

## M-bus communication protocol for EMS-96 series

### Setting M bus parameters and Readout data

See the instrument manual IM1200 section COMMUNICATION M bus (chapter SETTING and READOUT DATA) for all information about how setting the communication parameters and the readout data format.

### Initializing the M-BUS module (SND\_NKE)

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start	0x10	Start character
01	1	C Field	0x40	SND_UD2
02	1	A Field	XX	Primary address
03	1	Check Sum	XX	Check Sum byte
04	1	Stop	0x16	Stop byte

### Setting the baud rate with primary addressing

The acknowledge character (ACK = 0xE5) is sent by the MBUS device at the old baud rate.

It possible to set the new baud rate simultaneously on all MBUS modules on the network with value 255 (0xFF) in the primary address field.

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x03	---
02	1	L field repetition	0x03	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	XX	Primary Address
06	1	CI Field	XX	0xB8: Set baud rate to 300 kbit/s 0xB9: Set baud rate to 600 kbit/s 0xBA: Set baud rate to 1200 kbit/s 0xBB: Set baud rate to 2400 kbit/s [default] 0xBC: Set baud rate to 4800 kbit/s 0xBD: Set baud rate to 9600 kbit/s 0xBE: Set baud rate to 19200 kbit/s 0xBF: Set baud rate to 38400 kbit/s
07	1	Check Sum	XX	Check Sum byte
08	1	Stop	0x16	Stop byte

### Setting the baud rate with secondary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x0B	---
02	1	L field repetition	0x0B	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	0xFD	FD = secondary address
06	1	CI Field	XX	0xB8: Set baud rate to 300 kbit/s 0xB9: Set baud rate to 600 kbit/s 0xBA: Set baud rate to 1200 kbit/s 0xBB: Set baud rate to 2400 kbit/s 0xBC: Set baud rate to 4800 kbit/s 0xBD: Set baud rate to 9600 kbit/s 0xBE: Set baud rate to 19200 kbit/s 0xBF: Set baud rate to 38400 kbit/s
07	1	Secondary address	XX	Unique for each device
08	1	Secondary address	XX	Unique for each device
09	1	Secondary address	XX	Unique for each device
10	1	Secondary address	XX	Unique for each device
11	1	Manufacturer code	0x00	---
12	1	Manufacturer code	0x00	---
13	1	Device version	XX	---
14	1	Medium	0x02	Electricity
15	1	Check Sum	XX	Check Sum byte
16	1	Stop	0x16	Stop byte

### Setting primary address with primary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x06	---
02	1	L field repetition	0x06	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	XX	Primary Address
06	1	CI Field	0x51	---
07	1	DIF	0x01	8 Bit Integer
08	1	VIF	0x7A	Set Primary address
09	1	New Primary address	XX	---
10	1	Check Sum	XX	Check Sum byte
11	1	Stop	0x16	Stop byte

### Setting primary address with secondary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x0E	---
02	1	L field repetition	0x0E	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	0xFD	Primary Address = 0xFD
06	1	Secondary address	XX	Unique for each device
07	1	Secondary address	XX	Unique for each device
08	1	Secondary address	XX	Unique for each device
09	1	Secondary address	XX	Unique for each device
10	1	Manufacturer code	0x00	---
11	1	Manufacturer code	0x00	---
12	1	Device version	XX	---
13	1	Medium	0x02	Electricity
14	1	DIF	0x01	8 Bit Integer
15	1	VIF	0x7A	Set Primary address
16	1	New Primary address	XX	---
17	1	Check Sum	XX	Check Sum byte
18	1	Stop	0x16	Stop byte

### Resetting the M-BUS module access counter with primary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x03	---
02	1	L field repetition	0x03	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	XX	Primary Address
06	1	CI Field	0x50	Initalize M-BUS module access counter (set to 0)
07	1	Check Sum	XX	Check Sum byte
08	1	Stop	0x16	Stop byte

