Manual

Gateway

Configuration with **Device Monitor**

Content

1 Overview

1.1 About this document

This document based on the Device Monitor 2.16, for the Firmware version 2.1.4 of the Gateways.

1.2 Gateway activities

The Gateway was designed to provide our customer with meter data from his estates using electronical transfer methods.

The Gateway is in standby mode most of the time and wakes up on customer selected times to process scheduled tasks.

1. Collect and filter (according to White- and Blacklist) wireless M-Bus telegrams and store it into non-volatile FLASH-Memory of the Gateway.

2. Decode (AES) and format (file format) the data from non-volatile FLASH memory and upload the output to an FTP Server.

3. Decode (AES) and format (file format) the data from non-volatile FLASH memory and send the output via an SMTP server to an E-mail box.

4. Wait a certain time for configuration massages (SMS), progress them and send out an answer.

1.3 Configuration of the Gateway

The Gateway can be configured via USB or SMS. As soon as the gateway is connected to an USB port, it is in the configuration mode. The configuration mode is terminated after the USB port is disconnected from the Gateway.
Caution: No scheduled tasks are performed in the USB configuration mode!

1.4 Device Monitor activity

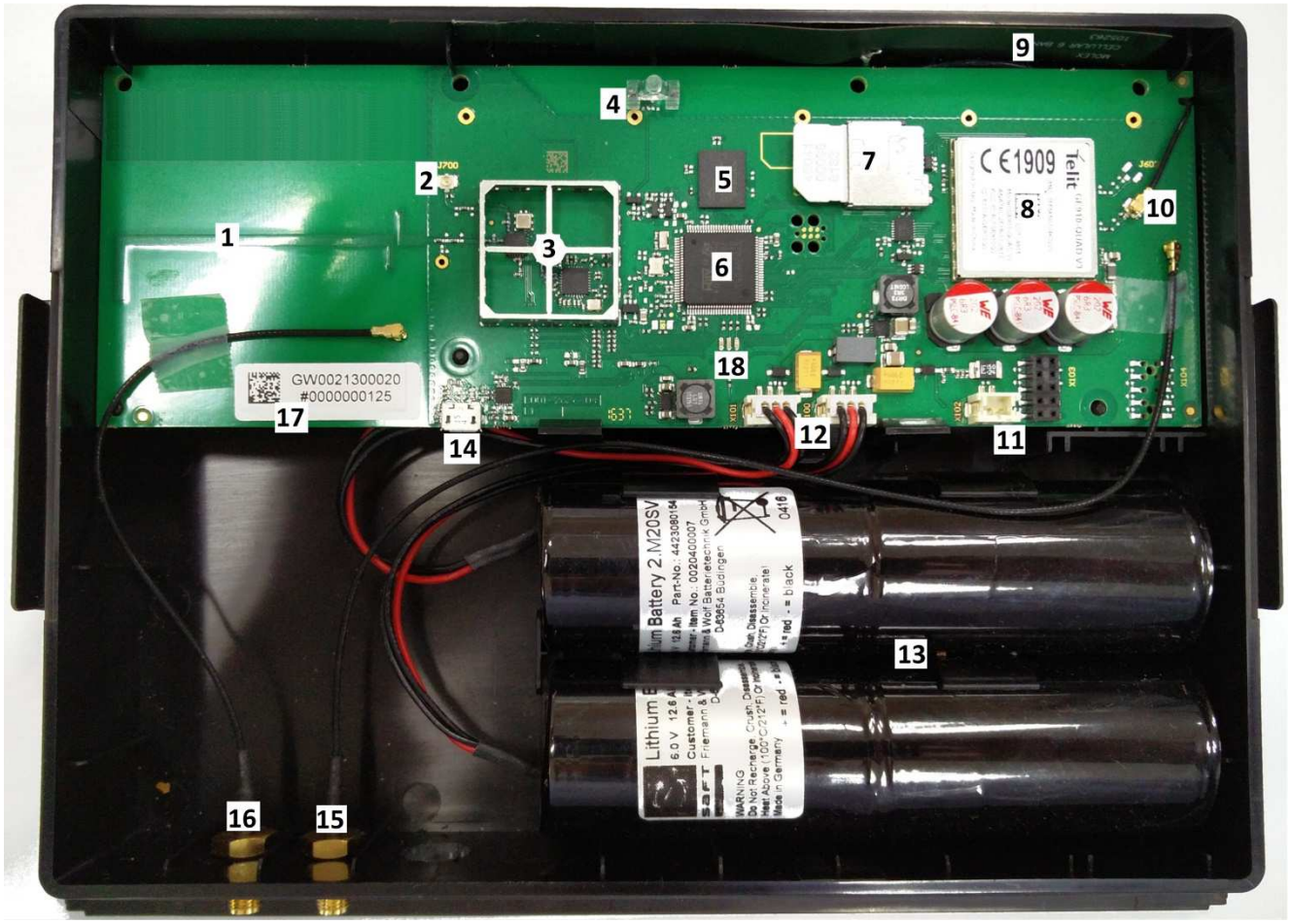
The Device Monitor is the graphic user interface for the Gateway's command interpreter. All functions of the gateway can be used and the corresponding SMS commands can be read out.

1.5 List of abbreviations

wM-Bus	Wireless-M-Bus
FTP	File Transfer Protocol
DBG	Debugging (error/Information)
LED	Light-emitting diode
USB	Universal Serial Bus
WL	Whitelist (Positive list of the gateway)
BL	Blacklist (Negative list of the gateway, restricts WL)
GSM	Global System for Mobile Communications
GPRS	General Packet Radio Service
SIM	Subscriber Identity Module
CFG	Configuration
COM	Communication
APN	Access Point Name
NTP	Network Time Protocol
SMTP	Simple Mail Transfer Protocol
CSV	Character-Separated Values
XML	Extensible Markup Language
AES	Advanced Encryption Standard, a symmetrical crypt system (cryptographic technique)
RSSI	Received Signal Strength Indicator (RSSI) Is an indicator of the reception field intensity of wireless communication applications.
RAW	Raw data format
IP	Internet Protocol Address (4 numbers (0-255) separated by a point)
DNS	Domain Name System (translate the name of a Server in a IP Address)
RAM	Radom Access Memory (main memory of the gateway)
HALO	Standard Email SMTP Protocol
EHLO	Enhanced Email SMTP Protocol
START TLS	SMTP over secured transport layer. TLS is the successor to SSL
SSL	(Secure Sockets Layer) secured transport layer. precursor of the TLS

2 Hardware Information

2.1 Basic construction Engelmann Gateway



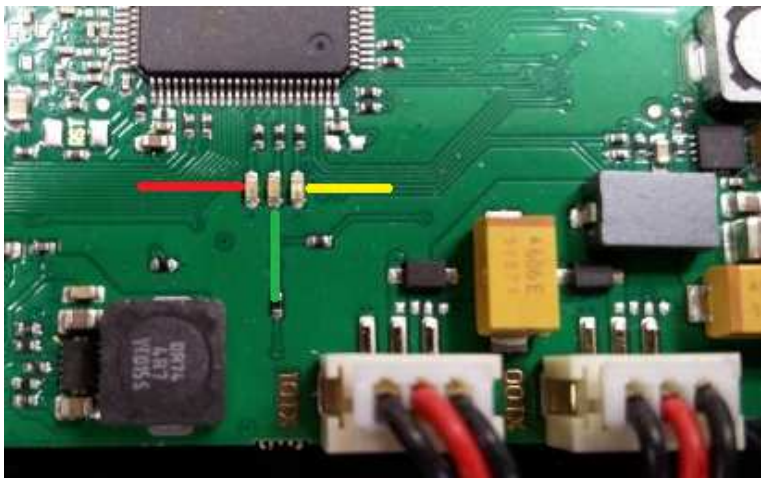
Description:

1: Internal wireless M-Bus antenna
2: External wireless M-Bus antenna connector
3: Wireless M-Bus module
4: Status LED
5: Non-volatile memory
6: Processor
7: SIM card holder
8: GSM/GPRS modem (IMEI number)
9: GSM/GPRS antenna
10: GSM/GPRS antenna connector
11: Power supply connector
12: Battery connectors
13: Batteries
14: Micro USB (configuration)
15: Antenna adapter GSM/GPRS (optional)
16: Antenna adapter wM-Bus (optional)
17: Serial number
18: Information LEDs

2.1.1 Status LED

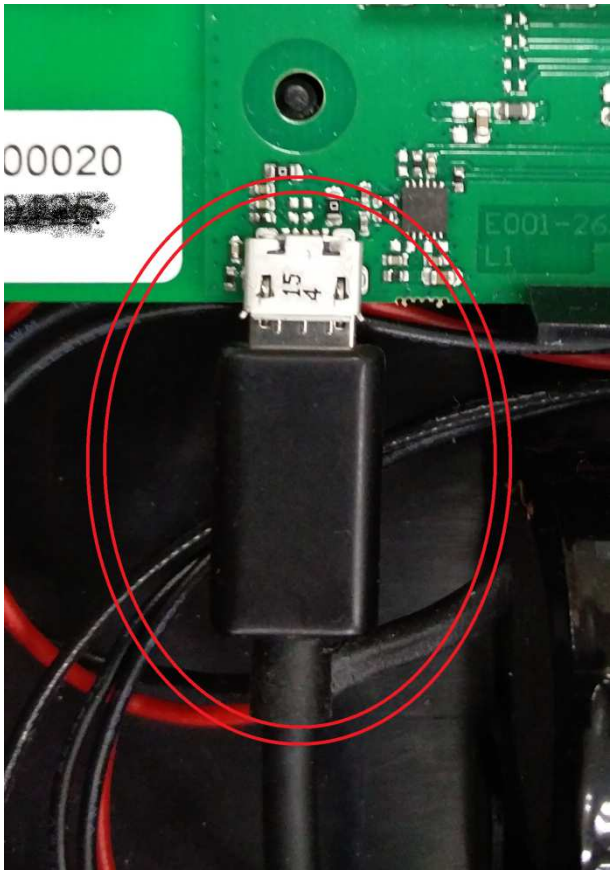
1. Standby Modus: Flash every 20 seconds
2. CFG (configuration modus): Flash every second
3. Sniffer mode: Flash every half second
4. Collect: Short flash every 15 seconds
5. SMS receiving: Flash every second
6. FTP Upload: Short flash every 15 seconds
7. SMTP Upload: Short flash every 5 seconds
8. Error: Flash with 16 Hz

2.1.2 Information LEDs



1. GSM-Module active without data connection: LED red static on
2. GSM-Module active with internet connection: LED red syncron to Status LED
3. GSM-Module active with data connection: LED red flashing
4. Wireless M-Bus active: LED green static or flashing
5. Non-volatile memory active: LED yellow static or flashing

2.1.3 USB connection



Engelmann suggests for easy COM-port recognition:
Disconnect all serial devices from computer.
Plug the USB connection.

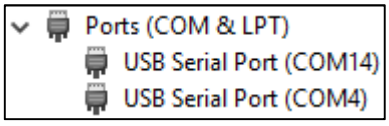
Connect the USB cable as shown in the picture above.

Plug the other end of the cable into the USB port of your laptop.

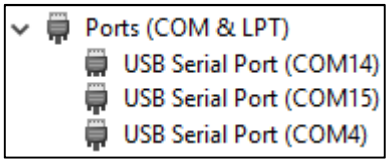
Windows 8 and later should recognise the new device and install the driver automatically.

In case of problems download and install the latest driver for VCP and D2XX from the FTDI homepage:
http://www.ftdichip.com/Drivers/VCP.htm

Tip: Open the device manager before connecting the Gateway USB cable.
After connecting the Gateway USB cable a new COM port appear.



>> Before connection



>> After connection (Gateway is on COM 15)

Caution: Once the Gateway is connected to a USB port, it is in the configuration mode. In this mode, the Gateway can be configured. Scheduled tasks are not executed in the configuration mode!

3 Basic Settings

3.1 General

3.1.1.1 Value acceptance

Nearly all settings can be read by using the buttons "read" and set with buttons "write". The background of the settings becomes green when the value is successfully transferred to the Gateway and red if errors occur.

The Gateway will set the new values only by using the “write” button.

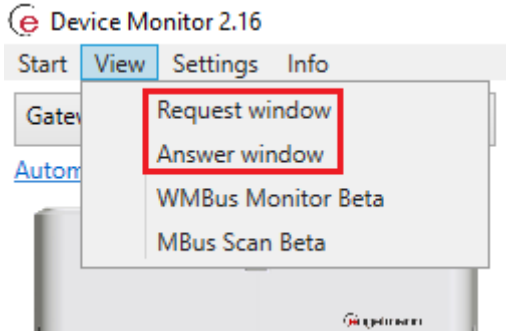
3.1.1.2 Device identifier wildcards

It is possible to put wildcards instead of the device identifier in some settings.

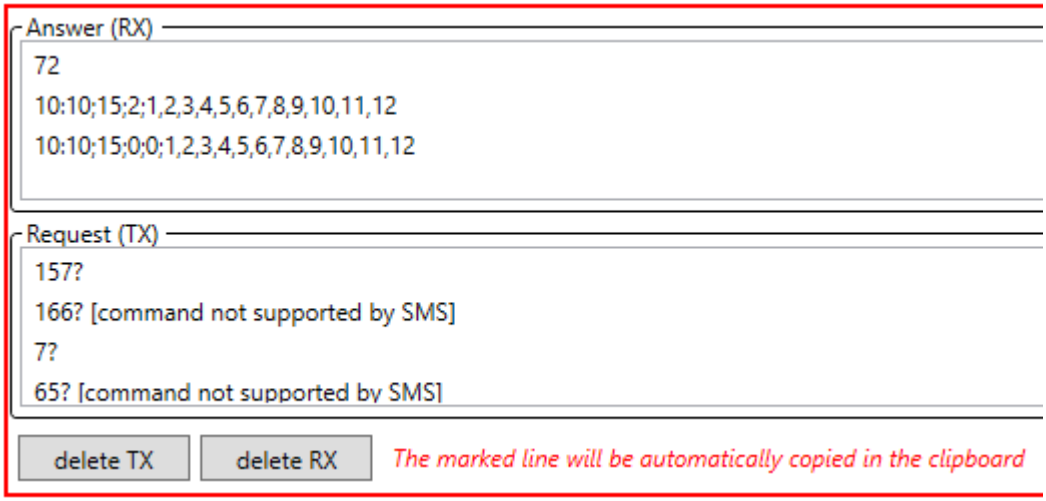
	Identification no.:	Manufacturer code:	Version code:	Device type:
Wildcard:	FFFFFFFF	???	FF	FF

Example: FFFFFFF-EFE-FF-FF only Engelmann devices
12345678-???-FF-08 only heat cost allocator with serial number 12345678

