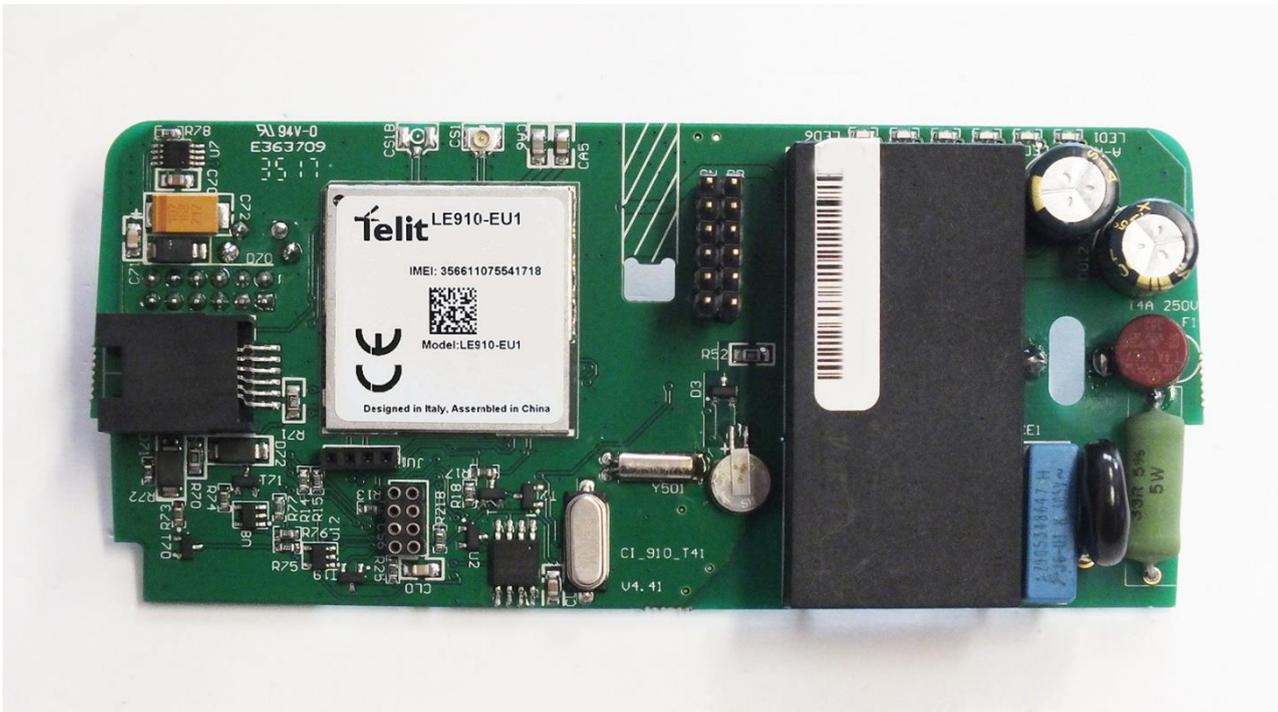


WM-E3S[®] modem with RS232 interface support

Installation Guide and Modem Configuration



Document specifications

This documentation was made for the installation and configuration of the **WM-E3S[®]** modem.

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Chapter 1. Introduction

WM-E3S® is an integrated modem unit PCB. It is suitable for remote reading of electricity meters.

This modem was especially developed for **Elster**® **AS220, AS230, AS300, AS1440, AS3000, AS3500** electricity meters, and can be connected to the meter by sliding into the meters' communication module slot and can be sealed.

Thus, the modem presents a compact solution, the dimensions of the meter will not change if a modem is fitted or not. This solution offers the possibility of future upgrade of the electricity meter with a communication module and is ideal for installations where there is restricted assembling space. The modem unit PCB is powered internally with 230V through the meter's integrated mains connectors.

The **WM-E3S**® is suitable for reading the meter's actual and stored consumption values, access the recorded event log, read the load profile data, and read or modify the parameter set of the meter. The device can also be used for remote management of the meter.

The modem can be used with push mechanism, thus the modem can initiate the communication with the AMR centre periodically at a pre-programmed time interval or triggered by an alarm (power outage, cover removal, reverse run, etc.)

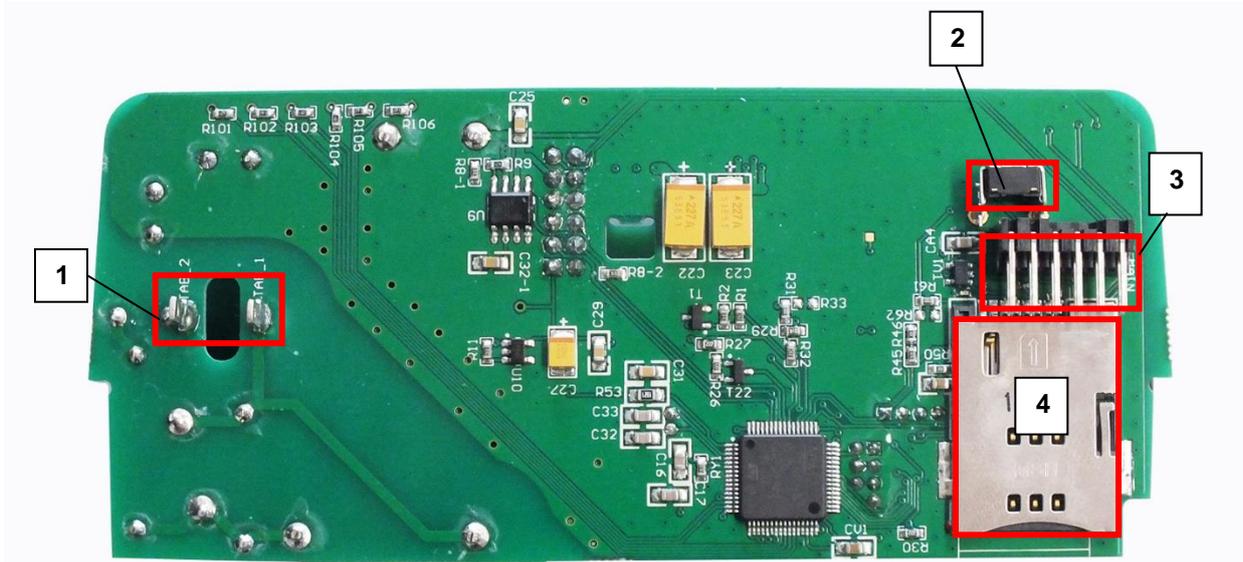
The modem can be accessed remotely through 2G/3G/4G network (by the **Telit**® module) and is able to send data on the Internet by using an APN.

