ADI OtoSense Smart Motor Sensor Installation Guide

INTENDED AUDIENCE

This section describes the intended audience for this guide.

This guide is intended for operators and administrators who are responsible for installing and configuring SMS devices on motors.

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REVISION HISTORY

1/2025—Revision 0: Initial Version

INTRODUCTION

The ADI OtoSense™ Smart Motor Sensor (SMS) performs predictive maintenance on low-voltage 3-phase induction motors. It is a complete, easy-to-setup hardware and software solution that uses advanced sensors and AI-based data analysis to:

- provide round-the-clock condition-based monitoring
- deliver electrical, mechanical, and thermal health diagnostics with severity levels
- recommend solutions for identified issues

BENEFITS

This section describes the benefits of using an SMS device.

The SMS device translates the collected data into actionable insights. Here are the some of the benefits of using the SMS device:

Non-intrusive Installation: The SMS device can be attached to active motors, ensuring continuous operation.

Enhanced Plant Efficiency: The SMS device monitors the health of a motor's components and sends alerts about anomalies and degradation that can lead to faults, enabling efficient maintenance planning and reducing unexpected breakdowns.

Secure Motor Data: The SMS device safely stores all the motor data on the ADI OtoSense™ Server, preventing data loss during power outages.

Better Inventory Management: The SMS device assists in identifying the required spare components, thereby assisting in minimizing surplus inventory and expenditure.

Reduced Maintenance Costs: The SMS device helps extend motor life by providing maintenance insights that reduce repair costs and downtime.

HOW DOES SMS DEVICE WORK?

This section describes the functionality of an SMS device.

The hardware and software solution consists of the following components:

• The SMS device or hardware

• Expert fault-prediction software hosted on the ADI OtoSense™ Server

• Mobile and web applications that allow customers to monitor the status of motors fitted with an SMS device

After an SMS device is configured and installed on a motor, it begins sending data to the ADI OtoSense™ Server. It undergoes a learning process during which the SMS device creates a unique, customized model of each motor. It measures the multi-axis vibration, magnetic field, and temperature conditions of the motor. With the help of this data, it detects critical anomalies and defects.

The SMS device can identify degradation that could lead to the following motor faults: power system, stator winding, rotor, motor shaft/balance, eccentricity, bearing, alignment, cooling system, loose foot, and overall motor performance.

MOTOR COMPATIBILITY

This section describes the motor specifications that are compatible with the SMS device.

An SMS device can monitor motors with the following specifications:

INTRODUCTION

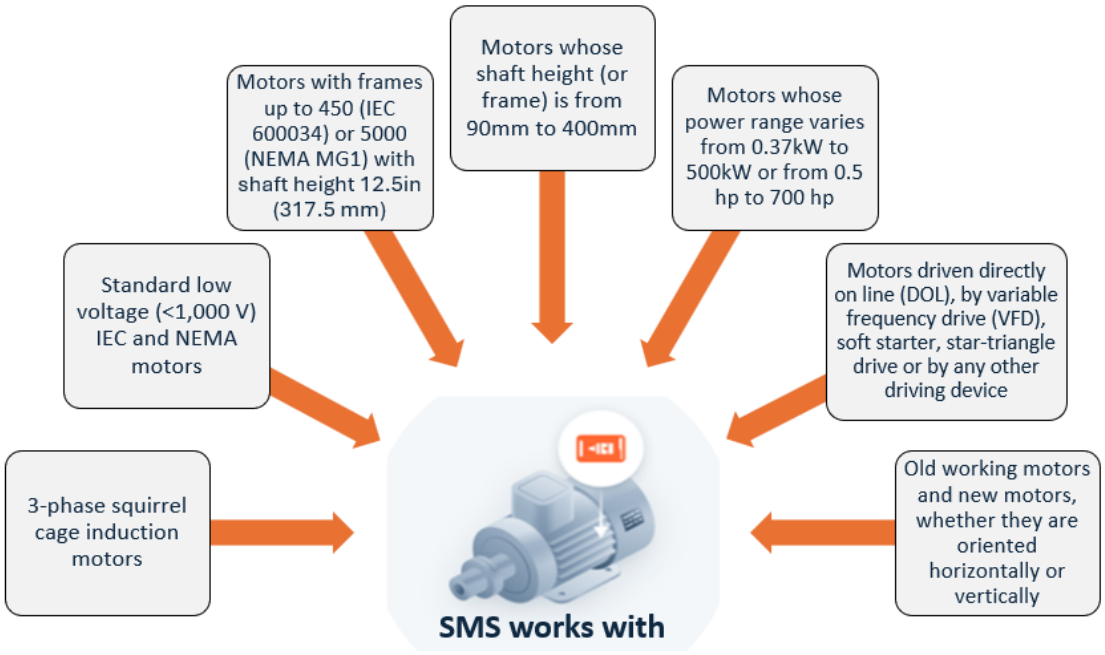

Figure 1. Compatible motor specifications

GETTING STARTED

This section describes the necessary steps to be taken before installation.

VERIFY NETWORK REQUIREMENTS

This section describes the Wi-Fi network configuration required to connect an SMS device to the ADI OtoSense™ Server. It also explains how to check your Wi-Fi network configuration and what to do if you have a corporate firewall.

Verify Wi-Fi Network Configuration

This section describes the process of verifying the Wi-Fi access point, the Wi-Fi security type, and the network availability at the motor location.

The SMS device requires internet connectivity to send data to the ADI OtoSense™ Server . To connect an SMS device to the internet, you must use the plant's local Wi-Fi network. The SMS device can only be connected to a Wi-Fi network that is password-protected and enabled 24/7.

The SMS device supports the following network configuration:

- Dedicated 2.4GHz network
- Security: WEP, WPA, or WPA2

Note: If your network does not meet the above requirements, you can use a Wi-Fi router to connect an SMS device to the ADI OtoSense™ Server . For more information, see Recommendations to Purchase a Router.

To verify Wi-Fi access point:

1. Locate your plant Wi-Fi router.
2. Check the settings on the back of the router. Verify that the Wi-Fi access point is 2.4GHz 802.11b/n/g.

Figure 2. Wi-Fi router details

To verify Wi-Fi security type:

1. Go to the Wi-Fi settings on your mobile device.
2. Select the Wi-Fi name to see the security type. Ensure that the Wi-Fi security is either WEP, WPA, or WPA2.

To verify Wi-Fi network availability at the motor location:

1. Go to the motor location.

GETTING STARTED

2. Open the Wi-Fi settings in your mobile device to see if the local Wi-Fi network is available.

Note: The minimal Wi-Fi signal strength must be greater than -60dB at the motor location.

Configure Firewall Ports

This section describes what to do if you have a corporate firewall.

If you have a corporate firewall, you may need to configure your firewall ports to allow an SMS device to connect to the ADI OtoSense™ Server.

To enable secure communication and remote updates, configure the required firewall ports for SMS device connectivity.

1. Open Port 8883 (MQTT over TLS/SSL)

Message Queuing Telemetry Transport (MQTT) protocol is used to exchange application messages. It relies on Transport Layer Security (TLS) for communicating securely between an SMS device and ADI OtoSense™ Server .

Note:

- Initially, allow all traffic on Port 8883 in order to pass the Validate Wi-Fi Network. The Network Validator tool tests if the port is open.
- Port 8883 must allow inbound traffic for Over-the-Air (OTA) updates to the SMS device .

1. Open Port 443 (HTTPS)

Hypertext Transfer Protocol Secure (HTTPS) protocol is used to securely communicate between user's web browser and the ADI OtoSense™ Server .

Whitelist Domains

This section describes the domains that you need to whitelist.

Whitelist the following domains to ensure uninterrupted connection and data processing. This is required for the device to safely connect to essential services.

- *.otosensesms.com - To direct communications and data exchange between an SMS device and the ADI OtoSense™ Server .
- *.amazonaws.com - To communicate securely with AWS resources because the SMS device relies on Amazon Web Services (AWS).

Note:

- The SMS device does not currently support IP address whitelisting. For more information on firewalls that support AWS IP ranges, see Firewall Support for AWS IP Ranges.
- If you need to whitelist the device MAC addresses on your network, the MAC addresses are available upon request.

PREPARE A MOBILE DEVICE

This section describes the mobile devices and the OS versions compatible with the SMS mobile app .

To commission a new SMS device , a mobile device is mandatory. You can use a smartphone or a tablet with either Android or iOS operating system. The mobile device must be able to connect to the plant's Wi-Fi network.

Note: You cannot use a Windows tablet.

The following OS versions are compatible with the SMS mobile app :

- Android: OS6.0 or later
- iOS13 or later

DOWNLOAD SMS MOBILE APP

This section describes the process of downloading the SMS mobile app to your mobile device.

An SMS device is commissioned using the **ADI OtoSense™ SMS** mobile application, available for iOS and Android.

To download the SMS mobile app :

GETTING STARTED

1. Scan the respective QR code from your mobile device's camera.

Figure 3. QR code for iOS devices

Figure 4. QR code for Android devices

1. Install the **ADI OtoSense™ SMS** app from the App Store or from Google Play.
2. Follow the on-screen instructions to complete the app installation.

ACTIVATE SMS ACCOUNT

This section describes the process of activating your SMS account to be able to log in to the SMS mobile and web applications.

Your ADI representative will send an invitation email with a link to activate your SMS account. You must first activate your account through a two-step authentication process.

To activate your account:

1. Open the invitation email and tap the link provided to open the SMS mobile app .
2. On the Welcome screen, enter or confirm your first name and last name.
3. Enter a password as per the ADI OtoSense™ password policy.
4. Check your email for a verification code.
5. Return to the SMS mobile app and enter the verification code.
6. Tap **Verify Email**.
7. The account is activated successfully.

GETTING STARTED

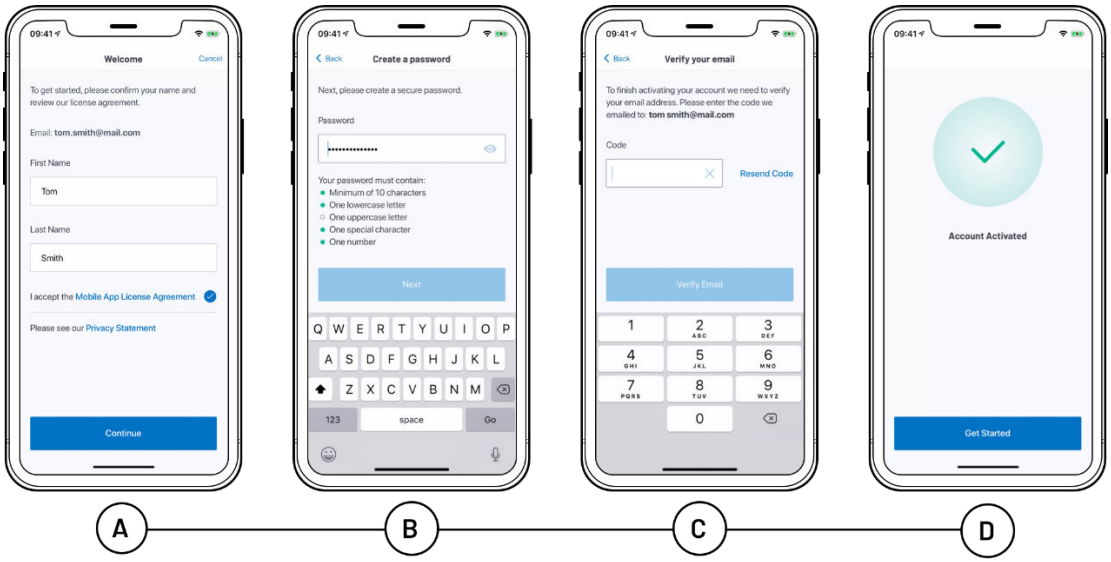

Figure 5. Process of activating an SMS account

CONNECT MOBILE DEVICE TO AN EXISTING WI-FI NETWORK

This section describes how to connect your smartphone or tablet to an existing Wi-Fi network in the plant or to the router provided by Analog Devices/Partner.

Prerequisite: Ensure that the Wi-Fi network meets the requirements outlined in Verify network requirements.

To connect the mobile device to an existing Wi-Fi network:

1. Unlock the iOS mobile device.
2. Open Control Center and tap **Wi-Fi**.
3. From the list of Wi-Fi networks, select the plant or partner Wi-Fi network.

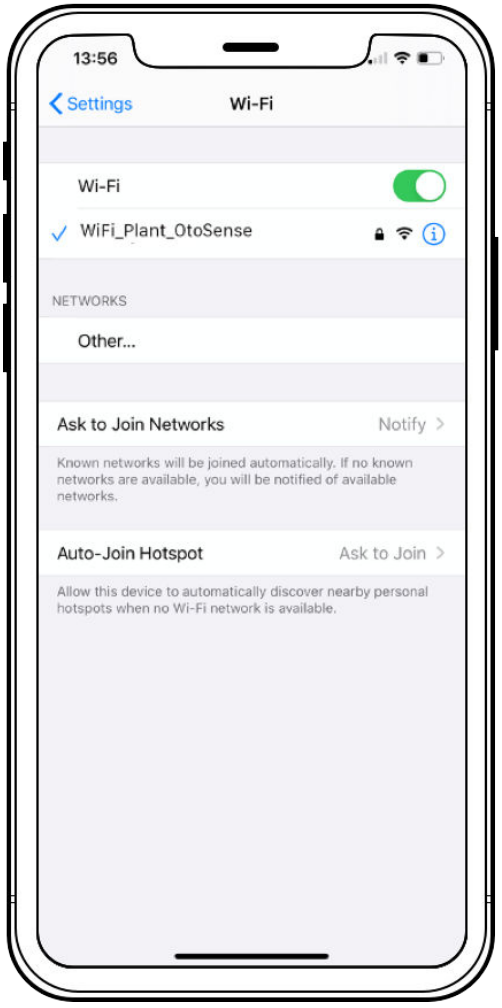

Figure 6. Mobile device connected to the plant's Wi-Fi

Note: If you are experiencing poor Wi-Fi or Internet connection during commissioning, contact your company's IT department to request guidance on improving your router signal.

VALIDATE WI-FI NETWORK

This section describes how to validate your plant's Wi-Fi network. This is to ensure that the network is robust enough to establish a reliable connection between an SMS device , the SMS mobile app , and the ADI OtoSense™ Server .

