



# SMA Energy Meter Installation Manual

Rev.0007

## VALIDITY

This document is valid for the SMA Energy Meter\* (EMETER-20) from firmware version 2.1.3.R.

## TARGET GROUP

Only qualified persons with the following skills are allowed to perform the tasks described in this document:

- Training in the installation and commissioning of electrical devices
- Training in electrical hazards and local safety regulations
- Knowledge of all applicable standards and directives
- Knowledge of and compliance with this document and all safety information

## SYMBOLS USED

|  |                  |   |
|--|------------------|---|
|  | <b>⚠ DANGER</b>  | Indicates a hazardous situation that, if not avoided, will result in death or serious injury. |
|  | <b>⚠ WARNING</b> | Indicates a hazardous situation that, if not avoided, can result in death or serious injury.  |
|  | <b>⚠ CAUTION</b> | Indicates a hazardous situation that, if not avoided, can result in minor or moderate injury. |
|  | <b>NOTICE</b>    | Indicates a situation that, if not avoided, can result in property damage.                    |
|  | <b>i</b>         | Information that is important for a specific topic or goal, but is not safety-relevant.       |
|  | <b>☑</b>         | Indicates a requirement for meeting a specific goal.  |
|  | <b>☑</b>         | Desired result.   |
|  | <b>✘</b>         | A problem that might occur.   |

## INTENDED USE

The Energy Meter is a measuring device which detects electrical measured values at the connection point and makes them available via Ethernet.

This product is not an energy meter for the consumption of active power as defined in the EU Directive 2004/22/EC (MID). The Energy Meter must not be used for billing purposes. The data collected by the Energy Meter relating to the power generated by your PV system may deviate from the data of the main Energy Meter, which is used for billing purposes.

The Energy Meter must only be connected to the subdistribution of the household on the load side behind the Energy Meter of the electric utility company. The Energy Meter must be installed in a switch cabinet. For applications bigger than 63 A, current transformers must be connected to the Energy Meter.

The Energy Meter is designed for indoor use only.

The Energy Meter is approved for use in all EU member states, in Great Britain, Australia and selected other countries. Only use the Energy Meter in accordance with the information provided in the enclosed documentation. Any other use can result in personal injury or property damage.

For safety reasons, it is not permitted to modify the product or install components that are not explicitly recommended or distributed by SMA Solar Technology AG for this product. Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

The enclosed documentation is an integral part of the product and must be read and observed. Keep in a convenient place for future reference.

When the Energy Meter is used in delta IT grids, the cumulative power values are correctly measured. Due to the measuring principle of the Energy Meter, other measured values may be incorrect. The Energy Meter can be used in SMA SMART HOME applications in delta IT grids.

### **i** Recommendations for future upgrades

To enable a registration process for future upgrades of the Energy Meter, the documentation package is delivered with an RID and PIC label. Store the label in a safe location for later use.

Alternatively, the RID and PIC are printed on the type label of the Energy Meter. Type labels are, however, difficult to read when installed.

## SUPPORTED PRODUCTS

For information on the supported products, see the product page of the Energy Meter at [www.SMA-Solar.com](http://www.SMA-Solar.com). A publication about the meter protocol being used is available at <http://www.sma.de/artner/sma-developer.html>.

## SAFETY INFORMATION

This section contains safety information that must be observed at all times when working on or with the product.

To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

### **⚠ DANGER**

#### **Danger to life due to electric shock**

Lethal voltages are present in the live components.

- Disconnect the connection point from voltage sources and make sure it cannot be reconnected.
- Before performing any work on the Energy Meter, disconnect the grid side from all voltage sources using the installed disconnect switch.
- Ensure that the conductors to be connected are de-energized.
- Only use the Energy Meter in a dry environment and keep it away from moisture.
- Install the Energy Meter in the switch cabinet only and ensure that the connection areas for the line conductors and the neutral conductor are behind a cover or have contact protection.
- Disconnect the Energy Meter from voltage sources before cleaning. The Energy Meter must be cleaned with a dry cloth only.
- Observe the prescribed minimum clearance between the network cable and live installation components, or use suitable insulation.

