Date	0	0	20	0	
	Complementary counter 1 Identification	8C 40,79,xx xx xx xx	A, 32 bits	Note 2	IdentificationNumber	1	0	0	0	
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 remainder	85 40,FF 02,xx xx xx xx	H, 32 bits	Note 2	VolumeRemainder	1	0	0	0	
	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	1	0	20	0	
	Complementary counter 1 unit	81 40,FF FF 05,cu	C, 8 bits	§ Note 2	AuxiliaryInputUnit	1	0	0	0	

User data	Complementary counter 1 pulse factor	85 40,cf cf 28,xx xx xx xx	H, 32 bits	Note 2	Dimensionless_PerInputPulseOnChannel0 | Volume_PerInputPulseOnChannel0	1	0	0	0	<Header>
	Initialize all monthly values of complementary counter 1	C4 49,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	1	0	19	0	
	Complementary counter 2 Identification	8C 80 40,79,xx xx xx xx	A, 32 bits	Note 2	IdentificationNumber	2	0	0	0	
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 remainder	85 80 40,FF 02,xx xx xx xx	H, 32 bits	Note 2	VolumeRemainder	2	0	0	0	
	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	2	0	20	0	
	Complementary counter 2 unit	81 80 40,FF FF 05,cu	C, 8 bits	§ Note 2	AuxiliaryInputUnit	2	0	0	0	
	Complementary counter 2 pulse factor	85 80 40,cf cf 28,xx xx xx xx	H, 32 bits	Note 2	Dimensionless_PerInputPulseOnChannel0 | Volume_PerInputPulseOnChannel0	2	0	0	0	
	Initialize all monthly values of complementary counter 2	C4 89 40,co co,xx xx xx xx	B, 32 bits	Note 2	Dimensionless | Volume	2	0	19	0	
	Change the AES128 encryption key	0D,FD 19,F0,xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR,128 bits	Note 2	SecurityKey	0	0	0	0	
	State of parameter	01,FD 66,pp	D, 8 bits	Note 2, after we are in "CONSUMER"	StateOfParameterActivation	0	0	0	0	
	Oms initialisation	0D,FD 76,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	Note 2	DataContainerForManufactureSpecificProtocol	0	0	0	0	
End	Check Sum	cs								
	Stop	16								

Max frame size: 216 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 detailled description in the Keys sheet.
2. The installer access right (or higher) is needed to change this value
3. The verifier access right (or higher) is needed to change this value