### Resetting the M-BUS module access counter with secondary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x0B	---
02	1	L field repetition	0x0B	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	0xFD	Address
06	1	CI Field	0x50	Initalize M-BUS module access counter (set to 0)
07	1	Secondary address	XX	Unique for each device
08	1	Secondary address	XX	Unique for each device
09	1	Secondary address	XX	Unique for each device
10	1	Secondary address	XX	Unique for each device
11	1	Manufacturer code	0x00	---
12	1	Manufacturer code	0x00	---
13	1	Device version	XX	---
14	1	Medium	0x02	Electricity
15	1	Check Sum	XX	Check Sum byte
16	1	Stop	0x16	Stop byte

### Setting to default the readout parameter with primary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x04	---
02	1	L field repetition	0x04	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	XX	Primary Address
06	1	CI Field	0x51	New data for M-BUS module
07	1	DIF	0x7F	Setting default
08	1	Check Sum	XX	Check Sum byte
09	1	Stop	0x16	Stop byte

### Setting to default the readout parameter with secondary addressing

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	0x0C	---
02	1	L field repetition	0x0C	---
03	1	Start character	0x68	---
04	1	C Field	0x73	SND_UD
05	1	A Field	0xFD	---
06	1	CI Field	0x51	New data for M-BUS module
07	1	Secondary address	XX	Unique for each device
08	1	Secondary address	XX	Unique for each device
09	1	Secondary address	XX	Unique for each device
10	1	Secondary address	XX	Unique for each device
11	1	Manufacturer code	0x00	---
12	1	Manufacturer code	0x00	---
13	1	Device version	XX	---
14	1	Medium	0x02	Electricity
15	1	DIF	0x7F	Setting default
16	1	Check Sum	XX	Check Sum byte
17	1	Stop	0x16	Stop byte

### Transferring readout data (REQ\_UD2)

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x10	Start byte – Short Frame
01	1	C Field	0x7B	REQ_UD2
02	1	A Field	XX	Device Primary address
03	1	Check Sum	XX	Check Sum byte
04	1	Stop	0x16	Stop byte

### Header Read-out data frame

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
00	1	Start character	0x68	---
01	1	L field	XX	---
02	1	L field repetition	XX	---
03	1	Start character	0x68	---
04	1	C Field	0x08	RSP_UD
05	1	A Field	XX	Primary address
06	1	CI Field	0x72	LSB is transmitted in first byte
07	4	Secondary address	XXXXXXXX	8 BCD digits – unique for each device
11	2	Manufacturer code	XXXX	---
13	1	Device version	XX	---
14	1	Measure Medium	02	Electricity
15	1	Access number	XX	Incremented by 1 for any answer frame
16	1	Status	XX	---
17	2	Signature	0x0000	---

Group (value to be insert)	
0	Any measure in readout data
1	Instantaneous
2	Energy
3	Energy – TB1
4	Energy – TB2
5	Energy – TB3
6	Energy – TB4
7	Energy – TB5
8	Energy – TB6
9	Energy – TB7
10	Energy – TB8
11	Energy – TB9
12	Energy – TB10
13	Energy – TB11
14	Energy – TB12
15	Energy – TB13
16	Energy – TB14
17	Energy – TB15
18	Energy – TB16
19	Average

