SKF TraX system

User Manual

WEM-200/US
(US version)

WEM-200/32
(European version)

WEM-200/EU
(European version)

Non-contractual images

Contents

1 Document identification

Table 1

Revision

Version	Date	Author	Comment
1	September 2019	CA	Initial creation
2	November 2019	CV	Revision for Pilot series release
3	September 2019	CV	Update with "Tools option" section
4	February 2021	TG/CV	Update to fit with Pilot series 2 system version
5	July 2021	TG	Update to fit with SOP version
6	June 2022	TG	Update to fit with the MVP
7	February 2023	TG/BT	Update with new functions and added clarifications
8	April 2023	BT	Addition of clarifications
9	September 2023	TG/BT	Update to fit with BSS10 software release

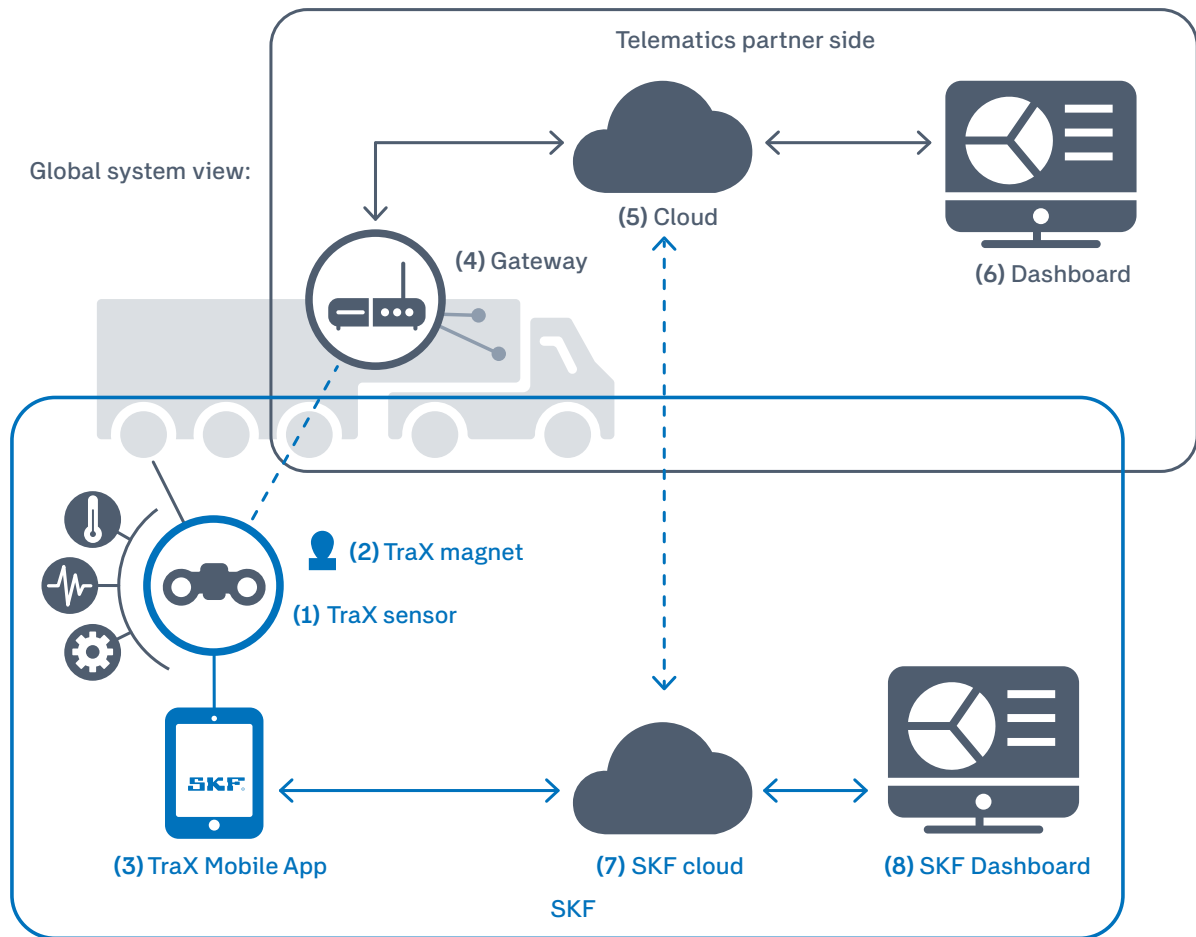# 2 Document references

Table 2

References

Document title	Document reference
Technical specification of WEM-200 SKF TraX	TS_WEM-200

2.1 Videos

- For the mounting instructions video, click here
- For the commissioning instructions video, click here
- For the decommissioning instructions video, click here

3 Introduction

Global system view:

Telematics partner side

(5) Cloud

(4) Gateway

(6) Dashboard

(2) TraX magnet

(1) TraX sensor

(3) TraX Mobile App

(7) SKF cloud

(8) SKF Dashboard

SKF

The SKF TraX system monitors the condition of wheel end bearings by measuring and analyzing wheel end vibration, usually on trucks, trailers and buses. It provides warnings when bearing failures are detected and checks on the condition of wheel end bearings.

The SKF TraX system is composed of five elements:

(1) The TraX WEM-200 sensor, is a battery-powered, wireless sensor that can be mounted on the wheel. It monitors the condition of the bearing and measures its temperature. It is available with three different base-plate dimensions depending on the pitch circle diameter of the wheel. The data it collects is sent by BLE (Bluetooth Low Energy) and collected by the gateway **(4)**, which displays relevant information on the dashboard **(6)**.

(2) A standard magnet is used to wake up the TraX sensor with a minimum field strength of 60 Gauss @ 10 mm from the magnet surface. This magnet is not in the scope of SKF's products. For example, a push pin magnet with neodymium material can be used.

(3) The TraX Mobile App is an iOS or Android application that can be installed on a smart device and used to configure the TraX sensor.

(7) SKF cloud is used for data storage and exchange.

(8) SKF dashboard is used for data visualization.

This user manual explains how to use the SKF TraX system, with reference to specific SKF components which are described in the technical specification document.

4 Mounting the sensor

Follow the mounting instructions below so that the TraX sensor performs a correct analysis.

1 Remove the rim cover (if existing)
2 Unscrew two consecutive rim nuts (or lug nuts)
3 Position the TraX sensor on the bolts.
Ensure the arrows on the sensor point outwards, towards the tire.