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits		Energy	0	0	0	0	<Records>
	Energy totalizer heating at set day	84 0A,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	20	0	
	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits		Volume	0	0	0	0	
	Volume totalizer at set day	84 0A,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	20	0	
	Internal version	0B,FD 0F,xx xx xx	6	A, 24 bits		OtherSoftwareVersion	0	0	0	0	
	Hardware version	0A,FD 0D,xx xx	5	A, 16 bits		HardwareVersion	0	0	0	0	
	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	0	0	
	Energy totalizer cooling at set day	84 1A,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	20	0	
	Temperature inlet maximum for cooling	95 10,5B,xx xx xx xx	7	H, 32 bits	[°C]	FlowTemperature	0	1	0	1	
	Complementary counter 1 Identification	8C 40,79,xx xx xx xx	7	A, 32 bits		IdentificationNumber	1	0	0	0	
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	20	0	
	Complementary counter 2 Identification	8C 80 40,79,xx xx xx xx	8	A, 32 bits		IdentificationNumber	2	0	0	0	
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	20	0	
	Energy remainder heating	05,FF 01,xx xx xx xx	7	H, 32 bits	§	EnergyRemainder	0	0	0	0	
	Volume remainder	05,FF 02,xx xx xx xx	7	H, 32 bits	§	VolumeRemainder	0	0	0	0	
	Energy remainder cooling	85 10,FF 01,xx xx xx xx	8	H, 32 bits	§	EnergyRemainder	0	1	0	0	
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits		FabricationNumber	0	0	0	0	
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits		DateAndTime	0	0	0	0	
	Set day	82 0A,6C,xx xx	5	G, 16 bits		Date	0	0	20	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	
	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	
	Device access right	01,FF 2B,ar	4	D, 8 bits	§	DeviceAccessRightLevel	0	0	0	0	
	Battery use duration	03,22,xx xx xx	5	B, 24 bits	[h]	OnTime	0	0	0	0	
	Detailed errors	02,FF 2C,er er	5	D, 16 bits	§	ManufacturerErrorFlags	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: 206 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits		Energy	0	0	0	0	<Records>
	Energy totalizer heating at set day	84 0A,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	20	0	
	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits		Volume	0	0	0	0	
	Volume totalizer at set day	84 0A,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	20	0	
	Internal version	0B,FD 0F,xx xx xx	6	A, 24 bits		OtherSoftwareVersion	0	0	0	0	
	Hardware version	0A,FD 0D,xx xx	5	A, 16 bits		HardwareVersion	0	0	0	0	
	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	0	0	
	Energy totalizer cooling at set day	84 1A,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	20	0	
	Temperature inlet maximum for cooling	95 10,5B,xx xx xx xx	7	H, 32 bits	[°C]	FlowTemperature	0	1	0	1	
	Complementary counter 1 Identification	8C 40,79,xx xx xx xx	7	A, 32 bits		IdentificationNumber	1	0	0	0	
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	20	0	
	Complementary counter 2 Identification	8C 80 40,79,xx xx xx xx	8	A, 32 bits		IdentificationNumber	2	0	0	0	
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	20	0	
	Energy remainder heating	05,FF 01,xx xx xx xx	7	H, 32 bits	§	EnergyRemainder	0	0	0	0	
	Volume remainder	05,FF 02,xx xx xx xx	7	H, 32 bits	§	VolumeRemainder	0	0	0	0	
	Energy remainder cooling	85 10,FF 01,xx xx xx xx	8	H, 32 bits	§	EnergyRemainder	0	1	0	0	
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits		FabricationNumber	0	0	0	0	
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits		DateAndTime	0	0	0	0	
	Set day	82 0A,6C,xx xx	5	G, 16 bits		Date	0	0	20	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	02,3B,xx xx	4	B, 16 bits	[0.001 m3/h]	VolumeFlow	0	0	0	0	
	Power	03,2C,xx xx xx	5	B, 24 bits	[0.01 kW]	Power	0	0	0	0	
	Device access right	01,FF 2B,ar	4	D, 8 bits	§	DeviceAccessRightLevel	0	0	0	0	
	Battery use duration	03,22,xx xx xx	5	B, 24 bits	[h]	OnTime	0	0	0	0	
	Detailed errors	02,FF 2C,er er	5	D, 16 bits	§	ManufacturerErrorFlags	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: 199 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	RF level	01,FD 71,xx	4	B, 8 bits	[dBm]	RfLevel_AdditiveCorrectionConstantFor	0	0	0	0	<Records>
	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits		Energy	0	0	0	0	
	Energy totalizer heating at set day	84 0A,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	20	0	
	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits		Volume	0	0	0	0	
	Volume totalizer at set day	84 0A,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	20	0	
	Internal version	0B,FD 0F,xx xx xx	6	A, 24 bits		OtherSoftwareVersion	0	0	0	0	
	Hardware version	0A,FD 0D,xx xx	5	A, 16 bits		HardwareVersion	0	0	0	0	
	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	0	0	
	Energy totalizer cooling at set day	84 1A,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	20	0	
	Temperature inlet maximum for cooling	95 10,5B,xx xx xx xx	7	H, 32 bits	[°C]	FlowTemperature	0	1	0	1	
	Complementary counter 1 Identification	8C 40,79,xx xx xx xx	7	A, 32 bits		IdentificationNumber	1	0	0	0	
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	20	0	
	Complementary counter 2 Identification	8C 80 40,79,xx xx xx xx	8	A, 32 bits		IdentificationNumber	2	0	0	0	
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	20	0	
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits		FabricationNumber	0	0	0	0	
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits		DateAndTime	0	0	0	0	
	Set day	82 0A,6C,xx xx	5	G, 16 bits		Date	0	0	20	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	
	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	
	Device access rights	01,FF 2B,ar	4	D, 8 bits	§	DeviceAccessRights	0	0	0	0	
	Battery use duration	03,22,xx xx xx	5	B, 24 bits	[h]	OnTime	0	0	0	0	
	Detailed errors	02,FF 2C,er er	5	D, 16 bits	§	ManufacturerErrorFlags	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: 188 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	RF level	01,FD 71,xx	4	B, 8 bits	[dBm]	RfLevel_AdditiveCorrectionConstantFor	0	0	0	0	<Records>
	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits		Energy	0	0	0	0	
	Energy totalizer heating at set day	84 0A,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	20	0	
	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits		Volume	0	0	0	0	
	Volume totalizer at set day	84 0A,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	20	0	
	Internal version	0B,FD 0F,xx xx xx	6	A, 24 bits		OtherSoftwareVersion	0	0	0	0	
	Hardware version	0A,FD 0D,xx xx	5	A, 16 bits		HardwareVersion	0	0	0	0	
	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	0	0	
	Energy totalizer cooling at set day	84 1A,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	20	0	
	Temperature inlet maximum for cooling	95 10,5B,xx xx xx xx	7	H, 32 bits	[°C]	FlowTemperature	0	1	0	1	
	Complementary counter 1 Identification	8C 40,79,xx xx xx xx	7	A, 32 bits		IdentificationNumber	1	0	0	0	
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	20	0	
	Complementary counter 2 Identification	8C 80 40,79,xx xx xx xx	8	A, 32 bits		IdentificationNumber	2	0	0	0	
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	20	0	
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits		FabricationNumber	0	0	0	0	
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits		DateAndTime	0	0	0	0	
	Set day	82 0A,6C,xx xx	5	G, 16 bits		Date	0	0	20	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	02,3B,xx xx	4	B, 16 bits	[0.001 m3/h]	VolumeFlow	0	0	0	0	
	Power	03,2C,xx xx xx	5	B, 24 bits	[0.01 kW]	Power	0	0	0	0	
	Device access rights	01,FF 2B,ar	4	D, 8 bits	§	DeviceAccessRights	0	0	0	0	
	Battery use duration	03,22,xx xx xx	5	B, 24 bits	[h]	OnTime	0	0	0	0	
	Detailed errors	02,FF 2C,er er	5	D, 16 bits	§	ManufacturerErrorFlags	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: 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Energy stored at month - 1	44,en,xx xx xx xx	6	B, 32 bits		Energy	0	0	1	0	<Records>
	Energy stored at month - 2	84 01,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	2	0	
	Energy stored at month - 3	C4 01,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	3	0	
	Energy stored at month - 4	84 02,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	4	0	
	Energy stored at month - 5	C4 02,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	5	0	
	Energy stored at month - 6	84 03,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	6	0	
	Energy stored at month - 7	C4 03,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	7	0	
	Energy stored at month - 8	84 04,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	8	0	
	Energy stored at month - 9	C4 04,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	9	0	
	Energy stored at month - 10	84 05,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	10	0	
	Energy stored at month - 11	C4 05,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	11	0	
	Energy stored at month - 12	84 06,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	12	0	
	Energy stored at month - 13	C4 06,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	13	0	
	Energy stored at month - 14	84 07,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	14	0	
	Energy stored at month - 15	C4 07,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	15	0	
	Energy stored at month - 16	84 08,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	16	0	
	Energy stored at month - 17	C4 08,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	17	0	
	Energy stored at month - 18	84 09,en,xx xx xx xx	7	B, 32 bits		Energy	0	0	18	0	
	Complementary counter 1 pulse factor	85 40,cf cf 28,xx xx xx xx	9	H, 32 bits		Dimensionless_PerInputPulseOnChannel0 | Volume_PerInputPulseOnChannel0	1	0	0	0	
	Complementary counter 2 pulse factor	85 80 40,cf cf 28,xx xx xx xx	10	H, 32 bits		Dimensionless_PerInputPulseOnChannel0 | Volume_PerInputPulseOnChannel0	2	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: 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 detailled description in the Keys sheet.

