GOSSEN METRAWATT

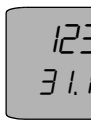
U128x-W2 and U138x-W2

Electronic Active and Reactive Energy Meters with M-Bus Interface

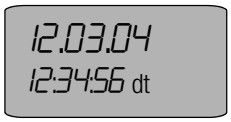
3-349-344-03
10/9.22

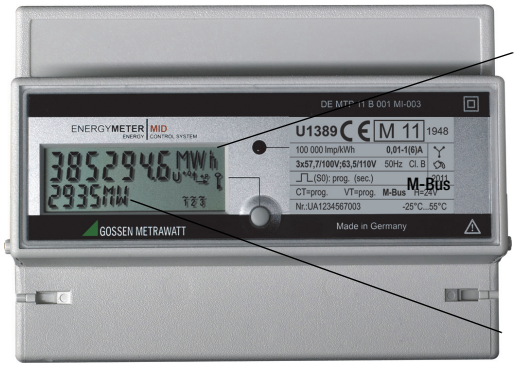
M-Bus

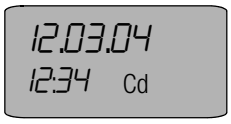
Cutoff Date
Energy



Date
Time

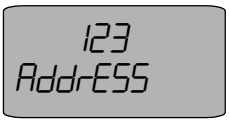






Next Cutoff Date

Baud Rate



Address

Error Messages

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1 M-Bus Interface

The M-bus is an inexpensive solution for widespread networking and remote meter reading of large numbers of heat meters, gas meters, water meters and energy meters from various manufacturers. The application, which reads out small volumes of data for each resource consumption meter at relatively large time intervals, places only minimal demands on transmission speed, and results in long transmission distances using simple, standard cables. The M-bus (meter bus) has been standardized on the basis of the European standard for heat meters, EN 1434-3, with regard to data exchange and interfaces. It was developed by Professor Ziegler at the university in Paderborn, Germany, in cooperation with Techem AG and Texas Instruments.

Detailed information regarding the M-bus is available from the official M-bus website at www.m-bus.com.
The document entitled “The M-Bus: A Documentation” provides newcomers with a complete overview of the bus system.

Requirements

Series U128x and U138x energy meters must be equipped with order option W2 (M-bus) for operation on the M-bus. If this is the case, the serial plate is identified with an “M-Bus” imprint.

Applications

When queried via the M-bus, the energy meter responds with a standard frame including the meter reading for imported energy and momentary power. In addition to this, operating hours, the number of switching operations and time of the last power-up are transmitted, as well as complete error identification.

The energy meter supports the cutoff date function with a cutoff date frame, and reads out energy on the cutoff date with date and time, as well as the next cutoff date.

The necessary parameters such as baud rate, primary address, date and time, as well as the next cutoff date, can be set directly at the energy meter or via the M-bus. In the event of power failure, all parameters remain in non-volatile memory along with meter parameters and the meter reading. The clock continues to run for an additional four days on back-up power from a goldcap.

Cabling

The M-bus uses one pair of wires in a standard telephone cable, for example JY(St)Y 2×2×0.8 mm. For a standard configuration with baud rates of between 300 and 9600 baud and up to 250 slaves, the maximum distance between master and slave is 350 meters. This distance corresponds to a cable resistance of 29 Ohm. Maximum distance is increased if a lower baud rate is utilized, or if the number of slaves is reduced.

Recommended Cable Lengths

Bus Type	Maximum Cable Length	Conductor Cross-Section	Number of Terminal Devices	Baud Rate
Building installation	350 m	0.5 square mm *	250	9600
Small wide area installation	1 km	0.5 square mm *	60	2400
Standard	2 km	0.8 square mm	60	2400
Large wide area installation	3 km	1.5 square mm	60	2400
Provider network installation	5 km	1.5 square mm	16	300
Maximum length (for linear topology)	10 km	1.5 square mm	1	300

* For example JY(ST)Y 2×2×0.8 mm

Data is transmitted bidirectionally. Voltage differences are utilized in the master-to-slave direction. The idle state on the bus is logic 1 (mark), which is expressed at the master with a bus voltage within a range of 35 to 40 V (U_{mark}).
Logic 0 (space) is represented as $U_{Space} = U_{Mark} – 12$ V. Current differences are utilized in the response direction (slave-to-master). Logic 1 (idle state) corresponds to a current requirement of no more than 1.5 mA per slave, and logic 0 corresponds to an increased current requirement within a range of 11 to 20 mA.
A PC with a level converter is used as a master. The master supplies power to the bus and converts the level from the serial interface to the M-bus level, and vice versa.

