lunar energy

Rogowski Coils (CTs) for the Lunar System



Application Note

lunarenergy.com

lunar energy

Table of Contents

Summary **2**

Installation Requirements **2**

Compatible Coils 2

Coils Installation at Main Panel 2

Coil Installation at Lunar Bridge 3

Coil Phase & Polarity **3**

Metering Verification Test 3

Adjusting Coil Phase & Polarity 6

Coil Indicator Arrow & Wire Termination 6

Installing Coils on Branch Circuit Wires 7

Revision History **8**

Summary

Rogowski Coils, referred to as Coils in this Application Note, are flexible, air-core sensors designed to measure alternating current (AC) by detecting the rate of change of current in a conductor. These current transformers (CTs) provide accurate, non-intrusive current measurements and transmit this telemetry to the Lunar System. The integration of Rogowski Coils within the Lunar System enables the following functionalities:

- **Partial Home Backup**: Monitoring energy usage of non-backup loads connected to an upstream panelboard.
- **Power Control System (PCS)**: The Lunar System, which includes the Lunar Battery (ESS), Lunar Bridge and optional Rogowski Coils (CTs), have been certified to both UL 1741 PCS CRD and UL 3141.

> ✓ **Note**: Rogowski Coils are an optional component of the Lunar Power Control System (PCS). For more details about PCS features, refer to the '*Power Control System (PCS) Features for the Lunar System*' Application Note and '*The Lunar Battery Installation Manual*'.

Installation Requirements

Compatible Coils

Only install Rogowski Coils sourced directly from Lunar Energy. The Lunar System uses the Magnelab RCT-120L Series Coils. Two Rogowski Coils along with the field applied labels are included in the Rogowski Coils kit (90-06789A). The datasheet for the Magnelab RCT-120L Coil is available here.

Coils Installation at Main Panel

The latch end of the Coils are typically installed on the service disconnect for a residential home.

Location: The Coil must be installed on the conductors in series between the Lunar Bridge and the grid.
Clasp: Ensure the Coil clasp is fully engaged by performing a gentle tug test to confirm it is secure.

Coil Installation at Lunar Bridge

Terminating the Coil leads to the labeled terminals Coil 1A/1B and Coil 2A/2B in the Bridge as shown in **Figure 1**.

If a drain wire is present, do not splice or connect it to any conductor or terminal.

When extending the length of the Coil free-end wires, splice the wires using 12-24 AWG shielded, twisted or untwisted wires. Note that the maximum length of spliced wire is 100 feet.

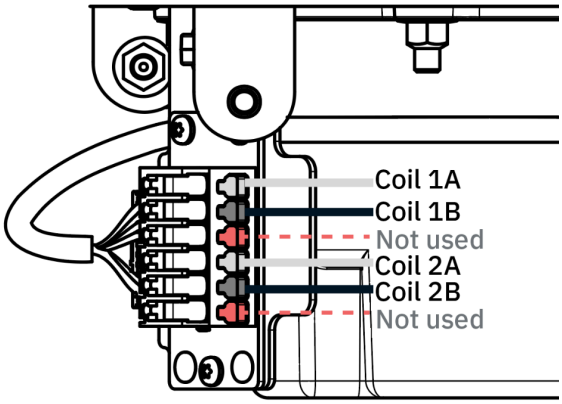


Figure 1: Bridge coil terminations.

Coil Phase & Polarity

To verify the correct phase (L1 versus L2) and polarity (positive current vs negative current) of the Coils, please follow the guidance in the Lunar Installer App.

Metering Verification Test

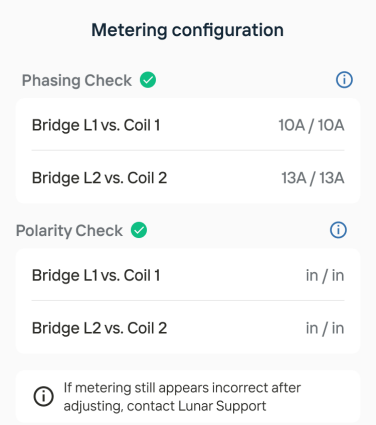
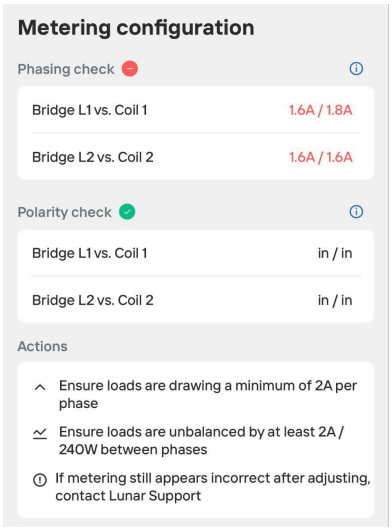
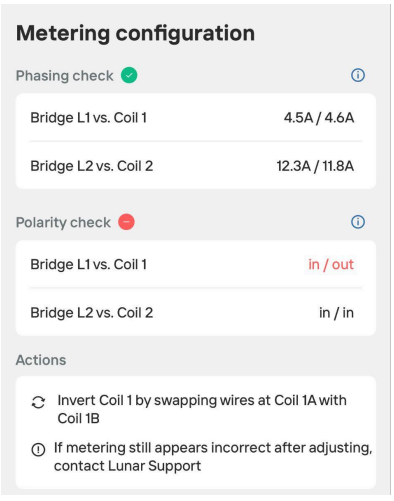
The Installer App uses the factory-installed Bridge Current Transformers (CTs) to compare the measured current from the Coils with that of the Bridge CTs, ensuring accurate Coil installation. This verification process requires the installer to adjust which loads are on or off in the home.

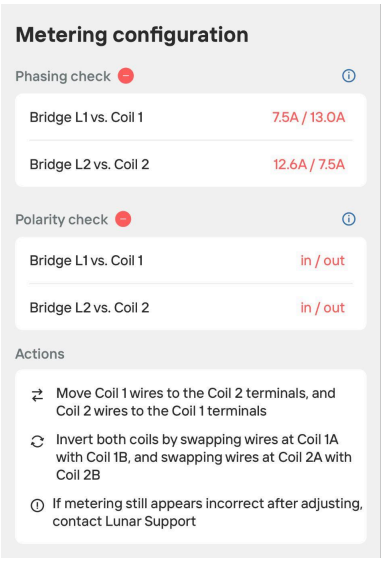
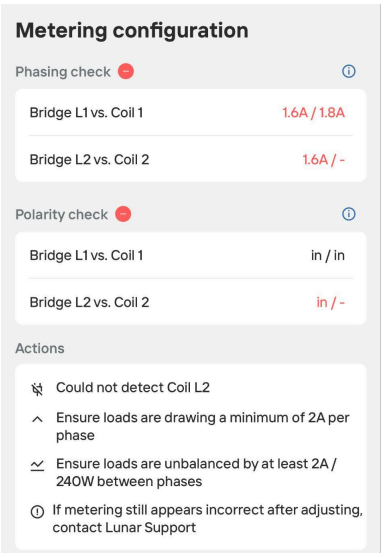
The Installer App will prompt the installer to:

1. Turn off all non-backup loads.
2. Turn on the backup loads fed from the Lunar Bridge, ensuring that the following conditions are met
    - Both AC L1 and AC L2 must have at least 2A of measured current.
    - There must be at least 2A of imbalanced current between AC L1 and AC L2 (i.e., one line must have at least 2A more measured current than the other).

The Installer App will display a green checkmark confirming the coil installation only when the required conditions are met. If the conditions are not met, the app will prompt users with the necessary actions to take, as outlined in the Table 1 below.

Table 1. Common Meter Configuration Issues and Resolutions

Meter Configuration		Installer App
1	The Installer App will display a green checkmark next to the Phasing Check and Polarity Check to confirm a correct coil installation. If the conditions are met, select 'Finish Test' to proceed.	
2	If there is less than 2A of measured current difference between the Bridge and Coils on either L1 or L2, the 'Phasing Check' will fail. **Installer Action**: • Ensure that the loads are drawing at least 2A per phase. • Ensure that the loads are unbalanced by at least 2A / 240W between phases.	
3	If 'Polarity check' is failing. **Installer Action**: • To change the coil polarity, swap the terminations of Coil 1A with Coil 1B or the terminations of Coil 2A with Coil 2B, depending on the specific error displayed. Ensure that only the relevant coil's connections are adjusted to correct the polarity issue.	

4	If there is more than 2A of measured current and the correct load imbalance, but the 'Phasing Check' and 'Polarity Check' are failing. **Installer Action**: • Change the Coil Phase by swapping the terminations of Coil 1A and Coil 1B with Coil 2A and Coil 2B. • Change the Coil Polarity by swapping the terminations of Coil 1A with Coil 1B, and similarly, swapping the terminations of Coil 2A with Coil 2B.	
5	If the 'Phasing Check' and 'Polarity Check' are failing and an ‘ - ‘ is shown on either Coil 1 or Coil 2. **Installer Action**: • Ensure that the loads are drawing at least 2A per phase. • Verify that the Coil clasp is securely engaged at the main breaker. Perform a gentle tug test to confirm the connection is firm and secure. • Verify all wire terminations, including at splice points and at the Bridge terminals. Ensure that no wires are connected to the terminals labeled "Not Used".	

Adjusting Coil Phase & Polarity

The easiest method to adjust Coil phase or polarity is to adjust the wiring terminations at the Bridge, rather than adjusting the clasp end of the Coil.

- **Coil Phase** is flipped by swapping the terminations of Coil 1A and Coil 1B with Coil 2A and Coil 2B.
- **Coil Polarity** is flipped by swapping the terminations of Coil 1A with Coil 1B, and similarly, swapping the terminations of Coil 2A with Coil 2B.

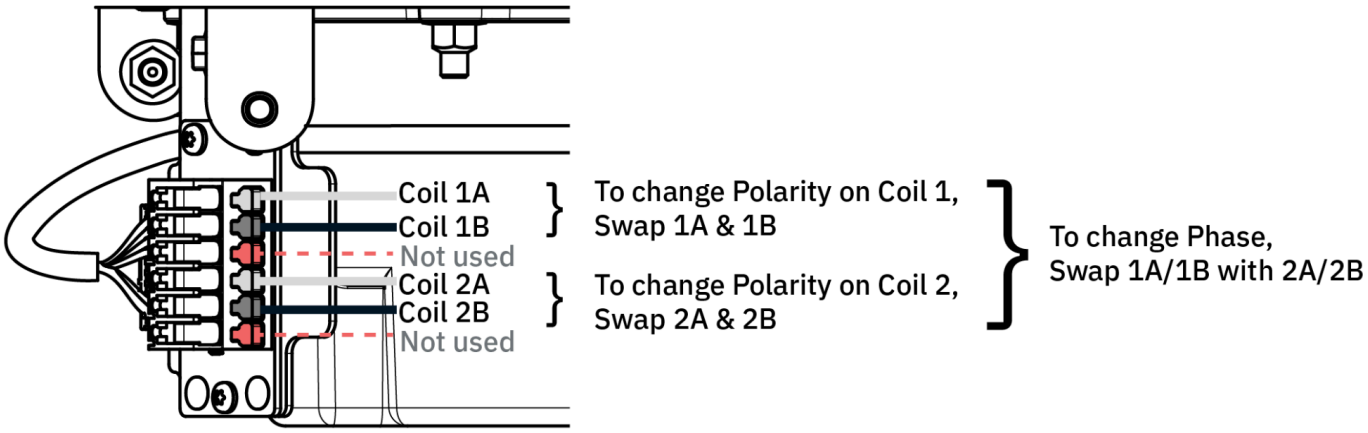


Figure 2: Changing the coil phase & coil polarity at the Bridge terminations.

Coil Indicator Arrow & Wire Termination

Each Coil has an arrow indicator intended to point toward the load. However, in the Lunar System, the Coil arrow may be pointed in either toward the Load or to the Grid, as long as the arrow indicator directions are consistent with the coil A/B wiring terminations, as shown in Table 2.

Coil Arrow Direction	Wiring Terminations
Arrow points toward the Load	Black on Coil A
	White on Coil B
Arrow points toward the Grid	White on Coil A
	Black on Coil B

Table 2. Coil arrow directions and their permissible wiring terminations.

Installing Coils on Branch Circuit Wires

When direct Coil installation on service conductors is not feasible due to physical limitations, such as a 4-wire main breaker, it is allowed to bundle branch circuit wires instead.

Please make sure to bundle all non-backup load feeders AND the Lunar Bridge feeders within the Coils, as shown in Figure 3.

1. All L1 conductors should be bundled together and be inserted through Coil 1.
2. All L2 conductors should be bundled together and be inserted through Coil 2.
3. All wires must be oriented so that the current flow direction to or from the grid is the same.

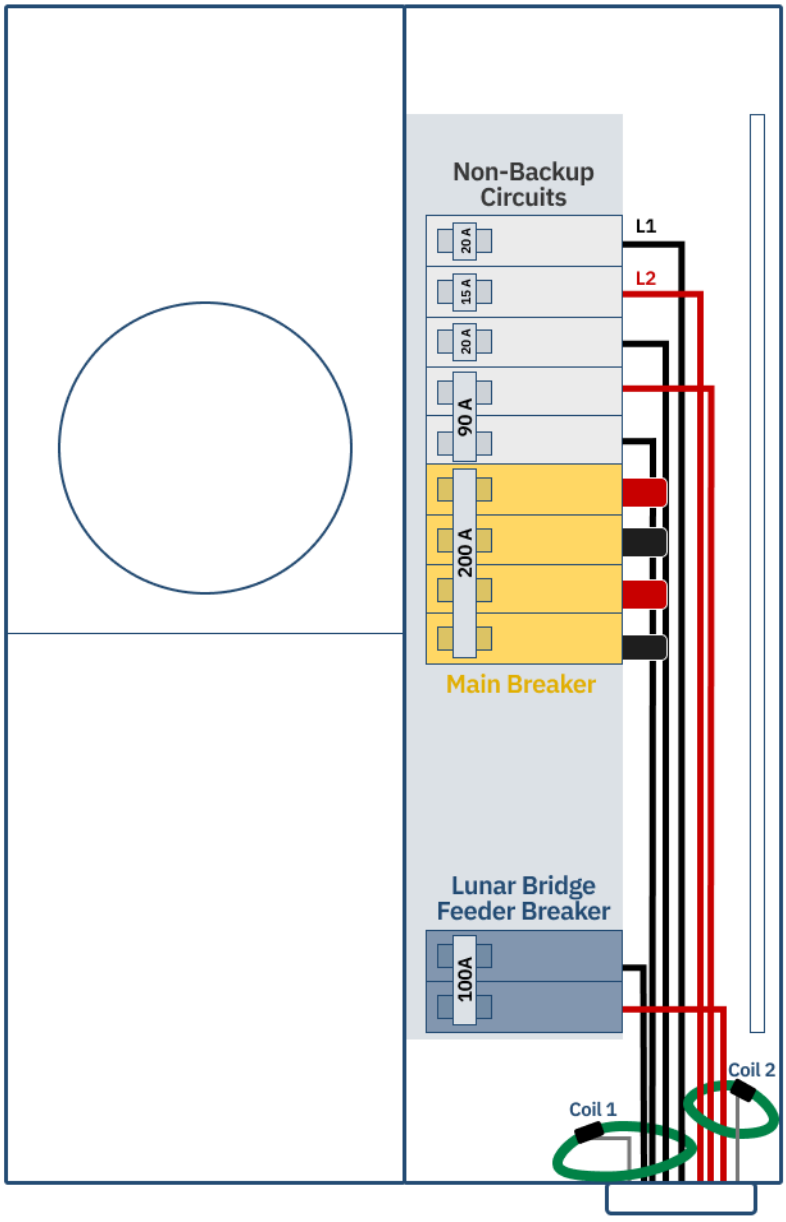


Figure 3. Load and Bridge feeder bundling example

Revision History

Revision	Description of Change	Effective Date
1	Initial Release	03/18/2025