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Volume totalizer stored at month - 1	44,vo,xx xx xx xx	6	B, 32 bits		Volume	0	0	1	0	<Records>
	Volume totalizer stored at month - 2	84 01,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	2	0	
	Volume totalizer stored at month - 3	C4 01,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	3	0	
	Volume totalizer stored at month - 4	84 02,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	4	0	
	Volume totalizer stored at month - 5	C4 02,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	5	0	
	Volume totalizer stored at month - 6	84 03,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	6	0	
	Volume totalizer stored at month - 7	C4 03,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	7	0	
	Volume totalizer stored at month - 8	84 04,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	8	0	
	Volume totalizer stored at month - 9	C4 04,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	9	0	
	Volume totalizer stored at month - 10	84 05,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	10	0	
	Volume totalizer stored at month - 11	C4 05,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	11	0	
	Volume totalizer stored at month - 12	84 06,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	12	0	
	Volume totalizer stored at month - 13	C4 06,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	13	0	
	Volume totalizer stored at month - 14	84 07,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	14	0	
	Volume totalizer stored at month - 15	C4 07,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	15	0	
	Volume totalizer stored at month - 16	84 08,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	16	0	
	Volume totalizer stored at month - 17	C4 08,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	17	0	
	Volume totalizer stored at month - 18	84 09,vo,xx xx xx xx	7	B, 32 bits		Volume	0	0	18	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: 147 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 detailled description in the Keys sheet.

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Energy totalizer (cooling) stored at month - 1	C4 10,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	1	0	<Records>
	Energy totalizer (cooling) stored at month - 2	84 11,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	2	0	
	Energy totalizer (cooling) stored at month - 3	C4 11,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	3	0	
	Energy totalizer (cooling) stored at month - 4	84 12,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	4	0	
	Energy totalizer (cooling) stored at month - 5	C4 12,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	5	0	
	Energy totalizer (cooling) stored at month - 6	84 13,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	6	0	
	Energy totalizer (cooling) stored at month - 7	C4 13,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	7	0	
	Energy totalizer (cooling) stored at month - 8	84 14,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	8	0	
	Energy totalizer (cooling) stored at month - 9	C4 14,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	9	0	
	Energy totalizer (cooling) stored at month - 10	84 15,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	10	0	
	Energy totalizer (cooling) stored at month - 11	C4 15,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	11	0	
	Energy totalizer (cooling) stored at month - 12	84 16,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	12	0	
	Energy totalizer (cooling) stored at month - 13	C4 16,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	13	0	
	Energy totalizer (cooling) stored at month - 14	84 17,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	14	0	
	Energy totalizer (cooling) stored at month - 15	C4 17,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	15	0	
	Energy totalizer (cooling) stored at month - 16	84 18,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	16	0	
	Energy totalizer (cooling) stored at month - 17	C4 18,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	17	0	
	Energy totalizer (cooling) stored at month - 18	84 19,en,xx xx xx xx	7	B, 32 bits		Energy	0	1	18	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: 148 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 detailled description in the Keys sheet.

