M-BUS
Communication Protocol

for counters with integrated M-BUS interface

7E.64…0310	40A 1phase counter with integrated M-BUS interface
7E.78…0312	80A 3phase counters with integrated M-BUS interface
7E.86…0312	6A 3phase counters with integrated M-BUS interface.

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USER MANUAL

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1. M-BUS DEVICE

1.1 M-Bus Interface

The M-BUS Interface (1 module wide, DIN rail mount) is developed to connect the Energy Counter to M-BUS. The interface receives the measurement data from the Energy Counter using infrared port available on the side of the counter, and gets the power supply from the bus.

1.2 M-Bus Integrated

Energy counters with integrated M-BUS interface allows to transmit data directly in M-BUS network, to manage counter without need of external communication module.

1.3 Overview

- M-BUS Interface complying with EN13757-2 and EN13757-3
- Circuiting by means of drilled two-wires cables
- 2 screw clamps on M-BUS Interface
- Current consumption of M-BUS Interface: 3 mA. This corresponds to 2 standard loads (2UL).
- The current consumption of energy meters with integrated M-Bus corresponds to 1 standard loads (1UL).
- The data transmission speed is selectable between 300, 600, 1200, 4800 and 9600 baud for all devices, exception for 7E.64 model, which has only 300, 2400, 9600 baud.
- The default speed is 2400 baud
- The default Primary Address is 000

2. TELEGRAM FORMATS

The telegram formats are three, identified by the first byte.

Byte	Single character (HEX)	Short Telegram (HEX)	Long Telegram (HEX)
1	E5	10	68
2	-	C Field	L Field
3	-	A Field	L Field (Repetition)
4	-	CS (Checksum)	68
5	-	16	C Field
6	-	-	A Field
7	-	-	CI Field
8 - YY	-	-	Data (0 – 246 Bytes)
YY + 1	-	-	CS (Checksum)
YY + 2	-	-	16

- Single Character: This telegram format consists of the single character E5h and is used to acknowledge the telegram received.
- Short Telegram: This telegram is identified by the start character 10h and consists of five characters. It's used by the M-BUS Master to command the transmission of data from the M-BUS Slave.
- Long Telegram: This telegram is identified by the start character 68h and consists of a variable number of characters, in which are present also the active data. It's used by the M-BUS Master to transmits commands to the M-BUS Slave, and by the M-BUS Slave to send the read-out Data to the M-BUS Master.

2.1 Telegram fields

The telegram fields (C, A, CI Fields, L and CS) have a fixed length of one byte (8 bit) and serve predetermined effects in the M-BUS communication. The L Field defines the number of bytes of the active data.

2.1.1 C FIELD

The Control Field (C Field) contains information on the direction of the exchange of communication, the success of the actual operation of communication and the proper function of the telegram.

Bit Number	7	6	5	4	3	2	1	0
Master > Slave	0	1	FCB	FCV	F3	F2	F1	F0
Slave > Master	0	0	ACD	DFC	F3	F2	F1	F0

C Field Bit Division

The Bit Nr 6 is set to 1 if the communication has the direction Master > Slave; vice versa it is set to 0.

In the Master > Slave direction, if the Frame Count Bit valid (FCV - Bit Nr 4) is set to 1, then the frame count bit (FCB – Bit Nr 5) has not to be ignored.

The FCB is used to indicate successful transmission procedure. A Master shall toggle the bit after a successful reception of a reply from the Slave. After this, if the Slave answer is multi-telegram, the Slave has to send the next telegram of the multi-telegram answer.

With an ACD bit (access demand) with a value of 1, the slave shows that it wants to transmit Class 1 data. The master should then send it a command to request Class 1 data. Such Class 1 data is of higher priority,

which (in contrast to Class 2 data) should be transmitted as soon as possible. The support of Class 1 data and the bits DFC and ADC is not required by the standard.

If the expected reply is missing, or the reception faults, the master resends the same telegram with the same FCB. The Bits Nr 3 – 0 are the function code of the message.

The C Field used here, are:

Telegram Name	C Field (BIN)	C Field (HEX)	Telegram	Description
SND_NKE	01000000	40	Short Frame	Initialization of the Slave
SND_UD	01x10011	53 / 73	Long Frame	Master send data to Slave
REQ_UD2	01x11011	5B / 7B	Short Frame	Master requests Class 2 Data to Slave
RSP_UD	000x1000	08 / 18	Long Frame	Data transfer from Slave to Master

C Field of the commands used in this protocol

2.1.2 A FIELD

The Address Field (A Field) is used to address the recipient in the calling direction, and to identify the sender of information in the receiving direction.

The size of this field is one byte, and it can assume the value between 0 – 255, divided in this way:

A Field (HEX)	Primary Address	Remarks
00	0	Default Address Given by Manufacturer
01 – FA	1 – 250	Primary Address Settable
FB, FC	251, 252	Reserved for Future Use
FD	253	Used for Secondary Address Procedures
FE	254	Use to Transmit Information to All Participants in the M-BUS System
FF	255	Use to Transmit Information to All Participants in the M-BUS System

Using the address 254 (FEh) every Slave answer with the acknowledging (E5h) or with their primary address. Using the address 255 (FFh) no one Slave replies.

2.1.3 CI FIELD

The Control Information (CI Field) contains information for the receiver of the telegram. The CI Field values used here, are:

CI Field (HEX)	Description
51	The telegram contains data for the Slave
52	Selection of the Slave
72	The telegram contains data for the Master
B8	Set Baud Rate to 300 bps
B9	Set Baud Rate to 600 bps
BA	Set Baud Rate to 1200 bps
BB	Set Baud Rate to 2400 bps
BC	Set Baud Rate to 4800 bps
BD	Set Baud Rate to 9600 bps

2.1.4 L FIELD

The Length Field (L Field) defines the number of bytes (expressed in hex value) of the Active Data making up the telegram, plus 3 bytes for the C, A and CI Fields.

This field is always transmitted twice in Long Telegrams.

2.1.5 CS FIELD (CHECKSUM)

The Checksum (CS Field) serves to recognize transmission and synchronization faults, and is configured from specific parts of telegram. The checksum is calculated from the arithmetical sum of the data mentioned above plus the Active Data, i.e. from C Field to CS Field (excluded).

2.2 Active data

The Active Data (0 – 246 bytes) in Long Telegrams include the data to be read from the M-BUS Master (Read-Out Data), or Command Information transmitted by the Master to the Slave.

2.2.1 CODING OF ACTIVE DATA TRANSMITTED FROM SLAVE TO MASTER: FIXED DATA RECORD HEADER

Each block of Active Data transmitted by the Slave to the Master starts with the following Fixed Data

Byte Nr.	Size (Byte)	Value (Hex)	Description
1 – 4	4	xx xx xx xx	M-BUS Interface Identification Number (secondary addr.)
5 – 6	2	xx xx	Manufacturer's ID
7	1	xx	Version Number of M-BUS Interface Firmware (00 – FF)
8	1	02	Medium: Electricity
9	1	xx	Access Number (00 – FF)
10	1	xx	M-BUS Interface Status (20 = Energy Counter Unreachable, 00 = Energy Counter Reachable)
11 – 12	2	0000	Signature (always 0000, i.e. not used)

Record Header (FDH):

Fixed Data Record Header

The Identification Number is a changeable number by the customer and runs from 00000000 to 99999999.

The Access Number has unsigned binary coding, and is incremented (modulo 256) by one after each RSP_UD from the Slave.

2.2.2 CODING OF ACTIVE DATA TRANSMITTED FROM SLAVE TO MASTER: DATA RECORDS

Every Data Record sent by Slave to the Master consist of the following Data Record Header (DRH):

Data Information Block (DIB)		Value Information Block (VIB)		
DIF	DIFE	VIF	VIFE	Data
1 Byte	0 – 10 Byte(s)	1 Byte	0 – 10 Byte(s)	0 – n Bytes

Data Records Structure

Data Information Block (DIB)

The Data Information Block (DIB) contains as a minimum one Data Information Field (DIF). This byte can be extended by a further 10 Data Information Field Extension Bytes (DIFE).