### **⚠ DANGER**

#### **Danger to life due to electric shock if external disconnect switch is missing**

Lethal voltages are present in the live components of the Energy Meter.

- Install an external disconnect switch between the Energy Meter and the grid-connection point. The external disconnect must be close to the Energy Meter and easily accessible.

### **⚠ WARNING**

#### **Danger to life due to electric shock**

Overvoltages (e.g. in the case of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cable if there is no overvoltage protection.

- Ensure that all devices in the same network are integrated in the existing overvoltage protection.
- When laying the network cable outdoors, attention must be given to suitable overvoltage protection at the network cable transition outdoors to the network inside the building.

### **⚠ WARNING**

#### **Risk of fire due to dirty or oxidized contact surfaces of live aluminum conductors**

Connecting dirty or oxidized contact surfaces with aluminum conductors reduces the conductivity of the live terminals, thereby increasing the transition resistances. This can cause components to overheat and catch fire.

- The contact surfaces are to be cleaned, brushed, and treated with acidic and alkaline substances (e.g. petroleum jelly or special thermal grease).

### **⚠ WARNING**

#### **Fire risk**

If a fuse is missing or incorrect and a fault occurs, a fire may be caused. This can result in death or serious injury.

- Protect the line conductors of the Energy Meter with a fuse or a main/selective circuit breaker, max. 63 A.

## NOTICE

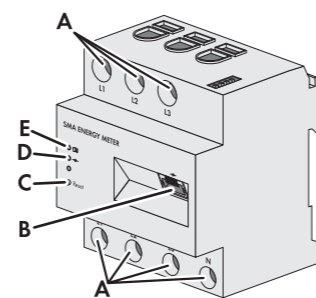
### **Damage to or destruction of the Energy Meter if connected to ISDN**

- Do not connect an ISDN cable to the network terminal of the Energy Meter.

### **Damage to or destruction of the Energy Meter due to inappropriate use**

- The Energy Meter must not be operated beyond the values specified in the technical data.

## PRODUCT DESCRIPTION



- A:** Connection area for line conductors and neutral conductor
- B:** Network terminal (Ethernet)
- C:** Reset button
- D:** COM LED
- E:** Status LED

## SCOPE OF DELIVERY

- 1 x Energy Meter (EMETER-20)
  - 1 x installation manual
- Contact your specialist dealer if you find any damage.

## TECHNICAL DATA

|   |  |
|---|--|
| Communication   | Ethernet                                 |
| Nominal voltage:                                      | 110 / 230 / 400 VAC                      |
| Frequency   | 50 / 60 Hz (± 5 %)                       |
| Self-consumption                                      | 2 W                                      |
| Limiting current/line conductor                       | 63 A                                     |
| Connection cross-section without current transformers | 10 mm <sup>2</sup> to 16 mm <sup>2</sup> |
| Connection cross-section with current transformers    | 10 mm <sup>2</sup> to 25 mm <sup>2</sup> |
| Max. cable length with current transformers           | 3 m                                      |
| Torque for screw terminals                            | 2 Nm                                     |
| Weight  | 0.30 kg                                  |
| Dimensions (W x H x D)                                | 70 mm x 85 mm x 65 mm                    |
| Ambient temperature in operation                      | -25 °C to +40 °C                         |
| Ambient temperature during transport/storage          | -25 °C to +70 °C                         |
| Relative humidity*                                    | 5% to 90%                                |
| Maximum operating altitude above mean sea level       | 2000 m                                   |
| Protection class                                      | II                                       |
| Degree of protection**                                | IP20                                     |

\* non-condensing

\*\* in accordance with IEC 60529

## LED STATES

### **Status LED ( ):**

- **Glowing green:** Energy Meter is switched on.
- **Flashing green slowly:** Energy Meter starting up.
- **Flashing green fast:** firmware update running.
- **Glowing or flashing red or orange:** an error has occurred (see Section "Troubleshooting").

