GOSSEN METRAWATT

ENERGY**MID**|**EM**

EM228X and EM238X

3-349-972-03

Energy Meters with Meter Reading Profile Feature (Z1)

3/6.20

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1 General

In the energy industry, the meter reading profile describes a series of continuously ascertained meter readings in consecutive measuring periods and storage of the meter readings at the end of each measuring period. These data can be used for the purpose of energy management. This document explains how to obtain these data using meters from the new ENRGY**MID** series.

Characteristic values:

- 16,000 time values
- Time format: “HH:MM” and “DD:MM:YY”
- Adjustable period duration: 1 to 5, 10, 15, 30 or 60 minutes
- Integrated real-time clock (accuracy: 20 ppm, resulting in maximum daily deviation of 1.728 seconds)

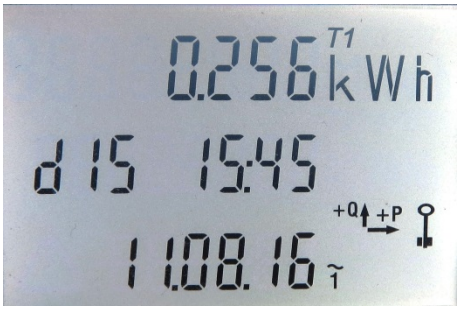

Figure 1: Meter Reading Profile Menu

2 Description of the Meter Reading Profile Measurement

Measuring method:

Meters included in the EM228x and EM238x series with feature Z1 conduct a meter reading profile measurement, i.e. they save the current meter reading for the active tariff for active and reactive power for both import and export for each selected period. In order to be able to determine the consumption profile from these values, the momentary meter readings must be subtracted from the previous ones in order to ascertain energy per period. (The consumption profile and a load profile resulting therefrom can also be determined using a spreadsheet calculation, for example. The data can be read out of the meter with the help of a tool. Refer to the section on reading out meter reading profile data in this regard.)

Applications:

The meter reading profile feature (Z1) can only be ordered in combination with a bus (not with S0 interface V≠0). Meter reading profile values can be viewed directly at the display or read out via the interface. The meter permits sequential read of the last 16,000 time points. This results in a minimum time of 11 days (where period duration = 1 min.) and a maximum time of 1.8 years (where period duration = 60 min.) – values for the last 5½ months can be retrieved if period duration is set to 15 minutes.

The following values are saved to meter reading profile memory during a period with duration of dxx[1] (see **Figure** 1):

- Line 1: meter reading with the associated tariff
- Line 2: selected period duration, in this case d 15 (= 15 minutes), and timestamp
- Line 3: Date
- Status, if applicable represented by a warning symbol: invalid value (see following section)

1 Any of the following period durations can be selected: 1, 2, 3, 4, 5, 10, **15**, 30 or 60 minutes

Meter reading profile memory features:

- At the end of each integrating period, all 4 energy values for the current tariff are saved to memory with enhanced accuracy along with timestamp and status.
- The integrating period is always ended synchronous to clock time, unless an event starts a new period (e.g. tariff change, time change).
- The status represents a cumulative view of events which have occurred during the integrating period.
- Incomplete integrating periods are identified.
- In the case of a tariff change or a time change, the integrating period is interrupted, the value is stored along with the old tariff or time and a new period is started.
- The last 16,000 values can be retrieved.

Table 1 shows the relationship between feature Q (transformer ratios) and primary/secondary value transmission. With the new EM228x and EM238x energy meter series, the calibrated energy value is always saved for the meter reading profile.

Table 1: Energy Value Transmission Relative to Feature Q

Feature	Transmitted Energy Value	Description
Q0	Primary = secondary	Both values are calibrated because CTxVT = 1.
Q1	Secondary value	In the case of meters with feature Q1, the secondary value is the calibrated value because CTxVT is variable.
Q9	Primary value	In the case of feature Q9, the ordered CTxVT value is also calibrated.

3 Invalid Value Within a Period

Example: In this case, momentary tariff T1 was switched to tariff T4 during a period.

A tariff change which takes place during a period is identified by the symbol in the bottom left-hand corner.