Instantaneous Group Measure (value to be insert)			
0	Any measure in readout data	26	ACTIVE POWER L <sub>2</sub>
1	SYSTEM VOLTAGE	27	ACTIVE POWER L <sub>3</sub>
2	PHASE VOLTAGE L <sub>1-N</sub>	28	SYSTEM REACTIVE POWER
3	PHASE VOLTAGE L <sub>2-N</sub>	29	REACTIVE POWER L <sub>1</sub>
4	PHASE VOLTAGE L <sub>3-N</sub>	30	REACTIVE POWER L <sub>2</sub>
5	LINE TO LINE VOLTAGE L <sub>1-2</sub>	31	REACTIVE POWER L <sub>3</sub>
6	LINE TO LINE VOLTAGE L <sub>2-3</sub>	32	NEUTRAL CURRENT <sup>(*)</sup>
7	LINE TO LINE VOLTAGE L <sub>3-1</sub>	33	FREQUENCY
8	SYSTEM CURRENT	34	TEMPERATURE
9	LINE CURRENT L <sub>1</sub>	35	THD VOLTAGE L <sub>1</sub> <sup>(***)</sup>
10	LINE CURRENT L <sub>2</sub>	36	THD VOLTAGE L <sub>2</sub> <sup>(***)</sup>
11	LINE CURRENT L <sub>3</sub>	37	THD VOLTAGE L <sub>3</sub> <sup>(***)</sup>
12	SYSTEM POWER FACTOR <sup>(**)</sup>	38	THD CURRENT L <sub>1</sub> <sup>(***)</sup>
13	POWER FACTOR L <sub>1</sub> <sup>(**)</sup>	39	THD CURRENT L <sub>2</sub> <sup>(***)</sup>
14	POWER FACTOR L <sub>2</sub> <sup>(**)</sup>	40	THD CURRENT L <sub>3</sub> <sup>(***)</sup>
15	POWER FACTOR L <sub>3</sub> <sup>(**)</sup>	41	ANGLE <sub>1-2</sub>
16	SYSTEM COS $\phi$ <sup>(**)</sup>	42	ANGLE <sub>2-3</sub>
17	PHASE COS $\phi_1$ <sup>(**)</sup>	43	ANGLE <sub>3-1</sub>
18	PHASE COS $\phi_2$ <sup>(**)</sup>	44	SYSTEM TANGENT $\phi$ <sup>(**)</sup>
19	PHASE COS $\phi_3$ <sup>(**)</sup>	45	PHASE TANGENT $\phi_1$ <sup>(**)</sup>
20	SYSTEM APPARENT POWER	46	PHASE TANGENT $\phi_2$ <sup>(**)</sup>
21	APPARENT POWER L <sub>1</sub>	47	PHASE TANGENT $\phi_3$ <sup>(**)</sup>
22	APPARENT POWER L <sub>2</sub>	48	EXPECTED SYSTEM ACTIVE POWER (mobile or fixed prevision)
23	APPARENT POWER L <sub>3</sub>	49	EXPECTED ACTIVE POWER L <sub>1</sub> (mobile or fixed prevision)
24	SYSTEM ACTIVE POWER	50	EXPECTED ACTIVE POWER L <sub>2</sub> (mobile or fixed prevision)
25	ACTIVE POWER L <sub>1</sub>	51	EXPECTED ACTIVE POWER L <sub>3</sub> (mobile or fixed prevision)

Energy Group Measure (value to be insert)			
0	Any measure in readout data	11	ACTIVE ENERGY IN L <sub>2</sub>
1	SYSTEM ACTIVE ENERGY IN	12	ACTIVE ENERGY OUT L <sub>2</sub>
2	SYSTEM ACTIVE ENERGY OUT	13	REACTIVE ENERGY IN L <sub>2</sub>
3	SYSTEM REACTIVE ENERGY IN	14	REACTIVE ENERGY OUT L <sub>2</sub>
4	SYSTEM REACTIVE ENERGY OUT	15	APPARENT ENERGY L <sub>2</sub>
5	SYSTEM APPARENT ENERGY	16	ACTIVE ENERGY IN L <sub>3</sub>
6	ACTIVE ENERGY IN L <sub>1</sub>	17	ACTIVE ENERGY OUT L <sub>3</sub>
7	ACTIVE ENERGY OUT L <sub>1</sub>	18	REACTIVE ENERGY IN L <sub>3</sub>
8	REACTIVE ENERGY IN L <sub>1</sub>	19	REACTIVE ENERGY OUT L <sub>3</sub>
9	REACTIVE ENERGY OUT L <sub>1</sub>	20	APPARENT ENERGY L <sub>3</sub>
10	APPARENT ENERGY L <sub>1</sub>		

**Readout data – Instantaneous Voltages (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFD	Extension of primary VIF-Codes
YY+2	1	VIFE	0xC6	mV
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System    0x01: Phase 1    0x12: Phase 1 to Phase 2 0x02: Phase 2    0x23: Phase 2 to Phase 3 0x03: Phase 3    0x31: Phase 3 to Phase 1
<b>YY+5</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Unsigned value</b>

