POWERWALL 2 AC NEURIO METER: ADVANCED CONNECTION VIA LOCAL WI-FI NETWORK (DHCP RESERVATION)

With the 1.20 firmware version release, an advanced meter configuration option was added in the Commissioning Wizard. This method allows installers to connect an energy meter to the Gateway by connecting the remote Neurio meter to the customer's Wi-Fi network, and then ultimately to the Gateway via the customer's network. This connection method may be a useful way to solve remote meter connection issues as long as the customer's router, or a Wi-Fi extender, provides good Wi-Fi signal strength at the meter location.

Overview

The following are required to establish this connection:

- Neurio Serial Number (which begins with OBB)
- Neurio MAC address
- Customer's Wi-Fi SSID and password
- Admin access to the customer's router, included router user name and password
- Ability to make a DHCP reservation on the device being connected to and on the customer's router. In some cases it may be possible to directly connect to the customer's device, but in other situations the Neurio will be connected to a Wi-Fi extender.

The Neurio will be connected to the customer's network by logging into the Neurio web interface (https://192.168.4.1). A DHCP reservation must also be assigned to the Neurio by logging into the customer's network router; this is not the same as assigning a static IP, and in fact a static IP cannot be assigned to the Neurio. Rather an address is being reserved for the Neurio on the DHCP server of the Wi-Fi device that the Neurio connects to. In the Commissioning Wizard, the designation will be made that the Neurio is connecting to the Gateway using the customer's network by identifying the Neurio by its MAC address and the IP address reserved for it on the customer network.

WARNING: Connections may not be successful if using a meter that has been connected previously to the TEG, either over Modbus or Wi-Fi. It is best to use a meter that has never been paired with any system. See Step 5(a) for details.

Instructions

1. Open a web browser (Chrome/Safari are recommended) and enter the address https://192.168.4.1/ in the address bar, but do not navigate to the address until instructed to do so (Step 4).

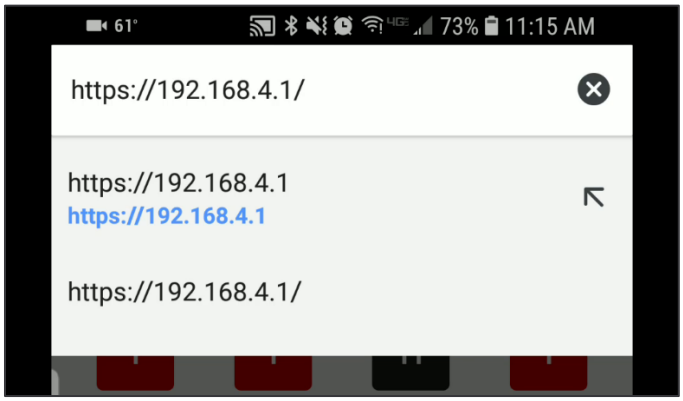

Figure 1: Neurio Homepage Address

2. Record the Neurio serial number including the OBB prefix and its MAC address into a text note on the commissioning device, then copy it so it is ready in the device clipboard.