When deploying an SMS device in a new location, it is recommended to use the Network Validator tool that is available on the SMS mobile app . This tool tests your network setup using four different parameters: signal strength, frequency, internet connectivity, and SMS cloud access.

Note: On iOS devices, the Network Validator tool tests your network setup using only two parameters: internet connectivity and SMS cloud access.

To validate Wi-Fi Network:

1. Go to the motor location.
2. Log in to the SMS mobile app on your mobile device with your credentials. If you are entering information in this account for the first time, you will see the prompt **'Validate your Wi-Fi network'** on the Dashboard.

Note: If this is not your first time entering information in this account, then go to **Settings** and tap **Network Validator**. In the next screen, tap **Validate** to run the Network Validator tool.

GETTING STARTED

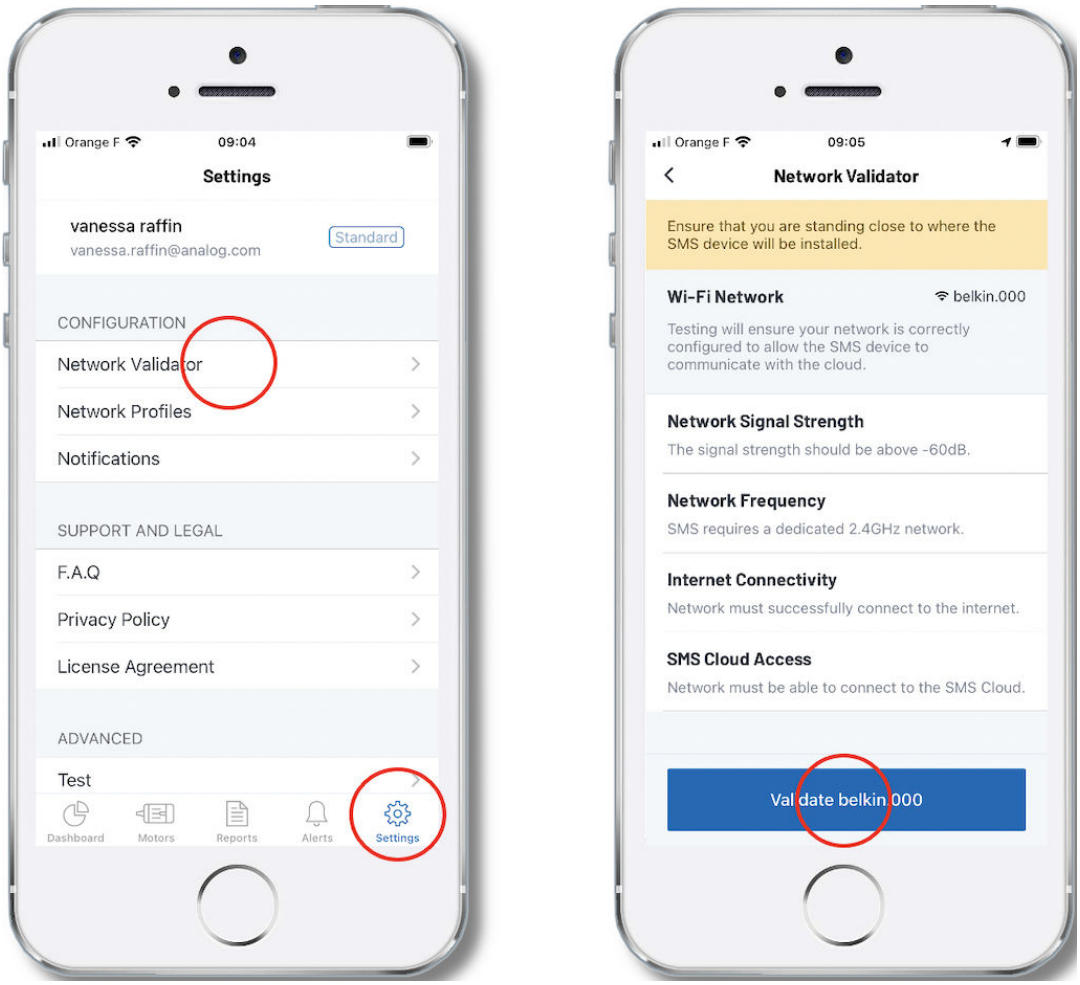

Figure 7. Settings Network Validator tool

1. Tap **Validate your Wi-Fi network**.

GETTING STARTED

Figure 8. Validate your Wi-Fi network screen

2. Confirm that you passed the last two parameters:
   a. Internet Connectivity
   b. SMS Cloud Access

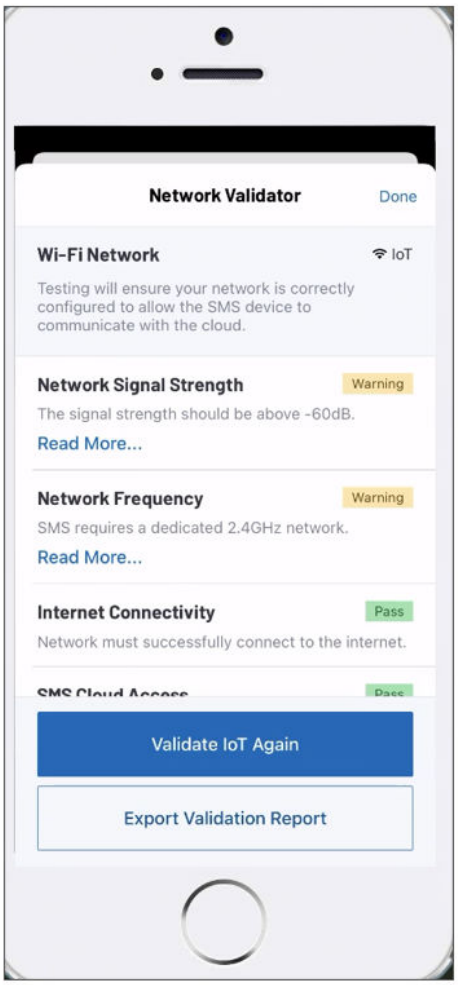

Figure 9. Network validation report

Note: On iOS devices, the first two parameters cannot be confirmed. Ignore the “Warning” sign.

1. For iOS devices, use a Wi-Fi analyzer tool such as Microsoft’s Wifi Analyzer running on an Android or Windows device to confirm your network signal strength.

Note: The signal strength must be greater than -60dB at the motor location.

1. Tap **Done** on the top-right of the screen.
2. Check the back of the plant’s Wi-Fi router to verify that the Wi-Fi access point is 2.4GHz 802.11b/n/g.

Note: For more information, see Verify Wi-Fi Access Point.

KEEP SMS SHIPMENT BOX HANDY

This section describes the installation tools required.

You will receive a shipment box from the ADI team which will contain the SMS device along with some installation tools. Additionally, you will require a few other installation tools that do not come with the shipment box. See "Unboxing SMS shipment box" section for details on all the installation tools required.

READ AND FILL MOTOR INFORMATION FORM

This section describes the procedure for filling out the Motor Information Form.

GETTING STARTED

To make the motor configuration process easier, download and fill out the following Motor Information Form. See the motor's nameplate to find the required details.

Note: You can also find the Motor Information Form in the Reference section.

INSTALLATION

This section describes the process of installing an SMS device on a motor. The installation process has two distinct phases:

1. Commissioning the SMS device on the SMS mobile app
2. Installing the SMS device on the motor

The commissioning process is implemented on the SMS mobile app . It involves establishing a connection between the SMS device , the SMS mobile app , and the ADI OtoSense™ Server . The installation process involves physically attaching the device to the motor.

Before commissioning an SMS device , Download SMS Mobile App and Activate SMS Account.

COMMISSION SMS USING THE SMS MOBILE APP

This section describes the process of commissioning a new SMS device .

The commissioning process can be broken down into the following steps:

1. Insert batteries into the SMS device and establish a connection with the mobile device
2. Enter motor details
3. Assign a location, plant, and process to the motor with the SMS device

The instructions described in the next sections are applicable to both the iOS and Android mobile devices except where indicated.

Alternatively, you can watch the tutorial video on how to commission an SMS device .

Commission the SMS Device

This section describes the process of commissioning an SMS device which involves:

1. powering up the SMS device by inserting batteries into it and
2. establishing a connection between the SMS device , the SMS mobile app , and the ADI OtoSense™ Server .

Prerequisite: Ensure you have the following tools handy:

- the SMS device (found in the SMS shipment box)
- four batteries (found in the SMS shipment box)
- A 3mm, 2.5mm Hex Wrench

To commission your SMS device :

1. Log in to the SMS mobile app on your mobile device with your credentials.
2. Tap **Dashboard** or **Motors** on the bottom of the screen.
3. Do one of the following:
   - If this is the first SMS device being added to your account, tap **Add new SMS device** to start commissioning the SMS device .

INSTALLATION

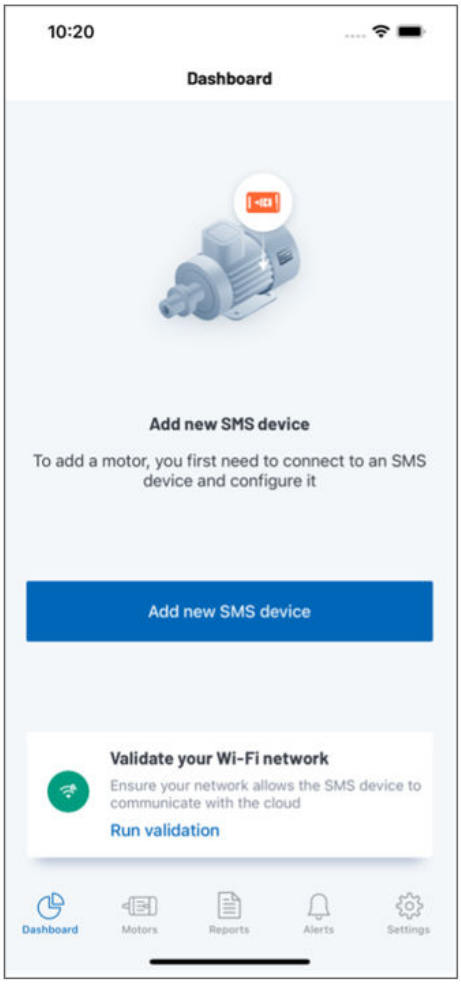

Figure 10. Dashboard tab - Add New SMS Device screen

INSTALLATION

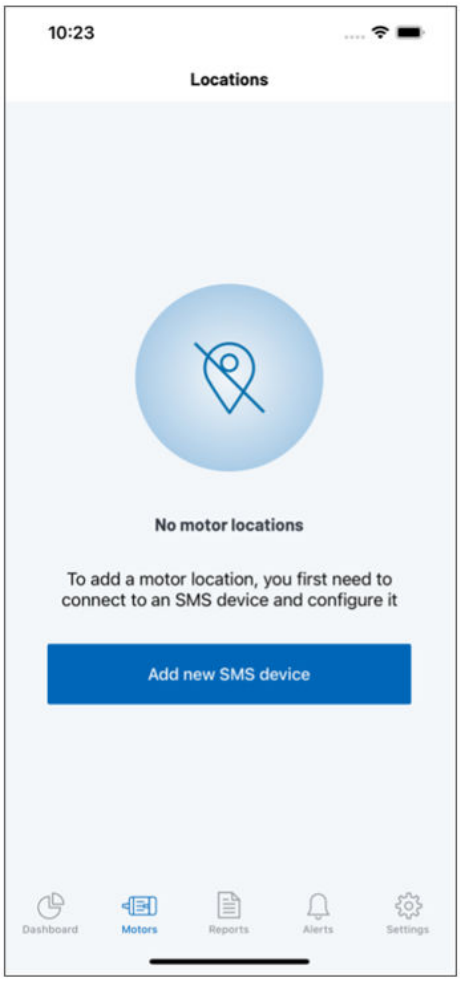

Figure 11. Motors tab - Add new SMS device screen

▶ If SMS device s have been added previously, navigate to **Motors**.

1. Tap Add Location.
2. Assign a Location, Plant and Process.
3. Tap **Add Motor** and continue from Step 5.

   a. In the Locations Permissions screen, tap **Allow Access**. In the pop-up that appears, tap **Allow While Using App**.

INSTALLATION

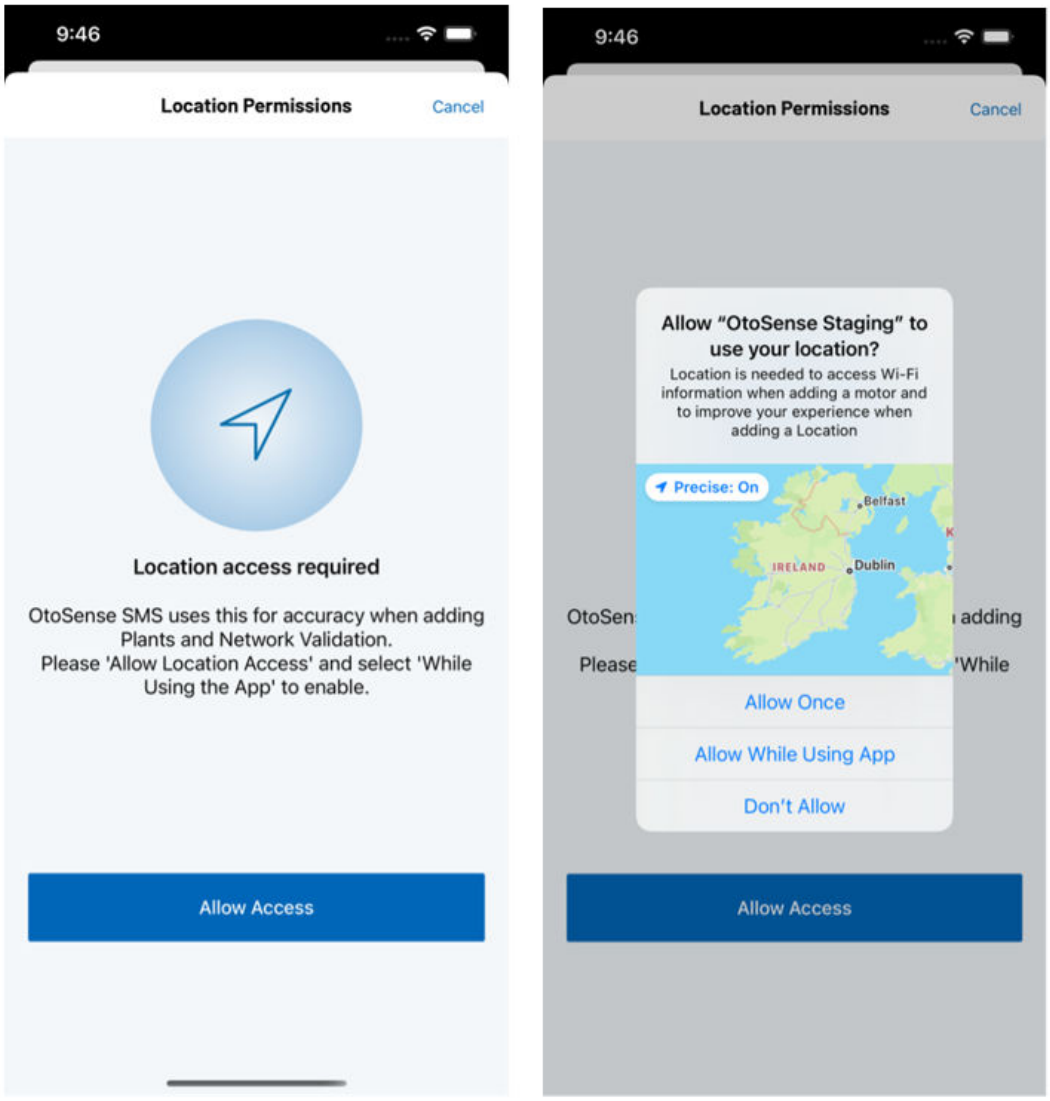

Figure 12. Location Permissions screen on iOS device

Note: The app requires your location information to access Wi-Fi information. This screen appears only if location access has not already been granted.

1. In the next screen, confirm the name of the current Wi-Fi network connected to the mobile device and ensure it is functional.

Note: You can also test the network at this point again by tapping **Test Network**. The SMS mobile app will Validate Wi-Fi Network.

INSTALLATION

Figure 13. Connect to Wi-Fi Network screen

1. Tap Use Network.

The next screen prompts you to insert the batteries into the SMS device .

Note: If you want to use another network, tap **Select another network**.

1. Remove the four outer screws of the SMS device and remove the orange cover.

Caution: Handle the device carefully to avoid damage to the battery or internal components.

INSTALLATION

Figure 14. Outer screws of the SMS device

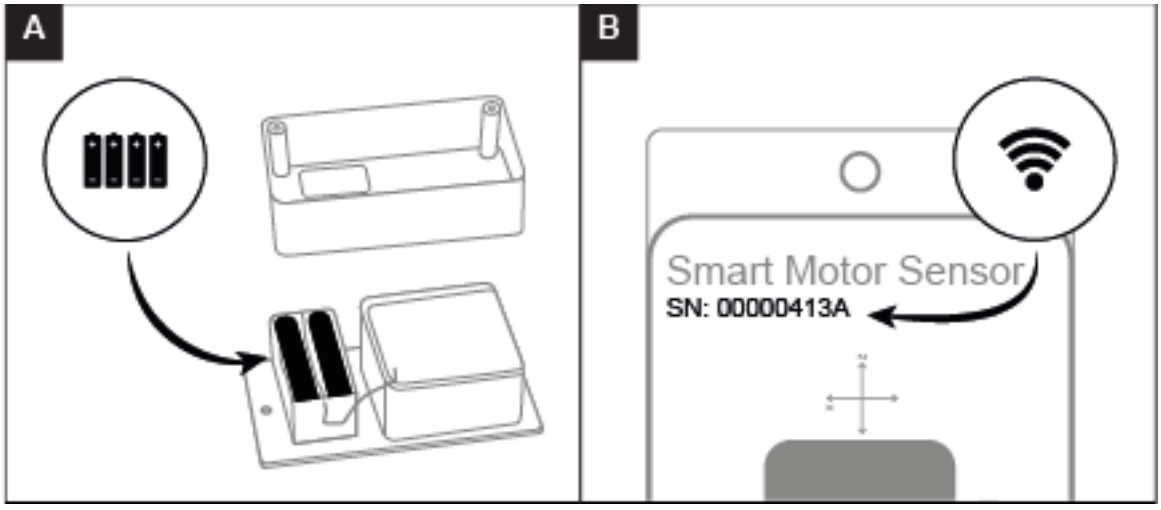

Figure 15. Battery holder in the SMS device and the Wi-Fi network generated by the SMS device

1. Insert the four batteries on either side of the battery holder.
2. Place the orange cover back and tighten the screws. Ensure that the foam area covers the battery holder.

INSTALLATION

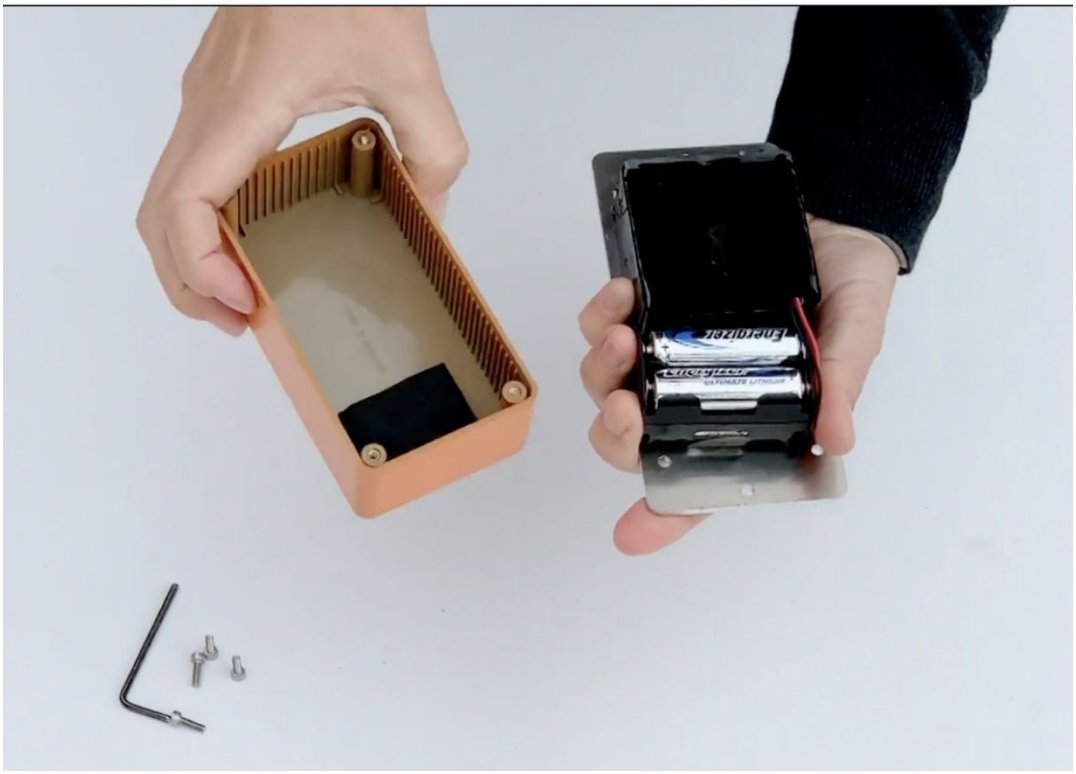

Figure 16. Position of the orange cover before re-inserting the screws

3. On the SMS mobile app , tap **Batteries have been inserted**. Powering up the device will generate a Wi-Fi network with the same numbering as the device, for example: SMS00000413A.

INSTALLATION

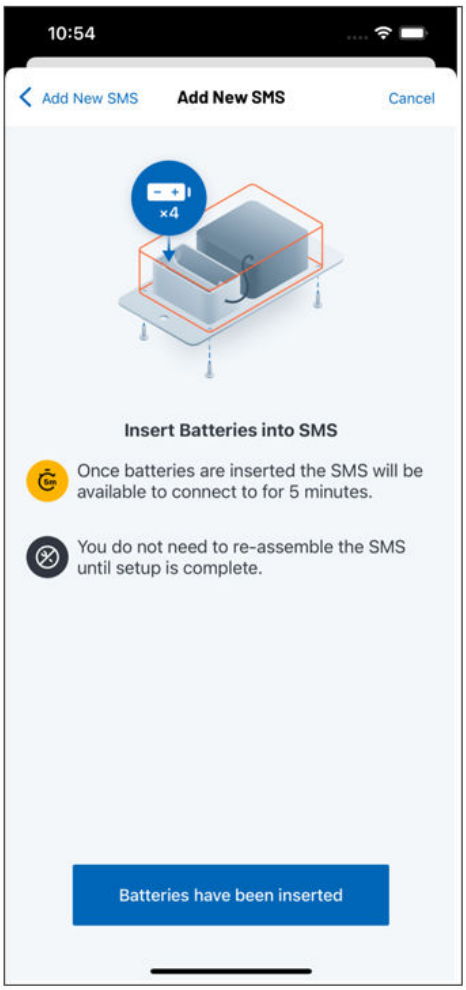

Figure 17. Insert Batteries into SMS screen

Note:

- The following section describes the process of establishing a connection between the mobile device and the Wi-Fi network generated by the SMS device .
- This process must be completed within 5 minutes because the network cannot remain active any longer.
- If for any reason you do not succeed in commissioning the device within the 5-minute timeframe, then remove the batteries, wait for roughly 20 seconds, re-insert the batteries, and start the process again.

1. On iOS devices, access your smartphone or tablet's Wi-Fi settings.

Note: On Android devices, the available Wi-Fi networks are displayed in the SMS mobile app itself.

1. Connect to the Wi-Fi network starting with 'SMS'. Wait until the blue tick appears to confirm that the connection with the SMS device has been established.
2. Return to the SMS mobile app .

Note: When using an iOS device, if it takes more than 90 seconds for the connection to be established. You may see a pop-up message asking you if you want to use cellular data instead of Wi-Fi. Select **Keep Trying Wi-Fi**.

INSTALLATION

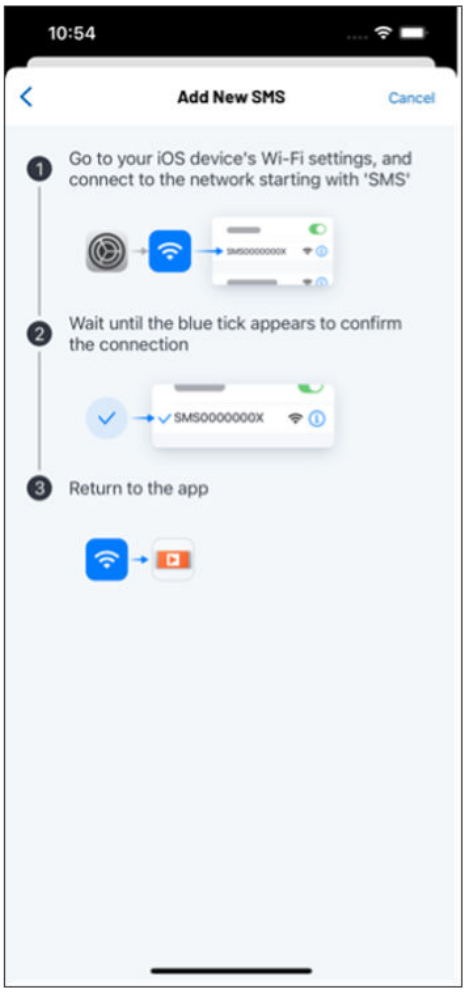

Figure 18. Add New SMS screen with instructions

1. Once connected, tap **Next Step**. The list of available local Wi-Fi networks will appear.
2. Select the plant's Wi-Fi network, enter its password and tap **Save**.

INSTALLATION

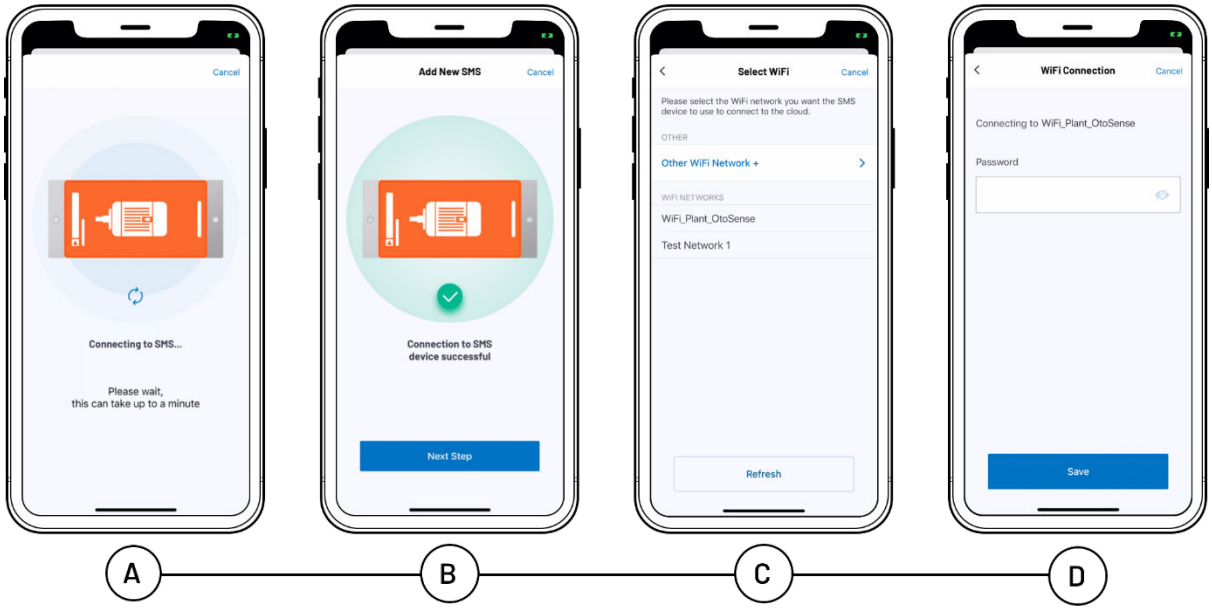

Figure 19. Process of connecting an SMS device and selecting plant's Wi-Fi

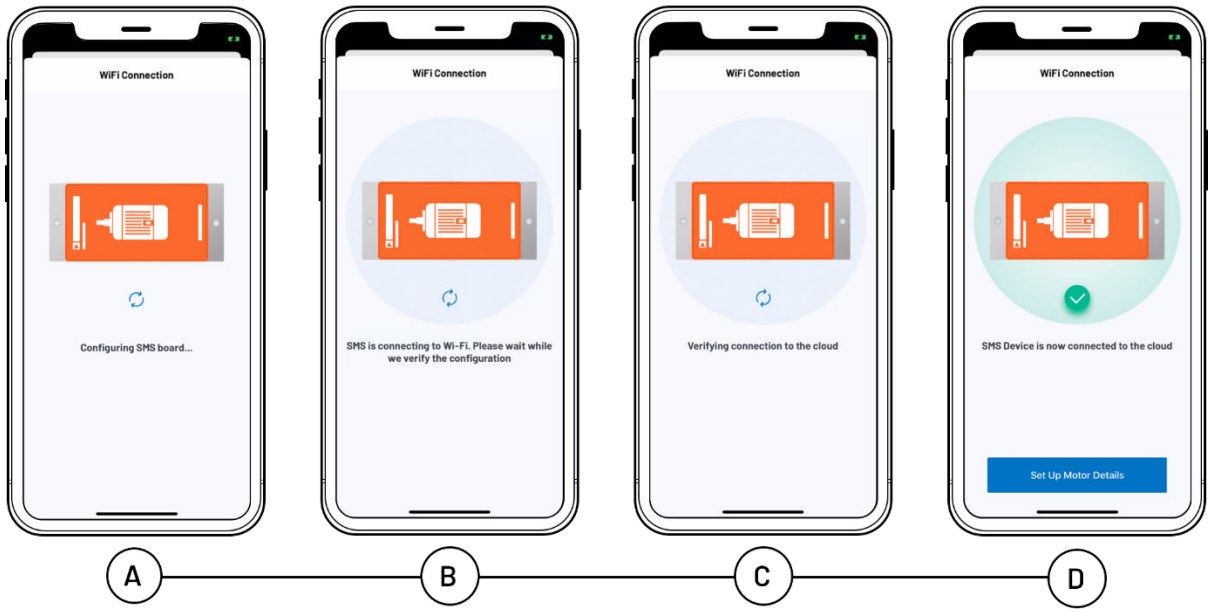

Figure 20. Process of an SMS device connecting to the plant's Wi-Fi network

The SMS device and the app will now communicate with one another and the ADI OtoSense™ Server to securely establish a connection.

Enter Motor Details

This section describes how to enter motor information in the SMS mobile app .

The SMS device can accurately learn and monitor the motor's operation using this information. The motor's nameplate contains key information that allows the SMS device to effectively analyze its performance.

If you have completed the Read and Fill Motor Information Form, use it for quick entry. Alternatively, see How to Read a Motor Plate.

INSTALLATION

To enter details of the motor:

1. After the SMS device is connected to the ADI OtoSense™ Server via the Wi-Fi network, tap **Set up motor details now**.

Note: If you want to perform this step later, then tap **Save for later**.

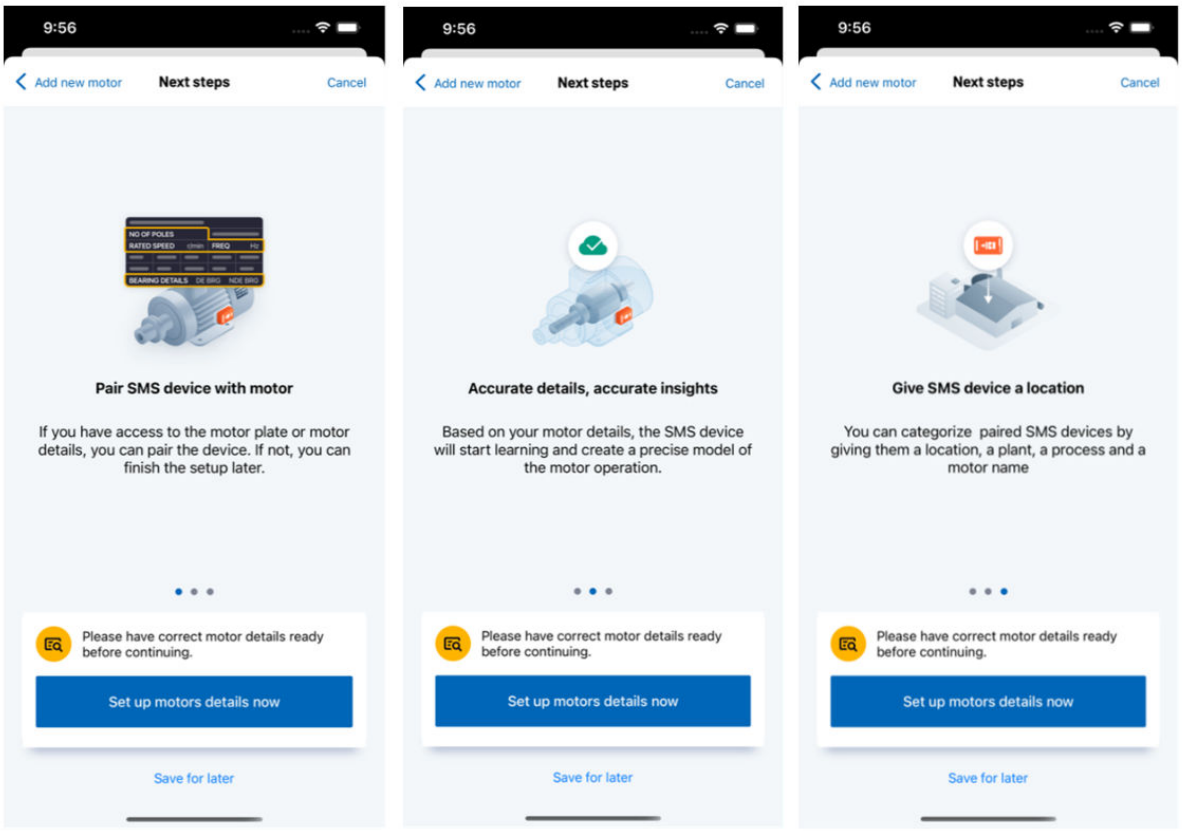

Figure 21. Screens explaining how to enter motor details

1. In the next screen, enter details of the motor to which you want to attach the SMS device .
2. Start by adding a photo of the motor and its nameplate.

INSTALLATION

Figure 22. Motor Details form

3. Enter the following motor data:
   - Motor name (TAG): Identification of the motor
   - Manufacturer: Enter manually if it does not appear on the list
   - Rated Power (kW)
   - Rated Voltage (V)
   - Number of Poles
   - Frequency (Hz)
   - Connection
   - Drive
   - Efficiency level
   - Model

Note: The SMS mobile app features some pre-filled data. Tap the relevant field to change this information, if needed.

1. Tap **Check Motor Details**.

INSTALLATION

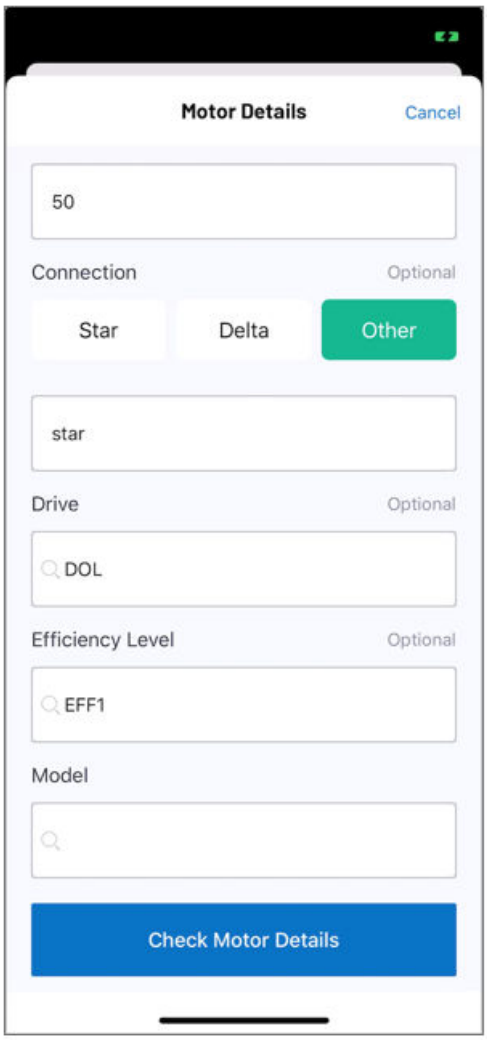

Figure 23. Motor Details form

Based on the data provided, the SMS mobile app displays more information about the motor. You can edit this information, if needed.

INSTALLATION

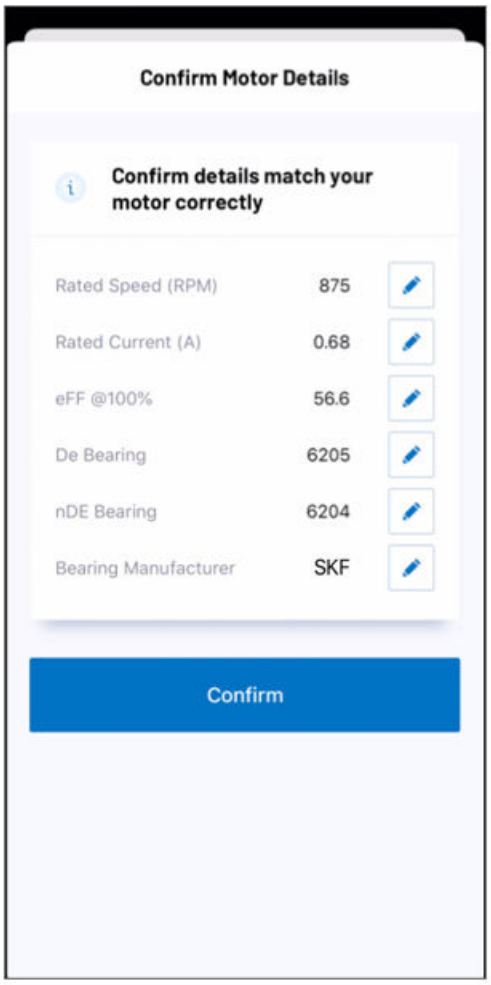

Figure 24. Confirm Motor Details screen

1. Enter the De Bearing and nDE Bearing numbers and the Bearing Manufacturer.

Note:

- De Bearing and nDE Bearing numbers are a **four-digit Industry Standard Number** for low-voltage induction motors. Both numbers can either be the same or different from each other. Examples include 6321 or NU303.
- The following table describes the acceptable and invalid inputs for bearing numbers:

Table 1.

Acceptable inputs	Invalid inputs
Accepted range of bearing numbers: ▶ 6202-6228 ▶ 6302-6328 Accepted range for NU series bearings: ▶ NU203-NU228 ▶ NU303-NU328	▶ Entering a single digit ▶ Adding variable letters at the end, for example, 6313ZZ ▶ Entering numbers with forward slashes, for example, 6321/56C ▶ Entering words such as UNKNOWN or MISSING

- If you don't have the Bearing Manufacturer information, leave this field blank and do not enter the motor manufacturer.
- If you don't have the De Bearing and nDE Bearing numbers, leave these fields blank.

INSTALLATION

IMPORTANT: Bearing models are required to identify potential problems and to enable the Bearing Health category analytics.

If you do not enter the De Bearing and nDE Bearing numbers, the Bearing Health category analytics will be disabled.

1. Tap **Confirm Motor Details**.

Assign a Location, Plant and Process

This section describes how to assign location, plant, and process attributes to the motor with the SMS device.

Assigning these attributes is a way of categorizing the motors added to a single account. This allows for easy navigation and sorting of motor information on mobile and web apps.

After entering motor details, the SMS mobile app displays a series of screens that prompt you to assign a location, plant, and process.

To assign attributes:

1. To assign a location, choose one of the following steps based on the scenario:
   - To select an existing location:
     a. Choose a location from the list where the motor resides.
   - To add a new location:
     a. Tap **Add New** in the top right corner to access the Add new location screen.
     b. Select the location from the map and tap **Add this location**.
   - To add a location for the first time:
     a. Select or adjust the location from the map, then tap **Add This Location.**

INSTALLATION

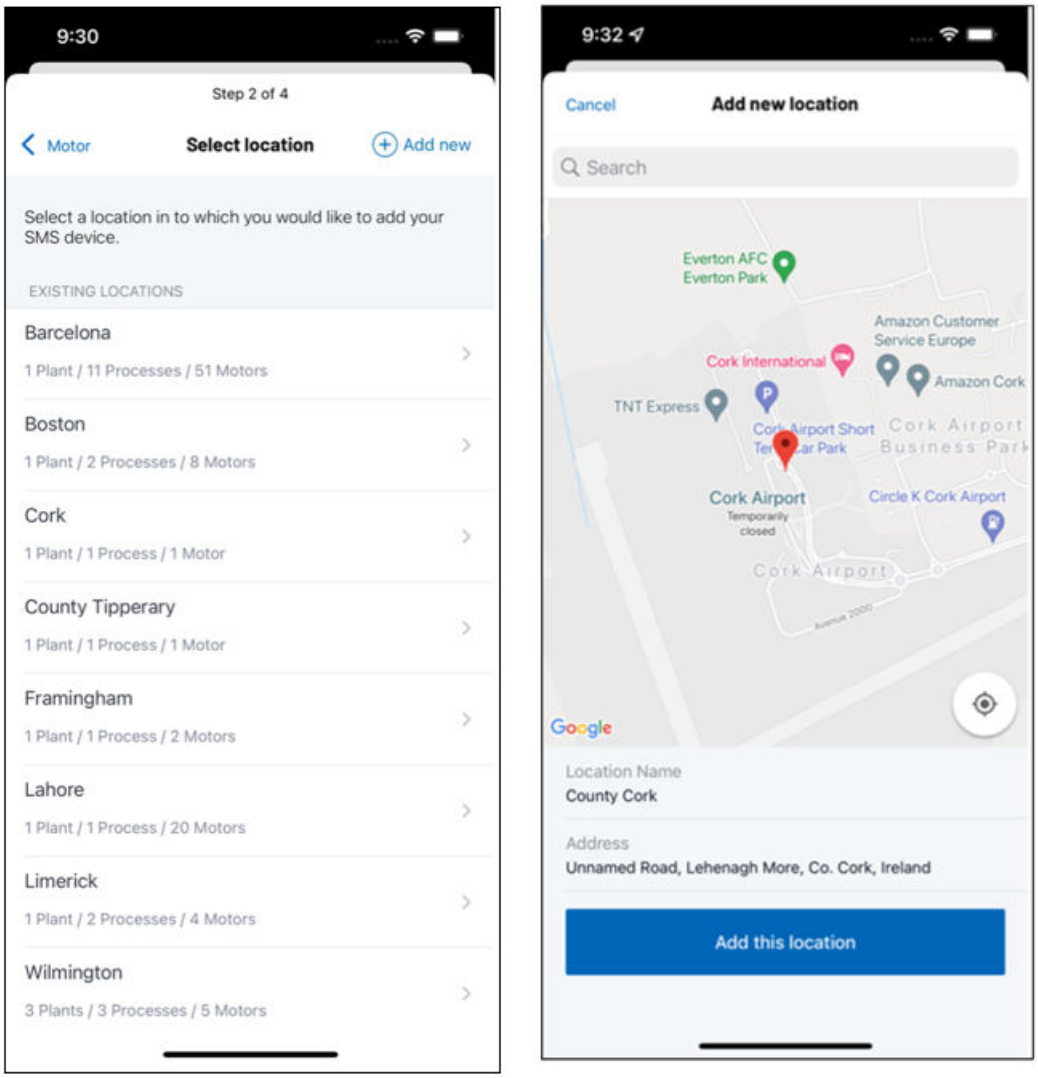

Figure 25. Assigning a location to a motor

2. To assign a plant, do one of the following:
   - To select an existing plant:
     a. Choose a plant from the list where the motor resides.
   - To add a new plant:
     a. Tap **Add New** in the top right corner to access the Add new plant screen.
     b. Enter a plant name and tap **Add this plant**.
   - To add a plant for the first time:
     a. In the Add new plant screen, enter a plant name and tap **Add this plant**.

INSTALLATION

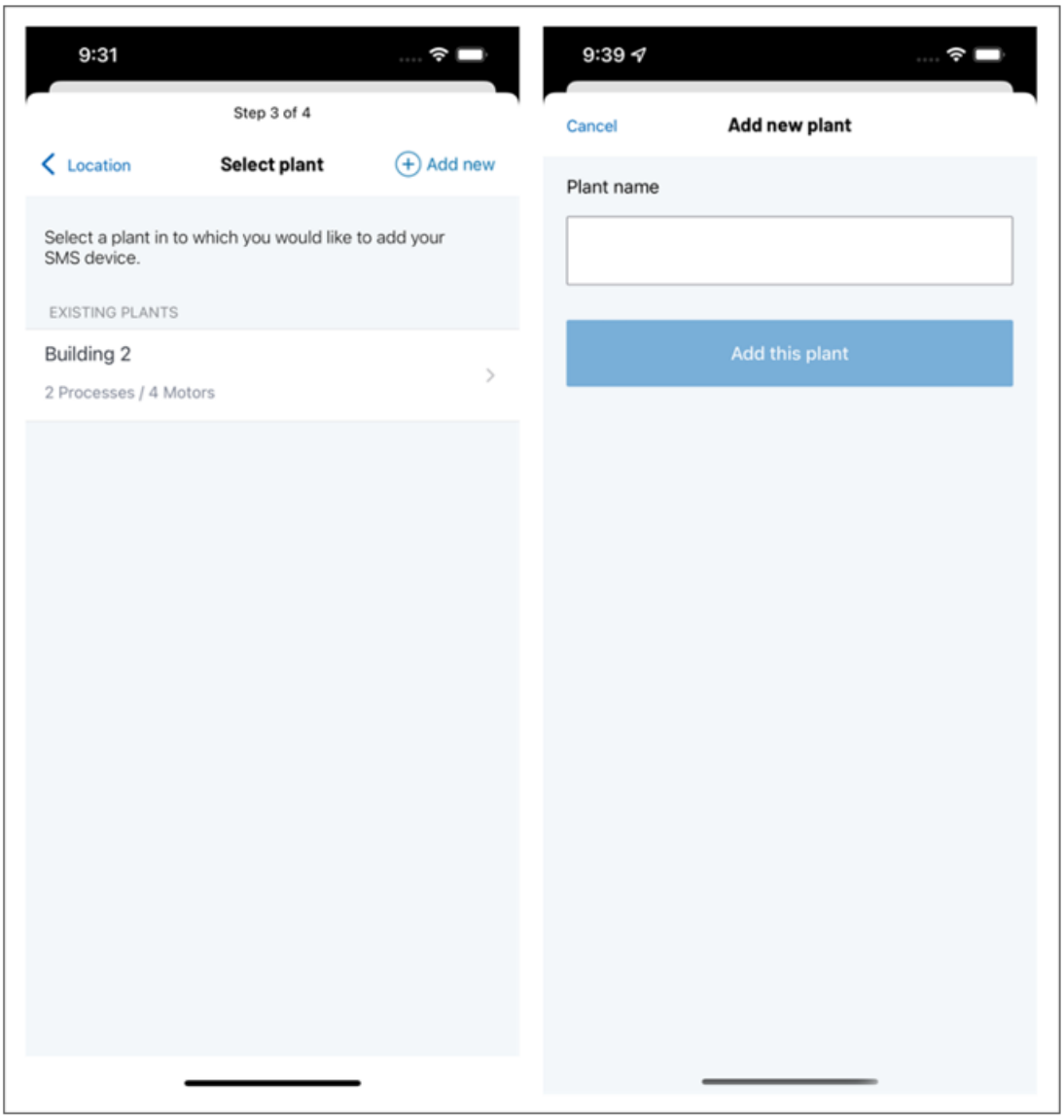

Figure 26. Assigning a plant to a motor

3. To assign a process, do one of the following:
   - To select an existing process:
     a. Choose a process from the list associated with the motor.
   - To add a new process:
     a. Tap **Add New** in the top right corner to access the Add new process screen.
     b. Enter a process name and tap **Add this process**.
   - To add a process for the first time:
     a. In the Add new process screen, enter a process name and tap **Add this process**.

INSTALLATION

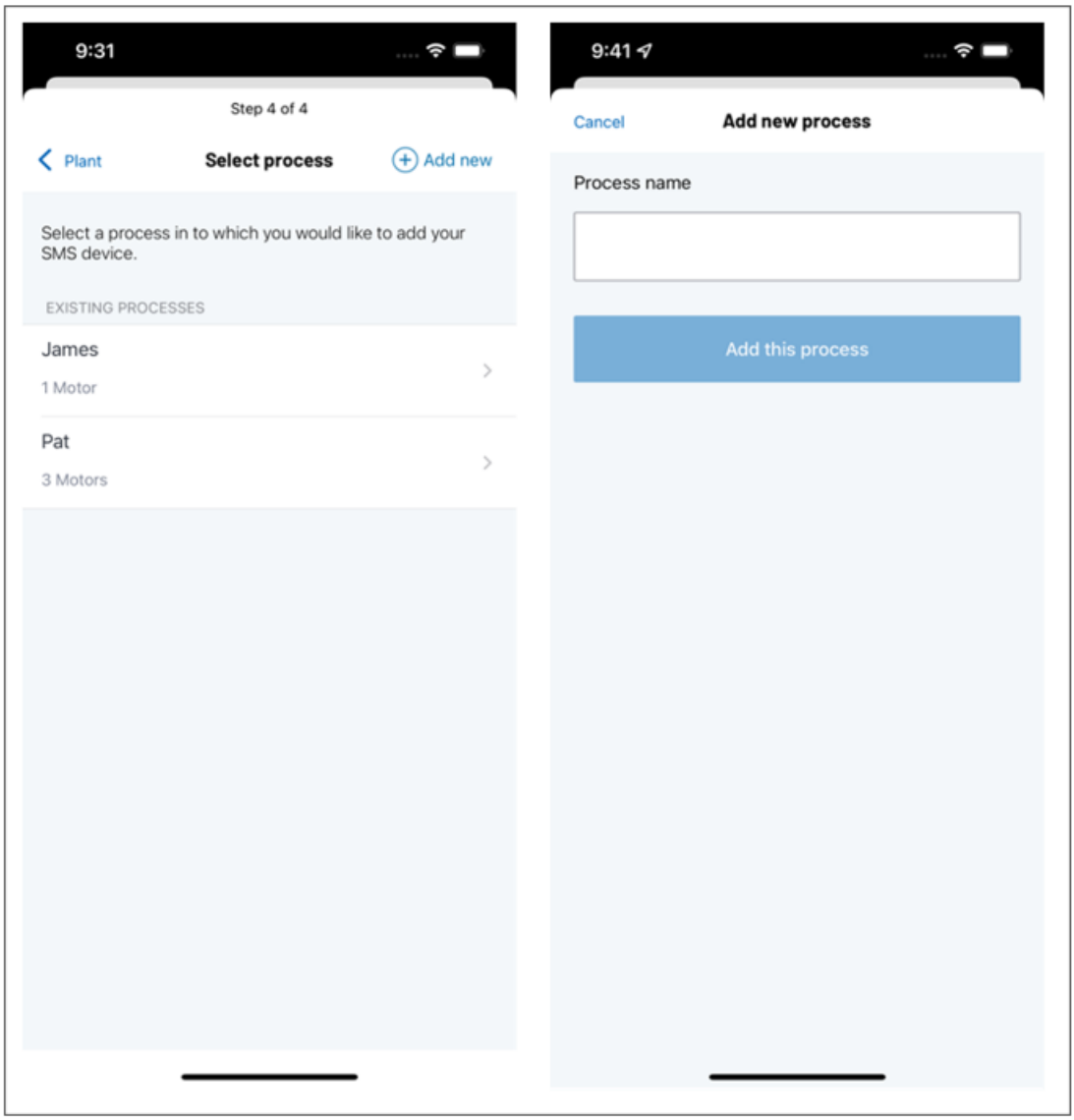

Figure 27. Assigning a process to a motor

After you assign the associated location, plant, and process attributes to the motor, the Confirm Motor Details screen is displayed with details of the motor.

1. Verify the details and tap **Confirm motor details**.

Note: If you want to change any of the details, then tap **Edit motor details**.

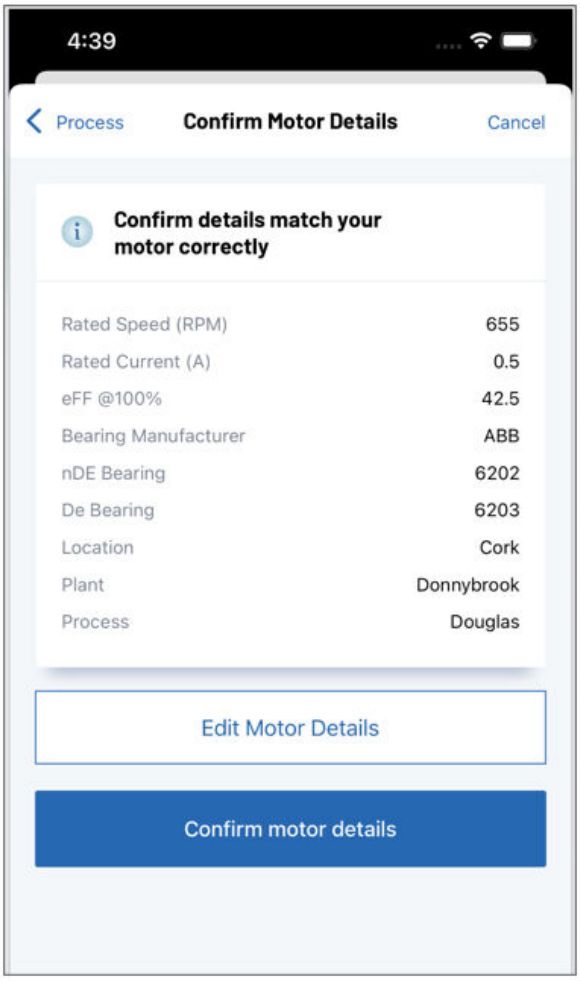

Figure 28. Confirm Motor Details screen

After adding your first motor, the SMS mobile app updates both the Dashboard and the Motors tab. The Dashboard tab displays a graph view of the monitoring status of all the motors added to the account. The Motors tab displays all the locations added to the account.

Add a Motor to an Unpaired SMS Device

This section describes how to add motor details to a previously commissioned SMS device .

After commissioning an SMS device , the SMS mobile app allows you to add motor details at a later stage.

To add a new motor:

1. Do one of the following:
   - Tap **Dashboard** and tap **Add new SMS device**. The Unpaired SMS Devices screen is displayed. or
   - Tap **Motors** and select the **Pair SMS Device** section at the top of the screen. The Unpaired SMS Devices screen is displayed.