Frames

Standard Frame

Data Point	Designation	Data Type
1	System time	Type F, date and time
2	Operating hours	Type B, 32-bit integer
3	Meter reading, active energy	Type B, 32-bit integer
4	Momentary active power	Type B, 32-bit integer
5	Power-up meter	Type B, 16-bit integer
6	Error flags	Type B, 8-bit integer
7	Time of last power-up	Type F, date and time
8	Meter reading, reactive energy [1)]	Type B, 32-bit integer
9	Momentary reactive power [1)]	Type B, 32-bit integer

[1)] only type ENERGYMETER MID meters with feature M2 or M3 see page 8

Operating Hours

The operating hours counter records time during which current consumption exceeds the meter’s starting current. This information can be used for preventive maintenance of the installation or the system.

Power-Up Meter

The power-up meter records the number of power-supply making operations at the energy meter, and the point in time of the last making operation. This information can be used to evaluate the frequency of power interruptions, as well as running time since the last making operation.

Error Flags

The error flags return error states which have been detected by the energy meter. The following differentiations are made amongst the various error messages:

Manufacturer-specific errors:	Phase sequence errors, frequency measuring errors, phase failure, excessive voltage or current
Permanent error:	Defective meter, balancing is required or DC offset is too large
Application error:	Meter has received a frame with commands it doesn't support.

Cutoff Date Frame

Data Point	Designation	Data Type
1	Cutoff date	Type F, date and time
2	Meter reading for energy on cutoff date	Type B, 32-bit integer
3	Next cutoff date	Type F, date and time
4	Features	Type B, 8-bit integer

1.1 M-Bus Communication

M-bus communication takes place at 300 to 9600 baud with 8 data bits, even parity and 1 stop bit. The baud rate is set to 2400 baud at the factory and can be changed with the usual M-bus command. The baud rate is saved to the EEPROM and remains active until changed.

Transmission of multi-byte variables takes place in accordance with M-bus mode 1. This means that the least significant byte is transmitted first.

The firmware supports primary as well as secondary addressing (with wildcards as well). The utilized M-bus frames are described below. Please refer to EN1434-3 and M-bus user group documentation for further explanations.

Utilized Abbreviations

Abbreviation	Meaning
LEN	Length
PADR	Primary address
IDENT	Secondary address
MAN	Manufacturer
GEN	Generation (device version)
MED	Medium
TC	Read-out meter
STAT	Status according to EN1434-3
L-Feld	Length field
C-Feld	Control field
CI-Feld	Control information field
A-Feld	Address field
DIF	Data information field
VIF	Value information field
U128x/138x	U1281 … U1389

1.1.1 RSP_UD Frame (respond user data)

If the master sends an REQ_UD2 frame to the meter, the meter responds with an RSP_UD frame with variable data structure. The U128x/138x can transmit two RSP_UD frames:

The Standard Frame

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	LEN	Frame length
L-Feld	1	LEN	Frame length
Start	1	68h	
C-Feld	1	08h	RSP_DU
A-Feld	1	PADR	Primary address
CI-Feld	1	72h	Read-out
Secondary address	4	IDENT	Secondary address
Manufacturer code	2	MAN	Manufacturer A31Dh = GMC
Device version	1	GEN	Generation (device version) GEN = 02: U118x series GEN = 0A: U128x/U138x series
Medium	1	MED	Medium 02h = electricity
Read-out meter	1	TC	Is incremented for each read-out
Status	1	STAT	Status according to EN1434-3
Signature	2	0000h	Not used
DIF / DIFE	1	04h	
VIF / VIFE	1	6Dh	Time Point, time & date, data type F
Value	4		System time, type F
DIF / DIFE	1	04h	
VIF / VIFE	1	22h	On-time, hours
Value	4		Operating hours, 32-bit integer
DIF / DIFE	1	04h	
VIF / VIFE	1(2)	VIF_E	Active Energy, kWh/MWh
Value	4		Meter reading, active energy, 32-bit integer
DIF / DIFE	1	04h	
VIF / VIFE	1(2)	VIF_P	Active Power, W/kW/MW
Value	4		Momentary active power, 32-bit integer
DIF / DIFE	1	02h	
VIF / VIFE	2	FD 60h	Power-up meter
Value	2		16-bit integer
DIF / DIFE	1	01h	
VIF / VIFE	2	FD 17h	Error flags (binary)
Value	1		Error flags B7… B0, 8-bit integer
DIF / DIFE	1	04h	
VIF / VIFE	1	6Dh	Time point, time & date, data type F
Value	4		Time of last power-up, type F
DIF / DIFE	3	84 80 40h	Reactive Energy Meter (unit 2)
VIF / VIFE	1(2)	VIF_E	Reactive Energy, kVArh/MVArh [1)]
Value	4		Meter reading, reactive energy, 32-bit integer [1)]
DIF / DIFE	3	84 80 40h	Reactive Energy Meter (unit 2)
VIF / VIFE	1(2)	VIF_P	Reactive Power, VAr/kVAr/MVAr [1)]
Value	4		Momentary reactive power, 32-bit integer [1)]
Checksum	1	CS	
Stop	1	16h	

[1)] only type ENERGYMETER MID meters with feature M2 or M3 see page 8

The Cutoff Date Frame

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	LEN	Frame length
L-Feld	1	LEN	Frame length
Start	1	68h	
C-Feld	1	08h	RSP_DU
A-Feld	1	PADR	Primary address
CI-Feld	1	72h	Read-out
Secondary address	4	IDENT	Secondary address
Manufacturer code	2	MAN	Manufacturer A31Dh = GMC
Device version	1	GEN	Generation (device version)
Medium	1	MED	Medium 02h = electricity
Read-out meter	1	TC	Is incremented for each read-out
Status	1	STAT	Status according to EN1434-3
Signature	2	0000h	Not used
DIF / DIFE	1	44h	
VIF / VIFE	1	6Dh	
Value	4		Cutoff date, type F
DIF / DIFE	1	44h	
VIF / VIFE	1(2)	VIF_E	Energy, kWh/MWh
Value	4		Energy reading on cutoff date, 32-bit integer
DIF	1	44h	
VIF, VIFE	2	ED7Eh	
Value	4		Next cutoff date, type F
DIF / DIFE	1	0Fh	
Features	1		Manufacturer-specific: features, 8-bit integer
Checksum	1	CS	
Stop	1	16h	

Selecting the frame: see “Selecting the Response Frame” on page 6

Status STAT

Bits	EN1434-3	U128x/U138x
7	Manufacturer-specific	Phase failure or error during frequency measurement
6	Manufacturer-specific	Phase failure
5	Manufacturer-specific	Maximum voltage or current value exceeded
4	Temporary error	Oring of all manufacturer-specific errors
3	Permanent error	Defective meter: Send device to repair department
2	Dead battery	0
1	00, no error 01, application is busy 10, application error 11, reserved	Application error
0		0

Application error:

– Is set when the meter receives a frame with unsupported commands.

– Is cleared with the “Application Reset Frame” described on page 7.

All other errors correspond to the error messages at the meter’s display.

Error Flags from the Standard Frame

Bits	Error Description
7	U1 < 75% of nominal voltage
6	U2 < 75% of nominal voltage
5	U3 < 75% of nominal voltage
4	I1 < starting current
3	I2 < starting current
2	I3 < starting current
1	Temporary error
0	Permanent error

Features from the Cutoff Date Frame

Bits	Features
7	Reserve
6 5 4	Transformation ratios Ct, Vt 0: Ct=Vt=1 1: Ct, Vt adjustable 2: Ct, Vt calibrated
3 2 1 0	Type 0: U1281 (1: U1287) 2: U1289 3: U1381 4: U1387 5: U1389

Meter Reading Units of Measure and Resolution for Energy, VIF_E (value information field energy)

Meter readings for energy are transmitted as 4 byte integers (with plus or minus sign). Unit of measure and resolution are the same as in the calibration display included with the U128x/138x.

