MID energy meters

User manual

INSPIRING INNOVATIONS

User manual

MID energy meters

UM EN EEM-EM3xx, Revision 00 2018-09-17

This user manual is valid for:

Designation	Order No.
EEM-EM325	2908576
EEM-EM355	2908578
EEM-EM375	2908581
EEM-EM327	2908586
EEM-EM357	2908588
EEM-EM377	2908590

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phoenixcontact.com

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1 For your safety

Read this user manual carefully and keep it for future reference.

1.1 Designation of warning notes

This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

DANGER
Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

WARNING
Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

CAUTION
Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.

This symbol together with the **NOTE** signal word warns the reader of actions that might cause property damage or a malfunction.

Here you will find additional information or detailed sources of information.

1.2 Qualification of users

The use of products described in this user manual is oriented exclusively to:

– Electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.
– Qualified application programmers and software engineers. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

1.3 Field of application of the product

1.3.1 Intended use

MID energy meters may only be used to measure electric characteristic values in applications that meet the specified technical data.

1.3.2 Foreseeable misuse

MID energy meters are not suitable for use with voltage transformers.

Only apply loads to the measuring inputs of the transformer measuring devices as specified in the connection scheme. Direct measurements at the measuring inputs of the transformer measuring devices must be avoided.

1.3.3 Product changes

Modifications to hardware and firmware of the device are not permitted.

Incorrect operation or modifications to the device can endanger your safety or damage the device. Do not repair the device yourself. If the device is defective, please contact Phoenix Contact.

1.4 Safety notes

The "exclamation mark" on the device labeling means that you need to:

Read the installation note in its entirety. Follow the installation note to avoid impairing the intended protection.

- The installation, operation, and maintenance work must be completed by a qualified electrician. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations must be observed.
- Use an appropriate voltage measuring device to ensure that no voltage is present.
- Install the device in accordance with instructions described in the installation notes. Accessing circuits within the device is prohibited.
- The measuring device is maintenance free. Repairs may only be carried out by the manufacturer.
- Only clean the device with a suitable damp cloth. Switch the device off before cleaning and do not use abrasive agents or solvents.
- Ensure that all connection terminals are connected correctly to prevent the device from being damaged.
- Observe the maximum permissible voltages (500 V AC phase/phase or 288 V AC phase/neutral conductor) and network frequency (50/60 Hz).

2 Device description

The Phoenix Contact energy meter device family for current, voltage, performance, and energy values record electrical characteristic values. The devices have an interface for the bus and network connection.

The energy values provided by the energy meters can be used for billing purposes. All of the devices have a MID approval.

Measurements are completed with current sensors in or on the device. Voltage measurements are completed directly. The phases are smoothed by the device during direct current measurements. Separate current transformers are used when conducting measurements via current transformers. All of the devices are supplied via the measuring circuit.

Communication is implemented via the bus or network connection (modbus/RTU, M bus or modbus/TCP). The communication interfaces are integrated in the device.

The current and voltage signals are digitalized internally. Other measured values are calculated in the processor and supplied via the communication interface.

All of the devices have an S0 output.

The input is used to switch between tariffs (not on devices with a modbus/TCP).

Table 2-1 Overview of the product features

Features	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
MID approval (EN 50470)	X	X	X	X	X	X
Measurement via current transformer (secondary rated current 1 A or 5 A)	X	X	X	-	-	-
Direct current measurement at 80 A	-	-	-	X	X	X
M bus	X	-	-	X	-	-
Modbus/RTU	-	X	-	-	X	-
Modbus/TCP	-	-	X	-	-	X
Input	X	X	-	X	X	-
S0 output	X	X	X	X	X	X

2.1 Scope of supply

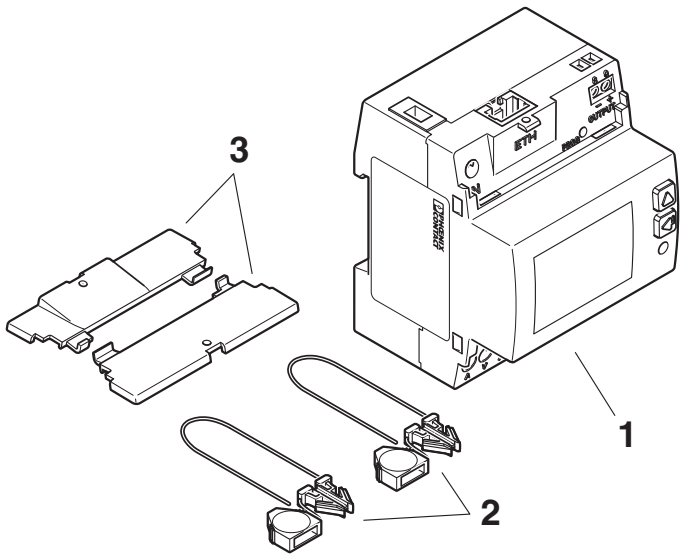

Figure 2-1 Scope of supply

1 Energy meter, certified in accordance with MID directive
2 2x seals
3 2x covers

2.2 Information about the device

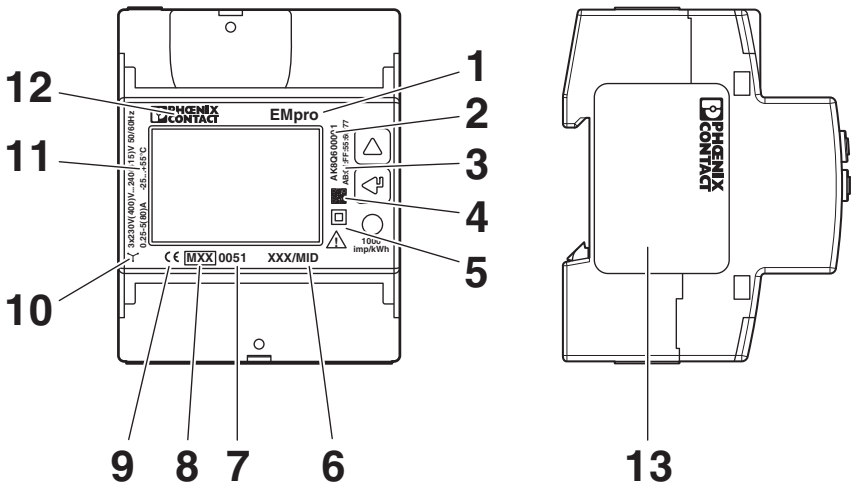

Figure 2-2 Information about the device

1	Order number and order designation	e.g. 2908581 EEM-EM375
2	Serial number	e.g. AANRBXXXXX
3	MAC address (only on devices with Ethernet interface)	e.g. 00-A0-45-E1-9A-A1
4	DataMatrix code	Contains the serial number
5	Safety notes	e.g. protection class II
6	Number of the examination certificate	e.g. 305/MID
7	ID number of designated body	e.g. 0051
8	Metrology marking and year	e.g. M16
9	CE marking	
10	Connection scheme	
11	MID data	
12	Manufacturer	
13	Security seal	

2.3 Operating and indication elements

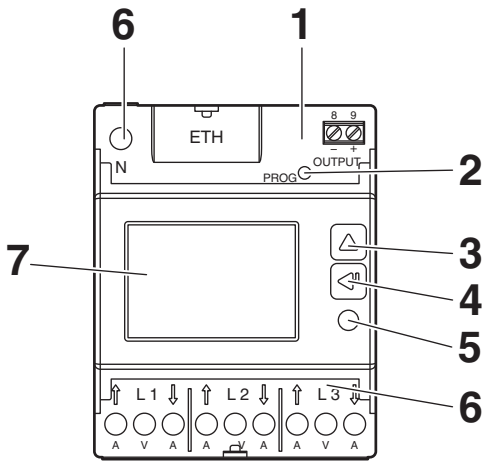

Figure 2-3 Operating and indication elements

1 Inputs, outputs, communication interface
2 PROG key
3 UP key
4 ENTER key
5 Metrological LED
6 Connections for the current and voltage measurement
7 LCD

2.3.1 LCD

The LCD displays the electric characteristic values or the configuration parameters available via the display pages. Other configuration parameters can be configured via the communication interface.

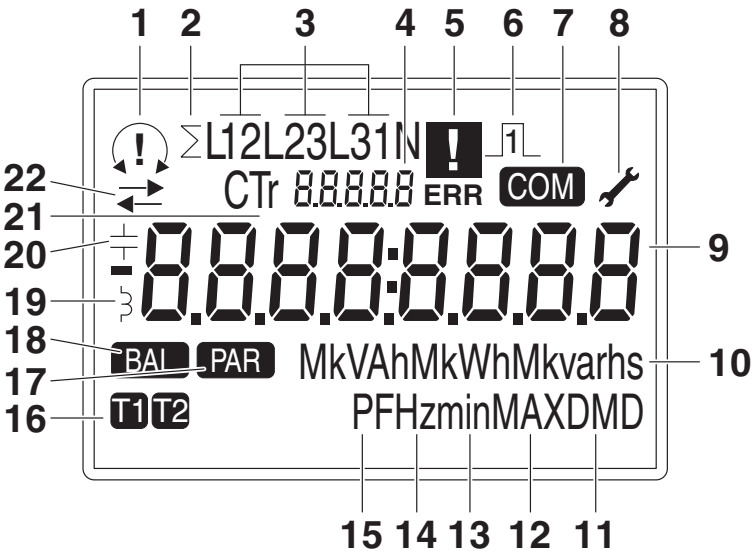

Figure 2-4 LCD

1	Phase sequence	Correct (123) Incorrect (132) Undefined (e.g. one or two phases are missing)
2	System values	
3	Phase detection	
4	Small display	5 characters, for additional information such as current menu, e.g. "info"
5	Error message	Incorrect metrological parameters
6	Output status	See section 6.5 "Outputs"
7	Communication status	On = active
8	Programming mode	On = Device is in programming mode
9	Large display	8 characters
10	Display value units	
11	Mean values	DMD = Demand
12	Maximum values	
13	Minimum values	

14	Frequency values		
15	Efficiency factor values		
16	Tariffs		
17	Partial energy meter values	PAR	= Partial
18	Balancing energy meter values	BAL	= Balancing
19	Inductive values		
20	Capacitive values		
21	Current transformer values	CTr	Current transformer ratio, e.g. 100/5 = 20
22	Power flow	→	Procurement
		←	Supply

2.3.2 Metrological LED

The metrological LED shows the effective energy pulses. The pulse constant is specified in the technical data (e.g. 1000 pulse/kWh). The metrological LED is active for the procurement and inactive for the supply.

Table 2-2 Functions of the metrological LED

Function	Description
Active	During procurement
Inactive	During supply

2.3.3 Ethernet LED

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	-	X
Direct measuring device	-	-	X

The Ethernet LEDs are located on the top of the device.

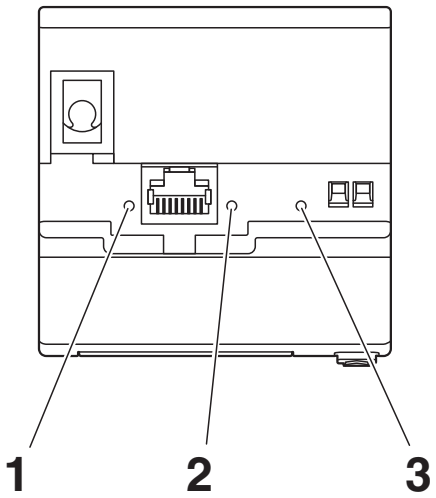

Figure 2-5 Ethernet LEDs

1 Link

Off	No connection
On	Connection OK
Flashing	Data transmission

2 Speed

Off	10 Mbps
On	100 Mbps

3 Status of

On	Device start up / upgrade is installed
Flashing slowly (every 3 seconds)	Internal communication without errors
Flashing quickly	Internal communication error

3 Quick start guide

The device is in start mode for approx. 8 seconds after the voltage is applied. Device information is displayed in start mode.

Following start mode, the device automatically switches to operating mode. The energy meter values, instantaneous values, mean values, maximum mean values, and the device information are displayed in operating mode.

Navigation

UP key	– Change values – In operating mode: scroll through the display sub-pages – In programming mode: scroll through the display pages
ENTER key	– Evaluate value – Confirm value change – In operating mode: scroll through the display pages

In the default settings, the password for the configuration is set to 1000.

Configuring parameters

Parameters are configured in programming mode 1, see section 5.1 "Programming mode 1".

1. Scroll through the menu using the ENTER key until the PROG display page appears. PROG is the first page of the display group for programming mode 1.
2. Press and hold the ENTER key for at least 3 seconds.
   The PASS display page appears.
3. Enter the password.
4. Confirm the fourth digit with the ENTER key.
   The device checks the password.
   Programming mode 1 is opened.
5. Configure the parameters, see section 5.1.2 "Parameters in programming mode 1".

Configuring the network type or current transformer ratio

The network type or current transformer ratio is configured in programming mode 2, see section 5.2 "Programming mode 2".

1. Press and hold the PROG key for at least 3 seconds.
   The PASS display page appears.
2. Enter the password.
3. Confirm the fourth digit with the ENTER key.
   The device checks the password.
   Programming mode 2 is opened.
4. Configure the parameters, see section 5.2.2 "Parameters in programming mode 2".

4 Mounting and installation

4.1 Snapping the device onto the DIN rail

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	X
Direct measuring device	X	X	X

The device is snapped onto a DIN rail in the control cabinet. The mounting position can be freely selected, but will be determined by the readability of the LCD.

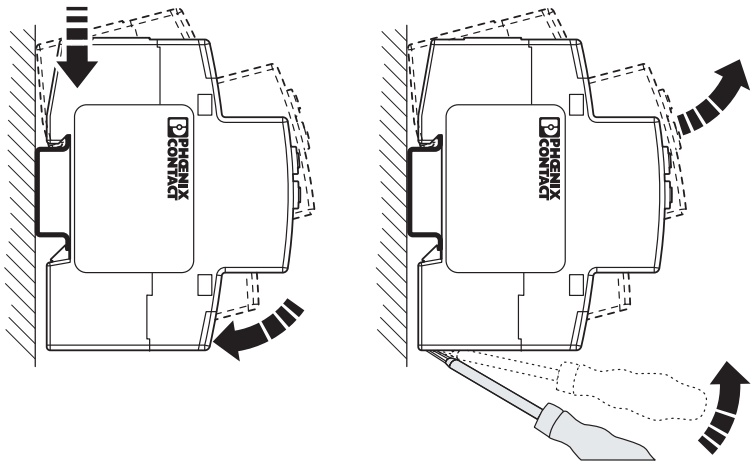

Figure 4-1 Snapping the device onto the DIN rail

4.2 Mounting the hinged ferrite

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	-	X
Direct measuring device	-	-	X

Attach the supplied hinged ferrite at a maximum distance of 5 cm from the Ethernet connection socket.

1. Open the hinged ferrite.
2. Guide the cable through the hinged ferrite two times.
3. Close the hinged ferrite.
4. Fasten the hinged ferrite with a cable tie.

