GOSSEN METRAWATT

U128x-W3 and U138x-W3

Electronic Active Energy Meters with L-Bus Interface

3-349-345-03
3/3.10

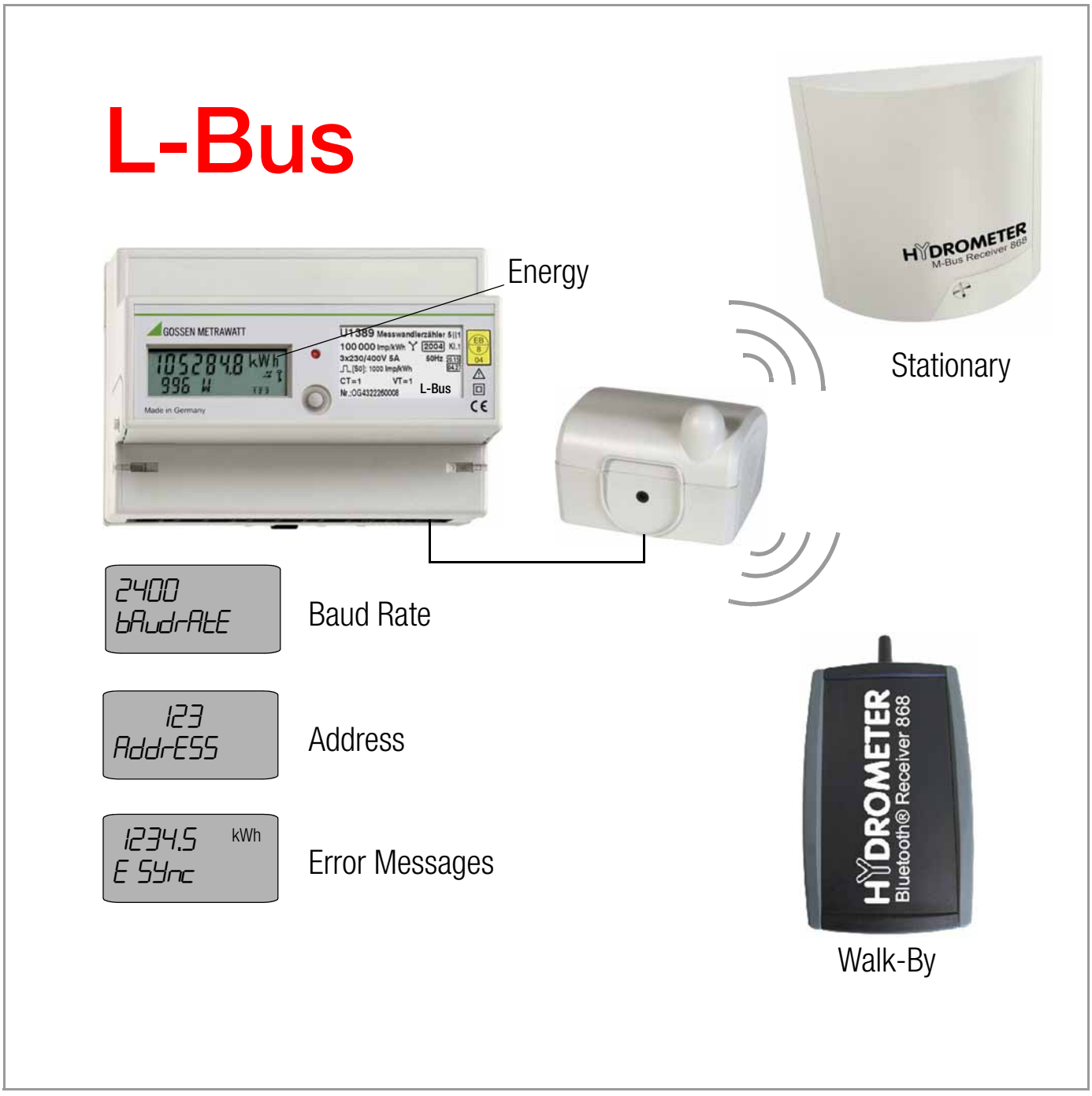


Table of Contents

1 L-Bus Interface

Requirements

Series U128x and U138x energy meters must be equipped with order option W3 (L-bus) for operation on the L-bus. If this is the case, the serial plate is identified with an “L-Bus” imprint.

Applications

The L-bus (low-voltage bus) is a simple interface and is used as an alternative to the M-bus. It can be used to connect display devices without having to supply high M-bus levels. The transmission protocol and bit encoding are the same as for the M-bus.