### **COM LED ( ):**

- **Off:** no Speedwire connection established.
- **Glowing green:** Speedwire connection established.
- **Flashing green:** Energy Meter is sending or receiving data.

## MOUNTING

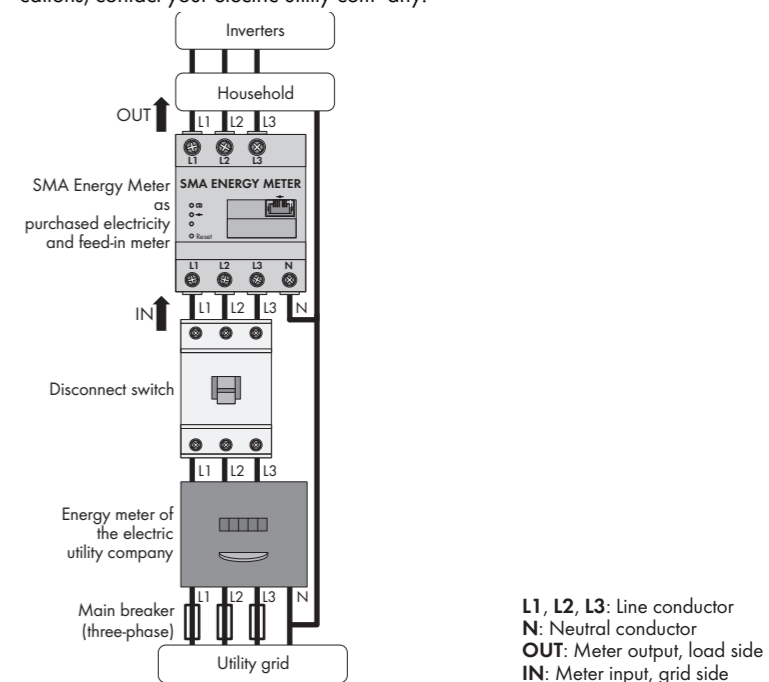
- Mount the Energy Meter on the top-hat rail. Hook the Energy Meter into the top edge of the top-hat rail and press down until it snaps into place.

## INFORMATION ON CONNECTION AND COMMISSIONING

- The line conductor L1 supplies the Energy Meter with power. At least the line conductor L1 and the neutral conductor must be connected for the Energy Meter to switch on.
- When using fine stranded wire, bootlace ferrules must be used.
- The screw terminals must be retightened after six to eight weeks.

## ELECTRICAL CONNECTION FOR APPLICATIONS < 63 A

The following figure shows a connection example in TN and TT grid configurations in the case of installation at the grid-connection point. For exact connection specifications, contact your electric utility company.



**L1, L2, L3:** Line conductor  
**N:** Neutral conductor  
**OUT:** Meter output, load side  
**IN:** Meter input, grid side

