

EnergyHub XL System

Installation and user manual







Warnings

- EnergyHub XL must not be opened by unauthorized personnel. Contact Ferroamp for instructions.
- The electrical installation must be carried out by a qualified installer and in accordance with applicable electrical standards and safety regulations.
- Read through the manual before installation.
- The warranty does not apply if the product has been modified.
- Note that EnergyHub compensate for current unbalance and thus using the electrical system's zero conductor. High current unbalance causes high currents in the neutral conductor. Therefore, use cable dimensions according to instructions in the document regarding Current Equalization.
- The DC cables must not be connected when EnergyHub XL is powered on

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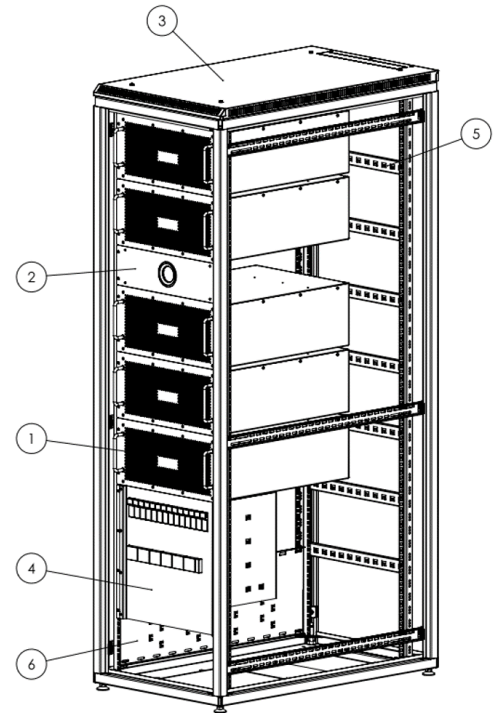
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1. Articles

<p>EnergyHub XL 28 kW</p>	 A black, rectangular power unit with a perforated front panel. It features a central circular display with a green needle and the number '13'. The brand name 'ferroamp' is printed below the display. There are two handles on the sides and a small green LED indicator on the right side.
<p>3 Current transformers with 10m connecting cable. Specify size before order.</p>	 A blue, L-shaped current transformer with a metal core and a small metal probe extending from the end.
<p>Contact for current transformers.</p>	 A small, green, rectangular component with multiple pins on one side, likely a contact for current transformers.
<p>Connector for connection to DC grid.</p>	 A grey, rectangular connector with three gold-colored pins on the left side and two gold-colored pins on the right side. The text 'EMERSON UCONTACT' is visible on the side.
<p>Three phase contact for AC grid connection</p>	 A grey, rectangular connector with three gold-colored pins on the left side and two gold-colored pins on the right side. The text 'EMERSON UCONTACT' is visible on the side.
<p>3G modem for internet connection (optional)</p>	 A small, black, rectangular 3G modem with a gold-colored connector on one end.

1 Placement of cabinet

- Measures of Cabinet 42 U: Width: 600mm, depth: 1000mm and height: 2100mm.
- Measures of Cabinet 24 U: Width: 600mm, depth: 1000mm and height: 1300mm.
- Leave 5 cm at the back of the cabinet to ensure free airflow.
- EnergyHub XL is pushed from the front into the cabinet and it is therefore recommended to have at least 1 meter of free space up front to facilitate installation.
- Make sure to have access to at least one of the sides or the back of the cabinet during installation to facilitate contacting
- The side walls of the cabinet are removable.
- Temperature: -25 - 55
- Relative humidity: 0-95%
- The room where the inverter is placed should be well ventilated. The heat development can be up to 2% of the maximum effect. A fully fitted cabinet with 5x28 kW can generate 2.8 kW of heat at 2% loss.



2 Installation of current transformers

To be able to utilize power equalization and the analysis tools that are available, current transformers need to be installed and connected to the Energyhub. These measurements form the basis for several of the functions in the system. There are three different types of current transformers available. The choice of transformer depends on the current in the cables and its diameter.

< 100A, ratio 2000

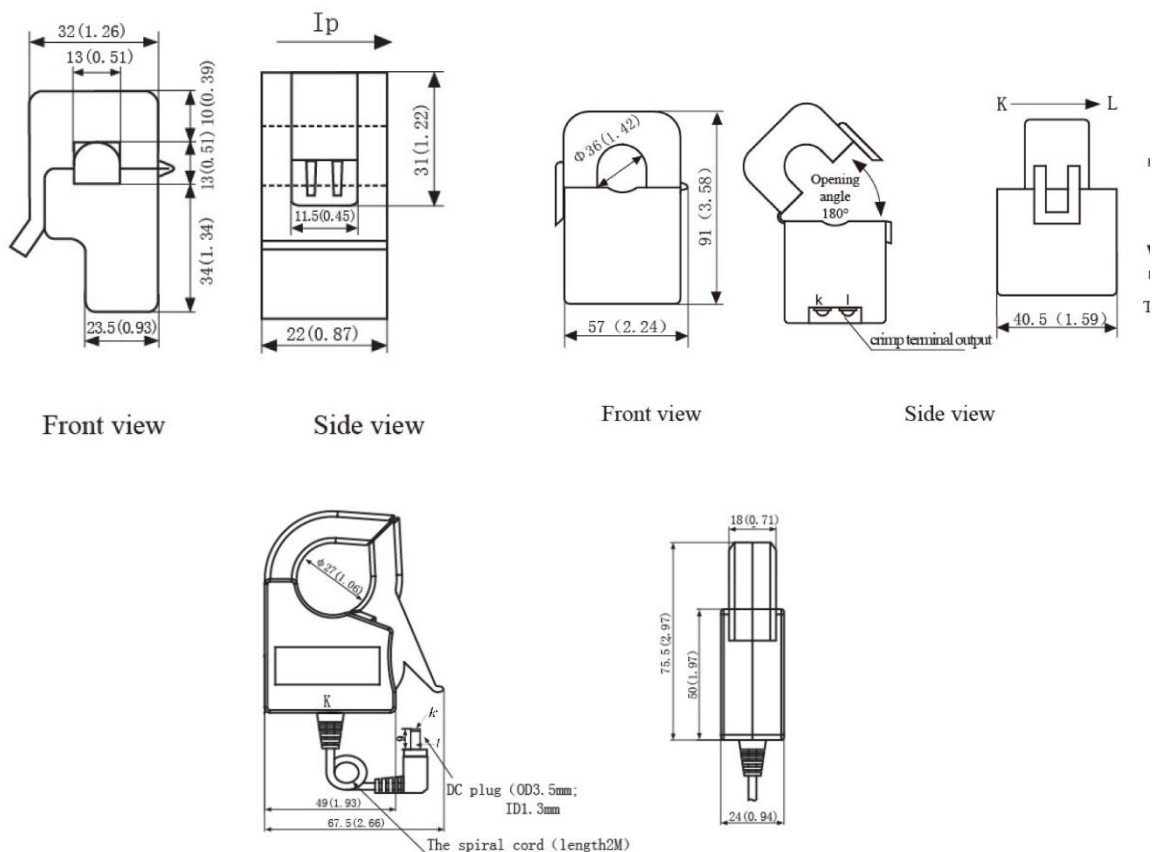
The smallest current transformers can manage up to 100 A per phase conductor and a maximum diameter of 13mm. The conversion rate is 2000.

< 160A, ratio 4000

The second largest current transformers can manage up to 160 A per phase conductor and a maximum diameter of 27mm. The conversion rate is 4000.

< 600A, ratio 6000

The largest current transformers can manage up to 600 A per phase conductor and a maximum diameter of 36mm. The conversion rate is 6000.



Installation of current transformers

- Install the current transformers on all three phase conductors. Current transformers should be installed between incoming power and EnergyHub. See diagram under section 5.
- Make sure that all current transformers have been closed properly. If they are open, calibration will fail.
- EnergyHub contains an automatic calibration function which ensures the function of each transformer regarding phase order and current direction. The calibration ensures correct functionality for current equalization and measurements.
- Adjust the cable length and connect them to the connector as shown in the picture below. Note the order of the phase conductor.

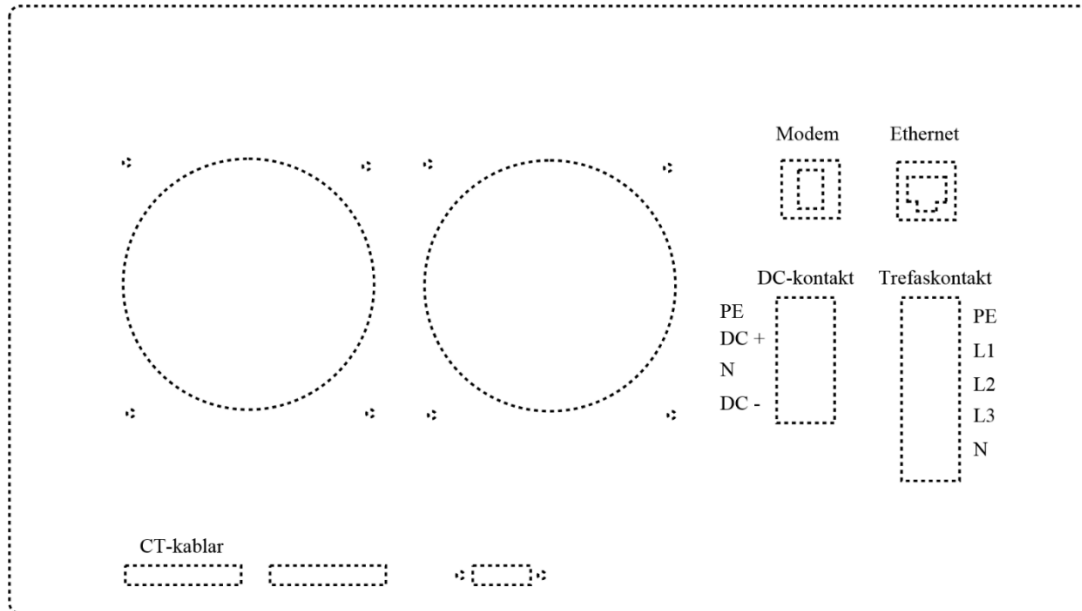
Control of current transformers:

- **Notes:** It is important that the current transformers are completely sealed around the cable. If they are not closed properly, the measurements may be incorrect.
- To ensure correct connection, check the resistance between the pairs: white-red, blue-black and green-yellow. All pairs should have approximately the same resistance. If any of the pairs deviate or do not have contact, there may be a failure with the connection. Make sure that the connector and all current transformers are closed.

Connection of EnergyHub XL.

Every inverter is installed from the front of the cabinet and is attached to the sides with M6 screws.

Connect the cables in the cabinet to the EnergyHub XL as follows:



- Five-pole AC-contact.



- Four-pole DC-contact.

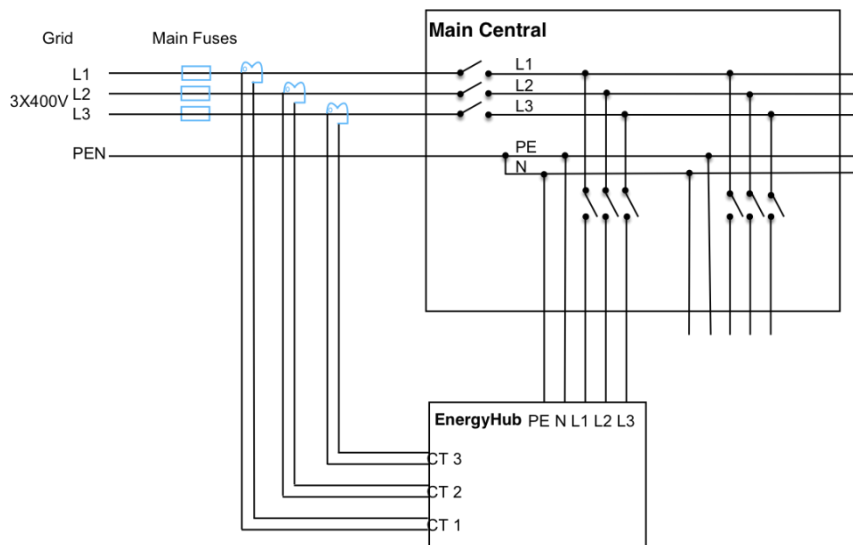


- Green CT-contact.

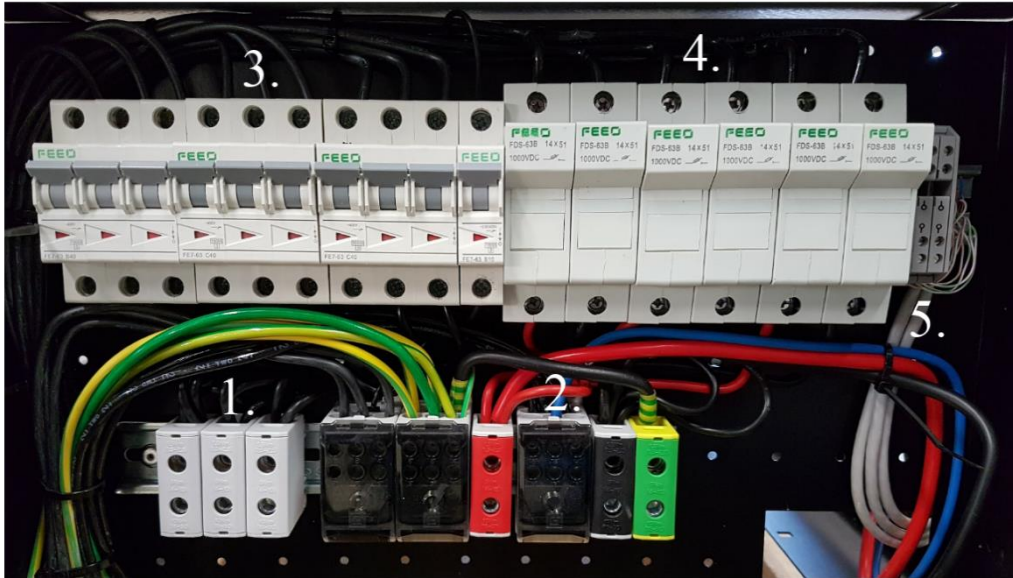


3 Connection cabinet

- Connect the three-phase cable to the marked terminals in the cabinet.
- There are built-in circuit breakers in the cabinet to every EnergyHub XL.
- The current in the neutral conductor to the EnergyHub can get up to 1.7 times larger than the rated current at full current equalization.
- It is recommended to install a circuit breaker for the whole cabinet.



The picture below shows the different connectors in the distribution designed for three EnergyHub XL. The number may vary depending on how many inverters are connected to the cabinet.



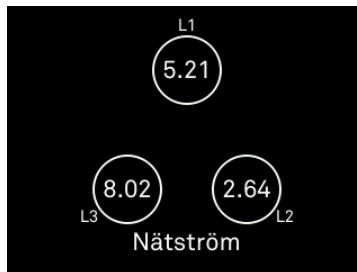
- 1 Terminals for AC connection
- 2 Terminals for DC connection
- 3 Breaker and fuses for AC
- 4 Fuses for DC to each EnergyHub XI
- 5 Terminals for current transformers

4 Internet Connection

The System needs access to internet in order to present measurements and data to the portal as well as software updates.

5 Commissioning

- Start the EnergyHub by closing the breaker
- Wait for one minute for the display starts.



- Press and hold on the display until it says Service menu activated
- Sweep right and left to switch between different views.
- Sweep until you find the Table view, seen below, and verify that the system is inactive.
If not sweep to the Start and Stop menu and press Stop.

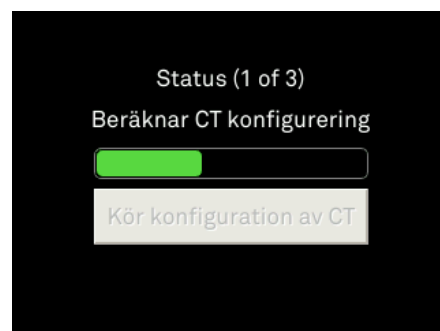
	L1	L2	L3
Spänning	230 V	230 V	231 V
ACE ström	2.1 A	2.1 A	2.1 A
Nätström	5.1 A	2.8 A	7.9 A
Fasvinkel	-12	34	-19
Effekt	3142 W		
Status	Active PV & ACE 10 A		
IP:	192.168.1.79		

- Go the CT-ration view and insert the correct CT-ratio



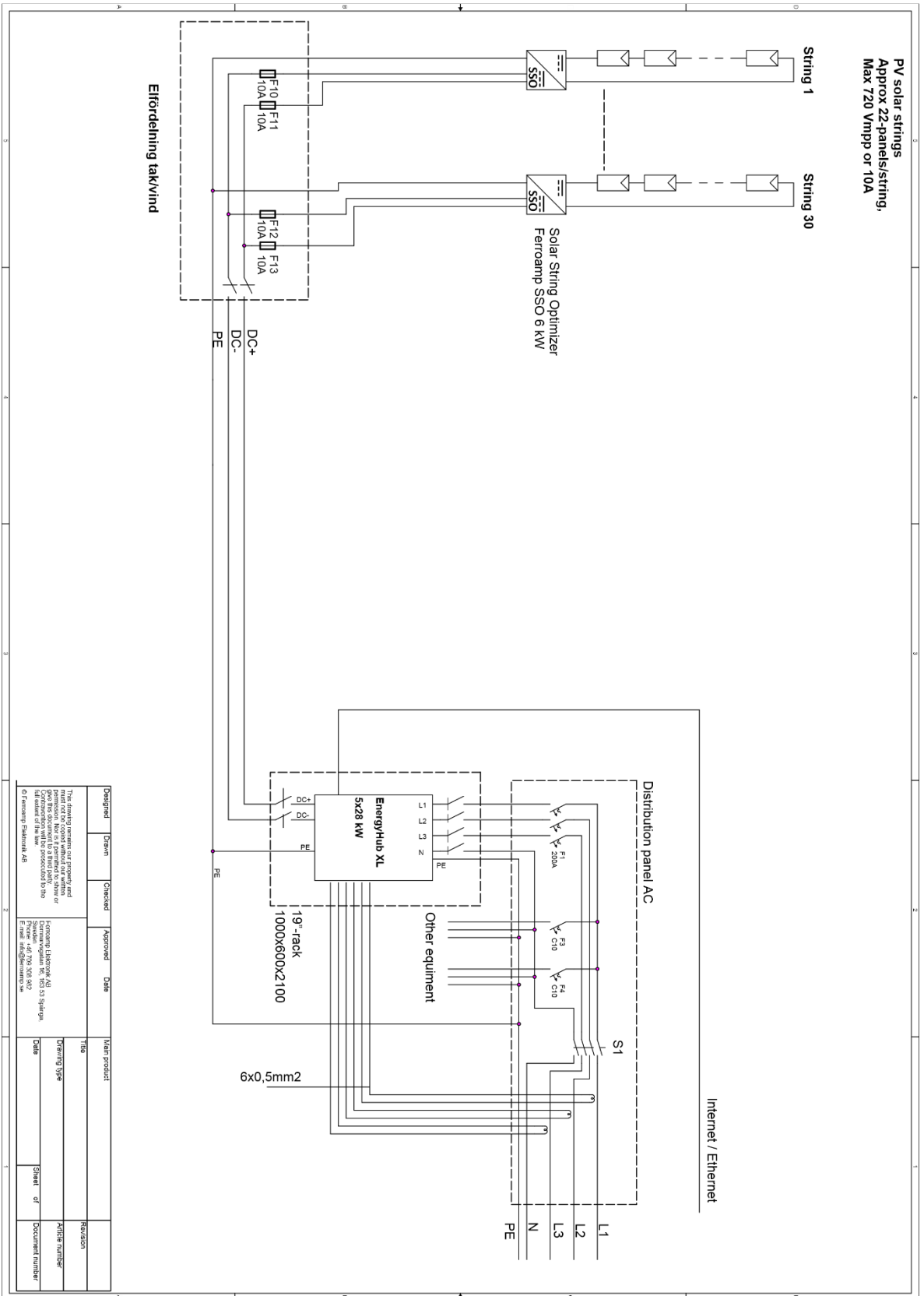
- To change the CT ratio push on the number.

- To start the calibration, sweep to the view “Run CT calibration” and push



- The configuration might take up to 5 minutes, during this time a progress bar is displayed
- If the configuration fails, check that the current transformers are correctly installed.
- Om displayen visar "Konfigureringen misslyckades" är strömtängerna in rätt inkopplade.
- Note; in order to have a fully functional system the CT configuration must pass.

6 Single line diagram

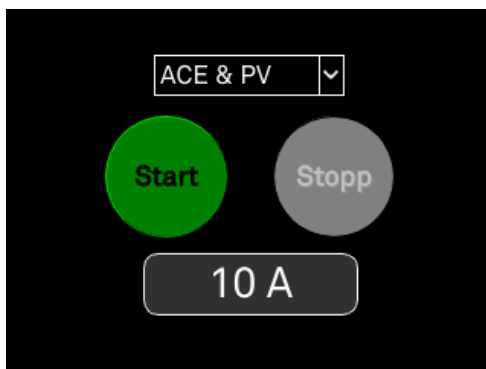


Designed	Drawn	Checked	Approved	Date	Main product	Revision
<p>The drawing remains our property and shall not be reproduced or used in any form without our prior written consent. We accept no liability for any loss or damage arising from the use of this drawing. All rights reserved. © Ferroamp Elektronik AB</p>				<p>Ferroamp Elektronik AB Skövde, SE-220 805 Skövde E-mail: info@ferroamp.se</p>		<p>Article number</p> <p>Document number</p>

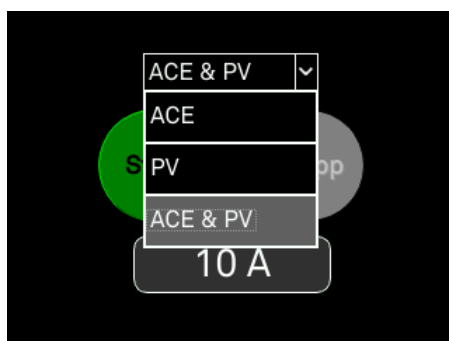
User manual

1. Activate ACE and solar production

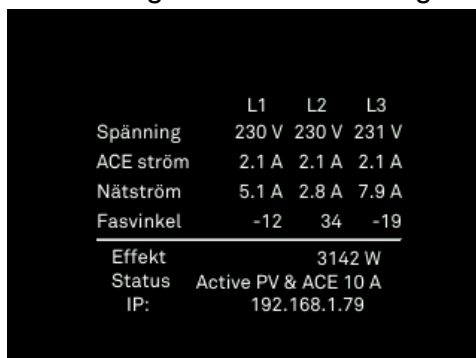
- Press and hold the display until “Service menu enabled” is shown.



- Choose ACE & PV from the drop-down menu.



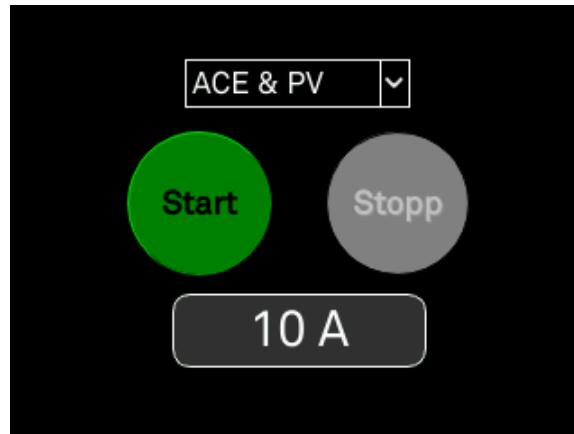
- Press the number at the bottom in order to change the threshold for the current equalization.
- Press start
- Verify that the system is running the correct settings in the table view



	L1	L2	L3
Spänning	230 V	230 V	231 V
ACE ström	2.1 A	2.1 A	2.1 A
Nätström	5.1 A	2.8 A	7.9 A
Fasvinkel	-12	34	-19
Effekt			3142 W
Status	Active PV & ACE 10 A		
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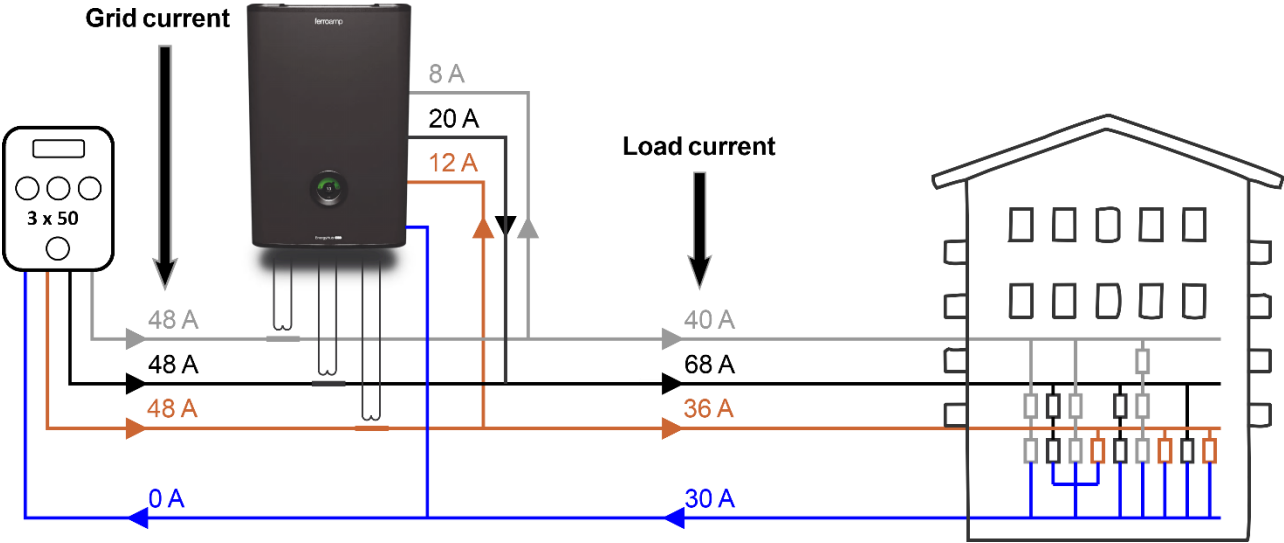
2. Change ACE limit

- Press and hold the display until “Service menu activated” is shown.
- Press Stop.

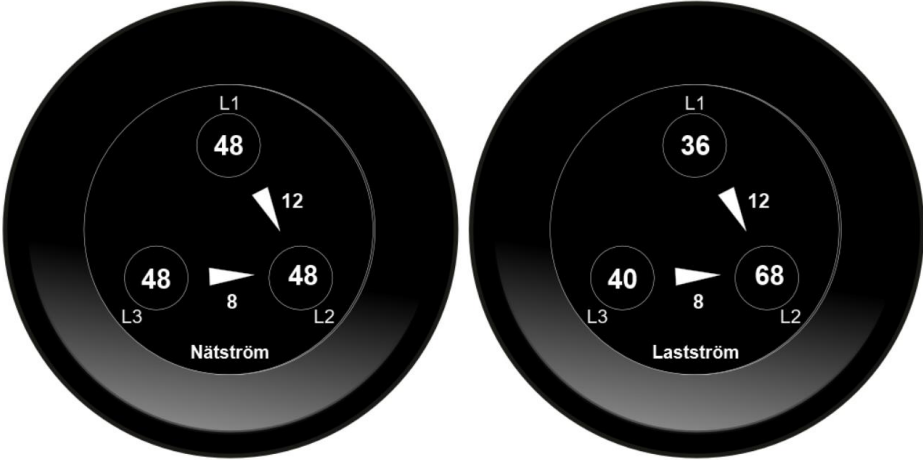


- Press the number at the bottom in order to change the threshold for the current equalization.
- Press Start.
- Verify the status in the table view
- Press and hold the display to go back to operational mode.

3. Grid current and Load current



- Grid current shows the current over the main fuse
- Load current shows the current inside the facility
- When ACE is activated, the transferred currents is shown by the arrows between the phases.



4. Activate ACE only

- Press and hold until “Service menu enabled” is shown.
- Swipe to the “Start and Stop” display.
- Choose “ACE only” in the drop-down menu



- Choose the current limit that triggers the ACE function
- Press Start
- Verify the status at the table view
- Press and hold the display to go back to operational mode.

5. Activate Solar production

- Press and hold until “Service menu enabled” is shown.
- Swipe to the “start and stop” display.
- Choose “PV only” in the drop-down menu



- Press Start
- Verify the status at the table view
- Press and hold the display to go back to operational mode.