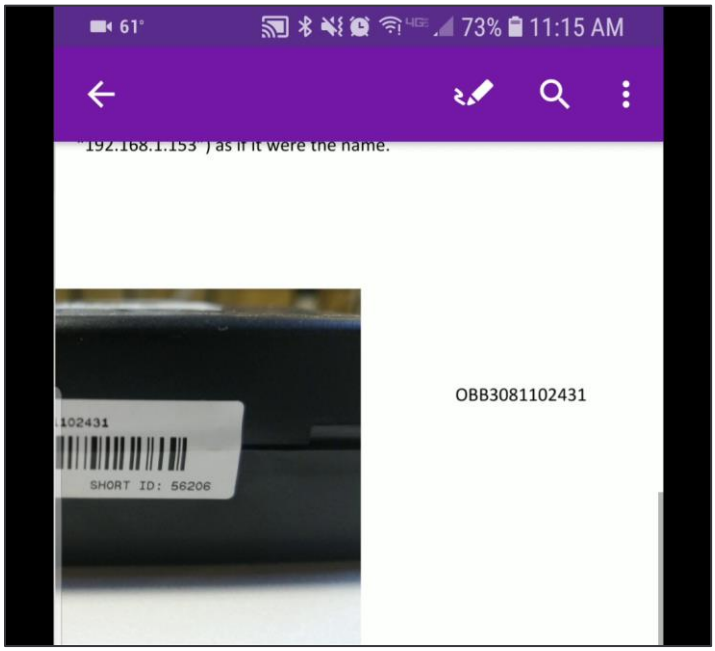

Figure 2: Neurio Serial Number

3. Restart the Neurio by opening and closing the circuit breaker it is powered from. If the Neurio is in the Backup Gateway, power-cycle the Gateway manually (not using the reset button). For more information on power-cycling the Gateway, visit Power-Cycling the Backup Gateway for Powerwall 2 AC. Wait for the Neurio to chime, indicating it has finished powering back up. At this point, there are approximately 60 seconds to connect the device's Wi-Fi adapter (phone, laptop, etc.) to the Neurio hotspot. The Neurio hotspot can be identified easily - it will begin with "Neurio-" and will be followed by the Neurio short ID. In the example below, the Neurio short ID is 56206 and the Neurio Wi-Fi network broadcasts as Neurio-56206.

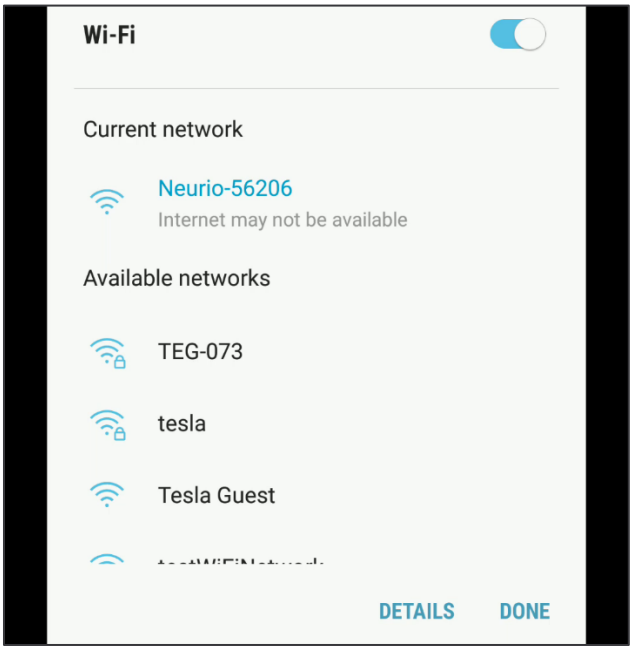

Figure 3: Connecting to the Neurio Hotspot

4. Load the Neurio homepage by navigating to the address https://192.168.4.1/ (prepared in Step 1). Enter the OBB serial as the password by pasting it from the clipboard, and select Enter or Sign In. The Neurio website may give a security certificate warning; tell the browser the site is safe and proceed to 192.168.4.1
    - Username - admin
    - Password - full serial number including OBB

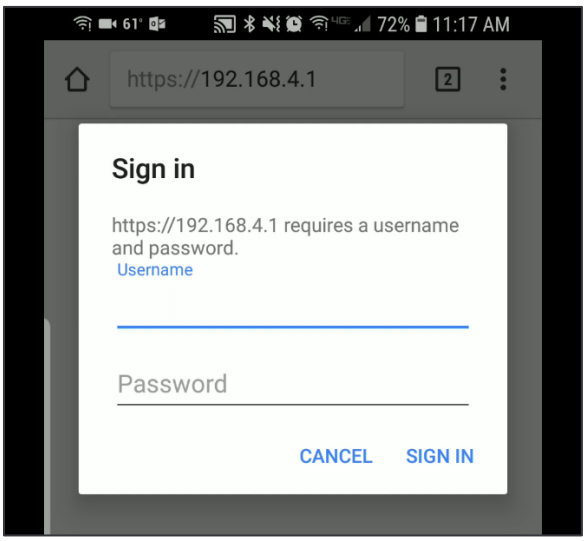

Figure 4: Neurio Homepage Login

5. Once logged into the Neurio web-based interface, there is a ten minute window to connect to the Wi-Fi network that connects back to the Energy Gateway. The Neurio interface will display a list of available networks. Select the correct network and enter the password. The Neurio will reboot itself and join that network. If the password entered is incorrect, the Neurio will begin broadcasting its own Wi-Fi network (hotspot) again, and there will be another chance to enter the password correctly.