3.1.1.3 Display communication flow



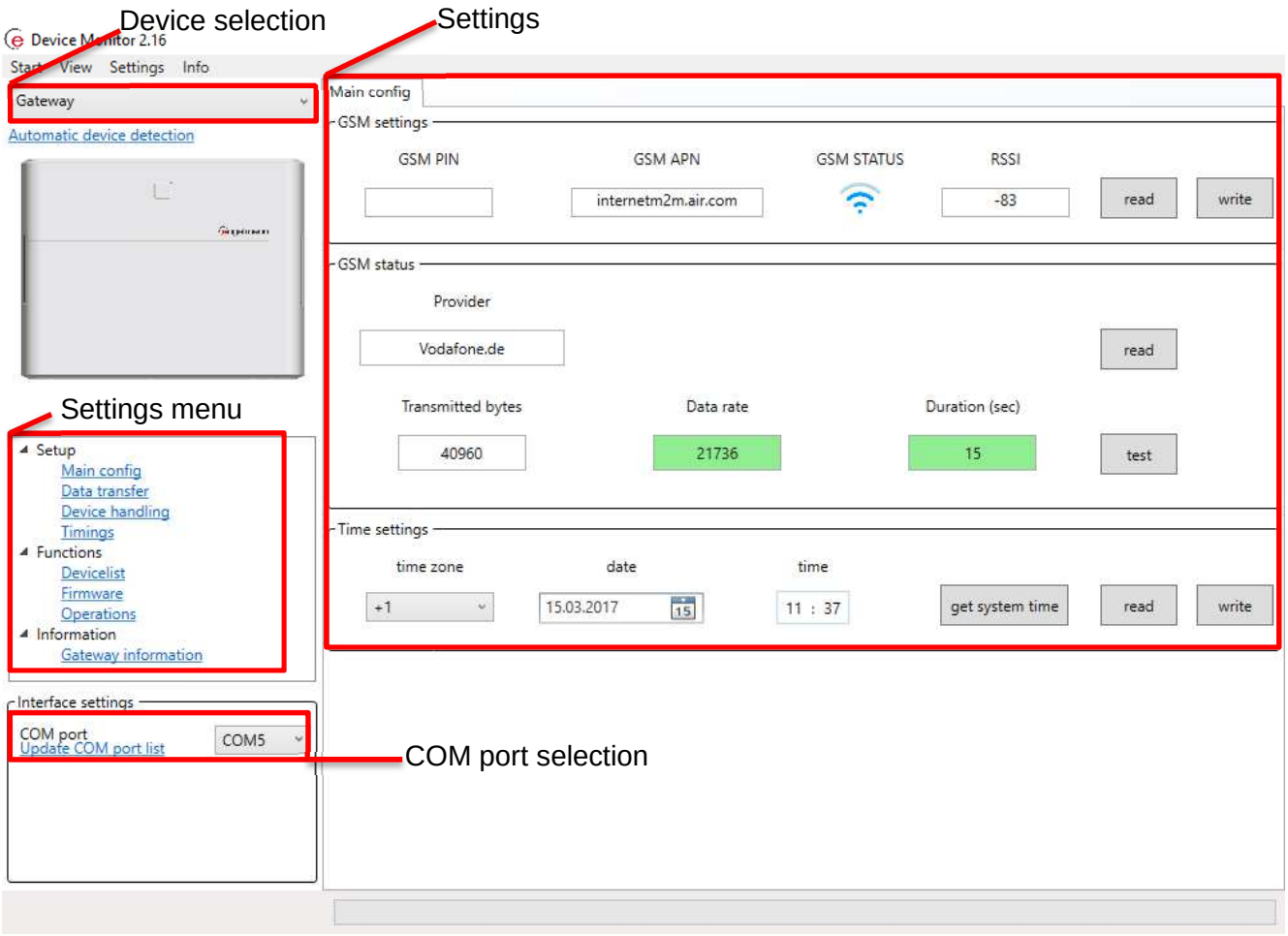
Under the tab View it is possible to display and hide the communication flow windows to (TX) and from (RX) the Gateway.



The commands are similar to the SMS commands.

(Some commands are not supported by SMS and are marked accordingly.)

3.2 Basic structure of the user interface in the Device Monitor

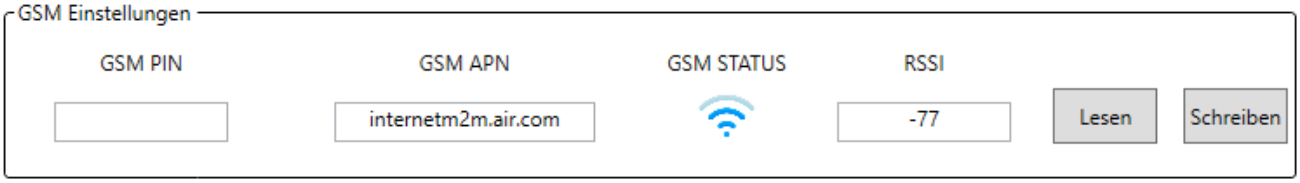


Device selection:	The Engelmann device to be configured can be selected here. In our case, the gateway must be selected (omit Automatic device detection)
COM port selection:	After the gateway has been connected to the USB port, the correct COM port can be selected in the Device Monitor. First, the COM port list should be updated and then the gateway COM port selected.
Settings menu:	The individual settings of the gateway can be selected here.
Settings:	Devices and specific settings.

3.3 Setup

3.3.1 Main config

3.3.1.1 GSM settings



GSM PIN: Four-digit number (default is the PIN is deactivated for m2m SIM cards)

GSM APN: max. 63 characters SIM card specific

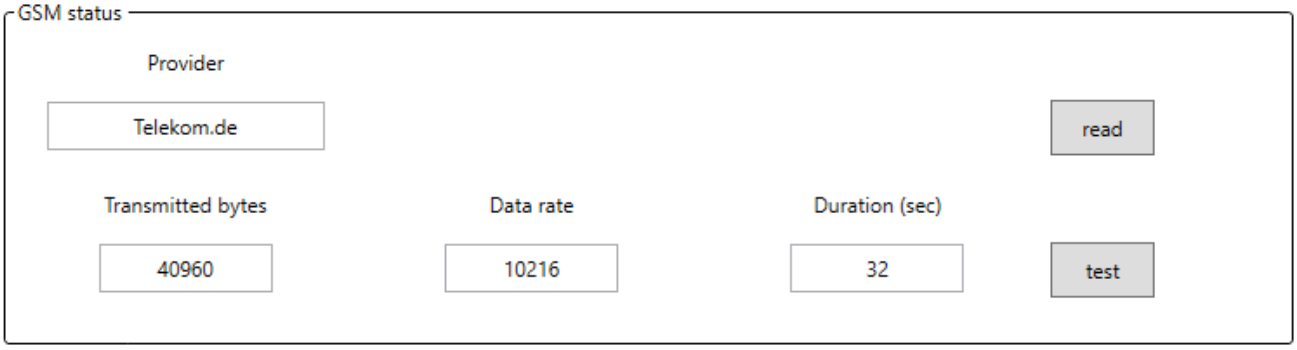
If the Engelmann Gateway is delivered without a SIM card, a M2M SIM card must be inserted and the APN value adjusted.

Factory settings: see picture

Information:

GSM status and RSSI (receive intensity) indicate the current values from Gateway (can't be set)

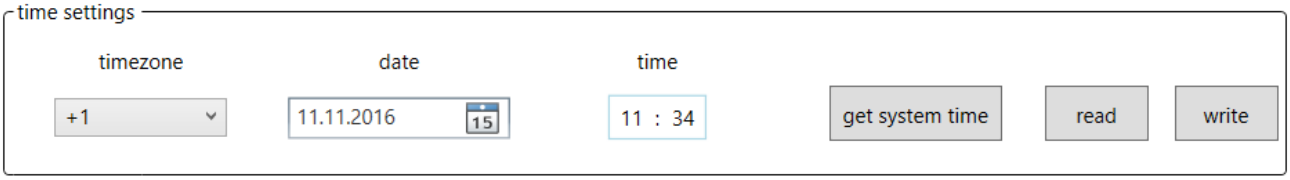
3.3.1.2 GSM status



Under GSM status you can check which provider (GSM network) the gateway is current using. In addition, it is possible to send a test file via the GSM network. For this, it is necessary that a FTP server was entered.

See "Data Transfer and FTP Settings".

3.3.1.3 Time settings



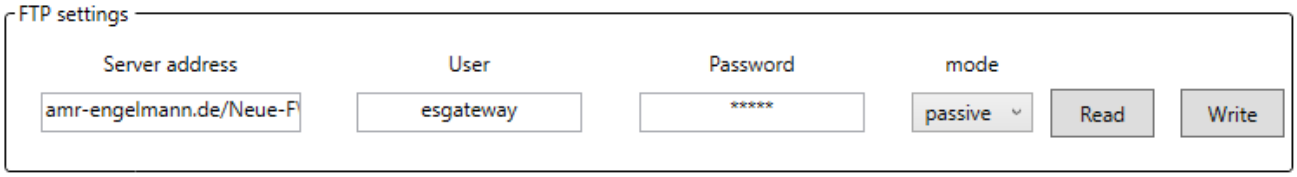
A correct time setting is essential for the correct time execution of tasks. The corresponding values can be set here. Alternatively, the PC time can be fetched.