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Complementary counter 1 totalizer stored at month - 1	C4 40,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	1	0	<Records>
	Complementary counter 1 totalizer stored at month - 2	84 41,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	2	0	
	Complementary counter 1 totalizer stored at month - 3	C4 41,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	3	0	
	Complementary counter 1 totalizer stored at month - 4	84 42,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	4	0	
	Complementary counter 1 totalizer stored at month - 5	C4 42,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	5	0	
	Complementary counter 1 totalizer stored at month - 6	84 43,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	6	0	
	Complementary counter 1 totalizer stored at month - 7	C4 43,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	7	0	
	Complementary counter 1 totalizer stored at month - 8	84 44,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	8	0	
	Complementary counter 1 totalizer stored at month - 9	C4 44,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	9	0	
	Complementary counter 1 totalizer stored at month - 10	84 45,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	10	0	
	Complementary counter 1 totalizer stored at month - 11	C4 45,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	11	0	
	Complementary counter 1 totalizer stored at month - 12	84 46,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	12	0	
	Complementary counter 1 totalizer stored at month - 13	C4 46,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	13	0	
	Complementary counter 1 totalizer stored at month - 14	84 47,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	14	0	
	Complementary counter 1 totalizer stored at month - 15	C4 47,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	15	0	
	Complementary counter 1 totalizer stored at month - 16	84 48,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	16	0	
	Complementary counter 1 totalizer stored at month - 17	C4 48,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	17	0	
	Complementary counter 1 totalizer stored at month - 18	84 49,co co,xx xx xx xx	8	B, 32 bits		Dimensionless | Volume	1	0	18	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: 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Complementary counter 2 totalizer stored at month - 1	C4 80 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	1	0	<Records>
	Complementary counter 2 totalizer stored at month - 2	84 81 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	2	0	
	Complementary counter 2 totalizer stored at month - 3	C4 81 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	3	0	
	Complementary counter 2 totalizer stored at month - 4	84 82 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	4	0	
	Complementary counter 2 totalizer stored at month - 5	C4 82 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	5	0	
	Complementary counter 2 totalizer stored at month - 6	84 83 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	6	0	
	Complementary counter 2 totalizer stored at month - 7	C4 83 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	7	0	
	Complementary counter 2 totalizer stored at month - 8	84 84 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	8	0	
	Complementary counter 2 totalizer stored at month - 9	C4 84 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	9	0	
	Complementary counter 2 totalizer stored at month - 10	84 85 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	10	0	
	Complementary counter 2 totalizer stored at month - 11	C4 85 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	11	0	
	Complementary counter 2 totalizer stored at month - 12	84 86 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	12	0	
	Complementary counter 2 totalizer stored at month - 13	C4 86 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	13	0	
	Complementary counter 2 totalizer stored at month - 14	84 87 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	14	0	
	Complementary counter 2 totalizer stored at month - 15	C4 87 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	15	0	
	Complementary counter 2 totalizer stored at month - 16	84 88 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	16	0	
	Complementary counter 2 totalizer stored at month - 17	C4 88 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	17	0	
	Complementary counter 2 totalizer stored at month - 18	84 89 40,co co,xx xx xx xx	9	B, 32 bits		Dimensionless | Volume	2	0	18	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: 184 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

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

	Field	Frame bytes in hex (Note 1)	Bytes	Coding	Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
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	"SON"	Manufacturer					
	Version of meter	19	1	C, 8 bits	25	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		Configuration					
	Fabrication Number	0C,78,xx xx xx xx	6	A, 32 bits		FabricationNumber	0	0	0	0	<Records>
	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	
	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	
	Energy totalizer heating test	84 C0 40,en,xx xx xx xx	8	B, 32 bits		Energy	3	0	0	0	
	Energy remainder heating test	85 C0 40,FF 01,xx xx xx xx	9	H, 32 bits	§ Ж	EnergyRemainder	3	0	0	0	
	Volume totalizer test	84 C0 40,vo,xx xx xx xx	8	B, 32 bits		Volume	3	0	0	0	
	Volume remainder test	85 C0 40,FF 02,xx xx xx xx	9	H, 32 bits	§ Ж	VolumeRemainder	3	0	0	0	
	Energy totalizer cooling test	84 D0 40,en,xx xx xx xx	8	B, 32 bits		Energy	3	1	0	0	
	Energy remainder cooling test	85 D0 40,FF 01,xx xx xx xx	9	H, 32 bits	§ Ж	EnergyRemainder	3	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: 103 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 detailled description in the Keys sheet.
2. Depending on the device configuration the kind of some values can be different. Therefore the XML attribute name can be one of the name separated by "|".