The product's case was designed to fit under the terminal cover of the meter. As part of an AMR/AMI solution, the modem provides a stable, transparent "push" or "pull" connection to the HES. The modem reads actual and stored consumption data, recorded event log, and load profile data by "push" or "pull" data transfer method. The device is fully configurable by our WM-E Term® software.

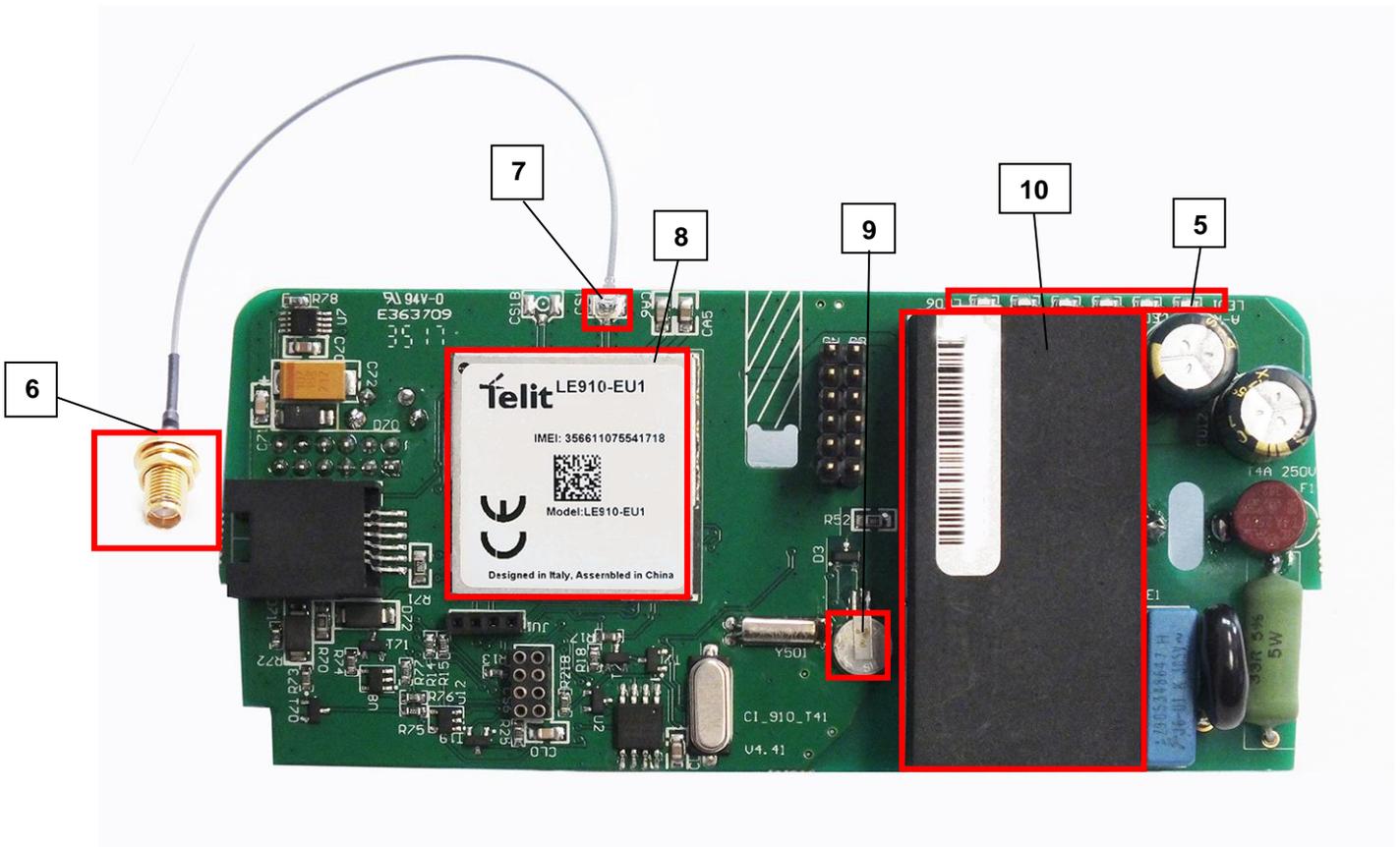
The communication module is a part of the Smart Metering concept. The CM is a replaceable module for the meter(s). Host Meter (HM) + Communication Module (CM) = Smart Meter.

Chapter 2. Assembling instructions

2.1 Connectors, interfaces



- | | |
|---|---|
| 1 – Mains connector | 6 – SMA antenna connector |
| 2 – Push button | 7 – U.FL antenna connector |
| 3 – Communication interface | 8 – Telit LTE module |
| 4 – SIM card holder (push-insert, mini SIM, 2FF type) | 9 – Rechargeable backup battery |
| 5 – Status LEDs | 10 – Power supply unit |
| | 11 – Internal data connector (to the meter) |



2.2 Inserting the SIM card

Insert an activated SIM card into the push-push SIM card slot (4). The SIM card is easily replaceable by pushing the inserted SIM card when it is necessary.