⚠ **WARNING**

4 Tighten the wheel nuts according to the manufacturer's wheel mounting specifications. Pay attention during tightening to correctly center the baseplate on the wheel stud and to avoid contact between wrench socket and sensor plastic housing.
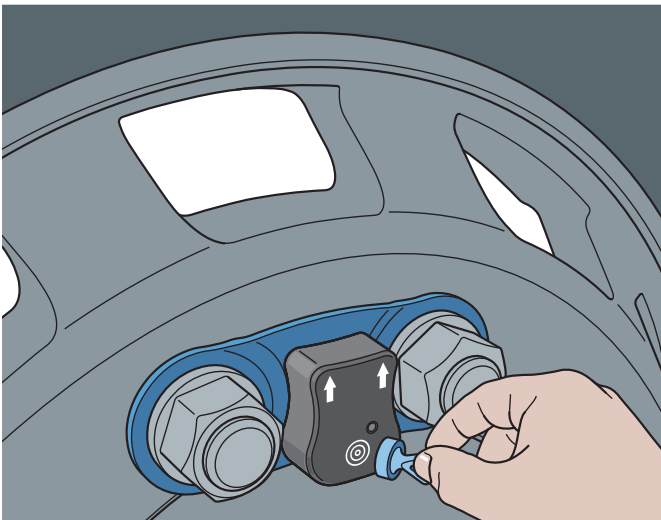
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5 Put back the rim cover (if existing)
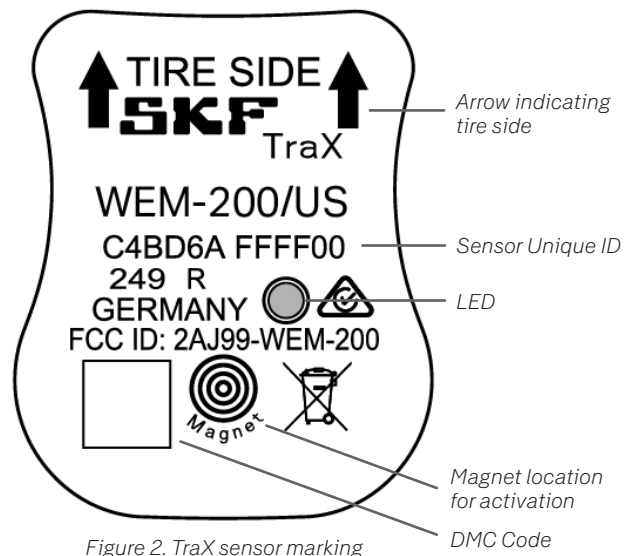

Figure 1. Mounting visualization

Figure 2. TraX sensor marking

Arrow indicating tire side

Sensor Unique ID

LED

Magnet location for activation

DMC Code

• For the mounting instructions video, click here

5 Mobile App installation

5.1 Creating an account

Using the TraX Mobile App requires creating an account in SKF Digital Services.

To create an account:

- Provide your SKF sales representative with your first and last names, email address and the name of your company
- SKF will create an account in your name
- When your account is created, you will receive an email notification from SKF Digital Services

5.2 Downloading the Mobile App

The Mobile App has been **developed for iOS and Android** devices.

Get SKF's Mobile App by following these steps:

1 Go to the App Store or Google Play, search SKF TraX and click to install
2 Activating Bluetooth
   2.1 iOS devices: Activate Bluetooth by going to Settings\Bluetooth\Yes
   2.2 Android devices: Activate Bluetooth by going to Settings\Connections\Go to Bluetooth, and tapping the switch
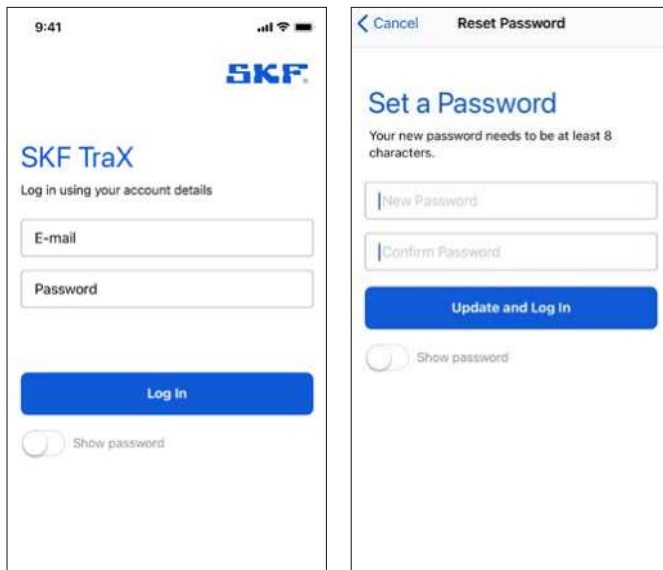3 Open the Mobile App by clicking the icon (shown below) on your smart device

6 The Mobile App

6.1 Activating an account

The first time that you log in, you will be required to activate your account. This can be carried out via the URL given in the activation email or in the app.

Enter the login details given in the activation email within ten days of receiving it. When you log in for the first time, you will be redirected to the Reset Password panel where you can create your own password.

6.2 Logging in and resetting the password

6.2.1 Login

Once you have activated your account via the URL provided or in the app, you can log in with your email address and password.
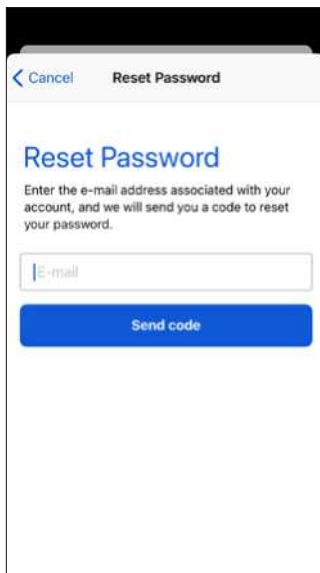
If you have forgotten your password, you can reset it by clicking on the **Forgot Password** link.

6.2.2 Resetting the password

- Enter your email in the **Reset Password** panel and click the Send code button
- An email, with a verification code will be sent to your address
- Enter the verification code in the Check your e-mail panel and click the Next button
- Enter and confirm your new password in the Set a Password panel
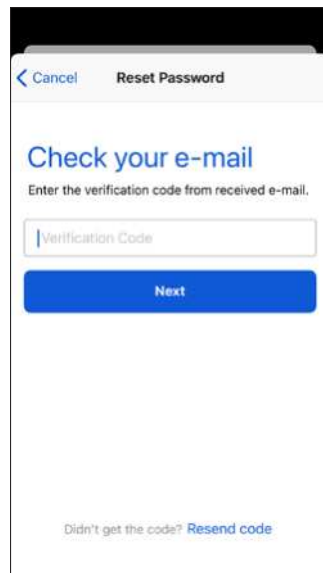- Click the Update and Log In button
- Your password is now reset
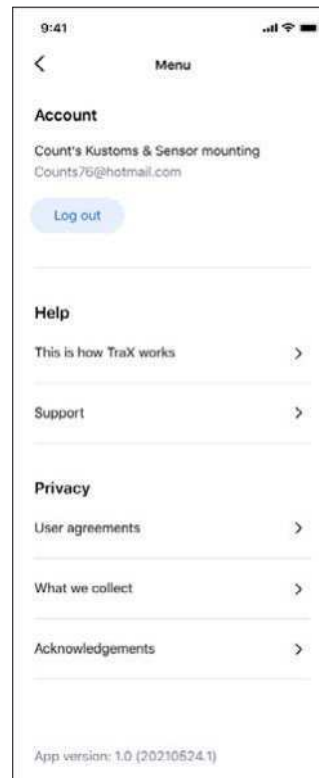
6.3 Menu

Click on menu, situated in top, right corner.