Ж. This remainder value must be added to the totalizer value before apply vif unit resolution

Send no reply SND-NR (wM-BUS), Variable structure response (master to other)

							<MbusRecord> XML attributes					
	Field	Frame bytes in hex (Note 1)	Bytes	Coding		Comment	Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
DLL	Length	Le	1									
DLL	C Field	44	1			SND-NR						
DLL	Manufacturer Code	EE 4D	2	C, 16 bits		"SON"						
DLL	Serial number	xx xx xx xx	4	A, 32 bits								
DLL	Version of meter	19	1	C, 16 bits		25	Manufacturer					
DLL	Device type	dt	1	D, 8 bits			DeviceType					
APL	CI field	7A	1	Ds, 8 bits		Variable structure response (short header = 4 bytes)	Status					
APL	Access number	xx	1	C, 8 bits			AccessNumber					
APL	Status	st	1	Ds, 8 bits			Status					
APL	Configuration	00 00	2	C, 16 bits			Configuration					
APL		2F 2F	2		🔒		Encryption verification					
APL	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits	🔒		DateAndTime	0	0	0	0	
APL	Set day	82 0A,6C,xx xx	5	G, 16 bits	🔒		Date	0	0	20	0	
APL	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits	🔒		Energy	0	0	0	0	
APL	Energy totalizer heating at set day	84 0A,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	20	0	
APL	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits	🔒		Volume	0	0	0	0	
APL	Volume totalizer at set day	84 0A,vo,xx xx xx xx	7	B, 32 bits	🔒		Volume	0	0	20	0	
APL	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	0	0	
APL	Energy totalizer cooling at set day	84 1A,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	20	0	
APL	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	0	0	
APL	Complementary counter 1 totalizer at set day	84 4A,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	20	0	
APL	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	0	0	
APL	Complementary counter 2 totalizer at set day	84 8A 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	20	0	
APL	High temperature	02,59,xx xx	4	B, 16 bits	🔒	[0.01°C]	FlowTemperature	0	0	0	0	
APL	Low temperature	02,5D,xx xx	4	B, 16 bits	🔒	[0.01°C]	ReturnTemperature	0	0	0	0	
APL	Flow	02,3B,xx xx	4	B, 16 bits	🔒	[0.001 m3/h]	VolumeFlow	0	0	0	0	
APL	Power	03,2C,xx xx xx	5	B, 24 bits	🔒	[0.01 kW]	Power	0	0	0	0	
APL		2F 2F 2F 2F 2F 2F 2F 2F	8		🔒		AES fill					
APL												
APL												

Max frame size: 127 bytes

Send no reply SND-NR (wM-BUS), Variable structure response (master to other)

	Field	Frame bytes in hex (Note 1)	Bytes	Coding		Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
DLL	Length	Le	1									
	C Field	44	1			SND-NR						
	Manufacturer Code	EE 4D	2	C, 16 bits		"SON"						
	Serial number	xx xx xx xx	4	A, 32 bits								
	Version of meter	19	1	C, 16 bits		25	Manufacturer					
	Device type	dt	1	D, 8 bits			DeviceType					
APL	CI field	7A	1	Ds, 8 bits		Variable structure response (short header = 4 bytes)	Status					
	Access number	xx	1	C, 8 bits			AccessNumber					
	Status	st	1	Ds, 8 bits			Status					
	Configuration	00 00	2	C, 16 bits			Configuration					
		2F 2F	2		🔒		Encryption verification					
	Current date & time	04,6D,xx xx xx xx	6	F, 32 bits	🔒		DateAndTime	0	0	0	0	
	Energy totalizer heating	04,en,xx xx xx xx	6	B, 32 bits	🔒		Energy	0	0	0	0	
	Volume totalizer	04,vo,xx xx xx xx	6	B, 32 bits	🔒		Volume	0	0	0	0	
	Energy stored at month - 1	44,en,xx xx xx xx	6	B, 32 bits	🔒		Energy	0	0	1	0	
	Energy stored at month - 2	84 01,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	2	0	
	Energy stored at month - 3	C4 01,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	3	0	
	Energy stored at month - 4	84 02,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	4	0	
	Energy stored at month - 5	C4 02,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	5	0	
	Energy stored at month - 6	84 03,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	6	0	
	Energy stored at month - 7	C4 03,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	7	0	
	Energy stored at month - 8	84 04,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	8	0	
	Energy stored at month - 9	C4 04,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	9	0	
	Energy stored at month - 10	84 05,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	10	0	
	Energy stored at month - 11	C4 05,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	11	0	
	Energy stored at month - 12	84 06,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	12	0	
	Energy stored at month - 13	C4 06,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	13	0	
	Energy stored at month - 14	84 07,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	14	0	
	Energy stored at month - 15	C4 07,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	15	0	
	Energy stored at month - 16	84 08,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	16	0	
	Energy stored at month - 17	C4 08,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	17	0	
	Energy stored at month - 18	84 09,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	0	18	0	
		2F 2F 2F 2F 2F 2F 2F 2F 2F 2F	15		🔒		AES fill					

Max frame size: 175 bytes

Send no reply SND-NR (wM-BUS), Variable structure response (master to other)