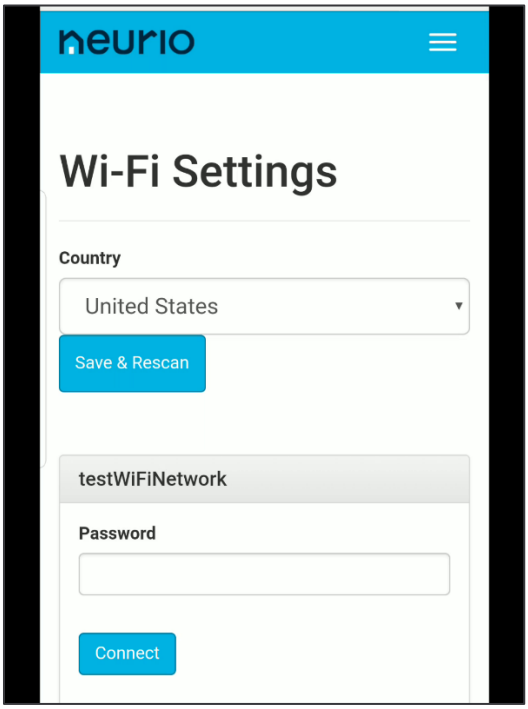

Figure 5: Neurio Hotspot Login

a. If the Neurio interface indicates that the meter has previously connected to a Gateway, it may not connect successfully. It is best to always start with a new meter. One indicator the meter has already been connected can be seen in the Meter Setup page; look for a TEG Wi-Fi name with a Launch button next to it. If this button is present, the Neurio may have already been configured for a Gateway and this process will likely not work with this meter. Start again with a new meter if that is the case.

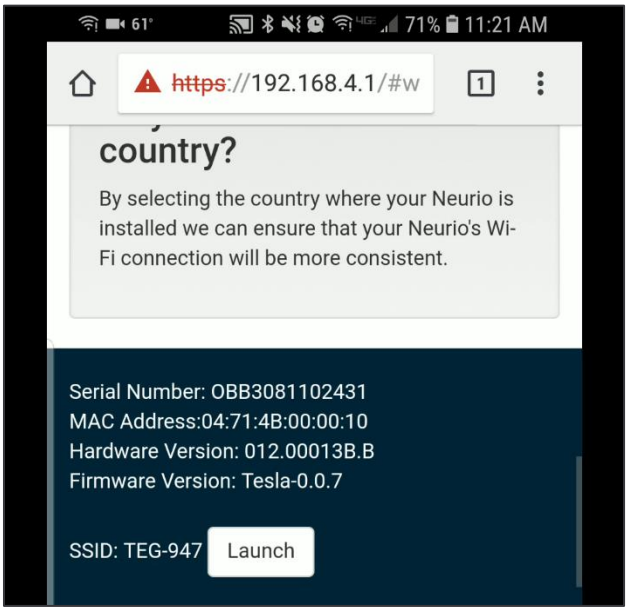

Figure 6: Neurio that has Previously Connected to Gateway

b. The Neurio interface will display the following message:
Connecting...
The message won't necessarily update. However, when the connection chime sounds (this chime is slightly different from the power up chime), the meter has connected.

6. Log into the router for the home network or the interface for the device that will be acting as the host for the Neurio connection. Often, the login URL and admin username and password will be printed on the back of the Wi-Fi router. Some customers may have changed the admin username and password from the default (router default passwords are often username:admin/password:admin), so ensure the login information for the Wi-Fi hosting device is available.