Bit	Name	Description
7	Extension Bit	Specifies if a DIFE Byte follows: 0 = No 1 = Yes
6	LSB of Storage Number	Always at 0, i.e. not used
5 – 4	Functions Field	Specifies the kind of the value, always at: 00 = Instantaneous Value
3 - 0	Data Field	Length and Coding of Data: 0001: 8 Bit Integer ($01) 0010: 16 Bit Integer ($02) 0011: 24 Bit Integer ($03) 0100: 32 Bit Integer ($04) 0110: 48 Bit Integer ($06) 0111: 64 Bit Integer ($07) 1100: 8 digit BCD ($0C) 1101: Variable Length ($0D)

The coding of DIF for this protocol is:

Data Information Field Structure

$7F is a special DIF used for read out all data command. See page 21.

Bit	Name	Description
7	Extension Bit	Specifies if another DIFE Byte follows: 0 = No 1 = Yes
6	Unit	Specifies the kind of Energy or Power when Bit 7 is set to 1: 0 = Reactive 1 = Apparent
5 - 4	Tariff	Specifies which tariff the values are related: 00 = Total Value 01 = Tariff 1 02 = Tariff 2
3 - 0	Storage Number	Always at 0000

The coding of DIFE for this protocol is:

Data Information Field Extension Structure

If Bit 7 is set to 0, the following Data Byte are related to Active Energy or Power. So, if the first DIFE is followed by another DIFE (i.e. Bit 7 is set to 1), the following Data Byte are related to Reactive or Apparent Energy or Power, depending on Bit 6 value.

Value Information Block (VIB)

The Value Information Block (VIB) contains as a minimum one Value Information Field (VIF). This byte can be extended by a further 10 Value Information Field Extension Bytes (VIFE).

The coding of VIF is:

Bit	Name	Description
7	Extension Bit	Specifies if a VIFE Byte follows: 0 = No 1 = Yes
6 – 0	Value Information	Contains Information on the single Value, such as Unit, Multiplier, etc…

Value Information Field Structure

The coding of VIFE is:

Bit	Name	Description
7	Extension Bit	Specifies if another VIFE Byte follows: 0 = No 1 = Yes
6 – 0	Value Information	Contains Information on the single Value, such as Unit, Multiplier, etc…

Value Information Field Extension Structure

Standard Value Information Field (VIF) Used

VIFE (BIN)	VIFE (HEX)	Description	Unit
10000010	82	Energy (VIFE follows)	0.1Wh
01111001	79	Set Secondary Address	Dimensionless
01111010	7A	Set Primary Address	Dimensionless
10101000	A8	Power (VIFE follows)	mW
11111101	FD	A standard VIFE from extension table follows	Dimensionless
11111111	FF	A further manufacturer specific VIFE follows	Dimensionless

Standard Value Information Field Extension (VIFE) Used

VIF (BIN)	VIF (HEX)	Description	Unit
00001011	0B	Parameter Set Identification	Dimensionless
00001100	0C	Firmware Version	Dimensionless
00001101	0D	Hardware Version	Dimensionless
11001100	C6	Voltage(VIFE follows)	mV
11011001	D9	Current(VIFE follows)	mA
11111111	FF	A further manufacturer specific VIFE follows	Dimensionless

Manufacturer Specific Value Information Field Extension (VIFE) Used

VIFE (BIN)	VIFE (HEX)	Description	Unit
00000000	00	3-Phase or System value	0.1Wh, mV, mA, mW, mVA or mvar
00000001	01	Phase 1	0.1Wh, mV, mA, mW, mVA or mvar
00000010	02	Phase 2	0.1Wh, mV, mA, mW, mVA or mvar
00000011	03	Phase 3	0.1Wh, mV, mA, mW, mVA or mvar
00000100	04	Neutral	mA
00000101	05	Line 12	mV
00000110	06	Line 23	mV
00000111	07	Line 31	mV
00010000	10	3-Phase Imported Inductive Energy	0.1VAh or 0.1varh
00010001	11	Phase 1 Imported Inductive Energy	0.1VAh or 0.1varh
00010010	12	Phase 2 Imported Inductive Energy	0.1VAh or 0.1varh
00010011	13	Phase 3 Imported Inductive Energy	0.1VAh or 0.1varh
00100000	20	3-Phase Exported Inductive Energy	0.1VAh or 0.1varh
00010001	21	Phase 1 Exported Inductive Energy	0.1VAh or 0.1varh
00010010	22	Phase 2 Exported Inductive Energy	0.1VAh or 0.1varh
00010011	23	Phase 3 Exported Inductive Energy	0.1VAh or 0.1varh
00100100	24	3-Phase Inductive Energy (for balance)	0.1VAh or 0.1varh
00110000	30	3-Phase Imported Capacitive Energy	0.1VAh or 0.1varh
00110001	31	Phase 1 Imported Capacitive Energy	0.1VAh or 0.1varh
00110010	32	Phase 2 Imported Capacitive Energy	0.1VAh or 0.1varh
00110011	33	Phase 3 Imported Capacitive Energy	0.1VAh or 0.1varh
01000000	40	3-Phase Exported Capacitive Energy	0.1VAh or 0.1varh
01000001	41	Phase 1 Exported Capacitive Energy	0.1VAh or 0.1varh
01000010	42	Phase 2 Exported Capacitive Energy	0.1VAh or 0.1varh
01000011	43	Phase 3 Exported Capacitive Energy	0.1VAh or 0.1varh
01000100	44	3-Phase Capacitive Energy (for balance)	0.1VAh or 0.1varh
01010000	50	Frequency	mHz
01010001	51	Phase Order	Dimensionless
01010010	52	CT Ratio Value	Dimensionless
01010011	53	PT Ratio Value	Dimensionless
01010100	54	Actual Tariff	Dimensionless
01010101	55	Serial Number	Dimensionless
01010110	56	Model	Dimensionless
01010111	57	Type	Dimensionless
01011000	58	Firmware Release	Dimensionless
01011001	59	Hardware Release	Dimensionless
01100000	60	Wiring Mode	Dimensionless
01100001	61	Primary or Secondary Value	Dimensionless
01100010	62	Error Code	Dimensionless
01100011	63	Out Of Range	Dimensionless
01100100	64	FSA Value	Dimensionless
01110000	70	Reset Partial Counter	Dimensionless
01110001	71	Start Partial Counter	Dimensionless
01110010	72	Stop Partial Counter	Dimensionless
01110011	73	Partial Counter Status	Dimensionless
10000000	80	Imported Active Energy	0.1Wh
10000001	81	Exported Active Energy	0.1Wh
10000010	82	Partial	Dimensionless

VIFE (BIN)	VIFE (HEX)	Description	Unit
10000011	83	Balance	Dimensionless
10000100	84	Power Factor	Dimensionless
10010000	90	Unit Volt-Ampere * 10-3	mVA
10010001	91	Unit Volt-Ampere per hour * 10-1	0.1VAh
10010010	92	Unit Reactive Volt-Ampere * 10-3	mvar
10010011	93	Unit Reactive Volt-Ampere per hour * 10-1	0.1varh
10010100	94	Unit Hertz (cycle per second) * 10-3	MHz

If Bit No. 7 in the Specific Value Information Field Extension (VIFE) is set to 1, another VIFE Byte follows. If Bit 7 is set to 0, the first Data Byte follows next.

3. COMMUNICATION PROCESS

The M-BUS communication accepts two kinds of transmission:

Send / Confirm > SND / CON

Request / Respond > REQ / RSP

A standard straight communication between M-BUS Master and M-BUS Slave is:

MASTER		SLAVE
SND_NKE	>	E5h
SND_UD	>	E5h
REQ_UD2	>	RSP_UD

3.1 Send / confirm procedure

There're many differences between the communication with a 3 phase (3PH, e.g. 7E.86) device and 1 phase device (1PH e.g. 7E.64).

First of all, when there are different VIFE for 3PH device, the only one correct to be used for 1PH device's is $00 (3PH or sys value). Also for baud rate value there're differences between the devices: not all devices have the same baud rate. Also a lot of telegram regard tariff or balance, but not all devices have this function. For more info check the quick guide of the device.

For every device: every signed value is made with two's complement.

3.1.1 SND_NKE

This procedure serve to start up after an interruption or beginning of communication. If the Slave was selected for secondary addressing, it will be deselected. The value of the frame count bit FCB is cleared in the Slave, i.e. it expects that the first telegram from a Master with FCV = 1, has the FCB = 1.