	Field	Frame bytes in hex (Note 1)	Bytes	Coding		Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
DLL	Length	Le	1									
	C Field	44	1			SND-NR						
	Manufacturer Code	EE 4D	2	C, 16 bits		"SON"						
	Serial number	xx xx xx xx	4	A, 32 bits								
	Version of meter	19	1	C, 16 bits		25	Manufacturer					
	Device type	dt	1	D, 8 bits			DeviceType					
APL	CI field	7A	1	Ds, 8 bits		Variable structure response (short header = 4 bytes)	Status					
	Access number	xx	1	C, 8 bits			AccessNumber					
	Status	st	1	Ds, 8 bits			Status					
	Configuration	00 00	2	C, 16 bits			Configuration					
		2F 2F	2		🔒		Encryption verification					
	Energy totalizer cooling	84 10,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	0	0	
	Energy totalizer (cooling) stored at month - 1	C4 10,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	1	0	
	Energy totalizer (cooling) stored at month - 2	84 11,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	2	0	
	Energy totalizer (cooling) stored at month - 3	C4 11,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	3	0	
	Energy totalizer (cooling) stored at month - 4	84 12,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	4	0	
	Energy totalizer (cooling) stored at month - 5	C4 12,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	5	0	
	Energy totalizer (cooling) stored at month - 6	84 13,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	6	0	
	Energy totalizer (cooling) stored at month - 7	C4 13,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	7	0	
	Energy totalizer (cooling) stored at month - 8	84 14,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	8	0	
	Energy totalizer (cooling) stored at month - 9	C4 14,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	9	0	
	Energy totalizer (cooling) stored at month - 10	84 15,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	10	0	
	Energy totalizer (cooling) stored at month - 11	C4 15,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	11	0	
	Energy totalizer (cooling) stored at month - 12	84 16,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	12	0	
	Energy totalizer (cooling) stored at month - 13	C4 16,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	13	0	
	Energy totalizer (cooling) stored at month - 14	84 17,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	14	0	
	Energy totalizer (cooling) stored at month - 15	C4 17,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	15	0	
	Energy totalizer (cooling) stored at month - 16	84 18,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	16	0	
	Energy totalizer (cooling) stored at month - 17	C4 18,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	17	0	
	Energy totalizer (cooling) stored at month - 18	84 19,en,xx xx xx xx	7	B, 32 bits	🔒		Energy	0	1	18	0	
		2F 2F 2F 2F 2F 2F 2F 2F 2F	9		🔒		AES fill					

Max frame size: 159 bytes

Send no reply SND-NR (wM-BUS), Variable structure response (master to other)

	Field	Frame bytes in hex (Note 1)	Bytes	Coding		Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
DLL	Length	Le	1									
	C Field	44	1			SND-NR						
	Manufacturer Code	EE 4D	2	C, 16 bits		"SON"						
	Serial number	xx xx xx xx	4	A, 32 bits								
	Version of meter	19	1	C, 16 bits		25	Manufacturer					
	Device type	dt	1	D, 8 bits			DeviceType					
APL	CI field	7A	1	Ds, 8 bits		Variable structure response (short header = 4 bytes)	Status					
	Access number	xx	1	C, 8 bits			AccessNumber					
	Status	st	1	Ds, 8 bits			Status					
	Configuration	00 00	2	C, 16 bits			Configuration					
		2F 2F	2		🔒		Encryption verification					
	Complementary counter 1 totalizer	84 40,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	0	0	
	Complementary counter 1 totalizer stored at month - 1	C4 40,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	1	0	
	Complementary counter 1 totalizer stored at month - 2	84 41,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	2	0	
	Complementary counter 1 totalizer stored at month - 3	C4 41,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	3	0	
	Complementary counter 1 totalizer stored at month - 4	84 42,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	4	0	
	Complementary counter 1 totalizer stored at month - 5	C4 42,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	5	0	
	Complementary counter 1 totalizer stored at month - 6	84 43,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	6	0	
	Complementary counter 1 totalizer stored at month - 7	C4 43,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	7	0	
	Complementary counter 1 totalizer stored at month - 8	84 44,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	8	0	
	Complementary counter 1 totalizer stored at month - 9	C4 44,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	9	0	
	Complementary counter 1 totalizer stored at month - 10	84 45,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	10	0	
	Complementary counter 1 totalizer stored at month - 11	C4 45,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	11	0	
	Complementary counter 1 totalizer stored at month - 12	84 46,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	12	0	
	Complementary counter 1 totalizer stored at month - 13	C4 46,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	13	0	
	Complementary counter 1 totalizer stored at month - 14	84 47,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	14	0	
	Complementary counter 1 totalizer stored at month - 15	C4 47,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	15	0	
	Complementary counter 1 totalizer stored at month - 16	84 48,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	16	0	
	Complementary counter 1 totalizer stored at month - 17	C4 48,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	17	0	
	Complementary counter 1 totalizer stored at month - 18	84 49,co co,xx xx xx xx	8	B, 32 bits	🔒		Dimensionless | Volume	1	0	18	0	
		2F 2F 2F 2F 2F 2F	6		🔒		AES fill					