Factory setting: timezone = +1

The factory setting of the clock in the Engelmann devices is standard Central European Time (GMT +1). There is no automatic changeover to daylight savings time.

3.3.2 Data transfer

3.3.2.1 FTP settings

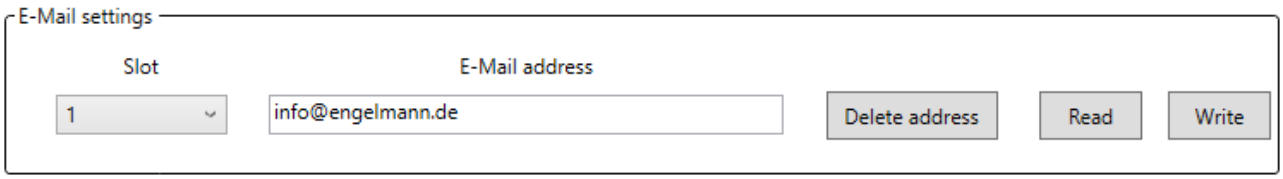


If FTP functionality should be used, the FTP settings must be entered.

The server can be specified in the form of an IP address or a DNS. The maximum length of the server address is 63 characters. The user name can have 31 characters. The password can have a maximum of 15 characters.

Factory setting: not set

3.3.2.2 Email settings

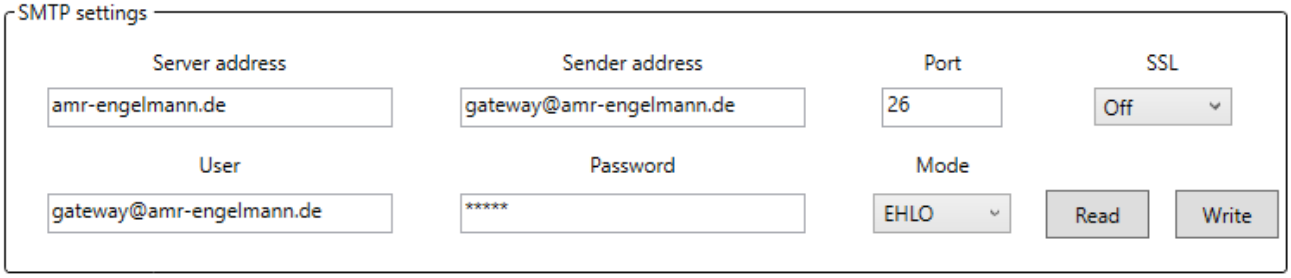


If E-Mail functionality should be used, the E-Mail and SMTP settings must be entered.

In the E-Mail settings field, 4 reception email addresses can be entered. The Gateway will send the collected device data to the mentioned addresses. Please note that for every address a separate E-Mail will be send (note the energy budget).

Factory setting: not set

3.3.2.3 SMTP settings



If E-Mail functionality should be used, the E-Mail and SMTP settings must be entered.

The server can be specified in the form of an IP address or a DNS. The maximum length is 50 characters. The maximum length of the sender address is 63 characters. The user name can have 31 characters. The password can have a maximum of 15 characters.

Factory setting: see image

Information:

The ports from 26 to 465 and 587 can be used.

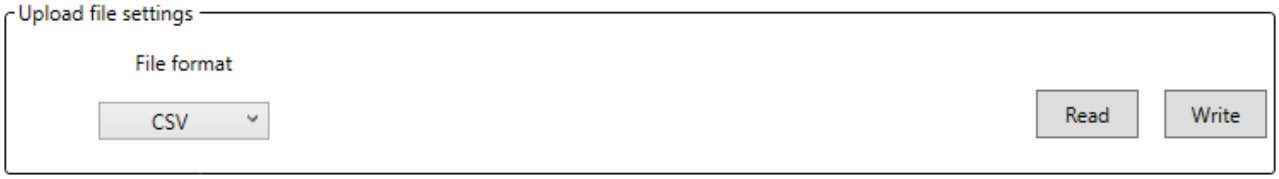
Port 587 is a standard SMTP port with "Start TLS". For this, SSL must be always on. All E-Mail servers known by us use the EHLO protocol. The table shows an overview of SMTP mail output server data from various E-Mail services.

Email-service	SMTP mail output server	Port	SSL	Mode
Yahoo*	smtp.mail.yahoo.com	587	on	EHLO
freenet	mx.freenet.de	587	on	EHLO
T-Online*	securesmtp.t-online.de	587	on	EHLO
smart-mail.de	smtp.smart-mail.de	587	on	EHLO
GMX.de	mail.gmx.net	587	on	EHLO
web.de	smtp.web.de	587	on	EHLO
Outlook-Mail	smtp-mail.outlook.com	587	on	EHLO
…	…	…	…	…

* It is necessary to set the ability to use external E-Mail programs in web portal.

The list shows the actual E-Mail service settings when the document was build.
In the meantime the settings could change and not correct anymore.

3.3.2.4 Upload file format setting



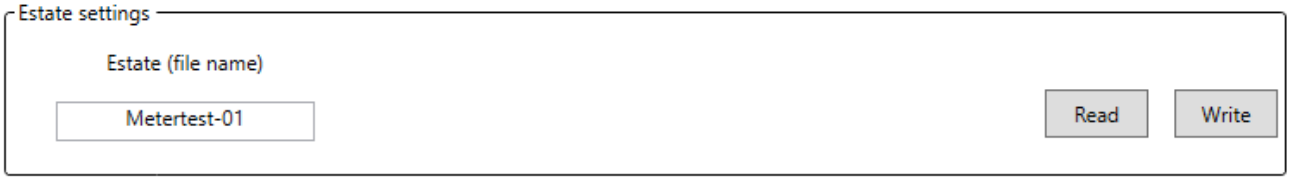
It is possible to choose between a CSV / XML file (decoded meter values) and a TXT file (raw hex meter data).

Information:

An XML file requires almost 3 times space of a CSV file.

Factory setting: CSV

3.3.2.5 Estate settings (file name)



The estate description can be a maximum of 31 characters. Umlauts are not permitted.

Information:

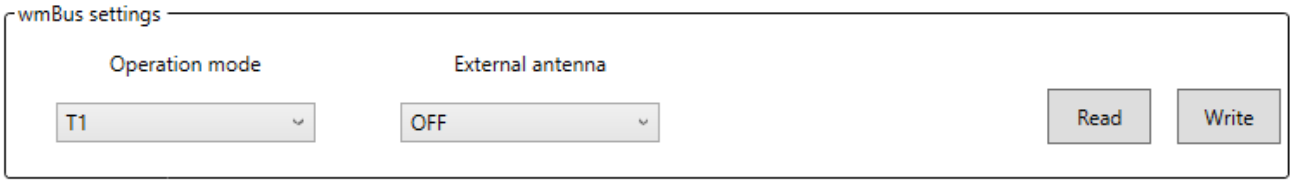
If this field is left blank, the IMEI number of the GSM module is taken as file name.

The file name will be always extended with time stamp (of the Gateway) in US format_YYMMDDhhmmss.