The Slave confirms a correct reception of the telegram with the single character acknowledge (E5h) or omits the answer if it didn't receive the telegram correctly.

Here follows the structure of SND_NKE command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	10	Start character - short telegram
2	1	40	C Field
3	1	xx	A Field – Primary Address 00 – FA: Valid Primary Address FB, FC: Reserved for Future Use FD: Transmission is by Secondary Address FE: Transmission to All M-BUS Slave in the System (everyone sends E5h) FF: Transmission to All M-BUS Slave in the System (no one sends E5h)
4	1	xx	CS Checksum, summed from C-Field to A Field included
5	1	16	Stop character

Answer of the Slave: E5h

3.1.2 SND_UD

This procedure is used to send user data to the M-BUS Slave. The Slave confirms a correct reception of the telegram with the single character acknowledge (E5h) or omits the answer if it didn't receive the telegram correctly.

Here follows the structure of the SND_UD commands used in this protocol.

Set Primary Address

This action enables to set a new Primary Address in the Slave interface. Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	06	L-Field
3	1	06	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73/53	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	01	DIF: 8 Bit Integer, 1 Byte
9	1	7A	VIF: Set Primary Address
10	1	xx	Value: New Primary Address Valid Range: 00 – FA (0 - 250) Invalid Range: FB – FF
11	1	xx	CS Checksum, summed from C-Field to A Field included
12	1	16	Stop character

Answer of the Slave: E5h

Set Secondary Address

This action enables to set a new Secondary Address in the Slave interface. The Secondary Address has this structure:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1 – 4	4	xx xx xx xx	Identification Number Range : 00000000 - 99999999
5 – 6	2	xx xx	Manufacturer ID Range: 0101/FFFF
7	1	xx	Version Number Range: 01 - FF
8	1	02	Device Type Identification 02: Electricity

Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	09	L-Field
3	1	09	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73/53	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	0C	DIF: 8 digits BCD, 4 Bytes data
9	1	79	VIF: Set Secondary Address
10	1	xx	Value: New Secondary Address digit 7 and 8 Range: 00 - 99
11	1	xx	Value: New Secondary Address digit 5 and 6 Range: 00 – 99
12	1	xx	Value: New Secondary Address digit 3 and 4 Range: 00 – 99
13	1	xx	Value: New Secondary Address digit 1 and 2 Range: 00 - 99
14	1	xx	CS Checksum, summed from C-Field to A Field included
15	1	16	Stop character

Answer of the Slave: E5h

Set Baud Rate

This action allows to change the Baud Rate of the M-BUS Interface.

The Slave answers with single character acknowledgement (E5h) in the old baud rate. As soon as the ACK is transmitted, the Slave switches to the new baud rate. To make sure that the Slave has properly changed its baud rate, the Master, within 2 minutes has to send a command to the Slave in the new baud rate. If the Slave doesn't send the ACK after x retry, the Master has to return to the old baud rate.

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	03	L-Field
3	1	03	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00 - FF = 0 - 255)
7	1	xx	CI-Field: Set New Baud Rate B8: Set Baud Rate to 300 baud B9: Set Baud Rate to 600 baud BA: Set Baud Rate to 1200 baud BB: Set Baud Rate to 2400 baud BC: Set Baud Rate to 4800 baud BD: Set Baud Rate to 9600 baud
8	1	xx	CS Checksum, summed from C-Field to A Field included
9	1	16	Stop character

Here follows the command:

Answer of the Slave: E5h

Reset Total/Tariff 1/Tariff 2/All Energy Counters

This action is permitted only if the Energy Counter is “NO MID” or “yes reset” type. Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	07	L-Field
3	1	07	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	01	DIF: 8 Bit Integer, 1 Byte
9	1	FF	VIF followed by manufacturer specific VIFE
10	1	70	manufacturer specific VIFE: Reset Counter
11	1	xx	Value: Energy Counters to be reset 00: Reset Total EC 01: Reset Tariff 1 EC 02: Reset Tariff 2 EC 03: Reset ALL EC
12	1	xx	CS Checksum, summed from C-Field to A Field included
13	1	16	Stop character

Answer of the Slave: E5h

Reset Partial Energy Counters

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	09	L-Field
3	1	09	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	01	DIF: 8 Bit Integer, 1 Byte
9	1	FF	VIF followed by manufacturer specific VIFE
10	1	82	VIFE: Partial Counters
11	1	FF	VIFE followed by specific VIFE
12	1	70	Manufacturer specific VIFE: Reset Partial Counter
13	1	xx	Value: Energy Counters to be reset 00: Imported Active Energy 01: Exported Active Energy 02: Imported Inductive Apparent Energy 03: Exported Inductive Apparent Energy 04: Imported Capacitive Apparent Energy 05: Exported Capacitive Apparent Energy 06: Imported Inductive Reactive Energy 07: Exported Inductive Reactive Energy 08: Imported Capacitive Reactive Energy 09: Exported Capacitive Reactive Energy 0A: ALL partial counters
14	1	xx	CS Checksum, summed from C-Field to A Field included
15	1	16	Stop character

Here follows the command:

Answer of the Slave: E5h

Start Partial Energy Counters

Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	09	L-Field
3	1	09	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	01	DIF: 8 Bit Integer, 1 Byte
9	1	FF	VIF followed by manufacturer specific VIFE
10	1	82	VIFE: Partial Counters
11	1	FF	VIFE followed by specific VIFE
12	1	71	Manufacturer specific VIFE: Start Counter
13	1	xx	Value: Partial Energy Counters to be reset 00: Imported Active Energy 01: Exported Active Energy 02: Imported Inductive Apparent Energy 03: Exported Inductive Apparent Energy 04: Imported Capacitive Apparent Energy 05: Exported Capacitive Apparent Energy 06: Imported Inductive Reactive Energy 07: Exported Inductive Reactive Energy 08: Imported Capacitive Reactive Energy 09: Exported Capacitive Reactive Energy 0A: ALL partial counters
14	1	xx	CS Checksum, summed from C-Field to A Field included
15	1	16	Stop character

Answer of the Slave: E5h

Stop Partial Energy Counters

Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character telegram query
2	1	09	L-Field
3	1	09	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	01	DIF: 8 Bit Integer, 1 Byte
9	1	FF	VIF followed by manufacturer specific VIFE
10	1	82	VIFE: Partial Counters
11	1	FF	VIFE followed by specific VIFE
12	1	72	Manufacturer specific VIFE: Stop Counter
13	1	xx	Value: Partial Energy Counters to be reset 00: Imported Active Energy 01: Exported Active Energy 02: Imported Inductive Apparent Energy 03: Exported Inductive Apparent Energy 04: Imported Capacitive Apparent Energy 05: Exported Capacitive Apparent Energy 06: Imported Inductive Reactive Energy 07: Exported Inductive Reactive Energy 08: Imported Capacitive Reactive Energy 09: Exported Capacitive Reactive Energy 0A: ALL partial counters
14	1	xx	CS Checksum, summed from C-Field to A Field included
15	1	16	Stop character

Answer of the Slave: E5h

With 7E.64 device it can be used also: 68 06 06 68 73 xx 51 00 FF 70 CS 16 for reset total counter, 68 08 08 68 73 xx 51 00 FF 82 FF 70 CS 16 for reset active imported partial counter, 68 08 08 68 73 xx 51 00 F 82 FF 71 CS 16 for start active imported partial counter, and 68 08 08 68 73 xx 51 00 FF 82 FF 72 CS 16 for stop active imported partial counter.

xx= primary address cs= Checksum

Select a Slave Using Secondary Address

Here follows the command to select a Slave by Secondary Address:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	0B	L-Field
3	1	0B	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	FD	A-Field, Primary Address = 253, i.e. take the secondary address
7	1	52	CI-Field
8 – 15	8	xx xx xx xx xx xx xx xx	Secondary Address UD
16	1	xx	CS Checksum, summed from C-Field to A Field included
17	1	16	Stop character

Answer of the Slave: E5h

Set Parameters Masks

This action allows to select the data to read-out from the Slave.

It can be possible read-out all data, choose the desired data or choose a default mask that include various kind of data.