Max frame size: 175 bytes

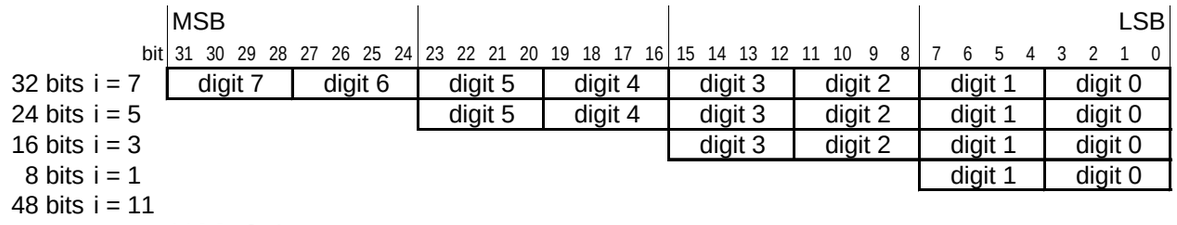
Send no reply SND-NR (wM-BUS), Variable structure response (master to other)

	Field	Frame bytes in hex (Note 1)	Bytes	Coding		Comment	<MbusRecord> XML attributes: Name (Note2)	SubUnit	Tariff	Storage	Function‡	Parent tag
DLL	Length	Le	1									
	C Field	44	1			SND-NR						
	Manufacturer Code	EE 4D	2	C, 16 bits		"SON"						
	Serial number	xx xx xx xx	4	A, 32 bits								
	Version of meter	19	1	C, 16 bits		25	Manufacturer					
	Device type	dt	1	D, 8 bits			DeviceType					
APL	CI field	7A	1	Ds, 8 bits		Variable structure response (short header = 4 bytes)	Status					
	Access number	xx	1	C, 8 bits			AccessNumber					
	Status	st	1	Ds, 8 bits			Status					
	Configuration	00 00	2	C, 16 bits			Configuration					
		2F 2F	2		🔒		Encryption verification					
	Complementary counter 2 totalizer	84 80 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	0	0	
	Complementary counter 2 totalizer stored at month - 1	C4 80 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	1	0	
	Complementary counter 2 totalizer stored at month - 2	84 81 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	2	0	
	Complementary counter 2 totalizer stored at month - 3	C4 81 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	3	0	
	Complementary counter 2 totalizer stored at month - 4	84 82 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	4	0	
	Complementary counter 2 totalizer stored at month - 5	C4 82 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	5	0	
	Complementary counter 2 totalizer stored at month - 6	84 83 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	6	0	
	Complementary counter 2 totalizer stored at month - 7	C4 83 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	7	0	
	Complementary counter 2 totalizer stored at month - 8	84 84 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	8	0	
	Complementary counter 2 totalizer stored at month - 9	C4 84 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	9	0	
	Complementary counter 2 totalizer stored at month - 10	84 85 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	10	0	
	Complementary counter 2 totalizer stored at month - 11	C4 85 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	11	0	
	Complementary counter 2 totalizer stored at month - 12	84 86 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	12	0	
	Complementary counter 2 totalizer stored at month - 13	C4 86 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	13	0	
	Complementary counter 2 totalizer stored at month - 14	84 87 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	14	0	
	Complementary counter 2 totalizer stored at month - 15	C4 87 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	15	0	
	Complementary counter 2 totalizer stored at month - 16	84 88 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	16	0	
	Complementary counter 2 totalizer stored at month - 17	C4 88 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	17	0	
	Complementary counter 2 totalizer stored at month - 18	84 89 40,co co,xx xx xx xx	9	B, 32 bits	🔒		Dimensionless | Volume	2	0	18	0	
		2F 2F 2F	3		🔒		AES fill					

Max frame size: 191 bytes

Type A

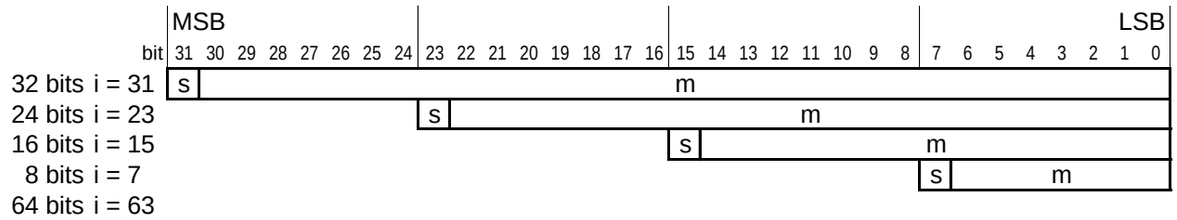
Unsigned integer BCD



bit[x] : 0, 1
digit[x] : 0 .. 9
digit[x] = bit[x*4+3]*2^3 + bit[x*4+2]*2^2 + bit[x*4+1]*2^1 + bit[x*4+0]*2^0
number = digit[i]*10^i + digit[i-1]*10^(i-1) + digit[i-2]*10^(i-2) + ... + digit[0]*10^0
range : 0 .. 10^(i+1)-1

