

WM-I3[®] metering modem

MQTT Protocol Technical Description

v1.20



2022-07-27

Document specifications

This documentation was made for presenting the MQTT configuration of the **WM-I3**[®] pulse counter / MBUS data collector and transmitter device.

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Chapter 1. Foreword

The WM-I3[®] device is also capable of using for MQTT compatible communication, which can be operated by performing the following settings.

Currently, the data transmission part has been implemented within the MQTT protocol.

For demo and test purposes, we recommend to use the MQTT Explorer software, which can be downloaded from the following URL: <http://mqtt-explorer.com/>

To make the necessary settings, you need to use the WM-E Term v1.3.51 or later configuration program. The usage of the software is described in the product's *User Guide* documentation.

The configuration software is also required for the configuration, which can be downloaded from the following link:

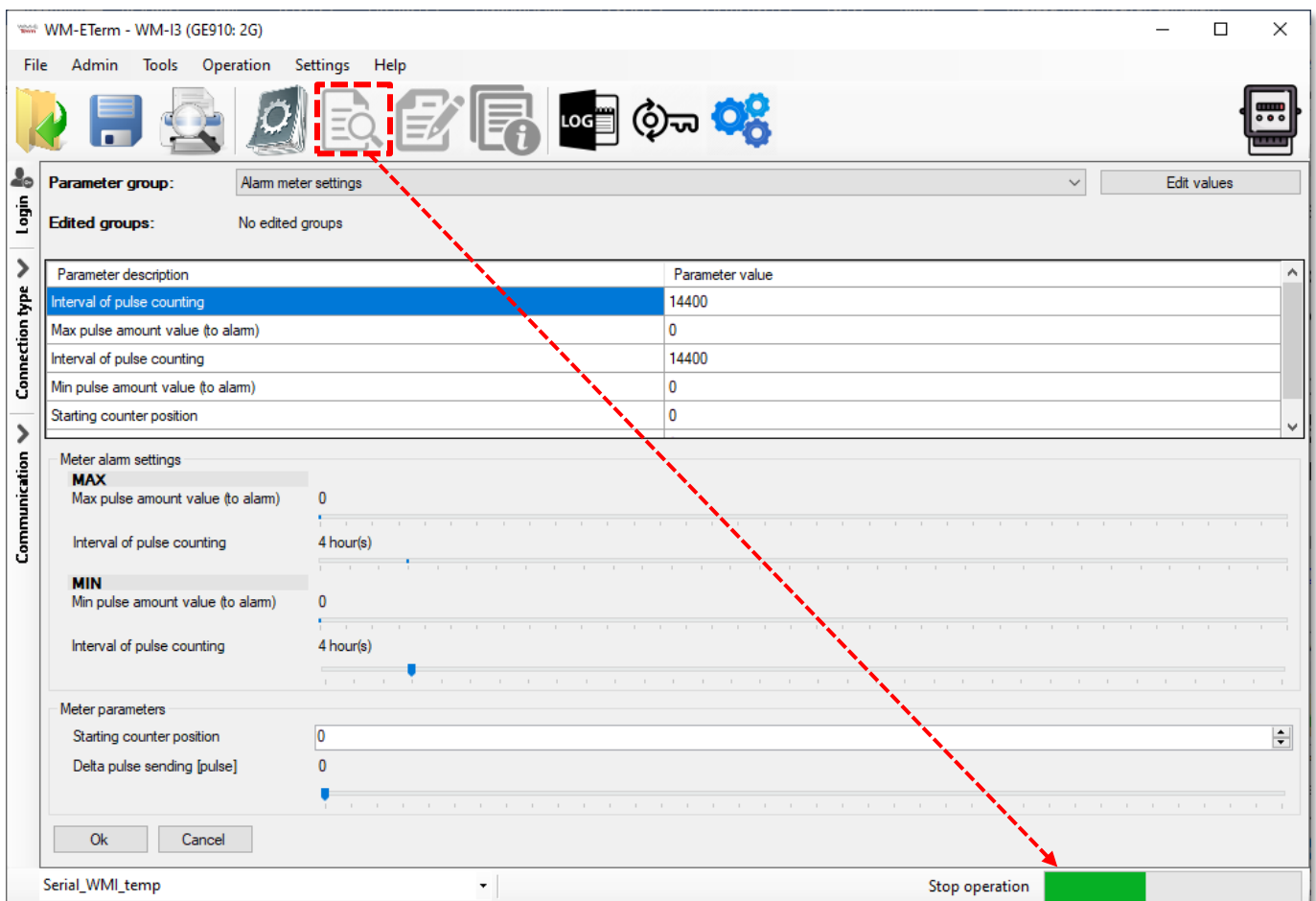
https://.m2mserver.com/m2m-downloads/WM-ETerm_v1_3_71.zip

Chapter 2. Settings

1. An MQTT template must be created on both the MQTT side and the WM-I3[®] client side.
2. Open the *WM-E Term* device configuration software (**WM-ETERM.exe** file), select **WM-I3** device, then click to **Login**.
3. Connect to the *WM-I3[®]*, and download the device settings (click to the **Read parameters** icon in the menu) - or download the device's factory configuration file and open it.