Factory setting: not set

3.3.3 Device handling

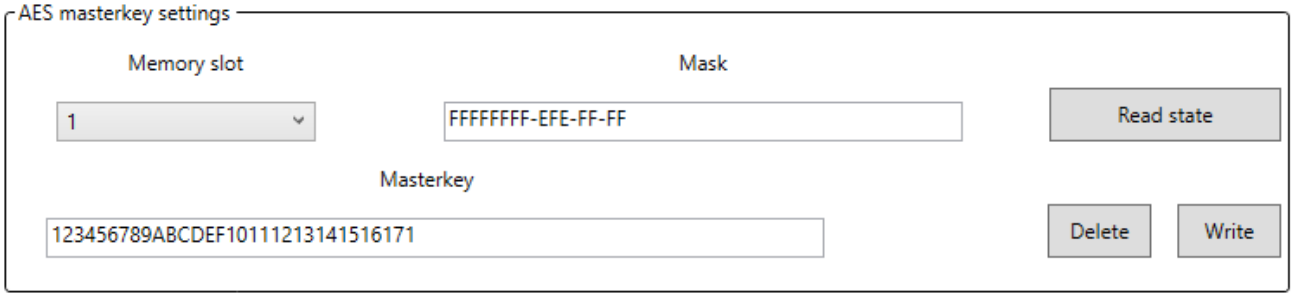
3.3.3.1 Wireless M-Bus settings



The send mode T1, C1 or S1 can be set in operation mode.
If an external antenna is used, select ON under external antenna.

Factory setting: T1, OFF

3.3.3.2 AES masterkey settings



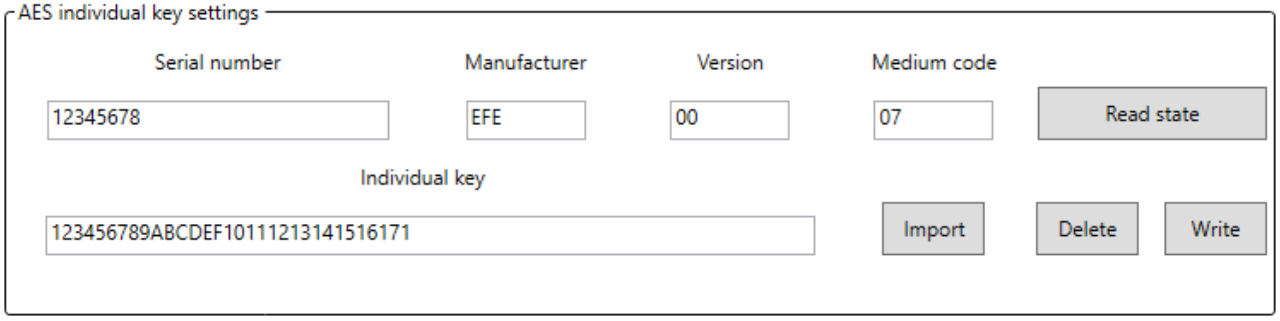
Up to 10 AES master keys can be stored.
An AES key is a hexadecimal number with 32 characters.

Read state: Output of a meter identifier list with masked AES keys

Delete: The stored list is completely deleted

Write: Save the settings

3.3.3.3 AES individual key settings



Individual AES Keys can be stored for individual meters.
For this, it is necessary to fill all fields without wildcards.

Read state: Output of a meter recognition list with masked AES keys

Delete: The entered meter detection (without AES key) is removed from the list.

Write: Save the settings.

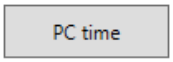
Import: CSV-data Import >>Format: meter recognition (column1), AES Key (column2)
Example:

12345678-EFE-00-04	123456789ABCDEF10111213141516171
11122223-EFE-0F-07	17161514131211101FEDCBA987654321

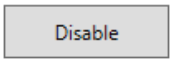
3.3.4 Timings

Controls

There are 2 buttons that adjust the corresponding settings in the Device Monitor.



Set the current PC-Time



disable the time function

Random and Duration

Random means when the upload start inside a timeframe. If more than one Gateway will be configured with the same setup the random feature will avoid uploads at the same time.

Duration means the timeframe in which the gateway is waiting for telegrams or messages.

Safety time gaps

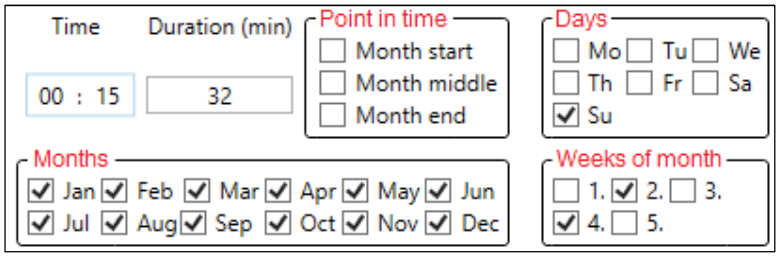
Some actions need time to deactivate or store/send data was not successful because of unknown reasons. In the last case a 3 times retry will be start. That's the reason why a function may need more time as mentioned. Therefore we suggest the following safety time gaps:

Collect: 1 minute time gap to the next action

FTP upload: 60 minutes time gap to the next action

E-Mail dispatch: 60 minutes time gap to the next action

Time settings



There are several ways to set the time intervals in the Device Monitor. (Shown in red)

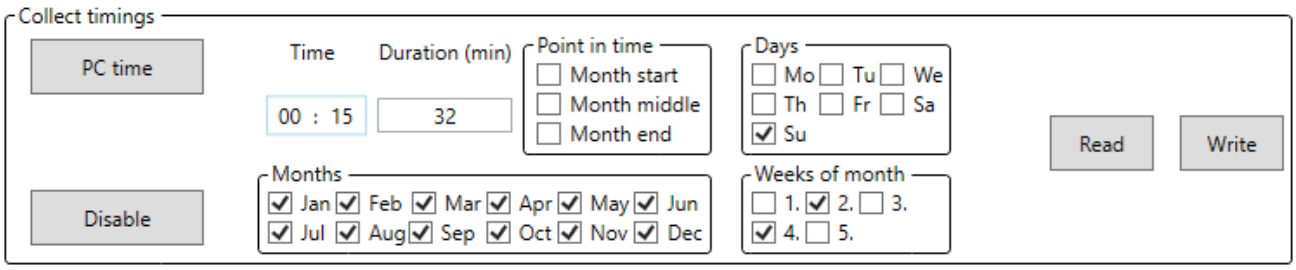
Point in time: This is the possibility to set the time at the beginning of the month or middle of the month or the end of the month. You can also select all 3 Month start times at the same time. (Energy Budget notice!) The beginning of the month is always the first and the end of the month is the last day of the month. The middle of the month is always the 15th. If none of these fields are selected, this function is disabled.

Month: The months are selected here. If none of the Month are selected, this function is disabled

Days: In addition to the Point in time, it is possible to select individual weekdays. You can select the Point in time and weekdays together as well as the days or only the Point in time. If none of the fields is selected, this function is disabled.

Weeks of month: If you have selected certain days, you can determine the days of the week in which the days should be activated. If none of the fields is selected, this function is disabled.

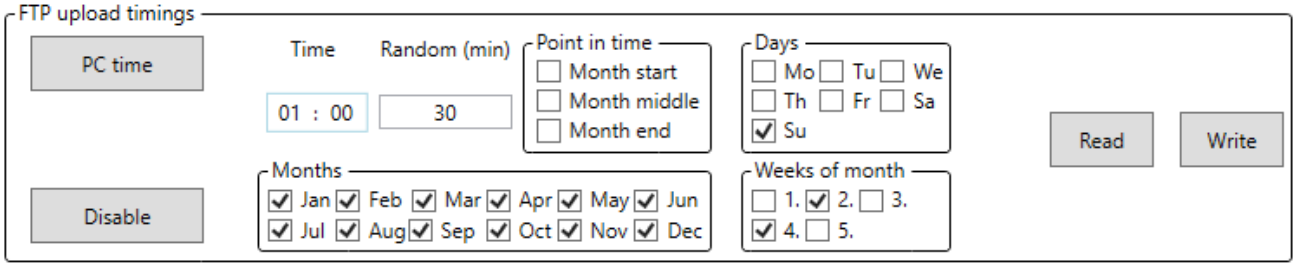
3.3.4.1 Collect timings



Possibility to set the time, duration and interval, when the gateway starts to collects the wireless M-Bus meter data.