   Note: Google the make and model of the device you're attempting to login to. Find the User's Manual and the default login credential should be present in the Setup section. The manual can also be helpful to make the DHCP reservation.

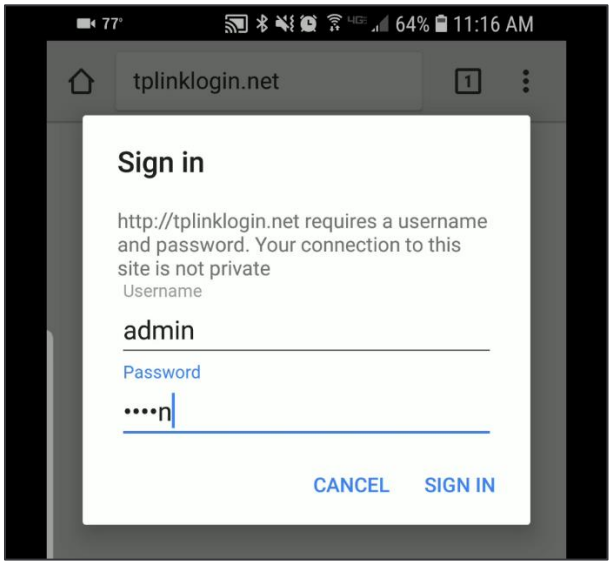

Figure 7: Home Network Login

7. Find the DHCP settings for the router and determine what range of addresses the device uses by default. Select a DHCP reservation for the Neurio that falls in the range of addresses that the router uses. In the example below, the router starts at 1921.68.0.100 and ends at 129.168.0.199, meaning that the selected address must begin with 192.168.XXX. and end with a number between 100 and 199. For this exercise, 150 has been chosen.

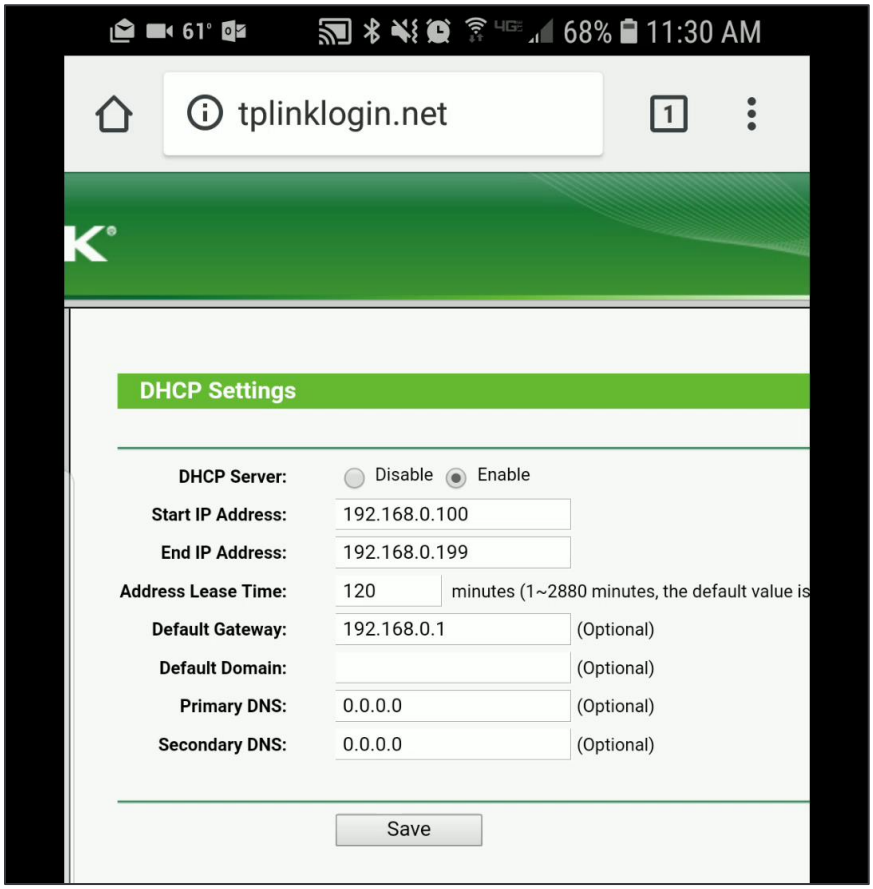

Figure 8: DHCP Settings

8. Identify the Neurio by SSID using the MAC address, which is printed on the side of the meter (identified and recorded in Step 2).