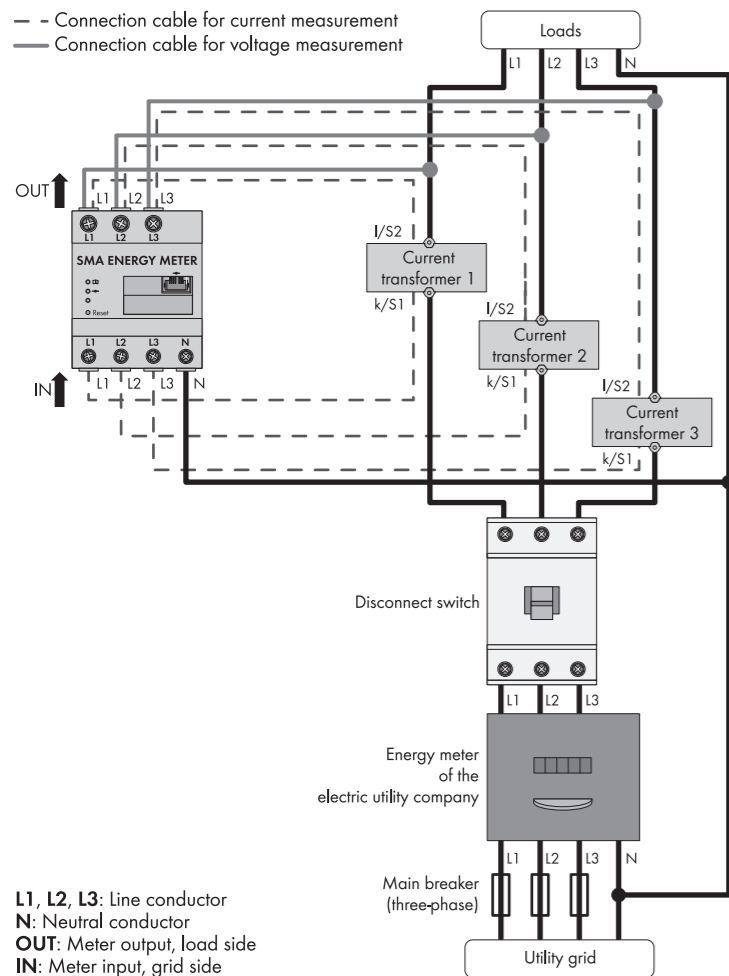
### **Procedure:**

1. Connect the conductors to the Energy Meter. Observe the permitted connection cross-section and torque for screw terminals (see Section "Technical data"):
  - In a three-phase utility grid, connect the line conductors L1, L2 and L3 and the neutral conductor to the Energy Meter in accordance with the wiring diagram.
  - In a single-phase utility grid, connect the line conductor L1 and the neutral conductor to the Energy Meter in accordance with the wiring diagram.

\* Referred to as Energy Meter or product in this document.

## ELECTRICAL CONNECTION FOR APPLICATIONS > 63 A

The following figure shows a connection example in TN and TT grid configurations in the case of installation at the grid-connection point. For exact connection specifications, contact your electric utility company.



### Additionally required material (not included in the scope of delivery):

- 3 x current transformer
- Connection cables for current transformers

#### **i** Recommendations for the current transformer

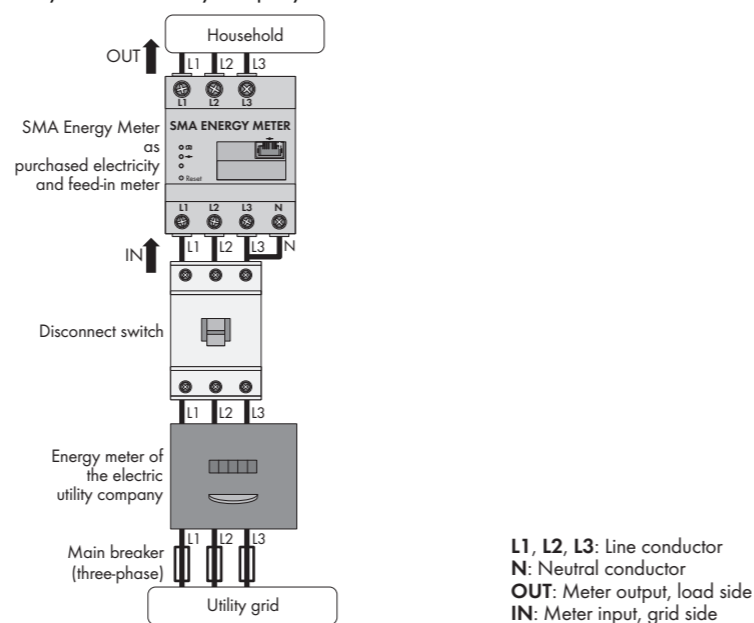
SMA Solar Technology AG recommends current transformers designed for a secondary current of 5 A. The current transformers should have at least accuracy class 1.