The following units of measure and resolutions are possible for meter readings:

Meter Type	CTxVT	Resolution *	U/M	VIF/ VIFE
U1281, U1289	—	0.01	kWh	04h
U1381, U1387, U1389	1 … 10	0.001	kWh	03h
	11 … 100	0.01	kWh	04h
	101 … 1000	0.1	kWh	05h
	1001 … 10,000	1	kWh	06h
	10,001 … 100,000	0.01	MWh	07h
	100,001… 1,000,000	0.1	MWh	FB 00h

* VArh instead of Wh for reactive energy
(only type ENERGYMETER MID meters with feature M2 or M3 see page 8)

Units of Measure and Resolution for Power, VIF_P (value information field power)

Power is transmitted as a 4-byte integer (with plus or minus sign).

The following units of measure and resolutions are possible for power:

Meter Type		Resolution *	U/M	VIF/ VIFE
U1281, U1289		0.01	kW	2Ch
U1381, U1387, U1389 CTxVT for U3	U1381, U1387, U1389 CTxVT for U5 … U7			
1 … 4	1	1	W	2Bh
5 … 40	2 … 10	0.01	kW	2Ch
41 … 400	11 … 100	0.1	kW	2Dh
401 … 4000	101 … 1000	1	kW	2Eh
4001 … 40,000	1001 … 10,000	0.01	MV	2Fh
40,001 … 400,000	10,001 … 100,000	0.1	MV	FB 28h
400,001 … 1,000,000	100,001 … 1,000,000	1	MV	FB 29h

* VAr instead of W for reactive power
(only type ENERGYMETER MID meters with feature M1 or M3 see page 8)

Primary VIF Codes (value information field)

Encoding	Meaning	Range Encoding	Range
E000 0nnn	Energy	10Ennn-3 Wh	0.001 Wh … 10,000 Wh
E010 00nn	On-time	nn = 00 seconds nn = 01 minutes nn = 10 hours nn = 11 days	
E010 01nn	Operating hours	Encoded like on-time	
E010 1nnn	Power	10Ennn-3 W	0.001 W … 10,000 W
E110 110n	Cutoff date (time point)	n = 0 date n = 1 time and date	Data type G Data type F

Primary VIF Code Extensions, VIFE

In the case of a VIF value of FBh (extension indicators), the “true” VIF value is in the first VIFE byte.

Encoding	Meaning	Range Encoding	Range
E000 000n	Energy	10En-1 MWh	0.1 MWh … 1 MWh
E010 100n	Power	10En-1 MW	0.1 MW … 1 MW

1.1.2 Configuration Frames

The following variables and parameters can be configured with M-bus frames:

Variable	Value Range	Note
Primary address	0 … 250	Standard: 0
Secondary address	8 digits, 0 … 9	Standard: derived from serial number
Baud rate	300 … 9600 baud	Standard: 2400 baud
Response frame	Standard / cutoff date	Standard: standard frame
Date and time	DD.MM.YYYY hh:mm	Standard: current date/time
Cutoff date	DD.MM.YYYY hh:mm	Standard: 01.00.2000 00:00

All parameters are stored to an EEPROM and are not lost in the event of power failure. All parameter settings are initiated by the master with an SND_UD frame. The U128x/138x responds with an ACK frame.

SND_UD Frames

Only one parameter can be changed per frame. Combining several values into a single frame is not possible.

Changing the Baud Rate

The U128x/138x supports rates of 300 to 9600 baud. The device is set to 2400 baud at the factory. The baud rate can be changed with the following frame.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	03h	
L-Feld	1	03h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	BBh	BBh = 2400 baud
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame using the old baud rate, and is then switched to the new baud rate.
- The baud rate is saved to the EEPROM.

Selectable Baud Rates

Baud rate	CI-Feld
300	B8
600	B9
1200	BA
2400	**BB**
4800	BC
9600	BD

The M-Bus User Group recommends using a baud rate of 300, 2400 or 9600.

Attention!

The meters are not equipped with automatic baud rate detection. The baud rate must be set in advance for this reason. It must be assured that the utilized M-bus topology (cable length, conductor cross-section) supports the selected baud rate. Otherwise the master is unable to communicate with the meter and it is no longer possible to change to a lower baud rate. In such cases, the baud rate must be changed to a lower value using the controls at the device.

Changing the Primary Address

The primary address can be changed with the following frame. Values from 0 to 250 are possible. The primary address is set to 0 at the factory.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	06h	
L-Feld	1	06h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Old primary address, 0 … 250
CI-Feld	1	51h	Parameters configuration
DIF	1	01h	
VIF	1	7Ah	
Value	1		New primary address, 0 … 250
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.
- The primary address is saved to the EEPROM.