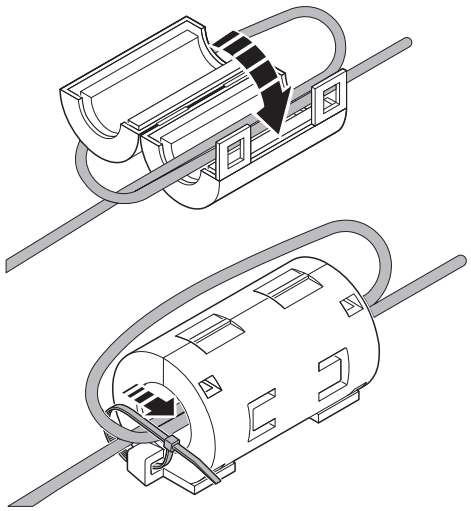

Figure 4-2 Mounting the hinged ferrite

4.3 Connection assignment

4.3.1 Modbus/RTU installation

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	-	-
Direct measuring device	X	-	-

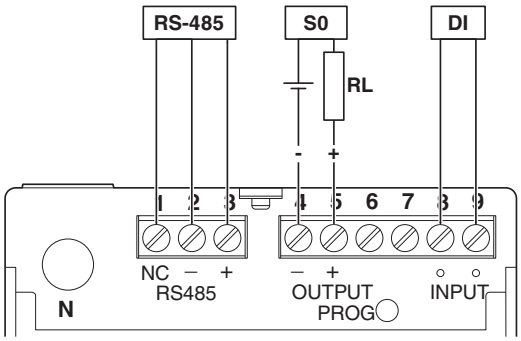

Figure 4-3 Connection assignment of modbus/RTU

1, 2, 3 RS-485 (NC, -, +)

4, 5 S0 pulse output (-, +)

8, 9 Digital input (any)

N Neutral conductor

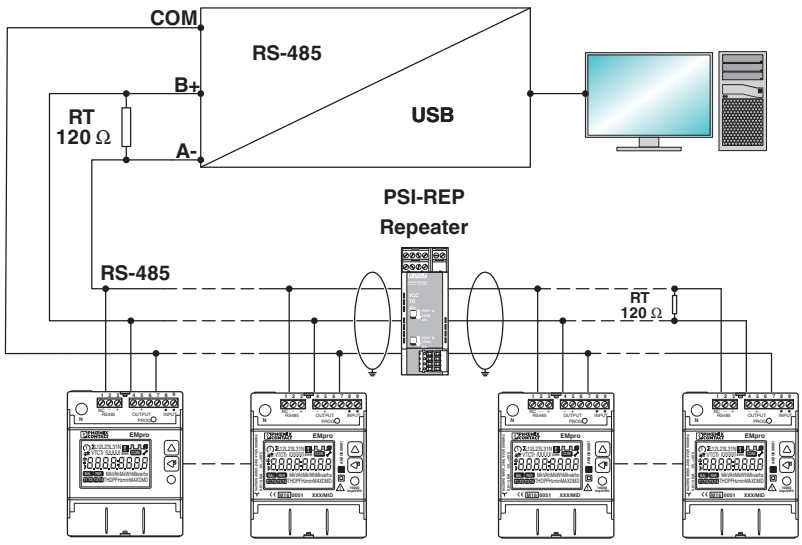

Figure 4-4 Modbus/RTU network

4.3.2 M bus installation

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	X	-
Direct measuring device	-	X	-

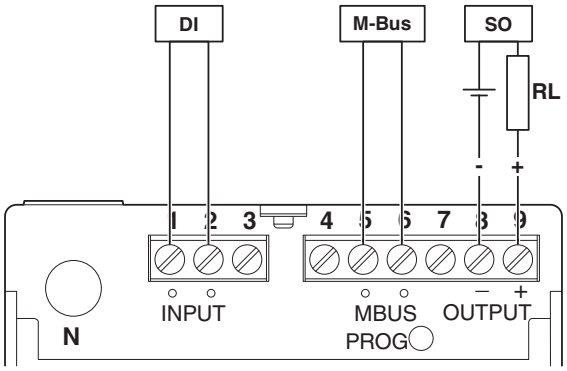

Figure 4-5 Connection assignment of M bus

1, 2 Digital input (any)

5, 6 M bus

8, 9 S0 pulse output (-, +)

N Neutral conductor

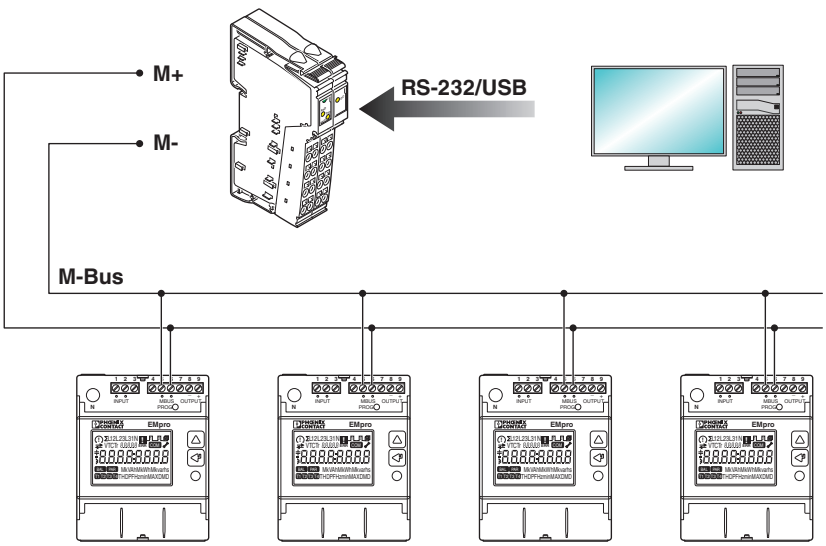

Figure 4-6 M bus network

4.3.3 Ethernet installation

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	-	X
Direct measuring device	-	-	X

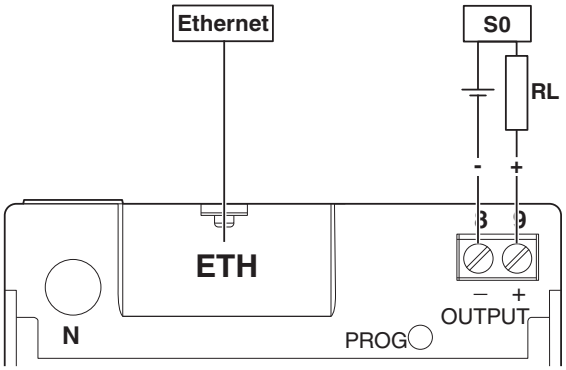

Figure 4-7 Ethernet connection assignment

ETH	Ethernet interface
8, 9	S0 pulse output (-, +)
N	Neutral conductor

The installation of the hinged ferrite is described in chapter 4.2 "Mounting the hinged ferrite".

4.4 Network type

4.4.1 Current transformer measuring device with Modbus/RTU or Modbus/TCP

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	-	X
Direct measuring device	-	-	-

The device is certified with the network type:

– 3 phases, 4 conductors, 3 current measurements (3.4.3)

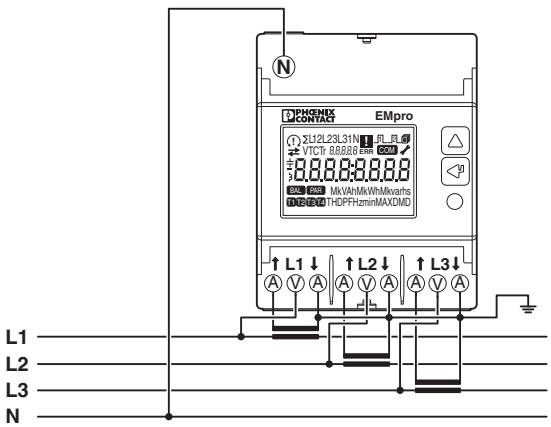

Figure 4-8 Network type: 3 phases, 4 conductors, 3 current measurements (3.4.3)

4.4.2 Direct measuring device with Modbus/RTU or Modbus/TCP

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	-	-
Direct measuring device	X	-	X

The device is certified with the network type:

– 3 phases, 4 conductors, 3 current measurements (3.4.3)

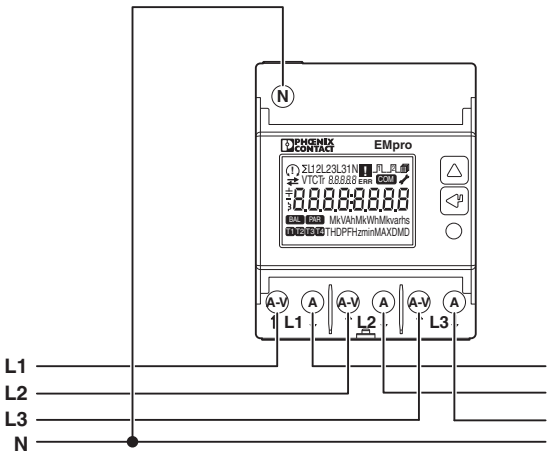

Figure 4-9 Network type: 3 phases, 4 conductors, 3 current measurements (3.4.3)

4.4.3 Current transformer measuring device with M bus

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	X	-
Direct measuring device	-	-	-

The device is certified with the network type:

– 3 phases, 4 conductors, 3 current measurements (3.4.3)
– 3 phases, 3 conductors, 3 current measurements (3.3.3)
– 3 phases, 3 conductors, 2 current measurements (3.3.2)

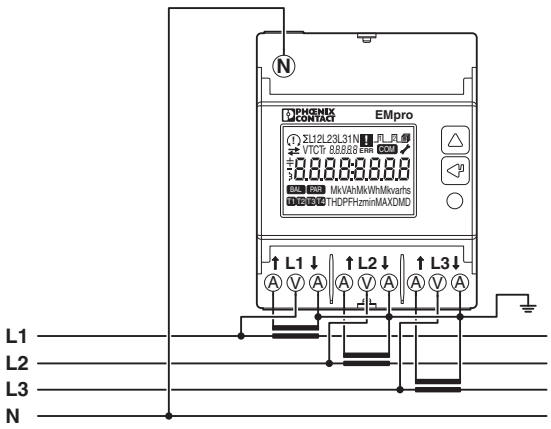

Figure 4-10 Network type: 3 phases, 4 conductors, 3 current measurements (3.4.3)

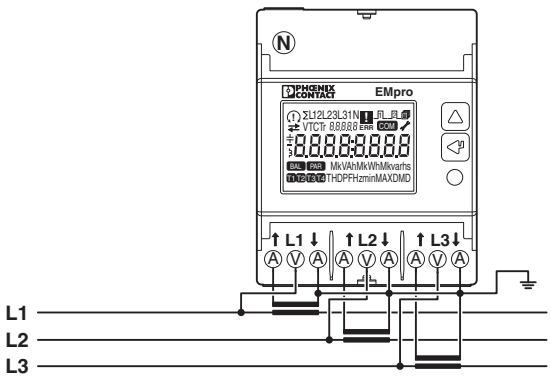

Figure 4-11 Network type: 3 phases, 3 conductors, 3 current measurements (3.3.3)

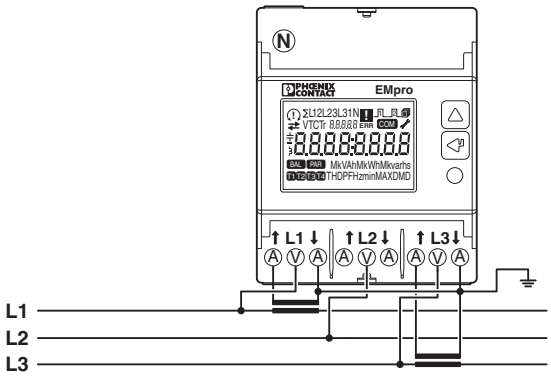

Figure 4-12 Network type: 3 phases, 3 conductors, 2 current measurements (3.3.2)

4.4.4 Direct measuring device with M bus

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	-	-	-
Direct measuring device	-	X	-

The device is certified with the network type:

– 3 phases, 4 conductors, 3 current measurements (3.4.3)
– 3 phases, 3 conductors, 3 current measurements (3.3.3)
– 3 phases, 3 conductors, 2 current measurements (3.3.2)

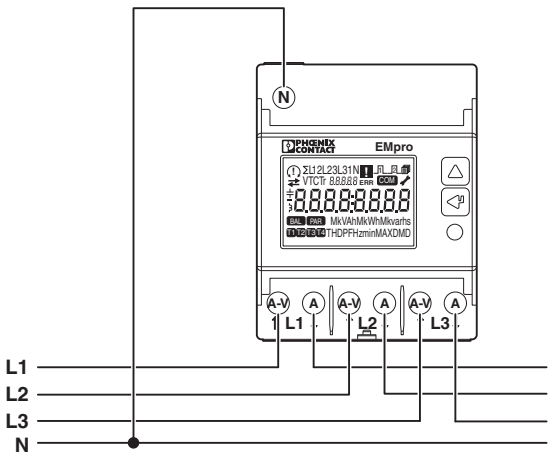

Figure 4-13 Network type: 3 phases, 4 conductors, 3 current measurements (3.4.3)

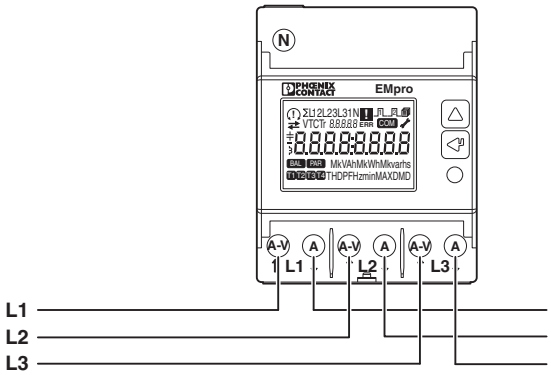

Figure 4-14 Network type: 3 phases, 3 conductors, 3 current measurements (3.3.3)

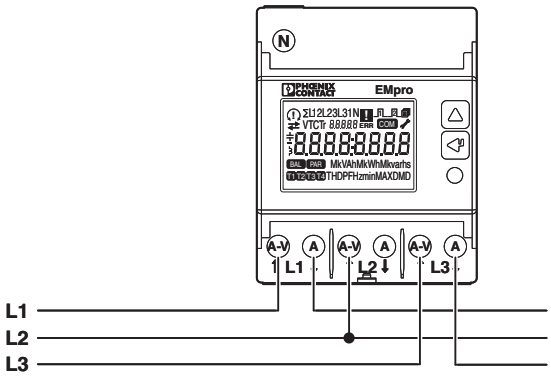

Figure 4-15 Network type: 3 phases, 3 conductors, 2 current measurements (3.3.2)

4.4.5 Information on installations with three conductors

On an installation with three conductors, the following phase information is displayed on the LCD, e.g.:

– Voltages (phase N)
– Neutral conductor current
– Active, reactive, and apparent power per phase
– Power factor per phase
– Energy meter values per phase

4.5 Seal

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	X
Direct measuring device	X	X	X

The upper cover of the Ethernet energy meter is different to the other covers.

If necessary, configure the current transformer ratios first (see section 5.2.2 "Parameters in programming mode 2").

1. Insert the upper cover (A).
2. Push the center of the upper cover upwards.
   The cover will engage with a click (B).

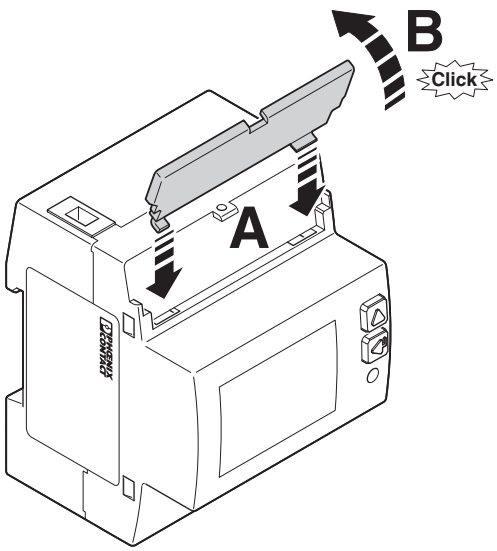

Figure 4-16 Snapping in the upper cover

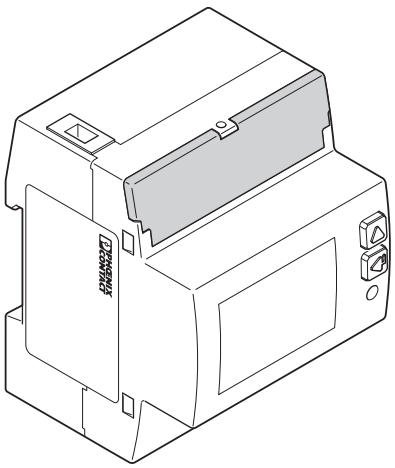

Figure 4-17 Installed upper cover

3. Grab one of the supplied seals.
4. First of all insert the seal cord through the front hole on the cover (C).
5. Guide the cord through the upper hole on the device (D).
6. Tighten the cord so that the seal is located directly on the upper cover.
   The seal must be located directly on the upper cover to complete the following steps.