Technical Data

- Communication takes place via a twisted-pair cable.
- Maximum cable length is 10 meters.
- Up to 1 slave can be connected to the HYDRO-Radio 868.
- Transmission protocol and bit encoding: same as M-bus
- Bus supply voltage is 3.2 V, and is supplied from the master. Power is supplied via R_i = 56 kΩ.
- Signal level:
  Master → Slave U_{High} = 1.8 ... 5 V (3.2 V), U_{Low} < 0.3 V
  Slave → Master R_{High} > 2 MOhm, R_{Low} < 12 kΩ
- Max. Input voltage: 30 V, max. Input current: 0.1 mA
- No function in case of reversed polarity
- Reverse polarity protected up to a voltage of 46 V
- The baud rate is fixed at a setting of 2400 baud.

2 Meter Reading via Radio Transmission

U128x/U138x energy meters can be read out via radio transmission with the help of the L-bus interface. A “HYDRO-RADIO 868 extern” radio module supplied by Hydrometer is connected to the L-bus at the energy meter to this end. The radio module transmits meter readings cyclically.

Connecting a “HYDRO-RADIO 868 extern” Supplied by Hydrometer to an L-Bus Energy Meter

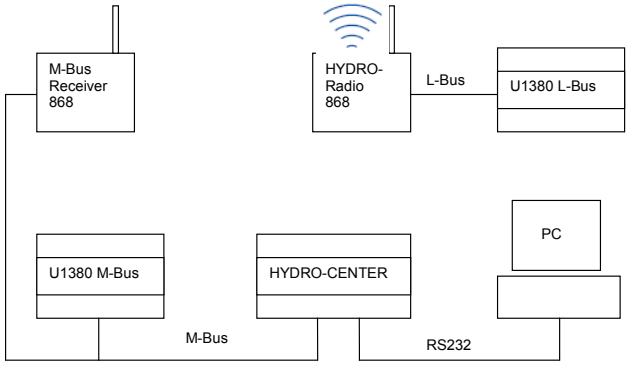
Signal	HYDRO-Radio 868 extern	U128x/U138x
L-bus +	White	Terminal 23
L-bus -	Brown	Terminal 24

See also “Technical Description, Hydro-Radio 868 extern” issued by Hydrometer.

Using the U128x/138x with the HYDRO-CENTER

In addition to other M-bus devices, a radio receiver, namely the M-BUS RECEIVER 868, can be connected to the HYDRO-CENTER. This makes it possible to read out data from M-bus devices and HYDRO-RADIO devices.

The radio module transmits current meter readings cyclically, the meter reading on the cutoff date and various operating information.



3 L-Bus Communication

L-bus communication takes place at 2400 baud with 8 data bits, 1 even parity bit and 1 stop bit. 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

3.1 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.

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	04h	
VIF / VIFE	1(2)	VIF_E	Energy, kWh/MWh
Value	4		Meter reading, energy, 32 bit integer
Checksum	1	CS	
Stop	1	16h	

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” command described on page 4.

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

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). The 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	Resolu-tion	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 ... 1 000	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*

* not possible in connection with HYDRO-Radio 868

Primary VIF Codes (value information field)

Encoding	Description	Range Encoding	Range
E000 0nnn	Energy	10Ennn-3 Wh	0.001 Wh ... 10,000 Wh

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	Description	Range Encoding	Range
E000 000n	Energy	10En-1 MWh	0.1 MWh ... 1 MWh

3.2 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 characters, 0 ... 9	Standard: derived from serial number

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 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_DU
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_DU
A-Feld	1	PADR	Primary address
CI-Feld	1	51h	Parameters configuration
DIF	1	0Ch	
VIF	1	78h	
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.

Application Reset Frame

The U128x/138x supports application reset. The application reset frame is initiated by the master with an SND_DU 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_DU
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.

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 02h.