Type B

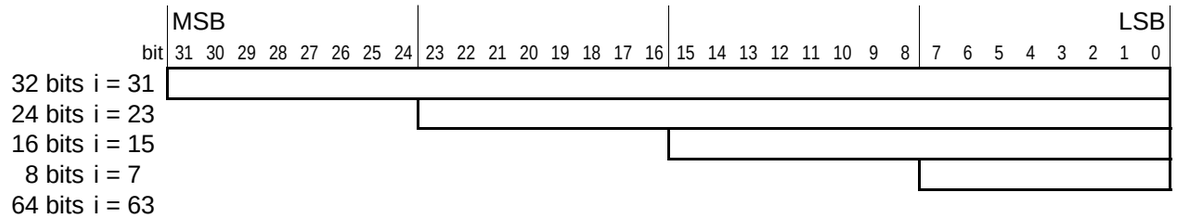
Binary integer



bit[x] : 0, 1
m = bit[i-1]*2^(i-1) + bit[i-2]*2^(i-2) + ... + 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 - 2^i
range : -2^i .. +(2^i)-1

Type C

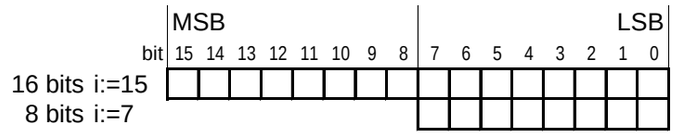
Unsigned integer



bit[x] : 0, 1
number = bit[i]*2^i + bit[i-1]*2^(i-1) + bit[i-2]*2^(i-2) + ... + bit[0]*2^0
range : 0 .. +2^(i+1)-1

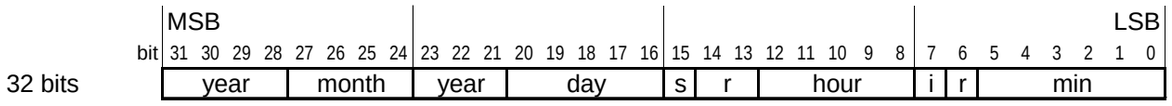
Type D

Array of Boolean



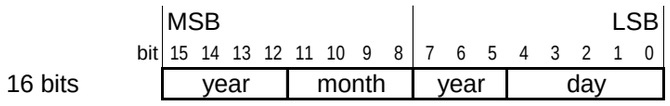
bit[x] : 0, 1
Boolean : 0=false, 1=true
Flag[i] = Boolean(bit[i])
Flag[i-1] = Boolean(bit[i-1])
...
Flag[0] = Boolean(bit[0])

Type F Date and Time



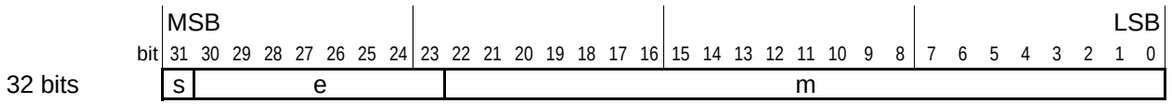
bit[x] : 0, 1
min : 0 .. 59 min = bit[5]*2^5 + ... + bit[0]*2^0
hour : 0 .. 23 hour = bit[12]*2^4 + ... + bit[8]*2^0
day : 1 .. 31 day = bit[20]*2^4 + ... + bit[16]*2^0
month : 1 .. 12 month = bit[27]*2^3 + ... + bit[24]*2^0
year : 0 .. 99 year = bit[31]*2^6 + ... + bit[28]*2^3 + bit[23]*2^2 + ... + bit[21]*2^0
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]*2^4 + ... + bit[0]*2^0
month : 1 .. 12 month = bit[11]*2^3 + ... + bit[8]*2^0
year : 0 .. 99 year = bit[15]*2^6 + ... + bit[12]*2^3 + bit[7]*2^2 + ... + bit[5]*2^0

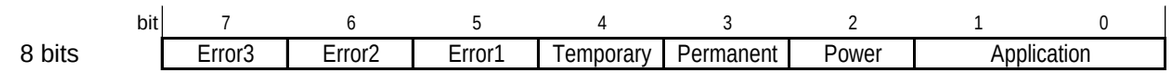
Type H Floating point (IEEE STD 754)



bit[x] : 0, 1
m = bit[22]*2^-1 + bit[21]*2^-2 + ... + bit[0]*2^-23
e = bit[30]*2^7 + bit[29]*2^6 + ... + bit[23]*2^0
s = -1^bit[31]

If (e>0) AND (e<255) Then number = s * 2^(e-127) * (1 + m)
If (e=0) AND (m<>0) Then number = s * 2^(e-126) * m
If (e=0) AND (m=0) Then number = s * 0
If (e=255) AND (m=0) Then number = s * infinite
If (e=255) AND (m<>0) Then number = not a number

Type Ds Status, array of boolean



bit[x] : 0, 1
Application = bit[1]*2^1 + bit[0]*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 : 1=flow measurement error (specific Sontex 739)
Error2 : 1=temperature measurement error (specific Sontex 739)