INSTALLATION

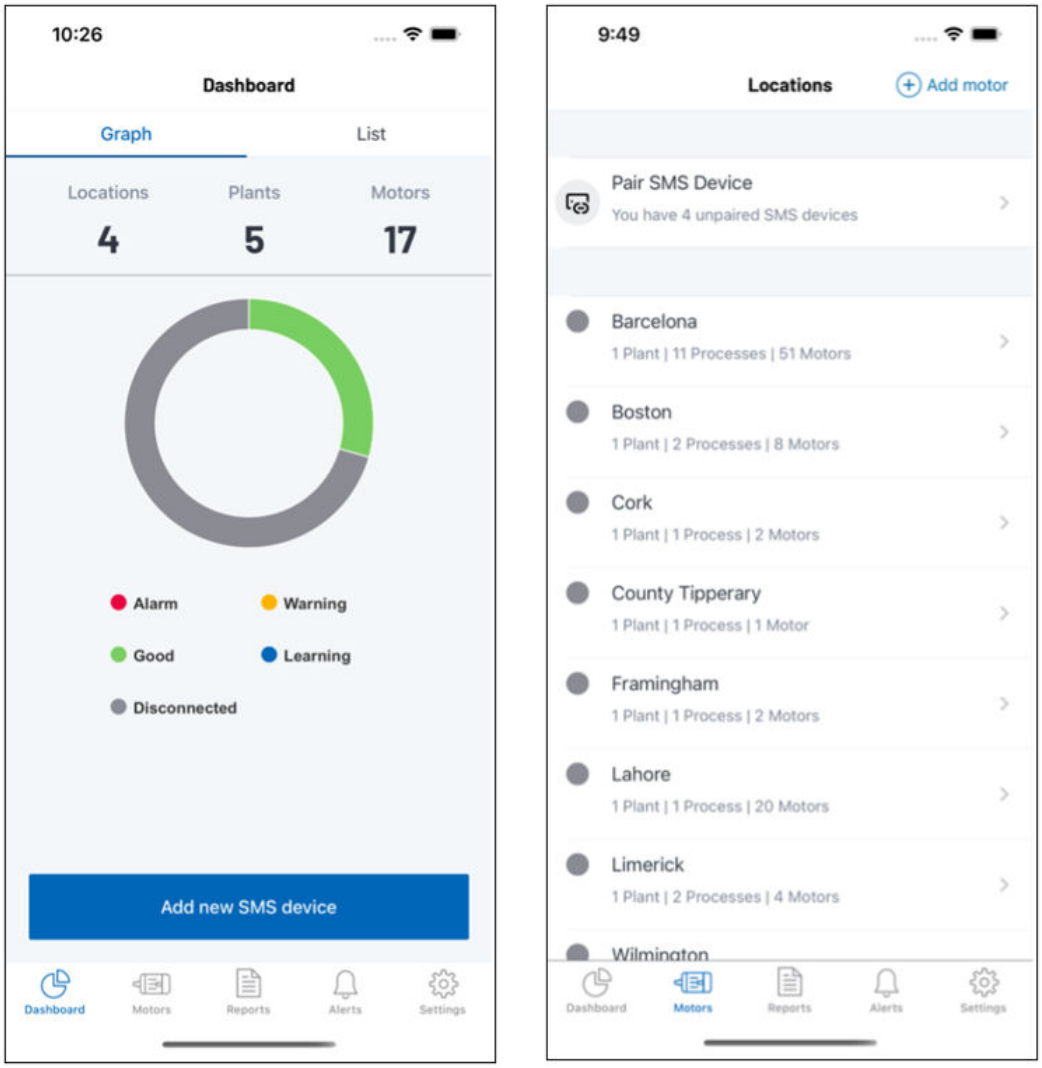

Figure 29. Dashboard and Motors screens

2. Tap one of the unpaired devices in the list to add a motor to it.

This will start the motor creation process described in the Enter Motor Details section.

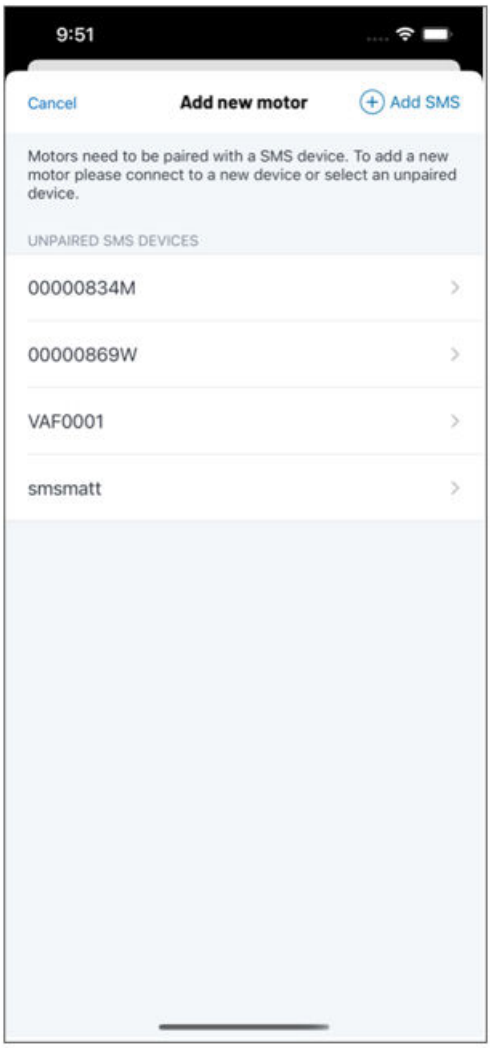

Figure 30. Unpaired SMS Devices list

INSTALL SMS DEVICE ON A MOTOR

This section describes the process of installing an SMS device to a motor with cooling ribs and without cooling ribs.

Unboxing SMS Shipment Box

This section describes the contents of the SMS shipment box and lists the other installation tools required.

INSTALLATION

Figure 31. Contents of the SMS shipping box and other installation tools

Contents of the SMS shipment box

1. SMS device
2. Epoxy bi-component adhesive
3. Four lithium batteries
4. Two fixing clamps, including screws
5. Sandpaper

Other installation tools required

1. A 3mm, 2.5mm Hex Wrench
2. A Phillips screwdriver
3. A marker

PPE (Personal Protective Equipment) Required:

- **Gloves:** When handling epoxy, wear gloves as epoxy is a strong adhesive.
- **Heat-resistant gloves**: When installing an SMS device on a running motor, wear heat-resistant gloves to avoid burns from the hot motor frame.

Magnetic base for motors without cooling ribs

In most of the motors, there are cooling ribs in the frame of the motor, and you will use clamps to fix an SMS device to the motor. For motors without cooling ribs in the frame, contact your ADI sales representative to purchase a specially designed magnetic base for SMS device installation. For instructions on how to install an SMS device with a magnetic base, see the Install SMS Device to a Motor Without Cooling Ribs section.

For instructions on how to install an SMS device , you can either read the following instructions or watch the tutorial video.

Installation - Dos and Don’ts

This section describes the correct and incorrect positioning of an SMS device on a motor.

DOs

Position the SMS device in the back-center area of the motor.

INSTALLATION

Note: Depending on the size of the motor, the SMS device will take up more surface area than what is shown in the sketch on the SMS case.

Figure 32. Correct positioning of the motor

DONT's

- **Incorrect Positioning**: Do not place the device away from the back-center area of the motor.

Figure 33. Incorrect Positioning – An SMS device installed at the top of the motor

- **Incorrect Orientation**: Do not place the device outside the back area relative to the motor shaft.

Figure 34. Incorrect Positioning – an SMS device installed in the front area relative to the motor shaft

- **Misalignment**: Do not place the device out of parallel with the cooling fins or laterally inverted relative to the motor shaft.

Figure 35. Incorrect Positioning – an SMS device laterally inverted with respect to the cooling shaft and not parallel to the cooling ribs

Install SMS Device to a Motor With Cooling Ribs

This section describes the process of installing an SMS device to a motor with cooling ribs.

INSTALLATION

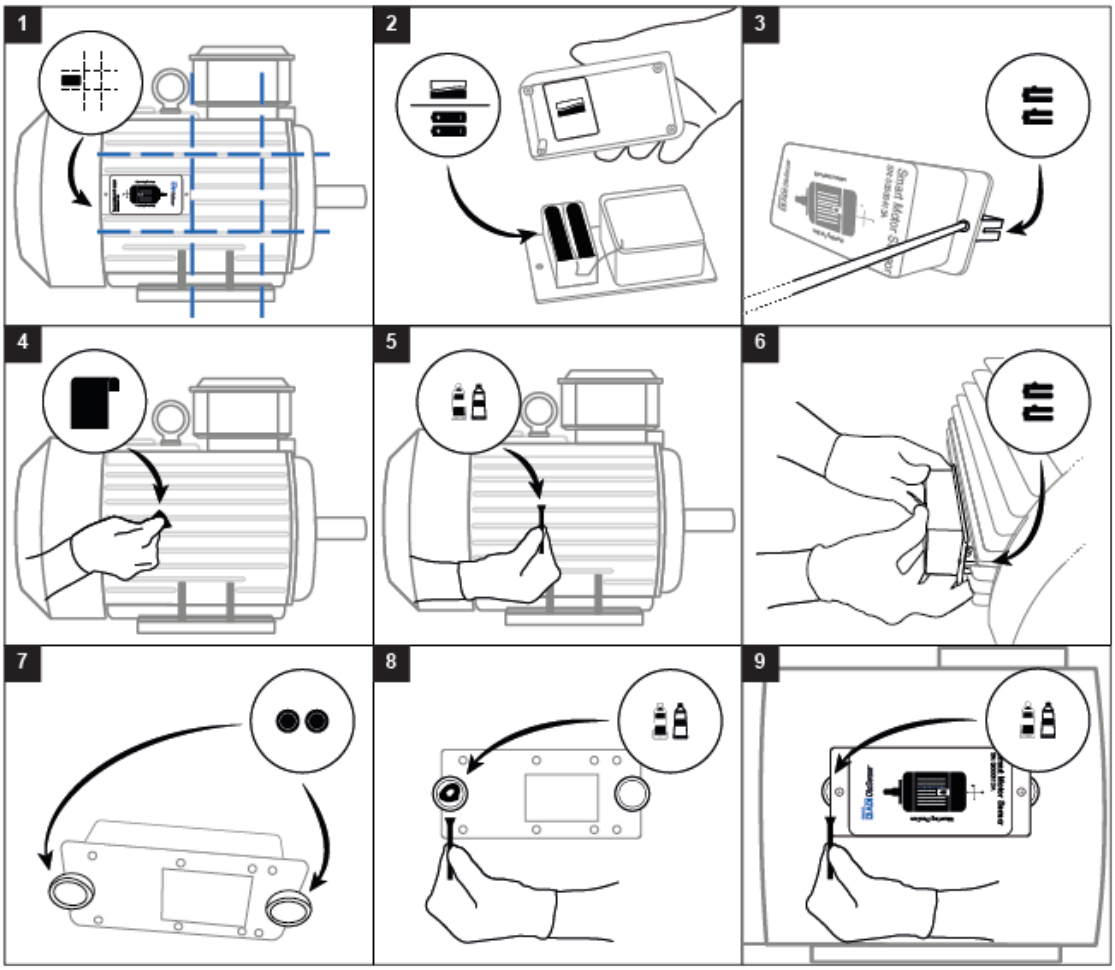

Figure 36. Process of installing an SMS device on a motor

To install an SMS device to a motor with cooling ribs:

1. Remove the four outer screws of the SMS device and remove the orange cover to verify that the batteries are installed.

Caution: Handle the device carefully to avoid damage to the battery or internal components.

1. Put the case back on. Ensure that the foam area covers the battery holder.

INSTALLATION

Figure 37. Position of the orange before re-inserting the screws

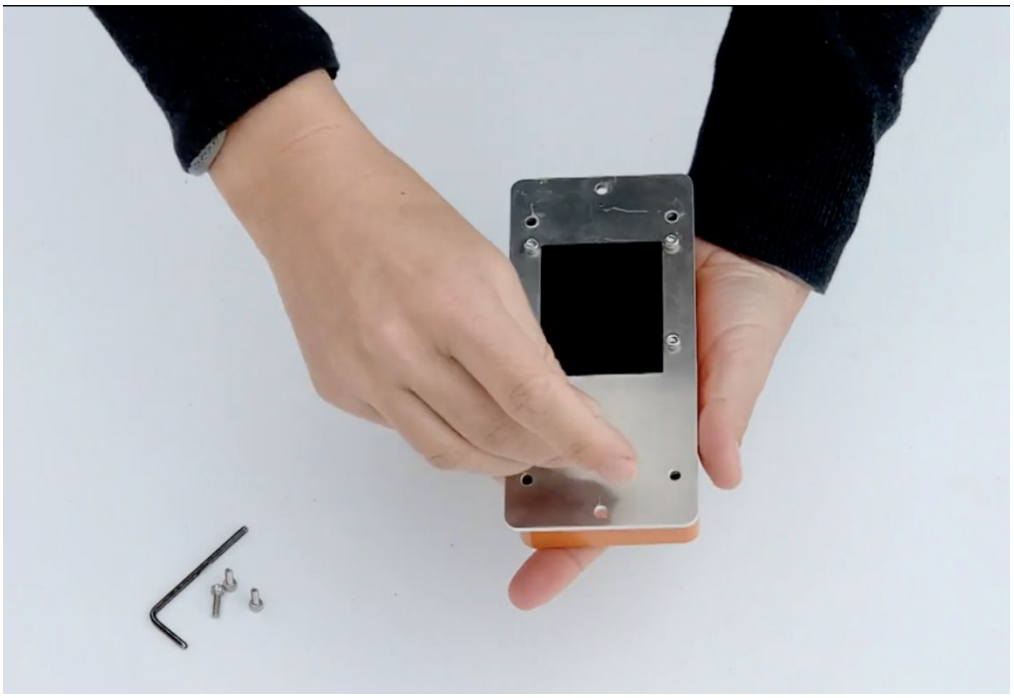

Figure 38. Reinserting outer screws

1. Take the screws provided in the shipment box and insert them into the base plate.

Figure 39. Position of the screws on the SMS device

2. Screw the fixing clamps into the base of the SMS device.

Install SMS Device to a Motor Without Cooling Ribs

This section describes the process of installing an SMS device to a motor without cooling ribs.

Prerequisite: You need a specially designed magnetic base.

INSTALLATION

Figure 40. Installing an SMS device on a motor without cooling ribs

To install an SMS device to a motor without cooling ribs:

1. Follow steps 1 and 2 of the Install SMS Device to a Motor With Cooling Ribs section to verify that the batteries are installed in the SMS device .
2. Attach and screw the magnetic base to the base of the SMS device .
3. Place the SMS device in the back-center area, as shown in the diagram on the SMS case.

Note: Follow these indications regardless of whether the motor is in a vertical or horizontal position. For more information on the proper positioning of an SMS device , see Installation - Dos and Don'ts.

1. Use a marker to mark the position where the magnetic base will be placed.
2. Use the sandpaper to sand the surface where the SMS device will be fitted to remove the paint. Preparing the surface will improve adhesion.

Caution: Wear gloves while handling sandpaper to avoid skin irritation. Use sandpaper gently to avoid damaging the cooling fins' surface.

PPE Required: Wear gloves before preparing the adhesive. Mix the bi-component adhesive using the mixing tool.

INSTALLATION

Figure 41. Mixing the bi-component adhesive

1. Apply the adhesive generously to the magnetic base.

Note: The adhesive is required in addition to the magnetic base.

1. Fix the device using the magnetic base to the motor.
2. On the SMS mobile app , confirm that the SMS device is installed by tapping **Confirm sensor is mounted** to begin the learning process.

INSTALLATION

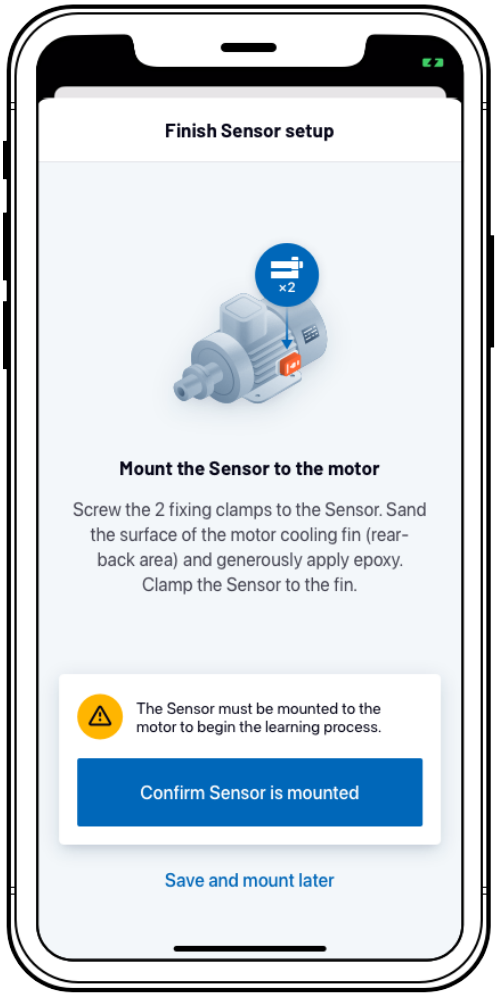

Figure 42. Finish Sensor setup screen

POST INSTALLATION

This section describes how to verify if the SMS device is connected and transmitting data.

After the SMS device is installed and configured, the device starts sending data to the ADI OtoSense™ Server . It is important to check and verify if the device is connected fully and transmitting the data.

To check SMS device connection:

1. Log in to the SMS mobile app using your login credentials.
2. Tap **Dashboard**.
3. Check that the device is visible in learning mode. The learning mode is displayed in blue on the dashboard.
4. Tap **List** and search for the corresponding motor name. It should be displayed with the status **Learning**.

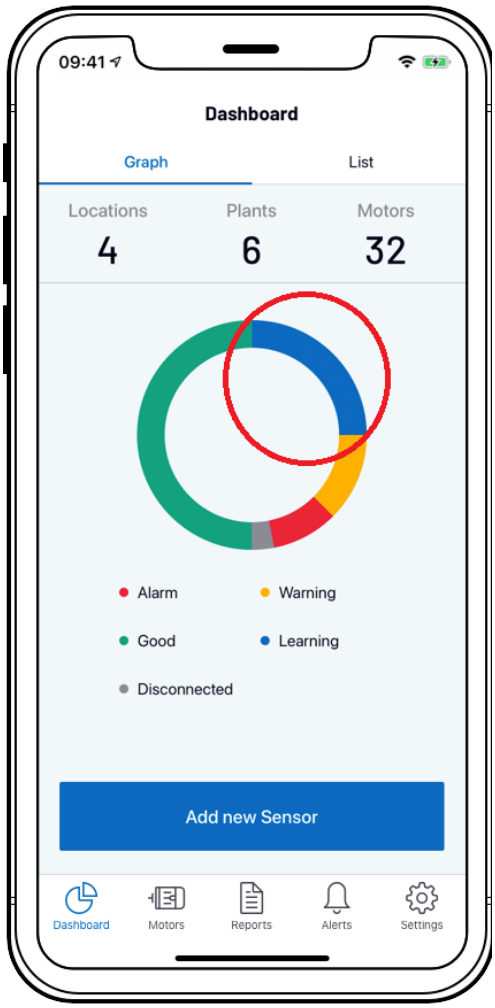

Figure 43. Motors in learning mode

To check that the device is correctly sending data to the ADI OtoSense™ Server :

1. Tap **Motors**.

The Locations list is displayed.

1. Select the corresponding location associated with the motor.
2. From the subsequent screens, select the corresponding process, plant, and motor name.
3. Select **History Plot** and **Parameters**.

POST INSTALLATION

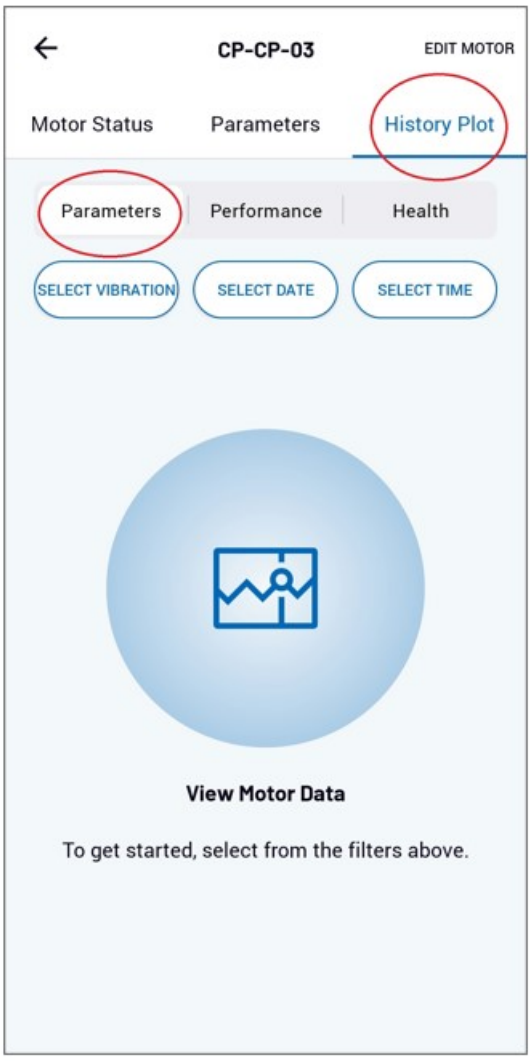

Figure 44. History Plot tab and Parameters sub-tab

4. Tap **Select Vibration** to select any parameter.
5. Tap **Select Date** and **Select Time** to select the date and time corresponding to the moment of the installation.

The corresponding waveform is displayed.

MAINTENANCE

This section describes the procedure for replacing or repairing a motor and replacing the batteries of an SMS device .

REPAIRING OR REPLACING A MOTOR

If the motor or any of its parts are repaired or needs to be replaced, the new part or motor's details need to be updated in the SMS mobile app .

Important: A new learning process is necessary in both cases.

Note:

- If a new motor is installed, request a new set of fixing clamps from your ADI sales representative.
- It is not necessary to replace the fixing clamps in case of repair work.

To update motor details on the SMS mobile app :

1. Log in to the SMS mobile app and tap **Dashboard**.
2. Tap **List** and find the motor that is in repair.
3. Select the motor to view the motor details
4. Tap **Edit Motor** to update the necessary fields.

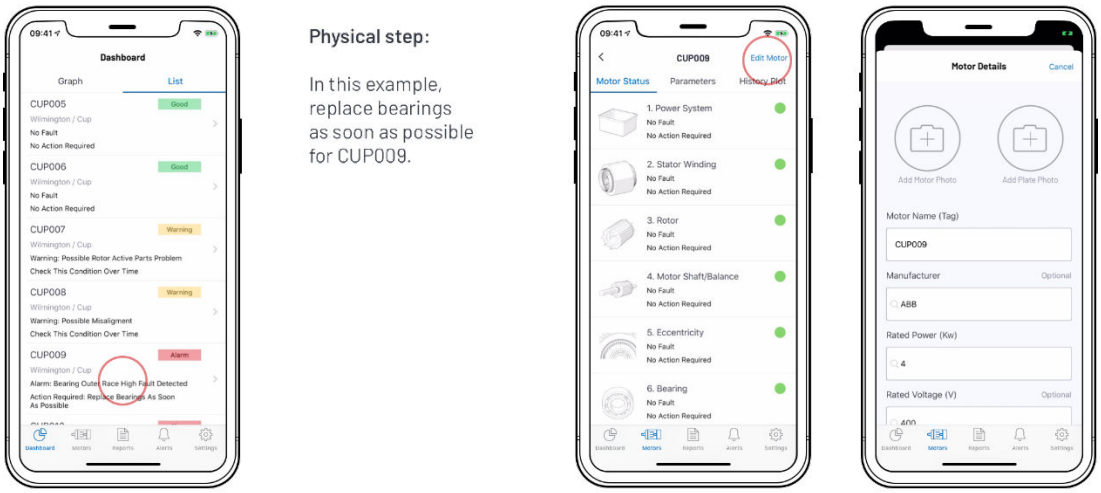

Figure 45. Process of editing motor details

5. Tap **Check Motor Details**.

Based on the data provided, the SMS mobile app displays more information about the motor. You can edit this information, if required.

1. Tap **Confirm Motor Details**.

Note: After the new or repaired motor is running again, ensure that the SMS device is connected by following the procedure in Post Installation.

MAINTENANCE

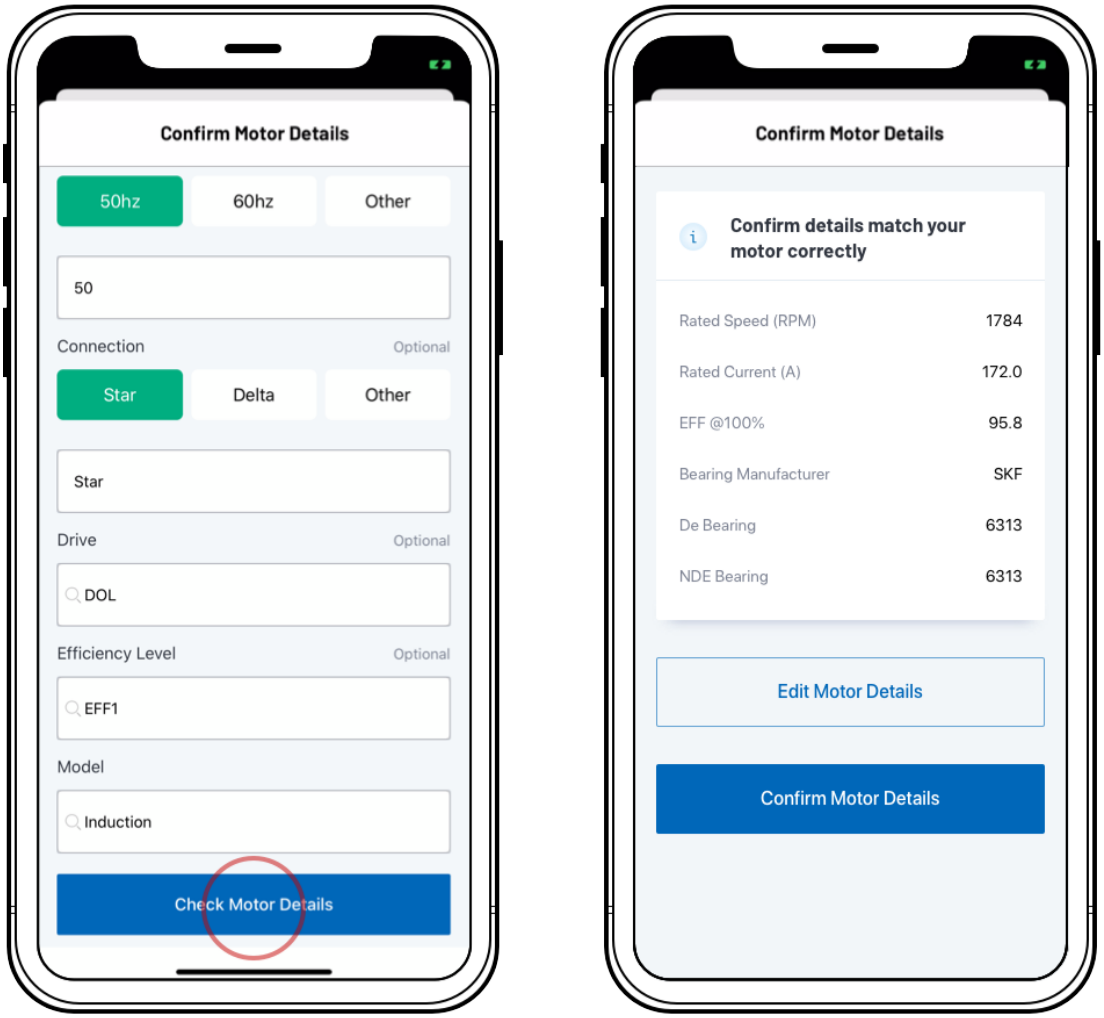

Figure 46. Confirm Motor Details screen

REPLACING THE BATTERIES

This section describes the procedure for replacing the batteries of an SMS device .

The SMS device will send an email and create a push notification in the SMS mobile app when the battery is low. It is recommended to replace the batteries before they become fully depleted.

On the SMS mobile app , the **Parameters** screen displays the battery status. A low-battery status means that the batteries must be replaced shortly.

MAINTENANCE

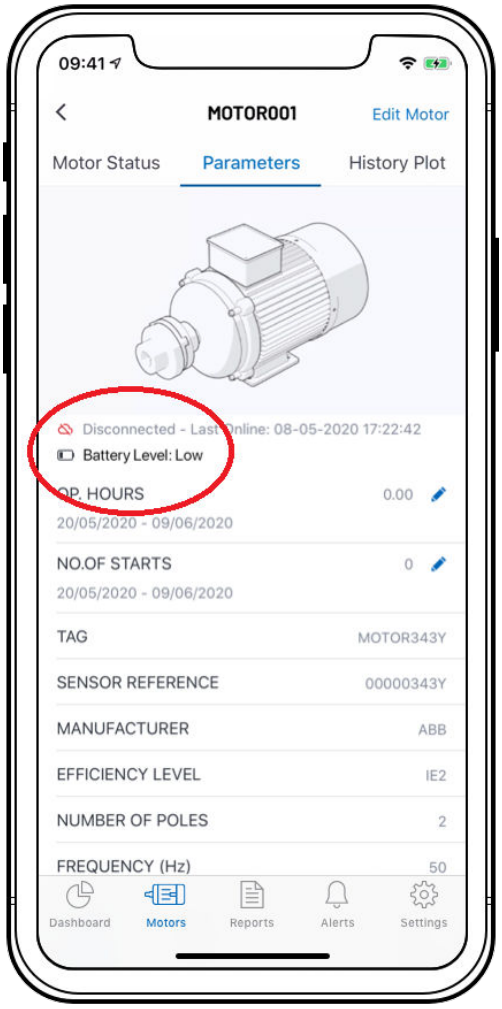

Figure 47. Parameters tab with Battery Level indicator

Prerequisite: The SMS device requires four lithium batteries with an output of 3000 mAh. We recommend Energizer L91 lithium AA batteries.