#### Procedure:

1. Connect one current transformer to each line conductor L1, L2 and L3.
2. On each current transformer, connect one connection cable for current measurement to each of the secondary current terminals (**k/S1** and **I/S2**). Observe the permitted connection cross-section of the Energy Meter (see Section "Technical data").
3. Connect the connection cables for current measurement (dashed gray line) to the Energy Meter. Observe the prescribed torque for screw terminals (see Section "Technical data").
4. Connect the connection cables for voltage measurement (solid gray line) to the Energy Meter. Observe the prescribed torque for screw terminals (see Section "Technical data").
5. Connect the connection cables for voltage measurement to the corresponding line conductors.

## ELECTRICAL CONNECTION FOR 3-PHASE APPLICATIONS IN DELTA IT NETWORKS

The following figure shows a connection example in delta IT networks in the case of installation at the grid-connection point. For exact connection specifications, contact your electric utility company.



#### Procedure:

- Connect the line conductors L1, L2 and L3 and the neutral conductor to the Energy Meter in accordance with the wiring diagram. Observe the permitted connection cross-section and torque for screw terminals (see Section "Technical data"):

## NETWORK PORT

### **i** IGMP protocol from version 2 must be supported

Data transmission with the Energy Meter works with multicasts. For the correct function of the Energy Meter, all network devices used must support the IGMP protocol, minimum required version 2 (IGMP V2).

#### Additionally required material (not included in the scope of delivery):

- 1 x network cable

#### Recommended cable types:

- SF/UTP, S-FTP, S/UTP, SF/FTP, S/FTP, S-STP
- For further information on cable types, refer to the Technical Information "SMA Speedwire Fieldbus" at [www.SMA-Solar.com](http://www.SMA-Solar.com).

#### Procedure:

1. Connect the network cable to the network terminal (Ethernet) of the Energy Meter.
2. Connect the other end of the network cable to a router/network switch. SMA products which are to receive measured values must be integrated in the same local network. If multiple SMA products in the local network require the measured values from the Energy Meter, do not connect the network cable directly to an individual SMA product.

## COMMISSIONING

1. Cover the Energy Meter with the cover or the contact protection of the sub-distribution.
2. Switch the power supply to the subdistribution back on.
  - The LEDs of the Energy Meter glow during start-up. If there is only one Energy Meter in the system, the Energy Meter connects automatically to SMA communication products in the same local network. For more information on commissioning, see the manual of the supported devices.
  - The LEDs are not glowing or the Energy Meter is not displayed by the SMA communication products?
    - Correct the error (see Section "Troubleshooting").

## ACCESSING THE USER INTERFACE

1. Call up the web browser and in the address line enter **http://SMA"Serial number".local**, e.g.: **http://SMA7435667356.local**  
 Note: The serial number can be found on the type label of the Energy Meter.
2. Select user group and enter the password.  
 Tip: The standard password for the user group **User** is "0000."  
 The standard password for the user group **Installer** is "1111."

3. Press Enter.
  - The user interface of the Energy Meter opens.
  - The user interface does not open?
    - Correct the error (see Section "Troubleshooting").
4. Create a personal password after your first login.

## CONFIGURING THE CURRENT TRANSFORMER

1. Call up the user interface of the Energy Meter.
2. Call up the menu **Device Parameters**.
3. Select **[Editing Parameters]**.
4. Set the parameter **external transformer** in the parameter group **Device > Device** to **Yes**.
5. Enter the desired transmission ratios for the parameters **Primary current** and **Secondary current**.
6. Select **[Save all]** to save the changes.

## UPDATING THE FIRMWARE

### AUTOMATIC UPDATE (RECOMMENDED)

1. Call up the user interface of the Energy Meter.
2. Select the option **Yes** in the menu **Device Parameters > Update > Automatic update**

### MANUAL FIRMWARE UPDATE

1. Download the update file from [www.SMA-Solar.com](http://www.SMA-Solar.com) and save it to your computer.
2. Call up the user interface of the Energy Meter.
3. Select the menu **Device Configuration**
4. Select **[Settings]**.
5. In the context menu, select **[Updating the Firmware]**.
6. Follow the instructions in the dialog.