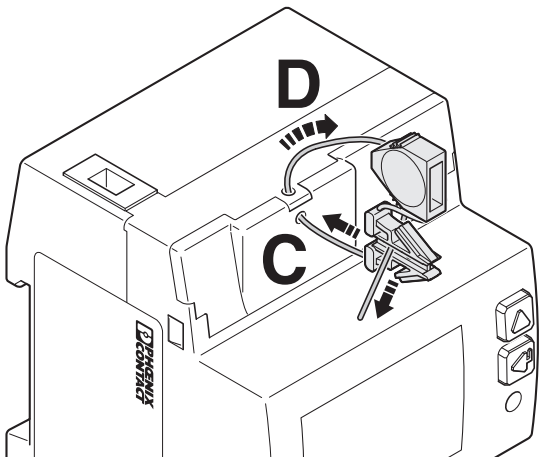

Figure 4-18 Guide the seal cord through both of the holes on the cover

7. First guide the cord through the left hole and then through the right hole of the seal (E).
8. Tighten the cord.
9. Place the cap on the seal.
10. Push the cap fully onto the seal (F).
    The cap will engage with a click.

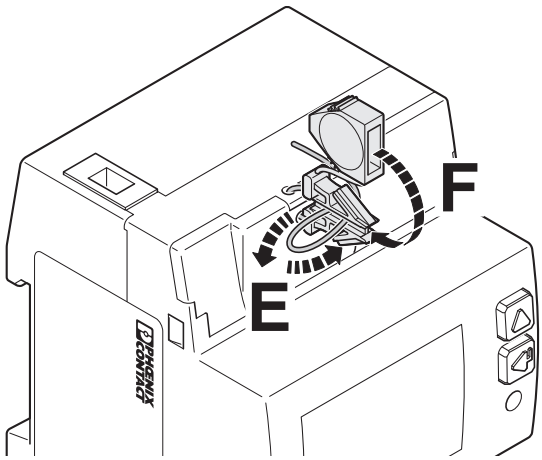

Figure 4-19 Guide the seal cord through both of the holes attach the cap

11. Shorten the protruding cord (G).

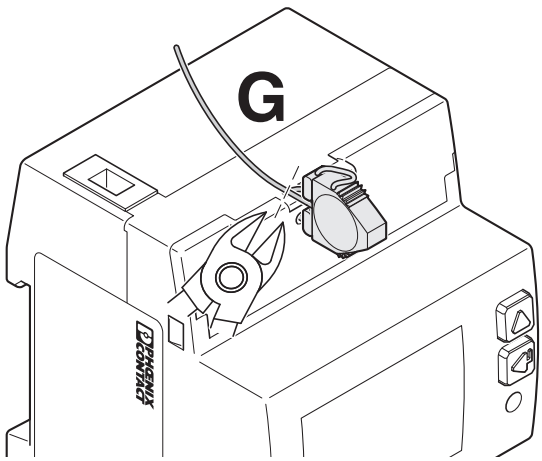

Figure 4-20 Shorten the protruding seal cord

12. Repeat these steps for the lower cover.

5 Configuration

This section describes how you can access the relevant programming modes and configure the parameters, e.g. the parameters of the integrated communication interface.

5.1 Programming mode 1

To scroll through the display pages:

1. Press the UP key.

To change the displayed value:

1. Press the ENTER key.
   The value flashes.
2. To change the value, press the UP key.
3. To save the value, press the ENTER key.

5.1.1 Opening programming mode 1

1. Scroll through the menu using the ENTER key until the PROG display page appears. PROG is the first page of the display group for programming mode 1.

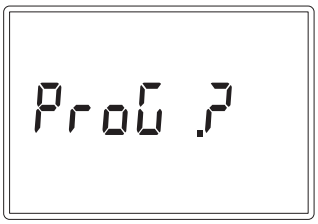

Figure 5-1 PROG display page

2. Press and hold the ENTER key for at least 3 seconds.
3. The PASS display page appears.

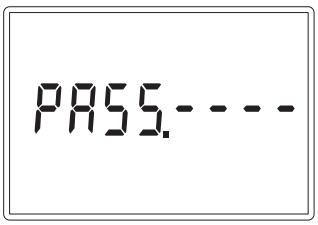

Figure 5-2 PASS display page

4. Enter the password.
5. Confirm the fourth digit with the ENTER key.
   The device checks the password.
   Programming mode 1 is opened.

In the default settings, the password for the configuration is set to 1000.

5.1.2 Parameters in programming mode 1

Device with M bus interface

The following display pages are available.

Table 5-1 Parameters in programming mode 1: Device with M bus interface

Menu item	Description	Setting range	Default settings
APri	Change primary address	0 ... 250	0
ASEC	Display secondary address	-	4549
bAud	Change baud rate	300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps	9600 bps
S0	Assign S0 output counter	ΣkWh procurement ΣkWh supply ΣkVAh inductive procurement ΣkVAh capacitive procurement ΣkVAh inductive supply ΣkVAh capacitive supply Σkvarh inductive procurement Σkvarh capacitive procurement Σkvarh inductive supply Σkvarh capacitive supply	ΣkWh procurement
PEr	Two parameters are displayed on the "Mean-value generation" display page. The Modbus of mean-value generation mode (parameter 1) and the interval duration (parameter 2) can be changed here. Parameter 1 – "Mean-value generation mode" is displayed: "S" means that the interval duration can be synchronized via a Modbus write command. Generally, an interval duration is specified first (via parameter 2). If the device does not receive the Modbus write command after a certain amount of time, the device closes the interval duration. "F" means that the mean-value generation will be closed without a Modbus command. Parameter 2 – "Interval duration" is displayed, e.g. 15 minutes.	F, S 10 s, 30 s, 1 min, 5 mins, 10 mins, 15 mins, 30 mins, 60 mins	S, 15 mins
rESET.ALL PAR	Reset partial energy meter	-	-
rESET MAXDMD	Reset maximum mean values	-	-
PASS	Change password	0000 ... 9999	1000

Device with Modbus/RTU interface

The following display pages are available.

Table 5-2 Parameters in programming mode 1: Device with Modbus/RTU interface

Menu item	Description	Setting range	Default settings
Addr	Change Modbus address	1 ... 247	5
bAud	Change baud rate	300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps	9600 bps
PrtY	Change parity	None, even, odd	None
Stop	Change stop bit	1, 2	1
S0	Assign S0 output counter	ΣkWh procurement ΣkWh supply ΣkVAh inductive procurement ΣkVAh capacitive procurement ΣkVAh inductive supply ΣkVAh capacitive supply Σkvarh inductive procurement Σkvarh capacitive procurement Σkvarh inductive supply Σkvarh capacitive supply	ΣkWh procurement
PEr	Two parameters are displayed on the "Mean-value generation" display page. The Modbus of mean-value generation mode (parameter 1) and the interval duration (parameter 2) can be changed here. Parameter 1 – "Mean-value generation mode" is displayed: "S" means that the interval duration can be synchronized via a Modbus write command. Generally, an interval duration is specified first (via parameter 2). If the device does not receive the Modbus write command after a certain amount of time, the device closes the interval duration. "F" means that the mean-value generation will be closed without a Modbus command. Parameter 2 – "Interval duration" is displayed, e.g. 15 minutes.	F, S 10 s, 30 s, 1 min, 5 mins, 10 mins, 15 mins, 30 mins, 60 mins	S, 15 mins
rESET.ALL PAR	Reset partial energy meter	-	-
rESET MAXDMD	Reset maximum mean values	-	-
PASS	Change password	0000 ... 9999	1000

Devices with Ethernet interface

The Modbus address is preset. The Modbus address in the default settings is set to 255.

The following display pages are available.

Table 5-3 Parameters in programming mode 1: Device with Ethernet interface

Menu item	Description	Setting range	Default settings
Eth SdEF	Reset Ethernet interface to default settings: Y: Confirm N: Cancel	-	-
dHCP	Activate DHCP If you have activated DHCP, the display pages for the "IP address", "Subnet mask" and "Gateway" parameters are hidden.	y = Yes (activated) n = No (not activated)	n
IP1 … IP4	Setting the IP address The address has the following structure: 1.2.3.4.	0.0.0.0 ... 255.255.255.255	192.168.1.1
net1 … net4	Setting the subnet mask	0.0.0.0 ... 255.255.255.255	255.255.255.0
Gat1 … Gat4	Setting the gateway	0.0.0.0 ... 255.255.255.255	192.168.1.100
S0	Assign S0 output counter	ΣkWh procurement ΣkWh supply ΣkVAh inductive procurement ΣkVAh capacitive procurement ΣkVAh inductive supply ΣkVAh capacitive supply Σkvarh inductive procurement Σkvarh capacitive procurement Σkvarh inductive supply Σkvarh capacitive supply	ΣkWh procurement

Table 5-3 Parameters in programming mode 1: Device with Ethernet interface [...]

Menu item [...]	Description	Setting range	Default settings
PEr	Two parameters are displayed on the "Mean-value generation" display page. The Modbus of mean-value generation mode (parameter 1) and the interval duration (parameter 2) can be changed here. Parameter 1 – "Mean-value generation mode" is displayed: "S" means that the interval duration can be synchronized via a Modbus write command. Generally, an interval duration is specified first (via parameter 2). If the device does not receive the Modbus write command after a certain amount of time, the device closes the interval duration. "F" means that the mean-value generation will be closed without a Modbus command. Parameter 2 – "Interval duration" is displayed, e.g. 15 minutes.	F, S 10 s, 30 s, 1 min, 5 mins, 10 mins, 15 mins, 30 mins, 60 mins	S, 15 mins
rESET.ALL PAR	Reset partial energy meter	-	-
rESET MAXDMD	Reset maximum mean values	-	-
PASS	Change password	0000 ... 9999	1000

Table 5-4 Ethernet interface: Default settings

DHCP activation	No
IP address	192.168.1.1
Subnet mask	255.255.255.0
Gateway	192.168.1.100

To open the web server call up the IP address in the address line in the browser.

Table 5-5 Login details for the web server: Default settings

User name	admin
Password	admin

5.2 Programming mode 2

You can only configure the ratio of the current transformer if no cover is mounted.

To scroll through the display pages:

1. Press the UP key.

To change the displayed value:

1. Press the ENTER key.
   The value flashes.
2. To change the value, press the UP key.
3. To save the value, press the ENTER key.

5.2.1 Opening programming mode 2

1. Press and hold the PROG key for at least 3 seconds.

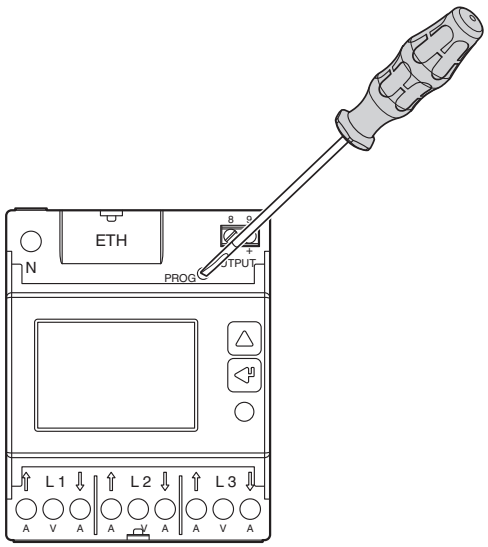

Figure 5-3 Opening programming mode 2

2. The PASS display page appears.

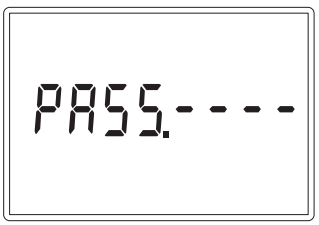

Figure 5-4 PASS display page

3. Enter the password.
4. Confirm the fourth digit with the ENTER key.
   The device checks the password.
   Programming mode 2 is opened.

In the default settings, the password for the configuration is set to 1000.

5.2.2 Parameters in programming mode 2

Device with M bus interface

The following display pages are available.

Table 5-6 Parameters in programming mode 2: Device with M bus interface

Menu item	Description	Default settings
Wir	Set network type	3.4.3

Device completing measurement via current transformer

The following display pages are available.

Table 5-7 Parameters in programming mode 2: Device completing measurement with a current transformer

Menu item	Description	Setting option	Default settings
FSA	Setting secondary current transformer	1, 5	5
CtP	Setting primary current transformer	At FSA = 1: 1 ... 10000 At FSA = 5: 5 ... 50000	5

5.3 Leave programming mode and save settings

1. To leave programming mode, press the ENTER key for at least 3 seconds.
   The SAVE parameter is displayed.

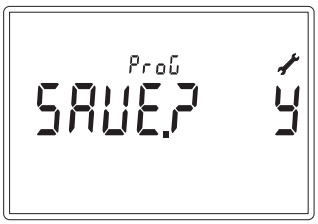

Figure 5-5 SAVE display page

2. To change the flashing value, press the UP key.

   Y Save change and exit menu

   N Cancel change and exit menu

   C Back

3. Press the ENTER key to confirm the selection.
   The info display page appears. The device is in operating mode.

6 Operation

6.1 Device-specific basic information

6.1.1 Partial energy meter

You cannot reset the partial energy meter.

You can start, stop, and reset partial energy meters and partial energy meter values. However, you cannot reset energy meters and energy meter values due to the MID approval.

Table 6-1 Overview: Resetting energy meters and partial energy meters

Energy meter	Cannot be reset due to MID approval
Partial energy meter	Can be reset

The following functions are only available for partial energy meters.

Table 6-2 Status of the partial energy meter

LCD element	Status	Description
PAR	Flashing	Partial energy meter stopped
	Illuminated constantly	Partial energy meter started

On the Start, Stop and Reset display pages the following applies:

Y	Confirm
N	Exit
UP	Change value

Start the stopped partial energy meter:

1. Simultaneously press the UP and ENTER keys.
2. To confirm the start with Y, press the ENTER key.

Stopping the started partial energy meter:

1. Simultaneously press the UP and ENTER keys.
2. To confirm the stop with Y, press the ENTER key.

Resetting the started partial energy meter:

1. Simultaneously press the UP and ENTER keys for at least 3 seconds.
2. To confirm the reset with Y, press the ENTER key.

6.1.2 Balancing energy meters

You cannot reset balancing energy meters.

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	X
Direct measuring device	X	X	X

Balancing energy meter values are calculated using the following formula:

Table 6-3 Calculation formula for balancing energy meter values

Balancing energy meter values	Calculation formula
Active energy (kWh)	(→ kWh T1) – (← kWh T1) + (→ kWh T2) – (← kWh T2)
Inductive apparent energy (kVAh ind)	(→ kVAh ind T1) – (← kVAh ind T1) + (→ kVAh ind T2) – (← kVAh ind T2)
Capacitive apparent energy (kVAh cap)	(→ kVAh cap T1) – (← kVAh cap T1) + (→ kVAh cap T2) – (← kVAh cap T2)
Inductive reactive energy (kvarh ind)	(→ kvarh ind T1) – (← kvarh ind T1) + (→ kvarh ind T2) – (← kvarh ind T2)
Capacitive reactive energy (kvarh cap)	(→ kvarh cap T1) – (← kvarh cap T1) + (→ kvarh cap T2) – (← kvarh cap T2)

Table 6-4 Display of the balancing energy meter values

Balancing energy meter values	LCD element	Unit
Active energy	BAL	kWh
Reactive energy	BAL	kvarh
Apparent energy	BAL	kVAh

6.1.3 Phase sequence

Correct (123)

Incorrect (132)

Undefined (e.g. one or two phases are missing)

6.1.4 Power flow

→ Procurement

← Supply

6.2 Start mode

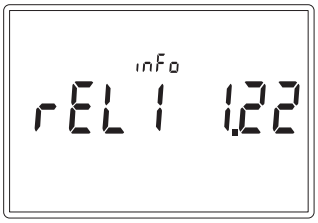

Figure 6-1 Start mode display page

The device is in start mode for approx. 8 seconds after the voltage is applied. The following display pages are shown in start mode.

Table 6-5 Display pages: Start mode

Menu item	Example	Description
rEL1	1.22	Metrological firmware release
rEL2	3.00	User interface firmware release
CS1	38E0	Checksum of the metrological firmware
CS2	5d4d	Checksum of the user interface firmware

6.3 Operating mode

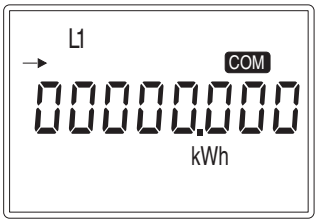

Figure 6-2 Display page in operating mode

Following start mode, the device automatically switches to operating mode. The following display pages are shown in operating mode.