**Readout data – Instantaneous Currents (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFD	Extension of primary VIF-Codes
YY+2	1	VIFE	0xC9	mA
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System – unsigned value    0x03: Phase 3 – unsigned value 0x01: Phase 1 – unsigned value    0x04: Neutral – signed value 0x02: Phase 2 – unsigned value
<b>YY+5</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	

(<sup>(\*)</sup>): calculated or measured, according with EMS version and command NEUTRAL CURRENT USED

**Readout data – Instantaneous Power Factor / Cos Phi (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFD	Extension of primary VIF-Codes
YY+2	1	VIFE	0xBA	Dimensionless ( $\pm 1000$ )
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System    0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
<b>YY+5</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Signed value</b>

(<sup>(\*)</sup>): Examples: +1000 is equal to +1.000; -200 is equal to -0.200

**Readout data – Instantaneous Apparent power (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x81	VA
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System    0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
<b>YY+5</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Unsigned value</b>

**Readout data – Instantaneous Active power / Expected power<sub>(mobile or fixed prevision)</sub> (length package 8 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xAB	Manufacturer specific
YY+2	1	VIFE	0xFF	W
YY+3	1	VIFE	0xYY	0x00: System    0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
<b>YY+4</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Signed value</b>

**Readout data – Instantaneous Reactive power (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x82	VAr
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System    0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
<b>YY+5</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Signed value</b>

**Readout data – Instantaneous Frequency (length package 7 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x03	mHz
<b>YY+3</b>	<b>4</b>	<b>VALUE</b>	<b>0XXXXXXXX</b>	<b>Signed value</b>

**Readout data – Instantaneous Temperature (length package 7 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x04	d°C
YY+3	4	VALUE	0XXXXXXXX	Signed value

**Readout data – Instantaneous THD voltage and THD current (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x85	%*100
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x01: Phase 1 0x02: Phase 2 0x03: Phase 3
YY+5	4	VALUE	0XXXXXXXX	Unsigned value

(\*\*\*): Examples: 100'00 equal to 100,00% - 50'00 equal to 50,00%

**Readout data – Phase angles (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFD	Extension of primary VIF-Codes
YY+2	1	VIFE	0xBA	Dimensionless (0 - 3600)
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x12: Phase 1 to Phase 2 0x23: Phase 2 to Phase 3 0x31: Phase 3 to Phase 1
YY+5	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Tangent Phi (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFD	Extension of primary VIF-Codes
YY+2	1	VIFE	0xBA	Dimensionless ( $\pm 100000$ )
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+5	4	VALUE	0XXXXXXXX	Signed value