2.3 Connecting the modem unit PCB to the meter

2.3.1 Connecting the modem unit PCB to the AS3000, A3500 meter

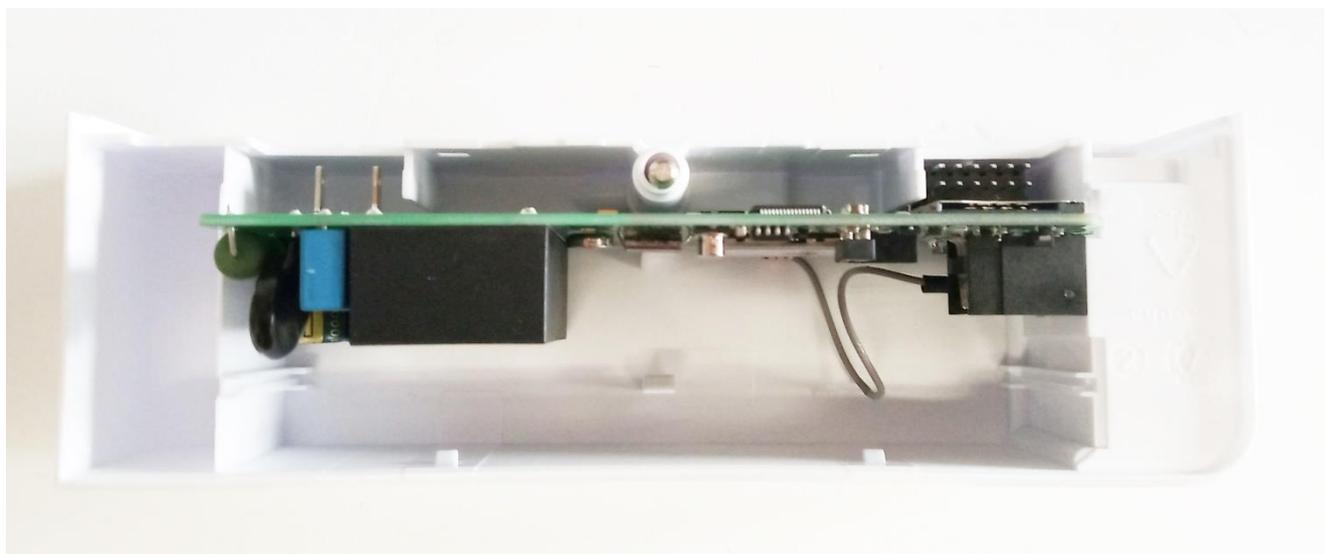
Take off the Elster® AS3000, AS3500 meter's communication module plastic case by releasing the screw from the top middle part of the housing.



Inside the communication unit's case mount the SMA-M antenna interface connector (6) on the housing (fix it with the SMA connector's screw).



Now snap the modem unit PCB into the communication module's plastic housing by sliding it through the guiding rails of the case until you hear a click sound. Beware to place the modem unit PCB orientation into the slot. The 12-pins data connector (3) can help You to find the right position (upper right in the figure).



The interface connector (3) is close to the SMA antenna connector (6) (right top side on the picture).

The PCB must be pushed until it is locked and fixed into the communication module's case. At the middle of the modem unit PCB there is whole that permits to the fixation hook of the communication module's housing to fix and holds back the modem unit PCB.

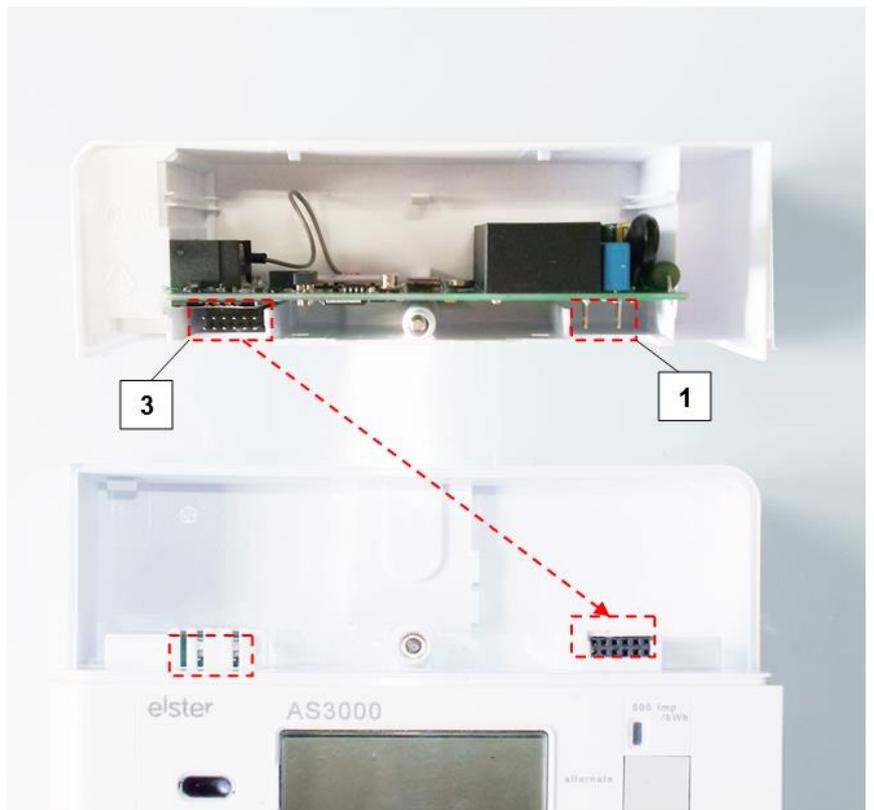


PCB there is whole that permits to the fixation hook of the communication module's housing to fix and holds back the modem unit PCB. When you want to remove the modem unit PCB, you must force the hook to release the PCB.

