In according with EN1434-3

1.2 Standard M-Bus telegrams

1.2.1 Standard Data (Answer for REQ_UD2)

Initialization of Slave (SND_NKE)

To start or initialize the communication Master sends this telegram to Slave :

SND_NKE	
CODE	**Description**
10h	Start
40h	C field : initialization
PADR	A field : device address 0..250 /254/255
CS	CheckSum = (40h+PADR) mod 100h
16h	Stop

If Slave receives SND_NKE it resets TC counter of sending telegrams and answers with E5.

Request for Data (REQ_UD2)

REQ_UD2	
CODE	**Description**
10h	Start
5B/7Bh	C field : Request for Data
PADR	A field : device address 0..250 /254
CS	CheckSum = (5B/7Bh+PADR) mod 100h
16h	Stop

When Master sends this telegram to a Slave, it answers a Standard Frame with RSP_UD multitelegram , where the last DIF in the user data part of the telegram is 0x1F to indicate that there are more data in the next telegram.

Position	Description	Byte	Data type	Page
1	Active Total Energy	6	Type A , 12 BCD digits	1
2	Active Positive Power 3-phase	4	Type H , IEEE Real	1
3	Reactive Total Energy	6	Type A , 12 BCD digits	1
4	Reactive Positive Power 3-phase	4	Type H , IEEE Real	1
5	Active Partial Energy	6	Type A , 12 BCD digits	1
6	Active Negative Power 3-phase	4	Type H , IEEE Real	1
7	Reactive Partial Energy	6	Type A , 12 BCD digits	1
8	Reactive Negative Power 3-phase	4	Type H , IEEE Real	1
9	Power Factor 3-phase	4	Type H , IEEE Real with sign	1
10	Error	1	Type B , 8-bit Integer	1
11	Current I1	4	Type H , IEEE Real	2
12	Current I2	4	Type H , IEEE Real	2
13	Current I3	4	Type H , IEEE Real	2
14	Voltage L1	4	Type H , IEEE Real	2
15	Voltage L2	4	Type H , IEEE Real	2
16	Voltage L3	4	Type H , IEEE Real	2
17	Active Power L1	4	Type H , IEEE Real with sign	3
18	Active Power L2	4	Type H , IEEE Real with sign	3
19	Active Power L3	4	Type H , IEEE Real with sign	3
20	Reactive Power L1	4	Type H , IEEE Real with sign	3
21	Reactive Power L2	4	Type H , IEEE Real with sign	3
22	Reactive Power L3	4	Type H , IEEE Real with sign	3
23	Power Factor L1	4	Type H , IEEE Real with sign	3
24	Power Factor L2	4	Type H , IEEE Real with sign	3
25	Power Factor L3	4	Type H , IEEE Real with sign	3
26	Voltage L1-L2	4	Type H , IEEE Real	3
27	Voltage L2-L3	4	Type H , IEEE Real	3
28	Voltage L3-L1	4	Type H , IEEE Real	3
29	Neutral Current	4	Type H , IEEE Real	3
30	Frequency	4	Type H , IEEE Real	3
31	Current Transform KTA	2	Type B , 16-bit Integer	3
32	Voltage Transform KTV	2	Type B , 16-bit Integer	3

1.2.1.1 Examples of telegram 1,2,3 readouts

Example of the 1st telegram (all values are hexadecimal).