Here you can find:

- General information such as Company name, email
- Log out
- Support
- This is how TraX works
- User agreements
- What we collect
- Acknowledgements
- App version

6.4 Start view

After the user logs in, the user comes to the Start view. The user can search for vehicles, add vehicles manually (not available for all) and, see Ongoing work.

6.4.1 Find vehicle

In the Find vehicle search field, the user can search and get existing vehicles from Enlight and from the TSP (available for users with TSP Integration). With the filtering function they can minimize the search results. The filtering alternatives are: All, Name and VIN.
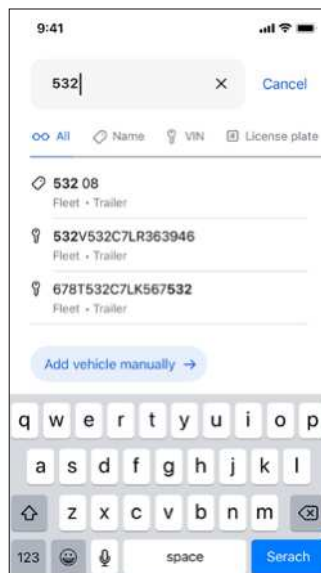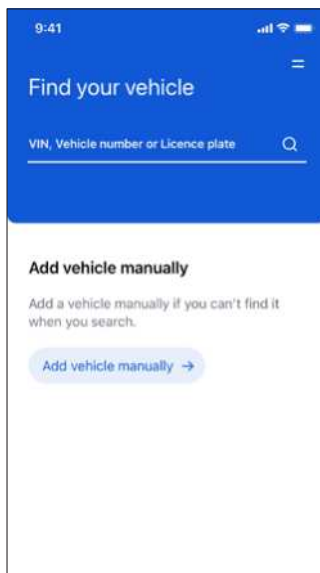
6.4.2 Ongoing work

In the Ongoing work, the user can open work items they previously worked on to continue their work. Work items are listed to Ongoing work if the user has started to add at least 1 sensor to a vehicle, but it's not completed.

If the user is considering the vehicle ready, they can always choose to close the work item, this action will set the item to done and disappear from the list. Ongoing work is tied to a device and account and saved only locally on the phone.
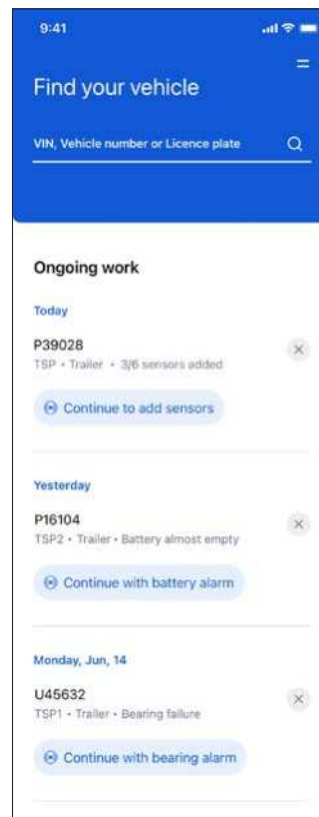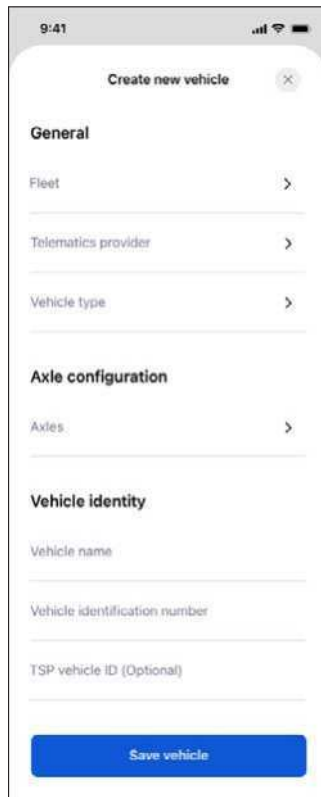
6.5 Add vehicle manually (not available for all)

Click on the Add Vehicle manually button to open the **Create new vehicle** panel. In this panel, you can enter information about the vehicle.

6.5.1 General

First enter the fleet/company, telematic provider and type of vehicle.

6.5.2 Axle configuration

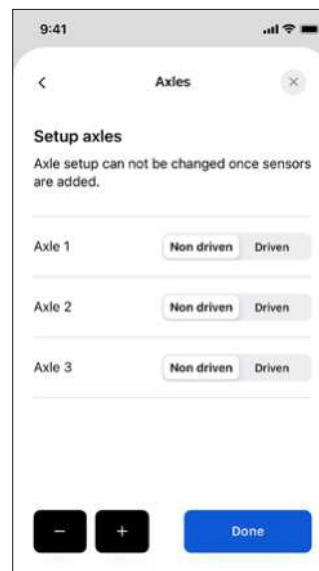Click on the Axle button in the Main panel to open the **Configure axles** panel.

Click on the plus and minus symbols to add and remove axles. You can also set the axles to Non-driven or Driven.

IMPORTANT

It is important to indicate the correct axle type: Driven/Non-Driven. The Axle type cannot be changed once the TraX sensors are added to the vehicle.

When you have finished configuring the axle, click done.

6.5.3 Vehicle identity

You are also required to enter the **Vehicle Identity**, including Vehicle name and Vehicle identification number (VIN).

6.6 Complete vehicle (available for users with TSP Integration)

In the Find vehicle you can complete a vehicle by selecting and fetching from the TSP's vehicle asset list.

To complete the vehicle you need to configure the hierarchy by doing the following:

• Choose Vehicle type.
• Add or Remove the number of axles. Limitations of the axle configuration, a user can not choose more than 10 axles. The WEM sensor handles only 10 axles.
• Choose if the axles are a Driven or Non driven axle.

6.7 Vehicle overview

When you have created a vehicle or chosen a vehicle from the search results, you come to the Vehicle overview page. In the **Vehicle overview**, you can see a representation of the vehicle with axles and wheels. You can also see the vehicle details and sensor setup.

6.7.1 Sensors

In the **Sensors** panel, you can see the axle setup and sensor placement. Here you can add a sensor by clicking on the + icons.
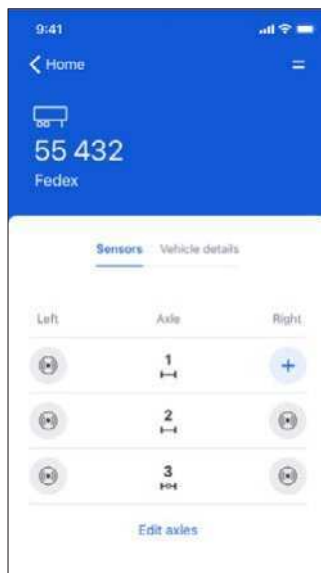
6.7.2 Vehicle details

In the **Vehicle details** panel, you can see overall information about the vehicle.