Changing the Secondary Address

The secondary address can be changed with the following frame. The secondary address is set to the last eight digits of the serial number at the factory.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	06h	
L-Feld	1	06h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	51h	Parameters configuration
DIF	1	0Ch	
VIF	1	79h	
Value	4	78563412	Secondary address, 12345678
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.
- The secondary address is saved to the EEPROM.

Selecting the Response Frame

The response frame can be selected with the following frame. Selection is made via DIF. The standard frame is selected as the default at the factory.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	05h	
L-Feld	1	05h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	51h	Parameters configuration
DIF, DIFE	1	08h / 48h	08h = standard / 48h = cutoff date (storage 0/1)
VIF	1	7E	All VIFs
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.
- Momentary values are saved to memory location number 0, and cutoff date values to memory location number 1.
- The selection is saved to the EEPROM.

Setting Date and Time

Date and time can be changed with the following frame.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	09h	
L-Feld	1	09h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	51h	Parameters configuration
DIF	1	04h	
VIF	1	6Dh	
Value	4		New date / new time, type F
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.
- No automatic switching to daylight saving time.

Comment:
Date/time is a 32-bit number which contains date and time encoded for the M-bus (type F = compound CP32: date and time):

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DT0	Valid	Re-served	Minutes (0 … 59)					
DT1	Day-light saving time	Re-served	Reserved	Hours (0 … 23)				
DT2	Year (LSB, 0 … 99)			Day (1 … 31)				
DT3	Year (MSB, 0 … 99)				Month (1 … 12)			

Setting the Cutoff Date

The cutoff date can be changed with the following frame.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	09h	
L-Feld	1	09h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	51h	Parameters configuration
DIF	1	44h	
VIF, VIFE	1	ED 7Eh	
Value	4		New cutoff date, type F
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.
- The cutoff date is saved to the EEPROM.

Application Reset Frame

The U128x/138x supports application reset. The application reset frame is initiated by the master with an SND_UD frame. The U128x/138x responds with an ACK frame.

After receiving this command, the U128x/138x clears any existing application errors:

An application error in the status byte of the RSP_UD frame is indicated if unknown C or CI fields are detected in an SND_UD frame. The bit is cleared with this frame.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	03h	
L-Feld	1	03h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	50h	Application reset
Checksum	1	CS	
Stop	1	16h	

- The U128x/138x responds with an ACK frame.

Freezing the Meter Reading (Freeze)

The freeze function sends out a freeze command to the M-Bus meter which then saves the momentary time as cutoff date and the momentary meter reading as cutoff value.

With this command an entire bus system can be instructed to save its meter readings simultaneously (broadcast address 255 without response). Subsequently, the master is capable of reading out all meters one after the other.

The two values are indicated in the cutoff date frame and are designated with the date of the cutoff date and the energy meter reading at the cutoff date.

The freeze command is supported as of version 2.14.

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	03h	
L-Feld	1	03h	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	PADR	Primary address
CI-Feld	1	54h	Freeze
Checksum	1	CS	
Stop	1	16h	

- U128x/138x responds with an ACK frame.

Freeze and cutoff date function

The freeze and cutoff date functions both use the cutoff date energy and the cutoff date memories.

In the cutoff date function the cutoff date energy and the cutoff date are stored to non-volatile memory as soon as the preset cutoff date is reached.

In the freeze function the cutoff date energy and the cutoff date are stored to the RAM when the corresponding command is received. They will be lost when the supply voltage is cut off and are overwritten with the stored cutoff date values.

As both functions use the same memory, they should not be used at the same time. When using the freeze function the next cutoff date should be set to a date in the past.

Initialize Normalization Frame

The master transmits an SND_NKE frame. The U128x/138x responds with an ACK frame.

Name	Number of Bytes	Value	Explanation
SND_NKE	1	40h	Initialization of the slaves

- Clears the selection
- Sets the read-out meter to zero
- The U128x/138x responds with an ACK frame.

Meter Recognition Acknowledge Frame

When a meter is addressed, it must respond to all SND_UD frames with E5, even if it is unable to process the content of the frame, the frame's content is faulty or it disregards the content for any reason whatsoever.