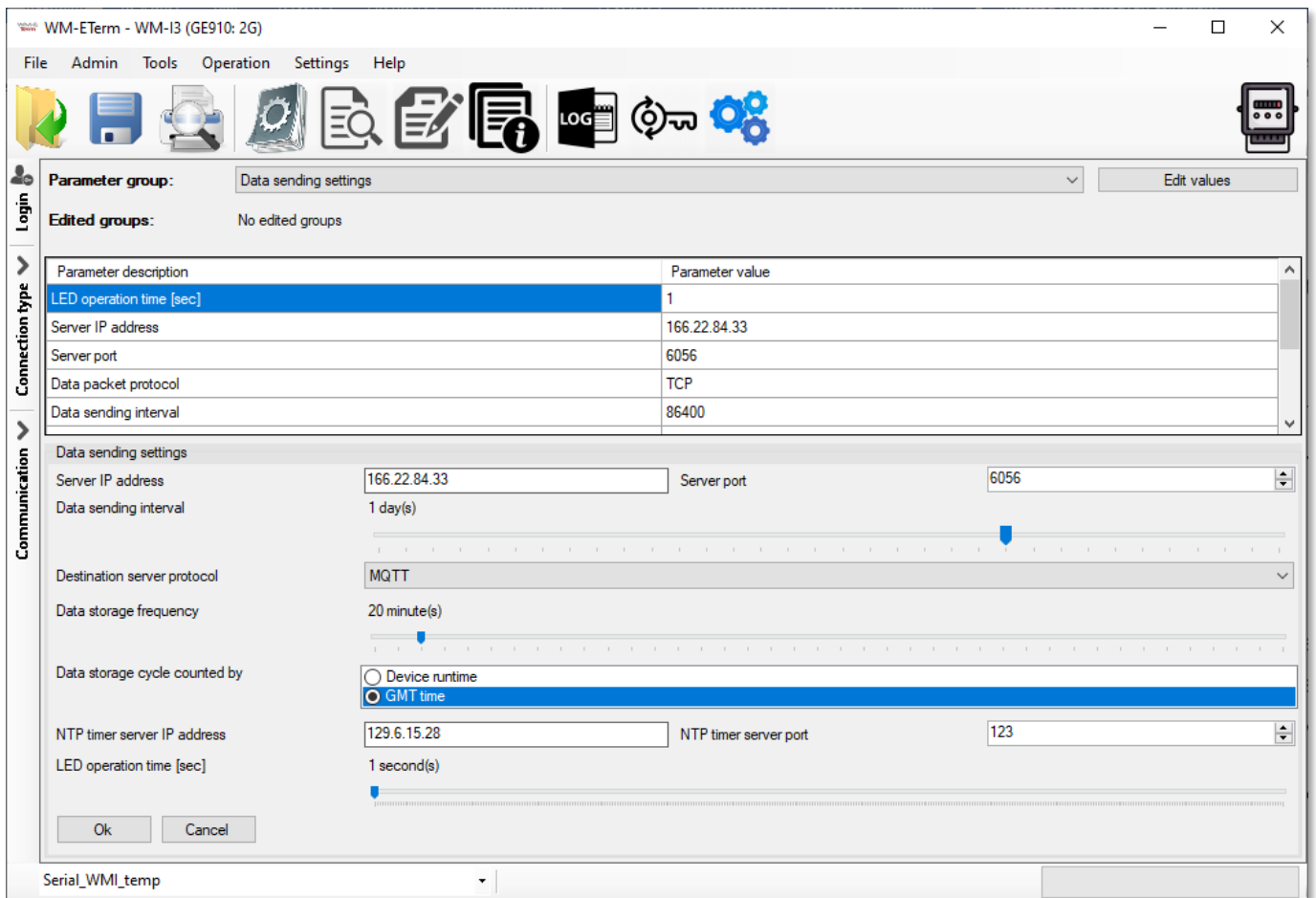
You can download the sample configuration file from here:

https://www.m2mserver.com/m2m-downloads/WM-I3_Sample_Config.zip



4. Wait for the parameters to load, then select the **Data sending settings** group at the top of the screen, at the **Parameter groups** field and then press to the **Edit values** button at right.