RSP_UD			
Field Name	**Byte Number**	**Value**	**Meaning**
Start	1	68	Start byte
L-f	1	LEN	Frame number byte
L-f	1	LEN	Frame number byte
Start	1	68	Start byte
C-f	1	08	RSP_UD
A-f	1	***PADR***	0..250
CI-f	1	72	Variable structure ,LSB is trasmitted first
Secondary address	4	**IDENT**	XXXXXXXX (8 BCD digits)
Manufacturer code	2	A5 25	"IME" = 25A5
Device version	1	GEN	Version
Medium	1	02	Electricity
Access number	1	TC	*incremented by 1 for any aswered telegram*
Status	1	STAT	Status for EN 1434-3 (*)
Signature	2	00 00	*Not used*
DIF	1	8E	Instantaneous Value, size 12 BCD digits
DIFE	1	50	Tariff 1 Unit 1 Storage number 0
VIF	1	04/05	Units kWh with resolution 0,01k/0,1k Wh
Value	6	xxxxxxxxxxxx	Active Positive Energy ,Total
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	50	Tariff 1 Unit 1 Storage number 0
VIF	1	2B	Power W
Value	4	xxxxxxxx	Total Active Positive Power
DIF	1	8E	Instantaneous Value, size 12 BCD digits
DIFE	1	90	Tariff 1
DIFE	1	40	Unit 2
VIF	1	04/05	Units kVArh with resolution 0,01k/0,1k VArh
Value	6	xxxxxxxxxxxx	Reactive Positive Energy ,Total
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	90	Tariff 1
DIFE	1	40	Unit 2
VIF	1	2B	Power Var
Value	4	xxxxxxxx	Total Reactive Positive Power
DIF	1	8E	Instantaneous Value, size 12 BCD digits
DIFE	1	60	Tariff 2 Unit 1 Storage number 0
VIF	1	04/05	Units kWh with resolution 0,01k/0,1k Wh
Value	6	xxxxxxxxxxxx	Active Negative Energy, Total
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	60	Tariff 2 Unit 1
VIF	1	2B	Power W
Value	4	xxxxxxxx	Total Active Negative Power
DIF	1	8E	Instantaneous Value, size 12 BCD digits
DIFE	1	A0	Tariff 2
DIFE	1	40	Unit 2

VIF	1	04/05	Units kVArh with resolution 0,01k/0,1k VArh
Value	6	xxxxxxxxxxxx	Reactive Negative Energy ,Total
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	A0	Tariff 2
DIFE	1	40	Unit2
VIF	1	2B	Power Var
Value	4	xxxxxxxx	Total Reactive Negative Power
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Power Factor
VIFE	1	3A	Dimensionless
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	01	Instantaneous Value, 8-bit integer
VIF	1	FD	Error flags (**)
VIFE	1	17	
Value	1	Yy	Error on 8 bit B7..B0
DIF	1	1F	more records will follow in next telegram
Value	5	0000000000	PAD bytes
Checksum	1	CS	
Stop	1	16	

Example of the 2nd telegram (all values are hexadecimal).

RSP_UD			
Field Name	**Byte Number**	**Value**	**Meaning**
Start	1	68	Start byte
L-f	1	LEN	Frame number byte
L-f	1	LEN	Frame number byte
Start	1	68	Start byte
C-f	1	08	RSP_UD
A-f	1	***PADR***	0..250
CI-f	1	72	Variable structure,LSB is trasmitted first
Secondary address	4	**IDENT**	XXXXXXXX (8 BCD digits)
Manufacturer code	2	A5 25	"IME" = 25A5
Device version	1	GEN	Version
Medium	1	02	Electricity
Access number	1	TC	*incremented by 1 for any aswered telegram*
Status	1	STAT	Status for EN 1434-3 (*)
Signature	2	00 00	*Not used*
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	DA	Units A with resolution mA
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	01	Line 1
Value	4	xxxxxxxx	Current L1
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	DA	Units A with resolution mA
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	02	Line 2
Value	4	xxxxxxxx	Current L2
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	DA	Units A with resolution mA
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	03	Line 3
Value	4	xxxxxxxx	Current L3
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 100 mV
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	01	Line 1
Value	4	xxxxxxxx	Voltage L1-N
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 100 mV
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	02	Line 2
Value	4	xxxxxxxx	Voltage L2-N
DIF	1	05	Instantaneous Value, 32-bit Real

VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 100 mV
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	03	Line 3
Value	4	xxxxxxxx	Voltage L3-N
DIF	1	1F	more records will follow in next telegram
Value	5	0000000000	PAD bytes
Checksum	1	CS	
Stop	1	16	

Example of the 3th telegram (all values are hexadecimal).