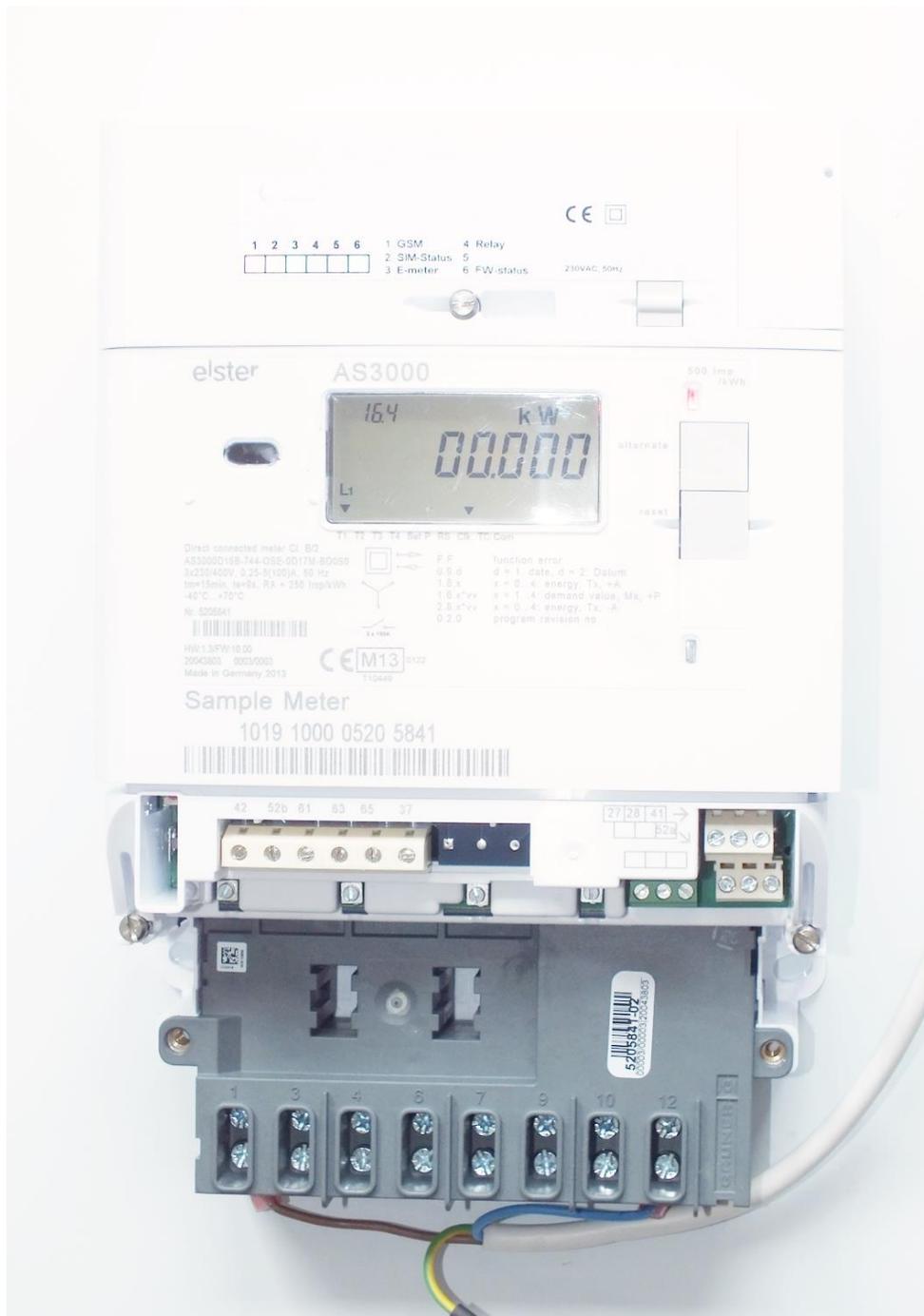
Now we can connect the communication module to the meter by sliding the communication unit into the meter housing.

The communication interface (3) and the mains connectors (1) must be connected to the connector pairs from the meter housing.

You will find that the meter and comm. module housing upper right edge is a rounded (radiused) as a sign of the perfect slide fit adaptation.

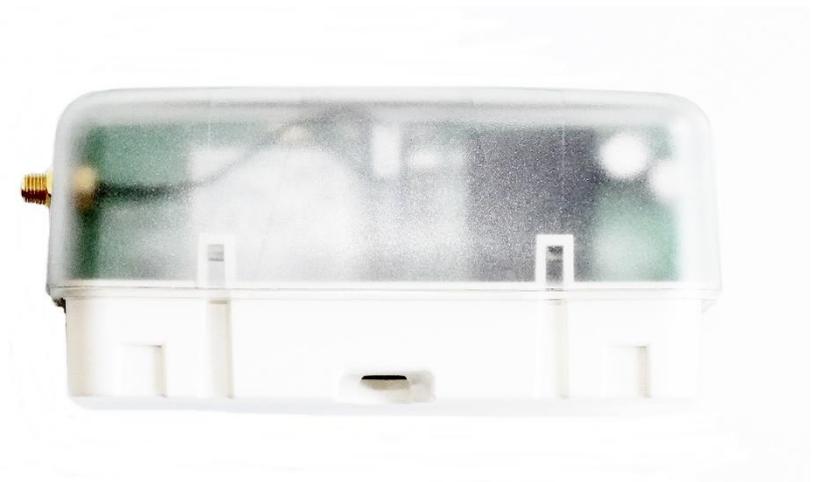


After assembling and turning on the meter the modem will be powered and its operation is confirmed by the LED signals.



2.3.2 Connecting the modem unit PCB to the AS220, AS230, AS300 meter

Disassemble the Elster® AS220, AS230, AS300 meter's communication module plastic case. Release the top screw at the middle and take off the upper modem unit case.



The modem unit PCB can be placed into the transparent plastic housing of the communication unit.

Inside the communication module's transparent plastic case mount the SMA-M antenna connector on the housing (fix it with the SMA connector screw).

The communication unit now is ready to be attached to the meter by fixing it on the meter housing. The 12 pins communication interface (3) and the mains connector (1) now plugs into the meter.