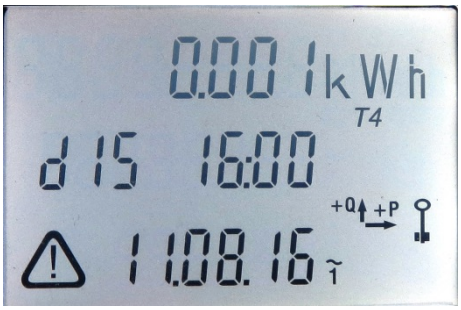

Figure 2: Invalid Value due to Tariff Change

Events which occur during a period are recorded and indicated by means of a warning symbol. Events are saved to meter reading profile memory in two status words, which finally result in a corresponding display.

Meter Reading Profile Status 1

This bit field identifies which events occurred during the integrating period:

MSB **LSB**

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Description
0	Current 1 has exceeded the maximum value
1	Current 2 has exceeded the maximum value
2	Current 3 has exceeded the maximum value
3	Maximum value for U1 exceeded
4	Maximum value for U2 exceeded
5	Maximum value for U3 exceeded
6	No frequency synchronization possible
7	Frequency too low
8	Frequency too high
9	Incorrect phase sequence
10	Phase sequence unknown
11	Device is not calibrated
12	Analog error: DC offset too high
13	Energy error: Erroneous energy reading
14	Internal communication error
15	The energy value has been reconstructed from cyclical backups.

Meter reading profile status 1: bits 0 ... 15 come from the operating logbook for events which have occurred during the meter reading profile interval.

Meter Reading Profile Status 2

Status Bit	*Description*
0	Shortened integrating period (not started/ended synchronous to clock time)
1	Started after a reset
2	End of period due to tariff change
3	End of period due to clock time change
4 - 15	-

If the logger entry for the meter reading profile is incomplete (after reset, tariff change or time change), this is indicated by the “incomplete meter reading profile interval” status bit.

If a reset has occurred, for example in the case of a **restart after a power failure**, this is indicated in the first meter reading profile entry by means of the “reset occurred” status bit (and incomplete logger interval for the meter reading profile).

If the tariff is changed, the momentary logger value for the meter reading profile (asynchronous entry) at the point in time of the **tariff change** is saved with the comment “tariff change”. A new meter reading profile interval is then started with the new tariff. As a result, no energy values can be lost (the entry after the tariff change and the next entry are flagged with the “incomplete meter reading profile interval” status bit).

If **time is changed**, the momentary logger value for the meter reading profile (asynchronous entry) is saved with the “time changed – asynchronous meter reading profile entry” status bit with the previous timestamp, after which a new logger period for the meter reading profile is started with the new time. As a result, no energy values can be lost (the entry after the tariff change and the next entry are flagged with the “incomplete meter reading profile interval” status bit).

4 Setting the Meter Reading Profile Period

The duration of the meter reading profile period can be set to any of the following values: 1 to 5, 10, **15**, 30 or 60 minutes The default setting is 15 minutes.

