xStorage Home Power Meters Manual

For 4.2 kWh, 6 kWh and 10 kWh systems capacity



This document is intended for Eaton certified installers





Content overview

1	Introduction	3
2	Good to know	3
3	SFERE DDS1946-DS: Technical specifications, installation and wiring	4
4	SFERE DTS1946-DS: Technical specifications, installation and wiring	8
5	Eastron SDM120CT: Technical specifications, installation and wiring	12
6	Eastron SDM630MV-CT: Technical specifications, installation and wiring	14

1. Introduction

Thank you for installing the xStorage Home system

By default, the xStorage Home system does not have a power meter installed, as explained in the xStorage Home installation manual. The Eaton certified installer should therefore provide the end user with a power meter that will enable the full user interface monitoring and functional capability of the system. Please refer to the xStorage Home installation manual to understand the power meters setup within the full system configuration.

This power meters manual provides Eaton certified installers with important instructions on how to install the power meters that are compatible with xStorage Home.

This manual is complementary to the xStorage Home installation manual and the xStorage Home user interface onboarding process manual.

Before you start

This manual contains important instructions that must be followed during the installation, operation and maintenance of the xStorage Home system. All instructions must be read before installing and operating the equipment. This manual should be retained for future reference. Please note that the xStorage Home system must only be installed by Eaton certified personnel, i.e. an Eaton technical support representative or an Eaton certified installer. There are no user serviceable parts inside the xStorage Home system. Failure to observe the above will void the warranty provided and Eaton cannot be held legally accountable.

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Technical disclaimer

In line with our goal to continuously improve the products and the customer service we provide, all specifications contained in this document are subject to change with due notice. All drawings, descriptions or illustrations contained in this document serve to provide a clear overview and/or technical explanation of the present product and its various components and accessories.

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2. Good to know

To download the latest technical documentation, such as the installation manual, the user interface onboarding process manual, the safety documentation and other relevant updates, visit our website **www.eaton.com/xstorage**. Please note that in order to improve our customer experience we are constantly updating and enhancing the relevant technical and marketing materials.

3. SFERE DDS1946-DS: Technical specifications, installation and wiring

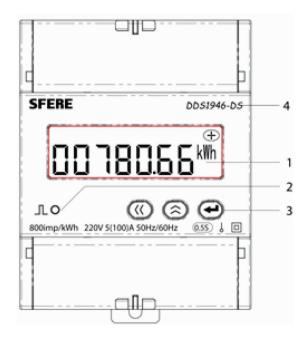
The single-phase SFERE DDS1946-DS meter belongs to the SFERE DDS1946 power meter series shown in Figure 1.

Figure 1: SFERE DDS1946-DS product overview



It enables real-time measurement of voltage, current and power. These monitored values are shown on the LCD panel at the front (Figure 2).

Figure 2: SFERE DDS1946-DS display overview

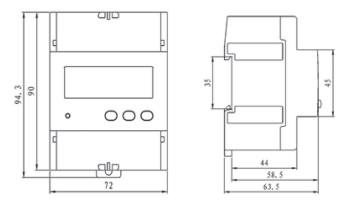


The referenced numbers in Figure 2 identify:

- 1. the LCD display interface;
- 2. the energy pulse indication light;
- 3. the menu navigation keys;
- 4. the model number.

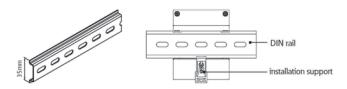
The front and side view [mm] dimensions of the meter are as shown below:

Figure 3: SFERE DDS1946-DS product dimensions



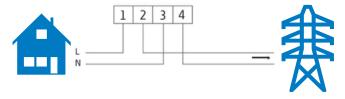
The DIN rail mount construction enables the power meter to be installed in a compact electrical distribution box (Figure 4).

Figure 4: DIN rail mounting style overview



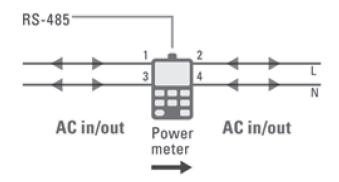
During the installation of the power meter, no additional protective devices are required. The meter connection terminals must be directly connected to the L (line) and N (neutral) wires (Figure 5).

Figure 5: Terminal wiring illustration 1



These connections are illustrated in diagrams in the xStorage Home installation manual as follows:

Figure 6: Terminal wiring illustration 2



Beside the L and N connections, the power meter must be connected to the xStorage Home system via the RS-485 communication cable (Figure 7), to enable real-time input of the monitored data into the xStorage Home system. This is possible through the RS-485 port. Data sent through this port is utilized by the xStorage Home User Interface (UI) to record the event history and to display the current energy consumption of both the critical and non-critical loads, as well as to track the PV-generated energy (as applicable).

The general wiring of the power meter is illustrated in Figure 7:

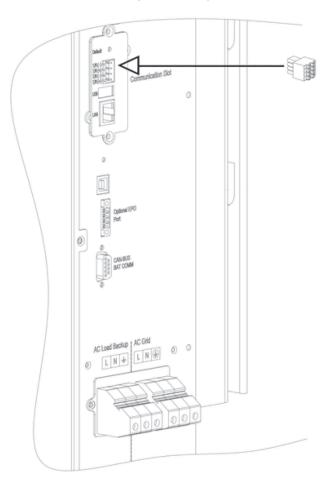
- References 58 and 59 identify the RS-485 connection terminals:
- References 47 and 48 identify the pulse terminals (not used for this product);
- · References 1 and 2 identify the line connection terminals;
- References 3 and 4 identify the neutral connection terminals.

Figure 7: SFERE power meter wiring terminals



The hybrid inverter RS-485 port terminals are located in the communication slot that is highlighted by the arrow pointer in Figure 8. Please note that up to two devices (in this case, two power meters) can be connected through the hybrid inverter's RS-485 port.

Figure 8: Connection of the RS845 terminal block connector to the RS-485 port of the hybrid inverter



The wiring of the RS-485 port terminals of the hybrid inverter and the power meters terminals is illustrated in Figure 9:

- Connect the RS-485 terminals of the power meter to the RS-485 terminal block using a 1 mm² cable, which is included in the accessory box kit mentioned in the xStorage Home installation manual:
- The connection to the RS-485 connection port of the hybrid inverter should be realized via the RS-485 terminal block.

Figure 9: Wiring the hybrid inverter and the power meters via the RS-485 port

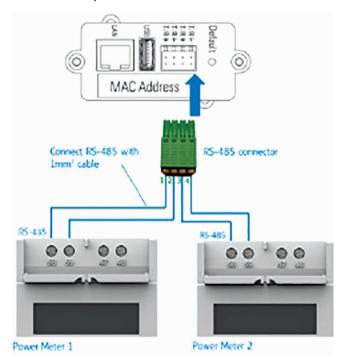
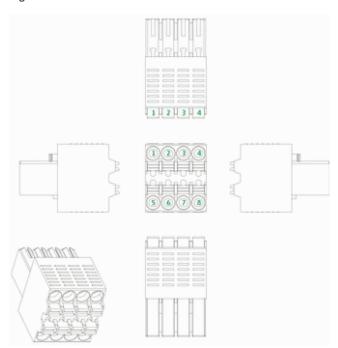


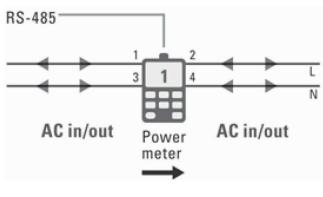
Figure 10: RS-485 connector terminals

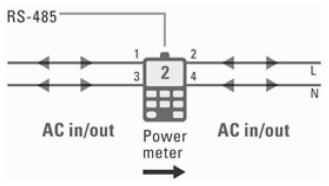


The design of the RS-486 connector terminals is illustrated in Figure 10.

Once the electrical installation has been carried out, the power meter must be properly configured in order to ensure the activation of the correct measuring mode and the correct communications flow to the xStorage Home system, i.e. to its hybrid inverter unit. The following illustrations explain the communication configuration for the power meters, i.e. for power meter 1 and power meter 2, whose purpose is explained in the xStorage Home installation manual.

Figure 11: Power meter icons in the xStorage Home installation diagrams



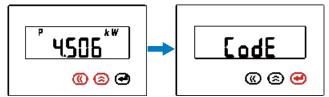


For the hybrid inverter to establish communications with the power meters through its RS-485 port, the address of the RS-485 port inside the power meter must be changed from its default setting of "0075" to:

- **0001** for power meter 1;
- **0002** for power meter 2.

The process for setting the communications parameters is the same for both power meters, with the exception of their assigned addresses. Enter the programming mode as described:

 Power up the meter and irrespective of the measurement message displayed (see display example) keep pressing the navigation keys @ and @ for more than three seconds until the word "Code" appears on the LCD display.



2. Press which will change display into "0000".



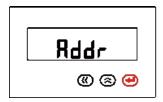
3. To continue press or to enter the default password, which is set as "0001".



4. Enter the first level of the system interface menu, which is denoted as "SYS", by pressing (a) whereupon the following message will be displayed.



Press again to enter the second-level menu i.e. the communications address interface.

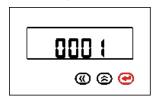


 Again press to enter the third-level menu. This will display the default slave address i.e. 0075.



7. Use keys or to change the current slave address to

a. 0001 for power meter 1 or

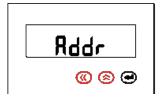


b. 0002 for power meter 2.



8. Press

a. $\ensuremath{ \bigodot \hspace{-0.07em} \bullet}$ to save modified data and return to second-level menu or



b.
and
at the same time to cancel the data modification and return to the second-level menu.



9. Press @ and @ to return to the first-level menu i.e. the communications setting interface.



10. Press © and ⊗ to exit the programming setting interface, and in the following, choose whether or not to save the modified address data. By default, "No" will be shown.

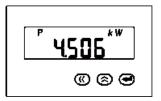


11. Press

- a. Press to exit the programming setting interface without saving the modified data;
- b. Press @ or @ to switch to the "YES" display message.



 Press to save the modified data and return to the measurement display interface.



Return to the measurement display interface after finishing the modification. To finalize the installation of the power meter, the power meter must also be set-up in the user interface. Please follow the instructions provided in the complementary xStorage Home user interface onboarding process manual.

4. SFERE DTS1946-DS: Technical specifications, installation and wiring

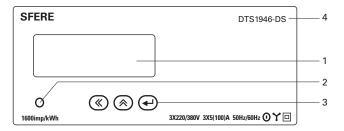
The three phase SFERE DTS1946-DS meter belongs to the SFERE DTS1946 power meter series shown in Figure 12.

Figure 12: SFERE DTS1946-DS product overview



It enables real-time measurement of voltage, current and power. These monitored values are shown on the LCD panel at the front (Figure 13).

Figure 13: SFERE DTS1946-DS display overview

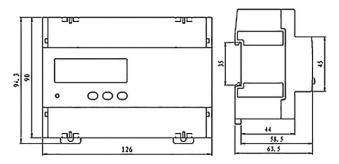


The referenced numbers in Figure 13 identify:

- 1. the LCD display interface;
- 2. the energy pulse indication light;
- 3. the menu navigation keys;
- 4. the model number.

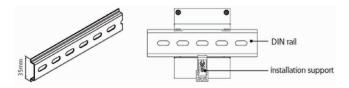
The front and side view [mm] dimensions of the meter are as shown below:

Figure 14: SFERE DDS1946-DS product dimensions



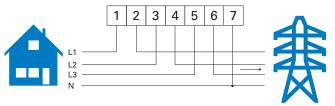
The DIN rail mount construction enables the power meter to be installed in a compact electrical distribution box (Figure 15).

Figure 15: DIN rail mounting style overview



During the installation of the power meter, no additional protective devices are required. The meter connection terminals must be directly connected to the L1, L2, L3 (lines) and N (neutral) wires (Figure 16). L1, L2, L3 and N (left side in the diagram) is the side connected to the xStorage Home inverter AC output. The arrow (right side in the diagram) is the side connected to the grid side.

Figure 16: Terminal wiring illustration 1

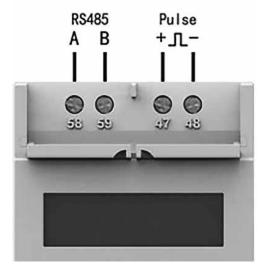


Beside the L1, L2, L3 and N (optional) connections, the power meter must be connected to the xStorage Home system via the RS-485 communication cable (Figure 17), to enable real-time input of the monitored data into the xStorage Home system. This is possible through the RS-485 port. Data sent through this port is utilized by the xStorage Home UI to record the event history and to display the current energy consumption of both the critical and non-critical loads, as well as to track the PV-generated energy (as applicable).

The general wiring of the power meter is illustrated in Figure 17:

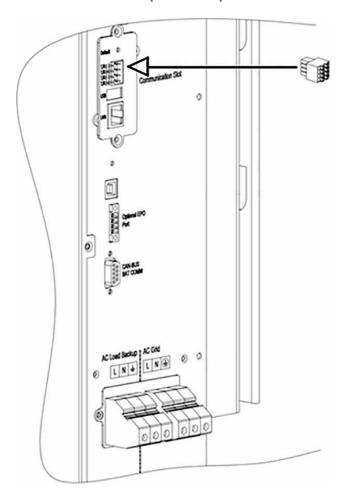
- References 58 and 59 identify the RS-485 connection terminals:
- References 47 and 48 identify the pulse terminals (not used for this product).

Figure 17: SFERE power meter wiring terminals



The hybrid inverter RS-485 port terminals are located in the communication slot that is highlighted by the arrow pointer in Figure 18. Please note that up to two devices (in this case, two power meters) can be connected through the hybrid inverter's RS-485 port.

Figure 18: Connection of the RS845 terminal block connector to the RS-485 port of the hybrid inverter



The wiring of the RS-485 port terminals of the hybrid inverter and the power meters terminals is illustrated in Figure 19:

- Connect the RS-485 terminals of the power meter to the RS-485 terminal block using a 1 mm² cable, which is included in the accessory box kit provided with the xStorage Home system and described in the xStorage Home installation manual;
- The connection to the RS-485 connection port of the hybrid inverter should be realized via the RS-485 terminal block.

Figure 19: Wiring the hybrid inverter and the power meters via the RS-485 port

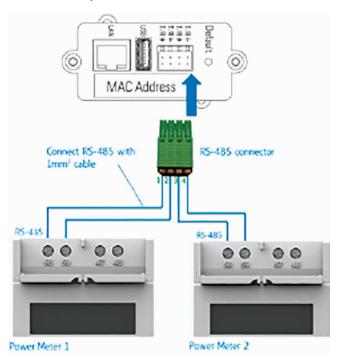
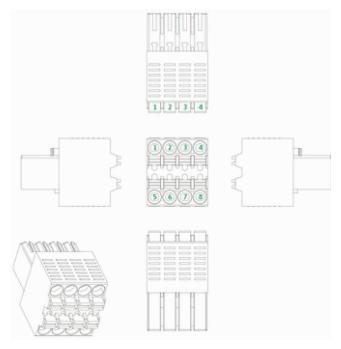


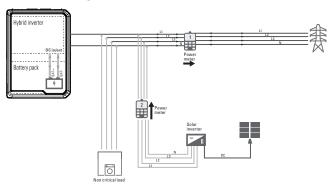
Figure 20: RS-485 connector terminals



The design of the RS-486 connector terminals is illustrated in Figure 20.

Once the electrical installation has been carried out, the power meter must be properly configured in order to ensure the activation of the correct measuring mode and the correct communications flow to the xStorage Home system, i.e. to its hybrid inverter unit. The following illustrations explain the communication configuration for the power meters, i.e. for power meter 1 and power meter 2, whose purpose is explained in the xStorage Home installation manual. Please be sure that power meter 2 is installed on the same phase of the xStorage Home and the existing PV inverter.

Figure 21: Power meter icons in the xStorage Home installation diagrams

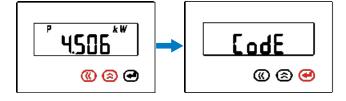


For the hybrid inverter to establish communications with the power meters through its RS-485 port, the address of the RS-485 port inside the power meter must be changed from its default setting of "0075" to:

- **0001** for power meter 1;
- **0002** for power meter 2.

The process for setting the communications parameters is the same for both power meters, with the exception of their assigned addresses. Enter the programming mode as described:

 Power up the meter and irrespective of the measurement message displayed (see display example) keep pressing the navigation keys
 and
 for more than three seconds until the word "Code" appears on the LCD display.



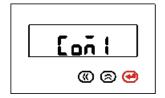
2. Press which will change display into "0000".



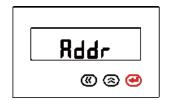
3. To continue press or to enter the default password, which is set as "0001".



4. Enter the first level of the system interface menu, which is denoted as "SYS", by pressing whereupon the following message will be displayed.



5. Press again (a) to enter the second-level menu i.e. the communications address interface.



6. Again press to enter the third-level menu. This will display the default slave address i.e. 0075.



7. Use keys s or s to change the current slave address to



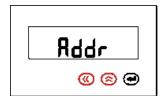


b. 0002 for EM2.



8. Press

a. $\ensuremath{\textcircled{\bullet}}$ to save modified data and return to second-level menu or



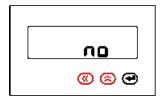
b.
 and
 at the same time to cancel the data modification and return to the second-level menu.



9. Press © and ® to return to the first-level menu i.e. the communications setting interface.



10. Press
and
to exit the programming setting interface, and in the following, choose whether or not to save the modified address data. By default, "No" will be shown.



11. Press

- a. Press to exit the programming setting interface without saving the modified data;
- b. Press @ or @ to switch to the "YES" display message.



 Press to save the modified data and return to the measurement display interface.



Return to the measurement display interface after finishing the modification. To finalize the installation of the power meter, the power meter must also be set-up in the user interface. Please follow the instructions provided in the complementary xStorage Home user interface onboarding process manual.

5. Eastron SDM120CT: Technical specifications, installation and wiring

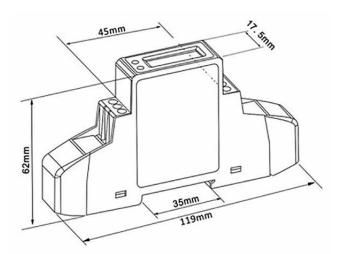
The Eastron SDM120CT belongs to the 120 power meter series. The power meter works in combination with the current transformer (CT) as it is shown in the picture below. The current transformer is Eastron that belongs to the ESCT-TU16 series.

Figure 22: Eastron SDM120CT and current transformer (CT) product overview



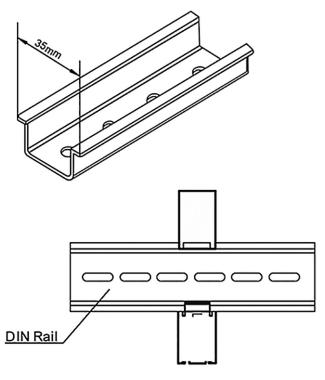
The dimensions [mm] of the meter are as shown below:

Figure 23: Eastron SDM120CT



The DIN rail mount construction enables the power meter to be installed in a compact electrical distribution box (Figure 24).

Figure 24: DIN Rail mount for Eastron meter



During the installation of the power meter, no additional protective devices are required. The meter connection terminals must be directly connected to the L (line) and N (neutral) wires. The split core CT is installed on the L phase in the same direction as the current (see Figure 25). After the CT is wired to the S1 and S2 terminals of the power meter, it is supplied directly by L (phase) and N (neutral) that are respectively wired to the terminal 3 and 4 of the power meter itself as it is displayed in the Figure 25.

Figure 25: How to wire the current transformer and the power meter to the L and N $\,$

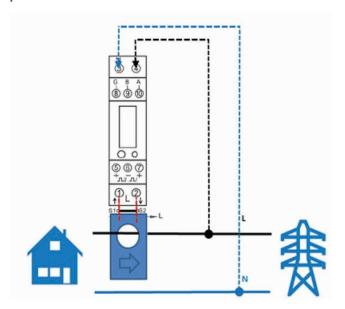
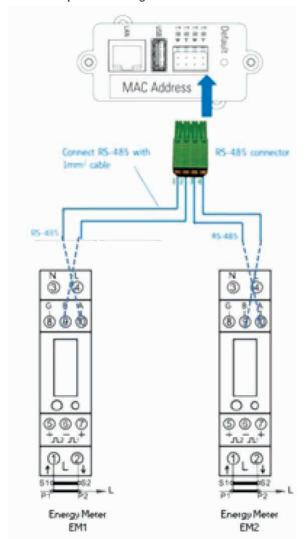
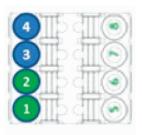


Figure 26 shows how to wire the power meter to the RS-485 port of the communication card located on the lateral surface of the hybrid inverter. This enables the Modbus functionality. There are two power meters: power meter 1 (EM1) measures the AC power injected from the grid to power up the non-critical loads and power meter 2 (EM2) measures the AC power generated from the existing PV system. The energy meter is connected to the terminal RS485 of the xStorage Home system with a 1 mm² cable.

- EM2: Please wire the terminal (10) of the EM2 to the terminal (3) of the RS-485 port. Please wire the terminal (9) of the EM2 to the terminal (4) of the RS-485 port.
- EM1: Please wire the terminal (10) of the EM1 to the terminal (1) of the RS-485 port. Please wire the terminal (9) of the EM1 to the terminal (2) of the RS-485 port. EM1 should be wired after the configuration is finalized.

Figure 26: How to wire the Eastron meters EM1 and EM2 to the RS-485 port of xStorage Home



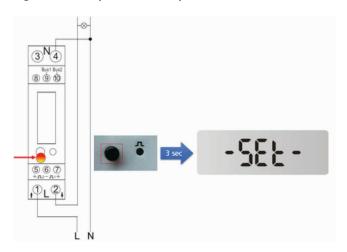


	Energy Meter Terminals		xStorage Home Terminals RS485	
EM1	10	+	①	
	9	-	Ø	
EM2	10	+	3	
LIVIZ	9	-	④	

To finalize the set-up of the power meter it is important that the appropriate meter is selected from the user interface. The procedure starts with EM2 and then needs to be repeated for EM1. Please refer to the xStorage Home user interface onboarding process manual to setup the meter in the user interface.

Please hold the button for three seconds, the meter will get into set-up mode as it is displayed in the picture below.

Figure 27: Set-up mode of the power meter



Once the meter is on SET mode as described, please be sure that from the user interface the right power meter is selected. The addressing between the power meter and xStorage Home is automatically made and the auto configuration is finished. Please refer to the user interface onboarding process manual to setup the meter in the user interface.

It is possible to verify that the process is successfully finalized also from the energy power meter display.

For the second power meter EM1 repeat all the steps previously made for the power meter EM2. Please note that it is only possible to setup EM1 after finalizing the installation of EM2. This means that the Eastron power meters are in SET status one at a time. If both meters are in SET mode during the installation, then addressing issues will occur. Follow the onboarding process of the user interface to finalize the installation of the power meters.

6. Eastron SDM630MV-CT: Technical specifications, installation and wiring

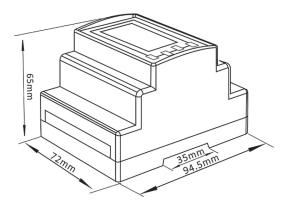
The Eastron SDM630MV-CT belongs to the 630 series. The meter works in combination with the current transformer (CT) as it is shown in the picture below. The current transformer is Eastron that belongs to the ESCT-TU16 series.

Figure 28: Eastron SDM630MV-CT and current transformer (CT) product overview



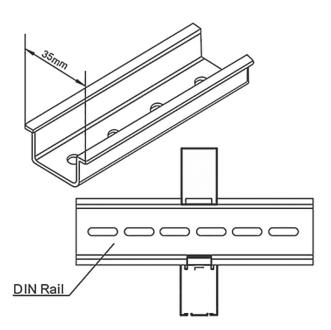
The dimensions [mm] of the meter are as shown below:

Figure 29: Eastron SDM630MV-CT



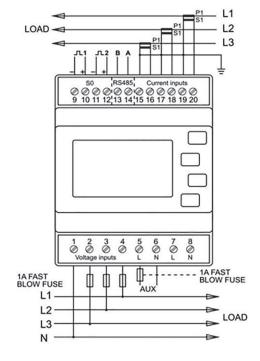
The DIN rail mount construction enables the power meter to be installed in a compact electrical distribution box (Figure 30).

Figure 30: DIN Rail mount for Eastron meter



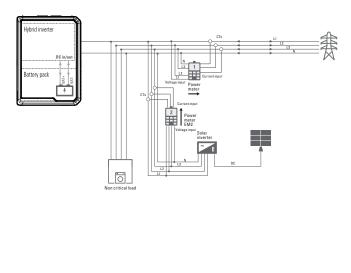
The unit can be configured to operate with the current transformer (CT) with a 0.33V output. The secondary CT is fixed to 0.33V, and the primary is optional. During the installation of the power meter, no additional protective devices are required. The meter connection terminals must be directly connected to the L1, L2, L3 (lines) and N (neutral) wires. The split core CT is installed on the L1, L2, L3 phases in the same direction as the current. An auxiliary power source that supplies the power meter must be added as it is described in the figure 31.

Figure 31: Three phase and four wires connection with the auxiliary power source



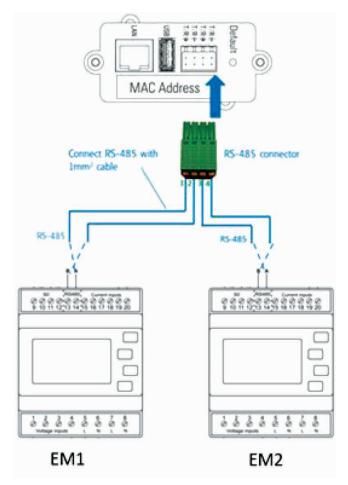
The figure 32 shows how to wire the Eastron meter as power meter 1 (EM1) and power meter 2 (EM2) in case of a general installation. Please be sure that power meter 2 is installed on the same phase of the xStorage Home system and the existing PV inverter.

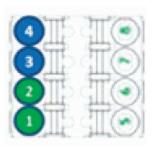
Figure 32: How to wire the Eastron meter for a general installation



The power meter is connected to the terminal RS485 of the xStorage Home system with a 1 mm² cable as it is shown in the picture below.

Figure 33: How to wire the Easton meters EM1 and EM2 to the RS-485 port of xStorage Home





Energy I Termi		xStorage Home Terminals RS485	
FA41	14	+ A	œ
EM1	13	- B	Ø
EM2	14	+ A	3
EIVIZ	13	- B	(4)

To set up the meters it is important that the appropriate meter is selected from the user interface. Both meters EM1 and EM2 should be selected in the user interface. Please refer to the xStorage Home user interface onboarding process manual to setup the meter in the user interface.

It is important to configure the address of EM1 to "001" and the address of EM2 to "002". To enter the set-up mode, please hold the "Enter" button for three seconds until the password screen appears. The set-up is password-protected so you must enter the correct password (default '1000') before processing.



From the set-up menu, use the "M" and "P" buttons to select "Address ID".



Press the "Enter" button to enter the selection routine. The current setting will be flashing.



Use the "M" and "P" buttons to choose the Modbus Address. The address of the power meter 1 must be 1. To exit the set-up mode, press the "Left" button repeatedly until the measurement screen is restored.



For the second power meter EM2 repeat all the steps, previously made for power meter EM1. Please note that it is only possible to setup EM2 after finalizing the installation of EM1.

This means that Eastron meter are in set-up status one at a time. Moreover, the Modbus address of the power meter 2 must be 2.



Once the addresses of both meters are set as described, finalize the installation of the meters following the onboarding process of the user interface. Please refer to the xStorage Home user interface onboarding process manual to setup the meters in the user interface. The procedure should be done for both EM1 and EM2.