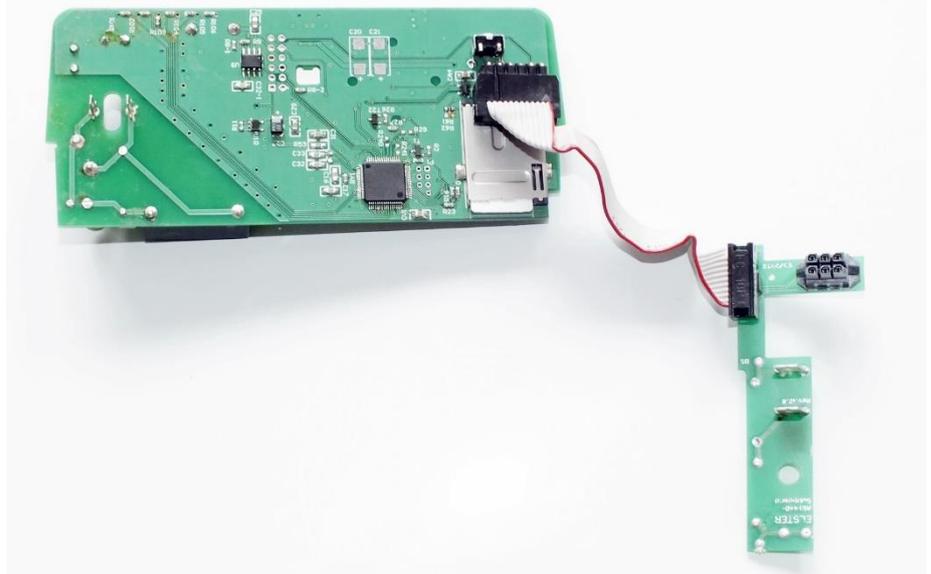
After assembly and turning the meter on the communication module is ready for operation. The LED signals will confirm the operation status of the communication module.



2.3.3 Connecting the modem unit PCB to the AS1440 meter

Connect the external PCB adapter with the 12 pins ribbon cable and slide the connector to the 12-pins communication interface (3) of the modem unit PCB as it can be seen in the picture.

The wire marked with red must be positioned towards the edge of the modem unit PCB.



The communication and power interface of the electricity meter to the module is provided by a 6-pin Elster® customized connector interface adapter.

Take off the Elster® AS1440 meter's terminal cover that hosts the communication module's plastic housing.

Release the back cover of the communication module in order to place the modem unit into the terminal cover.

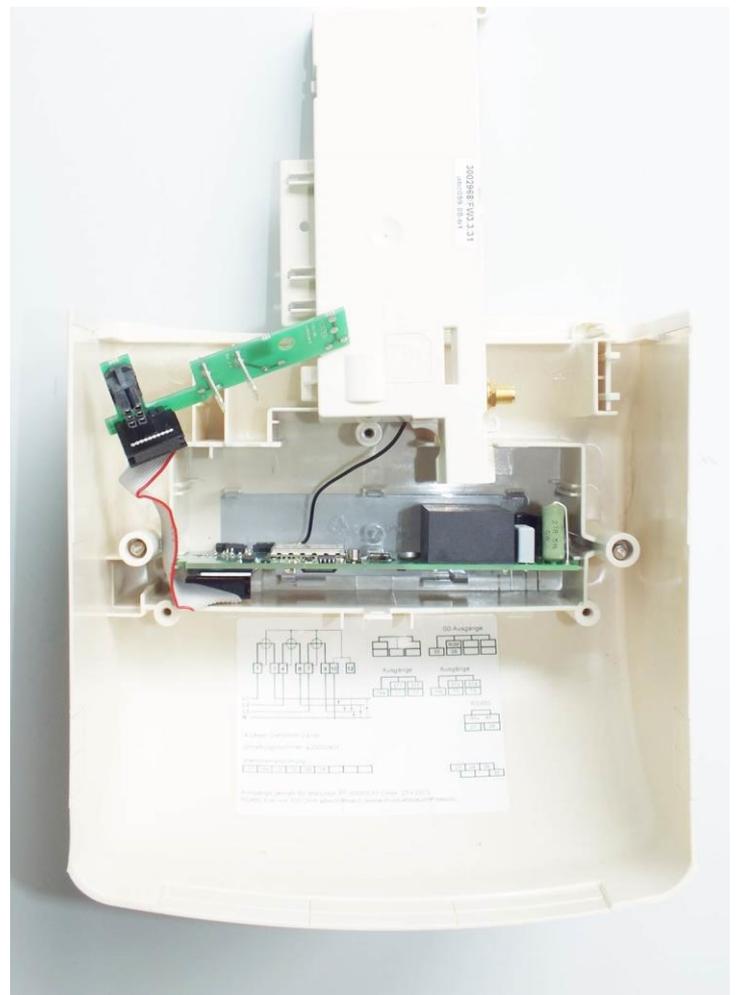
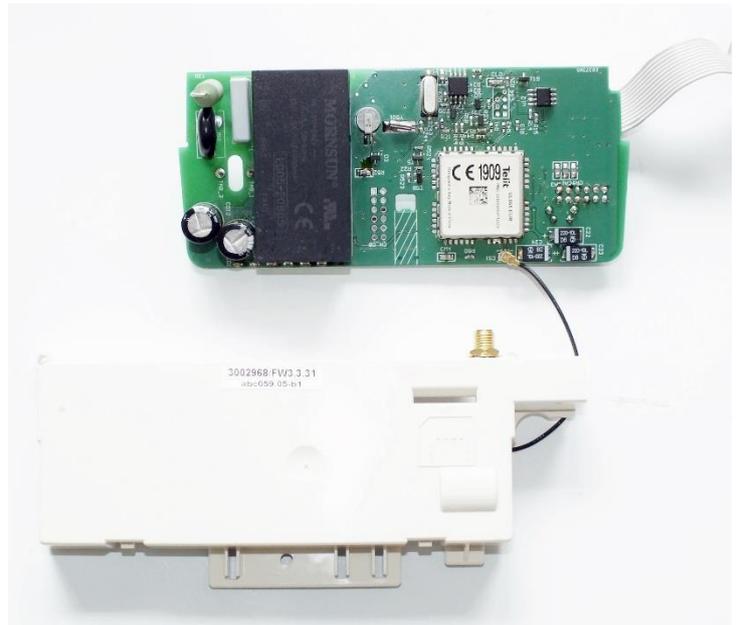


Mount the SMA-M antenna connector on the back cover of the communication module by fixing it with the antenna SMA screw (part of the U.FL cable).

Now insert the modem unit PCB inside the terminal cover's communication module housing by sliding it through the guiding rails that are closer to the fixing screws.