Figure 9: Neurio MAC Address

9. The Neurio must be assigned a DHCP reservation so that it will always have the same IP on the host network. There is no option to set a static IP in the Neurio interface, meaning the host device will assign the Neurio its IP address. This step allows the host device to identify the Neurio each time it connects because it is identified by its MAC address.
    a. Making a DHCP reservation varies from one router to another, but it can often be found in the Settings under DHCP Settings or DHCP Static Lease.
    b. The Neurio may be listed, or it may have to be manually identified by entering its MAC address. In either case, the IP address reservation must fall within the range of available IPs listed in Step 7.

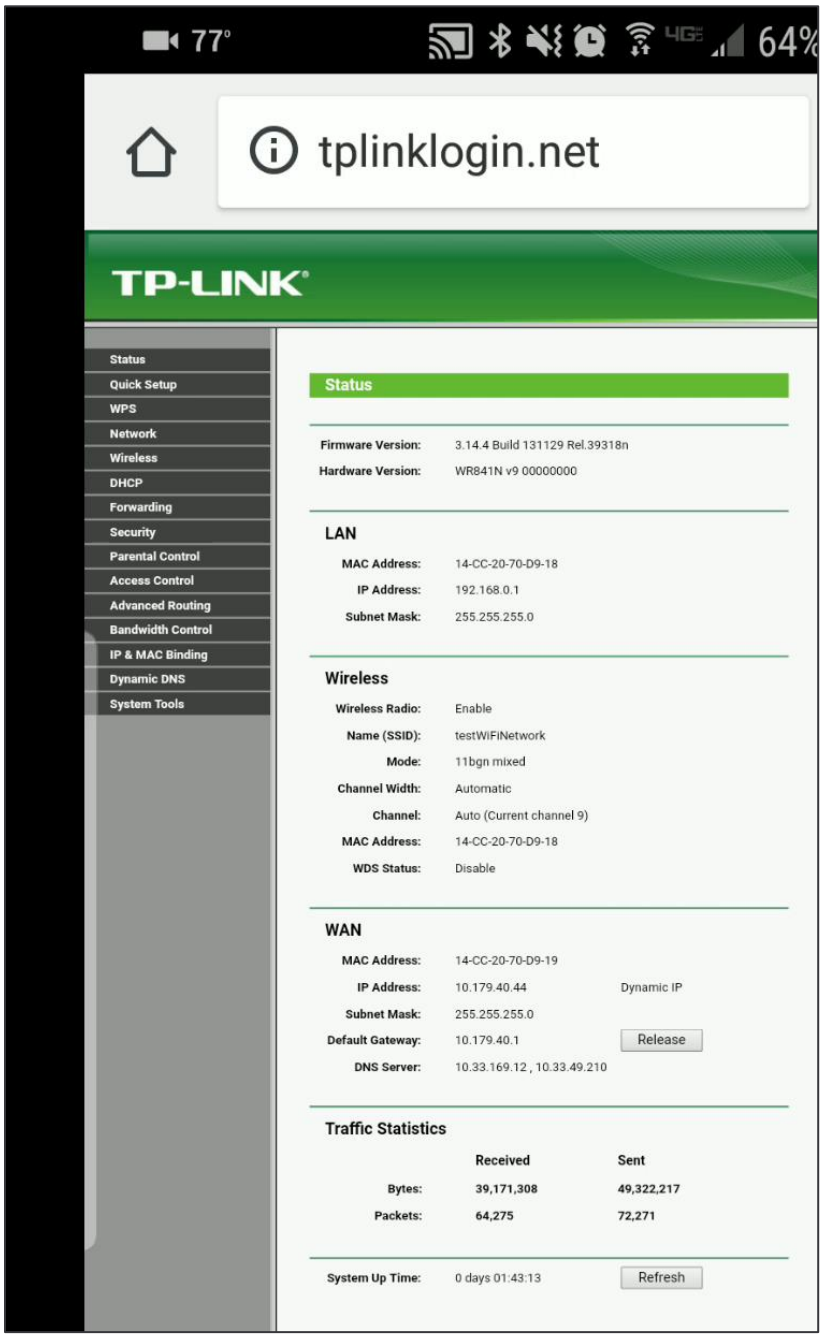

Figure 10: TP-Link Home Page

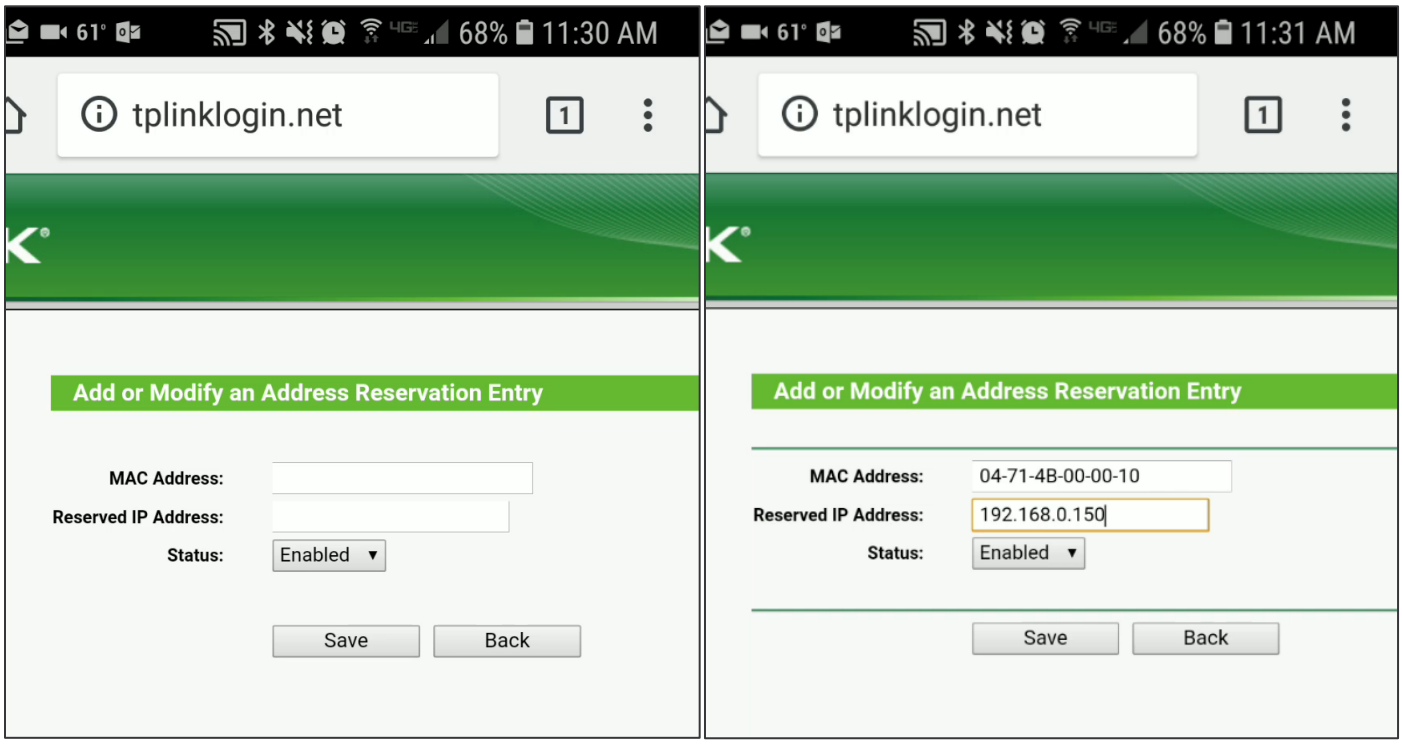

Figure 11: Creating a DHCP Reservation

a. If the Wi-Fi hotspot the Neurio is joining is an extender, or not the same device that the Gateway is connecting to, the DHCP server may need to be set up on the Gateway-connected device, and a DHCP reservation must be made for the Neurio there as well. This way the DHCP request from the Neurio does not have to make its way back to the main router.