Table 6-6 Display pages: Operating mode

Menu item	Description
T1	Only for Modbus/RTU and M bus Tariff meter 1
T2	Only for Modbus/RTU and M bus Tariff meter 2
kWh	Total meter
PAR	Partial energy meters and balancing energy meters
V	Instantaneous values
DMD	Mean values
MAXDMD	Maximum mean values
ProG	Programming mode 1
Info	Device information (info)

To scroll through the display pages:

1. Press the ENTER key.

To switch from the display page to the display sub-page:

1. Press the UP key.

To scroll through the display sub-pages:

1. Press the UP key.

6.3.1 Tariff energy meter 1 (T1)

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	-
Direct measuring device	X	X	-

The T1 display pages show the values of tariff energy meters 1.

Table 6-7 Display pages: Tariff energy meter 1 (T1)

LCD elements					Description
T1	kWh	→	L1/L2/L3/Σ		Tariff 1 – active energy procurement L1/L2/L3/Σ
		←	L1/L2/L3/Σ		Tariff 1 – active energy supply L1/L2/L3/Σ
	kVAh	→	⏚	L1/L2/L3/Σ	Tariff 1 – inductive apparent energy procurement L1/L2/L3/Σ
		←	⏚	L1/L2/L3/Σ	Tariff 1 – inductive apparent energy supply L1/L2/L3/Σ
		→	⏚	L1/L2/L3/Σ	Tariff 1 – capacitive apparent energy procurement L1/L2/L3/Σ
		←	⏚	L1/L2/L3/Σ	Tariff 1 – capacitive apparent energy supply L1/L2/L3/Σ
	kvarh	→	⏚	L1/L2/L3/Σ	Tariff 1 – inductive reactive energy procurement L1/L2/L3/Σ
		←	⏚	L1/L2/L3/Σ	Tariff 1 – inductive reactive energy supply L1/L2/L3/Σ
		→	⏚	L1/L2/L3/Σ	Tariff 1 – capacitive reactive energy procurement L1/L2/L3/Σ
		←	⏚	L1/L2/L3/Σ	Tariff 1 – capacitive reactive energy supply L1/L2/L3/Σ

6.3.2 Tariff energy meter 2 (T2)

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	-
Direct measuring device	X	X	-

The T2 display pages show the values of tariff energy meters 2.

Table 6-8 Display pages: Tariff energy meter 2 (T2)

LCD elements					Description
T2	kWh	→	L1/L2/L3/Σ		Tariff 2 – active energy procurement L1/L2/L3/Σ
		←	L1/L2/L3/Σ		Tariff 2 – active energy supply L1/L2/L3/Σ
	kVAh	→	⊃	L1/L2/L3/Σ	Tariff 2 – inductive apparent energy procurement L1/L2/L3/Σ
		←	⊃	L1/L2/L3/Σ	Tariff 2 – inductive apparent energy supply L1/L2/L3/Σ
		→	⊣⊢	L1/L2/L3/Σ	Tariff 2 – capacitive apparent energy procurement L1/L2/L3/Σ
		←	⊣⊢	L1/L2/L3/Σ	Tariff 2 – capacitive apparent energy supply L1/L2/L3/Σ
	kvarh	→	⊃	L1/L2/L3/Σ	Tariff 2 – inductive reactive energy procurement L1/L2/L3/Σ
		←	⊃	L1/L2/L3/Σ	Tariff 2 – inductive reactive energy supply L1/L2/L3/Σ
		→	⊣⊢	L1/L2/L3/Σ	Tariff 2 – capacitive reactive energy procurement L1/L2/L3/Σ
		←	⊣⊢	L1/L2/L3/Σ	Tariff 2 – capacitive reactive energy supply L1/L2/L3/Σ

6.3.3 Total energy meter (kWh)

The display pages starting with kWh show the values of the total energy meters. These values cannot be reset.

Table 6-9 Display pages: Total energy meter (kWh)

LCD elements				Description	
kWh	→	L1/L2/L3/Σ		Total active energy procurement L1/L2/L3/Σ	Cannot be reset
	←	L1/L2/L3/Σ		Total active energy supply L1/L2/L3/Σ	Cannot be reset
kVAh	→		L1/L2/L3/Σ	Total inductive apparent energy procurement L1/L2/L3/Σ	Cannot be reset
	←		L1/L2/L3/Σ	Total inductive apparent energy supply L1/L2/L3/Σ	Cannot be reset
	→		L1/L2/L3/Σ	Total capacitive apparent energy procurement L1/L2/L3/Σ	Cannot be reset
	←		L1/L2/L3/Σ	Total capacitive apparent energy supply L1/L2/L3/Σ	Cannot be reset
kvarh	→		L1/L2/L3/Σ	Total inductive reactive energy procurement L1/L2/L3/Σ	Cannot be reset
	←		L1/L2/L3/Σ	Total inductive reactive energy supply L1/L2/L3/Σ	Cannot be reset
	→		L1/L2/L3/Σ	Total capacitive reactive energy procurement L1/L2/L3/Σ	Cannot be reset
	←		L1/L2/L3/Σ	Total capacitive reactive energy supply L1/L2/L3/Σ	Cannot be reset

6.3.4 Partial energy meter (PAR)

The PAR display pages show the values of the partial energy meters. These values can be reset, see section 6.1.1 "Partial energy meter".

Table 6-10 Display pages: Partial energy meter (PAR)

LCD elements					Description
PAR	kWh	Σ	→		Partial energy meter – active energy procurement system
		Σ	←		Partial energy meter – active energy supply system
	kVAh		Σ	→	Partial energy meter – inductive apparent energy procurement system
			Σ	←	Partial energy meter – inductive apparent energy supply system
			Σ	→	Partial energy meter – capacitive apparent energy procurement system
			Σ	←	Partial energy meter – capacitive apparent energy supply system
		Σ	→		Partial energy meter – apparent energy procurement system
		Σ	←		Partial energy meter – apparent energy supply system
	kvarh		Σ	→	Partial energy meter – inductive reactive energy procurement system
			Σ	←	Partial energy meter – inductive reactive energy supply system
			Σ	→	Partial energy meter – capacitive reactive energy procurement system
			Σ	←	Partial energy meter – capacitive reactive energy supply system
		Σ	→		Partial energy meter – reactive energy procurement system
		Σ	←		Partial energy meter – reactive energy supply system
BAL	kWh	Σ			Balancing energy meter – active energy procurement/supply system
	kVAh		Σ		Balancing energy meter – inductive apparent energy system
			Σ		Balancing energy meter – capacitive apparent energy system
	kvarh		Σ		Balancing energy meter – inductive reactive energy system
			Σ		Balancing energy meter – capacitive reactive energy system

6.3.5 Instantaneous values (V)

The display pages starting with V show the instantaneous values. The instantaneous values are updated every second.

Table 6-11 Display pages: Instantaneous values (V)

LCD elements				Description
V	L1/L2/L3	N		Voltage L1/L2/L3-N
	L12/L23/L31			Conductor voltage L12/L23/L31
	L12 L23 L31	N		Conductor voltage system
	L1 L2 L3	N	Σ	Voltage L-N system
Hz				Frequency
A	L1/L2/L3/N/Σ			Current $I_1/I_2/I_3/I_n/I_{sys}$
kW	L1/L2/L3/Σ			Active power L1/L2/L3/Sys
kVA	L1/L2/L3/Σ			Apparent power L1/L2/L3/Sys
kvar	L1/L2/L3/Σ			Reactive power L1/L2/L3/Sys
PF	L1/L2/L3/Σ			Power factor L1/L2/L3/Sys

6.3.6 Mean values (DMD)

The DMD display pages show the mean values.

Table 6-12 Display pages: Mean values (DMD)

LCD elements				Description
DMD	V	N	L1/L2/L3	Mean value – conductor voltage to N L1/L2/L3
		L12/L23/L31		Mean value – conductor voltage to conductor L12/L23/L31
	Hz			Mean value – frequency
	A	L1/L2/L3/N/Σ		Mean value – current $I_1/I_2/I_3/I_n/I_{sys}$
	kW	L1	→	Mean value – active power procurement I_1
		L1	←	Mean value – active power supply I_1
		L2	→	Mean value – active power procurement I_2
		L2	←	Mean value – active power supply I_2
		L3	→	Mean value – active power procurement I_3
		L3	←	Mean value – active power supply I_3
		Σ	→	Mean value – active power procurement system
		Σ	←	Mean value – active power supply system
		Σ	BAL	Balanced mean value – active power system
	kVA	L1	→	Mean value – apparent power procurement I_1
		L1	←	Mean value – apparent power supply I_1
		L2	→	Mean value – apparent power procurement I_2
		L2	←	Mean value – apparent power supply I_2
		L3	→	Mean value – apparent power procurement I_3
		L3	←	Mean value – apparent power supply I_3
		Σ	→	Mean value – apparent power procurement system
		Σ	←	Mean value – apparent power supply system
		Σ	BAL	Balanced mean value – apparent power system
	kvar	L1	→	Mean value – reactive power procurement I_1
		L1	←	Mean value – reactive power supply I_1
		L2	→	Mean value – reactive power procurement I_2
		L2	←	Mean value – reactive power supply I_2
		L3	→	Mean value – reactive power procurement I_3
		L3	←	Mean value – reactive power supply I_3
		Σ	→	Mean value – reactive power procurement system
		Σ	←	Mean value – reactive power supply system
		Σ	BAL	Balanced mean value – reactive power system

Table 6-12 Display pages: Mean values (DMD) [...]

LCD elements				Description
	PF	L1	⊃⊂	Mean value – inductive power factor I_1
		L1	⊣⊢	Mean value – capacitive power factor I_1
		L2	⊃⊂	Mean value – inductive power factor I_2
		L2	⊣⊢	Mean value – capacitive power factor I_2
		L3	⊃⊂	Mean value – inductive power factor I_3
		L3	⊣⊢	Mean value – capacitive power factor I_3
		Σ	⊃⊂	Mean value – inductive power factor system
		Σ	⊣⊢	Mean value – capacitive power factor system

6.3.7 Maximum mean values (MAXDMD)

The MAXDMD display pages show the maximum mean values.

Table 6-13 Display pages: Maximum mean values (MAXDMD)

LCD elements				Description
MAXDMD	A	L1		Maximum mean value – current I_1
		L2		Maximum mean value – current I_2
		L3		Maximum mean value – current I_3
		N		Maximum mean value – current I_N
	kW	Σ	→	Maximum mean value – active power procurement system
		Σ	←	Maximum mean value – active power supply system
	kVA	Σ	→	Maximum mean value – apparent power procurement system
		Σ	←	Maximum mean value – apparent power supply system
	kvar	Σ	→	Maximum mean value – reactive power procurement system
		Σ	←	Maximum mean value – reactive power supply system

6.3.8 Device information (info)

The info display pages show the device information.

Table 6-14 Display pages: Device information (info)

LCD elements		Description
info	rEL1	Metrological firmware release, e.g. 1.22
	rEL2	User interface firmware release, e.g. 3.00
	CS1	Checksum of the metrological firmware, e.g. 38E0
	CS2	Checksum of the user interface firmware, e.g. 5d4d
	M bus/RS485/Eth	Communication type, e.g. M bus, RS-485 for Modbus/RTU and Eth for Modbus/TCP
	FSA	Only for measurements via current transformer Configured secondary rated current
Wir		Configured network type, e.g. 3.4.3 for 3 phases, 4 conductors and 3 current measurements
info	hc	Operating hours

6.4 Communication

6.4.1 Modbus/RTU

The EIA-485 (RS-485) interface is used for the local remote readout with the Modbus/RTU protocol. During this process, the measuring device is the server and the PC or controller is the client. Connect a terminal resistance (RT=120 Ω … 150 Ω) at the start and end of the network. The maximum recommended length is 1200 m at a speed of 9600 bps. You can use signal amplifiers for the transmission.

Table 6-15 Setting range and default settings of Modbus RTU communication

Parameters	Setting range	Default settings
Address	1 ... 247	5
Baud rate	300 bps, 600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps	9600 bps
Parity	None, even, odd	None
Stop bit	1, 2	1

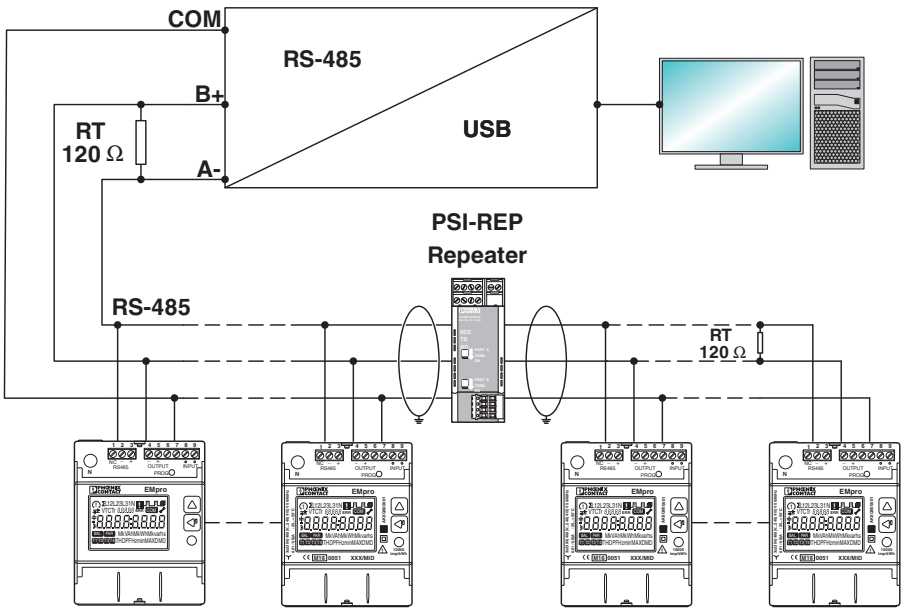

Figure 6-3 Modbus/RTU network

6.4.2 M bus

The M bus interface is designed to manage the devices via the M bus protocol. The number of devices to be connected is dependent on the M bus master. The figure below shows the installation.

The default settings are in accordance with standard EN 13575.

The M bus interface has no polarity.

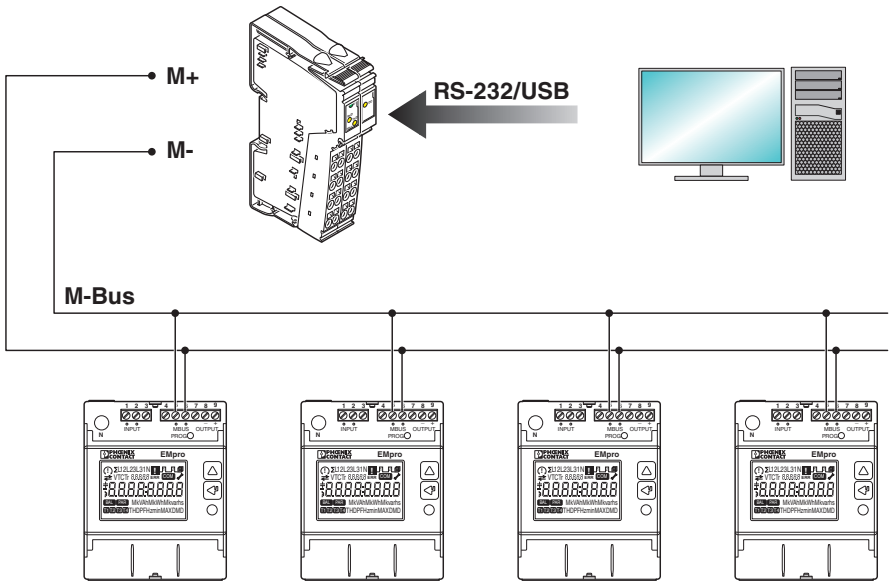

Figure 6-4 M bus network

6.4.3 Ethernet

The Ethernet interface is designed to manage the devices in an Ethernet network. The Ethernet interface is mainly used with the Modbus/TCP protocol. Other functions includes access via a web server, data storage and readout, and FTP uploads.

The default settings and the login details for the web server are provided in section 5.1.2 "Parameters in programming mode 1", subsection "Devices with Ethernet interface".

The following roles are available for the web server:

Table 6-16 Roles for the web server

Role	Description
Administrator	Full access, e.g. to create a user
User	Limited access, e.g. partial meters cannot be reset

6.5 Outputs

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	X
Direct measuring device	X	X	X

Each device has an S0 output for S0 signals that can either be assigned to kWh, kVAh, or kvarh. The S0 output is active during procurement and supply.