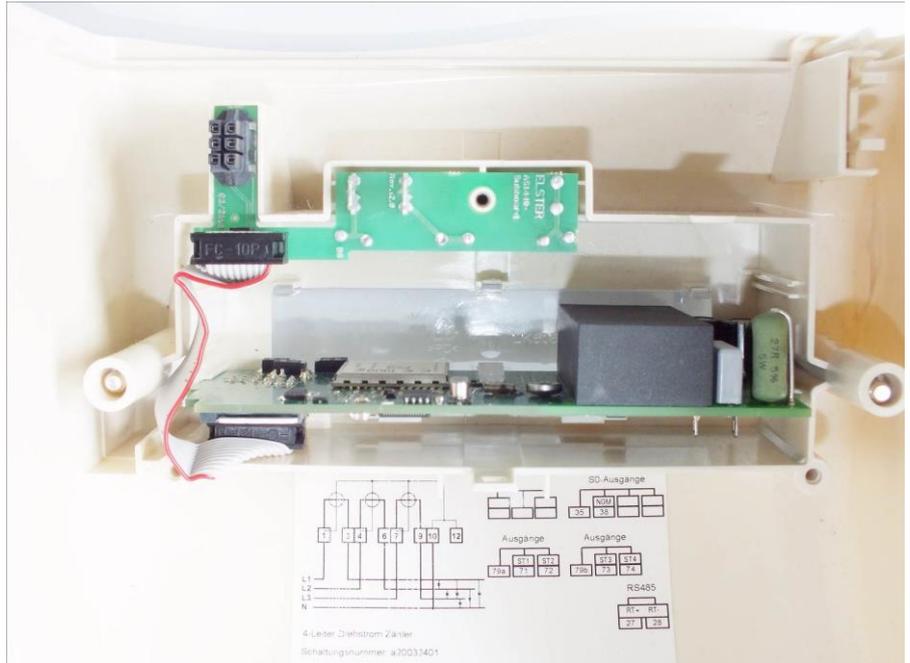
Take care to the position of the PCB and the power supply module (10) – which must be oriented to the right-side as it is shown on the picture. The 12-pins connector and its wire must be oriented to the left.

The modem unit PCB must be pushed until it will be locked and fixed into the case. In the terminal cover there are fixation points that hold the PCB in the plastic terminal cover.



Place the external power supply adapter PCB into the terminal cover case at the proper direction as it can be seen in the picture.

The 6 pins Microfit connector must be oriented to upside, the 12-pins wire must be placed to the left side – as it shown on the picture.



Please mind to arrange the ribbon cable to not obstruct the cover to be fixed on top of the communication unit housing.

Close the communication unit into the case by the back cover and fix it with the locking tabs and a screw.

Then place the terminal cover assembly onto the terminal block of the electricity meter. When inserting the terminal cover assembly, the 6-pins connector will assure power supply and data connection to the module from the meter.



After assembling and turning the meter on the communication module is ready for operation. The LED signals will confirm the operation status of the communication module.

2.4 Antenna connection

For proper operation of the communication module it is necessary to have satisfactory 2G/3G/4G signal strength. Where the signal strength is strong it is possible to use internal antenna, for areas with poor reception mount an antenna to the SMA-M connection interface of the device (through U.FL antenna wire connectors).



Chapter 3. Modem Installation Guide

The *WM-E3S*[®] communication module unit can be configured by the **WM-E Term**[®] configuration software or the **DM Set**[®] software which is suitable for setup the electricity meter through a serial connection.

From the **WM-E Term**[®] configuration software usage you will find User Manual documentation on our website.

Follow the next steps for configuring the CM to the meter.

3.1 Connection

1. The **DM Set**[®] software must be installed to a *Microsoft Windows*[®] capable installed PC computer.
2. Connect properly the optical head to the meter and to the USB port of the computer.
3. Configure the modem through the optical head.
4. Start the **DM Set**[®] application for the configuration (version 2.14 or newer is necessary).
5. After launching the application, choose the **Extras** menu and **Set modem series** option.
6. Then choose **AMXXX** option then click on the **OK**.
7. Choose **Extras** menu and **Options**, then choose the proper **serial port** which is used for the connectivity of the optical head. Let's choose the **7E1** data format and **300 baud** speed rate for the data transfer.
8. When you are configuring the modem first time, you can read out the version information only.