Factory setting: see picture

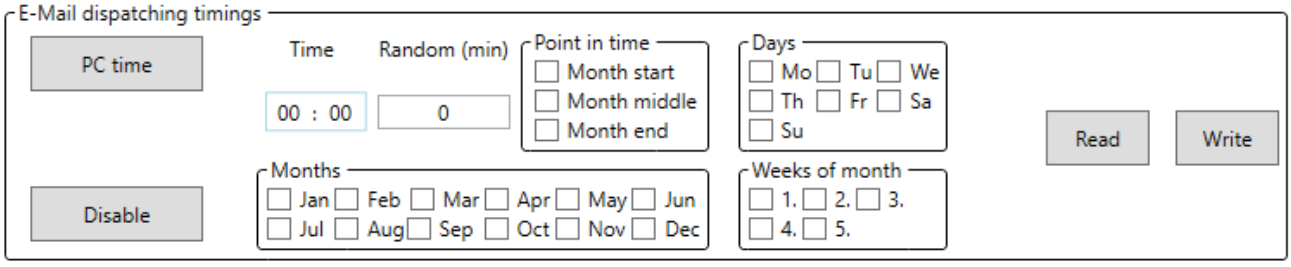
3.3.4.2 FTP upload timings



Possibility to set the time, timeframe and interval, when the gateway uploads the meter data to FTP server.

Factory setting: see picture

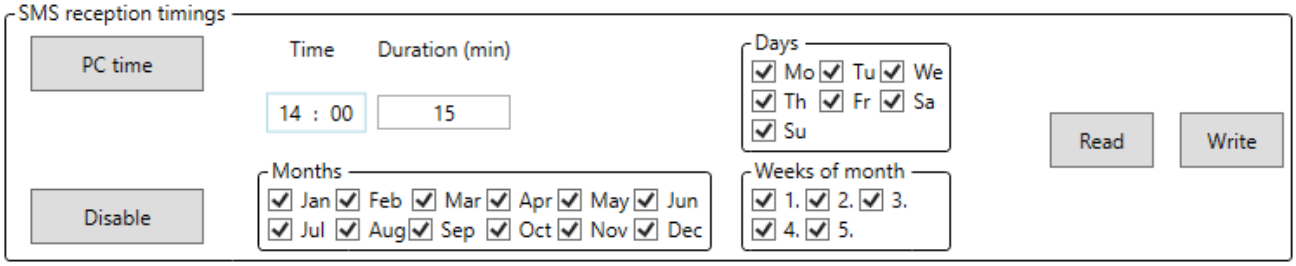
3.3.4.3 Email dispatching timings



Possibility to set the time, timeframe and interval, when the gateway sends the meter data to the SMTP server.

Factory setting: disabled (see picture)

3.3.4.4 SMS reception timings



Possibility to set the time, duration and interval, in which the gateway waits for SMS messages, progress them and send out an answer.

Factory setting: see picture

3.3.4.5 Energy budget

Here you can see the energy code in % for the current settings.

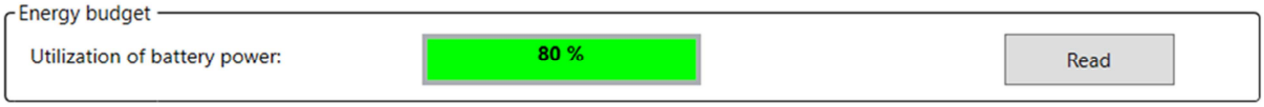
Calculation: adjusted annual consumption / maximum permissible annual consumption * 100

The display is updated every time the "Read" button is pushed.

Furthermore every time “Read” or “Write” button of the previous timing settings are pushed the displayed value is updated.

Values < 100% are set in the Gateway

Values >= 100% are not accepted by the Gateway



Energy budget > 100% are only possible with mains power supply.

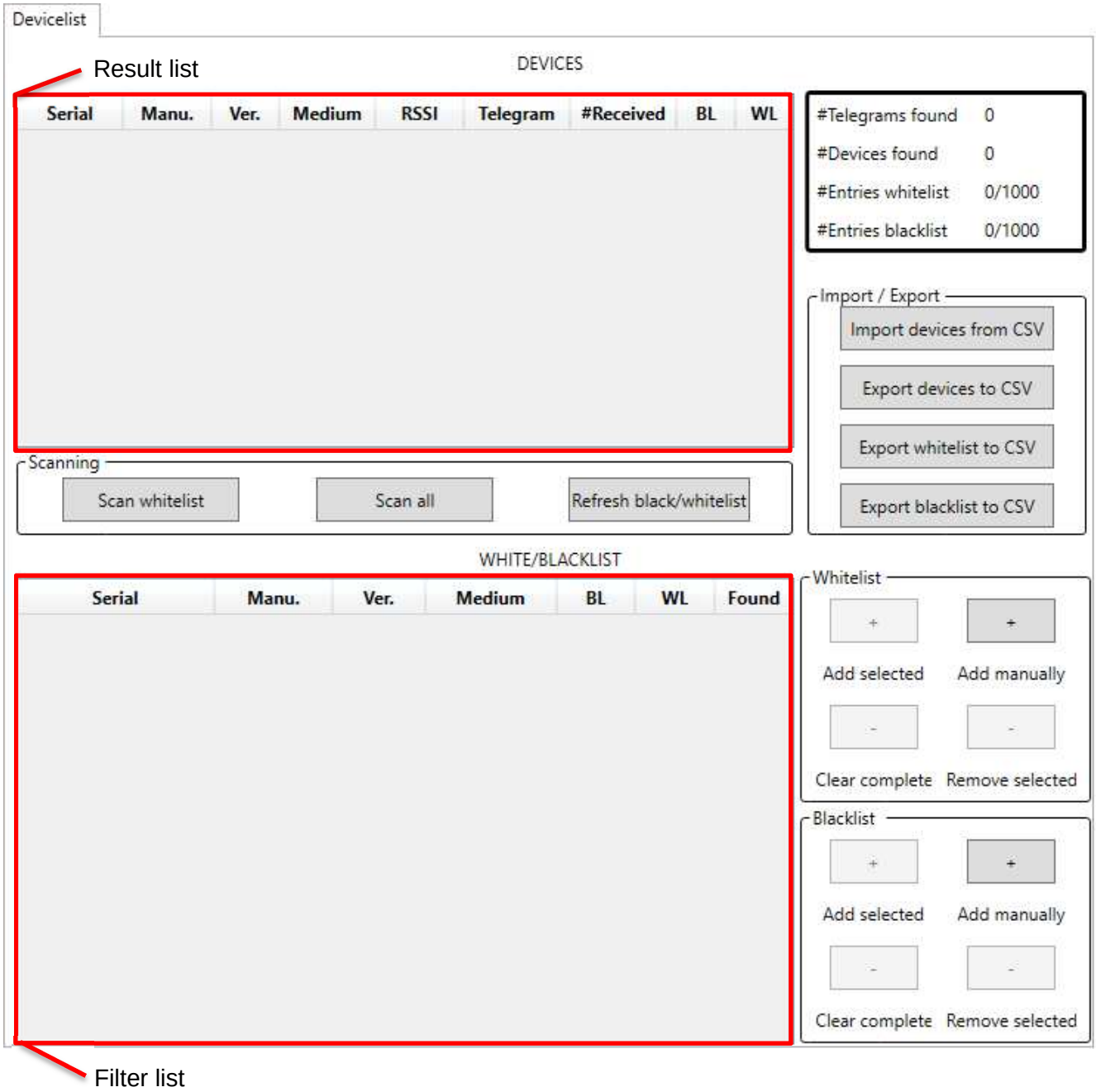
3.4 Functions

Filter

The Whitelist (WL) and Blacklist (BL) are used to restrict the found meters required by the customer. Here the Blacklist limits the Whitelist.