Then the following editable interface will be loaded.



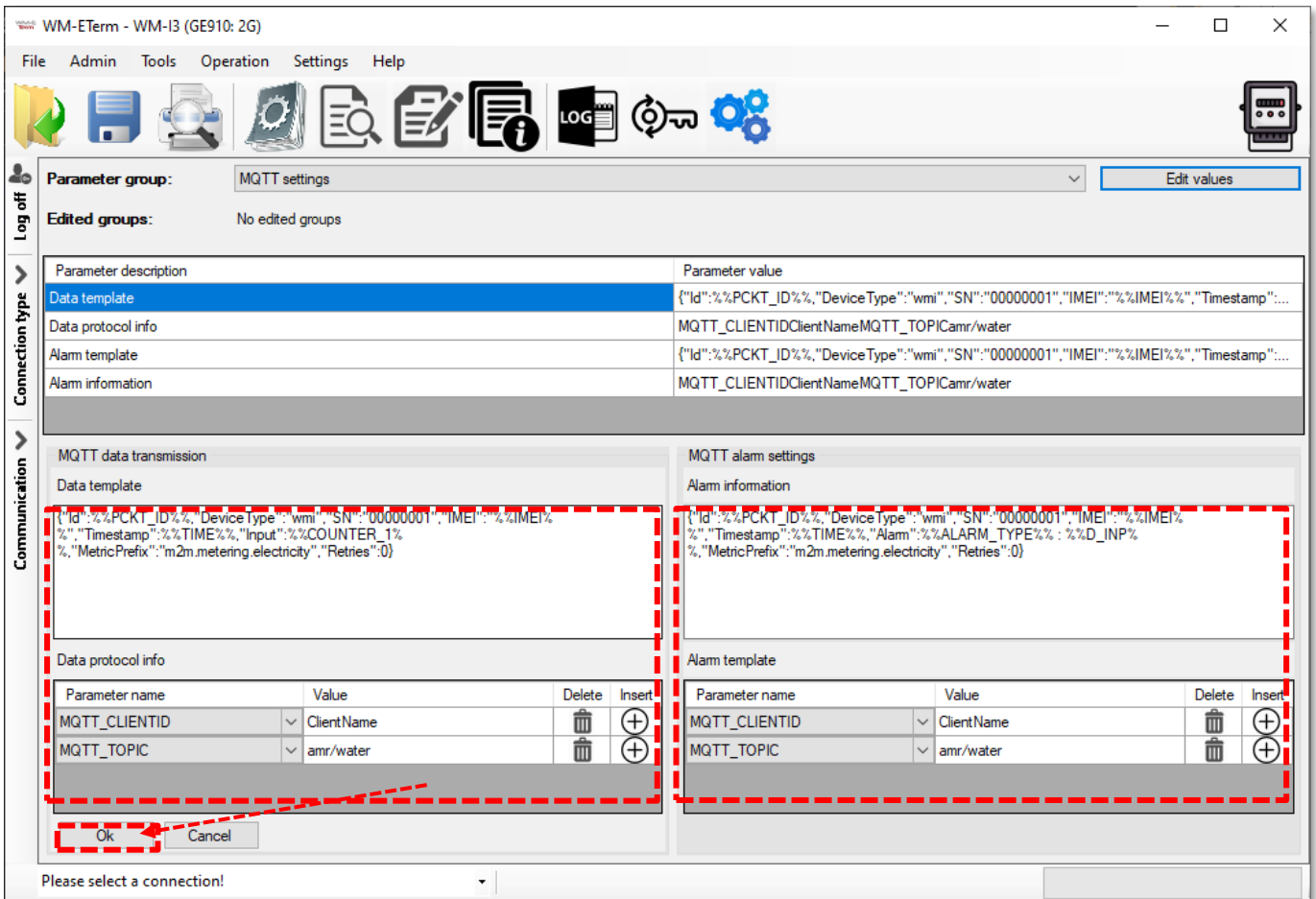
5. Add the **Server IP address**, **Server port** and **Data sending interval** values. Then change the **Destination server protocol** type to **MQTT**.