Here you can edit your vehicle data by clicking on the **Edit vehicle** button and you can delete vehicles by clicking the **Delete vehicle** (not available for all).
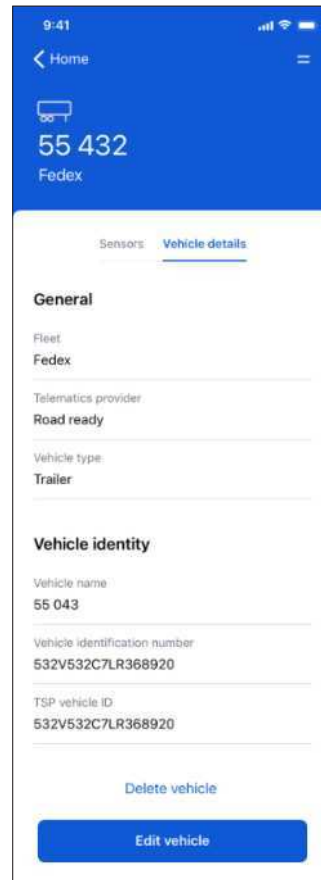
6.8 Commissioning the sensor

Click the + symbol that corresponds to the wheel on which the TraX sensor is mounted.

Follow the steps and instructions in the app to add a sensor.
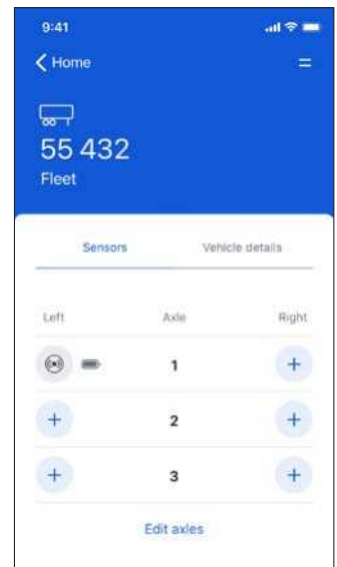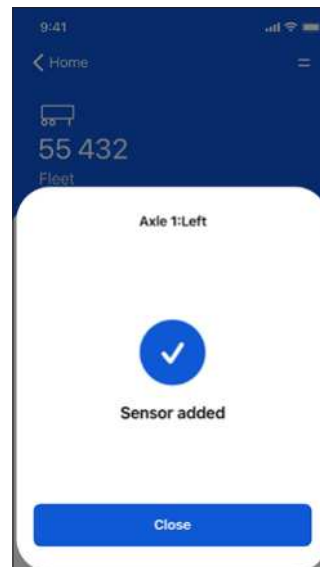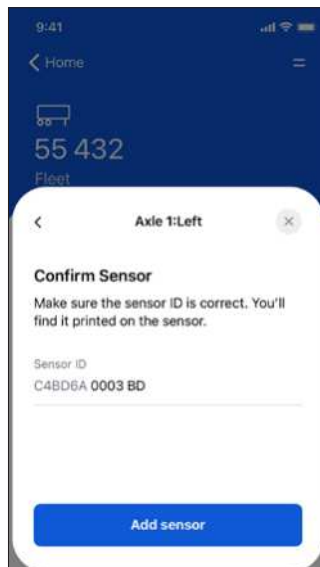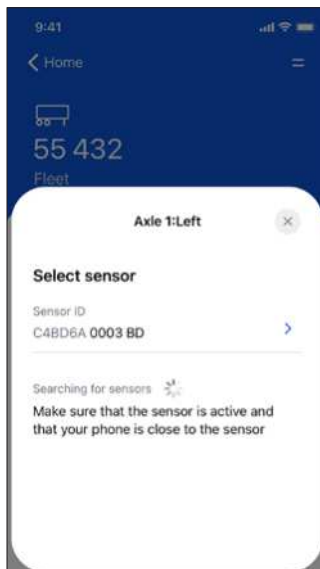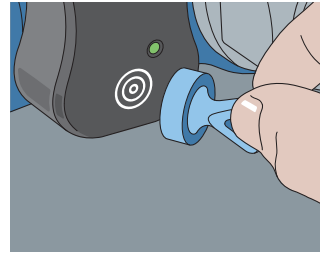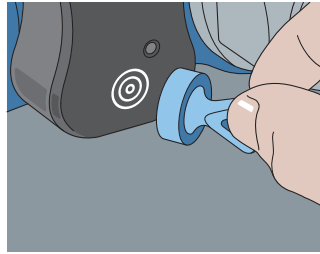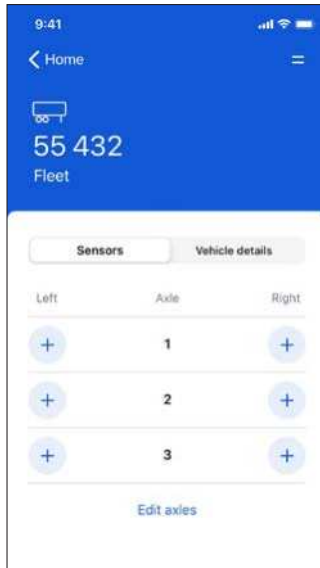
- For the commissioning instructions video, click here

6.9 Sensor information

Once activated, you can click on the sensor icon to access detailed information and carry out several actions.

The following information is available:

- Sensor ID
- Sensor position
- Axle type
- Firmware version and the possibility to update the sensor's firmware
- Status
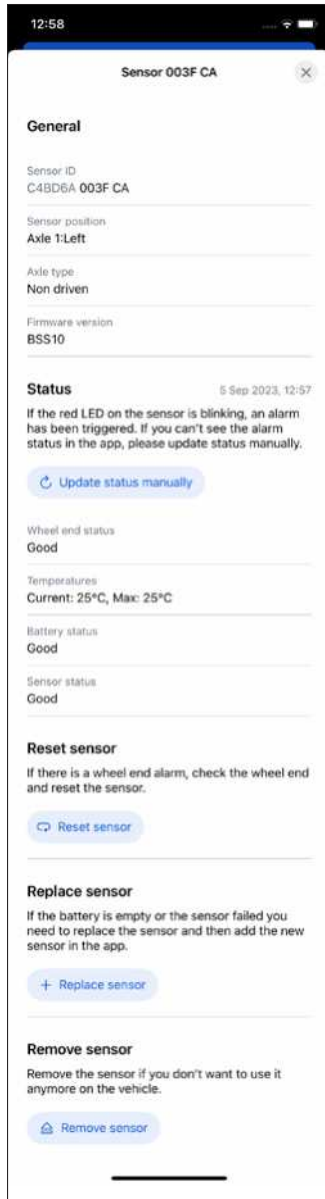
6.10 Updating the sensor firmware

Firmware updates can be made by adding or resetting a sensor or carrying out a manual update.

Follow the steps and instructions in the app to update the firmware for either alternative.

> ⚠ **WARNING**
>
> When performing a firmware update, it is crucial to adhere to all provided instructions within the application. When the application prompts you to activate the sensor, be sure to do so. This is necessary to allow the application to successfully finalize the firmware update and configuration process.