Whitelist: Only meter data are collected that corresponds to the Whitelist
Blacklist: All meter data that does not correspond to the black list are recorded

3.4.1 Devicelist



Result list: Shows the found or imported device identifier

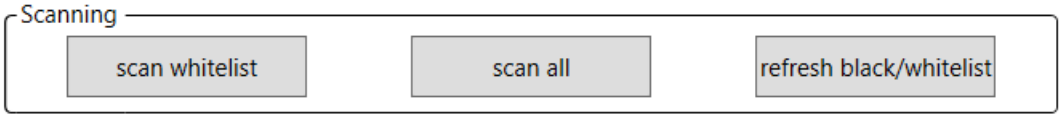
Filter list: Shows the (not) wanted device identifier

List of results:

Serial	Manu.	Ver.	Medium	RSSI	Telegramm	#Received	BL	WL
13083238	EFE	00	04	-85	0	1	☐	☐
61410893	EFE	11	08	-64	0	1	☐	☐
02780781	MAD	44	12	-64	0	1	☐	☐
44410456	EFE	07	08	-64	0	1	☐	☐
63001865	EFE	00	07	-64	0	1	☐	☐
31500202	EFE	00	07	-93	0	1	☐	☐

During the search, the results are displayed in the result list. RSSI indicates the reception intensity of the respective meter. Additional the number of telegrams, as well as the number of receive repeats are displayed. Meters, which are filtered, will be marked in BL/ WL column. If desired, it is possible to sort the respective columns by double-clicking the corresponding header with the mouse.

Remark: The device search function works only with the APN set!

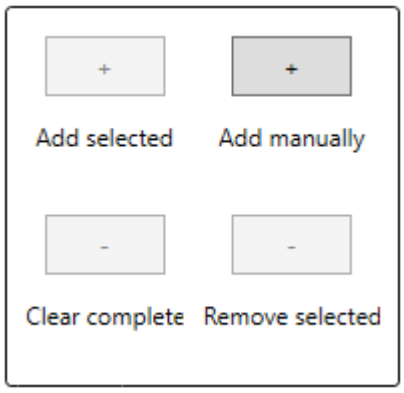


scan whitelist: Devices search based on Whitelist

scan all: Devices search without restriction

refresh black/whitelist: The filter lists are loaded into the Device Monitor from the Gateway. Filter list and sum display will be updated accordingly.

Filter



Add selected: The selected devices in result list will be added to the corresponding filter list. (CTRL+A will select all devices in result list)

Add manually: A new window come up, in which a meter identifier (wildcards allowed) can be added to the respective list. The version code is automatically set to FF

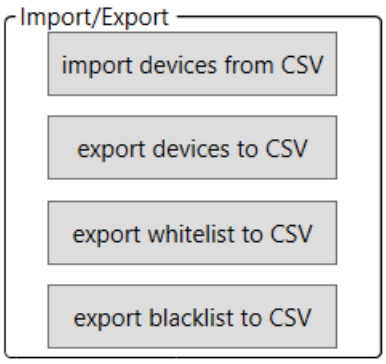
Remove selected: The selected devices will be removed from the corresponding list

Clear complete: The corresponding list will be erased

Filter list

Serial	Manu.	Ver.	Medium	BL	WL	Found
FFFFFFFF	EFE	FF	FF	☐	☑	☑
FFFFFFFF	ELM	FF	04	☐	☑	☐
FFFFFFFF	TCH	FF	01	☐	☑	☐
FFFFFFFF	WEP	FF	43	☐	☑	☐
FFFFFFFF	???	FF	04	☑	☐	☐

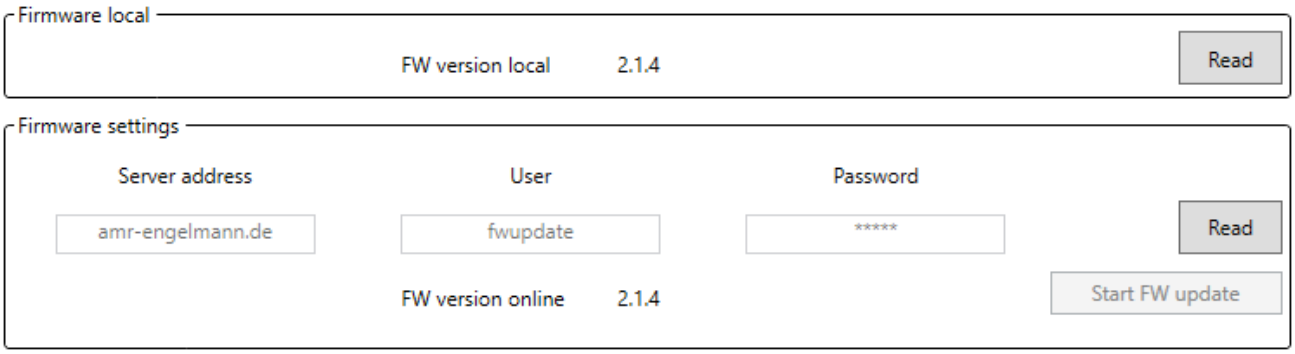
The devices identifiers detections with their affiliations are displayed here.



import devices from CSV:	Import a file with device identifiers into result list (Existing entries are deleted.)
export devices from CSV:	Export a file with all device identifiers from result list
export whitelist to CSV:	Export all WL marked device identifier into a CSV file
export blacklist to CSV:	Export all BL marked device identifier into a CSV file

3.4.2 Firmware

3.4.2.1 Firmware settings



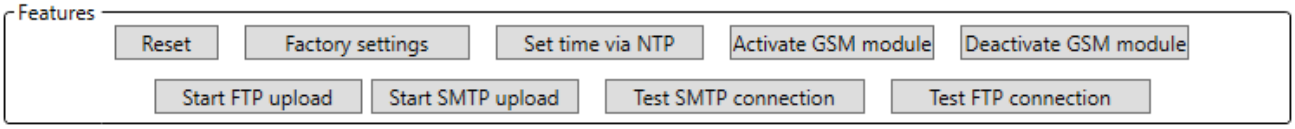
The firmware version of the gateway and on the update FTP server can checked here.
If the version inside the Gateway is lower than the one on the FTP server stored,
update can be started.

3.4.2.2 Developer options

The "developer options" are for the Engelmann support.

3.4.3 Operations

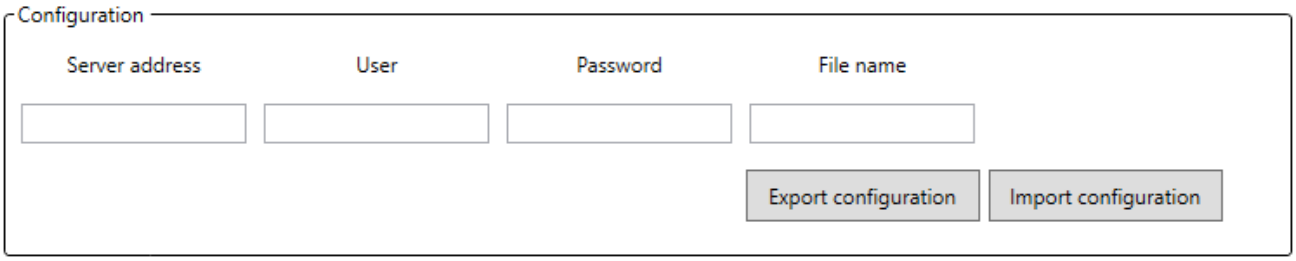
3.4.3.1 Features



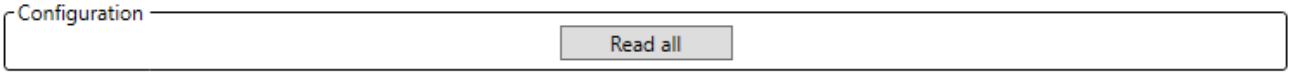
The following control elements are available for the Features setting:

Reset:	Device restart.
Factory settings:	Reset factory setting.
Set time via NTP:	Time setting is set automatically with the GSM time.
Activate GSM module:	Activates the GSM module.
Deactivate GSM module:	Deactivates the GSM module.
Start FTP upload:	The collected meter data are uploaded to the FTP server.
Start SMTP upload:	The collected meter data are sent to the e-mail addresses, which has been set.
Test SMTP connection:	Test if the SMTP settings are correct.
Test FTP connection:	Test the GSM connection. A test file is uploaded to the FTP server.