6. Push to the **OK** button.

7. Then choose the **MQTT settings** parameter group and then press to the **Edit values** button at right.

8. At left, at the **Data template** section, define a template for the data transmission by MQTT protocol. a list of parameter names and their values in JSON format with the following syntax.) The length can be max. 255 bytes long.

The name of the parameter variables should be placed between quotation marks – by the **"PARAMETER"** syntax – and separated by comma. The parameter values can should be used in **%%VALUE%%** format. In case of data sending the parameter variable will be changed to the real current of the parameter.



Example: {"PARAMETER1":%%VALUE%%,"PARAMETER2":%%VALUE%%}

The template content can be similar to this:

```
{\"Id\":\"%PCKT_ID%\", \"DeviceType\":\"wmi\", \"SN\":\"00000001\", \"IMEI\":\"%IMEI%\", \"Timestamp\":\"%TIME%\", \"Input\":\"%COUNTER_1%\", \"MetricPrefix\":\"m2m.metering.electricity\", \"Retries\":0}
```

parameters (

Available parameters:

- **"Id":%%PCKT_ID%%** - package identifier, which will be automatically incremented each time when it was sent
- **"SN":00000001** - product serial number (for hardware identification)

- "IMEI"%"IMEI%" - module ID (optional to use) for device identification
- "Timestamp":%"TIME%" - the time and date of the pulse value saved on the device (if there is no available received time from the cellular network, the NTP server based time will be used)
- "DeviceType": "wmi" - device type
- "Input":%"COUNTER_1%" - the value of the measured pulse (counting of input nr. 1)
- "D_INP" – for readout of digital input counter
- "ALARM_TYPE" – alarm type, possible statuses:
 - "Booted" – restart of the device
 - "tamper" – detection of top cover removal / open of the device housing
 - "external" – external power supply turned off / exhausted
 - "battery" – battery current voltage/power value
 - "minFlow" – if the min. configured amount of consumption / interval was not exceeded
 - "MAXFlow" – if the max. configured amount of consumption / interval was exceeded
- "MetricPrefix": "m2m.metering.electricity" - free to use field (optional to use)
- "Retries" - number of data sending retries (currently inactive) - so its value is fixed: 0 – not required to use

9. At left at **Data protocol information** part choose the required MQTT parameters. (You can add more fields by **Insert +**, button). Then enter the parameter **Value** to every **Parameter Name** according to the following syntax.

MQTT connection parameters:

- **MQTT_CLIENTID** – MQTT client identifier
- MQTT_QOS – Service quality level
- MQTT_RET – retain level

- **MQTT_TOPIC** – topic name

The required MQTT server-client identifiers for the connection, can be added at the protocol information, in plain text string format. The green, marked parameters are obligatory to use and define.

Example: **MQTT_CLIENTID**:ClientName **MQTT_TOPIC**:amr/water

For the **MQTT_QOS** parameter you can specify the quality of service (QoS) level. It's a level of agreement between the sender of the message and the recipient of the message, which determines the guarantee of delivery of the given message. There are 3 levels:

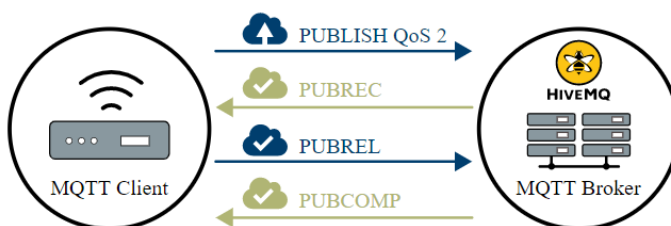
- Up to once (0)



- At least once (1)



- Exactly once (2)



The two sides of the message delivery must also be considered:

1. Delivery of the message from the publishing client to the broker.
2. Delivery of a message from the broker to the subscriber client.

If the subscriber client specifies a lower QoS than the publishing client, the broker forwards the message with a lower quality of service.

Other examples, explanation:

<https://www.hivemq.com/blog/mqtt-essentials-part-6-mqtt-quality-of-service-levels/>

The **MQTT_RET** retention value field specifies whether the server retains the value after sending it to the client. Possible values:

- 0 - The server will not keep the message after sending it to the subscriber (client)
- 1 - The server saves the message after it has been sent to the subscriber (client)

10. At the right side of the screen, at **Alarm template** part – if you would like to be notified about alarm event – add the required alarm template for event signaling by the MQTT protocol (a list of the MQTT parameters and values) – in JSON format – with the same syntax as we described above.

The available alarm event statuses can be found at the "**ALARM_TYPE**" field. Values should be defined as "**ALARM_TYPE**":"**battery**" – for battery status (the current power voltage of the battery will be signaled as an alarm).