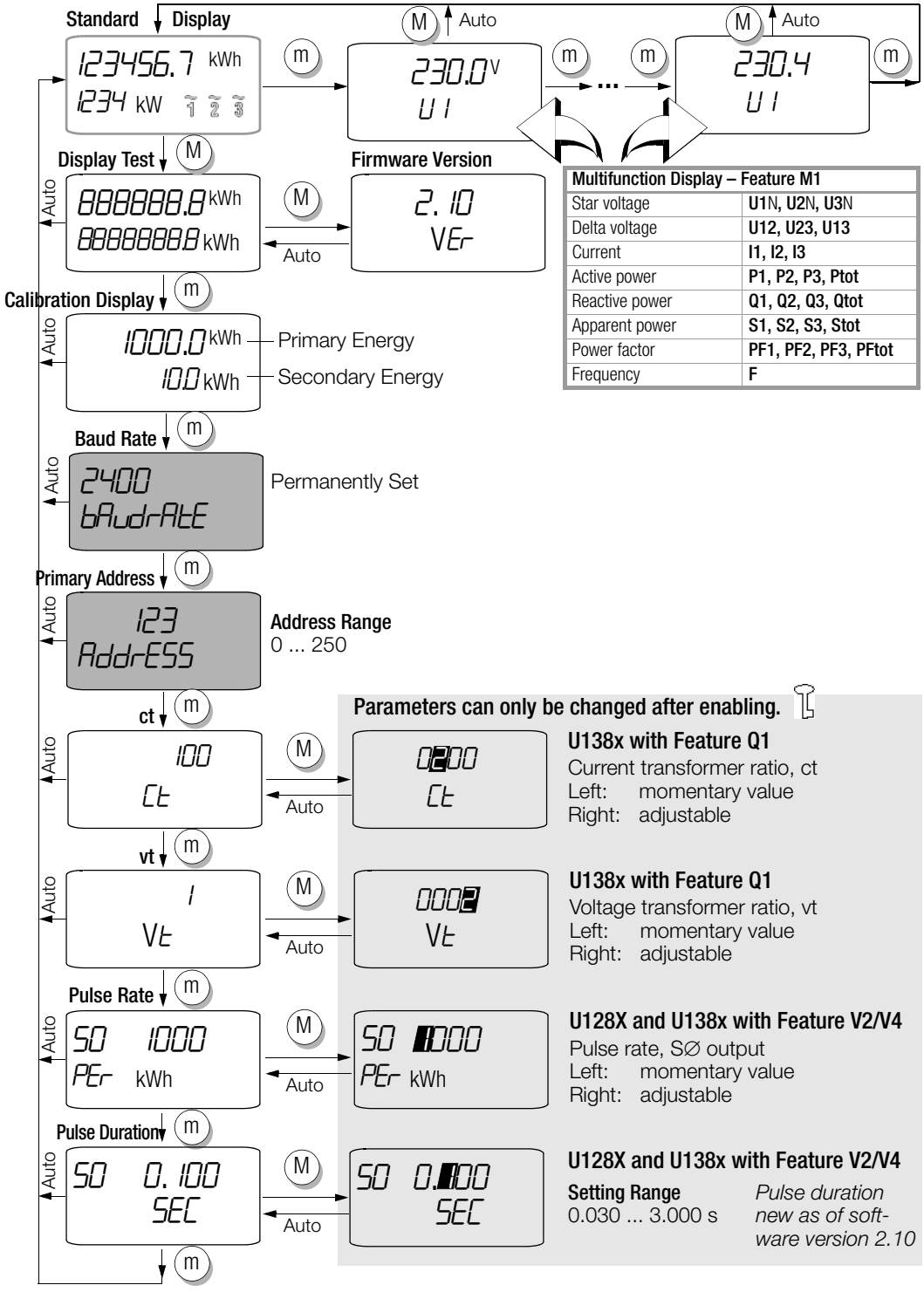
MED: The 8-bit wildcard, FFh, can also be used instead of 02h.

- 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

4 Operation

The only L-bus specific parameter is the primary address.
The baud rate is only displayed.

Overview of Parameter Settings (excerpt from operating instructions no. 3-349-275-29, expanded to include L-bus parameter settings)



Multifunction Display – Feature M1	
Star 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
ct	Transformation ratio, current
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 L-bus parameters

5 List of Sources

5.1 Information on Devices for Meter Read-Out via Radio Transmission

Information on the HYDRO-RADIO 868 extern, the M-bus receiver and the HYDRO-CENTER can be accessed at Hydrometer's website:

http://www.hydrometer.de

5.2 Information Regarding M-Bus

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

http://www.m-bus.com

6 Product Support

If required please contact:

GMC-I Messtechnik GmbH
Product Support Hotline
Phone: +49 911 8602-500
Fax: +49 911 8602-340
E-mail support@gossenmetrawatt.com

Prepared in Germany • Subject to change without notice • PDF version available on the Internet

GOSSEN METRAWATT

GMC-I Messtechnik GmbH
Südwestpark 15
90449 Nürnberg • Germany

Phone +49 911 8602-111
Fax +49 911 8602-777
E-Mail info@gossenmetrawatt.com
www.gossenmetrawatt.com