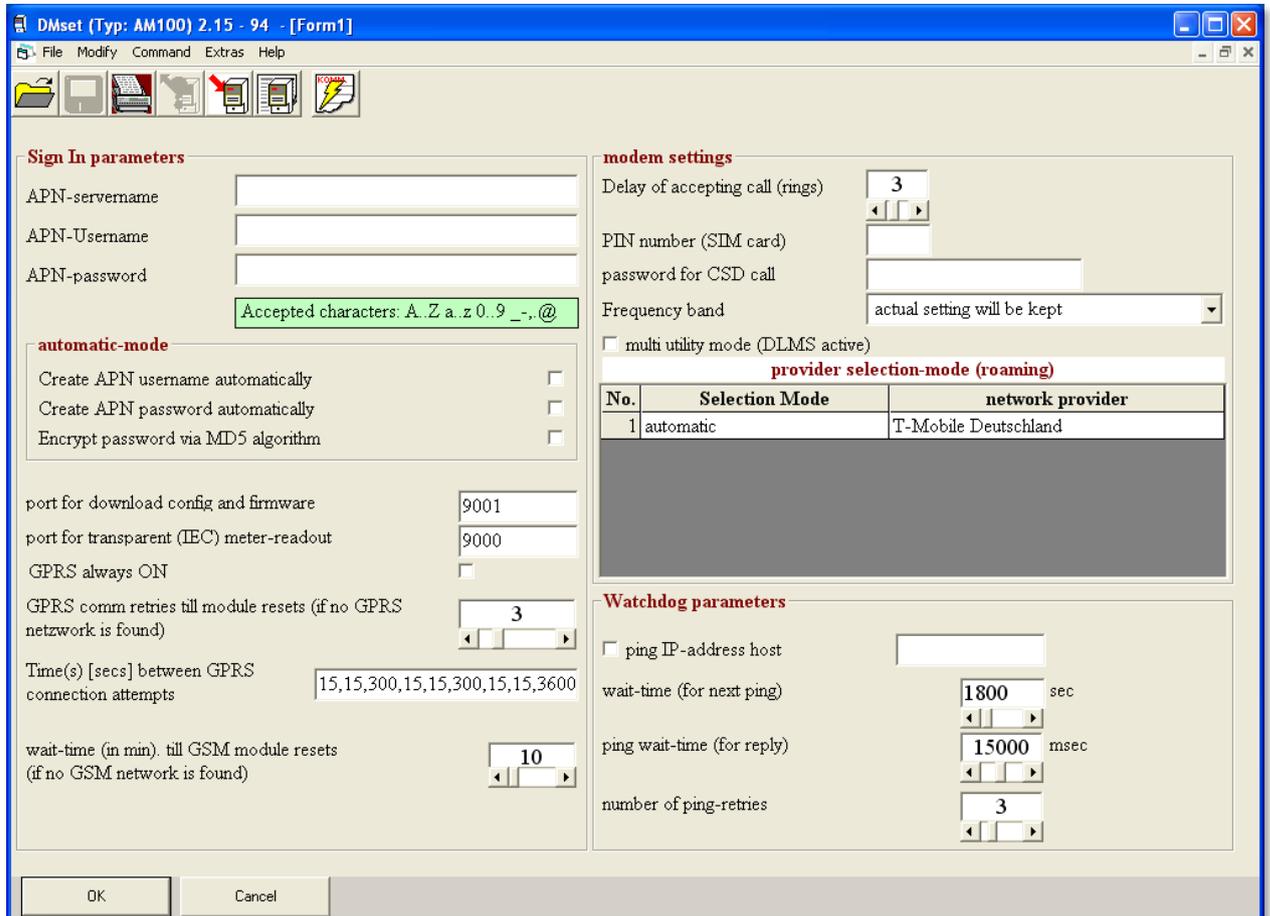
Load the sample config file provided (go to step 9.), or request it from your supplier.

IF YOU HAVE ALREADY LOADED A VALID CONFIGURATION FILE TO THE MODEM, You can use the Read Settings for readout the parameters of the meter (then edit and save the parameter settings with the Modify / Modem settings).

9. Or it's also possible to open a pre-defined configuration file with the **Open File** menu (after opening the file you can edit the configuration)
10. Choose the **Modify / Modem Settings** option from the menu and give the **APN server name** to configure the access point name for the secure logon.

(Then the modem will be communicating on the 9000 port by default.)

11. **GPRS Always ON** must be checked on.
12. You have to fill the **password** regarding the SIM Card settings (get information from Your Mobile Operator)



Settings of modem unit in the DM Set® application

13. In case of parameter modification after the changes. You have to save the changed parameter values into the configuration file by selecting the **File / Save** menu.
14. After the configuration the modem able to connect to the GPRS network.
15. The modem will be assessable through the meter.

3.2 Testing the readout of the meter

The readout and connection can be tested with **AlphaSet®** application. Let's *AlphaSet Reading and Configuration Tool Instruction Manual* documentation. ("alphaset_user_manual_GBR.doc")

3.3. Status LED signals

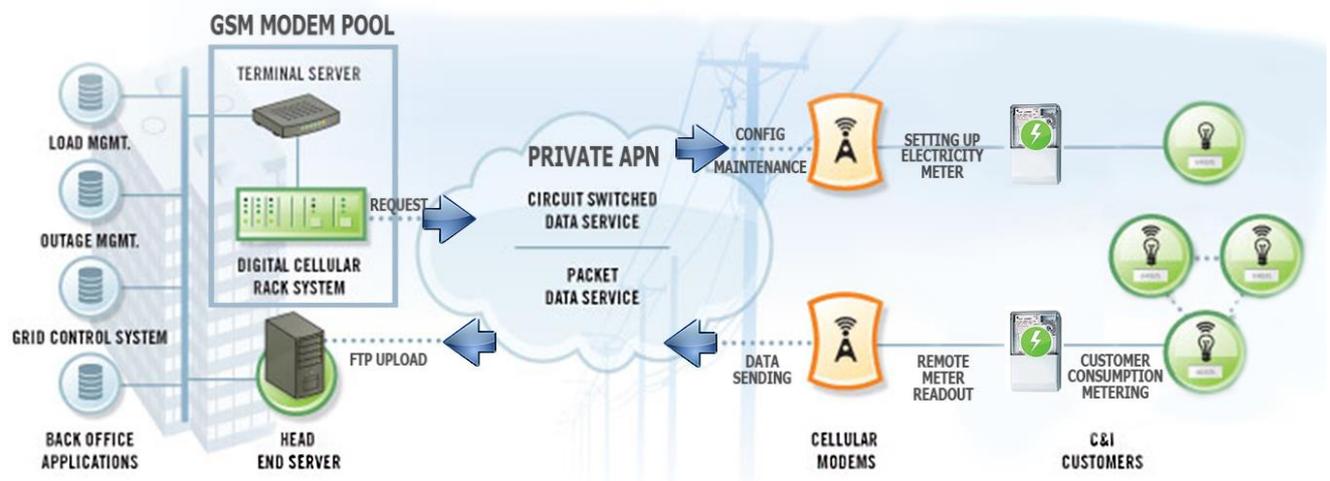
meaning of LED 1	GSM/GPRS status
meaning of LED 2	PIN status (ON=OK)
meaning of LED 3	E-meter communication (DLMS active)
meaning of LED 4	E-meter relay status
meaning of LED 5	M-Bus status
meaning of LED 6	Firmware status

* LED 1 will be flashing faster if it was registered on wireless network

** LED 4, 5 is available only in case of MBUS version.

3.4. Push operation method

The complete readout and data sending mechanism to the centre and the other direction for the configuration and maintenance tasks can be realized on the defined paths.



The modem is not operate continuously on the GPRS network.