6.10.1 Updating the firmware automatically

The Mobile App will inform you when a firmware update is available. In the Update sensor firmwear panel, click the Update firmwear button and keep your mobile device close to the sensor while the update is carried out.
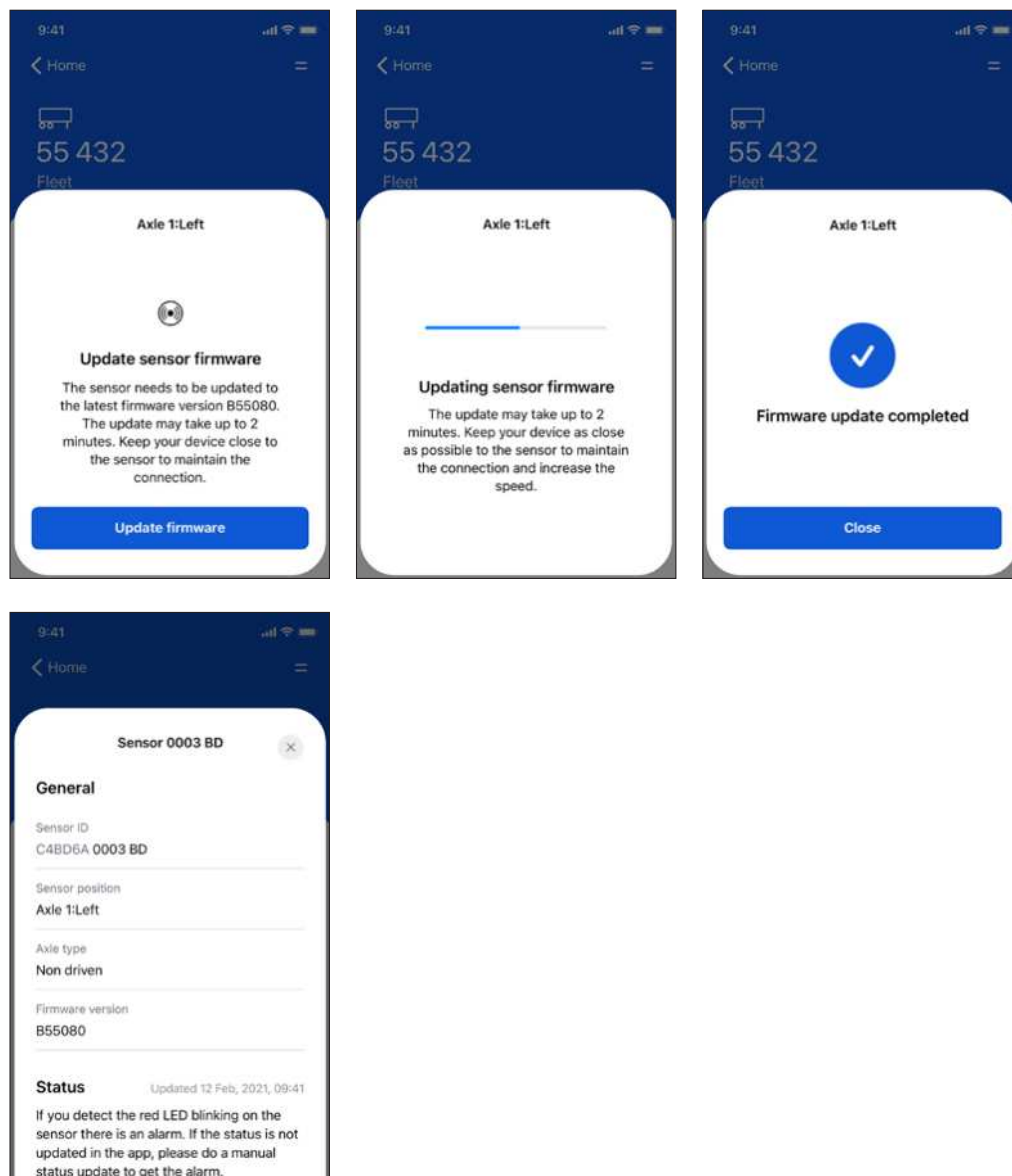
6.10.2 Updating the firmware manually

When you open the information panel for a sensor, you may see an Update to (firmware version) button. Clicking this button and following the instructions will update the firmware for the sensor.
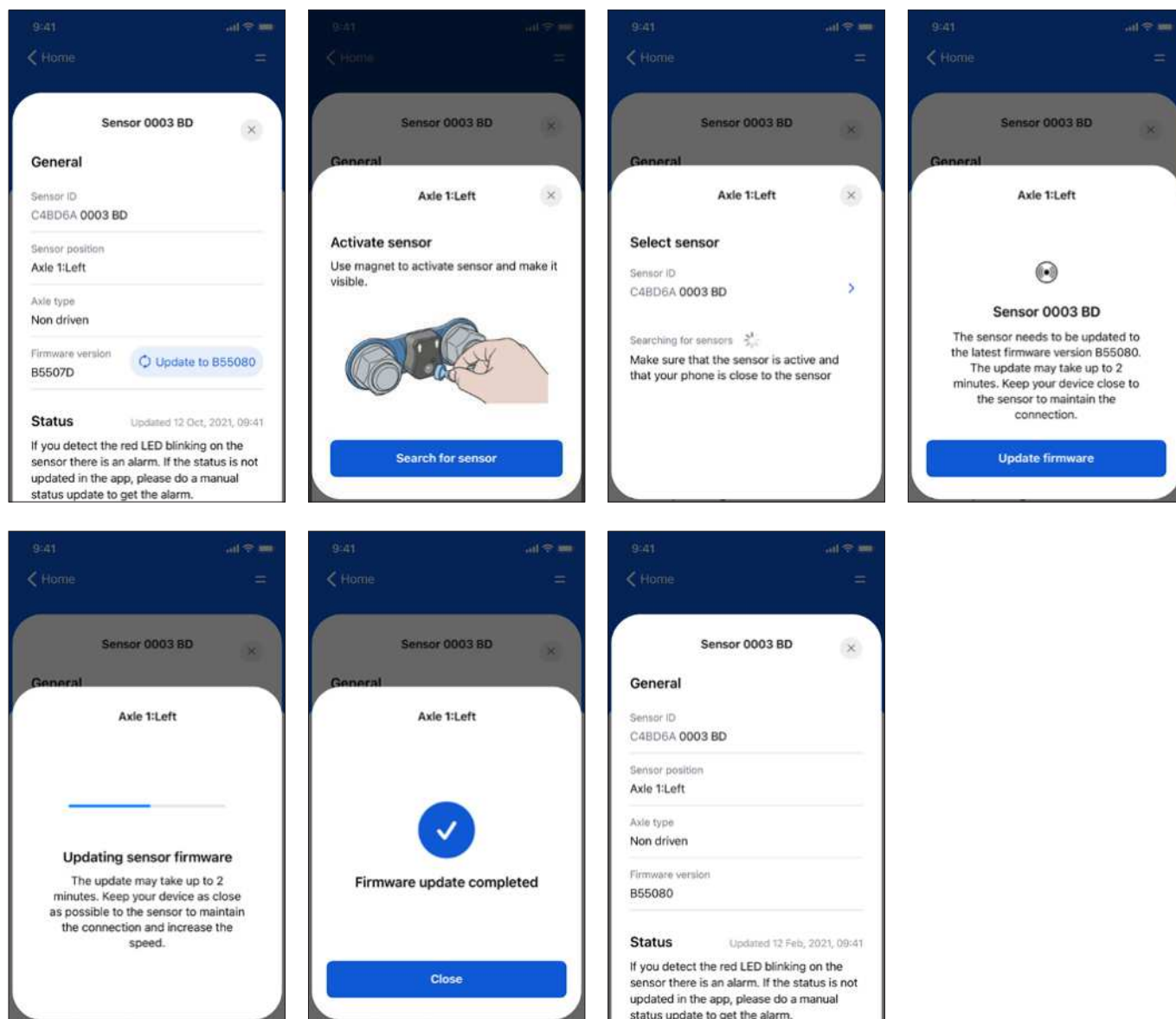
6.11 Sensor status