**Readout data – Total Active Energy In/Out (length package 8 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0x85	100*Wh
YY+2	1	VIFE	0xFF	Manufacturer specific
YY+3	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+4	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Total Reactive Energy In/Out (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x88	100*VArh
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+5	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Total Apparent Energy (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	VIF	0xFF	Manufacturer specific
YY+2	1	VIFE	0x87	100*VAh
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+5	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 1,2,3 Active Energy In/Out (length package 9 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x10: Tariff 1 0x20: Tariff 2 0x30: Tariff 3
YY+2	1	VIF	0x85	100*Wh
YY+3	1	VIFE	0xFF	Manufacturer specific
YY+4	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+5	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 1,2,3 Reactive Energy In/Out (length package 10 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x10: Tariff 1 0x20: Tariff 2 0x30: Tariff 3
YY+2	1	VIF	0xFF	Manufacturer specific
YY+3	1	VIFE	0x88	100*VArh
YY+4	1	VIFE	0xFF	Manufacturer specific
YY+5	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+6	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 1,2,3 Apparent Energy (length package 10 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x10: Tariff 1 0x20: Tariff 2 0x30: Tariff 3
YY+2	1	VIF	0xFF	Manufacturer specific
YY+3	1	VIFE	0x87	100*VAh
YY+4	1	VIFE	0xFF	Manufacturer specific
YY+5	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+6	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 4,5,6,7,8,9,10,11,12,13,14,15 Active Energy In/Out (length package 10 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x80 + 0x10: Tariff 4      0xA0 + 0x20: Tariff 10 0x90 + 0x10: Tariff 5      0x80 + 0x30: Tariff 12 0xA0 + 0x10: Tariff 6      0x90 + 0x30: Tariff 13
YY+2	1	DIFE	XX	0xB0 + 0x10: Tariff 7      0xA0 + 0x30: Tariff 14 0x80 + 0x20: Tariff 8      0xB0 + 0x30: Tariff 15 0x90 + 0x20: Tariff 9
YY+3	1	VIF	0x85	100*Wh
YY+4	1	VIFE	0xFF	Manufacturer specific
YY+5	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+6	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 4,5,6,7,8,9,10,11,12,13,14,15 Reactive Energy In/Out (length package 11 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x80 + 0x10: Tariff 4      0xA0 + 0x20: Tariff 10 0x90 + 0x10: Tariff 5      0x80 + 0x30: Tariff 12 0xA0 + 0x10: Tariff 6      0x90 + 0x30: Tariff 13
YY+2	1	DIFE	XX	0xB0 + 0x10: Tariff 7      0xA0 + 0x30: Tariff 14 0x80 + 0x20: Tariff 8      0xB0 + 0x30: Tariff 15 0x90 + 0x20: Tariff 9
YY+3	1	VIF	0xFF	Manufacturer specific
YY+4	1	VIFE	0x88	100*VArh
YY+5	1	VIFE	0xFF	Manufacturer specific
YY+6	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+7	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 4,5,6,7,8,9,10,11,12,13,14,15 Apparent Energy (length package 11 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	XX	0x80 + 0x10: Tariff 4 0x90 + 0x10: Tariff 5 0xA0 + 0x10: Tariff 6 0xB0 + 0x10: Tariff 7 0x80 + 0x20: Tariff 8 0x90 + 0x20: Tariff 9 0xA0 + 0x30: Tariff 12 0x90 + 0x30: Tariff 13 0xA0 + 0x30: Tariff 14 0xB0 + 0x30: Tariff 15
YY+2	1	DIFE	XX	
YY+3	1	VIF	0xFF	Manufacturer specific
YY+4	1	VIFE	0x87	100*VAh
YY+5	1	VIFE	0xFF	Manufacturer specific
YY+6	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+7	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 16 Active Energy In/Out (length package 11 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	0x80	Tariff 16
YY+2	1	DIFE	0x80	Tariff 16
YY+3	1	DIFE	0x10	Tariff 16
YY+4	1	VIF	0x85	100*Wh
YY+5	1	VIFE	0xFF	Manufacturer specific
YY+6	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+7	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 16 Reactive Energy In/Out (length package 12 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x84	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	0x80	Tariff 16
YY+2	1	DIFE	0x80	Tariff 16
YY+3	1	DIFE	0x10	Tariff 16
YY+4	1	VIF	0xFF	Manufacturer specific
YY+5	1	VIFE	0x88	100*VArh
YY+6	1	VIFE	0xFF	Manufacturer specific
YY+7	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+8	4	VALUE	0XXXXXXXX	Unsigned value

**Readout data – Timeband 16 Apparent Energy (length package 12 byte)**

Byte No.	Size (bytes)	Field Name	Value (hex)	Description
YY	1	DIF	0x04	Instantaneous value 32 Bit Integer
YY+1	1	DIFE	0x80	Tariff 16
YY+2	1	DIFE	0x80	Tariff 16
YY+3	1	DIFE	0x10	Tariff 16
YY+4	1	VIF	0xFF	Manufacturer specific
YY+5	1	VIFE	0x87	100*VAh
YY+6	1	VIFE	0xFF	Manufacturer specific
YY+7	1	VIFE	0xYY	0x00: System      0x02: Phase 2 0x01: Phase 1    0x03: Phase 3
YY+8	4	VALUE	0XXXXXXXX	Unsigned value