RSP_UD			
Field Name	**Byte Number**	**Value**	**Meaning**
Start	1	68	Start byte
L-f	1	LEN	Frame number byte
L-f	1	LEN	Frame number byte
Start	1	68	Start byte
C-f	1	08	RSP_UD
A-f	1	***PADR***	0..250
CI-f	1	72	Variable structure,LSB is trasmitted first
Secondary address	4	**IDENT**	XXXXXXXX (8 BCD digits)
Manufacturer code	2	A5 25	"IME" = 25A5
Device version	1	GEN	Version
Medium	1	02	Electricity
Access number	1	TC	*incremented by 1 for any aswered telegram*
Status	1	STAT	Status for EN 1434-3 (*)
Signature	2	00 00	*Not used*
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	40	Unit 1
VIF	1	AB/AD	Power W/ 0,1 kW
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	01	Active Power Line 1
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	40	Unit 1
VIF	1	AB/AD	Power W/ 0,1 kW
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	02	Active Power Line 2
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	85	Instantaneous Value, 32-bit Real
DIFE	1	40	Unit 1
VIF	1	AB/AD	Power W/ 0,1 kW
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	03	Active Power Line 3
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	85	Instantaneous Value, size 32-bit Real
DIFE	1	80	
DIFE	1	40	Unit 2
VIF	1	AB/AD	Power Var / 0,1 kVAr
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	01	Reactive Power L1
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	85	Istantaneous Value, size 32-bit Real
DIFE	1	80	
DIFE	1	40	Unit 2
VIF	1	AB/AD	Power VAr/ 0,1 kVAr
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	02	Reactive Power L2

Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	85	Instantaneous Value, size 32-bit Real
DIFE	1	80	
DIFE	1	40	Unit 2
VIF	1	AB/AD	Power Var / 0,1 kVAr
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	03	Reactive Power L3
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Power Factor
VIFE	1	BA	dimensionless
VIFE	1	FF	
VIFE	1	01	Power Factor Line 1
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Power Factor
VIFE	1	BA	dimensionless
VIFE	1	FF	
VIFE	1	02	Power Factor Line 2
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	05	Instantaneous Value, 32-bit Real
VIF	1	FD	Power Factor
VIFE	1	BA	dimensionless
VIFE	1	FF	
VIFE	1	03	Power Factor Line 3
Value	4	xxxxxxxx	b31 = sign| b30-b23 exponent| b22-b0 value
DIF	1	05	Instantaneous Value, size 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 0,1V
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	04	
Value	4	xxxxxxxx	Voltage L1-L2
DIF	1	05	Instantaneous Value, size 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 0,1V
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	05	
Value	4	xxxxxxxx	Voltage L2-L3
DIF	1	05	Instantaneous Value, size 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	C8	Units V with resolution 0,1V
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	06	
Value	4	xxxxxxxx	Voltage L3-L1
DIF	1	05	Instantaneous Value, size 32-bit Real
VIF	1	FD	Extension of VIF-codes
VIFE	1	DA	Units A with resolution 10 mA
VIFE	1	FF	Next byte is manufacturer specific
VIFE	1	04	
Value	4	xxxxxxxx	Neutral Current
DIF	1	05	Instantaneous Value, size 32-bit Real
VIF	1	FF	Next byte is Manufacturer specific
VIFE	1	5A	Units Hz with resolution 0.1 Hz
Value	4	xxxxxxxx	Frequency
DIF	1	02	Instantaneous Value, size 16-bit integer
VIF	1	FD	
VIFE	1	3A	dimensionless
Value	2	xxxx	Current Transform KTA
DIF	1	02	Instantaneous Value, size 16-bit integer
VIF	1	FD	
VIFE	1	3A	dimensionless
Value	2	xxxx	Voltage Transform KTV *10
DIF	1	0F	Indicating that this is the last telegram

Value	5	0000000000	PAD bytes
Checksum	1	CS	
Stop	1	16	

(*) Status

With this field various information about the status of counter, and faults wich have occurred, are communicated :

Bit setted	EN 1434-3	NEMO96HD
Bit 7 = 1	Specific to manifacturer	Not used
Bit 6 = 1	Specific to manifacturer	Not used
Bit 5 = 1	Specific to manifacturer	Not used
Bit 4 = 1	Temporary Error	Not used
Bit 3 = 1	Permanent Error	Incorrect voltage phase sequence
Bit 2 = 1	Power low	Not used
Bit 1 = 1	Application layer error 1	Not used
Bit 0 = 1	Application layer error 0	Not used

(**) Error flags

Parameter : YY = b7b6b5b4b3b2b1b0 is a bit mapped 8 bit Integer.