Table 6-17 S0 output status

Status	LCD element	Description
0	Not available	Inactive
1		Active

The following parameters of the total energy meter values can be created on the S0 output.

– Active energy in [imp/kWh]
– Reactive energy in [imp/kvarh]
– Apparent energy in [imp/kVAh]

Table 6-18 Overview of the pulse constant and current transformer ratio

Pulse constant	Current transformer ratio
1000	1 ... 4
200	5 ... 24
40	25 ... 124
8	125 ... 624
1	625 ... 3124
0.1	3125 ... 10000

6.6 Tariff inputs

Applies to:

	Modbus/RTU	M bus	Ethernet
Current transformer measuring device	X	X	-
Direct measuring device	X	X	-

Tariff management can be implemented by connecting an external device. The external device sends a signal to the tariff input.

The following functions are available at the tariff input:

Table 6-19 Functions at tariff input

Function	Case	Result
1	De-energized signal (e.g. 0 V)	Tariff 1 active
2	Energized signal (see packing slip, technical data)	Tariff 2 active

The total energy meters operate independently of the functions at the tariff input.

7 Technical data

7.1 Dimensions

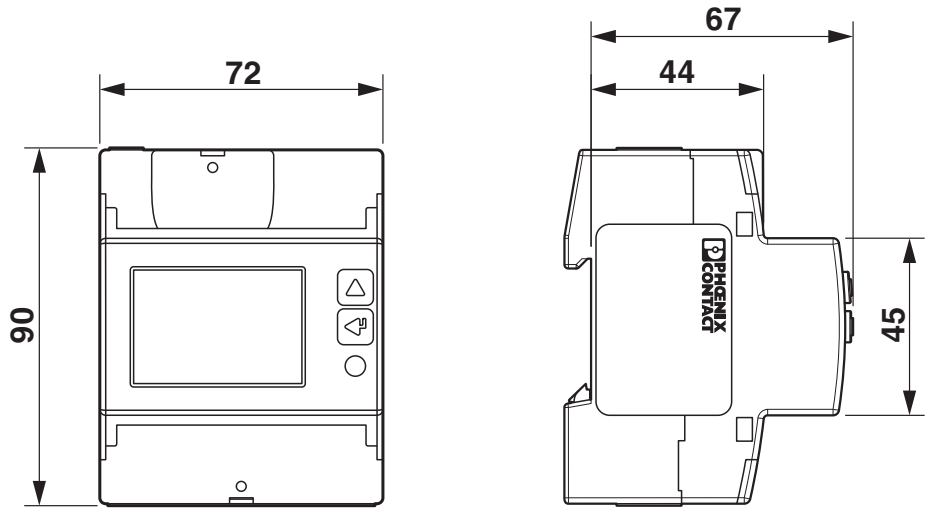

Figure 7-1 Dimensional drawing

7.2 Technical data

Measuring input data	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Input voltage range	3x 184 (320) V ... 288 (500) V					
Power consumption	7.5 VA (0.5 W)	3.5 VA (1 W)	3.5 VA (1 W)	7.5 VA (0.5 W)	3.5 VA (1 W)	3.5 VA (1 W)
Frequency	45 ... 65 Hz					
Current transformer load per phase	0.04 VA			-		
Auxiliary voltage	Device is supplied by the measuring circuit					
Starting current I_{st}	0.002 A			0.02 A		
Minimum current I_{min}	0.01 A			0.25 A		
Transient current I_{tr}	0.05 A			0.5 A		
Nominal current I_{ref}	1 A			5 A		
Maximum current I_{max}	6 A			80 A		
Secondary current transformer	1 A / 5 A			-		
Current transformer ratio	1 ... 10000			-		

Measurement connection data	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Measurement connection	1.5 … 6 mm^2 (2 Nm)			1.5 … 35 mm^2 (2 Nm)		
Other connections	0.14 … 2.5 mm^2 (0.5 Nm)					
Electric strength as per EN 50470-1	1.2 µs/50µs at 6 kV					
Electric strength as per EN 50470-3, 7.2	4 kV					

Ambient conditions	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Mechanical environment	M1					
Electromagnetic environment	E2					
Operating temperature	-25 °C … 55 °C					
Storage temperature	-25 °C … 75 °C					
Humidity	Max. 80 %, non-condensing					
Sinusoidal vibration amplitude	50 Hz ±0,075 mm					
Degree of protection - front	IP51 if mounted in a control cabinet with IP51 degree of protection or higher					
Degree of protection - connection	IP20					
Internal/external meter type	Internal					
Meter type	Bidirectional					

Safety	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Pollution degree	2					
Protection class as per EN 50470-1	II					
Flame resistance - housing	UL 94 class 10					

Accuracy	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Real energy as per EN 50470-3	Class B					
Real energy as per EN 62053-21	Class 1					
Reactive energy as per EN 62053-23	Class 2					

Housing	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Standard	DIN 43880					

Metrological LED	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Meter constant	10000 imp/kWh			1000 imp/kWh		

Communication	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Interface	EN 13757-1-2-3	EIA 485	RJ 45/ IEE 802.3	EN 13757-1-2-3	EIA 485	RJ 45/ IEE 802.3
Protocol	M bus	Modbus/RTU	Modbus/TCP, DHCP, ntp	M bus	Modbus/RTU	Modbus/TCP, DHCP, ntp
Speed	300 … 9600 bps	300 … 57600 bps	10 Mbps or 100 Mbps	300 … 9600 bps	300 … 57600 bps	10 Mbps or 100 Mbps
Parameters	Primary address	Address, speed, parity, stop	DHCP	Primary address	Address, speed, parity, stop	DHCP

Tariff input	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Type	Active opto-isolated					
Voltage range	80 … 276 V AC/DC					

S0 output	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Standard	EN 62053-31					
Meter constant	1000 imp/kWh, kVAh, kvarh (CT 1 … 4) 200 imp/kWh, kVAh, kvarh (CT 5 … 24) 40 imp/kWh, kVAh, kvarh (CT 25 … 124) 8 imp/kWh, kVAh, kvarh (CT 125 … 624) 1 imp/kWh, kVAh, kvarh (CT 625 … 3124) 0.1 imp/kWh, kVAh, kvarh (CT 3125 … 10000)			100 imp/kWh, kVAh, kvarh		
Type	Passive opto-isolated					
Maximum voltage	27 V DC					
Maximum current	27 mA					
Pulse time ONE	50 ms ±2 ms ON					
Minimum time OFF	30 ms ±2 ms OFF					

7.3 MID data

Feature	2908576 EEM-EM325	2908578 EEM-EM355	2908581 EEM-EM375	2908586 EEM-EM327	2908588 EEM-EM357	2908590 EEM-EM377
Accuracy	Class B as per EN 50470-3					
Voltage U_N	3x 230/400 V ... 3x 240/415 V					
Rated frequency f_N	50/60 Hz					
Cosine φ	0.5 inductive ... 0.8 capacitive					
Starting current I_{st}	0.002 A			0.02 A		
Minimum current I_{min}	0.01 A			0.25 A		
Transient current I_{tr}	0.05 A			0.5 A		
Nominal current I_{ref}	1 A			5 A		
Maximum current I_{max}	6 A			80 A		
Operating temperature	-25 °C ... 55 °C (-13 °F ... 131 °F)					
Relative humidity	≤ 90 % (40 °C)					
Electromagnetic ambient conditions	E2					
Mechanical ambient conditions	M1					
Type of application	Interior space counter					
Protection class	To ensure that protection against dust and water is provided in accordance with the specific standards as per MID, the energy meter must be installed in a housing or control cabinet with protection class IP51 (or higher).					

A Modbus register

Interpret the bit sequence as AB. If there is more than one word, it is interpreted as AB-CD.

Some registers are available as floating-point numbers IEEE-754 single number (32 bits).

Table A-1 Explanation of the AB structure

Byte 26, high byte							
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 27, low byte							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

A 1 Instantaneous values (identical to EEM-MAXXX)

Table A-2 Instantaneous values (identical to EEM-MAXXX)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
50512	0xC550	Display	62	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
50512	0xC550	2	Hour: Operating hours counter	h	100	UInt32
50514	0xC552	2	U12: Conductor voltage (1-2)	V	100	UInt32
50516	0xC554	2	U23: Conductor voltage (2-3)	V	100	UInt32
50518	0xC556	2	U31: Conductor voltage (3-1)	V	100	UInt32
50520	0xC558	2	V1: Conductor voltage to N	V	100	UInt32
50522	0xC55A	2	V2: Conductor voltage to N	V	100	UInt32
50524	0xC55C	2	V3: Conductor voltage to N	V	100	UInt32
50526	0xC55E	2	F: Frequency	Hz	100	UInt32
50528	0xC560	2	I1: Current	A	1000	UInt32
50530	0xC562	2	I2: Current	A	1000	UInt32
50532	0xC564	2	I3: Current	A	1000	UInt32
50534	0xC566	2	In: Neutral conductor current	A	1000	UInt32
50536	0xC568	2	ΣP: Total active power +/-	W	0.1	SInt32
50538	0xC56A	2	ΣQ: Total reactive power +/-	var	0.1	SInt32
50540	0xC56C	2	ΣS: Total apparent power	VA	0.1	UInt32
50542	0xC56E	2	ΣPF: Total power factor -: capacitive and +: inductive	1	1000	SInt32
50544	0xC570	2	P1: Active power phase 1 +/-	W	0.1	SInt32
50546	0xC572	2	P2: Active power phase 2 +/-	W	0.1	SInt32
50548	0xC574	2	P3: Active power phase 3 +/-	W	0.1	SInt32
50550	0xC576	2	Q1: Reactive power phase 1 +/-	var	0.1	SInt32
50552	0xC578	2	Q2: Reactive power phase 2 +/-	var	0.1	SInt32
50554	0xC57A	2	Q3: Reactive power phase 3 +/-	var	0.1	SInt32
50556	0xC57C	2	S1: Apparent power phase 1	VA	0.1	UInt32
50558	0xC57E	2	S2: Apparent power phase 2	VA	0.1	UInt32
50560	0xC580	2	S3: Apparent power phase 3	VA	0.1	UInt32
50562	0xC582	2	PF1; Power factor, phase 1 -: capacitive and +: inductive	1	1000	SInt32
50564	0xC584	2	PF2; Power factor, phase 2 -: capacitive and +: inductive	1	1000	SInt32

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
50566	0xC586	2	PF3; Power factor, phase 3 -: capacitive and +: inductive	1	1000	SInt32
50568	0xC588	2	ISYS: Mean current value (I1 + I2 + I3)/3	A	1000	UInt32
50570	0xC58A	2	USYS: Mean value of line voltages (U12 + U23 + U31)/3	V	100	UInt32
50572	0xC58C	2	VSYS: Mean value of line voltages to N (V1 + V2 + V3)/3	V	100	UInt32

A 2 Energy values (identical to EEM-MAXXX)

Table A-3 Energy values (identical to EEM-MAXXX)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
50768	0xC650	Display	22	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
50768	0xC650	2	Hour: Operating hours counter	h	100	UInt32
50770	0xC652	2	Total active energy procurement system	kWh	1	UInt32
50772	0xC654	2	Total inductive reactive energy system	kvarh	1	UInt32
50774	0xC656	2	Total apparent energy system	kVAh	1	UInt32
50776	0xC658	2	Total active energy supply system	kWh	1	UInt32
50778	0xC65A	2	Total capacitive reactive energy system	kvarh	1	UInt32
50780	0xC65C	2	Partial energy meter – active energy procurement system	kWh	1	UInt32
50782	0xC65E	2	Partial energy meter – inductive reactive energy system	kvarh	1	UInt32
50784	0xC660	2	Partial energy meter – apparent energy system	kVAh	1	UInt32
50786	0xC662	2	Partial energy meter – active energy supply system	kWh	1	UInt32
50788	0xC664	2	Partial energy meter – capacitive reactive energy system	kvarh	1	UInt32

A 3 Instantaneous values (integer)

Table A-4 Instantaneous values (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
0	0x0000	Display	84	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
0	0x0000	2	Conductor voltage to N U1	V	1000	UInt32
2	0x0002	2	Conductor voltage to N U2	V	1000	UInt32
4	0x0004	2	Conductor voltage to N U3	V	1000	UInt32
6	0x0006	2	Conductor voltage to conductor U12	V	1000	UInt32
8	0x0008	2	Conductor voltage to conductor U23	V	1000	UInt32
10	0x000A	2	Conductor voltage to conductor U31	V	1000	UInt32
12	0x000C	2	External conductor voltage system	V	1000	UInt32
14	0x000E	2	Current in conductor I1	A	1000	SInt32
16	0x0010	2	Current in conductor I2	A	1000	SInt32
18	0x0012	2	Current in conductor I3	A	1000	SInt32
20	0x0014	2	Current in conductor In	A	1000	SInt32
22	0x0016	2	System current	A	1000	SInt32
24	0x0018	2	Power factor phase 1 +/-	1	1000	SInt32
26	0x001A	2	Power factor phase 2 +/-	1	1000	SInt32
28	0x001C	2	Power factor phase 3 +/-	1	1000	SInt32
30	0x001E	2	System power factor	1	1000	SInt32
32	0x0020	4	Active power phase 1 +/-	W	1000	SInt64
36	0x0024	4	Active power phase 2 +/-	W	1000	SInt64
40	0x0028	4	Active power phase 3 +/-	W	1000	SInt64
44	0x002C	4	Total active power +/-	W	1000	SInt64
48	0x0030	4	Apparent power phase 1	VA	1000	SInt64
52	0x0034	4	Apparent power phase 2	VA	1000	SInt64
56	0x0038	4	Apparent power phase 3	VA	1000	SInt64
60	0x003C	4	Total apparent power +/-	VA	1000	SInt64
64	0x0040	4	Reactive power phase 1 +/-	var	1000	SInt64
68	0x0044	4	Reactive power phase 2 +/-	var	1000	SInt64
72	0x0048	4	Reactive power phase 3 +/-	var	1000	SInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
76	0x004C	4	Total reactive power +/-	var	1000	SInt64
80	0x0050	2	Frequency	Hz	1000	UInt32
82	0x0052	2	Phase sequence 0: 123 (CCW: counterclockwise) 1: 132 (CW: clockwise) 2: Not available	1	1000	UInt32

A 4 Instantaneous values (float)

Table A-5 Instantaneous values (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
4096	0x1000	Display	60	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4096	0x1000	2	Conductor voltage to N U1	V	float
4098	0x1002	2	Conductor voltage to N U2	V	float
4100	0x1004	2	Conductor voltage to N U3	V	float
4102	0x1006	2	Conductor voltage to conductor U12	V	float
4104	0x1008	2	Conductor voltage to conductor U23	V	float
4106	0x100A	2	Conductor voltage to conductor U31	V	float
4108	0x100C	2	External conductor voltage system	V	float
4110	0x100E	2	Current in conductor I1	A	float
4112	0x1010	2	Current in conductor I2	A	float
4114	0x1012	2	Current in conductor I3	A	float
4116	0x1014	2	Current in conductor In	A	float
4118	0x1016	2	System current	A	float
4120	0x1018	2	Power factor phase 1 +/-	1	float
4122	0x101A	2	Power factor phase 2 +/-	1	float
4124	0x101C	2	Power factor phase 3 +/-	1	float
4126	0x101E	2	System power factor	1	float
4128	0x1020	2	Active power phase 1 +/-	W	float
4130	0x1022	2	Active power phase 2 +/-	W	float
4132	0x1024	2	Active power phase 3 +/-	W	float
4134	0x1026	2	Total active power +/-	W	float
4136	0x1028	2	Apparent power phase 1	VA	float
4138	0x102A	2	Apparent power phase 2	VA	float
4140	0x102C	2	Apparent power phase 3	VA	float
4142	0x102E	2	Total apparent power +/-	VA	float
4144	0x1030	2	Reactive power phase 1 +/-	var	float
4146	0x1032	2	Reactive power phase 2 +/-	var	float
4148	0x1034	2	Reactive power phase 3 +/-	var	float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4150	0x1036	2	Total reactive power +/-	var	float
4152	0x1038	2	Frequency	Hz	float
4154	0x103A	2	Phase sequence 0.123 (CCW: counterclockwise) 0.132: (CW: clockwise) 0: Not available	-	float