## RESETTING THE ENERGY METER TO DEFAULT SETTINGS / RESETTING THE PASSWORD

- Press the reset button with a sharp object and hold it for two to six seconds.

## RESTARTING THE ENERGY METER

- Press the reset button with a sharp object and hold it for nine seconds or longer.

## PROCEDURE AFTER REPLACING AN ENERGY METER

- If more than one Energy Meter is installed in your system and you have replaced one or more Energy Meters, you will need to adjust the serial number of the corresponding Energy Meter in the inverter or in the communication product. This will avoid inaccurate meter reading data in the Speedwire data module:
  - In systems without Sunny Home Manager, enter the serial number of the Energy Meter via Sunny Explorer or the user interface in the inverter or in the communication product (for information on changing device parameters, see manual of the respective product).
  - In systems with Sunny Home Manager, configure the Energy Meter in Sunny Portal (see user manual of the Sunny Home Manager).

## TROUBLESHOOTING

### The status LEDs are off?

The Energy Meter is not supplied with power.

- Make sure that at least the line conductor L1 and the neutral conductor are connected to the Energy Meter.

### The status LEDs are glowing or flashing red or orange?

There is an error.

- Restart the Energy Meter (see Section "Restarting the Energy Meter").
- Contact Service.

### The Speedwire LED is not glowing or the Energy Meter is not displayed by the SMA communication product?

The network cable has not been correctly connected to the network terminal.

- Make sure that the network cable is correctly connected to the network terminal.
- The Energy Meter is not integrated into the same local network as the SMA communication product.
- Connect the Energy Meter to the same router/network switch as the SMA communication product.

### The Energy Meter provides unrealistic measured values?

The Energy Meter has been installed the wrong way round.

- Check the connection and commissioning, and perform again if necessary.

The user interface cannot be called up via **http://SMA"Serial number".local**.

The name resolution via Avahi (Multicast DNS) is not working.

- Call up the user interface via the current IP address of the Energy Meter. Call up the user interface of the router and read off the IP address of the Energy Meter (see router manual).
- Contact your network administrator.

The password for the user interface has been forgotten?

- Reset the password (see Section "Resetting the Energy Meter to Default Settings / Resetting the password").

## DECOMMISSIONING

### **! DANGER**

#### Danger to life due to electric shock

Lethal voltages are present in the switch cabinet.

- Disconnect the connection point from voltage sources and make sure it cannot be reconnected.
- Ensure that the conductors to be disconnected from the Energy Meter are de-energized.

#### Procedure:

1. Remove all conductors connected to the Energy Meter.
2. Remove the Energy Meter from the top-hat rail. Tilt the lower edge of the Energy Meter forwards and lift off the top-hat rail.

## DISPOSAL

- Dispose of the Energy Meter in accordance with the locally applicable disposal regulations for electronic waste.

## OPEN SOURCE LICENSES

The licenses for the software modules used can be called up on the user interface of the product. You can request the source code with modifications from the Service department.

## CONTACT

If you experience any technical problems with our products, please contact the Service. The following data is required in order to provide you with the necessary assistance:

- Type and serial number of the Energy Meter
- Type and serial number of the SMA products
- Error description
- Firmware version

You can find your country's contact information at:



<https://go.sma.de/service>

## SMA Solar Technology AG

Sonnenallee 1  
 34266 Niestetal  
 Germany  
 Tel. +49 561 9522-0  
 Fax +49 561 9522-100  
 E-mail: [info@SMA.de](mailto:info@SMA.de)  
[www.SMA.de](http://www.SMA.de)

Copyright © 2022 SMA Solar Technology AG. All rights reserved.: