

User Installation Manual For Oee

v1.0

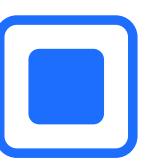
This manual provides an installation walk through of the PROCHECK OEE Toolkit. It also contains troubleshooting and remote diagnostics instructions.





Table Of Content

1. Installation Process	3
2. Wiring Connector Standard	5
3. Installation Checklist	6
4. Sensor and PLC Calibration	7
4.1 Sensor Calibration	7
4.1.1 Sensor Calibration	8
4.1.2 To set a specific range	11
4.2 PLC Troubleshooting	14
5. Wifi Configuration	15
5.1 Android	15
5.2 iOS	21
6. Troubleshooting	26



Installation Process

1. Unpack the OEE toolkit. Once done, ensure the following parts are present:

A Distribution Box containing the following:

1. PLC
2. Wifi shield
3. Power supply

And, if applicable, the following:

4. Mounts
5. Sensors
6. Wire connectors
7. Insulation Pipe
8. Wires

2. Place the distribution box at the designated location.
3. Mount the sensors so that there are two sensors at each rejection point. One sensor will be before the rejection point and one will be mounted after, as shown in Figure 1.

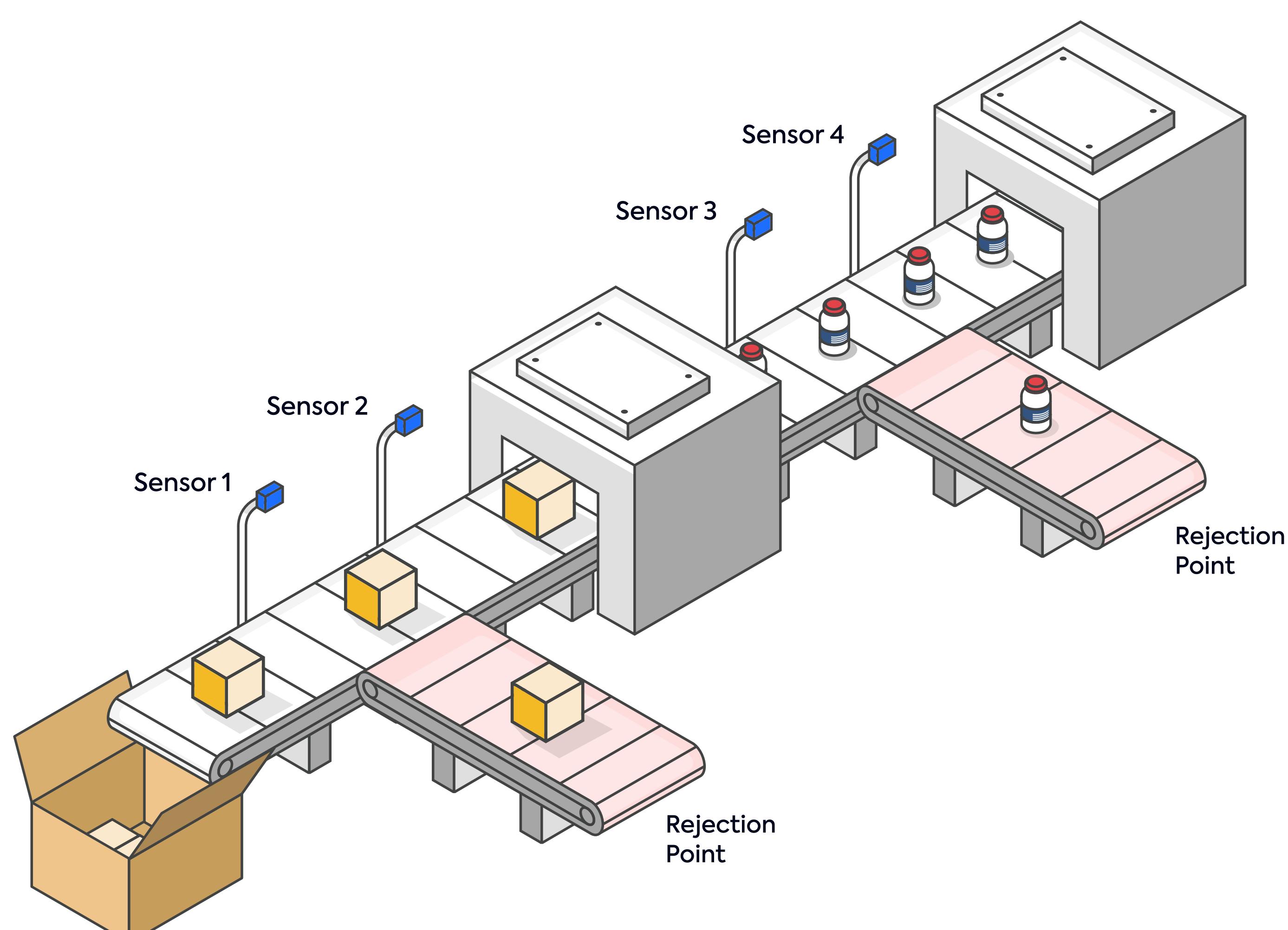
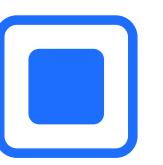


Figure 1: Ideal placement for sensor mount



4. Proceed to extend the sensor wires. It is important to ensure that any noise interference is avoided. This can be done by properly insulating all wires and keeping them away from AC power lines and other motors.
5. Now, plug the sensor wires inside the distribution box. Make sure to follow this accurately, as shown in Figure 2(a), and recheck the wiring once it is plugged.
6. Now, take the power cable and use it to supply power to the distribution box.
7. When connecting the power to the distribution box also connect the earthing wire to the designated terminal for earth next to the breaker.
8. Once the cable is supplying power to the box, switch on the breaker.
9. Calibrate the sensors according to the instructions given on **Page 7** or if the sensor you are using is not referred to in the guide, follow the sensor manual for that specific sensor.
10. Now connect the WiFi shield to the internet using instructions from **Page 15**.

Note: Ensure the sensors and mounts are fixed on rejection points as finalized in the assessment.



Wiring Connector

Begin with extending the wires using the standard given below:

WIRING CONNECTOR - SENSOR SIDE		
Pin	Detail	Male Connector
1	12V	Brown
3	Ground	Blue
4	Sensor Out	Pnp Wire

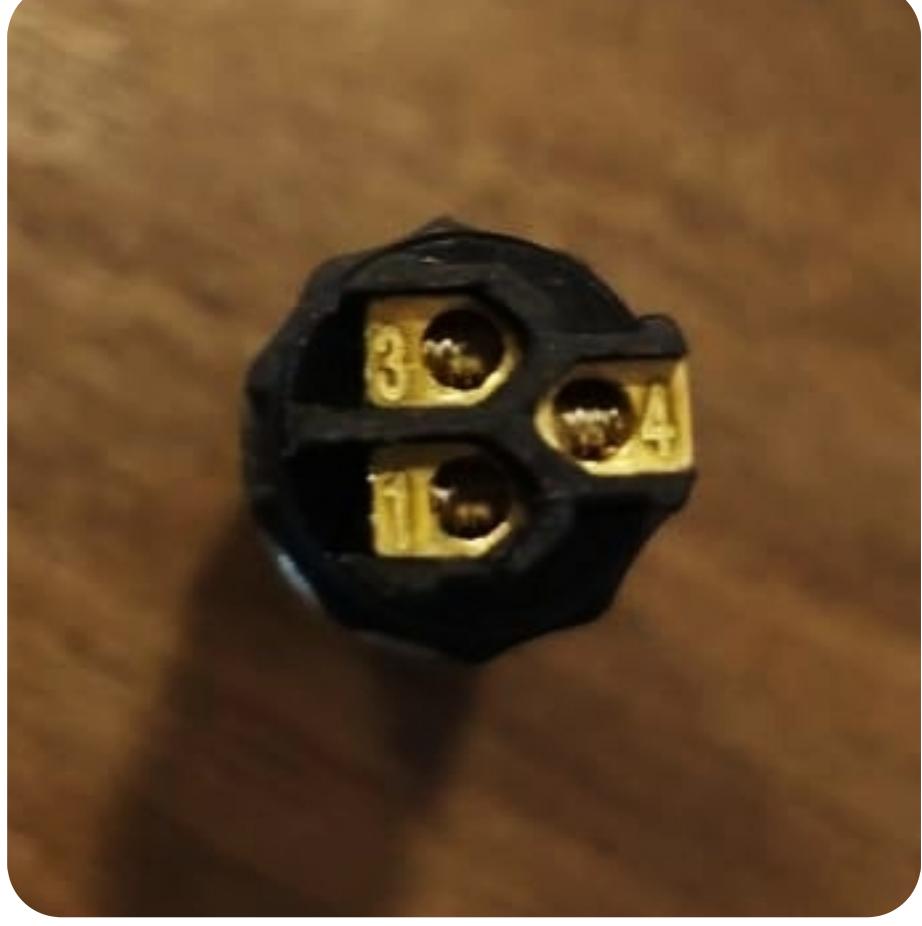


Figure 2(a): Wiring connector (sensor wire)

Table 1 (a)

Note: The wire colour scheme is printed on the sensor. This can be used for reference to the PNP wire.

EXTENSION WIRE		
Pin	Detail	Female Connector
1	12V	Green
3	Ground	Blue
4	Signal	Pnp Wire

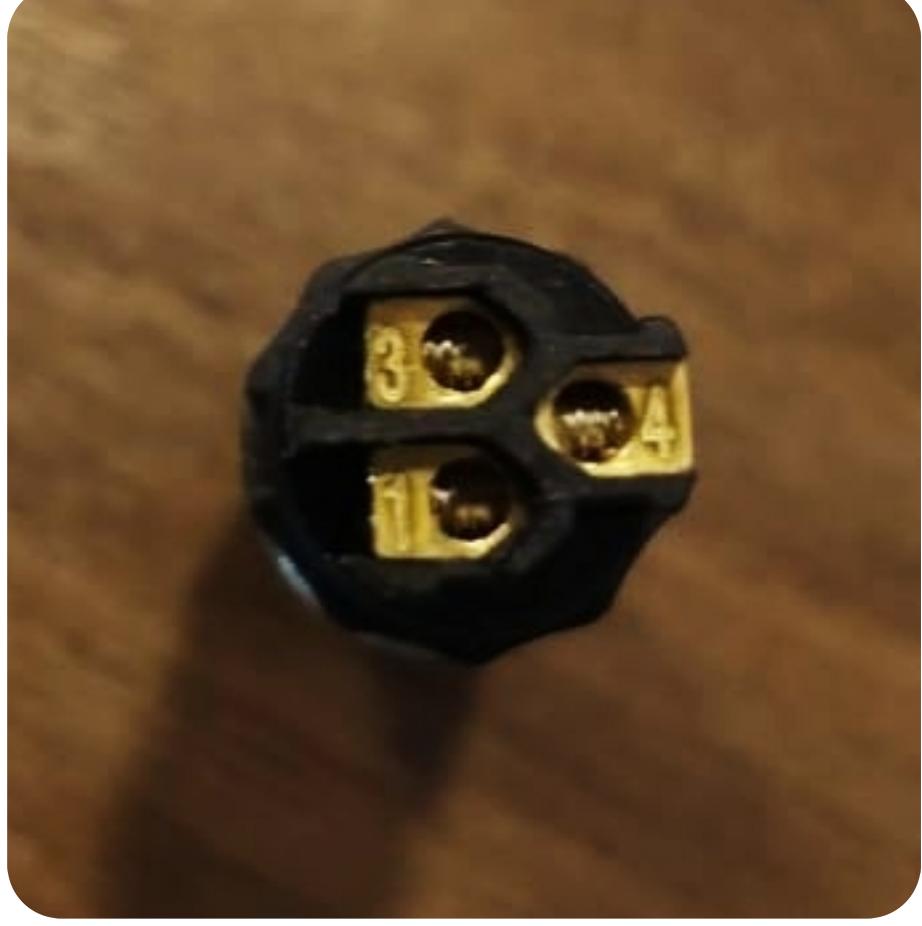


Figure 2(b): Extension wire connections

Table 1 (b)

Important Safety Measures:

- Ensure each wire is fully covered
- During routing, only use PVC wires inside the machines. These can be installed via ducts to provide more safety
- Wires must be secured using the cable ties provided
- Ensure the sensors are labelled in accordance with their connections



Installation Checklist

Refer to the checklist below after successful installation to document and verify that following steps are completed successfully.

PROCESS	CHECK
1. The distribution board is mounted at a precise location.	
2. Sensor mounts are positioned correctly at the rejection points.	
3. Sensors are fixed firmly in place.	
4. Sensor wires are connected as per the guidelines in the Wire Connector section.	
5. Wires are routed through insulation pipes all the way to the distribution board.	
6. Sensor wiring connected to the distribution board is in-line with wire connection standards.	
7. The distribution board is provided with a 220V supply using the power cable.	
8. Power breaker is switched ON.	
9. Sensors are calibrated in-line with the calibration guidelines.	
10. PLC is receiving sensors signals and is in-line with the calibration guide.	
11. Toolkit MAC address is whitelisted in the router.	
12. Wifi is setup as per the guidelines in WiFi configuration section.	
13. Data is uploaded to the cloud. That means, a GREEN LED in the WiFi shield lights up. Refer to Section 5 “Wifi Configuration” for led indications.	

Table 2



Sensor and PLC Calibration

4.1 Sensor Calibration

Sufficient physical distance is needed between the conveyor and the sensor mounts for appropriate calibration. To determine this distance:

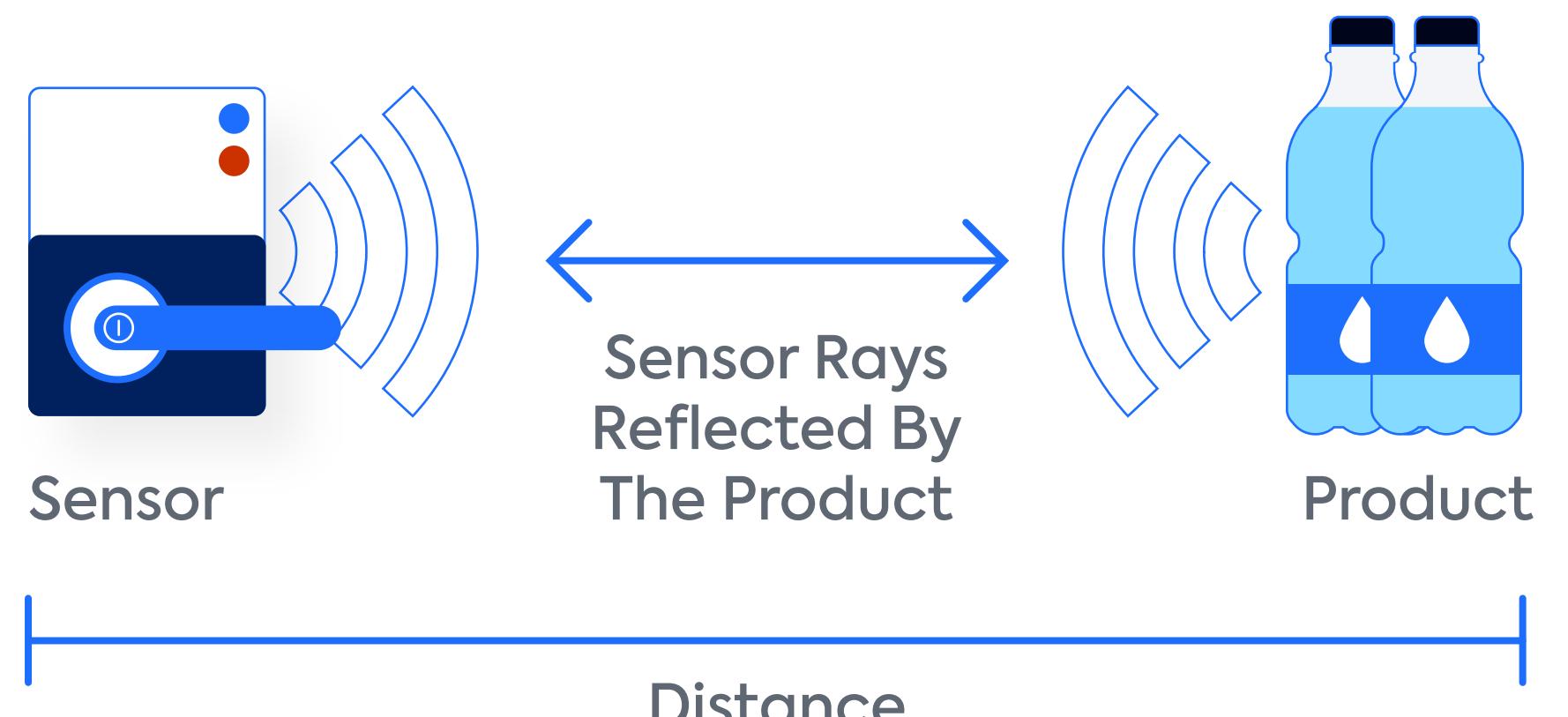
- Use tools to measure these distances accurately. This is imperative when detecting the product passing through the conveyor belt
- Sensors have a variable detection range, for accurate results calibration is required
- The range is varied by rotating the knob

Note: Use a screwdriver to rotate the sensor knob.



Figure 3(a)

Knob Set to Minimum:



Knob Set to Maximum:



Figure 3(b): A photoelectric sensor's range increases by turning the knob clockwise.



After mounting the sensor, the product will be placed parallel to the sensor. To adjust the distance between the product and the sensor, use a screwdriver to rotate the knob till optimal distance is achieved.

4.1.1 Calibration:

1. The sensors have a variable proximity range set by the knob. Locate the knob and adjust it until the **ORANGE** LED turns ON
2. The sensors have a built-in LED which turns ON when an object is detected and in range. When the product is removed, the **ORANGE** LED should turn OFF
3. When the product passes within range, the LED should blink. Run half a dozen products through the sensor for calibration
4. The respective LED will also blink on the PLC when a product is detected by the sensors

Note: Sensors are chosen for different applications, contingent on the material, cost, availability and space.



The fiber photoelectric sensor recommended by PROCHECK (E3X-NH41) has the following nomenclature:

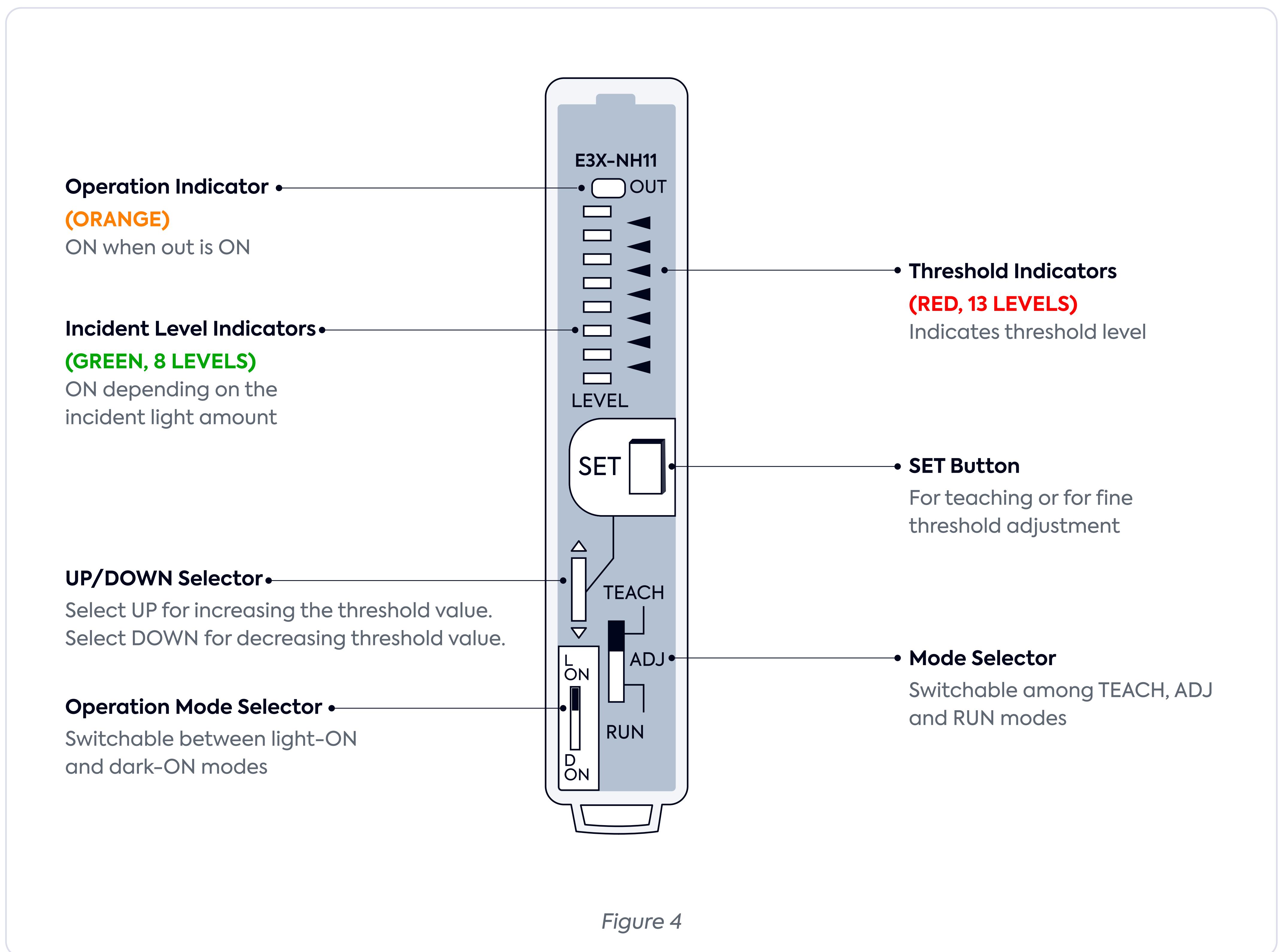
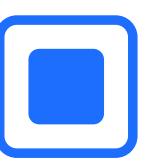


Figure 4

Note: Used for making fine-sensitivity adjustments

The sensitivity setting of this sensor is known as ‘teaching’. Note that the factory settings are at “maximum”. This can be changed manually by following the steps on the next page:

4. Sensor and PLC Calibration



1. Locate the mode selector and set to **TEACH**. Next, press the SET button for at least three seconds. The threshold indicators (**RED**) will be **ON**. The built-in buzzer will beep if done successfully.

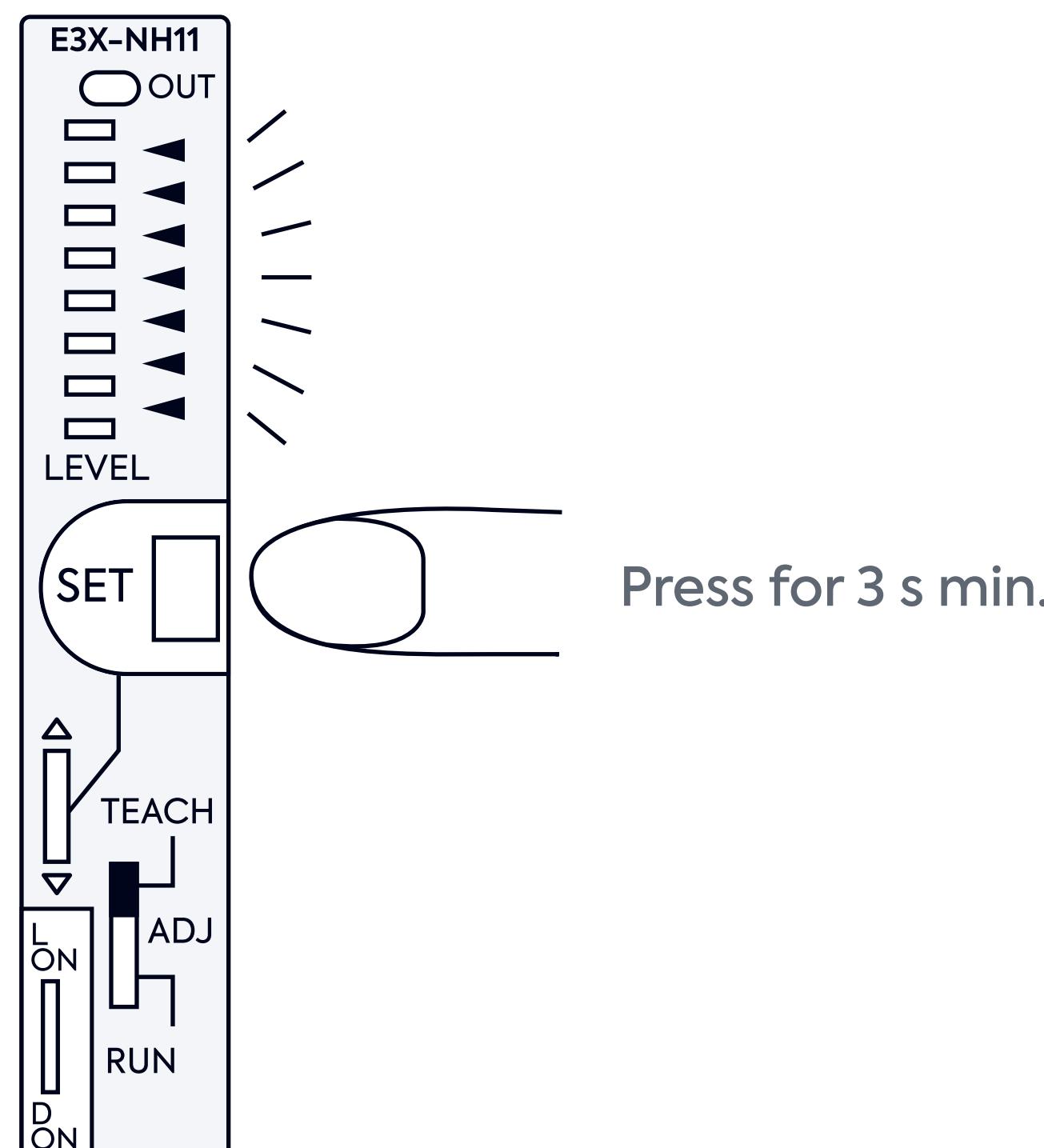


Figure 5

2. The buzzer will beep repeatedly when sensitivity is set. The incidents level indicators (**GREEN**) will also be **ON**.

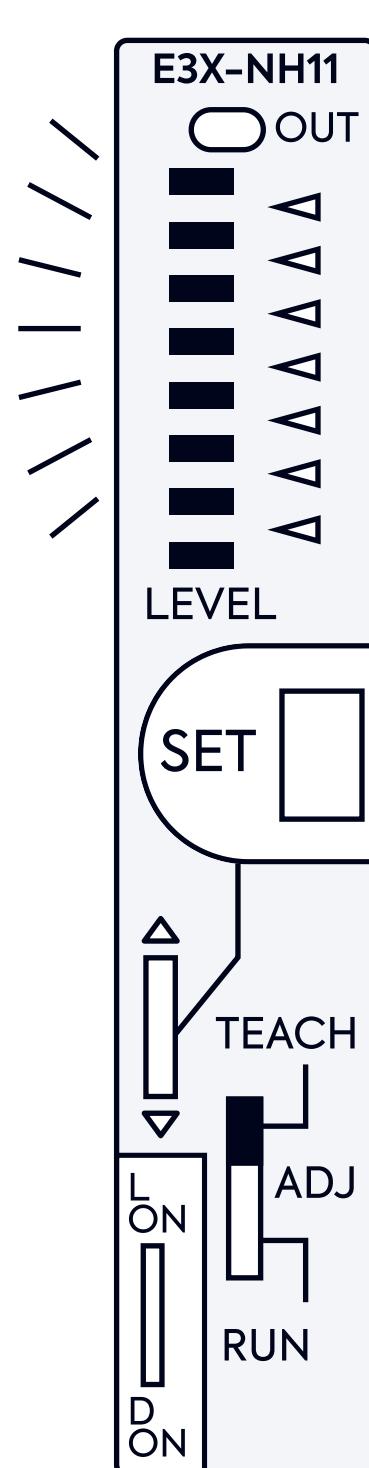
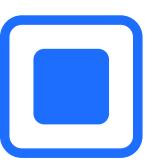


Figure 6



- In the final step, set the mode to **RUN**. Ensure that only the bottom threshold indicator is **ON** by observing the light.

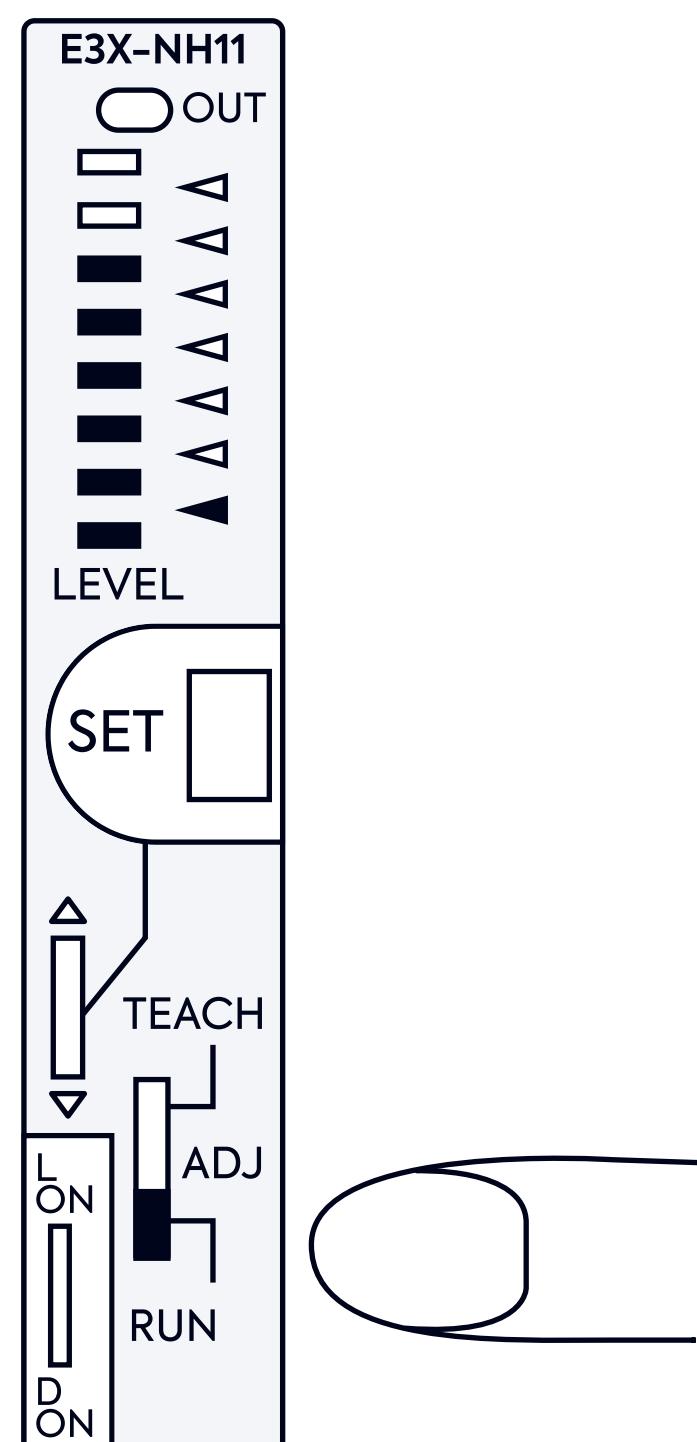


Figure 7

4.1.2 To Set A Specific Range:

- Adjust the mode selector to **TEACH**. Then, locate the object that needs to be sensed and press the **SET** button once. If done successfully, all the threshold indicators (**RED**) will be **ON** simultaneously and the built-in buzzer will start to beep.

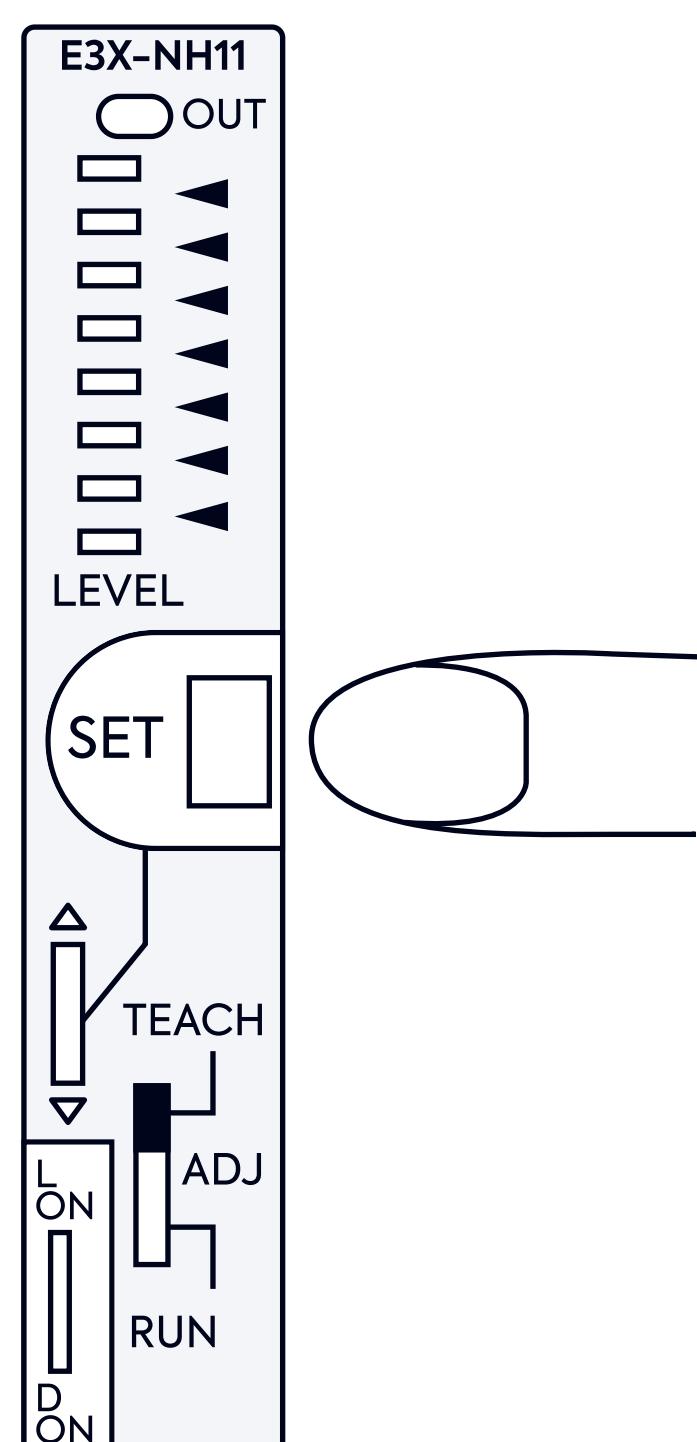
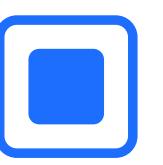
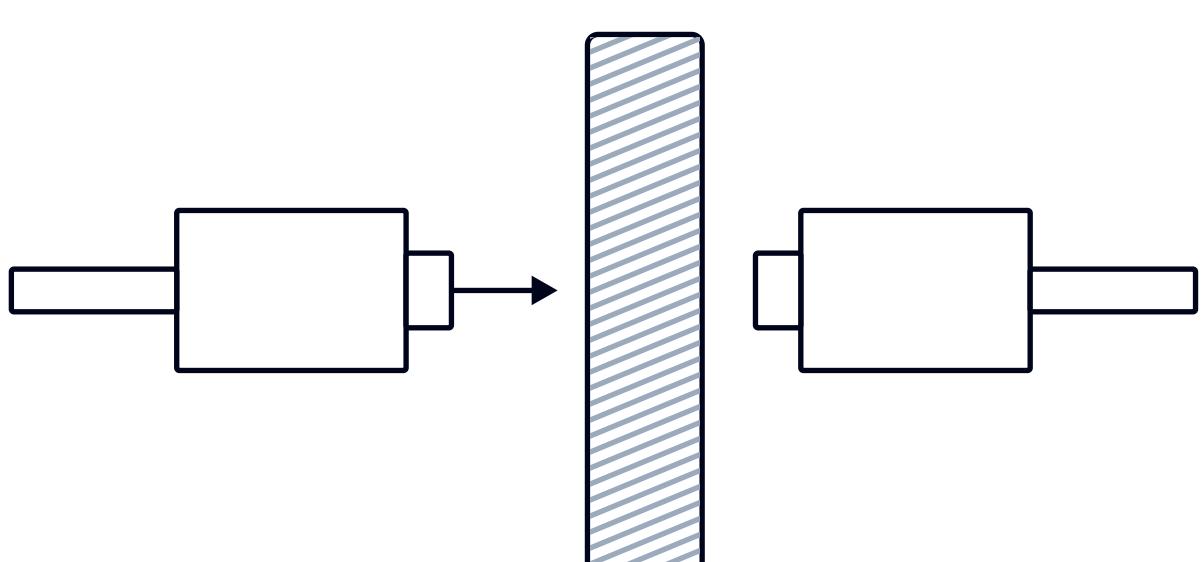


Figure 8

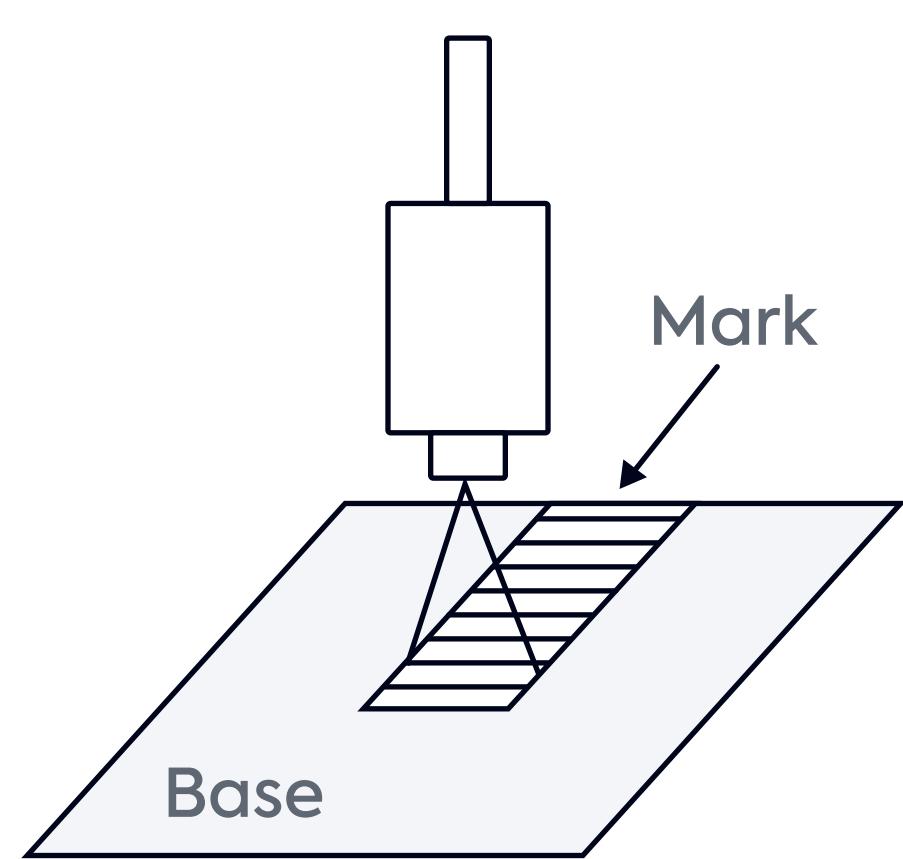
4. Sensor and PLC Calibration



Through-beam Model



Reflective Model



Reflective Model

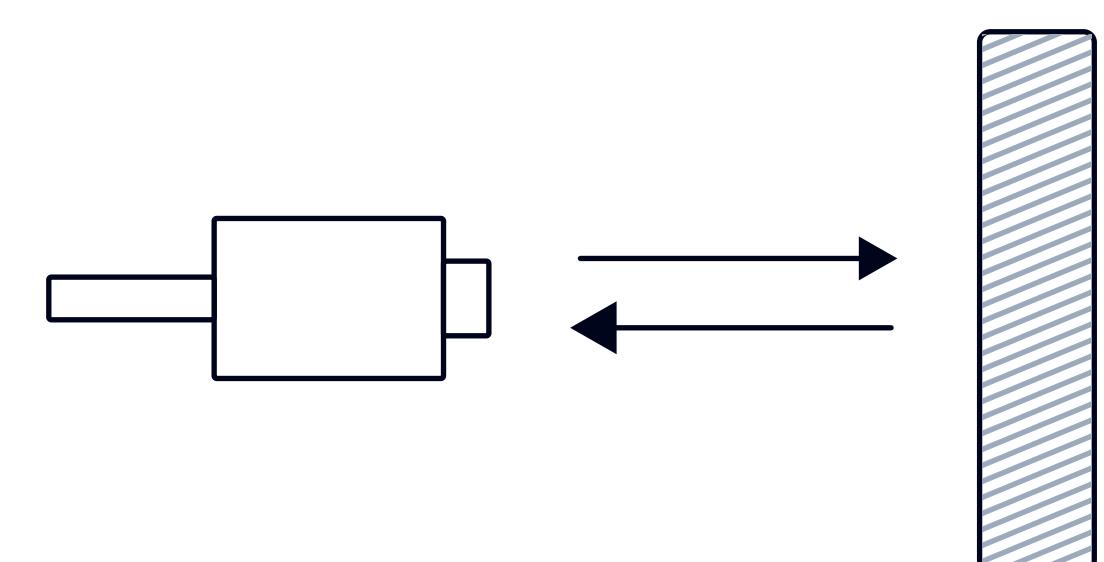


Figure 9

2. Next, move the object and press the **SET** button. If the teaching is done properly, all incident level indicators (**GREEN**) will be **ON** and the built-in buzzer will beep once.

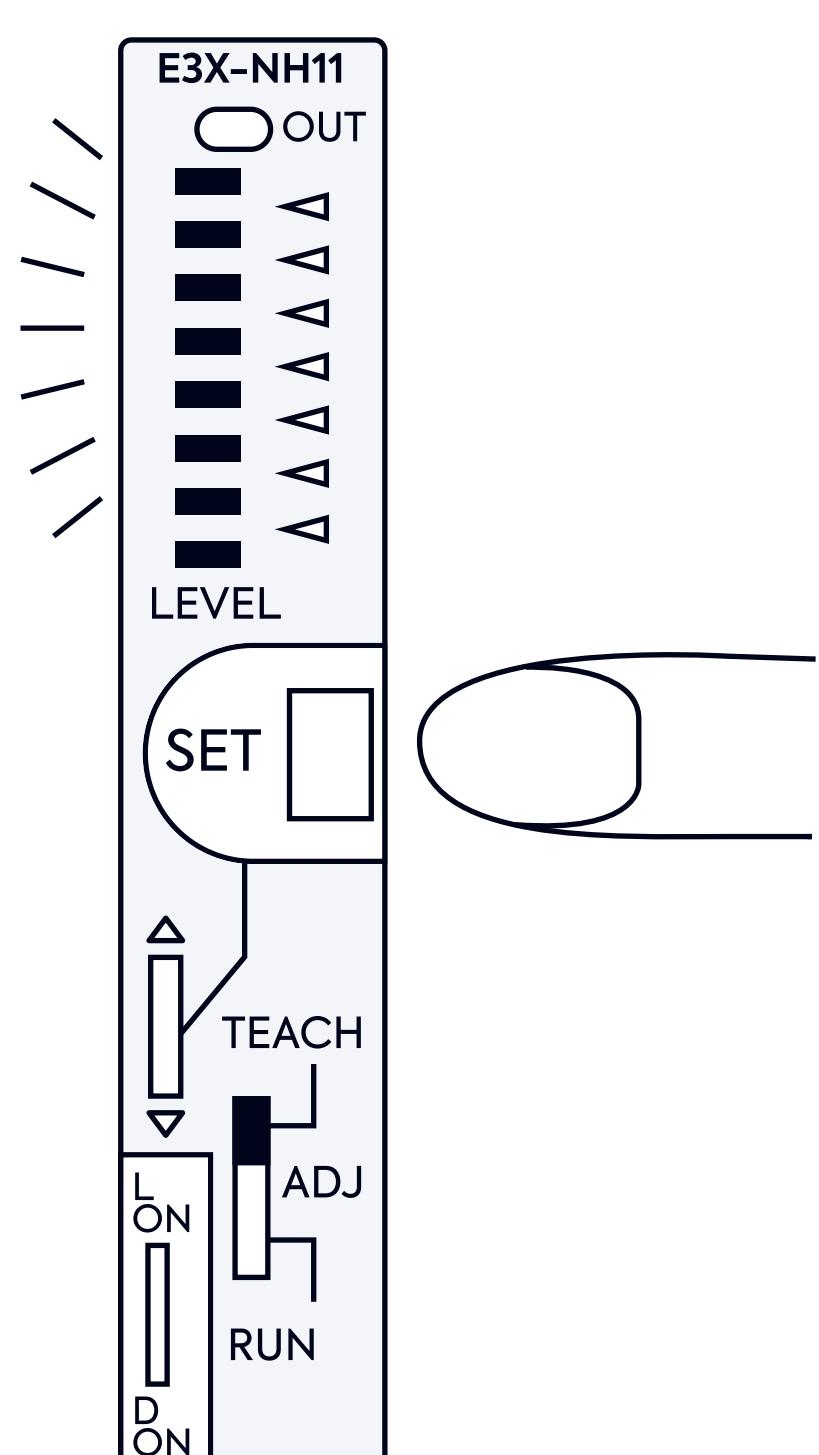


Figure 10

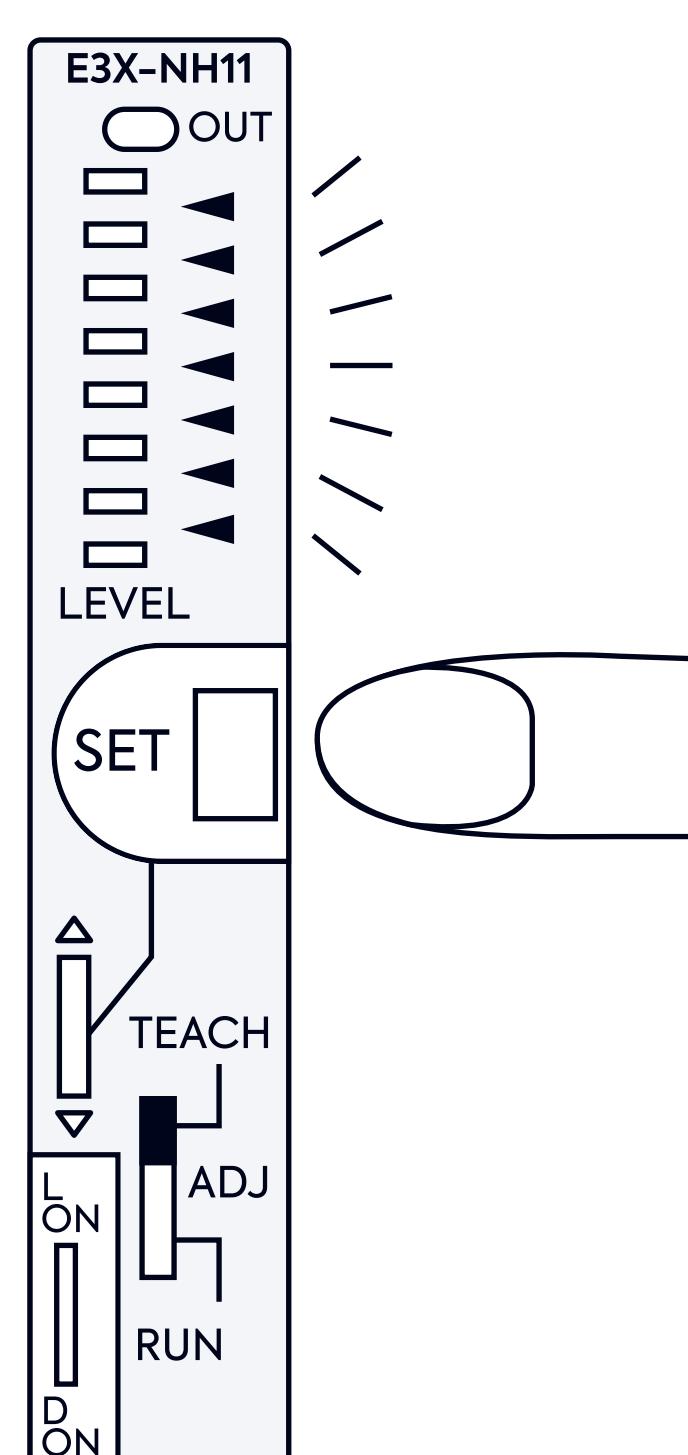
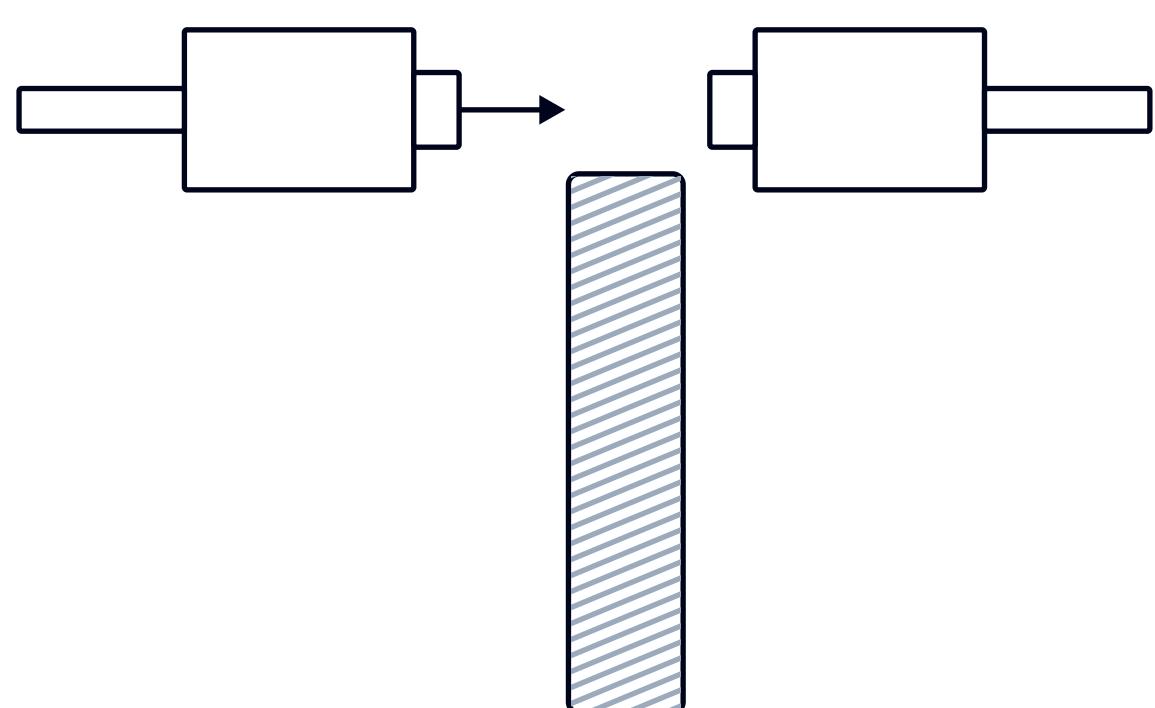
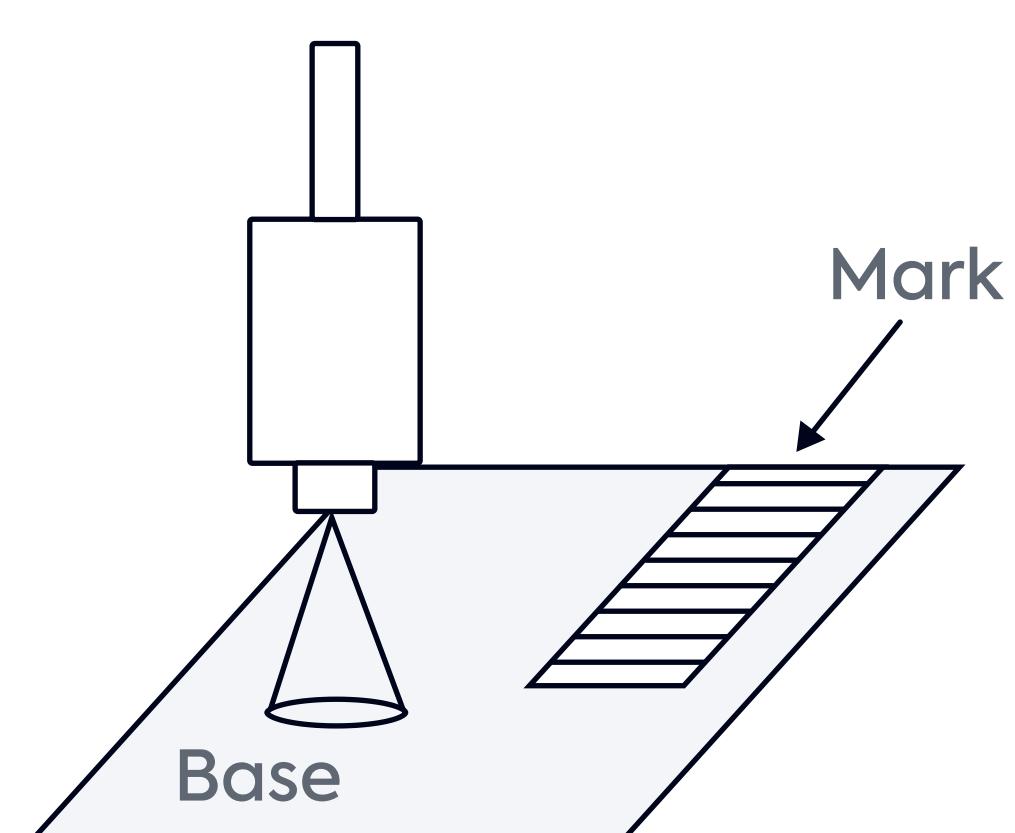


Figure 11

Through-beam Model



Reflective Model



Reflective Model

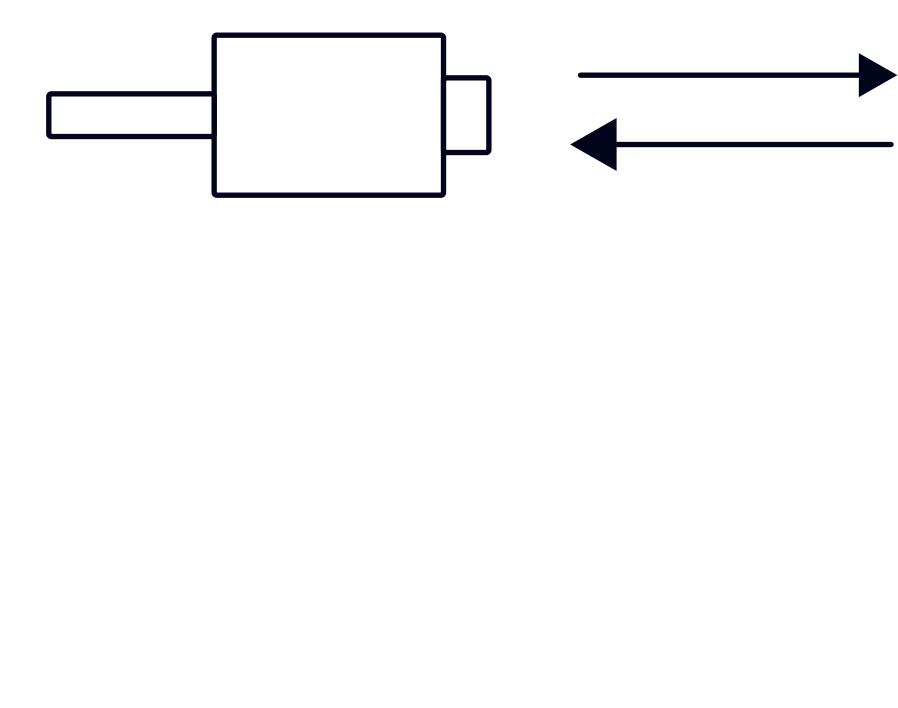


Figure 12

4. Sensor and PLC Calibration



3. Go back to the mode selector and set it to **RUN**. The middle threshold indicator will turn **ON**. This indicates that the threshold will be set to the median of the values obtained. The values are first obtained with the sensing object and then without it.

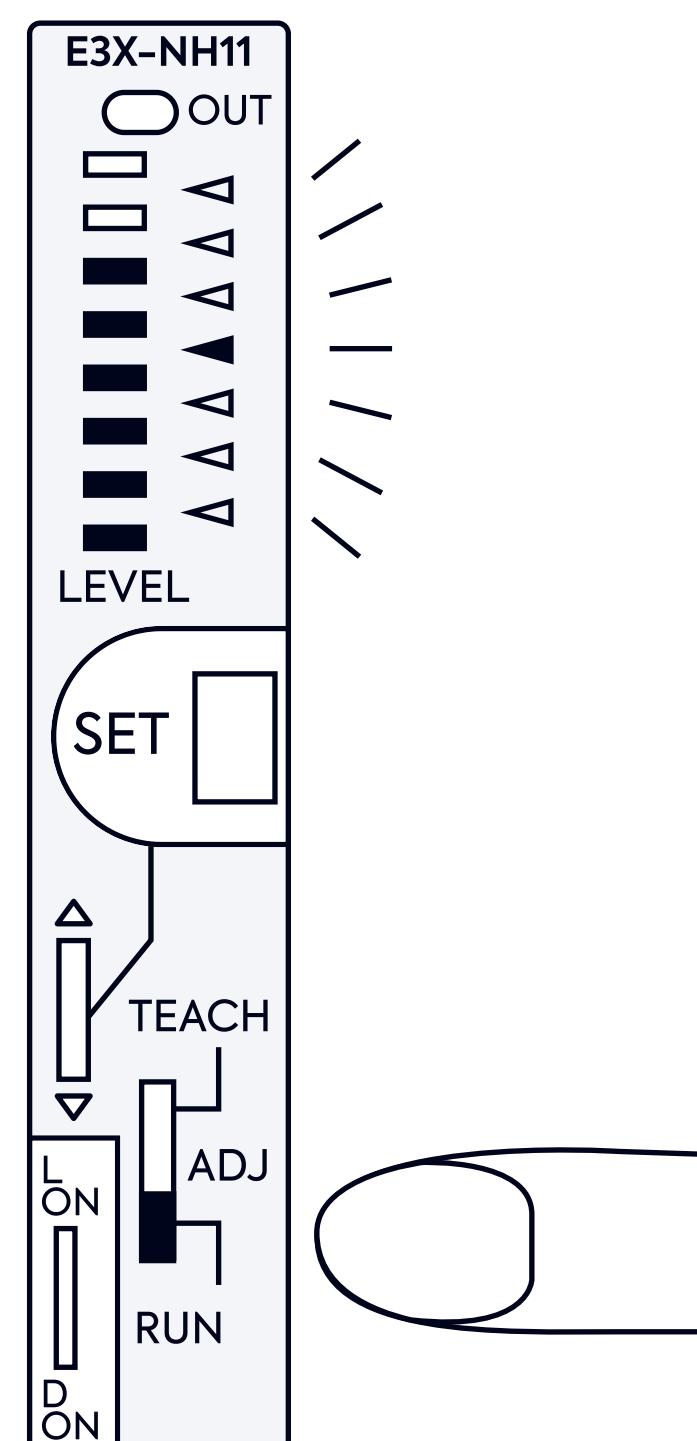


Figure 13



4.2 PLC Troubleshooting

When the LEDs on the PLC blink, refer to figure 14

- The sensor detects a product in range as shown in table 3
- The sensor transmits data to the WiFi shield after configuration
- Information is obtained from the sensor

Note: When sensor PLC connectivity is established, another LED will blink in confirmation.

The table below maps the sensors to their corresponding LEDs on the PLC.

FUNCTION	FUNCTION
Sensor 1	10.4
Sensor 2	10.3
Sensor 3	10.2
Sensor 4	10.1
Sensor 5	10.0
Sensor 6	10.6
Data to PROCHECK's WiFi Shield	Q0.4

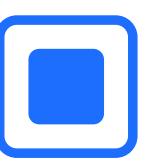
Table 3

For example, the following image represents a high LED at the Q0.0 pin of the PLC.



Figure 14

Note: When LED Q0.4 blinks, the **RGB** LED on the WiFi Shield blinks **RED**, confirming that the data has been sent from the PLC and received by the wifi shield.



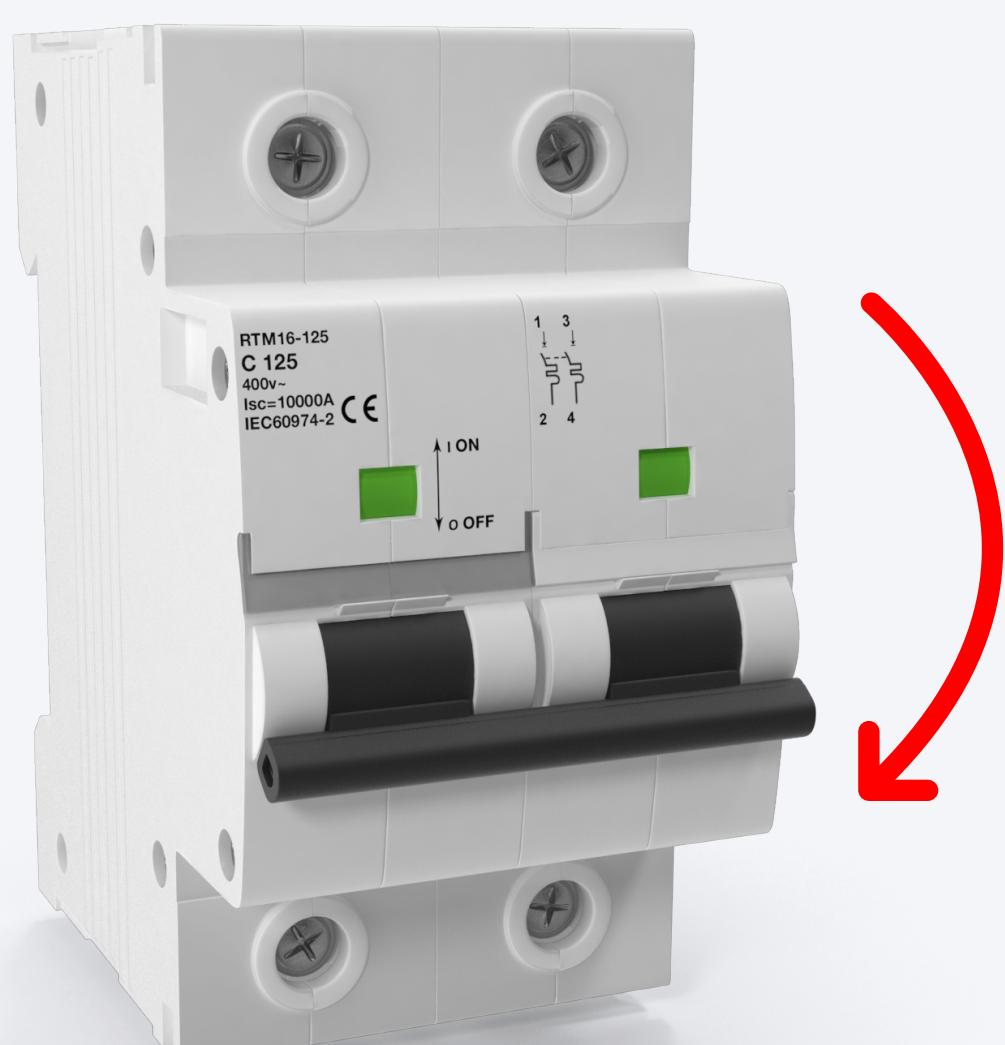
Changing and Establishing WiFi credentials

Note: Toolkit pairing with iOS/Android device require a Bluetooth application (BLE Scanner)

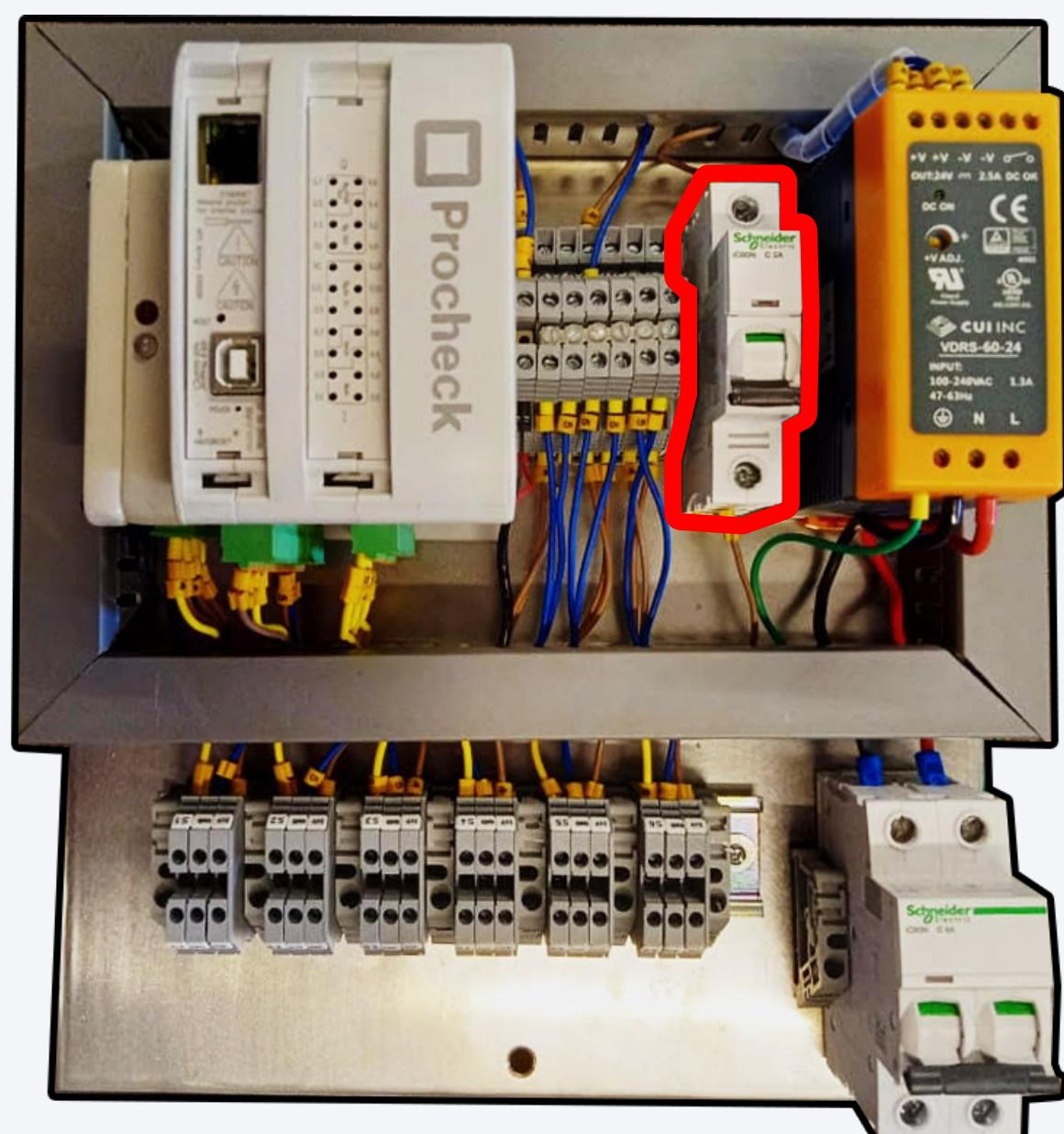
The toolkit comes with a physical Bluetooth button. Turn it to ON and then turn ON the Bluetooth on an Android/iOS device.

Follow the instructions below:

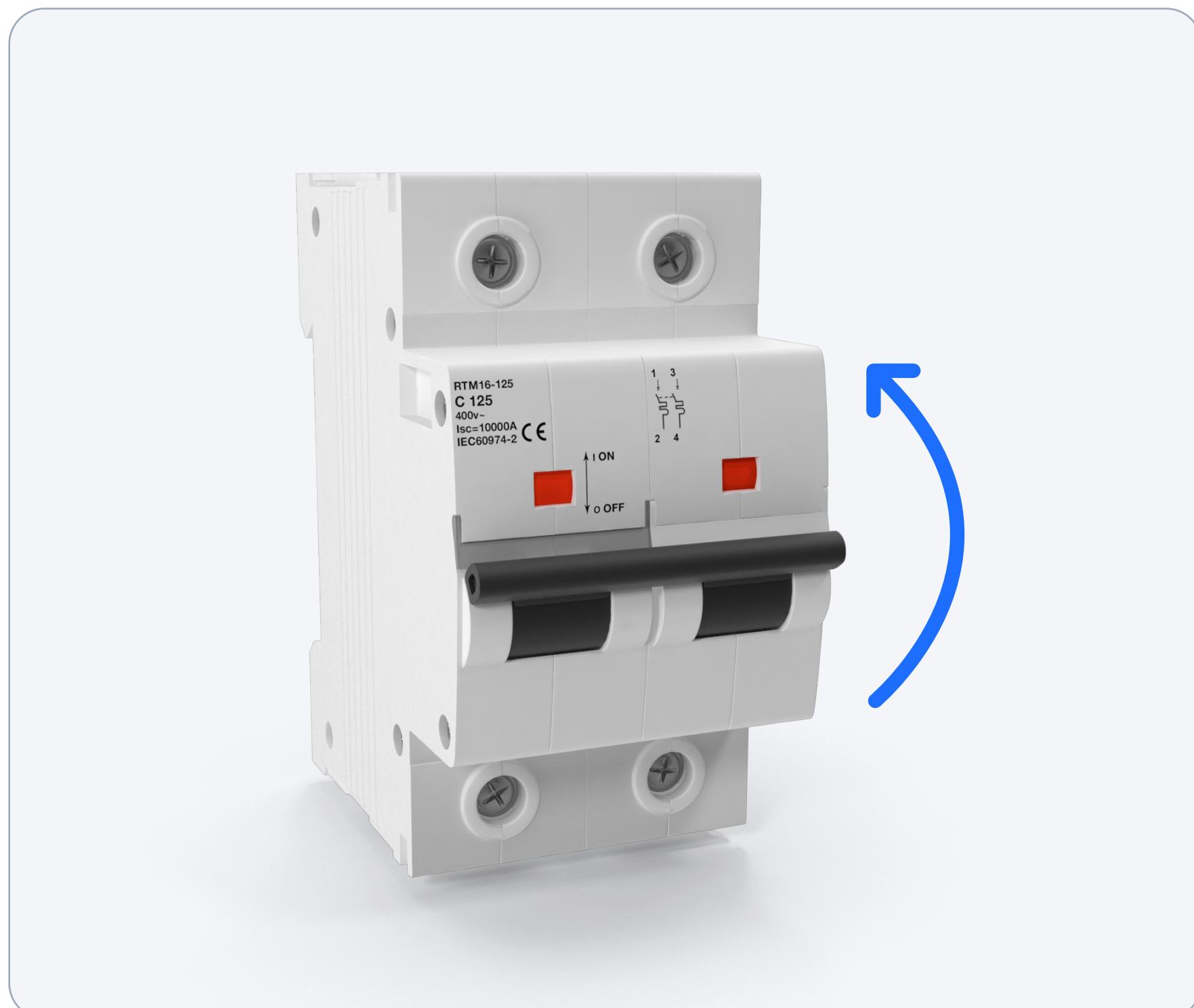
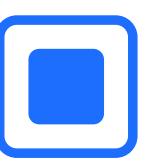
5.1 For Android Users



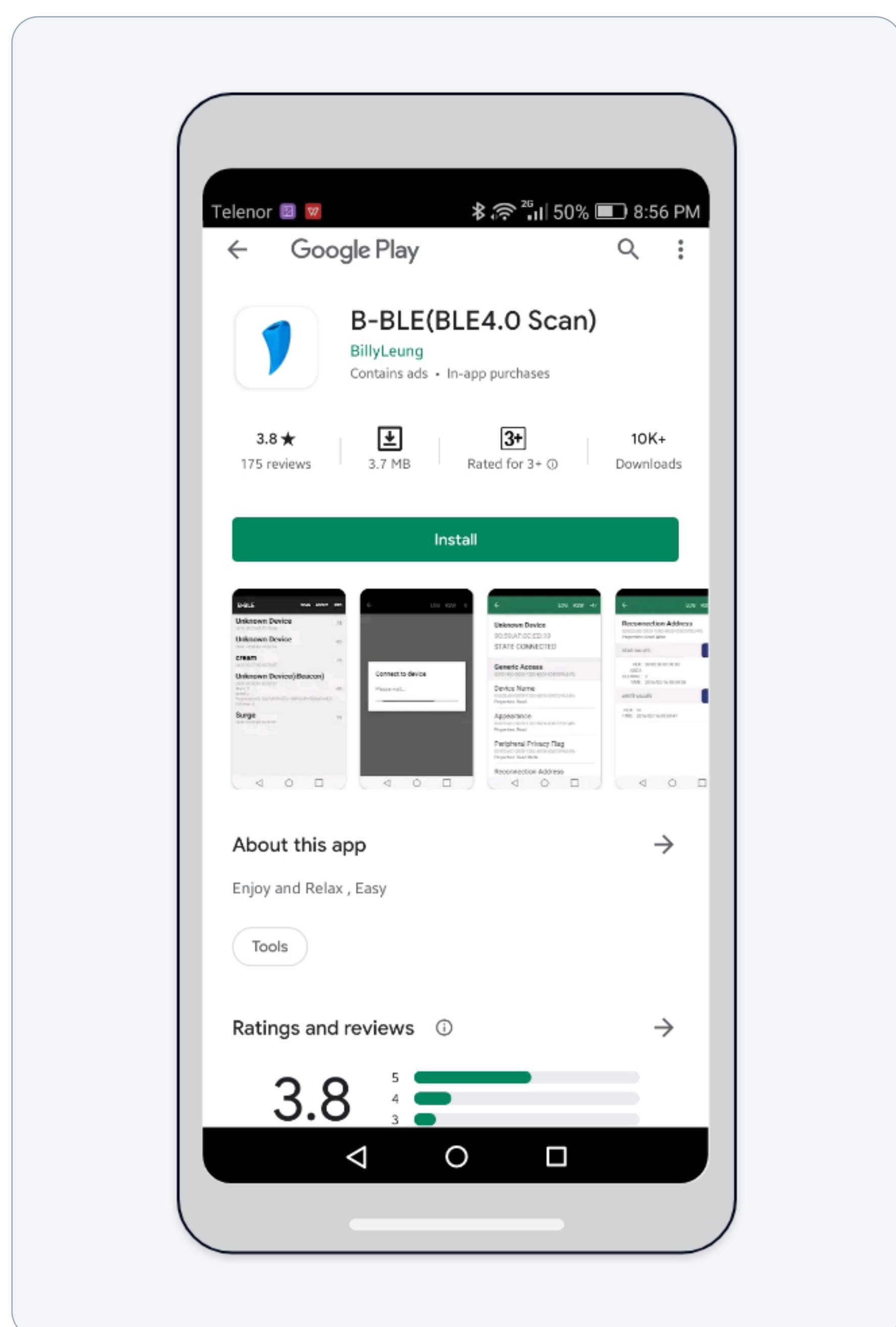
Step 1
Turn OFF main breaker



Step 2
Turn ON Bluetooth breaker

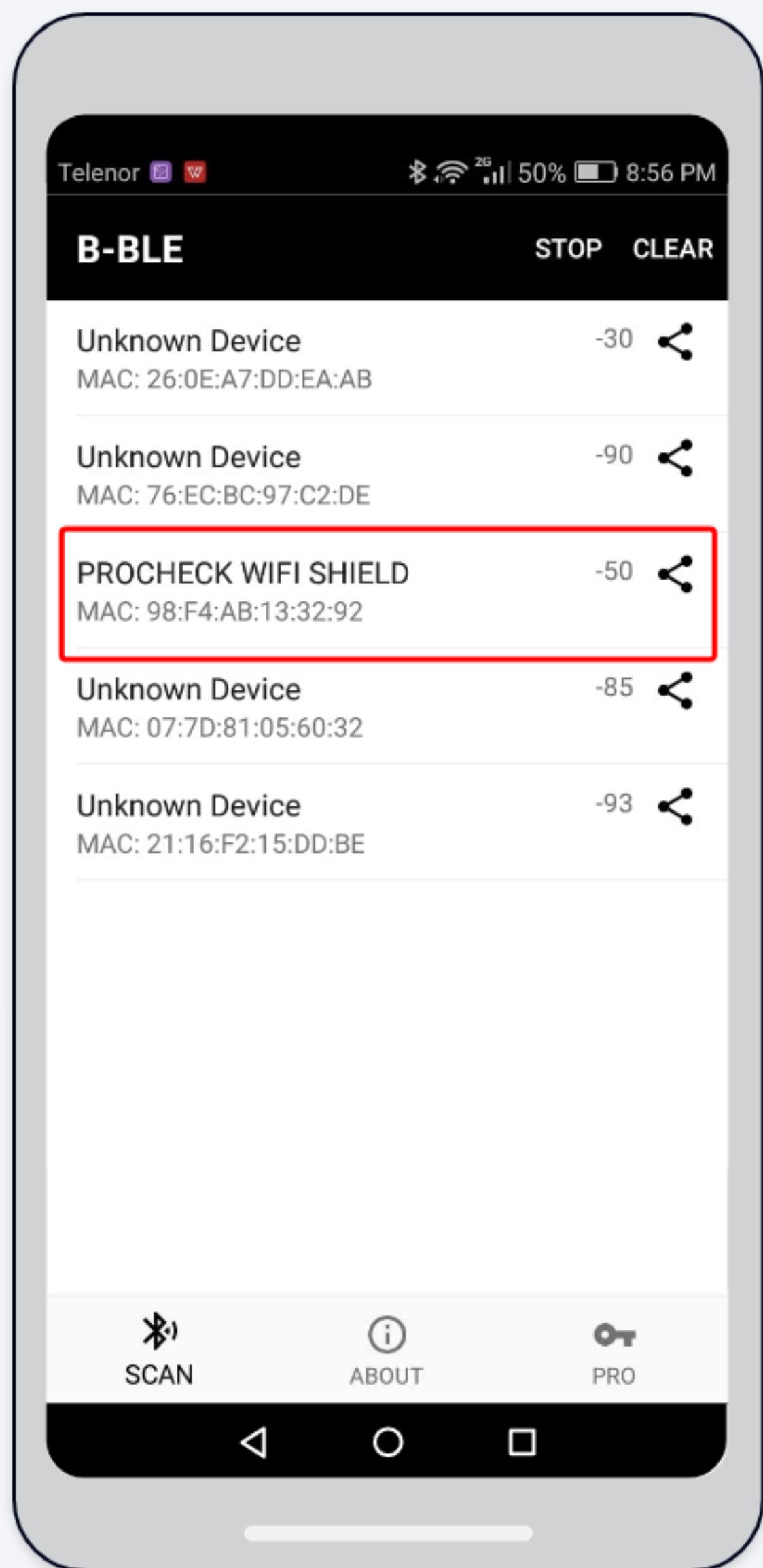


Step 3
Turn ON main breaker



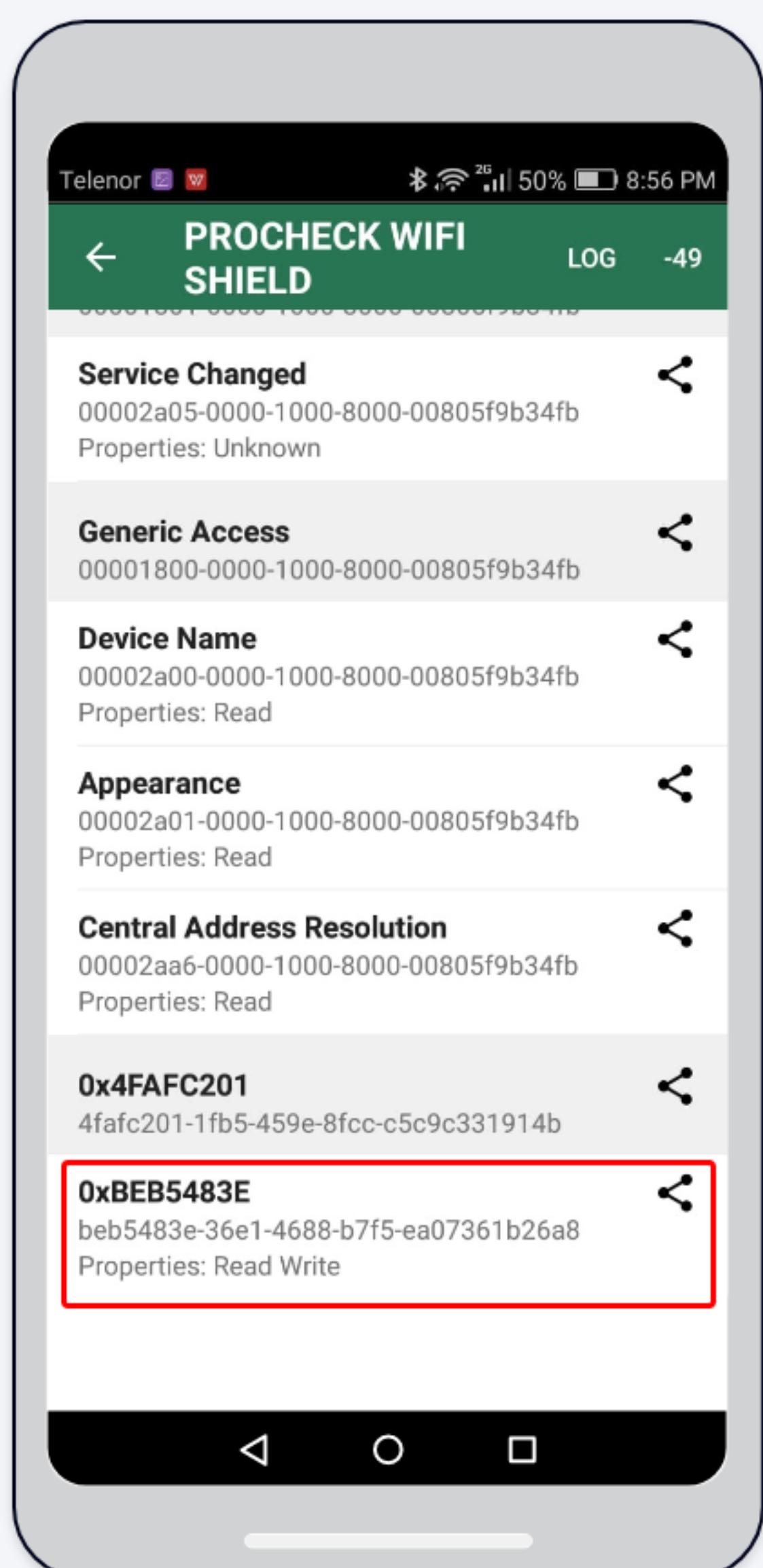
Step 3
Download B-BLE (BLE4.0) Scan from Playstore