If the red LED on the sensor is blinking, it indicates a warning. If you wish to check the latest status or if the status is not updated in the app, you can manually update the sensor's status by clicking on the "Update status manually" button. Simply follow the steps and instructions provided in the app to obtain the sensor's current status.
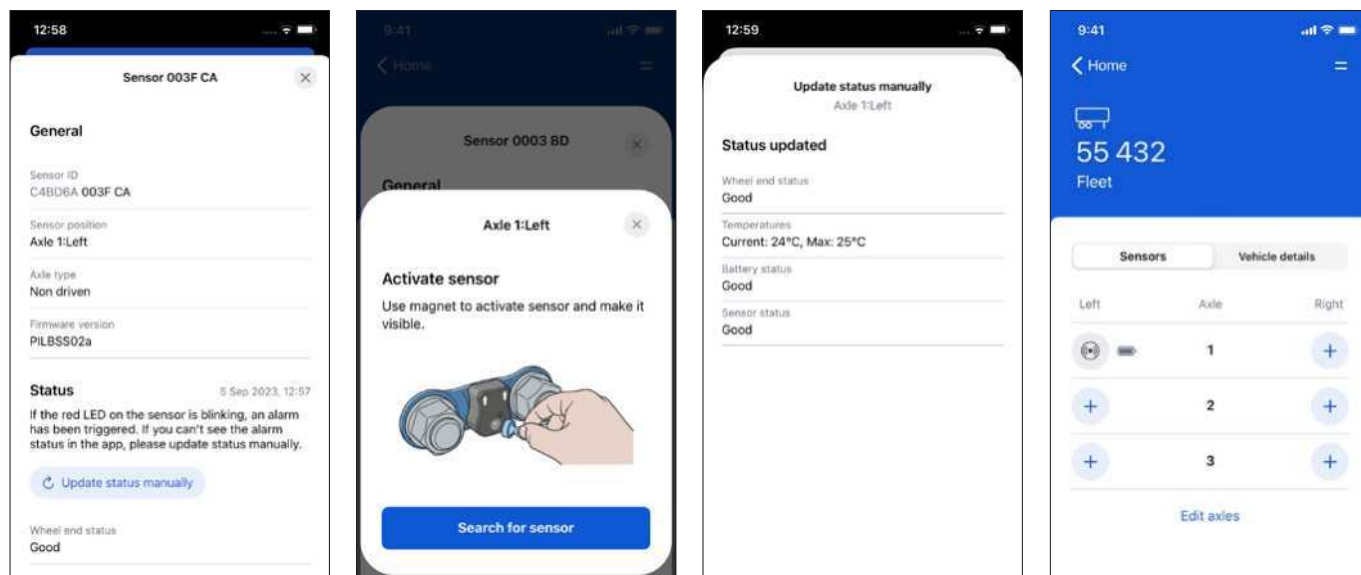
6.12 Resetting the sensor

To reset a sensor, click on the corresponding sensor icon in the Mobile App's Sensor panel. Put the magnet on the target area on the sensor to activate the sensor and make it visible. When the light on the sensor turns green, remove the magnet. Then follow the instructions in the Mobile App.
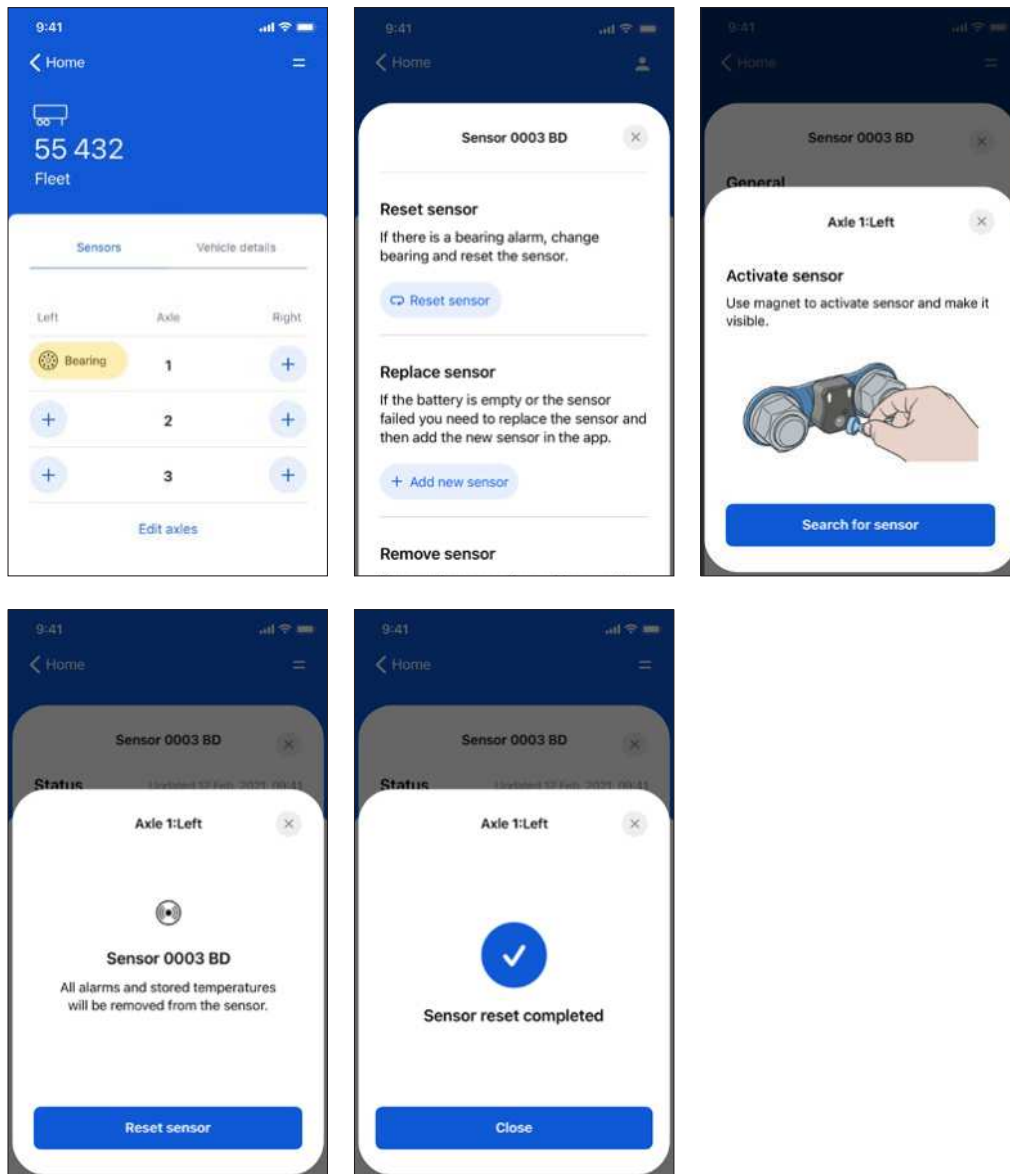
6.13 Replacing the sensor

The sensor must be replaced if it has failed or its battery has run out of power. Click on the sensor icon to receive information and instructions on how to do this. Once a new sensor has been mounted, click the Add new sensor button and follow the instructions in the Mobile App.
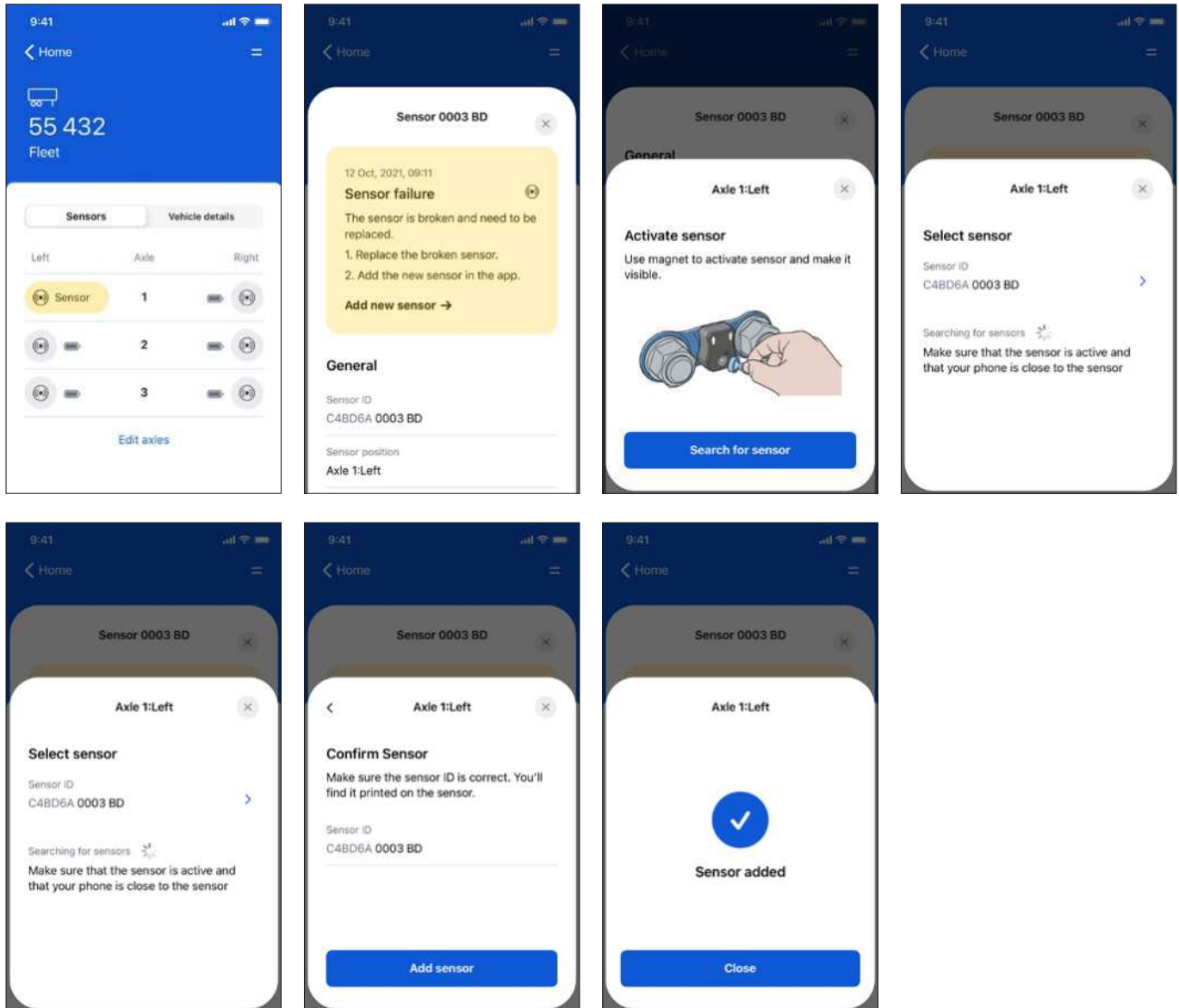
6.14 Decommissioning the sensor

Click on the sensor icon in the Mobile App's Sensor panel, then click Remove sensor and follow the instructions.
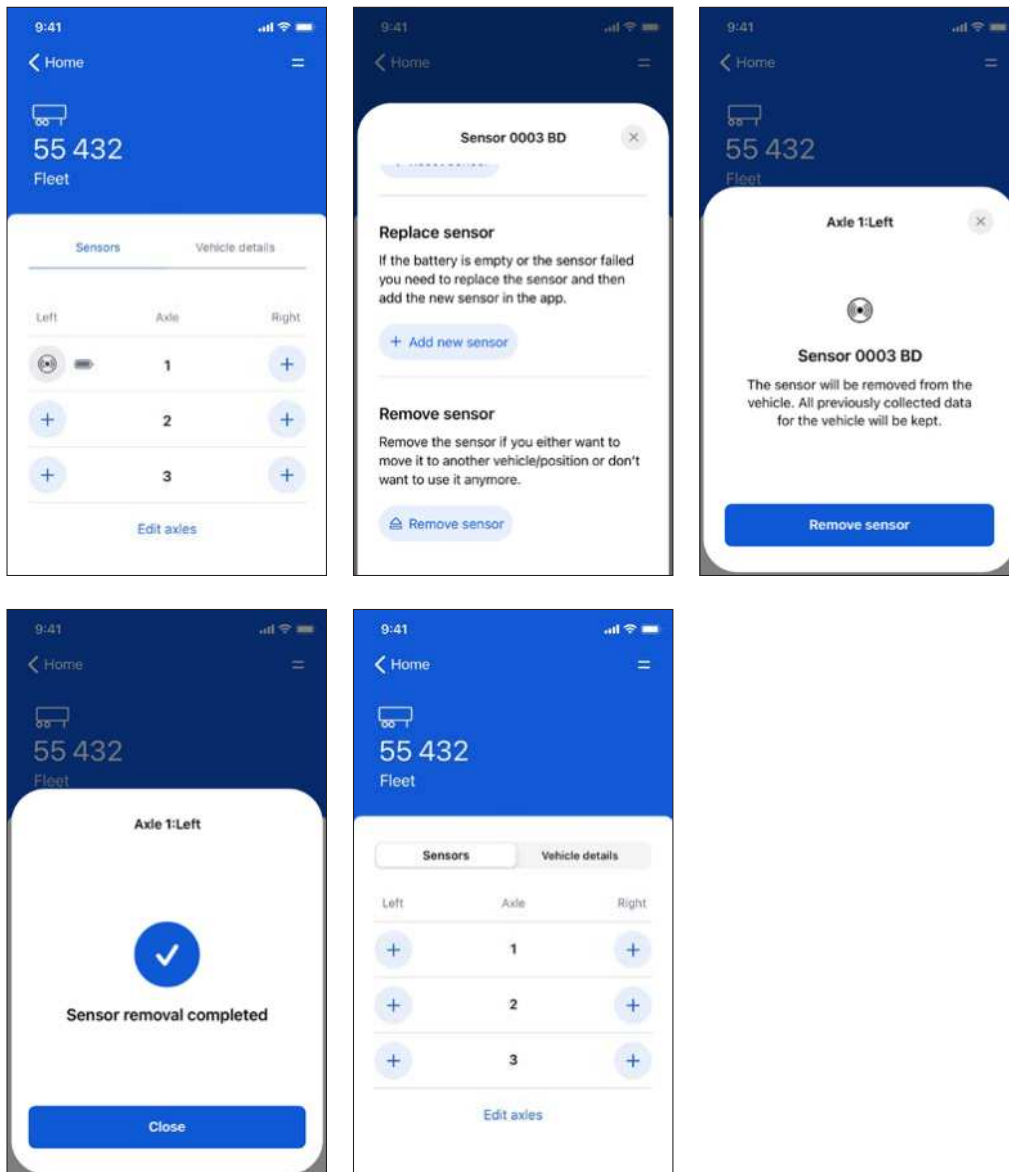
- For the decommissioning instructions video, click here