b. If additional devices (like a technician's phone or laptop) must be connected at a remote location, overlap the assigned range by just the one address that will be reserved. This will prevent the assigned addresses from conflicting.
For example, if the main router is at 192.168.1.1, operating a standard subnet (mask 255.255.255.0, valid addresses 192.168.1.1-254), and the main router's DHCP server offers addresses 101-150, then the new device would be set up as static 192.168.1.200 or something similar (a known, relied upon address that is not anywhere in the DHCP range). The remote device would then offer its own DHCP server on range 150-199 (overlapped by one address). The reservation for the Neurio MAC would be made at 192.168.0.150 so that regardless of which device actually responds to the request, it always gets the correct address, and that address cannot be assigned to anything else.
As outlined previously, identify which IP addresses the router uses.

10. Log into the TEG network, and navigate through the Wizard to the /meter page. The Wi-Fi meter must be added in the Advanced Settings. When the dropdown is selected, it will provide fields to specify the Neurio MAC address and IP address. After inputting all the information for the meter, click CONNECT to attempt to connect the meter. As connection is established, the TEG-xxx Wi-Fi network will drop. Wait for the TEG-xxx Wi-Fi network to begin broadcasting again, reconnect it, and then navigate back to the Wizard /meter page to see if the connection was successful. If the connection is not successful, double check that all steps were completed successfully. If this sequence fails three or more times, take pictures/screenshots of all of the screens and error messages before reaching out to the Hotline for additional support.