A 5 Meter (integer)

Table A-6 Meter (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
256	0x0100	Display	160	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
256	0x0100	4	Total active energy procurement L1 (cannot be reset)	kWh	1000	UInt64
260	0x0104	4	Total active energy procurement L2 (cannot be reset)	kWh	1000	UInt64
264	0x0108	4	Total active energy procurement L3 (cannot be reset)	kWh	1000	UInt64
268	0x010C	4	Total active energy procurement Σ (cannot be reset)	kWh	1000	UInt64
272	0x0110	4	Total active energy supply L1 (cannot be reset)	kWh	1000	UInt64
276	0x0114	4	Total active energy supply L2 (cannot be reset)	kWh	1000	UInt64
280	0x0118	4	Total active energy supply L3 (cannot be reset)	kWh	1000	UInt64
284	0x011C	4	Total active energy supply Σ (cannot be reset)	kWh	1000	UInt64
288	0x0120	4	Total inductive apparent energy procurement L1 (cannot be reset)	kVAh	1000	UInt64
292	0x0124	4	Total inductive apparent energy procurement L2 (cannot be reset)	kVAh	1000	UInt64
296	0x0128	4	Total inductive apparent energy procurement L3 (cannot be reset)	kVAh	1000	UInt64
300	0x012C	4	Total inductive apparent energy procurement Σ (cannot be reset)	kVAh	1000	UInt64
304	0x0130	4	Total inductive apparent energy supply L1 (cannot be reset)	kVAh	1000	UInt64
308	0x0134	4	Total inductive apparent energy supply L2 (cannot be reset)	kVAh	1000	UInt64
312	0x0138	4	Total inductive apparent energy supply L3 (cannot be reset)	kVAh	1000	UInt64
316	0x013C	4	Total inductive apparent energy supply Σ (cannot be reset)	kVAh	1000	UInt64
320	0x0140	4	Total capacitive apparent energy procurement L1 (cannot be reset)	kVAh	1000	UInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
324	0x0144	4	Total capacitive apparent energy procurement L2 (cannot be reset)	kVAh	1000	UInt64
328	0x0148	4	Total capacitive apparent energy procurement L3 (cannot be reset)	kVAh	1000	UInt64
332	0x014C	4	Total capacitive apparent energy procurement Σ (cannot be reset)	kVAh	1000	UInt64
336	0x0150	4	Total capacitive apparent energy supply L1 (cannot be reset)	kVAh	1000	UInt64
340	0x0154	4	Total capacitive apparent energy supply L2 (cannot be reset)	kVAh	1000	UInt64
344	0x0158	4	Total capacitive apparent energy supply L3 (cannot be reset)	kVAh	1000	UInt64
348	0x015C	4	Total capacitive apparent energy supply Σ (cannot be reset)	kVAh	1000	UInt64
352	0x0160	4	Total inductive reactive energy procurement L1 (cannot be reset)	kvarh	1000	UInt64
356	0x0164	4	Total inductive reactive energy procurement L2 (cannot be reset)	kvarh	1000	UInt64
360	0x0168	4	Total inductive reactive energy procurement L3 (cannot be reset)	kvarh	1000	UInt64
364	0x016C	4	Total inductive reactive energy procurement Σ (cannot be reset)	kvarh	1000	UInt64
368	0x0170	4	Total inductive reactive energy supply L1 (cannot be reset)	kvarh	1000	UInt64
372	0x0174	4	Total inductive reactive energy supply L2 (cannot be reset)	kvarh	1000	UInt64
376	0x0178	4	Total inductive reactive energy supply L3 (cannot be reset)	kvarh	1000	UInt64
380	0x017C	4	Total inductive reactive energy supply Σ (cannot be reset)	kvarh	1000	UInt64
384	0x0180	4	Total inductive reactive energy procurement L1 (cannot be reset)	kvarh	1000	UInt64
388	0x0184	4	Total inductive reactive energy procurement L2 (cannot be reset)	kvarh	1000	UInt64
392	0x0188	4	Total inductive reactive energy procurement L3 (cannot be reset)	kvarh	1000	UInt64
396	0x018C	4	Total inductive reactive energy procurement Σ (cannot be reset)	kvarh	1000	UInt64
400	0x0190	4	Total capacitive reactive energy supply L1 (cannot be reset)	kvarh	1000	UInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
404	0x0194	4	Total capacitive reactive energy supply L2 (cannot be reset)	kvarh	1000	UInt64
408	0x0198	4	Total capacitive reactive energy supply L3 (cannot be reset)	kvarh	1000	UInt64
412	0x019C	4	Total capacitive reactive energy supply Σ (cannot be reset)	kvarh	1000	UInt64

A 6 Meter (float)

Table A-7 Meter (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
4352	0x1100	Display	80	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4352	0x1100	2	Total active energy procurement L1 (cannot be reset)	Wh	float
4354	0x1102	2	Total active energy procurement L2 (cannot be reset)	Wh	float
4356	0x1104	2	Total active energy procurement L3 (cannot be reset)	Wh	float
4358	0x1106	2	Total active energy procurement Σ (cannot be reset)	Wh	float
4360	0x1108	2	Total active energy supply L1 (cannot be reset)	Wh	float
4362	0x110A	2	Total active energy supply L2 (cannot be reset)	Wh	float
4364	0x110C	2	Total active energy supply L3 (cannot be reset)	Wh	float
4366	0x110E	2	Total active energy supply Σ (cannot be reset)	Wh	float
4368	0x1110	2	Total inductive apparent energy procurement L1 (cannot be reset)	VAh	float
4370	0x1112	2	Total inductive apparent energy procurement L2 (cannot be reset)	VAh	float
4372	0x1114	2	Total inductive apparent energy procurement L3 (cannot be reset)	VAh	float
4372	0x1114	2	Total inductive apparent energy procurement Σ (cannot be reset)	VAh	float
4376	0x1118	2	Total inductive apparent energy supply L1 (cannot be reset)	VAh	float
4378	0x111A	2	Total inductive apparent energy supply L2 (cannot be reset)	VAh	float
4380	0x111C	2	Total inductive apparent energy supply L3 (cannot be reset)	VAh	float
4382	0x111E	2	Total inductive apparent energy supply Σ (cannot be reset)	VAh	float
4384	0x1120	2	Total capacitive apparent energy procurement L1 (cannot be reset)	VAh	float
4386	0x1122	2	Total capacitive apparent energy procurement L2 (cannot be reset)	VAh	float
4388	0x1124	2	Total capacitive apparent energy procurement L3 (cannot be reset)	VAh	float
4390	0x1126	2	Total capacitive apparent energy procurement Σ (cannot be reset)	VAh	float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4392	0x1128	2	Total capacitive apparent energy supply L1 (cannot be reset)	VAh	float
4394	0x112A	2	Total capacitive apparent energy supply L2 (cannot be reset)	VAh	float
4396	0x112C	2	Total capacitive apparent energy supply L3 (cannot be reset)	VAh	float
4398	0x112E	2	Total capacitive apparent energy supply Σ (cannot be reset)	VAh	float
4400	0x1130	2	Total inductive reactive energy procurement L1 (cannot be reset)	varh	float
4402	0x1132	2	Total inductive reactive energy procurement L2 (cannot be reset)	varh	float
4404	0x1134	2	Total inductive reactive energy procurement L3 (cannot be reset)	varh	float
4406	0x1136	2	Total inductive reactive energy procurement Σ (cannot be reset)	varh	float
4408	0x1138	2	Total inductive reactive energy supply L1 (cannot be reset)	varh	float
4410	0x113A	2	Total inductive reactive energy supply L2 (cannot be reset)	varh	float
4412	0x113C	2	Total inductive reactive energy supply L3 (cannot be reset)	varh	float
4414	0x113E	2	Total inductive reactive energy supply Σ (cannot be reset)	varh	float
4416	0x1140	2	Total inductive reactive energy procurement L1 (cannot be reset)	varh	float
4418	0x1142	2	Total inductive reactive energy procurement L2 (cannot be reset)	varh	float
4420	0x1144	2	Total inductive reactive energy procurement L3 (cannot be reset)	varh	float
4422	0x1146	2	Total inductive reactive energy procurement Σ (cannot be reset)	varh	float
4424	0x1148	2	Total capacitive reactive energy supply L1 (cannot be reset)	varh	float
4426	0x114A	2	Total capacitive reactive energy supply L2 (cannot be reset)	varh	float
4428	0x114C	2	Total capacitive reactive energy supply L3 (cannot be reset)	varh	float
4430	0x114E	2	Total capacitive reactive energy supply Σ (cannot be reset)	varh	float

A 7 Meter tariff 1 (integer)

Not available on energy meters with Ethernet interface.

Table A-8 Meter tariff 1 (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
512	0x0200	Display	160	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
512	0x0200	4	Tariff 1 – active energy procurement L1	kWh	1000	UInt64
516	0x0204	4	Tariff 1 – active energy procurement L2	kWh	1000	UInt64
520	0x0208	4	Tariff 1 – active energy procurement L3	kWh	1000	UInt64
524	0x020C	4	Tariff 1 – active energy procurement Σ	kWh	1000	UInt64
528	0x0210	4	Tariff 1 – active energy supply L1	kWh	1000	UInt64
532	0x0214	4	Tariff 1 – active energy supply L2	kWh	1000	UInt64
536	0x0218	4	Tariff 1 – active energy supply L3	kWh	1000	UInt64
540	0x021C	4	Tariff 1 – active energy supply Σ	kWh	1000	UInt64
544	0x0220	4	Tariff 1 – inductive apparent energy procurement L1	kVAh	1000	UInt64
548	0x0224	4	Tariff 1 – inductive apparent energy procurement L2	kVAh	1000	UInt64
552	0x0228	4	Tariff 1 – inductive apparent energy procurement L3	kVAh	1000	UInt64
556	0x022C	4	Tariff 1 – inductive apparent energy procurement Σ	kVAh	1000	UInt64
560	0x0230	4	Tariff 1 – inductive apparent energy supply L1	kVAh	1000	UInt64
564	0x0234	4	Tariff 1 – inductive apparent energy supply L2	kVAh	1000	UInt64
568	0x0238	4	Tariff 1 – inductive apparent energy supply L3	kVAh	1000	UInt64
572	0x023C	4	Tariff 1 – inductive apparent energy supply Σ	kVAh	1000	UInt64
576	0x0240	4	Tariff 1 – capacitive apparent energy procurement L1	kVAh	1000	UInt64
580	0x0244	4	Tariff 1 – capacitive apparent energy procurement L2	kVAh	1000	UInt64
584	0x0248	4	Tariff 1 – capacitive apparent energy procurement L3	kVAh	1000	UInt64
588	0x024C	4	Tariff 1 – capacitive apparent energy procurement Σ	kVAh	1000	UInt64
592	0x0250	4	Tariff 1 – capacitive apparent energy supply L1	kVAh	1000	UInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
596	0x0254	4	Tariff 1 – capacitive apparent energy supply L2	kVAh	1000	UInt64
600	0x0258	4	Tariff 1 – capacitive apparent energy supply L3	kVAh	1000	UInt64
604	0x025C	4	Tariff 1 – capacitive apparent energy supply Σ	kVAh	1000	UInt64
608	0x0260	4	Tariff 1 – inductive reactive energy procurement L1	kvarh	1000	UInt64
612	0x0264	4	Tariff 1 – inductive reactive energy procurement L2	kvarh	1000	UInt64
616	0x0268	4	Tariff 1 – inductive reactive energy procurement L3	kvarh	1000	UInt64
620	0x026C	4	Tariff 1 – inductive reactive energy procurement Σ	kvarh	1000	UInt64
624	0x0270	4	Tariff 1 – inductive reactive energy supply L1	kvarh	1000	UInt64
628	0x0274	4	Tariff 1 – inductive reactive energy supply L2	kvarh	1000	UInt64
632	0x0278	4	Tariff 1 – inductive reactive energy supply L3	kvarh	1000	UInt64
636	0x027C	4	Tariff 1 – inductive reactive energy supply Σ	kvarh	1000	UInt64
640	0x0280	4	Tariff 1 – capacitive reactive energy procurement L1	kvarh	1000	UInt64
644	0x0284	4	Tariff 1 – capacitive reactive energy procurement L2	kvarh	1000	UInt64
648	0x0288	4	Tariff 1 – capacitive reactive energy procurement L3	kvarh	1000	UInt64
652	0x028C	4	Tariff 1 – capacitive reactive energy procurement Σ	kvarh	1000	UInt64
656	0x0290	4	Tariff 1 – capacitive reactive energy supply L1	kvarh	1000	UInt64
660	0x0294	4	Tariff 1 – capacitive reactive energy supply L2	kvarh	1000	UInt64
664	0x0298	4	Tariff 1 – capacitive reactive energy supply L3	kvarh	1000	UInt64
668	0x029C	4	Tariff 1 – capacitive reactive energy supply Σ	kvarh	1000	UInt64

A 8 Meter tariff 1 (float)

Not available on energy meters with Ethernet interface.

Table A-9 Meter tariff 1 (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
4608	0x1200	Display	80	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4608	0x1200	2	Tariff 1 – active energy procurement L1	Wh	float
4610	0x1202	2	Tariff 1 – active energy procurement L2	Wh	float
4612	0x1204	2	Tariff 1 – active energy procurement L3	Wh	float
4614	0x1206	2	Tariff 1 – active energy procurement Σ	Wh	float
4616	0x1208	2	Tariff 1 – active energy supply L1	Wh	float
4618	0x120A	2	Tariff 1 – active energy supply L2	Wh	float
4620	0x120C	2	Tariff 1 – active energy supply L3	Wh	float
4622	0x120E	2	Tariff 1 – active energy supply Σ	Wh	float
4624	0x1210	2	Tariff 1 – inductive apparent energy procurement L1	VAh	float
4626	0x1212	2	Tariff 1 – inductive apparent energy procurement L2	VAh	float
4628	0x1214	2	Tariff 1 – inductive apparent energy procurement L3	VAh	float
4630	0x1216	2	Tariff 1 – inductive apparent energy procurement Σ	VAh	float
4632	0x1218	2	Tariff 1 – inductive apparent energy supply L1	VAh	float
4634	0x121A	2	Tariff 1 – inductive apparent energy supply L2	VAh	float
4636	0x121C	2	Tariff 1 – inductive apparent energy supply L3	VAh	float
4638	0x121E	2	Tariff 1 – inductive apparent energy supply Σ	VAh	float
4640	0x1220	2	Tariff 1 – capacitive apparent energy procurement L1	VAh	float
4642	0x1222	2	Tariff 1 – capacitive apparent energy procurement L2	VAh	float
4644	0x1224	2	Tariff 1 – capacitive apparent energy procurement L3	VAh	float
4646	0x1226	2	Tariff 1 – capacitive apparent energy procurement Σ	VAh	float
4648	0x1228	2	Tariff 1 – capacitive apparent energy supply L1	VAh	float
4650	0x122A	2	Tariff 1 – capacitive apparent energy supply L2	VAh	float
4652	0x122C	2	Tariff 1 – capacitive apparent energy supply L3	VAh	float
4654	0x122E	2	Tariff 1 – capacitive apparent energy supply Σ	VAh	float
4656	0x1230	2	Tariff 1 – inductive reactive energy procurement L1	varh	float
4658	0x1232	2	Tariff 1 – inductive reactive energy procurement L2	varh	float
4660	0x1234	2	Tariff 1 – inductive reactive energy procurement L3	varh	float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4662	0x1236	2	Tariff 1 – inductive reactive energy procurement Σ	varh	float
4664	0x1238	2	Tariff 1 – inductive reactive energy supply L1	varh	float
4666	0x123A	2	Tariff 1 – inductive reactive energy supply L2	varh	float
4668	0x123C	2	Tariff 1 – inductive reactive energy supply L3	varh	float
4670	0x123E	2	Tariff 1 – inductive reactive energy supply Σ	varh	float
4672	0x1240	2	Tariff 1 – capacitive reactive energy procurement L1	varh	float
4674	0x1242	2	Tariff 1 – capacitive reactive energy procurement L2	varh	float
4676	0x1244	2	Tariff 1 – capacitive reactive energy procurement L3	varh	float
4678	0x1246	2	Tariff 1 – capacitive reactive energy procurement Σ	varh	float
4680	0x1248	2	Tariff 1 – capacitive reactive energy supply L1	varh	float
4682	0x124A	2	Tariff 1 – capacitive reactive energy supply L2	varh	float
4684	0x124C	2	Tariff 1 – capacitive reactive energy supply L3	varh	float
4686	0x124E	2	Tariff 1 – capacitive reactive energy supply Σ	varh	float

A 9 Meter tariff 2 (integer)

Not available on energy meters with Ethernet interface.