Caution: Ensure that the motor is in a safe state before proceeding with battery replacement. Follow all safety protocols.

PPE Required: Heat-resistant gloves - When installing an SMS device on a running motor, wear heat-resistant gloves to avoid burns from the hot motor frame.

Warning: When removing or replacing an SMS device , handle it carefully to avoid damage to the device or surrounding components.

To replace the batteries:

1. Go to the plant motor location where the motor and the SMS device are located.
2. Locate the motor whose SMS device requires battery replacement.
3. Remove the SMS device from the fixing clamps and carefully remove the device's case.
4. Insert the new batteries and replace the case, ensuring that the foam area covers the batteries.

Note: Replacing the batteries does not require any further action or learning process.

MAINTENANCE

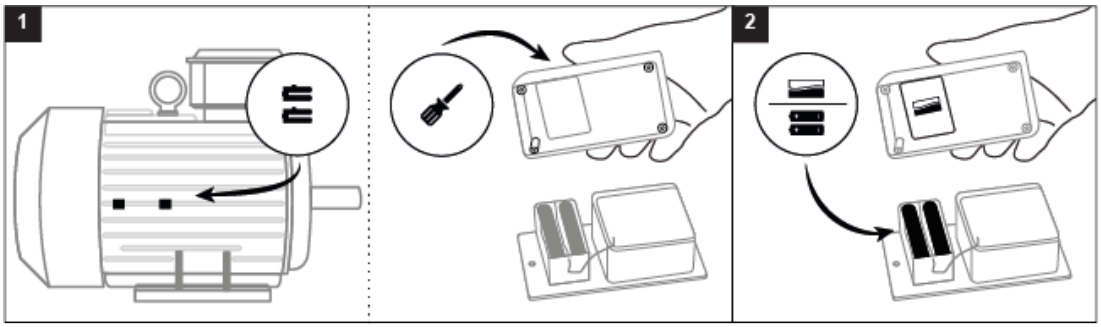

Figure 48. Process of replacing batteries

TROUBLESHOOTING

This section describes the common issues encountered when installing an SMS device and possible solutions.

UNABLE TO COMMISSION SMS DEVICE WITHIN 5 MINUTES

Problem

Unable to establish a connection between the SMS mobile app and the Wi-Fi network generated by an SMS device or unable to establish a connection between an SMS device and the plant's Wi-Fi network.

Cause

The connection issue could be due to several reasons such as:

- the client's AP is turned off
- the SSID/Wi-Fi network name or password has changed

Solution

1. After the five minutes have elapsed, remove the batteries from the SMS device to avoid draining them.
2. Make sure the plant's internet connection is in a working state.
3. Re-insert the batteries and try the connection process again.

REFERENCE

This section provides

- Contact Information
- Tutorial Videos
- Motor Information Form
- How to Read a Motor Plate
- Correspondence Between IEC and NEMA Frames
- Recommendations to Purchase a Router

CONTACT INFORMATION

If you need assistance, contact your ADI account manager or ADI support team at Support.PdM.Otosense@analog.com.

TUTORIAL VIDEOS

- For instructions on how to commission the SMS device , watch the tutorial video here.
- For instructions on how to install an SMS device , watch the tutorial video here.

MOTOR INFORMATION FORM

It is recommended to fill this form with the motor parameters to make the commissioning process easier. This information can be found on the motor's nameplate.

If you need assistance in filling out the information, see the next page on How to Read a Motor Plate. It shows a sample motor plate with indicators on where to find the necessary details. Match the **Alphabet Indicator** column in this table to the corresponding alphabets on the image in the next page to locate the details. Use this sample plate to read information from your motor plate and fill in the details.

Table 2.

Mandatory fields	Alphabet Indicator	Field	Example	Write the data for your motor
•		SMS Serial Number(printed on SMS case)	xxxxxxxxA(xxxxxxxx are numbers)	
•	A	Motor name (Tag)(This is the name you give to the motor)	Secondary Water Pump 1	
•		Wi-Fi SSID(at motor location)		
•		Password	xxx	
	B	Manufacturer	Brand Name	
•	C	Rated Power (KW)	2.984	
•	C	or Rated Power (HP)	4	
	D	Rated Voltage (V)	300	
•	E	Number of Poles	4	
•	F	Frequency (Hz)	60	
	G	Connection	Star, Delta, Double Star, etc.	
	H	Drive	VFD or DOL, etc.	
	I	Efficiency level	IE1, IE2 or IE3	
•	J	Model	1AA46	
•		Location	xx Factory	
•		Plant	Incinerator #1	
•		Process	Induced Draft Fun #1	
•	K	Rated Speed (RPM)	3420	
•	L	Rated current (A)	7.3	
	I	Eff @100%	84.5	
	M	Bearing manufacturer*	SKF	
•	N	DE bearing *	6206	

REFERENCE

Table 2. (Continued)

Mandatory fields	Alphabet Indicator	Field	Example	Write the data for your motor
•	O	NDE bearing *	6206	

*If you can't find this bearing information, leave the fields blank. This will effectively disable the Bearing Health category analytics.

How to Read a Motor Plate

This is a sample motor plate with indicators on where to find the necessary motor details.

REFERENCE

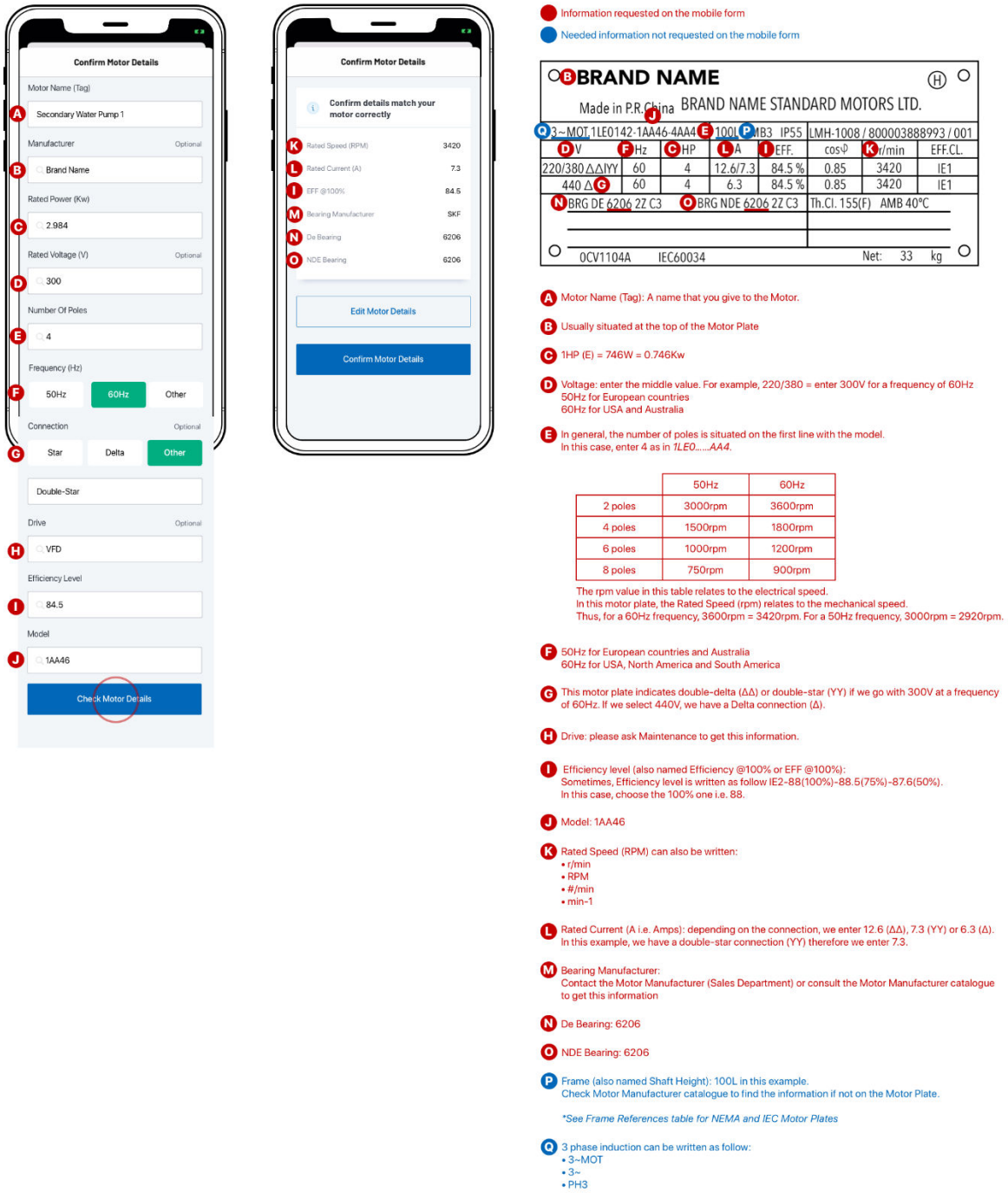

Figure 49. Reading a motor plate

Correspondence Between IEC and NEMA Frames

Table 3.

IEC Frame	NEMA Frame
63	42
71	48

REFERENCE

Table 3. (Continued)

IEC Frame	NEMA Frame
80	5656H
90S	143T145T
90L	182184182T184T
100	213215213T215T
112	254U256U254T256T
132	284U286U284T286T284TS286TS
160	324U326U324T326T324TS326TS
180	364U365U364T365T364TS365TS
200	404U405U404T405T404TS405TS
225 S	444U445U444T445T447T449T444TS445TS447TS449TS
225 M	
250 S	
250 M	
280 S	
280 M	
315 S, 2p	
315 S,4p-8p	
315 M, 2p	
315 M,4-8p	
355 S, 2p	
355 S,4-8p	
355 M, 2p	
355 M,4-8p	
355 L, 2p	
355 L,4-8p	

RECOMMENDATIONS TO PURCHASE A ROUTER

If your network does not meet the requirements, you can purchase a router to connect an SMS device to the internet.

Routers

Recommended features

When purchasing a router, the following features are recommended:

- **Ping Reboot/Keepalive** (highly recommended): When the router detects that it does not have internet connection, it will automatically restart.
- **Periodic Reboot**: The router will periodically restart to maintain optimal performance.
- **Remote Management**: Request router status or restart router remotely using API, text, or call.

Examples of routers with recommended features

- Teltonika RUT241 02U000 (North America)
- Teltonika RUT241 06E000 (Europe and UK)

SIM Cards and Data Plans

Each SMS device consumes up to 500 MB of data per month under normal operating conditions. If purchasing a SIM card to use with your router, consider the following:

- A contract or bill pay SIM card is preferred, to avoid interruption in internet connectivity.

- If using a prepaid SIM card, you should apply sufficient credit to the SIM plan to cover the trial period (90 days).

FIREWALL SUPPORT FOR AWS IP RANGES

The SMS device leverages the AWS Cloud to provide scalable and reliable Internet-of-Things (IoT) connectivity. :

AWS publishes the complete list of AWS IP ranges used by their cloud services at https://ip-ranges.amazonaws.com/ip-ranges.json. This list is dynamic, and the IP addresses change periodically. Your Network Administrator can subscribe to notifications about changes and apply these to maintain your network firewall configuration. Access full details at https://docs.aws.amazon.com/general/latest/gr/aws-ip-ranges.html

Check Point firewall

The Check Point firewall has a feature named **Updatable Objects** that supports the dynamic AWS IP ranges list. It automatically maintains your network firewall configuration whenever IP ranges change.

- https://sc1.checkpoint.com/documents/R81/WebAdminGuides/EN/CP_R81_SecurityManagement_AdminGuide/Topics-SECMG/Updatable-Objects.htm
- https://support.checkpoint.com/results/sk/sk131852

The subset of AWS IP ranges that are applicable to the SMS device comprise of the following:

- Amazon Services
- API Gateway Services
- CloudFront Services
- Rout53 Services

Create an Accept rule for traffic to these services on ports 8883 and 443 in the Updatable Objects console.

Palo Alto firewall

The **Palo Alto** firewall has a similar feature to Check Point's Updatable Objects named **External Dynamic Lists** (EDL).

- https://docs.paloaltonetworks.com/pan-os/8-1/pan-os-admin/policy/use-an-external-dynamic-list-in- policy
- https://docs.paloaltonetworks.com/pan-os/9-1/pan-os-web-interface-help/objects/objects-external-dynamic-lists

CERTIFICATIONS AND REGULATORY

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

REFERENCE

- This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

The product is a low power device, and its output power is lower than FCC SAR exemption level.

Product Labeling:

The product must be labeled in a visible area with the following: “**FCC ID: Z64-CC3220MOD**”.

Industry Canada Statement

This device complies with ISED’s license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d’ISEDapplicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes:

1. le dispositif nedoit pas produire de brouillage préjudiciable, et
2. ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated at a greater distance than 20 cm between the radiator and your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISEDétablies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

Product Labeling:

The product must be labelled in a visible area with the following: “**IC: 451I-CC3220MOD**”.

Plaque signalétique du produit final

Le produit doit êtreétiqueté dans un endroit visible avec l'inscription suivante: "**IC: 451I-CC3220MOD**".

EU Statement

This device complies with Directive 2014/53/EU issued by the Commission of the European Community.

The product is a low power device, and its output power is lower than the RF exposure requirements in Europe.

Frequency Bands and Powers

Operating frequency: 2.4 GHz

Number of channels: 13

Conducted output power: 14 dBM

In all cases assessment of the final product must be made against the Essential requirements of the **Directive 2014/53/EU** Articles 3.1(a) and (b), safety and EMC respectively, as well as any relevant Article 3.2 requirements.

REFERENCE