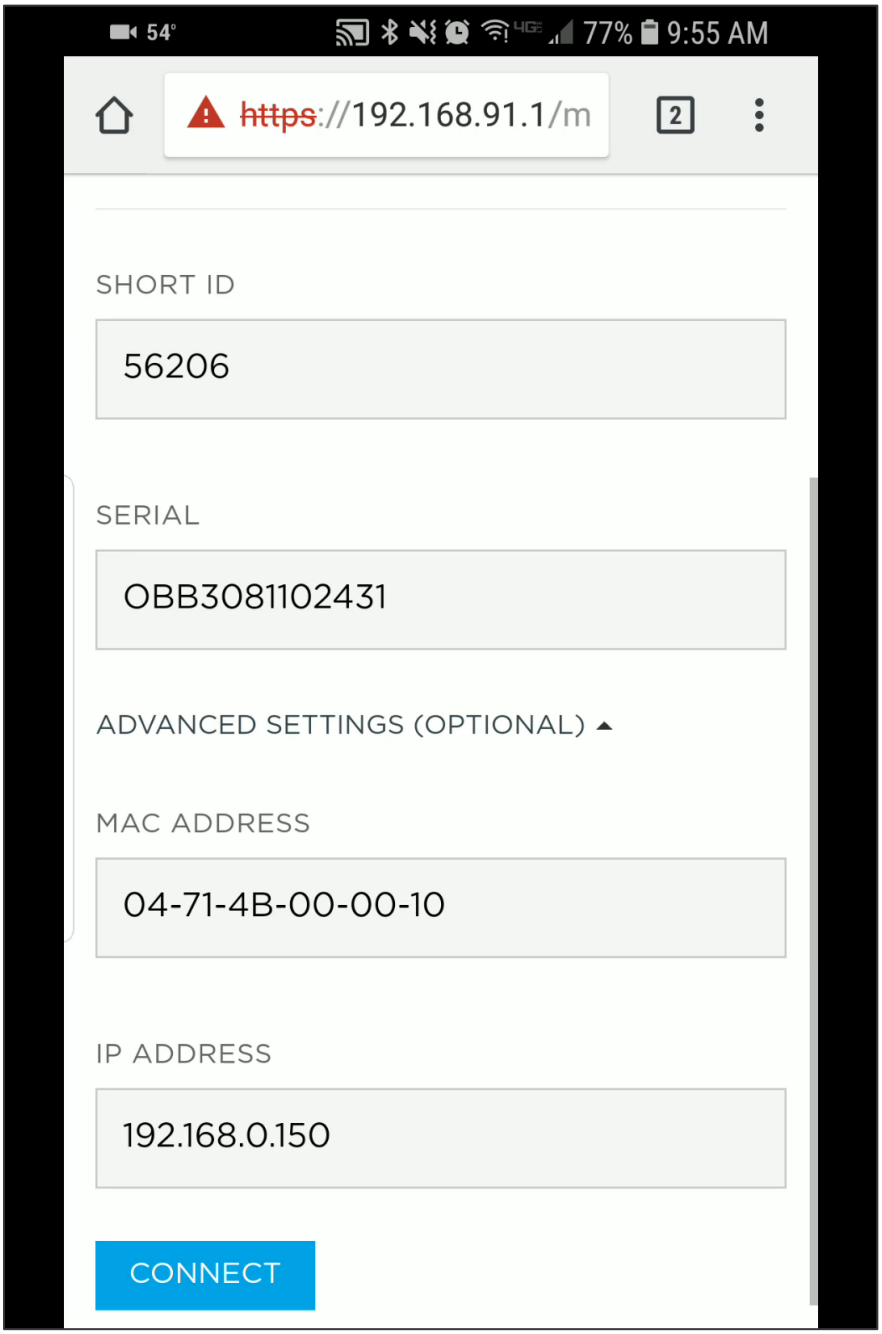

Figure 12: TEG Wizard Meter Page

Troubleshooting

When troubleshooting an unsuccessful pairing using the advanced connection method for remote meter pairing, the most important piece of information to begin with is whether the TEG is able to reach the meter over the homeowner's network. There are two key items to check to ensure that the TEG can reach the meter:

1. Is the TEG connected to the same Wi-Fi network as the meter?
2. Is the meter connected to the home Wi-Fi network?

Is the TEG connected to the same Wi-Fi network as the meter?

1. To verify that the TEG is connected to the same Wi-Fi network as the meter, start with the commissioning Wizard.
    a. Check the connection in the Wizard and make sure that the TEG is connected and the Wizard shows a green dot and checkmark indicating a connection.
    b. Note that the TEG can be connected to the customer's network using Ethernet as the primary connection or Wi-Fi. The TEG should be listed as a client on the customer's network (the host network).
2. The TEG can also be connected to the customer's router to verify that the Gateway has an address on the customer's network.
    a. The IP address in the Wizard should appear in the list of connected clients on the router.
    b. When the TEG's assigned IP address is pinged from a laptop that is connected to the router, responses in the command prompt should indicate the TEG is connected.

Is the meter connected to the home Wi-Fi network?

1. If the meter is connected to the home network, it should be possible to ping the Neurio from the same router that the Gateway is connected to. To check the connection:
    a. Connect a laptop to the customer's router.
    b. Issue a ping command for the IP address that was reserved for the meter. Responses from the meter should appear in the command prompt.
    c. Also ping the Neurio-XXXXX name e.g. "ping Neurio-12345"
2. If the meter is responding, it is connected to the router. If the Gateway is connected to the router, and the meter is also connected to the router, but the connection cannot be established using the advanced setting in the Wizard, then additional troubleshooting measures will be required.

Additional items to check:

1. Are all devices using the 2.4GHz Wi-Fi channel?
2. Is the exact MAC address from the sticker on the meter being used when the DHCP reservation is created?
3. Is the MAC address for the meter among the list of devices connected to the host router?
4. Is the Neurio connecting to the host network as well? Sometimes using extenders can complicate the connection and create difficulties.
5. Does the address reserved for the meter fall into the range of IP addresses that the DHCP server for the router uses?