READ-OUT ALL DATA

Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	04	L-Field
3	1	04	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	7F	DIF: Global Readout Request
9	1	xx	CS Checksum, summed from C-Field to A Field included
10	1	16	Stop character

Answer of the Slave: E5h

READ-OUT DESIRED DATA

Here follows the command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	0E	L-Field
3	1	0E	L-Field repetition
4	1	68	Start character long telegram repetition
5	1	73	C-Field SND_UD
6	1	xx	A-Field, Primary Address (00-FF = 0-255)
7	1	51	CI-Field
8	1	07	DIF: 64 Bit Integer, 8 Byte
9	1	FD	VIF: Followed by a standard VIFE
10	1	0B	VIFE: Parameter Set Identification
11	1	“PS0”	Selected Parameter of Parameter Set 0
12	1	“PS1”	Selected Parameter of Parameter Set 1
13	1	“PS2”	Selected Parameter of Parameter Set 2
14	1	“PS3”	Selected Parameter of Parameter Set 3
15	1	“PS4”	Selected Parameter of Parameter Set 4
16	1	“PS5”	Selected Parameter of Parameter Set 5
17	1	“PS6”	Selected Parameter of Parameter Set 6
18	1	“PS7”	Selected Parameter of Parameter Set 7
19	1	xx	CS Checksum, summed from C-Field to A Field included
20	1	16	Stop character

To set the Parameter Set from all M-BUS interface in the system is necessary use the primary address 255d (FFh) in the A-Field. In this case the M-BUS interface in the M-BUS system will not send an acknowledgement (no E5 will be sent by the M-BUS interfaces). See the Annex B for an example of a mask.

Answer of the Slave: E5h

3.1.3 REQ_UD2

This procedure is used by the M-BUS Master to receive data from the M-BUS Slave. The Slave confirms a correct reception of the telegram with the RSP_UD answer or omits the answer if it didn't receive the telegram correctly. The Slave sends the data requested by SND_UD command.

Here follows the structure of the REQ_UD2 command:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	10	Start character short telegram
2	1	7B / 5B	C-Field , Transmit Read-Out Data
3	1	xx	A Field – Primary Address 00 – FA: Valid Primary Address FB, FC: Reserved for Future Use FE: Transmission to All M-BUS Slave in the System (everyone sends E5h) FF: Transmission to All M-BUS Slave in the System (no one sends E5h) FD: Transmission is by Secondary Address
4	1	xx	CS Checksum, summed from C-Field to A Field included
5	1	16	Stop character

Answer of the Slave: RSP_UD

3.1.4 RSP_UD

This procedure is used by the M-BUS Slave to send the requested data to the M-BUS Master. The behavior of the multi-frame answer is explained in Annex A. Here follows the structure of the RSP_UD telegram:

Byte Nr.	Size (Byte)	Value (HEX)	Description
1	1	68	Start character long telegram
2	1	xx	L-Field
3	1	xx	L-Field Repetition
4	1	68	Start character long telegram repetition
5	1	08 /18	C-Field RSP_UD
6	1	xx	A-Field, Primary Address (00 - FA = 0 - 250)
7	1	72	CI-Field
8 – 11	4	xx xx xx xx	M-BUS Interface Identification Number
12 – 13	2	xx xx	Manufacturer's ID
14	1	xx	Version Number of M-BUS Interface Firmware (00 – FF)
15	1	02	Medium: Electricity
16	1	xx	Access Number (00 – FF > 00)
17	1	xx	M-BUS Interface Status (see error flags 3.1.4.57 table)
18 – 19	2	0000	Signature (always 0000, i.e. not used)
20 – YY	0 – EA	xx…xx	Read-out Data Parameter (see the following paragraphs)
YY + 1	1	0F / 1F	DIF: 0F = no more data; 1F = other data to send
YY + 2	1	xx	CS Checksum, summed from C-Field to A Field included
YY + 3	1	16	Stop character

Here follows every possible Read-Out data, included in 20 – YY bytes of the RSP_UD table.

Total 3-Phase, Phase 1, Phase 2 and Phase 3 imported Active Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	00	DIFE: Total
NN + 2	1	82	VIF: Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	80	VIFE: Imported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value, according to previous the VIFE

When is read “active energy imported” with the default profile of 7E.64 the DIF value is equal to $06. For this reason the DIFE in this case doesn’t exist. The other part of telegram (VIF, VIFE, VALUE, etc) are equal to all devices.

Total 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Active Energy,

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	00	DIFE: Total
NN + 2	1	82	VIF: Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	81	VIFE: Exported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value, according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value, according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Total 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 imported Active Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	10	DIFE: Tariff 1
NN + 2	1	82	VIF: Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	80	VIFE: Imported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Active Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	10	DIFE: Tariff 1
NN + 2	1	82	VIF: Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	81	VIFE: Exported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 1 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	90	DIFE: Tariff 1; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 imported Active Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	20	DIFE: Tariff 2
NN + 2	1	82	VIF: Active Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	80	VIFE: Imported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Active Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	20	DIFE: Tariff 2
NN + 2	1	82	VIF: Active Energy, 0.1Wh; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	81	VIFE: Exported Energy; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Apparent Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 imported inductive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	1x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Inductive 1: Phase 1 Imported Inductive 2: Phase 2 Imported Inductive 3: Phase 3 Imported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2 and Phase 3 Exported inductive Reactive Energy, Tariff 2

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	2x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Inductive 1: Phase 1 Exported Inductive 2: Phase 2 Exported Inductive 3: Phase 3 Exported Inductive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 imported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	MANUFACTURER specific VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	3x	MANUFACTURER specific VIFE: 0: 3-Phase Imported Capacitive 1: Phase 1 Imported Capacitive 2: Phase 2 Imported Capacitive 3: Phase 3 Imported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

Tariff 2 3-Phase, Phase 1, Phase 2 and Phase 3 Exported Capacitive Reactive Energy

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	A0	DIFE: Tariff 2; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	MANUFACTURER specific VIFE: Reactive Energy,0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	4x	MANUFACTURER specific VIFE: 0: 3-Phase Exported Capacitive 1: Phase 1 Exported Capacitive 2: Phase 2 Exported Capacitive 3: Phase 3 Exported Capacitive
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2 and Phase 3 voltage

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	03	DIF – 24 Bit Integer, 3 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	C6	VIFE: Instant Voltage (mV) followed by a VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 5 – NN + 7	3	xx xx xx	Value: according to previous the VIFE

Line 12, Line 23 and Line 31 voltage

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	03	DIF – 24 Bit Integer, 3 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	C6	VIFE: Instant Voltage (mV) followed by a VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	0x	MANUFACTURER specific VIFE: 5: Line 12 6: Line 23 7: Line 31
NN + 5 – NN + 7	3	xx xx xx	Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2, Phase 3 and Neutral Current

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	04	DIF – 32 Bit Integer, 4 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	D9	VIFE: Current (mA) followed by a VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3 4: Neutral
NN + 5 – NN + 8	4	xx xx xx xx	Signed Value: according to previous the VIFE

Frequency

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	94	MANUFACTURER specific VIFE: mHz
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	50	MANUFACTURER specific VIFE: Frequency (mHz)
NN + 5 – NN + 6	2	xx xx	Value: Frequency

Phase Order

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	51	MANUFACTURER specific VIFE: Phase Order
NN + 3	1	xx	Value: Phase Order 00: No Phase Order 7B: 123 84: 132

3-Phase, Phase 1, Phase 2 and Phase 3 Power Factor

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	84	MANUFACTURER specific VIFE: Power Factor; Followed by VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 5 – NN + 6	2	xx xx	Signed Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2 and Phase 3 Active Power

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	06	DIF – 48 Bit Integer, 6 Byte
NN + 1	1	A8	VIF: Active Power, mW; Followed by VIFE
NN + 2	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 3	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 4 – NN + 9	6	xx xx xx xx xx xx	Signed Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2 and Phase 3 Apparent Power

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Power
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	90	VIFE: Apparent Power, mVa; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Signed Value: according to previous the VIFE

3-Phase, Phase 1, Phase 2 and Phase 3 Reactive Power

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Power
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	92	VIFE: Reactive Power, mvar; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	0x	MANUFACTURER specific VIFE: 0: 3-Phase 1: Phase 1 2: Phase 2 3: Phase 3
NN + 7 – NN + 12	6	xx xx xx xx xx xx	Signed Value: according to previous the VIFE

3-Phase imported and Exported Active Energy Partial

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	06	DIF – 48 Bit Integer, 6 Byte
NN + 1	1	82	VIF: Active Energy, 0.1Wh; Followed by VIFE
NN + 2	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 3	1	8x	MANUFACTURER specific VIFE: 0: Imported Energy 1: Exported Energy Followed by VIFE
NN + 4	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 5	1	82	MANUFACTURER specific VIFE: Partial; Followed by VIFE
NN + 6	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 7	1	00	MANUFACTURER specific VIFE: 3-Phase
NN + 8 – NN + 12	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase imported and Exported inductive Apparent Energy Partial

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	82	MANUFACTURER specific VIFE: Partial; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x0	MANUFACTURER specific VIFE: 1: 3-Phase Imported Inductive 2: 3-Phase Exported Inductive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase imported and Exported Capacitive Apparent Energy Partial

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	82	MANUFACTURER specific VIFE: Partial; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x0	MANUFACTURER specific VIFE: 3: 3-Phase Imported Capacitive 4: 3-Phase Exported Capacitive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase imported and Exported inductive Reactive Energy Partial

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	82	MANUFACTURER specific VIFE: Partial; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x0	MANUFACTURER specific VIFE: 1: 3-Phase Imported Inductive 2: 3-Phase Exported Inductive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase imported and Exported Capacitive Reactive Energy Partial

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	82	MANUFACTURER specific VIFE: Partial; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x0	MANUFACTURER specific VIFE: 3: 3-Phase Imported Inductive 4: 3-Phase Exported Inductive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase Active Energy Balance

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	06	DIF – 48 Bit Integer, 6 Byte
NN + 1	1	82	VIF: Active Energy, 0.1Wh; Followed by VIFE
NN + 2	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 3	1	83	MANUFACTURER specific VIFE: Balance; Followed by VIFE
NN + 4	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 5	1	00	MANUFACTURER specific VIFE: 3-Phase
NN + 6 – NN + 11	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase inductive and Capacitive Apparent Energy Balance

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	40	DIFE: Apparent Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	91	VIFE: Apparent Energy, 0.1VAh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	83	MANUFACTURER specific VIFE: Balance; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x4	MANUFACTURER specific VIFE: 2: 3-Phase Inductive 4: 3-Phase Capacitive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

3-Phase inductive and Capacitive Reactive Energy Balance

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	86	DIF – 48 Bit Integer, 6 Byte; Followed by DIFE
NN + 1	1	80	DIFE: Total; Followed by DIFE
NN + 2	1	00	DIFE: Reactive Value
NN + 3	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 4	1	93	VIFE: Reactive Energy, 0.1varh; Followed by VIFE
NN + 5	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 6	1	83	MANUFACTURER specific VIFE: Balance; Followed by VIFE
NN + 7	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 8	1	x4	MANUFACTURER specific VIFE: 2: 3-Phase Inductive 4: 3-Phase Capacitive
NN + 9 – NN + 14	6	xx xx xx xx xx xx	Value: according to previous the VIFE

CT value

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	52	MANUFACTURER specific VIFE: CT Value
NN + 3 – NN + 4	2	xx xx	Value: CT ratio

Actual Tariff

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	54	MANUFACTURER specific VIFE: Actual Tariff
NN + 3	1	xx	Value: Actual Tariff 01: Tariff 1 02: Tariff 2

Serial Number

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	0D	DIF – Variable Length
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	55	MANUFACTURER specific VIFE: Serial Number
NN + 3	1	0A	Value: Serial Number First Byte is LVAR: i.e. 10 ASCII char follows
NN + 4 – NN + 13	10	xx xx xx xx xx xx xx xx xx xx	Value: Serial Number (ASCII char), transmitted “Least significant byte first”

Model

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	56	MANUFACTURER specific VIFE: Model
NN + 3	1	xx	Value: Model Code 03 = 3Phase, 4Wire, 6||1A 06 = 3Phase, 3Wire, 6||1A 08 = 3Phase, 4Wire, 80A 10 = 3Phase, 3Wire, 80A 12 = 1Phase, 80A 16 = 1Phase, 40A

Type

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	57	MANUFACTURER specific VIFE: Type
NN + 3	1	xx	Value: Type 00: no MID, yes reset 01: no MID, no reset 02: MID 03: no MID, no reset, Wiring SET 04: no MID, no reset 05: MID, no REACTIVE 06: no MID, no reset, no Wiring 07: MID, Wiring 08: MID, no Wiring

Energy Counter Firmware Release 1

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	58	MANUFACTURER specific VIFE: Firmware EC Release 1
NN + 3 – NN + 4	2	xx xx	Value: EC Firmware Release, e.g. 01.10

Energy Counter Firmware Release 2

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	65	MANUFACTURER specific VIFE: Firmware EC Release 2
NN + 3 – NN + 4	2	xx xx	Value: EC Firmware Release, e.g. 01.10

Energy Counter Hardware Release

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	59	MANUFACTURER specific VIFE: Hardware EC Release
NN + 3 – NN + 4	2	xx xx	Value: EC Hardware Version Number, e.g. 01.10

Primary or Secondary value

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	61	MANUFACTURER specific VIFE: Primary or Secondary Value
NN + 3	1	xx	Value: Primary or Secondary Values 00: Primary Values 01: Secondary Values

Error Code

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	62	MANUFACTURER specific VIFE: Error Code Value
NN + 3	1	xx	Value: Error Code 00: No Error 01: Phase Sequence Error 02: Memory Error

Out Of Range

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	06	DIF – 68 Bit Integer, 6 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	63	MANUFACTURER specific VIFE: Out Of Range Value
NN + 3	1	xx	Value: Out Of Range Frequency 00: No Out of Range 01: Frequency Out of Range
NN + 4 – NN + 5	2	xx xx	Value: Out Of Range Low/High Phase Current byte: 00 > FF – LORI2 | LORI1 | LORISYS | HORIN | HORI3 | HORI2 | HORI1 | HORISYS | byte: 00 > 03 – res | res | res | res | res | res | LORIN | LORI3 |
NN + 6	1	xx	Value: Out of Range Low/High Line Voltage 00 > 3F – res | res | LORVL23 | LORVL13 | LORVL12 | HORVL23 | HORVL13 | HORVL12 |
NN + 7	1	xx	Value: Out of Range Low/High Phase Voltage 00 > FF – LORV3N | LORV2N | LORV1N | LORVSYS | HORV3N | HORV2N | HORV1N | HORVSYS |
NN + 8	1	00	Empty Byte

Fabrication Number

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	0C	DIF – 8 digit BCD, 4 Byte
NN + 1	1	78	VIF: Fabrication No
NN + 2 – NN 5	4	xx xx xx xx	Value: Fabrication Number

M-BUS Module Firmware Release

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	0C	VIFE: Version
NN + 3 – NN 4	2	xx xx	Value: Module Firmware Release, e.g. 01.10

M-BUS Module Hardware Release

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	0D	VIFE: Hardware Version
NN + 3 – NN 4	2	xx xx	Value: Module Hardware Version Number, e.g. 01.10

Partial Counter Status

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 1	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 2	1	73	MANUFACTURER specific VIFE: Partial Counters Status
NN + 3 – NN + 4	2	xx xx	Every byte is divided in bit. If the bit is high the partial is in "start". There're the bit with the followed partial of every byte: byte: (MSB)-kvarhSYS-L-PAR|+kvarhSYS-L-PAR|-kVAhSYS-C-PAR| +kVAhSYS-C-PAR|-kVAhSYS-L-PAR|+kVAhSYS-L-PAR| -kWhSYS-PAR|+kWhSYS-PAR| byte: (MSB)res|res|res|res|res|res|-kvarhSYS-C-PAR| +kvarhSYS-C-PAR|

FSA value

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 1	1	FD	VIF: Followed by a standard VIFE
NN + 2	1	DC	VIFE: Current followed by a VIFE
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	64	MANUFACTURER specific VIFE: FSA Value
NN + 5	1	xx	Value: FSA Value 00: 1 A 01: 5 A 02: 80 A 03: 40 A

ANNEX A

In case of single-frame RSP_UD answer from the Slave, the communication process is the following:

MASTER		SLAVE
SND_NKE	>	E5h
SND_UD	>	E5h
REQ_UD2 with C Field = 7Bh i.e. FCB = 1 & FCV = 1	>	RSP_UD with C Field = 08h DIF = 0Fh as last data block

This means that, if the FCB is handled (i.e. FCV = 1), when the RSP_UD answer has a single-frame of data, the Slave has to send a RSP_UD answer with the last data block equal to 0F.

In case of multi-frame RSP_UD answer from the Slave (for example 2 frames), the communication process is the following:

MASTER		SLAVE
SND_NKE	>	E5h
SND_UD	>	E5h
REQ_UD2 with C Field = 7Bh i.e. FCB = 1 & FCV = 1	>	RSP_UD with C Field= 18h i.e. DFC = 1 DIF= 1Fh as last data block
REQ_UD2 with C Field = 5B i.e. FCB = 0 & FCV = 1	>	RSP_UD with C Field= 08 i.e. DFC = 0 DIF= 0Fh as last data block

This means that, if the FCB is handled (i.e. FCV = 1), when the RSP_UD answer has a single-frame of data, the Slave has to send a RSP_UD answer with the last data block equal to 0F.

ANNEX B

Here follows the bit division of every Parameter Set byte:

Bit Nr.	Bit value	Measure Unit	Bit	Parameter Set
01	From Bit 39 To Bit 50 - Reactive (0b) or Apparent (1b)	-	xxxx xxx1b	PS0
02	From Bit 51 To Bit 64 - Reactive (0b) or Apparent (1b)	-	xxxx xx1xb	
03	All Apparent and Reactive Energy Tariff 1	0.1varh & 0.1VAh	xxxx x1xxb	
04	All Apparent and Reactive Energy Total	0.1varh & 0.1VAh	xxxx 1xxxb	
05	All Apparent and Reactive Energy Balance	0.1varh & 0.1VAh	xxx1 xxxxb	
06	All Apparent and Reactive Energy Partial	0.1varh & 0.1VAh	xx1x xxxxb	
07	All Apparent and Reactive Energy Tariff 2	0.1varh & 0.1VAh	x1xx xxxxb	
08	Phase 1, 2, 3, Sys Active Power	mW	1xxx xxxxb	
09	Phase 1, 2, 3, Sys Apparent Power	mVA	xxxx xxx1b	PS1
10	Phase 1, 2, 3, Sys Reactive Power	mvar	xxxx xx1xb	
11	Phase 1, 2, 3, Sys Voltage	mV	xxxx x1xxb	
12	Line 12, 23, 31 Voltage	mV	xxxx 1xxxb	
13	Phase 1, 2, 3, N, Sys Current	mA	xxx1 xxxxb	
14	Phase 1, 2, 3, Sys Power Factor	-	xx1x xxxxb	
15	Frequency	mHz	x1xx xxxxb	
16	Phase Order	-	1xxx xxxxb	
17	Actual Tariff	-	xxxx xxx1b	PS2
18	CT Value, FSA Value, Wiring Mode	-	xxxx xx1xb	
19	Pri/Sec Value	-	xxxx x1xxb	
20	Error Code	-	xxxx 1xxxb	
21	Out Of Range	-	xxx1 xxxxb	
22	Partial Counter Status	-	xx1x xxxxb	
23	Serial Number, FW Release EC, HW Version EC, Model, Type, Fabrication Number	-	x1xx xxxxb	
24	FW Release, HW Version and Fabrication Number of external M-BUS Module	-	1xxx xxxxb	
25	Phase 1, 2, 3 Imported Active Energy Total	0.1Wh	xxxx xxx1b	PS3
26	3-Phase Imported Active Energy Total	0.1Wh	xxxx xx1xb	
27	Phase 1, 2, 3 Exported Active Energy Total	0.1Wh	xxxx x1xxb	
28	3-Phase Exported Active Energy Total	0.1Wh	xxxx 1xxxb	
29	Phase 1, 2, 3 Imported Active Energy Tariff 1	0.1Wh	xxx1 xxxxb	
30	3-Phase Imported Active Energy Tariff 1	0.1Wh	xx1x xxxxb	
31	Phase 1, 2, 3 Exported Active Energy Tariff 1	0.1Wh	x1xx xxxxb	
32	3-Phase Exported Active Energy Tariff 1	0.1Wh	1xxx xxxxb	
33	Phase 1, 2, 3 Imported Active Energy Tariff 2	0.1Wh	xxxx xxx1b	PS4
34	3-Phase Imported Active Energy Tariff 2	0.1Wh	xxxx xx1xb	
35	Phase 1, 2, 3 Exported Active Energy Tariff 2	0.1Wh	xxxx x1xxb	
36	3-Phase Exported Active Energy Tariff 2	0.1Wh	xxxx 1xxxb	
37	All Active Energy Balance	0.1Wh	xxx1 xxxxb	
38	All Active Energy Partial	0.1Wh	xx1x xxxxb	
39	Phase 1, 2, 3 Imported Inductive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	x1xx xxxxb	

Bit Nr.	Bit value	Measure Unit	Bit	Parameter Set
40	3-Phase Imported Inductive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	1xxx xxxxb	
41	Phase 1, 2, 3 Exported Inductive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xxx1b	PS5
42	3-Phase Exported Inductive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xx1xb	
43	Phase 1, 2, 3 Imported Inductive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx x1xxb	
44	3-Phase Imported Inductive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx 1xxxb	
45	Phase 1, 2, 3 Exported Inductive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxx1 xxxxb	
46	3-Phase Exported Inductive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xx1x xxxxb	
47	Phase 1, 2, 3 Imported Inductive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	x1xx xxxxb	
48	3-Phase Imported Inductive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	1xxx xxxxb	
49	Phase 1, 2, 3 Exported Inductive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xxx1b	PS6
50	3-Phase Exported Inductive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xx1xb	
51	Phase 1, 2, 3 Imported Capacitive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx x1xxb	
52	3-Phase Imported Capacitive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx 1xxxb	
53	Phase 1, 2, 3 Exported Capacitive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xxx1 xxxxb	
54	3-Phase Exported Capacitive Energy Total (Reactive or Apparent)	0.1varh/ 0.1VAh	xx1x xxxxb	
55	Phase 1, 2, 3 Imported Capacitive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	x1xx xxxxb	
56	3-Phase Imported Capacitive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	1xxx xxxxb	
57	Phase 1, 2, 3 Exported Capacitive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xxx1b	PS7
58	3-Phase Exported Capacitive Energy Tariff 1 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx xx1xb	
59	Phase 1, 2, 3 Imported Capacitive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx x1xxb	
60	3-Phase Imported Capacitive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxxx 1xxxb	
61	Phase 1, 2, 3 Exported Capacitive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xxx1 xxxxb	
62	3-Phase Exported Capacitive Energy Tariff 2 (Reactive or Apparent)	0.1varh/ 0.1VAh	xx1x xxxxb	
63	All Energy Balance (Reactive or Apparent)	0.1varh/ 0.1VAh	x1xx xxxxb	
64	All Energy Partial (Reactive or Apparent)	0.1varh/ 0.1VAh	1xxx xxxxb	

ANNEX C

A profile is a specific Parameter Set combination. All profiles are the same for every device.

-Setting the DEFAULT mask Profile for all the device (excluded 7E.64 model; see below description for this model):

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00000000	00	From Bit 39 to Bit 50 Reactive Values has to be taken From Bit 51 to Bit 64 Reactive Values has to be taken
PS1	00000000	00	No One Value
PS2	00011111	1F	Actual Tariff CT Value, FSA Value, Wiring Mode Pri/Sec Value, Error Code Out Of range
PS3	10100000	A0	3-Phase Imported Active Energy Tariff 1 3-Phase Exported Active Energy Tariff 1
PS4	00001010	0A	3-Phase Imported Active Energy Tariff 2 3-Phase Exported Active Energy Tariff 2
PS5	10101000	A8	3-Phase Imported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 2 (Reactive from PS0 bit 0)
PS6	10000010	82	3-Phase Exported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Imported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1)
PS7	00101010	2A	3-Phase Exported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1) 3-Phase Imported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1) 3-Phase Exported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1)

And so the Profile Default mask in HEX will be: 00 00 1F A0 0A A8 82 2A

Case of 7E.64 model, for Default Profile all PS must be set to 0 values. In this case, this model will provide a specific telegram containing the following parameters: Voltage [mV], Current [mA], Power factor [x0.001], Active power [mW], Frequency [mHz], Imported Active Energy [kWh], Imported Active Energy partial [kWh], Serial Number, Model, Type, Firmware Release Number, Hardware Version Number, Error Code, Partial Counter status, OEM code.

Here follow the decode frame of the answer in default profile (7E.64).

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN	1	03	DIF – 24 Bit Integer, 3 Byte
NN + 1	1	FD	VIF followed by STANDARD specific VIFE
NN + 2	1	C6	STANDARD specific VIFE: Voltage
NN + 3	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 4	1	00	MANUFACTURER specific VIFE: Monophase
NN + 5...NN + 7	3	xx xx xx	Value: Voltage
NN + 8	1	04	DIF – 32 Bit Integer, 4 Byte
NN + 9	1	FD	VIF followed by STANDARD specific VIFE
NN + 10	1	D9	STANDARD specific VIFE: Current
NN + 11	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 12	1	00	MANUFACTURER specific VIFE: Monophase
NN+13-…NN+16	4	xx xx xx xx	Value: Current

Byte Nr.	Size (Byte)	Value (HEX)	Description
NN + 17	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 18	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 19	1	84	STANDARD specific VIFE: Power factor
NN + 20	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 21	1	00	MANUFACTURER specific VIFE: Monophase
NN + 22…NN + 23	2	xx xx	Value: Power factor (PF x 1000 “2’s complement”: positive if inductive, negative if capacitive)
NN + 24	1	06	DIF – 48 Bit Integer, 6 Byte
NN + 25	1	A8	VIF: Power
NN + 26	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 27	1	00	MANUFACTURER specific VIFE: Monophase
NN + 28….NN + 33	6	xx xx xx xx xx xx	Value: Power
NN + 34	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 35	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 36	1	94	MANUFACTURER specific VIFE: 0.1Hz
NN + 37	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 38	1	50	MANUFACTURER specific VIFE: Frequency (0.1Hz)
NN + 39 NN + 40	2	xx xx	Value: Frequency
NN + 41	1	06	DIF – 48 Bit Integer, 6 Byte
NN + 42	1	82	VIF: Active Energy
NN + 43	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 44	1	80	MANUFACTURER specific VIFE: Imported Energy
NN + 45	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 46	1	00	MANUFACTURER specific VIFE: System value
NN + 47…NN + 52	6	xx xx xx xx xx xx	Value: energy
NN + 53	1	06	DIF – 8 Bit Integer, 1 Byte
N + 54	1	82	VIF: Energy
NN + 55	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 56	1	80	MANUFACTURER specific VIFE: Imported Energy
NN + 57	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 58	1	82	MANUFACTURER specific VIFE: Partial
NN + 59	1	FF	VIFE followed by MANUFACTURER specific VIFE
NN + 60	1	00	MANUFACTURER specific VIFE: Monophase
NN + 61…..NN + 67	6	xx xx xx xx xx xx	Value: Imported partial energy
NN + 68	1	OD	DIF – Variable Length
NN + 69	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 70	1	55	MANUFACTURER specific VIFE: Serial Number
NN + 71	1	0A	Value: Serial Number First Byte is LVAR: i.e. 10 ASCII char follows
NN + 72…NN + 82	10	xx xx xx xx xx xx xx xx xx xx	Value: Serial Number (ASCII char), transmitted “Least significant byte first”
NN + 83	1	01	DIF - 8 Bit Integer, 1 Byte
NN + 84	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 85	1	56	MANUFACTURER specific VIFE: Model
NN + 86	1	xx	Value: Model: $10 (europe)
NN + 87	1	01	DIF - 8 Bit Integer, 1 Byte
NN + 88	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 89	1	57	MANUFACTURER specific VIFE: Type
NN + 90	1	xx	Value: Type: $00= with RESET, NO MID, $02=MID, $05=MID

Byte Nr.	Size (Byte)	Value (HEX)	Description
			no varh, $0C=NO MID, no varh, RESET
NN + 91	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 92	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 93	1	58	MANUFACTURER specific VIFE: Firmware EC Release
NN + 94 - NN + 95	2	xx xx	Value: Firmware EC Release, e.g. xx.xx
NN + 96	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 97	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 98	1	59	MANUFACTURER specific VIFE: Hardware EC Release
NN + 99 - NN + 100	2	xx xx	Value: Hardware EC Release, e.g. xx.xx
NN + 101	1	01	DIF – 8 Bit Integer, 1 Byte
NN + 102	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 103	1	62	MANUFACTURER specific VIFE: Error Code Value
NN + 104	1	xx	Value: bit 0 - EEPROM ERROR bit 1 - RAM ERROR-bit 2 - CS(FW) ERROR
NN + 105	1	02	DIF – 16 Bit Integer, 2 Byte
NN + 106	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 107	1	73	MANUFACTURER specific VIFE: Partial Counter Status
NN + 108 - NN + 109	2	xx xx	Every byte is divided in bit. If the bit is high the partial is in “start”. There’re the bit with the followed partial of every byte: 1byte: (MSB)-kvarhSYS-L-PAR |+kvarhSYS-L-PAR | -kVAhSYS-C- PAR | +kVAhSYS-C-PAR | -kVAhSYS-L-PAR | +kVAhSYS-L-PAR |-kWhSYS-PAR | +kWhSYS-PAR 2 byte: (MSB) res| res| res| res| res| res| -kvarhSYS-C-PAR | +kvarhSYS- C-PAR
NN + 110	1	0D	DIF – Variable Length
NN + 111	1	FF	VIF followed by MANUFACTURER specific VIFE
NN + 112	1	65	MANUFACTURER specific VIFE: OEM code
NN + 113	1	04	Value: following 4 bytes
NN + 114...NN + 118	4	xx xx xx xx	Value: OEM code

And so the Parameter set of Profile Default mask in HEX will be: 00 00 00 00 00 00 00 00

-Setting the Profile ENERGY T1 e T2 mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00000000	00	From Bit 39 to Bit 50 Reactive Values has to be taken From Bit 51 to Bit 64 Reactive Values has to be taken
PS1	00000000	00	No one value
PS2	00011000	18	Error Code Out Of range
PS3	11111111	FF	Phase 1, 2, 3 Imported Active Energy Total 3-Phase Imported Active Energy Total Phase 1, 2, 3 Exported Active Energy Total 3-Phase Exported Active Energy Total Phase 1, 2, 3 Imported Active Energy Tariff 1 3-Phase Imported Active Energy Tariff 1 Phase 1, 2, 3 Exported Active Energy Tariff 1 3-Phase Exported Active Energy Tariff 1
PS4	11001111	CF	Phase 1, 2, 3 Imported Active Energy Tariff 2 3-Phase Imported Active Energy Tariff 2 Phase 1, 2, 3 Exported Active Energy Tariff 2 3-Phase Exported Active Energy Tariff 2 Phase 1, 2, 3 Imported Inductive Energy Total (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Total (Reactive from PS0 bit 0)
PS5	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Total (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Total (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) Phase 1, 2, 3 Exported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 2 (Reactive from PS0 bit 0)
PS6	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Capacitive Energy Total (Reactive from PS0 bit 0) 3-Phase Imported Capacitive Energy Total (Reactive from PS0 bit 0) Phase 1, 2, 3 Exported Capacitive Energy Total (Reactive from PS0 bit 0) 3-Phase Exported Capacitive Energy Total (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Capacitive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Imported Capacitive Energy Tariff 1 (Reactive from PS0 bit 0)
PS7	00111111	3F	Phase 1, 2, 3 Exported Capacitive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Exported Capacitive Energy Tariff 1 (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Capacitive Energy Tariff 2(Reactive from PS0 bit 0) 3-Phase Imported Capacitive Energy Tariff 2 (Reactive from PS0 bit 0) Phase 1, 2, 3 Exported Capacitive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Exported Capacitive Energy Tariff 2 (Reactive from PS0 bit 0)

And so the Profile Energy T1 e T2 mask in HEX will be: 00 00 18 FF CF FF FF 3F

-Setting the Profile TARIFF 1 mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00000100	04	All Apparent and Reactive Energy Tariff 1
PS1	00000000	00	No one value
PS2	00011000	18	Error Code Out Of range
PS3	11110000	F0	Phase 1, 2, 3 Imported Active Energy Tariff 1 3-Phase Imported Active Energy Tariff 1 Phase 1, 2, 3 Exported Active Energy Tariff 1 3-Phase Exported Active Energy Tariff 1
PS4	00000000	00	No one value
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Tariff 1 mask in HEX will be: 04 00 18 F0 00 00 00 00

-Setting the Profile TARIFF 2 mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	01000000	40	All Apparent and Reactive Energy Tariff 2
PS1	00000000	00	No one value
PS2	00011000	18	Error Code Out Of range
PS3	00000000	00	No one value
PS4	00001111	0F	Phase 1, 2, 3 Imported Active Energy Tariff 2 3-Phase Imported Active Energy Tariff 2 Phase 1, 2, 3 Exported Active Energy Tariff 2 3-Phase Exported Active Energy Tariff 2
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Tariff 2 mask in HEX will be: 40 00 18 00 F0 00 00 00

-Setting the Profile TOTAL ENERGY mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00001000	08	All Apparent and Reactive Energy Total
PS1	00000000	00	No one value
PS2	00011000	18	Error Code Out Of range
PS3	00001111	0F	Phase 1, 2, 3 Imported Active Energy Total 3-Phase Imported Active Energy Total Phase 1, 2, 3 Exported Active Energy Total 3-Phase Exported Active Energy Total
PS4	00000000	00	No one value
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Total Energy mask in HEX will be: 08 00 18 0F 00 00 00 00

-Setting the Profile REAL TIME mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	10010000	90	All Apparent and Reactive Energy Balance Phase 1, 2, 3 Active Power
PS1	11111111	FF	Phase 1, 2, 3, Sys Apparent Power Phase 1, 2, 3 Sys Reactive Power Phase 1, 2, 3, Sys Voltage Line 12, 23, 31 Voltage Phase 1, 2, 3, N, Sys Current Phase 1, 2, 3, Sys Power Factor Frequency Phase Order ActiveEnergyTariff1
PS2	11011111	DF	Actual Tariff CT Value, FSA Value Pri/Sec Value Error Code Out Of range Serial Number, FW Release EC, HW Version EC, Model, Type FW Release and HW Version M-BUS Module
PS3	00000000	00	No one value
PS4	00010000	10	All Active Energy Balance
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Real Time mask in HEX will be: 90 FF DF 00 10 00 00 00

-Setting the Profile PARTIAL mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00100000	20	All Apparent and Reactive Energy Partial
PS1	00000000	00	No one value
PS2	00111000	38	Error Code Out Of range Partial Counters Status
PS3	00000000	00	No one value
PS4	00100000	20	All Active Energy Partial
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Partial mask in HEX will be: 20 00 38 00 20 00 00 00

-Setting the Profile ACTIVE ENERGY mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	10000000	80	Phase 1, 2, 3, 3-Phase Active Power
PS1	01000000	40	Frequency
PS2	00011000	18	Error Code Out Of range
PS3	11111111	FF	Phase 1, 2, 3 Imported Active Energy Total 3-Phase Imported Active Energy Total Phase 1, 2, 3 Exported Active Energy Total 3-Phase Exported Active Energy Total Phase 1, 2, 3 Imported Active Energy Tariff 1 3-Phase Imported Active Energy Tariff 1 Phase 1, 2, 3 Exported Active Energy Tariff 1 3-Phase Exported Active Energy Tariff 1
PS4	00011111	1F	Phase 1, 2, 3 Imported Active Energy Tariff 2 3-Phase Imported Active Energy Tariff 2 Phase 1, 2, 3 Exported Active Energy Tariff 2 3-Phase Exported Active Energy Tariff 2 All Active Energy Balance
PS5	00000000	00	No one value
PS6	00000000	00	No one value
PS7	00000000	00	No one value

And so the Profile Active mask in HEX will be: 80 40 18 FF 1F 00 00 00

-Setting the Profile REACTIVE ENERGY mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00000000	00	From Bit 39 to Bit 50 Reactive Values has to be taken From Bit 51 to Bit 64 Reactive Values has to be taken
PS1	01000010	42	Phase 1, 2, 3 Sys Reactive Power Frequency
PS2	00011000	18	Error Code Out Of range
PS3	00000000	00	No one value
PS4	11000000	C0	Phase 1, 2, 3 Imported Inductive Energy Total (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Total (Reactive from PS0 bit 0)
PS5	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Total (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Total (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) Phase 1, 2, 3 Exported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 1 (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 2 (Reactive from PS0 bit 0)
PS6	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 2 (Reactive from PS0 bit 0) Phase 1, 2, 3 Imported Capacitive Energy Total (Reactive from PS0 bit 1) 3-Phase Imported Capacitive Energy Total (Reactive from PS0 bit 1) Phase 1, 2, 3 Exported Capacitive Energy Total (Reactive from PS0 bit 1) 3-Phase Exported Capacitive Energy Total (Reactive from PS0 bit 1) Phase 1, 2, 3 Imported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1) 3-Phase Imported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1)
PS7	01111111	7F	Phase 1, 2, 3 Exported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1) 3-Phase Exported Capacitive Energy Tariff 1 (Reactive from PS0 bit 1) Phase 1, 2, 3 Imported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1) 3-Phase Imported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1) Phase 1, 2, 3 Exported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1) 3-Phase Exported Capacitive Energy Tariff 2 (Reactive from PS0 bit 1) All Energy Balance (Reactive from PS0 bit 1)

And so the Profile Reactive mask in HEX will be: 00 42 18 00 C0 FF FF 7F

-Setting the Profile APPARENT ENERGY mask:

Parameter Set	Value (BIN)	Value (HEX)	Description
PS0	00000011	03	From Bit 39 to Bit 50 Apparent Values has to be taken From Bit 51 to Bit 64 Apparent Values has to be taken
PS1	01000001	41	Phase 1, 2, 3 Sys Apparent Power Frequency
PS2	00011000	18	Error Code Out Of range
PS3	00000000	00	No one value
PS4	11000000	C0	Phase 1, 2, 3 Imported Inductive Energy Total (Apparent from PS0 bit 0) 3-Phase Imported Inductive Energy Total (Apparent from PS0 bit 0)
PS5	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Total (Apparent from PS0 bit 0) 3-Phase Exported Inductive Energy Total (Apparent from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 1 (Apparent from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 1 (Apparent from PS0 bit 0) Phase 1, 2, 3 Exported Inductive Energy Tariff 1 (Apparent from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 1 (Apparent from PS0 bit 0) Phase 1, 2, 3 Imported Inductive Energy Tariff 2 (Apparent from PS0 bit 0) 3-Phase Imported Inductive Energy Tariff 2 (Apparent from PS0 bit 0)
PS6	11111111	FF	Phase 1, 2, 3 Exported Inductive Energy Tariff 2 (Apparent from PS0 bit 0) 3-Phase Exported Inductive Energy Tariff 2 (Apparent from PS0 bit 0) Phase 1, 2, 3 Imported Capacitive Energy Total (Apparent from PS0 bit 1) 3-Phase Imported Capacitive Energy Total (Apparent from PS0 bit 1) Phase 1, 2, 3 Exported Capacitive Energy Total (Apparent from PS0 bit 1) 3-Phase Exported Capacitive Energy Total (Apparent from PS0 bit 1) Phase 1, 2, 3 Imported Capacitive Energy Tariff 1 (Apparent from PS0 bit 1) 3-Phase Imported Capacitive Energy Tariff 1 (Apparent from PS0 bit 1)
PS7	01111111	7F	Phase 1, 2, 3 Exported Capacitive Energy Tariff 1 (Apparent from PS0 bit 1) 3-Phase Exported Capacitive Energy Tariff 1 (Apparent from PS0 bit 1) Phase 1, 2, 3 Imported Capacitive Energy Tariff 2 (Apparent from PS0 bit 1) 3-Phase Imported Capacitive Energy Tariff 2 (Apparent from PS0 bit 1) Phase 1, 2, 3 Exported Capacitive Energy Tariff 2 (Apparent from PS0 bit 1) 3-Phase Exported Capacitive Energy Tariff 2 (Apparent from PS0 bit 1) All Energy Balance (Apparent from PS0 bit 1)

And so the Profile Apparent mask in HEX will be: 03 41 18 00 C0 FF FF 7F