3.4.3.2 Configuration



Possibility to upload the current configuration and download a new configuration from a FTP server. The uploaded / downloaded configuration files are different and can't be vice versa. No file name is required to upload the configuration because the file name is created by the Gateway.

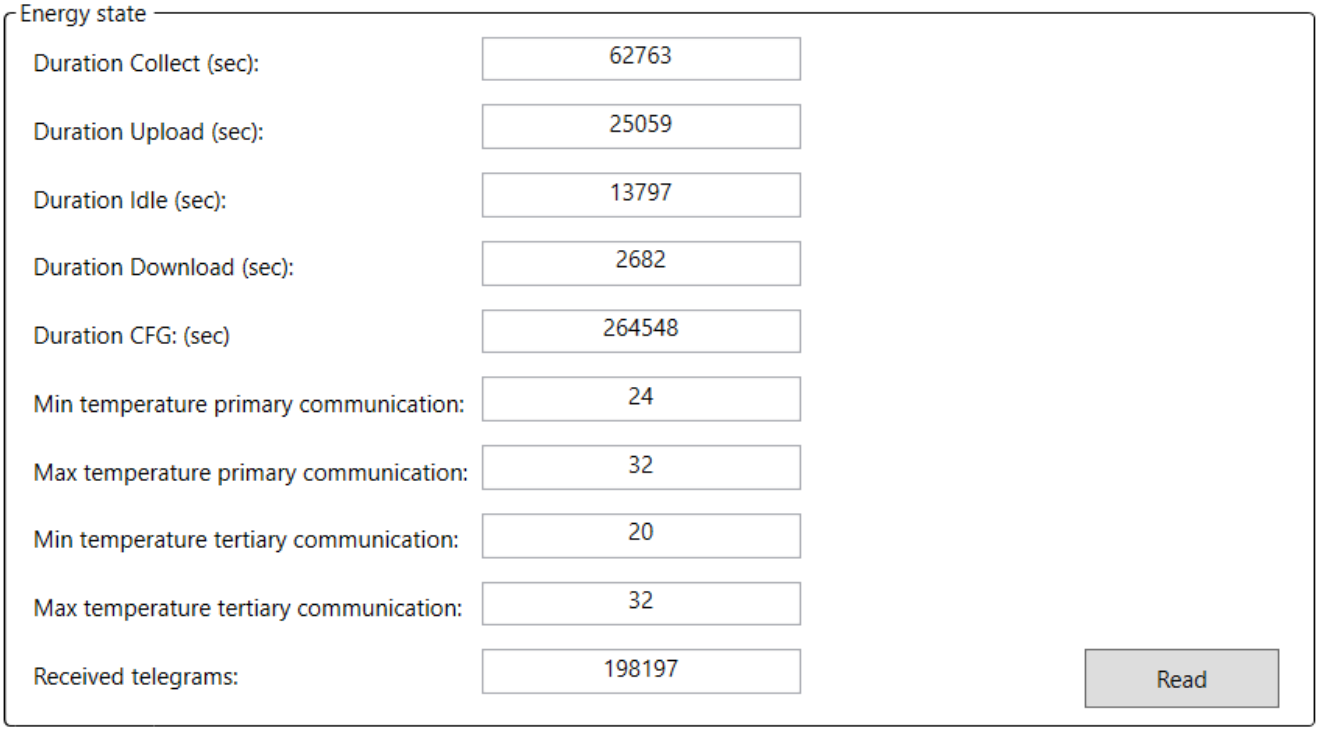


With the "Read all" button all settings are read out at once.

3.5 Information

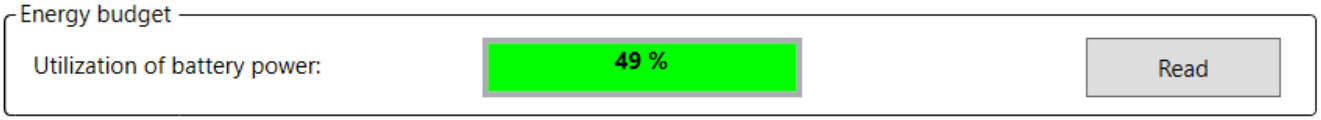
3.5.1 Gateway Information

3.5.1.1 Energy state



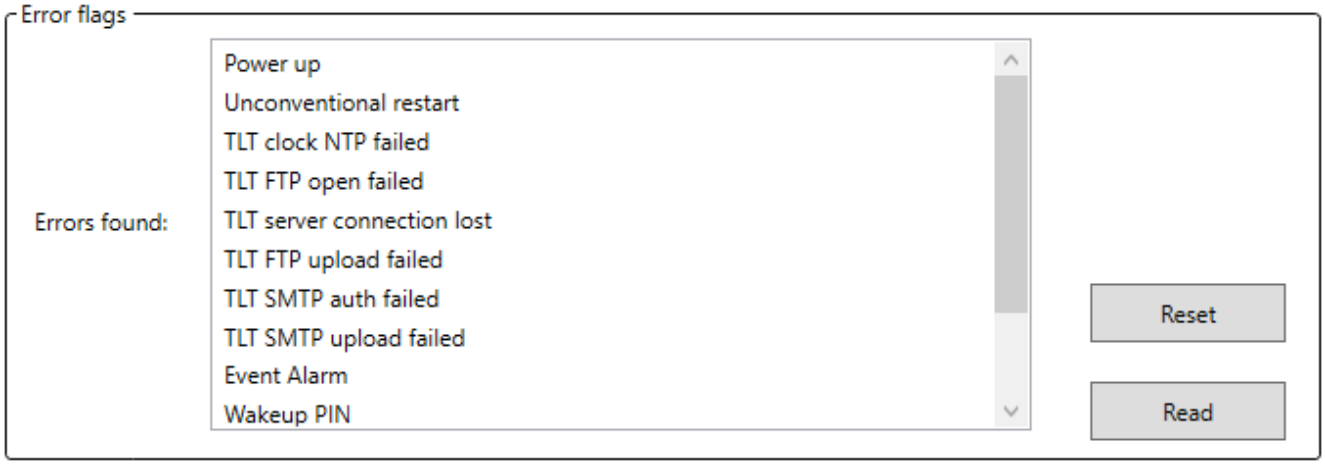
All information regarding the past use of the Gateway.

3.5.1.2 Energy budget



The energy budget can be read out here.

3.5.1.3 Error flags



Contrary to the description, information and errors are listed here.

The following errors or information are possible:

Error flags	meaning	status
Power up	First power-up after voltage connection	Info
Unconventional restart	Wake up (operation mode unknown)	Info
TLT power up failed	Modem voltage supply	Error
TLT no response from device	Modem no response	Error
TLT insufficent RSSI	Modem RSSI value insufficient	Error
TLT activate CTXT failed	No Internet connection	Error
TLT clock NTP failed	NTP-clock	Error
TLT FTP open failed	FTP server-connection	Error
TLT FTP type failed	FTP type Binary	Error
TLT FTP CWD failed	FTP Index	Error
TLT FTP put failed	FTP file creation	Error
TLT server connection lost	FTP/Email connection lost	Error
TLT server data stream timeout	FTP/Email Upload- interrupt	Error
TLT server log timeout	FTP/Email Server Timeout	Error
TLT FTP upload failed	FTP Fehler (all FTP Errors)	Error
TLT SMTP open failed	Email setup failed	Error
TLT SMTP IP failed	Email server Email-open failed	Error
TLT HELO EHLO failed	Email server attachment-open failed	Error
TLT SMTP auth failed	Email server Email-sending failed	Error
TLT email open failed	Not reserved	Error
TLT SMTP upload failed	Email Server (all SMTP Errors)	Error
Event Alarm	Processor Event Alarm	Info
Wakeup PIN	Wake up (by configuration)	Info
Standby undefined	Wake up (reason unknown)	Error
Reset undefined	Reset	Info
Wakeup error	Wake up (Error)	Error