7 Wheel End failure

If the TraX sensor has detected a bearing failure,
follow the instructions below:

1 Check the complete wheel end, a damaged part other than the bearing (e.g. tire) could have caused a high vibration level that would lead to an alarm. Issues other than bearing failure, such as tire hernias, flat tires, flat on tire due to heavy breaking, rime sides, and detached rims may also trigger the sensor's alarm.
2 If necessary, remove the sensor from the wheel
3 Replace either the bearing or the other damaged components
4 Remount the sensor
5 Reset the sensor in the Mobile App, see section 6.12

If possible, return damaged bearings to SKF.

8 Reliability on bearing failure detection

The product has been validated[1] to detect large spalling bearing damages on outer and inner raceways in the following configurations:

Sensor Ref	Axle type	Bearing Type	Bearing Reference Inner	Outer	SKF Set reference Inner	Outer
WEM-200/32	Non driven	THU2	BTF-0110B	BTF-0110B	VKBA5377	VKBA5377
WEM-200/32	Drive	sTRB standard hub	542-100	542-100	VKBA5423	VKBA5423
WEM-200/US	FF Steer non driven	PreSet	HM212011 HM212049	3720 3782	Set427	Set428
WEM-200/US	FF Steer non driven	sTRB standard hub	HM212011 HM212049	3720 3782	Set413	Set406
WEM-200/US	TN-TQ Tapered trailer non driven	sTRB standard hub	HM218210 HM218248	HM212011 HM212049	Set414	Set413
WEM-200/US	TP Parallel trailer non driven	sTRB standard hub	HM518410 HM518445	HM518410 HM518445	Set415	Set415

High vibration in wheel ends could be caused by many things: bearing damages, brake problems, tire problems and ambient conditions. SKF shall not be liable where a vibration alarm is triggered but no damage is observed on the wheel end, nor for cases where no vibration alarm is triggered or it is triggered late, even if damage has been encountered.

The product can be used to detect other types of defects on the wheel end and on other types of axles. In that case, a pilot test session of three months is recommended to validate the sensor with the new configuration.

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[1] Validation has been performed on a reduced number of tests. TraX sensors should only be mounted with agreed data sharing between Telematics and SKF and with a specific customer agreement.

9 Pilot test session

The product has been tested during specific pilot test sessions on the following bearing designations.

<div align="right">Table 4</div>

Sensor Ref	Axle type	Bearing Type	Bearing Reference Inner	Outer	SKF Set reference Inner	Outer
WEM-200/USPP	Trailer non driven	THU1	BTH-0500	BTH-0500	VKBA5460	VKBA5460
WEM-200/USPP	TN Tapered trailer non-driven (Hendrickson)	PreSet			Set431	Set427
WEM-200/USPP	FL Steer (Meritor)	PreSet			Set440	Set495
WEM-200/USPP	BPW	sTRB - Metric	33118	33213	33118	33213
WEM-200/USPP	Meritor Twin FF Steer	sTRB standard hub	HM212011 HM212049	3720 3782	Set413	Set406

10 Reliability on temperature measurement

From BSS10 firmware release, the temperature measurement is checked against a predefined temperature threshold. If this temperature is above the threshold for the defined period, an alarm is triggered.

Table 5

Parameter	Value	Unit	Comment
Temperature threshold	95	°C	
	203	°F	
Time period above the threshold	30	min	

During temperature alarm mode, the product is still in normal operation mode and continues to detect wheel end damage.

High temperature in wheel ends could be caused by many things: bearing damages, brake problems, braking for long periods, tire problems and ambient conditions. SKF shall not be liable if a temperature alarm is triggered but no damage is observed on the wheel end, nor if no or late temperature alarm is triggered even where damage has been encountered.

11 TraX sensor failure

If the sensor fails, a replacement is required.

Replace the sensor by following the instructions below:

1 Order a new sensor
2 Remove the failed sensor
3 Follow the instructions in Section 4 to mount the replacement sensor
4 Follow the instructions in Section 6.13 to activate the replacement sensor

Non exhaustive sensor failure list:

• Battery power is low or extremely low[2]
• The sensor is not transmitting data
• The LED doesn't light when activated by the magnet
• The metal baseplate is broken

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[2] The estimated battery life is five years, although this depends on the application. A low battery warning indicates that the sensor should continue to function for three more months. An extreme low battery warning indicates that the sensor should continue to function for one more month.

12 Precautions and maintenance

The TraX sensor is maintenance-free, non-repairable and should not be opened. Firmware updates are available OTA (Over The Air), see Section 6.10.

The sensor should be replaced in the event of an internal sensor failure or if the battery has reached the end of its life.

> ⚠ **CAUTION**
>
> When sensors are no longer working, they should be returned to SKF. If this is not possible, they should be disposed of in accordance with applicable local laws and regulations.

No significant performance degradation is expected before the internal battery has reached the end of its life. It is advisable to monitor the estimated remaining battery life, investigate any seemingly anomalous readings or status errors and, when necessary, replace the sensor.

13 General information

Warranty

This product has a one year warranty against manufacturing defects. Warranty after the initial one year period must be part of a service agreement.

FCC Compliance Statement (for US only)

(§15.19 Labelling requirements)
This device (TraX hardware) complies with part 15 of the FCC Rules.

Operation is subject to the following conditions:

1 This device must not cause harmful interference
2 This device may receive radio interference that affects its ability to function properly.

(§ 15.21 Information to the User)
« Changes or modifications not expressly approved by the party responsible for
compliance could void the user's authority to operate the equipment ».

(§ 15.105 statement)
«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 a reasonable protection against harmful interference in an industrial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and uses in accordance with the instructions, may cause harmful interference to radio communications ».

RoHS compliant