Table A-10 Meter tariff 2 (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
768	0x0300	Display	160	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
768	0x0300	4	Tariff 2 – active energy procurement L1	kWh	1000	UInt64
772	0x0304	4	Tariff 2 – active energy procurement L2	kWh	1000	UInt64
776	0x0308	4	Tariff 2 – active energy procurement L3	kWh	1000	UInt64
780	0x030C	4	Tariff 2 – Active energy procurement Σ	kWh	1000	UInt64
784	0x0310	4	Tariff 2 – active energy supply L1	kWh	1000	UInt64
788	0x0314	4	Tariff 2 – active energy supply L2	kWh	1000	UInt64
792	0x0318	4	Tariff 2 – active energy supply L3	kWh	1000	UInt64
796	0x031C	4	Tariff 2 – active energy supply Σ	kWh	1000	UInt64
800	0x0320	4	Tariff 2 – inductive apparent energy procurement L1	kVAh	1000	UInt64
804	0x0324	4	Tariff 2 – inductive apparent energy procurement L2	kVAh	1000	UInt64
808	0x0328	4	Tariff 2 – inductive apparent energy procurement L3	kVAh	1000	UInt64
812	0x032C	4	Tariff 2 – inductive apparent energy procurement Σ	kVAh	1000	UInt64
816	0x0330	4	Tariff 2 – inductive apparent energy supply L1	kVAh	1000	UInt64
820	0x0334	4	Tariff 2 – inductive apparent energy supply L2	kVAh	1000	UInt64
824	0x0338	4	Tariff 2 – inductive apparent energy supply L3	kVAh	1000	UInt64
828	0x033C	4	Tariff 2 – inductive apparent energy supply Σ	kVAh	1000	UInt64
832	0x0340	4	Tariff 2 – capacitive apparent energy procurement L1	kVAh	1000	UInt64
836	0x0344	4	Tariff 2 – capacitive apparent energy procurement L2	kVAh	1000	UInt64
840	0x0348	4	Tariff 2 – capacitive apparent energy procurement L3	kVAh	1000	UInt64
844	0x034C	4	Tariff 2 – capacitive apparent energy procurement Σ	kVAh	1000	UInt64
848	0x0350	4	Tariff 2 – capacitive apparent energy supply L1	kVAh	1000	UInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
852	0x0354	4	Tariff 2 – capacitive apparent energy supply L2	kVAh	1000	UInt64
856	0x0358	4	Tariff 2 – capacitive apparent energy supply L3	kVAh	1000	UInt64
860	0x035C	4	Tariff 2 – capacitive apparent energy supply Σ	kVAh	1000	UInt64
864	0x0360	4	Tariff 2 – inductive reactive energy procurement L1	kvarh	1000	UInt64
868	0x0364	4	Tariff 2 – inductive reactive energy procurement L2	kvarh	1000	UInt64
872	0x0368	4	Tariff 2 – inductive reactive energy procurement L3	kvarh	1000	UInt64
876	0x036C	4	Tariff 2 – inductive reactive energy procurement Σ	kvarh	1000	UInt64
880	0x0370	4	Tariff 2 – inductive reactive energy supply L1	kvarh	1000	UInt64
884	0x0374	4	Tariff 2 – inductive reactive energy supply L2	kvarh	1000	UInt64
888	0x0378	4	Tariff 2 – inductive reactive energy supply L3	kvarh	1000	UInt64
892	0x037C	4	Tariff 2 – inductive reactive energy supply Σ	kvarh	1000	UInt64
896	0x0380	4	Tariff 2 – capacitive reactive energy procurement L1	kvarh	1000	UInt64
900	0x0384	4	Tariff 2 – capacitive reactive energy procurement L2	kvarh	1000	UInt64
904	0x0388	4	Tariff 2 – capacitive reactive energy procurement L3	kvarh	1000	UInt64
908	0x038C	4	Tariff 2 – capacitive reactive energy procurement Σ	kvarh	1000	UInt64
912	0x0390	4	Tariff 2 – capacitive reactive energy supply L1	kvarh	1000	UInt64
916	0x0394	4	Tariff 2 – capacitive reactive energy supply L2	kvarh	1000	UInt64
920	0x0398	4	Tariff 2 – capacitive reactive energy supply L3	kvarh	1000	UInt64
924	0x039C	4	Tariff 2 – capacitive reactive energy supply Σ	kvarh	1000	UInt64

A 10 Meter tariff 2 (float)

Not available on energy meters with Ethernet interface.

Table A-11 Meter tariff 2 (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
4864	0x1300	Display	80	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4864	0x1300	2	Tariff 2 – active energy procurement L1	Wh	float
4866	0x1302	2	Tariff 2 – active energy procurement L2	Wh	float
4868	0x1304	2	Tariff 2 – active energy procurement L3	Wh	float
4870	0x1306	2	Tariff 2 – Active energy procurement Σ	Wh	float
4872	0x1308	2	Tariff 2 – active energy supply L1	Wh	float
4874	0x130A	2	Tariff 2 – active energy supply L2	Wh	float
4876	0x130C	2	Tariff 2 – active energy supply L3	Wh	float
4878	0x130E	2	Tariff 2 – active energy supply Σ	Wh	float
4880	0x1310	2	Tariff 2 – inductive apparent energy procurement L1	VAh	float
4882	0x1312	2	Tariff 2 – inductive apparent energy procurement L2	VAh	float
4884	0x1314	2	Tariff 2 – inductive apparent energy procurement L3	VAh	float
4886	0x1316	2	Tariff 2 – inductive apparent energy procurement Σ	VAh	float
4888	0x1318	2	Tariff 2 – inductive apparent energy supply L1	VAh	float
4890	0x131A	2	Tariff 2 – inductive apparent energy supply L2	VAh	float
4892	0x131C	2	Tariff 2 – inductive apparent energy supply L3	VAh	float
4894	0x131E	2	Tariff 2 – inductive apparent energy supply Σ	VAh	float
4896	0x1320	2	Tariff 2 – capacitive apparent energy procurement L1	VAh	float
4898	0x1322	2	Tariff 2 – capacitive apparent energy procurement L2	VAh	float
4900	0x1324	2	Tariff 2 – capacitive apparent energy procurement L3	VAh	float
4902	0x1326	2	Tariff 2 – capacitive apparent energy procurement Σ	VAh	float
4904	0x1328	2	Tariff 2 – capacitive apparent energy supply L1	VAh	float
4906	0x132A	2	Tariff 2 – capacitive apparent energy supply L2	VAh	float
4908	0x132C	2	Tariff 2 – capacitive apparent energy supply L3	VAh	float
4910	0x132E	2	Tariff 2 – capacitive apparent energy supply Σ	VAh	float
4912	0x1330	2	Tariff 2 – inductive reactive energy procurement L1	varh	float
4914	0x1332	2	Tariff 2 – inductive reactive energy procurement L2	varh	float
4916	0x1334	2	Tariff 2 – inductive reactive energy procurement L3	varh	float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
4918	0x1336	2	Tariff 2 – inductive reactive energy procurement Σ	varh	float
4920	0x1338	2	Tariff 2 – inductive reactive energy supply L1	varh	float
4922	0x133A	2	Tariff 2 – inductive reactive energy supply L2	varh	float
4924	0x133C	2	Tariff 2 – inductive reactive energy supply L3	varh	float
4926	0x133E	2	Tariff 2 – inductive reactive energy supply Σ	varh	float
4928	0x1340	2	Tariff 2 – capacitive reactive energy procurement L1	varh	float
4930	0x1342	2	Tariff 2 – capacitive reactive energy procurement L2	varh	float
4932	0x1344	2	Tariff 2 – capacitive reactive energy procurement L3	varh	float
4934	0x1346	2	Tariff 2 – capacitive reactive energy procurement Σ	varh	float
4936	0x1348	2	Tariff 2 – capacitive reactive energy supply L1	varh	float
4938	0x134A	2	Tariff 2 – capacitive reactive energy supply L2	varh	float
4940	0x134C	2	Tariff 2 – capacitive reactive energy supply L3	varh	float
4942	0x134E	2	Tariff 2 – capacitive reactive energy supply Σ	varh	float

A 11 Partial energy meters and balancing energy meters (integer)

Table A-12 Partial energy meters and balancing energy meters (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
1024	0x0400	Display	60	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
1024	0x0400	4	Partial energy meter – active energy procurement system	kWh	1000	UInt64
1028	0x0404	4	Partial energy meter – active energy supply system	kWh	1000	UInt64
1032	0x0408	4	Partial energy meter – inductive apparent energy procurement system	kVAh	1000	UInt64
1036	0x040C	4	Partial energy meter – inductive apparent energy supply system	kVAh	1000	UInt64
1040	0x0410	4	Partial energy meter – capacitive apparent energy procurement system	kVAh	1000	UInt64
1044	0x0414	4	Partial energy meter – capacitive apparent energy supply system	kVAh	1000	UInt64
1048	0x0418	4	Partial energy meter – inductive reactive energy procurement system	kvarh	1000	UInt64
1052	0x041C	4	Partial energy meter – inductive reactive energy supply system	kvarh	1000	UInt64
1056	0x0420	4	Partial energy meter – capacitive reactive energy procurement system	kvarh	1000	UInt64
1060	0x0424	4	Partial energy meter – capacitive reactive energy supply system	kvarh	1000	UInt64
1064	0x0428	4	Balancing energy meter – active energy system	kWh	1000	SInt64
1068	0x042C	4	Balancing energy meter – inductive apparent energy system	kVAh	1000	SInt64
1072	0x0430	4	Balancing energy meter – capacitive apparent energy system	kVAh	1000	SInt64
1076	0x0434	4	Balancing energy meter – inductive reactive energy system	kvarh	1000	SInt64
1080	0x0438	4	Balancing energy meter – capacitive reactive energy system	kvarh	1000	SInt64

A 12 Partial energy meters and balancing energy meters (float)

Table A-13 Partial energy meters and balancing energy meters (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
5120	0x1400	Display	30	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
5120	0x1400	2	Partial energy meter – active energy procurement system	Wh	float
5122	0x1402	2	Partial energy meter – active energy supply system	Wh	float
5124	0x1404	2	Partial energy meter – inductive apparent energy procurement system	VAh	float
5128	0x1406	2	Partial energy meter – inductive apparent energy supply system	VAh	float
5130	0x1408	2	Partial energy meter – capacitive apparent energy procurement system	VAh	float
5132	0x140A	2	Partial energy meter – capacitive apparent energy supply system	VAh	float
5134	0x140C	2	Partial energy meter – inductive reactive energy procurement system	varh	float
5136	0x140E	2	Partial energy meter – inductive reactive energy supply system	varh	float
5138	0x1410	2	Partial energy meter – capacitive reactive energy procurement system	varh	float
5140	0x1412	2	Partial energy meter – capacitive reactive energy supply system	varh	float
5142	0x1414	2	Balancing energy meter – active energy system	Wh	float
5144	0x1416	2	Balancing energy meter – inductive apparent energy system	VAh	float
5168	0x1418	2	Balancing energy meter – capacitive apparent energy system	VAh	float
5146	0x141A	2	Balancing energy meter – inductive reactive energy system	varh	float
5148	0x141C	2	Balancing energy meter – capacitive reactive energy system	varh	float

A 13 DMD (integer)

Table A-14 DMD (integer)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
1536	0x0600	Display	148	03	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
1536	0x0600	2	Mean value – conductor voltage to conductor L12	V	1000	UInt32
1538	0x0602	2	Mean value – conductor voltage to conductor L23	V	1000	UInt32
1540	0x0604	2	Mean value – conductor voltage to conductor L31	V	1000	UInt32
1542	0x0606	2	Mean value – conductor voltage to N L1	V	1000	UInt32
1544	0x0608	2	Mean value – conductor voltage to N L2	V	1000	UInt32
1546	0x060A	2	Mean value – conductor voltage to N L3	V	1000	UInt32
1548	0x060C	2	Mean frequency value	Hz	1000	UInt32
1550	0x060E	2	Mean value of current I1	A	1000	UInt32
1552	0x0610	2	Mean value of current I2	A	1000	UInt32
1554	0x0612	2	Mean value of current I3	A	1000	UInt32
1556	0x0614	2	Mean value of current In	A	1000	UInt32
1558	0x0616	2	Mean value of current Isys	A	1000	UInt32
1560	0x0618	4	Mean value – active power procurement I1	W	1000	UInt64
1564	0x061C	4	Mean value – active power supply I1	W	1000	UInt64
1568	0x0620	4	Mean value – active power procurement I2	W	1000	UInt64
1572	0x0624	4	Mean value – active power supply I2	W	1000	UInt64
1576	0x0628	4	Mean value – active power procurement I3	W	1000	UInt64
1580	0x062C	4	Mean value – active power supply I3	W	1000	UInt64
1584	0x0630	4	Mean value – active power procurement system	W	1000	UInt64
1588	0x0634	4	Mean value – active power supply system	W	1000	UInt64
1592	0x0638	4	Balanced mean value – active power system	W	1000	SInt64
1596	0x063C	4	Mean value – apparent power procurement I1	VA	1000	UInt64
1600	0x0640	4	Mean value – apparent power supply I1	VA	1000	UInt64
1604	0x0644	4	Mean value – apparent power procurement I2	VA	1000	UInt64
1608	0x0648	4	Mean value – apparent power supply I2	VA	1000	UInt64
1612	0x064C	4	Mean value – apparent power procurement I3	VA	1000	UInt64
1616	0x0650	4	Mean value – apparent power supply I3	VA	1000	UInt64

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
1620	0x0654	4	Mean value – apparent power procurement system	VA	1000	UInt64
1624	0x0658	4	Mean value – apparent power supply system	VA	1000	UInt64
1628	0x065C	4	Balanced mean value – apparent power system	VA	1000	UInt64
1632	0x0660	4	Mean value – reactive power procurement l1	var	1000	UInt64
1636	0x0664	4	Mean value – reactive power supply l1	var	1000	UInt64
1640	0x0668	4	Mean value – reactive power procurement l2	var	1000	UInt64
1644	0x066C	4	Mean value – reactive power supply l2	var	1000	UInt64
1648	0x0670	4	Mean value – reactive power procurement l3	var	1000	UInt64
1652	0x0674	4	Mean value – reactive power supply l3	var	1000	UInt64
1656	0x0678	4	Mean value – reactive power procurement system	var	1000	UInt64
1660	0x067C	4	Mean value – reactive power supply system	var	1000	UInt64
1664	0x0680	4	Balanced mean value – reactive power system	var	1000	UInt64
1668	0x0684	2	Mean value – inductive power factor l1	1	1000	UInt32
1670	0x0686	2	Mean value – capacitive power factor l1	1	1000	UInt32
1672	0x0688	2	Mean value – inductive power factor l2	1	1000	UInt32
1674	0x068A	2	Mean value – capacitive power factor l2	1	1000	UInt32
1676	0x068C	2	Mean value – inductive power factor l3	1	1000	UInt32
1678	0x068E	2	Mean value – capacitive power factor l3	1	1000	UInt32
1680	0x0690	2	Mean value – inductive power factor system	1	1000	UInt32
1682	0x0692	2	Mean value – capacitive power factor system	1	1000	UInt32

A 14 DMD (float)