Therefore, there is an another option and meter data sending mode to initiate a remote readout automatically in the pre-defined intervals. Anyway, it is also possible to start the data sending in case of different events (e.g. removal of meter cover, incoming SMS message from the centre).

In this situation the modem is connected to the mobile data network only during the time of the data transmission.

The devices needs to be connected to GSM network and ready to connect to GPRS, but without active IP connection.

- **Data Push - starting at predefined times**

The Data Push method triggers FTP file upload, plain text or encrypted.

The unique filename and the file is generated automatically.

The file is always has two parts, first the standard register reading, then the event log from last 31 days. (the period may extended automatically if the date of the event is earlier)

The readings shown as standard IEC format, including some ASCII control characters

like STX ETX, etc. also.

The ftp is set to passive mode.

- **Alarm Push** - starting when new event can be read from meter

Alarm Push method triggers TCP sending of a DLMS WPDU contains the IP address,

listening port number for transparent service, and the meter ID.

- **Triggering with SMS**

GPRS connection can be activated remotely with a defined SMS from any call number.

The SMS text must be left empty.

After the SMS received, the modem will connect to IP network, and will be accessible as a IP server for a time period defined in the config file.

Example config file will be provided with a 30 minute setting.

3.5. Configuration of the push operation mode

Configuration can be loaded with **DM-Set**, but there is no dedicated menu item for these settings. The configuration file must be edited manually.

The following **DM-Set** configuration file items are necessary to configure this mode.

- Data Push setting (using DMSet):

- GPRS always ON: unchecked
- ping IP-address host: host, user, password:
ftp://username:password@host/path using IRA(ITU T.50) character set

Some parameters cannot be set on the DMSet GUI, these must be defined by direct editing the config file in a text editor.

- Config file keywords:

- smp.always_on = 0
- smp.connect_on_timer = 1
- conn.ping_host = ftp://username:password@host/path

Example: ftp://device001:pwd001@server.com/upload

There can be defined a port number in the ftp upload URL. If the ftp port other than 21, eg. 1021 the port number must be defined.

Example: ftp://username:password@host:1021/path
ftp://device001:pwd001@server.com:1021/upload

- smp.connect_interval = 28800

Connect interval counted in seconds.

- smp.connect_start = YYYYMMDDWWHHmmSS

Y = Years, M = Months, D = Days, W = Day of week, where 01 is Monday and 07 Sunday.

H = Hours, m = Minutes, S = Seconds, wildcards FF are allowed.

At the datetime (connect_start) the wildcard=FF, upcase only!

For example: *smp.connect_start = FFFFFFFFFF0000* which means send once in every hour.

When the time is between 01:00:00 AM to 02:00:00 AM UTC, the scheduling maybe skipped on the start of the daylight savings, and run twice at the end.

- `csd.password = <max. 16 characters>`
- `conn.apn_name = wm2m`

Where apn name must be maximal 50 char long.

- `conn.apn_user =`
- `conn.apn_pass =`

Where apn password must be maximal 30 char long.

- `smp.connect_interval` in seconds, max 0xFFFFFFFF

Meter date format setting must be set in config file for proper operation:

`emeter.date_format = YYMMDD`

or

`emeter.date_format = DD-MM-YY`

for example.

- **Encryption:**

The file can be encrypted with AES-128 CBC method.

The 128-bit key must be added to the config file.

If the parameter is empty or the length is wrong, no encryption will be used.

`dlms.lls_secret = 00112233445566778899AABBCCDDEEFF`

- **Triggering with SMS:**

- `trigger: SMS triggered (Empty SMS)`

The SMS length must be 0. The encoding can be 7-bit or 8-bit.

The device will be registered to IP network for a predefined time, if the GPRS always on setting is unchecked (smp.always_on = 0) Setting of time period:

- Config file keywords:

- smp.disconnect_delay = 1800

Above an example can be found, where the 1800 seconds value means that in 30 minutes online time.

- Event Push settings:

The smp.disconnect_delay setting also applies to Event trigger.

The device will remain online for this time after sending the event notification.

- Config file keywords:

ei_client.addr = <destination IPV4 address>

ei_client.port = <destination port number>

example:

ei_client.addr = 192.168.0.1

ei_client.port = 4000

In these examples, the IP address is 192.168.0.1 and the port number is 4000. You can change these values with the required values.

The APN name, user and password parameters are also required for push mode operation.

The device will connect to the defined TCP port.

Event Push data format: DLMS WPDU contains the IP address, listening port number for transparent service, and the meter ID.

TCP data, binary, 29-byte:

0001000100010015FF0203060ACAB60F12232809083035323035383431

Structure:

DLMS WPDU HEADER, 8-byte

Version = 1

srcPort = 1

dstPort = 1

Payload Length = 21

AXDR encoded data packet:

<Data>

<Structure Qty="0003" >

<DoubleLongUnsigned Value="0ACAB60F" /> IP address

<LongUnsigned Value="0FA0" /> port number, that the device listening on

<OctetString Value="3035323035383431" /> meter ID

</Structure>

</Data>

When You'll save the **DM-Set** configuration file, please consider that the filename must be used the following naming convention:

IMEINumber_MeterCode_SN<MeterSerialNumber>_Date_Time_<4-digit_counter>.TXT file format.

Example: 123456789012345_ELS5_SN12345678_20140101_010000_1234.TXT

All strings in parameters must be fit to the IRA character set.

Reference: http://en.wikipedia.org/wiki/ITU_T.50

If You're using a 3G or 4G LTE capable version of modem hardware it is highly recommended to set the modem to 2G communication mode for reliable CSD connection.

When further information is necessary related on the implementation, this can be requested from our technical support.

Chapter 4. Support

If you have a technical question regarding the usage You can find us on the following contact possibilities:

Email: support@m2mserver.com

Phone: +36 20 333-1111

4.1 Support

The product has a identification void which has important product related information for the support line.

Warning! Damaging or removing the void sticker means the loss of product guarantee.

Online product support available here: <https://www.m2mserver.com/en/support/>

4.2 Product Support

The documents and information related on the product are available here. <https://www.m2mserver.com/en/product/wm-e3s/>

Chapter 5. Legal notice

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