Configuration Of Wifi And Troubleshooting



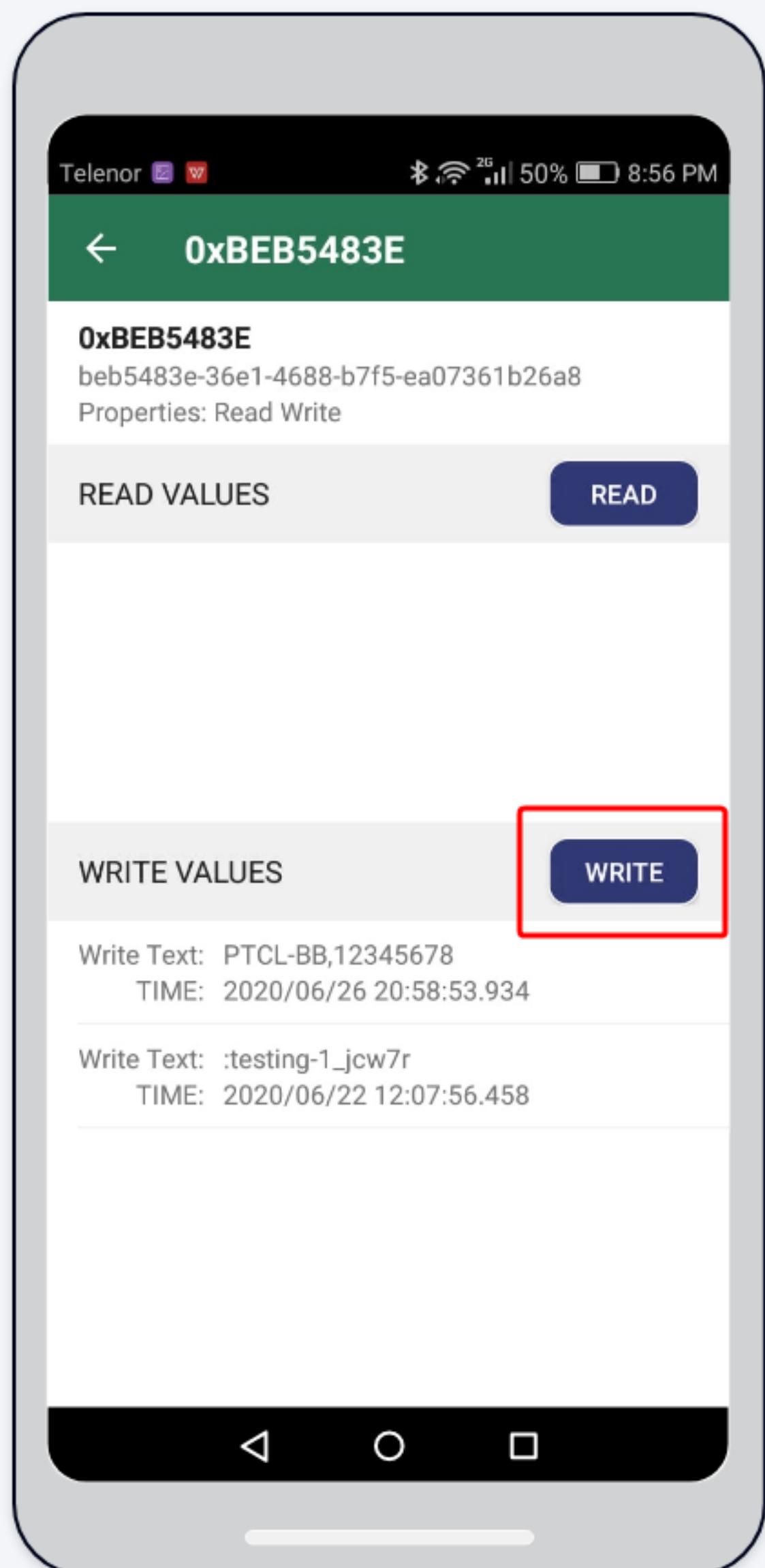
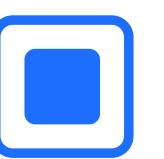
Step 4

Open the app and connect to Procheck WIFI Shield

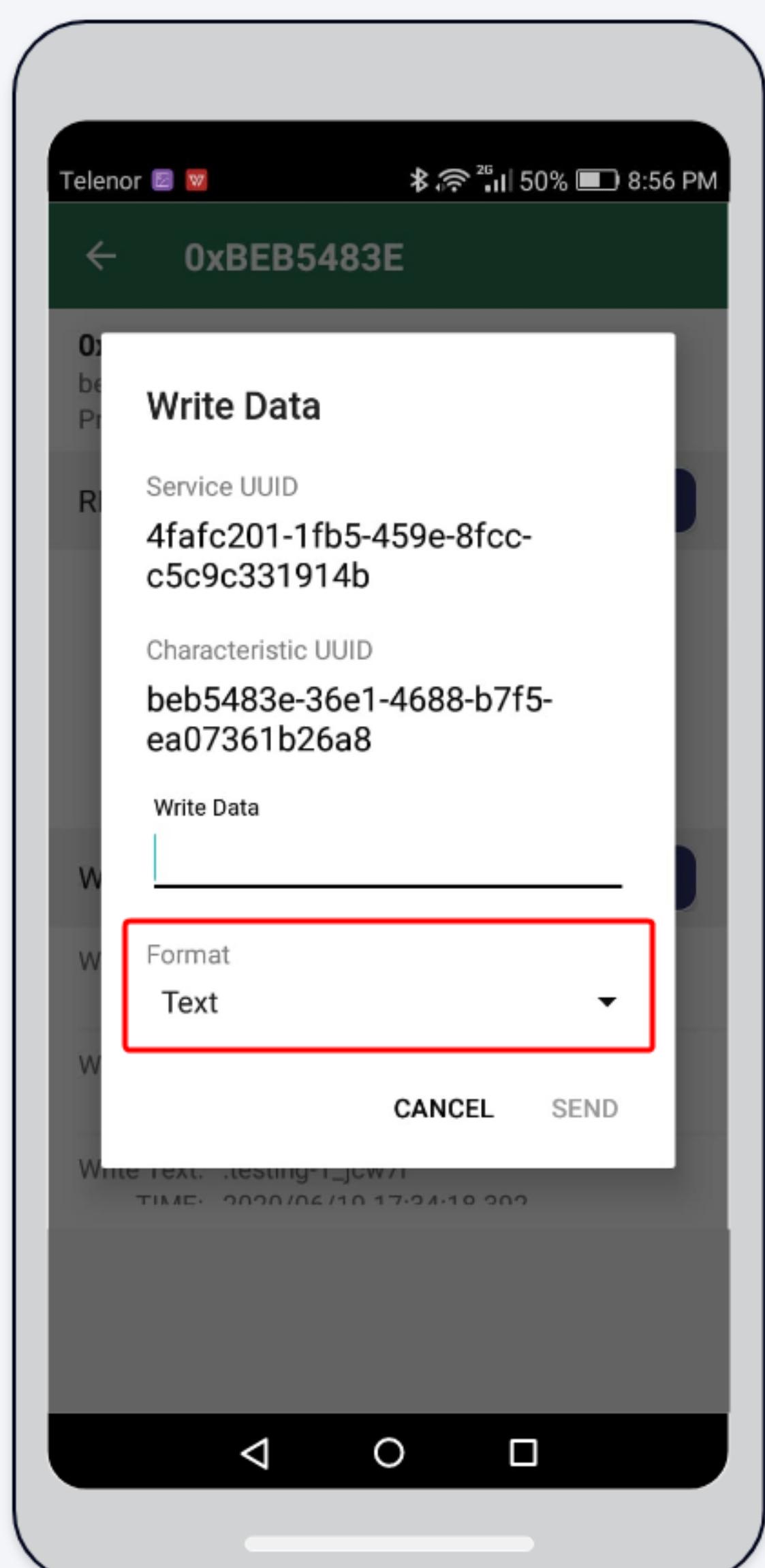


Step 5

Click over the icon having properties as 'Read Write'



Step 6
Click on the “Write” icon.



Step 7
Change Format to Text

Configuration Of Wifi And Troubleshooting

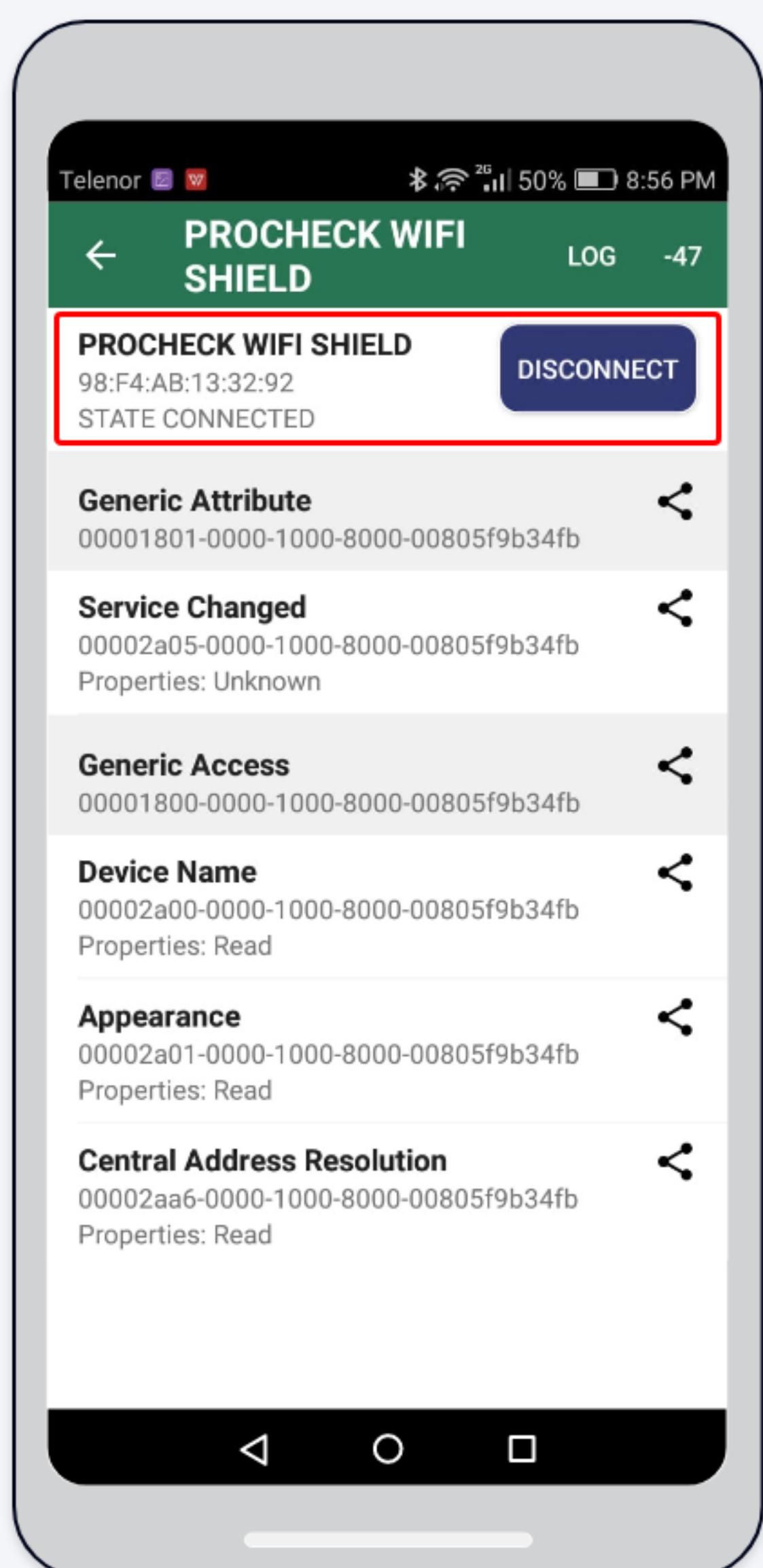


Step 8

Type WIFI credentials with the following format:

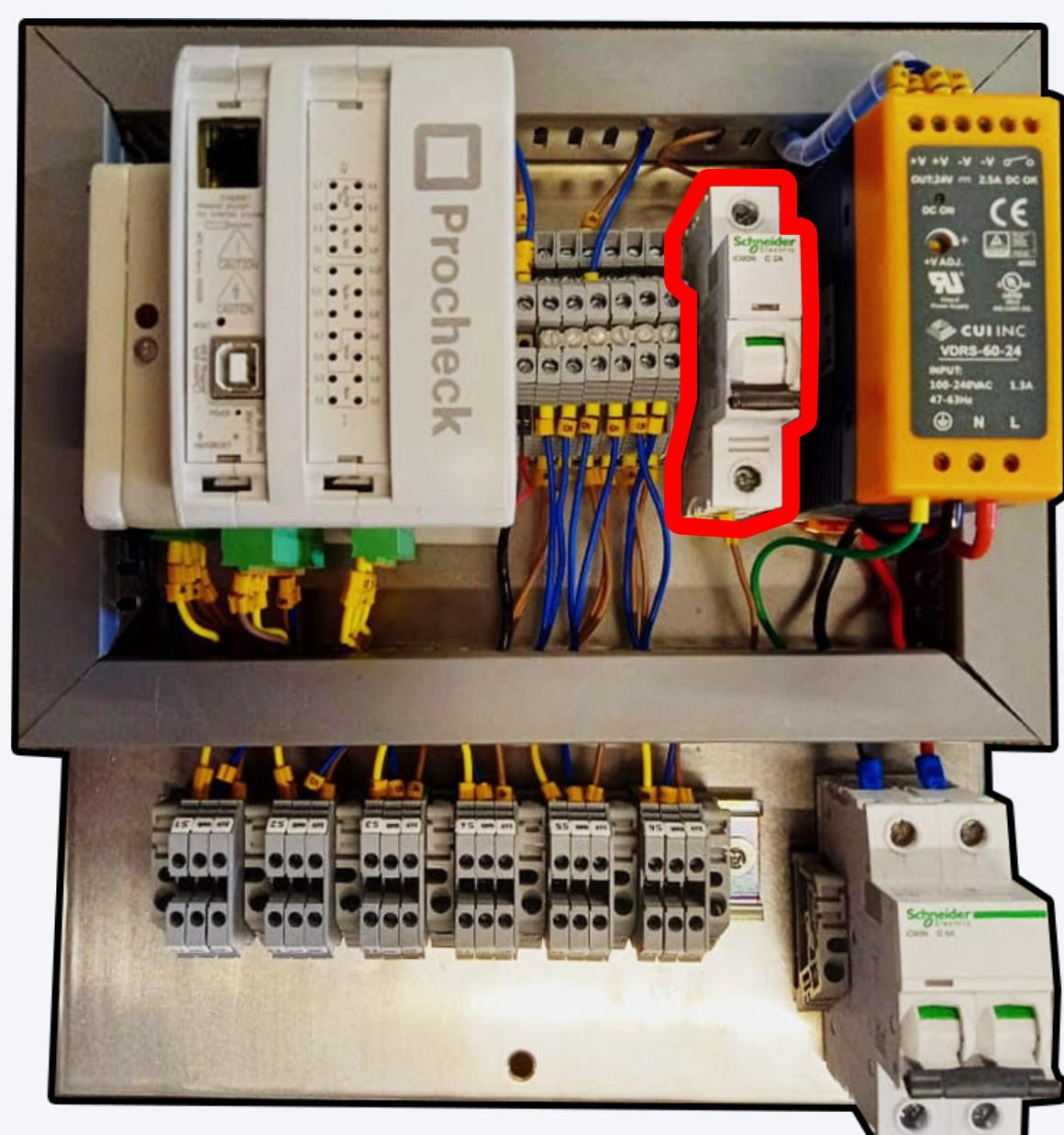
WIFI Name, Password

Note: Do not put a space after the comma





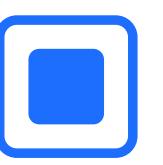
Step 9
Turn OFF main breaker



Step 10
Turn OFF Bluetooth breaker



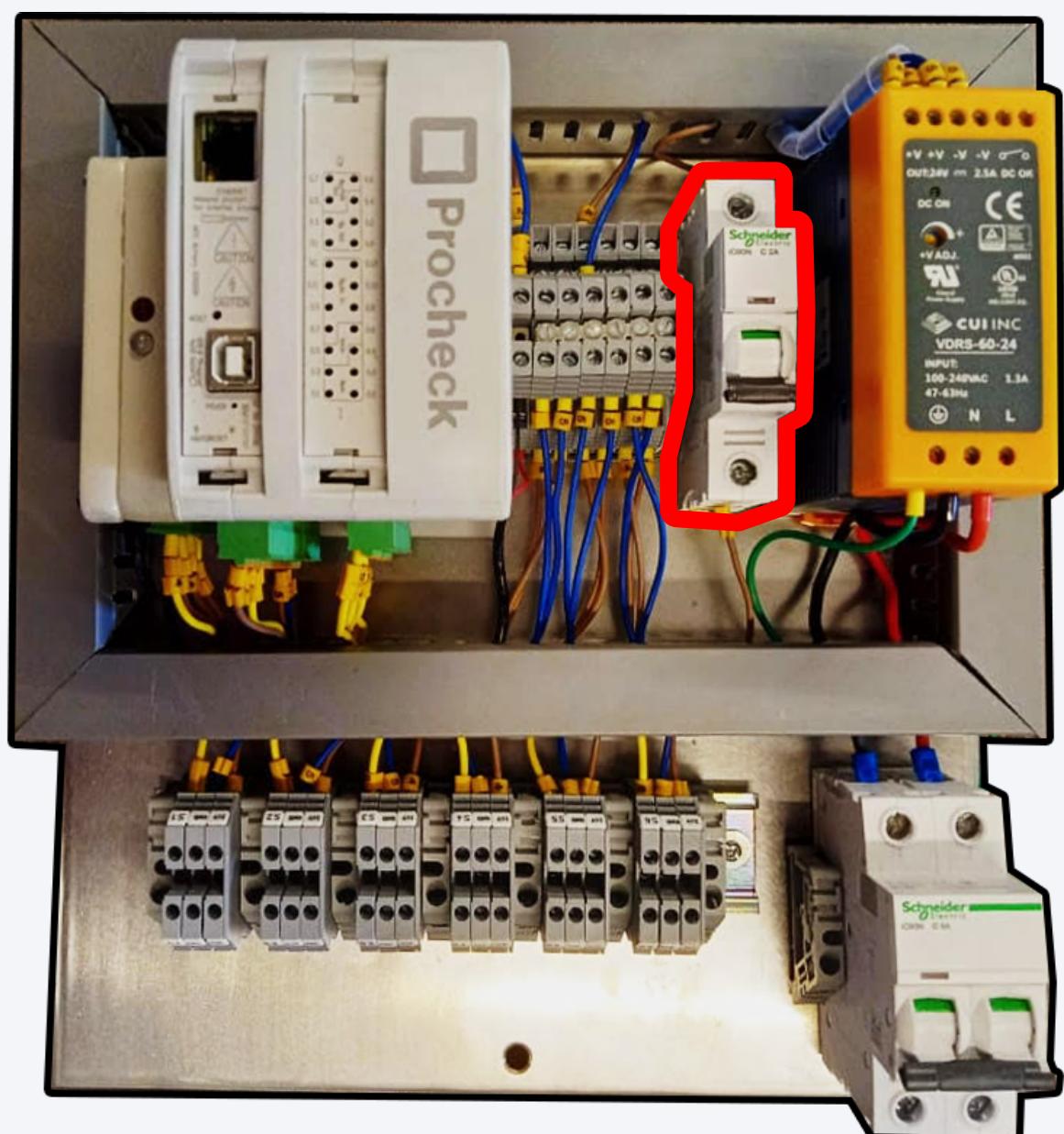
Step 11
Turn ON main breaker



5.2 For iOS Users



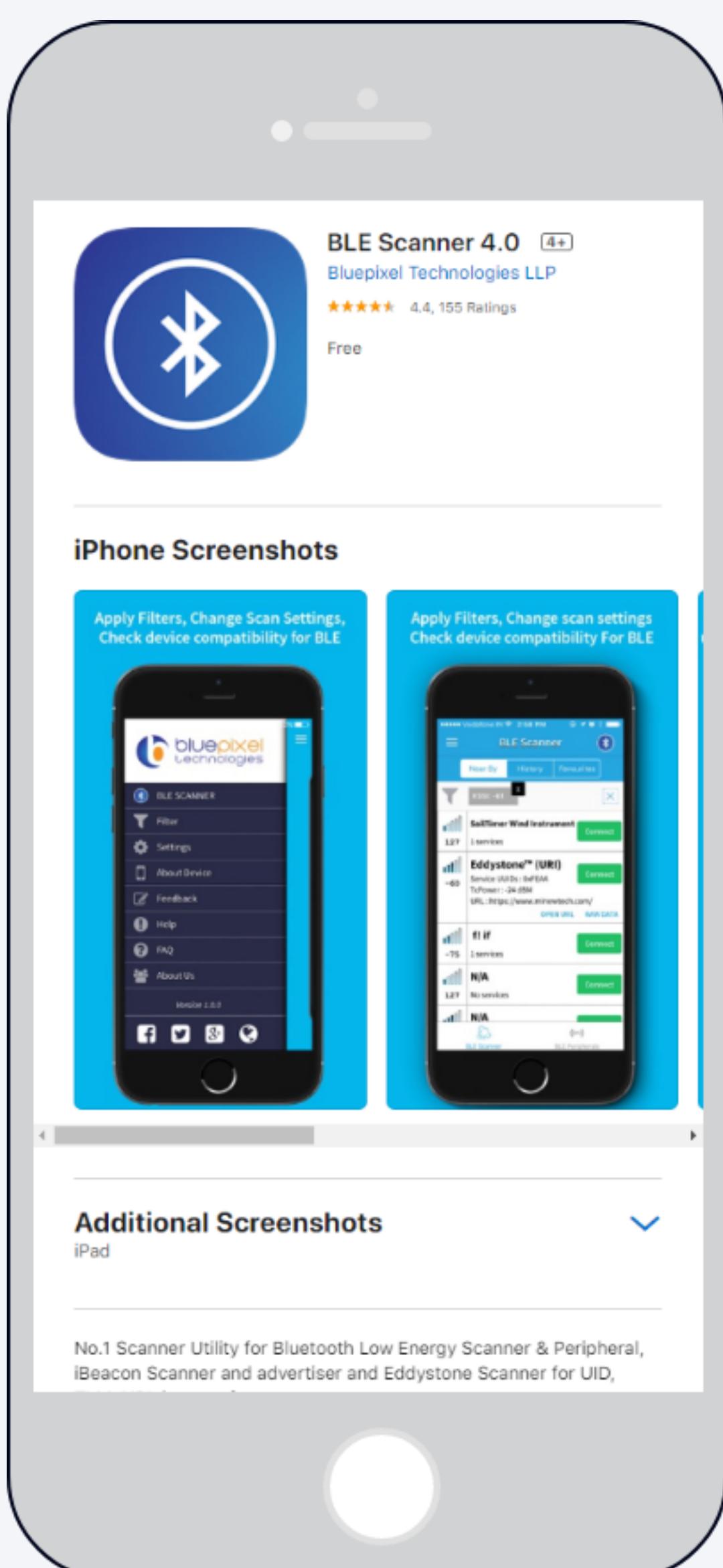
Step 1
Turn OFF main breaker



Step 2
Turn ON Bluetooth breaker

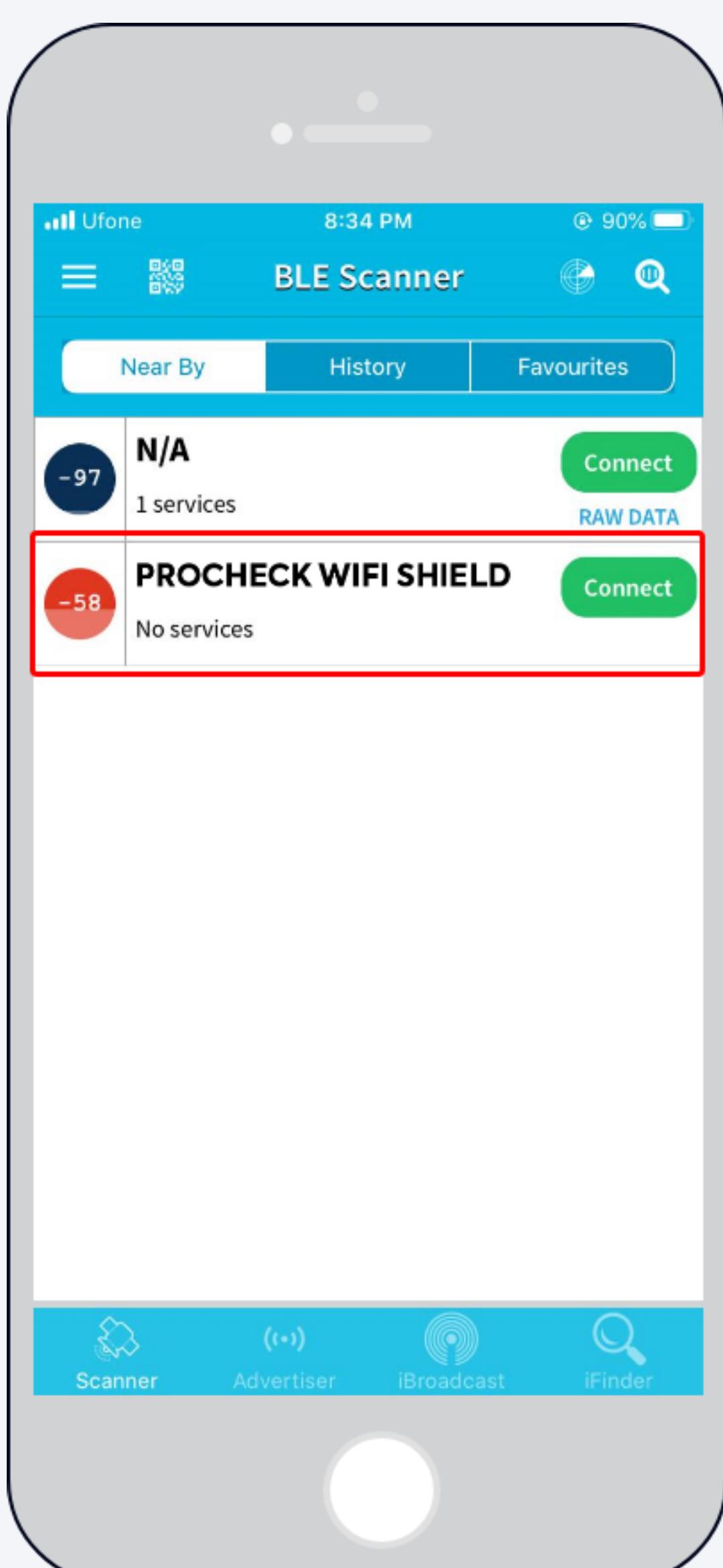


Step 3
Turn ON main breaker



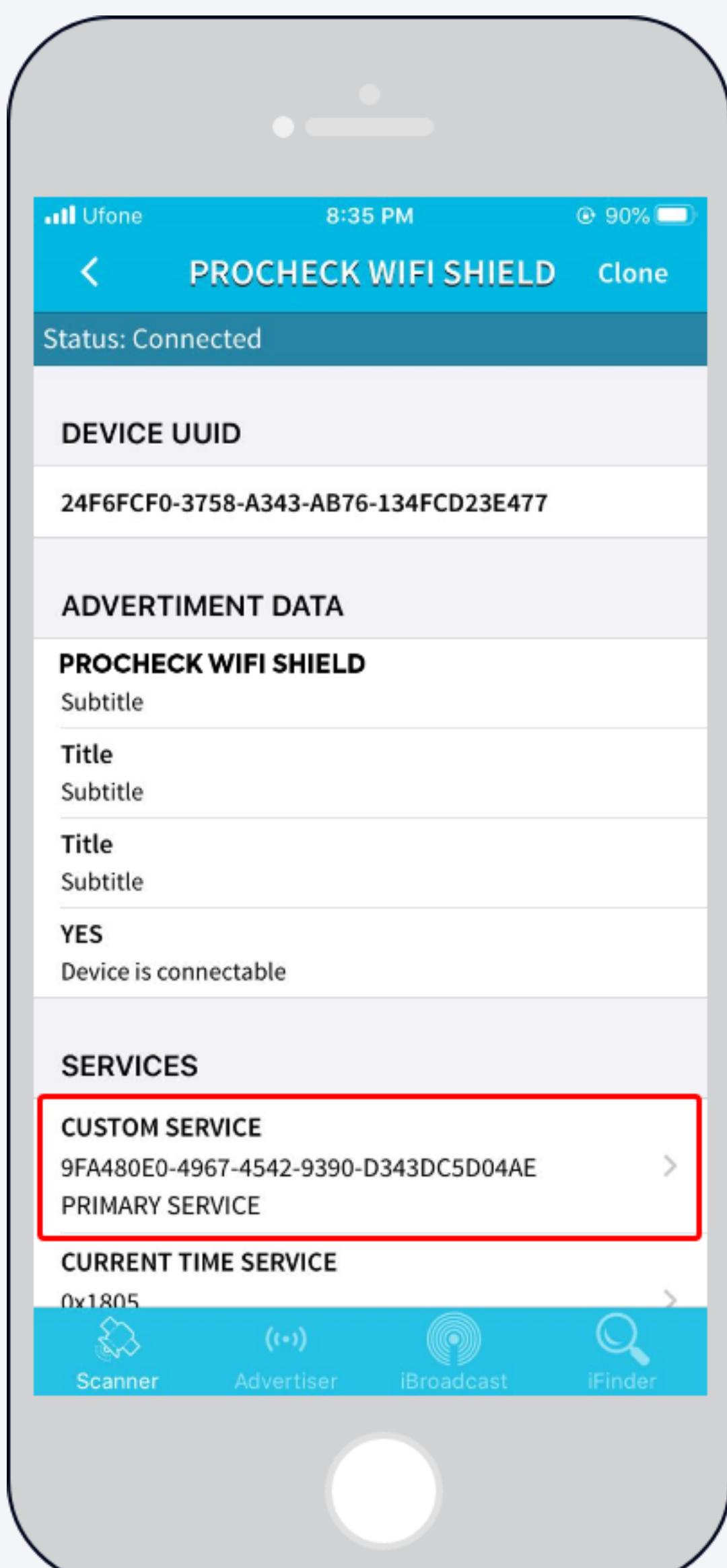
Step 4

Download BLE Scanner 4.0 from app store



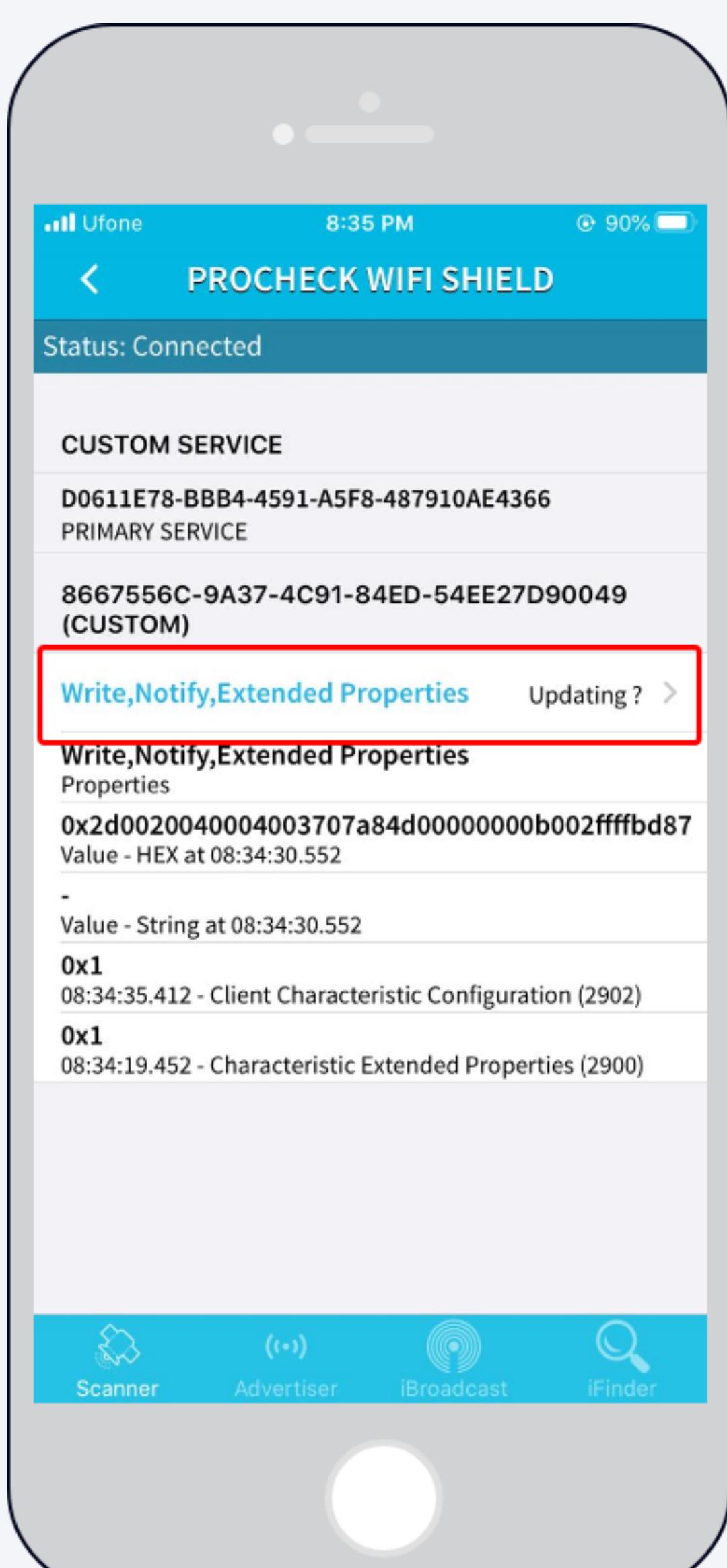
Step 5

Open the app and connect to PROCHECK WIFI Shield



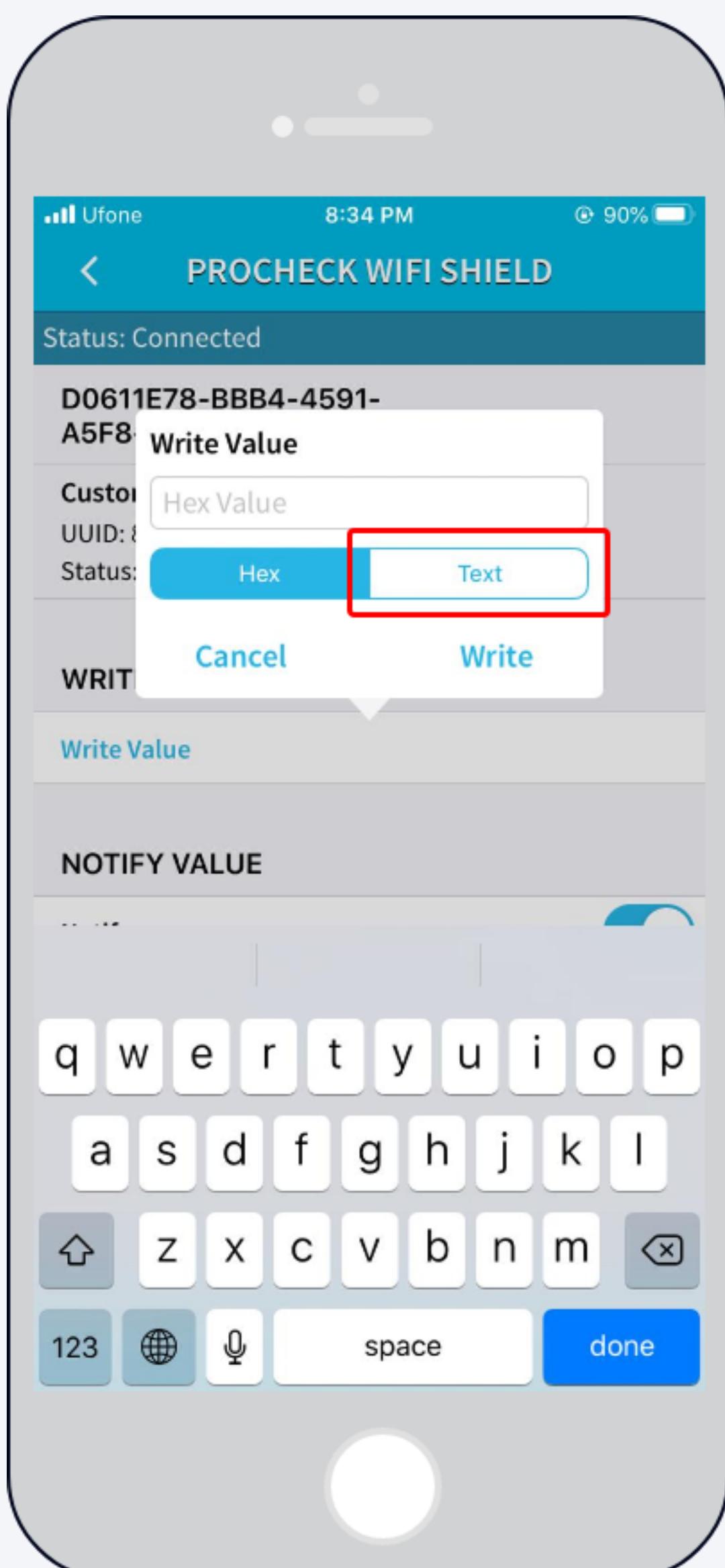
Step 5

Check over the custom service Icon

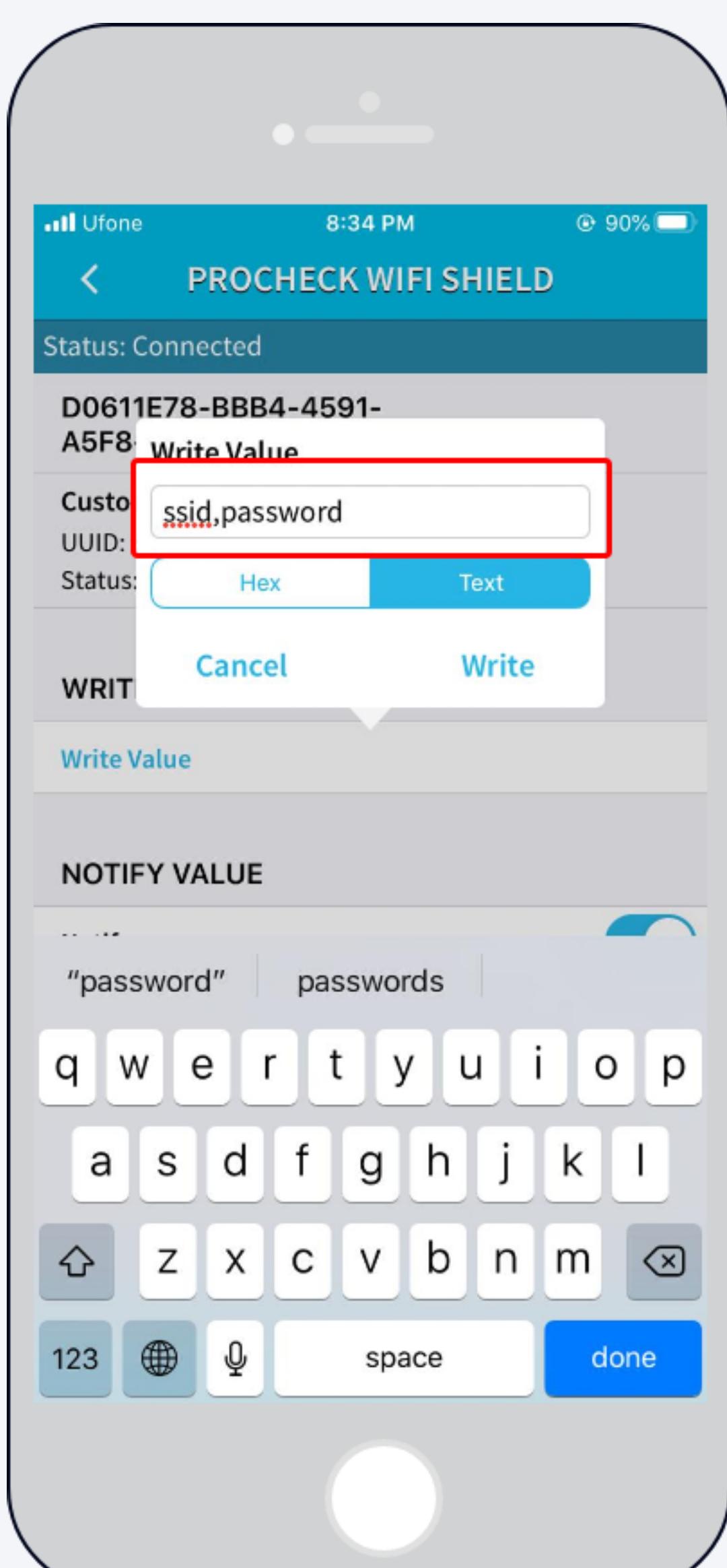


Step 6

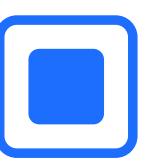
Click over the icon having properties as 'Read Write'



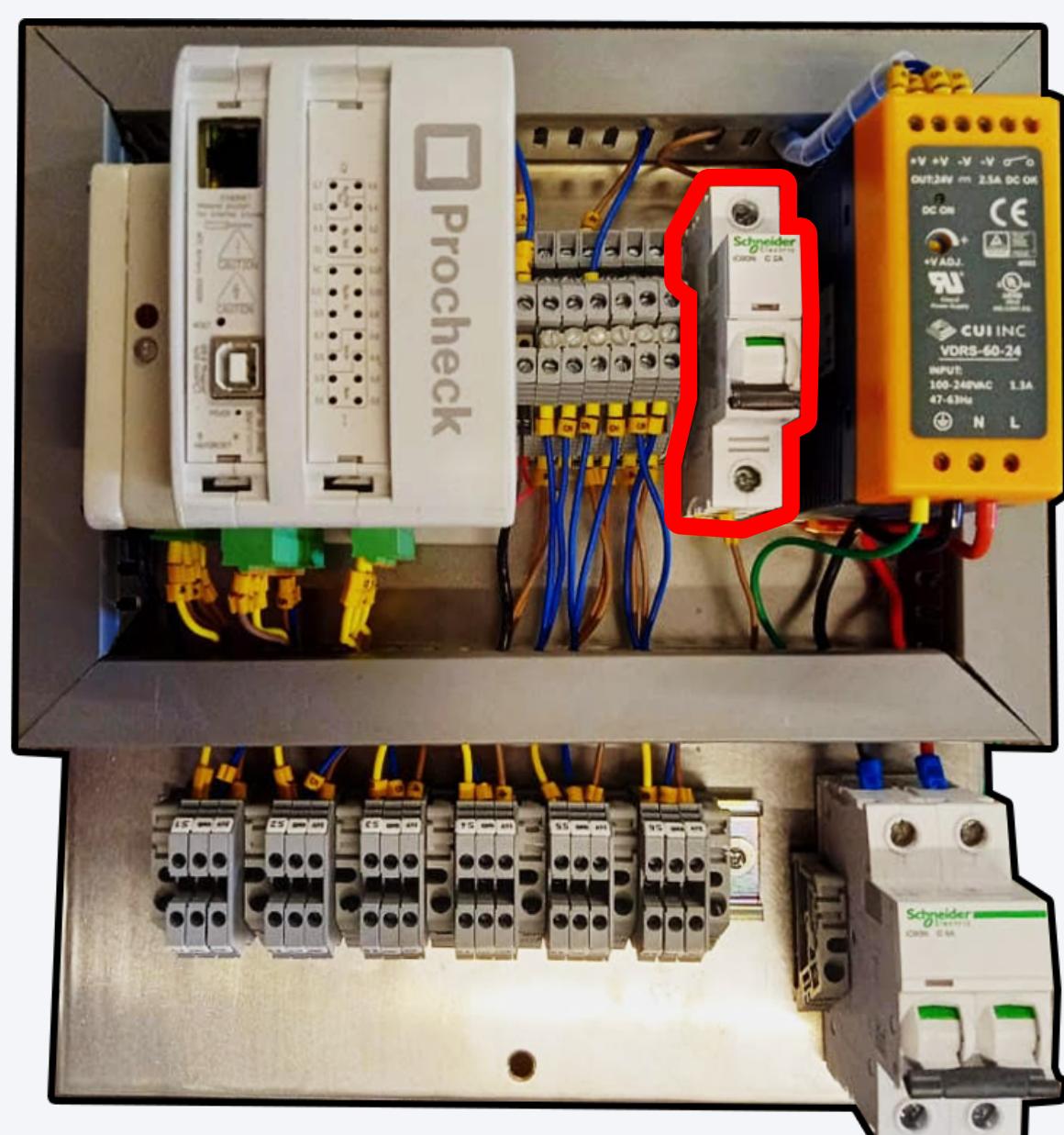
Step 7 Change Format to Text



Step 8 Type WIFI credentials with the following format: **WIFI Name, Password** *Note: Do not put a space after the comma*



Step 9
Turn OFF main breaker



Step 10
Turn OFF Bluetooth breaker



Step 11
Turn ON main breaker



Internet Troubleshooting

A stable internet connection is required for data transmission. Unstable connections can result in false outputs and impact results.

To check internet connectivity:

1. Download the WiFi Analyzer application from Google Play Store (Android) or WiFi Status (Apple iOS).
2. After the download is successful, open the App. There are certain connection parameters from the app. Please make sure the connection parameters are fulfilled according to the following specifications:

Db (Signal Strength)	Min-40 Max -60 Db
Signal Frequency	2.4 Ghz

Table 4

3. Ensure the product's MAC address is whitelisted in your router.

Note: This step is essential to let PROCHECK's devices access the internet for secure Local Area Networks.

4. The WiFi shield placed besides PROCHECK'S PLC will display two LED lights; **RED** and **RGB**.

The **RED** LED indicates in the following ways:

- a. It blinks when the module is trying to connect to WiFi
- b. It will turn OFF if the connection is successful

The **RGB** LED has three display types:

- a. **RED:** Packet received from the PLC
- b. **GREEN:** Packet transmission successful
- c. **BLUE:** Packet transmission not successful



For support related queries, please contact us at support@procheck.pk
or visit our website www.procheck.pk