11. At the **Alarm information** part choose the required MQTT parameters. (You can add more fields by **Insert +**, button). Then enter the parameter **Value** to every **Parameter Name** – useable syntax as we described.

12. In the program window, press the **OK** button and press to the **Write Parameters** button in the menu and the device will be send the settings to the device. The WM-I3® also sends the template to the MQTT server/address at the next data sending cycle.

13. You can also use the **File / Save** menu to save the MQTT template into the configuration file to your computer.

14. On the MQTT server side, or in the case of testing the data in *MQTT Explorer* – see the next screenshot - at the **Value** field (on the right), the MQTT template must be defined in a similar way - in JSON format.

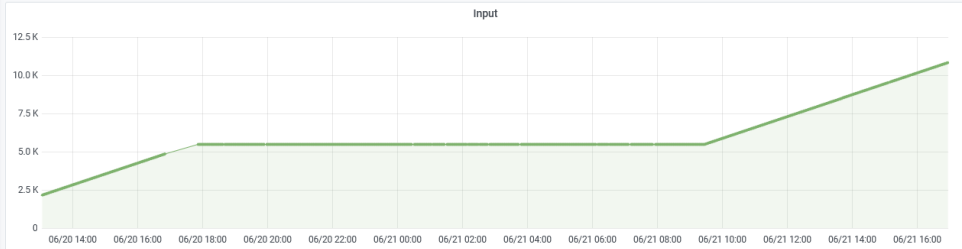
In the **Publish** field, enter the name of the *Topic* (according to the value of the **MQTT_TOPIC** field) and set the format to *json*.

The screenshot displays the MQTT Explorer application interface. On the left, a message log shows a series of JSON messages from the 'amr' topic, including '5th-water', '4th-water', '2th-water', and '2th-alarm'. Below the log are three line graphs for 'amr/water/5th-water', 'amr/water/4th-water', and 'amr/water/2th-water', each showing a rising trend. On the right, the 'Value' field displays a JSON template for a '2th-alarm' message. Below it, the 'History' section shows recent messages. At the bottom right, the 'Publish' section is active, with the topic 'amr/alarm/2th-alarm' and the format set to 'json'. A 'PUBLISH' button is visible.

15. The push tot he **PUBLISH** button for advertising the topic.

16. After data transmissions, the graphs and numbers will show the amount of counted delta pulses received from the WM-I3 and the consumption tendency, which will be also displayed on the MQTT server side (or in *MQTT Explorer*).

IMEI: 3560311 SN: 015443 Topic: amr/water/SNTdemo



Last pulse counter value

10824

Id	Input	Retries	Timestamp	_time
5371	2159	0	2022-06-20 13:03:01	2022-06-20 13:03:01
5372	2170	0	2022-06-20 13:04:01	2022-06-20 13:04:01
5373	2182	0	2022-06-20 13:05:01	2022-06-20 13:05:01
5374	2194	0	2022-06-20 13:06:01	2022-06-20 13:06:01
5375	2206	0	2022-06-20 13:07:01	2022-06-20 13:07:01
5376	2218	0	2022-06-20 13:08:01	2022-06-20 13:08:01
5377	2230	0	2022-06-20 13:09:01	2022-06-20 13:09:01
5378	2242	0	2022-06-20 13:10:01	2022-06-20 13:10:01
5379	2254	0	2022-06-20 13:11:01	2022-06-20 13:11:01
5380	2265	0	2022-06-20 13:12:01	2022-06-20 13:12:01
5381	2277	0	2022-06-20 13:13:02	2022-06-20 13:13:02
5382	2289	0	2022-06-20 13:14:01	2022-06-20 13:14:01
5383	2301	0	2022-06-20 13:15:01	2022-06-20 13:15:01

Chapter 3. Support

If you have any questions concerning the usage of the device, contact us at the following contact:

E-mail: iotsupport@wmsystems.hu

Phone: +36 20 3331111

Online product support can be required here at our website:

<https://www.m2mserver.com/en/support/>

For the proper identification of your device, use router sticker and its information, which contains important information for the call center.

Due to the support questions, the product identifier is important for resolve your problem. Please, when you are attempting to tell us an incident, please send us the IMEI and SN (serial number) information from the product warranty sticker (located on the front face of the product housing).

The documentation and software release for this product can be accessed via the following link: <https://m2mserver.com/en/product/wm-i3/>

Chapter 4. Legal notice

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Warning

Any errors occurring during the program update process may result in failure of the device.