Name	Number of Bytes	Value	Meaning
ACK	1	E5h	

Slave Select Frame

The U128x/138x can be selected for secondary addressing with the following frame:

Name	Number of Bytes	Value	Meaning
Start	1	68h	
L-Feld	1	0Bh	
L-Feld	1	0Bh	
Start	1	68h	
C-Feld	1	53h / 73h	SND_UD
A-Feld	1	FDh	Secondary addressing
CI-Feld	1	52h	Slave select
Secondary address	4	IDENT	Secondary address of the U128x/138x
Manufacturer code	2	MAN	Manufacturer A31Dh = GMC
Device version	1	GEN	Generation (device version)
Medium	1	MED	Medium 02h = electricity
Checksum	1	CS	
Stop	1	16h	

IDENT: The 4-bit wildcard, Fh, can also be used instead of the exact secondary address. Example based on FFFFF344h: All U128x/138x meters are selected whose secondary addresses end with 344h.

MAN: The 16-bit wildcard, FFFFh, can also be used instead of A31Dh.

GEN: The 8-bit wildcard, FFh, can also be used instead of, for example, 02h.

MED: The 8-bit wildcard, FFh, can also be used instead of 02h.

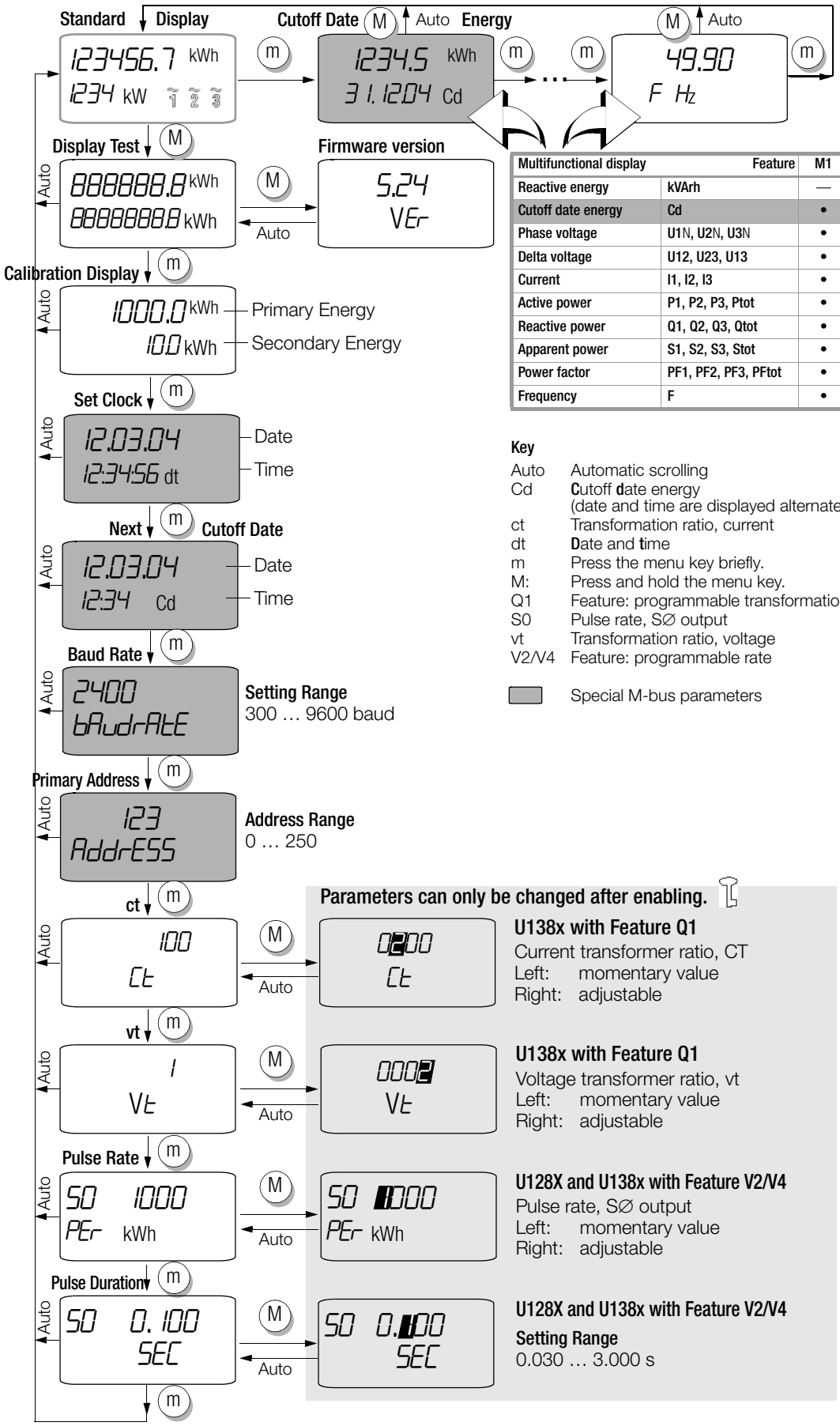
- If all four settings are in agreement with the parameter settings of the U128x/138x, it is selected and it responds with an ACK frame.
- If one or more settings do not agree with the parameter settings of the U128x/138x, it is deselected and it does not respond.
- A selected U128x/138x responds with its primary address, even when addressed with its secondary address. It can still be addressed with its primary address as well.