Table A-15 DMD (float)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
5376	0x1500	Display	94	03	32 bits float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
5376	0x1500	2	Mean value – conductor voltage to conductor L12	V	float
5378	0x1502	2	Mean value – conductor voltage to conductor L23	V	float
5380	0x1504	2	Mean value – conductor voltage to conductor L31	V	float
5382	0x1506	2	Mean value – conductor voltage to N L1	V	float
5384	0x1508	2	Mean value – conductor voltage to N L2	V	float
5386	0x150A	2	Mean value – conductor voltage to N L3	V	float
5388	0x150C	2	Mean frequency value	Hz	float
5390	0x150E	2	Mean value of current I1	A	float
5392	0x1510	2	Mean value of current I2	A	float
5394	0x1512	2	Mean value of current I3	A	float
5396	0x1514	2	Mean value of current In	A	float
5398	0x1516	2	Mean value of current Isys	A	float
5400	0x1518	2	Mean value – active power procurement I1	W	float
5402	0x151A	2	Mean value – active power supply I1	W	float
5404	0x151C	2	Mean value – active power procurement I2	W	float
5406	0x151E	2	Mean value – active power supply I2	W	float
5408	0x1520	2	Mean value – active power procurement I3	W	float
5410	0x1522	2	Mean value – active power supply I3	W	float
5412	0x1524	2	Mean value – active power procurement system	W	float
5414	0x1526	2	Mean value – active power supply system	W	float
5416	0x1528	2	Balanced mean value – active power system	W	float
5418	0x152A	2	Mean value – apparent power procurement I1	VA	float
5420	0x152C	2	Mean value – apparent power supply I1	VA	float
5422	0x152E	2	Mean value – apparent power procurement I2	VA	float
5424	0x1530	2	Mean value – apparent power supply I2	VA	float
5426	0x1532	2	Mean value – apparent power procurement I3	VA	float
5428	0x1534	2	Mean value – apparent power supply I3	VA	float
5430	0x1536	2	Mean value – apparent power procurement system	VA	float
5432	0x1538	2	Mean value – apparent power supply system	VA	float
5434	0x153A	2	Balanced mean value – apparent power system	VA	float

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
5436	0x153C	2	Mean value – reactive power procurement I1	var	float
5438	0x153E	2	Mean value – reactive power supply I1	var	float
5440	0x1540	2	Mean value – reactive power procurement I2	var	float
5442	0x1542	2	Mean value – reactive power supply I2	var	float
5444	0x1544	2	Mean value – reactive power procurement I3	var	float
5446	0x1546	2	Mean value – reactive power supply I3	var	float
5448	0x1548	2	Mean value – reactive power procurement system	var	float
5450	0x154A	2	Mean value – reactive power supply system	var	float
5452	0x154C	2	Balanced mean value – reactive power system	var	float
5454	0x154E	2	Mean value – power factor procurement I1	-	float
5456	0x1550	2	Mean value – power factor supply I1	-	float
5458	0x1552	2	Mean value – inductive power factor I1	-	float
5460	0x1554	2	Mean value – capacitive power factor I1	-	float
5462	0x1556	2	Mean value – inductive power factor I2	-	float
5464	0x1558	2	Mean value – capacitive power factor I2	-	float
5466	0x155A	2	Mean value – inductive power factor I3	-	float
5468	0x155C	2	Mean value – capacitive power factor I3	-	float

A 15 MAXDMD (integer)

Table A-16 MAXDMD (integer)

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Factor	Data type
51070	0xC77E	2	Maximum mean value – current I1	A	1000	UInt32
51072	0xC780	2	Maximum mean value – current I2	A	1000	UInt32
51074	0xC782	2	Maximum mean value – current I3	A	1000	UInt32
51076	0xC784	2	Maximum mean value – current IN	A	1000	UInt32
51078	0xC786	2	Maximum mean value – active power procurement system	kW	100	UInt32
51080	0xC788	2	Maximum mean value – active power supply system	kW	100	UInt32
51082	0xC78A	2	Maximum mean value – reactive power procurement system	kvar	100	UInt32
51084	0xC78C	2	Maximum mean value – reactive power supply system	kvar	100	UInt32
51086	0xC78E	2	Maximum mean value – apparent power procurement system	kVA	100	UInt32
51088	0xC790	2	Maximum mean value – apparent power supply system	kVA	100	UInt32

A 16 Device information and configuration

Table A-17 Device information and configuration

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1280	0x0500	6	Serial number: 10 ASCII digits Example read (ASCII): 0x414B (AK) 0x4852 (HR) 0x3739 (79) 0x3030 (00) 0x3032 (02) 0x0000 (NUL NUL) Example serial number: AKHR790002	-	ASCII
1286	0x0506	2	Reserved	-	-
1288	0x0508	2	Reserved	-	-
1290	0x050A	2	Release number 1, e.g. "0x66" = "102" > "1.02"	-	UInt32
1292	0x050C	2	Release number 2, e.g. "0x66" = "102" > "1.02"	-	UInt32
1294	0x050E	2	Reserved	-	-
1296	0x0510	2	Active tariff meter, e.g. 0x1 = Tariff 1 active, 0x2 = Tariff 2 active	-	UInt32
1298	0x0512	2	Reserved	-	-
1300	0x0514	2	Error code "0x00" = no error "0x01" = Phase sequence error "0x02" = Memory error (only Ethernet) "0x04" = Real-time lost (only Ethernet)	-	UInt32
1302	0x0516	2	Primary current: 0x0001 to 0xC350	-	UInt32
1304	0x518	2	Reserved	-	-
1306	0x51A	2	Secondary rated current 0x01 = 1 A 0x05 = 5 A 0x50 = 80 A	-	UInt32
1308	0x51C	2	Network type 0x05 = 3 phases, 4 conductors, 3 currents 0x03 = 3 phases, 3 conductors, 3 currents 0x02 = 3 phases, 3 conductors, 2 currents	-	UInt32

Table A-17 Device information and configuration [...]

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1310	0x051E	2	Modbus address: 0x01 to 0xF7 (with Ethernet: 255)	-	UInt32
1312	0x0520	2	Reserved	-	-
1314	0x0522	2	Modbus/RTU baud rate 0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps 5: 57600 bps 6: n/a 7: n/a 8: 300 bps 9: 1200 bps Reserved: 0xFFFF FFFF (with Ethernet)	-	UInt32
1316	0x0524	2	Reserved	-	-

Table A-17 Device information and configuration [...]

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1318	0x526	1	Status of the partial energy meter Convert the hexadecimal values to the binary format: 0x0003 = 0000000000000011 Every bit corresponds to the status of the partial energy meter. 0 = inactive 1 = active 0000000000000011 1 +kWhΣ PAR 2 -kWhΣ PAR 3 +kVAhΣ-L PAR 4 -kVAhΣ-L PAR 5 +kVAhΣ-C PAR 6 -kVAhΣ-C PAR 7 +kvarhΣ-L PAR 8 -kvarhΣ-L PAR 9 +kvarhΣ-C PAR 10 -kvarhΣ-C PAR 11 kVAhΣ PAR 12 +kvarhΣ PAR 13 -kvarhΣ PAR The last three digits of the string are reserved. In the example, only the following partial energy meters are active: +kWhΣ PAR -kWhΣ PAR	-	UInt16
1319	0x527	13	Reserved	-	-

Table A-17 Device information and configuration [...]

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1340	0x053C	1	Mean-value generation of interval duration and interval type MSB: Mean-value generation via broadcast command b15 = 60 mins b14 = 30 mins b13 = 15 mins b12 = 10 mins b11 = 5 mins b10 = 1 mins b9 = 30 s b8 = 10 s LSB: internal synchronization b7 = 60 mins b6 = 30 mins b5 = 15 mins b4 = 10 mins b3 = 5 mins b2 = 1 min b1 = 30 s b0 = 10 s	-	-

A 17 Write

Table A-18 Write

Type	Functions	Format
Display/write	03/06/16	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1318	0x0526	1	Partial energy meter (start, stop, reset) Selection of the partial energy meter MSB: 00 = +kWhSYS-PAR 01 = -kWhSYS-PAR 02 = +kVAhLSYS-PAR 03 = -kVAhLSYS-PAR 04 = +kVAhCSYS-PAR 05 = -kVAhCSYS-PAR 06 = +kvarhLSYS-PAR 07 = -kvarhLSYS-PAR 08 = +kvarhCSYS-PAR 09 = -kvarhCSYS-PAR 0A = kVAhΣ PAR 0B = +kvarhΣ PAR 0C = -kvarhΣ PAR 0D = ALL LSB: 01 = Start 02 = Stop 03 = Reset e.g. 0x0D01, to start all partial energy meters	-	-

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1340	0x053C	1	Mean-value generation of interval duration and interval type MSB: Mean-value generation via broadcast command b15 = 60 mins b14 = 30 mins b13 = 15 mins b12 = 10 mins b11 = 5 mins b10 = 1 mins b9 = 30 s b8 = 10 s LSB: internal synchronization b7 = 60 mins b6 = 30 mins b5 = 15 mins b4 = 10 mins b3 = 5 mins b2 = 1 min b1 = 30 s b0 = 10 s	-	-
1341	0x053D	1	Only for mean-value generation via broadcast command (see 0x053C) Interval duration is synchronized by writing this register with 1. If the broadcast command is not maintained, the interval is closed after a certain amount of time.	-	-
57355	0xE00B	1	See 0x053C	-	-
57344	0xE000	1	Network type	-	-
57345	0xE001	1	Secondary rated current	-	-
57346	0xE002	1	Primary rated current	-	-
57347	0xE003	1	Reserved	-	-
57348	0xE004	1	Reserved	-	-
57349	0xE005	1	Reserved	-	-
57350	0xE006	1	Reserved	-	-
57351	0xE007	1	Reserved	-	-

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
57352	0xE008	1	Reserved	-	-
57616	0xE110	1	IP = CL. A.B.C.D Ethernet IP address CL. A (0-255)	-	-
57617	0xE111	1	Ethernet IP address CL. B (0-255)	-	-
57618	0xE112	1	Ethernet IP address CL. C (0-255)	-	-
57619	0xE113	1	Ethernet IP address CL. D (0-255)	-	-
57620	0xE114	1	Ethernet Gateway address CL. A (0-255)	-	-
57621	0xE115	1	Ethernet Gateway address CL. B (0-255)	-	-
57622	0xE116	1	Ethernet Gateway address CL. C (0-255)	-	-
57623	0xE117	1	Ethernet Gateway address CL. D (0-255)	-	-
57624	0xE118	1	Ethernet Subnet mask CL. A (0-255)	-	-
57625	0xE119	1	Ethernet Subnet mask CL. B(0-255)	-	-
57626	0xE11A	1	Ethernet Subnet mask CL. C (0-255)	-	-

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
57627	0xE11B	1	Ethernet Subnet mask CL. D (0-255)	-	UInt16
57628	0xE11C	1	DHCPv4 Active: 0x0100 Inactive: 0x000	-	UInt16
57629	0xE11D	1	Reserved	-	-
57630	0xE11E	1	Reserved	-	-
57631	0xE11F	2	Modbus/RTU baud rate 0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps 5: 57600 bps 6: n/a 7: n/a 8: 300 bps 9: 1200 bps	-	UInt32
57633	0xE121	1	Modbus/RTU parity 0: none 1: even 2: odd	-	UInt16
57634	0xE122	1	Modbus/RTU stop bit 0: 1 bit 1: 2 bits	-	UInt16
57635	0xE123	1	Reserved	-	-
57636	0xE124	1	Modbus/RTU slave address (with Modbus/TCP fixed on 0xFF)	-	UInt16
57856	0xE200	1	Save and restart the configuration: 0xA1(161): Intermediate storage in EEPROM 0xB2(178): Load configuration from EEPROM	-	-

A 18 Write: Modbus configuration

Table A-19 Write: Modbus configuration

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
57636	0xE124	Display/write	1	03/06/16	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
57636	0xE124	1	Slave address Modbus/TCP: 0xFF = 255	-	UInt8

A 19 Write: Configuration RS-485

Table A-20 Write: Configuration RS-485

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
57631	0xE11F	Display/write	3	03/06/16	Integer

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
57631	0xE11F	2	Baud rate 0: 2400 bps 1: 4800 bps 2: 9600 bps 3: 19200 bps 4: 38400 bps 5: 57600 bps 6: n/a 7: n/a 8: 300 bps 9: 1200 bps	-	UInt32
57633	0xE121	1	Parity 0: none 1: even 2: odd	-	UInt16
57634	0xE122	1	Stop bit 0: 1 bit 1: 2 bits	-	UInt16

A 20 Write: Save configuration and restart device

Table A-21 Write: Save configuration and restart device

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
57856	0xE200	Write	1	06/16	-

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
57856	0xE200	1	Save and restart the configuration: 0xA1(161): Intermediate storage in EEPROM 0xB2(178): Load configuration from EEPROM	-	UInt16

A 21 Write: Resetting partial energy meters

Table A-22 Write: Resetting partial energy meters

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
1318	0x0526	Write	1	06/16	-

Decimal address	Hexadecimal address	Number of registers	Description	Unit	Data type
1318	0x0526	1	Partial energy meter (start, stop, reset) Selection of the partial energy meter MSB: 00 = +kWhSYS-PAR 01 = -kWhSYS-PAR 02 = +kVAhLSYS-PAR 03 = -kVAhLSYS-PAR 04 = +kVAhCSYS-PAR 05 = -kVAhCSYS-PAR 06 = +kvarhLSYS-PAR 07 = -kvarhLSYS-PAR 08 = +kvarhCSYS-PAR 09 = -kvarhCSYS-PAR 0A = kVAh? PAR 0B = +kvarh? PAR 0C = -kvarh? PAR 0D = ALL LSB: 01 = Start 02 = Stop 03 = Reset e.g. 0x0D01, to start all partial energy meters	-	UInt16

A 22 Alarm signals (coils)

Table A-23 Alarm signals (coils)

Decimal start address	Hexadecimal start address	Type	Size	Functions	Format
0	0x0000	Read	40 Bits	01	Binary

Decimal address	Hexadecimal address	Short designation	Designation	Description
0	0	OVsys	Overvoltage system	OVL-N: 240 V +20 %
1	1	OV1	Overvoltage L1	OVL-N: 240 V +20 %
2	2	OV2	Overvoltage L2	OVL-N: 240 V +20 %
3	3	OV3	Overvoltage L3	OVL-N: 240 V +20 %
4	4	UVsys	Undervoltage system	UVL-N: 230 V -20 %
5	5	UV1	Undervoltage L1	UVL-N: 230 V -20 %
6	6	UV2	Undervoltage L2	UVL-N: 230 V -20 %
7	7	UV3	Undervoltage L3	UVL-N: 230 V -20 %
8	8	OV12	Overvoltage L12	OVL-L: 415 V +20 %
9	9	OV23	Overvoltage L23	OVL-L: 415 V +20 %
10	A	OV31	Overvoltage L31	OVL-L: 415 V +20 %
11	B	UV12	Undervoltage U12	UVL-L: 400 V -20 %
12	C	UV23	Undervoltage U23	UVL-L: 400 V -20 %
13	D	UV31	Undervoltage U31	UVL-L: 400 V -20 %
14	E	Res	Reserved	-
15	F	Red	Reserved	-
16	10	UI3	Undercurrent I3	Current range < 0.001 A[1]
17	11	UIN	Undercurrent IN	Current range < 0.001 A[1]
18	12	Res	Reserved	-
19	13	Res	Reserved	-
20	14	Res	Reserved	-
21	15	Res	Reserved	-
22	16	Res	Reserved	-
23	17	Res	Reserved	-
24	18	OIsys	Overcurrent Isys	Current range > 1 A[1]
25	19	OI1	Overcurrent I1	Current range > 1 A[1]
26	1A	OI2	Overcurrent I2	Current range > 1 A[1]
27	1B	OI3	Overcurrent I3	Current range > 1 A[1]
28	1C	OIN	Overcurrent IN	Current range > 1 A[1]

Decimal address	Hexadecimal address	Short designation	Designation	Description
29	1D	UIsys	Undercurrent Isys	Current range < 0.001 A^2
30	1E	UI1	Undercurrent I1	Current range < 0.001 A^2
31	1F	UI2	Undercurrent I2	Current range < 0.001 A^2
32	20	FOU	Leave frequency range	Frequency range: 45 ... 65 Hz
33	21	Res	Reserved	-
34	22	Res	Reserved	-
35	23	Res	Reserved	-
36	24	Res	Reserved	-
37	25	Res	Reserved	-
38	26	Res	Reserved	-
39	27	Res	Reserved	-

[1] Secondary current

[2] Start current

Voltage Conductor to N	Voltage Conductor to conductor	Current	Frequency
UV_{L-N}: 230 V -20 % OV_{L-N}: 240 V +20 %	UV_{L-L}: 400 V -20 % OV_{L-L}: 415 V +20 %	Current range dependent on configuration: Start current (Ist) - secondary current 1 A/5 A/80 A	45 ... 65 Hz

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Appendix A

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