BIT number	Description
b7 = 1	Not used
b6 = 1	Not used
b5 = 1	Not used
b4 = 1	Not used
b3 = 1	Calibration data Error
b2 = 1	Not used
b1 = 1	Setup data Error
b0 = 1	Not used

Here is an example of requesting and answering telegrams :

Request

10 5B 01 5C 16

Answer

68	64	64	68	08	01	72	78	56	34	02	A5	25	1D	02	00
00	00	00	8E	50	04	00	00	00	00	00	00	85	50	2B	00
00	00	00	8E	90	40	04	00	00	00	00	00	00	85	90	40
2B	00	00	00	00	8E	60	04	00	00	00	00	00	00	85	60
2B	00	00	00	00	8E	A0	40	04	00	00	00	00	00	00	85
A0	40	2B	00	00	00	00	05	FD	3A	00	00	80	3F	01	FD
17	00	1F	00	00	00	00	00	5F	16						

Meaning

Unit	Tariff	Storage	Data	Value	Funct.	VIB
1	1	0	BCD12	000000000000	Inst.	Energy 10 [Wh]
1	1	0	REAL4	0.000000e+000	Inst.	Power [W]
2	1	0	BCD12	000000000000	Inst.	Energy 10 [Wh]
2	1	0	REAL4	0.000000e+000	Inst.	Power [W]
1	2	0	BCD12	000000000000	Inst.	Energy 10 [Wh]
1	2	0	REAL4	0.000000e+000	Inst.	Power [W]
2	2	0	BCD12	000000000000	Inst.	Energy 10 [Wh]
2	2	0	REAL4	0.000000e+000	Inst.	Power [W]
0	0	0	REAL4	1.000000e+000	Inst.	No VIF
0	0	0	INT1	0	Inst.	Error Flags (binary)
0	0	0	Special	00 00 00 00 00	Inst.	

Request

10 7B 01 7C 16

Answer

68	4B	4B	68	08	01	72	78	56	34	02	A5	25	1D	02	01
00	00	00	05	FD	D9	FF	01	00	00	00	00	05	FD	D9	FF
02	00	00	00	00	05	FD	D9	FF	03	00	00	00	00	05	FD
C8	FF	01	00	00	00	00	05	FD	C8	FF	02	00	00	00	00
05	FD	C8	FF	03	00	00	00	00	1F	00	00	00	00	00	7D
16															

Meaning

Unit	Tariff	Storage	Data	Value	Funct.	VIB
0	0	0	REAL4	0.000000e+000	Inst.	Current [mA]->Next VIFE Manufacturer specific->Too
0	0	0	REAL4	0.000000e+000	Inst.	Current [mA]->Next VIFE Manufacturer specific->Stor
0	0	0	REAL4	0.000000e+000	Inst.	Current [mA]->Next VIFE Manufacturer specific->Unit
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->
0	0	0	Special	00 00 00 00 00	Inst.	

Request

10 5B 01 5C 16

Answer

68	9E	9E	68	08	01	72	78	56	34	02	A5	25	1D	02	02
00	00	00	85	40	AB	FF	01	00	00	00	00	85	40	AB	FF
02	00	00	00	00	85	40	AB	FF	03	00	00	00	00	85	80
40	AB	FF	01	00	00	00	00	85	80	40	AB	FF	02	00	00
00	00	85	80	40	AB	FF	03	00	00	00	00	05	FD	BA	FF
01	00	00	80	3F	05	FD	BA	FF	02	00	00	80	3F	05	FD
BA	FF	03	00	00	80	3F	05	FD	C8	FF	04	00	00	00	00
05	FD	C8	FF	05	00	00	00	00	05	FD	C8	FF	06	00	00
00	00	05	FD	D9	FF	04	00	00	00	00	05	FF	5A	00	00
00	00	02	FD	3A	01	00	02	FD	3A	0A	00	0F	00	00	00
00	00	36	16												

Meaning

Unit	Tariff	Storage	Data	Value	Funct.	VIB
1	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Too m
1	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Storag
1	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Unit n
2	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Too m
2	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Storag
2	0	0	REAL4	0.000000e+000	Inst.	Power [W]->Next VIFE Manufacturer specific->Unit n
0	0	0	REAL4	1.000000e+000	Inst.	No VIF->Next VIFE Manufacturer specific->Too many
0	0	0	REAL4	1.000000e+000	Inst.	No VIF->Next VIFE Manufacturer specific->Storage n
0	0	0	REAL4	1.000000e+000	Inst.	No VIF->Next VIFE Manufacturer specific->Unit numb
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->
0	0	0	REAL4	0.000000e+000	Inst.	Voltage 100 [mV]->Next VIFE Manufacturer specific->Da
0	0	0	REAL4	0.000000e+000	Inst.	Current [mA]->Next VIFE Manufacturer specific->Tariff nu
0	0	0	REAL4	0.000000e+000	Inst.	Manufacturer specific->5A
0	0	0	INT2	1	Inst.	No VIF
0	0	0	INT2	10	Inst.	No VIF
0	0	0	Special	00 00 00 00 00	Inst.	

1.2.3 Reading of Instantaneous Active Power :

Reading of P, P1, P2, P3 is made with following SND_UD telegram :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	06h	*Header*
L-f	1	06h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	88h	Selection for Readout
DIFE	1	0Xh	Parameter
VIF	1	28h	
Check Sum	1	CS	
Stop	1	16h	Stop

DIFE :

0X h : 00 h -> P
01 h -> P1
02 h -> P2
03 h -> P3

Parameter in RSP_UD :

XXXXXXXX : 32 Bit Integer, before LSB .

For any KT value we have the following unit for Power :

KT = KTA * KTV	Unit	VIF
< 5000	1 W	2Bh
>= 5000	0,1 kW	2Dh

Reading example of Active Power :

SND_UD	68 06 06 68 73 FE 51 88 00 28 72 16
E5h	E5
REQ_UD2	10 5B FE 59 16
RSP_UD	68 16 16 68 08 01 72 00 00 00 00 A8 15 00 02 6B 00 00 00 84 00 2B 0E B0 03 00 7C 16

Received data 0E B0 03 00 h
Hexadecimal value = 00 03 B0 0E h
Decimal value = 241678 d

1.2.4 Reading of istantaneous phase voltages

To read V1,V2, V3 send the following SND_UD telegram and then REQ_UD2 :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	07h	*Header*
L-f	1	07h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	88h	Selection for Readout
DIFE	1	0Xh	Parameter
VIF	1	FDh	
VIFE	1	40h	Voltages
Check Sum	1	CS	
Stop	1	16h	Stop

DIFE :

0X h : 01 h -> V1
02 h -> V2
03 h -> V3

Parameter in RSP_UD :

XXXXXXXX : 32 Bit Integer before LSB.

KTV	Risolution
1 <= KTV < 10	0.01 V
10 <= KTV < 100	0.1 V
100 <= KTV	1 V

Reading example of V1 :

SND_UD	68 07 07 68 73 FE 51 88 01 FD 40 88 16
E5h	E5
REQ_UD2	10 7B FE 79 16
RSP_UD	68 17 17 68 08 01 72 11 11 11 11 A8 15 00 02 6F 00 00 00 84 01 FD **47** ED 59 00 00 FC 16

Received data ED 59 00 00 h
Hexadecimal value = 00 00 59 ED h
Decimal value = 23021 d

1.2.5 Reading of Istantaneous phase currents

To read I1, I2, I3 send the following SND_UD telegram and then REQ_UD2 :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	07h	*Header*
L-f	1	07h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	88h	Selection for Readout
DIFE	1	0Xh	Parameter
VIF	1	FDh	
VIFE	1	50h	Currents
Check Sum	1	CS	
Stop	1	16h	Stop

DIFE :

0X h : 01 h -> I1
02 h -> I2
03 h -> I3

Parameter in RSP_UD :

XXXXXXXX : 32 Bit Integer before LSB.

KTA	Risolution
1 <= KTA < 10	0.001 A
10 <= KTA < 100	0.01 A
100 <= KTA < 10000	0.1 A

Reading example of I1 :

SND_UD	68 07 07 68 53 01 51 88 01 FD 50 7B 16
E5h	E5
REQ_UD2	10 7B FE 79 16
RSP_UD	68 17 17 68 08 01 72 11 11 11 11 A8 15 00 02 72 00 00 00 84 01 FD 59 AC 88 00 00 FF 16

Received data AC 88 00 00 h
Hexadecimal value = 00 00 88 AC h
Decimal value = 34988 d

1.2.6 Reading of Primary Address

To write Primary Address send a SND_UD telegram :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	06h	*Header*
L-f	1	06h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	01h	8 Bit Integer
VIF	1	7Ah	BUS Address
Value	1	XX	Value
Check Sum	1	CS	
Stop	1	16h	Stop

Parameter :

XX : 0 .. 250

To read Primary Address send a SND_UD telegram and then REQ_UD2 :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	05h	*Header*
L-f	1	05h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***FE***	Broadcast Address
CI-f	1	51h	Data send
DIF	1	08h	Selection for Readout
VIF	1	7Ah	
Check Sum	1	CS	
Stop	1	16h	Stop

Reading example of primary address 1 :

SND_UD	68 05 05 68 53 FE 51 08 7A 24 16
E5h	E5
REQ_UD2	10 7B FE 79 16
RSP_UD	68 12 12 68 08 01 72 00 00 00 00 A8 15 00 02 9E 00 00 00 01 7A 01 54 16

1.2.7 Reading of Secondary Address

To write Secondary Address send a SND_UD telegram and then REQ_UD2 :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	09h	*Header*
L-f	1	09h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	0Ch	8 Bit Integer
VIF	1	79h	
Value	4	X1X0X3X2X5X4X7X6	LSB before
Check Sum	1	CS	
Stop	1	16h	Stop

To read Secondary Address send a SND_UD telegram and then REQ_UD2 :

Field Name	Number of byte	Value	Meaning
Start	1	68h	Start
L-f	1	05h	*Header*
L-f	1	05h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	51h	Data send
DIF	1	08h	
VIF	1	79h	
Check Sum	1	CS	
Stop	1	16h	Stop

Parameter : in SND_UD and in RSP_UD
X1X0X3X2X5X4X7X6 => X7X6X5X4X3X2X1X0: 8 BCD digits.

Reading example of secondary address 12345678 :

SND_UD	68 05 05 68 73 FE 51 08 79 43 16
E5h	E5
REQ_UD2	10 5B FE 59 16
RSP_UD	68 15 15 68 08 01 72 78 56 34 12 A8 15 00 02 0E 00 00 00 0C 79 78 56 34 12 F5 16

Received value = 78 56 34 12 h
Value 12345678

1.2.9 Application Reset

NEMO96HD allows application reset.
After this message NEMO96HD resets the answer counter, the pending selection frame, the error flags and responds with the ACK character (E5h) :

Field Name	**Number of byte**	**Value**	**Meaning**
Start	1	68h	
L-f	1	03h	*Header*
L-f	1	03h	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***PADR***	Primary Address
CI-f	1	50h	Application reset
Check Sum	1	CS	
Stop	1	16h	

1.3 Selection and Secondary Addressing

In an M-Bus network we can have at maximum 250 primary addresses, from 1 to 250, instead 0 is used for an unconfigurated device.

If there are more than 250 devices, we have to make an extension with secondary address.

Master sends the following SND_UD telegram to a Slave to select it :

Field Name	Number of byte	Value	Meaning
Start	1	68h	
L-f	1	0Bh	*Header*
L-f	1	0Bh	
Start	1	68h	
C-f	1	53h/73h	*SND_UD*
A-f	1	***FDh***	Primary Address
CI-f	1	52h	
Value	4	X1X0X3X2X5X4X7X6	Secondary Address
Manufacturer code	2	A5 25	"IME" = 25A5
Device version	1	GEN	Version
Medium	1	02	Electricity
Check Sum	1	CS	
Stop	1	16h	

If there is a Slave that has Secondary Address X7X6X5X4X3X2X1X0, with the right Manufacturer code, Device version and Medium it gives an ACK (0xE5) character as answer ,
otherwise there will be no answer.

If the Slave is correctly selected it change its state in "selected" . This means that it will answer to all commands REQ_UD2, made to the Slave with Primary Address 0xFD, with a RSP_UD.
In other words Master uses Primary Address 253 (0xFD) to speak with Slave.

The Slave remains in a "selected" state until it receives either a selection command to a different Secondary Address or a SND_NKE command to Address 0xFD.

During the selection it is allowed to use 0xF wild card instead of any digit of Manufacturer code, Device version and Medium. For example 0xFFFF instead of 0xA525, 0xFF instead of 0x1D and 0xFF instead of 0x02.

Example

M -> S [68][0b][0b][68][53][fd][52][02][00][00][00][a5][25][14][02][8d][16]
S -> M [e5]
M -> S [10][5b][fd][58][16]
M -> S
[68][64][64][68][08][01][72][02][00][00][00][a5][25][14][02][04][00][00][00][8e]
[50][04][02][00][00][00][00][00 [16]