2 Operation

M-bus specific parameters can be set in additional menu items. These include date and time, next cutoff date, baud rate and primary address.

Energy on the cutoff date is displayed additionally in the measured value loop.

Overview of Parameter Settings (excerpt from operating instructions no. 3-349-275-15 or 3-349-618-15, expanded to include M-bus parameter settings)



Multifunctional display	Feature	M1	M2	M3
Reactive energy	kVArh	—	•	•
Cutoff date energy	Cd	•	•	•
Phase voltage	U1N, U2N, U3N	•	—	•
Delta voltage	U12, U23, U13	•	—	•
Current	I1, I2, I3	•	—	•
Active power	P1, P2, P3, Ptot	•	—	•
Reactive power	Q1, Q2, Q3, Qtot	•	—	•
Apparent power	S1, S2, S3, Stot	•	—	•
Power factor	PF1, PF2, PF3, PFtot	•	—	•
Frequency	F	•	—	•

Key

Auto	Automatic scrolling
Cd	**C**utoff **d**ate energy (date and time are displayed alternately)
ct	Transformation ratio, current
dt	**D**ate and **t**ime
m	Press the menu key briefly.
M:	Press and hold the menu key.
Q1	Feature: programmable transformation ratios
S0	Pulse rate, SØ output
vt	Transformation ratio, voltage
V2/V4	Feature: programmable rate

Special M-bus parameters

Parameters can only be changed after enabling.

U138x with Feature Q1
Current transformer ratio, CT
Left: momentary value
Right: adjustable

U138x with Feature Q1
Voltage transformer ratio, vt
Left: momentary value
Right: adjustable

U128X and U138x with Feature V2/V4
Pulse rate, SØ output
Left: momentary value
Right: adjustable

U128X and U138x with Feature V2/V4
Setting Range
0.030 … 3.000 s

Cutoff Date and Clock Functions

The real-time clock is used for implementing the clock and cutoff date functions. Date and time are represented in the following format: DD.MM.YY hh:mm. The M-bus format does not include seconds. A 24 hour clock is used.

Cutoff Date

The micro-controller saves the momentary meter reading as cutoff date energy on the cutoff date, as well as the momentary values for date and time as the cutoff date.

The cutoff date can be set via the M-bus, or with the controls on the meter. Cutoff date energy and the cutoff date itself can be read via the M-bus, as well as directly at the meter.

Cutoff date, cutoff date energy and the cutoff date itself are stored to non-volatile memory.

The following functions can be implemented by entering wildcards (00) to the date field:

01.01.00 00:00	Save every year on 1 Jan. at midnight	Annual consumption
01.00.00 00:00	Save in the 1st of each month at midnight	Monthly consumption, default
00.00.00 00:00	Save every day at midnight	Daily consumption

3 Parameters Configuring

A special parameter configuration software is not necessary as all parameters can be adjusted directly at the M-bus meter.

Commercially available M-bus programs can be used if you wish to configure the parameters via the M-bus.

4 List of Sources

4.1 Information Regarding M-Bus

The latest information and documentation on the M-bus can be accessed at the M-Bus User Group website:

http://www.m-bus.com

5 Product Support

If required please contact:

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