Setting the Meter Reading Profile

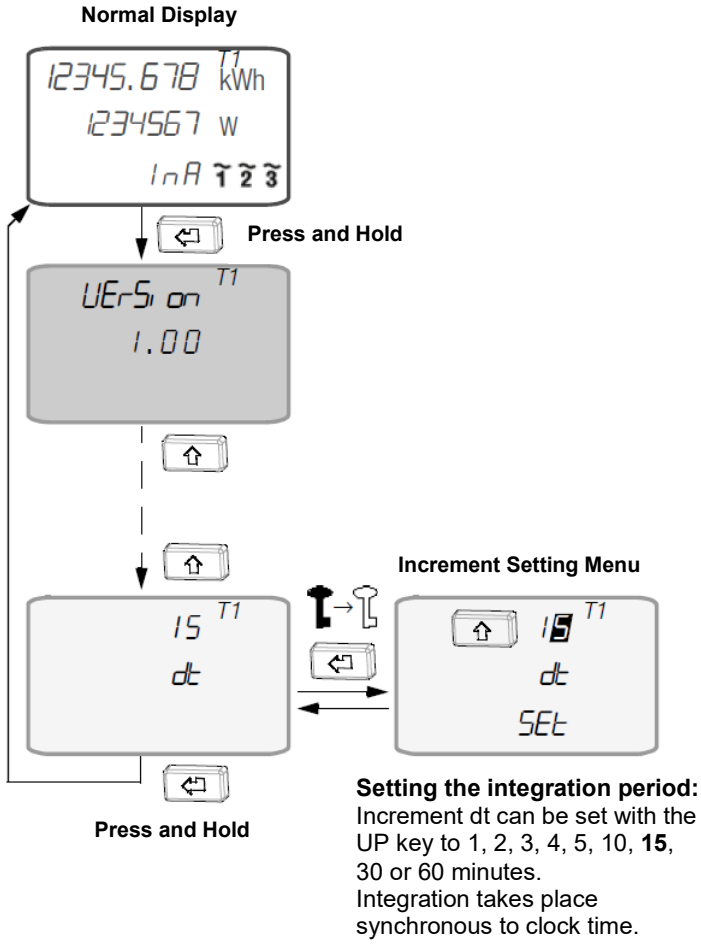

Figure 3: Setting the Integration Period

5 Reading Out Data Memory

In the case of an M-Bus, a MODBUS-RTU or a MODBUS-TCP energy meter, logger data can be read out with the ENERGY**MID** TOOL.

The registers for reading out stored data are described in the respective interface descriptions.

After the device has been connected to the tool, the number of most recent values to be read out can be selected in the “Logbook” tab, after which read-out can be started with the “Read” switch.

If the values need to be saved to an Excel spreadsheet, a checkmark must be entered next to “Save File”.

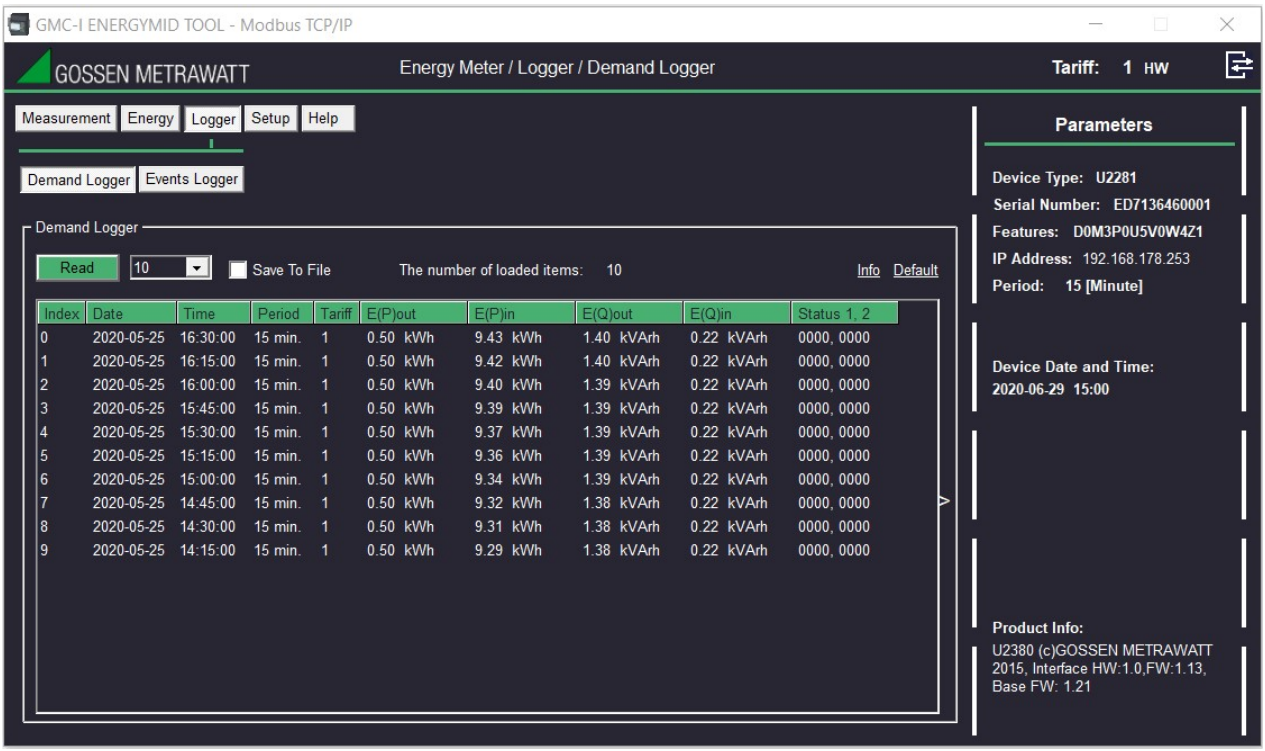

Figure 4: Reading Out the Logger

6 Product Support

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